APPENDIX I-1
2006 SETTLEMENT AGREEMENT

<u>SETTLEMENT AGREEMENT</u>

This Settlement Agreement (Agreement) is entered into between the Great Basin Unified Air Pollution Control District (District) and the City of Los Angeles by and through its Department of Water and Power (collectively "City") (the City and District to be referred to as the "Parties") to resolve the City's challenge to the District's Supplemental Control Requirement (SCR) determination for the Owens Lake bed issued on December 21, 2005, and modified on April 4, 2006.

RECITALS

WHEREAS:

A. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancha.

B. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts.

C. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter (PM_{10}).

D. PM_{10} is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq*., as amended (CAA).

E. Under the National Ambient Air Quality Standard (NAAQS) adopted pursuant to the CAA, PM_{10} levels may not exceed an average concentration of 150 micrograms per cubic meter ($\mu g/m^3$) during a 24-hour period more than one time per calendar year averaged over three years.

F. The District has regulatory authority over air quality issues in the region where Owens Lake is situated.

G. Under Health and Safety Code Section 42316, enacted by the California Legislature in 1983, the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS for PM_{10}.

H. In 1987, the United States Environmental Protection Agency (EPA) identified the Owens Valley Planning Area (OVPA), which encompasses

Owens Lake, as an area not meeting the NAAQS for PM_{10}. In 1993, the OVPA was reclassified as a serious non-attainment area under the CAA.

I. In 1997, the District adopted the Owens Valley PM_{10} Demonstration of Attainment State Implementation Plan as required by the CAA (1997 SIP). In 1998, the District and the City agreed that the City would construct control measures on 16.5 square miles of the Owens Lake bed by the end of 2003 as part of a SIP revision in 1998.

J. In 2003, through District Board Order 03111-01 (Order), the District required the City to construct dust control measures (DCMs) on an additional 13.3 square miles of the Owens Lake bed by the end of 2006, for a total of 29.8 square miles of dust control measures, as part of a Revised SIP (2003 SIP). The Order and 2003 SIP also established a process whereby the Air Pollution Control Officer of the District (APCO) must evaluate on at least an annual basis the potential need for additional DCMs and "watch areas" at Owens Lake bed in order to attain the NAAQS. The process involves a determination by the APCO and an opportunity for the City to present an alternative analysis.

K. On December 21, 2005, the APCO issued the 2004/2005 SCR determination finding that the City would be required to implement DCMs on an additional 9.31 square miles of Owens Lake bed and identifying 0.66 square miles as "watch area."

L. On January 20, 2006, the City appealed the 2004/2005 SCR determination to the California Air Resources Board (CARB). The District disagreed that the determination was subject to such an appeal.

M. On February 22, 2006, the City submitted an Alternative Analysis contesting aspects of the 2004/2005 SCR determination.

N. On April 4, 2006, the APCO modified the SCR determination issued on December 21, 2005 to reduce the supplemental DCM area to 8.66 square miles and increased the "watch area" to 0.79 square miles (Modified SCR determination).

O. On May 3, 2006, the City filed an appeal of the April 4, 2006 Modified SCR determination with the CARB. The District disagreed that the determination was subject to such an appeal.

P. On May 4, 2006, the City filed a petition for writ of mandate challenging the APCO's April 4, 2006 Modified SCR determination (*City of Los Angeles Department of Water and Power v. Great Basin Unified Air Pollution Control District*, Kern County Superior Court Case No. S-1500-

CV-258678, RJO). The Parties entered into mediation and a temporary stay of the litigation.

AGREEMENT

NOW, THEREFORE, in consideration of the provisions herein contained and to resolve the disputes over methods to address air quality at Owens Lake, including the disputes over the SCR determination issued on December 21, 2005, and modified on April 4, 2006, the City and the District hereby agree as follows:

DUST CONTROL MEASURES (DCMs)

1. The City shall apply DCMs as provided in this Agreement on additional areas of the lake bed beyond the 29.8 square miles required in the 2003 SIP.

    A. The areas on the lake bed on which DCMs will be applied are designated in this Agreement as follows:

        (i) The 12.7 square-mile area of additional DCMs shall be known as the 2006 Supplemental Dust Control Area (SDCA).

        (ii) The 29.8 square miles of DCMs required by the 2003 SIP shall be known as the 2003 Dust Control Area (DCA).

        (iii) The 0.5 square miles of natural drainage channels on the south area of the lake bed shall be known as the Channel Area.

        (iv) The combined 43.0 square miles of DCMs and Channel Area shall be known as the Total Dust Control Area (TDCA).

        (v) The SDCA, DCA, Channel Area and TDCA are delineated on the TDCA Map, attached as Exhibit 1. The SDCA and Channel Area coordinate descriptions are attached as Exhibit 2. The DCA coordinate description is contained in the 2003 SIP.

    B. Minor adjustments may be made to the boundaries of the SDCA upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the TDCA shall also be modified to reflect the modified SDCA boundaries.

    C. The City may, at its sole option, apply DCMs to additional areas outside the TDCA.

    D. The City shall begin full operation of the DCMs within the SDCA as follows:

(i) Moat and row controls shall be operational by October 1, 2009.

(ii) All other controls shall be operational by April 1, 2010.

E. Following the dates set out above in this Section, the City shall continuously operate and maintain the DCMs within the TDCA. The City shall continuously operate and maintain DCMs within the DCA as required under the 2003 SIP, except as otherwise provided in this Agreement.

2. A. The City shall construct within the SDCA a minimum of 9.2 square miles of Shallow Flood dust controls. The Shallow Flood areas are delineated on the Dust Control Measure Map, attached as Exhibit 3.

B. On the remaining 3.5 square miles of the SDCA not specifically designated for Shallow Flood on the DCM Map (Exhibit 3), the City shall

(i) construct Shallow Flood, Managed Vegetation, or gravel cover, as described in the Dust Control Measures Description, attached as Exhibit 4, and which are currently approved as Best Available Control Measures (BACM) under the 2003 SIP; or

(ii) subject to Sections 3, 7 and 8, treat up to 3.5 square miles of the SDCA with the alternative dust control measure known as "Moat and Row," as described in the DCM Description (Exhibit 4).

C. TDCA areas designated as Channel Area represent areas containing natural drainage channels having potentially significant resource issues and regulatory constraints. While these areas are not a part of the SDCA, they shall be addressed as part of the control strategy for the SDCA. However, it is acknowledged that the control strategy in this area may be subject to additional regulatory constraints, design considerations, and impacts caused by adjacent DCMs.

D. The internal control measure boundaries delineated on the DCM Map (Exhibit 3) are approximate and are subject to final written approval by the APCO. The areas designated on the DCM Map (Exhibit 3) for Shallow Flood and Moat and Row may be modified upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld.

3. All DCMs within the SDCA shall be designed, constructed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 5. The initial target MDCEs (Target MDCEs):

A. Are based on the results of air quality modeling, as described in the 2003 SIP, conducted by the City and approved by the APCO for the period July 2002 through June 2006;

B. Assume 100 percent control efficiency in the 29.8 square miles of the DCA required under the 2003 SIP, except during the fall and spring ramping periods as described in Section 26, and achievement of the target MDCEs for the areas in the SDCA. Control efficiencies during the fall and spring ramping periods shall be based on modeling that accounts for reduced wetness cover pursuant to Sections 5 and 26;

C. Have been selected to achieve PM_{10} concentrations that will not exceed the federal 24-hour PM_{10} ambient air quality standard of 150 $\mu g/m^3$ (federal standard) at all historic shoreline (elevation 3600 feet above sea level) receptors.

4. Prior to April 1, 2010, the Target MDCEs may be modified, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, if the modified MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, attached as Exhibit 6, pursuant to Section 3.

5. For the Shallow Flood areas identified in DCM Map (Exhibit 3), the percentage of each area that must be wetted shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 7, or an update of the SFCE Curve mutually agreeable to the Parties, to achieve the control efficiency levels in the MDCE Map (Exhibit 5).

6. The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:

A. From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and

B. After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and

C. The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.

7. As Moat and Row is not a currently approved BACM dust control measure under the 2003 SIP, the City will develop, in consultation with the District, and conduct Moat and Row Demonstration Projects on the lake bed. These Demonstration Projects will be conducted on two or more locations on the lake bed outside of the DCA. The proposed location of these Demonstration Project areas are shown on attached Moat and Row Demonstration Project Map (Exhibit 8). The actual locations of the projects may be changed by the City, and in such event, the City shall notify the APCO in writing of the changed locations. The City will be the California Environmental Quality Act (CEQA) lead agency for implementation of the Moat and Row Demonstration Projects.

8. Based on results of the Moat and Row Demonstration Projects described in Section 7 and subject to Sections 2 and 3, the City in its sole discretion may decide which DCMs to implement in the areas designated for Moat and Row in Section 2 and Exhibit 3 of this Agreement. The City shall consult with the District before making its decision and inform the District of its decision in writing.

A. Depending on the results of the Moat and Row Demonstration Projects, the measures implemented in these areas by the City may include Moat and Row, enhanced Moat and Row (*e.g.*, closer Moat and Row spacing, Moat and Row with some Shallow Flooding, Moat and Row with some vegetation), combined Moat and Row/Shallow Flood, MDCE-BACM, or BACM.

B. If the City implements Moat and Row, it shall design and construct Moat and Row to achieve the Target MDCEs described in Section 3. The Moat and Row configuration required to achieve these Target MDCEs will be decided solely by the City, after consultation with and written notification to the District.

C. In the event of a dispute regarding the City's proposed decision or action pursuant to Section 8.A or 8.B, either Party may initiate the Dispute Resolution Process pursuant to Section 32.

D. Upon written request of the City, the APCO shall determine in writing if Moat and Row and/or Enhanced Moat and Row constitutes BACM or MDCE-BACM, in accordance with the revisions to the 2003 SIP provided in Section 28.

DUST IDENTIFICATION (DUST ID) PROGRAM

9. The Parties mutually recognize that a method for identifying sources of potential exceedances of the federal standard at the historic shoreline could be developed that is superior to and could replace or modify the current Dust ID Program.

   A. The Parties will work cooperatively, with the participation of a mutually agreeable independent third party technical expert or experts under contract to the District and jointly managed by the Parties, in a good faith effort to develop, before April 1, 2010, an improved Dust ID Program. The APCO will implement all mutually-agreeable changes to the Dust ID Program and notify the City in writing of those changes.

   B. The District will continue to work with the City after April 1, 2010 to further improve the Dust ID Program and will implement all additional mutually agreeable changes in a written decision.

   C. In furtherance of efforts to improve the Dust ID Program:

      (i) The Parties will promptly begin a mediated process for refining the Dust ID Program and resolving disputes.

      (ii) The Parties will select a mutually agreeable expert or panel of independent third-party technical experts.

      (iii) The District, after consultation with the City, will increase the number of PM_{10} monitors at or near the historic shoreline. In all cases, the District will notify the City of the location of the monitors within 30 days of placement of the monitors. If a PM_{10} monitor is located above the historic shoreline, the District will make reasonable attempts to account for non-lake bed sources that may affect the monitor.

      (iv) The District, after consultation with the City, will modify the existing sand flux monitor network to concentrate on areas of special interest, and will, in all cases, notify the City of the modifications within 30 days of any modification.

      (v) The Parties will establish mutually agreeable model performance measures. Such measures may, but are not required to, include a minimum model performance standard.

      (vi) The District will make reasonable efforts to account for impacts of DCM construction activities.

10. The City will lead a joint effort with the District to develop methods for directly measuring PM_{10} emission rates from the lake bed. The District will incorporate mutually agreeable methods into the Dust ID Program.

11. A. If the City is in compliance with Sections 1 and 2 of this Agreement, the following shall apply to the time period before April 1, 2010.

(i) The APCO will not issue any further determinations regarding the need for SCRs that provide for additional requirements beyond those in this Agreement. However, the District will continue to use the Dust ID Program, as that program may be modified pursuant to Sections 9 and 10. The District will periodically advise the City of results in writing and may recommend actions to the City based on the model results.

(ii) Data collected before April 1, 2010 will not be used in future determinations requiring SCRs, except in those areas delineated as Study Areas on the Study Area Map attached as Exhibit 9 and described in Exhibit 2. Data collected from the Study Areas between July 1, 2006 and April 1, 2010 may only be used in SCR determinations after April 1, 2010, and may be used only in accordance with the current form of the Dust ID Program that is in effect after April 1, 2010.

(iii) The District will not issue an order requiring the City to implement any additional controls on any lake bed dust source areas in order to achieve the state PM_{10} standard of 50 micrograms per cubic meter unless compelled to issue such an order by state law.

B. The District shall determine compliance with the state PM_{10} standard based on concentrations only in the surrounding communities, unless otherwise compelled by state law.

12. The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

A. The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.

B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

SHALLOW FLOOD BACM REFINEMENT

13. The City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the DCA (Shallow Flood Cover Test).

A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.

B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.

C. The City will be CEQA lead agency for the Shallow Flood Cover Test.

14. If the APCO reasonably determines in writing that DCMs in the TDCA have been operational for one full year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section 14.C, provided that:

A. Application of the 10 percent reduction in wetness cover during the Fall and Spring Shallow Flood DCM Compliance periods set out in Sections 25 and 26 shall result in the lower of:

(i) The areal cover resulting from a 10 percent reduction; or

(ii) The areal cover required in Section 26.A.

B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

(i) the results of testing carried out pursuant to Section 13, if conducted; and

(ii) the results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Section 26.

C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.

D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in Section 18 and subject to the provisions of Section 16.

E. Except as provided in Section 16, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.

15. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section 14, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM_{10} concentrations at the historic shoreline.

16. Any areas for which wetness cover has been reduced pursuant to Section 14 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan requirements pursuant to Sections 18 and 22 below.

A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section 14 provided that:

(i) The maximum 24-hour PM_{10} shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 $\mu g/m^3$; and

(ii) The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time

period set forth in Section 16.A.(i) plus the background of 20 $\mu g/m^3$ do not exceed 120 $\mu g/m^3$ at the historic shoreline.

B. If the monitored values at the historic shoreline exceed 130 $\mu g/m^3$, and it is determined that non-lake bed sources are contributing greater than 20 $\mu g/m^3$, then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.

C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:

(i) A map that depicts the eligible Shallow Flood areas;

(ii) The proposed amount of wetness cover for each eligible Shallow Flood area; and

(iii) The method for determining effectiveness of the proposed wetness cover.

D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

<u>ACTIONS TO ADDRESS STANDARD VIOLATIONS</u>

17. After May 1, 2010, the APCO will recommence written SCR determinations under the revisions to the 2003 SIP as provided in Section 28. Recommenced determinations will use Dust ID data collected only after April 1, 2010, except as provided in Section 11.A.(ii) for Study Areas, and shall be made at least once in every calendar year.

18. If, pursuant to Section 17, the APCO determines that a monitored or modeled exceedance of the federal standard caused by emissions from the lake bed has occurred at or above the historic shoreline:

A. The APCO, based on all available information, including visual observation, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.

B. (i) If the APCO identifies the need for additional controls, the APCO shall issue a SCR determination.

(ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an Alternative Analysis. If the City submits an Alternative Analysis, the APCO shall consider the Analysis and may withdraw, modify or confirm the SCR determination.

(iii) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Section 32. The APCO may modify the SCR determination based on the Dispute Resolution process.

(iv) In the event the Parties are unable to resolve disagreements over future SCR determinations through the Dispute Resolution Process, the City may appeal future determinations to CARB under the provisions of Health and Safety Code Section 42316 (Section 42316), provided that the Parties expressly intend that this Agreement be the final resolution regarding the existing disputes between the Parties that are the subject of this Agreement. Based on the foregoing, the City stipulates and agrees that all of the provisions and determinations, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the SCR determination dated April 4, 2006, which the City in good faith disputed, shall be deemed to be valid and reasonable, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceeding, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future SCR determination under Section 42316; however any arguments or challenges must be based on data and information that do not currently exist, but that exist after the execution of this Agreement.

C. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Section 21 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

D. The District may, as appropriate, also issue a notice of violation.

19. In the event:

A. The APCO has made a written determination pursuant to Section 18 that an exceedance of the federal standard, occurring after April 1, 2010,

resulted from a Control Area or portion of a Control Area treated with Moat and Row; and

B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Section 21 below; and

C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (*i.e.*, an exceedance occurred after the City attempted to remediate that area under Section 21);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat and Row to MDCE-BACM or BACM, to address the exceedance described in Section 19.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Section 24.

20. If the APCO determines that Moat and Row constitutes BACM or MDCE-BACM, then upon issuance of such written determination, the provisions of Section 19 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Section 20.

21. A Remedial Action Plan prepared by the City pursuant to Section 18 will contain a description of:

A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:

(i) Maintenance of facilities (*e.g.*, berms, moats and rows);

(ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);

(iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, addition of sand fences, surface wetting, armoring, vegetation, surface roughening) of Moat and Row areas;

(iv) Transition of Moat and Row areas to BACM, or MDCE-BACM.

B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.

C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

22. The Schedule of Contingency Measures attached to this Agreement as Exhibit 10 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Section 21, and the timing required for their implementation.

23. Before any full-scale Moat and Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat and Row area consistent with Section 19. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat and Row to another DCM is needed, or where such transition is required pursuant to Section 19.

24. Areas to be transitioned from Moat and Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat and Row Transition Schedule attached as Exhibit 11. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule attached as Exhibit 12.

<u>FALL AND SPRING SHALLOW FLOOD DCM COMPLIANCE</u>

25. For the time period from October 16 of each year through May 15 of the next year, the Shallow Flood Control Areas shall be considered to be in compliance with this Agreement and applicable laws and regulations, if the areal wetness cover within each Shallow Flood Control Area in the TDCA meets the MDCE required in Exhibit 6 using the SFCE Curve in Exhibit 7.

26. The provisions set forth in this section shall apply to all Shallow Flood areas with target control efficiencies of 99 percent or more, except those which the City and the District may mutually agree to exclude.

    A. Beginning on April 1, 2010, compliance of TDCA Control Areas with 99 percent control efficiency Shallow Flood requirements shall be as follows:

        (i) Beginning May 16 and through May 31 of every year, Shallow Flood may be reduced to a minimum of 70 percent areal wetness cover.

        (ii) Beginning June 1 and through June 15 of every year, Shallow Flood may be reduced to a minimum of 65 percent areal wetness cover.

        (iii) Beginning June 16 and through June 30 of every year, Shallow Flood may be reduced to a minimum of 60 percent areal wetness cover.

(iv) If for any Shallow Flood area, the percent of areal wetness cover in the periods specified in Sections 26A.(i), (ii) and (iii) is below the minimum percentages specified in those sections, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance with this Agreement and applicable laws and regulations if the City demonstrates in writing and the APCO reasonably determines in writing that maximum mainline flow was maintained in the applicable period.

B. From July 1 through September 30 of each year, the City is not required by the 2003 SIP to apply water for dust control, but is required to maintain minimum areal wetness cover as required by applicable environmental documents and approvals.

C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the federal standard at the historic shoreline as a result of excessive dry areas on Shallow Flood Control Areas during the dust control periods for each year between May 16 through June 30, and October 1 through October 15, the provisions of Sections 17 and 18 shall apply.

27. The provisions of Sections 25 and 26 are subject to the results of air quality modeling, to be conducted by the City and approved by the APCO, that demonstrates attainment of the federal standard at the historic shoreline using the reduced areal wetness covers set forth in Section 26. The modeling shall be conducted as described in the 2003 SIP using data for the period July 2002 through June 2006. The control efficiency of the areal wetness covers shall be modeled using the SFCE Curve as provided in Section 5.

REVISION OF THE STATE IMPLEMENTATION PLAN (SIP)

28. A. The APCO will propose a District Board Order that will revise the 2003 SIP to incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. The APCO will propose the Board Order and SIP revision at a time sufficient to allow the proposed revisions to be considered and adopted by the District Board by July 1, 2008. The time for consideration and adoption shall take into account, without limitation, the time for legally required environmental review and public notice and hearing. The District Board will act on the proposed SIP revisions by July 1, 2008.

B. If the District Board has the legal ability to act and fails to act by November 1, 2008 on a proposed District Board Order as described in Subsection 28.A, the City may terminate this Agreement by providing

written notice to the District, provided, however, that the City will not provide such notice prior to the conclusion of the Dispute Resolution Process pursuant to Section 32, which process may be initiated by either Party.

C. The Parties have developed this Agreement with the intention that its provisions will be incorporated into a revision of the 2003 SIP and are consistent with applicable provisions of the Health and Safety Code, including Section 42316, and applicable provisions of federal law regarding attainment of the NAAQS.

D. The APCO shall confer in good faith with the City to develop procedures to modify and authorize MDCE-BACM for incorporation into the revisions to the 2003 SIP.

E. The District will be CEQA lead agency and will prepare, in consultation with the City, and will consider for certification on or before March 1, 2008 an environmental impact report (EIR) on the proposed SIP revisions.

F. (i) In the event:

(a) the District Board adopts a District Board Order revising the 2003 SIP that does not incorporate all the terms and conditions of this Agreement, except such terms and conditions, if any that may not lawfully be included in the SIP; or

(b) the District Board adopts a District Board Order revising the 2003 SIP that incorporates all the terms and conditions of this Agreement except such terms and conditions, if any, that may not lawfully be included in the SIP, and subsequent judicial action causes the revised SIP to be materially inconsistent or materially in conflict with the terms and conditions of this Agreement,

the City may terminate this Agreement in the case of Section 28.F(i)(a), and either Party may terminate this Agreement in the case of Section 28.F(i)(b), within 30 days of such action by providing written notice to the other Party.

(ii) If the City does not elect to terminate this Agreement pursuant to Section 28.F(i) and any inconsistencies or conflicts exist between this Agreement that preclude compliance with both, the provisions of the District Board Order shall prevail.

G. The City will support and will not appeal or in any other way challenge or oppose revisions to the 2003 SIP and resulting District Board Order that incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. After issuance of the District Board Order provided for in this Section, the City shall not challenge the order under CEQA to the extent that Order is consistent with this Agreement.

H. In the event the District Board fails to certify the EIR by March 1, 2008 or to act on the proposed SIP revisions by July 1, 2008, the Parties shall meet and confer as provided in Section 33.A.

I. Any provisions of this Agreement that are incorporated into the District Board Order as provided in Section 28.A. shall, upon adoption of that Order by the District Board, cease to have any further force and effect as part of this Agreement, and shall instead be effective as part of the District Board Order.

J. Any provisions of this Agreement that are not incorporated into the District Board Order as provided in Section 28.A shall remain in full force and effect as part of this Agreement until May 1, 2012, at which time those provisions shall cease to be of any further force or effect as part of this Agreement, provided that the Parties may mutually agree in writing to extend this date.

<u>COVER MEASUREMENT TECHNIQUES AND PERFORMANCE SPECIFICATIONS</u>

29. The District and City will collaboratively develop wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications. Final acceptance of those cover measurement techniques and compliance specifications with regulatory impact will be at the sole discretion of the APCO.

<u>KEELER DUNES</u>

30. The Parties acknowledge that dust emissions from the area known as the Keeler Dunes may cause or contribute to exceedances of federal and state standards for PM_{10}. The City hereby agrees to cooperate with the District and other federal, state and local agencies and experts as necessary to develop a plan to reduce dust emissions from the Keeler Dunes.

<u>COOPERATION BETWEEN PARTIES AND DISPUTE RESOLUTION</u>

31. In carrying out the terms of this Agreement, the Parties intend to cooperate fully and to consult with each other effectively and on a regular basis. The Parties will make good faith efforts to provide each other with relevant documents and

technical information in a timely manner, and they will keep each other informed of their respective progress in actions to implement the actions set forth in this Agreement, including, without limitation, progress in entering into consultant and construction contracts and in securing permits from agencies with permitting authority.

32. Notwithstanding the Parties' commitment to cooperate in implementing the terms of this Agreement, they recognize that differences may arise between them. To address this situation, the Parties agree that, in the event either Party believes that a dispute exists regarding implementation or interpretation of any provision of this Agreement, that Party may, by informing the other Party in writing within 21 days of the decision or determination, action or proposed action triggering the dispute, initiate non-binding mediation between the Parties. A party may not seek non-binding mediation for issues that were already the subject of mediation under this Section unless both Parties agree in writing.

A. The mediator shall be a mediator mutually acceptable to the Parties. The Parties may also by mutual agreement include in the mediation, one or more of the technical experts selected pursuant to Section 9.C.(ii), or any other technical experts, such experts to be under contract to the District and jointly managed by the Parties. The City shall be responsible for the cost of the mediator and the technical experts pursuant to Health and Safety Code Section 42316. The mediation will be conducted and completed within 60 days of the notice initiating the Dispute Resolution Process unless that time period is extended by mutual agreement of the Parties. The mediation will be conducted under all applicable California laws regarding mediation, including but not limited to Cal. Evidence Code Sections 1115-1128.

B. Neither Party will commence any litigation concerning the implementation of terms of this Agreement unless that Party has first initiated the mediation described in this Section, and the sooner of the following two events takes place:

(i) Sixty (60) days has expired from the date that Party first sent written notice to commence the mediation; or

(ii) Both Parties agree, or the mediator(s) states, in writing that the mediation has been completed.

(iii) Notwithstanding the provisions of this Section 32.B, a Party may commence litigation at an earlier time if necessary to pursue a claim or cause of action that would otherwise be time barred under an applicable statute of limitations.

C. If the Dispute Resolution Process pursuant to this Section 32 is initiated to address a dispute regarding a SCR determination issued by the APCO pursuant to Section 18.B, then that SCR determination shall not be deemed final until the conclusion of this process under Section 32.B.

D. Nothing in this section is intended to or shall be construed to restrict or eliminate a Party's right to utilize available legal remedies following completion of the mediation process.

<u>EXTENSIONS OF TIME</u>

33. A. In the event that the District

(i) Anticipates that it will fail to certify or fails to certify an environmental impact report on the proposed SIP revisions and related actions by March 1, 2008; or

(ii) Anticipates that it will fail to act on or fails to act on a proposed District Board Order pursuant to Section 28.A by July 1, 2008,

the District shall promptly notify the City, and Parties shall meet and confer to determine what if any revisions to other dates contained in this Agreement may be appropriate. The Parties may mutually agree to the participation of a mediator in the meet and confer process.

B. In the event the City

(i) Anticipates that it will be unable to complete implementation or fails to complete implementation of moat and row controls pursuant to this Agreement by October 1, 2009; or

(ii) Anticipates that it will be unable to complete implementation or fails to complete implementation of all other controls by April 1, 2010,

the City may seek relief for such failure or delay by obtaining a variance from the Hearing Board of the Great Basin Unified Air Pollution Control District pursuant to District Regulation VI and all applicable law for variance relief from a District Order, including but not limited to Health and Safety Code Section 42350 *et seq*. In such event, the District shall, at the request of the City, meet with the City, prior to or after the filing of a request for a variance, in order to ascertain whether the District will support the City's variance request. In the event the District will not support the City's variance request, the City may invoke the Dispute Resolution Process pursuant to Section 32.

C. Nothing in this Section is intended to or shall limit the ability of the City to seek a variance from requirements not included in this Section.

D. Each Party will undertake to inform the other Party as early as practicable of the fact that it anticipates that it will not meet or has failed to meet any of the dates set out in this Section.

34. In the event either Party claims that the other Party is in material breach of the terms of this Agreement, including without limitation, a claim by the District that the City is in material breach under Section 11, the Party claiming the breach shall provide written notice of the claimed breach to the other Party. In the event the Party claimed to be in breach contests such claim, the issue shall be subject to the Dispute Resolution Process in Section 32.

LAWSUIT/APPEAL SETTLEMENT CONDITIONS

35. Within 15 days of execution of this Agreement, the APCO shall issue a revised SCR determination that incorporates the terms of this Agreement and that supersedes all previous determinations.

36. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall immediately commence the process for implementing additional DCMs on the Owens Lake bed consistent with the terms of this Agreement.

37. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall within seven days dismiss with prejudice its CARB appeals and the litigation against the District as described in the Recitals at Paragraphs L, O. and P.

DEFINITIONS

38. Definitions of terms used in this Agreement are contained herein and in Exhibit 13. Where specifically identified in Exhibit 13, these terms as used in this Agreement and Exhibits shall have the meanings provided in this Exhibit 13. Where no definition is provided herein or in Exhibit 13, the words and terms shall have their meaning as provided in the federal Clean Air Act or state air pollution law in the Health and Safety Code, and where no definition is found there, shall have their ordinary meaning as read in the context of this Agreement and consistent with the expressed intent of the Parties.

NOTICES

39. Whenever, under the terms of this Agreement, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be sent by overnight mail and directed to the individual at the address

specified below, unless that individual or his or her successor gives notice of a change to the other Party in writing.

As to the City:

Ronald F. Deaton
General Manager
Los Angeles Department of Water and Power
111 North Hope Street, Room 1550
Los Angeles, CA 90012

As to the District:

Theodore D. Schade
Air Pollution Control Officer
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514

ADDITIONAL PROVISIONS

40. By this Agreement, the City and the District intend to settle their disputes regarding methods to address air quality issues at Owens Lake, including disagreements over the SCR determination issued on December 21, 2005, and the Modified SCR determination issued on April 4, 2006.

41. This Agreement is the final integrated agreement between the Parties regarding the matters addressed herein, and may not be modified except in a writing signed by both Parties.

42. This Agreement shall be construed in accordance with the laws of the State of California.

43. In the event any provision of this Agreement is judicially determined to be unenforceable, the Parties shall meet and confer and following such meeting, the Parties may amend the Agreement, or continue the Agreement without amendment, or either Party may terminate the Agreement.

44. This Agreement shall not create any rights in any third party.

45. No failure by a Party to insist on strict performance of any term or condition of this Agreement shall constitute a waiver of such term or condition or a breach hereof.

46. Each Party represents that their respective signatories below have the authority to bind them to the terms of this Agreement.

REVIEWED AND AGREED TO:

Dated: November 30, 2006

Ronald F. Deaton
General Manager, Los Angeles Department of Water and Power

The City of Los Angeles
By and Through the
Los Angeles Department of Water and Power

Dated: December 4, 2006

Henry "Skip" Veatch
Board Chairman

Great Basin Unified Air Pollution Control District

APPROVED AS TO FORM AND LEGALITY
ROCKARD J. DELGADILLO, CITY ATTORNEY

NOV 30 2006

BY
JULIE A. CONBOY
Deputy City Attorney

List of Exhibits

EXHIBIT 1 -- TOTAL DUST CONTROL AREA MAP

The Total Dust Control Area (TDCA) is comprised of the 2006 Supplemental Dust Control Area (SDCA) and the 2003 Dust Control Area (DCA).

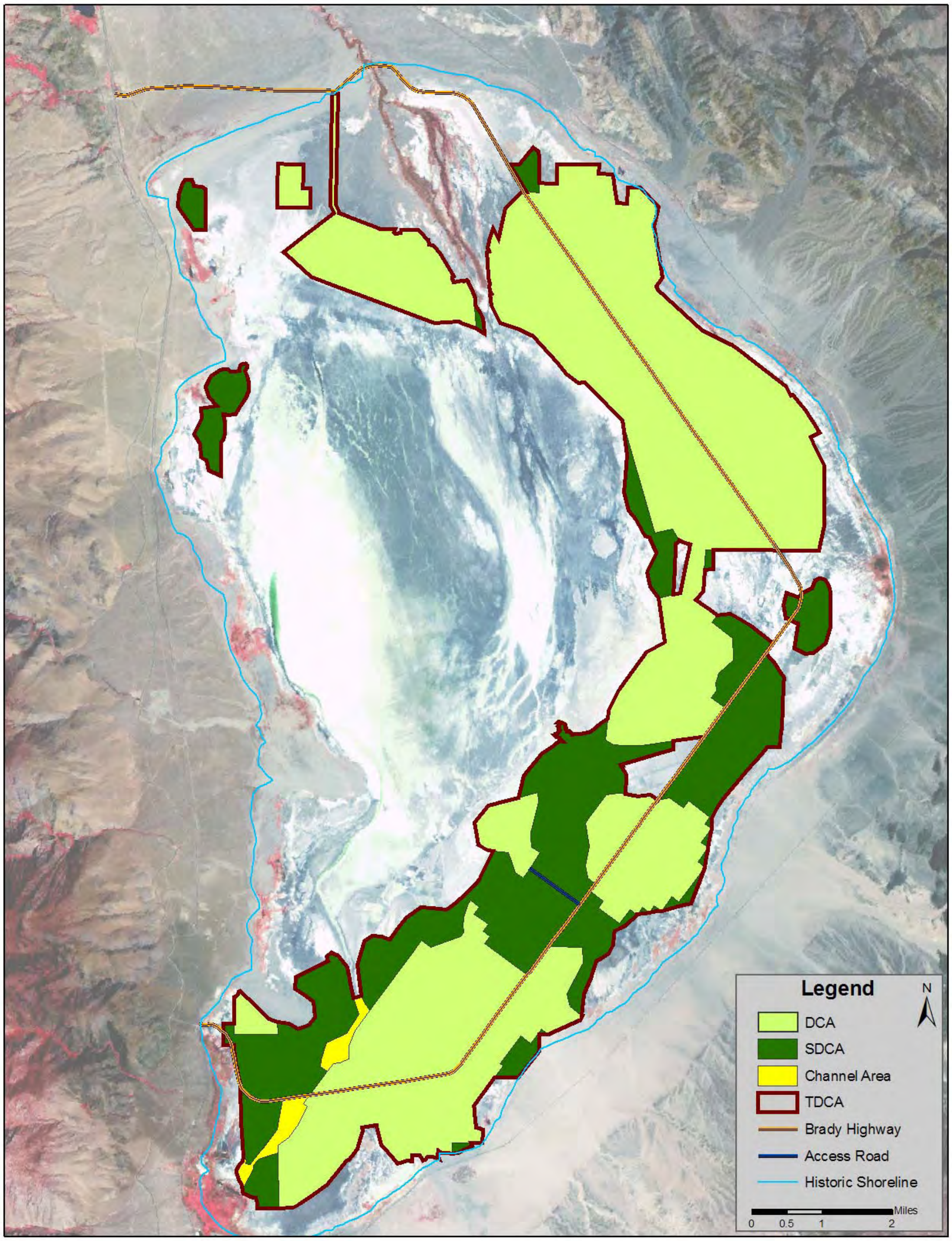

EXHIBIT 2 -- 2006 SUPPLEMENTAL DUST CONTROL AREA COORDINATE DESCRIPTIONS

KEY MAP

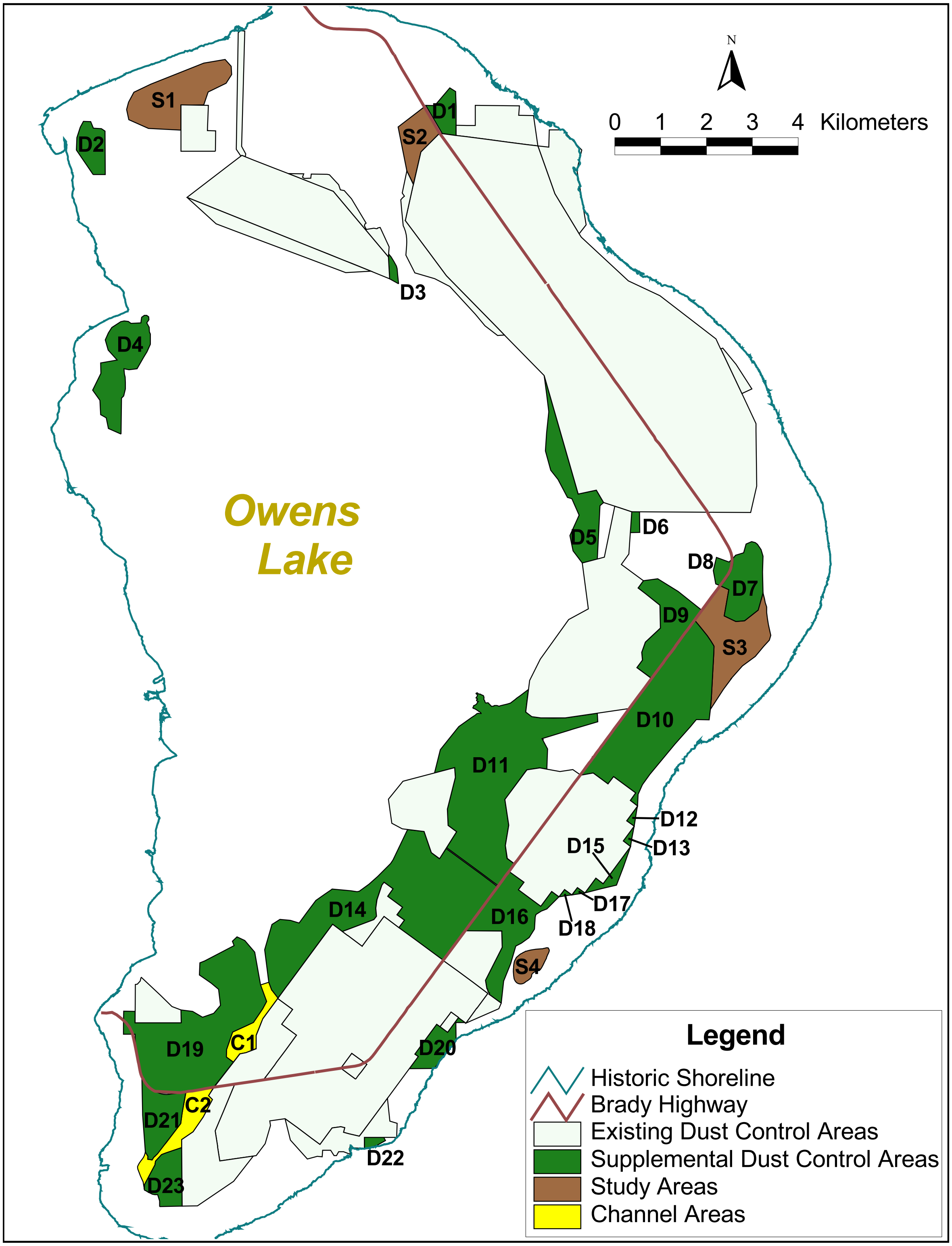

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D1	0.16	SDCA	416,001.0310	4,042,347.3789
			415,701.7500	4,042,385.7617
			415,343.2810	4,042,999.8633
			415,539.4060	4,042,999.0234
			415,866.3750	4,043,383.8359
			415,994.4060	4,043,304.2109
			416,002.6250	4,042,981.9922
			416,005.6250	4,042,568.5234
			416,001.0310	4,042,347.3789
D2	0.21	SDCA	408,085.5000	4,041,493.3164
			407,718.8130	4,042,027.7422
			407,731.5000	4,042,299.3945
			407,804.9060	4,042,524.2148
			407,873.2810	4,042,654.1211
			408,032.2500	4,042,647.6875
			408,089.5630	4,042,502.0625
			408,267.6560	4,042,491.4219
			408,347.0630	4,042,440.3203
			408,348.9690	4,041,492.4844
			408,085.5000	4,041,493.3164
D3	0.03	SDCA	414,747.2500	4,039,108.7500
			414,550.5000	4,039,224.6641
			414,528.0310	4,039,697.5156
			414,532.5000	4,039,759.7891
			414,583.3750	4,039,699.2617
			414,643.3130	4,039,605.6250
			414,700.5000	4,039,498.9766
			414,718.6880	4,039,441.7188
			414,729.1250	4,039,314.2500
			414,747.2500	4,039,108.7500
D4	0.59	SDCA	408,694.5000	4,035,836.9883
			408,417.2190	4,035,957.7344
			408,370.5940	4,036,191.9453
			408,249.5940	4,036,258.3164
			408,231.6880	4,036,571.0625
			408,075.5000	4,036,791.1719
			408,254.4060	4,037,157.2813
			408,249.9060	4,037,387.3789
			408,606.5630	4,037,448.5391
			408,414.0000	4,037,664.3359
			408,348.8750	4,037,888.7227
			408,415.9060	4,038,042.2422
			408,494.0000	4,038,156.0977
			408,687.9380	4,038,284.6484
			408,762.7190	4,038,303.7813
			408,853.0940	4,038,290.2422
			408,911.3130	4,038,246.2109
			409,028.9380	4,038,251.5742
			409,126.1560	4,038,258.7344
			409,134.0630	4,038,309.6602
			409,144.5940	4,038,382.5547
			409,201.0630	4,038,424.0508
			409,255.5940	4,038,422.9180
			409,299.1250	4,038,391.3789
			409,304.7190	4,038,329.9609
			409,254.9380	4,038,259.1797
			409,308.0940	4,038,163.0195
			409,312.7190	4,038,061.7695
			409,335.7190	4,038,017.0195
			409,334.3750	4,037,792.3008
			409,260.5630	4,037,628.4492
			409,184.9060	4,037,508.1055
			409,044.0630	4,037,256.8359
			408,869.9060	4,037,236.6055
			408,755.8130	4,037,260.8867
			408,768.2810	4,037,143.0156
			408,784.9690	4,037,079.6914
			408,789.7190	4,036,817.3555
			408,751.4060	4,036,667.7344
			408,706.5940	4,036,616.2422
			408,694.5000	4,035,836.9883

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D5	0.57	SDCA	418754.0310	4033026.5000
			418552.9690	4033287.6914
			418484.0000	4033621.1133
			418689.0940	4034066.4102
			418529.0310	4034424.5078
			418434.8130	4034452.0664
			418325.1880	4034653.5234
			418224.7810	4034845.3438
			418067.7500	4035047.7852
			417953.1880	4035467.4961
			417980.5000	4035865.3203
			418027.9060	4036319.6094
			417924.4060	4037110.5117
			418666.3750	4034527.9844
			419065.6880	4034610.9648
			419223.4690	4034342.1406
			419141.3750	4034271.8047
			419084.1880	4033110.8086
			418754.0310	4033026.5000
D6	0.03	SDCA	419801.2810	4033687.7539
			419831.7500	4034141.1016
			420006.8130	4034139.3281
			420012.7190	4033690.4844
			419801.2810	4033687.7539
D7	0.43	SDCA	422105.2500	4031749.0176
			421854.9690	4031871.4102
			421952.1880	4032442.4199
			421827.1560	4032498.3555
			421778.4380	4032522.0762
			421882.0310	4032660.6934
			421931.3130	4032728.7031
			421954.3130	4032765.7129
			421966.3130	4032785.8828
			421992.7810	4032841.0703
			422013.5310	4032894.8164
			422030.0630	4032956.1914
			422039.5000	4033014.7422
			422042.1560	4033068.7461
			422042.4380	4033082.8008
			422040.7810	4033127.2188
			422103.3750	4033191.3320
			422274.9380	4033248.8359
			422331.4380	4033437.2383
			422451.9060	4033492.2617
			422530.2190	4033470.0195
			422579.0940	4033430.6797
			422659.7190	4033313.9453
			422698.6880	4033173.2383
			422688.0630	4032830.0469
			422701.7500	4032367.5195
			422592.2190	4031994.7988
			422299.6560	4031762.5020
			422105.2500	4031749.0176
D8	0.06	SDCA	421758.4690	4032529.3477
			421668.6250	4032569.9238
			421615.5310	4032859.4297
			421680.6250	4033146.5156
			421959.5000	4033044.5586
			422021.5000	4033108.1875
			422022.5630	4033079.4023
			422019.3130	4033018.7031
			422010.1880	4032960.1484
			421994.8130	4032902.9766
			421977.7500	4032858.2227
			421948.4060	4032795.7422
			421918.7190	4032746.2988
			421884.3440	4032697.7148
			421806.2810	4032593.7305
			421758.4690	4032529.3477

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D9	0.53	SDCA	420,265.8440	4,030,508.7188
			419,947.7500	4,030,741.5176
			420,067.1880	4,030,907.7324
			420,051.5940	4,031,073.7461
			420,132.5000	4,031,300.5000
			420,460.9690	4,031,604.7441
			420,449.4060	4,032,103.9551
			419,975.9690	4,032,480.4902
			420,091.3750	4,032,635.9316
			420,399.6560	4,032,679.1270
			420,847.1880	4,032,406.2988
			421,363.7810	4,031,994.1230
			420,995.8750	4,031,495.0273
			420,265.8440	4,030,508.7188
D10	1.75	SDCA	419,965.0000	4,027,728.2520
			419,803.2190	4,027,847.7363
			419,922.8440	4,028,009.4902
			419,437.5940	4,028,368.0176
			419,317.9690	4,028,206.2617
			418,994.5310	4,028,445.2656
			418,730.3440	4,028,397.0371
			419,406.8750	4,029,323.4316
			421,010.9060	4,031,484.3145
			421,216.1560	4,031,761.8594
			421,439.0940	4,031,498.2363
			421,631.0310	4,031,208.7773
			421,571.8750	4,030,077.3184
			421,548.9690	4,029,833.7383
			421,523.2500	4,029,607.1328
			421,241.1880	4,029,607.8887
			421,116.0000	4,029,457.7559
			420,776.0000	4,029,075.9551
			420,233.7500	4,028,421.8027
			420,070.9690	4,028,193.2832
			419,973.2500	4,027,978.3457
			419,965.0000	4,027,728.2520
D11	2.32	SDCA	416,924.2190	4,025,991.8965
			416,906.7190	4,026,000.2598
			416,817.3750	4,026,065.2832
			415,808.9380	4,026,810.0977
			415,803.8440	4,026,822.5840
			415,810.1250	4,026,837.9219
			416,016.5310	4,027,163.7559
			415,829.9690	4,027,301.7383
			415,812.0000	4,027,654.7500
			415,987.3440	4,028,348.8008
			415,969.6880	4,028,562.7461
			415,530.3750	4,028,446.4922
			415,660.2500	4,028,955.4551
			416,062.8130	4,029,458.0664
			416,386.1560	4,029,683.9746
			416,436.9060	4,029,720.7148
			416,449.5000	4,029,732.7207
			416,468.5940	4,029,742.7246
			416,489.8750	4,029,746.4355
			416,529.4060	4,029,741.9941
			416,547.9690	4,029,741.4180
			416,541.4060	4,029,755.8789
			416,528.0940	4,029,767.9277
			416,515.2190	4,029,777.7969
			416,501.9690	4,029,786.2637
			416,489.6560	4,029,794.9004
			416,430.1250	4,029,834.6543
			416,415.3750	4,029,843.4570
			416,400.7190	4,029,849.4766
			416,387.3130	4,029,856.1563
			416,372.5940	4,029,860.3105
			416,368.5310	4,029,870.0703
			416,375.7810	4,029,880.6270
			416,384.4690	4,029,895.7617
			416,385.5310	4,029,910.9023
			416,395.3130	4,029,918.6621
			416,406.0630	4,029,922.9727
			416,419.9060	4,029,929.8086
			416,435.1560	4,029,936.6543
			416,449.2500	4,029,947.3340
			416,459.1250	4,029,961.2246
			416,462.9690	4,029,976.8418
			416,471.5630	4,029,988.3965

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	416481.0000	4029994.3359
			416483.2500	4030000.4590
			416476.4690	4030004.0684
			416464.6250	4030013.5332
			416452.1250	4030020.7266
			416447.3130	4030031.0762
			416454.8750	4030042.8809
			416467.7500	4030052.9766
			416466.0630	4030067.6035
			416454.5310	4030077.5586
			416440.6250	4030076.0938
			416437.6250	4030084.6914
			416445.8130	4030098.3496
			416459.0310	4030110.6875
			416465.9060	4030126.0488
			416467.1560	4030142.7871
			416461.5310	4030157.1523
			416450.1560	4030168.0938
			416439.0940	4030177.2402
			416443.8750	4030188.7227
			416458.4380	4030192.3809
			416470.3130	4030190.8789
			416479.0310	4030177.9727
			416493.8130	4030171.2637
			416510.6250	4030166.2656
			416527.2190	4030165.8828
			416541.7810	4030161.9238
			416568.0630	4030143.3945
			416585.0000	4030137.3281
			416601.6250	4030130.7734
			416608.7190	4030112.7188
			416614.8750	4030093.7324
			416614.1560	4030081.1367
			416606.9690	4030057.0176
			416610.2810	4030041.6328
			416621.0310	4030029.7910
			416626.8440	4030016.4492
			416634.6560	4030003.4863
			416639.6560	4029988.0273
			416642.2500	4029973.2676
			416656.7190	4029972.4727
			416688.3750	4029977.5293
			416704.9380	4029976.5762
			416715.9690	4029964.5742
			416723.1250	4029949.7949
			416734.4690	4029937.7109
			416747.7190	4029929.2070
			416759.0310	4029916.4004
			416768.4690	4029902.2207
			416781.8130	4029898.3633
			416790.3750	4029900.3945
			416827.0940	4029907.2129
			416838.2500	4029915.7813
			416845.7500	4029917.9492
			416852.5940	4029916.0938
			416867.9690	4029916.1543
			416880.3440	4029917.7637
			416895.6880	4029914.7402
			416925.9380	4029904.3965
			416940.7190	4029903.4805
			416954.8130	4029907.8730
			416966.3750	4029914.2246
			417119.3130	4029946.7070
			417187.6250	4029971.9180
			417582.2500	4030268.0078
			417521.0310	4029772.5176
			417701.5630	4029667.0430
			417771.4380	4029656.0293
			417852.7810	4029647.5566
			418130.3750	4029643.4648
			418383.2810	4029647.0859
			419083.7810	4029748.1953
			419086.1880	4029746.9258
			419093.6560	4029564.0527
			417887.0630	4029198.4668
			417896.1560	4029182.4668
			417881.5000	4029187.7246
			418000.2190	4028968.8594
			417985.8130	4028531.7539
			417825.0940	4028556.4668
			417545.0000	4028513.0254

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	417,068.6250	4,027,867.9766
			417,152.6880	4,027,307.1758
			417,077.1880	4,026,864.2910
			417,117.7810	4,026,581.1016
			417,277.7500	4,026,460.9707
			416,924.2190	4,025,991.8965
D12	0.02	SDCA	419,887.8440	4,027,285.2500
			419,726.0310	4,027,404.7344
			419,965.0000	4,027,728.2520
			419,949.5310	4,027,659.1582
			419,887.8440	4,027,285.2500
D13	0.02	SDCA	419,810.5000	4,026,842.2539
			419,648.7190	4,026,961.7383
			419,772.4690	4,027,130.8359
			419,887.8440	4,027,285.2500
			419,880.3750	4,027,234.3164
			419,832.8130	4,026,984.5820
			419,810.5000	4,026,842.2539
D14	2.46	SDCA	412,117.6560	4,023,538.0977
			411,983.4060	4,023,714.6152
			411,915.1560	4,023,883.7793
			411,828.0940	4,024,594.2207
			411,988.0310	4,025,141.2695
			412,161.8440	4,025,254.5859
			412,387.4060	4,025,234.3184
			412,577.3130	4,025,175.8184
			412,752.9380	4,025,413.6777
			412,942.5940	4,025,667.2090
			413,298.0630	4,025,913.1816
			413,700.7190	4,025,878.1113
			413,843.4060	4,025,859.0313
			413,892.3750	4,025,869.0625
			414,103.4380	4,026,021.7207
			414,294.0310	4,026,188.3672
			414,574.5630	4,026,473.5742
			414,628.3130	4,026,552.7695
			414,946.8130	4,027,212.3789
			415,303.7810	4,027,171.2480
			415,463.6880	4,026,711.0117
			415,639.0630	4,026,577.9492
			415,777.6250	4,026,784.4590
			415,787.8440	4,026,793.4668
			415,793.6560	4,026,794.4512
			416,290.3440	4,026,429.5527
			416,545.3750	4,026,241.2695
			416,908.5000	4,025,969.6309
			416,207.2500	4,025,017.7598
			415,765.2810	4,024,422.9277
			415,712.3440	4,024,368.7461
			414,755.6880	4,025,075.7559
			414,875.1560	4,025,237.5156
			414,715.5000	4,025,356.9941
			414,832.8440	4,025,518.7598
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.2539
			414,383.9380	4,025,997.9883
			414,274.7500	4,025,678.2109
			414,249.7810	4,025,496.0098
			414,266.4690	4,025,323.2305
			414,210.4380	4,025,245.9863
			413,519.9380	4,024,988.5723
			413,307.2500	4,025,145.7637
			413,144.4690	4,024,931.4102
			412,117.6560	4,023,538.0977
D15	0.08	SDCA	418,812.6560	4,025,829.9941
			419,051.1560	4,026,152.9863
			419,213.4060	4,026,034.2168
			419,810.5000	4,026,842.2539
			419,655.1250	4,026,404.8789
			419,499.9380	4,025,999.3496
			419,182.9690	4,025,925.2813
			418,812.6560	4,025,829.9941

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D16	0.70	SDCA	416987.0630	4023427.0801
			416718.5630	4023625.5098
			416734.5310	4023647.0078
			416700.3440	4023672.5195
			416689.5630	4023734.1953
			416678.1560	4023741.8613
			416644.1560	4023925.0195
			417010.6880	4024645.2734
			417000.8130	4024984.0566
			417004.5630	4024995.9414
			416997.8130	4025001.7578
			416224.2500	4025007.0430
			416932.7810	4025971.6777
			417170.5000	4026294.0039
			417483.0940	4026061.2461
			417363.6250	4025899.4863
			417848.8440	4025541.0000
			418087.8130	4025864.5176
			418249.6250	4025744.9961
			417981.1560	4025483.1621
			417862.3130	4025432.8262
			417742.6560	4025357.7832
			417731.0940	4025299.8848
			417711.4060	4025042.9023
			417596.9060	4024857.0391
			417427.9690	4024735.2051
			417308.1560	4024673.9160
			417192.2500	4024288.4082
			417038.6560	4023907.3789
			416987.0630	4023427.0801
D17	0.01	SDCA	418812.6560	4025829.9941
			418722.7810	4025817.3457
			418531.3750	4025787.7188
			418650.8440	4025949.5527
			418812.6560	4025829.9941
D18	0.01	SDCA	418250.0940	4025745.5586
			418369.5630	4025907.3164
			418531.2190	4025787.8750
			418422.7500	4025775.2305
			418250.0940	4025745.5586
D19	1.88	SDCA	410989.2810	4022251.9551
			411145.7810	4022140.5918
			410728.5630	4021605.7773
			410525.7190	4021575.8516
			410434.2500	4021553.4805
			410330.1560	4021538.0020
			410249.0940	4021523.9121
			410165.6880	4021513.8320
			410012.7810	4021489.0801
			409988.7810	4021485.5020
			409958.9380	4021487.3027
			409834.5940	4021472.0918
			409710.8750	4021458.8867
			409588.2190	4021468.2129
			409472.9060	4021506.2676
			409364.2190	4021564.2617
			409273.0310	4021648.9043
			409231.3750	4021698.0781
			409192.6560	4021749.2871
			409142.4380	4021863.0625
			409121.8750	4021936.3730
			409108.8130	4021989.7910
			409094.0000	4022070.1055
			409085.6880	4022117.5977
			409078.5310	4022146.7773
			409061.1250	4022247.9473
			409045.9690	4022310.3633
			409033.1250	4022381.5703
			409029.3750	4022398.8301
			409009.4380	4022518.7207
			409000.8440	4022749.8164
			408748.8130	4022752.2285
			408748.6880	4022994.9199
			408752.0000	4023250.6855
			409002.0630	4023249.9121
			408999.6250	4023000.2637
			410005.0940	4022997.9844
			410001.1880	4023280.3379
			410254.3750	4023245.9746

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D19 continued	1.88	SDCA	410,472.1880	4,023,123.1172
			410,718.0630	4,023,206.8965
			410,862.1250	4,023,378.8164
			410,821.5940	4,023,731.0039
			410,665.3750	4,023,862.7910
			410,401.5000	4,024,041.8867
			410,411.4380	4,024,308.5215
			410,520.6560	4,024,349.3066
			411,162.2810	4,024,681.8047
			411,124.9690	4,024,778.6250
			411,222.3440	4,024,873.7930
			411,392.4060	4,024,792.1602
			411,607.8130	4,024,539.2461
			411,737.1560	4,023,825.0313
			411,867.2500	4,023,463.2520
			411,784.7500	4,023,306.3613
			411,582.4060	4,023,006.9551
			411,126.7810	4,022,795.5957
			410,994.2500	4,022,416.6367
			410,989.2810	4,022,251.9551
D20	0.21	SDCA	414,982.2190	4,021,997.8164
			415,176.7190	4,022,263.2852
			415,103.2190	4,022,320.4727
			415,581.2500	4,022,965.4922
			415,817.9380	4,022,790.5078
			416,056.9060	4,023,113.9902
			416,207.6250	4,023,003.7656
			415,998.3750	4,023,002.3203
			416,002.5310	4,022,602.1270
			415,526.5000	4,022,002.0215
			414,982.2190	4,021,997.8164
D21	0.39	SDCA	409,784.0630	4,021,446.5840
			409,836.5940	4,021,452.1992
			409,959.4380	4,021,467.4043
			409,986.8440	4,021,465.6152
			410,014.9380	4,021,469.1094
			410,109.0000	4,021,484.2637
			410,027.5940	4,021,036.2754
			409,998.0310	4,020,801.4766
			409,487.5940	4,020,143.3262
			409,409.3130	4,020,065.3262
			409,373.6560	4,020,006.3652
			409,360.9380	4,020,010.4766
			409,276.4690	4,020,023.0879
			409,280.3750	4,020,086.8984
			409,223.5310	4,020,182.5996
			409,166.6250	4,020,986.3672
			409,146.5630	4,021,804.0762
			409,176.1250	4,021,738.1621
			409,218.6880	4,021,681.9980
			409,255.5940	4,021,639.3984
			409,351.8750	4,021,549.4316
			409,464.4690	4,021,488.9551
			409,583.4380	4,021,449.5684
			409,710.2810	4,021,438.8574
			409,784.0630	4,021,446.5840
D22	0.03	SDCA	414,001.2500	4,020,257.5078
			414,001.4690	4,020,502.5137
			414,426.0000	4,020,500.8262
			414,464.0310	4,020,432.0313
			414,293.7190	4,020,338.7207
			414,135.9690	4,020,279.6660
			414,001.2500	4,020,257.5078
D23	0.29	SDCA	409,535.8130	4,018,994.6445
			409,534.9380	4,019,112.7676
			409,493.8750	4,019,250.0898
			409,428.5630	4,019,253.1973
			409,374.7500	4,019,259.9512
			409,200.4380	4,019,355.6914
			409,208.0310	4,019,472.8008
			409,435.7810	4,019,902.2852
			409,445.4060	4,019,983.3887
			409,576.6880	4,020,126.1250
			410,016.9060	4,020,278.1445
			410,025.1560	4,019,002.0527
			409,535.8130	4,018,994.6445

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S1	0.71	Study	410001.6560	4042464.2656
			409290.7190	4042500.2383
			408861.2190	4042688.4688
			408813.8750	4042910.9609
			408859.4380	4043071.8984
			408972.0940	4043285.6914
			409337.5310	4043461.0000
			410500.6560	4043924.3945
			410962.4690	4044000.3555
			411096.8440	4043852.2109
			411108.0630	4043672.6836
			410984.4380	4043481.0273
			410592.0940	4043294.9219
			410496.6250	4043013.0352
			410003.5310	4043008.3594
			410001.6560	4042464.2656
S2	0.27	Study	415072.8130	4041278.8984
			414928.6560	4041572.7422
			414740.2500	4042529.6992
			415304.2190	4042966.9609
			415642.3130	4042393.3203
			415234.1250	4041986.6914
			415072.8130	4041278.8984
S3	0.72	Study	421548.9690	4029833.7383
			421571.8750	4030077.3184
			421631.0310	4031208.7773
			421439.0940	4031498.2363
			421216.1560	4031761.8594
			421260.3750	4031837.4414
			421371.5310	4031985.9238
			421398.8440	4032023.9863
			421454.5000	4032099.1406
			421509.5310	4032174.3066
			421645.9690	4032358.6465
			421725.3130	4032466.9844
			421769.8440	4032526.2539
			421827.1560	4032498.3555
			421952.1880	4032442.4199
			421854.9690	4031871.4102
			422105.2500	4031749.0176
			422299.6560	4031762.5020
			422592.2190	4031994.7988
			422701.7500	4032367.5195
			422732.5630	4032243.8984
			422746.8130	4032159.0254
			422779.7500	4032064.7734
			422779.7190	4031946.8984
			422793.9060	4031814.8984
			422817.5310	4031682.9316
			422840.9690	4031565.0645
			422869.3130	4031447.2109
			422836.2810	4031338.7852
			422713.7500	4031206.8086
			422529.9380	4030985.2422
			422250.5940	4030779.7578
			422000.0310	4030499.9922
			422006.2810	4030500.0156
			421836.9380	4030271.0234
			421548.9690	4029833.7383
S4	0.15	Study	417410.5630	4023845.5176
			417398.8440	4023845.8750
			417387.4380	4023846.9883
			417377.4060	4023848.7207
			417367.8440	4023851.0527
			417358.9380	4023853.9434
			417350.9380	4023857.4238
			417343.0940	4023861.6250
			417335.2810	4023866.7793
			417327.4690	4023872.8066
			417319.6880	4023879.7500
			417310.5940	4023888.9688
			417301.9690	4023899.1680
			417293.6560	4023910.1230
			417286.2810	4023921.5137
			417281.1250	4023930.3848
			417276.9060	4023939.6543
			417273.1560	4023949.9414
			417269.7190	4023961.3281
			417266.5000	4023975.5664
			417263.6560	4023992.3125

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
S4 continued	0.15	Study	417,257.5630	4,024,036.4043
			417,255.7810	4,024,053.0898
			417,254.3440	4,024,071.4844
			417,253.3440	4,024,112.0410
			417,253.6880	4,024,135.3887
			417,256.4690	4,024,211.2207
			417,258.9380	4,024,248.6602
			417,260.8130	4,024,266.7930
			417,266.0630	4,024,299.1426
			417,269.5630	4,024,313.8516
			417,274.6560	4,024,330.5859
			417,281.5940	4,024,349.5684
			417,289.7810	4,024,368.9414
			417,298.0630	4,024,386.4863
			417,306.2810	4,024,401.4785
			417,314.9690	4,024,415.0508
			417,324.0630	4,024,427.2441
			417,333.2500	4,024,437.8730
			417,341.8130	4,024,446.3809
			417,362.2810	4,024,463.6328
			417,374.6880	4,024,472.7871
			417,391.6880	4,024,484.4727
			417,422.5940	4,024,504.8984
			417,438.9380	4,024,515.1504
			417,454.8440	4,024,524.5742
			417,469.5000	4,024,532.6895
			417,483.8130	4,024,540.1250
			417,497.9690	4,024,546.9180
			417,525.0310	4,024,558.3184
			417,537.3130	4,024,562.7500
			417,550.9690	4,024,567.0371
			417,565.6880	4,024,571.1504
			417,595.7190	4,024,578.3379
			417,644.3750	4,024,588.4512
			417,671.1560	4,024,593.2676
			417,699.5630	4,024,597.4395
			417,729.9690	4,024,601.0371
			417,763.4060	4,024,604.2285
			417,801.4380	4,024,607.2109
			417,876.5000	4,024,612.3184
			417,885.9690	4,024,613.4160
			417,906.1880	4,024,617.6074
			417,954.9060	4,024,630.4629
			417,966.3750	4,024,632.8535
			417,976.4690	4,024,634.2813
			417,984.4060	4,024,634.8398
			417,991.7190	4,024,634.7266
			417,998.0940	4,024,633.9082
			418,004.0310	4,024,632.4531
			418,009.1560	4,024,630.2891
			418,013.8130	4,024,627.4102
			418,017.8750	4,024,623.8594
			418,021.4380	4,024,619.5566
			418,027.1560	4,024,609.7598
			418,032.4060	4,024,597.6895
			418,034.6560	4,024,589.4512
			418,035.8750	4,024,580.7773
			418,035.6560	4,024,570.7617
			418,034.0630	4,024,559.9766
			418,031.0630	4,024,548.3418
			418,026.3750	4,024,535.4473
			418,020.4690	4,024,521.3984
			418,000.5310	4,024,478.6465
			417,984.5630	4,024,435.9668
			417,970.9060	4,024,402.7227
			417,957.8130	4,024,373.8125
			417,943.3130	4,024,343.8242
			417,931.2500	4,024,320.3027
			417,918.0940	4,024,295.7734
			417,880.1250	4,024,228.6719
			417,859.5000	4,024,190.0117
			417,854.1250	4,024,181.0176
			417,848.9380	4,024,173.2773
			417,843.6250	4,024,166.4160
			417,838.3130	4,024,160.3535
			417,832.0940	4,024,154.4258
			417,825.1250	4,024,149.1992
			417,816.9690	4,024,144.4160
			417,807.5630	4,024,140.0762
			417,799.1250	4,024,136.8242
			417,789.4690	4,024,133.5957
			417,744.3750	4,024,120.6641
			417,733.3130	4,024,116.6641

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
S4 continued	0.15	Study	417723.6250	4024112.4082
			417716.8440	4024108.7773
			417710.6880	4024104.8281
			417693.1880	4024092.0859
			417683.1250	4024084.1797
			417674.4380	4024076.5137
			417667.2810	4024069.1191
			417661.4690	4024061.8086
			417657.0630	4024054.5488
			417654.5000	4024048.2773
			417652.5000	4024040.8516
			417647.9060	4024009.5918
			417646.3750	4024002.8047
			417644.5940	4023996.9746
			417640.7500	4023988.9395
			417636.0310	4023980.8086
			417630.3750	4023972.9629
			417623.6560	4023965.2930
			417617.2810	4023958.7949
			417609.9690	4023952.3184
			417601.7810	4023945.7832
			417592.6250	4023939.0781
			417575.3440	4023927.6641
			417540.5940	4023906.3262
			417526.8440	4023897.4316
			417515.0940	4023889.3320
			417487.6880	4023868.7949
			417472.0940	4023858.9844
			417463.6560	4023854.8926
			417455.1880	4023851.9063
			417444.7810	4023849.1504
			417433.6250	4023847.1348
			417422.1560	4023845.9258
			417410.5630	4023845.5176
C1	0.21	Channel	411145.9380	4022140.5117
			410989.3130	4022252.0020
			410994.2500	4022416.6367
			411126.7810	4022795.5957
			411582.4060	4023006.9551
			411784.7500	4023306.3613
			411867.2500	4023463.2520
			411737.1560	4023825.0313
			411915.1560	4023883.7793
			411983.4060	4023714.6152
			412117.6560	4023538.0977
			411792.0630	4023094.1152
			411782.4060	4023076.2949
			411748.7190	4022994.3965
			411643.6250	4022726.7266
			411641.6880	4022435.3887
			411419.2190	4022347.2383
			411284.5000	4022318.9453
			411145.9380	4022140.5117
C2	0.30	Channel	409201.5000	4019370.5664
			409173.3130	4019532.8418
			409115.7190	4019657.4395
			409058.5940	4019813.5703
			409055.4380	4019859.0117
			409098.6560	4019944.7520
			409192.5940	4020079.2344
			409223.5310	4020182.5996
			409280.3750	4020086.8984
			409276.4690	4020023.0879
			409352.7190	4020011.6758
			409373.6560	4020006.3652
			409409.3130	4020065.3262
			409487.8750	4020143.3594
			409998.1880	4020801.4746
			410027.7500	4021036.2715
			410109.2810	4021484.2578
			410174.2810	4021494.7188
			410242.0940	4021502.6836
			410335.4060	4021518.5000
			410438.7190	4021533.8438
			410529.8750	4021556.1816
			410712.0940	4021583.1074
			410602.7500	4021411.3418
			410686.8440	4021328.9805
			410488.7190	4020946.7344
			410264.6250	4020620.0820
			410015.6880	4020454.4902

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
C2 continued	0.30	Channel	410,016.9060	4,020,278.1445
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates

Total SDCA	12.77
Total Study	1.85
Total Channel	0.50

EXHIBIT 3 -- DUST CONTROL MEASURE MAP

Shown are dust control measures assigned to areas within the SDCA.

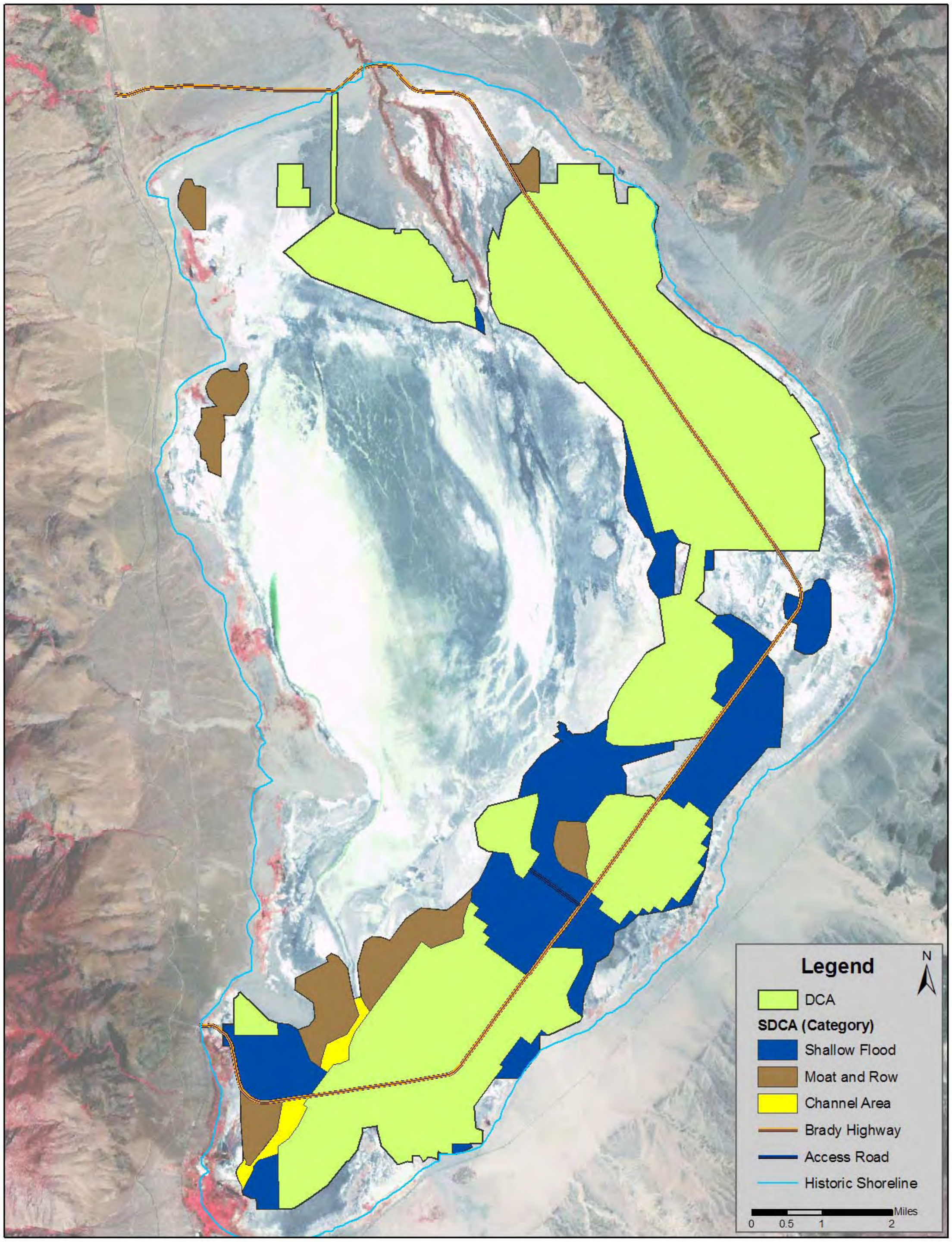

EXHIBIT 4 -- DUST CONTROL MEASURE DESCRIPTIONS

Brief descriptions of dust control measures for use on Owens Lake are given below. More detailed descriptions of the three BACM approved dust control methods (shallow flooding, managed vegetation and gravel) are provided in the 2003 SIP. Modifications to these measures as provided in the Settlement Agreement (Agreement) are noted. All references are to sections of the Agreement; section numbers of the Agreement are contained in square brackets.

Shallow Flooding

The “shallow flooding” (SF) dust control measure involves wetting emissive lake bed surfaces to reduce dust emissions. Performance specifications and a detailed description of the SF measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Otherwise, water shall be applied in amounts sufficient to achieve the required wetness cover as specified in Sections 3 through 5, 25, 26, and 27, or as modified under the provisions of Sections 5, 14, 15, 18, and 29. Satellite imagery, aerial photography or other methods approved by the APCO under the provisions of Section 29 are used to measure wetness cover for compliance.

Managed Vegetation

The “managed vegetation” (MV) dust control measure involves establishing a plant cover on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications and a detailed description of the MV control measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Vegetative cover on the MV site present on the lake bed on January 1, 2007 shall be as specified in Section 6. The performance specification of MV may be modified under the provisions of Section 29. Point-frame measurements satellite imagery or other methods approved by the APCO under the provisions of Section 29 are used to measure plant cover for compliance.

Gravel Cover

The “gravel cover” (GC) dust control measure involves placing a layer of gravel on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications are described in the 2003 SIP.

Moat and Row

The general form of the “moat and row” (MR) measure is an array (see Figure E4-1) of earthen berms (rows) about 5 feet high with sloping sides, flanked on either side by ditches (moats) about 4 feet deep (see Figure E4-2). Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual MR elements are constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the MR array is intended to control emissions under the full range of principal wind directions (see Figure E4-1). Initial pre-test

modeling indicates that MR elements' spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM_{10} control effectiveness required on the MR area.

The PM_{10} control effectiveness of MR may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, sand fences, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding moats and rows to the array, which reduces the distance between rows.

The final form of MR will largely be determined from the results of testing on the lake bed as provided in Sections 7 and 8. Final design is subject to test results, required PM_{10} control effectiveness, environmental documentation and permitting, engineering, and monitoring considerations.

In areas where MR is used as a control measure, the City shall implement the measure in a manner consistent with the Agreement, particularly Sections 7 and 8, or as modified by actions pursuant to Sections 18 through 24.

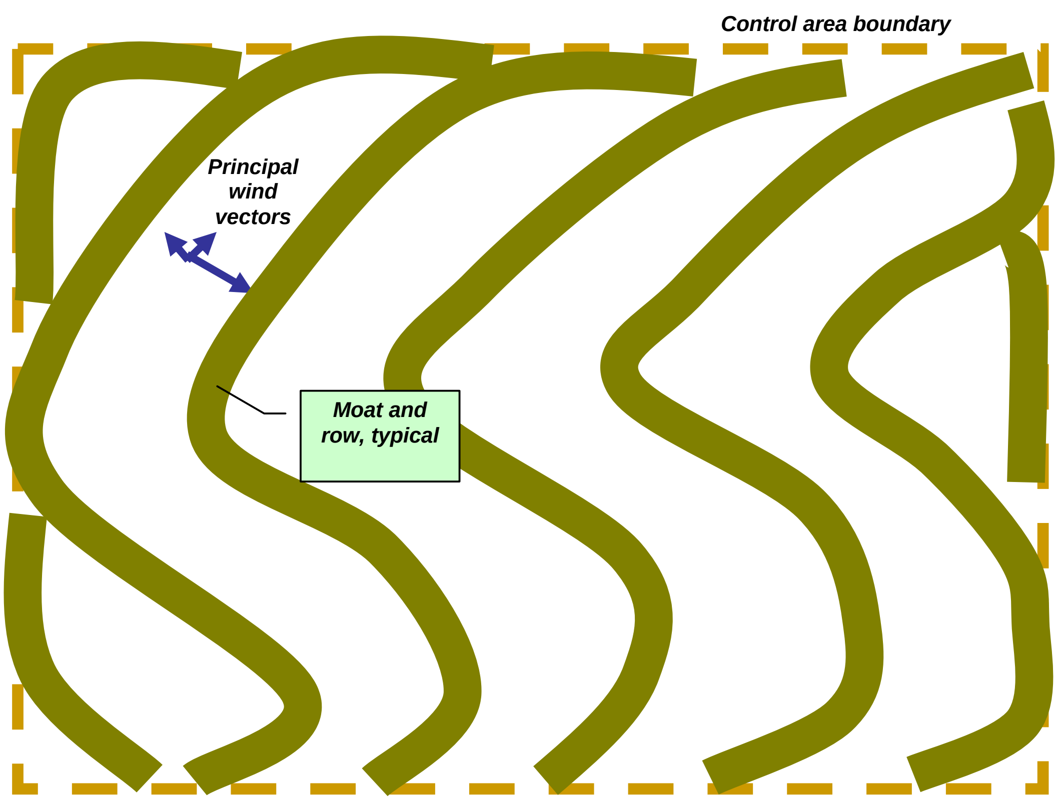

Figure E4-1. Moat and Row Array Plan View (schematic).

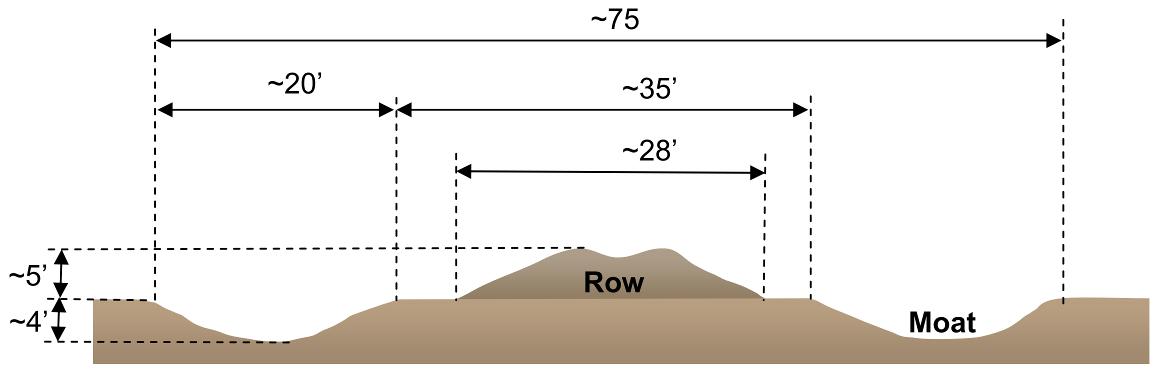

Figure E4-2. Profile of Moat and Row with Approximate Dimensions (schematic).

EXHIBIT 5 -- TDCA MINIMUM DUST CONTROL EFFICIENCY MAP

Shown are MDCEs calculated according to Sections 3 and 4 of the agreement.

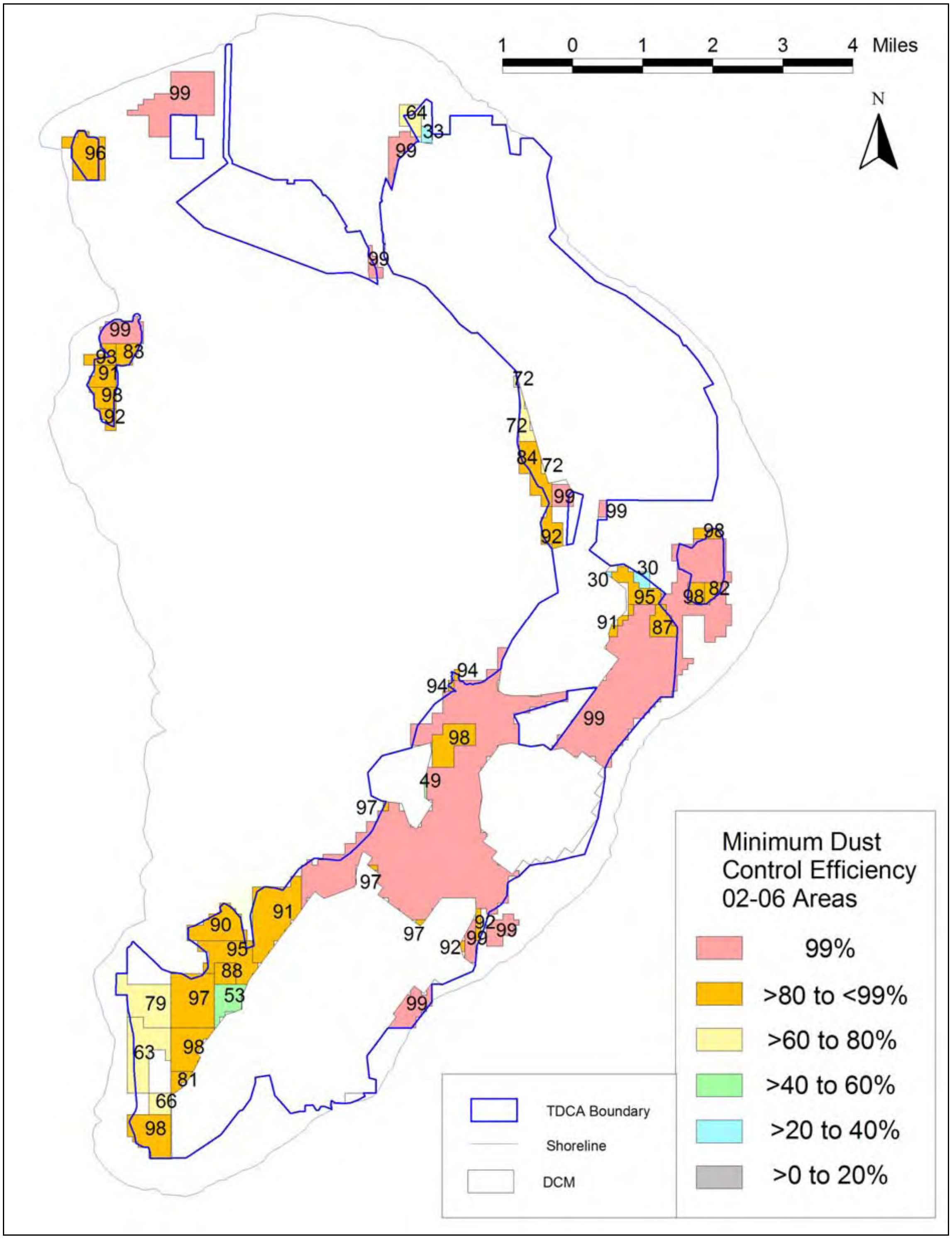

EXHIBIT 6 -- MDCE SELECTION PROCESS

This exhibit summarizes the purpose of the MDCE Selection Process Spreadsheet. A copy of the Process Spreadsheet, which contains a description of the spreadsheet structure and operation, may be downloaded from the District's website at http://www.gbuapcd.org/.

The District developed the Dust ID Model as a tool for identifying dust control areas on the lake bed. The Dust ID Model computes the amount of dust being generated from each source area on the lake bed, but the results cannot be used without additional processing to identify the acceptable combinations of dust control required on each source area (that is, each area's minimum dust control efficiency or "MDCE") to achieve the federal 24-hour PM_{10} standard along the shoreline. There are many possible combinations of MDCEs that could produce the acceptable result of achieving the standard at the shoreline. For example, 50 percent control on hypothetical Area 1 and 99 percent control on Area 2 may produce the same modeled shoreline concentration as 99 percent control on Area 1 and 50 percent control on Area 2. However, the first combination might be more practical and less costly than the second, and for that reason it is important to have a process that can quickly and efficiently identify acceptable combinations. In all cases, the outcome of this process is some combination of area-by-area dust control efficiencies that produces a modeled attainment of the federal PM_{10} standard everywhere along the shoreline.

The process for selecting the acceptable combinations of dust control levels has been, heretofore, a manual process. The MDCE Selection Process Spreadsheet (Process Spreadsheet) was developed to more quickly and efficiently identify combinations of dust controls required to produce compliance with the federal 24-hour PM_{10} standard along the shoreline. The worksheet is set up so that MDCE calculations are automatic, yet it still allows manual adjustments to be made.

EXHIBIT 7 -- SHALLOW FLOOD CONTROL EFFICIENCY CURVE

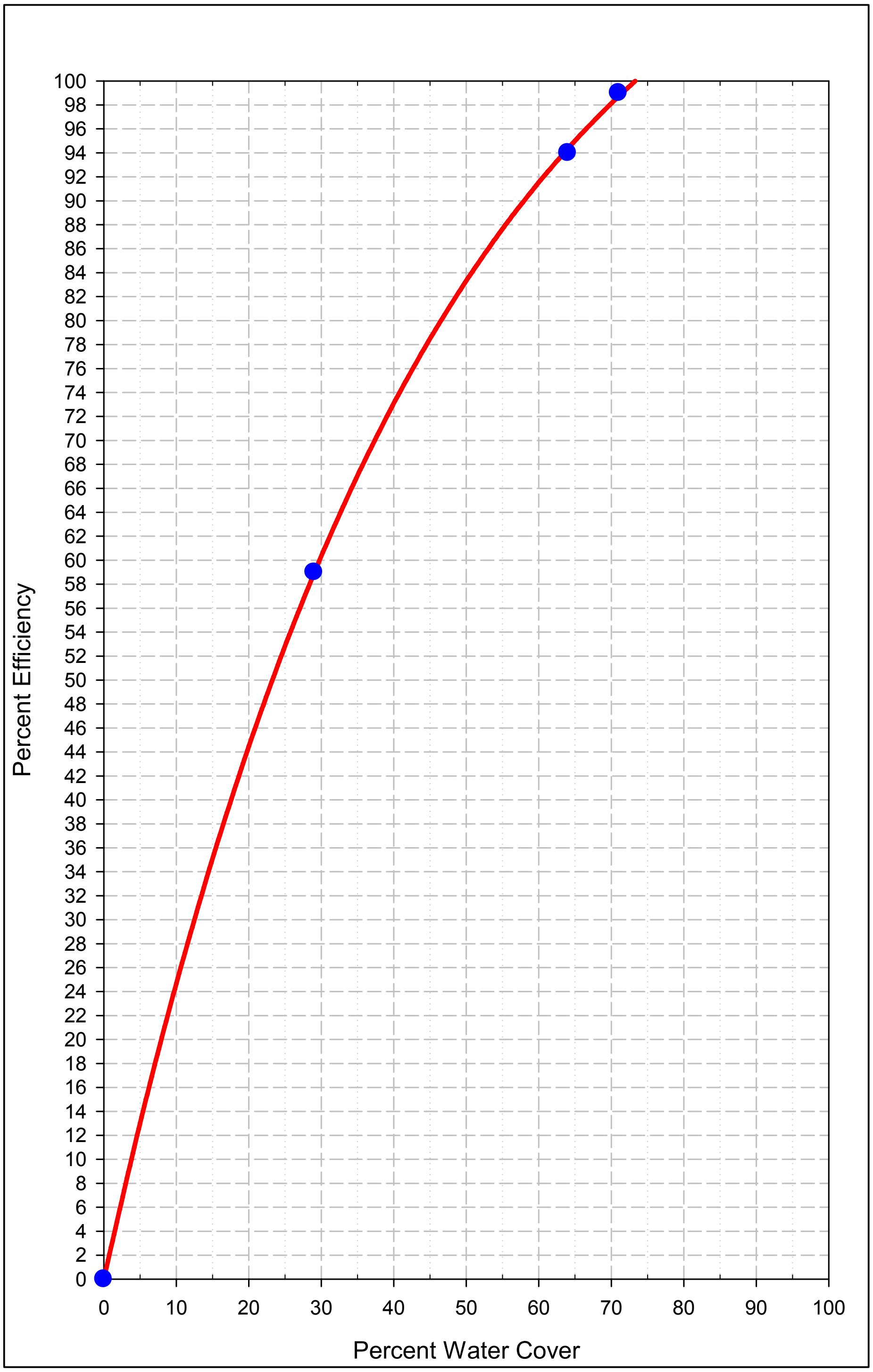

EXHIBIT 8 -- MOAT AND ROW DEMONSTRATION PROJECT LOCATION MAP

Two proposed moat and row demonstration project locations

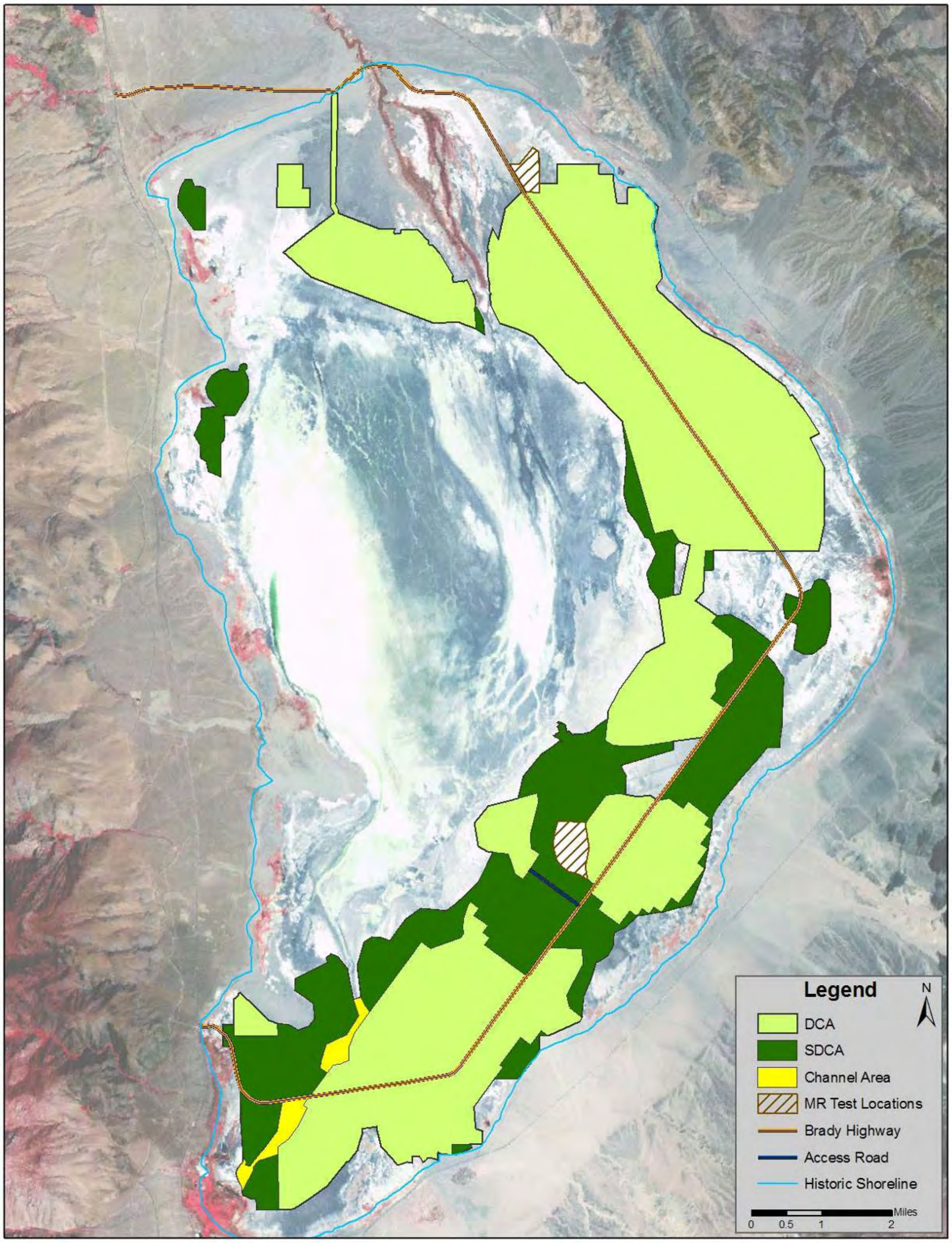

EXHIBIT 9 -- STUDY AREA MAP

Four proposed study area locations

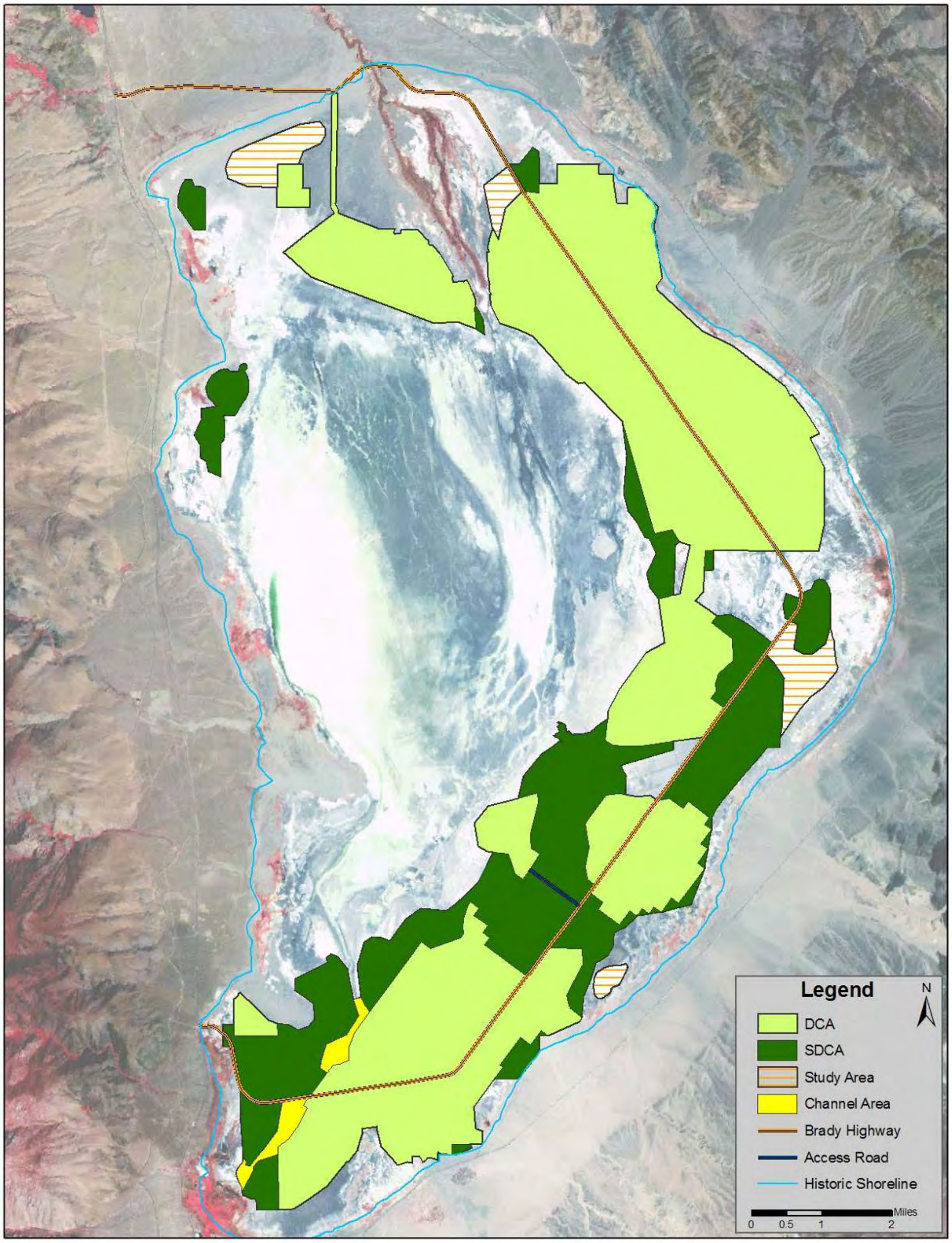

EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

Issue	*Resolution*	*Duration*	*Units*
Moat and Row			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
Managed Vegetation			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Gravel Patches			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
Shallow Flood			
Emissions from dry areas (insufficient uniformity of wetting)	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
Other features			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years)
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years)
New area shallow flood DCM[a]	2.9
New area managed vegetation DCM[a]	6.1
New area gravel cover DCM[a]	2.2
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
[a]Assumes that total new area <2 square miles per year	

EXHIBIT 13. DEFINITIONS

A. "Background PM_{10} concentration" shall mean the concentration of PM_{10} caused by sources other than from wind blown dust emanating from the Owens Lake bed. For the purpose of modeling air quality impacts, the background concentration is assumed to be 20 $\mu g/m^3$ (micrograms per cubic meter) during every hour at all receptor locations. The monitored and modeled PM_{10} emissions from the Keeler Dunes, which are located off the lake bed are treated as a separate dust source area and are not included in the background concentration.

B. "Best Available Control Measures" or "BACM" shall have the same definition as in the federal Clean Air Act. Approved BACM in the 2003 SIP was associated with PM_{10} emission reductions of at least 99 percent and includes managed vegetation, shallow flood, and gravel cover.

C. "Contingency measures" shall mean dust control measures or modifications to the dust control measures that can be implemented to mitigate dust source areas that cause or contribute to an exceedance of the federal standard at the historic shoreline in the event that a previously approved control strategy was found to be insufficient.

D. "Control Area" shall mean an area on the lake bed for which dust control is required.

E. "Control efficiency" shall mean the relative reduction or percent reduction in PM_{10} emissions resulting from the implementation of a control measure compared to the uncontrolled emissions.

F. "Control measures" shall mean measures effective in reducing the PM_{10} emissions from the lakebed surface over which they are implemented.

G. "Dust control measure" or "DCM" shall mean measures designed to suppress sand motion and reduce dust emissions from the Owens Lake bed.

H. "Dust ID Model" shall mean a computer-based air quality modeling approach developed as part of the 2003 SIP to identify emissive areas on the Owens Lake bed and to estimate the resulting PM_{10} concentrations at the shoreline. See also "Dust ID Program."

I. "Dust ID Program" shall mean a long-term monitoring and modeling program that is used to identify dust source areas at Owens Lake that cause or contribute to exceedances and violations of the federal PM_{10} standard. The current protocol for conducting the Dust ID Program is

included in the 2003 SIP (Exhibit 2 – Attachment 4). See also "Dust ID Model."

J. "Emission rate" shall mean the rate (expressed as mass per unit area per unit time) at which an air constituent (PM_{10}, for example) is transported away from the surface of the lake bed.

K. "Exceedance of the federal standard" or "exceedance" shall mean any single-day PM_{10} concentration that is monitored or modeled to be above 150 $\mu g/m^3$ (24-hour average from midnight to midnight) at any location at or above the historic shoreline.

L. "Historic shoreline" or "shoreline" shall mean the elevation contour line of 3,600 feet above mean sea level at Owens Lake, California.

M. "Lake bed" or "Owens Lake bed" or "playa" shall mean the exposed surface within and below the historic shoreline.

N. "Managed Vegetation" is a Dust Control Measure consisting of lakebed surfaces planted with protective vegetation.

O. "May not lawfully be included in the SIP" shall mean that inclusion of the provision in question in the revisions to the 2003 SIP has been determined by binding judicial order to be unlawful.

P. "MCDE-BACM" shall mean Dust Control Measures that achieve Minimum Dust Control Efficiency and are found to be appropriate for the area of application.

Q. "Minimum Dust Control Efficiency" or "MDCE" shall mean the lowest dust control efficiency, as determined by the Dust ID model, in the Supplemental Dust Control Area necessary to meet the federal standard at the historic shoreline.

R. "Moat and Row" shall mean a Dust Control Measure consisting of arrays of sand breaks that arrest sand motion.

S. "PM_{10}" or "particulate matter" shall mean atmospheric particulate matter less than 10 micrometers in nominal aerodynamic diameter.

T. "PM_{10} monitor" shall mean an instrument used to detect the concentrations of PM_{10} in the air.

U. "Sand flux monitor" shall mean a device used to measure the amount and/or rate of moving or saltating sand and sand-sized particles caused by wind erosion.

V. “Shallow Flood” is a Dust Control Measure consisting of lakebed areas wetted to a specified proportion of surface coverage.

W. “2003 SIP” or “2003 Owens Valley PM_{10} State Implementation Plan” shall mean the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision – Adopted November 13, 2003.

X. “Supplemental Control Requirements” or “SCR” shall mean Dust Control Measures required by the District on areas outside of the DCA that cause or contribute to an exceedance of the federal PM_{10} standard at the historic shoreline of Owens Lake.

APPENDIX II-1
2014 STIPULATED JUDGMENT

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Attorneys for Respondent and Defendant
GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

Exempt from Filing Fees
Government Code § 6103

FILED / ENDORSED
DEC 30 2014
By E. Higginbotham, Deputy Clerk

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SACRAMENTO

CITY OF LOS ANGELES, a California Municipal Corporation, ACTING BY AND THROUGH ITS DEPARTMENT OF WATER AND POWER,

Petitioner and Plaintiff,

v.

CALIFORNIA AIR RESOURCES BOARD; EXECUTIVE OFFICER OF THE CALIFORNIA AIR RESOURCES BOARD, in its official capacity; GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT; and DOES 1-100,

Respondents and Defendants.

CALIFORNIA STATE LANDS COMMISSION; and DOES 101-500,

Real Parties in Interest.

Case No. 34-2013-80001451-CU-WM-GDS

[Assigned for All Purposes to the Honorable Shelleyanne W.L. Chang]

STIPULATED JUDGMENT FOR RESPONDENT AND DEFENDANT GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

Department: 24
Date Action Filed: December 19, 2012

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Attorneys for Petitioner and Plaintiff
CITY OF LOS ANGELES, a California Municipal Corporation,
ACTING BY AND THROUGH ITS DEPARTMENT
OF WATER AND POWER

Petitioner and Plaintiff CITY OF LOS ANGELES, a California Municipal Corporation, ACTING BY AND THROUGH ITS DEPARTMENT OF WATER AND POWER ("Petitioner" or "City") and Respondent and Defendant GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT ("District") (collectively "Parties"), having agreed and consented to the entry of this stipulated judgment for the Respondents and Defendants ("Stipulated Judgment") containing the terms specified below, and the Court having been presented with the Stipulated Judgment and reviewed its terms, the Court hereby approves the Stipulated Judgment and these terms, and issues the following orders:

RECITALS BY THE PARTIES

A. The District is a unified air pollution control district as provided by Division 26, Part 3, Chapter 3 of the California Health and Safety Code and consists of all of Inyo, Mono and Alpine counties.

B. The City is a charter city in the State of California, and its Department of Water and Power ("LADWP") is a proprietary department of the City. The LADWP is responsible for providing water and power to the residents of Los Angeles. Its duties include operating the Los Angeles Aqueduct, which transports water from the Eastern Sierra region to Southern California.

C. The dispute between the parties concerns the control of air pollution from Owens Lake. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancha.

D. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts. The City's water diversions from the Owens Valley, including by the use of the Los Angeles Aqueduct, has exposed lake bed areas.

E. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter ("PM_{10}").

F. PM_{10} is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq.*, as amended ("CAA").

G. Under the National Ambient Air Quality Standard ("NAAQS") adopted pursuant to the CAA, PM_{10} levels may not exceed an average concentration of 150 micrograms per cubic meter ("$\mu g/m^3$") during a 24-hour period more than one time per calendar year averaged over three years.

H. The CAA further requires the U.S. Environmental Protection Agency ("EPA") to divide each state into air quality control regions. Each region is characterized as either "attainment" or "non-attainment" for each identified air pollutant, depending on whether the monitored level of that air pollutant in that region is at or below (attainment) or above (non-attainment) the level mandated by the NAAQS.

I. Once the EPA establishes the NAAQS, the states have the primary responsibility to prepare a State Implementation Plan ("SIP") for achieving and maintaining the NAAQS within each air quality control region within the state. The SIP must establish "enforceable emission limitations and other control measures" designed to, among other things, achieve attainment in non-attainment regions within the state.

J. The California Legislature delegated responsibility and authority to meet the CAA's SIP requirements to Respondent CARB and authorized CARB to implement this requirement through the creation of thirty-five (35) air pollution control districts.

K. On August 7, 1987, the EPA designated the Owens Valley Planning Area ("OVPA") as one of the regions in California in violation of the PM_{10} NAAQS. The EPA designated the OVPA as a "serious nonattainment area" for PM_{10}.

L. In addition to the federal NAAQS, the State of California has adopted a PM_{10} standard ("State Standard"). The State Standard is violated when monitors record PM_{10} concentrations greater than 50 $\mu g/m^3$ averaged over a 24-hour period.

M. The District has regulatory authority over air quality issues in the OVPA where Owens Lake is situated.

N. Health and Safety Code Section 42316 ("Section 42316"), enacted by the California Legislature in 1983, provides in part that the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS and State Standard for PM_{10}.

O. In November 1998, the District submitted to EPA its 1998 SIP. In September 1999, the EPA approved the 1998 SIP. The District and the City agreed to the provisions in the 1998 SIP and requested EPA to extend the attainment deadline for the OVPA. In September 1999, the EPA approved the 1998 SIP and extended the attainment deadline by five years, from December 31, 2001 to December 31, 2006.

P. The 1998 SIP provides three allowable mitigation control measures that are approved as Best Available Control Measures ("BACM") that the City may select for use at the dried Owens Lake bed: (1) shallow flooding; (2) managed vegetation; or (3) gravel cover.

Q. Under the CAA at 42 U.S.C. § 7513(e), for areas receiving extensions of the original attainment date, the SIP shall provide for implementation of "the most stringent measures that are included in the implementation plan of any State or are achieved in practice in any State, and can feasibly be implemented in the [nonattainment] area."

R. In 2003, the District revised the 1998 SIP and submitted the 2003 SIP to EPA for approval. The 2003 SIP requires most stringent measures ("MSM") BACM controls. EPA has not taken action on the 2003 SIP.

S. In 2005, the City disputed orders issued by the District under Section 42316 for additional air pollution controls at the dried Owens Lake bed. To resolve this dispute, the City and the District entered into a settlement agreement. Pursuant to that agreement, the District agreed to submit revisions to the 2003 SIP. For this purpose, in 2008, the District adopted Board Order No. 080128-01 and submitted the order as the 2008 SIP ("2008 SIP Order"). CARB approved the 2008 SIP Order and submitted it to the EPA for approval, which is pending before EPA. The 2008 SIP also requires MSM BACM controls.

T. On or about August 1, 2011, the District issued the 2011 SCRD which ordered the City to install additional dust control measures on approximately 2.86 square miles of the dried Owens Lake bed to meet the NAAQS for PM_{10}. These are known as the Phase 9 dust control areas.

U. The City appealed the 2011 SCRD under Section 42316(b). On June 15, 2012, the Executive Officer of the CARB held a hearing on the City's appeal. On November 19, 2012, the CARB issued its written decision denying the City's appeal and affirming the 2011 SCRD ("CARB Decision").

V. On or about December 10, 2012, the City filed a Verified Petition for Writ of Mandate in this action entitled *City of Los Angeles, et al. v California Air Resources Board,* Los Angeles County Superior Court, Case No. BS140620 (the "Action"). This Action was transferred to the Sacramento County Superior Court and the City filed a First Amended Verified Petition for Writ of Mandate and Complaint for Declaratory Relief on or about August 30, 2013 ("Amended Petition'). The District filed its Answer to the Amended Petition on September 30, 2013. The Action in part appeals the CARB Decision pursuant to Sections 42316 and Civil Procedure Code Section 1094.5. On September 25, 2014, the Court issued a tentative ruling denying the City's petition for writ of mandate and ordering entry of judgment for Respondents and Defendants. A hearing was held on September 26, 2014 and after oral argument, the Court took the matter under submission pending the issuance of its final ruling and order.

W. On November 16, 2012, the District issued the 2012 SCRD which ordered the City to install additional 0.76 square miles of dust control measures on the dried Owens Lake bed to meet the NAAQS for PM_{10}. These are known as the Phase 10 dust control areas.

X. The City appealed the 2012 SCRD under Section 42316(b). On April 18, 2014, the Executive Officer of the CARB held a hearing on the City's appeal. A decision on this appeal is pending.

Y. On April 4, 2014, the District issued the 2013 SCRD which stated that no additional areas of the lake bed required controls at that time. On August 6, 2014, the District issued its preliminary 2014 SCRD which also stated that no additional areas of the lake bed required controls at that time.

Z. Based on data collected, the 2011, 2012, 2013 and 2014 SCRDs, modeling and experience by the District to date, the District estimates that the City's control of dust emissions by applying BACM to 48.6 square miles of the dried Owens Lake bed, and the District's control of dust emissions from the adjacent Keeler Dunes will reduce emissions in the OVPA such that it can attain the NAAQS. Further monitoring and data collection will be needed to confirm the estimates of attainment.

AA. The Parties acknowledge the need to control dust from the lakebed caused by the City's water production activities and for additional effective dust control measures that do not rely on water that can be substituted in areas currently under control or applied in areas ordered to be controlled.

BB. The Parties further acknowledge the need to balance the requirements to control dust emissions and conserve water with the requirements to minimize impacts to cultural and biological resources.

CC. Now, therefore, after extensive negotiations to resolve their disputes, the Parties have reached a settlement with the terms contained herein, and agree to entry of this Stipulated Judgment to resolve this action and their disputes including those stated in the Amended Petition and the District's Answer, and those regarding the 2011 SCRD, 2012 SCRD, 2013 SCRD and 2014 SCRD under Section 42316.

STIPULATED JUDGMENT

1. **Entry of Judgment**. The Court orders that final judgment on the Petition and Complaint in this action, including all terms contained herein, be entered for Respondent and Defendant District against Petitioner and Plaintiff on all causes of action in the pending First Amended Petition and Complaint ("Judgment"). The Judgment shall constitute final judgment resolving all claims and defenses alleged in the Amended Petition and the Answer filed by the District. The Parties agree not to appeal or further contest this Judgment. The Judgment shall consists of any final ruling and order by this Court on the City's writ of mandate as referenced in Preamble Paragraph V, which shall be attached as Attachment A to this Stipulated Judgment, and the additional terms contained herein, which the Parties stipulate are consistent with the Court's order.

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2. **Phase 9/10 Project to Implement 2011 and 2012 Supplemental Control Requirement Determinations**

A. By December 31, 2017, the City shall construct a dust control project to complete the Phase 9 and Phase 10 dust controls by selecting and installing BACM on 3.62 square miles of areas identified in the 2011 SCRD and 2012 SCRD (collectively referred to as the "Phase 9/10" project). The Phase 9/10 project shall bring the total area of the City's dust controls on the Owens Lake bed to 48.6 square miles. The construction deadline set forth in this paragraph is subject to the Force Majeure and Stipulated Penalties provisions set forth in Paragraphs 14 and 15 below.

B. The City may submit an application to the APCO to approve modifications to the City's proposed project or measures on certain areas that are determined to contain significant cultural resources. The District shall consider and decide the City's application under the procedures contained in the 2013 Stipulated Abatement Order No. 130819-01.

C. The Phase 9/10 project will use dust control measures that are waterless or "water neutral" by offsetting any new or increased water use with water savings elsewhere on the lakebed.

D. Within 60 days of the court's entry of this Stipulated Judgment, the City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan ("RAP") for the Phase 9/10 project that provides for project completion by December 31, 2017. The plan shall contain intermediate milestones specifying the completion dates for CEQA compliance (and to the extent joint documents are prepared under CEQA and NEPA, for CEQA/NEPA compliance), construction bid award and control measure compliance.

E. Upon completion of the Phase 9/10 project, and any additional BACM Contingency Measures as provided in Paragraph 3 below, the City shall permanently operate dust controls with approved BACM on those areas and all other existing areas where the City has installed and operates dust controls on the dried Owens Lake bed, except as provided by a SIP for BACM testing and development.

3. **Additional BACM Contingency Measures**

A. To provide the emission reductions necessary to meet the NAAQS in the OVPA, the District's Air Pollution Control Officer ("APCO") may order the City on or any time after January 1, 2016 to implement additional BACM contingency measure controls on up to 4.8 square miles (which need not be contiguous) of the dried Owens Lake bed ("BACM Contingency Measures"). If the City implements the entire 4.8 square miles of BACM Contingency Measure controls, there will be a total of 53.4 square miles of dust controls on the Owens Lake bed. Any BACM Contingency Measure orders shall be based on evidence presented to the APCO that the area considered for such order has caused or contributed to an exceedance of the NAAQS or State Standard. Areas that are deferred for controls under the procedures in Paragraph 2.B because of the presence of significant cultural resources, then re-ordered for controls per those procedures, shall not be counted as part of the 4.8 square miles allowed for BACM Contingency Measures. Although the City may provide comment on a proposed BACM Contingency Measures order by the APCO, the City shall not appeal or contest the APCO's order for dust controls included in the combined 53.4 square miles now or in the future in any administrative or judicial forum, under any law, statute or legal theory whatsoever including Section 42316.

B. Except for the 4.8 square mile BACM Contingency Measure area and any area re-ordered for control under Paragraph 2.B of this Judgment, the District shall not issue any further orders for mitigation measures to the City under Section 42316 or any other law, including but not limited to SCRDs, requiring the City to control windblown dust emissions (including PM 10, PM 2.5 or any speciated components or products of PM) from any areas on the dried Owens Lake bed beyond the combined 53.4 square miles. The provisions in this paragraph do not apply to fee orders issued to the City under Section 42316, or any orders for areas that are not on the dried Owens Lake bed.

C. The BACM Contingency Measures provided under this paragraph will be limited to the Owens Lake bed below elevation 3,600.00 feet above mean sea level ("amsl") and above the natural brine pool at elevation 3,553.55 feet amsl.

D. The BACM Contingency Measures areas will be controlled with waterless or water-neutral dust control measures by offsetting any new or increased water use with water savings elsewhere on the lakebed.

E. The BACM Contingency Measures shall be installed by the City and be operational within three years of the date that the APCO orders City to implement the BACM Contingency Measures, except that if the City selects the use of managed vegetation for its BACM for any of the areas ordered for BACM Contingency Measures, the City will be allowed an additional two years to achieve full vegetation-cover compliance for those areas. The implementation deadline set forth in this paragraph is subject to the Force Majeure and Stipulated Penalties provisions set forth in Paragraphs 14 and 15 below. The City shall be solely responsible for all CEQA compliance, and to the extent joint documents are prepared under CEQA and NEPA, for CEQA/NEPA compliance, and all lease and permit requirements associated with any Contingency Measures.

F. Within 60 days of the date that the APCO orders City to implement the BACM Contingency Measures, the City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a RAP that provides for the completion of those measures by the time deadlines provided in Paragraph 3.E above. The plan shall contain intermediate milestones specifying the completion dates for CEQA/NEPA compliance, construction bid award and control measure compliance.

4. Monitoring

A. For PM_{10} monitoring, the City shall grant an irrevocable right in perpetuity to the District to site air monitors on City-occupied or unoccupied property in communities located in the OVPA at the District's sole discretion, shall provide electric power to those monitors if such power source is under the City's control, and shall not interfere with the operation of those monitors, cut off their power supply (except for planned or emergency system outages), or take any other action to evict or remove the monitors.

5. Tillage with BACM Backup (TwB2)

A. In addition to the approved BACM in the 2008 SIP Order, the City may select a variation on the Shallow Flood BACM called Tillage with BACM Backup ("TwB2").

TwB2 is a District-approved variation of the approved Shallow Flood BACM that wets and/or roughens emissive Owens Lake bed surfaces to prevent air emissions. TwB2 consists of soil tilling and/or wetting within all or portions of Shallow Flood BACM PM_{10} control areas (TwB2 Areas) where sufficient shallow flood infrastructure and available water supply exists. The City shall at all times maintain all TwB2 areas in compliance with all conditions and procedures contained in this Stipulated Judgment such that TwB2 areas do not cause or contribute to exceedances of the PM_{10} Standard. The City shall have the sole duty to obtain all required approvals and permits required by law for TwB2. The District will support the City's efforts to obtain these approvals and permits in compliance with the law.

B. The City's selection and implementation of TwB2 shall comply with the "Protocol for Operation and Maintenance of Owens Lake Tillage with BACM Backup" attached hereto and made part of this Stipulated Judgment as Attachment B ("TwB2 Operations Protocol"). The TwB2 Operations Protocol addresses site selection, site dry-down, measures to prevent untilled drying surfaces from becoming emissive during dry-down, tilling, maintenance and rewetting. The City shall have sole discretion to modify the Operations Protocol as necessary to ensure efficient operation of TwB2.

C. The District's monitoring and enforcement of TwB2 Areas shall comply with the "Protocol for Monitoring and Enforcing Owens Lake Tillage with BACM Backup" attached hereto and made part of this Stipulated Judgment as Attachment C ("TwB2 Monitoring Protocol"). This protocol describes the data to be collected and methods of analysis to determine if TwB2 areas on the Owens Lake bed need maintenance and/or reflooding in order to maintain or reestablish control efficiency for compliance with the PM_{10} NAAQS. Based on data and after consulting with the City, the APCO shall have sole discretion to modify the TwB2 Monitoring Protocol in writing as necessary to ensure air quality protection.

D. The APCO may order, and the City is required to reflood a TwB2 area as provided in the TwB2 Monitoring Protocol. Within 37 days of notification by the APCO that a TwB2 area must be reflooded, the City shall complete reflooding of that area in accordance with approved Shallow Flooding BACM requirements. The City shall not appeal or contest the TwB2

Protocol, any revisions to that protocol that comply with this Paragraph 5, or the APCO's order to reflood a TwB2 area now or in the future in any administrative or judicial forum, under any law, statute or legal theory whatsoever including Section 42316, except the City may contest an APCO order to reflood a TwB2 area on the sole basis that the APCO did not follow the TwB2 Monitoring Protocol. Such a challenge shall be brought exclusively to this Court to enforce this Stipulated Judgment, and not by an appeal under Section 42316 or by any challenge in any other administrative or judicial forum.

E. The Parties agree to periodic joint inspections of the TwB2 Areas by the District and the City. The Parties shall agree to a standing time for meetings at least every other week after the City commences tillage for TwB2 to discuss the status of the surface conditions, whether re-tilling or re-flooding should be ordered to avoid unlawful dust emissions, and to foster collaboration and cooperation at the staff level. The District will provide the City with at least 24-hour notification of the time and location of the District's TwB2 field inspections and testing. Although the presence of City staff is not required during these inspections and testing by the District, this prior notification will give the City the opportunity to observe any TwB2 monitoring that the APCO will use to determine if a TwB2 area should be flooded.

F. The City may at its discretion file an application with the District to seek approval of tillage without TwB2 as BACM. The Parties shall follow the process in the 2008 SIP Order for this application.

G. The City shall be solely responsible to obtain all required approvals and permits required to implement TwB2. The District will support the City's efforts to obtain such approvals in compliance with the law.

6. <u>New and refined dust control measures</u>

A. The District will review new or refined dust control measures proposed by the City, and will approve a measure as MSM BACM if the District determines that the measure is consistent with the federal EPA's interpretation of the term Best Available Control Measure under the federal Clean Air Act and implementation of MSM as required for the Owens Valley nonattainment area. In assessing whether a dust control measure (including a new measure or extension of a previously identified measure to a new area) is BACM, the District will consider the technological feasibility of the measure, as well as energy, environmental, and economic impacts and other costs.

B. The Parties will continue to collaborate on the expedited testing of Tillage, Engineered Roughness Elements, Lake Brine and Dust Palliative Chemicals as candidate BACMs. The Parties further agree to identify additional candidate BACMs, as appropriate. New dust control measures should be waterless, where feasible. Where not feasible, new dust control measures should be water neutral by offsetting any new or increased water use with water savings elsewhere on the lakebed.

C. The Parties commit to a minimum of quarterly meetings and field visits to discuss and review BACM testing.

7. <u>Lake-wide efforts to reduce water use</u>

A. The City and the District commit to work together to jointly develop and propose "Dynamic Water Management" actions for incorporation into the 2015 SIP revision referenced in Paragraph 11. These actions may include "early water ramp-down" in non-emissive years. TwB2 is not a Dynamic Water Management concept. The proposed actions shall set forth the conditions upon which the APCO can approve the City's application to undertake these dynamic water management actions.

8. <u>Revision to the 2008 SIP Transition Procedure</u>

A. The District shall amend the 2008 SIP Order to increase the Transition Area project size limitation from 0.5 square miles for Managed Vegetation BACM, or 1.5 square miles for other BACM, as provided in Attachment D, Section 3 to the 2008 SIP Order, to 3.0 square mile at one time. The 3.0 square mile Transition Area shall be in addition to the TwB2 Areas implemented by the City as provide in Paragraph 5 above.

B. The City shall control emissions during Transition Area project construction periods as provided in the 2008 SIP Order at Attachment D, Section 3, and the Stipulated Abatement Order No. 110317-01 at Paragraph 8, dated March 17, 2011.

C. The City shall only conduct construction of a Transition Area project between July 1 of year when on-site work on the project begins, through December 31 of the next year when all such work shall be completed and the new controls shall be fully installed and operational. The completion deadline set forth in this paragraph is subject to the Force Majeure and Stipulated Penalties provisions set forth in Paragraphs 14 and 15 below.

9. <u>Cultural and Biological Resources</u>

Cultural and biological resource protection and mitigation shall be incorporated to the extent feasible as required by law into the design of dust control areas.

10. <u>Collaboration with Other Agencies</u>

A. The Parties agree to collaborate in their efforts to secure support for the terms of this agreement, agreement implementation, and obtaining necessary permits, leases and approvals with the California Air Resources Board, California Department of Fish and Wildlife, California State Historic Preservation Office, California State Lands Commission, California Native American Heritage Commission, U.S. Army Corps of Engineers, U.S. Bureau of Land Management, U.S. Environmental Protection Agency and private parties owning land in the areas to be controlled in Phases 9 and 10. The Parties plan to continue to meet with these agencies to prepare them for favorable decisions on future dust control projects and revisions to the SIP.

B. The Parties are aware that all final approvals necessary for TwB2 may not be obtained before this Stipulated Judgment is executed and approved, and anticipate obtaining those approvals after the entry of this judgment.

11. <u>2015 SIP revision and CEQA/NEPA compliance</u>

A. By July 1, 2015, the City shall prepare and consider for certification the environmental impact analysis documents required by the California Environmental Quality Act ("CEQA") and, if applicable, the National Environmental Policy Act ("NEPA") necessary to proceed with Phase 9/10 Project.

B. By December 31, 2015, the District shall prepare a SIP revision that consists of the 2008 SIP Order and the provisions of this Stipulated Judgment ("2015 SIP Order"). The City shall support and not challenge the adoption of the 2015 SIP Order by the District Governing Board, CARB and EPA, except that the City may challenge any new term that the City has not agreed to in advance, and that is not contained in the 2008 SIP Order as modified by this Stipulated Judgment.

C. The City shall not appeal or contest the 2015 SIP Order that contain the terms of this Stipulated Judgment now or in the future in any administrative or judicial forum, under any law, statute or legal theory whatsoever including CEQA or Section 42316, and agrees that the terms of that 2015 SIP Order are valid and reasonable under Section 42316.

D. The District intends to act as a responsible agency and use the City's Phase 9/10 CEQA/NEPA documents to act on the SIP revision. If the City's CEQA/NEPA document is not adequate for the District's approval purposes, the District shall have until December 31, 2016 to act on the SIP revision.

E. The Parties have developed the terms of this Stipulated Judgment with the intention that its provisions will be incorporated into the 2015 SIP Order and are consistent with applicable provisions of federal, state and local law, including Section 42316, including all applicable provisions of federal law regarding attainment of the NAAQS and exceptional events.

12. Owens Lake Scientific Advisory Panel

A. The Parties agree to establish the Owens Lake Scientific Advisory Panel ("OLSAP" or "Panel") under the authority of the California Health and Safety Code Section 42316 and the Los Angeles City Charter. The Parties will contract with the National Academy of Sciences ("NAS") to establish, staff and administer the OLSAP pursuant to the NAS study process found at http://www.nationalacademies.org/studyprocess/index.html.

B. The purpose of OLSAP is to evaluate, assess and provide ongoing advice on the reduction of airborne dust in the Owens Valley. The Panel will review scientific and technical issues related to the research, development and implementation of waterless and low-water use BACM, and other approaches to reduce dust in the Owens Valley. The Parties intend for the Panel to foster communication and understanding on the scientific and technical approaches and become a vehicle for increased cooperation and collaboration between District and the City in balancing the requirement to meet air quality standards and conserve water.

C. The Panel will hold meetings, analyze issues, review and compile information, produce reports, make recommendations and undertake other activities necessary to meet its responsibilities. The Panel will initially be assigned the following task:

i. Evaluate the effectiveness of alternative dust control methodologies for their degree of PM_{10} reduction at the Owens Lake bed and reduce use of water in controlling dust emissions from the dried lake beds. The evaluation should consider associated energy, environmental and economic impacts, and assess the durability and reliability of such control methods.

Additional issues for the NAS may be submitted to the Panel by the General Manager of the Los Angeles Department of Water and Power ("LADWP"), or the APCO. The OLSAP shall function per the "Study Process: Guidelines of the NAS" found at http://www.nationalacademies.org/studyprocess/index.html. The City and the District will promptly respond to requests for information from the Panel.

D. Term and Estimated Number and Frequency of Meetings. Until January 1, 2025, the Panel will meet in person at least once annually. When actively working on issues, the Panel shall meet in person at least two times a year. The Panel may meet more often in person, telephonically or by other networked conferencing means as needed. When issues are referred to the Panel, the Panel shall convene to discuss within 60 days, provide an initial work plan within three (3) months and a final report within eighteen (18) months, unless an extension is granted by agreement of both parties.

E. The NAS will submit the Panel's reports to the Chair of the District Governing Board and the APCO, and the President of the Board of the LADWP and General Manager of LADWP.

F. The duties of OLSAP are solely advisory in nature and in no way alter the authority and responsibility of the District, District Board or the APCO. The City and the District will give due consideration to the Panel's findings and recommendations.

G. All financial support for the OLSAP shall be provided by the City pursuant to fee orders from the District under Section 42316. The Parties estimate that the annual costs of the Panel will be approximately $500,000 to $750,000, but may vary based on the statement of work and tasks submitted to the NAS. The City shall be responsible to provide additional funding to the Panel for reporting and analyzing new and relevant testing data up to $2,000,000 annually. The City and the District will make best efforts to jointly seek further funding and in-kind support opportunities from other organizations.

13. Sacramento lawsuit and pending CARB appeals

A. The Parties stipulate and agree that all terms in the Stipulated Judgment are valid and reasonable under Section 42316 and under any and all other laws. The City waives any challenge to the terms of this Stipulated Judgment and shall not now or in the future challenge or oppose the terms of this Stipulated Judgment in any administrative or judicial forum, under any law, statute or legal theory whatsoever including but limited to Section 42316.

B. Within three days of entry of this Stipulated Judgment, the City shall dismiss its appeal of the 2012 SCRD by the District if CARB has not yet issued its written decision on that appeal. If CARB has issued that written decision on the 2012 SCRD appeal, that decision shall be deemed final and binding, and the City shall not appeal or otherwise challenge that CARB decision to the Superior Court or in any other judicial or administrative forum. The City shall dismiss its appeal of the 2013 SCRD and not appeal the 2014 SCRD by the District. The City shall not appeal or contest the 2012 SCRD, 2013 SCRD or 2014 SCRD now or in the future in any administrative or judicial forum, under any law, statute or legal theory whatsoever including Section 42316.

C. The CARB Decision referenced in Preamble Paragraph U shall be deemed final and binding on the Parties. In addition, if the Court has issued its final ruling on the City's writ of mandate as referenced in Preamble Paragraph V, that ruling shall also be deemed final and binding on the Parties. The City shall not challenge the orders for BACM Contingency Measures referenced in Paragraph 3.A, or the revised 2015 SIP as provided in Paragraph 11, based upon any of the arguments asserted by the City in its appeals of the 2011 SCRD, 2012 SCRD, 2013 SCRD or 2014 SCRD, or in the instant case.

14. Force Majeure

A. "Force Majeure" as used in the paragraphs above relating to the Phase 9/10 project

(Paragraph 2.A), Contingency Measure projects (Paragraph 3.E), and Transition Area projects (Paragraph 8.C), is defined as one of the following events that prevents the City's performance of the specified act by the deadline set forth in that Paragraph: (a) any act of God, war, fire, earthquake, windstorm, flood, severe drought that is declared as an official state of emergency by the Governor of the State of California, or natural catastrophe; (b) unexpected and unintended accidents (excluding those caused by the City or the negligence of its agents or employees); civil disturbance, vandalism, sabotage or terrorism; (c) restraint by court order or public authority or agency; (d) action or non-action by, or inability to obtain the necessary authorizations or approvals from any governmental agency, provided that the City demonstrates it has made a timely and complete application to the agency and used its best efforts to obtain that approval, or (e) the inability to obtain private property owner access, provided that the City demonstrates it has made a timely and complete request to the owner, and used its best efforts to obtain that access. Force Majeure shall not include normal inclement weather, other asserted shortages of water, economic hardship or inability to pay.

B. The City's performance of its duties under Paragraph 14.A will be temporarily postponed only during the condition of Force Majeure, but not excused, and the City will continue to be responsible to recommence performance of its actions to comply with the deadlines at the end of the Force Majeure event. The deadlines for performance shall automatically be extended by the period of interruption caused by the Force Majeure event. The City shall exercise due diligence to resolve and remove any Force Majeure event. Nothing in this paragraph shall be interpreted to relieve the City of its obligations and duties under all applicable laws.

C. Any party seeking to rely upon this paragraph to excuse or postpone performance under Paragraph 14.A shall have the burden of establishing each of these elements to this Court with jurisdiction over this Stipulated Judgment, and that it could not reasonably have been expected to avoid the event or circumstance, and which by exercise of due diligence has been unable to overcome the failure of performance.

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15. Stipulated Penalties

A. The City shall be subject to notices of violation from the APCO and stipulated daily penalties for failure to meet dust control measure completion deadlines set forth in this Stipulated Judgment for the Phase 9/10 project (Paragraph 2.A), Contingency Measure projects (Paragraph 3.E), and Transition Area projects (Paragraph 8.C), except as excused by a condition of Force Majeure as defined in Paragraph 14. The amount of the daily penalty for each missed deadline shall be determined by the following formula:

Stipulated daily penalty ($/day) = $10,000 – $4500 ($A_C/A_R$),

where

A_C = Dust control area required by the APCO that is completed and compliant (square miles), and

A_R = Total dust control area required by the APCO (square miles).

B. The City shall pay any stipulated daily penalties within 90 days of any notice of violation from the APCO for failure to meet these deadlines. The City shall not challenge or oppose its duty to pay the stipulated daily penalty in any administrative or judicial forum, under any law, statute or legal theory whatsoever including H&S Section 42316(b).

C. This Paragraph 15 applies only to the failure to meet dust control measure completion deadlines as set forth in Paragraphs 2.A, 3.E and 8.C and does not apply to any other notice of violation or enforcement of laws by the District or its APCO.

16. Sacramento County Superior Court to Retain Jurisdiction

The Sacramento County Superior Court shall retain jurisdiction over the Stipulated Judgment including the enforcement of its terms. Either Party to this Stipulated Judgment may file an *ex parte* application or noticed motion before this Court to show a violation of the terms of this Stipulated Judgment and/or to enforce its terms. Before either Party files such a motion or application, they agree to meet and confer with the other Party at least seven days before the filing, either in person or by telephone, to attempt to resolve the dispute.

17. Final Resolution of Claims

This Stipulated Judgment is intended to be the full and final resolution of all claims and causes of action raised in this action by the Parties, including those relating to this action, the 2011 SCRD, 2012 SCRD, 2013 SCRD and 2014 SCRD.

18. <u>Additional Provisions</u>

A. <u>Execution of Additional Documents</u>. Each of the Parties agrees to promptly do such acts and execute such additional documents as might be necessary to carry out the provisions and effectuate the purposes of this Stipulated Judgment.

B. <u>Authority</u>. Each person executing this Stipulated Judgment on behalf of an agency or other entity represents that he or she has the full legal right, power and authority to execute and deliver this Stipulated Judgment and to bind the Party for whom such individual is signing, and to cause such Party to perform its obligations hereunder.

C. <u>Exclusive Remedy</u>. By executing this Stipulated Judgment, each of the Parties acknowledges and agrees that the rights and remedies provided in this Stipulated Judgment shall be the sole and exclusive rights and remedies surviving as between and among the Parties hereto relating to the subject matter of this Stipulated Judgment.

D. <u>No Reliance on Others</u>. No representations, oral or otherwise, express or implied, other than those contained herein have been made by any Party, or any officer, director, commissioner, agent, affiliate, attorney or employee thereof. By executing this Stipulated Judgment, each of the Parties warrants and represents that this Stipulated Judgment is made and entered into without reliance upon any statements or representations of any other Party, or in reliance upon any statements or representations made by any officers, directors, commissioners, agents, affiliates, insurer, attorneys or employees, of any other Party.

E. <u>Independent Investigation</u>. Each of the Parties warrants and represents that he, she or it has made its own independent investigation, in the manner deemed necessary and appropriate by them, of the facts and circumstances surrounding this Stipulated Judgment and the agreements contained herein, and that through such independent investigation, each Party has satisfied itself that the execution of this Stipulated Judgment and entry into the agreements contained herein is in his, her or its best interest and are in compliance with the law. Also, each of the Parties warrants and represents that his, her or its independent investigation has included, but not been limited to, receipt of independent advice by legal counsel on the advisability of entering into this Stipulated Judgment and making the agreements contained herein, and that the Stipulated Judgment is in compliance with the law.

F. Litigation Expenses. Upon the entry of the Stipulated Judgment, neither Party shall further seek an award from this Court of the costs of suit and attorneys' fees incurred and/or accrued in connection with this lawsuit.

G. Construction of Agreement. Each of the Parties has cooperated in the drafting and preparation of this Stipulated Judgment and, therefore, any construction of the intent of the Parties or language hereof to be made by a court or arbitrator shall not be construed against any of the Parties. This agreement shall be construed in accordance with the laws of the State of California.

H. Comprehension of Terms. Each of the Parties warrants and represents that he, she and it has read this Stipulated Judgment in full, consulted with their legal counsel regarding its terms, fully understands each and every provision hereof, and agrees to be bound by all of the terms and provisions set forth herein.

I. Severability. Any portion of this Stipulated Judgment found to be invalid, void or unenforceable shall be deemed severable from the remainder of this Stipulated Judgment and shall not invalidate the remainder of the paragraph in which it is located or the remainder of this Stipulated Judgment.

J. Merger and Integration. This Stipulated Judgment contains the full and entire agreement between and among the Parties with respect to the entire subject matter hereof and supersedes any and all prior or contemporaneous agreements and discussions, whether written or oral. Any and all prior or contemporaneous discussions, negotiations, writings, commitments and/or undertakings related hereto are merged therein.

K. Amendment. This Stipulated Judgment may be amended only by a written agreement signed by all Parties and approved by this Court.

L. Counterparts. This Agreement may be executed and delivered by facsimile or emailed in pdf format and in any number of counterparts, each of which shall be deemed an original.

M. Notice. Any notice required or permitted to be given under the terms of this Stipulated Judgment shall be in writing and delivered by email and Overnight Mail. Notices shall be sent to the following persons:

To: Great Basin Unified Air Pollution Control District

Theodore D. Schade
Air Pollution Control Officer
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, CA 93514
Telephone: (760) 872-8211
Email: tschade@gbuapcd.org

With a copy to:

Peter Hsiao, Esq.
Morrison & Foerster LLP
707 Wilshire Boulevard. Suite 6000
Los Angeles, CA 90017-3543
Telephone: (213) 892-5200
Email: phsiao@mofo.com

To: City of Los Angeles Department of Water and Power

Attention: Marcie L. Edwards, General Manager
City of Los Angeles Department of Water and Power
111 North Hope Street, Room 1550
Los Angeles, CA 90012-2607
Telephone: (213) 367-1338
E-mail: marcie.edwards@ladwp.com

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With copies to:

Edward J. Casey, Esq.
Alston & Bird LLP
333 South Hope Street, 16th Floor
Los Angeles, CA 90071
Telephone: (213) 576-1000
E-mail: ed.casey@alston.com

And

Julie Riley, Deputy City Attorney
Los Angeles City Attorney's Office
111 North Hope Street, Suite 340
Los Angeles, CA 90051
Telephone: (213) 250-7357
E-mail: julie.riley@ladwp.com

Notice shall be deemed given as of the date of transmission of the notice.

Any Party may change its addressee(s) for notice by providing written notice of such change in accordance with the requirements of this paragraph of the Stipulated Judgment.

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THE UNDERSIGNED SIGNATORIES represent that they have all necessary authority to agree and enter into this Stipulated Judgment on behalf of their respective party.

REVIEWED AND AGREED TO:

Dated: 12-3-14, 2014

Marcie L. Edwards
General Manager, Los Angeles Department of Water and Power

The City of Los Angeles
By and Through the
Los Angeles Department of Water and Power

Dated: December 19, 2014

Theodore D. Schade
Air Pollution Control Officer

Great Basin Unified Air Pollution Control District

APPROVED AS TO FORM AND LEGALITY:

Dated: 19 December, 2014

Michael N. Feuer, City Attorney
Julie C. Riley
Deputy City Attorney

Attorney for Petitioner and Plaintiff
The City of Los Angeles
By and Through the
Los Angeles Department of Water and Power

Dated: December 19, 2014

Peter Hsiao
Morrison & Foerster, LLP

Attorney for Respondent and Defendant
People of the State of California and the
Great Basin Unified Air Pollution Control District

Attachment A – Court Final Ruling and Order
Attachment B – TwB2 Operations Protocol
Attachment C – TwB2 Monitoring Protocol

THIS STIPULATED JUDGMENT IS REVIEWED, APPROVED AND ENTERED AS THE JUDGMENT OF THE COURT.

Dated: December 30, 2014

Honorable Shelleyanne W.L. Chang
Sacramento County Superior Court Judge

SUPERIOR COURT OF CALIFORNIA COUNTY OF SACRAMENTO

EXHIBIT A

SUPERIOR COURT OF CALIFORNIA

COUNTY OF SACRAMENTO

DATE: JUDGE:	December 16, 2014 HON. SHELLEYANNE W. L. CHANG	DEP. NO.: CLERK:	24 E. HIGGINBOTHAM

CITY OF LOS ANGELES, a California Municipal Corporation, ACTING BY AND THROUGH ITS DEPARTMENT OF WATER AND POWER, Petitioner and Plaintiff, v. CALIFORNIA AIR RESOURCES BOARD; EXECUTIVE OFFICER OF THE CALIFORNIA AIR RESOURCES BOARD, in his official capacity, GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT; and DOES 1-100, Respondents and Defendants. CALIFORNIA STATE LANDS COMMISSION; and DOES 101-500, Real Parties in Interest.	Case No. 34-2013-80001451
Nature of Proceedings:	RULING ON SUBMITTED MATTER AND ORDER: PETITION FOR WRIT OF MANDATE

The Court issued a Tentative Ruling on September 25, 2014, in which it denied the Petition for Writ of Mandate. The parties appeared for oral argument on September 26, 2014, and were represented by counsel as stated on the record. After oral argument, the Court took the matter under submission. The Court rules as follows

The City of Los Angeles (City) petitions for a writ of mandate that (1) declares void the 2011 Supplemental Control Requirements Determination (2011 SCRD) issued by Respondent Great Basin Unified Air Pollution District (District), and (2) invalidates the decision of Respondent California Air Resources Board (CARB) affirming the 2011 SCRD. The Petition is **DENIED**.

I. BACKGROUND

a. Background Facts and Law

This litigation reflects the long-running dispute between the City and agencies such as Respondents, which have jurisdiction over air quality affected by the City's water diversion. The City has been drawing water from the Owens River for over 100 years.

This diversion has dried the Owens Lake Bed, creating large volumes of dust, in particular, the pollutant PM_{10}.[1] (CARB OL A:006453.)[2]

The instant litigation arises from the District's issuance of an order (2011 SCRD) that requires the City to mitigate PM_{10} on an additional 2.86[3] square miles of the Owens Lakebed.

i. Background Law

Before discussing the facts, the Court provides an overview of the pertinent law to explain the regulatory relationship between the City, the District, and CARB.

Under the federal Clean Air Act, the United States Environmental Protection Agency (EPA) is charged with identifying air pollutants and setting National Ambient Air Quality Standards (NAAQS), identifying areas that do not meet the NAAQS for criteria pollutants, and directing the creation of State Implementation Plans (SIPs) to attain the NAAQS for the pollutants. (*See*, First Amended Petition (FAP), ¶¶ 22-26; *see also* 42 U.S.C. § 7410.) CARB has the responsibility and authority to meet the Clean Air Act's SIP requirements through each of the State's 35 air pollution control districts. (FAP, ¶ 28.) The District is one such air pollution control district.[4] (FAP, ¶¶ 22-26.)

In 1987, the EPA found that the Owens Valley Planning Area (OVPA) (in which the Owens Lake and District are located) did not meet the NAAQS for PM_{10}, a designated criteria pollutant. (AR: 2g:1769; CARB OL A:006454.) In 1993, the EPA reclassified the OVPA as a "serious non-attainment area" for PM_{10}. (*Id.*) The District manages air quality in the OVPA through SIPs, which are submitted to and approved by "the State" (CARB) and then to the EPA. (*See* 42 U.S.C. § 7410.) The District regulates the PM_{10} emissions caused by the City's water diversion through SIPs, SCRD orders, and an agreement, as described later in the ruling.

In 1983, Health and Safety Code[5] section 42316 was enacted to resolve disputes between the City and District regarding water diversion and air quality. Section 42316 provides in pertinent part:

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[1] PM_{10} refers to particulate matter 10 microns or less in diameter. (CARB OL A:006453.)

[2] Citations to the administrative proceedings before CARB appear as "CARB OL A:____." Other citations to the administrative record appear as "AR volume number, volume letter:bates number" (e.g., AR 2g:1789.)

[3] Although the SCRD initially required the City to implement mitigation on 2.93 square miles, the District issued a revised SCRD reducing the new control area from 2.93 to 2.86 square miles. (CARL OL A: 6458.)

[4] The District is formed pursuant to Health and Safety Code sections 40000 *et seq.*

[5] Unless otherwise specified, all future references shall be to the Health and Safety Code.

> (a) The Great Basin Air Pollution Control District may require the City of Los Angeles to undertake reasonable measures, including studies, to mitigate the air quality impacts of its activities in the production, diversion, storage, or conveyance of water and may require the city to pay, on an annual basis, reasonable fees, based on an estimate of the actual costs to the district of its activities associated with the development of the mitigation measures and related air quality analysis with respect to those activities of the city. The mitigation measures shall not affect the right of the city to produce, divert, store, or convey water and, except for studies and monitoring activities, the mitigation measures may only be required or amended on the basis of substantial evidence establishing that water production, diversion, storage, or conveyance by the city causes or contributes to violations of state or federal ambient air quality standards.
>
> (b) ***The city may appeal any measures or fees imposed by the district to the state board [CARB]*** within 30 days of the adoption of the measures or fees. [CARB], on at least 30 days' notice, ***shall conduct an independent hearing on the validity of the measures*** or reasonableness of the fees which are the subject of the appeal. The decision of [CARB] shall be in writing and shall be served on both the district and the city. Pending a decision by [CARB], the city shall not be required to comply with any measures which have been appealed. ***Either the district or the city may bring a judicial action to challenge a decision by [CARB] under this section. The action shall be brought pursuant to Section 1094.5 of the Code of Civil Procedure*** and shall be filed within 30 days of service of the decision of [CARB].... (Health & Saf. Code, 42316 (emphasis added).)

Thus, the District may require the City to undertake reasonable mitigation measures to mitigate the air quality impacts of diverting water, which must be supported by substantial evidence establishing that the City's water diversion causes the violations. Section 42316 also sets forth the process by which the City and District resolve disputes about the reasonableness of the mitigation measures. The City may appeal District orders to CARB. CARB then "conduct[s] an independent hearing on the validity of the measures." Either party may then file a petition for writ of mandate pursuant to Code of Civil Procedure, section 1094.5. (Health & Saf. Code, § 42316.)

The parties agree that Section 43216 governs this litigation.

b. Procedural Background

The City implements dust suppression measures on approximately 43 square miles of the Owens Lake Bed. (CARB OL A:6454-6455.) The City implements these measures pursuant to Supplemental Control Requirements Determinations (SCRD) from the District that have been incorporated into various SIPs, and a 2006 Agreement between the City and District. (*Ibid*; *see also*, AR 2g:1769-1770.)

In late 2006, the City and District entered into an Agreement to settle litigation in which the City challenged a SCRD issued by the District's Air Pollution Control Officer (APCO). (AR 2g:1769-1770.) The Court refers to this Agreement as the "2006 Agreement." Among other things, the City agreed to:

- **Apply Dust Control Measures on additional areas of the Owens Lakebed,** beyond the 29.8 square miles required by the 2003 SIP. (AR 2g:1770.)

- Work with the District to improve the current "Dust ID Program" used to monitor PM_{10} emissions. (AR 2g:1774-1775.)

- **Allow the APCO to "recommence" written SCRDs, under the "revisions to the 2003 SIP."** Pertinent here, the SCRDs will use Dust ID Data collected after April 1, 2010, and shall be made once every calendar year. (AR 2g:1778.)

- **Abide by a particular dispute resolution process if it did not agree to a SCRD issued by the APCO.** If the City and District dispute a SCRD, "the City may appeal future [SCRDs] to CARB under the provisions of... Section 42316....provided that the Parties expressly intend that this Agreement be the final resolution regarding existing disputes between the Parties that are the subject of this Agreement.....*[T]he City stipulates and agrees that all of the provisions and determinations*, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the [SCRD] dated April 4, 2006, which the City in good faith disputed, *shall be deemed to be valid and reasonable*, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceedings, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future [SCRD] under Section 42316; *however any arguments or challenges must be based on data or information that do not currently exist, but that exist after the execution of this Agreement.* (AR 2g:1779 (emphasis added).)

In 2008, the District issued order #080128-01 (2008 Order). The 2008 Order incorporated the 2006 Agreement and approved the 2008 SIP, which regulated the PM_{10} emissions caused by the City's water diversion. The 2008 Order has been approved by CARB and the EPA under the 2010 Coso Junction Maintenance Plan, and has not been challenged by the City. (See AR 2a:899-900; CARB OL A: 6457.)

The 2008 Order ordered the City to continue to implement certain PM_{10} controls (Best Available Control Measures or BACMs) on 29.8 square miles of the Owens Lakebed, and then on other specified portions of the Lakebed for a total of 43.0 square miles of "Total Dust Control Area." (AR 3a:1815-1816.) The 2008 Order specified the BACM mitigation measures that could be used by the City: shallow flooding, managed vegetation, and gravel blanket.[6] (AR 3a:1820-1842.)

[6] The 2008 Order also specified that "Moat and Row," an alternative mitigation measure, was not currently approved by the District. (AR 3a:1825-1825.)

The 2008 Order also provided that at least once a year, the District's APCO will make a written determination as to whether any areas, in addition to those required by the 2008 Order require additional mitigation to comply with the NAAQS for PM_{10}. (AR 3a:1817.) The 2008 Order further provided that once the APCO issues such a determination, the City must implement the BACM mitigation and comply with the California Environmental Quality Act (CEQA) and secure any necessary permits to implement the mitigation. (AR 3a:1818.)

On August 1, 2011, the District APCO issued the 2011 SCRD. The 2011 SCRD orders the City to "implement, operate and maintain air pollution control measures on an additional 2.86 square miles" of the Owens Lake Bed. (AR 2a:906.) The 2011 SCRD states that the City may use any combination of the three approved BACM measures: shallow flooding, managed vegetation, or gravel. (Id.; CARB OL A 6457.)

The City appealed the 2011 SCRD to CARB pursuant to Section 42316. Following a June 15, 2012 administrative hearing, CARB issued a decision affirming the District's SCRD on November 19, 2012. (CARB OL A: 006451-006483.)

The City filed a petition for a writ of mandate in the Superior Court for Los Angeles County, which was then transferred to the Superior Court for Sacramento County. The City amended its petition to add claims for declaratory relief. In February 2014, the Court granted Respondents' motion for judgment on the pleadings as to each claim for declaratory relief. This ruling addresses the remaining writ causes of action.

II. DISCUSSION

a. Requests for Judicial Notice

On January 21, 2014, the City submitted a request for judicial notice (RJN) in support of its Reply Briefs. Because the RJN was unopposed by any party, the Court granted the City's request in its tentative ruling.

At the hearing, the District objected to the Court's ruling, because the exhibit attached to the RJN, a statement from Governor's Office "Declar[ing] a Drought State of Emergency," was not in the administrative record. The District had nine months to make this objection. Because it is untimely, the District's objection is **OVERRULED**. In any event, the Court's consideration of the City's Request for Judicial Notice does not alter the outcome of the ruling.

The District also asked the Court at the hearing to disregard other evidence cited by the City in its Reply Brief (to the District) that was stricken from the administrative record. These objections are **OVERRULED**, as they are untimely. In any event the citations do not alter the Court's ruling.

b. California State Lands Commission

Real Party in Interest California State Lands Commission (CSLC) objects to being named as a party, because it did not take any actions subject to mandate. This contention is inapposite. A real party in interest includes any person or entity whose interest will be directly affected by the proceeding, or anyone having a direct interest in the result, which is therefore entitled to notice of the proceedings. (*Sonoma County Nuclear Free Zone v. Superior Court* (1987) 189 Cal.App.3d 167, 173-174.) CSLC owns a portion of the Owens Lakebed upon which the City must implement mitigation measures. As its ownership interests could be affected, it is properly named as a Real Party in Interest.

CSLC clarified at the hearing that it did not object to being named a Real Party in Interest, but objected to the extent that the City was trying to seek mandate relief against it. The City replied that it is not seeking mandate relief against the CSLC, and this contention is apparent from the Petition.

c. Standard of Review

i. The Court Reviews CARB's Decision

As a preliminary matter, the Court rejects the City's argument that because it "appealed" the 2011 SCRD issued by the District, the Court must review the District's decision to issue the 2011 SCRD, not the CARB decision that affirmed it. The plain language of Section 42316 says otherwise: "Either the district or the city may bring a judicial action to challenge a decision by [CARB]" pursuant to Code of Civil Procedure section 1094.5. (Health & Saf. Code, § 42316, subd. (b).) This language indicates that the Court reviews *CARB's* decision.

The City argues that, by analogy, the Court may review the District's decision because Water Code sections 13320 and 13330 allow courts to review a regional water board's order, which is administratively appealable to the State Water Resources Control Board (State Board). The Court rejects this argument.

Unlike Section 42316, Water Code sections 13330 and 13320 make express reference to the reviewability of regional board decisions for which the State Board denies review. (Water Code, § 13330, subd. (b).) Additionally, the California Supreme Court has interpreted these statutes to reflect that "decisions and orders of the [regional board], including the issuance and renewal of NPDES permits, are reviewable by administrative appeal to the State Water Board, and then by petition for administrative mandamus in the superior court." (*Voices of the Wetlands v. State Water Resources Control Board* (2011) 52 Cal.4th 499, 516.) In contrast to these Water Code provisions, no published appellate authority has construed Section 42316. Thus, procedurally, these statutes are inapposite as Petitioner is not seeking review of a decision by a regional board and this is not a case where the State Board has denied review.

The City also contends that the Court may review the District's decision, because CARB's hearing was an appellate hearing and not a true *de novo* hearing. However, Section 42316 provides that the City may appeal any mitigation measures or fees imposed by the District to CARB, which shall conduct an "independent hearing on the validity of the measures." (Health & Saf. Code, § 42316, subd. (b).) The statute expressly provides that the hearing by CARB is *de novo*.

Accordingly, the Court reviews CARB's decision.

ii. Review of CARB's Decision

The Court reviews CARB's decision to determine "whether the respondent has proceeded without, or in excess of, jurisdiction; whether there was a fair trial; and <u>whether there was any prejudicial abuse of discretion</u>. Abuse of discretion is established if the respondent has not proceeded in the manner required by law, the order or decision is not supported by the findings, or the findings are not supported by the evidence." (Code Civ. Proc., § 1094.5, subd. (b) (emphasis added).) "[A]buse of discretion is established if the court determines that the findings are not supported by substantial evidence in the light of the whole record." (*Ibid*, § 1094.5, subd. (c).)

The parties agree that the standard of review for CARB's factual determinations,[7] e.g., whether the mitigation measures in the 2011 SCRD are "valid," is whether they are supported by substantial evidence. (*Sierra Club v. California Coastal Comm'n* (1993) 19 Cal.App.4th 547, 556-557; Health & Saf. Code, § 42316, subd. (b).)

CARB's decision is presumed to be supported by substantial evidence, and Petitioner bears the burden of showing that there is no substantial evidence to support the findings of the agency. (*Ross v. California Coastal Comm'n* (2011) 199 Cal.App.4th 900, 921.) Petitioner argues that the Court must "weigh the evidence." This is incorrect. In reviewing CARB's decision, the Court examines the entire administrative record and considers all relevant evidence, including evidence that detracts from the decision. (*Ibid.*) Although this task may involve some weighing to fairly estimate the worth of the evidence, that limited weighing does not constitute independent review where the Court substitutes its own findings and inferences for the agency's. (*Id.* at p. 922.) Rather, it is for CARB to weigh the evidence, and the Court may reverse CARB's decision only if, based on the evidence, a reasonable person could not have reached the conclusion CARB reached. (*Ibid.*)

The parties agree that the Court reviews *de novo* whether CARB has complied with procedural requirements (*see Citizens for East Shore Parks v. California State Lands Comm'n.* (2011) 202 Cal.App.4th 549, 557) and issues of law (*see Pasternak v. Boutris* (2002) 99 Cal.App.4th 907, 918).

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[7] Such factual determinations include disagreements regarding the methodology used for assessing environmental impacts, and reliability or accuracy of data upon which the agency relies. (*North Coast Rivers Alliance v. Marin Mun. Water Distr.* (2013) 216 Cal.App.4th 614, 642-643.)

d. The City Has Failed to Show that CARB Did Not Follow Proper Procedures in Conducting the Hearing

The City argues that CARB abused its discretion by failing to comply with procedures required by law because CARB did not conduct a true "independent" hearing. Namely, the City argues that the CARB Executive Officer admitted some evidence but did not consider the City's. The City has shown no prejudicial abuse of discretion.

The Executive Officer conducting the hearing on behalf of CARB[8] declined to conduct a "new unlimited evidentiary hearing." (CARB OL A:006458-6459.) He interpreted Section 42316's "independent hearing" requirement to mean that he would apply his independent judgment in reviewing the 2011 SCRD. He also decided to limit the evidence to the "administrative record" before the District, plus any additional evidence admitted to augment the record, and rule *do novo* on this evidence. (*Ibid.*) The Executive Officer outlined these rules in January 17, 2012 First Procedural Order issued at the outset of the administrative process, and after argument and briefing from the parties. (CARB OL A:000915, *et seq.*)

Specifically, the Executive Officer issued a procedural order permitting the administrative record to be augmented only if (1) the evidence was presented to and accepted by the District but was mistakenly omitted from the record, (2) is relevant, but could not, with the exercise of reasonable diligence, have been presented to the District before the 2011 SCRD issued, or (3) the parties stipulated to admit the evidence. (CARB, OL A:000963.)

The City contends that the Executive Officer denied the City's motions and requests to introduce new evidence into the record. The City has failed to demonstrate how these alleged errors were prejudicial, notably, by not describing what the evidence was and how its omission assisted CARB or how its admission would have assisted the City.

The City argues that CARB erroneously disallowed the City from presenting unidentified new evidence—first on March 7, 2012, and then on November 19, 2012 when the City submitted some "declarations and supporting documents"[9] with its Opening and Reply briefs in the CARB hearing. (CARB OL A:006459-6460.) The improper exclusion of competent and material evidence may constitute a prejudicial abuse of discretion, particularly if it relates to a defense. (*King v. Board of Med. Examiners* (1944) 65 Cal.App.2d 644, 649.) Here, the City has not even identified what the evidence is and how it is competent and material. Accordingly, the City has not shown that the Executive Officer prejudicially abused his discretion.

Second, the City argues that CARB "re-ran" technical data and allowed its staff to testify as witnesses, but did not allow the City to cross-examine those staff. CARB disputes the accuracy of these statements. The City has not shown that CARB prejudicially abused its

[8] For the sake of convenience, this ruling may refer to the acts of the Executive Officer as "CARB."
[9] The City does not further explain the nature of the evidence it sought to introduce.

discretion. Beyond these vague statements, the City does not describe the technical data that CARB "re-ran" or the statements of staff at the hearing, and explain how they were relevant or critical to the decision.

The City cites to one page of a CARB staff report prepared for the CARB hearing. In the report, staff note that the City argues that the District did not accurately account for background concentrations and emissions for "Lone Violator" and "Watch Areas," because on certain "exceedance days," the District did not account for attributing the exceedances from other sources. CARB staff examined the exceedance days cited by the City and concluded that even if those days were omitted, there were a "sufficient number of other [violation] days in the modeling output records to qualify for control in each [2011 SCRD] area." (CARB OL A: 5814.)

The staff report rather notes that, even assuming that specific dates mentioned by the City were removed, it would not alter the District's findings. The City argues in a conclusory fashion that it is prejudiced because it could not respond to this conclusion. However, even if the City could "respond" to this conclusion, it would not alter the conclusions regarding the "Lone Violator" and "Watch Areas." (Id.) The City has shown no prejudice.

The City next avers that CARB improperly allowed three additional documents not before the District—the District's quality assurance plan for another pollutant; a maintenance plan for a different planning area; and an abatement order to the City. (AR 3b:1964, 5:3629, 4089.) The Court disposes of this argument on two grounds.

CARB responds that Petitioner made no attempt during the hearing to exclude the documents it now objects to. Accordingly, the City did not exhaust its administrative remedies for this argument.

Moreover, the City does not specify how the admission of these documents was improper or objectionable. First, the City does not identify how the documents were relevant to CARB's decision and to what extent the Executive Officer relied on them. Additionally, Petitioner has not established that the admission of this evidence was in error, namely that the Executive Officer admitted this evidence after a successful motion to augment the administrative record, e.g., he found that it was relevant but was omitted from the administrative record.

Generally, admission of improper evidence is generally not a prejudicial abuse of discretion if there is sufficient competent evidence to support the agency's decision. (*Southern Cal. Jockey Club, Inc. v. California Horse Racing Bd.* (1950) 36 Cal.2d 167, 175; *Carden v. Board of Prof'l Eng'rs.* (1985) 174 Cal.App.3d 736, 744.) As the City fails to identify how the admitted evidence was improper, it cannot show a prejudicial abuse of discretion.

e. The City's CEQA Challenge is Barred

The City contends that the 2011 SCRD Order (as affirmed by CARB) violates CEQA because it requires the City to implement one of three particular mitigation measures. (CARB OL A:6478-6479.) The gravamen of the City's argument is that it believes that the 2011 SCRD will require it to use additional water to mitigate PM_{10}, emissions, which will create additional environmental impacts that the City must evaluate under CEQA.

The City argues that requiring additional PM_{10} mitigation is a CEQA "project," but by restricting the mitigation measures, the District has precluded the City, as lead agency, from fully considering the environmental impacts of the 2011 SCRD, considering other alternatives and mitigation measures, and deciding whether to adopt a Statement of Overriding Considerations. The City also argues that the 2011 SCRD violates CEQA because implementing it will likely impact cultural resources in the area.

CARB found no substantial evidence that the 2011 SCRD violates CEQA. (CARB OL A:6480.) Having reviewed the administrative record, the Court agrees.

The City's CEQA challenge is based on its complaint that the 2011 SCRD restricts the City's choice of PM_{10} mitigation. But the 2008 Order already outlined the types of permissible mitigation measures, which the City did not challenge. In fact, the City agreed not to do so in the 2006 Agreement with the District.

The 2011 SCRD requires the City to use one of three mitigation measures to mitigate dust on an additional 2.86 square miles of the Owens Lakebed: shallow flooding, managed vegetation, or gravel. The District issued the 2011 SCRD pursuant to the 2008 Order, which was approved by CARB and the EPA in the Coso Junction Maintenance Plan, and not challenged by the City. (AR 2a:899-900.) These mitigation measures are also set forth in the District's most recent (2008) SIP, which is confirmed by the District's 2008 Order. The 2008 Order also reflects that the City will assume the role of CEQA lead agency, and prepare any documentation, related to additional mitigation.

Respondents observe that City stipulated in the 2006 Agreement "not to challenge (the 2008 Order) under CEQA to the extent the Order is consistent with [the 2006 Agreement]." This 2006 Stipulation is incorporated into the 2008 Order. (AR 2h:233, para. G.)

The City does not meaningfully dispute these contentions—that it now brings a CEQA challenge to mitigation measures set forth in a 2008 Order which formed the authority for the 2011 SCRD. Moreover, the City does not assert that it may bring a CEQA action now because the mitigation measures reflected in the 2011 SCRD and set forth in the 2008 Order are somehow inconsistent with the provisions of the 2006 Agreement. Rather, the City appears to argue that its 2006 Agreement was invalid: it could not stipulate to forego a CEQA challenge because the public has a right to be informed of decisions under the CEQA process. However, the City should have asserted this in a timely action to challenge the mitigation measures set forth in the 2008 Order, which it failed to do.

The mitigation measures the City seeks to challenge are contained in the 2008 Order. The statute of limitations for a CEQA action is "within 180 days from the date of the public agency's decision to carry out or approve the project." (Pub. Resources Code, § 21167, subd. (a).) Accordingly, the statute of limitations bars the City from asserting a CEQA challenge to particular mitigation measures that were the subject of the 2008 Order.

f. The City Has Not Shown that CARB's Factual Decisions are Unsupported by Substantial Evidence

As a preliminary matter, the Court addresses the City's contention that the 2008 Order (incorporating the 2006 Agreement and approving the 2008 SIP) does not bar the City's challenge to the SCRD. The City argues that by entering the 2006 Agreement, it did not waive its statutory right to challenge the mitigation measures in the SCRD, because Section 43216 is a public interest statute.

"Civil Code section 3513 provides: 'Any one may waive the advantage of a law intended solely for his benefit. But a law established for a public reason cannot be contravened by a private agreement.' Nonetheless, statutory benefit may be waived if (1) the statute does not prohibit waiver, (2) the statute's public purpose is incidental to its primary purpose, and (3) the waiver does not seriously undermine any public purpose the statute was designed to serve." (*Lanigan v. City of Los Angeles* (2011) 199 Cal.App.4th 1020, 1030.)

The City argues that because it is asserting the violation of "important public rights" (contained in either Section 43216 or the California Constitution), the City, as a public agency, apparently could not enter into the 2006 Agreement, which the 2008 Order incorporated. Were the Court to accept the City's argument, the City could negate any past consent to procedures and methodologies governing issuance future SCRDs. Moreover, the City does not meaningfully argue that any waiver in the 2006 Agreement "seriously undermines any public purpose the statute (or any law) was designed to serve."

The Court concludes that the City's entry into the 2006 Agreement does not allow the City to then challenge procedures and methodologies to which it previously agreed. Additionally, the 2008 Order functions as an independent order barring the City's challenges, regardless of whether the Court finds that the City did not waive any statutory or constitutional claims under the 2006 Agreement.

However, other grounds exist to defeat the City's specific challenges to the 2011 SCRD, which the Court will address.

The City argues the 2011 SCRD is unsupported by "substantial evidence establishing" that the City's water diversion causes the PM_{10}, emissions for which the City must impose additional mitigation. (Health & Saf. Code, § 42316.) CARB decided that the mitigation measures in the 2011 SCRD were supported by substantial evidence. The Court affirms CARB's decision, and discusses each "substantial evidence" argument.

i. Shoreline

The 2011 SCRD defines the Owens lakebed "regulatory shoreline" at 3,600 feet above sea level (fasl), "below which the City is responsible for air pollution emissions and above which air quality standards are expected to be maintained." (AR 2a:901-902.)

The City argues that the 2011 SCRD's selection of the 3,600 fasl level is not supported by substantial evidence, because, according to modeling done by the Desert Research Institute (DRI), the shoreline would have fluctuated during the 100 years in which the City has been diverting water. The City argues that the regulatory shoreline should be below 3,600 fasl.

The City stipulated in the 2006 Agreement not to challenge future SCRDs, unless the challenges were based on data that existed after the time of the 2006 Agreement. The Executive Officer found that the location of the "historic" or "regulatory" shoreline was data that existed at or before the time of the 2006 Agreement. Additionally, because the studies cited to by the City in support of its argument all predated the 2006 Agreement, the City's challenge was barred. (CARB OL A:006466.)

The SCRD procedure contained in the 2008 Order,[10] attachment B, allows the APCO to regulate the City if the monitored or modeled emissions exceed the NAAQS caused by emissions occurring "at or above the historic shoreline." (AR 1f:6; CARB OL A:006465.) The SCRD procedure definitions define a "shoreline monitor" as one located at the 3,600 feet elevation (historic shoreline) contour" or one in the "non-attainment area." (AR 1f:5.) Moreover, the 2008 Order and District Rule 401.D respectively specify that the historic shoreline is 3,600 fasl, and that 3,600 fasl is the "control to" elevation. (AR 2h:356, 2a:974.)

Thus, the Executive Officer did not abuse his discretion in concluding that the City's challenge to the regulatory shoreline is barred.

The City claims that it may revive this argument, because Section 42316 requires that components of the 2011 SCRD be supported by substantial evidence. Even if the Court accepts this argument, however, the City's citation to another modeling report, indicating that the lake levels could have fluctuated over time, does not establish that the District's choice of a 3,600 fasl "regulatory" shoreline is somehow unsupported by substantial evidence.

ii. Modeling and Methods

In the CARB hearing, the City asserted that the modeling procedure used by the District to identify source areas for mitigation is flawed for several reasons, and does not

[10] The Executive Officer refers to the 2008 Order as "Board Order 080128-01."

constitute substantial evidence establishing that the City caused the PM_{10} emissions. The Court considers and rejects each argument.

1. Recommendation of Expert Panel

The City first contends that the 2011 SCRD Order is invalid because the District did not adequately implement the recommendations of agreed-on technical experts (Expert Panel) with regard to measurement and monitoring of the PM_{10} emissions (e.g., DUST ID program).

As part of the 2006 Agreement, the City and District stipulated that they would select an Expert Panel to make recommendations to the DUST ID program, and that the District would "implement all mutually-agreeable changes to the DUST ID program." (AR 2g:1774.) The City faults the District for not making sufficient changes to the DUST ID program after the Expert Panel concluded that some components of the program should be improved. The City contends that the District adopted "a number of," but not all of, the Expert Panel's recommendations.

However, by the City's own admission, the Settlement Agreement required the District to implement all "mutually-agreeable" changes. Accordingly, the District's decision not make *all* changes recommended by the Expert Panel does not, in and of itself render the 2011 SCRD invalid.

The City argues that the 2006 Agreement is irrelevant, because under Section 42316, "substantial evidence" must show that the City's water diversion causes PM_{10} emissions, and the Executive Officer should not be permitted to "disregard" findings of the Expert Panel that the DUST ID program needs improvement.

However, the Executive Officer *did* consider the Expert Panel's recommendations. He found that it was impossible for the District to adopt all recommendations, because adoption of all of the Expert Panel recommendations required both the City and District's agreement, and that the City withheld its agreement by not meeting with the District to discuss implementing those recommendations. (CARB OL A:006470,)

The City does not appear to dispute this, but also argues that it offered its own solution to the potential problems caused by the DUST ID program, which the District rejected.

The Executive Officer further found that despite the City's lack of cooperation, the District implemented a "majority" of the Expert Panel's recommendations, that the record had substantial evidence to support the District's modeling approach, and even if the District could have, but did not, adopt all of the Expert Panel's recommendations, the SCRD was not invalid, as the City cited no substantial evidence that it tried to change the modeling protocols. (CARL OL A:006470.)

The Court has reviewed the record and concluded that the Expert Panel's statements do not show that the 2011 SCRD and decision affirming it were unsupported by substantial evidence..

The City cites its own technical data contending that the DUST ID model overpredicts PM_{10} concentrations by a factor of two and is inaccurate, and argues that the District improperly disregarded the recommendations of the Expert Panel. The District responds that the DUST ID program performs well based on comparisons to other air quality models, and that the DUST ID program's results are appropriate because they are conservative to protect public health and do not underestimate PM_{10} emissions.

While the City has shown that there may be a "battle of the experts" regarding the DUST ID program and that reasonable minds may differ, this is not a basis for finding that the 2011 SCRD was unsupported by substantial evidence to the extent that the District's mitigation measures were at variance with any recommendations of the Expert Panel. (*Association of Irritated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383, 1397 (noting that "[w]hen the evidence on an issue conflicts, the decisionmaker is 'permitted to give more weight to some of the evidence and to favor the opinions and estimates of some of the experts over the others.'") (citation omitted).)

g. EPA Recommendations

The City also argues that CARB's decision affirming the 2011 SCRD is invalid because the District did not follow EPA rules and regulations in collecting the monitoring data that is the basis for the SCRD. The Court rejects these arguments.

i. QAPP

The City first argues that the District did not collect certain data pursuant to an EPA-approved Quality Assurance Project Plan (QAPP) to ensure that the District's methodologies are trustworthy. The District concedes that it used a "CARB-approved" QAPP, which it contends is sufficient. The City argues that this method is infirm, and renders the 2011 SCRD defective.

The Executive Officer found that the District was not required to operate under an EPA-approved QAPP. (CARB OL A:006473 (citing AR 5:3874, 4373).) However, other than challenging the QAPP-collected data on the basis that the CARB's approval is insufficient, the City does not identify the (1) specific data gathered under the QAPP, (2) its relationship to the SCRD, and (3) how the methodology or data is invalid. Additionally, the City cites no case law where particular data, *that may otherwise be accurate*, renders an agency enforcement order unsupported by substantial evidence because the EPA did not approve it. The City has not met its burden of showing that CARB's decision on this issue is unsupported by substantial evidence.

ii. CALPUFF

The City contends that the District improperly uses "CALPUFF," an "alternative" modeling tool that has not been approved by the EPA. The City argues that although CALPUFF is approved as a long-range dispersion model, it is not approved by the EPA for "near-field" assessments, that are used here.

The District contends that the EPA has approved CALPUFF for the SCRD modeling process. The Executive Officer found that CARB and the EPA approved the use of CALPUFF. Specifically, he found that the EPA approved the CALPUFF modeling system for the SCRD process when it approved the 2010 Coso Junction Management Plan, and the 2008 Order (#08128-01). (CARB OL A:06468 (citing AR 2f:4994; AR 5:4371.)

The Court rejects the City's claims that CARB's decision is unsupported by substantial evidence for the same reasons as discussed above. Other than challenging the CALPUFF-collected data on the basis that the CARB's approval is insufficient, the City does not identify the (1) specific data gathered by CALPUFF, and why it is "near-field" rather than "long range", (2) its relationship to the SCRD, and (3) how the methodology or data is invalid. Additionally, the City cites no case law where particular data, *that may otherwise be accurate*, renders an agency enforcement order unsupported by substantial evidence because the EPA did not approve it.

iii. Calibration of Data

The City also argues that the District improperly calibrates data from the DUST ID model by comparing model estimates and the actual PM_{10} measurements, a practice that is disapproved by the EPA. The City contends that the District "adjusts" the modeled K-factors to "force agreement" between the modeled K-factors and the actual observed PM_{10} concentrations at the shoreline. According to the City, this is improper "calibration."

The District responds that it does not "calibrate" DUST ID data with its own results. Rather, the District argues that it compares a small amount of paired predictions with actual emissions, to develop a K-Factor value for different areas and periods, to capture seasonal variations on the Owens Lakebed that cannot be predicted by independent means.

The Executive Officer found that the DUST ID protocol was not improper calibration, because it did not "change" the inner workings of the model, but used the model with the actual values to "improve" emissions estimates. (CARB OL A:006488.)

The Court defers to the technical expertise of CARB in determining that the District did not engage in "calibration" that is disapproved of by the EPA. Petitioner has not shown that CARB's decision was unsupported by substantial evidence.

iv. Other Federal Regulations

The City contends that the District did not comply with other federal regulations that require the District to account for PM_{10} emissions from other sources. Thus, the City argues that some amount of PM_{10} emissions are wrongly attributed to its water diversion. The City avers that off-lake sources cause a background level of dust that renders inaccurate the number of exceedances for a measured air quality level. The City also argues that the District did not properly consider the EPA's "exceptional events" policy.

The Executive Officer reviewed these arguments raised by the City, and found that, in this case, the identified federal regulations do not apply. (CARB OL A:006473-6477.) Additionally, the City has not attempted to quantify the amount of PM_{10} emissions attributable to other sources. Rather, the City appears to argue that if *any* PM_{10} emissions could come from other sources, this renders the 2011 SCRD order invalid and unsupported by substantial evidence. The City has not shown that CARB's decision is invalid in this regard.

h. Watch Areas

The City also contests the 2011 SCRD's order that the City to prepare 30 percent designs for dust controls on an additional 1.87 square miles, identified as "Watch Areas." (AR 2:a906; 4g:3544-3545.) The City argues that there is no legal authority for this requirement, because Section 42316 requires that mitigation measures must be supported with substantial evidence. The City argues that the District has *not* determined that Watch Areas cause any NAAQS PM_{10} violation.

However, the Executive Officer found that the District's use of "Watch Areas" is supported by legal authority—specifically the 2008 Order.

Section 11 of the 2008 Order, titled "CRITERIA FOR DETERMINING THE NEED FOR ADDITIONAL PM10 CONTROLS" states that the APCO will use the criteria, methods, and procedures in the SCRD procedure, incorporated as Attachment B and the "2008 Owens Lake Dust Source Identification Program Protocol" in Attachment C. (CARB OL A:006464; AR 2:h193).)

The SCRD Procedure states that if the DUST ID model predicts that emissions from a source will cause shoreline PM_{10} concentrations at or greater than 100 $\mu g/m^3$ but less than 150 $\mu g/m^3$, with the inclusion of 20 $\mu g/m^3$ background concentration, the APCO will direct the City to choose the mitigation it wishes to implement in the identified area. The City must then develop a detailed "scope of work" for the "identified potential source areas." The District may deploy monitors upwind and downwind of the area, and will notify the City if "additional controls" are needed. (CARB PL A:006464; AR 2h:271-274.) Although the SCRD Procedure in the 2008 Order does not use the term "Watch Area," the Executive Officer found that "Watch Area" criteria and requirements in the 2011 SCRD match those in the 2008 Order.

Accordingly, by designating a "Watch Area," the 2011 SCRD implicitly found that DUST ID model predicted that emissions from a source will cause shoreline PM_{10} concentrations within at or greater than 110 $\mu g/m^3$ but less than 150 $\mu g/m^3$, with the inclusion of 20 $\mu g/m^3$ background concentration. The City does not explain how this finding is not substantial evidence supporting the Order that the city prepare 30 percent design for dust controls on the "Watch Areas."

Accordingly, the City has not shown that CARB's decision is unsupported by substantial evidence.

i. The City's Constitutional Claim

The City contends that the 2011 SCRD (1) permits a "waste" of water prohibited by the California Constitution, and (2) interferes with its right to divert water under Section 42316. The Court rejects these arguments.

Although the City raised them in a slightly different context, the Executive Officer considered and rejected those claims. The Court agrees with CARB's decision.

First, the City agreed that the specific types of mitigation measures issued by the 2011 SCRD (shallow flooding, managed vegetation, gravel blanket) were valid and reasonable, and it agreed not to challenge them.

Further, the 2011 SCRD does allow the use of a mitigation measure (gravel blanket) that appears to require little or no water. The City discounts this mitigation measure as illusory. It observes that two of the three PM_{10} mitigation measures require it to use substantial amounts of water, and that CSLC, which owns the land upon which the City must implement mitigation, has opposed and effectively prevented the City from choosing the gravel blanket mitigation measure. Thus, the City argues that the 2011 SCRD will require it to use large amounts of water in violation of the California Constitution, and its right to divert water.

The Executive Officer found that this claim was speculative, because the City had not cited any substantial evidence where it communicated with CSLC about the issuance of leases (for land CSLC owns) for implementing the 2011 SCRD. The City cites other evidence that CSLC has opposed the gravel blanket mitigation measure.

The Court cannot conclude that the 2011 SCRD Order which allows a choice of mitigation measures,[11] combined with past statements of CSLC opposing gravel mitigation on *other* areas of the Owens Lakebed, means that the City will necessarily use huge quantities of water for mitigation.

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[11] Additionally, there may be a water use difference between the two mitigation measures that require water: shallow flooding and managed vegetation. The City does not explain this difference but asks the Court to assume that any use of water is necessarily wasteful.

Further, even if the City does use some water, the City has failed to demonstrate that such water use is a prohibited "waste" or constitutes "interference" with its ability to divert water.

III. DISPOSITION

The petition for writ of mandate is **DENIED**.

Counsel for Respondent District or CARB shall prepare a formal order and judgment, incorporating this ruling as an exhibit; submit it to all parties for approval as to form; and thereafter submit it to the Court for signature and entry of judgment in accordance with California Rules of Court, rule 3.1312.

Date: December 16, 2014

Shelleyanne W.L. Chang
Judge of the Superior Court of California
County of Sacramento

Declaration of Mailing

I hereby certify that I am not a party to the within action and that I deposited a copy of this document in sealed envelopes with first class postage prepaid, addressed to each party or the attorney of record in the U.S. Mail at 720 Ninth Street, Sacramento, California.

Dated: December 17, 2014

E. Higginbotham, Deputy Clerk **/s/ E. Higginbotham**

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EXHIBIT B

Attachment B to the Stipulated Judgment
Protocol for Operation and Maintenance of Owens Lake Tillage with BACM Backup

1.0 SITE SELECTION, OPERATION, AND MAINTENANCE

This report summarizes the methods used by the Los Angeles Department of Water and Power (LADWP) to select, operate, and maintain tilled areas with BACM backup (TwB2) on Owens Lake.

1.1 Site Selection

TwB2 sites will be selected based on the following criteria, shown in order of priority:

1. Sites within existing shallow flood (SF) infrastructure

2. Sites with predominantly deep fine-textured soils

3. Sites with other than predominantly deep fine-textured soils

4. Sites outside of existing SF infrastructure as allowed by GBUAPCD with predominantly deep fine-textured soils, provided an alternate source of water is in place to provide water for soil wetting on an as-needed basis.

5. Sites outside of existing SF infrastructure with other than deep fine-textured soils, provided an alternate source of water is in place to provide water for soil wetting on an as-needed basis.

1.2 Site Operation

Site operations encompass selection of the tillage method, activities to minimize emissions during the tilling operations, and the periodic inspections to ensure that the required site roughness is being maintained, particularly after large wind, rain, or flood events, and to focus maintenance activities where these are indicated. Each activity is discussed below.

1.2.1 Selection of Tillage Method

The method of tillage will be determined predominantly by soil type, texture, and moisture content. Preliminary methods are listed below. Final methods will be determined in the field by LADWP Operations, who will at that point understand site-specific constraints, and employ the tool(s) that confer the greatest, most sustainable degree of roughness.

1. If the soils are too wet for other implements, an excavator (possibly on mats) will be used.

2. If the soils are too wet for other implements but dry enough to use a switch plow, a switch plow will be used.

3. If the soils are also dry enough to run a Towner disk, it may be used as an option to the switch plow.

4. If soils are dry enough to operate a bull plow, a bull plow will be operated after switch plowing or disking.

5. The direction of the final operation will be generally east-west, in a gently curving/wave pattern, to the extent practicable.

6. If roughness conferred by other tools is not sufficiently durable, a Sandfighter or equivalent may be used to rapidly restore roughness.

1.2.2 Minimizing Emissions During Tilling Operations

Primary tillage such as that practiced and planned at Owens Lake generally does not generate excessive emissions because the objective is to avoid soil pulverization. The main approach to minimizing emissions is to minimize the number of passes across a field to achieve the required roughness.

A secondary protection from excessive emissions is soil moisture. Most soils on Owens Lake are naturally moist, further limiting potential emissions. When soils are re-tilled, LADWP will endeavor to take advantage of natural moisture (precipitation) to perform needed maintenance events.

1.2.3 Periodic Site Inspection

LADWP will inspect all tillage sites on a weekly basis to ensure that there are no visible dust plumes, and that the required site roughness is being maintained. LADWP's site inspection program will consist of a combination of drone inspection, periodic LiDAR flights to quantify site roughness, and ground-truth observations by human inspectors as determined useful by LADWP. Each of these elements is discussed below.

1.2.3.1 Drone Observation

Drones will provide observations because of their ability to travel quickly over large areas of rough terrain, recording videos as they go with GPS waypoint coordinates. If any areas of reduced roughness are observed, which would be most likely after a high wind event, rainstorm, or other type of inundation (e.g., berm breach, flash flooding), the drone would be used to GPS the boundaries of the area for later mapping and maintenance decision-making.

During their weekly flights, the drones will record the following parameters:

- Roughness relative to goal and/or historic levels

- Location and scale of any "blowouts," where roughness has been locally diminished by deposition and/or erosion.

- Evidence of excessively fine material deposition in areas where this poses a significant risk due to re-suspension.

1.2.3.2 Periodic LiDAR Observations for Use in Mapping and Roughness Calculations

Quantitative characterization of Tillage morphology is essential for accurately mapping, classifying, and evaluating compliance of the Tillage BACM over time.

On tilled areas, terrain analysis will be used to quantify measurements of Tillage elements, such as RH and RS. Several methods are possible for quantifying Tillage roughness through terrain analysis, including LiDAR (Light Detection and Ranging) and a new remote imaging.

At this juncture, LADWP believes that the best available method for quantifying tillage roughness is with aerial LiDAR. The following steps summarize the process for analyzing aerial LiDAR to assess tillage roughness:

1. Acquire Elevation Data: The first step in the roughness determination is to acquire digital elevation data with sufficient resolution and accuracy to capture the variability at different spatial scales. At least once a quarter, LADWP will capture high-resolution elevation data with aerial LIDAR and use it to produce a DEM for each tilled area.

2. Identify Tillage Elements: The next step in the process is to identify and extract tillage element morphological data from the DEM. Morphometric elements of interest include tillage ridge, inter-ridge, and furrow positions.

3. Characterize Tillage Elements: After the DEM data are acquired and quantified, elevation values for each identified Tillage element will then be estimated from the DEM and used to quantify RH and RS. These calculations result in local height and spacing estimates across the Tillage BACM area.

4. Reporting Scale: Tillage element characteristics will be aggregated to three spatial grid scales (i.e., 1-acre, 10-acre, and 100-acre grids), similar to the approach used in the Managed Vegetation BACM reporting process. Similar to Managed Vegetation, these reporting scales were chosen to ensure compliance at different spatial scales while also providing operational flexibility. This approach provides meaningful feedback on the Tillage row condition over time. Standard summary statistics (minimum, maximum, mean, median, range, and standard

deviation) will be summarized for row height and row spacing. A ratio of the representative row height and row spacing will then be reported at each grid level.

5. Reporting Frequency and Operational Considerations: Comprehensive coverage of high-resolution elevation data will be collected on a quarterly basis to quantify and report Tillage element characteristics using the methods outlined above. As part of the operational management process, regular evaluation of Tillage will be completed using a variety of tools, including high-resolution optical data (i.e., satellite imagery). It is anticipated that visual changes in texture of the Tillage site will be readily identified in the optical imagery and will provide a prioritization tool, identifying potential blowouts (i.e., highly eroded areas) or problems within the Tillage areas. If blowouts or areas of interest are identified, small-scale acquisition of elevation data may be acquired to further quantify and assess the change in row height and spacing. Elevation data acquisition for these localized areas will be accomplished through survey-grade GPS, terrestrial LIDAR, or other appropriate methods. Once the elevation data are captured, they will be analyzed using the same geomorphometric procedures outlined above. This information, combined with other factors, will be used to determine if operational enhancements to the localized Tillage problem areas are required.

1.2.3.3 Ground-based Observations

Ground observations are usually needed to complement aerial and satellite-based collections:

1. Important features that cannot be evaluated remotely with confidence, such as soil structure.

2. Information needed to calibrate remotely sensed data or interpretations.

3. Tactical, spot observations where remote observations are impractical, inconvenient, or in need of calibration.

Ground based observations will be employed sparingly, and focused on resolving questions and testing hypotheses of the day.

Initially, regular observations are expected to be tied to key features (roughness, loose and fine material deposition), and focused around the perimeter areas of tilled areas.

1.3 Site Maintenance

In this section, maintenance triggers and optional maintenance responses are described.

1.3.1 Maintenance Triggers

Maintenance will be undertaken on that portion of each tilled area that falls below the range of acceptable roughness as described in Section 3.3.2, Evaluating Tillage Control Efficiency Over Large Areas, in the Tillage BACM Application (pp. 39-42). The procedure for determining which portion of each tilled site is sufficient rough is described as follows.

1. Shortly after the initial tillage operation and periodically thereafter, roughness will be assessed by remote sensing on one-acre blocks encompassing the entire tillage area. One-acre blocks with an average RH/RS that exceeds the threshold RH/RS will be considered sufficiently rough to control sand motion and PM10 emissions. One-acre blocks with an average RH/RS that falls below the threshold RH/RS will be assigned a control efficiency (CE) based on the maximum of either Equation 7 (see Appendix B of Application) or a fetch relationship from SWEEP (described below). For mapping purposes, contiguous areas with similar roughness will be merged into larger polygons using remote sensing techniques.

2. Based on the same one-acre remote sensing grid system, the fetch distance for the merged polygons will be assessed along the predominant wind directions, which may vary for different locations on the playa. The CE associated with each fetch distance will be assessed using a set of relationships generated using the Single-event Wind Erosion Evaluation Program, or SWEEP. In this case, the CE is the fetch-limited sand motion relative to that achieved on the open playa with unlimited fetch. A site-appropriate SWEEP curve will be used, representing the unique soil and surface conditions that exist on each tilled site.

3. The CE generated by the SWEEP relationships in step #2 considers fetch effects but assumes a smooth, erodible surface with no aerodynamic sheltering from existing roughness. The CE in step #1 accounts for the aerodynamic sheltering but no fetch. Thus, the CE for each roughness area is the maximum of steps #1 and #2.

4. The CE of the entire tilled site will then be determined using the area-weighted average CE of the various roughness areas. The areas with high roughness (RH/RS > threshold RH/RS) are assumed to have 100 percent control because $u^*t > u^*$ using the methods described in Appendix B of the Application.

5. The overall site will be judged "sufficiently rough" if the adjusted area-weighted average CE is greater than or equal to the District-required CE for a site. Nominally, the control efficiency is 99% but could vary depending on the location, frequency, and magnitude of dust emissions from each tilled site.

Even if the entire site is judged "sufficiently rough," LADWP will have the option to enter tilled areas to re-roughen the surfaces that have degraded over time by a combination of wind and water erosions. If the entire site is deemed "not sufficiently rough," then LADWP will have to entire the site to maintain the surfaces using the methods summarized below.

1.3.2 Maintenance Options

When and where monitoring data so indicate, maintenance to re-roughen areas will be undertaken. Areas warranting such activity must (a) approach or fall below the required roughness thresholds, and (b) approach or exceed a scale large enough to produce emissions.

When/where/if, through field inspection or actual tillage, it is determined that no method of re-tillage is likely to restore adequate roughness, or for any other operational reason, LADWP may shift an area to some other method of dust control, or re-flooded. In the event of re-flooding, once soil has been thoroughly wetted, it may be re-drained, and re-tilled to restore roughness.

EXHIBIT C

Attachment C to the Stipulated Judgment
Protocol for Monitoring and Enforcing Owens Lake Tillage with BACM Backup

A. Objective

The Great Basin Unified Air Pollution Control District (District) intends to use this protocol as a basis for monitoring and enforcing the Owens Lake PM_{10} control method known as "Tillage with Best Available Control Measure (BACM) Backup" (TwB2). The District intends to use the methods set forth in this protocol as a basis for determining if TwB2 areas on the Owens Lake bed need maintenance and/or reflooding in order to maintain or reestablish control efficiency for compliance with the National Ambient Air Quality Standard for particulate matter less than or equal to 10 microns (PM_{10}). The District requires the Los Angeles Department of Water and Power (LADWP) to at all times maintain all TwB2 areas in compliance with all conditions and procedures contained in this document such that TwB2 areas provide the 99 percent PM_{10} reduction levels associated with the most stringent measure BACM required on Owens Lake.

B. Introduction

1. TwB2 is a District-approved variation of the approved Shallow Flood BACM that wets and/or roughens emissive Owens Lake bed surfaces to prevent air emissions. TwB2 consists of soil tilling and/or wetting within all or portions of Shallow Flood BACM PM_{10} control areas (TwB2 Areas) where sufficient shallow flood infrastructure and available water supply exists.

2. TwB2 can be used by LADWP throughout the Owens Lake bed where backup Shallow Flood BACM infrastructure exists and can be implemented as set forth in this protocol to ensure that tilled areas do not cause or contribute to PM_{10} Standard exceedances.

3. LADWP is required to reflood TwB2 Areas as set forth herein upon a written order issued by the District's Air Pollution Control Officer (APCO). LADWP may not appeal an APCO order to reflood a TwB2 Area to the District Governing or Hearing Boards or any other agency.

4. Within 37 calendar days of a written order by the APCO that all or part of a TwB2 Area must be reflooded, LADWP shall reflood so as to reestablish compliant Shallow Flooding in that area in accordance with the Shallow Flooding BACM requirements contained in the latest Owens Valley Planning Area State Implementation Plan (SIP). If feasible, reflooding can be limited to portions of TwB2 Areas that are determined by the APCO to require reflooding and not to the entire TwB2 Area as defined by LADWP.

5. Failure to comply with the Shallow Flooding BACM requirements in any area within 37 days of the APCO's written order to reflood may result in notices of violation from the APCO for each day of non-compliance.

6. Initial TwB2 tillage decisions are at LADWP's sole discretion, but shall follow the "TwB2 Site Selection and Operations & Maintenance Protocols for Owens Lake" prepared by LADWP and dated May, 2014 (O&M Protocol, attached as Attachment B to the Stipulated Judgment). LADWP reserves the right to modify the O&M Protocol based on supporting data and after consultation with the APCO. LADWP's right to modify its O&M Protocol does not extend to the sand flux or PM_{10} monitoring procedures or thresholds set forth in the O&M Protocol which may conflict with this overriding Monitoring and Enforcement Protocol. Those provisions may only be modified by LADWP with consent of the APCO.

7. LADWP shall also have sole discretion regarding implementing and maintaining TwB2 Areas such that they remain sufficiently non-emissive to maintain the 99 percent control efficiency required for Owens Lake BACM. Implementation and maintenance efforts shall follow the provisions of LADWP's O&M Protocol and can include any combination of retilling, reflooding, sprinkling, flattening, compacting or other measures intended to maintain or restore the PM_{10} control efficiency of tilled surfaces.

8. The boundaries for each TwB2 Area proposed for tillage will be pre-defined by LADWP prior to implementation. Each TwB2 Area will be monitored separately as specified in Section D, "TwB2 Monitoring Tests," below, in order to limit maintenance operations to the areas that require attention. LADWP shall notify the APCO of all pre-planned tillage activities in writing at least 14 calendar days before any tillage begins in an area. LADWP shall notify the APCO of emergency maintenance activities in writing as soon as practicable, but no later than the start of tillage activities. Failure to provide notifications may result in notices of violation from the APCO for each day on non-compliance.

9. Tillage shall create rows and furrows in roughly east to west directions in order to create maximum surface roughness for winds from the north and south. Additional roughness to protect surfaces from west winds shall be created in tilled areas sufficient to prevent emissions from east and west winds. Failure to protect tilled lakebed surfaces from all wind directions may result in an APCO reflood order. See Section F for requirements to provide protection from west winds.

10. If TwB2 maintenance is indicated by any of the below described TwB2 Monitoring Tests (Section D – Tillage Roughness Test, Sand Flux Test, PM_{10} Monitor Test, Induced

Particulate Emission Test or Surface Armoring Test) or by Surface Integrity Observations (Section E), LADWP will have 37 calendar days during the dust season (October 15 through June 30) and 74 calendar days during summer season (July 1 through October 14) to select and execute maintenance procedures. Any maintenance under way at the start of the dust season (October 15) shall be completed by November 1. Failure to execute maintenance procedures and reestablish a compliant tilled or flooded surface within specified time limits may result in notices of violation and/or reflood orders from the APCO.

11. TwB2 maintenance options include re-tilling, wetting with sprinkler systems, re-flooding or any other techniques selected at LADWP's discretion in accordance with the O&M Protocol.

12. After the maintenance activities have been performed, re-testing using the tests set forth in Section D will be conducted within 30 calendar days.

C. Dry-Down Period

1. A "dry down" period may be necessary to transition a Shallow Flood Area to TwB2. It is recognized that there is the possibility of dust emissions during the dry-down period after Shallow Flooding is shut off when the surface soils are emissive, but the deeper soils are too wet to allow tilling. To reduce risk of emissions during this time, LADWP will take reasonable precautions to prevent dust emissions during the dust season (October 15 – June 30). Reasonable precautions include installation of temporary controls (*e.g.*, sand fencing, roughness elements, such as straw bales, or other wind barriers and surface protections) and phased drying/tilling as may be required to prevent dust emissions.

2. Failure to adequately control dust emissions during dry-down of TwB2 Areas may result in notices of violation and/or reflood orders from the APCO.

D. TwB2 Monitoring Tests

The District will use the TwB2 monitoring tests set forth below to ensure TwB2 Areas provide the 99 percent emission reduction associated with the most stringent measure BACM required on the Owens Lake bed. The District acknowledges that the performance criteria set forth below may be more stringent than is necessary to meet the 99 percent emission reduction requirement, however, TwB2 did not go through the BACM development process set forth in the District's 2008 Owens Valley PM_{10} State Implementation Plan. Therefore, in order to provide assurance that TwB2 will provide the high level of public health protection associated with most stringent measure BACM, the District will initially require that TwB2 Areas pass the following tests. During the first year of TwB2 operation, the District will meet regularly with the LADWP to review and evaluate TwB2 performance. After one year of TwB2 operation experience, the APCO will consider revising the TwB2 performance criteria.

1. **Tillage Roughness Test**

a) The Tillage Roughness Test will use remote sensing and/or direct field measurements to determine Ridge Spacing (RS) and Ridge Height (RH) in order to calculate inverse roughness (RS divided by RH or RS/RH). The T-12 Tillage Test site (heavy clay soils) was tilled with a ridge spacing of approximately 12 to 14 feet and a furrow bottom to ridge top difference of between 3.2 and 4 feet (ridge height = 1.6 to 2 feet). This yields inverse roughness values of 6.00 to 8.75 and has, as of September 2014, been shown to provide sufficient PM_{10} control efficiency. Assuming that ridge tops will weather and lower, the inverse roughness value in TwB2 areas will be maintained at or below 10.0 (14/1.4) and the average ridge height will be at or above 1.25 feet (furrow depth to ridge top difference at least 2.5 feet). Averages will be calculated on 40-acre blocks as described in LADWP's O&M Protocol.

b) Lidar, aerial photography or other APCO-approved methods with comparable accuracies will be used by LADWP to measure inverse roughness and ridge height. Roughness measurements will be made in the north-to-south direction—the direction of the primary dust producing winds. Roughness measurements may also be made in other directions. See Section F for requirements to provide protection from west winds. Roughness measurements will be reported to the APCO within 30 days of measurement.

c) Inverse roughness and ridge height measurements will be made at 6 month, or more frequent, intervals. Inverse roughness and ridge height for a TwB2 Area will be tracked and plotted as a function of time. Where feasible, field measurements may also be taken to confirm lidar or other remotely sensed results. LADWP will conduct regular roughness measurements and report the measurements within 30 days to the APCO. The District reserves the right to conduct its own roughness measurements at any time.

d) Tillage maintenance will be performed by LADWP if average inverse roughness is between 10.1 and 12.0 or if average ridge height is less than 1.3 feet in a tilled area.

e) The APCO may issue a full or partial TwB2 Area reflood order if inverse roughness exceeds 12.0 (12/1) or ridge height falls below 1.0 foot for any defined 40-acre averaging area.

f) The APCO reserves the right to adjust the above criteria based on supporting data and after consultation with LADWP.

2. Sand Flux Test

a) Each tilled area, as defined in Section B.8, will be instrumented by LADWP with at least four Sensits and Cox sand catchers (CSCs) on untilled surfaces (circular pads with 3 m radius) in the general northern, southern, eastern and western portions of a tillage area. The APCO may require proportionally more sand catchers in tilled areas greater than 320 acres such that there is approximately one Sensit per 80 acres of TwB2 Area.

b) LADWP will pair CSCs with Sensits, radio equipment and dataloggers programmed to record 5-minute sand motion data. All Sensit data will be reported to the District via the District's radio data collection network. Sand motion data from the CSCs and Sensits will be processed to calculate the sand flux history of a site.

c) All sand flux monitoring equipment will be placed by LADWP as soon as practicable as Shallow Flood areas dry, but no later than the start of tillage activities. Failure to deploy monitoring equipment may result in notices of violation and/or reflood orders from the APCO.

d) High sand flux values recorded during maintenance activities and non-tillage sand flux sources shall be excluded from the sand flux data. Maintenance activities and non-tillage sand flux sources may include, but are not limited to, rain-splatters, bugs, adjacent grading and road construction activities, as well as vehicle traffic. Sensits should be placed so as to minimize impacts from non-tillage sand flux sources. The APCO shall have sole authority to determine if Sensits have been impacted by non-tillage area sand flux sources or activities.

e) When (other than during maintenance activities taking place in the tillage area) the sand flux exceeds 0.50 $g/cm^2/day$, LADWP will perform maintenance in the tillage area.

f) The APCO may issue a partial or full TwB2 Area reflood order if sand flux exceeds 1.0 $g/cm^2/day$ at any sand flux site within a TwB2 Area.

g) The APCO acknowledges that these sand flux triggers may be conservative for TwB2 areas located away from the regulatory shoreline. The APCO may adjust the sand flux trigger value on a case-by-case basis for each TwB2 area based on its distance from the regulatory shoreline.

h) The APCO reserves the right to adjust the above criteria based on supporting data and after consultation with LADWP.

3. PM_{10} Monitor Test

a) Each TwB2 area will be assigned upwind and downwind PM_{10} monitors (not necessarily at the TwB2 Area boundary) to monitor PM_{10} emissions from the tillage area. For a given wind direction, the downwind monitors shall be within 22 degrees (±11.5°) of the upwind monitors. Upwind/downwind monitor assignments will be requested by LADWP and approved by the APCO. Existing monitors operated by the District may be used as upwind/downwind monitors. Additional EPA-approved monitors shall be operated by LADWP, unless mutually agreed otherwise. If a monitor is operated by LADWP, its operation and maintenance must follow District procedures and data collection must be incorporated into the District communications network. The District reserves the right to audit monitors and monitoring data collected by LADWP. The District also reserves the right to install and operate or require the LADWP to install and operate additional PM_{10} monitors to adequately monitor the PM_{10} emissions coming from tilled areas.

b) All PM_{10} monitoring equipment will be in place as soon as practicable as Shallow Flood areas dry, but no later than the start of tillage activities. Failure to deploy PM_{10} monitoring equipment may result in notices of violation and/or reflood orders from the APCO.

c) Impacts caused by maintenance activities and non-tillage sources shall be excluded from the PM_{10} data. Maintenance activities and non-tillage PM_{10} sources may include, but are not limited to, adjacent grading and road construction activities, as well as vehicle traffic. PM_{10} monitors should be placed so as to minimize impacts from non-tillage sources. The APCO shall have sole authority to determine if monitors have been impacted by maintenance activities and/or non-tillage area sources.

d) When the daily downwind to upwind PM_{10} concentration difference for any dust event (other than during maintenance activities in the tillage area) exceeds 50

$\mu g/m^3$ and there is no evidence to show that the additional downwind PM_{10} did not come from the TwB2 Area, maintenance will be performed in the tillage area.

e) The APCO may issue a reflood order if the daily PM_{10} difference between the downwind and upwind monitors exceeds 100 $\mu g/m^3$.

f) The APCO reserves the right to adjust the above criteria based on supporting data and after consultation with LADWP.

4. Induced Particulate Emission Test

a) The District will utilize the Induced Particulate Erosion Test (IPET) method to determine if tilled area surfaces are starting to become emissive and to advise LADWP with erosion potential alerts. The method described below may be modified based on the results of a study being conducted by the Desert Research Institute for the District. The District will discuss the results of the IPET study with LADWP.

b) The IPET method proposes to use a small radio-controlled helicopter-type craft (Radio-Controlled Wind Induction Device or RCWInD) to create wind on the surface. Because the winds created by the RCWInD will vary with differing craft designs, each craft will be pre-tested to determine the test height above the surface (H_t) at which the craft creates a target maximum horizontal wind speed (TWS) measured at 1 centimeter ($U_{0.01}$) above a flat surface. The initial TWS is 11.3 meters per second (m/s). The TWS may be modified by the APCO based on supporting data and after consultation with LADWP. If the payload on a craft is changed, *e.g.* a different camera is used, then H_t must be re-determined for the new payload since it will affect the amount of thrust needed to keep the RCWInD aloft. Testing to determine H_t and TWS will be done on a smooth flat surface, *e.g.* concrete or asphalt pavement or plywood test platform with calm ambient winds (< 2 m/s). The maximum wind speed for any flight height is taken at a height one centimeter above the surface at a point that is one rotor blade length away from the point beneath the center of the fastest rotor blade taken on a line extending outward from the rotor arm. The wind speed measurement is taken with a pitot tube pointing toward the center of the rotor blade. The RCWInD must be flown in a stationary position to get a sustained measurement from the anemometer. When the craft is flown over a ridged surface, the flight height is measured from the bottom of the craft's rotor blades to the highest surface projection anywhere directly below the craft.

c) The District will give LADWP field operations staff at least 24 hour notice of the time and place for RCWInD runs in order to allow LADWP staff an opportunity to observe those tests. LADWP staff does not need to be present for RCWInD testing to be used to call erosion alerts.

d) Three erosion alert levels are set using the IPET method: 1) an early warning of possible clod and surface stability deterioration, 2) a warning level to alert LADWP of a potential breakdown of the surface stability and to advise voluntary maintenance efforts, and 3) a mitigation action level to require retilling and/or reflooding of all or part of a TwB2 Area. The IPET method will be used to determine erosion alert levels as follows:

   i. Level 1 – An erosion early warning is indicated when any visible dust is observed to be emitted from a surface or particles are dislodged when the RCWInD is flown at a height below one half of H_t. Voluntary mitigation may be appropriate to prevent further surface degradation.

   ii. Level 2 – An erosion warning is indicated when any visible dust is observed to be emitted from a surface when the RCWInD is flown at a height below H_t and above one half of H_t. Voluntary mitigation is advised to prevent further surface degradation.

   iii. Level 3 – Mitigation action is required if visible dust is observed to be emitted from a surface when the RCWInD is flown at a height of H_t or higher. If ordered by the APCO, LADWP must retill and/or reflood all or part of a TwB2 Area that triggers a Level 3 alert.

   The APCO acknowledges that warning and mitigation triggers may be conservative for TwB2 areas located away from the regulatory shoreline. The warning and mitigation trigger values may be adjusted on a case-by-case basis by the APCO for each TwB2 area based on its distance from the regulatory shoreline. After one year of experience with TwB2 and the IPET test, LADWP and the District will meet to discuss the results of the testing and consider adjustments to the triggers.

e) The APCO reserves the right to adjust these criteria based on supporting data and after consultation with LADWP.

5. **Surface Armoring Test**

a) Previous studies indicate surface armoring with clods is essential to creating a tilled surface that prevents dust emissions. The District intends to review existing studies and conduct tests to develop a technique to measure the surface armoring or "cloddiness" of a tilled area and set a minimum required level of surface armoring.

b) In order to assure TwB2 areas do not cause or contribute to exceedances of the PM_{10} standard, an initial target clod cover of 60 percent will be used. Soil clods must be 1/2 inch diameter or larger. The APCO may issue a reflood order if the clod cover in a tilled area is less than 60 percent. This value will be reevaluated by the APCO after one year of TwB2 implementation and as appropriate thereafter.

c) Clod coverage will be measured concurrently with roughness measurements by LADWP and/or the District. Lidar, aerial photography, point-frame, or other APCO-approved methods with comparable accuracies will be used by LADWP to measure clod coverage. Clod cover measurements will be reported to the APCO within 30 days of measurement. The APCO shall approve the clod cover measurement method.

d) Upon completion of any additional testing or observation of TwB2 Areas, and after consultation with LADWP, the APCO reserves the right to adjust these criteria.

E. **Surface Integrity Observations**

1. The District will notify LADWP's designated representatives on monthly basis or as otherwise required during the dust season (October 15 through June 30) of District field observations to evaluate the overall erosion stability of the tillage areas based on surface observations, soil conditions, and the results of the above described TwB2 monitoring tests.

2. The District will use on-site visual observations, as well as photography, video or other remote sensing techniques to document the condition and potential emissivity of tilled areas. Conditions including, but not limited to, the presence or absence of ridge-top and furrow-bottom clods, loose soil deposits, efflorescence and ridge erosion will be used to evaluate the overall integrity of tilled areas. These observations will be used in conjunction with the above described tests to recommend that LADWP undertake maintenance activities or as a basis for an APCO reflood order.

F. Protection from Winds Parallel to Tillage Rows

1. Paragraph B.9., above, requires tillage rows and furrows in roughly east to west directions in order to create maximum surface roughness for winds from the north and south.

2. In order to ensure that tillage areas are protected from all wind directions, tilled areas will be jointly evaluated by District and LADWP staffs within 5 calendar days after initial tillage activities to determine if the tillage configuration and clodding will provide sufficient protection. If the District determines that the tilled areas will not provide protection from all wind directions the APCO will notify LADWP that additional protection measures will be required.

3. Upon such notification by the APCO, LADWP will take further actions to create additional protection from winds parallel to the initial rows and furrows, it will deploy other protection measures (*e.g.*, additional tillage ridges oriented perpendicular to the original tillage or creation of clod clover greater than 60%), or it may abandon tillage in the area of concern and reestablish compliant Shallow Flooding. The DWP must implement the additional protection measures within 15 days of being notified by the APCO.

4. Failure to protect tilled lakebed surfaces from all wind directions may result in an APCO reflood order.

PROOF OF SERVICE

I declare that I am employed with the law firm of Morrison & Foerster LLP, whose address is 707 Wilshire Boulevard, Los Angeles, California 90017-3543. I am not a party to the within cause, and I am over the age of eighteen years.

I further declare that on December 19, 2014, I served a copy of:

STIPULATED JUDGMENT FOR RESPONDENT AND DEFENDANT GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

☒ **BY U.S. MAIL [Code Civ. Proc sec. 1013(a)]** by placing a true copy thereof enclosed in a sealed envelope with postage thereon fully prepaid, addressed as follows, for collection and mailing at Morrison & Foerster LLP, 707 Wilshire Boulevard, Los Angeles, California 90017-3543 in accordance with Morrison & Foerster LLP's ordinary business practices.

I am readily familiar with Morrison & Foerster LLP's practice for collection and processing of correspondence for mailing with the United States Postal Service, and know that in the ordinary course of Morrison & Foerster LLP's business practice the document(s) described above will be deposited with the United States Postal Service on the same date that it (they) is (are) placed at Morrison & Foerster LLP with postage thereon fully prepaid for collection and mailing.

☒ **BY ELECTRONIC SERVICE [Code Civ. Proc sec. 1010.6; CRC 2.251]** by electronically mailing a true and correct copy through Morrison & Foerster LLP's electronic mail system to the email address(es) set forth below, or as stated on the attached service list per agreement in accordance with Code of Civil Procedure section 1010.6 and CRC Rule 2.251.

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Susan A. Austin Deputy Attorney General – Office of the California Attorney General 1515 Clay Street, 20th Floor P.O. Box 70550 Oakland, CA 94612	*Attorney for California State Lands Commission*

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed at Los Angeles, California, December 19, 2014.

Holly Hickish	Holly Hickish
(typed)	(signature)

APPENDIX III-1
PM_{10} NAAQS EXCEEDANCES (2012-2014)

Calendar Year	Date	Monitoring Station	Daily Average PM_{10} ($\mu g/m^3$)	Measurement Method	From-the-Lake		Non-Lake		All Wind Directions	Predominantly Non-Lake?	Comparison to Significance Threshold ($5\ \mu g/m^3$)
					Number of Hours	Average Hourly PM_{10} ($\mu g/m^3$)	Number of Hours	Average Hourly PM_{10} ($\mu g/m^3$)	Number of Hours	Yes (Y) or No (N) or Maybe (M)	
2012	3/6/2012	Dirty Socks TEOM	858.8	TEOM	17	1080.3	7	320.9	24	N	0.6%
	3/7/2012	Dirty Socks TEOM	322.7	TEOM	24	322.7			24	N	1.5%
	6/9/2012	Dirty Socks TEOM	277.7	TEOM	11	587.1	13	15.9	24	N	1.8%
	10/22/2012	Dirty Socks TEOM	252.6	TEOM	4	50.8	20	292.9	24	Y	2.0%
	11/8/2012	Dirty Socks TEOM	170.5	TEOM	3	15.3	18	196.4	21	Y	2.9%
2012	3/6/2012	Keeler PM10 TEOM	612.0	TEOM	7	602.2	17	616.0	24	Y	0.8%
	3/7/2012	Keeler PM10 TEOM	517.6	TEOM			24	517.6	24	Y	1.0%
	5/25/2012	Keeler PM10 TEOM	231.4	TEOM	13	215.6	7	260.7	20	M	2.2%
	6/9/2012	Keeler PM10 TEOM	342.1	TEOM	12	18.5	12	665.8	24	Y	1.5%
	12/18/2012	Keeler PM10 TEOM	247.4	TEOM	10	4.5	14	421.0	24	Y	2.0%
2013	1/7/2013	Keeler PM10 TEOM	167.2	TEOM			24	167.2	24	Y	3.0%
	2/20/2013	Keeler PM10 TEOM	529.4	TEOM	1	8.5	23	552.0	24	Y	0.9%
	4/8/2013	Keeler PM10 TEOM	334.4	TEOM	3	369.3	20	329.1	23	Y	1.5%
	4/9/2013	Keeler PM10 TEOM	361.3	TEOM			24	361.3	24	Y	1.4%
	4/23/2013	Keeler PM10 TEOM	318.3	TEOM	11	34.1	13	558.8	24	Y	1.6%
	4/30/2013	Keeler PM10 TEOM	253.9	TEOM	10	14.2	14	425.0	24	Y	2.0%
	5/1/2013	Keeler PM10 TEOM	424.6	TEOM			24	424.6	24	Y	1.2%
	5/14/2013	Keeler PM10 TEOM	314.8	TEOM	9	23.8	15	489.4	24	Y	1.6%
	10/3/2013	Keeler PM10 TEOM	153.1	TEOM	7	8.0	17	212.9	24	Y	3.3%
	12/3/2013	Keeler PM10 TEOM	253.1	TEOM	7	221.9	17	266.0	24	Y	2.0%
2014	3/17/2014	Keeler PM10 TEOM	506.4	TEOM			24	506.4	24	Y	1.0%
	4/22/2014	Keeler PM10 TEOM	208.0	TEOM	8	293.5	16	165.3	24	N	2.4%
	5/10/2014	Keeler PM10 TEOM	577.5	TEOM	6	7.9	18	767.3	24	Y	0.9%
	5/11/2014	Keeler PM10 TEOM	150.1	TEOM			24	150.1	24	Y	3.3%
	6/18/2014	Keeler PM10 TEOM	209.8	TEOM	11	71.2	13	327.0	24	Y	2.4%
	7/30/2014	Keeler PM10 TEOM	366.2	TEOM	3	24.5	21	415.0	24	Y	1.4%
	11/15/2014	Keeler PM10 TEOM	160.7	TEOM	9	7.9	15	252.4	24	Y	3.1%
2012	3/6/2012	Lizard Tail TEOM	734.7	TEOM	6	1013.7	18	641.7	24	M	0.7%
	3/7/2012	Lizard Tail TEOM	180.7	TEOM			24	180.7	24	Y	2.8%
	3/16/2012	Lizard Tail TEOM	197.4	TEOM	12	333.7	12	61.1	24	N	2.5%
	3/31/2012	Lizard Tail TEOM	734.2	TEOM	18	907.7	6	213.7	24	N	0.7%
	5/25/2012	Lizard Tail TEOM	3916.1	TEOM	9	9630.5	15	487.4	24	M	0.1%
	6/4/2012	Lizard Tail TEOM	684.6	TEOM	18	894.5	6	55.2	24	N	0.7%
	6/23/2012	Lizard Tail TEOM	593.4	TEOM	14	995.3	10	30.8	24	N	0.8%
	6/24/2012	Lizard Tail TEOM	410.3	TEOM	20	486.2	4	30.8	24	N	1.2%
	6/25/2012	Lizard Tail TEOM	234.6	TEOM	21	267.0	3	7.7	24	N	2.1%
	11/30/2012	Lizard Tail TEOM	711.3	TEOM	12	1388.5	12	34.1	24	N	0.7%
	12/2/2012	Lizard Tail TEOM	880.4	TEOM	8	2610.5	16	15.4	24	N	0.6%
	12/12/2012	Lizard Tail TEOM	155.8	TEOM	19	194.7	5	8.0	24	N	3.2%

Calendar Year	Date	Monitoring Station	Daily Average PM_{10} ($\mu g/m^3$)	Measurement Method	From-the-Lake Number of Hours	From-the-Lake Average Hourly PM_{10} ($\mu g/m^3$)	Non-Lake Number of Hours	Non-Lake Average Hourly PM_{10} ($\mu g/m^3$)	All Wind Directions Number of Hours	Predominantly Non-Lake? Yes (Y) or No (N) or Maybe (M)	Comparison to Significance Threshold (5 $\mu g/m^3$)
2013	4/8/2013	Lizard Tail TEOM	283.0	TEOM	2	414.7	21	270.5	23	Y	1.8%
	4/9/2013	Lizard Tail TEOM	158.0	TEOM			24	158.0	24	Y	3.2%
2014	3/17/2014	Lizard Tail TEOM	195.0	TEOM	2	16.5	22	211.2	24	Y	2.6%
	5/10/2014	Lizard Tail TEOM	257.3	TEOM	5	12.5	19	321.8	24	Y	1.9%
2012	5/25/2012	Lone Pine TEOM	168.8	TEOM	3	28.1	21	188.8	24	Y	3.0%
2012	3/6/2012	Mill	491.9	FRM	14	697.6	10	203.8	24	N	1.0%
	3/7/2012	Mill	156.5	FRM	19	186.3	5	43.1	24	N	3.2%
	5/25/2012	Mill	712.0	FRM	21	803.4	3	72.3	24	N	0.7%
	11/30/2012	Mill	167.7	FRM	17	230.9	7	14.2	24	N	3.0%
2012	3/6/2012	North Beach TEOM	1535.6	TEOM	6	3860.6	18	760.6	24	N	0.3%
	3/12/2012	North Beach TEOM	354.5	TEOM	18	464.9	6	23.5	24	N	1.4%
	3/16/2012	North Beach TEOM	281.3	TEOM	17	392.7	7	10.7	24	N	1.8%
	3/31/2012	North Beach TEOM	362.9	TEOM	22	298.9	2	1066.6	24	N	1.4%
	4/11/2012	North Beach TEOM	154.8	TEOM	22	168.5	2	3.3	24	N	3.2%
	5/25/2012	North Beach TEOM	358.4	TEOM	18	418.9	6	176.9	24	N	1.4%
	6/4/2012	North Beach TEOM	342.1	TEOM	23	332.4	1	566.5	24	N	1.5%
	6/20/2012	North Beach TEOM	193.3	TEOM	12	333.0	10	25.6	22	N	2.6%
	6/21/2012	North Beach TEOM	385.3	TEOM	20	456.0	4	31.6	24	N	1.3%
2012	3/6/2012	Olancha 3 TEOM	278.9	TEOM	7	512.9	17	182.5	24	N	1.8%
	3/7/2012	Olancha 3 TEOM	485.3	TEOM	22	524.5	2	54.7	24	N	1.0%
	6/9/2012	Olancha 3 TEOM	197.0	TEOM	7	627.7	17	19.6	24	N	2.5%
2013	2/20/2013	Olancha 3 TEOM	236.3	TEOM	20	282.2	4	7.2	24	N	2.1%
	3/9/2013	Olancha 3 TEOM	152.3	TEOM	18	200.1	6	9.0	24	N	3.3%
	4/8/2013	Olancha 3 TEOM	276.8	TEOM	18	334.0	6	105.1	24	N	1.8%
	4/9/2013	Olancha 3 TEOM	241.0	TEOM	24	241.0			24	N	2.1%
	4/23/2013	Olancha 3 TEOM	167.5	TEOM	13	285.2	11	28.3	24	N	3.0%
	5/1/2013	Olancha 3 TEOM	194.8	TEOM	18	252.4	6	22.1	24	N	2.6%
	11/22/2013	Olancha 3 TEOM	170.9	TEOM	24	170.9			24	N	2.9%
2014	5/10/2014	Olancha 3 TEOM	202.2	TEOM	11	387.6	13	45.4	24	N	2.5%
	5/11/2014	Olancha 3 TEOM	309.9	TEOM	24	309.9			24	N	1.6%
2012	3/6/2012	Shell Cut TEOM	549.1	TEOM	16	461.9	8	723.6	24	N	0.9%
	3/16/2012	Shell Cut TEOM	203.5	TEOM			24	203.5	24	Y	2.5%
	3/31/2012	Shell Cut TEOM	642.6	TEOM	2	196.1	22	683.2	24	Y	0.8%
	4/26/2012	Shell Cut TEOM	269.4	TEOM	5	673.8	19	163.0	24	M	1.9%
	5/25/2012	Shell Cut TEOM	2149.4	TEOM	6	99.0	18	2832.9	24	Y	0.2%
	6/4/2012	Shell Cut TEOM	236.3	TEOM	1	197.8	23	237.9	24	Y	2.1%
	10/22/2012	Shell Cut TEOM	246.2	TEOM			24	246.2	24	Y	2.0%
	11/8/2012	Shell Cut TEOM	159.7	TEOM	6	22.9	15	214.5	21	Y	3.1%
	11/29/2012	Shell Cut TEOM	223.0	TEOM			24	223.0	24	Y	2.2%
	11/30/2012	Shell Cut TEOM	215.2	TEOM	1	276.9	19	211.9	20	Y	2.3%
2013	3/6/2013	Shell Cut TEOM	447.1	TEOM			24	447.1	24	Y	1.1%
	4/8/2013	Shell Cut TEOM	153.4	TEOM	22	157.3	1	67.5	23	N	3.3%
	5/5/2013	Shell Cut TEOM	339.4	TEOM	4	26.0	20	402.1	24	Y	1.5%
	9/21/2013	Shell Cut TEOM	185.7	TEOM	6	190.6	18	184.1	24	Y	2.7%
2014	4/22/2014	Shell Cut TEOM	150.8	TEOM	14	43.6	10	301.0	24	Y	3.3%

Calendar Year	Date	Monitoring Station	Daily Average PM_{10} ($\mu g/m^3$)	Measurement Method	From-the-Lake		Non-Lake		All Wind Directions	Predominantly Non-Lake?	Comparison to Significance Threshold (5 $\mu g/m^3$)
					Number of Hours	Average Hourly PM_{10} ($\mu g/m^3$)	Number of Hours	Average Hourly PM_{10} ($\mu g/m^3$)	Number of Hours	Yes (Y) or No (N) or Maybe (M)	
2012	2/29/2012	Stanley TEOM	180.3	TEOM	9	9.5	15	282.8	24	Y	2.8%
	5/17/2012	Stanley TEOM	232.1	TEOM	8	13.7	16	341.4	24	Y	2.2%
	11/30/2012	Stanley TEOM	222.8	TEOM	11	49.0	13	369.9	24	Y	2.2%
2014	2/26/2014	Stanley TEOM	179.6	TEOM	24	179.6			24	N	2.8%

Notes:
The above analysis covers the period from January 2012 through November 2014.
Shaded rows indicate exceedance days resulting from predominantly "non-lake" source areas.

FRM - Federal Reference Method
TEOM - Tapered Element Oscillating Microbalance
$\mu g/m^3$ - micrograms per cubic meter

OVPA NAAQS PM10 Violations 2012-2014

Exceedance Count: Impact Source by Monitor

Monitor	Combination	Keeler Dunes	Off-lake Source	On-lake Source
Dirty Socks TEOM	1		2	2
Keeler#3 PM10 TEOM	9	15		
Lizard Tail TEOM	1		5	10
Lone Pine FDMS				1
Mill	2	1		2
North Beach TEOM	1		1	8
Olancha 3 TEOM	7		2	4
Shell Cut TEOM	3		12	
Stanley TEOM			4	

OVPA NAAQS PM10 Violations 2012-2014

Exceedance Count: Impact Source by Year

Impact Source	*2012*	*2013*	*2014*
Combination	8	6	10
Keeler Dunes	5	10	1
Off-lake Source	14	5	7
On-lake Source	25	2	

OVPA NAAQS PM10 Exceedances > 150 µg/m^3 2012-2014

Grouped by Day

Exceedance Date	Source Category

2/29/2012 Off-lake Source

Strong down-slope winds from the west. Off-lake sources impact Stanley.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Stanley TEOM	180	Off-lake Source

3/6/2012 Combination

Lake sources from south and west winds until 15:00, then southbound dust cloud engulfs Owens Lake.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	612	Combination
Lizard Tail TEOM	734	Combination
North Beach TEOM	1535	Combination
Dirty Socks TEOM	858	Combination
Shell Cut TEOM	549	Combination
Olancha 3 TEOM	278	Combination
Mill	491	Combination

3/7/2012 Combination

North winds - Keeler Dunes impact Keeler, Mill Site. Olancha and Dirty Socks impacted by On-lake sources. Lizard Tail impacted by local sources and some upwind, off-lake sources to the north.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	517	Keeler Dunes
Lizard Tail TEOM	180	Off-lake Source
Dirty Socks TEOM	322	On-lake Source
Olancha 3 TEOM	485	On-lake Source
Mill	156	Keeler Dunes

3/12/2012 On-lake Source

Phase 8 area, with south winds, impacts North Beach.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
North Beach TEOM	354	On-lake Source

3/16/2012 Combination

South winds - Lizard Tail primarily impacted by nearby on-lake sources. North Beach impacted by on-lake Phase 8 area. Shell Cut impacted by localized Off-lake sources.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	197	On-lake Source
North Beach TEOM	281	On-lake Source
Shell Cut TEOM	203	Off-lake Source

3/31/2012 Combination

Shell Cut impacted by nearby off-lake sources. Lizard Tail and North Beach impacted by on-lake sources, immediately south of the monitors.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	734	On-lake Source
North Beach TEOM	362	On-lake Source
Shell Cut TEOM	642	Off-lake Source

Exceedance Date	Source Category

4/11/2012 On-lake Source

Phase 8 impacts North Beach, just barely an exceedance.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
North Beach TEOM	154	On-lake Source

4/26/2012 Combination

Two hours caused this exceedance at Shell Cut: one off-lake, one on-lake. The off-lake wind direction was along the shoreline from the southwest at 3:00PM. At 5:00PM the wind shifted to the WNW and on-lake sources impacted the monitor (T1A4, T10-3).

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Shell Cut TEOM	269	Combination

5/17/2012 Off-lake Source

Downslope winds from the west resulting in an exceedance at Stanley from west of Owens Lake. On-lake sources erupted but caused no shoreline exceedances.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Stanley TEOM	232	Off-lake Source

5/25/2012 Combination

Shell Cut impacted by off-lake sources. All others, on-lake sources. Lizard Tail: T32-1, North Beach: Phase 8, Mill Site: T-21 area, Keeler largest hit from Keeler Dunes.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	231	Keeler Dunes
Lizard Tail TEOM	3916	On-lake Source
Lone Pine FDMS	168	On-lake Source
North Beach TEOM	358	On-lake Source
Shell Cut TEOM	2149	Off-lake Source
Mill	712	On-lake Source

6/4/2012 Combination

On-lake exceedances: Lizard Tail from sources in the T32-1 area, North Beach from Phase 8 area. Off-lake exceedance at Shell Cut from SW wind along the shoreline

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	684	On-lake Source
North Beach TEOM	342	On-lake Source
Shell Cut TEOM	236	Off-lake Source

6/9/2012 Combination

Dust cloud travels south down Owens Valley, hits Owens Lake at 19:00. Keeler primary source: Keeler Dunes. Dirty Socks primary source: T10-3. Olancha primary source: T1A4.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	342	Keeler Dunes
Dirty Socks TEOM	277	On-lake Source
Olancha 3 TEOM	197	On-lake Source

6/20/2012 On-lake Source

Phase 8 impacts North Beach during two hours with south wind averaging 9 m/s.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
North Beach TEOM	193	On-lake Source

Exceedance Date	Source Category

6/21/2012 **On-lake Source**
Phase 8 impacts North Beach in south winds.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
North Beach TEOM	385	On-lake Source

6/23/2012 **On-lake Source**
T32-1 impacts Lizard Tail in south winds.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	593	On-lake Source

6/24/2012 **On-lake Source**
T32-1 impacts Lizard Tail in south winds.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	410	On-lake Source

6/25/2012 **On-lake Source**
T32-1 impacts Lizard Tail in south winds.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	234	On-lake Source

10/22/2012 **Off-lake Source**
Dirty Socks and Shell Cut experience south and southwest winds all day. Off-lake sources from near the shoreline and the Olancha Dunes are the primary sources.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Dirty Socks TEOM	252	Off-lake Source
Shell Cut TEOM	246	Off-lake Source

11/8/2012 **Off-lake Source**
Dirty Socks and Shell Cut experience south and southwest winds all day. Off-lake sources from near the shoreline and the Olancha Dunes are the primary sources.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Dirty Socks TEOM	166	Off-lake Source
Shell Cut TEOM	156	Off-lake Source

11/29/2012 **Off-lake Source**
Shell Cut experiences south and southwest winds all day. Off-lake sources from near the shoreline and the Olancha Dunes are the primary sources.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Shell Cut TEOM	222	Off-lake Source

11/30/2012 **Combination**
Strong south winds shifting to west, then south again. Stanley hit by off-lake impacts from the west. Shell Cut impacted by shoreline (off-lake) sources and near-shoreline sources in southwest winds. Mill hit by T21 area, Lizard Tail by T32-1.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	711	On-lake Source
Stanley TEOM	222	Off-lake Source
Shell Cut TEOM	215	Off-lake Source
Mill	167	On-lake Source

12/2/2012 **On-lake Source**
Lizard Tail hit with south wind impacts from T32-1.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	880	On-lake Source

Exceedance Date	Source Category

12/12/2012 **On-lake Source**

Lizard Tail hit with south wind impacts from T32-1.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Lizard Tail TEOM	155	On-lake Source

12/18/2012 **Keeler Dunes**

Keeler impacted by Keeler Dunes in northwest wind.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	247	Keeler Dunes

1/7/2013 **Keeler Dunes**

Keeler impacted by Keeler Dunes in northwest wind.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	167	Keeler Dunes

2/20/2013 **Combination**

North winds all day. Keeler impacted by Keeler Dunes. Olancha impacted by on-lake sources (i.e. T1A4)

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	529	Keeler Dunes
Olancha 3 TEOM	236	On-lake Source

3/6/2013 **Off-lake Source**

South-southwest wind. Shell Cut impacted by off-lake sources.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Shell Cut TEOM	447	Off-lake Source

3/9/2013 **Combination**

Olancha impacted by a combination of uncontrolled southern Owens Lake on-lake sources and nearby off-lake sources.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Olancha 3 TEOM	152	Combination

4/8/2013 **Combination**

Southbound dust cloud envelops Owens Lake starting at 11AM. However, Keeler primarily impacted by Keeler Dunes. Lizard tail impacted by nearby off-lake sources to the north. Shell Cut and Olancha impacted by a combination of on/off-lake sources.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	334	Keeler Dunes
Lizard Tail TEOM	283	Off-lake Source
Shell Cut TEOM	153	Combination
Olancha 3 TEOM	276	Combination

4/9/2013 **Combination**

North winds. Keeler impacted by Keeler Dunes. Olancha impacted by southern Owens Lake sources in the T1A3 area and Olancha dunes area. Lizard Tail impaced by nearby off-lake sources.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	361	Keeler Dunes
Lizard Tail TEOM	157	Off-lake Source
Olancha 3 TEOM	240	Combination

4/23/2013 **Combination**

North winds - Keeler impacted by Keeler Dunes. Olancha impacted by on-lake sources such as T1A3 and Olancha dunes area.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	318	Keeler Dunes
Olancha 3 TEOM	167	Combination

Exceedance Date	Source Category

4/30/2013 **Keeler Dunes**

North wind - Keeler impacted by Keeler Dunes. Keeler PM10 Partisol measured a daily average of 260 µg/m³.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	253	Keeler Dunes

5/1/2013 **Combination**

North wind - Keeler impacted by Keeler Dunes. Olancha impaced by on-lake sources such as T1A3 and Olancha dunes area.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	424	Keeler Dunes
Olancha 3 TEOM	194	On-lake Source

5/5/2013 **Off-lake Source**

South wind - Shell Cut impacted by off-lake sources on the alluvial fan.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Shell Cut TEOM	339	Off-lake Source

5/14/2013 **Keeler Dunes**

North wind - Keeler impacted by Keeler Dunes. Keeler PM10 Partisol daily average of 325 µg/m³.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	314	Keeler Dunes

9/21/2013 **Off-lake Source**

Southwest winds stir up dust along the shoreline (off-lake), impacting Shell Cut.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Shell Cut TEOM	185	Off-lake Source

10/3/2013 **Keeler Dunes**

Keeler Dunes impacts Keeler TEOM, just barely an exceedance

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	153	Keeler Dunes

11/22/2013 **Combination**

North wind - Olancha impacted by Owens Lake sources in the T1A3 region and Olancha dunes area.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Olancha 3 TEOM	170	Combination

12/3/2013 **Keeler Dunes**

North wind - Keeler impacted by Keeler Dunes.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	253	Keeler Dunes

2/26/2014 **Off-lake Source**

West wind - Stanley impacted by off-lake sources from the west.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Stanley TEOM	179	Off-lake Source

3/17/2014 **Combination**

North winds. Keeler impacted by Keeler Dunes. Lizard Tail impacted by nearby off-lake sources. Keeler PM10 Partisol measured a daily average of 547 µg/m³.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	506	Keeler Dunes
Lizard Tail TEOM	194	Off-lake Source

Exceedance Date	Source Category

4/22/2014 Combination

South winds shifting to west then north. Keeler impacted by on-lake sources in west wind, then by Keeler Dunes. Shell Cut primary impacted sources along the shoreline during southwest winds.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	208	Combination
Shell Cut TEOM	150	Off-lake Source

5/10/2014 Combination

North winds culminating with a southbound dust cloud enveloping Owens Lake starting 16:00. Lizard Tail impacted by off-lake sources. Keeler impacted by Keeler Dunes and T28 transition area. Olancha impacted by on-lake sources and off-lake dust cloud.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	577	Combination
Lizard Tail TEOM	257	Off-lake Source
Olancha 3 TEOM	202	Combination

5/11/2014 Combination

North wind with no upwind concentrations (i.e. Lone Pine is relatively low). Olancha impacted by Olancha Dunes.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	150	Combination
Olancha 3 TEOM	309	Off-lake Source

6/18/2014 Combination

North wind with some widespread upwind PM. A combination of upwind and Keeler Dunes sources impact Keeler.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	209	Combination

7/30/2014 Combination

North wind - Keeler impacted by on-lake transition area T28 and Keeler Dunes.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	366	Combination

11/15/2014 Combination

North wind - Keeler impacted by Keeler Dunes and on-lake transition area T28.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	160	Combination

12/25/2014 Combination

North wind - Keeler impacted by Keeler Dunes and on-lake transition area T28.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	303	Combination

12/31/2014 Combination

North winds all day. Lizard Tail impacted by localized off-lake sources to the north. Olancha impacted by Olancha Dunes. Keeler and Mill Site impaced by Keeler Dunes and T28 transition area. Keeler PM10 Partisol measured a daily average of 1015 μg/m³.

Monitor(s)	*Daily Average PM10*	*Monitor Impact Source*
Keeler#3 PM10 TEOM	950	Combination
North Beach TEOM	229	Off-lake Source
Olancha 3 TEOM	233	Off-lake Source
Mill	776	Combination

APPENDIX III-2
TRENDS IN PM_{10} LEVELS AT OWENS LAKE (MARCH 11, 2015)

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March 11, 2015

MEMORANDUM

Subject: Trends in PM10 Levels at Owens Lake

From: Phill Kiddoo

To: Owens Lake File

PURPOSE

Analysis of PM10 trends at Owens Lake regulatory shoreline monitors.

METHOD

National Ambient Air Quality Standard (NAAQS) exceedances for PM10 were calculated for all continuous Tapered Element Oscillating Microbalance (TEOM) monitors used for compliance at the Owens Lake regulatory shoreline. In addition to the regulatory calculation for daily PM10 averages, both "on-lake" and "off-lake" PM10 exceedances were calculated using hourly PM10 values screened by wind direction. For each PM10 monitoring station, wind direction data were paired to collocated meteorological data. During prolonged periods of missing collocated met, nearest neighbor wind data was used as a surrogate. For 'on-lake' and 'off-lake' daily PM10 concentration calculations, hours outside of designated wind screen directions were replaced with Owens Lake background concentration of 20 $\mu g/m^3$. The map in Figure 1 shows locations of all past and present Owens Lake shoreline PM10 monitors with associated directional arcs for each set of wind directions. The table in the lower right corner of Figure 1 lists wind directions used for sites in analysis. In addition to PM10 screens from "On-Lake" and "Off-Lake" wind directions, continuous PM10 data at the Keeler monitoring station were screened further by including a Keeler Dunes wind direction wedge. The associated wind direction arcs for the Keeler Dunes wedge are shown in Figure 2 and the Keeler Dune dust control area in Figure 3. Flat Rock has been excluded from this analysis because it was determined to be unrepresentative of sources on the Owens Lake playa and moved to Mill shortly before LADWP lease termination in 2012. Mill has also been excluded from this analysis because monitoring has just recently been reinitiated in December 2014 per Article 4 in the 2014 Stipulated Judgment (2014, SJ).

RESULTS

Table 1 below summarizes three year average PM10 NAAQS exceedances for each site. The data record period, peak year, 2014 calendar year and yearly exceedance forecast after dust controls are in place are listed for each site. All valid daily PM10 concentrations for each monitor during this period can be found in Appendix A.

Table 1.
Three Year Average Number of NAAQS Exceedances

Site (Data Period)	Peak	2014	Forecast with Controls
Keeler (1993 - 2014)	20	8	0
Lone Pine (1993 - 2014)	4	1	1
Olancha (1993 - 2014)	8	4	0
Dirty Socks (2001 - 2012)	41	9	2
Lizard Tail (2010 - 2014)	14	6	2
Shell Cut (2003 - 2014)	19	5	4
Bill Stanley (2004 - 2014)	3	1	1

Summarizing yearly PM10 exceedance days provides useful insight regarding the extent of wind-blown dust from Owens Lake in the Owens Valley PM10 non-attainment area. However, further investigation and analysis provide a better understanding of the magnitude of the initial problem and the subsequent success of dust control mitigation at Owens Lake. Prior to January 1, 2000 the Great Basin Unified Air Pollution Control District (District) was primarily monitoring PM10 only in the communities of Lone Pine, Keeler and Olancha. By January 1, 2001 the District's Dust ID program and associated Owens Lake ambient air quality monitoring network was in place and fully operational.

Further investigation on a site by site basis with 'on-lake' and 'off-lake' screens yield additional PM10 reduction trend information. Below in alphabetical order are PM10 exceedance trends for these sites. Corresponding Figures 4.1 through 4.8 show three series of NAAQS exceedances for 'All', 'On-Lake' and 'Off-Lake' calculations with respective wind screen directions. Note, in all these figures the y-axis is fixed at 25 for all sites with the exception of Dirty Socks which is fixed at 45 due to the larger number of exceedances measured at this site.

Dirty Socks. In Figure 4.1, Dirty Socks has had an 89% reduction in exceedances from a maximum of 44 exceedances in 2001 and 2002 down to five exceedances in 2012 prior to shutting down the monitor due to lease termination by the Los Angeles Department of Water and Power (LADWP). PM10 exceedances from on-lake wind directions have been reduced by 91% from peaks in 2001 and 2002 to lows in 2012 prior the monitor being shut down. PM10 from off-lake wind directions continue to impact the site enough to cause at least one exceedance approximately every other year since 2007. With the December 30, 2014 endorsement of the 2014 Stipulated Judgment, per Article 4, monitoring has recommenced at Dirty Socks.

Keeler. In Figure 4.2, Keeler has had a 61% reduction in exceedances from a maximum of 23 exceedances in 1995 down to nine exceedances in 2014. PM10 exceedances from on-lake wind directions have been reduced by 93% from the peak in 1994 compared to the 2014 monitoring year. Three years, 2007, 2011 and 2013 didn't have any PM10 exceedances from on-lake wind directions. The single exceedance from on-lake wind directions in 2014 occurred on December 31st due to drying down of the existing T-26 shallow flood dust control area that is being transitioned. PM10 exceedances from the Keeler Dunes wind direction fluctuate between 1-10 exceedances per year. To control dust emissions from the Keeler Dunes, the District is currently implementing a straw bale and native shrub project on 138 acres. Figure 5 shows an aerial view of the completed bale array as of January 20, 2015. It is anticipated that once straw bales are in place PM10 reductions will immediately result. From off-lake wind directions excluding the Keeler Dunes, 2011 is the only year when Keeler has only experienced a PM10 exceedance in the last decade.

Lone Pine. In Figure 4.3, Lone Pine has measured considerably less PM10 exceedances since dust control mitigation has been constructed at Owens Lake. Since 2009, Lone Pine has only had one PM10 exceedance which was on May 25, 2012 with a measured PM10 concentration of 169 μg/m³. Hourly wind screens on this day indicate elevated PM10 from off-lake wind directions from the east southeast.

Lizard Tail. In Figure 4.4, source areas on Owens Lake south of Lizard Tail became emissive resulting in an increase of PM10 exceedances between the years 2009 – 2012. In subsequent years following these southerly on-lake events, off-lake PM10 exceedance events began to increase. One possibility for this increase in off-lake exceedances is due to deposition of Owens Lake material transported in previous years being blow back toward the lake from northerly wind events. As required by Article 2 of the 2014 Stipulated Judgment (2014 SJ), Best Available Control Measures (BACM) will be implemented at these Lizard Tail source areas as identified in District Supplemental Control Requirement Determinations (SCRD). Once these dust control measures are complete and operational by the December 31, 2017 deadline, future PM10 exceedances aren't expected.

North Beach. In Figure 4.5, North Beach collected four years of PM10 data prior to being shut down on December 26, 2012 as a result of LADWP lease termination. Due to the brevity of data collected before a two year no data period during the 2013 and 2014 calendar years, trends and trend directions are non-existent. During this gap of monitoring data collection, Phase 8 source areas from Owens Lake were controlled with gravel BACM. The extent of Phase 8 gravelling from space via GeoEye satellite imagery is observable on July 7, 2012 in Figure 6.1. For reference, post Phase 8 gravel BACM dust control construction images at ground level and an elevated aerial perspective are shown in Figures 6.2 and 6.3 respectively. With Phase 8 dust control mitigation now in place, future PM10 exceedances from on-lake wind directions aren't expected. The North Beach PM10 TEOM monitor was redeployed per Article 4 of the 2014 Stipulated Judgment in December 2014. On December 31, 2014 an exceedance was measured form off-lake wind directions. Moving forward, monitoring will provide valuable insight towards future PM10 trend direction.

Olancha. In Figure 4.6, Olancha continues to measure a few exceedances of the PM10 standard each year. Although a reduction in exceedances have taken place as dust controls expand at Owens Lake, it likely won't be until the scheduled Phase 9/10 dust control measures are complete when on-lake yearly exceedances reach the compliance level. Off-lake exceedances have been at zero for the past three years.

Shell Cut. In Figure 4.7, Shell Cut has had a drastic reduction in PM10 exceedances from a high of 20 in 2004 to a recent low of one in 2014. In 2008 Shell Cut was impacted from SCRD sources during wind events that will be controlled and part of LADWP's Phase 9/10 dust control mitigation. On-lake trends are expected to stay below compliance levels. In 2013 Shell Cut has a run of off-lake exceedances following flash flood material deposited in the Coso Wash upwind of the monitoring station. Other off-lake source that continue to impact Shell Cut occasionally are the Olancha Dunes. While off-lake exceedances are expected to trend back toward compliance levels and flood deposits stabilize, no controls are proposed for the Olancha Dunes.

Stanley. Once a reliable power supply was brought to Ash Point in May of 2005, the Bill Stanley monitor has been up and operational since. In Figure 4.8, PM10 exceedances at Stanley have ranged from six exceedances in 2009 to zero exceedances in 2013. During 2014, one exceedance was measured on February 26 at 177 $\mu g/m^3$ when Phase 7a T1A-2-a was being transitioned to non-shallow flood dust control and was emissive. Exceedances from on-lake wind directions given the assumption that current dust control remain operational, should be below compliance level from here on out. Elevated off-lake PM10 events from strong down sloping westerly winds out of Cartago Canyon may continue to make infrequent appearances however, PM10 exceedance are expected to be at or below compliance levels.

All Sites - Three Year Averages. In addition to the yearly trend analysis above, three year averages for "All", "On-Lake" and "Off-Lake" exceedances provide additional insight for PM10 trends in regards to compliance and attainment. Figures 7.1 – 7.8 are ordered alphabetically similar to the annual plots and site descriptions above. In these plots, Keeler, Lone Pine, Shell Cut and Stanley show PM10 trends at or below compliance levels for on-lake wind directions. Keeler (excluding the Keeler Dunes), Lone Pine, Olancha and Stanley show PM10 at or below compliance levels for off-lake wind directions. Only Lone Pine shows PM10 levels at or below compliance for unscreened NAAQS values. Due to incomplete monitoring records for both North Beach and Dirty Socks, these sites should be re-evaluated in three years prior to drawing any conclusions.

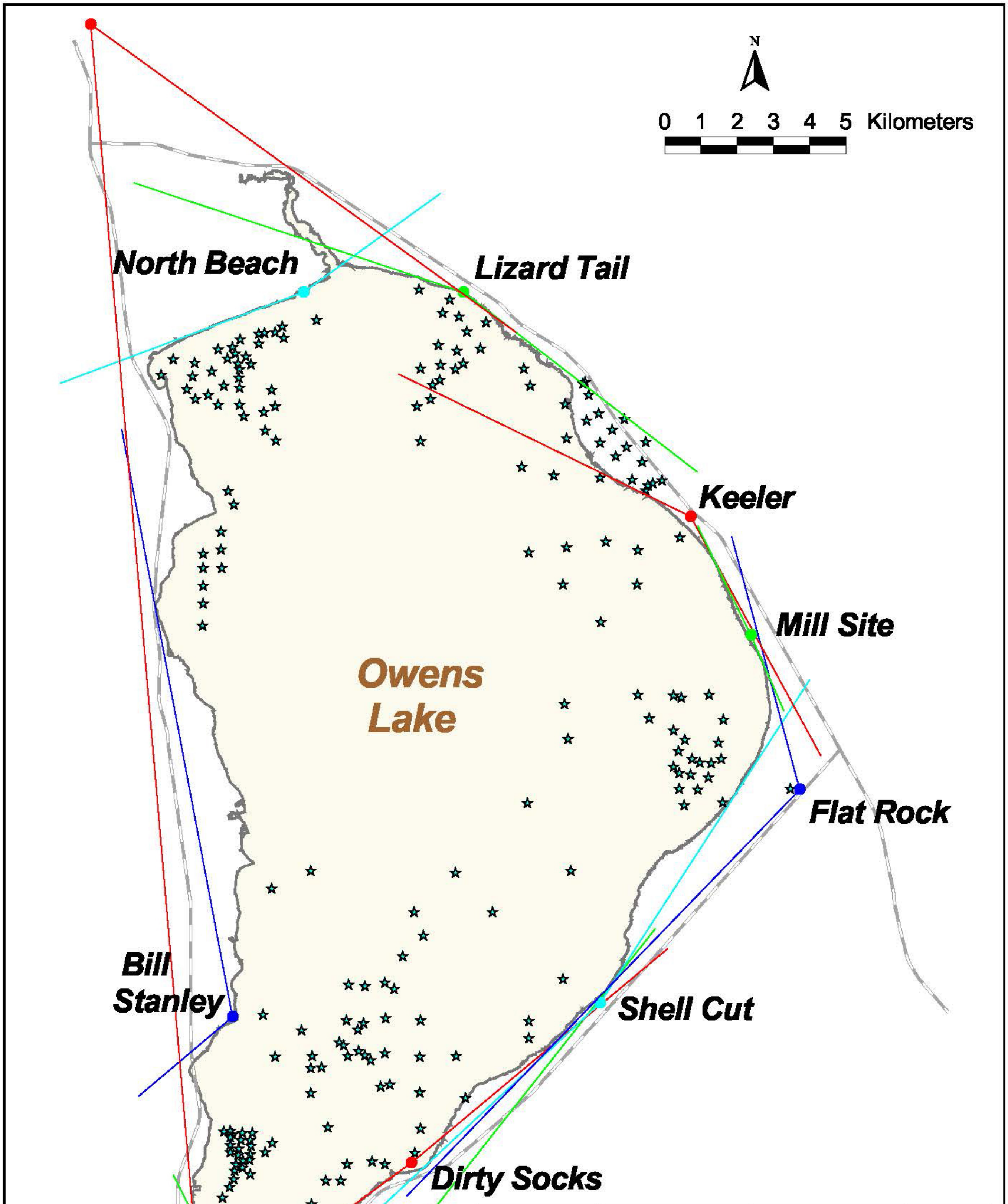
CONCLUSUION

The foregoing analysis establishes that PM10 NAAQS exceedances at Owens Lake regulatory shoreline monitors are trending towards compliance. After completion of the Phase 9/10 Dust Control Mitigation Project at Owens Lake which is scheduled to be fully operational by December 31, 2017, further trending towards compliance are expected lake-wide. For Keeler Dunes PM10 impacts, with the completion of the District's Keeler Dunes Dust Control Project, exceedance trends at Keeler are expected to achieve compliance levels.

References:

2014 Stipulated Judgment; Great Basin Unified Air Pollution Control District and Los Angeles Department of Water and Power, 2014. Stipulated Judgment, Superior Court of the State of California, County of Sacramento, December 30, 2014. http://gbuapcd.org/owenslake/2011SCR/StipulatedJudgment20141230.pdf

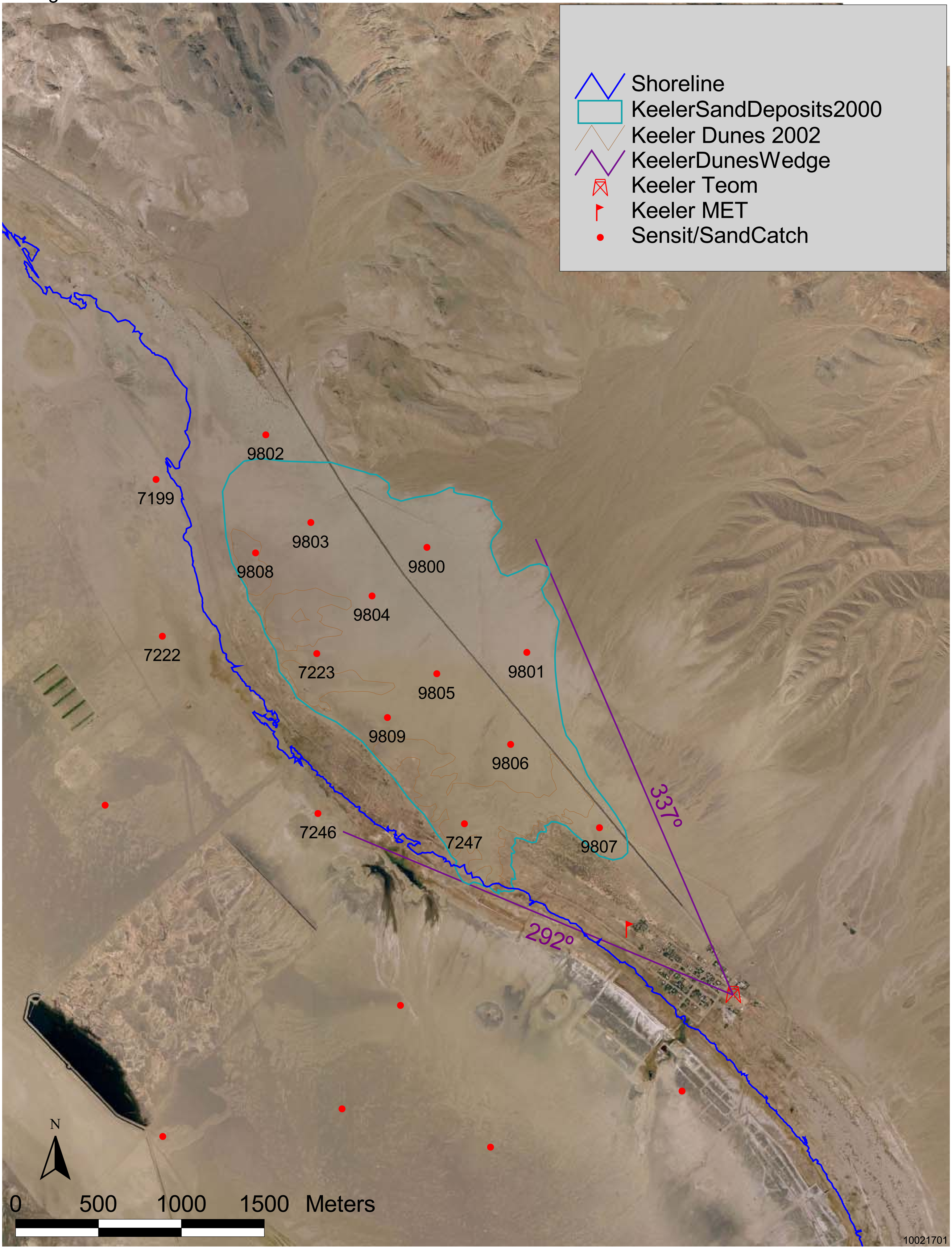
Figure 1.



	From-the-Lake	Non-Lake	
PM_{10} Monitor Site	*Wind Dir.(Deg.)*	*Wind Dir.(Deg.)*	*Met Tower*
Lone Pine	$126 \le WD \le 176$	$WD \le 126$ or $WD \ge 176$	Lone Pine
Keeler	$151 \le WD \le 296$	$WD \le 151$ or $WD \ge 296$	Keeler
Flat Rock	$224 \le WD \le 345$	$WD \le 224$ or $WD \ge 345$	Flat Rock
Shell Cut	$WD \ge 227$ or $WD \le 33$	$33 \le WD \le 227$	Shell Cut
Dirty Socks	$WD \ge 234$ or $WD \le 50$	$50 \le WD \le 234$	Dirty Socks
Olancha	$WD \ge 333$ or $WD \le 39$	$39 \le WD \le 333$	Olancha
Bill Stanley	$WD \ge 349$ or $WD \le 230$	$WD \le 349$ or $WD \ge 230$	Bill Stanley
Lizard Tail	$128 \le WD \le 288$	$WD \le 128$ or $WD \ge 288$	Lizard Tail
North Beach	$55 \le WD \le 250$	$WD \le 55$ or $WD \ge 250$	North Beach
Mill Site	$157 \le WD \le 333$	$WD \le 157$ or $WD \ge 333$	Mill Site

On-Lake Off-Lake Wind Directions for PM10 Monitor Sites

Figure 2.



Shoreline
KeelerSandDeposits2000
Keeler Dunes 2002
KeelerDunesWedge
Keeler Teom
Keeler MET
Sensit/SandCatch
9802
7199
9803
9808
9800
9804
7222
7223
9801
9805
9809
9806
337°
7246
7247
9807
292°
N
0
500
1000
1500
Meters
10021701

Figure 3.

Keeler Dunes & Vicinity

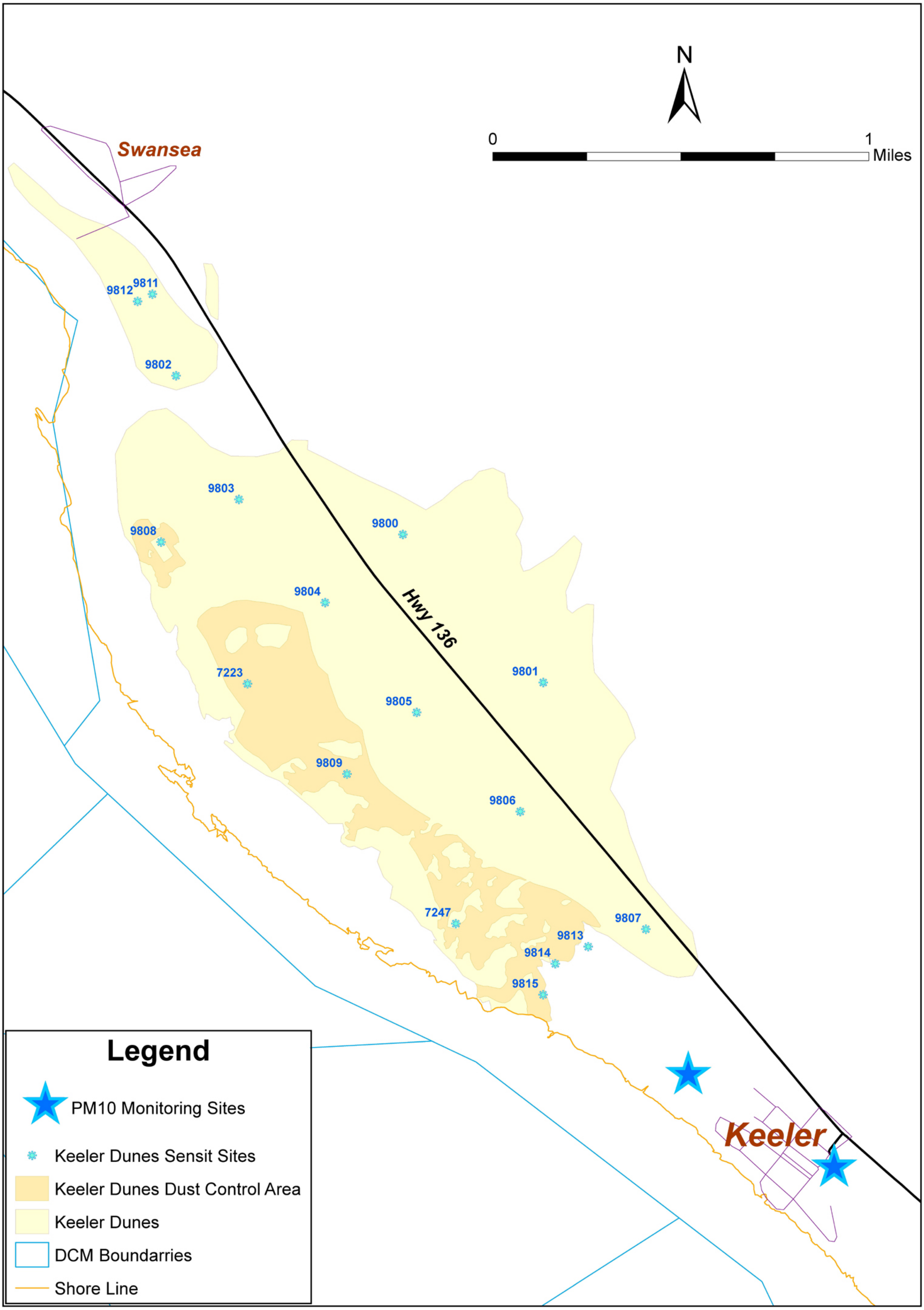
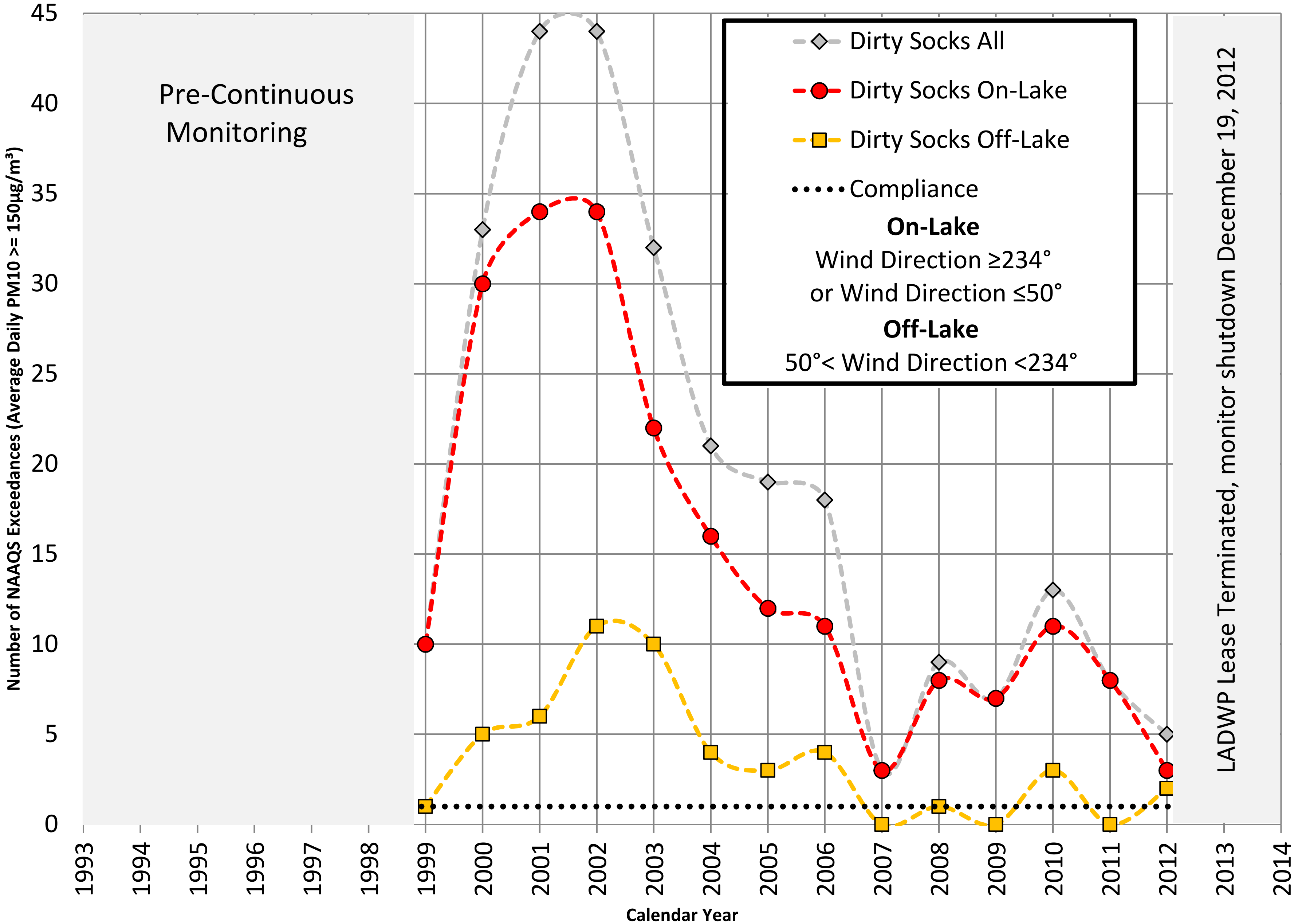
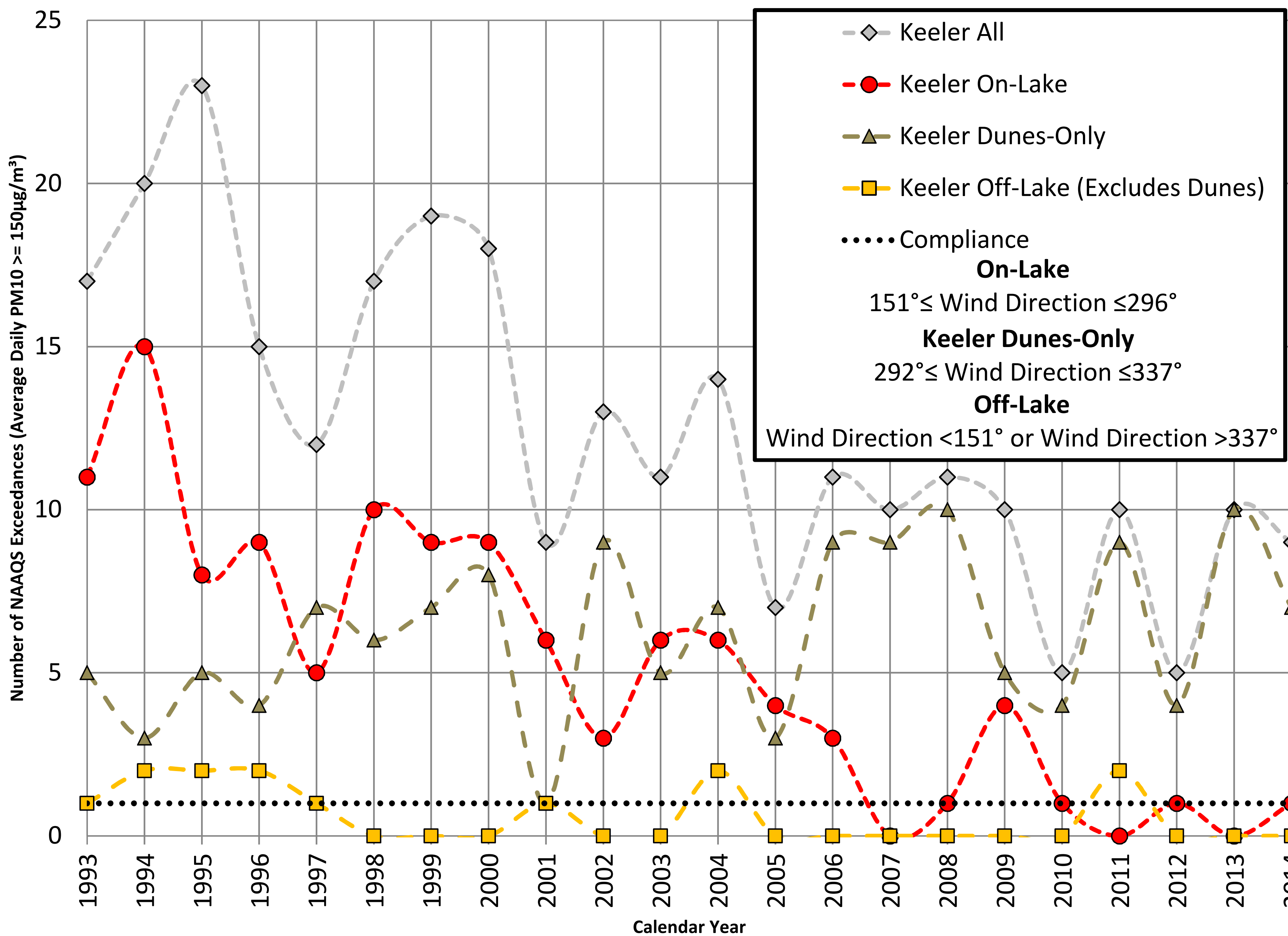


Figure 4.1.



Pre-Continuous Monitoring
Dirty Socks All
Dirty Socks On-Lake
Dirty Socks Off-Lake
Compliance
On-Lake
Wind Direction ≥234°
or Wind Direction ≤50°
Off-Lake
50°< Wind Direction <234°
LADWP Lease Terminated, monitor shutdown December 19, 2012
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
30
35
40
45
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

Figure 4.2.



Keeler All
Keeler On-Lake
Keeler Dunes-Only
Keeler Off-Lake (Excludes Dunes)
Compliance
On-Lake
151°≤ Wind Direction ≤296°
Keeler Dunes-Only
292°≤ Wind Direction ≤337°
Off-Lake
Wind Direction <151° or Wind Direction >337°
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
1995
1996
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1998
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2000
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2007
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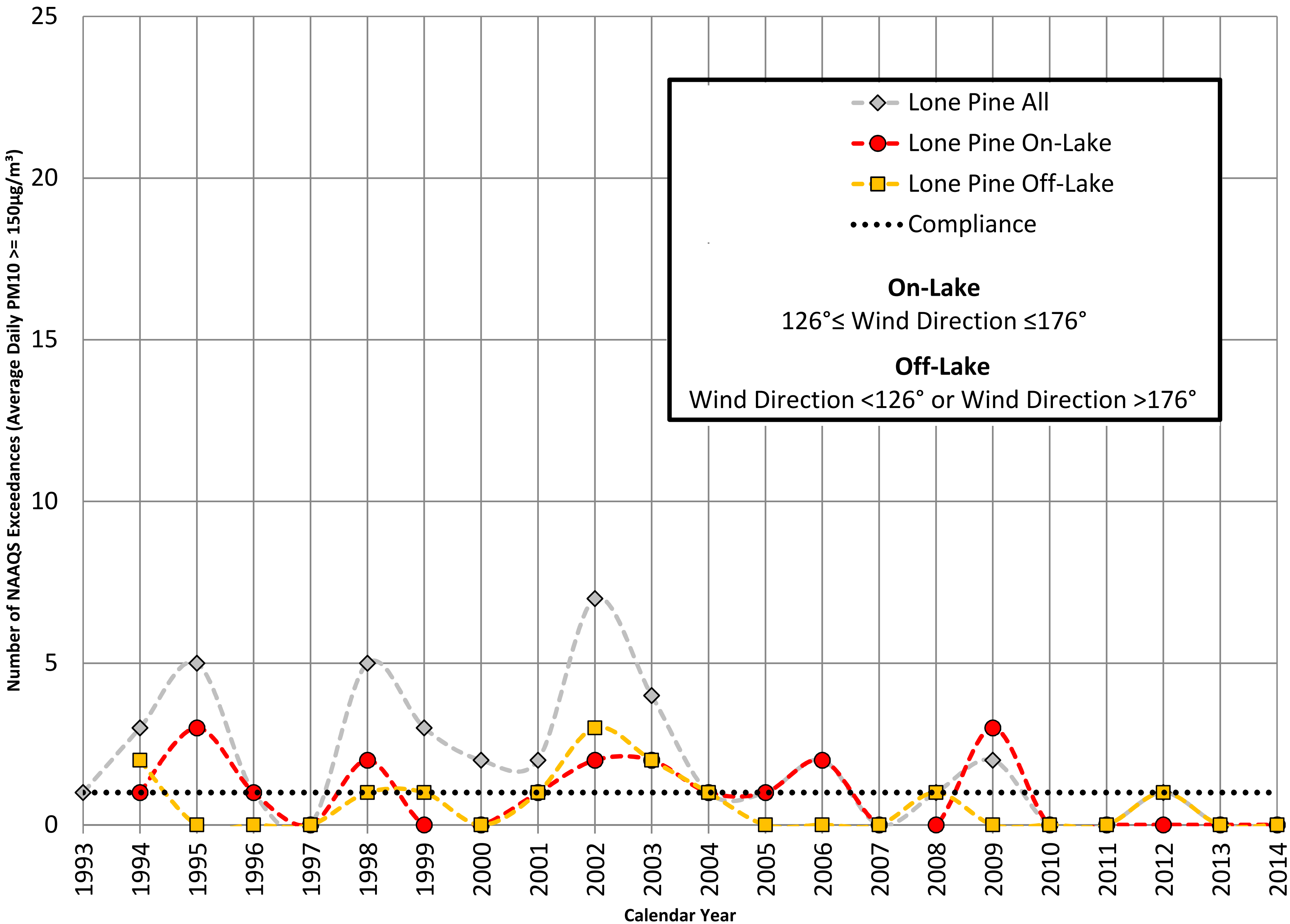
2010
2011
2012
2013
2014

Figure 4.3.


Lone Pine All
Lone Pine On-Lake
Lone Pine Off-Lake
Compliance
On-Lake
126°≤ Wind Direction ≤176°
Off-Lake
Wind Direction <126° or Wind Direction >176°
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
1995
1996
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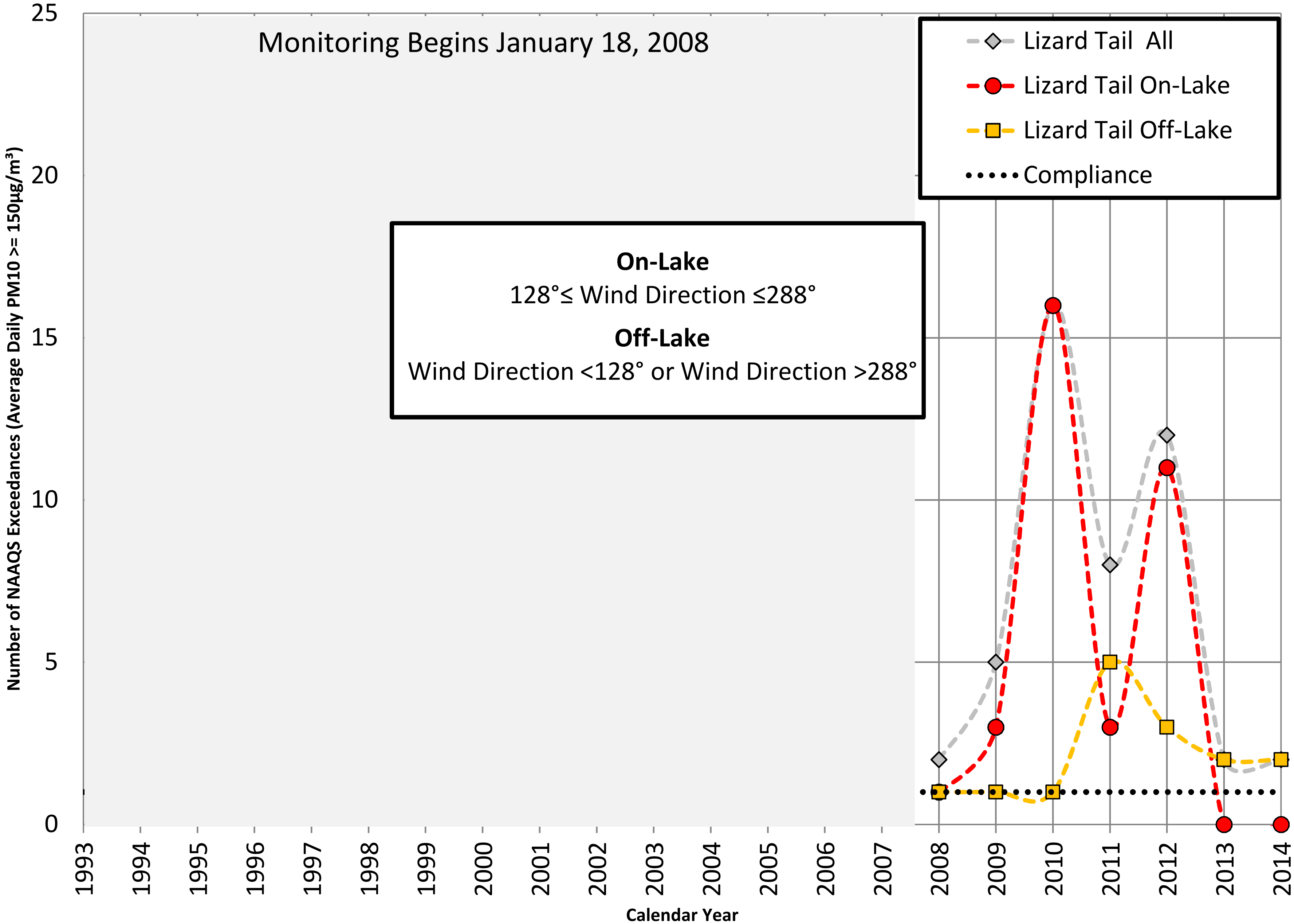
2009
2010
2011
2012
2013
2014

Figure 4.4.



Monitoring Begins January 18, 2008
Lizard Tail All
Lizard Tail On-Lake
Lizard Tail Off-Lake
Compliance
On-Lake
128°≤ Wind Direction ≤288°
Off-Lake
Wind Direction <128° or Wind Direction >288°
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
1995
1996
1997
1998
1999
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2007
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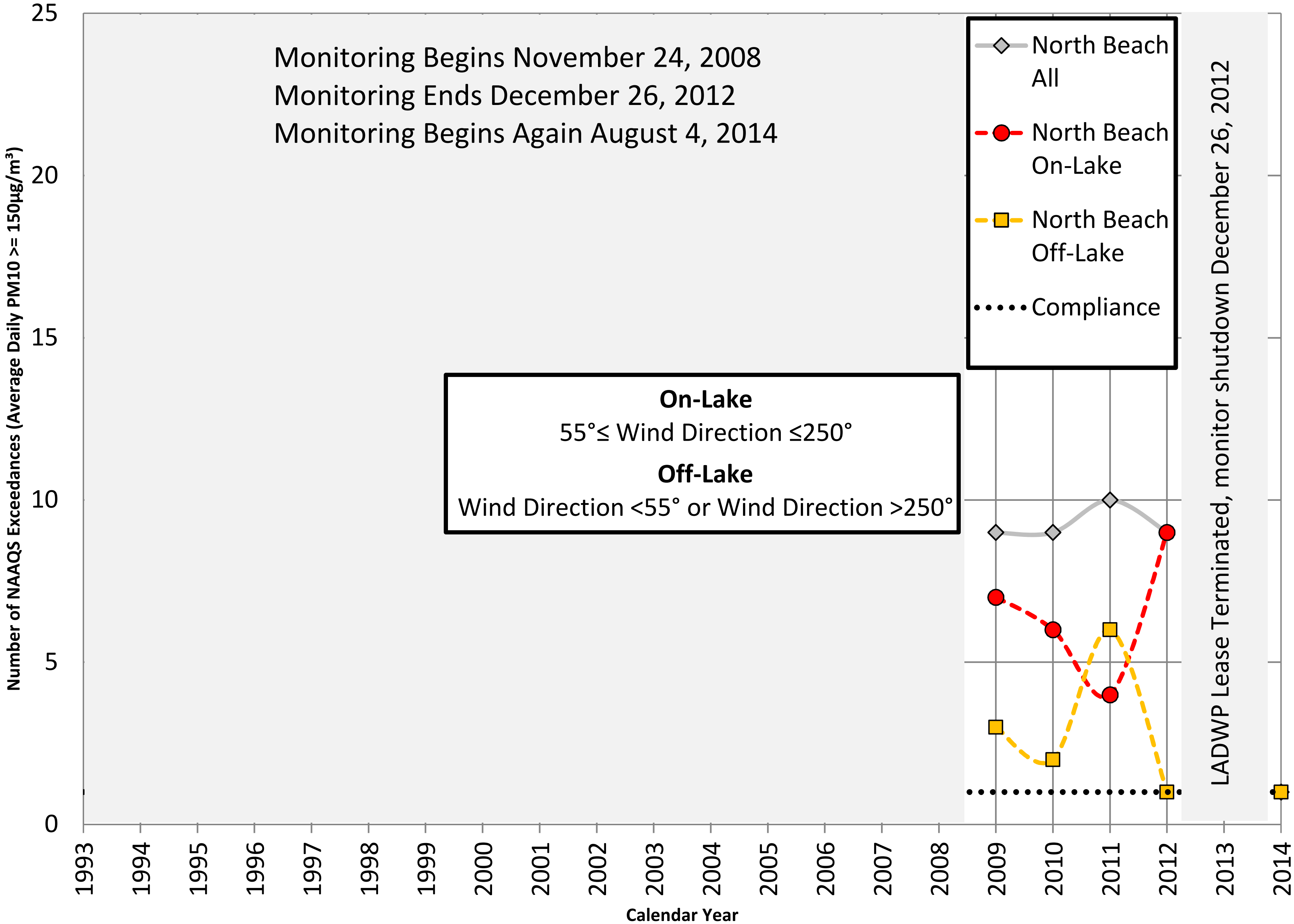
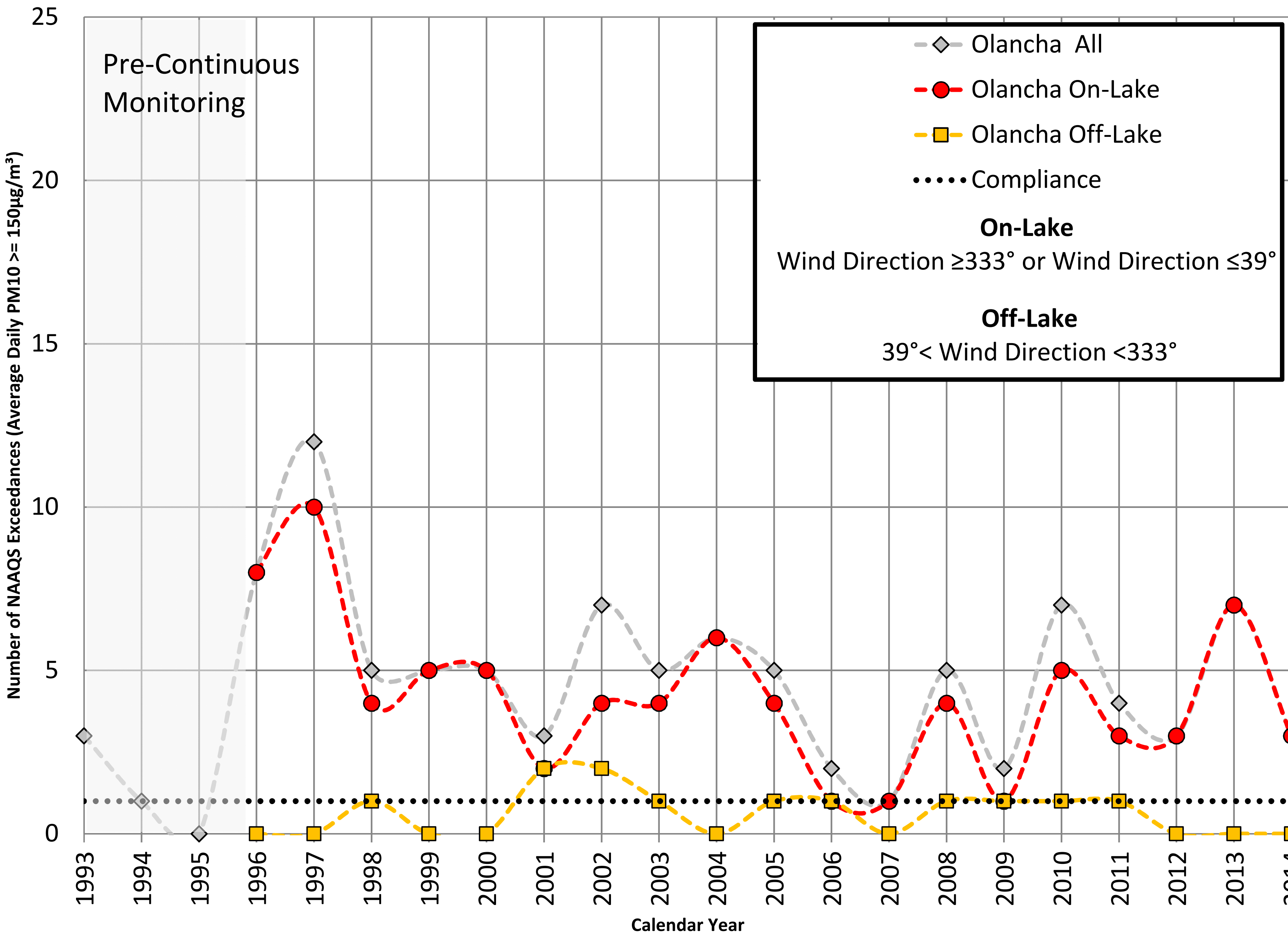
2011
2012
2013
2014

Figure 4.5.



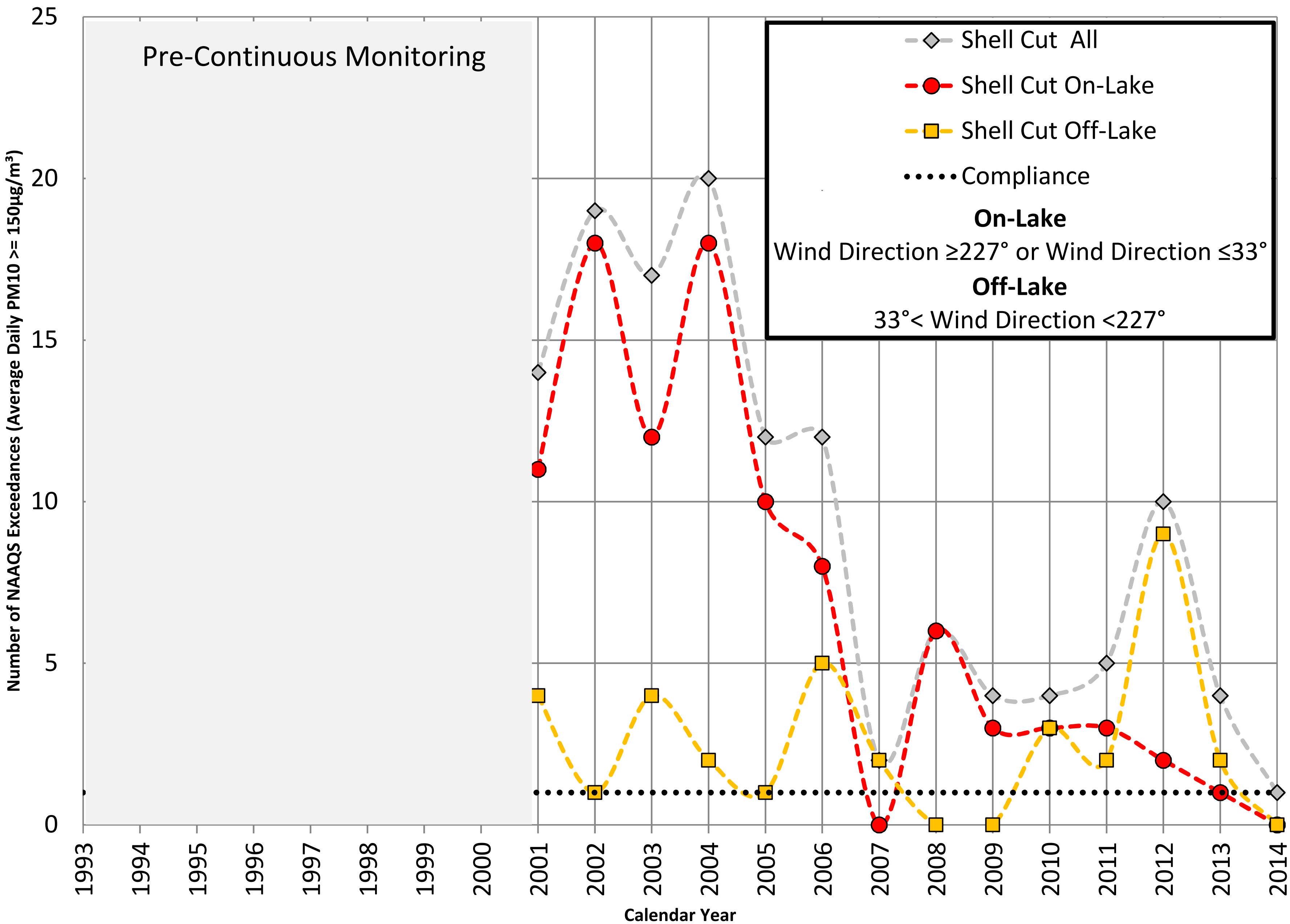
Monitoring Begins November 24, 2008
Monitoring Ends December 26, 2012
Monitoring Begins Again August 4, 2014
North Beach All
North Beach On-Lake
North Beach Off-Lake
Compliance
On-Lake
55°≤ Wind Direction ≤250°
Off-Lake
Wind Direction <55° or Wind Direction >250°
LADWP Lease Terminated, monitor shutdown December 26, 2012
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

Figure 4.6.



Pre-Continuous Monitoring
Olancha All
Olancha On-Lake
Olancha Off-Lake
Compliance
On-Lake
Wind Direction ≥333° or Wind Direction ≤39°
Off-Lake
39°< Wind Direction <333°
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

Figure 4.7.



Pre-Continuous Monitoring
Shell Cut All
Shell Cut On-Lake
Shell Cut Off-Lake
Compliance
On-Lake
Wind Direction ≥227° or Wind Direction ≤33°
Off-Lake
33°< Wind Direction <227°
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
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2005
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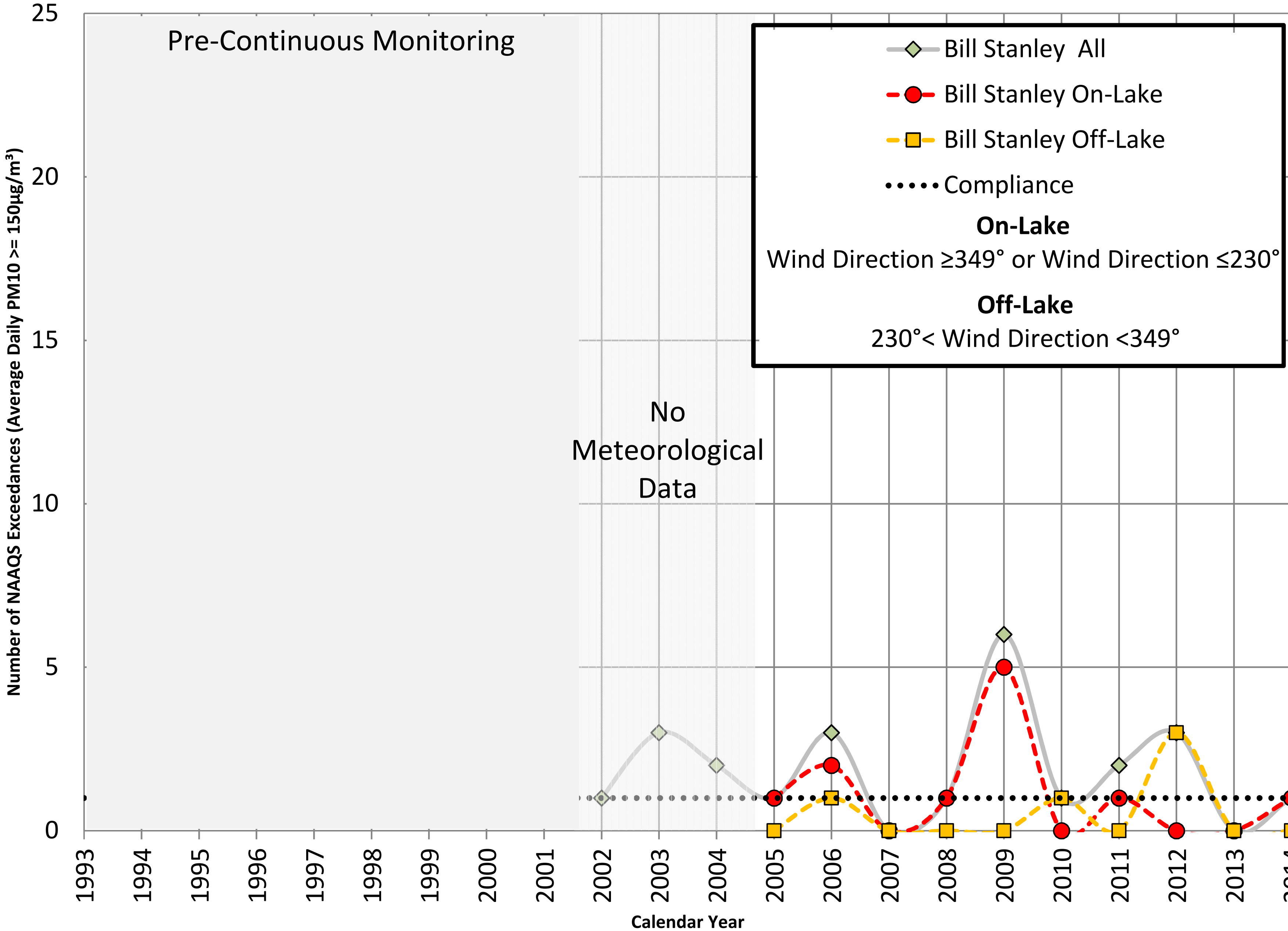
2007
2008
2009
2010
2011
2012
2013
2014

Figure 4.8.



Pre-Continuous Monitoring
No Meteorological Data
Bill Stanley All
Bill Stanley On-Lake
Bill Stanley Off-Lake
Compliance
On-Lake
Wind Direction ≥349° or Wind Direction ≤230°
Off-Lake
230°< Wind Direction <349°
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
25
20
15
10
5
0
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

Figure 5.

Air Photo of completed bale array on Horseshoe Dune (January 20, 2015)

Figure 6.1.

Great Basin Unified Air Pollution Control District

GeoEye Imagery: July 7, 2012

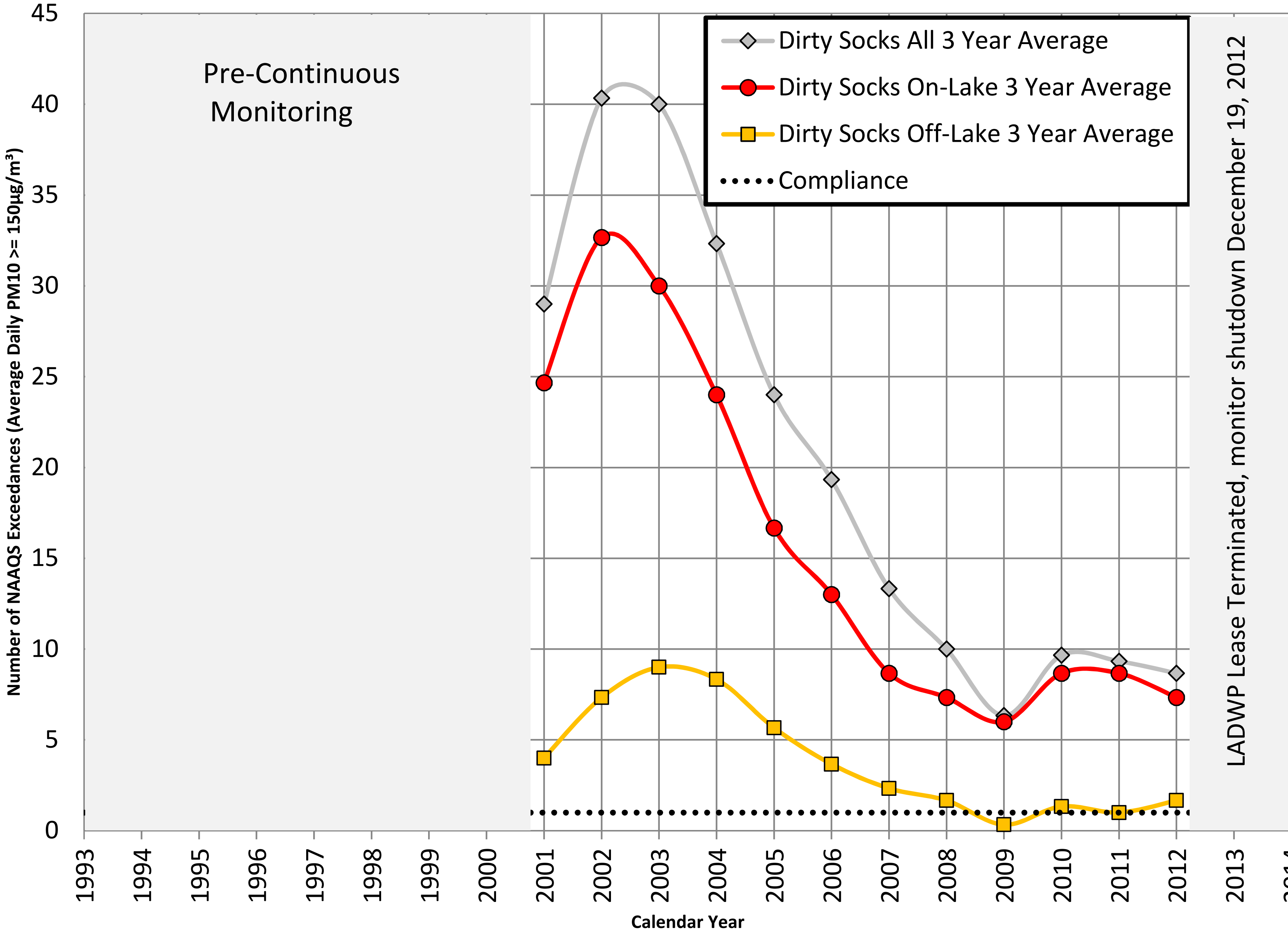
7/17/2012 4:22:24 PM

Owens Lake Status July 7 2012.mxd

Figure 6.2.

Figure 6.3.

Figure 7.1.



Pre-Continuous Monitoring
Dirty Socks All 3 Year Average
Dirty Socks On-Lake 3 Year Average
Dirty Socks Off-Lake 3 Year Average
Compliance
LADWP Lease Terminated, monitor shutdown December 19, 2012
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
30
35
40
45
1993
1994
1995
1996
1997
1998
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2001
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2010
2011
2012
2013
2014

Figure 7.2.

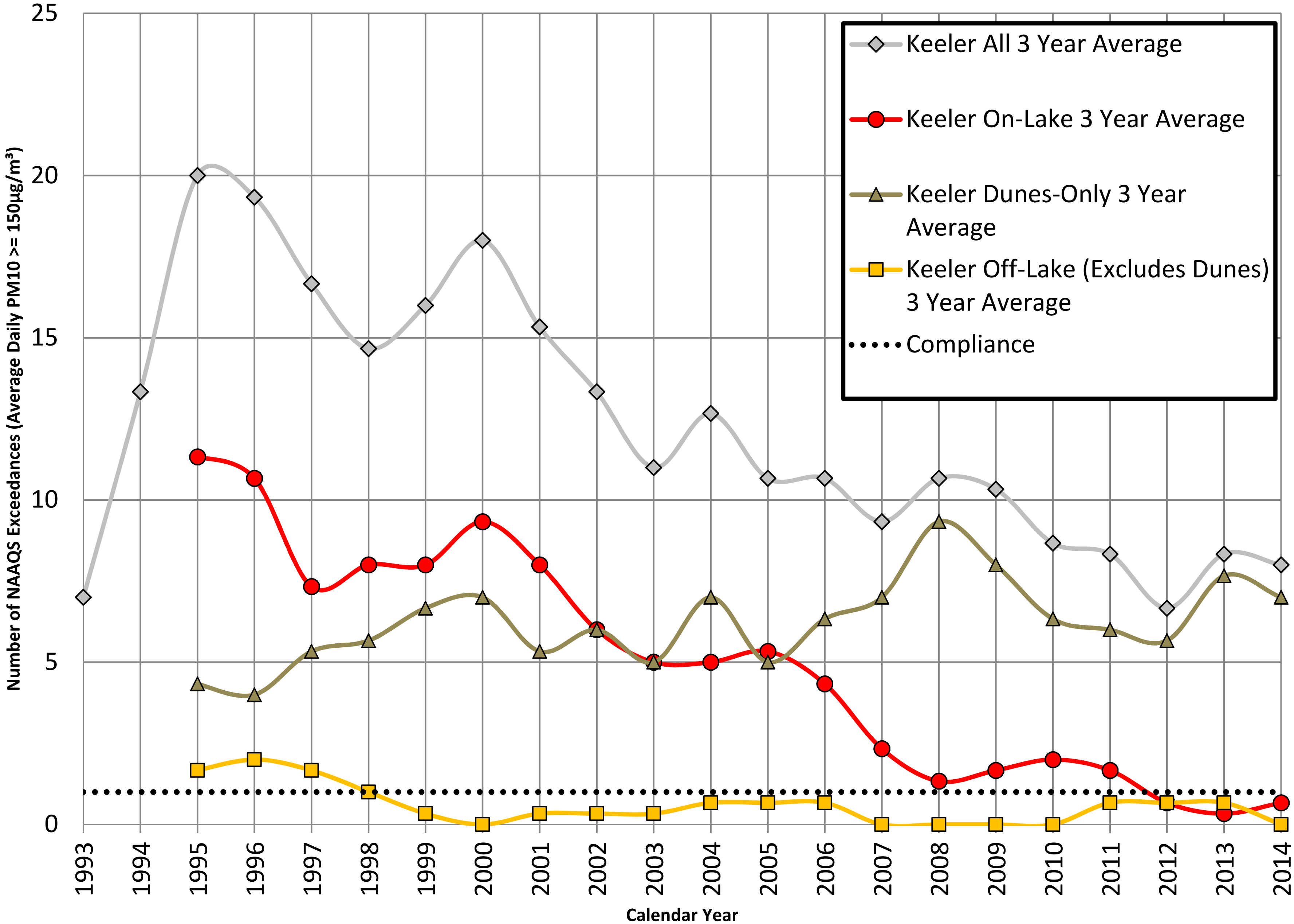
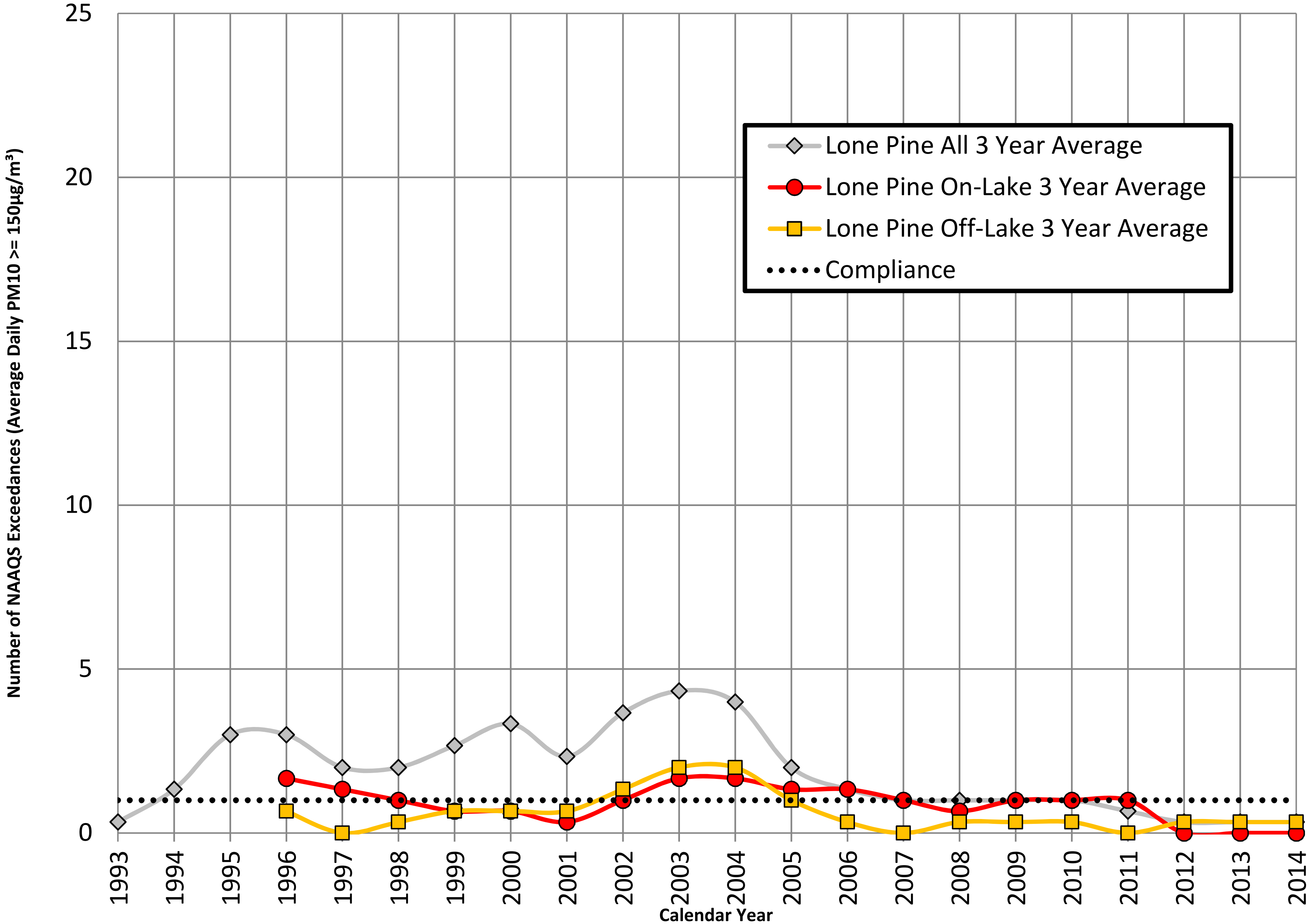
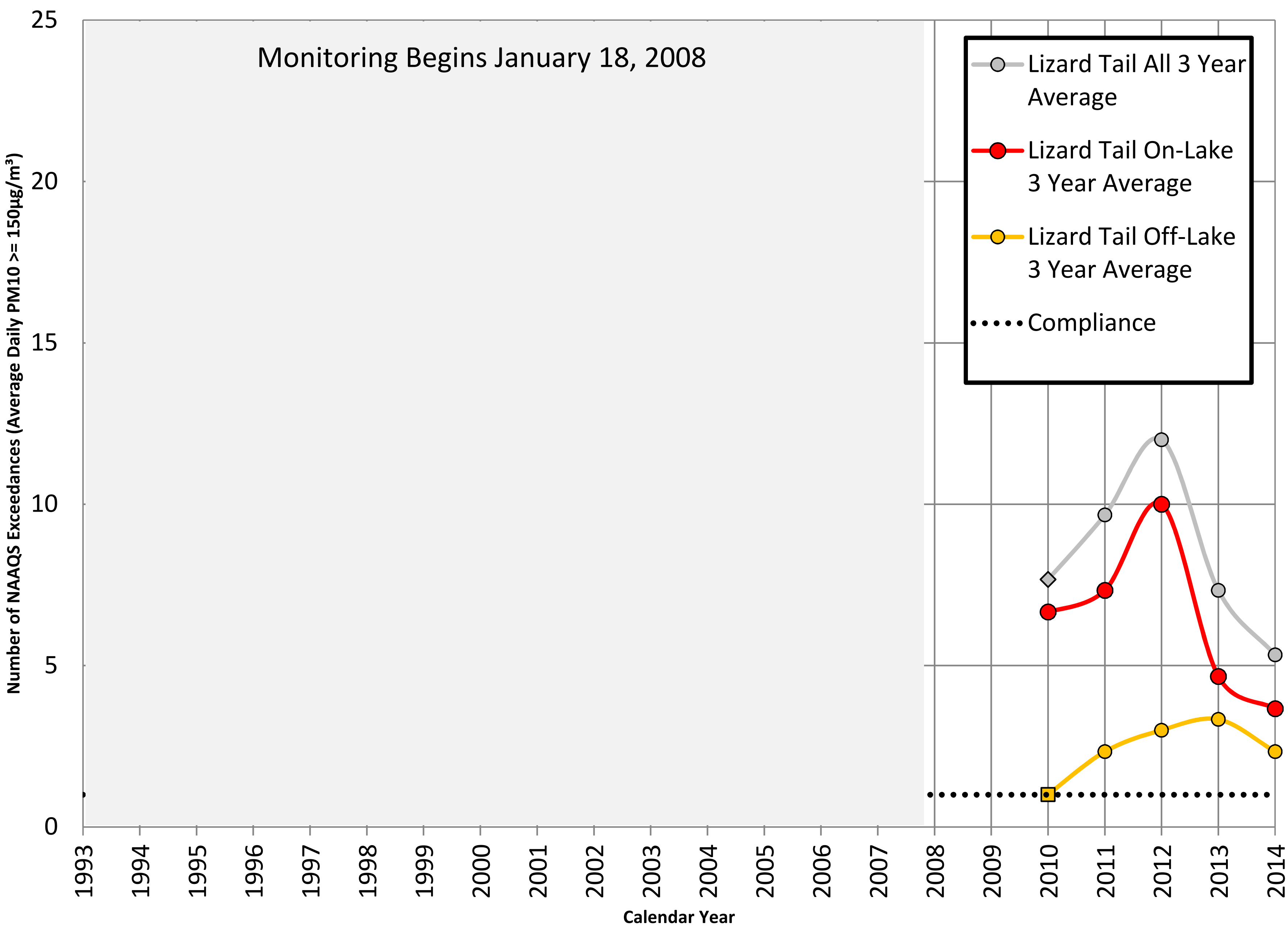

25
20
15
10
5
0
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Calendar Year
Keeler All 3 Year Average
Keeler On-Lake 3 Year Average
Keeler Dunes-Only 3 Year Average
Keeler Off-Lake (Excludes Dunes) 3 Year Average
Compliance

Figure 7.3.



25
20
15
10
5
0
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Lone Pine All 3 Year Average
Lone Pine On-Lake 3 Year Average
Lone Pine Off-Lake 3 Year Average
Compliance
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Calendar Year

Figure 7.4.



Monitoring Begins January 18, 2008
Lizard Tail All 3 Year Average
Lizard Tail On-Lake 3 Year Average
Lizard Tail Off-Lake 3 Year Average
Compliance
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
25
20
15
10
5
0
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
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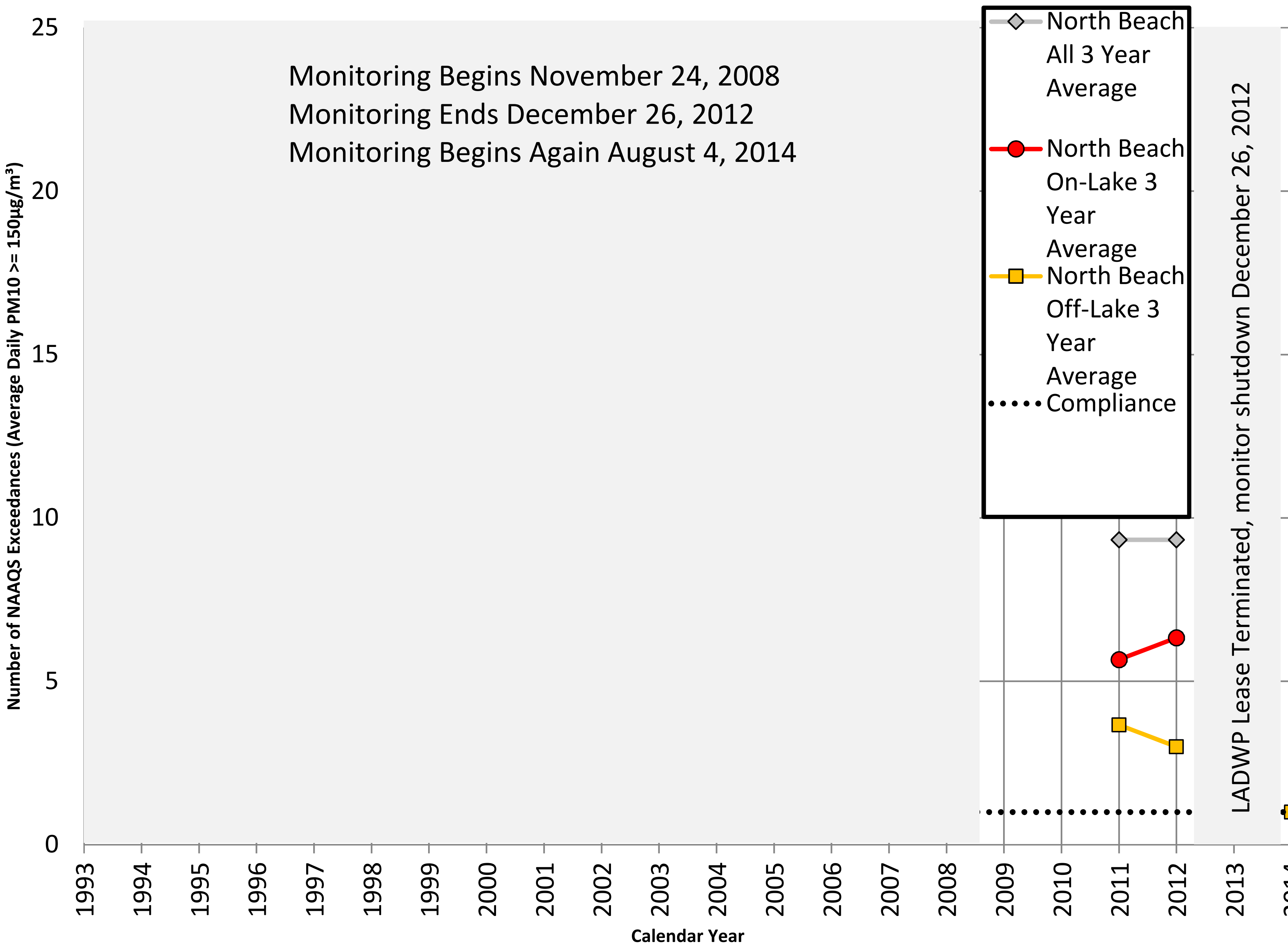
2006
2007
2008
2009
2010
2011
2012
2013
2014
Calendar Year

Figure 7.5.


Monitoring Begins November 24, 2008
Monitoring Ends December 26, 2012
Monitoring Begins Again August 4, 2014
North Beach All 3 Year Average
North Beach On-Lake 3 Year Average
North Beach Off-Lake 3 Year Average
Compliance
LADWP Lease Terminated, monitor shutdown December 26, 2012
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
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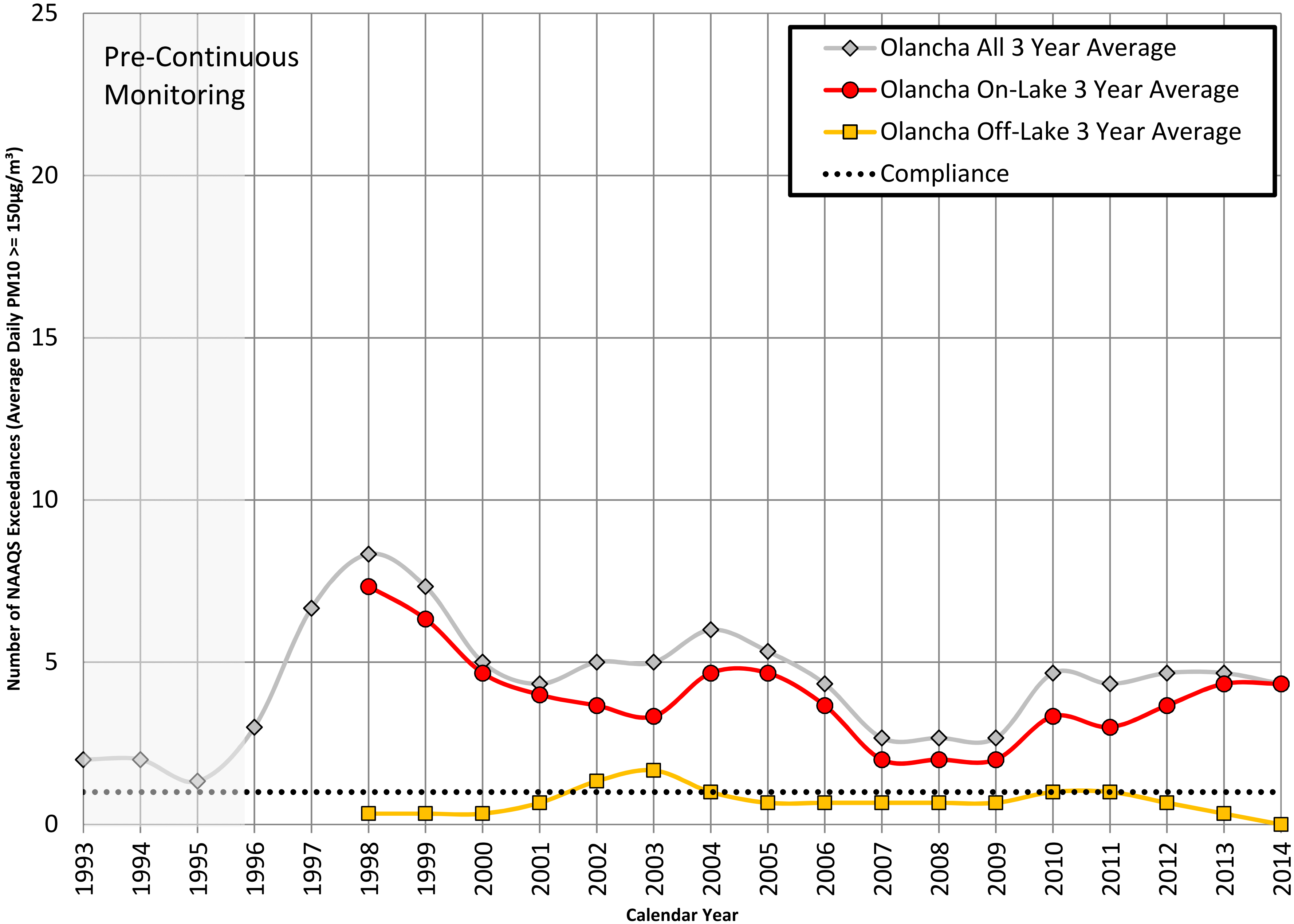
2010
2011
2012
2013
2014

Figure 7.6.



Pre-Continuous Monitoring
Olancha All 3 Year Average
Olancha On-Lake 3 Year Average
Olancha Off-Lake 3 Year Average
Compliance
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
25
20
15
10
5
0
1993
1994
1995
1996
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2013
2014

Figure 7.7.

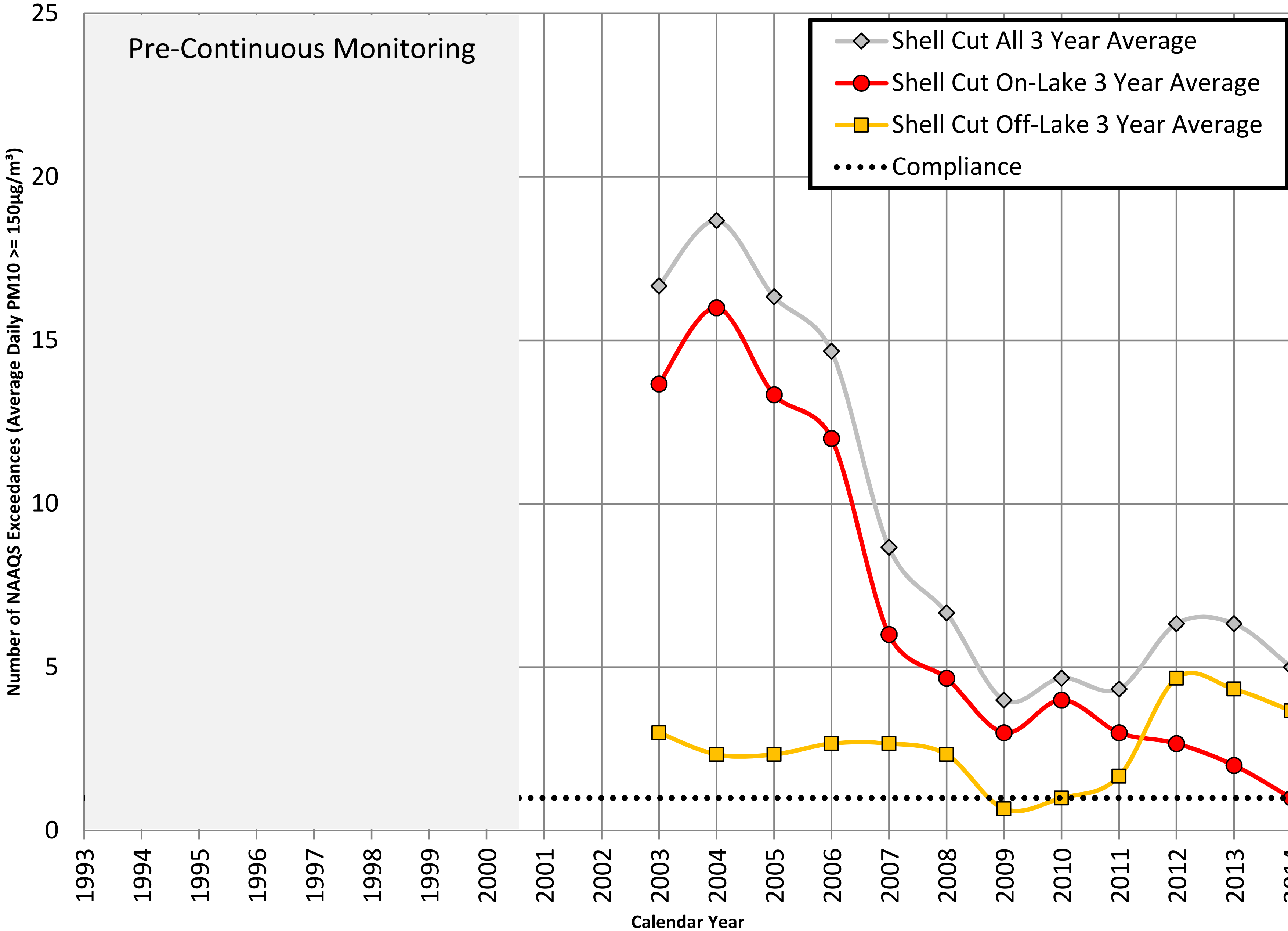
Pre-Continuous Monitoring
Shell Cut All 3 Year Average
Shell Cut On-Lake 3 Year Average
Shell Cut Off-Lake 3 Year Average
Compliance
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
1995
1996
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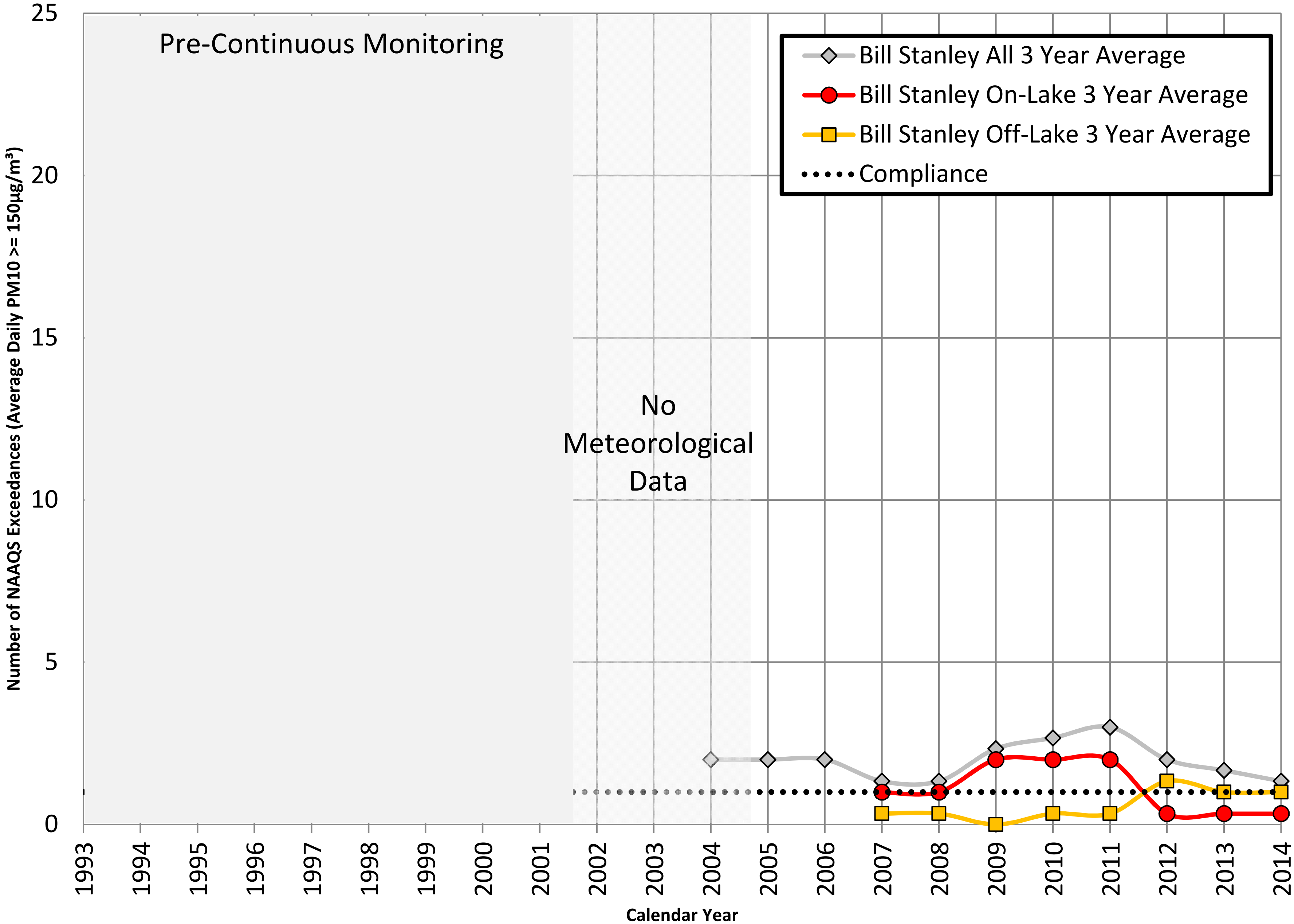
Figure 7.8.



Pre-Continuous Monitoring
No Meteorological Data
Bill Stanley All 3 Year Average
Bill Stanley On-Lake 3 Year Average
Bill Stanley Off-Lake 3 Year Average
Compliance
Number of NAAQS Exceedances (Average Daily PM10 >= 150µg/m³)
Calendar Year
0
5
10
15
20
25
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
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2014

APPENDIX IV-1
2016 SIP INVENTORY

Appendix IV-1. Table 1a. Exceedance Day PM_{10} Inventory for the Owens Lake Subarea (May 11, 2014)

DRAFT

INVENTORY CATEGORY	PM_{10} EMISSIONS (TONS/DAY)		RATIO CODE	Comments	% OF TOTAL INVENTORY	
	2012	2015			2012	2015
MANUFACTURING AND INDUSTRIAL	0.03	0.03	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
FOOD AND AGRICULTURAL PROCESSING	0.00	0.00	AG AREA		0%	0%
SERVICE AND COMMERCIAL	0.01	0.01	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
OTHER (FUEL COMBUSTION)	0.00	0.00	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
INCINERATORS	0.00	0.00	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
MINERAL PROCESSES	0.71	0.71	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
METAL PROCESSES	0.02	0.03	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
OTHER (INDUSTRIAL PROCESSES)	0.01	0.01	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
RESIDENTIAL FUEL COMBUSTION	0.02	0.02	POP		0%	0%
FARMING OPERATIONS						
TILLING DUST	0.00	0.00	AG AREA		0%	0%
HARVEST OPERATIONS - DUST	0.00	0.00	AG AREA		0%	0%
CONSTRUCTION AND DEMOLITION	0.01	0.01	POP		0%	0%
PAVED ROAD DUST	0.03	0.03	PAVED RD		0%	0%
UNPAVED ROAD DUST	0.92	0.92	CUSTOM	GBUAPCD Activity-Based Unpaved Roads Method (Appendix IV-1. Table 4)	0%	0%
FUGITIVE WINDBLOWN DUST						
DUST FROM AGRICULTURAL LANDS (NON-PASTURE)	0.01	0.01	AG AREA		0%	0%
DUST FROM UNPAVED ROADS AND ASSOCIATED AREAS	11.17	11.17	CUSTOM	GBUAPCD Windblown Unpaved Roads Method (Appendix IV-1. Table 3a)	2%	2%
DUST FROM EXPOSED LAKEBEDS	45.30	45.30	CUSTOM	Modeling Results	8%	8%
DUST FROM KEELER DUNES	169.20	169.20	CUSTOM	Modeling Results	31%	31%
DUST FROM OLANCHA DUNES	312.00	312.00	CUSTOM	Modeling Results	57%	57%
DUST FROM OPEN DESERT (EX. KEELER AND OLANCHA)	2.94	2.94	CUSTOM	Imperial Land Use Emission Factors (Appendix IV-1. Table 5a)	1%	1%
FIRES	0.00	0.00	POP		0%	0%
MANAGED BURNING AND DISPOSAL	0.09	0.09	VEG AREA		0%	0%
COOKING	0.00	0.00	POP		0%	0%
LIGHT DUTY PASSENGER (LDA)	0.00	0.00	PAVED RD		0%	0%
LIGHT DUTY TRUCKS - 1 (LDT1)	0.00	0.00	PAVED RD		0%	0%
LIGHT DUTY TRUCKS - 2 (LDT2)	0.00	0.00	PAVED RD		0%	0%
MEDIUM DUTY TRUCKS (MDV)	0.00	0.00	PAVED RD		0%	0%
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.00	0.00	PAVED RD		0%	0%
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.00	0.00	PAVED RD		0%	0%
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.00	0.00	PAVED RD		0%	0%
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.00	0.00	PAVED RD		0%	0%
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.00	0.00	PAVED RD		0%	0%
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.00	0.00	PAVED RD		0%	0%
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.00	0.00	PAVED RD		0%	0%
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.01	0.00	PAVED RD		0%	0%
MOTORCYCLES (MCY)	0.00	0.00	PAVED RD		0%	0%
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.00	0.00	PAVED RD		0%	0%
SCHOOL BUSES - DIESEL (SBD)	0.00	0.00	PAVED RD		0%	0%
OTHER BUSES - GAS (OBG)	0.00	0.00	PAVED RD		0%	0%
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.00	0.00	PAVED RD		0%	0%
ALL OTHER BUSES - DIESEL (OBD)	0.00	0.00	PAVED RD		0%	0%
MOTOR HOMES (MH)	0.00	0.00	PAVED RD		0%	0%
AIRCRAFT	0.00	0.00	AREA		0%	0%
RECREATIONAL BOATS	0.00	0.00	WATER AREA		0%	0%
OFF-ROAD RECREATIONAL VEHICLES	0.00	0.00	AREA		0%	0%
OFF-ROAD EQUIPMENT	0.00	0.00	AREA		0%	0%
FARM EQUIPMENT	0.00	0.00	AG AREA		0%	0%
WILDFIRES	0.17	0.17	AREA	If applicable, will use in-OVPA episode emissions.	0%	0%
TOTAL (TONS/DAY)	**542.65**	**542.66**			100%	100%

Notes:

[1] Except where noted, the values in the table have been derived from the ARB emission inventory for Inyo County and have been ratioed by various factors to obtain results relevant to the Owens Valley Planning Area. The type of ratio used is presented in the 'RATIO CODE' column and is further explained in Appendix IV-1. Table 2.

[2] Emission sources reported as having zero emissions in the ARB emission inventory have been removed from the table.

INVENTORY CATEGORY	PM_{10} EMISSIONS (TONS/DAY)		RATIO CODE	Comments
	2012	2015		
MANUFACTURING AND INDUSTRIAL	0.03	0.03	NO RATIO	Could modify based on area and/or location of point sources.
FOOD AND AGRICULTURAL PROCESSING	0.00	0.00	AG AREA	
SERVICE AND COMMERCIAL	0.01	0.01	NO RATIO	Could modify based on area and/or location of point sources.
OTHER (FUEL COMBUSTION)	0.00	0.00	NO RATIO	Could modify based on area and/or location of point sources.
INCINERATORS	0.00	0.00	NO RATIO	Could modify based on area and/or location of point sources.
MINERAL PROCESSES	0.71	0.71	NO RATIO	Could modify based on area and/or location of point sources.
METAL PROCESSES	0.02	0.03	NO RATIO	Could modify based on area and/or location of point sources.
OTHER (INDUSTRIAL PROCESSES)	0.01	0.01	NO RATIO	Could modify based on area and/or location of point sources.
RESIDENTIAL FUEL COMBUSTION	0.02	0.02	POP	
FARMING OPERATIONS				
TILLING DUST	0.00	0.00	AG AREA	
HARVEST OPERATIONS - DUST	0.00	0.00	AG AREA	
CONSTRUCTION AND DEMOLITION	0.01	0.01	POP	
PAVED ROAD DUST	0.03	0.03	PAVED RD	
UNPAVED ROAD DUST	0.92	0.92	CUSTOM	GBUAPCD Activity-Based Unpaved Roads Method (Appendix IV-1. Table 4)
FUGITIVE WINDBLOWN DUST				
DUST FROM AGRICULTURAL LANDS (NON-PASTURE)	0.01	0.01	AG AREA	
DUST FROM UNPAVED ROADS AND ASSOCIATED AREAS	143.31	143.31	CUSTOM	GBUAPCD Windblown Unpaved Roads Method (Appendix IV-1. Table 3b)
DUST FROM EXPOSED LAKEBEDS	45.30	45.30	CUSTOM	Modeling Results
DUST FROM KEELER DUNES	169.20	169.20	CUSTOM	Modeling Results
DUST FROM OLANCHA DUNES	312.00	312.00	CUSTOM	Modeling Results
DUST FROM OPEN DESERT (EX. KEELER AND OLANCHA)	56.69	56.69	CUSTOM	Imperial Land Use Emission Factors (Appendix IV-1. Table 5b)
FIRES	0.00	0.00	POP	
MANAGED BURNING AND DISPOSAL	0.09	0.09	VEG AREA	
COOKING	0.00	0.00	POP	
LIGHT DUTY PASSENGER (LDA)	0.00	0.00	PAVED RD	
LIGHT DUTY TRUCKS - 1 (LDT1)	0.00	0.00	PAVED RD	
LIGHT DUTY TRUCKS - 2 (LDT2)	0.00	0.00	PAVED RD	
MEDIUM DUTY TRUCKS (MDV)	0.00	0.00	PAVED RD	
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.00	0.00	PAVED RD	
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.00	0.00	PAVED RD	
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.00	0.00	PAVED RD	
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.00	0.00	PAVED RD	
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.00	0.00	PAVED RD	
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.00	0.00	PAVED RD	
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.00	0.00	PAVED RD	
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.01	0.00	PAVED RD	
MOTORCYCLES (MCY)	0.00	0.00	PAVED RD	
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.00	0.00	PAVED RD	
SCHOOL BUSES - DIESEL (SBD)	0.00	0.00	PAVED RD	
OTHER BUSES - GAS (OBG)	0.00	0.00	PAVED RD	
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.00	0.00	PAVED RD	
ALL OTHER BUSES - DIESEL (OBD)	0.00	0.00	PAVED RD	
MOTOR HOMES (MH)	0.00	0.00	PAVED RD	
AIRCRAFT	0.00	0.00	AREA	
RECREATIONAL BOATS	0.00	0.00	WATER AREA	
OFF-ROAD RECREATIONAL VEHICLES	0.00	0.00	AREA	
OFF-ROAD EQUIPMENT	0.00	0.00	AREA	
FARM EQUIPMENT	0.00	0.00	AG AREA	
WILDFIRES	0.17	0.17	AREA	If applicable, will use in-OVPA episode emissions.
TOTAL (TONS/DAY)	**728.54**	**728.55**		

Notes:

[1] Except where noted, the values in the table have been derived from the ARB emission inventory for Inyo County and have been ratioed by various factors to obtain results relevant to the Owens Valley Planning Area. The type of ratio used is presented in the 'RATIO CODE' column and is further explained in Appendix IV-1. Table 2.

[2] Emission sources reported as having zero emissions in the ARB emission inventory have been removed from the table.

Owens Valley SIP Inventory Development Details

LAND USE:

Land Use Type Code	Specific Land Use Type	General Land Use Type	Area (acres) (2011)		
			2-Km Buffer	OVPA	Inyo County
11	Open Water	Open Water	28	10,643	13,300
12	Perennial Snow/Ice	Perennial Snow/Ice	0	14	1,103
21	Developed, Open Space	Developed	1,029	3,974	21,675
22	Developed, Low Intensity	Developed	619	2,671	10,884
23	Developed, Medium Intensity	Developed	79	438	1,146
24	Developed, High Intensity	Developed	3	28	63
31	Barren Land	Barren Land	6,836	104,373	405,383
41	Deciduous Forest	Forest	0	643	2,578
42	Evergreen Forest	Forest	46	85,155	303,533
43	Mixed Forest	Forest	5	565	1,843
52	Shrub/Scrub	Shrub/Scrub	34,597	642,193	5,667,781
71	Herbaceuous	Shrub/Scrub	284	16,393	66,445
81	Hay/Pasture	Agriculture	0	1,428	13,195
82	Cultivated Crops	Agriculture	0	575	10,205
90	Woody Wetlands	Wetland	573	4,467	8,237
95	Emergent Herbaceuous Wetlands	Wetland	13	4,773	18,112

Note:

[1] The National Land Use Data Set was obtained from http://www.mrlc.gov/viewerjs/. Accessed August 10, 2015.

RATIOS (OVPA to INYO):

Ratio Code	Value
AREA	0.134
WATER AREA	0.800
AG AREA	0.086
VEG AREA	0.124
POP	0.172
PAVED RD	0.206
NO RATIO	1.000
REMOVE	0.000

POPULATION:

	Population (2010)
OVPA	3,193
Inyo County	18,546

Note:

Population numbers were extracted from 2010 U.S. Census data.

ROADS:

	Unpaved Roads (miles)	Paved Roads (miles)	Total Roads (miles)
OVPA	1,103	390	1493
Inyo County	5,437	1,890	7327

Note:

Values extracted from GBUAPCD Unpaved Roads Analysis which used TIGER 2012 data.

$$E = 1.34\ x\ 10^{-5} e^{(0.25xu)}$$

E = PM_{10} emissions in grams per square meter per second
u = Hourly average wind speed at 10 meters in meters per second (for u > 7.6 m/s)

Exceedance Day Scenario: 05/11/2014 (Lone Pine)

Hour	Wind Speed (m/s)	Emission Rate		Emissions 2-Km Buffer	
		$g/m^2/s$	$g/m^2/hr$	kg/hr	tons/hr
100	8.63	1.16E-04	4.17E-01	3.52E+02	3.88E-01
200	8.19	1.04E-04	3.74E-01	3.15E+02	3.48E-01
300	8.88	1.23E-04	4.44E-01	3.75E+02	4.13E-01
400	9.63	1.49E-04	5.36E-01	4.52E+02	4.98E-01
500	10.48	1.84E-04	6.63E-01	5.59E+02	6.16E-01
600	10.63	1.91E-04	6.88E-01	5.80E+02	6.40E-01
700	11.39	2.31E-04	8.32E-01	7.02E+02	7.74E-01
800	13.37	3.79E-04	1.36E+00	1.15E+03	1.27E+00
900	12.64	3.16E-04	1.14E+00	9.59E+02	1.06E+00
1000	12.47	3.03E-04	1.09E+00	9.19E+02	1.01E+00
1100	12.1	2.76E-04	9.93E-01	8.38E+02	9.24E-01
1200	11.11	2.15E-04	7.76E-01	6.54E+02	7.21E-01
1300	10.95	2.07E-04	7.45E-01	6.29E+02	6.93E-01
1400	10.47	1.84E-04	6.61E-01	5.58E+02	6.15E-01
1500	9.2	1.34E-04	4.81E-01	4.06E+02	4.47E-01
1600	9.11	1.31E-04	4.70E-01	3.97E+02	4.38E-01
1700	7.84	9.51E-05	3.42E-01	2.89E+02	3.19E-01
1800	6.62	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1900	6.63	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2000	6.27	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2100	5.38	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2200	6.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2300	5.71	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2400	5.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
				kg/day	**tons/day**
			TOTAL	**1.01E+04**	**1.12E+01**

Note:
[1] Methodology is consistent with that presented in the technical memorandum authored by GBUAPCD and titled, *Unpaved Road Dust Inyo County May 3, 2010 (REVISED).*

Assumptions:
- 20 = average width of unpaved road (ft)
- 86 = unpaved road in 2-kilometer buffer (miles)
- 843,709 = erodable surface area (square meters)
- 208 = erodable surface area (acres)
- 7.6 = threshold windspeed (meters per second)

Conversion Factors:
- 5,280 = feet per mile
- 11 = square feet per square meter
- 43,560 = square feet per acre
- 1,000 = grams per kilogram
- 453.592 = grams per pound
- 2,000 = pounds per ton
- 60 = seconds per minute

$$E = 1.34\ x\ 10^{-5} e^{(0.25xu)}$$

E = PM_{10} emissions in grams per square meter per second
u = Hourly average wind speed at 10 meters in meters per second (for u > 7.6 m/s)

Exceedance Day Scenario: 05/11/2014 (Lone Pine)

Hour	Wind Speed	Emission Rate		Emissions OVPA	
	(m/s)	$g/m^2/s$	$g/m^2/hr$	kg/hr	tons/hr
100	8.63	1.16E-04	4.17E-01	4.52E+03	4.98E+00
200	8.19	1.04E-04	3.74E-01	4.04E+03	4.46E+00
300	8.88	1.23E-04	4.44E-01	4.81E+03	5.30E+00
400	9.63	1.49E-04	5.36E-01	5.80E+03	6.39E+00
500	10.48	1.84E-04	6.63E-01	7.17E+03	7.90E+00
600	10.63	1.91E-04	6.88E-01	7.44E+03	8.21E+00
700	11.39	2.31E-04	8.32E-01	9.00E+03	9.92E+00
800	13.37	3.79E-04	1.36E+00	1.48E+04	1.63E+01
900	12.64	3.16E-04	1.14E+00	1.23E+04	1.36E+01
1000	12.47	3.03E-04	1.09E+00	1.18E+04	1.30E+01
1100	12.1	2.76E-04	9.93E-01	1.08E+04	1.19E+01
1200	11.11	2.15E-04	7.76E-01	8.39E+03	9.25E+00
1300	10.95	2.07E-04	7.45E-01	8.06E+03	8.89E+00
1400	10.47	1.84E-04	6.61E-01	7.15E+03	7.88E+00
1500	9.2	1.34E-04	4.81E-01	5.21E+03	5.74E+00
1600	9.11	1.31E-04	4.70E-01	5.09E+03	5.61E+00
1700	7.84	9.51E-05	3.42E-01	3.71E+03	4.09E+00
1800	6.62	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1900	6.63	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2000	6.27	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2100	5.38	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2200	6.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2300	5.71	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2400	5.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
				kg/day	**tons/day**
			TOTAL	**1.30E+05**	**1.43E+02**

Note:
[1] Methodology is consistent with that presented in the technical memorandum authored by GBUAPCD and titled, *Unpaved Road Dust Inyo County May 3, 2010 (REVISED).*

Assumptions:

20	= average width of unpaved road (ft)
1,103	= unpaved road in OVPA (miles)
10,821,059	= erodable surface area (square meters)
2,674	= erodable surface area (acres)
7.6	= threshold windspeed (meters per second)

Conversion Factors:

5,280	= feet per mile
11	= square feet per square meter
43,560	= square feet per acre
1,000	= grams per kilogram
453.592	= grams per pound
2,000	= pounds per ton
60	= seconds per minute

$$E = \frac{k\left(\frac{s}{12}\right)^{a}\left(\frac{S}{30}\right)^{d}}{\left(\frac{M}{0.5}\right)^{c}} - C$$

E = PM_{10} emissions in pounds per vehicle mile traveled
s = silt content of road surface material (%)
S = mean vehicle speed (mph)
M = surface material moisture content (%)
C = emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear (PM_{10})

For PM_{10} from public unpaved roads:
1.8 = k
1 = a
0.5 = d
0.2 = c

Area	Annual PM_{10}		
	lb/VMT	tons/day	tons/year
OVPA	8.30E-01	9.16E-01	3.34E+02

Notes:
[1] Methodology is consistent with that presented in the technical memorandum authored by GBUAPCD and titled, *Unpaved Road Dust Inyo County May 3, 2010 (REVISED).*

Assumptions:
5 = s, silt content of road surface material (%) (Keeler, CA)
30 = S, mean vehicle speed (mph)
0.3 = M, surface material moisture content (%)
0.00047 = C, emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear (PM_{10})
1,103 = unpaved road in OVPA (miles)
2 = vehicle trips per mile per day
2,206 = vehicle miles traveled per day

Conversion Factors:
2000 = pounds per ton
365 = days per year

Imperial County Land Use Category	PM_{10} Emission Factor (tons/acre/yr)	National Land Use Data Set Land Use Category	Area in 2-Kilometer Buffer (acres)	2-Kilometer Buffer Emissions (tons/yr)	2-Kilometer Buffer Emissions (tons/day)
Urban	0.0001	Developed	1,730	0	0
Grass/Shrublands	0.0272	Shrub/Scrub	33,489	911	2
Forest	0.0034	Forest	51	0	0
Barren	0.0241	Barren Land	6,628	160	0
Sand Dunes	0.0481	--	0	--	--
Agricultural	0.0070	Agriculture	0	0	0
--	0.0000	Open Water	28	0	0
--	0.0000	Perennial Snow/Ice	0	0	0
--	0.0000	Wetland	586	0	0
			TOTAL	**1,071**	**2.9**

Notes:

[1] Imperial Valley land use PM_{10} emission factors obtained from, Mansell, Gerard. 2005. Final Revision for the Imperial Valley Fugitive Dust Emission Inventory. *Technical Memorandum to Brad Poiriez, Imperial County Air Pollution Control District* . September 20.

[2] Land use areas have been derived from the National Land Use Data Set, available at http://www.mrlc.gov/viewerjs/. Accessed August 10, 2015. These estimates were adjusted to remove the areas related to the Keeler Dunes and Olancha Dunes, as well as unpaved roads as emissions from these areas are already being accounted for under alternative methodologies (see assumptions listed below).

Assumptions:

208 = Area (acres) already covered under the *Windblown Dust Emissions from Unpaved Roads* calculation; assumed to fall under the "Barren Land" land use category.

870 = Keeler Dune area (acres) on Exceedance Day (05/11/2014); assumed to fall under the "Shrub/Scrub" land use category

100% = Percent of Keeler Dune area in the 2-kilometer buffer

1,045 = Olancha Dune area (acres) on Exceedance Day (05/11/2014); assumed to fall under the "Shrub/Scrub" land use category

50% = Percent of Keeler Dune area in the 2-kilometer buffer

Conversion Factors:

365 = days per year

247.105 = acres per km^2

DRAFT

Imperial County Land Use Category	PM_{10} Emission Factor (tons/acre/yr)	National Land Use Data Set Land Use Category	OVPA Area (Acres)	OVPA Emissions (tons/yr)	OVPA Emissions (tons/day)
Urban	0.0001	Developed	7,112	1	0
Grass/Shrublands	0.0272	Shrub/Scrub	656,671	17,865	49
Forest	0.0034	Forest	86,364	294	1
Barren	0.0241	Barren Land	104,373	2,519	7
Sand Dunes	0.0481	--	--	--	--
Agricultural	0.0070	Agriculture	2,004	14	0
--	0.0000	Open Water	10,643	0	0
--	0.0000	Perennial Snow/Ice	14	0	0
--	0.0000	Wetland	9,240	0	0
			TOTAL	**20,693**	**57**

Notes:

[1] Imperial Valley land use PM_{10} emission factors obtained from, Mansell, Gerard. 2005. Final Revision for the Imperial Valley Fugitive Dust Emission Inventory. *Technical Memorandum to Brad Poiriez, Imperial County Air Pollution Control District*. September 20.

[2] OVPA land use areas have been derived from the National Land Use Data Set, available at http://www.mrlc.gov/viewerjs/. Accessed August 10, 2015.

Assumptions:

870 = Keeler Dune area (acres) on Exceedance Day (05/11/2014); assumed to fall under the "Shrub/Scrub" land use category

1045 = Olancha Dune area (acres) on Exceedance Day (05/11/2014); assumed to fall under the "Shrub/Scrub" land use category

Conversion Factors:

365 = days per year

247.105 = acres per km^2

APPENDIX V-1
OVPA 2016 SIP BACM ASSESSMENT

DRAFT FINAL

Prepared for
Great Basin Unified Air Pollution Control District

Prepared by
Ramboll Environ US Corporation
Los Angeles, California

Date
February 2016

OWENS VALLEY PLANNING AREA 2016 STATE IMPLEMENTATION PLAN BACM ASSESSMENT

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
BISHOP, CALIFORNIA

RAMBOLL ENVIRON

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1. INTRODUCTION

1.1 Background

The Owens Valley Planning Area (OVPA) is located in Inyo County in eastern-central California. It is situated at the south end of the deep, long, narrow Owens Valley with the Sierra Nevada mountain range to the west (max. elevation 14,505 feet), the White-Inyo Mountains to the east (max. elevation 14,246 feet), and the Coso Range to the south (max. elevation 8,160 feet). A major feature in the OVPA is the predominantly dry, alkaline Owens Lake bed located approximately eight miles south of the community of Lone Pine on U.S. Highway 395, 60 miles north of the city of Ridgecrest, and 35 miles west of Death Valley. The communities of Olancha and Keeler are located on the southwestern and eastern shores of the lake bed, respectively. The bed of Owens Lake is defined as the area below 3,600 feet above mean sea level. It extends about seventeen miles north and south and ten miles east and west and covers an area of approximately 110 square miles (70,000 acres). The majority of the lake bed (over 89%) is state land under the jurisdiction of the California State Lands Commission (CSLC). The remaining portions of the lake bed are owned by the City of Los Angeles, the U.S. Bureau of Land Management (BLM), and other public and private entities.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the National Ambient Air Quality Standard (NAAQS), replacing total suspended particulates (TSP) with particulate matter of 10 microns or less (PM_{10}), a new indicator for particulate matter. On August 7, 1987, the USEPA designated the OVPA as one of the areas in the nation that violated the new PM_{10} NAAQS. Subsequent air quality monitoring by the Great Basin Unified Air Pollution Control District (GBUAPCD or "District") has shown that the bed of Owens Lake is the major source of PM_{10} emissions contributing to air quality violations in the OVPA. The Owens Lake bed is considered an anthropogenic (human caused) source of PM_{10} because the City of Los Angeles' Aqueduct diverts water sources that historically supplied the lake.

In January 1993, the OVPA was reclassified as "serious nonattainment" for PM_{10}. The District prepared and adopted a State Implementation Plan (SIP) in 1998 (1998 SIP), which was approved by the USEPA in 1999. USEPA determined that the 1998 SIP's "three control measures, shallow flooding, managed vegetation, and gravel cover meet the requirements for BACM ..." [March 24, 2000 letter from David Howekamp, USEPA to Dr. Ellen Hardebeck, GBUAPCD; see Appendix A]. Subsequent SIP revisions were prepared in 2003 to address PM_{10} control requirements to reduce windblown dust from Owens Lake and in 2008 to incorporate dust control provisions of the 2006 Settlement Agreement between the City of Los Angeles and the District. A 2011 Settlement Agreement expanded areas and types of PM_{10} controls, including modifications to managed vegetation. A 2016 SIP is in development that will provide an update on control measure implementation, this (Best Available Control Measure) BACM Assessment, and related control strategy revisions, as necessary for the attainment and 5% plan requirements.

1.2 Best Available Control Measure (BACM) Development and Assessment

The Clean Air Act (CAA) requires areas designated as serious nonattainment for PM_{10} to implement BACM and Best Available Control Technology (BACT) on all significant sources of PM_{10} or PM_{10} precursors.[1] BACM/BACT is defined as the maximum degree of emission

[1] BACM applies to certain area sources and BACT applies to stationary, mostly point, sources.

reduction considering technical and economic feasibility and environmental impacts of the control. BACM/BACT must be implemented independent of attainment requirements. While BACM/BACT apply to PM_{10} precursors, ambient PM_{10} in the OVPA is overwhelmingly primary PM_{10}, with little or no contribution from secondary aerosols; therefore BACM/BACT is not required for those precursors.

1.3 Purpose

This report constitutes the OVPA's BACM demonstration performed in conjunction with the OVPA's 2016 SIP and follows USEPA's guidance on BACM development and assessment. It includes: 1) an inventory of PM_{10} sources, 2) determination of a *de minimis* level, 3) identification of significant source categories, 4) a comparative analysis of the controls implemented in the OVPA and BACM in other serious nonattainment areas for significant source categories, and 5) emission reductions and costs associated with candidate BACM.

1.4 Report Organization

This report is organized as follows:

- Chapter 2 presents a determination of PM_{10} *de minimis* levels for the OVPA based on the current emission inventory and representative ambient measurements and identifies the potentially significant sources of PM_{10};
- Chapter 3 presents a comparative analysis of controls implemented in the OVPA with BACM in other serious PM_{10} nonattainment areas;
- Chapter 4 presents the cost-effectiveness of candidate BACM;
- Chapter 5 presents the conclusions and recommendations of this report;
- Appendix A presents a March 24, 2000 letter from the USEPA that recognized certain Owens Lake dust control measures as BACM;
- Appendix B presents a table of the stationary sources of PM_{10} emissions currently permitted in the OVPA;
- Appendix C presents the detailed OVPA near-exceedance day PM_{10} inventory and supporting documentation;
- Appendix D presents the 2008 Board Order 080128-01 requiring the City of Los Angeles to undertake measures to control PM_{10} emissions from the dried bed of Owens Lake;
- Appendix E presents the 2013 Board Order 130916-01-01 amending the 2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2008 SIP) to incorporate revisions to the date required for the implementation of BACM for the "Phase 7A" Dust Control Areas, modifying certain BACM descriptions, and modifying provisions for PM_{10} control in the Keeler Dunes;
- Appendix F presents GBUAPCD Fugitive Dust Rules (400, 401, 402);
- Appendix G presents a memorandum written by GBUAPCD in regards to off-lake PM_{10} reductions in areas adjacent to lake bed dust controls.

2. SIGNIFICANT AND DE MINIMIS SOURCE CATEGORIES

2.1 Background

USEPA has established *de minimis* criteria for source categories contributing to PM_{10}. Specifically, USEPA has established a source category contribution level of 5 µg/m^3 based on the 24-hour PM_{10} NAAQS.[2,3] If a source category contributes more than this level to measured ambient PM_{10} concentrations in a serious nonattainment area, then BACM or BACT are required to be implemented for that source. The purpose of this report is to determine the *de minimis* conditions, on an emission per µg/m^3 basis, for sources of primary PM_{10} in the OVPA. Once the *de minimis* level is determined, then any source category which exceeds that limit is subject to BACM/BACT. For individual stationary sources that meet the state and/or federal definition of a PM_{10} major source, one needs to determine whether BACT has been imposed, and, if BACT has not been applied, one needs to assess the impact of the source(s) on ambient concentrations, relative to the significance thresholds. At present, there are no PM_{10} sources in the OVPA that meet the federal definition of a PM_{10} major source (see Appendix B). Therefore, no BACT analysis is required.

2.2 Ambient PM_{10}

The *de minimis* level is calculated using the ambient PM_{10} data and the related emission inventory. There are ten PM_{10} monitoring stations located in the OVPA. Ambient PM_{10} measurements have been taken at the Keeler, Olancha, and Lone Pine sites for over 25 years. Four additional PM_{10} monitoring stations were set up on the shoreline of Owens Lake as part of the Owens Lake Dust Identification Program. These are the Dirty Socks (Summer 1999), Shell Cut (January 2001), Flat Rock (January 2001), and Bill Stanley (March 2002) sites. Other sites that have or still monitor for PM_{10} in the OVPA include Lizard Tail, North Beach, and Mill. Meteorological data are collected at each of these sites to provide wind speed, wind direction, and temperature data. When an exceedance occurs, wind direction data are used to evaluate the predominant source of PM_{10} contributing to the exceedance.

It has been clear since before the 1998 SIP that the dry lake bed is the major source of particulate matter on exceedance days, particularly those with very high (> 300 µg/m^3) concentrations. Some of these exceedance days had wind directions indicating contributions from non-lake bed upwind sources. To ensure that all potential significant sources are identified, a day when non-lake bed upwind sources almost exclusively caused an exceedance was analyzed. The ambient PM_{10} data used in this analysis is from a near-exceedance day scenario[4] in which the 24-hour PM_{10} concentration was measured near the NAAQS 24-hour PM_{10} exceedance threshold (150 µg/m^3) at the Keeler monitoring site and the predominant source of PM_{10} was characterized as “non-lake.” On the same day, there was an exceedance at the Olancha monitoring site (310 µg/m^3) resulting from on-lake sources. This is a conservative approach to calculating the *de minimis* level as it produces a small *de minimis* threshold and makes it feasible for non-lake sources to be considered

[2] State Implementation Plans for Serious PM_{10} Non-Attainment Areas, and Attainment Date Waivers for PM_{10} Non-Attainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, Federal Register, Vol. 59, No. 157, August 16, 1994.

[3] The USEPA eliminated the annual PM_{10} NAAQS of 50 µg/m^3 in 2006.

[4] On the example near-exceedance day, May 11, 2014, the PM_{10} 24-hour average was measured to be 150.1 µg/m^3 at the Keeler monitoring site. It should be noted that on this same day, an exceedance caused almost entirely by “on-lake” sources was measured at the Olancha monitoring site, where the PM_{10} 24-hour average was measured to be 309.9 µg/m^3.

significant. Using an exceedance day with higher ambient concentrations and large lake contributions would raise the *de minimis* threshold and make it so that most non-lake sources would not be considered significant.

With the exception of fugitive windblown dust emissions and activity-related unpaved road dust emissions, the emissions data used in this analysis are derived from the California Air Resources Board (CARB) 2012 and 2015 emission inventories for Inyo County, and are ratioed to the OVPA by various factors (e.g. population, roadway miles, and land area). Where applicable, the fugitive windblown dust emission estimates take into account the wind conditions that occurred on the modeled near-exceedance day. A more detailed description of the emission inventory can be found in Sections 2.4 and 2.5.

2.3 Calculation of *De Minimis* Level Factor

The *de minimis* level factor is calculated by determining the emissions that are proportional to 5 $\mu g/m^3$ (24-hour average), based on the ambient data. The ambient concentration used in this analysis is the 24-hour PM_{10} level measured on the near-exceedance day (150.1 $\mu g/m^3$). Dividing 5 $\mu g/m^3$ by 150.1 $\mu g/m^3$ produces a *de minimis* level factor of approximately 3.33%. The *de minimis* threshold is then determined by multiplying the *de minimis* level factor by the near-exceedance day emission inventory, which is discussed in the sections below.

2.4 Emission Inventory

PM_{10} emissions in the OVPA are dominated by fugitive dust emissions resulting from wind erosion on the exposed Owens Lake playa. Other wind erosion sources in the OVPA include off-lake sources of lake bed dust (i.e. the Keeler and Olancha dune areas), small mining facilities, and open areas near the municipalities of Lone Pine and Independence that have been disturbed by human activity, including Inyo County's Lone Pine landfill. There is a lack of large industrial sources in the Owens Valley and the only other sources of criteria pollutant emissions are wood stoves, fireplaces, unpaved and paved road dust, and vehicle tailpipe emissions. Prescribed burning for wildland management on federal and private lands also generates PM_{10} in and around the nonattainment area; however, prescribed burning is not normally conducted on windy days when wind erosion is at its highest. Appendix C has the details of the emission inventory used for this significant sources determination.

As stated previously, with the exception of the fugitive windblown dust emissions and activity-related unpaved road dust emissions, the emissions data used in this analysis are derived from the California Air Resources Board (CARB) 2012 and 2015 emission inventories for Inyo County, and have been ratioed to the OVPA by various factors (e.g. population, roadway miles, and land area). Appendix C2 presents the ratios that were used in developing the OVPA emission estimates, while Table 2-1 below presents the resulting 2012 and 2015 near-exceedance day inventories. The fugitive windblown dust and activity-related unpaved road dust estimates have been revised to more accurately reflect conditions in the OVPA. These revisions are discussed in the following sections. The resulting identification of significant and *de minimis* source categories can be found at the end of this chapter.

Table 2-1: Exceedance Day PM_{10} Emission Inventory for the OVPA Significant Source Determination (tons/day)

Category[1]	2012	2015
Manufacturing and Industrial	0.03	0.03
Service and Commercial	0.01	0.01
Mineral Processes	0.71	0.71
Metal Processes	0.02	0.03
Other (Industrial Processes)	0.01	0.01
Residential Fuel Combustion	0.02	0.02
Construction and Demolition	0.01	0.01
Paved Road Dust	0.03	0.03
Fugitive Windblown Dust from Agricultural Lands (Non-Pasture)	0.01	0.01
Fugitive Windblown Dust and Activity-related Dust from Unpaved Roads and Associated Areas[2]	12.09	12.09
Fugitive Windblown Dust from Exposed Lake Beds	45.30	45.30
Fugitive Windblown Dust from Dunes	--	--
Keeler Dunes	169.20	169.20
Olancha Dunes	312.00	312.00
Fugitive Windblown Dust from Open Desert[2,3]	2.94	2.94
Managed Burning and Disposal	0.09	0.09
On-Road Mobile	0.02	0.01
Wildfires	0.17	0.17
TOTAL	**542.65**	**542.66**

Notes:

[1] Sources with emissions less than 0.005 tons/day have been omitted.

[2] Fugitive windblown dust source limited to 2-kilometer buffer around Owens Lake.

[3] Excluding areas associated with Olancha and Keeler dunes.

Data Sources:

All Source Categories (except those noted below): CARB emission inventory for Inyo County ratioed to the OVPA (see Appendix C); **Unpaved Road Dust**: GBUAPCD; **Lake beds and Dunes**: Air Quality Modeling; **Open Desert**: Constructive estimate based on similar land uses and conditions in Imperial County Air Pollution Control District.

2.5 Updated Methodologies

2.5.1 Fugitive Windblown Dust from Open Desert

Fugitive dust emissions from open desert areas are a function of the classification and stability of the open desert as well as meteorology and wind speeds, all of which vary across the OVPA. For this source category, a decision was made to develop a representative estimate using emission factors of a similar desert-like environment (e.g. Imperial County). As a result, estimates of fugitive dust emissions from wind erosion on open areas (excluding unpaved roads, exposed lake bed, and dune areas) were calculated using emission factors developed in relation to the May 2004 Ramboll Environ (formerly ENVIRON International Corporation) report entitled "Development of a Windblown Fugitive Dust Model and Inventory for Imperial County."[5,6] These emission factors, with units of tons PM_{10} per acre per year, calculate a daily emission rate of 2.94 tons PM_{10} when applied to the OVPA land use areas (see Appendix C5).

Note that emissions from this source have been limited to a 2-kilometer buffer surrounding the Owens Lake bed. This approach is similar to the "source weighting" technique used by the Maricopa Association of Governments (MAG) for the design day emission inventories in the May 2012 *MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* ("MAG 5% Plan").[7] In the MAG 5% Plan, MAG asserted that there is a need to account for distance between emission sources and impacted monitors and found that a 1/distance weighting factor proved to be the best value to use to adjust PM_{10} emissions developed through back trajectory domains. In addition, in supporting analyses performed using the dispersion model AERMOD, MAG found that at the threshold of high wind conditions (i.e. winds greater than 12 miles per hour), PM_{10} concentrations drop by a factor of 10 between 0 and 500 meters, between 500 and 2,800 meters, and between 2,800 and 30,000 meters.[8] In addition, a specific study of dust sources affecting non-attainment monitors has been prepared (Holder, 2016). That report concluded that:

> "… the primary source of windblown dust in the Owens Valley Planning Area is from the lake bed and the area immediately surrounding the bed of Owens Lake. This is confirmed by air monitoring conducted by the District since the 1980's and by observations (including video observations from the dust camera network) conducted over the past decade. This conclusion is also supported by review of the land classification and land ownership information with over 97% of the OVPA consisting of public lands managed in a stable and non-emissive state and only 2.6% private land. The focus of the air quality model for the 2016 SIP on dust sources on Owens Lake and the surrounding 2 kilometer zone surrounding the lake bed is reasonable and justified."

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5 ENVIRON International Corporation. 2004. Development of a Wind Blown Fugitive Dust Model and Inventory for Imperial County, California. Prepared for Imperial County Air Pollution Control District. May 12. Available online at: https://nrmsecure.dfg.ca.gov/FileHandler.ashx?DocumentID=9447. Accessed on October 10, 2015.

6 Mansell, Gerard. 2005. Final Revision for the Imperial Valley Fugitive Dust Emission Inventory. Technical Memorandum to Brad Poiriez, Imperial County Air Pollution Control District. September 20.

7 MAG. 2012. MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area. May. Available at: http://www.azmag.gov/Documents/EP_2012-06-06_FINAL-MAG-2012-Five-Percent-Plan-for-PM10-for-the-Maricopa-County-Nonattainment-Area.pdf. Accessed on January 11, 2016.

8 MAG. 2012. MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area. Appendices: Volume II. May. Available at: http://www.azmag.gov/Documents/EP_2012-06-06_FINAL-MAG-2012-Five-Percent-Plan-Appendices_Volume-2.pdf. Accessed on January 11, 2016

2.5.2 Fugitive Windblown Dust from Unpaved Roads and Associated Areas

For estimates of fugitive dust emissions resulting from wind erosion of unpaved roads, the CARB emission inventory website references the August 1997 *Windblown Dust – Unpaved Roads* methodology.[9] This methodology relies on such factors as soil erodibility, climate, vegetative cover, surface roughness, and unsheltered field width to estimate the quantity of unpaved road dust entrained to the air by wind erosion per acre of land. The inventory created for this analysis uses the CARB methodology, but updates the acreage used in the calculation to reflect GBUAPCD's most recent estimate of unpaved road mileage in a 2-kilometer buffer around the Owens Lake bed, which is equal to 86 miles or 208 acres[10]. GBUAPCD's estimate relied on GIS analysis using Topologically Integrated Geographic Encoding and Referencing (TIGER) 2012 data and first-hand knowledge of the condition of roadways surrounding Owens Lake. Using the above approach, one calculates a daily emission rate of 11.2 tons PM_{10} from this source category (see Appendix C3).

2.5.3 Fugitive Windblown Dust from Exposed Lake Bed, Keeler Dunes, and Olancha Dunes

The inventory estimates for fugitive dust emissions from Owens Lake, Keeler Dunes, and Olancha Dunes are derived from the mass emission modeling estimates for these areas on the near-exceedance day, May 11, 2014. These estimates are based on the modeling approach described in the 2016 SIP.

2.5.4 Entrained Unpaved Road Dust

For estimates of entrained dust emissions resulting from vehicle activity on unpaved roads, the CARB emission inventory website references the August 1997 *Unpaved Road Dust (Non-Farm Roads)*[11] and *Unpaved Road Dust, Farm Roads*[12] methodologies. Both methodologies rely on a statewide emission factor of 2.27 pounds of PM_{10} per vehicle mile traveled—a value derived from the average of 22 emission tests of unpaved roads in San Joaquin Valley. Regarding vehicle activity, the non-farm road methodology assumes that all unpaved roads in the state receive 10 vehicle passes per day, whereas the farm methodology assumes all unpaved farm roads in California receive 175 vehicle passes per year per 40 acres of crops and cultivating practices.

The inventory created for this analysis uses an alternative methodology presented in Section 13.2.2 of the USEPA's *Compilation of Air Pollution Emission Factors, AP-42* (Equation 1) and discussed in a May 3, 2010 memorandum entitled "Unpaved Road Dust" written by the GBUAPCD (see Appendix C Exhibit C1).[13]

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[9] CARB. 1997. Windblown Dust – Unpaved Roads. Section 7.13. August. Available at: http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-13.pdf. Accessed on October 10, 2015.

[10] When assuming an average road width of 20 feet.

[11] CARB. 1997. Unpaved Roads Dust (Non-farm Roads). Section 7.10. August. Available at: http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-10prev.pdf. Accessed on October 10, 2015.

[12] CARB. 1997. Unpaved Roads Dust, Farm Roads. Section 7.11. August. Available at: http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-11.pdf. Accessed on October 10, 2015.

[13] USEPA. 2006. Compilation of Emission Factors, AP-42. Section 13.2.2 Unpaved Roads. November. Available at: http://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0202.pdf. Accessed on October 10, 2015.

$$E = \frac{k\,(s/_{12})^{a}(S/_{30})^{d}}{(M/_{0.5})^{c}} - C \qquad \text{Eq. 1}$$

Where:
- E = PM_{10} emissions in pounds per vehicle mile traveled
- s = silt content of road surface material (5% measured in Keeler, CA)
- S = mean vehicle speed (30 miles per hour)
- M = surface material moisture content (assume 0.3%)
- C = emission factor for 1980s vehicle fleet exhaust, brake wear, and tire wear (0.00047 lb/VMT for PM_{10} per Table 13.2.2-4 of AP-42)

Using Table 13.2.2-2 of AP-42 and assuming vehicle travel on public roads (where k = 1.8 lb/VMT, a = 1, c = 0.2, and d = 0.5), the above equation yields an emission factor of 0.83 pounds of PM_{10} per vehicle mile traveled. Estimated vehicle activity is based on a November 2001 traffic survey of four unpaved roads in the Owens and Panamint Valleys of Inyo County. This survey showed that there are approximately three vehicle trips per day on unpaved roads during the month of November.[14] Because many of the roads in lower elevation areas of Inyo County are not used during the hot months of the year, and unpaved roads at higher elevations are not used when they are snowbound during the cold months of the year, a seasonal-use factor of 2/3 was applied to the number of vehicle trips per day. This results in around two vehicle trips per day on each mile of unpaved road in Inyo County. Using these values in conjunction with GBUAPCD's most recent estimate of unpaved road mileage in the OVPA (1,103 miles), one calculates a daily emission rate of 0.92 tons PM_{10} from this source category (see Appendix C4).

2.6 Conclusions

As discussed previously, the *de minimis* threshold is determined by multiplying the *de minimis* level factor (3.33%) by the near-exceedance day emission inventory (542.65 tons/day). This calculation results in a *de minimis* threshold of 18.1 tons per day per 5 µg/m^3. Because this analysis uses a day in which the ambient concentration was measured close to the NAAQS exceedance level, the resulting *de minimis* level factor is conservatively large (and *de minimis* threshold conservatively low).

2.6.1 Significant Sources

Based on the threshold level of 18.1 tons per day, there are three PM_{10} sources above the de minimis level and therefore identified as significant source categories in the OVPA (Table 2-2).

Table 2-2: Significant Source Categories of PM_{10} in the OVPA (tons/day)

Category	2012	2015
Fugitive Windblown Dust from Exposed Lake Beds	45.30	45.30
Fugitive Windblown Dust from Dunes	--	--
Keeler Dunes	169.20	169.20
Olancha Dunes	312.00	312.00

[14] Niemeier, Debbie A. 2002. Estimating Statewide Vehicle Activity and Roadway Mileage for Unpaved Roads in California. Prepared for the California Air Resources Board. University of California, Davis. California. October 31.

2.6.2 *De Minimis* Sources

De Minimis source categories are provided for informational purposes only (Table 2-3).

Table 2-3: *De Minimis* Source Categories of PM_{10} in the OVPA (tons/day)

Category[1]	2012	2015
Manufacturing and Industrial	0.03	0.03
Service and Commercial	0.01	0.01
Mineral Processes	0.71	0.71
Metal Processes	0.02	0.03
Other (Industrial Processes)	0.01	0.01
Residential Fuel Combustion	0.02	0.02
Construction and Demolition	0.01	0.01
Paved Road Dust	0.03	0.03
Unpaved Road Dust	0.92	0.92
Fugitive Windblown Dust from Agricultural Lands (Non-Pasture)	0.01	0.01
Fugitive Windblown Dust and Activity-related Dust from Unpaved Roads and Associated Areas[2]	12.09	12.09
Fugitive Windblown Dust from Open Desert[2,3]	2.94	2.94
Managed Burning and Disposal	0.09	0.09
On-Road Mobile	0.02	0.01
Wildfires	0.17	0.17

Notes:

[1] Sources with emissions less than 0.005 tons/day have been omitted.

[2] Fugitive windblown dust source limited to 2-kilometer buffer around Owens Lake.

[3] Excluding areas associated with Olancha and Keeler dunes.

3. COMPARATIVE ANALYSIS

3.1 Introduction

This chapter presents a comparative analysis of fugitive dust controls in the OVPA compared to similar measures in other PM_{10} serious nonattainment areas, specifically as they relate to the PM_{10} sources identified as significant in the proceeding section (i.e. sources above the *de minimis* threshold). This comparative analysis is intended to serve as the basis for evaluating the stringency of measures in the OVPA. Any measures for significant sources that are not as stringent as the most stringent measures implemented in other areas will be justified based on local conditions, needs, and resources. The PM_{10} serious nonattainment areas considered in this analysis are San Joaquin Valley, Maricopa County (Phoenix area), Clark County (Las Vegas area), South Coast (Los Angeles basin), Coachella Valley (Palm Springs area), and Imperial Valley.[15] The measures are addressed by significant source category which have been divided into the following: fugitive windblown dust from exposed lake beds and fugitive windblown dust from sand dunes. It should be noted that all significant sources are windblown dust sources. As a result, rules in other serious nonattainment areas for activity-based emissions are not included in this comparative study.

3.2 Fugitive Windblown Dust from Exposed Lake Bed

Since 1980 GBUAPCD and other researchers have been involved with the study of the lake environment and the mechanisms that cause Owens Lake's severe dust storms. Since 1989 GBUAPCD has pursued a comprehensive research and testing program to develop PM_{10} control measures that are effective in the unusual Owens Lake playa environment. Three dust control measures have been approved for use on the lake and have been designated as BACM by the District in concurrence with the USEPA (Appendix A).[16] These measures include Shallow Flooding, Managed Vegetation, and Gravel Blanket; subsequent GBUAPCD Board Orders (see below) expanded and/or modified these BACM. Sections 3.2.1 and 3.2.2 also provide information on these measures and their implementation history.

3.2.1 2008 SIP Dust Control Measures

Concurrent with the publication of the 2008 SIP, GBUAPCD adopted Board Order No. 080128-01 ("2008 Order"; Appendix D), which required the City of Los Angeles to continue to operate and maintain the 29.8 square miles of BACM already established in the 2003 Dust Control Area (DCA). The 2008 Order also required the City of Los Angeles to implement an additional 12.7 square miles of Shallow Flooding or an alternative measure known as "Moat & Row" in an area delineated as the 2006 Supplemental Dust Control Area (SDCA). The City was also mandated to control PM_{10} emissions from a 0.5 square-mile area in the southern portion of the Owens Lake bed, known as the "Channel Area" (see Figure 3-1 for the locations of the 2003 DCA, 2006 SDCA, and the Channel Area per the 2008 SIP). Per the 2008 Order, the City was allowed to implement up to 3.5 square miles of Moat & Row in the SDCA. After three years, if the measure proved effective the City could apply to the District for a SIP revision to designate Moat & Row as BACM.

[15] Clark County and South Coast, though designated as serious nonattainment, have now demonstrated attainment and have submitted maintenance plans. They have been included for illustrative purposes.

[16] Great Basin Unified Air Pollution Control District. 2003. Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan – 2003 Revision. GBUAPCD. Bishop, California. November 13.

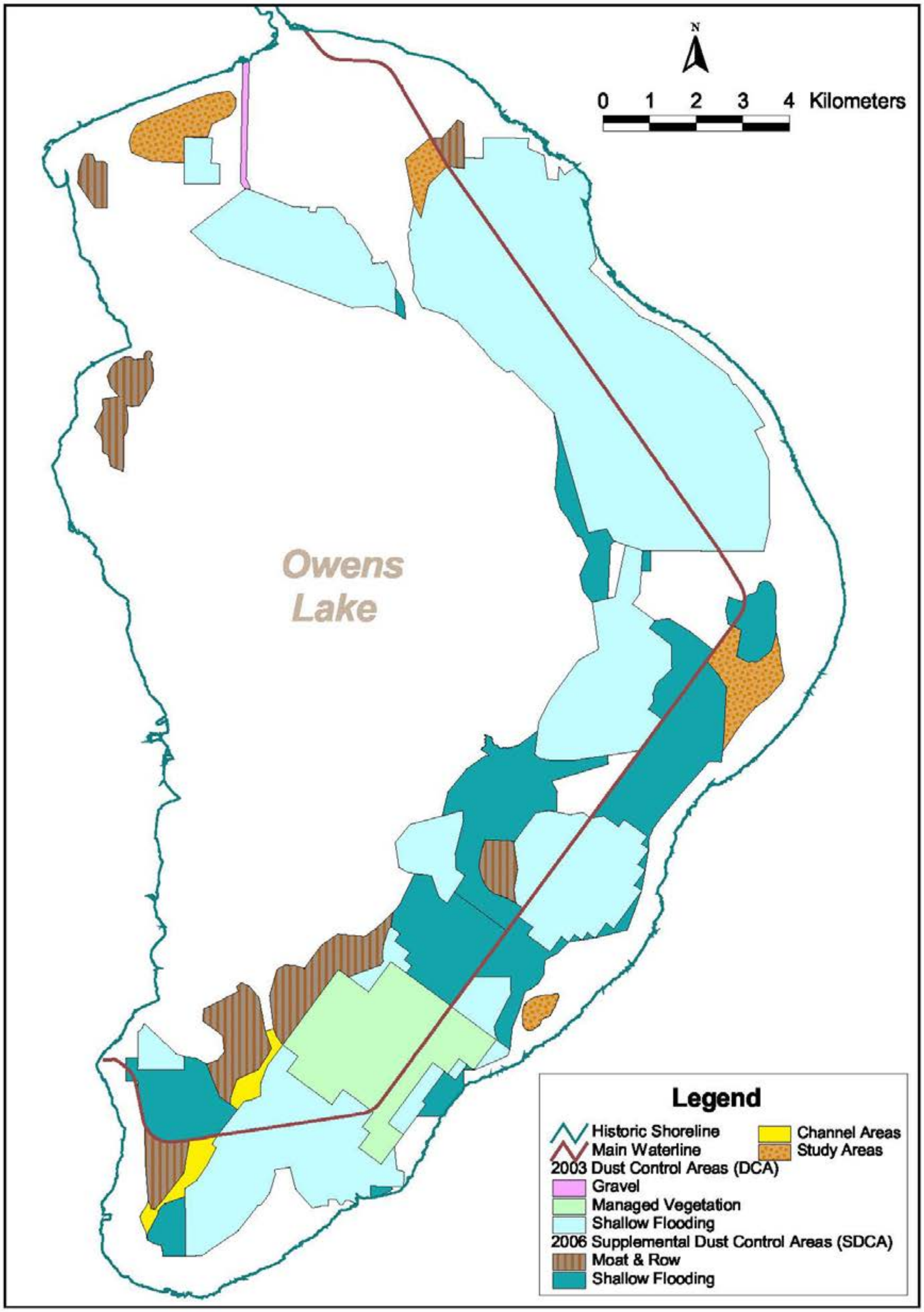

Figure 3-1: 2008 SIP PM_{10} Control Areas

3.2.2 Post-2008 SIP Dust Control Measures

A revision to the 2008 SIP was prepared in 2013 to incorporate an extension to the NAAQS attainment deadline, as well as to include modifications to some of the previously implemented control measures. Concurrent with this revision, GBUAPCD adopted Board Order No. 130916-01 ("2013 Order"; Appendix E), which required the City of Los Angeles to implement new dust control measures in place of Moat & Row in an approximately 3.1 square-mile area now called the "Phase 7a" area. The Phase 7a area includes six DCAs designated as T37-1, T37-2, T1A-3, T1A-4, T-32-1, and T12-1 (see Figure 3-2). Per the 2013 Order, the City of Los Angeles was required to implement fully-compliant BACM PM_{10} controls (other than Managed Vegetation BACM) in the Phase 7a areas by December 31, 2015. Areas controlled by Managed Vegetation BACM were required to achieve fully-compliant BACM vegetation cover by December 31, 2017. The 2013 Order excluded from the Phase 7a areas all California Register of Historical Resources-eligible areas plus necessary buffer areas. Approximately 277 acres of the Phase 7a areas were identified as Eligible Cultural Resources (ERA) areas and were given the title of "Initial Phase 7b Areas." The 2013 Order also recognized adjustments to existing BACM, including "Reduced Thickness Gravel"[17] as an approved type of the Gravel Blanket BACM and "Brine Shallow Flooding"[18] as a subcategory of the Shallow Flooding BACM. In light of California's ongoing drought, the 2013 Order also emphasized the need for reductions in water usage, stating that "[the] District and [the City of Los Angeles] shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered on Owens Lake." Lastly, the 2013 Order modified provisions for PM_{10} control in the Keeler Dunes stating that the District would work with stakeholders to develop and implement a project to control dust emissions from the dunes by December 31, 2015 (see Section 3.3).

In 2011, a dispute arose between the District and the City of Los Angeles regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2008 SIP. Subsequent disputes were fully and finally resolved by a Stipulated Judgement entered in favor of the District on December 30, 2014 in the case entitled *City of Los Angeles, et al. v California Air Resources Board*, Sacramento Superior Court, Case No. 34-2013-80001451-CU-WM-GDS (Stipulated Judgement).

In conjunction with the release of the 2016 SIP, the District intends to issue a new Board Order that will consist of the 2008 Order as modified by the 2013 SIP Amendment and the Stipulated Judgement. This Order is anticipated to require the City of Los Angeles to continue to operate and maintain the 45.0 square miles of existing controls currently established on the Owens Lake bed. It is also anticipated to require the City of Los Angeles to implement BACM on an additional 3.62 square miles of area (known as the "Phase 9/10" areas), bringing the total area of the City's dust controls on the Owens Lake bed to approximately 48.6 square miles; controls implemented on the Phase 9/10 areas would be waterless or "water neutral." In addition to the existing BACM measures, the Order will likely recognize three additional approved PM_{10} control measures including "Tillage with Shallow Flood BACM Back-up" (TWB^2), "Brine BACM"[19], and "Dynamic Water Management." As usual, the Order

[17] A measure consistent with the Gravel Blanket BACM except that the gravel thickness is reduced from a minimum of four inches to two inches, provided that all reduced thickness gravel areas are underlain with geotextile fabric.

[18] A measure consistent with the Shallow Flooding BACM except that the water used for dust control may contain elevated levels of dissolved salts.

[19] Brine BACM is a version of Shallow Flooding BACM except that the requirement for covering the surface with water to meet prescribed Shallow Flooding wetness cover is only needed when the surface condition of an area

would also include contingency measures to be enacted in the event that the District determines that additional emission reductions are needed in order to meet the NAAQS and State Standard. Under this provision, the District would reserve the right to order the City to implement BACM contingency measures up to a total of 53.4 square miles.

Currently, District Rule 401 specifically requires the City of Los Angeles to implement BACM (or other approved control measures) on any windblown dust source areas on Owens Lake that cause or contribute to monitored exceedances of State PM_{10} standards[20] at residences within communities zoned for residential use. (Appendix F includes GBUAPCD Rules 400, 401 and 402). Figure 3-2 shows the location and type of dust control measures implemented to date, as well as the locations for future installations. Since the Owens Lake playa is the only source of its kind in the United States, the controls currently implemented on the lake bed are the most stringent for this source type.

deteriorates such that it is in a potentially emissive state. Therefore, Brine BACM uses less water than Brine Shallow Flooding, which was approved in 2013.

[20] The California Ambient Air Quality Standards (CAAQS) for PM_{10} are more stringent than the NAAQS, with a 24-hr standard of 50 μg/m^3 and an annual standard of 20 μg/m^3.

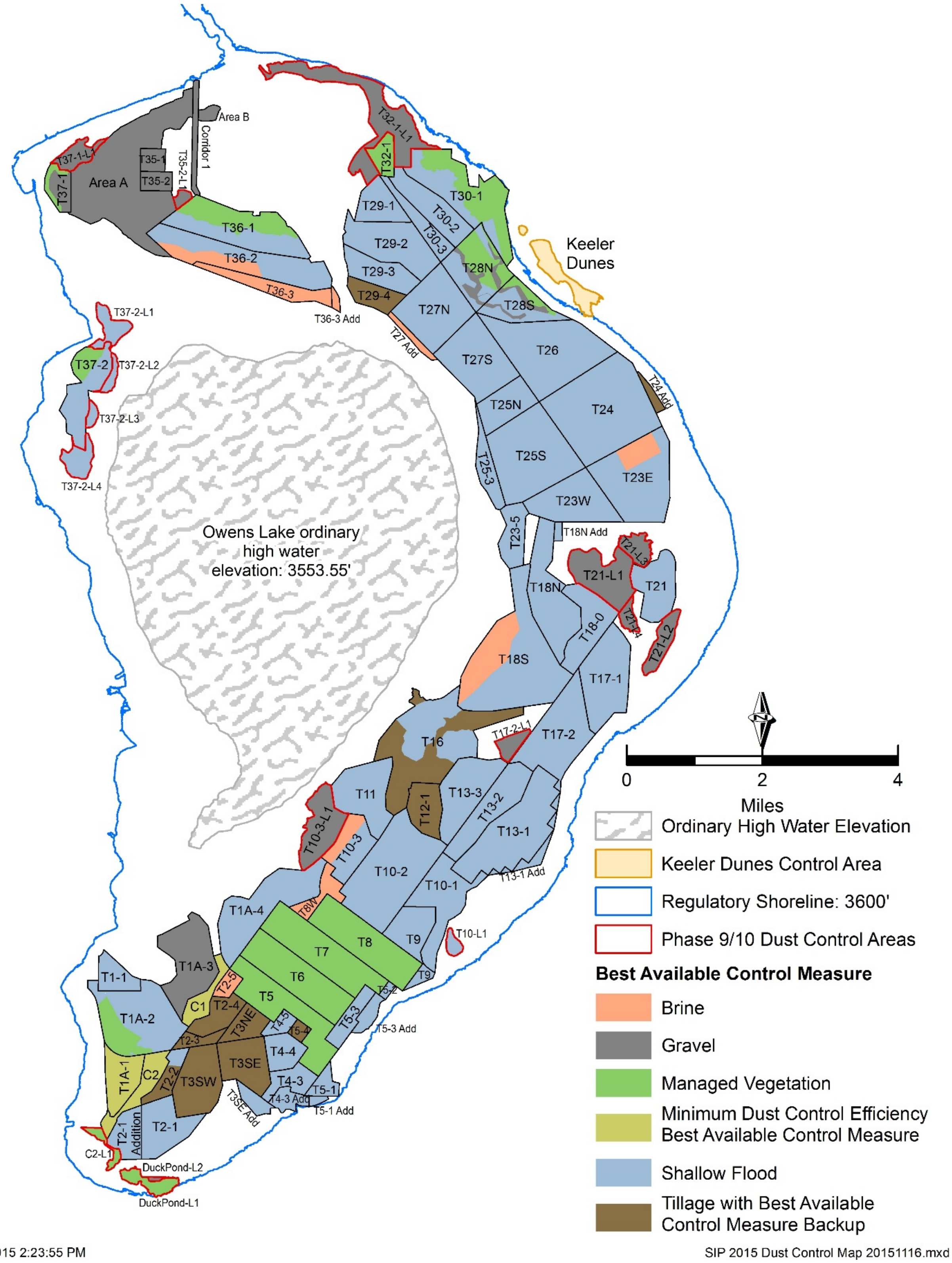

Figure 3-2: 2016 SIP PM_{10} Control Areas

3.2.3 Discussion of Alternatives

As noted above, BACM have been implemented on the Owens Lake bed since before the 2008 Board Order. During the initial identification of BACM for lake bed sources for the USEPA-approved 1998 SIP, several alternatives to the chosen BACM (e.g., shallow flooding, managed vegetation, and gravel blanket) were identified and subsequently removed from consideration as BACM:

> "Since 1989 the District has pursued a comprehensive research and testing program to develop PM_{10} control measures that are effective in the unique Owens Lake playa environment. Control measures that were tested on the lake, but have not been shown to be effective dust control measures for the SIP, include the use of sprinklers, chemical dust suppressants, surface compaction, sand fences and brush fences. These measures were discussed in the Owens Valley PM_{10} Planning Area Demonstration of Attainment SIP Projects Alternatives Analysis document (GBUAPCD, 1996) and in the Final Environmental Impact Report (FEIR) (GBUAPCD, 1997) and FEIR Addendum Number 1 (GBUAPCD, 1998b) for the SIP." [1998 SIP, page 5-1]

The information and rationale demonstrating that these other control measures were not effective dust control measures for lake bed sources has not changed since the 1998 SIP.

3.3 Fugitive Windblown Dust from Sand Dunes

The areas surrounding Owens Lake contain multiple dune systems created by sand moving off of the exposed lake bed during various times in the past as the lake level fluctuated. Most of these dune deposits contain a suite of native shrubs and grasses that stabilize them such that they are not significant dust sources. However, there are two dune systems, the Keeler Dunes and Olancha Dunes, which contain mobile sands that generate PM_{10} during wind events. The Keeler Dunes, located approximately one mile northwest of the community of Keeler, cause multiple exceedances of the NAAQS per year in the community of Keeler. As a response and consistent with the 2013 Board Order commitments, the District is in the process of implementing a dust control project, which will involve the placement of approximately 82,000 straw bales and planting of approximately 246,000 native shrubs. The goal of the project is to create a stable self-sustaining low-impact vegetated dune system, similar in nature to the non-emissive dune areas around the lake. To date, no dune-related dust control projects of this size have been implemented in other serious nonattainment areas. Placement of the straw bales was completed in December 2015 along with the planting of 48,000 native shrubs. Additional plantings will take place in 2016 to complete the project, but in the meantime, the straw bales are expected to reduce dust emissions from the Keeler Dunes by 95%.

The Olancha Dunes are located south of Owens Lake about 1.5 miles east of the community of Olancha. The Olancha Dunes have not been monitored and investigated to the same extent as the Keeler Dunes. However, since the implementation of dust control measures on the southern portions of Owens Lake starting in 2002, the number of PM_{10} exceedances coming from the direction of the Olancha Dunes has shown a downward trend. It is expected that the downward trend in PM_{10} levels will continue over time as the dunes continue to erode and the dust is winnowed out from the sand deposit areas. This is discussed in greater detail in an October 2015 memorandum developed by GBUAPCD (see Appendix G).

Lastly, alternatives to reducing fugitive windblown dust from sand dunes were considered in the development of the 2013 Board Order and explicitly in the 2014 Environmental Impact

Report / Environmental Assessment (EIR/EA) for the Keeler Dunes Project (www.gbuapcd.org/keelerdunes/index.htm). The Project and analyzed alternatives all involved watering to establish the native plants. Alternatives rejected as infeasible included geotextile fabric/gravel, excavation/removal and spraying of emission sand deposits.

3.4 Summary

As discussed above and summarized in Table 3-1 below, GBUAPCD is currently implementing BACM for the Owens Lake playa and Keeler Dunes, the leading contributors to PM_{10} exceedances in the OVPA. These source types are unique to the OVPA, and GBUAPCD and partnering entities have gone to significant lengths to study and control the PM_{10} emissions associated with these areas. The impact analysis in Chapter 4 will assess the emission reductions, cost and cost-effectiveness of the measures in this chapter.

Table 3-1: Comparative Analysis for Sources Above the *De Minimis* Level

Source Category	Dry Lake Bed	Off-Lake Dunes
Great Basin	The 2008 and 2013 Board Orders have adaptively managed BACM implementation over time, actively evaluating emitting portions of the lake bed and related BACM. BACM is location-specific, with control efficiencies from 20 to 100%. Shallow flooding, managed vegetation, and gravel cover have been deemed to meet the requirements of BACM by the USEPA (March 2000).	Board Order 130916-01 requires the implementation of a PM_{10} control project on the Keeler dunes. This project is currently in progress and involves creating a stable self-sustaining low-impact vegetated dune system, designed to reduce PM_{10} emissions by ~95% in Keeler.
Imperial County	N/A	N/A
San Joaquin Valley	N/A	N/A
South Coast	N/A	N/A
Maricopa County	N/A	N/A
Clark County	N/A	N/A
Discussion / Justification	This source is the only one of its kind actively managed with tested and adopted BACM measures. Thus, controls implemented represent the most stringent in any serious PM_{10} nonattainment area.	To date, no dune-related dust control projects of this type have been implemented particularly on this scale. Thus, controls implemented represent the most stringent in any serious PM_{10} nonattainment area.

Notes:

[1] "N/A" implies that the source does not exist or is not actively managed in the nonattainment area.

4. IMPACT ANALYSIS

4.1 Introduction

This chapter presents information about the emission reductions, cost, and cost-effectiveness of the dust control measures implemented in the OVPA. This report primarily relies on cost data transmitted to the District by the City of Los Angeles Department of Water and Power.[21]

4.2 Control Effectiveness, Cost Information, and Cost Effectiveness

The following subsections provide information on control effectiveness of specific control measures, as well as related cost and cost-effectiveness information.

4.2.1 Fugitive Windblown Dust from Exposed Lake Bed

District Rule 401 specifically requires the City of Los Angeles to implement BACM (or other approved control measures) on any windblown dust source areas on Owens Lake that cause or contribute to monitored exceedances of State PM_{10} standards at residences within communities zoned for residential use. Measures recognized as BACM to date have included Shallow Flooding, Managed Vegetation, and Gravel Blanket. Many of these measures have already been implemented on the lake (see Figure 3-1 and Figure 3-2[22]) and the mitigating effects have been realized. For this reason, a cost effectiveness analysis for this measure is unnecessary. Furthermore, at this point in time cost-effectiveness information regarding these measures may not be accurate, as some measures have had to be re-done. However, one estimate of the cost effectiveness of dust controls at Owens Lake is approximately $2,390 per ton. This estimate was calculated by assuming an annualized capital cost of $84.3 million (over 25 years) and an annual operating and maintenance and water replacement cost of $61.5 million (for a total annual cost of $145.8 million) and dividing this number by the estimated annual reductions of PM_{10} by mid-2018 when compared to 2006 emissions(60,950 tons). Table 4-1 summarizes the major control strategy milestones at Owens Lake, along with their control effectiveness, and cost information, if known.

[21] Los Angeles Department of Water and Power. 2015. Los Angeles Department of Water and Power's Expenditures for Mitigation Dust Emissions from Owens Lake. E-mail from Milad Taghavi, LADWP to Phill Kiddo, GBUAPCD. December 28.

[22] Figure 3-1 presents the controls implemented on Owens Lake as published in the 2008 SIP. One can compare Figure 3-1 to Figure 3-2 to see the progression of controls over time.

Table 4-1: Control Strategy Milestones at Owens Lake

Milestone	1st Year in Full Operation	Control Effectiveness	Costs[1]
2003 SIP Control Areas			
Phase I – 10 sq. mi.	2002	Up to 99%	$452M (capital costs incurred from 2002-2008)
Phase II – 3.5 sq. mi.	2003	Up to 99%	
Phase IV[2] – 3.0 sq. mi.	2004	Up to 99%	
Phase V – 13.3 sq. mi.	2007	Up to 99%	
2008 SIP Control Areas			
Moat & Row control area[3,4] – originally up to 3.5 sq. mi.	2010	63-79%[4]	$139M (capital costs incurred from 2008-2010)
Shallow Flood control area[4] – minimum 9.2 sq. mi. + 0.5 sq. mi. Channel Area	2011	30-99%[4]	
Keeler Dunes control area[5]	2014	85%	$10M
2010/2011 Control Areas			
Phase 8[6] – 2 sq. mi.	2012	100%	$300M (capital costs incurred from 2010-2015)
Proposed 2016 SIP Control Areas			
Phase 9/10 – 3.62 sq. mi.	2017	Up to 99%	$313M (capital costs anticipated for 2015-2018)

Table 4-1: Control Strategy Milestones at Owens Lake

Milestone	1st Year in Full Operation	Control Effectiveness	Costs[1]

Notes:

[1] Cost data are only available by year and may not directly relate to the control measures listed (LADWP, 2015).

[2] Phase III is the Brady Highway Construction

[3] Under Board Order 130916-01, approximately 3.1 sq. mi. of Moat & Row areas were transitioned to Managed Vegetation BACM (Phase 7a/7b). The T1A-1 sand fence area is the only approved Moat & Row area currently.

[4] Beginning in 2008, the District allowed for Minimum Dust Control Efficiency or MDCE BACM in certain areas to reduce water use and address environmental concerns in sensitive wetlands areas. MDCE BACM is a dust control measure for which the control efficiency target is adjusted to match the required control level based on air quality modeling for the 2006 dust control areas. The control efficiency targets may be less than 99%, but the level of control in all areas is intended to prevent exceedances of the NAAQS.

[5] Under Board Order 130916-01, the deadline for the implementation of PM_{10} controls on the Keeler Dunes was extended to December 31, 2015.

[6] Phase 8, consisting of gravel blanket BACM, was ordered and addressed in Board orders 101206-01 and 110317-01.

4.2.2 Fugitive Windblown Dust from Sand Dunes

The District is in the process of implementing a dust control project on Keeler Dunes, which will involve the placement of approximately 82,000 straw bales and planting of approximately 246,000 native shrubs. The goal of the project is to create a stable self-sustaining low-impact vegetated dune system. At full build-out, the project is expected to reduce PM_{10} emissions by approximately 95%, and bring the community of Keeler into compliance with state and federal PM_{10} standards. Costs are projected to be approximately $10 million.

4.3 Summary

Table 4-2 summarizes the results of the impact analysis.

Table 4-2: Control Effectiveness, Cost Information, and Cost Effectiveness

Source Category (and Windblown Dust Controls)	Average Annual Emissions (tons)	Control Effectiveness	Costs	Cost-effectiveness (if known)
Dry Lake Bed (varied controls)	2006: 73,174 2010: 43,325 2014: 1,936	Up to 99% depending on control and location	$145.8M (annualized)[3] for 2016 SIP	$2,390/ton
Off-Lake Dunes (straw bales and re-vegetation)	Keeler[1]: 3,309 Olancha[1,2]: 5,418	95% for Keeler Dunes based on straw bales with future shrub establishment.	$700,000 (annualized)[3] for straw bales and re-vegetation with watering	$222/ton

Notes:

[1] Average of 2010-2014 annual emissions.

[2] No active controls are anticipated for the Olancha Dunes. PM_{10} will reduce over time as entrained material from the increasingly controlled lake bed sources are reduced (see Appendix G).

[3] Costs are annualized assuming interest = 5%, n = 25 years, A/P = 0.07.

5. CONCLUSIONS

This BACM assessment meets the requirements of the CAA. Chapter 2 calculated a *de minimis* level for determining whether emission inventory sources are significant (and thus require a BACM comparative analysis) and identified significant sources. The *de minimis* level was calculated to be approximately 3.33% of an exceedance day emissions and the following sources were determined to be significant for the OVPA:

- Fugitive windblown dust from exposed lake bed
- Fugitive dust from dunes near the exposed lake bed

A comparative analysis for each significant source was conducted, comparing GBUAPCD rules to rules/regulations in other serious PM_{10} nonattainment areas. Measures such as shallow flooding, managed vegetation, and gravel that were proposed in the 1998 SIP were designated BACM by USEPA (March, 2000). Additional measures/refinements to these dry lake bed BACM measures were adopted by the GBUAPCD Board in 2008 and 2013 (see Appendices D and E, respectively). In addition, the 2013 Board Order (Appendix E) adopted control provisions for the Keeler Dunes. These measures are unique in the US and are, by definition, the most stringent requirements for these sources.

The BACM assessment concludes the impact analysis of the current and proposed control program for the exposed lake bed and Keeler dunes, featuring information on control effectiveness, cost, and cost-effectiveness.

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APPENDIX A
USEPA REGION IX BACM APPROVAL LETTER
(MARCH 24, 2000)

APPENDIX B
PERMITTED SOURCES OF PM_{10} IN THE OVPA (2015)

APPENDIX C
EXCEEDANCE DAY PM_{10} INVENTORY FOR THE OVPA

APPENDIX D
2008 GBUAPCD BOARD ORDER NO. 080128-01

APPENDIX E
2013 GBUAPCD BOARD ORDER NO. 130916-01

APPENDIX F
GBUAPCD FUGITIVE DUST RULES
(400, 401, 402)

APPENDIX G
GBUAPCD OFF-LAKE PM_{10} REDUCTIONS MEMORANDUM (OCTOBER 9, 2015)

APPENDIX A
USEPA REGION IX BACM APPROVAL LETTER (MARCH 24, 2000)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

APR - 3 2000

March 24, 2000

Dr. Ellen Hardebeck
Air Pollution Control Officer
Great Basin Unified Air pollution Control District
157 Short Street
Bishop, CA 93514

Dear Ellen:

Thank you for your letter of February 3, 2000 to our Regional Administrator Felicia Marcus concerning Best Available Control Measures (BACM) for wind-blown particulate emissions from Owens Lake. I have been asked to respond to your request. We agree with your understanding of Sections I.4. (b) and (c) of the Proposed Approval and Promulgation of Implementation Plans; California-Owens Valley Nonattainment Area; PM-10 (64 Federal Register 34173, June 25, 1999) which contained EPA's conclusions for BACM upon the Owen Lake bed. The Plan's three control measures, shallow flooding, managed vegetation, and gravel cover meet the requirements for BACM; and that there are at this time no alternative or additional measures for the control of wind-blown particulate emission from Owens Lake that have been shown to meet these requirements.

If we can be of further assistance, please contact Larry Biland of my staff at (415) 744-1227.

Sincerely

David P. Howekamp
Director
Air Division

APPENDIX B
PERMITTED SOURCES OF PM_{10} IN THE OVPA (2015)

Facility Type	PM_{10} (tons/yr)[1,2]	Company Name[3]	Permit Number	Facility City
Concrete Batch Plant				
	0.610	7/11 Materials, Inc.	1681-00-15	Keeler
Facilities subject to Agricultural Conservation Management Plans				
	3.63	8-Mile Ranch	1367-00-12	Independence
		All Five Ranch Inc.	1489-00-08	Independence
		Hunter Ranch	1370-00-12	Olancha
		Zachary Smith Ranch	1368-00-06	Independence
		Zachary Smith Ranch	1488-00-08	Independence
		Zachary Smith Ranch	1573-00-11	Independence
		Summers Ranch	1487-00-08	Olancha
Rock Crushing and Screening Operations				
	113.75	B.J. Rees's Enterprise - Durability Quarry	1598-01-13	Keeler
	2	Big Pine Distributors	0783-00-06	Olancha
	30	Federal White Aggregates	0840-01-08	Lone Pine
	101	Global Pumice, LLC	1659-00-13	Olancha
	34.8	South West Pumice, LLC	1682-00-15	Olancha
Diesel Engines				
	5.782	California Department of Fish and Game - Black Rock	1223-00-06	Independence
	3.469	California Department of Fish and Game - Black Rock	1226-00-06	Independence
	1.176	Department of Water & Power - City of Los Angeles	1241-00-06	Keeler
	1.176	Department of Water & Power - City of Los Angeles	1242-00-06	Keeler
	0.424	Department of Water & Power - City of Los Angeles	1352-00-07	Keeler
	0.424	Department of Water & Power - City of Los Angeles	1353-00-07	Keeler
	0.146	Department of Water & Power - City of Los Angeles	1413-00-07	Keeler
	0.030	Federal Aviation Administration	1474-01-13	Lone Pine
	0.911	Global Pumice, LLC	1658-00-13	Olancha
	2.072	Southern Inyo Hospital- FEE EXEMPT	1269-00-06	Lone Pine
	0.306	Verizon California - Lone Pine	1538-01-10	Lone Pine
	0.261	Verizon Wireless - Independence Site (Ridge Communications)	1507-00-09	Independence

Facility Type	PM_{10} (tons/yr)[1,2]	Company Name[3]	Permit Number	Facility City
Diesel-fueled Boilers				
	0.064	Southern Inyo Hospital District	1431-00-08	Lone Pine
	0.002	Southern Inyo Hospital District	1433-00-08	Lone Pine

Notes:
[1] Emissions represent facility potentials-to-emit (PTE) based on allowable throughput and/or operating hours.
[2] Although there are facilities with total PTEs greater than 70 tons per year, none of these facilities have point source emissions greater than 70 tons and thus no facilities meet the federal definition of a major source in a serious PM_{10} nonattainment area.
[3] Facilities with PTE emissions of zero PM_{10} have been excluded.

Source: GBUAPCD

APPENDIX C
EXCEEDANCE DAY PM_{10} INVENTORY FOR THE OVPA

Appendix C1. Exceedance Day PM_{10} Inventory for the OVPA (May 11, 2014)

INVENTORY CATEGORY	PM_{10} EMISSIONS (TONS/DAY)		RATIO CODE	Comments	% OF TOTAL INVENTORY	
	2012	2015			2012	2015
MANUFACTURING AND INDUSTRIAL	0.03	0.03	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
FOOD AND AGRICULTURAL PROCESSING	0.00	0.00	AG AREA		0%	0%
SERVICE AND COMMERCIAL	0.01	0.01	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
OTHER (FUEL COMBUSTION)	0.00	0.00	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
INCINERATORS	0.00	0.00	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
MINERAL PROCESSES	0.71	0.71	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
METAL PROCESSES	0.02	0.03	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
OTHER (INDUSTRIAL PROCESSES)	0.01	0.01	NO RATIO	Could modify based on area and/or location of point sources.	0%	0%
RESIDENTIAL FUEL COMBUSTION	0.02	0.02	POP		0%	0%
FARMING OPERATIONS						
TILLING DUST	0.00	0.00	AG AREA		0%	0%
HARVEST OPERATIONS - DUST	0.00	0.00	AG AREA		0%	0%
CONSTRUCTION AND DEMOLITION	0.01	0.01	POP		0%	0%
PAVED ROAD DUST	0.03	0.03	PAVED RD		0%	0%
UNPAVED ROAD DUST	0.92	0.92	CUSTOM	GBUAPCD Activity-Based Unpaved Roads Method (Appendix C4)	0%	0%
FUGITIVE WINDBLOWN DUST						
DUST FROM AGRICULTURAL LANDS (NON-PASTURE)	0.01	0.01	AG AREA		0%	0%
DUST FROM UNPAVED ROADS AND ASSOCIATED AREAS	11.17	11.17	CUSTOM	GBUAPCD Windblown Unpaved Roads Method (Appendix C3)	2%	2%
DUST FROM EXPOSED LAKEBEDS	45.30	45.30	CUSTOM	Modeling Results	8%	8%
DUST FROM KEELER DUNES	169.20	169.20	CUSTOM	Modeling Results	31%	31%
DUST FROM OLANCHA DUNES	312.00	312.00	CUSTOM	Modeling Results	57%	57%
DUST FROM OPEN DESERT (EX. KEELER AND OLANCHA)	2.94	2.94	CUSTOM	Imperial Land Use Emission Factors (Appendix C5)	1%	1%
FIRES	0.00	0.00	POP		0%	0%
MANAGED BURNING AND DISPOSAL	0.09	0.09	VEG AREA		0%	0%
COOKING	0.00	0.00	POP		0%	0%
LIGHT DUTY PASSENGER (LDA)	0.00	0.00	PAVED RD		0%	0%
LIGHT DUTY TRUCKS - 1 (LDT1)	0.00	0.00	PAVED RD		0%	0%
LIGHT DUTY TRUCKS - 2 (LDT2)	0.00	0.00	PAVED RD		0%	0%
MEDIUM DUTY TRUCKS (MDV)	0.00	0.00	PAVED RD		0%	0%
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.00	0.00	PAVED RD		0%	0%
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.00	0.00	PAVED RD		0%	0%
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.00	0.00	PAVED RD		0%	0%
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.00	0.00	PAVED RD		0%	0%
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.00	0.00	PAVED RD		0%	0%
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.00	0.00	PAVED RD		0%	0%
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.00	0.00	PAVED RD		0%	0%
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.01	0.00	PAVED RD		0%	0%
MOTORCYCLES (MCY)	0.00	0.00	PAVED RD		0%	0%
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.00	0.00	PAVED RD		0%	0%
SCHOOL BUSES - DIESEL (SBD)	0.00	0.00	PAVED RD		0%	0%
OTHER BUSES - GAS (OBG)	0.00	0.00	PAVED RD		0%	0%
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.00	0.00	PAVED RD		0%	0%
ALL OTHER BUSES - DIESEL (OBD)	0.00	0.00	PAVED RD		0%	0%
MOTOR HOMES (MH)	0.00	0.00	PAVED RD		0%	0%
AIRCRAFT	0.00	0.00	AREA		0%	0%
RECREATIONAL BOATS	0.00	0.00	WATER AREA		0%	0%
OFF-ROAD RECREATIONAL VEHICLES	0.00	0.00	AREA		0%	0%
OFF-ROAD EQUIPMENT	0.00	0.00	AREA		0%	0%
FARM EQUIPMENT	0.00	0.00	AG AREA		0%	0%
WILDFIRES	0.17	0.17	AREA	If applicable, will use in-OVPA episode emissions.	0%	0%
TOTAL (TONS/DAY)	**542.65**	**542.66**			100%	100%

Notes:

[1] Except where noted, the values in the table have been derived from the ARB emission inventory for Inyo County and have been ratioed by various factors to obtain results relevant to the Owens Valley Planning Area. The type of ratio used is presented in the 'RATIO CODE' column and is further explained in Appendix C2.

[2] Emission sources reported as having zero emissions in the ARB emission inventory have been removed from the table.

LAND USE:

Land Use Type Code	Specific Land Use Type	General Land Use Type	Area (acres) (2011)		
			2-Km Buffer	OVPA	Inyo County
11	Open Water	Open Water	28	10,643	13,300
12	Perennial Snow/Ice	Perennial Snow/Ice	0	14	1,103
21	Developed, Open Space	Developed	1,029	3,974	21,675
22	Developed, Low Intensity	Developed	619	2,671	10,884
23	Developed, Medium Intensity	Developed	79	438	1,146
24	Developed, High Intensity	Developed	3	28	63
31	Barren Land	Barren Land	6,836	104,373	405,383
41	Deciduous Forest	Forest	0	643	2,578
42	Evergreen Forest	Forest	46	85,155	303,533
43	Mixed Forest	Forest	5	565	1,843
52	Shrub/Scrub	Shrub/Scrub	34,597	642,193	5,667,781
71	Herbaceuous	Shrub/Scrub	284	16,393	66,445
81	Hay/Pasture	Agriculture	0	1,428	13,195
82	Cultivated Crops	Agriculture	0	575	10,205
90	Woody Wetlands	Wetland	573	4,467	8,237
95	Emergent Herbaceuous Wetlands	Wetland	13	4,773	18,112

Note:
The National Land Use Data Set was obtained from http://www.mrlc.gov/viewerjs/. Accessed August 10, 2015.

RATIOS (OVPA to INYO):

Ratio Code	Value
AREA	0.134
WATER AREA	0.800
AG AREA	0.086
VEG AREA	0.124
POP	0.172
PAVED RD	0.206
NO RATIO	1.000
REMOVE	0.000

POPULATION:

	Population (2010)
OVPA	3,193
Inyo County	18,546

Note:
Population numbers were extracted from 2010 U.S. Census data.

ROADS:

	Unpaved Roads (miles)	Paved Roads (miles)	Total Roads (miles)
OVPA	1,103	390	1493
Inyo County	5,437	1,890	7327

Note:
Values extracted from GBUAPCD Unpaved Roads Analysis which used TIGER 2012 data.

$$E = 1.34\ x\ 10^{-5} e^{(0.25xu)}$$

E = PM_{10} emissions in grams per square meter per second
u = Hourly average wind speed at 10 meters in meters per second (for u > 7.6 m/s)

Exceedance Day Scenario: 05/11/2014 (Lone Pine)

Hour	Wind Speed (m/s)	Emission Rate		Emissions OVPA	
		$g/m^2/s$	$g/m^2/hr$	kg/hr	tons/hr
100	8.63	1.16E-04	4.17E-01	3.52E+02	3.88E-01
200	8.19	1.04E-04	3.74E-01	3.15E+02	3.48E-01
300	8.88	1.23E-04	4.44E-01	3.75E+02	4.13E-01
400	9.63	1.49E-04	5.36E-01	4.52E+02	4.98E-01
500	10.48	1.84E-04	6.63E-01	5.59E+02	6.16E-01
600	10.63	1.91E-04	6.88E-01	5.80E+02	6.40E-01
700	11.39	2.31E-04	8.32E-01	7.02E+02	7.74E-01
800	13.37	3.79E-04	1.36E+00	1.15E+03	1.27E+00
900	12.64	3.16E-04	1.14E+00	9.59E+02	1.06E+00
1000	12.47	3.03E-04	1.09E+00	9.19E+02	1.01E+00
1100	12.1	2.76E-04	9.93E-01	8.38E+02	9.24E-01
1200	11.11	2.15E-04	7.76E-01	6.54E+02	7.21E-01
1300	10.95	2.07E-04	7.45E-01	6.29E+02	6.93E-01
1400	10.47	1.84E-04	6.61E-01	5.58E+02	6.15E-01
1500	9.2	1.34E-04	4.81E-01	4.06E+02	4.47E-01
1600	9.11	1.31E-04	4.70E-01	3.97E+02	4.38E-01
1700	7.84	9.51E-05	3.42E-01	2.89E+02	3.19E-01
1800	6.62	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1900	6.63	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2000	6.27	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2100	5.38	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2200	6.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2300	5.71	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2400	5.2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
				kg/day	**tons/day**
			TOTAL	**1.01E+04**	**1.12E+01**

Note:
Methodology is consistent with that presented in the technical memorandum authored by GBUAPCD and titled, *Unpaved Road Dust Inyo County May 3, 2010 (REVISED).*

Assumptions:
20 = average width of unpaved road (ft)
86 = unpaved road in 2-kilometer buffer (miles)
843,709 = erodable surface area (square meters)
208 = erodable surface area (acres)
7.6 = threshold windspeed (meters per second)

Conversion Factors:
5,280 = feet per mile
11 = square feet per square meter
43,560 = square feet per acre
1,000 = grams per kilogram
453.592 = grams per pound
2,000 = pounds per ton
60 = seconds per minute

$$E = \frac{k\left(\frac{s}{12}\right)^{a}\left(\frac{S}{30}\right)^{d}}{\left(\frac{M}{0.5}\right)^{c}} - C$$

E = PM_{10} emissions in pounds per vehicle mile traveled
s = silt content of road surface material (%)
S = mean vehicle speed (mph)
M = surface material moisture content (%)
C = emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear (PM_{10})

For PM_{10} from public unpaved roads:
1.8 = k
1 = a
0.5 = d
0.2 = c

Area	Annual PM_{10}		
	lb/VMT	tons/day	tons/year
OVPA	8.30E-01	9.16E-01	3.34E+02

Notes:
Methodology is consistent with that presented in the technical memorandum authored by GBUAPCD and titled, *Unpaved Road Dust Inyo County May 3, 2010 (REVISED).*

Assumptions:
5 = s, silt content of road surface material (%) (Keeler, CA)
30 = S, mean vehicle speed (mph)
0.3 = M, surface material moisture content (%)
0.00047 = C, emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear (PM_{10})
1,103 = unpaved road in OVPA (miles)
2 = vehicle trips per mile per day
2,206 = vehicle miles traveled per day

Conversion Factors:
2000 = pounds per ton
365 = days per year

Imperial County Land Use Category	PM_{10} Emission Factor (tons/acre/yr)	National Land Use Data Set Land Use Category	Area in 2-Kilometer Buffer (acres)	2-Kilometer Buffer Emissions (tons/yr)	2-Kilometer Buffer Emissions (tons/day)
Urban	0.0001	Developed	1,730	0	0
Grass/Shrublands	0.0272	Shrub/Scrub	33,489	911	2
Forest	0.0034	Forest	51	0	0
Barren	0.0241	Barren Land	6,628	160	0
Sand Dunes	0.0481	--	0	--	--
Agricultural	0.0070	Agriculture	0	0	0
--	0.0000	Open Water	28	0	0
--	0.0000	Perennial Snow/Ice	0	0	0
--	0.0000	Wetland	586	0	0
			TOTAL	**1,071**	**2.9**

Notes:

[1] Imperial Valley land use PM_{10} emission factors obtained from, Mansell, Gerard. 2005. Final Revision for the Imperial Valley Fugitive Dust Emission Inventory. *Technical Memorandum to Brad Poiriez, Imperial County Air Pollution Control District*. September 20.

[2] Land use areas have been derived from the National Land Use Data Set, available at http://www.mrlc.gov/viewerjs/. Accessed August 10, 2015. These estimates were adjusted to remove the areas related to the Keeler Dunes and Olancha Dunes, as well as unpaved roads as emissions from these areas are already being accounted for under alternative methodologies (see assumptions listed below).

Assumptions:

208 = Area (acres) already covered under the *Windblown Dust Emissions from Unpaved Roads* calculation; assumed to fall under the "Barren Land" land use category.

870 = Keeler Dune area (acres) on Exceedance Day (05/11/2014); assumed to fall under the "Shrub/Scrub" land use category

100% = Percent of Keeler Dune area in the 2-kilometer buffer

1,045 = Olancha Dune area (acres) on Exceedance Day (05/11/2014); assumed to fall under the "Shrub/Scrub" land use category

50% = Percent of Keeler Dune area in the 2-kilometer buffer

Conversion Factors:

365 = days per year

UNPAVED ROAD DUST
INYO COUNTY
May 3, 2010 (REVISED)

Re-entrained Unpaved Road Dust

Unpaved road dust emissions for Inyo County were estimated for public unpaved roads based on traffic volume and the amount of unpaved roads in 2008. PM10 emissions from reentrained road dust from unpaved roads is based on the method found in US EPA's *Compilation of Air Pollution Emission Factors*, *AP-42*. (USEPA, 2006)

$$E = \frac{k\,(s/_{12})^{a}(S/_{30})^{d}}{(M/_{0.5})^{c}} - C \qquad \text{Eq. 1}$$

Where: *E* = PM10 emissions in pound per vehicle mile traveled
s = silt content of road surface material (5% measured in Keeler, CA)
S = mean vehicle speed (30 miles per hour)
M = surface material moisture content (assume 0.3%)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 for PM10).

For PM10 from public unpaved roads: k = 1.8, a = 1, d = 0.5 and c = 0.2.

Equation 1 yields an emission rate of 0.83 pounds of PM10 per vehicle mile traveled. This PM10 emission rate is applied to all public unpaved roads in Inyo County.
Daily vehicle miles traveled in Inyo County is separated into the Coso Junction Planning Area, Owens Valley Planning Area and the remainder of Inyo County. This is shown in Table 1. The number of daily trips in Table 1 is based on a traffic survey of 4 unpaved roads in the Owens and Panamint Valleys of Inyo County in November 2001. This survey showed that there were about 3 vehicles trips per day on unpaved roads during the month of November. (Niemeyer, 2002) Because many unpaved roads in lower elevation areas of Inyo County are not used during the hot months of the year and unpaved roads at higher elevations are not used when they are snowbound during the cold months of the year, a seasonal-use factor of 2/3 is applied to the number of vehicle trips per day. This results in about 2 vehicle trips per day on each mile of unpaved road in Inyo County. As shown in Table 1, the District estimates the daily average PM10 emissions from reentrained road dust in Inyo County in 2008 (and 2009) are around 1.33 tons per day. In comparison, CARB's emission inventory for unpaved road dust in Inyo County is about 20 times higher; it shows an estimate of 19.91 tons/day for 2008.

Differences between CARB 2008 Emissions Inventory and District's recommended revisions: CARB staff assumed 10 trips per day on 1,600 miles of unpaved roads or 16,000 vehicle miles traveled each day in Inyo County. They applied a state-wide emission rate of 2.27 lbs PM10/VMT based on studies by UC Davis and DRI in the San Joaquin Valley. (CARB, 2010) District staff believes a total VMT for Inyo County of 3,200 vehicle miles traveled per year based on 2 trips per mile of unpaved road and the emission factor in Equation 1 are more appropriate for activity levels and soil conditions in Inyo County.

Windblown Dust from Unpaved Roads

PM10 emissions due to windblown dust from unpaved roads were estimated from a wind tunnel-based emissions algorithm developed for the 1998 Owens Valley PM10 SIP. The Owens Lake emissions equation for the fall period in equation 2 provides a good estimate for wind erosion from unpaved roads. The higher emission rate generated from the spring period equation developed at Owens Lake is not appropriate because unpaved roads do not form the efflorescent salt surface that is characteristic the most erodible surfaces at Owens Lake. (GBUAPCD, 1998)

$$E = 1.34 \times 10^{-5}\, e^{(0.25 \times u)} \qquad \text{Eq. 2}$$

Where: E = PM10 emissions in grams per square meter per second
u = Hourly average wind speed at 10 m in meters per second (for u > 7.6 m/s)

Assuming that the width of an unpaved road is about 20 feet (6.1 m) and there are 1,600 miles (2.57×10^6 m) of unpaved roads in the Inyo County yields 1.57×10^7 m^2 of wind erodible surface area on unpaved roads. Using hourly wind speed data for Laws, CA for 2005 yields an emission rate of 221.6 $g/m^2/yr$. Applying this emission rate to all unpaved road surfaces in Inyo County gives total PM10 emissions of 3,827 tons per year from all unpaved roads in Inyo County. Table 1 shows the estimates for each of the planning areas using the same emission rate. A daily average emission rate for windblown dust from all unpaved roads in Inyo County would be 10.5 tons per day if you divide the annual total emissions by 365 days.

In comparison, CARB applied the agricultural wind erosion equation from AP-42 and estimated average daily windblown dust emissions from unpaved roads at 4.72 tons per day (1,723.9 tons/year). This is about half of the district's estimate. It should be noted that the average tons per day is different from the peak daily emissions for the windiest days. If we used the peak daily emissions from equation 2 (occurred on 11/26/2005), we get peak daily PM10 emissions of 230 tons from all unpaved roads

REFERENCES

CARB, 2010, Emissions Inventory Data, California Air Resources Board, website accessed February 11, 2010, http://www.arb.ca.gov/ei/emissiondata.htm.

Niemeyer, Debbie A., 2002, "Estimating Statewide Vehicle Activity and Roadway Mileage for Unpaved Roads in California," prepared for the California Air Resources Board, University of California, Davis, California, October 31, 2002.

GBUAPCD, 1998, Great Basin Unified Air Pollution Control District, "PM10 State Implementation Plan for the Searles Valley Planning Planning Area," GBUAPCD, Bishop, California, November 16, 1998.

USEPA, 2006. United States Environmental Protection Agency, Compilation of Air Pollution Emission Factors AP-42 (Fifth Edition), USEPA, Research Triangle Park, North Carolina, updated at http://www.epa.gov/ttn/chief/ap42/index.html.

Table 1. PM10 emissions from reentrained dust and windblown dust from unpaved roads in Inyo County, CA for 2008 and 2009.				
	Portion of Inyo County			Inyo County
	Coso Junction Planning Area	Owens Valley Planning Area	Remainder of Inyo County	
Miles of Public Unpaved Roads	50	250	1,300	1,600
Avg. Number of vehicle trips per day	2	2	2	2
Daily Vehicle Miles Traveled (VMT)	100	500	2,600	3,200
Daily PM10 Emissions (lbs/day)	83	415	2,158	2,656
Daily PM10 Emissions (tons/day)	0.04	0.21	1.08	1.33
Windblown Dust from Unpaved Roads (tons/year)	120	598	3,109	3,827
Windblown Dust from Unpaved Roads (avg. tons/day)	0.3	1.6	8.5	10.5
Windblown Dust from Unpaved Roads Maximum in a Day (Peak daily tons)	7	36	187	230

APPENDIX D
2008 GBUAPCD BOARD ORDER NO. 080128-01

BOARD ORDER # 080128-01 AS AMENDED PURSUANT TO BOARD ORDER 130916-01 and 110718-04 REQUIRING THE CITY OF LOS ANGELES TO UNDERTAKE MEASURES TO CONTROL PM_{10} EMISSIONS FROM THE DRIED BED OF OWENS LAKE

With regard to the control of PM_{10} emissions from the bed of Owens Lake, the Governing Board of the Great Basin Unified Air Pollution Control District (District) orders the City of Los Angeles (City) as follows:

PREAMBLE

A. WHEREAS, the 1998 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (1998 SIP), dated November 16, 1998 and the 2003 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2003 SIP), dated November 13, 2003, require the City to implement a series of measures and actions to reduce particulate emissions from the Owens Lake bed such that the Owens Valley Planning Area (OVPA) will attain and maintain the federal 24-hour National Ambient Air Quality Standards (NAAQS) for particulate matter (PM_{10}) by the statutory deadlines;

B. WHEREAS, the District is required by law to maintain its discretion to protect the environment, public health and safety, and this Order is intended to fulfill those duties without improperly constraining that lawful exercise of discretion;

C. WHEREAS, based on additional information collected subsequent to the information used to adopt the 1998 SIP and 2003 SIP, the District has determined that additional measures and actions will be required to continue to reduce particulate emissions in the OVPA such that the OVPA will attain and maintain the federal 24-hour NAAQS for PM_{10} by the statutory deadlines;

D. WHEREAS, in 2006 a dispute arose between the District and the City regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2003 SIP;

E. WHEREAS, on December 4, 2006 a Settlement Agreement was approved by both the District and the City. Under the provisions of this agreement, the City agreed to implement additional dust control measures by April 1, 2010 and the District agreed to revise the 2003 SIP before March 1, 2008 to incorporate the provisions of the Settlement Agreement;

F. WHEREAS, on March 23, 2007, the U.S. Environmental Protection Agency (USEPA) published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for particulate matter of 10 microns or less (PM_{10}) by December 31, 2006 as mandated by the U.S Clean Air Act Amendments of 1990;

G. WHEREAS, as a result of the USEPA finding, the 2003 SIP must be revised to include a control strategy that will provide for attainment in the Owens Valley Planning Area as soon as practicable and that said revised SIP must be submitted to the USEPA by December 31, 2007;

H. WHEREAS, in consideration of the District's continuing duties under federal and state law, including but not limited to the Clean Air Act, to control particulate emissions from the Owens Lake bed without interruption, the District intends, if this Order is stayed or disapproved, that Board Order #031113-01 (adopted on November 13, 2003) shall continue to be in effect, so that at all times there will be continuous control of these emissions;

I. WHEREAS, the District thereby intends that if this Order is stayed due to a legal challenge, including but not limited to a challenge to this Order under California Health and Safety Code Section 42316, to the State Implementation Plan, or to the Environmental Impact Report for this SIP, or if this Order is disapproved by the California Air Resources Board (CARB), the District will revert to enforce the terms of Board Order #031113-01 which shall continue to be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, unless and until another Order is issued by this Board; and

J. WHEREAS, to prevent the deterioration of air quality due to dismantling or "backsliding" on control measures that have already been implemented before any such stay or disapproval, the District intends that the City shall continue to operate and maintain all control measures already implemented at the time of any such stay or disapproval without interruption, unless and until a further Order of the District allows for such interruption, if the City has not appealed the control measures under Section 42316 within 30 days of the effective date of this Order, and if those control measures were not invalidated as a result of that appeal;

K. WHEREAS, it is the District's intention that this 2008 revised SIP is consistent with the 2006 Settlement Agreement between the District and the City and that it is the District's intention to independently meet all its commitments and obligations under said Settlement Agreement.

THEREFORE, IT IS HEREBY ORDERED AS FOLLOWS:

ORDER

<u>IMPLEMENTATION OF OWENS LAKE BED PM_{10} CONTROL MEASURES</u>

1. <u>Existing PM_{10} controls</u> – From the date of adoption of this order, the City shall continue to operate and maintain the existing Best Available Control Measures (BACM) for PM_{10}, as described in Paragraph 8 hereof, on 29.8 square miles of the Owens Lake bed within the 2003 Dust Control Area (DCA) delineated in Exhibit 1.

2. Additional Shallow Flood supplemental PM_{10} controls – By April 1, 2010 the City shall implement a minimum of 9.2 square miles of additional Shallow Flooding BACM PM_{10} controls within the 12.7 square-mile area known as the 2006 Supplemental Dust Control Area (SDCA) delineated in Exhibit 1. The areas within the SDCA designated for Shallow Flooding only are delineated in Exhibit 1. Shallow Flooding BACM is described in Paragraphs 8, 9 and 15 hereof.

3. Other additional supplemental PM_{10} controls – On a maximum of 3.5 square miles within the 2006 SDCA delineated in Exhibit 1, the City shall implement BACM for PM_{10}, as described in Paragraphs 8, 9 and 15 through 17 hereof, or the City may implement the alternative non-BACM PM_{10} control measure known as "Moat & Row," as described in Paragraph 18. If BACM are installed, the controls shall be operational by April 1, 2010. If Moat & Row is installed, it shall be operational by October 1, 2009. In accordance with Board Order 130916-01, the 3.1 square mile area remaining of the possible areas eligible for alternative non-BACM PM10 control measures using Moat & Row, are now identified as the "Phase 7a areas." The deadlines to implement BACM in the Phase 7a areas are provided as follows:

   A. With the exceptions noted below, the deadline for LADWP to construct all infrastructure and install fully-compliant BACM PM_{10} controls (other than Managed Vegetation BACM) in those portions of the "2008 Dust Control Area" known as the "Phase 7a" areas, which total approximately 3.1 square miles, shall be December 31, 2015. All infrastructure and plant materials for Phase 7a areas controlled with Managed Vegetation BACM will be installed by December 31, 2015. The Phase 7a areas are a portion of the 2008 Dust Control Area previously referred to as "Moat & Row Dust Control Areas" and are shown and described in Exhibit 1.

   B. The deadline to achieve fully-compliant BACM vegetation cover for those Phase 7a areas controlled by the Managed Vegetation BACM shall be December 31, 2017.

   C. The extensions of the deadlines set forth in sections 3.A. and 3.B. shall be contingent upon all of the following:

      (1) LADWP timely receiving from California State Lands Commission ("CSLC") and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM controls within the deadlines set forth in sections 3.A. and 3.B.

      (2) The timely removal from the Phase 7a areas of all California Register of Historical Resources ("CRHR")-eligible areas plus necessary buffer areas, referred to as the "Eligible Cultural Resource ("ECR") areas." The ECR areas initially consist of 277 acres of the Phase 7a areas (the "Initial Phase 7b Areas"). The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas shall comprise the "Phase 7b" areas. The Phase 7b Areas are not limited to the initial 277 acres.

(3) Order 110317-01 being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas are considered a condition of force majeure under paragraph 5(d) of that Order.

D. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of Order 110317-01, as modified by Order 130819-01, and paragraphs 6 and 22 of Order 110317-01, which shall not be unreasonably denied by the District.

E. LADWP shall not be required to install dust controls in the Phase 7b areas (initially, 277 acres) under the provisions of the 2008 Owens Valley SIP, Board Order 080128-01or Order 130819-01. If the District Governing Board subsequently decides to order LADWP to install dust controls in Initial Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake. LADWP is not waiving its right to contest the new Board order or orders.

4. Channel Area PM_{10} controls – A 0.5 square-mile area of natural drainage channels on the south area of the Owens Lake bed is known as the “Channel Area” and is delineated in Exhibit 1. The City shall control PM_{10} emissions from the Channel Area by implementing and operating BACM, modified-BACM or alternative non-BACM controls approved by the District’s Air Pollution Control Officer (APCO), that take into account the resource issues in the Channel Area, by April 1, 2010. Portions of the Channel Area that are determined by the APCO to be naturally non-emissive (for example, adequately vegetated areas) will not require controls. If BACM are implemented in the Channel Area, they shall be as described in paragraphs 8, 9 and 15 through 17 hereof. If the City seeks to implement modified-BACM or alternative non-BACM, the City will apply such modifications as are permissible to resource agencies in this channel, with the primary objective of controlling dust, and provide the District with a monitoring plan aimed at identifying source areas that could cause or contribute to shoreline violations. Should such areas be identified after facilities are fully operational (including vegetative development), the District and the City will work with resource agencies to develop site-specific and implementable dust control approaches. Regardless of the approach selected for Channel Area dust control, the City shall prepare and submit to the District a detailed plan demonstrating the need and effectiveness of the control measures and their projected impacts to the environment, and obtain the prior approval of the District and any other applicable regulatory agencies with jurisdiction over the Channel Area for use of the modified-BACM. The City shall be responsible for any additional environmental analyses that may be required and for all required permits.

5. Total PM_{10} control area – The 29.8 square-mile 2003 Dust Control Area (DCA), the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA) and the 0.5 square-mile Channel Area together comprise the 43.0 square-mile area known as the 2008 Total Dust Control Area (TDCA). These PM_{10} control areas are delineated in Exhibit 1.

6. Minor adjustments to PM_{10} control area boundaries – Upon written request by the City to the District and written approval by the District's APCO, minor adjustments may be made to the interior and exterior boundaries of the 2006 SDCA, for example to avoid impacts to existing resources or features, or for constructability reasons, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the 2008 TDCA shall also be modified to reflect the modified 2006 SDCA boundaries.

7. Study Areas – The District has identified four additional "Study Areas" on the Owens Lake bed totaling up to 1.85 square miles that may require some level of control in order to attain the PM_{10} NAAQS. The four Study Areas are delineated in Exhibit 1. The District will study emissions from the Study Areas occurring between July 1, 2006 and April 1, 2010 to determine whether they will cause or contribute to PM_{10} NAAQS exceedances such that controls will be required. The District will use the data collected during this period to make a determination after May 1, 2010 as to the need for additional controls, as set forth in Paragraph 10, below. However, if the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls in the Study Areas may be made prior to May 1, 2010.

   A. Phase 8 Gravel - As required by Order 110317-01, the City constructed and implemented an approximately 2 square mile BACM project that encompassed the location of Study Area 1. This BACM project is known as Phase 8 and is delineated in Exhibit 1.

PM_{10} CONTROL MEASURES

8. The City shall implement BACM PM_{10} control measures as set forth in this Order, described below in Paragraphs 15 through 17. The City may implement the alternative non-BACM PM_{10} control measure as set forth in this Order, described below in Paragraph 18. To complete implementation of a specified control measure by a date as required by this Order means that the control measure shall be constructed, installed, operated and maintained without interruption, so as to comply with the performance standards for the specified control measure not later than 5:00 p.m. on the required date.

9. All PM_{10} control measures within the 2006 SDCA shall be designed, constructed, installed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 2. MDCEs are the actual dust control measure control efficiencies required to meet the PM_{10} NAAQS, based on data collected during the four-year period between July 2002 and June 2006. Prior to April 1, 2010, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, the initial target MDCEs may be modified if the modified target MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, as set forth in the 2006 Settlement Agreement between the District and the City. This Settlement Agreement is attached as Attachment A.

CONTINGENCY MEASURES – SUPPLEMENTAL CONTROL DETERMINATIONS

10. At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether any areas, in addition to those described in Exhibit 1, require air pollution control measures in order to attain or maintain compliance with the NAAQS for PM_{10}. The APCO's determination will also contain an analysis of the minimum dust control efficiency provided by the PM_{10} controls in the 2008 TDCA to determine if a higher level of control efficiency is required in order to attain or maintain compliance with the NAAQS for PM_{10}. In making these determinations, the APCO shall employ the methods described in Paragraph 11 of this Order. If the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls may be made prior to May 1, 2010.

    A. If the APCO determines under this Paragraph that additional areas require air pollution control measures or that existing PM_{10} control measures require a higher level of control efficiency, the APCO shall issue a written determination to the City informing them that the provisions of Paragraph 11 of this Order require the City to implement, install, operate and maintain PM_{10} BACM on additional areas of the Owens Lake bed or that the control efficiency on existing PM_{10} controls must be increased. The determination will identify those areas of the lake bed that will require PM_{10} BACM and the control efficiency necessary to attain the PM_{10} NAAQS. The City shall secure all permits and leases necessary to implement BACM and conduct any additional analysis, if any, required to comply with the California Environmental Quality Act and any other applicable laws.

    B. The APCO's annual determinations will use data collected after April 1, 2010, except as provided in Paragraph 7, above, for the four Study Areas. The annual determinations for the Study Areas will use data collected after July 1, 2006.

    C. In the event the City appeals the supplemental control determination under Health & Safety Code Section 42316, and pending a decision of the CARB, the City is not required to comply with any measure imposed by the supplemental control determination. The District relies upon action by the CARB to issue its decision on the City's appeal within 90 days. If CARB does not affirm the District supplemental control determination, or otherwise require the City to immediately undertake alternative supplemental control measures within 90 days in such circumstances where automatic control measures are required under Sections 172(c)(1) or 182(c)(9) of the federal Clean Air Act, 42 U.S.C. Sections 7502(c)(9) and 7511a(c)(9), the District relies upon the CARB to take these federal requirements into account in its determination of the City's appeal and to issue such interim orders as necessary to implement automatic supplemental control measures so that this Order complies with the Clean Air Act and can be approved by the U.S. Environmental Protection Agency as a proper State Implementation Plan. The foregoing is not intended to provide the CARB with any authority other than its authority under state law.

    D. Paragraph 11 fixes the period of time within which the implementation of the additional control measures must be completed. Upon implementation, the City shall continuously operate and maintain, without interruption, the control measures to comply with performance standards set forth for such measures in the control measure descriptions contained in this Order.

CRITERIA FOR DETERMINING THE NEED FOR ADDITIONAL PM_{10} CONTROLS

11. The criteria, methods and procedures for the APCO's determination of the need for additional PM_{10} controls described in Paragraph 10 shall be those described in detail in the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" document incorporated as Attachment B along with its referenced "2008 Owens Lake Dust Source Identification Program Protocol" incorporated as Attachment C.

NEW BACM, ADJUSTMENTS TO EXISTING BACM, AND BACM TRANSITIONS

12. Upon written request by the City, the APCO may approve new BACM, a modification or adjustment to the existing BACMs described in Paragraphs 15, 16 and 17 of this Order, and/or the transition from one BACM to another provided that, at all times, the performance standards of one or the other BACM are continuously met during the transition to assure that the transition shall not prevent the OVPA from attaining or maintaining the NAAQS for PM_{10}. The City's request shall contain a detailed description of the proposed alternative and a demonstration that the request satisfied all requirements of law and this Order. The APCO shall have full discretion to consider any such application for a change in BACM, and to accept, reject or condition its approval of such application. Non-compliance with any such condition shall be enforceable as noncompliance with a District Order. Without limiting the District's discretion as provided herein and with the exception of the provisions made for Order 110317-01 for "Transition Areas", the procedures for transitions of implemented control measures or adjustments to BACM shall be those described in Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

    A. BACM Testing and Approval
    The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Engineered Roughness Elements and Tillage in soil type areas where these controls can be applied. The District Governing Board shall consider BACM approval of these candidate measures by September 28, 2014. If the accelerated testing does not result in approved BACM for the candidate measures, the District's and LADWP's respective Boards shall jointly assess why the accelerated testing did not result in the District Board's BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM controls.

ALTERNATIVE METHODS FOR IMPLEMENTING CONTINGENCY MEASURES AND SUPPLEMENTAL CONTROLS

13. Notwithstanding any other provision of this Order, the District shall maintain its authority under Health and Safety Code Section 42316 to order the City to implement additional controls, to control additional emissive areas and/or to undertake additional reasonable measures necessary to mitigate the air pollution caused in the District by the City's water-gathering activities in order to prevent the OVPA from failing to attain or maintain the

NAAQS for PM_{10}, if circumstances arise that are not specifically addressed in Paragraphs 10 or 12 of this Order.

RELATIONSHIP TO BOARD ORDER 031113-01

14. The District hereby stays the force and effect of Board Order 031113-01 for all times that this Order is in full force and effect. In the event this Order, or any provision of this Order, is stayed due to a legal challenge, including but not limited to a challenge to this Order under Health & Safety Code Section 42316, or any other law, to the State Implementation Plan, or to the Environmental Impact Report for this Revised SIP, or in the event the Order is disapproved by the CARB, the following shall apply:

    A. If the stay or disapproval causes Paragraph 1 through 5 of this Order to cease its operative force and effect, Board Order #031113-01 shall immediately be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, until another Order is issued by this Board. In addition, the City shall continue to operate and maintain without interruption all control measures already implemented in any area if those control measures were not appealed under Health & Safety Code Section 42316 within 30 days of the date of this Order, and if those measures were not invalidated as a result of that appeal.

    B. If the stay or disapproval causes Paragraph 10 and/or 11 of this Order to cease its operative force and effect, but does not affect Paragraphs 1 through 5 of this Order, the City shall continue to operate and maintain all control measures already implemented without interruption.

    C. If the stay or disapproval does not affect Paragraphs 1 through 7, 10 or 11 of this Order, those Paragraphs and any other terms of this Order that are not stayed or disapproved shall be in effect, and shall remain in full force for the duration of any stay. In all cases, the City shall continue to operate and maintain, without interruption, all control measures already implemented.

    D. If a stay of this Order is imposed, then lifted so that this Order is in effect, the City shall, immediately, meet all requirements and deadlines set by this Order as if no stay had been imposed. The City shall not remove or decrease any control measures without the express written permission of the APCO, and the provisions of Board Order 031113-01 shall again be stayed. If the stay of this Order is only partially lifted such that any portion of this Order remains stayed, Board Order 031113-01 shall remain in effect as provided under Paragraphs 14.A., 14.B. and 14.C, above.

PM_{10} CONTROL MEASURES

15. BACM Shallow Flooding

    The “Shallow Flooding” PM_{10} control measure will apply water to the surface of those areas of the lake bed where Shallow Flooding is used as a PM_{10} control measure. Water shall be applied in amounts and by means sufficient to achieve the following performance standards:

A. For Shallow Flooding areas within the 29.8 square-mile 2003 DCA:

   i. Until April 1, 2010: At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 1 of each year, and ending on June 30 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.

   ii. After April 1, 2010:

      a. At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
      b. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
      c. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
      d. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
      e. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraphs 15.A.ii,b, c, and d, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance, if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

B. For Shallow Flooding areas within the 12.7 square-mile 2006 SDCA:

   i. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 3 to achieve the control efficiency levels in the MDCE Map (Exhibit 2).

   ii. For Shallow Flooding areas with control efficiencies of 99 percent or more:

      a. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
      b. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.

c. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
d. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraph 15.B.ii.a,b, and c, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the PM_{10} NAAQS at the historic shoreline as a result of excessive dry areas within Shallow Flooding control areas during the dust control periods for each year between October 1 and June 30 of the next year, the provisions of Paragraph 10 shall apply.

D. From July 1 through September 30 of each year, the City is not required by the 2008 SIP to apply water to Shallow Flooding areas for dust control purposes, but is required to maintain minimum areal wetness cover as required by applicable environmental documents, permits, leases and approvals.

E. Aerial photography, satellite imagery or other methods approved at the sole discretion of the APCO shall be used to confirm wetness coverage.

F. The following portions of the areas designated for control with Shallow Flooding are exempted from the requirement of dust control by means of a saturated surface:

i. Raised berms, roadways and their shoulders necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive and

ii. Raised pads containing vaults, pumping equipment or control equipment necessary for the operation of Shallow Flooding infrastructure which are otherwise controlled and maintained to render them substantially non-emissive.

G. “Substantially non-emissive” shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

H. Excess surface waters and shallow groundwaters above the annual average water table that existed before site construction that reach the lower boundary of the dust control areas will be contained, collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. If drains are used, they shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted. These requirements do not apply to Shallow Flood area T36-4, due to its adjacency to the Lower Owens River Project (LORP) and the City's intention to integrate the design and operation of T36-4 into the LORP.

I. The City shall remove all exotic pest plants, including salt cedar (*Tamarix ramosissima*), that invade any of the areas designated for control by Shallow Flooding.

J. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the control areas, including within communities less than three miles from a PM_{10} control area, by effective means that minimize adverse effects upon adjacent wildlife.

K. Brine Shallow Flooding BACM. The Governing Board approves "Brine Shallow Flooding BACM" as a subcategory of Shallow Flooding BACM. Brine Shallow Flooding is defined per the "Shallow Flooding BACM" in the 2008 Owens Valley SIP except that the water used for dust control may contain elevated levels of dissolved salts. The Air Pollution Control Officer will develop a Brine Shallow Flood BACM compliance methodology with input from the LADWP. The District and LADWP acknowledge and agree that the District's approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the existing natural Brine Pool on Owens Lake. The existing "natural Brine Pool" is defined as those areas at Owens Lake below elevation 3,553.55 feet.

16. <u>BACM Managed Vegetation (This section amended on 7/18/2011, BO 110718-04)</u>

A. The "Managed Vegetation" PM_{10} control measure will consist of establishing and maintaining locally adapted native plants at specified cover requirements on those areas of the lake bed where Managed Vegetation is used as a PM_{10} control measure. Any Managed Vegetation area will be considered compliant when the vegetative cover requirements are maintained on the area by the City as specified in Order 110718-04.

B. All Managed Vegetation areas

i. The vegetation planted for dust control shall consist only of locally-adapted native species approved by the APCO or other species approved by both the APCO and the California State Lands Commission (CSLC).

ii. Vegetative cover compliance is to be determined on a fall satellite image of the area calibrated and validated by reference to measurements made by the point-frame method, by ground-truthed remote sensing or by other methods approved at the sole discretion of the APCO.

iii. The following portions of the areas designated for control with Managed Vegetation are exempted from the requirements set forth in Paragraphs 16.A. and 16.B., above:

a. Portions consistently inundated with water, such as reservoirs, ponds and canals,

b. Roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and

c. Portions used as floodwater diversion channels or desiltation/retention basins.

iv. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

v. Excess surface waters and shallow groundwaters above the root zone depths that reach the lower boundary of the dust control areas shall be collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. Drains shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted.

vi. To protect the Managed Vegetation control measure from flood damage and alluvial deposition, the City shall incorporate stormwater and siltation control facilities into and around Managed Vegetation areas adequate to maintain the dust mitigation function of Managed Vegetation. The Managed Vegetation protection facilities shall be designed to dissipate flood waters and capture the alluvial material carried by flood waters, so as to avoid greater than normal water flows and deposition of alluvial material into the Owens Lake brine pool.

vii. The City shall remove all exotic pest plants, including salt cedar (*Tamarix* spp.), that invade any of the areas designated for control by Managed Vegetation.

viii. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the dust control areas, including within communities less than three miles from a PM_{10} control area, by effective means that minimize adverse effects upon adjacent wildlife.

17. <u>BACM Gravel Blanket</u>

A. In areas where Gravel Blanket is used as a PM_{10} control measure, the City shall meet the following performance standard: one hundred percent of the control area shall be covered with a layer of gravel at least four inches thick. All gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. Where it is necessary to support the gravel blanket, it shall be placed over a permanent permeable geotextile fabric. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final

Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.

B. To protect the Gravel Blanket control measure from flooding, the City shall incorporate drains and channels into and around the control measure areas adequate to maintain the dust mitigation function of the Gravel Blanket, and outlet flood waters into the Owens Lake brine pool, Shallow Flooding areas, or reservoirs. The drains and channels shall be designed to incorporate features such as desiltation or retention basins that are adequate to capture the alluvial material carried by the flood waters and to avoid greater than normal deposition of this material into the Owens Lake brine pool.

C. The gravel placement design and implementation shall adequately protect the graveled areas from the deposition of wind- and water-borne soil or infiltration of sediments from below. All graveled areas will be visually monitored to ensure that the Gravel Blanket is not filled with sand, dust or salt and that it has not been inundated or washed out from flooding. If any of these conditions are observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface such that the original performance standard is maintained. The City shall apply best available control measures (BACM) and New Source Performance Standard (NSPS) emission limits to its gravel mining and transportation activities occurring within the District's geographic boundaries as required by the District in the City's District-issued Authority to Construct and Permit to Operate.

D. Reduced Thickness Gravel. As an alternative to the use of a gravel blanket at least four inches thick in 17.A., the Governing Board approves "Reduced Thickness Gravel" as an approved type of Gravel Blanket BACM. For Reduced Thickness Gravel the gravel thickness is reduced from a minimum of four inches (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. One hundred percent of the control area shall be covered with a layer of gravel and all gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification "Material Specification 592—Geotextile" (National Engineering Handbook, Chapter 3, Part 642), or equivalent as approved by the Air Pollution Control Officer. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.

18. <u>Alternative Non-BACM Moat & Row Control Measure</u>

A. The Moat & Row PM_{10} control measure is not a currently-approved BACM. The preliminary form of Moat & Row is described in Exhibit 4 of the 2006 Settlement Agreement between the District and the City (Attachment A). The final form of the Moat & Row PM_{10} control measure will be determined from the results of a demonstration project and testing to be conducted by the City on the lake bed. All Moat

& Row controls will be designed, constructed and operated to achieve the MDCEs described in Paragraph 9.

B. The PM_{10} control effectiveness of Moat & Row may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding additional moats and rows to the array.

C. Final design for the Moat & Row control measure will be determined solely by the City after consultation with and written notification to the District. The City shall consider the following elements in its final design:

i. Test results demonstrating that the required MDCE for each Moat & Row area can be met,

ii. Completion of all required environmental documentation, approvals, permits and leases, and

iii. Inclusion of monitoring in the infrastructure design to continuously monitor compliance with the target MDCE for each area.

D. Upon written request of the City, the APCO shall determine in writing if any given Moat & Row design constitutes BACM or MDCE-BACM in accordance with Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

E. Areas of Moat & Row that do not function as designed or that cause or contribute to an exceedance of the federal 24-hour PM_{10} NAAQS will be remediated as specifically provided in Attachment B, the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure."

PM_{10} CONTROL MEASURE COMPLIANCE AND ENFORCEMENT

19. The District and City will work collaboratively to develop improved wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications for all PM_{10} control measures. Final acceptance and implementation of all compliance measurement techniques and PM_{10} control measure compliance specifications with regulatory impact will be at the sole discretion of the APCO.

STORMWATER MANAGEMENT

20. The City shall design, install, continually operate and maintain flood and siltation control facilities to protect the all PM_{10} control measures installed on the lake bed at all times, and in a manner that groundwater levels, surface water extent, and wetlands in adjacent uncontrolled areas are not impacted by induced drainage. Flood and siltation control facilities shall be integrated into the design and operation of the PM_{10} control measures. All flood and siltation control facilities and PM_{10} control measures damaged by stormwater runoff or

flooding shall be promptly repaired and restored to their designed level of protection and effectiveness. All flood and siltation control facilities shall be designed and operated in a manner to prevent any greater threat of alluvial material contamination to the existing trona mineral deposit lease area (State Lands Commission leases PRC 5464.1, PRC 3511 and PRC 2969.1) than would have occurred under natural conditions prior to the installation of PM_{10} control measures.

SCHEDULE

21. The Control Measures shall be implemented on the areas set forth in Paragraphs 1 through 4 by the dates set forth in those Paragraphs. Supplemental Control Requirements shall be met on the schedule provided for in Attachment B.

PERFORMANCE MONITORING PLAN

22. The City, in consultation with the District, shall annually develop and provide to the District in writing a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

    A. The PMP shall describe the measurements and methods used to verify the performance of the constructed DCMs. The PMP shall also describe the measurements and methods used to maximize information on dust emissions from any areas of special interest.

    B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

    C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

    D. The PMP for each calendar year shall be submitted to the APCO by March 31 of the following calendar year.

ADDITIONAL REQUIREMENTS

23. The District Board orders the City of Los Angeles to satisfy the following requirements related to the implementation of the Shallow Flooding, Managed Vegetation, Gravel Blanket and Moat & Row control measures:

    A. The City’s construction, operation and maintenance activities shall comply with all Mitigation Measures set forth in Final Environmental Impact Reports, EIR Addendums and Mitigated Negative Declarations associated with the areas on which dust controls are placed, and all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP.

    B. The City shall comply with any and all applicable requirements of the Mitigation Monitoring and Reporting Programs adopted by the District and associated with the Final

Environmental Impact Reports and Final Environmental Impact Report Addendums for this project, and with all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP. All mitigation measures required in certified environmental documents associated with the implementation, operation and maintenance of PM_{10} control measures required by this order are hereby incorporated as requirements of this order and may be enforced as such.

C. The City shall apply best available control measures (BACM) to control air emissions from its construction/implementation activities occurring in the District's geographic boundaries.

Exhibits

Exhibit 1 Map and Coordinates of PM_{10} Control Areas

Exhibit 2 Minimum Dust Control Efficiency Map

Exhibit 3 Shallow Flood Control Efficiency Curve

Attachments

Attachment A 2006 Settlement Agreement between the Great Basin Unified Air Pollution Control District and the City of Los Angeles

Attachment B 2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure

Attachment C 2008 Owens Lake Dust Source Identification Program Protocol

Attachment D 2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area

Exhibit 1 - Map and Coordinates of PM10 Control Areas

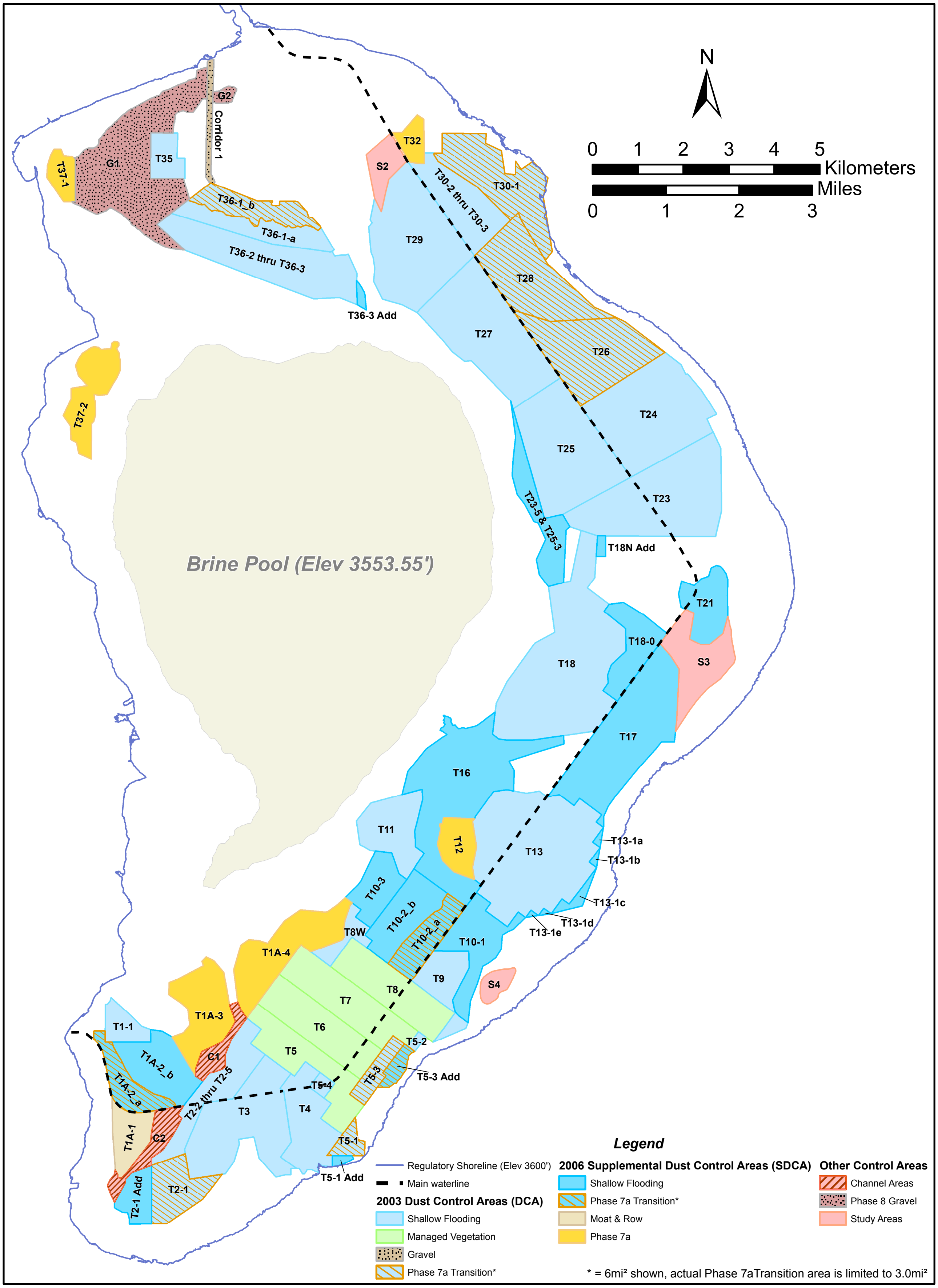


Exhibit 1 - Coordinates of PM10 Control Areas

Area Summary

PM10 Control Areas

2003 DCA	Sq Miles	2006 SDCA	Sq Miles	Other Controls	Sq Miles
Corridor 1	0.1370	T1A-1	0.3883	C1 *(Channel)*	0.2075
T1-1	0.2421	T1A-2_a	0.3989	C2 *(Channel)*	0.2972
T2-1	0.5206	T1A-2_b	0.6929	G1 *(Gravel)*	1.9565
T2-2 thru T2-5	0.7123	T1A-3	0.7850	G2 *(Gravel)*	0.0581
T3	1.4534	T1A-4	0.9618	S2 *(Study)*	0.2790
T4	0.7416	T2-1 Add	0.2916	S3 *(Study)*	0.7210
T5	0.8429	T5-1 Add	0.0310	S4 *(Study)*	0.1488
T5-1	0.1351	T5-3 Add	0.1225		
T5-2	0.0310	T10-1	0.6993		
T5-3	0.2209	T10-2_a	0.4419		
T5-4	0.0625	T10-2_b	0.6442		
T6	0.8745	T10-3	0.4386		
T7	0.9370	T12	0.3428		
T8	0.8742	T13-1a	0.0153		
T8W	0.2084	T13-1b	0.0155		
T9	0.4575	T13-1c	0.0784		
T11	0.6747	T13-1d	0.0078		
T13	2.4578	T13-1e	0.0076		
T18	2.6728	T16	1.9875		
T23	1.8524	T17	1.7604		
T24	1.7643	T18-0	0.5290		
T25	1.6857	T18N Add	0.0333		
T26	1.3301	T21	0.4944		
T27	1.7861	T23-5 & T25-3	0.5717		
T28	1.1774	T32	0.1755		
T29	1.7510	T36-3 Add	0.0325		
T30-1	1.0815	T37-1	0.2146		
T30-2 thru T30-3	0.7634	T37-2	0.5903		
T35	0.2559				
T36-1-a	0.5256				
T36-1_b	0.4831				
T36-2 thru T36-3	1.3981				

2003 DCA
Total 30.11104 $miles^2$

2006 SDCA
Total 12.75245 $miles^2$

Channel Areas
Total 0.50469 $miles^2$

Phase 8 Gravel
Total 2.01458 $miles^2$

Study Areas
Total 1.14875 $miles^2$

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *2003 DCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
Corridor 1	0.1370		
		411,404.1637	4,041,882.1942
		411,328.7980	4,041,911.0091
		411,307.5628	4,041,894.7186
		411,206.9290	4,042,044.9075
		411,237.3205	4,043,740.6607
		411,250.0279	4,044,449.6939
		411,252.3971	4,044,581.8872
		411,297.8028	4,044,632.7570
		411,393.9218	4,044,623.3657
		411,326.8256	4,042,108.9708
		411,411.9449	4,041,944.4412
		411,404.1637	4,041,882.1942
T1-1	0.2421		
		410,001.3479	4,023,280.2990
		410,002.3580	4,023,206.9595
		410,005.2363	4,022,997.9711
		409,150.1396	4,022,999.8884
		408,999.6293	4,023,000.2258
		409,002.0721	4,023,249.9209
		409,002.6986	4,023,313.7804
		409,007.7806	4,023,833.1024
		409,051.0269	4,023,839.2045
		409,110.9082	4,023,908.2518
		409,130.6312	4,023,981.8092
		409,555.1195	4,023,595.2654
		409,806.6814	4,023,351.0115
		410,001.3479	4,023,280.2990
T2-1	0.5206		
		411,579.3994	4,020,095.6486
		411,149.7636	4,019,542.1549
		410,360.7181	4,019,008.5005
		410,025.1591	4,019,002.0354
		410,021.5195	4,020,289.5251
		410,764.8535	4,020,543.1808
		410,856.3054	4,019,986.9089
		411,246.3282	4,020,045.5553
		411,579.3994	4,020,095.6486
T2-2 thru T2-5	0.7123		
		410,764.8535	4,020,543.1808
		410,021.5195	4,020,289.5251
		410,015.7153	4,020,454.4270
		410,264.9378	4,020,620.1863
		410,488.7112	4,020,946.6551
		410,592.4067	4,021,145.4323
		410,686.3969	4,021,329.2488
		410,604.9139	4,021,412.4751
		410,723.1430	4,021,595.2150
		410,772.2220	4,021,661.6656
		410,794.5608	4,021,690.3325
		411,069.6619	4,022,043.1456
		411,151.2016	4,022,147.9844
		411,290.0657	4,022,321.4651
		411,421.1708	4,022,347.8283
		411,641.2736	4,022,435.1011
		411,645.2720	4,022,735.1098
		411,702.1375	4,022,877.2132
		411,780.3515	4,023,076.2456
		411,853.5786	4,023,178.4492
		411,898.3534	4,023,239.0517
		412,114.1288	4,023,531.1972
		412,159.2499	4,023,493.2116
		412,237.2383	4,023,435.6152
		412,435.5486	4,023,289.1826
		412,327.9694	4,023,143.6398
		412,269.0657	4,023,063.9330
		412,196.4642	4,022,965.6545
		412,264.8371	4,022,915.1168
		412,292.7693	4,022,894.4741
		412,520.0138	4,022,726.6285
		412,280.9151	4,022,403.1215
		412,090.5723	4,022,145.4802
		412,041.9403	4,022,079.6437
		411,848.2994	4,021,817.5154
		411,802.8532	4,021,756.0717
		411,753.6515	4,021,748.6529
		411,604.4684	4,021,726.2842
		411,449.4651	4,021,702.9848
		411,171.1912	4,021,661.1653
		410,911.0799	4,021,031.0051
		410,750.1808	4,020,640.9787
		410,764.8535	4,020,543.1808

Area / ID *2003 DCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T3	1.4534		
		413,074.9993	4,020,946.8083
		413,096.9447	4,020,800.0171
		412,857.9724	4,020,476.5179
		412,906.4567	4,020,440.6744
		413,034.4897	4,020,346.0780
		413,216.5995	4,020,220.4048
		413,090.0414	4,020,217.8291
		413,082.4137	4,020,077.9380
		412,973.9179	4,020,085.6761
		412,756.6975	4,020,031.3975
		412,608.0432	4,020,197.5292
		412,389.2662	4,020,442.0285
		412,281.9783	4,020,866.6437
		412,270.9733	4,020,910.1986
		411,937.4110	4,020,860.1271
		411,952.8142	4,020,757.8941
		411,890.5687	4,020,548.9971
		411,835.6901	4,020,364.6351
		411,644.0866	4,020,105.5040
		411,579.3994	4,020,095.6486
		411,246.3282	4,020,045.5553
		410,856.3054	4,019,986.9089
		410,764.8535	4,020,543.1808
		410,750.1808	4,020,640.9787
		410,911.0799	4,021,031.0051
		411,171.1912	4,021,661.1653
		411,449.4651	4,021,702.9848
		411,604.4684	4,021,726.2842
		411,753.6515	4,021,748.6529
		411,802.8532	4,021,756.0717
		411,848.2994	4,021,817.5154
		412,041.9403	4,022,079.6437
		412,090.5723	4,022,145.4802
		412,280.9151	4,022,403.1215
		412,520.0138	4,022,726.6285
		412,843.4972	4,022,487.5883
		413,088.6035	4,022,306.4585
		412,849.6316	4,021,982.9620
		412,928.1826	4,021,923.8598
		413,012.4600	4,021,362.4642
		413,055.0876	4,021,078.5086
		413,074.9993	4,020,946.8083
T4	0.7416		
		413,729.5137	4,022,333.1287
		413,490.4317	4,022,009.5808
		413,652.2147	4,021,890.0650
		413,814.0009	4,021,770.5574
		413,975.7851	4,021,651.0243
		413,741.0231	4,021,324.3436
		413,898.4688	4,021,208.0224
		414,222.0726	4,020,969.0150
		414,160.6092	4,020,885.8261
		413,982.9758	4,020,645.4436
		413,893.6355	4,020,524.5934
		413,877.7052	4,020,502.9468
		414,001.4695	4,020,502.4758
		414,001.2533	4,020,257.4915
		413,893.7745	4,020,264.7699
		413,767.6592	4,020,273.3310
		413,695.4389	4,020,332.7395
		413,677.0551	4,020,225.3030
		413,700.3399	4,020,128.3549
		413,627.7543	4,020,158.1265
		413,549.0822	4,020,190.3946
		413,490.8659	4,020,190.3962
		413,444.3883	4,020,190.3975
		413,424.8082	4,020,157.2395
		413,385.0218	4,020,104.3834
		413,343.6338	4,020,101.2053
		413,266.1224	4,020,221.4128
		413,216.5995	4,020,220.4048
		413,034.4897	4,020,346.0780
		412,906.4567	4,020,440.6744
		412,857.9724	4,020,476.5179
		413,096.9447	4,020,800.0171
		413,074.9993	4,020,946.8083
		413,055.0876	4,021,078.5086
		413,012.4600	4,021,362.4642
		412,928.1826	4,021,923.8598
		412,849.6316	4,021,982.9620
		413,088.6035	4,022,306.4585
		413,166.9434	4,022,248.5872
		413,406.0618	4,022,572.1831
		413,729.5137	4,022,333.1287

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
2003 DCA	(miles²)	X-coordinates	Y_coordinates
T5	0.8429		
		414,615.6262	4,022,178.5720
		414,426.4783	4,021,922.6108
		414,376.5555	4,021,855.0570
		414,700.1075	4,021,616.0524
		414,505.9987	4,021,353.3100
		414,461.0480	4,021,292.4897
		414,222.0726	4,020,969.0150
		413,898.4688	4,021,208.0224
		413,741.0231	4,021,324.3436
		413,975.7851	4,021,651.0243
		413,814.0009	4,021,770.5574
		413,865.8579	4,021,840.7154
		413,931.8875	4,021,930.0605
		414,053.0895	4,022,094.0927
		413,729.5137	4,022,333.1287
		413,406.0618	4,022,572.1831
		413,166.9434	4,022,248.5872
		413,088.6035	4,022,306.4585
		412,843.4972	4,022,487.5883
		412,520.0138	4,022,726.6285
		412,292.7693	4,022,894.4741
		412,264.8371	4,022,915.1168
		412,196.4642	4,022,965.6545
		412,269.0657	4,023,063.9330
		412,327.9694	4,023,143.6398
		412,435.5486	4,023,289.1826
		412,237.2383	4,023,435.6152
		412,159.2499	4,023,493.2116
		412,114.1288	4,023,531.1972
		412,316.2796	4,023,804.5494
		412,351.0895	4,023,851.6783
		412,674.5366	4,023,612.7141
		412,997.9834	4,023,373.7502
		413,321.5800	4,023,134.6691
		413,645.0264	4,022,895.7058
		413,968.6226	4,022,656.6253
		414,292.0677	4,022,417.6245
		414,615.6262	4,022,178.5720
T5-1	0.1351		
		414,429.2165	4,020,500.8382
		414,232.1268	4,020,501.5982
		414,001.4695	4,020,502.4758
		413,877.7052	4,020,502.9468
		413,893.6355	4,020,524.5934
		413,982.9758	4,020,645.4436
		414,160.6092	4,020,885.8261
		414,222.0726	4,020,969.0150
		414,461.0480	4,021,292.4897
		414,505.9987	4,021,353.3100
		414,557.3614	4,020,853.0235
		414,632.3454	4,020,832.6501
		414,717.5371	4,020,809.5032
		414,704.8599	4,020,499.7994
		414,429.2165	4,020,500.8382
T5-2	0.0310		
		416,056.8587	4,023,113.9676
		415,815.3044	4,022,792.4623
		415,704.1714	4,022,874.5914
		415,656.1628	4,022,910.0892
		415,895.2471	4,023,233.5923
		416,056.8587	4,023,113.9676
T5-3	0.2209		
		415,580.7123	4,022,964.7690
		415,520.5385	4,022,883.3346
		415,380.8866	4,022,694.3156
		415,192.7623	4,022,439.6891
		415,127.4250	4,022,351.2549
		415,106.6479	4,022,323.0048
		415,148.1754	4,022,285.3898
		415,178.1077	4,022,263.0525
		415,146.6854	4,022,220.5223
		414,989.6965	4,022,007.9919
		414,750.3341	4,021,684.0582
		414,700.1075	4,021,616.0524
		414,376.5555	4,021,855.0570
		414,426.4783	4,021,922.6108
		414,615.6262	4,022,178.5720
		414,854.5912	4,022,502.0156
		415,093.6715	4,022,825.5607
		415,332.6768	4,023,149.0322
		415,453.5288	4,023,059.7725
		415,580.7123	4,022,964.7690

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
2003 DCA	(miles²)	X-coordinates	Y_coordinates
T5-4	0.0625		
		413,814.0009	4,021,770.5574
		413,652.2147	4,021,890.0650
		413,490.4317	4,022,009.5808
		413,729.5137	4,022,333.1287
		414,053.0895	4,022,094.0927
		413,931.8875	4,021,930.0605
		413,865.8579	4,021,840.7154
		413,814.0009	4,021,770.5574
T6	0.8745		
		415,093.6715	4,022,825.5607
		414,854.5912	4,022,502.0156
		414,615.6262	4,022,178.5720
		414,292.0677	4,022,417.6245
		413,968.6226	4,022,656.6253
		413,645.0264	4,022,895.7058
		413,321.5800	4,023,134.6691
		412,997.9834	4,023,373.7502
		412,674.5366	4,023,612.7141
		412,351.0895	4,023,851.6783
		412,393.1732	4,023,908.6402
		412,590.0541	4,024,175.1253
		412,716.3209	4,024,345.9798
		412,829.1735	4,024,498.6832
		413,152.4691	4,024,259.7978
		413,475.9145	4,024,020.7953
		413,799.5105	4,023,781.7139
		414,122.9555	4,023,542.7119
		414,446.5511	4,023,303.6311
		414,770.1473	4,023,064.5885
		415,093.6715	4,022,825.5607
T7	0.9370		
		413,520.9060	4,024,987.7652
		413,630.5473	4,024,906.7558
		413,705.0932	4,024,851.6720
		413,813.9702	4,024,771.2201
		413,954.0157	4,024,667.7535
		414,277.5935	4,024,428.7162
		414,601.0379	4,024,189.7139
		414,924.6337	4,023,950.6707
		415,248.2293	4,023,711.6277
		415,571.8247	4,023,472.5851
		415,895.2471	4,023,233.5923
		415,656.1628	4,022,910.0892
		415,622.4090	4,022,934.9994
		415,580.7123	4,022,964.7690
		415,453.5288	4,023,059.7725
		415,332.6768	4,023,149.0322
		415,093.6715	4,022,825.5607
		414,770.1473	4,023,064.5885
		414,446.5511	4,023,303.6311
		414,122.9555	4,023,542.7119
		413,799.5105	4,023,781.7139
		413,475.9145	4,024,020.7953
		413,152.4691	4,024,259.7978
		412,829.1735	4,024,498.6832
		413,005.9543	4,024,737.9616
		413,068.1384	4,024,822.1295
		413,307.2567	4,025,145.6105
		413,520.9060	4,024,987.7652
T8	0.8742		
		414,755.6684	4,025,075.7084
		414,987.6679	4,024,904.2813
		415,079.1212	4,024,836.7146
		415,225.2485	4,024,728.7512
		415,402.7156	4,024,597.6328
		415,721.8772	4,024,363.7439
		416,049.7522	4,024,119.5115
		416,373.1960	4,023,880.5480
		416,696.6388	4,023,641.5466
		416,457.6759	4,023,318.1030
		416,213.7556	4,022,998.2673
		416,081.2099	4,023,096.2253
		416,056.8587	4,023,113.9676
		415,895.2471	4,023,233.5923
		415,571.8247	4,023,472.5851
		415,248.2293	4,023,711.6277
		414,924.6337	4,023,950.6707
		414,601.0379	4,024,189.7139
		414,277.5935	4,024,428.7162
		413,954.0157	4,024,667.7535
		414,117.8568	4,024,889.3542
		414,193.0965	4,024,991.1381

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
2003 DCA	(miles^2)	X-coordinates	Y_coordinates
T8 *continued*	0.8742		
		414,365.0268	4,025,223.8960
		414,432.1019	4,025,314.6897
		414,755.6684	4,025,075.7084
T8W	0.2084		
		414,714.1101	4,025,356.9862
		414,875.1490	4,025,237.4744
		414,828.4698	4,025,174.2710
		414,755.6684	4,025,075.7084
		414,432.1019	4,025,314.6897
		414,365.0268	4,025,223.8960
		414,348.6477	4,025,201.7221
		414,193.0965	4,024,991.1381
		414,117.8568	4,024,889.3542
		413,954.0157	4,024,667.7535
		413,813.9702	4,024,771.2201
		413,705.0932	4,024,851.6720
		413,630.5473	4,024,906.7558
		413,520.9060	4,024,987.7652
		414,210.4545	4,025,245.9289
		414,234.5783	4,025,278.7465
		414,237.4033	4,025,282.6518
		414,265.6270	4,025,321.6698
		414,260.7145	4,025,375.7116
		414,249.7773	4,025,496.0299
		414,253.5442	4,025,523.3931
		414,275.2628	4,025,680.9863
		414,383.8825	4,025,998.0971
		414,433.1201	4,026,063.8621
		414,628.9092	4,025,919.5013
		414,592.2070	4,025,869.8256
		414,509.4040	4,025,757.7501
		414,573.9046	4,025,710.0958
		414,832.3590	4,025,517.9893
		414,714.1101	4,025,356.9862
T9	0.4575		
		416,987.0241	4,023,427.0505
		416,933.0673	4,023,305.0811
		416,213.7556	4,022,998.2673
		416,457.6759	4,023,318.1030
		416,696.6388	4,023,641.5466
		416,373.1960	4,023,880.5480
		416,049.7522	4,024,119.5115
		415,721.8772	4,024,363.7439
		415,752.1670	4,024,382.2273
		415,795.7936	4,024,428.4142
		416,222.2418	4,025,004.5422
		416,423.1407	4,025,002.1395
		416,999.8010	4,024,996.4655
		417,001.1420	4,024,947.4364
		417,009.4547	4,024,643.4367
		416,773.5777	4,024,179.3379
		416,740.4644	4,024,114.1911
		416,644.2056	4,023,924.8115
		416,681.7283	4,023,739.4429
		416,700.3078	4,023,672.4212
		416,724.9459	4,023,638.9524
		416,791.8080	4,023,571.3270
		416,987.0241	4,023,427.0505
T11	0.6747		
		416,016.5518	4,027,163.7735
		415,892.7261	4,026,970.7408
		415,850.0994	4,026,904.2900
		415,790.4216	4,026,811.2579
		415,677.0319	4,026,634.4934
		415,640.1630	4,026,578.7438
		415,466.7219	4,026,708.6624
		415,340.1072	4,027,066.6946
		415,303.7796	4,027,171.2685
		415,233.1529	4,027,179.3891
		415,156.5509	4,027,188.1773
		414,946.8125	4,027,212.2390
		414,829.7448	4,027,225.6694
		414,704.5839	4,027,293.5349
		414,603.3991	4,027,348.4000
		414,525.4449	4,027,872.6930
		414,845.5480	4,028,265.1622
		415,530.3795	4,028,446.4469
		415,969.6875	4,028,562.7110
		415,987.3754	4,028,348.7866
		415,812.0017	4,027,654.7769
T11 *continued*	0.6747		
		415,815.0825	4,027,594.0878
		415,819.5445	4,027,506.2313
		415,821.2552	4,027,472.5544
		415,829.9319	4,027,301.7159
		415,955.5124	4,027,208.8937
		416,016.5518	4,027,163.7735
T13	2.4578		
		417,985.8356	4,028,530.6268
		418,270.9212	4,028,479.7746
		418,552.1861	4,028,522.0171
		418,641.0131	4,028,456.3877
		418,725.6089	4,028,396.0970
		418,940.0949	4,028,435.3170
		418,994.5143	4,028,445.2593
		419,318.0047	4,028,206.2594
		419,437.6778	4,028,367.7751
		419,922.7917	4,028,009.4868
		419,803.4484	4,027,847.6038
		419,853.4559	4,027,810.6655
		419,964.9561	4,027,727.9417
		419,815.0913	4,027,525.2967
		419,726.2673	4,027,404.5246
		419,887.7273	4,027,284.9795
		419,648.9217	4,026,961.5818
		419,810.2777	4,026,841.6888
		419,748.5558	4,026,757.6663
		419,525.0923	4,026,455.4515
		419,499.4993	4,026,420.9158
		419,206.2888	4,026,038.3123
		419,051.1767	4,026,152.9153
		418,944.5404	4,026,008.5914
		418,812.4327	4,025,829.9087
		418,650.4050	4,025,948.9162
		418,530.6017	4,025,787.6073
		418,369.1355	4,025,906.6762
		418,250.0503	4,025,745.2361
		418,087.8706	4,025,864.4329
		417,965.0399	4,025,698.1844
		417,848.8505	4,025,540.9244
		417,363.5983	4,025,899.4766
		417,483.0867	4,026,061.2172
		417,366.8592	4,026,147.0905
		417,170.2116	4,026,293.6483
		417,289.1233	4,026,454.5769
		417,122.8974	4,026,577.3922
		417,084.2094	4,026,850.3179
		417,168.0579	4,027,307.0306
		417,084.6434	4,027,863.9835
		417,123.5860	4,027,916.7887
		417,149.3087	4,027,977.2199
		417,545.6899	4,028,513.6273
		417,827.9025	4,028,557.0432
		417,876.9859	4,028,548.4822
		417,985.8356	4,028,530.6268
T18	2.6728		
		418,383.2186	4,029,647.0736
		418,130.4116	4,029,646.0180
		417,852.8347	4,029,647.5471
		417,771.7107	4,029,657.7122
		417,699.9538	4,029,667.9768
		417,653.3789	4,029,674.6593
		417,521.5049	4,029,776.4691
		417,581.9086	4,030,267.7438
		417,605.6678	4,030,460.9564
		417,838.7772	4,030,929.0825
		418,459.9718	4,031,788.9629
		418,889.1261	4,032,024.0241
		418,754.0253	4,033,026.4824
		419,084.1419	4,033,110.8123
		419,239.5306	4,033,150.5146
		419,365.9142	4,033,768.8440
		419,466.7915	4,034,261.8713
		419,496.3620	4,034,252.3887
		419,832.6228	4,034,141.1372
		419,802.4606	4,033,687.7767
		419,771.8711	4,033,218.0199
		419,606.1581	4,032,994.4388
		419,929.6631	4,032,755.4136
		420,091.3942	4,032,635.9359
		419,976.1285	4,032,480.3898
		420,133.8016	4,032,354.8284

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
2003 DCA	(miles^2)	X-coordinates	Y_coordinates
T18	2.6728		
continued		420,425.7541	4,032,122.7085
		420,448.8685	4,032,104.3398
		420,460.8875	4,031,607.1656
		420,174.1314	4,031,339.0630
		420,132.5084	4,031,300.4919
		420,102.1497	4,031,215.3678
		420,051.6551	4,031,073.7611
		420,067.1527	4,030,907.7868
		419,953.0593	4,030,737.6865
		420,100.9126	4,030,629.4127
		420,270.2682	4,030,504.5926
		420,257.4813	4,030,470.7618
		419,822.9960	4,029,884.0794
		419,798.7906	4,029,851.3951
		419,084.5984	4,029,747.7702
		418,383.2186	4,029,647.0736
T23	1.8524		
		422,559.8892	4,034,701.7965
		422,429.2563	4,034,127.0388
		421,482.5827	4,034,132.2129
		420,004.5740	4,034,139.6849
		419,832.6228	4,034,141.1372
		419,496.3620	4,034,252.3887
		419,466.7915	4,034,261.8713
		419,223.1494	4,034,342.8214
		419,188.9454	4,034,400.9790
		419,064.9605	4,034,610.8361
		420,562.6228	4,035,433.5165
		422,377.3155	4,036,418.9679
		422,544.4991	4,036,065.0490
		422,546.3765	4,035,898.7421
		422,559.8892	4,034,701.7965
T24	1.7643		
		421,672.5269	4,037,910.9745
		421,775.5115	4,037,695.3944
		421,815.4472	4,037,708.0811
		422,114.0386	4,037,354.1188
		422,305.0531	4,037,054.4244
		422,453.6130	4,036,821.3405
		422,237.3513	4,036,716.5520
		422,377.3155	4,036,418.9679
		420,562.6228	4,035,433.5165
		419,459.5560	4,036,993.8362
		421,317.9300	4,038,183.2674
		421,672.5269	4,037,910.9745
T25	1.6857		
		419,064.9605	4,034,610.8361
		418,665.8457	4,034,527.9245
		418,192.9713	4,036,174.1094
		417,974.8683	4,036,933.5367
		419,017.0594	4,037,619.7626
		419,459.5560	4,036,993.8362
		420,562.6228	4,035,433.5165
		419,064.9605	4,034,610.8361
T26	1.3301		
		420,260.2740	4,038,939.6141
		420,448.8516	4,038,850.6281
		421,317.9300	4,038,183.2674
		419,459.5560	4,036,993.8362
		419,017.0594	4,037,619.7626
		417,959.0480	4,039,116.3619
		418,789.3715	4,038,860.6801
		420,260.2740	4,038,939.6141
T27	1.7861		
		417,959.0480	4,039,116.3619
		419,017.0594	4,037,619.7626
		417,974.8683	4,036,933.5367
		417,924.4340	4,037,108.4563
		417,056.7418	4,037,995.5171
		416,908.7138	4,037,982.5250
		416,631.9746	4,038,195.4231
		416,422.7260	4,038,451.3374
		416,046.9016	4,038,858.3728
		415,865.4763	4,039,054.8651
		415,933.4067	4,039,143.8996
		416,323.1348	4,039,525.0305
		416,658.3540	4,039,852.3712
		417,121.6189	4,040,304.5343

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
2003 DCA	(miles^2)	X-coordinates	Y_coordinates
T27	1.7861		
continued		417,255.4209	4,040,111.6752
		417,959.0480	4,039,116.3619
T28	1.1774		
		420,260.2740	4,038,939.6141
		418,789.3715	4,038,860.6801
		417,959.0480	4,039,116.3619
		417,255.4209	4,040,111.6752
		417,121.6189	4,040,304.5343
		417,473.8189	4,040,647.9564
		417,921.3802	4,041,084.8832
		418,093.9730	4,041,254.0466
		418,155.9146	4,041,076.4185
		418,687.1386	4,040,203.3590
		418,733.7251	4,040,126.7522
		418,872.7825	4,039,997.9387
		419,760.8752	4,039,175.2704
		420,260.2740	4,038,939.6141
T29	7.7510		
		416,435.5451	4,041,276.9560
		417,121.6189	4,040,304.5343
		416,658.3540	4,039,852.3712
		416,323.1348	4,039,525.0305
		415,933.4067	4,039,143.8996
		415,865.4763	4,039,054.8651
		415,536.0232	4,039,224.5107
		415,102.2160	4,039,351.9435
		414,905.7226	4,039,737.5501
		414,921.1090	4,039,918.0500
		414,927.2536	4,039,990.1326
		414,931.2068	4,040,036.5085
		414,921.7343	4,040,096.5239
		414,906.2118	4,040,194.8691
		414,894.9833	4,040,266.0091
		414,848.0568	4,040,379.0156
		414,814.5852	4,040,750.8719
		414,797.1740	4,040,944.3347
		414,835.3793	4,040,983.9777
		414,873.5845	4,041,023.6206
		414,850.9250	4,041,058.2850
		414,828.2654	4,041,092.9493
		414,928.6584	4,041,572.8182
		415,073.9313	4,041,276.5424
		415,237.3285	4,041,985.5193
		415,630.5647	4,042,376.1020
		415,655.6659	4,042,384.0795
		416,435.5451	4,041,276.9560
T30-1	1.0815		
		418,687.1386	4,040,203.3590
		418,155.9146	4,041,076.4185
		418,093.9730	4,041,254.0466
		417,921.3802	4,041,084.8832
		417,171.9137	4,041,828.3044
		416,322.8671	4,042,382.8026
		416,237.8729	4,042,517.5607
		416,238.8166	4,042,563.7458
		416,413.8960	4,042,560.2618
		416,415.9268	4,043,001.9282
		417,384.3152	4,042,993.4517
		417,370.6762	4,042,778.5344
		417,719.8507	4,042,619.4658
		417,792.5767	4,042,117.6796
		418,026.3192	4,042,090.2555
		418,032.4649	4,042,385.2584
		418,154.9595	4,042,206.3723
		418,410.5623	4,042,382.5975
		418,608.9968	4,042,170.9490
		418,642.6771	4,042,098.0531
		418,743.9293	4,042,022.1567
		418,637.1570	4,041,594.2678
		418,746.9274	4,040,943.5424
		418,839.1598	4,040,396.7884
		418,687.1386	4,040,203.3590

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *2003 DCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	 Y_coordinates
T30-2 thru T30-3	0.7634		
		416,322.8671	4,042,382.8026
		417,171.9137	4,041,828.3044
		417,921.3802	4,041,084.8832
		417,473.8189	4,040,647.9564
		417,121.6189	4,040,304.5343
		416,435.5451	4,041,276.9560
		415,655.6659	4,042,384.0795
		415,692.3612	4,042,371.6124
		415,869.3630	4,042,338.0433
		416,015.9120	4,042,330.2460
		416,020.8582	4,042,568.1991
		416,238.8166	4,042,563.7458
		416,237.8729	4,042,517.5607
		416,322.8671	4,042,382.8026
T35	0.2559		
		410,756.1353	4,042,245.4528
		410,754.6508	4,042,002.5380
		410,723.8358	4,042,002.5739
		410,000.0033	4,042,003.4174
		410,001.6954	4,042,464.1381
		410,003.7039	4,043,010.8326
		410,268.6279	4,043,005.6231
		410,493.9516	4,043,001.1922
		410,599.0285	4,042,999.1260
		410,587.3545	4,042,696.5372
		410,577.9311	4,042,452.2776
		410,757.3767	4,042,448.5842
		410,756.1353	4,042,245.4528
T36-1-a	0.5256		
		413,750.7680	4,040,919.5075
		414,039.1683	4,040,436.0033
		414,010.8260	4,040,412.9166
		413,965.4168	4,040,383.7884
		412,673.7969	4,040,565.9749
		410,453.6629	4,041,239.6583
		410,825.3880	4,041,524.8233
		410,846.2711	4,041,514.7386
		410,992.7310	4,041,468.1333
		411,055.8087	4,041,440.0159
		411,135.8416	4,041,421.5977
		411,183.1486	4,041,440.7177
		411,235.6910	4,041,389.3648
		411,274.9063	4,041,341.6397
		411,347.5440	4,041,289.8688
		411,408.1782	4,041,305.3608
		411,518.4236	4,041,289.6650
		411,591.6884	4,041,268.0371
		411,660.8374	4,041,209.6374
		411,710.8667	4,041,198.5448
		411,804.2266	4,041,176.4989
		411,974.8273	4,041,162.8983
		412,071.8847	4,041,157.5286
		412,118.0073	4,041,119.7120
		412,161.7561	4,041,128.8540
		412,184.0859	4,041,074.7789
		412,245.9095	4,040,986.3758
		412,288.6829	4,040,948.6289
		412,352.3875	4,040,950.6544
		412,370.0391	4,040,993.8458
		412,399.2015	4,041,107.1616
		412,446.7174	4,041,136.3291
		412,482.7924	4,041,098.7215
		412,538.8232	4,041,053.9974
		412,592.6194	4,041,062.9304
		412,649.6953	4,041,068.4443
		412,683.9537	4,041,104.5889
		412,733.0771	4,041,049.9567
		412,809.5514	4,041,021.5608
		412,892.5848	4,040,986.3270
		412,965.2921	4,040,937.9055
		413,008.9013	4,040,940.3492
		413,026.3440	4,040,973.4927
		413,108.8898	4,040,914.8146
		413,182.8508	4,040,926.6789
		413,233.7158	4,040,955.7766
		413,303.6310	4,040,934.2185
		413,361.1248	4,040,959.8278
		413,418.4792	4,040,978.7387
		413,584.8942	4,040,925.0172
		413,680.6972	4,040,859.3622
		413,728.4917	4,040,901.9263
		413,750.7680	4,040,919.5075

Area / ID *2003 DCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	 Y_coordinates
T36-1-b	0.4831		
		411,404.1637	4,041,882.1942
		412,344.1688	4,041,513.1631
		412,682.1021	4,041,508.1389
		412,652.1923	4,041,436.0645
		412,690.1314	4,041,406.0416
		412,833.6710	4,041,412.9149
		412,841.4082	4,041,505.7657
		413,191.4978	4,041,500.2871
		413,241.1227	4,041,488.5169
		413,443.2128	4,041,269.5238
		413,478.6456	4,041,158.2255
		413,561.2523	4,041,141.5984
		413,723.0869	4,040,965.9151
		413,750.7680	4,040,919.5075
		413,728.4917	4,040,901.9263
		413,680.6972	4,040,859.3622
		413,584.8942	4,040,925.0172
		413,418.4792	4,040,978.7387
		413,361.1248	4,040,959.8278
		413,303.6310	4,040,934.2185
		413,233.7158	4,040,955.7766
		413,182.8508	4,040,926.6789
		413,108.8898	4,040,914.8146
		413,026.3440	4,040,973.4927
		413,008.9013	4,040,940.3492
		412,965.2921	4,040,937.9055
		412,892.5848	4,040,986.3270
		412,809.5514	4,041,021.5608
		412,733.0771	4,041,049.9567
		412,683.9537	4,041,104.5889
		412,649.6953	4,041,068.4443
		412,592.6194	4,041,062.9304
		412,538.8232	4,041,053.9974
		412,482.7924	4,041,098.7215
		412,446.7174	4,041,136.3291
		412,399.2015	4,041,107.1616
		412,370.0391	4,040,993.8458
		412,352.3875	4,040,950.6544
		412,288.6829	4,040,948.6289
		412,245.9095	4,040,986.3758
		412,184.0859	4,041,074.7789
		412,161.7561	4,041,128.8540
		412,118.0073	4,041,119.7120
		412,071.8847	4,041,157.5286
		411,974.8273	4,041,162.8983
		411,804.2266	4,041,176.4989
		411,710.8667	4,041,198.5448
		411,660.8374	4,041,209.6374
		411,591.6884	4,041,268.0371
		411,518.4236	4,041,289.6650
		411,408.1782	4,041,305.3608
		411,347.5440	4,041,289.8688
		411,274.9063	4,041,341.6397
		411,235.6910	4,041,389.3648
		411,183.1486	4,041,440.7177
		411,135.8416	4,041,421.5977
		411,055.8087	4,041,440.0159
		410,992.7310	4,041,468.1333
		410,846.2711	4,041,514.7386
		410,825.3880	4,041,524.8233
		410,857.4942	4,041,549.4532
		411,307.5628	4,041,894.7186
		411,328.7980	4,041,911.0091
		411,404.1637	4,041,882.1942
T36-2 thru T36-3	1.3981		
		412,673.7969	4,040,565.9749
		413,965.4168	4,040,383.7884
		414,010.8260	4,040,412.9166
		414,002.9668	4,040,378.3377
		414,050.7092	4,040,298.5802
		414,211.1526	4,040,321.9816
		414,280.2236	4,040,319.3575
		414,347.5813	4,040,337.7609
		414,544.1961	4,039,918.4944
		414,532.4404	4,039,758.0190
		414,528.0492	4,039,697.5872
		414,537.5701	4,039,498.0063
		414,548.2365	4,039,274.9161
		414,550.5526	4,039,224.6348
		414,146.0294	4,039,386.3858
		413,592.7832	4,039,353.6958
		412,804.1591	4,039,650.8708
		412,039.2079	4,039,939.1253
		411,230.3923	4,040,243.9095

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *2003 DCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T36-2 thru T36-3 *continued*	1.3981		
		410,766.2080	4,040,418.8272
		410,754.5323	4,040,429.4164
		410,132.6677	4,040,993.4098
		410,453.6629	4,041,239.6583
		412,673.7969	4,040,565.9749

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *2006 SDCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T1A-1	0.3883		
		410,110.0532	4,021,493.3823
		410,038.4994	4,021,096.3389
		410,027.5849	4,021,036.2856
		409,998.0302	4,020,801.4793
		409,724.2880	4,020,448.5196
		409,487.6034	4,020,143.3409
		409,409.2894	4,020,065.3131
		409,362.4622	4,020,009.5035
		409,276.4247	4,020,023.1050
		409,280.4484	4,020,086.9084
		409,223.1416	4,020,188.3568
		409,215.0243	4,020,302.8876
		409,166.5836	4,020,986.3494
		409,149.2804	4,021,803.3442
		409,163.9608	4,021,774.2356
		409,179.6823	4,021,745.9744
		409,194.6701	4,021,721.5470
		409,209.7590	4,021,699.6128
		409,225.4173	4,021,678.7661
		409,252.5708	4,021,646.4477
		409,273.6568	4,021,624.1573
		409,294.6311	4,021,604.2271
		409,323.3516	4,021,579.8075
		409,359.8403	4,021,552.6623
		409,394.2697	4,021,530.5798
		409,430.4700	4,021,510.7705
		409,469.1538	4,021,492.9143
		409,509.3814	4,021,477.5621
		409,541.7453	4,021,467.7021
		409,587.0138	4,021,456.9762
		409,628.6050	4,021,450.2633
		409,667.1756	4,021,446.5232
		409,702.2970	4,021,445.4495
		409,734.0450	4,021,446.0422
		409,774.5213	4,021,449.4157
		409,835.6679	4,021,458.1413
		409,886.0723	4,021,465.7122
		409,975.4401	4,021,479.1354
		410,079.1896	4,021,494.7189
		410,110.0532	4,021,493.3823
T1A-2-a	0.3989		
		410,350.3675	4,021,535.4504
		410,110.0532	4,021,493.3823
		410,079.1896	4,021,494.7189
		409,975.4401	4,021,479.1354
		409,886.0723	4,021,465.7122
		409,835.6679	4,021,458.1413
		409,774.5213	4,021,449.4157
		409,734.0450	4,021,446.0422
		409,702.2970	4,021,445.4495
		409,667.1756	4,021,446.5232
		409,628.6050	4,021,450.2633
		409,587.0138	4,021,456.9762
		409,541.7453	4,021,467.7021
		409,509.3814	4,021,477.5621
		409,469.1538	4,021,492.9143
		409,430.4700	4,021,510.7705
		409,394.2697	4,021,530.5798
		409,359.8403	4,021,552.6623
		409,323.3516	4,021,579.8075
		409,294.6311	4,021,604.2271
		409,273.6568	4,021,624.1573
		409,252.5708	4,021,646.4477
		409,225.4173	4,021,678.7661
		409,209.7590	4,021,699.6128
		409,194.6701	4,021,721.5470
		409,179.6823	4,021,745.9744
		409,163.9608	4,021,774.2356
		409,149.2804	4,021,803.3442
		409,108.8160	4,021,989.7821
		409,094.0513	4,022,070.0886
		409,085.6763	4,022,117.5963
		409,078.4606	4,022,146.7713
		409,062.7226	4,022,238.2376
		409,046.0396	4,022,310.3637
		409,031.2722	4,022,390.1936
		409,011.1297	4,022,508.5332
		408,992.2636	4,022,598.4083
		408,976.2034	4,022,678.3443
		408,957.5809	4,022,750.2154
		408,947.0031	4,022,786.7507
		408,929.8478	4,022,830.1862
		408,906.8526	4,022,877.2718
		408,890.4273	4,022,904.6472
T1A-2-a	0.3989		
continued		408,861.2270	4,022,947.3527
		408,845.1668	4,022,972.1730
		408,798.0812	4,023,021.8137
		408,749.6047	4,023,067.1420
		408,752.0708	4,023,250.6832
		409,002.0721	4,023,249.9209
		408,999.6293	4,023,000.2258
		409,150.1396	4,022,999.8884
		409,181.4260	4,022,901.4813
		409,270.0247	4,022,737.5736
		409,349.7637	4,022,609.1054
		409,451.6522	4,022,400.8982
		409,531.3911	4,022,276.8600
		409,606.7001	4,022,157.2515
		409,744.0282	4,022,064.2229
		409,885.7863	4,021,975.6241
		410,071.8438	4,021,860.4457
		410,280.0509	4,021,798.4264
		410,421.8090	4,021,749.6971
		410,528.1277	4,021,656.6684
		410,566.9152	4,021,570.1680
		410,350.3675	4,021,535.4504
T1A-2-b	0.6929		
		410,472.0427	4,023,123.1702
		410,987.9078	4,022,252.4215
		411,151.2016	4,022,147.9844
		411,069.6619	4,022,043.1456
		410,794.5608	4,021,690.3325
		410,772.2220	4,021,661.6656
		410,723.1430	4,021,595.2150
		410,566.9152	4,021,570.1680
		410,528.1277	4,021,656.6684
		410,421.8090	4,021,749.6971
		410,280.0509	4,021,798.4264
		410,071.8438	4,021,860.4457
		409,885.7863	4,021,975.6241
		409,744.0282	4,022,064.2229
		409,606.7001	4,022,157.2515
		409,531.3911	4,022,276.8600
		409,451.6522	4,022,400.8982
		409,349.7637	4,022,609.1054
		409,270.0247	4,022,737.5736
		409,181.4260	4,022,901.4813
		409,150.1396	4,022,999.8884
		410,005.2363	4,022,997.9711
		410,002.3580	4,023,206.9595
		410,001.3479	4,023,280.2990
		410,254.3830	4,023,245.9717
		410,472.0427	4,023,123.1702
T1A-3	0.7850		
		411,737.3086	4,023,824.9915
		411,856.6603	4,023,492.7197
		411,867.2652	4,023,463.2354
		411,784.7187	4,023,306.3704
		411,733.8386	4,023,231.0923
		411,581.3611	4,023,006.5993
		411,460.7988	4,022,950.7106
		411,432.4438	4,022,937.5450
		411,126.7256	4,022,795.5958
		411,073.0277	4,022,641.9086
		410,994.3205	4,022,416.6426
		410,987.9078	4,022,252.4215
		410,472.0427	4,023,123.1702
		410,717.9845	4,023,206.8909
		410,862.0901	4,023,378.8217
		410,821.5600	4,023,731.0035
		410,665.4241	4,023,862.7932
		410,559.0790	4,023,934.9698
		410,401.5722	4,024,041.8691
		410,411.4127	4,024,308.5175
		410,520.5786	4,024,349.2917
		411,162.2767	4,024,681.8151
		411,124.9240	4,024,778.6121
		411,222.3255	4,024,873.8035
		411,392.3945	4,024,792.1429
		411,607.7455	4,024,539.2489
		411,694.2835	4,024,061.5800
		411,737.3086	4,023,824.9915

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *2006 SDCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T1A-4	0.9618		
		414,433.1201	4,026,063.8621
		414,383.8825	4,025,998.0971
		414,275.2628	4,025,680.9863
		414,253.5442	4,025,523.3931
		414,249.7773	4,025,496.0299
		414,260.7145	4,025,375.7116
		414,265.6270	4,025,321.6698
		414,234.5783	4,025,278.7465
		414,210.4545	4,025,245.9289
		413,520.9060	4,024,987.7652
		413,307.2567	4,025,145.6105
		413,068.1384	4,024,822.1295
		413,005.9543	4,024,737.9616
		412,829.1735	4,024,498.6832
		412,716.3209	4,024,345.9798
		412,590.0541	4,024,175.1253
		412,393.1732	4,023,908.6402
		412,351.0895	4,023,851.6783
		412,316.2796	4,023,804.5494
		412,114.1288	4,023,531.1972
		411,987.3569	4,023,709.3450
		411,915.0878	4,023,883.7727
		411,828.1298	4,024,594.2291
		411,987.9741	4,025,141.2709
		412,161.8337	4,025,254.5966
		412,387.4889	4,025,234.3186
		412,577.2692	4,025,175.8075
		412,752.8915	4,025,413.6926
		412,942.5931	4,025,667.2112
		413,140.6925	4,025,804.2789
		413,273.7478	4,025,896.3417
		413,298.0623	4,025,913.1653
		413,700.6748	4,025,878.0963
		413,843.4527	4,025,859.0182
		413,892.4598	4,025,869.0491
		414,103.3906	4,026,021.7264
		414,280.6829	4,026,176.7292
		414,433.1201	4,026,063.8621
T2-1 Add	0.2916		
		410,025.1591	4,019,002.0354
		409,535.8384	4,018,994.6572
		409,534.8572	4,019,112.7819
		409,493.9270	4,019,250.0862
		409,428.6436	4,019,253.2063
		409,374.7338	4,019,259.9508
		409,302.2554	4,019,299.7624
		409,272.1768	4,019,316.2843
		409,240.1576	4,019,333.8721
		409,207.4586	4,019,355.6851
		409,208.2558	4,019,473.1115
		409,435.8230	4,019,902.2959
		409,445.4661	4,019,983.4003
		409,576.6128	4,020,126.1299
		409,630.4774	4,020,144.7287
		409,689.8168	4,020,165.2179
		410,021.5195	4,020,289.5251
		410,025.1591	4,019,002.0354
T5-1 Add	0.0310		
		414,429.2165	4,020,500.8382
		414,464.0586	4,020,432.0182
		414,293.7162	4,020,338.7319
		414,135.9213	4,020,279.6763
		414,001.2533	4,020,257.4915
		414,001.4695	4,020,502.4758
		414,232.1268	4,020,501.5982
		414,429.2165	4,020,500.8382
T5-3 Add	0.1225		
		415,656.1628	4,022,910.0892
		415,704.1714	4,022,874.5914
		415,815.3044	4,022,792.4623
		415,748.1977	4,022,764.6488
		415,699.5372	4,022,723.3612
		415,670.0461	4,022,679.1244
		415,672.9952	4,022,639.3114
		415,650.8768	4,022,577.3799
		415,643.2259	4,022,531.0919
		415,621.3856	4,022,398.9584
		415,574.1998	4,022,322.2813
		415,529.9630	4,022,266.2481
		415,496.0482	4,022,202.8421
		415,434.1167	4,022,145.3343
		415,404.6256	4,022,093.7248

Area / ID *2006 SDCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T5-3 Add *continued*	0.1225		
		415,361.8634	4,022,096.6739
		415,302.8811	4,022,046.5389
		415,242.8901	4,022,005.1797
		414,989.6965	4,022,007.9919
		415,146.6854	4,022,220.5223
		415,178.1077	4,022,263.0525
		415,148.1754	4,022,285.3898
		415,106.6479	4,022,323.0048
		415,127.4250	4,022,351.2549
		415,192.7623	4,022,439.6891
		415,380.8866	4,022,694.3156
		415,520.5385	4,022,883.3346
		415,580.7123	4,022,964.7690
		415,622.4090	4,022,934.9994
		415,656.1628	4,022,910.0892
T10-1	0.6993		
		417,483.0867	4,026,061.2172
		417,363.5983	4,025,899.4766
		417,848.8505	4,025,540.9244
		417,965.0399	4,025,698.1844
		418,087.8706	4,025,864.4329
		418,250.0503	4,025,745.2361
		417,981.0900	4,025,483.1796
		417,862.3542	4,025,432.8305
		417,742.6529	4,025,357.7897
		417,731.0963	4,025,299.8718
		417,711.4790	4,025,042.9035
		417,596.8590	4,024,857.0344
		417,427.9719	4,024,735.2047
		417,308.1869	4,024,673.9089
		417,192.2023	4,024,288.3952
		417,038.6920	4,023,907.3688
		416,987.0241	4,023,427.0505
		416,791.8080	4,023,571.3270
		416,724.9459	4,023,638.9524
		416,700.3078	4,023,672.4212
		416,681.7283	4,023,739.4429
		416,644.2056	4,023,924.8115
		416,740.4644	4,024,114.1911
		416,773.5777	4,024,179.3379
		417,009.4547	4,024,643.4367
		417,001.1420	4,024,947.4364
		416,999.8010	4,024,996.4655
		416,423.1407	4,025,002.1395
		416,222.2418	4,025,004.5422
		416,940.2572	4,025,981.7598
		417,170.2116	4,026,293.6483
		417,366.8592	4,026,147.0905
		417,483.0867	4,026,061.2172
T10-2-a	0.4419		
		416,940.2572	4,025,981.7598
		416,222.2418	4,025,004.5422
		415,795.7936	4,024,428.4142
		415,752.1670	4,024,382.2273
		415,721.8772	4,024,363.7439
		415,402.7156	4,024,597.6328
		415,225.2485	4,024,728.7512
		415,320.9627	4,024,860.0799
		415,528.3940	4,025,157.8442
		415,715.7513	4,025,348.5469
		415,976.7131	4,025,619.5459
		416,180.7986	4,025,810.2488
		416,257.7489	4,025,873.8164
		416,344.7363	4,025,907.2731
		416,408.3038	4,025,957.4580
		416,428.3779	4,026,037.7539
		416,428.3778	4,026,108.0129
		416,530.2813	4,026,263.8174
		416,536.3813	4,026,273.1182
		416,940.2572	4,025,981.7598
T10-2-b	0.6442		
		416,536.3813	4,026,273.1182
		416,530.2813	4,026,263.8174
		416,428.3778	4,026,108.0129
		416,428.3779	4,026,037.7539
		416,408.3038	4,025,957.4580
		416,344.7363	4,025,907.2731
		416,257.7489	4,025,873.8164
		416,180.7986	4,025,810.2488
		415,976.7131	4,025,619.5459
		415,715.7513	4,025,348.5469
		415,528.3940	4,025,157.8442

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
2006 SDCA	(miles²)	X-coordinates	Y_coordinates
T10-2-b	0.6442		
continued		415,320.9627	4,024,860.0799
		415,225.2485	4,024,728.7512
		415,079.1212	4,024,836.7146
		414,987.6679	4,024,904.2813
		414,755.6684	4,025,075.7084
		414,828.4698	4,025,174.2710
		414,875.1490	4,025,237.4744
		414,714.1101	4,025,356.9862
		414,832.3590	4,025,517.9893
		415,640.1630	4,026,578.7438
		415,677.0319	4,026,634.4934
		415,790.4216	4,026,811.2579
		416,536.3813	4,026,273.1182
T10-3	0.4386		
		415,640.1630	4,026,578.7438
		414,832.3590	4,025,517.9893
		414,573.9046	4,025,710.0958
		414,509.4040	4,025,757.7501
		414,592.2070	4,025,869.8256
		414,628.9092	4,025,919.5013
		414,510.4174	4,026,006.8686
		414,433.1201	4,026,063.8621
		414,280.6829	4,026,176.7292
		414,294.0026	4,026,188.3743
		414,474.4641	4,026,371.4413
		414,574.5451	4,026,473.5791
		414,628.2736	4,026,552.7589
		414,946.8125	4,027,212.2390
		415,156.5509	4,027,188.1773
		415,233.1529	4,027,179.3891
		415,303.7796	4,027,171.2685
		415,340.0472	4,027,066.8674
		415,340.1072	4,027,066.6946
		415,466.7219	4,026,708.6624
		415,640.1630	4,026,578.7438
T12	0.3428		
		417,123.5860	4,027,916.7887
		417,084.6434	4,027,863.9835
		417,168.0579	4,027,307.0306
		417,084.2094	4,026,850.3179
		417,122.8974	4,026,577.3922
		416,674.9793	4,026,748.4247
		416,425.8276	4,026,988.5600
		416,307.8668	4,027,358.6501
		416,380.4537	4,027,677.3045
		416,356.7395	4,027,801.5013
		416,412.4399	4,027,812.1367
		416,445.8246	4,027,952.8636
		417,123.5860	4,027,916.7887
T13-1-a	0.0153		
		419,887.7273	4,027,284.9795
		419,726.2673	4,027,404.5246
		419,815.0913	4,027,525.2967
		419,964.9561	4,027,727.9417
		419,949.6216	4,027,659.1454
		419,887.7273	4,027,284.9795
T13-1-b	0.0155		
		419,810.2777	4,026,841.6888
		419,648.9217	4,026,961.5818
		419,887.7273	4,027,284.9795
		419,880.3754	4,027,234.3218
		419,832.8927	4,026,984.5658
		419,810.2777	4,026,841.6888
T13-1-c	0.0784		
		418,812.4327	4,025,829.9087
		418,944.5404	4,026,008.5914
		419,051.1767	4,026,152.9153
		419,206.2888	4,026,038.3123
		419,499.4993	4,026,420.9158
		419,525.0923	4,026,455.4515
		419,748.5558	4,026,757.6663
		419,810.2777	4,026,841.6888
		419,499.9094	4,025,999.3318
		419,182.9598	4,025,925.2840
		418,812.4327	4,025,829.9087

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
2006 SDCA	(miles²)	X-coordinates	Y_coordinates
T13-1-d	0.0078		
		418,812.4327	4,025,829.9087
		418,720.4393	4,025,816.9724
		418,530.6017	4,025,787.6073
		418,650.4050	4,025,948.9162
		418,812.4327	4,025,829.9087
T13-1-e	0.0076		
		418,530.6017	4,025,787.6073
		418,422.7811	4,025,775.2222
		418,250.0503	4,025,745.2361
		418,369.1355	4,025,906.6762
		418,530.6017	4,025,787.6073
T16	1.9875		
		417,581.9086	4,030,267.7438
		417,521.5049	4,029,776.4691
		417,653.3789	4,029,674.6593
		417,699.9538	4,029,667.9768
		417,771.7107	4,029,657.7122
		417,852.8347	4,029,647.5471
		418,130.4116	4,029,646.0180
		418,383.2186	4,029,647.0736
		419,084.5984	4,029,747.7702
		419,093.6209	4,029,564.0366
		418,540.1609	4,029,396.3602
		418,492.0331	4,029,381.7793
		417,887.8942	4,029,186.5402
		418,000.2288	4,028,968.8521
		417,985.8356	4,028,530.6268
		417,876.9859	4,028,548.4822
		417,827.9025	4,028,557.0432
		417,545.6899	4,028,513.6273
		417,149.3087	4,027,977.2199
		417,123.5860	4,027,916.7887
		416,445.8246	4,027,952.8636
		416,412.4399	4,027,812.1367
		416,356.7395	4,027,801.5013
		416,380.4537	4,027,677.3045
		416,307.8668	4,027,358.6501
		416,425.8276	4,026,988.5600
		416,674.9793	4,026,748.4247
		417,122.8974	4,026,577.3922
		417,289.1233	4,026,454.5769
		417,170.2116	4,026,293.6483
		416,940.2572	4,025,981.7598
		416,536.3813	4,026,273.1182
		415,790.4216	4,026,811.2579
		415,850.0994	4,026,904.2900
		415,892.7261	4,026,970.7408
		416,016.5518	4,027,163.7735
		415,955.5124	4,027,208.8937
		415,829.9319	4,027,301.7159
		415,821.2552	4,027,472.5544
		415,819.5445	4,027,506.2313
		415,815.0825	4,027,594.0878
		415,812.0017	4,027,654.7769
		415,987.3754	4,028,348.7866
		415,969.6875	4,028,562.7110
		415,530.3795	4,028,446.4469
		415,660.2354	4,028,955.4660
		416,062.8635	4,029,458.0553
		416,338.7305	4,029,650.8434
		416,414.3687	4,029,700.9180
		416,477.5638	4,029,742.9928
		416,497.9138	4,029,756.5417
		416,520.7968	4,029,773.4766
		416,520.8264	4,029,773.4985
		416,501.9688	4,029,786.2637
		416,489.6563	4,029,794.9004
		416,430.1250	4,029,834.6543
		416,415.3750	4,029,843.4570
		416,400.7188	4,029,849.4766
		416,387.3125	4,029,856.1563
		416,372.5938	4,029,860.3105
		416,368.5313	4,029,870.0703
		416,375.7813	4,029,880.6270
		416,384.4688	4,029,895.7617
		416,385.5313	4,029,910.9023
		416,395.3125	4,029,918.6621
		416,406.0625	4,029,922.9727
		416,419.9063	4,029,929.8086
		416,435.1563	4,029,936.6543
		416,449.2500	4,029,947.3340

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *2006 SDCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T16	1.9875		
continued		416,459.1250	4,029,961.2246
		416,462.9688	4,029,976.8418
		416,471.5625	4,029,988.3965
		416,481.0000	4,029,994.3359
		416,483.2500	4,030,000.4590
		416,476.4688	4,030,004.0684
		416,464.6250	4,030,013.5332
		416,452.1250	4,030,020.7266
		416,447.3125	4,030,031.0762
		416,454.8750	4,030,042.8809
		416,467.7500	4,030,052.9766
		416,466.0625	4,030,067.6035
		416,454.5313	4,030,077.5586
		416,440.6250	4,030,076.0938
		416,437.6250	4,030,084.6914
		416,445.8125	4,030,098.3496
		416,459.0313	4,030,110.6875
		416,465.9063	4,030,126.0488
		416,467.1563	4,030,142.7871
		416,461.5313	4,030,157.1523
		416,450.1563	4,030,168.0938
		416,439.0938	4,030,177.2402
		416,443.8750	4,030,188.7227
		416,458.4375	4,030,192.3809
		416,470.3125	4,030,190.8789
		416,479.0313	4,030,177.9727
		416,493.8125	4,030,171.2637
		416,510.6250	4,030,166.2656
		416,527.2188	4,030,165.8828
		416,541.7813	4,030,161.9238
		416,568.0625	4,030,143.3945
		416,585.0000	4,030,137.3281
		416,601.6250	4,030,130.7734
		416,608.7188	4,030,112.7188
		416,614.8750	4,030,093.7324
		416,614.1563	4,030,081.1367
		416,606.9688	4,030,057.0176
		416,610.2813	4,030,041.6328
		416,621.0313	4,030,029.7910
		416,626.8438	4,030,016.4492
		416,634.6563	4,030,003.4863
		416,639.6563	4,029,988.0273
		416,642.2500	4,029,973.2676
		416,656.7188	4,029,972.4727
		416,688.3750	4,029,977.5293
		416,704.9375	4,029,976.5762
		416,715.9688	4,029,964.5742
		416,723.1250	4,029,949.7949
		416,734.4688	4,029,937.7109
		416,747.7188	4,029,929.2070
		416,759.0313	4,029,916.4004
		416,768.4688	4,029,902.2207
		416,781.8125	4,029,898.3633
		416,790.3750	4,029,900.3945
		416,827.0938	4,029,907.2129
		416,838.2500	4,029,915.7813
		416,845.7500	4,029,917.9492
		416,852.5938	4,029,916.0938
		416,867.9688	4,029,916.1543
		416,880.3438	4,029,917.7637
		416,895.6875	4,029,914.7402
		416,933.2774	4,029,903.9416
		416,933.3437	4,029,903.9482
		416,960.6093	4,029,911.0537
		417,119.3092	4,029,946.7131
		417,187.5882	4,029,971.9062
		417,307.5528	4,030,061.9091
		417,404.8087	4,030,134.8752
		417,581.9086	4,030,267.7438
T17	1.7604		
		421,549.0082	4,029,833.7401
		421,523.2951	4,029,607.1388
		421,241.1573	4,029,607.9067
		421,115.9541	4,029,457.7723
		420,796.0648	4,029,098.4398
		420,776.0445	4,029,075.9509
		420,233.8289	4,028,421.8006
		420,070.9764	4,028,193.2976
		419,973.2496	4,027,978.3517
		419,964.9561	4,027,727.9417
		419,853.4559	4,027,810.6655
		419,803.4484	4,027,847.6038

Area / ID *2006 SDCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T17	1.7604		
continued		419,922.7917	4,028,009.4868
		419,437.6778	4,028,367.7751
		419,318.0047	4,028,206.2594
		418,994.5143	4,028,445.2593
		418,940.0949	4,028,435.3170
		418,725.6089	4,028,396.0970
		418,756.9252	4,028,433.4718
		419,406.8125	4,029,323.4179
		419,775.3475	4,029,819.8899
		419,798.7906	4,029,851.3951
		419,822.9960	4,029,884.0794
		420,257.4813	4,030,470.7618
		420,270.2682	4,030,504.5926
		420,395.6316	4,030,679.8608
		420,485.2029	4,030,805.0886
		420,995.8461	4,031,495.0314
		421,054.3411	4,031,574.3940
		421,209.7312	4,031,769.2300
		421,298.8678	4,031,663.9944
		421,331.5889	4,031,625.3209
		421,366.6346	4,031,583.9002
		421,439.1082	4,031,498.2427
		421,548.5165	4,031,333.2213
		421,631.0272	4,031,208.7695
		421,622.9727	4,031,054.6596
		421,571.8926	4,030,077.3204
		421,549.0082	4,029,833.7401
T18-0	0.5290		
		421,209.7312	4,031,769.2300
		421,054.3411	4,031,574.3940
		420,995.8461	4,031,495.0314
		420,485.2029	4,030,805.0886
		420,395.6316	4,030,679.8608
		420,270.2682	4,030,504.5926
		420,100.9126	4,030,629.4127
		419,953.0593	4,030,737.6865
		420,067.1527	4,030,907.7868
		420,051.6551	4,031,073.7611
		420,102.1497	4,031,215.3678
		420,132.5084	4,031,300.4919
		420,174.1314	4,031,339.0630
		420,460.8875	4,031,607.1656
		420,448.8685	4,032,104.3398
		420,425.7541	4,032,122.7085
		420,133.8016	4,032,354.8284
		419,976.1285	4,032,480.3898
		420,091.3942	4,032,635.9359
		420,399.6558	4,032,679.1114
		420,847.2185	4,032,406.3000
		421,363.7119	4,031,994.1301
		421,209.7312	4,031,769.2300
T18N Add	0.0333		
		420,004.5740	4,034,139.6849
		420,012.6570	4,033,690.4716
		419,802.4606	4,033,687.7767
		419,832.6228	4,034,141.1372
		420,004.5740	4,034,139.6849
T21	0.4944		
		422,698.7244	4,033,173.2549
		422,688.1222	4,032,830.0374
		422,701.7643	4,032,367.5270
		422,592.2681	4,031,994.7888
		422,299.6378	4,031,762.4906
		422,105.2825	4,031,749.0183
		421,855.0233	4,031,871.3901
		421,952.1081	4,032,442.4394
		421,827.2288	4,032,498.3566
		421,672.6950	4,032,568.0642
		421,615.4529	4,032,859.4383
		421,680.5833	4,033,146.5036
		421,959.4881	4,033,044.5656
		422,031.2822	4,033,112.9606
		422,103.3088	4,033,191.3140
		422,274.9333	4,033,248.8166
		422,331.3994	4,033,437.2447
		422,451.8434	4,033,492.2605
		422,530.2048	4,033,470.0379
		422,579.0949	4,033,430.6750
		422,659.7524	4,033,313.9588
		422,698.7244	4,033,173.2549

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *2006 SDCA*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T23-5 & T25-3	0.5717		
		418,192.9713	4,036,174.1094
		418,665.8457	4,034,527.9245
		419,064.9605	4,034,610.8361
		419,188.9454	4,034,400.9790
		419,223.1494	4,034,342.8214
		419,141.4448	4,034,271.8118
		419,084.1419	4,033,110.8123
		418,754.0253	4,033,026.4824
		418,552.8969	4,033,287.6994
		418,483.9471	4,033,621.1100
		418,689.0409	4,034,066.4152
		418,529.1039	4,034,424.5053
		418,434.8263	4,034,452.0750
		418,325.1939	4,034,653.5406
		418,224.8453	4,034,845.3287
		418,067.8080	4,035,047.7803
		417,953.2284	4,035,467.5065
		417,980.4697	4,035,865.3136
		418,027.8561	4,036,319.6127
		417,976.7952	4,036,709.7435
		417,940.1967	4,036,989.3746
		417,924.4340	4,037,108.4563
		417,974.8683	4,036,933.5367
		418,192.9713	4,036,174.1094
T32	0.1755		
		416,020.8582	4,042,568.1991
		416,015.9120	4,042,330.2460
		415,869.3630	4,042,338.0433
		415,692.3612	4,042,371.6124
		415,316.6838	4,043,015.0880
		415,532.3824	4,043,014.2631
		415,863.2633	4,043,403.6167
		416,009.4278	4,043,312.8570
		416,019.1461	4,042,804.9417
		416,021.7492	4,042,611.0661
		416,020.8582	4,042,568.1991
T36-3 Add	0.0325		
		414,550.5526	4,039,224.6348
		414,548.2365	4,039,274.9161
		414,537.5701	4,039,498.0063
		414,528.0492	4,039,697.5872
		414,532.4404	4,039,758.0190
		414,583.4212	4,039,699.2761
		414,643.2559	4,039,605.6218
		414,700.4892	4,039,498.9600
		414,718.6997	4,039,441.7268
		414,729.1056	4,039,314.2529
		414,747.2438	4,039,109.5495
		414,550.5526	4,039,224.6348
T37-1	0.2146		
		408,316.4774	4,042,459.9838
		408,346.9908	4,042,440.3199
		408,348.9029	4,041,492.4725
		408,085.5117	4,041,493.3164
		407,718.8959	4,042,027.7602
		407,731.4988	4,042,299.4041
		407,804.9242	4,042,524.2075
		407,873.2855	4,042,654.1035
		408,032.2792	4,042,647.7062
		408,067.3807	4,042,558.3666
		408,078.1553	4,042,530.9437
		408,089.5014	4,042,502.0659
		408,267.7178	4,042,491.4062
		408,316.4774	4,042,459.9838
T37-2	0.5903		
		409,254.9333	4,038,259.1717
		409,308.0584	4,038,163.0196
		409,312.7645	4,038,061.7760
		409,335.6731	4,038,017.0272
		409,334.4056	4,037,792.2852
		409,260.6274	4,037,628.4629
		409,184.9769	4,037,508.1215
		409,044.0149	4,037,256.8354
		408,869.9095	4,037,236.6162
		408,755.7934	4,037,260.8691
		408,768.3315	4,037,143.0313
		408,784.9129	4,037,079.6832
		408,787.0526	4,036,961.8229
		408,789.6756	4,036,817.3542
		408,751.3271	4,036,667.7207
		408,706.6520	4,036,616.2502
T37-2 *continued*	0.5903		
		408,694.4951	4,035,836.9988
		408,417.2066	4,035,957.7318
		408,370.5660	4,036,191.9354
		408,249.5600	4,036,258.3226
		408,231.7489	4,036,571.0454
		408,075.5676	4,036,791.1801
		408,254.3940	4,037,157.2867
		408,249.8202	4,037,387.3633
		408,606.5674	4,037,448.5389
		408,414.0682	4,037,664.3519
		408,348.7912	4,037,888.7233
		408,415.8298	4,038,042.2505
		408,493.9799	4,038,156.1081
		408,687.9040	4,038,284.6646
		408,762.6862	4,038,303.7721
		408,853.1404	4,038,290.2585
		408,911.3347	4,038,246.1919
		409,028.9283	4,038,251.5605
		409,126.1477	4,038,258.7530
		409,134.0177	4,038,309.6731
		409,144.5362	4,038,382.5555
		409,201.1026	4,038,424.0681
		409,267.1731	4,038,414.5390
		409,299.1846	4,038,391.3782
		409,304.7188	4,038,329.9625
		409,254.9333	4,038,259.1717

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
Other Control Areas	(miles²)	X-coordinates	Y_coordinates
C1	0.2075		
		412,114.1288	4,023,531.1972
		411,898.3534	4,023,239.0517
		411,853.5786	4,023,178.4492
		411,780.3515	4,023,076.2456
		411,702.1375	4,022,877.2132
		411,645.2720	4,022,735.1098
		411,641.2736	4,022,435.1011
		411,421.1708	4,022,347.8283
		411,290.0657	4,022,321.4651
		411,151.2016	4,022,147.9844
		410,987.9078	4,022,252.4215
		410,994.3205	4,022,416.6426
		411,073.0277	4,022,641.9086
		411,126.7256	4,022,795.5958
		411,432.4438	4,022,937.5450
		411,460.7988	4,022,950.7106
		411,581.3611	4,023,006.5993
		411,733.8386	4,023,231.0923
		411,784.7187	4,023,306.3704
		411,867.2652	4,023,463.2354
		411,856.6603	4,023,492.7197
		411,737.3086	4,023,824.9915
		411,915.0878	4,023,883.7727
		411,987.3569	4,023,709.3450
		412,114.1288	4,023,531.1972
C2	0.2972		
		410,021.5195	4,020,289.5251
		409,689.8168	4,020,165.2179
		409,630.4774	4,020,144.7287
		409,576.6128	4,020,126.1299
		409,445.4661	4,019,983.4003
		409,435.8230	4,019,902.2959
		409,208.2558	4,019,473.1115
		409,164.6560	4,019,560.5346
		409,119.1730	4,019,653.6761
		409,076.9241	4,019,775.7268
		409,064.5237	4,019,812.8632
		409,052.3419	4,019,860.5319
		409,109.9316	4,019,969.9738
		409,201.9155	4,020,086.6047
		409,223.1416	4,020,188.3568
		409,280.4484	4,020,086.9084
		409,276.4247	4,020,023.1050
		409,362.4622	4,020,009.5035
		409,409.2894	4,020,065.3131
		409,487.6034	4,020,143.3409
		409,724.2880	4,020,448.5196
		409,998.0302	4,020,801.4793
		410,027.5849	4,021,036.2856
		410,038.4994	4,021,096.3389
		410,110.0532	4,021,493.3823
		410,350.3675	4,021,535.4504
		410,566.9152	4,021,570.1680
		410,723.1430	4,021,595.2150
		410,604.9139	4,021,412.4751
		410,686.3969	4,021,329.2488
		410,592.4067	4,021,145.4323
		410,488.7112	4,020,946.6551
		410,264.9378	4,020,620.1863
		410,015.7153	4,020,454.4270
		410,021.5195	4,020,289.5251
G1	1.9565		
		411,237.3205	4,043,740.6607
		411,207.6845	4,043,753.6791
		411,179.2895	4,043,757.2091
		411,151.6315	4,043,749.0266
		411,123.9014	4,043,730.4160
		411,089.3187	4,043,670.0089
		410,953.8469	4,043,482.2177
		410,935.7348	4,043,461.5191
		410,823.5172	4,043,456.9972
		410,787.0434	4,043,466.5179
		410,727.7247	4,043,492.0010
		410,704.5141	4,043,495.0568
		410,597.5819	4,043,458.1315
		410,565.5024	4,043,436.8383
		410,543.3654	4,043,401.4241
		410,537.6911	4,043,382.7183
		410,536.8726	4,043,348.8422
		410,542.2467	4,043,327.0034
		410,533.5401	4,043,305.6995
		410,526.6307	4,043,242.9925
		410,511.3725	4,043,210.0862

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
Other Control Areas	(miles²)	X-coordinates	Y_coordinates
G1	1.9565		
continued		410,493.9516	4,043,001.1922
		410,268.6279	4,043,005.6231
		410,003.7039	4,043,010.8326
		410,001.6954	4,042,464.1381
		410,000.0033	4,042,003.4174
		410,723.8358	4,042,002.5739
		410,857.4942	4,041,549.4532
		410,825.3880	4,041,524.8233
		410,453.6629	4,041,239.6583
		410,132.6677	4,040,993.4098
		410,754.5323	4,040,429.4164
		410,536.3607	4,040,449.0193
		410,369.0729	4,040,479.2024
		410,233.7633	4,040,544.6348
		410,176.5626	4,040,579.7134
		410,104.1071	4,040,608.5803
		409,907.2818	4,040,745.3987
		409,879.5179	4,040,756.3952
		409,750.2805	4,040,876.4342
		409,701.3330	4,040,895.5954
		409,678.6324	4,040,925.6786
		409,642.8276	4,040,956.5193
		409,600.4556	4,040,974.3942
		409,571.2767	4,041,006.1819
		409,557.0110	4,041,045.3963
		409,545.6251	4,041,061.2854
		409,454.5386	4,041,143.5883
		409,411.7061	4,041,174.3745
		409,399.9933	4,041,192.2740
		409,373.0680	4,041,216.8668
		409,144.3041	4,041,353.2179
		409,121.3431	4,041,357.7851
		409,098.3821	4,041,353.2179
		409,025.7306	4,041,294.5927
		408,819.0912	4,041,213.6030
		408,655.7727	4,041,290.5176
		408,426.6115	4,041,410.1279
		408,344.8643	4,041,438.2143
		408,298.9586	4,041,458.6585
		408,268.2287	4,041,492.7310
		408,348.9029	4,041,492.4725
		408,346.9908	4,042,440.3199
		408,316.4774	4,042,459.9838
		408,343.1912	4,042,464.6985
		408,361.9306	4,042,476.0760
		408,405.7674	4,042,488.7920
		408,428.3087	4,042,504.1697
		408,511.8896	4,042,600.4769
		408,526.1185	4,042,623.0446
		408,574.9830	4,042,654.0923
		408,629.8639	4,042,674.8894
		408,665.3417	4,042,677.9675
		408,696.6588	4,042,672.3560
		408,745.3474	4,042,680.9963
		408,792.4681	4,042,699.5891
		408,825.1265	4,042,720.2498
		408,844.1085	4,042,744.4106
		408,863.2774	4,042,792.0999
		408,856.0866	4,042,860.0523
		408,910.5689	4,042,909.9627
		408,959.3314	4,042,975.2857
		408,994.3653	4,043,008.9637
		409,011.3561	4,043,054.5105
		409,092.7411	4,043,129.5655
		409,146.6404	4,043,168.0094
		409,169.4921	4,043,202.9767
		409,194.5618	4,043,220.2162
		409,208.7762	4,043,242.7534
		409,246.0315	4,043,266.6016
		409,331.5726	4,043,349.9087
		409,344.7418	4,043,368.3637
		409,498.2187	4,043,486.8379
		409,513.1152	4,043,503.3271
		409,564.1080	4,043,531.4515
		409,606.3741	4,043,547.2951
		410,002.9423	4,043,763.4240
		410,192.6181	4,043,839.1058
		410,212.5063	4,043,857.7331
		410,224.8423	4,043,887.6674
		410,263.2830	4,043,926.8198
		410,428.1796	4,043,982.7461
		410,597.2709	4,044,063.9791
		410,780.5637	4,044,127.9989
		410,797.1634	4,044,138.3212
		410,822.1383	4,044,165.6308

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *Other Control Areas*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	 Y_coordinates
G1	1.9565		
continued		410,976.4794	4,044,211.0969
		410,994.0806	4,044,226.5327
		411,004.4350	4,044,247.5293
		411,020.9354	4,044,383.2291
		411,194.2518	4,044,437.7691
		411,250.0279	4,044,449.6939
		411,237.3205	4,043,740.6607
G2	0.0581		
		411,602.8327	4,043,660.0595
		411,456.7364	4,043,657.0894
		411,368.8821	4,043,685.0145
		411,375.0392	4,043,915.7480
		411,516.4385	4,043,938.4040
		411,620.8424	4,044,005.2321
		411,709.8854	4,044,038.2482
		411,758.3361	4,044,037.2052
		411,828.9394	4,044,025.2421
		411,888.9563	4,043,991.2337
		411,896.9565	4,043,946.2341
		411,863.9022	4,043,894.9825
		411,828.8353	4,043,806.6428
		411,788.9031	4,043,686.1008
		411,697.8689	4,043,662.0922
		411,602.8327	4,043,660.0595
S2	0.2790		
		415,283.2813	4,043,000.1953
		415,639.7813	4,042,385.2695
		415,237.3125	4,041,985.5195
		415,075.1250	4,041,273.9336
		414,928.6563	4,041,572.7617
		414,740.2500	4,042,529.6992
		415,283.2813	4,043,000.1953
S3	0.7210		
		421,369.5313	4,031,989.5391
		421,766.0313	4,032,526.5938
		421,778.4375	4,032,522.0762
		421,827.1563	4,032,498.3555
		421,952.1875	4,032,442.4199
		421,854.9688	4,031,871.4102
		422,105.2500	4,031,749.0176
		422,299.6563	4,031,762.5020
		422,592.2188	4,031,994.7988
		422,701.7500	4,032,367.5195
		422,732.5625	4,032,243.8984
		422,746.8125	4,032,159.0254
		422,779.7500	4,032,064.7734
		422,779.7188	4,031,946.8984
		422,793.9063	4,031,814.8984
		422,817.5313	4,031,682.9316
		422,840.9688	4,031,565.0645
		422,869.3125	4,031,447.2109
		422,836.2813	4,031,338.7852
		422,713.7500	4,031,206.8086
		422,529.9375	4,030,985.2422
		422,250.5938	4,030,779.7578
		422,000.0313	4,030,499.9922
		422,006.2813	4,030,500.0156
		421,836.9375	4,030,271.0234
		421,548.9688	4,029,833.7383
		421,571.8750	4,030,077.3184
		421,631.0313	4,031,208.7773
		421,439.0938	4,031,498.2363
		421,216.1563	4,031,761.8594
		421,208.0625	4,031,771.3574
		421,210.0938	4,031,774.1426
		421,369.5313	4,031,989.5391
S4	0.1488		
		417,410.5625	4,023,845.5176
		417,398.8438	4,023,845.8750
		417,387.4375	4,023,846.9883
		417,377.4063	4,023,848.7207
		417,367.8438	4,023,851.0527
		417,358.9375	4,023,853.9434
		417,350.9375	4,023,857.4238
		417,343.0938	4,023,861.6250
		417,335.2813	4,023,866.7793
		417,327.4688	4,023,872.8066
		417,319.6875	4,023,879.7500
		417,310.5938	4,023,888.9688
		417,301.9688	4,023,899.1680
		417,293.6563	4,023,910.1230

Area / ID *Other Control Areas*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	 Y_coordinates
S4	0.1488		
continued		417,286.2813	4,023,921.5137
		417,281.1250	4,023,930.3848
		417,276.9063	4,023,939.6543
		417,273.1563	4,023,949.9414
		417,269.7188	4,023,961.3281
		417,266.5000	4,023,975.5664
		417,263.6563	4,023,992.3125
		417,257.5625	4,024,036.4043
		417,255.7813	4,024,053.0898
		417,254.3438	4,024,071.4844
		417,253.3438	4,024,112.0410
		417,253.6875	4,024,135.3887
		417,256.4688	4,024,211.2207
		417,258.9375	4,024,248.6602
		417,260.8125	4,024,266.7930
		417,266.0625	4,024,299.1426
		417,269.5625	4,024,313.8516
		417,274.6563	4,024,330.5859
		417,281.5938	4,024,349.5684
		417,289.7813	4,024,368.9414
		417,298.0625	4,024,386.4863
		417,306.2813	4,024,401.4785
		417,314.9688	4,024,415.0508
		417,324.0625	4,024,427.2441
		417,333.2500	4,024,437.8730
		417,341.8125	4,024,446.3809
		417,362.2813	4,024,463.6328
		417,374.6875	4,024,472.7871
		417,391.6875	4,024,484.4727
		417,422.5938	4,024,504.8984
		417,438.9375	4,024,515.1504
		417,454.8438	4,024,524.5742
		417,469.5000	4,024,532.6895
		417,483.8125	4,024,540.1250
		417,497.9688	4,024,546.9180
		417,525.0313	4,024,558.3184
		417,537.3125	4,024,562.7500
		417,550.9688	4,024,567.0371
		417,565.6875	4,024,571.1504
		417,595.7188	4,024,578.3379
		417,644.3750	4,024,588.4512
		417,671.1563	4,024,593.2676
		417,699.5625	4,024,597.4395
		417,729.9688	4,024,601.0371
		417,763.4063	4,024,604.2285
		417,801.4375	4,024,607.2109
		417,876.5000	4,024,612.3184
		417,885.9688	4,024,613.4160
		417,906.1875	4,024,617.6074
		417,954.9063	4,024,630.4629
		417,966.3750	4,024,632.8535
		417,976.4688	4,024,634.2813
		417,984.4063	4,024,634.8398
		417,991.7188	4,024,634.7266
		417,998.0938	4,024,633.9082
		418,004.0313	4,024,632.4531
		418,009.1563	4,024,630.2891
		418,013.8125	4,024,627.4102
		418,017.8750	4,024,623.8594
		418,021.4375	4,024,619.5566
		418,027.1563	4,024,609.7598
		418,032.4063	4,024,597.6895
		418,034.6563	4,024,589.4512
		418,035.8750	4,024,580.7773
		418,035.6563	4,024,570.7617
		418,034.0625	4,024,559.9766
		418,031.0625	4,024,548.3418
		418,026.3750	4,024,535.4473
		418,020.4688	4,024,521.3984
		418,000.5313	4,024,478.6465
		417,984.5625	4,024,435.9668
		417,970.9063	4,024,402.7227
		417,957.8125	4,024,373.8125
		417,943.3125	4,024,343.8242
		417,931.2500	4,024,320.3027
		417,918.0938	4,024,295.7734
		417,880.1250	4,024,228.6719
		417,859.5000	4,024,190.0117
		417,854.1250	4,024,181.0176
		417,848.9375	4,024,173.2773
		417,843.6250	4,024,166.4160
		417,838.3125	4,024,160.3535
		417,832.0938	4,024,154.4258
		417,825.1250	4,024,149.1992
		417,816.9688	4,024,144.4160

Exhibit 1 - Coordinates of PM10 Control Areas

Area / ID *Other Control Areas*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
S4	0.1488		
continued		417,807.5625	4,024,140.0762
		417,799.1250	4,024,136.8242
		417,789.4688	4,024,133.5957
		417,744.3750	4,024,120.6641
		417,733.3125	4,024,116.6641
		417,723.6250	4,024,112.4082
		417,716.8438	4,024,108.7773
		417,710.6875	4,024,104.8281
		417,693.1875	4,024,092.0859
		417,683.1250	4,024,084.1797
		417,674.4375	4,024,076.5137
		417,667.2813	4,024,069.1191
		417,661.4688	4,024,061.8086
		417,657.0625	4,024,054.5488
		417,654.5000	4,024,048.2773
		417,652.5000	4,024,040.8516
		417,647.9063	4,024,009.5918
		417,646.3750	4,024,002.8047
		417,644.5938	4,023,996.9746
		417,640.7500	4,023,988.9395
		417,636.0313	4,023,980.8086
		417,630.3750	4,023,972.9629
		417,623.6563	4,023,965.2930
		417,617.2813	4,023,958.7949
		417,609.9688	4,023,952.3184
		417,601.7813	4,023,945.7832
		417,592.6250	4,023,939.0781
		417,575.3438	4,023,927.6641
		417,540.5938	4,023,906.3262
		417,526.8438	4,023,897.4316
		417,515.0938	4,023,889.3320
		417,487.6875	4,023,868.7949
		417,472.0938	4,023,858.9844
		417,463.6563	4,023,854.8926
		417,455.1875	4,023,851.9063
		417,444.7813	4,023,849.1504
		417,433.6250	4,023,847.1348
		417,422.1563	4,023,845.9258
		417,410.5625	4,023,845.5176

Area / ID *Other Control Areas*	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates

Exhibit 2 - TDCA Minimum Dust Control Efficiency map

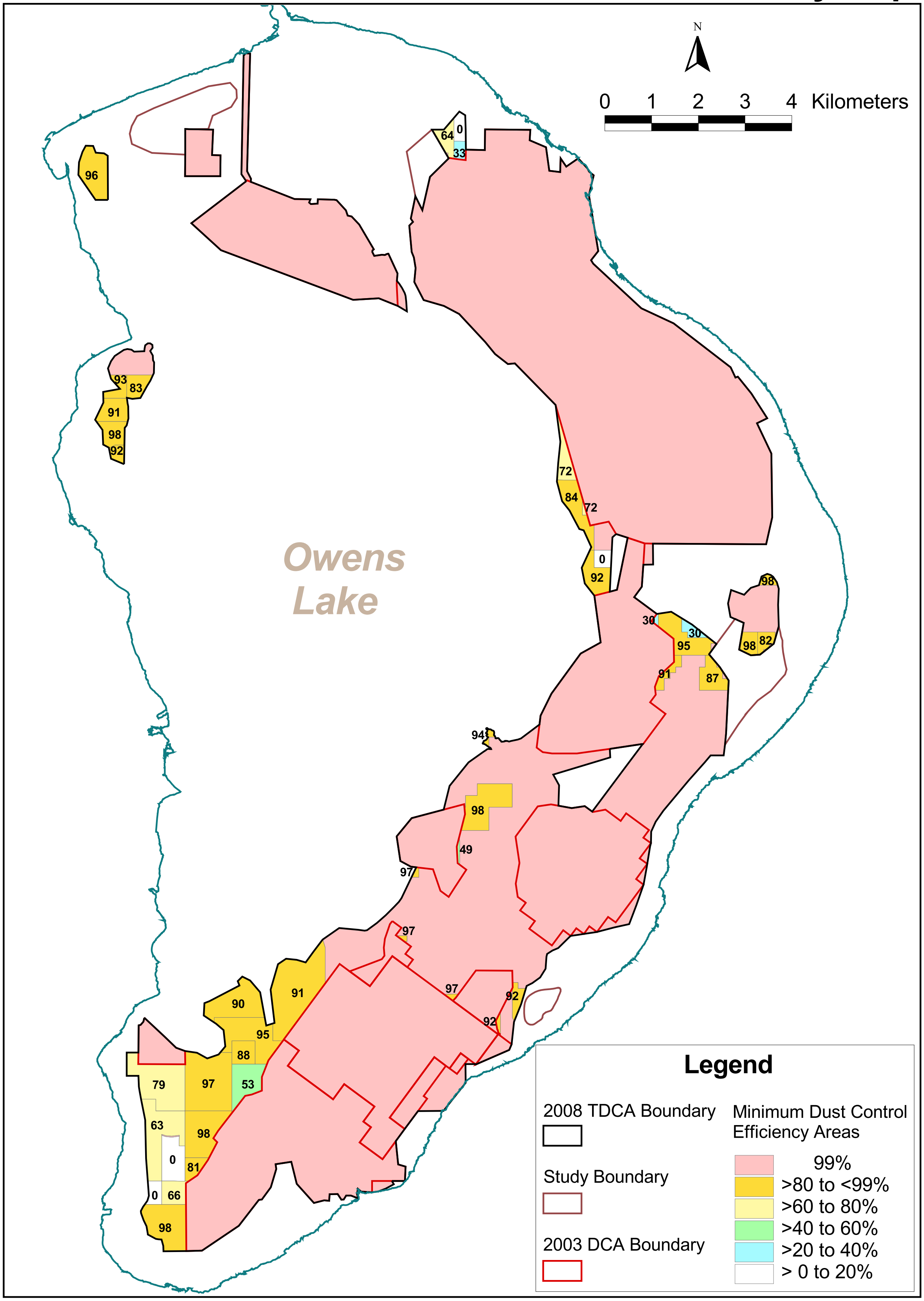
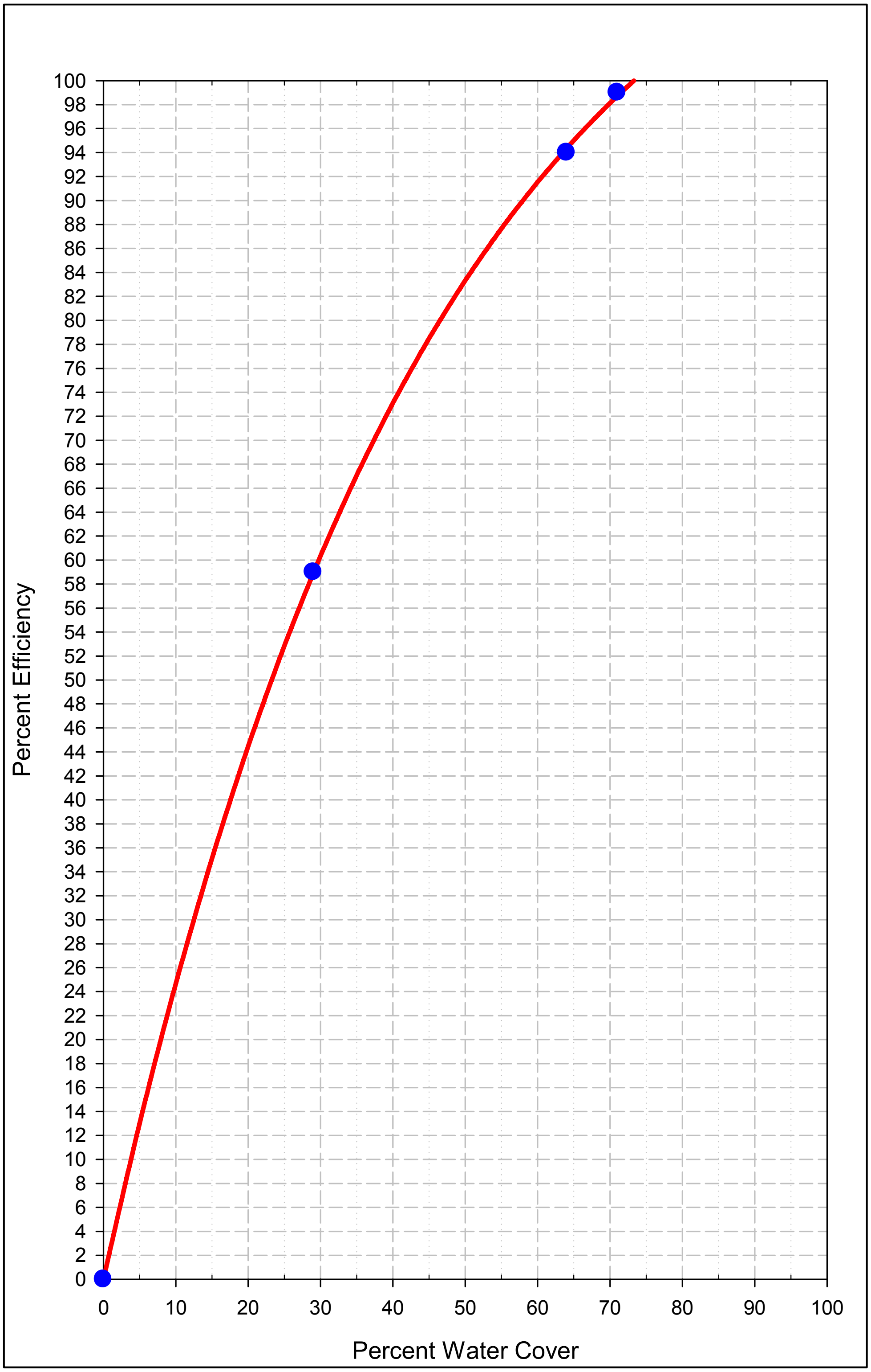


Exhibit 3 - Shallow Flood control efficiency curve



SETTLEMENT AGREEMENT

This Settlement Agreement (Agreement) is entered into between the Great Basin Unified Air Pollution Control District (District) and the City of Los Angeles by and through its Department of Water and Power (collectively "City") (the City and District to be referred to as the "Parties") to resolve the City's challenge to the District's Supplemental Control Requirement (SCR) determination for the Owens Lake bed issued on December 21, 2005, and modified on April 4, 2006.

RECITALS

WHEREAS:

A. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancha.

B. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts.

C. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter (PM_{10}).

D. PM_{10} is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq.*, as amended (CAA).

E. Under the National Ambient Air Quality Standard (NAAQS) adopted pursuant to the CAA, PM_{10} levels may not exceed an average concentration of 150 micrograms per cubic meter ($\mu g/m^3$) during a 24-hour period more than one time per calendar year averaged over three years.

F. The District has regulatory authority over air quality issues in the region where Owens Lake is situated.

G. Under Health and Safety Code Section 42316, enacted by the California Legislature in 1983, the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS for PM_{10}.

H. In 1987, the United States Environmental Protection Agency (EPA) identified the Owens Valley Planning Area (OVPA), which encompasses

Owens Lake, as an area not meeting the NAAQS for PM_{10}. In 1993, the OVPA was reclassified as a serious non-attainment area under the CAA.

I. In 1997, the District adopted the Owens Valley PM_{10} Demonstration of Attainment State Implementation Plan as required by the CAA (1997 SIP). In 1998, the District and the City agreed that the City would construct control measures on 16.5 square miles of the Owens Lake bed by the end of 2003 as part of a SIP revision in 1998.

J. In 2003, through District Board Order 03111-01 (Order), the District required the City to construct dust control measures (DCMs) on an additional 13.3 square miles of the Owens Lake bed by the end of 2006, for a total of 29.8 square miles of dust control measures, as part of a Revised SIP (2003 SIP). The Order and 2003 SIP also established a process whereby the Air Pollution Control Officer of the District (APCO) must evaluate on at least an annual basis the potential need for additional DCMs and "watch areas" at Owens Lake bed in order to attain the NAAQS. The process involves a determination by the APCO and an opportunity for the City to present an alternative analysis.

K. On December 21, 2005, the APCO issued the 2004/2005 SCR determination finding that the City would be required to implement DCMs on an additional 9.31 square miles of Owens Lake bed and identifying 0.66 square miles as "watch area."

L. On January 20, 2006, the City appealed the 2004/2005 SCR determination to the California Air Resources Board (CARB). The District disagreed that the determination was subject to such an appeal.

M. On February 22, 2006, the City submitted an Alternative Analysis contesting aspects of the 2004/2005 SCR determination.

N. On April 4, 2006, the APCO modified the SCR determination issued on December 21, 2005 to reduce the supplemental DCM area to 8.66 square miles and increased the "watch area" to 0.79 square miles (Modified SCR determination).

O. On May 3, 2006, the City filed an appeal of the April 4, 2006 Modified SCR determination with the CARB. The District disagreed that the determination was subject to such an appeal.

P. On May 4, 2006, the City filed a petition for writ of mandate challenging the APCO's April 4, 2006 Modified SCR determination (*City of Los Angeles Department of Water and Power v. Great Basin Unified Air Pollution Control District*, Kern County Superior Court Case No. S-1500-

CV-258678, RJO). The Parties entered into mediation and a temporary stay of the litigation.

AGREEMENT

NOW, THEREFORE, in consideration of the provisions herein contained and to resolve the disputes over methods to address air quality at Owens Lake, including the disputes over the SCR determination issued on December 21, 2005, and modified on April 4, 2006, the City and the District hereby agree as follows:

DUST CONTROL MEASURES (DCMs)

1. The City shall apply DCMs as provided in this Agreement on additional areas of the lake bed beyond the 29.8 square miles required in the 2003 SIP.

   A. The areas on the lake bed on which DCMs will be applied are designated in this Agreement as follows:

      (i) The 12.7 square-mile area of additional DCMs shall be known as the 2006 Supplemental Dust Control Area (SDCA).

      (ii) The 29.8 square miles of DCMs required by the 2003 SIP shall be known as the 2003 Dust Control Area (DCA).

      (iii) The 0.5 square miles of natural drainage channels on the south area of the lake bed shall be known as the Channel Area.

      (iv) The combined 43.0 square miles of DCMs and Channel Area shall be known as the Total Dust Control Area (TDCA).

      (v) The SDCA, DCA, Channel Area and TDCA are delineated on the TDCA Map, attached as Exhibit 1. The SDCA and Channel Area coordinate descriptions are attached as Exhibit 2. The DCA coordinate description is contained in the 2003 SIP.

   B. Minor adjustments may be made to the boundaries of the SDCA upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the TDCA shall also be modified to reflect the modified SDCA boundaries.

   C. The City may, at its sole option, apply DCMs to additional areas outside the TDCA.

   D. The City shall begin full operation of the DCMs within the SDCA as follows:

(i) Moat and row controls shall be operational by October 1, 2009.

(ii) All other controls shall be operational by April 1, 2010.

E. Following the dates set out above in this Section, the City shall continuously operate and maintain the DCMs within the TDCA. The City shall continuously operate and maintain DCMs within the DCA as required under the 2003 SIP, except as otherwise provided in this Agreement.

2. A. The City shall construct within the SDCA a minimum of 9.2 square miles of Shallow Flood dust controls. The Shallow Flood areas are delineated on the Dust Control Measure Map, attached as Exhibit 3.

B. On the remaining 3.5 square miles of the SDCA not specifically designated for Shallow Flood on the DCM Map (Exhibit 3), the City shall

(i) construct Shallow Flood, Managed Vegetation, or gravel cover, as described in the Dust Control Measures Description, attached as Exhibit 4, and which are currently approved as Best Available Control Measures (BACM) under the 2003 SIP; or

(ii) subject to Sections 3, 7 and 8, treat up to 3.5 square miles of the SDCA with the alternative dust control measure known as "Moat and Row," as described in the DCM Description (Exhibit 4).

C. TDCA areas designated as Channel Area represent areas containing natural drainage channels having potentially significant resource issues and regulatory constraints. While these areas are not a part of the SDCA, they shall be addressed as part of the control strategy for the SDCA. However, it is acknowledged that the control strategy in this area may be subject to additional regulatory constraints, design considerations, and impacts caused by adjacent DCMs.

D. The internal control measure boundaries delineated on the DCM Map (Exhibit 3) are approximate and are subject to final written approval by the APCO. The areas designated on the DCM Map (Exhibit 3) for Shallow Flood and Moat and Row may be modified upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld.

3. All DCMs within the SDCA shall be designed, constructed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 5. The initial target MDCEs (Target MDCEs):

A. Are based on the results of air quality modeling, as described in the 2003 SIP, conducted by the City and approved by the APCO for the period July 2002 through June 2006;

B. Assume 100 percent control efficiency in the 29.8 square miles of the DCA required under the 2003 SIP, except during the fall and spring ramping periods as described in Section 26, and achievement of the target MDCEs for the areas in the SDCA. Control efficiencies during the fall and spring ramping periods shall be based on modeling that accounts for reduced wetness cover pursuant to Sections 5 and 26;

C. Have been selected to achieve PM_{10} concentrations that will not exceed the federal 24-hour PM_{10} ambient air quality standard of 150 $\mu g/m^3$ (federal standard) at all historic shoreline (elevation 3600 feet above sea level) receptors.

4. Prior to April 1, 2010, the Target MDCEs may be modified, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, if the modified MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, attached as Exhibit 6, pursuant to Section 3.

5. For the Shallow Flood areas identified in DCM Map (Exhibit 3), the percentage of each area that must be wetted shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 7, or an update of the SFCE Curve mutually agreeable to the Parties, to achieve the control efficiency levels in the MDCE Map (Exhibit 5).

6. The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:

A. From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and

B. After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and

C. The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.

7. As Moat and Row is not a currently approved BACM dust control measure under the 2003 SIP, the City will develop, in consultation with the District, and conduct Moat and Row Demonstration Projects on the lake bed. These Demonstration Projects will be conducted on two or more locations on the lake bed outside of the DCA. The proposed location of these Demonstration Project areas are shown on attached Moat and Row Demonstration Project Map (Exhibit 8). The actual locations of the projects may be changed by the City, and in such event, the City shall notify the APCO in writing of the changed locations. The City will be the California Environmental Quality Act (CEQA) lead agency for implementation of the Moat and Row Demonstration Projects.

8. Based on results of the Moat and Row Demonstration Projects described in Section 7 and subject to Sections 2 and 3, the City in its sole discretion may decide which DCMs to implement in the areas designated for Moat and Row in Section 2 and Exhibit 3 of this Agreement. The City shall consult with the District before making its decision and inform the District of its decision in writing.

A. Depending on the results of the Moat and Row Demonstration Projects, the measures implemented in these areas by the City may include Moat and Row, enhanced Moat and Row (*e.g.*, closer Moat and Row spacing, Moat and Row with some Shallow Flooding, Moat and Row with some vegetation), combined Moat and Row/Shallow Flood, MDCE-BACM, or BACM.

B. If the City implements Moat and Row, it shall design and construct Moat and Row to achieve the Target MDCEs described in Section 3. The Moat and Row configuration required to achieve these Target MDCEs will be decided solely by the City, after consultation with and written notification to the District.

C. In the event of a dispute regarding the City's proposed decision or action pursuant to Section 8.A or 8.B, either Party may initiate the Dispute Resolution Process pursuant to Section 32.

D. Upon written request of the City, the APCO shall determine in writing if Moat and Row and/or Enhanced Moat and Row constitutes BACM or MDCE-BACM, in accordance with the revisions to the 2003 SIP provided in Section 28.

DUST IDENTIFICATION (DUST ID) PROGRAM

9. The Parties mutually recognize that a method for identifying sources of potential exceedances of the federal standard at the historic shoreline could be developed that is superior to and could replace or modify the current Dust ID Program.

A. The Parties will work cooperatively, with the participation of a mutually agreeable independent third party technical expert or experts under contract to the District and jointly managed by the Parties, in a good faith effort to develop, before April 1, 2010, an improved Dust ID Program. The APCO will implement all mutually-agreeable changes to the Dust ID Program and notify the City in writing of those changes.

B. The District will continue to work with the City after April 1, 2010 to further improve the Dust ID Program and will implement all additional mutually agreeable changes in a written decision.

C. In furtherance of efforts to improve the Dust ID Program:

(i) The Parties will promptly begin a mediated process for refining the Dust ID Program and resolving disputes.

(ii) The Parties will select a mutually agreeable expert or panel of independent third-party technical experts.

(iii) The District, after consultation with the City, will increase the number of PM_{10} monitors at or near the historic shoreline. In all cases, the District will notify the City of the location of the monitors within 30 days of placement of the monitors. If a PM_{10} monitor is located above the historic shoreline, the District will make reasonable attempts to account for non-lake bed sources that may affect the monitor.

(iv) The District, after consultation with the City, will modify the existing sand flux monitor network to concentrate on areas of special interest, and will, in all cases, notify the City of the modifications within 30 days of any modification.

(v) The Parties will establish mutually agreeable model performance measures. Such measures may, but are not required to, include a minimum model performance standard.

(vi) The District will make reasonable efforts to account for impacts of DCM construction activities.

10. The City will lead a joint effort with the District to develop methods for directly measuring PM_{10} emission rates from the lake bed. The District will incorporate mutually agreeable methods into the Dust ID Program.

11. A. If the City is in compliance with Sections 1 and 2 of this Agreement, the following shall apply to the time period before April 1, 2010.

(i) The APCO will not issue any further determinations regarding the need for SCRs that provide for additional requirements beyond those in this Agreement. However, the District will continue to use the Dust ID Program, as that program may be modified pursuant to Sections 9 and 10. The District will periodically advise the City of results in writing and may recommend actions to the City based on the model results.

(ii) Data collected before April 1, 2010 will not be used in future determinations requiring SCRs, except in those areas delineated as Study Areas on the Study Area Map attached as Exhibit 9 and described in Exhibit 2. Data collected from the Study Areas between July 1, 2006 and April 1, 2010 may only be used in SCR determinations after April 1, 2010, and may be used only in accordance with the current form of the Dust ID Program that is in effect after April 1, 2010.

(iii) The District will not issue an order requiring the City to implement any additional controls on any lake bed dust source areas in order to achieve the state PM_{10} standard of 50 micrograms per cubic meter unless compelled to issue such an order by state law.

B. The District shall determine compliance with the state PM_{10} standard based on concentrations only in the surrounding communities, unless otherwise compelled by state law.

12. The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

A. The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.

B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

SHALLOW FLOOD BACM REFINEMENT

13. The City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the DCA (Shallow Flood Cover Test).

A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.

B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.

C. The City will be CEQA lead agency for the Shallow Flood Cover Test.

14. If the APCO reasonably determines in writing that DCMs in the TDCA have been operational for one full year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section 14.C, provided that:

A. Application of the 10 percent reduction in wetness cover during the Fall and Spring Shallow Flood DCM Compliance periods set out in Sections 25 and 26 shall result in the lower of:

(i) The areal cover resulting from a 10 percent reduction; or

(ii) The areal cover required in Section 26.A.

B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

(i) the results of testing carried out pursuant to Section 13, if conducted; and

(ii) the results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Section 26.

C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.

D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in Section 18 and subject to the provisions of Section 16.

E. Except as provided in Section 16, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.

15. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section 14, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM_{10} concentrations at the historic shoreline.

16. Any areas for which wetness cover has been reduced pursuant to Section 14 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan requirements pursuant to Sections 18 and 22 below.

A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section 14 provided that:

(i) The maximum 24-hour PM_{10} shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 $\mu g/m^3$; and

(ii) The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time

period set forth in Section 16.A.(i) plus the background of 20 μg/m^3 do not exceed 120 μg/m^3 at the historic shoreline.

B. If the monitored values at the historic shoreline exceed 130 μg/m^3, and it is determined that non-lake bed sources are contributing greater than 20 μg/m^3, then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.

C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:

(i) A map that depicts the eligible Shallow Flood areas;

(ii) The proposed amount of wetness cover for each eligible Shallow Flood area; and

(iii) The method for determining effectiveness of the proposed wetness cover.

D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

ACTIONS TO ADDRESS STANDARD VIOLATIONS

17. After May 1, 2010, the APCO will recommence written SCR determinations under the revisions to the 2003 SIP as provided in Section 28. Recommenced determinations will use Dust ID data collected only after April 1, 2010, except as provided in Section 11.A.(ii) for Study Areas, and shall be made at least once in every calendar year.

18. If, pursuant to Section 17, the APCO determines that a monitored or modeled exceedance of the federal standard caused by emissions from the lake bed has occurred at or above the historic shoreline:

A. The APCO, based on all available information, including visual observation, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.

B. (i) If the APCO identifies the need for additional controls, the APCO shall issue a SCR determination.

(ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an Alternative Analysis. If the City submits an Alternative Analysis, the APCO shall consider the Analysis and may withdraw, modify or confirm the SCR determination.

(iii) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Section 32. The APCO may modify the SCR determination based on the Dispute Resolution process.

(iv) In the event the Parties are unable to resolve disagreements over future SCR determinations through the Dispute Resolution Process, the City may appeal future determinations to CARB under the provisions of Health and Safety Code Section 42316 (Section 42316), provided that the Parties expressly intend that this Agreement be the final resolution regarding the existing disputes between the Parties that are the subject of this Agreement. Based on the foregoing, the City stipulates and agrees that all of the provisions and determinations, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the SCR determination dated April 4, 2006, which the City in good faith disputed, shall be deemed to be valid and reasonable, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceeding, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future SCR determination under Section 42316; however any arguments or challenges must be based on data and information that do not currently exist, but that exist after the execution of this Agreement.

C. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Section 21 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

D. The District may, as appropriate, also issue a notice of violation.

19. In the event:

A. The APCO has made a written determination pursuant to Section 18 that an exceedance of the federal standard, occurring after April 1, 2010,

resulted from a Control Area or portion of a Control Area treated with Moat and Row; and

B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Section 21 below; and

C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (*i.e.*, an exceedance occurred after the City attempted to remediate that area under Section 21);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat and Row to MDCE-BACM or BACM, to address the exceedance described in Section 19.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Section 24.

20. If the APCO determines that Moat and Row constitutes BACM or MDCE-BACM, then upon issuance of such written determination, the provisions of Section 19 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Section 20.

21. A Remedial Action Plan prepared by the City pursuant to Section 18 will contain a description of:

A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:

(i) Maintenance of facilities (*e.g.*, berms, moats and rows);

(ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);

(iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, addition of sand fences, surface wetting, armoring, vegetation, surface roughening) of Moat and Row areas;

(iv) Transition of Moat and Row areas to BACM, or MDCE-BACM.

B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.

C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

22. The Schedule of Contingency Measures attached to this Agreement as Exhibit 10 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Section 21, and the timing required for their implementation.

23. Before any full-scale Moat and Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat and Row area consistent with Section 19. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat and Row to another DCM is needed, or where such transition is required pursuant to Section 19.

24. Areas to be transitioned from Moat and Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat and Row Transition Schedule attached as Exhibit 11. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule attached as Exhibit 12.

<u>FALL AND SPRING SHALLOW FLOOD DCM COMPLIANCE</u>

25. For the time period from October 16 of each year through May 15 of the next year, the Shallow Flood Control Areas shall be considered to be in compliance with this Agreement and applicable laws and regulations, if the areal wetness cover within each Shallow Flood Control Area in the TDCA meets the MDCE required in Exhibit 6 using the SFCE Curve in Exhibit 7.

26. The provisions set forth in this section shall apply to all Shallow Flood areas with target control efficiencies of 99 percent or more, except those which the City and the District may mutually agree to exclude.

A. Beginning on April 1, 2010, compliance of TDCA Control Areas with 99 percent control efficiency Shallow Flood requirements shall be as follows:

(i) Beginning May 16 and through May 31 of every year, Shallow Flood may be reduced to a minimum of 70 percent areal wetness cover.

(ii) Beginning June 1 and through June 15 of every year, Shallow Flood may be reduced to a minimum of 65 percent areal wetness cover.

(iii) Beginning June 16 and through June 30 of every year, Shallow Flood may be reduced to a minimum of 60 percent areal wetness cover.

(iv) If for any Shallow Flood area, the percent of areal wetness cover in the periods specified in Sections 26A.(i), (ii) and (iii) is below the minimum percentages specified in those sections, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance with this Agreement and applicable laws and regulations if the City demonstrates in writing and the APCO reasonably determines in writing that maximum mainline flow was maintained in the applicable period.

B. From July 1 through September 30 of each year, the City is not required by the 2003 SIP to apply water for dust control, but is required to maintain minimum areal wetness cover as required by applicable environmental documents and approvals.

C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the federal standard at the historic shoreline as a result of excessive dry areas on Shallow Flood Control Areas during the dust control periods for each year between May 16 through June 30, and October 1 through October 15, the provisions of Sections 17 and 18 shall apply.

27. The provisions of Sections 25 and 26 are subject to the results of air quality modeling, to be conducted by the City and approved by the APCO, that demonstrates attainment of the federal standard at the historic shoreline using the reduced areal wetness covers set forth in Section 26. The modeling shall be conducted as described in the 2003 SIP using data for the period July 2002 through June 2006. The control efficiency of the areal wetness covers shall be modeled using the SFCE Curve as provided in Section 5.

<u>REVISION OF THE STATE IMPLEMENTATION PLAN (SIP)</u>

28. A. The APCO will propose a District Board Order that will revise the 2003 SIP to incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. The APCO will propose the Board Order and SIP revision at a time sufficient to allow the proposed revisions to be considered and adopted by the District Board by July 1, 2008. The time for consideration and adoption shall take into account, without limitation, the time for legally required environmental review and public notice and hearing. The District Board will act on the proposed SIP revisions by July 1, 2008.

B. If the District Board has the legal ability to act and fails to act by November 1, 2008 on a proposed District Board Order as described in Subsection 28.A, the City may terminate this Agreement by providing

written notice to the District, provided, however, that the City will not provide such notice prior to the conclusion of the Dispute Resolution Process pursuant to Section 32, which process may be initiated by either Party.

C. The Parties have developed this Agreement with the intention that its provisions will be incorporated into a revision of the 2003 SIP and are consistent with applicable provisions of the Health and Safety Code, including Section 42316, and applicable provisions of federal law regarding attainment of the NAAQS.

D. The APCO shall confer in good faith with the City to develop procedures to modify and authorize MDCE-BACM for incorporation into the revisions to the 2003 SIP.

E. The District will be CEQA lead agency and will prepare, in consultation with the City, and will consider for certification on or before March 1, 2008 an environmental impact report (EIR) on the proposed SIP revisions.

F. (i) In the event:

(a) the District Board adopts a District Board Order revising the 2003 SIP that does not incorporate all the terms and conditions of this Agreement, except such terms and conditions, if any that may not lawfully be included in the SIP; or

(b) the District Board adopts a District Board Order revising the 2003 SIP that incorporates all the terms and conditions of this Agreement except such terms and conditions, if any, that may not lawfully be included in the SIP, and subsequent judicial action causes the revised SIP to be materially inconsistent or materially in conflict with the terms and conditions of this Agreement,

the City may terminate this Agreement in the case of Section 28.F(i)(a), and either Party may terminate this Agreement in the case of Section 28.F(i)(b), within 30 days of such action by providing written notice to the other Party.

(ii) If the City does not elect to terminate this Agreement pursuant to Section 28.F(i) and any inconsistencies or conflicts exist between this Agreement that preclude compliance with both, the provisions of the District Board Order shall prevail.

G. The City will support and will not appeal or in any other way challenge or oppose revisions to the 2003 SIP and resulting District Board Order that incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. After issuance of the District Board Order provided for in this Section, the City shall not challenge the order under CEQA to the extent that Order is consistent with this Agreement.

H. In the event the District Board fails to certify the EIR by March 1, 2008 or to act on the proposed SIP revisions by July 1, 2008, the Parties shall meet and confer as provided in Section 33.A.

I. Any provisions of this Agreement that are incorporated into the District Board Order as provided in Section 28.A. shall, upon adoption of that Order by the District Board, cease to have any further force and effect as part of this Agreement, and shall instead be effective as part of the District Board Order.

J. Any provisions of this Agreement that are not incorporated into the District Board Order as provided in Section 28.A shall remain in full force and effect as part of this Agreement until May 1, 2012, at which time those provisions shall cease to be of any further force or effect as part of this Agreement, provided that the Parties may mutually agree in writing to extend this date.

<u>COVER MEASUREMENT TECHNIQUES AND PERFORMANCE SPECIFICATIONS</u>

29. The District and City will collaboratively develop wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications. Final acceptance of those cover measurement techniques and compliance specifications with regulatory impact will be at the sole discretion of the APCO.

<u>KEELER DUNES</u>

30. The Parties acknowledge that dust emissions from the area known as the Keeler Dunes may cause or contribute to exceedances of federal and state standards for PM_{10}. The City hereby agrees to cooperate with the District and other federal, state and local agencies and experts as necessary to develop a plan to reduce dust emissions from the Keeler Dunes.

<u>COOPERATION BETWEEN PARTIES AND DISPUTE RESOLUTION</u>

31. In carrying out the terms of this Agreement, the Parties intend to cooperate fully and to consult with each other effectively and on a regular basis. The Parties will make good faith efforts to provide each other with relevant documents and

technical information in a timely manner, and they will keep each other informed of their respective progress in actions to implement the actions set forth in this Agreement, including, without limitation, progress in entering into consultant and construction contracts and in securing permits from agencies with permitting authority.

32. Notwithstanding the Parties' commitment to cooperate in implementing the terms of this Agreement, they recognize that differences may arise between them. To address this situation, the Parties agree that, in the event either Party believes that a dispute exists regarding implementation or interpretation of any provision of this Agreement, that Party may, by informing the other Party in writing within 21 days of the decision or determination, action or proposed action triggering the dispute, initiate non-binding mediation between the Parties. A party may not seek non-binding mediation for issues that were already the subject of mediation under this Section unless both Parties agree in writing.

A. The mediator shall be a mediator mutually acceptable to the Parties. The Parties may also by mutual agreement include in the mediation, one or more of the technical experts selected pursuant to Section 9.C.(ii), or any other technical experts, such experts to be under contract to the District and jointly managed by the Parties. The City shall be responsible for the cost of the mediator and the technical experts pursuant to Health and Safety Code Section 42316. The mediation will be conducted and completed within 60 days of the notice initiating the Dispute Resolution Process unless that time period is extended by mutual agreement of the Parties. The mediation will be conducted under all applicable California laws regarding mediation, including but not limited to Cal. Evidence Code Sections 1115-1128.

B. Neither Party will commence any litigation concerning the implementation of terms of this Agreement unless that Party has first initiated the mediation described in this Section, and the sooner of the following two events takes place:

(i) Sixty (60) days has expired from the date that Party first sent written notice to commence the mediation; or

(ii) Both Parties agree, or the mediator(s) states, in writing that the mediation has been completed.

(iii) Notwithstanding the provisions of this Section 32.B, a Party may commence litigation at an earlier time if necessary to pursue a claim or cause of action that would otherwise be time barred under an applicable statute of limitations.

C. If the Dispute Resolution Process pursuant to this Section 32 is initiated to address a dispute regarding a SCR determination issued by the APCO pursuant to Section 18.B, then that SCR determination shall not be deemed final until the conclusion of this process under Section 32.B.

D. Nothing in this section is intended to or shall be construed to restrict or eliminate a Party's right to utilize available legal remedies following completion of the mediation process.

<u>EXTENSIONS OF TIME</u>

33. A. In the event that the District

(i) Anticipates that it will fail to certify or fails to certify an environmental impact report on the proposed SIP revisions and related actions by March 1, 2008; or

(ii) Anticipates that it will fail to act on or fails to act on a proposed District Board Order pursuant to Section 28.A by July 1, 2008,

the District shall promptly notify the City, and Parties shall meet and confer to determine what if any revisions to other dates contained in this Agreement may be appropriate. The Parties may mutually agree to the participation of a mediator in the meet and confer process.

B. In the event the City

(i) Anticipates that it will be unable to complete implementation or fails to complete implementation of moat and row controls pursuant to this Agreement by October 1, 2009; or

(ii) Anticipates that it will be unable to complete implementation or fails to complete implementation of all other controls by April 1, 2010,

the City may seek relief for such failure or delay by obtaining a variance from the Hearing Board of the Great Basin Unified Air Pollution Control District pursuant to District Regulation VI and all applicable law for variance relief from a District Order, including but not limited to Health and Safety Code Section 42350 *et seq*. In such event, the District shall, at the request of the City, meet with the City, prior to or after the filing of a request for a variance, in order to ascertain whether the District will support the City's variance request. In the event the District will not support the City's variance request, the City may invoke the Dispute Resolution Process pursuant to Section 32.

C. Nothing in this Section is intended to or shall limit the ability of the City to seek a variance from requirements not included in this Section.

D. Each Party will undertake to inform the other Party as early as practicable of the fact that it anticipates that it will not meet or has failed to meet any of the dates set out in this Section.

34. In the event either Party claims that the other Party is in material breach of the terms of this Agreement, including without limitation, a claim by the District that the City is in material breach under Section 11, the Party claiming the breach shall provide written notice of the claimed breach to the other Party. In the event the Party claimed to be in breach contests such claim, the issue shall be subject to the Dispute Resolution Process in Section 32.

LAWSUIT/APPEAL SETTLEMENT CONDITIONS

35. Within 15 days of execution of this Agreement, the APCO shall issue a revised SCR determination that incorporates the terms of this Agreement and that supersedes all previous determinations.

36. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall immediately commence the process for implementing additional DCMs on the Owens Lake bed consistent with the terms of this Agreement.

37. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall within seven days dismiss with prejudice its CARB appeals and the litigation against the District as described in the Recitals at Paragraphs L, O. and P.

DEFINITIONS

38. Definitions of terms used in this Agreement are contained herein and in Exhibit 13. Where specifically identified in Exhibit 13, these terms as used in this Agreement and Exhibits shall have the meanings provided in this Exhibit 13. Where no definition is provided herein or in Exhibit 13, the words and terms shall have their meaning as provided in the federal Clean Air Act or state air pollution law in the Health and Safety Code, and where no definition is found there, shall have their ordinary meaning as read in the context of this Agreement and consistent with the expressed intent of the Parties.

NOTICES

39. Whenever, under the terms of this Agreement, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be sent by overnight mail and directed to the individual at the address

specified below, unless that individual or his or her successor gives notice of a change to the other Party in writing.

As to the City:

Ronald F. Deaton
General Manager
Los Angeles Department of Water and Power
111 North Hope Street, Room 1550
Los Angeles, CA 90012

As to the District:

Theodore D. Schade
Air Pollution Control Officer
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514

ADDITIONAL PROVISIONS

40. By this Agreement, the City and the District intend to settle their disputes regarding methods to address air quality issues at Owens Lake, including disagreements over the SCR determination issued on December 21, 2005, and the Modified SCR determination issued on April 4, 2006.

41. This Agreement is the final integrated agreement between the Parties regarding the matters addressed herein, and may not be modified except in a writing signed by both Parties.

42. This Agreement shall be construed in accordance with the laws of the State of California.

43. In the event any provision of this Agreement is judicially determined to be unenforceable, the Parties shall meet and confer and following such meeting, the Parties may amend the Agreement, or continue the Agreement without amendment, or either Party may terminate the Agreement.

44. This Agreement shall not create any rights in any third party.

45. No failure by a Party to insist on strict performance of any term or condition of this Agreement shall constitute a waiver of such term or condition or a breach hereof.

46. Each Party represents that their respective signatories below have the authority to bind them to the terms of this Agreement.

REVIEWED AND AGREED TO:

Dated: November 30, 2006

Ronald F. Deaton
Ronald F. Deaton
General Manager, Los Angeles Department of Water and Power

The City of Los Angeles
By and Through the
Los Angeles Department of Water and Power

Dated: December 4, 2006

Henry Veatch
Henry "Skip" Veatch
Board Chairman

Great Basin Unified Air Pollution Control District

APPROVED AS TO FORM AND LEGALITY
ROCKARD J. DELGADILLO, CITY ATTORNEY
NOV 30 2006
BY Julie A. Conboy
JULIE A. CONBOY
Deputy City Attorney

Attachment A

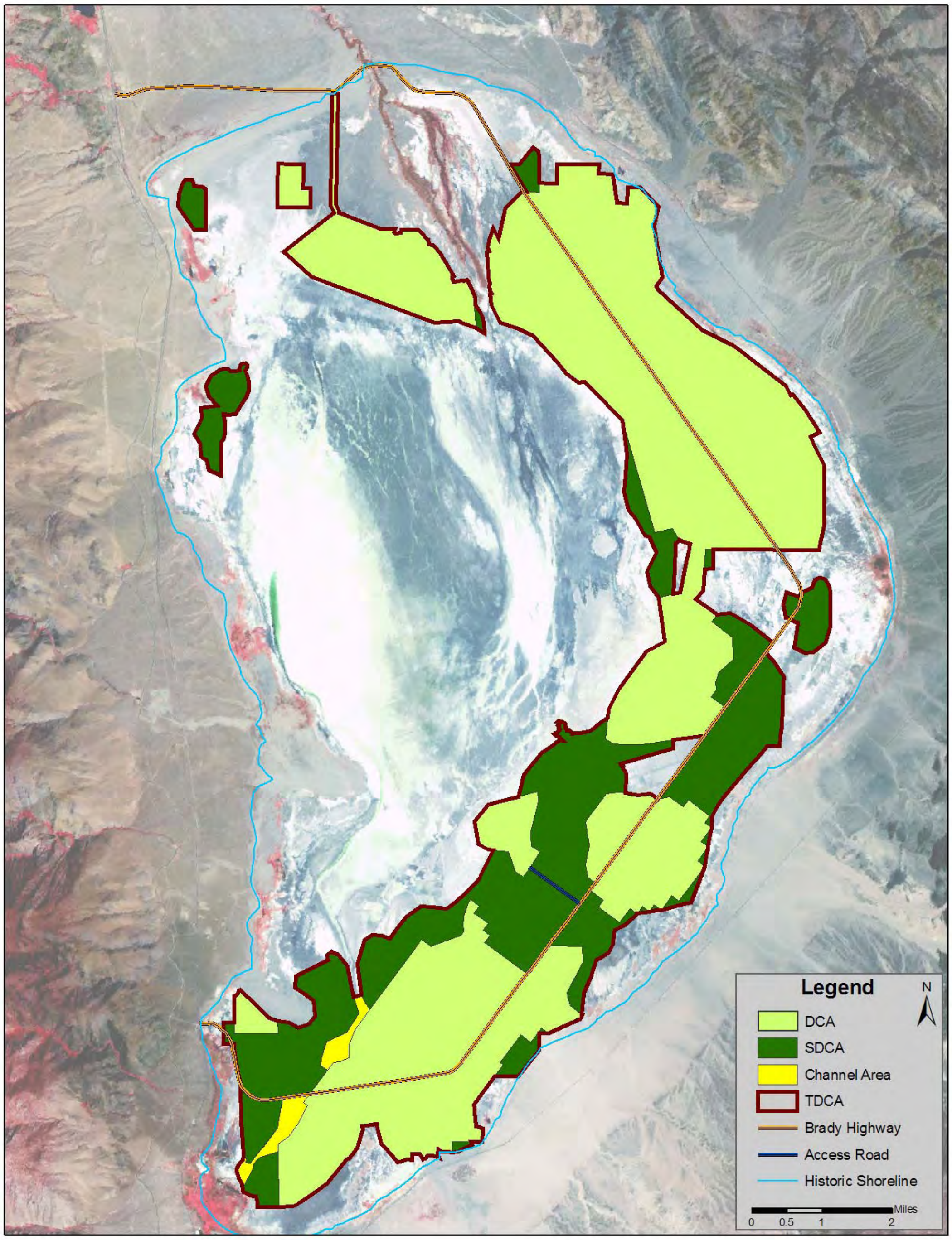
List of Exhibits

1. Total Dust Control Area Map
2. 2006 Supplemental Dust Control Area Coordinate Description
3. Dust Control Measure Map
4. Dust Control Measures Description
5. Minimum Dust Control Efficiency Map
6. MDCE Selection Process Spreadsheet
7. Shallow Flood Control Efficiency Curve
8. Moat and Row Demonstration Project Location Map
9. Study Area Map
10. Schedule of Contingency Measures
11. Moat and Row Transition Schedule
12. DCM Operation Schedule
13. Definitions

Attachment A

EXHIBIT 1 -- TOTAL DUST CONTROL AREA MAP

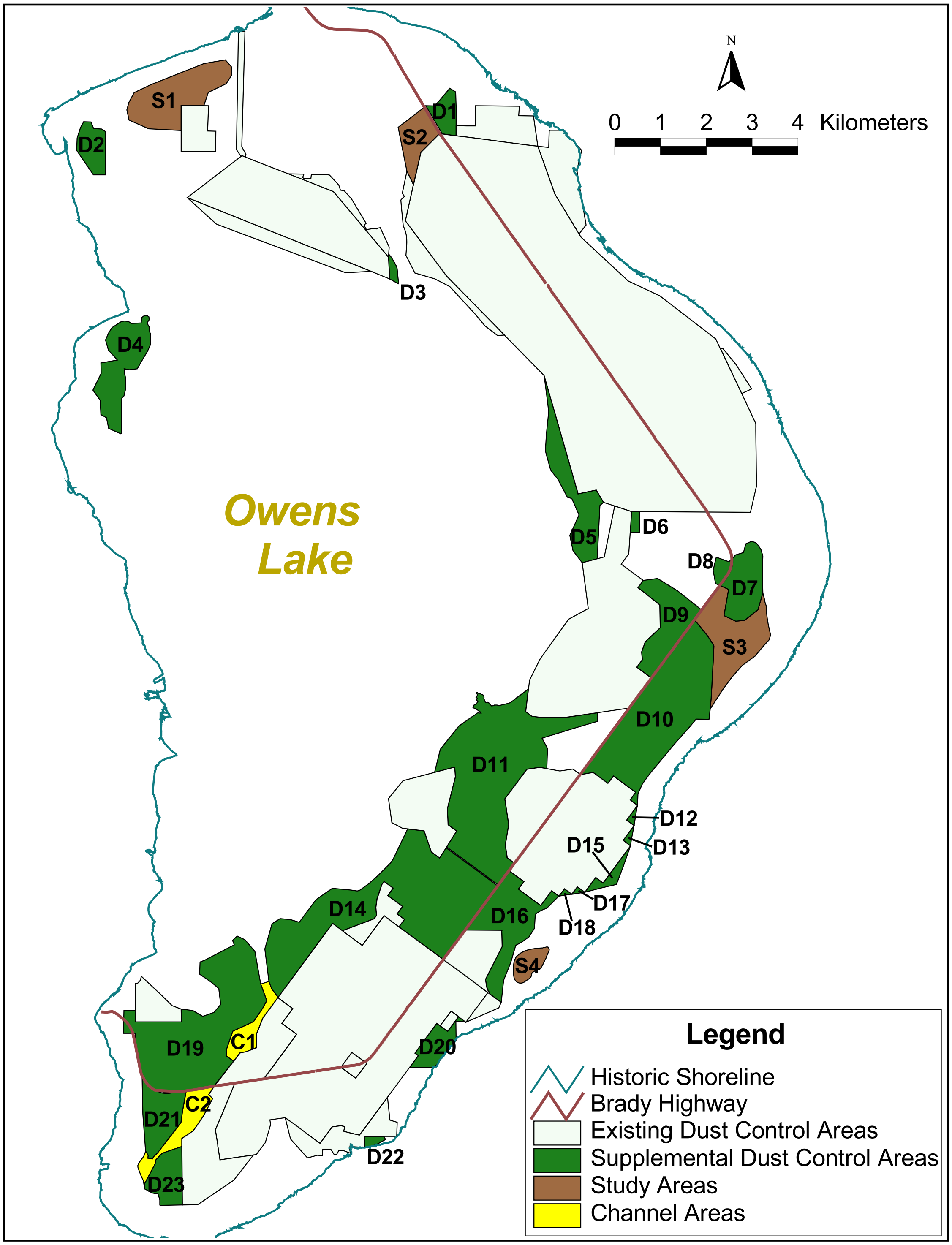
The Total Dust Control Area (TDCA) is comprised of the 2006 Supplemental Dust Control Area (SDCA) and the 2003 Dust Control Area (DCA).



Attachment A

EXHIBIT 2 -- 2006 SUPPLEMENTAL DUST CONTROL AREA COORDINATE DESCRIPTIONS

KEY MAP



Attachment A

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D1	0.16	SDCA	416,001.0310	4,042,347.3789
			415,701.7500	4,042,385.7617
			415,343.2810	4,042,999.8633
			415,539.4060	4,042,999.0234
			415,866.3750	4,043,383.8359
			415,994.4060	4,043,304.2109
			416,002.6250	4,042,981.9922
			416,005.6250	4,042,568.5234
			416,001.0310	4,042,347.3789
D2	0.21	SDCA	408,085.5000	4,041,493.3164
			407,718.8130	4,042,027.7422
			407,731.5000	4,042,299.3945
			407,804.9060	4,042,524.2148
			407,873.2810	4,042,654.1211
			408,032.2500	4,042,647.6875
			408,089.5630	4,042,502.0625
			408,267.6560	4,042,491.4219
			408,347.0630	4,042,440.3203
			408,348.9690	4,041,492.4844
			408,085.5000	4,041,493.3164
D3	0.03	SDCA	414,747.2500	4,039,108.7500
			414,550.5000	4,039,224.6641
			414,528.0310	4,039,697.5156
			414,532.5000	4,039,759.7891
			414,583.3750	4,039,699.2617
			414,643.3130	4,039,605.6250
			414,700.5000	4,039,498.9766
			414,718.6880	4,039,441.7188
			414,729.1250	4,039,314.2500
			414,747.2500	4,039,108.7500
D4	0.59	SDCA	408,694.5000	4,035,836.9883
			408,417.2190	4,035,957.7344
			408,370.5940	4,036,191.9453
			408,249.5940	4,036,258.3164
			408,231.6880	4,036,571.0625
			408,075.5000	4,036,791.1719
			408,254.4060	4,037,157.2813
			408,249.9060	4,037,387.3789
			408,606.5630	4,037,448.5391
			408,414.0000	4,037,664.3359
			408,348.8750	4,037,888.7227
			408,415.9060	4,038,042.2422
			408,494.0000	4,038,156.0977
			408,687.9380	4,038,284.6484
			408,762.7190	4,038,303.7813
			408,853.0940	4,038,290.2422
			408,911.3130	4,038,246.2109
			409,028.9380	4,038,251.5742
			409,126.1560	4,038,258.7344
			409,134.0630	4,038,309.6602
			409,144.5940	4,038,382.5547
			409,201.0630	4,038,424.0508
			409,255.5940	4,038,422.9180
			409,299.1250	4,038,391.3789
			409,304.7190	4,038,329.9609
			409,254.9380	4,038,259.1797
			409,308.0940	4,038,163.0195
			409,312.7190	4,038,061.7695
			409,335.7190	4,038,017.0195
			409,334.3750	4,037,792.3008
			409,260.5630	4,037,628.4492
			409,184.9060	4,037,508.1055
			409,044.0630	4,037,256.8359
			408,869.9060	4,037,236.6055
			408,755.8130	4,037,260.8867
			408,768.2810	4,037,143.0156
			408,784.9690	4,037,079.6914
			408,789.7190	4,036,817.3555
			408,751.4060	4,036,667.7344
			408,706.5940	4,036,616.2422
			408,694.5000	4,035,836.9883

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D5	0.57	SDCA	418754.0310	4033026.5000
			418552.9690	4033287.6914
			418484.0000	4033621.1133
			418689.0940	4034066.4102
			418529.0310	4034424.5078
			418434.8130	4034452.0664
			418325.1880	4034653.5234
			418224.7810	4034845.3438
			418067.7500	4035047.7852
			417953.1880	4035467.4961
			417980.5000	4035865.3203
			418027.9060	4036319.6094
			417924.4060	4037110.5117
			418666.3750	4034527.9844
			419065.6880	4034610.9648
			419223.4690	4034342.1406
			419141.3750	4034271.8047
			419084.1880	4033110.8086
			418754.0310	4033026.5000
D6	0.03	SDCA	419801.2810	4033687.7539
			419831.7500	4034141.1016
			420006.8130	4034139.3281
			420012.7190	4033690.4844
			419801.2810	4033687.7539
D7	0.43	SDCA	422105.2500	4031749.0176
			421854.9690	4031871.4102
			421952.1880	4032442.4199
			421827.1560	4032498.3555
			421778.4380	4032522.0762
			421882.0310	4032660.6934
			421931.3130	4032728.7031
			421954.3130	4032765.7129
			421966.3130	4032785.8828
			421992.7810	4032841.0703
			422013.5310	4032894.8164
			422030.0630	4032956.1914
			422039.5000	4033014.7422
			422042.1560	4033068.7461
			422042.4380	4033082.8008
			422040.7810	4033127.2188
			422103.3750	4033191.3320
			422274.9380	4033248.8359
			422331.4380	4033437.2383
			422451.9060	4033492.2617
			422530.2190	4033470.0195
			422579.0940	4033430.6797
			422659.7190	4033313.9453
			422698.6880	4033173.2383
			422688.0630	4032830.0469
			422701.7500	4032367.5195
			422592.2190	4031994.7988
			422299.6560	4031762.5020
			422105.2500	4031749.0176
D8	0.06	SDCA	421758.4690	4032529.3477
			421668.6250	4032569.9238
			421615.5310	4032859.4297
			421680.6250	4033146.5156
			421959.5000	4033044.5586
			422021.5000	4033108.1875
			422022.5630	4033079.4023
			422019.3130	4033018.7031
			422010.1880	4032960.1484
			421994.8130	4032902.9766
			421977.7500	4032858.2227
			421948.4060	4032795.7422
			421918.7190	4032746.2988
			421884.3440	4032697.7148
			421806.2810	4032593.7305
			421758.4690	4032529.3477

Attachment A

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
D9	0.53	SDCA	420,265.8440	4,030,508.7188
			419,947.7500	4,030,741.5176
			420,067.1880	4,030,907.7324
			420,051.5940	4,031,073.7461
			420,132.5000	4,031,300.5000
			420,460.9690	4,031,604.7441
			420,449.4060	4,032,103.9551
			419,975.9690	4,032,480.4902
			420,091.3750	4,032,635.9316
			420,399.6560	4,032,679.1270
			420,847.1880	4,032,406.2988
			421,363.7810	4,031,994.1230
			420,995.8750	4,031,495.0273
			420,265.8440	4,030,508.7188
D10	1.75	SDCA	419,965.0000	4,027,728.2520
			419,803.2190	4,027,847.7363
			419,922.8440	4,028,009.4902
			419,437.5940	4,028,368.0176
			419,317.9690	4,028,206.2617
			418,994.5310	4,028,445.2656
			418,730.3440	4,028,397.0371
			419,406.8750	4,029,323.4316
			421,010.9060	4,031,484.3145
			421,216.1560	4,031,761.8594
			421,439.0940	4,031,498.2363
			421,631.0310	4,031,208.7773
			421,571.8750	4,030,077.3184
			421,548.9690	4,029,833.7383
			421,523.2500	4,029,607.1328
			421,241.1880	4,029,607.8887
			421,116.0000	4,029,457.7559
			420,776.0000	4,029,075.9551
			420,233.7500	4,028,421.8027
			420,070.9690	4,028,193.2832
			419,973.2500	4,027,978.3457
			419,965.0000	4,027,728.2520
D11	2.32	SDCA	416,924.2190	4,025,991.8965
			416,906.7190	4,026,000.2598
			416,817.3750	4,026,065.2832
			415,808.9380	4,026,810.0977
			415,803.8440	4,026,822.5840
			415,810.1250	4,026,837.9219
			416,016.5310	4,027,163.7559
			415,829.9690	4,027,301.7383
			415,812.0000	4,027,654.7500
			415,987.3440	4,028,348.8008
			415,969.6880	4,028,562.7461
			415,530.3750	4,028,446.4922
			415,660.2500	4,028,955.4551
			416,062.8130	4,029,458.0664
			416,386.1560	4,029,683.9746
			416,436.9060	4,029,720.7148
			416,449.5000	4,029,732.7207
			416,468.5940	4,029,742.7246
			416,489.8750	4,029,746.4355
			416,529.4060	4,029,741.9941
			416,547.9690	4,029,741.4180
			416,541.4060	4,029,755.8789
			416,528.0940	4,029,767.9277
			416,515.2190	4,029,777.7969
			416,501.9690	4,029,786.2637
			416,489.6560	4,029,794.9004
			416,430.1250	4,029,834.6543
			416,415.3750	4,029,843.4570
			416,400.7190	4,029,849.4766
			416,387.3130	4,029,856.1563
			416,372.5940	4,029,860.3105
			416,368.5310	4,029,870.0703
			416,375.7810	4,029,880.6270
			416,384.4690	4,029,895.7617
			416,385.5310	4,029,910.9023
			416,395.3130	4,029,918.6621
			416,406.0630	4,029,922.9727
			416,419.9060	4,029,929.8086
			416,435.1560	4,029,936.6543
			416,449.2500	4,029,947.3340
			416,459.1250	4,029,961.2246
			416,462.9690	4,029,976.8418
			416,471.5630	4,029,988.3965

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	416481.0000	4029994.3359
			416483.2500	4030000.4590
			416476.4690	4030004.0684
			416464.6250	4030013.5332
			416452.1250	4030020.7266
			416447.3130	4030031.0762
			416454.8750	4030042.8809
			416467.7500	4030052.9766
			416466.0630	4030067.6035
			416454.5310	4030077.5586
			416440.6250	4030076.0938
			416437.6250	4030084.6914
			416445.8130	4030098.3496
			416459.0310	4030110.6875
			416465.9060	4030126.0488
			416467.1560	4030142.7871
			416461.5310	4030157.1523
			416450.1560	4030168.0938
			416439.0940	4030177.2402
			416443.8750	4030188.7227
			416458.4380	4030192.3809
			416470.3130	4030190.8789
			416479.0310	4030177.9727
			416493.8130	4030171.2637
			416510.6250	4030166.2656
			416527.2190	4030165.8828
			416541.7810	4030161.9238
			416568.0630	4030143.3945
			416585.0000	4030137.3281
			416601.6250	4030130.7734
			416608.7190	4030112.7188
			416614.8750	4030093.7324
			416614.1560	4030081.1367
			416606.9690	4030057.0176
			416610.2810	4030041.6328
			416621.0310	4030029.7910
			416626.8440	4030016.4492
			416634.6560	4030003.4863
			416639.6560	4029988.0273
			416642.2500	4029973.2676
			416656.7190	4029972.4727
			416688.3750	4029977.5293
			416704.9380	4029976.5762
			416715.9690	4029964.5742
			416723.1250	4029949.7949
			416734.4690	4029937.7109
			416747.7190	4029929.2070
			416759.0310	4029916.4004
			416768.4690	4029902.2207
			416781.8130	4029898.3633
			416790.3750	4029900.3945
			416827.0940	4029907.2129
			416838.2500	4029915.7813
			416845.7500	4029917.9492
			416852.5940	4029916.0938
			416867.9690	4029916.1543
			416880.3440	4029917.7637
			416895.6880	4029914.7402
			416925.9380	4029904.3965
			416940.7190	4029903.4805
			416954.8130	4029907.8730
			416966.3750	4029914.2246
			417119.3130	4029946.7070
			417187.6250	4029971.9180
			417582.2500	4030268.0078
			417521.0310	4029772.5176
			417701.5630	4029667.0430
			417771.4380	4029656.0293
			417852.7810	4029647.5566
			418130.3750	4029643.4648
			418383.2810	4029647.0859
			419083.7810	4029748.1953
			419086.1880	4029746.9258
			419093.6560	4029564.0527
			417887.0630	4029198.4668
			417896.1560	4029182.4668
			417881.5000	4029187.7246
			418000.2190	4028968.8594
			417985.8130	4028531.7539
			417825.0940	4028556.4668
			417545.0000	4028513.0254

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	417,068.6250	4,027,867.9766
			417,152.6880	4,027,307.1758
			417,077.1880	4,026,864.2910
			417,117.7810	4,026,581.1016
			417,277.7500	4,026,460.9707
			416,924.2190	4,025,991.8965
D12	0.02	SDCA	419,887.8440	4,027,285.2500
			419,726.0310	4,027,404.7344
			419,965.0000	4,027,728.2520
			419,949.5310	4,027,659.1582
			419,887.8440	4,027,285.2500
D13	0.02	SDCA	419,810.5000	4,026,842.2539
			419,648.7190	4,026,961.7383
			419,772.4690	4,027,130.8359
			419,887.8440	4,027,285.2500
			419,880.3750	4,027,234.3164
			419,832.8130	4,026,984.5820
			419,810.5000	4,026,842.2539
D14	2.46	SDCA	412,117.6560	4,023,538.0977
			411,983.4060	4,023,714.6152
			411,915.1560	4,023,883.7793
			411,828.0940	4,024,594.2207
			411,988.0310	4,025,141.2695
			412,161.8440	4,025,254.5859
			412,387.4060	4,025,234.3184
			412,577.3130	4,025,175.8184
			412,752.9380	4,025,413.6777
			412,942.5940	4,025,667.2090
			413,298.0630	4,025,913.1816
			413,700.7190	4,025,878.1113
			413,843.4060	4,025,859.0313
			413,892.3750	4,025,869.0625
			414,103.4380	4,026,021.7207
			414,294.0310	4,026,188.3672
			414,574.5630	4,026,473.5742
			414,628.3130	4,026,552.7695
			414,946.8130	4,027,212.3789
			415,303.7810	4,027,171.2480
			415,463.6880	4,026,711.0117
			415,639.0630	4,026,577.9492
			415,777.6250	4,026,784.4590
			415,787.8440	4,026,793.4668
			415,793.6560	4,026,794.4512
			416,290.3440	4,026,429.5527
			416,545.3750	4,026,241.2695
			416,908.5000	4,025,969.6309
			416,207.2500	4,025,017.7598
			415,765.2810	4,024,422.9277
			415,712.3440	4,024,368.7461
			414,755.6880	4,025,075.7559
			414,875.1560	4,025,237.5156
			414,715.5000	4,025,356.9941
			414,832.8440	4,025,518.7598
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.2539
			414,383.9380	4,025,997.9883
			414,274.7500	4,025,678.2109
			414,249.7810	4,025,496.0098
			414,266.4690	4,025,323.2305
			414,210.4380	4,025,245.9863
			413,519.9380	4,024,988.5723
			413,307.2500	4,025,145.7637
			413,144.4690	4,024,931.4102
			412,117.6560	4,023,538.0977
D15	0.08	SDCA	418,812.6560	4,025,829.9941
			419,051.1560	4,026,152.9863
			419,213.4060	4,026,034.2168
			419,810.5000	4,026,842.2539
			419,655.1250	4,026,404.8789
			419,499.9380	4,025,999.3496
			419,182.9690	4,025,925.2813
			418,812.6560	4,025,829.9941

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D16	0.70	SDCA	416987.0630	4023427.0801
			416718.5630	4023625.5098
			416734.5310	4023647.0078
			416700.3440	4023672.5195
			416689.5630	4023734.1953
			416678.1560	4023741.8613
			416644.1560	4023925.0195
			417010.6880	4024645.2734
			417000.8130	4024984.0566
			417004.5630	4024995.9414
			416997.8130	4025001.7578
			416224.2500	4025007.0430
			416932.7810	4025971.6777
			417170.5000	4026294.0039
			417483.0940	4026061.2461
			417363.6250	4025899.4863
			417848.8440	4025541.0000
			418087.8130	4025864.5176
			418249.6250	4025744.9961
			417981.1560	4025483.1621
			417862.3130	4025432.8262
			417742.6560	4025357.7832
			417731.0940	4025299.8848
			417711.4060	4025042.9023
			417596.9060	4024857.0391
			417427.9690	4024735.2051
			417308.1560	4024673.9160
			417192.2500	4024288.4082
			417038.6560	4023907.3789
			416987.0630	4023427.0801
D17	0.01	SDCA	418812.6560	4025829.9941
			418722.7810	4025817.3457
			418531.3750	4025787.7188
			418650.8440	4025949.5527
			418812.6560	4025829.9941
D18	0.01	SDCA	418250.0940	4025745.5586
			418369.5630	4025907.3164
			418531.2190	4025787.8750
			418422.7500	4025775.2305
			418250.0940	4025745.5586
D19	1.88	SDCA	410989.2810	4022251.9551
			411145.7810	4022140.5918
			410728.5630	4021605.7773
			410525.7190	4021575.8516
			410434.2500	4021553.4805
			410330.1560	4021538.0020
			410249.0940	4021523.9121
			410165.6880	4021513.8320
			410012.7810	4021489.0801
			409988.7810	4021485.5020
			409958.9380	4021487.3027
			409834.5940	4021472.0918
			409710.8750	4021458.8867
			409588.2190	4021468.2129
			409472.9060	4021506.2676
			409364.2190	4021564.2617
			409273.0310	4021648.9043
			409231.3750	4021698.0781
			409192.6560	4021749.2871
			409142.4380	4021863.0625
			409121.8750	4021936.3730
			409108.8130	4021989.7910
			409094.0000	4022070.1055
			409085.6880	4022117.5977
			409078.5310	4022146.7773
			409061.1250	4022247.9473
			409045.9690	4022310.3633
			409033.1250	4022381.5703
			409029.3750	4022398.8301
			409009.4380	4022518.7207
			409000.8440	4022749.8164
			408748.8130	4022752.2285
			408748.6880	4022994.9199
			408752.0000	4023250.6855
			409002.0630	4023249.9121
			408999.6250	4023000.2637
			410005.0940	4022997.9844
			410001.1880	4023280.3379
			410254.3750	4023245.9746

Attachment A

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D19 continued	1.88	SDCA	410,472.1880	4,023,123.1172
			410,718.0630	4,023,206.8965
			410,862.1250	4,023,378.8164
			410,821.5940	4,023,731.0039
			410,665.3750	4,023,862.7910
			410,401.5000	4,024,041.8867
			410,411.4380	4,024,308.5215
			410,520.6560	4,024,349.3066
			411,162.2810	4,024,681.8047
			411,124.9690	4,024,778.6250
			411,222.3440	4,024,873.7930
			411,392.4060	4,024,792.1602
			411,607.8130	4,024,539.2461
			411,737.1560	4,023,825.0313
			411,867.2500	4,023,463.2520
			411,784.7500	4,023,306.3613
			411,582.4060	4,023,006.9551
			411,126.7810	4,022,795.5957
			410,994.2500	4,022,416.6367
			410,989.2810	4,022,251.9551
D20	0.21	SDCA	414,982.2190	4,021,997.8164
			415,176.7190	4,022,263.2852
			415,103.2190	4,022,320.4727
			415,581.2500	4,022,965.4922
			415,817.9380	4,022,790.5078
			416,056.9060	4,023,113.9902
			416,207.6250	4,023,003.7656
			415,998.3750	4,023,002.3203
			416,002.5310	4,022,602.1270
			415,526.5000	4,022,002.0215
			414,982.2190	4,021,997.8164
D21	0.39	SDCA	409,784.0630	4,021,446.5840
			409,836.5940	4,021,452.1992
			409,959.4380	4,021,467.4043
			409,986.8440	4,021,465.6152
			410,014.9380	4,021,469.1094
			410,109.0000	4,021,484.2637
			410,027.5940	4,021,036.2754
			409,998.0310	4,020,801.4766
			409,487.5940	4,020,143.3262
			409,409.3130	4,020,065.3262
			409,373.6560	4,020,006.3652
			409,360.9380	4,020,010.4766
			409,276.4690	4,020,023.0879
			409,280.3750	4,020,086.8984
			409,223.5310	4,020,182.5996
			409,166.6250	4,020,986.3672
			409,146.5630	4,021,804.0762
			409,176.1250	4,021,738.1621
			409,218.6880	4,021,681.9980
			409,255.5940	4,021,639.3984
			409,351.8750	4,021,549.4316
			409,464.4690	4,021,488.9551
			409,583.4380	4,021,449.5684
			409,710.2810	4,021,438.8574
			409,784.0630	4,021,446.5840
D22	0.03	SDCA	414,001.2500	4,020,257.5078
			414,001.4690	4,020,502.5137
			414,426.0000	4,020,500.8262
			414,464.0310	4,020,432.0313
			414,293.7190	4,020,338.7207
			414,135.9690	4,020,279.6660
			414,001.2500	4,020,257.5078
D23	0.29	SDCA	409,535.8130	4,018,994.6445
			409,534.9380	4,019,112.7676
			409,493.8750	4,019,250.0898
			409,428.5630	4,019,253.1973
			409,374.7500	4,019,259.9512
			409,200.4380	4,019,355.6914
			409,208.0310	4,019,472.8008
			409,435.7810	4,019,902.2852
			409,445.4060	4,019,983.3887
			409,576.6880	4,020,126.1250
			410,016.9060	4,020,278.1445
			410,025.1560	4,019,002.0527
			409,535.8130	4,018,994.6445

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S1	0.71	Study	410001.6560	4042464.2656
			409290.7190	4042500.2383
			408861.2190	4042688.4688
			408813.8750	4042910.9609
			408859.4380	4043071.8984
			408972.0940	4043285.6914
			409337.5310	4043461.0000
			410500.6560	4043924.3945
			410962.4690	4044000.3555
			411096.8440	4043852.2109
			411108.0630	4043672.6836
			410984.4380	4043481.0273
			410592.0940	4043294.9219
			410496.6250	4043013.0352
			410003.5310	4043008.3594
			410001.6560	4042464.2656
S2	0.27	Study	415072.8130	4041278.8984
			414928.6560	4041572.7422
			414740.2500	4042529.6992
			415304.2190	4042966.9609
			415642.3130	4042393.3203
			415234.1250	4041986.6914
			415072.8130	4041278.8984
S3	0.72	Study	421548.9690	4029833.7383
			421571.8750	4030077.3184
			421631.0310	4031208.7773
			421439.0940	4031498.2363
			421216.1560	4031761.8594
			421260.3750	4031837.4414
			421371.5310	4031985.9238
			421398.8440	4032023.9863
			421454.5000	4032099.1406
			421509.5310	4032174.3066
			421645.9690	4032358.6465
			421725.3130	4032466.9844
			421769.8440	4032526.2539
			421827.1560	4032498.3555
			421952.1880	4032442.4199
			421854.9690	4031871.4102
			422105.2500	4031749.0176
			422299.6560	4031762.5020
			422592.2190	4031994.7988
			422701.7500	4032367.5195
			422732.5630	4032243.8984
			422746.8130	4032159.0254
			422779.7500	4032064.7734
			422779.7190	4031946.8984
			422793.9060	4031814.8984
			422817.5310	4031682.9316
			422840.9690	4031565.0645
			422869.3130	4031447.2109
			422836.2810	4031338.7852
			422713.7500	4031206.8086
			422529.9380	4030985.2422
			422250.5940	4030779.7578
			422000.0310	4030499.9922
			422006.2810	4030500.0156
			421836.9380	4030271.0234
			421548.9690	4029833.7383
S4	0.15	Study	417410.5630	4023845.5176
			417398.8440	4023845.8750
			417387.4380	4023846.9883
			417377.4060	4023848.7207
			417367.8440	4023851.0527
			417358.9380	4023853.9434
			417350.9380	4023857.4238
			417343.0940	4023861.6250
			417335.2810	4023866.7793
			417327.4690	4023872.8066
			417319.6880	4023879.7500
			417310.5940	4023888.9688
			417301.9690	4023899.1680
			417293.6560	4023910.1230
			417286.2810	4023921.5137
			417281.1250	4023930.3848
			417276.9060	4023939.6543
			417273.1560	4023949.9414
			417269.7190	4023961.3281
			417266.5000	4023975.5664
			417263.6560	4023992.3125

Attachment A

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	417,257.5630	4,024,036.4043
			417,255.7810	4,024,053.0898
			417,254.3440	4,024,071.4844
			417,253.3440	4,024,112.0410
			417,253.6880	4,024,135.3887
			417,256.4690	4,024,211.2207
			417,258.9380	4,024,248.6602
			417,260.8130	4,024,266.7930
			417,266.0630	4,024,299.1426
			417,269.5630	4,024,313.8516
			417,274.6560	4,024,330.5859
			417,281.5940	4,024,349.5684
			417,289.7810	4,024,368.9414
			417,298.0630	4,024,386.4863
			417,306.2810	4,024,401.4785
			417,314.9690	4,024,415.0508
			417,324.0630	4,024,427.2441
			417,333.2500	4,024,437.8730
			417,341.8130	4,024,446.3809
			417,362.2810	4,024,463.6328
			417,374.6880	4,024,472.7871
			417,391.6880	4,024,484.4727
			417,422.5940	4,024,504.8984
			417,438.9380	4,024,515.1504
			417,454.8440	4,024,524.5742
			417,469.5000	4,024,532.6895
			417,483.8130	4,024,540.1250
			417,497.9690	4,024,546.9180
			417,525.0310	4,024,558.3184
			417,537.3130	4,024,562.7500
			417,550.9690	4,024,567.0371
			417,565.6880	4,024,571.1504
			417,595.7190	4,024,578.3379
			417,644.3750	4,024,588.4512
			417,671.1560	4,024,593.2676
			417,699.5630	4,024,597.4395
			417,729.9690	4,024,601.0371
			417,763.4060	4,024,604.2285
			417,801.4380	4,024,607.2109
			417,876.5000	4,024,612.3184
			417,885.9690	4,024,613.4160
			417,906.1880	4,024,617.6074
			417,954.9060	4,024,630.4629
			417,966.3750	4,024,632.8535
			417,976.4690	4,024,634.2813
			417,984.4060	4,024,634.8398
			417,991.7190	4,024,634.7266
			417,998.0940	4,024,633.9082
			418,004.0310	4,024,632.4531
			418,009.1560	4,024,630.2891
			418,013.8130	4,024,627.4102
			418,017.8750	4,024,623.8594
			418,021.4380	4,024,619.5566
			418,027.1560	4,024,609.7598
			418,032.4060	4,024,597.6895
			418,034.6560	4,024,589.4512
			418,035.8750	4,024,580.7773
			418,035.6560	4,024,570.7617
			418,034.0630	4,024,559.9766
			418,031.0630	4,024,548.3418
			418,026.3750	4,024,535.4473
			418,020.4690	4,024,521.3984
			418,000.5310	4,024,478.6465
			417,984.5630	4,024,435.9668
			417,970.9060	4,024,402.7227
			417,957.8130	4,024,373.8125
			417,943.3130	4,024,343.8242
			417,931.2500	4,024,320.3027
			417,918.0940	4,024,295.7734
			417,880.1250	4,024,228.6719
			417,859.5000	4,024,190.0117
			417,854.1250	4,024,181.0176
			417,848.9380	4,024,173.2773
			417,843.6250	4,024,166.4160
			417,838.3130	4,024,160.3535
			417,832.0940	4,024,154.4258
			417,825.1250	4,024,149.1992
			417,816.9690	4,024,144.4160
			417,807.5630	4,024,140.0762
			417,799.1250	4,024,136.8242
			417,789.4690	4,024,133.5957
			417,744.3750	4,024,120.6641
			417,733.3130	4,024,116.6641

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	417723.6250	4024112.4082
			417716.8440	4024108.7773
			417710.6880	4024104.8281
			417693.1880	4024092.0859
			417683.1250	4024084.1797
			417674.4380	4024076.5137
			417667.2810	4024069.1191
			417661.4690	4024061.8086
			417657.0630	4024054.5488
			417654.5000	4024048.2773
			417652.5000	4024040.8516
			417647.9060	4024009.5918
			417646.3750	4024002.8047
			417644.5940	4023996.9746
			417640.7500	4023988.9395
			417636.0310	4023980.8086
			417630.3750	4023972.9629
			417623.6560	4023965.2930
			417617.2810	4023958.7949
			417609.9690	4023952.3184
			417601.7810	4023945.7832
			417592.6250	4023939.0781
			417575.3440	4023927.6641
			417540.5940	4023906.3262
			417526.8440	4023897.4316
			417515.0940	4023889.3320
			417487.6880	4023868.7949
			417472.0940	4023858.9844
			417463.6560	4023854.8926
			417455.1880	4023851.9063
			417444.7810	4023849.1504
			417433.6250	4023847.1348
			417422.1560	4023845.9258
			417410.5630	4023845.5176
C1	0.21	Channel	411145.9380	4022140.5117
			410989.3130	4022252.0020
			410994.2500	4022416.6367
			411126.7810	4022795.5957
			411582.4060	4023006.9551
			411784.7500	4023306.3613
			411867.2500	4023463.2520
			411737.1560	4023825.0313
			411915.1560	4023883.7793
			411983.4060	4023714.6152
			412117.6560	4023538.0977
			411792.0630	4023094.1152
			411782.4060	4023076.2949
			411748.7190	4022994.3965
			411643.6250	4022726.7266
			411641.6880	4022435.3887
			411419.2190	4022347.2383
			411284.5000	4022318.9453
			411145.9380	4022140.5117
C2	0.30	Channel	409201.5000	4019370.5664
			409173.3130	4019532.8418
			409115.7190	4019657.4395
			409058.5940	4019813.5703
			409055.4380	4019859.0117
			409098.6560	4019944.7520
			409192.5940	4020079.2344
			409223.5310	4020182.5996
			409280.3750	4020086.8984
			409276.4690	4020023.0879
			409352.7190	4020011.6758
			409373.6560	4020006.3652
			409409.3130	4020065.3262
			409487.8750	4020143.3594
			409998.1880	4020801.4746
			410027.7500	4021036.2715
			410109.2810	4021484.2578
			410174.2810	4021494.7188
			410242.0940	4021502.6836
			410335.4060	4021518.5000
			410438.7190	4021533.8438
			410529.8750	4021556.1816
			410712.0940	4021583.1074
			410602.7500	4021411.3418
			410686.8440	4021328.9805
			410488.7190	4020946.7344
			410264.6250	4020620.0820
			410015.6880	4020454.4902

Attachment A

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
C2 continued	0.30	Channel	410,016.9060	4,020,278.1445
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates

Total SDCA	12.77
Total Study	1.85
Total Channel	0.50

Attachment A

EXHIBIT 3 -- DUST CONTROL MEASURE MAP

Shown are dust control measures assigned to areas within the SDCA.

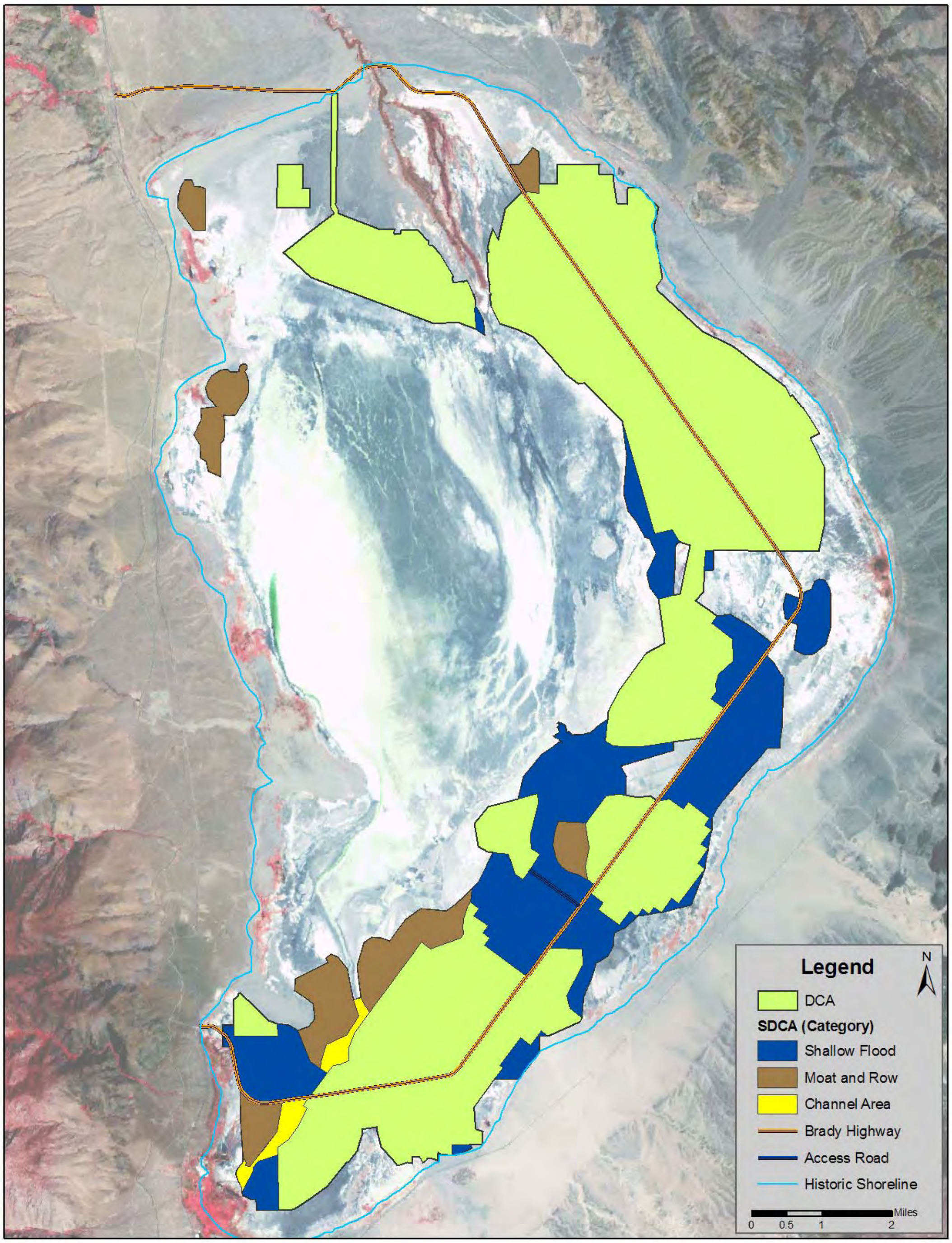


EXHIBIT 4 -- DUST CONTROL MEASURE DESCRIPTIONS

Brief descriptions of dust control measures for use on Owens Lake are given below. More detailed descriptions of the three BACM approved dust control methods (shallow flooding, managed vegetation and gravel) are provided in the 2003 SIP. Modifications to these measures as provided in the Settlement Agreement (Agreement) are noted. All references are to sections of the Agreement; section numbers of the Agreement are contained in square brackets.

Shallow Flooding

The "shallow flooding" (SF) dust control measure involves wetting emissive lake bed surfaces to reduce dust emissions. Performance specifications and a detailed description of the SF measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Otherwise, water shall be applied in amounts sufficient to achieve the required wetness cover as specified in Sections 3 through 5, 25, 26, and 27, or as modified under the provisions of Sections 5, 14, 15, 18, and 29. Satellite imagery, aerial photography or other methods approved by the APCO under the provisions of Section 29 are used to measure wetness cover for compliance.

Managed Vegetation

The "managed vegetation" (MV) dust control measure involves establishing a plant cover on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications and a detailed description of the MV control measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Vegetative cover on the MV site present on the lake bed on January 1, 2007 shall be as specified in Section 6. The performance specification of MV may be modified under the provisions of Section 29. Point-frame measurements satellite imagery or other methods approved by the APCO under the provisions of Section 29 are used to measure plant cover for compliance.

Gravel Cover

The "gravel cover" (GC) dust control measure involves placing a layer of gravel on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications are described in the 2003 SIP.

Moat and Row

The general form of the "moat and row" (MR) measure is an array (see Figure E4-1) of earthen berms (rows) about 5 feet high with sloping sides, flanked on either side by ditches (moats) about 4 feet deep (see Figure E4-2). Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual MR elements are constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the MR array is intended to control emissions under the full range of principal wind directions (see Figure E4-1). Initial pre-test

modeling indicates that MR elements' spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM_{10} control effectiveness required on the MR area.

The PM_{10} control effectiveness of MR may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, sand fences, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding moats and rows to the array, which reduces the distance between rows.

The final form of MR will largely be determined from the results of testing on the lake bed as provided in Sections 7 and 8. Final design is subject to test results, required PM_{10} control effectiveness, environmental documentation and permitting, engineering, and monitoring considerations.

In areas where MR is used as a control measure, the City shall implement the measure in a manner consistent with the Agreement, particularly Sections 7 and 8, or as modified by actions pursuant to Sections 18 through 24.

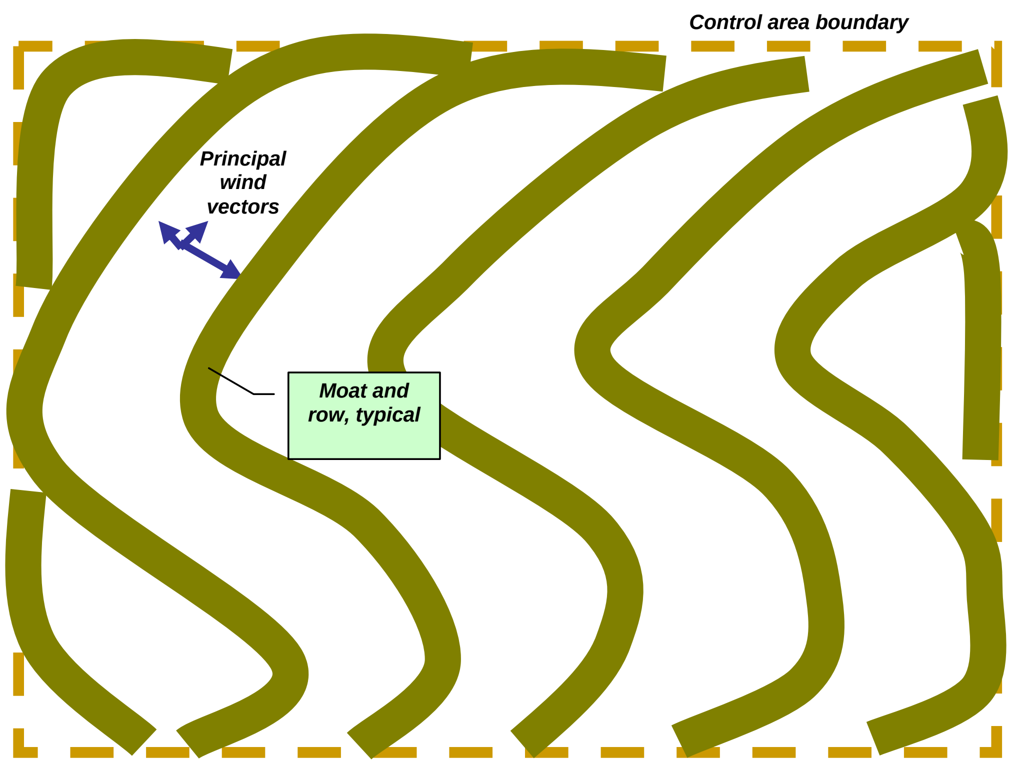


Figure E4-1. Moat and Row Array Plan View (schematic).

Attachment A

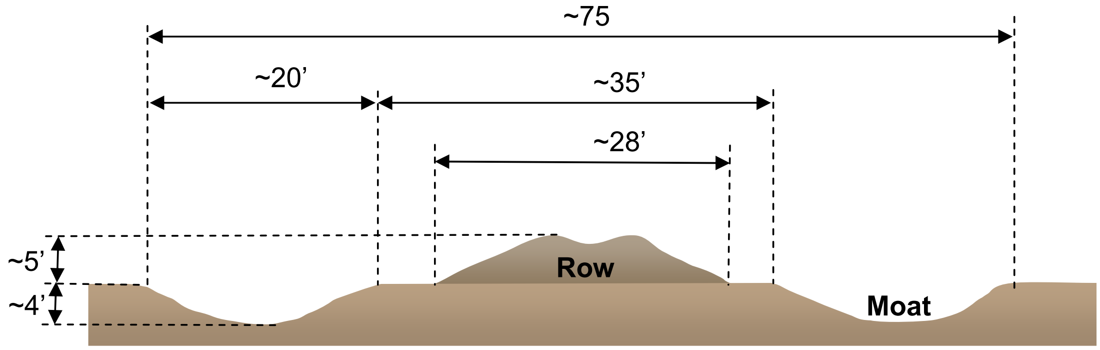


Figure E4-2. Profile of Moat and Row with Approximate Dimensions (schematic).

Attachment A

EXHIBIT 5 -- TDCA MINIMUM DUST CONTROL EFFICIENCY MAP

Shown are MDCEs calculated according to Sections 3 and 4 of the agreement.

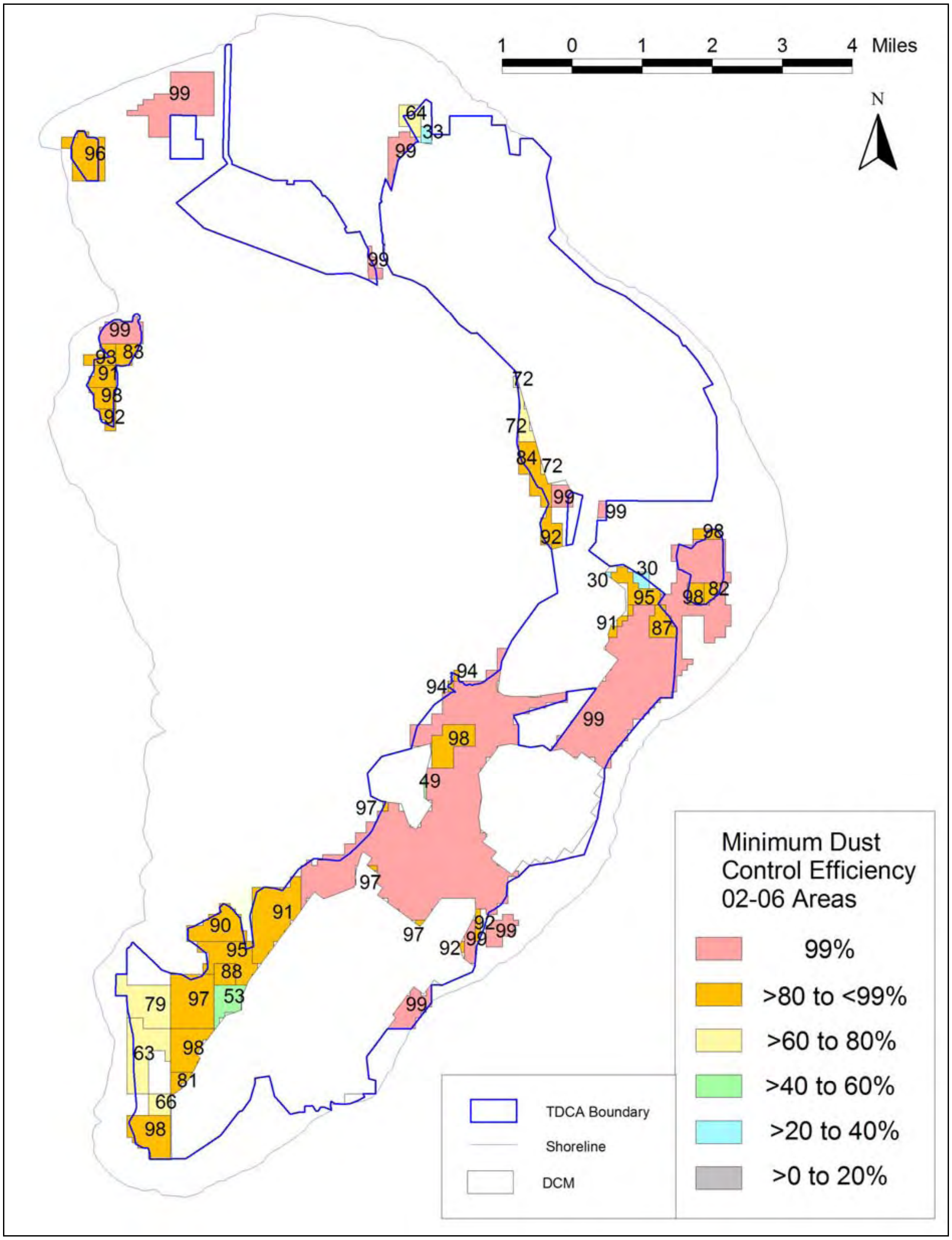


EXHIBIT 6 -- MDCE SELECTION PROCESS

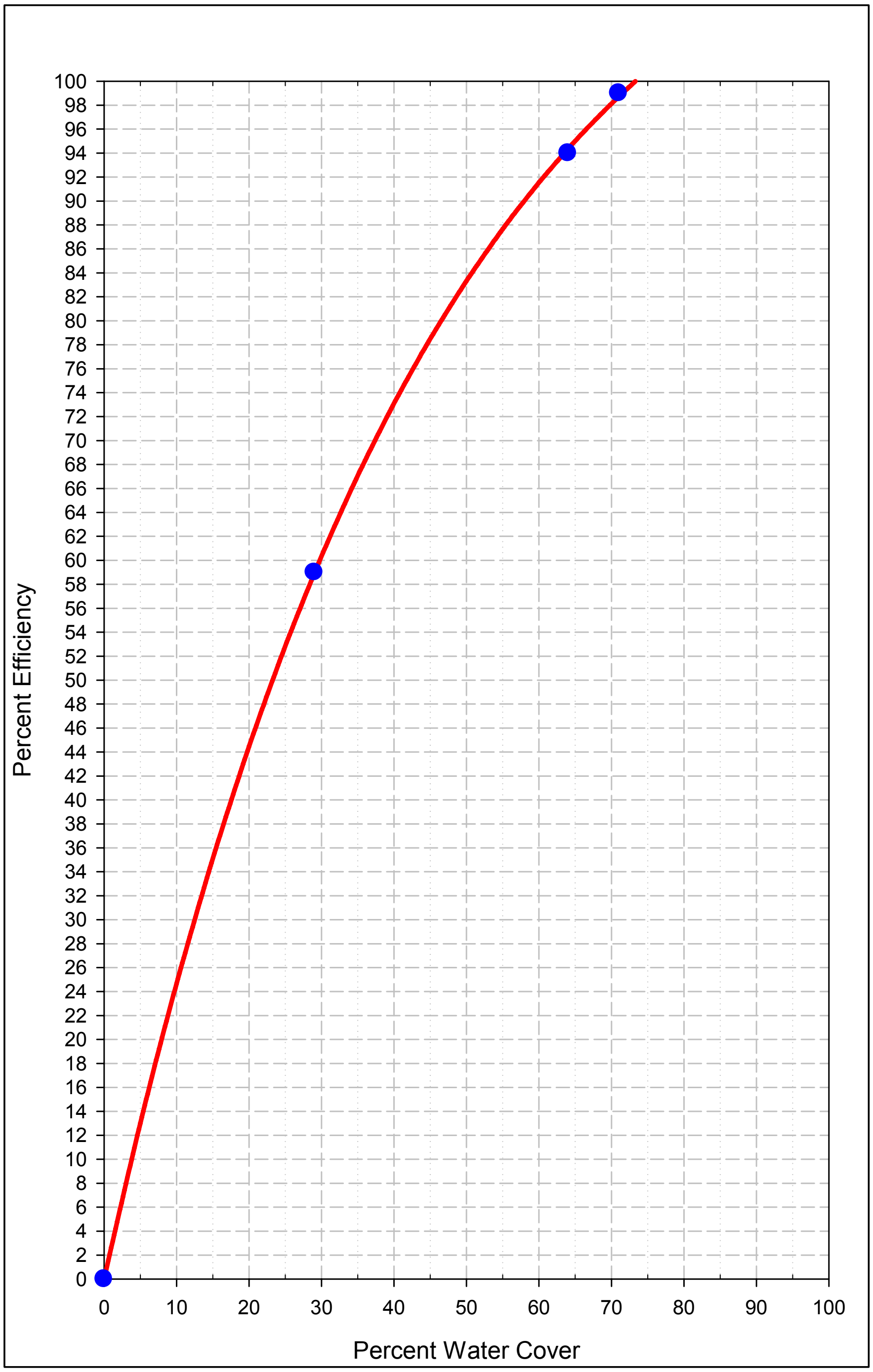
This exhibit summarizes the purpose of the MDCE Selection Process Spreadsheet. A copy of the Process Spreadsheet, which contains a description of the spreadsheet structure and operation, may be downloaded from the District's website at http://www.gbuapcd.org/.

The District developed the Dust ID Model as a tool for identifying dust control areas on the lake bed. The Dust ID Model computes the amount of dust being generated from each source area on the lake bed, but the results cannot be used without additional processing to identify the acceptable combinations of dust control required on each source area (that is, each area's minimum dust control efficiency or "MDCE") to achieve the federal 24-hour PM_{10} standard along the shoreline. There are many possible combinations of MDCEs that could produce the acceptable result of achieving the standard at the shoreline. For example, 50 percent control on hypothetical Area 1 and 99 percent control on Area 2 may produce the same modeled shoreline concentration as 99 percent control on Area 1 and 50 percent control on Area 2. However, the first combination might be more practical and less costly than the second, and for that reason it is important to have a process that can quickly and efficiently identify acceptable combinations. In all cases, the outcome of this process is some combination of area-by-area dust control efficiencies that produces a modeled attainment of the federal PM_{10} standard everywhere along the shoreline.

The process for selecting the acceptable combinations of dust control levels has been, heretofore, a manual process. The MDCE Selection Process Spreadsheet (Process Spreadsheet) was developed to more quickly and efficiently identify combinations of dust controls required to produce compliance with the federal 24-hour PM_{10} standard along the shoreline. The worksheet is set up so that MDCE calculations are automatic, yet it still allows manual adjustments to be made.

Attachment A

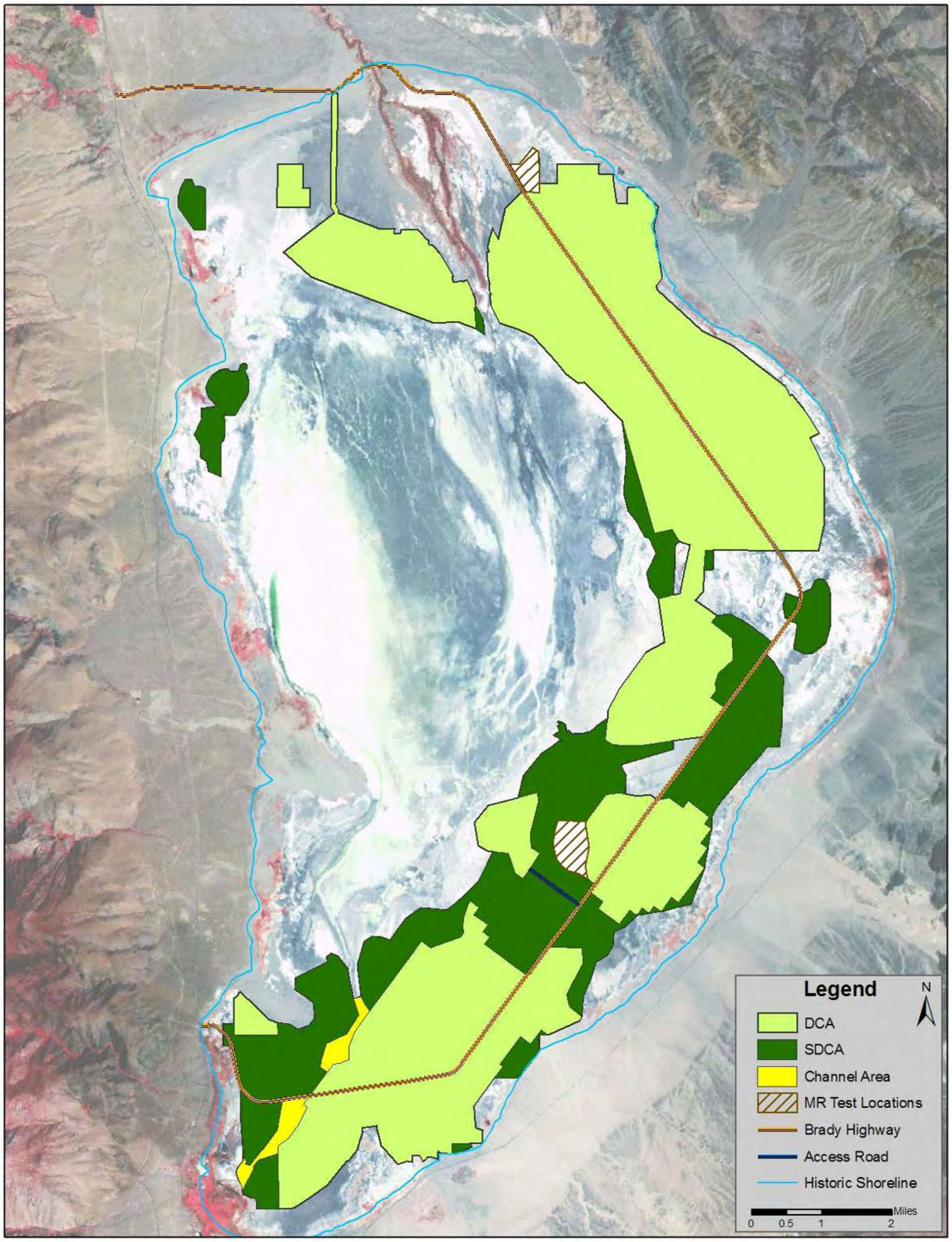
EXHIBIT 7 -- SHALLOW FLOOD CONTROL EFFICIENCY CURVE



Attachment A

EXHIBIT 8 -- MOAT AND ROW DEMONSTRATION PROJECT LOCATION MAP

Two proposed moat and row demonstration project locations



Attachment A

EXHIBIT 9 -- STUDY AREA MAP

Four proposed study area locations

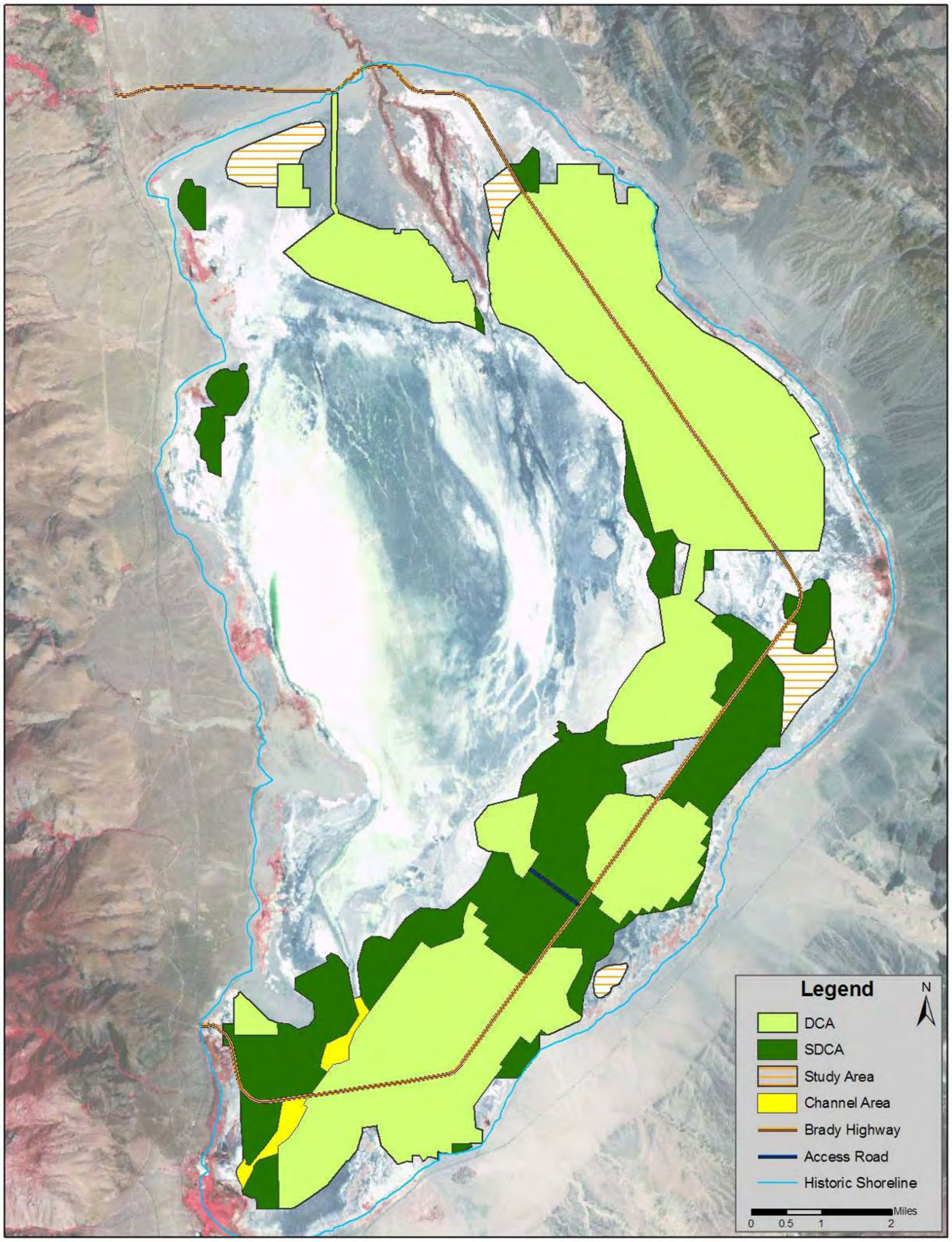


EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

Issue	Resolution	Duration	Units
Moat and Row			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
Managed Vegetation			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Gravel Patches			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
Shallow Flood			
Emissions from dry areas (insufficient uniformity of wetting)	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
Other features			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years)
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years)
New area shallow flood DCM[a]	2.9
New area managed vegetation DCM[a]	6.1
New area gravel cover DCM[a]	2.2
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4

[a]Assumes that total new area <2 square miles per year

EXHIBIT 13. DEFINITIONS

A. "Background PM_{10} concentration" shall mean the concentration of PM_{10} caused by sources other than from wind blown dust emanating from the Owens Lake bed. For the purpose of modeling air quality impacts, the background concentration is assumed to be 20 $\mu g/m^3$ (micrograms per cubic meter) during every hour at all receptor locations. The monitored and modeled PM_{10} emissions from the Keeler Dunes, which are located off the lake bed are treated as a separate dust source area and are not included in the background concentration.

B. "Best Available Control Measures" or "BACM" shall have the same definition as in the federal Clean Air Act. Approved BACM in the 2003 SIP was associated with PM_{10} emission reductions of at least 99 percent and includes managed vegetation, shallow flood, and gravel cover.

C. "Contingency measures" shall mean dust control measures or modifications to the dust control measures that can be implemented to mitigate dust source areas that cause or contribute to an exceedance of the federal standard at the historic shoreline in the event that a previously approved control strategy was found to be insufficient.

D. "Control Area" shall mean an area on the lake bed for which dust control is required.

E. "Control efficiency" shall mean the relative reduction or percent reduction in PM_{10} emissions resulting from the implementation of a control measure compared to the uncontrolled emissions.

F. "Control measures" shall mean measures effective in reducing the PM_{10} emissions from the lakebed surface over which they are implemented.

G. "Dust control measure" or "DCM" shall mean measures designed to suppress sand motion and reduce dust emissions from the Owens Lake bed.

H. "Dust ID Model" shall mean a computer-based air quality modeling approach developed as part of the 2003 SIP to identify emissive areas on the Owens Lake bed and to estimate the resulting PM_{10} concentrations at the shoreline. See also "Dust ID Program."

I. "Dust ID Program" shall mean a long-term monitoring and modeling program that is used to identify dust source areas at Owens Lake that cause or contribute to exceedances and violations of the federal PM_{10} standard. The current protocol for conducting the Dust ID Program is

included in the 2003 SIP (Exhibit 2 – Attachment 4). See also "Dust ID Model."

J. "Emission rate" shall mean the rate (expressed as mass per unit area per unit time) at which an air constituent (PM_{10}, for example) is transported away from the surface of the lake bed.

K. "Exceedance of the federal standard" or "exceedance" shall mean any single-day PM_{10} concentration that is monitored or modeled to be above 150 $\mu g/m^3$ (24-hour average from midnight to midnight) at any location at or above the historic shoreline.

L. "Historic shoreline" or "shoreline" shall mean the elevation contour line of 3,600 feet above mean sea level at Owens Lake, California.

M. "Lake bed" or "Owens Lake bed" or "playa" shall mean the exposed surface within and below the historic shoreline.

N. "Managed Vegetation" is a Dust Control Measure consisting of lakebed surfaces planted with protective vegetation.

O. "May not lawfully be included in the SIP" shall mean that inclusion of the provision in question in the revisions to the 2003 SIP has been determined by binding judicial order to be unlawful.

P. "MCDE-BACM" shall mean Dust Control Measures that achieve Minimum Dust Control Efficiency and are found to be appropriate for the area of application.

Q. "Minimum Dust Control Efficiency" or "MDCE" shall mean the lowest dust control efficiency, as determined by the Dust ID model, in the Supplemental Dust Control Area necessary to meet the federal standard at the historic shoreline.

R. "Moat and Row" shall mean a Dust Control Measure consisting of arrays of sand breaks that arrest sand motion.

S. "PM_{10}" or "particulate matter" shall mean atmospheric particulate matter less than 10 micrometers in nominal aerodynamic diameter.

T. "PM_{10} monitor" shall mean an instrument used to detect the concentrations of PM_{10} in the air.

U. "Sand flux monitor" shall mean a device used to measure the amount and/or rate of moving or saltating sand and sand-sized particles caused by wind erosion.

V. “Shallow Flood” is a Dust Control Measure consisting of lakebed areas wetted to a specified proportion of surface coverage.

W. “2003 SIP” or “2003 Owens Valley PM_{10} State Implementation Plan” shall mean the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision – Adopted November 13, 2003.

X. “Supplemental Control Requirements” or “SCR” shall mean Dust Control Measures required by the District on areas outside of the DCA that cause or contribute to an exceedance of the federal PM_{10} standard at the historic shoreline of Owens Lake.

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Attachment B

Board Order 080128-01
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2008 Owens Valley Planning Area
Supplemental Control Requirements Determination Procedure

BACKGROUND

The State Implementation Plan (SIP) adopted by the Great Basin Unified Air Pollution Control District (District) in 2003 required the City of Los Angeles (City) to install and operate PM_{10} controls on a total of 29.8 square miles of the dried Owens Lake bed by the end of 2006. The 2003 SIP also contained a provision and procedures for an annual review of air quality monitoring data by the District's Air Pollution Control Officer (APCO) in order to determine if controls were needed on additional areas beyond the 29.8 square miles in order for the Owens Valley Planning Area to attain or maintain the federal 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS). If additional controls were needed, the 2003 SIP provided for the APCO to require the City to implement the necessary controls. This annual review and possible requirement for additional controls is known as the Supplemental Control Requirements (SCR) determination. The 2003 SIP required that SCR determinations use data collected starting July 1, 2002.

In December 2005, after analyzing data collected from July 2002 through June 2004, the District's APCO made the first SCR determination under the provisions of the 2003 SIP. The City objected to the APCO's analysis and submitted an alternative analysis of the data. After reviewing the City's analysis, the APCO revised the SCR determination in April 2006. The City also objected to the revised determination and filed a lawsuit against the District in May 2006. In June 2006 the City and the District entered into settlement negotiations in an attempt to resolve their disputes.

In December 2006 a final Settlement Agreement was approved by the District and the City. This agreement is Attachment A to Board Order 080128-01. Among other issues, the Settlement Agreement provides for modifications to be made to the 2003 SIP's SCR determination procedure. These modifications are incorporated into this revised 2008 SCR determination procedure.

CONDITIONS

The 2008 Owens Lake Dust Source Identification Program Protocol (Protocol) (Attachment C) contains the procedures to collect, screen, analyze and model the data used by the District's APCO to determine if exceedances of the 24-hour PM_{10} NAAQS have occurred and additional Supplemental Controls are necessary on the Owens Lake bed. The following actions may be taken by the APCO and will not be considered a change to the Protocol:

- Add, remove or move PM_{10} monitors and meteorological stations
- Replace TEOMs with any other USEPA-approved Reference or Equivalent Method monitors that collect hourly concentration data
- Replace Sensits with any other sand flux monitor (SFM) that collects hourly data
- Replace Cox Sand Catchers with any other SFM

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- Add, remove or move SFMs as long as the maximum grid cell size for modeling remains at one square kilometer
- Calculate “from-the-lake” wind directions for new PM_{10} monitor sites
- Determine default K-factors for new source areas

The Protocol and these Supplemental Control Requirements (SCR) specify many assumptions and decision trees to be followed that may need to be changed in the future. The following changes to the Protocol and the SCR may be made by written agreement of the APCO and the General Manager of the City of Los Angeles (City) Department of Water and Power:

- The background value of 20 $\mu g/m^3$ may be changed to another value or a procedure may be established to calculate the background from upwind/downwind lake bed monitors
- The default K-factors may be updated
- The default seasonal cut points may be updated
- The CalPUFF modeling system may be changed to another USEPA guideline model
- The procedure for determining the sand flux from a Dust Control Measure (DCM) area may be updated
- The K-factor screening criteria may be updated
- From-the-lake wind directions in Attachment B, Table 1 may be changed to avoid including off-lake sources
- Non-reference or non-equivalent method special purpose PM_{10} monitors may be added
- Procedures for determining source area boundaries may be updated
- Methods for directly measuring source area emission rates may be implemented

DEFINITIONS

A ***shoreline or near-shore PM_{10} monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM_{10} Monitor located approximately on the 3600-foot elevation (historic shoreline) contour, or within the Owens Valley Non-Attainment Area above the 3600-foot elevation. The existing shoreline or near-shore PM_{10} monitors are at Keeler, Flat Rock, Shell Cut, Dirty Socks, Olancha, Bill Stanley and Lone Pine (see Attachment B, Map 1).

A ***special purpose PM_{10} monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM_{10} monitor installed upwind of or near potential dust source areas on the lake bed below the 3600-foot elevation. These lake bed PM_{10} monitors will be used to monitor new dust sources areas to generate new K-factors and to evaluate model predictions at the PM_{10} sites. They shall not be used to monitor compliance with the NAAQS and the data will not be submitted to USEPA’s Aerometric Information and Retrieval System (AIRS).

An ***exceedance*** is a midnight to midnight Pacific Standard Time 24-hour average PM_{10} concentration greater than 150 $\mu g/m^3$ measured by a shoreline or near-shore PM_{10} monitor.

From-the-lake wind directions are determined by extending two straight lines from the PM_{10} monitor site to the points on the 3600-foot contour of the Owens Lake bed that maximize the angle in the direction of the lake bed between the two straight lines. From-the-lake and non-lake wind directions for the existing PM_{10} monitor sites are shown in Attachment B, Table 1.

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Physical evidence of a source area boundary consists of Global Positioning System (GPS) data, visual observations, photographic observations, video observations, or any other method described for this purpose in the Dust ID Protocol.

BACM are Best Available Control Measures/Most Stringent Measures (MSM) defined as the dust controls determined to be BACM/MSM for Owens Lake in Paragraphs 15, 16 and 17 of Board Order 080128-01. If, in the future, the District changes or deletes existing BACM or adds new BACM, then the dust controls are those as revised by the latest District action.

Implements BACM control measures means BACM are constructed and meeting the performance standards outlined Paragraphs 15, 16 and 17 of Board Order 080128-01.

Extreme violators are areas currently required to implement BACM, but BACM are found to be insufficient to adequately control emissions.

Environmental analysis document complete means that a project level environmental document has been certified covering the location and the BACM/MSM selected for implementation by the City.

<u>GENERAL SCR DETERMINATION PROCEDURE</u>

1. If the City is in compliance with Paragraphs 1 and 3 of Board Order 08128-01 regarding the amount, timing and operation of existing and future dust controls, the APCO will not issue additional written SCR determinations until after May 1, 2010 and will not use data collected prior to April 1, 2010 for new determinations, except for Study Areas as provided in Paragraph 2, below. This will allow the City time to complete construction and implementation of the additional PM_{10} controls within the 2008 Total Dust Control Area.

2. After May 1, 2010, the APCO will recommence written SCR determinations using the latest SCR procedure. Recommenced determinations will use data collected only after April 1, 2010, except in those areas delineated as Study Areas. SCR determinations for Study Areas shall use data collected after July 1, 2006. The APCO shall make SCR determinations at least once in every calendar year. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure construction activities.

3. If, pursuant to Paragraph 2, herein, the APCO determines that a monitored or modeled exceedance of the federal 24-hour PM_{10} NAAQS caused by emissions from the lake bed has occurred at or above the historic shoreline:

   A. The APCO, based on all available information, including, visual observation, physical evidence, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.

      (i) If the APCO identifies the need for additional controls and/or increased MDCE on existing controls, the APCO shall issue a written SCR determination to the City.

(ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination.

(iii) If the City submits an alternative analysis, the APCO shall consider the City's analysis and has full and sole discretion to withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

(iv) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the outcome of the Dispute Resolution Process.

(v) In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316. The CARB will act within 90 days on the City's appeal.

(vi) The implementation of additional control measures under the SCR determination process will be considered contingency measures under Section 172(c)(9) of the federal Clean Air Act and will be implemented automatically upon final action of the SCR determination.

B. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

C. If the City proposes in their Remedial Action Plan to decrease the control efficiency in any previously controlled dust source area, the City must demonstrate that the proposed strategy will control dust sources to the extent that there are no modeled exceedances at the shoreline based on:

(i) new dust event(s) that caused or contributed to a modeled or monitored exceedance,

(ii) dust events that took place from July 2002 through June 2006 based on the results of the MDCE Selection Process Spreadsheet as set forth in the 2006 Settlement Agreement, and

(iii) that previously determined control efficiency levels are maintained in (a) all areas that are required to have 99% control efficiency or higher in the 2003 SIP Dust Control Area and (b) new dust source areas that are not included in the MDCE Selection Process Spreadsheet.

D. The District may, as appropriate, also issue Notices of Violation.

4. In the event:

A. The APCO has made a written determination pursuant to Paragraph 3 that an exceedance of the federal standard, occurring after April 1, 2010, resulted from a Control Area or portion of a Control Area treated with the Moat & Row PM_{10} control measure; and

B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Paragraph 6 below; and

C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (i.e., an exceedance occurred after the City's initial attempt to remediate that area under Paragraph 6);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat & Row to MDCE-BACM or BACM as described in Paragraphs 15, 16 and 17 of Board Order 080128-01, to address the exceedance described in Paragraph 4.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Paragraph 9.

5. If the APCO determines that Moat & Row constitutes BACM or MDCE-BACM as provided for in Attachment D of Board Order 080128-01, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area," then upon issuance of such written determination, the provisions of Paragraph 4 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Paragraph 5.

6. A Remedial Action Plan prepared by the City pursuant to Paragraph 3.B will contain a description of:

A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:

(i) Maintenance of facilities (*e.g.*, berms, moats and rows);

(ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);

(iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, surface-protecting elements) of Moat & Row areas;

(iv) Transition of Moat & Row areas to BACM, or MDCE-BACM.

B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.

C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

7. The Schedule of Contingency Measures incorporated as part of this Procedure as Attachment B, Exhibit 1 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Paragraph 6, and the timing required for their implementation.

8. Before any full-scale Moat & Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat & Row area consistent with Paragraph 4. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat & Row to another DCM is needed, or where such transition is required pursuant to Paragraph 4.

9. Areas to be transitioned from Moat & Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat & Row Transition Schedule incorporated as Attachment B, Exhibit 2. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. In all cases, the time allowed for implementation of control measures shall not include any time between the City's appeal to the California Air Resources Board under the provisions of Health and Safety Code Section 42316 and resolution of such an appeal.

DETAILED SCR DETERMINATION PROCEDURE

Exceedances of the federal 24-hour PM_{10} National Ambient Air Quality Standard of 150 µg/m³ at or above the historic shoreline of Owens Lake (elevation 3600 feet above mean sea level) can either be measured directly via a PM_{10} monitor or they can be modeled using the procedures set forth in the latest Owens Lake Dust Source Identification Program Protocol. Set forth below are the two procedures to be used by the APCO in making SCR determinations: the first uses directly monitored exceedances and the second uses modeled exceedances.

A. MONITORED EXCEEDANCES

A.1 – Do lake bed source areas cause or contribute to a monitored 24-hour average PM_{10} concentration greater than 150 µg/m³ at an historic shoreline PM_{10} monitor or at a near-shore PM_{10} monitor?

Any event that causes a monitored 24-hour average PM_{10} concentration greater than 150 µg/m³ at a shoreline or near-shore PM_{10} monitor will be evaluated to determine if lake bed dust source areas caused or contributed to the exceedance. The following steps will be used to screen hourly PM_{10} concentrations to determine if a lake bed source area caused or contributed to a monitored exceedance:

1) For hourly average from-the-lake wind directions, use the recorded hourly PM_{10} concentration.
2) For hourly average non-lake wind directions or missing data, replace the recorded hourly PM_{10} concentration with the background concentration of 20 µg/m^3.

3) Average the adjusted hourly concentrations from steps 1 and 2 for the 24-hour period from midnight to midnight, Pacific Standard Time.

If the 24-hour average of the adjusted hourly PM_{10} concentrations exceeds 150 $\mu g/m^3$ at the monitor site, go to A.2. If not, go to B.1.

A.2 – Is there physical evidence of lake bed emissions and/or air quality modeling sufficient to define boundaries for the area to be controlled?

Source Delineation.
If possible, the boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol (Attachment C).

If neither the GPS boundary nor other physical evidence, as described above, is available, the default area size will be one square kilometer centered on the sand flux monitor (SFM), or one grid cell if the SFMs are in a closer array.

If there is physical evidence, as described above, to define the boundaries for the area to be controlled, and no K-factor for that area or no sand catch data above one gram for the sampling period from a sand flux sampler located within a 30 degree upwind cone centered on the wind direction of the defined source, then modeling cannot be performed. Go to A.3.

Modeling.
If sand flux data is available for the exceedance identified in A.1, the District will model the event. Modeling will be performed following the latest Dust ID Modeling Protocol using the source area determined above.

The order of priority for applying K-factors in the model will be:

1) When available, the District will use event specific storm-average K-factors to model dust events at the PM_{10} monitor if there are three or more hours of screened hourly K-factors for a 48-hour period. If not,

2) The District will use the most recent temporal and spatial 75-percentile hourly K-factors to model events, if there are nine or more screened hourly K-factors for a period and they are determined by the methods described in the most current Dust ID Protocol. If not,

3) The District will use the default K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area.

Only those on-lake and off-lake dust sources with sand flux data will be included in the model. All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review.

The modeling results will be used to prioritize multiple upwind source areas for control, or to determine the fraction of a single upwind source area that needs to be controlled.

Go to A.3

If neither physical evidence nor model results are available, go to A.5.

A.3 – District directs City to implement dust controls.

Source areas in A.2 that cause or contribute to an exceedance may be new source areas, or may be emissions from areas with existing dust controls. The APCO will determine, in writing, that conditions specified in Section A.1 were met for a specified area determined by A.2. For emissions from areas with existing dust controls, the City will have the choice of increasing the controls in the existing dust control areas or controlling other contributing sources that will result in lowering the monitored impact below the 150 $\mu g/m^3$ exceedance threshold, if such areas exist. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to A.4.

A.4 – City implements dust controls.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

A.5– District collects additional physical evidence and installs sand flux monitors in suspected areas.

If there is insufficient physical evidence and no sand flux monitor data to determine the emissive area on the lake bed that caused the monitored or modeled exceedance, the District will install Sensits and Cox Sand Catchers (CSC) sand flux monitors in the suspected area in a sampling array with a maximum spacing of one kilometer. The District will also continue to collect other physical evidence.

B. Modeled Exceedances

B.1 – Does the Dust ID model predict a 24-hour shoreline concentration greater than 150 μg/m³, including background?

Dispersion Modeling Analysis.
At least once a year, the District will examine the Dust ID information and dispersion model to determine if there have been any modeled shoreline exceedances since the period included in the last model run. Modeling will be performed following the 2008 Owens Lake Dust Source Identification Program (Dust ID) Protocol (Attachment C).

K-factors.
New K-factors may be generated from PM_{10} concentrations measured at any shoreline or near-shore PM_{10} monitor using the methods described in the Dust ID Protocol. The order of priority for applying K-factors in the model will be:

1) The current temporal and spatial 75th percentile hourly K-factors. The District will use the current modeling period temporal and spatial 75th percentile hourly K-factors to model events, if there are nine or more hourly K-factors for an agreed upon seasonal period and area determined by the methods described in the most current Dust ID Protocol.

2) If there is no agreement on seasonal cut-points, the default cut points, as shown in Attachment B, Table 2, will be used with number 1, above.

3) If there is no agreement on area, the default areas, as shown in Attachment B, Map 1, will be used with number 1, above.

4) If there are fewer than nine hourly K-factors for any area and period, go to 5), below.

5) Default K-factors from Attachment B, Table 2. The District will use the K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area. If the new dust source area is not within a K-factor area shown in Attachment B, Table 2, the APCO shall determine the default K-factor for the new source area based on the default K-factors of areas with similar soil characteristics.

Source Area Size, Location and Sand Flux.
The boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol.

The details of how to delineate source area boundaries are contained in the Dust ID Protocol.

If neither the GPS boundary nor the other physical evidence as described above is available, the default area size will be one square kilometer centered on the SFM, or one grid cell if the SFM are in a closer array.

All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review. If the modeling shows that lake bed source areas have caused or contributed to any modeled shoreline PM_{10} impact greater than 150 µg/m³ for a 24-hour average, go to B.7. If not, go to B.2.

B.2 – Is the modeled concentration less than 100 µg/m³?

This refers to the modeled concentration calculated in B.1 and includes the background PM_{10} level of 20 µg/m³. If yes, go to B.6. If no, go to B.3.

B.3 – District directs the City to commence environmental impact analysis, design and permitting.

The APCO will direct the City in writing to choose the BACM it wishes to implement in the area identified in B.1.

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The City will develop a scope of work for the identified potential source areas, including: (1) a summary of the sites pertinent conditions, features, and location, (2) appropriate control alternatives and approach, including a conceptual layout of dust control and integration into the TDCA (roads, water supply, drainage, and power), (3) standard and site-specific permitting considerations, (4) anticipated environmental documentation considerations and approach, and (5) an approximate timetable for implementation beginning at an undefined start date that might coincide with a future SCR determination . City shall complete these steps within 180 days of the date of the written direction from the APCO. Go to B.4.

B.4 – District deploys reference and/or non-reference method Special Purpose PM_{10} monitor(s) to confirm model (if not already deployed).

The District will deploy reference and/or non-reference method Special Purpose PM_{10} monitor(s) on the lake bed upwind and downwind of the identified emissive area, if there are no existing monitors at locations that can be used in Section B.5 to refine the model predictions. Monitors will be sited between 250 and 5000 meters outside of any GPS'd or observed source area boundaries. These PM_{10} monitoring sites may be removed after the model confirmation procedure described in B.5. Shoreline and near-shore PM_{10} monitors that are sited to confirm the model may be used for NAAQS compliance, if an exceedance is monitored. Go to B.5.

B.5 – Is the refined model prediction greater than 150 μg/m³?

For each event measured under Section B.4 that results in a 24-hour monitored concentration of greater than 100 μg/m³, the event-specific K-factor (defined in the Dust ID Protocol) will be used to model the concentration at the shoreline receptors. If the event-specific K-factor was derived for the same year and season as the original event modeled in B.1, the Section B.1 event will be remodeled using the new K-factor. If either that remodeled concentration for the Section B.1 event, or the new modeled concentration for the on-lake monitored event, is greater than 150 μg/m³ at a shoreline receptor, go to B.7. If not, go to B.6.

The District will make a determination if any currently modeled event within the same season and K-factor area using the appropriate K-factors as determined by this procedure causes a shoreline receptor to exceed 150 μg/m³. If yes, go to B.7.

B.6 – No action required.

No action is required of the City at this time. Data collected during this period can be used in conjunction with data collected at a later time to define emissive areas on the lake bed according to this protocol and to develop K-factors for emissive areas.

B.7 – District directs the City to implement dust controls.

Source areas in B.1 and B.5 that cause or contribute to an exceedance may be new source areas or existing source areas with less than the required level of control (MDCE not high enough to prevent exceedances).

The APCO will determine, in writing, that conditions specified in Sections B.1 or B.5 were met for the specified area. Within 30 days of that determination by the APCO, the City will be notified of that determination in writing. If possible, the City will have the choice of increasing

the control efficiencies on existing dust control areas and/or controlling other contributing sources that will result in lowering the modeled impact below the 150 µg/m³ exceedance threshold. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6, above, to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to B.8.

B.8 – City implements BACM.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

For source areas that arrive at B.7 from B.5, all time periods in the above referenced implementation schedule in B.8 shall apply but be reduced by the time period elapsed since the date of the written direction from the APCO described in Section B.3, or one year, whichever is less.

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Attachment B Enclosures

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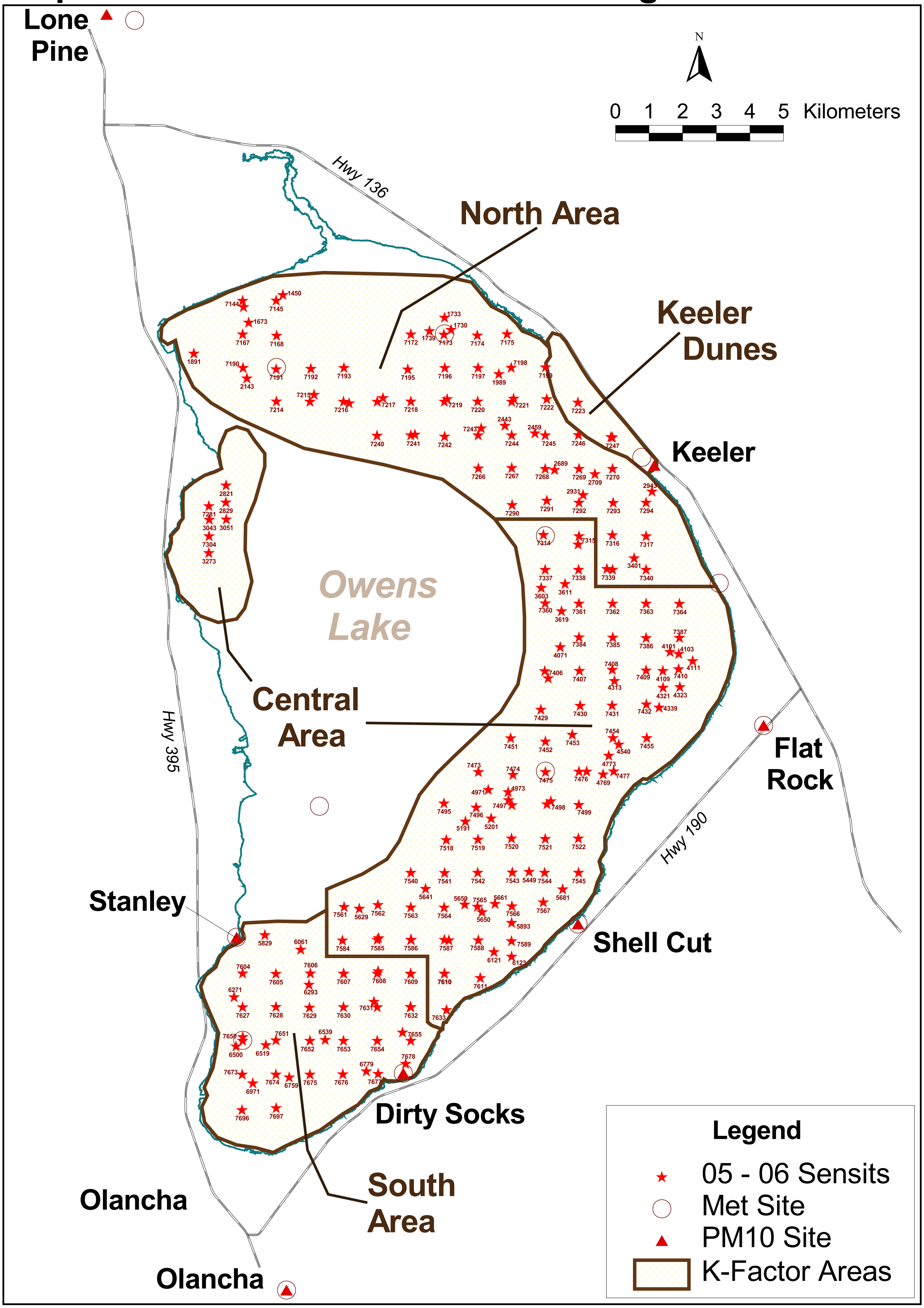
Map 1 - Owens Lake Dust ID monitoring network



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Attachment B - Table 1

From-the-Lake and Non-Lake Wind Directions for PM_{10} Monitor Sites

PM_{10} Monitor Site	From-the-Lake Wind Dir. (Deg.)	Non-lake Wind Dir. (Deg.)	Met Tower
Lone Pine	126≤WD≤176	WD<126 or WD>176	Lone Pine
Keeler	147≤WD≤290	WD<147 or WD>290	Keeler
Flat Rock	224≤WD≤345	WD<224 or WD>345	Flat Rock
Shell Cut	WD≥227 or WD≤ 33	33<WD<227	Shell Cut
Dirty Socks	WD≥234 or WD≤50	50<WD<234	Dirty Socks
Olancha	WD≥333 or WD≤39	39<WD<333	Olancha
Bill Stanley	WD≥349 or WD≤230	WD<349 or WD>230	Bill Stanley
New Sites	TBD	TBD	TBD

TBD – From-the-lake and non-lake wind directions will be determined for new sites by the APCO when sites are selected.

Attachment B - Table 2

Default Spatial and Temporal K-factors for the Dust ID Model

AREA	K-factor Jan.– Apr. & Dec.	K-factor May-Nov. (These are the default cutpoints.)
Keeler Dunes	7.4×10^{-5}	6.0×10^{-5}
North Area	3.9×10^{-5}	1.5×10^{-5}
Central Area	12.0×10^{-5}	6.9×10^{-5}
South Area	4.0×10^{-5}	1.9×10^{-5}

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Attachment B - Exhibit 1: Schedule of Contingency Measures

From 2006 Settlement Agreement

EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

Issue	Resolution	Duration	Units
Moat and Row			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
Managed Vegetation			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Gravel Patches			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
Shallow Flood			
Emissions from dry areas (insufficient uniformity of wetting)	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
Other features			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

Attachment B - Exhibit 2

From 2006 Settlement Agreement

EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years)
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

Attachment B - Exhibit 3

From 2006 Settlement Agreement

EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years)
New area shallow flood DCM[a]	2.9
New area managed vegetation DCM[a]	6.1
New area gravel cover DCM[a]	2.2
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4

[a]Assumes that total new area <2 square miles per year

Board Order 080128-01
Attachment C

2008 Owens Lake Dust Source Identification Program Protocol

Great Basin Unified Air Pollution Control District
157 Short Street, Bishop, California 93514
Telephone (760) 872-8211

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Attachment C

2008 Owens Lake Dust Source Identification Program Protocol

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Glossary of Terms and Symbols

AIRS	US Environmental Protection Agency's Aerometric Information and Retrieval System
ATV	All-Terrain Vehicle
APCO	Air Pollution Control Officer
BACM	Best Available Control Measure
BACT	Best Available Control Technology
CAAA	Clean Air Act Amendments of 1990
CALMET	A meteorological preprocessor program for CALPUFF.
CALPUFF	An air pollution model
CARB	California Air Resources Board
CSC	Cox Sand Catcher, a passive sand flux measurement device.
DCA	Dust Control Area
DCM	Dust Control Measure
Dust ID Program	Owens Lake Dust Source Identification Program
EIR	Environmental Impact Report
Event-specific K_f	Weighted-average of hourly K-factors for a dust event, weighted by the hourly PM_{10} concentration
Exceedance	Modeled or monitored PM_{10} > 150 µg/m^3 at the shoreline
FTEE	Full-time equivalent employee
GBUAPCD	Great Basin Unified Air Pollution Control District
GIS	Geographic Information System
GPS	Global Positioning System
KE	Kinetic energy
K-factor	Proportionality constant for sand flux and PM_{10} emissions, K_f
LADWP	City of Los Angeles Department of Water and Power (also City)
m^3	cubic meter
met	meteorological
mg	milligram
MSM	Most Stringent Measure
NAAQS	National Ambient Air Quality Standards
NEAP	Natural Events Action Plan
OVPA	Owens Valley PM_{10} Planning Area
PC	Particle count
PM_{10}	Particulate matter less than 10 microns aerodynamic diameter
QA	Quality Assurance
RASS	Radio Acoustic Sounding System
RSIP	Great Basin APCD 2003 Owens Valley PM_{10} Planning Area Revised State Implementation Plan

Sensit	An electronic sand motion detector.
Settlement Agreement	2006 Settlement Agreement between LADWP and GBUAPCD
Storm-average K_f	Arithmetic average of hourly K-factors for a dust event
SCR	Supplemental Control Requirements of the 2003 SIP
SFM	Sand flux monitor
TEOM	Tapered-Element Oscillating Microbalance, measures PM_{10}.
USEPA	United States Environmental Protection Agency
USGS	US Geological Survey
WD	Wind direction
2003 SIP	Great Basin APCD 2003 Owens Valley PM_{10} Planning Area Revised State Implementation Plan
μg	microgram

Attachment C

2008 Owens Lake Dust Source Identification Program Protocol

1. Program Overview

1.1 Introduction

The objective of the Owens Lake Dust Source Identification (Dust ID) Program is to identify dust source areas at Owens Lake that can cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) for PM_{10}. The Dust ID Program is a long-term monitoring program that is intended to identify dust source areas for control under the provisions of the Supplemental Control Requirements (SCR) in the 2003 revised Owens Valley PM_{10} State Implementation Plan (RSIP) and the 2006 Owens Lake Settlement Agreement (Settlement Agreement). The text of the Settlement Agreement and SCR provisions is included in the appendices to this document.

The RSIP and Settlement Agreement require the City of Los Angeles Department of Water & Power (City) to control all sources of wind blown dust from the lake bed of Owens Lake that cause or contribute to an exceedance of the PM_{10} NAAQS at the historic shoreline (3,600-foot contour line). Based on dust events that occurred between January 2000 and July 2006, 43 square miles of the lake bed were found to cause or contribute to NAAQS violations. Dust controls are required to be implemented on 29.8 square miles of the lake bed by December 31, 2006, and an additional 13.2 square miles by April 1, 2010.

Provided that these control measures are implemented in accordance with the RSIP and Settlement Agreement, the District will suspend making determinations to control additional dust source areas from December 4, 2006 until May 1, 2010. During this period, all monitoring, modeling and observations will continue as described in this Dust ID Program Protocol. Data and information collected during this period will be used to determine any control requirements for Study Areas as described in the Settlement Agreement, and to advise the City on any monitored dust emissions from the lake bed and surrounding areas. If any new lake bed dust source areas are identified from data collected after April 1, 2010, they will be subject to dust control requirements as provided for in the Settlement Agreement and any future revisions to the Owens Valley PM_{10} State Implementation Plan. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure (DCM) construction activities.

1.2 Locating Dust Source Areas

A network of sand flux samplers, PM_{10} monitors, meteorological towers and remote camera sites will be used to monitor and locate dust source areas at Owens Lake. Figure 1.1 shows a map of the Dust ID network at Owens Lake. As configured in 2003, the Dust ID network included: sand flux monitors at 136 lake bed sites at 1-km spacing, 7 PM_{10} monitors, 13 met towers, 8 observation sites, and 10 time-lapse cameras at 7 sites. At the discretion of the Air Pollution Control Officer, additional sand flux, PM_{10} and met sites will be added as necessary to collect

information that can be used to monitor and model the impact from new areas that may become emissive on the lake bed.

The automated monitoring network will be augmented with information from observers who will map dust source locations from off-lake sites when dust events take place during normal work hours. These maps will be used to help document source areas that may be outside the sand flux network or that may be within the network, but missed by the samplers. Field personnel will inspect active source areas and map the source area boundaries using a GPS (Global Positioning System) as conditions allow. Data collected from the sand flux network, visual mapping and GPS surveys will be included in a Geographic Information System (GIS) database for mapping and analysis. Maps generated using these different methods will be compared qualitatively to help delineate source area boundaries.

1.3 Monitored Exceedances

Analysis of hourly PM_{10} concentrations at shoreline and off-lake monitoring sites may show that lake bed source areas cause or contribute to PM_{10} exceedances. Monitoring of PM_{10} concentrations will be done using US EPA-approved monitors. Currently, hourly PM_{10} readings are obtained using TEOM (Tapered-Element Oscillating Microbalance) PM_{10} monitors manufactured by R&P, Inc. If a PM_{10} exceedance is monitored, PM_{10} concentrations will be paired with the local wind direction for each hour of that event to determine if lake bed source areas caused or contributed to the exceedance.

Twenty-four hour average PM_{10} monitor concentrations will be adjusted for winds coming from the direction of the lake to the monitor (from-the-lake) and from directions not from the lake to the monitor (non-lake). PM_{10} concentrations during any hour with winds from a non-lake wind direction will be assumed to have an average background concentration of 20 $\mu g/m^3$ and from-the-lake wind directions will be given their hourly value. If the adjusted 24-hour average is greater than 150 $\mu g/m^3$, then an exceedance will have been monitored from a lake bed source or sources.

If a lake bed source area causes or contributes to an exceedance, hourly PM_{10} concentrations and wind directions will be reviewed to see if a new source area (or areas) is associated with that exceedance. If sand flux data are available that show erosion activity in the direction of a new source area, this event will also be modeled as described in the air quality modeling protocol. If the PM_{10} monitor data indicate that a new source area caused or contributed to an exceedance, DCMs may be required under the provisions of the Settlement Agreement or current SIP.

1.4 Modeled Exceedances

Air quality modeling will be performed with the CALPUFF modeling system or other United States Environmental Protection Agency (USEPA) approved modeling method. At least once a year, the Dust ID information will be examined and the model will be run to determine if there were any modeled shoreline exceedances since the period covered by the last model run. PM_{10} emissions for the model will be based on hourly sand flux measured at lake bed sites and spatial and temporal factors derived using the empirical relationship between sand motion on the lake

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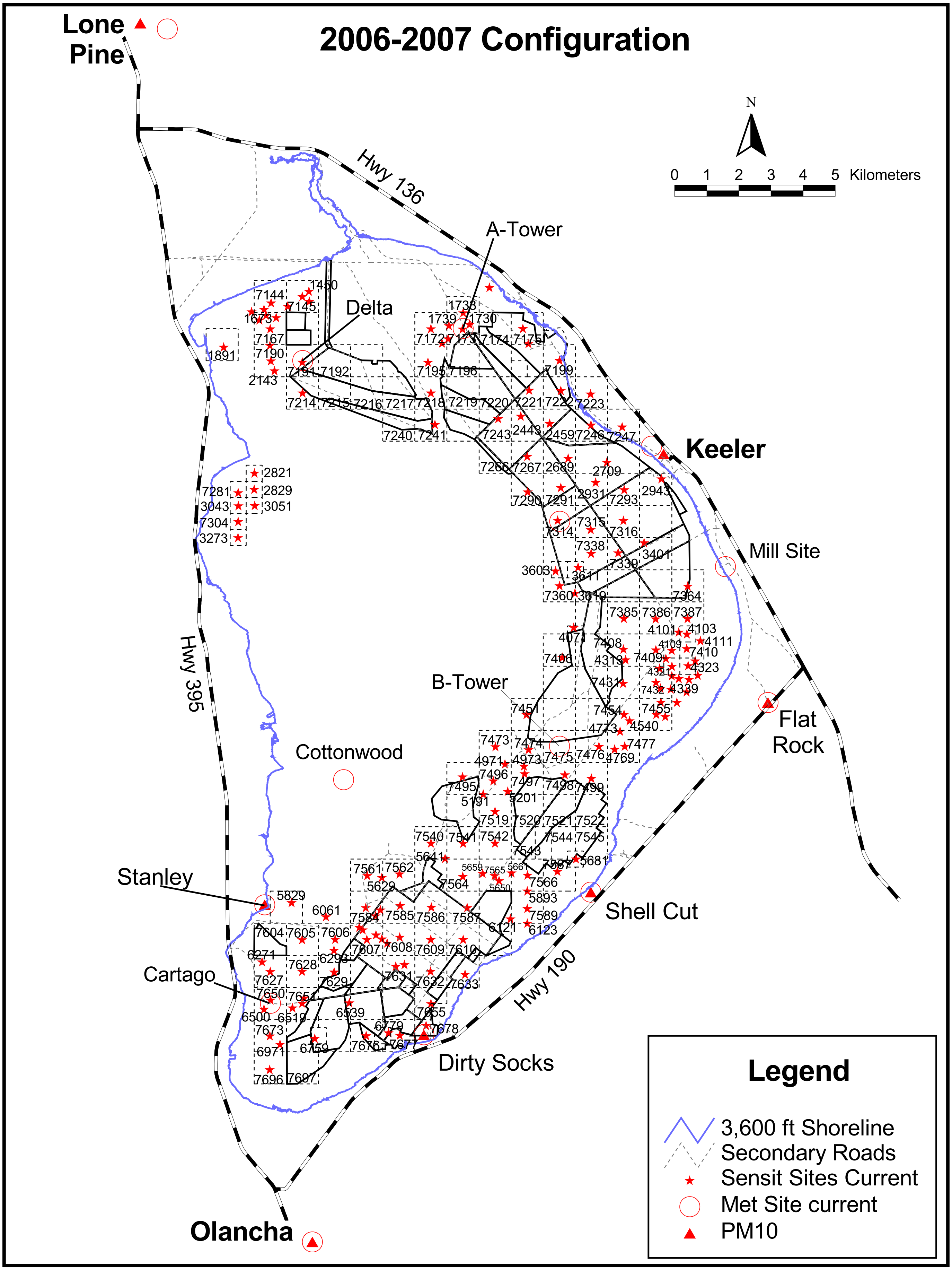

Figure 1.1 - Owens Lake Dust ID monitoring network

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bed and measured PM_{10} values. CALPUFF will be run using the following equation to estimate emissions and to model PM_{10} impacts at the shoreline:

Equation 1.1

$$PM_{10} = K_f \times q$$

where,

q = Sand flux measured at 15 cm above the surface [g/cm^2/hr]
K_f = K-factor, empirically-derived ratio of the PM_{10} emission flux to the sand flux at 15 cm.

The ratio of PM_{10} to sand flux (K_f) is referred to as the K-factor. The initial Dust ID program results showed that K-factors could be derived empirically by comparing model predictions to monitored PM_{10} concentrations. Initial studies also showed that average K-factors can vary spatially and seasonally at Owens Lake. Default K-factors will be used with Equation 1.1 to estimate hourly PM_{10} emissions unless new K-factors are generated from future dust events following the modeling procedures in this program protocol. If the CALPUFF model results indicate that a new lake bed source area caused or contributed to an exceedance at a shoreline location, dust controls may be required under the provisions of the 2006 Settlement Agreement or the current SIP.

1.5 Sand Flux Measurements

Sand flux is measured using a combination of Cox Sand Catchers (CSC) and Sensits. CSCs are sand collection devices that provide a mass collection amount for a certain time period (about 1 to 3 months), and Sensits are electronic sand motion detectors used to time-resolve the collected mass to estimate hourly sand flux rates. The sand flux rate is applied to the area represented by the sand flux sampling site, which may vary in size and shape depending on the source area delineated by field observations.

1.6 Dust ID Program Protocol Content

Section 2 of the Dust ID Program Protocol describes the methods and instrumentation that will be used to monitor sand flux with Sensits and CSCs on the lake bed. Section 3 provides a brief description of the PM_{10} and meteorological monitoring network that will be used to monitor PM_{10} exceedances, develop K-factors and to call public health advisories. Section 4 describes methods that will be used by visual observers and field personnel to map lake bed dust source areas and delineate boundaries using GPS. Section 5 explains the procedures for developing K-factors using air quality modeling and monitoring data. Section 6 provides the protocol for dispersion modeling.

2. Protocol for Measuring Sand Flux Rates and Operation of the Sensit and Cox Sand Catcher Network

2.1 Objective

Sand flux measurements will be used as a surrogate to estimate PM_{10} emissions coming off the lake bed. The objective of the sand flux measurements is to provide an hourly emissions estimate for all active source areas on the lake bed.

2.2 Methods and Instrumentation

Sand flux will be measured with Sensits and Cox Sand Catchers (CSCs). Collocated Sensits and CSCs are used to measure hourly sand flux rates at different locations on the lake bed. The 2006-2007 Sensit/CSC network locations are shown in Figure 1.1. The instruments are placed with their sensors or inlets positioned 15 cm above the surface. Sensits are electronic sensors that measure the kinetic energy or the particle counts of sand-sized particles as they saltate, or bounce, across the surface. Sensits are used to time-resolve the CSC mass to provide hourly sand flux rates.

Figure 2.1 shows a Sensit suspended above the ground on the right, and a CSC in the ground to the left. The photo was taken at a site that was used to test the accuracy of Sensits and CSCs before the Dust ID Program began. The battery powered Sensits are augmented with a solar charging system. A datalogger records 5-minute Sensit data during active saltation periods. Data collection is triggered by particle count activity and continues until particle counts are zero for an hourly period. Each datalogger has a radio transmitter that sends Sensit data to the District's Keeler field office once a day to provide updates on erosion activity at each site. These daily updates are used to alert field personnel to active source areas for possible Global Positioning System (GPS) mapping and inspection. Daily transmission of the data may be temporarily suspended if the solar battery power is low due to extended days of cloud cover.

CSCs are passive collection instruments that capture windblown, sand-sized particles. These instruments were designed and built by the District as a reliable instrument that could withstand the harsh conditions at Owens Lake. CSCs have no moving parts and can collect sand for a month or more at Owens Lake without overloading the collectors. Field personnel visit CSC sites to measure the mass of the collected sand catch. A diagram of the CSC is shown in Figure 2.2. Not shown in the diagram is an internal sampling tube that can be seen in the photo in Figure 2.3. The internal sampling tube is removed from the PVC casing to measure the sand catch sample. The lengths of the sampling tubes and casings are adjusted during construction to accommodate the amount of sand flux in each area and to avoid overloading the CSC. The CSC length ranges from about one to three feet. Because the PVC casing is buried in the ground, an adjustment sleeve is used to keep the inlet height at 15 cm to compensate for surface erosion and deposition. Field techs use a standardized measuring device to check or adjust the sampling inlets to 15 cm after collecting each sample.

Figure 2.4 shows an example of the linear relationship between the CSC collected sand mass and the kinetic energy measured with a co-located Sensit. Sensits measure saltation in terms of

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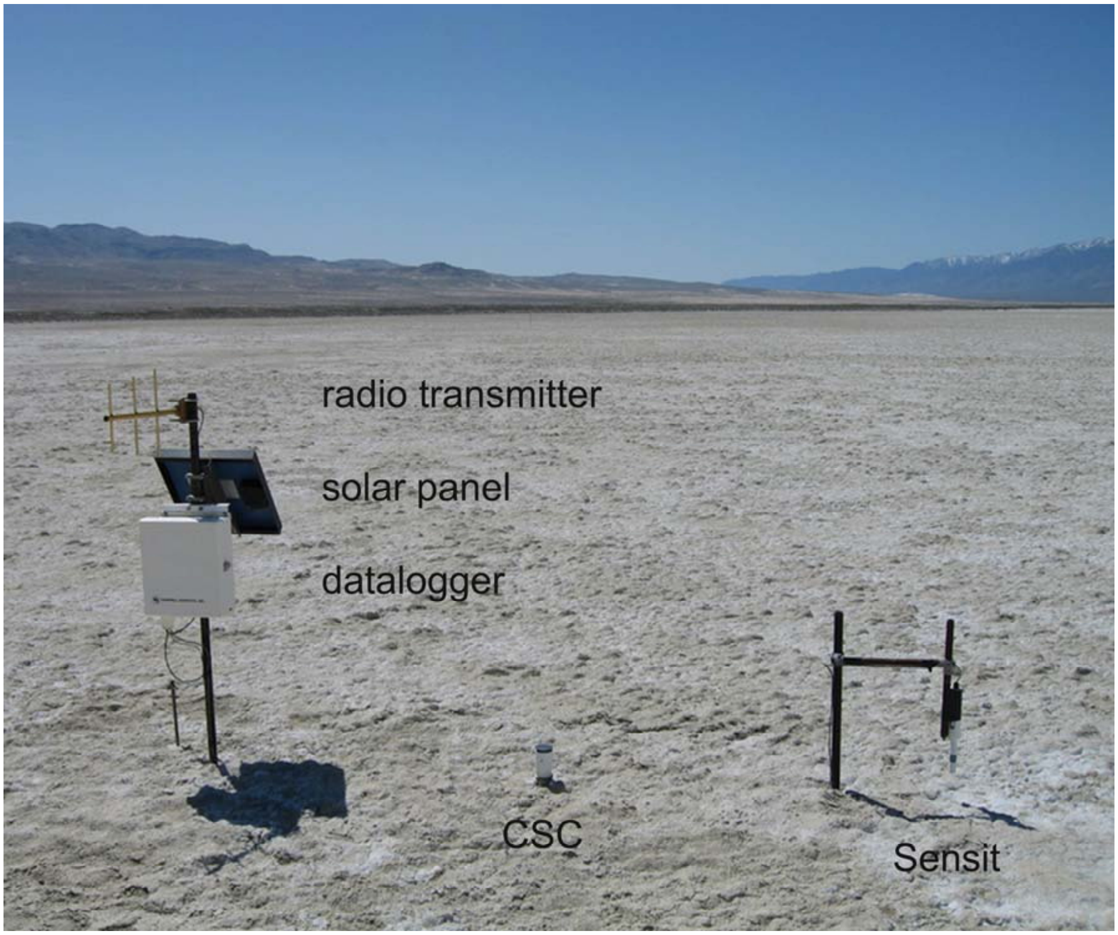

Figure 2.1 - Dust ID sand flux monitor sites measure wind erosion activity using CSCs to collect sand-sized particles and Sensits that electronically detect moving particles. Sensit data are recorded on dataloggers and transmitted by radio from each site to the District's office in Keeler.

Attachment C

Figure 2.2 - Diagram of the Cox Sand Catcher (CSC) used to measure sand flux at Owens Lake.

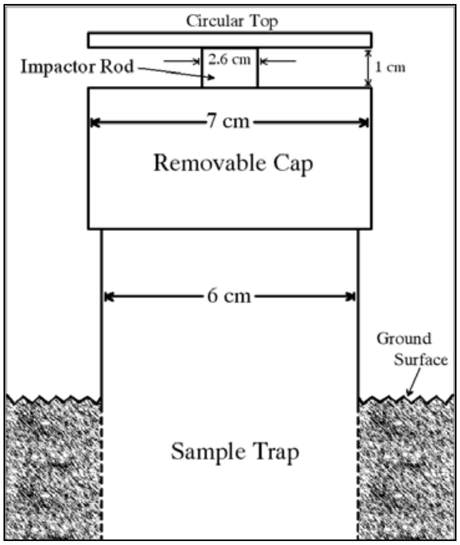

Figure 2.3 - Example of a Cox Sand Catcher (CSC) with the inner sampling collection tube removed.

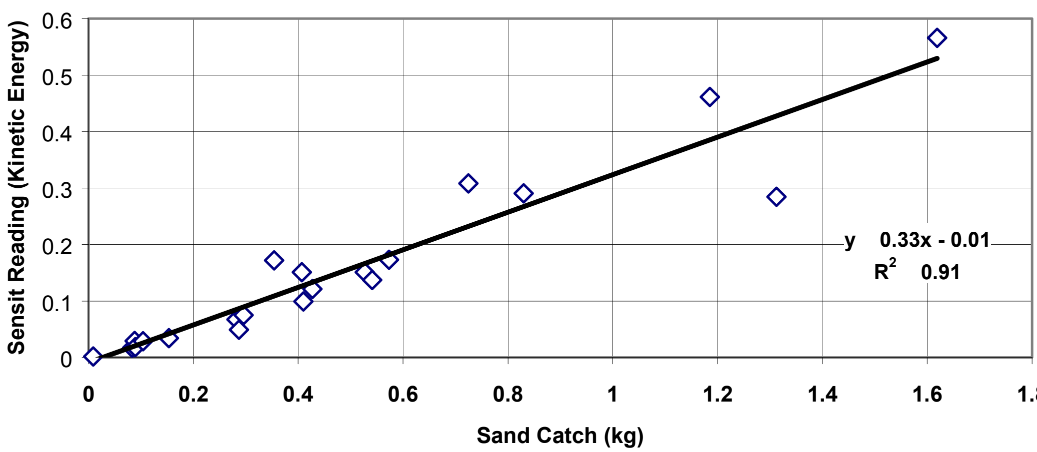

Figure 2.4 - Example of the linearity between CSC mass and a Sensit reading using kinetic energy reading (Sensit No. 7291).

kinetic energy (KE) and particle count (PC). The District uses the output (KE or PC) that provides the best precision and accuracy for the range of saltation activity expected at each site.

Because the electronic Sensit response to the saltation flux can vary, Sensits were used in combination with CSCs to determine hourly sand flux rates. This combination takes advantage of the good precision and accuracy of the CSC sand catch data, and the ability of Sensits to time-resolve the sand flux for each hour of the CSC sampling period. In this way, the sum of the hourly sand catches always matches the CSC sand catch for each sampling period, and it minimizes the error in the hourly sand flux.

Changes to the sand flux monitoring network are made as necessary to improve the characterization of dust source areas on the lake bed. Sand flux sampler sites are added to the network to monitor new source areas or to improve the sand flux estimates for known dust source areas. Although the sand flux network was originally designed in a fixed grid pattern with 1 km site spacing, the current practice is to place the samplers at sites that represent smaller source areas. Some sites may be less than 250 m apart, and their locations may be off the regular grid pattern to better represent sand flux activity in the dust source area. In addition, many of the original sampling sites that are now in flooded portions of the shallow flood DCM were removed, since PM_{10} emissions from the flooded sites can be assumed to be zero in the Dust ID model.

2.3 Operating Procedures

Sand captured in the CSCs will be weighed in the Keeler lab to the nearest tenth of a gram. A field technician will visit each site every one to three months to collect the sample tubes. The following procedures will be used when collecting the CSC samples and downloading Sensit data:

1) Park field vehicle 10 meters or more east of the site and walk the remaining distance to the sampling site. Field personnel will access all Sensit and CSC sites from an easterly approach to minimize upwind surface impacts near the sampling sites.
2) Measure and record the inlet height above the surface to the middle of the inlet.
3) Remove the sample collection tube from the CSC.
4) Verify collection tube number corresponds to site number on the field form.
5) Weigh and record the gross weight of the collection tube and sample to the nearest 1 gram using a field scale.
6) If any soil material is visible in the tube, seal the collection tube and place it in the tube rack for transport to the lab. If no soil material is visible, note this on the collection form and reuse the collection tube for the next sampling period.
7) Place a clean collection tube in the CSC and record the collection tube number.
8) Replace the CSC inlet and adjust the height to 15 cm ($\pm$1 cm).
9) Download Sensit data from the datalogger to a storage module.
10) Measure and record the Sensit sensor height above the surface to the center of the sensor using the Height Adjustment Tool, and adjust if necessary to 15 cm. See Figure 2.5.
11) Inspect the sensor and radio transmitter wiring and clean or repair, if needed.

12) A field operational response test on the Sensit will be completed during each visit and the Sensit will be replaced, if it fails the test.
13) CSC samples will be removed from the sample collection tubes and weighed on a calibrated bench-top scale in the Keeler lab to the nearest 0.1 gram.
14) Wet samples will be removed from the collection tubes and oven dried before weighing in the lab.

2.4 Data Collection

A field form will be used to document the information for the CSC and Sensit (see example in Figure 2.6). The form will have the site number, date and time of measurement (Pacific Standard Time), "as is" CSC inlet and Sensit sensor height (± 1 cm), tube tare weight prior to sand catch (± 0.001 kg), total sand catch weight (± 0.001 kg), and post-catch tube weight (± 0.001 kg), Sensit response test (particle counts or kinetic energy), operator's initials, and a comments section where the condition of the sampler and any other relevant factors, such as surface condition will be documented. The Data Processing Department will calculate the net sand catch weight from the CSC during data analysis. CSC lab weights, measured to the nearest 0.1 g will be recorded on the Lab Form shown in Figure 2.7. After completion of the forms, the field technician will make a copy of the completed forms and file the copies at the Keeler office. The original forms will be sent to Data Processing in the Bishop office. Data Processing will enter the data into an electronic file. The original hard copy forms will be filed in the Bishop office.

Each day, dataloggers for all Sensit sites will be downloaded by radio transmission to the Keeler Field office. Data from the storage modules will be downloaded to the computer at the Keeler office by the field technician at the end of a collection period. The radio transmitted Sensit data will be used as the data of record. Storage module data will be collected at least quarterly and will serve as a back-up file.

Technicians will keep a log of all the repairs, maintenance, or replacement of Sensits or CSCs, radio transmitters, and datalogger equipment. This log will be kept in a field notebook and the field forms sent to Data Processing as they are completed. It is the technician's or operator's responsibility to review the data and notify the Air Monitoring Specialist and Data Processing who will decide whether any data should be edited or deleted and why.

2.5 Chain of Custody

Each field form will be initialed and dated by the field technician during each site visit. The form will be signed and dated by the person receiving the data when delivered to the Bishop office. If no person is available to sign the form in the Bishop office, the delivery person will sign and date the form and place it in the Data Processor's box.

2.6 Quality Assurance

All field and lab scales will be checked at least every two months using Class F weights. Field scales will also be checked with a 100-gram weight at each sample site before weighing the sand catch and the weight recorded on the field form. The bench-top scale in the Keeler office will be

Attachment C

Figure 2.5 - A Height Adjustment Tool is used to measure the height of Sensits and CSCs and to adjust the sensor and inlet height to 15 cm above the soil surface.

Attachment C

CSC Field Form.xls

Technician: Date (mm/dd/yyyy): / /

Site #	Time PST	Pre-Sensit Height, cm	Sensit Response	Final Sensit Height, cm	Pre-CSC Inlet Height, cm	Field Cal Weight, kg	CSC Full, kg	CSC Tare, kg	Final CSC Height, cm	No VP
	:					.	.	.		
	:					.	.	.		
	:					.	.	.		
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	:					.	.	.		
	:					.	.	.		

Marble Rankings: 0=No Crust 1=Complete Damage 2=Indent or Surface Damage 3=No Damage 4=Wet

Site #	Rank	Surface Description	Comments and Maintenance

Delivered By:	Date:
Received By:	Date:

Figure 2.6 - Example of a CSC and Sensit Field Documentation Form

Attachment C

CSC Lab Form.xls

Lab Technician: Tare Date (mm/dd/yyyy): / /

Lab Technician: Post Date (mm/dd/yyyy): / /

Site Tube #	Tube Tare, g	Tube/Catch Weight, g	Catch Weight, g	Comments
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Figure 2.7 - Example of a CSC laboratory documentation form

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checked with the Class F weights before each set of sand catches are weighed. The test weights will be recorded on the scale log sheet in the laboratory. Both scales will be calibrated and certified at least once every year. Ten percent of the CSC sand catch samples will be stored for at least one year from the date of collection before discarding.

2.7 Calculating Hourly Sand Flux

For modeling purposes discussed in Section 6, hourly sand flux is calculated for each Sensit/CSC site using the sand catch to Sensit reading ratio for each collection period and apportioning the sand catch to the hourly Sensit reading. The hourly sand flux is divided by 1.2 cm^2, which is the equivalent inlet opening size of the CSC for flux calculation purposes.

For Sensits using kinetic energy,

Equation 2.1

$$q_{n,t} = \left(S_{n,t} - S_{n,bg}\right) \times \frac{CSC_{n,p}}{\sum_{t=1}^{N}\left(S_{n,t} - S_{n,bg}\right)} \times \frac{1}{1.2} \quad [g/cm^2/hr]$$

Where,
$q_{n,t}$ = hourly sand flux at site n, for hour t [$g/cm^2/hr$]
$CSC_{n,p}$ = CSC mass for site n, for collection period p [g]
$S_{n,t}$ = Sensit total KE reading for site n, for hour t [non-dimensional]
$S_{n,bg}$ = Sensit KE background reading for site n, [non-dimensional]
N = Total number of hours in CSC collection period p.

For Sensits using particle count,

Equation 2.2

$$q_{n,t} = S'_{n,t} \times \frac{CSC_{n,p}}{\sum_{t=1}^{N} S'_{n,t}} \times \frac{1}{1.2} \quad [g/cm^2/hr]$$

Where,
$S'_{n,t}$ = Sensit total PC reading for site n, for hour t [non-dimensional]

2.8 Sensit Calibration and Data Analysis

2.8.1 Sensit Calibration Check

Data Processing will track Sensits by their serial number. After each sample collection period, Sensit and CSC data will be added to data from other sample collections. Data Processing will determine the average sand catch to Sensit ratio for each Sensit. Sensit readings will be collected

for particle counts and kinetic energy for each Sensit. Due to differences in individual Sensit responses, some Sensits have a more consistent sand flux to Sensit reading ratio using particle count rather than kinetic energy. This normally depends on the manufacturer’s electronic design. At high sand flux sites, kinetic energy provides a more linear response for most Sensits. If KE is used, a background KE is subtracted from the reading if it is not zero. A background KE is determined from the KE reading when the PC reading is zero.

The ratio of the Sensit response to the collected mass will be compared for each collection period to previous ratios for the same instrument to ensure that the Sensit is responding consistently. As seen in Figure 2.4 this ratio can vary, especially at low collection masses, so large deviations in the ratio should only be used as an indicator for a possible problem. Sensits will be replaced if they show no readings with significant sand associated CSC collection, have significant readings during calm wind periods, have an erratic response as compared to previous collection periods, or if they fail the field operational response test.

2.8.2 Replacing Missing Sand Catch Data

Sand catch data can be lost if the CSC collector tube is full, or damaged, or if the sample is spilled during weighing. The lost sand catch data will be estimated using Sensit data. A cumulative sand catch to Sensit ratio is calculated by adding all of the valid sand catches and all of the corresponding Sensit data for that particular Sensit/CSC pair, and then dividing them to obtain the total ratio. The cumulative ratio is applied to the Sensit data to estimate the hourly sand flux. If there was a Sensit change, only data generated after the Sensit change is used to calculate the cumulative sand catch to Sensit ratio.

CSC collection tubes will be weighed and reset at the same time as any Sensit change at a site in order to maintain the time correlation between the two devices.

2.8.3 Replacing Missing Sensit Data

Sensit data can be lost when the datalogger or Sensit fails. In such cases, the sand catch data will be time resolved using a neighboring site. The historical hourly sand flux data are compared to determine which neighboring site behaves most similarly to the site with the lost data. The correlation coefficients between the data sets will be used to determine which site behaves most similarly. If no adjacent sites were active during the period of lost Sensit data, then the nearest active sites will be used for comparison.

3. Protocol for Measuring Ambient PM_{10} and Meteorological Conditions

3.1 Objective

Ambient PM_{10} monitors will be placed at locations generally around the shoreline of Owens Lake and in local communities to monitor the ambient air for exceedances of the PM_{10} NAAQS and to develop K-factors for modeling PM_{10} emissions from lake bed sources. PM_{10} monitors may be placed on the lake bed for short-term special-purpose monitoring studies.

3.2 Methods and Instrumentation for PM_{10} and Meteorological Data

PM_{10} monitoring will be performed using USEPA-approved reference or equivalent method monitors. The current monitoring network shown in Figure 1.1 includes seven PM_{10} monitor sites – Keeler, Lone Pine, Olancha, Dirty Socks, Shell Cut, Bill Stanley and Flat Rock. Each PM_{10} site is equipped with a Tapered Element Oscillating Microbalance (TEOM) PM_{10} monitor. TEOM monitors are capable of measuring hourly PM_{10} concentrations. The Dust ID Program will rely on the TEOM to determine if an exceedance is caused by a lake bed source, since the data can be correlated with hourly wind directions to determine dust source directions. TEOM data will also be used to generate K-factors to model the PM_{10} emissions from lake bed sources.

Ten-meter meteorological towers will be located near each PM_{10} monitor site and at other locations around the lakeshore and on the lake bed. The current met sites are shown in Figure 1.1. The met data are used to create wind fields with the CALMET model that are used with CALPUFF to model air quality impacts. All met towers include instrumentation to measure wind speed and wind direction. Two lake bed met sites (A & B Towers) measure wind speed at different heights (0.5, 1, 2, 5 and 10 m) to determine surface roughness and vertical wind speed profiles. Some met sites also measure temperature, relative humidity, barometric pressure, and/or precipitation.

3.3 Operating Procedures, Instrument Calibration and Quality Assurance

PM_{10} monitoring will be performed in accordance with USEPA monitoring guidelines found in 40 CFR, Part 58 and meteorological monitoring will be performed in accordance with USEPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I, II, and IV.

3.4 Data Handling and Data Access via Modem

TEOM PM_{10} data will be delivered to Data Processing on a routine monthly schedule. After the data pass the proper data review and QA checks they will be submitted to the USEPA's AIRS database. PM_{10} data from special-purpose monitors that may be located on the lake bed will not be submitted to the AIRS database.

All the PM_{10} sites and some met sites are equipped with modem links that allow for access to the hourly concentrations. These data are useful for alerting field personnel to possible new sources of PM_{10}, and for alerting the public in case of high concentrations. For hourly concentrations above 400 $\mu g/m^3$ the District will issue public health advisories when the communities of Keeler, Lone Pine or Olancha are affected. The public can view real-time wind speed, direction and PM_{10} data from the Dust ID monitoring network on the District's website at www.gbuapcd.org/data.

4. Protocol for Observing and Mapping Source Areas and Dust Plume Paths

4.1 Objective

The objective for source area mapping is to use the best available information from visual observations, GPS mapping, and sand flux measurements to delineate the boundaries of dust source areas for as many events as possible. This information will be used to help delineate the control area boundaries for new sources.

4.2 Methods and Instrumentation

The Dust ID Program includes four methods to help locate dust source areas and to delineate the source area boundaries. The methods are: 1) visual mapping by trained observers, 2) time-lapse cameras, 3) surface inspections with GPS mapping, and 4) sand flux activity (as measured with Sensits and CSCs).

4.2.1 Mapping Dust Source Areas from Off-Lake Observation Sites

One or more trained observers will complete observations from viewpoints to best observe the active dust source areas. For instance, two observers may be at viewpoints on the east side of the dust plume in the Inyo and Coso Mountains and a third may be on the west side in the Sierra. The observers will create hourly maps of the visible boundaries of any dust source areas, their plume direction and note if the visible plume crosses the shoreline. To the extent practicable, all lake bed and off-lake dust sources will be included in the observations. Figure 4.1 shows an example of sand flux measurements and the cumulative information that can be collected by observers mapping the dust plumes from different locations.

4.2.2 Video Cameras

Remote time-lapse video cameras will record dust events during daylight hours. This information will be reviewed to help identify source areas that may have been missed by observers, or to help confirm source area activity detected by PM_{10} monitors or the sand flux network. Remote time-lapse video can also be used to help verify modeled impacts that were not monitored by the PM_{10} network, to check compliance of dust control areas, and to identify off-lake sources not measured by any of the other methods.

4.2.3 Mapping Using GPS

4.2.3.1 "Trigger" Levels for Initiating Field Inspections and GPS Surveys

Dust observations, Sensit activity, elevated PM_{10} concentrations and video will be used as "trigger data" to determine the time and location for a Dust Source Area Survey (survey). Sensit and PM_{10} data will be automatically collected via radio transmission every workday. A technician will summarize and review the data each workday. The summary will list all Sensit activity greater than background output levels, and hourly TEOM PM_{10} concentrations over

Attachment C

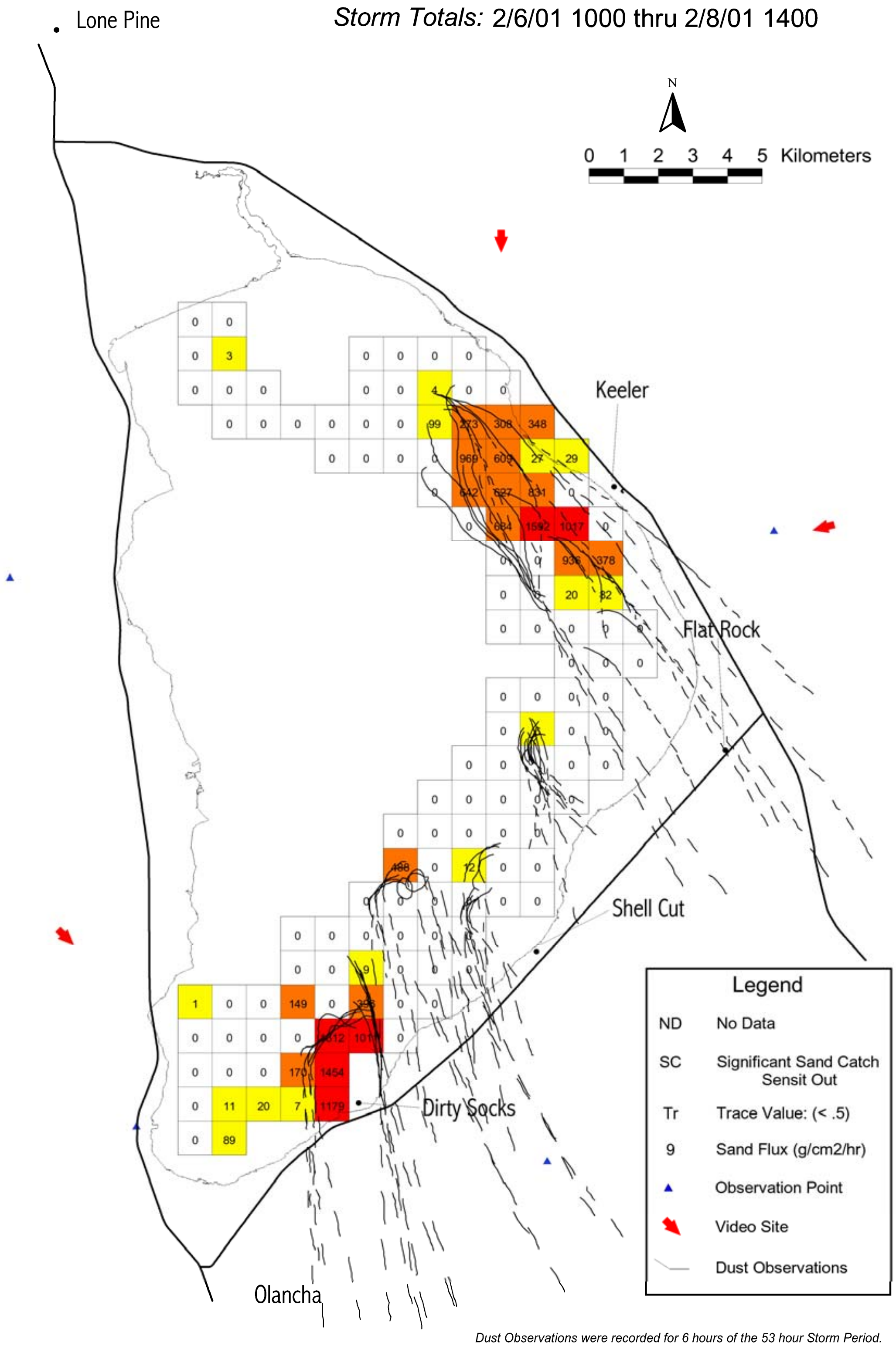

Figure 4.1 - Example of dust plume maps drawn by observers during daylight hours and total sand flux for a dust event on February 6-8, 2001.

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50 µg/m^3 with corresponding wind speed and direction data. If dust observations are available from a recent dust storm, they will be used to confirm the location of the dust source(s) that correspond with the Sensit activity and elevated PM_{10} concentration. Video will be used to identify a source or sources that were not identified by observations, Sensit data or PM_{10} information. Wind speed and wind direction data will be used to help determine if a lake bed dust source could have caused elevated PM_{10} concentrations. All of the trigger information will be used to identify any lake bed dust source area to initiate a dust source survey and/or surface inspection. The survey should be completed the same day if weather conditions are favorable. For larger areas, surveying may continue for several days or until precipitation obscures the boundaries of the source area.

In addition to the above process, general field inspections will be completed after dust storms to verify lake bed emission activity and the need for a survey. A survey will be completed if the trigger data and /or field inspections indicate emissive conditions in an area that has not been previously surveyed during the current dust period (Section 4.3) or in an area that has been previously surveyed but has increased in size since its last survey. The priorities for completing a survey are:

1) new lake bed source areas outside the instrumented Sensit network;
2) new lake bed source areas that have not been surveyed within the instrumented Sensit network; and
3) lake bed source areas that have previously been surveyed.

4.2.3.2 GPS Mapping Procedures

After a dust source is identified by dust observation, Sensit data, sand catch data, video, PM_{10} concentration or inspection of the lake bed surface, District staff will map the exterior boundary of as many of the source areas identified as possible during daylight hours, as weather conditions allow. The mapping will begin as soon as possible after a dust storm and continue until all the identified areas are mapped or precipitation occurs. The boundary of the emissive area(s) will be mapped using a Global Positioning System (GPS). Surveyors conducting the mapping will ride an ATV or walk around the outer boundary of the wind-damaged surface surveying a line with the GPS. A wind-damaged surface is defined as a soil surface with wind erosion evidence and/or aeolian deposition that has not been modified to an unrecognizable point by precipitation since the last identified dust storm.

GPS line data should be collected at an interval of one record every 10 seconds or less. Data should be collected in NAD83 UTM Zone 11 coordinates. Only GPS units capable of continuously recording line data will be used. Data should be processed and corrected using base station data (either from a commercial correction service or using data from the District’s Keeler base station) to ensure positional accuracy.

Before beginning a survey, the edge of the source area is determined by a visual review of the surface conditions within a representative one square meter area along the edge of the source area. An undamaged surface is evident if there is no visible evidence of a disturbed lake bed surface due to wind damage. As an aid to calibrate the level of disturbed surface, a surveyor will

begin each survey by estimating the percentage of surface that is undamaged by the wind. The surveyor visually determines where a surface with 70 to 80 percent of undisturbed surface is located. The surveyor completes the survey by following a line of travel that closely represents the initial one-meter calibration. The following defined list, Boundary Conditions and Survey Procedures (see below), can be used to determine how to map the source boundary under differing surface boundary conditions.

Boundary Conditions and Survey Procedures:

Distinct Boundary: A visibly sharp transition, 25 feet or less in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. The surveyor should travel directly along this distinct outside edge, if possible, and may deviate 25 feet to the inside or outside on occasion. Small (25-foot wide or less) channels, boundary indentations, roads, mounds, and other obstacles may be directly crossed if the continuation of the main source boundary is clearly visible on the opposite side.

Diffuse Boundary: A visibly distinct transition, 25 to 100 feet in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. Every effort should be made to travel along the outermost edge of the visible distinction.

Indistinct Boundary: **A** boundary that is not obvious to the surveyor where the edge of the source is located. Mapping would be stopped at this point until a Distinct or Diffuse Boundary can be located.

Generally the surveyor will maintain a constant course of travel following the Distinct Boundary of the wind-damaged area. As the boundary becomes less distinct, it is recommended to move the course of travel further into or outside the source to maintain recognition of surface damage. It is acceptable to travel within approximately 50 feet of the outer or inner edge of the larger more noticeable active area if the boundary is Diffuse. When encountering an Indistinct Boundary condition, the surveyor should note if the boundary can be found or if the boundary cannot be mapped during the existing survey and why. If the boundary cannot be mapped, the survey shall end at that point leaving an unclosed source area polygon.

It is possible for the surveyor to find himself or herself greater than 50 feet within or outside of the source area boundary. When this happens, the surveyor should turn perpendicular to the direction they were traveling and travel in the direction where the distinct edge should be located. For example, if the surveyor were inside the source area, they would turn in the direction where erosion evidence was not observed earlier along their path. If the surveyor were outside the source area, they would turn toward the side where they previously observed the source. Boundary loss may occur because of an Indistinct Boundary or unfavorable lighting conditions. The time and coordinates should always be noted when it is necessary to relocate the boundary during a survey.

Another alternative for relocating a source area edge is to pause the GPS unit from recording data until the boundary is located and then resume with data collection. This allows the surveyor to travel in any direction until the edge is relocated or end the survey if an edge cannot be located. The line produced between the point where the GPS unit was paused and then restarted would be deleted and considered un-surveyed during post processing.

The presence of Indistinct Boundaries or conditions that cause the ending of a survey must be annotated on the GPS data or explained in the field notes, including point coordinates. Examples would include dust storm, precipitation, lightning, mud, and channel with flowing water, pond, and time constraint or equipment malfunction.

4.2.4 Using Sand Flux Monitors to Map Source Area Boundaries

Dust source area boundaries can be delineated or refined using default cell boundaries represented by active sand flux monitors. The area represented by the active SFM site may be shaped to exclude known non-emissive areas, such as; DCM areas, wetlands, or areas with different soil texture where there is evidence that it is non-emissive.

4.3 Composite Dust Source Map Development

Data Processing will compile the cumulative mapping information from the visual observers and field inspections using the GPS into a GIS database for two periods each year, December through June and July through November. A new composite map will be developed for each period containing only those data collected during that period. Hand drawn observation maps will be scanned and translated into the GIS database. Observation maps will be compared with source area locations from other methods through the GIS generated layers. Overlays of the maps generated from sand flux monitors, video cameras, visual observers and GPS'd source areas will be compared qualitatively, considering the information may have been collected at different times.

5. Protocol for Determining K-factors and PM_{10} Emission Rates from Sand Flux Data

5.1 Objective

The objective of this portion of the Dust ID Program is to estimate the PM_{10} emission flux for each cell or source area using the relationship *PM_{10} emission flux = sand flux x K-factor*. PM_{10} emissions for each area will be used with the CALPUFF modeling system or other USEPA approved model to determine if the PM_{10} emissions will cause or contribute to a NAAQS violation at the shoreline.

5.2 Method for Determining PM_{10} Emissions and New K-factors

5.2.1 PM_{10} Emission Flux = Sand Flux x K-factor

PM_{10} emissions will be estimated using the sand flux for each area represented by a Sensit and CSC and an appropriate K-factor for the area and period. The sand flux values will come from

the Sensit and CSC data as discussed in Section 2. New K-factors for each area and period will be developed as discussed in this section, and default K-factors will be used to model dust events unless newer K-factors are determined.

5.2.2 Default Temporal and Spatial Storm-average K-factors

PM_{10} emissions may be estimated from default K-factors that were developed from previous dust events that occurred in the same area and the same range of calendar months in previous years.

The areas for K-factor groupings are shown in Figure 1.1: North Area, Central Area, Keeler dunes, and the South Area. Any new source area within the depicted boundaries will be associated with that area for the spatial grouping of new K-factor values. If a new source area and K-factor is developed for an area outside these boundaries, the area and default K-factor will be associated with the K-factor for an existing area with the most similar surface soil texture. The determination of the most similar existing area will be made by the Air Pollution Control Officer.

5.2.3 Method to Determine Sand Flux from Areas with Implemented Dust Control Measures (DCM)

Sand flux will be measured at sites within the shallow flood and managed vegetation DCM areas. Sensits and CSCs will be sited on dry areas within the shallow flood DCM to represent dry areas near the site. DCM areas covered with standing water will be assumed to have zero sand flux. For the Managed Vegetation DCM, sand flux sites will be placed in spatially representative areas and in areas within the DCM where wind blown dust may have been previously observed.

5.2.4 New K-factors Seasonal Cut-points

The APCO will review the K-factor data and propose seasonal cut-points to the LADWP. LADWP will respond to the proposed cut-points within 30 days. If no agreement can be reached within 60 days, the default periods will be used.

The two default periods to be used are: the winter/spring period that includes the months of December, January, February, March and April, and the summer/fall period that includes May through November. These same calendar months will be used to generate new temporal K-factors for each area and to generate new 75-percentile hourly K-factor values for modeling PM_{10} emissions.

5.2.5 Using CALPUFF Modeling System to Generate New K-factors

New hourly K-factors can be inferred from the CALPUFF model by using hourly sand flux as a surrogate for PM_{10} emissions. Modeled PM_{10} predictions can then be compared to monitored concentrations at PM_{10} monitor sites to determine the K-factor that would correctly predict the monitored concentration for each hour. More information on the modeling procedures is included in Section 6.

Attachment C

A K-factor of 5 x 10^{-5} will be used initially to run the CALPUFF model and to generate concentration values that are close to the monitored concentrations. Hourly K-factor values will then be adjusted in a post-processing step to determine the K-factor value that would make the modeled concentration match the monitored concentration at the PM_{10} monitor site. The initial K-factor will then be adjusted using Equation 5.2.

<u>*Equation 5.2*</u>

$$K_f = K_i \left(\frac{C_{obs.} - C_{bac.}}{C_{mod.}} \right)$$

Where,

K_i = Initial K-factor (5 x 10^{-5})
$C_{obs.}$ = Observed hourly PM_{10} concentration. [µg/m^3]
$C_{bac.}$ = Background PM_{10} concentration
$C_{mod.}$ = Model-predicted hourly PM_{10} concentration. [µg/m^3]

5.2.6 Screening Hourly K-factors

K-factors will be calculated for every hour that has active sand flux in cells upwind from a PM_{10} monitor. These hourly K-factors will be screened to remove hours that did not have strong source-receptor relationships between the active source area (target area) and the downwind PM_{10} monitor. For example, the screening criteria will exclude hours when a PM_{10} monitor site is located on the edge of a dust plume. Because the edge of a dust plume has a very high concentration gradient, a few degrees error in the plume direction could greatly affect the calculated K-factor.

The following criteria will be used to screen the hourly K-factors:

<u>Initial K-factor Screen</u>

1) Wind speed is greater than 5 m/s at 10 m height at any network site.

2) Hourly modeled and monitored PM_{10} concentrations were both greater than 150 µg/m^3 at the same monitor-receptor site.

3) Hourly wind direction as listed in Table 5.1 for each monitor site.

4) The mean sand flux for all sites with non-zero sand flux is greater than 0.5 g/cm^2/hr.

<u>Final K-factor Screen</u>

5) At least one sand flux site located within the target area and within a 30-degree upwind cone has sand flux greater than 2 g/cm^2/hr.

6) All sources are within a distance of 15 km of the receptor.

7) More than 65 percent of the PM_{10} contribution at a monitor site came from the target source area (North Area, South Area, Central Area or Keeler dunes).

8) Eliminate hours when sand flux data are missing from one or more cells that are located within a 30-degree upwind cone and within 10 km of the shoreline monitor. For Olancha and Lone Pine, which are both located 5 to 10 km from the lake bed, the distance limitation is changed to 10 km upwind of the shoreline.

Table 5.1 Wind Directions for the Initial K-factor Screen

PM_{10} Monitor Site	From-the-Lake Wind Dir. (Deg.)	Met Tower
Lone Pine	110≤WD≤190	Lone Pine
Keeler	130≤WD≤330	Keeler
Flat Rock	210≤WD≤360	Flat Rock
Shell Cut	WD≥210 or WD≤50	Shell Cut
Dirty Socks	WD≥220 or WD≤65	Dirty Socks
Olancha	WD≥320 or WD≤55	Olancha
Bill Stanley	50≤WD≤190	Bill Stanley
New Sites	TBD	TBD

The from-the-lake wind directions for the initial K-factor screening criterion 3) are shown in Table 5.1. From-the-lake wind directions for any new PM_{10} sites will be determined by the APCO as needed for the initial K-factor screen. Note that 'From-the-Lake' wind directions for assessing the lake bed impacts at PM_{10} monitor sites (see 2008 SIP) are different from these K-factor screening wind directions.

Hourly K-factors that pass through the screening criteria will be used to develop new event-specific spatial K-factors, and new 75-percentile hourly average temporal and spatial K-factors, if enough K-factors are available.

5.3 Temporal and Spatial Event-specific K-factors

5.3.1 Event-Specific K-factors

Screened hourly K-factors will be used to generate event-specific K-factors for the active source areas. The event-specific K-factor will be calculated as the arithmetic average using all the hours when the hourly K-factor passes the screening criteria for the target area.

5.3.2 Temporal & Spatial 75-Percentile K-factors

The statistical 75-percentile value will be determined from the distribution of the hourly K-factors that pass the screening criteria for that area and period, whenever there are nine or more hourly K-factors. The 75^{th} percentile will be calculated using the Microsoft Excel PERCENTILE function. The Microsoft Excel PERCENTILE function works by sorting values from lowest to highest, then assigns the 0^{th} percentile is the lowest value, the 100^{th} percentile is the largest value, and the values in between as (k-1)/(n-1) where n is the number of data values in the list and k is index of the k^{th} lowest value in the list. Thus, each value is placed 1/(n-1) apart. If a requested percentile does not lie on a 1/(n-1) step, then the PERCENTILE function linearly interpolates between the neighboring values.

5.3.3 Default K-factors

Table 5.2 shows the default K-factors for each of the K-factor areas and periods. These K-factors are derived for the temporal and spatial 75-percentile values from the screened hourly K-factors for the 30-month Dust ID period used for the RSIP. Each of the two temporal periods combines hourly K-factors from the same calendar periods for 2 or 3 years.

Table 5.2 - Default Spatial and Temporal K-factors for the Dust ID Model

AREA	K-factor Jan.– Apr. & Dec.	K-factor May-Nov.
Keeler Dunes	7.4×10^{-5}	6.0×10^{-5}
North Area	3.9×10^{-5}	1.5×10^{-5}
Central Area	$12. \times 10^{-5}$	6.9×10^{-5}
South Area	4.0×10^{-5}	1.9×10^{-5}

6. Protocol For Dispersion Modeling

This section of the *Protocol* discusses the dispersion model methods planned for the simulation of wind blown dust at Owens Lake using data from the Dust ID Program. The modeling procedures follow the methods used in the RSIP, with refinements based on experience and modifications to support the provisions of the SCR. The modeling techniques will be used both diagnostically to infer emission rates for source areas and prognostically to predict PM_{10} concentrations at the historic shoreline. Following an overview of the modeling approach, the remainder of this section discusses construction of the meteorological data set, dispersion model options, background concentrations and source area characterization.

6.1 Overview of Modeling Procedures and Rationale for Model Selection

The CALPUFF modeling system was used in the RSIP and has been selected for continuing studies in the Dust ID Program. CALPUFF is the USEPA recommended modeling approach for long-range transport studies and USEPA has proposed CALPUFF as a *Guideline Model* to be

included in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W). Recently the modeling system is also being applied to near-field dispersion problems where the three-dimensional qualities of the wind field are important and for stagnation episodes when pollutants remain within the modeling domain over periods of several hours or more. Dust events on Owen Lake are sometimes influenced by complex wind patterns, with plumes from the North Sand Sheet traveling in different directions than plumes from the South Sand Sheet.

The proposed model domain shown in Figure 6.1 includes a 34 km-by-48 km area centered on Owens Lake. The meteorological and computational grid will use a one-kilometer horizontal mesh size with ten vertical levels extending from the surface to four kilometers aloft. The extent of the model domain was selected to include the “data rich” Dust ID Program study area, terrain features that act to channel winds, and receptor areas of interest. This same model domain and mesh size were used in the simulations supporting the RSIP.

6.2 Meteorological Data Set Construction

Three-dimensional wind fields for CALPUFF will be constructed from surface and upper air observations using the CALMET meteorological preprocessor program and the procedures employed in the RSIP. CALMET combines surface observations, upper air observations, terrain elevations, and land use data into the format required by CALPUFF. Winds are adjusted objectively using combinations of both surface and upper air observations according to options specified by the user. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model.

6.3 CALPUFF Options and Application

Surface Observations. The necessary surface meteorological data will come from the District’s network of ten-meter towers shown in Figure 1.1. The District may also install additional stations to better characterize winds near suspect source areas not currently near an existing site. Very few periods of missing data are typically contained in the District’s database. Periods of missing data will be flagged and CALMET will construct the wind fields using the data from the remaining stations. In addition to the District’s network, surface data from other field programs at Owens Lake will be used when available.

Cloud Cover Data. The current version of CALMET also requires cloud cover and ceiling height observations. Cloud cover is a variable used by CALMET to estimate the surface energy fluxes and, along with ceiling height, is used to calculate the Pasquill stability class. Hourly cloud cover and ceiling height observations are being collected from the surrounding surface airways observations at China Lake and Bishop Airport. During dust event conditions, the sensitivity of the CALPUFF modeling system to these variables is reduced, as the stability class becomes neutral under moderate to high winds. Algorithms within the modeling system that depend on the surface energy fluxes are dominated by the momentum flux and tend to be insensitive to cloud cover under high winds. For these reasons, the absence of local cloud cover and ceiling height measurements are not expected to significantly affect the results of the modeling study.

Attachment C

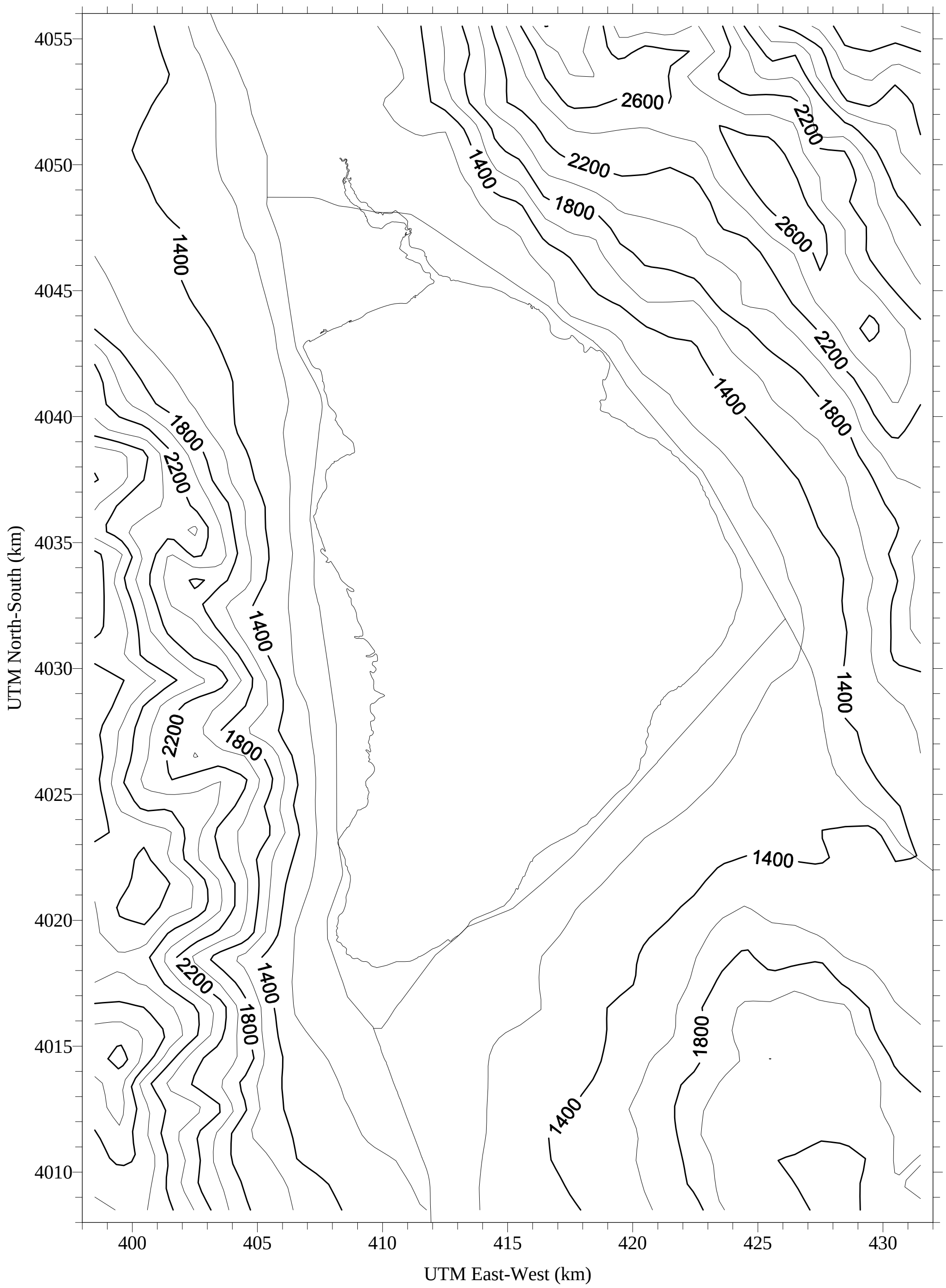

Figure 6.1 - Model Domain, elevation contours and UTM coordinates for the Dust ID Model

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Surface Characteristics and Terrain. The CALPUFF modeling system requires land use and terrain data. These data are used by CALMET to adjust the wind field and affect the calculations performed by the CALPUFF dispersion model. CALPUFF considers spatial changes in land use, including the surface roughness, and the input data are specified on a horizontal grid. The terrain data influence the constructed wind fields and plume trajectories in regions of sparse observations. Land use and terrain data have been obtained from the U.S. Geological Survey (USGS) data sets on the Internet. The resolution of these land use and terrain data sets are 200 m and about 30 m, respectively. The District has prepared these data sets using the pre-processing software provided with the CALPUFF modeling system. The resulting grids have been plotted and checked against data from the District's GIS database where the modeling domain overlaps the District's data. The 1-km mesh size terrain used by CALMET and CALPUFF is shown in Figure 6.1.

Upper air data. Upper air data will be collected from a number of different sources for construction of the wind fields and estimation of mixing heights with CALMET. In the RSIP, both local and regional data were collected as follows:

- A 915 MHz Radar Wind Profiler and Radio Acoustic Sounding System (RASS) were used to collect upper level wind and temperature measurements. The Wind Profiler was initially located at Dirty Socks then moved to the Mill Site during the 4th quarter of 2001. The District discontinued measurements with the Wind Profiler on June 30, 2003. The Wind Profiler with RASS samples wind and temperature from 100 m, up to 5000 m with a vertical resolution as low as 60 m depending on the clutter environment, atmospheric scattering conditions, and pulse length. Experience at Owens Lake indicates wind data recovery is sometimes poor above 1000 m due to the dry environment and the RASS data are limited to the lower levels during windy conditions.

- Regional twice-daily upper air soundings from Desert Rock Airport (Mercury, Nevada) and China Lake Naval Air Station.

During high wind events, observations from the Wind Profiler at both the Mill Site and Dirty Socks indicate very little wind speed or wind direction shear with height. Previous CALPUFF simulations suggest concentrations predicted at PM_{10} monitoring sites and at the historical shoreline are not usually influenced by upper level winds because the sources are ground based. The highest impacts occur close to the source areas, and there is very little wind shear during high winds.

Following removal of the Wind Profiler, soundings from China Lake and Desert Rock will be used to construct the data set. The China Lake and Desert Rock sounding will primarily be used for upper level temperature lapse rates. Winds aloft will be based on extrapolation of the surface wind measurements. The default algorithms employed by CALMET based on Similarity Theory often adjust the winds in the wrong direction and predict too much increase in wind speed with height even for very small surface roughness lengths. As an alternative, wind speeds aloft will be adjusted using the empirical results suggested by the previous Wind Profiler measurements. No wind direction turning with height will be assumed except near the Wind Profiler site where the actual data will be used until this program is discontinued.

CALMET options. The options employed for the application of CALMET to construct the wind fields were provided in the "Modeling Protocol" (MFG, 2001). The majority of the selected model options are based on the defaults incorporated in the code by the model author. Notable model options include:

- Ten vertical levels varying geometrically from the surface to 4000 m. The geometric spacing provides better resolution near the surface and the upper limit is high enough to be above the boundary layer height.

- Vertical extrapolation of surface winds aloft using the results of the Wind Profiler studies.

- Less than default smoothing of wind fields. LADWP contractors Air Sciences and Environ suggested less smoothing of the wind fields by CALMET after review of the *Owens Valley PM_{10} Attainment Demonstration Modeling Protocol*.

Wind fields constructed with CALMET will be randomly checked by plotting the resultant fields and the surface observations on a base map. The CALDESK™ software package will also be used to view the CALMET wind fields.

The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, the dispersion options also affect predicted PM_{10} concentrations. The model options used in the RSIP will continue to be used for the Dust ID Program. In this study, the following options will be used for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves. Sensitivity tests were also performed by applying CALPUFF with dispersion routines based on Similarity Theory and estimated surface energy fluxes. These tests did not indicate improved performance over the Pasquill-Gifford based simulations.
- Near-field puffs modeled as Gaussian puffs, not elongated "slugs." CALPUFF contains a computation intensive "slug" algorithm for improved representation of plumes when wind directions vary rapidly in time. This option was tested, but did not significantly influence the CALPUFF predictions.
- Consideration of dry deposition and depletion of mass from the plume. The particle size data used will be based on measurements taken within dust plumes on Owens Lake as discussed below.

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, *et al*. (1999), the CALPUFF simulations will assume a lognormal distribution with a geometric mean diameter of 3.5 µm and a geometric standard deviation of 2.2.

6.4 Background PM_{10} Concentrations

The dispersion model simulations include only wind blown emissions from the source areas with sand flux activity measurements. During high wind events other local and regional sources of fugitive dust can contribute to the PM_{10} concentrations observed at the monitoring locations. In the RSIP a constant background concentration of 20 µg/m^3 was added to all predictions to account for background sources. The constant background was calculated from the average of the lowest observed PM_{10} concentrations for each dust event when 24-hour PM_{10} concentrations at any of the sites were above 150 µg/m^3. To avoid including impacts from lake bed dust source areas in the background estimate, the procedures used a simple wind direction filter to exclude hours when the lake bed may have directly influenced observed PM_{10} concentrations. Such hours were removed and daily average background concentrations were recalculated based on the remaining data.

Additional PM_{10} monitors are proposed for installation at Owens Lake. These monitors can be used to measure hourly PM_{10} concentrations upwind from lake bed source areas. Some of these monitors may be representative of regional PM_{10} concentrations and others may be influenced by local sources that may indicate a higher PM_{10} concentration than the regional background level. A method to calculate background concentrations based on upwind monitor concentrations for each modeled-event approved by both the APCO and the General Manager of the LADWP may be developed in the future. Meanwhile, a default background of 20 µg/m^3 will be added to the model prediction for each receptor location.

6.5 Area Source Characterization

CALPUFF simulations at Owens Lake are sensitive to source configuration. Emissions will be varied hourly according to the methods described in Section 6.6 and dust sources represented as rectangular area sources. CALPUFF contains an area source algorithm that provides numerically precise calculations within and near the area source location. The area source configuration used for the Dust ID model run for the period from July 2002 through June 2003 is shown in Figure 6.2. The paired Sensit and CSC measurements were assumed to be representative of the horizontal sand flux for irregularly shaped source areas near the sand flux site. Field observers determined the size and shape of the source areas based on GPS mapping after the storms, observation maps made during the storms, and physical surface characteristics. All source areas were represented by sand flux measured at a single site that was applied to a series of 250 m x 250 m cells that were configured to conform to the general shape of the source area represented by the sand flux site.

The following general rules are used to characterize and map source areas on the lake bed:

- Actual source boundaries will be used when available to delineate emission sources in the simulations. Actual source boundaries will be determined using a weight-of-evidence approach considering visual observations, GPS mapping, and surface erosive characteristics. Erosive characteristics that might be considered when defining a source boundary include properties of the soil, surface crusting, wetlands, and the proximity of the brine pool and existing DCMs.

- Source boundaries will also be defined based on the DCM locations. For example, sand flux measurements outside the DCM will be assumed to apply up to the boundary of the DCM. Sand flux measurements inside the DCM will be assumed to apply to the area inside the DCM.

- All source areas will be represented by a series of 250 m x 250 m cells that generally conform to the shape of the source area and share the same hourly sand flux rates as the sand flux site representing that source area. Cells small than 250 m x 250 m may be used near the shoreline to better represent source areas where predicted concentrations are expected to be particularly sensitive to the source area configuration. (Figure 6.2)

6.6 Estimation of PM_{10} Emissions

Hourly PM_{10} emissions for each source area will be estimated using Dust ID sand flux data and K-factors following the procedures described in Section 5. See also SCR Section 1.2 and 2.1 regarding the order of priority for using K-factors for modeling.

6.7 Simulation of Shoreline Concentrations

Under the provisions of the SCR in the RSIP, CALPUFF simulations will be used to assess whether lake bed source areas cause or contribute to an exceedance of the PM_{10} NAAQS in areas without PM_{10} monitoring sites. Predictions will be obtained using the RSIP receptor network that contains more than 460 receptor locations placed at the historic shoreline (approximately at the 3600' elevation) of Owens Lake (see Figure 6.2). The receptor spacing along the historic shoreline ranges from 100 to 200 m. Note in several locations along the shoreline, receptors are very close to or even within potential source areas (see Figure 6.3).

7. Owens Lake Safety & Training Program

7.1 Objective

All field personnel that work at Owens Lake are required to complete special training courses to deal with the unique hazards and environmental precautions that must be considered when working on the lake bed. Training includes: first aid and CPR training, proper ATV use, respiratory protection and dust safety, lake bed access reporting, and snowy plover protection.

7.2 Safety Requirements

Safety is the first priority while working at Owens Lake. Training requirements are required for every worker at the lake for their own safety. Dust storms can start within minutes exposing workers to dust and sand. Lightning storms often occur in the summer. Winters have sub-freezing temperatures and summers have temperatures well above 100 degrees. Access is usually restricted to ATV’s and can change often throughout each year. The objective of all the training requirements is to put safety as the highest priority at all times.

Attachment C

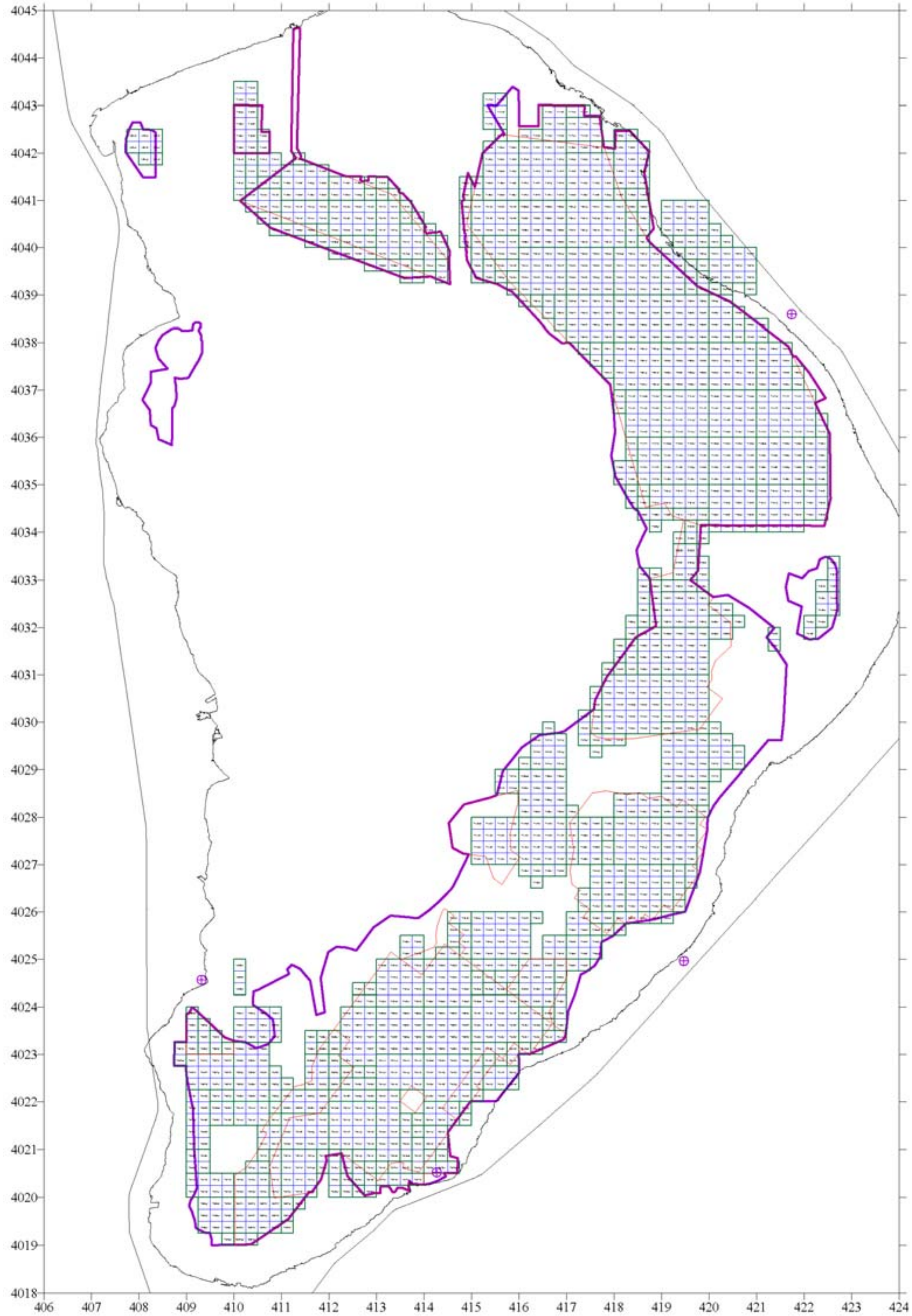

Figure 6.2 - Area source configuration using 250 m x 250 m cells for July 2002 through June 2003 Dust ID model run. Purple lines represent the control area boundary used with the Settlement Agreement.

Attachment C

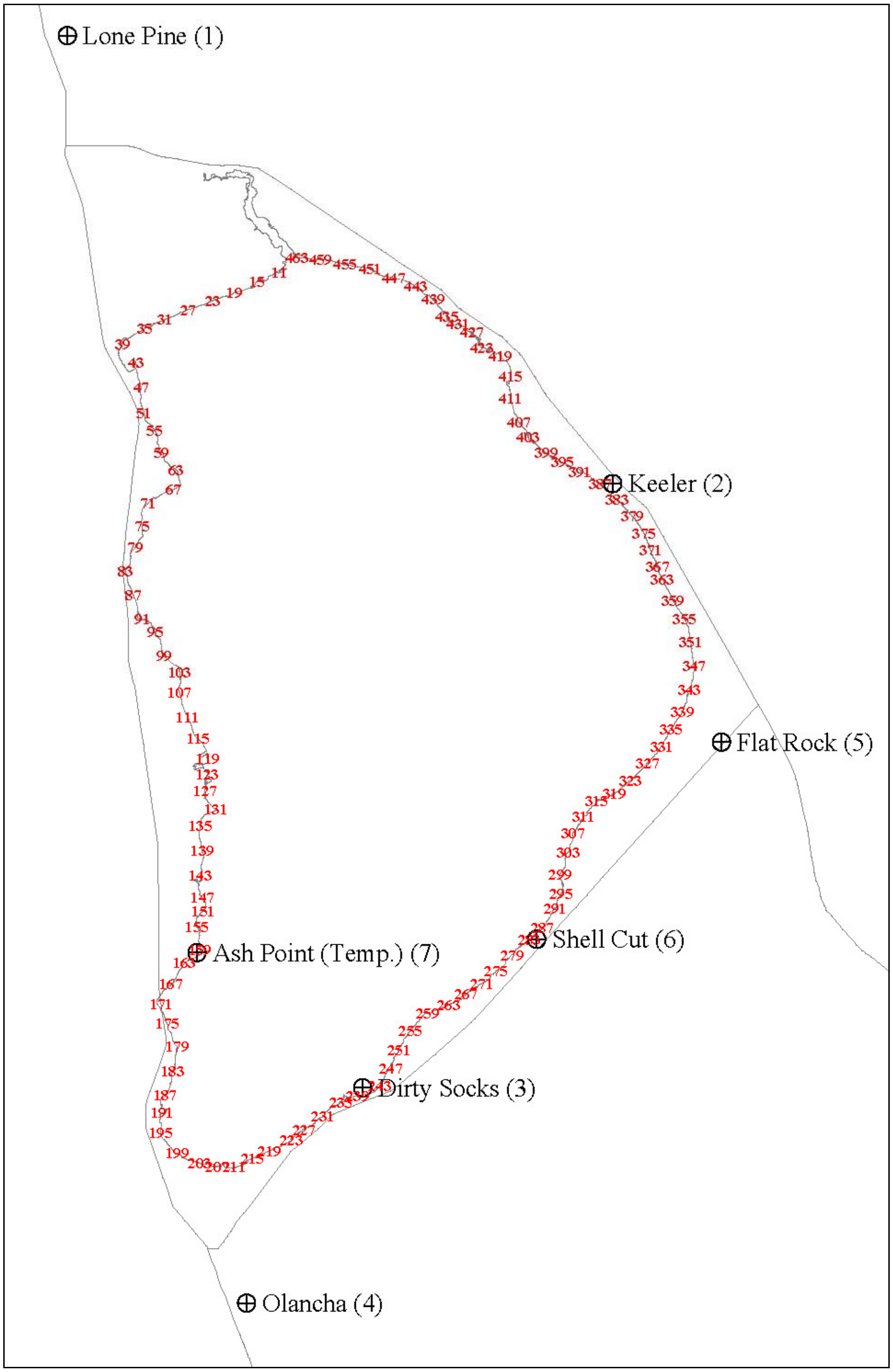

Figure 6.3 -The Dust ID model evaluates PM_{10} impacts at over 460 receptor locations around Owens Lake.

All personnel that are involved with any fieldwork under the Dust ID Program are required to complete all safety training before working on the lake. Everyone must report going onto and leaving the lake. Workers are required to stop work and leave the lake when a dust storm starts. Every field worker will be issued a respirator, goggles for eye protection and earplugs to be used when caught in a dust storm while leaving the lake. Workers are required to leave the Keeler office when the dust impacts Keeler and the TEOM monitor reading exceeds 1000 $\mu g/m^3$. Respirator training and face fits will be completed annually. First Aid and CPR training and successful certification is required every three years. Snowy Plover training is required before any new worker can start work on the lake. Other safety issues that all workers will be informed of include the proper use of tools, special weather conditions such as temperature extremes, rain and lightning and training in the operation of ATVs.

7.3 Reporting Procedure for Working on the Lake and Contacts

1. Normal work hours on the Owens Lake are defined as sunrise to 4:45 PM, Monday through Friday. The lake is defined as any area below the 3600 ft. contour.

2. Every person or group must call the Bishop office and leave a message or speak to the Administrative Specialist (AS) to notify that they are working on the lake. They also must inform the AS what area of the lake they will be working. Examples: DIVIT, Dirty Socks sand sheet, “A” Met tower or any commonly used identifiable name of a site or area you will be working.

3. The AS will record the person’s name (s) and area of the lake they are working on.

4. Every person or group working on the lake must notify the Bishop office before 4:45 PM on the same day; that they have left the lake OK. This must be done or a person will be sent out to look for you! False alerts will not be appreciated.

5. The AS will call the Director of Technical Services (DTS) in Keeler or one of the back up persons in order on the list below, and report the missing person if not notified before the specified time. An attempt will be first made to contact the missing person by phone and determine their situation. The DTS or an assigned person will begin a search for the missing person if the person cannot be contacted by phone. The search will continue until dark or unsafe conditions at which time the Inyo Sheriff will be notified for assistance.

6. Everyone may work outside normal work hours Monday through Friday <u>at your own risk.</u> However, they must call the Bishop office before the designated time and notify the AS that they will be working past 4:45 PM and call again and leave a message that they left the lake OK before 8:00 AM the next day.

7. The AS will check the messages every morning and record the information. The DTS will be notified if a person that worked after normal hours did not call and leave a message that they left the lake OK. The DTS or an assigned person will follow the procedure for a missing person outlined in step 5.

8. Nobody may work on the lake after 4:45 PM on Friday, all day Saturday or Sunday unless they receive special permission from their direct supervisor. The supervisor will be responsible for making sure the worker left the lake OK and responding to an emergency or search if necessary. The worker must notify their supervisor when they leave the lake OK during these periods.

Emergency Assistance Reporting Contacts and Phone Numbers (Area Code 760):

Call 911 first if you have an emergency!

Bishop Office AS	872-8211	
Bill Cox (DTS)	876-8103	Cell 937-2886
Earl Wilson	876-8104	Cell 937-1060
Nik Barbieri	876-1803	Cell 937-6696
Grace Holder	872-8211	Cell 937-2887
Guy Davis	876-8115	Cell 937-1766
Dan Johnson	876-4544	Cell 937-1715
Ted Schade	872-8211	Cell 937-3360

7.4 Snowy Plover Training and Other Wildlife Protection Procedures

Field technicians and other District personnel and contractors are required to take precautions to avoid disturbing western snowy plovers during the nesting and brooding season which is from March 15 through August 30 each year. All lake bed personnel must complete snowy plover awareness and avoidance training before venturing onto the lake bed during snowy plover season. A qualified biologist will provide training for all lake bed personnel. In addition to completing snowy plover training, the plover protection program requires the following:

- Report snowy plover sightings to the District’s biological resources monitor for dissemination to all lake bed personnel and for scientific data collection purposes. The biological resources monitor will map and mark the sightings in the case of nesting pairs, and will map the last known locations of broods. Lake bed workers will be responsible for checking the latest maps before encroaching onto potential snowy plover use areas.

- If snowy plover nests are found within areas of potential conflict with Dust ID monitoring, they will be marked in the field with green stakes. Within the buffer area demarked by stakes, the maximum allowable time per visit is 10 minutes.

- Field personnel should use established ATV and 4WD vehicle trails to approach and depart monitoring sites. The maximum allowable speed on ATV and off-road 4WD on the lake bed is 15 mph during the snowy plover season.

All existing and new Dust ID monitoring installations will be fitted with raptor perching deterrent (eg., Nixalite) at potential perch sites with a height of greater than 60 inches above the

playa surface. Maintenance of perching deterrents will be routinely performed. Any new construction that causes new ground disturbance during the snowy plover season will require a pre-construction survey for snowy plover use. A qualified biologist will perform the survey within 1 week prior to the start of construction.

Monitoring will be performed on site in a manner that is least disturbing to wildlife and plant resources as possible. Potentially affected upland resources (those located outside the playa) that could be disturbed during any new ground-disturbing construction activities were identified during District environmental analyses. The animals that use upland areas vary seasonally, with nesting and foraging birds, mammals, reptiles, and invertebrates occurring during the period of dust monitoring. No special training is required to work in upland areas during the dust monitoring season, however pre-construction wildlife and rare plant surveys are required if placement of new facilities at any time of year will cause new ground disturbance.

Attachment D

Board Order 080128-01
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2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area

The City may transition from one approved BACM to another provided that the performance standard of one or the other BACM is met at all times during the transition, and that the City makes a complete and technically well-supported written demonstration of that performance, with a built-in margin of safety, to the satisfaction of the APCO in advance of any actions by the City to transition. There are three circumstances under which temporary modifications may be allowed to the BACM identified in this SIP, if certain conditions are met. The circumstances are:

1. Adjustments to existing BACM. Research to demonstrate that sufficient PM_{10} control efficiency during the dust season can be achieved and the NAAQS can be attained everywhere on or above the historic shoreline with a different performance standard for an existing BACM.

2. Research on new BACM

3. Transition from one BACM to another that requires a time period where neither BACM's performance standards can be met.

The City may make an application for any of these modifications in writing to the APCO. The complete application must include all necessary data and other technical information to support the application. Except for the specific limitations set forth below for BACM adjustments to Shallow Flooding, the APCO shall have full and sole discretion to accept, reject or condition the City's application for modifications to BACM on Owens Lake, to require additional technical information, and/or to independently monitor the results of the project, and shall provide her/his decision in writing. This same discretion shall apply to the APCO's consideration of each of the other applications that the City may make as further described below. The APCO will consider and respond to comments made by the City regarding any decision by the APCO to reject, condition or modify an application. Failure by the City to comply with any condition of the project approval may result in the APCO revoking the project approval and directing closure procedures be implemented for the project.

The flexible BACM description under the terms of the Order preclude the application of the U.S. Environmental Protection Agency's Natural Events Policy for monitoring data used to make the determinations in this Attachment. All monitored PM_{10} concentrations that meet the EPA quality-assurance requirements contained in 40 CFR Part 58 and are measured at stations located at or no more than 3 kilometers above the historic shoreline (shoreline monitors) will be used in the analysis. The monitored values will be used as measured, and will not be adjusted for from-the-lake and non-lake wind directions as they are for the Supplemental Control Requirements.

Attachment D

The modeling for the determinations will be performed in accordance with the 2008 Owens Lake Dust Source Identification Program Protocol (Board Order 080128-01, Attachment C).

1. ADJUSTMENTS TO EXISTING BACM

A. BACM Adjustments to Shallow Flooding

1. After approval of the 2008 SIP, the City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the boundaries of the 2003 Dust Control Area (Shallow Flood Cover Test).

   A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.

   B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.

   C. The City will be CEQA lead agency for the Shallow Flood Cover Test and shall secure all required responsible agency approvals, permits and leases.

2. If the APCO reasonably determines in writing that the PM_{10} Dust Control Measures in the 2008 Total Dust Control Area (TDCA) have been operational for one continuous year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the 2008 TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over those Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section A.2.C, below, provided that:

   A. Application of the 10 percent reduction in wetness cover during the May 16 through June 30 Shallow Flood areal wetness cover reductions provided for in Paragraphs 15.A.ii and 15.B.ii of Board order 080128-01 shall result in the lower of:

      i. The areal cover resulting from a 10 percent reduction; or

      ii. The areal cover required in Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.

   B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

i. The results of testing carried out pursuant to Section A.1, if conducted; and

ii. The results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.

C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.

D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the 2008 TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in the "2008 Owens Valley Planning Area Supplemental Control Requirements Procedure" (Attachment B) and subject to the provisions of Section A.4, below.

E. Except as provided in Section A.4, below, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.

3. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section A.2, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM_{10} concentrations at the historic shoreline.

4. Any areas for which wetness cover has been reduced pursuant to Section A.2 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan prepared pursuant to the requirements of Attachment B.

A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section A.2 provided that:

i. The maximum 24-hour PM_{10} shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 $\mu g/m^3$; and

ii. The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time period set forth in

Section A.4.A.(i) plus the background of 20 μg/m^3 do not exceed 120 μg/m^3 at the historic shoreline.

B. If the monitored values at the historic shoreline exceed 130 μg/m^3, and it is determined that non-lake bed sources are contributing greater than 20 μg/m^3, then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.

C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:

   i. A map that depicts the eligible Shallow Flood areas;

   ii. The proposed amount of wetness cover for each eligible Shallow Flood area; and

   iii. The method for determining effectiveness of the proposed wetness cover.

D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

B. BACM Adjustment to Measures Other than Shallow Flooding within Existing Dust Control Areas

<u>Requirements to Begin the Process</u>
At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether the Owens Lake bed will require additional PM_{10} controls in order to attain or maintain the federal 24-hour PM_{10} NAAQS. The APCO will use the procedure forth in Board Order 080128-01 to make the determination.

If the APCO determines that there were no monitored or modeled exceedances of the PM_{10} NAAQS as described above for the previous calendar year, each calendar year the APCO will do the following:

1) determine from the modeling if there are shoreline receptors where the model shows the combined predicted yearly maximum 24-hour contribution from all source areas on the lake bed contributing to those receptors plus background (24-hour average of 20 μg/m^3) is less than 120 μg/m^3, and

2) determine that there were no concentrations greater than 120 μg/m^3 measured at any shoreline or near-shore monitoring site in the area of those receptors.

The City may perform an independent assessment using the data and methods of the Dust ID Protocol in order to confirm the APCO's findings. The APCO will consider and respond to the

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City's assessment before making his/her final determination. The APCO has full and sole discretion to make this determination.

First Step on Test Areas

If there are receptors that meet the requirements described above, and provided that the City is in compliance with SIP control requirements on all areas of the lake bed, the APCO will inform the City that they may submit an application to reduce the level of control within a 1 to 2-square-mile test area of an existing Shallow Flooding Dust Control Measure (DCM) area or within a 160 to 320 acre test area of an existing Managed Vegetation DCM area that the modeling shows contributes to, and only to, the shoreline receptors described above where the yearly maximum 24-hour contribution from the lake bed plus background is less than 120 $\mu g/m^3$. Application may be made for more than one area to be tested simultaneously provided the test areas do not impact any of the same modeled shoreline receptors or monitors (no overlapping impacts). The above limitations on test area size and location do not apply outside the boundaries of existing Dust Control Areas.

For the Managed Vegetation DCM, the cover may be reduced by no more than 5%, e.g. 50% to 45%, (one step). For other BACM or changes to compliance averaging areas (e.g., one acre for Managed Vegetation), the APCO will determine the permitted test area size, averaging area, test location and step amount. An area with a non-zero contribution to a receptor will be considered not to contribute to a receptor if the contribution from that area is less than 5 $\mu g/m^3$ and the yearly maximum 24-hour contribution from the lake bed plus background (20 $\mu g/m^3$) to that receptor is less then 140 $\mu g/m^3$. (A "zero contribution" is defined by the accuracy of the instruments used to collect the data, but in no case shall it be greater than 1 $\mu g/m^3$.) The City may also satisfy the requirements of a BACM test for Managed Vegetation with documentation of a site-specific BACM test, along with written justification for more general application of the results of this test.

The City's application to reduce the level of control over any area within the boundaries of existing Dust Control Areas must be accompanied by a modeling analysis that demonstrates that increasing PM_{10} emissions within the test area will not cause the predicted yearly maximum 24-hour concentrations along the shoreline to exceed 120 $\mu g/m^3$, including background (20 $\mu g/m^3$).

The application must also include, but is not limited to:

1) a project description,
2) site plan,
3) any necessary environmental documentation, responsible agency approvals, permits and leases,
4) a protocol to measure PM_{10} emissions and performance standards,
5) a time frame for project milestones and completion,
6) plans to control PM_{10} emissions if they exceed project limits,
7) project closure procedures if the project is discontinued,
8) soil texture information, soil chemistry, groundwater chemistry and applied water chemistry, and

9) a protocol to evaluate control effectiveness, estimate emissions and determine whether the results are transferable to other areas of the lake bed.

For BACM other than Shallow Flooding, the City will submit a relationship between control efficiency and performance standards based upon research results. The APCO has full and sole discretion to accept, reject, or modify that relationship. All modeling will be done according to the Dust ID Protocol.

Rectified aerial or satellite images of the area of adjusted BACM, or any other method approved by the APCO, will be used by the APCO to determine the performance standards for the adjusted BACM for this step and all subsequent steps.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the test at any time if modeling or monitoring show that modeled (including background of 20 $\mu g/m^3$) or monitored emissions are increasing above trigger levels set by the APCO based upon a 140 $\mu g/m^3$ modeled or monitored PM_{10} concentration at the shoreline, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

The APCO has full and sole discretion to approve or reject the City's application or require conditions. The APCO will take action and notify the City in writing within 90 days of receipt of the written application. No changes may be made to BACM in advance of the APCO's approval. Any adjustments to BACM will be reported to EPA by the APCO within 60 days of the APCO's approval.

Subsequent Steps on Test Areas

The adjusted BACM shall be maintained by the City for one year. No other adjustments to BACM may be made during that year that impact any of the same set of model shoreline receptors. At the end of the year, the City may submit a new application to the APCO to reduce the level of control in the test area by another step provided:

1) the modeled yearly maximum 24-hour contribution at all of the shoreline receptors identified above from all lake bed sources including the test area, plus background (20 $\mu g/m^3$), during the test period is less than 120 $\mu g/m^3$, and

2) no concentrations greater than 120 $\mu g/m^3$ were measured at any shoreline monitor in the area of those receptors during the test period.

The new application must contain all the same elements as the original application, and all the data and modeling from the first step of the test.

The APCO has full and sole discretion to approve or reject the City's application, or to require conditions. Subsequent steps may be made in the same manner. The APCO will take action and notify the City in writing within 90 days of receipt of the written application.

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Requirement to Increase Controls on Test Areas

If, at the end of the year or any subsequent year before the SIP Revision to adjust BACM is approved by USEPA, the predicted yearly maximum 24-hour contribution from all lake bed sources including the test area plus background (20 $\mu g/m^3$) exceeds 140 $\mu g/m^3$ at any of the shoreline receptors identified above, and/or concentrations greater than 140 $\mu g/m^3$ were measured at a shoreline monitor in the area of the identified receptors, then the City must increase the control efficiency on the test area to the last step that achieved concentrations below the 140-$\mu g/m^3$ threshold. For Managed Vegetation, this action must be taken within 12 months of the written determination by the APCO that the requirements for adjusting BACM were not met. For all other PM_{10} control measures, this action must be taken within 60 days of the written determination by the APCO that the requirements for adjusting BACM were not met. The APCO has full and sole discretion to make that determination. The APCO will determine the time scale for compliance for other BACM as part of the approval of the application.

SIP Revision for BACM for the Test Area

After three consecutive years of successful operation of the adjusted-BACM test area (modeled and monitored concentrations less than 140 $\mu g/m^3$ as described above), the City may apply to the District for a SIP Revision to redefine BACM for that test area on the Owens Lake bed provided:

1) the predicted yearly maximum 24-hour PM_{10} contribution for each year of the test from the test area plus background (20 $\mu g/m^3$) at all shoreline receptors is 140 $\mu g/m^3$ or less, and

2) no PM_{10} concentrations greater than 140 $\mu g/m^3$ were measured at any shoreline monitor during the three years of the test.

The APCO has full and sole discretion to determine whether these conditions have been met. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP revision.

Lake-Wide SIP Revision for BACM for a Soil Type

If, after three consecutive years of successful operation of the adjusted-BACM test area, the predicted yearly maximum 24-hour contribution from the test area and all source areas on the lake bed plus background (20 $\mu g/m^3$) at all shoreline receptors for all three years of the test is 140 $\mu g/m^3$ or less and no concentrations greater than 140 $\mu g/m^3$ were measured at any shoreline monitor during the three years of the test, the research conducted on these test areas can be used to determine the relationship between the PM_{10} emissions, control efficiency and DCM performance standards. After the relationship has been identified, the City will use the research results in an updated modeling analysis that applies the test results to other areas on the lake bed with the same general soil type (sand-dominated, silt-dominated or clay-dominated) and under the same range of evaluated emissions or control efficiencies and performance standards as the test. The modeling will cover the entire test period, and will be done in accordance with the Dust ID Protocol. A DCM control map (map) will be prepared of lake bed control efficiencies (with corresponding DCM performance standards) that would be required to achieve the PM_{10} NAAQS everywhere along the historic shoreline with that DCM in the same general soil type

(sand-dominated, silt dominated or clay-dominated) as the test area and under the same range of control efficiencies, emissions, and performance standards evaluated in the test.

The City will then submit this draft map to the APCO for approval. The submittal must contain all the data from the test area and the modeling that produced the map. The APCO has full and sole discretion to approve, disapprove, or modify the draft map.

If the APCO approves the map, the City may apply to the District Board for a SIP Revision to redefine that BACM for that mapped area on the Owens Lake bed. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP Revision. If a SIP Revision identifying a redefined BACM for Owens Lake is adopted by the District Board and approved by USEPA, the redefined BACM may be implemented anywhere designated by the new DCM control map. If the City has implemented a different DCM in the mapped area, the requirements of the following section below titled "Transitioning From One BACM to Another BACM After 2010" must also be met. If any modeled or monitored exceedance of the PM_{10} NAAQS results from these adjustments to BACM, the requirements of Board Order 080128-01, Paragraphs 10 and 11, will automatically apply to increase controls on these extreme violators to restore attainment of the NAAQS.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing adjustments to existing BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

2. RESEARCH ON POTENTIAL NEW BACM INCLUDING MOAT ROW

The City may test new dust control measures at any time on areas of the lake bed that are emissive, except within the 43.0 square-mile 2008 Total Dust Control Area footprint where BACM (or on up to 3.5 square miles, the non-BACM dust control known as Moat & Row) must be implemented by April 1, 2010 or within any Supplemental Control Area where existing BACM has been implemented or is scheduled for implementation. This testing area exclusion does not apply to Moat & Row PM_{10} controls constructed within the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA). The City may test up to 3.5 square miles of Moat & Row within the SDCA. If the City has tested a new control measure for three years in this manner, it may apply in writing to the APCO for a SIP Revision to designate the new dust control measure as BACM. The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO's satisfaction that the new control measure is sufficient to achieve the required PM_{10} emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.

The application shall include, but not be limited to:

1) a description of the new dust control measure

2) a description of the test site and the meteorological conditions under which it was tested
3) the measured PM_{10} emissions during the test
4) the test time frame
5) all raw data collected during the test
6) all data screening criteria and final data sets
7) data supporting the conclusion that the required control efficiency was achieved
8) a performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency
9) an analysis of any environmental impacts of the dust control measure
10) the appropriate responsible agency approvals, permits and leases

The application must include modeling that demonstrates that the required PM_{10} emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historic shoreline.

If the APCO determines that the application is complete and the above conditions have been met, he/she will have full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard and include that method in the description of the proposed BACM for the SIP Revision. The District Governing Board has full and sole discretion to determine whether to adopt a SIP Revision for approval of any new BACM.

Upon adoption by the District Board, approval by CARB, and submission to USEPA of a SIP Revision that identifies a new BACM for Owens Lake, the City may implement only this one new control measure on one-half square mile of the next area to be identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. No other new control measures may be implemented on areas identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. The District Governing Board may limit the new BACM to specific circumstances, for example, distance of the new dust control measure from the shoreline or approval in a specific general soil type. Upon approval by USEPA, the new BACM may be implemented per the requirements described in the following section, “Transitioning From One BACM to Another BACM After 2010,” or on any subsequent areas requiring control under the “2008 Owens Valley Planning Area Supplemental Control Requirements Procedure” (Board Order 080128-01, Attachment B), subject to any limitation to specific circumstances.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing any BACM test or new BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

Attachment D

3. TRANSITIONING FROM ONE BACM TO ANOTHER BACM AFTER 2010

If the City wishes to transition from one existing BACM to another existing BACM without meeting the performance standard of one or the other BACM at all times, it may submit an application to the APCO in writing for permission to do so after April 1, 2010. The APCO has full and sole discretion to accept, reject or condition the City's application. The transition may be done on no more than one and one-half (1.5) square miles lake-wide for any BACM except Managed Vegetation, or 320 acres lake-wide if the transition is to Managed Vegetation, at one time. The City shall not begin the transition in advance of the APCO's written approval.

The application shall include, but not be limited to:

1) a protocol that includes a project description
2) a site plan
3) a plan to measure PM_{10} emissions
4) a time frame for project milestones and completion
5) plans to control PM_{10} if emissions exceed any trigger value set by the APCO based upon a 140µg/m^3 modeled (including background of 20µg/m^3) or monitored PM_{10} concentration at the shoreline
6) data supporting the assumption that the transition can be completed and the BACM performance standards can be achieved within three years of the start-up of construction
7) project closure procedures if the project is discontinued for any reason or if the PM_{10} trigger value is exceeded
8) any necessary environmental documentation, responsible agency approvals, permits and leases

The protocol must include modeling in accordance with the Dust ID Protocol that predicts that the NAAQS will be met at all times everywhere on the shoreline during the transition period, and must include a method to monitor emissions continuously throughout the transition period. The transition must be complete, and the new BACM performance standard achieved, within three years of written notification from the City to the APCO that they are no longer maintaining the performance standard for the existing BACM, and are beginning the transition.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the transition at any time if modeling or monitoring show that emissions are increasing above any pre-set trigger level described in 5) above, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

If the data show to the APCO's satisfaction that the transition has been accomplished while attaining the NAAQS everywhere at the shoreline, the City may submit an application to the APCO to allow another area to be transitioned. The APCO has full and sole discretion to accept, reject or condition the City's application. The same procedures outlined above will apply.

Attachment D

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to BACM transitions. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

APPENDIX E
2013 GBUAPCD BOARD ORDER NO. 130916-01

BOARD ORDER 130916-01

ORDER OF THE GOVERNING BOARD OF THE GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT AMENDING THE 2008 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN TO INCORPORATE REVISIONS TO THE DATE REQUIRED FOR THE IMPLEMENTATION OF BEST AVAILABLE CONTROL MEASURES FOR THE "PHASE 7A" DUST CONTROL AREAS, MODIFYING CERTAIN BEST AVAILABLE CONTROL MEASURE DESCRIPTIONS AND MODIFYING PROVISIONS FOR PM_{10} CONTROL IN THE KEELER DUNES

September 16, 2013

WHEREAS, on February 1, 2008, the Governing Board of the Great Basin Unified Air Pollution Control District ("District"), an agency organized pursuant to Division 26, Part 3, Chapter 3 of the California Health and Safety Code, approved the *2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan* ("2008 SIP") and its associated implementing Board Order Number 080128-01 ("SIP Order"). The SIP Order is attached as Exhibit 1.

WHEREAS, the SIP order requires the City of Los Angeles, acting by and through its Los Angeles Department of Water and Power ("LADWP"), a municipal corporation organized under the Los Angeles City Charter and the Constitution and laws of the State of California, to construct Best Available Control Measure ("BACM") PM_{10} controls on various emissive areas of the dried Owens Lake bed in Inyo County, California. The SIP Order sets forth a methodology for identifying emissive lake bed areas that require BACM PM_{10} controls.

WHEREAS, on September 25, 2009, the LADWP requested and was granted a conditional variance by the District Hearing Board (District Hearing Board Order Number GB09-06, Exhibit 2) to extend the deadline by one year for the completion of dust control measures in an approximately 3.1 square-mile area now known as "Phase 7a," which includes the six Dust Control Areas ("DCAs") designated as T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1.

WHEREAS, on March 17, 2011, the District Governing Board issued Stipulated Order for Abatement Number 110317-01 ("Order 110317-01") (Exhibit 3). Order 110317-01 extended the SIP Order and Hearing Board Order GB09-06 deadlines by which the LADWP was required to construct the Phase 7a dust control project. With the exception of DCA T12-1, Order 110317-01 required Phase 7a dust controls to be BACM controls. Order 110317-01 allows LADWP to conduct a BACM test of Tillage in DCA T12-1 and to transition approximately 3.0 square miles of existing BACM control areas to other types of BACM control ("Transition Area").

WHEREAS, Order 110317-01 requires LADWP to install the Phase 7a and Transition Area BACM controls by no later than December 31, 2013, and to install BACM controls in the T12-1 tillage test area by May 1, 2016. (*See also* Governing Board Order No. 120206-07.) Under Order 110317-01, all Phase 7a Areas and Transition Areas controlled by Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover by December 31, 2015.

WHEREAS, the LADWP subsequently determined that it would be unable to meet the deadlines set forth in Order No. 110317-01 and, after discussions with the District, entered into a settlement agreement with the District entitled *Phase 7a and Keeler Dunes Settlement Terms*, dated June 25, 2013 ("Term Sheet") that was approved by LADWP's Water and Power Commissioners on June 26, 2013, and the District's Governing Board on June 27, 2013. The Term Sheet is attached as Exhibit 4.

WHEREAS, the Term Sheet required the District and the LADWP to enter into a Settlement Agreement that formalized and approved the provisions of the Term Sheet. On August 19, 2013 and August 27, 2013, the District and LADWP, respectively, approved the *Settlement Agreement and Release Between the Great Basin Unified Air Pollution Control District and City of Los Angeles Acting by and Through its Department of Water and Power Concerning Modification to Phase 7a Stipulated Order for Abatement No. 110317 and Keeler Dunes Project* ("Settlement Agreement"). The Settlement Agreement is attached as Exhibit 5.

WHEREAS, the Term Sheet and Settlement Agreement required the District to modify Order 110317-01 to comply with the provisions of the Term Sheet and Settlement Agreement. On August 19, 2013, the Governing Board adopted Order No. 130819-01 – *Findings and Decision of District Governing Board Upon Hearing for Stipulated Modification to Stipulated Order for Abatement 110317-01* which modified Order 110317-01. Order 130819-01 is attached as Exhibit 6.

WHEREAS, the Term Sheet (Section II.B.1.c.) and Settlement Agreement (Section II.b.iii.) require that "The District shall amend the 2008 SIP and Board Order 080128-01 consistent with the terms of this Agreement, … and shall request the United States Environmental Protection Agency ("EPA") and CARB [California Air Resources Board] to approve the amended SIP."

THEREFORE, as required by the Term Sheet and Settlement Agreement, the District Governing Board hereby makes the following amendments to the 2008 SIP and the 2008 SIP Order, and directs the Board Clerk to promptly submit the two amended documents to the California Air Resources Board ("CARB") for approval and forwarding to the U.S. Environmental Protection Agency ("EPA") for its consideration and approval. The District requests that the CARB and EPA consider the above two amendments separately and approve those portions that are approvable. It is the intention of the Governing Board to only make such amendments that are necessary to implement and enforce the terms and provisions of the Term Sheet, Settlement Agreement and Abatement Order Number 130819-01.

The amendments to the 2008 SIP and 2008 SIP Order are as follows:

A. PHASE 7a DUST CONTROLS

1. **Deadline Extensions**: All of the locations in the 2008 SIP and SIP Order that discuss the deadlines for constructing dust controls in the "Moat & Row" areas (now known as the "Phase 7a" areas) shall be revised to be consistent with the new timeframes discussed below in subdivisions (a)-(d) and the following shall be added to the 2008 SIP and SIP Order:

a. With the exceptions noted below, the deadline for LADWP to construct all infrastructure and install fully-compliant BACM PM_{10} controls (other than Managed Vegetation BACM) in those portions of the "2008 Dust Control Area" (SIP Sec. 7.3 and SIP Order paragraphs 2 and 3) known as the "Phase 7a" areas, which total approximately 3.1 square miles, shall be December 31, 2015. All infrastructure and plant materials for Phase 7a areas controlled with Managed Vegetation BACM will be installed by December 31, 2015. The Phase 7a areas are a portion of the 2008 Dust Control Area previously referred to in the 2008 SIP and SIP Order as "Moat & Row Dust Control Areas" and are shown and described in Exhibit 7.

b. The deadline to achieve fully-compliant BACM vegetation cover for those Phase 7a areas controlled by the Managed Vegetation BACM shall be December 31, 2017. (See 2008 SIP Section 7.3 and SIP Order paragraph 3)

c. The extensions of the deadlines set forth in sections A.1.a. and A.1.b. shall be contingent upon all of the following:

   (1) LADWP timely receiving from California State Lands Commission ("CSLC") and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM controls within the deadlines set forth in sections A.1.a. and A.1.b..

   (2) The timely removal from the Phase 7a areas of all California Register of Historical Resources ("CRHR")-eligible areas plus necessary buffer areas, referred to as the "Eligible Cultural Resource ("ECR") areas." The ECR areas initially consist of 277 acres of the Phase 7a areas (the "Initial Phase 7b Areas"). The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas shall comprise the "Phase 7b" areas. The Phase 7b Areas are not limited are not limited to the initial 277 acres.

   (3) Order 110317-01 being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas are considered a condition of force majeure under paragraph 5(d) of that Order.

d. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of Order 110317-01, as modified by Order 130819-01, and paragraphs 6 and 22 of Order 110317-01, which shall not be unreasonably denied by the District.

2. **Removal of Phase 7b Areas:** All of the locations in the 2008 SIP and SIP Order that discuss or identify the boundaries of Moat & Row (now Phase 7a) shall be revised to recognize that LADWP shall not be required to install dust controls in the Phase 7b areas (initially, 277 acres) under the provisions of the 2008 SIP, the SIP Order, Order 110317-01 or Order 130819-01, and the following shall be added to the 2008 SIP and SIP Order:

If the District Governing Board subsequently decides to order LADWP to install dust controls in Initial Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake. LADWP is not waiving its right to contest the new Board order or orders.

3. **Figure Revisions:** The existing figures in the 2008 SIP, including Figure 2.3 and 7.1, and SIP Order Exhibit 1 shall be revised to identify:

   a. The Moat & Row Areas as "Phase 7a"

   b. The location of "Brine Shallow Flooding" BACM

   c. The existing shallow flooding areas to be transitioned to other BACM as part of the Phase 7a project, and

   d. The completed BACM controls in the Phase 8 area.

B. **BEST AVAILABLE CONTROL MEASURE (BACM) MODIFICATIONS**

1. **Reduced Thickness Gravel:** All of the locations in the 2008 SIP and SIP Order that discuss the Gravel Blanket BACM control shall be revised to recognize that the District Governing Board approves "Reduced Thickness Gravel" as an approved type of the Gravel Blanket BACM. Reduced Thickness Gravel is defined per the 2008 SIP Section 5.4 and SIP Order paragraph 17 except that the gravel thickness is reduced from a minimum of four inched (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification "Material Specification 592—Geotextile" (National Engineering Handbook, Chapter 3, Part 642), or equivalent as approved by the Air Pollution Control Officer.

2. **Brine Shallow Flood:** The following shall be added to the 2008 SIP and SIP Order:

   The Governing Board approves "Brine Shallow Flooding BACM" as a subcategory of Shallow Flooding BACM. Brine Shallow Flooding is defined per the "Shallow Flooding BACM" in the 2008 SIP except that the water used for dust control may contain elevated levels of dissolved salts. The Air Pollution Control Officer will develop a Brine Shallow Flood BACM compliance methodology with input from the LADWP.

   The District and LADWP acknowledge and agree that the District's approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the existing natural Brine Pool on Owens Lake. The existing "natural Brine Pool" is defined as those areas at Owens Lake below elevation 3,553.55 feet.

3. **Removal of Moat & Row:** Remove the following sentence from the fourth paragraph of Section 2.1.1 "LOCATION" in the 2008 SIP:

   If the Moat & Row control measures cannot achieve the necessary PM_{10} control efficiency for the indicated areas (ranges from 50% to 99%), the unsuccessful Moat & Row areas must be converted to Shallow Flooding.

4. **BACM Testing and Approval:** The following shall be added to the 2008 SIP Section 7.9 "CHANGES TO BACM" and to the SIP Order as Paragraph 12.a.:

   The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Engineered Roughness Elements and Tillage in soil type areas where these controls can be applied. The District Governing Board shall consider BACM approval of these candidate measures by September 28, 2014. If the accelerated testing does not result in approved BACM for the candidate measures, the District's and LADWP's respective Boards shall jointly assess why the accelerated testing did not result in the District Board's BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM controls.

5. **Waterless BACM:** Revise the first sentence in Section 7.9 "CHANGES TO BACM" of the 2008 SIP adding the underlined text:

   Existing BACM controls may be replaced with other BACM to help reduce implementation and operating costs and water usage. The District and LADWP shall make every effort to develop, approve and deploy high-confidence, waterless dust control measures in all areas where dust controls are ordered on Owens Lake. In addition, control measure research may identify new BACM control methods that are as effective as the BACM methods discussed in Chapter 5. Any approved BACM can be changed to any other approved BACM, however, with the exception of the provisions made in Order 110317-01 for "Transition Areas," associated with the such transitions must be done in a manner that at all times results in the performance specifications for one or the other BACMs being met. Any environmental analyses, permits or leases required as a result of the transition are the sole responsibility of the City.

C. **KEELER DUNES**

1. **2008 SIP Section 6.4**: The third paragraph in Section 6.4 of the 2008 SIP titled "ATTAINMENT DEMONSTRATION" shall be removed and replaced with the following:

   Emissions from the Keeler dunes were excluded from the simulations to assess attainment in the 2008 SIP. As discussed in more detail in Section 7.5, the District will work with federal, state and local agencies, other than LADWP, to develop a plan to control dust emissions from the Keeler dunes. Any PM_{10} control measures necessary for the Keeler dunes will be implemented by the District, or by entities other than the LADWP, by December 31, 2015.

2. **<u>2008 SIP Section 7.5</u>**: Section 7.5 of the 2008 SIP titled "DUST CONTROLS FOR KEELER DUNES" shall be removed and replaced with the following:

   The Keeler dunes are located northwest of the town of Keeler above the 3,600-foot elevation that defines the regulatory Owens Lake shoreline (Figure 4.14). The total area covered by deep sand is about 0.64 square kilometers (157 acres). Figure 7.4 shows a sand dune about one-half mile north of Keeler in the Keeler dune field that formed across the abandoned State highway. Sensits and sand catchers have been installed in the Keeler dunes so that their PM_{10} emissions can be modeled, and not attributed to lakebed sources.

   Due to their proximity to the town of Keeler, dust emissions from the Keeler dunes contribute significantly to exceedances of the federal PM_{10} standard in the town. After all the Owens Lake bed sources that cause or contribute to PM_{10} standard exceedances are controlled, the Keeler dunes area is expected to be the only significant remaining dust source that causes exceedances of the PM_{10} standard in the planning area.

   In June 2013, in an agreement with the LADWP, the District committed to implement a PM_{10} control project on the Keeler Dunes with funding provided by the LADWP. The District will work with federal, state and local agencies, other than the LADWP, to develop and implement a project to control dust emissions from the Keeler dunes. This project is known as the "Keeler Project." The District shall have exclusive authority over, and responsibility for, the Keeler Project including, but not limited to, environmental impact analysis, design, permitting, construction, operation, maintenance, management, and monitoring. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and the United States Bureau of Land Management ("BLM"). LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and any other activities directly and exclusively related to the Keeler Project for as long as dust controls are required. Any dust monitoring undertaken by the District on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

   In addition, the District forever releases LADWP from any and all liability under any and all federal, state and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP and SIP Order that can be enforced by the District, and fugitive dust emission rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Keeler Dunes, regardless of origin, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached as Exhibit 8 and incorporated into the 2008 SIP and SIP Order. Keeler Dunes controls will be implemented by December 31, 2015.

The other major dune area, the Olancha dunes, is shown in Figure 4.14 and was not monitored or included in the model. The Olancha dunes are believed to be primarily natural dunes. If PM_{10} violations are attributed to the Olancha dunes, these violations will be treated as natural events and a Natural Events Action Plan will be developed and implemented in accordance with the USEPA guidance and rules on Exceptional Events (see Section 2.2.3.3). In addition, the District forever releases LADWP from any and all liability under any and all federal, state, and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP and SIP Order that can be enforced by the District, and fugitive dust emission rules, for dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin, including but not limited to portions of the Other Dunes Areas that may be owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin. The LADWP is not released from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas is attached as Exhibit 8 and incorporated into the 2008 SIP and SIP Order.

3. **2008 SIP Section 7.10**: The fourth paragraph in Section 7.10 of the 2008 SIP titled "IMPLEMENTATION MILESTONES AND EMISSION REDUCTIONS" shall be removed and replaced with the following:

   Attainment of the federal PM_{10} standard is expected by the end of 2017. By this time, the District expects to have at least one year of air monitoring data that show no violations of the federal standard in the planning area.

4. **2008 SIP Section 7.11**: Section 7.11 of the 2008 SIP titled "REASONABLE FURTHER PROGRESS" shall be removed and replaced with the following:

   Under CAAA Section 189(c), the demonstration of attainment SIP is required to include quantitative milestones that are to be achieved every three years until the area is redesignated attainment. These milestones must demonstrate reasonable further progress toward attainment of the NAAQS by the attainment date. Table 7.1 includes the estimated emissions reductions associated with the various control strategies to achieve the emission reduction trend as shown in Figure 7.5 to demonstrate reasonable further progress toward attaining the NAAQS. Milestones associated with this 2008 SIP include completion of Phase 7a dust controls by

December 31, 2015, with full compliance of BACM Managed Vegetation areas by December 31, 2017 (unless the time frames are extended as provided by Orders 110317-01 and 130819-01 or the Phase 7a areas become Phase 7b areas), and control of the Keeler dunes by December 31, 2015. The contingency measures shall not be triggered against LADWP for Phase 7b or the District's failure to control Keeler Dunes by December 31, 2015. As required by Section 189(c)(2) of the CAAA, the District shall submit to the USEPA, no later than 90 days after the date of each milestone, a demonstration that each milestone has been met.

5. **2008 SIP Table 7.1**: Table 7.1 titled "Control strategy milestones and estimated PM_{10} emission reductions" shall be modified by":

   a. Renaming the Table "Estimated PM10 emissions for control strategies."

   b. Replacing the "Milestone" category with "Control Strategy."

   c. Removing the term "Moat & Row" and replacing it with "Phase 7a."

   d. In the "Keeler dunes control area" row of the "1st Year in Full Operation" column, removing "2014" and replacing it with "2016."

The effective date of this Order and all its amendments shall be September 16, 2013.

///////

APPROVED, ADOPTED and ORDERED by the Governing Board of the Great Basin Unified Air Pollution Control District this 16th day of September, 2013 by the following vote:

Yes: Board Members - Eastman, Hames, Rawson, Arcularius
Kingsley, Johnston, Hunt

No: 0

Abstain: 0

John Eastman

John Eastman, Chair of the Governing Board

Attest:

Tori DeHaven

Tori DeHaven, Clerk of the Governing Board

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List of Exhibits

Exhibit 1	*2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan* Board Order Number 080128-01 ("SIP Order")
Exhibit 2	District Hearing Board Order GB09-06, *Findings and Order Granting Regular variance from Requirements set Forth in Governing Board Order 080128-01*, September 25, 2009.
Exhibit 3	Stipulated Order for Abatement Number 110317-01
Exhibit 4	*Phase 7a and Keeler Dunes Settlement Terms* dated June 25, 2013 ("Term Sheet")
Exhibit 5	*Settlement Agreement and Release Between the Great Basin Unified Air Pollution Control District and City Of Los Angeles Acting by and Through its Department of Water and Power Concerning Modification to Phase 7a Stipulated Order for Abatement No. 110317 and Keeler Dunes Project*, dated August 19, 2013 ("Settlement Agreement")
Exhibit 6	District Governing Board Order Number 130819-01 – *Findings and Decision of District Governing Board Upon Hearing for Stipulated Modification to Stipulated Order for Abatement 110317-01*, dated August 19, 2013
Exhibit 7	Map of Phase 7a areas
Exhibit 8	Map of Keeler and Other Dune Areas

Great Basin Unified Air Pollution Control District

2013 Amendment to the Owens Valley PM_{10} SIP

Board Order 130916-01

Exhibit 1: 2008 Owens Valley PM_{10} Planning Area
Demonstration of Attainment State Implementation Plan
Board Order Number 080128-01 (“SIP Order”)

BOARD ORDER # 080128-01
REQUIRING THE CITY OF LOS ANGELES TO UNDERTAKE MEASURES TO CONTROL PM_{10} EMISSIONS FROM THE DRIED BED OF OWENS LAKE

With regard to the control of PM_{10} emissions from the bed of Owens Lake, the Governing Board of the Great Basin Unified Air Pollution Control District (District) orders the City of Los Angeles (City) as follows:

PREAMBLE

A. WHEREAS, the 1998 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (1998 SIP), dated November 16, 1998 and the 2003 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2003 SIP), dated November 13, 2003, require the City to implement a series of measures and actions to reduce particulate emissions from the Owens Lake bed such that the Owens Valley Planning Area (OVPA) will attain and maintain the federal 24-hour National Ambient Air Quality Standards (NAAQS) for particulate matter (PM_{10}) by the statutory deadlines;

B. WHEREAS, the District is required by law to maintain its discretion to protect the environment, public health and safety, and this Order is intended to fulfill those duties without improperly constraining that lawful exercise of discretion;

C. WHEREAS, based on additional information collected subsequent to the information used to adopt the 1998 SIP and 2003 SIP, the District has determined that additional measures and actions will be required to continue to reduce particulate emissions in the OVPA such that the OVPA will attain and maintain the federal 24-hour NAAQS for PM_{10} by the statutory deadlines;

D. WHEREAS, in 2006 a dispute arose between the District and the City regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2003 SIP;

E. WHEREAS, on December 4, 2006 a Settlement Agreement was approved by both the District and the City. Under the provisions of this agreement, the City agreed to implement additional dust control measures by April 1, 2010 and the District agreed to revise the 2003 SIP before March 1, 2008 to incorporate the provisions of the Settlement Agreement;

F. WHEREAS, on March 23, 2007, the U.S. Environmental Protection Agency (USEPA) published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for particulate matter of 10 microns or less (PM_{10}) by December 31, 2006 as mandated by the U.S Clean Air Act Amendments of 1990;

G. WHEREAS, as a result of the USEPA finding, the 2003 SIP must be revised to include a control strategy that will provide for attainment in the Owens Valley Planning Area as soon as practicable and that said revised SIP must be submitted to the USEPA by December 31, 2007;

H. WHEREAS, in consideration of the District's continuing duties under federal and state law, including but not limited to the Clean Air Act, to control particulate emissions from the Owens Lake bed without interruption, the District intends, if this Order is stayed or disapproved, that Board Order #031113-01 (adopted on November 13, 2003) shall continue to be in effect, so that at all times there will be continuous control of these emissions;

I. WHEREAS, the District thereby intends that if this Order is stayed due to a legal challenge, including but not limited to a challenge to this Order under California Health and Safety Code Section 42316, to the State Implementation Plan, or to the Environmental Impact Report for this SIP, or if this Order is disapproved by the California Air Resources Board (CARB), the District will revert to enforce the terms of Board Order #031113-01 which shall continue to be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, unless and until another Order is issued by this Board; and

J. WHEREAS, to prevent the deterioration of air quality due to dismantling or "backsliding" on control measures that have already been implemented before any such stay or disapproval, the District intends that the City shall continue to operate and maintain all control measures already implemented at the time of any such stay or disapproval without interruption, unless and until a further Order of the District allows for such interruption, if the City has not appealed the control measures under Section 42316 within 30 days of the effective date of this Order, and if those control measures were not invalidated as a result of that appeal;

K. WHEREAS, it is the District's intention that this 2008 revised SIP is consistent with the 2006 Settlement Agreement between the District and the City and that it is the District's intention to independently meet all its commitments and obligations under said Settlement Agreement.

THEREFORE, IT IS HEREBY ORDERED AS FOLLOWS:

ORDER

IMPLEMENTATION OF OWENS LAKE BED PM_{10} CONTROL MEASURES

1. Existing PM_{10} controls – From the date of adoption of this order, the City shall continue to operate and maintain the existing Best Available Control Measures (BACM) for PM_{10}, as described in Paragraph 8 hereof, on 29.8 square miles of the Owens Lake bed within the 2003 Dust Control Area (DCA) delineated in Exhibit 1.

2. Additional Shallow Flood supplemental PM_{10} controls – By April 1, 2010 the City shall implement a minimum of 9.2 square miles of additional Shallow Flooding BACM PM_{10}

controls within the 12.7 square-mile area known as the 2006 Supplemental Dust Control Area (SDCA) delineated in Exhibit 1. The areas within the SDCA designated for Shallow Flooding only are delineated in Exhibit 1. Shallow Flooding BACM is described in Paragraphs 8, 9 and 15 hereof.

3. Other additional supplemental PM_{10} controls – On a maximum of 3.5 square miles within the 2006 SDCA delineated in Exhibit 1, the City shall implement BACM for PM_{10}, as described in Paragraphs 8, 9 and 15 through 17 hereof, or the City may implement the alternative non-BACM PM_{10} control measure known as “Moat & Row,” as described in Paragraph 18. If BACM are installed, the controls shall be operational by April 1, 2010. If Moat & Row is installed, it shall be operational by October 1, 2009.

4. Channel Area PM_{10} controls – A 0.5 square-mile area of natural drainage channels on the south area of the Owens Lake bed is known as the “Channel Area” and is delineated in Exhibit 1. The City shall control PM_{10} emissions from the Channel Area by implementing and operating BACM, modified-BACM or alternative non-BACM controls approved by the District’s Air Pollution Control Officer (APCO), that take into account the resource issues in the Channel Area, by April 1, 2010. Portions of the Channel Area that are determined by the APCO to be naturally non-emissive (for example, adequately vegetated areas) will not require controls. If BACM are implemented in the Channel Area, they shall be as described in paragraphs 8, 9 and 15 through 17 hereof. If the City seeks to implement modified-BACM or alternative non-BACM, the City will apply such modifications as are permissible to resource agencies in this channel, with the primary objective of controlling dust, and provide the District with a monitoring plan aimed at identifying source areas that could cause or contribute to shoreline violations. Should such areas be identified after facilities are fully operational (including vegetative development), the District and the City will work with resource agencies to develop site-specific and implementable dust control approaches. Regardless of the approach selected for Channel Area dust control, the City shall prepare and submit to the District a detailed plan demonstrating the need and effectiveness of the control measures and their projected impacts to the environment, and obtain the prior approval of the District and any other applicable regulatory agencies with jurisdiction over the Channel Area for use of the modified-BACM. The City shall be responsible for any additional environmental analyses that may be required and for all required permits.

5. Total PM_{10} control area – The 29.8 square-mile 2003 Dust Control Area (DCA), the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA) and the 0.5 square-mile Channel Area together comprise the 43.0 square-mile area known as the 2008 Total Dust Control Area (TDCA). These PM_{10} control areas are delineated in Exhibit 1.

6. Minor adjustments to PM_{10} control area boundaries – Upon written request by the City to the District and written approval by the District’s APCO, minor adjustments may be made to the interior and exterior boundaries of the 2006 SDCA, for example to avoid impacts to existing resources or features, or for constructability reasons, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the 2008 TDCA shall also be modified to reflect the modified 2006 SDCA boundaries.

7. Study Areas – The District has identified four additional "Study Areas" on the Owens Lake bed totaling up to 1.85 square miles that may require some level of control in order to attain the PM_{10} NAAQS. The four Study Areas are delineated in Exhibit 1. The District will study emissions from the Study Areas occurring between July 1, 2006 and April 1, 2010 to determine whether they will cause or contribute to PM_{10} NAAQS exceedances such that controls will be required. The District will use the data collected during this period to make a determination after May 1, 2010 as to the need for additional controls, as set forth in Paragraph 10, below. However, if the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls in the Study Areas may be made prior to May 1, 2010.

PM_{10} CONTROL MEASURES

8. The City shall implement BACM PM_{10} control measures as set forth in this Order, described below in Paragraphs 15 through 17. The City may implement the alternative non-BACM PM_{10} control measure as set forth in this Order, described below in Paragraph 18. To complete implementation of a specified control measure by a date as required by this Order means that the control measure shall be constructed, installed, operated and maintained without interruption, so as to comply with the performance standards for the specified control measure not later than 5:00 p.m. on the required date.

9. All PM_{10} control measures within the 2006 SDCA shall be designed, constructed, installed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 2. MDCEs are the actual dust control measure control efficiencies required to meet the PM_{10} NAAQS, based on data collected during the four-year period between July 2002 and June 2006. Prior to April 1, 2010, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, the initial target MDCEs may be modified if the modified target MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, as set forth in the 2006 Settlement Agreement between the District and the City. This Settlement Agreement is attached as Attachment A.

CONTINGENCY MEASURES – SUPPLEMENTAL CONTROL DETERMINATIONS

10. At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether any areas, in addition to those described in Exhibit 1, require air pollution control measures in order to attain or maintain compliance with the NAAQS for PM_{10}. The APCO's determination will also contain an analysis of the minimum dust control efficiency provided by the PM_{10} controls in the 2008 TDCA to determine if a higher level of control efficiency is required in order to attain or maintain compliance with the NAAQS for PM_{10}. In making these determinations, the APCO shall employ the methods described in Paragraph 11 of this Order. If the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls may be made prior to May 1, 2010.

   A. If the APCO determines under this Paragraph that additional areas require air pollution control measures or that existing PM_{10} control measures require a higher level of control efficiency, the APCO shall issue a written determination to the City informing them that the provisions of Paragraph 11 of this Order require the City to implement, install, operate and maintain PM_{10} BACM on additional areas of the Owens Lake bed or that the control efficiency on existing PM_{10} controls must be increased. The determination will identify those areas of the lake bed that will require PM_{10} BACM and the control efficiency necessary to attain the PM_{10} NAAQS. The City shall secure all permits and leases necessary to implement BACM and conduct any additional analysis, if any, required to comply with the California Environmental Quality Act and any other applicable laws.

B. The APCO's annual determinations will use data collected after April 1, 2010, except as provided in Paragraph 7, above, for the four Study Areas. The annual determinations for the Study Areas will use data collected after July 1, 2006.

C. In the event the City appeals the supplemental control determination under Health & Safety Code Section 42316, and pending a decision of the CARB, the City is not required to comply with any measure imposed by the supplemental control determination. The District relies upon action by the CARB to issue its decision on the City's appeal within 90 days. If CARB does not affirm the District supplemental control determination, or otherwise require the City to immediately undertake alternative supplemental control measures within 90 days in such circumstances where automatic control measures are required under Sections 172(c)(1) or 182(c)(9) of the federal Clean Air Act, 42 U.S.C. Sections 7502(c)(9) and 7511a(c)(9), the District relies upon the CARB to take these federal requirements into account in its determination of the City's appeal and to issue such interim orders as necessary to implement automatic supplemental control measures so that this Order complies with the Clean Air Act and can be approved by the U.S. Environmental Protection Agency as a proper State Implementation Plan. The foregoing is not intended to provide the CARB with any authority other than its authority under state law.

D. Paragraph 11 fixes the period of time within which the implementation of the additional control measures must be completed. Upon implementation, the City shall continuously operate and maintain, without interruption, the control measures to comply with performance standards set forth for such measures in the control measure descriptions contained in this Order.

CRITERIA FOR DETERMINING THE NEED FOR ADDITIONAL PM_{10} CONTROLS

11. The criteria, methods and procedures for the APCO's determination of the need for additional PM_{10} controls described in Paragraph 10 shall be those described in detail in the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" document incorporated as Attachment B along with its referenced "2008 Owens Lake Dust Source Identification Program Protocol" incorporated as Attachment C.

NEW BACM, ADJUSTMENTS TO EXISTING BACM, AND BACM TRANSITIONS

12. Upon written request by the City, the APCO may approve new BACM, a modification or adjustment to the existing BACMs described in Paragraphs 15, 16 and 17 of this Order, and/or the transition from one BACM to another provided that, at all times, the performance

standards of one or the other BACM are continuously met during the transition to assure that the transition shall not prevent the OVPA from attaining or maintaining the NAAQS for PM_{10}. The City's request shall contain a detailed description of the proposed alternative and a demonstration that the request satisfied all requirements of law and this Order. The APCO shall have full discretion to consider any such application for a change in BACM, and to accept, reject or condition its approval of such application. Non-compliance with any such condition shall be enforceable as noncompliance with a District Order. Without limiting the District's discretion as provided herein, the procedures for transitions of implemented control measures or adjustments to BACM shall be those described in Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

<u>ALTERNATIVE METHODS FOR IMPLEMENTING CONTINGENCY MEASURES AND SUPPLEMENTAL CONTROLS</u>

13. Notwithstanding any other provision of this Order, the District shall maintain its authority under Health and Safety Code Section 42316 to order the City to implement additional controls, to control additional emissive areas and/or to undertake additional reasonable measures necessary to mitigate the air pollution caused in the District by the City's water-gathering activities in order to prevent the OVPA from failing to attain or maintain the NAAQS for $PM_{10,}$ if circumstances arise that are not specifically addressed in Paragraphs 10 or 12 of this Order.

<u>RELATIONSHIP TO BOARD ORDER 031113-01</u>

14. The District hereby stays the force and effect of Board Order 031113-01 for all times that this Order is in full force and effect. In the event this Order, or any provision of this Order, is stayed due to a legal challenge, including but not limited to a challenge to this Order under Health & Safety Code Section 42316, or any other law, to the State Implementation Plan, or to the Environmental Impact Report for this Revised SIP, or in the event the Order is disapproved by the CARB, the following shall apply:

    A. If the stay or disapproval causes Paragraph 1 through 5 of this Order to cease its operative force and effect, Board Order #031113-01 shall immediately be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, until another Order is issued by this Board. In addition, the City shall continue to operate and maintain without interruption all control measures already implemented in any area if those control measures were not appealed under Health & Safety Code Section 42316 within 30 days of the date of this Order, and if those measures were not invalidated as a result of that appeal.

    B. If the stay or disapproval causes Paragraph 10 and/or 11 of this Order to cease its operative force and effect, but does not affect Paragraphs 1 through 5 of this Order, the City shall continue to operate and maintain all control measures already implemented without interruption.

    C. If the stay or disapproval does not affect Paragraphs 1 through 7, 10 or 11 of this Order, those Paragraphs and any other terms of this Order that are not stayed or disapproved shall be in effect, and shall remain in full force for the duration of any stay. In all cases, the City shall continue to operate and maintain, without interruption, all control measures already implemented.

D. If a stay of this Order is imposed, then lifted so that this Order is in effect, the City shall, immediately, meet all requirements and deadlines set by this Order as if no stay had been imposed. The City shall not remove or decrease any control measures without the express written permission of the APCO, and the provisions of Board Order 031113-01 shall again be stayed. If the stay of this Order is only partially lifted such that any portion of this Order remains stayed, Board Order 031113-01 shall remain in effect as provided under Paragraphs 14.A., 14.B. and 14.C, above.

PM_{10} CONTROL MEASURES

15. BACM Shallow Flooding

The "Shallow Flooding" PM_{10} control measure will apply water to the surface of those areas of the lake bed where Shallow Flooding is used as a PM_{10} control measure. Water shall be applied in amounts and by means sufficient to achieve the following performance standards:

A. For Shallow Flooding areas within the 29.8 square-mile 2003 DCA:

i. Until April 1, 2010: At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 1 of each year, and ending on June 30 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.

ii. After April 1, 2010:

a. At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
b. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
c. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
d. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
e. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraphs 15.A.ii,b, c, and d, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic

shoreline, that area will be deemed to be in compliance, if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

B. For Shallow Flooding areas within the 12.7 square-mile 2006 SDCA:

i. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 3 to achieve the control efficiency levels in the MDCE Map (Exhibit 2).

ii. For Shallow Flooding areas with control efficiencies of 99 percent or more:

a. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
b. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
c. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
d. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraph 15.B.ii.a,b, and c, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the PM_{10} NAAQS at the historic shoreline as a result of excessive dry areas within Shallow Flooding control areas during the dust control periods for each year between October 1 and June 30 of the next year, the provisions of Paragraph 10 shall apply.

D. From July 1 through September 30 of each year, the City is not required by the 2008 SIP to apply water to Shallow Flooding areas for dust control purposes, but is required to maintain minimum areal wetness cover as required by applicable environmental documents, permits, leases and approvals.

E. Aerial photography, satellite imagery or other methods approved at the sole discretion of the APCO shall be used to confirm wetness coverage.

F. The following portions of the areas designated for control with Shallow Flooding are exempted from the requirement of dust control by means of a saturated surface:

i. Raised berms, roadways and their shoulders necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive and

ii. Raised pads containing vaults, pumping equipment or control equipment necessary for the operation of Shallow Flooding infrastructure which are otherwise controlled and maintained to render them substantially non-emissive.

G. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

H. Excess surface waters and shallow groundwaters above the annual average water table that existed before site construction that reach the lower boundary of the dust control areas will be contained, collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. If drains are used, they shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted. These requirements do not apply to Shallow Flood area T36-4, due to its adjacency to the Lower Owens River Project (LORP) and the City's intention to integrate the design and operation of T36-4 into the LORP.

I. The City shall remove all exotic pest plants, including salt cedar (*Tamarix ramosissima*), that invade any of the areas designated for control by Shallow Flooding.

J. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the control areas, including within communities less than three miles from a PM_{10} control area, by effective means that minimize adverse effects upon adjacent wildlife.

16. <u>BACM Managed Vegetation</u>

A. <u>Existing Managed Vegetation areas</u>
For areas controlled with the Managed Vegetation PM_{10} control measure prior to January 1, 2007, the areas shall be operated and maintained in accordance with a Managed Vegetation Operation and Management Plan to be approved in writing by the APCO, which approval shall not be unreasonably withheld. The requirements of the Plan may be revised upon written request by the City and written approval of the APCO, which approval shall not be unreasonable withheld,. The City's request shall contain a specific description of the modification requested and provide a demonstration regarding the effect of the modification on the environment and PM_{10} control effectiveness.

B. New Managed Vegetation areas
In PM_{10} control areas constructed after January 1, 2007 where Managed Vegetation is used as a PM_{10} control measure, the following performance standard shall be achieved commencing on October 1 of each year, and ending on June 30 of the next year: substantially evenly distributed live or dead vegetation coverage of at least 50 percent on each acre designated for Managed Vegetation.

C. All Managed Vegetation areas
i. The vegetation planted for dust control shall consist only of locally-adapted native species approved by the APCO or other species approved by both the APCO and the California State Lands Commission (CSLC). To date, the only approved locally-adapted native species is saltgrass (*Distichlis spicata*). However, other appropriate species may be approved upon written request of the City and written approval of both the APCO and CSLC.

ii. Vegetation coverage shall be measured by the point-frame method, by ground-truthed remote sensing or by other methods approved at the sole discretion of the APCO.

iii. The following portions of the areas designated for control with Managed Vegetation are exempted from the requirements set forth in Paragraphs 16.A. and 16.B., above:

a. Portions consistently inundated with water, such as reservoirs, ponds and canals,

b. Roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and

c. Portions used as floodwater diversion channels or desiltation/retention basins.

iv. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

v. Excess surface waters and shallow groundwaters above the root zone depths that reach the lower boundary of the dust control areas shall be collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. Drains shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted.

vi. To protect the Managed Vegetation control measure from flood damage and alluvial deposition, the City shall incorporate stormwater and siltation control facilities into and around Managed Vegetation areas adequate to maintain the dust mitigation function of Managed Vegetation. The Managed Vegetation protection facilities shall be designed to dissipate flood waters and capture the alluvial material carried by flood waters, so as to avoid greater than normal water flows and deposition of alluvial material into the Owens Lake brine pool.

vii. The City shall remove all exotic pest plants, including salt cedar (*Tamarix* spp.), that invade any of the areas designated for control by Managed Vegetation.

viii. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the dust control areas, including within communities less than three miles from a PM_{10} control area, by effective means that minimize adverse effects upon adjacent wildlife.

17. <u>BACM Gravel Blanket</u>

A. In areas where Gravel Blanket is used as a PM_{10} control measure, the City shall meet the following performance standard: one hundred percent of the control area shall be covered with a layer of gravel at least four inches thick. All gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. Where it is necessary to support the gravel blanket, it shall be placed over a permanent permeable geotextile fabric. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.

B. To protect the Gravel Blanket control measure from flooding, the City shall incorporate drains and channels into and around the control measure areas adequate to maintain the dust mitigation function of the Gravel Blanket, and outlet flood waters into the Owens Lake brine pool, Shallow Flooding areas, or reservoirs. The drains and channels shall be designed to incorporate features such as desiltation or retention basins that are adequate to capture the alluvial material carried by the flood waters and to avoid greater than normal deposition of this material into the Owens Lake brine pool.

C. The gravel placement design and implementation shall adequately protect the graveled areas from the deposition of wind- and water-borne soil or infiltration of sediments from below. All graveled areas will be visually monitored to ensure that the Gravel Blanket is not filled with sand, dust or salt and that it has not been inundated or washed out from flooding. If any of these conditions are observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface such that the original performance standard is maintained. The City shall apply best available control measures (BACM) and New Source Performance Standard (NSPS) emission limits to its gravel mining and transportation activities occurring within the District's geographic boundaries as required by the District in the City's District-issued Authority to Construct and Permit to Operate.

18. <u>Alternative Non-BACM Moat & Row Control Measure</u>

A. The Moat & Row PM_{10} control measure is not a currently-approved BACM. The preliminary form of Moat & Row is described in Exhibit 4 of the 2006 Settlement

Agreement between the District and the City (Attachment A). The final form of the Moat & Row PM_{10} control measure will be determined from the results of a demonstration project and testing to be conducted by the City on the lake bed. All Moat & Row controls will be designed, constructed and operated to achieve the MDCEs described in Paragraph 9.

B. The PM_{10} control effectiveness of Moat & Row may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding additional moats and rows to the array.

C. Final design for the Moat & Row control measure will be determined solely by the City after consultation with and written notification to the District. The City shall consider the following elements in its final design:

i. Test results demonstrating that the required MDCE for each Moat & Row area can be met,

ii. Completion of all required environmental documentation, approvals, permits and leases, and

iii. Inclusion of monitoring in the infrastructure design to continuously monitor compliance with the target MDCE for each area.

D. Upon written request of the City, the APCO shall determine in writing if any given Moat & Row design constitutes BACM or MDCE-BACM in accordance with Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

E. Areas of Moat & Row that do not function as designed or that cause or contribute to an exceedance of the federal 24-hour PM_{10} NAAQS will be remediated as specifically provided in Attachment B, the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure."

PM_{10} CONTROL MEASURE COMPLIANCE AND ENFORCEMENT

19. The District and City will work collaboratively to develop improved wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications for all PM_{10} control measures. Final acceptance and implementation of all compliance measurement techniques and PM_{10} control measure compliance specifications with regulatory impact will be at the sole discretion of the APCO.

STORMWATER MANAGEMENT

20. The City shall design, install, continually operate and maintain flood and siltation control facilities to protect the all PM_{10} control measures installed on the lake bed at all times, and in a manner that groundwater levels, surface water extent, and wetlands in adjacent

uncontrolled areas are not impacted by induced drainage. Flood and siltation control facilities shall be integrated into the design and operation of the PM_{10} control measures. All flood and siltation control facilities and PM_{10} control measures damaged by stormwater runoff or flooding shall be promptly repaired and restored to their designed level of protection and effectiveness. All flood and siltation control facilities shall be designed and operated in a manner to prevent any greater threat of alluvial material contamination to the existing trona mineral deposit lease area (State Lands Commission leases PRC 5464.1, PRC 3511 and PRC 2969.1) than would have occurred under natural conditions prior to the installation of PM_{10} control measures.

SCHEDULE

21. The Control Measures shall be implemented on the areas set forth in Paragraphs 1 through 4 by the dates set forth in those Paragraphs. Supplemental Control Requirements shall be met on the schedule provided for in Attachment B.

PERFORMANCE MONITORING PLAN

22. The City, in consultation with the District, shall annually develop and provide to the District in writing a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

    A. The PMP shall describe the measurements and methods used to verify the performance of the constructed DCMs. The PMP shall also describe the measurements and methods used to maximize information on dust emissions from any areas of special interest.

    B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

    C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

    D. The PMP for each calendar year shall be submitted to the APCO by March 31 of the following calendar year.

ADDITIONAL REQUIREMENTS

23. The District Board orders the City of Los Angeles to satisfy the following requirements related to the implementation of the Shallow Flooding, Managed Vegetation, Gravel Blanket and Moat & Row control measures:

    A. The City’s construction, operation and maintenance activities shall comply with all Mitigation Measures set forth in Final Environmental Impact Reports, EIR Addendums and Mitigated Negative Declarations associated with the areas on which dust controls are placed, and all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP.

B. The City shall comply with any and all applicable requirements of the Mitigation Monitoring and Reporting Programs adopted by the District and associated with the Final Environmental Impact Reports and Final Environmental Impact Report Addendums for this project, and with all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP. All mitigation measures required in certified environmental documents associated with the implementation, operation and maintenance of PM_{10} control measures required by this order are hereby incorporated as requirements of this order and may be enforced as such.

C. The City shall apply best available control measures (BACM) to control air emissions from its construction/implementation activities occurring in the District's geographic boundaries.

Exhibits

Exhibit 1 Map and Coordinates of PM_{10} Control Areas

Exhibit 2 Minimum Dust Control Efficiency Map

Exhibit 3 Shallow Flood Control Efficiency Curve

Attachments

Attachment A	2006 Settlement Agreement between the Great Basin Unified Air Pollution Control District and the City of Los Angeles
Attachment B	2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure
Attachment C	2008 Owens Lake Dust Source Identification Program Protocol
Attachment D	2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area

Exhibit 1 - Map and coordinates of PM_{10} control areas

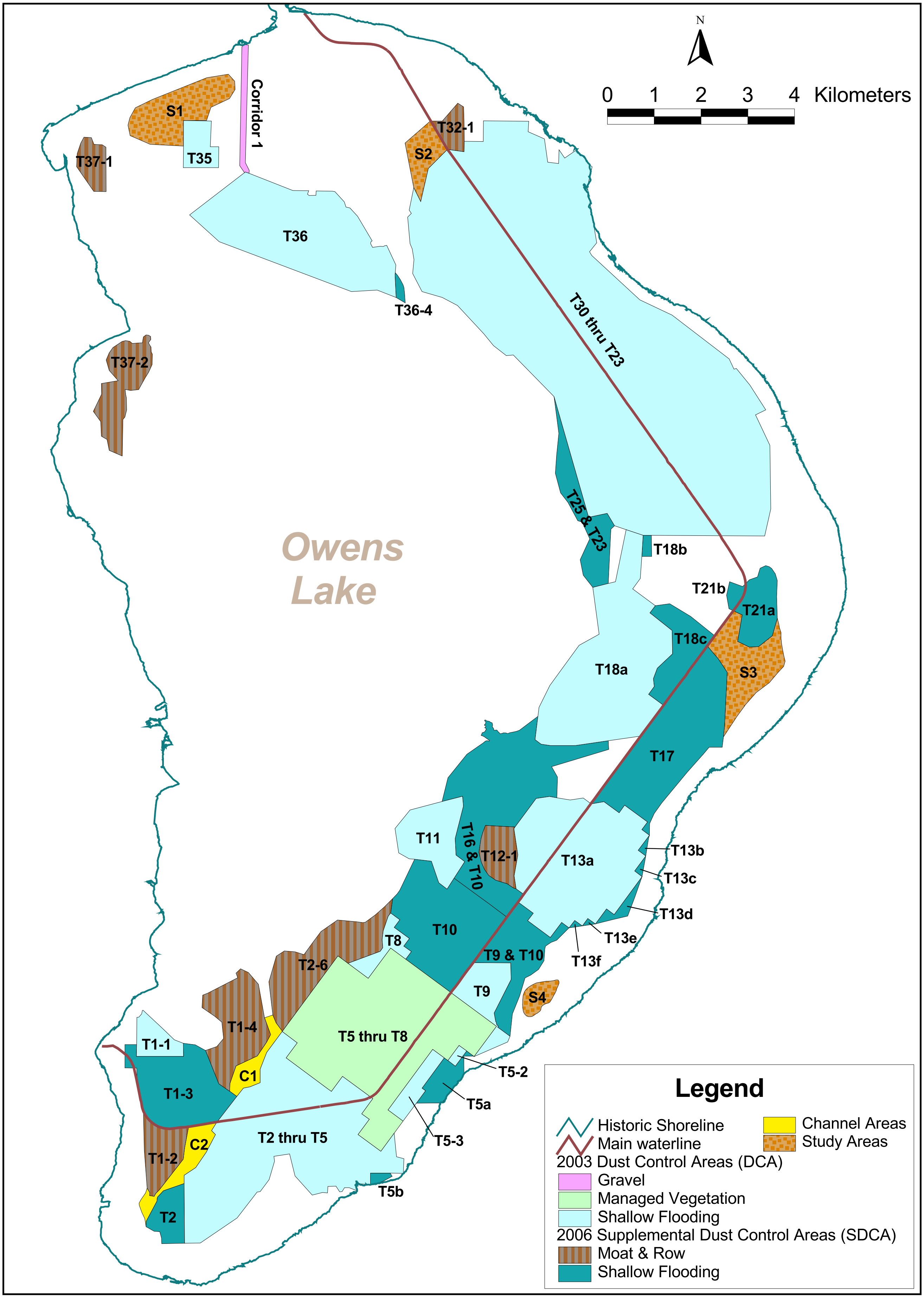

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
T32-1	0.17	SDCA	415,639.7810	4,042,385.2695
			415,283.2810	4,043,000.1953
			415,539.4060	4,042,999.0234
			415,866.3750	4,043,383.8359
			415,994.4060	4,043,304.2109
			416,002.6250	4,042,981.9922
			416,005.6250	4,042,568.5234
			416,000.9380	4,042,344.1055
			415,872.2190	4,042,360.3477
			415,645.7500	4,042,391.2070
			415,639.7810	4,042,385.2695
T37-1	0.21	SDCA	408,348.9690	4,041,492.4844
			408,085.5000	4,041,493.3164
			407,718.8130	4,042,027.7422
			407,731.5000	4,042,299.3945
			407,804.9060	4,042,524.2148
			407,873.2810	4,042,654.1211
			408,032.2500	4,042,647.6875
			408,089.5630	4,042,502.0625
			408,267.6560	4,042,491.4219
			408,347.0630	4,042,440.3203
			408,348.9690	4,041,492.4844
T36-4	0.03	SDCA	414,532.5630	4,039,759.7188
			414,583.3750	4,039,699.2617
			414,643.3130	4,039,605.6250
			414,700.5000	4,039,498.9766
			414,718.6880	4,039,441.7188
			414,729.1250	4,039,314.2500
			414,747.2500	4,039,108.7500
			414,550.5940	4,039,224.6563
			414,528.0310	4,039,697.5039
			414,532.5630	4,039,759.7188
T37-2	0.59	SDCA	408,694.5000	4,035,836.9883
			408,417.2190	4,035,957.7344
			408,370.5940	4,036,191.9453
			408,249.5940	4,036,258.3164
			408,231.6880	4,036,571.0625
			408,075.5000	4,036,791.1719
			408,254.4060	4,037,157.2813
			408,249.9060	4,037,387.3789
			408,606.5630	4,037,448.5391
			408,414.0000	4,037,664.3359
			408,348.8750	4,037,888.7227
			408,415.9060	4,038,042.2422
			408,494.0000	4,038,156.0977
			408,687.9380	4,038,284.6484
			408,762.7190	4,038,303.7813
			408,853.0940	4,038,290.2422
			408,911.3130	4,038,246.2109
			409,028.9380	4,038,251.5742
			409,126.1560	4,038,258.7344
			409,134.0630	4,038,309.6602
			409,144.5940	4,038,382.5547
			409,201.0630	4,038,424.0508
			409,255.5940	4,038,422.9180
			409,299.1250	4,038,391.3789
			409,304.7190	4,038,329.9609
			409,254.9380	4,038,259.1797
			409,308.0940	4,038,163.0195
			409,312.7190	4,038,061.7695
			409,335.7190	4,038,017.0195
			409,334.3750	4,037,792.3008
			409,260.5630	4,037,628.4492
			409,184.9060	4,037,508.1055
			409,044.0630	4,037,256.8359
			408,869.9060	4,037,236.6055
			408,755.8130	4,037,260.8867
			408,768.2810	4,037,143.0156
			408,784.9690	4,037,079.6914
			408,789.7190	4,036,817.3555
			408,751.4060	4,036,667.7344
			408,706.5940	4,036,616.2422
			408,694.5000	4,035,836.9883

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
T25 & T23	0.57	SDCA	418754.0310	4033026.4648
			418552.9690	4033287.6914
			418484.0000	4033621.1133
			418689.0940	4034066.4102
			418529.0310	4034424.5078
			418434.8130	4034452.0664
			418325.1880	4034653.5234
			418224.7810	4034845.3438
			418067.7500	4035047.7852
			417953.1880	4035467.4961
			417980.5000	4035865.3203
			418027.9060	4036319.6094
			417924.7190	4037107.5195
			418665.4380	4034527.8516
			419064.9060	4034610.8672
			419222.8750	4034343.4492
			419141.3750	4034271.8047
			419084.1880	4033110.8242
			418754.0310	4033026.4648
T18b	0.03	SDCA	419802.4690	4033687.7656
			420012.7190	4033690.4844
			420006.8750	4034140.9297
			419832.0310	4034141.9609
			419802.4690	4033687.7656
T21a	0.43	SDCA	421766.0310	4032526.5938
			421758.4690	4032529.3477
			421806.2810	4032593.7305
			421884.3440	4032697.7148
			421918.7190	4032746.2988
			421948.4060	4032795.7422
			421977.7500	4032858.2227
			421994.8130	4032902.9766
			422010.1880	4032960.1484
			422019.3130	4033018.7031
			422022.5630	4033079.4023
			422021.5000	4033108.1875
			422103.3750	4033191.3320
			422274.9380	4033248.8359
			422331.4380	4033437.2383
			422451.9060	4033492.2617
			422530.2190	4033470.0195
			422579.0940	4033430.6797
			422659.7190	4033313.9453
			422698.6880	4033173.2383
			422688.0630	4032830.0469
			422701.7500	4032367.5195
			422592.2190	4031994.7988
			422299.6560	4031762.5020
			422105.2500	4031749.0176
			421854.9690	4031871.4102
			421952.1880	4032442.4199
			421827.1560	4032498.3555
			421778.4380	4032522.0762
			421766.0310	4032526.5938
T21b	0.06	SDCA	422021.5000	4033108.1875
			421959.5000	4033044.5586
			421680.6250	4033146.5156
			421615.5310	4032859.4297
			421668.6250	4032569.9238
			421758.4690	4032529.3477
			421806.2810	4032593.7305
			421884.3440	4032697.7148
			421918.7190	4032746.2988
			421948.4060	4032795.7422
			421977.7500	4032858.2227
			421994.8130	4032902.9766
			422010.1880	4032960.1484
			422019.3130	4033018.7031
			422022.5630	4033079.4023
			422021.5000	4033108.1875

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
T18c	0.53	SDCA	420,276.9060	4,030,498.4297
			419,947.7810	4,030,741.5820
			420,067.1880	4,030,907.8086
			420,051.5940	4,031,073.7539
			420,132.5000	4,031,300.5000
			420,460.9690	4,031,604.8574
			420,448.8130	4,032,104.4238
			420,133.6880	4,032,354.6504
			419,976.0000	4,032,480.4629
			420,091.3440	4,032,635.9063
			420,399.6560	4,032,679.1270
			420,847.1880	4,032,406.2988
			421,369.5310	4,031,989.5391
			421,208.0630	4,031,771.3574
			421,204.5310	4,031,775.5723
			420,996.0630	4,031,494.8789
			420,276.9060	4,030,498.4297
T17	1.77	SDCA	419,965.0000	4,027,728.2129
			419,803.2190	4,027,847.7363
			419,922.8440	4,028,009.4902
			419,437.4690	4,028,368.0195
			419,317.9690	4,028,206.2617
			418,994.5310	4,028,445.2656
			418,723.3130	4,028,395.6211
			418,709.8750	4,028,405.5527
			418,741.5630	4,028,448.9863
			419,397.6250	4,029,329.5273
			419,791.5940	4,029,850.3008
			419,798.7500	4,029,851.3320
			420,276.9060	4,030,498.4297
			420,996.0630	4,031,494.8789
			421,204.5310	4,031,775.5723
			421,439.0940	4,031,498.2363
			421,631.0310	4,031,208.7773
			421,571.8750	4,030,077.3184
			421,548.9690	4,029,833.7383
			421,523.2500	4,029,607.1328
			421,241.1880	4,029,607.8887
			421,116.0000	4,029,457.7559
			420,776.0000	4,029,075.9551
			420,233.7500	4,028,421.8027
			420,070.9690	4,028,193.2832
			419,973.2500	4,027,978.3457
			419,965.0000	4,027,728.2129
T16 & T10	2.00	SDCA	416,930.1250	4,025,968.3438
			415,789.8440	4,026,810.3555
			416,016.5310	4,027,163.7949
			415,829.9690	4,027,301.7383
			415,812.0000	4,027,654.7695
			415,987.3440	4,028,348.7813
			415,969.6880	4,028,562.7461
			415,530.3750	4,028,446.4922
			415,660.2500	4,028,955.4551
			416,062.8130	4,029,458.0664
			416,386.1560	4,029,683.9746
			416,436.9060	4,029,720.7148
			416,449.5000	4,029,732.7207
			416,468.5940	4,029,742.7246
			416,489.8750	4,029,746.4355
			416,529.4060	4,029,741.9941
			416,547.9690	4,029,741.4180
			416,541.4060	4,029,755.8789
			416,528.0940	4,029,767.9277
			416,515.2190	4,029,777.7969
			416,501.9690	4,029,786.2637
			416,489.6560	4,029,794.9004
			416,430.1250	4,029,834.6543
			416,415.3750	4,029,843.4570
			416,400.7190	4,029,849.4766
			416,387.3130	4,029,856.1563
			416,372.5940	4,029,860.3105
			416,368.5310	4,029,870.0703
			416,375.7810	4,029,880.6270
			416,384.4690	4,029,895.7617
			416,385.5310	4,029,910.9023
			416,395.3130	4,029,918.6621
			416,406.0630	4,029,922.9727
			416,419.9060	4,029,929.8086
			416,435.1560	4,029,936.6543

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
T16 & T10 continued	2.00	SDCA	416449.2500	4029947.3340
			416459.1250	4029961.2246
			416462.9690	4029976.8418
			416471.5630	4029988.3965
			416481.0000	4029994.3359
			416483.2500	4030000.4590
			416476.4690	4030004.0684
			416464.6250	4030013.5332
			416452.1250	4030020.7266
			416447.3130	4030031.0762
			416454.8750	4030042.8809
			416467.7500	4030052.9766
			416466.0630	4030067.6035
			416454.5310	4030077.5586
			416440.6250	4030076.0938
			416437.6250	4030084.6914
			416445.8130	4030098.3496
			416459.0310	4030110.6875
			416465.9060	4030126.0488
			416467.1560	4030142.7871
			416461.5310	4030157.1523
			416450.1560	4030168.0938
			416439.0940	4030177.2402
			416443.8750	4030188.7227
			416458.4380	4030192.3809
			416470.3130	4030190.8789
			416479.0310	4030177.9727
			416493.8130	4030171.2637
			416510.6250	4030166.2656
			416527.2190	4030165.8828
			416541.7810	4030161.9238
			416568.0630	4030143.3945
			416585.0000	4030137.3281
			416601.6250	4030130.7734
			416608.7190	4030112.7188
			416614.8750	4030093.7324
			416614.1560	4030081.1367
			416606.9690	4030057.0176
			416610.2810	4030041.6328
			416621.0310	4030029.7910
			416626.8440	4030016.4492
			416634.6560	4030003.4863
			416639.6560	4029988.0273
			416642.2500	4029973.2676
			416656.7190	4029972.4727
			416688.3750	4029977.5293
			416704.9380	4029976.5762
			416715.9690	4029964.5742
			416723.1250	4029949.7949
			416734.4690	4029937.7109
			416747.7190	4029929.2070
			416759.0310	4029916.4004
			416768.4690	4029902.2207
			416781.8130	4029898.3633
			416790.3750	4029900.3945
			416827.0940	4029907.2129
			416838.2500	4029915.7813
			416845.7500	4029917.9492
			416852.5940	4029916.0938
			416867.9690	4029916.1543
			416880.3440	4029917.7637
			416895.6880	4029914.7402
			416925.9380	4029904.3965
			416940.7190	4029903.4805
			416954.8130	4029907.8730
			416966.3750	4029914.2246
			417119.3130	4029946.7070
			417187.6250	4029971.9180
			417581.8750	4030267.7148
			417521.0310	4029772.5156
			417653.4060	4029674.6738
			417852.7810	4029647.5566
			418383.2810	4029647.0859
			419085.9690	4029748.5098
			419093.6560	4029564.0527
			417877.2810	4029195.6055
			418000.2190	4028968.8594
			417985.4380	4028529.5684
			417827.8440	4028557.0566
			417546.5630	4028514.7832
			417094.6880	4027903.0527

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T16 & T10 continued	2.00	SDCA	416,457.7500	4,027,936.9766
			416,404.6880	4,027,788.4297
			416,365.0310	4,027,655.1465
			416,321.9690	4,027,364.6660
			416,373.0940	4,027,155.4727
			416,439.1560	4,026,996.8691
			416,529.0000	4,026,870.1172
			416,679.5310	4,026,765.2285
			416,794.3130	4,026,730.5000
			416,918.4690	4,026,690.9277
			417,059.9690	4,026,600.0957
			417,118.0940	4,026,580.9805
			417,289.0630	4,026,454.5645
			416,930.1250	4,025,968.3438
T12-1	0.33	SDCA	417,094.6880	4,027,903.0527
			416,457.7500	4,027,936.9766
			416,404.6880	4,027,788.4297
			416,365.0310	4,027,655.1465
			416,321.9690	4,027,364.6660
			416,373.0940	4,027,155.4727
			416,439.1560	4,026,996.8691
			416,529.0000	4,026,870.1172
			416,679.5310	4,026,765.2285
			416,794.3130	4,026,730.5000
			416,918.4690	4,026,690.9277
			417,059.9690	4,026,600.0957
			417,118.0940	4,026,580.9805
			417,075.7810	4,026,862.2246
			417,153.0940	4,027,305.2637
			417,068.6250	4,027,867.7852
			417,094.6880	4,027,903.0527
T13B	0.02	SDCA	419,887.6880	4,027,285.1777
			419,726.0630	4,027,404.7207
			419,965.0000	4,027,728.2129
			419,949.5310	4,027,659.1582
			419,887.6880	4,027,285.1777
T13c	0.02	SDCA	419,810.5000	4,026,842.1797
			419,648.7500	4,026,961.7246
			419,887.6880	4,027,285.1777
			419,878.5000	4,027,228.6270
			419,810.5000	4,026,842.1797
T10	1.51	SDCA	414,755.7190	4,025,075.7422
			414,875.1560	4,025,237.4785
			414,713.3750	4,025,356.9609
			414,832.8130	4,025,518.7363
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.3691
			414,474.4380	4,026,371.4551
			414,574.5630	4,026,473.5742
			414,628.3130	4,026,552.7695
			414,946.8130	4,027,212.2402
			415,303.7810	4,027,171.2852
			415,463.6880	4,026,710.9355
			415,641.0630	4,026,578.4043
			415,789.8440	4,026,810.3555
			416,930.1250	4,025,968.3438
			416,221.4060	4,025,003.5195
			415,803.2190	4,024,437.5703
			415,788.3750	4,024,419.2480
			415,755.0630	4,024,385.7285
			415,740.0630	4,024,367.4102
			415,730.9380	4,024,355.1348
			414,755.7190	4,025,075.7422
T13d	0.08	SDCA	418,812.1880	4,025,829.3945
			419,051.1560	4,026,152.9102
			419,212.9380	4,026,033.3887
			419,810.5000	4,026,842.1797
			419,654.8130	4,026,404.0859
			419,499.9380	4,025,999.3496
			419,182.9690	4,025,925.2813
			418,812.1880	4,025,829.3945

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T2-6	0.97	SDCA	411915.1560	4023883.7793
			411828.0940	4024594.2207
			411988.0310	4025141.2695
			412161.8440	4025254.5859
			412387.4060	4025234.3184
			412577.3130	4025175.8184
			412752.9380	4025413.6777
			412942.5940	4025667.2090
			413298.0630	4025913.1816
			413700.7190	4025878.1113
			413843.4060	4025859.0313
			413892.3750	4025869.0625
			414103.4380	4026021.7207
			414294.0310	4026188.3672
			414474.4380	4026371.4551
			414432.8750	4026064.3691
			414383.9380	4025998.1035
			414275.7810	4025684.7422
			414249.7810	4025496.0488
			414265.6560	4025321.0762
			414210.4380	4025245.9102
			413520.9060	4024987.7734
			413307.2500	4025145.6113
			412118.5000	4023536.9766
			411983.4060	4023714.6152
			411915.1560	4023883.7793
T9 & T10	0.70	SDCA	416221.4060	4025003.5195
			416930.1250	4025968.3438
			417169.6250	4026292.8027
			417483.0630	4026061.2207
			417363.6560	4025899.4727
			417848.8440	4025540.9238
			418087.8130	4025864.4414
			418249.6250	4025744.9199
			417981.1560	4025483.1621
			417862.3130	4025432.8262
			417742.6560	4025357.7832
			417731.0940	4025299.8848
			417711.4060	4025042.9023
			417596.9060	4024857.0391
			417427.9690	4024735.2051
			417308.1560	4024673.9160
			417192.2500	4024288.4082
			417038.6560	4023907.3789
			416987.0630	4023427.0801
			416718.5940	4023625.4961
			416734.5000	4023647.0195
			416700.3130	4023672.3301
			416688.8130	4023734.0977
			416678.0000	4023742.0566
			416644.1880	4023924.8242
			417009.4380	4024643.3945
			416999.7190	4024998.1367
			416221.4060	4025003.5195
T13e	0.01	SDCA	418530.9060	4025787.1563
			418650.3750	4025948.9160
			418812.1880	4025829.3945
			418722.7810	4025817.3457
			418530.9060	4025787.1563
T13f	0.01	SDCA	418249.6250	4025744.9199
			418369.0940	4025906.6797
			418530.9060	4025787.1563
			418416.1250	4025770.9355
			418249.6250	4025744.9199
T1-4	0.81	SDCA	410989.3130	4022252.0020
			410984.9060	4022253.3125
			410759.9060	4022411.6719
			410472.0310	4023123.1973
			410718.0630	4023206.8965
			410862.1250	4023378.8164
			410821.5940	4023731.0039
			410665.3750	4023862.7910
			410401.5000	4024041.8867
			410411.4380	4024308.5215
			410520.6560	4024349.3066
			411162.2810	4024681.8047
			411124.9690	4024778.6250
			411222.3440	4024873.7930

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T1-4	0.81	SDCA	411,392.4060	4,024,792.1602
continued			411,607.8130	4,024,539.2461
			411,737.1560	4,023,825.0313
			411,867.2500	4,023,463.2520
			411,784.7500	4,023,306.3613
			411,582.4060	4,023,006.9551
			411,126.7810	4,022,795.5957
			410,994.2500	4,022,416.6367
			410,989.3130	4,022,252.0020
T1-3	1.09	SDCA	410,109.0000	4,021,484.2637
			410,014.9380	4,021,469.1094
			409,986.8440	4,021,465.6152
			409,959.4380	4,021,467.4043
			409,836.5940	4,021,452.1992
			409,710.2810	4,021,438.8574
			409,583.4380	4,021,449.5684
			409,464.4690	4,021,488.9551
			409,351.8750	4,021,549.4316
			409,255.5940	4,021,639.3984
			409,218.6880	4,021,681.9980
			409,176.1250	4,021,738.1621
			409,146.5630	4,021,804.0762
			409,136.6880	4,021,861.1289
			409,118.7810	4,021,931.0723
			409,108.8130	4,021,989.7910
			409,094.0000	4,022,070.1055
			409,085.6880	4,022,117.5977
			409,078.5310	4,022,146.7773
			409,061.1250	4,022,247.9473
			409,045.9690	4,022,310.3633
			409,033.1250	4,022,381.5703
			409,029.3750	4,022,398.8301
			409,009.4380	4,022,518.7207
			409,000.8440	4,022,749.8164
			408,748.8130	4,022,752.2285
			408,748.6880	4,022,994.9199
			408,752.0000	4,023,250.6855
			409,002.0630	4,023,249.9121
			408,999.6250	4,023,000.2637
			410,005.2500	4,022,997.9414
			410,001.3440	4,023,280.3730
			410,254.3750	4,023,245.9746
			410,472.0310	4,023,123.1973
			410,759.9060	4,022,411.6719
			410,984.9060	4,022,253.3125
			410,989.3130	4,022,252.0020
			411,145.5940	4,022,140.7344
			410,718.8440	4,021,593.2148
			410,712.3750	4,021,582.9375
			410,529.8750	4,021,556.1816
			410,438.7190	4,021,533.8438
			410,335.4060	4,021,518.5000
			410,242.0940	4,021,502.6836
			410,174.2810	4,021,494.7188
			410,109.0000	4,021,484.2637
T5a	0.21	SDCA	414,982.1560	4,021,997.8184
			415,526.5000	4,022,002.0215
			416,002.5310	4,022,602.1270
			415,998.3750	4,023,002.3203
			416,206.3130	4,023,003.7539
			416,056.9690	4,023,114.1348
			415,817.9380	4,022,790.5840
			415,581.1880	4,022,965.4980
			415,103.1880	4,022,318.4160
			415,178.0630	4,022,263.0664
			414,982.1560	4,021,997.8184
T1-2	0.39	SDCA	409,223.5310	4,020,182.5996
			409,280.3750	4,020,086.8984
			409,276.4690	4,020,023.0879
			409,360.9380	4,020,010.4766
			409,373.6560	4,020,006.3652
			409,409.3130	4,020,065.3262
			409,487.5940	4,020,143.3262
			409,998.0310	4,020,801.4766
			410,027.5940	4,021,036.2754
			410,109.0000	4,021,484.2637
			410,014.9380	4,021,469.1094
			409,986.8440	4,021,465.6152
			409,959.4380	4,021,467.4043
			409,836.5940	4,021,452.1992

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T1-2	0.39	SDCA	409710.2810	4021438.8574
continued			409583.4380	4021449.5684
			409495.3440	4021478.5996
			409464.4690	4021488.9551
			409351.8750	4021549.4316
			409255.5940	4021639.3984
			409218.6880	4021681.9980
			409176.1250	4021738.1621
			409146.5630	4021804.0762
			409166.6250	4020986.3672
			409223.5310	4020182.5996
T5b	0.03	SDCA	414001.2500	4020257.5078
			414001.4690	4020502.4766
			414426.0000	4020500.8613
			414464.0310	4020432.0313
			414293.7190	4020338.7207
			414135.9690	4020279.6660
			414001.2500	4020257.5078
T2	0.29	SDCA	410025.1560	4019002.0527
			410016.8750	4020278.1387
			409576.6880	4020126.1250
			409445.4060	4019983.3887
			409435.7810	4019902.2852
			409208.0310	4019472.8008
			409200.4380	4019355.6914
			409374.7500	4019259.9512
			409428.5630	4019253.1973
			409493.8750	4019250.0898
			409534.9380	4019112.7676
			409535.8130	4018994.6445
			410025.1560	4019002.0527
S1	0.71	Study	410001.6560	4042464.2656
			409290.7190	4042500.2383
			408861.2190	4042688.4688
			408813.8750	4042910.9609
			408859.4380	4043071.8984
			408972.0940	4043285.6914
			409337.5310	4043461.0000
			410500.6560	4043924.3945
			410962.4690	4044000.3555
			411096.8440	4043852.2109
			411108.0630	4043672.6836
			410984.4380	4043481.0273
			410592.0940	4043294.9219
			410496.6250	4043013.0352
			410088.4380	4043009.1836
			410003.7500	4043010.8320
			410001.6560	4042464.2656
S2	0.28	Study	414928.6560	4041572.7617
			415075.1250	4041273.9336
			415237.3130	4041985.5195
			415639.7810	4042385.2695
			415283.2810	4043000.1953
			414740.2500	4042529.6992
			414928.6560	4041572.7617
S3	0.72	Study	421208.0630	4031771.3574
			421766.0310	4032526.5938
			421778.4380	4032522.0762
			421827.1560	4032498.3555
			421952.1880	4032442.4199
			421854.9690	4031871.4102
			422105.2500	4031749.0176
			422299.6560	4031762.5020
			422592.2190	4031994.7988
			422701.7500	4032367.5195
			422732.5630	4032243.8984
			422746.8130	4032159.0254
			422779.7500	4032064.7734
			422779.7190	4031946.8984
			422793.9060	4031814.8984
			422817.5310	4031682.9316
			422840.9690	4031565.0645
			422869.3130	4031447.2109
			422836.2810	4031338.7852
			422713.7500	4031206.8086
			422529.9380	4030985.2422
			422250.5940	4030779.7578
			422000.0310	4030499.9922

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S3 continued	0.72	Study	422,006.2810	4,030,500.0156
			421,836.9380	4,030,271.0234
			421,548.9690	4,029,833.7383
			421,571.8750	4,030,077.3184
			421,631.0310	4,031,208.7773
			421,439.0940	4,031,498.2363
			421,208.0630	4,031,771.3574
S4	0.15	Study	417,410.5630	4,023,845.5176
			417,398.8440	4,023,845.8750
			417,387.4380	4,023,846.9883
			417,377.4060	4,023,848.7207
			417,367.8440	4,023,851.0527
			417,358.9380	4,023,853.9434
			417,350.9380	4,023,857.4238
			417,343.0940	4,023,861.6250
			417,335.2810	4,023,866.7793
			417,327.4690	4,023,872.8066
			417,319.6880	4,023,879.7500
			417,310.5940	4,023,888.9688
			417,301.9690	4,023,899.1680
			417,293.6560	4,023,910.1230
			417,286.2810	4,023,921.5137
			417,281.1250	4,023,930.3848
			417,276.9060	4,023,939.6543
			417,273.1560	4,023,949.9414
			417,269.7190	4,023,961.3281
			417,266.5000	4,023,975.5664
			417,263.6560	4,023,992.3125
			417,257.5630	4,024,036.4043
			417,255.7810	4,024,053.0898
			417,254.3440	4,024,071.4844
			417,253.3440	4,024,112.0410
			417,253.6880	4,024,135.3887
			417,256.4690	4,024,211.2207
			417,258.9380	4,024,248.6602
			417,260.8130	4,024,266.7930
			417,266.0630	4,024,299.1426
			417,269.5630	4,024,313.8516
			417,274.6560	4,024,330.5859
			417,281.5940	4,024,349.5684
			417,289.7810	4,024,368.9414
			417,298.0630	4,024,386.4863
			417,306.2810	4,024,401.4785
			417,314.9690	4,024,415.0508
			417,324.0630	4,024,427.2441
			417,333.2500	4,024,437.8730
			417,341.8130	4,024,446.3809
			417,362.2810	4,024,463.6328
			417,374.6880	4,024,472.7871
			417,391.6880	4,024,484.4727
			417,422.5940	4,024,504.8984
			417,438.9380	4,024,515.1504
			417,454.8440	4,024,524.5742
			417,469.5000	4,024,532.6895
			417,483.8130	4,024,540.1250
			417,497.9690	4,024,546.9180
			417,525.0310	4,024,558.3184
			417,537.3130	4,024,562.7500
			417,550.9690	4,024,567.0371
			417,565.6880	4,024,571.1504
			417,595.7190	4,024,578.3379
			417,644.3750	4,024,588.4512
			417,671.1560	4,024,593.2676
			417,699.5630	4,024,597.4395
			417,729.9690	4,024,601.0371
			417,763.4060	4,024,604.2285
			417,801.4380	4,024,607.2109
			417,876.5000	4,024,612.3184
			417,885.9690	4,024,613.4160
			417,906.1880	4,024,617.6074
			417,954.9060	4,024,630.4629
			417,966.3750	4,024,632.8535
			417,976.4690	4,024,634.2813
			417,984.4060	4,024,634.8398
			417,991.7190	4,024,634.7266
			417,998.0940	4,024,633.9082
			418,004.0310	4,024,632.4531
			418,009.1560	4,024,630.2891
			418,013.8130	4,024,627.4102
			418,017.8750	4,024,623.8594
			418,021.4380	4,024,619.5566
			418,027.1560	4,024,609.7598

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	418032.4060	4024597.6895
			418034.6560	4024589.4512
			418035.8750	4024580.7773
			418035.6560	4024570.7617
			418034.0630	4024559.9766
			418031.0630	4024548.3418
			418026.3750	4024535.4473
			418020.4690	4024521.3984
			418000.5310	4024478.6465
			417984.5630	4024435.9668
			417970.9060	4024402.7227
			417957.8130	4024373.8125
			417943.3130	4024343.8242
			417931.2500	4024320.3027
			417918.0940	4024295.7734
			417880.1250	4024228.6719
			417859.5000	4024190.0117
			417854.1250	4024181.0176
			417848.9380	4024173.2773
			417843.6250	4024166.4160
			417838.3130	4024160.3535
			417832.0940	4024154.4258
			417825.1250	4024149.1992
			417816.9690	4024144.4160
			417807.5630	4024140.0762
			417799.1250	4024136.8242
			417789.4690	4024133.5957
			417744.3750	4024120.6641
			417733.3130	4024116.6641
			417723.6250	4024112.4082
			417716.8440	4024108.7773
			417710.6880	4024104.8281
			417693.1880	4024092.0859
			417683.1250	4024084.1797
			417674.4380	4024076.5137
			417667.2810	4024069.1191
			417661.4690	4024061.8086
			417657.0630	4024054.5488
			417654.5000	4024048.2773
			417652.5000	4024040.8516
			417647.9060	4024009.5918
			417646.3750	4024002.8047
			417644.5940	4023996.9746
			417640.7500	4023988.9395
			417636.0310	4023980.8086
			417630.3750	4023972.9629
			417623.6560	4023965.2930
			417617.2810	4023958.7949
			417609.9690	4023952.3184
			417601.7810	4023945.7832
			417592.6250	4023939.0781
			417575.3440	4023927.6641
			417540.5940	4023906.3262
			417526.8440	4023897.4316
			417515.0940	4023889.3320
			417487.6880	4023868.7949
			417472.0940	4023858.9844
			417463.6560	4023854.8926
			417455.1880	4023851.9063
			417444.7810	4023849.1504
			417433.6250	4023847.1348
			417422.1560	4023845.9258
			417410.5630	4023845.5176
C1	0.21	Channel	410989.3130	4022252.0020
			410994.2500	4022416.6367
			411126.7810	4022795.5957
			411582.4060	4023006.9551
			411784.7500	4023306.3613
			411867.2500	4023463.2520
			411737.1560	4023825.0313
			411915.1560	4023883.7793
			411983.4060	4023714.6152
			412118.5000	4023536.9766
			411783.0000	4023082.8359
			411698.3750	4022867.5078
			411641.7810	4022726.1934
			411641.2190	4022434.6367
			411422.2810	4022348.0508
			411285.7500	4022320.5957
			411145.5940	4022140.7344
			410989.3130	4022252.0020

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
C2	0.29	Channel	409,223.5310	4,020,182.5996
			409,280.3750	4,020,086.8984
			409,276.4690	4,020,023.0879
			409,360.9380	4,020,010.4766
			409,373.6560	4,020,006.3652
			409,409.3130	4,020,065.3262
			409,487.5940	4,020,143.3262
			409,998.0310	4,020,801.4766
			410,027.5940	4,021,036.2754
			410,109.0000	4,021,484.2637
			410,174.2810	4,021,494.7188
			410,242.0940	4,021,502.6836
			410,335.4060	4,021,518.5000
			410,438.7190	4,021,533.8438
			410,529.8750	4,021,556.1816
			410,712.3750	4,021,582.9375
			410,604.9060	4,021,412.4785
			410,687.5940	4,021,327.9746
			410,488.7190	4,020,946.6582
			410,264.9380	4,020,620.1895
			410,015.6880	4,020,454.4141
			410,016.8750	4,020,278.1387
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664
			409,173.3130	4,019,532.8418
			409,115.7190	4,019,657.4395
			409,058.5940	4,019,813.5703
			409,055.4380	4,019,859.0117
			409,098.6560	4,019,944.7520
			409,192.5940	4,020,079.2344
			409,223.5310	4,020,182.5996
Corridor 1	0.14	DCM	411,404.0940	4,041,881.5078
			411,328.8130	4,041,911.0039
			411,307.5940	4,041,894.7266
			411,206.9380	4,042,044.9063
			411,252.4060	4,044,581.8867
			411,297.8130	4,044,632.7539
			411,393.9060	4,044,623.3633
			411,326.8130	4,042,108.9727
			411,411.9380	4,041,944.4414
			411,404.0940	4,041,881.5078
T35	0.26	DCM	410,001.6560	4,042,464.2656
			410,000.0000	4,042,003.4180
			410,754.6560	4,042,002.5391
			410,757.3750	4,042,448.5820
			410,577.9380	4,042,452.2773
			410,599.0630	4,042,999.1289
			410,003.7500	4,043,010.8320
			410,001.6560	4,042,464.2656
T23 thru 30	13.19	DCM	419,832.0310	4,034,141.9609
			419,222.8750	4,034,343.4492
			419,064.9060	4,034,610.8672
			418,665.4380	4,034,527.8516
			417,924.7190	4,037,107.5195
			417,056.8130	4,037,995.5234
			416,908.7190	4,037,982.5234
			416,631.9690	4,038,195.4219
			416,422.7190	4,038,451.3359
			415,865.4690	4,039,054.8633
			415,536.0310	4,039,224.5117
			415,102.2190	4,039,351.9453
			414,905.7190	4,039,737.5508
			414,931.1560	4,040,036.5156
			414,894.9380	4,040,266.0117
			414,848.0630	4,040,378.9961
			414,797.1880	4,040,944.3359
			414,873.6560	4,041,023.6289
			414,828.3130	4,041,092.9570
			414,928.6560	4,041,572.7617
			415,075.1250	4,041,273.9336
			415,237.3130	4,041,985.5195
			415,645.7500	4,042,391.2070
			415,872.2190	4,042,360.3477
			416,000.9380	4,042,344.1055
			416,005.6250	4,042,568.5234
			416,413.8750	4,042,560.2578
			416,415.9060	4,043,001.9297

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T23 thru 30 continued	13.19	DCM	417385.2500	4042993.4570
			417370.0940	4042770.4766
			417719.9060	4042619.4531
			417792.5000	4042117.6719
			418026.3130	4042090.2539
			418032.4690	4042385.2734
			418154.9060	4042206.3711
			418410.5000	4042382.5898
			418608.9380	4042170.9414
			418642.5940	4042098.0430
			418743.9060	4042022.1406
			418637.1560	4041594.2695
			418839.1560	4040396.7852
			418687.1250	4040203.3438
			418733.7190	4040126.7656
			419760.8750	4039175.2695
			420448.8750	4038850.6133
			421672.5630	4037910.9570
			421774.5940	4037694.9570
			421823.2190	4037710.5156
			422114.0310	4037354.1172
			422453.6250	4036821.3398
			422236.8440	4036716.3086
			422544.5630	4036065.0313
			422559.9380	4034701.7969
			422429.2810	4034127.0234
			419832.0310	4034141.9609
T36	2.41	DCM	414532.5630	4039759.7188
			414544.1880	4039918.4961
			414347.2810	4040341.8281
			414341.6250	4040340.8398
			414296.4060	4040328.5234
			414287.8440	4040319.8633
			414268.3750	4040314.5508
			414211.2190	4040321.9883
			414047.5000	4040298.1172
			414003.0000	4040378.3242
			414010.8750	4040412.9063
			414039.0940	4040436.0195
			413723.0940	4040965.9141
			413561.2500	4041141.6016
			413478.6880	4041158.2148
			413443.2190	4041269.5156
			413241.1250	4041488.5234
			413191.5310	4041500.2969
			412841.4380	4041505.7500
			412833.7190	4041412.9141
			412690.1560	4041406.0313
			412652.2190	4041436.0781
			412682.0630	4041508.1523
			412344.1560	4041513.1602
			411328.8130	4041911.0039
			410132.5940	4040993.3945
			410766.2190	4040418.8281
			413592.7810	4039353.6953
			414146.5000	4039386.4141
			414550.5940	4039224.6563
			414528.0310	4039697.5039
			414532.5630	4039759.7188
T18a	2.67	DCM	417581.8750	4030267.7148
			417605.5940	4030460.9473
			417838.7500	4030929.0918
			418459.9380	4031788.9746
			418889.0940	4032024.0352
			418754.0310	4033026.4648
			419239.5310	4033150.5156
			419467.0940	4034262.6992
			419832.0310	4034141.9609
			419771.8750	4033218.0078
			419606.1560	4032994.4258
			420091.3440	4032635.9063
			419976.0000	4032480.4629
			420133.6880	4032354.6504
			420448.8130	4032104.4238
			420460.9690	4031604.8574
			420132.5000	4031300.5000
			420051.5940	4031073.7539
			420067.1880	4030907.8086
			419947.7810	4030741.5820
			420276.9060	4030498.4297
			419798.7500	4029851.3320

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T18a continued	2.67	DCM	418,383.2810	4,029,647.0859
			417,852.7810	4,029,647.5566
			417,653.4060	4,029,674.6738
			417,521.0310	4,029,772.5156
			417,581.8750	4,030,267.7148
T11	0.67	DCM	415,789.8440	4,026,810.3555
			415,641.0630	4,026,578.4043
			415,463.6880	4,026,710.9355
			415,303.7810	4,027,171.2852
			414,829.7500	4,027,225.6699
			414,603.4060	4,027,348.4004
			414,525.4380	4,027,872.6914
			414,845.5630	4,028,265.1602
			415,969.6880	4,028,562.7461
			415,987.3440	4,028,348.7813
			415,812.0000	4,027,654.7695
			415,829.9690	4,027,301.7383
			416,016.5310	4,027,163.7949
			415,789.8440	4,026,810.3555
T13a	2.47	DCM	417,169.6250	4,026,292.8027
			417,289.0630	4,026,454.5645
			417,118.0940	4,026,580.9805
			417,075.7810	4,026,862.2246
			417,153.0940	4,027,305.2637
			417,068.6250	4,027,867.7852
			417,546.5630	4,028,514.7832
			417,827.8440	4,028,557.0566
			418,270.9380	4,028,479.7695
			418,552.2190	4,028,522.0059
			418,723.3130	4,028,395.6211
			418,994.5310	4,028,445.2656
			419,317.9690	4,028,206.2617
			419,437.4690	4,028,368.0195
			419,922.8440	4,028,009.4902
			419,803.2190	4,027,847.7363
			419,965.0000	4,027,728.2129
			419,726.0630	4,027,404.7207
			419,887.6880	4,027,285.1777
			419,648.7500	4,026,961.7246
			419,810.5000	4,026,842.1797
			419,212.9380	4,026,033.3887
			419,051.1560	4,026,152.9102
			418,812.1880	4,025,829.3945
			418,650.3750	4,025,948.9160
			418,530.9060	4,025,787.1563
			418,369.0940	4,025,906.6797
			418,249.6250	4,025,744.9199
			418,087.8130	4,025,864.4414
			417,848.8440	4,025,540.9238
			417,363.6560	4,025,899.4727
			417,483.0630	4,026,061.2207
			417,169.6250	4,026,292.8027
T8	0.21	DCM	413,520.9060	4,024,987.7734
			413,954.0000	4,024,667.7598
			414,432.0940	4,025,314.7227
			414,755.7190	4,025,075.7422
			414,875.1560	4,025,237.4785
			414,713.3750	4,025,356.9609
			414,832.8130	4,025,518.7363
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.3691
			414,383.9380	4,025,998.1035
			414,275.7810	4,025,684.7422
			414,249.7810	4,025,496.0488
			414,265.6560	4,025,321.0762
			414,210.4380	4,025,245.9102
			413,520.9060	4,024,987.7734
T5 thru T8	3.53	DCM	414,505.9690	4,021,353.3281
			414,222.0630	4,020,969.0215
			413,736.8130	4,021,327.4629
			413,975.7810	4,021,651.0234
			413,814.0000	4,021,770.5449
			414,053.0940	4,022,094.1016
			413,406.0630	4,022,572.1836
			413,166.9380	4,022,248.5879
			412,196.4380	4,022,965.6328
			412,435.5630	4,023,289.1914
			412,112.0000	4,023,528.1816

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T5 thru T8 continued	3.53	DCM	413307.2500	4025145.6113
			413954.0000	4024667.7598
			414432.0940	4025314.7227
			416696.5940	4023641.5605
			416218.7190	4022994.5840
			415895.2810	4023233.6211
			415656.1880	4022910.1016
			415332.7190	4023149.1055
			414376.5630	4021855.0645
			414700.1560	4021616.0996
			414505.9690	4021353.3281
T9	0.46	DCM	416218.7190	4022994.5840
			416696.5940	4023641.5605
			415730.9380	4024355.1348
			415740.0630	4024367.4102
			415755.0630	4024385.7285
			415788.3750	4024419.2480
			415803.2190	4024437.5703
			416221.4060	4025003.5195
			416999.7190	4024998.1367
			417009.4380	4024643.3945
			416644.1880	4023924.8242
			416678.0000	4023742.0566
			416688.8130	4023734.0977
			416700.3130	4023672.3301
			416734.5000	4023647.0195
			416718.5940	4023625.4961
			416987.0630	4023427.0801
			416933.0310	4023305.0703
			416218.7190	4022994.5840
T1-1	0.24	DCM	410001.3440	4023280.3730
			410005.2500	4022997.9414
			408999.6250	4023000.2637
			409007.7810	4023833.0859
			409051.0310	4023839.1992
			409110.8440	4023908.2500
			409125.3750	4023977.1719
			409135.9380	4023986.4395
			409555.1250	4023595.2637
			409806.6880	4023351.0098
			410001.3440	4023280.3730
T2 thru 5	3.62	DCM	410025.1560	4019002.0527
			410015.6880	4020454.4141
			410264.9380	4020620.1895
			410488.7190	4020946.6582
			410687.5940	4021327.9746
			410604.9060	4021412.4785
			410718.8440	4021593.2148
			411285.7500	4022320.5957
			411422.2810	4022348.0508
			411641.2190	4022434.6367
			411641.7810	4022726.1934
			411698.3750	4022867.5078
			411783.0000	4023082.8359
			412112.0000	4023528.1816
			412435.5630	4023289.1914
			412196.4380	4022965.6328
			413088.5940	4022306.4473
			413166.9380	4022248.5879
			413406.0630	4022572.1836
			414053.0940	4022094.1016
			413814.0000	4021770.5449
			413975.7810	4021651.0234
			413736.8130	4021327.4629
			414222.0630	4020969.0215
			414505.9690	4021353.3281
			414557.3750	4020853.0215
			414717.5310	4020809.5039
			414704.8750	4020499.7988
			414001.4690	4020502.4766
			414001.2500	4020257.5078
			413767.6560	4020273.3301
			413695.4380	4020332.7383
			413677.0630	4020225.3008
			413700.3440	4020128.3535
			413549.0940	4020190.3926
			413444.4060	4020190.3945
			413394.0000	4020105.0723
			413343.6560	4020101.2031
			413266.1250	4020221.4121

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T2 thru 5 continued	3.62	DCM	413090.0310	4020217.8281
			413082.4060	4020077.9375
			412973.9060	4020085.6738
			412756.6880	4020031.3984
			412389.2810	4020442.0293
			412270.9690	4020910.1992
			411937.4060	4020860.1270
			411952.8130	4020757.8945
			411835.6880	4020364.6348
			411,644.0940	4,020,105.5039
			411,579.3750	4,020,095.7637
			411,149.7500	4,019,542.1543
			410,360.7190	4,019,008.5000
			410,025.1560	4,019,002.0527
T5-2	0.03	DCM	415,656.1880	4,022,910.1016
			415,817.9380	4,022,790.5840
			416,056.9690	4,023,114.1348
			415,895.2810	4,023,233.6211
			415,656.1880	4,022,910.1016
T5-3	0.22	DCM	414,700.1560	4,021,616.0996
			414,376.5630	4,021,855.0645
			415,332.7190	4,023,149.1055
			415,581.1880	4,022,965.4980
			415,103.1880	4,022,318.4160
			415,178.0630	4,022,263.0664
			414,700.1560	4,021,616.0996

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates

Total SDCA	12.86
Total Study	1.86
Total Channel	0.50
Total DCM	30.12

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Exhibit 2 - TDCA Minimum Dust Control Efficiency map

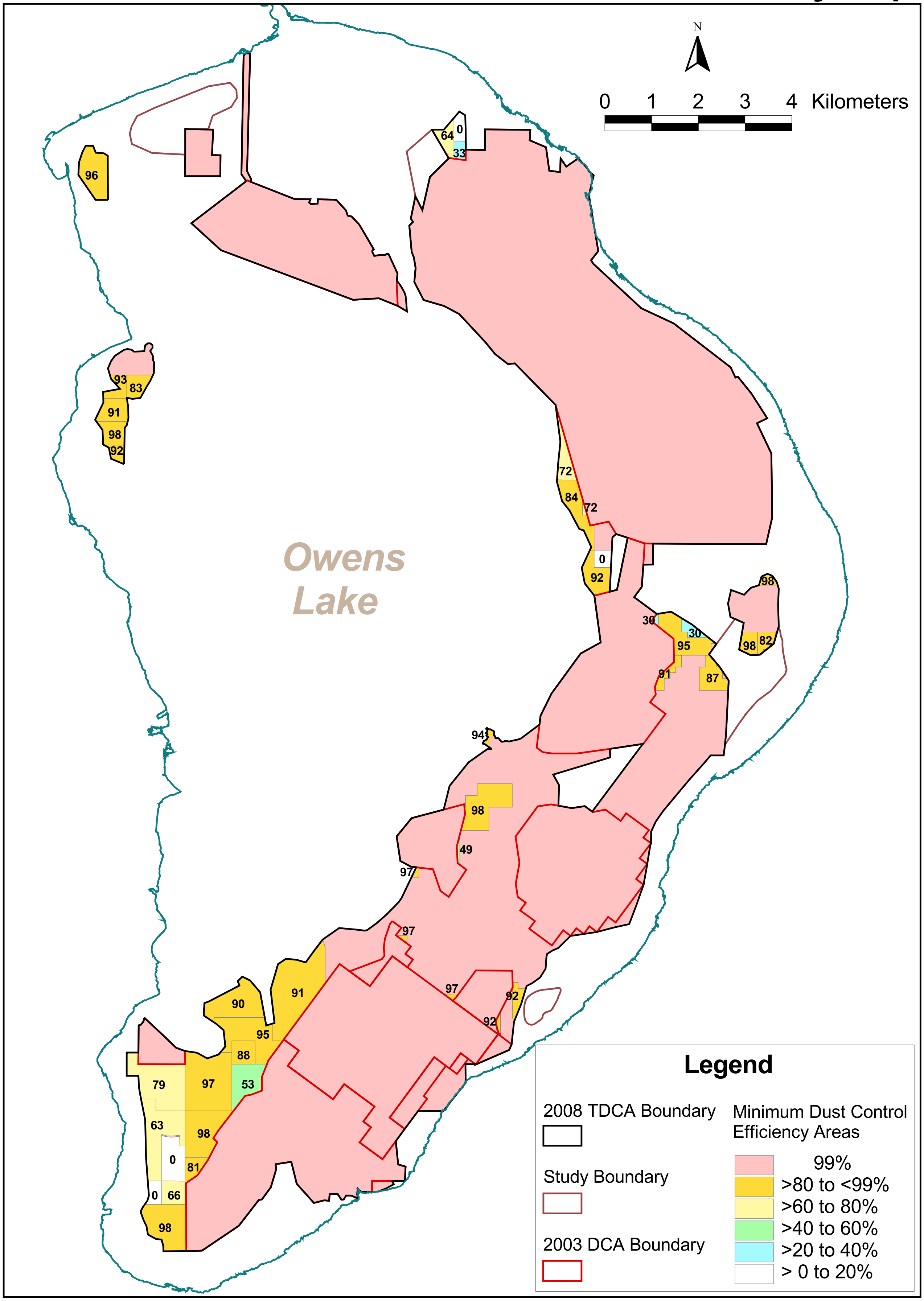

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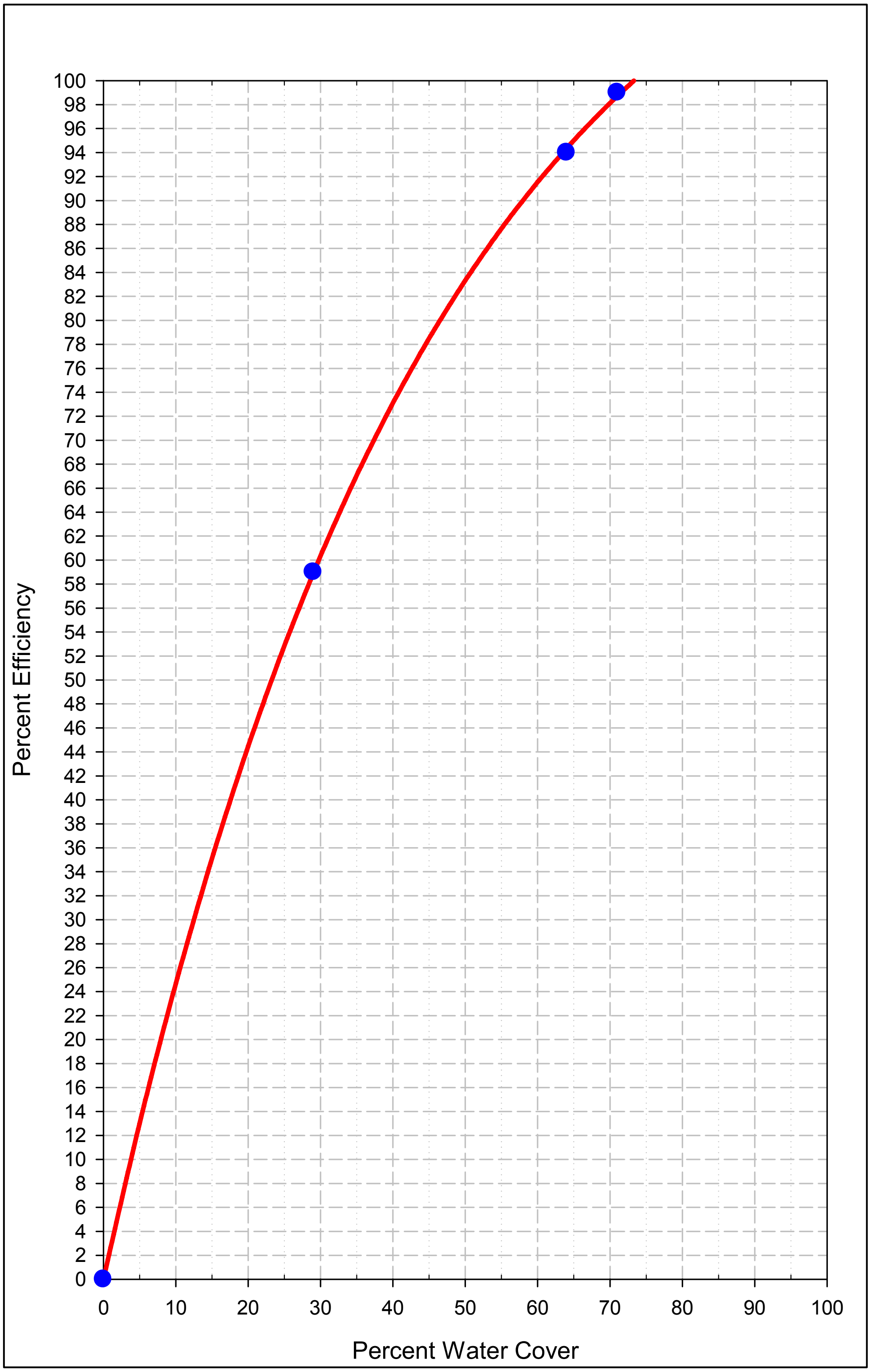
Exhibit 3 - Shallow Flood control efficiency curve



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SETTLEMENT AGREEMENT

This Settlement Agreement (Agreement) is entered into between the Great Basin Unified Air Pollution Control District (District) and the City of Los Angeles by and through its Department of Water and Power (collectively "City") (the City and District to be referred to as the "Parties") to resolve the City's challenge to the District's Supplemental Control Requirement (SCR) determination for the Owens Lake bed issued on December 21, 2005, and modified on April 4, 2006.

RECITALS

WHEREAS:

A. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancha.

B. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts.

C. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter (PM_{10}).

D. PM_{10} is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq*., as amended (CAA).

E. Under the National Ambient Air Quality Standard (NAAQS) adopted pursuant to the CAA, PM_{10} levels may not exceed an average concentration of 150 micrograms per cubic meter ($\mu g/m^3$) during a 24-hour period more than one time per calendar year averaged over three years.

F. The District has regulatory authority over air quality issues in the region where Owens Lake is situated.

G. Under Health and Safety Code Section 42316, enacted by the California Legislature in 1983, the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS for PM_{10}.

H. In 1987, the United States Environmental Protection Agency (EPA) identified the Owens Valley Planning Area (OVPA), which encompasses

Owens Lake, as an area not meeting the NAAQS for PM_{10}. In 1993, the OVPA was reclassified as a serious non-attainment area under the CAA.

I. In 1997, the District adopted the Owens Valley PM_{10} Demonstration of Attainment State Implementation Plan as required by the CAA (1997 SIP). In 1998, the District and the City agreed that the City would construct control measures on 16.5 square miles of the Owens Lake bed by the end of 2003 as part of a SIP revision in 1998.

J. In 2003, through District Board Order 03111-01 (Order), the District required the City to construct dust control measures (DCMs) on an additional 13.3 square miles of the Owens Lake bed by the end of 2006, for a total of 29.8 square miles of dust control measures, as part of a Revised SIP (2003 SIP). The Order and 2003 SIP also established a process whereby the Air Pollution Control Officer of the District (APCO) must evaluate on at least an annual basis the potential need for additional DCMs and "watch areas" at Owens Lake bed in order to attain the NAAQS. The process involves a determination by the APCO and an opportunity for the City to present an alternative analysis.

K. On December 21, 2005, the APCO issued the 2004/2005 SCR determination finding that the City would be required to implement DCMs on an additional 9.31 square miles of Owens Lake bed and identifying 0.66 square miles as "watch area."

L. On January 20, 2006, the City appealed the 2004/2005 SCR determination to the California Air Resources Board (CARB). The District disagreed that the determination was subject to such an appeal.

M. On February 22, 2006, the City submitted an Alternative Analysis contesting aspects of the 2004/2005 SCR determination.

N. On April 4, 2006, the APCO modified the SCR determination issued on December 21, 2005 to reduce the supplemental DCM area to 8.66 square miles and increased the "watch area" to 0.79 square miles (Modified SCR determination).

O. On May 3, 2006, the City filed an appeal of the April 4, 2006 Modified SCR determination with the CARB. The District disagreed that the determination was subject to such an appeal.

P. On May 4, 2006, the City filed a petition for writ of mandate challenging the APCO's April 4, 2006 Modified SCR determination (*City of Los Angeles Department of Water and Power v. Great Basin Unified Air Pollution Control District*, Kern County Superior Court Case No. S-1500-

CV-258678, RJO). The Parties entered into mediation and a temporary stay of the litigation.

AGREEMENT

NOW, THEREFORE, in consideration of the provisions herein contained and to resolve the disputes over methods to address air quality at Owens Lake, including the disputes over the SCR determination issued on December 21, 2005, and modified on April 4, 2006, the City and the District hereby agree as follows:

DUST CONTROL MEASURES (DCMs)

1. The City shall apply DCMs as provided in this Agreement on additional areas of the lake bed beyond the 29.8 square miles required in the 2003 SIP.

   A. The areas on the lake bed on which DCMs will be applied are designated in this Agreement as follows:

      (i) The 12.7 square-mile area of additional DCMs shall be known as the 2006 Supplemental Dust Control Area (SDCA).

      (ii) The 29.8 square miles of DCMs required by the 2003 SIP shall be known as the 2003 Dust Control Area (DCA).

      (iii) The 0.5 square miles of natural drainage channels on the south area of the lake bed shall be known as the Channel Area.

      (iv) The combined 43.0 square miles of DCMs and Channel Area shall be known as the Total Dust Control Area (TDCA).

      (v) The SDCA, DCA, Channel Area and TDCA are delineated on the TDCA Map, attached as Exhibit 1. The SDCA and Channel Area coordinate descriptions are attached as Exhibit 2. The DCA coordinate description is contained in the 2003 SIP.

   B. Minor adjustments may be made to the boundaries of the SDCA upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the TDCA shall also be modified to reflect the modified SDCA boundaries.

   C. The City may, at its sole option, apply DCMs to additional areas outside the TDCA.

   D. The City shall begin full operation of the DCMs within the SDCA as follows:

(i) Moat and row controls shall be operational by October 1, 2009.

(ii) All other controls shall be operational by April 1, 2010.

E. Following the dates set out above in this Section, the City shall continuously operate and maintain the DCMs within the TDCA. The City shall continuously operate and maintain DCMs within the DCA as required under the 2003 SIP, except as otherwise provided in this Agreement.

2. A. The City shall construct within the SDCA a minimum of 9.2 square miles of Shallow Flood dust controls. The Shallow Flood areas are delineated on the Dust Control Measure Map, attached as Exhibit 3.

B. On the remaining 3.5 square miles of the SDCA not specifically designated for Shallow Flood on the DCM Map (Exhibit 3), the City shall

(i) construct Shallow Flood, Managed Vegetation, or gravel cover, as described in the Dust Control Measures Description, attached as Exhibit 4, and which are currently approved as Best Available Control Measures (BACM) under the 2003 SIP; or

(ii) subject to Sections 3, 7 and 8, treat up to 3.5 square miles of the SDCA with the alternative dust control measure known as "Moat and Row," as described in the DCM Description (Exhibit 4).

C. TDCA areas designated as Channel Area represent areas containing natural drainage channels having potentially significant resource issues and regulatory constraints. While these areas are not a part of the SDCA, they shall be addressed as part of the control strategy for the SDCA. However, it is acknowledged that the control strategy in this area may be subject to additional regulatory constraints, design considerations, and impacts caused by adjacent DCMs.

D. The internal control measure boundaries delineated on the DCM Map (Exhibit 3) are approximate and are subject to final written approval by the APCO. The areas designated on the DCM Map (Exhibit 3) for Shallow Flood and Moat and Row may be modified upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld.

3. All DCMs within the SDCA shall be designed, constructed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 5. The initial target MDCEs (Target MDCEs):

A. Are based on the results of air quality modeling, as described in the 2003 SIP, conducted by the City and approved by the APCO for the period July 2002 through June 2006;

B. Assume 100 percent control efficiency in the 29.8 square miles of the DCA required under the 2003 SIP, except during the fall and spring ramping periods as described in Section 26, and achievement of the target MDCEs for the areas in the SDCA. Control efficiencies during the fall and spring ramping periods shall be based on modeling that accounts for reduced wetness cover pursuant to Sections 5 and 26;

C. Have been selected to achieve PM_{10} concentrations that will not exceed the federal 24-hour PM_{10} ambient air quality standard of 150 $\mu g/m^3$ (federal standard) at all historic shoreline (elevation 3600 feet above sea level) receptors.

4. Prior to April 1, 2010, the Target MDCEs may be modified, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, if the modified MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, attached as Exhibit 6, pursuant to Section 3.

5. For the Shallow Flood areas identified in DCM Map (Exhibit 3), the percentage of each area that must be wetted shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 7, or an update of the SFCE Curve mutually agreeable to the Parties, to achieve the control efficiency levels in the MDCE Map (Exhibit 5).

6. The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:

A. From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and

B. After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and

C. The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.

7. As Moat and Row is not a currently approved BACM dust control measure under the 2003 SIP, the City will develop, in consultation with the District, and conduct Moat and Row Demonstration Projects on the lake bed. These Demonstration Projects will be conducted on two or more locations on the lake bed outside of the DCA. The proposed location of these Demonstration Project areas are shown on attached Moat and Row Demonstration Project Map (Exhibit 8). The actual locations of the projects may be changed by the City, and in such event, the City shall notify the APCO in writing of the changed locations. The City will be the California Environmental Quality Act (CEQA) lead agency for implementation of the Moat and Row Demonstration Projects.

8. Based on results of the Moat and Row Demonstration Projects described in Section 7 and subject to Sections 2 and 3, the City in its sole discretion may decide which DCMs to implement in the areas designated for Moat and Row in Section 2 and Exhibit 3 of this Agreement. The City shall consult with the District before making its decision and inform the District of its decision in writing.

A. Depending on the results of the Moat and Row Demonstration Projects, the measures implemented in these areas by the City may include Moat and Row, enhanced Moat and Row (*e.g.*, closer Moat and Row spacing, Moat and Row with some Shallow Flooding, Moat and Row with some vegetation), combined Moat and Row/Shallow Flood, MDCE-BACM, or BACM.

B. If the City implements Moat and Row, it shall design and construct Moat and Row to achieve the Target MDCEs described in Section 3. The Moat and Row configuration required to achieve these Target MDCEs will be decided solely by the City, after consultation with and written notification to the District.

C. In the event of a dispute regarding the City's proposed decision or action pursuant to Section 8.A or 8.B, either Party may initiate the Dispute Resolution Process pursuant to Section 32.

D. Upon written request of the City, the APCO shall determine in writing if Moat and Row and/or Enhanced Moat and Row constitutes BACM or MDCE-BACM, in accordance with the revisions to the 2003 SIP provided in Section 28.

DUST IDENTIFICATION (DUST ID) PROGRAM

9. The Parties mutually recognize that a method for identifying sources of potential exceedances of the federal standard at the historic shoreline could be developed that is superior to and could replace or modify the current Dust ID Program.

A. The Parties will work cooperatively, with the participation of a mutually agreeable independent third party technical expert or experts under contract to the District and jointly managed by the Parties, in a good faith effort to develop, before April 1, 2010, an improved Dust ID Program. The APCO will implement all mutually-agreeable changes to the Dust ID Program and notify the City in writing of those changes.

B. The District will continue to work with the City after April 1, 2010 to further improve the Dust ID Program and will implement all additional mutually agreeable changes in a written decision.

C. In furtherance of efforts to improve the Dust ID Program:

(i) The Parties will promptly begin a mediated process for refining the Dust ID Program and resolving disputes.

(ii) The Parties will select a mutually agreeable expert or panel of independent third-party technical experts.

(iii) The District, after consultation with the City, will increase the number of PM_{10} monitors at or near the historic shoreline. In all cases, the District will notify the City of the location of the monitors within 30 days of placement of the monitors. If a PM_{10} monitor is located above the historic shoreline, the District will make reasonable attempts to account for non-lake bed sources that may affect the monitor.

(iv) The District, after consultation with the City, will modify the existing sand flux monitor network to concentrate on areas of special interest, and will, in all cases, notify the City of the modifications within 30 days of any modification.

(v) The Parties will establish mutually agreeable model performance measures. Such measures may, but are not required to, include a minimum model performance standard.

(vi) The District will make reasonable efforts to account for impacts of DCM construction activities.

10. The City will lead a joint effort with the District to develop methods for directly measuring PM_{10} emission rates from the lake bed. The District will incorporate mutually agreeable methods into the Dust ID Program.

11. A. If the City is in compliance with Sections 1 and 2 of this Agreement, the following shall apply to the time period before April 1, 2010.

(i) The APCO will not issue any further determinations regarding the need for SCRs that provide for additional requirements beyond those in this Agreement. However, the District will continue to use the Dust ID Program, as that program may be modified pursuant to Sections 9 and 10. The District will periodically advise the City of results in writing and may recommend actions to the City based on the model results.

(ii) Data collected before April 1, 2010 will not be used in future determinations requiring SCRs, except in those areas delineated as Study Areas on the Study Area Map attached as Exhibit 9 and described in Exhibit 2. Data collected from the Study Areas between July 1, 2006 and April 1, 2010 may only be used in SCR determinations after April 1, 2010, and may be used only in accordance with the current form of the Dust ID Program that is in effect after April 1, 2010.

(iii) The District will not issue an order requiring the City to implement any additional controls on any lake bed dust source areas in order to achieve the state PM_{10} standard of 50 micrograms per cubic meter unless compelled to issue such an order by state law.

B. The District shall determine compliance with the state PM_{10} standard based on concentrations only in the surrounding communities, unless otherwise compelled by state law.

12. The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

A. The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.

B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

SHALLOW FLOOD BACM REFINEMENT

13. The City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the DCA (Shallow Flood Cover Test).

A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.

B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.

C. The City will be CEQA lead agency for the Shallow Flood Cover Test.

14. If the APCO reasonably determines in writing that DCMs in the TDCA have been operational for one full year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section 14.C, provided that:

A. Application of the 10 percent reduction in wetness cover during the Fall and Spring Shallow Flood DCM Compliance periods set out in Sections 25 and 26 shall result in the lower of:

(i) The areal cover resulting from a 10 percent reduction; or

(ii) The areal cover required in Section 26.A.

B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

(i) the results of testing carried out pursuant to Section 13, if conducted; and

(ii) the results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Section 26.

C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.

D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in Section 18 and subject to the provisions of Section 16.

E. Except as provided in Section 16, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.

15. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section 14, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM_{10} concentrations at the historic shoreline.

16. Any areas for which wetness cover has been reduced pursuant to Section 14 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan requirements pursuant to Sections 18 and 22 below.

A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section 14 provided that:

(i) The maximum 24-hour PM_{10} shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 $\mu g/m^3$; and

(ii) The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time

period set forth in Section 16.A.(i) plus the background of 20 $\mu g/m^3$ do not exceed 120 $\mu g/m^3$ at the historic shoreline.

B. If the monitored values at the historic shoreline exceed 130 $\mu g/m^3$, and it is determined that non-lake bed sources are contributing greater than 20 $\mu g/m^3$, then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.

C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:

(i) A map that depicts the eligible Shallow Flood areas;

(ii) The proposed amount of wetness cover for each eligible Shallow Flood area; and

(iii) The method for determining effectiveness of the proposed wetness cover.

D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

<u>ACTIONS TO ADDRESS STANDARD VIOLATIONS</u>

17. After May 1, 2010, the APCO will recommence written SCR determinations under the revisions to the 2003 SIP as provided in Section 28. Recommenced determinations will use Dust ID data collected only after April 1, 2010, except as provided in Section 11.A.(ii) for Study Areas, and shall be made at least once in every calendar year.

18. If, pursuant to Section 17, the APCO determines that a monitored or modeled exceedance of the federal standard caused by emissions from the lake bed has occurred at or above the historic shoreline:

A. The APCO, based on all available information, including visual observation, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.

B. (i) If the APCO identifies the need for additional controls, the APCO shall issue a SCR determination.

(ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an Alternative Analysis. If the City submits an Alternative Analysis, the APCO shall consider the Analysis and may withdraw, modify or confirm the SCR determination.

(iii) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Section 32. The APCO may modify the SCR determination based on the Dispute Resolution process.

(iv) In the event the Parties are unable to resolve disagreements over future SCR determinations through the Dispute Resolution Process, the City may appeal future determinations to CARB under the provisions of Health and Safety Code Section 42316 (Section 42316), provided that the Parties expressly intend that this Agreement be the final resolution regarding the existing disputes between the Parties that are the subject of this Agreement. Based on the foregoing, the City stipulates and agrees that all of the provisions and determinations, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the SCR determination dated April 4, 2006, which the City in good faith disputed, shall be deemed to be valid and reasonable, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceeding, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future SCR determination under Section 42316; however any arguments or challenges must be based on data and information that do not currently exist, but that exist after the execution of this Agreement.

C. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Section 21 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

D. The District may, as appropriate, also issue a notice of violation.

19. In the event:

A. The APCO has made a written determination pursuant to Section 18 that an exceedance of the federal standard, occurring after April 1, 2010,

resulted from a Control Area or portion of a Control Area treated with Moat and Row; and

B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Section 21 below; and

C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (*i.e.*, an exceedance occurred after the City attempted to remediate that area under Section 21);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat and Row to MDCE-BACM or BACM, to address the exceedance described in Section 19.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Section 24.

20. If the APCO determines that Moat and Row constitutes BACM or MDCE-BACM, then upon issuance of such written determination, the provisions of Section 19 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Section 20.

21. A Remedial Action Plan prepared by the City pursuant to Section 18 will contain a description of:

A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:

(i) Maintenance of facilities (*e.g.*, berms, moats and rows);

(ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);

(iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, addition of sand fences, surface wetting, armoring, vegetation, surface roughening) of Moat and Row areas;

(iv) Transition of Moat and Row areas to BACM, or MDCE-BACM.

B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.

C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

22. The Schedule of Contingency Measures attached to this Agreement as Exhibit 10 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Section 21, and the timing required for their implementation.

23. Before any full-scale Moat and Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat and Row area consistent with Section 19. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat and Row to another DCM is needed, or where such transition is required pursuant to Section 19.

24. Areas to be transitioned from Moat and Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat and Row Transition Schedule attached as Exhibit 11. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule attached as Exhibit 12.

FALL AND SPRING SHALLOW FLOOD DCM COMPLIANCE

25. For the time period from October 16 of each year through May 15 of the next year, the Shallow Flood Control Areas shall be considered to be in compliance with this Agreement and applicable laws and regulations, if the areal wetness cover within each Shallow Flood Control Area in the TDCA meets the MDCE required in Exhibit 6 using the SFCE Curve in Exhibit 7.

26. The provisions set forth in this section shall apply to all Shallow Flood areas with target control efficiencies of 99 percent or more, except those which the City and the District may mutually agree to exclude.

    A. Beginning on April 1, 2010, compliance of TDCA Control Areas with 99 percent control efficiency Shallow Flood requirements shall be as follows:

        (i) Beginning May 16 and through May 31 of every year, Shallow Flood may be reduced to a minimum of 70 percent areal wetness cover.

        (ii) Beginning June 1 and through June 15 of every year, Shallow Flood may be reduced to a minimum of 65 percent areal wetness cover.

        (iii) Beginning June 16 and through June 30 of every year, Shallow Flood may be reduced to a minimum of 60 percent areal wetness cover.

(iv) If for any Shallow Flood area, the percent of areal wetness cover in the periods specified in Sections 26A.(i), (ii) and (iii) is below the minimum percentages specified in those sections, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance with this Agreement and applicable laws and regulations if the City demonstrates in writing and the APCO reasonably determines in writing that maximum mainline flow was maintained in the applicable period.

B. From July 1 through September 30 of each year, the City is not required by the 2003 SIP to apply water for dust control, but is required to maintain minimum areal wetness cover as required by applicable environmental documents and approvals.

C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the federal standard at the historic shoreline as a result of excessive dry areas on Shallow Flood Control Areas during the dust control periods for each year between May 16 through June 30, and October 1 through October 15, the provisions of Sections 17 and 18 shall apply.

27. The provisions of Sections 25 and 26 are subject to the results of air quality modeling, to be conducted by the City and approved by the APCO, that demonstrates attainment of the federal standard at the historic shoreline using the reduced areal wetness covers set forth in Section 26. The modeling shall be conducted as described in the 2003 SIP using data for the period July 2002 through June 2006. The control efficiency of the areal wetness covers shall be modeled using the SFCE Curve as provided in Section 5.

REVISION OF THE STATE IMPLEMENTATION PLAN (SIP)

28. A. The APCO will propose a District Board Order that will revise the 2003 SIP to incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. The APCO will propose the Board Order and SIP revision at a time sufficient to allow the proposed revisions to be considered and adopted by the District Board by July 1, 2008. The time for consideration and adoption shall take into account, without limitation, the time for legally required environmental review and public notice and hearing. The District Board will act on the proposed SIP revisions by July 1, 2008.

B. If the District Board has the legal ability to act and fails to act by November 1, 2008 on a proposed District Board Order as described in Subsection 28.A, the City may terminate this Agreement by providing

written notice to the District, provided, however, that the City will not provide such notice prior to the conclusion of the Dispute Resolution Process pursuant to Section 32, which process may be initiated by either Party.

C. The Parties have developed this Agreement with the intention that its provisions will be incorporated into a revision of the 2003 SIP and are consistent with applicable provisions of the Health and Safety Code, including Section 42316, and applicable provisions of federal law regarding attainment of the NAAQS.

D. The APCO shall confer in good faith with the City to develop procedures to modify and authorize MDCE-BACM for incorporation into the revisions to the 2003 SIP.

E. The District will be CEQA lead agency and will prepare, in consultation with the City, and will consider for certification on or before March 1, 2008 an environmental impact report (EIR) on the proposed SIP revisions.

F. (i) In the event:

(a) the District Board adopts a District Board Order revising the 2003 SIP that does not incorporate all the terms and conditions of this Agreement, except such terms and conditions, if any that may not lawfully be included in the SIP; or

(b) the District Board adopts a District Board Order revising the 2003 SIP that incorporates all the terms and conditions of this Agreement except such terms and conditions, if any, that may not lawfully be included in the SIP, and subsequent judicial action causes the revised SIP to be materially inconsistent or materially in conflict with the terms and conditions of this Agreement,

the City may terminate this Agreement in the case of Section 28.F(i)(a), and either Party may terminate this Agreement in the case of Section 28.F(i)(b), within 30 days of such action by providing written notice to the other Party.

(ii) If the City does not elect to terminate this Agreement pursuant to Section 28.F(i) and any inconsistencies or conflicts exist between this Agreement that preclude compliance with both, the provisions of the District Board Order shall prevail.

G. The City will support and will not appeal or in any other way challenge or oppose revisions to the 2003 SIP and resulting District Board Order that incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. After issuance of the District Board Order provided for in this Section, the City shall not challenge the order under CEQA to the extent that Order is consistent with this Agreement.

H. In the event the District Board fails to certify the EIR by March 1, 2008 or to act on the proposed SIP revisions by July 1, 2008, the Parties shall meet and confer as provided in Section 33.A.

I. Any provisions of this Agreement that are incorporated into the District Board Order as provided in Section 28.A. shall, upon adoption of that Order by the District Board, cease to have any further force and effect as part of this Agreement, and shall instead be effective as part of the District Board Order.

J. Any provisions of this Agreement that are not incorporated into the District Board Order as provided in Section 28.A shall remain in full force and effect as part of this Agreement until May 1, 2012, at which time those provisions shall cease to be of any further force or effect as part of this Agreement, provided that the Parties may mutually agree in writing to extend this date.

COVER MEASUREMENT TECHNIQUES AND PERFORMANCE SPECIFICATIONS

29. The District and City will collaboratively develop wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications. Final acceptance of those cover measurement techniques and compliance specifications with regulatory impact will be at the sole discretion of the APCO.

KEELER DUNES

30. The Parties acknowledge that dust emissions from the area known as the Keeler Dunes may cause or contribute to exceedances of federal and state standards for PM_{10}. The City hereby agrees to cooperate with the District and other federal, state and local agencies and experts as necessary to develop a plan to reduce dust emissions from the Keeler Dunes.

COOPERATION BETWEEN PARTIES AND DISPUTE RESOLUTION

31. In carrying out the terms of this Agreement, the Parties intend to cooperate fully and to consult with each other effectively and on a regular basis. The Parties will make good faith efforts to provide each other with relevant documents and

technical information in a timely manner, and they will keep each other informed of their respective progress in actions to implement the actions set forth in this Agreement, including, without limitation, progress in entering into consultant and construction contracts and in securing permits from agencies with permitting authority.

32. Notwithstanding the Parties' commitment to cooperate in implementing the terms of this Agreement, they recognize that differences may arise between them. To address this situation, the Parties agree that, in the event either Party believes that a dispute exists regarding implementation or interpretation of any provision of this Agreement, that Party may, by informing the other Party in writing within 21 days of the decision or determination, action or proposed action triggering the dispute, initiate non-binding mediation between the Parties. A party may not seek non-binding mediation for issues that were already the subject of mediation under this Section unless both Parties agree in writing.

A. The mediator shall be a mediator mutually acceptable to the Parties. The Parties may also by mutual agreement include in the mediation, one or more of the technical experts selected pursuant to Section 9.C.(ii), or any other technical experts, such experts to be under contract to the District and jointly managed by the Parties. The City shall be responsible for the cost of the mediator and the technical experts pursuant to Health and Safety Code Section 42316. The mediation will be conducted and completed within 60 days of the notice initiating the Dispute Resolution Process unless that time period is extended by mutual agreement of the Parties. The mediation will be conducted under all applicable California laws regarding mediation, including but not limited to Cal. Evidence Code Sections 1115-1128.

B. Neither Party will commence any litigation concerning the implementation of terms of this Agreement unless that Party has first initiated the mediation described in this Section, and the sooner of the following two events takes place:

(i) Sixty (60) days has expired from the date that Party first sent written notice to commence the mediation; or

(ii) Both Parties agree, or the mediator(s) states, in writing that the mediation has been completed.

(iii) Notwithstanding the provisions of this Section 32.B, a Party may commence litigation at an earlier time if necessary to pursue a claim or cause of action that would otherwise be time barred under an applicable statute of limitations.

C. If the Dispute Resolution Process pursuant to this Section 32 is initiated to address a dispute regarding a SCR determination issued by the APCO pursuant to Section 18.B, then that SCR determination shall not be deemed final until the conclusion of this process under Section 32.B.

D. Nothing in this section is intended to or shall be construed to restrict or eliminate a Party's right to utilize available legal remedies following completion of the mediation process.

<u>EXTENSIONS OF TIME</u>

33. A. In the event that the District

(i) Anticipates that it will fail to certify or fails to certify an environmental impact report on the proposed SIP revisions and related actions by March 1, 2008; or

(ii) Anticipates that it will fail to act on or fails to act on a proposed District Board Order pursuant to Section 28.A by July 1, 2008,

the District shall promptly notify the City, and Parties shall meet and confer to determine what if any revisions to other dates contained in this Agreement may be appropriate. The Parties may mutually agree to the participation of a mediator in the meet and confer process.

B. In the event the City

(i) Anticipates that it will be unable to complete implementation or fails to complete implementation of moat and row controls pursuant to this Agreement by October 1, 2009; or

(ii) Anticipates that it will be unable to complete implementation or fails to complete implementation of all other controls by April 1, 2010,

the City may seek relief for such failure or delay by obtaining a variance from the Hearing Board of the Great Basin Unified Air Pollution Control District pursuant to District Regulation VI and all applicable law for variance relief from a District Order, including but not limited to Health and Safety Code Section 42350 *et seq*. In such event, the District shall, at the request of the City, meet with the City, prior to or after the filing of a request for a variance, in order to ascertain whether the District will support the City's variance request. In the event the District will not support the City's variance request, the City may invoke the Dispute Resolution Process pursuant to Section 32.

C. Nothing in this Section is intended to or shall limit the ability of the City to seek a variance from requirements not included in this Section.

D. Each Party will undertake to inform the other Party as early as practicable of the fact that it anticipates that it will not meet or has failed to meet any of the dates set out in this Section.

34. In the event either Party claims that the other Party is in material breach of the terms of this Agreement, including without limitation, a claim by the District that the City is in material breach under Section 11, the Party claiming the breach shall provide written notice of the claimed breach to the other Party. In the event the Party claimed to be in breach contests such claim, the issue shall be subject to the Dispute Resolution Process in Section 32.

LAWSUIT/APPEAL SETTLEMENT CONDITIONS

35. Within 15 days of execution of this Agreement, the APCO shall issue a revised SCR determination that incorporates the terms of this Agreement and that supersedes all previous determinations.

36. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall immediately commence the process for implementing additional DCMs on the Owens Lake bed consistent with the terms of this Agreement.

37. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall within seven days dismiss with prejudice its CARB appeals and the litigation against the District as described in the Recitals at Paragraphs L, O. and P.

DEFINITIONS

38. Definitions of terms used in this Agreement are contained herein and in Exhibit 13. Where specifically identified in Exhibit 13, these terms as used in this Agreement and Exhibits shall have the meanings provided in this Exhibit 13. Where no definition is provided herein or in Exhibit 13, the words and terms shall have their meaning as provided in the federal Clean Air Act or state air pollution law in the Health and Safety Code, and where no definition is found there, shall have their ordinary meaning as read in the context of this Agreement and consistent with the expressed intent of the Parties.

NOTICES

39. Whenever, under the terms of this Agreement, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be sent by overnight mail and directed to the individual at the address

specified below, unless that individual or his or her successor gives notice of a change to the other Party in writing.

As to the City:

Ronald F. Deaton
General Manager
Los Angeles Department of Water and Power
111 North Hope Street, Room 1550
Los Angeles, CA 90012

As to the District:

Theodore D. Schade
Air Pollution Control Officer
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514

ADDITIONAL PROVISIONS

40. By this Agreement, the City and the District intend to settle their disputes regarding methods to address air quality issues at Owens Lake, including disagreements over the SCR determination issued on December 21, 2005, and the Modified SCR determination issued on April 4, 2006.

41. This Agreement is the final integrated agreement between the Parties regarding the matters addressed herein, and may not be modified except in a writing signed by both Parties.

42. This Agreement shall be construed in accordance with the laws of the State of California.

43. In the event any provision of this Agreement is judicially determined to be unenforceable, the Parties shall meet and confer and following such meeting, the Parties may amend the Agreement, or continue the Agreement without amendment, or either Party may terminate the Agreement.

44. This Agreement shall not create any rights in any third party.

45. No failure by a Party to insist on strict performance of any term or condition of this Agreement shall constitute a waiver of such term or condition or a breach hereof.

46. Each Party represents that their respective signatories below have the authority to bind them to the terms of this Agreement.

REVIEWED AND AGREED TO:

Dated: November 30, 2006

Ronald F. Deaton
Ronald F. Deaton
General Manager, Los Angeles Department of Water and Power

The City of Los Angeles
By and Through the
Los Angeles Department of Water and Power

Dated: December 4, 2006

Henry Veatch
Henry "Skip" Veatch
Board Chairman

Great Basin Unified Air Pollution Control District

APPROVED AS TO FORM AND LEGALITY
ROCKARD J. DELGADILLO, CITY ATTORNEY

NOV 30 2006

BY Julie A. Conboy
JULIE A. CONBOY
Deputy City Attorney

List of Exhibits

EXHIBIT 1 -- TOTAL DUST CONTROL AREA MAP

The Total Dust Control Area (TDCA) is comprised of the 2006 Supplemental Dust Control Area (SDCA) and the 2003 Dust Control Area (DCA).

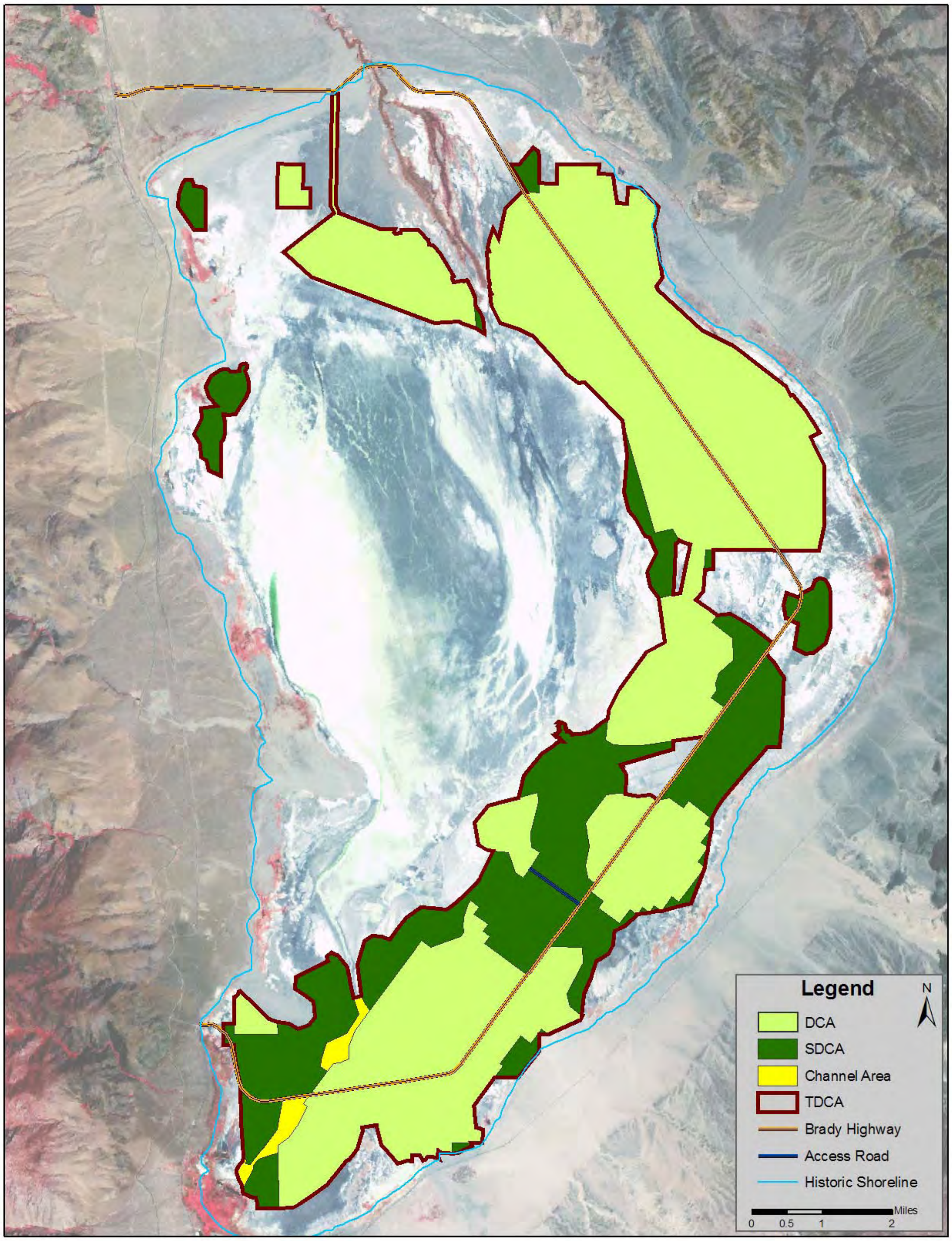

EXHIBIT 2 -- 2006 SUPPLEMENTAL DUST CONTROL AREA COORDINATE DESCRIPTIONS

KEY MAP

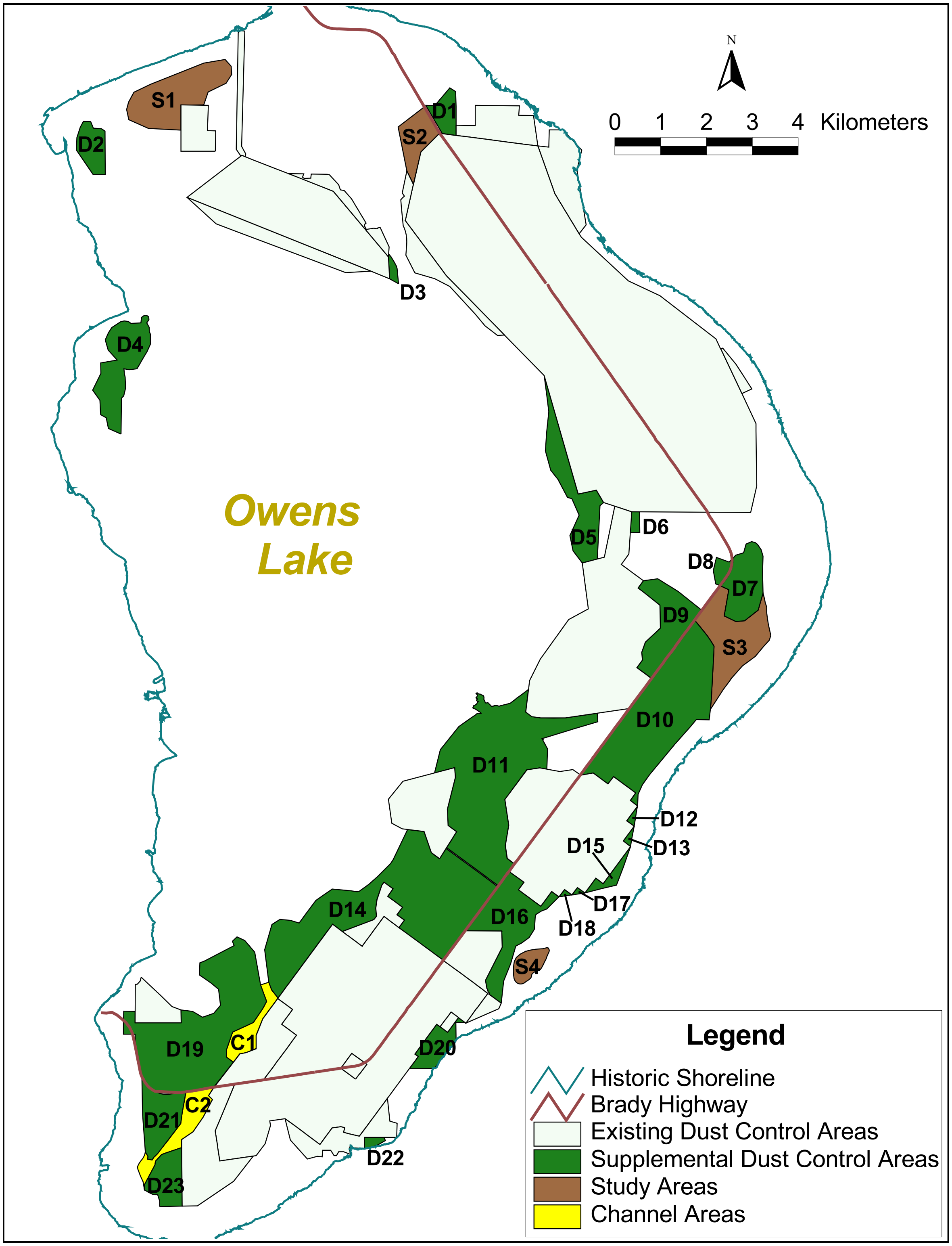

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
D1	0.16	SDCA	416,001.0310	4,042,347.3789
			415,701.7500	4,042,385.7617
			415,343.2810	4,042,999.8633
			415,539.4060	4,042,999.0234
			415,866.3750	4,043,383.8359
			415,994.4060	4,043,304.2109
			416,002.6250	4,042,981.9922
			416,005.6250	4,042,568.5234
			416,001.0310	4,042,347.3789
D2	0.21	SDCA	408,085.5000	4,041,493.3164
			407,718.8130	4,042,027.7422
			407,731.5000	4,042,299.3945
			407,804.9060	4,042,524.2148
			407,873.2810	4,042,654.1211
			408,032.2500	4,042,647.6875
			408,089.5630	4,042,502.0625
			408,267.6560	4,042,491.4219
			408,347.0630	4,042,440.3203
			408,348.9690	4,041,492.4844
			408,085.5000	4,041,493.3164
D3	0.03	SDCA	414,747.2500	4,039,108.7500
			414,550.5000	4,039,224.6641
			414,528.0310	4,039,697.5156
			414,532.5000	4,039,759.7891
			414,583.3750	4,039,699.2617
			414,643.3130	4,039,605.6250
			414,700.5000	4,039,498.9766
			414,718.6880	4,039,441.7188
			414,729.1250	4,039,314.2500
			414,747.2500	4,039,108.7500
D4	0.59	SDCA	408,694.5000	4,035,836.9883
			408,417.2190	4,035,957.7344
			408,370.5940	4,036,191.9453
			408,249.5940	4,036,258.3164
			408,231.6880	4,036,571.0625
			408,075.5000	4,036,791.1719
			408,254.4060	4,037,157.2813
			408,249.9060	4,037,387.3789
			408,606.5630	4,037,448.5391
			408,414.0000	4,037,664.3359
			408,348.8750	4,037,888.7227
			408,415.9060	4,038,042.2422
			408,494.0000	4,038,156.0977
			408,687.9380	4,038,284.6484
			408,762.7190	4,038,303.7813
			408,853.0940	4,038,290.2422
			408,911.3130	4,038,246.2109
			409,028.9380	4,038,251.5742
			409,126.1560	4,038,258.7344
			409,134.0630	4,038,309.6602
			409,144.5940	4,038,382.5547
			409,201.0630	4,038,424.0508
			409,255.5940	4,038,422.9180
			409,299.1250	4,038,391.3789
			409,304.7190	4,038,329.9609
			409,254.9380	4,038,259.1797
			409,308.0940	4,038,163.0195
			409,312.7190	4,038,061.7695
			409,335.7190	4,038,017.0195
			409,334.3750	4,037,792.3008
			409,260.5630	4,037,628.4492
			409,184.9060	4,037,508.1055
			409,044.0630	4,037,256.8359
			408,869.9060	4,037,236.6055
			408,755.8130	4,037,260.8867
			408,768.2810	4,037,143.0156
			408,784.9690	4,037,079.6914
			408,789.7190	4,036,817.3555
			408,751.4060	4,036,667.7344
			408,706.5940	4,036,616.2422
			408,694.5000	4,035,836.9883

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
D5	0.57	SDCA	418754.0310	4033026.5000
			418552.9690	4033287.6914
			418484.0000	4033621.1133
			418689.0940	4034066.4102
			418529.0310	4034424.5078
			418434.8130	4034452.0664
			418325.1880	4034653.5234
			418224.7810	4034845.3438
			418067.7500	4035047.7852
			417953.1880	4035467.4961
			417980.5000	4035865.3203
			418027.9060	4036319.6094
			417924.4060	4037110.5117
			418666.3750	4034527.9844
			419065.6880	4034610.9648
			419223.4690	4034342.1406
			419141.3750	4034271.8047
			419084.1880	4033110.8086
			418754.0310	4033026.5000
D6	0.03	SDCA	419801.2810	4033687.7539
			419831.7500	4034141.1016
			420006.8130	4034139.3281
			420012.7190	4033690.4844
			419801.2810	4033687.7539
D7	0.43	SDCA	422105.2500	4031749.0176
			421854.9690	4031871.4102
			421952.1880	4032442.4199
			421827.1560	4032498.3555
			421778.4380	4032522.0762
			421882.0310	4032660.6934
			421931.3130	4032728.7031
			421954.3130	4032765.7129
			421966.3130	4032785.8828
			421992.7810	4032841.0703
			422013.5310	4032894.8164
			422030.0630	4032956.1914
			422039.5000	4033014.7422
			422042.1560	4033068.7461
			422042.4380	4033082.8008
			422040.7810	4033127.2188
			422103.3750	4033191.3320
			422274.9380	4033248.8359
			422331.4380	4033437.2383
			422451.9060	4033492.2617
			422530.2190	4033470.0195
			422579.0940	4033430.6797
			422659.7190	4033313.9453
			422698.6880	4033173.2383
			422688.0630	4032830.0469
			422701.7500	4032367.5195
			422592.2190	4031994.7988
			422299.6560	4031762.5020
			422105.2500	4031749.0176
D8	0.06	SDCA	421758.4690	4032529.3477
			421668.6250	4032569.9238
			421615.5310	4032859.4297
			421680.6250	4033146.5156
			421959.5000	4033044.5586
			422021.5000	4033108.1875
			422022.5630	4033079.4023
			422019.3130	4033018.7031
			422010.1880	4032960.1484
			421994.8130	4032902.9766
			421977.7500	4032858.2227
			421948.4060	4032795.7422
			421918.7190	4032746.2988
			421884.3440	4032697.7148
			421806.2810	4032593.7305
			421758.4690	4032529.3477

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D9	0.53	SDCA	420,265.8440	4,030,508.7188
			419,947.7500	4,030,741.5176
			420,067.1880	4,030,907.7324
			420,051.5940	4,031,073.7461
			420,132.5000	4,031,300.5000
			420,460.9690	4,031,604.7441
			420,449.4060	4,032,103.9551
			419,975.9690	4,032,480.4902
			420,091.3750	4,032,635.9316
			420,399.6560	4,032,679.1270
			420,847.1880	4,032,406.2988
			421,363.7810	4,031,994.1230
			420,995.8750	4,031,495.0273
			420,265.8440	4,030,508.7188
D10	1.75	SDCA	419,965.0000	4,027,728.2520
			419,803.2190	4,027,847.7363
			419,922.8440	4,028,009.4902
			419,437.5940	4,028,368.0176
			419,317.9690	4,028,206.2617
			418,994.5310	4,028,445.2656
			418,730.3440	4,028,397.0371
			419,406.8750	4,029,323.4316
			421,010.9060	4,031,484.3145
			421,216.1560	4,031,761.8594
			421,439.0940	4,031,498.2363
			421,631.0310	4,031,208.7773
			421,571.8750	4,030,077.3184
			421,548.9690	4,029,833.7383
			421,523.2500	4,029,607.1328
			421,241.1880	4,029,607.8887
			421,116.0000	4,029,457.7559
			420,776.0000	4,029,075.9551
			420,233.7500	4,028,421.8027
			420,070.9690	4,028,193.2832
			419,973.2500	4,027,978.3457
			419,965.0000	4,027,728.2520
D11	2.32	SDCA	416,924.2190	4,025,991.8965
			416,906.7190	4,026,000.2598
			416,817.3750	4,026,065.2832
			415,808.9380	4,026,810.0977
			415,803.8440	4,026,822.5840
			415,810.1250	4,026,837.9219
			416,016.5310	4,027,163.7559
			415,829.9690	4,027,301.7383
			415,812.0000	4,027,654.7500
			415,987.3440	4,028,348.8008
			415,969.6880	4,028,562.7461
			415,530.3750	4,028,446.4922
			415,660.2500	4,028,955.4551
			416,062.8130	4,029,458.0664
			416,386.1560	4,029,683.9746
			416,436.9060	4,029,720.7148
			416,449.5000	4,029,732.7207
			416,468.5940	4,029,742.7246
			416,489.8750	4,029,746.4355
			416,529.4060	4,029,741.9941
			416,547.9690	4,029,741.4180
			416,541.4060	4,029,755.8789
			416,528.0940	4,029,767.9277
			416,515.2190	4,029,777.7969
			416,501.9690	4,029,786.2637
			416,489.6560	4,029,794.9004
			416,430.1250	4,029,834.6543
			416,415.3750	4,029,843.4570
			416,400.7190	4,029,849.4766
			416,387.3130	4,029,856.1563
			416,372.5940	4,029,860.3105
			416,368.5310	4,029,870.0703
			416,375.7810	4,029,880.6270
			416,384.4690	4,029,895.7617
			416,385.5310	4,029,910.9023
			416,395.3130	4,029,918.6621
			416,406.0630	4,029,922.9727
			416,419.9060	4,029,929.8086
			416,435.1560	4,029,936.6543
			416,449.2500	4,029,947.3340
			416,459.1250	4,029,961.2246
			416,462.9690	4,029,976.8418
			416,471.5630	4,029,988.3965

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D11	2.32	SDCA	416481.0000	4029994.3359
continued			416483.2500	4030000.4590
			416476.4690	4030004.0684
			416464.6250	4030013.5332
			416452.1250	4030020.7266
			416447.3130	4030031.0762
			416454.8750	4030042.8809
			416467.7500	4030052.9766
			416466.0630	4030067.6035
			416454.5310	4030077.5586
			416440.6250	4030076.0938
			416437.6250	4030084.6914
			416445.8130	4030098.3496
			416459.0310	4030110.6875
			416465.9060	4030126.0488
			416467.1560	4030142.7871
			416461.5310	4030157.1523
			416450.1560	4030168.0938
			416439.0940	4030177.2402
			416443.8750	4030188.7227
			416458.4380	4030192.3809
			416470.3130	4030190.8789
			416479.0310	4030177.9727
			416493.8130	4030171.2637
			416510.6250	4030166.2656
			416527.2190	4030165.8828
			416541.7810	4030161.9238
			416568.0630	4030143.3945
			416585.0000	4030137.3281
			416601.6250	4030130.7734
			416608.7190	4030112.7188
			416614.8750	4030093.7324
			416614.1560	4030081.1367
			416606.9690	4030057.0176
			416610.2810	4030041.6328
			416621.0310	4030029.7910
			416626.8440	4030016.4492
			416634.6560	4030003.4863
			416639.6560	4029988.0273
			416642.2500	4029973.2676
			416656.7190	4029972.4727
			416688.3750	4029977.5293
			416704.9380	4029976.5762
			416715.9690	4029964.5742
			416723.1250	4029949.7949
			416734.4690	4029937.7109
			416747.7190	4029929.2070
			416759.0310	4029916.4004
			416768.4690	4029902.2207
			416781.8130	4029898.3633
			416790.3750	4029900.3945
			416827.0940	4029907.2129
			416838.2500	4029915.7813
			416845.7500	4029917.9492
			416852.5940	4029916.0938
			416867.9690	4029916.1543
			416880.3440	4029917.7637
			416895.6880	4029914.7402
			416925.9380	4029904.3965
			416940.7190	4029903.4805
			416954.8130	4029907.8730
			416966.3750	4029914.2246
			417119.3130	4029946.7070
			417187.6250	4029971.9180
			417582.2500	4030268.0078
			417521.0310	4029772.5176
			417701.5630	4029667.0430
			417771.4380	4029656.0293
			417852.7810	4029647.5566
			418130.3750	4029643.4648
			418383.2810	4029647.0859
			419083.7810	4029748.1953
			419086.1880	4029746.9258
			419093.6560	4029564.0527
			417887.0630	4029198.4668
			417896.1560	4029182.4668
			417881.5000	4029187.7246
			418000.2190	4028968.8594
			417985.8130	4028531.7539
			417825.0940	4028556.4668
			417545.0000	4028513.0254

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	417,068.6250	4,027,867.9766
			417,152.6880	4,027,307.1758
			417,077.1880	4,026,864.2910
			417,117.7810	4,026,581.1016
			417,277.7500	4,026,460.9707
			416,924.2190	4,025,991.8965
D12	0.02	SDCA	419,887.8440	4,027,285.2500
			419,726.0310	4,027,404.7344
			419,965.0000	4,027,728.2520
			419,949.5310	4,027,659.1582
			419,887.8440	4,027,285.2500
D13	0.02	SDCA	419,810.5000	4,026,842.2539
			419,648.7190	4,026,961.7383
			419,772.4690	4,027,130.8359
			419,887.8440	4,027,285.2500
			419,880.3750	4,027,234.3164
			419,832.8130	4,026,984.5820
			419,810.5000	4,026,842.2539
D14	2.46	SDCA	412,117.6560	4,023,538.0977
			411,983.4060	4,023,714.6152
			411,915.1560	4,023,883.7793
			411,828.0940	4,024,594.2207
			411,988.0310	4,025,141.2695
			412,161.8440	4,025,254.5859
			412,387.4060	4,025,234.3184
			412,577.3130	4,025,175.8184
			412,752.9380	4,025,413.6777
			412,942.5940	4,025,667.2090
			413,298.0630	4,025,913.1816
			413,700.7190	4,025,878.1113
			413,843.4060	4,025,859.0313
			413,892.3750	4,025,869.0625
			414,103.4380	4,026,021.7207
			414,294.0310	4,026,188.3672
			414,574.5630	4,026,473.5742
			414,628.3130	4,026,552.7695
			414,946.8130	4,027,212.3789
			415,303.7810	4,027,171.2480
			415,463.6880	4,026,711.0117
			415,639.0630	4,026,577.9492
			415,777.6250	4,026,784.4590
			415,787.8440	4,026,793.4668
			415,793.6560	4,026,794.4512
			416,290.3440	4,026,429.5527
			416,545.3750	4,026,241.2695
			416,908.5000	4,025,969.6309
			416,207.2500	4,025,017.7598
			415,765.2810	4,024,422.9277
			415,712.3440	4,024,368.7461
			414,755.6880	4,025,075.7559
			414,875.1560	4,025,237.5156
			414,715.5000	4,025,356.9941
			414,832.8440	4,025,518.7598
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.2539
			414,383.9380	4,025,997.9883
			414,274.7500	4,025,678.2109
			414,249.7810	4,025,496.0098
			414,266.4690	4,025,323.2305
			414,210.4380	4,025,245.9863
			413,519.9380	4,024,988.5723
			413,307.2500	4,025,145.7637
			413,144.4690	4,024,931.4102
			412,117.6560	4,023,538.0977
D15	0.08	SDCA	418,812.6560	4,025,829.9941
			419,051.1560	4,026,152.9863
			419,213.4060	4,026,034.2168
			419,810.5000	4,026,842.2539
			419,655.1250	4,026,404.8789
			419,499.9380	4,025,999.3496
			419,182.9690	4,025,925.2813
			418,812.6560	4,025,829.9941

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
D16	0.70	SDCA	416987.0630	4023427.0801
			416718.5630	4023625.5098
			416734.5310	4023647.0078
			416700.3440	4023672.5195
			416689.5630	4023734.1953
			416678.1560	4023741.8613
			416644.1560	4023925.0195
			417010.6880	4024645.2734
			417000.8130	4024984.0566
			417004.5630	4024995.9414
			416997.8130	4025001.7578
			416224.2500	4025007.0430
			416932.7810	4025971.6777
			417170.5000	4026294.0039
			417483.0940	4026061.2461
			417363.6250	4025899.4863
			417848.8440	4025541.0000
			418087.8130	4025864.5176
			418249.6250	4025744.9961
			417981.1560	4025483.1621
			417862.3130	4025432.8262
			417742.6560	4025357.7832
			417731.0940	4025299.8848
			417711.4060	4025042.9023
			417596.9060	4024857.0391
			417427.9690	4024735.2051
			417308.1560	4024673.9160
			417192.2500	4024288.4082
			417038.6560	4023907.3789
			416987.0630	4023427.0801
D17	0.01	SDCA	418812.6560	4025829.9941
			418722.7810	4025817.3457
			418531.3750	4025787.7188
			418650.8440	4025949.5527
			418812.6560	4025829.9941
D18	0.01	SDCA	418250.0940	4025745.5586
			418369.5630	4025907.3164
			418531.2190	4025787.8750
			418422.7500	4025775.2305
			418250.0940	4025745.5586
D19	1.88	SDCA	410989.2810	4022251.9551
			411145.7810	4022140.5918
			410728.5630	4021605.7773
			410525.7190	4021575.8516
			410434.2500	4021553.4805
			410330.1560	4021538.0020
			410249.0940	4021523.9121
			410165.6880	4021513.8320
			410012.7810	4021489.0801
			409988.7810	4021485.5020
			409958.9380	4021487.3027
			409834.5940	4021472.0918
			409710.8750	4021458.8867
			409588.2190	4021468.2129
			409472.9060	4021506.2676
			409364.2190	4021564.2617
			409273.0310	4021648.9043
			409231.3750	4021698.0781
			409192.6560	4021749.2871
			409142.4380	4021863.0625
			409121.8750	4021936.3730
			409108.8130	4021989.7910
			409094.0000	4022070.1055
			409085.6880	4022117.5977
			409078.5310	4022146.7773
			409061.1250	4022247.9473
			409045.9690	4022310.3633
			409033.1250	4022381.5703
			409029.3750	4022398.8301
			409009.4380	4022518.7207
			409000.8440	4022749.8164
			408748.8130	4022752.2285
			408748.6880	4022994.9199
			408752.0000	4023250.6855
			409002.0630	4023249.9121
			408999.6250	4023000.2637
			410005.0940	4022997.9844
			410001.1880	4023280.3379
			410254.3750	4023245.9746

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D19 continued	1.88	SDCA	410,472.1880	4,023,123.1172
			410,718.0630	4,023,206.8965
			410,862.1250	4,023,378.8164
			410,821.5940	4,023,731.0039
			410,665.3750	4,023,862.7910
			410,401.5000	4,024,041.8867
			410,411.4380	4,024,308.5215
			410,520.6560	4,024,349.3066
			411,162.2810	4,024,681.8047
			411,124.9690	4,024,778.6250
			411,222.3440	4,024,873.7930
			411,392.4060	4,024,792.1602
			411,607.8130	4,024,539.2461
			411,737.1560	4,023,825.0313
			411,867.2500	4,023,463.2520
			411,784.7500	4,023,306.3613
			411,582.4060	4,023,006.9551
			411,126.7810	4,022,795.5957
			410,994.2500	4,022,416.6367
			410,989.2810	4,022,251.9551
D20	0.21	SDCA	414,982.2190	4,021,997.8164
			415,176.7190	4,022,263.2852
			415,103.2190	4,022,320.4727
			415,581.2500	4,022,965.4922
			415,817.9380	4,022,790.5078
			416,056.9060	4,023,113.9902
			416,207.6250	4,023,003.7656
			415,998.3750	4,023,002.3203
			416,002.5310	4,022,602.1270
			415,526.5000	4,022,002.0215
			414,982.2190	4,021,997.8164
D21	0.39	SDCA	409,784.0630	4,021,446.5840
			409,836.5940	4,021,452.1992
			409,959.4380	4,021,467.4043
			409,986.8440	4,021,465.6152
			410,014.9380	4,021,469.1094
			410,109.0000	4,021,484.2637
			410,027.5940	4,021,036.2754
			409,998.0310	4,020,801.4766
			409,487.5940	4,020,143.3262
			409,409.3130	4,020,065.3262
			409,373.6560	4,020,006.3652
			409,360.9380	4,020,010.4766
			409,276.4690	4,020,023.0879
			409,280.3750	4,020,086.8984
			409,223.5310	4,020,182.5996
			409,166.6250	4,020,986.3672
			409,146.5630	4,021,804.0762
			409,176.1250	4,021,738.1621
			409,218.6880	4,021,681.9980
			409,255.5940	4,021,639.3984
			409,351.8750	4,021,549.4316
			409,464.4690	4,021,488.9551
			409,583.4380	4,021,449.5684
			409,710.2810	4,021,438.8574
			409,784.0630	4,021,446.5840
D22	0.03	SDCA	414,001.2500	4,020,257.5078
			414,001.4690	4,020,502.5137
			414,426.0000	4,020,500.8262
			414,464.0310	4,020,432.0313
			414,293.7190	4,020,338.7207
			414,135.9690	4,020,279.6660
			414,001.2500	4,020,257.5078
D23	0.29	SDCA	409,535.8130	4,018,994.6445
			409,534.9380	4,019,112.7676
			409,493.8750	4,019,250.0898
			409,428.5630	4,019,253.1973
			409,374.7500	4,019,259.9512
			409,200.4380	4,019,355.6914
			409,208.0310	4,019,472.8008
			409,435.7810	4,019,902.2852
			409,445.4060	4,019,983.3887
			409,576.6880	4,020,126.1250
			410,016.9060	4,020,278.1445
			410,025.1560	4,019,002.0527
			409,535.8130	4,018,994.6445

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S1	0.71	Study	410001.6560	4042464.2656
			409290.7190	4042500.2383
			408861.2190	4042688.4688
			408813.8750	4042910.9609
			408859.4380	4043071.8984
			408972.0940	4043285.6914
			409337.5310	4043461.0000
			410500.6560	4043924.3945
			410962.4690	4044000.3555
			411096.8440	4043852.2109
			411108.0630	4043672.6836
			410984.4380	4043481.0273
			410592.0940	4043294.9219
			410496.6250	4043013.0352
			410003.5310	4043008.3594
			410001.6560	4042464.2656
S2	0.27	Study	415072.8130	4041278.8984
			414928.6560	4041572.7422
			414740.2500	4042529.6992
			415304.2190	4042966.9609
			415642.3130	4042393.3203
			415234.1250	4041986.6914
			415072.8130	4041278.8984
S3	0.72	Study	421548.9690	4029833.7383
			421571.8750	4030077.3184
			421631.0310	4031208.7773
			421439.0940	4031498.2363
			421216.1560	4031761.8594
			421260.3750	4031837.4414
			421371.5310	4031985.9238
			421398.8440	4032023.9863
			421454.5000	4032099.1406
			421509.5310	4032174.3066
			421645.9690	4032358.6465
			421725.3130	4032466.9844
			421769.8440	4032526.2539
			421827.1560	4032498.3555
			421952.1880	4032442.4199
			421854.9690	4031871.4102
			422105.2500	4031749.0176
			422299.6560	4031762.5020
			422592.2190	4031994.7988
			422701.7500	4032367.5195
			422732.5630	4032243.8984
			422746.8130	4032159.0254
			422779.7500	4032064.7734
			422779.7190	4031946.8984
			422793.9060	4031814.8984
			422817.5310	4031682.9316
			422840.9690	4031565.0645
			422869.3130	4031447.2109
			422836.2810	4031338.7852
			422713.7500	4031206.8086
			422529.9380	4030985.2422
			422250.5940	4030779.7578
			422000.0310	4030499.9922
			422006.2810	4030500.0156
			421836.9380	4030271.0234
			421548.9690	4029833.7383
S4	0.15	Study	417410.5630	4023845.5176
			417398.8440	4023845.8750
			417387.4380	4023846.9883
			417377.4060	4023848.7207
			417367.8440	4023851.0527
			417358.9380	4023853.9434
			417350.9380	4023857.4238
			417343.0940	4023861.6250
			417335.2810	4023866.7793
			417327.4690	4023872.8066
			417319.6880	4023879.7500
			417310.5940	4023888.9688
			417301.9690	4023899.1680
			417293.6560	4023910.1230
			417286.2810	4023921.5137
			417281.1250	4023930.3848
			417276.9060	4023939.6543
			417273.1560	4023949.9414
			417269.7190	4023961.3281
			417266.5000	4023975.5664
			417263.6560	4023992.3125

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	417,257.5630	4,024,036.4043
			417,255.7810	4,024,053.0898
			417,254.3440	4,024,071.4844
			417,253.3440	4,024,112.0410
			417,253.6880	4,024,135.3887
			417,256.4690	4,024,211.2207
			417,258.9380	4,024,248.6602
			417,260.8130	4,024,266.7930
			417,266.0630	4,024,299.1426
			417,269.5630	4,024,313.8516
			417,274.6560	4,024,330.5859
			417,281.5940	4,024,349.5684
			417,289.7810	4,024,368.9414
			417,298.0630	4,024,386.4863
			417,306.2810	4,024,401.4785
			417,314.9690	4,024,415.0508
			417,324.0630	4,024,427.2441
			417,333.2500	4,024,437.8730
			417,341.8130	4,024,446.3809
			417,362.2810	4,024,463.6328
			417,374.6880	4,024,472.7871
			417,391.6880	4,024,484.4727
			417,422.5940	4,024,504.8984
			417,438.9380	4,024,515.1504
			417,454.8440	4,024,524.5742
			417,469.5000	4,024,532.6895
			417,483.8130	4,024,540.1250
			417,497.9690	4,024,546.9180
			417,525.0310	4,024,558.3184
			417,537.3130	4,024,562.7500
			417,550.9690	4,024,567.0371
			417,565.6880	4,024,571.1504
			417,595.7190	4,024,578.3379
			417,644.3750	4,024,588.4512
			417,671.1560	4,024,593.2676
			417,699.5630	4,024,597.4395
			417,729.9690	4,024,601.0371
			417,763.4060	4,024,604.2285
			417,801.4380	4,024,607.2109
			417,876.5000	4,024,612.3184
			417,885.9690	4,024,613.4160
			417,906.1880	4,024,617.6074
			417,954.9060	4,024,630.4629
			417,966.3750	4,024,632.8535
			417,976.4690	4,024,634.2813
			417,984.4060	4,024,634.8398
			417,991.7190	4,024,634.7266
			417,998.0940	4,024,633.9082
			418,004.0310	4,024,632.4531
			418,009.1560	4,024,630.2891
			418,013.8130	4,024,627.4102
			418,017.8750	4,024,623.8594
			418,021.4380	4,024,619.5566
			418,027.1560	4,024,609.7598
			418,032.4060	4,024,597.6895
			418,034.6560	4,024,589.4512
			418,035.8750	4,024,580.7773
			418,035.6560	4,024,570.7617
			418,034.0630	4,024,559.9766
			418,031.0630	4,024,548.3418
			418,026.3750	4,024,535.4473
			418,020.4690	4,024,521.3984
			418,000.5310	4,024,478.6465
			417,984.5630	4,024,435.9668
			417,970.9060	4,024,402.7227
			417,957.8130	4,024,373.8125
			417,943.3130	4,024,343.8242
			417,931.2500	4,024,320.3027
			417,918.0940	4,024,295.7734
			417,880.1250	4,024,228.6719
			417,859.5000	4,024,190.0117
			417,854.1250	4,024,181.0176
			417,848.9380	4,024,173.2773
			417,843.6250	4,024,166.4160
			417,838.3130	4,024,160.3535
			417,832.0940	4,024,154.4258
			417,825.1250	4,024,149.1992
			417,816.9690	4,024,144.4160
			417,807.5630	4,024,140.0762
			417,799.1250	4,024,136.8242
			417,789.4690	4,024,133.5957
			417,744.3750	4,024,120.6641
			417,733.3130	4,024,116.6641

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	417723.6250	4024112.4082
			417716.8440	4024108.7773
			417710.6880	4024104.8281
			417693.1880	4024092.0859
			417683.1250	4024084.1797
			417674.4380	4024076.5137
			417667.2810	4024069.1191
			417661.4690	4024061.8086
			417657.0630	4024054.5488
			417654.5000	4024048.2773
			417652.5000	4024040.8516
			417647.9060	4024009.5918
			417646.3750	4024002.8047
			417644.5940	4023996.9746
			417640.7500	4023988.9395
			417636.0310	4023980.8086
			417630.3750	4023972.9629
			417623.6560	4023965.2930
			417617.2810	4023958.7949
			417609.9690	4023952.3184
			417601.7810	4023945.7832
			417592.6250	4023939.0781
			417575.3440	4023927.6641
			417540.5940	4023906.3262
			417526.8440	4023897.4316
			417515.0940	4023889.3320
			417487.6880	4023868.7949
			417472.0940	4023858.9844
			417463.6560	4023854.8926
			417455.1880	4023851.9063
			417444.7810	4023849.1504
			417433.6250	4023847.1348
			417422.1560	4023845.9258
			417410.5630	4023845.5176
C1	0.21	Channel	411145.9380	4022140.5117
			410989.3130	4022252.0020
			410994.2500	4022416.6367
			411126.7810	4022795.5957
			411582.4060	4023006.9551
			411784.7500	4023306.3613
			411867.2500	4023463.2520
			411737.1560	4023825.0313
			411915.1560	4023883.7793
			411983.4060	4023714.6152
			412117.6560	4023538.0977
			411792.0630	4023094.1152
			411782.4060	4023076.2949
			411748.7190	4022994.3965
			411643.6250	4022726.7266
			411641.6880	4022435.3887
			411419.2190	4022347.2383
			411284.5000	4022318.9453
			411145.9380	4022140.5117
C2	0.30	Channel	409201.5000	4019370.5664
			409173.3130	4019532.8418
			409115.7190	4019657.4395
			409058.5940	4019813.5703
			409055.4380	4019859.0117
			409098.6560	4019944.7520
			409192.5940	4020079.2344
			409223.5310	4020182.5996
			409280.3750	4020086.8984
			409276.4690	4020023.0879
			409352.7190	4020011.6758
			409373.6560	4020006.3652
			409409.3130	4020065.3262
			409487.8750	4020143.3594
			409998.1880	4020801.4746
			410027.7500	4021036.2715
			410109.2810	4021484.2578
			410174.2810	4021494.7188
			410242.0940	4021502.6836
			410335.4060	4021518.5000
			410438.7190	4021533.8438
			410529.8750	4021556.1816
			410712.0940	4021583.1074
			410602.7500	4021411.3418
			410686.8440	4021328.9805
			410488.7190	4020946.7344
			410264.6250	4020620.0820
			410015.6880	4020454.4902

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
C2 continued	0.30	Channel	410,016.9060	4,020,278.1445
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates

Total SDCA	12.77
Total Study	1.85
Total Channel	0.50

EXHIBIT 3 -- DUST CONTROL MEASURE MAP

Shown are dust control measures assigned to areas within the SDCA.

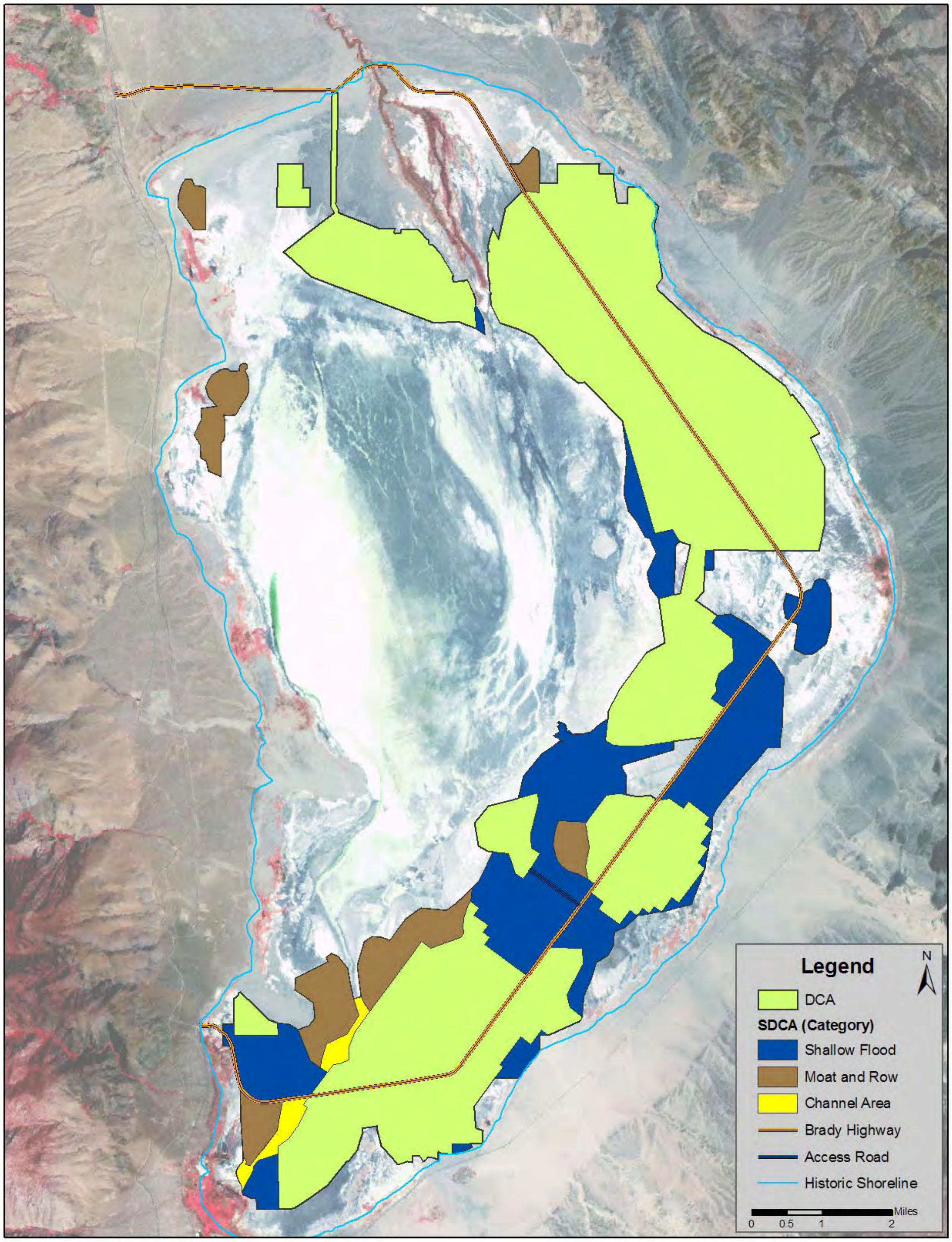

EXHIBIT 4 -- DUST CONTROL MEASURE DESCRIPTIONS

Brief descriptions of dust control measures for use on Owens Lake are given below. More detailed descriptions of the three BACM approved dust control methods (shallow flooding, managed vegetation and gravel) are provided in the 2003 SIP. Modifications to these measures as provided in the Settlement Agreement (Agreement) are noted. All references are to sections of the Agreement; section numbers of the Agreement are contained in square brackets.

Shallow Flooding

The "shallow flooding" (SF) dust control measure involves wetting emissive lake bed surfaces to reduce dust emissions. Performance specifications and a detailed description of the SF measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Otherwise, water shall be applied in amounts sufficient to achieve the required wetness cover as specified in Sections 3 through 5, 25, 26, and 27, or as modified under the provisions of Sections 5, 14, 15, 18, and 29. Satellite imagery, aerial photography or other methods approved by the APCO under the provisions of Section 29 are used to measure wetness cover for compliance.

Managed Vegetation

The "managed vegetation" (MV) dust control measure involves establishing a plant cover on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications and a detailed description of the MV control measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Vegetative cover on the MV site present on the lake bed on January 1, 2007 shall be as specified in Section 6. The performance specification of MV may be modified under the provisions of Section 29. Point-frame measurements satellite imagery or other methods approved by the APCO under the provisions of Section 29 are used to measure plant cover for compliance.

Gravel Cover

The "gravel cover" (GC) dust control measure involves placing a layer of gravel on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications are described in the 2003 SIP.

Moat and Row

The general form of the "moat and row" (MR) measure is an array (see Figure E4-1) of earthen berms (rows) about 5 feet high with sloping sides, flanked on either side by ditches (moats) about 4 feet deep (see Figure E4-2). Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual MR elements are constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the MR array is intended to control emissions under the full range of principal wind directions (see Figure E4-1). Initial pre-test

modeling indicates that MR elements' spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM_{10} control effectiveness required on the MR area.

The PM_{10} control effectiveness of MR may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, sand fences, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding moats and rows to the array, which reduces the distance between rows.

The final form of MR will largely be determined from the results of testing on the lake bed as provided in Sections 7 and 8. Final design is subject to test results, required PM_{10} control effectiveness, environmental documentation and permitting, engineering, and monitoring considerations.

In areas where MR is used as a control measure, the City shall implement the measure in a manner consistent with the Agreement, particularly Sections 7 and 8, or as modified by actions pursuant to Sections 18 through 24.

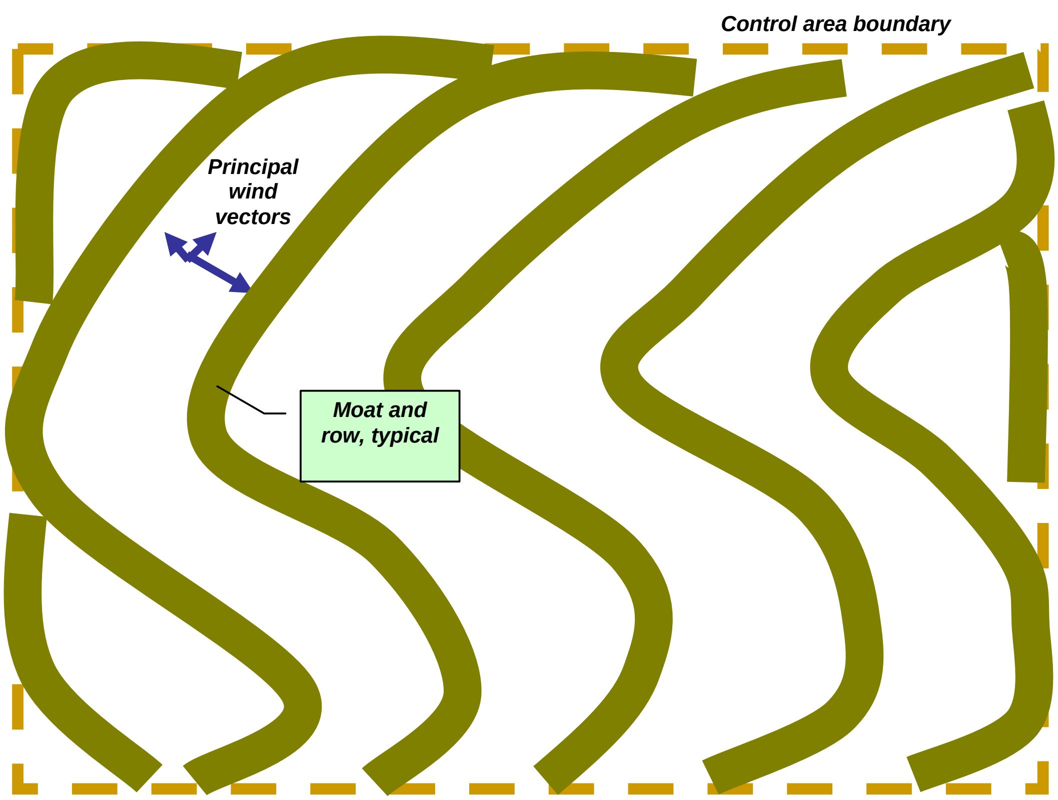

Figure E4-1. Moat and Row Array Plan View (schematic).

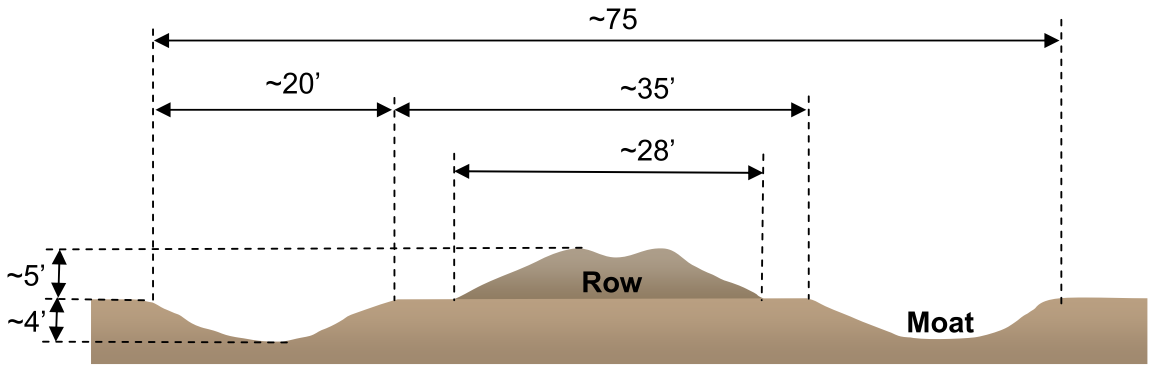

Figure E4-2. Profile of Moat and Row with Approximate Dimensions (schematic).

EXHIBIT 5 -- TDCA MINIMUM DUST CONTROL EFFICIENCY MAP

Shown are MDCEs calculated according to Sections 3 and 4 of the agreement.

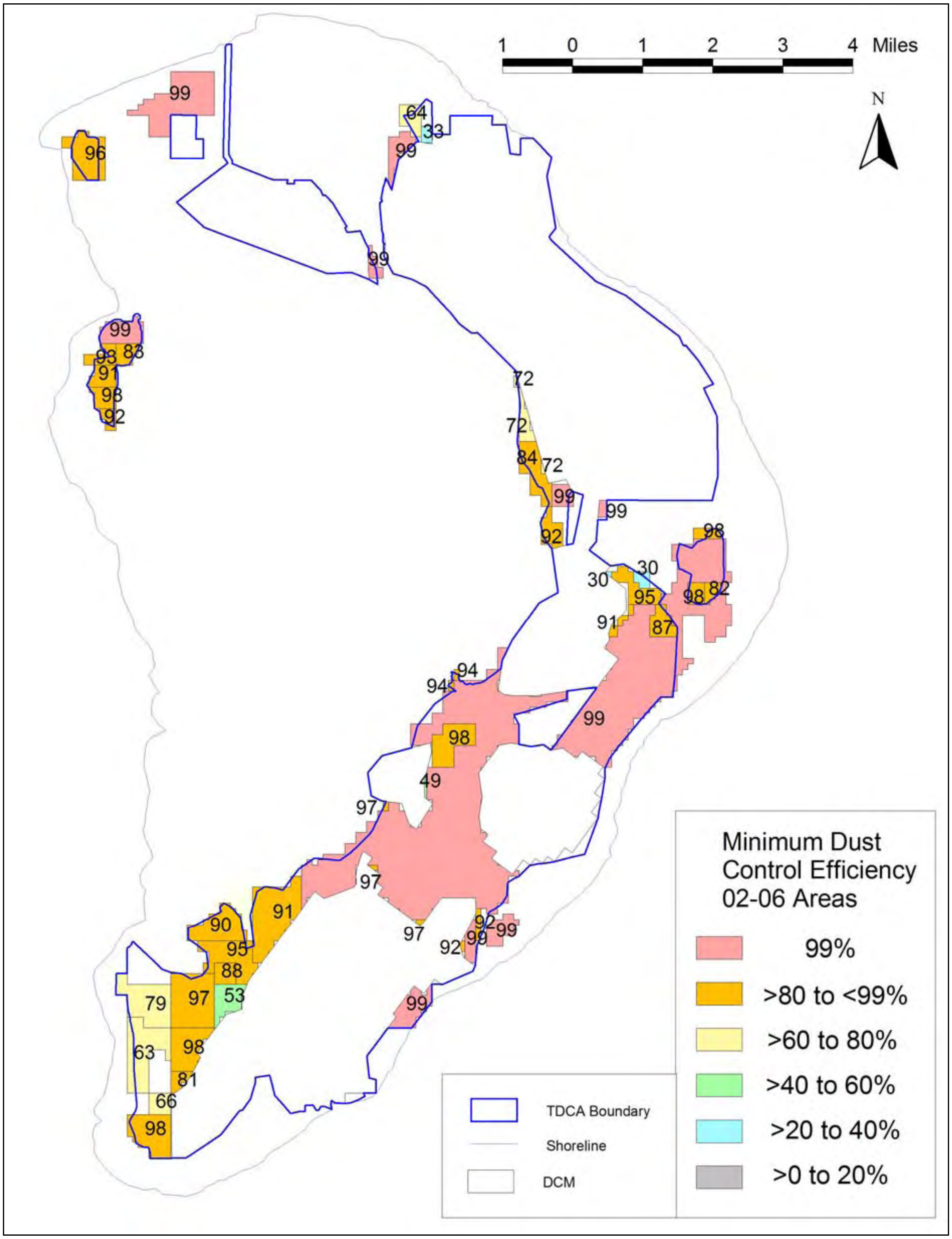

EXHIBIT 6 -- MDCE SELECTION PROCESS

This exhibit summarizes the purpose of the MDCE Selection Process Spreadsheet. A copy of the Process Spreadsheet, which contains a description of the spreadsheet structure and operation, may be downloaded from the District's website at http://www.gbuapcd.org/.

The District developed the Dust ID Model as a tool for identifying dust control areas on the lake bed. The Dust ID Model computes the amount of dust being generated from each source area on the lake bed, but the results cannot be used without additional processing to identify the acceptable combinations of dust control required on each source area (that is, each area's minimum dust control efficiency or "MDCE") to achieve the federal 24-hour PM_{10} standard along the shoreline. There are many possible combinations of MDCEs that could produce the acceptable result of achieving the standard at the shoreline. For example, 50 percent control on hypothetical Area 1 and 99 percent control on Area 2 may produce the same modeled shoreline concentration as 99 percent control on Area 1 and 50 percent control on Area 2. However, the first combination might be more practical and less costly than the second, and for that reason it is important to have a process that can quickly and efficiently identify acceptable combinations. In all cases, the outcome of this process is some combination of area-by-area dust control efficiencies that produces a modeled attainment of the federal PM_{10} standard everywhere along the shoreline.

The process for selecting the acceptable combinations of dust control levels has been, heretofore, a manual process. The MDCE Selection Process Spreadsheet (Process Spreadsheet) was developed to more quickly and efficiently identify combinations of dust controls required to produce compliance with the federal 24-hour PM_{10} standard along the shoreline. The worksheet is set up so that MDCE calculations are automatic, yet it still allows manual adjustments to be made.

EXHIBIT 7 -- SHALLOW FLOOD CONTROL EFFICIENCY CURVE

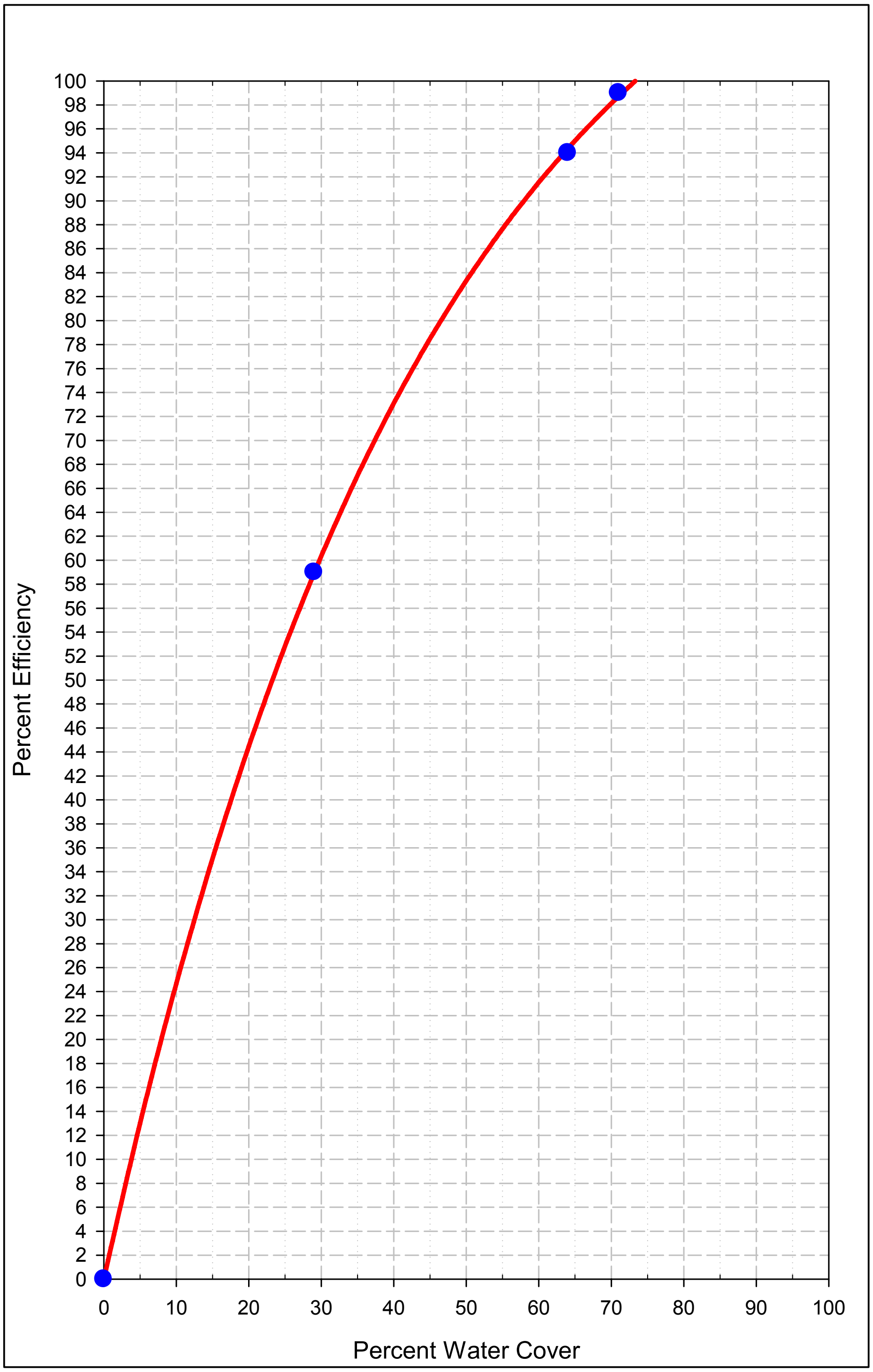

EXHIBIT 8 -- MOAT AND ROW DEMONSTRATION PROJECT LOCATION MAP

Two proposed moat and row demonstration project locations

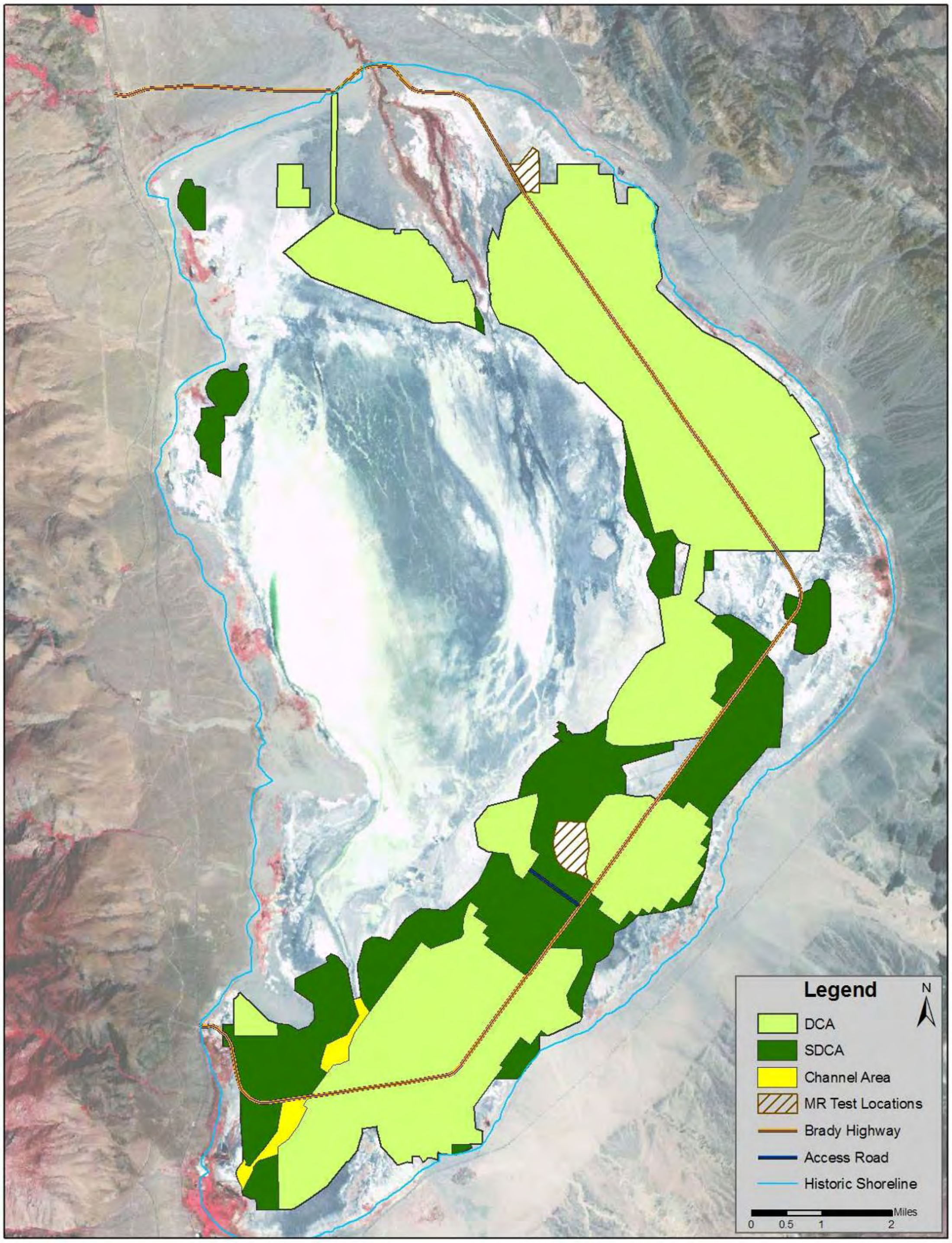

EXHIBIT 9 -- STUDY AREA MAP

Four proposed study area locations

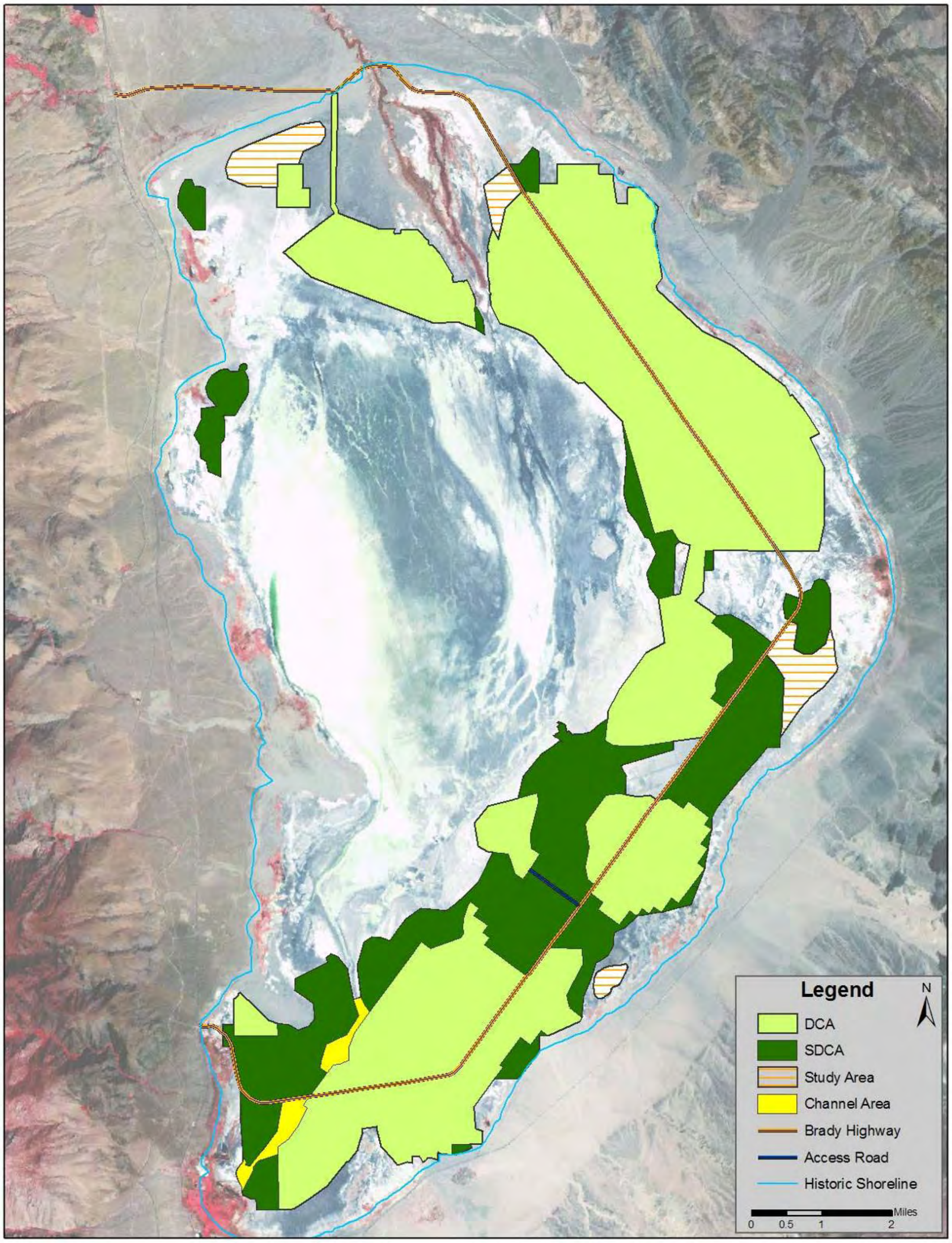

EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

Issue	Resolution	Duration	Units
Moat and Row			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
Managed Vegetation			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Gravel Patches			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
Shallow Flood			
Emissions from dry areas (insufficient uniformity of wetting)	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
Other features			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years)
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years)
New area shallow flood DCM[a]	2.9
New area managed vegetation DCM[a]	6.1
New area gravel cover DCM[a]	2.2
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
[a]Assumes that total new area <2 square miles per year	

EXHIBIT 13. DEFINITIONS

A. “Background PM_{10} concentration” shall mean the concentration of PM_{10} caused by sources other than from wind blown dust emanating from the Owens Lake bed. For the purpose of modeling air quality impacts, the background concentration is assumed to be 20 $\mu g/m^3$ (micrograms per cubic meter) during every hour at all receptor locations. The monitored and modeled PM_{10} emissions from the Keeler Dunes, which are located off the lake bed are treated as a separate dust source area and are not included in the background concentration.

B. “Best Available Control Measures” or “BACM” shall have the same definition as in the federal Clean Air Act. Approved BACM in the 2003 SIP was associated with PM_{10} emission reductions of at least 99 percent and includes managed vegetation, shallow flood, and gravel cover.

C. “Contingency measures” shall mean dust control measures or modifications to the dust control measures that can be implemented to mitigate dust source areas that cause or contribute to an exceedance of the federal standard at the historic shoreline in the event that a previously approved control strategy was found to be insufficient.

D. “Control Area” shall mean an area on the lake bed for which dust control is required.

E. “Control efficiency” shall mean the relative reduction or percent reduction in PM_{10} emissions resulting from the implementation of a control measure compared to the uncontrolled emissions.

F. “Control measures” shall mean measures effective in reducing the PM_{10} emissions from the lakebed surface over which they are implemented.

G. “Dust control measure” or “DCM” shall mean measures designed to suppress sand motion and reduce dust emissions from the Owens Lake bed.

H. “Dust ID Model” shall mean a computer-based air quality modeling approach developed as part of the 2003 SIP to identify emissive areas on the Owens Lake bed and to estimate the resulting PM_{10} concentrations at the shoreline. See also “Dust ID Program.”

I. “Dust ID Program” shall mean a long-term monitoring and modeling program that is used to identify dust source areas at Owens Lake that cause or contribute to exceedances and violations of the federal PM_{10} standard. The current protocol for conducting the Dust ID Program is included in the 2003 SIP (Exhibit 2 – Attachment 4). See also “Dust ID Model.”

J. “Emission rate” shall mean the rate (expressed as mass per unit area per unit time) at which an air constituent (PM_{10}, for example) is transported away from the surface of the lake bed.

K. “Exceedance of the federal standard” or “exceedance” shall mean any single-day PM_{10} concentration that is monitored or modeled to be above 150 $\mu g/m^3$ (24-hour average from midnight to midnight) at any location at or above the historic shoreline.

L. “Historic shoreline” or “shoreline” shall mean the elevation contour line of 3,600 feet above mean sea level at Owens Lake, California.

M. “Lake bed” or “Owens Lake bed” or “playa” shall mean the exposed surface within and below the historic shoreline.

N. “Managed Vegetation” is a Dust Control Measure consisting of lakebed surfaces planted with protective vegetation.

O. “May not lawfully be included in the SIP” shall mean that inclusion of the provision in question in the revisions to the 2003 SIP has been determined by binding judicial order to be unlawful.

P. “MCDE-BACM” shall mean Dust Control Measures that achieve Minimum Dust Control Efficiency and are found to be appropriate for the area of application.

Q. “Minimum Dust Control Efficiency” or “MDCE” shall mean the lowest dust control efficiency, as determined by the Dust ID model, in the Supplemental Dust Control Area necessary to meet the federal standard at the historic shoreline.

R. “Moat and Row” shall mean a Dust Control Measure consisting of arrays of sand breaks that arrest sand motion.

S. “PM_{10}” or “particulate matter” shall mean atmospheric particulate matter less than 10 micrometers in nominal aerodynamic diameter.

T. “PM_{10} monitor” shall mean an instrument used to detect the concentrations of PM_{10} in the air.

U. “Sand flux monitor” shall mean a device used to measure the amount and/or rate of moving or saltating sand and sand-sized particles caused by wind erosion.

V. “Shallow Flood” is a Dust Control Measure consisting of lakebed areas wetted to a specified proportion of surface coverage.

W. “2003 SIP” or “2003 Owens Valley PM_{10} State Implementation Plan” shall mean the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision – Adopted November 13, 2003.

X. “Supplemental Control Requirements” or “SCR” shall mean Dust Control Measures required by the District on areas outside of the DCA that cause or contribute to an exceedance of the federal PM_{10} standard at the historic shoreline of Owens Lake.

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Board Order 080128-01
Attachment B

2008 Owens Valley Planning Area
Supplemental Control Requirements Determination Procedure

BACKGROUND

The State Implementation Plan (SIP) adopted by the Great Basin Unified Air Pollution Control District (District) in 2003 required the City of Los Angeles (City) to install and operate PM_{10} controls on a total of 29.8 square miles of the dried Owens Lake bed by the end of 2006. The 2003 SIP also contained a provision and procedures for an annual review of air quality monitoring data by the District's Air Pollution Control Officer (APCO) in order to determine if controls were needed on additional areas beyond the 29.8 square miles in order for the Owens Valley Planning Area to attain or maintain the federal 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS). If additional controls were needed, the 2003 SIP provided for the APCO to require the City to implement the necessary controls. This annual review and possible requirement for additional controls is known as the Supplemental Control Requirements (SCR) determination. The 2003 SIP required that SCR determinations use data collected starting July 1, 2002.

In December 2005, after analyzing data collected from July 2002 through June 2004, the District's APCO made the first SCR determination under the provisions of the 2003 SIP. The City objected to the APCO's analysis and submitted an alternative analysis of the data. After reviewing the City's analysis, the APCO revised the SCR determination in April 2006. The City also objected to the revised determination and filed a lawsuit against the District in May 2006. In June 2006 the City and the District entered into settlement negotiations in an attempt to resolve their disputes.

In December 2006 a final Settlement Agreement was approved by the District and the City. This agreement is Attachment A to Board Order 080128-01. Among other issues, the Settlement Agreement provides for modifications to be made to the 2003 SIP's SCR determination procedure. These modifications are incorporated into this revised 2008 SCR determination procedure.

CONDITIONS

The 2008 Owens Lake Dust Source Identification Program Protocol (Protocol) (Attachment C) contains the procedures to collect, screen, analyze and model the data used by the District's APCO to determine if exceedances of the 24-hour PM_{10} NAAQS have occurred and additional Supplemental Controls are necessary on the Owens Lake bed. The following actions may be taken by the APCO and will not be considered a change to the Protocol:

- Add, remove or move PM_{10} monitors and meteorological stations
- Replace TEOMs with any other USEPA-approved Reference or Equivalent Method monitors that collect hourly concentration data
- Replace Sensits with any other sand flux monitor (SFM) that collects hourly data
- Replace Cox Sand Catchers with any other SFM

- Add, remove or move SFMs as long as the maximum grid cell size for modeling remains at one square kilometer
- Calculate “from-the-lake” wind directions for new PM_{10} monitor sites
- Determine default K-factors for new source areas

The Protocol and these Supplemental Control Requirements (SCR) specify many assumptions and decision trees to be followed that may need to be changed in the future. The following changes to the Protocol and the SCR may be made by written agreement of the APCO and the General Manager of the City of Los Angeles (City) Department of Water and Power:

- The background value of 20 $\mu g/m^3$ may be changed to another value or a procedure may be established to calculate the background from upwind/downwind lake bed monitors
- The default K-factors may be updated
- The default seasonal cut points may be updated
- The CalPUFF modeling system may be changed to another USEPA guideline model
- The procedure for determining the sand flux from a Dust Control Measure (DCM) area may be updated
- The K-factor screening criteria may be updated
- From-the-lake wind directions in Attachment B, Table 1 may be changed to avoid including off-lake sources
- Non-reference or non-equivalent method special purpose PM_{10} monitors may be added
- Procedures for determining source area boundaries may be updated
- Methods for directly measuring source area emission rates may be implemented

DEFINITIONS

A ***shoreline or near-shore PM_{10} monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM_{10} Monitor located approximately on the 3600-foot elevation (historic shoreline) contour, or within the Owens Valley Non-Attainment Area above the 3600-foot elevation. The existing shoreline or near-shore PM_{10} monitors are at Keeler, Flat Rock, Shell Cut, Dirty Socks, Olancha, Bill Stanley and Lone Pine (see Attachment B, Map 1).

A ***special purpose PM_{10} monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM_{10} monitor installed upwind of or near potential dust source areas on the lake bed below the 3600-foot elevation. These lake bed PM_{10} monitors will be used to monitor new dust sources areas to generate new K-factors and to evaluate model predictions at the PM_{10} sites. They shall not be used to monitor compliance with the NAAQS and the data will not be submitted to USEPA’s Aerometric Information and Retrieval System (AIRS).

An ***exceedance*** is a midnight to midnight Pacific Standard Time 24-hour average PM_{10} concentration greater than 150 $\mu g/m^3$ measured by a shoreline or near-shore PM_{10} monitor.

From-the-lake wind directions are determined by extending two straight lines from the PM_{10} monitor site to the points on the 3600-foot contour of the Owens Lake bed that maximize the angle in the direction of the lake bed between the two straight lines. From-the-lake and non-lake wind directions for the existing PM_{10} monitor sites are shown in Attachment B, Table 1.

Physical evidence of a source area boundary consists of Global Positioning System (GPS) data, visual observations, photographic observations, video observations, or any other method described for this purpose in the Dust ID Protocol.

BACM are Best Available Control Measures/Most Stringent Measures (MSM) defined as the dust controls determined to be BACM/MSM for Owens Lake in Paragraphs 15, 16 and 17 of Board Order 080128-01. If, in the future, the District changes or deletes existing BACM or adds new BACM, then the dust controls are those as revised by the latest District action.

Implements BACM control measures means BACM are constructed and meeting the performance standards outlined Paragraphs 15, 16 and 17 of Board Order 080128-01.

Extreme violators are areas currently required to implement BACM, but BACM are found to be insufficient to adequately control emissions.

Environmental analysis document complete means that a project level environmental document has been certified covering the location and the BACM/MSM selected for implementation by the City.

GENERAL SCR DETERMINATION PROCEDURE

1. If the City is in compliance with Paragraphs 1 and 3 of Board Order 08128-01 regarding the amount, timing and operation of existing and future dust controls, the APCO will not issue additional written SCR determinations until after May 1, 2010 and will not use data collected prior to April 1, 2010 for new determinations, except for Study Areas as provided in Paragraph 2, below. This will allow the City time to complete construction and implementation of the additional PM_{10} controls within the 2008 Total Dust Control Area.

2. After May 1, 2010, the APCO will recommence written SCR determinations using the latest SCR procedure. Recommenced determinations will use data collected only after April 1, 2010, except in those areas delineated as Study Areas. SCR determinations for Study Areas shall use data collected after July 1, 2006. The APCO shall make SCR determinations at least once in every calendar year. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure construction activities.

3. If, pursuant to Paragraph 2, herein, the APCO determines that a monitored or modeled exceedance of the federal 24-hour PM_{10} NAAQS caused by emissions from the lake bed has occurred at or above the historic shoreline:

    A. The APCO, based on all available information, including, visual observation, physical evidence, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.

        (i) If the APCO identifies the need for additional controls and/or increased MDCE on existing controls, the APCO shall issue a written SCR determination to the City.

(ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination.

(iii) If the City submits an alternative analysis, the APCO shall consider the City's analysis and has full and sole discretion to withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

(iv) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the outcome of the Dispute Resolution Process.

(v) In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316. The CARB will act within 90 days on the City's appeal.

(vi) The implementation of additional control measures under the SCR determination process will be considered contingency measures under Section 172(c)(9) of the federal Clean Air Act and will be implemented automatically upon final action of the SCR determination.

B. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

C. If the City proposes in their Remedial Action Plan to decrease the control efficiency in any previously controlled dust source area, the City must demonstrate that the proposed strategy will control dust sources to the extent that there are no modeled exceedances at the shoreline based on:

(i) new dust event(s) that caused or contributed to a modeled or monitored exceedance,

(ii) dust events that took place from July 2002 through June 2006 based on the results of the MDCE Selection Process Spreadsheet as set forth in the 2006 Settlement Agreement, and

(iii) that previously determined control efficiency levels are maintained in (a) all areas that are required to have 99% control efficiency or higher in the 2003 SIP Dust Control Area and (b) new dust source areas that are not included in the MDCE Selection Process Spreadsheet.

D. The District may, as appropriate, also issue Notices of Violation.

4. In the event:

A. The APCO has made a written determination pursuant to Paragraph 3 that an exceedance of the federal standard, occurring after April 1, 2010, resulted from a Control Area or portion of a Control Area treated with the Moat & Row PM_{10} control measure; and

B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Paragraph 6 below; and

C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (i.e., an exceedance occurred after the City's initial attempt to remediate that area under Paragraph 6);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat & Row to MDCE-BACM or BACM as described in Paragraphs 15, 16 and 17 of Board Order 080128-01, to address the exceedance described in Paragraph 4.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Paragraph 9.

5. If the APCO determines that Moat & Row constitutes BACM or MDCE-BACM as provided for in Attachment D of Board Order 080128-01, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area," then upon issuance of such written determination, the provisions of Paragraph 4 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Paragraph 5.

6. A Remedial Action Plan prepared by the City pursuant to Paragraph 3.B will contain a description of:

A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:

(i) Maintenance of facilities (*e.g.*, berms, moats and rows);

(ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);

(iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, surface-protecting elements) of Moat & Row areas;

(iv) Transition of Moat & Row areas to BACM, or MDCE-BACM.

B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.

C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

7. The Schedule of Contingency Measures incorporated as part of this Procedure as Attachment B, Exhibit 1 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Paragraph 6, and the timing required for their implementation.

8. Before any full-scale Moat & Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat & Row area consistent with Paragraph 4. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat & Row to another DCM is needed, or where such transition is required pursuant to Paragraph 4.

9. Areas to be transitioned from Moat & Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat & Row Transition Schedule incorporated as Attachment B, Exhibit 2. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. In all cases, the time allowed for implementation of control measures shall not include any time between the City's appeal to the California Air Resources Board under the provisions of Health and Safety Code Section 42316 and resolution of such an appeal.

DETAILED SCR DETERMINATION PROCEDURE

Exceedances of the federal 24-hour PM_{10} National Ambient Air Quality Standard of 150 µg/m³ at or above the historic shoreline of Owens Lake (elevation 3600 feet above mean sea level) can either be measured directly via a PM_{10} monitor or they can be modeled using the procedures set forth in the latest Owens Lake Dust Source Identification Program Protocol. Set forth below are the two procedures to be used by the APCO in making SCR determinations: the first uses directly monitored exceedances and the second uses modeled exceedances.

A. MONITORED EXCEEDANCES

A.1 – Do lake bed source areas cause or contribute to a monitored 24-hour average PM_{10} concentration greater than 150 µg/m³ at an historic shoreline PM_{10} monitor or at a near-shore PM_{10} monitor?

Any event that causes a monitored 24-hour average PM_{10} concentration greater than 150 µg/m³ at a shoreline or near-shore PM_{10} monitor will be evaluated to determine if lake bed dust source areas caused or contributed to the exceedance. The following steps will be used to screen hourly PM_{10} concentrations to determine if a lake bed source area caused or contributed to a monitored exceedance:

1) For hourly average from-the-lake wind directions, use the recorded hourly PM_{10} concentration.
2) For hourly average non-lake wind directions or missing data, replace the recorded hourly PM_{10} concentration with the background concentration of 20 µg/m^3.

3) Average the adjusted hourly concentrations from steps 1 and 2 for the 24-hour period from midnight to midnight, Pacific Standard Time.

If the 24-hour average of the adjusted hourly PM_{10} concentrations exceeds 150 µg/m³ at the monitor site, go to A.2. If not, go to B.1.

<u>A.2 – Is there physical evidence of lake bed emissions and/or air quality modeling sufficient to define boundaries for the area to be controlled?</u>

<u>Source Delineation.</u>
If possible, the boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol (Attachment C).

If neither the GPS boundary nor other physical evidence, as described above, is available, the default area size will be one square kilometer centered on the sand flux monitor (SFM), or one grid cell if the SFMs are in a closer array.

If there is physical evidence, as described above, to define the boundaries for the area to be controlled, and no K-factor for that area or no sand catch data above one gram for the sampling period from a sand flux sampler located within a 30 degree upwind cone centered on the wind direction of the defined source, then modeling cannot be performed. Go to A.3.

<u>Modeling.</u>
If sand flux data is available for the exceedance identified in A.1, the District will model the event. Modeling will be performed following the latest Dust ID Modeling Protocol using the source area determined above.

The order of priority for applying K-factors in the model will be:

1) When available, the District will use event specific storm-average K-factors to model dust events at the PM_{10} monitor if there are three or more hours of screened hourly K-factors for a 48-hour period. If not,

2) The District will use the most recent temporal and spatial 75-percentile hourly K-factors to model events, if there are nine or more screened hourly K-factors for a period and they are determined by the methods described in the most current Dust ID Protocol. If not,

3) The District will use the default K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area.

Only those on-lake and off-lake dust sources with sand flux data will be included in the model. All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review.

The modeling results will be used to prioritize multiple upwind source areas for control, or to determine the fraction of a single upwind source area that needs to be controlled.

Go to A.3

If neither physical evidence nor model results are available, go to A.5.

A.3 – District directs City to implement dust controls.

Source areas in A.2 that cause or contribute to an exceedance may be new source areas, or may be emissions from areas with existing dust controls. The APCO will determine, in writing, that conditions specified in Section A.1 were met for a specified area determined by A.2. For emissions from areas with existing dust controls, the City will have the choice of increasing the controls in the existing dust control areas or controlling other contributing sources that will result in lowering the monitored impact below the 150 $\mu g/m^3$ exceedance threshold, if such areas exist. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to A.4.

A.4 – City implements dust controls.

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

A.5– District collects additional physical evidence and installs sand flux monitors in suspected areas.

If there is insufficient physical evidence and no sand flux monitor data to determine the emissive area on the lake bed that caused the monitored or modeled exceedance, the District will install Sensits and Cox Sand Catchers (CSC) sand flux monitors in the suspected area in a sampling array with a maximum spacing of one kilometer. The District will also continue to collect other physical evidence.

B. MODELED EXCEEDANCES

B.1 – Does the Dust ID model predict a 24-hour shoreline concentration greater than 150 µg/m³, including background?

Dispersion Modeling Analysis.
At least once a year, the District will examine the Dust ID information and dispersion model to determine if there have been any modeled shoreline exceedances since the period included in the last model run. Modeling will be performed following the 2008 Owens Lake Dust Source Identification Program (Dust ID) Protocol (Attachment C).

K-factors.
New K-factors may be generated from PM_{10} concentrations measured at any shoreline or near-shore PM_{10} monitor using the methods described in the Dust ID Protocol. The order of priority for applying K-factors in the model will be:

1) The current temporal and spatial 75th percentile hourly K-factors. The District will use the current modeling period temporal and spatial 75th percentile hourly K-factors to model events, if there are nine or more hourly K-factors for an agreed upon seasonal period and area determined by the methods described in the most current Dust ID Protocol.

2) If there is no agreement on seasonal cut-points, the default cut points, as shown in Attachment B, Table 2, will be used with number 1, above.

3) If there is no agreement on area, the default areas, as shown in Attachment B, Map 1, will be used with number 1, above.

4) If there are fewer than nine hourly K-factors for any area and period, go to 5), below.

5) Default K-factors from Attachment B, Table 2. The District will use the K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area. If the new dust source area is not within a K-factor area shown in Attachment B, Table 2, the APCO shall determine the default K-factor for the new source area based on the default K-factors of areas with similar soil characteristics.

Source Area Size, Location and Sand Flux.
The boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol.

The details of how to delineate source area boundaries are contained in the Dust ID Protocol.

If neither the GPS boundary nor the other physical evidence as described above is available, the default area size will be one square kilometer centered on the SFM, or one grid cell if the SFM are in a closer array.

All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review. If the modeling shows that lake bed source areas have caused or contributed to any modeled shoreline PM_{10} impact greater than 150 µg/m³ for a 24-hour average, go to B.7. If not, go to B.2.

B.2 – Is the modeled concentration less than 100 µg/m³?

This refers to the modeled concentration calculated in B.1 and includes the background PM_{10} level of 20 µg/m³. If yes, go to B.6. If no, go to B.3.

B.3 – District directs the City to commence environmental impact analysis, design and permitting.

The APCO will direct the City in writing to choose the BACM it wishes to implement in the area identified in B.1.

The City will develop a scope of work for the identified potential source areas, including: (1) a summary of the sites pertinent conditions, features, and location, (2) appropriate control alternatives and approach, including a conceptual layout of dust control and integration into the TDCA (roads, water supply, drainage, and power), (3) standard and site-specific permitting considerations, (4) anticipated environmental documentation considerations and approach, and (5) an approximate timetable for implementation beginning at an undefined start date that might coincide with a future SCR determination . City shall complete these steps within 180 days of the date of the written direction from the APCO. Go to B.4.

B.4 – District deploys reference and/or non-reference method Special Purpose PM_{10} monitor(s) to confirm model (if not already deployed).

The District will deploy reference and/or non-reference method Special Purpose PM_{10} monitor(s) on the lake bed upwind and downwind of the identified emissive area, if there are no existing monitors at locations that can be used in Section B.5 to refine the model predictions. Monitors will be sited between 250 and 5000 meters outside of any GPS'd or observed source area boundaries. These PM_{10} monitoring sites may be removed after the model confirmation procedure described in B.5. Shoreline and near-shore PM_{10} monitors that are sited to confirm the model may be used for NAAQS compliance, if an exceedance is monitored. Go to B.5.

B.5 – Is the refined model prediction greater than 150 $\mu g/m^3$?

For each event measured under Section B.4 that results in a 24-hour monitored concentration of greater than 100 $\mu g/m^3$, the event-specific K-factor (defined in the Dust ID Protocol) will be used to model the concentration at the shoreline receptors. If the event-specific K-factor was derived for the same year and season as the original event modeled in B.1, the Section B.1 event will be remodeled using the new K-factor. If either that remodeled concentration for the Section B.1 event, or the new modeled concentration for the on-lake monitored event, is greater than 150 $\mu g/m^3$ at a shoreline receptor, go to B.7. If not, go to B.6.

The District will make a determination if any currently modeled event within the same season and K-factor area using the appropriate K-factors as determined by this procedure causes a shoreline receptor to exceed 150 $\mu g/m^3$. If yes, go to B.7.

B.6 – No action required.

No action is required of the City at this time. Data collected during this period can be used in conjunction with data collected at a later time to define emissive areas on the lake bed according to this protocol and to develop K-factors for emissive areas.

B.7 – District directs the City to implement dust controls.

Source areas in B.1 and B.5 that cause or contribute to an exceedance may be new source areas or existing source areas with less than the required level of control (MDCE not high enough to prevent exceedances).

The APCO will determine, in writing, that conditions specified in Sections B.1 or B.5 were met for the specified area. Within 30 days of that determination by the APCO, the City will be notified of that determination in writing. If possible, the City will have the choice of increasing

the control efficiencies on existing dust control areas and/or controlling other contributing sources that will result in lowering the modeled impact below the 150 $\mu g/m^3$ exceedance threshold. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6, above, to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to B.8.

B.8 – City implements BACM.

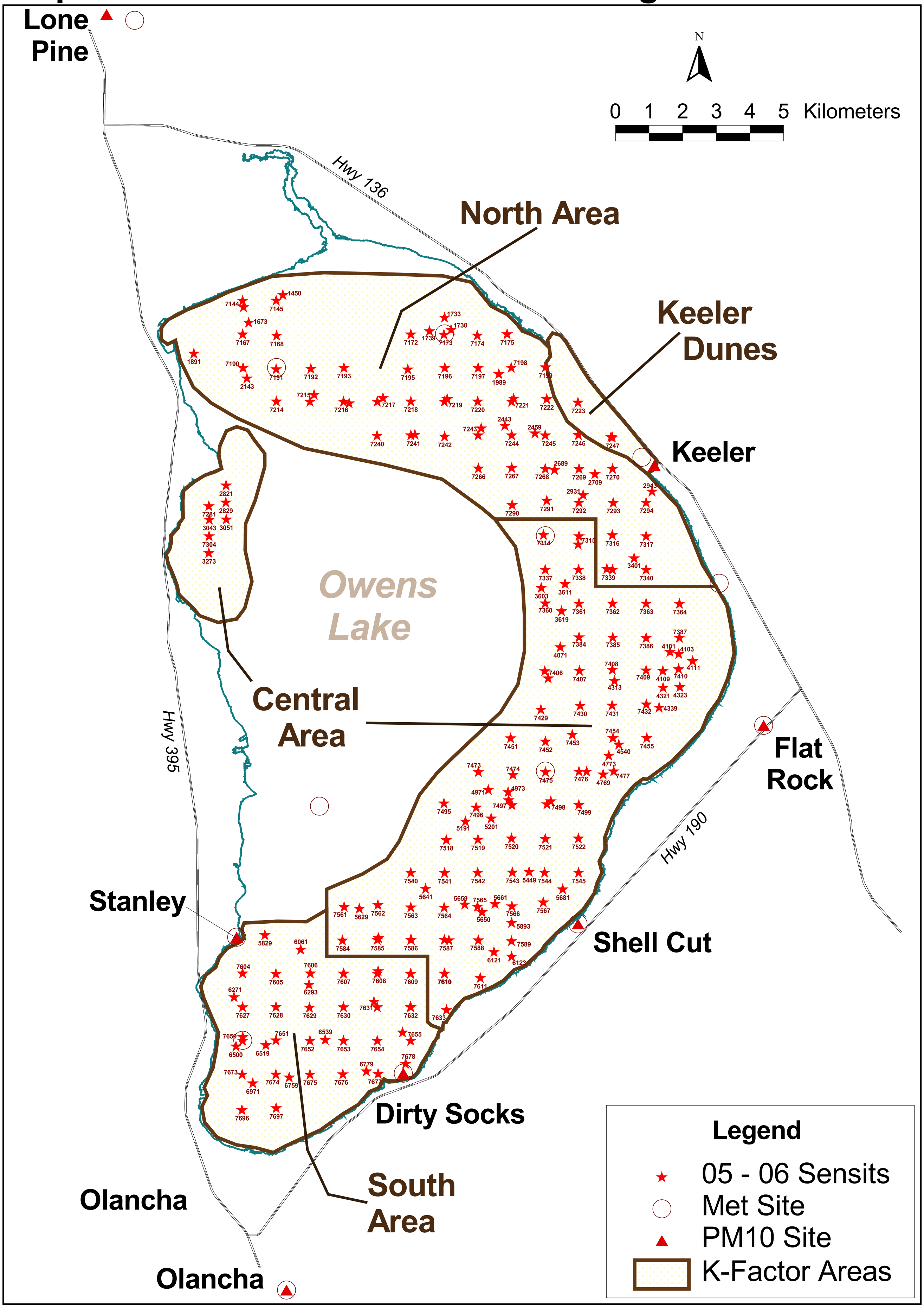
DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

For source areas that arrive at B.7 from B.5, all time periods in the above referenced implementation schedule in B.8 shall apply but be reduced by the time period elapsed since the date of the written direction from the APCO described in Section B.3, or one year, whichever is less.

<u>Attachment B Enclosures</u>

Map 1: Owens Lake Dust ID Monitoring Map
Table 1: From-the-lake and Non-lake Wind Directions for PM_{10} Monitor Sites
Table 2: Default Spatial and Temporal K-factors for the Dust ID Model
Exhibit 1: Schedule of Contingency Measures
Exhibit 2: Moat & Row Transition Schedule
Exhibit 3: DCM Operation Schedule

Map 1 - Owens Lake Dust ID monitoring network



Attachment B - Table 1

From-the-Lake and Non-Lake Wind Directions for PM_{10} Monitor Sites

PM_{10} Monitor Site	From-the-Lake Wind Dir. (Deg.)	Non-lake Wind Dir. (Deg.)	Met Tower
Lone Pine	126≤WD≤176	WD<126 or WD>176	Lone Pine
Keeler	147≤WD≤290	WD<147 or WD>290	Keeler
Flat Rock	224≤WD≤345	WD<224 or WD>345	Flat Rock
Shell Cut	WD≥227 or WD≤ 33	33<WD<227	Shell Cut
Dirty Socks	WD≥234 or WD≤50	50<WD<234	Dirty Socks
Olancha	WD≥333 or WD≤39	39<WD<333	Olancha
Bill Stanley	WD≥349 or WD≤230	WD<349 or WD>230	Bill Stanley
New Sites	TBD	TBD	TBD

TBD – From-the-lake and non-lake wind directions will be determined for new sites by the APCO when sites are selected.

Attachment B - Table 2

Default Spatial and Temporal K-factors for the Dust ID Model

AREA	K-factor Jan.– Apr. & Dec.	K-factor May-Nov. (These are the default cutpoints.)
Keeler Dunes	7.4×10^{-5}	6.0×10^{-5}
North Area	3.9×10^{-5}	1.5×10^{-5}
Central Area	12.0×10^{-5}	6.9×10^{-5}
South Area	4.0×10^{-5}	1.9×10^{-5}

Attachment B - Exhibit 1: Schedule of Contingency Measures

From 2006 Settlement Agreement

EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

Issue	Resolution	Duration	Units
Moat and Row			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
Managed Vegetation			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Gravel Patches			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
Shallow Flood			
Emissions from dry areas (insufficient uniformity of wetting)	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
Other features			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

Attachment B - Exhibit 2

From 2006 Settlement Agreement

EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years)
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

Attachment B - Exhibit 3

From 2006 Settlement Agreement

EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years)
New area shallow flood DCM[a]	2.9
New area managed vegetation DCM[a]	6.1
New area gravel cover DCM[a]	2.2
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
[a]Assumes that total new area <2 square miles per year	

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Board Order 080128-01
Attachment C

2008 Owens Lake Dust Source Identification Program Protocol

Great Basin Unified Air Pollution Control District
157 Short Street, Bishop, California 93514
Telephone (760) 872-8211

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2008 Owens Lake Dust Source Identification Program Protocol

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Glossary of Terms and Symbols

AIRS	US Environmental Protection Agency's Aerometric Information and Retrieval System
ATV	All-Terrain Vehicle
APCO	Air Pollution Control Officer
BACM	Best Available Control Measure
BACT	Best Available Control Technology
CAAA	Clean Air Act Amendments of 1990
CALMET	A meteorological preprocessor program for CALPUFF.
CALPUFF	An air pollution model
CARB	California Air Resources Board
CSC	Cox Sand Catcher, a passive sand flux measurement device.
DCA	Dust Control Area
DCM	Dust Control Measure
Dust ID Program	Owens Lake Dust Source Identification Program
EIR	Environmental Impact Report
Event-specific K_f	Weighted-average of hourly K-factors for a dust event, weighted by the hourly PM_{10} concentration
Exceedance	Modeled or monitored PM_{10} > 150 µg/m^3 at the shoreline
FTEE	Full-time equivalent employee
GBUAPCD	Great Basin Unified Air Pollution Control District
GIS	Geographic Information System
GPS	Global Positioning System
KE	Kinetic energy
K-factor	Proportionality constant for sand flux and PM_{10} emissions, K_f
LADWP	City of Los Angeles Department of Water and Power (also City)
m^3	cubic meter
met	meteorological
mg	milligram
MSM	Most Stringent Measure
NAAQS	National Ambient Air Quality Standards
NEAP	Natural Events Action Plan
OVPA	Owens Valley PM_{10} Planning Area
PC	Particle count
PM_{10}	Particulate matter less than 10 microns aerodynamic diameter
QA	Quality Assurance
RASS	Radio Acoustic Sounding System
RSIP	Great Basin APCD 2003 Owens Valley PM_{10} Planning Area Revised State Implementation Plan

Sensit	An electronic sand motion detector.
Settlement Agreement	2006 Settlement Agreement between LADWP and GBUAPCD
Storm-average K_f	Arithmetic average of hourly K-factors for a dust event
SCR	Supplemental Control Requirements of the 2003 SIP
SFM	Sand flux monitor
TEOM	Tapered-Element Oscillating Microbalance, measures PM_{10}.
USEPA	United States Environmental Protection Agency
USGS	US Geological Survey
WD	Wind direction
2003 SIP	Great Basin APCD 2003 Owens Valley PM_{10} Planning Area Revised State Implementation Plan
µg	microgram

2008 Owens Lake Dust Source Identification Program Protocol

1. Program Overview

1.1 Introduction

The objective of the Owens Lake Dust Source Identification (Dust ID) Program is to identify dust source areas at Owens Lake that can cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) for PM_{10}. The Dust ID Program is a long-term monitoring program that is intended to identify dust source areas for control under the provisions of the Supplemental Control Requirements (SCR) in the 2003 revised Owens Valley PM_{10} State Implementation Plan (RSIP) and the 2006 Owens Lake Settlement Agreement (Settlement Agreement). The text of the Settlement Agreement and SCR provisions is included in the appendices to this document.

The RSIP and Settlement Agreement require the City of Los Angeles Department of Water & Power (City) to control all sources of wind blown dust from the lake bed of Owens Lake that cause or contribute to an exceedance of the PM_{10} NAAQS at the historic shoreline (3,600-foot contour line). Based on dust events that occurred between January 2000 and July 2006, 43 square miles of the lake bed were found to cause or contribute to NAAQS violations. Dust controls are required to be implemented on 29.8 square miles of the lake bed by December 31, 2006, and an additional 13.2 square miles by April 1, 2010.

Provided that these control measures are implemented in accordance with the RSIP and Settlement Agreement, the District will suspend making determinations to control additional dust source areas from December 4, 2006 until May 1, 2010. During this period, all monitoring, modeling and observations will continue as described in this Dust ID Program Protocol. Data and information collected during this period will be used to determine any control requirements for Study Areas as described in the Settlement Agreement, and to advise the City on any monitored dust emissions from the lake bed and surrounding areas. If any new lake bed dust source areas are identified from data collected after April 1, 2010, they will be subject to dust control requirements as provided for in the Settlement Agreement and any future revisions to the Owens Valley PM_{10} State Implementation Plan. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure (DCM) construction activities.

1.2 Locating Dust Source Areas

A network of sand flux samplers, PM_{10} monitors, meteorological towers and remote camera sites will be used to monitor and locate dust source areas at Owens Lake. Figure 1.1 shows a map of the Dust ID network at Owens Lake. As configured in 2003, the Dust ID network included: sand flux monitors at 136 lake bed sites at 1-km spacing, 7 PM_{10} monitors, 13 met towers, 8 observation sites, and 10 time-lapse cameras at 7 sites. At the discretion of the Air Pollution Control Officer, additional sand flux, PM_{10} and met sites will be added as necessary to collect

information that can be used to monitor and model the impact from new areas that may become emissive on the lake bed.

The automated monitoring network will be augmented with information from observers who will map dust source locations from off-lake sites when dust events take place during normal work hours. These maps will be used to help document source areas that may be outside the sand flux network or that may be within the network, but missed by the samplers. Field personnel will inspect active source areas and map the source area boundaries using a GPS (Global Positioning System) as conditions allow. Data collected from the sand flux network, visual mapping and GPS surveys will be included in a Geographic Information System (GIS) database for mapping and analysis. Maps generated using these different methods will be compared qualitatively to help delineate source area boundaries.

1.3 Monitored Exceedances

Analysis of hourly PM_{10} concentrations at shoreline and off-lake monitoring sites may show that lake bed source areas cause or contribute to PM_{10} exceedances. Monitoring of PM_{10} concentrations will be done using US EPA-approved monitors. Currently, hourly PM_{10} readings are obtained using TEOM (Tapered-Element Oscillating Microbalance) PM_{10} monitors manufactured by R&P, Inc. If a PM_{10} exceedance is monitored, PM_{10} concentrations will be paired with the local wind direction for each hour of that event to determine if lake bed source areas caused or contributed to the exceedance.

Twenty-four hour average PM_{10} monitor concentrations will be adjusted for winds coming from the direction of the lake to the monitor (from-the-lake) and from directions not from the lake to the monitor (non-lake). PM_{10} concentrations during any hour with winds from a non-lake wind direction will be assumed to have an average background concentration of 20 $\mu g/m^3$ and from-the-lake wind directions will be given their hourly value. If the adjusted 24-hour average is greater than 150 $\mu g/m^3$, then an exceedance will have been monitored from a lake bed source or sources.

If a lake bed source area causes or contributes to an exceedance, hourly PM_{10} concentrations and wind directions will be reviewed to see if a new source area (or areas) is associated with that exceedance. If sand flux data are available that show erosion activity in the direction of a new source area, this event will also be modeled as described in the air quality modeling protocol. If the PM_{10} monitor data indicate that a new source area caused or contributed to an exceedance, DCMs may be required under the provisions of the Settlement Agreement or current SIP.

1.4 Modeled Exceedances

Air quality modeling will be performed with the CALPUFF modeling system or other United States Environmental Protection Agency (USEPA) approved modeling method. At least once a year, the Dust ID information will be examined and the model will be run to determine if there were any modeled shoreline exceedances since the period covered by the last model run. PM_{10} emissions for the model will be based on hourly sand flux measured at lake bed sites and spatial and temporal factors derived using the empirical relationship between sand motion on the lake

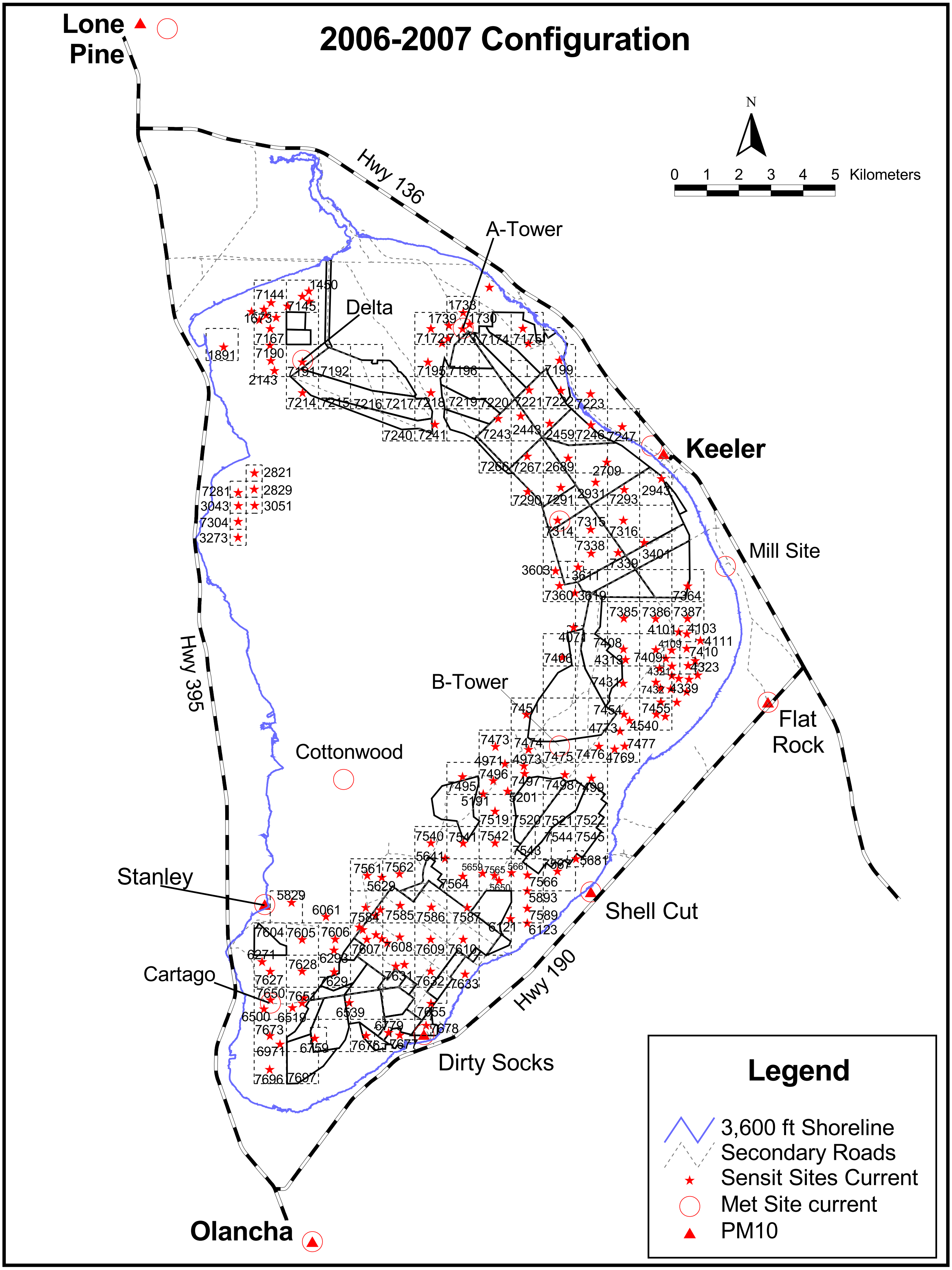

Figure 1.1 - Owens Lake Dust ID monitoring network

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bed and measured PM_{10} values. CALPUFF will be run using the following equation to estimate emissions and to model PM_{10} impacts at the shoreline:

Equation 1.1

$$PM_{10} = K_f \times q$$

where,

q = Sand flux measured at 15 cm above the surface [$g/cm^2/hr$]
K_f = K-factor, empirically-derived ratio of the PM_{10} emission flux to the sand flux at 15 cm.

The ratio of PM_{10} to sand flux (K_f) is referred to as the K-factor. The initial Dust ID program results showed that K-factors could be derived empirically by comparing model predictions to monitored PM_{10} concentrations. Initial studies also showed that average K-factors can vary spatially and seasonally at Owens Lake. Default K-factors will be used with Equation 1.1 to estimate hourly PM_{10} emissions unless new K-factors are generated from future dust events following the modeling procedures in this program protocol. If the CALPUFF model results indicate that a new lake bed source area caused or contributed to an exceedance at a shoreline location, dust controls may be required under the provisions of the 2006 Settlement Agreement or the current SIP.

1.5 Sand Flux Measurements

Sand flux is measured using a combination of Cox Sand Catchers (CSC) and Sensits. CSCs are sand collection devices that provide a mass collection amount for a certain time period (about 1 to 3 months), and Sensits are electronic sand motion detectors used to time-resolve the collected mass to estimate hourly sand flux rates. The sand flux rate is applied to the area represented by the sand flux sampling site, which may vary in size and shape depending on the source area delineated by field observations.

1.6 Dust ID Program Protocol Content

Section 2 of the Dust ID Program Protocol describes the methods and instrumentation that will be used to monitor sand flux with Sensits and CSCs on the lake bed. Section 3 provides a brief description of the PM_{10} and meteorological monitoring network that will be used to monitor PM_{10} exceedances, develop K-factors and to call public health advisories. Section 4 describes methods that will be used by visual observers and field personnel to map lake bed dust source areas and delineate boundaries using GPS. Section 5 explains the procedures for developing K-factors using air quality modeling and monitoring data. Section 6 provides the protocol for dispersion modeling.

2. Protocol for Measuring Sand Flux Rates and Operation of the Sensit and Cox Sand Catcher Network

2.1 Objective

Sand flux measurements will be used as a surrogate to estimate PM_{10} emissions coming off the lake bed. The objective of the sand flux measurements is to provide an hourly emissions estimate for all active source areas on the lake bed.

2.2 Methods and Instrumentation

Sand flux will be measured with Sensits and Cox Sand Catchers (CSCs). Collocated Sensits and CSCs are used to measure hourly sand flux rates at different locations on the lake bed. The 2006-2007 Sensit/CSC network locations are shown in Figure 1.1. The instruments are placed with their sensors or inlets positioned 15 cm above the surface. Sensits are electronic sensors that measure the kinetic energy or the particle counts of sand-sized particles as they saltate, or bounce, across the surface. Sensits are used to time-resolve the CSC mass to provide hourly sand flux rates.

Figure 2.1 shows a Sensit suspended above the ground on the right, and a CSC in the ground to the left. The photo was taken at a site that was used to test the accuracy of Sensits and CSCs before the Dust ID Program began. The battery powered Sensits are augmented with a solar charging system. A datalogger records 5-minute Sensit data during active saltation periods. Data collection is triggered by particle count activity and continues until particle counts are zero for an hourly period. Each datalogger has a radio transmitter that sends Sensit data to the District’s Keeler field office once a day to provide updates on erosion activity at each site. These daily updates are used to alert field personnel to active source areas for possible Global Positioning System (GPS) mapping and inspection. Daily transmission of the data may be temporarily suspended if the solar battery power is low due to extended days of cloud cover.

CSCs are passive collection instruments that capture windblown, sand-sized particles. These instruments were designed and built by the District as a reliable instrument that could withstand the harsh conditions at Owens Lake. CSCs have no moving parts and can collect sand for a month or more at Owens Lake without overloading the collectors. Field personnel visit CSC sites to measure the mass of the collected sand catch. A diagram of the CSC is shown in Figure 2.2. Not shown in the diagram is an internal sampling tube that can be seen in the photo in Figure 2.3. The internal sampling tube is removed from the PVC casing to measure the sand catch sample. The lengths of the sampling tubes and casings are adjusted during construction to accommodate the amount of sand flux in each area and to avoid overloading the CSC. The CSC length ranges from about one to three feet. Because the PVC casing is buried in the ground, an adjustment sleeve is used to keep the inlet height at 15 cm to compensate for surface erosion and deposition. Field techs use a standardized measuring device to check or adjust the sampling inlets to 15 cm after collecting each sample.

Figure 2.4 shows an example of the linear relationship between the CSC collected sand mass and the kinetic energy measured with a co-located Sensit. Sensits measure saltation in terms of

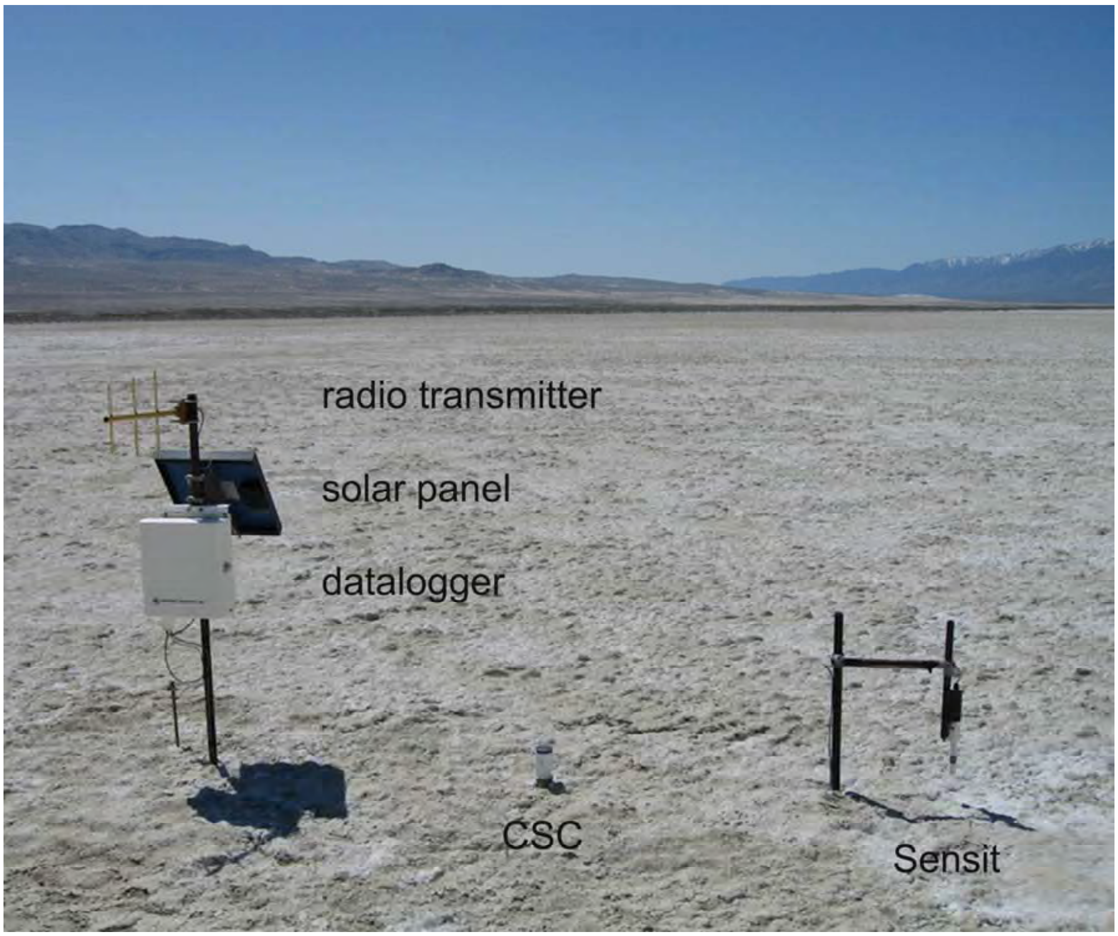

Figure 2.1 - Dust ID sand flux monitor sites measure wind erosion activity using CSCs to collect sand-sized particles and Sensits that electronically detect moving particles. Sensit data are recorded on dataloggers and transmitted by radio from each site to the District's office in Keeler.

Figure 2.2 - Diagram of the Cox Sand Catcher (CSC) used to measure sand flux at Owens Lake.

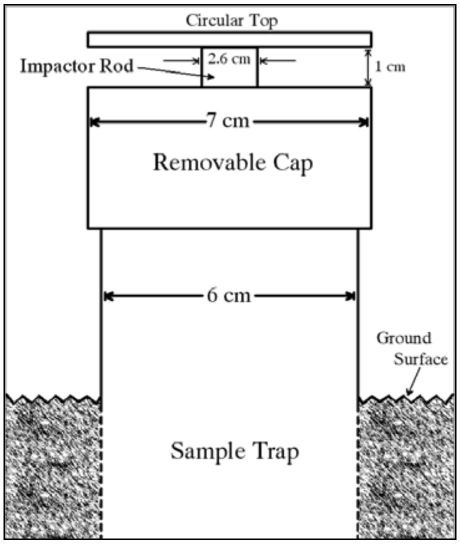

Figure 2.3 - Example of a Cox Sand Catcher (CSC) with the inner sampling collection tube removed.

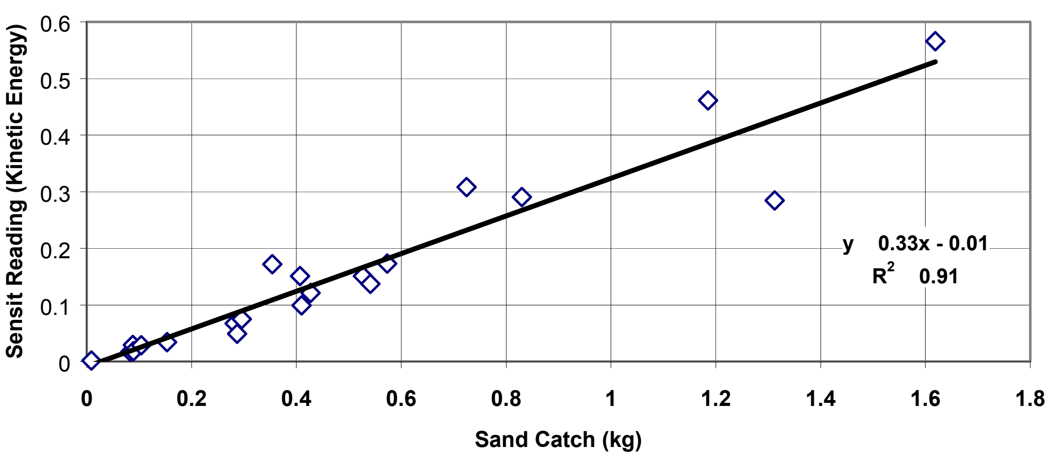

Figure 2.4 - Example of the linearity between CSC mass and a Sensit reading using kinetic energy reading (Sensit No. 7291).

kinetic energy (KE) and particle count (PC). The District uses the output (KE or PC) that provides the best precision and accuracy for the range of saltation activity expected at each site.

Because the electronic Sensit response to the saltation flux can vary, Sensits were used in combination with CSCs to determine hourly sand flux rates. This combination takes advantage of the good precision and accuracy of the CSC sand catch data, and the ability of Sensits to time-resolve the sand flux for each hour of the CSC sampling period. In this way, the sum of the hourly sand catches always matches the CSC sand catch for each sampling period, and it minimizes the error in the hourly sand flux.

Changes to the sand flux monitoring network are made as necessary to improve the characterization of dust source areas on the lake bed. Sand flux sampler sites are added to the network to monitor new source areas or to improve the sand flux estimates for known dust source areas. Although the sand flux network was originally designed in a fixed grid pattern with 1 km site spacing, the current practice is to place the samplers at sites that represent smaller source areas. Some sites may be less than 250 m apart, and their locations may be off the regular grid pattern to better represent sand flux activity in the dust source area. In addition, many of the original sampling sites that are now in flooded portions of the shallow flood DCM were removed, since PM_{10} emissions from the flooded sites can be assumed to be zero in the Dust ID model.

2.3 Operating Procedures

Sand captured in the CSCs will be weighed in the Keeler lab to the nearest tenth of a gram. A field technician will visit each site every one to three months to collect the sample tubes. The following procedures will be used when collecting the CSC samples and downloading Sensit data:

1) Park field vehicle 10 meters or more east of the site and walk the remaining distance to the sampling site. Field personnel will access all Sensit and CSC sites from an easterly approach to minimize upwind surface impacts near the sampling sites.
2) Measure and record the inlet height above the surface to the middle of the inlet.
3) Remove the sample collection tube from the CSC.
4) Verify collection tube number corresponds to site number on the field form.
5) Weigh and record the gross weight of the collection tube and sample to the nearest 1 gram using a field scale.
6) If any soil material is visible in the tube, seal the collection tube and place it in the tube rack for transport to the lab. If no soil material is visible, note this on the collection form and reuse the collection tube for the next sampling period.
7) Place a clean collection tube in the CSC and record the collection tube number.
8) Replace the CSC inlet and adjust the height to 15 cm ($\pm$1 cm).
9) Download Sensit data from the datalogger to a storage module.
10) Measure and record the Sensit sensor height above the surface to the center of the sensor using the Height Adjustment Tool, and adjust if necessary to 15 cm. See Figure 2.5.
11) Inspect the sensor and radio transmitter wiring and clean or repair, if needed.

12) A field operational response test on the Sensit will be completed during each visit and the Sensit will be replaced, if it fails the test.
13) CSC samples will be removed from the sample collection tubes and weighed on a calibrated bench-top scale in the Keeler lab to the nearest 0.1 gram.
14) Wet samples will be removed from the collection tubes and oven dried before weighing in the lab.

2.4 Data Collection

A field form will be used to document the information for the CSC and Sensit (see example in Figure 2.6). The form will have the site number, date and time of measurement (Pacific Standard Time), "as is" CSC inlet and Sensit sensor height (± 1 cm), tube tare weight prior to sand catch (± 0.001 kg), total sand catch weight (± 0.001 kg), and post-catch tube weight (± 0.001 kg), Sensit response test (particle counts or kinetic energy), operator's initials, and a comments section where the condition of the sampler and any other relevant factors, such as surface condition will be documented. The Data Processing Department will calculate the net sand catch weight from the CSC during data analysis. CSC lab weights, measured to the nearest 0.1 g will be recorded on the Lab Form shown in Figure 2.7. After completion of the forms, the field technician will make a copy of the completed forms and file the copies at the Keeler office. The original forms will be sent to Data Processing in the Bishop office. Data Processing will enter the data into an electronic file. The original hard copy forms will be filed in the Bishop office.

Each day, dataloggers for all Sensit sites will be downloaded by radio transmission to the Keeler Field office. Data from the storage modules will be downloaded to the computer at the Keeler office by the field technician at the end of a collection period. The radio transmitted Sensit data will be used as the data of record. Storage module data will be collected at least quarterly and will serve as a back-up file.

Technicians will keep a log of all the repairs, maintenance, or replacement of Sensits or CSCs, radio transmitters, and datalogger equipment. This log will be kept in a field notebook and the field forms sent to Data Processing as they are completed. It is the technician's or operator's responsibility to review the data and notify the Air Monitoring Specialist and Data Processing who will decide whether any data should be edited or deleted and why.

2.5 Chain of Custody

Each field form will be initialed and dated by the field technician during each site visit. The form will be signed and dated by the person receiving the data when delivered to the Bishop office. If no person is available to sign the form in the Bishop office, the delivery person will sign and date the form and place it in the Data Processor's box.

2.6 Quality Assurance

All field and lab scales will be checked at least every two months using Class F weights. Field scales will also be checked with a 100-gram weight at each sample site before weighing the sand catch and the weight recorded on the field form. The bench-top scale in the Keeler office will be

Figure 2.5 - A Height Adjustment Tool is used to measure the height of Sensits and CSCs and to adjust the sensor and inlet height to 15 cm above the soil surface.

CSC Field Form.xls

Technician: Date (mm/dd/yyyy): / /

Site #	Time PST	Pre-Sensit Height, cm	Sensit Response	Final Sensit Height, cm	Pre-CSC Inlet Height, cm	Field Cal Weight, kg	CSC Full, kg	CSC Tare, kg	Final CSC Height, cm	No VP
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Marble Rankings: 0=No Crust 1=Complete Damage 2=Indent or Surface Damage 3=No Damage 4=Wet

Site #	Rank	Surface Description	Comments and Maintenance

Delivered By:	Date:
Received By:	Date:

Figure 2.6 - Example of a CSC and Sensit Field Documentation Form

CSC Lab Form.xls

Lab Technician: Tare Date (mm/dd/yyyy): / /
Lab Technician: Post Date (mm/dd/yyyy): / /

Site Tube #	Tube Tare, g	Tube/Catch Weight, g	Catch Weight, g	Comments
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Figure 2.7 - Example of a CSC laboratory documentation form

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checked with the Class F weights before each set of sand catches are weighed. The test weights will be recorded on the scale log sheet in the laboratory. Both scales will be calibrated and certified at least once every year. Ten percent of the CSC sand catch samples will be stored for at least one year from the date of collection before discarding.

2.7 Calculating Hourly Sand Flux

For modeling purposes discussed in Section 6, hourly sand flux is calculated for each Sensit/CSC site using the sand catch to Sensit reading ratio for each collection period and apportioning the sand catch to the hourly Sensit reading. The hourly sand flux is divided by 1.2 cm^2, which is the equivalent inlet opening size of the CSC for flux calculation purposes.

For Sensits using kinetic energy,

Equation 2.1

$$q_{n,t} = \left(S_{n,t} - S_{n,bg}\right) \times \frac{CSC_{n,p}}{\sum_{t=1}^{N}\left(S_{n,t} - S_{n,bg}\right)} \times \frac{1}{1.2} \quad [\mathrm{g/cm^2/hr}]$$

Where,
$q_{n,t}$ = hourly sand flux at site n, for hour t [g/cm^2/hr]
$CSC_{n,p}$ = CSC mass for site n, for collection period p [g]
$S_{n,t}$ = Sensit total KE reading for site n, for hour t [non-dimensional]
$S_{n,bg}$ = Sensit KE background reading for site n, [non-dimensional]
N = Total number of hours in CSC collection period p.

For Sensits using particle count,

Equation 2.2

$$q_{n,t} = S'_{n,t} \times \frac{CSC_{n,p}}{\sum_{t=1}^{N} S'_{n,t}} \times \frac{1}{1.2} \quad [\mathrm{g/cm^2/hr}]$$

Where,
$S'_{n,t}$ = Sensit total PC reading for site n, for hour t [non-dimensional]

2.8 Sensit Calibration and Data Analysis

2.8.1 Sensit Calibration Check

Data Processing will track Sensits by their serial number. After each sample collection period, Sensit and CSC data will be added to data from other sample collections. Data Processing will determine the average sand catch to Sensit ratio for each Sensit. Sensit readings will be collected

for particle counts and kinetic energy for each Sensit. Due to differences in individual Sensit responses, some Sensits have a more consistent sand flux to Sensit reading ratio using particle count rather than kinetic energy. This normally depends on the manufacturer's electronic design. At high sand flux sites, kinetic energy provides a more linear response for most Sensits. If KE is used, a background KE is subtracted from the reading if it is not zero. A background KE is determined from the KE reading when the PC reading is zero.

The ratio of the Sensit response to the collected mass will be compared for each collection period to previous ratios for the same instrument to ensure that the Sensit is responding consistently. As seen in Figure 2.4 this ratio can vary, especially at low collection masses, so large deviations in the ratio should only be used as an indicator for a possible problem. Sensits will be replaced if they show no readings with significant sand associated CSC collection, have significant readings during calm wind periods, have an erratic response as compared to previous collection periods, or if they fail the field operational response test.

2.8.2 Replacing Missing Sand Catch Data

Sand catch data can be lost if the CSC collector tube is full, or damaged, or if the sample is spilled during weighing. The lost sand catch data will be estimated using Sensit data. A cumulative sand catch to Sensit ratio is calculated by adding all of the valid sand catches and all of the corresponding Sensit data for that particular Sensit/CSC pair, and then dividing them to obtain the total ratio. The cumulative ratio is applied to the Sensit data to estimate the hourly sand flux. If there was a Sensit change, only data generated after the Sensit change is used to calculate the cumulative sand catch to Sensit ratio.

CSC collection tubes will be weighed and reset at the same time as any Sensit change at a site in order to maintain the time correlation between the two devices.

2.8.3 Replacing Missing Sensit Data

Sensit data can be lost when the datalogger or Sensit fails. In such cases, the sand catch data will be time resolved using a neighboring site. The historical hourly sand flux data are compared to determine which neighboring site behaves most similarly to the site with the lost data. The correlation coefficients between the data sets will be used to determine which site behaves most similarly. If no adjacent sites were active during the period of lost Sensit data, then the nearest active sites will be used for comparison.

3. Protocol for Measuring Ambient PM_{10} and Meteorological Conditions

3.1 Objective

Ambient PM_{10} monitors will be placed at locations generally around the shoreline of Owens Lake and in local communities to monitor the ambient air for exceedances of the PM_{10} NAAQS and to develop K-factors for modeling PM_{10} emissions from lake bed sources. PM_{10} monitors may be placed on the lake bed for short-term special-purpose monitoring studies.

3.2 Methods and Instrumentation for PM_{10} and Meteorological Data

PM_{10} monitoring will be performed using USEPA-approved reference or equivalent method monitors. The current monitoring network shown in Figure 1.1 includes seven PM_{10} monitor sites – Keeler, Lone Pine, Olancha, Dirty Socks, Shell Cut, Bill Stanley and Flat Rock. Each PM_{10} site is equipped with a Tapered Element Oscillating Microbalance (TEOM) PM_{10} monitor. TEOM monitors are capable of measuring hourly PM_{10} concentrations. The Dust ID Program will rely on the TEOM to determine if an exceedance is caused by a lake bed source, since the data can be correlated with hourly wind directions to determine dust source directions. TEOM data will also be used to generate K-factors to model the PM_{10} emissions from lake bed sources.

Ten-meter meteorological towers will be located near each PM_{10} monitor site and at other locations around the lakeshore and on the lake bed. The current met sites are shown in Figure 1.1. The met data are used to create wind fields with the CALMET model that are used with CALPUFF to model air quality impacts. All met towers include instrumentation to measure wind speed and wind direction. Two lake bed met sites (A & B Towers) measure wind speed at different heights (0.5, 1, 2, 5 and 10 m) to determine surface roughness and vertical wind speed profiles. Some met sites also measure temperature, relative humidity, barometric pressure, and/or precipitation.

3.3 Operating Procedures, Instrument Calibration and Quality Assurance

PM_{10} monitoring will be performed in accordance with USEPA monitoring guidelines found in 40 CFR, Part 58 and meteorological monitoring will be performed in accordance with USEPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I, II, and IV.

3.4 Data Handling and Data Access via Modem

TEOM PM_{10} data will be delivered to Data Processing on a routine monthly schedule. After the data pass the proper data review and QA checks they will be submitted to the USEPA's AIRS database. PM_{10} data from special-purpose monitors that may be located on the lake bed will not be submitted to the AIRS database.

All the PM_{10} sites and some met sites are equipped with modem links that allow for access to the hourly concentrations. These data are useful for alerting field personnel to possible new sources of PM_{10}, and for alerting the public in case of high concentrations. For hourly concentrations above 400 $\mu g/m^3$ the District will issue public health advisories when the communities of Keeler, Lone Pine or Olancha are affected. The public can view real-time wind speed, direction and PM_{10} data from the Dust ID monitoring network on the District's website at www.gbuapcd.org/data.

4. Protocol for Observing and Mapping Source Areas and Dust Plume Paths

4.1 Objective

The objective for source area mapping is to use the best available information from visual observations, GPS mapping, and sand flux measurements to delineate the boundaries of dust source areas for as many events as possible. This information will be used to help delineate the control area boundaries for new sources.

4.2 Methods and Instrumentation

The Dust ID Program includes four methods to help locate dust source areas and to delineate the source area boundaries. The methods are: 1) visual mapping by trained observers, 2) time-lapse cameras, 3) surface inspections with GPS mapping, and 4) sand flux activity (as measured with Sensits and CSCs).

4.2.1 Mapping Dust Source Areas from Off-Lake Observation Sites

One or more trained observers will complete observations from viewpoints to best observe the active dust source areas. For instance, two observers may be at viewpoints on the east side of the dust plume in the Inyo and Coso Mountains and a third may be on the west side in the Sierra. The observers will create hourly maps of the visible boundaries of any dust source areas, their plume direction and note if the visible plume crosses the shoreline. To the extent practicable, all lake bed and off-lake dust sources will be included in the observations. Figure 4.1 shows an example of sand flux measurements and the cumulative information that can be collected by observers mapping the dust plumes from different locations.

4.2.2 Video Cameras

Remote time-lapse video cameras will record dust events during daylight hours. This information will be reviewed to help identify source areas that may have been missed by observers, or to help confirm source area activity detected by PM_{10} monitors or the sand flux network. Remote time-lapse video can also be used to help verify modeled impacts that were not monitored by the PM_{10} network, to check compliance of dust control areas, and to identify off-lake sources not measured by any of the other methods.

4.2.3 Mapping Using GPS

4.2.3.1 “Trigger” Levels for Initiating Field Inspections and GPS Surveys

Dust observations, Sensit activity, elevated PM_{10} concentrations and video will be used as “trigger data” to determine the time and location for a Dust Source Area Survey (survey). Sensit and PM_{10} data will be automatically collected via radio transmission every workday. A technician will summarize and review the data each workday. The summary will list all Sensit activity greater than background output levels, and hourly TEOM PM_{10} concentrations over

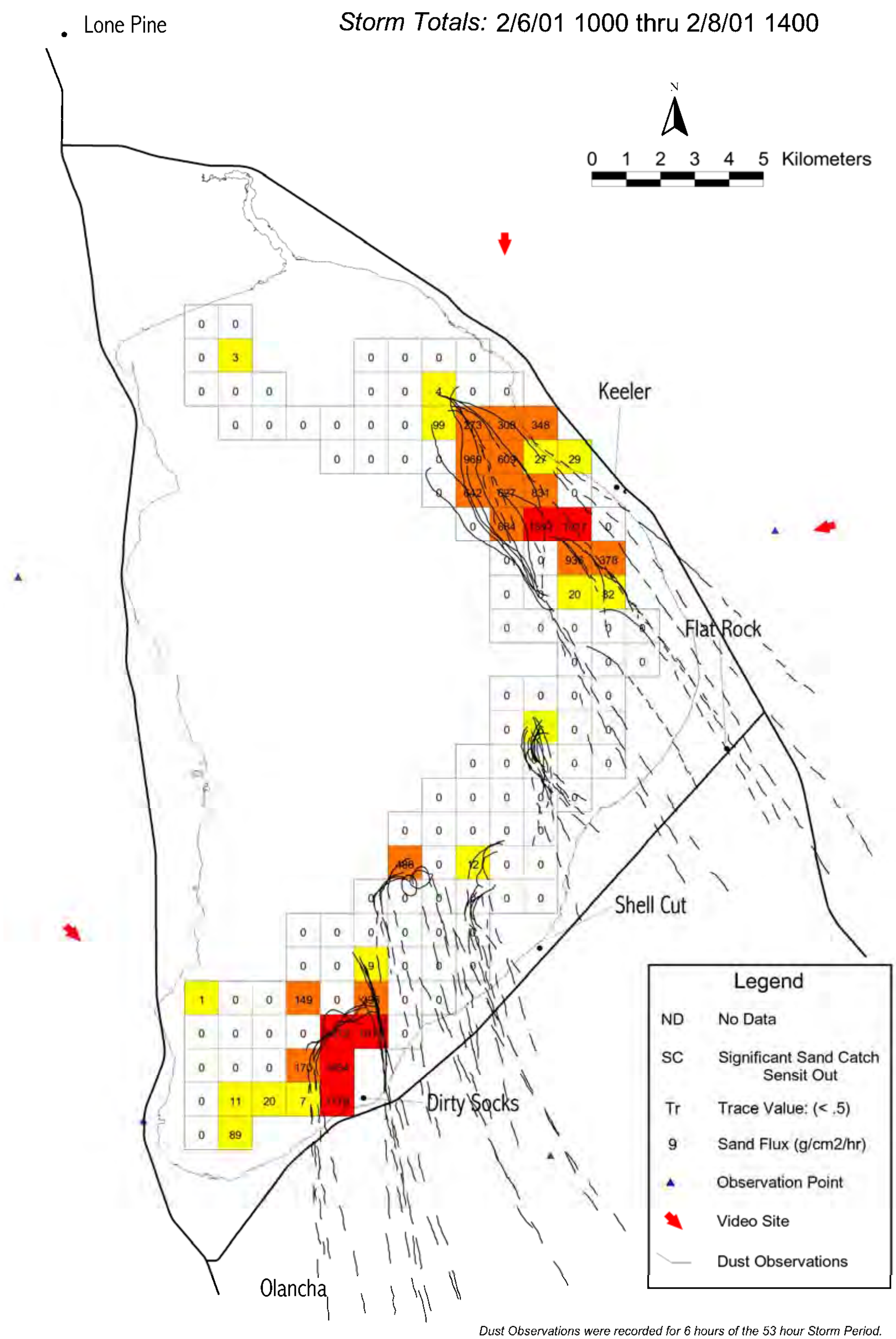

Figure 4.1 - Example of dust plume maps drawn by observers during daylight hours and total sand flux for a dust event on February 6-8, 2001.

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50 µg/m^3 with corresponding wind speed and direction data. If dust observations are available from a recent dust storm, they will be used to confirm the location of the dust source(s) that correspond with the Sensit activity and elevated PM_{10} concentration. Video will be used to identify a source or sources that were not identified by observations, Sensit data or PM_{10} information. Wind speed and wind direction data will be used to help determine if a lake bed dust source could have caused elevated PM_{10} concentrations. All of the trigger information will be used to identify any lake bed dust source area to initiate a dust source survey and/or surface inspection. The survey should be completed the same day if weather conditions are favorable. For larger areas, surveying may continue for several days or until precipitation obscures the boundaries of the source area.

In addition to the above process, general field inspections will be completed after dust storms to verify lake bed emission activity and the need for a survey. A survey will be completed if the trigger data and /or field inspections indicate emissive conditions in an area that has not been previously surveyed during the current dust period (Section 4.3) or in an area that has been previously surveyed but has increased in size since its last survey. The priorities for completing a survey are:

1) new lake bed source areas outside the instrumented Sensit network;
2) new lake bed source areas that have not been surveyed within the instrumented Sensit network; and
3) lake bed source areas that have previously been surveyed.

4.2.3.2 GPS Mapping Procedures

After a dust source is identified by dust observation, Sensit data, sand catch data, video, PM_{10} concentration or inspection of the lake bed surface, District staff will map the exterior boundary of as many of the source areas identified as possible during daylight hours, as weather conditions allow. The mapping will begin as soon as possible after a dust storm and continue until all the identified areas are mapped or precipitation occurs. The boundary of the emissive area(s) will be mapped using a Global Positioning System (GPS). Surveyors conducting the mapping will ride an ATV or walk around the outer boundary of the wind-damaged surface surveying a line with the GPS. A wind-damaged surface is defined as a soil surface with wind erosion evidence and/or aeolian deposition that has not been modified to an unrecognizable point by precipitation since the last identified dust storm.

GPS line data should be collected at an interval of one record every 10 seconds or less. Data should be collected in NAD83 UTM Zone 11 coordinates. Only GPS units capable of continuously recording line data will be used. Data should be processed and corrected using base station data (either from a commercial correction service or using data from the District's Keeler base station) to ensure positional accuracy.

Before beginning a survey, the edge of the source area is determined by a visual review of the surface conditions within a representative one square meter area along the edge of the source area. An undamaged surface is evident if there is no visible evidence of a disturbed lake bed surface due to wind damage. As an aid to calibrate the level of disturbed surface, a surveyor will

begin each survey by estimating the percentage of surface that is undamaged by the wind. The surveyor visually determines where a surface with 70 to 80 percent of undisturbed surface is located. The surveyor completes the survey by following a line of travel that closely represents the initial one-meter calibration. The following defined list, Boundary Conditions and Survey Procedures (see below), can be used to determine how to map the source boundary under differing surface boundary conditions.

Boundary Conditions and Survey Procedures:

Distinct Boundary: A visibly sharp transition, 25 feet or less in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. The surveyor should travel directly along this distinct outside edge, if possible, and may deviate 25 feet to the inside or outside on occasion. Small (25-foot wide or less) channels, boundary indentations, roads, mounds, and other obstacles may be directly crossed if the continuation of the main source boundary is clearly visible on the opposite side.

Diffuse Boundary: A visibly distinct transition, 25 to 100 feet in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. Every effort should be made to travel along the outermost edge of the visible distinction.

Indistinct Boundary: **A** boundary that is not obvious to the surveyor where the edge of the source is located. Mapping would be stopped at this point until a Distinct or Diffuse Boundary can be located.

Generally the surveyor will maintain a constant course of travel following the Distinct Boundary of the wind-damaged area. As the boundary becomes less distinct, it is recommended to move the course of travel further into or outside the source to maintain recognition of surface damage. It is acceptable to travel within approximately 50 feet of the outer or inner edge of the larger more noticeable active area if the boundary is Diffuse. When encountering an Indistinct Boundary condition, the surveyor should note if the boundary can be found or if the boundary cannot be mapped during the existing survey and why. If the boundary cannot be mapped, the survey shall end at that point leaving an unclosed source area polygon.

It is possible for the surveyor to find himself or herself greater than 50 feet within or outside of the source area boundary. When this happens, the surveyor should turn perpendicular to the direction they were traveling and travel in the direction where the distinct edge should be located. For example, if the surveyor were inside the source area, they would turn in the direction where erosion evidence was not observed earlier along their path. If the surveyor were outside the source area, they would turn toward the side where they previously observed the source. Boundary loss may occur because of an Indistinct Boundary or unfavorable lighting conditions. The time and coordinates should always be noted when it is necessary to relocate the boundary during a survey.

Another alternative for relocating a source area edge is to pause the GPS unit from recording data until the boundary is located and then resume with data collection. This allows the surveyor to travel in any direction until the edge is relocated or end the survey if an edge cannot be located. The line produced between the point where the GPS unit was paused and then restarted would be deleted and considered un-surveyed during post processing.

The presence of Indistinct Boundaries or conditions that cause the ending of a survey must be annotated on the GPS data or explained in the field notes, including point coordinates. Examples would include dust storm, precipitation, lightning, mud, and channel with flowing water, pond, and time constraint or equipment malfunction.

4.2.4 Using Sand Flux Monitors to Map Source Area Boundaries

Dust source area boundaries can be delineated or refined using default cell boundaries represented by active sand flux monitors. The area represented by the active SFM site may be shaped to exclude known non-emissive areas, such as; DCM areas, wetlands, or areas with different soil texture where there is evidence that it is non-emissive.

4.3 Composite Dust Source Map Development

Data Processing will compile the cumulative mapping information from the visual observers and field inspections using the GPS into a GIS database for two periods each year, December through June and July through November. A new composite map will be developed for each period containing only those data collected during that period. Hand drawn observation maps will be scanned and translated into the GIS database. Observation maps will be compared with source area locations from other methods through the GIS generated layers. Overlays of the maps generated from sand flux monitors, video cameras, visual observers and GPS'd source areas will be compared qualitatively, considering the information may have been collected at different times.

5. Protocol for Determining K-factors and PM_{10} Emission Rates from Sand Flux Data

5.1 Objective

The objective of this portion of the Dust ID Program is to estimate the PM_{10} emission flux for each cell or source area using the relationship *PM_{10} emission flux = sand flux x K-factor*. PM_{10} emissions for each area will be used with the CALPUFF modeling system or other USEPA approved model to determine if the PM_{10} emissions will cause or contribute to a NAAQS violation at the shoreline.

5.2 Method for Determining PM_{10} Emissions and New K-factors

5.2.1 PM_{10} Emission Flux = Sand Flux x K-factor

PM_{10} emissions will be estimated using the sand flux for each area represented by a Sensit and CSC and an appropriate K-factor for the area and period. The sand flux values will come from

the Sensit and CSC data as discussed in Section 2. New K-factors for each area and period will be developed as discussed in this section, and default K-factors will be used to model dust events unless newer K-factors are determined.

5.2.2 Default Temporal and Spatial Storm-average K-factors

PM_{10} emissions may be estimated from default K-factors that were developed from previous dust events that occurred in the same area and the same range of calendar months in previous years.

The areas for K-factor groupings are shown in Figure 1.1: North Area, Central Area, Keeler dunes, and the South Area. Any new source area within the depicted boundaries will be associated with that area for the spatial grouping of new K-factor values. If a new source area and K-factor is developed for an area outside these boundaries, the area and default K-factor will be associated with the K-factor for an existing area with the most similar surface soil texture. The determination of the most similar existing area will be made by the Air Pollution Control Officer.

5.2.3 Method to Determine Sand Flux from Areas with Implemented Dust Control Measures (DCM)

Sand flux will be measured at sites within the shallow flood and managed vegetation DCM areas. Sensits and CSCs will be sited on dry areas within the shallow flood DCM to represent dry areas near the site. DCM areas covered with standing water will be assumed to have zero sand flux. For the Managed Vegetation DCM, sand flux sites will be placed in spatially representative areas and in areas within the DCM where wind blown dust may have been previously observed.

5.2.4 New K-factors Seasonal Cut-points

The APCO will review the K-factor data and propose seasonal cut-points to the LADWP. LADWP will respond to the proposed cut-points within 30 days. If no agreement can be reached within 60 days, the default periods will be used.

The two default periods to be used are: the winter/spring period that includes the months of December, January, February, March and April, and the summer/fall period that includes May through November. These same calendar months will be used to generate new temporal K-factors for each area and to generate new 75-percentile hourly K-factor values for modeling PM_{10} emissions.

5.2.5 Using CALPUFF Modeling System to Generate New K-factors

New hourly K-factors can be inferred from the CALPUFF model by using hourly sand flux as a surrogate for PM_{10} emissions. Modeled PM_{10} predictions can then be compared to monitored concentrations at PM_{10} monitor sites to determine the K-factor that would correctly predict the monitored concentration for each hour. More information on the modeling procedures is included in Section 6.

A K-factor of 5×10^{-5} will be used initially to run the CALPUFF model and to generate concentration values that are close to the monitored concentrations. Hourly K-factor values will then be adjusted in a post-processing step to determine the K-factor value that would make the modeled concentration match the monitored concentration at the PM_{10} monitor site. The initial K-factor will then be adjusted using Equation 5.2.

<u>*Equation 5.2*</u>

$$K_f = K_i \left(\frac{C_{obs.} - C_{bac.}}{C_{mod.}} \right)$$

Where,

K_i = Initial K-factor (5×10^{-5})
$C_{obs.}$ = Observed hourly PM_{10} concentration. [µg/m^3]
$C_{bac.}$ = Background PM_{10} concentration
$C_{mod.}$ = Model-predicted hourly PM_{10} concentration. [µg/m^3]

5.2.6 Screening Hourly K-factors

K-factors will be calculated for every hour that has active sand flux in cells upwind from a PM_{10} monitor. These hourly K-factors will be screened to remove hours that did not have strong source-receptor relationships between the active source area (target area) and the downwind PM_{10} monitor. For example, the screening criteria will exclude hours when a PM_{10} monitor site is located on the edge of a dust plume. Because the edge of a dust plume has a very high concentration gradient, a few degrees error in the plume direction could greatly affect the calculated K-factor.

The following criteria will be used to screen the hourly K-factors:

<u>Initial K-factor Screen</u>

1) Wind speed is greater than 5 m/s at 10 m height at any network site.

2) Hourly modeled and monitored PM_{10} concentrations were both greater than 150 µg/m^3 at the same monitor-receptor site.

3) Hourly wind direction as listed in Table 5.1 for each monitor site.

4) The mean sand flux for all sites with non-zero sand flux is greater than 0.5 g/cm^2/hr.

<u>Final K-factor Screen</u>

5) At least one sand flux site located within the target area and within a 30-degree upwind cone has sand flux greater than 2 g/cm^2/hr.

6) All sources are within a distance of 15 km of the receptor.

7) More than 65 percent of the PM_{10} contribution at a monitor site came from the target source area (North Area, South Area, Central Area or Keeler dunes).

8) Eliminate hours when sand flux data are missing from one or more cells that are located within a 30-degree upwind cone and within 10 km of the shoreline monitor. For Olancha and Lone Pine, which are both located 5 to 10 km from the lake bed, the distance limitation is changed to 10 km upwind of the shoreline.

Table 5.1 Wind Directions for the Initial K-factor Screen

PM_{10} Monitor Site	From-the-Lake Wind Dir. (Deg.)	Met Tower
Lone Pine	$110 \leq WD \leq 190$	Lone Pine
Keeler	$130 \leq WD \leq 330$	Keeler
Flat Rock	$210 \leq WD \leq 360$	Flat Rock
Shell Cut	$WD \geq 210$ or $WD \leq 50$	Shell Cut
Dirty Socks	$WD \geq 220$ or $WD \leq 65$	Dirty Socks
Olancha	$WD \geq 320$ or $WD \leq 55$	Olancha
Bill Stanley	$50 \leq WD \leq 190$	Bill Stanley
New Sites	TBD	TBD

The from-the-lake wind directions for the initial K-factor screening criterion 3) are shown in Table 5.1. From-the-lake wind directions for any new PM_{10} sites will be determined by the APCO as needed for the initial K-factor screen. Note that 'From-the-Lake' wind directions for assessing the lake bed impacts at PM_{10} monitor sites (see 2008 SIP) are different from these K-factor screening wind directions.

Hourly K-factors that pass through the screening criteria will be used to develop new event-specific spatial K-factors, and new 75-percentile hourly average temporal and spatial K-factors, if enough K-factors are available.

5.3 Temporal and Spatial Event-specific K-factors

5.3.1 Event-Specific K-factors

Screened hourly K-factors will be used to generate event-specific K-factors for the active source areas. The event-specific K-factor will be calculated as the arithmetic average using all the hours when the hourly K-factor passes the screening criteria for the target area.

5.3.2 Temporal & Spatial 75-Percentile K-factors

The statistical 75-percentile value will be determined from the distribution of the hourly K-factors that pass the screening criteria for that area and period, whenever there are nine or more hourly K-factors. The 75th percentile will be calculated using the Microsoft Excel PERCENTILE function. The Microsoft Excel PERCENTILE function works by sorting values from lowest to highest, then assigns the 0th percentile is the lowest value, the 100th percentile is the largest value, and the values in between as (k-1)/(n-1) where n is the number of data values in the list and k is index of the kth lowest value in the list. Thus, each value is placed 1/(n-1) apart. If a requested percentile does not lie on a 1/(n-1) step, then the PERCENTILE function linearly interpolates between the neighboring values.

5.3.3 Default K-factors

Table 5.2 shows the default K-factors for each of the K-factor areas and periods. These K-factors are derived for the temporal and spatial 75-percentile values from the screened hourly K-factors for the 30-month Dust ID period used for the RSIP. Each of the two temporal periods combines hourly K-factors from the same calendar periods for 2 or 3 years.

Table 5.2 - Default Spatial and Temporal K-factors for the Dust ID Model

AREA	K-factor Jan.– Apr. & Dec.	K-factor May-Nov.
Keeler Dunes	7.4×10^{-5}	6.0×10^{-5}
North Area	3.9×10^{-5}	1.5×10^{-5}
Central Area	$12. \times 10^{-5}$	6.9×10^{-5}
South Area	4.0×10^{-5}	1.9×10^{-5}

6. Protocol For Dispersion Modeling

This section of the *Protocol* discusses the dispersion model methods planned for the simulation of wind blown dust at Owens Lake using data from the Dust ID Program. The modeling procedures follow the methods used in the RSIP, with refinements based on experience and modifications to support the provisions of the SCR. The modeling techniques will be used both diagnostically to infer emission rates for source areas and prognostically to predict PM_{10} concentrations at the historic shoreline. Following an overview of the modeling approach, the remainder of this section discusses construction of the meteorological data set, dispersion model options, background concentrations and source area characterization.

6.1 Overview of Modeling Procedures and Rationale for Model Selection

The CALPUFF modeling system was used in the RSIP and has been selected for continuing studies in the Dust ID Program. CALPUFF is the USEPA recommended modeling approach for long-range transport studies and USEPA has proposed CALPUFF as a *Guideline Model* to be

included in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W). Recently the modeling system is also being applied to near-field dispersion problems where the three-dimensional qualities of the wind field are important and for stagnation episodes when pollutants remain within the modeling domain over periods of several hours or more. Dust events on Owen Lake are sometimes influenced by complex wind patterns, with plumes from the North Sand Sheet traveling in different directions than plumes from the South Sand Sheet.

The proposed model domain shown in Figure 6.1 includes a 34 km-by-48 km area centered on Owens Lake. The meteorological and computational grid will use a one-kilometer horizontal mesh size with ten vertical levels extending from the surface to four kilometers aloft. The extent of the model domain was selected to include the "data rich" Dust ID Program study area, terrain features that act to channel winds, and receptor areas of interest. This same model domain and mesh size were used in the simulations supporting the RSIP.

6.2 Meteorological Data Set Construction

Three-dimensional wind fields for CALPUFF will be constructed from surface and upper air observations using the CALMET meteorological preprocessor program and the procedures employed in the RSIP. CALMET combines surface observations, upper air observations, terrain elevations, and land use data into the format required by CALPUFF. Winds are adjusted objectively using combinations of both surface and upper air observations according to options specified by the user. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model.

6.3 CALPUFF Options and Application

Surface Observations. The necessary surface meteorological data will come from the District's network of ten-meter towers shown in Figure 1.1. The District may also install additional stations to better characterize winds near suspect source areas not currently near an existing site. Very few periods of missing data are typically contained in the District's database. Periods of missing data will be flagged and CALMET will construct the wind fields using the data from the remaining stations. In addition to the District's network, surface data from other field programs at Owens Lake will be used when available.

Cloud Cover Data. The current version of CALMET also requires cloud cover and ceiling height observations. Cloud cover is a variable used by CALMET to estimate the surface energy fluxes and, along with ceiling height, is used to calculate the Pasquill stability class. Hourly cloud cover and ceiling height observations are being collected from the surrounding surface airways observations at China Lake and Bishop Airport. During dust event conditions, the sensitivity of the CALPUFF modeling system to these variables is reduced, as the stability class becomes neutral under moderate to high winds. Algorithms within the modeling system that depend on the surface energy fluxes are dominated by the momentum flux and tend to be insensitive to cloud cover under high winds. For these reasons, the absence of local cloud cover and ceiling height measurements are not expected to significantly affect the results of the modeling study.

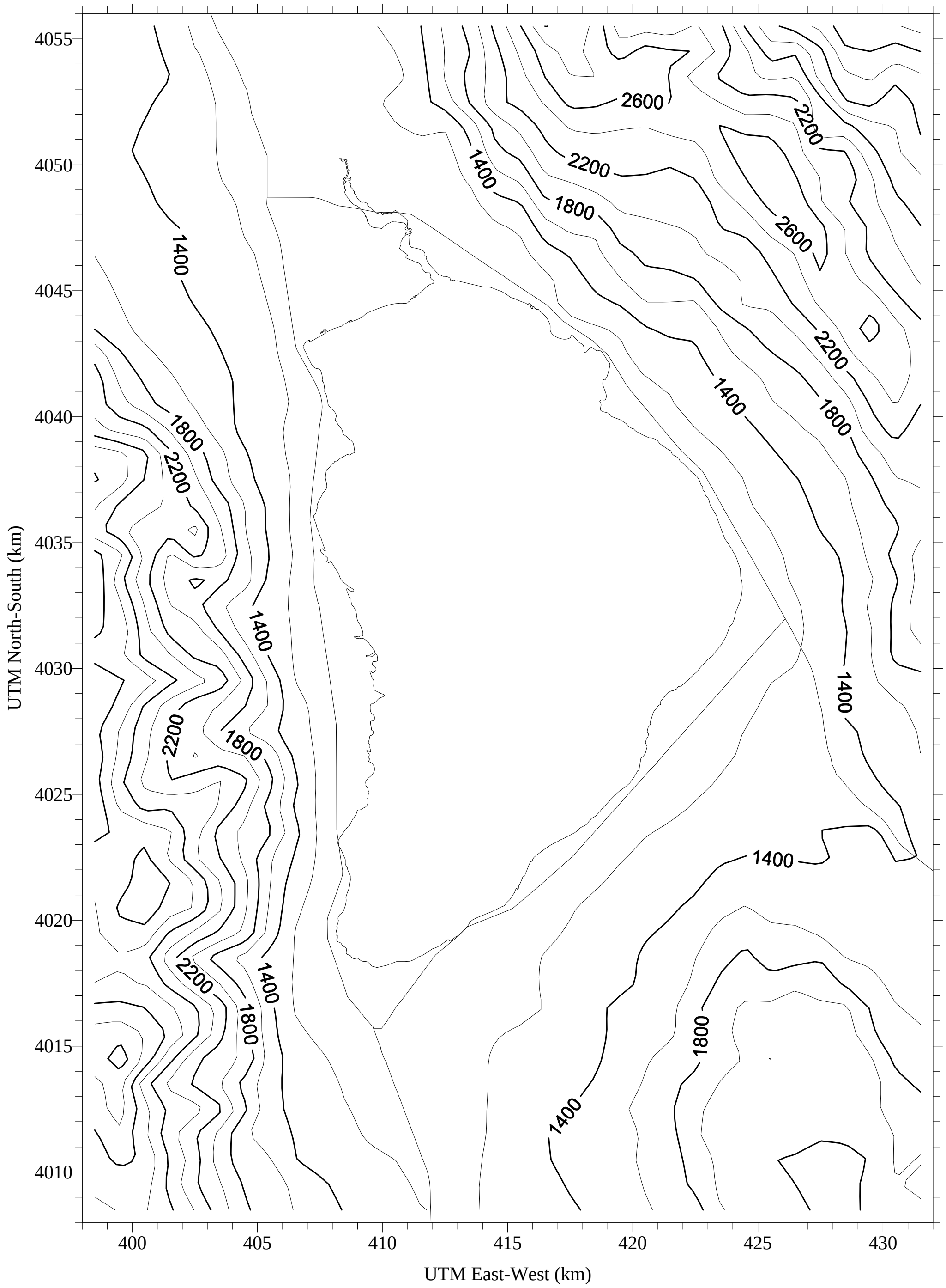

Figure 6.1 - Model Domain, elevation contours and UTM coordinates for the Dust ID Model

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Surface Characteristics and Terrain. The CALPUFF modeling system requires land use and terrain data. These data are used by CALMET to adjust the wind field and affect the calculations performed by the CALPUFF dispersion model. CALPUFF considers spatial changes in land use, including the surface roughness, and the input data are specified on a horizontal grid. The terrain data influence the constructed wind fields and plume trajectories in regions of sparse observations. Land use and terrain data have been obtained from the U.S. Geological Survey (USGS) data sets on the Internet. The resolution of these land use and terrain data sets are 200 m and about 30 m, respectively. The District has prepared these data sets using the pre-processing software provided with the CALPUFF modeling system. The resulting grids have been plotted and checked against data from the District's GIS database where the modeling domain overlaps the District's data. The 1-km mesh size terrain used by CALMET and CALPUFF is shown in Figure 6.1.

Upper air data. Upper air data will be collected from a number of different sources for construction of the wind fields and estimation of mixing heights with CALMET. In the RSIP, both local and regional data were collected as follows:

- A 915 MHz Radar Wind Profiler and Radio Acoustic Sounding System (RASS) were used to collect upper level wind and temperature measurements. The Wind Profiler was initially located at Dirty Socks then moved to the Mill Site during the 4th quarter of 2001. The District discontinued measurements with the Wind Profiler on June 30, 2003. The Wind Profiler with RASS samples wind and temperature from 100 m, up to 5000 m with a vertical resolution as low as 60 m depending on the clutter environment, atmospheric scattering conditions, and pulse length. Experience at Owens Lake indicates wind data recovery is sometimes poor above 1000 m due to the dry environment and the RASS data are limited to the lower levels during windy conditions.

- Regional twice-daily upper air soundings from Desert Rock Airport (Mercury, Nevada) and China Lake Naval Air Station.

During high wind events, observations from the Wind Profiler at both the Mill Site and Dirty Socks indicate very little wind speed or wind direction shear with height. Previous CALPUFF simulations suggest concentrations predicted at PM_{10} monitoring sites and at the historical shoreline are not usually influenced by upper level winds because the sources are ground based. The highest impacts occur close to the source areas, and there is very little wind shear during high winds.

Following removal of the Wind Profiler, soundings from China Lake and Desert Rock will be used to construct the data set. The China Lake and Desert Rock sounding will primarily be used for upper level temperature lapse rates. Winds aloft will be based on extrapolation of the surface wind measurements. The default algorithms employed by CALMET based on Similarity Theory often adjust the winds in the wrong direction and predict too much increase in wind speed with height even for very small surface roughness lengths. As an alternative, wind speeds aloft will be adjusted using the empirical results suggested by the previous Wind Profiler measurements. No wind direction turning with height will be assumed except near the Wind Profiler site where the actual data will be used until this program is discontinued.

CALMET options. The options employed for the application of CALMET to construct the wind fields were provided in the "Modeling Protocol" (MFG, 2001). The majority of the selected model options are based on the defaults incorporated in the code by the model author. Notable model options include:

- Ten vertical levels varying geometrically from the surface to 4000 m. The geometric spacing provides better resolution near the surface and the upper limit is high enough to be above the boundary layer height.

- Vertical extrapolation of surface winds aloft using the results of the Wind Profiler studies.

- Less than default smoothing of wind fields. LADWP contractors Air Sciences and Environ suggested less smoothing of the wind fields by CALMET after review of the *Owens Valley PM_{10} Attainment Demonstration Modeling Protocol*.

Wind fields constructed with CALMET will be randomly checked by plotting the resultant fields and the surface observations on a base map. The CALDESK™ software package will also be used to view the CALMET wind fields.

The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, the dispersion options also affect predicted PM_{10} concentrations. The model options used in the RSIP will continue to be used for the Dust ID Program. In this study, the following options will be used for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves. Sensitivity tests were also performed by applying CALPUFF with dispersion routines based on Similarity Theory and estimated surface energy fluxes. These tests did not indicate improved performance over the Pasquill-Gifford based simulations.
- Near-field puffs modeled as Gaussian puffs, not elongated "slugs." CALPUFF contains a computation intensive "slug" algorithm for improved representation of plumes when wind directions vary rapidly in time. This option was tested, but did not significantly influence the CALPUFF predictions.
- Consideration of dry deposition and depletion of mass from the plume. The particle size data used will be based on measurements taken within dust plumes on Owens Lake as discussed below.

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, *et al*. (1999), the CALPUFF simulations will assume a lognormal distribution with a geometric mean diameter of 3.5 µm and a geometric standard deviation of 2.2.

6.4 Background PM_{10} Concentrations

The dispersion model simulations include only wind blown emissions from the source areas with sand flux activity measurements. During high wind events other local and regional sources of fugitive dust can contribute to the PM_{10} concentrations observed at the monitoring locations. In the RSIP a constant background concentration of 20 µg/m^3 was added to all predictions to account for background sources. The constant background was calculated from the average of the lowest observed PM_{10} concentrations for each dust event when 24-hour PM_{10} concentrations at any of the sites were above 150 µg/m^3. To avoid including impacts from lake bed dust source areas in the background estimate, the procedures used a simple wind direction filter to exclude hours when the lake bed may have directly influenced observed PM_{10} concentrations. Such hours were removed and daily average background concentrations were recalculated based on the remaining data.

Additional PM_{10} monitors are proposed for installation at Owens Lake. These monitors can be used to measure hourly PM_{10} concentrations upwind from lake bed source areas. Some of these monitors may be representative of regional PM_{10} concentrations and others may be influenced by local sources that may indicate a higher PM_{10} concentration than the regional background level. A method to calculate background concentrations based on upwind monitor concentrations for each modeled-event approved by both the APCO and the General Manager of the LADWP may be developed in the future. Meanwhile, a default background of 20 µg/m^3 will be added to the model prediction for each receptor location.

6.5 Area Source Characterization

CALPUFF simulations at Owens Lake are sensitive to source configuration. Emissions will be varied hourly according to the methods described in Section 6.6 and dust sources represented as rectangular area sources. CALPUFF contains an area source algorithm that provides numerically precise calculations within and near the area source location. The area source configuration used for the Dust ID model run for the period from July 2002 through June 2003 is shown in Figure 6.2. The paired Sensit and CSC measurements were assumed to be representative of the horizontal sand flux for irregularly shaped source areas near the sand flux site. Field observers determined the size and shape of the source areas based on GPS mapping after the storms, observation maps made during the storms, and physical surface characteristics. All source areas were represented by sand flux measured at a single site that was applied to a series of 250 m x 250 m cells that were configured to conform to the general shape of the source area represented by the sand flux site.

The following general rules are used to characterize and map source areas on the lake bed:

- Actual source boundaries will be used when available to delineate emission sources in the simulations. Actual source boundaries will be determined using a weight-of-evidence approach considering visual observations, GPS mapping, and surface erosive characteristics. Erosive characteristics that might be considered when defining a source boundary include properties of the soil, surface crusting, wetlands, and the proximity of the brine pool and existing DCMs.

- Source boundaries will also be defined based on the DCM locations. For example, sand flux measurements outside the DCM will be assumed to apply up to the boundary of the DCM. Sand flux measurements inside the DCM will be assumed to apply to the area inside the DCM.

- All source areas will be represented by a series of 250 m x 250 m cells that generally conform to the shape of the source area and share the same hourly sand flux rates as the sand flux site representing that source area. Cells small than 250 m x 250 m may be used near the shoreline to better represent source areas where predicted concentrations are expected to be particularly sensitive to the source area configuration. (Figure 6.2)

6.6 Estimation of PM_{10} Emissions

Hourly PM_{10} emissions for each source area will be estimated using Dust ID sand flux data and K-factors following the procedures described in Section 5. See also SCR Section 1.2 and 2.1 regarding the order of priority for using K-factors for modeling.

6.7 Simulation of Shoreline Concentrations

Under the provisions of the SCR in the RSIP, CALPUFF simulations will be used to assess whether lake bed source areas cause or contribute to an exceedance of the PM_{10} NAAQS in areas without PM_{10} monitoring sites. Predictions will be obtained using the RSIP receptor network that contains more than 460 receptor locations placed at the historic shoreline (approximately at the 3600' elevation) of Owens Lake (see Figure 6.2). The receptor spacing along the historic shoreline ranges from 100 to 200 m. Note in several locations along the shoreline, receptors are very close to or even within potential source areas (see Figure 6.3).

7. Owens Lake Safety & Training Program

7.1 Objective

All field personnel that work at Owens Lake are required to complete special training courses to deal with the unique hazards and environmental precautions that must be considered when working on the lake bed. Training includes: first aid and CPR training, proper ATV use, respiratory protection and dust safety, lake bed access reporting, and snowy plover protection.

7.2 Safety Requirements

Safety is the first priority while working at Owens Lake. Training requirements are required for every worker at the lake for their own safety. Dust storms can start within minutes exposing workers to dust and sand. Lightning storms often occur in the summer. Winters have sub-freezing temperatures and summers have temperatures well above 100 degrees. Access is usually restricted to ATV’s and can change often throughout each year. The objective of all the training requirements is to put safety as the highest priority at all times.

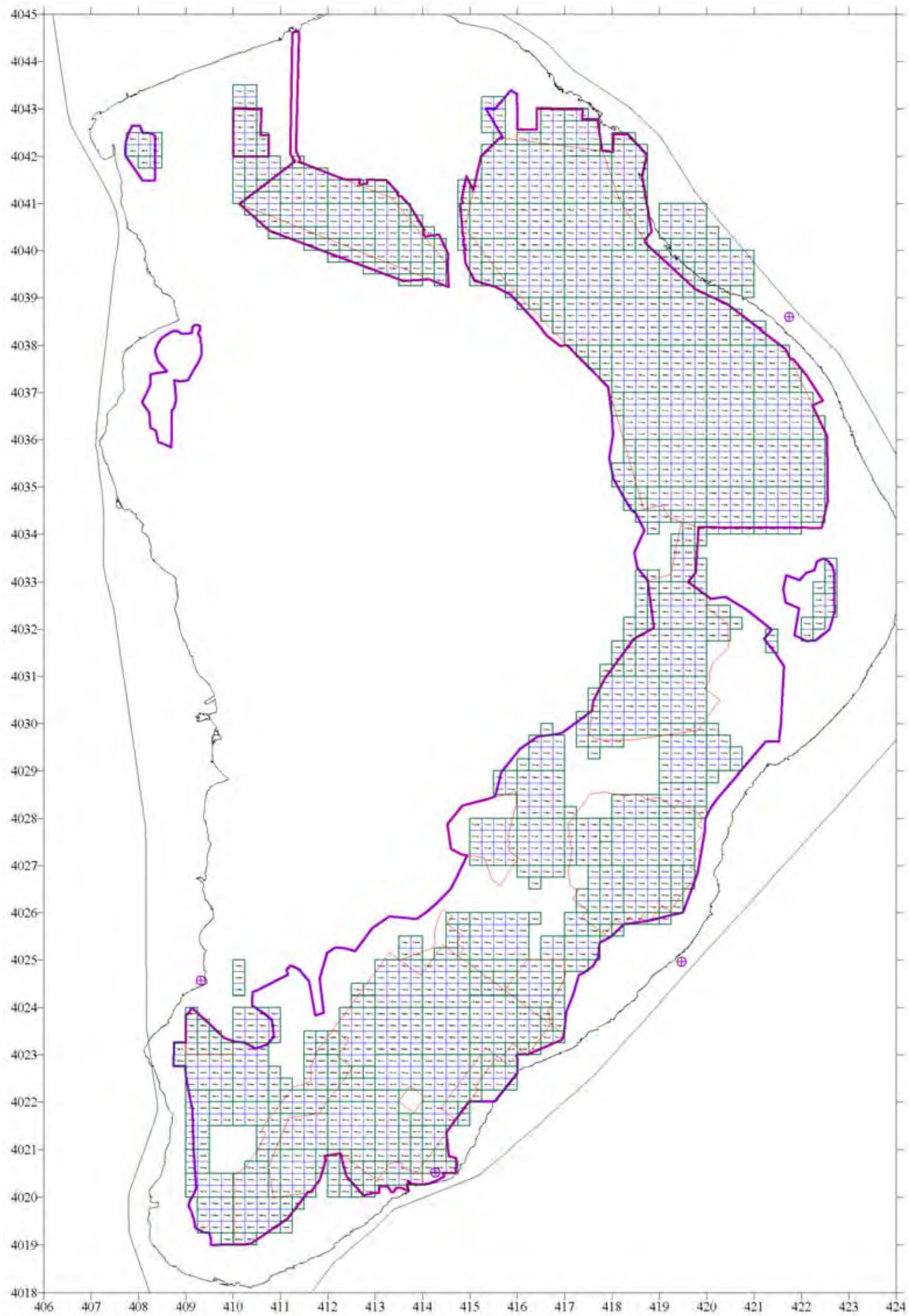

Figure 6.2 - Area source configuration using 250 m x 250 m cells for July 2002 through June 2003 Dust ID model run. Purple lines represent the control area boundary used with the Settlement Agreement.

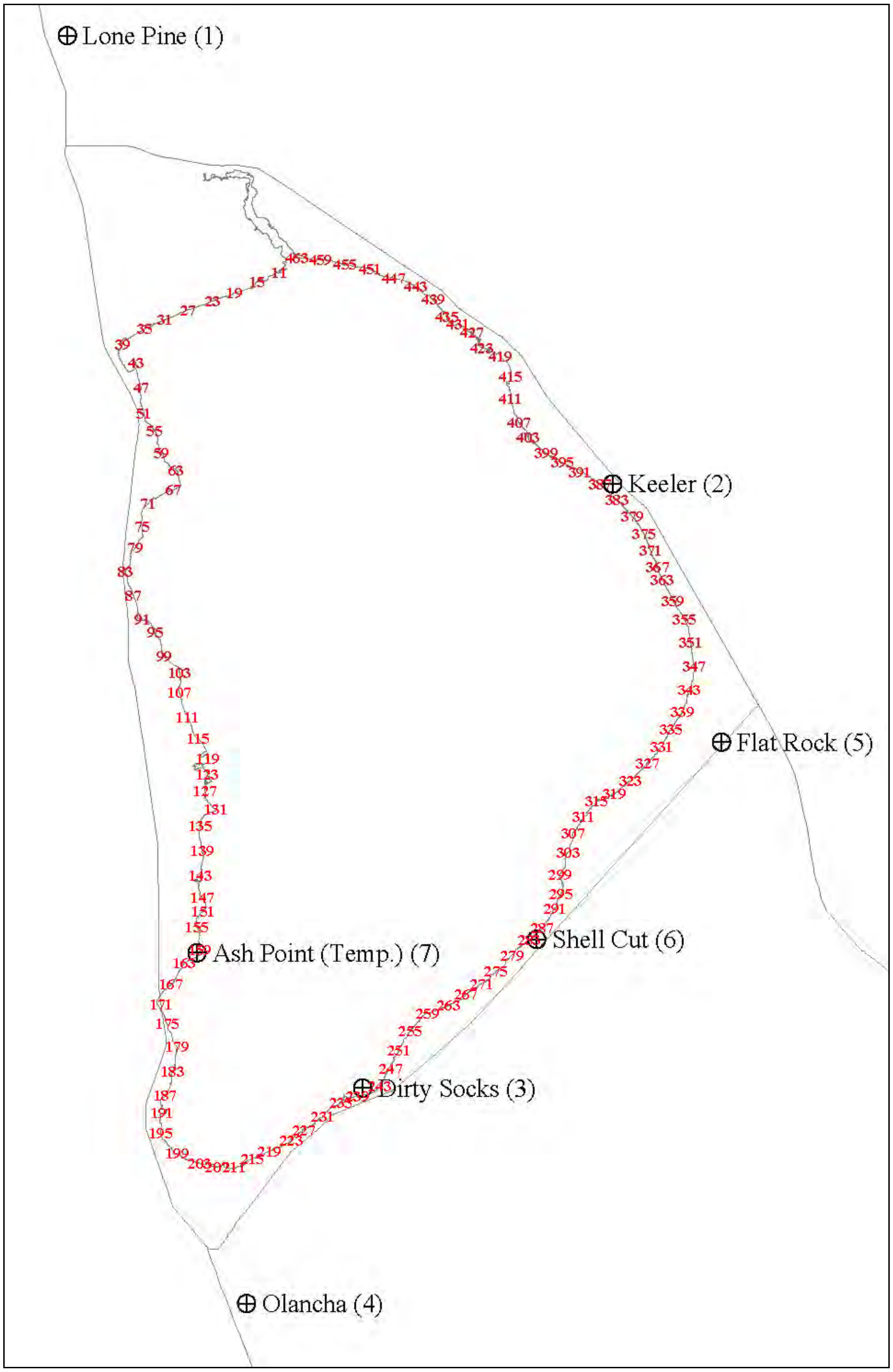

Figure 6.3 -The Dust ID model evaluates PM_{10} impacts at over 460 receptor locations around Owens Lake.

All personnel that are involved with any fieldwork under the Dust ID Program are required to complete all safety training before working on the lake. Everyone must report going onto and leaving the lake. Workers are required to stop work and leave the lake when a dust storm starts. Every field worker will be issued a respirator, goggles for eye protection and earplugs to be used when caught in a dust storm while leaving the lake. Workers are required to leave the Keeler office when the dust impacts Keeler and the TEOM monitor reading exceeds 1000 $\mu g/m^3$. Respirator training and face fits will be completed annually. First Aid and CPR training and successful certification is required every three years. Snowy Plover training is required before any new worker can start work on the lake. Other safety issues that all workers will be informed of include the proper use of tools, special weather conditions such as temperature extremes, rain and lightning and training in the operation of ATVs.

7.3 Reporting Procedure for Working on the Lake and Contacts

1. Normal work hours on the Owens Lake are defined as sunrise to 4:45 PM, Monday through Friday. The lake is defined as any area below the 3600 ft. contour.

2. Every person or group must call the Bishop office and leave a message or speak to the Administrative Specialist (AS) to notify that they are working on the lake. They also must inform the AS what area of the lake they will be working. Examples: DIVIT, Dirty Socks sand sheet, “A” Met tower or any commonly used identifiable name of a site or area you will be working.

3. The AS will record the person’s name (s) and area of the lake they are working on.

4. Every person or group working on the lake must notify the Bishop office before 4:45 PM on the same day; that they have left the lake OK. This must be done or a person will be sent out to look for you! False alerts will not be appreciated.

5. The AS will call the Director of Technical Services (DTS) in Keeler or one of the back up persons in order on the list below, and report the missing person if not notified before the specified time. An attempt will be first made to contact the missing person by phone and determine their situation. The DTS or an assigned person will begin a search for the missing person if the person cannot be contacted by phone. The search will continue until dark or unsafe conditions at which time the Inyo Sheriff will be notified for assistance.

6. Everyone may work outside normal work hours Monday through Friday <u>at your own risk.</u> However, they must call the Bishop office before the designated time and notify the AS that they will be working past 4:45 PM and call again and leave a message that they left the lake OK before 8:00 AM the next day.

7. The AS will check the messages every morning and record the information. The DTS will be notified if a person that worked after normal hours did not call and leave a message that they left the lake OK. The DTS or an assigned person will follow the procedure for a missing person outlined in step 5.

8. Nobody may work on the lake after 4:45 PM on Friday, all day Saturday or Sunday unless they receive special permission from their direct supervisor. The supervisor will be responsible for making sure the worker left the lake OK and responding to an emergency or search if necessary. The worker must notify their supervisor when they leave the lake OK during these periods.

Emergency Assistance Reporting Contacts and Phone Numbers (Area Code 760):

Call 911 first if you have an emergency!

Bishop Office AS	872-8211	
Bill Cox (DTS)	876-8103	Cell 937-2886
Earl Wilson	876-8104	Cell 937-1060
Nik Barbieri	876-1803	Cell 937-6696
Grace Holder	872-8211	Cell 937-2887
Guy Davis	876-8115	Cell 937-1766
Dan Johnson	876-4544	Cell 937-1715
Ted Schade	872-8211	Cell 937-3360

7.4 Snowy Plover Training and Other Wildlife Protection Procedures

Field technicians and other District personnel and contractors are required to take precautions to avoid disturbing western snowy plovers during the nesting and brooding season which is from March 15 through August 30 each year. All lake bed personnel must complete snowy plover awareness and avoidance training before venturing onto the lake bed during snowy plover season. A qualified biologist will provide training for all lake bed personnel. In addition to completing snowy plover training, the plover protection program requires the following:

- Report snowy plover sightings to the District’s biological resources monitor for dissemination to all lake bed personnel and for scientific data collection purposes. The biological resources monitor will map and mark the sightings in the case of nesting pairs, and will map the last known locations of broods. Lake bed workers will be responsible for checking the latest maps before encroaching onto potential snowy plover use areas.

- If snowy plover nests are found within areas of potential conflict with Dust ID monitoring, they will be marked in the field with green stakes. Within the buffer area demarked by stakes, the maximum allowable time per visit is 10 minutes.

- Field personnel should use established ATV and 4WD vehicle trails to approach and depart monitoring sites. The maximum allowable speed on ATV and off-road 4WD on the lake bed is 15 mph during the snowy plover season.

All existing and new Dust ID monitoring installations will be fitted with raptor perching deterrent (eg., Nixalite) at potential perch sites with a height of greater than 60 inches above the

playa surface. Maintenance of perching deterrents will be routinely performed. Any new construction that causes new ground disturbance during the snowy plover season will require a pre-construction survey for snowy plover use. A qualified biologist will perform the survey within 1 week prior to the start of construction.

Monitoring will be performed on site in a manner that is least disturbing to wildlife and plant resources as possible. Potentially affected upland resources (those located outside the playa) that could be disturbed during any new ground-disturbing construction activities were identified during District environmental analyses. The animals that use upland areas vary seasonally, with nesting and foraging birds, mammals, reptiles, and invertebrates occurring during the period of dust monitoring. No special training is required to work in upland areas during the dust monitoring season, however pre-construction wildlife and rare plant surveys are required if placement of new facilities at any time of year will cause new ground disturbance.

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Board Order 080128-01
Attachment D

2008 Procedure for
Modifying Best Available Control Measures (BACM)
for the Owens Valley Planning Area

The City may transition from one approved BACM to another provided that the performance standard of one or the other BACM is met at all times during the transition, and that the City makes a complete and technically well-supported written demonstration of that performance, with a built-in margin of safety, to the satisfaction of the APCO in advance of any actions by the City to transition. There are three circumstances under which temporary modifications may be allowed to the BACM identified in this SIP, if certain conditions are met. The circumstances are:

1. Adjustments to existing BACM. Research to demonstrate that sufficient PM_{10} control efficiency during the dust season can be achieved and the NAAQS can be attained everywhere on or above the historic shoreline with a different performance standard for an existing BACM.

2. Research on new BACM

3. Transition from one BACM to another that requires a time period where neither BACM's performance standards can be met.

The City may make an application for any of these modifications in writing to the APCO. The complete application must include all necessary data and other technical information to support the application. Except for the specific limitations set forth below for BACM adjustments to Shallow Flooding, the APCO shall have full and sole discretion to accept, reject or condition the City's application for modifications to BACM on Owens Lake, to require additional technical information, and/or to independently monitor the results of the project, and shall provide her/his decision in writing. This same discretion shall apply to the APCO's consideration of each of the other applications that the City may make as further described below. The APCO will consider and respond to comments made by the City regarding any decision by the APCO to reject, condition or modify an application. Failure by the City to comply with any condition of the project approval may result in the APCO revoking the project approval and directing closure procedures be implemented for the project.

The flexible BACM description under the terms of the Order preclude the application of the U.S. Environmental Protection Agency's Natural Events Policy for monitoring data used to make the determinations in this Attachment. All monitored PM_{10} concentrations that meet the EPA quality-assurance requirements contained in 40 CFR Part 58 and are measured at stations located at or no more than 3 kilometers above the historic shoreline (shoreline monitors) will be used in the analysis. The monitored values will be used as measured, and will not be adjusted for from-the-lake and non-lake wind directions as they are for the Supplemental Control Requirements.

The modeling for the determinations will be performed in accordance with the 2008 Owens Lake Dust Source Identification Program Protocol (Board Order 080128-01, Attachment C).

1. ADJUSTMENTS TO EXISTING BACM

A. BACM Adjustments to Shallow Flooding

1. After approval of the 2008 SIP, the City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the boundaries of the 2003 Dust Control Area (Shallow Flood Cover Test).

   A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.

   B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.

   C. The City will be CEQA lead agency for the Shallow Flood Cover Test and shall secure all required responsible agency approvals, permits and leases.

2. If the APCO reasonably determines in writing that the PM_{10} Dust Control Measures in the 2008 Total Dust Control Area (TDCA) have been operational for one continuous year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the 2008 TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over those Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section A.2.C, below, provided that:

   A. Application of the 10 percent reduction in wetness cover during the May 16 through June 30 Shallow Flood areal wetness cover reductions provided for in Paragraphs 15.A.ii and 15.B.ii of Board order 080128-01 shall result in the lower of:

      i. The areal cover resulting from a 10 percent reduction; or

      ii. The areal cover required in Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.

   B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

i. The results of testing carried out pursuant to Section A.1, if conducted; and

ii. The results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.

C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.

D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the 2008 TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in the “2008 Owens Valley Planning Area Supplemental Control Requirements Procedure” (Attachment B) and subject to the provisions of Section A.4, below.

E. Except as provided in Section A.4, below, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.

3. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section A.2, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM_{10} concentrations at the historic shoreline.

4. Any areas for which wetness cover has been reduced pursuant to Section A.2 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan prepared pursuant to the requirements of Attachment B.

A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section A.2 provided that:

i. The maximum 24-hour PM_{10} shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 $\mu g/m^3$; and

ii. The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time period set forth in

Section A.4.A.(i) plus the background of 20 μg/m^3 do not exceed 120 μg/m^3 at the historic shoreline.

B. If the monitored values at the historic shoreline exceed 130 μg/m^3, and it is determined that non-lake bed sources are contributing greater than 20 μg/m^3, then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.

C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:

   i. A map that depicts the eligible Shallow Flood areas;

   ii. The proposed amount of wetness cover for each eligible Shallow Flood area; and

   iii. The method for determining effectiveness of the proposed wetness cover.

D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

B. BACM Adjustment to Measures Other than Shallow Flooding within Existing Dust Control Areas

<u>Requirements to Begin the Process</u>
At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether the Owens Lake bed will require additional PM_{10} controls in order to attain or maintain the federal 24-hour PM_{10} NAAQS. The APCO will use the procedure forth in Board Order 080128-01 to make the determination.

If the APCO determines that there were no monitored or modeled exceedances of the PM_{10} NAAQS as described above for the previous calendar year, each calendar year the APCO will do the following:

1) determine from the modeling if there are shoreline receptors where the model shows the combined predicted yearly maximum 24-hour contribution from all source areas on the lake bed contributing to those receptors plus background (24-hour average of 20 μg/m^3) is less than 120 μg/m^3, and

2) determine that there were no concentrations greater than 120 μg/m^3 measured at any shoreline or near-shore monitoring site in the area of those receptors.

The City may perform an independent assessment using the data and methods of the Dust ID Protocol in order to confirm the APCO's findings. The APCO will consider and respond to the

City’s assessment before making his/her final determination. The APCO has full and sole discretion to make this determination.

First Step on Test Areas

If there are receptors that meet the requirements described above, and provided that the City is in compliance with SIP control requirements on all areas of the lake bed, the APCO will inform the City that they may submit an application to reduce the level of control within a 1 to 2-square-mile test area of an existing Shallow Flooding Dust Control Measure (DCM) area or within a 160 to 320 acre test area of an existing Managed Vegetation DCM area that the modeling shows contributes to, and only to, the shoreline receptors described above where the yearly maximum 24-hour contribution from the lake bed plus background is less than 120 μg/m^3. Application may be made for more than one area to be tested simultaneously provided the test areas do not impact any of the same modeled shoreline receptors or monitors (no overlapping impacts). The above limitations on test area size and location do not apply outside the boundaries of existing Dust Control Areas.

For the Managed Vegetation DCM, the cover may be reduced by no more than 5%, e.g. 50% to 45%, (one step). For other BACM or changes to compliance averaging areas (e.g., one acre for Managed Vegetation), the APCO will determine the permitted test area size, averaging area, test location and step amount. An area with a non-zero contribution to a receptor will be considered not to contribute to a receptor if the contribution from that area is less than 5 μg/m^3 and the yearly maximum 24-hour contribution from the lake bed plus background (20 μg/m^3) to that receptor is less then 140 μg/m^3. (A “zero contribution” is defined by the accuracy of the instruments used to collect the data, but in no case shall it be greater than 1 μg/m^3.) The City may also satisfy the requirements of a BACM test for Managed Vegetation with documentation of a site-specific BACM test, along with written justification for more general application of the results of this test.

The City’s application to reduce the level of control over any area within the boundaries of existing Dust Control Areas must be accompanied by a modeling analysis that demonstrates that increasing PM_{10} emissions within the test area will not cause the predicted yearly maximum 24-hour concentrations along the shoreline to exceed 120 μg/m^3, including background (20 μg/m^3).

The application must also include, but is not limited to:

1) a project description,
2) site plan,
3) any necessary environmental documentation, responsible agency approvals, permits and leases,
4) a protocol to measure PM_{10} emissions and performance standards,
5) a time frame for project milestones and completion,
6) plans to control PM_{10} emissions if they exceed project limits,
7) project closure procedures if the project is discontinued,
8) soil texture information, soil chemistry, groundwater chemistry and applied water chemistry, and

9) a protocol to evaluate control effectiveness, estimate emissions and determine whether the results are transferable to other areas of the lake bed.

For BACM other than Shallow Flooding, the City will submit a relationship between control efficiency and performance standards based upon research results. The APCO has full and sole discretion to accept, reject, or modify that relationship. All modeling will be done according to the Dust ID Protocol.

Rectified aerial or satellite images of the area of adjusted BACM, or any other method approved by the APCO, will be used by the APCO to determine the performance standards for the adjusted BACM for this step and all subsequent steps.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the test at any time if modeling or monitoring show that modeled (including background of 20 μg/m^3) or monitored emissions are increasing above trigger levels set by the APCO based upon a 140 μg/m^3 modeled or monitored PM_{10} concentration at the shoreline, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

The APCO has full and sole discretion to approve or reject the City's application or require conditions. The APCO will take action and notify the City in writing within 90 days of receipt of the written application. No changes may be made to BACM in advance of the APCO's approval. Any adjustments to BACM will be reported to EPA by the APCO within 60 days of the APCO's approval.

<u>Subsequent Steps on Test Areas</u>
The adjusted BACM shall be maintained by the City for one year. No other adjustments to BACM may be made during that year that impact any of the same set of model shoreline receptors. At the end of the year, the City may submit a new application to the APCO to reduce the level of control in the test area by another step provided:

1) the modeled yearly maximum 24-hour contribution at all of the shoreline receptors identified above from all lake bed sources including the test area, plus background (20 μg/m^3), during the test period is less than 120 μg/m^3, and

2) no concentrations greater than 120 μg/m^3 were measured at any shoreline monitor in the area of those receptors during the test period.

The new application must contain all the same elements as the original application, and all the data and modeling from the first step of the test.

The APCO has full and sole discretion to approve or reject the City's application, or to require conditions. Subsequent steps may be made in the same manner. The APCO will take action and notify the City in writing within 90 days of receipt of the written application.

Requirement to Increase Controls on Test Areas

If, at the end of the year or any subsequent year before the SIP Revision to adjust BACM is approved by USEPA, the predicted yearly maximum 24-hour contribution from all lake bed sources including the test area plus background (20 $\mu g/m^3$) exceeds 140 $\mu g/m^3$ at any of the shoreline receptors identified above, and/or concentrations greater than 140 $\mu g/m^3$ were measured at a shoreline monitor in the area of the identified receptors, then the City must increase the control efficiency on the test area to the last step that achieved concentrations below the 140-$\mu g/m^3$ threshold. For Managed Vegetation, this action must be taken within 12 months of the written determination by the APCO that the requirements for adjusting BACM were not met. For all other PM_{10} control measures, this action must be taken within 60 days of the written determination by the APCO that the requirements for adjusting BACM were not met. The APCO has full and sole discretion to make that determination. The APCO will determine the time scale for compliance for other BACM as part of the approval of the application.

SIP Revision for BACM for the Test Area

After three consecutive years of successful operation of the adjusted-BACM test area (modeled and monitored concentrations less than 140 $\mu g/m^3$ as described above), the City may apply to the District for a SIP Revision to redefine BACM for that test area on the Owens Lake bed provided:

1) the predicted yearly maximum 24-hour PM_{10} contribution for each year of the test from the test area plus background (20 $\mu g/m^3$) at all shoreline receptors is 140 $\mu g/m^3$ or less, and

2) no PM_{10} concentrations greater than 140 $\mu g/m^3$ were measured at any shoreline monitor during the three years of the test.

The APCO has full and sole discretion to determine whether these conditions have been met. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP revision.

Lake-Wide SIP Revision for BACM for a Soil Type

If, after three consecutive years of successful operation of the adjusted-BACM test area, the predicted yearly maximum 24-hour contribution from the test area and all source areas on the lake bed plus background (20 $\mu g/m^3$) at all shoreline receptors for all three years of the test is 140 $\mu g/m^3$ or less and no concentrations greater than 140 $\mu g/m^3$ were measured at any shoreline monitor during the three years of the test, the research conducted on these test areas can be used to determine the relationship between the PM_{10} emissions, control efficiency and DCM performance standards. After the relationship has been identified, the City will use the research results in an updated modeling analysis that applies the test results to other areas on the lake bed with the same general soil type (sand-dominated, silt-dominated or clay-dominated) and under the same range of evaluated emissions or control efficiencies and performance standards as the test. The modeling will cover the entire test period, and will be done in accordance with the Dust ID Protocol. A DCM control map (map) will be prepared of lake bed control efficiencies (with corresponding DCM performance standards) that would be required to achieve the PM_{10} NAAQS everywhere along the historic shoreline with that DCM in the same general soil type

(sand-dominated, silt dominated or clay-dominated) as the test area and under the same range of control efficiencies, emissions, and performance standards evaluated in the test.

The City will then submit this draft map to the APCO for approval. The submittal must contain all the data from the test area and the modeling that produced the map. The APCO has full and sole discretion to approve, disapprove, or modify the draft map.

If the APCO approves the map, the City may apply to the District Board for a SIP Revision to redefine that BACM for that mapped area on the Owens Lake bed. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP Revision. If a SIP Revision identifying a redefined BACM for Owens Lake is adopted by the District Board and approved by USEPA, the redefined BACM may be implemented anywhere designated by the new DCM control map. If the City has implemented a different DCM in the mapped area, the requirements of the following section below titled “Transitioning From One BACM to Another BACM After 2010” must also be met. If any modeled or monitored exceedance of the PM_{10} NAAQS results from these adjustments to BACM, the requirements of Board Order 080128-01, Paragraphs 10 and 11, will automatically apply to increase controls on these extreme violators to restore attainment of the NAAQS.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing adjustments to existing BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

2. RESEARCH ON POTENTIAL NEW BACM INCLUDING MOAT ROW

The City may test new dust control measures at any time on areas of the lake bed that are emissive, except within the 43.0 square-mile 2008 Total Dust Control Area footprint where BACM (or on up to 3.5 square miles, the non-BACM dust control known as Moat & Row) must be implemented by April 1, 2010 or within any Supplemental Control Area where existing BACM has been implemented or is scheduled for implementation. This testing area exclusion does not apply to Moat & Row PM_{10} controls constructed within the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA). The City may test up to 3.5 square miles of Moat & Row within the SDCA. If the City has tested a new control measure for three years in this manner, it may apply in writing to the APCO for a SIP Revision to designate the new dust control measure as BACM. The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO’s satisfaction that the new control measure is sufficient to achieve the required PM_{10} emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.

The application shall include, but not be limited to:

1) a description of the new dust control measure

2) a description of the test site and the meteorological conditions under which it was tested
3) the measured PM_{10} emissions during the test
4) the test time frame
5) all raw data collected during the test
6) all data screening criteria and final data sets
7) data supporting the conclusion that the required control efficiency was achieved
8) a performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency
9) an analysis of any environmental impacts of the dust control measure
10) the appropriate responsible agency approvals, permits and leases

The application must include modeling that demonstrates that the required PM_{10} emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historic shoreline.

If the APCO determines that the application is complete and the above conditions have been met, he/she will have full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard and include that method in the description of the proposed BACM for the SIP Revision. The District Governing Board has full and sole discretion to determine whether to adopt a SIP Revision for approval of any new BACM.

Upon adoption by the District Board, approval by CARB, and submission to USEPA of a SIP Revision that identifies a new BACM for Owens Lake, the City may implement only this one new control measure on one-half square mile of the next area to be identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. No other new control measures may be implemented on areas identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. The District Governing Board may limit the new BACM to specific circumstances, for example, distance of the new dust control measure from the shoreline or approval in a specific general soil type. Upon approval by USEPA, the new BACM may be implemented per the requirements described in the following section, “Transitioning From One BACM to Another BACM After 2010,” or on any subsequent areas requiring control under the “2008 Owens Valley Planning Area Supplemental Control Requirements Procedure” (Board Order 080128-01, Attachment B), subject to any limitation to specific circumstances.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing any BACM test or new BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

3. TRANSITIONING FROM ONE BACM TO ANOTHER BACM AFTER 2010

If the City wishes to transition from one existing BACM to another existing BACM without meeting the performance standard of one or the other BACM at all times, it may submit an application to the APCO in writing for permission to do so after April 1, 2010. The APCO has full and sole discretion to accept, reject or condition the City's application. The transition may be done on no more than one and one-half (1.5) square miles lake-wide for any BACM except Managed Vegetation, or 320 acres lake-wide if the transition is to Managed Vegetation, at one time. The City shall not begin the transition in advance of the APCO's written approval.

The application shall include, but not be limited to:

1) a protocol that includes a project description
2) a site plan
3) a plan to measure PM_{10} emissions
4) a time frame for project milestones and completion
5) plans to control PM_{10} if emissions exceed any trigger value set by the APCO based upon a 140$\mu g/m^3$ modeled (including background of 20$\mu g/m^3$) or monitored PM_{10} concentration at the shoreline
6) data supporting the assumption that the transition can be completed and the BACM performance standards can be achieved within three years of the start-up of construction
7) project closure procedures if the project is discontinued for any reason or if the PM_{10} trigger value is exceeded
8) any necessary environmental documentation, responsible agency approvals, permits and leases

The protocol must include modeling in accordance with the Dust ID Protocol that predicts that the NAAQS will be met at all times everywhere on the shoreline during the transition period, and must include a method to monitor emissions continuously throughout the transition period. The transition must be complete, and the new BACM performance standard achieved, within three years of written notification from the City to the APCO that they are no longer maintaining the performance standard for the existing BACM, and are beginning the transition.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the transition at any time if modeling or monitoring show that emissions are increasing above any pre-set trigger level described in 5) above, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

If the data show to the APCO's satisfaction that the transition has been accomplished while attaining the NAAQS everywhere at the shoreline, the City may submit an application to the APCO to allow another area to be transitioned. The APCO has full and sole discretion to accept, reject or condition the City's application. The same procedures outlined above will apply.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to BACM transitions. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

Great Basin Unified Air Pollution Control District

2013 Amendment to the Owens Valley PM_{10} SIP

Board Order 130916-01

Exhibit 2: District Hearing Board Order GB09-06, Findings and Order Granting Regular Variance from Requirements Set Forth in Governing Board Order 080128-01, September 25, 2009

BEFORE THE HEARING BOARD

OF THE

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

VARIANCE REQUEST

Petitioner:
City of Los Angeles
Department of Water & Power
111 North Hope Street, Suite 340
Los Angeles, California 90012-2607

Request Received: August 21, 2009

Facility Location:
Owens Lake Dust Mitigation Project
111 Sulfate Road, Keeler, CA 93530

Docket Number: GB09-06

FINDINGS AND ORDER GRANTING REGULAR VARIANCE FROM REQUIREMENTS SET FORTH IN GOVERNING BOARD ORDER 080128-01

Hearing Date: September 25, 2009

BACKGROUND

The City of Los Angeles Department of Water and Power (Petitioner) submitted a variance petition to the Great Basin Unified Air Pollution Control District (District) Hearing Board on August 21, 2009 pursuant to California Health and Safety Code Section 42350 and District Regulation VI (Rules 600 *et seq.)* Petitioner requested consideration of a variance to temporarily relieve it from the obligation to comply with District Board Order 080128-01, paragraphs 3, 7 and 10 and for one year of regulatory relief from October 1, 2009 deadline set forth in said order to complete 3.5 square miles of alternative experimental dust control measure (DCM) known as “Moat & Row” on the dried bed of Owens Lake, California.

As described in the variance petition, Petitioner contended that delays in securing approvals for their Moat & Row project from State Lands Commission and California Department of Fish and Game will cause the 3.5 square-mile project to be completed one year late, by October 1, 2010. Petitioner contended that the delays were beyond its reasonable control. However in order to offset the excess air pollution emissions caused by the one year delay, Petitioner agreed to two additional dust control projects.

PROCEEDINGS

Pursuant to District Rule 617, upon receipt of the petition, the Air Pollution Control Officer (APCO) transmitted the Petition together with the APCO’s recommendation to grant the regular variance to the Hearing Board. The recommendations were set forth in the Staff Report for this matter, which is on file with the Hearing Board.

Pursuant to Government Code 42359.5 and District Rule 16, with notice and hearing, the Hearing Board considered the Petitioner’s Regular Variance petition and the District’s recommendations on September 25, 2009 in the Town of Mammoth Lakes Council Chambers, 437 Old Mammoth Road, Suite Z, Mammoth Lakes, California 93546, with participation and sworn testimony from Ted Schade, GBUAPCD APCO; Grace McCarley Holder , GBUAPCD Playa Geologist; William VanWagoner, Milad Taghavi, Brian Tillemans and Gene Coufal, City of Los Angeles Department of Water and Power. Tori Jenkins, Clerk of the Board; Julie Conboy Riley and David Hodgekiss, Counsel for the City of Los Angeles Department of Water and Power; George Poppic of the California Air Resources Board, Representing Counsel for the Hearing Board; and Mel Joseph of the Lone Pine Paiute Shoshone Reservation were in attendance. After hearing all testimony and considering all evidence, the Hearing

Board made the Findings and granted the issuance of a Regular Variance subject to certain conditions as set forth below.

FINDINGS

The Hearing Board makes the following findings as required by Sections 42352 and 42353 of the California Health and Safety Code:

1. Petitioner will be in violation of District Board Order 080128-01, Paragraph 3, which requires Petitioner to have any Phase 7 Moat & Row DCM operational by October 1, 2009.
2. Due to conditions beyond the reasonable control of the Petitioner, it has been prevented it from completing the Moat & Row DCM by the October 1, 2009 deadline specified in the Board Order. There is no practical method to achieve compliance with the Board Order sooner than through a time extension to complete the Dust Mitigation Project, Moat & Row. Closing the Los Angeles Aqueduct would not alleviate the PM10 emission problem. Immediate compliance would impose unreasonable burden upon an essential public service.
3. There would be no corresponding benefit to the closing or taking of the Los Angeles Aqueduct. Closing the aqueduct would not be an expeditious means of controlling emissions from the 3.5 square-mile Moat & Row project area. The 3.5 square-mile Moat & Row project area is made up of seven small sub-areas, none of which have existing water-delivery infrastructure. Controlling the emissions from these widely dispersed areas by closing the Aqueduct and redirecting its waters onto the Owens Lake bed via the Owens River would take the full flow of the Aqueduct for 5 to 20 years.
4. Applicant has considered curtailing operations, however, such action would not lead to compliance with the Board Order, nor would it provide any immediate control of the emissions

associated with the 3.5 square-mile Moat and Row area. Closing the aqueduct would cause considerable hardship to the City of Los Angeles.

5. Petitioner has committed to control excess emissions from the Owens Lake bed to the maximum extent feasible during the period the variance is in effect. Petitioner proposes two methods during two periods.

The first period is the six months from October 1, 2009 until April 1, 2010. Petitioner will be continuing construction of the 9.7 square-mile of Phase 7 Shallow Flooding DCMs during this period. The Board Order requires the additional 9.7 square-miles of Shallow Flooding control to be operational by April 1, 2010. Petitioner is committed to providing at least 3.5 square-miles of temporary dust control within the 9.7 square-mile Phase 7 project by area by October 1, 2009. The temporary control will be provided by tilling 3.5 square-miles of clay soils up into very large clods that will increase the surface roughness of the lake bed and temporarily prevent emissions. Based on various studies conducted, Petitioner believes tilling will provide at least six months of sufficient control. As the Petitioner completes the Shallow Flooding construction in the tilled areas, water will cover the tilled surfaces and permanent control will be established. Petitioner is expediting control via tilling method in areas already scheduled for control by April 2010.

The second period for required emission reduction is the six-month period between April 1, 2010 and October 1, 2010. Petitioner is unable to provide direct on-lake bed offsets of the emissions from the 3.5 square-mile of Moat & Row are during this six month period because required DCMs will occupy all lake bed areas (39.5 square miles) for which Petitioner has permits and approvals.

However, the District's air quality monitoring indicates that there are additional areas on the lake bed, beyond the 43 square miles currently ordered (39.5 square-miles with permits and

3.5 square-miles of Moat and Row), that require controls. District and Petitioner staffs have preliminarily identified two square miles that were emissive during the 2007 through 2009 period. However, the 2008 SIP and Board Order prevent the District from ordering controls on much of these areas until possibly well after May 1, 2010.

Petitioner has agreed that, as an offset to the emissions that will occur from the 3.5 square-mile Moat & Row area, it will immediately begin the regulatory approval process required to construct two additional square miles of BACM dust controls on the lake bed and will complete those controls six months earlier than would ordinarily be required by the 2008 SIP. Because Petitioner is starting the process seven months earlier than the earliest it would normally start under an order from the District and it will complete the DCMs six months earlier than provided in the 2008 SIP, necessary dust controls will be in place on the lake bed more than a year earlier than under the normal procedures. The additional two square miles of expedited dust controls offsets the six months of excess emissions from the 3.5 square-mile Moat & Row area.

6. The District has an extensive air and emissions monitoring program at Owens Lake and will continue to operate the program and quantify dust emissions from the lake bed, including areas subject to this variance request. Petitioner provides annual funding through assessments levied by the Governing Board to conduct this monitoring.

7. Petitioner will continue to operate between 29.8 and 39.5 square-miles of DCMs on the lake bed during the one-year variance period. The existing controls have reduced historic PM10 levels about 90 percent and additional reductions are expected by April 1, 2010, when the current 9.7 square-mile Phase 7 Shallow Flooding project areas are completed. The delay in implementing DCMs on 3.5 square-miles of Owens Lake is not expected to result in discharge of “air contaminants or other material which may cause injury, detriment, nuisance or annoyance to any

considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property."

ORDER

1. Now therefore, the Hearing Board orders that the Petitioner, the City of Los Angeles Department of Water and Power, is granted a Regular Variance, subject to the conditions set forth in Paragraphs 3, 4 and 5, below, for a one-year extension of the deadline for the completion of Moat & Row dust control measures on the bed of Owens Lake. The existing deadline of October 1, 2009 is required in Paragraph 3 of District Governing Board Order Number 080128-01, which is contained in the "2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan." The Petitioner is granted regulatory relief from this requirement until October 1, 2010.
2. Further, the Hearing Board finds that, subject to the conditions set forth in Paragraphs 3, 4 and 5, below, that by granting one year of regulatory relief from the existing October 1, 2009 deadline for the completion of the Moat & Row dust controls contained in Paragraph 3 of Board Order 080128-01, the Petitioner does not trigger the provisions in Paragraphs 7 and 10 of said Order, which provide for supplemental control determinations to resume prior to May 1, 2010, due to the non-completion of Moat & Row dust controls.
3. In order to reduce excess emissions to the maximum extent feasible, the Hearing Board conditions the variance to require the Petitioner to:
   a. Temporarily control at least 3.5 square-miles of Owens Lake within the Shallow Flood portion of the current Phase 7 dust control construction project through surface tillage to

increase surface roughness by October 1, 2009. A map showing the locations of the tilled areas and the tilling specifications are attached as Order Exhibit 3.

b. Construct and operate a new dust control project on at least two square-miles of Owens Lake in the areas shown in Order Exhibit 4. This new dust control project shall be known as "Phase 8" of the Owens Lake Dust Mitigation Program. The Phase 8 project shall be implemented by the Petitioner in lieu of any other areas that would be required for control by the District under the supplemental control determination provisions in Paragraphs 7 and 10 of Board Order 080128-01 for the period from July 1, 2006 through April 1. 2010. Thus, other than the determination that the Phase 8 areas require the implementation of DCMs, no supplemental control determination should be issued the Air Pollution Control Officer in 2010. A set of geographic coordinates defining the boundaries of the Phase 8 dust control areas shall be developed by the District and provided to the Petitioner by January 1, 2010. The size and location of the Phase 8 areas may be modified upon mutual agreement of the District Governing Board and the Los Angeles Department of Water and Power Board of Commissioners. The type of dust control measures used in the Phase 8 areas will be selected at the Petitioner's sole discretion from the list of Best Available Control Measures approved by the District as of the date construction begins on the Phase 8 project. The Petitioner shall conduct all required site investigations and environmental impact analyses and secure all required regulatory approvals and permits. The Petitioner shall start the regulatory approval and design processes for the Phase 8 project immediately upon receipt of this variance from the Hearing Board. The Petitioner shall complete construction and begin operation of the Phase 8 dust control measures six months earlier than it would have been required to do so under the provisions of Board Order 080128-01. These modified times are set forth in the attached Order Exhibit 2.

4. The Hearing Board requires, as a condition of the variance, that the Petitioner agree to a stipulated order from the District Governing Board under the provisions of California Health and Safety Code Section 42316 ordering the Phase 8 project as set forth in Paragraph 3.b, above. This order will be issued by the District Governing Board within 90 days of the certification of the environmental impact analysis by the Petitioner but no later than October 1, 2010, whichever date is later.

5. The Hearing Board requires, as a condition of the variance, that the Petitioner meet the increments of progress schedule attached as Order Exhibit 1 and submit quarterly progress reports to the Hearing Board.

Dated the 25th day of September 2009

Brad Mettam
Hearing Board Chairman

Attest:

Tori Jenkins
Tori Jenkins, Board Clerk

Order Exhibit List:

Exhibit 1 –Increments of Progress Schedule
Exhibit 2 – Modified Times for Completion of Phase 8 Dust Controls
Exhibit 3 – Map and Specifications for 3.5 square-mile Temporary Tilling Dust Controls
Exhibit 4 – Map of Phase 8 Dust Control Project

ORDER EXHIBIT 1

INCREMENTS OF PROGRESS SCHEDULE

FOR VARIANCE GB09-06

LOS ANGELES DEPARTMENT OF WATER AND POWER

MOAT & ROW DUST CONTROL MEASURE DEADLINE EXTENSION

By:	Milestone
October 1, 2009	Petitioner shall complete 3.5 square miles of temporary tilling dust control within the Phase 7 dust control area as shown on Order Exhibit 3.
October 1, 2009	Start clock for completion of 2 square-mile Phase 8 dust control project (project times shown in Order Exhibit 2).
October 1, 2009	Petitioner shall begin preparation of required CEQA documentation for the 2 square-mile Phase 8 dust control project.
January 1, 2010	Petitioner shall commence construction of the Moat & Row dust controls.
April 1, 2010	Petitioner shall convert 3.5 square miles of temporary tilling dust controls to 3.5 square miles of Shallow Flooding dust controls.
October 1, 2010	Petitioner shall select and notify the District of the BACM to be used on the 2 square-mile Phase 8 project.
October 1, 2010	District Governing Board shall issue stipulated order under H&S Sec. 42316 requiring the 2 square-mile Phase 8 dust control project (subject to certification of Phase 8 CEQA document by Petitioner).
October 1, 2010	Petitioner shall complete 3.5 square miles of Moat & Row dust controls.
To be determined	Depending on which BACM Petitioner selects, Petitioner shall complete 2 square-mile Phase 8 dust control project (times for completion are set forth in Order Exhibit 2).

DISTRICT EXHIBIT 2

MODIFIED TIMES FOR COMPLETION OF PHASE 8 DUST CONTROLS

FOR VARIANCE GB09-06

LOS ANGELES DEPARTMENT OF WATER AND POWER

MOAT & ROW DUST CONTROL MEASURE DEADLINE EXTENSION

Activity	Duration (years)
New area of Shallow Flooding DCM	2.4*
New area of Managed Vegetation DCM	5.6*
New area of Gravel Cover DCM	1.7*
Other approved BACM	Determined by District**
Additions to above times:***	
Mainline capacity increase	2.1
New aqueduct turnout	1.4
New power feed	1.0
Expanded CEQA triggered	1.4

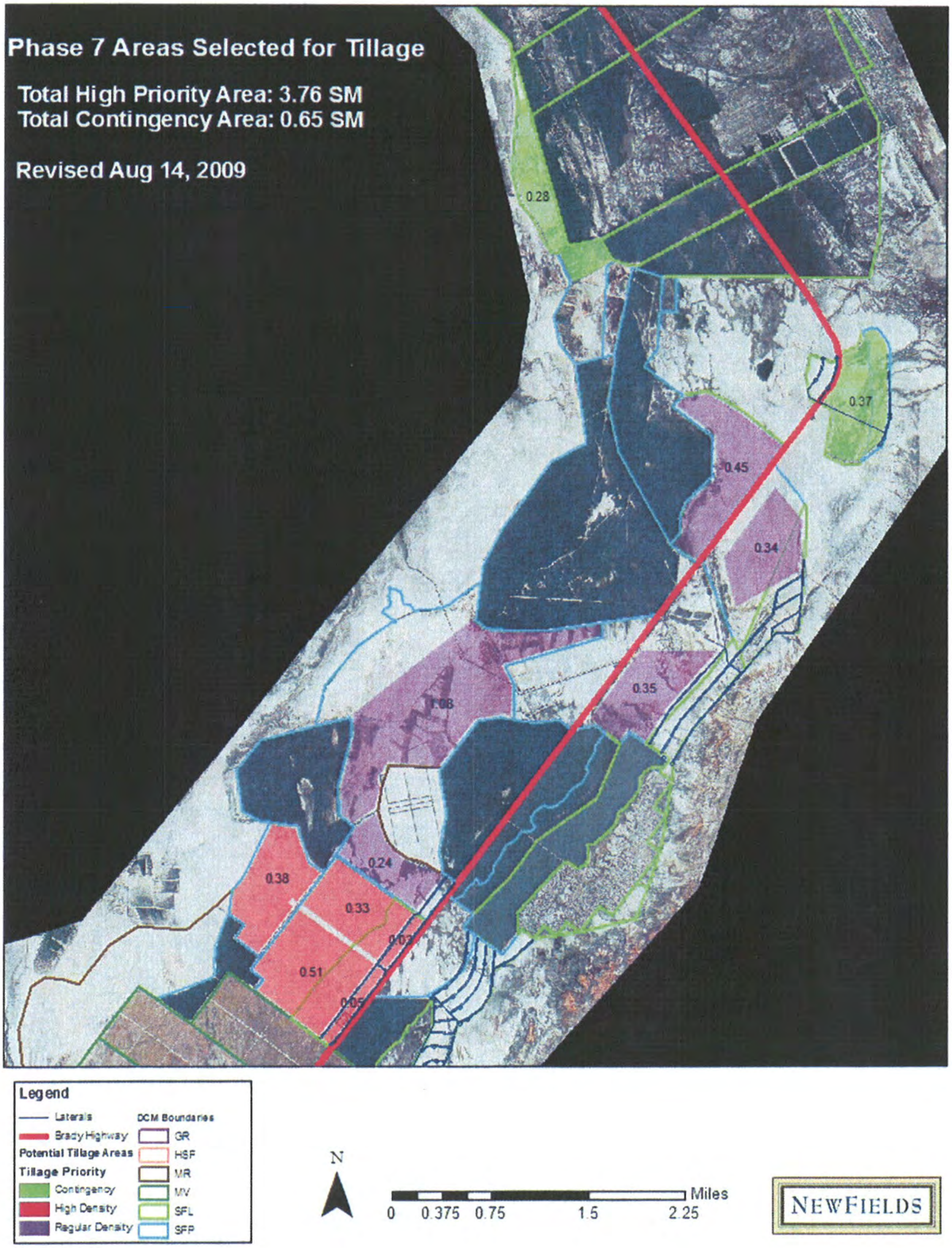
* The durations shown for the three existing BACMs are 0.5 years shorter than the times provided in Attachment B, Exhibit 3 of District Board Order 080128-01.

** If the District approves any new BACM prior to the start of the Phase 8 project, implementation durations will be included in the new BACM description. The Phase 8 durations will be 0.5 years shorter than non-Phase 8 durations.

*** Multiple additions to the BACM completion durations are not additive.

2013 SIP Amendment - EXHIBIT 2 - Variance GB09-06

Order Exhibit 3

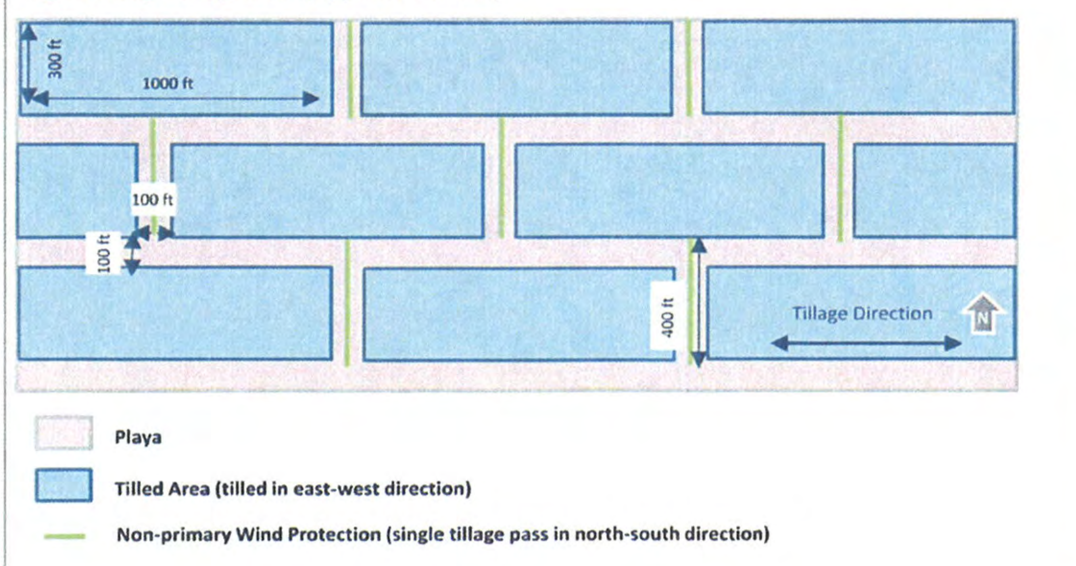


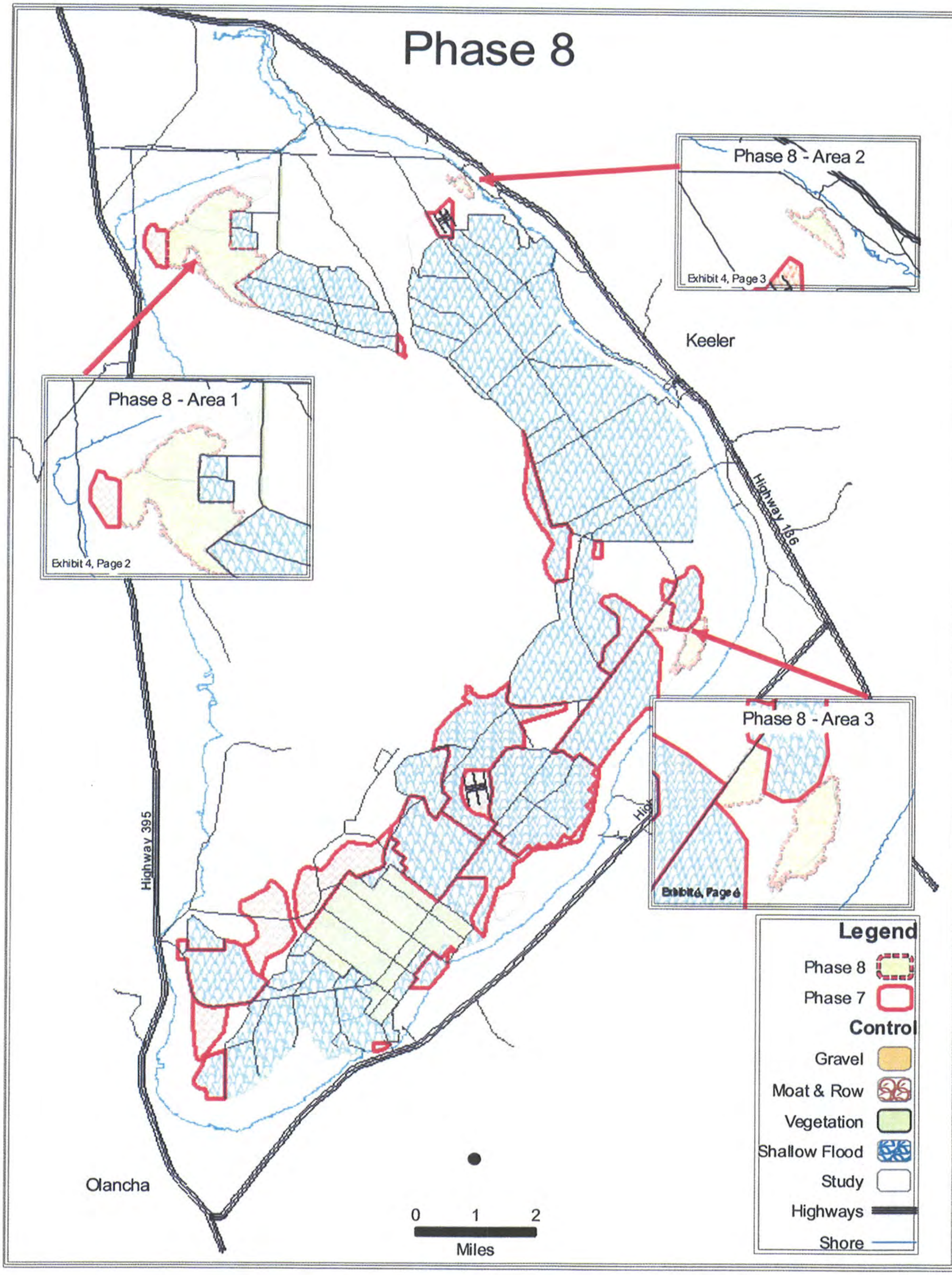
Order Exhibit 3

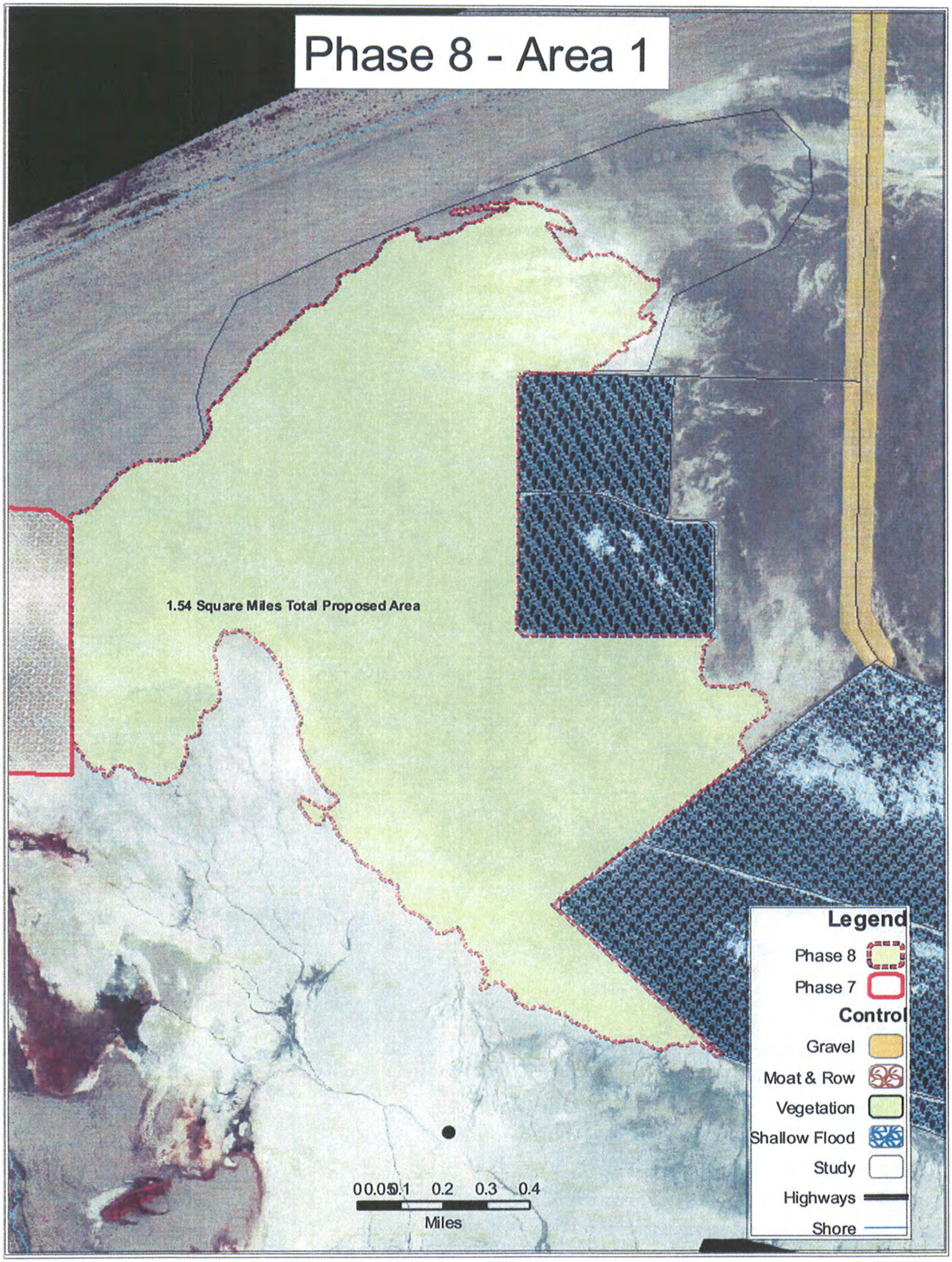
Phase 7 Tillage Configurations

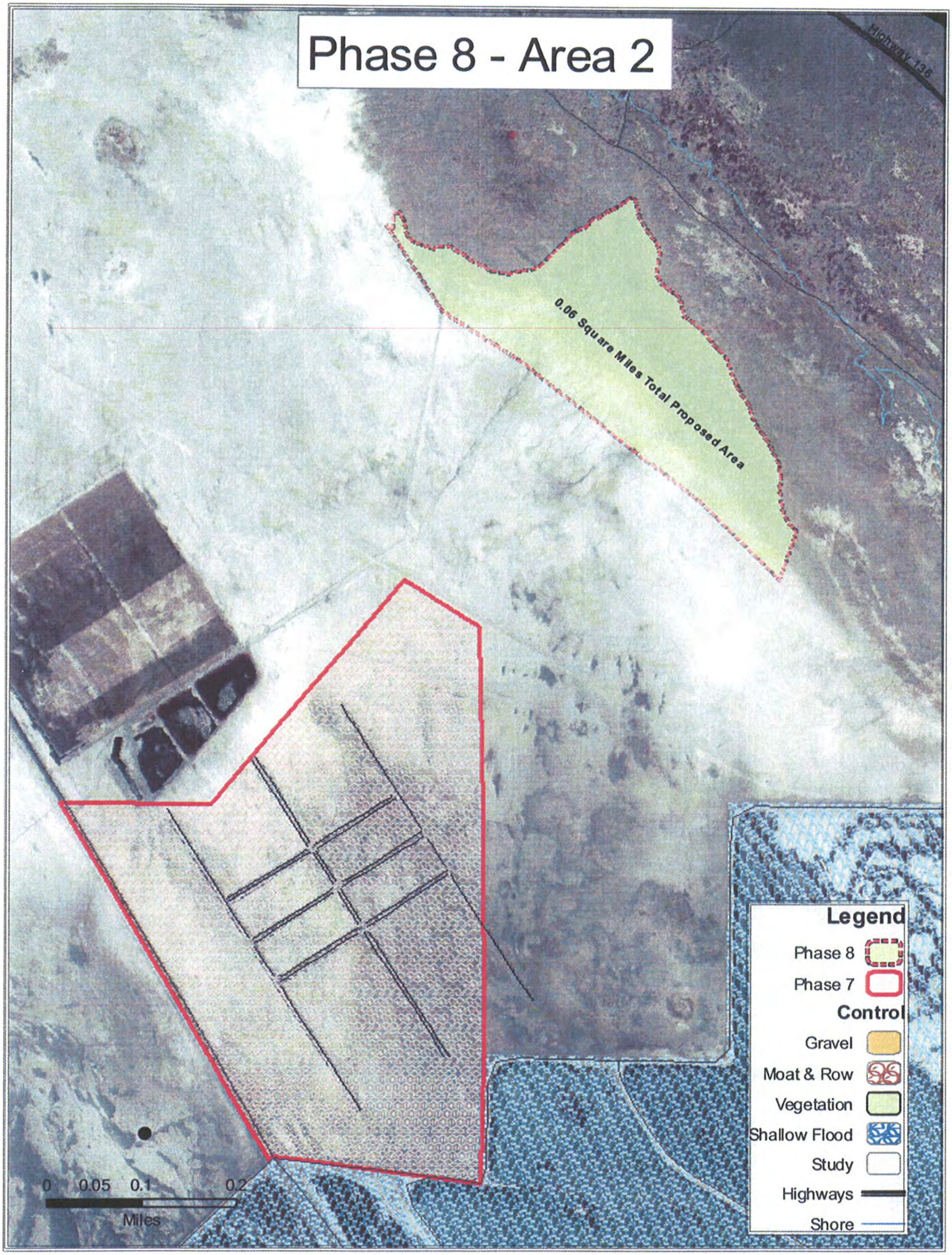
Regular Configuration (Approx 50% tilled)

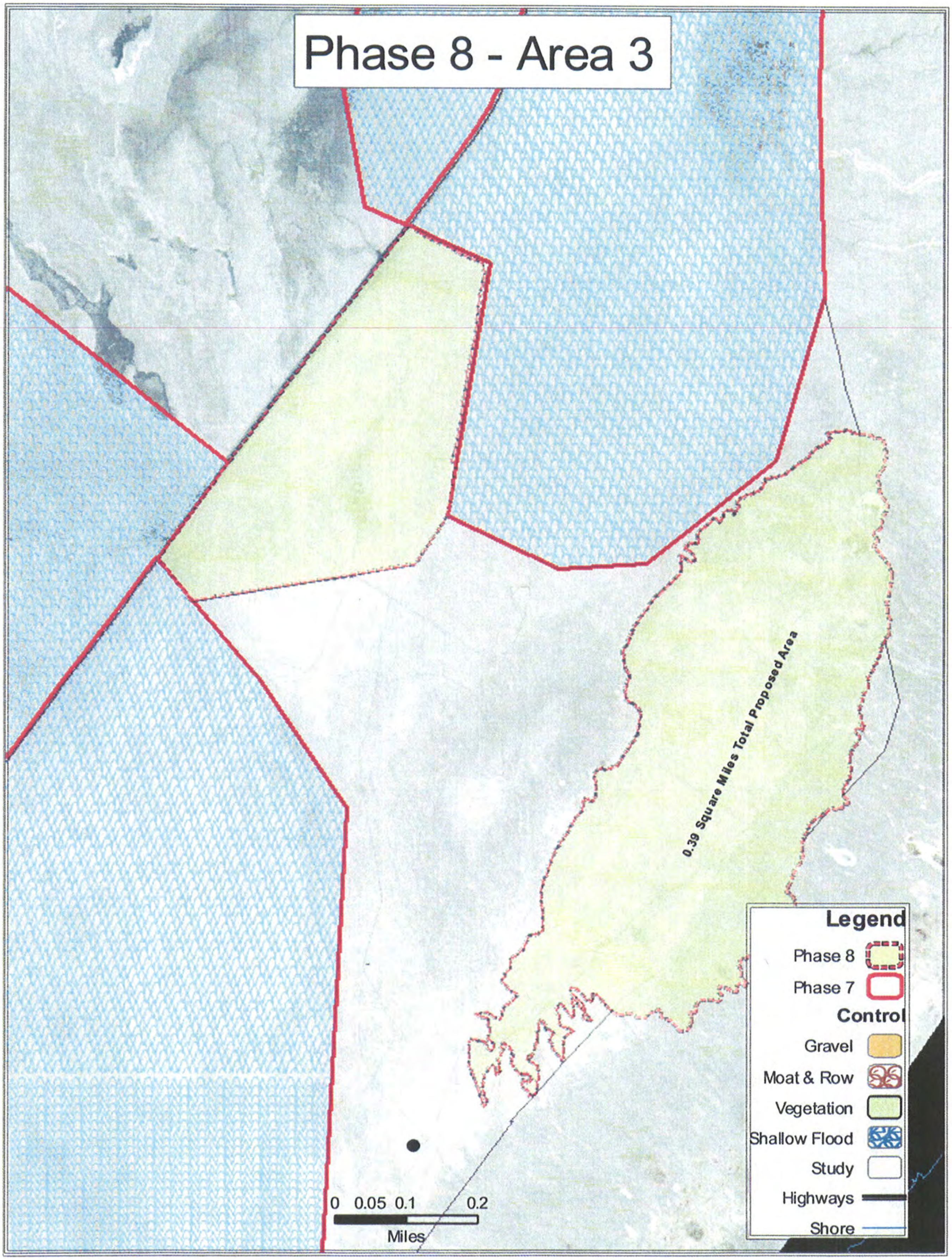
High Density Configuration (Approx 70% tilled)




Phase 8
Phase 8 - Area 2
Exhibit 4, Page 3
Keeler
Phase 8 - Area 1
Exhibit 4, Page 2
Highway 136
Phase 8 - Area 3
Highway 395
Legend
Phase 8
Phase 7
Control
Gravel
Moat & Row
Vegetation
Shallow Flood
Study
Highways
Shore
Olancha
0 1 2
Miles


Phase 8 - Area 1
1.54 Square Miles Total Proposed Area
Legend
Phase 8
Phase 7
Control
Gravel
Moat & Row
Vegetation
Shallow Flood
Study
Highways
Shore
0 0.05 0.1 0.2 0.3 0.4
Miles


Phase 8 - Area 2
Highway 136
0.06 Square Miles Total Proposed Area
Legend
Phase 8
Phase 7
Control
Gravel
Moat & Row
Vegetation
Shallow Flood
Study
Highways
Shore
0 0.05 0.1 0.2
Miles


Phase 8 - Area 3
0.39 Square Miles Total Proposed Area
Legend
Phase 8
Phase 7
Control
Gravel
Moat & Row
Vegetation
Shallow Flood
Study
Highways
Shore
0 0.05 0.1 0.2
Miles

Great Basin Unified Air Pollution Control District

2013 Amendment to the Owens Valley PM_{10} SIP

Board Order 130916-01

Exhibit 3: Stipulated Order for Abatement Number 110317-01

Theodore D. Schade
Air Pollution Control Officer

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537
760-872-8211 Fax: 760-872-6109

B/O #110317-01

March 17, 2011

I HEREBY CERTIFY that at a regular meeting of the Great Basin Unified Air Pollution Control District Governing Board held in the multi-purpose room of the City of Los Angeles, Department of Water and Power, Bishop, California on March 17, 2011 an order was duly made and entered as follows:

AGENDA ITEM #14: **ADOPTION OF AN ORDER FOR ABATEMENT DIRECTING THE CITY OF LOS ANGELES TO IMPLEMENT AN ADDITIONAL 3.1 SQUARE MILES OF BEST AVAILABLE CONTROL MEASURES FOR CONTROL OF PM10 EMISSIONS FROM THE DRIED BED OF OWENS LAKE AND TO PAY SIX MILLION FIVE-HUNDRED THOUSAND DOLLARS ($6,500,000) TO OFFSET EXCESS AIR POLLUTION EMISSIONS.**

A motion was made by Cervantes and seconded by Sweeney Adopting the Stipulated Order with the modifications relative to deleting references to the Hearing Board and replacing thereof the Governing Board. Directing Board Chair Arcularius to sign the Order following signatures from the General Manager of the City of Los Angeles Department of Water and Power and the Air Pollution Control Officer of the Great Basin Unified Air Pollution Control District. The following findings were also made by the Governing Board:

1) Notice of hearing on this matter was duly given and published in accordance with Health and Safety Code §42450 and District Rule 811.

2) All parties have stipulated to this matter being heard by the District Governing Board and have waived all rights to contest ongoing authority of the District Governing Board to hear this matter.

3) Members of the public were offered opportunity to provide comment on the Order of Abatement and comments of zero people were heard.

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Ayes: Board Members – Arcularius, Hansen, Johnston, Cervantes, Veatch, Sweeney, Eastman

Noes: Ø

Abstain: Ø

Absent: Board Members - Ø

Motion carried 7/0 and so ordered.

ATTEST:

Shirley Ono

Shirley Ono, Acting Clerk of the Board

Final: 3/17/2011

BEFORE THE GOVERNING BOARD OF THE

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

In the Matter of **THEODORE D. SCHADE** AIR POLLUTION CONTROL OFFICER GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT, Petitioner, vs. **CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER** Respondent.	**Order Number 110317-01** **FINDINGS AND DECISION OF GOVERNING BOARD UPON HEARING FOR STIPULATED ORDER FOR ABATEMENT** Hearing Date: March 17, 2011 Location: Bishop, California

FINDINGS AND DECISION OF THE GOVERNING BOARD

A petition from the Great Basin Unified Air Pollution Control District's Air Pollution Control Officer for a Stipulated Order for Abatement ("Order") was heard on March 17, 2011, pursuant to notice and in accordance with the provisions of California Health and Safety Code Section 40823 and District Rule 811. Seven members of the District Governing Board were present: Board Chair, Linda Arcularius, Board members Tom Sweeney, Henry Veatch, Larry Johnston, Tim Hansen, Richard Cervantes and John Eastman. The District Governing Board was represented by George Poppic of the California Air Resources Board. Petitioner, Theodore D. Schade, the Air Pollution Control Officer (APCO), was represented by Randy Keller, District Counsel. Respondent, the City of Los Angeles Department of Water and Power, was represented by Michelle Lyman, Deputy City Attorney for the City of

Los Angeles. The public was given the opportunity to testify. The matter was submitted and evidence received. The District Governing Board finds, concludes and orders as follows:

FINDINGS OF FACT

1. The Great Basin Unified Air Pollution Control District (hereinafter "District") is organized pursuant to Division 16, Part 3, Chapter 3 of the California Health and Safety Code, and is the sole and exclusive agency with the responsibility for comprehensive air pollution control and regulation in the Great Basin Valleys Air Basin (California's Alpine, Mono and Inyo Counties), including that area of southern Inyo County known as the Owens Lake bed (Exhibit 1).

2. Respondent, the City of Los Angeles, acting by and through its Department of Water and Power, is a municipal corporation organized under the Los Angeles City Charter and the constitution and laws of the State of California, doing business within the jurisdiction of the Great Basin Unified Air Pollution Control District. Respondent operates a municipal water collection, distribution and aqueduct system in Inyo and Mono Counties for the purpose of supplying water to the residents of the City of Los Angeles.

3. Respondent is subject to District Governing Board Order 080128-01 adopted on January 28, 2008 (Exhibit 2). District Governing Board Order 080128-01 is the order contained in both the *2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan* (2008 SIP) and the *2010 PM_{10} Maintenance Plan and Redesignation Request for the Coso Junction Planning Area*. This order requires the Respondent to take a number of actions by certain specified dates in order to timely control the particulate matter air pollution (PM_{10}) emissions caused by its water production, diversion, storage and conveyance activities.

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4. Respondent is also subject to District Hearing Board Order GB09-06 (Exhibit 3). District Hearing Board Order GB09-06 is the order associated with a variance, granted to the Respondent on September 25, 2009, that provided the Respondent additional time to implement PM_{10} controls on some areas of the Owens Lake bed originally ordered by District Governing Board Order 080128-01.

5. District Governing Board Order 080128-01 required Respondent to install a total of 13.2 square miles of additional PM_{10} controls beyond the 29.8 square miles of PM_{10} controls constructed prior to January 1, 2007. These 13.2 square miles are known as the "Phase 7" areas.

6. Of the required 13.2 total square miles in Phase 7, Respondent implemented 9.6 square miles in compliance with District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 and there are 0.5 square miles known as the "Channel Area" on which no representations regarding compliance status are made in this Order. These 10.1 square miles are not the subject of this Order.

7. However, within the 3.1 square-mile balance of the 13.2 square-mile Phase 7 areas, there are six sub-areas known collectively as "Phase 7a" where Respondent did not implement dust control measures in compliance with District Governing Board Order 080128-01 and District Hearing Board Order GB09-06. For the Phase 7a areas, District Governing Board Order 080128-01 required Respondent to implement any combination of approved PM_{10} controls known as Best Available Control Measures ("BACM"), which consists of Shallow Flooding, Managed Vegetation and Gravel Blanket, or an experimental, non-BACM PM_{10} control measure known as "Moat and Row."

8. Respondent had the legal option to select at its sole discretion any of the methods of dust control described in Findings of Fact Paragraph 7 herein and was required to secure all appropriate approvals and construct the controls by the deadline set forth in the order and modified by the variance. The deadline set by District Governing Board Order 080128-01 for constructing controls on the Phase 7a project areas was originally April 1, 2010, if Respondent selected BACM controls, or October 1, 2009, if Respondent selected Moat & Row controls.

9. Using District-, State- and Federally-approved air pollution modeling techniques specifically developed for Owens Lake emissions (District Board Order 080128-01, Attachment B, "Supplemental Control Requirements Determination Procedure"), for the period 2006 through 2010 the District determined that the Phase 7a areas emitted an annual average of approximately 6,265 tons of excess PM_{10}. These excess emissions have caused and contributed to violations of the state and federal 24-hour PM_{10} standards.

10. All of the Phase 7a areas are on State of California public lands managed by the California State Lands Commission ("CSLC"). Respondent is required to secure a lease from the CSLC before it may proceed to conduct any dust control activities occurring on state lands. The CSLC is not subject to District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 or any other current order requiring it to control PM_{10} emissions from the areas of the dried bed of Owens Lake owned by the State of California and managed by the CSLC.

11. Respondent exercised its discretion to implement Moat and Row controls on the Phase 7a project areas. In order to secure the necessary permits, leases and approvals from other public agencies, Respondent was required to and did conduct full-scale dust

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control performance testing of Moat and Row at two locations on the Owens Lake bed. Results of the testing were disputed by the Petitioner and Respondent.

12. As a condition of considering Respondent's application for a Moat and Row lease for the Phase 7a areas, CSLC staff required that Respondent prepare a supplemental Environmental Impact Report ("SEIR") pursuant to the California Environmental Quality Act ("CEQA"). Respondent agreed to prepare the SEIR required by CSLC staff. The SEIR prepared and finalized by Respondent was not legally challenged by the CSLC or any other party.

13. Delays caused by preparation of the SEIR and securing the necessary permits, leases and approvals resulted in Respondent's inability to implement Moat and Row dust control measures on Phase 7a by October 1, 2009. Respondent therefore sought and was granted Variance Order GB09-06 from the District Hearing Board. The Variance Order extended the deadline for completion of the Phase 7a Moat and Row controls by one year from October I, 2009 until October 1, 2010. The variance order also contained additional requirements designed to reduce excess PM_{10} emissions to the maximum extent feasible. These requirements provided for PM_{10} control through the use of temporary tilling on 3.5 square miles of area then under construction (a portion of the Phase 7 areas) and through implementation of a future dust control project to be completed six months earlier than would have normally been required under the provisions of Governing Board Order 080128-01. The expedited future project is 2.03 square miles of BACM known as the "Phase 8" project, which was ordered by the District Governing Board on December 6, 2010 (Order Number 101206-01).

14. For more than two years, Respondent negotiated with the CSLC in an attempt to procure a lease to implement Moat and Row controls in the Phase 7a project areas.

15. On April 6, 2010, the CSLC denied Respondent's application for the Moat and Row lease. As a result of the CSLC's denial of the Moat and Row lease, Respondent was unable to construct Moat and Row dust control measures on any part of the 3.1 square-mile Phase 7a project areas and was required to remove the Moat and Row dust control measures in place at the two Phase 7a demonstration areas. Thereafter, Respondent had insufficient time to comply with CEQA, obtain the necessary permits, leases and approvals and construct BACM on the 3.1 square mile Phase 7a project areas by October 1, 2010.

16. At all times relevant herein, Respondent acted in good faith to comply with District Governing Board Order 080128-01 and District Hearing Board Order GB09-06.

17. As there were no approved PM_{10} controls in place on the Phase 7a areas by the October 1, 2010 deadline, Petitioner determined that Respondent was in violation of District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 on that date. Petitioner determines that Respondent will remain in violation of District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 until approved PM_{10} controls are fully installed and operational on all Phase 7a areas.

18. "Fully installed and operational" means that all required Phase 7a and "Transition Areas" (additional areas that are transitioned from an existing BACM to another BACM in order to conserve water) infrastructure, earthwork and appurtenances necessary for compliant BACM operation is installed and, in the case of managed vegetation BACM, all plant materials are in place, but the plants may not necessarily be fully developed or grown

sufficiently to meet the 2008 SIP requirements for cover conditions. The Phase 7a and Transition Areas locations are shown and described in Exhibit 4.

19. Due to the fact no approved controls were in place on the Phase 7a areas, on October 1, 2010 the APCO issued Notice of Violation ("NOV") number 471 to Respondent for violating District Governing Board Order 080128-01 and District Hearing Board Order GB09-06.

20. Paragraph 11 of District Governing Board Order 080128-01 requires the APCO to use the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" ("SCR procedure," contained in Attachment B of Order) to determine the need for additional PM_{10} controls on the Owens Lake bed beyond those required by the original Order.

21. The SCR procedure provides that if Respondent is in compliance with the requirements set forth in "Board Order 080128-01 regarding the amount, timing and operation of existing and future dust controls, the APCO will not issue additional written SCR determinations until after May 1, 2010 and will not use data collected prior to April 1, 2010 for new determinations." The last SCR determination was issued in January 2008 in association with the 2008 SIP and used data up to June 30, 2006. The data collected starting July 1, 2006 has not previously been used to make an SCR determination.

22. Respondent maintains the right to challenge SCR determinations made by the APCO and orders for additional PM10 controls issued by the APCO based on such SCR determinations. Respondent retains all of its rights pursuant to Health and Safety Code § 42316, Attachment B to Board Order 080128-01, and all other available legal remedies to

challenge SCR determinations and orders based on such determinations. Nothing in this Order for Abatement amends or otherwise changes the SCR procedures.

23. Notice of hearing on this matter was duly given and published in accordance with Health and Safety Code §42450 and District Rule 811.

24. All parties have stipulated to this matter being heard by the District Governing Board and have waived all rights to contest the ongoing authority of the District Governing Board to hear this matter.

25. Members of the public were offered the opportunity to provide comment on the Order of Abatement. No public comments were offered.

26. To the extent any of these Findings of Fact are considered or deemed to be Conclusions or part of the Order, they are incorporated into those sections as if fully set forth therein.

CONCLUSIONS

1. The District Governing Board finds that Respondent is in violation of requirements in District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 due to Respondent's failure to implement approved PM_{10} control measures on the 3.1 square-mile Phase 7a areas by October 1, 2010. The District estimates these violations are expected to result in approximately 6,265 tons of excess PM_{10} per year to be emitted from the Phase 7a areas of the dried bed of Owens Lake. These emissions would have been controlled if the Phase 7a PM_{10} controls had been implemented according to requirements. Excess PM_{10} emissions from the Phase 7a areas are expected to continue to cause or contribute to exceedances of both state and federal 24-hour PM_{10} standards.

2. The District Governing Board finds that Petitioner and Respondent have worked together to develop a number of corrective actions and Petitioner has committed to take such actions so as to provide effective PM_{10} control on the Phase 7a as expeditiously as feasible. Until dust control measures are implemented pursuant to this Order, there is the potential for excess emissions and state and federal air quality standards violations to continue to occur.

3. The District Governing Board finds that Respondent can achieve compliance with District requirements as expeditiously as feasible by implementing BACM, including an APCO-approved BACM test on Area T12-1 only, on the 3.1 square-mile Phase 7a areas.

4. The District Governing Board finds that, in addition to the expeditious implementation of BACM, Respondent must offset the potential excess PM_{10} air pollution emissions that may be emitted during the non-compliance period by taking additional actions to control and/or offset any excess air pollution emissions to the extent feasible.

5. The District Governing Board finds that due to the need to construct extensive infrastructure to deliver water to the emissive Phase 7a areas, if Respondent were to terminate, or reduce its water production, diversion, storage or conveyance activities in Inyo County, the available water could not immediately or readily be put to use in reducing excess PM_{10} air pollution emissions.

6. The District Governing Board finds it is not reasonable under California Health and Safety Code section 42316 to require Respondent to cease or curtail its water production, diversion, storage and conveyance activities in Inyo County during the non-compliance period, since the water is needed to comply with dust control requirements for the existing 39.9 square miles of PM_{10} control measures currently operating at Owens Lake

as required by District Governing Board Order 080128-01 and District Hearing Board Order GB09-06.

7. Therefore, the District Governing Board finds that the cessation or curtailment of Respondent's water production, diversion, storage and conveyance activities in Inyo County during the non-compliance period is contrary to Health and Safety Code § 42316 and would not provide a corresponding benefit in reducing the excess PM_{10} emissions.

8. The District Governing Board finds that, in addition to the essential and mandatory requirements that Owens Lake dust controls be effective and ensure that air quality standards are met in a timely manner, it is important that Owens Lake dust controls be as cost-efficient and water-use-efficient as possible.

9. The District Governing Board finds that issuance of this Order will not constitute a taking of property without due process of law.

10. The District Governing Board finds that corrective actions to be taken by the Respondent and compliance with the conditions set forth in this Order will bring the Respondent's water production, diversion, storage and conveyance activities into compliance with District orders, rules and requirements as expeditiously as feasible.

11. To the extent any of these Conclusions are considered or deemed to be Findings of Fact or part of the Order, they are incorporated into those sections as if fully set forth therein.

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ORDER

THEREFORE, subject to the aforesaid statements, findings and good cause appearing, the Governing Board of the Great Basin Unified Air Pollution Control District orders as follows:

1. Except as provided in Paragraph 2 of this Stipulated Order for Abatement (Order), below, Respondent shall install, operate and maintain Best Available Control Measures (BACM) on approximately 3.1 square miles of the Owens Lake bed known as the "Phase 7a" areas and on approximately 3.0 square miles known as the "Transition Areas" as shown and described in Exhibit 4. BACM shall consist of the existing approved Shallow Flooding, Managed Vegetation, Gravel Blanket or any new/modified District-approved BACM. BACM are described in Paragraphs 12, 15, 16 and 17 of District Governing Board Order 080128-01, as well as in Chapter 5 of the 2008 SIP.

2. Respondent shall construct existing BACM, or conduct testing of new or modified BACM, as set forth in Attachment D of District Governing Board Order 080128-01 on up to one-third (0.33) square mile of the Phase 7a project area. The test area is limited to the Phase 7a subarea known as "T12-1" and is shown in Exhibit 4. BACM testing shall begin before October 1, 2011 and shall be conducted as provided in the 2008 SIP. As provided in District Governing Board Order 080128-01, Attachment D, additional research on potential new, modified and adjusted BACM shall be allowed within the 43.0 square mile 2008 Total Dust Control Area (which is described in District Board Order 080128-01, Exhibit 1).

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3. The BACM and BACM-testing described in Order Paragraphs 1 and 2 shall generally be constructed as set forth in the Project Description attached as Exhibit 5. The Parties agree that in order for the project to comply with Health and Safety Code Section 42316, the Phase 7a project will rely upon and incorporate the use of all three approved BACMs.

4. Respondent shall install fully operational BACM for the Phase 7a areas and Transition Areas according to the following schedule:

a. Except the T12-1 BACM test area, BACM controls shall be fully installed and operational (as defined in Findings of Fact Paragraph 18, above) by December 31, 2013. All Phase 7a and Transition areas controlled by the Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover as specified in the March 2010 Managed Vegetation BACM Proposal (Exhibit 6) by December 31, 2015. The APCO shall submit said Proposal to the District Governing Board for approval and incorporation into the 2008 SIP prior to July 31, 2011.

b. For the T12-1 BACM test area (as provided in Order Paragraph 2, above) either any existing BACM or a District-approved new BACM shall be fully installed and operational by December 31, 2015 or an earlier date, if specified in the District's approval of the new BACM.

5. Respondent shall not be deemed in violation of this Order if Respondent is acting in good faith to comply with the terms of Order Paragraphs 1 through 4, but is impeded in its ability to comply with one or more of those terms of this Order as applicable to the Phase 7a and Transition Areas due to:

a. Unreasonable delays caused by the California State Lands Commission (CSLC), the District, or any other agency, except the City of Los Angeles and its agencies, in processing Respondent's application for a required permit, approval or lease necessary to allow Respondent to implement any of the three BACM, or the proposed 7a project.

b. Denial by the CSLC, the District, or any other agency, except the City of Los Angeles and its agencies, of a required permit, approval or lease necessary to allow Respondent to implement any of the three BACM, or the proposed 7a project.

c. A condition for a required permit, approval or lease made by the CSLC, the District or any other agency, except the City of Los Angeles and its agencies, that is unreasonable, unduly onerous, or that is not comparable to conditions contained in similar permits, approvals or leases necessary to allow Respondent to implement any of the three BACM, or the proposed 7a project.

d. Delays caused by any third party challenge to Respondent's compliance with CEQA related to the Phase 7a areas or the Transition Areas.

e. A condition of Force Majeure, which is defined to mean an extraordinary event or circumstance beyond the control of the parties, such as a war, labor actions, riot, crime, disruption of utilities or acts of God (such as adverse weather, earthquake, volcanic eruption or other natural disaster). Adverse weather is any weather condition, including but not limited to flooding and dust storms, that forces the Respondent to suspend all construction operations or prevents the Respondent from proceeding with 50 percent or more of the normal labor force and of the equipment

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engaged on critical path work. Delays shall only be granted for adverse weather days greater than 30 days for each 12 month period from April 1 through March 31.

f. Force Majeure is not intended to excuse delays or conditions where non-performance is caused by the usual and natural consequences of external forces, or where the intervening circumstances are specifically contemplated.

The Parties shall follow the procedure set forth in Order Paragraph 6 to determine if Respondent acted in good faith, but has been impeded in its ability to comply with the Order for any of the causes or conditions set forth above.

6. If Respondent's Board of Commissioners determines that Respondent has been impeded in its ability to comply with the requirements of this Order due to one or more conditions set forth in Order Paragraph 5, the following procedure shall be followed:

a. The Board of Commissioners shall pass a resolution making such a finding. If such a resolution is passed by the Board of Commissioners, Respondent shall notify the APCO in writing within 15 days of such resolution, and propose a detailed schedule of increments of progress setting deadlines for future actions to come into full compliance with this Order and to request an extension of the deadlines contained in this Order ("Schedule of Increments").

b. If the APCO concurs with the Board of Commissioners resolution, the Respondent and APCO shall jointly petition the District Governing Board to modify this Order as provided in Order Paragraph 22.

c. If the APCO does not concur with the Board of Commissioners resolution, the following shall occur:

i. The APCO shall notify the Respondent and the District Governing Board in writing of his finding within 15 days of receipt of the Board of Commissioner's resolution.

ii. Within 30 days of such written notice by the APCO to Respondent, two District Governing Board members and two of Respondent's Board members may meet to make a non-binding recommendation as to whether Respondent has met the requirements of Order Paragraph 5 and whether the requested Schedule of Increments should be granted, granted with modifications, or denied. The final recommendation, if any, shall be made in writing within 15 days of the meeting. If a recommendation is not made, or the meeting does not take place within 30 days of written notice by the APCO, Respondent may request a final determination from the District Governing Board at a public hearing, as provided in Order Paragraph 22.

iii. If there is written recommendation pursuant to Order Paragraph (6)(c)(ii), the APCO shall submit such written recommendation to the District Governing Board. The Respondent shall have the burden of proof by a preponderance of the evidence that the conditions set forth in Order Paragraph 5 have been met.

iv. If, at a public hearing, as provided in Order Paragraph 22, the District Governing Board finds that Respondent has proved by a preponderance of the evidence that the conditions set forth in Order Paragraph 5 have been met, the District Governing Board shall grant or grant with modifications the Schedule of Increments to allow Respondent additional time to comply without additional financial penalties being imposed for the delay. In addition, Respondent shall not be found in violation of this Order.

d. The Respondent retains all of its appellate and other legal rights to contest the findings of the District Governing Board to a court of competent jurisdiction.

7. In order to decrease water use on Owens Lake consistent with the stated goals of the Respondent and the District, up to 3.0 square miles of existing Shallow Flood controls as described in the attached Project Description (Exhibit 5) may be transitioned to any combination of the three approved BACM measures (Managed Vegetation, Shallow Flooding and/or Gravel Blanket) in order to provide a water supply for the 3.1 square miles of Phase 7a areas. The Transition Areas and the Phase 7a areas (with the exception of Area T12-1, which will be a BACM test) when completed shall only include BACM and will not include Moat and Row or any other non-BACM.

8. The parties stipulate that during construction of the Transition Areas, the Transition Areas may not be compliant at all times with the BACM requirements set forth in Governing Board Order 080128-01. Respondent therefore shall take "Reasonable Precautions" to control particulate matter emissions to the extent practicable during construction of the Transition Areas as set forth in District Rule 401A (adopted 09/05/74; amended 12/04/06). Respondent has developed a Conceptual Dust Control Plan for the Transition Areas consistent with, and considered to be the Reasonable Precautions required by, District Rule 401A and (attached hereto as Exhibit 7). Upon completion of the design of the Transition Areas and prior to any construction or any time when dust control measures in Transition Areas may be modified in a manner that would cause the areas not to comply with BACM requirements, Respondent shall submit to the APCO for his approval a final Dust

Control Plan. The APCO shall expeditiously review Respondent's plan and shall not unreasonably withhold his approval of such plan. Despite the terms of Sections 7.9 of the 2008 SIP and Attachment D to the Board Order, if the Transition Areas are not BACM compliant and if there is a monitored exceedance or if the Dust ID Protocol predicts an exceedance of the National Ambient Air Quality Standard for PM_{10} caused solely by emissions from the Transition Areas (as determined by the "Dust ID" procedure set forth in the 2008 SIP), the District shall not take enforcement action pursuant to the Health and Safety Code, a variance will not be required and the Respondent shall not be deemed in violation of this Order, District Governing Board Order 080128-01, the 2008 SIP, or other District rules or orders related to such exceedances, provided that Respondent implements the approved Dust Control Plan or under circumstances of force majeure prohibiting compliance with the Dust Control Plan during this transition period

9. Respondent shall submit quarterly written reports on Phase 7a and Transition Area progress to the APCO and Board Clerk. Quarterly reports shall describe the status of the work completed during that quarter, the planned work for the next four quarters, compliance with the schedule, and specifically identify issues that could delay progress on the Phase 7a project. Respondent shall promptly notify the District in writing of any circumstances that could cause project delays. Quarterly reports shall be due within 30 days of the end of each calendar quarter. The first quarterly report subject to this Order shall be due on or before July 30, 2011 and the last quarterly report subject to this Order shall be due for the quarter during which Respondent has achieved full compliance for all Phase 7a areas and all Transition Areas.

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10. Based on the 2008 SIP modeling protocol estimate of 6,265 tons of excess annual PM_{10} air pollution emissions expected to be caused by Respondent's failure to implement effective PM_{10} controls on the Phase 7a areas by the mandatory deadlines, Respondent shall pay six-million-five-hundred-thousand dollars ($6,500,000.00) to the District to offset and mitigate such excess emissions that may occur between October 1, 2010 and December 31, 2013.

11. Except as provided in Order Paragraphs 5, 6, 8 and 9, above, and failure to comply with BACM implementation and operation deadlines for all Phase 7a areas and Transition areas as set forth in Order Paragraph 4, above, or by deadlines as subsequently modified by the District as provided in Paragraph 22, Respondent shall be subject to additional daily offset payments prorated by the amount of noncompliant area according to the following formula:

$$\text{Offset Amount (\$/day)} = \$5{,}500 + \$4500\,(A_{7a} + A_{TA})/6.1$$

where,

A_{7a} = Non-compliant Phase 7a Area (square miles), and

A_{TA} = Non-compliant Transition Area (square miles).

12. Respondent shall make the payment as set forth in of this Order Paragraph 10, above, within 90 days of the date of this Stipulated Order for Abatement, or within 90 days of the issuance of an order to pay, if additional payments are demanded, as provided in Paragraph 11 above, for failure to meet the completion dates set forth in Order Paragraph 4, above.

13. Eighty-five percent (85%) of the excess air pollution offset/mitigation payment made by Respondent to the District under Paragraphs 10 and 11 of this Order shall

be deposited into an Owens Lake Excess Air Pollution Offset Fund established by the District. These monies shall be used for Clean Air Projects within the District (Inyo, Mono and Alpine Counties) with preference given to projects in the Owens Valley PM_{10} Planning Area. "Clean Air Projects" are defined as improvements, replacements, or programs that directly or indirectly result in a reduction in air pollution emissions. Monies shall not be used to fund projects that Respondent is required to undertake or implement. The District Governing Board shall have the sole authority and discretion regarding project selection and approval, but will consider any project recommendations made by Respondent. Projects shall be publicized as joint projects of the Great Basin Unified Air Pollution Control District and the Los Angeles Department of Water and Power. Fifteen percent (15%) of the Clean Air Projects funds will be deposited into the District's regular budget account. All costs incurred by the District to administer the Clean Air Projects program will be paid by the District from the District regular budget account. The District shall have the sole discretion and responsibility for the Clean Air Projects program administration, planning and implementation, and Respondent shall not be responsible for program costs other than for the offset mitigation payments in compliance with Paragraphs 10 and 11 of this Order.

14. The APCO shall resume the Supplemental Control Requirement determinations required in Paragraph 10 of District Governing Board Order 080128-01 and shall use data collected since July 1, 2006 to make such determinations.

15. The parties commit to work cooperatively to support Respondent's efforts to develop and implement new PM_{10} control measures or modify existing measures that are as water-use efficient as possible.

16. Respondent shall comply with all other District rules, codes, orders and regulations not covered by this Order for Abatement, including all provisions of District Governing Board Order 080128-01 and District Hearing Board order GB09-06 that have not been modified by this Order for Abatement. Respondent's violation of any District rules, codes, orders or regulations not covered by this Order for Abatement, including all other provisions of District Governing Board Order 080128-01 and District Hearing Board Order GB09-06, shall be subject to District enforcement and will be considered separate violations not subject to the limitations and reductions set forth in the Order for Abatement.

17. This Order for Abatement does not act as a variance and Respondent is subject to all rules and regulations of the District except as provided in this Order for Abatement.

18. Final compliance shall be achieved, and this Order for Abatement shall terminate when Phase 7a and the Transition Areas are fully operational, but no later than December 31, 2015. Respondent shall notify the Clerk of the Board and the APCO in writing when final compliance is achieved.

19. Respondent enters into this Stipulated Order for Abatement without admitting liability and for the limited purpose of settling NOV No. 471 issued to Respondent by the APCO on October 1, 2010, and for violation of Governing Board Order 080128-01, and for violation of District Hearing Board Order GB09-06. Respondent specifically waives and agrees not to appeal or otherwise contest this Stipulated Order for Abatement under Health and Safety Code Section 42316 or any other cause of action. Respondent however, reserves its legal and appellate rights to contest any allegation that it has violated this Stipulated Order for Abatement. Respondent does not waive or give up its right to contest any other future

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order, NOV, civil or criminal prosecution, or any other action the District may bring against Respondent subsequent to entry of this Stipulated Order for Abatement.

20. This Stipulated Order for Abatement is a full and final settlement of NOV No. 471 issued by the APCO to Respondent on October 1, 2010, and for the violation of Governing Board Order 080128-01. The stipulated order is the final integrated agreement between the parties regarding the matters addressed herein. By entering this Stipulated Order of Abatement, Respondent is hereby released from any additional liability for these violations except as set forth in this Order.

21. The District Governing Board shall retain jurisdiction over this matter until December 31, 2015, unless the Order is amended or modified.

22. The parties may petition the District Governing Board for a modification of this Order for Abatement with or without a stipulation. The Governing Board may modify the Order for Abatement without the stipulation of the parties upon a showing of good cause therefore and upon making the findings required by Health and Safety Code Section 42451(a) and District rule 805(a). Any modification of the Order shall be made only at a public hearing held upon ten (10) days published notice and appropriate notice to the parties.

23. The United States Environmental Protection (USEPA) Region 9 has been informed of this agreement made and entered into between the District and Respondent.

24. Petitioner and Respondent stipulate that the District Governing Board has full and complete jurisdiction in the matter of this Stipulated Order for Abatement.

25. Petitioner and Respondent affirm that their respective signatories below have the authority to represent and bind their respective parties to the terms of this Stipulated Order for Abatement.

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Reviewed and Stipulated by:

Air Pollution Control Officer, Petitioner:

Theodore D. Schade, Air Pollution Control Officer — Date: 1 April 2011

Los Angeles Department of Water and Power, Respondent:

Ronald O. Nichols, General Manager — Date: 3/30/11

ORDERED FOR THE BOARD BY:

Linda Arcularius, Chair, District Governing Board — Date: April 1, 2011

ATTEST:

Shirley Ono, Acting Board Clerk

Date: April 1, 2011

APPROVED AS TO FORM AND LEGALITY
CARMEN A. TRUTANICH, CITY ATTORNEY

MAR 29 2011

MICHELLE LYMAN
DEPUTY CITY ATTORNEY

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List of Exhibits

Exhibit 1	Owens Lake – Map
Exhibit 2	District Governing Board Order 080128-01, contained in the *2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan*, January 28, 2008
Exhibit 3	District Hearing Board Order GB09-06, *Findings and Order Granting Regular Variance from Requirements Set Forth in Governing Board Order 080128-01*, September 25, 2009
Exhibit 4	Phase 7a and Transition Areas– Map and Coordinate Description
Exhibit 5	Phase 7a and Transition Areas Project Description
Exhibit 6	March 2010 Managed Vegetation BACM Proposal
Exhibit 7	Conceptual Transition Area Dust Control Plan

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

Board Order Number 110317-01 ~ Exhibits 1 through 7

City of Los Angeles, Department of Water & Power

Abatement Hearing

March 17, 2011

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

EXHIBIT 1

OWENS LAKE – MAP

Great Basin Unified Air Pollution Control District - Order for Abatement 10-01

Exhibit 1: Owens Lake General Vicinity Map

Overview Map:

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

EXHIBIT 2

DISTRICT GOVERNING BOARD ORDER

080128-01

Exhibit 2

Theodore D. Schade
Air Pollution Control Officer

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537
760-872-8211 Fax: 760-872-6109

Board Order No. #080128-01

2008 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (SIP) and associated Environmental Impact Report (EIR)

January 28, 2008 / February 1, 2008

I HEREBY CERTIFY that Board Order No. 080128-01 was duly adopted and issued by the Governing Board of the Great Basin Unified Air Pollution Control District at a regular meeting on February 1, 2008, continued from January 28, 2008, held in the Inyo County Board of Supervisors Chamber, Inyo County Administrative Center, 224 North Edwards Street (US Highway 395), Independence, California. A true and correct copy is attached hereto.

ATTEST:

Wendy Sugimura

Wendy Sugimura, Clerk of the Board

BOARD ORDER # 080128-01
REQUIRING THE CITY OF LOS ANGELES TO UNDERTAKE MEASURES TO CONTROL PM_{10} EMISSIONS FROM THE DRIED BED OF OWENS LAKE

With regard to the control of PM_{10} emissions from the bed of Owens Lake, the Governing Board of the Great Basin Unified Air Pollution Control District (District) orders the City of Los Angeles (City) as follows:

PREAMBLE

A. WHEREAS, the 1998 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (1998 SIP), dated November 16, 1998 and the 2003 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (2003 SIP), dated November 13, 2003, require the City to implement a series of measures and actions to reduce particulate emissions from the Owens Lake bed such that the Owens Valley Planning Area (OVPA) will attain and maintain the federal 24-hour National Ambient Air Quality Standards (NAAQS) for particulate matter (PM_{10}) by the statutory deadlines;

B. WHEREAS, the District is required by law to maintain its discretion to protect the environment, public health and safety, and this Order is intended to fulfill those duties without improperly constraining that lawful exercise of discretion;

C. WHEREAS, based on additional information collected subsequent to the information used to adopt the 1998 SIP and 2003 SIP, the District has determined that additional measures and actions will be required to continue to reduce particulate emissions in the OVPA such that the OVPA will attain and maintain the federal 24-hour NAAQS for PM_{10} by the statutory deadlines;

D. WHEREAS, in 2006 a dispute arose between the District and the City regarding the District's requirements for the City to control dust from additional areas at Owens Lake beyond those areas identified in the 2003 SIP;

E. WHEREAS, on December 4, 2006 a Settlement Agreement was approved by both the District and the City. Under the provisions of this agreement, the City agreed to implement additional dust control measures by April 1, 2010 and the District agreed to revise the 2003 SIP before March 1, 2008 to incorporate the provisions of the Settlement Agreement;

F. WHEREAS, on March 23, 2007, the U.S. Environmental Protection Agency (USEPA) published a finding that the Owens Valley Planning Area did not attain the 24-hour NAAQS for particulate matter of 10 microns or less (PM_{10}) by December 31, 2006 as mandated by the U.S Clean Air Act Amendments of 1990;

G. WHEREAS, as a result of the USEPA finding, the 2003 SIP must be revised to include a control strategy that will provide for attainment in the Owens Valley Planning Area as soon as practicable and that said revised SIP must be submitted to the USEPA by December 31, 2007;

H. WHEREAS, in consideration of the District's continuing duties under federal and state law, including but not limited to the Clean Air Act, to control particulate emissions from the Owens Lake bed without interruption, the District intends, if this Order is stayed or disapproved, that Board Order #031113-01 (adopted on November 13, 2003) shall continue to be in effect, so that at all times there will be continuous control of these emissions;

I. WHEREAS, the District thereby intends that if this Order is stayed due to a legal challenge, including but not limited to a challenge to this Order under California Health and Safety Code Section 42316, to the State Implementation Plan, or to the Environmental Impact Report for this SIP, or if this Order is disapproved by the California Air Resources Board (CARB), the District will revert to enforce the terms of Board Order #031113-01 which shall continue to be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, unless and until another Order is issued by this Board; and

J. WHEREAS, to prevent the deterioration of air quality due to dismantling or "backsliding" on control measures that have already been implemented before any such stay or disapproval, the District intends that the City shall continue to operate and maintain all control measures already implemented at the time of any such stay or disapproval without interruption, unless and until a further Order of the District allows for such interruption, if the City has not appealed the control measures under Section 42316 within 30 days of the effective date of this Order, and if those control measures were not invalidated as a result of that appeal;

K. WHEREAS, it is the District's intention that this 2008 revised SIP is consistent with the 2006 Settlement Agreement between the District and the City and that it is the District's intention to independently meet all its commitments and obligations under said Settlement Agreement.

THEREFORE, IT IS HEREBY ORDERED AS FOLLOWS:

ORDER

IMPLEMENTATION OF OWENS LAKE BED PM_{10} CONTROL MEASURES

1. Existing PM_{10} controls – From the date of adoption of this order, the City shall continue to operate and maintain the existing Best Available Control Measures (BACM) for PM_{10}, as described in Paragraph 8 hereof, on 29.8 square miles of the Owens Lake bed within the 2003 Dust Control Area (DCA) delineated in Exhibit 1.

2. Additional Shallow Flood supplemental PM_{10} controls – By April 1, 2010 the City shall implement a minimum of 9.2 square miles of additional Shallow Flooding BACM PM_{10}

controls within the 12.7 square-mile area known as the 2006 Supplemental Dust Control Area (SDCA) delineated in Exhibit 1. The areas within the SDCA designated for Shallow Flooding only are delineated in Exhibit 1. Shallow Flooding BACM is described in Paragraphs 8, 9 and 15 hereof.

3. Other additional supplemental PM_{10} controls – On a maximum of 3.5 square miles within the 2006 SDCA delineated in Exhibit 1, the City shall implement BACM for PM_{10}, as described in Paragraphs 8, 9 and 15 through 17 hereof, or the City may implement the alternative non-BACM PM_{10} control measure known as "Moat & Row," as described in Paragraph 18. If BACM are installed, the controls shall be operational by April 1, 2010. If Moat & Row is installed, it shall be operational by October 1, 2009.

4. Channel Area PM_{10} controls – A 0.5 square-mile area of natural drainage channels on the south area of the Owens Lake bed is known as the "Channel Area" and is delineated in Exhibit 1. The City shall control PM_{10} emissions from the Channel Area by implementing and operating BACM, modified-BACM or alternative non-BACM controls approved by the District's Air Pollution Control Officer (APCO), that take into account the resource issues in the Channel Area, by April 1, 2010. Portions of the Channel Area that are determined by the APCO to be naturally non-emissive (for example, adequately vegetated areas) will not require controls. If BACM are implemented in the Channel Area, they shall be as described in paragraphs 8, 9 and 15 through 17 hereof. If the City seeks to implement modified-BACM or alternative non-BACM, the City will apply such modifications as are permissible to resource agencies in this channel, with the primary objective of controlling dust, and provide the District with a monitoring plan aimed at identifying source areas that could cause or contribute to shoreline violations. Should such areas be identified after facilities are fully operational (including vegetative development), the District and the City will work with resource agencies to develop site-specific and implementable dust control approaches. Regardless of the approach selected for Channel Area dust control, the City shall prepare and submit to the District a detailed plan demonstrating the need and effectiveness of the control measures and their projected impacts to the environment, and obtain the prior approval of the District and any other applicable regulatory agencies with jurisdiction over the Channel Area for use of the modified-BACM. The City shall be responsible for any additional environmental analyses that may be required and for all required permits.

5. Total PM_{10} control area – The 29.8 square-mile 2003 Dust Control Area (DCA), the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA) and the 0.5 square-mile Channel Area together comprise the 43.0 square-mile area known as the 2008 Total Dust Control Area (TDCA). These PM_{10} control areas are delineated in Exhibit 1.

6. Minor adjustments to PM_{10} control area boundaries – Upon written request by the City to the District and written approval by the District's APCO, minor adjustments may be made to the interior and exterior boundaries of the 2006 SDCA, for example to avoid impacts to existing resources or features, or for constructability reasons, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the 2008 TDCA shall also be modified to reflect the modified 2006 SDCA boundaries.

7. Study Areas – The District has identified four additional “Study Areas” on the Owens Lake bed totaling up to 1.85 square miles that may require some level of control in order to attain the PM_{10} NAAQS. The four Study Areas are delineated in Exhibit 1. The District will study emissions from the Study Areas occurring between July 1, 2006 and April 1, 2010 to determine whether they will cause or contribute to PM_{10} NAAQS exceedances such that controls will be required. The District will use the data collected during this period to make a determination after May 1, 2010 as to the need for additional controls, as set forth in Paragraph 10, below. However, if the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls in the Study Areas may be made prior to May 1, 2010.

PM_{10} CONTROL MEASURES

8. The City shall implement BACM PM_{10} control measures as set forth in this Order, described below in Paragraphs 15 through 17. The City may implement the alternative non-BACM PM_{10} control measure as set forth in this Order, described below in Paragraph 18. To complete implementation of a specified control measure by a date as required by this Order means that the control measure shall be constructed, installed, operated and maintained without interruption, so as to comply with the performance standards for the specified control measure not later than 5:00 p.m. on the required date.

9. All PM_{10} control measures within the 2006 SDCA shall be designed, constructed, installed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 2. MDCEs are the actual dust control measure control efficiencies required to meet the PM_{10} NAAQS, based on data collected during the four-year period between July 2002 and June 2006. Prior to April 1, 2010, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, the initial target MDCEs may be modified if the modified target MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, as set forth in the 2006 Settlement Agreement between the District and the City. This Settlement Agreement is attached as Attachment A.

CONTINGENCY MEASURES – SUPPLEMENTAL CONTROL DETERMINATIONS

10. At least once per calendar year after May 1, 2010, the District’s APCO will make a written determination as to whether any areas, in addition to those described in Exhibit 1, require air pollution control measures in order to attain or maintain compliance with the NAAQS for PM_{10}. The APCO’s determination will also contain an analysis of the minimum dust control efficiency provided by the PM_{10} controls in the 2008 TDCA to determine if a higher level of control efficiency is required in order to attain or maintain compliance with the NAAQS for PM_{10}. In making these determinations, the APCO shall employ the methods described in Paragraph 11 of this Order. If the City is not in compliance with Paragraphs 1 and 3 of this Order, the determination as to the need for additional controls may be made prior to May 1, 2010.

    A. If the APCO determines under this Paragraph that additional areas require air pollution control measures or that existing PM_{10} control measures require a higher level of control efficiency, the APCO shall issue a written determination to the City informing them that the provisions of Paragraph 11 of this Order require the City to implement, install, operate and maintain PM_{10} BACM on additional areas of the Owens Lake bed or that the control efficiency on existing PM_{10} controls must be increased. The determination will identify those areas of the lake bed that will require PM_{10} BACM and the control efficiency necessary to attain the PM_{10} NAAQS. The City shall secure all permits and leases necessary to implement BACM and conduct any additional analysis, if any, required to comply with the California Environmental Quality Act and any other applicable laws.

B. The APCO's annual determinations will use data collected after April 1, 2010, except as provided in Paragraph 7, above, for the four Study Areas. The annual determinations for the Study Areas will use data collected after July 1, 2006.

C. In the event the City appeals the supplemental control determination under Health & Safety Code Section 42316, and pending a decision of the CARB, the City is not required to comply with any measure imposed by the supplemental control determination. The District relies upon action by the CARB to issue its decision on the City's appeal within 90 days. If CARB does not affirm the District supplemental control determination, or otherwise require the City to immediately undertake alternative supplemental control measures within 90 days in such circumstances where automatic control measures are required under Sections 172(c)(1) or 182(c)(9) of the federal Clean Air Act, 42 U.S.C. Sections 7502(c)(9) and 7511a(c)(9), the District relies upon the CARB to take these federal requirements into account in its determination of the City's appeal and to issue such interim orders as necessary to implement automatic supplemental control measures so that this Order complies with the Clean Air Act and can be approved by the U.S. Environmental Protection Agency as a proper State Implementation Plan. The foregoing is not intended to provide the CARB with any authority other than its authority under state law.

D. Paragraph 11 fixes the period of time within which the implementation of the additional control measures must be completed. Upon implementation, the City shall continuously operate and maintain, without interruption, the control measures to comply with performance standards set forth for such measures in the control measure descriptions contained in this Order.

CRITERIA FOR DETERMINING THE NEED FOR ADDITIONAL PM_{10} CONTROLS

11. The criteria, methods and procedures for the APCO's determination of the need for additional PM_{10} controls described in Paragraph 10 shall be those described in detail in the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" document incorporated as Attachment B along with its referenced "2008 Owens Lake Dust Source Identification Program Protocol" incorporated as Attachment C.

NEW BACM, ADJUSTMENTS TO EXISTING BACM, AND BACM TRANSITIONS

12. Upon written request by the City, the APCO may approve new BACM, a modification or adjustment to the existing BACMs described in Paragraphs 15, 16 and 17 of this Order, and/or the transition from one BACM to another provided that, at all times, the performance

standards of one or the other BACM are continuously met during the transition to assure that the transition shall not prevent the OVPA from attaining or maintaining the NAAQS for PM_{10}. The City's request shall contain a detailed description of the proposed alternative and a demonstration that the request satisfied all requirements of law and this Order. The APCO shall have full discretion to consider any such application for a change in BACM, and to accept, reject or condition its approval of such application. Non-compliance with any such condition shall be enforceable as noncompliance with a District Order. Without limiting the District's discretion as provided herein, the procedures for transitions of implemented control measures or adjustments to BACM shall be those described in Attachment D, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area."

ALTERNATIVE METHODS FOR IMPLEMENTING CONTINGENCY MEASURES AND SUPPLEMENTAL CONTROLS

13. Notwithstanding any other provision of this Order, the District shall maintain its authority under Health and Safety Code Section 42316 to order the City to implement additional controls, to control additional emissive areas and/or to undertake additional reasonable measures necessary to mitigate the air pollution caused in the District by the City's water-gathering activities in order to prevent the OVPA from failing to attain or maintain the NAAQS for $PM_{10,}$ if circumstances arise that are not specifically addressed in Paragraphs 10 or 12 of this Order.

RELATIONSHIP TO BOARD ORDER 031113-01

14. The District hereby stays the force and effect of Board Order 031113-01 for all times that this Order is in full force and effect. In the event this Order, or any provision of this Order, is stayed due to a legal challenge, including but not limited to a challenge to this Order under Health & Safety Code Section 42316, or any other law, to the State Implementation Plan, or to the Environmental Impact Report for this Revised SIP, or in the event the Order is disapproved by the CARB, the following shall apply:

    A. If the stay or disapproval causes Paragraph 1 through 5 of this Order to cease its operative force and effect, Board Order #031113-01 shall immediately be in effect and shall remain in full force for the duration of any stay or, in the case of disapproval, until another Order is issued by this Board. In addition, the City shall continue to operate and maintain without interruption all control measures already implemented in any area if those control measures were not appealed under Health & Safety Code Section 42316 within 30 days of the date of this Order, and if those measures were not invalidated as a result of that appeal.

    B. If the stay or disapproval causes Paragraph 10 and/or 11 of this Order to cease its operative force and effect, but does not affect Paragraphs 1 through 5 of this Order, the City shall continue to operate and maintain all control measures already implemented without interruption.

    C. If the stay or disapproval does not affect Paragraphs 1 through 7, 10 or 11 of this Order, those Paragraphs and any other terms of this Order that are not stayed or disapproved shall be in effect, and shall remain in full force for the duration of any stay. In all cases, the City shall continue to operate and maintain, without interruption, all control measures already implemented.

D. If a stay of this Order is imposed, then lifted so that this Order is in effect, the City shall, immediately, meet all requirements and deadlines set by this Order as if no stay had been imposed. The City shall not remove or decrease any control measures without the express written permission of the APCO, and the provisions of Board Order 031113-01 shall again be stayed. If the stay of this Order is only partially lifted such that any portion of this Order remains stayed, Board Order 031113-01 shall remain in effect as provided under Paragraphs 14.A., 14.B. and 14.C, above.

PM_{10} CONTROL MEASURES

15. BACM Shallow Flooding

The "Shallow Flooding" PM_{10} control measure will apply water to the surface of those areas of the lake bed where Shallow Flooding is used as a PM_{10} control measure. Water shall be applied in amounts and by means sufficient to achieve the following performance standards:

A. For Shallow Flooding areas within the 29.8 square-mile 2003 DCA:

i. Until April 1, 2010: At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 1 of each year, and ending on June 30 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.

ii. After April 1, 2010:

a. At least 75 percent of each square mile of the designated areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. If a contiguous Shallow Flood dust control area is less than one square mile, 75 percent of the entire contiguous area shall consist of substantially evenly distributed standing water or surface-saturated soil.
b. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
c. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
d. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
e. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraphs 15.A.ii,b, c, and d, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic

shoreline, that area will be deemed to be in compliance, if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

B. For Shallow Flooding areas within the 12.7 square-mile 2006 SDCA:

i. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 3 to achieve the control efficiency levels in the MDCE Map (Exhibit 2).

ii. For Shallow Flooding areas with control efficiencies of 99 percent or more:

a. Beginning May 16 and through May 31 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 70 percent.
b. Beginning June 1 and through June 15 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 65 percent.
c. Beginning June 16 and through June 30 of every year, Shallow Flooding areal wetness cover may be reduced to a minimum of 60 percent.
d. If for any Shallow Flooding area, the percent of areal wetness cover in the periods specified in Paragraph 15.B.ii.a,b, and c, above, is below the minimum percentages specified for each shallow flood area based on the air quality model for the analysis period from July 2002 through June 2006, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period.

C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the PM_{10} NAAQS at the historic shoreline as a result of excessive dry areas within Shallow Flooding control areas during the dust control periods for each year between October 1 and June 30 of the next year, the provisions of Paragraph 10 shall apply.

D. From July 1 through September 30 of each year, the City is not required by the 2008 SIP to apply water to Shallow Flooding areas for dust control purposes, but is required to maintain minimum areal wetness cover as required by applicable environmental documents, permits, leases and approvals.

E. Aerial photography, satellite imagery or other methods approved at the sole discretion of the APCO shall be used to confirm wetness coverage.

F. The following portions of the areas designated for control with Shallow Flooding are exempted from the requirement of dust control by means of a saturated surface:

i. Raised berms, roadways and their shoulders necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive and

ii. Raised pads containing vaults, pumping equipment or control equipment necessary for the operation of Shallow Flooding infrastructure which are otherwise controlled and maintained to render them substantially non-emissive.

G. "Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

H. Excess surface waters and shallow groundwaters above the annual average water table that existed before site construction that reach the lower boundary of the dust control areas will be contained, collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. If drains are used, they shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted. These requirements do not apply to Shallow Flood area T36-4, due to its adjacency to the Lower Owens River Project (LORP) and the City's intention to integrate the design and operation of T36-4 into the LORP.

I. The City shall remove all exotic pest plants, including salt cedar (*Tamarix ramosissima*), that invade any of the areas designated for control by Shallow Flooding.

J. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the control areas, including within communities less than three miles from a PM_{10} control area, by effective means that minimize adverse effects upon adjacent wildlife.

16. <u>BACM Managed Vegetation</u>

A. <u>Existing Managed Vegetation areas</u>
For areas controlled with the Managed Vegetation PM_{10} control measure prior to January 1, 2007, the areas shall be operated and maintained in accordance with a Managed Vegetation Operation and Management Plan to be approved in writing by the APCO, which approval shall not be unreasonably withheld. The requirements of the Plan may be revised upon written request by the City and written approval of the APCO, which approval shall not be unreasonable withheld,. The City's request shall contain a specific description of the modification requested and provide a demonstration regarding the effect of the modification on the environment and PM_{10} control effectiveness.

B. New Managed Vegetation areas
In PM_{10} control areas constructed after January 1, 2007 where Managed Vegetation is used as a PM_{10} control measure, the following performance standard shall be achieved commencing on October 1 of each year, and ending on June 30 of the next year: substantially evenly distributed live or dead vegetation coverage of at least 50 percent on each acre designated for Managed Vegetation.

C. All Managed Vegetation areas

i. The vegetation planted for dust control shall consist only of locally-adapted native species approved by the APCO or other species approved by both the APCO and the California State Lands Commission (CSLC). To date, the only approved locally-adapted native species is saltgrass (*Distichlis spicata*). However, other appropriate species may be approved upon written request of the City and written approval of both the APCO and CSLC.

ii. Vegetation coverage shall be measured by the point-frame method, by ground-truthed remote sensing or by other methods approved at the sole discretion of the APCO.

iii. The following portions of the areas designated for control with Managed Vegetation are exempted from the requirements set forth in Paragraphs 16.A. and 16.B., above:

a. Portions consistently inundated with water, such as reservoirs, ponds and canals,

b. Roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and

c. Portions used as floodwater diversion channels or desiltation/retention basins.

iv. “Substantially non-emissive” shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

v. Excess surface waters and shallow groundwaters above the root zone depths that reach the lower boundary of the dust control areas shall be collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The dust control measure areas shall have lateral boundary edge berms and/or drains as necessary to contain excess waters in the control areas and to isolate the dust control measure areas from each other and from areas not controlled. Drains shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted.

vi. To protect the Managed Vegetation control measure from flood damage and alluvial deposition, the City shall incorporate stormwater and siltation control facilities into and around Managed Vegetation areas adequate to maintain the dust mitigation function of Managed Vegetation. The Managed Vegetation protection facilities shall be designed to dissipate flood waters and capture the alluvial material carried by flood waters, so as to avoid greater than normal water flows and deposition of alluvial material into the Owens Lake brine pool.

vii. The City shall remove all exotic pest plants, including salt cedar (*Tamarix* spp.), that invade any of the areas designated for control by Managed Vegetation.

viii. As necessary to protect human health, the City shall prevent, avoid and/or abate mosquito, other pest vector and biting nuisance insect breeding and swarming within and in the vicinity of the dust control areas, including within communities less than three miles from a PM_{10} control area, by effective means that minimize adverse effects upon adjacent wildlife.

17. <u>BACM Gravel Blanket</u>

A. In areas where Gravel Blanket is used as a PM_{10} control measure, the City shall meet the following performance standard: one hundred percent of the control area shall be covered with a layer of gravel at least four inches thick. All gravel material placed must be screened to a size greater than one-half inch (½ inch) in diameter. Where it is necessary to support the gravel blanket, it shall be placed over a permanent permeable geotextile fabric. The gravel shall have resistance to leaching and erosion. It shall be no more toxic than the gravel from the Keeler fan site analyzed by the District in the Final Environmental Report prepared for the 1997 SIP. To minimize visual impacts, all gravel used shall be comparable in coloration to the existing lake bed soils.

B. To protect the Gravel Blanket control measure from flooding, the City shall incorporate drains and channels into and around the control measure areas adequate to maintain the dust mitigation function of the Gravel Blanket, and outlet flood waters into the Owens Lake brine pool, Shallow Flooding areas, or reservoirs. The drains and channels shall be designed to incorporate features such as desiltation or retention basins that are adequate to capture the alluvial material carried by the flood waters and to avoid greater than normal deposition of this material into the Owens Lake brine pool.

C. The gravel placement design and implementation shall adequately protect the graveled areas from the deposition of wind- and water-borne soil or infiltration of sediments from below. All graveled areas will be visually monitored to ensure that the Gravel Blanket is not filled with sand, dust or salt and that it has not been inundated or washed out from flooding. If any of these conditions are observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface such that the original performance standard is maintained. The City shall apply best available control measures (BACM) and New Source Performance Standard (NSPS) emission limits to its gravel mining and transportation activities occurring within the District's geographic boundaries as required by the District in the City's District-issued Authority to Construct and Permit to Operate.

18. <u>Alternative Non-BACM Moat & Row Control Measure</u>

A. The Moat & Row PM_{10} control measure is not a currently-approved BACM. The preliminary form of Moat & Row is described in Exhibit 4 of the 2006 Settlement

Agreement between the District and the City (Attachment A). The final form of the Moat & Row PM_{10} control measure will be determined from the results of a demonstration project and testing to be conducted by the City on the lake bed. All Moat & Row controls will be designed, constructed and operated to achieve the MDCEs described in Paragraph 9.

B. The PM_{10} control effectiveness of Moat & Row may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding additional moats and rows to the array.

C. Final design for the Moat & Row control measure will be determined solely by the City after consultation with and written notification to the District. The City shall consider the following elements in its final design:

i. Test results demonstrating that the required MDCE for each Moat & Row area can be met,

ii. Completion of all required environmental documentation, approvals, permits and leases, and

iii. Inclusion of monitoring in the infrastructure design to continuously monitor compliance with the target MDCE for each area.

D. Upon written request of the City, the APCO shall determine in writing if any given Moat & Row design constitutes BACM or MDCE-BACM in accordance with Attachment D, “2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area.”

E. Areas of Moat & Row that do not function as designed or that cause or contribute to an exceedance of the federal 24-hour PM_{10} NAAQS will be remediated as specifically provided in Attachment B, the “2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure.”

PM_{10} CONTROL MEASURE COMPLIANCE AND ENFORCEMENT

19. The District and City will work collaboratively to develop improved wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications for all PM_{10} control measures. Final acceptance and implementation of all compliance measurement techniques and PM_{10} control measure compliance specifications with regulatory impact will be at the sole discretion of the APCO.

STORMWATER MANAGEMENT

20. The City shall design, install, continually operate and maintain flood and siltation control facilities to protect the all PM_{10} control measures installed on the lake bed at all times, and in a manner that groundwater levels, surface water extent, and wetlands in adjacent

uncontrolled areas are not impacted by induced drainage. Flood and siltation control facilities shall be integrated into the design and operation of the PM_{10} control measures. All flood and siltation control facilities and PM_{10} control measures damaged by stormwater runoff or flooding shall be promptly repaired and restored to their designed level of protection and effectiveness. All flood and siltation control facilities shall be designed and operated in a manner to prevent any greater threat of alluvial material contamination to the existing trona mineral deposit lease area (State Lands Commission leases PRC 5464.1, PRC 3511 and PRC 2969.1) than would have occurred under natural conditions prior to the installation of PM_{10} control measures.

SCHEDULE

21. The Control Measures shall be implemented on the areas set forth in Paragraphs 1 through 4 by the dates set forth in those Paragraphs. Supplemental Control Requirements shall be met on the schedule provided for in Attachment B.

PERFORMANCE MONITORING PLAN

22. The City, in consultation with the District, shall annually develop and provide to the District in writing a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

    A. The PMP shall describe the measurements and methods used to verify the performance of the constructed DCMs. The PMP shall also describe the measurements and methods used to maximize information on dust emissions from any areas of special interest.

    B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

    C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

    D. The PMP for each calendar year shall be submitted to the APCO by March 31 of the following calendar year.

ADDITIONAL REQUIREMENTS

23. The District Board orders the City of Los Angeles to satisfy the following requirements related to the implementation of the Shallow Flooding, Managed Vegetation, Gravel Blanket and Moat & Row control measures:

    A. The City's construction, operation and maintenance activities shall comply with all Mitigation Measures set forth in Final Environmental Impact Reports, EIR Addendums and Mitigated Negative Declarations associated with the areas on which dust controls are placed, and all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP.

B. The City shall comply with any and all applicable requirements of the Mitigation Monitoring and Reporting Programs adopted by the District and associated with the Final Environmental Impact Reports and Final Environmental Impact Report Addendums for this project, and with all subsequent environmental documents adopted by the District for implementation of the requirements of this SIP. All mitigation measures required in certified environmental documents associated with the implementation, operation and maintenance of PM_{10} control measures required by this order are hereby incorporated as requirements of this order and may be enforced as such.

C. The City shall apply best available control measures (BACM) to control air emissions from its construction/implementation activities occurring in the District's geographic boundaries.

Exhibits

Exhibit 1 Map and Coordinates of PM_{10} Control Areas

Exhibit 2 Minimum Dust Control Efficiency Map

Exhibit 3 Shallow Flood Control Efficiency Curve

Attachments

Attachment A 2006 Settlement Agreement between the Great Basin Unified Air Pollution Control District and the City of Los Angeles

Attachment B 2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure

Attachment C 2008 Owens Lake Dust Source Identification Program Protocol

Attachment D 2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area

Exhibit 1 - Map and coordinates of PM_{10} control areas

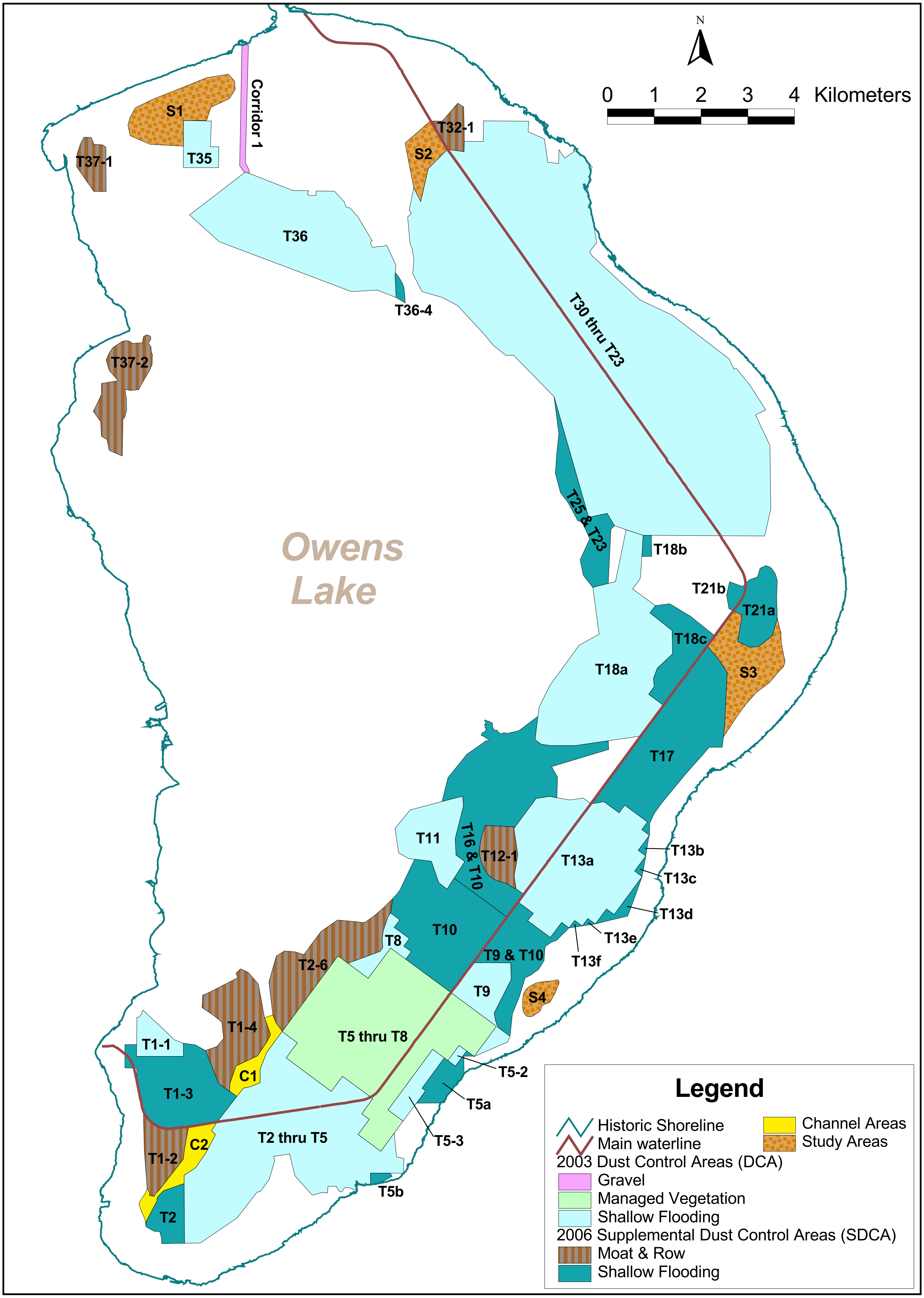

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T32-1	0.17	SDCA	415,639.7810	4,042,385.2695
			415,283.2810	4,043,000.1953
			415,539.4060	4,042,999.0234
			415,866.3750	4,043,383.8359
			415,994.4060	4,043,304.2109
			416,002.6250	4,042,981.9922
			416,005.6250	4,042,568.5234
			416,000.9380	4,042,344.1055
			415,872.2190	4,042,360.3477
			415,645.7500	4,042,391.2070
			415,639.7810	4,042,385.2695
T37-1	0.21	SDCA	408,348.9690	4,041,492.4844
			408,085.5000	4,041,493.3164
			407,718.8130	4,042,027.7422
			407,731.5000	4,042,299.3945
			407,804.9060	4,042,524.2148
			407,873.2810	4,042,654.1211
			408,032.2500	4,042,647.6875
			408,089.5630	4,042,502.0625
			408,267.6560	4,042,491.4219
			408,347.0630	4,042,440.3203
			408,348.9690	4,041,492.4844
T36-4	0.03	SDCA	414,532.5630	4,039,759.7188
			414,583.3750	4,039,699.2617
			414,643.3130	4,039,605.6250
			414,700.5000	4,039,498.9766
			414,718.6880	4,039,441.7188
			414,729.1250	4,039,314.2500
			414,747.2500	4,039,108.7500
			414,550.5940	4,039,224.6563
			414,528.0310	4,039,697.5039
			414,532.5630	4,039,759.7188
T37-2	0.59	SDCA	408,694.5000	4,035,836.9883
			408,417.2190	4,035,957.7344
			408,370.5940	4,036,191.9453
			408,249.5940	4,036,258.3164
			408,231.6880	4,036,571.0625
			408,075.5000	4,036,791.1719
			408,254.4060	4,037,157.2813
			408,249.9060	4,037,387.3789
			408,606.5630	4,037,448.5391
			408,414.0000	4,037,664.3359
			408,348.8750	4,037,888.7227
			408,415.9060	4,038,042.2422
			408,494.0000	4,038,156.0977
			408,687.9380	4,038,284.6484
			408,762.7190	4,038,303.7813
			408,853.0940	4,038,290.2422
			408,911.3130	4,038,246.2109
			409,028.9380	4,038,251.5742
			409,126.1560	4,038,258.7344
			409,134.0630	4,038,309.6602
			409,144.5940	4,038,382.5547
			409,201.0630	4,038,424.0508
			409,255.5940	4,038,422.9180
			409,299.1250	4,038,391.3789
			409,304.7190	4,038,329.9609
			409,254.9380	4,038,259.1797
			409,308.0940	4,038,163.0195
			409,312.7190	4,038,061.7695
			409,335.7190	4,038,017.0195
			409,334.3750	4,037,792.3008
			409,260.5630	4,037,628.4492
			409,184.9060	4,037,508.1055
			409,044.0630	4,037,256.8359
			408,869.9060	4,037,236.6055
			408,755.8130	4,037,260.8867
			408,768.2810	4,037,143.0156
			408,784.9690	4,037,079.6914
			408,789.7190	4,036,817.3555
			408,751.4060	4,036,667.7344
			408,706.5940	4,036,616.2422
			408,694.5000	4,035,836.9883

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T25 & T23	0.57	SDCA	418754.0310	4033026.4648
			418552.9690	4033287.6914
			418484.0000	4033621.1133
			418689.0940	4034066.4102
			418529.0310	4034424.5078
			418434.8130	4034452.0664
			418325.1880	4034653.5234
			418224.7810	4034845.3438
			418067.7500	4035047.7852
			417953.1880	4035467.4961
			417980.5000	4035865.3203
			418027.9060	4036319.6094
			417924.7190	4037107.5195
			418665.4380	4034527.8516
			419064.9060	4034610.8672
			419222.8750	4034343.4492
			419141.3750	4034271.8047
			419084.1880	4033110.8242
			418754.0310	4033026.4648
T18b	0.03	SDCA	419802.4690	4033687.7656
			420012.7190	4033690.4844
			420006.8750	4034140.9297
			419832.0310	4034141.9609
			419802.4690	4033687.7656
T21a	0.43	SDCA	421766.0310	4032526.5938
			421758.4690	4032529.3477
			421806.2810	4032593.7305
			421884.3440	4032697.7148
			421918.7190	4032746.2988
			421948.4060	4032795.7422
			421977.7500	4032858.2227
			421994.8130	4032902.9766
			422010.1880	4032960.1484
			422019.3130	4033018.7031
			422022.5630	4033079.4023
			422021.5000	4033108.1875
			422103.3750	4033191.3320
			422274.9380	4033248.8359
			422331.4380	4033437.2383
			422451.9060	4033492.2617
			422530.2190	4033470.0195
			422579.0940	4033430.6797
			422659.7190	4033313.9453
			422698.6880	4033173.2383
			422688.0630	4032830.0469
			422701.7500	4032367.5195
			422592.2190	4031994.7988
			422299.6560	4031762.5020
			422105.2500	4031749.0176
			421854.9690	4031871.4102
			421952.1880	4032442.4199
			421827.1560	4032498.3555
			421778.4380	4032522.0762
			421766.0310	4032526.5938
T21b	0.06	SDCA	422021.5000	4033108.1875
			421959.5000	4033044.5586
			421680.6250	4033146.5156
			421615.5310	4032859.4297
			421668.6250	4032569.9238
			421758.4690	4032529.3477
			421806.2810	4032593.7305
			421884.3440	4032697.7148
			421918.7190	4032746.2988
			421948.4060	4032795.7422
			421977.7500	4032858.2227
			421994.8130	4032902.9766
			422010.1880	4032960.1484
			422019.3130	4033018.7031
			422022.5630	4033079.4023
			422021.5000	4033108.1875

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T18c	0.53	SDCA	420,276.9060	4,030,498.4297
			419,947.7810	4,030,741.5820
			420,067.1880	4,030,907.8086
			420,051.5940	4,031,073.7539
			420,132.5000	4,031,300.5000
			420,460.9690	4,031,604.8574
			420,448.8130	4,032,104.4238
			420,133.6880	4,032,354.6504
			419,976.0000	4,032,480.4629
			420,091.3440	4,032,635.9063
			420,399.6560	4,032,679.1270
			420,847.1880	4,032,406.2988
			421,369.5310	4,031,989.5391
			421,208.0630	4,031,771.3574
			421,204.5310	4,031,775.5723
			420,996.0630	4,031,494.8789
			420,276.9060	4,030,498.4297
T17	1.77	SDCA	419,965.0000	4,027,728.2129
			419,803.2190	4,027,847.7363
			419,922.8440	4,028,009.4902
			419,437.4690	4,028,368.0195
			419,317.9690	4,028,206.2617
			418,994.5310	4,028,445.2656
			418,723.3130	4,028,395.6211
			418,709.8750	4,028,405.5527
			418,741.5630	4,028,448.9863
			419,397.6250	4,029,329.5273
			419,791.5940	4,029,850.3008
			419,798.7500	4,029,851.3320
			420,276.9060	4,030,498.4297
			420,996.0630	4,031,494.8789
			421,204.5310	4,031,775.5723
			421,439.0940	4,031,498.2363
			421,631.0310	4,031,208.7773
			421,571.8750	4,030,077.3184
			421,548.9690	4,029,833.7383
			421,523.2500	4,029,607.1328
			421,241.1880	4,029,607.8887
			421,116.0000	4,029,457.7559
			420,776.0000	4,029,075.9551
			420,233.7500	4,028,421.8027
			420,070.9690	4,028,193.2832
			419,973.2500	4,027,978.3457
			419,965.0000	4,027,728.2129
T16 & T10	2.00	SDCA	416,930.1250	4,025,968.3438
			415,789.8440	4,026,810.3555
			416,016.5310	4,027,163.7949
			415,829.9690	4,027,301.7383
			415,812.0000	4,027,654.7695
			415,987.3440	4,028,348.7813
			415,969.6880	4,028,562.7461
			415,530.3750	4,028,446.4922
			415,660.2500	4,028,955.4551
			416,062.8130	4,029,458.0664
			416,386.1560	4,029,683.9746
			416,436.9060	4,029,720.7148
			416,449.5000	4,029,732.7207
			416,468.5940	4,029,742.7246
			416,489.8750	4,029,746.4355
			416,529.4060	4,029,741.9941
			416,547.9690	4,029,741.4180
			416,541.4060	4,029,755.8789
			416,528.0940	4,029,767.9277
			416,515.2190	4,029,777.7969
			416,501.9690	4,029,786.2637
			416,489.6560	4,029,794.9004
			416,430.1250	4,029,834.6543
			416,415.3750	4,029,843.4570
			416,400.7190	4,029,849.4766
			416,387.3130	4,029,856.1563
			416,372.5940	4,029,860.3105
			416,368.5310	4,029,870.0703
			416,375.7810	4,029,880.6270
			416,384.4690	4,029,895.7617
			416,385.5310	4,029,910.9023
			416,395.3130	4,029,918.6621
			416,406.0630	4,029,922.9727
			416,419.9060	4,029,929.8086
			416,435.1560	4,029,936.6543
T16 & T10 continued	2.00	SDCA	416449.2500	4029947.3340
			416459.1250	4029961.2246
			416462.9690	4029976.8418
			416471.5630	4029988.3965
			416481.0000	4029994.3359
			416483.2500	4030000.4590
			416476.4690	4030004.0684
			416464.6250	4030013.5332
			416452.1250	4030020.7266
			416447.3130	4030031.0762
			416454.8750	4030042.8809
			416467.7500	4030052.9766
			416466.0630	4030067.6035
			416454.5310	4030077.5586
			416440.6250	4030076.0938
			416437.6250	4030084.6914
			416445.8130	4030098.3496
			416459.0310	4030110.6875
			416465.9060	4030126.0488
			416467.1560	4030142.7871
			416461.5310	4030157.1523
			416450.1560	4030168.0938
			416439.0940	4030177.2402
			416443.8750	4030188.7227
			416458.4380	4030192.3809
			416470.3130	4030190.8789
			416479.0310	4030177.9727
			416493.8130	4030171.2637
			416510.6250	4030166.2656
			416527.2190	4030165.8828
			416541.7810	4030161.9238
			416568.0630	4030143.3945
			416585.0000	4030137.3281
			416601.6250	4030130.7734
			416608.7190	4030112.7188
			416614.8750	4030093.7324
			416614.1560	4030081.1367
			416606.9690	4030057.0176
			416610.2810	4030041.6328
			416621.0310	4030029.7910
			416626.8440	4030016.4492
			416634.6560	4030003.4863
			416639.6560	4029988.0273
			416642.2500	4029973.2676
			416656.7190	4029972.4727
			416688.3750	4029977.5293
			416704.9380	4029976.5762
			416715.9690	4029964.5742
			416723.1250	4029949.7949
			416734.4690	4029937.7109
			416747.7190	4029929.2070
			416759.0310	4029916.4004
			416768.4690	4029902.2207
			416781.8130	4029898.3633
			416790.3750	4029900.3945
			416827.0940	4029907.2129
			416838.2500	4029915.7813
			416845.7500	4029917.9492
			416852.5940	4029916.0938
			416867.9690	4029916.1543
			416880.3440	4029917.7637
			416895.6880	4029914.7402
			416925.9380	4029904.3965
			416940.7190	4029903.4805
			416954.8130	4029907.8730
			416966.3750	4029914.2246
			417119.3130	4029946.7070
			417187.6250	4029971.9180
			417581.8750	4030267.7148
			417521.0310	4029772.5156
			417653.4060	4029674.6738
			417852.7810	4029647.5566
			418383.2810	4029647.0859
			419085.9690	4029748.5098
			419093.6560	4029564.0527
			417877.2810	4029195.6055
			418000.2190	4028968.8594
			417985.4380	4028529.5684
			417827.8440	4028557.0566
			417546.5630	4028514.7832
			417094.6880	4027903.0527

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T16 & T10 continued	2.00	SDCA	416,457.7500	4,027,936.9766
			416,404.6880	4,027,788.4297
			416,365.0310	4,027,655.1465
			416,321.9690	4,027,364.6660
			416,373.0940	4,027,155.4727
			416,439.1560	4,026,996.8691
			416,529.0000	4,026,870.1172
			416,679.5310	4,026,765.2285
			416,794.3130	4,026,730.5000
			416,918.4690	4,026,690.9277
			417,059.9690	4,026,600.0957
			417,118.0940	4,026,580.9805
			417,289.0630	4,026,454.5645
			416,930.1250	4,025,968.3438
T12-1	0.33	SDCA	417,094.6880	4,027,903.0527
			416,457.7500	4,027,936.9766
			416,404.6880	4,027,788.4297
			416,365.0310	4,027,655.1465
			416,321.9690	4,027,364.6660
			416,373.0940	4,027,155.4727
			416,439.1560	4,026,996.8691
			416,529.0000	4,026,870.1172
			416,679.5310	4,026,765.2285
			416,794.3130	4,026,730.5000
			416,918.4690	4,026,690.9277
			417,059.9690	4,026,600.0957
			417,118.0940	4,026,580.9805
			417,075.7810	4,026,862.2246
			417,153.0940	4,027,305.2637
			417,068.6250	4,027,867.7852
			417,094.6880	4,027,903.0527
T13B	0.02	SDCA	419,887.6880	4,027,285.1777
			419,726.0630	4,027,404.7207
			419,965.0000	4,027,728.2129
			419,949.5310	4,027,659.1582
			419,887.6880	4,027,285.1777
T13c	0.02	SDCA	419,810.5000	4,026,842.1797
			419,648.7500	4,026,961.7246
			419,887.6880	4,027,285.1777
			419,878.5000	4,027,228.6270
			419,810.5000	4,026,842.1797
T10	1.51	SDCA	414,755.7190	4,025,075.7422
			414,875.1560	4,025,237.4785
			414,713.3750	4,025,356.9609
			414,832.8130	4,025,518.7363
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.3691
			414,474.4380	4,026,371.4551
			414,574.5630	4,026,473.5742
			414,628.3130	4,026,552.7695
			414,946.8130	4,027,212.2402
			415,303.7810	4,027,171.2852
			415,463.6880	4,026,710.9355
			415,641.0630	4,026,578.4043
			415,789.8440	4,026,810.3555
			416,930.1250	4,025,968.3438
			416,221.4060	4,025,003.5195
			415,803.2190	4,024,437.5703
			415,788.3750	4,024,419.2480
			415,755.0630	4,024,385.7285
			415,740.0630	4,024,367.4102
			415,730.9380	4,024,355.1348
			414,755.7190	4,025,075.7422
T13d	0.08	SDCA	418,812.1880	4,025,829.3945
			419,051.1560	4,026,152.9102
			419,212.9380	4,026,033.3887
			419,810.5000	4,026,842.1797
			419,654.8130	4,026,404.0859
			419,499.9380	4,025,999.3496
			419,182.9690	4,025,925.2813
			418,812.1880	4,025,829.3945

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T2-6	0.97	SDCA	411915.1560	4023883.7793
			411828.0940	4024594.2207
			411988.0310	4025141.2695
			412161.8440	4025254.5859
			412387.4060	4025234.3184
			412577.3130	4025175.8184
			412752.9380	4025413.6777
			412942.5940	4025667.2090
			413298.0630	4025913.1816
			413700.7190	4025878.1113
			413843.4060	4025859.0313
			413892.3750	4025869.0625
			414103.4380	4026021.7207
			414294.0310	4026188.3672
			414474.4380	4026371.4551
			414432.8750	4026064.3691
			414383.9380	4025998.1035
			414275.7810	4025684.7422
			414249.7810	4025496.0488
			414265.6560	4025321.0762
			414210.4380	4025245.9102
			413520.9060	4024987.7734
			413307.2500	4025145.6113
			412118.5000	4023536.9766
			411983.4060	4023714.6152
			411915.1560	4023883.7793
T9 & T10	0.70	SDCA	416221.4060	4025003.5195
			416930.1250	4025968.3438
			417169.6250	4026292.8027
			417483.0630	4026061.2207
			417363.6560	4025899.4727
			417848.8440	4025540.9238
			418087.8130	4025864.4414
			418249.6250	4025744.9199
			417981.1560	4025483.1621
			417862.3130	4025432.8262
			417742.6560	4025357.7832
			417731.0940	4025299.8848
			417711.4060	4025042.9023
			417596.9060	4024857.0391
			417427.9690	4024735.2051
			417308.1560	4024673.9160
			417192.2500	4024288.4082
			417038.6560	4023907.3789
			416987.0630	4023427.0801
			416718.5940	4023625.4961
			416734.5000	4023647.0195
			416700.3130	4023672.3301
			416688.8130	4023734.0977
			416678.0000	4023742.0566
			416644.1880	4023924.8242
			417009.4380	4024643.3945
			416999.7190	4024998.1367
			416221.4060	4025003.5195
T13e	0.01	SDCA	418530.9060	4025787.1563
			418650.3750	4025948.9160
			418812.1880	4025829.3945
			418722.7810	4025817.3457
			418530.9060	4025787.1563
T13f	0.01	SDCA	418249.6250	4025744.9199
			418369.0940	4025906.6797
			418530.9060	4025787.1563
			418416.1250	4025770.9355
			418249.6250	4025744.9199
T1-4	0.81	SDCA	410989.3130	4022252.0020
			410984.9060	4022253.3125
			410759.9060	4022411.6719
			410472.0310	4023123.1973
			410718.0630	4023206.8965
			410862.1250	4023378.8164
			410821.5940	4023731.0039
			410665.3750	4023862.7910
			410401.5000	4024041.8867
			410411.4380	4024308.5215
			410520.6560	4024349.3066
			411162.2810	4024681.8047
			411124.9690	4024778.6250
			411222.3440	4024873.7930

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T1-4 continued	0.81	SDCA	411,392.4060	4,024,792.1602
			411,607.8130	4,024,539.2461
			411,737.1560	4,023,825.0313
			411,867.2500	4,023,463.2520
			411,784.7500	4,023,306.3613
			411,582.4060	4,023,006.9551
			411,126.7810	4,022,795.5957
			410,994.2500	4,022,416.6367
			410,989.3130	4,022,252.0020
T1-3	1.09	SDCA	410,109.0000	4,021,484.2637
			410,014.9380	4,021,469.1094
			409,986.8440	4,021,465.6152
			409,959.4380	4,021,467.4043
			409,836.5940	4,021,452.1992
			409,710.2810	4,021,438.8574
			409,583.4380	4,021,449.5684
			409,464.4690	4,021,488.9551
			409,351.8750	4,021,549.4316
			409,255.5940	4,021,639.3984
			409,218.6880	4,021,681.9980
			409,176.1250	4,021,738.1621
			409,146.5630	4,021,804.0762
			409,136.6880	4,021,861.1289
			409,118.7810	4,021,931.0723
			409,108.8130	4,021,989.7910
			409,094.0000	4,022,070.1055
			409,085.6880	4,022,117.5977
			409,078.5310	4,022,146.7773
			409,061.1250	4,022,247.9473
			409,045.9690	4,022,310.3633
			409,033.1250	4,022,381.5703
			409,029.3750	4,022,398.8301
			409,009.4380	4,022,518.7207
			409,000.8440	4,022,749.8164
			408,748.8130	4,022,752.2285
			408,748.6880	4,022,994.9199
			408,752.0000	4,023,250.6855
			409,002.0630	4,023,249.9121
			408,999.6250	4,023,000.2637
			410,005.2500	4,022,997.9414
			410,001.3440	4,023,280.3730
			410,254.3750	4,023,245.9746
			410,472.0310	4,023,123.1973
			410,759.9060	4,022,411.6719
			410,984.9060	4,022,253.3125
			410,989.3130	4,022,252.0020
			411,145.5940	4,022,140.7344
			410,718.8440	4,021,593.2148
			410,712.3750	4,021,582.9375
			410,529.8750	4,021,556.1816
			410,438.7190	4,021,533.8438
			410,335.4060	4,021,518.5000
			410,242.0940	4,021,502.6836
			410,174.2810	4,021,494.7188
			410,109.0000	4,021,484.2637
T5a	0.21	SDCA	414,982.1560	4,021,997.8184
			415,526.5000	4,022,002.0215
			416,002.5310	4,022,602.1270
			415,998.3750	4,023,002.3203
			416,206.3130	4,023,003.7539
			416,056.9690	4,023,114.1348
			415,817.9380	4,022,790.5840
			415,581.1880	4,022,965.4980
			415,103.1880	4,022,318.4160
			415,178.0630	4,022,263.0664
			414,982.1560	4,021,997.8184
T1-2	0.39	SDCA	409,223.5310	4,020,182.5996
			409,280.3750	4,020,086.8984
			409,276.4690	4,020,023.0879
			409,360.9380	4,020,010.4766
			409,373.6560	4,020,006.3652
			409,409.3130	4,020,065.3262
			409,487.5940	4,020,143.3262
			409,998.0310	4,020,801.4766
			410,027.5940	4,021,036.2754
			410,109.0000	4,021,484.2637
			410,014.9380	4,021,469.1094
			409,986.8440	4,021,465.6152
			409,959.4380	4,021,467.4043
			409,836.5940	4,021,452.1992

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T1-2 continued	0.39	SDCA	409710.2810	4021438.8574
			409583.4380	4021449.5684
			409495.3440	4021478.5996
			409464.4690	4021488.9551
			409351.8750	4021549.4316
			409255.5940	4021639.3984
			409218.6880	4021681.9980
			409176.1250	4021738.1621
			409146.5630	4021804.0762
			409166.6250	4020986.3672
			409223.5310	4020182.5996
T5b	0.03	SDCA	414001.2500	4020257.5078
			414001.4690	4020502.4766
			414426.0000	4020500.8613
			414464.0310	4020432.0313
			414293.7190	4020338.7207
			414135.9690	4020279.6660
			414001.2500	4020257.5078
T2	0.29	SDCA	410025.1560	4019002.0527
			410016.8750	4020278.1387
			409576.6880	4020126.1250
			409445.4060	4019983.3887
			409435.7810	4019902.2852
			409208.0310	4019472.8008
			409200.4380	4019355.6914
			409374.7500	4019259.9512
			409428.5630	4019253.1973
			409493.8750	4019250.0898
			409534.9380	4019112.7676
			409535.8130	4018994.6445
			410025.1560	4019002.0527
S1	0.71	Study	410001.6560	4042464.2656
			409290.7190	4042500.2383
			408861.2190	4042688.4688
			408813.8750	4042910.9609
			408859.4380	4043071.8984
			408972.0940	4043285.6914
			409337.5310	4043461.0000
			410500.6560	4043924.3945
			410962.4690	4044000.3555
			411096.8440	4043852.2109
			411108.0630	4043672.6836
			410984.4380	4043481.0273
			410592.0940	4043294.9219
			410496.6250	4043013.0352
			410088.4380	4043009.1836
			410003.7500	4043010.8320
			410001.6560	4042464.2656
S2	0.28	Study	414928.6560	4041572.7617
			415075.1250	4041273.9336
			415237.3130	4041985.5195
			415639.7810	4042385.2695
			415283.2810	4043000.1953
			414740.2500	4042529.6992
			414928.6560	4041572.7617
S3	0.72	Study	421208.0630	4031771.3574
			421766.0310	4032526.5938
			421778.4380	4032522.0762
			421827.1560	4032498.3555
			421952.1880	4032442.4199
			421854.9690	4031871.4102
			422105.2500	4031749.0176
			422299.6560	4031762.5020
			422592.2190	4031994.7988
			422701.7500	4032367.5195
			422732.5630	4032243.8984
			422746.8130	4032159.0254
			422779.7500	4032064.7734
			422779.7190	4031946.8984
			422793.9060	4031814.8984
			422817.5310	4031682.9316
			422840.9690	4031565.0645
			422869.3130	4031447.2109
			422836.2810	4031338.7852
			422713.7500	4031206.8086
			422529.9380	4030985.2422
			422250.5940	4030779.7578
			422000.0310	4030499.9922

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
S3 continued	0.72	Study	422,006.2810	4,030,500.0156
			421,836.9380	4,030,271.0234
			421,548.9690	4,029,833.7383
			421,571.8750	4,030,077.3184
			421,631.0310	4,031,208.7773
			421,439.0940	4,031,498.2363
			421,208.0630	4,031,771.3574
S4	0.15	Study	417,410.5630	4,023,845.5176
			417,398.8440	4,023,845.8750
			417,387.4380	4,023,846.9883
			417,377.4060	4,023,848.7207
			417,367.8440	4,023,851.0527
			417,358.9380	4,023,853.9434
			417,350.9380	4,023,857.4238
			417,343.0940	4,023,861.6250
			417,335.2810	4,023,866.7793
			417,327.4690	4,023,872.8066
			417,319.6880	4,023,879.7500
			417,310.5940	4,023,888.9688
			417,301.9690	4,023,899.1680
			417,293.6560	4,023,910.1230
			417,286.2810	4,023,921.5137
			417,281.1250	4,023,930.3848
			417,276.9060	4,023,939.6543
			417,273.1560	4,023,949.9414
			417,269.7190	4,023,961.3281
			417,266.5000	4,023,975.5664
			417,263.6560	4,023,992.3125
			417,257.5630	4,024,036.4043
			417,255.7810	4,024,053.0898
			417,254.3440	4,024,071.4844
			417,253.3440	4,024,112.0410
			417,253.6880	4,024,135.3887
			417,256.4690	4,024,211.2207
			417,258.9380	4,024,248.6602
			417,260.8130	4,024,266.7930
			417,266.0630	4,024,299.1426
			417,269.5630	4,024,313.8516
			417,274.6560	4,024,330.5859
			417,281.5940	4,024,349.5684
			417,289.7810	4,024,368.9414
			417,298.0630	4,024,386.4863
			417,306.2810	4,024,401.4785
			417,314.9690	4,024,415.0508
			417,324.0630	4,024,427.2441
			417,333.2500	4,024,437.8730
			417,341.8130	4,024,446.3809
			417,362.2810	4,024,463.6328
			417,374.6880	4,024,472.7871
			417,391.6880	4,024,484.4727
			417,422.5940	4,024,504.8984
			417,438.9380	4,024,515.1504
			417,454.8440	4,024,524.5742
			417,469.5000	4,024,532.6895
			417,483.8130	4,024,540.1250
			417,497.9690	4,024,546.9180
			417,525.0310	4,024,558.3184
			417,537.3130	4,024,562.7500
			417,550.9690	4,024,567.0371
			417,565.6880	4,024,571.1504
			417,595.7190	4,024,578.3379
			417,644.3750	4,024,588.4512
			417,671.1560	4,024,593.2676
			417,699.5630	4,024,597.4395
			417,729.9690	4,024,601.0371
			417,763.4060	4,024,604.2285
			417,801.4380	4,024,607.2109
			417,876.5000	4,024,612.3184
			417,885.9690	4,024,613.4160
			417,906.1880	4,024,617.6074
			417,954.9060	4,024,630.4629
			417,966.3750	4,024,632.8535
			417,976.4690	4,024,634.2813
			417,984.4060	4,024,634.8398
			417,991.7190	4,024,634.7266
			417,998.0940	4,024,633.9082
			418,004.0310	4,024,632.4531
			418,009.1560	4,024,630.2891
			418,013.8130	4,024,627.4102
			418,017.8750	4,024,623.8594
			418,021.4380	4,024,619.5566
			418,027.1560	4,024,609.7598

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83)	
			X-coordinates	Y-coordinates
S4 continued	0.15	Study	418032.4060	4024597.6895
			418034.6560	4024589.4512
			418035.8750	4024580.7773
			418035.6560	4024570.7617
			418034.0630	4024559.9766
			418031.0630	4024548.3418
			418026.3750	4024535.4473
			418020.4690	4024521.3984
			418000.5310	4024478.6465
			417984.5630	4024435.9668
			417970.9060	4024402.7227
			417957.8130	4024373.8125
			417943.3130	4024343.8242
			417931.2500	4024320.3027
			417918.0940	4024295.7734
			417880.1250	4024228.6719
			417859.5000	4024190.0117
			417854.1250	4024181.0176
			417848.9380	4024173.2773
			417843.6250	4024166.4160
			417838.3130	4024160.3535
			417832.0940	4024154.4258
			417825.1250	4024149.1992
			417816.9690	4024144.4160
			417807.5630	4024140.0762
			417799.1250	4024136.8242
			417789.4690	4024133.5957
			417744.3750	4024120.6641
			417733.3130	4024116.6641
			417723.6250	4024112.4082
			417716.8440	4024108.7773
			417710.6880	4024104.8281
			417693.1880	4024092.0859
			417683.1250	4024084.1797
			417674.4380	4024076.5137
			417667.2810	4024069.1191
			417661.4690	4024061.8086
			417657.0630	4024054.5488
			417654.5000	4024048.2773
			417652.5000	4024040.8516
			417647.9060	4024009.5918
			417646.3750	4024002.8047
			417644.5940	4023996.9746
			417640.7500	4023988.9395
			417636.0310	4023980.8086
			417630.3750	4023972.9629
			417623.6560	4023965.2930
			417617.2810	4023958.7949
			417609.9690	4023952.3184
			417601.7810	4023945.7832
			417592.6250	4023939.0781
			417575.3440	4023927.6641
			417540.5940	4023906.3262
			417526.8440	4023897.4316
			417515.0940	4023889.3320
			417487.6880	4023868.7949
			417472.0940	4023858.9844
			417463.6560	4023854.8926
			417455.1880	4023851.9063
			417444.7810	4023849.1504
			417433.6250	4023847.1348
			417422.1560	4023845.9258
			417410.5630	4023845.5176
C1	0.21	Channel	410989.3130	4022252.0020
			410994.2500	4022416.6367
			411126.7810	4022795.5957
			411582.4060	4023006.9551
			411784.7500	4023306.3613
			411867.2500	4023463.2520
			411737.1560	4023825.0313
			411915.1560	4023883.7793
			411983.4060	4023714.6152
			412118.5000	4023536.9766
			411783.0000	4023082.8359
			411698.3750	4022867.5078
			411641.7810	4022726.1934
			411641.2190	4022434.6367
			411422.2810	4022348.0508
			411285.7500	4022320.5957
			411145.5940	4022140.7344
			410989.3130	4022252.0020

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
C2	0.29	Channel	409,223.5310	4,020,182.5996
			409,280.3750	4,020,086.8984
			409,276.4690	4,020,023.0879
			409,360.9380	4,020,010.4766
			409,373.6560	4,020,006.3652
			409,409.3130	4,020,065.3262
			409,487.5940	4,020,143.3262
			409,998.0310	4,020,801.4766
			410,027.5940	4,021,036.2754
			410,109.0000	4,021,484.2637
			410,174.2810	4,021,494.7188
			410,242.0940	4,021,502.6836
			410,335.4060	4,021,518.5000
			410,438.7190	4,021,533.8438
			410,529.8750	4,021,556.1816
			410,712.3750	4,021,582.9375
			410,604.9060	4,021,412.4785
			410,687.5940	4,021,327.9746
			410,488.7190	4,020,946.6582
			410,264.9380	4,020,620.1895
			410,015.6880	4,020,454.4141
			410,016.8750	4,020,278.1387
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664
			409,173.3130	4,019,532.8418
			409,115.7190	4,019,657.4395
			409,058.5940	4,019,813.5703
			409,055.4380	4,019,859.0117
			409,098.6560	4,019,944.7520
			409,192.5940	4,020,079.2344
			409,223.5310	4,020,182.5996
Corridor 1	0.14	DCM	411,404.0940	4,041,881.5078
			411,328.8130	4,041,911.0039
			411,307.5940	4,041,894.7266
			411,206.9380	4,042,044.9063
			411,252.4060	4,044,581.8867
			411,297.8130	4,044,632.7539
			411,393.9060	4,044,623.3633
			411,326.8130	4,042,108.9727
			411,411.9380	4,041,944.4414
			411,404.0940	4,041,881.5078
T35	0.26	DCM	410,001.6560	4,042,464.2656
			410,000.0000	4,042,003.4180
			410,754.6560	4,042,002.5391
			410,757.3750	4,042,448.5820
			410,577.9380	4,042,452.2773
			410,599.0630	4,042,999.1289
			410,003.7500	4,043,010.8320
			410,001.6560	4,042,464.2656
T23 thru 30	13.19	DCM	419,832.0310	4,034,141.9609
			419,222.8750	4,034,343.4492
			419,064.9060	4,034,610.8672
			418,665.4380	4,034,527.8516
			417,924.7190	4,037,107.5195
			417,056.8130	4,037,995.5234
			416,908.7190	4,037,982.5234
			416,631.9690	4,038,195.4219
			416,422.7190	4,038,451.3359
			415,865.4690	4,039,054.8633
			415,536.0310	4,039,224.5117
			415,102.2190	4,039,351.9453
			414,905.7190	4,039,737.5508
			414,931.1560	4,040,036.5156
			414,894.9380	4,040,266.0117
			414,848.0630	4,040,378.9961
			414,797.1880	4,040,944.3359
			414,873.6560	4,041,023.6289
			414,828.3130	4,041,092.9570
			414,928.6560	4,041,572.7617
			415,075.1250	4,041,273.9336
			415,237.3130	4,041,985.5195
			415,645.7500	4,042,391.2070
			415,872.2190	4,042,360.3477
			416,000.9380	4,042,344.1055
			416,005.6250	4,042,568.5234
			416,413.8750	4,042,560.2578
			416,415.9060	4,043,001.9297

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T23 thru 30 continued	13.19	DCM	417385.2500	4042993.4570
			417370.0940	4042770.4766
			417719.9060	4042619.4531
			417792.5000	4042117.6719
			418026.3130	4042090.2539
			418032.4690	4042385.2734
			418154.9060	4042206.3711
			418410.5000	4042382.5898
			418608.9380	4042170.9414
			418642.5940	4042098.0430
			418743.9060	4042022.1406
			418637.1560	4041594.2695
			418839.1560	4040396.7852
			418687.1250	4040203.3438
			418733.7190	4040126.7656
			419760.8750	4039175.2695
			420448.8750	4038850.6133
			421672.5630	4037910.9570
			421774.5940	4037694.9570
			421823.2190	4037710.5156
			422114.0310	4037354.1172
			422453.6250	4036821.3398
			422236.8440	4036716.3086
			422544.5630	4036065.0313
			422559.9380	4034701.7969
			422429.2810	4034127.0234
			419832.0310	4034141.9609
T36	2.41	DCM	414532.5630	4039759.7188
			414544.1880	4039918.4961
			414347.2810	4040341.8281
			414341.6250	4040340.8398
			414296.4060	4040328.5234
			414287.8440	4040319.8633
			414268.3750	4040314.5508
			414211.2190	4040321.9883
			414047.5000	4040298.1172
			414003.0000	4040378.3242
			414010.8750	4040412.9063
			414039.0940	4040436.0195
			413723.0940	4040965.9141
			413561.2500	4041141.6016
			413478.6880	4041158.2148
			413443.2190	4041269.5156
			413241.1250	4041488.5234
			413191.5310	4041500.2969
			412841.4380	4041505.7500
			412833.7190	4041412.9141
			412690.1560	4041406.0313
			412652.2190	4041436.0781
			412682.0630	4041508.1523
			412344.1560	4041513.1602
			411328.8130	4041911.0039
			410132.5940	4040993.3945
			410766.2190	4040418.8281
			413592.7810	4039353.6953
			414146.5000	4039386.4141
			414550.5940	4039224.6563
			414528.0310	4039697.5039
			414532.5630	4039759.7188
T18a	2.67	DCM	417581.8750	4030267.7148
			417605.5940	4030460.9473
			417838.7500	4030929.0918
			418459.9380	4031788.9746
			418889.0940	4032024.0352
			418754.0310	4033026.4648
			419239.5310	4033150.5156
			419467.0940	4034262.6992
			419832.0310	4034141.9609
			419771.8750	4033218.0078
			419606.1560	4032994.4258
			420091.3440	4032635.9063
			419976.0000	4032480.4629
			420133.6880	4032354.6504
			420448.8130	4032104.4238
			420460.9690	4031604.8574
			420132.5000	4031300.5000
			420051.5940	4031073.7539
			420067.1880	4030907.8086
			419947.7810	4030741.5820
			420276.9060	4030498.4297
			419798.7500	4029851.3320

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T18a continued	2.67	DCM	418,383.2810	4,029,647.0859
			417,852.7810	4,029,647.5566
			417,653.4060	4,029,674.6738
			417,521.0310	4,029,772.5156
			417,581.8750	4,030,267.7148
T11	0.67	DCM	415,789.8440	4,026,810.3555
			415,641.0630	4,026,578.4043
			415,463.6880	4,026,710.9355
			415,303.7810	4,027,171.2852
			414,829.7500	4,027,225.6699
			414,603.4060	4,027,348.4004
			414,525.4380	4,027,872.6914
			414,845.5630	4,028,265.1602
			415,969.6880	4,028,562.7461
			415,987.3440	4,028,348.7813
			415,812.0000	4,027,654.7695
			415,829.9690	4,027,301.7383
			416,016.5310	4,027,163.7949
			415,789.8440	4,026,810.3555
T13a	2.47	DCM	417,169.6250	4,026,292.8027
			417,289.0630	4,026,454.5645
			417,118.0940	4,026,580.9805
			417,075.7810	4,026,862.2246
			417,153.0940	4,027,305.2637
			417,068.6250	4,027,867.7852
			417,546.5630	4,028,514.7832
			417,827.8440	4,028,557.0566
			418,270.9380	4,028,479.7695
			418,552.2190	4,028,522.0059
			418,723.3130	4,028,395.6211
			418,994.5310	4,028,445.2656
			419,317.9690	4,028,206.2617
			419,437.4690	4,028,368.0195
			419,922.8440	4,028,009.4902
			419,803.2190	4,027,847.7363
			419,965.0000	4,027,728.2129
			419,726.0630	4,027,404.7207
			419,887.6880	4,027,285.1777
			419,648.7500	4,026,961.7246
			419,810.5000	4,026,842.1797
			419,212.9380	4,026,033.3887
			419,051.1560	4,026,152.9102
			418,812.1880	4,025,829.3945
			418,650.3750	4,025,948.9160
			418,530.9060	4,025,787.1563
			418,369.0940	4,025,906.6797
			418,249.6250	4,025,744.9199
			418,087.8130	4,025,864.4414
			417,848.8440	4,025,540.9238
			417,363.6560	4,025,899.4727
			417,483.0630	4,026,061.2207
			417,169.6250	4,026,292.8027
T8	0.21	DCM	413,520.9060	4,024,987.7734
			413,954.0000	4,024,667.7598
			414,432.0940	4,025,314.7227
			414,755.7190	4,025,075.7422
			414,875.1560	4,025,237.4785
			414,713.3750	4,025,356.9609
			414,832.8130	4,025,518.7363
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.3691
			414,383.9380	4,025,998.1035
			414,275.7810	4,025,684.7422
			414,249.7810	4,025,496.0488
			414,265.6560	4,025,321.0762
			414,210.4380	4,025,245.9102
			413,520.9060	4,024,987.7734
T5 thru T8	3.53	DCM	414,505.9690	4,021,353.3281
			414,222.0630	4,020,969.0215
			413,736.8130	4,021,327.4629
			413,975.7810	4,021,651.0234
			413,814.0000	4,021,770.5449
			414,053.0940	4,022,094.1016
			413,406.0630	4,022,572.1836
			413,166.9380	4,022,248.5879
			412,196.4380	4,022,965.6328
			412,435.5630	4,023,289.1914
			412,112.0000	4,023,528.1816

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T5 thru T8 continued	3.53	DCM	413307.2500	4025145.6113
			413954.0000	4024667.7598
			414432.0940	4025314.7227
			416696.5940	4023641.5605
			416218.7190	4022994.5840
			415895.2810	4023233.6211
			415656.1880	4022910.1016
			415332.7190	4023149.1055
			414376.5630	4021855.0645
			414700.1560	4021616.0996
			414505.9690	4021353.3281
T9	0.46	DCM	416218.7190	4022994.5840
			416696.5940	4023641.5605
			415730.9380	4024355.1348
			415740.0630	4024367.4102
			415755.0630	4024385.7285
			415788.3750	4024419.2480
			415803.2190	4024437.5703
			416221.4060	4025003.5195
			416999.7190	4024998.1367
			417009.4380	4024643.3945
			416644.1880	4023924.8242
			416678.0000	4023742.0566
			416688.8130	4023734.0977
			416700.3130	4023672.3301
			416734.5000	4023647.0195
			416718.5940	4023625.4961
			416987.0630	4023427.0801
			416933.0310	4023305.0703
			416218.7190	4022994.5840
T1-1	0.24	DCM	410001.3440	4023280.3730
			410005.2500	4022997.9414
			408999.6250	4023000.2637
			409007.7810	4023833.0859
			409051.0310	4023839.1992
			409110.8440	4023908.2500
			409125.3750	4023977.1719
			409135.9380	4023986.4395
			409555.1250	4023595.2637
			409806.6880	4023351.0098
			410001.3440	4023280.3730
T2 thru 5	3.62	DCM	410025.1560	4019002.0527
			410015.6880	4020454.4141
			410264.9380	4020620.1895
			410488.7190	4020946.6582
			410687.5940	4021327.9746
			410604.9060	4021412.4785
			410718.8440	4021593.2148
			411285.7500	4022320.5957
			411422.2810	4022348.0508
			411641.2190	4022434.6367
			411641.7810	4022726.1934
			411698.3750	4022867.5078
			411783.0000	4023082.8359
			412112.0000	4023528.1816
			412435.5630	4023289.1914
			412196.4380	4022965.6328
			413088.5940	4022306.4473
			413166.9380	4022248.5879
			413406.0630	4022572.1836
			414053.0940	4022094.1016
			413814.0000	4021770.5449
			413975.7810	4021651.0234
			413736.8130	4021327.4629
			414222.0630	4020969.0215
			414505.9690	4021353.3281
			414557.3750	4020853.0215
			414717.5310	4020809.5039
			414704.8750	4020499.7988
			414001.4690	4020502.4766
			414001.2500	4020257.5078
			413767.6560	4020273.3301
			413695.4380	4020332.7383
			413677.0630	4020225.3008
			413700.3440	4020128.3535
			413549.0940	4020190.3926
			413444.4060	4020190.3945
			413394.0000	4020105.0723
			413343.6560	4020101.2031
			413266.1250	4020221.4121

Exhibit 1 - Map and coordinates of PM_{10} control areas

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
T2 thru 5 continued	3.62	DCM	413090.0310	4020217.8281
			413082.4060	4020077.9375
			412973.9060	4020085.6738
			412756.6880	4020031.3984
			412389.2810	4020442.0293
			412270.9690	4020910.1992
			411937.4060	4020860.1270
			411952.8130	4020757.8945
			411835.6880	4020364.6348
			411,644.0940	4,020,105.5039
			411,579.3750	4,020,095.7637
			411,149.7500	4,019,542.1543
			410,360.7190	4,019,008.5000
			410,025.1560	4,019,002.0527
T5-2	0.03	DCM	415,656.1880	4,022,910.1016
			415,817.9380	4,022,790.5840
			416,056.9690	4,023,114.1348
			415,895.2810	4,023,233.6211
			415,656.1880	4,022,910.1016
T5-3	0.22	DCM	414,700.1560	4,021,616.0996
			414,376.5630	4,021,855.0645
			415,332.7190	4,023,149.1055
			415,581.1880	4,022,965.4980
			415,103.1880	4,022,318.4160
			415,178.0630	4,022,263.0664
			414,700.1560	4,021,616.0996

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates

Total SDCA	12.86
Total Study	1.86
Total Channel	0.50
Total DCM	30.12

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Exhibit 2 - TDCA Minimum Dust Control Efficiency map

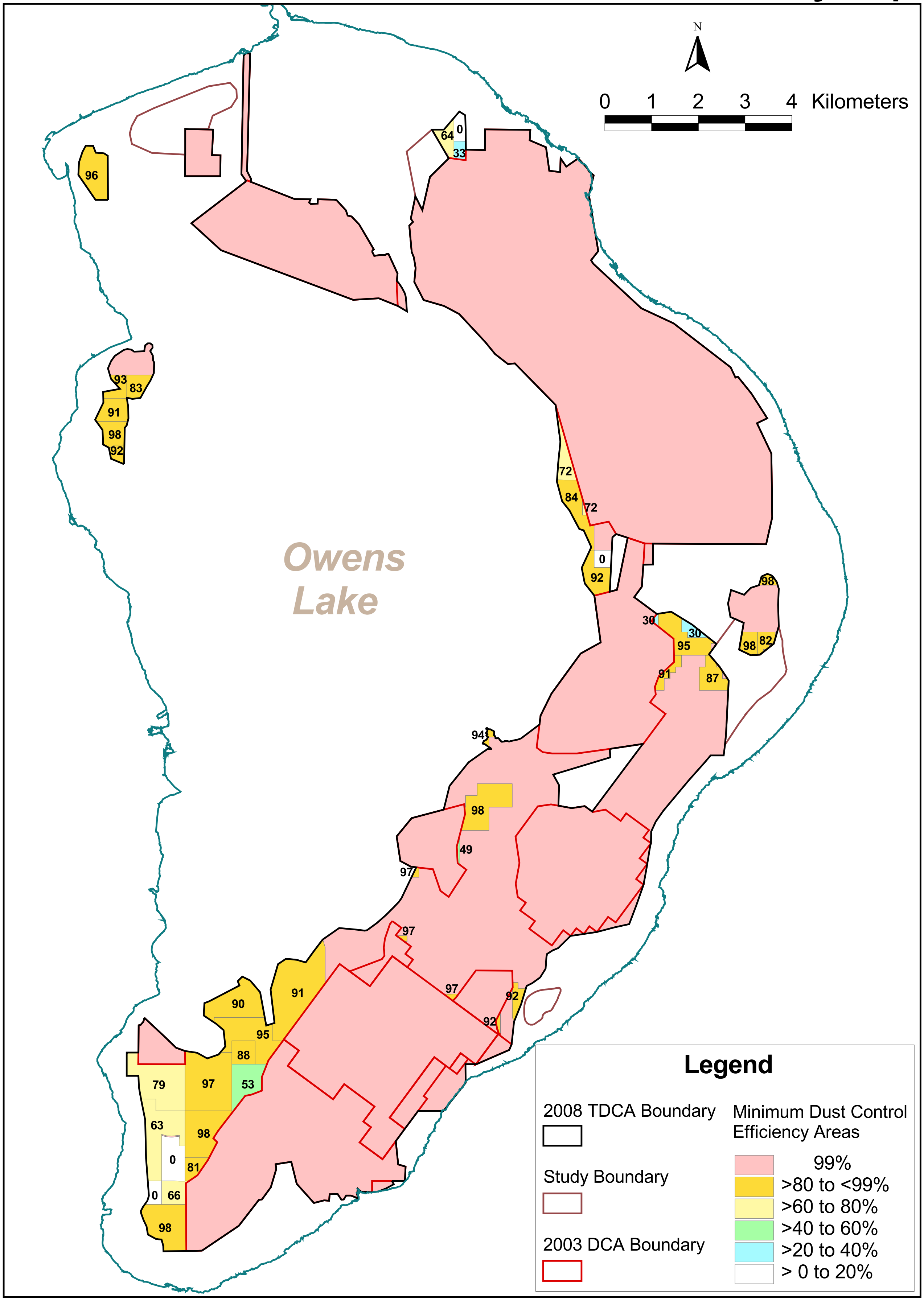

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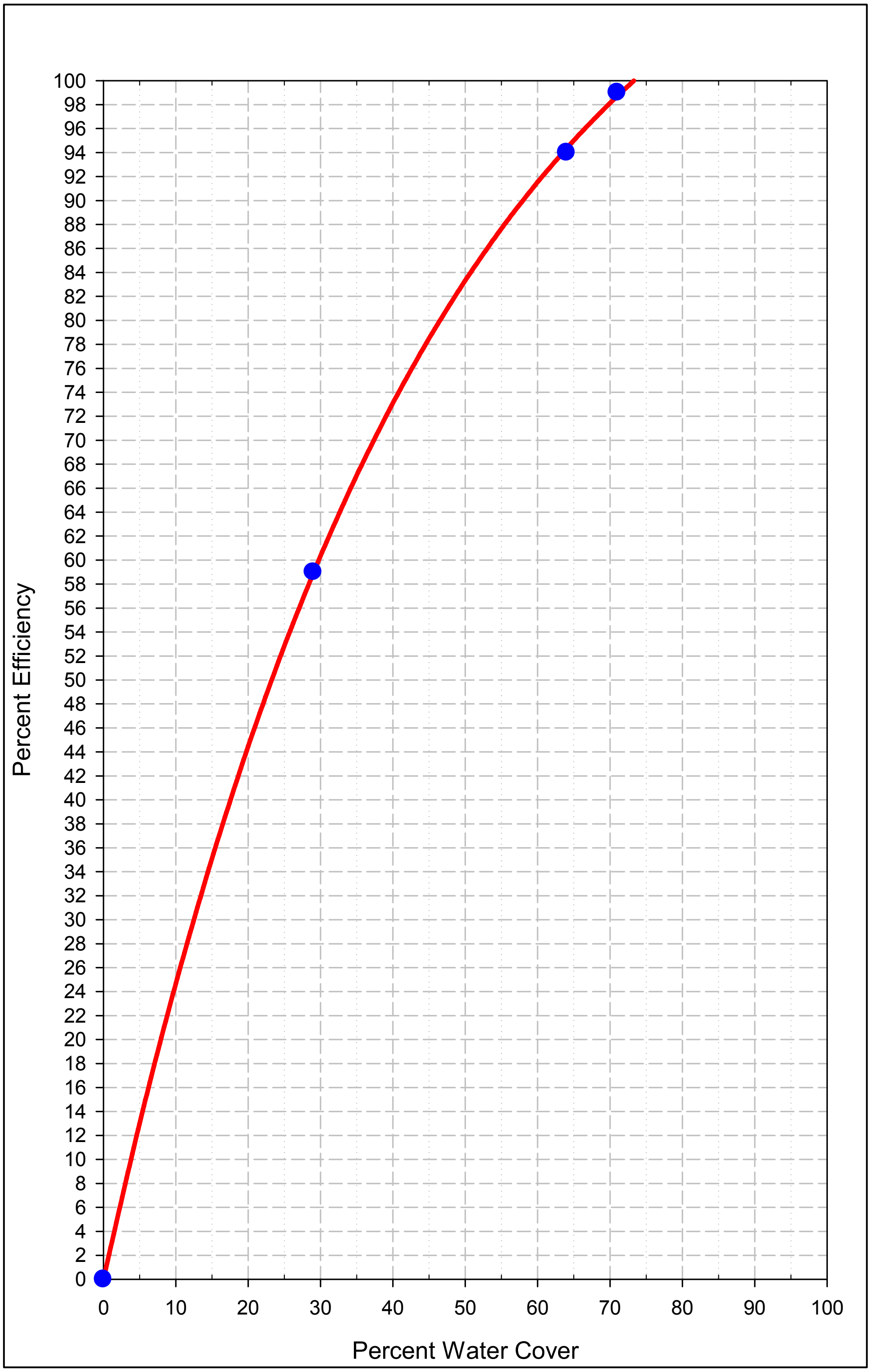
Exhibit 3 - Shallow Flood control efficiency curve



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SETTLEMENT AGREEMENT

This Settlement Agreement (Agreement) is entered into between the Great Basin Unified Air Pollution Control District (District) and the City of Los Angeles by and through its Department of Water and Power (collectively "City") (the City and District to be referred to as the "Parties") to resolve the City's challenge to the District's Supplemental Control Requirement (SCR) determination for the Owens Lake bed issued on December 21, 2005, and modified on April 4, 2006.

RECITALS

WHEREAS:

A. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancha.

B. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts.

C. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter (PM_{10}).

D. PM_{10} is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq*., as amended (CAA).

E. Under the National Ambient Air Quality Standard (NAAQS) adopted pursuant to the CAA, PM_{10} levels may not exceed an average concentration of 150 micrograms per cubic meter ($\mu g/m^3$) during a 24-hour period more than one time per calendar year averaged over three years.

F. The District has regulatory authority over air quality issues in the region where Owens Lake is situated.

G. Under Health and Safety Code Section 42316, enacted by the California Legislature in 1983, the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS for PM_{10}.

H. In 1987, the United States Environmental Protection Agency (EPA) identified the Owens Valley Planning Area (OVPA), which encompasses

Owens Lake, as an area not meeting the NAAQS for PM_{10}. In 1993, the OVPA was reclassified as a serious non-attainment area under the CAA.

I. In 1997, the District adopted the Owens Valley PM_{10} Demonstration of Attainment State Implementation Plan as required by the CAA (1997 SIP). In 1998, the District and the City agreed that the City would construct control measures on 16.5 square miles of the Owens Lake bed by the end of 2003 as part of a SIP revision in 1998.

J. In 2003, through District Board Order 03111-01 (Order), the District required the City to construct dust control measures (DCMs) on an additional 13.3 square miles of the Owens Lake bed by the end of 2006, for a total of 29.8 square miles of dust control measures, as part of a Revised SIP (2003 SIP). The Order and 2003 SIP also established a process whereby the Air Pollution Control Officer of the District (APCO) must evaluate on at least an annual basis the potential need for additional DCMs and "watch areas" at Owens Lake bed in order to attain the NAAQS. The process involves a determination by the APCO and an opportunity for the City to present an alternative analysis.

K. On December 21, 2005, the APCO issued the 2004/2005 SCR determination finding that the City would be required to implement DCMs on an additional 9.31 square miles of Owens Lake bed and identifying 0.66 square miles as "watch area."

L. On January 20, 2006, the City appealed the 2004/2005 SCR determination to the California Air Resources Board (CARB). The District disagreed that the determination was subject to such an appeal.

M. On February 22, 2006, the City submitted an Alternative Analysis contesting aspects of the 2004/2005 SCR determination.

N. On April 4, 2006, the APCO modified the SCR determination issued on December 21, 2005 to reduce the supplemental DCM area to 8.66 square miles and increased the "watch area" to 0.79 square miles (Modified SCR determination).

O. On May 3, 2006, the City filed an appeal of the April 4, 2006 Modified SCR determination with the CARB. The District disagreed that the determination was subject to such an appeal.

P. On May 4, 2006, the City filed a petition for writ of mandate challenging the APCO's April 4, 2006 Modified SCR determination (*City of Los Angeles Department of Water and Power v. Great Basin Unified Air Pollution Control District*, Kern County Superior Court Case No. S-1500-

CV-258678, RJO). The Parties entered into mediation and a temporary stay of the litigation.

AGREEMENT

NOW, THEREFORE, in consideration of the provisions herein contained and to resolve the disputes over methods to address air quality at Owens Lake, including the disputes over the SCR determination issued on December 21, 2005, and modified on April 4, 2006, the City and the District hereby agree as follows:

<u>DUST CONTROL MEASURES (DCMs)</u>

1. The City shall apply DCMs as provided in this Agreement on additional areas of the lake bed beyond the 29.8 square miles required in the 2003 SIP.

   A. The areas on the lake bed on which DCMs will be applied are designated in this Agreement as follows:

      (i) The 12.7 square-mile area of additional DCMs shall be known as the 2006 Supplemental Dust Control Area (SDCA).

      (ii) The 29.8 square miles of DCMs required by the 2003 SIP shall be known as the 2003 Dust Control Area (DCA).

      (iii) The 0.5 square miles of natural drainage channels on the south area of the lake bed shall be known as the Channel Area.

      (iv) The combined 43.0 square miles of DCMs and Channel Area shall be known as the Total Dust Control Area (TDCA).

      (v) The SDCA, DCA, Channel Area and TDCA are delineated on the TDCA Map, attached as Exhibit 1. The SDCA and Channel Area coordinate descriptions are attached as Exhibit 2. The DCA coordinate description is contained in the 2003 SIP.

   B. Minor adjustments may be made to the boundaries of the SDCA upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the TDCA shall also be modified to reflect the modified SDCA boundaries.

   C. The City may, at its sole option, apply DCMs to additional areas outside the TDCA.

   D. The City shall begin full operation of the DCMs within the SDCA as follows:

(i) Moat and row controls shall be operational by October 1, 2009.

(ii) All other controls shall be operational by April 1, 2010.

E. Following the dates set out above in this Section, the City shall continuously operate and maintain the DCMs within the TDCA. The City shall continuously operate and maintain DCMs within the DCA as required under the 2003 SIP, except as otherwise provided in this Agreement.

2. A. The City shall construct within the SDCA a minimum of 9.2 square miles of Shallow Flood dust controls. The Shallow Flood areas are delineated on the Dust Control Measure Map, attached as Exhibit 3.

B. On the remaining 3.5 square miles of the SDCA not specifically designated for Shallow Flood on the DCM Map (Exhibit 3), the City shall

(i) construct Shallow Flood, Managed Vegetation, or gravel cover, as described in the Dust Control Measures Description, attached as Exhibit 4, and which are currently approved as Best Available Control Measures (BACM) under the 2003 SIP; or

(ii) subject to Sections 3, 7 and 8, treat up to 3.5 square miles of the SDCA with the alternative dust control measure known as "Moat and Row," as described in the DCM Description (Exhibit 4).

C. TDCA areas designated as Channel Area represent areas containing natural drainage channels having potentially significant resource issues and regulatory constraints. While these areas are not a part of the SDCA, they shall be addressed as part of the control strategy for the SDCA. However, it is acknowledged that the control strategy in this area may be subject to additional regulatory constraints, design considerations, and impacts caused by adjacent DCMs.

D. The internal control measure boundaries delineated on the DCM Map (Exhibit 3) are approximate and are subject to final written approval by the APCO. The areas designated on the DCM Map (Exhibit 3) for Shallow Flood and Moat and Row may be modified upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld.

3. All DCMs within the SDCA shall be designed, constructed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 5. The initial target MDCEs (Target MDCEs):

A. Are based on the results of air quality modeling, as described in the 2003 SIP, conducted by the City and approved by the APCO for the period July 2002 through June 2006;

B. Assume 100 percent control efficiency in the 29.8 square miles of the DCA required under the 2003 SIP, except during the fall and spring ramping periods as described in Section 26, and achievement of the target MDCEs for the areas in the SDCA. Control efficiencies during the fall and spring ramping periods shall be based on modeling that accounts for reduced wetness cover pursuant to Sections 5 and 26;

C. Have been selected to achieve PM_{10} concentrations that will not exceed the federal 24-hour PM_{10} ambient air quality standard of 150 $\mu g/m^3$ (federal standard) at all historic shoreline (elevation 3600 feet above sea level) receptors.

4. Prior to April 1, 2010, the Target MDCEs may be modified, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, if the modified MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, attached as Exhibit 6, pursuant to Section 3.

5. For the Shallow Flood areas identified in DCM Map (Exhibit 3), the percentage of each area that must be wetted shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 7, or an update of the SFCE Curve mutually agreeable to the Parties, to achieve the control efficiency levels in the MDCE Map (Exhibit 5).

6. The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:

A. From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and

B. After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and

C. The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.

7. As Moat and Row is not a currently approved BACM dust control measure under the 2003 SIP, the City will develop, in consultation with the District, and conduct Moat and Row Demonstration Projects on the lake bed. These Demonstration Projects will be conducted on two or more locations on the lake bed outside of the DCA. The proposed location of these Demonstration Project areas are shown on attached Moat and Row Demonstration Project Map (Exhibit 8). The actual locations of the projects may be changed by the City, and in such event, the City shall notify the APCO in writing of the changed locations. The City will be the California Environmental Quality Act (CEQA) lead agency for implementation of the Moat and Row Demonstration Projects.

8. Based on results of the Moat and Row Demonstration Projects described in Section 7 and subject to Sections 2 and 3, the City in its sole discretion may decide which DCMs to implement in the areas designated for Moat and Row in Section 2 and Exhibit 3 of this Agreement. The City shall consult with the District before making its decision and inform the District of its decision in writing.

A. Depending on the results of the Moat and Row Demonstration Projects, the measures implemented in these areas by the City may include Moat and Row, enhanced Moat and Row (*e.g.*, closer Moat and Row spacing, Moat and Row with some Shallow Flooding, Moat and Row with some vegetation), combined Moat and Row/Shallow Flood, MDCE-BACM, or BACM.

B. If the City implements Moat and Row, it shall design and construct Moat and Row to achieve the Target MDCEs described in Section 3. The Moat and Row configuration required to achieve these Target MDCEs will be decided solely by the City, after consultation with and written notification to the District.

C. In the event of a dispute regarding the City's proposed decision or action pursuant to Section 8.A or 8.B, either Party may initiate the Dispute Resolution Process pursuant to Section 32.

D. Upon written request of the City, the APCO shall determine in writing if Moat and Row and/or Enhanced Moat and Row constitutes BACM or MDCE-BACM, in accordance with the revisions to the 2003 SIP provided in Section 28.

DUST IDENTIFICATION (DUST ID) PROGRAM

9. The Parties mutually recognize that a method for identifying sources of potential exceedances of the federal standard at the historic shoreline could be developed that is superior to and could replace or modify the current Dust ID Program.

A. The Parties will work cooperatively, with the participation of a mutually agreeable independent third party technical expert or experts under contract to the District and jointly managed by the Parties, in a good faith effort to develop, before April 1, 2010, an improved Dust ID Program. The APCO will implement all mutually-agreeable changes to the Dust ID Program and notify the City in writing of those changes.

B. The District will continue to work with the City after April 1, 2010 to further improve the Dust ID Program and will implement all additional mutually agreeable changes in a written decision.

C. In furtherance of efforts to improve the Dust ID Program:

(i) The Parties will promptly begin a mediated process for refining the Dust ID Program and resolving disputes.

(ii) The Parties will select a mutually agreeable expert or panel of independent third-party technical experts.

(iii) The District, after consultation with the City, will increase the number of PM_{10} monitors at or near the historic shoreline. In all cases, the District will notify the City of the location of the monitors within 30 days of placement of the monitors. If a PM_{10} monitor is located above the historic shoreline, the District will make reasonable attempts to account for non-lake bed sources that may affect the monitor.

(iv) The District, after consultation with the City, will modify the existing sand flux monitor network to concentrate on areas of special interest, and will, in all cases, notify the City of the modifications within 30 days of any modification.

(v) The Parties will establish mutually agreeable model performance measures. Such measures may, but are not required to, include a minimum model performance standard.

(vi) The District will make reasonable efforts to account for impacts of DCM construction activities.

10. The City will lead a joint effort with the District to develop methods for directly measuring PM_{10} emission rates from the lake bed. The District will incorporate mutually agreeable methods into the Dust ID Program.

11. A. If the City is in compliance with Sections 1 and 2 of this Agreement, the following shall apply to the time period before April 1, 2010.

(i) The APCO will not issue any further determinations regarding the need for SCRs that provide for additional requirements beyond those in this Agreement. However, the District will continue to use the Dust ID Program, as that program may be modified pursuant to Sections 9 and 10. The District will periodically advise the City of results in writing and may recommend actions to the City based on the model results.

(ii) Data collected before April 1, 2010 will not be used in future determinations requiring SCRs, except in those areas delineated as Study Areas on the Study Area Map attached as Exhibit 9 and described in Exhibit 2. Data collected from the Study Areas between July 1, 2006 and April 1, 2010 may only be used in SCR determinations after April 1, 2010, and may be used only in accordance with the current form of the Dust ID Program that is in effect after April 1, 2010.

(iii) The District will not issue an order requiring the City to implement any additional controls on any lake bed dust source areas in order to achieve the state PM_{10} standard of 50 micrograms per cubic meter unless compelled to issue such an order by state law.

B. The District shall determine compliance with the state PM_{10} standard based on concentrations only in the surrounding communities, unless otherwise compelled by state law.

12. The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

A. The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.

B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

SHALLOW FLOOD BACM REFINEMENT

13. The City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the DCA (Shallow Flood Cover Test).

A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.

B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.

C. The City will be CEQA lead agency for the Shallow Flood Cover Test.

14. If the APCO reasonably determines in writing that DCMs in the TDCA have been operational for one full year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section 14.C, provided that:

A. Application of the 10 percent reduction in wetness cover during the Fall and Spring Shallow Flood DCM Compliance periods set out in Sections 25 and 26 shall result in the lower of:

(i) The areal cover resulting from a 10 percent reduction; or

(ii) The areal cover required in Section 26.A.

B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

(i) the results of testing carried out pursuant to Section 13, if conducted; and

(ii) the results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Section 26.

C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.

D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in Section 18 and subject to the provisions of Section 16.

E. Except as provided in Section 16, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.

15. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section 14, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM_{10} concentrations at the historic shoreline.

16. Any areas for which wetness cover has been reduced pursuant to Section 14 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan requirements pursuant to Sections 18 and 22 below.

A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section 14 provided that:

(i) The maximum 24-hour PM_{10} shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 $\mu g/m^3$; and

(ii) The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time

period set forth in Section 16.A.(i) plus the background of 20 $\mu g/m^3$ do not exceed 120 $\mu g/m^3$ at the historic shoreline.

B. If the monitored values at the historic shoreline exceed 130 $\mu g/m^3$, and it is determined that non-lake bed sources are contributing greater than 20 $\mu g/m^3$, then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.

C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:

(i) A map that depicts the eligible Shallow Flood areas;

(ii) The proposed amount of wetness cover for each eligible Shallow Flood area; and

(iii) The method for determining effectiveness of the proposed wetness cover.

D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

<u>ACTIONS TO ADDRESS STANDARD VIOLATIONS</u>

17. After May 1, 2010, the APCO will recommence written SCR determinations under the revisions to the 2003 SIP as provided in Section 28. Recommenced determinations will use Dust ID data collected only after April 1, 2010, except as provided in Section 11.A.(ii) for Study Areas, and shall be made at least once in every calendar year.

18. If, pursuant to Section 17, the APCO determines that a monitored or modeled exceedance of the federal standard caused by emissions from the lake bed has occurred at or above the historic shoreline:

A. The APCO, based on all available information, including visual observation, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.

B. (i) If the APCO identifies the need for additional controls, the APCO shall issue a SCR determination.

(ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an Alternative Analysis. If the City submits an Alternative Analysis, the APCO shall consider the Analysis and may withdraw, modify or confirm the SCR determination.

(iii) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Section 32. The APCO may modify the SCR determination based on the Dispute Resolution process.

(iv) In the event the Parties are unable to resolve disagreements over future SCR determinations through the Dispute Resolution Process, the City may appeal future determinations to CARB under the provisions of Health and Safety Code Section 42316 (Section 42316), provided that the Parties expressly intend that this Agreement be the final resolution regarding the existing disputes between the Parties that are the subject of this Agreement. Based on the foregoing, the City stipulates and agrees that all of the provisions and determinations, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the SCR determination dated April 4, 2006, which the City in good faith disputed, shall be deemed to be valid and reasonable, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceeding, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future SCR determination under Section 42316; however any arguments or challenges must be based on data and information that do not currently exist, but that exist after the execution of this Agreement.

C. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Section 21 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

D. The District may, as appropriate, also issue a notice of violation.

19. In the event:

A. The APCO has made a written determination pursuant to Section 18 that an exceedance of the federal standard, occurring after April 1, 2010,

resulted from a Control Area or portion of a Control Area treated with Moat and Row; and

B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Section 21 below; and

C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (*i.e.*, an exceedance occurred after the City attempted to remediate that area under Section 21);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat and Row to MDCE-BACM or BACM, to address the exceedance described in Section 19.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Section 24.

20. If the APCO determines that Moat and Row constitutes BACM or MDCE-BACM, then upon issuance of such written determination, the provisions of Section 19 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Section 20.

21. A Remedial Action Plan prepared by the City pursuant to Section 18 will contain a description of:

A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:

(i) Maintenance of facilities (*e.g.*, berms, moats and rows);

(ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);

(iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, addition of sand fences, surface wetting, armoring, vegetation, surface roughening) of Moat and Row areas;

(iv) Transition of Moat and Row areas to BACM, or MDCE-BACM.

B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.

C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

22. The Schedule of Contingency Measures attached to this Agreement as Exhibit 10 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Section 21, and the timing required for their implementation.

23. Before any full-scale Moat and Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat and Row area consistent with Section 19. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat and Row to another DCM is needed, or where such transition is required pursuant to Section 19.

24. Areas to be transitioned from Moat and Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat and Row Transition Schedule attached as Exhibit 11. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule attached as Exhibit 12.

FALL AND SPRING SHALLOW FLOOD DCM COMPLIANCE

25. For the time period from October 16 of each year through May 15 of the next year, the Shallow Flood Control Areas shall be considered to be in compliance with this Agreement and applicable laws and regulations, if the areal wetness cover within each Shallow Flood Control Area in the TDCA meets the MDCE required in Exhibit 6 using the SFCE Curve in Exhibit 7.

26. The provisions set forth in this section shall apply to all Shallow Flood areas with target control efficiencies of 99 percent or more, except those which the City and the District may mutually agree to exclude.

A. Beginning on April 1, 2010, compliance of TDCA Control Areas with 99 percent control efficiency Shallow Flood requirements shall be as follows:

(i) Beginning May 16 and through May 31 of every year, Shallow Flood may be reduced to a minimum of 70 percent areal wetness cover.

(ii) Beginning June 1 and through June 15 of every year, Shallow Flood may be reduced to a minimum of 65 percent areal wetness cover.

(iii) Beginning June 16 and through June 30 of every year, Shallow Flood may be reduced to a minimum of 60 percent areal wetness cover.

(iv) If for any Shallow Flood area, the percent of areal wetness cover in the periods specified in Sections 26A.(i), (ii) and (iii) is below the minimum percentages specified in those sections, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance with this Agreement and applicable laws and regulations if the City demonstrates in writing and the APCO reasonably determines in writing that maximum mainline flow was maintained in the applicable period.

B. From July 1 through September 30 of each year, the City is not required by the 2003 SIP to apply water for dust control, but is required to maintain minimum areal wetness cover as required by applicable environmental documents and approvals.

C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the federal standard at the historic shoreline as a result of excessive dry areas on Shallow Flood Control Areas during the dust control periods for each year between May 16 through June 30, and October 1 through October 15, the provisions of Sections 17 and 18 shall apply.

27. The provisions of Sections 25 and 26 are subject to the results of air quality modeling, to be conducted by the City and approved by the APCO, that demonstrates attainment of the federal standard at the historic shoreline using the reduced areal wetness covers set forth in Section 26. The modeling shall be conducted as described in the 2003 SIP using data for the period July 2002 through June 2006. The control efficiency of the areal wetness covers shall be modeled using the SFCE Curve as provided in Section 5.

REVISION OF THE STATE IMPLEMENTATION PLAN (SIP)

28. A. The APCO will propose a District Board Order that will revise the 2003 SIP to incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. The APCO will propose the Board Order and SIP revision at a time sufficient to allow the proposed revisions to be considered and adopted by the District Board by July 1, 2008. The time for consideration and adoption shall take into account, without limitation, the time for legally required environmental review and public notice and hearing. The District Board will act on the proposed SIP revisions by July 1, 2008.

B. If the District Board has the legal ability to act and fails to act by November 1, 2008 on a proposed District Board Order as described in Subsection 28.A, the City may terminate this Agreement by providing

written notice to the District, provided, however, that the City will not provide such notice prior to the conclusion of the Dispute Resolution Process pursuant to Section 32, which process may be initiated by either Party.

C. The Parties have developed this Agreement with the intention that its provisions will be incorporated into a revision of the 2003 SIP and are consistent with applicable provisions of the Health and Safety Code, including Section 42316, and applicable provisions of federal law regarding attainment of the NAAQS.

D. The APCO shall confer in good faith with the City to develop procedures to modify and authorize MDCE-BACM for incorporation into the revisions to the 2003 SIP.

E. The District will be CEQA lead agency and will prepare, in consultation with the City, and will consider for certification on or before March 1, 2008 an environmental impact report (EIR) on the proposed SIP revisions.

F. (i) In the event:

(a) the District Board adopts a District Board Order revising the 2003 SIP that does not incorporate all the terms and conditions of this Agreement, except such terms and conditions, if any that may not lawfully be included in the SIP; or

(b) the District Board adopts a District Board Order revising the 2003 SIP that incorporates all the terms and conditions of this Agreement except such terms and conditions, if any, that may not lawfully be included in the SIP, and subsequent judicial action causes the revised SIP to be materially inconsistent or materially in conflict with the terms and conditions of this Agreement,

the City may terminate this Agreement in the case of Section 28.F(i)(a), and either Party may terminate this Agreement in the case of Section 28.F(i)(b), within 30 days of such action by providing written notice to the other Party.

(ii) If the City does not elect to terminate this Agreement pursuant to Section 28.F(i) and any inconsistencies or conflicts exist between this Agreement that preclude compliance with both, the provisions of the District Board Order shall prevail.

G. The City will support and will not appeal or in any other way challenge or oppose revisions to the 2003 SIP and resulting District Board Order that incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. After issuance of the District Board Order provided for in this Section, the City shall not challenge the order under CEQA to the extent that Order is consistent with this Agreement.

H. In the event the District Board fails to certify the EIR by March 1, 2008 or to act on the proposed SIP revisions by July 1, 2008, the Parties shall meet and confer as provided in Section 33.A.

I. Any provisions of this Agreement that are incorporated into the District Board Order as provided in Section 28.A. shall, upon adoption of that Order by the District Board, cease to have any further force and effect as part of this Agreement, and shall instead be effective as part of the District Board Order.

J. Any provisions of this Agreement that are not incorporated into the District Board Order as provided in Section 28.A shall remain in full force and effect as part of this Agreement until May 1, 2012, at which time those provisions shall cease to be of any further force or effect as part of this Agreement, provided that the Parties may mutually agree in writing to extend this date.

COVER MEASUREMENT TECHNIQUES AND PERFORMANCE SPECIFICATIONS

29. The District and City will collaboratively develop wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications. Final acceptance of those cover measurement techniques and compliance specifications with regulatory impact will be at the sole discretion of the APCO.

KEELER DUNES

30. The Parties acknowledge that dust emissions from the area known as the Keeler Dunes may cause or contribute to exceedances of federal and state standards for PM_{10}. The City hereby agrees to cooperate with the District and other federal, state and local agencies and experts as necessary to develop a plan to reduce dust emissions from the Keeler Dunes.

COOPERATION BETWEEN PARTIES AND DISPUTE RESOLUTION

31. In carrying out the terms of this Agreement, the Parties intend to cooperate fully and to consult with each other effectively and on a regular basis. The Parties will make good faith efforts to provide each other with relevant documents and

technical information in a timely manner, and they will keep each other informed of their respective progress in actions to implement the actions set forth in this Agreement, including, without limitation, progress in entering into consultant and construction contracts and in securing permits from agencies with permitting authority.

32. Notwithstanding the Parties' commitment to cooperate in implementing the terms of this Agreement, they recognize that differences may arise between them. To address this situation, the Parties agree that, in the event either Party believes that a dispute exists regarding implementation or interpretation of any provision of this Agreement, that Party may, by informing the other Party in writing within 21 days of the decision or determination, action or proposed action triggering the dispute, initiate non-binding mediation between the Parties. A party may not seek non-binding mediation for issues that were already the subject of mediation under this Section unless both Parties agree in writing.

A. The mediator shall be a mediator mutually acceptable to the Parties. The Parties may also by mutual agreement include in the mediation, one or more of the technical experts selected pursuant to Section 9.C.(ii), or any other technical experts, such experts to be under contract to the District and jointly managed by the Parties. The City shall be responsible for the cost of the mediator and the technical experts pursuant to Health and Safety Code Section 42316. The mediation will be conducted and completed within 60 days of the notice initiating the Dispute Resolution Process unless that time period is extended by mutual agreement of the Parties. The mediation will be conducted under all applicable California laws regarding mediation, including but not limited to Cal. Evidence Code Sections 1115-1128.

B. Neither Party will commence any litigation concerning the implementation of terms of this Agreement unless that Party has first initiated the mediation described in this Section, and the sooner of the following two events takes place:

(i) Sixty (60) days has expired from the date that Party first sent written notice to commence the mediation; or

(ii) Both Parties agree, or the mediator(s) states, in writing that the mediation has been completed.

(iii) Notwithstanding the provisions of this Section 32.B, a Party may commence litigation at an earlier time if necessary to pursue a claim or cause of action that would otherwise be time barred under an applicable statute of limitations.

C. If the Dispute Resolution Process pursuant to this Section 32 is initiated to address a dispute regarding a SCR determination issued by the APCO pursuant to Section 18.B, then that SCR determination shall not be deemed final until the conclusion of this process under Section 32.B.

D. Nothing in this section is intended to or shall be construed to restrict or eliminate a Party's right to utilize available legal remedies following completion of the mediation process.

<u>EXTENSIONS OF TIME</u>

33. A. In the event that the District

(i) Anticipates that it will fail to certify or fails to certify an environmental impact report on the proposed SIP revisions and related actions by March 1, 2008; or

(ii) Anticipates that it will fail to act on or fails to act on a proposed District Board Order pursuant to Section 28.A by July 1, 2008,

the District shall promptly notify the City, and Parties shall meet and confer to determine what if any revisions to other dates contained in this Agreement may be appropriate. The Parties may mutually agree to the participation of a mediator in the meet and confer process.

B. In the event the City

(i) Anticipates that it will be unable to complete implementation or fails to complete implementation of moat and row controls pursuant to this Agreement by October 1, 2009; or

(ii) Anticipates that it will be unable to complete implementation or fails to complete implementation of all other controls by April 1, 2010,

the City may seek relief for such failure or delay by obtaining a variance from the Hearing Board of the Great Basin Unified Air Pollution Control District pursuant to District Regulation VI and all applicable law for variance relief from a District Order, including but not limited to Health and Safety Code Section 42350 *et seq*. In such event, the District shall, at the request of the City, meet with the City, prior to or after the filing of a request for a variance, in order to ascertain whether the District will support the City's variance request. In the event the District will not support the City's variance request, the City may invoke the Dispute Resolution Process pursuant to Section 32.

C. Nothing in this Section is intended to or shall limit the ability of the City to seek a variance from requirements not included in this Section.

D. Each Party will undertake to inform the other Party as early as practicable of the fact that it anticipates that it will not meet or has failed to meet any of the dates set out in this Section.

34. In the event either Party claims that the other Party is in material breach of the terms of this Agreement, including without limitation, a claim by the District that the City is in material breach under Section 11, the Party claiming the breach shall provide written notice of the claimed breach to the other Party. In the event the Party claimed to be in breach contests such claim, the issue shall be subject to the Dispute Resolution Process in Section 32.

LAWSUIT/APPEAL SETTLEMENT CONDITIONS

35. Within 15 days of execution of this Agreement, the APCO shall issue a revised SCR determination that incorporates the terms of this Agreement and that supersedes all previous determinations.

36. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall immediately commence the process for implementing additional DCMs on the Owens Lake bed consistent with the terms of this Agreement.

37. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall within seven days dismiss with prejudice its CARB appeals and the litigation against the District as described in the Recitals at Paragraphs L, O. and P.

DEFINITIONS

38. Definitions of terms used in this Agreement are contained herein and in Exhibit 13. Where specifically identified in Exhibit 13, these terms as used in this Agreement and Exhibits shall have the meanings provided in this Exhibit 13. Where no definition is provided herein or in Exhibit 13, the words and terms shall have their meaning as provided in the federal Clean Air Act or state air pollution law in the Health and Safety Code, and where no definition is found there, shall have their ordinary meaning as read in the context of this Agreement and consistent with the expressed intent of the Parties.

NOTICES

39. Whenever, under the terms of this Agreement, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be sent by overnight mail and directed to the individual at the address

specified below, unless that individual or his or her successor gives notice of a change to the other Party in writing.

As to the City:

Ronald F. Deaton
General Manager
Los Angeles Department of Water and Power
111 North Hope Street, Room 1550
Los Angeles, CA 90012

As to the District:

Theodore D. Schade
Air Pollution Control Officer
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514

ADDITIONAL PROVISIONS

40. By this Agreement, the City and the District intend to settle their disputes regarding methods to address air quality issues at Owens Lake, including disagreements over the SCR determination issued on December 21, 2005, and the Modified SCR determination issued on April 4, 2006.

41. This Agreement is the final integrated agreement between the Parties regarding the matters addressed herein, and may not be modified except in a writing signed by both Parties.

42. This Agreement shall be construed in accordance with the laws of the State of California.

43. In the event any provision of this Agreement is judicially determined to be unenforceable, the Parties shall meet and confer and following such meeting, the Parties may amend the Agreement, or continue the Agreement without amendment, or either Party may terminate the Agreement.

44. This Agreement shall not create any rights in any third party.

45. No failure by a Party to insist on strict performance of any term or condition of this Agreement shall constitute a waiver of such term or condition or a breach hereof.

46. Each Party represents that their respective signatories below have the authority to bind them to the terms of this Agreement.

REVIEWED AND AGREED TO:

Dated: November 30, 2006

Ronald F. Deaton
Ronald F. Deaton
General Manager, Los Angeles Department of Water and Power

The City of Los Angeles
By and Through the
Los Angeles Department of Water and Power

Dated: December 4, 2006

Henry Veatch
Henry "Skip" Veatch
Board Chairman

Great Basin Unified Air Pollution Control District

APPROVED AS TO FORM AND LEGALITY
ROCKARD J. DELGADILLO, CITY ATTORNEY

NOV 30 2006

BY Julie A. Conboy
JULIE A. CONBOY
Deputy City Attorney

List of Exhibits

1. Total Dust Control Area Map
2. 2006 Supplemental Dust Control Area Coordinate Description
3. Dust Control Measure Map
4. Dust Control Measures Description
5. Minimum Dust Control Efficiency Map
6. MDCE Selection Process Spreadsheet
7. Shallow Flood Control Efficiency Curve
8. Moat and Row Demonstration Project Location Map
9. Study Area Map
10. Schedule of Contingency Measures
11. Moat and Row Transition Schedule
12. DCM Operation Schedule
13. Definitions

EXHIBIT 1 -- TOTAL DUST CONTROL AREA MAP

The Total Dust Control Area (TDCA) is comprised of the 2006 Supplemental Dust Control Area (SDCA) and the 2003 Dust Control Area (DCA).

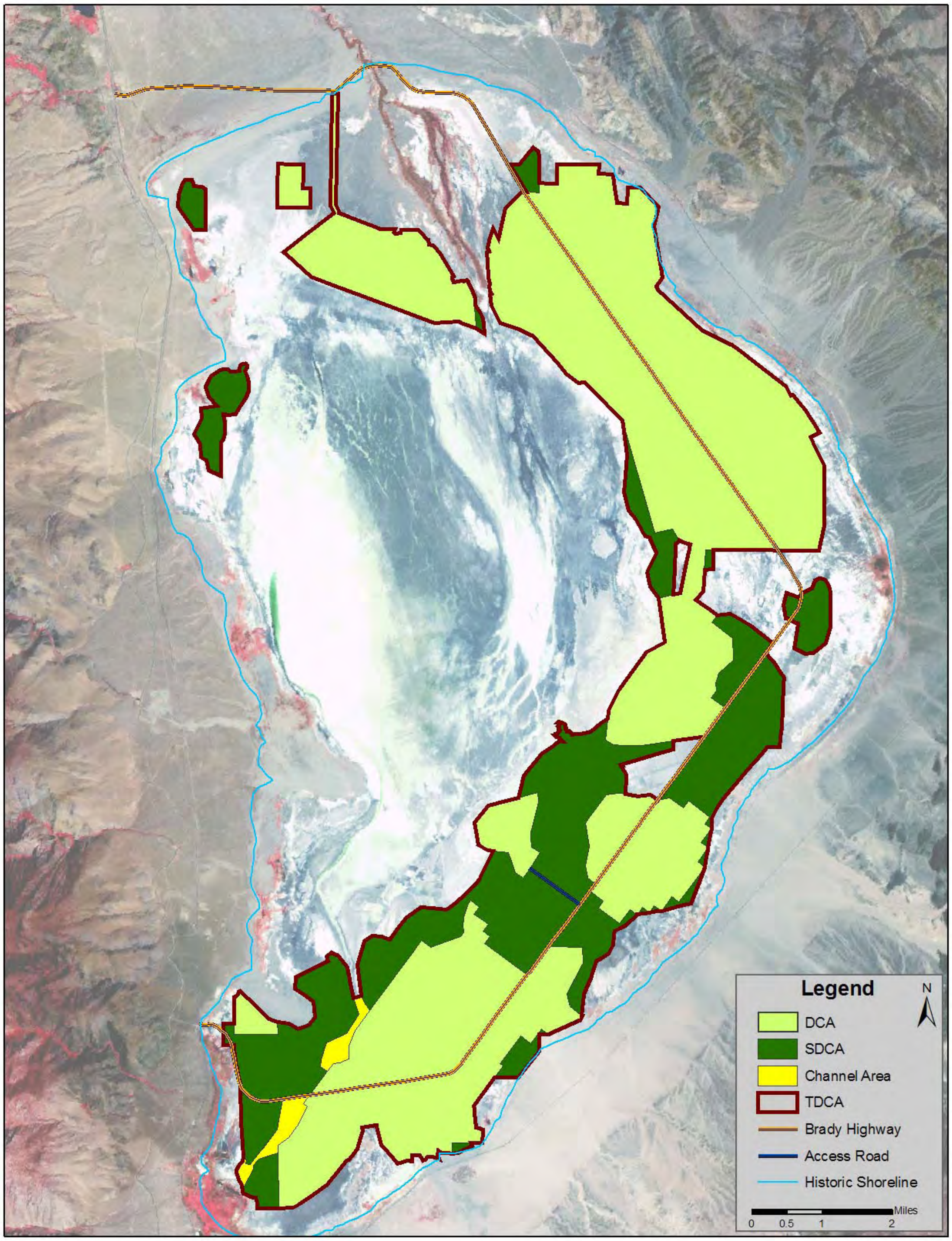

EXHIBIT 2 -- 2006 SUPPLEMENTAL DUST CONTROL AREA COORDINATE DESCRIPTIONS

KEY MAP

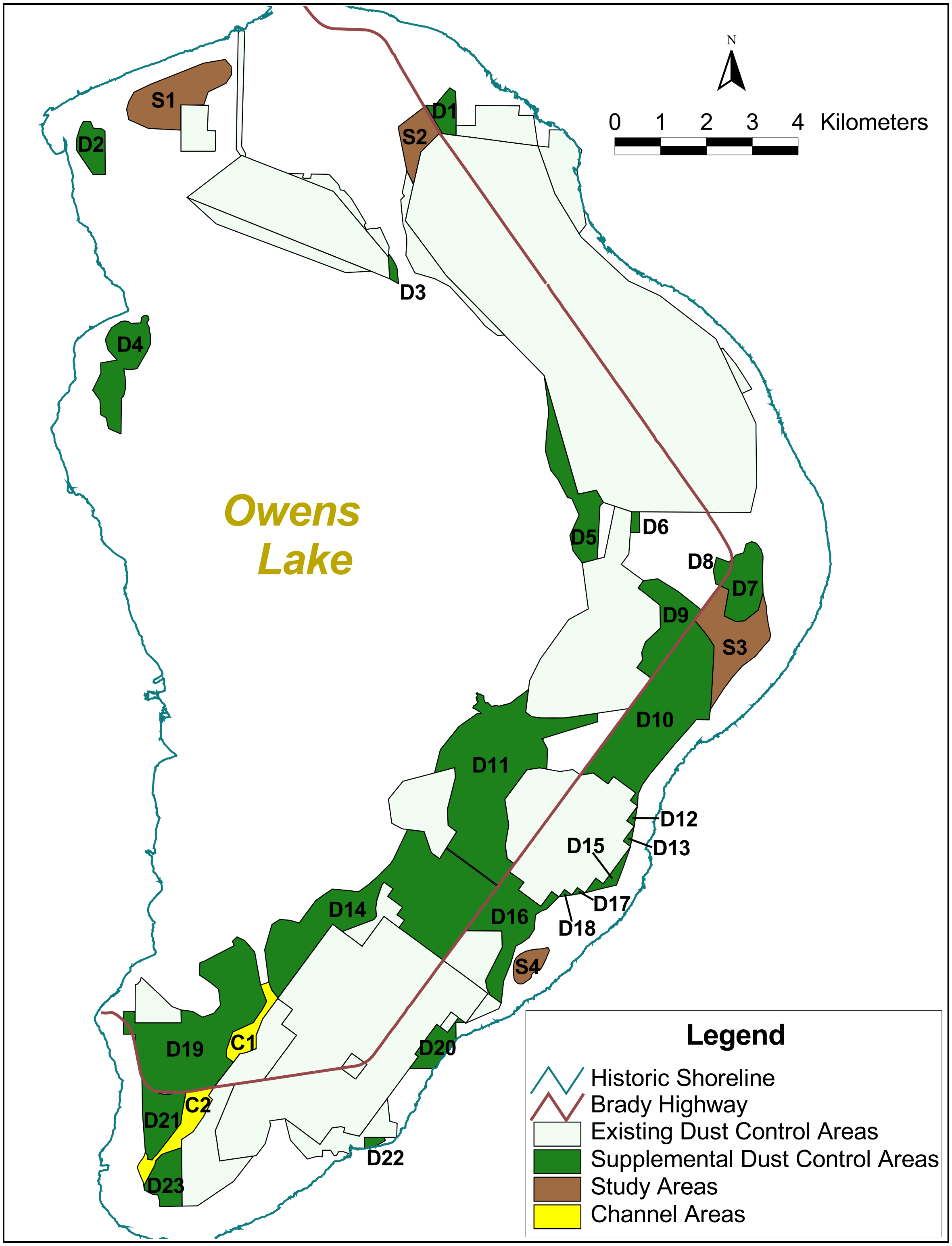

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D1	0.16	SDCA	416,001.0310	4,042,347.3789
			415,701.7500	4,042,385.7617
			415,343.2810	4,042,999.8633
			415,539.4060	4,042,999.0234
			415,866.3750	4,043,383.8359
			415,994.4060	4,043,304.2109
			416,002.6250	4,042,981.9922
			416,005.6250	4,042,568.5234
			416,001.0310	4,042,347.3789
D2	0.21	SDCA	408,085.5000	4,041,493.3164
			407,718.8130	4,042,027.7422
			407,731.5000	4,042,299.3945
			407,804.9060	4,042,524.2148
			407,873.2810	4,042,654.1211
			408,032.2500	4,042,647.6875
			408,089.5630	4,042,502.0625
			408,267.6560	4,042,491.4219
			408,347.0630	4,042,440.3203
			408,348.9690	4,041,492.4844
			408,085.5000	4,041,493.3164
D3	0.03	SDCA	414,747.2500	4,039,108.7500
			414,550.5000	4,039,224.6641
			414,528.0310	4,039,697.5156
			414,532.5000	4,039,759.7891
			414,583.3750	4,039,699.2617
			414,643.3130	4,039,605.6250
			414,700.5000	4,039,498.9766
			414,718.6880	4,039,441.7188
			414,729.1250	4,039,314.2500
			414,747.2500	4,039,108.7500
D4	0.59	SDCA	408,694.5000	4,035,836.9883
			408,417.2190	4,035,957.7344
			408,370.5940	4,036,191.9453
			408,249.5940	4,036,258.3164
			408,231.6880	4,036,571.0625
			408,075.5000	4,036,791.1719
			408,254.4060	4,037,157.2813
			408,249.9060	4,037,387.3789
			408,606.5630	4,037,448.5391
			408,414.0000	4,037,664.3359
			408,348.8750	4,037,888.7227
			408,415.9060	4,038,042.2422
			408,494.0000	4,038,156.0977
			408,687.9380	4,038,284.6484
			408,762.7190	4,038,303.7813
			408,853.0940	4,038,290.2422
			408,911.3130	4,038,246.2109
			409,028.9380	4,038,251.5742
			409,126.1560	4,038,258.7344
			409,134.0630	4,038,309.6602
			409,144.5940	4,038,382.5547
			409,201.0630	4,038,424.0508
			409,255.5940	4,038,422.9180
			409,299.1250	4,038,391.3789
			409,304.7190	4,038,329.9609
			409,254.9380	4,038,259.1797
			409,308.0940	4,038,163.0195
			409,312.7190	4,038,061.7695
			409,335.7190	4,038,017.0195
			409,334.3750	4,037,792.3008
			409,260.5630	4,037,628.4492
			409,184.9060	4,037,508.1055
			409,044.0630	4,037,256.8359
			408,869.9060	4,037,236.6055
			408,755.8130	4,037,260.8867
			408,768.2810	4,037,143.0156
			408,784.9690	4,037,079.6914
			408,789.7190	4,036,817.3555
			408,751.4060	4,036,667.7344
			408,706.5940	4,036,616.2422
			408,694.5000	4,035,836.9883

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D5	0.57	SDCA	418754.0310	4033026.5000
			418552.9690	4033287.6914
			418484.0000	4033621.1133
			418689.0940	4034066.4102
			418529.0310	4034424.5078
			418434.8130	4034452.0664
			418325.1880	4034653.5234
			418224.7810	4034845.3438
			418067.7500	4035047.7852
			417953.1880	4035467.4961
			417980.5000	4035865.3203
			418027.9060	4036319.6094
			417924.4060	4037110.5117
			418666.3750	4034527.9844
			419065.6880	4034610.9648
			419223.4690	4034342.1406
			419141.3750	4034271.8047
			419084.1880	4033110.8086
			418754.0310	4033026.5000
D6	0.03	SDCA	419801.2810	4033687.7539
			419831.7500	4034141.1016
			420006.8130	4034139.3281
			420012.7190	4033690.4844
			419801.2810	4033687.7539
D7	0.43	SDCA	422105.2500	4031749.0176
			421854.9690	4031871.4102
			421952.1880	4032442.4199
			421827.1560	4032498.3555
			421778.4380	4032522.0762
			421882.0310	4032660.6934
			421931.3130	4032728.7031
			421954.3130	4032765.7129
			421966.3130	4032785.8828
			421992.7810	4032841.0703
			422013.5310	4032894.8164
			422030.0630	4032956.1914
			422039.5000	4033014.7422
			422042.1560	4033068.7461
			422042.4380	4033082.8008
			422040.7810	4033127.2188
			422103.3750	4033191.3320
			422274.9380	4033248.8359
			422331.4380	4033437.2383
			422451.9060	4033492.2617
			422530.2190	4033470.0195
			422579.0940	4033430.6797
			422659.7190	4033313.9453
			422698.6880	4033173.2383
			422688.0630	4032830.0469
			422701.7500	4032367.5195
			422592.2190	4031994.7988
			422299.6560	4031762.5020
			422105.2500	4031749.0176
D8	0.06	SDCA	421758.4690	4032529.3477
			421668.6250	4032569.9238
			421615.5310	4032859.4297
			421680.6250	4033146.5156
			421959.5000	4033044.5586
			422021.5000	4033108.1875
			422022.5630	4033079.4023
			422019.3130	4033018.7031
			422010.1880	4032960.1484
			421994.8130	4032902.9766
			421977.7500	4032858.2227
			421948.4060	4032795.7422
			421918.7190	4032746.2988
			421884.3440	4032697.7148
			421806.2810	4032593.7305
			421758.4690	4032529.3477

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D9	0.53	SDCA	420,265.8440	4,030,508.7188
			419,947.7500	4,030,741.5176
			420,067.1880	4,030,907.7324
			420,051.5940	4,031,073.7461
			420,132.5000	4,031,300.5000
			420,460.9690	4,031,604.7441
			420,449.4060	4,032,103.9551
			419,975.9690	4,032,480.4902
			420,091.3750	4,032,635.9316
			420,399.6560	4,032,679.1270
			420,847.1880	4,032,406.2988
			421,363.7810	4,031,994.1230
			420,995.8750	4,031,495.0273
			420,265.8440	4,030,508.7188
D10	1.75	SDCA	419,965.0000	4,027,728.2520
			419,803.2190	4,027,847.7363
			419,922.8440	4,028,009.4902
			419,437.5940	4,028,368.0176
			419,317.9690	4,028,206.2617
			418,994.5310	4,028,445.2656
			418,730.3440	4,028,397.0371
			419,406.8750	4,029,323.4316
			421,010.9060	4,031,484.3145
			421,216.1560	4,031,761.8594
			421,439.0940	4,031,498.2363
			421,631.0310	4,031,208.7773
			421,571.8750	4,030,077.3184
			421,548.9690	4,029,833.7383
			421,523.2500	4,029,607.1328
			421,241.1880	4,029,607.8887
			421,116.0000	4,029,457.7559
			420,776.0000	4,029,075.9551
			420,233.7500	4,028,421.8027
			420,070.9690	4,028,193.2832
			419,973.2500	4,027,978.3457
			419,965.0000	4,027,728.2520
D11	2.32	SDCA	416,924.2190	4,025,991.8965
			416,906.7190	4,026,000.2598
			416,817.3750	4,026,065.2832
			415,808.9380	4,026,810.0977
			415,803.8440	4,026,822.5840
			415,810.1250	4,026,837.9219
			416,016.5310	4,027,163.7559
			415,829.9690	4,027,301.7383
			415,812.0000	4,027,654.7500
			415,987.3440	4,028,348.8008
			415,969.6880	4,028,562.7461
			415,530.3750	4,028,446.4922
			415,660.2500	4,028,955.4551
			416,062.8130	4,029,458.0664
			416,386.1560	4,029,683.9746
			416,436.9060	4,029,720.7148
			416,449.5000	4,029,732.7207
			416,468.5940	4,029,742.7246
			416,489.8750	4,029,746.4355
			416,529.4060	4,029,741.9941
			416,547.9690	4,029,741.4180
			416,541.4060	4,029,755.8789
			416,528.0940	4,029,767.9277
			416,515.2190	4,029,777.7969
			416,501.9690	4,029,786.2637
			416,489.6560	4,029,794.9004
			416,430.1250	4,029,834.6543
			416,415.3750	4,029,843.4570
			416,400.7190	4,029,849.4766
			416,387.3130	4,029,856.1563
			416,372.5940	4,029,860.3105
			416,368.5310	4,029,870.0703
			416,375.7810	4,029,880.6270
			416,384.4690	4,029,895.7617
			416,385.5310	4,029,910.9023
			416,395.3130	4,029,918.6621
			416,406.0630	4,029,922.9727
			416,419.9060	4,029,929.8086
			416,435.1560	4,029,936.6543
			416,449.2500	4,029,947.3340
			416,459.1250	4,029,961.2246
			416,462.9690	4,029,976.8418
			416,471.5630	4,029,988.3965

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	416481.0000	4029994.3359
			416483.2500	4030000.4590
			416476.4690	4030004.0684
			416464.6250	4030013.5332
			416452.1250	4030020.7266
			416447.3130	4030031.0762
			416454.8750	4030042.8809
			416467.7500	4030052.9766
			416466.0630	4030067.6035
			416454.5310	4030077.5586
			416440.6250	4030076.0938
			416437.6250	4030084.6914
			416445.8130	4030098.3496
			416459.0310	4030110.6875
			416465.9060	4030126.0488
			416467.1560	4030142.7871
			416461.5310	4030157.1523
			416450.1560	4030168.0938
			416439.0940	4030177.2402
			416443.8750	4030188.7227
			416458.4380	4030192.3809
			416470.3130	4030190.8789
			416479.0310	4030177.9727
			416493.8130	4030171.2637
			416510.6250	4030166.2656
			416527.2190	4030165.8828
			416541.7810	4030161.9238
			416568.0630	4030143.3945
			416585.0000	4030137.3281
			416601.6250	4030130.7734
			416608.7190	4030112.7188
			416614.8750	4030093.7324
			416614.1560	4030081.1367
			416606.9690	4030057.0176
			416610.2810	4030041.6328
			416621.0310	4030029.7910
			416626.8440	4030016.4492
			416634.6560	4030003.4863
			416639.6560	4029988.0273
			416642.2500	4029973.2676
			416656.7190	4029972.4727
			416688.3750	4029977.5293
			416704.9380	4029976.5762
			416715.9690	4029964.5742
			416723.1250	4029949.7949
			416734.4690	4029937.7109
			416747.7190	4029929.2070
			416759.0310	4029916.4004
			416768.4690	4029902.2207
			416781.8130	4029898.3633
			416790.3750	4029900.3945
			416827.0940	4029907.2129
			416838.2500	4029915.7813
			416845.7500	4029917.9492
			416852.5940	4029916.0938
			416867.9690	4029916.1543
			416880.3440	4029917.7637
			416895.6880	4029914.7402
			416925.9380	4029904.3965
			416940.7190	4029903.4805
			416954.8130	4029907.8730
			416966.3750	4029914.2246
			417119.3130	4029946.7070
			417187.6250	4029971.9180
			417582.2500	4030268.0078
			417521.0310	4029772.5176
			417701.5630	4029667.0430
			417771.4380	4029656.0293
			417852.7810	4029647.5566
			418130.3750	4029643.4648
			418383.2810	4029647.0859
			419083.7810	4029748.1953
			419086.1880	4029746.9258
			419093.6560	4029564.0527
			417887.0630	4029198.4668
			417896.1560	4029182.4668
			417881.5000	4029187.7246
			418000.2190	4028968.8594
			417985.8130	4028531.7539
			417825.0940	4028556.4668
			417545.0000	4028513.0254

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	417,068.6250	4,027,867.9766
			417,152.6880	4,027,307.1758
			417,077.1880	4,026,864.2910
			417,117.7810	4,026,581.1016
			417,277.7500	4,026,460.9707
			416,924.2190	4,025,991.8965
D12	0.02	SDCA	419,887.8440	4,027,285.2500
			419,726.0310	4,027,404.7344
			419,965.0000	4,027,728.2520
			419,949.5310	4,027,659.1582
			419,887.8440	4,027,285.2500
D13	0.02	SDCA	419,810.5000	4,026,842.2539
			419,648.7190	4,026,961.7383
			419,772.4690	4,027,130.8359
			419,887.8440	4,027,285.2500
			419,880.3750	4,027,234.3164
			419,832.8130	4,026,984.5820
			419,810.5000	4,026,842.2539
D14	2.46	SDCA	412,117.6560	4,023,538.0977
			411,983.4060	4,023,714.6152
			411,915.1560	4,023,883.7793
			411,828.0940	4,024,594.2207
			411,988.0310	4,025,141.2695
			412,161.8440	4,025,254.5859
			412,387.4060	4,025,234.3184
			412,577.3130	4,025,175.8184
			412,752.9380	4,025,413.6777
			412,942.5940	4,025,667.2090
			413,298.0630	4,025,913.1816
			413,700.7190	4,025,878.1113
			413,843.4060	4,025,859.0313
			413,892.3750	4,025,869.0625
			414,103.4380	4,026,021.7207
			414,294.0310	4,026,188.3672
			414,574.5630	4,026,473.5742
			414,628.3130	4,026,552.7695
			414,946.8130	4,027,212.3789
			415,303.7810	4,027,171.2480
			415,463.6880	4,026,711.0117
			415,639.0630	4,026,577.9492
			415,777.6250	4,026,784.4590
			415,787.8440	4,026,793.4668
			415,793.6560	4,026,794.4512
			416,290.3440	4,026,429.5527
			416,545.3750	4,026,241.2695
			416,908.5000	4,025,969.6309
			416,207.2500	4,025,017.7598
			415,765.2810	4,024,422.9277
			415,712.3440	4,024,368.7461
			414,755.6880	4,025,075.7559
			414,875.1560	4,025,237.5156
			414,715.5000	4,025,356.9941
			414,832.8440	4,025,518.7598
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.2539
			414,383.9380	4,025,997.9883
			414,274.7500	4,025,678.2109
			414,249.7810	4,025,496.0098
			414,266.4690	4,025,323.2305
			414,210.4380	4,025,245.9863
			413,519.9380	4,024,988.5723
			413,307.2500	4,025,145.7637
			413,144.4690	4,024,931.4102
			412,117.6560	4,023,538.0977
D15	0.08	SDCA	418,812.6560	4,025,829.9941
			419,051.1560	4,026,152.9863
			419,213.4060	4,026,034.2168
			419,810.5000	4,026,842.2539
			419,655.1250	4,026,404.8789
			419,499.9380	4,025,999.3496
			419,182.9690	4,025,925.2813
			418,812.6560	4,025,829.9941

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D16	0.70	SDCA	416987.0630	4023427.0801
			416718.5630	4023625.5098
			416734.5310	4023647.0078
			416700.3440	4023672.5195
			416689.5630	4023734.1953
			416678.1560	4023741.8613
			416644.1560	4023925.0195
			417010.6880	4024645.2734
			417000.8130	4024984.0566
			417004.5630	4024995.9414
			416997.8130	4025001.7578
			416224.2500	4025007.0430
			416932.7810	4025971.6777
			417170.5000	4026294.0039
			417483.0940	4026061.2461
			417363.6250	4025899.4863
			417848.8440	4025541.0000
			418087.8130	4025864.5176
			418249.6250	4025744.9961
			417981.1560	4025483.1621
			417862.3130	4025432.8262
			417742.6560	4025357.7832
			417731.0940	4025299.8848
			417711.4060	4025042.9023
			417596.9060	4024857.0391
			417427.9690	4024735.2051
			417308.1560	4024673.9160
			417192.2500	4024288.4082
			417038.6560	4023907.3789
			416987.0630	4023427.0801
D17	0.01	SDCA	418812.6560	4025829.9941
			418722.7810	4025817.3457
			418531.3750	4025787.7188
			418650.8440	4025949.5527
			418812.6560	4025829.9941
D18	0.01	SDCA	418250.0940	4025745.5586
			418369.5630	4025907.3164
			418531.2190	4025787.8750
			418422.7500	4025775.2305
			418250.0940	4025745.5586
D19	1.88	SDCA	410989.2810	4022251.9551
			411145.7810	4022140.5918
			410728.5630	4021605.7773
			410525.7190	4021575.8516
			410434.2500	4021553.4805
			410330.1560	4021538.0020
			410249.0940	4021523.9121
			410165.6880	4021513.8320
			410012.7810	4021489.0801
			409988.7810	4021485.5020
			409958.9380	4021487.3027
			409834.5940	4021472.0918
			409710.8750	4021458.8867
			409588.2190	4021468.2129
			409472.9060	4021506.2676
			409364.2190	4021564.2617
			409273.0310	4021648.9043
			409231.3750	4021698.0781
			409192.6560	4021749.2871
			409142.4380	4021863.0625
			409121.8750	4021936.3730
			409108.8130	4021989.7910
			409094.0000	4022070.1055
			409085.6880	4022117.5977
			409078.5310	4022146.7773
			409061.1250	4022247.9473
			409045.9690	4022310.3633
			409033.1250	4022381.5703
			409029.3750	4022398.8301
			409009.4380	4022518.7207
			409000.8440	4022749.8164
			408748.8130	4022752.2285
			408748.6880	4022994.9199
			408752.0000	4023250.6855
			409002.0630	4023249.9121
			408999.6250	4023000.2637
			410005.0940	4022997.9844
			410001.1880	4023280.3379
			410254.3750	4023245.9746

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D19 continued	1.88	SDCA	410,472.1880	4,023,123.1172
			410,718.0630	4,023,206.8965
			410,862.1250	4,023,378.8164
			410,821.5940	4,023,731.0039
			410,665.3750	4,023,862.7910
			410,401.5000	4,024,041.8867
			410,411.4380	4,024,308.5215
			410,520.6560	4,024,349.3066
			411,162.2810	4,024,681.8047
			411,124.9690	4,024,778.6250
			411,222.3440	4,024,873.7930
			411,392.4060	4,024,792.1602
			411,607.8130	4,024,539.2461
			411,737.1560	4,023,825.0313
			411,867.2500	4,023,463.2520
			411,784.7500	4,023,306.3613
			411,582.4060	4,023,006.9551
			411,126.7810	4,022,795.5957
			410,994.2500	4,022,416.6367
			410,989.2810	4,022,251.9551
D20	0.21	SDCA	414,982.2190	4,021,997.8164
			415,176.7190	4,022,263.2852
			415,103.2190	4,022,320.4727
			415,581.2500	4,022,965.4922
			415,817.9380	4,022,790.5078
			416,056.9060	4,023,113.9902
			416,207.6250	4,023,003.7656
			415,998.3750	4,023,002.3203
			416,002.5310	4,022,602.1270
			415,526.5000	4,022,002.0215
			414,982.2190	4,021,997.8164
D21	0.39	SDCA	409,784.0630	4,021,446.5840
			409,836.5940	4,021,452.1992
			409,959.4380	4,021,467.4043
			409,986.8440	4,021,465.6152
			410,014.9380	4,021,469.1094
			410,109.0000	4,021,484.2637
			410,027.5940	4,021,036.2754
			409,998.0310	4,020,801.4766
			409,487.5940	4,020,143.3262
			409,409.3130	4,020,065.3262
			409,373.6560	4,020,006.3652
			409,360.9380	4,020,010.4766
			409,276.4690	4,020,023.0879
			409,280.3750	4,020,086.8984
			409,223.5310	4,020,182.5996
			409,166.6250	4,020,986.3672
			409,146.5630	4,021,804.0762
			409,176.1250	4,021,738.1621
			409,218.6880	4,021,681.9980
			409,255.5940	4,021,639.3984
			409,351.8750	4,021,549.4316
			409,464.4690	4,021,488.9551
			409,583.4380	4,021,449.5684
			409,710.2810	4,021,438.8574
			409,784.0630	4,021,446.5840
D22	0.03	SDCA	414,001.2500	4,020,257.5078
			414,001.4690	4,020,502.5137
			414,426.0000	4,020,500.8262
			414,464.0310	4,020,432.0313
			414,293.7190	4,020,338.7207
			414,135.9690	4,020,279.6660
			414,001.2500	4,020,257.5078
D23	0.29	SDCA	409,535.8130	4,018,994.6445
			409,534.9380	4,019,112.7676
			409,493.8750	4,019,250.0898
			409,428.5630	4,019,253.1973
			409,374.7500	4,019,259.9512
			409,200.4380	4,019,355.6914
			409,208.0310	4,019,472.8008
			409,435.7810	4,019,902.2852
			409,445.4060	4,019,983.3887
			409,576.6880	4,020,126.1250
			410,016.9060	4,020,278.1445
			410,025.1560	4,019,002.0527
			409,535.8130	4,018,994.6445

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S1	0.71	Study	410001.6560	4042464.2656
			409290.7190	4042500.2383
			408861.2190	4042688.4688
			408813.8750	4042910.9609
			408859.4380	4043071.8984
			408972.0940	4043285.6914
			409337.5310	4043461.0000
			410500.6560	4043924.3945
			410962.4690	4044000.3555
			411096.8440	4043852.2109
			411108.0630	4043672.6836
			410984.4380	4043481.0273
			410592.0940	4043294.9219
			410496.6250	4043013.0352
			410003.5310	4043008.3594
			410001.6560	4042464.2656
S2	0.27	Study	415072.8130	4041278.8984
			414928.6560	4041572.7422
			414740.2500	4042529.6992
			415304.2190	4042966.9609
			415642.3130	4042393.3203
			415234.1250	4041986.6914
			415072.8130	4041278.8984
S3	0.72	Study	421548.9690	4029833.7383
			421571.8750	4030077.3184
			421631.0310	4031208.7773
			421439.0940	4031498.2363
			421216.1560	4031761.8594
			421260.3750	4031837.4414
			421371.5310	4031985.9238
			421398.8440	4032023.9863
			421454.5000	4032099.1406
			421509.5310	4032174.3066
			421645.9690	4032358.6465
			421725.3130	4032466.9844
			421769.8440	4032526.2539
			421827.1560	4032498.3555
			421952.1880	4032442.4199
			421854.9690	4031871.4102
			422105.2500	4031749.0176
			422299.6560	4031762.5020
			422592.2190	4031994.7988
			422701.7500	4032367.5195
			422732.5630	4032243.8984
			422746.8130	4032159.0254
			422779.7500	4032064.7734
			422779.7190	4031946.8984
			422793.9060	4031814.8984
			422817.5310	4031682.9316
			422840.9690	4031565.0645
			422869.3130	4031447.2109
			422836.2810	4031338.7852
			422713.7500	4031206.8086
			422529.9380	4030985.2422
			422250.5940	4030779.7578
			422000.0310	4030499.9922
			422006.2810	4030500.0156
			421836.9380	4030271.0234
			421548.9690	4029833.7383
S4	0.15	Study	417410.5630	4023845.5176
			417398.8440	4023845.8750
			417387.4380	4023846.9883
			417377.4060	4023848.7207
			417367.8440	4023851.0527
			417358.9380	4023853.9434
			417350.9380	4023857.4238
			417343.0940	4023861.6250
			417335.2810	4023866.7793
			417327.4690	4023872.8066
			417319.6880	4023879.7500
			417310.5940	4023888.9688
			417301.9690	4023899.1680
			417293.6560	4023910.1230
			417286.2810	4023921.5137
			417281.1250	4023930.3848
			417276.9060	4023939.6543
			417273.1560	4023949.9414
			417269.7190	4023961.3281
			417266.5000	4023975.5664
			417263.6560	4023992.3125

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	417,257.5630	4,024,036.4043
			417,255.7810	4,024,053.0898
			417,254.3440	4,024,071.4844
			417,253.3440	4,024,112.0410
			417,253.6880	4,024,135.3887
			417,256.4690	4,024,211.2207
			417,258.9380	4,024,248.6602
			417,260.8130	4,024,266.7930
			417,266.0630	4,024,299.1426
			417,269.5630	4,024,313.8516
			417,274.6560	4,024,330.5859
			417,281.5940	4,024,349.5684
			417,289.7810	4,024,368.9414
			417,298.0630	4,024,386.4863
			417,306.2810	4,024,401.4785
			417,314.9690	4,024,415.0508
			417,324.0630	4,024,427.2441
			417,333.2500	4,024,437.8730
			417,341.8130	4,024,446.3809
			417,362.2810	4,024,463.6328
			417,374.6880	4,024,472.7871
			417,391.6880	4,024,484.4727
			417,422.5940	4,024,504.8984
			417,438.9380	4,024,515.1504
			417,454.8440	4,024,524.5742
			417,469.5000	4,024,532.6895
			417,483.8130	4,024,540.1250
			417,497.9690	4,024,546.9180
			417,525.0310	4,024,558.3184
			417,537.3130	4,024,562.7500
			417,550.9690	4,024,567.0371
			417,565.6880	4,024,571.1504
			417,595.7190	4,024,578.3379
			417,644.3750	4,024,588.4512
			417,671.1560	4,024,593.2676
			417,699.5630	4,024,597.4395
			417,729.9690	4,024,601.0371
			417,763.4060	4,024,604.2285
			417,801.4380	4,024,607.2109
			417,876.5000	4,024,612.3184
			417,885.9690	4,024,613.4160
			417,906.1880	4,024,617.6074
			417,954.9060	4,024,630.4629
			417,966.3750	4,024,632.8535
			417,976.4690	4,024,634.2813
			417,984.4060	4,024,634.8398
			417,991.7190	4,024,634.7266
			417,998.0940	4,024,633.9082
			418,004.0310	4,024,632.4531
			418,009.1560	4,024,630.2891
			418,013.8130	4,024,627.4102
			418,017.8750	4,024,623.8594
			418,021.4380	4,024,619.5566
			418,027.1560	4,024,609.7598
			418,032.4060	4,024,597.6895
			418,034.6560	4,024,589.4512
			418,035.8750	4,024,580.7773
			418,035.6560	4,024,570.7617
			418,034.0630	4,024,559.9766
			418,031.0630	4,024,548.3418
			418,026.3750	4,024,535.4473
			418,020.4690	4,024,521.3984
			418,000.5310	4,024,478.6465
			417,984.5630	4,024,435.9668
			417,970.9060	4,024,402.7227
			417,957.8130	4,024,373.8125
			417,943.3130	4,024,343.8242
			417,931.2500	4,024,320.3027
			417,918.0940	4,024,295.7734
			417,880.1250	4,024,228.6719
			417,859.5000	4,024,190.0117
			417,854.1250	4,024,181.0176
			417,848.9380	4,024,173.2773
			417,843.6250	4,024,166.4160
			417,838.3130	4,024,160.3535
			417,832.0940	4,024,154.4258
			417,825.1250	4,024,149.1992
			417,816.9690	4,024,144.4160
			417,807.5630	4,024,140.0762
			417,799.1250	4,024,136.8242
			417,789.4690	4,024,133.5957
			417,744.3750	4,024,120.6641
			417,733.3130	4,024,116.6641

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	417723.6250	4024112.4082
			417716.8440	4024108.7773
			417710.6880	4024104.8281
			417693.1880	4024092.0859
			417683.1250	4024084.1797
			417674.4380	4024076.5137
			417667.2810	4024069.1191
			417661.4690	4024061.8086
			417657.0630	4024054.5488
			417654.5000	4024048.2773
			417652.5000	4024040.8516
			417647.9060	4024009.5918
			417646.3750	4024002.8047
			417644.5940	4023996.9746
			417640.7500	4023988.9395
			417636.0310	4023980.8086
			417630.3750	4023972.9629
			417623.6560	4023965.2930
			417617.2810	4023958.7949
			417609.9690	4023952.3184
			417601.7810	4023945.7832
			417592.6250	4023939.0781
			417575.3440	4023927.6641
			417540.5940	4023906.3262
			417526.8440	4023897.4316
			417515.0940	4023889.3320
			417487.6880	4023868.7949
			417472.0940	4023858.9844
			417463.6560	4023854.8926
			417455.1880	4023851.9063
			417444.7810	4023849.1504
			417433.6250	4023847.1348
			417422.1560	4023845.9258
			417410.5630	4023845.5176
C1	0.21	Channel	411145.9380	4022140.5117
			410989.3130	4022252.0020
			410994.2500	4022416.6367
			411126.7810	4022795.5957
			411582.4060	4023006.9551
			411784.7500	4023306.3613
			411867.2500	4023463.2520
			411737.1560	4023825.0313
			411915.1560	4023883.7793
			411983.4060	4023714.6152
			412117.6560	4023538.0977
			411792.0630	4023094.1152
			411782.4060	4023076.2949
			411748.7190	4022994.3965
			411643.6250	4022726.7266
			411641.6880	4022435.3887
			411419.2190	4022347.2383
			411284.5000	4022318.9453
			411145.9380	4022140.5117
C2	0.30	Channel	409201.5000	4019370.5664
			409173.3130	4019532.8418
			409115.7190	4019657.4395
			409058.5940	4019813.5703
			409055.4380	4019859.0117
			409098.6560	4019944.7520
			409192.5940	4020079.2344
			409223.5310	4020182.5996
			409280.3750	4020086.8984
			409276.4690	4020023.0879
			409352.7190	4020011.6758
			409373.6560	4020006.3652
			409409.3130	4020065.3262
			409487.8750	4020143.3594
			409998.1880	4020801.4746
			410027.7500	4021036.2715
			410109.2810	4021484.2578
			410174.2810	4021494.7188
			410242.0940	4021502.6836
			410335.4060	4021518.5000
			410438.7190	4021533.8438
			410529.8750	4021556.1816
			410712.0940	4021583.1074
			410602.7500	4021411.3418
			410686.8440	4021328.9805
			410488.7190	4020946.7344
			410264.6250	4020620.0820
			410015.6880	4020454.4902

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
C2 continued	0.30	Channel	410,016.9060	4,020,278.1445
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates

Total SDCA	12.77
Total Study	1.85
Total Channel	0.50

EXHIBIT 3 -- DUST CONTROL MEASURE MAP

Shown are dust control measures assigned to areas within the SDCA.

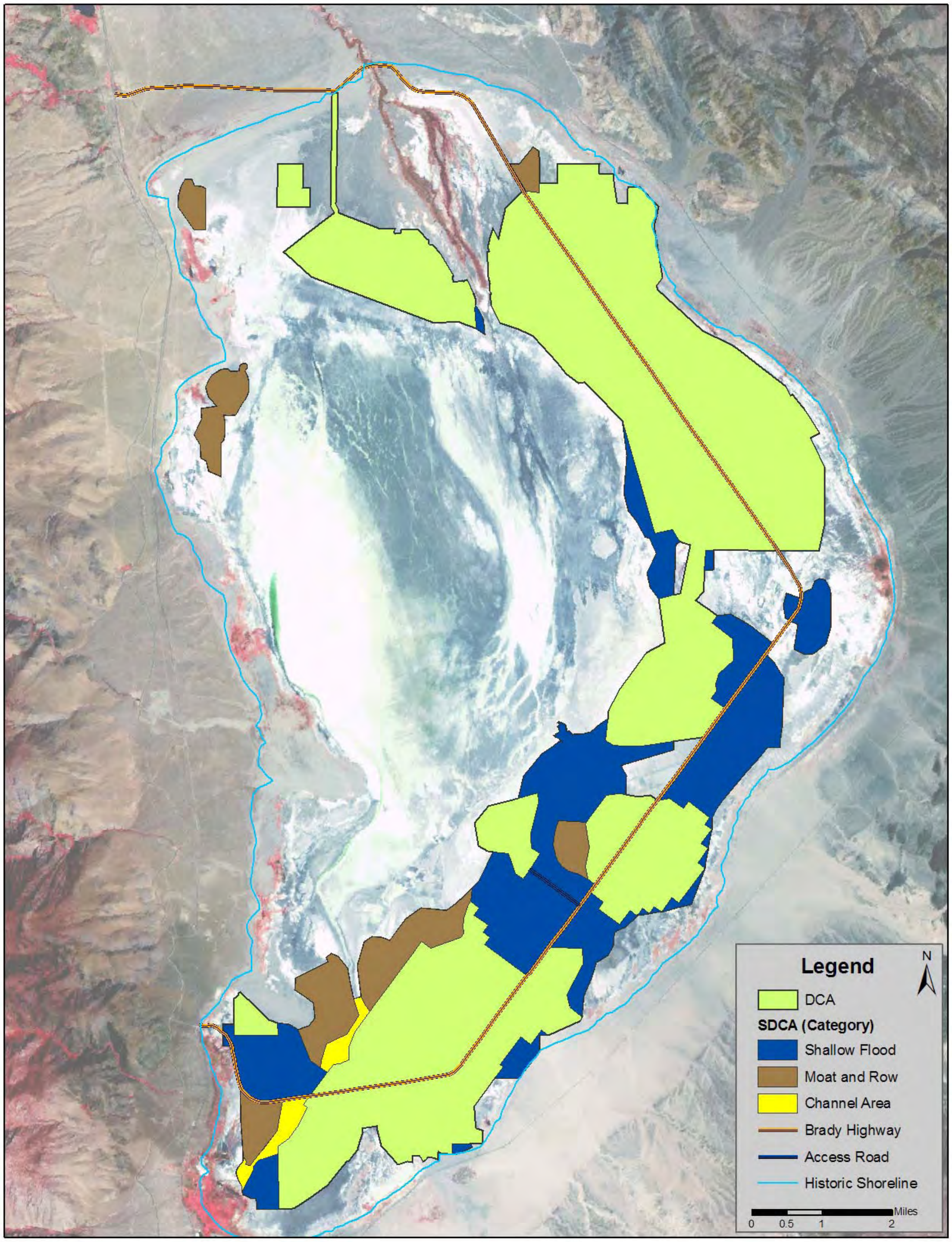

EXHIBIT 4 -- DUST CONTROL MEASURE DESCRIPTIONS

Brief descriptions of dust control measures for use on Owens Lake are given below. More detailed descriptions of the three BACM approved dust control methods (shallow flooding, managed vegetation and gravel) are provided in the 2003 SIP. Modifications to these measures as provided in the Settlement Agreement (Agreement) are noted. All references are to sections of the Agreement; section numbers of the Agreement are contained in square brackets.

Shallow Flooding

The "shallow flooding" (SF) dust control measure involves wetting emissive lake bed surfaces to reduce dust emissions. Performance specifications and a detailed description of the SF measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Otherwise, water shall be applied in amounts sufficient to achieve the required wetness cover as specified in Sections 3 through 5, 25, 26, and 27, or as modified under the provisions of Sections 5, 14, 15, 18, and 29. Satellite imagery, aerial photography or other methods approved by the APCO under the provisions of Section 29 are used to measure wetness cover for compliance.

Managed Vegetation

The "managed vegetation" (MV) dust control measure involves establishing a plant cover on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications and a detailed description of the MV control measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Vegetative cover on the MV site present on the lake bed on January 1, 2007 shall be as specified in Section 6. The performance specification of MV may be modified under the provisions of Section 29. Point-frame measurements satellite imagery or other methods approved by the APCO under the provisions of Section 29 are used to measure plant cover for compliance.

Gravel Cover

The "gravel cover" (GC) dust control measure involves placing a layer of gravel on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications are described in the 2003 SIP.

Moat and Row

The general form of the "moat and row" (MR) measure is an array (see Figure E4-1) of earthen berms (rows) about 5 feet high with sloping sides, flanked on either side by ditches (moats) about 4 feet deep (see Figure E4-2). Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual MR elements are constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the MR array is intended to control emissions under the full range of principal wind directions (see Figure E4-1). Initial pre-test

modeling indicates that MR elements' spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM_{10} control effectiveness required on the MR area.

The PM_{10} control effectiveness of MR may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, sand fences, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding moats and rows to the array, which reduces the distance between rows.

The final form of MR will largely be determined from the results of testing on the lake bed as provided in Sections 7 and 8. Final design is subject to test results, required PM_{10} control effectiveness, environmental documentation and permitting, engineering, and monitoring considerations.

In areas where MR is used as a control measure, the City shall implement the measure in a manner consistent with the Agreement, particularly Sections 7 and 8, or as modified by actions pursuant to Sections 18 through 24.

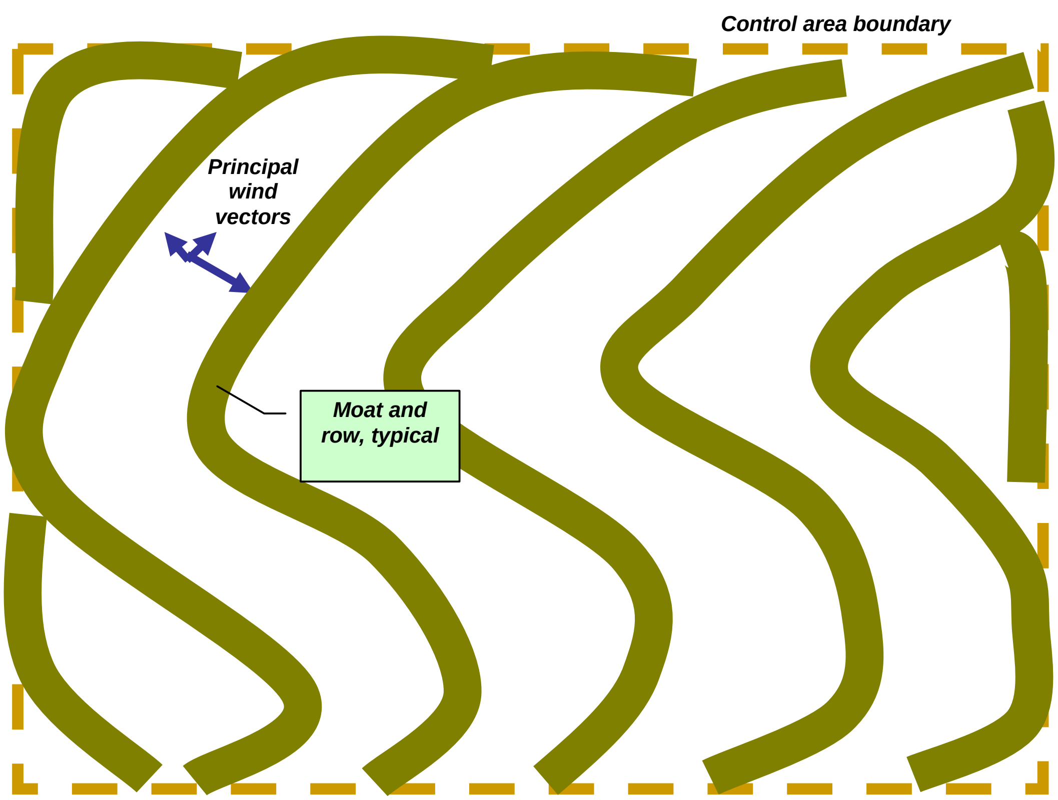

Figure E4-1. Moat and Row Array Plan View (schematic).

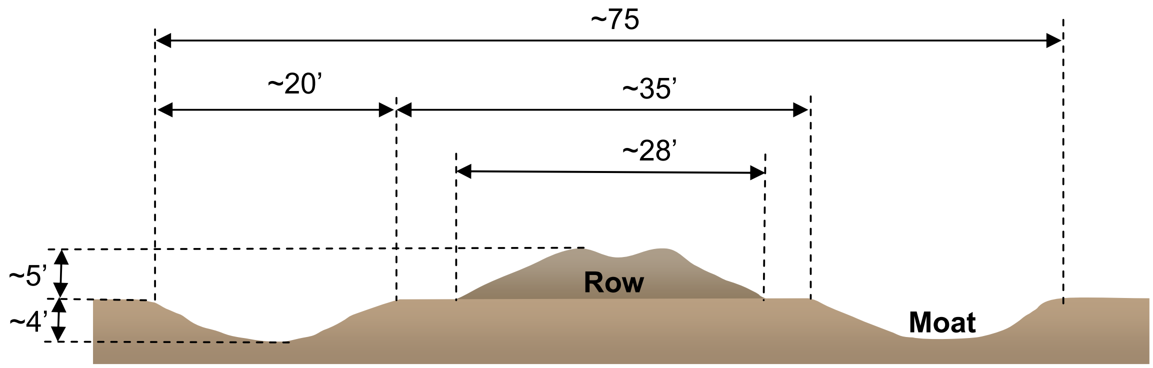

Figure E4-2. Profile of Moat and Row with Approximate Dimensions (schematic).

EXHIBIT 5 -- TDCA MINIMUM DUST CONTROL EFFICIENCY MAP

Shown are MDCEs calculated according to Sections 3 and 4 of the agreement.

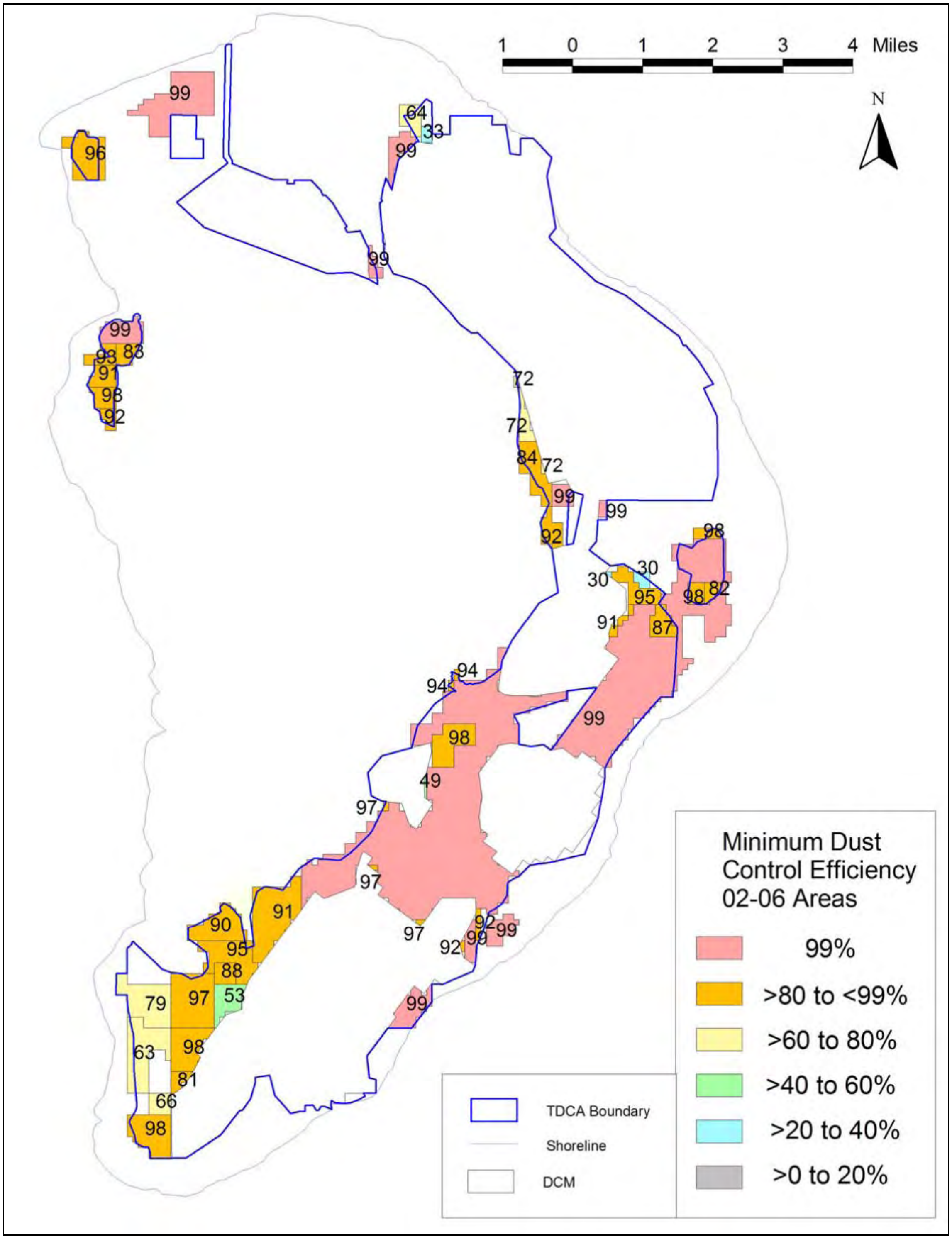

EXHIBIT 6 -- MDCE SELECTION PROCESS

This exhibit summarizes the purpose of the MDCE Selection Process Spreadsheet. A copy of the Process Spreadsheet, which contains a description of the spreadsheet structure and operation, may be downloaded from the District's website at http://www.gbuapcd.org/.

The District developed the Dust ID Model as a tool for identifying dust control areas on the lake bed. The Dust ID Model computes the amount of dust being generated from each source area on the lake bed, but the results cannot be used without additional processing to identify the acceptable combinations of dust control required on each source area (that is, each area's minimum dust control efficiency or "MDCE") to achieve the federal 24-hour PM_{10} standard along the shoreline. There are many possible combinations of MDCEs that could produce the acceptable result of achieving the standard at the shoreline. For example, 50 percent control on hypothetical Area 1 and 99 percent control on Area 2 may produce the same modeled shoreline concentration as 99 percent control on Area 1 and 50 percent control on Area 2. However, the first combination might be more practical and less costly than the second, and for that reason it is important to have a process that can quickly and efficiently identify acceptable combinations. In all cases, the outcome of this process is some combination of area-by-area dust control efficiencies that produces a modeled attainment of the federal PM_{10} standard everywhere along the shoreline.

The process for selecting the acceptable combinations of dust control levels has been, heretofore, a manual process. The MDCE Selection Process Spreadsheet (Process Spreadsheet) was developed to more quickly and efficiently identify combinations of dust controls required to produce compliance with the federal 24-hour PM_{10} standard along the shoreline. The worksheet is set up so that MDCE calculations are automatic, yet it still allows manual adjustments to be made.

EXHIBIT 7 -- SHALLOW FLOOD CONTROL EFFICIENCY CURVE

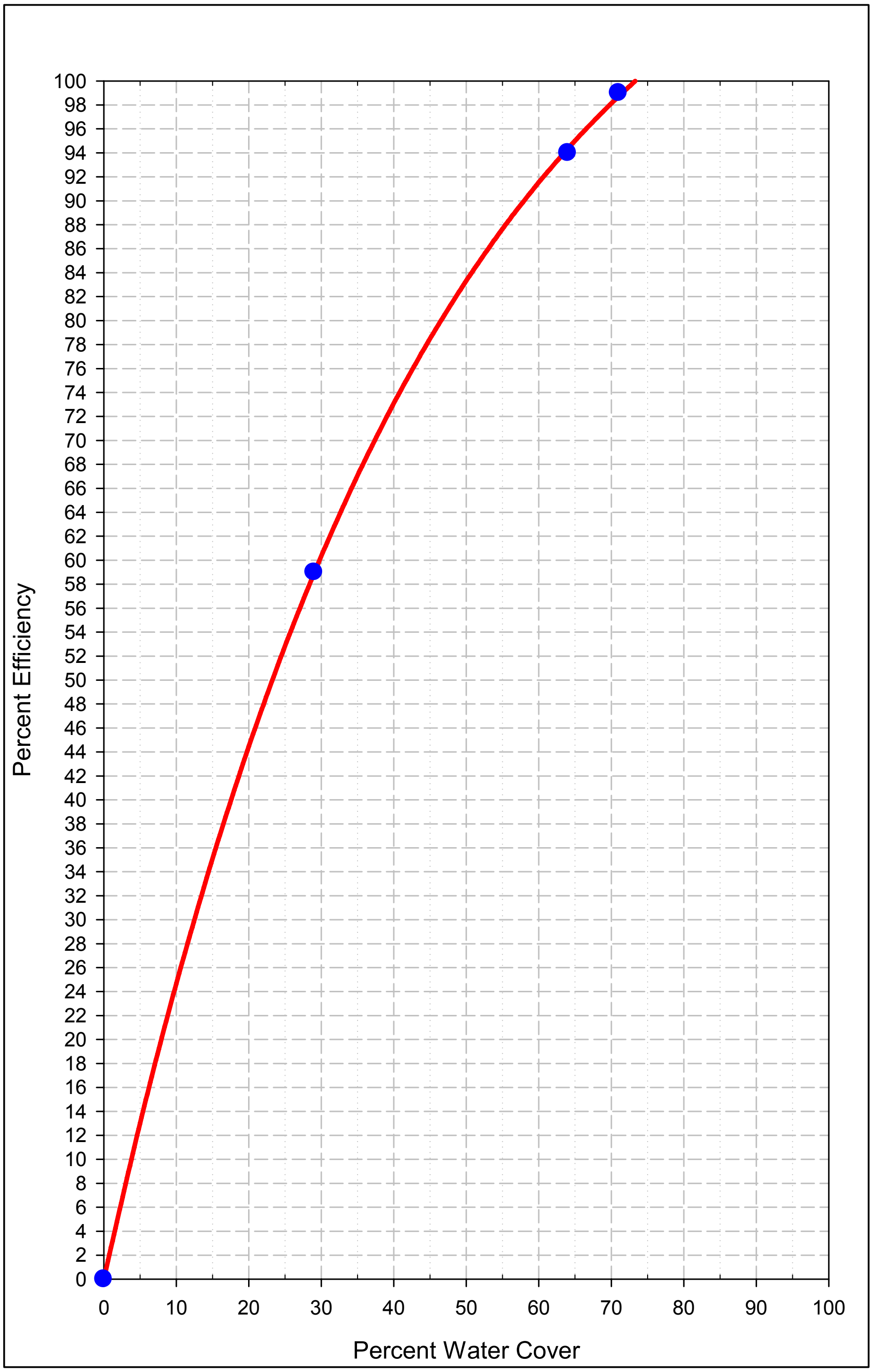

EXHIBIT 8 -- MOAT AND ROW DEMONSTRATION PROJECT LOCATION MAP

Two proposed moat and row demonstration project locations

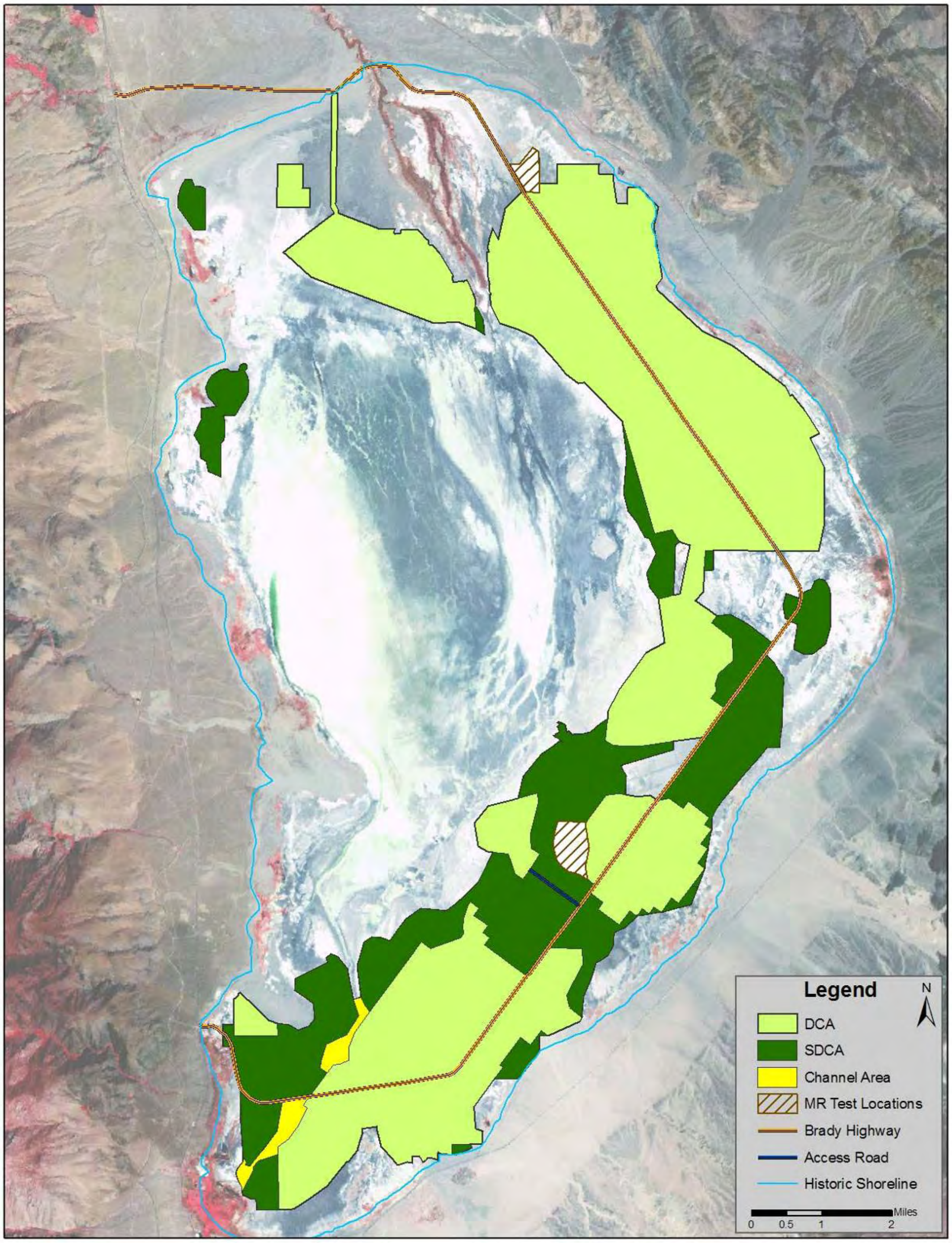

EXHIBIT 9 -- STUDY AREA MAP

Four proposed study area locations

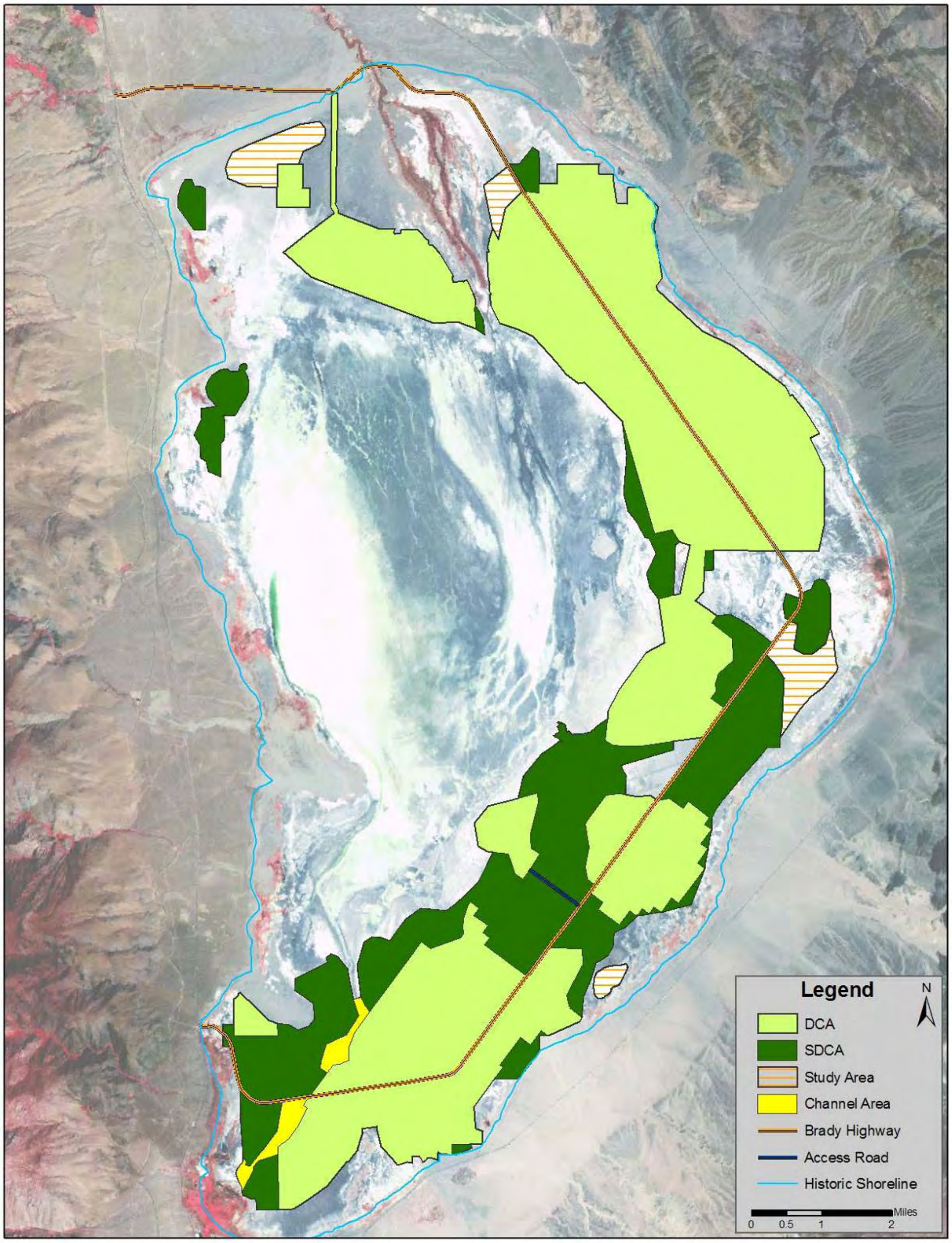

EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

Issue	*Resolution*	*Duration*	*Units*
Moat and Row			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
Managed Vegetation			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Gravel Patches			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
Shallow Flood			
Emissions from dry areas (insufficient uniformity of wetting)	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
Other features			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years)
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years)
New area shallow flood DCM[a]	2.9
New area managed vegetation DCM[a]	6.1
New area gravel cover DCM[a]	2.2
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4

[a]Assumes that total new area <2 square miles per year

EXHIBIT 13. DEFINITIONS

A. "Background PM_{10} concentration" shall mean the concentration of PM_{10} caused by sources other than from wind blown dust emanating from the Owens Lake bed. For the purpose of modeling air quality impacts, the background concentration is assumed to be 20 $\mu g/m^3$ (micrograms per cubic meter) during every hour at all receptor locations. The monitored and modeled PM_{10} emissions from the Keeler Dunes, which are located off the lake bed are treated as a separate dust source area and are not included in the background concentration.

B. "Best Available Control Measures" or "BACM" shall have the same definition as in the federal Clean Air Act. Approved BACM in the 2003 SIP was associated with PM_{10} emission reductions of at least 99 percent and includes managed vegetation, shallow flood, and gravel cover.

C. "Contingency measures" shall mean dust control measures or modifications to the dust control measures that can be implemented to mitigate dust source areas that cause or contribute to an exceedance of the federal standard at the historic shoreline in the event that a previously approved control strategy was found to be insufficient.

D. "Control Area" shall mean an area on the lake bed for which dust control is required.

E. "Control efficiency" shall mean the relative reduction or percent reduction in PM_{10} emissions resulting from the implementation of a control measure compared to the uncontrolled emissions.

F. "Control measures" shall mean measures effective in reducing the PM_{10} emissions from the lakebed surface over which they are implemented.

G. "Dust control measure" or "DCM" shall mean measures designed to suppress sand motion and reduce dust emissions from the Owens Lake bed.

H. "Dust ID Model" shall mean a computer-based air quality modeling approach developed as part of the 2003 SIP to identify emissive areas on the Owens Lake bed and to estimate the resulting PM_{10} concentrations at the shoreline. See also "Dust ID Program."

I. "Dust ID Program" shall mean a long-term monitoring and modeling program that is used to identify dust source areas at Owens Lake that cause or contribute to exceedances and violations of the federal PM_{10} standard. The current protocol for conducting the Dust ID Program is

included in the 2003 SIP (Exhibit 2 – Attachment 4). See also "Dust ID Model."

J. "Emission rate" shall mean the rate (expressed as mass per unit area per unit time) at which an air constituent (PM_{10}, for example) is transported away from the surface of the lake bed.

K. "Exceedance of the federal standard" or "exceedance" shall mean any single-day PM_{10} concentration that is monitored or modeled to be above 150 $\mu g/m^3$ (24-hour average from midnight to midnight) at any location at or above the historic shoreline.

L. "Historic shoreline" or "shoreline" shall mean the elevation contour line of 3,600 feet above mean sea level at Owens Lake, California.

M. "Lake bed" or "Owens Lake bed" or "playa" shall mean the exposed surface within and below the historic shoreline.

N. "Managed Vegetation" is a Dust Control Measure consisting of lakebed surfaces planted with protective vegetation.

O. "May not lawfully be included in the SIP" shall mean that inclusion of the provision in question in the revisions to the 2003 SIP has been determined by binding judicial order to be unlawful.

P. "MCDE-BACM" shall mean Dust Control Measures that achieve Minimum Dust Control Efficiency and are found to be appropriate for the area of application.

Q. "Minimum Dust Control Efficiency" or "MDCE" shall mean the lowest dust control efficiency, as determined by the Dust ID model, in the Supplemental Dust Control Area necessary to meet the federal standard at the historic shoreline.

R. "Moat and Row" shall mean a Dust Control Measure consisting of arrays of sand breaks that arrest sand motion.

S. "PM_{10}" or "particulate matter" shall mean atmospheric particulate matter less than 10 micrometers in nominal aerodynamic diameter.

T. "PM_{10} monitor" shall mean an instrument used to detect the concentrations of PM_{10} in the air.

U. "Sand flux monitor" shall mean a device used to measure the amount and/or rate of moving or saltating sand and sand-sized particles caused by wind erosion.

V. “Shallow Flood” is a Dust Control Measure consisting of lakebed areas wetted to a specified proportion of surface coverage.

W. “2003 SIP” or “2003 Owens Valley PM_{10} State Implementation Plan” shall mean the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision – Adopted November 13, 2003.

X. “Supplemental Control Requirements” or “SCR” shall mean Dust Control Measures required by the District on areas outside of the DCA that cause or contribute to an exceedance of the federal PM_{10} standard at the historic shoreline of Owens Lake.

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Board Order 080128-01
Attachment B

2008 Owens Valley Planning Area
Supplemental Control Requirements Determination Procedure

BACKGROUND

The State Implementation Plan (SIP) adopted by the Great Basin Unified Air Pollution Control District (District) in 2003 required the City of Los Angeles (City) to install and operate PM_{10} controls on a total of 29.8 square miles of the dried Owens Lake bed by the end of 2006. The 2003 SIP also contained a provision and procedures for an annual review of air quality monitoring data by the District's Air Pollution Control Officer (APCO) in order to determine if controls were needed on additional areas beyond the 29.8 square miles in order for the Owens Valley Planning Area to attain or maintain the federal 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS). If additional controls were needed, the 2003 SIP provided for the APCO to require the City to implement the necessary controls. This annual review and possible requirement for additional controls is known as the Supplemental Control Requirements (SCR) determination. The 2003 SIP required that SCR determinations use data collected starting July 1, 2002.

In December 2005, after analyzing data collected from July 2002 through June 2004, the District's APCO made the first SCR determination under the provisions of the 2003 SIP. The City objected to the APCO's analysis and submitted an alternative analysis of the data. After reviewing the City's analysis, the APCO revised the SCR determination in April 2006. The City also objected to the revised determination and filed a lawsuit against the District in May 2006. In June 2006 the City and the District entered into settlement negotiations in an attempt to resolve their disputes.

In December 2006 a final Settlement Agreement was approved by the District and the City. This agreement is Attachment A to Board Order 080128-01. Among other issues, the Settlement Agreement provides for modifications to be made to the 2003 SIP's SCR determination procedure. These modifications are incorporated into this revised 2008 SCR determination procedure.

CONDITIONS

The 2008 Owens Lake Dust Source Identification Program Protocol (Protocol) (Attachment C) contains the procedures to collect, screen, analyze and model the data used by the District's APCO to determine if exceedances of the 24-hour PM_{10} NAAQS have occurred and additional Supplemental Controls are necessary on the Owens Lake bed. The following actions may be taken by the APCO and will not be considered a change to the Protocol:

- Add, remove or move PM_{10} monitors and meteorological stations
- Replace TEOMs with any other USEPA-approved Reference or Equivalent Method monitors that collect hourly concentration data
- Replace Sensits with any other sand flux monitor (SFM) that collects hourly data
- Replace Cox Sand Catchers with any other SFM

- Add, remove or move SFMs as long as the maximum grid cell size for modeling remains at one square kilometer
- Calculate "from-the-lake" wind directions for new PM_{10} monitor sites
- Determine default K-factors for new source areas

The Protocol and these Supplemental Control Requirements (SCR) specify many assumptions and decision trees to be followed that may need to be changed in the future. The following changes to the Protocol and the SCR may be made by written agreement of the APCO and the General Manager of the City of Los Angeles (City) Department of Water and Power:

- The background value of 20 $\mu g/m^3$ may be changed to another value or a procedure may be established to calculate the background from upwind/downwind lake bed monitors
- The default K-factors may be updated
- The default seasonal cut points may be updated
- The CalPUFF modeling system may be changed to another USEPA guideline model
- The procedure for determining the sand flux from a Dust Control Measure (DCM) area may be updated
- The K-factor screening criteria may be updated
- From-the-lake wind directions in Attachment B, Table 1 may be changed to avoid including off-lake sources
- Non-reference or non-equivalent method special purpose PM_{10} monitors may be added
- Procedures for determining source area boundaries may be updated
- Methods for directly measuring source area emission rates may be implemented

DEFINITIONS

A ***shoreline or near-shore PM_{10} monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM_{10} Monitor located approximately on the 3600-foot elevation (historic shoreline) contour, or within the Owens Valley Non-Attainment Area above the 3600-foot elevation. The existing shoreline or near-shore PM_{10} monitors are at Keeler, Flat Rock, Shell Cut, Dirty Socks, Olancha, Bill Stanley and Lone Pine (see Attachment B, Map 1).

A ***special purpose PM_{10} monitor*** is a fixed or portable USEPA-approved Federal Reference Method or Equivalent Method PM_{10} monitor installed upwind of or near potential dust source areas on the lake bed below the 3600-foot elevation. These lake bed PM_{10} monitors will be used to monitor new dust sources areas to generate new K-factors and to evaluate model predictions at the PM_{10} sites. They shall not be used to monitor compliance with the NAAQS and the data will not be submitted to USEPA's Aerometric Information and Retrieval System (AIRS).

An ***exceedance*** is a midnight to midnight Pacific Standard Time 24-hour average PM_{10} concentration greater than 150 $\mu g/m^3$ measured by a shoreline or near-shore PM_{10} monitor.

From-the-lake wind directions are determined by extending two straight lines from the PM_{10} monitor site to the points on the 3600-foot contour of the Owens Lake bed that maximize the angle in the direction of the lake bed between the two straight lines. From-the-lake and non-lake wind directions for the existing PM_{10} monitor sites are shown in Attachment B, Table 1.

Physical evidence of a source area boundary consists of Global Positioning System (GPS) data, visual observations, photographic observations, video observations, or any other method described for this purpose in the Dust ID Protocol.

BACM are Best Available Control Measures/Most Stringent Measures (MSM) defined as the dust controls determined to be BACM/MSM for Owens Lake in Paragraphs 15, 16 and 17 of Board Order 080128-01. If, in the future, the District changes or deletes existing BACM or adds new BACM, then the dust controls are those as revised by the latest District action.

Implements BACM control measures means BACM are constructed and meeting the performance standards outlined Paragraphs 15, 16 and 17 of Board Order 080128-01.

Extreme violators are areas currently required to implement BACM, but BACM are found to be insufficient to adequately control emissions.

Environmental analysis document complete means that a project level environmental document has been certified covering the location and the BACM/MSM selected for implementation by the City.

GENERAL SCR DETERMINATION PROCEDURE

1. If the City is in compliance with Paragraphs 1 and 3 of Board Order 08128-01 regarding the amount, timing and operation of existing and future dust controls, the APCO will not issue additional written SCR determinations until after May 1, 2010 and will not use data collected prior to April 1, 2010 for new determinations, except for Study Areas as provided in Paragraph 2, below. This will allow the City time to complete construction and implementation of the additional PM_{10} controls within the 2008 Total Dust Control Area.

2. After May 1, 2010, the APCO will recommence written SCR determinations using the latest SCR procedure. Recommenced determinations will use data collected only after April 1, 2010, except in those areas delineated as Study Areas. SCR determinations for Study Areas shall use data collected after July 1, 2006. The APCO shall make SCR determinations at least once in every calendar year. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure construction activities.

3. If, pursuant to Paragraph 2, herein, the APCO determines that a monitored or modeled exceedance of the federal 24-hour PM_{10} NAAQS caused by emissions from the lake bed has occurred at or above the historic shoreline:

   A. The APCO, based on all available information, including, visual observation, physical evidence, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.

      (i) If the APCO identifies the need for additional controls and/or increased MDCE on existing controls, the APCO shall issue a written SCR determination to the City.

(ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination.

(iii) If the City submits an alternative analysis, the APCO shall consider the City's analysis and has full and sole discretion to withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

(iv) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the outcome of the Dispute Resolution Process.

(v) In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316. The CARB will act within 90 days on the City's appeal.

(vi) The implementation of additional control measures under the SCR determination process will be considered contingency measures under Section 172(c)(9) of the federal Clean Air Act and will be implemented automatically upon final action of the SCR determination.

B. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

C. If the City proposes in their Remedial Action Plan to decrease the control efficiency in any previously controlled dust source area, the City must demonstrate that the proposed strategy will control dust sources to the extent that there are no modeled exceedances at the shoreline based on:

(i) new dust event(s) that caused or contributed to a modeled or monitored exceedance,

(ii) dust events that took place from July 2002 through June 2006 based on the results of the MDCE Selection Process Spreadsheet as set forth in the 2006 Settlement Agreement, and

(iii) that previously determined control efficiency levels are maintained in (a) all areas that are required to have 99% control efficiency or higher in the 2003 SIP Dust Control Area and (b) new dust source areas that are not included in the MDCE Selection Process Spreadsheet.

D. The District may, as appropriate, also issue Notices of Violation.

4. In the event:

A. The APCO has made a written determination pursuant to Paragraph 3 that an exceedance of the federal standard, occurring after April 1, 2010, resulted from a Control Area or portion of a Control Area treated with the Moat & Row PM_{10} control measure; and

B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Paragraph 6 below; and

C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (i.e., an exceedance occurred after the City's initial attempt to remediate that area under Paragraph 6);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat & Row to MDCE-BACM or BACM as described in Paragraphs 15, 16 and 17 of Board Order 080128-01, to address the exceedance described in Paragraph 4.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Paragraph 9.

5. If the APCO determines that Moat & Row constitutes BACM or MDCE-BACM as provided for in Attachment D of Board Order 080128-01, "2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area," then upon issuance of such written determination, the provisions of Paragraph 4 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Paragraph 5.

6. A Remedial Action Plan prepared by the City pursuant to Paragraph 3.B will contain a description of:

A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:

(i) Maintenance of facilities (*e.g.*, berms, moats and rows);

(ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);

(iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, surface-protecting elements) of Moat & Row areas;

(iv) Transition of Moat & Row areas to BACM, or MDCE-BACM.

B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.

C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

7. The Schedule of Contingency Measures incorporated as part of this Procedure as Attachment B, Exhibit 1 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Paragraph 6, and the timing required for their implementation.

8. Before any full-scale Moat & Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat & Row area consistent with Paragraph 4. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat & Row to another DCM is needed, or where such transition is required pursuant to Paragraph 4.

9. Areas to be transitioned from Moat & Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat & Row Transition Schedule incorporated as Attachment B, Exhibit 2. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. In all cases, the time allowed for implementation of control measures shall not include any time between the City's appeal to the California Air Resources Board under the provisions of Health and Safety Code Section 42316 and resolution of such an appeal.

DETAILED SCR DETERMINATION PROCEDURE

Exceedances of the federal 24-hour PM_{10} National Ambient Air Quality Standard of 150 µg/m³ at or above the historic shoreline of Owens Lake (elevation 3600 feet above mean sea level) can either be measured directly via a PM_{10} monitor or they can be modeled using the procedures set forth in the latest Owens Lake Dust Source Identification Program Protocol. Set forth below are the two procedures to be used by the APCO in making SCR determinations: the first uses directly monitored exceedances and the second uses modeled exceedances.

A. MONITORED EXCEEDANCES

A.1 – Do lake bed source areas cause or contribute to a monitored 24-hour average PM_{10} concentration greater than 150 µg/m³ at an historic shoreline PM_{10} monitor or at a near-shore PM_{10} monitor?

Any event that causes a monitored 24-hour average PM_{10} concentration greater than 150 µg/m³ at a shoreline or near-shore PM_{10} monitor will be evaluated to determine if lake bed dust source areas caused or contributed to the exceedance. The following steps will be used to screen hourly PM_{10} concentrations to determine if a lake bed source area caused or contributed to a monitored exceedance:

1) For hourly average from-the-lake wind directions, use the recorded hourly PM_{10} concentration.
2) For hourly average non-lake wind directions or missing data, replace the recorded hourly PM_{10} concentration with the background concentration of 20 µg/m^3.

3) Average the adjusted hourly concentrations from steps 1 and 2 for the 24-hour period from midnight to midnight, Pacific Standard Time.

If the 24-hour average of the adjusted hourly PM_{10} concentrations exceeds 150 µg/m³ at the monitor site, go to A.2. If not, go to B.1.

A.2 – Is there physical evidence of lake bed emissions and/or air quality modeling sufficient to define boundaries for the area to be controlled?

Source Delineation.

If possible, the boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol (Attachment C).

If neither the GPS boundary nor other physical evidence, as described above, is available, the default area size will be one square kilometer centered on the sand flux monitor (SFM), or one grid cell if the SFMs are in a closer array.

If there is physical evidence, as described above, to define the boundaries for the area to be controlled, and no K-factor for that area or no sand catch data above one gram for the sampling period from a sand flux sampler located within a 30 degree upwind cone centered on the wind direction of the defined source, then modeling cannot be performed. Go to A.3.

Modeling.

If sand flux data is available for the exceedance identified in A.1, the District will model the event. Modeling will be performed following the latest Dust ID Modeling Protocol using the source area determined above.

The order of priority for applying K-factors in the model will be:

1) When available, the District will use event specific storm-average K-factors to model dust events at the PM_{10} monitor if there are three or more hours of screened hourly K-factors for a 48-hour period. If not,

2) The District will use the most recent temporal and spatial 75-percentile hourly K-factors to model events, if there are nine or more screened hourly K-factors for a period and they are determined by the methods described in the most current Dust ID Protocol. If not,

3) The District will use the default K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area.

Only those on-lake and off-lake dust sources with sand flux data will be included in the model. All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review.

The modeling results will be used to prioritize multiple upwind source areas for control, or to determine the fraction of a single upwind source area that needs to be controlled.

Go to A.3

If neither physical evidence nor model results are available, go to A.5.

A.3 – District directs City to implement dust controls.

Source areas in A.2 that cause or contribute to an exceedance may be new source areas, or may be emissions from areas with existing dust controls. The APCO will determine, in writing, that conditions specified in Section A.1 were met for a specified area determined by A.2. For emissions from areas with existing dust controls, the City will have the choice of increasing the controls in the existing dust control areas or controlling other contributing sources that will result in lowering the monitored impact below the 150 $\mu g/m^3$ exceedance threshold, if such areas exist. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to A.4.

<u>A.4 – City implements dust controls.</u>

DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

<u>A.5– District collects additional physical evidence and installs sand flux monitors in suspected areas.</u>

If there is insufficient physical evidence and no sand flux monitor data to determine the emissive area on the lake bed that caused the monitored or modeled exceedance, the District will install Sensits and Cox Sand Catchers (CSC) sand flux monitors in the suspected area in a sampling array with a maximum spacing of one kilometer. The District will also continue to collect other physical evidence.

<u>B. MODELED EXCEEDANCES</u>

<u>B.1 – Does the Dust ID model predict a 24-hour shoreline concentration greater than 150 µg/m³, including background?</u>

<u>Dispersion Modeling Analysis.</u>
At least once a year, the District will examine the Dust ID information and dispersion model to determine if there have been any modeled shoreline exceedances since the period included in the last model run. Modeling will be performed following the 2008 Owens Lake Dust Source Identification Program (Dust ID) Protocol (Attachment C).

<u>K-factors.</u>
New K-factors may be generated from PM_{10} concentrations measured at any shoreline or near-shore PM_{10} monitor using the methods described in the Dust ID Protocol. The order of priority for applying K-factors in the model will be:

1) The current temporal and spatial 75th percentile hourly K-factors. The District will use the current modeling period temporal and spatial 75th percentile hourly K-factors to model events, if there are nine or more hourly K-factors for an agreed upon seasonal period and area determined by the methods described in the most current Dust ID Protocol.

2) If there is no agreement on seasonal cut-points, the default cut points, as shown in Attachment B, Table 2, will be used with number 1, above.

3) If there is no agreement on area, the default areas, as shown in Attachment B, Map 1, will be used with number 1, above.

4) If there are fewer than nine hourly K-factors for any area and period, go to 5), below.

5) Default K-factors from Attachment B, Table 2. The District will use the K-factors in Attachment B, Table 2 to model events, based on the month of the event being investigated and the K-factor area. If the new dust source area is not within a K-factor area shown in Attachment B, Table 2, the APCO shall determine the default K-factor for the new source area based on the default K-factors of areas with similar soil characteristics.

Source Area Size, Location and Sand Flux.
The boundary of a dust source area will be delineated by a GPS survey. Under certain circumstances, the surveyed boundary of the dust source area will not result in a closed polygon. If the GPS survey yields a partial boundary and not a closed polygon, then the polygon area may be closed, if the length of the closure is equal to or less than one-half kilometer or is less than 20 percent of the surveyed source area perimeter, whichever is smaller. The ends of the partial surveyed area boundary will be completed with a straight line, unless survey notes or visual observations indicate that a different shaped boundary should be used. If the surveyed source area boundary has a complex shape, then the partial boundary to be closed will use the best available field and visual data to connect the two ends and form the polygon. Boundaries of existing controlled areas or other previously located boundaries will be used in place of a GPS survey boundary, if the survey notes or visual observations indicate the erosion area extends to that boundary.

If the GPS boundary described above is not available, the area will be defined by any one or a combination of GPS surveying, visual observations, and video observations or any other method described in the Dust ID Protocol.

The details of how to delineate source area boundaries are contained in the Dust ID Protocol.

If neither the GPS boundary nor the other physical evidence as described above is available, the default area size will be one square kilometer centered on the SFM, or one grid cell if the SFM are in a closer array.

All data collected by the District pursuant to this Section shall be shared with the City within 30 days of final data review. If the modeling shows that lake bed source areas have caused or contributed to any modeled shoreline PM_{10} impact greater than 150 µg/m³ for a 24-hour average, go to B.7. If not, go to B.2.

B.2 – Is the modeled concentration less than 100 µg/m³?

This refers to the modeled concentration calculated in B.1 and includes the background PM_{10} level of 20 µg/m³. If yes, go to B.6. If no, go to B.3.

B.3 – District directs the City to commence environmental impact analysis, design and permitting.

The APCO will direct the City in writing to choose the BACM it wishes to implement in the area identified in B.1.

The City will develop a scope of work for the identified potential source areas, including: (1) a summary of the sites pertinent conditions, features, and location, (2) appropriate control alternatives and approach, including a conceptual layout of dust control and integration into the TDCA (roads, water supply, drainage, and power), (3) standard and site-specific permitting considerations, (4) anticipated environmental documentation considerations and approach, and (5) an approximate timetable for implementation beginning at an undefined start date that might coincide with a future SCR determination . City shall complete these steps within 180 days of the date of the written direction from the APCO. Go to B.4.

B.4 – District deploys reference and/or non-reference method Special Purpose PM_{10} monitor(s) to confirm model (if not already deployed).

The District will deploy reference and/or non-reference method Special Purpose PM_{10} monitor(s) on the lake bed upwind and downwind of the identified emissive area, if there are no existing monitors at locations that can be used in Section B.5 to refine the model predictions. Monitors will be sited between 250 and 5000 meters outside of any GPS'd or observed source area boundaries. These PM_{10} monitoring sites may be removed after the model confirmation procedure described in B.5. Shoreline and near-shore PM_{10} monitors that are sited to confirm the model may be used for NAAQS compliance, if an exceedance is monitored. Go to B.5.

B.5 – Is the refined model prediction greater than 150 μg/m³?

For each event measured under Section B.4 that results in a 24-hour monitored concentration of greater than 100 μg/m³, the event-specific K-factor (defined in the Dust ID Protocol) will be used to model the concentration at the shoreline receptors. If the event-specific K-factor was derived for the same year and season as the original event modeled in B.1, the Section B.1 event will be remodeled using the new K-factor. If either that remodeled concentration for the Section B.1 event, or the new modeled concentration for the on-lake monitored event, is greater than 150 μg/m³ at a shoreline receptor, go to B.7. If not, go to B.6.

The District will make a determination if any currently modeled event within the same season and K-factor area using the appropriate K-factors as determined by this procedure causes a shoreline receptor to exceed 150 μg/m³. If yes, go to B.7.

B.6 – No action required.

No action is required of the City at this time. Data collected during this period can be used in conjunction with data collected at a later time to define emissive areas on the lake bed according to this protocol and to develop K-factors for emissive areas.

B.7 – District directs the City to implement dust controls.

Source areas in B.1 and B.5 that cause or contribute to an exceedance may be new source areas or existing source areas with less than the required level of control (MDCE not high enough to prevent exceedances).

The APCO will determine, in writing, that conditions specified in Sections B.1 or B.5 were met for the specified area. Within 30 days of that determination by the APCO, the City will be notified of that determination in writing. If possible, the City will have the choice of increasing

the control efficiencies on existing dust control areas and/or controlling other contributing sources that will result in lowering the modeled impact below the 150 µg/m³ exceedance threshold. If the APCO identifies the need for additional controls, the APCO shall issue a written SCR determination to the City.

If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an alternative analysis of the data used by the APCO to make the determination. If the City submits an alternative analysis, the APCO shall consider the City's analysis and may withdraw, modify or confirm the SCR determination. If the APCO takes action to withdraw or modify the SCR determination, he shall do so within 60 days of the City's submittal of the alternative analysis.

If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's final action, the City may initiate the Dispute Resolution Process pursuant to Paragraph 32 of the 2006 Settlement Agreement between the District and the City (Attachment A to Board Order 080128-01). The APCO may modify the SCR determination based on the Dispute Resolution Process.

In the event the Parties are unable to resolve disagreements over the APCO's SCR determinations through the Dispute Resolution Process, the City may appeal the APCO's SCR determinations to the California Air Resources Board (CARB) under the provisions of Health and Safety Code Section 42316 (Section 42316). The CARB will act within 90 days on the City's appeal.

The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Paragraph 6, above, to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

Go to B.8.

B.8 – City implements BACM.

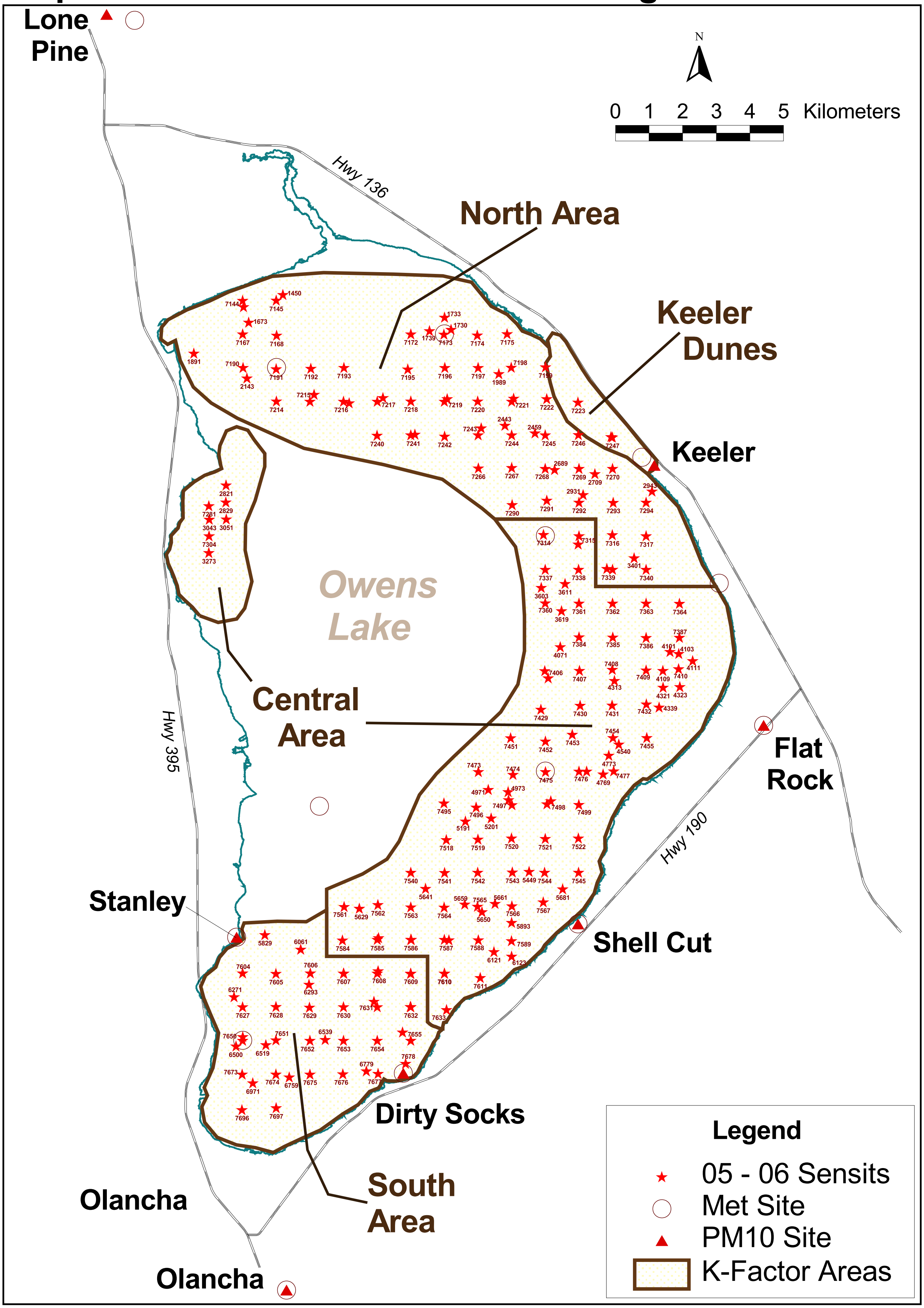
DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule incorporated as Attachment B, Exhibit 3. The City is solely responsible for all environmental impact analyses required by the California Environmental Quality Act and for all required permits and leases.

For source areas that arrive at B.7 from B.5, all time periods in the above referenced implementation schedule in B.8 shall apply but be reduced by the time period elapsed since the date of the written direction from the APCO described in Section B.3, or one year, whichever is less.

Attachment B Enclosures

Map 1: Owens Lake Dust ID Monitoring Map
Table 1: From-the-lake and Non-lake Wind Directions for PM_{10} Monitor Sites
Table 2: Default Spatial and Temporal K-factors for the Dust ID Model
Exhibit 1: Schedule of Contingency Measures
Exhibit 2: Moat & Row Transition Schedule
Exhibit 3: DCM Operation Schedule

Map 1 - Owens Lake Dust ID monitoring network



Attachment B - Table 1

From-the-Lake and Non-Lake Wind Directions for PM_{10} Monitor Sites

PM_{10} Monitor Site	From-the-Lake Wind Dir. (Deg.)	Non-lake Wind Dir. (Deg.)	Met Tower
Lone Pine	126≤WD≤176	WD<126 or WD>176	Lone Pine
Keeler	147≤WD≤290	WD<147 or WD>290	Keeler
Flat Rock	224≤WD≤345	WD<224 or WD>345	Flat Rock
Shell Cut	WD≥227 or WD≤ 33	33<WD<227	Shell Cut
Dirty Socks	WD≥234 or WD≤50	50<WD<234	Dirty Socks
Olancha	WD≥333 or WD≤39	39<WD<333	Olancha
Bill Stanley	WD≥349 or WD≤230	WD<349 or WD>230	Bill Stanley
New Sites	TBD	TBD	TBD

TBD – From-the-lake and non-lake wind directions will be determined for new sites by the APCO when sites are selected.

Attachment B - Table 2

Default Spatial and Temporal K-factors for the Dust ID Model

AREA	**K-factor Jan.– Apr. & Dec.**	**K-factor May-Nov. (These are the default cutpoints.)**
Keeler Dunes	7.4×10^{-5}	6.0×10^{-5}
North Area	3.9×10^{-5}	1.5×10^{-5}
Central Area	12.0×10^{-5}	6.9×10^{-5}
South Area	4.0×10^{-5}	1.9×10^{-5}

Attachment B - Exhibit 1: Schedule of Contingency Measures

From 2006 Settlement Agreement

EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

Issue	Resolution	Duration	Units
Moat and Row			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
Managed Vegetation			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Gravel Patches			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
Shallow Flood			
Emissions from dry areas (insufficient uniformity of wetting)	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
Other features			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

Attachment B - Exhibit 2

From 2006 Settlement Agreement

EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years)
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

Attachment B - Exhibit 3

From 2006 Settlement Agreement

EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years)
New area shallow flood DCM[a]	2.9
New area managed vegetation DCM[a]	6.1
New area gravel cover DCM[a]	2.2
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4
[a]Assumes that total new area <2 square miles per year	

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Board Order 080128-01
Attachment C

2008 Owens Lake Dust Source Identification Program Protocol

Great Basin Unified Air Pollution Control District
157 Short Street, Bishop, California 93514
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2008 Owens Lake Dust Source Identification Program Protocol

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Glossary of Terms and Symbols

AIRS	US Environmental Protection Agency's Aerometric Information and Retrieval System
ATV	All-Terrain Vehicle
APCO	Air Pollution Control Officer
BACM	Best Available Control Measure
BACT	Best Available Control Technology
CAAA	Clean Air Act Amendments of 1990
CALMET	A meteorological preprocessor program for CALPUFF.
CALPUFF	An air pollution model
CARB	California Air Resources Board
CSC	Cox Sand Catcher, a passive sand flux measurement device.
DCA	Dust Control Area
DCM	Dust Control Measure
Dust ID Program	Owens Lake Dust Source Identification Program
EIR	Environmental Impact Report
Event-specific K_f	Weighted-average of hourly K-factors for a dust event, weighted by the hourly PM_{10} concentration
Exceedance	Modeled or monitored PM_{10} > 150 µg/m^3 at the shoreline
FTEE	Full-time equivalent employee
GBUAPCD	Great Basin Unified Air Pollution Control District
GIS	Geographic Information System
GPS	Global Positioning System
KE	Kinetic energy
K-factor	Proportionality constant for sand flux and PM_{10} emissions, K_f
LADWP	City of Los Angeles Department of Water and Power (also City)
m^3	cubic meter
met	meteorological
mg	milligram
MSM	Most Stringent Measure
NAAQS	National Ambient Air Quality Standards
NEAP	Natural Events Action Plan
OVPA	Owens Valley PM_{10} Planning Area
PC	Particle count
PM_{10}	Particulate matter less than 10 microns aerodynamic diameter
QA	Quality Assurance
RASS	Radio Acoustic Sounding System
RSIP	Great Basin APCD 2003 Owens Valley PM_{10} Planning Area Revised State Implementation Plan

Sensit	An electronic sand motion detector.
Settlement Agreement	2006 Settlement Agreement between LADWP and GBUAPCD
Storm-average K_f	Arithmetic average of hourly K-factors for a dust event
SCR	Supplemental Control Requirements of the 2003 SIP
SFM	Sand flux monitor
TEOM	Tapered-Element Oscillating Microbalance, measures PM_{10}.
USEPA	United States Environmental Protection Agency
USGS	US Geological Survey
WD	Wind direction
2003 SIP	Great Basin APCD 2003 Owens Valley PM_{10} Planning Area Revised State Implementation Plan
µg	microgram

2008 Owens Lake Dust Source Identification Program Protocol

1. Program Overview

1.1 Introduction

The objective of the Owens Lake Dust Source Identification (Dust ID) Program is to identify dust source areas at Owens Lake that can cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) for PM_{10}. The Dust ID Program is a long-term monitoring program that is intended to identify dust source areas for control under the provisions of the Supplemental Control Requirements (SCR) in the 2003 revised Owens Valley PM_{10} State Implementation Plan (RSIP) and the 2006 Owens Lake Settlement Agreement (Settlement Agreement). The text of the Settlement Agreement and SCR provisions is included in the appendices to this document.

The RSIP and Settlement Agreement require the City of Los Angeles Department of Water & Power (City) to control all sources of wind blown dust from the lake bed of Owens Lake that cause or contribute to an exceedance of the PM_{10} NAAQS at the historic shoreline (3,600-foot contour line). Based on dust events that occurred between January 2000 and July 2006, 43 square miles of the lake bed were found to cause or contribute to NAAQS violations. Dust controls are required to be implemented on 29.8 square miles of the lake bed by December 31, 2006, and an additional 13.2 square miles by April 1, 2010.

Provided that these control measures are implemented in accordance with the RSIP and Settlement Agreement, the District will suspend making determinations to control additional dust source areas from December 4, 2006 until May 1, 2010. During this period, all monitoring, modeling and observations will continue as described in this Dust ID Program Protocol. Data and information collected during this period will be used to determine any control requirements for Study Areas as described in the Settlement Agreement, and to advise the City on any monitored dust emissions from the lake bed and surrounding areas. If any new lake bed dust source areas are identified from data collected after April 1, 2010, they will be subject to dust control requirements as provided for in the Settlement Agreement and any future revisions to the Owens Valley PM_{10} State Implementation Plan. SCR determinations shall make reasonable efforts to account for impacts caused by Dust Control Measure (DCM) construction activities.

1.2 Locating Dust Source Areas

A network of sand flux samplers, PM_{10} monitors, meteorological towers and remote camera sites will be used to monitor and locate dust source areas at Owens Lake. Figure 1.1 shows a map of the Dust ID network at Owens Lake. As configured in 2003, the Dust ID network included: sand flux monitors at 136 lake bed sites at 1-km spacing, 7 PM_{10} monitors, 13 met towers, 8 observation sites, and 10 time-lapse cameras at 7 sites. At the discretion of the Air Pollution Control Officer, additional sand flux, PM_{10} and met sites will be added as necessary to collect

information that can be used to monitor and model the impact from new areas that may become emissive on the lake bed.

The automated monitoring network will be augmented with information from observers who will map dust source locations from off-lake sites when dust events take place during normal work hours. These maps will be used to help document source areas that may be outside the sand flux network or that may be within the network, but missed by the samplers. Field personnel will inspect active source areas and map the source area boundaries using a GPS (Global Positioning System) as conditions allow. Data collected from the sand flux network, visual mapping and GPS surveys will be included in a Geographic Information System (GIS) database for mapping and analysis. Maps generated using these different methods will be compared qualitatively to help delineate source area boundaries.

1.3 Monitored Exceedances

Analysis of hourly PM_{10} concentrations at shoreline and off-lake monitoring sites may show that lake bed source areas cause or contribute to PM_{10} exceedances. Monitoring of PM_{10} concentrations will be done using US EPA-approved monitors. Currently, hourly PM_{10} readings are obtained using TEOM (Tapered-Element Oscillating Microbalance) PM_{10} monitors manufactured by R&P, Inc. If a PM_{10} exceedance is monitored, PM_{10} concentrations will be paired with the local wind direction for each hour of that event to determine if lake bed source areas caused or contributed to the exceedance.

Twenty-four hour average PM_{10} monitor concentrations will be adjusted for winds coming from the direction of the lake to the monitor (from-the-lake) and from directions not from the lake to the monitor (non-lake). PM_{10} concentrations during any hour with winds from a non-lake wind direction will be assumed to have an average background concentration of 20 $\mu g/m^3$ and from-the-lake wind directions will be given their hourly value. If the adjusted 24-hour average is greater than 150 $\mu g/m^3$, then an exceedance will have been monitored from a lake bed source or sources.

If a lake bed source area causes or contributes to an exceedance, hourly PM_{10} concentrations and wind directions will be reviewed to see if a new source area (or areas) is associated with that exceedance. If sand flux data are available that show erosion activity in the direction of a new source area, this event will also be modeled as described in the air quality modeling protocol. If the PM_{10} monitor data indicate that a new source area caused or contributed to an exceedance, DCMs may be required under the provisions of the Settlement Agreement or current SIP.

1.4 Modeled Exceedances

Air quality modeling will be performed with the CALPUFF modeling system or other United States Environmental Protection Agency (USEPA) approved modeling method. At least once a year, the Dust ID information will be examined and the model will be run to determine if there were any modeled shoreline exceedances since the period covered by the last model run. PM_{10} emissions for the model will be based on hourly sand flux measured at lake bed sites and spatial and temporal factors derived using the empirical relationship between sand motion on the lake

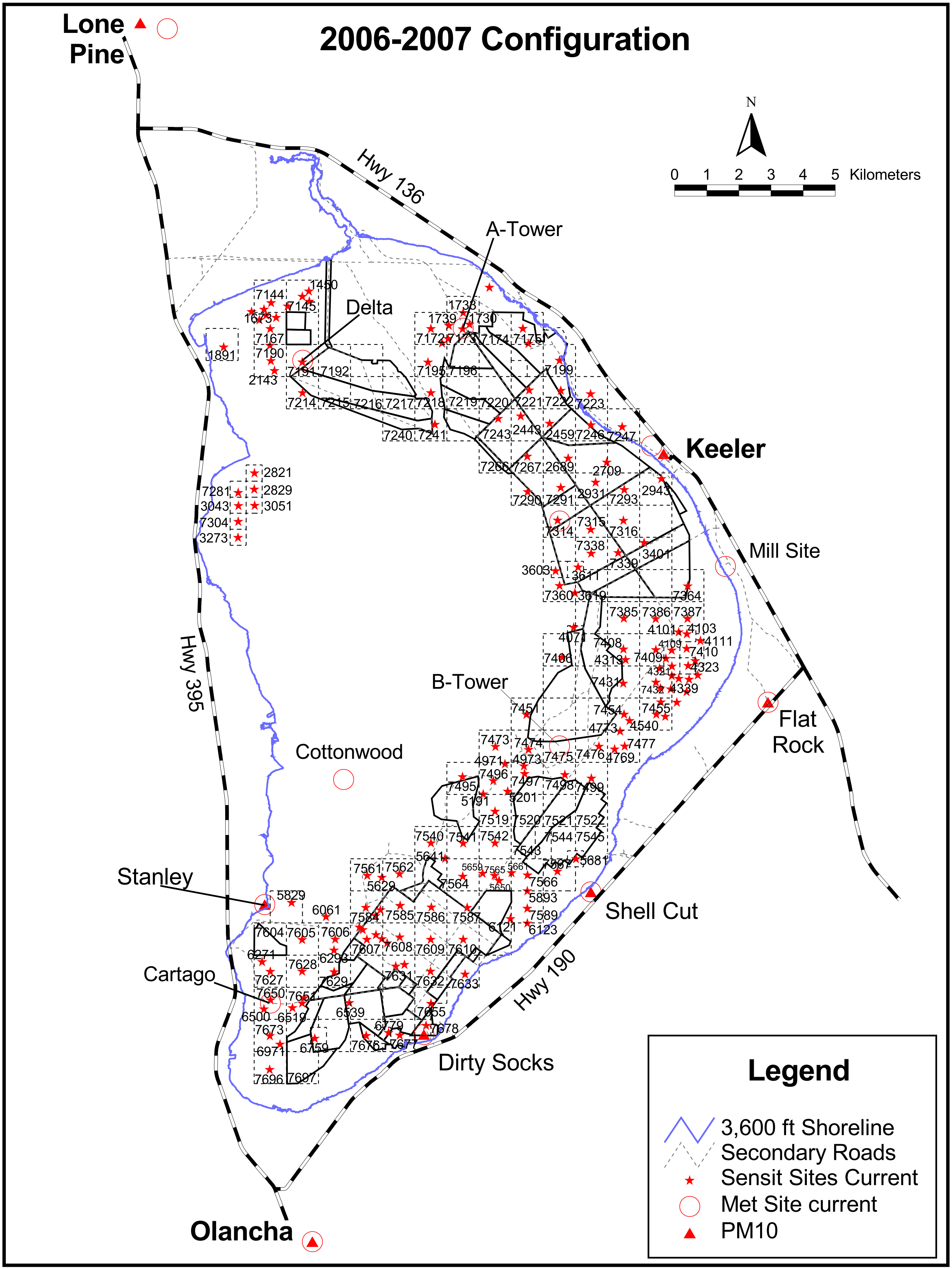

Figure 1.1 - Owens Lake Dust ID monitoring network

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bed and measured PM_{10} values. CALPUFF will be run using the following equation to estimate emissions and to model PM_{10} impacts at the shoreline:

Equation 1.1

$$PM_{10} = K_f \times q$$

where,

q = Sand flux measured at 15 cm above the surface [$g/cm^2/hr$]
K_f = K-factor, empirically-derived ratio of the PM_{10} emission flux to the sand flux at 15 cm.

The ratio of PM_{10} to sand flux (K_f) is referred to as the K-factor. The initial Dust ID program results showed that K-factors could be derived empirically by comparing model predictions to monitored PM_{10} concentrations. Initial studies also showed that average K-factors can vary spatially and seasonally at Owens Lake. Default K-factors will be used with Equation 1.1 to estimate hourly PM_{10} emissions unless new K-factors are generated from future dust events following the modeling procedures in this program protocol. If the CALPUFF model results indicate that a new lake bed source area caused or contributed to an exceedance at a shoreline location, dust controls may be required under the provisions of the 2006 Settlement Agreement or the current SIP.

1.5 Sand Flux Measurements

Sand flux is measured using a combination of Cox Sand Catchers (CSC) and Sensits. CSCs are sand collection devices that provide a mass collection amount for a certain time period (about 1 to 3 months), and Sensits are electronic sand motion detectors used to time-resolve the collected mass to estimate hourly sand flux rates. The sand flux rate is applied to the area represented by the sand flux sampling site, which may vary in size and shape depending on the source area delineated by field observations.

1.6 Dust ID Program Protocol Content

Section 2 of the Dust ID Program Protocol describes the methods and instrumentation that will be used to monitor sand flux with Sensits and CSCs on the lake bed. Section 3 provides a brief description of the PM_{10} and meteorological monitoring network that will be used to monitor PM_{10} exceedances, develop K-factors and to call public health advisories. Section 4 describes methods that will be used by visual observers and field personnel to map lake bed dust source areas and delineate boundaries using GPS. Section 5 explains the procedures for developing K-factors using air quality modeling and monitoring data. Section 6 provides the protocol for dispersion modeling.

2. Protocol for Measuring Sand Flux Rates and Operation of the Sensit and Cox Sand Catcher Network

2.1 Objective

Sand flux measurements will be used as a surrogate to estimate PM_{10} emissions coming off the lake bed. The objective of the sand flux measurements is to provide an hourly emissions estimate for all active source areas on the lake bed.

2.2 Methods and Instrumentation

Sand flux will be measured with Sensits and Cox Sand Catchers (CSCs). Collocated Sensits and CSCs are used to measure hourly sand flux rates at different locations on the lake bed. The 2006-2007 Sensit/CSC network locations are shown in Figure 1.1. The instruments are placed with their sensors or inlets positioned 15 cm above the surface. Sensits are electronic sensors that measure the kinetic energy or the particle counts of sand-sized particles as they saltate, or bounce, across the surface. Sensits are used to time-resolve the CSC mass to provide hourly sand flux rates.

Figure 2.1 shows a Sensit suspended above the ground on the right, and a CSC in the ground to the left. The photo was taken at a site that was used to test the accuracy of Sensits and CSCs before the Dust ID Program began. The battery powered Sensits are augmented with a solar charging system. A datalogger records 5-minute Sensit data during active saltation periods. Data collection is triggered by particle count activity and continues until particle counts are zero for an hourly period. Each datalogger has a radio transmitter that sends Sensit data to the District's Keeler field office once a day to provide updates on erosion activity at each site. These daily updates are used to alert field personnel to active source areas for possible Global Positioning System (GPS) mapping and inspection. Daily transmission of the data may be temporarily suspended if the solar battery power is low due to extended days of cloud cover.

CSCs are passive collection instruments that capture windblown, sand-sized particles. These instruments were designed and built by the District as a reliable instrument that could withstand the harsh conditions at Owens Lake. CSCs have no moving parts and can collect sand for a month or more at Owens Lake without overloading the collectors. Field personnel visit CSC sites to measure the mass of the collected sand catch. A diagram of the CSC is shown in Figure 2.2. Not shown in the diagram is an internal sampling tube that can be seen in the photo in Figure 2.3. The internal sampling tube is removed from the PVC casing to measure the sand catch sample. The lengths of the sampling tubes and casings are adjusted during construction to accommodate the amount of sand flux in each area and to avoid overloading the CSC. The CSC length ranges from about one to three feet. Because the PVC casing is buried in the ground, an adjustment sleeve is used to keep the inlet height at 15 cm to compensate for surface erosion and deposition. Field techs use a standardized measuring device to check or adjust the sampling inlets to 15 cm after collecting each sample.

Figure 2.4 shows an example of the linear relationship between the CSC collected sand mass and the kinetic energy measured with a co-located Sensit. Sensits measure saltation in terms of

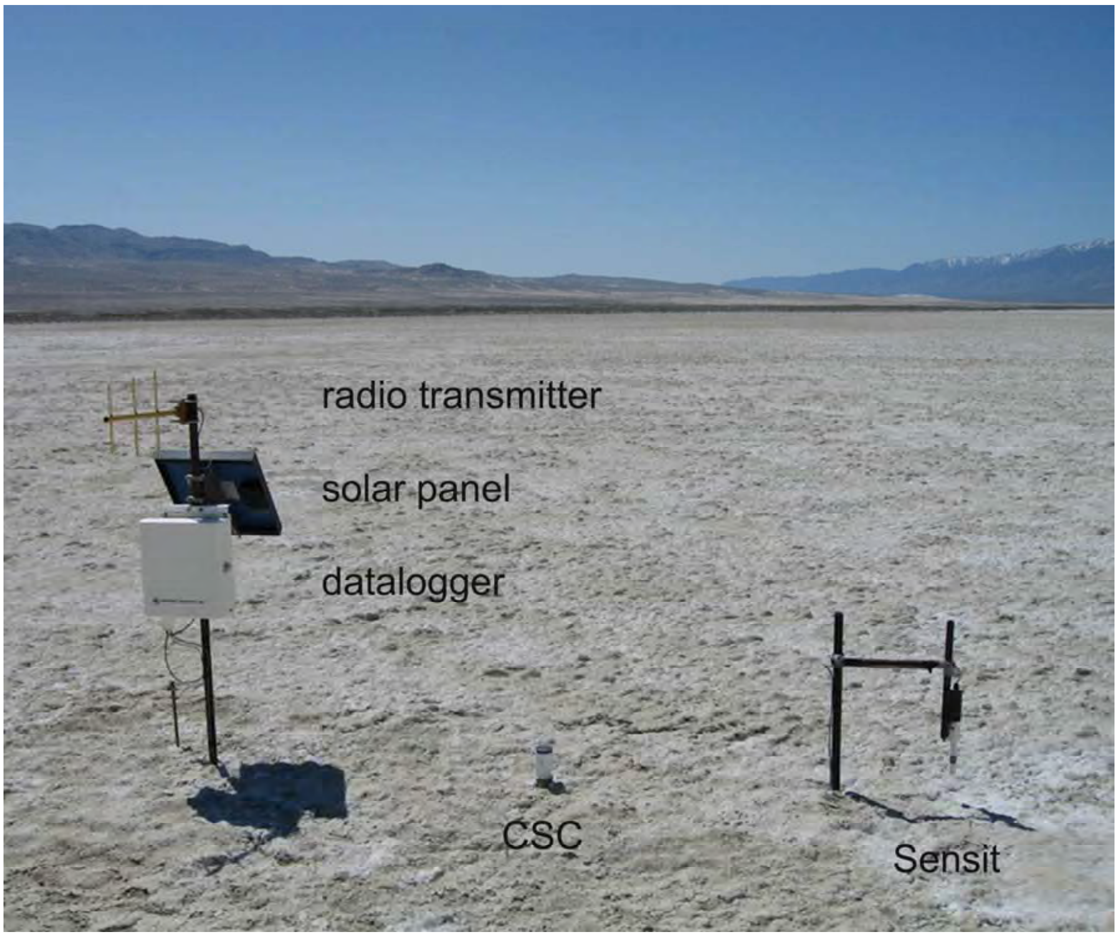

Figure 2.1 - Dust ID sand flux monitor sites measure wind erosion activity using CSCs to collect sand-sized particles and Sensits that electronically detect moving particles. Sensit data are recorded on dataloggers and transmitted by radio from each site to the District's office in Keeler.

Figure 2.2 - Diagram of the Cox Sand Catcher (CSC) used to measure sand flux at Owens Lake.

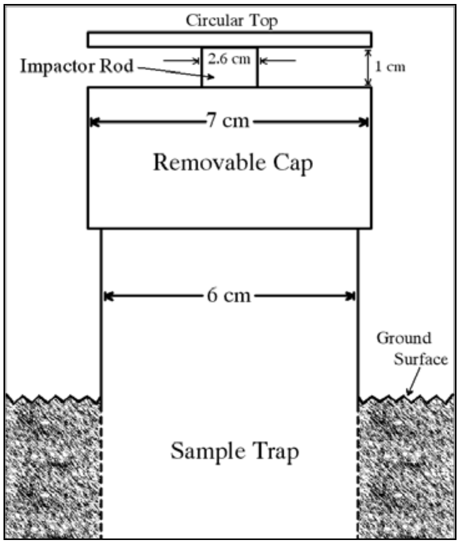

Figure 2.3 - Example of a Cox Sand Catcher (CSC) with the inner sampling collection tube removed.

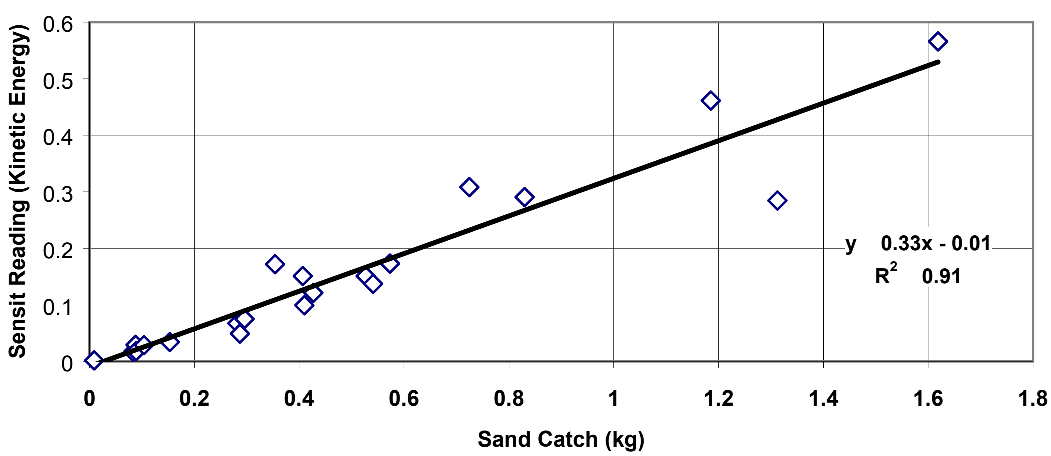

Figure 2.4 - Example of the linearity between CSC mass and a Sensit reading using kinetic energy reading (Sensit No. 7291).

kinetic energy (KE) and particle count (PC). The District uses the output (KE or PC) that provides the best precision and accuracy for the range of saltation activity expected at each site.

Because the electronic Sensit response to the saltation flux can vary, Sensits were used in combination with CSCs to determine hourly sand flux rates. This combination takes advantage of the good precision and accuracy of the CSC sand catch data, and the ability of Sensits to time-resolve the sand flux for each hour of the CSC sampling period. In this way, the sum of the hourly sand catches always matches the CSC sand catch for each sampling period, and it minimizes the error in the hourly sand flux.

Changes to the sand flux monitoring network are made as necessary to improve the characterization of dust source areas on the lake bed. Sand flux sampler sites are added to the network to monitor new source areas or to improve the sand flux estimates for known dust source areas. Although the sand flux network was originally designed in a fixed grid pattern with 1 km site spacing, the current practice is to place the samplers at sites that represent smaller source areas. Some sites may be less than 250 m apart, and their locations may be off the regular grid pattern to better represent sand flux activity in the dust source area. In addition, many of the original sampling sites that are now in flooded portions of the shallow flood DCM were removed, since PM_{10} emissions from the flooded sites can be assumed to be zero in the Dust ID model.

2.3 Operating Procedures

Sand captured in the CSCs will be weighed in the Keeler lab to the nearest tenth of a gram. A field technician will visit each site every one to three months to collect the sample tubes. The following procedures will be used when collecting the CSC samples and downloading Sensit data:

1) Park field vehicle 10 meters or more east of the site and walk the remaining distance to the sampling site. Field personnel will access all Sensit and CSC sites from an easterly approach to minimize upwind surface impacts near the sampling sites.
2) Measure and record the inlet height above the surface to the middle of the inlet.
3) Remove the sample collection tube from the CSC.
4) Verify collection tube number corresponds to site number on the field form.
5) Weigh and record the gross weight of the collection tube and sample to the nearest 1 gram using a field scale.
6) If any soil material is visible in the tube, seal the collection tube and place it in the tube rack for transport to the lab. If no soil material is visible, note this on the collection form and reuse the collection tube for the next sampling period.
7) Place a clean collection tube in the CSC and record the collection tube number.
8) Replace the CSC inlet and adjust the height to 15 cm ($\pm$1 cm).
9) Download Sensit data from the datalogger to a storage module.
10) Measure and record the Sensit sensor height above the surface to the center of the sensor using the Height Adjustment Tool, and adjust if necessary to 15 cm. See Figure 2.5.
11) Inspect the sensor and radio transmitter wiring and clean or repair, if needed.

12) A field operational response test on the Sensit will be completed during each visit and the Sensit will be replaced, if it fails the test.
13) CSC samples will be removed from the sample collection tubes and weighed on a calibrated bench-top scale in the Keeler lab to the nearest 0.1 gram.
14) Wet samples will be removed from the collection tubes and oven dried before weighing in the lab.

2.4 Data Collection

A field form will be used to document the information for the CSC and Sensit (see example in Figure 2.6). The form will have the site number, date and time of measurement (Pacific Standard Time), "as is" CSC inlet and Sensit sensor height (± 1 cm), tube tare weight prior to sand catch (± 0.001 kg), total sand catch weight (± 0.001 kg), and post-catch tube weight (± 0.001 kg), Sensit response test (particle counts or kinetic energy), operator's initials, and a comments section where the condition of the sampler and any other relevant factors, such as surface condition will be documented. The Data Processing Department will calculate the net sand catch weight from the CSC during data analysis. CSC lab weights, measured to the nearest 0.1 g will be recorded on the Lab Form shown in Figure 2.7. After completion of the forms, the field technician will make a copy of the completed forms and file the copies at the Keeler office. The original forms will be sent to Data Processing in the Bishop office. Data Processing will enter the data into an electronic file. The original hard copy forms will be filed in the Bishop office.

Each day, dataloggers for all Sensit sites will be downloaded by radio transmission to the Keeler Field office. Data from the storage modules will be downloaded to the computer at the Keeler office by the field technician at the end of a collection period. The radio transmitted Sensit data will be used as the data of record. Storage module data will be collected at least quarterly and will serve as a back-up file.

Technicians will keep a log of all the repairs, maintenance, or replacement of Sensits or CSCs, radio transmitters, and datalogger equipment. This log will be kept in a field notebook and the field forms sent to Data Processing as they are completed. It is the technician's or operator's responsibility to review the data and notify the Air Monitoring Specialist and Data Processing who will decide whether any data should be edited or deleted and why.

2.5 Chain of Custody

Each field form will be initialed and dated by the field technician during each site visit. The form will be signed and dated by the person receiving the data when delivered to the Bishop office. If no person is available to sign the form in the Bishop office, the delivery person will sign and date the form and place it in the Data Processor's box.

2.6 Quality Assurance

All field and lab scales will be checked at least every two months using Class F weights. Field scales will also be checked with a 100-gram weight at each sample site before weighing the sand catch and the weight recorded on the field form. The bench-top scale in the Keeler office will be

Figure 2.5 - A Height Adjustment Tool is used to measure the height of Sensits and CSCs and to adjust the sensor and inlet height to 15 cm above the soil surface.

CSC Field Form.xls

Technician: Date (mm/dd/yyyy): / /

Site #	Time PST	Pre-Sensit Height, cm	Sensit Response	Final Sensit Height, cm	Pre-CSC Inlet Height, cm	Field Cal Weight, kg	CSC Full, kg	CSC Tare, kg	Final CSC Height, cm	No VP
	:					.	.	.		
	:					.	.	.		
	:					.	.	.		
	:					.	.	.		
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Marble Rankings: 0=No Crust 1=Complete Damage 2=Indent or Surface Damage 3=No Damage 4=Wet

Site #	Rank	Surface Description	Comments and Maintenance

Delivered By: Date:

Received By: Date:

Figure 2.6 - Example of a CSC and Sensit Field Documentation Form

CSC Lab Form.xls

Lab Technician: Tare Date (mm/dd/yyyy): / /

Lab Technician: Post Date (mm/dd/yyyy): / /

Site Tube #	Tube Tare, g	Tube/Catch Weight, g	Catch Weight, g	Comments
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Figure 2.7 - Example of a CSC laboratory documentation form

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checked with the Class F weights before each set of sand catches are weighed. The test weights will be recorded on the scale log sheet in the laboratory. Both scales will be calibrated and certified at least once every year. Ten percent of the CSC sand catch samples will be stored for at least one year from the date of collection before discarding.

2.7 Calculating Hourly Sand Flux

For modeling purposes discussed in Section 6, hourly sand flux is calculated for each Sensit/CSC site using the sand catch to Sensit reading ratio for each collection period and apportioning the sand catch to the hourly Sensit reading. The hourly sand flux is divided by 1.2 cm^2, which is the equivalent inlet opening size of the CSC for flux calculation purposes.

For Sensits using kinetic energy,

Equation 2.1

$$q_{n,t} = \left(S_{n,t} - S_{n,bg}\right) \times \frac{CSC_{n,p}}{\sum_{t=1}^{N}\left(S_{n,t} - S_{n,bg}\right)} \times \frac{1}{1.2} \quad [\text{g/cm}^2/\text{hr}]$$

Where,
$q_{n,t}$ = hourly sand flux at site n, for hour t [g/cm^2/hr]
$CSC_{n,p}$ = CSC mass for site n, for collection period p [g]
$S_{n,t}$ = Sensit total KE reading for site n, for hour t [non-dimensional]
$S_{n,bg}$ = Sensit KE background reading for site n, [non-dimensional]
N = Total number of hours in CSC collection period p.

For Sensits using particle count,

Equation 2.2

$$q_{n,t} = S'_{n,t} \times \frac{CSC_{n,p}}{\sum_{t=1}^{N} S'_{n,t}} \times \frac{1}{1.2} \quad [\text{g/cm}^2/\text{hr}]$$

Where,
$S'_{n,t}$ = Sensit total PC reading for site n, for hour t [non-dimensional]

2.8 Sensit Calibration and Data Analysis

2.8.1 Sensit Calibration Check

Data Processing will track Sensits by their serial number. After each sample collection period, Sensit and CSC data will be added to data from other sample collections. Data Processing will determine the average sand catch to Sensit ratio for each Sensit. Sensit readings will be collected

for particle counts and kinetic energy for each Sensit. Due to differences in individual Sensit responses, some Sensits have a more consistent sand flux to Sensit reading ratio using particle count rather than kinetic energy. This normally depends on the manufacturer's electronic design. At high sand flux sites, kinetic energy provides a more linear response for most Sensits. If KE is used, a background KE is subtracted from the reading if it is not zero. A background KE is determined from the KE reading when the PC reading is zero.

The ratio of the Sensit response to the collected mass will be compared for each collection period to previous ratios for the same instrument to ensure that the Sensit is responding consistently. As seen in Figure 2.4 this ratio can vary, especially at low collection masses, so large deviations in the ratio should only be used as an indicator for a possible problem. Sensits will be replaced if they show no readings with significant sand associated CSC collection, have significant readings during calm wind periods, have an erratic response as compared to previous collection periods, or if they fail the field operational response test.

2.8.2 Replacing Missing Sand Catch Data

Sand catch data can be lost if the CSC collector tube is full, or damaged, or if the sample is spilled during weighing. The lost sand catch data will be estimated using Sensit data. A cumulative sand catch to Sensit ratio is calculated by adding all of the valid sand catches and all of the corresponding Sensit data for that particular Sensit/CSC pair, and then dividing them to obtain the total ratio. The cumulative ratio is applied to the Sensit data to estimate the hourly sand flux. If there was a Sensit change, only data generated after the Sensit change is used to calculate the cumulative sand catch to Sensit ratio.

CSC collection tubes will be weighed and reset at the same time as any Sensit change at a site in order to maintain the time correlation between the two devices.

2.8.3 Replacing Missing Sensit Data

Sensit data can be lost when the datalogger or Sensit fails. In such cases, the sand catch data will be time resolved using a neighboring site. The historical hourly sand flux data are compared to determine which neighboring site behaves most similarly to the site with the lost data. The correlation coefficients between the data sets will be used to determine which site behaves most similarly. If no adjacent sites were active during the period of lost Sensit data, then the nearest active sites will be used for comparison.

3. Protocol for Measuring Ambient PM_{10} and Meteorological Conditions

3.1 Objective

Ambient PM_{10} monitors will be placed at locations generally around the shoreline of Owens Lake and in local communities to monitor the ambient air for exceedances of the PM_{10} NAAQS and to develop K-factors for modeling PM_{10} emissions from lake bed sources. PM_{10} monitors may be placed on the lake bed for short-term special-purpose monitoring studies.

3.2 Methods and Instrumentation for PM_{10} and Meteorological Data

PM_{10} monitoring will be performed using USEPA-approved reference or equivalent method monitors. The current monitoring network shown in Figure 1.1 includes seven PM_{10} monitor sites – Keeler, Lone Pine, Olancha, Dirty Socks, Shell Cut, Bill Stanley and Flat Rock. Each PM_{10} site is equipped with a Tapered Element Oscillating Microbalance (TEOM) PM_{10} monitor. TEOM monitors are capable of measuring hourly PM_{10} concentrations. The Dust ID Program will rely on the TEOM to determine if an exceedance is caused by a lake bed source, since the data can be correlated with hourly wind directions to determine dust source directions. TEOM data will also be used to generate K-factors to model the PM_{10} emissions from lake bed sources.

Ten-meter meteorological towers will be located near each PM_{10} monitor site and at other locations around the lakeshore and on the lake bed. The current met sites are shown in Figure 1.1. The met data are used to create wind fields with the CALMET model that are used with CALPUFF to model air quality impacts. All met towers include instrumentation to measure wind speed and wind direction. Two lake bed met sites (A & B Towers) measure wind speed at different heights (0.5, 1, 2, 5 and 10 m) to determine surface roughness and vertical wind speed profiles. Some met sites also measure temperature, relative humidity, barometric pressure, and/or precipitation.

3.3 Operating Procedures, Instrument Calibration and Quality Assurance

PM_{10} monitoring will be performed in accordance with USEPA monitoring guidelines found in 40 CFR, Part 58 and meteorological monitoring will be performed in accordance with USEPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I, II, and IV.

3.4 Data Handling and Data Access via Modem

TEOM PM_{10} data will be delivered to Data Processing on a routine monthly schedule. After the data pass the proper data review and QA checks they will be submitted to the USEPA's AIRS database. PM_{10} data from special-purpose monitors that may be located on the lake bed will not be submitted to the AIRS database.

All the PM_{10} sites and some met sites are equipped with modem links that allow for access to the hourly concentrations. These data are useful for alerting field personnel to possible new sources of PM_{10}, and for alerting the public in case of high concentrations. For hourly concentrations above 400 $\mu g/m^3$ the District will issue public health advisories when the communities of Keeler, Lone Pine or Olancha are affected. The public can view real-time wind speed, direction and PM_{10} data from the Dust ID monitoring network on the District's website at www.gbuapcd.org/data.

4. Protocol for Observing and Mapping Source Areas and Dust Plume Paths

4.1 Objective

The objective for source area mapping is to use the best available information from visual observations, GPS mapping, and sand flux measurements to delineate the boundaries of dust source areas for as many events as possible. This information will be used to help delineate the control area boundaries for new sources.

4.2 Methods and Instrumentation

The Dust ID Program includes four methods to help locate dust source areas and to delineate the source area boundaries. The methods are: 1) visual mapping by trained observers, 2) time-lapse cameras, 3) surface inspections with GPS mapping, and 4) sand flux activity (as measured with Sensits and CSCs).

4.2.1 Mapping Dust Source Areas from Off-Lake Observation Sites

One or more trained observers will complete observations from viewpoints to best observe the active dust source areas. For instance, two observers may be at viewpoints on the east side of the dust plume in the Inyo and Coso Mountains and a third may be on the west side in the Sierra. The observers will create hourly maps of the visible boundaries of any dust source areas, their plume direction and note if the visible plume crosses the shoreline. To the extent practicable, all lake bed and off-lake dust sources will be included in the observations. Figure 4.1 shows an example of sand flux measurements and the cumulative information that can be collected by observers mapping the dust plumes from different locations.

4.2.2 Video Cameras

Remote time-lapse video cameras will record dust events during daylight hours. This information will be reviewed to help identify source areas that may have been missed by observers, or to help confirm source area activity detected by PM_{10} monitors or the sand flux network. Remote time-lapse video can also be used to help verify modeled impacts that were not monitored by the PM_{10} network, to check compliance of dust control areas, and to identify off-lake sources not measured by any of the other methods.

4.2.3 Mapping Using GPS

4.2.3.1 "Trigger" Levels for Initiating Field Inspections and GPS Surveys

Dust observations, Sensit activity, elevated PM_{10} concentrations and video will be used as "trigger data" to determine the time and location for a Dust Source Area Survey (survey). Sensit and PM_{10} data will be automatically collected via radio transmission every workday. A technician will summarize and review the data each workday. The summary will list all Sensit activity greater than background output levels, and hourly TEOM PM_{10} concentrations over

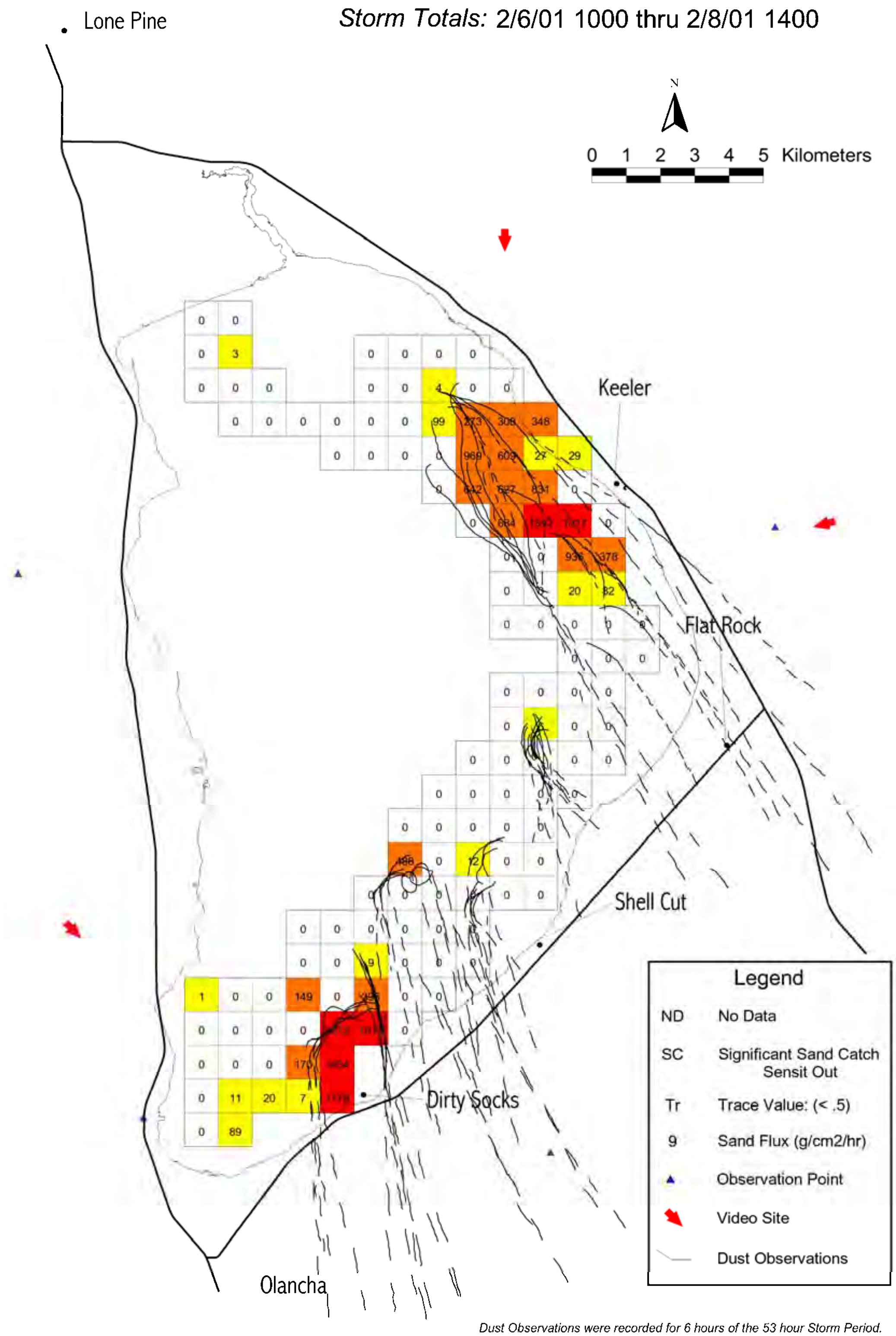

Figure 4.1 - Example of dust plume maps drawn by observers during daylight hours and total sand flux for a dust event on February 6-8, 2001.

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50 μg/m^3 with corresponding wind speed and direction data. If dust observations are available from a recent dust storm, they will be used to confirm the location of the dust source(s) that correspond with the Sensit activity and elevated PM_{10} concentration. Video will be used to identify a source or sources that were not identified by observations, Sensit data or PM_{10} information. Wind speed and wind direction data will be used to help determine if a lake bed dust source could have caused elevated PM_{10} concentrations. All of the trigger information will be used to identify any lake bed dust source area to initiate a dust source survey and/or surface inspection. The survey should be completed the same day if weather conditions are favorable. For larger areas, surveying may continue for several days or until precipitation obscures the boundaries of the source area.

In addition to the above process, general field inspections will be completed after dust storms to verify lake bed emission activity and the need for a survey. A survey will be completed if the trigger data and /or field inspections indicate emissive conditions in an area that has not been previously surveyed during the current dust period (Section 4.3) or in an area that has been previously surveyed but has increased in size since its last survey. The priorities for completing a survey are:

1) new lake bed source areas outside the instrumented Sensit network;
2) new lake bed source areas that have not been surveyed within the instrumented Sensit network; and
3) lake bed source areas that have previously been surveyed.

4.2.3.2 GPS Mapping Procedures

After a dust source is identified by dust observation, Sensit data, sand catch data, video, PM_{10} concentration or inspection of the lake bed surface, District staff will map the exterior boundary of as many of the source areas identified as possible during daylight hours, as weather conditions allow. The mapping will begin as soon as possible after a dust storm and continue until all the identified areas are mapped or precipitation occurs. The boundary of the emissive area(s) will be mapped using a Global Positioning System (GPS). Surveyors conducting the mapping will ride an ATV or walk around the outer boundary of the wind-damaged surface surveying a line with the GPS. A wind-damaged surface is defined as a soil surface with wind erosion evidence and/or aeolian deposition that has not been modified to an unrecognizable point by precipitation since the last identified dust storm.

GPS line data should be collected at an interval of one record every 10 seconds or less. Data should be collected in NAD83 UTM Zone 11 coordinates. Only GPS units capable of continuously recording line data will be used. Data should be processed and corrected using base station data (either from a commercial correction service or using data from the District's Keeler base station) to ensure positional accuracy.

Before beginning a survey, the edge of the source area is determined by a visual review of the surface conditions within a representative one square meter area along the edge of the source area. An undamaged surface is evident if there is no visible evidence of a disturbed lake bed surface due to wind damage. As an aid to calibrate the level of disturbed surface, a surveyor will

begin each survey by estimating the percentage of surface that is undamaged by the wind. The surveyor visually determines where a surface with 70 to 80 percent of undisturbed surface is located. The surveyor completes the survey by following a line of travel that closely represents the initial one-meter calibration. The following defined list, Boundary Conditions and Survey Procedures (see below), can be used to determine how to map the source boundary under differing surface boundary conditions.

Boundary Conditions and Survey Procedures:

Distinct Boundary: A visibly sharp transition, 25 feet or less in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. The surveyor should travel directly along this distinct outside edge, if possible, and may deviate 25 feet to the inside or outside on occasion. Small (25-foot wide or less) channels, boundary indentations, roads, mounds, and other obstacles may be directly crossed if the continuation of the main source boundary is clearly visible on the opposite side.

Diffuse Boundary: A visibly distinct transition, 25 to 100 feet in width, between a wind-damaged lake bed surface and an undamaged lake bed surface. Every effort should be made to travel along the outermost edge of the visible distinction.

Indistinct Boundary: **A** boundary that is not obvious to the surveyor where the edge of the source is located. Mapping would be stopped at this point until a Distinct or Diffuse Boundary can be located.

Generally the surveyor will maintain a constant course of travel following the Distinct Boundary of the wind-damaged area. As the boundary becomes less distinct, it is recommended to move the course of travel further into or outside the source to maintain recognition of surface damage. It is acceptable to travel within approximately 50 feet of the outer or inner edge of the larger more noticeable active area if the boundary is Diffuse. When encountering an Indistinct Boundary condition, the surveyor should note if the boundary can be found or if the boundary cannot be mapped during the existing survey and why. If the boundary cannot be mapped, the survey shall end at that point leaving an unclosed source area polygon.

It is possible for the surveyor to find himself or herself greater than 50 feet within or outside of the source area boundary. When this happens, the surveyor should turn perpendicular to the direction they were traveling and travel in the direction where the distinct edge should be located. For example, if the surveyor were inside the source area, they would turn in the direction where erosion evidence was not observed earlier along their path. If the surveyor were outside the source area, they would turn toward the side where they previously observed the source. Boundary loss may occur because of an Indistinct Boundary or unfavorable lighting conditions. The time and coordinates should always be noted when it is necessary to relocate the boundary during a survey.

Another alternative for relocating a source area edge is to pause the GPS unit from recording data until the boundary is located and then resume with data collection. This allows the surveyor to travel in any direction until the edge is relocated or end the survey if an edge cannot be located. The line produced between the point where the GPS unit was paused and then restarted would be deleted and considered un-surveyed during post processing.

The presence of Indistinct Boundaries or conditions that cause the ending of a survey must be annotated on the GPS data or explained in the field notes, including point coordinates. Examples would include dust storm, precipitation, lightning, mud, and channel with flowing water, pond, and time constraint or equipment malfunction.

4.2.4 Using Sand Flux Monitors to Map Source Area Boundaries

Dust source area boundaries can be delineated or refined using default cell boundaries represented by active sand flux monitors. The area represented by the active SFM site may be shaped to exclude known non-emissive areas, such as; DCM areas, wetlands, or areas with different soil texture where there is evidence that it is non-emissive.

4.3 Composite Dust Source Map Development

Data Processing will compile the cumulative mapping information from the visual observers and field inspections using the GPS into a GIS database for two periods each year, December through June and July through November. A new composite map will be developed for each period containing only those data collected during that period. Hand drawn observation maps will be scanned and translated into the GIS database. Observation maps will be compared with source area locations from other methods through the GIS generated layers. Overlays of the maps generated from sand flux monitors, video cameras, visual observers and GPS'd source areas will be compared qualitatively, considering the information may have been collected at different times.

5. Protocol for Determining K-factors and PM_{10} Emission Rates from Sand Flux Data

5.1 Objective

The objective of this portion of the Dust ID Program is to estimate the PM_{10} emission flux for each cell or source area using the relationship *PM_{10} emission flux = sand flux x K-factor*. PM_{10} emissions for each area will be used with the CALPUFF modeling system or other USEPA approved model to determine if the PM_{10} emissions will cause or contribute to a NAAQS violation at the shoreline.

5.2 Method for Determining PM_{10} Emissions and New K-factors

5.2.1 PM_{10} Emission Flux = Sand Flux x K-factor

PM_{10} emissions will be estimated using the sand flux for each area represented by a Sensit and CSC and an appropriate K-factor for the area and period. The sand flux values will come from

the Sensit and CSC data as discussed in Section 2. New K-factors for each area and period will be developed as discussed in this section, and default K-factors will be used to model dust events unless newer K-factors are determined.

5.2.2 Default Temporal and Spatial Storm-average K-factors

PM_{10} emissions may be estimated from default K-factors that were developed from previous dust events that occurred in the same area and the same range of calendar months in previous years.

The areas for K-factor groupings are shown in Figure 1.1: North Area, Central Area, Keeler dunes, and the South Area. Any new source area within the depicted boundaries will be associated with that area for the spatial grouping of new K-factor values. If a new source area and K-factor is developed for an area outside these boundaries, the area and default K-factor will be associated with the K-factor for an existing area with the most similar surface soil texture. The determination of the most similar existing area will be made by the Air Pollution Control Officer.

5.2.3 Method to Determine Sand Flux from Areas with Implemented Dust Control Measures (DCM)

Sand flux will be measured at sites within the shallow flood and managed vegetation DCM areas. Sensits and CSCs will be sited on dry areas within the shallow flood DCM to represent dry areas near the site. DCM areas covered with standing water will be assumed to have zero sand flux. For the Managed Vegetation DCM, sand flux sites will be placed in spatially representative areas and in areas within the DCM where wind blown dust may have been previously observed.

5.2.4 New K-factors Seasonal Cut-points

The APCO will review the K-factor data and propose seasonal cut-points to the LADWP. LADWP will respond to the proposed cut-points within 30 days. If no agreement can be reached within 60 days, the default periods will be used.

The two default periods to be used are: the winter/spring period that includes the months of December, January, February, March and April, and the summer/fall period that includes May through November. These same calendar months will be used to generate new temporal K-factors for each area and to generate new 75-percentile hourly K-factor values for modeling PM_{10} emissions.

5.2.5 Using CALPUFF Modeling System to Generate New K-factors

New hourly K-factors can be inferred from the CALPUFF model by using hourly sand flux as a surrogate for PM_{10} emissions. Modeled PM_{10} predictions can then be compared to monitored concentrations at PM_{10} monitor sites to determine the K-factor that would correctly predict the monitored concentration for each hour. More information on the modeling procedures is included in Section 6.

A K-factor of 5 x 10^{-5} will be used initially to run the CALPUFF model and to generate concentration values that are close to the monitored concentrations. Hourly K-factor values will then be adjusted in a post-processing step to determine the K-factor value that would make the modeled concentration match the monitored concentration at the PM_{10} monitor site. The initial K-factor will then be adjusted using Equation 5.2.

Equation 5.2

$$K_f = K_i \left(\frac{C_{obs.} - C_{bac.}}{C_{mod.}} \right)$$

Where,

K_i = Initial K-factor (5 x 10^{-5})
$C_{obs.}$ = Observed hourly PM_{10} concentration. [µg/m^3]
$C_{bac.}$ = Background PM_{10} concentration
$C_{mod.}$ = Model-predicted hourly PM_{10} concentration. [µg/m^3]

5.2.6 Screening Hourly K-factors

K-factors will be calculated for every hour that has active sand flux in cells upwind from a PM_{10} monitor. These hourly K-factors will be screened to remove hours that did not have strong source-receptor relationships between the active source area (target area) and the downwind PM_{10} monitor. For example, the screening criteria will exclude hours when a PM_{10} monitor site is located on the edge of a dust plume. Because the edge of a dust plume has a very high concentration gradient, a few degrees error in the plume direction could greatly affect the calculated K-factor.

The following criteria will be used to screen the hourly K-factors:

Initial K-factor Screen

1) Wind speed is greater than 5 m/s at 10 m height at any network site.

2) Hourly modeled and monitored PM_{10} concentrations were both greater than 150 µg/m^3 at the same monitor-receptor site.

3) Hourly wind direction as listed in Table 5.1 for each monitor site.

4) The mean sand flux for all sites with non-zero sand flux is greater than 0.5 g/cm^2/hr.

Final K-factor Screen

5) At least one sand flux site located within the target area and within a 30-degree upwind cone has sand flux greater than 2 g/cm^2/hr.

6) All sources are within a distance of 15 km of the receptor.

7) More than 65 percent of the PM_{10} contribution at a monitor site came from the target source area (North Area, South Area, Central Area or Keeler dunes).

8) Eliminate hours when sand flux data are missing from one or more cells that are located within a 30-degree upwind cone and within 10 km of the shoreline monitor. For Olancha and Lone Pine, which are both located 5 to 10 km from the lake bed, the distance limitation is changed to 10 km upwind of the shoreline.

Table 5.1 Wind Directions for the Initial K-factor Screen

PM_{10} Monitor Site	From-the-Lake Wind Dir. (Deg.)	Met Tower
Lone Pine	$110 \leq WD \leq 190$	Lone Pine
Keeler	$130 \leq WD \leq 330$	Keeler
Flat Rock	$210 \leq WD \leq 360$	Flat Rock
Shell Cut	$WD \geq 210$ or $WD \leq 50$	Shell Cut
Dirty Socks	$WD \geq 220$ or $WD \leq 65$	Dirty Socks
Olancha	$WD \geq 320$ or $WD \leq 55$	Olancha
Bill Stanley	$50 \leq WD \leq 190$	Bill Stanley
New Sites	TBD	TBD

The from-the-lake wind directions for the initial K-factor screening criterion 3) are shown in Table 5.1. From-the-lake wind directions for any new PM_{10} sites will be determined by the APCO as needed for the initial K-factor screen. Note that ‘From-the-Lake’ wind directions for assessing the lake bed impacts at PM_{10} monitor sites (see 2008 SIP) are different from these K-factor screening wind directions.

Hourly K-factors that pass through the screening criteria will be used to develop new event-specific spatial K-factors, and new 75-percentile hourly average temporal and spatial K-factors, if enough K-factors are available.

5.3 Temporal and Spatial Event-specific K-factors

5.3.1 Event-Specific K-factors

Screened hourly K-factors will be used to generate event-specific K-factors for the active source areas. The event-specific K-factor will be calculated as the arithmetic average using all the hours when the hourly K-factor passes the screening criteria for the target area.

5.3.2 Temporal & Spatial 75-Percentile K-factors

The statistical 75-percentile value will be determined from the distribution of the hourly K-factors that pass the screening criteria for that area and period, whenever there are nine or more hourly K-factors. The 75th percentile will be calculated using the Microsoft Excel PERCENTILE function. The Microsoft Excel PERCENTILE function works by sorting values from lowest to highest, then assigns the 0th percentile is the lowest value, the 100th percentile is the largest value, and the values in between as (k-1)/(n-1) where n is the number of data values in the list and k is index of the kth lowest value in the list. Thus, each value is placed 1/(n-1) apart. If a requested percentile does not lie on a 1/(n-1) step, then the PERCENTILE function linearly interpolates between the neighboring values.

5.3.3 Default K-factors

Table 5.2 shows the default K-factors for each of the K-factor areas and periods. These K-factors are derived for the temporal and spatial 75-percentile values from the screened hourly K-factors for the 30-month Dust ID period used for the RSIP. Each of the two temporal periods combines hourly K-factors from the same calendar periods for 2 or 3 years.

Table 5.2 - Default Spatial and Temporal K-factors for the Dust ID Model

AREA	K-factor Jan.– Apr. & Dec.	K-factor May-Nov.
Keeler Dunes	7.4×10^{-5}	6.0×10^{-5}
North Area	3.9×10^{-5}	1.5×10^{-5}
Central Area	$12. \times 10^{-5}$	6.9×10^{-5}
South Area	4.0×10^{-5}	1.9×10^{-5}

6. Protocol For Dispersion Modeling

This section of the *Protocol* discusses the dispersion model methods planned for the simulation of wind blown dust at Owens Lake using data from the Dust ID Program. The modeling procedures follow the methods used in the RSIP, with refinements based on experience and modifications to support the provisions of the SCR. The modeling techniques will be used both diagnostically to infer emission rates for source areas and prognostically to predict PM_{10} concentrations at the historic shoreline. Following an overview of the modeling approach, the remainder of this section discusses construction of the meteorological data set, dispersion model options, background concentrations and source area characterization.

6.1 Overview of Modeling Procedures and Rationale for Model Selection

The CALPUFF modeling system was used in the RSIP and has been selected for continuing studies in the Dust ID Program. CALPUFF is the USEPA recommended modeling approach for long-range transport studies and USEPA has proposed CALPUFF as a *Guideline Model* to be

included in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W). Recently the modeling system is also being applied to near-field dispersion problems where the three-dimensional qualities of the wind field are important and for stagnation episodes when pollutants remain within the modeling domain over periods of several hours or more. Dust events on Owen Lake are sometimes influenced by complex wind patterns, with plumes from the North Sand Sheet traveling in different directions than plumes from the South Sand Sheet.

The proposed model domain shown in Figure 6.1 includes a 34 km-by-48 km area centered on Owens Lake. The meteorological and computational grid will use a one-kilometer horizontal mesh size with ten vertical levels extending from the surface to four kilometers aloft. The extent of the model domain was selected to include the "data rich" Dust ID Program study area, terrain features that act to channel winds, and receptor areas of interest. This same model domain and mesh size were used in the simulations supporting the RSIP.

6.2 Meteorological Data Set Construction

Three-dimensional wind fields for CALPUFF will be constructed from surface and upper air observations using the CALMET meteorological preprocessor program and the procedures employed in the RSIP. CALMET combines surface observations, upper air observations, terrain elevations, and land use data into the format required by CALPUFF. Winds are adjusted objectively using combinations of both surface and upper air observations according to options specified by the user. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model.

6.3 CALPUFF Options and Application

Surface Observations. The necessary surface meteorological data will come from the District's network of ten-meter towers shown in Figure 1.1. The District may also install additional stations to better characterize winds near suspect source areas not currently near an existing site. Very few periods of missing data are typically contained in the District's database. Periods of missing data will be flagged and CALMET will construct the wind fields using the data from the remaining stations. In addition to the District's network, surface data from other field programs at Owens Lake will be used when available.

Cloud Cover Data. The current version of CALMET also requires cloud cover and ceiling height observations. Cloud cover is a variable used by CALMET to estimate the surface energy fluxes and, along with ceiling height, is used to calculate the Pasquill stability class. Hourly cloud cover and ceiling height observations are being collected from the surrounding surface airways observations at China Lake and Bishop Airport. During dust event conditions, the sensitivity of the CALPUFF modeling system to these variables is reduced, as the stability class becomes neutral under moderate to high winds. Algorithms within the modeling system that depend on the surface energy fluxes are dominated by the momentum flux and tend to be insensitive to cloud cover under high winds. For these reasons, the absence of local cloud cover and ceiling height measurements are not expected to significantly affect the results of the modeling study.

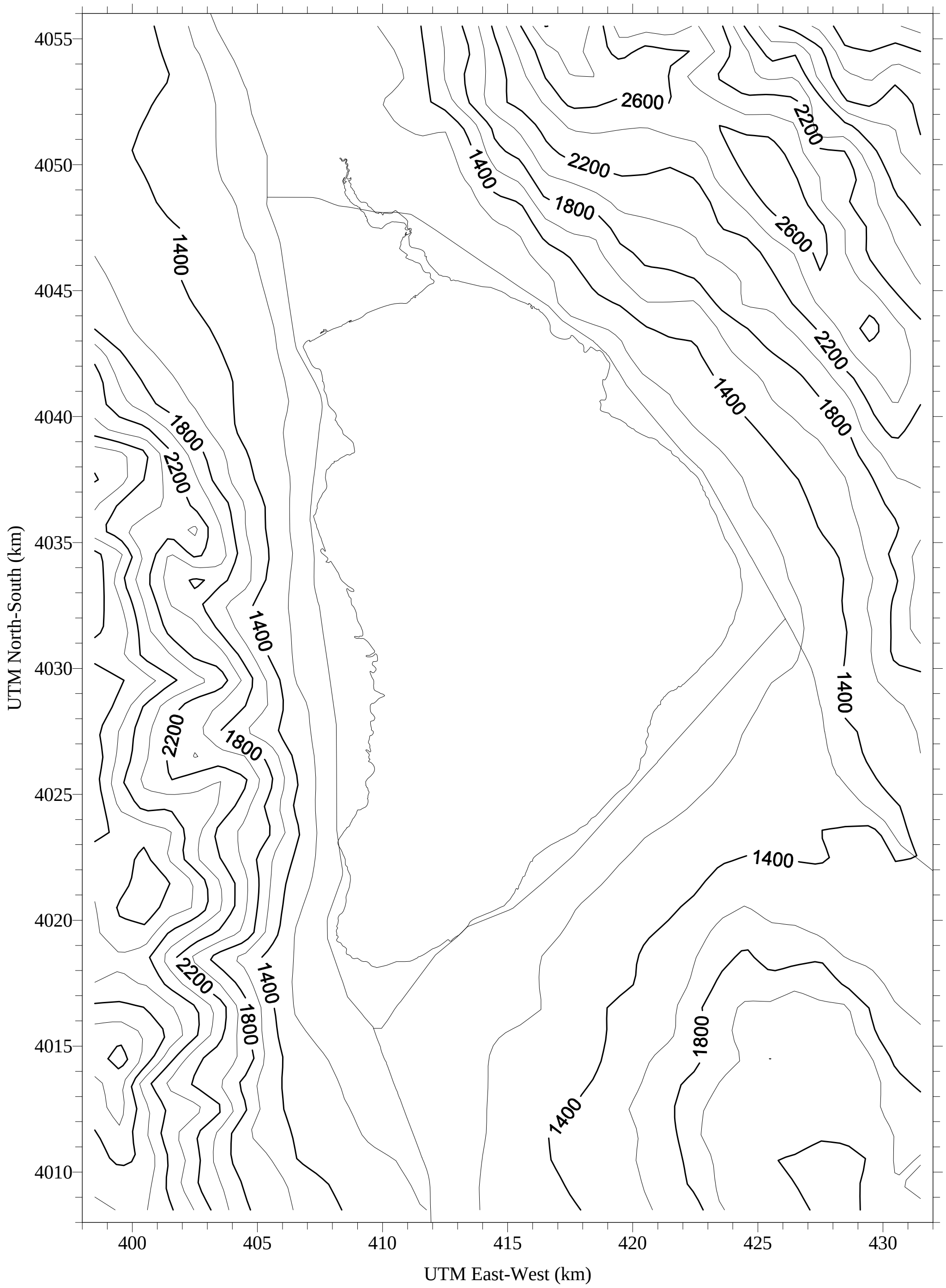

Figure 6.1 - Model Domain, elevation contours and UTM coordinates for the Dust ID Model

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Surface Characteristics and Terrain. The CALPUFF modeling system requires land use and terrain data. These data are used by CALMET to adjust the wind field and affect the calculations performed by the CALPUFF dispersion model. CALPUFF considers spatial changes in land use, including the surface roughness, and the input data are specified on a horizontal grid. The terrain data influence the constructed wind fields and plume trajectories in regions of sparse observations. Land use and terrain data have been obtained from the U.S. Geological Survey (USGS) data sets on the Internet. The resolution of these land use and terrain data sets are 200 m and about 30 m, respectively. The District has prepared these data sets using the pre-processing software provided with the CALPUFF modeling system. The resulting grids have been plotted and checked against data from the District's GIS database where the modeling domain overlaps the District's data. The 1-km mesh size terrain used by CALMET and CALPUFF is shown in Figure 6.1.

Upper air data. Upper air data will be collected from a number of different sources for construction of the wind fields and estimation of mixing heights with CALMET. In the RSIP, both local and regional data were collected as follows:

- A 915 MHz Radar Wind Profiler and Radio Acoustic Sounding System (RASS) were used to collect upper level wind and temperature measurements. The Wind Profiler was initially located at Dirty Socks then moved to the Mill Site during the 4th quarter of 2001. The District discontinued measurements with the Wind Profiler on June 30, 2003. The Wind Profiler with RASS samples wind and temperature from 100 m, up to 5000 m with a vertical resolution as low as 60 m depending on the clutter environment, atmospheric scattering conditions, and pulse length. Experience at Owens Lake indicates wind data recovery is sometimes poor above 1000 m due to the dry environment and the RASS data are limited to the lower levels during windy conditions.

- Regional twice-daily upper air soundings from Desert Rock Airport (Mercury, Nevada) and China Lake Naval Air Station.

During high wind events, observations from the Wind Profiler at both the Mill Site and Dirty Socks indicate very little wind speed or wind direction shear with height. Previous CALPUFF simulations suggest concentrations predicted at PM_{10} monitoring sites and at the historical shoreline are not usually influenced by upper level winds because the sources are ground based. The highest impacts occur close to the source areas, and there is very little wind shear during high winds.

Following removal of the Wind Profiler, soundings from China Lake and Desert Rock will be used to construct the data set. The China Lake and Desert Rock sounding will primarily be used for upper level temperature lapse rates. Winds aloft will be based on extrapolation of the surface wind measurements. The default algorithms employed by CALMET based on Similarity Theory often adjust the winds in the wrong direction and predict too much increase in wind speed with height even for very small surface roughness lengths. As an alternative, wind speeds aloft will be adjusted using the empirical results suggested by the previous Wind Profiler measurements. No wind direction turning with height will be assumed except near the Wind Profiler site where the actual data will be used until this program is discontinued.

CALMET options. The options employed for the application of CALMET to construct the wind fields were provided in the “Modeling Protocol” (MFG, 2001). The majority of the selected model options are based on the defaults incorporated in the code by the model author. Notable model options include:

- Ten vertical levels varying geometrically from the surface to 4000 m. The geometric spacing provides better resolution near the surface and the upper limit is high enough to be above the boundary layer height.

- Vertical extrapolation of surface winds aloft using the results of the Wind Profiler studies.

- Less than default smoothing of wind fields. LADWP contractors Air Sciences and Environ suggested less smoothing of the wind fields by CALMET after review of the *Owens Valley PM_{10} Attainment Demonstration Modeling Protocol*.

Wind fields constructed with CALMET will be randomly checked by plotting the resultant fields and the surface observations on a base map. The CALDESK™ software package will also be used to view the CALMET wind fields.

The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, the dispersion options also affect predicted PM_{10} concentrations. The model options used in the RSIP will continue to be used for the Dust ID Program. In this study, the following options will be used for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves. Sensitivity tests were also performed by applying CALPUFF with dispersion routines based on Similarity Theory and estimated surface energy fluxes. These tests did not indicate improved performance over the Pasquill-Gifford based simulations.
- Near-field puffs modeled as Gaussian puffs, not elongated “slugs.” CALPUFF contains a computation intensive “slug” algorithm for improved representation of plumes when wind directions vary rapidly in time. This option was tested, but did not significantly influence the CALPUFF predictions.
- Consideration of dry deposition and depletion of mass from the plume. The particle size data used will be based on measurements taken within dust plumes on Owens Lake as discussed below.

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, *et al*. (1999), the CALPUFF simulations will assume a lognormal distribution with a geometric mean diameter of 3.5 µm and a geometric standard deviation of 2.2.

6.4 Background PM_{10} Concentrations

The dispersion model simulations include only wind blown emissions from the source areas with sand flux activity measurements. During high wind events other local and regional sources of fugitive dust can contribute to the PM_{10} concentrations observed at the monitoring locations. In the RSIP a constant background concentration of 20 µg/m^3 was added to all predictions to account for background sources. The constant background was calculated from the average of the lowest observed PM_{10} concentrations for each dust event when 24-hour PM_{10} concentrations at any of the sites were above 150 µg/m^3. To avoid including impacts from lake bed dust source areas in the background estimate, the procedures used a simple wind direction filter to exclude hours when the lake bed may have directly influenced observed PM_{10} concentrations. Such hours were removed and daily average background concentrations were recalculated based on the remaining data.

Additional PM_{10} monitors are proposed for installation at Owens Lake. These monitors can be used to measure hourly PM_{10} concentrations upwind from lake bed source areas. Some of these monitors may be representative of regional PM_{10} concentrations and others may be influenced by local sources that may indicate a higher PM_{10} concentration than the regional background level. A method to calculate background concentrations based on upwind monitor concentrations for each modeled-event approved by both the APCO and the General Manager of the LADWP may be developed in the future. Meanwhile, a default background of 20 µg/m^3 will be added to the model prediction for each receptor location.

6.5 Area Source Characterization

CALPUFF simulations at Owens Lake are sensitive to source configuration. Emissions will be varied hourly according to the methods described in Section 6.6 and dust sources represented as rectangular area sources. CALPUFF contains an area source algorithm that provides numerically precise calculations within and near the area source location. The area source configuration used for the Dust ID model run for the period from July 2002 through June 2003 is shown in Figure 6.2. The paired Sensit and CSC measurements were assumed to be representative of the horizontal sand flux for irregularly shaped source areas near the sand flux site. Field observers determined the size and shape of the source areas based on GPS mapping after the storms, observation maps made during the storms, and physical surface characteristics. All source areas were represented by sand flux measured at a single site that was applied to a series of 250 m x 250 m cells that were configured to conform to the general shape of the source area represented by the sand flux site.

The following general rules are used to characterize and map source areas on the lake bed:

- Actual source boundaries will be used when available to delineate emission sources in the simulations. Actual source boundaries will be determined using a weight-of-evidence approach considering visual observations, GPS mapping, and surface erosive characteristics. Erosive characteristics that might be considered when defining a source boundary include properties of the soil, surface crusting, wetlands, and the proximity of the brine pool and existing DCMs.

- Source boundaries will also be defined based on the DCM locations. For example, sand flux measurements outside the DCM will be assumed to apply up to the boundary of the DCM. Sand flux measurements inside the DCM will be assumed to apply to the area inside the DCM.

- All source areas will be represented by a series of 250 m x 250 m cells that generally conform to the shape of the source area and share the same hourly sand flux rates as the sand flux site representing that source area. Cells small than 250 m x 250 m may be used near the shoreline to better represent source areas where predicted concentrations are expected to be particularly sensitive to the source area configuration. (Figure 6.2)

6.6 Estimation of PM_{10} Emissions

Hourly PM_{10} emissions for each source area will be estimated using Dust ID sand flux data and K-factors following the procedures described in Section 5. See also SCR Section 1.2 and 2.1 regarding the order of priority for using K-factors for modeling.

6.7 Simulation of Shoreline Concentrations

Under the provisions of the SCR in the RSIP, CALPUFF simulations will be used to assess whether lake bed source areas cause or contribute to an exceedance of the PM_{10} NAAQS in areas without PM_{10} monitoring sites. Predictions will be obtained using the RSIP receptor network that contains more than 460 receptor locations placed at the historic shoreline (approximately at the 3600' elevation) of Owens Lake (see Figure 6.2). The receptor spacing along the historic shoreline ranges from 100 to 200 m. Note in several locations along the shoreline, receptors are very close to or even within potential source areas (see Figure 6.3).

7. Owens Lake Safety & Training Program

7.1 Objective

All field personnel that work at Owens Lake are required to complete special training courses to deal with the unique hazards and environmental precautions that must be considered when working on the lake bed. Training includes: first aid and CPR training, proper ATV use, respiratory protection and dust safety, lake bed access reporting, and snowy plover protection.

7.2 Safety Requirements

Safety is the first priority while working at Owens Lake. Training requirements are required for every worker at the lake for their own safety. Dust storms can start within minutes exposing workers to dust and sand. Lightning storms often occur in the summer. Winters have sub-freezing temperatures and summers have temperatures well above 100 degrees. Access is usually restricted to ATV’s and can change often throughout each year. The objective of all the training requirements is to put safety as the highest priority at all times.

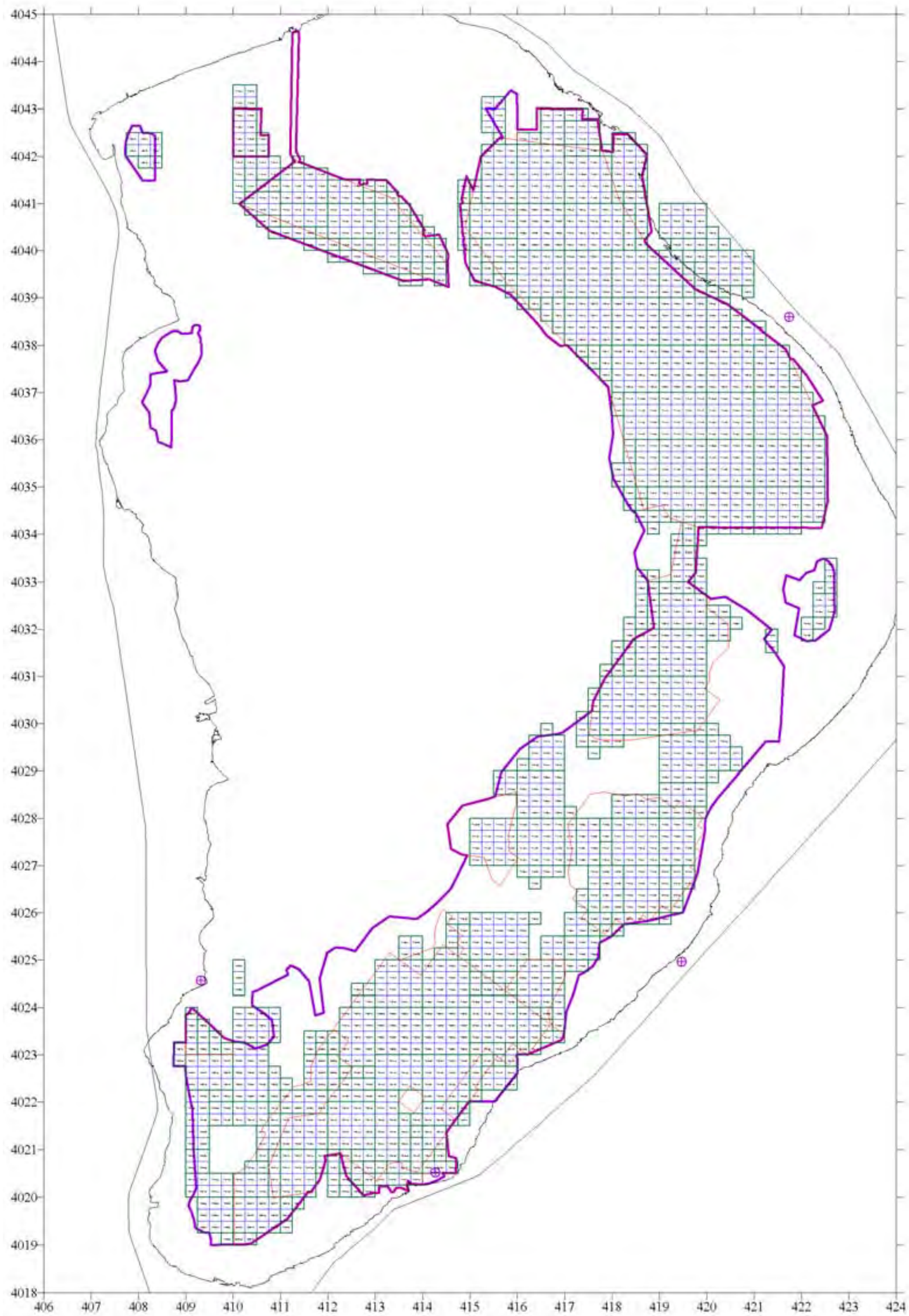

Figure 6.2 - Area source configuration using 250 m x 250 m cells for July 2002 through June 2003 Dust ID model run. Purple lines represent the control area boundary used with the Settlement Agreement.

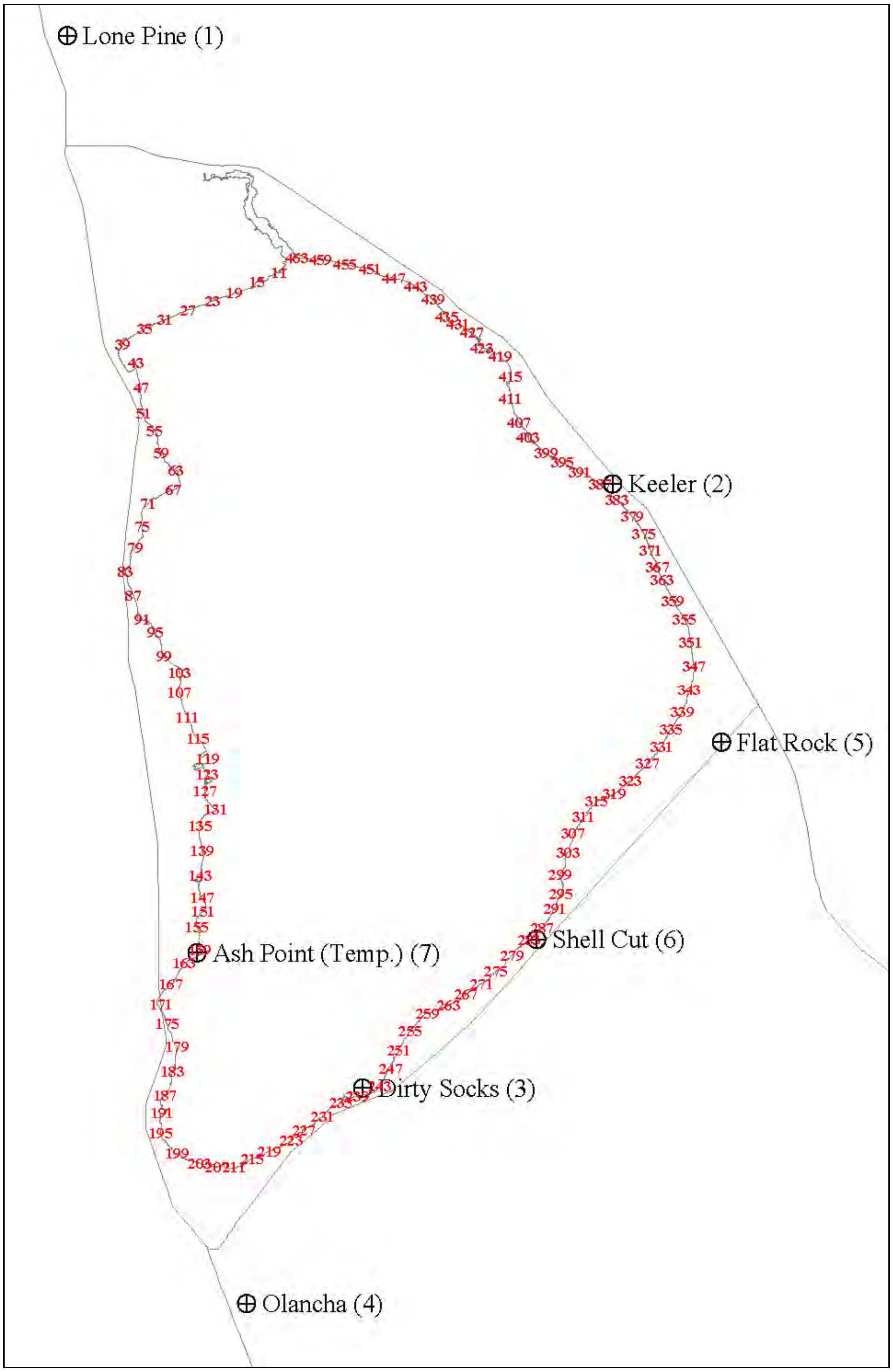

Figure 6.3 -The Dust ID model evaluates PM_{10} impacts at over 460 receptor locations around Owens Lake.

All personnel that are involved with any fieldwork under the Dust ID Program are required to complete all safety training before working on the lake. Everyone must report going onto and leaving the lake. Workers are required to stop work and leave the lake when a dust storm starts. Every field worker will be issued a respirator, goggles for eye protection and earplugs to be used when caught in a dust storm while leaving the lake. Workers are required to leave the Keeler office when the dust impacts Keeler and the TEOM monitor reading exceeds 1000 $\mu g/m^3$. Respirator training and face fits will be completed annually. First Aid and CPR training and successful certification is required every three years. Snowy Plover training is required before any new worker can start work on the lake. Other safety issues that all workers will be informed of include the proper use of tools, special weather conditions such as temperature extremes, rain and lightning and training in the operation of ATVs.

7.3 Reporting Procedure for Working on the Lake and Contacts

1. Normal work hours on the Owens Lake are defined as sunrise to 4:45 PM, Monday through Friday. The lake is defined as any area below the 3600 ft. contour.

2. Every person or group must call the Bishop office and leave a message or speak to the Administrative Specialist (AS) to notify that they are working on the lake. They also must inform the AS what area of the lake they will be working. Examples: DIVIT, Dirty Socks sand sheet, “A” Met tower or any commonly used identifiable name of a site or area you will be working.

3. The AS will record the person’s name (s) and area of the lake they are working on.

4. Every person or group working on the lake must notify the Bishop office before 4:45 PM on the same day; that they have left the lake OK. This must be done or a person will be sent out to look for you! False alerts will not be appreciated.

5. The AS will call the Director of Technical Services (DTS) in Keeler or one of the back up persons in order on the list below, and report the missing person if not notified before the specified time. An attempt will be first made to contact the missing person by phone and determine their situation. The DTS or an assigned person will begin a search for the missing person if the person cannot be contacted by phone. The search will continue until dark or unsafe conditions at which time the Inyo Sheriff will be notified for assistance.

6. Everyone may work outside normal work hours Monday through Friday <u>at your own risk.</u> However, they must call the Bishop office before the designated time and notify the AS that they will be working past 4:45 PM and call again and leave a message that they left the lake OK before 8:00 AM the next day.

7. The AS will check the messages every morning and record the information. The DTS will be notified if a person that worked after normal hours did not call and leave a message that they left the lake OK. The DTS or an assigned person will follow the procedure for a missing person outlined in step 5.

8. Nobody may work on the lake after 4:45 PM on Friday, all day Saturday or Sunday unless they receive special permission from their direct supervisor. The supervisor will be responsible for making sure the worker left the lake OK and responding to an emergency or search if necessary. The worker must notify their supervisor when they leave the lake OK during these periods.

Emergency Assistance Reporting Contacts and Phone Numbers (Area Code 760):

Call 911 first if you have an emergency!

Bishop Office AS	872-8211	
Bill Cox (DTS)	876-8103	Cell 937-2886
Earl Wilson	876-8104	Cell 937-1060
Nik Barbieri	876-1803	Cell 937-6696
Grace Holder	872-8211	Cell 937-2887
Guy Davis	876-8115	Cell 937-1766
Dan Johnson	876-4544	Cell 937-1715
Ted Schade	872-8211	Cell 937-3360

7.4 Snowy Plover Training and Other Wildlife Protection Procedures

Field technicians and other District personnel and contractors are required to take precautions to avoid disturbing western snowy plovers during the nesting and brooding season which is from March 15 through August 30 each year. All lake bed personnel must complete snowy plover awareness and avoidance training before venturing onto the lake bed during snowy plover season. A qualified biologist will provide training for all lake bed personnel. In addition to completing snowy plover training, the plover protection program requires the following:

- Report snowy plover sightings to the District's biological resources monitor for dissemination to all lake bed personnel and for scientific data collection purposes. The biological resources monitor will map and mark the sightings in the case of nesting pairs, and will map the last known locations of broods. Lake bed workers will be responsible for checking the latest maps before encroaching onto potential snowy plover use areas.

- If snowy plover nests are found within areas of potential conflict with Dust ID monitoring, they will be marked in the field with green stakes. Within the buffer area demarked by stakes, the maximum allowable time per visit is 10 minutes.

- Field personnel should use established ATV and 4WD vehicle trails to approach and depart monitoring sites. The maximum allowable speed on ATV and off-road 4WD on the lake bed is 15 mph during the snowy plover season.

All existing and new Dust ID monitoring installations will be fitted with raptor perching deterrent (eg., Nixalite) at potential perch sites with a height of greater than 60 inches above the

playa surface. Maintenance of perching deterrents will be routinely performed. Any new construction that causes new ground disturbance during the snowy plover season will require a pre-construction survey for snowy plover use. A qualified biologist will perform the survey within 1 week prior to the start of construction.

Monitoring will be performed on site in a manner that is least disturbing to wildlife and plant resources as possible. Potentially affected upland resources (those located outside the playa) that could be disturbed during any new ground-disturbing construction activities were identified during District environmental analyses. The animals that use upland areas vary seasonally, with nesting and foraging birds, mammals, reptiles, and invertebrates occurring during the period of dust monitoring. No special training is required to work in upland areas during the dust monitoring season, however pre-construction wildlife and rare plant surveys are required if placement of new facilities at any time of year will cause new ground disturbance.

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Board Order 080128-01
Attachment D

2008 Procedure for
Modifying Best Available Control Measures (BACM)
for the Owens Valley Planning Area

The City may transition from one approved BACM to another provided that the performance standard of one or the other BACM is met at all times during the transition, and that the City makes a complete and technically well-supported written demonstration of that performance, with a built-in margin of safety, to the satisfaction of the APCO in advance of any actions by the City to transition. There are three circumstances under which temporary modifications may be allowed to the BACM identified in this SIP, if certain conditions are met. The circumstances are:

1. Adjustments to existing BACM. Research to demonstrate that sufficient PM_{10} control efficiency during the dust season can be achieved and the NAAQS can be attained everywhere on or above the historic shoreline with a different performance standard for an existing BACM.

2. Research on new BACM

3. Transition from one BACM to another that requires a time period where neither BACM's performance standards can be met.

The City may make an application for any of these modifications in writing to the APCO. The complete application must include all necessary data and other technical information to support the application. Except for the specific limitations set forth below for BACM adjustments to Shallow Flooding, the APCO shall have full and sole discretion to accept, reject or condition the City's application for modifications to BACM on Owens Lake, to require additional technical information, and/or to independently monitor the results of the project, and shall provide her/his decision in writing. This same discretion shall apply to the APCO's consideration of each of the other applications that the City may make as further described below. The APCO will consider and respond to comments made by the City regarding any decision by the APCO to reject, condition or modify an application. Failure by the City to comply with any condition of the project approval may result in the APCO revoking the project approval and directing closure procedures be implemented for the project.

The flexible BACM description under the terms of the Order preclude the application of the U.S. Environmental Protection Agency's Natural Events Policy for monitoring data used to make the determinations in this Attachment. All monitored PM_{10} concentrations that meet the EPA quality-assurance requirements contained in 40 CFR Part 58 and are measured at stations located at or no more than 3 kilometers above the historic shoreline (shoreline monitors) will be used in the analysis. The monitored values will be used as measured, and will not be adjusted for from-the-lake and non-lake wind directions as they are for the Supplemental Control Requirements.

The modeling for the determinations will be performed in accordance with the 2008 Owens Lake Dust Source Identification Program Protocol (Board Order 080128-01, Attachment C).

1. ADJUSTMENTS TO EXISTING BACM

A. BACM Adjustments to Shallow Flooding

1. After approval of the 2008 SIP, the City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the boundaries of the 2003 Dust Control Area (Shallow Flood Cover Test).

   A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.

   B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.

   C. The City will be CEQA lead agency for the Shallow Flood Cover Test and shall secure all required responsible agency approvals, permits and leases.

2. If the APCO reasonably determines in writing that the PM_{10} Dust Control Measures in the 2008 Total Dust Control Area (TDCA) have been operational for one continuous year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the 2008 TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over those Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section A.2.C, below, provided that:

   A. Application of the 10 percent reduction in wetness cover during the May 16 through June 30 Shallow Flood areal wetness cover reductions provided for in Paragraphs 15.A.ii and 15.B.ii of Board order 080128-01 shall result in the lower of:

      i. The areal cover resulting from a 10 percent reduction; or

      ii. The areal cover required in Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.

   B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

i. The results of testing carried out pursuant to Section A.1, if conducted; and

ii. The results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Paragraphs 15.A.ii and 15.B.ii of Board Order 080128-01.

C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.

D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the 2008 TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in the "2008 Owens Valley Planning Area Supplemental Control Requirements Procedure" (Attachment B) and subject to the provisions of Section A.4, below.

E. Except as provided in Section A.4, below, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.

3. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section A.2, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM_{10} concentrations at the historic shoreline.

4. Any areas for which wetness cover has been reduced pursuant to Section A.2 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan prepared pursuant to the requirements of Attachment B.

A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section A.2 provided that:

i. The maximum 24-hour PM_{10} shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 $\mu g/m^3$; and

ii. The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time period set forth in

Section A.4.A.(i) plus the background of 20 µg/m^3 do not exceed 120 µg/m^3 at the historic shoreline.

B. If the monitored values at the historic shoreline exceed 130 µg/m^3, and it is determined that non-lake bed sources are contributing greater than 20 µg/m^3, then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.

C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:

   i. A map that depicts the eligible Shallow Flood areas;

   ii. The proposed amount of wetness cover for each eligible Shallow Flood area; and

   iii. The method for determining effectiveness of the proposed wetness cover.

D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

B. BACM Adjustment to Measures Other than Shallow Flooding within Existing Dust Control Areas

Requirements to Begin the Process

At least once per calendar year after May 1, 2010, the District's APCO will make a written determination as to whether the Owens Lake bed will require additional PM_{10} controls in order to attain or maintain the federal 24-hour PM_{10} NAAQS. The APCO will use the procedure forth in Board Order 080128-01 to make the determination.

If the APCO determines that there were no monitored or modeled exceedances of the PM_{10} NAAQS as described above for the previous calendar year, each calendar year the APCO will do the following:

1) determine from the modeling if there are shoreline receptors where the model shows the combined predicted yearly maximum 24-hour contribution from all source areas on the lake bed contributing to those receptors plus background (24-hour average of 20 µg/m^3) is less than 120 µg/m^3, and

2) determine that there were no concentrations greater than 120 µg/m^3 measured at any shoreline or near-shore monitoring site in the area of those receptors.

The City may perform an independent assessment using the data and methods of the Dust ID Protocol in order to confirm the APCO's findings. The APCO will consider and respond to the

City's assessment before making his/her final determination. The APCO has full and sole discretion to make this determination.

First Step on Test Areas

If there are receptors that meet the requirements described above, and provided that the City is in compliance with SIP control requirements on all areas of the lake bed, the APCO will inform the City that they may submit an application to reduce the level of control within a 1 to 2-square-mile test area of an existing Shallow Flooding Dust Control Measure (DCM) area or within a 160 to 320 acre test area of an existing Managed Vegetation DCM area that the modeling shows contributes to, and only to, the shoreline receptors described above where the yearly maximum 24-hour contribution from the lake bed plus background is less than 120 μg/m^3. Application may be made for more than one area to be tested simultaneously provided the test areas do not impact any of the same modeled shoreline receptors or monitors (no overlapping impacts). The above limitations on test area size and location do not apply outside the boundaries of existing Dust Control Areas.

For the Managed Vegetation DCM, the cover may be reduced by no more than 5%, e.g. 50% to 45%, (one step). For other BACM or changes to compliance averaging areas (e.g., one acre for Managed Vegetation), the APCO will determine the permitted test area size, averaging area, test location and step amount. An area with a non-zero contribution to a receptor will be considered not to contribute to a receptor if the contribution from that area is less than 5 μg/m^3 and the yearly maximum 24-hour contribution from the lake bed plus background (20 μg/m^3) to that receptor is less then 140 μg/m^3. (A "zero contribution" is defined by the accuracy of the instruments used to collect the data, but in no case shall it be greater than 1 μg/m^3.) The City may also satisfy the requirements of a BACM test for Managed Vegetation with documentation of a site-specific BACM test, along with written justification for more general application of the results of this test.

The City's application to reduce the level of control over any area within the boundaries of existing Dust Control Areas must be accompanied by a modeling analysis that demonstrates that increasing PM_{10} emissions within the test area will not cause the predicted yearly maximum 24-hour concentrations along the shoreline to exceed 120 μg/m^3, including background (20 μg/m^3).

The application must also include, but is not limited to:

1) a project description,
2) site plan,
3) any necessary environmental documentation, responsible agency approvals, permits and leases,
4) a protocol to measure PM_{10} emissions and performance standards,
5) a time frame for project milestones and completion,
6) plans to control PM_{10} emissions if they exceed project limits,
7) project closure procedures if the project is discontinued,
8) soil texture information, soil chemistry, groundwater chemistry and applied water chemistry, and

9) a protocol to evaluate control effectiveness, estimate emissions and determine whether the results are transferable to other areas of the lake bed.

For BACM other than Shallow Flooding, the City will submit a relationship between control efficiency and performance standards based upon research results. The APCO has full and sole discretion to accept, reject, or modify that relationship. All modeling will be done according to the Dust ID Protocol.

Rectified aerial or satellite images of the area of adjusted BACM, or any other method approved by the APCO, will be used by the APCO to determine the performance standards for the adjusted BACM for this step and all subsequent steps.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the test at any time if modeling or monitoring show that modeled (including background of 20 μg/m^3) or monitored emissions are increasing above trigger levels set by the APCO based upon a 140 μg/m^3 modeled or monitored PM_{10} concentration at the shoreline, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

The APCO has full and sole discretion to approve or reject the City's application or require conditions. The APCO will take action and notify the City in writing within 90 days of receipt of the written application. No changes may be made to BACM in advance of the APCO's approval. Any adjustments to BACM will be reported to EPA by the APCO within 60 days of the APCO's approval.

<u>Subsequent Steps on Test Areas</u>
The adjusted BACM shall be maintained by the City for one year. No other adjustments to BACM may be made during that year that impact any of the same set of model shoreline receptors. At the end of the year, the City may submit a new application to the APCO to reduce the level of control in the test area by another step provided:

1) the modeled yearly maximum 24-hour contribution at all of the shoreline receptors identified above from all lake bed sources including the test area, plus background (20 μg/m^3), during the test period is less than 120 μg/m^3, and

2) no concentrations greater than 120 μg/m^3 were measured at any shoreline monitor in the area of those receptors during the test period.

The new application must contain all the same elements as the original application, and all the data and modeling from the first step of the test.

The APCO has full and sole discretion to approve or reject the City's application, or to require conditions. Subsequent steps may be made in the same manner. The APCO will take action and notify the City in writing within 90 days of receipt of the written application.

Requirement to Increase Controls on Test Areas

If, at the end of the year or any subsequent year before the SIP Revision to adjust BACM is approved by USEPA, the predicted yearly maximum 24-hour contribution from all lake bed sources including the test area plus background (20 $\mu g/m^3$) exceeds 140 $\mu g/m^3$ at any of the shoreline receptors identified above, and/or concentrations greater than 140 $\mu g/m^3$ were measured at a shoreline monitor in the area of the identified receptors, then the City must increase the control efficiency on the test area to the last step that achieved concentrations below the 140-$\mu g/m^3$ threshold. For Managed Vegetation, this action must be taken within 12 months of the written determination by the APCO that the requirements for adjusting BACM were not met. For all other PM_{10} control measures, this action must be taken within 60 days of the written determination by the APCO that the requirements for adjusting BACM were not met. The APCO has full and sole discretion to make that determination. The APCO will determine the time scale for compliance for other BACM as part of the approval of the application.

SIP Revision for BACM for the Test Area

After three consecutive years of successful operation of the adjusted-BACM test area (modeled and monitored concentrations less than 140 $\mu g/m^3$ as described above), the City may apply to the District for a SIP Revision to redefine BACM for that test area on the Owens Lake bed provided:

1) the predicted yearly maximum 24-hour PM_{10} contribution for each year of the test from the test area plus background (20 $\mu g/m^3$) at all shoreline receptors is 140 $\mu g/m^3$ or less, and

2) no PM_{10} concentrations greater than 140 $\mu g/m^3$ were measured at any shoreline monitor during the three years of the test.

The APCO has full and sole discretion to determine whether these conditions have been met. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP revision.

Lake-Wide SIP Revision for BACM for a Soil Type

If, after three consecutive years of successful operation of the adjusted-BACM test area, the predicted yearly maximum 24-hour contribution from the test area and all source areas on the lake bed plus background (20 $\mu g/m^3$) at all shoreline receptors for all three years of the test is 140 $\mu g/m^3$ or less and no concentrations greater than 140 $\mu g/m^3$ were measured at any shoreline monitor during the three years of the test, the research conducted on these test areas can be used to determine the relationship between the PM_{10} emissions, control efficiency and DCM performance standards. After the relationship has been identified, the City will use the research results in an updated modeling analysis that applies the test results to other areas on the lake bed with the same general soil type (sand-dominated, silt-dominated or clay-dominated) and under the same range of evaluated emissions or control efficiencies and performance standards as the test. The modeling will cover the entire test period, and will be done in accordance with the Dust ID Protocol. A DCM control map (map) will be prepared of lake bed control efficiencies (with corresponding DCM performance standards) that would be required to achieve the PM_{10} NAAQS everywhere along the historic shoreline with that DCM in the same general soil type

(sand-dominated, silt dominated or clay-dominated) as the test area and under the same range of control efficiencies, emissions, and performance standards evaluated in the test.

The City will then submit this draft map to the APCO for approval. The submittal must contain all the data from the test area and the modeling that produced the map. The APCO has full and sole discretion to approve, disapprove, or modify the draft map.

If the APCO approves the map, the City may apply to the District Board for a SIP Revision to redefine that BACM for that mapped area on the Owens Lake bed. After public notice and comment and a public hearing, the District Board has full and sole discretion to determine whether to adopt the SIP Revision. If a SIP Revision identifying a redefined BACM for Owens Lake is adopted by the District Board and approved by USEPA, the redefined BACM may be implemented anywhere designated by the new DCM control map. If the City has implemented a different DCM in the mapped area, the requirements of the following section below titled "Transitioning From One BACM to Another BACM After 2010" must also be met. If any modeled or monitored exceedance of the PM_{10} NAAQS results from these adjustments to BACM, the requirements of Board Order 080128-01, Paragraphs 10 and 11, will automatically apply to increase controls on these extreme violators to restore attainment of the NAAQS.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing adjustments to existing BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

2. RESEARCH ON POTENTIAL NEW BACM INCLUDING MOAT ROW

The City may test new dust control measures at any time on areas of the lake bed that are emissive, except within the 43.0 square-mile 2008 Total Dust Control Area footprint where BACM (or on up to 3.5 square miles, the non-BACM dust control known as Moat & Row) must be implemented by April 1, 2010 or within any Supplemental Control Area where existing BACM has been implemented or is scheduled for implementation. This testing area exclusion does not apply to Moat & Row PM_{10} controls constructed within the 12.7 square-mile 2006 Supplemental Dust Control Area (SDCA). The City may test up to 3.5 square miles of Moat & Row within the SDCA. If the City has tested a new control measure for three years in this manner, it may apply in writing to the APCO for a SIP Revision to designate the new dust control measure as BACM. The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO's satisfaction that the new control measure is sufficient to achieve the required PM_{10} emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.

The application shall include, but not be limited to:

1) a description of the new dust control measure

2) a description of the test site and the meteorological conditions under which it was tested
3) the measured PM_{10} emissions during the test
4) the test time frame
5) all raw data collected during the test
6) all data screening criteria and final data sets
7) data supporting the conclusion that the required control efficiency was achieved
8) a performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency
9) an analysis of any environmental impacts of the dust control measure
10) the appropriate responsible agency approvals, permits and leases

The application must include modeling that demonstrates that the required PM_{10} emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historic shoreline.

If the APCO determines that the application is complete and the above conditions have been met, he/she will have full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard and include that method in the description of the proposed BACM for the SIP Revision. The District Governing Board has full and sole discretion to determine whether to adopt a SIP Revision for approval of any new BACM.

Upon adoption by the District Board, approval by CARB, and submission to USEPA of a SIP Revision that identifies a new BACM for Owens Lake, the City may implement only this one new control measure on one-half square mile of the next area to be identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. No other new control measures may be implemented on areas identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. The District Governing Board may limit the new BACM to specific circumstances, for example, distance of the new dust control measure from the shoreline or approval in a specific general soil type. Upon approval by USEPA, the new BACM may be implemented per the requirements described in the following section, “Transitioning From One BACM to Another BACM After 2010,” or on any subsequent areas requiring control under the “2008 Owens Valley Planning Area Supplemental Control Requirements Procedure” (Board Order 080128-01, Attachment B), subject to any limitation to specific circumstances.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to implementing any BACM test or new BACM. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

3. TRANSITIONING FROM ONE BACM TO ANOTHER BACM AFTER 2010

If the City wishes to transition from one existing BACM to another existing BACM without meeting the performance standard of one or the other BACM at all times, it may submit an application to the APCO in writing for permission to do so after April 1, 2010. The APCO has full and sole discretion to accept, reject or condition the City's application. The transition may be done on no more than one and one-half (1.5) square miles lake-wide for any BACM except Managed Vegetation, or 320 acres lake-wide if the transition is to Managed Vegetation, at one time. The City shall not begin the transition in advance of the APCO's written approval.

The application shall include, but not be limited to:

1) a protocol that includes a project description
2) a site plan
3) a plan to measure PM_{10} emissions
4) a time frame for project milestones and completion
5) plans to control PM_{10} if emissions exceed any trigger value set by the APCO based upon a 140µg/m^3 modeled (including background of 20µg/m^3) or monitored PM_{10} concentration at the shoreline
6) data supporting the assumption that the transition can be completed and the BACM performance standards can be achieved within three years of the start-up of construction
7) project closure procedures if the project is discontinued for any reason or if the PM_{10} trigger value is exceeded
8) any necessary environmental documentation, responsible agency approvals, permits and leases

The protocol must include modeling in accordance with the Dust ID Protocol that predicts that the NAAQS will be met at all times everywhere on the shoreline during the transition period, and must include a method to monitor emissions continuously throughout the transition period. The transition must be complete, and the new BACM performance standard achieved, within three years of written notification from the City to the APCO that they are no longer maintaining the performance standard for the existing BACM, and are beginning the transition.

All raw data must be shared with the APCO, and all data screening criteria must be approved (or disapproved) in writing by the APCO. The APCO may terminate the transition at any time if modeling or monitoring show that emissions are increasing above any pre-set trigger level described in 5) above, or if the City is not following the APCO-approved protocol. The APCO has full and sole discretion to determine whether these conditions have been met.

If the data show to the APCO's satisfaction that the transition has been accomplished while attaining the NAAQS everywhere at the shoreline, the City may submit an application to the APCO to allow another area to be transitioned. The APCO has full and sole discretion to accept, reject or condition the City's application. The same procedures outlined above will apply.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the City must secure the appropriate approvals, leases and permits prior to BACM transitions. However, nothing in this section is intended to give any responsible agency any authority beyond their authority under law.

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GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

EXHIBIT 3

DISTRICT HEARING BOARD ORDER

GB09-06

EXHIBIT 3

BEFORE THE HEARING BOARD

OF THE

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

VARIANCE REQUEST

Petitioner:
City of Los Angeles
Department of Water & Power
111 North Hope Street, Suite 340
Los Angeles, California 90012-2607

Request Received: August 21, 2009

Facility Location:
Owens Lake Dust Mitigation Project
111 Sulfate Road, Keeler, CA 93530

Docket Number: GB09-06

FINDINGS AND ORDER GRANTING REGULAR VARIANCE FROM REQUIREMENTS SET FORTH IN GOVERNING BOARD ORDER 080128-01

Hearing Date: September 25, 2009

BACKGROUND

The City of Los Angeles Department of Water and Power (Petitioner) submitted a variance petition to the Great Basin Unified Air Pollution Control District (District) Hearing Board on August 21, 2009 pursuant to California Health and Safety Code Section 42350 and District Regulation VI (Rules 600 *et seq.)* Petitioner requested consideration of a variance to temporarily relieve it from the obligation to comply with District Board Order 080128-01, paragraphs 3, 7 and 10 and for one year of regulatory relief from October 1, 2009 deadline set forth in said order to complete 3.5 square miles of alternative experimental dust control measure (DCM) known as "Moat & Row" on the dried bed of Owens Lake, California.

As described in the variance petition, Petitioner contended that delays in securing approvals for their Moat & Row project from State Lands Commission and California Department of Fish and Game will cause the 3.5 square-mile project to be completed one year late, by October 1, 2010. Petitioner contended that the delays were beyond its reasonable control. However in order to offset the excess air pollution emissions caused by the one year delay, Petitioner agreed to two additional dust control projects.

PROCEEDINGS

Pursuant to District Rule 617, upon receipt of the petition, the Air Pollution Control Officer (APCO) transmitted the Petition together with the APCO's recommendation to grant the regular variance to the Hearing Board. The recommendations were set forth in the Staff Report for this matter, which is on file with the Hearing Board.

Pursuant to Government Code 42359.5 and District Rule 16, with notice and hearing, the Hearing Board considered the Petitioner's Regular Variance petition and the District's recommendations on September 25, 2009 in the Town of Mammoth Lakes Council Chambers, 437 Old Mammoth Road, Suite Z, Mammoth Lakes, California 93546, with participation and sworn testimony from Ted Schade, GBUAPCD APCO; Grace McCarley Holder , GBUAPCD Playa Geologist; William VanWagoner, Milad Taghavi, Brian Tillemans and Gene Coufal, City of Los Angeles Department of Water and Power. Tori Jenkins, Clerk of the Board; Julie Conboy Riley and David Hodgekiss, Counsel for the City of Los Angeles Department of Water and Power; George Poppic of the California Air Resources Board, Representing Counsel for the Hearing Board; and Mel Joseph of the Lone Pine Paiute Shoshone Reservation were in attendance. After hearing all testimony and considering all evidence, the Hearing

Board made the Findings and granted the issuance of a Regular Variance subject to certain conditions as set forth below.

FINDINGS

The Hearing Board makes the following findings as required by Sections 42352 and 42353 of the California Health and Safety Code:

1. Petitioner will be in violation of District Board Order 080128-01, Paragraph 3, which requires Petitioner to have any Phase 7 Moat & Row DCM operational by October 1, 2009.
2. Due to conditions beyond the reasonable control of the Petitioner, it has been prevented it from completing the Moat & Row DCM by the October 1, 2009 deadline specified in the Board Order. There is no practical method to achieve compliance with the Board Order sooner than through a time extension to complete the Dust Mitigation Project, Moat & Row. Closing the Los Angeles Aqueduct would not alleviate the PM10 emission problem. Immediate compliance would impose unreasonable burden upon an essential public service.
3. There would be no corresponding benefit to the closing or taking of the Los Angeles Aqueduct. Closing the aqueduct would not be an expeditious means of controlling emissions from the 3.5 square-mile Moat & Row project area. The 3.5 square-mile Moat & Row project area is made up of seven small sub-areas, none of which have existing water-delivery infrastructure. Controlling the emissions from these widely dispersed areas by closing the Aqueduct and redirecting its waters onto the Owens Lake bed via the Owens River would take the full flow of the Aqueduct for 5 to 20 years.
4. Applicant has considered curtailing operations, however, such action would not lead to compliance with the Board Order, nor would it provide any immediate control of the emissions

associated with the 3.5 square-mile Moat and Row area. Closing the aqueduct would cause considerable hardship to the City of Los Angeles.

5. Petitioner has committed to control excess emissions from the Owens Lake bed to the maximum extent feasible during the period the variance is in effect. Petitioner proposes two methods during two periods.

The first period is the six months from October 1, 2009 until April 1, 2010. Petitioner will be continuing construction of the 9.7 square-mile of Phase 7 Shallow Flooding DCMs during this period. The Board Order requires the additional 9.7 square-miles of Shallow Flooding control to be operational by April 1, 2010. Petitioner is committed to providing at least 3.5 square-miles of temporary dust control within the 9.7 square-mile Phase 7 project by area by October 1, 2009. The temporary control will be provided by tilling 3.5 square-miles of clay soils up into very large clods that will increase the surface roughness of the lake bed and temporarily prevent emissions. Based on various studies conducted, Petitioner believes tilling will provide at least six months of sufficient control. As the Petitioner completes the Shallow Flooding construction in the tilled areas, water will cover the tilled surfaces and permanent control will be established. Petitioner is expediting control via tilling method in areas already scheduled for control by April 2010.

The second period for required emission reduction is the six-month period between April 1, 2010 and October 1, 2010. Petitioner is unable to provide direct on-lake bed offsets of the emissions from the 3.5 square-mile of Moat & Row are during this six month period because required DCMs will occupy all lake bed areas (39.5 square miles) for which Petitioner has permits and approvals.

However, the District's air quality monitoring indicates that there are additional areas on the lake bed, beyond the 43 square miles currently ordered (39.5 square-miles with permits and

3.5 square-miles of Moat and Row), that require controls. District and Petitioner staffs have preliminarily identified two square miles that were emissive during the 2007 through 2009 period. However, the 2008 SIP and Board Order prevent the District from ordering controls on much of these areas until possibly well after May 1, 2010.

Petitioner has agreed that, as an offset to the emissions that will occur from the 3.5 square-mile Moat & Row area, it will immediately begin the regulatory approval process required to construct two additional square miles of BACM dust controls on the lake bed and will complete those controls six months earlier than would ordinarily be required by the 2008 SIP. Because Petitioner is starting the process seven months earlier than the earliest it would normally start under an order from the District and it will complete the DCMs six months earlier than provided in the 2008 SIP, necessary dust controls will be in place on the lake bed more than a year earlier than under the normal procedures. The additional two square miles of expedited dust controls offsets the six months of excess emissions from the 3.5 square-mile Moat & Row area.

6. The District has an extensive air and emissions monitoring program at Owens Lake and will continue to operate the program and quantify dust emissions from the lake bed, including areas subject to this variance request. Petitioner provides annual funding through assessments levied by the Governing Board to conduct this monitoring.

7. Petitioner will continue to operate between 29.8 and 39.5 square-miles of DCMs on the lake bed during the one-year variance period. The existing controls have reduced historic PM10 levels about 90 percent and additional reductions are expected by April 1, 2010, when the current 9.7 square-mile Phase 7 Shallow Flooding project areas are completed. The delay in implementing DCMs on 3.5 square-miles of Owens Lake is not expected to result in discharge of "air contaminants or other material which may cause injury, detriment, nuisance or annoyance to any

considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property."

ORDER

1. Now therefore, the Hearing Board orders that the Petitioner, the City of Los Angeles Department of Water and Power, is granted a Regular Variance, subject to the conditions set forth in Paragraphs 3, 4 and 5, below, for a one-year extension of the deadline for the completion of Moat & Row dust control measures on the bed of Owens Lake. The existing deadline of October 1, 2009 is required in Paragraph 3 of District Governing Board Order Number 080128-01, which is contained in the "2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan." The Petitioner is granted regulatory relief from this requirement until October 1, 2010.
2. Further, the Hearing Board finds that, subject to the conditions set forth in Paragraphs 3, 4 and 5, below, that by granting one year of regulatory relief from the existing October 1, 2009 deadline for the completion of the Moat & Row dust controls contained in Paragraph 3 of Board Order 080128-01, the Petitioner does not trigger the provisions in Paragraphs 7 and 10 of said Order, which provide for supplemental control determinations to resume prior to May 1, 2010, due to the non-completion of Moat & Row dust controls.
3. In order to reduce excess emissions to the maximum extent feasible, the Hearing Board conditions the variance to require the Petitioner to:
   a. Temporarily control at least 3.5 square-miles of Owens Lake within the Shallow Flood portion of the current Phase 7 dust control construction project through surface tillage to

increase surface roughness by October 1, 2009. A map showing the locations of the tilled areas and the tilling specifications are attached as Order Exhibit 3.

b. Construct and operate a new dust control project on at least two square-miles of Owens Lake in the areas shown in Order Exhibit 4. This new dust control project shall be known as "Phase 8" of the Owens Lake Dust Mitigation Program. The Phase 8 project shall be implemented by the Petitioner in lieu of any other areas that would be required for control by the District under the supplemental control determination provisions in Paragraphs 7 and 10 of Board Order 080128-01 for the period from July 1, 2006 through April 1. 2010. Thus, other than the determination that the Phase 8 areas require the implementation of DCMs, no supplemental control determination should be issued the Air Pollution Control Officer in 2010. A set of geographic coordinates defining the boundaries of the Phase 8 dust control areas shall be developed by the District and provided to the Petitioner by January 1, 2010. The size and location of the Phase 8 areas may be modified upon mutual agreement of the District Governing Board and the Los Angeles Department of Water and Power Board of Commissioners. The type of dust control measures used in the Phase 8 areas will be selected at the Petitioner's sole discretion from the list of Best Available Control Measures approved by the District as of the date construction begins on the Phase 8 project. The Petitioner shall conduct all required site investigations and environmental impact analyses and secure all required regulatory approvals and permits. The Petitioner shall start the regulatory approval and design processes for the Phase 8 project immediately upon receipt of this variance from the Hearing Board. The Petitioner shall complete construction and begin operation of the Phase 8 dust control measures six months earlier than it would have been required to do so under the provisions of Board Order 080128-01. These modified times are set forth in the attached Order Exhibit 2.

4. The Hearing Board requires, as a condition of the variance, that the Petitioner agree to a stipulated order from the District Governing Board under the provisions of California Health and Safety Code Section 42316 ordering the Phase 8 project as set forth in Paragraph 3.b, above. This order will be issued by the District Governing Board within 90 days of the certification of the environmental impact analysis by the Petitioner but no later than October 1, 2010, whichever date is later.

5. The Hearing Board requires, as a condition of the variance, that the Petitioner meet the increments of progress schedule attached as Order Exhibit 1 and submit quarterly progress reports to the Hearing Board.

Dated the 25th day of September 2009

Brad Mettam
Hearing Board Chairman

Attest:

Tori Jenkins
Tori Jenkins, Board Clerk

Order Exhibit List:
Exhibit 1 –Increments of Progress Schedule
Exhibit 2 – Modified Times for Completion of Phase 8 Dust Controls
Exhibit 3 – Map and Specifications for 3.5 square-mile Temporary Tilling Dust Controls
Exhibit 4 – Map of Phase 8 Dust Control Project

ORDER EXHIBIT 1

INCREMENTS OF PROGRESS SCHEDULE

FOR VARIANCE GB09-06

LOS ANGELES DEPARTMENT OF WATER AND POWER

MOAT & ROW DUST CONTROL MEASURE DEADLINE EXTENSION

By:	Milestone
October 1, 2009	Petitioner shall complete 3.5 square miles of temporary tilling dust control within the Phase 7 dust control area as shown on Order Exhibit 3.
October 1, 2009	Start clock for completion of 2 square-mile Phase 8 dust control project (project times shown in Order Exhibit 2).
October 1, 2009	Petitioner shall begin preparation of required CEQA documentation for the 2 square-mile Phase 8 dust control project.
January 1, 2010	Petitioner shall commence construction of the Moat & Row dust controls.
April 1, 2010	Petitioner shall convert 3.5 square miles of temporary tilling dust controls to 3.5 square miles of Shallow Flooding dust controls.
October 1, 2010	Petitioner shall select and notify the District of the BACM to be used on the 2 square-mile Phase 8 project.
October 1, 2010	District Governing Board shall issue stipulated order under H&S Sec. 42316 requiring the 2 square-mile Phase 8 dust control project (subject to certification of Phase 8 CEQA document by Petitioner).
October 1, 2010	Petitioner shall complete 3.5 square miles of Moat & Row dust controls.
To be determined	Depending on which BACM Petitioner selects, Petitioner shall complete 2 square-mile Phase 8 dust control project (times for completion are set forth in Order Exhibit 2).

DISTRICT EXHIBIT 2

MODIFIED TIMES FOR COMPLETION OF PHASE 8 DUST CONTROLS FOR VARIANCE GB09-06

LOS ANGELES DEPARTMENT OF WATER AND POWER

MOAT & ROW DUST CONTROL MEASURE DEADLINE EXTENSION

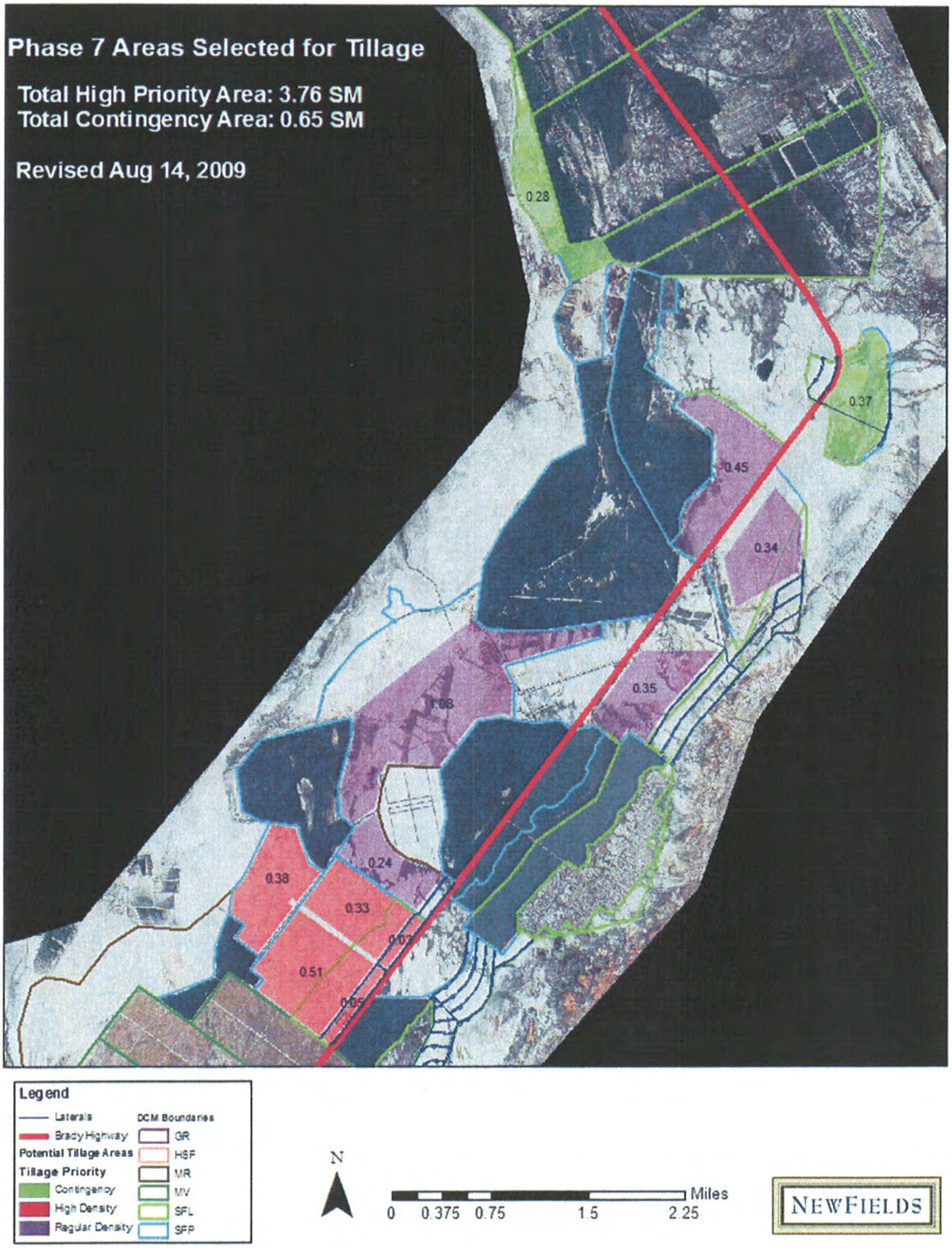
Activity	Duration (years)
New area of Shallow Flooding DCM	2.4*
New area of Managed Vegetation DCM	5.6*
New area of Gravel Cover DCM	1.7*
Other approved BACM	Determined by District**
Additions to above times:***	
Mainline capacity increase	2.1
New aqueduct turnout	1.4
New power feed	1.0
Expanded CEQA triggered	1.4

* The durations shown for the three existing BACMs are 0.5 years shorter than the times provided in Attachment B, Exhibit 3 of District Board Order 080128-01.

** If the District approves any new BACM prior to the start of the Phase 8 project, implementation durations will be included in the new BACM description. The Phase 8 durations will be 0.5 years shorter than non-Phase 8 durations.

*** Multiple additions to the BACM completion durations are not additive.

Order Exhibit 3

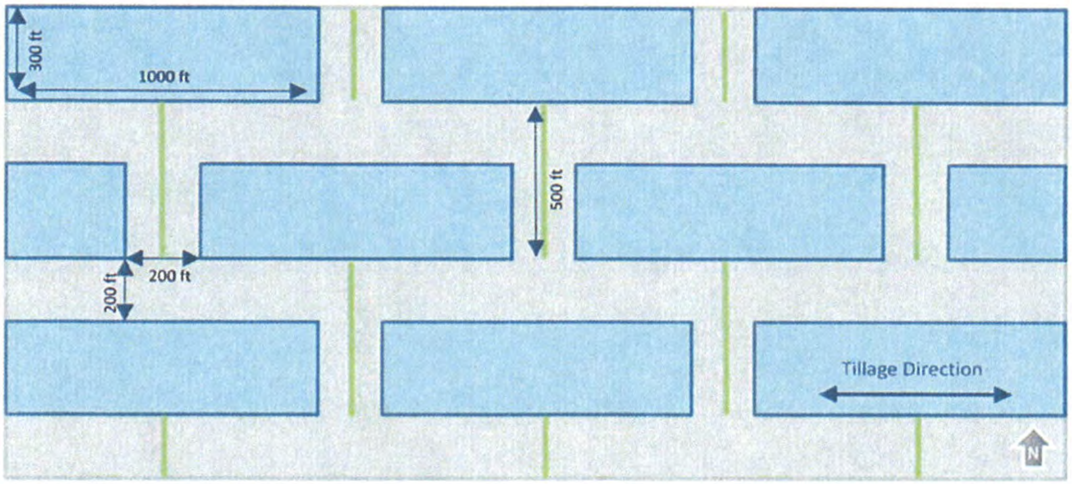


Variance GB09-06 District Exhibit 3 Page 1 of 2

Order Exhibit 3

Phase 7 Tillage Configurations

Regular Configuration (Approx 50% tilled)

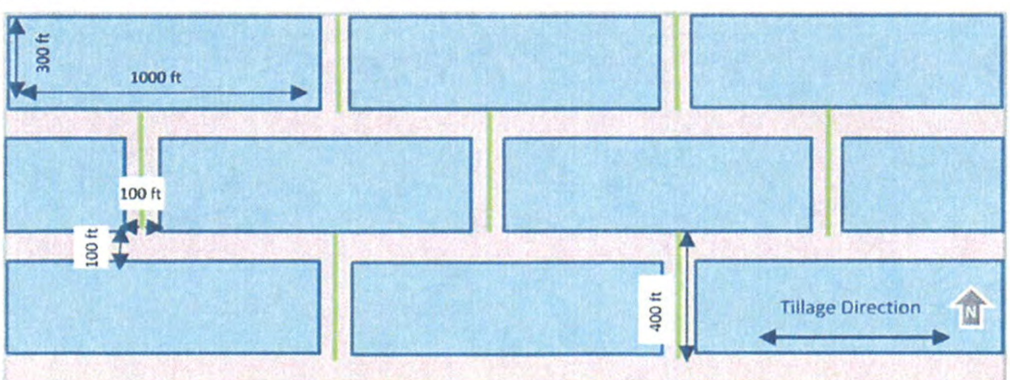


Playa

Tilled Area (tilled in east-west direction)

Non-primary Wind Protection (single tillage pass in north-south direction)

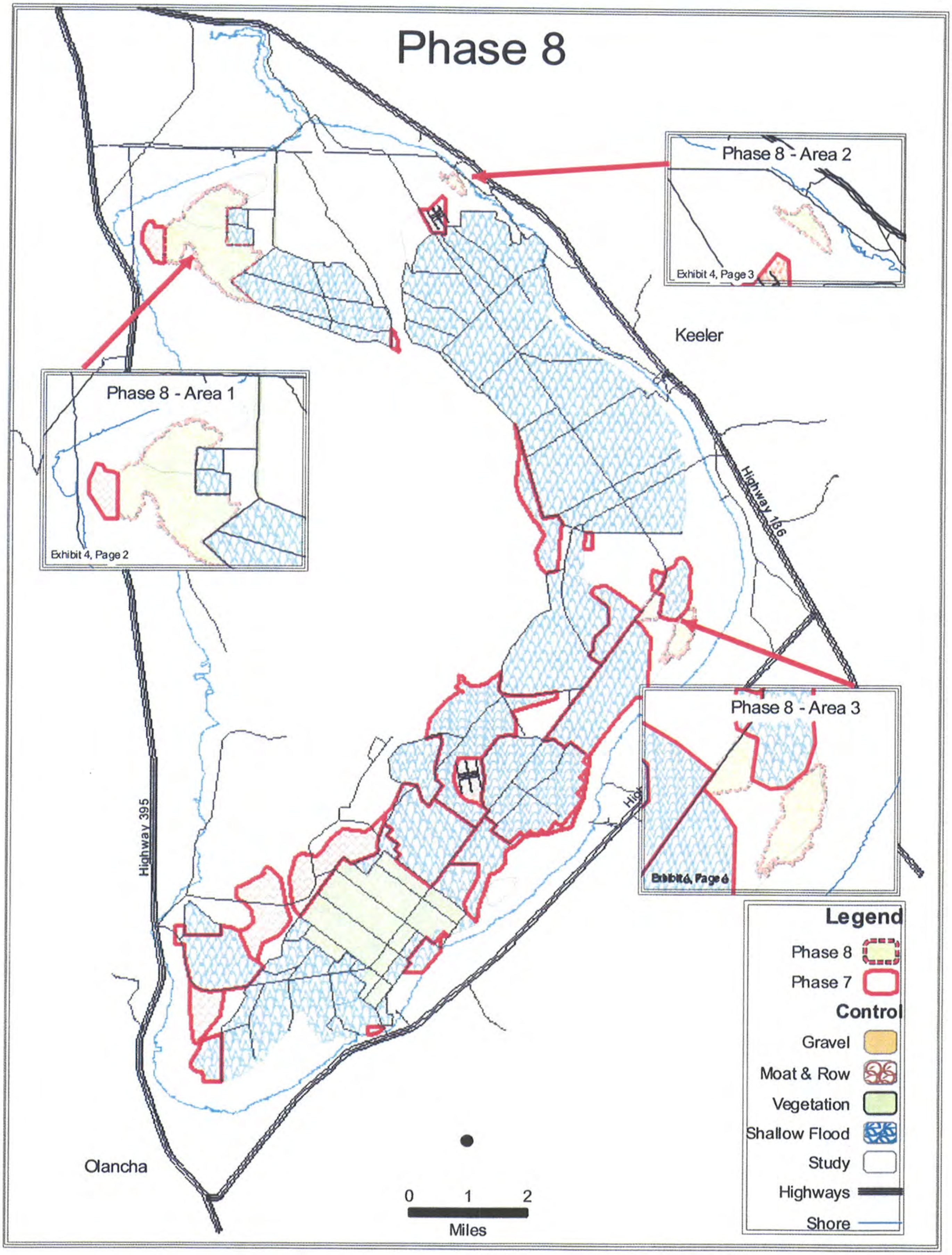
High Density Configuration (Approx 70% tilled)

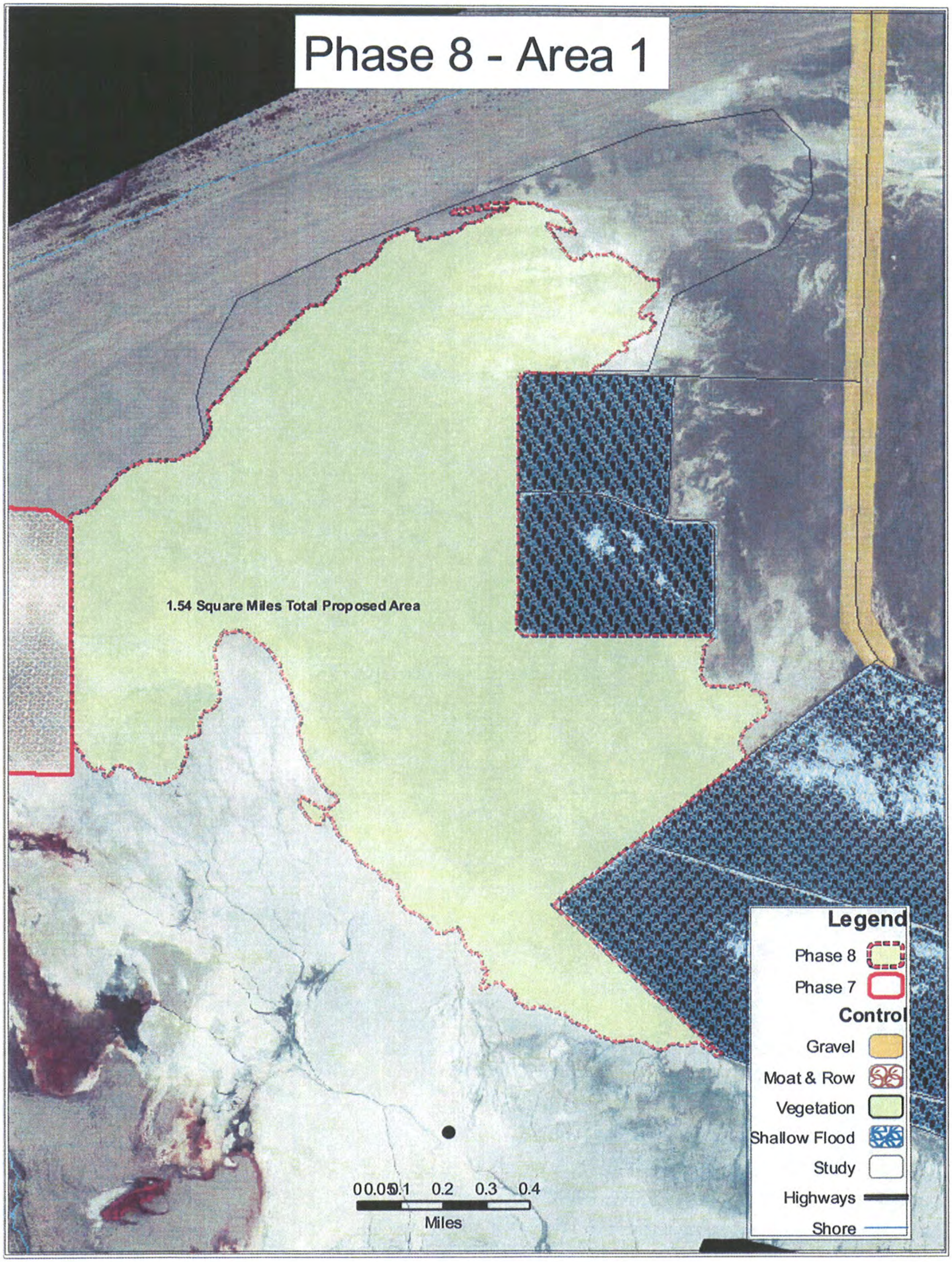


Playa

Tilled Area (tilled in east-west direction)

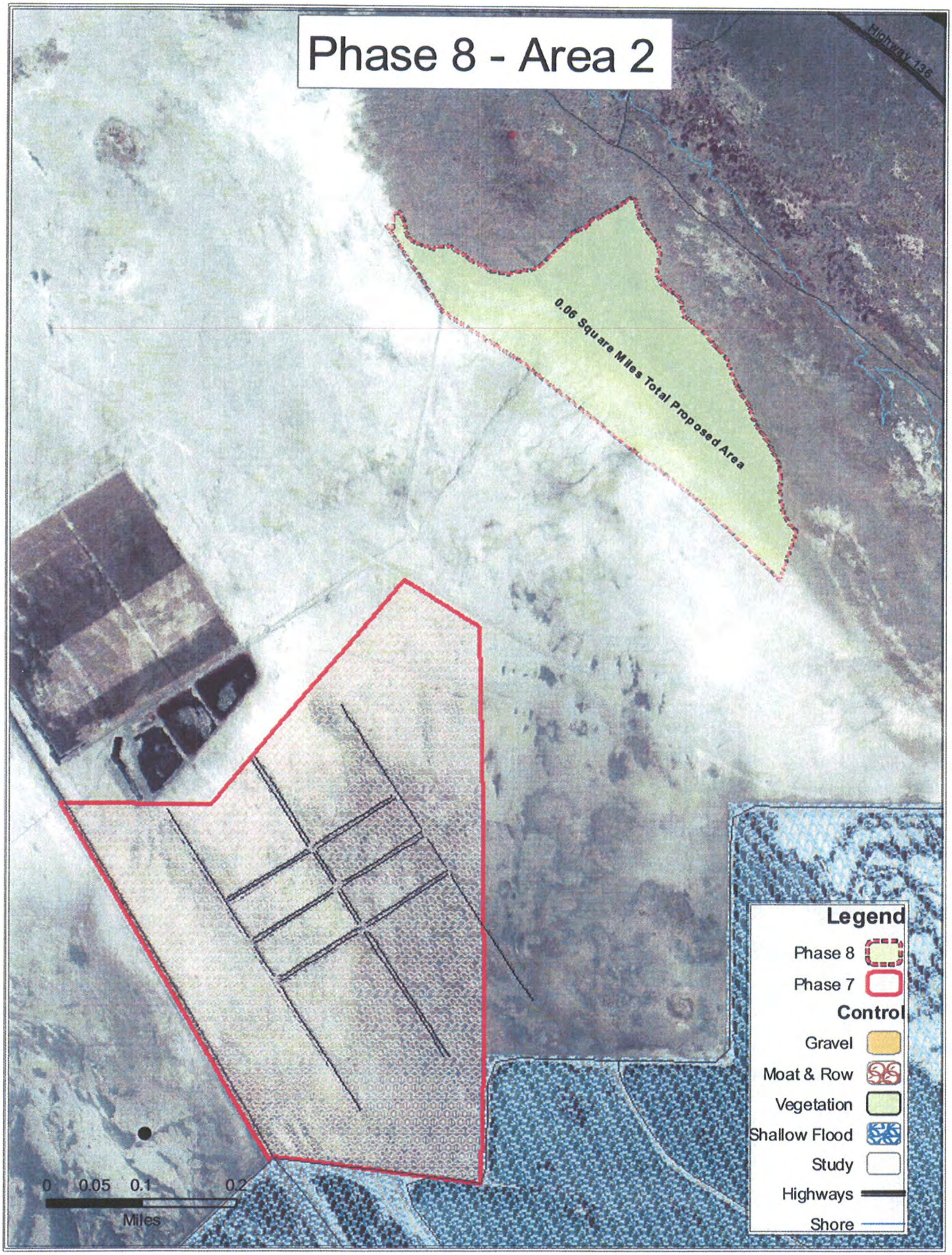
Non-primary Wind Protection (single tillage pass in north-south direction)

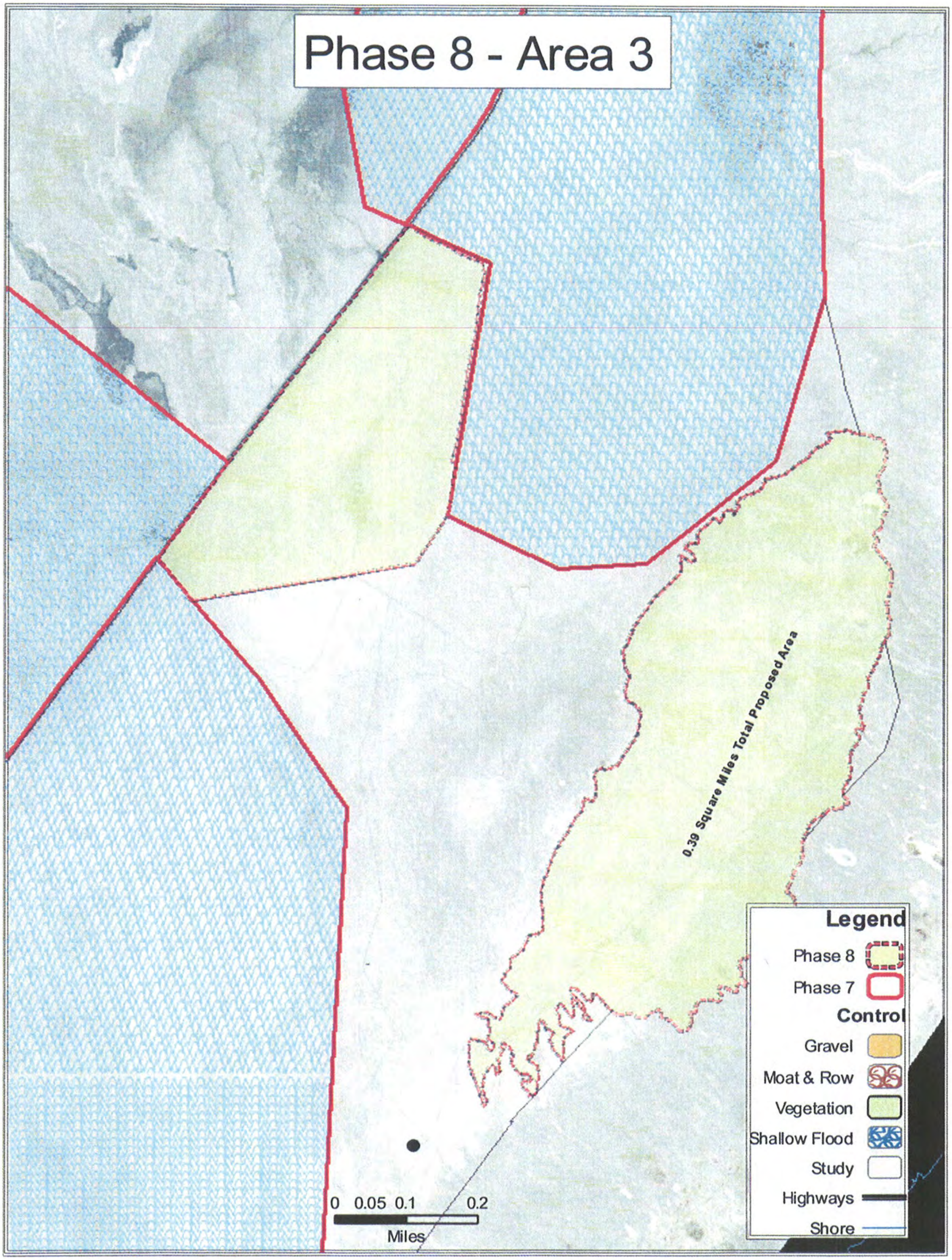

Phase 8
Phase 8 - Area 2
Exhibit 4, Page 3
Keeler
Phase 8 - Area 1
Exhibit 4, Page 2
Highway 136
Phase 8 - Area 3
Exhibit 4, Page 4
Highway 395
Legend
Phase 8
Phase 7
Control
Gravel
Moat & Row
Vegetation
Shallow Flood
Study
Highways
Shore
Olancha
0 1 2
Miles



Phase 8 - Area 1
1.54 Square Miles Total Proposed Area
0 0.05 0.1 0.2 0.3 0.4
Miles
Legend
Phase 8
Phase 7
Control
Gravel
Moat & Row
Vegetation
Shallow Flood
Study
Highways
Shore

Order Exhibit 4




Phase 8 - Area 3
0.39 Square Miles Total Proposed Area
Legend
Phase 8
Phase 7
Control
Gravel
Moat & Row
Vegetation
Shallow Flood
Study
Highways
Shore
0 0.05 0.1 0.2
Miles

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

EXHIBIT 4

PHASE 7A AND TRANSITION AREAS – MAP AND COORDINATE DESCRIPTION

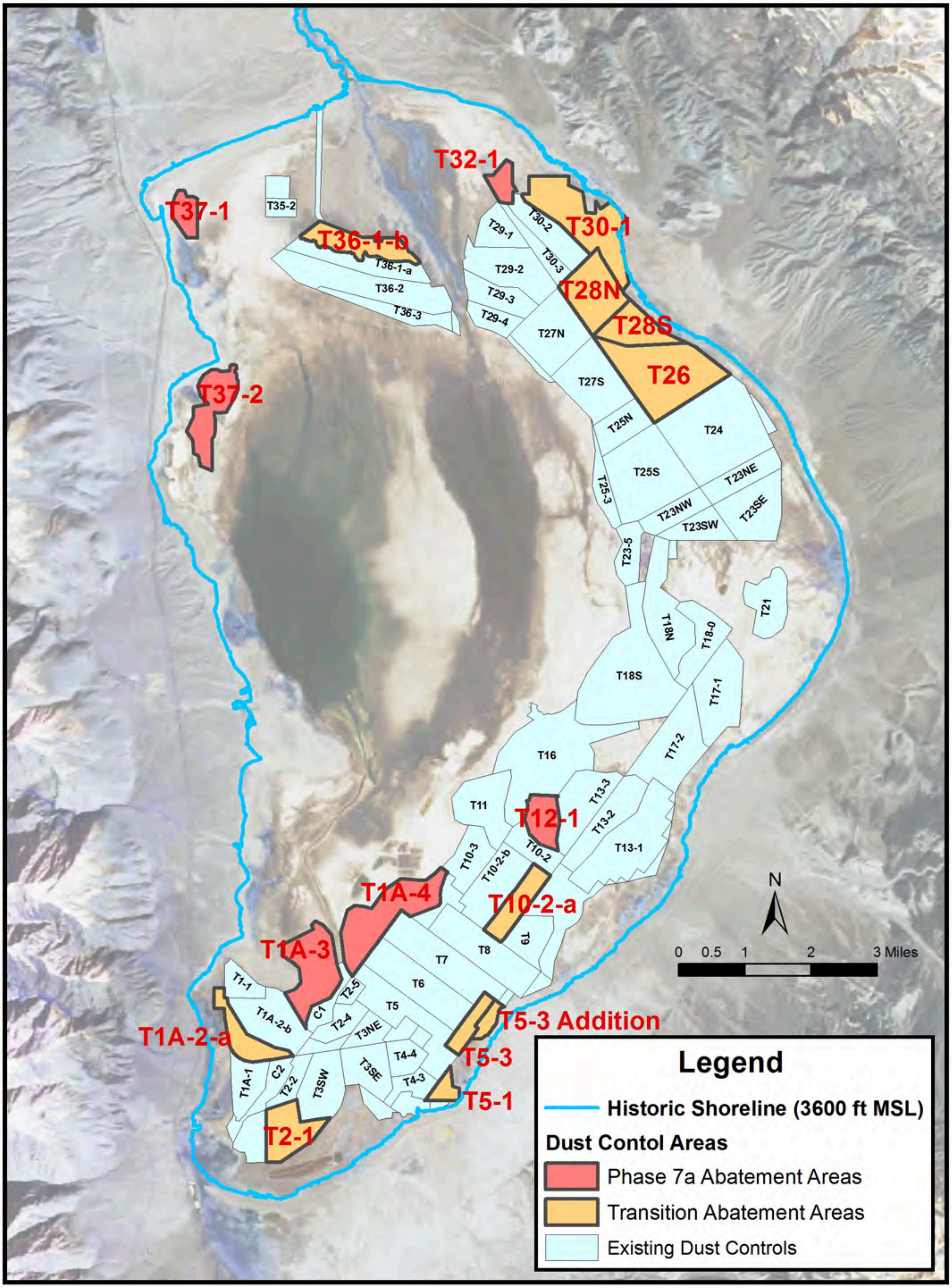

T32-1
T37-1
T35-2
T36-1-b
T36-1-a
T36-2
T36-3
T29-1
T30-2
T30-1
T30-3
T29-2
T28N
T29-3
T29-4
T27N
T28S
T26
T27S
T25N
T24
T25S
T23NE
T25-3
T23NW
T23SE
T23SW
T23-5
T21
T18N
T18-0
T18S
T17-1
T37-2
T16
T17-2
T13-3
T11
T12-1
T13-2
T13-1
T10-3
T10-2-b
T10-2
T1A-4
T10-2-a
T9
T8
T7
T1A-3
T6
T1-1
T2-5
T5
C1
T1A-2-b
T2-4
T3NE
T5-3 Addition
T1A-2-a
T4-4
T5-3
C2
T1A-1
T2-2
T3SW
T3SE
T4-3
T5-1
T2-1
N
0 0.5 1 2 3 Miles
Legend
Historic Shoreline (3600 ft MSL)
Dust Contol Areas
Phase 7a Abatement Areas
Transition Abatement Areas
Existing Dust Controls

Exhibit 4 - Transition Area coordinates

Area / ID	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T36-1-b	0.5	413,764.1054	4,040,897.1473
		413,669.6636	4,040,839.8789
		413,582.2166	4,040,888.1255
		413,502.8107	4,040,927.3259
		413,419.3842	4,040,936.3722
		413,341.9886	4,040,931.3465
		413,234.4388	4,040,920.2900
		413,135.9352	4,040,916.2694
		413,027.3803	4,040,929.3362
		412,940.9385	4,040,953.4595
		412,838.4144	4,040,996.6804
		412,764.0342	4,041,034.8757
		412,708.7516	4,041,060.0041
		412,662.5152	4,041,047.9425
		412,598.1864	4,041,042.9168
		412,528.8318	4,041,051.9630
		412,485.6109	4,041,074.0761
		412,453.4465	4,041,140.4152
		412,429.3232	4,041,154.4871
		412,394.1433	4,041,099.2045
		412,374.0406	4,041,062.0144
		412,382.0817	4,041,023.8192
		412,381.0765	4,040,991.6548
		412,349.9173	4,040,944.4133
		412,297.6501	4,040,937.3773
		412,255.4343	4,040,955.4698
		412,234.3264	4,040,987.6342
		412,213.2185	4,041,022.8140
		412,177.0335	4,041,044.9271
		412,166.9821	4,041,080.1069
		412,152.9102	4,041,111.2662
		412,125.7715	4,041,111.2662
		412,099.6379	4,041,117.2970
		412,083.5557	4,041,160.5180
		412,061.4426	4,041,145.4409
		412,038.3244	4,041,133.3792
		412,003.1446	4,041,136.3946
		411,963.9442	4,041,145.4409
		411,895.5948	4,041,147.4512
		411,845.3379	4,041,153.4820
		411,796.0862	4,041,157.5025
		411,747.8395	4,041,157.5025
		411,713.6648	4,041,170.5693
		411,693.5621	4,041,179.6156
		411,666.4234	4,041,191.6772
		411,639.2846	4,041,198.7132
		411,626.2178	4,041,216.8057
		411,597.0688	4,041,249.9752
		411,569.9301	4,041,253.9958
		411,529.7246	4,041,270.0780
		411,512.6372	4,041,282.1397
		411,492.5345	4,041,271.0831
		411,487.5088	4,041,289.1756
		411,464.3906	4,041,298.2219
		411,453.3341	4,041,291.1859
		411,422.1748	4,041,290.1808
		411,403.0772	4,041,309.2784
		411,394.0309	4,041,298.2219
		411,375.9384	4,041,288.1705
		411,343.7740	4,041,261.0318
		411,308.5942	4,041,273.0934
		411,269.3938	4,041,309.2784
		411,237.2294	4,041,342.4480
		411,228.1831	4,041,369.5867
		411,229.1883	4,041,404.7665
		411,217.1266	4,041,423.8641
		411,187.9776	4,041,424.8693
		411,167.8749	4,041,436.9309
		411,147.7721	4,041,429.8950
		411,134.7053	4,041,409.7922
		411,085.4535	4,041,420.8487
		411,068.3662	4,041,421.8539
		411,050.2737	4,041,439.9463
		411,028.1607	4,041,444.9720
		410,992.9808	4,041,446.9823
		410,963.8318	4,041,474.1210
		410,934.6828	4,041,478.1416
		410,902.5184	4,041,478.1416

Area / ID	Area (miles²)	Coordinates(UTM Zone 11 meters NAD83) X-coordinates	Y_coordinates
T36-1-b *continued*	0.5	410,863.3180	4,041,486.1827
		410,840.9723	4,041,536.7786
		411,307.5628	4,041,894.7186
		411,328.7980	4,041,911.0091
		411,404.1637	4,041,882.1942
		412,344.1688	4,041,513.1631
		412,682.1021	4,041,508.1389
		412,652.1923	4,041,436.0645
		412,690.1314	4,041,406.0416
		412,833.6710	4,041,412.9149
		412,841.4082	4,041,505.7657
		413,191.4978	4,041,500.2871
		413,241.1227	4,041,488.5169
		413,443.2128	4,041,269.5238
		413,478.6456	4,041,158.2255
		413,561.2523	4,041,141.5984
		413,723.0869	4,040,965.9151
		413,764.1054	4,040,897.1473
T30-1	1.08	418,687.1386	4,040,203.3590
		418,155.9146	4,041,076.4185
		418,093.9730	4,041,254.0466
		417,921.3802	4,041,084.8832
		417,171.9137	4,041,828.3044
		416,322.8671	4,042,382.8026
		416,237.8729	4,042,517.5607
		416,238.8166	4,042,563.7458
		416,413.8960	4,042,560.2618
		416,415.9268	4,043,001.9282
		417,384.3152	4,042,993.4517
		417,370.6762	4,042,778.5344
		417,719.8507	4,042,619.4658
		417,792.5767	4,042,117.6796
		418,026.3192	4,042,090.2555
		418,032.4649	4,042,385.2584
		418,154.9595	4,042,206.3723
		418,410.5623	4,042,382.5975
		418,608.9968	4,042,170.9490
		418,642.6771	4,042,098.0531
		418,743.9293	4,042,022.1567
		418,637.1570	4,041,594.2678
		418,746.9274	4,040,943.5424
		418,839.1598	4,040,396.7884
		418,687.1386	4,040,203.3590
T28N	0.71	418,155.9146	4,041,076.4185
		418,687.1386	4,040,203.3590
		418,733.7251	4,040,126.7522
		418,872.7825	4,039,997.9387
		417,959.0480	4,039,116.3619
		417,255.4209	4,040,111.6752
		417,121.6189	4,040,304.5343
		417,473.8189	4,040,647.9564
		417,921.3802	4,041,084.8832
		418,093.9730	4,041,254.0466
		418,155.9146	4,041,076.4185
T28S	0.47	420,260.2740	4,038,939.6141
		418,789.3715	4,038,860.6801
		417,959.0480	4,039,116.3619
		418,872.7825	4,039,997.9387
		419,760.8752	4,039,175.2704
		420,260.2740	4,038,939.6141
T26	1.33	420,260.2740	4,038,939.6141
		420,448.8516	4,038,850.6281
		421,317.9300	4,038,183.2674
		419,459.5560	4,036,993.8362
		419,017.0594	4,037,619.7626
		417,959.0480	4,039,116.3619
		418,789.3715	4,038,860.6801
		420,260.2740	4,038,939.6141
T10-2-a	0.4	415,311.0176	4,024,665.3822
		415,423.1292	4,024,804.7239
		415,609.6721	4,025,037.9025
		415,772.8972	4,025,265.8994
		415,933.5314	4,025,483.5329

Exhibit 4 - Transition Area coordinates

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
	(miles^2)	X-coordinates	Y_coordinates
T10-2-a	0.4	416,086.3929	4,025,659.7123
continued		416,226.3001	4,025,838.4826
		416,368.7982	4,026,053.5251
		416,524.5004	4,026,281.6892
		416,940.2572	4,025,981.7598
		416,222.2418	4,025,004.5422
		415,795.7936	4,024,428.4142
		415,752.1670	4,024,382.2273
		415,721.8772	4,024,363.7439
		415,402.7156	4,024,597.6328
		415,311.0176	4,024,665.3822
T5-3	0.22	415,580.7123	4,022,964.7690
		415,520.5385	4,022,883.3346
		415,380.8866	4,022,694.3156
		415,192.7623	4,022,439.6891
		415,127.4250	4,022,351.2549
		415,106.6479	4,022,323.0048
		415,148.1754	4,022,285.3898
		415,178.1077	4,022,263.0525
		415,146.6854	4,022,220.5223
		414,989.6965	4,022,007.9919
		414,750.3341	4,021,684.0582
		414,700.1075	4,021,616.0524
		414,376.5555	4,021,855.0570
		414,426.4783	4,021,922.6108
		414,615.6262	4,022,178.5720
		414,854.5912	4,022,502.0156
		415,093.6715	4,022,825.5607
		415,332.6768	4,023,149.0322
		415,453.5288	4,023,059.7725
		415,580.7123	4,022,964.7690
T5-3	0.12	415,815.3044	4,022,792.4623
Addition		415,748.1977	4,022,764.6488
		415,699.5372	4,022,723.3612
		415,670.0461	4,022,679.1244
		415,672.9952	4,022,639.3114
		415,650.8768	4,022,577.3799
		415,643.2259	4,022,531.0919
		415,621.3856	4,022,398.9584
		415,574.1998	4,022,322.2813
		415,529.9630	4,022,266.2481
		415,496.0482	4,022,202.8421
		415,434.1167	4,022,145.3343
		415,404.6256	4,022,093.7248
		415,361.8634	4,022,096.6739
		415,302.8811	4,022,046.5389
		415,242.8901	4,022,005.1797
		414,989.6965	4,022,007.9919
		415,146.6854	4,022,220.5223
		415,178.1077	4,022,263.0525
		415,148.1754	4,022,285.3898
		415,106.6479	4,022,323.0048
		415,127.4250	4,022,351.2549
		415,192.7623	4,022,439.6891
		415,380.8866	4,022,694.3156
		415,520.5385	4,022,883.3346
		415,580.7123	4,022,964.7690
		415,622.4090	4,022,934.9994
		415,656.1628	4,022,910.0892
		415,704.1714	4,022,874.5914
		415,815.3044	4,022,792.4623
T5-1	0.14	414,429.2165	4,020,500.8382
		414,232.1268	4,020,501.5982
		414,001.4695	4,020,502.4758
		413,877.7052	4,020,502.9468
		413,893.6355	4,020,524.5934
		413,982.9758	4,020,645.4436
		414,160.6092	4,020,885.8261
		414,222.0726	4,020,969.0150
		414,461.0480	4,021,292.4897

Area / ID	Area	Coordinates(UTM Zone 11 meters NAD83)	
	(miles^2)	X-coordinates	Y_coordinates
T5-1	0.14	414,505.9987	4,021,353.3100
continued		414,557.3614	4,020,853.0235
		414,632.3454	4,020,832.6501
		414,717.5371	4,020,809.5032
		414,704.8599	4,020,499.7994
		414,429.2165	4,020,500.8382
T2-1	0.52	410,856.3054	4,019,986.9089
		411,246.3282	4,020,045.5553
		411,579.3994	4,020,095.6486
		411,149.7636	4,019,542.1549
		410,360.7181	4,019,008.5005
		410,025.1591	4,019,002.0354
		410,021.5195	4,020,289.5251
		410,764.8535	4,020,543.1808
		410,856.3054	4,019,986.9089
T1A-2-a	0.38	409,073.6678	4,023,000.0598
		409,093.8737	4,022,865.3802
		409,543.4247	4,022,121.7619
		410,232.9617	4,021,797.2739
		410,570.9701	4,021,719.5320
		410,673.5282	4,021,587.2606
		410,350.3675	4,021,535.4504
		410,110.0532	4,021,493.3823
		410,079.1896	4,021,494.7189
		409,975.4401	4,021,479.1354
		409,886.0723	4,021,465.7122
		409,835.6679	4,021,458.1413
		409,774.5213	4,021,449.4157
		409,734.0450	4,021,446.0422
		409,702.2970	4,021,445.4495
		409,667.1756	4,021,446.5232
		409,628.6050	4,021,450.2633
		409,587.0138	4,021,456.9762
		409,541.7453	4,021,467.7021
		409,509.3814	4,021,477.5621
		409,469.1538	4,021,492.9143
		409,430.4700	4,021,510.7705
		409,394.2697	4,021,530.5798
		409,359.8403	4,021,552.6623
		409,323.3516	4,021,579.8075
		409,294.6311	4,021,604.2271
		409,273.6568	4,021,624.1573
		409,252.5708	4,021,646.4477
		409,225.4173	4,021,678.7661
		409,209.7590	4,021,699.6128
		409,194.6701	4,021,721.5470
		409,179.6823	4,021,745.9744
		409,163.9608	4,021,774.2356
		409,149.2804	4,021,803.3442
		409,108.8160	4,021,989.7821
		409,094.0513	4,022,070.0886
		409,085.6763	4,022,117.5963
		409,078.4606	4,022,146.7713
		409,062.7226	4,022,238.2376
		409,046.0396	4,022,310.3637
		409,031.2722	4,022,390.1936
		409,011.1297	4,022,508.5332
		409,005.5373	4,022,622.1243
		409,000.7984	4,022,749.8012
		408,748.7645	4,022,752.2163
		408,748.6344	4,022,994.9303
		408,752.0708	4,023,250.6832
		409,002.0721	4,023,249.9209
		408,999.6293	4,023,000.2258
		409,073.6678	4,023,000.0598

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

EXHIBIT 5

PHASE 7A AND TRANSITION AREAS PROJECT DESCRIPTION

OWENS LAKE PHASE 7A AND TRANSITION AREAS DUST CONTROL MEASURES

PROJECT DESCRIPTION

February 2011

The Phase 7a Project consists of a total of 3.1 square miles of new dust control measures (DCMs) and 3 square miles of transitioned dust controls for a total area of 6.1 square miles. The 3.1 square miles of new DCMs consist of 6 separate subareas. Within five of these subareas totaling 2.77 square miles, the Los Angeles Department of Water and Power (LADWP) will implement current Best Available Control Measures (BACM) including Gravel Cover, Shallow Flooding, and Managed Vegetation. The remaining sixth area with an area of 0.33 square miles is currently planned for a tillage BACM test. (**Figure 1**). The Phase 7a project components are:

- Shallow Flooding in T1A-4 and a portion of T37-2
- Managed Vegetation in T32-1 and a portion of T37-2
- Gravel Cover in T37-1 and T1A-3
- A Tillage BACM test in T12-1

Water demand related to implementation of BACM on the new Phase 7a dust control areas (DCAs) will be balanced with water conservation measures at existing DCAs, including:

- Conversion of approximately 3 square miles of existing Shallow Flooding to a hybrid of BACM including Managed Vegetation, Gravel Cover and Shallow Flooding (Transition Areas). The 3 square miles of Transition Areas will be selected from the following 6 square miles of existing Shallow Flooding areas: T1A-2_a, T10-2_a, T2-1, T5-1, T5-3, T5-3 Addition_a, T5-3 Addition_b, T26, T28N, T28S, T30-1_a, T30-1_b, and T36-1_b

- Optional Additional Component - Conversion of existing Shallow Flooding areas T35-1 and T35-2 to Gravel Cover, potentially including installation of a water supply pipeline (and access roadway) to the western and northern perimeter of T37-1 to enhance vegetation growth

1.1 SHALLOW FLOODING

1.1.1 Shallow Flooding Description

This dust control measure (DCM) consists of releasing water into a bermed DCA and allowing it to spread, wet the surface, and thereby suppress windborne dust. In order to meet the requirements for dust control in the 2008 SIP for Shallow Flooding, at least 75% of the surface must be wet or have saturated soil. There are two general methods of Shallow Flooding: 1) Ponding and 2) Lateral Shallow Flooding. The Shallow Flooding planned in the Phase 7a project consists of Lateral Shallow Flooding. The performance requirements for Shallow Flood BACM are set forth in detail in the 2008 SIP. Nothing in this document is intended to supersede SIP requirements.

Lateral Shallow Flooding is proposed for subarea T1A-4 and a portion of subarea T37-2 (the portion where vegetation cannot be established). Located in the southern portion of the dry lake adjacent to the existing Managed Vegetation areas (T5 through T8), Subarea T1A-4 occupies approximately 0.97 square miles. Area T37-2 is located on the western edge of the lake, west of the brine pool and occupies approximately 0.59 square miles. It is estimated that the Shallow Flood portion of T37-2 will comprise approximately two-thirds of T37-2.

A lateral Shallow Flooding network for T1A-4 will include two 18- to 24-inch diameter buried pipelines (mainlines) that will supply water to the lateral submains (4- to 12-inch diameter buried pipelines), which will be spaced up to 1,400 feet apart. The network includes a modified whipline array (diameter to be determined by available equipment and cost), spaced up to 120 feet apart and with a length of up to 700 feet. The whipline array includes sprinkler heads spaced up to 70 feet apart or bubblers. Laterals up to 4,000 feet in length will have risers with drains at the end. Lateral valves will be placed at each intersection with the mainline. Flush lines will be incorporated for sprinkler drainage and to reduce plugging. A small pump station (capacity determined by infrastructure installed) will be located at the lowest point to drain the system. Drain water will most likely be recycled within T1A-4. A second supply alternative to TA1-4 will also be evaluated during project design that consists of a single 24-inch mainline connected to the zonal mainline near the T1A-1 turnout.

The components of the lateral Shallow Flooding network for T37-2 are similar to the Shallow Flooding design for T1A-4, with the exception of spacing. The lateral submains will be spaced up to 1,000 feet apart. The whiplines in T37-2 will be up to 500 feet long and spacing will be up to 60 feet. Approximately the western third of this area will be designed, constructed, and operated as Managed Vegetation.

Turnout Facilities. Water to the lateral Shallow Flooding will be distributed to the lake bed DCAs via area turnouts. Turnouts consist of above grade piping, pressure reducing valves (PRV), control valves (CV), magnetic flow meters (or flow elements, FE), isolation valves, combination air-vacuum release valves (CARV), pressure indicating transmitters (PIT), filtering system control valve filters, electric equipment, and monitoring and automatic control instrumentation. The turnouts are typically constructed on raised earthen pads adjacent to the DCAs. The turnouts include mechanical equipment and electrical equipment on concrete pads; **Figure 2** is an existing turnout located on the lakebed. It is anticipated that four turnouts will be constructed under the Phase 7a project.

The turnouts will be connected to the zonal mainline that is a continuous loop connecting to the Los Angeles Aqueduct at the north and south ends of the Owens Lake Dust Mitigation Program (OLDMP) area. T1A-4 and T32-1 will require new connections to the zonal mainline. T37-1 will be connected to an existing submain near the end of Corridor 1 Road. The Corridor 1 Road submain is connected to the zonal mainline.

Water enters a Shallow Flood area through PRVs, located at the turnouts. The turnouts distribute freshwater to the DCAs via area Shallow Flood submains. The PRVs at the turnouts function to lower the zonal mainline pressure to the submain operating pressure for the shallow pond submains. The PRVs at the laterals function to control and further lower the Shallow Flood submain pressure to the lateral operating maximum pressure.

Figure 2
Existing Turnout on Owens Dry Lake

Source: LADWP, November 2010 (T1A-2)

The PRVs at the turnouts are hydraulically controlled valves. These valves operate by using pilot water (supplied by the freshwater from the submains) to control the valves. The freshwater from the submains contain large quantities of sediments which will clog up the PRVs. To prevent the PRVs from clogging, the pilot water is diverted through a separate pilot water filtration system. Tailwater and Drainwater pump stations collect and recirculate flow within a given DCA and submain to optimize use of water within the irrigated zone and minimize loss of water offsite.

New Supply Pipeline. A new supply pipeline will be required to deliver water from T36-2 to T37-2. An up to 30-inch high density polyethylene (HDPE) pipeline will be installed underneath a new roadway to be built between these two DCAs. The approximately 1.7 mile roadway is required to enable year-round accessibility for maintenance of the up to 30-inch HEPE pipeline and the T37-2 irrigation system (**Figure 1**). The roadbed will be raised approximately 3 feet, with culverts installed to prevent stormwater from being impounded. Additionally, a vehicle bridge (approximately 16 feet wide, 1 to 2 feet high prefabricated or possibly portable bridge) may be installed between the northern and southern portions of T37-2 for maintenance access.

1.1.2 Shallow Flooding Construction

Construction of Shallow Flood DCAs for Phase 7a is estimated to occur over 14 months at T1A-4 and at T37-2 with the heaviest levels of construction activity occurring during the dry season. Anticipated sequential activities are:

- Installation of new turnouts
- Land leveling
- Installation of berms
- Pipe and electrical cable excavation
- Placement of irrigation pipes and sprinklers

To the maximum extent feasible, earthwork in each area will be balanced onsite. As suitable, onsite material will be used to build berms and turnout earthen pads. In some cases, suitable material may be disked and spread to reduce moisture content before placement. Sand bedding, base course, and riprap will be imported to the DCAs. It is anticipated that this material will be obtained from a local gravel production operations such as the LADWP Shale borrow pit and the Federal White Aggregate (F.W. Aggregate) Dolomite mine.

Land leveling will be performed based on existing topography and final design to achieve required 75% surface cover of water and consideration of excavation of suitable material for berm and turnout pad construction. It is anticipated that berm heights will vary from 3 to 5 feet and the turnout earthen pads may range up to 5 to 8 feet in height to protect facilities from localized flooding. Over excavation will be done underneath proposed earthen berm alignments to remove any unsuitable material. Geotextile fabric will then be placed directly on the existing surface to create a firm base. The earthen berm will be constructed over the geotextile fabric. Earthen berm side slopes facing water will be armored with riprap. Earthen berm slopes not directly in contact with water and travel surfaces will be covered with road base.

1.2 MANAGED VEGETATION

1.2.1 Managed Vegetation Description

Vegetation on the playa reduces sand motion and soil erosion. Aboveground cover acts as a wind break, lowering the velocity at the playa surface. Under Phase 7a, Managed Vegetation is proposed for the 0.16-square-mile area in T32-1, which is located in the northeast portion of the dry lake, and for a portion of the western half of T37-2; the specific acreage of Managed Vegetation will be determined based on soil conditions at the time of construction.

Currently, only saltgrass (*Distichilis spicata*) is approved as a vegetation dust control measure on Owens Lake; existing Managed Vegetation areas T5 through T8, located in the southeastern portion of the dry lake, are planted with saltgrass. A revised plant species list for Owens Lake BACM was recently developed and has been approved by the Great Basin Unified Air Pollution Control District (District), but awaits approval by the California State Lands Commission. The plant species on this list meet the locally-adapted native criterion specified by the 2008 State Implementation Plan (SIP) adopted by the District. In addition to saltgrass, 39 species have been proposed to increase the habitat diversity of the Managed Vegetation areas, reduce fertilizer need, and increase the diversity and amount of seed produced on the playa for use in future projects (**Table 1**). The final species mix in T32-1 and T37-2 will depend on the availability of planting material, and suitability of species to soil and hydrologic conditions. The T32-1 area is relatively well drained and will probably be reclaimed (i.e., decline in salinity) fairly rapidly. T37-2 is less well drained and may require additional time for reclamation. The initial cover may be achieved by fast-growing species, but after some time, the stand will probably change and diversify, partly from planted material, and partly from volunteer plants establishing from windblown seed.

An existing supply of 600 pounds of saltgrass seed is stored by S&S Seeds (in Carpinteria, California), and is available for use. Although seed of most species other than saltgrass will need to be collected, some additional seed may be available commercially. If the full complement of desired species is not available initially, the area may be over-seeded or interplanted with additional species in the future.

Seed supply for T32-1, T37-2 and the Transition Areas will be collected by hand, and by targeted mowing of existing vegetated DCAs. Seed of some herbaceous species may be multiplied by planting in managed areas and then harvesting. Once collected and cleaned, seed will be tested for germination, dried, and stored. Before planting, some seed may require special treatment to break dormancy. While seeding is preferred, some species may also be transplanted to accelerate establishment of vegetative cover. The finished landscape will consist of a variety of plants native to the Owens Valley area.

The goal for these areas will be to establish a compliant vegetative cover (per cover requirements in the SIP) as quickly as possible. Vegetative cover is assessed each fall, and compliance is determined by comparing cover levels with criteria contained in the BACM definition. The criteria contained in the 2008 SIP are currently in effect, but a modification providing for the compliance methodology on existing Managed Vegetation area to be applied to new managed Vegetation areas is pending before the District's Board, having already gained a staff recommendation for approval. These new criteria accommodate levels of soil and drainage variability that occur on the playa, while maintaining needed levels of dust control. They are likely to be the basis for evaluating new Managed Vegetation on Owens Lake. The criteria have been applied to the existing

Managed Vegetation site during the 2009 and 2010 seasons under a Managed Vegetation Operations and Management Plan with good agronomic and dust control results.

With fall seeding, a fast-growing early-cover species mix, and potentially some spring transplants, compliance in these areas may be achieved during the first growing season. In the event that this does not occur, areas with the most limited growth would be assessed for drainage limitations. Drainage would be improved by constructing surface, French, or subsurface drains, and the area might be replanted. The site would continue to be managed to comply and/or control dust as swiftly as possible.

Table 1
Species Proposed for Managed Vegetation DCAs

Scientific Name	Common Name
Alkali Marsh Species	
Amphiscirpus nevadensis	Nevada bulrush
Anemopsis californica	Yerba mansa
Schoenoplectus maritimus	Saltmarsh bulrush
Cordylanthus maritimus	Bird’s beak
Distichlis spicata	Saltgrass
Eleocharis parishii	Spikerush
Frankenia salina	Alkali heath
Helianthus annuus	Sunflower
Heliotropium curassavicum	Heliotrope
Juncus arcticus var. balticus	Wire rush
Juncus arcticus var. mexicanus	Mexican rush
Nitrophila occidentalis	Alkali pink
Poa secunda	Blue grass
Schoenoplectus americanus	Bulrush
Sporobolus airoides	Alkali sacaton
Sesuvium verrucosum	Verrucose seapurslane
Playa Scrub Species	
Atriplex confertifolia	Shadscale
Atriplex lentiformis ssp. torreyi	Torrey's saltbush
Atriplex parryi	Parry's saltbush
Atriplex phyllostegia	Leafcover saltweed
Cleome sparsifolia	Fewleaf bee plant
Cleome lutea	Yellow bee plant
Cressa truxillensis	Alkali weed
Kochia californica	Mojave red sage
Poa secunda	Blue grass
Sarcobatus vermiculatus	Greasewood
Suaeda moquinii	Bush seepweed
Chrysothamnus nauseosus	Rubber rabbitbrush
Machaeranthera carnosa	Shrubby alkaliaster

Marsh and Riparian Species	
Paspalum distichum	Knotgrass
Populus fremontii	Fremont cottonwood
Salix lasiolepis	Arroyo willow
Schoenoplectus californicus	Bulrush
Typha domingensis	Southern cattail
Typha latifolia	Broad-leaved cattail
Cyperus laevigatus	Smooth flatsedge
Juncus torreyi	Torrey's rush
Triglochin concinna	Slender arrowgrass
Muhlenbergia asperifolia	Scratchgrass
Phragmites australis	Common reed

1.2.2 Managed Vegetation Construction

During installation and establishment, several steps will be required to create an environment where plants can thrive on the otherwise dry and hypersaline playa:

- Irrigation systems will be installed and may include sprinklers, bubblers or drip irrigation. For areas with sprinklers or bubblers, irrigation piping will be buried to avoid damage from traffic, animals, temperature fluctuations, and UV radiation. Sprinkler heads or bubblers in these areas will rise from the buried laterals to allow water to be dispersed across the planted area during irrigation. Some irrigation systems (i.e., drip irrigation) require filtration of water; filters would be located at the turnout, and at times in the field. Liquid fertilizer will periodically be blended into irrigation water at relatively low rates that have been shown to accelerate growth and increase salinity tolerance (and therefore plant growth and survival) of several native species that have been studied on Owens Lake. Fertilizer tanks with associated injection pumps and containment will be needed in close proximity to Managed Vegetation areas.

- Broad, raised ridges will be formed to provide a reclaimed drained area within which plants can grow. Without this feature, saline shallow groundwater can easily invade the root zone, especially during and after storms, and kill plants. The ridges will be laid out such that they traverse topographic contours, allowing surface water to drain downhill along the low areas. Closed depressions that would otherwise prevent surface drainage will be opened by grading. Starter fertilizer needed to promote early growth and expansion will be applied and incorporated into the soil. The amounts of fertilizer applied to native plant stands are typically very low relative to what is used for agricultural production, but the ability of plants to tolerate drought and salinity, and to rapidly expand to protect the soil, is greatly enhanced.

- Initial reclamation (reduction of salt concentration in the surface soil by irrigation) will be completed before planting. This will likely require several irrigation events that may occur over up to 30 or 40 days. Once monitored soil salinity levels have declined to acceptable levels, the land will be allowed to dry sufficiently until it can again bear equipment traffic.

- Seeding will be done with a brillion seeder (wheeled seed bin that tows behind a tractor) and an air disc/drill. Seed is dispensed from the bottom of the box and buried by pulverizing discs that also break up surface soil, providing good seed-soil contact needed for germination and emergence.

1.3 GRAVEL COVER

1.3.1 Gravel Cover Description

Under the Phase 7a project, LADWP will install a 4-inch layer of coarse gravel to T37-1 and T1A-3, and potentially T35-1 and T35-2, to reduce PM_{10} emissions by: (a) preventing the formation of efflorescent evaporite salt crusts at the surface, because the large pore spaces between the gravel particles disrupt the capillary movement of saline water to the surface where it can evaporate and deposit salts; and (b) creating a surface that has a high threshold wind velocity so that direct movement of the large gravel particles is prevented and the finer particles of the underlying lake bed soils are protected.

The term “gravel” includes clasts from both fluvial and alluvial sources and crushed stone. The gravel will be screened to greater than ½-inch in diameter, pursuant to the specifications issued by the District (District, 2008). Gravel application will include approximately 122,000 tons distributed over 0.21 square miles of T37-1, 447,000 tons distributed over 0.79 square miles of T1A-3, 67,000 tons distributed over 0.11 square miles of T35-1, and 92,000 tons over 0.15 square miles of T35-2. A total of 728,000 tons of gravel is proposed to be spread over the four areas.

Gravel Sources. It is anticipated that gravel will be obtained from local gravel production operations such as the F.W. Aggregate Dolomite mine or the LADWP State Route 136 Shale borrow pit (LADWP Shale borrow pit). The LADWP Shale borrow pit is located just west of the Keeler Fan gravel site – a site previously considered as a gravel source and referenced in the Memorandum of Agreement between LADWP and the District (1998 MOA). The LADWP Shale borrow pit is located east of SR 136, approximately 1.5 miles southeast of Keeler, and less than 2 miles from the lakebed. The LADWP Shale borrow pit is located on public lands managed by the U.S. Bureau of Land Management (BLM) and operated per the requirements of the Surface Mining and Reclamation Act (SMARA). Shale is a fine-grained sedimentary rock consisting of compacted and hardened clay, silt or mud. The LADWP Shale borrow pit is currently permitted for 40 acres of development.

The F.W. Aggregate Dolomite mine is a privately owned commercial aggregate facility located in Dolomite, California, approximately 0.75 miles southeast of Swansea. The access point for the mine is directly off SR 136, between Swansea and Keeler. The Dolomite mine is situated on both privately owned lands and public lands managed by the BLM. Three subareas of the mine (Durability, North Pole, and Translucent) total approximately 480 acres and are able to produce up to 50 million tons; the site is permitted up to the year 2057 (T. Lopez, pers. comm., June 25, 2010). Rock at the F.W. Aggregate site is obtained from a dolomitic limestone source (mountain face), which is blasted and crushed to supply primarily white decorative rock. The existing 0.14 square miles of Gravel Cover DCM area (Corridor 1 which separates Phase 8 Areas A and B) was covered with limestone from the Dolomite mine. This source has also supplied other areas on the lakebed where gravel and rip-rap were necessary for road construction and for armoring of berms.

Gravel Coloration. Per the terms of the 1998 MOA, gravel used for dust control on Owens Dry Lake shall be comparable in coloration to the lake bed soils.

Gravel Effectiveness. The effectiveness of Gravel Cover is summarized from the 2008 SIP (District, 2008). According to the District, gravel blankets (also known as Gravel Cover) are effective at controlling dust emissions on essentially any type of soil surface. A gravel layer forms a non-erodible surface when the size of the gravel is large enough that the wind cannot move the surface. If the gravel surface does not move, it protects finer particles from being emitted from the surface. Gravel and rock coverings have been used successfully to prevent wind erosion from mine tailings in Arizona (Chow and Ono, 1992).

The District estimated the potential PM_{10} emissions from a gravel layer using the U.S. Environmental Protection Agency (USEPA) emission calculation method for industrial wind erosion for wind speeds above the threshold for the surface (District, 2008). PM_{10} will not be emitted if the wind speed is below the threshold speed. With a minimum particle size of ½ inch, a gravel layer will have a threshold wind speed of more than 90 miles per hour measured at 10 meters (USEPA, 1992; Ono and Keisler, 1996). The District predicted that PM_{10} emissions would be virtually zero for a gravel layer since the threshold wind speed to entrain gravel, and thus PM_{10}, is above the highest wind speeds expected for the area. A 100 percent reduction of PM_{10} from areas that are covered by gravel was predicted.

The proposed 4-inch thick gravel layer is intended to prevent capillary movement of salts to the surface. Were fine sands and silts to fill in void spaces in the gravel, capillary rise of salts might ensue and reduce the dust control effectiveness of a gravel layer. In addition, finer particles would lower the average particle size and lower the threshold wind speed for the surface. The District performed small-scale gravel test plots at two sites on Owens Lake starting in June 1986. These tests showed that 4-inch thick gravel blankets composed of ½- to 1½-inch and larger rocks prevented capillary rise of salts to the surface. Observations of un-graveled test plots in the same area, one with no surface covering and another with local unscreened alluvial soil, showed that salts would otherwise rise to the surface (Cox, 1996).

Permeable Geotextile Fabric. Gravel Cover will be placed over a nonwoven geotextile fabric (anticipated to be approximately 2.3 millimeter (90 mils) thick) to prevent gravel from settling into lakebed sediments and thereby losing effectiveness in controlling dust emissions. The permanent geotextile will be permeable to allow draining. Geotextile membranes are artificial fabrics that have a variety of uses including: filtration/drainage, ground stabilization, structural waterproofing, land containment, as well as weed and root control. The geotextile is chemically inert and generally not affected by acids and alkalis that may be present in the soils.

Access Roadways for Gravel Areas. The boundaries surrounding T37-1 and T1A-3 will have raised roadbeds for vehicle access and for wind protection to limit sand inundation of the gravel. The roadbeds will be earthen, approximately 3 feet high, 16 feet wide and armored with gravel. Vehicle bypass pads (turnoff or turnaround pads) (approximately 20 ft by 40 ft in area) will facilitate vehicle travel in two directions. Geotextile fabric may be placed directly on the existing surface to create a firm base. The earthen raised roadway will be constructed over the geotextile fabric. Earthen side slopes facing water or adjacent to potential runoff flows will be armored with rip rap. Earthern slopes not directly in contact with water and travel surfaces will be covered with road base. Installation of access roadways on the boundaries of T37-1 and T1A-3 will include earthwork inside of the boundary of the DCAs; suitable earth material will be scraped, used to construct the raised roadway, and then the area will be smoothed to an even slope. Base course (crushed rock less than ¾ inch) from a local gravel source would then be placed on the travel surface. To the extent feasible, Gravel Cover for the access roadways shall be consistent with the type, size, and color of the Gravel Cover placed on the adjoining lakebed areas.

1.3.2 Gravel Cover Construction

Gravel installation at T1A-3 and T37-1 for Phase 7a is estimated to occur over an approximately 12 month period. Construction activities are:

- Development of gravel stockpile area
- Installation of access roadways
- Gravel conveyance
- Geotextile and Gravel installation

Gravel Stockpile. Gravel stockpile areas will be developed within the boundaries of both T1A-3 and T37-1. These areas will be covered with aggregate to prepare the sites for gravel deliveries during the initial months of construction. Dump trucks will deposit gravel and a dozer will be used to pile the aggregate. Assuming 25 tons per truck, approximately 3,000 tons per day will be transported to each staging area location. Gravel transport will continue throughout the construction period concurrent with geotextile fabric and gravel installation. From the stockpile location, low ground pressure (LGP) vehicles will be used for travel directly on the playa.

Gravel Conveyance. If gravel is obtained from the LADWP Shale borrow pit, trucks will cross SR 136 to Sulfate Road to Main Line Road and then to the stockpile locations (at T37-1 or T1A-3). Although a conveyor is not currently installed at the borrow pit, if one was constructed in the future it could be used to convey gravel across SR 136 to the

LADWP Sulfate Facility and then trucks would be used to transport gravel to the stockpile locations.

If gravel is obtained from F.W. Aggregate Dolomite mine, trucks will cross SR 136 to the T30 road to Main Line Road and then to the stockpile locations (at T37-1 or T1A-3).

Geotextile Installation. Before installation of the geotextile membrane, minor land leveling may be required in areas where obstructions will damage the fabric. A pipe dragged behind a tractor will remove localized high and low spots and prepare the surface; there will be no import or export of soils related to this minor site preparation. It is assumed that the fabric will be delivered to the site on spools carried by flatbed trucks. Small areas of fabric will be rolled out and staked to secure them before gravel installation.

The two vehicle and equipment staging areas previously used (for Phases 7 and 8) will be used for Phase 7a. These previously disturbed sites are located near the intersection of Main Line Road and Corridor 1 at the north end of the lake (20 acre site) and at the southern end of the lake adjacent to Dirty Socks Access Road (3.75 acre site). In addition to office trailers and equipment and vehicle storage, these areas will have fueling stations for gas and diesel. Fuel trucks will be used to refuel construction equipment (including the low ground pressure gravel trucks) and the long haul gravel trucks; no vehicle fuels or oils will be stored in the gravel stockpile areas. Additionally, refueling may occur at the existing LADWP Sulfate facility. Once the geotextile is staked, dozers and ground crews will spread gravel to the required 4-inch thickness. Depending on site conditions, conveyors may be used internally within the DCM boundaries to move gravel from the stockpile locations to other areas of the DCM site.

The onsite construction workforce will consist of laborers, supervisory personnel, support personnel, and construction management personnel. The onsite workforce is expected to reach a maximum of approximately 140 workers during the gravel and geotextile installation.

1.4 TILLAGE

Tillage is commonly used to control wind erosion in agricultural and arid regions around the world. It works by clodding and roughening the soil surface, rendering it more resistant to wind erosion. Surface roughness reduces the wind velocity at the surface, so that windblown soil particles like sand are trapped. The creation of soil clods through appropriate tillage methods forms a stable surface resistant to wind erosion by binding of the available fine-grained loose soil particles.

Tillage was previously applied on the playa of Owens Lake for temporary dust control in some Shallow Flooding construction areas (T21-A, T21-B, T18-O, T17-1_a, T17-2_a, T16, T10-2_b, and T10-3) between October 1, 2009 and April 1, 2010. This tillage may have reduced the frequency and intensity of observed emissions within these areas, even when wind erosion occurred within untilled areas immediately adjacent.

Under Phase 7a, a tillage management plan would be implemented as part of a new BACM test on 0.32 square miles of T12-1, an area with relatively heavy (rich in clay and silt) soils. The BACM test plan (in draft) states that the area will be initially tilled and then once it begins to deteriorate such that it does not meet required control dust efficiency it will be sprinkler irrigated to increase soil moisture. Irrigation will be followed by re-tilling to re-establish needed dust control efficiencies. Irrigation piping (submains and whiplines, flush lines connected to flush mains) would be buried more than 2 feet below the soil (such that they are below the reach of the tillage equipment) with sprinkler risers positioned throughout the DCA; the layout will be similar to the Shallow Flooding areas.

Tractors pulling plows or harrows will roughen the surface of T12-1 creating swaths of tilled ridges with spacing between swaths allowing for irrigation installation and maintenance, as well as monitoring access. The goal of the BACM testing will be to establish dust control efficiency relationships over a wide range of climatic conditions upon which to base performance specifications in a new BACM description. Over time, the surface roughness achieved by Tillage will begin to be altered by weathering and dust control efficiency may decline. The amount of fine material (sand and smaller particles) on the surface may change due to 1) disaggregation of soil, 2) crusting and re-aggregation of fine material, 3) deposition of transported fine material, and 4) erosion and export of material. When monitoring indicates that these processes have reduced the dust control efficiency achieved by Tillage to levels that threaten to violate air quality standards, the area will normally be re-tilled. The goal of re-tilling will be to restore erosion-resistant levels of roughness and aggregation. When Tillage control efficiency declines, the area will be irrigated to restore optimum soil moisture, and then re-tilled. Monitoring will include visual observations of surface conditions and other actions as outlined in the draft Tillage BACM Test Monitoring Plan (Air Sciences, 2010).

A complete tillage BACM test project plan must be submitted and approved by the District before any work in the T12-1 area can proceed. Tillage may be implemented in T12-1 before installation of the irrigation network. This tillage was considered in the Addendum to the Supplemental EIR for the Owens Lake Dust Control Measures (LADWP, 2010) for the Phase 7 project.

To minimize dust emissions during construction, areas will be tilled during low wind periods. To the extent feasible, installation will occur in the summer season when winds are relatively lower and when the playa tends to be less erodible. Tilling will be conducted in daylight hours without use of artificial lighting.

1.5 TRANSITION AREAS FROM SHALLOW FLOODING TO BACM HYBRID

New Shallow Flooding in subareas T1A-4 and T37-2, and new Managed Vegetation in T32-1 and T37-2, are estimated to require approximately 3,700 acre-feet per year (afy) of water. To provide water to these areas, approximately 6 square miles of 13 existing DCAs (T1A-2_a, T10-2_a, T2-1, T5-1, T5-3, T5-3 Addition_a, T5-3 Addition_b, T26, T28N, T28S, T30-1_a, T30-1_b, and T36-1_b) will be evaluated for transition from Shallow Flood to a hybrid mix of approved BACMs. Approximately 3 square miles will be converted under the Phase 7a project. Note that some areas identified for conversion are already partially vegetated. For example, T30-1 (_a and _b) is currently designated as Shallow Flooding by the LADWP and evaluated as Shallow Flooding by the District, despite significant vegetative cover. As of the end of 2010, vegetative cover in this area is being evaluated relative to proposed Managed Vegetation criteria. Areas that pass will be proposed to the District for evaluation as Managed Vegetation for compliance purposes. Area T36-1_b is also currently partially vegetated.

While 3 square miles of existing Shallow Flooding DCAs are proposed for transition to BACM Hybrid, approximately 6 square miles will be evaluated. Consideration of this larger area is proposed since soil and drainage data are limited; it is anticipated that some areas may prove too difficult to vegetate. Owens Lake soils present significant challenges (mainly a combination of very high salinity, extremely poor drainage, and low bearing capacity) for the establishment of compliant stands of vegetation. Ultimately, 3 square miles will be chosen from the 6 square miles studied for transition as part of the Phase 7a project.

The proposed Transition Areas will be developed as BACM Hybrid. Each portion of these areas would be evaluated as an existing (per the SIP definition) dust control measure for compliance purposes. Under the Hybrid concept, approximately two-thirds of the area will be a mix of Shallow Flooding and Managed Vegetation and up to one third will be Gravel Cover (**Figures 3** and **4**). With a gravel layer 4 inches thick, approximately 500,000 tons of gravel will be applied. Irrigation systems similar to those previously described will be installed in non-gravel areas.

Construction, reclamation, planting, establishment, and compliance in the Transition Areas will proceed as previously described for the new Managed Vegetation areas. However, due to potentially more challenging soil and drainage conditions in the Transition Areas, multi-year efforts for establishment may be necessary. Minor reconfiguration of the eastern berms for areas T30-1_b, T28N, T28S, T26, T5-1, and T5-3 may be required. Additional berm modifications may be necessary for access.

A reasonable Transition Areas Dust Control Plan will be developed and implemented during construction for all construction areas, including the Transition Areas. The plan will particularly address measures to be taken when removing existing DCAs from service. The following best management practices (BMPs) will be implemented:

- Use of water trucks to spray roadway travel surfaces on existing and temporary roads used for construction
- Installation of temporary sand fences strategically placed within the DCA being constructed
- Placement of a gravel surface on interim staging areas within the DCA used by the contractor
- Termination of work activities during high wind events

Figure 3
Rendering 1 of BACM Hybrid Area

Figure 4
Rendering 2 of BACM Hybrid Area

1.6 OTHER FEATURES FOR PHASE 7A DCAs

1.6.1 Drainage System

For new non-gravel DCAs included in Phase 7a (T32-1, T12-1, T37-2, T1A-4), drainage systems will be installed beneath Managed Vegetation fields and on the margins of Shallow Flooding areas. New drainage laterals to be installed in Phase 7a will be perforated plastic pipes in covered trenches placed 5 to 9 feet below the ground surface. The drainage system will control soil saturation to:

- maintain drained root zone under irrigated vegetation
- maintain drained pipe zone (prevent pipe floatation)
- capture water along the DCA perimeters to reduce seepage off-site

Drainage return flows can be recirculated into Shallow Flooding areas. The existing drainwater system functions in this manner. A drainwater mainline (brineline) runs parallel to the water supply mainline throughout the dust mitigation area from T2 to T25. The drainwater mainline also delivers water to the Shallow Flooding areas.

1.6.2 Power Supply and Controls

Power for pumps for water conveyance to and from DCAs is supplied by an existing underground 3-phase, 4.8 KV grid. The 4.8 KV grid will be connected to the new turnouts with directed buried cables. The turnouts have their own distribution system for power and controls. Transformers at the turnouts convert the power to lower voltages to supply various equipment, lighting, and control instrumentation. The 3-phase 480 volts alternating current (VAC) is typically used for pump stations. Directed buried cables will be used to supply power from the turnouts to the pump stations. T1A-4, T32-1 and T37-2 will have small pump stations. For Phase 7a, a new high voltage cable will be installed to power pumps associated with T37-2.

1.7 OVERALL 7A CONSTRUCTION SEQUENCE

After design of the proposed facilities is complete, it is anticipated that the construction sequence would proceed as follows:

- Tillage
- Turnout construction
- Earthwork, berm re-enforcement and water distribution systems for Shallow Flooding Areas
- Sprinkler system installation in Transition Areas
- Gravel installation
- Earthwork, berm re-enforcement and sprinkler system installation for BACM Hybrid Areas
- Planting and seeding in Managed Vegetation Areas

1.8 WATER REQUIREMENTS

The total water demand for new DCAs (T1A-4, T32-1 and T37-2) for Phase 7a is estimated at approximately 3,700 afy. To enable these additional water commitments, existing areas of Shallow Flooding will be transitioned to BACM Hybrid, and potentially Gravel Cover (T35-1 and T35-2). The approximately 3 square miles of Transition Areas selected for the Phase 7a project will be designed to provide approximately 3,700 afy to ensure adequate water supply for the new Phase 7a areas.

1.9 OPERATIONS AND MAINTENANCE

1.9.1 Gravel Cover

Once the Gravel Cover has been applied to the playa, limited maintenance will be required to preserve the gravel blanket. The gravel will be visually monitored for sand and dust accumulation, evidence of washouts, or inundation. If any of these conditions are observed over a substantial area, additional gravel will be transported to the playa. It is assumed that no maintenance will be needed in the initial years of operation. Subsequently, small areas may require replenishment and later, larger areas may require replacement. It is anticipated that the total volume of gravel on the Phase 7a areas may be replaced at most once every 50 years.

1.9.2 Shallow Flooding

To attain the required PM_{10} control efficiency, generally at least 75 percent of each square mile of the control area must be wetted to produce standing water or surface-saturated soil, between October 1 and June 30 of each year. Actual Shallow Flooding BACM requirements are set forth in the 2008 SIP. Surface saturation will continue to be monitored via satellite images (as is currently the practice). Maintenance activities will occur as needed throughout the year. However, when feasible, extended facility maintenance (repair of pumps, berms, laterals, and submains) will be completed during the period when dust storms generally do not occur (mid/late summer to early fall). Inflows, outflows and water quality in Shallow Flooding areas will also be monitored. Drains and valves will be inspected periodically and maintained as necessary.

1.9.3 Berms and Roadways

Berms and roadways will be continually maintained to prevent erosion and washout, and to maintain safe driving conditions. Maintenance activity will include minor earthwork and gravel replenishment.

1.9.4 Managed Vegetation

Vegetation will be monitored in the field to determine reclamation progress (declines in soil salinity), soil moisture, irrigation system function (including leak identification and repair), germination success, transplant mortality, and plant vigor. Once established, soil fertility and plant tissue will be monitored at least annually, and vegetative cover will be assessed with satellite imagery. At present, imagery is ground-truthed with specialized, near-surface digital images of vegetative cover. Operations activities will include maintenance of irrigation systems and replanting/reseeded as necessary.

1.9.5 Tillage

Tillage in DCA T12-1 is proposed as BACM Testing. Periodic wetting, re-tilling, and/or alterations in the configuration of the tilling will occur throughout the testing period. Operations activities will include maintenance of irrigation systems as necessary, as well as monitoring of surface conditions, meteorological parameters, and biological resources as part of the BACM test.

2.1 PHASE 7A SCHEDULE MILESTONES

Milestone	Anticipated Completion Date
Award engineering & design contract	April 2011
Design Completion	October/November 2011
LADWP Board approval of CEQA document	December 2011
California Department of Fish and Game issues Streambed Alteration Agreement	No later than March 2012
Lahontan Regional Water Quality Control Board issues Section 401 permit	No later than March 2012
US Army Corps of Engineers issues Section 404 permit	No later than April 2012
California State Lands Commission issues lease	No later than April 2012
Award construction contract	May 2012
Notice to Proceed for Construction	June 2012
Construction Completion	December 2013

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

EXHIBIT 6

MARCH 2010 MANAGED VEGETATION BACM PROPOSAL

Report

Managed Vegetation BACM Proposal

Prepared for

Los Angeles Department of Water and Power

March 2010

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ACRONYMS AND ABBREVIATIONS

Adj	adjusted
AFB	Absolute Fractional Bias
APCO	Air Pollution Control Officer
BACM	best available control measure
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
DCM	Dust control measure
DPF	digital point frame
GBUAPCD	Great Basin Unified Air Pollution Control District
LADWP	Los Angeles Department of Water and Power
MVPU	Managed Vegetation Performance Update
NAAQS	National Ambient Air Quality Standards
Plan	Managed Vegetation Operations and Management Plan
Playa	Owens Lake playa
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
Proposal	Managed Vegetation BACM Proposal
SIP	State Implementation Plan
USEPA	U.S. Environmental Protection Agency

PREFACE

Great Basin Air Pollution Control District (GBUAPCD) prepared the *2008 Owens Valley PM10 Planning Area Demonstration of Attainment, State Implementation Plan* (GBUAPCD, 2008a), referred to in this document as "the SIP". Among other things, the SIP provided for the development of new best available control measures (BACM), which are applied to stabilize the surface of the Owens Lake playa (Playa), referencing GBUAPCD's method for identifying dust sources on the Playa, the Dust ID Protocol. The SIP states the following on Pages 8 and 9 of Chapter 8, Appendix D, in the section "Research on Potential New BACM – Including Moat & Row":

> *The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO's satisfaction that the new control measure is sufficient to achieve the required PM_{10} emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.*
>
> *The application shall include, but not be limited to:*
>
> 1) *a description of the new dust control measure*
> 2) *a description of the test site and the meteorological conditions under which it was tested*
> 3) *the measured PM_{10} emissions during the test*
> 4) *the test time frame*
> 5) *all raw data collected during the test*
> 6) *all data screening criteria and final data sets*
> 7) *data supporting the conclusion that the required control efficiency was achieved*
> 8) *a performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency*
> 9) *an analysis of any environmental impacts of the dust control measure*
> 10) *the appropriate responsible agency approvals, permits and leases*
>
> *The application must include modeling that demonstrates that the required PM_{10} emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historic shoreline.*
>
> *If the APCO determines that the application is complete and the above conditions have been met, he/she will have full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard and include that method in the description of the proposed BACM for the SIP Revision. The District Governing Board has full and sole discretion to determine whether to adopt a SIP Revision for approval of any new BACM.*
>
> *Upon adoption by the District Board, approval by CARB, and submission to USEPA of a SIP Revision that identifies a new BACM for Owens Lake, the City may implement only this one new control measure on one-half square mile of the next area to be identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. No other new control measures may be implemented on areas identified as needing control under the 2003 SIP Revision Supplemental Control Requirements until EPA approves this new measure as BACM. The District Governing Board may limit the new BACM to specific circumstances, for example, distance of the new dust control measure from the shoreline or approval in a specific general soil type. Upon approval by USEPA, the new BACM may be implemented per the requirements described in the following section, "Transitioning From One BACM to Another BACM After 2010," or on any subsequent areas requiring control under the "2008 Owens Valley Planning Area Supplemental Control Requirements Procedure" (Board Order 080128-01, Attachment B), subject to any limitation to specific circumstances.*

This *Managed Vegetation BACM Proposal* (Proposal) is submitted by the City of Los Angeles Department of Water & Power (LADWP) to satisfy the requirements of this section of the SIP. In the sections that follow and attachments, the relationship between measurable conditions and control efficiency is presented, and performance standards are proposed. In the future, the Proposal may be updated and re-submitted based on new knowledge or changed conditions.

The Managed Vegetation Operation and Management Plan and attachments (Plan; NewFields et al., 2008) was submitted by LADWP in June 2008 and approved by GBUAPCD in a letter dated July 7, 2008. In the process of developing this Plan, LADWP and GBUAPCD invested substantial effort in developing, deliberating, and finalizing a sound scientific basis and set of performance specifications for dust control with vegetative cover. In discussions with the APCO, we have determined that to the maximum practicable extent, applicable technical content from this document will be referenced to satisfy requirements of this Proposal. The main body of this Proposal accordingly contains references to supporting documents (mostly provided previously with the Plan) as needed. These documents are appended. Since the entirety of the Plan has been reviewed by and is familiar to LADWP and GBUAPCD, it is hoped that this approach will minimize duplication of previous effort and allow the parties to focus on questions that are unique to this Proposal.

In addition to these and other cited documents, several sets of environmental documentation and management plans that touch on managed vegetation have been developed for Owens Lake (GBUAPCD 1998, 2003, and 2008b; LADWP 2001 and 2009). These documents are relevant context and useful references when considering both existing managed vegetation and future sites.

BACKGROUND AND PURPOSE

Performance criteria for Managed Vegetation are explained in the SIP as follows (GBUAPCD, 2008a, pp. 5-11):

> *Tests by the District and others have shown that vegetation covers ranging from 11 to 54 percent provide the surface protection necessary for the 99 percent PM_{10} control needed at Owens Lake in order to meet the NAAQS. In order to provide the margin of safety necessary to prevent PM_{10} emissions in all conditions, the District has determined that 50 percent total cover averaged over every acre is an appropriate, conservative prescription for the Managed Vegetation PM_{10} control measure. Total cover includes living plants and any dead plant materials, as both function to prevent PM_{10} emissions.*

The SIP also acknowledges the following (GBUAPCD, 2008a, pp. 5-11):

> *The City currently has about 3.5 square miles of Managed Vegetation PM_{10} controls on the lake bed. The Managed Vegetation area is in one contiguous block near the south end of the lake bed. Initial site planting occurred in the summer of 2002 and the City has worked since that time to improve vegetation cover. Although there are portions of the existing Managed Vegetation area that meet the 50 percent cover requirement, the overall site vegetation cover averages about 24 percent. This is well below the SIP requirement of 50 percent vegetation cover on every acre. However, the 3.5 square mile site, as a whole, has achieved a high level of PM_{10} control (Air Sciences, Inc., 2006).*

So, Managed Vegetation performance criteria in the SIP were based on a combination of information from control efficiency results from other sites (documented in scientific literature), from wind-tunnel studies designed to reflect Owens Lake conditions, and observations of plant growth on Owens Lake. With the implementation and monitoring of a full-scale (2,100-acre) Managed Vegetation facility, we now have the opportunity to review and refine performance criteria based on several years of performance relationships observed on Owens Lake. A further advantage is that the large scale of the monitored facility is comparable to potential future installations. These Owens Lake observations, therefore, are the basis for this Proposal.

The purpose of this Proposal is to present and provide technical support for compliance requirements for the Managed Vegetation dust control measure (DCM). Detailed requirements pertaining to levels of control efficiency below 99%, as well as regulatory requirements unrelated to air quality, are not provided in this document.

BACM PROPOSAL TECHNICAL ELEMENTS

As described in the Preface, many of the technical elements of this Proposal have been addressed previously in NewFields et al. (2008). A summary of the technical elements of the proposal is contained in Table 1. Table 1 provides a quick reference to the location of documentation for each element listed in the SIP.

Table 1. Required Elements of BACM Proposal

Required Element (per the SIP)		Location of Documentation
1	Description of the new dust control measure	Appendix 1
2	Description of the test site and the meteorological conditions under which it was tested	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
3	Measured PM10 emissions during the test	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
4	Test time frame	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
5	All raw data collected during the test	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
6	All data screening criteria and final data sets	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
7	Data supporting the conclusion that the required control efficiency was achieved	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.

Table 1. Required Elements of BACM Proposal

Required Element (per the SIP)		Location of Documentation
8	Performance standard that the new dust control measure must meet in order to achieve the required emission reductions or control efficiency	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
9	Analysis of any environmental impacts of the dust control measure	Main body of BACM Proposal
10	Appropriate responsible agency approvals, permits and leases	Main body of BACM Proposal
	Modeling that demonstrates that the required PM_{10} emission reductions or control efficiency can be achieved during the dust season anywhere this control measure may be implemented on Owens Lake, and the NAAQS can be met at all times everywhere along the historical shoreline	Appendix 3, Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. Also Appendix 4, Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007.
	Documentation of compliance measurement methodology	Appendix 2

In Appendices 3 and 4, it was shown that 99% control efficiency was achieved at between 11 and 20 percent vegetative cover based on digital point frame (DPF) images assessed by the spectral method. Subsequently, vegetative cover monitoring methods transitioned to visual interpretation of DPF images, which was found to result in about 9% greater vegetative cover (site-wide average). This is equivalent to finding that 99% control efficiency was achieved at between 20 and 29 percent vegetative cover based on visual interpretation of the DPF images. The average vegetative cover on the existing Managed Vegetation site in November 2004 (according to a calibrated vegetation map based on visually interpreted DPF) was about 42%. Therefore, the average vegetative cover on the site at the reference date exceeds the vegetative cover level demonstrated in Appendices 3 and 4 to produce 99% control efficiency. Part of this margin accounts for wintertime reductions in vegetative cover levels due to leaf senescence. The remainder is a margin of conservatism that is protective of public health.

Details of the nature of Managed Vegetation and associated performance specifications are described in Appendix 1. The general approach to the Managed Vegetation DCM management is described in Appendix 5, relating DCM conditions to actions by LADWP.

Analysis of any environmental impacts of the dust control measure

The changes to performance specifications contained in this proposal are not of a nature that would significantly alter the environmental impacts of Managed Vegetation relative to research and full-scale facilities that have been constructed and operated previously on Owens Lake.

None of the previous environmental analyses, or any aspect of operation of the full-scale, existing Managed Vegetation site since planting in summer 2002, has brought to light a significant environmental impact. On the contrary, as originally envisioned, Managed Vegetation successfully mimics existing plant communities in the Owens Lake area while controlling dust. Some of the existing area serves as mitigation for predicted project impacts to dry alkaline meadow habitat, and the remainder incidentally provides many of these same environmental benefits.

Appropriate responsible agency approvals, permits and leases

Managed Vegetation BACM was analyzed in each approved California Environmental Quality Act (CEQA) analysis for the 1997, 1998, 2003, and the 2008 SIPs (all by GBUAPCD), and for Phase 2 South (existing Managed Vegetation) dust control (by LADWP). It has been successfully permitted and leases obtained for construction and operation of Phase 2 South on Owens Lake. In addition, GBUAPCD operated pilot Managed Vegetation research facilities at 6 locations on the playa, one of which continues under LADWP operation (the Vegetation on Sand, or VOS, site north of T32-1).

New Managed Vegetation facilities would likely have regulatory requirements similar to the existing site including the existing Waste Discharge Requirements and other existing permits, and leases. Where new facilities are to be built or existing facilities are to be modified, pertinent aspects of new facilities would be described in project-specific CEQA analyses, lease applications, permit updates, and the like.

CONCLUSION

As documented, this Proposal contains the following assurances that DCM effectiveness will be adequate in the future:

1. DCM management is an active program to promote development and maintenance of adequate vegetative cover and to minimize and restrict areas of sparse vegetative coverage. Benefits of improved management and greater maturity to vegetative cover levels and DCM effectiveness for any particular site are cumulative.
2. The Proposal commits LADWP to actively manage potential problem areas (see Appendices 1 and 5).

3. Vegetative cover thresholds are based on the end of the second season during which no significant sand motion was measured on the existing Managed Vegetation site, and future vegetative cover levels must meet or exceed these thresholds. Further, vegetative cover levels lower than those specified in this BACM application were shown to provide 99% control efficiency (Appendix 4).
4. The existing Managed Vegetation site was effective even when surrounded by uncontrolled playa. New Managed Vegetation areas will in many cases border on controlled areas, reducing sand mass moving into margins of Managed Vegetation areas. These areas would thereby be subjected to less intense erosive forces than was the existing Managed Vegetation site upon which the proposed performance specifications are based.
5. This Proposal is based on six years of DCM management experience, the firmest foundation yet for a set of DCM performance specifications.

By all of these means, this Proposal provides amply for robust DCM performance and the protection of public health.

ACKNOWLEDGEMENTS

During development of the ideas in this Proposal, GBUAPCD and their consultants provided valuable comments and suggestions. The contributions of all team members are appreciated by the authors and LADWP, and were essential to the successful completion of this work.

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Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006. (Also Appendix 3 to this document)

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APPENDIX 1.
DESCRIPTION OF MANAGED VEGETATION FOR PM_{10} CONTROL (SIP SECTION 5.3.1, PROPOSED)

Vegetated surfaces are resistant to soil movement and thus provide protection from PM_{10} emissions. Vegetative cover that is sufficiently dense and uniform (particularly avoiding large, contiguous expanses of barren playa) provides a very effective barrier that traps sand and sand-sized soil particles and keeps wind speeds from reaching the threshold friction velocity required to generate emissions at the playa surface. Vegetation has naturally become established where sufficient water quantity and quality is available on or near the playa surface to leach the salty playa soils and sustain plant growth. Natural saltgrass meadows around the playa margins and the scattered spring mounds found on the playa are examples of such areas (Figure 5.13). Observation of these naturally vegetated areas has shown that very little dust emissions are generated from them. The Managed Vegetation strategy is modeled on these naturally protective saltgrass vegetated areas. Dust control using Managed Vegetation is a mosaic of fields with soil conditions suitable for plant growth. These conditions may (usually are) created by minimal irrigation and, where necessary, artificial subsurface drainage. Aerial and ground-level views of existing Managed Vegetation PM_{10} controls constructed by the City are shown in Figures 5.14, 5.15a and 5.15b.

To date, the Managed Vegetation control measure has been implemented by constructing and operating farm-like facilities to transform the naturally barren playa. The saline soil is first reclaimed with the application of relatively fresh water, and then planted with salt-tolerant plants that are native to the Owens Valley. Thereafter, soil fertility and moisture inputs are managed to encourage plant development first to rapidly achieve, and then to maintain, required levels and patterns of vegetative cover. Existing Managed Vegetation controls on the lake bed are irrigated with buried drip irrigation tubing and drained during wet weather by surface overland flow and a network of buried tile drains that capture excess water for reuse on the Managed Vegetation area or in Shallow Flooding areas.

Future Managed Vegetation facilities may also include habitat enhancement and/or recreation features unrelated to dust control, such as watering points to promote wildlife reproductive success in a manner that does not compromise components required for plant establishment and maintenance.

The root zone is the soil volume in which active rooting, and uptake of water and nutrients, occurs. Managed Vegetation is sustainable at Owens Lake only if salts present in unreclaimed lake bed soils and the naturally occurring shallow groundwater are prevented from reaching critically high concentrations in the root zone. Leaching with rainfall and irrigation water applied to Managed Vegetation serves to generally move salts down and away from the root zone of the planted vegetation. The subsurface drainage system facilitates this process, and may be essential in some areas. Water must be applied to satisfy the plants' uptake needs and the soil reclamation requirements. Excess applied water may exceed that which can practically be moved downward through the soil. When that occurs, the soil can become waterlogged, and salinity may accumulate at concentrations that can damage plants. The two main approaches to avoiding this circumstance are (a) minimizing the volume of applied water and (b) providing artificial subsurface drainage. Approach (a) involves promoting good surface drainage (to avoid surface flow of stormwater and applied water to low points within the control area) and by monitoring of site conditions and scheduling irrigation to avoid exceeding drainage capacity of the soil. Approach (b) involves constructing subsurface drainage facilities of various designs, each of which collect subsurface water into perforated pipes or gravel channels, and removal of collected water for recycling, usually with pumps.

Water is pumped from the subsurface drain system and placed into brine storage ponds where it can be recycled and used for Shallow Flooding, or mixed with fresh irrigation water for re-application to Managed Vegetation. However, depending on local site conditions and compliance requirements, alternative irrigation and drainage configurations, water supply quality, irrigation scheduling regimes, and plant communities may be employed, so long as the dust-controlling vegetative cover requirements are achieved. Drains installed near naturally occurring wetlands are operated so as not to cause significant groundwater drawdown or loss of surface water extent in the adjacent wetland areas. Drainage systems are to be operated with the goal of not decreasing the amount and or changing the type of existing natural wetlands.

In some cases, it is possible to reduce root-zone salinity to levels that are too low. In clay dominated soils, irrigation with low-salinity or fresh water may cause soil structure to collapse, altering future water infiltration and salt leaching. The City's existing Managed Vegetation site has a target applied water salinity of approximately 9 deciSiemens per meter (a measure of electrical conductivity—seawater has a salinity of about 35 deciSiemens per meter). Needed salt is collected in drain water. Prolonged irrigation of clay soils on Owens Lake with freshwater, where attempted, has not been observed to cause dramatic immediate effects. Over time, however, there does appear to be a consolidation of very large soil prisms, limiting most water flow, aeration, and rooting to the surfaces of those prisms. Therefore, where this is considered a risk on Owens Lake, irrigation water salinity may be controlled to avoid creating this undesirable condition.

Operational experience indicates that applied water of approximately 1.2 feet per year (net of recycled drainage water) is required to maintain sufficient protective vegetative cover. A somewhat greater depth of applied water is required for land reclamation and establishment (primarily before and during the first growing season). Thereafter, the appropriate applied water depth varies widely around this average depending on local soil and drainage conditions.

At the end of 2009, the City had about 3.5 square miles of Managed Vegetation PM_{10} controls on the lake bed. This 2009 Managed Vegetation area is in one contiguous block near the south end of the lake bed. Initial site planting occurred in the summer of 2002 and the City has worked since that time to improve and maintain vegetative cover.

Once 3.5 square miles of Managed Vegetation was established, the District and City engaged in relatively intense monitoring and analysis of control efficiency. This collaborative effort has formed the basis for refinement of the initial performance specifications for Managed Vegetation. The required control efficiency for the site has been 99%, and new performance specifications are for that level of control. However, other vegetative cover levels could be similarly determined where lower control efficiency levels are required. The refined specifications and their basis are described next.

Tests by LADWP have shown that the 3.5-square-mile site, as a whole, has achieved a high level of PM_{10} control. Air quality modeling conducted in conjunction with the 2008 SIP revision confirmed that the site achieved its required level of PM_{10} control. In addition, two studies were produced based on a control efficiency study on the existing Managed Vegetation facility on Owens Lake:

- Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006 (Appendix 3 of this BACM Proposal).
- Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007 (Appendix 4 of this BACM Proposal).

The 2006 study determined that 99% control was achieved on the existing Managed Vegetation site with between 11 and 20% vegetative cover (as measured by methods in use at the time. This is equivalent to 20 to 29% vegetative cover measured with the updated remote sensing approach).

The 2007 study verified, on the basis of the Dust ID model and sand motion data collected by the GBUAPCD and LADWP, that the entire Managed Vegetation site did not cause or contribute to an exceedance of the federal 24-hour PM_{10} standard at the shoreline. Vegetative cover performance specifications (average vegetative cover and spatial distribution requirements) for Managed Vegetation at Owens Lake have been developed based on effectiveness monitoring results from the existing Managed Vegetation facility. An appropriate margin of safety has been incorporated into these specifications and is reinforced by selection of a 99% PM10 emissions control efficiency for many areas; lower vegetative cover levels would be acceptable where lower control efficiencies are required, and where evidence indicates that the lower target vegetative cover levels could achieve that lower control efficiency.

Pursuant to the 2006 Settlement Agreement between the District and the City (Chapter 8, Attachment A, 2006 Settlement Agreement, Paragraph 6) the City prepared, and the APCO approved a Managed Vegetation Operation and Management Plan that ensured the 3.5 square-mile site continued to achieve control sufficient to prevent emissions that caused or contributed to NAAQS violations. With respect to determination of compliance, that Plan will be superseded by this BACM Proposal upon APCO approval, except where it is cited herein.

Vegetative cover requirements cannot be met until vegetation has had time to develop. Initial development may take at least two growing seasons, after which substantial control efficiency should be achieved. Resolution of site-specific drainage challenges and compliant levels of vegetative cover may require another several seasons for resolution. Vegetation of some of these areas may or may not be required for compliance, but their improvement will in any case render the facility more robust, and is therefore desirable where practicable. Some areas of the playa, however, may prove extremely hard to vegetate and must either be controlled in the context of an otherwise vegetated site, or by some other means.

Any Managed Vegetation area will be considered compliant when the vegetative cover requirements in Table 1.1 are maintained on the area by the City. Vegetative cover compliance is to be determined on a **fall satellite image of the area and ground-truthed, calibrated, and validated by reference to** measurements made by point frame or by equivalent methods (including digital point frame [measurement of vegetative cover on downward-looking, high-resolution digital images of vegetative cover taken a few meters from the land surface]). Vegetative cover provided by any locally adapted native plant species will count toward compliance in any Managed Vegetation area.

TABLE 1.1
Managed Vegetation DCM Vegetative Cover Criteria without Adjustments Based on Absolute Fractional Bias of the Cover Measurement
Managed Vegetation BACM

Grid Scale	Average	5 cover	10 cover	20 cover
(acres)	(minimum % cover)	(minimum % of DCM area)		
0.1	37	92	83	65
1	37	94	87	68
10	37	95	89	74
100	37	95	90	77

[a]Note that in the measured reference condition, no whole, 1- to 100-acre grid cells had <5 percent vegetative cover. The associated criteria are not intended to imply or to allow whole 10-acre or 100-acre grid cells to have < 5 percent vegetative cover. Rather, they are intended to allow for smaller grid cell fragments (e.g., at the DCM's edges) with this level of vegetative cover.

DCM areas will be subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grids (to 1, 10, and 100 acres). Vegetative cover distributions among these grid cells (average vegetative cover in each cell, and the distribution of those average values for each grid scale) will be characterized. Average cover thresholds in Table 1.1 will be adjusted for uncertainty of the vegetation map for that particular date, based on the vegetative cover map validation results. Adjustment of each of these thresholds will be made as follows:

$$Threshold_{adj} = Threshold*(1-(AFB/2.5)) \qquad (1)$$

where AFB = half of the Absolute Fractional Bias (ranging from 0 to 2, with 0 indicating no error in the calibrated model prediction of vegetative cover at independent validation points), *Threshold* = any average % cover threshold from Table 1.1, and $\mathit{Threshold_{adj}}$ is the adjusted criterion against which an average cover measurement for the date and parameter in question would be evaluated.

Table 1.2 contains a summary of responses in the event that one or more of the following occur in a Managed Vegetation area:

- Vegetation shows signs of decline over significant areas that could result in future failures to meet vegetative cover requirements
- Vegetative cover levels are shown to be less than those required in Table 1.1

TABLE 1.2

Tabular Summary of Managed Vegetation Operation and Management

Site condition	Management requirement	Regulatory requirement	Range of site management responses
1. Vegetation and soil conditions	No 10-acre grids with predominantly orange or brown aboveground saltgrass and insignificant new growth during an entire growing season (as determined by ground observations and subsurface investigation).	See item 2.	a) Site-specific evaluation of plant health and determining factors, and surrounding conditions, b) develop and implement steps to address determining factors identified in Step a, c) if actions were required under Step b, then monitor and verify that these actions achieve their stated goals.
2. Vegetative cover	No 10-acre grids with <5% cover; 1-acre grids with <5% cover (subject to site-specific review).	Cover levels > threshold shown in Table 1.1.	a) Site-specific evaluation of plant health and determining factors, and surrounding conditions, b) develop and implement steps to address determining factors identified in Step a, c) if actions were required under Step b, then monitor and verify that these actions achieve their stated goals.
	Assess green cover annually during the August-September period. Identify and evaluate areas with low rates of green cover generation.	Process and results documented, and reviewed annually with GBUAPCD.	Employ primarily as “early warning”. Consider green vegetative cover in the context of total vegetative cover, in relation to the size and surroundings of the area being considered. Develop management responses to remedy low levels of green vegetative cover replacement when and where this evaluation indicates that such action is needed.

The following portions of the areas designated for control with Managed Vegetation are exempted from the vegetative cover requirements:

1. portions of the site that are consistently inundated with water, such as reservoirs, ponds and canals,
2. roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and
3. portions of the site that are used as floodwater diversion channels or desilting/retention basins.

“Substantially non-emissive” shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

APPENDIX 2.
VEGETATIVE COVER MEASUREMENT

Final Report

Methods Used for Verification of Vegetative Cover on the Managed Vegetation Dust Mitigation Site

Prepared for

The Los Angeles Department of Water and Power

August 2007

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ACRONYMS AND ABBREVIATIONS

AGL	*above the ground level*
CT	*calibration target*
DCM	*dust control measure*
DN	*digital number*
DOS	*Dark object subtraction*
DPF	*digital point framing*
GBUAPCD	*Great Basin Unified Air Pollution Control District*
GC	*Geometric correction*
HB	*HydroBio*
DPF	*Hi-Pod digital point frame*
LADWP	*Los Angeles Department of Water and Power*
MV	*managed vegetation*
MVL	*Managed Vegetation Land*
NDVI	*Normalized Difference Vegetative Index*
Plan	*Managed Vegetation Operation and Management Plan*
PMP	*performance and monitoring plan*
SAVI	*Soil Adjusted Vegetative Index*
TOA	*top-of-atmosphere*

SECTION 1.0
INTRODUCTION

1.1 Background

Contained within the November 2006 Settlement Agreement between Great Basin Unified Air Pollution Control District (GBUAPCD) and the Los Angeles Department of Water and Power (LADWP) is a provision requiring the development of a *Managed Vegetation Operation and Management Plan* (Plan). Essential to the Plan is accurate verification of current and historic vegetative cover levels across the managed vegetation (MV). A *performance and monitoring plan* (PMP) submitted on an annual basis will be used to compare specific criteria related to historic conditions that achieved 99 percent control efficiency at the site. The most appropriate methodologies to quantitatively verify vegetative cover are, therefore, essential to both the Plan and annual PMP.

Following the establishment of the MV dust control measure (DCM) in 2003, both GBUAPCD and LADWP independently developed remote sensing techniques to quantitatively verify vegetative cover. Detailed evaluation of the two methods revealed that the basic foundations from which both methods are derived contain several similarities; each uses independent ground truthed data (in the form of measured vegetative cover) to calibrate remotely sensed imagery, resulting in a quantitative assessment of cover. Although several similarities exist, slight differences between the two methods are apparent and stem from the methods involved in ground truthing vegetative cover and remotely sensed image calibration/validation. Differences between the two methods are noteworthy and warrant a closer examination to quantify the strengths and weakness of each respective method.

1.2 Purpose

The purpose of this memorandum is to provide a detailed description of both remote sensing vegetative monitoring methods, identify areas of agreement and disagreement between the two methods, outline a study methodology to collaboratively address areas of disagreement, and use the results from the collaborative study to determine methodology for future vegetative compliance monitoring. This report is organized as follows:

- Section 1.0 - Introduction
- Section 2.0 - LADWP's Monitoring Methodology
- Section 3.0 - GBUAPCD's Monitoring Methodology
- Section 4.0 - Proposed Plan of Action and Future Vegetative Compliance Methodology
- Section 5.0 - Conclusions
- Section 6.0 - Work Cited

SECTION 2.0
LADWP MONITORING METHODOLOGY

With any intensive remote sensing analysis effort, concurrent collection of representative ground truth data and remotely sensed imagery is necessary to ensure proper image calibration. It is essential that ground truth data be gathered at a scale that is appropriate for the desired image calibration and validation. Several methods for estimating vegetative cover for ground truth sites have been developed by plant ecologists, agronomists, and remote sensing experts. Contemporary methods of assessing vegetative cover for ground truth sites; such as a reference frame, quadrant siting frame, and point-frame transects, can be considered subjective in nature and do not facilitate recreation or checking after the initial field evaluation. These methods can also be time consuming, and results are drawn from a few points located systematically in relatively small unit areas. To overcome the restricted sampling area of these methods, measurements located at random in larger areas of interest must be repeated many times over.

These methods are, however, well established, and cover measurements by point frame in particular are the method by which vegetative cover in the MV at Owens Lake was previously defined. It is therefore desirable that vegetation cover ground truthing be easily related to this method. To achieve this, LADWP developed a new method that is somewhat more rapid, readily reproduced (checked), that takes in more points in a relatively large quadrant, and that can be readily analyzed for site-specific trends and accuracy through time.

2.1 Ground Truthing Tool

Digital photos of the ground surface provide a means of quantitatively estimating vegetative cover. LADWP's method for capturing digital photos to quantify vegetative cover evolved as digital photo technology (especially resolution and automatic exposure control) improved. The original method, termed digital point framing (DPF), consisted of photos taken with a digital camera held at eye-level, approximately 5 feet above the ground level (AGL). This height was chosen based on a maximum camera resolution at that time, which was 3.1 mega pixels or 2560 x 1920 lines. This 5-foot AGL height captured an image such that between the resolution of the camera and the AGL height, the pixel resolution was such that lessened the quantity of grass blade and soil mixed pixels, though these mixed pixels certainly still exist. This lessened the mixed pixel effect, thus improving spectral discrimination results. To get a representative vegetative cover estimate in a quadrat extending from inter-row to inter-row, sets of four slightly (~20 percent) overlapping photos were taken to cover a combined area of 1.5 feet by 5 feet. The four photos were then mosaicked (digitally stitched together) into a single, panoramic digital image (Figure 2-1).

FIGURE 2-1
Figure 2-1A: Four DPF Photos
Figure 2-1B: Final DPF Mosaic

In an effort to maximize the area characterized per DPF and minimize the time associated with ground truthing, a more powerful digital camera mounted on a 15-foot Hi-Pod monopod system (Figure 2-2), was purchased in October 2006. This new devices improved the efficiency of the DPF methodology. The new DPF characterized a larger ground surface area than the original DPF methodology (Table 2-1), increasing the ground surface area characterized from 2.25 ft^2 per photo (four photos then mosaicked together for a total area of 7.5 ft^2) to one photo characterizing a total of 16.7 ft^2. The single frame capture of a larger array area also eliminated the need for the mosaic process previously used on four DPF frames. Elimination of that process was significant because mosaicing of photos taken at a 5-foot AGL was never fully capable of modeling out the effects introduced by the (4) individual points of perspective. It also resulted in a significant reduction in field work associated with photo capture.

The new DPF approach had a substantial field effort savings in that (1) technician can spend 2-3 days (16-24 hrs) collecting all DPF photos, rather than the 2-3 days of (4) staff necessary for the point-frame field effort.

FIGURE 2-2
DPF Field Equipment Setup
The new DPF equipment included the use of a high resolution camera mounted on a 15' Hi-Pod monopod.

TABLE 2-1
DPF and DPF Specifications

Item	Original DPF Specification	New DPF Specification
Camera Brand	Sony Cyber-shot DSC-F717	Sony Cyber-shot DSC-R1
Camera Resolution	2560 x 1920	3888 x 2560 pixels
Photo height	5’ above ground surface	14.5’ above ground surface
Photo Dimensions	1.5’ x 1.5’; Four photos per location	5’ x 3.3’; One photo per location
Surface Area Characterized	7.5 ft^2	16.7 ft^2

2.1.1 DPF Grass Classification

Two methods for classifying the amount of vegetation within each DPF have been developed by LADWP. The first method spectrally classifies each pixel within the DPF into one of three classes (green grass, brown grass, or no grass) (Figure 2-3). At one time this was done using an ISODATA unsupervised classification approach, segmenting the image into 100 spectral classes, which were then assigned to one of the three cover classes based on visual analysis. The current spectral approach, which has been found to be more successful at separating the cover classes, was adopted in late 2005. This method involves modeling of two ratios of the photo’s bands to separate the cover classes (blue/red and green/red). New thresholds must be selected for each DPF event due to seasonal variation of the vegetation and illumination characteristics on the day of capture. Thresholds are selected to separate green grass, brown grass, and bare ground. The model performs the following logic:

1. (blue/red < threshold1 AND green/red > threshold2) = green grass
2. (blue/red < threshold) – green grass from above = brown grass
3. Other pixels = bare ground

This process resulted in a vegetation cover map for each photo. Each pixel is designated as one of the cover categories.

While the spectral analysis worked relatively well, selection of the thresholds (done subjectively by the analyst) is time consuming. Further, the added “silver” classification category introduces challenges due to similar spectral characteristics with the substrate. Because of the visible-range spectrum similarity between bare ground surfaces and brown/silver grass, there is also some balancing done in the threshold selection process, such that the amounts of bare ground erroneously classified brown grass roughly balances with the amount of brown grass that is classified bare ground. This threshold is also subjectively identified by the analyst. These processes are to a large extent due to the sensor’s limited spectral range, rendering more automated classification techniques unusable.

From this vegetation cover map, areas within the DPF that are covered by vegetation can be readily determined by software that counts pixels in each class. Quadrats defined by DPF can be used to characterize larger areas of vegetated land (equivalent to the mean DPF results in the area). Cover levels for these areas can in turn be employed to calibrate index or ratio results in satellite imagery.

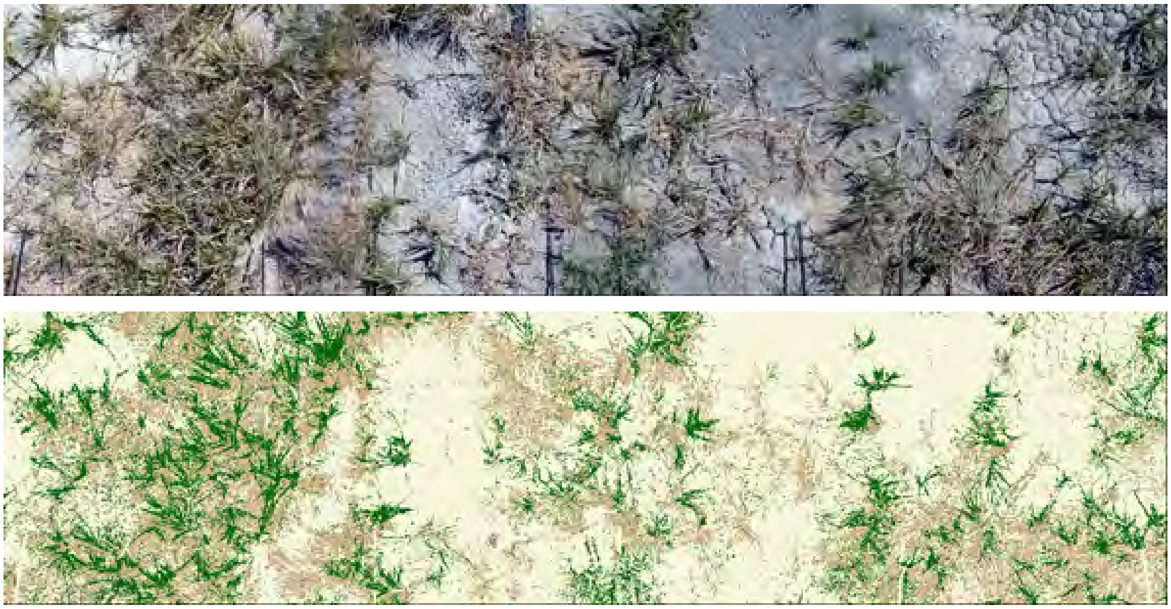


FIGURE 2-3
Figure 2-3A: Example DPF
Figure 2-3B: Example Spectral Grass Classification of a DPF
Spectral classification divides vegetation into three classes: (1) green = green grass, (2) brown = brown grass, (3) white = bare ground surface

In October 2006, a second non-spectrally-based method of estimating percent cover within each DPF was developed to assess the accuracy and precision of the spectral classification method. Termed digital pin classification, it visually assessed vegetative cover with computer grid points overlain on the DPF photo at regular intervals (Figure 2-4). An ESRI shapefile grid of 50 points (crosshairs) per photo was overlain on each photo. The center of each crosshair, not any other part of the crosshair, was used in the determination of vegetative cover. Each of the 50 crosshair points (per DPF) was characterized as either green grass, brown grass, or no grass (silver grass is easily added in as a category in that the visual discrimination is clearly made in the DPF image). This classification was then entered into the attribute table for the shapefile, which was then copied to an Excel spreadsheet where mean percent cover percentages were calculated for each site. Both methods will be used in future vegetative monitoring events to compare the difference between the results of the two methods. The digital pin classification method time requirements puts the level of effort into the same general amount as the conventional point-frame, once accounting for the 1-technician field data collection and subsequent DPF analysis, as compared to the 4-technician field data collection effort necessary for conventional point frame. Again, the advantage of the DPF approach is for historical record of a data collection event.

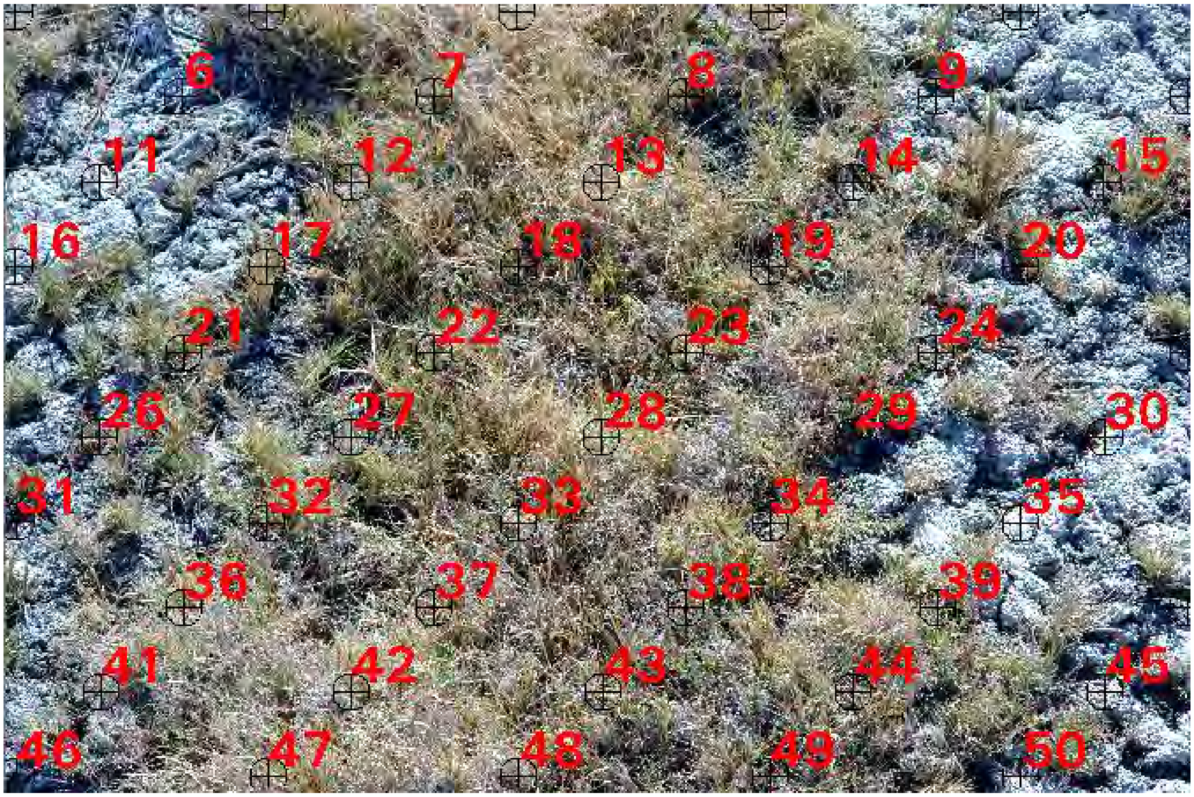


FIGURE 2-4
DPF "Digital Pin" Classification
DPF photo with the 50 point grid shapefile overlain

2.2 Calibration Target Characteristics

Accurate satellite image calibration is dependent on several calibration target (CT) characteristics. These include: size, shape, number, distribution, and relative homogeneity.

2.1.1 Calibration Target Size and Shape

Currently, the LADWP CT size is equivalent to a square 3x3 QB pixel area (9 QB pixels), which is approximately 52 m^2 (558 ft^2). The 9 QB pixels are averaged and compared to percent cover derived from one DPF photo. One DPF photo characterizes 1.6 m^2 (16.5 ft^2) which is approximately 3 percent of the CT area.

2.1.2 Calibration Target Quantity and Distribution

The quantity and distribution of CT sites is important to proper image calibration and validation. Currently, LADWP ground truths a total of 51 CT locations. When possible, the same locations have been used repeatedly year after year to develop a baseline of comparison. Depending on weather conditions and yearly vegetative growth patterns, some locations have been moved, removed, or added. Current CT LADWP CT locations are presented in Figure 2-5.

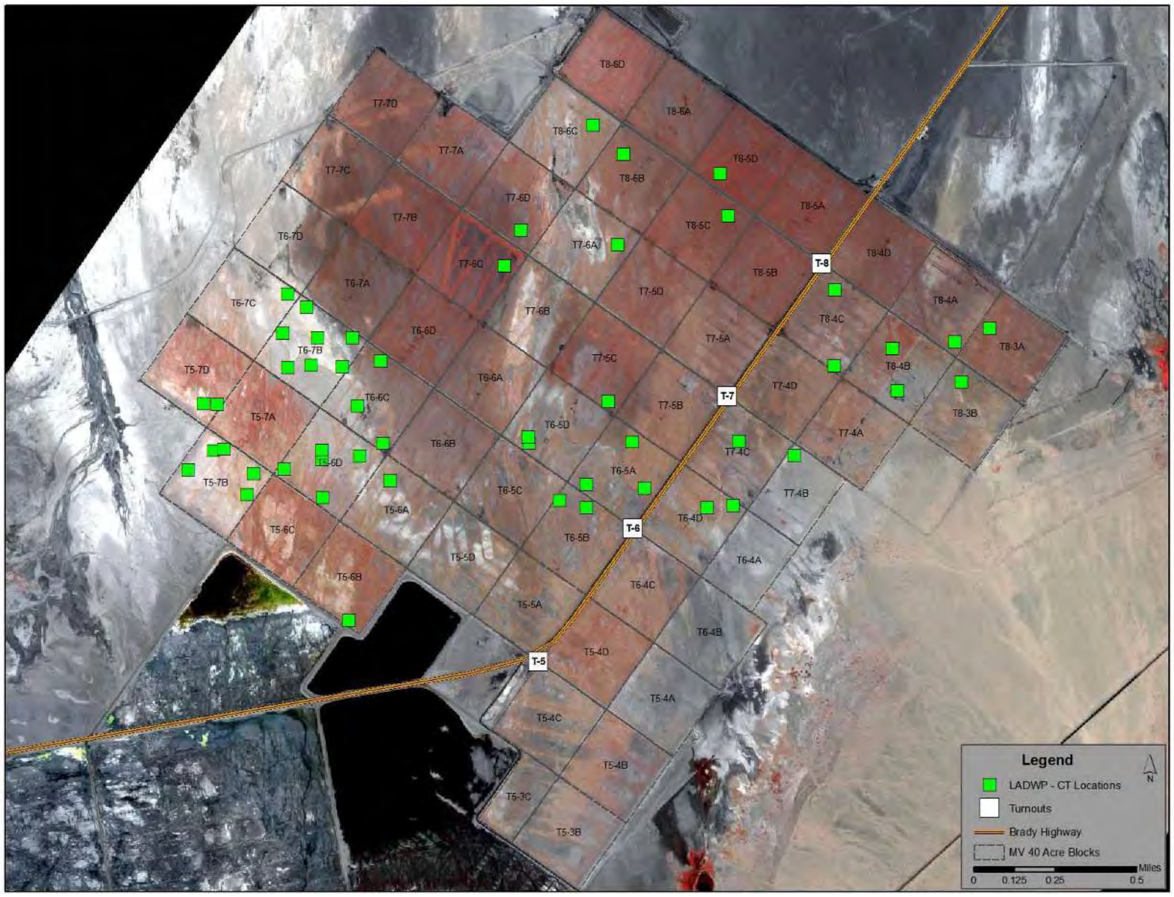


FIGURE 2-5
Current LADWP CT Locations

Equally important to proper image calibration and validation is the distribution of those sites relative to the actual vegetative cover distribution of the MV site. Current LADWP calibration site distributions relative to the estimated MV site distribution are presented graphically in Figure 2-6. LADWP has targeted areas to be used for image calibration that fall into the less-than-30 percent vegetative cover class.

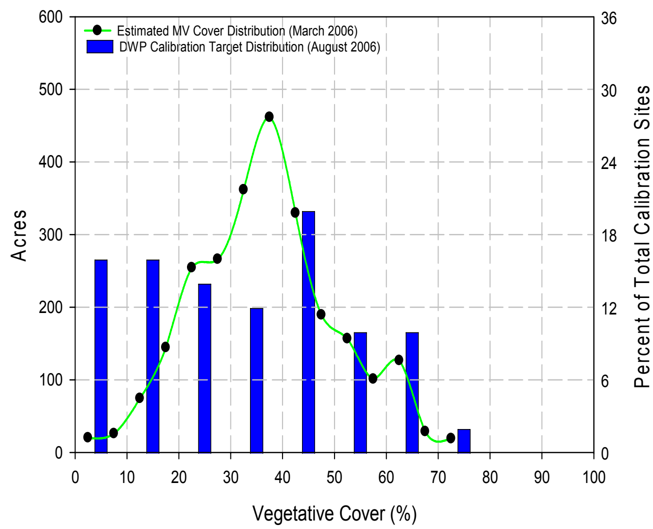


FIGURE 2-6
Current LADWP Calibration Target Distribution Relative to the MV Cover Distribution

2.3 Remote Sensing Image Analysis

The LADWP image analysis approach uses imagery from the QuickBird satellite (DigitalGlobe, Inc). QuickBird imagery is preferred because of its spatial and spectral characteristics, as well as its cost. The approach developed by LADWP requires a high-resolution image with both visible and near-infrared spectral range, a reliable geometry and band registration, and an associated cost allowing for many analyses per year at a reasonable expense. Note that cover was previously tracked by LADWP higher frequency for control effectiveness investigations. In the future, if annual assessment is sufficient, the cost of imagery is less important.

The QuickBird multispectral imagery is composed of four bands, each of which represents a specific portion of the spectrum; green, blue, red, near-infrared. The multispectral imagery is capable of a spatial resolution of 2.4m per pixel. Also included in the “standard bundle” package is the high-resolution panchromatic band. Spectrally, the high-resolution panchromatic band represents nearly all of the visible range and slightly into the near-infrared range of the spectrum. Spatially, this band is capable of 0.6m per pixel resolution.

The cost of the QuickBird imagery for the MV sites, per collection, is approximately $2,500. For comparison, an airborne (airplane-based) sensor capable of multispectral image collection appropriate for spectral post-processing may cost $10,000 or more per collection.

2.3.1 Preprocessing of the Quickbird imagery

To calculate vegetative indices or ratios to assess vegetative cover, QuickBird data must first be preprocessed or corrected to account for various environmental factors including: instrument irregularities, solar angle, distance of the sun, and atmospheric scatter. Details on the preprocessing steps used to prepare Quickbird images for mapping vegetative cover are presented in Table 2-2. An additional pre-processing step was performed when compliance assessments were being made. This included delineation of vegetated areas, which excluded roads, turnouts, irrigation equipment, and the like.

TABLE 2-2
QuickBird Image Preprocessing Steps

Preprocessing Correction Conversion	Explanation	Method Details
Geometric correction (GC)	GC is used to rectify the satellite image to known ground control points. This essentially adjusts the image to known corresponding visual features.	Ground control points visually identified in reference panchromatic (0.6m image) and newly acquired panchromatic image, geometric model calculated and applied to both 0.6m Pan and 2.4m Multispec imagery. Image projection parameters used for Geocorrection: UTM, Zone 11, GRS 1980 Spheroid; NAD83 Datum; Nearest Neighbor Resampling; 2.4 Meter Pixel Size.
Conversion of image digital number (DNs) to top-of-atmosphere (TOA) Spectral Radiance	Conversion to TOA spectral radiance normalizes the data for the incident energy of the sun. This changes with solar angle and distance, which is a factor of time of day and year.	Each band of the image is multiplied by a K-Conversion Factor and divided by the bandwidth to obtain TOA radiance values. K-Conversion Factors and Bandwidths: Band 1 = 0.0160412, 0.068; Band 2 = 0.0143847, 0.099; Band 3 = 0.0126735, 0.071; Band 4 = 0.0154242, 0.114.
Conversion of TOA radiance to refleCTnce	ReleCTnce values are used in the calculation of some vegetative indices (e.g., NDVI, SAVI, etc.).	Reflectance calculation: (image band * earth-sun distance * pi) / (irradiance * COS(90 degrees – sun elevation) The Earth – Sun Distance is estimated from the Landsat Data User's Handbook*. Sun elevation and Exoatmospheric Solar Spectral Irradiance are provided in the image metadata from the Satellite Image Vender DigitalGlobe.
Dark object subtraction (DOS)	DOS corrects for atmospheric scatter and other environmental conditions.	The histogram of each band of the reflectance image is observed and the value at the low end of the curve, which is at the point of having a significant number of pixels (~100) is recorded. That value is then subtracted from its source band to shift the low value close to what should be the actual lowest value.

* Source: Table 11.4 Earth-Sun Distance in Astronomical Units in the Landsat Data User's Handbook.

2.3.2 Producing Vegetation Indices/Ratios from Satellite Images

Several standard vegetative indices and ratios have been calculated by LADWP to correlate to vegetative cover. Until recently, focus of the LADWP vegetative monitoring effort has been to support management activities during the growing season when green grass is the dominant vegetative color at the MV Site. Although all indices and ratios were calculated for each image, special consideration was given to those known to predict green grass vegetative cover. Recently, as the focus shifted to other time periods when green grass was not the dominant color (e.g., during wintertime), other vegetative indices or ratios more appropriate for senesced grass color were utilized. A description of each index or ratio calculated is as follows:

- Normalized Difference Vegetative Index (NDVI). NDVI is a known indicator of green vegetative activity. Green vegetative growth is easily quantified because red light is absorbed by the plant chlorophyll and other wavelengths are reflected. The NDVI standard index is produced with the following equation:

  NDVI = (band 4 – band 3) / (band 4 + band 3)

- Soil Adjusted Vegetative Index (SAVI). SAVI was developed as a variation of the NDVI to remove the soil effects on index calculation. The standard SAVI index is produced with the following equation:

  *SAVI = (band 4 – band 3) / (band 4 + band 3 + 0.5) * (1 + 0.5)*

- Simple band ratios have been tested and determined to be useful for extracting green and senesced vegetation. At times, all of these ratios have shown promise as having high correlation to percent cover for the combination of green and brown grass. Image ratios are calculated by simply dividing the bands in the ratio name (i.e., 4/2 image ratio equals band 4 divided by band 2). Ratios historically used include:
  - 4/2 Ratio Image
  - 4/1 Ratio Image
  - 3/2 Ratio Image
  - 3/1 Ratio Image

2.3.3 Linear Regression and Percent Cover Calibration

Percent cover was determined from the CT locations by processing of the DPF photos as described above. The ground truthed CT values were obtained through the DPF grass classification process described previously. Procedurally, the percentages were stored as values in a spreadsheet, which were related to the unique location IDs of the ground truth sites. Percent categories assessed included percent green, percent brown, and percent bare ground. The total percent vegetated was determined based on the sum of the percent green and percent brown categories.

Mean values were then obtained from each of the processed index and ratios calculated. For each of these images, a circle (equal in area to a 3x3 pixel array) was used to extract the mean value for each CT location. The values for each location, for each index or ratio calculated, were added to the spreadsheet containing the ground truth percent cover data. The geographically common DPF percent cover values and the 3x3 mean calculation values were correlated through a linear regression calculation resulting in slope and intercept values defining the relationship of the correlation. All ratios and indices calculated were regressed with percent green grass and total percent vegetated, resulting in two sets of slopes, intercepts, and r^2 values.

Slopes and intercepts for the ratio or index were applied with a calibration model ((index x slope) + intercept) within the image analysis software. The output of this calibration model represented a percent cover continuum of values in the imagery (i.e., a percent cover map) (Figure 2-8). This model was run to produce maps for percent green grass and total percent vegetated. A total of 24 of the 51 “active” CT sites were used for this analysis.

Error analysis was performed with the remaining 27 CT sites by comparing percent cover values from those locations to the mean index/ratio calculation from the calibrated percent cover map for those same check points. A difference statistic was then calculated for each check site.

Final tabular results of mean vegetative cover statistics were presented at four different scales for comparison (0.1-acre, 1.0-acre, 10-acre, and 100-acre grids). Construction of the grids was performed in ArcGIS, producing grid cells in four separate shapefiles to cover the entire managed vegetation area. Grids were clipped to exclude non-grass areas such as road and turnouts. Table 2-3 presents mean percent cover statistics for each of the grid cells (0.1-acre, 1.0-acre, 10-acre, and 100-acre) extracted from the March 2005 QuickBird image. The March 2005 cover maps were

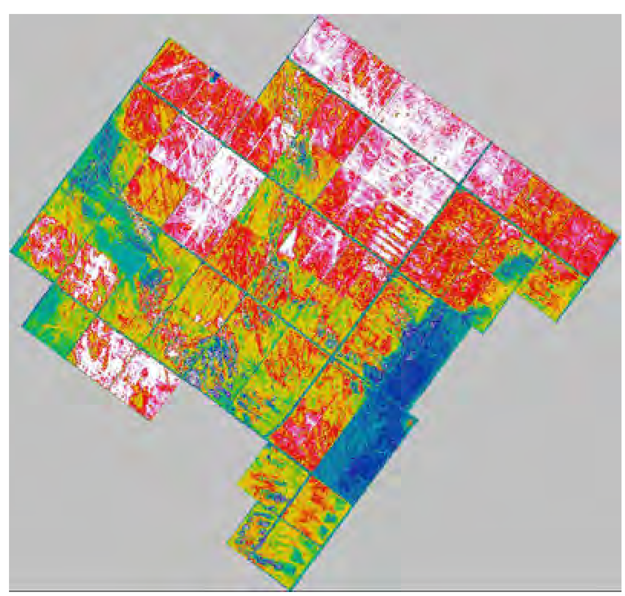


FIGURE 2-8
Example Vegetative Cover Map

created using the 4/2 image ratio, which returned the highest R^2 with the least error compared to all other indices and ratios tested.

TABLE 2-3
Tabular Vegetative Cover Statistics-March 2005
Tabular vegetative cover statistics from the March 2005 QuickBird Image. Percent cover was assessed using the 4/2 image ratio.

Grid Scale	n	*Average*	*SD*	*%>5*	*%>10*	*%>20*
Reference			(measured)			
0.1	22,954	23	12	92	83	59
1	2,419	22	11	96	88	59
10	278	22	9	99	93	60
100	38	22	8	100	97	71

SECTION 3.0
GBUAPCD VEGETATIVE COMPLIANCE MONITORING METHODOLOGY

Procedures used by the GBUAPCD to assess vegetative cover on the MV Site have been developing since the completion of the MV DCM in 2003. The following sections briefly describe past methods while focusing largely on the current methodology. The current GBUAPCD method is implied by LADWP from collaborative field efforts in December 2003 and several subsequent reports provided to LADWP by GBUAPCD on behalf of HydroBio (HB). Reports and technical memorandum used for this evaluation include the following:

- Report 2003: Owens Lake Vegetation Compliance Report
- Technical Memorandum June 2004: Managed Vegetation Evaluation
- Report 2004: Owens Lake Vegetation Compliance Report
- Report August, 2005: 3/2 Index Versus Allgrass Methods for Evaluating Managed Vegetation at Owens Lake
- Technical Memorandum March, 2007: Preliminary Products for the Managed Vegetation Land (MVL) (With HydoBio's Initial Thoughts for Remediation)
- Technical Memorandum April, 2007: Managed Vegetation Cover-2005 Growing Season

3.1 Ground Truthing

Similar to the LADWP approach for assessing vegetative cover, GBUAPCD uses concurrent collection of ground truthed data (in the form of vegetative cover measurements) to calibrate Quickbird satellite images. In December 2003, a LADWP team (composed of CH2M HILL and Earthworks staff) shadowed GBUAPCD staff in the field as ground truthed data were being collected with a PF device. At that time, the PF data were being collected with the 10-pin 18-inch-wide metal device (Figure 3-1). The PF central rod was pushed into the ground so that the 10 measurement pins barely came into contact with the ground surface. The technician then analyzed each of the (10) pins of the PF by raising each pin to the full height in the PF and then lowering each slowly. As each pin was lowered, it was recorded as hitting either live, dead, or no vegetation. The results of each PF location were recorded onto standard hard copy tally-forms that were later transcribed into an Excel spreadsheet. The ground truthing activity was completed within 2 days of the satellite imagery acquisition date.

In 2006, a new PF device was used by GBUAPCD for ground truthing vegetative cover (Figure 3-1). The new PF device was 5 feet long with 14 pins compared to the old device, which was 18 inches long and only 10 pins. The new PF device improved ground truth vegetative cover characterization by improving the ability to properly characterize the 5-foot inter-row to inter-row distance.

FIGURE 3-1
GBUAPCD Point Frame Device
The original PF device (left photo) was 18 inches wide with 10 pins. The new PF device (right photo) is approximately 5 feet wide with 14 pins.

3.2 Calibration Target Characteristics

3.2.1 Calibration Target Size and Shape

Currently, the GBUAPCD CT size is equivalent to a 5.5m-radius circle, which is approximately 95 m^2 (1023 ft^2). This area equates to 16 QB pixels, which are averaged and compared to percent cover derived from 30 PF measurements. One PF measurement characterizes approximately 0.05 m^2 (0.5 ft^2)[1]. The 30 PF measurements taken per CT site represent approximately 1.5 percent of the CT area.

3.2.2 Calibration Target Quantity and Distribution

The quantity and distribution of CT sites is important to proper image calibration and validation. Currently, GBUAPCD ground truths a total of 28 calibration sites. It appears that when possible, the same sites have been used repeatedly year after year. Current GBUAPCD CT locations are presented in Figure 3-2.

As stated in the previous section, the distribution of CT sites compared to the MV cover distribution is equally important to proper image calibration and validation. Current GBUAPCD calibration site distributions relative to the estimated MV Site distribution are presented graphically in Figure 3-3.

[1] Area characterized by a single PF measurement was estimated assuming a 5-foot PF, characterizing an area 5 feet long by 3 inches wide. Although PF measurements are usually not quantified in this manner, it is useful for quantification of area characterized for vegetative cover per CT.

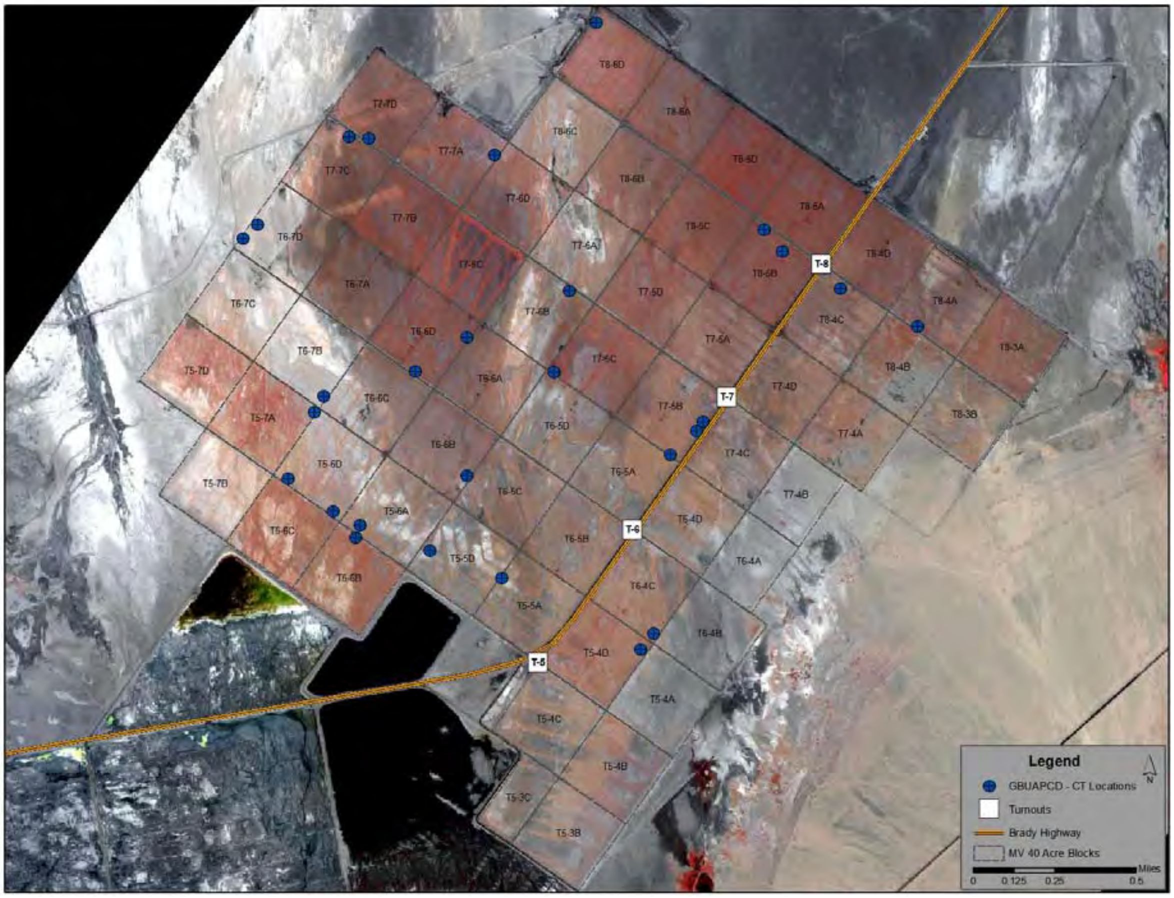


FIGURE 3-2
Current GBUAPCD CT Locations

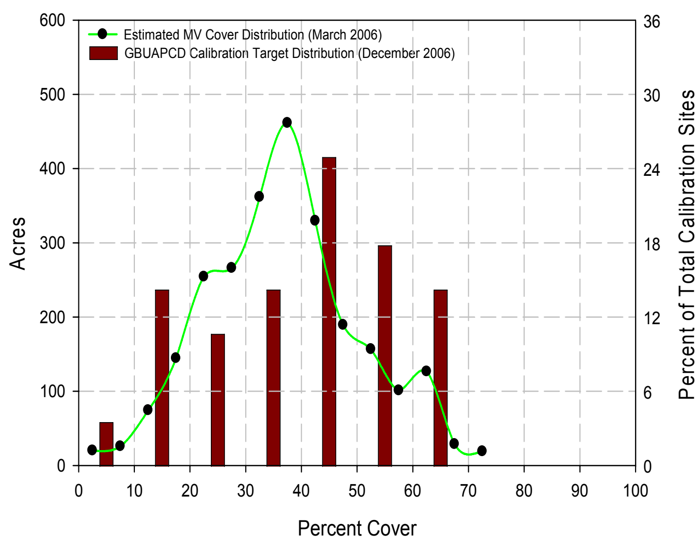


FIGURE 3-3
Current GBUAPCD Calibration Target Distribution Relative to the MV Cover Distribution

3.3 Remote Sensing Image Analysis

3.3.1 Quickbird Image Preprocessing and Vegetative Index/Ratio Calculation

Comparable to the LADWP approach, GBUAPCD image analysis uses imagery from the QuickBird satellite. Details described in several HB Reports and Memorandum (HydroBio 2003-2007) suggests that the standard remote sensing procedures (identical to LADWP methods) are used by GBUAPCD. The following procedures are understood to be identical to those used by LADWP and outlined in Section 2.3.

1. QuickBird image preprocessing
   - Geometric correction
   - Conversion to top of atmosphere radiance
   - Conversion to reflectance (for vegetative indices only)
   - Dark object subtraction
2. Vegetative indices/ratio calculation
   - NDVI
   - SAVI
   - NDVI Offset and NDVI*[2]
   - 4/2 Ratio Image
   - 4/1 Ratio Image
   - 3/2 Ratio Image
   - 3/1 Ratio Image

3.3.2 Linear Regression and Percent Cover Calibration

GBUAPCD linear regression and percent cover calibration are calculated from 28 ground control sites. The ground truth values (percent cover for each CT) are obtained from PF measurements described in the previous sections. Vegetative cover categories include percent green, percent brown, and percent bare ground. The total percent vegetated cover is determined based on the sum of the percent green and percent brown categories.

Mean values are then obtained from each of the processed index and ratio calculations. For each of these images, a 5.5m-radius circle (equal in area to a 4x4 pixel array) is used to extract the mean value for each ground truth site location. The values for each location, for each index or ratio, are added to a spreadsheet containing the ground truth percent cover data. The geographically common PF percent cover values and the 5.5m-radius circle mean calculation values are correlated through a linear regression calculation that results in a slope and intercept value defining the relationship of the correlation.

The slope and intercept from the index or ratio with the highest coefficient of determination (R^2) are applied with a calibration model ((index x slope) + intercept) back to the satellite index or ratio. The final product of the calibration model is a percent cover continuum of values in the imagery, i.e., a percent cover map.

[2] NDVI Offset and NDVI* have been mentioned by HB in several reports and memoranda, but LADWP is not currently calculating these indices for vegetative cover assessment.

SECTION 4.0
PROPOSED PLAN OF ACTION AND FUTURE COMPLIANCE MONITORING METHODOLOGY

Documented in the previous sections are the current methods used by LADWP and GBUAPCD to quantitatively verify vegetative cover on the MV Site. The basic foundations from which the two methods are constructed are quite similar. Both use ground truth data to calibrate a QuickBird image, resulting in a spatial estimate of vegetative cover. While several similarities are apparent, some minor differences in the mechanics of ground truthing and image calibration do exist. This section identifies those similarities and differences and proposes a collaborative path forward for future compliance monitoring efforts. Current similarities and differences between the two methods are outlined in Table 4-1 and detailed in the following sections.

TABLE 4-1
LADWP and GBUAPCD Managed Vegetative Compliance Monitoring Methods
Comparison of LADWP and GBUAPCD ground truthing tools, calibration target characteristics, and QB image analysis techniques.

Specification	Current LADWP Method	Current GBUAPCD Method	Proposed Future Method
Ground Truthing Tool			
Type	DPF	Traditional PF	DPF Methodology
Size	1 DPF: 1.6 m^2 (16.7 ft^2)	1 PF: 0.05 m^2 (0.5 ft^2)	
Documentation	Photo history that can be traced and recreated; electronic database of results	Electronic Database of Results	
Calibration Target Characteristics			
Shape	Square 3x3 QB Pixel Area	5.5m-radius circle	5.5m-radius circle
Size	51.8 m^2 (558 ft^2)	95 m^2 (1,023 ft^2)	95 m^2 (1,023 ft^2)
Area Ground Truthed	1 DPF equivalent to 1.6 m^2 (16.7 ft^2) or 3% of the calibration target area	30 PFs equivalent to 1.4 m^2 (15 ft^2) or 1.5% of the calibration target area	9.5 m^2 (102 ft^2) or 10% of the calibration target area
Number	51 sites	28 sites	40 sites
Distribution	See Figure 4-2A	See Figure 4-2A	See Figure 4-2B
QB Image Analysis Techniques			
Image Preprocessing	Geocorrection, Conversion to TOA, Conversion to RefleCTnce, Dark Object Subtraction	Geocorrection, Conversion to TOA, Conversion to RefleCTnce, Dark Object Subtraction	Geocorrection, Conversion to TOA, Conversion to RefleCTnce, Dark Object Subtraction
Index / Ratio Calculated	NDVI, SAVI, 3/2 ratio, 4/2 ratio, 4/1 ratio, 3/1 ratio	NDVI, SAVI, 3/2 ratio, 4/2 ratio, 4/1 ratio, 3/1 ratio	NDVI, SAVI, 3/2 ratio, 4/2 ratio, 4/1 ratio, 3/1 ratio

TABLE 4-1
LADWP and GBUAPCD Managed Vegetative Compliance Monitoring Methods
Comparison of LADWP and GBUAPCD ground truthing tools, calibration target characteristics, and QB image analysis techniques.

Specification	Current LADWP Method	Current GBUAPCD Method	Proposed Future Method
Index / Ratio Calibration	Index / ratio calibrated using linear regression on 25 of 51 calibration sites	Index / ratio calibrated using linear regression on 28 of 28 calibration sites	Index / ratio calibrated using linear regression on 25 of the 40 calibration sites
Index / Ratio Validation	Index / ratio validated using 26 of the 51 calibration sites	None	Index / ratio validated using 15 of the 40 calibration sites
Index / Ratio Selection Criteria	Strictly use NDVI	Varies based on R^2	Index / ratio selection criteria based on R2 and validation results
Data Format and Sharing	LADWP Only	GBUAPCD Only	Open book policy between the two parties

4.1 Ground Truthing Tool

Currently, LADWP and GBUAPCD are utilizing different ground truthing tools to assess vegetative cover. GBUPACD uses a traditional PF method; LADWP uses a novel DPF method. Both methods have merit in quantifying vegetative cover, but each has inherent advantages and disadvantages. The traditional PF method is field proven, yet can be considered subjective in nature. Checking of past PF results after field collection is impossible. DPF results can be traced through time, recreated from archived DPF images, and re-processed to validate previous measurements long after the related field conditions have passed. A recent study of sagebrush steppe vegetation by Seefeldt and Booth (2006) confirmed the advantages of ground truthing vegetative cover with 2m AGL digital images. They found that for the purpose of measuring plant cover, digital photos taken from 2m AGL performed as well or better than traditional visual estimation techniques for speed, standard deviation, and cost. They concluded that the acquisition of permanent digital photos taken at 2m AGL are an important advantage because vegetation can be analyzed retrospectively using improved software or to answer different questions; and changes in vegetation over time can be more accurately determined, particularly if quadrats are permanently located.

While DPF technology has proven successful at evaluating vegetative cover, direct assessment of its accuracy and reliability in producing comparable results to traditional PF methodology has not been attempted. For this reason, it is proposed that a side-by-side, quantitative comparison between the two methods be completed. The results of the evaluation are of interest to both GBUAPCD and LADWP, so it is proposed that the comparison be conducted in a collaborative manner, with GBUAPCD participation in field work, open sharing of data and results of analyses, and joint development of a single, shared interpretation and implications for future monitoring of vegetation. It is further proposed that the study be focused on evaluation of the DPF methodology as proposed by LADWP relative to traditional point framing. Finally, it is proposed that a single protocol should be drafted by LADWP for use in developing future PMPs, and that this protocol should then be reviewed and finalized with GBUAPCD[3].

[3] The collaborative study proposed in this section was completed June 2007. Final methodology utilized and subsequent results of the study are attached to this document as Addendum A.

4.1.1 Proposed Collaborative Study

Direct comparisons of percent cover estimates within each DPF for each CT will be evaluated for accuracy and repeatability. Within each CT area (CT) a systematic sampling grid will be assigned to indicate the sampling locations of the DPF photos (Figure 4-1). While the a-priori locations of the sampling points would be systematic, once applied in the field, these would yield conditions randomly distributed across the range of vegetation cover existing in each CT, and independent of the field technician's judgment. DPF images will be taken from inter-row to inter-row and analyzed in by three different techniques to obtain three comparable vegetative cover estimates. The three techniques consist of:

1. Analyzing vegetative cover over the entire image with spectral classification methodology, essentially sampling the entire 16.5 feet^2 area of the images (~17 percent of the CT).
2. Analyzing a subset of each picture by overlaying a set of grid points along several linear transects ("digital pins"). By systematically sub sampling points in the image, this methodology is the digital equivalent to the traditional PF method applied by the GBUAPCD (Section 3), except that a larger number of points are observed, and the points are in a two-dimensional grid as opposed to the PF's linear array.
3. Ground-based PF measurements will be completed within each DPF footprint. The amount and location of the ground-based PF measurements within the DPF footprint will be determined in the field by LADWP and GBUAPCD personnel. A set of random x-y locations and orientations will be available for the field team's use in locating PF observations, if desired.

The three vegetative cover estimates derived from the techniques above will be compared within and among all DPF photos per CT. Results will be used to evaluate the validity of DPF methodology to traditional PF methodology.

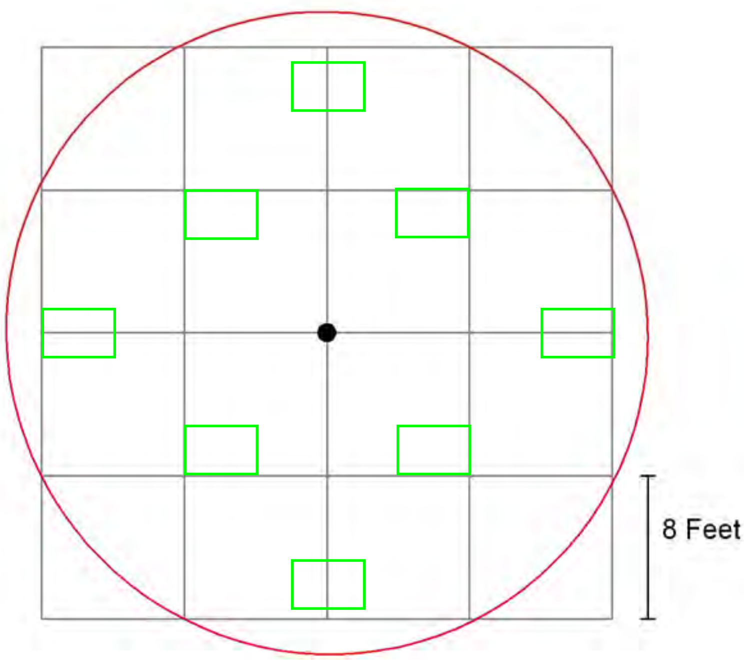


FIGURE 4-1
Conceptual Design of Calibration Target Layout
Shown is the proposed 5.5m-radius circle used for the ground truth measurements (red circle), the 2.4m grid cells as seen by the QuickBird satellite (gray lines), and the DPF locations (green rectangles). Ground-based PF measurements will be made within each DPF footprint (green rectangles).

4.2 Calibration Target Area Characteristics

As discussed previously, accurate satellite image calibration is dependent on several CT characteristics. These include CT size, shape, number, distribution, and internal homogeneity. Several similarities and relatively few differences existed between the GBUAPCD and LADWP methods (Table 4-1). Each characteristic is discussed below and if differences were identified, a plan to address the differences is presented.

4.2.1 Calibration Target Size and Shape

Currently, GBUAPCD CTs are sized to a 5.5m-radius circle centered on each CT site. Each CT consists of approximately 16 QB pixels and characterizes an area of 95 m^2 or 1,023 ft^2. The 16 QB pixels are averaged and compared to a percent cover value derived from approximately 30 PF measurements. Those 30 PF measurements characterize an area of approximately 15ft^2, which equates to roughly 1.5 percent of the CT area. In contrast, each LADWP CT is equivalent to a 3x3 QB pixel area (9 QB pixels), which is approximately 52 m^2 or 558 ft^2. The 9 QB pixels are averaged and compared to percent cover derived from one DPF photo. One DPF photo characterizes 16.5 ft^2 which is 3 percent of the CT area.

The differences in methods explained above are relatively minor. GBUAPCD's CT area is circular compared to LADWP's square pixel method. LADWP's CT area is roughly half the size of GB's CT area. While this may seem significant, both characterize relatively small areas. It is proposed that future CT areas be sized according to current GBUAPCD methodology, equivalent to the area of a 5.5m-radius circle (95 m^2 or 1,023 ft^2).

Both methods inadequately characterize percent cover relative to the entire area of the calibration site. GBUAPCD's method characterizes approximately 1.5 percent of the CT area with the PF device, while LADWP's method characterizes approximately 3 percent of the area using DPFs. To ensure that CT vegetative cover levels are adequately characterized, the percentage of area evaluated for vegetative cover within the each CT should be increased to minimum of 10 percent. Statistical analysis of subsampling variability can then be applied to optimize the number of subsamples, which may turn out to be different than this initial, conservative level. The optimum subsample number may change over time, so it is recommended that the 10 percent subsample be retained through several events and varying conditions, and that all of these events should be analyzed to help select an optimum long-term subsampling intensity.

4.2.2 Calibration Target Quantity and Distribution

As discussed in Sections 2.2 and 3.2, GBUAPCD and LADWP methods utilize different quantities of CT sites. GBUAPCD samples anywhere from 16 to 28 CT sites, while LADWP samples 51 CT sites. For future compliance monitoring events, it is proposed that a total of 40 CT sites, composed from historic LADWP and GBUAPCD CT locations, be utilized (Figure 4-2). Of the total 40 CT sites, 25 would be employed to build the QuickBird calibration curve, and the remaining 15 would serve as an independent dataset. The latter is necessary to assess the performance of the calibration model with statistics independent of the original calibration. This method provides a more meaningful evaluation of performance than the R^2 of the calibration itself, by assessing the success of the model in accurately mapping cover at various locations on the site. Ultimately, the coefficient of determination and the independent data set will be used together to determine which band ratio calculation is most appropriate for that particular satellite image date. This flexibility in choice of band ratio for each date is similar to the approach that has been taken by HydroBio, and differs from the consistent use of the same band ratio (despite variable performance over time) taken by LADWP.

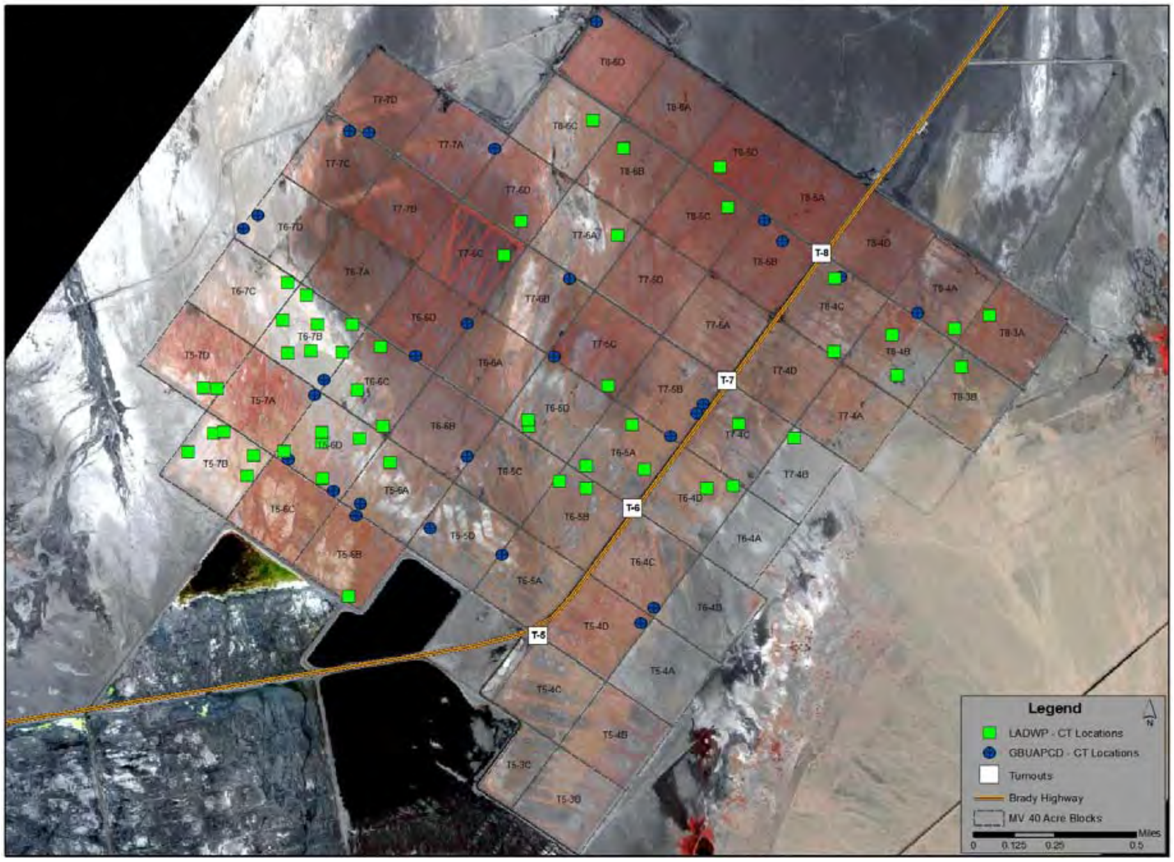
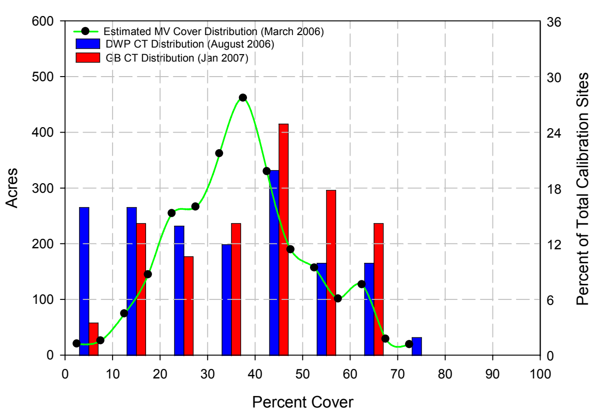


FIGURE 4-2
Current GBUAPCD and LADWP CT Locations
Future CT locations should be composed of historic GBUAPCD and LADWP CT locations where possible.

Equally important to image calibration is the distribution of CT sites relative to the distribution of vegetative cover on the MV Site. The 40 CTs will be distributed over different cover classes to: 1) Represent the full range of cover classes on the MV Site, and, 2) provide an emphasis on the cover classes of greatest interest for compliance purposes (0 to 30 percent). The cover distribution of the current GBUAPCD and LADWP sites is shown in Figure 4-3A. While the GBUAPCD CT sites overrepresent the higher cover classes, LADWP CT sites have insufficient representation in middle cover classes (20 to 40 percent cover). It is proposed that a distribution similar to that depicted in Figure 4-3B be adopted, to provide sufficient characterization in all cover classes for both calibration as well as verification purposes, and to emphasize the critical 0 to 30 percent interval.



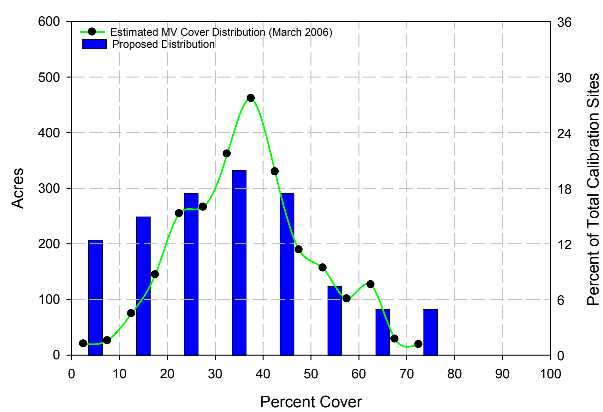


FIGURE 4-3
Figure 4-3.A: Estimated MV Cover Distribution relative to LADWP and GBUAPCD Calibration Site Distribution
Figure 4-3.B: Estimated MV Cover Distribution and Proposed Calibration Site Distribution

4.2.3 Calibration Target Homogeneity

DWP and GBUAPCD have made extensive efforts in the past to select CT sites that appear to be homogenous in cover. Subsampling results for vegetative cover within each CT will be analyzed for homogeneity. From these data, a homogeneity criterion will be statistically derived and used to identify suitable CTs for future monitoring efforts.

4.3 QuickBird Image Analysis Criteria

LADWP and GBUAPCD methods for preparation of QuickBird images for verifying vegetative cover are almost identical. Methodology for future compliance monitoring events is detailed in the following sections.

4.3.1 Preprocessing of Quickbird Satellite Images

Steps outlined in Table 4-2 (identical to current GBUAPCD and LADWP methodologies) will be followed to prepare Quickbird images for mapping vegetative cover.

TABLE 4-2
QuickBird Image Preprocessing Steps
The steps outlined in this Table will be used to preprocess QuickBird imagery.

Preprocessing Correction Conversion	Explanation	Method Details
Geometric correction (GC)	GC is used to rectify the satellite image to known ground control points. This essentially adjusts the image to known corresponding visual features.	Increase the quantity of differential GPS coordinates of known visual features used as GC points to visually identify in reference panchromatic (0.6m image) and newly acquired panchromatic image, geometric model calculated and applied to both 0.6m Pan and 2.4m Multispec imagery. Image projection parameters used for GC: UTM, Zone 11, GRS 1980 Spheroid; NAD83 Datum; Nearest Neighbor Resampling; 2.4 Meter Pixel Size
Conversion of image digital number (DNs) to top-of-atmosphere (TOA) Spectral Radiance	Conversion to TOA spectral radiance normalizes the data for the incident energy of the sun. This changes with solar angle and distance which is a factor of time of day and year.	Each band of the image is multiplied by a K-Conversion Factor and divided by the bandwidth to obtain TOA radiance values. K -Conversion Factors and Bandwidths: Band 1 = 0.0160412, 0.068; Band 2 = 0.0143847, 0.099; Band 3 = 0.0126735, 0.071; Band 4 = 0.0154242, 0.114
Conversion of TOA radiance to reflectance	Relectance values are used in the calculation of some vegetative indices (e.g., NDVI, SAVI, etc.).	Reflectance calculation: (image band x earth-sun distance x pi) / (irradiance x COS(90 degrees – sun elevation) The Earth – Sun Distance is estimated from the Landsat Data User's Handbook*. Sun elevation and Exoatmospheric Solar Spectral Irradiance are provided in the image metadata from the Satellite Image Vender DigitalGlobe.
Dark object subtraction (DOS)	DOS corrects for atmospheric scatter and other environmental conditions.	The histogram of each band of the refleCTnce image is observed and the value at the low end of the curve, which is at the point of having a significant number of pixels (~100) is recorded. That value is then subtracted from its source band to shift the low value close to what should be the actual lowest value.

TABLE 4-2
QuickBird Image Preprocessing Steps
The steps outlined in this Table will be used to preprocess QuickBird imagery.

Preprocessing Correction Conversion	Explanation	Method Details

* Source: Table 11.4 Earth-Sun Distance in Astronomical Units in the Landsat Data User's Handbook.

4.3.2 Producing Vegetation Indices/Ratios from Satellite Images

Standard vegetative indices and ratios have been calculated by LADWP and GBUAPCD. It has been documented extensively by GBUAPCD and LADWP that the ratio or index providing the best correlation with vegetative cover varies due to environmental and atmospheric conditions. For that reason, we will test all indices and ratios to identify the most appropriate candidate for each vegetative cover estimate. Not only should indices and ratios that have been used in the past be calculated for continuity and historical reference, but others that appear to hold promise should be evaluated. A number of standard indices and ratios common to remote sensing that might produce a strong relationship to observed vegetative cover are presented in Table 4-3.

TABLE 4-3

Vegetative Indices and Ratios

This table contains a list of vegetative indices and ratios that are currently used by GBUAPCD or LADWP. In addition, other documented indices and ratios are presented for potential use in future compliance monitoring efforts.

Vegetative Index or Ratio	Mathematical Formula
Normalized Difference Vegetative Index (NDVI).[a]	NDVI = (band 4 – band 3) / (band 4 + band 3)
Normalized Difference Vegetative Index Offset ($NDVI^{OFFSET}$) [a]	GBUAPCD Formula
Normalized Difference Vegetative Index* (NDVI*) [a]	GBUAPCD Formula
Soil Adjusted Vegetative Index (SAVI). [a]	SAVI = (band 4 – band 3) / (band 4 + band 3 + 0.5) * (1 + 0.5)
4/2 Ratio Image [a]	Band 4 / Band 2
4/1 Ratio Image [a]	Band 4 / Band 1
3/2 Ratio Image [a]	Band 3 / Band 2
3/1 Ratio Image [a]	Band 3 / Band 1
Ratio Vegetation Index (RVI)[b]	RVI = NIR/Red
Infrared Percentage Vegetation Index (IPVI) [b]	IPVI = NIR/NIR + Red
Difference Vegetation Index (DVI) [b]	DVI = NIR – Red
Perpendicular Vegetation Index (PVI) [b]	PVI = sin(a)NIR – cos(a)Red where a is the angle between the soil line and the NIR axis
Weighted Difference Vegetation Index (WDVI) [b]	WDVI = NIR – g * Red where g is the slope of the soil line
Transformed Soil Adjusted Vegetation Index TSAVI) [b]	TSAVI = s(NIR – s * Red – a)/(a * NIR + Red – a * s + X * (1 + s * s) where a is the soil line intercept, s is the soil line slope, and X is an adjustment factor which is set to minimize soil noise (0.08 in original papers)

TABLE 4-3

Vegetative Indices and Ratios

This table contains a list of vegetative indices and ratios that are currently used by GBUAPCD or LADWP. In addition, other documented indices and ratios are presented for potential use in future compliance monitoring efforts.

Vegetative Index or Ratio	Mathematical Formula
Modified Soil Adjusted Vegetation Index (MSAVI) [b]	MSAVI = (NIR – Red/NIR + Red + L) * (1 + L) where L = 1 - 2*s*NDVI*WDVI
second Modified Soil Adjusted Vegetation Index (MSAVI2) [b]	MSAVI2 = (1/2) * (2* (NIR + 1) – sqrt((2 * NIR + 1)2 – 8(NIR – Red))
Enhanced Vegetation Index (EVI) [b]	EVI = 2.5 * (NIR – Red) / (NIR + (6 * Red) – (7.5 * Blue) +1
Green Difference Vegetation Index (GDVI) [b]	GDVI = NIR – Green
Green Normalized Difference Vegetation Index (GNDVI) [b]	GNDVI = (NIR – Green) / (NIR + Green)
Green Optimized Soil Adjusted Vegetation Index (GOSAVI) [b]	GOSAVI = (NIR – Green) / NIR + Green + 0.16)
Green Ratio Vegetation Index (GRVI) [b]	GRVI = NIR / Green
Green Soil Adjusted Vegetation Index (GSAVI) [b]	GSAVI = ((NIR – Green) / (NIR +G + 0.5)) * 1.5
Norm NIR [b]	Norm NIR = NIR / (NIR + Red + Green)
Norm R [b]	Norm R = Red / (NIR + Red + Green)
Norm G [b]	Norm G = Green / (NIR + Red + Green)
Rel NIR [b]	Rel NIR = NIRplot / NIRreference plot
Rel Red [b]	Rel Red = Redplot / Redreference plot
Rel Green [b]	Rel Green = Greenplot / Greenreference plot
Optimized Soil Adjusted Vegetation Index (OSAVI)	OSAVI = (NIR – Red) / (NIR + Red + 0.16)
Relative Difference Vegetation Index (RDVI) [b]	
Relative Green Difference Vegetation Index (RGDVI) [b]	RGDVI = GDVIplot / GDVIreference plot
Relative Green Normalized Difference Vegetation Index (RGNDVI) [b]	RGNDVI = DVIplot / DVIreference plot
Relative Green Optimized Soil Adjusted Vegetation Index (RGOSAVI) [b]	RGOSAVI = GOSAVIplot / GOSAVIreference plot
Relative Green Ratio Vegetation Index (RGRVI) [b]	RGRVI = GRVIplot / GRVIreference plot
Relative Green Soil Adjusted Vegetation Index (RGSAVI) [b]	RGSAVI= GSAVIplot / GSAVIreference plot
Relative Normalized Difference Vegetation Index (RNDVI) [b]	
Relative Optimized Soil Adjusted Vegetation Index (ROSAVI) [b]	ROSAVI = OSAVIplot / OSAVIreference plot
Relative Ratio Vegetation Index (RRVI) [b]	PRVI = RVIplot / RVIreference plot

TABLE 4-3

Vegetative Indices and Ratios

This table contains a list of vegetative indices and ratios that are currently used by GBUAPCD or LADWP. In addition, other documented indices and ratios are presented for potential use in future compliance monitoring efforts.

Vegetative Index or Ratio	Mathematical Formula
Relative Soil Adjusted Vegetation Index (RSAVI) [b]	RSAVI = SAVIplot / SAVIreference plot
Atmospherically Resistant Vegetation Index (ARVI)[b]	ARVI = -0.18 + 1.17 * NDVI
Soil Corrected & Atmospherically Resistant Vegetation Index (SARVI) [b]	SARVI = Corrected NIR – Corrected rb / Corrected NIR + Corrected rbWhere Corrected rb = Corrected Red – γ(Corrected Blue – Corrected Red) and γ is an analyst supplied value between 0.7 and 1.3
Simple Ratio Vegetation Index (SRVI) [b]	
Modified Non-Linear Vegetation Index (MNLI) [b]	MNLI = (NIR2 – Red)(1 + L) / (NIR2 + Red + L)
Modified Simple Ratio (MSR) [b]	MSR = (NIR/Red – 1) / (NIR/Red)1/2 + 1
NDVI*SR [b]	NDVI*SR = (NIR2 – Red) / (NIR + Red2)
SAVI*SR [b]	SAVI*SR = (NIR2 – Red) / (NIR + Red + L) * Red

[a] Vegetative indices or ratios historically used by GBUAPCD or LADWP.
[b] Other documented vegetative indices or ratios that could be useful for compliance monitoring efforts.

4.3.3 Linear Regression Calibration and Selection Criteria for Indices and Ratios

Linear regression will be performed with each of the processed indices and ratios. Mean vegetative cover values within each of 25 of the 40 calibration sites will be employed. The slope and intercept for each will be applied to the source index or ratio to produce preliminary vegetation cover maps. The predicted percent cover by each method will then be checked against the mean of cover results within each of the remaining 15 validation sites. The statistical comparison of the linear regression equations with this independent dataset will then be used to determine which combination of field and remote sensing methodologies produces the most accurate result, and should be retained to generate the final vegetation cover map. Specific statistical methods and their explanation are given in Table 4-4

TABLE 4-4

Vegetative Model Statistical Performance Measures

Statistical methods used for ranking vegetative index ratio model performance

Vegetative Model Statistical Performance Measures	Definition / Explanation for Use
R^2-calibrate	Coefficient of determination based on the linear regression between the vegetative indices / ratios and the ground-based cover measurement. The corresponding linear regression curve serves as the calibration equation based on which the cover of the entire MV-area is estimated

TABLE 4-4
Vegetative Model Statistical Performance Measures
Statistical methods used for ranking vegetative index ratio model performance

Vegetative Model Statistical Performance Measures	Definition / Explanation for Use
R^2-check	Coefficient of determination based on the linear regression between actual ground-based cover measurements and the estimated cover based on the calibration equation. Since this regression is based on an independent set of field sampling points that was not applied to built the calibration curve, this can be considered an independent test of the "goodness of fit" of the calibration equation.
Mean normalized bias (MNB)	MNB is defined as the difference between the predicted and the observed cover values, of the independent data set, normalized to the observed cover value. It provides an indication of the overall error in the cover prediction model, as well as the direction of the error, specifically, over- or under prediction.
Mean normalized error (MNE)	MNE is defined as the mean of absolute values of MNB, and therefore does not distinguish between under- and over predictions. This makes it a suitable indicator of the overall magnitude of the mean error, since over- and under predictions do not cancel each other out, as is the case with the MNB.
Mean fractional bias (FB)	FB is defined as the mean of the differences between the predicted and the observed cover values, of the independent data set, normalized to the sum of the observed and predicted cover values. This normalization step reduces the influence of large outlying values, either over- or over predictions, on the mean error statistic. It provides an indication of the overall error, as well as the direction of the error, specifically, over- or under prediction.
Mean absolute fractional bias (AFB):	AFB is defined as the mean of the absolute differences between the predicted and the observed cover values, of the independent data set, normalized to the sum of the observed and predicted cover values. This normalization step reduces the influence of large outlying values on the mean error statistic. Similar to the MNE, it is an indicator of the overall magnitude of the mean error, since over- and under predictions do not cancel each other out, as is the case with the FB.

As an example, the relative performance of the each ratio / index for each statistical comparison described in Table 4-4 (six per image date) for the March 2005 QB image are presented in Table 4-5. Only ratios and indices historically used by GBUAPCD and LADWP are presented in this analysis.

In the future, when a QB image is acquired for cover estimate purposes, statistical results will be used to sum, score, and ultimately rank each of the ratio / indices from Section 4.3.2 based on the following two steps:

1. Sum each of the five independent model performance measures, essentially all of the above except the R^2-calibrate, by calibration method. The overall sum consists of the sum of each the error indices and the inverse of R^2-check (Table 4-5). Each index will then be ranked by calibration method. The calibration method with the lowest total sum (and rank) is considered to be the best performing method by this statistical comparison.

TABLE 4-5

Statistical Comparison Method Results

Statistical comparison results for March 2005 QB image.

Ratio / Index	Calibrate R^2	Check R^2	MNB	MNE	FB	AFB	Abs(FB)	Overall Sum[1]	Overall Rank[2]
NDVI	0.56	0.67	0.63	1.09	-0.16	0.49	0.16	3.9	2
SAVI	0.38	0.62	0.61	1.05	-0.11	0.49	0.11	3.9	3
3/2 Ratio	0.49	0.54	0.29	0.93	-0.29	0.62	0.29	4	4
3/1 Ratio	0.38	0.31	0.66	1.35	-0.29	0.68	0.29	6.2	6
4/2 Ratio	0.6	0.64	0.41	0.96	-0.23	0.56	0.23	3.7	1
4/1 Ratio	0.5	0.52	0.63	1.27	-0.29	0.64	0.29	4.8	5

[1] Overall sum equal the sum of individual ranks for respective ratio / indices.

[2] Overall rank determined by overall score. Lowest score = 1, highest score = 5.

2. Determine the most appropriate vegetative index / ratio to be retained by ranking each of the five independent model performance measures, individually (essentially all of Table 4-4 except the R^2 –calibrate) from best to worst, for each statistical method (Table 4-6). The best and worst performing calibration methods are assigned the lowest and highest rank, respectively 1 and 6. Next, all five ranks will be summed over each of the six calibration methods, and the sum of the ranks will be ranked by calibration method. The calibration method with the lowest total sum (and rank) is considered the best performing method.

TABLE 4-6

Statistical Ranking Scores

Ranking Scores for Statistical comparison of the March 2005 QB image. Results derived from Table X-X

Ratio / Index	Calibrate R^2	Check R^2	MNB	MNE	Abs(FB)	AFB	Overall Score[1]	Overall Rank[2]
NDVI	2	1	4	4	2	1	14	2
SAVI	6	3	3	3	1	2	18	3
3/2 Ratio	4	4	1	1	6	4	20	4
3/1 Ratio	5	6	6	6	5	6	34	6
4/2 Ratio	1	2	2	2	3	3	13	1
4/1 Ratio	3	5	5	5	4	5	27	5

[1] Overall score equal the sum of individual ranks for respective ratio / indices.

[2] Overall rank determined by overall score. Lowest score = 1, highest score = 5.

Final ratio / index selection for each image date will be determined by the quantitative results in steps 1 and 2 above. As an example, the 4/2 ratio performed the best for the March 2005 QB image (Table 4-6). It is possible that in some cases more than one method could be considered to perform equally well (i.e. overall sum and score are equal). In this case, a qualitative judgment call will be made on which index or ratio should be selected.

SECTION 5.0

CONCLUSIONS

This report outlined current GBUAPCD and LADWP vegetative compliance monitoring methodologies and proposed a methodology for future compliance monitoring efforts. Several similarities and very few differences were identified between the two methods. When minor differences were recognized, the preferred method for future compliance monitoring events was proposed. , a plan to collaboratively address the difference was proposed. Each characteristic and its associated category are summarized below.

1. Similarities between the two methods included the following:
   - Image analysis preprocessing techniques
   - Image analysis index/ratio calculation
   - Image analysis index/ration calibration techniques
2. Minor differences between the two methods included:
   - CT size and shape
   - CT number and distribution
   - Index / ratio selection criteria
   - Index / ratio validation
3. Significant differences between the two methods for which a collaborative study was proposed include the following:
   - Ground truthing tool

When finalized, the methodology presented in this report for future compliance monitoring events should provide the desired outcomes for regulatory evaluation of vegetative cover at Owens Lake.

SECTION 6.0
WORK CITED

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ADDENDUM A

Quantitative Comparison of Digital Point Frame and Traditional Point Frame Ground Truth Data (June 2007)

1.0 Introduction and Purpose

The Los Angeles Department of Water and Power (LADWP) and Great Basin Unified Air Pollution Control District (GBUAPCD) use different ground-truthing tools to assess vegetative cover. GBUPACD uses a traditional point frame (PF) method; LADWP uses a novel digital point frame (DPF) method. Both methods have merit in quantifying vegetative cover, but each has inherent advantages and disadvantages. The traditional PF method is field proven, but it can be considered subjective in nature and verification of PF results after field collection is impossible. DPF results can be traced through time, re-created from archived DPF images, and re-processed to validate previous measurements long after the related field conditions have passed. While DPF technology has proven successful at evaluating vegetative cover in the past, direct assessment of its accuracy and reliability in producing comparable results to traditional PF methodology had not been completed. Therefore, in June 2007 representatives from GBUAPCD and LADWP initiated a collaborative comparison study (study) designed to compare the two methods to determine which method was appropriate for future compliance monitoring events. Comprehensive details on the two methods are presented in the main report to which this addendum is attached.

2.0 Methodology

This section describes the methodology used to identify and characterize vegetative cover on appropriate calibration targets for the study. Additional background information on the basis of each methodology can also be found in the main report, Section 4.0.

2.1 Calibration Target (CT) Selection

Historic GBUAPCD and LADWP CT sites formed the basis from which CT locations were selected for use in the study. Care was taken to identify CT locations that were distributed over different cover classes that: 1) represented the full range of cover classes on the MV Site, 2) provided sufficient spatial distribution across the MV site, and, 3) provided an emphasis on the cover classes of greatest interest for compliance purposes (0 to 30 percent). The actual vegetative cover distributions of the CT locations utilized in the study are shown in Figure A-1a. The spatial distribution of those same sites on the MV is shown in Figure A-1b.

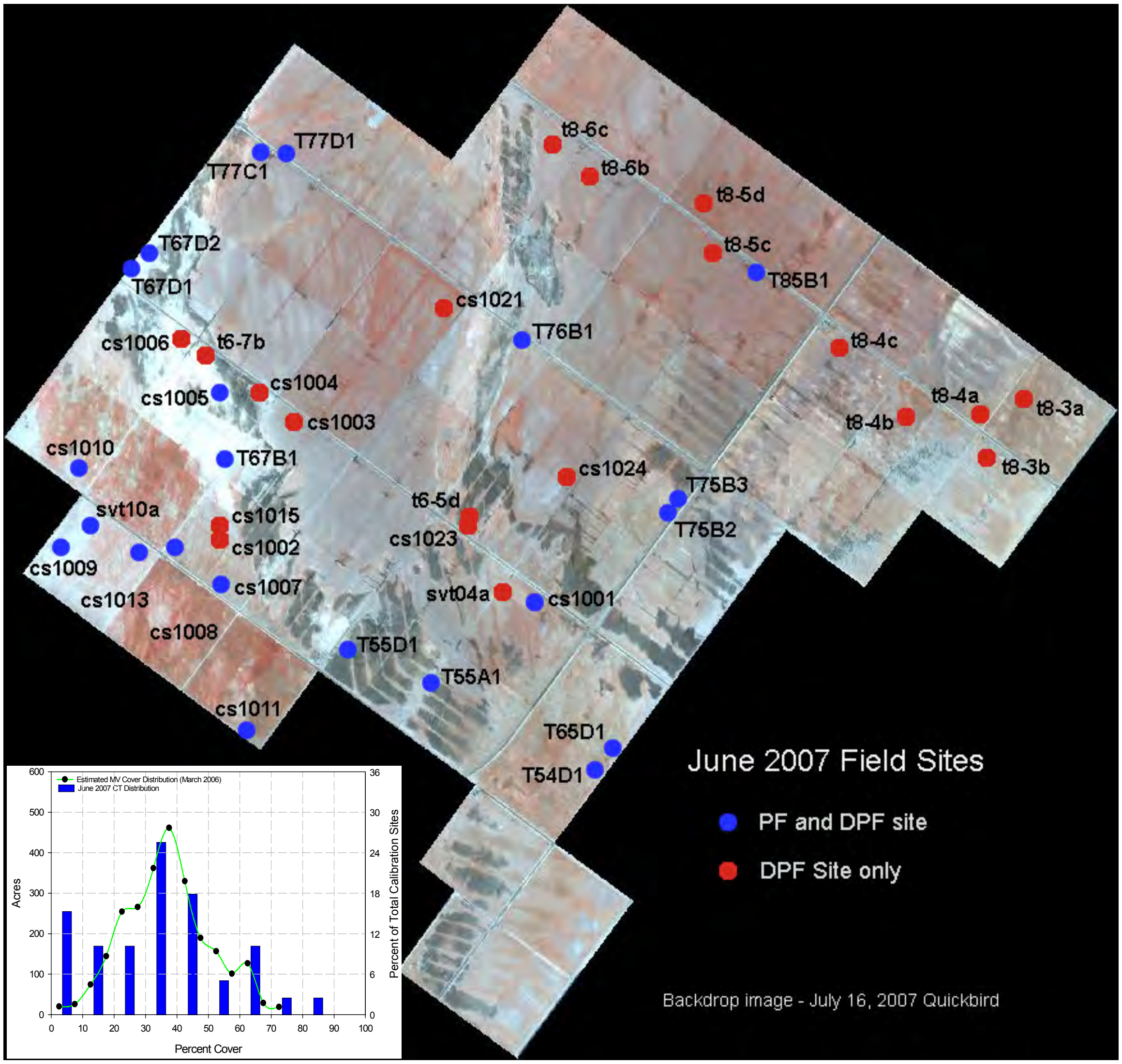


FIGURE A-1
Figure A-1a: Vegetative Cover Distribution of CTs Utilized in the Study
Figure A-1b: Spatial Distribution of CTs used

2.2 CT Vegetative Cover Characterization

As discussed in Section 4.0 of the main report, GBUAPCD and LADWP CT size was determined to be equivalent to a 5.5m-radius circle centered on the middle of the CT location. This size equated to approximately 16 QB pixels, which were averaged and compared to percent cover derived from the PF or DPF measurements discussed below.

PF Characterization Methodology

Current GBUAPCD PF methodology was used in the study. The PF consisted of a 5-foot long device with 14 individual pins used for vegetative cover assessment (Figure A-2). Each pin was raised to the full height of the PF and then individually lowered into the vegetation. As each pin was lowered, it was recorded as a green, brown, silver, or no vegetation "hit".

Consistent with GBUAPCD methodology, a total of 28 PF measurements were made within each calibration target. Care was taken to ensure that the 28 PF measurements were properly distributed to characterize the entire CT area. Results from each PF location were recorded onto standard hard copy tally-forms that were later transcribed into an Excel spreadsheet.

FIGURE A-2
GBUAPCD Point Frame Device
The GBUAPCD PF device is approximately 5 feet wide with 14 individual pins.

DPF Characterization Methodology

Current LADWP DPF methodology was utilized in the study. DPFs were captured using a Sony Cyber-shot DSC-R1 digital camera mounted on a 15-foot Hi-Pod monopod system (Figure A-3). Detailed camera settings used for DPF collection and standard DPF specifications are presented in Table A-1.

A total of 8 DPFs, which characterized approximately 134 ft^2, were captured in each CT location. Within each CT area a systematic sampling grid was assigned to indicate the sampling locations of the DPF photos (Figure A-4). While the a-priori locations of the sampling points was systematic, once the points were identified in the field they were randomly distributed across the range of vegetation cover within each CT, and independent of the field technician's judgment. All DPF images were taken from inter-row to inter-row. Extreme care was taken to minimize foot traffic and subsequent stomping of vegetation at each CT location. DPFs were captured before PF measurements because significantly less foot traffic was associated with DPF capture.

FIGURE A-3
DPF Field Equipment Setup
DPF equipment included the use of a high resolution camera mounted on a 15' Hi-Pod monopod.

TABLE A-1
Digital Camera and DPF Specifications

Item	DPF Specification
Camera Brand	Sony Cyber-shot DSC-R1
Camera Resolution	3888 x 2560 pixels
Exposure Value (E.V.)	0.0
F. Stop	Auto adjust
ISO	160
Shutter Speed	500
Photo height	14.5’ above ground surface
Photo Dimensions	5’ x 3.3’
Surface Area Characterized	16.7 ft^2

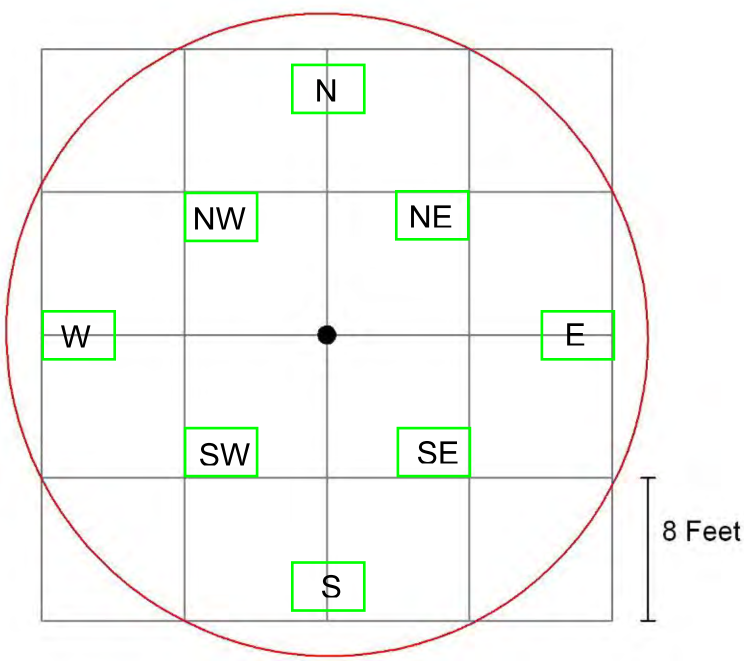


FIGURE A-4
Idealized DPF Locations within CT Layout
Shown is the proposed 5.5m-radius circle used for the ground truth measurements (red circle), the 2.4m grid cells as seen by the QuickBird satellite (gray lines), and the DPF locations (green rectangles). Ground-based PF measurements will be made within each DPF footprint (green rectangles).

Two methods were utilized in assessment of vegetative cover within each DPF. The first method consisted of spectral classification. Specifically, two ratios were calculated from the DPF photos: blue/red (3/1) and green/red (2/1). A threshold was visually set for the blue/red ratio to separate grass from substrate and another threshold was visually set for the green/red ratio that, when combined with the blue/red ratio, separated green grass from brown grass. The output classification image contained green, brown, and no vegetation classes.

The second method consisted of overlaying an ESRI shapefile grid of 50 points (digital pins) on each DPF photo. The center of each digital pin was used in the determination of vegetative cover. Each of the 50 digital pins (per DPF) was characterized as green, brown, silver, or no vegetation hits. This classification was then entered into the attribute table for the shapefile and copied to an Excel spreadsheet, where the mean percent cover was calculated for each site.

3.0 Results and Discussion

Direct comparisons of percent cover estimates between PF and DPF measurements for each CT were evaluated for accuracy and repeatability. In addition, the number of sub-samples (individual PF or DPF measurement) and their influence on mean CT percent cover estimates were evaluated. Specific comparisons completed in the study are listed below:

- DPF Percent Cover Estimation
- PF Percent Cover Estimation
- DPF and PF CT Percent Cover Comparison
- DPF and PF Economic / Labor Analysis

3.1 DPF Percent Cover Estimation

Two methods were used to characterize vegetative cover for each DPF: spectral classification and digital pin classification.

Spectral Classification

To automate DPF classification, spectral analysis was completed on a limited number of DPFs in the study. Results from the spectral classification exercise demonstrated the difficulty in identifying and separating "silver" grass (particularly on the right side of Figures A-5a and A-5b) from the underlying substrate. In addition, bright light-colored grass suffered the same problem as silver grass and was sometimes classified as substrate. Also problematic was the accurate separation of green grass from brown grass (i.e. shades of green appeared as brown in the classification).

Given the difficulties discussed above, spectral classification was not completed on all DPFs and it was not considered a viable option for DPF classification. That said, although spectral classification proved difficult and often inaccurate, more sophisticated remote sensing techniques that make use of additional information contained within the DPF may be the key to solving this problem. Specifically, incorporation of spectral signatures with image morphological features (shape, area, length, width, texture, etc.) will likely improve the classification of the DPFs and may result in a semi-automated approach to DPF cover characterization.

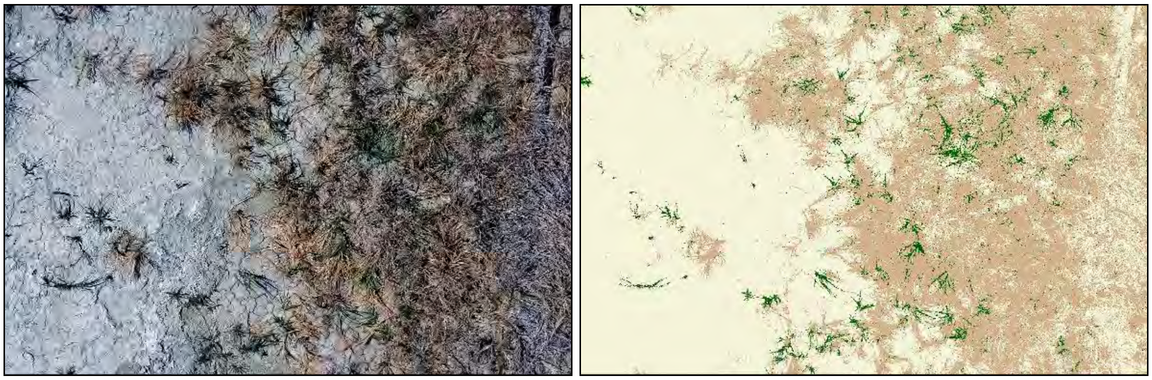


FIGURE A-5
Figure A-5a: DPF in Natural Color
Figure A-5b: DPF Spectrally Classified

Digital Pin Classification

Each DPF was analyzed for percent cover using the digital pin methodology. DPF percent cover values are presented in Appendix A.

In order to understand the number of digital pins needed for accurate DPF vegetative cover characterization, an efficiency analysis was completed to determine the number of pins needed to reach equilibrium in mean vegetative cover within each DPF as well as the number of DPFs needed to reach equilibrium per CT. Pins were randomly and sequentially added to the analysis. Results demonstrated that the area of equilibrium, where variability in calculated percent cover diminished, was near the 30-35 pin range (Figure A-6). This area of equilibrium represented the point at which introduction of additional pins into the percent cover estimation resulted in little or no change in the mean DPF percent cover estimate. This analysis demonstrated that only 30-35 pins are needed for accurate classification, thus resulting in substantial savings of time and labor compared to the classification of all 50 pins.

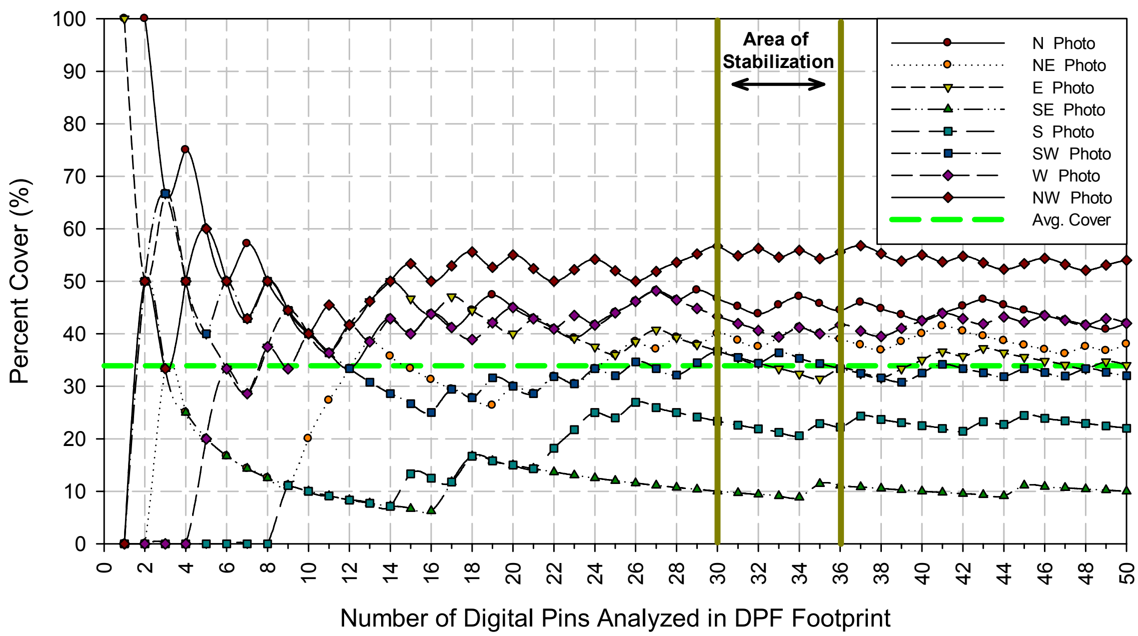


FIGURE A-6
Estimated Percent Vegetative Cover vs. Number of Digital Pins Analyzed for CT CS1001

The second part of the efficiency analysis was completed to determine the number of DPFs needed to reach equilibrium per CT. Results suggested that in most cases, equilibrium in the mean percent cover estimate was reached using 8 DPFs per CT. However, sparsely covered CTs (0-10%) had more cover variability and thus struggled to reach equilibrium using 8 DPFs (Appendix B). This is most likely a result of the inherent variability and non-uniformity of the sparsely covered CTs.

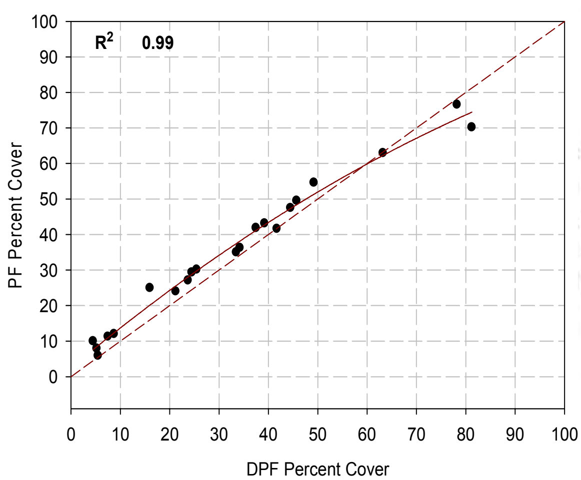
3.2 PF Percent Cover Estimation and Efficiency Analysis

GBUAPCD PF methodology was used to estimate percent cover on 21 of the 40 CTs used in the study (Figure A-1). Percent cover values from the PF methodology are given in Appendix B. Each CT was characterized by 28 PF measurements. Each position where the PF was dropped represented a sub sample used to calculate mean percent cover for the CT. An efficiency analysis was completed to determine if equilibrium in mean percent cover per CT was reached with the 28 sub samples. Results revealed that nearly all CTs reached equilibrium with the 28 sub samples (Appendix B), indicating that the CTs were sufficiently sampled to obtain a good estimate of the mean percent cover.

However, similar to the DPF efficiency analysis, results suggested that CT in the 0-10% cover range struggled to reach equilibrium. This is likely a result of the inherent variability and non-uniformity of the sparsely cover CTs.

3.3 Comparison of DPF vs. PF Results

A total of 21 CT locations were evaluated using PF and DPF ground truth methodology. Of the 21 CTs evaluated, 19 (91%) had less than or equal to 5% absolute difference between PF and DPF estimates (Appendix A). Regression results of PF and DPF demonstrated that the two methods tracked very well with an R^2 of 0.99 (Figure A-7a). Below 50% cover, the traditional PF tended to give slightly higher cover estimates compared to DPF, on average around 3.5% (Figure A-7b). Above 50% cover, methods tracked more closely, with DPF giving slightly higher cover estimates, on average around 1.5%. Overall, negligible differences between PF and DPF percent cover estimates were observed.



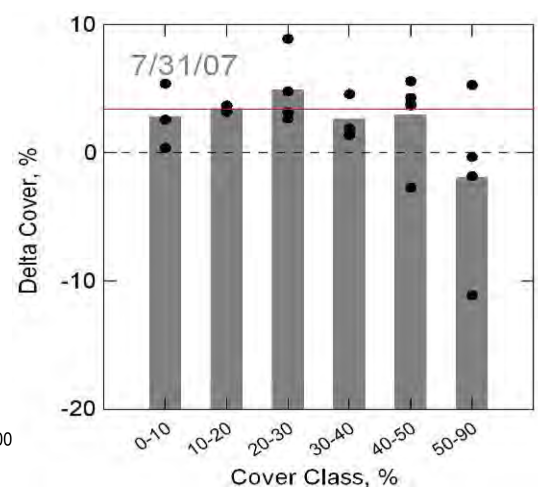


FIGURE A-7
Figure A-7a: DPF vs. PF Best Fit Regression
Figure A-7b: Change in Cover for each Cover Class

3.4 DPF and PF Economic / Labor Analysis

The economics of DPF and PF methodology were explored by assessing the labor required to complete a compliance monitoring event. For normal compliance monitoring events, DPF methodology required 1 person capturing DPFs for a total of 18 hours (Table A-2). Office analysis of the digital pins required the most time, averaging 1 hour and 15 min per CT, for a total of 50 hours per compliance monitoring event. Final processing and QA /QC efforts accounted for an additional 4 hours. The cumulative time required for compliance monitoring using DPF methodology was estimated at 72 hours (Table A-2).

Traditional PF methodology required substantially more personnel for field monitoring efforts. A total of three people were needed. Two people took PF measurements while a third transcribed results onto a hardcopy form, for a total of 120 hours. Office analysis consisted of transcribing PF measurements from hardcopy forms to excel format, for a total of 2 hours. Final QA / QC efforts accounted for an additional 2 hours per compliance monitoring event (Table A-2).

Results of this analysis demonstrated that significant time savings were realized through DPF ground truth methodology. Field labor was cut by 100 hours when compared to traditional PF methodology, due largely to the decrease in staff needed per compliance monitoring event. In total, DPF methodology saved 42 labor hours per compliance monitoring event when compared to traditional PF.

TABLE A-2
DPF and PF Economic Analysis
Economic analysis of total labor required to complete a compliance monitoring event using DPF and traditional PF

Category	DPF			Labor		
	Staff	Labor (Hours / CT)	Event Total (Staff x Labor x 40 Sites)	Personnel	Time (Hours / CT)	Event Total (Staff x labor x 40 Sites)
Fieldwork	1	0.45	18	3	1	120
Office Analysis	1	1.25	50	1	0.05	2
QA / QC	1	0.1	4	1	0.05	2
Total			72 hours			124 hours

4.0 Conclusions

This addendum presented the results from the GBUAPCD and LADWP collaborative DPF vs. PF comparison study. Conclusions from the study clearly indicated DPF percent cover estimates accurately replicated PF estimates (R^2 = 0.99). Specific conclusions generated from the study consisted of the following:

- Correlation between DPF and PF percent cover estimates was extremely high. DPF and PF methodologies result in essentially the same percent cover estimates.
- Spectral analysis of DPFs proved difficult and inaccurate. More sophisticated remote sensing techniques that take into account spectral signature as well as image morphological features (shape, area, length, width, texture, etc.) may be the key to successful spectral classification of DPFs.
- DPF mean percent cover equilibrium was reached using 30-35 digital pins per DPF compared to the normal 50 pins. This will result in a substantial time savings for future compliance monitoring events.
- CT mean percent cover equilibrium is reach for nearly all cover classes using 8 DPFs per CT location. The one exception is the 0-10% cover range. An increased number of DPFs per CT would result in increased accuracy, however improvement opportunity is small, considering the results already compare very well with each other (R^2 = 0.99)

- PF mean percent cover equilibrium was reached for all cover classes using 28 PF measurements per CT location. This indicates that the plot is sufficiently sampled to obtain a good estimate of the mean cover
- A substantial time savings of 50 hours per compliance monitoring event was realized using DPF methodology vs. PF methodology.

The results and conclusions from this study strongly indicate that DPF ground truthing methodology should be the preferred methodology for future compliance monitoring events.

APPENDIX A

APPENDIX A
Estimated Percent Cover for CTs using PF and DPF Methodology
PF and DPF percent coverage estimates

Calibration Target	PF Percent Cover	DPF Percent Cover	Absolute Difference
CS1001	36.2%	34.3%	2.0%
CS1002	NA*	41.5%	NA*
CS1003	NA*	34.8%	NA*
CS1004	NA*	11.5%	NA*
CS1005	24.0%	21.3%	2.7%
CS1006	NA*	11.3%	NA*
CS1007	34.9%	33.5%	1.4%
CS1008	54.6%	49.3%	5.3%
CS1009	9.9%	4.5%	5.4%
CS1010	41.8%	37.5%	4.3%
CS1011	70.2%	81.3%	11.1%
CS1013	27.0%	23.8%	3.3%
CS1015	NA*	41.0%	NA*
CS1021	NA*	81.3%	NA*
CS1023	NA*	0.3%	NA*
CS1024	NA*	36.8%	NA*
SVT04A	NA*	36.3%	NA*
SVT10A	12.0%	8.8%	3.2%
T5-4D1	76.5%	78.3%	1.7%
T5-5A1	29.3%	24.5%	4.8%
T5-5D1	30.1%	25.5%	4.6%
T6-4C1	NA*	59.3%	NA*
T6-5D1	5.9%	5.5%	0.4%
T6-7B1	11.2%	7.5%	3.7%
T6-7D1	7.9%	5.3%	2.7%
T6-7D2	24.9%	16.0%	8.9%
T7-5B2	47.4%	44.5%	2.9%
T7-5B3	41.6%	41.8%	0.2%
T7-7C1	43.1%	39.3%	3.9%
T7-7D1	49.5%	45.8%	3.7%
T8-3A	NA*	68.5%	NA*

APPENDIX A

Estimated Percent Cover for CTs using PF and DPF Methodology

PF and DPF percent coverage estimates

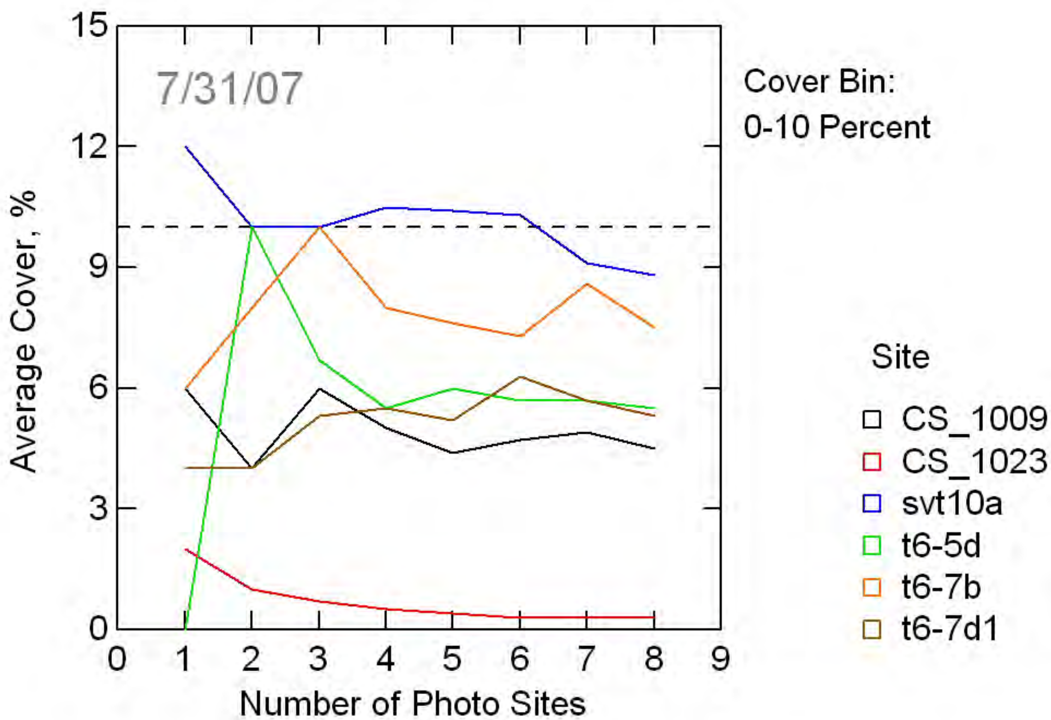
Calibration Target	PF Percent Cover	DPF Percent Cover	Absolute Difference
T8-3B	NA*	17.0%	NA*
T8-4A	NA*	45.5%	NA*
T8-4B	NA*	62.0%	NA*
T8-4C	NA*	39.5%	NA*
T8-5B1	62.9%	63.3%	0.3%
T8-5C	NA*	58.8%	NA*
T8-5D	NA*	66.3%	NA*
T8-6B	NA*	36.8%	NA*
T8-6C	NA*	36.8%	NA*

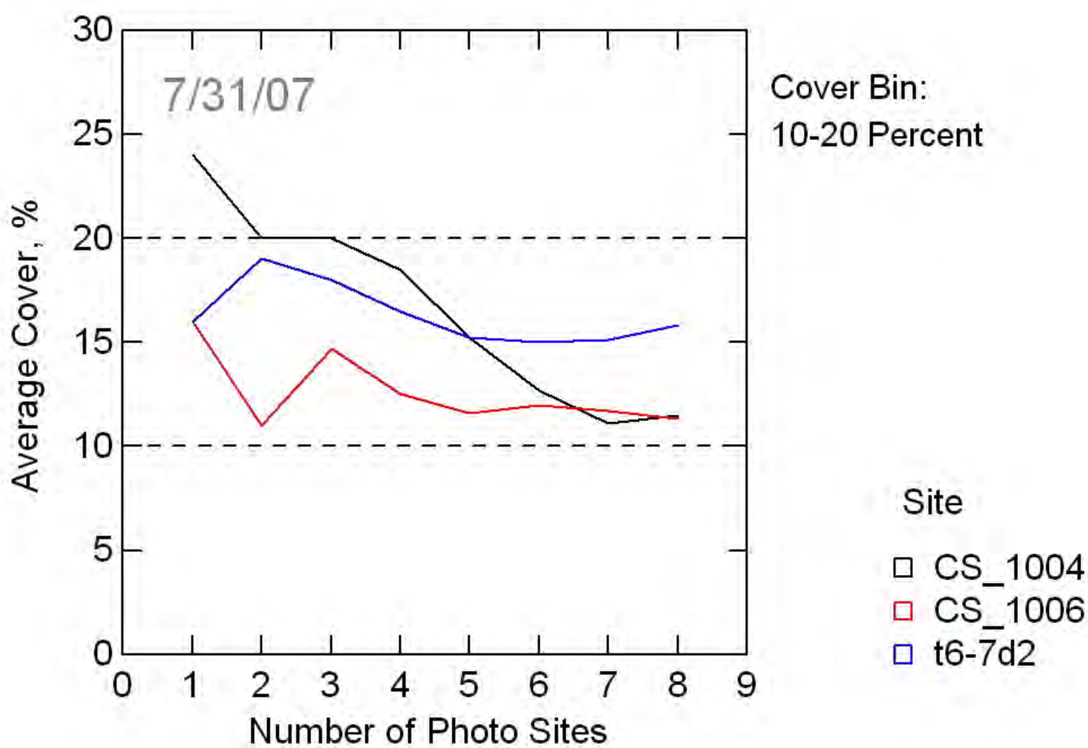
* Site not sampled using PF methodology

APPENDIX B

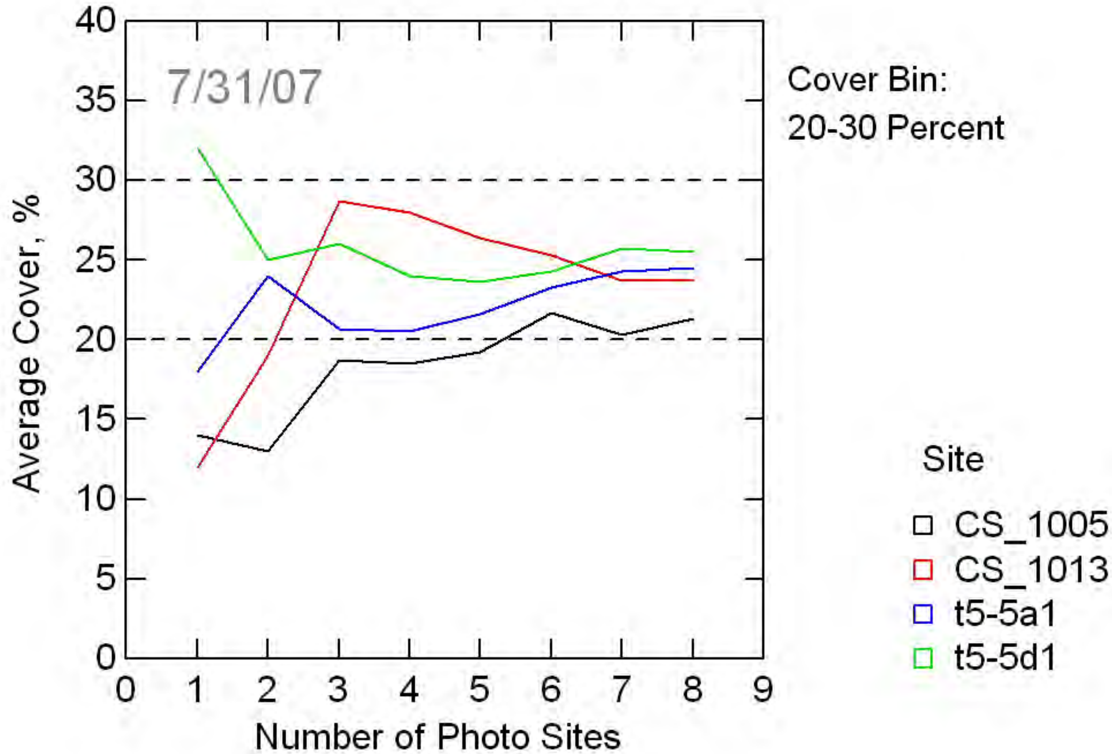
Appendix B

1. DPF Efficiency Analysis Graphs





Appendix B


7/31/07
Cover Bin:
20-30 Percent
Average Cover, %
Number of Photo Sites
Site
CS_1005
CS_1013
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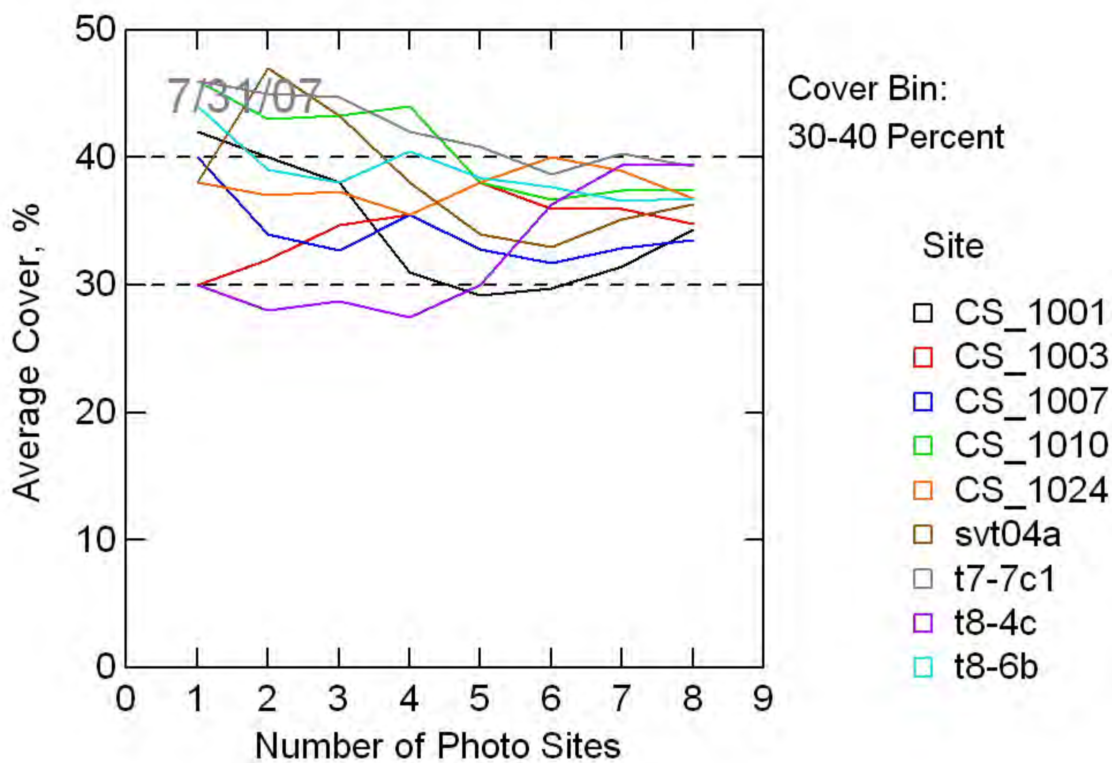
t5-5d1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Average Cover, %
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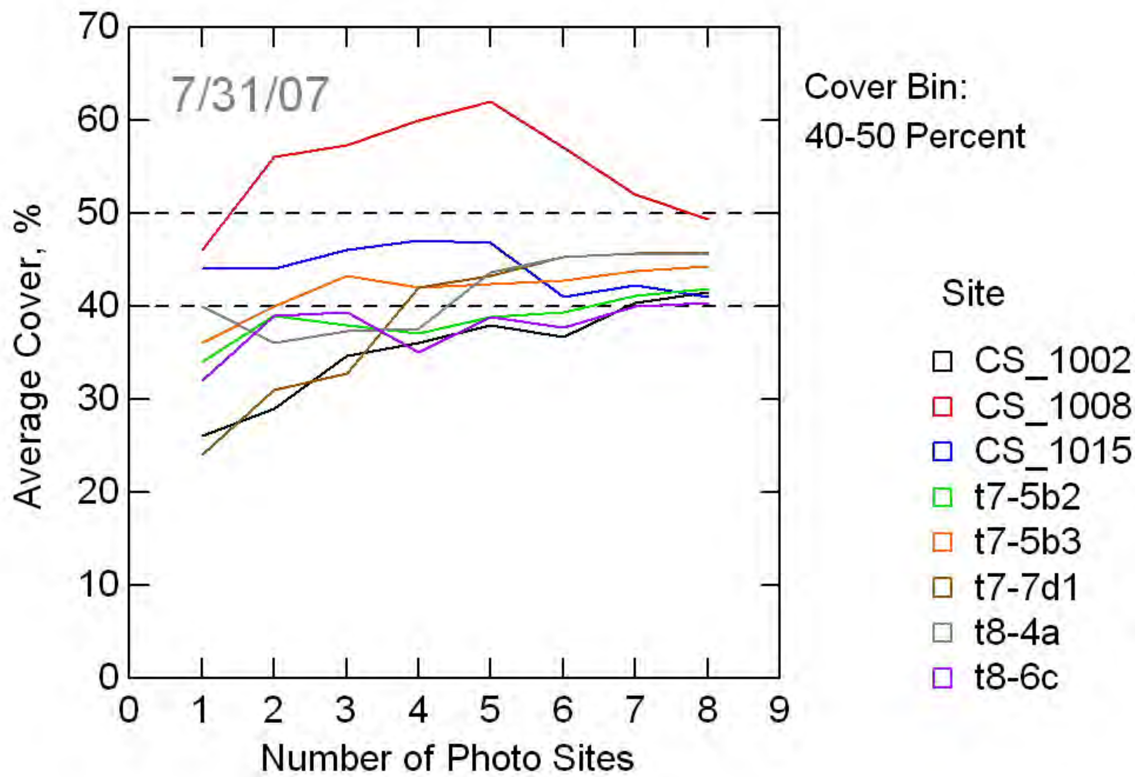
t8-4c
t8-6b

Appendix B



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3
4
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6
7
8
9
Site
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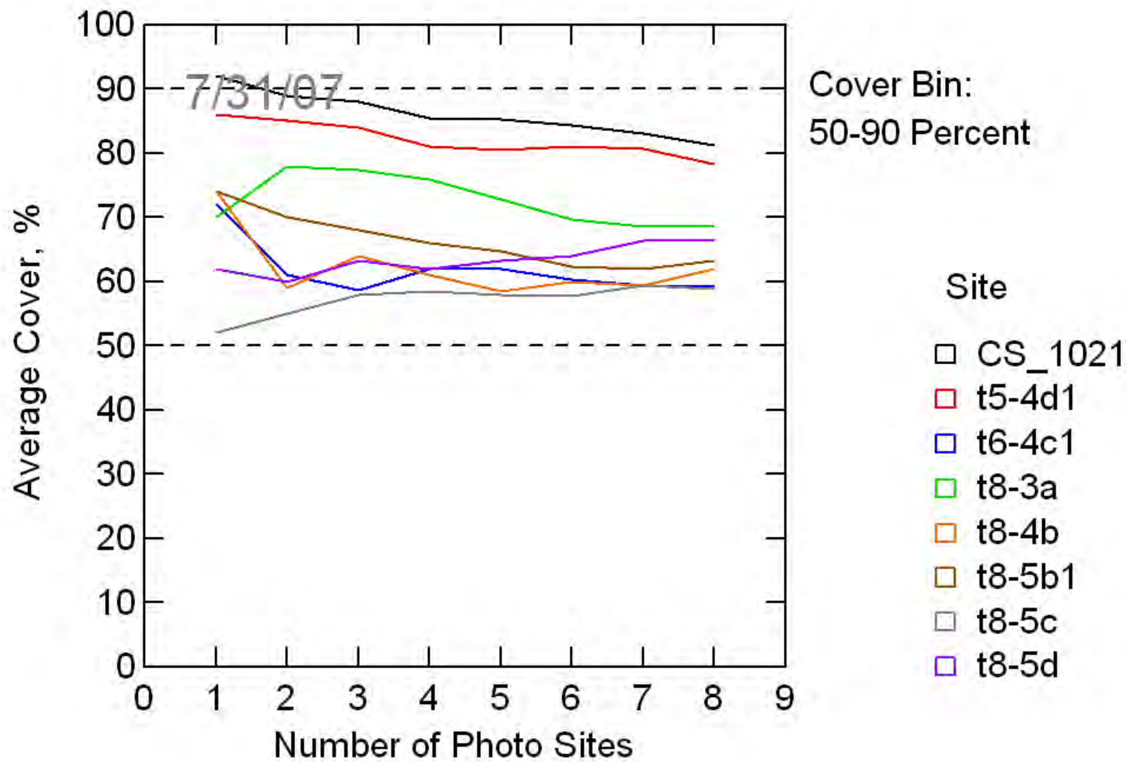
t8-6c

Appendix B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t8-5c
t8-5d
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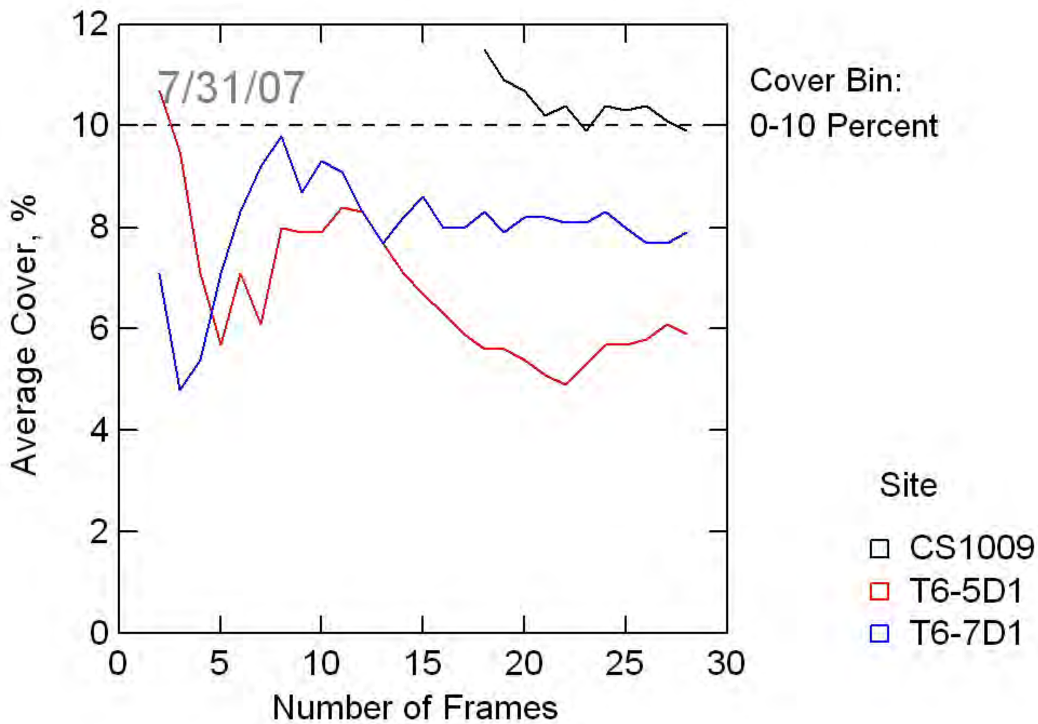
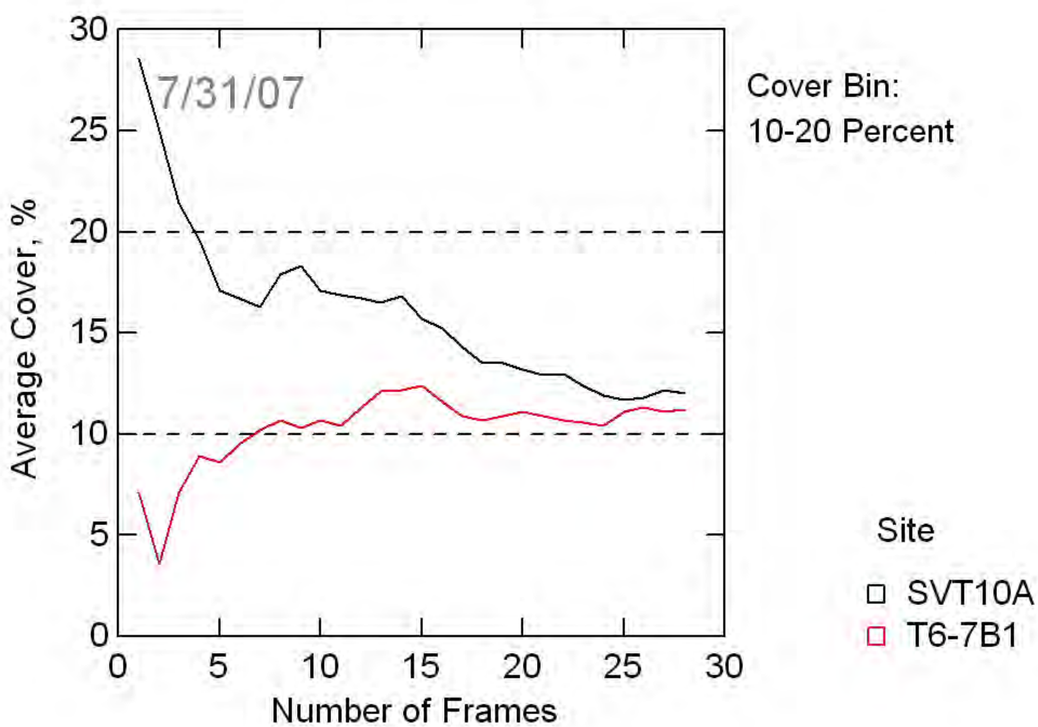
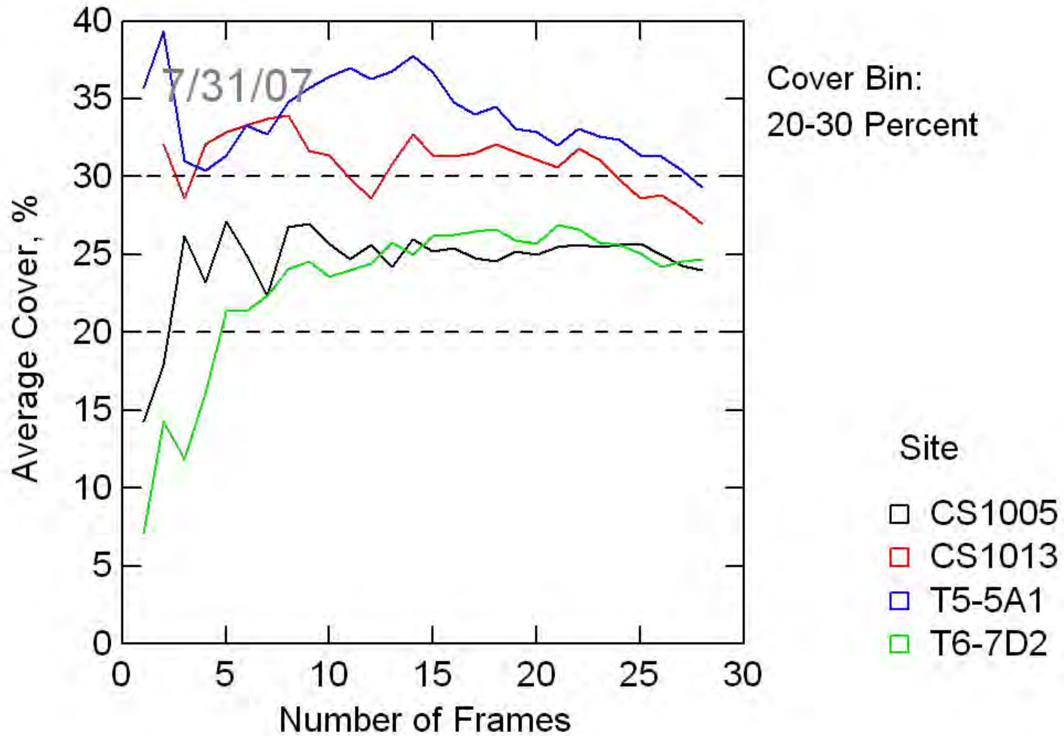
9

2. PF Efficiency Analysis Graphs





Appendix B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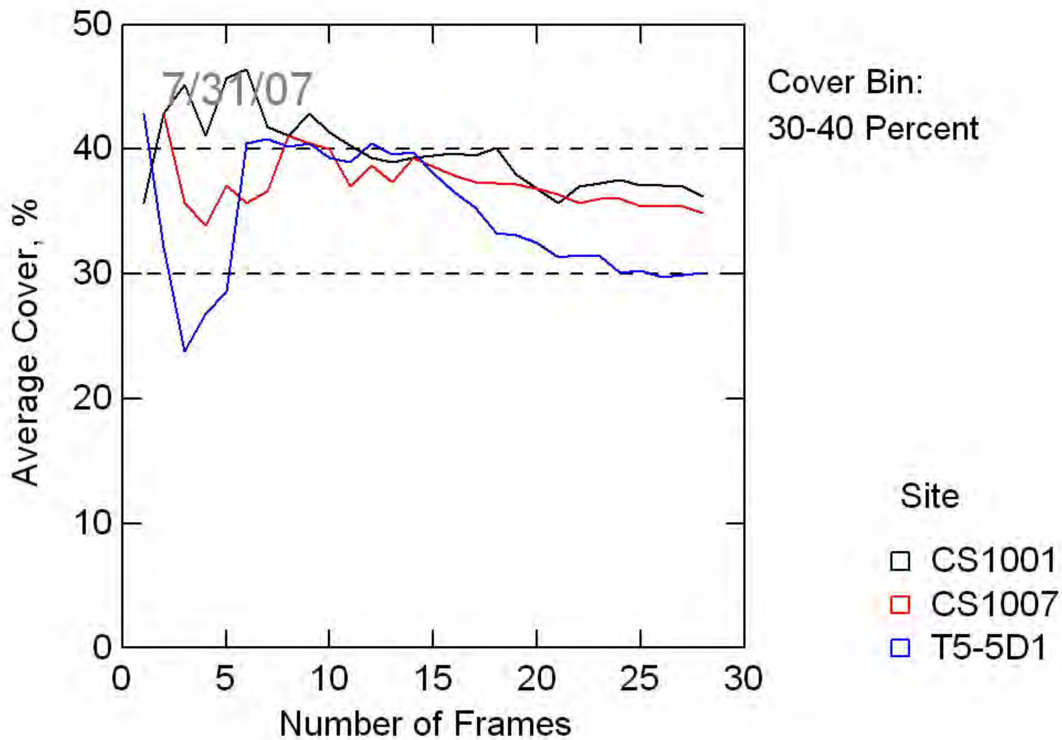
Appendix B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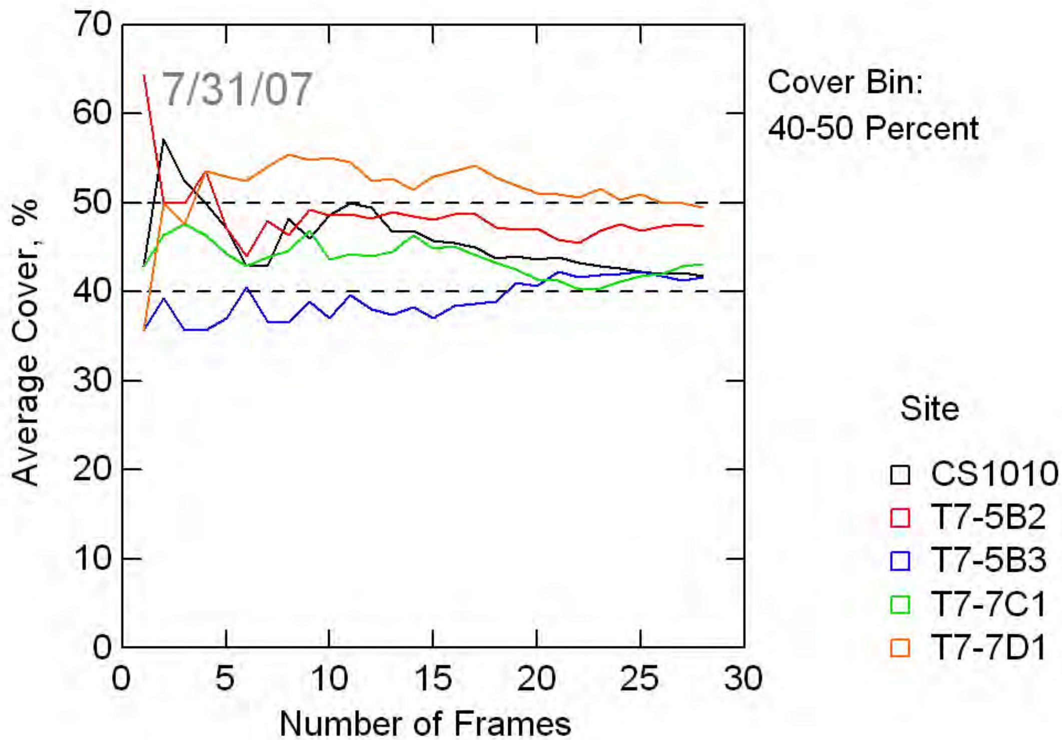
30

Appendix B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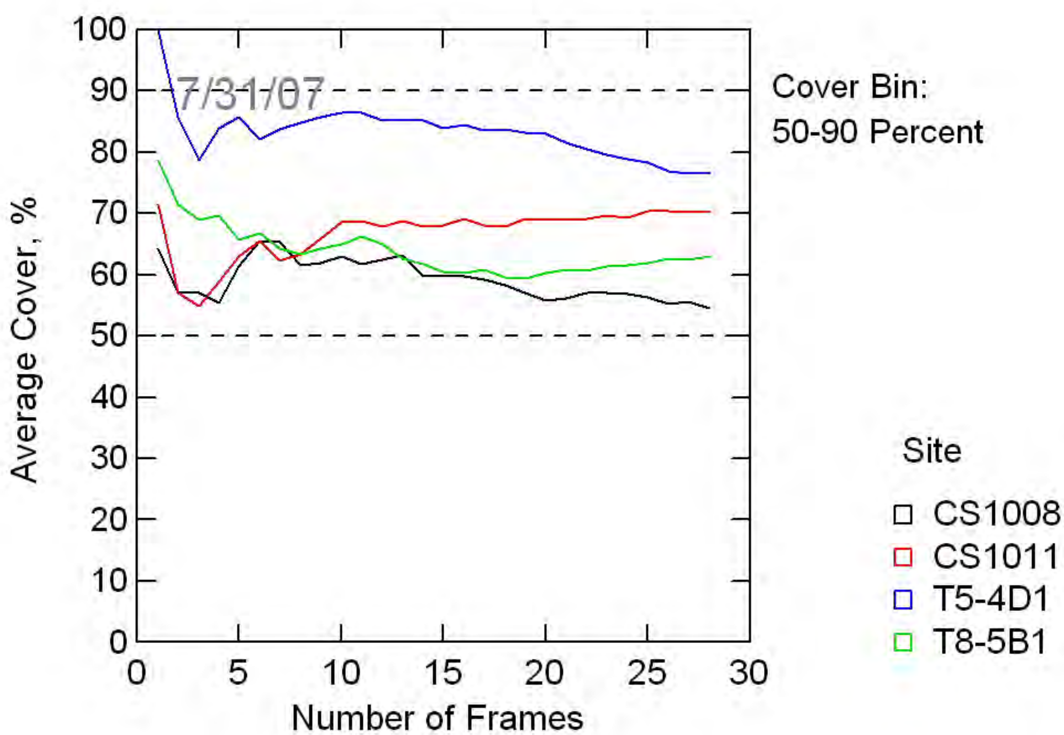
7/31/07
Cover Bin:
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Average Cover, %
Number of Frames
Site
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T8-5B1

NEWFIELDS

MEMORANDUM

TO: File

FROM: John Dickey

DATE: January 10, 2008

SUBJECT: Notes on the January 2008 Version of the Owens Lake Managed Vegetation Operation and Management Plan

The purpose of this memo is to summarize items that were reviewed after discussion of the August 2007 version of the Owens Lake Managed Vegetation Operation and Management Plan, and to summarize changes made to create the January 2008 version of the Owens Lake Managed Vegetation Operation and Management Plan (Plan).

Two aspects of the vegetative cover analysis that form part of the basis for the Plan were reviewed and altered: geometric correction of the imagery, and analysis of ground truth data (digital images of the plant canopy) along with associated image calibration. The review and modification are briefly summarized in the following sections.

GEOMETRIC CORRECTION OF IMAGE

Summary: Changes to geometric correction requested by Great Basin Air Pollution Control District (GBUAPCD) were implemented. A set of ground control points collected during fall 2007 and now used by GBUAPCD were employed to geometrically correct satellite imagery... The changes had no significant effect on cover results. No specific changes to the Plan were technically necessary from the standpoint of accuracy. Nevertheless, the revised geometric correction was employed in cover estimates in the new version of the Plan.

LADWP had historically employed a mixture of surveyed points on the ground with engineering drawings to establish ground control points for geometric correction of images. During fall 2007, GBUAPCD collected a set of GPS surveyed ground control points (GBUAPCD Points) to use for the same purpose. So that imagery in the Plan would be corrected in a manner consistent with these new points, the geometrically corrected image used to develop the Plan was shifted (re-corrected) to match the GBUAPCD Points.

One of the concerns raised by GBUAPCD was that the method previously employed by LADWP might have resulted in very different and/or erroneous geometric correction, possibly calling into question work based on previously corrected images, including previous versions of the Plan. This hypothesis was tested, and the results suggest that the difference between previous calibrations and that achieved with GBUAPCD Points is slight, with a mean 1.8 pixel shift (with direction and magnitude varying across the study area). This shift is less than the inherent scale of error in image data. There is no evidence that either correction basis is erroneous. However, consistency between GBUAPCD and LADWP processes is preferred and so the GBUAPCD points were used for this Plan and will be used in to the future.

To further assess the potential impact of a shift on image interpretation, image analysis areas at each image calibration target location (5.5m circles) were shifted (in the cardinal directions north, east, south, and west) by 1.8 pixel, and compared to results for the original, unshifted calibration target area (see Figure 1).

The average 4/2 ratio values were extracted for each of the shifted calibration target areas, and regressed against average 4/2 values for the original calibration target area. Results are shown in Figure 2, showing a tight (R^2 = 0.98) 1:1 relationship (i.e., practically identical ratio values for shifted and unshifted target locations with no systematic bias). Of the 49 calibration targets, only one (in T5-6D) exhibited significantly different average 4/2 ratio values when shifted in the 4 cardinal directions. This area is shown in Figure 3, where the localized effect of a drain line running close to the calibration target appears to be the source of this difference.

Another way of looking at the magnitude of change is to compare it to the range of 4/2 ratio observations across the site. A box plot of the observed changes is shown on Figure 4. The magnitude of these changes relative to the range of observations is minute.

In general, these results suggest a very close relationship between results for shifted and unshifted calibration targets, and therefore little effect of the change in geometric correction basis on calibration of images. Results developed and discussed based on previous image geometric correction would have been virtually identical had the more recent set of GBUAPCD Points been used for these analyses.

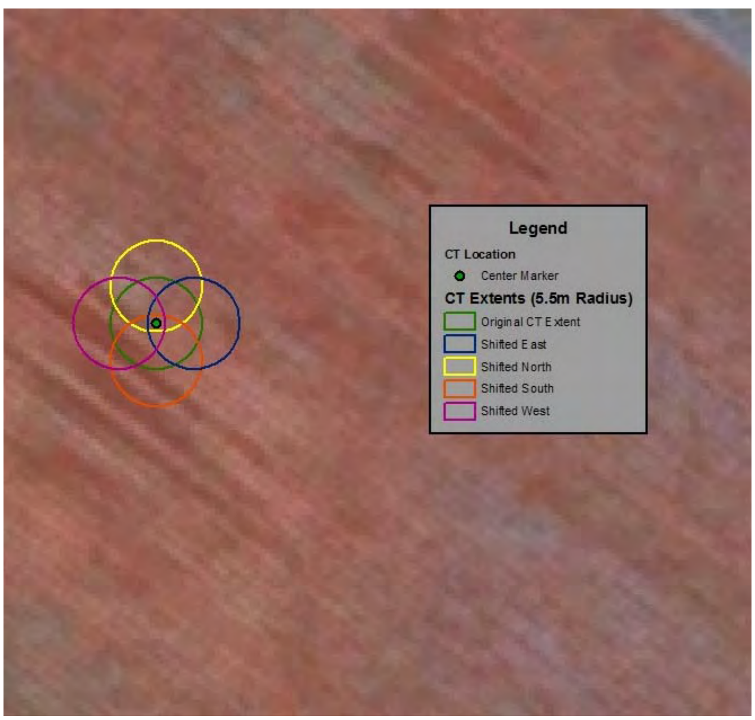


Figure 1. Original and shifted calibration target areas. Displacement is 1.8 pixels in each of four cardinal directions.

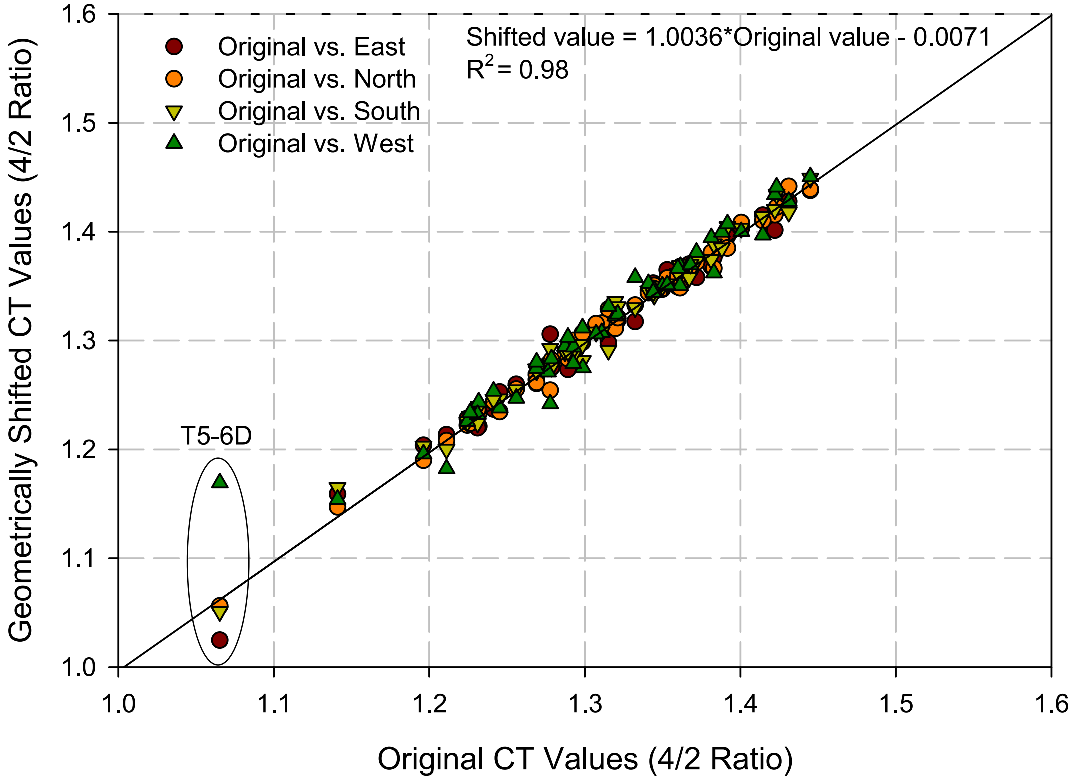


Figure 2. The 4/2 ratio for shifted versus original calibration target areas.

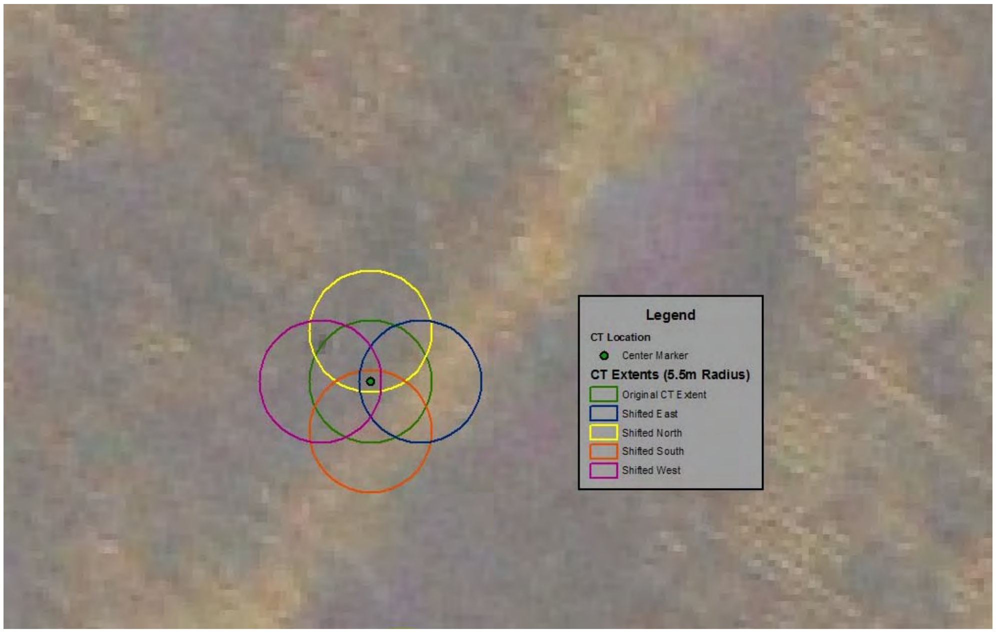


Figure 3. Original and shifted calibration target areas in T5-6D.

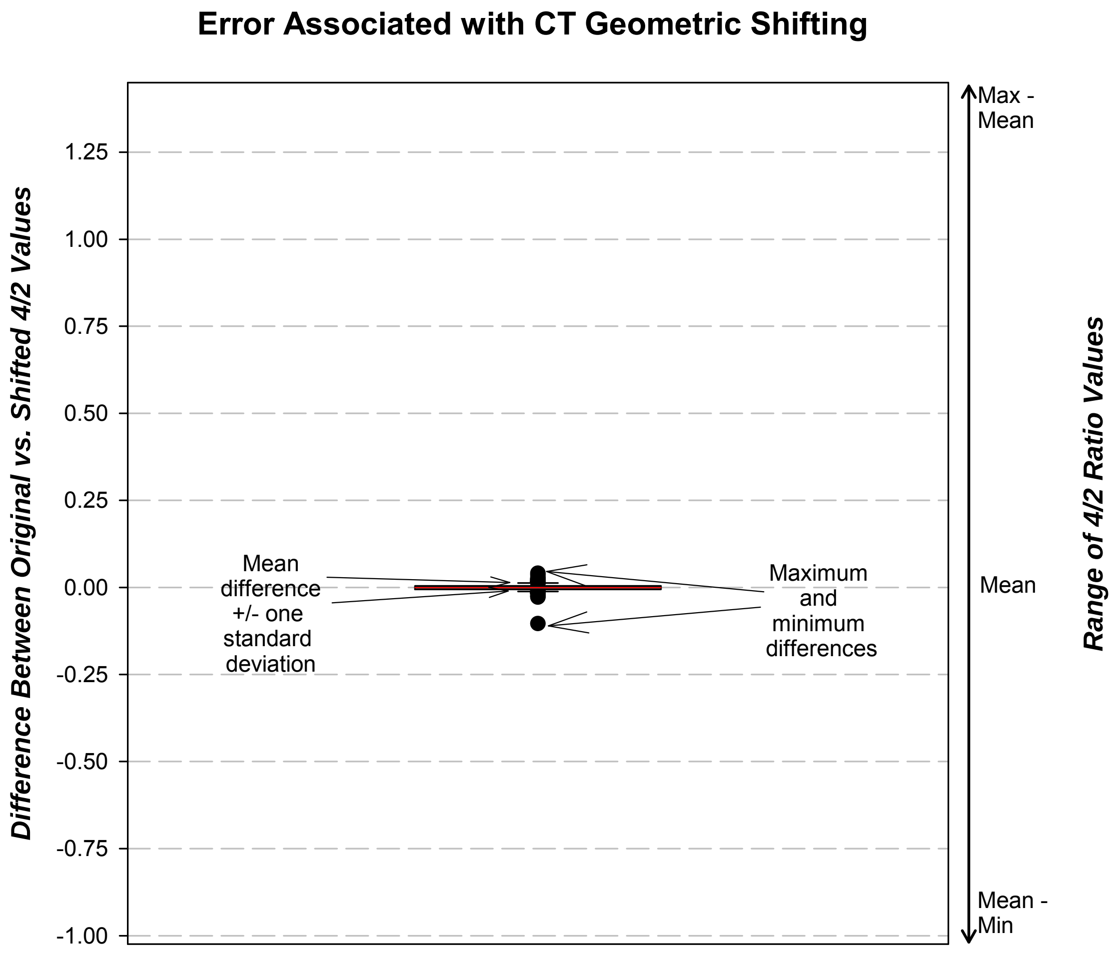


Figure 4. Differences between original and shifted image analysis area results (average 4/2 ratio within shifted and unshifted image analysis areas).

GROUND TRUTH DATA RE-ANALYSIS AND RE-CALIBRATION OF SATELLITE IMAGE

Summary: A change to ground truth digital image analysis was implemented as requested by GBUAPCD. The change resulted in a significant but relatively consistent increase in vegetative cover results. It being essential that the Plan be consistent with methods that will be used to evaluate cover in the future, it was essential to re-analyze cover data and revise the Plan to reflect new cover results.

During discussion of image calibration that took place in spring and summer of 2007 between LADWP and GBUAPCD, GBUAPCD expressed a preference for a particular method of assessing the amount of vegetative cover in low-altitude (below 20’) digital images of the plant canopy. The preferred method closely mimics a physical point frame, long the standard employed by GBUAPCD for these meaurements. This “digital point frame” (DPF) method consists of a visual inspection of vegetation that is visible on the high-resolution image with a standard grid of observation points overlaid on the image, then calculating the percent of cover (vegetation hits/[hits+misses]) observed. The points and an image are shown at two scales in Figure 5. The percentage of hits is then used to represent the percent cover for the DPF location in question. These estimates of cover can then be used to calibrate satellite imagery by relating them to spectral indices representing the same points in space and time. These indices are calculated from data underlying a concurrent satellite image. Indices selected are those that are most sensitive to observed vegetation on the date in question.

This GBUAPCD-preferred method was agreed upon as the method to be used for future ground truth efforts.

By contrast, LADWP had in the past employed a spectral technique to allow a computer to automatically differentiate between plant canopy and everything else on the DPF image, then count the "vegetation" and "not vegetation pixels on the photo. The ground truth data used to develop the August 2007 Plan were analyzed by this method. The goal of the present work was to evaluate the difference between the two methods, and to incorporate GBUAPCD's preferred method into the image calibration used for the Plan. The method employed for this work was the following:

- Selected 7 dates to evaluate: 11/2004, 3/2005, 5/2005, 8/2005, 2/2006, 5/2006, and 8/2006.
- Visually counted vegetation hits at pins in all DPF images available for these 7 dates (25 pins per DPF, average 50 DPFs per date, and 7dates, for a total of 8750 pins).
- Compared spectral percent cover estimates to those developed from visual pin counts.

The comparison of cover estimates from spectral and pin counting methods is shown in Figure 6. Pin counting resulted in generally higher cover estimates across the board, but the two methods show a strong relationship (R^2 = 0.85). Where the spectral method indicated moderate to high (20 to 70 percent) cover, pin counting showed about 20 percent more cover.

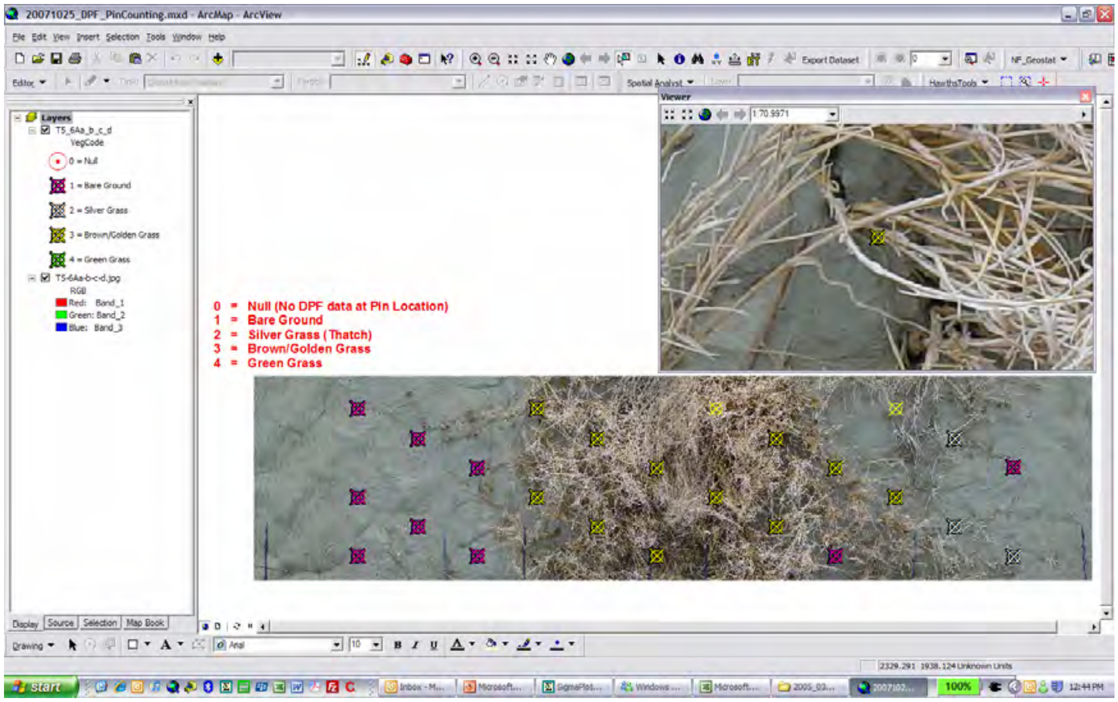


Figure 5. Digital point frame visual pin count analysis results for one ground truth image, showing points overlain on image. Note that software allows for points to be examined at various scales (see zoomed point at upper right) to facilitate identification of the proper classification for each point.

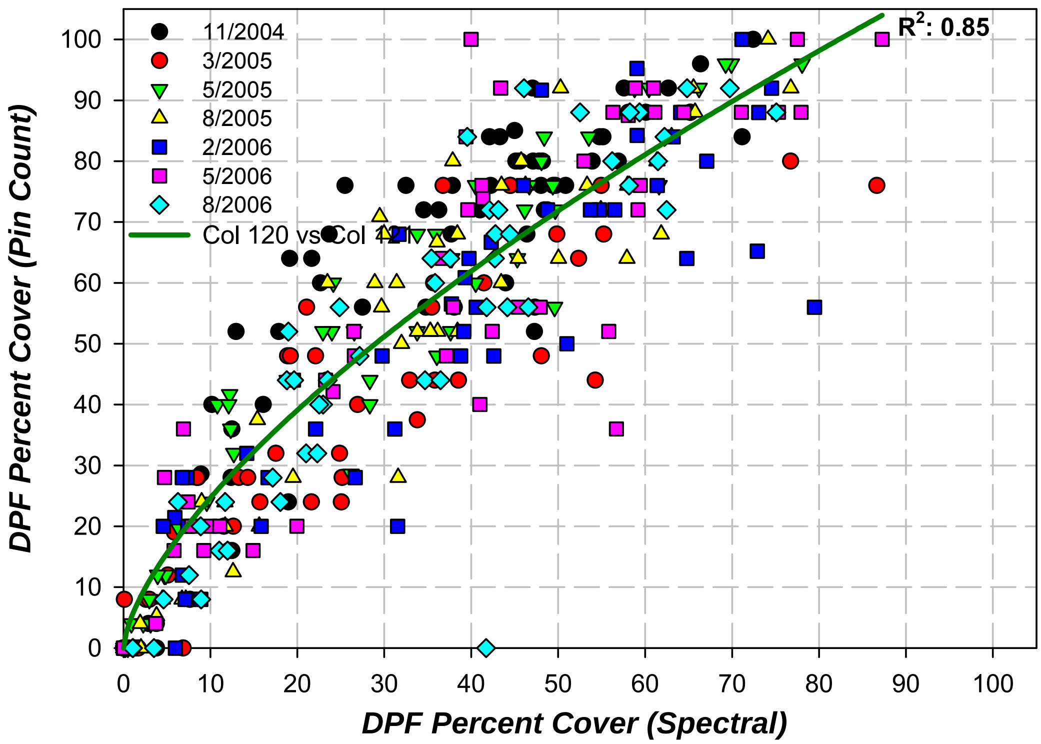


Figure 6. Comparison of results for ground-truth images analyzed by visual pin counting and spectral methods.

A comparative review of images seemed to suggest that the reason for the lower average cover estimate by the spectral technique was the inability of the spectral technique to delineate foliage consistently and reliably over a broad range of color classes. The scatter of data is due partly to the same cause, and partly to the fact that visual pin counting samples a relatively low percentage of the available points on the image, sometimes exaggerating, sometimes underestimating the percentage of the surface covered by foliage.

Since the visual pin count method resulted in a significantly different level of vegetative cover, and since the Plan must reflect methods that will be used by the GBUAPCD to measure cover on the ground in the future, the following additional steps were taken:

- Re-calibrated three satellite images (taken on 3/2005, 2/2006, and 7/2007) based on cover estimates from pin counts. According to the calibration methodology agreed to with GBUAPCD, each time a calibration is carried out, the statistical performance of several spectral indices for vegetation are compared. The index with the best performance is selected to create a vegetation cover map. This process resulted in the selection of a different spectral index for vegetation than was previously (August 2007) employed for the March 2005 vegetation map. Best performance was achieved with the 4/2 ratio.
- Revised the Plan and the *Approach to the Managed Vegetation Operation and Management Plan* documents (i.e., the vegetative cover levels shown in both documents) based on these new cover estimates.

In general, this results in an apparent requirement of higher levels of vegetative cover. However, the more critical issue is that of consistency between cover measurement methodology used to develop the Plan (based on the 3/2005 image), and then to evaluate future conditions. With a consistent method, the real point of reference is not a number, but rather the condition upon which the standard is based. That standard remains unchanged in this most recent version of the Plan. The numeric changes should therefore result in the same protection of the land surface and of consequent dust control.

MEMORANDUM

NEWFIELDS

TO: File

FROM: John Dickey

DATE: May 24, 2008

SUBJECT: Procedure for transforming vegetative cover grid results for regulatory comparisons under the Owens Lake Managed Vegetation O&M Plan

Under the Owens Lake Managed Vegetation O&M Plan (May 2008 Version), a set of quantitative criteria were established, including average cover, and the percentage of the area in grid cells of 0.1, 1, 10, and 100 acres that have >5%, >10%, and >20% cover. In the future, these % cover and % area results will be compared annually during the October-November period to the baseline reference criteria from November 2004. It is therefore useful to have an archiving and analysis toolset for storing cover data, making the needed calculations, and making comparisons with baseline comparisons. This memo summarizes this toolset.

Develop vegetative cover layer: NewFields 2007 and 2008 document agreed methods for determining total vegetative cover.

Grid and vegetated area GIS layers: These layers are employed to develop % cover results for grid cells across the 0.1-to-100-acre range on the Site. Vegetation map development methods are documented in NewFields (2007).

MV cover.mdb: This is an access database into which grid % cover results are imported as tables. A series of ten queries are then run to produce results that can be compared to the baseline reference criteria. The queries are numbered 1 to 10 for the March 2005 data, 11 to 20 for November 2004, 21 to 30 for October 2006, and 31 to 40 for November 2007. It is recommended that the most recent queries be renamed and updated for future dates, beginning with the lowest numbered query. For example, in fall 2008, the first step would be to import grid results for that period into four appropriately named tables. The second step would be to rename Query 31 to Query 41, and to update all references to reflect the fall 2008 image data sources. The user would then proceed to update queries in order through a new Query 50. The results of Query 50 would be used in the next tool.

Reference cover for MV OM.xls: Make a copy of the “New date template” worksheet, and then copy the data resulting from the current query (numbered a multiple of ten) where it says, “Paste data here”. Insert rows so that the first line of the <5%, <10%, and <20% blocks of results occur every fourth row, as shown by the colored blocks. Then copy and paste those data into the block with cell A1 at the upper left. Where “#N/A” shows on lines 2 through 5 in columns R, S, and T, enter “0”. Review the pale yellow highlighted cells and investigate any negative numbers, which indicate that cover on this date may in some areas be deficient relative to the reference cover levels.

References:

NewFields. 2007. Methods Used for Verification of Vegetative Cover on the Managed Vegetation Dust Control Measure.

NewFields. 2008a. Notes on the January 2008 Version of the Owens Lake Managed Vegetation Operation and Management Plan (January 10, 2008 memo from John Dickey to File).

APPENDIX 3.
AIR SCIENCES INC. 2006. MANAGED VEGETATION CONTROL EFFICIENCY STUDY, OWENS DRY LAKE, CALIFORNIA

AIR SCIENCES INC.
DENVER • PORTLAND

TECHNICAL MEMORANDUM

MANAGED VEGETATION CONTROL EFFICIENCY STUDY, OWENS DRY LAKE, CALIFORNIA

PREPARED FOR: Richard Harasick, Los Angeles Department of Water & Power

PREPARED BY: Mark D. Schaaf, Air Sciences, Portland
Maarten Schreuder, Air Sciences, Portland

PROJECT NO.: 179-1-32

COPIES: Rich Coles, CH2M HILL, Santa Ana
John Dickey, CH2M HILL, Sacramento

DATE: July 24, 2006

Abstract

This technical memorandum summarizes the results of a study designed to measure the PM_{10} control efficiency of the managed vegetation (MV) dust control measure (DCM) on the Owens (dry) Lake, California. In its current configuration, the MV dust control measure consists of approximately 2,100 acres (851 hectares) of saltgrass on the southern end of the Owens Lake. The MV DCM was installed and planted in the spring and summer of 2002. Since the spring of 2004, the Los Angeles Department of Water & Power (DWP) has operated monitoring equipment in and over the MV area, which records the percentage of the saltgrass cover, surface moisture content, surface crust conditions, and sand motion within the DCM. The monitoring system consists of:

- Twenty-four sand motion monitoring sites, targeting six sites in each of the 4-percent vegetation cover ranges (0 to 10 percent, 11 to 20 percent, 21 to 30 percent, and 31 to 40 percent);
- Two 10-meter-tall meteorological towers within the MV area; and
- Six real-time PM_{10} monitors (TEOMs) on the perimeter of the MV area.

This technical memorandum summarizes the measurement and calculation procedures used to assess sand motion, sand motion control efficiency, and vegetative cover for the period from May 2004 through April 2006. The monitoring results of this nearly two-year period show that MV is highly effective in suppressing sand motion, even at a low vegetation cover. The sand motion was controlled by 99 percent or more at a saltgrass areal coverage

of 20 percent or more. This level of sand motion and PM_{10} control was achieved at far less than the 50-percent cover requirement in the 2003 Revised Owens Valley State Implementation Plan, or 2003 SIP (GBUAPCD, 2003, p. 5-8). Very high PM_{10} control was also measured at lower percent vegetation covers within the MV area. In the zero to 20 percent cover range, sand motion was reduced by an average of 97 percent (range 75 to 100 percent). This control is thought to be achieved by a combination of factors, including:

- The saltgrass cover is effectively sheltering the surface.
- The drip irrigation is keeping the soils relatively moist for about seven months per year (April to October).
- The saltgrass furrows are aerodynamically rough, reducing the wind speed and sand motion within the MV area.
- The sand and sand-sized particles are being trapped along the margins of the area, reducing the amount of particles available to abrade surfaces within the MV area.

Introduction

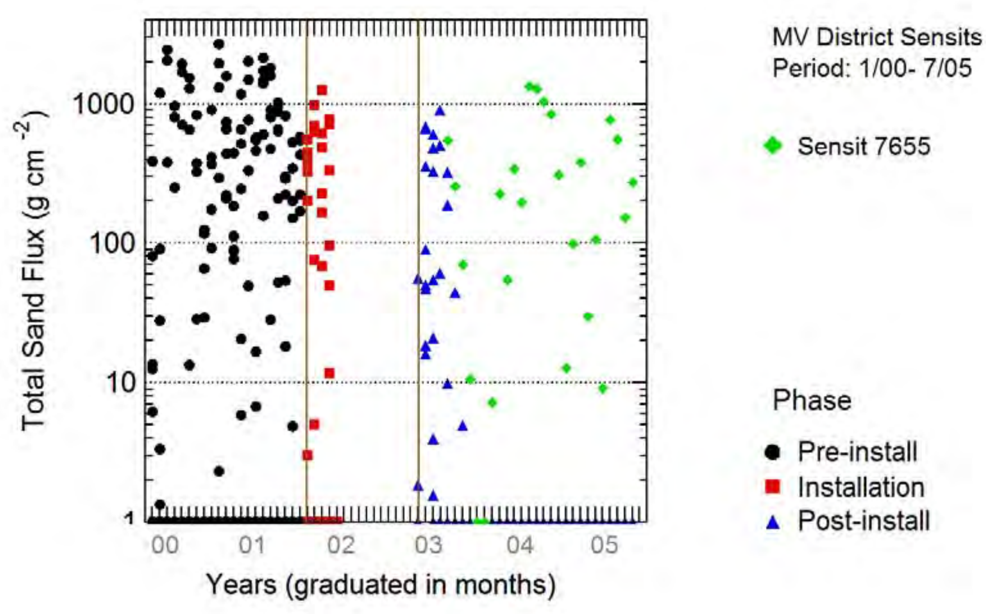
The 2003 Revised SIP included three options for controlling dust on the Owens dry lakebed (GBUAPCD[1], 2003). Managed vegetation was one of those options. Based on on-site research efforts as well as literature reviews, the District concluded that "…more than 99 percent reduction of soil erosion and PM_{10} will be achieved at Owens Lake with saltgrass cover of 50 percent" (GBUAPCD, 2003; p. 5-8). In the spring and summer of 2002, DWP implemented the MV DCM by planting native saltgrass on approximately 2,400 acres (currently 2,100 acres) north of the Dirty Socks monitoring site. The MV area was largely bare for the first year until the saltgrass cover established itself during the 2003 growing season. After the saltgrass was established, the sand motion was significantly reduced and is essentially non-existent within the MV area. The sand motion reduction trend is supported by monitoring data from the District sand motion network, Figure 1, as well as from the DWP monitoring network. The latter is the subject matter of this technical memorandum. The District's monitoring network recorded high cumulative sand fluxes during the period preceding the installation, as well as during the initial phase of construction (Figure 1). Sand motion remained high during the initial months of 2003, when saltgrass had been planted but not yet established. However, since the fall of 2003, sand motion within the MV area was eliminated at all but one of nine District monitoring locations. The exception was Sensit 7655, located on the southern fringe of the MV area and clearly not representative of the remaining area (Figure 1).

[1] GBUAPCD (Great Basin Unified Air Pollution Control District). 2003. Owens Valley 2003 Revised PM_{10} Planning Area Demonstration of Attainment State Implementation Plan. GBUAPCD, Bishop, California.

To better understand the temporal and spatial dynamics of sand motion in relation to saltgrass density and distribution, DWP has monitored vegetative cover, sand motion, meteorology, and PM_{10} concentrations within and around the MV area beginning in May 2004. This technical memorandum summarizes the monitoring network; data collection and analysis methodologies; and resulting sand motion, vegetative cover, and sand flux control efficiencies in space and time. The data included in this analysis is from May 2004 through April 2006.

Figure 1: Monthly total sand flux in the managed vegetation DCM from January 2000 to June 2005, as measured by the District sand motion network.

The three phases indicate pre-installation, installation, and post-installation (black circles, red squares, and blue triangles, respectively). Sand flux values of "1" indicate marginal or no sand motion, from zero to 1 gram of collected sand mass. The absence of data points in 2002 indicates a temporary removal of sensors to accommodate construction activities. Sensit 7655 (green diamonds) is the only location to show significant sand motion after 2003. This monitoring site is located in the far southeast corner of the MV DCM, and arguably not representative for the DCM in general, since it is located less than 500 feet from the edge, close to sand dunes just outside of the MV DCM, and has a low grass cover (~10%).



Methodology

Approach Summary

The objective of this study is to better understand the relationship between sand motion and saltgrass cover. The monitoring instruments required to achieve this objective included: a network of 24 sand motion monitoring sites, two 10-meter-tall meteorological towers, and six real-time PM_{10} monitors (Tapered Element Oscillating Microbalance instruments, or TEOMs). The data from these monitors were recorded and processed on an hourly time resolution basis. Hourly sand motion data were used to calculate sand flux and then matched with hourly wind speed. Baseline sand fluxes were calculated for the pre-construction data period from January 2000 through October 2001. This is the period between the start of data collection by the District and the start of construction activities in the MV DCM. This baseline, which expresses pre-construction sand flux as a function of wind speed, established the reference to calculate the control efficiency, normalized by wind speed. The control efficiency, CE, is defined as the absolute decrease in sand flux after the establishment of the saltgrass vegetation, and it is expressed as a percentage of the baseline or uncontrolled sand flux at a similar wind speed. The saltgrass cover was estimated for each month at each of the locations of the sand motion monitors. Based on this information, the sand flux control efficiency was expressed as a function of saltgrass cover.

For reasons of brevity, the discussion of the TEOM locations, data analysis procedures, and results are not included in this memorandum and will be included in a future memorandum.

Sample Collection – Sand Motion

Equipment and Network

The sand motion was measured using a network of 24 monitoring locations (Figure 2a and Figure 2b). Each monitoring location was equipped with two pairs of instruments—one Cox Sand Catcher (CSC) and one Sensit in a pair—with one pair located between the rows of grass, and the other located within the grass row (Figure 3). The CSC is a passive sampling device consisting of an adjustable PVC-tube buried in the ground, and used to collect sand and sand-sized particles being transported across the site by the wind (Figure 3). Sensits are cylindrical electronic devices that record the particle counts and kinetic energy of sand and soil particles colliding with the sensor (Figure 3). Both instruments were installed with their collection surfaces at a height of 15 cm above the mean ground level. While CSC sand masses are collected on a monthly basis, Sensits provide a signal time resolved to five minutes. Using mathematical relationships between the sand mass collected by the CSC and the signal collected from the Sensits, hourly sand flux estimates were calculated (see next section). The sand motion monitoring using the CSC-Sensit pairs in the MV DCM was commenced in May of 2004 and is ongoing.

All instrumentation was audited on a regular basis to ensure the quality of the data collected. The auditing and quality assurance procedures are documented in separate DWP documents.

Figure 2a: Image of the MV DCM as seen by the QuickBird remotely sensed NDVI signal, February 2006.

Lighter colors indicate increasing saltgrass cover. The sand motion monitoring locations are indicated with the yellow squares. The meteorological towers are indicated by the red diamonds.

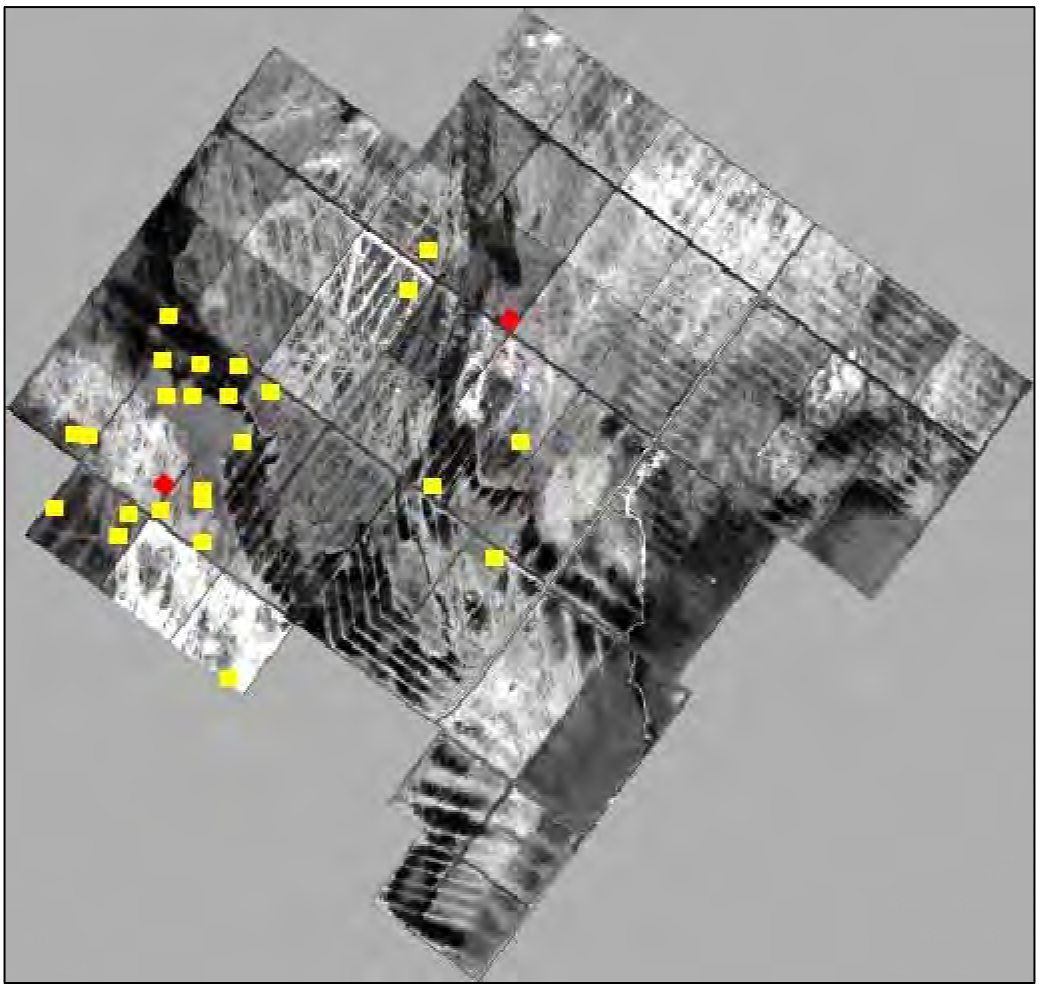


Figure 2b: Managed vegetation map with locations of sand flux monitoring sites.

Shown are monitoring sites operated by the Districts since 2000 and Spring of 2007, indicated as purple and and green circle, respectively. Monitoring sites operated by the DWP (May 2004 to September 2006) are indicated as the gray and blue circles (colors indicate the different configuration over time).

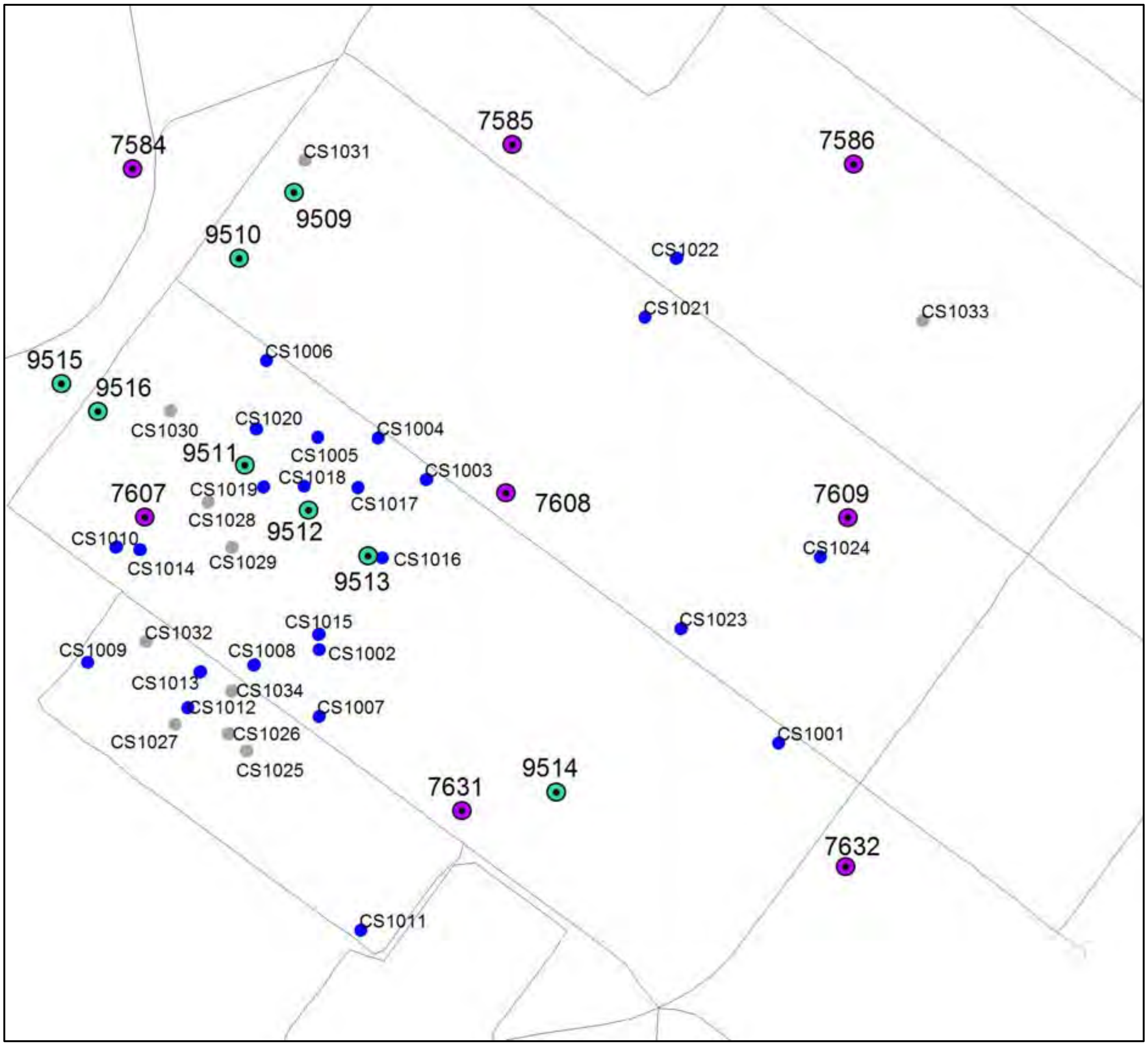
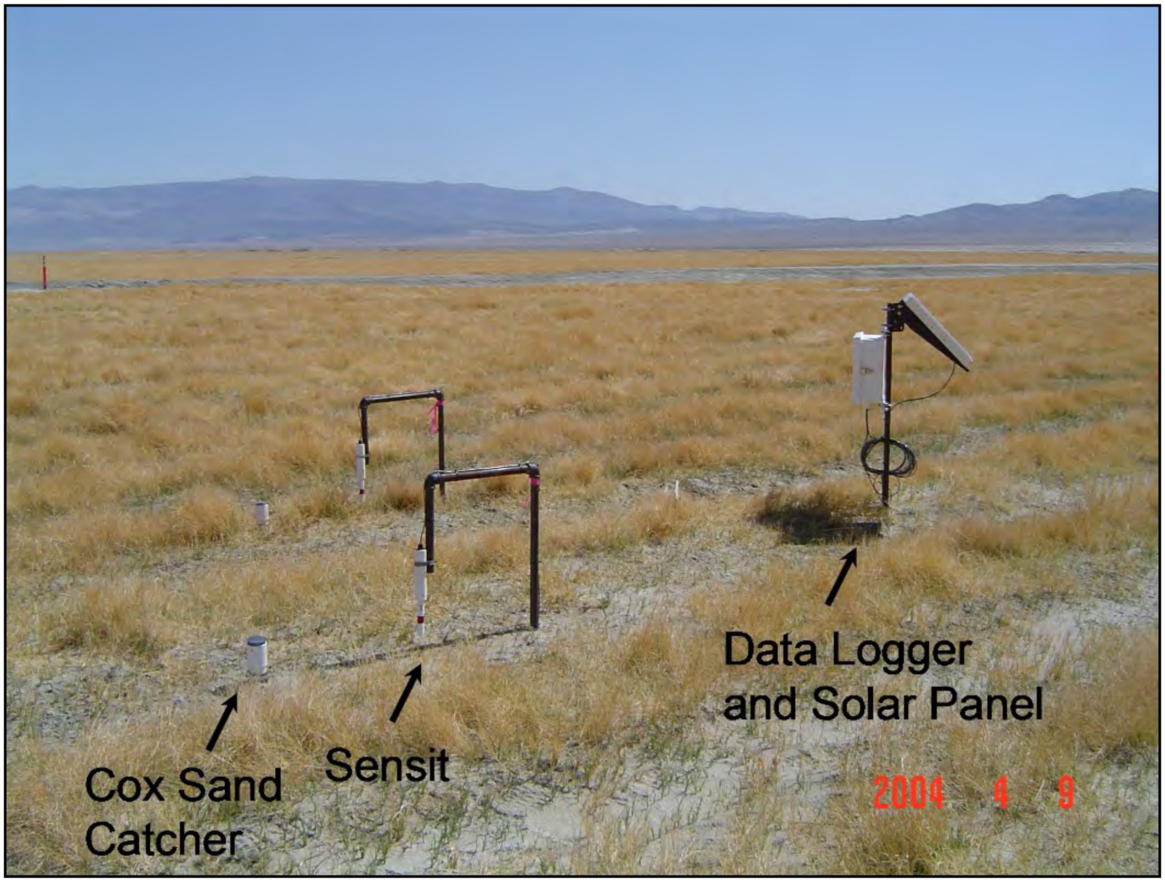


Figure 3: View of the Sensit-CSC collection site in the MV DCM operated by DWP.



CSC sand masses were collected in the field approximately once a month. Samples were then transported to the laboratory in Keeler, where they were weighed and the results entered into the Site Information Management System (SIMS). Sensit and meteorological data were downloaded in the field once a week and also uploaded to the SIMS database. The data set was screened to eliminate records representing erroneous data, missing data periods, erratic Sensit data, and periods of low wind speed (hourly wind speed less than 5 m s^{-1}).

The next step was to develop the CSC sand mass to Sensit relationships to distribute the sand mass within the (monthly) collection period, resulting in estimated hourly sand fluxes. The CSC sand mass was time-resolved into an hourly sand flux only when the total collection mass weighed more than 5 grams, or when the collection mass was between one and five grams and there was a clear relationship between CSC sand mass and Sensit observations. Sand masses less than 1 gram were typically not time-resolved because of the measurement uncertainty. Hourly sand flux is expressed in gram per square cm per hour (g

cm^{-2} h^{-1}). When these data are adjusted my means of a scaling factor (the K-factor), a PM_{10} emission rate can be estimated. The hourly sand fluxes formed the basis for the sand motion control efficiency calculation described in the Data Analysis and Results Sections.

Sample Collection – Meteorological Data

An important driving factor of sand motion on the Owens playa is wind speed. Because of this, the control efficiency calculations were normalized by the hourly wind speed (see Control Efficiency Calculation section). Wind speed and several other meteorological parameters are recorded at two 10-meter meteorological monitoring towers (for example, Figure 4) located inside the MV area (Figure 2). The hourly data provided by these towers include: wind speed at three heights above the ground (1, 2, and 10 meters), wind direction (10 meters), temperature (2 and 10 meters), and relative humidity (2 and 10 meters). Meteorological monitoring began in December 2004, and is ongoing. Meteorological data are stored on a five-minute basis and downloaded to a laptop computer in the field on a weekly basis. The data are then uploaded to the SIMS database for quality control and processing.

Sample Collection – Vegetative Cover

Saltgrass cover across the MV area was determined periodically using a combination of remote sensing and ground-based sampling techniques. The remote sensing data were collected by satellite (QuickBird)-mounted sensors, and images were obtained every one or two months. The Normalized Difference Vegetation Index (NDVI) was calculated from the QuickBird data, and is shown as the gray-scale background in Figure 2. This map was used to estimate the cover over the entire MV DCM at an 8-foot by 8-foot pixel resolution. The estimated cover was transformed to a color scale to improve the visualization of its spatial distribution (Figure 5). Ground-based cover measurements were used to calibrate the NDVI map, which allows for the estimation of vegetative cover over the entire MV DCM. The calibration procedure was based on saltgrass cover measurements at 24 sites, at which sand motion also was measured. The cover measurement was based on a "digital point frame" (DPF) method.

The DPF method consists of a series of digital photographs along a fixed, representative, 5- by 1.25-foot transect located approximately 10 feet away from the sand motion instruments. The digital images from each transect were merged in the lab and electronically analyzed for both green (live) and brown (dead, senescent) grass cover, as well as bare soil. The estimated cover at these 24 sites on the ground was then linked to the corresponding remote sensing NDVI values. Based on this information a calibration equation was developed. The calibration equation is applied in two ways. First, it is used to estimate cover over the entire MV area. Second, is it used to estimate the saltgrass cover at the 24 sand motion monitoring sites. A more detailed description of the cover estimates at the monitoring sites is provided in the (following) Data Analysis section.

Figure 4: View of a 10-meter meteorological monitoring tower (located at a shallow flood DCM).

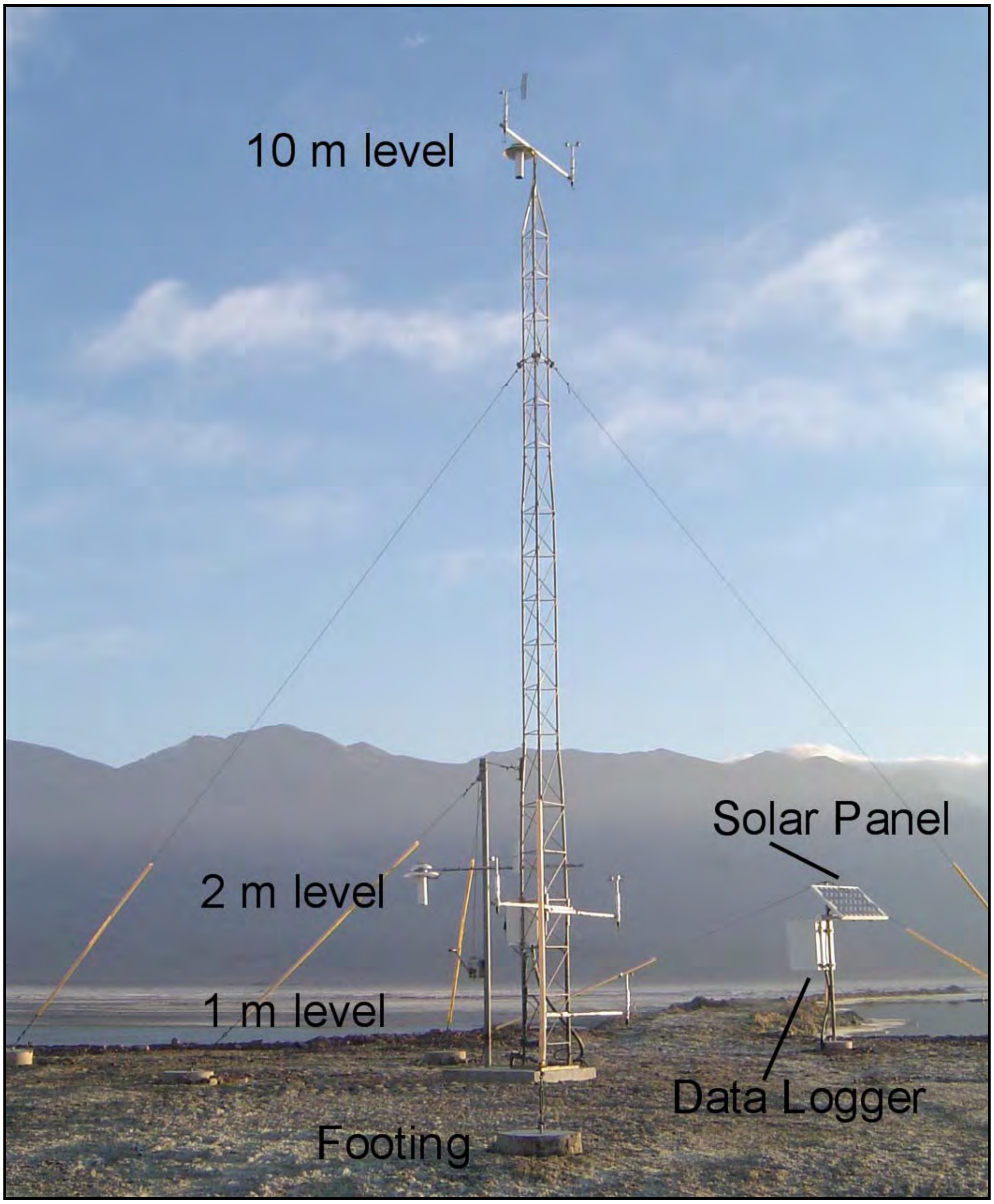
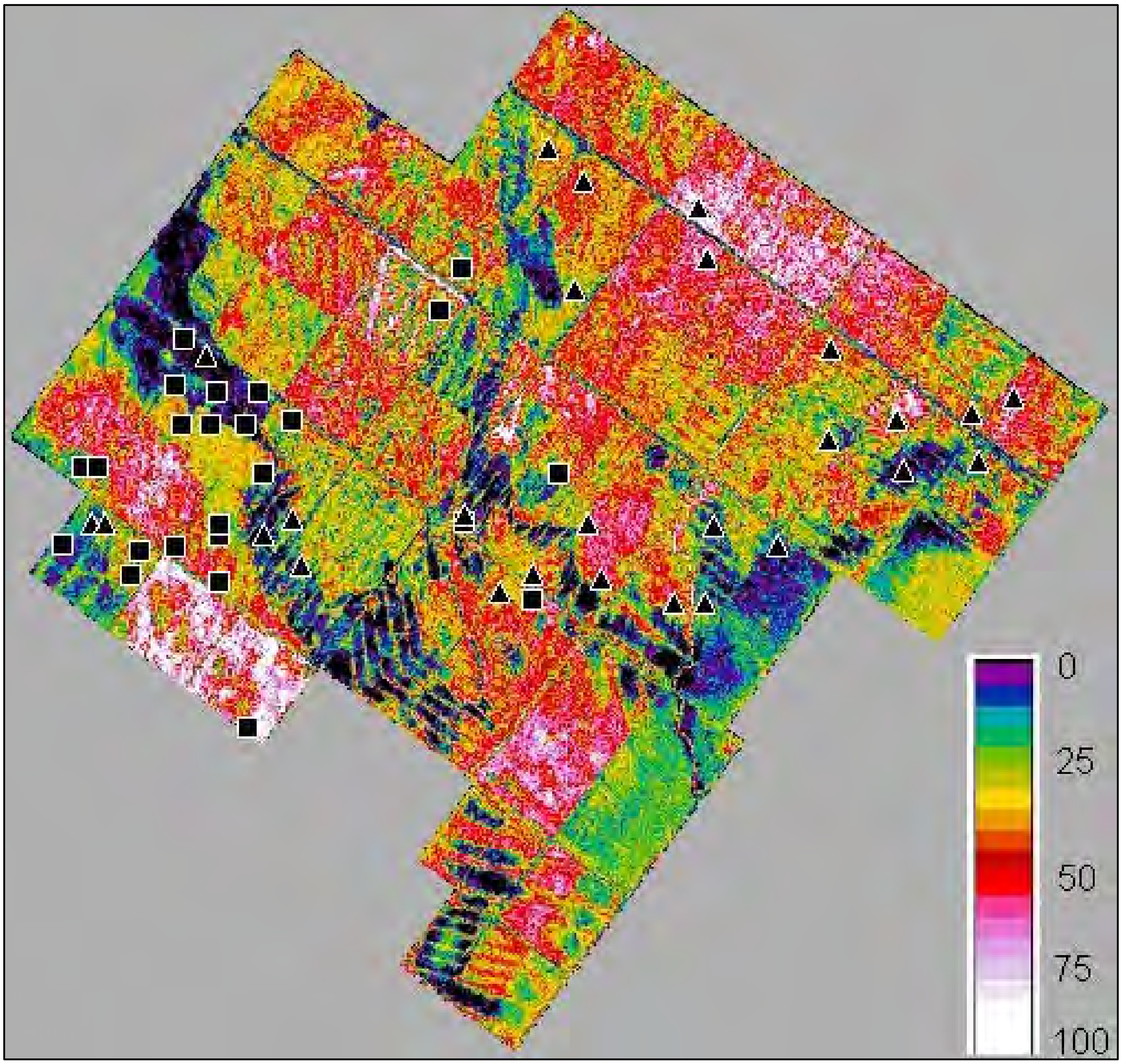


Figure 5: Image of the MV DCM, with the NDVI signal converted to saltgrass cover classes, February 2006.

The lowest vegetation cover is indicated by black shading, and highest cover by white shading. Sites equipped with sand motion monitors and used to develop the cover calibration equation are indicated as black squares. Sites used to independently verify the satellite calibration are shown as black triangles.



Data Analysis

Vegetative Cover by Collection Period

During the analysis period, May 2004 through April 2006, saltgrass cover was estimated each month based on an area of 24 feet by 24 feet around the Sensit location, equivalent to 9 pixels on the QuickBird satellite image. Since QuickBird images are not available for all months, data filling and smoothing procedures were applied. For the 24-month period, QuickBird-based cover estimates were available for 16 months, or for 66 percent of the period. For months for which satellite-based cover estimates were not available, the cover was estimated as the average cover in the months preceding and following the month with the missing cover data. Next, the three-month moving average cover was calculated. For example, the estimated cover for July 2005 was calculated as the average cover for June through August 2005. This second processing step provided a reasonably robust temporal trend in cover for each of the Sensit locations. For example, a time series of estimated cover at Sensit location 118, Figure 6, shows an increase in saltgrass cover during the growing season (April through October), and a decrease during the winter months due to senescence (dying and shrinking) of the saltgrass foliage. It should be noted, however, that since the calibration procedures of the NDVI-based remote sensing images distinguishes between green grass (live), brown grass (dead), and bare soil, the NDVI images can be calibrated during any month of the year.

The vegetative cover at each of the monitoring locations was categorized on the basis of four cover classes: 0 to 10 percent, 11 to 20 percent, 21 to 30 percent, and 31 to 40 percent. The number of sites in each cover category over time is summarized (for part of the analysis period) in Figure 7. The distribution of sites of by cover class does show variability over the 14-month period (Figure 7). The dynamics of the changes in the distribution by cover class are due to a combination of several factors, including:

- Growth during spring and summer (green bars) leads to a loss of sites in the lower two cover classes.
- Senescence of the grass in fall and winter essentially reduces the “projected area” of the (brown) grass and thereby shifts the distribution back to lower cover classes.
- Random error in the estimating procedure. The latter can result in shifts between cover classes from month to month, especially when the actual cover is close to the threshold value separating two cover classes.

Figure 6: Estimated saltgrass cover at Sensit 118 from March 2005 through April 2006, based on QuickBird NDVI processed values.

Shown are months of senescent grass only (brown bars) and the growing season (green bars).

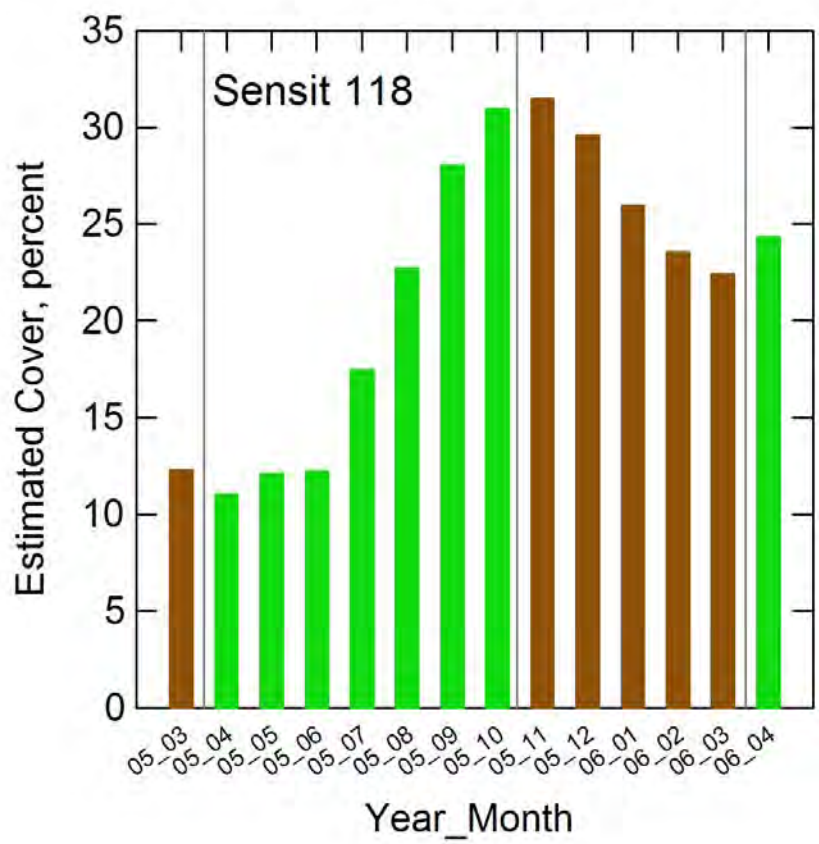
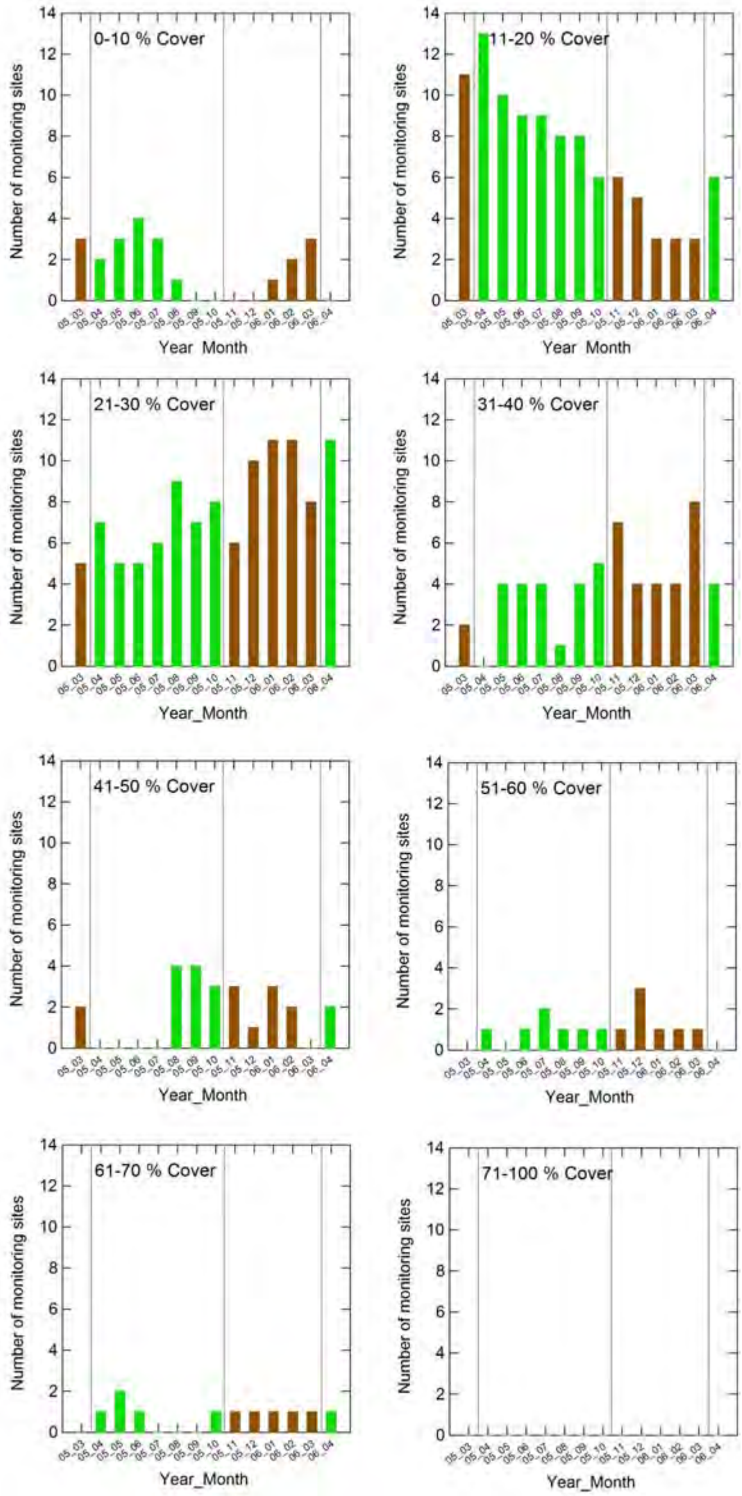


Figure 7: Distribution of sand motion monitoring sites by cover class by month, March 2005 through April 2006, using QuickBird-based NDVI processed values.

Shown are months of senescent grass only (brown bars) and the growing season (green bars).



Control Efficiency Calculation

The control efficiency, CE, is defined as the reduction in sand flux with the managed vegetation DCM in place over the uncontrolled, pre-DCM sand flux:

$$CE = 100\% * \left[\frac{(SF_{Baseline,WS} - SF_{Controlled,WS})}{SF_{Baseline,WS}} \right] \qquad [1]$$

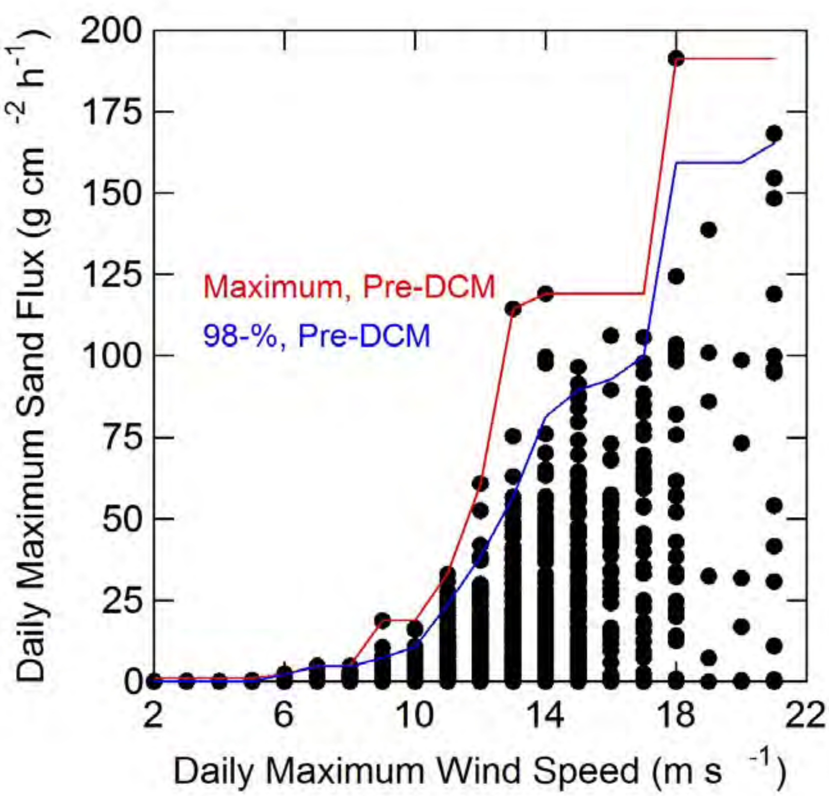
where CE is the achieved control efficiency in percent, $SF_{Baseline,WS}$ the pre-DCM, uncontrolled sand flux (g cm^{-2} h^{-1}), also referred to as the baseline, and $SF_{Controlled,WS}$ the controlled sand flux with managed vegetation in place (g cm^{-2} h^{-1}). Both the baseline and controlled sand fluxes are normalized by the wind speed, WS.

The baseline sand flux was based on the pre-construction period, January 2000 through October 2001. The construction of the MV area began in November of 2001. Hourly sand flux was calculated based on all sand motion sites operated by the District located in or right on the edge of the MV area, a total of 11 sites. For each calendar day in the pre-construction period, the maximum hourly sand flux was matched with the maximum hourly wind speed at the Dirty Socks meteorological monitor. Any sand fluxes below a significance threshold, set at a value of 0.5 g cm^{-2} $hour^{-1}$, were excluded from the baseline analysis. This lower threshold of "significant" sand motion is consistent with the screening procedures used by the District in the Dust ID modeling protocol (GBUAPCD, 2003). A single wind speed class, with a 1 meter per second (m s^{-1}) resolution, was assigned to each day and each location with a significant sand flux. The resulting screened database was used to extract the baseline sand flux, representing the pre-DCM uncontrolled sand flux. The baseline sand flux was calculated as the 98^{th}-percentile sand flux of all days at all locations by wind speed class. The results of this analysis are summarized in Figure 8, with the blue line indicating the baseline sand flux, the 98^{th}-percentile, normalized by wind speed.

Sand flux and wind speed from the DWP monitoring network in the MV DCM were analyzed based on the following procedures. The maximum hourly wind speed was calculated for each day using the meteorological tower located most central (northern most) in the MV DCM (Figure 2). The District's Dirty Socks meteorological tower was used from May 2004 through mid December 2004, until data from the DWP-operated towers became available. Hourly wind speed and wind direction between the two DWP towers tracked each other well so that no significant error is introduced into the analysis by using only one of the two meteorological towers. Similar to the procedures as described for the baseline sand flux calculation, the maximum hourly sand flux was calculated at each of the 24 sites (48 monitor pairs total: one pair in the planted row, one pair between the planted rows as shown inf Figure 2) with a daily time resolution (by calendar day). Maximum daily sand fluxes above the significance threshold of 0.5 g cm^{-2} h^{-1} were matched with the maximum wind speed and the corresponding wind speed class. Next, CE was calculated using Equation [1], and the initial results were graphically summarized. These visual summaries assisted in identifying any periods and monitoring locations with significant sand motion. Moreover, these summaries also aided in identifying periods and locations that were likely affected by human disturbance activities and therefore should be removed from the final data set. Based on this screening analysis, sand flux data were removed for three time periods, at one or more monitoring locations. The screening analysis is discussed in more detail in the Results Section and Appendix A.

Figure 8: Baseline sand flux in MV DCM, January 2000 through October 2001.

The data points are daily maximum hourly sand flux as a function daily maximum hourly wind speed class. The lines indicate the maximum and 98th-percentile by wind speed (red and blues lines, respectively).



Results

The first screening step consisted of only considering the maximum daily sand fluxes above the significance threshold of 0.5 g cm^{-2} h^{-1}, as indicated in the previous section. The data set based on this first screening level resulted in sand fluxes (normalized by wind speed) that were considerably lower than the baseline for the period preceding the DCM installation. This data set contained several high sand fluxes during the 24-month analysis period. A closer look at the temporal and spatial distribution of these high values, linked with DWP construction and maintenance records for this area, indicated that many of the high sand fluxes were associated with unavoidable human disturbance of the surface crust near the monitoring sites, due to construction and maintenance activities. These disturbance activities consisted of three distinct periods:

1. Saltgrass replanting over the entire MV DCM (April 2004 - May 2004).
2. Drip line replacement in a subsection of MV DCM (December 2005 - March 2006).
3. Phase V shallow flood construction adjacent to the southwest corner of the MV DCM (January 2006 - current).

Each of these activities had a distinct effect on the sand motion data (Appendix A),and the data from one or more sites were subsequently excluded from the final database.

Based on the screened database, observed sand fluxes were compared to the baseline (Figure 9). The highest observed sand fluxes occurred in the cover classes below 20 percent (Figure 9). Moreover, observed sand fluxes were well below the baseline sand flux (Figure 9). In the next analysis step the observed control efficiency, CE (Equation [1]) was calculated. The majority of CE values were well above 90 percent (Figure 10). The only CE values below 90 percent were observed at site 70/71 (Figure 10). This is not unexpected since this site is located on a sandy soil type, has low grass cover (~13 percent), and is located only 300 feet from the edge of the DCM (Appendix A). When expressed as the average CE, the control efficiency of the MV DCM is equal or greater than 99 percent at saltgrass coverage levels of 20 percent or more (Figure 11).

Figure 9: Sand flux from the DWP monitoring network in the MV DCM, by cover class, normalized by wind speed.

Cover classes are differentiated by symbols and colors. The baseline is indicated with the blue line.

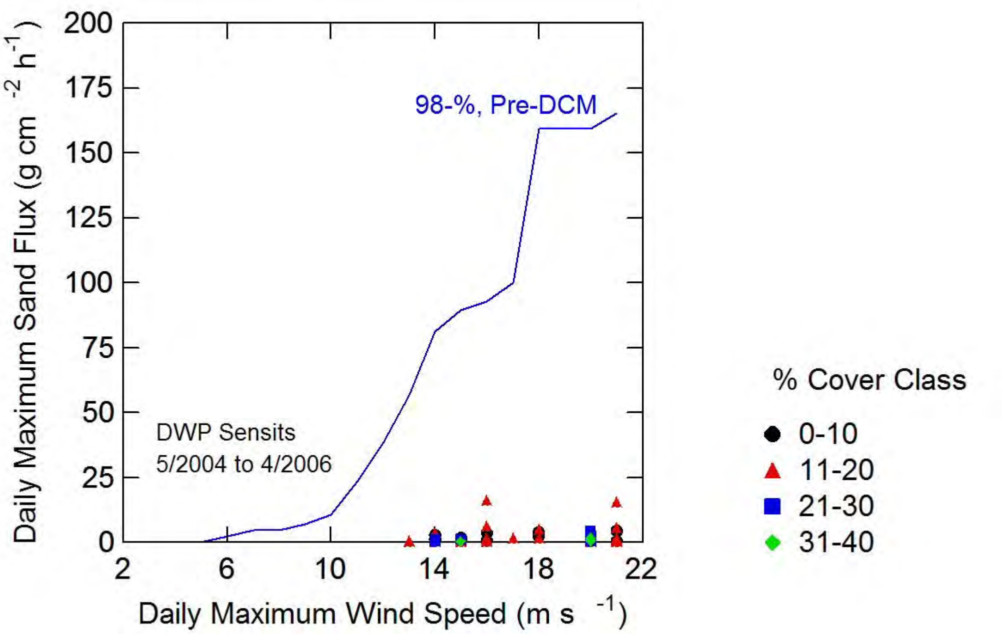


Figure 10: Control efficiency from the DWP monitoring network in the MV DCM.

Data are screened for valid data only. Symbols indicate monitoring sites 70 and 71 (red stars), and all other monitoring sites (blue circles).

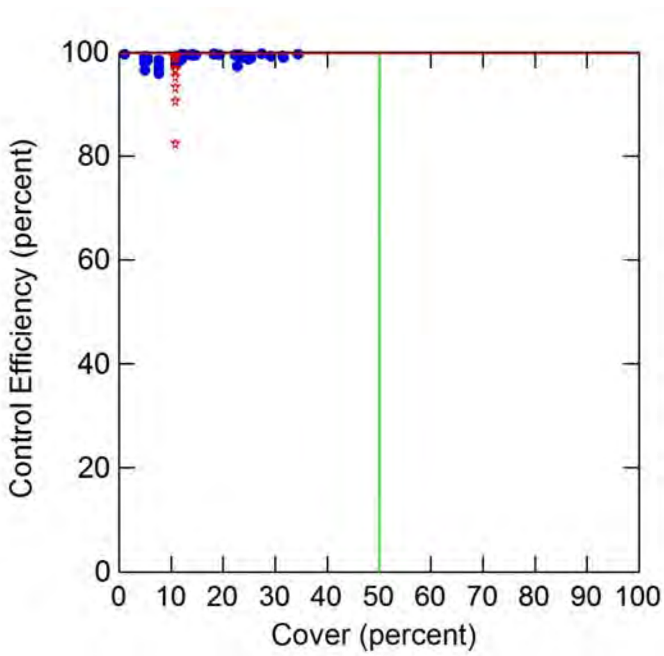
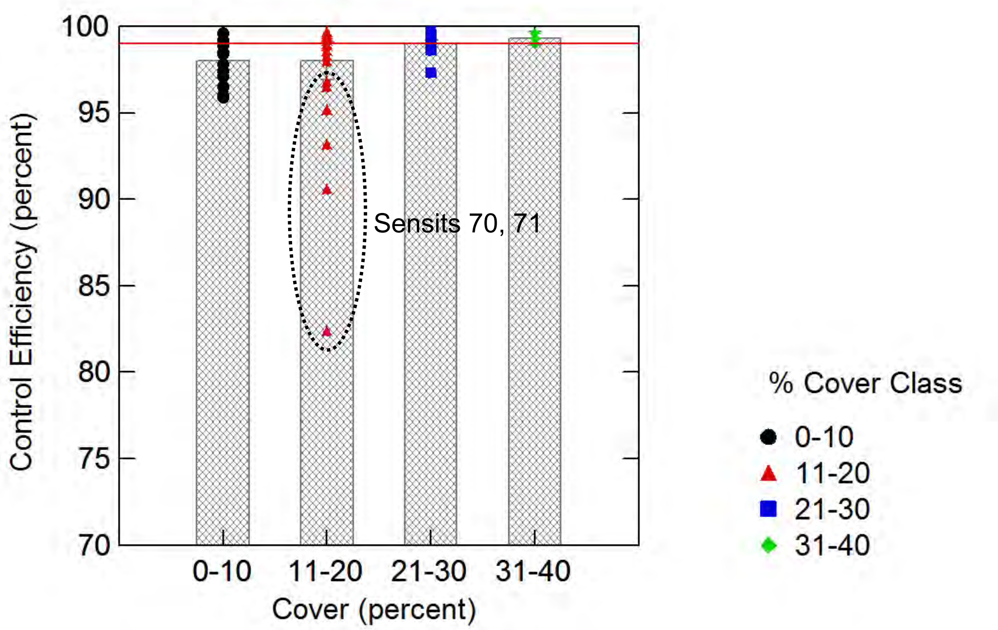


Figure 11: Control efficiency from the DWP monitoring network in the MV DCM, by cover class, normalized by wind speed.

Data are screened for valid data only. Shown are the (arithmetic) mean (gray bar) and the actual values. The red line indicates the 99-percent control threshold. Sample sizes are: 0 to 10%-18, 11 to 20%- 44, 21 to 30%-24, 31 to 40%- 6, and, >40%-zero. (No sand fluxes above the significance threshold are observed).



Discussion and Conclusions

The data collected over the 24-month period indicate that an average of 99 percent control of sand flux is effectively achieved at saltgrass covers of 20 percent or more (Figure 11, Figure 12, Table 1). A very high level of sand flux control is also observed at lower saltgrass cover, with average control efficiencies of ~97.5 percent in both the 0-to-10- and 11-to-20-percent cover bins (Figure 11, Figure 12, Table 1). This level of control is attributed to a combination of factors, including:

- The saltgrass cover is effectively sheltering the surface.
- The drip irrigation is keeping the soils relatively moist for about seven months per year (April to October).
- The saltgrass furrows are aerodynamically rough, reducing the wind speed and sand motion within the MV area.

- The sand and sand-sized particles are being trapped along the margins of the area, reducing the amount of particles available to abrade surfaces within the MV area.

It should be noted that the control efficiency in the cover classes with a saltgrass cover above 40 percent was so high that the results were not included in the summary Figure 11. While sand motion was monitored in these cover classes during the entire period (Figure 7, Table 1), none of the sand fluxes observed in these cover classes exceeded the significance threshold (sand flux 0.5 g cm^{-2} h^{-1}). Only seven days with maximum hourly sand fluxes above 0.01 g cm^{-2} h^{-1} were observed in these cover classes in the entire analysis period. Therefore, at a saltgrass cover of above 40 percent the observed and average control efficiency was effectively 100 percent (Table 1).

It should also be noted that the absence of sand motion in the higher cover classes cannot be attributed to the lack of wind. Over the analysis period of a total of 699 days, 455 days, or 65 percent, of the total number of days exceeded the threshold wind speed for sand motion (i.e., 7.5 m s^{-1} for at least one hour per day). Twenty percent of the total number of hours in the period (16,776 hours), or nearly 3,400 hours, exceeded this threshold wind speed. This indicates that the observed wind speed distribution exceeded the sand motion frequently enough during this period to initiate sand motion if the surface in the MV area would be susceptible to erosion (Table 1). Instead, no significant sand motion was observed with a vegetation cover of 40 percent, and for vegetation covers below 40 percent very high control efficiencies were achieved (Table 1, Figure 12).

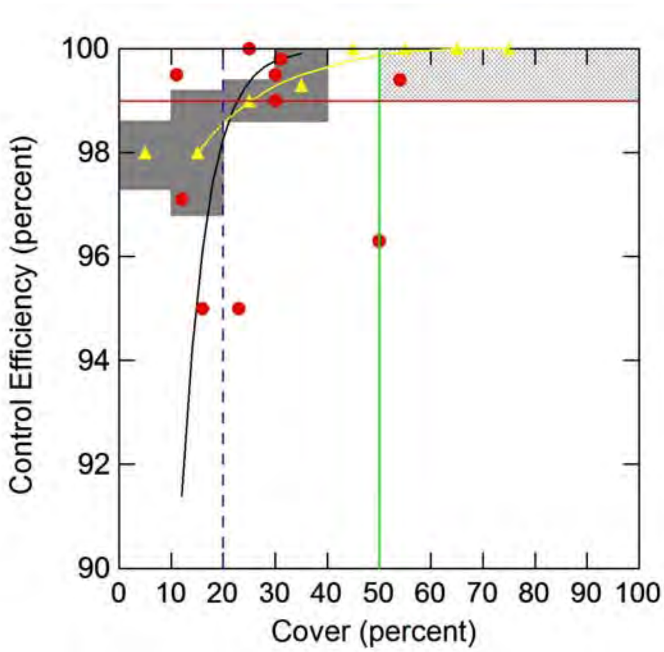
Table 1: Number of monitoring sites and CSC-Sensit pairs by cover class and by collection period, and overall average control efficiency (CE) by cover class.

Values represent the average number of sites by class and period (24 months total), the number of monitor pairs (48 total), and the average CE. The values in brackets represent the observed range. The "number of days by site with a significant sand flux" is derived from a total of 455 days during which the wind speed exceeded 7.5 m s^{-1} for at least one hour per day. With 48 monitors, this produced over 20,000 data points.

Parameter	Saltgrass Cover Class		
Average and (Range)	0-20 percent	20-40 percent	>40 percent
Number of monitoring sites	7 (2 to 15)	11 (6 to 16)	4 (1 to 9)
Number of monitor pairs	14 (4 to 30)	22 (12 to 32)	8 (2 to 18)
Number of days with significant sand flux (out of 455)	15	5	0
Number of days with significant sand flux (out of >20,000)	49	16	0
Control Efficiency	98.0% (82.4 – 100)	99.1% (97.3 – 100)	100% (99.8 - 100)

Figure 12: Control efficiency from the DWP monitoring network in the MV DCM, by cover class, in relation to the research results referenced in the 2003 SIP (GBUAPCD, 2003).

The DWP results are shown as the (arithmetic) mean CE (yellow triangles and regressed line) and the 95-percent confidence interval (solid gray bars). The District data (GBUAPCD, 2003) are shown as actual data points (red circles), the 50 percent cover threshold (green line) required to achieve 99-percent control of sand motion (light gray shaded box), and the control efficiency relationship developed for Owens Lake by Lancaster (1996).



APPENDIX A

Data Screening Procedures

Data Screening Procedures

Step 1

The first level of data screening consisted of filtering the raw data set of hourly sand fluxes for the entire 24-month period and all monitoring pairs for values above the minimum threshold of 0.5 g cm^{-2} h^{-1}. This threshold of "significant sand flux" is consistent with the screening procedures used by the District in the Dust ID modeling protocol (GBUAPCD, 2003). The resulting data were then compared with the baseline (Figure A.1), and the control efficiencies were calculated (Figure A.2).

Step 2

In the second step of the screening procedures, periods during which construction or maintenance related surface disturbance occurred, in or adjacent to the MV DCM, were identified (Figure A.3, Figure A.4). This analysis consisted of a close examination of the temporal and spatial distribution of the high sand flux values. In many cases the occurrence of the highest sand fluxes was associated with unavoidable human disturbance near the monitoring sites, due to construction or maintenance activities. The timing (to a daily resolution) and location of these activities was traced back using observations from field personnel, as well as detailed construction and maintenance records and maps. The identified construction and maintenance related activities in and around the MV DCM during the analysis period consisted of three distinct activities.

Replanting of Saltgrass

In the late spring of 2004, saltgrass was replanted throughout the entire MV DCM in order to fill in areas where the initial establishment of saltgrass was insufficient. The startup period of the DWP sand motion monitoring overlapped with the replanting effort. Many of the DWP monitors showed significant sand motion only during the first month, May 2004, when replanting was recent or still ongoing (Figure A.3, Figure A.4), but no significant activity thereafter. Based on the overlapping of these two activities, the May 2004 period was removed from the control efficiency analysis for the entire MV DCM.

Maintenance of Drip Lines

In December of 2005, new drip lines were installed over a significant portion of the MV DCM. This involved heavy equipment, including tractors, which radically disturbed surface crusts in these areas. Field personnel documented the area where the surface crust was severely disturbed during these maintenance activities and developed a list of the monitoring sites potentially affected by the surface disturbance. In the early winter of 2006 most of these sites, which had not shown significant sand motion until then, became highly emissive (Figure A.3, Figure A.4). In comparison, areas where the drain line replacement did not take place did not show any significant sand motion during this period. Moreover, the (potentially) affected sites were documented several weeks before these sites actually became emissive. Based on the insufficient time frame for the salt crust to heal after the disturbance, the period from December 2005 through March 2006 was removed from the control efficiency analysis for five monitoring sites (10 monitoring pairs) affected by maintenance activities originating in December 2005.

Phase Shallow Flood Construction

In January of 2006, Phase V shallow flooding construction activities commenced adjacent to the MV DCM near the southwest corner of the DCM (Figure A.5). One of the monitoring sites just inside of the berm of the MV DCM appeared to be strongly affected by these activities (Figure A.3, Figure A.4). This site, Site 70/71 (Figure A.5), is characterized by a low saltgrass cover, approximately 13 percent, and did show significant sand motion in 2005 before the Phase V construction commenced. However, sand fluxes increased three-fold within two weeks of the onset of Phase V construction. Based on this information, the period from January 2006 and onwards (as construction is still ongoing) was removed from the control efficiency analysis for Site 70/71.

Step 3

In the third screening step the sand flux data for period and Sensit combinations affected by surface disturbance due to construction and maintenance activities, as identified in Step 2, were removed from the data set. The resulting data set indicated that the observed sand fluxes were considerably lower than the baseline (Figure A.6). Moreover, the only site with significant sand motion is Site 70/71. This is not unexpected since this site is located on a sandy soil type, has a low grass cover (~13 percent), and is located only 300 feet from the edge of the DCM (Figure A.5). The resulting screened CE values range from 75 to 100 percent at Site 70/71, and are over 90 percent at all other sites (Figure A-7). A more in depth breakdown of CE by saltgrass cover is provided in the Results Section and the Discussion and Conclusions Section.

Figure A.1: Sand flux from the DWP monitoring network in the MV DCM, May 2004 to April 2006, normalized by wind speed.

The baseline is indicated by the blue line. Data are screened by threshold level only (Step 1).

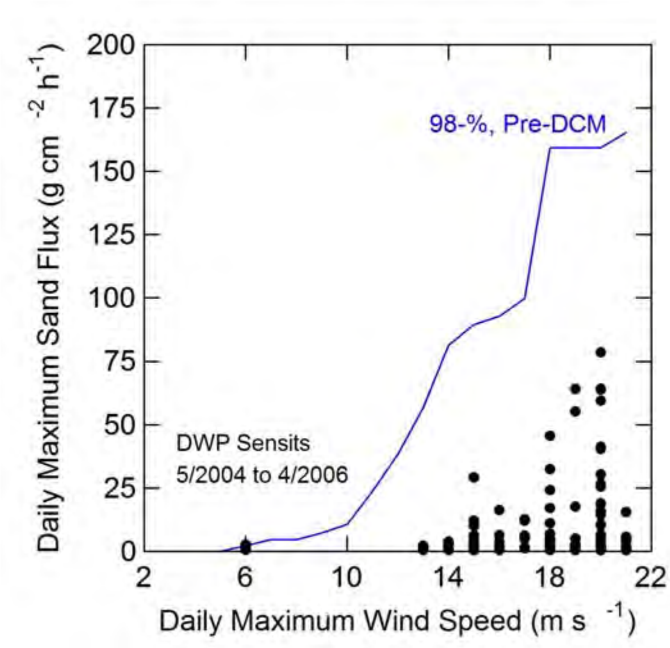


Figure A.2: Sand flux control efficiency (percent) as a function of saltgrass cover, May 2004 to April 2006, normalized by wind speed.

The lines indicate a 50-percent cover and the 99-percent control level, based on the 2003 SIP (respectively, green and red line). The data are screened by threshold level only (Step 1).

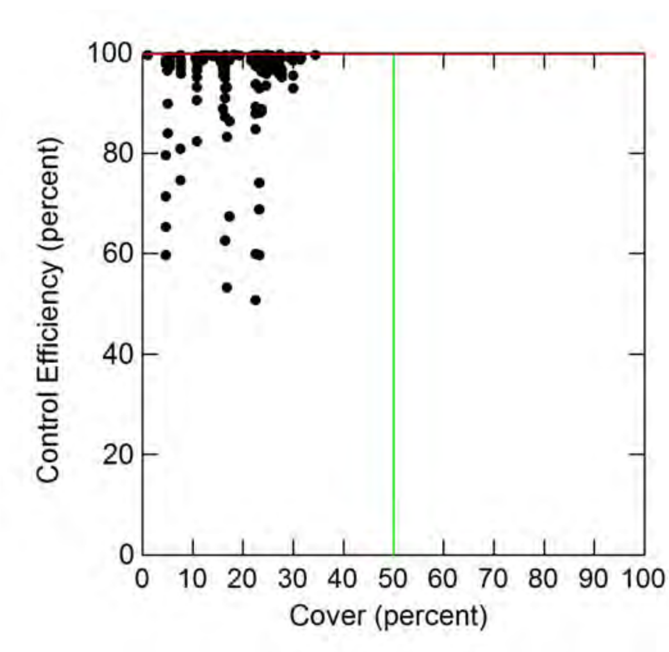


Figure A.3: Sand flux from the DWP monitoring network in the MV DCM, May 2004 to April 2006, normalized by wind speed.

The baseline is indicated by the blue line. The data are screened by threshold level (Step 1). The construction and maintenance periods are differentiated by symbols and colors (Step 2).

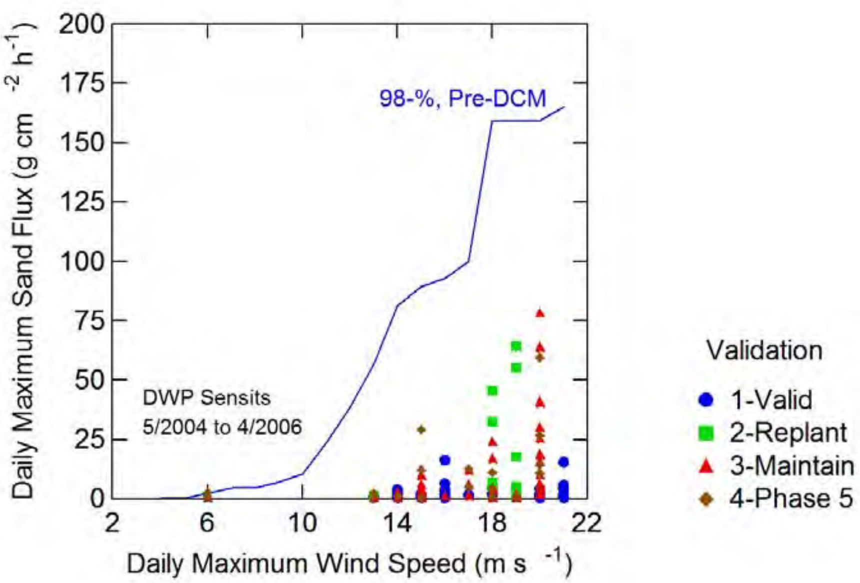


Figure A.4: Sand flux control efficiency (percent) as a function of saltgrass cover, May 2004 to April 2006, normalized by wind speed.

The lines indicate a 50-percent cover and the 99-percent control level (green and red lines, respectively). Data are screened by threshold level (Step 1). Construction and maintenance periods are differentiated by symbols and colors (Step 2).

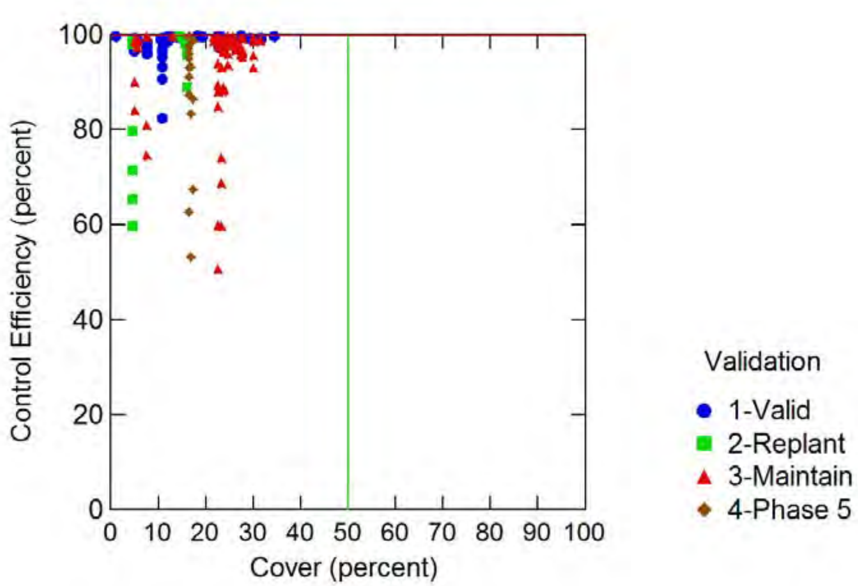


Figure A.5: The south west corner of MV DCM as seen by QuickBird satellite imagery in January 2006 (Panel A) and February 2006 (Panel B).

Monitoring Site 70/71, located approximately 300 feet from the edge of the DCM, is indicated as a red star. Severe ground disturbance due Phase V construction is visible in the February image, but is absent in the January image.

Figure A.6: Sand flux from the DWP monitoring network in the MV DCM, May 2004 to April 2006, normalized by wind speed.

The baseline is indicated by the blue line. The saltgrass cover classes are differentiated by symbol and color. The data are screened by threshold level (Step 1) and construction and maintenance periods (Step 2 and Step 3).

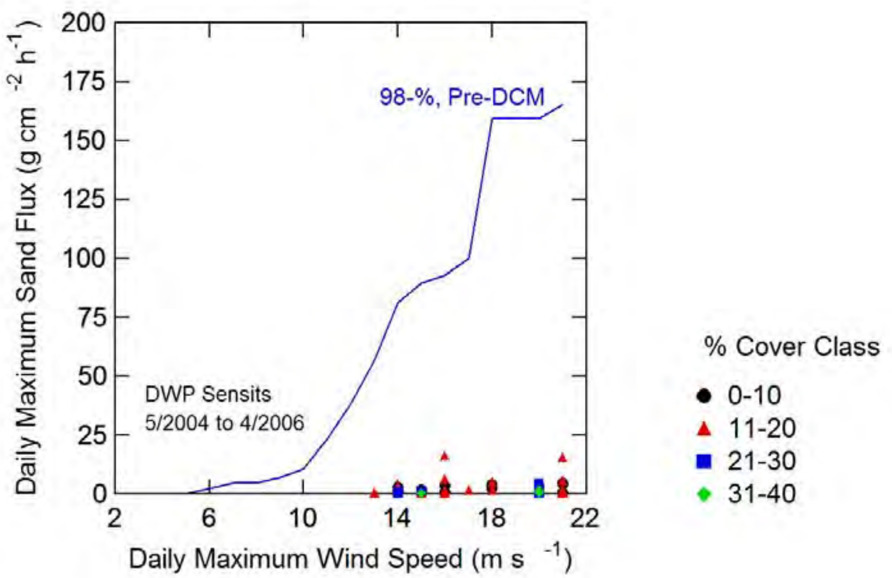
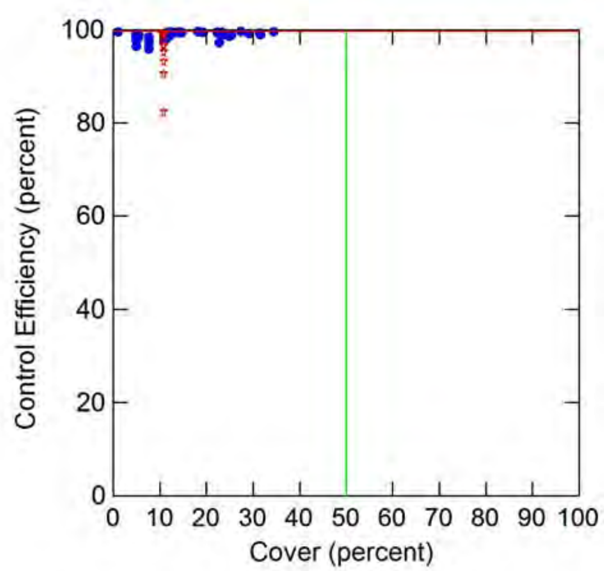


Figure A.7: Sand flux control efficiency (percent) as a function of saltgrass cover, May 2004 to April 2006, normalized by wind speed.

The lines indicate a 50-percent cover and the 99-percent control level (green and red lines, respectively). The symbols represent Site 70/71 (red stars) and all other monitoring sites (blue circles). The data are screened by threshold level (Step 1) and construction and maintenance periods (Step 2 and Step 3)



APPENDIX 4.
AIR SCIENCES INC. 2007A. DEMONSTRATION OF 99 CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE.

AIR SCIENCES INC.
DENVER • PORTLAND

TECHNICAL MEMORANDUM

DEMONSTRATION OF 99-PERCENT CONTROL EFFICIENCY FOR THE MANAGED VEGETATION DUST CONTROL MEASURE

PREPARED FOR:	Duane Ono, GBUAPCD Mark Schaaf, Air Sciences
PREPARED BY:	Kent Norville, Air Sciences
PROJECT NO.:	228-7
COPIES:	Richard Harasick, LADWP Ted Schade, GBUAPCD
DATE:	June 27, 2007

This modeling report outlines the methods, data, and assumptions for the air quality dispersion analysis used to evaluate whether the Owens Lake managed vegetation (MV) area has met the required 99-percent control efficiency as defined under the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision (RSIP). The approaches used in this analysis follow those outlined in the RSIP.

Model Selection

Following the RSIP, Air Sciences used the CALPUFF modeling system files generated for the Winter 2007 Dust ID modeling analysis. The specific model versions were CALPUFF version 5.711b (051216) and CALMET version 5.53b.

Meteorological Data

For this analysis, data from two calendar years (2005 and 2006) were used. The monthly CALMET data sets were already processed as part of the Dust ID program by the District's consultant.

Sand Catches

According to the RSIP, PM_{10} emission rates are computed on the basis of sand flux, which is computed using data from Cox Sand Catchers (CSC) and Sensits. The CSC is a passive collection device that captures wind-transported sand and sand-sized particles. Sensits are real-time particle motion sensors used to time-resolve the mass collected by the CSC. Both instruments were installed to sample at a height of 15 cm above the surface.

Within the MV area, the District operated eight long-term sand catch sites, identified as: 7585, 7586, 7607, 7608, 7609, 7610, 7631, and 7632 (Figures 1 and 2). In 2005, the resolution of the sand catches was 1 gram as the sand masses were measured in the field. In 2006, the District began weighing the sand masses in its laboratory, and the resolution is now lower than 0.1 grams. In mid December 2006, the District added six more sand catch sites: 9509, 9510, 9511, 9512, 9513, and 9514 (Figure 2). In January 2007 (outside the period covered by this modeling analysis), the District added two more sites: 9515 and 9516 (Figure 2). The 2006 sand catch masses for these 13 District sites operating during calendar year 2006 are shown in Table 1. Sites with a single collection greater than 5 grams are highlighted in yellow.

Table 1: District sand catch sites with collected sand masses by year (largest and total).

	2005		2006	
District Sites	Largest Collection (grams)	Total Mass (grams)	Largest Collection (grams)	Total Mass (grams)
Long-Term Sensits				
7585	0	0	2	2
7586	0	0	1	1
7607	1	1	1.5	1.5
7608	0	0	0	0
7609	0	0	1	1
7610	0	0	1	1
7631	0	0	0.4	0.4
7632	0	0	0.2	0.2
Installed December 2006				
9509	--	--	0	0
9510	--	--	0	0
9511	--	--	54	54
9512	--	--	4	4
9513	--	--	116	116
9514	--	--	0	0

From February 2005 through September 2006, LADWP operated 24 sand catch sites within the MV area to support the Managed Vegetation Control Efficiency Study[1], as shown in Figure 3. The 2005 and 2006 sand catch masses for the LADWP sites are presented in Table 2. Each LADWP site employed an instrument pair. The resolution of the LADWP catches was 0.1 grams.

Table 2: LADWP sand catch sites with collected sand masses by year (largest and total). Yellow highlighted sites had a sand collection mass greater than 5 grams.

		2005		2006	
LADWP Site	Sensit Number	Largest Collection (grams)	Total Mass (grams)	Largest Collection (grams)	Total Mass (grams)
CS1001	20054	2.0	3.9	4.9	9.0
	20055	4.2	7.2	4.9	9.0
CS1002	20056	0.6	1.8	0.9	2.2
	20057	0.5	1.3	1.9	2.9
CS1003	20058	0.3	1.1	0.8	2.1
	20059	0.2	0.9	0.6	1.8
CS1004	20060	0.7	1.9	13.7	18.2
	20061	0.5	1.5	10.2	14.2
CS1005	20062	3.0	4.2	3.0	7.5
	20063	3.0	4.1	2.1	6.1
CS1006	20064	51.8	82.1	5.5	12
	20065	44.2	89.4	3.7	6.6
CS1007	20066	0.5	1.8	0.8	2.1
	20067	0.4	1.4	0.4	1.3
CS1008	20068	0.3	0.8	1.3	2.8
	20069	0.2	0.9	0.7	1.9
CS1009	20070	139.5	148.1	167	359.5
	20071	47.2	51.6	62.9	141.8
CS1010	20018	1.5	4.0	1.8	4.9
	20019	1.5	3.2	1.6	3.8
CS1011	20032	0.5	2.2	2.0	5.9
	20033	0.4	1.7	1.6	5.0
CS1012	20008	0.3	1.1	1.9	3.6
	20009	0.4	1.8	1.0	2.7
CS1013	20012	0.1	0.8	0.8	2.2
	20013	0.3	1.2	0.7	2.3
CS1014	20016	0.7	2.1	0.9	2.7
	20017	0.7	1.5	1.0	3.1

[1] Managed Vegetation Control Efficiency Study, Owens Dry Lake, California, Technical Memorandum prepared for Richard Harasick, Los Angeles Department of Water & Power by Air Sciences Inc., July 24, 2006.

Table 2 (continued): LADWP sand catch sites with collected sand masses by year (largest and total). Yellow highlighted sites had a sand collection mass greater than 5 grams.

		2005		2006	
LADWP Site	Sensit Number	Largest Collection (grams)	Total Mass (grams)	Largest Collection (grams)	Total Mass (grams)
CS1015	20040	1.2	3.4	1.1	3.8
	20041	2.1	4.6	1.1	3
CS1016	20038	0.7	3.1	209.8	481.6
	20039	0.8	3.2	271.2	543.7
CS1017	20028	2.5	5.8	77.2	155.4
	20029	1.8	3.7	58	107.3
CS1018	20026	3.9	13.3	61.6	115.4
	20027	2.5	5.6	30	62.3
CS1019	20024	2.6	6.7	49.5	91.5
	20025	2.5	6.2	49.1	91.5
CS1020	20036	8.3	13.5	46.8	84.5
	20037	5.3	11.4	47.2	82.4
CS1021	20046	3.7	5.9	3.8	6
	20047	1	3.3	3.4	5.8
CS1022	20048	0.8	1.7	1.5	2.4
	20049	1.6	2.3	1.2	2.8
CS1023	20050	1.2	3.2	3	6.8
	20051	1	2.6	2.8	6.5
CS1024	20052	0.2	0.7	0.6	1.6
	20053	0.3	0.8	0.5	1.5

Figure 1: District sand catch sites within the Managed Vegetation area. The green circles are District sand catch sites operating in 2005 and 2006. The red circles are District sites that were installed in mid-December 2006.

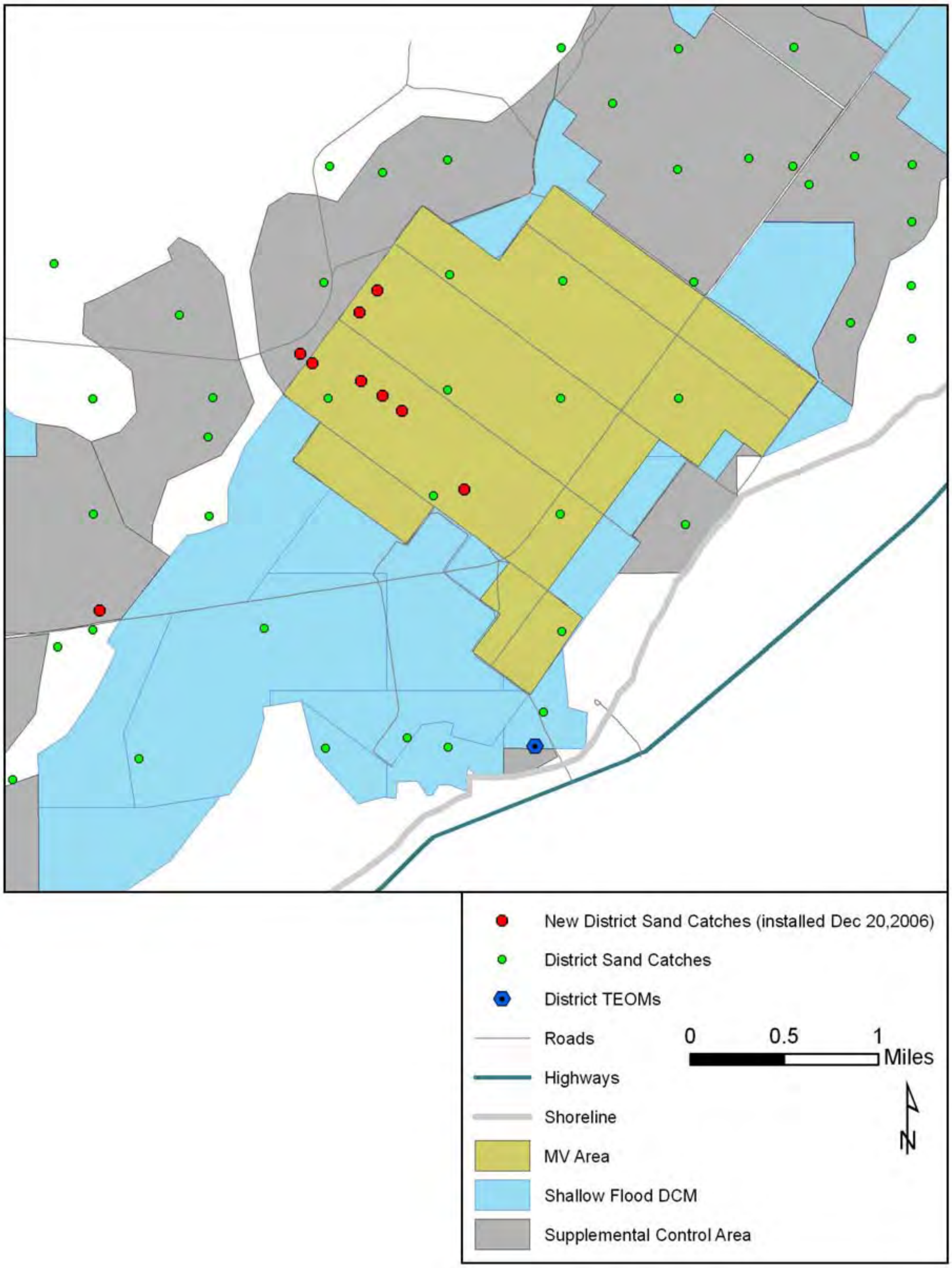


Figure 2: Closeup of District sand catches sites within the MV area.

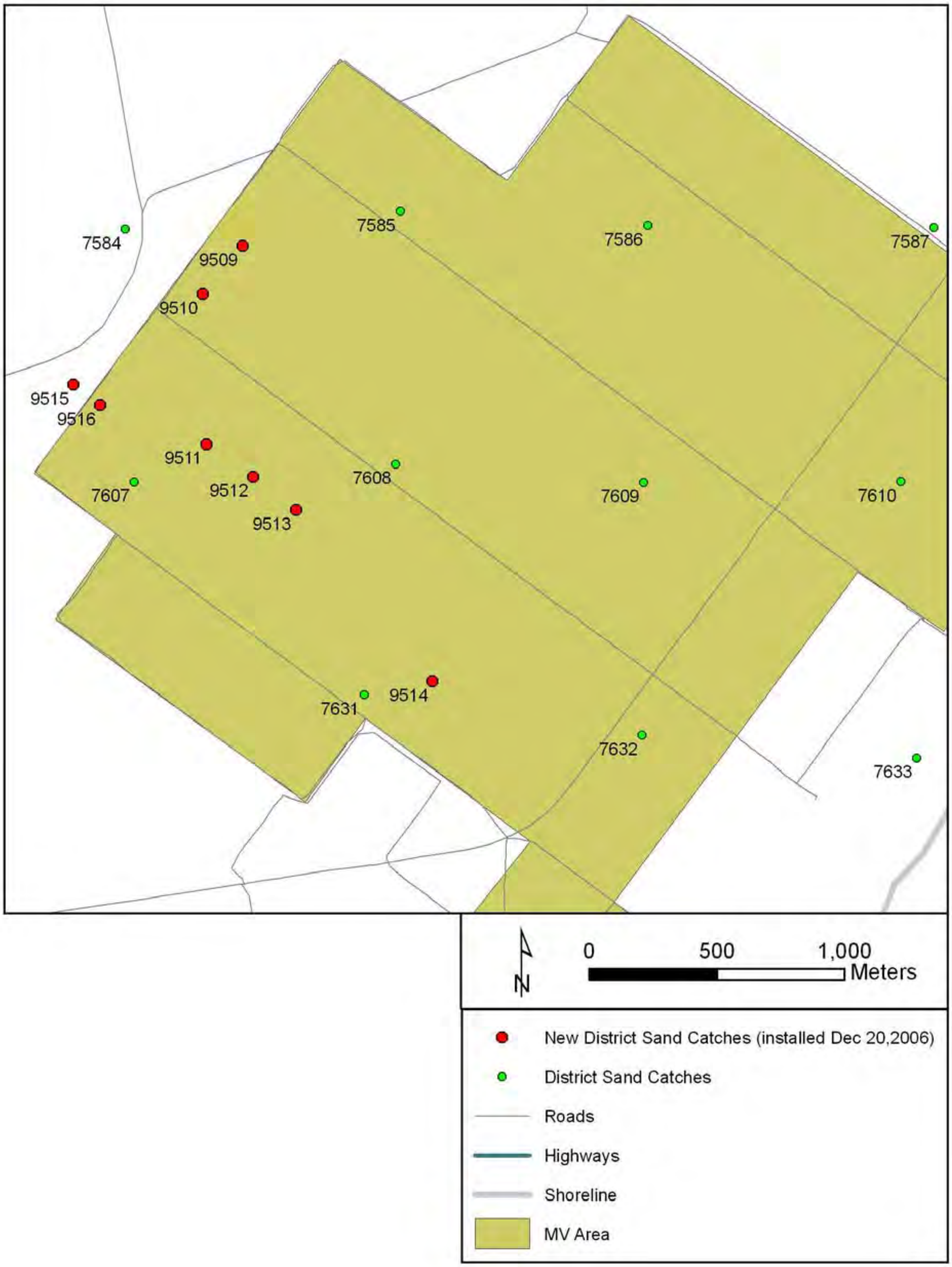
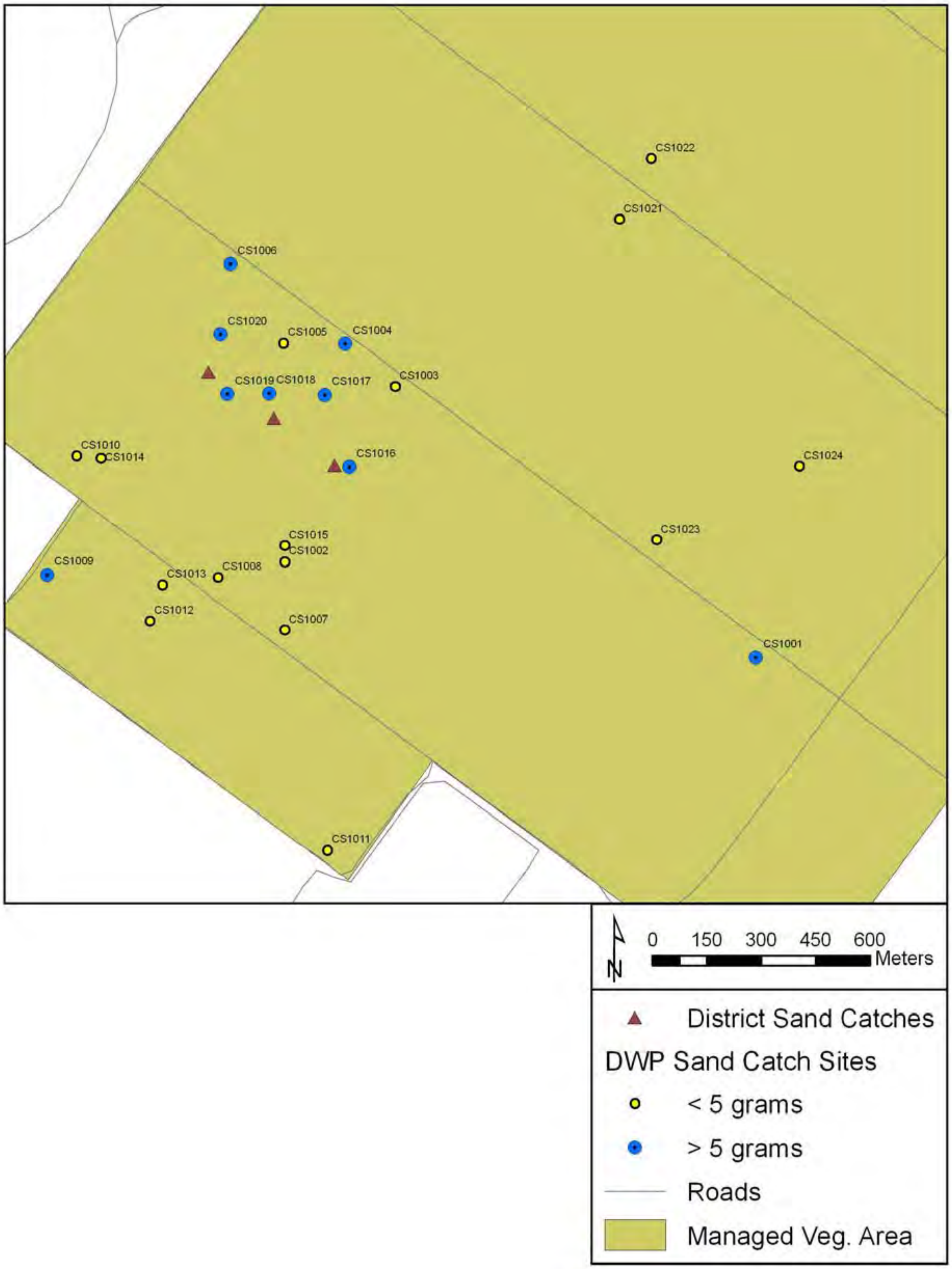


Figure 3: LADWP sand catch sites within the MV area.



Modeled Areas

For this analysis, two types of areas were considered. The first class were discrete areas associated with the higher mass sites, generally with a catch greater than 5 grams with a definable boundary. The second class was the remainder of the general MV area. The general area was represented by the scattered low mass catches which generally did not have a clearly identified emissive area associated with them.

The discrete areas with high sand masses are shown in Figure 4. Eight sand catch sites are associated with this source class: CS1004, CS1006, CS1009, CS1016, CS1017, CS1018, CS1019 and CS1020. Five of these, CS1016 through CS1020, were associated with the 34-acre area of drip tube shanking in late 2005. This area is also represented by District sites 9511, 9512, and 9513. CS1004 was associated with a 1.25-acre LADWP-delineated area. CS1009 was associated with sand intrusion coming onto the MV area from the bare playa just west of the MV area. This area encompasses approximately 4.39 acres. CS1006 was identified with a 7.5-acre area of poor subsurface drainage and sparse vegetation. The area extends to CS1005, but CS1005 was not included with this area because of its low 2006 sand masses.

These distinct areas were then characterized using the methodology from the Dust ID Program, i.e., they were modeled as rectangles with the same area as the source delineation. Because each site has two sets of instruments (one in-row and one between-row), the sand fluxes were calculated hourly and then averaged over both sets on an hour-by-hour basis to represent the site. Only collections when the sand catch was above 1 gram were considered.

The general MV area was characterized as a series of 250-meter by 250-meter squares, except around the distinct areas described above. Around these distinct areas, smaller squares or rectangles were used. For the sand flux, all of the non-distinct area catches were averaged and then time-resolved using an average flux based on a unit sand mass. This way, the modeled flux would be based on the area-wide average values and not biased toward any one site. If all of the distinct areas had sand masses less than 1 gram, then the area-wide MV emissions were assumed to be zero.

Note that the long-term District sites were not used in this analysis because the Dust ID files that Air Sciences had on hand were not resolved below 5 grams in 2005. It is Air Sciences' opinion that this omission does not have a significant impact on the results because these sites had zero or small sand catches (comparable to the LADWP set) during this time period.

K-factors

For this analysis, the South Area default K-factors were used.

Analysis and Results

Using the sand flux, source areas, and K-factors, the CALPUFF model was run for each source area to calculate the maximum 24-hour average shoreline PM_{10} concentration. Table 3 shows the maximum 24-hour concentrations for each individual area and for the overall cumulative contribution.

Table 3: Maximum 24-hour PM_{10} concentrations for 2005 and 2006.

LADWP Site Number	District Site Number	Maximum 24-hour Concentration (μg/m³) 2005	2006
1004		0	0.05
1006		0.71	0.04
1009		1.18	1.73
1016	9513	0.05	12.57
1017		0.03	0.95
1018		0.11	0.85
1019	9511	0.06	2.01
1020		0.09	0.21
Rest of MV Area		16.41	7.66
Cumulative Maximum		16.41	19.01

Because the source contributions are much smaller than the standard less the background concentration (130 μg/m³), it is assumed that these source areas are achieving the required 99-percent control efficiency.

Figure 4: Discrete source areas within the Managed Vegetation site.

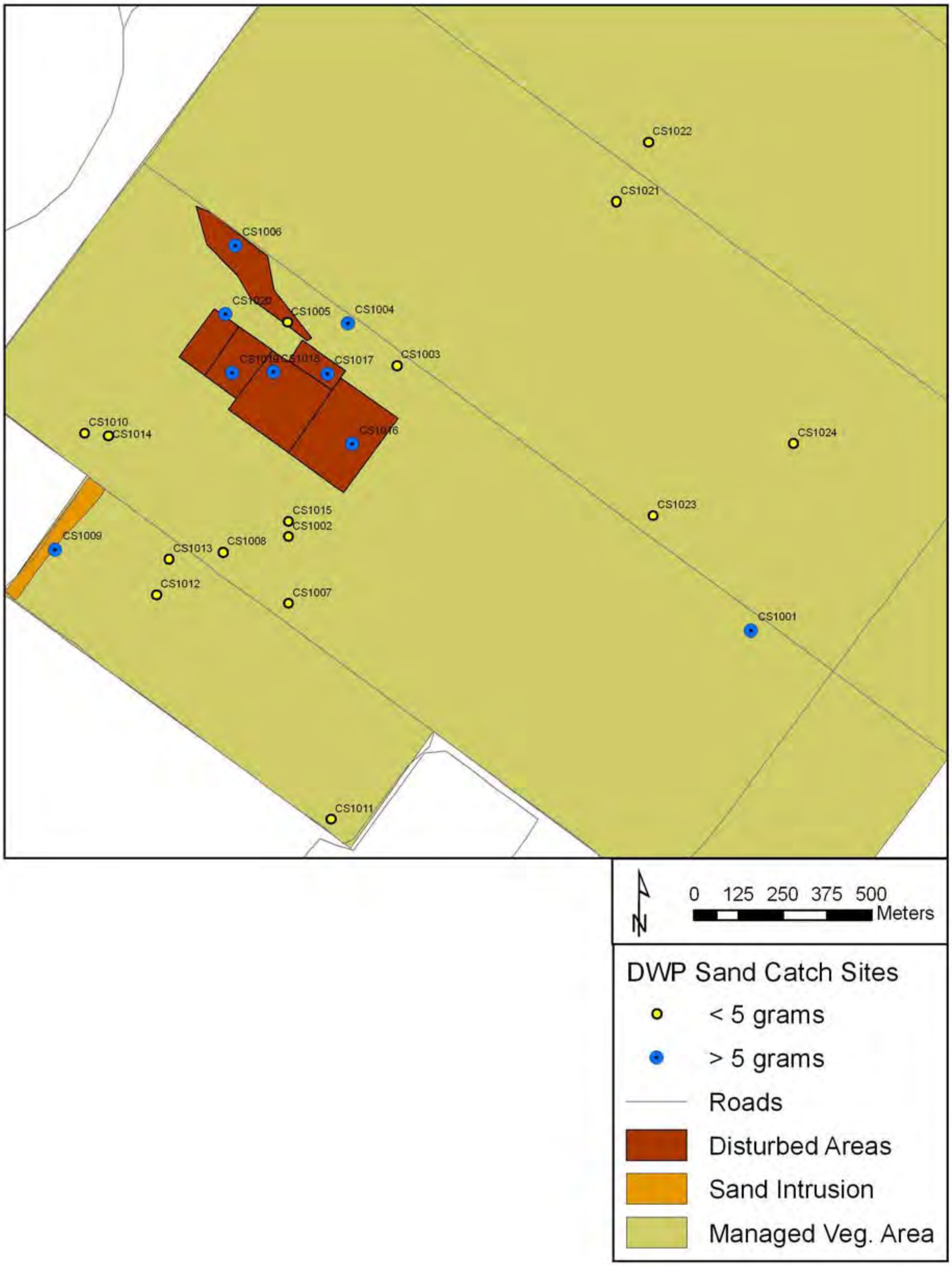
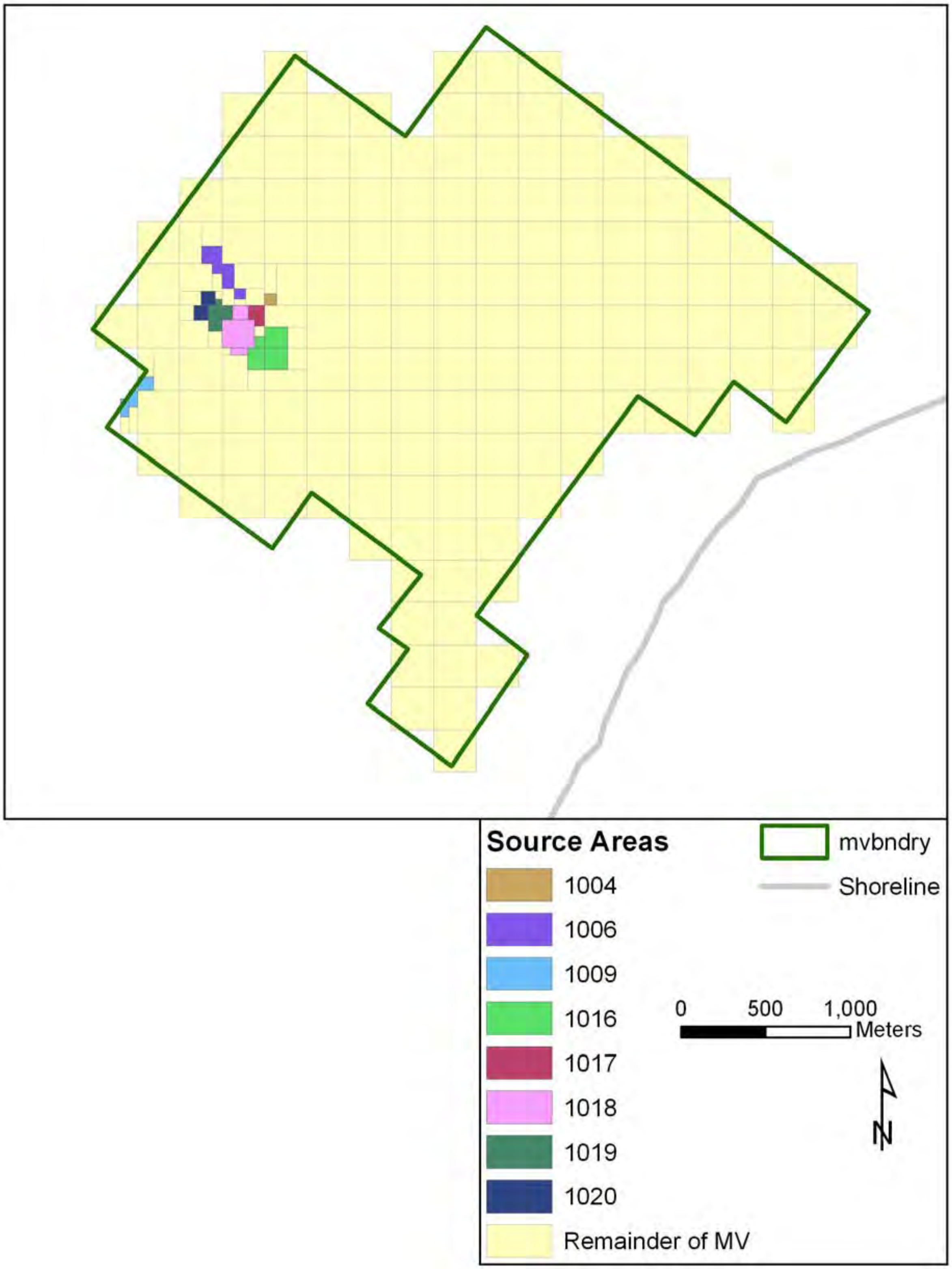


Figure 5: Modeled source areas for the LADWP sand catch sites (February 2005 to August 2006).



AIR SCIENCES INC.
DENVER • PORTLAND

TECHNICAL MEMORANDUM

CALCULATION OF MANAGED VEGETATION SAND FLUX CONTROL EFFICIENCY

PREPARED FOR: Duane Ono/GBUAPD
Mark Schaaf, Air Sciences

PREPARED BY: Kent Norville, Air Sciences

PROJECT NO.: 228-7-1

DATE: August 1, 2007

This memorandum outlines the methods, data, and assumptions for calculating the sand flux control efficiency in the Managed Vegetation (MV) area in order to demonstrate compliance with the required 99-percent control efficiency as defined under the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision (RSIP).

Approach

The sand flux control efficiency is defined as

$$CE = \frac{[SF_{base}(w) - SF_{MV}(w)]}{SF_{base}(w)}$$

where SF_{MV} is the MV area averaged sand flux and SF_{base} is the uncontrolled pre-MV sand flux. Both sand fluxes are functions of wind speed. To estimate the uncontrolled sand fluxes, two years of pre-construction sand flux data from nine Sensit sites (7586, 7607, 7608, 7609, 7630, 7631, 7632, 7633 and 7654) in the MV area were used. First, for each Sensit, the cumulative daily sand flux was calculated. Since the pre-construction source areas were designated as square kilometers, the average daily sand flux was found by averaging the nine individual daily cumulative sand fluxes. Then for each day, the maximum wind speed, as measured at the Dirty Socks monitor, was determined. The sand flux was then binned into 1 m/s wind speed increments and the 98 percentile sand flux was determined. Figure 1 shows the binned sand flux values and the 98th percentile sand flux line. This line was set so that a bin's 98th percentile was never less than that found in a lower wind speed bin.

For the controlled MV area, the DWP MV Sensit data from January 2005 to June 2006 were used. DWP had 24 sites on the MV area operating during this period. Most of the sites had little sand activity; however, several sites (1004, 1006, 1009, 1016, 1017, 1018, 1019, and 1020) had higher sand activity and were thus assigned to delineated areas. These high activity sites were treated individually. For the low sand mass sites, the catches were averaged and then time-resolved using an average flux based on a unit sand mass. This way, the modeled flux was the area-wide average value and not biased toward any one site. Then the daily cumulative sand fluxes were calculated and then weighted based on the size of the area that was assigned using:

$$SF_{MV} = \frac{\sum_{site} SF_s A_s}{\sum_{site} A_s}$$

where SF_s is the daily cumulative sand flux for site s and A_s is the delineated area for site s. Then, the sand flux was then binned into 1 m/s wind speed increments, using the wind data from the Dirty Socks monitor, and the 98 percentile sand flux was determined. Figure 2 shows the binned sand flux values and the 98th percentile sand flux curve.

Results

Table 1 shows the CE for each wind speed bin. All of the CE's are greater than 99 percent control indicating compliance with the 99 percent control requirement.

Table 1. Calculate CE by wind speed bin

WS Bin (m/s)	SF_{MV} (g/cm²/day)	SF_{base} (g/cm²/day)	CE (%)
7	0.18	37.80	99.52
8	0.18	47.65	99.62
9	0.18	74.63	99.76
10	0.22	194.04	99.89
11	0.22	194.04	99.89
12	0.22	194.04	99.89
13	0.22	199.98	99.89
14	0.61	199.98	99.70
15	0.61	540.12	99.89
16	0.61	540.12	99.89
17	0.61	540.12	99.89
18	0.61	540.12	99.89
19	0.61	540.12	99.89
20	1.47	540.12	99.73
21	1.47	540.12	99.73
22	2.04	540.12	99.62
23	2.04	540.12	99.62

Figure 1. Binned uncontrolled sand flux (SF_{base}) and the 98th percentile line

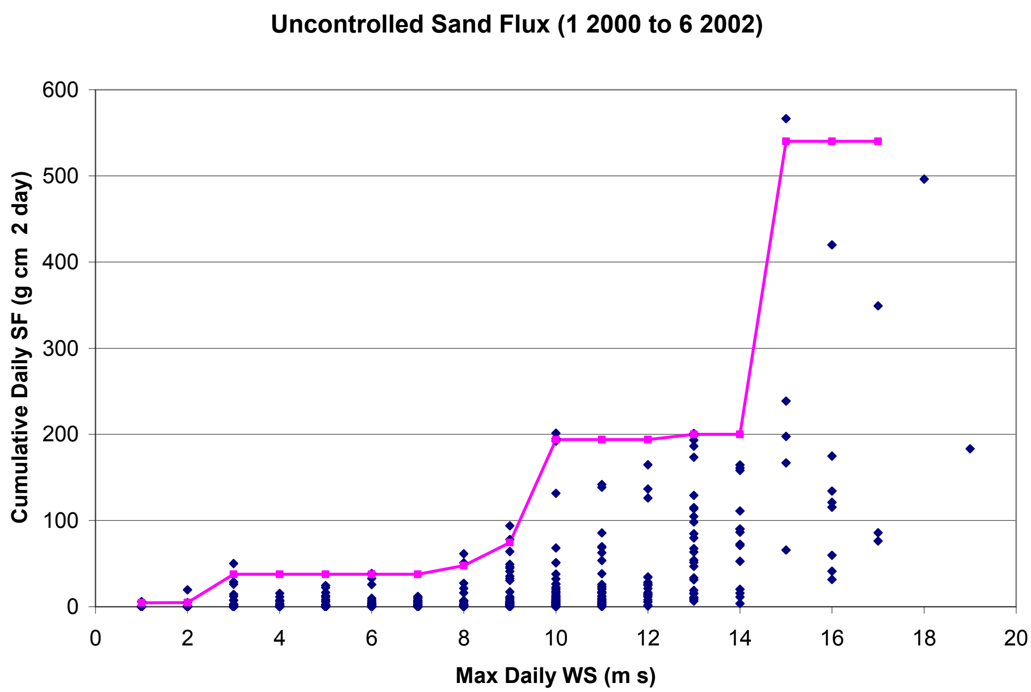
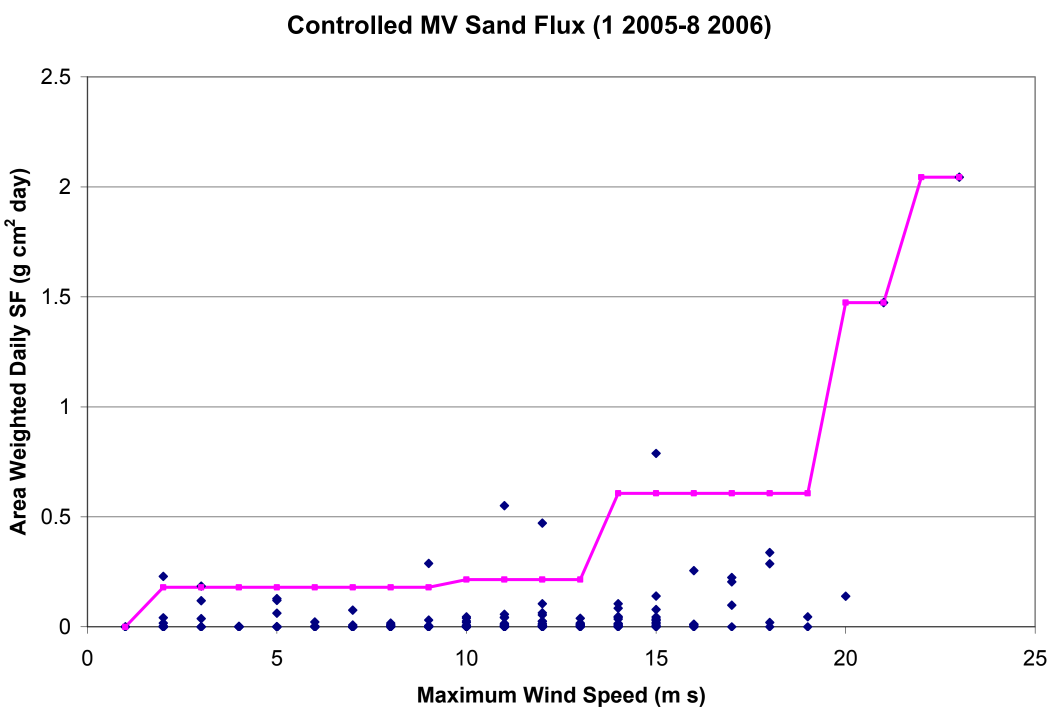


Figure 2. Binned controlled MV sand flux (SF_{MV}) and the 98th percentile line



APPENDIX 5. NEWFIELDS, AIR SCIENCES, AND EARTHWORKS. 2008. APPROACH TO THE MANAGED VEGETATION OPERATION AND MANAGEMENT PLAN.

Report

Approach to the Managed Vegetation Operation and Management Plan

Prepared for

Los Angeles Department of Water and Power

May 2008

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Co-authored by

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and
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ACRONYMS AND ABBREVIATIONS

AOC	area of concern
APCO	Air Pollution Control Officer
DCM	dust control measure
DMU	drainage management unit
DPF	digital point frame
GBUAPCD	Great Basin Unified Air Pollution Control District
LADWP	Los Angeles Department of Water and Power
MV	managed vegetation
Plan	Managed Vegetation Operation and Management Plan
PMP	Performance Monitoring Plan
Site	managed vegetation Site
SOP	standard operating procedure

INTRODUCTION

Item 6 of the November 2006 Settlement Agreement between Great Basin Unified Air Pollution Control District (GBUAPCD) and the Los Angeles Department of Water and Power (LADWP) contains a provision requiring the development of a *Managed Vegetation Operation and Management Plan* (Plan; NewFields et al., 2008), as follows:

6. *The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:*

   A. *From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and*

   B. *After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and*

   C. *The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.*

During the 2003 through 2006 period, LADWP conducted the Managed Vegetation Effectiveness Monitoring Study (Study). Data gathered during this study forms the basis for assessments of dust control effectiveness at the existing managed vegetation site (Site). The study is described in greater detail in an evaluation of the control efficiency of the Site is provided in Air Sciences (2006). This explanation of the approach to the Plan (Approach) explains how the Site will be operated and managed in the future to meet or exceed the minimum cover requirements, and to address any areas that threaten to produce shoreline NAAQS exceedances. It is understood that if cover condition that achieved 99 percent control efficiency in the past are met or exceeded, then achievement of these goals will be very likely. The Plan itself (NewFields et al., 2008) describes how ongoing compliance with federal PM_{10} standards will be verified by GBUAPCD. The main elements of this approach are the following:

1. **Managing the Site.** The general Site management approach is described, but most of this section is devoted to areas that have required specific effort to establish and/or maintain. Over the past 5 years, the Site has been managed to maximize plant growth and cover, balancing the irrigation and drainage needs of diverse areas, often within a single, 40-acre block. The challenges encountered and successful management approaches developed, as well as the plant growth results achieved during this period are described.
2. **Verifying compliance with federal PM_{10} standards.** Aerometric and meteorological data will be collected at selected locations and analyzed to better focus operations and maintenance (O&M) activities. Areas with sparse vegetation have been reduced in number and scale since the first planting that covered about 80 percent of the Site with live saltgrass, and seasonal growth across the Site as a whole increases average vegetative cover. Risk of significant emissions is, therefore, declining. Nevertheless, remaining or newly sparse areas will be monitored and, if they pose a significant emissions risk, will be specially managed to reduce this risk.
3. **Verifying vegetative cover.** Cover will be measured annually on the Site. Results will be compared with specific criteria related to historical conditions that were related to 99 percent control efficiency for the Site. Criteria will be developed or applied with a margin of safety. This comparison and any new O&M actions to address problems will be submitted annually by

LADWP in the Performance Monitoring Plan, as provided for in Item 12 of the Settlement Agreement:

12. *The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.*

    A. *The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.*

    B. *The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.*

    C. *The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.*

This version of the Plan has been developed in response to review of vegetative cover estimates. These reviews and their impact on the Plan are summarized in NewFields (2008).

APPROACH TO SITE MANAGEMENT

The Site will be managed to meet or exceed target cover conditions, and address any areas identified as a threat to produce shoreline violations (see *Air Sciences 2007a and 2007b)*.

1.1 Historical Management Strategy Experience

The first 5 years of Site operation included intensive monitoring, extensive investment in facilities improvements, numerous research test plots, and a considerable replanting of problem areas (areas of concern, or AOCs) in 2004. The following brief summary of the progression of Site management strategies provides a backdrop against which the current management strategy has developed. More details of the intensive monitoring, observations, and management responses are available in the multiple annual monitoring reports and special investigation reports prepared by LADWP during the 2002 – 2007 period.

Figure 1 shows the first 5, now transitioning into 6 years of Site O&M. A few of the O&M activities that have been implemented each year are shown. As more is learned about

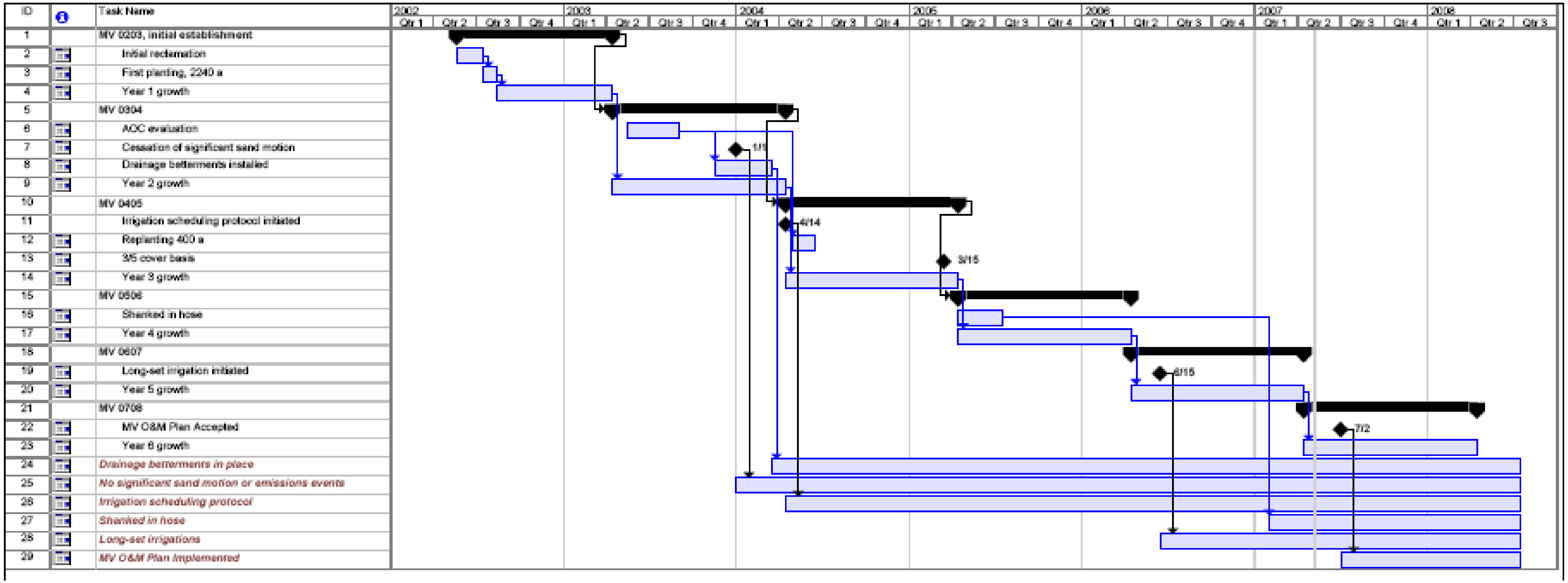

FIGURE 1
Managed Vegetation Site History. Tasks Shown in Maroon Coloring are Perpetual, Ongoing Benefits of One-time Facilities Betterments, Changes in Management, or Refined Regulatory Goals.

managed vegetation on Owens Lake in general, and about the Site in particular, O&M responses are developed to address specific challenges and to improve the Site's vegetative cover. Once implemented, benefits of improvements are generally there for the life of the Site. The accumulation of improvements (betterments and improved O&M) and the ongoing benefits generally improves the Site and reduces the risk that air quality violations will be caused by emissions from it. These ongoing benefits are shown in maroon font at the bottom of the schedule shown in Figure 1, beginning at the time that the improvement was first implemented, and continuing for as long as the Site is operated.

The following sections detail these and other improvements to Site facilities and O&M during past years of operation, again as an indication of the general approach to Site management that is anticipated for the future.

2002 – 2003 – Focus on Establishment and Growth

- After installing Site facilities and planting in the summer of 2002, management activities in 2002 and 2003 focused on irrigation for establishment and growth of as much area as possible.
- Management required irrigation within blocks to be balanced among drier and wetter areas, providing most of the young plants adequate, but not excessive, soil moisture to allow establishment.
- Growth and survivorship was compromised in multiple small areas (most of the AOCs, about 20 percent of the Site) in an effort to promote growth in the largest possible proportion of the Site.
- Initial mapping of AOCs was conducted primarily in areas that were too wet or too dry relative to the larger portions of blocks, and areas with localized problems related to drainage or offsite impacts (surface and subsurface flow into the area) were identified.
- Approximately 400 acres out of the 2,240-acre managed vegetation area were delineated as having poor establishment and targeted for replanting in the spring of 2004.
- Multiple management actions were taken to address facilities problems or other issues that were identified, including installation of 151 drainage system improvements to reduce site-specific drainage problems that led to many of the problem areas that required replanting.

2004 – Focus on Replant Establishment

- After the replanting effort in April 2004, the irrigation and drainage management strategy focused on careful attention to irrigation to support establishment of the plants in the replanted areas.
- Many of these replanted areas were the wetter portions of blocks within larger areas of established vegetation, again requiring a balance of wet areas with dry areas in the same blocks. However, now the established areas could tolerate more restricted irrigation because of their established root systems.
- Other replanted areas required high irrigation rates in generally dry blocks to establish replants.
- An irrigation scheduling protocol driven by field observations of the most sensitive areas, along with other irrigation system operating constraints, was developed and implemented. Generally, this led to more precise balancing of wetter and drier areas, taking advantage of the tolerance of more established vegetation to optimize irrigation management for more sensitive, newly replanted areas wherever possible.
- Close monitoring of the soil conditions in the DCA during 2004 further defined the need for focus of irrigation to coincide spring and fall saltgrass growing season.
- At the close of this season, all but about 11 of the initial 400 acres of AOCs had adequate plant populations from which to develop vegetative cover.

2005 – 2006 – Shift to Long-term Sustainability and Attention to Remaining Isolated Problem Areas

- With the bulk of the Site well established and expanding, and with most of the 2004 replanted areas established, operations in 2005 and 2006 shifted somewhat to more specific attention to smaller areas that continued to exhibit special needs.
- Continued careful monitoring of irrigation based on soil and historic wet areas in particular blocks served to refine generalized irrigation management strategies for particular blocks.
- The very wet winter preceding the 2005 growing season also provided an opportunity to observe how Site management must adjust to variable environmental factors such as high winter groundwater.
- An example of the diligent monitoring and adaptive management response during the 2005 growing season was the identification of discoloration and reduced vigor of vegetation in low areas of block T7-5A, a well-established block with greater than 50 percent cover. In response, an investigation was launched, and it was learned that the heavier-than-normal winter precipitation had raised the level of boron, chloride, and sulfate, as well as EC (bulk salinity) the root zone within low areas of block T7-5A. Irrigation applied at rates employed the previous season had not been adequate to re-reclaim the affected areas. However, when irrigation schedules were modified based on the results of the study, this block recovered by mid-season 2006.
- Other special project management actions taken in 2005 and 2006 in response to detailed monitoring observations included:
  - splitting irrigation control within blocks to better manage wet and dry portions
  - burying drip irrigation hoses in some blocks where the lines had been installed on the surface to respond to special establishment needs or installation challenges in those areas
  - implementing longer irrigation sets in 2006 to improve root zone leaching, especially in problem areas

1.2 Overall MV Operations Strategy

With this intensive effort and the knowledge gained from several years of operations, a reasonably stable protocol has been established for most of the Site. However, as expected for such a novel vegetated system in the unique, saline, and poorly drained lakebed environment, small areas within the Site still require special attention. In addition, new conditions may develop during ongoing operation (as occurs on any farm) that will require adaptive management. Accordingly, the Site O&M strategy requires:

1. Ongoing Site monitoring and O&M to support historical cover levels (applicable to the majority of the Site, see *Verification of Vegetative Cover* section)
2. Special monitoring and O&M actions to respond to problem areas and unusual conditions

The following sections detail the planned monitoring and management activities in these two categories (overall Site and problem areas).

1.3 Ongoing Management to Support Historical Cover Levels on the Overall Site

The majority of the Site will be managed to support adequate growth each year to maintain vegetative cover levels at target (historical) levels. Ongoing Site management encompasses a variety of activities to sustain the existing vegetation and grow new vegetation to replace the portion of previous years' growth that may have been decomposed or blown away. The management protocols for the well-established portions of the Site have been calibrated on a block-by-block basis to support continued health of the bulk of the vegetated areas within each block without negatively affecting areas within the block where cover needs to be increased.

Ongoing management activities will be conducted as described in the following sections, unless a specific condition requiring a different response is identified through the monitoring program. If a special condition is identified, the affected area will be delineated, and a special condition management response plan will be developed and implemented according to the protocol defined in the *Problem Area Management Response* section.

Ongoing Drainage System Operation

The drainage system for the Site will be operated year-round according to the standard protocols established during previous seasons. The Site's drainage system includes the drainage management units (DMUs) listed in Table 1.

The DMU pump stations are equipped with automatic level switches that cycle the DMU pumps on and off at set water levels. The appropriate level settings for each DMU have been identified over time to balance the need for low drainwater levels in the sump with pump cycling frequency. Operation of the drainage system will continue according to the following general guidance and in compliance with the established equipment-specific standard operating procedures (SOPs):

- DMUs will be operated year-round.
- DMU pump station levels will be kept at a level necessary to ensure DMU drainage function is not compromised by pump station water levels. Levels may be adjusted upward or downward according to other management needs, as long as such settings do not compromise DMU function.
- In the event of damaged or malfunctioning DMU pumps and supporting facilities, repairs will be made as quickly as practicable to restore proper function.
- DMUs will be periodically monitored for evidence of drain line or lateral clogging. Evidence of an impediment to flow will result in investigation and appropriate response to correct the problem.

TABLE 1
Drainage Management Units Serving the Managed Vegetation Area
Approach to the Managed Vegetation Operation and Management Plan

DMU	MV Blocks Served
41	T5-3B, 3C, 4B, 4C
42A	T5,-6B, 6C, 7B
51	T5-4D T6-4C
52	T5-5A, 5D, 6A, 6D T6-5B, 5C, 6B, 6C
53	T5-7A, 7D T6-7B, 7C
61	T6-4D T7-4C
62	T6-5A, 5Dn, 5Ds, 6A, 6D T7-5B, 5C, 6B, 6C
63	T6-7A, 7Dn, 7Ds T7-7B, 7C
71	T7-4An, 4As, 4D T8-3B, 4Bn, 4Bs
72	T7-5A, 5D, 6A

TABLE 1
Drainage Management Units Serving the Managed Vegetation Area
Approach to the Managed Vegetation Operation and Management Plan

DMU	MV Blocks Served
41	T5-3B, 3C, 4B, 4C
42A	T5,-6B, 6C, 7B T8-5B, 5C, 6B, 6C
73A	T7-6D, 6A, 7D T8-6CT7-6D, 6A, 7D
81A	T8-3A, 4A, 4D
82	T8-5A, 5D, 6A, 6D

Other factors that cannot be controlled by DMUs, such as soil hydraulic properties, may limit drainage function. These problems are discussed elsewhere.

Ongoing Irrigation Operation

The Site irrigation system will be operated during the growing season according to the standard protocols established over the previous operating seasons. Operation of the irrigation system will continue according to the following general guidance and in compliance with the established equipment-specific SOPs:

- The Site will be irrigated on a schedule balancing plant needs with field drainage capacity during the growing season, approximately April through October each year.
- Annual start-up and end-of-the-year shut-down times will be adjusted annually to account for temperature and precipitation conditions during the preceding year.
- At the beginning of each year, an anticipated irrigation schedule will be established for each block based on block-by-block experience of irrigation needs during previous years. This schedule will serve as a starting point for irrigation during the coming year, but will also be adjusted during the year based on field observation of plant growth and soil salinity, and on actual weather conditions (e.g., temperature, wind, and precipitation.).
- Routine operations and regular maintenance functions will be performed according to appropriate SOPs developed by LADWP based on manufacturer's guidelines and/or LADWP operations experience. These functions include:
- Automatic primary filter backflush as determined by filter pressure differential
- Manual secondary filter cleaning
- Repair of irrigation system leaks as observed
- The need for soil amendments, such as fertilizers, will be determined on an approximately annual basis. *Routine MV Site Condition Monitoring* (see below) or focused investigations form the basis to establish amendment needs.
- Protocol may be altered when and where necessary to support operational research.
- LADWP will inform GBUAPCD within 48 hours of any significant breach of this O&M protocol.

Routine MV Site Condition Monitoring

Irrigation operations staff will observe conditions in the field and take corrective action as part of normal duties. Observations to be noted include:

- Irrigation leaks or plugging, as evidenced by spraying water, standing water, or altered system flow rates.
- Areas of abnormal surface saturation or dry conditions that may indicate irrigation leaks or drip-tube clogging, or that may indicate a need for irrigation adjustment.
- Notable vegetation variation such as discoloration or unexpected levels of die-back.
- DMU and/or other drainage system malfunction as evidenced by conditions in sumps and fields.
- Turnout or control system malfunction, as evidenced by water quality or timing of irrigation.

Corrective actions may include making necessary repairs and/or notifying supervisor or Site manager. If immediate solutions or corrective actions are not obvious or routine, the supervisor or Site manager may initiate a special investigation, consult with off-site (vendor or specialist) personnel.

In addition to routine observations by field operations staff, regular dedicated monitoring will be conducted by one or more plant biology and/or agricultural specialist at approximately monthly intervals during the growing season. These monitoring observations will include assessment of:

- Plant health indicators, including discolorations, leaf curling, wilting, etc.
- General soil conditions such as moisture and salt crust
- Soil salinity monitoring at select locations to verify salinity levels in the acceptable range
- Other general site conditions such as:
  - Significant pest damage or populations
  - Exotic plant species
  - Recruitment of other native plant species

More detailed soil monitoring to track Site-wide soil conditions and to identify changes or trends in chemical and physical characteristics that are significant for plant growth. This more detailed monitoring will be conducted annually during the growing season and will include:

- Site-wide composite soil chemistry sampling to track levels of agronomic constituents
- Characterization of soils at select locations by description and sampling in test-pits to track soil physical conditions, root development and soil reclamation profiles in the upper 4 feet of soil. Test pit locations will be selected in consultation with the Site Manager to investigate areas that represent conditions of special operational interest.
- As directed by other monitoring efforts and LADWP operations staff, specific soil investigations or monitoring may be conducted to monitor operational trials or to investigate specific conditions or areas of concern.

Monitoring specialists will make recommendations regarding irrigation schedule, blending, fertilizer, amendment, drainage, or other appropriate adjustments, and will report to the designated LADWP operations staff before and after each visit. An annual report, summarizing field observations, block irrigation, soil monitoring, and associated recommendations will be prepared each of the next five years (2007 – 2011). Pertinent aspects of these reports will be cited in the PMP.

Problem Area Management Response

The general process for identification of and response to problem areas, and several examples of types of problem areas and responses, are described in this section. If a specific type of problem is not described here, but actually disrupts the Site in a manner that may threaten cover levels that provide needed levels of performance, then the general process will be applied to resolve the problem. The Site history (previous section) demonstrates how this has been done during the past 5 years to resolve the diverse issues that have already arisen for saltgrass trying to grow on Owens Lake.

Problem Area Identification and Response Process

If field monitoring of vegetation or soil identifies signs of possible problems, and a solution can be readily established, the solution will be applied. If the nature of the problem or an appropriate solution are not evident, then a **Problem Area Special Investigation** will be initiated to investigate the problem, identify likely causal factors, and develop a responsive action plan to correct the problem.

Signs of possible vegetation problems may include, but are not limited to unexpected:

- Downward trends in vegetative cover
- Expansion of a previously existing areas of sparse growth or plant stress
- Development of unique plant coloration
- Ponding in new areas or expansion of previously identified ponded areas
- General signs of reduced plant vigor

Upon identification of possible problems, the monitoring personnel noting the problem will notify the LADWP Operations Engineer. The Operation Engineer will assign a staff member (or team) to:

- Define and document the general nature and spatial extent of the suspected problem
- Assemble and review basic supporting information from operations (SCADA), performance monitoring, and field monitoring teams

If review of supporting information suggests that further study is needed, the Operations Engineer will:

- Identify additional specialized expertise needed to clarify the condition
- Assign a team to:
  - Define and conduct additional investigations, if needed
  - Develop corrective action plan options
  - Direct the Site Manager to implement corrective actions

In actual practice, the Site Manager and field staff understands the Site very well and may at times either investigate and solve problems, or seek outside consultation, informing the Operations Engineer of their activities. This type of initiative and ownership is one of the reasons that the Site is successful.

Possible Problems and Example Responses

A number of problems that can be associated with this Site, and with vegetating Owens Lake in general, have already been encountered, or may be anticipated given experience on and knowledge of existing Site conditions and facilities. A brief description of some of the more likely problems and example responses are provided here for illustrative purposes. These examples illustrate a general process: problem identification, investigation of causes, development of appropriate management response(s), implementation of management responses, monitoring of Site response to changed management, and feedback from monitoring if further refinement of management is indicated. This general approach notwithstanding, problems will be dealt with on a case-by-case basis, considering the actual symptoms and conditions, so that future responses may differ somewhat from these examples.

Intrusion of High-EC Groundwater into Plant Root Zone.

Periods of high precipitation, over irrigation, or poor drainage performance can lead to a rise of shallow groundwater into the plant root zone. Evidence suggests that this saline groundwater intrusion can be tolerated by saltgrass for short periods without long-term impacts, although plant growth and health may be temporally affected by even short-term exposure.

This is the suspected cause of a notable decline in plant health and cover in block T7-5A in 2005 compared to the previous year. In response, LADWP analyzed groundwater levels, irrigation history, and soil conditions (see Schmid/Inman TM, April 2006). The results of that investigation suggested that elevated shallow groundwater levels resulting from abnormally high rainfall in the winter of 2004-2005 had increased the salinity in the plant root zone of the block and immediately adjacent areas of some surrounding blocks. In response to recommendations from the investigation, irrigation amounts and durations to T7-5A and surrounding blocks were increased in 2006, and the block experienced a rebound in cover of approximately 10 percent in 2006. In this case, cover decline was identified and corrective action was successful in reversing the trend without cover levels dropping below 50 percent in the affected blocks (according to LADWP cover measurement estimates).

Surface Ponding.

As noted above and in supporting documents, variations in topography and soil hydraulic conductivity within single blocks requires balancing the irrigation supply to the block to adequately wet the higher or better draining areas without over irrigating or inundating the lower or poorer draining areas within the block. This is often a precarious balance, and rather small changes in root zone hydrologic balance caused by irrigation or precipitation events can cause surface ponding to develop. This surface ponding can lead to redistribution of resident salts, which can quickly affect plant health when salts move into previously reclaimed soil where plant roots reside and extract water and nutrients to support metabolism and growth.

Surface ponding has occurred in limited areas across the Site since start-up in 2002. Ponding was particularly pronounced in 2002 and 2003, when the management emphasis was on achieving rapid increases in cover over most of the Site. The extent of surface ponding has dropped dramatically during subsequent years as irrigation strategy has shifted away from quick establishment of the driest areas to ongoing maintenance of cover on the whole Site, with special attention to problem areas. This shift in strategy recognizes the ability of well-established vegetation to survive and expand with less-than-optimum water supply.

Multiple strategies have been implemented to respond to surface ponding conditions including:

- Installation of supplemental surface and “French drains” in 151 locations between 2003 and 2004 (in advance of the April 2004 replanting effort) to improve drainage in frequently ponded areas.
- Reduction of irrigation frequency or set lengths in numerous blocks to manage to the problem areas after vegetation was well established in drier areas of the block

Build-up of Salts.

Salt buildup could occur in areas where irrigation applications do not adequately leach salts from a reclaimed portion of the root zone. Causes of salt buildup could include inadequate local drainage, or low or excessive irrigation application rates, or sporadic irrigation. Any of these can cause water accumulation and evapo-concentration in the root zone. Ultimate sources of salts can be irrigation water and/or shallow groundwater. Subsurface drip irrigation is meant to provide adequate leaching in a zone along the drip line, while leaching native and applied salts outward to inter-row areas and downward to drains.

The reclaimed soil zone varies across the Site according to local soil/drainage conditions and the influence of block-wise irrigation strategies. Saltgrass roots and rhizomes are observed surviving in a wide range of soil salinity and physical conditions. Other native, salt-tolerant vegetation that might occur at the Site should behave in a similar manner, tolerating a wide range of Site conditions.

Regular and annual soil monitoring along drip irrigated rows provides information on areas that may exceed salinity thresholds and therefore may be experiencing salt accumulations. Likewise, annual soil test-pit salinity sampling helps to better understand the profile of salinity in the irrigated zone for different soil types.

When high salinity areas are detected, potential causes are assessed by reviewing irrigation rates, precipitation records, and block observations of ponding or drainage issues. Appropriate management actions are then selected and may include

- Altered irrigation rates
- Actions to improve local drainage (see "surface ponding" above), or
- Modification to irrigation durations (i.e. long sets as opposed to more frequent, short sets)
- Re-testing areas that do not show vegetative stress indicators or signs of plant die-back

These management actions have been successful in correcting or reducing high salinity areas in widely ranging soil conditions across the Site.

Onsite Sand Deposition

Where sand blown offsite is determined to cause permanent vegetative cover reduction or net decline in vegetative cover over time, corrective actions may be taken. Where the plant stand is irreversibly damaged (and this is rare), some replanting may be needed. Otherwise, conditions for plant stand regrowth and restoration of cover are optimized to the extent practicable. Where perimeter control of sand motion is pending implementation of a planned, adjacent dust control measure, this will be taken into account.

1.4 Approach to Verifying Vegetative Cover

This section discusses methods of vegetative cover measurement and develops baseline cover criteria against which Site conditions can be judged in the future. The intent is to employ actual Site conditions associated with successful control of sand motion in the past as a reference for judging whether the Site can successfully control sand motion in the future. No implementable cover criteria could guarantee that every portion of the Site would perform adequately under all imaginable future conditions. For this reason, forgoing sections of the Plan focused mainly on identification and management of "problem areas." This section, on the other hand, is intended to provide criteria for judging the adequacy of vegetative cover across *the entire Site.* However, in recognition of the still-developing understanding of how spatially variable vegetative cover works to control dust emissions, an extremely detailed spatial analysis of historical patterns of vegetative distribution have been employed and incorporated into cover criteria. This effectively prevents Site cover from degrading in a manner that could cause it to become much more emissive than it has been during past years.

Implementing either this portion, or the preceding sections of the Plan, could by themselves provide a Site that prevents significant PM_{10} emissions from the Site in the future. When all parts of the Plan are implemented together, they provide a robust, redundant program with a very substantial and desirable margin of safety.

An additional factor of safety is the accumulation of knowledge and gradual improvement in Site cover and management. As noted previously, the benefits of most improvements begin when the improvement is implemented, and continue thereafter, so that the benefits of all previously accumulated improvements are active at the Site at any time. This has the effect of gradually increasing Site reliability in controlling emissions.

Measuring and Reporting Management and Cover

Measurement of vegetative cover on the Site has been undertaken by GBUAPCD and LADWP using a variety of methods. Future cover measurement methods are discussed in NewFields (2007). It is the intent of this Plan that the method of cover measurement employed for judging compliance with the Plan should be identical to the method employed to develop criteria in the Plan, or should contain adjustments that adequately compensate for differences in methodology. This avoids confusion and challenges associated with comparison among existing cover standards and contemporary cover estimates based on different methods.

Vegetative Cover Thresholds

Cover on the Site developed over its five years of operation. Vegetation maps were developed from calibrated Quickbird images. Ground truthing for these calibrations, performed as part of the Study, was done by capturing low-altitude (6 feet high) digital images of the land surface (digital point frame, or DPF images), and then assessing vegetation cover by spectral analysis of each image. The consistent methodology was necessary to capture trends over time during the study.

After the Study was completed, GBUAPCD agreed to the use of DPF images analyzed by observing grid points on each image and taking the percentage of these points at which vegetation is observed as the percent cover (NewFields, 2008). To establish a reference cover measurement, areas that were not intended to be vegetated were identified and removed from consideration. These areas include primary roads and turnout facilities. Shifting of image registration among image capture events was taken into consideration so that, for example, roads will never be treated as vegetated areas, or vice-versa.

The vegetation map used to represent the Site reference cover was developed by calibrating the satellite image against ground truth results developed by the method agreed to with GBUAPCD, that is, counting of pins (grid points) on DPF images. The average vegetative cover levels in these calibrated images is somewhat higher than resulted from previous calibrations. The reasons for this difference, and the rationale supporting use of the agreed ground truth method, are explained in NewFields (2008). Cover distributions and criteria presented in this document are based on this agreed ground truth and calibration approach.

Figure 3 shows average vegetative cover results on site vegetation maps calibrated and validated with grid-point analyzed DPF images.

Cover level increased annually during the growing season, and declined annually by about 20 percentage points during the winter dormancy period. Fall cover levels increased from about 42 to 55% cover from fall 2004 to fall 2006, and then remained constant during the following year.

The observed levels of cover coincided with an extinction of significant sand motion by the beginning of 2004. Additional detail regarding Site performance in arresting sand motion and PM_{10} emissions is provided in Air Sciences (2006).

The baseline reference for cover criteria in this Plan are based on observations of the Site in November 2004, after a season during which no significant sand motion was observed on the Site, but during which the average level and distribution of cover on the Site gradually improved because of the Site’s age and aggressive management of both overall and site-specific vegetative cover (see *Approach to Site Management* section). Also, total cover measurements are most accurate during the November period, and at the beginning of the season during which cover is actually called upon to control emissions during the least stable season when most significant PM_{10} emissions events occur. The choice of this point in time as reference cover, then, incorporates a margin of safety, since inferior cover conditions during the 2003-2004 season had resulted in adequate performance.

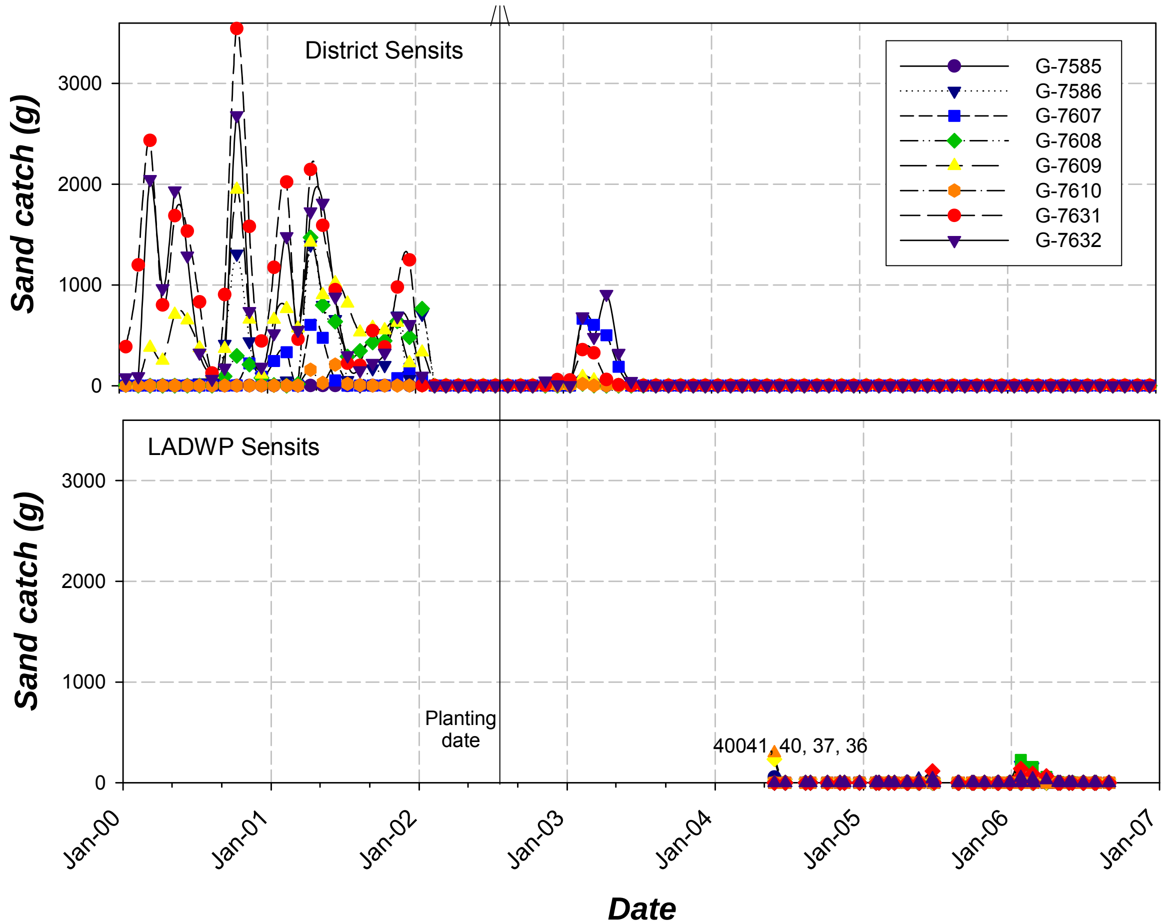

FIGURE 2
History of Sand Motion at the Site.

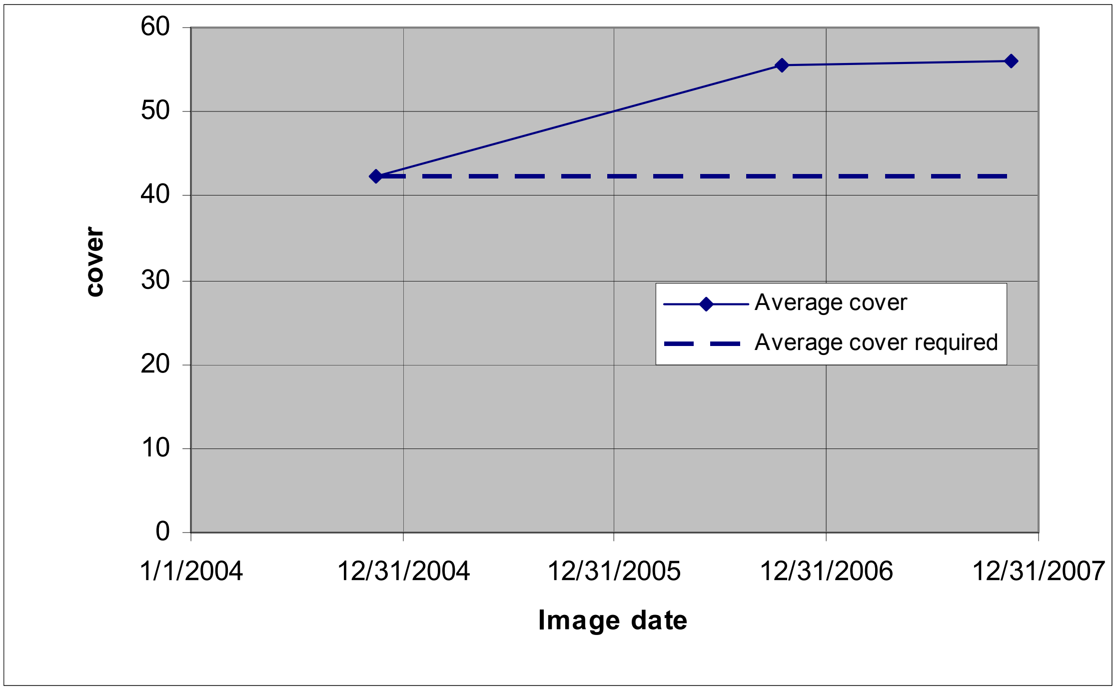

FIGURE 3
Fall cover for 2004, 2006, and 2007.

In Air Sciences (2006), it was shown that 99% control efficiency was achieved at between 11 and 20 percent vegetative cover on DPF images assessed by the spectral method. The average cover on the Site in November 2004 (according to a calibrated vegetation map based on spectrally interpreted DPF) was about 42%. However, several observations should be made to place the relationship between the control efficiency finding and average November 2004 cover:

- The control efficiency study (Air Sciences, 2006) employed spectral analysis of DPF images, while the proposed reference cover for the Managed Vegetation O&M Plan employs grid point observations of DPF. Where similar images have been calibrated by the two methods, average site-wide cover results were about 9 percentage points higher for calibration employing the grid-point observations.
- Air Sciences (2006) relates control efficiency to cover measured during each month. In the Managed Vegetation O&M Plan, fall cover will be evaluated as an indicator of site conditions during the following year, particularly during the ensuing winter and spring. Fall cover is about 10 percentage points higher than cover later in the potentially emissive winter-spring season
- The conservative (high) end of the control efficiency cover range is 20%, as indicated by spectral DPF. The ground truthing method now employed would likely attribute about 29% cover to such an area. Since measurements are to be taken in the fall, cover levels could fluctuate downward by up to 10 percentage points by springtime. Therefore, of 39% fall vegetative cover should result in maintenance of 29% or more cover throughout the winter season, which would approximate the highest level of cover that could be required for 99% control efficiency.
- This is another indication that a 42% site-wide average October-November cover requirement is appropriate, and perhaps conservative.

The Site is currently understood to control dust emissions as a unit. That is, a particular point within the Site, placed on open playa, might not achieve desired levels of control if pelted by saltating sand produced by surrounding uncontrolled playa. However, each point in the Site functions adequately within its actual context, surrounded as it is by other vegetated areas. The critical aspect of its surroundings (in terms a mathematically specific parameter describing distribution of cover) that allows each interdependent part to perform is currently unknown. However, this interdependence must be captured in these criteria. This is achieved by characterizing the actual spatial distribution of the successful Site, without preconception as to the specific aspects of the distribution that confer effectiveness.

The Site was subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grids (to 1, 10, and 100 acres). Cover distributions among these grid cells (average cover in each cell, and the distribution of those average values for each grid scale) were characterized. These distributions are shown in Figure 4.

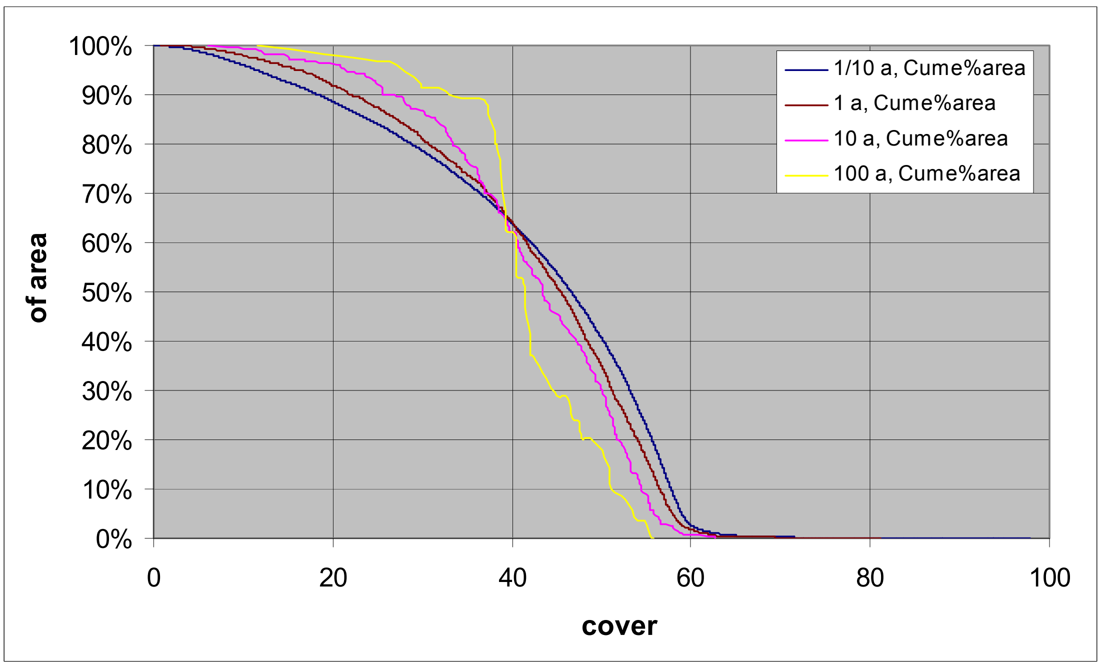

FIGURE 3
November 2004 Vegetative Cover Distributions in Grids at Four Scales Spanning Four Orders of Magnitude in Spatial Resolution.

A variance was then applied to each distribution to account for the fact that no future condition would likely match every point on a historical distribution perfectly. The lowest variances were applied to the lowest cover classes. The resulting criteria are shown relative to each of the four distributions in Table 2.

Vegetative cover at the Site is to be measured as described in NewFields (2007). As previously described, the Site has been subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grids (to 1, 10, and 100 acres). Cover distributions among these grid cells (average cover in each cell, and the distribution of those average values for each grid scale) will be characterized at any point in time. Cover thresholds in Table 2 will be adjusted for uncertainty of the vegetation map for that particular date (see discussion of map validation in NewFields [2007]), based on the cover map validation results. Adjustment of each threshold will be made as follows:

$$\text{Threshold}_{adj} = \text{Threshold}*(1\text{-AFB})/5) \quad \textbf{\textit{(1)}}$$

where *AFB* = half of the Absolute Fractional Bias (ranging from 0 to 1, with 1 indicating no error in the calibrated model prediction of vegetative cover at independent validation points), *Threshold* = any threshold from Table 2, and *Threshold****adj*** is the adjusted criterion against which vegetation measurements for the date and parameter in question would be evaluated.

TABLE 2
Site cover levels and thresholds. Percent cover was assessed according to NewFields (2007), with imaged calibrated to ground truth measurements per NewFields (2007 and 2008). The vegetation map from the November 2004 Quickbird image of the site was employed.
Approach to the Managed Vegetation Operation and Management Plan

Grid Scale	n	Average (cover)	5	10	20
			(of Site area)		
Measured Reference					
0.1	22,938	42	99	96	89
1	2,414	42	100	98	92
10	277	42	100	100	96
100	40	42	100	100	100
Minimum Thresholds[a]					
0.1		42	94	86	71
1		42	95	88	73
10		42	95	90	77
100		42	95	90	80
Thresholds Reference			(of measured reference)		
		100	95	90	80

[a]Note that in the measured reference condition, no 1- to 100-acre grid cells had <5 percent cover. The associated criteria are not intended to imply or to allow whole 10-acre or 100-acre grid cells to have < 5 percent cover. Rather, they are intended to allow for smaller grid cell fragments (e.g., at the site's edges) with this level of cover.

In future years, the Site will be evaluated relative to adjusted threshold cover levels. The status of the Site along with indicated management responses will be reported in the PMP.

CONCLUSION

The Plan contains the following assurances that Site effectiveness will be adequate in the future:

1. Site management is an active program to promote a general increase in cover and to further restrict areas of sparse coverage. Benefits of improved management and greater maturity to the Site are cumulative.
2. The Plan itself is an improvement to Site management, committing LADWP to actively manage problem areas.
3. Verification of compliance with federal PM_{10} standards actively identifies areas that could cause violations.
4. Cover thresholds are based on the end of the second season during which no significant sand motion was measured, and future cover levels must meet or exceed these thresholds.
5. The Site was effective while surrounded by uncontrolled playa. New control along the margins of the Site reduces the sand mass moving into Site margins.
6. This Plan is based on five years of Site management experience, the firmest foundation yet for a set of DCM performance specifications.

By all of these means, this Approach provides amply for maintenance of Site performance and the protection of human health.

ACKNOWLEDGEMENTS

Previous drafts and a final version of this document were prepared by CH2M HILL, Air Sciences, and Earthworks Restoration. This version is based largely on that work, and includes changes based on comments and suggestions from GBUAPCD and their consultants. The contributions of all team members are appreciated by the authors and LADWP, and were essential to the completion of this work.

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Air Sciences Inc. 2007a. Demonstration of 99% Control Efficiency for Managed Vegetation Dust Control Measure.

Air Sciences Inc. 2007b. Monitoring Of Hotspots Within The Managed Vegetation Area, Owens Lake Dust Mitigation Project.

NewFields. 2007. Methods Used for Verification of Vegetative Cover on the Managed Vegetation Dust Control Measure.

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NewFields. 2008. *Notes on the January 2008 Version of the Owens Lake Managed Vegetation Operation and Management Plan* (January 10, 2008 memo from John Dickey to File).

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

EXHIBIT 7

CONCEPTUAL TRANSITION AREA DUST CONTROL PLAN

Great Basin Unified Air Pollution Control District
Abatement Order 110317-01

EXHIBIT 7

Conceptual Dust Control Plan

The following Reasonable Precautions have been approved by the APCO pursuant to Rule 401A and shall be implemented by Respondent as reasonably necessary and feasible to mitigate PM10 emissions from the Transition Areas during construction:

1. Temporary sand fences shall be installed where feasible as soon as practicable without delaying project completion and shall be maintained as necessary until areas of Managed Vegetation have been established;
2. Water trucks shall be used as necessary and feasible during construction;
3. Tillage shall be implemented where soil conditions allow.
4. Construction activities shall cease during high wind events.

The Dust Control Plan shall be similar to the following plans previously approved by the APCO:

a. T1A-1 Sand Fence and Tillage Construction Dust Control Plan – September 23, 2010 from Clarence E. Martin to Ted Schade and Susan Young
b. Owens Lake Phase VII Construction Dust Control Plan – November 3, 2008 from William T. Van Wagoner to Theodore Schade

Great Basin Unified Air Pollution Control District

2013 Amendment to the Owens Valley PM_{10} SIP

Board Order 130916-01

Exhibit 4: Phase 7a and Keeler Dunes Settlement Terms dated June 25, 2013 (“Terms Sheet”)

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

AND

LOS ANGELES DEPARTMENT OF WATER AND POWER

PHASE 7a AND KEELER DUNES

SETTLEMENT TERMS

JUNE 25, 2013

The following constitutes the Settlement Terms (the "Terms") for the Phase 7a Stipulated Order for Abatement (SOA) and Keeler Dunes issues between the Great Basin Governing Board (GB) and the Los Angeles Department of Water and Power (LADWP):

I. MODIFICATION OF SOA

A. <u>GB and LADWP agree that GB shall modify the Phase 7a SOA to do the following</u>:

1. Deadline Extensions

   a) Existing December 31, 2013 deadline for all infrastructure for BACM and compliant operation (other than Managed Vegetation Compliance) to be installed and fully operational extended to December 31, 2015.

   b) Existing December 31, 2015 deadline for Managed Vegetation Controls (fully compliant managed vegetation cover) extended to December 31, 2017.

2. Assumptions for Extension of Deadlines

   a) Timely Availability of necessary leases from State Lands and of necessary permits from other agencies

b) Acceptance by GB of 328 acres of Eligible Cultural Resource (ECR) areas. ECR areas are defined as California Register of Historical Resources (CRHR)-eligible areas plus necessary buffer areas and are to be removed from Phase 7a and placed into Phase 7b (see below) and potentially the subject of a new future Board order. A confidential map of the existing 328-acre ECR areas shall be attached to the amended SOA.

c) Force majeure process of original SOA to be followed for newly discovered potential ECRs.

B. <u>Creation of Phase 7b</u>

1. Phase 7b would be created for the treatment of the 328 acres of ECR areas plus any newly discovered cultural resources within Phase 7a that are determined by LADWP's state certified archaeologist to be CRHR-eligible and necessary buffer areas (the "Additional Phase 7b Areas") and whose determination is confirmed by a second, state certified archaeologist mutually agreeable to GB, LADWP and State Lands (the "Second Archaeologist").

2. Initially Phase 7b would include 328 acres of previously identified ECR areas from Phase 7a (the "Initial Phase 7b Areas").

3. Any areas in Phase 7a (beyond the Initial Phase 7b Areas) where ECRs are located during Phase 7a construction shall be handled as part of Phase 7b (the "Additional Phase 7b Areas"). Promptly upon discovery of any cultural resources during the Phase 7a construction process, LADWP shall promptly notify GB of, and confer with GB about, such discovery, and LADWP's state certified archeologist shall fulfill their legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the

CRHR eligible areas; such evaluations shall be confirmed by the Second Archaeologist. Newly identified CRHR eligible areas and necessary buffer areas shall become ECR areas and become part of the Additional Phase 7b Areas.

4. Cultural Resource Task Force

   a) The amended SOA will establish a Cultural Resource Task Force (CRTF). The CRTF will be an advisory group consisting of LADWP, GB, State Lands, State Historical Preservation Office, and Local Tribal Representatives. The CRTF shall be able to draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the reasonable costs of the CRTF, including reimbursements for travel expenses of CRTF members.

   b) The CRTF will initially be charged to make recommendations to GB and LADWP as to the best course of action and timing for the treatment of the Initial Phase 7b Areas. Such treatment could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. The CRTF will make non-binding recommendations to the GB Governing Board and LADWP regarding treatment of the Initial Phase 7b Areas on or before December 31, 2014. LADWP and GB shall commit to form the CRTF and host its initial meeting within ninety (90) days after the effective date of the amended SOA.

   c) The CRTF shall also make non-binding recommendations to GB and LADWP with respect to the treatment of ECRs that may become part of the Additional Phase 7b Areas. After making its recommendations for the Initial Phase 7b Areas, the CRTF shall remain in existence to make recommendations for any Additional Phase 7b Areas that may be designated ECRs by LADWP's state certified archaeologist and confirmed by the Second Archaeologist.

d) If after considering the non-binding recommendations of the CRTF, GB exercises its discretion to order LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, GB will issue a new Board order or orders after receiving input from LADWP and will determine if any SIP amendment is necessary. The new Board order or orders shall include control completion deadlines that take into account project circumstances, including but not limited to, recovery and additional environmental work necessary to complete the project at issue. The new Board order or orders shall recognize that the construction period shall be subject to all time-extensions-for-cause provisions of Paragraphs 5 and 6 of the SOA.

e) Like the SOA for Phase 7a, any future order or orders issued by GB pertaining to Phase 7b will give due consideration to the shared goals of GB and LADWP to control air pollution and decrease the use of water for dust control at Owens Lake. In making its recommendations, the CRTF will also give due consideration to GB's and LADWP's shared water saving and air pollution control goals.

f) The CRTF will be advisory in nature only, and GB and LADWP will retain final determination as to the treatment of ECR areas. GB reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order.

g) Permanent avoidance of any portion of the Phase 7b Areas will be considered by GB, which, upon approval, shall amend the 2008 SIP and Board Order 080128-01 in order to get USEPA approval.

C. <u>No Fines</u>

1. GB shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any areas of Phase 7a, provided that the Phase 7a dust controls are put into place within the time frames set forth in Section I.A.1.

2. GB shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the SOA and this agreement.

D. Modification of SOA

1. The amended SOA shall clarify that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be included in the SOA's existing time-extensions-for-cause, as set forth in SOA Paragraphs 5 and 6.

2. The amended SOA shall reiterate that GB and LADWP shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.

3. The amended SOA shall state that the modification of the SOA by GB and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in the amended SOA and the Keeler and Other Dunes Release".[1]

4. The effective date of the amended SOA shall be the date upon which the necessary decision makers of the City of Los Angeles and the GB Governing Board agree to enter into this agreement to modify the SOA.

E. Clarification on BACM

1. GB hereby approves Reduced Thickness Gravel BACM (2 inches of gravel with geotextile fabric underlay).

[1] LADWP disputes the legality of and does not agree to the Supplemental Control Requirements Determination (SCRD) process. GB asserts that LADWP agreed to the SCRD process in the original Phase 7a SOA and elsewhere, and the SCRD process is now the law. GB and LADWP have a continuing disagreement on this point.

2. GB hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. GB and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. “Brine Pool” is defined as those areas below elevation 3,553.55 feet.

3. GB will commit to work with the LADWP on an accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the effective date of the amended SOA, GB and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. Said schedules will include consideration for BACM approval of these candidate measures by the GB Board within one year of completion of the schedules (within 13 months of the effective date of the amended SOA). If the accelerated testing does not result in approved BACM designation for the candidate measures, LADWP and the GB Board will jointly assess why the accelerated testing did not result in BACM approvals. GB and LADWP also will commit to work on accelerated testing schedules and BACM approvals for other forms of BACM.

4. GB will memorialize its approvals set forth in Sections I E. (1) and (2) and any future approvals pursuant to Section I E. (3) in formal GB board resolutions and orders. GB and LADWP will jointly appeal to State Lands to approve use of new BACMs promptly upon their approval by GB and, with respect to the approvals set forth in Sections I E. (1) and (2) within 90 days of the effective date of the amended SOA.

II. KEELER DUNES

A. Keeler Dunes Dust Control Project

1. LADWP shall provide $10 Million to GB as a public benefit contribution to and will support GB's "Keeler Project" (as defined herein below) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the $10 Million in a single payment to GB within 90 days after the effective date of the amended SOA and the following two actions are completed: 1) delivery to LADWP of the "Keeler and Other Dunes Release" (defined herein below) and 2) the submittal to the California Air Resources Board (CARB) as described in Paragraph II.B.1.c., below. The "Keeler and Other Dunes Release" shall not be effective until GB receives the $10 Million payment.

2. GB shall use the funds for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly related activities for a dust emission control project at Keeler Dunes (the "Keeler Project"). No funds shall be used for the purpose of attorney fees, public affairs or governmental relations (collectively, "Public Affairs") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and BLM. GB shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.

3. Upon delivery of the "Keeler and Other Dunes Release" (defined herein below) and the SIP and Board Order 080128-01 amendment submittal to the CARB as described in Paragraph II.B.1.c., below, LADWP will immediately provide GB with access to its property in the Keeler Dunes area in order to complete environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler

Project. So long as such access is provided by LADWP, GB shall indemnify in perpetuity, defend and hold LADWP (and the City of LA) harmless for personal injuries caused by the negligence or willful misconduct of GB with respect to all activities undertaken by GB and its employees, agents and contractors on LADWP's property and GB shall promptly repair any damage to LADWP's property caused by GB's activities on LADWP's property except that GB shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by GB on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

4. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit GB's books and records on an annual basis to verify that the $10 Million contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with the amended SOA, the amended SIP, the Keeler and Other Dunes Release and any other document memorializing the Terms, and for no other purpose. GB shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

B. Release of LADWP/LA City for Keeler and Other Dunes Areas

1. Upon the effective date of the amended SOA, GB shall deliver to LADWP a release (the "Keeler and Other Dunes Areas Release") as follows:

   a) Release for Keeler Dunes:
   GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of Keeler Dunes owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement

action by any other agency against LADWP related to dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached and incorporated into this agreement.

b) Release for Swansea and Olancha Dunes (collectively these dunes are defined as the Other Dunes Areas):

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake, including but not limited to portions of such dunes that may be owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement action by any other agency against LADWP related to dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake. This agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas in the vicinity of Owens Lake are attached and incorporated into this agreement.

c) SIP and Board Order Amendment:
Great Basin shall amend the SIP and Board Order 080128-01consistent with the terms of this agreement and the "Keeler and Other Dunes Areas Release" and shall request the USEPA and CARB to approve the amended SIP.

2. LADWP reserves the right to contest and defend any alleged violations not covered by the releases herein, including but not limited to the right to contest and defend any alleged violations of Rule 401, or alleged violations of H&S 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler

Dunes and Other Dunes Areas. GB reserves the right to assert that any such defenses are barred or otherwise not legally supported.

3. After the date of this agreement, GB shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

III. GENERAL SETTLEMENT CONDITIONS

A. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to final approval by LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles.

B. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to approval of GB Board and shall be memorialized in GB Board modification of SOA and appropriate GB resolutions, the 2008 SIP, if required, and Board orders.

C. GB and LADWP shall memorialize the Terms in formal settlement documents, including the amended SOA, the Keeler Release and the Other Dunes Area Release, within 30 days after approval of the Terms by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles. Prior to such approvals and until such time that public disclosure is mandated by law, GB and LADWP shall not disclose the Terms or the existence and content of the SOA Mediation and shall keep the Terms confidential.

D. Once the Terms are fully approved by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles, GB and LADWP shall issue a joint press release to announce the successful conclusion of the SOA Mediation, the Terms, the amended SOA and the Keeler Release.

E. The parties to the SOA Mediation shall each execute a copy of this document to evidence that it contains the final and complete statement of the Terms resulting from the SOA Mediation that will be submitted for approval to the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles and to the GB Board.

F. Prior to the public announcement of this Agreement, LADWP and GB will develop a mutually agreeable joint communication, which announces and explains this Agreement. The Parties agree not to disclose or divulge the content and substance of the Settlement Terms to any third parties, including, but not limited to members of the press or media, unless and until LADWP and the District have approved a final settlement. The confidentiality requirements do not extend to the undersigned participants' discussions with their respective party's legal counsel and governing boards, regarding the settlement meetings.

In witness thereof, the parties hereto have set their hands to this agreement on June 27, 2013.

Great Basin Unified Air Pollution Control District	Los Angeles Department of Water and Power
By: ______________________________	By: ______________________________
Name: ___________________________	Name: ___________________________
Title: ____________________________	Title: ____________________________
Date: ____________________________	Date: ____________________________

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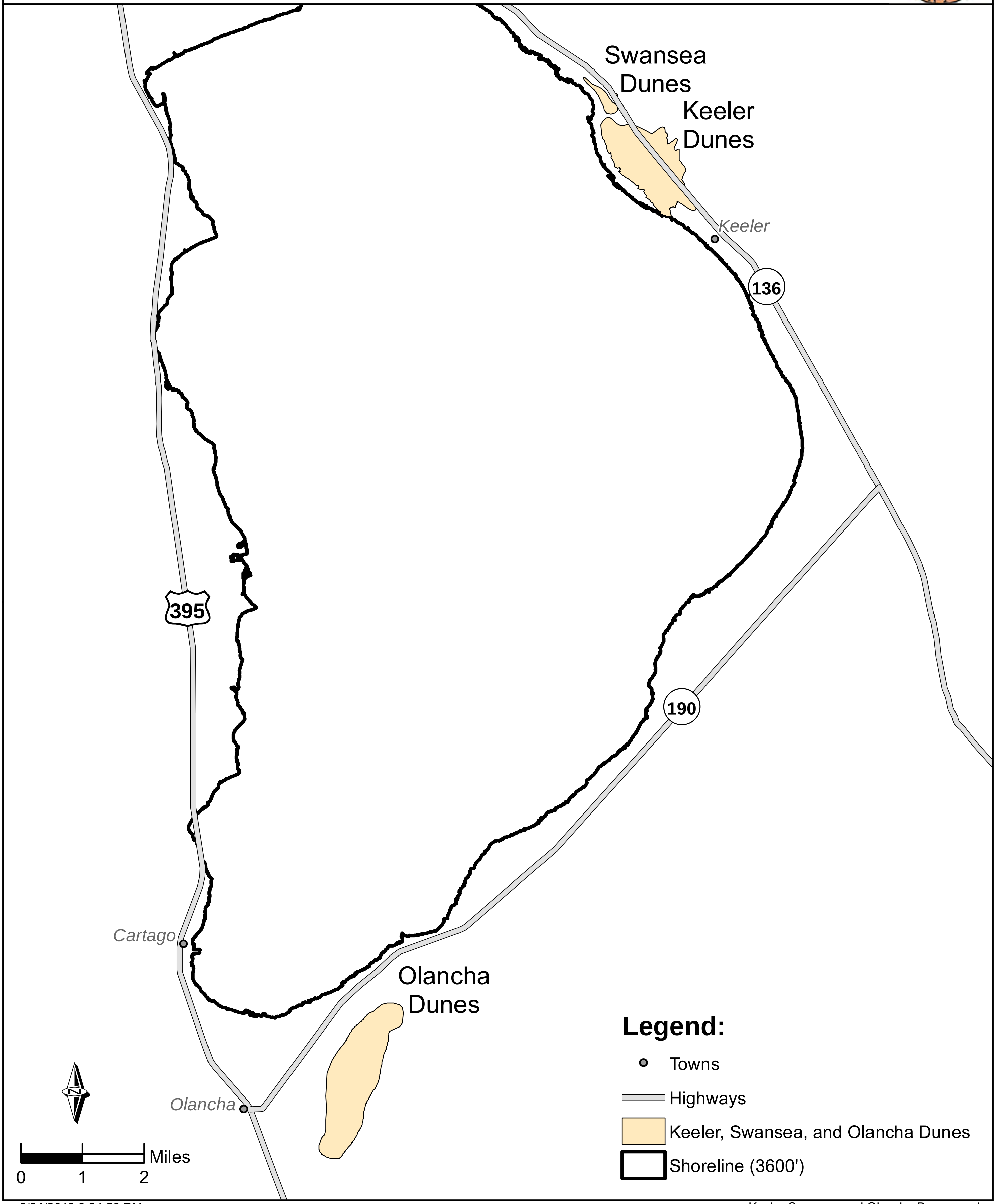
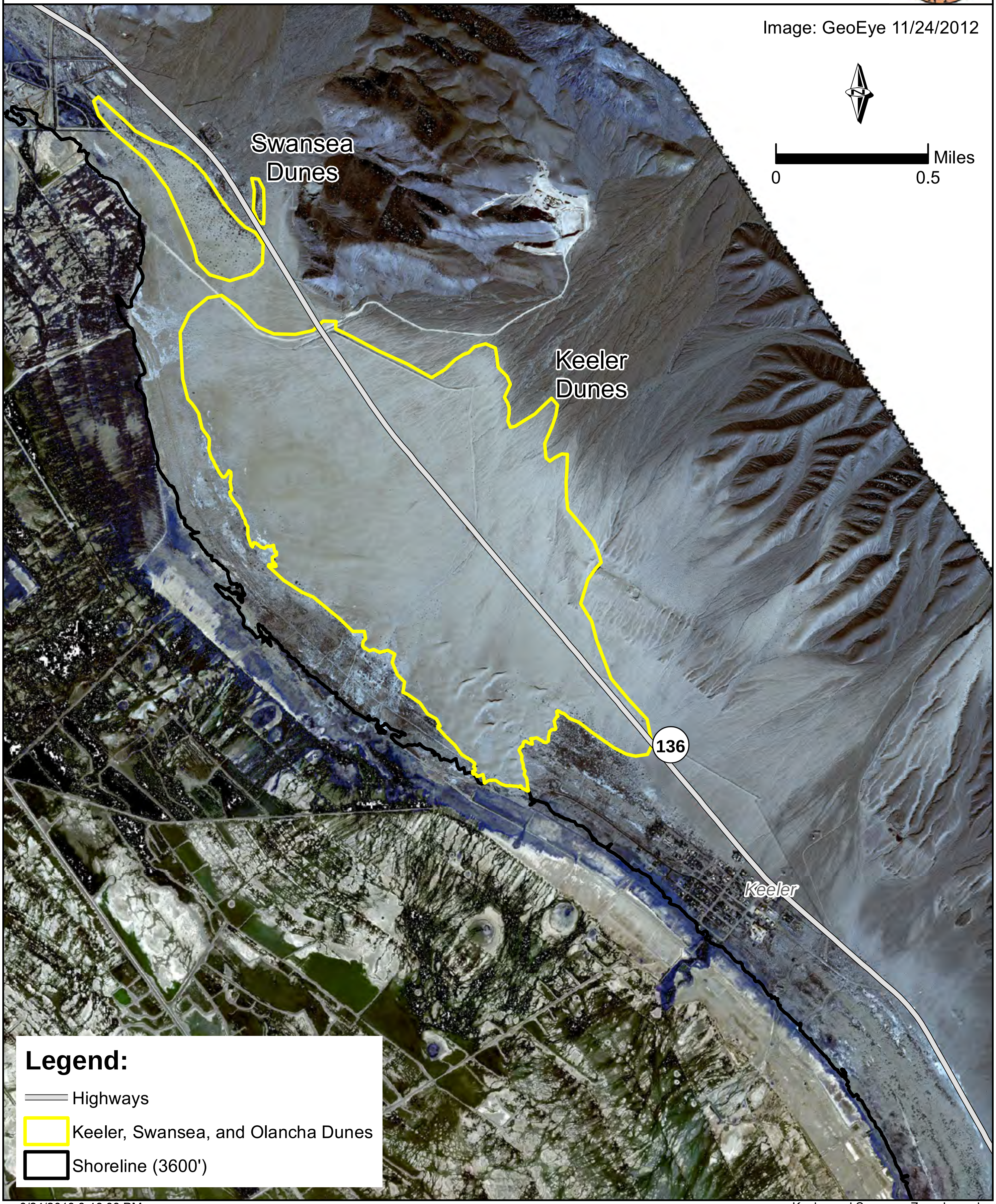
Great Basin Unified Air Pollution Control District

Keeler, Swansea, and Olancha Dunes



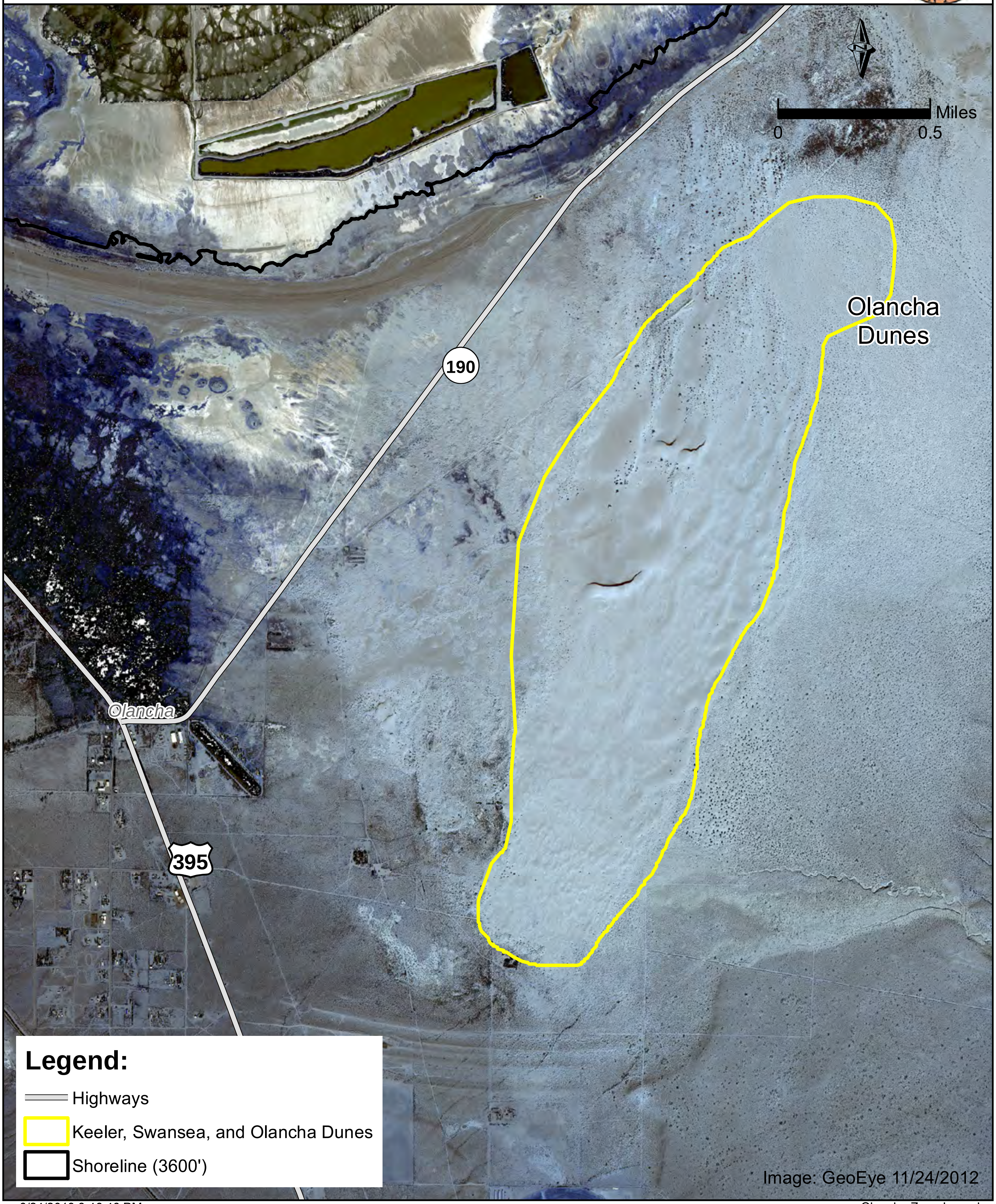
Great Basin Unified Air Pollution Control District

Keeler and Swansea Dunes - Detail



Great Basin Unified Air Pollution Control District

Olancha Dunes - Detail



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Great Basin Unified Air Pollution Control District

2013 Amendment to the Owens Valley PM_{10} SIP

Board Order 130916-01

Exhibit 5: Settlement Agreement and Release between the Great Basin Unified Air Pollution Control District and City of Los Angeles Acting by and through its Department of Water and Power Concerning Modification to Phase 7a Stipulated Order for Abatement No. 110317-01, dated August 13, 2013

SETTLEMENT AGREEMENT AND RELEASE BETWEEN THE GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT AND CITY OF LOS ANGELES ACTING BY AND THROUGH ITS DEPARTMENT OF WATER AND POWER CONCERNING MODIFICATION TO PHASE 7A STIPULATED ORDER FOR ABATEMENT NO. 110317 AND KEELER DUNES PROJECT

August 19, 2013

THIS SETTLEMENT AGREEMENT AND RELEASE ("**Agreement**") is entered into on this 19th day of August, 2013, by and between the **Great Basin Unified Air Pollution Control District**, an agency organized pursuant to Division 16, Part 3, Chapter 3 of the California Health and Safety Code ("**District**"), on one hand, and the **City of Los Angeles acting by and through its Department of Water and Power** ("**LADWP**"), a municipal corporation organized under the Los Angeles City Charter and the Constitution and laws of the State of California, on the other hand. The District and LADWP may be referred to herein individually as "**Party**" or collectively as the "**Parties**."

WHEREAS, on March 17, 2011, the District Governing Board issued Stipulated Order for Abatement, Order No. 110317-01 ("**Original Abatement Order**"). The Original Abatement Order requires LADWP to construct a dust control project, known as Phase 7a, on approximately 3.1 square miles of the Owens Lakebed, which includes six Dust Control Areas ("**DCAs**"), T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1 ("**Phase 7a areas**"). The Original Abatement Order allows LADWP to transition approximately 3.0 square miles of existing dust control areas ("**Transition Areas**"). These areas are identified in Exhibit 4 of the Original Abatement Order.

WHEREAS, the Original Abatement Order requires LADWP to install Best Available Control Measures ("**BACM**") in DCAs T37-1, T37-2, T1A-3, T1A-4 and T-32-1 and provides for LADWP to change BACM in the Transition Areas to conserve water, by no later than December 31, 2013, and to install BACM in the T12-1 tillage test area by May 1, 2016. (*See also* Governing Board Order No. 120206-07.) Under the Original Abatement Order, all Phase 7a Areas and Transition Areas controlled by Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover by December 31, 2015. Installation of BACM on the Phase 7a DCAs and Transition Areas entails ground disturbing activities such as grading, planting, dirt moving, boring, trenching and road, berm, pipeline and other construction.

WHEREAS, LADWP was required under District Governing Board Order No. 080128-01 ("**Board Order 080128-01**"), the enforcement Board order for the 2008 Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan ("**2008 SIP**"), to conduct environmental review for the Phase 7a project in compliance with the California Environmental Quality Act ("**CEQA**"). LADWP unexpectedly discovered significant cultural and archaeological resources in the Phase 7a area during the CEQA process that required LADWP to undertake additional investigations under CEQA and to comply with mitigation measures included in the District supplemental environmental impact report for the 2008 SIP ("**SEIR**"), both of which resulted in unanticipated CEQA and project design and construction delays that LADWP determined are outside of its control.

WHEREAS, LADWP released the draft Phase 7a EIR for public review and comment in January 2013 for a 45 day public comment period. LADWP staff considered and responded to public comments, conducted further consultations with Native American groups and others about project impacts and comments on the draft EIR, and revised the draft EIR, as necessary, to incorporate any changes to the project. Alternatives were identified in the EIR that would avoid impacts to cultural resources by excluding California Register of Historic Resources ("**CRHR**")-eligible areas from the Phase 7a project, including the Avoidance Alternative, which involved construction of the originally proposed Phase 7a project, except for 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 known to contain significant cultural resources.

WHEREAS, on June 4, 2013, LADWP's Board of Water and Power Commissioners considered and certified the final Phase 7a EIR and approved the Avoidance Alternative for the Phase 7a project, subject to and contingent upon the District Governing Board's approval of a petition to modify the Original Abatement Order to remove these 350 acres from the original Phase 7a area, and to make any other additional changes necessary to ensure consistency between the Original Abatement Order, the Phase 7a project and the Final EIR, including, but not limited to, obtaining extensions of time for completing the Phase 7a project necessitated by the unexpected discovery of significant cultural resources in the Phase 7a areas.

WHEREAS, paragraph 5 of the Original Abatement Order outlines circumstances that allow LADWP to seek an extension of time to comply with the Original Abatement Order, without penalty, when it is acting in good faith to comply with the terms of the Original Abatement Order but is impeded by circumstances beyond its control. In compliance with the Original Abatement Order, LADWP's Board of Water and Power Commissioners adopted three resolutions on February 7, 2012 (Resolution No. 012-170), April 3, 2012 (Resolution No. 012-210), and January 11, 2013 (Resolution No. 013-157), finding that LADWP has acted in good faith to comply with the Original Abatement Order, but has been impeded by the unexpected discovery of significant cultural resources in the Phase 7a areas. In compliance with paragraph 6 of the Original Abatement Order, LADWP notified the District's Air Pollution Control Officer ("**APCO**") of each resolution and proposed schedules of increments of progress. The APCO objected to LADWP's Resolution No. 013-157 on February 4, 2013. Pursuant to paragraph 5 of the Original Abatement Order, LADWP requested a meeting with District Governing Board members to attempt to resolve the dispute.

WHEREAS, designated members of the LADWP and District Boards have engaged in several meetings ("**Settlement Meetings**") in April, May and June 2013 to resolve the dispute related to the Original Abatement Order. During the Settlement Meetings, the Parties also attempted to resolve a separate dispute related to the development and origin of the Keeler Dunes and a possible future District order requiring control of emissions at the Keeler Dunes. The District Governing Board has not made any findings or issued any order concluding that the Keeler Dunes are anthropogenic in nature and/or caused by LADWP's activities in the production, diversion, storage, or conveyance of water. The District Governing Board has not made any findings or issued any order concluding that LADWP is liable for, or that LADWP's activities in the production, diversion, storage, or conveyance of water has caused or contributed to any violations of state or federal air quality standards in the Keeler Dunes or other dunes areas, including the Swansea and Olancha Dunes, in the vicinity of Owens Lake.

WHEREAS, the Settlement Meetings resulted in an agreement on settlement terms dated June 17, 2013 ("**Term Sheet**") that was approved by LADWP's Water and Power Commissioners on June 26, 2013, and the District's Governing Board on June 27, 2013, and are memorialized in this Agreement. This Agreement does not result in any waiver by the District or LADWP of arguments raised in other proceedings or disputed issues that are not covered under this Agreement, including but not limited to the District's Supplemental Control Requirements Determination ("**SCRD**") process, SB 270 budgets, and fees.

For good and valuable consideration, the Parties agree as follows:

I. **PHASE 7a DUST CONTROLS**. [*Corresponds to Term Sheet section I.A.*] The District Governing Board shall approve a modification to the Original Abatement Order ("**Modified Abatement Order**") that reflects the following terms:

a. **Deadline Extensions**. [*Corresponds to Term Sheet sections I.A.1.-I.A.2.*]

i. The deadline for LADWP to construct all infrastructure and install fully-compliant BACM in the Phase 7a areas and Transition Areas, except for those areas controlled by Managed Vegetation BACM, as set forth in paragraphs 1 and 4(a) of the Original Abatement Order, shall be extended from December 31, 2013, to December 31, 2015. All infrastructure and plant materials for Managed Vegetation BACM will be installed by December 31, 2015.

ii. The deadline to achieve fully-compliant BACM vegetation cover for areas controlled by Managed Vegetation BACM in the Phase 7a areas and Transition Areas, as set forth in paragraphs 1 and 4(a) of the Original Abatement Order, shall be extended from December 31, 2015, to December 31, 2017.

iii. The extensions of the deadlines set forth in section I(a)(i)-(ii) shall be contingent upon all of the following:

(1) LADWP timely receiving from California State Lands Commission ("**CSLC**") and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM within the deadlines required by the Modified Abatement Order.

(2) The timely removal from the Original Abatement Order of all CRHR-eligible areas plus necessary buffer areas, referred to as the "Eligible Cultural Resource ("**ECR**") areas." The ECR areas initially consist of 328 acres of the Phase 7a areas

identified in Exhibit 1 (the "**Initial Phase 7b Areas**"), which is incorporated into this Agreement. Because Exhibit 1 identifies the locations of cultural resources, it is confidential and shall not be made publically available. The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas are considered part of Phase 7b, as set forth in section I(b)(i) below. A confidential map of the initial 328-acre ECR area shall be attached to the Modified Abatement Order.

(3) The Original Abatement Order being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas is considered a condition of force majeure under paragraph 5(d) of the Original Abatement Order.

iv. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of the Original Abatement Order, as modified by the Modified Abatement Order, and paragraphs 6 and 22 of the Original Abatement Order, which shall not be unreasonably denied by the District.

b. **Creation of Phase 7b**. [*Corresponds to Term Sheet sections I.B.1.-I.B.3., I.D.1*]

i. Phase 7b shall consist of the Initial 328 acres of Phase 7b Areas and any other areas in Phase 7a that LADWP's state-certified archaeologist has determined, and which are confirmed by a second, state-certified archaeologist mutually agreeable to the District, LADWP and CSLC (the "**Second Archaeologist**") to be CRHR-eligible and necessary buffer areas (the "**Additional Phase 7b Areas**"). The difference between the 328 acres defined in this Agreement as the Initial Phase 7b areas, and the 350 acres identified in the Avoidance Alternative in the Phase 7a EIR, will also be subject to the Phase 7b process, if necessary, as described in this Agreement. The Additional Phase 7b Areas are not limited to the 350 acres described in the Avoidance Alternative in the Phase 7a EIR. All areas in Phase 7b shall be considered removed from the Original Abatement Order.

ii. LADWP shall promptly notify and confer with the District if any cultural resources are discovered during the construction of Phase 7a. The discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be subject to the procedure set forth in paragraph 5 of the Original Abatement Order, as modified by the Modified Abatement Order, and paragraph 6 of the Original Abatement Order. Upon the discovery of the cultural resources, LADWP will request that its state-certified archeologist fulfill his or her legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state-certified archaeologist shall be responsible for evaluating whether any of the newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, define the additional buffer areas necessary to address disturbance of the CRHR-eligible areas. LADWP's state-certified archeologist's recommendations shall be reviewed by the Second Archaeologist. If confirmed by the Second Archaeologist, the newly identified CRHR-eligible areas and necessary buffer areas shall become ECR areas that are withdrawn from the Original Abatement Order and included in Phase 7b.

c. Cultural Resource Task Force ("**CRTF**") [*Corresponds to Term Sheet sections I.B.4*]

   i. LADWP and District commit to form the CRTF and host its initial meeting within ninety (90) days after the Effective Date of the Modified Order. The CRTF will be an advisory group consisting of representatives from LADWP, the District, CSLC, State Historical Preservation Office, and Local Tribal Representatives. The CRTF may draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the CRTF's reasonable costs, including reimbursing CRTF members for reasonable travel expenses. The CRTF shall exist to make recommendations for the Initial Phase 7b Areas and any Additional Phase 7b Areas.

   ii. The CRTF will be advisory in nature only, and the District and LADWP will each retain its final decision-making authority as to the treatment of ECR areas. The District reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order or orders.

   iii. The CRTF will initially make non-binding recommendations to the District Governing Board and LADWP on or before December 31, 2014, as to the best course of action and timing for the treatment of the Initial Phase 7b Areas, which could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery, or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. In making its recommendations, the CRTF shall give due consideration to the District's and LADWP's shared water saving and air pollution control goals.

   iv. The CRTF shall also make non-binding recommendations to the District Governing Board and LADWP with respect to the treatment of the Additional Phase 7b Areas. In making its recommendations, the CRTF shall give due consideration to the District's and LADWP's shared water saving and air pollution control goals.

   v. If, after considering the CRTF's non-binding recommendations and input from LADWP, the District Governing Board exercises its discretion and orders LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances, including but not limited to, the time to complete a Phase III cultural resources recovery and perform additional environmental work required under CEQA to approve the new project. The new Board order or orders shall incorporate the provisions in paragraph 5 of the Original Abatement Order as amended by section I(a) and the Modified Abatement Order. In issuing the new Board order or orders, the District Governing Board will determine if any amendment to the 2008 SIP is necessary. LADWP is not waiving its right to contest the new Board order or orders.

vi. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake.

d. **No Fines Imposed**. [*Corresponds to Term Sheet sections I.C.1.-I.C.2.*]

i. The District shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any Phase 7a areas if LADWP constructs the dust controls in the Phase 7a areas within the modified time frames set forth in sections I(a)(i)-(ii), or any modified time frames resulting from sections I(a)(iii)-(iv).

ii. The District shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the Original Abatement Order, this Agreement, and the Modified Abatement Order.

e. **Other Abatement Order Modifications**. [*Corresponds to Term Sheet sections I.D.2.-I.D.4.*]

i. The Modified Abatement Order shall reiterate that the District and LADWP shall make every effort to develop, approve and deploy high-confidence, waterless dust control measures in all areas where dust controls are ordered on Owens Lake.

ii. The Modified Abatement Order shall state that the District's and LADWP's agreement to modify the Original Abatement Order shall not be construed as a waiver by either Party of any rights, remedies, legal theories or positions that either Party may choose to assert in any hearing, proceeding, tribunal or action now or in the future, except with respect to the particular subject matter contained in this Agreement and the Modified Abatement Order.

iii. The date the District Governing Board adopts the Modified Abatement Order shall be the effective date upon which the necessary decision makers of LADWP, the City of Los Angeles, and District Governing Board agree to enter into this Agreement to modify the Original Abatement Order, the "**Effective Date**."

f. **BACM Clarifications**. [*Corresponds to Term Sheet sections I.E.1.-I.E.4.*]

i. District hereby approves Reduced Thickness Gravel as a BACM. "Reduced Thickness Gravel is defined as per the 2008 Owens Valley PM10 State Implementation Plan except that the gravel thickness is reduced from a minimum of four inched (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification "Material Specification 592—Geotextile" (National Engineering Handbook, Chapter 3, Part 642), or equivalent.

ii. The District hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. District and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. The existing "Brine Pool" is defined as those areas at Owens Lake below elevation 3,553.55 feet.

iii. The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the Effective Date of the Modified Abatement Order, the District and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these controls can be applied. The schedules shall include the District Governing Board's consideration of BACM approval of these candidate measures within one year of completion of the schedule (within 13 months of the Effective Date of the Modified Abatement Order). If the accelerated testing does not result in approved BACM for the candidate measures, the District's and LADWP's respective Boards shall jointly assess why the accelerated testing did not result in the District Board's BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM.

iv. The District shall memorialize its approvals set forth in sections I(f)(i)-(ii), and any future approvals pursuant to section I(f)(iii), in formal District Board resolutions and orders, including but not limited to, modifications to the 2008 SIP and Board Order 080128-01. The District and LADWP shall jointly apply to CSLC for approval to use new BACMs promptly upon their approval by the District and, with respect to the approvals set forth in Sections I(f)(i)-(ii), within 90 days of the Effective Date of the Modified Abatement Order.

II. **KEELER DUNES**.

a. **Keeler Dunes Dust Control Project**. [*Corresponds to Term Sheet sections II.A.1.-II.A.4*.]

i. LADWP shall provide ten million dollars ($10,000,000) to the District as a public benefit contribution to support the District's "**Keeler Project**" (as defined in section II(a)(ii)) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the $10,000,000 in one single payment to the District within 90 days after: (1) the date of approval of the Modified Abatement Order, which is also the Effective Date of this Agreement that includes the "**Keeler and Other Dunes Release**" defined in section II(b); and (2) the District Governing Board approves amendments to the 2008 SIP and Board Order 080128-01, and such amendments are submitted to the California Air Resources Board ("**CARB**") pursuant to section II(b)(iii). The Keeler and Other

Dunes Release in this Agreement shall not be effective until the District receives the $10,000,000 contribution.

ii. The District shall use the $10,000,000 for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly-related activities for a dust emission control project at Keeler Dunes (the "**Keeler Project**"), including work previously conducted by the District in connection with the Keeler Project that was funded by Owens Lake Trust Fund monies. The District shall not seek from LADWP any reimbursement of Owens Lake Trust Fund monies used to pay for work conducted in connection with the Keeler Project through future SB 270 assessments or otherwise. No portion of the $10,000,000 shall be used to pay for the District's attorneys' fees, public affairs or governmental relations (collectively, "**Public Affairs**") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and the United States Bureau of Land Management ("**BLM**"). The District shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and any other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.

iii. Upon the effective date of the Keeler and Other Dunes Release pursuant to section II(b) of this Agreement, and the 2008 SIP and Board Order 080128-01 amendments submittal to CARB as described in section II(b)(iii) of this Agreement, LADWP will immediately provide the District access to its property in the Keeler Dunes area in order for the District to complete the environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler Project. So long as access is provided by LADWP, the District shall indemnify in perpetuity, defend and hold the City of Los Angeles and LADWP harmless for personal injuries caused by the negligence or willful misconduct of the District with respect to all activities undertaken by the District and its employees, agents and contractors on LADWP's property, except that the District shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by the District on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

iv. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit the District's books and records on an annual basis to verify that the $10,000,000 contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with this Agreement, which includes the Keeler Dunes and Other Dunes Release, the Modified Abatement Order, the amended 2008 SIP and Board Order 080128-01, and any other document memorializing Term Sheet, and for no other purpose. The District shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

b. **<u>District's Release of the City/LADWP for Keeler and Other Dunes Areas</u>**. [*Corresponds to Term Sheet sections II.B.1.-II.B.4.*] The following Keeler and Other Dunes Release shall apply to the City of Los Angeles and LADWP and shall become effective upon the date the Modified Abatement Order is adopted and after the District has received the $10,000,000 contribution from LADWP:

i. Release for Keeler Dunes: The District forever releases LADWP from any and all liability under any and all federal, state and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP that can be enforced by the District, and fugitive dust emission rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Keeler Dunes, regardless of origin, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached as Exhibit 2 and incorporated into this Agreement.

ii. Release for Swansea and Olancha Dunes (collectively these dunes are defined as the "**Other Dunes Areas**"): The District forever releases LADWP from any and all liability under any and all federal, state, and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP that can be enforced by the District, and fugitive dust emission rules, for dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin, including but not limited to portions of the Other Dunes Areas that may be owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin. This Agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas is attached as Exhibit 2 and incorporated into this Agreement.

iii. 2008 SIP and Board Order 080128-01 Amendments: The District shall amend the 2008 SIP and Board Order 080128-01 consistent with the terms of this Agreement, including the Keeler and Other Dunes Release as defined in sections II(b)(i)-(ii), and shall request the United Stated Environmental Protection Agency ("**EPA**") and CARB to approve the amended SIP.

iv. LADWP reserves the right to contest and defend any alleged violations not encompassed in the Keeler and Other Dunes Release, including but not limited to, the right to contest and defend any alleged violations of Rule 401, or alleged liability or violations of Health and Safety Code section 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler Dunes and Other Dunes Areas. The District reserves the right to assert that any such defenses are barred or otherwise not legally supported.

v. Upon the Effective Date of this Agreement, the District shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

III. **GENERAL SETTLEMENT CONDITIONS**. [*Corresponds to Term Sheet sections III.A.-III.E.*]

a. **Approval by District Board, LADWP Board, and City of Los Angeles**.

i. All settlement terms and other matters contained in this Agreement (which includes the Keeler and Other Dunes Release) and the Modified Abatement Order shall be subject to final approval by the LADWP Board of Water and Power Commissioners and all other necessary decision makers at the City of Los Angeles.

ii. All settlement terms and other matters contained in this Agreement (which includes the Keeler and Other Dunes Release) and the Modified Abatement Order shall be subject to approval of the District Governing Board and shall be memorialized in the District Governing Board's approval of the Modified Abatement Order and other appropriate District Board resolutions and orders, including modifications to the 2008 SIP, if required, and Board orders, including Order 080128-01.

b. **Binding Effect**. The provisions of this Agreement shall be binding upon and inure to the benefit of the Parties. There are no third-party beneficiaries to this Agreement.

c. **Representations**. The Parties represent that on and as of the date of this Agreement, they have full capacity, right, power and authority to execute, deliver and perform under this Agreement. The individuals signing this Agreement are duly authorized to sign the same on the Parties' behalves and to bind the Parties thereto. This Agreement is and shall be binding upon and enforceable against the Parties in accordance with its respective terms.

d. **Integration**. This Agreement is intended by the Parties to memorialize the terms in the Term Sheet, which is attached as Exhibit 3 to this Agreement, and to be the final expression of their agreement with respect to the subject matter of this Agreement and the complete and exclusive statement of the terms of this Agreement between the Parties, and supersedes any prior understandings between the Parties, whether oral or written.

e. **Interpretation**. In all cases, the language in all parts of this Agreement shall be construed simply, according to its fair meaning and not strictly for or against any Party, with the view of preserving and protecting the intent and purposes of the Agreement, it being agreed that the Parties or their agents have all participated in the preparation of this Agreement.

f. **Governing Law**. The Parties agree that this Agreement is made, executed and entered into, and is intended to be formed within the State of California and that this Agreement is to be interpreted and enforced under the laws of the State of California. Any federal law claims shall be interpreted and enforced under federal law.

g. **Counterparts**. This Agreement may be executed in two or more identical counterparts, each of which shall be deemed to be an original and each of which shall be deemed to be one and the same instrument when each Party signs each such counterpart.

h. **Recitals**. Each of the Recitals is incorporated into this Agreement.

i. **Definitions; Attachments**. Capitalized terms used herein shall have the respective meanings specified in the text of this Agreement. Unless otherwise indicated, references in this Agreement to sections, paragraphs, clauses, exhibits, attachments and schedules are those contained in or attached to this Agreement and all exhibits and schedules referenced herein are incorporated herein by this reference as though fully set forth in this Agreement.

j. **Parties**. All references to the Parties shall include all officials, officers, personnel, employees, agents, assigns, and subcontractors of the Parties.

"Great Basin Unified Air Pollution Control District"

Dated:_______________

By:________________________________

Governing Board Chair

APPROVED AS TO LEGAL FORM:

By: _________________________

District Counsel

"Los Angeles Department of Water and Power"

Dated:_______________

By:________________________________

Board of Commissioners Chair

APPROVED AS TO LEGAL FORM:

By: _________________________

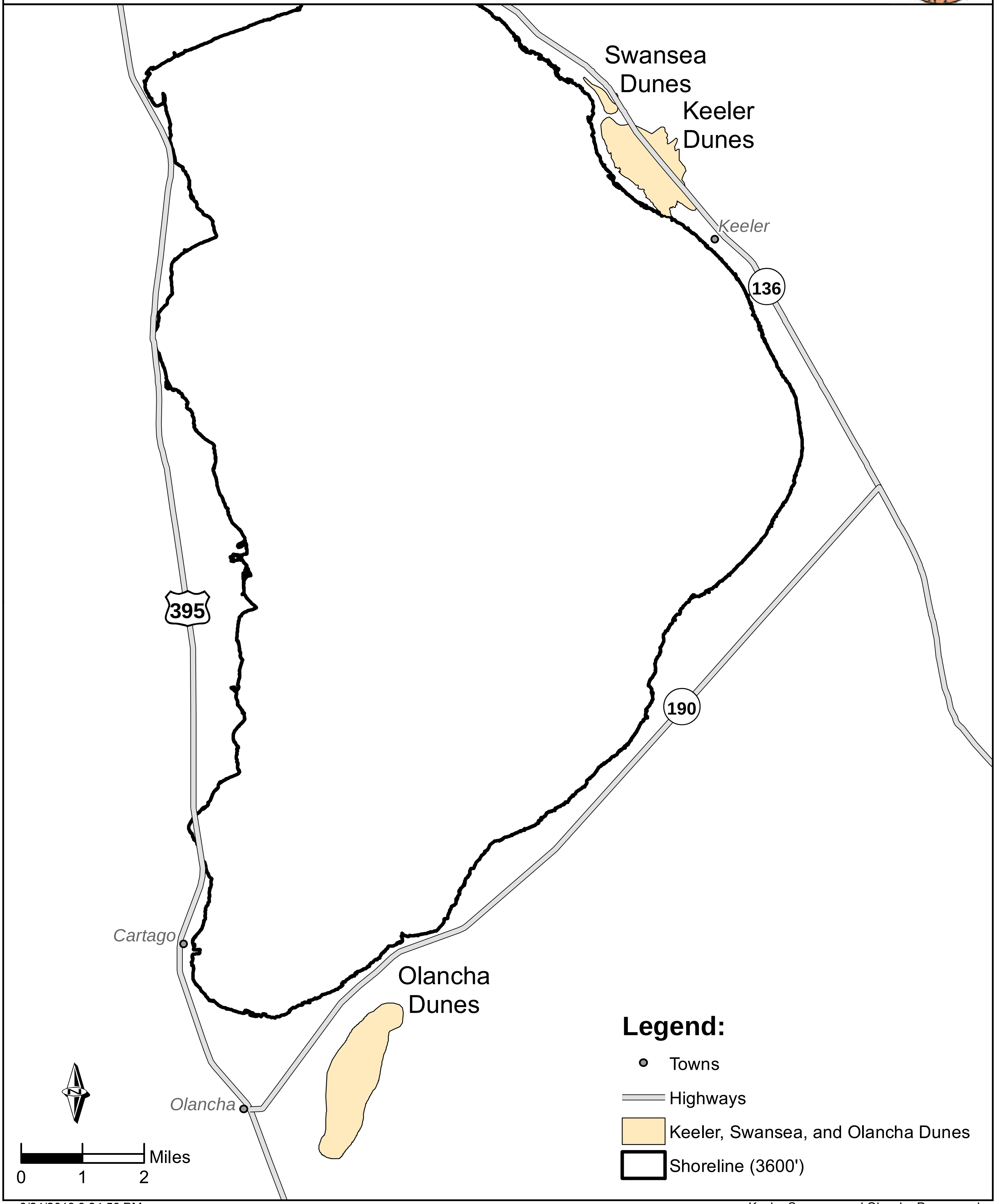
City Attorney

List of Exhibits

Exhibit 1	**CONFIDENTIAL** – Maps of Initial Phase 7b areas (X Pages)
Exhibit 2	Maps of the Keeler and Other Dunes Areas (3 pages)
Exhibit 3	Term Sheet Term Sheet approved by the LADWP Board of Commissioners on June 26, 2013, and the District Governing Board on June 27, 2013

Great Basin Unified Air Pollution Control District

Keeler, Swansea, and Olancha Dunes



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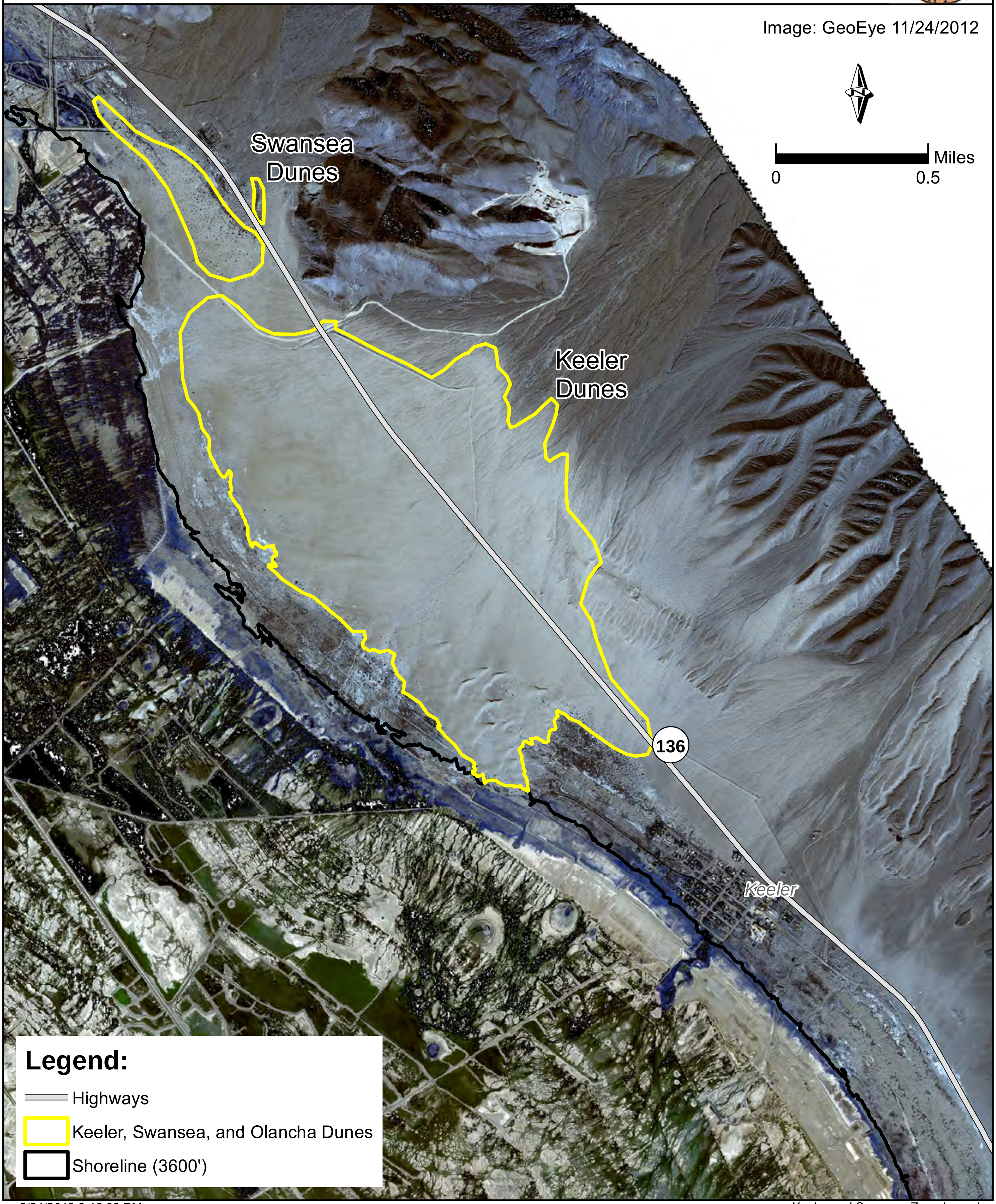
Great Basin Unified Air Pollution Control District

Keeler and Swansea Dunes - Detail



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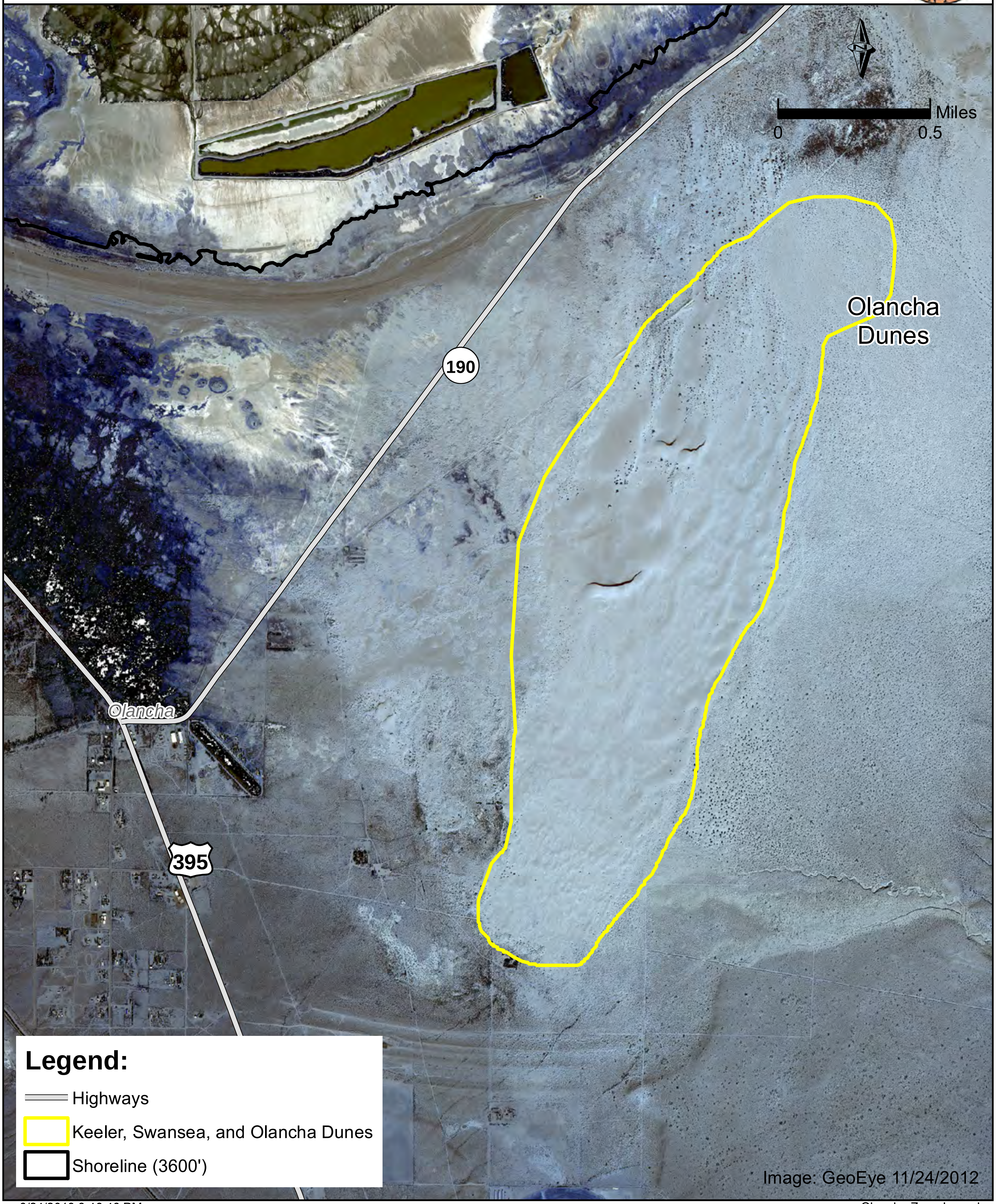
Keeler and Swansea ZoomIn.mxd

Great Basin Unified Air Pollution Control District

Olancha Dunes - Detail



GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

AND

LOS ANGELES DEPARTMENT OF WATER AND POWER

PHASE 7a AND KEELER DUNES

SETTLEMENT TERMS

JUNE 25, 2013

The following constitutes the Settlement Terms (the "Terms") for the Phase 7a Stipulated Order for Abatement (SOA) and Keeler Dunes issues between the Great Basin Governing Board (GB) and the Los Angeles Department of Water and Power (LADWP):

I. MODIFICATION OF SOA

A. <u>GB and LADWP agree that GB shall modify the Phase 7a SOA to do the following</u>:

1. Deadline Extensions

   a) Existing December 31, 2013 deadline for all infrastructure for BACM and compliant operation (other than Managed Vegetation Compliance) to be installed and fully operational extended to December 31, 2015.

   b) Existing December 31, 2015 deadline for Managed Vegetation Controls (fully compliant managed vegetation cover) extended to December 31, 2017.

2. Assumptions for Extension of Deadlines

   a) Timely Availability of necessary leases from State Lands and of necessary permits from other agencies

b) Acceptance by GB of 328 acres of Eligible Cultural Resource (ECR) areas. ECR areas are defined as California Register of Historical Resources (CRHR)-eligible areas plus necessary buffer areas and are to be removed from Phase 7a and placed into Phase 7b (see below) and potentially the subject of a new future Board order. A confidential map of the existing 328-acre ECR areas shall be attached to the amended SOA.

c) Force majeure process of original SOA to be followed for newly discovered potential ECRs.

B. <u>Creation of Phase 7b</u>

1. Phase 7b would be created for the treatment of the 328 acres of ECR areas plus any newly discovered cultural resources within Phase 7a that are determined by LADWP's state certified archaeologist to be CRHR-eligible and necessary buffer areas (the "Additional Phase 7b Areas") and whose determination is confirmed by a second, state certified archaeologist mutually agreeable to GB, LADWP and State Lands (the "Second Archaeologist").

2. Initially Phase 7b would include 328 acres of previously identified ECR areas from Phase 7a (the "Initial Phase 7b Areas").

3. Any areas in Phase 7a (beyond the Initial Phase 7b Areas) where ECRs are located during Phase 7a construction shall be handled as part of Phase 7b (the "Additional Phase 7b Areas"). Promptly upon discovery of any cultural resources during the Phase 7a construction process, LADWP shall promptly notify GB of, and confer with GB about, such discovery, and LADWP's state certified archeologist shall fulfill their legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the

CRHR eligible areas; such evaluations shall be confirmed by the Second Archaeologist. Newly identified CRHR eligible areas and necessary buffer areas shall become ECR areas and become part of the Additional Phase 7b Areas.

4. Cultural Resource Task Force

a) The amended SOA will establish a Cultural Resource Task Force (CRTF). The CRTF will be an advisory group consisting of LADWP, GB, State Lands, State Historical Preservation Office, and Local Tribal Representatives. The CRTF shall be able to draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the reasonable costs of the CRTF, including reimbursements for travel expenses of CRTF members.

b) The CRTF will initially be charged to make recommendations to GB and LADWP as to the best course of action and timing for the treatment of the Initial Phase 7b Areas. Such treatment could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. The CRTF will make non-binding recommendations to the GB Governing Board and LADWP regarding treatment of the Initial Phase 7b Areas on or before December 31, 2014. LADWP and GB shall commit to form the CRTF and host its initial meeting within ninety (90) days after the effective date of the amended SOA.

c) The CRTF shall also make non-binding recommendations to GB and LADWP with respect to the treatment of ECRs that may become part of the Additional Phase 7b Areas. After making its recommendations for the Initial Phase 7b Areas, the CRTF shall remain in existence to make recommendations for any Additional Phase 7b Areas that may be designated ECRs by LADWP's state certified archaeologist and confirmed by the Second Archaeologist.

d) If after considering the non-binding recommendations of the CRTF, GB exercises its discretion to order LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, GB will issue a new Board order or orders after receiving input from LADWP and will determine if any SIP amendment is necessary. The new Board order or orders shall include control completion deadlines that take into account project circumstances, including but not limited to, recovery and additional environmental work necessary to complete the project at issue. The new Board order or orders shall recognize that the construction period shall be subject to all time-extensions-for-cause provisions of Paragraphs 5 and 6 of the SOA.

e) Like the SOA for Phase 7a, any future order or orders issued by GB pertaining to Phase 7b will give due consideration to the shared goals of GB and LADWP to control air pollution and decrease the use of water for dust control at Owens Lake. In making its recommendations, the CRTF will also give due consideration to GB's and LADWP's shared water saving and air pollution control goals.

f) The CRTF will be advisory in nature only, and GB and LADWP will retain final determination as to the treatment of ECR areas. GB reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order.

g) Permanent avoidance of any portion of the Phase 7b Areas will be considered by GB, which, upon approval, shall amend the 2008 SIP and Board Order 080128-01 in order to get USEPA approval.

C. <u>No Fines</u>

1. GB shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any areas of Phase 7a, provided that the Phase 7a dust controls are put into place within the time frames set forth in Section I.A.1.

2. GB shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the SOA and this agreement.

D. Modification of SOA

1. The amended SOA shall clarify that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be included in the SOA's existing time-extensions-for-cause, as set forth in SOA Paragraphs 5 and 6.

2. The amended SOA shall reiterate that GB and LADWP shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.

3. The amended SOA shall state that the modification of the SOA by GB and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in the amended SOA and the Keeler and Other Dunes Release".[1]

4. The effective date of the amended SOA shall be the date upon which the necessary decision makers of the City of Los Angeles and the GB Governing Board agree to enter into this agreement to modify the SOA.

E. Clarification on BACM

1. GB hereby approves Reduced Thickness Gravel BACM (2 inches of gravel with geotextile fabric underlay).

[1] LADWP disputes the legality of and does not agree to the Supplemental Control Requirements Determination (SCRD) process. GB asserts that LADWP agreed to the SCRD process in the original Phase 7a SOA and elsewhere, and the SCRD process is now the law. GB and LADWP have a continuing disagreement on this point.

2. GB hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. GB and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. "Brine Pool" is defined as those areas below elevation 3,553.55 feet.

3. GB will commit to work with the LADWP on an accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the effective date of the amended SOA, GB and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. Said schedules will include consideration for BACM approval of these candidate measures by the GB Board within one year of completion of the schedules (within 13 months of the effective date of the amended SOA). If the accelerated testing does not result in approved BACM designation for the candidate measures, LADWP and the GB Board will jointly assess why the accelerated testing did not result in BACM approvals. GB and LADWP also will commit to work on accelerated testing schedules and BACM approvals for other forms of BACM.

4. GB will memorialize its approvals set forth in Sections I E. (1) and (2) and any future approvals pursuant to Section I E. (3) in formal GB board resolutions and orders. GB and LADWP will jointly appeal to State Lands to approve use of new BACMs promptly upon their approval by GB and, with respect to the approvals set forth in Sections I E. (1) and (2) within 90 days of the effective date of the amended SOA.

II. KEELER DUNES

A. Keeler Dunes Dust Control Project

1. LADWP shall provide $10 Million to GB as a public benefit contribution to and will support GB's "Keeler Project" (as defined herein below) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the $10 Million in a single payment to GB within 90 days after the effective date of the amended SOA and the following two actions are completed: 1) delivery to LADWP of the "Keeler and Other Dunes Release" (defined herein below) and 2) the submittal to the California Air Resources Board (CARB) as described in Paragraph II.B.1.c., below. The "Keeler and Other Dunes Release" shall not be effective until GB receives the $10 Million payment.

2. GB shall use the funds for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly related activities for a dust emission control project at Keeler Dunes (the "Keeler Project"). No funds shall be used for the purpose of attorney fees, public affairs or governmental relations (collectively, "Public Affairs") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and BLM. GB shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.

3. Upon delivery of the "Keeler and Other Dunes Release" (defined herein below) and the SIP and Board Order 080128-01 amendment submittal to the CARB as described in Paragraph II.B.1.c., below, LADWP will immediately provide GB with access to its property in the Keeler Dunes area in order to complete environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler

Project. So long as such access is provided by LADWP, GB shall indemnify in perpetuity, defend and hold LADWP (and the City of LA) harmless for personal injuries caused by the negligence or willful misconduct of GB with respect to all activities undertaken by GB and its employees, agents and contractors on LADWP's property and GB shall promptly repair any damage to LADWP's property caused by GB's activities on LADWP's property except that GB shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by GB on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

4. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit GB's books and records on an annual basis to verify that the $10 Million contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with the amended SOA, the amended SIP, the Keeler and Other Dunes Release and any other document memorializing the Terms, and for no other purpose. GB shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

B. <u>Release of LADWP/LA City for Keeler and Other Dunes Areas</u>

1. Upon the effective date of the amended SOA, GB shall deliver to LADWP a release (the "Keeler and Other Dunes Areas Release") as follows:

   a) <u>Release for Keeler Dunes</u>:
   GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of Keeler Dunes owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement

action by any other agency against LADWP related to dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached and incorporated into this agreement.

b) Release for Swansea and Olancha Dunes (collectively these dunes are defined as the Other Dunes Areas):

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake, including but not limited to portions of such dunes that may be owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement action by any other agency against LADWP related to dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake. This agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas in the vicinity of Owens Lake are attached and incorporated into this agreement.

c) SIP and Board Order Amendment:
Great Basin shall amend the SIP and Board Order 080128-01consistent with the terms of this agreement and the “Keeler and Other Dunes Areas Release” and shall request the USEPA and CARB to approve the amended SIP.

2. LADWP reserves the right to contest and defend any alleged violations not covered by the releases herein, including but not limited to the right to contest and defend any alleged violations of Rule 401, or alleged violations of H&S 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler

Dunes and Other Dunes Areas. GB reserves the right to assert that any such defenses are barred or otherwise not legally supported.

3. After the date of this agreement, GB shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

III. GENERAL SETTLEMENT CONDITIONS

A. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to final approval by LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles.

B. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to approval of GB Board and shall be memorialized in GB Board modification of SOA and appropriate GB resolutions, the 2008 SIP, if required, and Board orders.

C. GB and LADWP shall memorialize the Terms in formal settlement documents, including the amended SOA, the Keeler Release and the Other Dunes Area Release, within 30 days after approval of the Terms by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles. Prior to such approvals and until such time that public disclosure is mandated by law, GB and LADWP shall not disclose the Terms or the existence and content of the SOA Mediation and shall keep the Terms confidential.

D. Once the Terms are fully approved by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles, GB and LADWP shall issue a joint press release to announce the successful conclusion of the SOA Mediation, the Terms, the amended SOA and the Keeler Release.

E. The parties to the SOA Mediation shall each execute a copy of this document to evidence that it contains the final and complete statement of the Terms resulting from the SOA Mediation that will be submitted for approval to the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles and to the GB Board.

F. Prior to the public announcement of this Agreement, LADWP and GB will develop a mutually agreeable joint communication, which announces and explains this Agreement. The Parties agree not to disclose or divulge the content and substance of the Settlement Terms to any third parties, including, but not limited to members of the press or media, unless and until LADWP and the District have approved a final settlement. The confidentiality requirements do not extend to the undersigned participants' discussions with their respective party's legal counsel and governing boards, regarding the settlement meetings.

In witness thereof, the parties hereto have set their hands to this agreement on June 27, 2013.

Great Basin Unified Air Pollution Control District	Los Angeles Department of Water and Power
By: John Eastman	By: Ronald Nichols
Name: John Eastman	Name: RONALD O. NICHOLS
Title: Governing Board Chair	Title: General Manager
Date: June 27, 2013	Date: 7/25/13

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APPROVED AS TO FORM AND LEGALITY
CARMEN A. TRUTANICH, CITY ATTORNEY

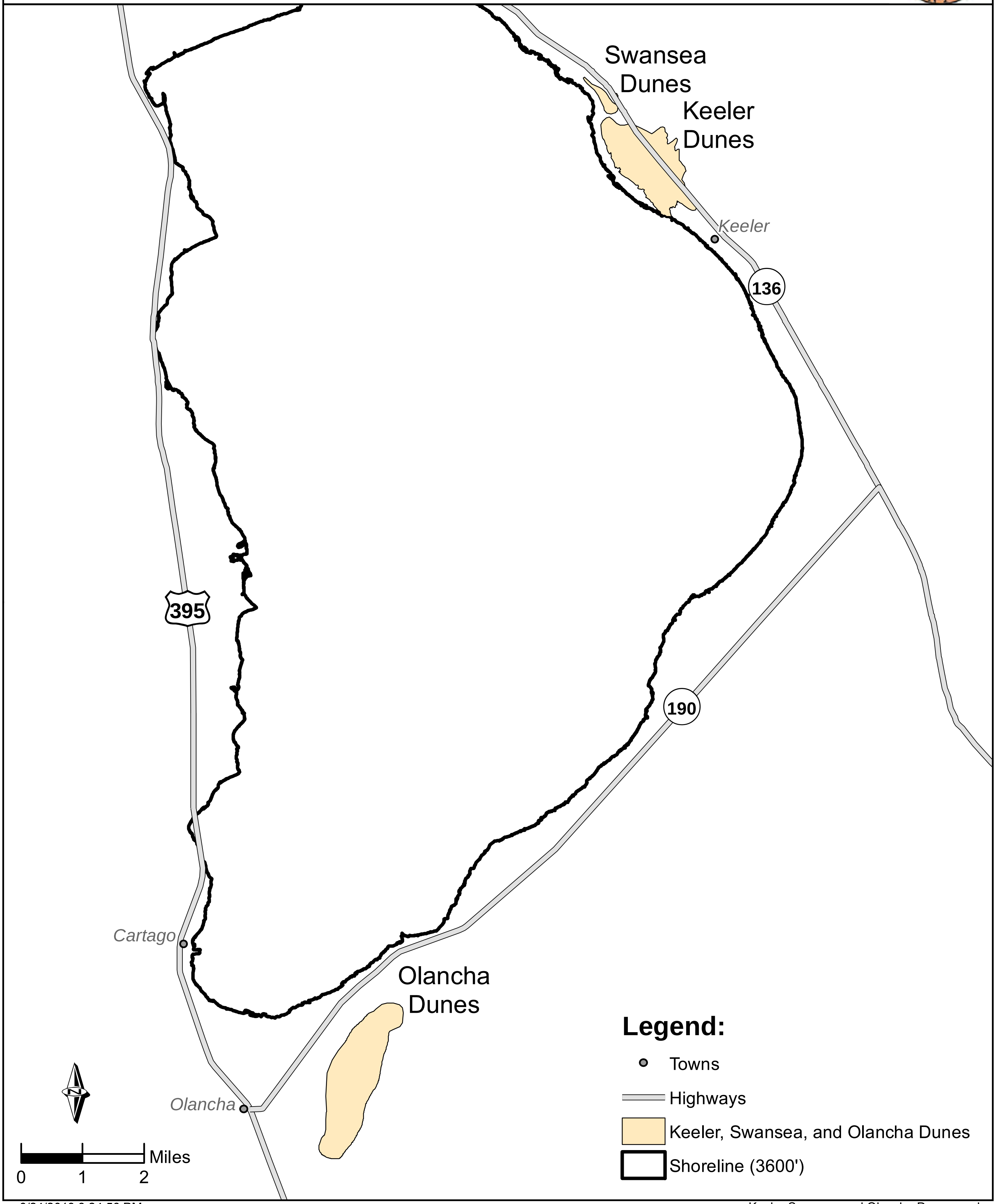
JUL 22 2013

Michelle Lyman

MICHELLE LYMAN
DEPUTY CITY ATTORNEY

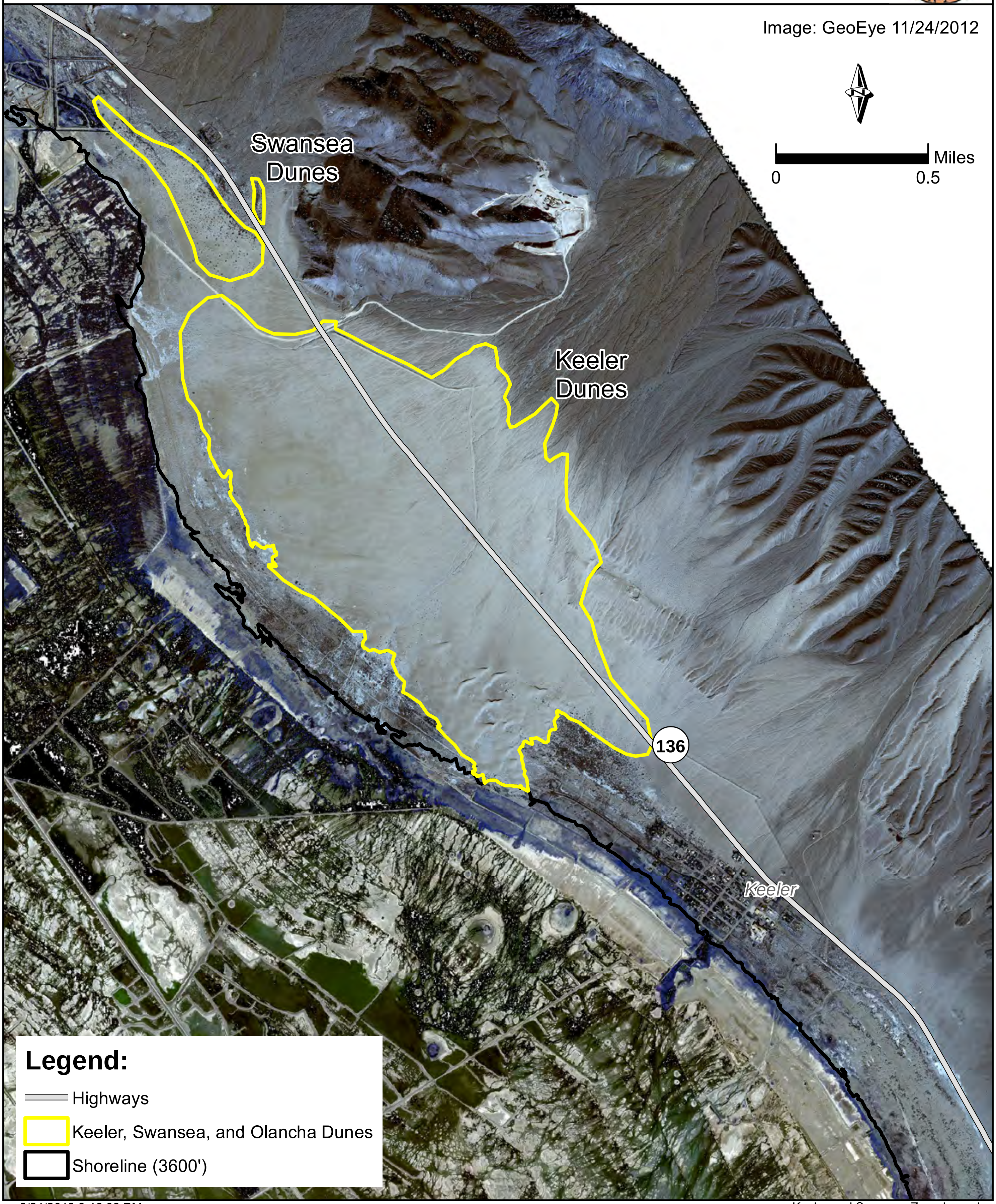
Great Basin Unified Air Pollution Control District

Keeler, Swansea, and Olancha Dunes



Great Basin Unified Air Pollution Control District

Keeler and Swansea Dunes - Detail



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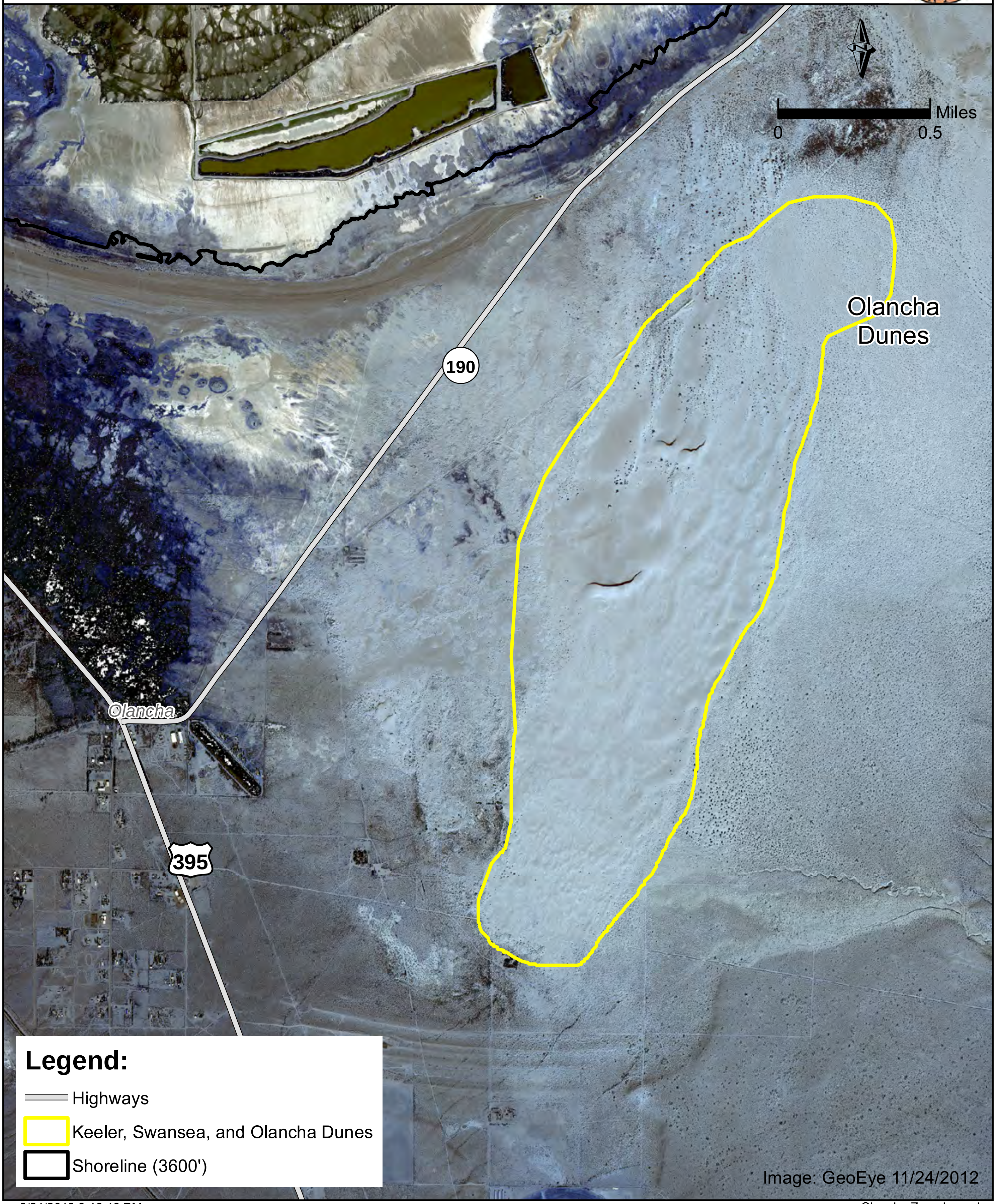
Keeler and Swansea ZoomIn.mxd

Great Basin Unified Air Pollution Control District

Olancha Dunes - Detail



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Olancha ZoomIn.mxd

Great Basin Unified Air Pollution Control District

2013 Amendment to the Owens Valley PM_{10} SIP

Board Order 130916-01

Exhibit 6: District Governing Board Order Number 130819-01 – Findings and Decision of District Governing board Upon Hearing for Stipulated Order for Abatement 110317-01, dated August 19, 2013

BEFORE THE GOVERNING BOARD OF THE

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

In the Matter of Joint Petition and Stipulation to Modify District Governing Board Order No. 110317-01 **THEODORE D. SCHADE** AIR POLLUTION CONTROL OFFICER GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT, vs. **CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER**	Order Number 130819-01 FINDINGS AND DECISION OF DISTRICT GOVERNING BOARD UPON HEARING FOR STIPULATED MODIFICATION TO STIPULATED ORDER FOR ABATEMENT 110317-01 Hearing Date: August 19, 2013 Location: Bishop, California

FINDINGS AND DECISION OF THE GOVERNING BOARD

A joint petition from the Great Basin Unified Air Pollution Control District's ("District") Air Pollution Control Officer ("APCO") and the City of Los Angeles by and through its Department of Water and Power ("LADWP") was heard on August 19, 2013, pursuant to notice and in accordance with the provisions of California Health and Safety Code sections 40823 and 42450, District Rule 811, paragraph 22 of the Order 110317-01. Seven members of District Governing Board were present: Board Chair John Eastman, Board Vice-Chair Ron Hames, Linda Arcularius, Matt Kingsley, Larry Johnston, Byng Hunt, and Mary Rawson. The District Governing Board was represented by George Poppic of the California Air Resources Board. Co-Petitioner, Theodore D. Schade, APCO, was represented by Peter Hsiao of the law firm Morrison and Foerster. Co-Petitioner, LADWP was represented by Michelle Lyman, Deputy City Attorney for the City of Los Angeles. The public was given an opportunity to testify. The matter was submitted and evidence received including, but not limited to, the Original Stipulated Order for Abatement (Exhibit 1), LADWP's Petition with all attachments to the District Governing Board to modify Order 110317-01 submitted to the District on June 14, 2013 (Exhibit 2), the Term Sheet approved by the LADWP Board of Commissioners on June 26, 2013, and the District Governing Board on June 27, 2013 (Exhibit 3), the District Board Report for the June 27, 2013 special meeting (Exhibit 4), and the Settlement Agreement and Release (Exhibit 5), a confidential map of the 277-acre Initial Eligible Cultural Resources Area (Exhibit 6), and a map of Phase 7a Modified Areas and Phase 7a Transition Areas (Exhibit 7). The District Governing Board finds, concludes, and orders as follows:

FINDINGS OF FACT

1. Co-Petitioner APCO is authorized and empowered pursuant to Division 26, Part 3, Chapter 7 of the California Health and Safety Code as the public official responsible for air pollution observation and enforcement in the Owens Valley Planning Area (“OVPA”).

2. Co-Petitioner LADWP is a municipal corporation organized under the Los Angeles City Charter and the Constitution and laws of the State of California. LADWP operates a municipal water collection, distribution, and aqueduct system in Inyo County that supplies water to the residents of the City of Los Angeles.

Abatement Order Key Terms

3. On May 17, 2011, the District Governing Board adopted Stipulated Order for Abatement No. 110317-01 (“Order 110317-01”). Order 110317-01 requires LADWP to construct a dust control project, known as Phase 7a, on approximately six square miles of the Owens Lakebed, which includes 3.1 square miles within six Dust Control Areas (“DCAs”), T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1 (“Phase 7a areas”), and approximately 3 square miles of transition areas, as identified in Exhibit 4 of Order 110317-01 (“Transition Areas”). Except as to the modifications made herein, Order 110317-01 remains in full force and effect.

4. Paragraphs 1 and 4(a) of Order 110317-01 set forth the compliance schedule for Phase 7a of December 31, 2013, to install dust controls and December 31, 2015, to achieve

fully-compliant vegetation cover.

5. Order 110317-01 also requires dust controls be installed in the T12-1 tillage test area by December 31, 2015. The District Governing Board subsequently adopted Board Order No. 120206-07 extending the deadline to install BACM in DCA T12-1 from December 31, 2015, to May 1, 2016.

6. Paragraph 5 of Order 110317-01 provides that LADWP shall not be in violation of Order 110317-01 if LADWP is acting in good faith to comply with the terms of the Order 110317-01, but is impeded or prevented from doing so by, among other things, events or circumstances beyond its control. Paragraph 6 of Order 110317-01 permits the LADWP Board of Water and Power Commissioners ("LADWP Board") to adopt a resolution to this effect, and requires that LADWP notify the District's APCO of any such resolution within 15 days of its adoption. If the APCO does not concur with the LADWP Board's resolution, the APCO shall notify LADWP and the District Governing Board in writing within 15 days of receipt of the LADWP Board's resolution. Within 30 days of such written notice, two District Governing Board members and two LADWP Board members may meet to make a non-binding recommendation as to whether LADWP has met the requirements of Paragraph 5 of Order 110317-01 and whether the requested Schedule of Increments should be granted, granted with modifications, or denied.

7. Paragraph 21 of Order 110317-01 provides that the District Governing Board shall retain jurisdiction over the matter in Order 110317-01 until December 31, 2015, unless Order 110317-01 is amended or modified. The District Board's jurisdiction was extended to at least May 2016, which is the amended deadline to install BACM in the DCA T12-1, when it adopted District Governing Board Order 120206-07.

8. Paragraph 22 of Order 110317-01 provides that either the APCO or LADWP may petition the District Governing Board for a modification of Order 110317-01 with or without a stipulation. The District Governing Board may modify Order 110317-01 without a

stipulation upon a showing of good cause and upon making findings required by Health and Safety Code section 42451, subdivision (a), and District Rule 805, subdivision (a).

9. LADWP is currently in full compliance with Order 110317-01.

Phase 7a Cultural Resources Evaluation

10. LADWP was required under District Governing Board Order 080128-01 ("Board Order 080128-01"), the enforcement Board Order for the 2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan ("2008 SIP"), to analyze the environmental impacts of the Phase 7a project under the California Environmental Quality Act (Pub. Res. Code, §§ 21000, et seq.) ("CEQA").

11. LADWP retained Garcia and Associates ("GANDA"), a natural and cultural resources consulting firm with state-certified archaeologists, to conduct all of the archaeological investigations necessary to comply with CEQA requirements for Phase 7a. Between May and August 2011, GANDA conducted a Phase I pedestrian survey of the subareas within Phase 7a and discovered there were extensive unanticipated archaeological and cultural resources throughout the proposed project. The 2008 SEIR mitigation measures require among other things, that if the Phase I pedestrian survey identified significant unanticipated cultural and archaeological resources, LADWP must conduct an assessment of potentially impacted cultural sites—both known and undiscovered—for significance under CEQA through the implementation of Phase II investigations. (SEIR § 3.3.5; p. 3.3-24; *see also* Appendix R-E [Final Cultural Resources Technical Report], § 5.3, pp. 5-107-109.) LADWP was required to obtain an Archaeological Investigation Permit from California State Lands Commission ("CSLC") before conducting the Phase II testing and evaluation. CSLC approved the permit on September 1, 2011.

12. After CSLC approved the permit, GANDA commenced Phase II testing and evaluation of the sites identified during the Phase I pedestrian survey to determine the sites' eligibility for inclusion in the California Register of Historical Resources ("CRHR") and National Register of Historic Places ("NRHP"). In October 2011, GANDA completed its

Phase II testing and evaluation of the DCAs impacted by archaeological and cultural resources. GANDA determined that the impacted DCAs contain 16 archaeological sites, of which six are CRHR-eligible. GANDA advised LADWP to avoid any ground disturbing activities in or near the CRHR-eligible sites and, if avoidance was not feasible, LADWP was required to complete a Phase III recovery before commencing ground disturbing activities in or near the CRHR-eligible sites.

13. In November and December 2011, LADWP evaluated whether it could proceed with the necessary geotechnical work on the impacted DCAs while avoiding the disturbance of the CRHR-eligible sites. LADWP determined that it was infeasible to avoid disturbance of the four CRHR-eligible sites identified in one of the DCAs during geotechnical work and, therefore, LADWP did not proceed with geotechnical work on that DCA. In addition, on December 13, 2011, GANDA issued a stop work order to LADWP pursuant to its authority under the CSLC permit, requiring LADWP to stop all geotechnical work or other construction-related ground disturbing activity on another DCA until after the completion of Phase III archaeological data recovery excavations. LADWP determined that the CRHR-eligible sites on this DCA could be avoided during geotechnical work. LADWP completed the geotechnical work on in December 2011. LADWP, however, determined that it could not avoid any of the Phase 7a CRHR-eligible sites if it constructed dust control measures in accordance with Order 110317-01.

14. LADWP and the District's APCO met several times to discuss LADWP's progress on Phase 7a and possible alternatives to the project, including whether irreversible impacts to the cultural resources could be avoided, allowing the archaeologically-sensitive areas to remain untouched. In August 2012, GANDA completed its final Phase II Testing Report[1] and evaluation of historical and archaeological resources in all of the Phase 7a DCAs, except for the T12-1 tillage test area. In its January 30, 2012, memorandum, GANDA informed LADWP that two DCAs contains a total of 53 archaeological sites, five of which are

[1] The Phase II Testing Report contains sensitive cultural resources information that cannot be publicly disclosed under protection laws.

CRHR-eligible. GANDA recommended that the CRHR-eligible sites be completely avoided and that no geotechnical sampling or other construction-related ground disturbances be performed on these DCAs, since the CRHR-eligible sites encompass much of much of the DCAs and cannot otherwise be avoided. GANDA further recommended that if avoidance or preservation in place were determined to be infeasible, then no ground disturbances should occur on the two impacted DCAs until after the completion of Phase III archaeological data recovery excavations.

15. As a result of its investigations GANDA determined there are eleven sites in the Phase 7a project area eligible for listing in the CRHR. Three of the eleven sites are likely locations involving the Owens Valley Indian Wars.

Phase 7a CEQA Process

16. The entire Phase 7a and Transition Areas are a single project under CEQA and Order 110317-01. (Cal. Code Reg., tit. 14, § 15378, subd. (a).) In accordance with CEQA, LADWP conducted one environmental evaluation for the entire Phase 7a project, and LADWP determined that no single part of the project could be implemented until CEQA for the entire project was completed. Therefore, even though some of the Phase 7a and Transition Areas are not known to contain significant cultural resources, LADWP determined that design could not be completed, permits from other agencies could not be obtained, construction contracts could not be awarded, and construction of the dust controls could not commence until LADWP had completed the entire CEQA process for Phase 7a.

17. In May 2011, LADWP prepared an Initial Study based on State CEQA Guidelines Appendix G, which concluded that: (i) construction and operation of the proposed Phase 7a project would result in significant effects on the environment; and, (ii) that an EIR was required to analyze those environmental effects. A Notice of Preparation of the EIR, along with the Initial Study, was filed with the State Clearinghouse on May 23, 2011. A public scoping meeting for the Phase 7a project was held on June 7, 2011, at LADWP's office in Keeler, California.

18. LADWP released the draft EIR in January 2013 for a 45 day public comment period. Over the course of the next several months, LADWP staff considered and responded to public comments from the District, CSLC, and other stakeholders; conducted further consultations with Native American groups and others about project impacts and comments on the draft EIR; and, revised the draft EIR, as necessary, to incorporate any changes to the project.

19. CEQA requires that the EIR identify a reasonable range of alternatives to the proposed Phase 7a project that "would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project," and then provide detailed discussion of the comparative merits of each alternative for the decision-making body of the lead agency (LADWP Board) to consider before deciding which form of the project, if any, to ultimately approve. (CEQA Guidelines, §§ 15126.6, 15004, subd. (a).) Alternatives were identified in the EIR that would avoid impacts to cultural resources by excluding CRHR-eligible areas from the Phase 7a dust control project.

20. On June 4, 2013, the LADWP Board considered and certified the Final EIR and approved the Avoidance Alternative for the Phase 7a project. The Avoidance Alternative involved construction of the original proposed Phase 7a project in all areas except for 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 ("Avoidance Area") known to contain significant cultural resources. Because the Avoidance Alternative would protect these significant cultural resources, increase vegetated area on the lake and improve the habitat value of the Transition Areas, it was identified as environmentally superior to the originally proposed Phase 7a project and to the other alternatives evaluated in the Phase 7a EIR. The EIR also concluded that a Phase III data investigation and recovery would not be feasible mitigation for these eleven sites because of the importance of these sites to both the archaeological and local Native American communities for their prehistoric and historic value as unique historical resources. The LADWP Board approved the Phase 7a project and certified the Final EIR subject to and contingent upon the District's Governing Board's approval of a modification to

Order 110317-01 to remove the Avoidance Area from the original Phase 7a area, and to make any other additional changes necessary to ensure consistency between Order 110317-01, the Phase 7a project, and the Final EIR.

<u>Compliance with Order 110317-01 Procedure to Obtain Extension of Time</u>

21. On February 6, 2012, LADWP advised the District Governing Board at its meeting that numerous cultural resources had been discovered, and that LADWP may need to return to the Board to seek additional time to comply with Order 110317-01.

22. On February 7, 2012, in accordance with Paragraphs 5 and 6(a) of Order 110317-01, the LADWP Board passed Resolution No. 012-170, finding that LADWP had acted in good faith to comply with the terms of Order 110317-01, but had been otherwise impeded in meeting the December 31, 2013, deadline for installing BACM on two Phase 7a DCA areas due to the unexpected discovery of extensive cultural resources. On February 21, 2012, LADWP notified the APCO in writing of the LADWP Board's Resolution No. 012-170, and proposed a schedule of increments of progress and deadlines for future actions in compliance with Paragraph 6(a) of Order 110317-01. Under paragraph 6(c)(i) of Order 110317-01, if the APCO does not concur with the LADWP Board's resolution, the APCO is required to notify LADWP and the District Governing Board in writing of his finding within 15 days of receipt of the LADWP Board's resolution. The APCO did not provide such notification under paragraph 6(c)(i) of Order 110317-01.

23. On April 3, 2012, in accordance with Paragraphs 5 and 6(a) of Order 110317-01, the LADWP Board adopted Resolution No. 012-210, finding that LADWP had acted in good faith to comply with the terms of Order 110317-01, but had been otherwise impeded in meeting the December 31, 2013, deadline for installing BACM on two Phase 7a DCA areas due to the unexpected discovery of extensive cultural resources. On April 17, 2012, LADWP notified the APCO in writing of the LADWP Board's Resolution No. 012-210, and proposed a schedule of increments of progress and deadlines for future actions in compliance with Paragraph 6(a) of Order 110317-01. Under paragraph 6(c)(i) of Order 110317-01, if the APCO

does not concur with the LADWP Board's resolution, the APCO is required to notify LADWP and the District Governing Board in writing of his finding within 15 days of receipt of the LADWP Board's resolution. The APCO did not provide such notification under paragraph 6(c)(i) of Order 110317-01.

24. On September 5, 2012, in accordance with Paragraphs 5 and 6(a) of Order 110317-01, LADWP representatives attended the District Governing Board meeting and presented information about the unanticipated cultural resources discovered in Phase 7a, and the potential effect the discovery of these resources would have on LADWP's ability to complete the Phase 7a EIR and install dust controls on Phase 7a by the December 31, 2013, deadline set forth in Order 110317-01.

25. On September 5, 2012, LADWP notified the District Governing Board at its meeting that LADWP had located extensive unanticipated cultural resources that had impacted the construction schedule for the dust controls that LADWP would be returning to the Governing Board with a Petition to modify Order 110317-01. LADWP also sent a letter to the Governing Board Chair on February 14, 2013, informing the District of these issues.

26. On January 11, 2013, in accordance with Paragraphs 5 and 6(a) of Order 110317-01, the LADWP Board adopted Resolution No. 013-157, finding that LADWP had acted in good faith to comply with the terms of Order 110317-01, but had been otherwise impeded in meeting the December 31, 2013 deadline for installing BACM on DCA T1A-4 and the Transition Areas due to the unexpected discovery of extensive cultural resources and the resulting delay in completing the Phase 7a EIR. Even though significant cultural resources have not been discovered in these areas, LADWP determined that the schedule for installing BACM in these areas is affected by the unexpected discoveries in the other Phase 7a area because CEQA requires one environmental analysis to encompass the entire project. DCA T1A-4 and the Transition Areas cannot be excluded from the project under CEQA. On January 23, 2013, LADWP notified the APCO in writing of the LADWP Board's Resolution No. 013-157 and proposed a schedule of increments of progress and deadlines for future

actions, in compliance with Paragraph 6(a) of Order 110317-01. Pursuant to paragraph 6(c)(i) of Order 110317-01, the APCO responded on February 4, 2013, stating that he did not concur with the findings of Resolution No. 013-517.

27. Following notification of the APCO's non-concurrence with Resolution No. 013-517, in accordance with Paragraph 6(c)(ii) of Order 110317-01, two members of the LADWP Board (Richard Moss and Jonathan Parfrey) and three members of the District Governing Board (Linda Arcularius, Larry Johnston, and Matthew Kingsley) held several meetings to discuss the APCO's non-concurrence with Resolution No. 013-517.

28. On June 14, 2013, LADWP submitted a Petition to Modify Order 110317-01, with exhibits, to the District Governing Board. LADWP acknowledged in the Petition that the discussions between the District Governing Board and LADWP Board members remained ongoing, and that the modifications to Order 110317-01 requested in the Petition may need to be amended to reflect the terms of any agreement reached between the parties.

<u>Phase 7a Settlement Terms</u>

29. The District and LADWP Board member discussions resulted in an agreement on settlement terms dated June 17, 2013 ("Term Sheet") that was approved by LADWP on June 26, 2013, and the District on June 27, 2013. (*See* Exhibit 3 [Term Sheet]; Exhibit 4 [APCO Board Report, dated June 27, 2013].)

30. Based on the provisions of the approved Term Sheet, the District and LADWP propose to enter into a settlement agreement dated August 19, 2013 ("Settlement Agreement") (*See* Exhibit 5 [Settlement Agreement].). The District approved the Settlement Agreement on August 19, 2013. LADWP is scheduled to approve the Settlement Agreement on August 27, 2013.

31. The District and LADWP agreed in the Term Sheet and Settlement Agreement to, among other things, modify Order 110317-01, to extend the compliance deadlines, and also to address the discovery of cultural resources in the Phase 7a area.

32. LADWP agreed to provide the District with a ten million dollar ($10,000,000) public-benefit contribution for a dust control project carried out by the District in the Keeler Dunes. LADWP also agreed to support the District's project to control PM_{10} emissions from the Keeler Dunes. The District agreed to release the LADWP from liability for the Keeler and other dune areas emissions. The details of these agreements are set forth in the Settlement Agreement.

The Settlement Agreement provides as follows:

Extensions of Compliance Deadlines.

33. The District and LADWP agreed to the extension of LADWP's deadline to construct all infrastructure and install fully-compliant BACM in the Phase 7a areas and Transition Areas, except for those areas controlled by Managed Vegetation BACM, as set forth in paragraph 4(a) of Order 110317-01, from December 31, 2013, to December 31, 2015. All infrastructure and plant materials for Managed Vegetation BACM will be installed by December 31, 2015.

34. The District and LADWP agreed to the extension of LADWP's deadline to achieve fully-compliant BACM vegetation cover for areas controlled by Managed Vegetation BACM in the Phase 7a areas and Transition Areas, as set forth in paragraph 4(a) of Order 110317-01, from December 31, 2015, to December 31, 2017.

35. The District and LADWP agreed that extensions of the deadlines in this Order would be contingent upon all of the following:

a) LADWP timely receiving from CSLC and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM within the deadlines required by Order 110317-01.

b) Timely adoption of this Order modifying Order 110317-01 to remove all CRHR-eligible areas plus necessary buffer areas, referred to as the "Eligible Cultural Resource ("ECR") areas." The ECR areas initially consist of 277 acres of the Phase 7a areas identified in the confidential map attached to this Order as Exhibit 6 (the "Initial ECR Areas"). The

Initial ECR Areas and any newly discovered CRHR-eligible and necessary buffer areas (the "Additional ECR Areas") become Phase 7b.

c) Adoption of this Order modifying Order 110317-01 to state explicitly that the discovery of any cultural resources in the Phase 7a areas is considered a condition of force majeure under paragraph 5(d) of Order 110317-01.

d) If any one of the above contingencies is not met, then LADWP may seek further extensions of time under paragraph 5 of Order 110317-01, as modified by Order 130819-01, and paragraphs 6 and 22 of Order 110317-01, which shall not be unreasonably denied by the District.

Creation of Phase 7b.

36. The District and LADWP agreed to create Phase 7b, which shall consist of the Initial ECR Areas and any Additional ECR Areas. Additional ECR Areas are determined by LADWP's state-certified archaeologist, and which are confirmed by a second, state-certified archaeologist mutually agreeable to the District, LADWP and CSLC (the "Second Archaeologist"). The District and LADWP agreed that this Order would modify Order 110317-01 to remove all areas in Phase 7b.

37. The District and LADWP agreed that LADWP will promptly notify and confer with the District if any cultural resources are discovered during the construction of Phase 7a. Upon the discovery of the cultural resources, LADWP will request that its state-certified archeologist fulfill his or her legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state-certified archaeologist shall be responsible for evaluating whether any of the newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, define the additional buffer areas necessary to prevent disturbance of the CRHR-eligible areas. LADWP's state-certified archeologist's recommendations shall be confirmed by the Second Archaeologist. The District and LADWP agreed that once confirmed by the Second Archaeologist, the newly identified CRHR-eligible

areas and necessary buffer areas shall become ECR, will be withdrawn from Order 110317-01 and included in Phase 7b.

Cultural Resources Task Force.

38. The City and District agreed to form a Cultural Resources Task Force ("CRTF") and host its initial meeting within ninety (90) days after the Effective Date of this Order. The CRTF will be an advisory group consisting of representatives from the LADWP, District, CSLC, State Historical Preservation Office, and Local Tribal Representatives. The CRTF may draw upon outside resources and experts, as needed, to aid the CRTF's process.

39. The District and LADWP agreed that the CRTF will initially be charged to make non-binding recommendations to the District and LADWP on or before December 31, 2014, as to the best course of action and timing for the treatment of the Initial Phase 7b Areas.

40. The District and LADWP agreed that CRTF will be advisory in nature only, and that the District and LADWP will each retain their independent final decision-making authority as to the treatment of ECR areas.

No Fines Imposed.

41. The District agreed not to fine, issue fees or impose any other type of penalty upon LADWP with respect to any Phase 7a areas, provided that the Phase 7a dust controls are put into place within the time frames set forth in paragraphs 33 and 34 above.

42. The District agreed not fine LADWP for any areas in the Initial Phase 7b Areas and any Additional Phase 7b Areas pursuant to Order 110317-01 and Order 130819-01.

Other Abatement Order Modifications.

43. The District and LADWP agreed to make every effort to develop, approve and deploy high-confidence, waterless dust control measures in all areas where dust controls are ordered on Owens Lake.

44. The District and LADWP agreed that this Order shall not be construed as a waiver by either the District or LADWP of any rights, remedies, legal theories or positions that either the District or LADWP may choose to assert in any hearing, proceeding, tribunal or

action now or in the future, except with respect to the particular subject matter contained in this Order. For example, LADWP disputes the legality of and does not agree to the District's Supplemental Control Requirements Determination ("SCRD") process. The District asserts that LADWP agreed to the SCRD process in Order 110317-01 and elsewhere, and that the SCRD process is now the law. LADWP and the District have a continuing disagreement on this point.

BACM Clarifications.

45. The District approved Reduced Thickness Gravel BACM, which is defined as two (2) inches of gravel with geotextile fabric underlay. "Reduced Thickness Gravel is defined as per the 2008 Owens Valley PM_{10} State Implementation Plan except that the gravel thickness is reduced from a minimum of four inched (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification "Material Specification 592—Geotextile" (National Engineering Handbook, Chapter 3, Part 642), or equivalent.

46. The District approved "Brine Shallow Flooding BACM" as a subcategory of Shallow Flooding BACM. The District and LADWP acknowledged and agreed that LADWP is not liable for maintenance of the existing brine pool on Owens Lake. "Brine Pool" is defined as those areas at Owens Lake below elevation 3,553.55 feet.

47. The District agreed to work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the Effective Date of this Order, the District and LADWP committed to agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. The schedules shall include the District Governing Board's consideration of BACM approval of these candidate measures within one year of completion of the schedule (within 13 months of the Effective Date of this Order). If the accelerated testing does not result in approved BACM

for the candidate measures, the District's and LADWP's respective Boards shall jointly assess why the accelerated testing did not result in the District Board's BACM approval. The District and LADWP also agreed to work on accelerated testing schedules and BACM approvals for other forms of BACM.

CONCLUSIONS

48. In accordance with Health and Safety Code §42450 and Rule 805 of the Great Basin Unified Air Pollution Control District: Rules and Regulations, entitled "Findings," the Board finds that the findings listed in Order 110317-01 under that portion of the Order entitled "Conclusions" remain extant as of the effective date of this Order.

49. The District Governing Board finds that, because this Order is modified pursuant to a stipulation, this Order may be issued without making the finding required under California Health and Safety Code section 42451, subdivision (a). This Order constitutes the written explanation required by California Health and Safety Code section 42451, subdivision (b).

50. The District Governing Board finds that LADWP is in compliance with all of the terms of Order 110317-01.

51. The District Governing Board finds that there is currently no violation of Order 110317-01. Accordingly, no fines or penalties of any type (including those in Order paragraph 11 of Order 110317-01 and Order 130819-01) are imposed upon LADWP with respect to any areas of Phase 7a as identified in Order 110317-01, and for any areas in the Initial Phase 7b Areas and Additional Phase 7b Areas, at this time.

52. The District Governing Board agrees and, therefore, finds that the deadlines for installing and operating dust controls on Phase 7a Modified Areas and Transition Areas shall be extended.

53. The District Governing Board agrees and, therefore, finds that these new deadlines shall be subject to the timely issuance of permits, approvals, and leases; there being no discovery of new cultural resources or CRHR-eligible sites; and the District's timely

acceptance and removal of any new CRHR-eligible sites and associated buffer areas from Phase 7a Modified Areas and Order 110317-01. LADWP shall not be deemed in violation of Order 110317-01 or this Order if LADWP is impeded in its ability to comply due to these circumstances and those identified in paragraph 5 of Order 110317-01. Paragraph 5.e. of Order 110317-01 shall be clarified by this Order to mean that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be considered a condition of force majeure.

54. The District Governing Board finds that a Phase 7b area shall be created for the treatment of Initial ECR Areas and Additional ECR Areas. The Phase 7b areas are not subject to any requirements or deadlines to install dust controls in Order 110317-01 or this Order. This Order does not require the construction and operation of dust controls on Phase 7b areas; new Board Orders would be required after completion of the CRTF process set forth in the Settlement Agreement (Exhibit 5). There is no agreement that dust controls will or will not be ordered.

55. The District Governing Board agrees and, therefore, finds that the District and LADWP shall make every effort to develop, approve, and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.

56. The District Governing Board finds that LADWP may implement Reduced Thickness Gravel BACM ("Reduced Thickness Gravel" is defined as per the 2008 Owens Valley PM_{10} State Implementation Plan except that the gravel thickness is reduced from a minimum of four inched (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification "Material Specification 592—Geotextile" (National Engineering Handbook, Chapter 3, Part 642), or equivalent), or Brine Shallow Flooding BACM in Phase 7a Modified Areas and Transition Areas.

57. The District Governing Board agrees and, therefore, finds that LADWP's selection of the Transition Areas as discussed in the Phase 7a EIR is consistent and fully compliant with Paragraphs 7 and 8 of Order 110317-01, which provided that during construction of the Phase 7a project a maximum of 3.0 square miles of Transition Areas may be without BACM during the October 1 through June 30 "dust season."

58. The District Governing Board finds and agrees that the LADWP's stipulation to this Order is not a ratification of or agreement to the SCRD discussion in Order 110317-01 and does not constitute agreement to any previous or any future SCRDs, nor is the District Governing Board's approval of this Order a concession by the District that the LADWP has not agreed to previous of future SCRDs or the SCRD procedure and requirements set forth in the 2008 SIP. Further, the parties' stipulation to and the District Governing Board's issuance of this Order shall not be construed as a waiver by either the District or LADWP of any rights, remedies, legal theories, or positions that either may choose to assert in any hearing, proceeding, tribunal, or action now or in the future except with respect to the matters covered by the Settlement Agreement and this Order.

59. The District Governing Board finds that the effective date of this Order shall be the date upon which the necessary decision makers of the City of Los Angeles and the District Governing Board fully execute the Settlement Agreement.

60. The District Governing Board finds it shall retain jurisdiction over Order 110317-01 and this Order until December 31, 2017.

ORDER

THEREFORE, subject to the aforesaid statements, findings, and good cause appearing, the Governing Board of the Great Basin Unified Air Pollution Control District orders as follows:

A. Board Order No. 120206-07 extended the deadline in Order paragraphs 2 and 4.b. to install BACM in DCA T12-1 from December 31, 2015, to May 1, 2016. This Order modifies Order paragraphs 1 and 4.a. of Order 110317-01 by removing the existing paragraphs and replacing them with the following new paragraph 1 which reads as follows:

1. Except as provided in Paragraph 2 of this Stipulated Order for Abatement (Order), below, LADWP shall install, operate and maintain Best Available Control Measure (BACM) dust controls on the “Phase 7a Modified Areas” and the “Phase 7a Transition Areas” by December 31, 2015. The Phase 7a Modified Areas are the “Original Phase 7a Areas” identified in Order 110317-01 excluding the “Phase 7b Areas.” Phase 7b includes 277 acres located within the Original Phase 7a Areas that contain California Register of Historical Resources (CRHR)-eligible sites and necessary buffer areas (Initial Phase 7b Areas) plus any newly discovered cultural resources within the Phase 7a Modified Areas that are determined by LADWP’s state certified archaeologist to be CRHR-eligible and necessary buffer areas and whose determination is confirmed by a second, state-certified archaeologist mutually agreeable to the District, LADWP, and California State Lands Commission (Additional Phase 7b Areas). All Phase 7b areas are not subject to Order 110317-01. The areas and BACM dust controls to be constructed, operated and maintained on the Phase 7a Modified Areas and Phase 7a Transition Areas are shown and described in Exhibit 7. For those areas to be controlled by Gravel BACM, LADWP may implement Reduced Thickness Gravel BACM (as defined above). LADWP may also implement Brine Shallow Flooding BACM. Vegetation cover shall meet the requirements of the March 2010 Managed Vegetation BACM Proposal (Exhibit 6 to Order 110317-01) by December 31, 2017. Other eligible BACM are described in paragraphs 12, 15, 16 and 17 of District Governing Board Order 080128-01, as well as in Chapter 5 of the 2008 SIP. LADWP’s selection of approximately 3.4 square miles of the existing Shallow Flooding areas in Phase 7a Transition Areas (Subareas T1A-2, T28N, T28S, T30-1a, T30-1b, and T36-1b) to be transitioned to a hybrid of BACM including Managed Vegetation, Gravel Cover (including Reduced Thickness Gravel Cover) and Shallow Flooding (including Brine Shallow Flooding), is consistent and fully compliant with Paragraphs 7 and 8 of Order 110317-01. During construction of the Phase 7a project a maximum of 3.0 square

miles of Transition Areas may be without BACM during the dust season. The schedule of increments of progress and deadlines to install, operate and maintain dust controls on Phase 7a Modified Areas and Phase 7a Transition Areas, including the vegetative cover requirements, are contingent upon all of the following circumstances:

a) LADWP timely receiving from California State Lands Commission and all other agencies all of the required permits, approvals, or leases (collectively, "required approvals") necessary to permit LADWP to construct the dust controls within these deadlines. A list of the anticipated required permits, approvals and leases are identified in the Phase 7a EIR. This list is not inclusive of all agencies, and there may be other permits and approvals that are required.

b) There being no discovery of new cultural resources or CRHR-eligible sites.

c) The District's timely acceptance and removal of all new CRHR-eligible sites and associated buffer areas from the Phase 7a Modified Areas and Order 110317-01.

LADWP shall not be subject to any legal action, nor shall the District impose any fines or penalties of any type (including those in Order paragraph 11 of Order 110317-01 or in Order 130819-01) upon LADWP with respect to any delay in installing dust controls in any areas of Phase 7a as identified in Order 110317-01 that is related to LADWP not timely receiving the required permits, approvals, or leases necessary to permit LADWP to construct the dust controls, or the discovery of new cultural resources or CRHR-eligible sites are discovered, or the District not timely accepting and removing all new CRHR-eligible sites and associated buffer areas from the Phase 7a Modified Areas and Order 110317-01. LADWP may petition the District Governing Board pursuant to paragraph 22 of Order 110317-01 to modify the timeframes in revised Order paragraph 1. It is the intent of this Order that the District Governing Board will extend the timeframes under these circumstances if they are beyond the control of LADWP.

B. The Phase 7a map and coordinates presently included as Exhibit 4 to Order 110317-01 shall be removed and replaced with Exhibit 7 in order to accurately reflect the Phase 7a Modified Areas, Transition Areas and the approved dust controls.

C. This Order modifies Order paragraph 3 of Order 110317-01 by removing the existing paragraph and replacing it with the following new paragraph 3 which reads as follows:

3. The 277 acres located in the Initial Phase 7b Areas that contain CRHR-eligible sites and necessary buffer areas are identified in Exhibit 6 and hereby removed from Order 110317-01 and added to Phase 7b. Exhibit 6 is strictly confidential because it identifies the location of cultural resources and neither the District nor LADWP shall release or otherwise make the Exhibit available to the public. Additional areas shall be added to Phase 7b and removed from Order 110317-01 in accordance with the following process:

a) During the construction of Phase 7a, LADWP shall promptly notify the District of, and confer with the District about, the discovery of any cultural resources.

b) LADWP shall request that its state-certified archeologist fulfill their legal obligations relative to assessing and making recommendations for these discovered cultural resources. LADWP's state-certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the CRHR-eligible areas.

c) If LADWP's state-certified archaeologist finds that the newly discovered cultural resource areas are CRHR-eligible, then LADWP will transmit the findings to the District and a second state-certified archaeologist mutually agreeable to the District, LADWP, and California State Lands Commission.

d) The second state-certified archaeologist will evaluate LADWP's state certified archaeologist findings to confirm those findings.

e) The second state-certified archaeologist shall send its findings concurrently to LADWP, the District and California State Lands Commission.

f) If the second state-certified archaeologist confirms LADWP's state certified archaeologist findings, the District APCO shall within one week issue an Order removing the new CRHR-eligible area and associated buffer area from Phase 7a and placing it in Phase 7b.

g) If the second state-certified archaeologist does not confirm LADWP's state certified archaeologist findings, then the California State Lands Commission as the landowner shall determine whether the cultural resources shall be preserved in place or, whether California State Lands Commission intends to direct a Phase III data recovery or whether another approach is appropriate.

h) The District APCO shall within one week of receiving a determination from the California State Lands Commission that the cultural resources shall be preserved in place issue an Order removing the new CRHR-eligible area and associated buffer area from Phase 7a and placing it in Phase 7b.

D. This Order modifies Order paragraph 5.e. of Order 110317-01 by removing the existing paragraph and replacing it with the following new paragraph 5.e., which reads as follows:

5.e) A condition of Force Majeure, which is defined to mean an extraordinary event or circumstance beyond the control of the parties, such as a war, labor actions, riot, crime, disruption of utilities, acts of God (such as adverse weather, earthquake, volcanic eruption, or other natural disaster), and the discovery of potential ECRs. Adverse weather is any weather condition, including but not limited to flooding and dust storms, that forces the LADWP to suspend all construction operations or prevents the LADWP from proceeding with 50 percent or more of the normal labor force and of the equipment engaged on critical path work. Delays shall only be granted for adverse weather days greater than 30 days for each 12 month period from April 1 through March 31.

E. This Order modifies Order paragraph 15 of Order 110317-01 by removing the existing paragraph and replacing it with the following new paragraph 15, which reads as follows:

15. The parties commit to work cooperatively to support LADWP's efforts to develop and implement new PM_{10} control measures or modify existing measures that are as water-use efficient as possible. The District and LADWP will make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered. Neither this Order, Order 110317-01, Order 080128-01 or the 2008 SIP shall preclude the transition of areas with existing dust control measures to alternative high-confidence waterless dust control measures.

F. This Order modifies Order paragraph 18 of Order 110317-01 by changing the date of December 31, 2015 to December 31, 2017. Paragraph 18 shall read as follows:

18. Final compliance shall be achieved, and this Order shall terminate when Phase 7a and the Transition Areas are fully operational, but no later than December 31, 2017. LADWP shall notify the Clerk of the Board and the APCO in writing when final compliance is achieved.

G. This Order modifies Order paragraph 21 of Order 110317-01 by changing the date of December 31, 2015 to December 31, 2017. Paragraph 21 shall read as follows:

21. The District Governing Board shall retain jurisdiction over this matter until December 31, 2017, unless the Order is amended or modified.

H. This Order adds the following paragraph 26 to Order 110317-01:

26. LADWP shall pay ten million dollars ($10,000,000) to the District as a public-benefit contribution in support of the District's Keeler Dunes PM_{10} control project. One hundred percent (100%) of said payment shall be used by the District to control PM_{10} emissions from the area known as the Keeler Dunes (generally located above the eastern regulatory shoreline of Owens Lake and north of the community of Keeler). Details and conditions of the Keeler project and said payment are set forth in a separate Settlement Agreement between the District and LADWP. This agreement is attached to this Order as Exhibit 5.

I. The modification of Order 110317-01 by the District and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in this Order the Keeler and Other Dunes Release which is not subject to this Order or Order 110317-01.

J. The APCO and LADWP affirm that their respective signatories below have the authority to represent and bind their respective parties to the terms of this Stipulated Order for Abatement.

K. The effective date of this Order is August 19, 2013.

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Reviewed and Stipulated by:

District Air Pollution Control Officer, Co-Petitioner:

______________________________________ ______________________

Theodore D. Schade, Air Pollution Control Officer Date

City of Los Angeles Department of Water and Power, Co-Petitioner

______________________________________ ______________________

Ronald O. Nichols, General Manager Date

ORDERED FOR THE BOARD BY:

______________________________________ ______________________

John Eastman, Chair, District Governing Board Date

ATTEST:

____

Tori DeHaven, District Governing Board Clerk

Date: __________________________

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List of Exhibits

Exhibit 1: District Governing Board Order 110317-01

Exhibit 2: LADWP's Petition and attachments to the District Governing Board to modify Order 110317-01, filed June 14, 2013

Exhibit 3: Term Sheet approved by the LADWP Board of Commissioners on June 26, 2013, and the District Governing Board on June 27, 2013

Exhibit 4: District Governing Board Report for June 27, 2013, special meeting

Exhibit 5: Settlement Agreement and Release between District and LADWP, dated August 19, 2013

Exhibit 6: **CONFIDENTIAL** map of the 277-acre Initial ECR Area

Exhibit 7: Map of Phase 7a Modified Areas and Phase 7a Transition Areas

ATTACHMENT C

Exhibit 1

District Governing Board Order of Abatement 110317-01

BEFORE THE GOVERNING BOARD OF THE

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

In the Matter of **THEODORE D. SCHADE** AIR POLLUTION CONTROL OFFICER GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT, Petitioner, vs. **CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER** Respondent.	**Order Number 110317-01** **FINDINGS AND DECISION OF GOVERNING BOARD UPON HEARING FOR STIPULATED ORDER FOR ABATEMENT** Hearing Date: March 17, 2011 Location: Bishop, California

FINDINGS AND DECISION OF THE GOVERNING BOARD

A petition from the Great Basin Unified Air Pollution Control District's Air Pollution Control Officer for a Stipulated Order for Abatement ("Order") was heard on March 17, 2011, pursuant to notice and in accordance with the provisions of California Health and Safety Code Section 40823 and District Rule 811. Seven members of the District Governing Board were present: Board Chair, Linda Arcularius, Board members Tom Sweeney, Henry Veatch, Larry Johnston, Tim Hansen, Richard Cervantes and John Eastman. The District Governing Board was represented by George Poppic of the California Air Resources Board. Petitioner, Theodore D. Schade, the Air Pollution Control Officer (APCO), was represented by Randy Keller, District Counsel. Respondent, the City of Los Angeles Department of Water and Power, was represented by Michelle Lyman, Deputy City Attorney for the City of

Los Angeles. The public was given the opportunity to testify. The matter was submitted and evidence received. The District Governing Board finds, concludes and orders as follows:

FINDINGS OF FACT

1. The Great Basin Unified Air Pollution Control District (hereinafter "District") is organized pursuant to Division 16, Part 3, Chapter 3 of the California Health and Safety Code, and is the sole and exclusive agency with the responsibility for comprehensive air pollution control and regulation in the Great Basin Valleys Air Basin (California's Alpine, Mono and Inyo Counties), including that area of southern Inyo County known as the Owens Lake bed (Exhibit 1).

2. Respondent, the City of Los Angeles, acting by and through its Department of Water and Power, is a municipal corporation organized under the Los Angeles City Charter and the constitution and laws of the State of California, doing business within the jurisdiction of the Great Basin Unified Air Pollution Control District. Respondent operates a municipal water collection, distribution and aqueduct system in Inyo and Mono Counties for the purpose of supplying water to the residents of the City of Los Angeles.

3. Respondent is subject to District Governing Board Order 080128-01 adopted on January 28, 2008 (Exhibit 2). District Governing Board Order 080128-01 is the order contained in both the *2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan* (2008 SIP) and the *2010 PM_{10} Maintenance Plan and Redesignation Request for the Coso Junction Planning Area*. This order requires the Respondent to take a number of actions by certain specified dates in order to timely control the particulate matter air pollution (PM_{10}) emissions caused by its water production, diversion, storage and conveyance activities.

4. Respondent is also subject to District Hearing Board Order GB09-06 (Exhibit 3). District Hearing Board Order GB09-06 is the order associated with a variance, granted to the Respondent on September 25, 2009, that provided the Respondent additional time to implement PM_{10} controls on some areas of the Owens Lake bed originally ordered by District Governing Board Order 080128-01.

5. District Governing Board Order 080128-01 required Respondent to install a total of 13.2 square miles of additional PM_{10} controls beyond the 29.8 square miles of PM_{10} controls constructed prior to January 1, 2007. These 13.2 square miles are known as the "Phase 7" areas.

6. Of the required 13.2 total square miles in Phase 7, Respondent implemented 9.6 square miles in compliance with District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 and there are 0.5 square miles known as the "Channel Area" on which no representations regarding compliance status are made in this Order. These 10.1 square miles are not the subject of this Order.

7. However, within the 3.1 square-mile balance of the 13.2 square-mile Phase 7 areas, there are six sub-areas known collectively as "Phase 7a" where Respondent did not implement dust control measures in compliance with District Governing Board Order 080128-01 and District Hearing Board Order GB09-06. For the Phase 7a areas, District Governing Board Order 080128-01 required Respondent to implement any combination of approved PM_{10} controls known as Best Available Control Measures ("BACM"), which consists of Shallow Flooding, Managed Vegetation and Gravel Blanket, or an experimental, non-BACM PM_{10} control measure known as "Moat and Row."

8. Respondent had the legal option to select at its sole discretion any of the methods of dust control described in Findings of Fact Paragraph 7 herein and was required to secure all appropriate approvals and construct the controls by the deadline set forth in the order and modified by the variance. The deadline set by District Governing Board Order 080128-01 for constructing controls on the Phase 7a project areas was originally April 1, 2010, if Respondent selected BACM controls, or October 1, 2009, if Respondent selected Moat & Row controls.

9. Using District-, State- and Federally-approved air pollution modeling techniques specifically developed for Owens Lake emissions (District Board Order 080128-01, Attachment B, "Supplemental Control Requirements Determination Procedure"), for the period 2006 through 2010 the District determined that the Phase 7a areas emitted an annual average of approximately 6,265 tons of excess PM_{10}. These excess emissions have caused and contributed to violations of the state and federal 24-hour PM_{10} standards.

10. All of the Phase 7a areas are on State of California public lands managed by the California State Lands Commission ("CSLC"). Respondent is required to secure a lease from the CSLC before it may proceed to conduct any dust control activities occurring on state lands. The CSLC is not subject to District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 or any other current order requiring it to control PM_{10} emissions from the areas of the dried bed of Owens Lake owned by the State of California and managed by the CSLC.

11. Respondent exercised its discretion to implement Moat and Row controls on the Phase 7a project areas. In order to secure the necessary permits, leases and approvals from other public agencies, Respondent was required to and did conduct full-scale dust

control performance testing of Moat and Row at two locations on the Owens Lake bed. Results of the testing were disputed by the Petitioner and Respondent.

12. As a condition of considering Respondent's application for a Moat and Row lease for the Phase 7a areas, CSLC staff required that Respondent prepare a supplemental Environmental Impact Report ("SEIR") pursuant to the California Environmental Quality Act ("CEQA"). Respondent agreed to prepare the SEIR required by CSLC staff. The SEIR prepared and finalized by Respondent was not legally challenged by the CSLC or any other party.

13. Delays caused by preparation of the SEIR and securing the necessary permits, leases and approvals resulted in Respondent's inability to implement Moat and Row dust control measures on Phase 7a by October 1, 2009. Respondent therefore sought and was granted Variance Order GB09-06 from the District Hearing Board. The Variance Order extended the deadline for completion of the Phase 7a Moat and Row controls by one year from October 1, 2009 until October 1, 2010. The variance order also contained additional requirements designed to reduce excess PM_{10} emissions to the maximum extent feasible. These requirements provided for PM_{10} control through the use of temporary tilling on 3.5 square miles of area then under construction (a portion of the Phase 7 areas) and through implementation of a future dust control project to be completed six months earlier than would have normally been required under the provisions of Governing Board Order 080128-01. The expedited future project is 2.03 square miles of BACM known as the "Phase 8" project, which was ordered by the District Governing Board on December 6, 2010 (Order Number 101206-01).

14. For more than two years, Respondent negotiated with the CSLC in an attempt to procure a lease to implement Moat and Row controls in the Phase 7a project areas.

15. On April 6, 2010, the CSLC denied Respondent's application for the Moat and Row lease. As a result of the CSLC's denial of the Moat and Row lease, Respondent was unable to construct Moat and Row dust control measures on any part of the 3.1 square-mile Phase 7a project areas and was required to remove the Moat and Row dust control measures in place at the two Phase 7a demonstration areas. Thereafter, Respondent had insufficient time to comply with CEQA, obtain the necessary permits, leases and approvals and construct BACM on the 3.1 square mile Phase 7a project areas by October 1, 2010.

16. At all times relevant herein, Respondent acted in good faith to comply with District Governing Board Order 080128-01 and District Hearing Board Order GB09-06.

17. As there were no approved PM_{10} controls in place on the Phase 7a areas by the October 1, 2010 deadline, Petitioner determined that Respondent was in violation of District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 on that date. Petitioner determines that Respondent will remain in violation of District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 until approved PM_{10} controls are fully installed and operational on all Phase 7a areas.

18. "Fully installed and operational" means that all required Phase 7a and "Transition Areas" (additional areas that are transitioned from an existing BACM to another BACM in order to conserve water) infrastructure, earthwork and appurtenances necessary for compliant BACM operation is installed and, in the case of managed vegetation BACM, all plant materials are in place, but the plants may not necessarily be fully developed or grown

sufficiently to meet the 2008 SIP requirements for cover conditions. The Phase 7a and Transition Areas locations are shown and described in Exhibit 4.

19. Due to the fact no approved controls were in place on the Phase 7a areas, on October 1, 2010 the APCO issued Notice of Violation ("NOV") number 471 to Respondent for violating District Governing Board Order 080128-01 and District Hearing Board Order GB09-06.

20. Paragraph 11 of District Governing Board Order 080128-01 requires the APCO to use the "2008 Owens Valley Planning Area Supplemental Control Requirements Determination Procedure" ("SCR procedure," contained in Attachment B of Order) to determine the need for additional PM_{10} controls on the Owens Lake bed beyond those required by the original Order.

21. The SCR procedure provides that if Respondent is in compliance with the requirements set forth in "Board Order 080128-01 regarding the amount, timing and operation of existing and future dust controls, the APCO will not issue additional written SCR determinations until after May 1, 2010 and will not use data collected prior to April 1, 2010 for new determinations." The last SCR determination was issued in January 2008 in association with the 2008 SIP and used data up to June 30, 2006. The data collected starting July 1, 2006 has not previously been used to make an SCR determination.

22. Respondent maintains the right to challenge SCR determinations made by the APCO and orders for additional PM10 controls issued by the APCO based on such SCR determinations. Respondent retains all of its rights pursuant to Health and Safety Code § 42316, Attachment B to Board Order 080128-01, and all other available legal remedies to

challenge SCR determinations and orders based on such determinations. Nothing in this Order for Abatement amends or otherwise changes the SCR procedures.

23. Notice of hearing on this matter was duly given and published in accordance with Health and Safety Code §42450 and District Rule 811.

24. All parties have stipulated to this matter being heard by the District Governing Board and have waived all rights to contest the ongoing authority of the District Governing Board to hear this matter.

25. Members of the public were offered the opportunity to provide comment on the Order of Abatement. No public comments were offered.

26. To the extent any of these Findings of Fact are considered or deemed to be Conclusions or part of the Order, they are incorporated into those sections as if fully set forth therein.

CONCLUSIONS

1. The District Governing Board finds that Respondent is in violation of requirements in District Governing Board Order 080128-01 and District Hearing Board Order GB09-06 due to Respondent's failure to implement approved PM_{10} control measures on the 3.1 square-mile Phase 7a areas by October 1, 2010. The District estimates these violations are expected to result in approximately 6,265 tons of excess PM_{10} per year to be emitted from the Phase 7a areas of the dried bed of Owens Lake. These emissions would have been controlled if the Phase 7a PM_{10} controls had been implemented according to requirements. Excess PM_{10} emissions from the Phase 7a areas are expected to continue to cause or contribute to exceedances of both state and federal 24-hour PM_{10} standards.

2. The District Governing Board finds that Petitioner and Respondent have worked together to develop a number of corrective actions and Petitioner has committed to take such actions so as to provide effective PM_{10} control on the Phase 7a as expeditiously as feasible. Until dust control measures are implemented pursuant to this Order, there is the potential for excess emissions and state and federal air quality standards violations to continue to occur.

3. The District Governing Board finds that Respondent can achieve compliance with District requirements as expeditiously as feasible by implementing BACM, including an APCO-approved BACM test on Area T12-1 only, on the 3.1 square-mile Phase 7a areas.

4. The District Governing Board finds that, in addition to the expeditious implementation of BACM, Respondent must offset the potential excess PM_{10} air pollution emissions that may be emitted during the non-compliance period by taking additional actions to control and/or offset any excess air pollution emissions to the extent feasible.

5. The District Governing Board finds that due to the need to construct extensive infrastructure to deliver water to the emissive Phase 7a areas, if Respondent were to terminate, or reduce its water production, diversion, storage or conveyance activities in Inyo County, the available water could not immediately or readily be put to use in reducing excess PM_{10} air pollution emissions.

6. The District Governing Board finds it is not reasonable under California Health and Safety Code section 42316 to require Respondent to cease or curtail its water production, diversion, storage and conveyance activities in Inyo County during the non-compliance period, since the water is needed to comply with dust control requirements for the existing 39.9 square miles of PM_{10} control measures currently operating at Owens Lake

as required by District Governing Board Order 080128-01 and District Hearing Board Order GB09-06.

7. Therefore, the District Governing Board finds that the cessation or curtailment of Respondent's water production, diversion, storage and conveyance activities in Inyo County during the non-compliance period is contrary to Health and Safety Code § 42316 and would not provide a corresponding benefit in reducing the excess PM_{10} emissions.

8. The District Governing Board finds that, in addition to the essential and mandatory requirements that Owens Lake dust controls be effective and ensure that air quality standards are met in a timely manner, it is important that Owens Lake dust controls be as cost-efficient and water-use-efficient as possible.

9. The District Governing Board finds that issuance of this Order will not constitute a taking of property without due process of law.

10. The District Governing Board finds that corrective actions to be taken by the Respondent and compliance with the conditions set forth in this Order will bring the Respondent's water production, diversion, storage and conveyance activities into compliance with District orders, rules and requirements as expeditiously as feasible.

11. To the extent any of these Conclusions are considered or deemed to be Findings of Fact or part of the Order, they are incorporated into those sections as if fully set forth therein.

ORDER

THEREFORE, subject to the aforesaid statements, findings and good cause appearing, the Governing Board of the Great Basin Unified Air Pollution Control District orders as follows:

1. Except as provided in Paragraph 2 of this Stipulated Order for Abatement (Order), below, Respondent shall install, operate and maintain Best Available Control Measures (BACM) on approximately 3.1 square miles of the Owens Lake bed known as the "Phase 7a" areas and on approximately 3.0 square miles known as the "Transition Areas" as shown and described in Exhibit 4. BACM shall consist of the existing approved Shallow Flooding, Managed Vegetation, Gravel Blanket or any new/modified District-approved BACM. BACM are described in Paragraphs 12, 15, 16 and 17 of District Governing Board Order 080128-01, as well as in Chapter 5 of the 2008 SIP.

2. Respondent shall construct existing BACM, or conduct testing of new or modified BACM, as set forth in Attachment D of District Governing Board Order 080128-01 on up to one-third (0.33) square mile of the Phase 7a project area. The test area is limited to the Phase 7a subarea known as "T12-1" and is shown in Exhibit 4. BACM testing shall begin before October 1, 2011 and shall be conducted as provided in the 2008 SIP. As provided in District Governing Board Order 080128-01, Attachment D, additional research on potential new, modified and adjusted BACM shall be allowed within the 43.0 square mile 2008 Total Dust Control Area (which is described in District Board Order 080128-01, Exhibit 1).

3. The BACM and BACM-testing described in Order Paragraphs 1 and 2 shall generally be constructed as set forth in the Project Description attached as Exhibit 5. The Parties agree that in order for the project to comply with Health and Safety Code Section 42316, the Phase 7a project will rely upon and incorporate the use of all three approved BACMs.

4. Respondent shall install fully operational BACM for the Phase 7a areas and Transition Areas according to the following schedule:

a. Except the T12-1 BACM test area, BACM controls shall be fully installed and operational (as defined in Findings of Fact Paragraph 18, above) by December 31, 2013. All Phase 7a and Transition areas controlled by the Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover as specified in the March 2010 Managed Vegetation BACM Proposal (Exhibit 6) by December 31, 2015. The APCO shall submit said Proposal to the District Governing Board for approval and incorporation into the 2008 SIP prior to July 31, 2011.

b. For the T12-1 BACM test area (as provided in Order Paragraph 2, above) either any existing BACM or a District-approved new BACM shall be fully installed and operational by December 31, 2015 or an earlier date, if specified in the District's approval of the new BACM.

5. Respondent shall not be deemed in violation of this Order if Respondent is acting in good faith to comply with the terms of Order Paragraphs 1 through 4, but is impeded in its ability to comply with one or more of those terms of this Order as applicable to the Phase 7a and Transition Areas due to:

a. Unreasonable delays caused by the California State Lands Commission (CSLC), the District, or any other agency, except the City of Los Angeles and its agencies, in processing Respondent's application for a required permit, approval or lease necessary to allow Respondent to implement any of the three BACM, or the proposed 7a project.

b. Denial by the CSLC, the District, or any other agency, except the City of Los Angeles and its agencies, of a required permit, approval or lease necessary to allow Respondent to implement any of the three BACM, or the proposed 7a project.

c. A condition for a required permit, approval or lease made by the CSLC, the District or any other agency, except the City of Los Angeles and its agencies, that is unreasonable, unduly onerous, or that is not comparable to conditions contained in similar permits, approvals or leases necessary to allow Respondent to implement any of the three BACM, or the proposed 7a project.

d. Delays caused by any third party challenge to Respondent's compliance with CEQA related to the Phase 7a areas or the Transition Areas.

e. A condition of Force Majeure, which is defined to mean an extraordinary event or circumstance beyond the control of the parties, such as a war, labor actions, riot, crime, disruption of utilities or acts of God (such as adverse weather, earthquake, volcanic eruption or other natural disaster). Adverse weather is any weather condition, including but not limited to flooding and dust storms, that forces the Respondent to suspend all construction operations or prevents the Respondent from proceeding with 50 percent or more of the normal labor force and of the equipment engaged on critical path work. Delays shall only be granted for adverse weather days greater than 30 days for each 12 month period from April 1 through March 31.

f. Force Majeure is not intended to excuse delays or conditions where non-performance is caused by the usual and natural consequences of external forces, or where the intervening circumstances are specifically contemplated.

The Parties shall follow the procedure set forth in Order Paragraph 6 to determine if Respondent acted in good faith, but has been impeded in its ability to comply with the Order for any of the causes or conditions set forth above.

6. If Respondent's Board of Commissioners determines that Respondent has been impeded in its ability to comply with the requirements of this Order due to one or more conditions set forth in Order Paragraph 5, the following procedure shall be followed:

a. The Board of Commissioners shall pass a resolution making such a finding. If such a resolution is passed by the Board of Commissioners, Respondent shall notify the APCO in writing within 15 days of such resolution, and propose a detailed schedule of increments of progress setting deadlines for future actions to come into full compliance with this Order and to request an extension of the deadlines contained in this Order ("Schedule of Increments").

b. If the APCO concurs with the Board of Commissioners resolution, the Respondent and APCO shall jointly petition the District Governing Board to modify this Order as provided in Order Paragraph 22.

c. If the APCO does not concur with the Board of Commissioners resolution, the following shall occur:

i. The APCO shall notify the Respondent and the District Governing Board in writing of his finding within 15 days of receipt of the Board of Commissioner's resolution.

ii. Within 30 days of such written notice by the APCO to Respondent, two District Governing Board members and two of Respondent's Board members may meet to make a non-binding recommendation as to whether Respondent has met the requirements of Order Paragraph 5 and whether the requested Schedule of Increments should be granted, granted with modifications, or denied. The final recommendation, if any, shall be made in writing within 15 days of the meeting. If a recommendation is not made, or the meeting does not take place within 30 days of written notice by the APCO, Respondent may request a final determination from the District Governing Board at a public hearing, as provided in Order Paragraph 22.

iii. If there is written recommendation pursuant to Order Paragraph (6)(c)(ii), the APCO shall submit such written recommendation to the District Governing Board. The Respondent shall have the burden of proof by a preponderance of the evidence that the conditions set forth in Order Paragraph 5 have been met.

iv. If, at a public hearing, as provided in Order Paragraph 22, the District Governing Board finds that Respondent has proved by a preponderance of the evidence that the conditions set forth in Order Paragraph 5 have been met, the District Governing Board shall grant or grant with modifications the Schedule of Increments to allow Respondent additional time to comply without additional financial penalties being imposed for the delay. In addition, Respondent shall not be found in violation of this Order.

d. The Respondent retains all of its appellate and other legal rights to contest the findings of the District Governing Board to a court of competent jurisdiction.

7. In order to decrease water use on Owens Lake consistent with the stated goals of the Respondent and the District, up to 3.0 square miles of existing Shallow Flood controls as described in the attached Project Description (Exhibit 5) may be transitioned to any combination of the three approved BACM measures (Managed Vegetation, Shallow Flooding and/or Gravel Blanket) in order to provide a water supply for the 3.1 square miles of Phase 7a areas. The Transition Areas and the Phase 7a areas (with the exception of Area T12-1, which will be a BACM test) when completed shall only include BACM and will not include Moat and Row or any other non-BACM.

8. The parties stipulate that during construction of the Transition Areas, the Transition Areas may not be compliant at all times with the BACM requirements set forth in Governing Board Order 080128-01. Respondent therefore shall take “Reasonable Precautions” to control particulate matter emissions to the extent practicable during construction of the Transition Areas as set forth in District Rule 401A (adopted 09/05/74; amended 12/04/06). Respondent has developed a Conceptual Dust Control Plan for the Transition Areas consistent with, and considered to be the Reasonable Precautions required by, District Rule 401A and (attached hereto as Exhibit 7). Upon completion of the design of the Transition Areas and prior to any construction or any time when dust control measures in Transition Areas may be modified in a manner that would cause the areas not to comply with BACM requirements, Respondent shall submit to the APCO for his approval a final Dust

Control Plan. The APCO shall expeditiously review Respondent's plan and shall not unreasonably withhold his approval of such plan. Despite the terms of Sections 7.9 of the 2008 SIP and Attachment D to the Board Order, if the Transition Areas are not BACM compliant and if there is a monitored exceedance or if the Dust ID Protocol predicts an exceedance of the National Ambient Air Quality Standard for PM_{10} caused solely by emissions from the Transition Areas (as determined by the "Dust ID" procedure set forth in the 2008 SIP), the District shall not take enforcement action pursuant to the Health and Safety Code, a variance will not be required and the Respondent shall not be deemed in violation of this Order, District Governing Board Order 080128-01, the 2008 SIP, or other District rules or orders related to such exceedances, provided that Respondent implements the approved Dust Control Plan or under circumstances of force majeure prohibiting compliance with the Dust Control Plan during this transition period

9. Respondent shall submit quarterly written reports on Phase 7a and Transition Area progress to the APCO and Board Clerk. Quarterly reports shall describe the status of the work completed during that quarter, the planned work for the next four quarters, compliance with the schedule, and specifically identify issues that could delay progress on the Phase 7a project. Respondent shall promptly notify the District in writing of any circumstances that could cause project delays. Quarterly reports shall be due within 30 days of the end of each calendar quarter. The first quarterly report subject to this Order shall be due on or before July 30, 2011 and the last quarterly report subject to this Order shall be due for the quarter during which Respondent has achieved full compliance for all Phase 7a areas and all Transition Areas.

10. Based on the 2008 SIP modeling protocol estimate of 6,265 tons of excess annual PM_{10} air pollution emissions expected to be caused by Respondent's failure to implement effective PM_{10} controls on the Phase 7a areas by the mandatory deadlines, Respondent shall pay six-million-five-hundred-thousand dollars ($6,500,000.00) to the District to offset and mitigate such excess emissions that may occur between October 1, 2010 and December 31, 2013.

11. Except as provided in Order Paragraphs 5, 6, 8 and 9, above, and failure to comply with BACM implementation and operation deadlines for all Phase 7a areas and Transition areas as set forth in Order Paragraph 4, above, or by deadlines as subsequently modified by the District as provided in Paragraph 22, Respondent shall be subject to additional daily offset payments prorated by the amount of noncompliant area according to the following formula:

$$\text{Offset Amount (\$/day)} = \$5{,}500 + \$4500\,(A_{7a} + A_{TA})/6.1$$

where,

A_{7a} = Non-compliant Phase 7a Area (square miles), and

A_{TA} = Non-compliant Transition Area (square miles).

12. Respondent shall make the payment as set forth in of this Order Paragraph 10, above, within 90 days of the date of this Stipulated Order for Abatement, or within 90 days of the issuance of an order to pay, if additional payments are demanded, as provided in Paragraph 11 above, for failure to meet the completion dates set forth in Order Paragraph 4, above.

13. Eighty-five percent (85%) of the excess air pollution offset/mitigation payment made by Respondent to the District under Paragraphs 10 and 11 of this Order shall

be deposited into an Owens Lake Excess Air Pollution Offset Fund established by the District. These monies shall be used for Clean Air Projects within the District (Inyo, Mono and Alpine Counties) with preference given to projects in the Owens Valley PM_{10} Planning Area. “Clean Air Projects” are defined as improvements, replacements, or programs that directly or indirectly result in a reduction in air pollution emissions. Monies shall not be used to fund projects that Respondent is required to undertake or implement. The District Governing Board shall have the sole authority and discretion regarding project selection and approval, but will consider any project recommendations made by Respondent. Projects shall be publicized as joint projects of the Great Basin Unified Air Pollution Control District and the Los Angeles Department of Water and Power. Fifteen percent (15%) of the Clean Air Projects funds will be deposited into the District’s regular budget account. All costs incurred by the District to administer the Clean Air Projects program will be paid by the District from the District regular budget account. The District shall have the sole discretion and responsibility for the Clean Air Projects program administration, planning and implementation, and Respondent shall not be responsible for program costs other than for the offset mitigation payments in compliance with Paragraphs 10 and 11 of this Order.

14. The APCO shall resume the Supplemental Control Requirement determinations required in Paragraph 10 of District Governing Board Order 080128-01 and shall use data collected since July 1, 2006 to make such determinations.

15. The parties commit to work cooperatively to support Respondent’s efforts to develop and implement new PM_{10} control measures or modify existing measures that are as water-use efficient as possible.

16. Respondent shall comply with all other District rules, codes, orders and regulations not covered by this Order for Abatement, including all provisions of District Governing Board Order 080128-01 and District Hearing Board order GB09-06 that have not been modified by this Order for Abatement. Respondent's violation of any District rules, codes, orders or regulations not covered by this Order for Abatement, including all other provisions of District Governing Board Order 080128-01 and District Hearing Board Order GB09-06, shall be subject to District enforcement and will be considered separate violations not subject to the limitations and reductions set forth in the Order for Abatement.

17. This Order for Abatement does not act as a variance and Respondent is subject to all rules and regulations of the District except as provided in this Order for Abatement.

18. Final compliance shall be achieved, and this Order for Abatement shall terminate when Phase 7a and the Transition Areas are fully operational, but no later than December 31, 2015. Respondent shall notify the Clerk of the Board and the APCO in writing when final compliance is achieved.

19. Respondent enters into this Stipulated Order for Abatement without admitting liability and for the limited purpose of settling NOV No. 471 issued to Respondent by the APCO on October 1, 2010, and for violation of Governing Board Order 080128-01, and for violation of District Hearing Board Order GB09-06. Respondent specifically waives and agrees not to appeal or otherwise contest this Stipulated Order for Abatement under Health and Safety Code Section 42316 or any other cause of action. Respondent however, reserves its legal and appellate rights to contest any allegation that it has violated this Stipulated Order for Abatement. Respondent does not waive or give up its right to contest any other future

order, NOV, civil or criminal prosecution, or any other action the District may bring against Respondent subsequent to entry of this Stipulated Order for Abatement.

20. This Stipulated Order for Abatement is a full and final settlement of NOV No. 471 issued by the APCO to Respondent on October 1, 2010, and for the violation of Governing Board Order 080128-01. The stipulated order is the final integrated agreement between the parties regarding the matters addressed herein. By entering this Stipulated Order of Abatement, Respondent is hereby released from any additional liability for these violations except as set forth in this Order.

21. The District Governing Board shall retain jurisdiction over this matter until December 31, 2015, unless the Order is amended or modified.

22. The parties may petition the District Governing Board for a modification of this Order for Abatement with or without a stipulation. The Governing Board may modify the Order for Abatement without the stipulation of the parties upon a showing of good cause therefore and upon making the findings required by Health and Safety Code Section 42451(a) and District rule 805(a). Any modification of the Order shall be made only at a public hearing held upon ten (10) days published notice and appropriate notice to the parties.

23. The United States Environmental Protection (USEPA) Region 9 has been informed of this agreement made and entered into between the District and Respondent.

24. Petitioner and Respondent stipulate that the District Governing Board has full and complete jurisdiction in the matter of this Stipulated Order for Abatement.

25. Petitioner and Respondent affirm that their respective signatories below have the authority to represent and bind their respective parties to the terms of this Stipulated Order for Abatement.

Final: 3/17/2011

Reviewed and Stipulated by:

Air Pollution Control Officer, Petitioner:

Theodore D. Schade, Air Pollution Control Officer — 1 April 2011 Date

Los Angeles Department of Water and Power, Respondent:

Ronald O. Nichols, General Manager — 3/30/11 Date

ORDERED FOR THE BOARD BY:

Linda Arcularius, Chair, District Governing Board — April 1, 2011 Date

ATTEST:

Shirley Ono, Acting Board Clerk

Date: April 1, 2011

APPROVED AS TO FORM AND LEGALITY
CARMEN A. TRUTANICH, CITY ATTORNEY

MAR 29 2011

MICHELLE LYMAN
DEPUTY CITY ATTORNEY

List of Exhibits

Exhibit 1	Owens Lake – Map
Exhibit 2	District Governing Board Order 080128-01, contained in the *2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan*, January 28, 2008
Exhibit 3	District Hearing Board Order GB09-06, *Findings and Order Granting Regular Variance from Requirements Set Forth in Governing Board Order 080128-01*, September 25, 2009
Exhibit 4	Phase 7a and Transition Areas– Map and Coordinate Description
Exhibit 5	Phase 7a and Transition Areas Project Description
Exhibit 6	March 2010 Managed Vegetation BACM Proposal
Exhibit 7	Conceptual Transition Area Dust Control Plan

ATTACHMENT C

Exhibit 2

LADWP Petition to the District Governing Board to modify Order 110317-01,

filed June 14, 2013

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Attorneys for CITY OF LOS ANGELES
ACTING BY AND THROUGH ITS
DEPARTMENT OF WATER AND POWER

BEFORE THE GOVERNING BOARD OF THE

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

IN RE STIPULATED ORDER FOR ABATEMENT (ORDER 110317-01)	**PETITION BY THE CITY OF LOS ANGELES ACTING BY AND THROUGH ITS DEPARTMENT OF WATER AND POWER TO MODIFY ORDER 110317-01**

1. INTRODUCTION.

The City of Los Angeles, acting by and through its Department of Water and Power (LADWP), respectfully submits this Petition to modify Stipulated Order of Abatement 110317-01, dated March 17, 2011, by and between LADWP and the Great Basin Unified Air Pollution Control District (Great Basin), a copy of which is attached as Exhibit 1 (the Order). LADWP is currently in full compliance with the Order. However, due to the unexpected discovery of significant cultural and archaeological resources in the Phase 7a area, LADWP will not be able to complete the construction of the Phase 7a dust controls in the five Phase 7a subareas (T37-1, T37-2, T1A-3, T1A-4, and T32-1) and the transition areas selected from existing Shallow Flooding areas (T1A-2a, T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b) within the time frame specified in the Order. The extent and significance of these cultural resources is unprecedented around Owens Lake. LADWP relied upon the disclosures related to cultural resources set forth in the 2008 State Implementation Plan (2008 SIP) Supplemental Environmental Impact Report (SEIR) in agreeing to the time schedule in the Order. However, when LADWP investigated the presence of cultural resources, which it is required to do under Great Basin Governing Board Order 080128-01 (Order 080128-01), ¶ 23, the 2008 State Implementation Plan (SIP), §§ 5.1, 8.1, the SEIR, §§ 3.3.5, and the California Environmental Quality Act (Pub. Resources Code, §§ 21000, et seq.) (CEQA), LADWP discovered the cultural resources were far more extensive than disclosed in the SEIR. Because the consultation, investigation, and analysis of these extensive and unanticipated cultural resources must be completed before engineering design and contracting can begin, the construction of dust controls in the Phase 7a did not commence when it needed to in order to meet the future deadlines in the Order. Thus, the deadlines in the Order no longer provide a reasonable and sufficient time to construct the Phase 7a dust control project.

Section 5 of the Order explicitly allows for situations like this where LADWP is acting in good faith to comply with the Order's terms, but is impeded by circumstances beyond its control. LADWP fully satisfied the requirements of Paragraphs 5 and 6 of the Order by adopting three resolutions on February 7, 2012, April 3, 2012, and January 11, 2013, finding that LADWP acted in good faith to comply with the terms of the Order, but has otherwise been impeded in meeting the deadlines for installing BACM due to the unexpected discovery of extensive cultural resources. LADWP also briefed the Governing Board at its September 5, 2012, meeting about the impacts of the unexpected discovery of extensive cultural resources in the Phase 7a area. The September 5, 2012 meeting is part of the record for these proceedings. The Order provides that after adoption of the resolutions, LADWP may petition the Governing Board to modify the Order.

In addition to adjusting the deadlines to construct dust controls, LADWP is also requesting that the Governing Board adjust the boundaries of the Phase 7a dust control area to remove 350 acres (Avoided Area). This request is based upon the results of an extensive CEQA analysis conducted by LADWP that included consultation with local tribal representatives. The Avoided Area includes sites that are eligible for inclusion in the California Register of Historical Resources (CRHR) and a small buffer area. As further explained in this petition, there is good cause to support the Governing Board's approval of LADWP's request.

2. SUMMARY OF LADWP'S MODIFICATION REQUEST.

LADWP submits this Petition requesting that the Governing Board modify the Order as follows:

First, LADWP requests an extension of time to install dust controls on Phase 7a subareas (T37-1, T37-2, T1A-3, T1A-4, and T32-1), and the transition areas (T1A-2a, T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b). In order to implement BACM as expeditiously as possible, LADWP proposes to implement the BACM project in two Phases.

Phase 1 Schedule

The proposed Phase 1 schedule covers the following areas:

- Phase 7a: T1A-4 and T37-2 (except for 14 acres)
- Transition areas: T1A-2a, T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b

LADWP requests an extension of time to install controls in these areas until April 2, 2015, and for the areas with managed vegetation (T37-2 (minus 14 acres), T1A-2, T28N, T28S, T30-1a, T30-1b, and T36-1b) to have the vegetation sufficiently established by March 30, 2017.

<u>Phase 2 Schedule</u>

The proposed Phase 2 schedule covers the following areas:

- Phase 7a: T37-1, T1A-3, and T32-1

LADWP requests an extension of time to install controls in these areas until December 30, 2016, and for the areas with managed vegetation (T32-1) to have the vegetation sufficiently established by December 28, 2018.

The proposed schedules for Phase 1 and Phase 2 are contingent upon no further discovery of significant cultural and archeological resources, sufficient climatic conditions to facilitate the growth of the managed vegetation, and other agencies timely approving a lease amendment and the numerous permits required to implement the Phase 7a Project. These contingencies should be included in the modified Order.

Second, LADWP requests that 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 identified in the Final EIR certified by LADWP (*see* <u>Exhibit</u> 2) that contain CRHR-eligible sites be removed from the Phase 7a project area to permanently avoid impacts to the cultural resources in these areas. LADWP also requests that the Order be adjusted to comply with LADWP's EIR mitigation measure CR-3 that requires protection of three archaeological sites.

Third, LADWP requests that the Order be modified to clarify and confirm that LADWP's selection of approximately 3.4 square miles of the existing Shallow Flooding areas in Phase 7a subareas T1A-2, T28N, T28S, T30-1a, T30-1b, and T36-1b to be transitioned to a hybrid of BACM including Managed Vegetation, Gravel Cover and Shallow Flooding (Transition Areas), is consistent and fully compliant with Paragraphs 7 and 8 of the Order, which provide that during construction of the Phase 7a project a maximum of 3.0 square miles of Transition Areas may be without BACM at any time. LADWP's transition of the additional 0.4 square miles of dust control areas will be accomplished during the non-dust control season. (Draft EIR, § 3.1.8.1.) Therefore, consistent with the Order, no more than 3.0 square miles of the Transition Areas will be uncontrolled at any one time.

Fourth, LADWP requests that the Phase 7a map and coordinates presently included as Exhibit 4 to the Order be removed and replaced with Figure 1-1 of the Final EIR (*see* Exhibit 3) so as to accurately reflect the current Phase 7a Project area, Transition Areas and approved Best Available Control Measures (BACM).

Fifth, LADWP requests that the discovery of cultural resources be expressly recognized as one of the conditions beyond LADWP's control and for which LADWP is not deemed to be in violation of the Order. While LADWP believes this circumstance is covered by the Order, the Air Pollution Control Officer (APCO) has expressed some reservations about whether this circumstance is covered. Therefore, this request is necessary.

Sixth, LADWP requests that the Governing Board issue a modification to Order 080128-01 that is submitted to the California Air Resources Board (CARB) and United States Environmental Protection Agency (EPA) to conform that order to the these modifications.

Seventh, LADWP requests the Governing Board retain jurisdiction over the Order until December 31, 2018.

Finally, by this request, LADWP is not ratifying the Supplemental Control Requirements Determination (SCRD) discussion in the Order or agreeing to the previous or any future SCRDs.

3. FACTUAL AND PROCEDURAL BACKGROUND.

A. The Phase 7a Order for Abatement Requirements.

On March 17, 2011, the Governing Board issued the Order requiring LADWP to install BACM on Phase 7a. Phase 7a, a total area of approximately six square miles, consists of six separate and discrete Dust Control Areas (DCAs): T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1 (a total of approximately 3.1 square miles), and 3.0 square miles of Transition Areas (identified on Exhibit 4 to the Order).

Paragraph 4(a) of the Order provides that approved BACM shall be fully installed and operational on all Phase 7a subareas, except for T12-1, and Transition Areas by December 31, 2013, and that Transition Areas controlled by the Managed Vegetation BACM are to achieve fully compliant BACM vegetation cover by December 31, 2015. Paragraph 4(b) of the Order provides that BACM shall be installed and operational on the T-12-1 subarea by December 31, 2015.[1] This is a massive undertaking. The 6.5 square miles of individual Phase 7a and Transition Areas are dispersed all over the lakebed. As a basis of comparison, the City of Bishop is approximately 2 square miles in size. In order to install BACM in these Phase 7a and Transition Areas, LADWP must also construct a new access road, construct three new turn out facilities and modify four existing turn out facilities, install or reconfigure the berms on areas immediately adjacent to DCAs, and construct new water supply pipelines.

Paragraph 5 of the Order provides that LADWP shall not be in violation of the Order if LADWP is acting in good faith to comply with the terms of the Order, but is impeded or prevented from doing so by, among other things, events or circumstances beyond its control. Paragraph 6 of the Order permits the LADWP Board to adopt a resolution to this effect, and requires that LADWP notify Great Basin's APCO of any such resolution within 15 days of its adoption. As discussed below, the LADWP Board fully satisfied the requirements of Paragraph 5 by adopting three resolutions documenting unavoidable delays resulting from unanticipated cultural resources findings and timely notifying the APCO. Paragraph 22 of the Order provides that either LADWP or Great Basin may petition the Governing Board for a modification of the Order with or without a stipulation.

The Governing Board expressly retained jurisdiction over the Order until at least May 2016, which is the amended deadline to install BACM in the T12-1 subarea. (Order, p. 21 (¶ 21).) The Order also expressly allows for modifications to the Order (¶ 22) and specifically contemplates that LADWP would be able to seek a modification of the Order, for example, in the event LADWP is unable to install BACM in Phase 7a in accordance with the deadlines set forth in the Order. (, p. 14 (¶ 6.b.).) The modification provision is not limited to changes caused by conditions beyond LADWP's control. (Order, p. 21 (¶ 21).)

[1] On February 6, 2012, the Governing Board approved the APCO and LADWP's joint petition to modify the Order to extend the deadline for LADWP to install BACM on the T-12 subarea from December 31, 2015, to May 1, 2016 (Board Order No. 120206-07).

Board Order 080128-01 recognizes that the exact boundaries of Phase 7a (*i.e.*, the 2006 SDCA) may need to be modified to account for unforeseen project impacts (such as may be discovered during the course of completing CEQA review) or operational/construction issues, and that District approval of any formal request for modification by LADWP or the City "shall not be unreasonably withheld." Specifically:

> Upon written request by the City to the District and written approval by the District's APCO, minor adjustments may be made to the interior and exterior boundaries of the 2006 SDCA, for example to avoid impacts to existing resources or features, or for constructability reasons, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the 2008 TDCA [2008 Total Dust Control Area] shall also be modified to reflect the modified 2006 SDCA boundaries.

(Board Order 080128-01, ¶6.)

B. <u>Phase 7a Cultural Resources Evaluation.</u>

The 2008 SIP required LADWP to be responsible for conducting any CEQA analysis beyond the 2008 SIP SEIR in order to implement the control strategy and to obtain any necessary leases or other approvals from responsible agencies for the project. (*See* 2008 SIP, §§ 8.1, 5.1, 5.2.6). LADWP retained Garcia and Associates (GANDA) to conduct all of the archaeological investigations necessary to comply with CEQA requirements for Phase 7a. Between May and August 2011, GANDA conducted a Phase I pedestrian survey of the subareas within Phase 7a and discovered extensive archaeological and cultural resources throughout the proposed project that necessitated Phase II testing and evaluation. LADWP was required to obtain an Archaeological Investigation Permit from California State Lands Commission (CSLC) before conducting the Phase II testing and evaluation. CSLC approved the permit on September 1, 2011.

Immediately after CSLC approved the permit, GANDA commenced Phase II testing and evaluation of the sites identified during the Phase I pedestrian survey to determine the sites' eligibility for inclusion in the National Register of Historic Places (NRHP) and CRHR. In October 2011, GANDA completed its Phase II testing and evaluation of the T37-1 and T37-2 subareas. GANDA determined that subarea T37-1 contains four archaeological sites that are CRHR-eligible, and subarea T37-2 contains 12 archaeological sites, two of which are CRHR-eligible. GANDA advised LADWP to avoid any ground disturbing activities in or near the CRHR-eligible sites and, if avoidance was not feasible, LADWP would be required to complete a Phase III recovery before commencing ground disturbing activities in or near the CRHR-eligible sites.

In November and December 2011, LADWP evaluated whether it could proceed with the necessary geotechnical work on the T37-1 and T37-2 subareas while avoiding the disturbance of the CRHR-eligible sites. LADWP determined that it was infeasible to avoid disturbance of the four CRHR-eligible sites identified on T37-1 during geotechnical work and, therefore, LADWP did not proceed with geotechnical work on subarea T37-1. In addition, on December 13, 2011, GANDA issued a stop work order to LADWP (*see* Exhibit 4), pursuant to its authority under the CSLC permit, requiring LADWP to stop all geotechnical work or other construction-related ground disturbing activity on T37-1 until after the completion of Phase III archaeological data recovery excavations. LADWP determined that the CRHR-eligible sites on T37-2 could be avoided during geotechnical work. LADWP completed the geotechnical work on T37-2 in December 2011. LADWP, however, could not avoid any of the CRHR-eligible sites on T37-1 or T37-2 if it constructed dust control measures in accordance with the Order.

LADWP and the APCO met several times to discuss LADWP's progress on Phase 7a and possible alternatives to the project, including whether a cultural resources recovery effort could be avoided by increasing dust control efficiencies in other areas of Phase 7a that would enable the archaeologically-sensitive areas to remain untouched. In August 2012, GANDA completed its final Phase II Testing Report[2] and evaluation of historical and archaeological resources in all of the Phase 7a subareas, except for the T12-1 tillage test area. In its January 30, 2012, memorandum (*see* Exhibit 5), GANDA informed LADWP that subarea T1A-3 contains 38 archaeological sites, three of which are CRHR-eligible. GANDA further informed LADWP that subarea T32-1 contains 15

[2] The Phase II Testing Report contains sensitive cultural resources information that cannot be disclosed under protection laws. If requested by the Governing Board, LADWP will provide a copy of the Phase II Testing Report to the Governing Board for in-camera review subject to the Phase 7a Confidentiality Agreement between LADWP and Great Basin, dated March 27, 2012. GANDA also issued an additional stop work order on September 17, 2012. If requested by the Governing Board, LADWP will also provide this document for in-camera review subject to the Confidentiality Agreement.

archaeological sites, two of which are eligible for inclusion in the CRHR. GANDA recommended that the CRHR-eligible sites on subareas T1A-3 and T32-1 be completely avoided and that no geotechnical sampling or other construction-related ground disturbances be performed on T1A-3 or T32-1, since the CRHR-eligible sites encompass much of T1A-3 and T32-1 and cannot otherwise be avoided. GANDA further recommended that if avoidance or preservation in place were determined to be infeasible, then no ground disturbances should occur on T1A-3 or T32-1 until after the completion of Phase III archaeological data recovery excavations.

As a result of its investigations GANDA determined there are eleven sites in the Phase 7a project area (portions of T1A-3, T32-1, T37-1 and T37-2) eligible for listing in the CRHR. Three of the eleven sites (CA-NY-7414, CA-INY-7413/H, and CA-INY-7415/H) are locations involving the Owens Valley Indian Wars. These CRHR-sites are within the Avoidance Area. A summary of GANDA's Phase 7a investigations was presented to CARB on June 15, 2012, and is attached as Exhibit 6 [Powerpoint presentation].

A. Phase 7a CEQA Process.

Paragraph 23 of Board Order 080128-01 requires LADWP to comply with applicable CEQA mitigation measures included in the 2008 SIP SEIR. The mitigation measures require among other things, that if the Phase I pedestrian survey identified significant unanticipated cultural and archaeological resources, LADWP must conduct an assessment of potentially impacted cultural sites – both known and undiscovered – for significance under CEQA through the implementation of Phase II investigations. (SEIR § 3.3.5; p. 3.3-24; *see also* Appendix R-E [Final Cultural Resources Technical Report], § 5.3, pp. 5-107-109.).

The entire Phase 7a and Transition Areas are considered a single project under CEQA. (Cal. Code Reg., tit. 14, § 15378, subd. (a).) In accordance with CEQA, one environmental evaluation was conducted for the entire project, and no single part of the project could be implemented until CEQA for the entire project was completed. (*Orinda Ass'n v. Bd. of Supervisors* (1986) 182 Cal.App.3d 1145, 1171-72; *Topanga Beach Renters Ass'n v. Department of General Services* (1976) 58 Cal.App.3d 188, 195-196.) Therefore, even though some of the Phase 7a and

Transition Areas are not known to contain significant cultural resources, design could not be completed, permits from other agencies could not be obtained, construction contracts could not be awarded, and construction of the dust controls could not commence until LADWP had completed the entire CEQA process for Phase 7a.

In May 2011, LADWP prepared a CEQA Initial Study based on State CEQA Guidelines Appendix G, to determine whether construction and operation of the proposed project would result in significant effects on the environment. Since potentially significant effects were identified, LADWP determined that an EIR was needed to analyze those effects. A Notice of Preparation (NOP) of the EIR, along with the Initial Study, was prepared and filed with the State Clearinghouse on May 23, 2011. A public scoping meeting for the Phase 7a project was held on June 7, 2011, at the LADWP office in Keeler, California.

LADWP released the draft EIR in January 2013 for a 45 day public comment period. Over the course of the next several months, LADWP staff considered and responded to public comments, conducted further consultations with Native American groups and others about project impacts and comments on the draft EIR, and revised the draft EIR, as necessary, to incorporate any changes to the project.

CEQA requires that an EIR identify a reasonable range of alternatives to the proposed project (Phase 7a) that "would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project," and then provide detailed discussion of the comparative merits of each alternative for the decision-making body of the lead agency (LADWP Board of Commissioners) to consider before deciding which form of the project, if any, to ultimately approve. (CEQA Guidelines, §§ 15126.6, 15004, subd. (a).) Alternatives were identified in the EIR that would avoid impacts to cultural resources by excluding CRHR-eligible areas from the Phase 7a dust control project.

The Inyo County General Plan policies were also considered as part of the CEQA decision-making process. The Land Use/Conservation/Open Space element of the Inyo County General Plan identifies several goals that are related to preserving and promoting the County's historic and prehistoric cultural heritage, including:

- **Policy CUL-1.3, Protection of Cultural Resources:** Preserve and protect key resources that have contributed to the social, political, and economic history and prehistory of the area, unless overriding considerations are warranted.
- **Policy CUL-1.4, Regulatory Compliance**: Development and/or demolition shall be reviewed in accordance with the requirements of CEQA and the National Historic Preservation Act.
- **Policy CUL-1.5, Native American Consultation:** The County and private organizations shall work with appropriate Native American groups when potential Native American resources could be affected by development proposals.

On June 4, 2013, the LADWP Board of Commissioners considered and certified the Final EIR and approved the Avoidance Alternative for the Phase 7a project. (Exhibits 7, 8, 9, 10 [EIR, Board Approval Letter, and Resolution].) The Avoidance Alternative involved construction of the original proposed Phase 7a project in all areas except for 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 known to contain significant cultural resources. Because the Avoidance Alternative would protect these significant cultural resources, increase vegetated area on the lake, improve the habitat value of the Transition Areas, and achieve the emission reductions originally expected in the 2008 SIP, it was identified as environmentally superior to the originally proposed Phase 7a project and to the other alternatives evaluated in the Phase 7a EIR. The EIR also concluded that a Phase III data investigation and recovery would not be feasible mitigation for these eleven sites because of the tremendous importance of these sites to both the archaeological and local Native American communities for their prehistoric and historic value as unique historical resources. The Board of Commissioners approved the Phase 7a project and certified the Final EIR subject to and contingent upon the Governing Board's approval of this petition to modify the Order to remove these 350 acres from the original Phase 7a area, and to make any other additional changes necessary to ensure consistency between the Order, the Phase 7a project and the Final EIR.

B. <u>LADWP's Board of Commissioners Adopted Resolution No. 012-170 Regarding Phase 7a Subareas T37-1 and T37-2.</u>

On February 7, 2012, in accordance with Paragraphs 5 and 6(a) of the Order, the LADWP Board passed Resolution No. 012-170, finding that LADWP had acted in good faith to comply with the terms of the Order, but had been otherwise impeded in meeting the December 31, 2013, deadline for installing BACM on the T37-1 and T37-2 subareas of Phase 7a due to the unexpected discovery of extensive archaeological resources. On February 21, 2012, LADWP notified the APCO in writing of the LADWP Board's Resolution No. 012-170, and proposed a schedule of increments of progress and deadlines for future actions in compliance with Paragraph 6(a) of the Order. (*See* <u>Exhibit</u> 11 [resolution and notice].) The APCO did not object to Resolution No. 012-170, and thus, waived any objections to the findings in this resolution.

C. <u>LADWP's Board of Commissioners Adopted Resolution No. 012-210 Regarding Phase 7a Subareas T1A-3 and T32-1.</u>

On April 3, 2012, the LADWP Board adopted Resolution No. 012-210, finding that LADWP had acted in good faith to comply with the terms of the Order, but had been otherwise impeded in meeting the December 31, 2013, deadline for installing BACM on T1A-3 and T32-1 of the Phase 7a project due to the unexpected discovery of extensive archaeological resources. On April 17, 2012, LADWP notified the APCO in writing of the LADWP Board's Resolution No. 012-210, and proposed a schedule of increments of progress and deadlines for future actions in compliance with Paragraph 6(a) of the Order. (*See* <u>Exhibit</u> 12 [resolution and notice].) The APCO did not object to Resolution No. 012-210 and thus, waived any objections to the findings in this resolution.

D. <u>The September 5, 2012, Governing Board Meeting.</u>

On September 5, 2012, LADWP representatives attended the Governing Board meeting and presented information about the unanticipated cultural resources discovered in Phase 7a, and the potential effect the discovery of these resources would have on LADWP's ability to complete the Phase 7a EIR under CEQA, and install dust controls on Phase 7a by the December 31, 2013, deadline set forth in the Order. (*See* <u>Exhibit</u> 13.) LADWP also notified the Governing Board that it would be returning to the Governing Board with the current Petition. LADWP also followed up with a letter to the Governing Board Chair on February 14, 2013. (*See* Exhibit 14.)

E. LADWP's Board of Commissioners Adopted Resolution No. 013-157 Regarding Phase 7a Subarea T1A-4 and Transition Areas.

On January 11, 2013, the LADWP Board adopted Resolution No. 013-157, finding that LADWP had acted in good faith to comply with the terms of the Order, but had been otherwise impeded in meeting the December 31, 2013, deadline for installing BACM on T1A-4 and the Transition Areas of the Phase 7a project due to the unexpected discovery of extensive archaeological resources and the resulting delay in completing the Phase 7a EIR. Even though significant cultural resources have not been discovered in these areas, the schedule for installing BACM in these areas is affected by the unexpected discoveries in the other Phase 7a area because CEQA requires one environmental analysis to encompass the entire project. The T1A-4 and the Transition Areas cannot be excluded from the project under CEQA. On January 23, 2013, LADWP notified the APCO in writing of the LADWP Board's Resolution No. 013-157 and proposed a schedule of increments of progress and deadlines for future actions, in compliance with Paragraph 6(a) of the Order. (*See* Exhibit 15 [resolution and notice].) The APCO responded on February 4, 2013, stating that he did not concur with the findings of Resolution No. 013-517.[3] Thus, the APCO's objections must be limited to this resolution.

F. LADWP's Board of Commissioners and Great Basin Governing Board Meet and Confer in Accordance with Paragraph 6(c)(ii) of the Order.

Paragraph 6(c)(ii) of the Order provides that, in the event the APCO does not concur with the Board of Commissioners' resolution, two Great Basin Governing Board members and two LADWP Board of Commissioners members may meet to make a non-binding recommendation to the Governing Board as to whether LADWP has met the requirements of Paragraph 5 of the Order and whether the requested Schedule of Increments should be granted, granted with modifications, or denied. Following notification of the APCO's non-concurrence with Resolution No. 013-517,

[3] On February 28, 2013, LADWP responded to the assertions raised in the APCO's February 4, 2013, letter regarding his refusal to concur with Resolution No. 013-517. A copy of LADWP's February 28, 2013, correspondence is attached as Exhibit 16.

two members of the LADWP Board of Commissioners (Richard Moss and Jonathan Parfrey) and two members of the Great Basin Governing Board (Linda Arcularius and Matthew Kingsley) met to discuss the APCO's refusal to concur with Resolution No. 013-517. LADWP and Great Basin have since held several meetings and made significant progress towards resolving this matter. These discussions remain ongoing; consequently, the modifications to the Order requested by this Petition may need to be amended to reflect the terms of any agreement reached between the parties.

4. <u>THE DISCOVERY OF EXTENSIVE CULTURAL RESOURCES NECESSITATED AN EXTENDED CEQA PROCESS.</u>

In the history of LADWP's dust control efforts in Owens Valley, the quality and quantity of archaeological resources discovered during the Phase I and II investigations of the Phase 7a area are unprecedented. LADWP had no reasonable expectation when it stipulated to the Order that it would later discover extensive archaeological resources in the Phase 7a area because it has never discovered resources on this scale in any other dust control areas. Great Basin has represented that the area was submerged under water and exposed only by LADWP's water gathering activities. Further, the SEIR for the 2008 SIP did not disclose the extensive cultural resources that were subsequently discovered when LADWP conducted its analysis. Therefore, LADWP would not expect to discover that the area it was being required to control was not submerged, but actually inhabited in recent times.

In conducting its CEQA assessment, LADWP complied with Paragraph 23 of Board Order 080128-01. This Board Order requires LADWP to comply with applicable CEQA mitigation measures included in the 2008 SIP SEIR. After the Phase I pedestrian survey identified significant unanticipated cultural and archaeological resources, LADWP was required by SEIR Mitigation Measure Cultural-2 to conduct an assessment of potentially impacted cultural sites – both known and undiscovered – for significance under CEQA through the implementation of Phase II investigations. (SEIR § 3.3.5; p. 3.3-24; *see also* Appendix R-E [Final Cultural Resources Technical Report], § 5.3, pp. 5-107-109.) The CEQA analysis was delayed while LADWP's consultant, GANDA, conducted the required Phase II investigations for the Phase 7a EIR. CEQA requires that any project that causes a substantial adverse change in the significance of an historical resource, including archaeological resources, is a "significant effect" requiring the preparation of an EIR. (Pub. Resources Code, §§ 21084.1, 21083.2; 14 Cal. Code Regs., § 15064.5.) Therefore, the preparation of the Phase 7a EIR was delayed while the Phase II investigations were conducted and the subsequent analysis of the results were prepared. A summary of LADWP's diligent efforts to promptly assess and respond to the cultural resource issues, and the impacts of the cultural resource investigation upon the Phase 7a project schedule is included in Exhibit 17.

LADWP was also required to consult with the Native American Heritage Commission (NAHC) as part of the EIR process. (Pub. Res. Code, § 5097.97; *Environmental Protection Info. Ctr. v. Johnson* (1985) 170 Cal.App.3d 604, 626.) Under Public Resources Code section 5097.97, the NAHC may also investigate the effect of proposed actions by a public agency if the proposed action may cause severe or irreparable damage to a Native American sacred site located on public property and may recommend mitigation measures for consideration by the public agency if the NAHC finds, after a public hearing, that the proposed action would result in damage to or interference with access to the sacred site.

LADWP also sought the input of the landowner and interested Indian tribes in conducting its CEQA analysis for the Phase 7a project in light of the significant archaeological findings. LADWP received a letter dated February 3, 2012, from Mary Wuester, Chairperson of the Lone Pine Paiute-Shoshone Reservation (Exhibit 18) expressing concern over the fate of the archaeological resources found in the Phase 7a project area and requesting to be included in the decision-making process. Similar correspondence was received as part of the public review and comment process on the EIR. These letters are included in the EIR, Exhibit 7. LADWP understands that the unique historical and archaeological resources discovered in the Phase 7a area, including the CRHR-eligible sites in subareas T37-1, T37-2, T1A-3 and T32-1, hold significant cultural value to Owens Valley residents and local Native American tribes. Given the extent of the archaeological resources in the Phase 7a project that are of direct significance to the culture and history of the local Native American tribes, the tribes were necessarily included in the discussion and evaluation of the significance of the resources, and whether they should remain in place undisturbed.

The required consultation and input from interested Native American tribes were incorporated into the Phase 7a EIR. As a result of the consultation and input, the project proposed under CEQA was revised to exclude 350 acres to protect in place certain sites that are eligible for inclusion in the NRHP and/or CRHR. The LADWP Board of Commissioners, as the lead agency under CEQA, ultimately determined to adopt this revised project (*i.e.*, the Avoidance Alternative) as the final Project for Phase 7a after considering the Phase 7a EIR and public comments, including numerous comments from local Native American tribal representatives, about whether to preserve the CRHR-eligible sites and other artifacts in place and leave them undisturbed, or to conduct a Phase III recovery. As noted previously, LADWP could not move forward with the preparation of final engineering designs and construction contract bidding until the entire CEQA process had been completed. These extended analyses and consultations significantly lengthened the CEQA process beyond what it would have been if cultural resources were not such a significant issue for Phase 7a.

Portions of the Phase 7a dust control project without cultural resources could not proceed because the entire dust control area constituted one "project" under CEQA, and LADWP cannot construct the project without first complying with CEQA. (*Citizens of Goleta Valley v. Bd. of Supervisors* (1990) 52 Cal.3d 553, 564; CEQA Guidelines, §§ 15126.6, 15004, subd. (a).)

The deadlines in the Order were impossible to achieve in light of the unanticipated discovery of the cultural resources. Had LADWP moved forward with construction when it needed to in order to achieve the deadlines in the Order, there could be serious consequences to LADWP, including penalties, legal challenges, or other ramifications for violating laws and requirements under:

- CEQA
- Board Order 080128-01
- SEIR mitigation measures
- Public Res. Code § 5097.9, Native American Historical, Cultural, and Sacred Sites

- CRHR laws
- GANDA's stop work order issued on December 13, 2011
- Inyo County Code, § 9.52.050 - Destruction of sites where artifacts or remains have been identified is punishable as a misdemeanor by a fine or by imprisonment
- Cal. Penal Code § 622 ½
- Archaeological Resources Protection Act of 1979 (16 U.S.C.A. §§ 470aa to 470mm; 36 C.F.R. § 800 et seq.)
- Religious Freedom and Restoration Act (RFRA), 42 U.S.C. § 2000bb et seq.
- Native American Graves Protection and Repatriation Act (25 U.S.C. § 3001 et seq.)
- California Native American Graves Protection and Repatriation Act of 2001 (Health & Saf. Code, § 8010 et seq.)

These are exactly the kind of circumstances covered by paragraphs 5 and 6 of the Order.

5. <u>REQUEST TO MODIFY THE ORDER.</u>

LADWP satisfied the conditions set forth in Paragraph 5 of the Order by adopting Resolutions 012-170, 012-210, and 013-157 and certifying the Phase 7a EIR contingent upon the Governing Board's approval of this Petition to modify the Order so that it is consistent with the approved Phase 7a project and Final EIR. Pursuant to Paragraph 22 of the Order and Paragraph 6 of Board Order 080128-01 (and all other appropriate authority) and the express direction of LADWP's Board of Commissioners, LADWP submits this Petition and requests that the Governing Board approve the following modifications to the Order:[4]

1. LADWP requests that the Governing Board modify the Order to extend the time for the installation of BACM on Phase 7a subareas: T37-1, T37-2, T1A-3, T1A-4, and T32-1, and the Transition Areas (T1A-2a, T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b).[5] In order

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[4] In light of the ongoing discussions between representatives of the LADWP Board of Commissioners and Great Basin Governing Board pursuant to Paragraph 6(c)(ii) of the Order, LADWP reserves the right to continue, withdraw and/or modify this Petition at any time prior to the upcoming July 15, 2013, Governing Board meeting.

[5] For reference, the attached <u>Exhibit</u> 17 provides a comparison of the schedule expected when the Order was adopted with the proposed schedule based on the unanticipated extensive discovery of the cultural and archaeological resources.

to implement the dust controls as expeditiously as possible, LADWP proposes to implement the project in two Phases.

<u>Phase 1 Schedule</u>

The proposed Phase 1 schedule covers the following areas:

- Phase 7a: T1A-4 and T37-2 (except for 14 acres)
- Transition areas: T1A-2a, T28N, T28S, T30-1a, T30-1b, T35-1, T35-2, and T36-1b

In early November 2012, LADWP conducted additional geotechnical work to help complete the design of Transition Areas. The design and construction specifications for the non-culturally sensitive areas of Phase 7a, including the Transition Areas, T1A-4 and T37-2, were completed in May 2013. (*See* April 30, 2013, Phase 7a Quarterly Report.) LADWP expects to award a construction contract by early August 2013, and start construction in September 2013. LADWP estimates that construction of dust control in these areas can be completed over a period of approximately 20 months after the acquisition of all necessary permits, leases and other approvals discussed above. The discovery of any further cultural resources in these areas will impact the construction schedule. A summary of the proposed schedule is as follows:

Activity	Time Frame
Completion of the design and construction specifications	May 2013
Certification of the Phase 7a EIR and Decision on the Project	June 2013
Great Basin Issuance of an Order to Comport Order to the Phase 7a EIR and Project	July 2013
Issuance of Other Required Permits	August 2013
Award of construction contract	August 2013
Construction of dust controls begins	September 2013
Construction of dust controls completed	April 2015
Vegetation and transition areas compliant (T37-2, T1A-2, T28N, T28S, T30-1a, T30-1b, and T36-1b)	March 2017

This schedule represents a 16-month extension of time.

Phase 2 Schedule

The proposed Phase 2 schedule covers the following areas:

- Phase 7a: T37-1, T1A-3, and T32-1

The design of controls for T37-1, T32-1, and T1A-3 had to be suspended when the significant cultural resources were identified in order to assess the impacts under CEQA and identify mitigation, including avoidance. Now that the LADWP Board has approved a Phase 7a project that requires avoidance of the 350 acres known to contain significant cultural resources, LADWP will proceed to design the project, and award a construction contract. A summary of the estimated schedule for Phase 2 is as follows:

Activity	Time Frame
Certification of the Phase 7a EIR and Decision on the Project	June 2013
Great Basin Issuance of an Order to Comport Order to the Phase 7a EIR and Project	July 2013
Completion of the design and construction specifications	December 2013 (approx. six months after EIR certification)
Issuance of Other Required Permits	June 2014
Award of construction contract	June 2014
Construction of Dust Controls	December 2016 (approx. 30 months after contract awarded)
Areas with managed vegetation established (T32-1)	December 2018 (approx. two years after dust controls installed)

This schedule represents a 2½ year extension of time.

These estimated schedules for Phases 1 and 2 are contingent upon no further discovery of significant cultural and archeological resources, sufficient climatic conditions to facilitate the growth of the managed vegetation, and other agencies timely approving the numerous permits required to implement the Phase 7a project, including but not limited to the following:

- A lease amendment for use of state lands will be required from the CSLC prior to project construction.
- Consistent with the previous DCMs installed on Owens Lake, a Lakebed Alteration Agreement pursuant to Section 1602 of the Fish and Game Code will be needed from the California Department of Fish and Wildlife (CDFW).
- An amendment to existing Clean Water Act Section 404 permit SPL-2008-00582-BAH from the U.S. Army Corps of Engineers for Phase 7 to include construction, operations, and maintenance associated with Phase 7a will be needed.
- Construction of the Phase 7a project will be completed in compliance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES NO. CAS000002). Pursuant to the General Permit, a Storm Water Pollution Prevention Plan (SWPPP) incorporating best management practices (BMPs) for erosion control will be developed and implemented during project construction.
- Discharge of water to the Lake for dust control is currently permitted by the Lahontan Regional Board through Waste Discharge Requirements (WDR) for the Southern Zones Dust Control Project (Board Order No. R6V-2006-0036). It is LADWP's current understanding that the Regional Board has determined that implementation of the Phase 7a project does not warrant a revision or amendment to the existing WDR. If the Regional Board decides differently, a WDR will need to be obtained.
- LADWP will need to use the SR 136 right-of-way for gravel transport. This activity will require approval from the Bureau of Land Management (BLM) and an encroachment permit from the California Department of Transportation (Caltrans). Caltrans encroachment permits will also need to be obtained for access roadways, Dirty Socks

Road and other roadways, as necessary. The permits address access, maintenance, legal sized load restrictions and traffic control (*i.e.*, Traffic Work Safety Plan).

- A Dust Control Plan will need to be approved by Great Basin.
- A permit or non-objection letter from Inyo County for the maintenance of the Highway 395/T37-2 access road will also need to be obtained.
- Relevant archaeological investigation and/or excavation permits will need to be obtained from the CSLC.
- Subsequent modifications to the Order, and possibly other Board Orders, to implement the approved Phase 7a project will need to be adopted by the Governing Board.
- The installation of the fuel tank at the construction office to serve the haul trucks will require the following:
    1) Permit to Operate (1316-00-06) – An air quality permit from Great Basin related to vapor recovery.
    2) Certified Unified Program Agency (CUPA) Facility Permit – A hazardous material/waste permit and associated contingency and business plan from the Inyo County Department of Environmental Health Services.
    3) Spill Prevention Control and Countermeasure (SPCC) Plan – For aboveground oil tanks of 1,320 gallons or more, and for fuel trucks when fuel will be left in the truck overnight. The Plan is filed with the Inyo County Department of Environmental Health Services.

2. LADWP requests that 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 known to contain CRHR-eligible sites be removed from the Phase 7a project area so as to allow for permanent avoidance of impacts to resources in these areas (*see* Exhibit 2). The removal of these 350 acres shall not affect LADWP's ability to proceed with the design and implementation of dust controls on the remaining Phase 7a areas not known to contain cultural resources and/or unrelated to these avoidance areas. LADWP also requests that the Order be adjusted to comply with LADWP's EIR mitigation measure CR-3 that requires protection of three archaeological sites.

3. LADWP requests that the Order be modified to clarify that the approximately 3.4 square miles of Transition Areas selected by LADWP to be transitioned from Shallow Flooding into a hybrid of BACM, including Managed Vegetation, Gravel Cover and Shallow Flooding, are consistent and fully compliant with Paragraphs 7 and 8 of the Order. Paragraphs 7 and 8 provide that a maximum of 3.0 square miles of Transition Areas may be without BACM at any time during construction of the Phase 7a project. LADWP's transition of the additional 0.4 square miles of dust control areas (above the allowable 3.0 square miles) will be accomplished during the non-dust control season. (Draft EIR, § 3.1.8.1.) Therefore, consistent with the Order, no more than 3.0 square miles of the Transition Areas will be uncontrolled at any one time.

4. LADWP requests that the Phase 7a map and coordinates presently included as Exhibit 4 to the Order be removed and replaced with Figure 1-1 of the Final EIR (*see* Exhibit 3) in order to accurately reflect the current Phase 7a Project areas, Transition Areas and the approved BACM.

5. LADWP requests that the discovery of cultural resources be expressly recognized as one of the conditions beyond LADWP's control and for which LADWP is not deemed to be in violation of the Order.

6. LADWP requests that the Governing Board issue a modification to Order 080128-01 that is submitted to CARB and EPA to conform that order to the these modifications.

7. LADWP requests the Governing Board retain jurisdiction over the Order until December 31, 2018.

LADWP reserves the right to introduce further evidence to support its petition prior to or at the hearing.

6. CONCLUSION.

The unexpected discovery of significant cultural and archaeological resources in the Phase 7a area that are beyond LADWP's control will prevent LADWP from installing BACM by the deadlines anticipated in the Order. LADWP has satisfied the requirements of Paragraphs 5 and 6 of the Order by adopting the three resolutions and completing the CEQA process for Phase 7a.

The modifications to the Order sought by this Petition are necessary to ensure consistency between the Order and the Phase 7a project and EIR approved/certified by the LADWP Board of Commissioners. Therefore, LADWP respectfully requests that the Order be modified as requested.

DATED: June 14, 2013

Respectfully Submitted,

CITY OF LOS ANGELES, DEPARTMENT OF WATER AND POWER

By: Michelle M. Lyman

Michelle M. Lyman
Attorneys for CITY OF LOS ANGELES ACTING BY AND THROUGH ITS DEPARTMENT OF WATER AND POWER

ATTACHMENT C

Exhibit 3

Term Sheet Agreement approved by LADWP Board of Commissioners

on June 26, 2013 and District Governing Board on June 27, 2013

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
AND
LOS ANGELES DEPARTMENT OF WATER AND POWER

PHASE 7a AND KEELER DUNES
SETTLEMENT TERMS
JUNE 25, 2013

The following constitutes the Settlement Terms (the "Terms") for the Phase 7a Stipulated Order for Abatement (SOA) and Keeler Dunes issues between the Great Basin Governing Board (GB) and the Los Angeles Department of Water and Power (LADWP):

I. MODIFICATION OF SOA

A. GB and LADWP agree that GB shall modify the Phase 7a SOA to do the following:

1. Deadline Extensions

   a) Existing December 31, 2013 deadline for all infrastructure for BACM and compliant operation (other than Managed Vegetation Compliance) to be installed and fully operational extended to December 31, 2015.

   b) Existing December 31, 2015 deadline for Managed Vegetation Controls (fully compliant managed vegetation cover) extended to December 31, 2017.

2. Assumptions for Extension of Deadlines

   a) Timely Availability of necessary leases from State Lands and of necessary permits from other agencies

b) Acceptance by GB of 328 acres of Eligible Cultural Resource (ECR) areas. ECR areas are defined as California Register of Historical Resources (CRHR)-eligible areas plus necessary buffer areas and are to be removed from Phase 7a and placed into Phase 7b (see below) and potentially the subject of a new future Board order. A confidential map of the existing 328-acre ECR areas shall be attached to the amended SOA.

c) Force majeure process of original SOA to be followed for newly discovered potential ECRs.

B. <u>Creation of Phase 7b</u>

1. Phase 7b would be created for the treatment of the 328 acres of ECR areas plus any newly discovered cultural resources within Phase 7a that are determined by LADWP's state certified archaeologist to be CRHR-eligible and necessary buffer areas (the "Additional Phase 7b Areas") and whose determination is confirmed by a second, state certified archaeologist mutually agreeable to GB, LADWP and State Lands (the "Second Archaeologist").

2. Initially Phase 7b would include 328 acres of previously identified ECR areas from Phase 7a (the "Initial Phase 7b Areas").

3. Any areas in Phase 7a (beyond the Initial Phase 7b Areas) where ECRs are located during Phase 7a construction shall be handled as part of Phase 7b (the "Additional Phase 7b Areas"). Promptly upon discovery of any cultural resources during the Phase 7a construction process, LADWP shall promptly notify GB of, and confer with GB about, such discovery, and LADWP's state certified archeologist shall fulfill their legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the

CRHR eligible areas; such evaluations shall be confirmed by the Second Archaeologist. Newly identified CRHR eligible areas and necessary buffer areas shall become ECR areas and become part of the Additional Phase 7b Areas.

4. Cultural Resource Task Force

a) The amended SOA will establish a Cultural Resource Task Force (CRTF). The CRTF will be an advisory group consisting of LADWP, GB, State Lands, State Historical Preservation Office, and Local Tribal Representatives. The CRTF shall be able to draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the reasonable costs of the CRTF, including reimbursements for travel expenses of CRTF members.

b) The CRTF will initially be charged to make recommendations to GB and LADWP as to the best course of action and timing for the treatment of the Initial Phase 7b Areas. Such treatment could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. The CRTF will make non-binding recommendations to the GB Governing Board and LADWP regarding treatment of the Initial Phase 7b Areas on or before December 31, 2014. LADWP and GB shall commit to form the CRTF and host its initial meeting within ninety (90) days after the effective date of the amended SOA.

c) The CRTF shall also make non-binding recommendations to GB and LADWP with respect to the treatment of ECRs that may become part of the Additional Phase 7b Areas. After making its recommendations for the Initial Phase 7b Areas, the CRTF shall remain in existence to make recommendations for any Additional Phase 7b Areas that may be designated ECRs by LADWP's state certified archaeologist and confirmed by the Second Archaeologist.

d) If after considering the non-binding recommendations of the CRTF, GB exercises its discretion to order LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, GB will issue a new Board order or orders after receiving input from LADWP and will determine if any SIP amendment is necessary. The new Board order or orders shall include control completion deadlines that take into account project circumstances, including but not limited to, recovery and additional environmental work necessary to complete the project at issue. The new Board order or orders shall recognize that the construction period shall be subject to all time-extensions-for-cause provisions of Paragraphs 5 and 6 of the SOA.

e) Like the SOA for Phase 7a, any future order or orders issued by GB pertaining to Phase 7b will give due consideration to the shared goals of GB and LADWP to control air pollution and decrease the use of water for dust control at Owens Lake. In making its recommendations, the CRTF will also give due consideration to GB's and LADWP's shared water saving and air pollution control goals.

f) The CRTF will be advisory in nature only, and GB and LADWP will retain final determination as to the treatment of ECR areas. GB reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order.

g) Permanent avoidance of any portion of the Phase 7b Areas will be considered by GB, which, upon approval, shall amend the 2008 SIP and Board Order 080128-01 in order to get USEPA approval.

C. <u>No Fines</u>

1. GB shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any areas of Phase 7a, provided that the Phase 7a dust controls are put into place within the time frames set forth in Section I.A.1.

2. GB shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the SOA and this agreement.

D. Modification of SOA

1. The amended SOA shall clarify that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be included in the SOA's existing time-extensions-for-cause, as set forth in SOA Paragraphs 5 and 6.

2. The amended SOA shall reiterate that GB and LADWP shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.

3. The amended SOA shall state that the modification of the SOA by GB and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in the amended SOA and the Keeler and Other Dunes Release".[1]

4. The effective date of the amended SOA shall be the date upon which the necessary decision makers of the City of Los Angeles and the GB Governing Board agree to enter into this agreement to modify the SOA.

E. Clarification on BACM

1. GB hereby approves Reduced Thickness Gravel BACM (2 inches of gravel with geotextile fabric underlay).

[1] LADWP disputes the legality of and does not agree to the Supplemental Control Requirements Determination (SCRD) process. GB asserts that LADWP agreed to the SCRD process in the original Phase 7a SOA and elsewhere, and the SCRD process is now the law. GB and LADWP have a continuing disagreement on this point.

2. GB hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. GB and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. “Brine Pool” is defined as those areas below elevation 3,553.55 feet.

3. GB will commit to work with the LADWP on an accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the effective date of the amended SOA, GB and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. Said schedules will include consideration for BACM approval of these candidate measures by the GB Board within one year of completion of the schedules (within 13 months of the effective date of the amended SOA). If the accelerated testing does not result in approved BACM designation for the candidate measures, LADWP and the GB Board will jointly assess why the accelerated testing did not result in BACM approvals. GB and LADWP also will commit to work on accelerated testing schedules and BACM approvals for other forms of BACM.

4. GB will memorialize its approvals set forth in Sections I E. (1) and (2) and any future approvals pursuant to Section I E. (3) in formal GB board resolutions and orders. GB and LADWP will jointly appeal to State Lands to approve use of new BACMs promptly upon their approval by GB and, with respect to the approvals set forth in Sections I E. (1) and (2) within 90 days of the effective date of the amended SOA.

II. KEELER DUNES

A. Keeler Dunes Dust Control Project

1. LADWP shall provide $10 Million to GB as a public benefit contribution to and will support GB's "Keeler Project" (as defined herein below) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the $10 Million in a single payment to GB within 90 days after the effective date of the amended SOA and the following two actions are completed: 1) delivery to LADWP of the "Keeler and Other Dunes Release" (defined herein below) and 2) the submittal to the California Air Resources Board (CARB) as described in Paragraph II.B.1.c., below. The "Keeler and Other Dunes Release" shall not be effective until GB receives the $10 Million payment.

2. GB shall use the funds for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly related activities for a dust emission control project at Keeler Dunes (the "Keeler Project"). No funds shall be used for the purpose of attorney fees, public affairs or governmental relations (collectively, "Public Affairs") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and BLM. GB shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.

3. Upon delivery of the "Keeler and Other Dunes Release" (defined herein below) and the SIP and Board Order 080128-01 amendment submittal to the CARB as described in Paragraph II.B.1.c., below, LADWP will immediately provide GB with access to its property in the Keeler Dunes area in order to complete environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler

Project. So long as such access is provided by LADWP, GB shall indemnify in perpetuity, defend and hold LADWP (and the City of LA) harmless for personal injuries caused by the negligence or willful misconduct of GB with respect to all activities undertaken by GB and its employees, agents and contractors on LADWP's property and GB shall promptly repair any damage to LADWP's property caused by GB's activities on LADWP's property except that GB shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by GB on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

4. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit GB's books and records on an annual basis to verify that the $10 Million contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with the amended SOA, the amended SIP, the Keeler and Other Dunes Release and any other document memorializing the Terms, and for no other purpose. GB shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

B. <u>Release of LADWP/LA City for Keeler and Other Dunes Areas</u>

1. Upon the effective date of the amended SOA, GB shall deliver to LADWP a release (the "Keeler and Other Dunes Areas Release") as follows:

   a) <u>Release for Keeler Dunes</u>:
   GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of Keeler Dunes owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement

action by any other agency against LADWP related to dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached and incorporated into this agreement.

b) Release for Swansea and Olancha Dunes (collectively these dunes are defined as the Other Dunes Areas):

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake, including but not limited to portions of such dunes that may be owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement action by any other agency against LADWP related to dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake. This agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas in the vicinity of Owens Lake are attached and incorporated into this agreement.

c) SIP and Board Order Amendment:
Great Basin shall amend the SIP and Board Order 080128-01consistent with the terms of this agreement and the “Keeler and Other Dunes Areas Release” and shall request the USEPA and CARB to approve the amended SIP.

2. LADWP reserves the right to contest and defend any alleged violations not covered by the releases herein, including but not limited to the right to contest and defend any alleged violations of Rule 401, or alleged violations of H&S 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler

Dunes and Other Dunes Areas. GB reserves the right to assert that any such defenses are barred or otherwise not legally supported.

3. After the date of this agreement, GB shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

III. GENERAL SETTLEMENT CONDITIONS

A. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to final approval by LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles.

B. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to approval of GB Board and shall be memorialized in GB Board modification of SOA and appropriate GB resolutions, the 2008 SIP, if required, and Board orders.

C. GB and LADWP shall memorialize the Terms in formal settlement documents, including the amended SOA, the Keeler Release and the Other Dunes Area Release, within 30 days after approval of the Terms by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles. Prior to such approvals and until such time that public disclosure is mandated by law, GB and LADWP shall not disclose the Terms or the existence and content of the SOA Mediation and shall keep the Terms confidential.

D. Once the Terms are fully approved by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles, GB and LADWP shall issue a joint press release to announce the successful conclusion of the SOA Mediation, the Terms, the amended SOA and the Keeler Release.

E. The parties to the SOA Mediation shall each execute a copy of this document to evidence that it contains the final and complete statement of the Terms resulting from the SOA Mediation that will be submitted for approval to the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles and to the GB Board.

F. Prior to the public announcement of this Agreement, LADWP and GB will develop a mutually agreeable joint communication, which announces and explains this Agreement. The Parties agree not to disclose or divulge the content and substance of the Settlement Terms to any third parties, including, but not limited to members of the press or media, unless and until LADWP and the District have approved a final settlement. The confidentiality requirements do not extend to the undersigned participants' discussions with their respective party's legal counsel and governing boards, regarding the settlement meetings.

In witness thereof, the parties hereto have set their hands to this agreement on June 27, 2013.

Great Basin Unified
Air Pollution Control District

By: John Eastman

Name: John Eastman

Title: Governing Board Chair

Date: June 27, 2013

Los Angeles
Department of Water and Power

By: Ronald Nichols

Name: RONALD O. NICHOLS

Title: General Manager

Date: 7/25/13

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APPROVED AS TO FORM AND LEGALITY
CARMEN A. TRUTANICH, CITY ATTORNEY

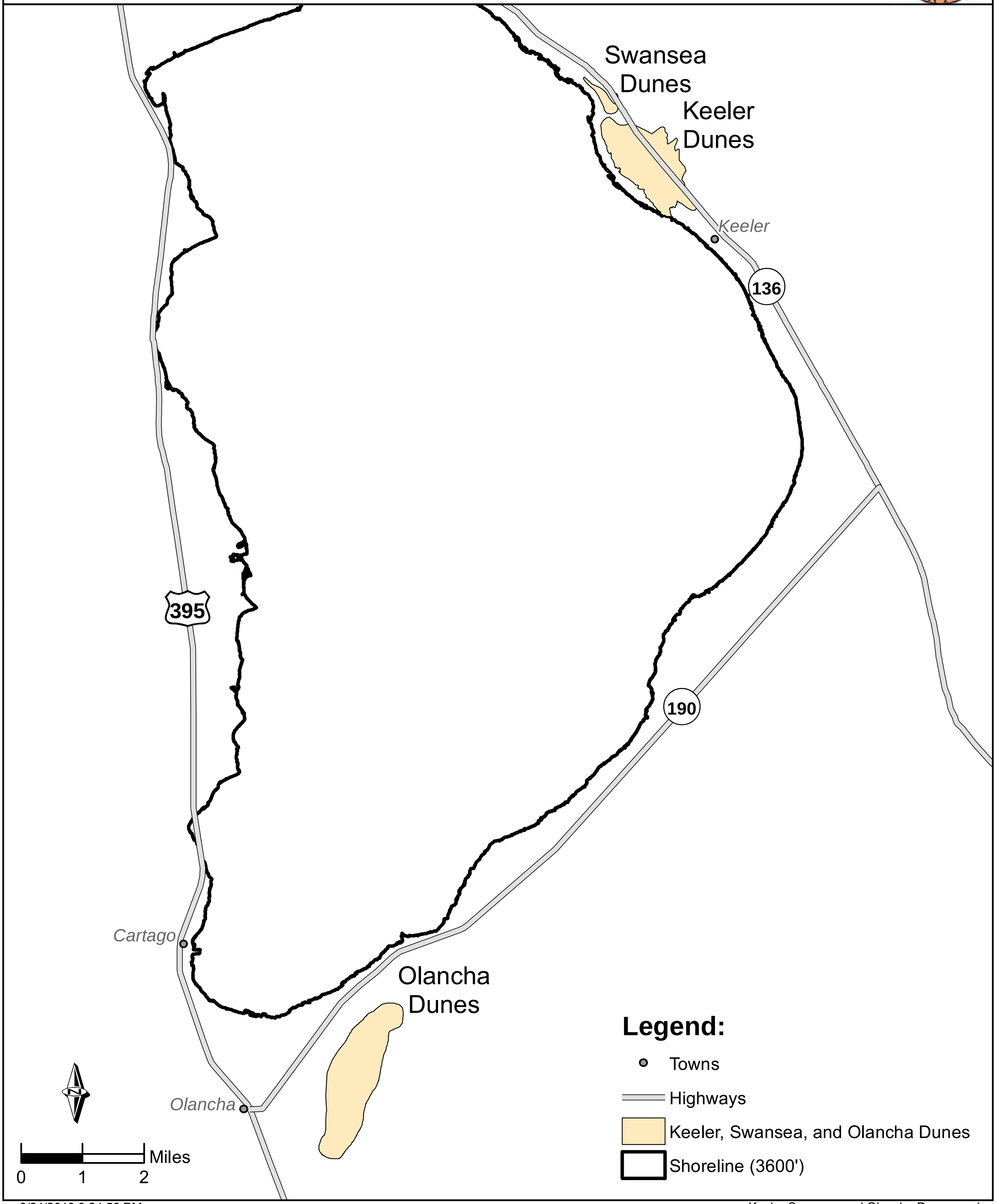
JUL 22 2013

Michelle Lyman

MICHELLE LYMAN
DEPUTY CITY ATTORNEY

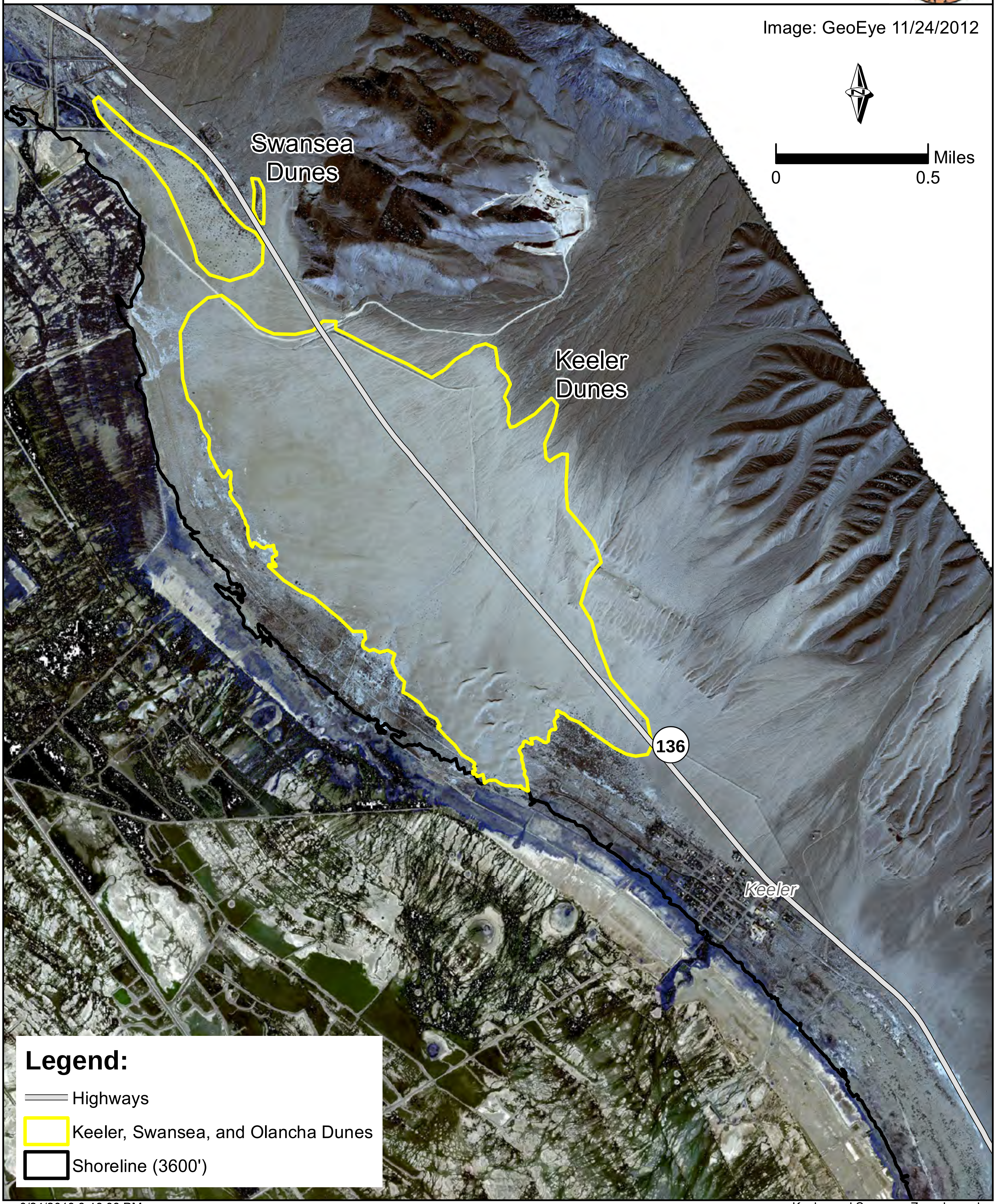
Great Basin Unified Air Pollution Control District

Keeler, Swansea, and Olancha Dunes



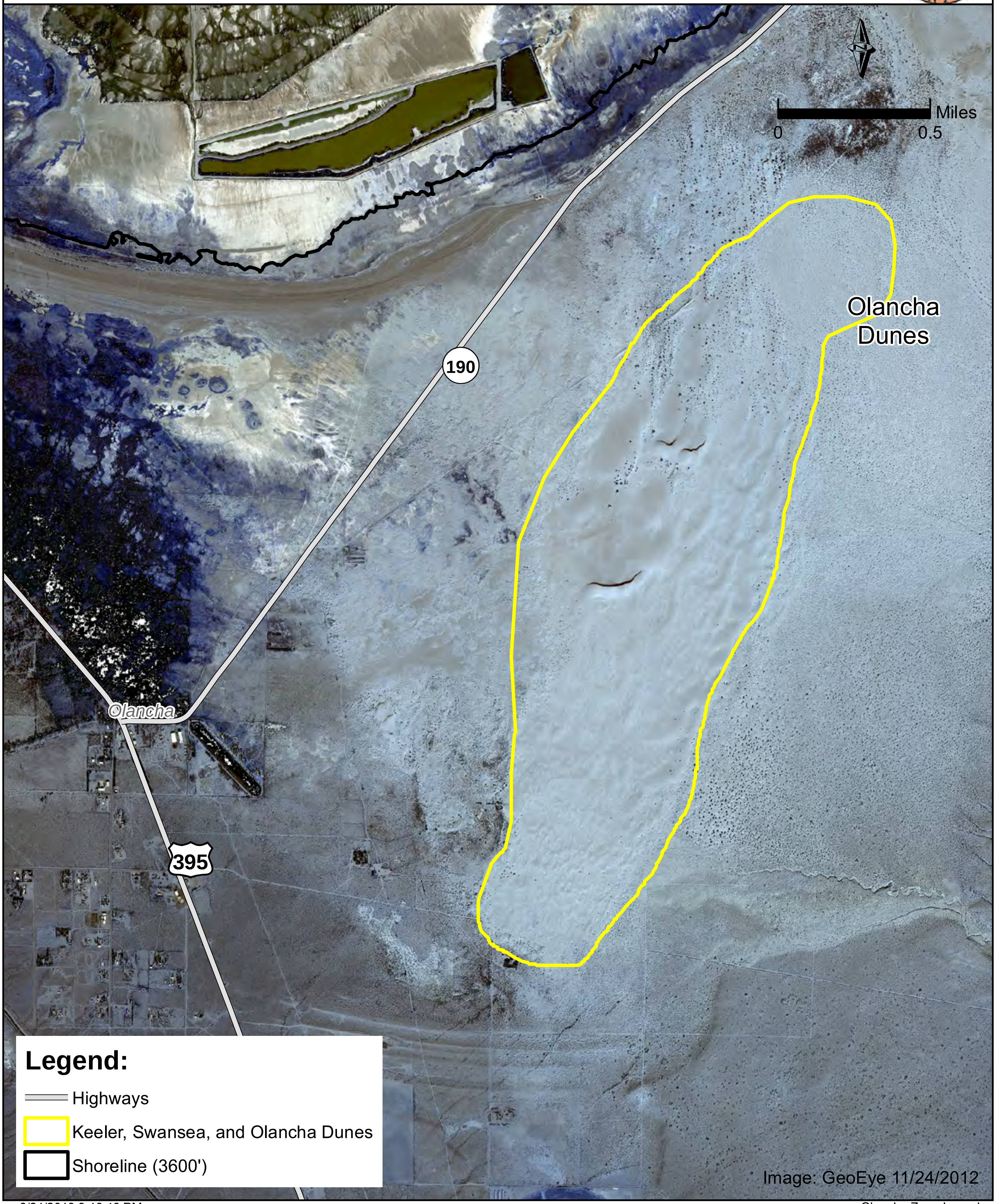
Great Basin Unified Air Pollution Control District

Keeler and Swansea Dunes - Detail



Great Basin Unified Air Pollution Control District

Olancha Dunes - Detail



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ATTACHMENT C

Exhibit 4

Staff Report for June 27, 2013 Special District Governing Board Meeting

Theodore D. Schade
Air Pollution Control Officer

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537
Tel: 760-872-8211

BOARD REPORT

Mtg. Date: June 27, 2013

To: District Governing Board

From: Theodore D. Schade, Air Pollution Control Officer

Subject: Consideration of an Agreement regarding Settlement Terms with the LADWP regarding Owens Lake Phase 7a and Keeler Dunes dust controls

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Background

In 2006, Great Basin and the Los Angeles Department of Water and Power entered into a Settlement agreement regarding additional Owens Lake dust controls. The Agreement required the LADWP to deploy approximately 13 square miles of additional dust controls onto the lakebed, including a 3.1 square-mile area known as “Phase 7a.” The original deadline for constructing the Phase 7a controls was October 2009. Due to a number of circumstances, LADWP failed to meet the October 2009 deadline and received a one-year extension, until October 2010, from the District Hearing Board. In return for the one-year extension, LADWP agreed to construct two additional square miles of dust controls known as “Phase 8.”

LADWP also did not meet the October 2010 deadline for the Phase 7a controls and in March 2011 it received an extension until December 2013 from the District Governing Board by means of a Stipulated Order for Abatement (SOA). The SOA (#110317-01) is attached to this report. In addition to providing additional time for Phase 7a, LADWP was required to pay $6.5 million into an “excess air pollution offset fund.” The District is using these funds to reduce other sources of air pollution in the District. The SOA provides that, if LADWP fails to meet future deadlines, it agrees to make late payments of up to $10,000 per day until all 3.1 square miles of Phase 7a controls are in place.

However, once again, due to a number of circumstances, including the purported discovery of a significant quantity of important cultural resources within the Phase 7a area, LADWP asserts it will be unable to meet the December 2013 deadline for Phase 7a controls. The 2011 SOA provides a procedure for LADWP to be granted additional time due to circumstances beyond its control. In January 2013, LADWP initiated the procedure in the SOA (Order Paragraphs 5 and 6) by which two LADWP Board Commissioners could meet with two Great Basin Board members to develop a non-binding recommendation to the full Great Basin Board as to whether, and under what conditions, LADWP should be granted additional time to complete the dust controls.

Over the past two months LADWP Commissioners Jonathan Parfrey and Richard Moss have been meeting with Great Basin Board members Larry Johnston, Matt Kingsley and Linda Arcularius in an attempt to develop a mutually agreeable path forward. The Air Pollution Control Officer deeply appreciates the time and dedication these five leaders devoted to this difficult task. With the assistance of staff and attorneys from both agencies, on Monday, June 24, agreement was reached on a number of issues related to the Phase 7a dust controls, as well as other issues of concern, including a plan for the protection of cultural resources and control of dust from the Keeler Dunes. A proposed "Agreement of Settlement Terms" (Settlement) has been drafted and is being presented to both the LADWP Board of Commissioners and the Great Basin Governing Board for consideration and approval. The proposed agreement is attached to this report.

Discussion

The proposed Settlement is a framework which will later be developed into a more formal agreement consistent with the terms with the Settlement. The formal agreement will then be incorporated into an amendment to the 2011 SOA that is to be considered by the Board within 30 days (before July 27, 2013).

In addition to considering amending the SOA within 30 days, the Settlement requires the Board to consider amending the 2008 Owens Valley State Implementation Plan (SIP) to incorporate some of the provisions of the Settlement into the SIP. In order to amend the SIP, the District is required to have a 30-day public comment period.

Therefore, a three-step process is required to approve and implement the Settlement: 1) Today's consideration of the settlement terms, 2) Consideration of a more specific SOA amendment within 30 days (prior to July 27), and 3) Consideration of a SIP amendment after at least 30 days public notice.

The proposed Settlement contains a number of provisions and staff encourages the Board members to carefully read through the document. In summary, the Settlement contains the following major components:

I. Phase 7a Dust Controls

1. The deadline for completion of construction of the Phase 7a infrastructure is extended by two years from December 2013 to December 2015. Any vegetation planted for dust control must be fully compliant (about 20% cover) by December 2017.
2. 328 acres of Phase 7a area that contains sensitive cultural resources is to be removed from the Phase 7a project and will be known as the "Phase 7b" project. Phase 7a contains about 2,000 acres, so Phase 7b is about 17 percent of the total area.
3. Any additional significant cultural resource areas encountered during Phase 7a construction will be moved to Phase 7b.
4. A "Cultural Resource Task Force" (CRTF) will be formed of interested parties, including local Indian Tribes to make recommendations for Phase 7b regarding the balance between protection of cultural resources and air pollution control requirements. The CRTF will make recommendations to LADWP and the District. The District Board, after considering the CRTF's recommendations, will issue additional orders regarding the Phase 7b areas, if appropriate.

5. As long as all Phase 7a and Phase 7b deadlines are met, LADWP will not be subject to fines.

II. Best Available Control Measures (BACM)

6. The District approves two modified BACMs: "Reduced Thickness Gravel" (2 inches of gravel over a geotextile fabric underlay) and "Brine Shallow Flooding." The District and LADWP agree that LADWP is not liable for maintenance of the natural brine pool remnant of Owens Lake.
7. The District and LADWP agree to work on accelerated testing of "Tillage" and "Roughness Elements" as candidate BACMs. It is both agencies' intentions to have the District Board make a BACM decision on these measures within 13 months.

III. Keeler Dunes

8. LADWP will pay the District $10 million as a public-benefit contribution for and will support the District's effort to implement a dust control project on the Keeler Dunes. The District will be solely responsible for implementing the Keeler Dunes project. LADWP will make the $10 million payment within 90 days of: 1) the District releasing LADWP from liability for the Keeler, Swansea and Olancha Dunes and 2) District submittal to the California Air Resources Board of a SIP revision incorporating the agreement provisions into the 2008 SIP.
9. LADWP can audit the District's records to verify the appropriate expenditure of the $10 million.
10. The District agrees to release the LADWP from any and all liability under any and all federal, state and local laws that the District can enforce regarding dust emissions from the Keeler, Swansea and Olancha Dunes. The District also agrees not to request, encourage or join in an enforcement action by any other agency related to dust emissions from these three dune areas.
11. The District agrees to hold no further hearings regarding LADWP's liability or responsibility for dust emissions from the three dune areas.

Staff Recommendation

Staff has been closely involved in the development of the proposed Settlement and recommends the following three actions:

1. That the full Board approve the draft Settlement as presented,
2. That the Board set the date, within 30 days, for a special meeting to consider incorporating the provisions of the Agreement into Stipulated Order for Abatement 110317-01, and
3. That the Board set the date, after a 30-day public review and comment period, for a meeting to consider amending the 2008 Owens Valley PM-10 State Implementation Plan to incorporate the modified Abatement order.

<u>Attachments:</u>
Stipulated Order for Abatement 110317-01
Phase 7a and Keeler Dunes Settlement Terms Agreement dated June 25, 2013

13062601

ATTACHMENT C

Exhibit 5

Settlement Agreement between District and LADWP,

approved by District Governing Board August 19, 2013

STAFF DRAFT – SUBJECT TO REVISION AND NOT REVIEWED OR APPROVED BY THE LADWP BOARD OF COMMISSIONERS

SETTLEMENT AGREEMENT AND RELEASE BETWEEN THE GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT AND CITY OF LOS ANGELES ACTING BY AND THROUGH ITS DEPARTMENT OF WATER AND POWER CONCERNING MODIFICATION TO PHASE 7A STIPULATED ORDER FOR ABATEMENT NO. 110317 AND KEELER DUNES PROJECT

August 19, 2013

THIS SETTLEMENT AGREEMENT AND RELEASE ("**Agreement**") is entered into on this 19th day of August, 2013, by and between the **Great Basin Unified Air Pollution Control District**, an agency organized pursuant to Division 16, Part 3, Chapter 3 of the California Health and Safety Code ("**District**"), on one hand, and the **City of Los Angeles acting by and through its Department of Water and Power** ("**LADWP**"), a municipal corporation organized under the Los Angeles City Charter and the Constitution and laws of the State of California, on the other hand. The District and LADWP may be referred to herein individually as "**Party**" or collectively as the "**Parties**."

WHEREAS, on March 17, 2011, the District Governing Board issued Stipulated Order for Abatement, Order No. 110317-01 ("**Original Abatement Order**"). The Original Abatement Order requires LADWP to construct a dust control project, known as Phase 7a, on approximately 3.1 square miles of the Owens Lakebed, which includes six Dust Control Areas ("**DCAs**"), T37-1, T37-2, T1A-3, T1A-4, T-32-1 and T12-1 ("**Phase 7a areas**"). The Original Abatement Order allows LADWP to transition approximately 3.0 square miles of existing dust control areas ("**Transition Areas**"). These areas are identified in Exhibit 4 of the Original Abatement Order.

WHEREAS, the Original Abatement Order requires LADWP to install Best Available Control Measures ("**BACM**") in DCAs T37-1, T37-2, T1A-3, T1A-4 and T-32-1 and provides for LADWP to change BACM in the Transition Areas to conserve water, by no later than December 31, 2013, and to install BACM in the T12-1 tillage test area by May 1, 2016. (*See also* Governing Board Order No. 120206-07.) Under the Original Abatement Order, all Phase 7a Areas and Transition Areas controlled by Managed Vegetation BACM are to achieve fully-compliant BACM vegetation cover by December 31, 2015. Installation of BACM on the Phase 7a DCAs and Transition Areas entails ground disturbing activities such as grading, planting, dirt moving, boring, trenching and road, berm, pipeline and other construction.

WHEREAS, LADWP was required under District Governing Board Order No. 080128-01 ("**Board Order 080128-01**"), the enforcement Board order for the 2008 Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan ("**2008 SIP**"), to conduct environmental review for the Phase 7a project in compliance with the California Environmental Quality Act ("**CEQA**"). LADWP unexpectedly discovered significant cultural and archaeological resources in the Phase 7a area during the CEQA process that required LADWP to undertake additional investigations under CEQA and to comply with mitigation measures included in the District supplemental environmental impact report for the 2008 SIP ("**SEIR**"), both of which resulted in unanticipated CEQA and project design and construction delays that LADWP determined are outside of its control.

WHEREAS, LADWP released the draft Phase 7a EIR for public review and comment in January 2013 for a 45 day public comment period. LADWP staff considered and responded to public comments, conducted further consultations with Native American groups and others about project impacts and comments on the draft EIR, and revised the draft EIR, as necessary, to incorporate any changes to the project. Alternatives were identified in the EIR that would avoid impacts to cultural resources by excluding California Register of Historic Resources ("**CRHR**")-eligible areas from the Phase 7a project, including the Avoidance Alternative, which involved construction of the originally proposed Phase 7a project, except for 350 acres of Phase 7a subareas T1A-3, T32-1, T37-1 and T37-2 known to contain significant cultural resources.

WHEREAS, on June 4, 2013, LADWP's Board of Water and Power Commissioners considered and certified the final Phase 7a EIR and approved the Avoidance Alternative for the Phase 7a project, subject to and contingent upon the District Governing Board's approval of a petition to modify the Original Abatement Order to remove these 350 acres from the original Phase 7a area, and to make any other additional changes necessary to ensure consistency between the Original Abatement Order, the Phase 7a project and the Final EIR, including, but not limited to, obtaining extensions of time for completing the Phase 7a project necessitated by the unexpected discovery of significant cultural resources in the Phase 7a areas.

WHEREAS, paragraph 5 of the Original Abatement Order outlines circumstances that allow LADWP to seek an extension of time to comply with the Original Abatement Order, without penalty, when it is acting in good faith to comply with the terms of the Original Abatement Order but is impeded by circumstances beyond its control. In compliance with the Original Abatement Order, LADWP's Board of Water and Power Commissioners adopted three resolutions on February 7, 2012 (Resolution No. 012-170), April 3, 2012 (Resolution No. 012-210), and January 11, 2013 (Resolution No. 013-157), finding that LADWP has acted in good faith to comply with the Original Abatement Order, but has been impeded by the unexpected discovery of significant cultural resources in the Phase 7a areas. In compliance with paragraph 6 of the Original Abatement Order, LADWP notified the District's Air Pollution Control Officer ("**APCO**") of each resolution and proposed schedules of increments of progress. The APCO objected to LADWP's Resolution No. 013-157 on February 4, 2013. Pursuant to paragraph 5 of the Original Abatement Order, LADWP requested a meeting with District Governing Board members to attempt to resolve the dispute.

WHEREAS, designated members of the LADWP and District Boards have engaged in several meetings ("**Settlement Meetings**") in April, May and June 2013 to resolve the dispute related to the Original Abatement Order. During the Settlement Meetings, the Parties also attempted to resolve a separate dispute related to the development and origin of the Keeler Dunes and a possible future District order requiring control of emissions at the Keeler Dunes. The District Governing Board has not made any findings or issued any order concluding that the

Keeler Dunes are anthropogenic in nature and/or caused by LADWP's activities in the production, diversion, storage, or conveyance of water. The District Governing Board has not made any findings or issued any order concluding that LADWP is liable for, or that LADWP's activities in the production, diversion, storage, or conveyance of water has caused or contributed to any violations of state or federal air quality standards in the Keeler Dunes or other dunes areas, including the Swansea and Olancha Dunes, in the vicinity of Owens Lake.

WHEREAS, the Settlement Meetings resulted in an agreement on settlement terms dated June 17, 2013 ("**Term Sheet**") that was approved by LADWP's Water and Power Commissioners on June 26, 2013, and the District's Governing Board on June 27, 2013, and are memorialized in this Agreement. This Agreement does not result in any waiver by the District or LADWP of arguments raised in other proceedings or disputed issues that are not covered under this Agreement, including but not limited to the District's Supplemental Control Requirements Determination ("**SCRD**") process, SB 270 budgets, and fees.

For good and valuable consideration, the Parties agree as follows:

I. **PHASE 7a DUST CONTROLS**. [*Corresponds to Term Sheet section I.A.*] The District Governing Board shall approve a modification to the Original Abatement Order ("**Modified Abatement Order**") that reflects the following terms:

a. **Deadline Extensions**. [*Corresponds to Term Sheet sections I.A.1.-I.A.2.*]

i. The deadline for LADWP to construct all infrastructure and install fully-compliant BACM in the Phase 7a areas and Transition Areas, except for those areas controlled by Managed Vegetation BACM, as set forth in paragraphs 1 and 4(a) of the Original Abatement Order, shall be extended from December 31, 2013, to December 31, 2015. All infrastructure and plant materials for Managed Vegetation BACM will be installed by December 31, 2015.

ii. The deadline to achieve fully-compliant BACM vegetation cover for areas controlled by Managed Vegetation BACM in the Phase 7a areas and Transition Areas, as set forth in paragraphs 1 and 4(a) of the Original Abatement Order, shall be extended from December 31, 2015, to December 31, 2017.

iii. The extensions of the deadlines set forth in section I(a)(i)-(ii) shall be contingent upon all of the following:

(1) LADWP timely receiving from California State Lands Commission ("**CSLC**") and all other agencies all of the required permits, approvals, or leases necessary to allow LADWP to construct BACM within the deadlines required by the Modified Abatement Order.

(2) The timely removal from the Original Abatement Order of all CRHR-eligible areas plus necessary buffer areas, referred to as the "Eligible Cultural Resource ("**ECR**")

areas." The ECR areas initially consist of 328 acres of the Phase 7a areas identified in Exhibit 1 (the "**Initial Phase 7b Areas**"), which is incorporated into this Agreement. Because Exhibit 1 identifies the locations of cultural resources, it is confidential and shall not be made publically available. The Initial ECR areas and any newly discovered CRHR-eligible and necessary buffer areas are considered part of Phase 7b, as set forth in section I(b)(i) below. A confidential map of the initial 328-acre ECR area shall be attached to the Modified Abatement Order.

(3) The Original Abatement Order being revised to state explicitly that any newly discovered potential ECRs in the Phase 7a areas is considered a condition of force majeure under paragraph 5(d) of the Original Abatement Order.

iv. If any one of the above contingencies is not met, LADWP may seek further extensions of time under the provisions of paragraph 5 of the Original Abatement Order, as modified by the Modified Abatement Order, and paragraphs 6 and 22 of the Original Abatement Order, which shall not be unreasonably denied by the District.

b. **Creation of Phase 7b**. [*Corresponds to Term Sheet sections I.B.1.-I.B.3., I.D.1*]

i. Phase 7b shall consist of the Initial 328 acres of Phase 7b Areas and any other areas in Phase 7a that LADWP's state-certified archaeologist has determined, and which are confirmed by a second, state-certified archaeologist mutually agreeable to the District, LADWP and CSLC (the "**Second Archaeologist**") to be CRHR-eligible and necessary buffer areas (the "**Additional Phase 7b Areas**"). The difference between the 328 acres defined in this Agreement as the Initial Phase 7b areas, and the 350 acres identified in the Avoidance Alternative in the Phase 7a EIR, will also be subject to the Phase 7b process, if necessary, as described in this Agreement. The Additional Phase 7b Areas are not limited to the 350 acres described in the Avoidance Alternative in the Phase 7a EIR. All areas in Phase 7b shall be considered removed from the Original Abatement Order.

ii. LADWP shall promptly notify and confer with the District if any cultural resources are discovered during the construction of Phase 7a. The discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be subject to the procedure set forth in paragraph 5 of the Original Abatement Order, as modified by the Modified Abatement Order, and paragraph 6 of the Original Abatement Order. Upon the discovery of the cultural resources, LADWP will request that its state-certified archeologist fulfill his or her legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state-certified archaeologist shall be responsible for evaluating whether any of the newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, define the additional buffer areas necessary to address disturbance of the CRHR-eligible areas. LADWP's state-certified archeologist's recommendations shall be reviewed by the Second Archaeologist. If confirmed by the Second Archaeologist, the newly identified CRHR-eligible areas and necessary buffer areas shall become ECR areas that are withdrawn from the Original Abatement Order and included in Phase 7b.

c. Cultural Resource Task Force ("**CRTF**") [*Corresponds to Term Sheet sections I.B.4*]

i. LADWP and District commit to form the CRTF and host its initial meeting within ninety (90) days after the Effective Date of the Modified Order. The CRTF will be an advisory group consisting of representatives from LADWP, the District, CSLC, State Historical Preservation Office, and Local Tribal Representatives. The CRTF may draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the CRTF's reasonable costs, including reimbursing CRTF members for reasonable travel expenses. The CRTF shall exist to make recommendations for the Initial Phase 7b Areas and any Additional Phase 7b Areas.

ii. The CRTF will be advisory in nature only, and the District and LADWP will each retain its final decision-making authority as to the treatment of ECR areas. The District reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order or orders.

iii. The CRTF will initially make non-binding recommendations to the District Governing Board and LADWP on or before December 31, 2014, as to the best course of action and timing for the treatment of the Initial Phase 7b Areas, which could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery, or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. In making its recommendations, the CRTF shall give due consideration to the District's and LADWP's shared water saving and air pollution control goals.

iv. The CRTF shall also make non-binding recommendations to the District Governing Board and LADWP with respect to the treatment of the Additional Phase 7b Areas. In making its recommendations, the CRTF shall give due consideration to the District's and LADWP's shared water saving and air pollution control goals.

v. If, after considering the CRTF's non-binding recommendations and input from LADWP, the District Governing Board exercises its discretion and orders LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, the District Governing Board will do so by issuing a new Board order or orders. The new Board order or orders shall include deadlines for constructing dust controls that accommodate project circumstances, including but not limited to, the time to complete a Phase III cultural resources recovery and perform additional environmental work required under CEQA to approve the new project. The new Board order or orders shall incorporate the provisions in paragraph 5 of the Original

Abatement Order as amended by section I(a) and the Modified Abatement Order. In issuing the new Board order or orders, the District Governing Board will determine if any amendment to the 2008 SIP is necessary. LADWP is not waiving its right to contest the new Board order or orders.

vi. Any future order or orders issued by the District for Phase 7b will give due consideration to the shared goal of the District and LADWP to control air pollution and decrease the use of water as a dust control measure at Owens Lake.

d. **No Fines Imposed**. [*Corresponds to Term Sheet sections I.C.1.-I.C.2.*]

i. The District shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any Phase 7a areas if LADWP constructs the dust controls in the Phase 7a areas within the modified time frames set forth in sections I(a)(i)-(ii), or any modified time frames resulting from sections I(a)(iii)-(iv).

ii. The District shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the Original Abatement Order, this Agreement, and the Modified Abatement Order.

e. **Other Abatement Order Modifications**. [*Corresponds to Term Sheet sections I.D.2.-I.D.4.*]

i. The Modified Abatement Order shall reiterate that the District and LADWP shall make every effort to develop, approve and deploy high-confidence, waterless dust control measures in all areas where dust controls are ordered on Owens Lake.

ii. The Modified Abatement Order shall state that the District's and LADWP's agreement to modify the Original Abatement Order shall not be construed as a waiver by either Party of any rights, remedies, legal theories or positions that either Party may choose to assert in any hearing, proceeding, tribunal or action now or in the future, except with respect to the particular subject matter contained in this Agreement and the Modified Abatement Order.

iii. The date the District Governing Board adopts the Modified Abatement Order shall be the effective date upon which the necessary decision makers of LADWP, the City of Los Angeles, and District Governing Board agree to enter into this Agreement to modify the Original Abatement Order, the "**Effective Date**."

f. **BACM Clarifications**. [*Corresponds to Term Sheet sections I.E.1.-I.E.4*.]

i. District hereby approves Reduced Thickness Gravel as a BACM. "Reduced Thickness Gravel is defined as per the 2008 Owens Valley PM10 State Implementation Plan except that the gravel thickness is reduced from a minimum of four inched (4") to two inches (2") and all reduced thickness gravel areas shall be underlain with geotextile fabric. All geotextile fabric shall be Class I woven or nonwoven geotextile fabric meeting the minimum specifications set forth in the National Standard Materials Specification "Material Specification 592—Geotextile" (National Engineering Handbook, Chapter 3, Part 642), or equivalent.

ii. The District hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. District and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. The existing "Brine Pool" is defined as those areas at Owens Lake below elevation 3,553.55 feet.

iii. The District shall work with LADWP on accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the Effective Date of the Modified Abatement Order, the District and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. The schedules shall include the District Governing Board's consideration of BACM approval of these candidate measures within one year of completion of the schedule (within 13 months of the Effective Date of the Modified Abatement Order). If the accelerated testing does not result in approved BACM for the candidate measures, the District's and LADWP's respective Boards shall jointly assess why the accelerated testing did not result in the District Board's BACM approval. The District and LADWP shall also work on accelerated testing schedules and BACM approvals for other forms of BACM.

iv. The District shall memorialize its approvals set forth in sections I(f)(i)-(ii), and any future approvals pursuant to section I(f)(iii), in formal District Board resolutions and orders, including but not limited to, modifications to the 2008 SIP and Board Order 080128-01. The District and LADWP shall jointly apply to CSLC for approval to use new BACMs promptly upon their approval by the District and, with respect to the approvals set forth in Sections I(f)(i)-(ii), within 90 days of the Effective Date of the Modified Abatement Order.

II. **KEELER DUNES**.

a. **Keeler Dunes Dust Control Project**. [*Corresponds to Term Sheet sections II.A.1.-II.A.4*.]

i. LADWP shall provide ten million dollars ($10,000,000) to the District as a public benefit contribution to support the District's "**Keeler Project**" (as defined in section II(a)(ii)) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the $10,000,000 in one single payment to the District within 90 days after: (1) the date of approval of the Modified Abatement Order, which is also the Effective Date of this Agreement that includes the "**Keeler and Other Dunes Release**" defined in section II(b); and (2) the District Governing Board approves amendments to the 2008 SIP and Board Order 080128-01, and such amendments are submitted to the California

Air Resources Board ("**CARB**") pursuant to section II(b)(iii). The Keeler and Other Dunes Release in this Agreement shall not be effective until the District receives the $10,000,000 contribution.

ii. The District shall use the $10,000,000 for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly-related activities for a dust emission control project at Keeler Dunes (the "**Keeler Project**"), including work previously conducted by the District in connection with the Keeler Project that was funded by Owens Lake Trust Fund monies. The District shall not seek from LADWP any reimbursement of Owens Lake Trust Fund monies used to pay for work conducted in connection with the Keeler Project through future SB 270 assessments or otherwise. No portion of the $10,000,000 shall be used to pay for the District's attorneys' fees, public affairs or governmental relations (collectively, "**Public Affairs**") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and the United States Bureau of Land Management ("**BLM**"). The District shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and any other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.

iii. Upon the effective date of the Keeler and Other Dunes Release pursuant to section II(b) of this Agreement, and the 2008 SIP and Board Order 080128-01 amendments submittal to CARB as described in section II(b)(iii) of this Agreement, LADWP will immediately provide the District access to its property in the Keeler Dunes area in order for the District to complete the environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler Project. So long as access is provided by LADWP, the District shall indemnify in perpetuity, defend and hold the City of Los Angeles and LADWP harmless for personal injuries caused by the negligence or willful misconduct of the District with respect to all activities undertaken by the District and its employees, agents and contractors on LADWP's property, except that the District shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by the District on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

iv. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit the District's books and records on an annual basis to verify that the $10,000,000 contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with this Agreement, which includes the Keeler Dunes and Other Dunes Release, the Modified Abatement Order, the amended 2008 SIP and

Board Order 080128-01, and any other document memorializing Term Sheet, and for no other purpose. The District shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

b. **<u>District's Release of the City/LADWP for Keeler and Other Dunes Areas</u>**. [*Corresponds to Term Sheet sections II.B.1.-II.B.4*.] The following Keeler and Other Dunes Release shall apply to the City of Los Angeles and LADWP and shall become effective upon the date the Modified Abatement Order is adopted and after the District has received the $10,000,000 contribution from LADWP:

i. Release for Keeler Dunes: The District forever releases LADWP from any and all liability under any and all federal, state and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP that can be enforced by the District, and fugitive dust emission rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Keeler Dunes, regardless of origin, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached as Exhibit 2 and incorporated into this Agreement.

ii. Release for Swansea and Olancha Dunes (collectively these dunes are defined as the "**Other Dunes Areas**"): The District forever releases LADWP from any and all liability under any and all federal, state, and local laws that the District can enforce and settle, including but not limited to the Health and Safety Code, those portions of the 2008 SIP that can be enforced by the District, and fugitive dust emission rules, for dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin, including but not limited to portions of the Other Dunes Areas that may be owned by LADWP. The District forever agrees not to request, encourage, or join in an enforcement action by any other agency against LADWP related to dust emissions from the Other Dunes Areas in the vicinity of Owens Lake, regardless of origin. This Agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas is attached as Exhibit 2 and incorporated into this Agreement.

iii. 2008 SIP and Board Order 080128-01 Amendments: The District shall amend the 2008 SIP and Board Order 080128-01 consistent with the terms of this Agreement, including the Keeler and Other Dunes Release as defined in sections II(b)(i)-(ii), and shall request the United Stated Environmental Protection Agency ("**EPA**") and CARB to approve the amended SIP.

iv. LADWP reserves the right to contest and defend any alleged violations not encompassed in the Keeler and Other Dunes Release, including but not limited to, the right to contest and defend any alleged violations of Rule 401, or alleged liability or violations of Health and Safety Code section 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler Dunes and Other Dunes Areas. The District reserves the right to assert that any such defenses are barred or otherwise not legally supported.

v. Upon the Effective Date of this Agreement, the District shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

III. **GENERAL SETTLEMENT CONDITIONS**. [*Corresponds to Term Sheet sections III.A.-III.E.*]

a. **Approval by District Board, LADWP Board, and City of Los Angeles**.

i. All settlement terms and other matters contained in this Agreement (which includes the Keeler and Other Dunes Release) and the Modified Abatement Order shall be subject to final approval by the LADWP Board of Water and Power Commissioners and all other necessary decision makers at the City of Los Angeles.

ii. All settlement terms and other matters contained in this Agreement (which includes the Keeler and Other Dunes Release) and the Modified Abatement Order shall be subject to approval of the District Governing Board and shall be memorialized in the District Governing Board's approval of the Modified Abatement Order and other appropriate District Board resolutions and orders, including modifications to the 2008 SIP, if required, and Board orders, including Order 080128-01.

b. **Binding Effect**. The provisions of this Agreement shall be binding upon and inure to the benefit of the Parties. There are no third-party beneficiaries to this Agreement.

c. **Representations**. The Parties represent that on and as of the date of this Agreement, they have full capacity, right, power and authority to execute, deliver and perform under this Agreement. The individuals signing this Agreement are duly authorized to sign the same on the Parties' behalves and to bind the Parties thereto. This Agreement is and shall be binding upon and enforceable against the Parties in accordance with its respective terms.

d. **Integration**. This Agreement is intended by the Parties to memorialize the terms in the Term Sheet, which is attached as Exhibit 3 to this Agreement, and to be the final expression of their agreement with respect to the subject matter of this Agreement and the complete and exclusive statement of the terms of this Agreement between the Parties, and supersedes any prior understandings between the Parties, whether oral or written.

e. **Interpretation**. In all cases, the language in all parts of this Agreement shall be construed simply, according to its fair meaning and not strictly for or against any Party, with the view of preserving and protecting the intent and purposes of the Agreement, it being agreed that the Parties or their agents have all participated in the preparation of this Agreement.

f. **Governing Law**. The Parties agree that this Agreement is made, executed and entered into, and is intended to be formed within the State of California and that this Agreement is to be interpreted and enforced under the laws of the State of California. Any federal law claims shall be interpreted and enforced under federal law.

g. **Counterparts**. This Agreement may be executed in two or more identical counterparts, each of which shall be deemed to be an original and each of which shall be deemed to be one and the same instrument when each Party signs each such counterpart.

h. **Recitals**. Each of the Recitals is incorporated into this Agreement.

i. **Definitions; Attachments**. Capitalized terms used herein shall have the respective meanings specified in the text of this Agreement. Unless otherwise indicated, references in this Agreement to sections, paragraphs, clauses, exhibits, attachments and schedules are those contained in or attached to this Agreement and all exhibits and schedules referenced herein are incorporated herein by this reference as though fully set forth in this Agreement.

j. **Parties**. All references to the Parties shall include all officials, officers, personnel, employees, agents, assigns, and subcontractors of the Parties.

"Great Basin Unified Air Pollution Control District"

*Dated:*________________

*By:*_________________________________

Governing Board Chair

APPROVED AS TO LEGAL FORM:

By: __________________________

District Counsel

"Los Angeles Department of Water and Power"

*Dated:*_______________

*By:*________________________________

Board of Commissioners Chair

APPROVED AS TO LEGAL FORM:

By: _________________________

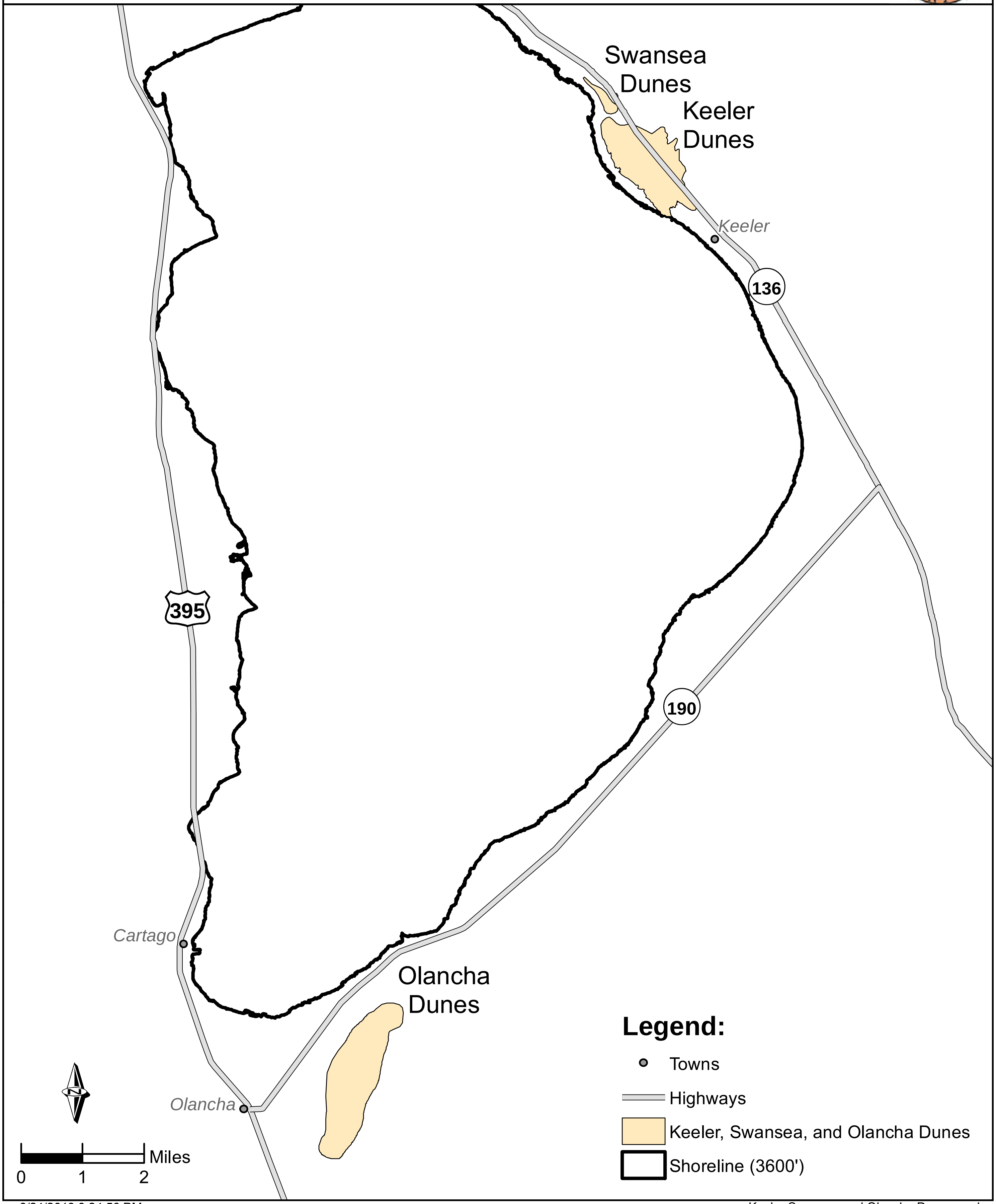
City Attorney

List of Exhibits

Exhibit 1	**CONFIDENTIAL** – Maps of Initial Phase 7b areas (X Pages)
Exhibit 2	Maps of the Keeler and Other Dunes Areas (3 pages)
Exhibit 3	Term Sheet Term Sheet approved by the LADWP Board of Commissioners on June 26, 2013, and the District Governing Board on June 27, 2013

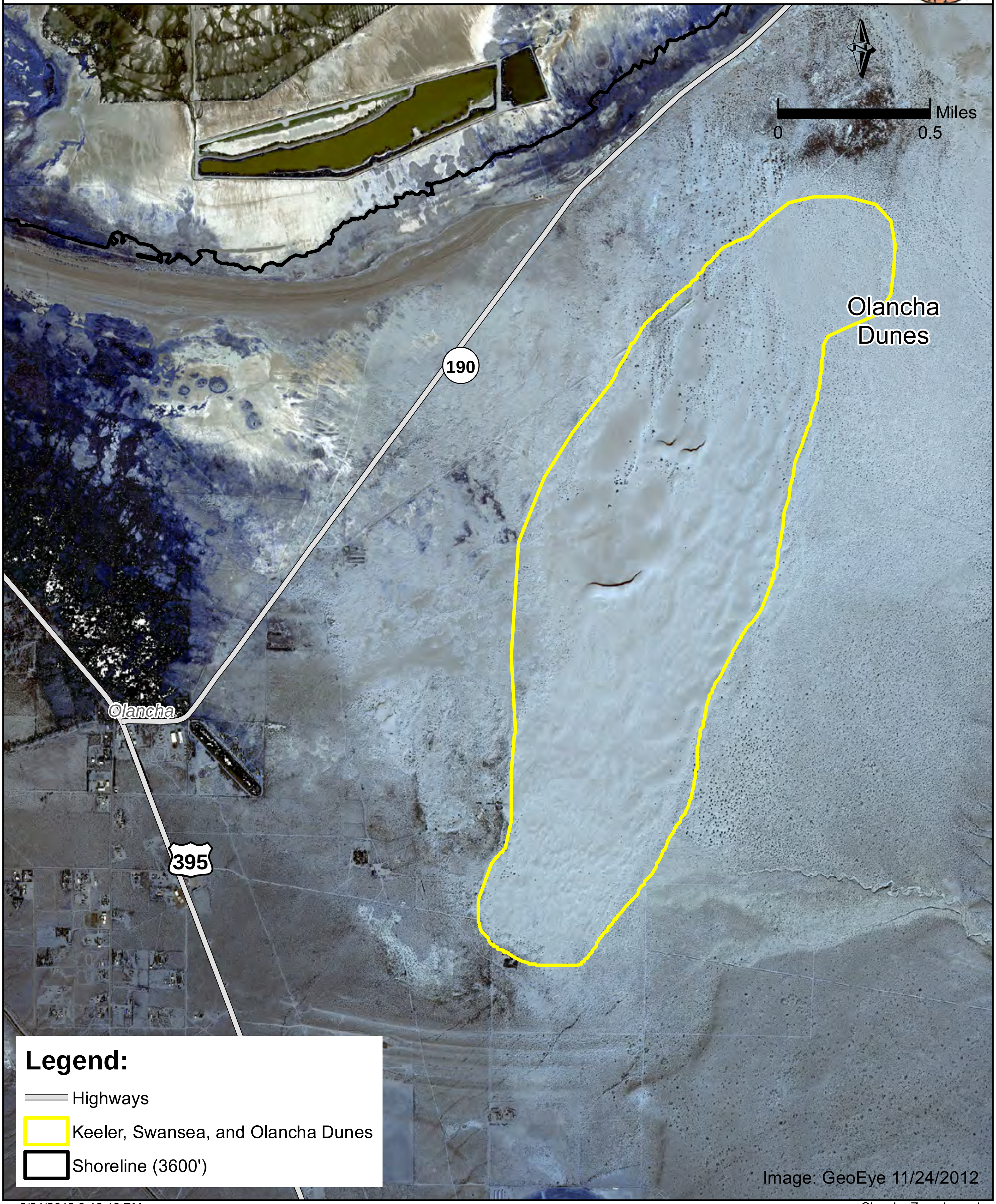
Great Basin Unified Air Pollution Control District

Keeler, Swansea, and Olancha Dunes



Great Basin Unified Air Pollution Control District

Olancha Dunes - Detail



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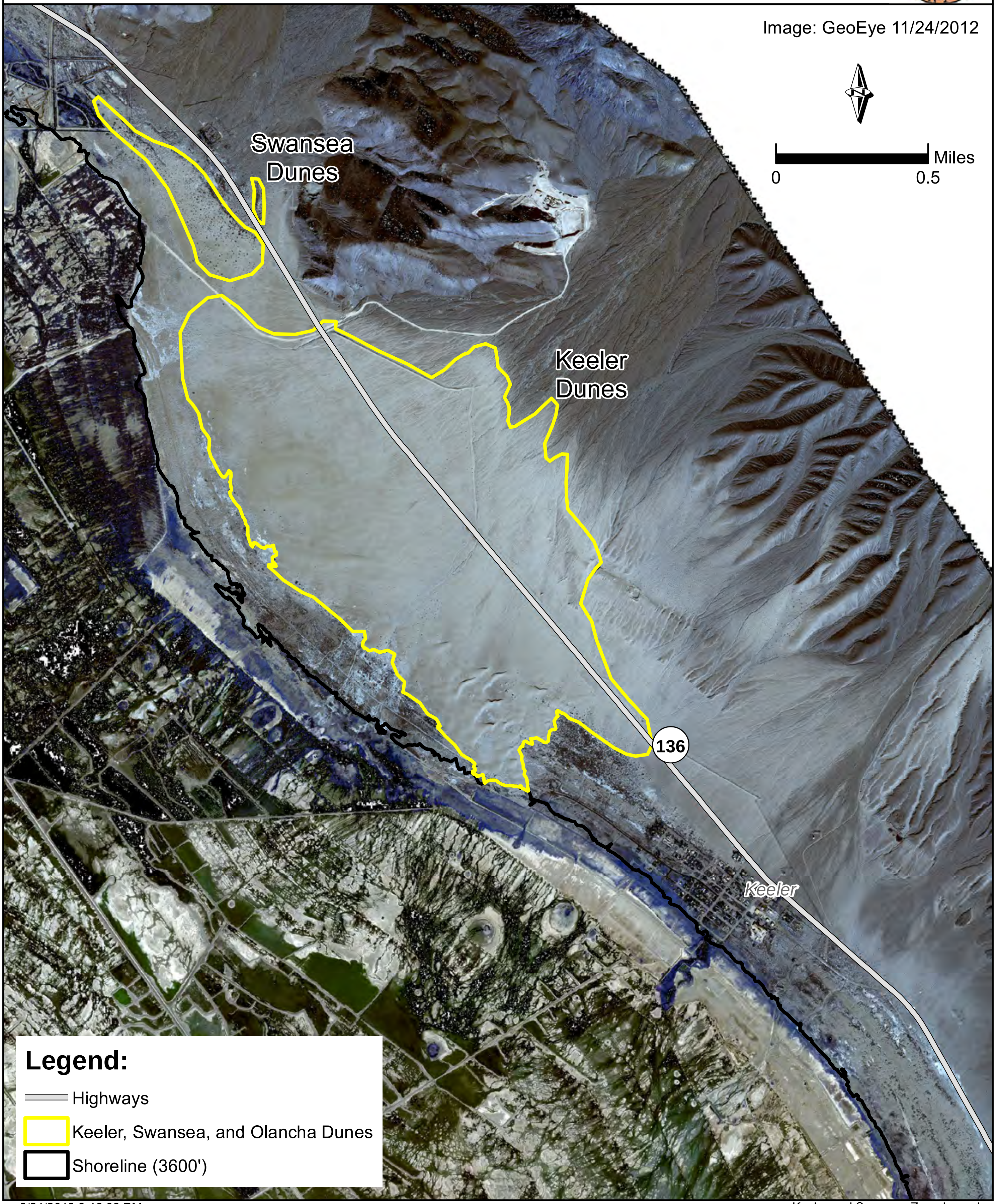
Olancha ZoomIn.mxd

Great Basin Unified Air Pollution Control District

Keeler and Swansea Dunes - Detail



GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
AND
LOS ANGELES DEPARTMENT OF WATER AND POWER

PHASE 7a AND KEELER DUNES
SETTLEMENT TERMS
JUNE 25, 2013

The following constitutes the Settlement Terms (the “Terms”) for the Phase 7a Stipulated Order for Abatement (SOA) and Keeler Dunes issues between the Great Basin Governing Board (GB) and the Los Angeles Department of Water and Power (LADWP):

I. MODIFICATION OF SOA

A. GB and LADWP agree that GB shall modify the Phase 7a SOA to do the following:

1. Deadline Extensions

   a) Existing December 31, 2013 deadline for all infrastructure for BACM and compliant operation (other than Managed Vegetation Compliance) to be installed and fully operational extended to December 31, 2015.

   b) Existing December 31, 2015 deadline for Managed Vegetation Controls (fully compliant managed vegetation cover) extended to December 31, 2017.

2. Assumptions for Extension of Deadlines

   a) Timely Availability of necessary leases from State Lands and of necessary permits from other agencies

b) Acceptance by GB of 328 acres of Eligible Cultural Resource (ECR) areas. ECR areas are defined as California Register of Historical Resources (CRHR)-eligible areas plus necessary buffer areas and are to be removed from Phase 7a and placed into Phase 7b (see below) and potentially the subject of a new future Board order. A confidential map of the existing 328-acre ECR areas shall be attached to the amended SOA.

c) Force majeure process of original SOA to be followed for newly discovered potential ECRs.

B. <u>Creation of Phase 7b</u>

1. Phase 7b would be created for the treatment of the 328 acres of ECR areas plus any newly discovered cultural resources within Phase 7a that are determined by LADWP's state certified archaeologist to be CRHR-eligible and necessary buffer areas (the "Additional Phase 7b Areas") and whose determination is confirmed by a second, state certified archaeologist mutually agreeable to GB, LADWP and State Lands (the "Second Archaeologist").

2. Initially Phase 7b would include 328 acres of previously identified ECR areas from Phase 7a (the "Initial Phase 7b Areas").

3. Any areas in Phase 7a (beyond the Initial Phase 7b Areas) where ECRs are located during Phase 7a construction shall be handled as part of Phase 7b (the "Additional Phase 7b Areas"). Promptly upon discovery of any cultural resources during the Phase 7a construction process, LADWP shall promptly notify GB of, and confer with GB about, such discovery, and LADWP's state certified archeologist shall fulfill their legal obligations relative to assessing and making recommendations for cultural resources. LADWP's state certified archaeologist shall be responsible for evaluating whether any newly discovered cultural resource areas within Phase 7a are CRHR-eligible, and if so, the additional buffer areas necessary to address disturbance of the

CRHR eligible areas; such evaluations shall be confirmed by the Second Archaeologist. Newly identified CRHR eligible areas and necessary buffer areas shall become ECR areas and become part of the Additional Phase 7b Areas.

4. Cultural Resource Task Force

a) The amended SOA will establish a Cultural Resource Task Force (CRTF). The CRTF will be an advisory group consisting of LADWP, GB, State Lands, State Historical Preservation Office, and Local Tribal Representatives. The CRTF shall be able to draw upon outside resources and experts, as needed, to aid the CRTF's process. LADWP shall be responsible for paying the reasonable costs of the CRTF, including reimbursements for travel expenses of CRTF members.

b) The CRTF will initially be charged to make recommendations to GB and LADWP as to the best course of action and timing for the treatment of the Initial Phase 7b Areas. Such treatment could include whether particular areas should be permanently avoided, subject to Phase III cultural recovery or subject to some less intensive form of cultural recovery to protect cultural resources in the Initial Phase 7b Areas. The CRTF will make non-binding recommendations to the GB Governing Board and LADWP regarding treatment of the Initial Phase 7b Areas on or before December 31, 2014. LADWP and GB shall commit to form the CRTF and host its initial meeting within ninety (90) days after the effective date of the amended SOA.

c) The CRTF shall also make non-binding recommendations to GB and LADWP with respect to the treatment of ECRs that may become part of the Additional Phase 7b Areas. After making its recommendations for the Initial Phase 7b Areas, the CRTF shall remain in existence to make recommendations for any Additional Phase 7b Areas that may be designated ECRs by LADWP's state certified archaeologist and confirmed by the Second Archaeologist.

d) If after considering the non-binding recommendations of the CRTF, GB exercises its discretion to order LADWP to install dust controls in either the Initial Phase 7b Areas or in the Additional Phase 7b Areas, GB will issue a new Board order or orders after receiving input from LADWP and will determine if any SIP amendment is necessary. The new Board order or orders shall include control completion deadlines that take into account project circumstances, including but not limited to, recovery and additional environmental work necessary to complete the project at issue. The new Board order or orders shall recognize that the construction period shall be subject to all time-extensions-for-cause provisions of Paragraphs 5 and 6 of the SOA.

e) Like the SOA for Phase 7a, any future order or orders issued by GB pertaining to Phase 7b will give due consideration to the shared goals of GB and LADWP to control air pollution and decrease the use of water for dust control at Owens Lake. In making its recommendations, the CRTF will also give due consideration to GB's and LADWP's shared water saving and air pollution control goals.

f) The CRTF will be advisory in nature only, and GB and LADWP will retain final determination as to the treatment of ECR areas. GB reserves the right to issue a future order or orders requiring LADWP to install dust controls on Phase 7b areas and LADWP reserves the right to contest any such order.

g) Permanent avoidance of any portion of the Phase 7b Areas will be considered by GB, which, upon approval, shall amend the 2008 SIP and Board Order 080128-01 in order to get USEPA approval.

C. <u>No Fines</u>

1. GB shall not fine, issue fees or impose any other type of penalty upon LADWP with respect to any areas of Phase 7a, provided that the Phase 7a dust controls are put into place within the time frames set forth in Section I.A.1.

2. GB shall not fine LADWP for any areas in the Initial Phase 7b Areas and the Additional Phase 7b Areas pursuant to the SOA and this agreement.

D. Modification of SOA

1. The amended SOA shall clarify that the discovery of any cultural resources that are determined by LADWP's state-certified archeologist to be potentially CRHR-eligible shall be included in the SOA's existing time-extensions-for-cause, as set forth in SOA Paragraphs 5 and 6.

2. The amended SOA shall reiterate that GB and LADWP shall make every effort to develop, approve and deploy high-confidence waterless dust control measures in all areas where dust controls are ordered.

3. The amended SOA shall state that the modification of the SOA by GB and LADWP shall not be construed as a waiver by either party of any rights, remedies, legal theories or positions that either party may choose to assert in any hearing, proceeding, tribunal or action now or in the future except with respect to the particular subject matter contained in the amended SOA and the Keeler and Other Dunes Release".[1]

4. The effective date of the amended SOA shall be the date upon which the necessary decision makers of the City of Los Angeles and the GB Governing Board agree to enter into this agreement to modify the SOA.

E. Clarification on BACM

1. GB hereby approves Reduced Thickness Gravel BACM (2 inches of gravel with geotextile fabric underlay).

[1] LADWP disputes the legality of and does not agree to the Supplemental Control Requirements Determination (SCRD) process. GB asserts that LADWP agreed to the SCRD process in the original Phase 7a SOA and elsewhere, and the SCRD process is now the law. GB and LADWP have a continuing disagreement on this point.

2. GB hereby approves Brine Shallow Flooding BACM as a subcategory of Shallow Flooding BACM. GB and LADWP acknowledge and agree that the foregoing approval of Brine Shallow Flooding BACM shall not make LADWP liable for maintenance of the natural Brine Pool on Owens Lake. "Brine Pool" is defined as those areas below elevation 3,553.55 feet.

3. GB will commit to work with the LADWP on an accelerated testing schedules and BACM approval, if warranted, for Roughness Elements and Tillage in soil type areas where these controls can be applied. Within 30 days of the effective date of the amended SOA, GB and LADWP shall agree upon accelerated testing schedules for the candidate Roughness Elements and Tillage BACMs in soil types where these control can be applied. Said schedules will include consideration for BACM approval of these candidate measures by the GB Board within one year of completion of the schedules (within 13 months of the effective date of the amended SOA). If the accelerated testing does not result in approved BACM designation for the candidate measures, LADWP and the GB Board will jointly assess why the accelerated testing did not result in BACM approvals. GB and LADWP also will commit to work on accelerated testing schedules and BACM approvals for other forms of BACM.

4. GB will memorialize its approvals set forth in Sections I E. (1) and (2) and any future approvals pursuant to Section I E. (3) in formal GB board resolutions and orders. GB and LADWP will jointly appeal to State Lands to approve use of new BACMs promptly upon their approval by GB and, with respect to the approvals set forth in Sections I E. (1) and (2) within 90 days of the effective date of the amended SOA.

II. KEELER DUNES

A. Keeler Dunes Dust Control Project

1. LADWP shall provide $10 Million to GB as a public benefit contribution to and will support GB's "Keeler Project" (as defined herein below) to control PM10 emissions from the Keeler Dunes. LADWP shall tender the $10 Million in a single payment to GB within 90 days after the effective date of the amended SOA and the following two actions are completed: 1) delivery to LADWP of the "Keeler and Other Dunes Release" (defined herein below) and 2) the submittal to the California Air Resources Board (CARB) as described in Paragraph II.B.1.c., below. The "Keeler and Other Dunes Release" shall not be effective until GB receives the $10 Million payment.

2. GB shall use the funds for environmental impact analysis, design, permitting, construction, operation, maintenance, management, monitoring and directly related activities for a dust emission control project at Keeler Dunes (the "Keeler Project"). No funds shall be used for the purpose of attorney fees, public affairs or governmental relations (collectively, "Public Affairs") or contractors or subcontractors for Public Affairs. The Keeler Project includes all those portions of the Keeler Dunes owned by LADWP and BLM. GB shall have exclusive authority over, and responsibility for, the Keeler Project. LADWP shall have no responsibility for the design, permitting, construction, operation, maintenance, management, monitoring and other activities directly and exclusively related to the Keeler Project for as long as dust controls are required.

3. Upon delivery of the "Keeler and Other Dunes Release" (defined herein below) and the SIP and Board Order 080128-01 amendment submittal to the CARB as described in Paragraph II.B.1.c., below, LADWP will immediately provide GB with access to its property in the Keeler Dunes area in order to complete environmental impact analyses and for all design, permitting, construction, operation, maintenance, management, monitoring and activities directly and exclusively related to the Keeler

Project. So long as such access is provided by LADWP, GB shall indemnify in perpetuity, defend and hold LADWP (and the City of LA) harmless for personal injuries caused by the negligence or willful misconduct of GB with respect to all activities undertaken by GB and its employees, agents and contractors on LADWP's property and GB shall promptly repair any damage to LADWP's property caused by GB's activities on LADWP's property except that GB shall not be required to repair any alteration of the property that is part of or related to the design or implementation of the dust control measures for the Keeler Project. Any dust monitoring undertaken by GB on LADWP's Keeler Dunes property shall exclusively be for the Keeler Project and shall not be used for any other purpose.

4. LADWP, at its sole cost and expense, shall have the right (without obligation) to audit GB's books and records on an annual basis to verify that the $10 Million contributed by LADWP has been exclusively used to fund the Keeler Project in accordance with the amended SOA, the amended SIP, the Keeler and Other Dunes Release and any other document memorializing the Terms, and for no other purpose. GB shall fully co-operate with any annual audit of the Keeler Project initiated by LADWP.

B. <u>Release of LADWP/LA City for Keeler and Other Dunes Areas</u>

1. Upon the effective date of the amended SOA, GB shall deliver to LADWP a release (the "Keeler and Other Dunes Areas Release") as follows:

   a) <u>Release for Keeler Dunes</u>:
   GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of Keeler Dunes owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement

action by any other agency against LADWP related to dust emissions, regardless of origin, from the Keeler Dunes, including but not limited to portions of the Keeler Dunes owned by LADWP. A map defining the geographical boundaries of the Keeler Dunes is attached and incorporated into this agreement.

b) Release for Swansea and Olancha Dunes (collectively these dunes are defined as the Other Dunes Areas):

GB forever releases LADWP from any and all liability under any and all federal, state and local laws that GB can enforce and settle, including but not limited to the Health and Safety Code, those portions of the SIP that can be enforced by GB, and fugitive dust emissions rules, for dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake, including but not limited to portions of such dunes that may be owned by LADWP. GB forever agrees not to request, encourage or join in an enforcement action by any other agency against LADWP related to dust emissions, regardless of origin, from the Other Dunes Areas in the vicinity of Owens Lake. This agreement does not release LADWP from liability for dust emissions resulting from any future groundwater pumping by LADWP at or below the 3600-foot contour in the Owens Lake area. Maps defining the geographical boundaries of the Other Dunes Areas in the vicinity of Owens Lake are attached and incorporated into this agreement.

c) SIP and Board Order Amendment:
Great Basin shall amend the SIP and Board Order 080128-01consistent with the terms of this agreement and the "Keeler and Other Dunes Areas Release" and shall request the USEPA and CARB to approve the amended SIP.

2. LADWP reserves the right to contest and defend any alleged violations not covered by the releases herein, including but not limited to the right to contest and defend any alleged violations of Rule 401, or alleged violations of H&S 42316 below the 3600-foot elevation and above the 3600-foot elevation in those areas outside the Keeler

Dunes and Other Dunes Areas. GB reserves the right to assert that any such defenses are barred or otherwise not legally supported.

3. After the date of this agreement, GB shall hold no hearings regarding LADWP's liability/responsibility for dust emissions from the Keeler Dunes or from the Other Dunes Areas.

III. GENERAL SETTLEMENT CONDITIONS

A. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to final approval by LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles.

B. All Settlements and other matters contained in the amended SOA and Keeler Release shall be subject to approval of GB Board and shall be memorialized in GB Board modification of SOA and appropriate GB resolutions, the 2008 SIP, if required, and Board orders.

C. GB and LADWP shall memorialize the Terms in formal settlement documents, including the amended SOA, the Keeler Release and the Other Dunes Area Release, within 30 days after approval of the Terms by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles. Prior to such approvals and until such time that public disclosure is mandated by law, GB and LADWP shall not disclose the Terms or the existence and content of the SOA Mediation and shall keep the Terms confidential.

D. Once the Terms are fully approved by the GB Board and by the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles, GB and LADWP shall issue a joint press release to announce the successful conclusion of the SOA Mediation, the Terms, the amended SOA and the Keeler Release.

E. The parties to the SOA Mediation shall each execute a copy of this document to evidence that it contains the final and complete statement of the Terms resulting from the SOA Mediation that will be submitted for approval to the LADWP Board of Commissioners and all other necessary decision makers at the City of Los Angeles and to the GB Board.

F. Prior to the public announcement of this Agreement, LADWP and GB will develop a mutually agreeable joint communication, which announces and explains this Agreement. The Parties agree not to disclose or divulge the content and substance of the Settlement Terms to any third parties, including, but not limited to members of the press or media, unless and until LADWP and the District have approved a final settlement. The confidentiality requirements do not extend to the undersigned participants' discussions with their respective party's legal counsel and governing boards, regarding the settlement meetings.

In witness thereof, the parties hereto have set their hands to this agreement on June 27, 2013.

Great Basin Unified Air Pollution Control District	Los Angeles Department of Water and Power
By: John Eastman	By: Ronald Nichols
Name: John Eastman	Name: RONALD O. NICHOLS
Title: Governing Board Chair	Title: General Manager
Date: June 27, 2013	Date: 7/25/13

////////

APPROVED AS TO FORM AND LEGALITY
CARMEN A. TRUTANICH, CITY ATTORNEY

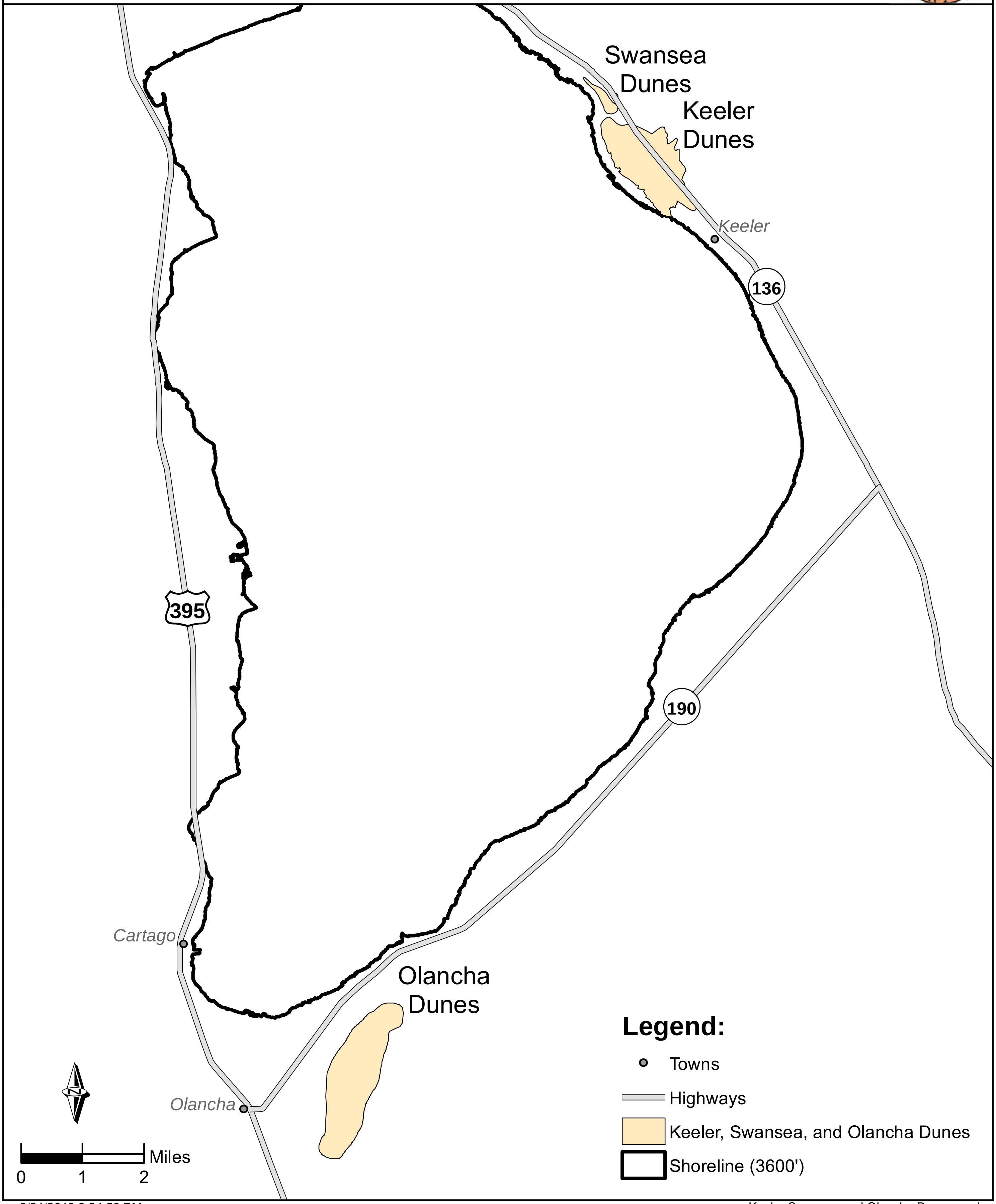
JUL 22 2013

Michelle Lyman

MICHELLE LYMAN
DEPUTY CITY ATTORNEY

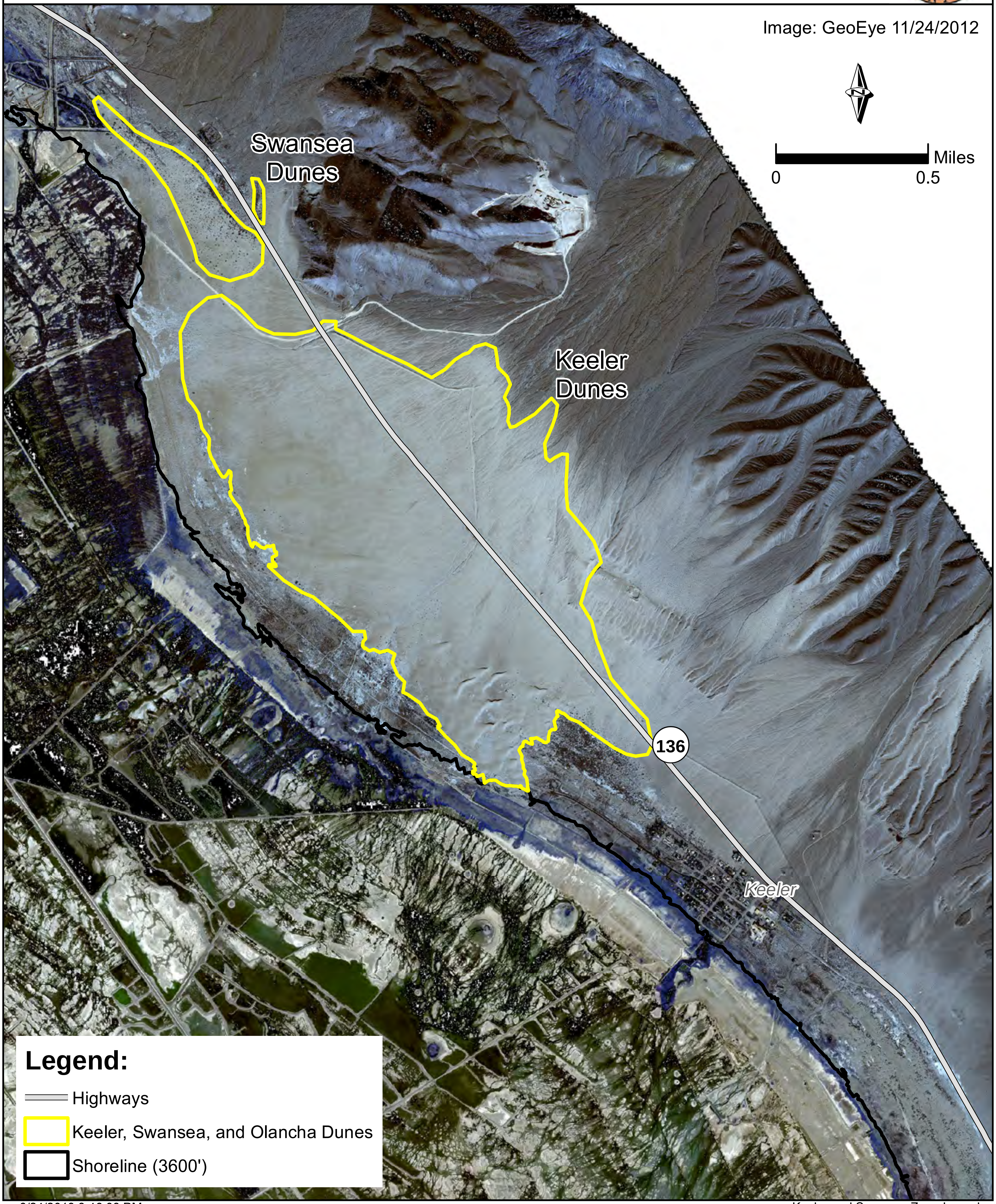
Great Basin Unified Air Pollution Control District

Keeler, Swansea, and Olancha Dunes



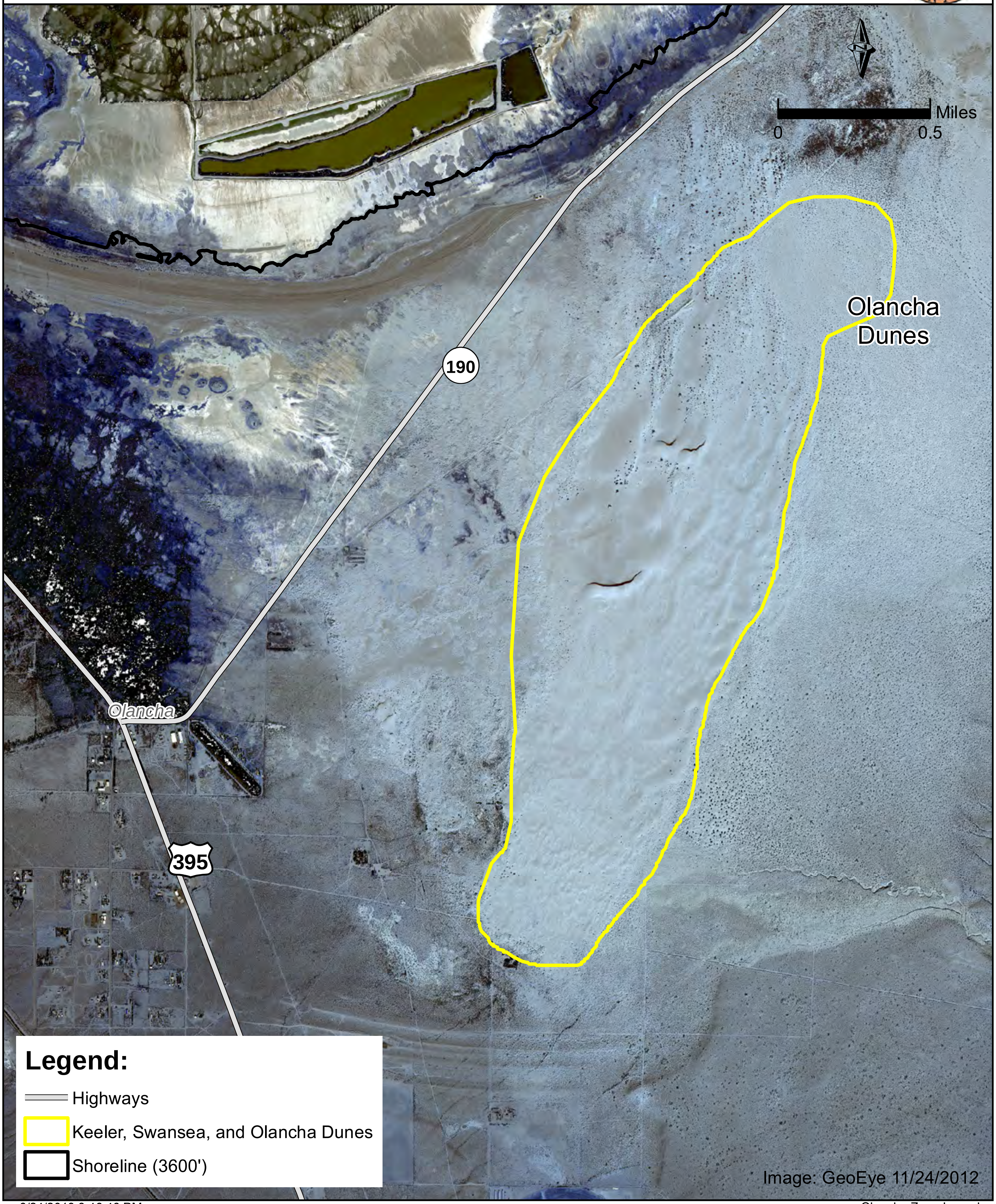
Great Basin Unified Air Pollution Control District

Keeler and Swansea Dunes - Detail



Great Basin Unified Air Pollution Control District

Olancha Dunes - Detail



ATTACHMENT C

Exhibit 6

CONFIDENTIAL Map of 328-Acre

Initial Eligible Cultural Resource Areas (Phase 7b Areas)

This map contains sensitive cultural resources information that cannot be publicly disclosed under protection laws.

ATTACHMENT C

Exhibit 7

Map of Phase 7a Modified Areas and Phase 7a Transition Areas

(Map to be provided by the LADWP prior to

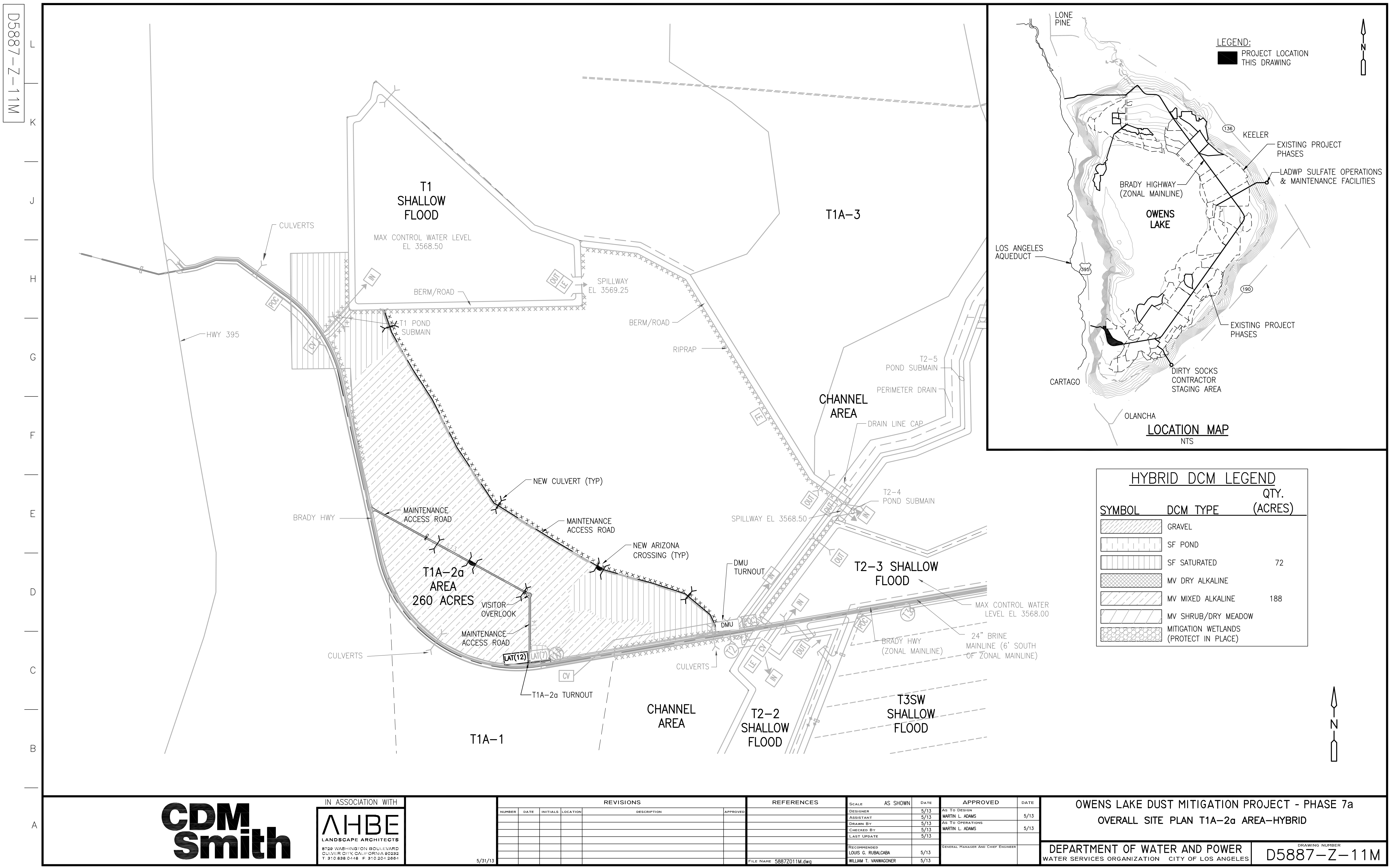
August 19, 2013 Special District Governing Board meeting)

Great Basin Unified Air Pollution Control District

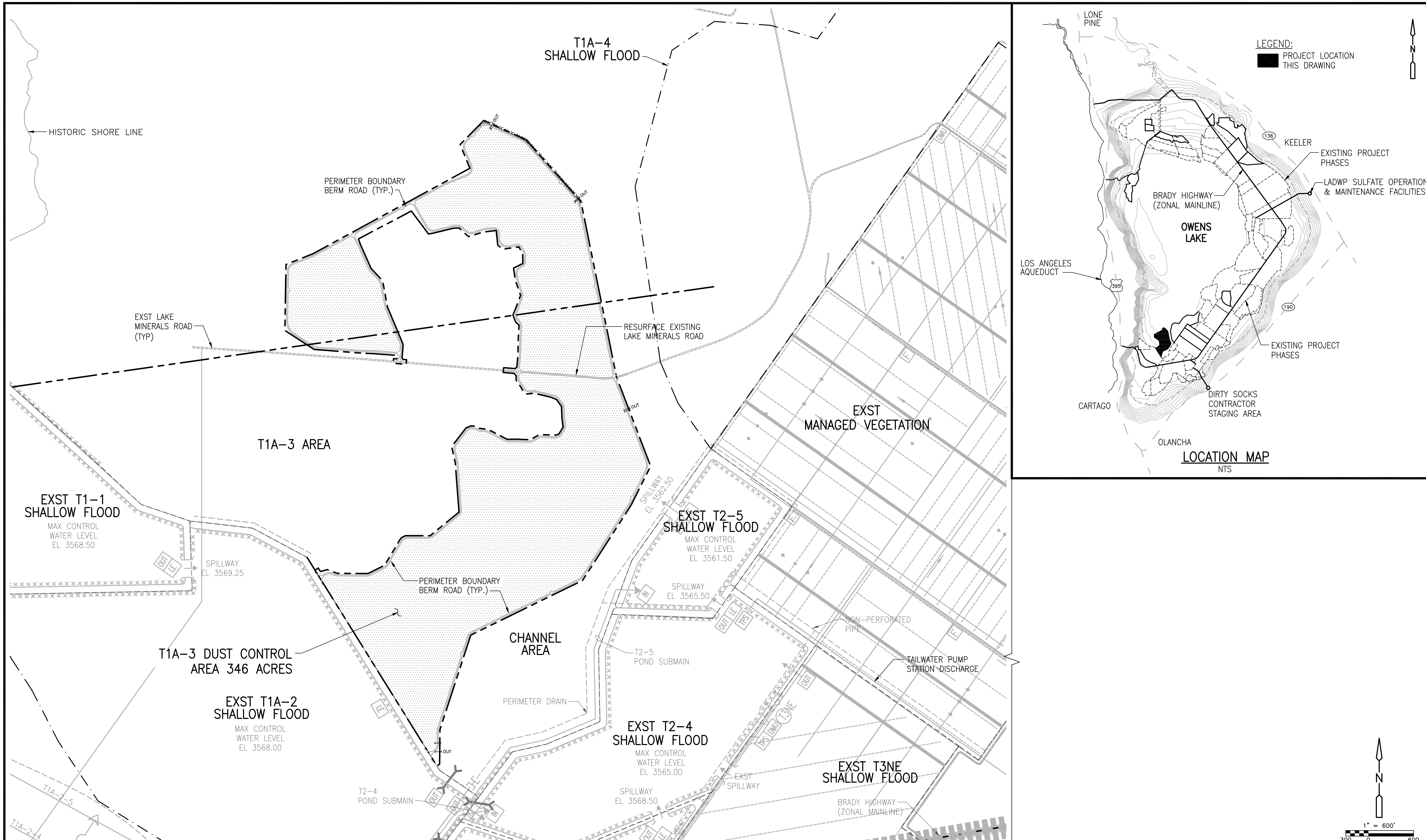
2013 Amendment to the Owens Valley PM_{10} SIP

Board Order 130916-01

Exhibit 7: Map of Phase 7a Areas


D5887-Z-11M
T1
SHALLOW
FLOOD
MAX CONTROL WATER LEVEL
EL 3568.50
T1A-3
CULVERTS
BERM/ROAD
SPILLWAY
EL 3569.25
T1 POND
SUBMAIN
HWY 395
BERM/ROAD
RIPRAP
T2-5
POND SUBMAIN
PERIMETER DRAIN
CHANNEL
AREA
DRAIN LINE CAP
NEW CULVERT (TYP)
T2-4
POND SUBMAIN
BRADY HWY
MAINTENANCE
ACCESS ROAD
MAINTENANCE
ACCESS ROAD
SPILLWAY EL 3568.50
NEW ARIZONA
CROSSING (TYP)
T1A-2a
AREA
260 ACRES
DMU
TURNOUT
T2-3 SHALLOW
FLOOD
VISITOR
OVERLOOK
MAX CONTROL WATER
LEVEL EL 3568.00
MAINTENANCE
ACCESS ROAD
BRADY HWY
(ZONAL MAINLINE)
24" BRINE
MAINLINE (6' SOUTH
OF ZONAL MAINLINE)
CULVERTS
LAT(12)
CULVERTS
T1A-2a TURNOUT
CHANNEL
AREA
T2-2
SHALLOW
FLOOD
T3SW
SHALLOW
FLOOD
T1A-1
LONE
PINE
LEGEND:
PROJECT LOCATION
THIS DRAWING
KEELER
EXISTING PROJECT
PHASES
LADWP SULFATE OPERATIONS
& MAINTENANCE FACILITIES
BRADY HIGHWAY
(ZONAL MAINLINE)
OWENS
LAKE
LOS ANGELES
AQUEDUCT
EXISTING PROJECT
PHASES
CARTAGO
DIRTY SOCKS
CONTRACTOR
STAGING AREA
OLANCHA
LOCATION MAP
NTS
HYBRID DCM LEGEND
SYMBOL | DCM TYPE | QTY. (ACRES)
GRAVEL
SF POND
SF SATURATED 72
MV DRY ALKALINE
MV MIXED ALKALINE 188
MV SHRUB/DRY MEADOW
MITIGATION WETLANDS
(PROTECT IN PLACE)
CDM Smith
IN ASSOCIATION WITH
AHBE
LANDSCAPE ARCHITECTS
REVISIONS
REFERENCES
SCALE AS SHOWN
APPROVED
MARTIN L. ADAMS
LOUIS G. RUBALCABA
WILLIAM T. VANWAGONER
File Name 5887Z011M.dwg
5/31/13
OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN T1A-2a AREA-HYBRID
DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES
D5887-Z-11M

D5887-Z-13P



CDM Smith

IN ASSOCIATION WITH

E2 Consulting Engineers, Inc.

5/31/13

REVISIONS					
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REFERENCES

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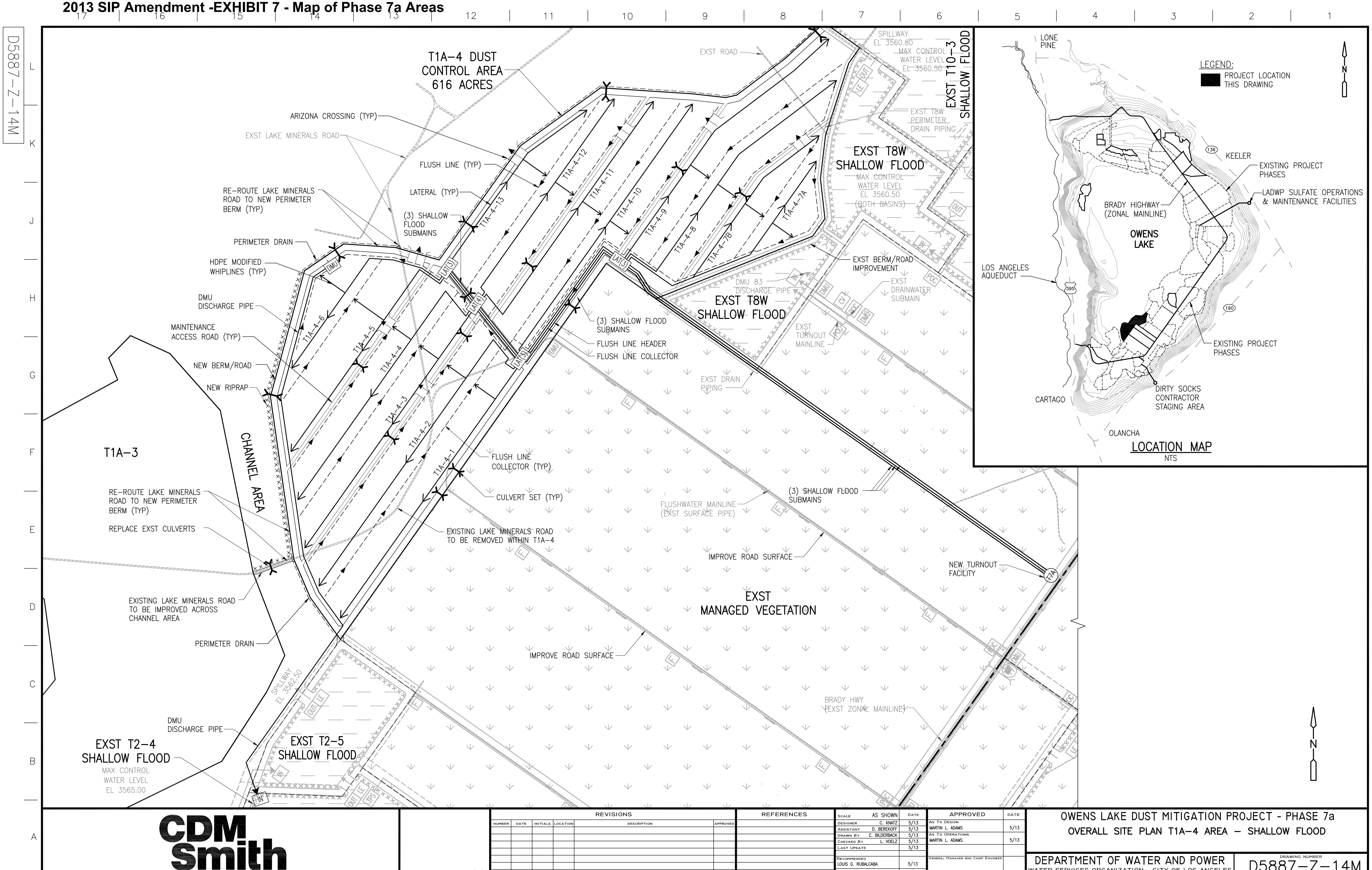
SCALE	AS SHOWN	DATE
DESIGNER	L. WEINBRENNER	5/13
ASSISTANT	–	5/13
DRAWN BY	B. HARRIS	5/13
CHECKED BY	V. BADANI	5/13
LAST UPDATE		5/13
RECOMMENDED LOUIS G. RUBALCABA		5/13
WILLIAM T. VANWAGONER		5/13

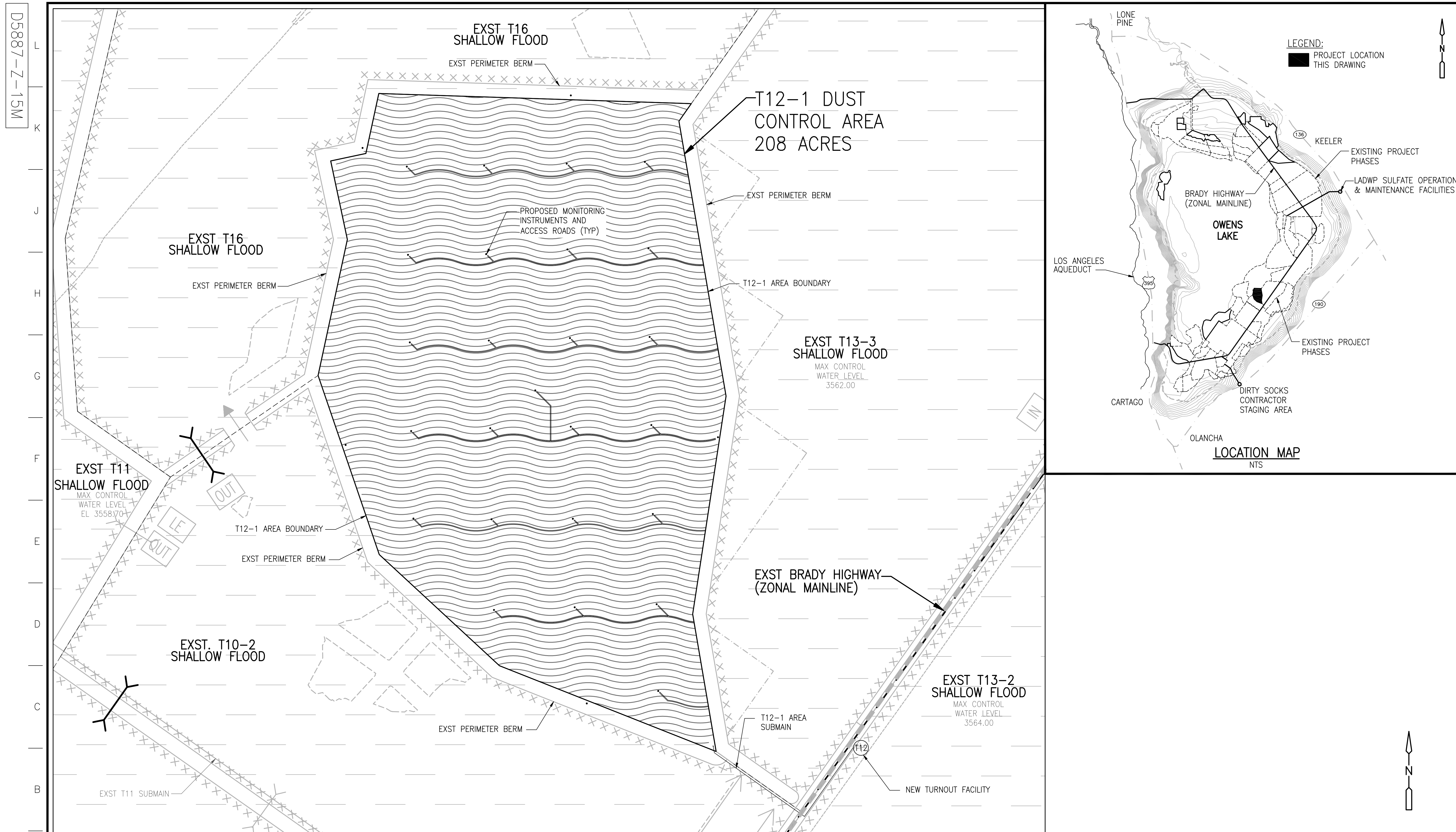
APPROVED	DATE
AS TO DESIGN MARTIN L. ADAMS	5/13
AS TO OPERATIONS MARTIN L. ADAMS	5/13
GENERAL MANAGER AND CHIEF ENGINEER	

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN
T1A-3 AREA – GRAVEL COVER

DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER
D5887-Z-13P


D5887-Z-14M
T1A-4 DUST CONTROL AREA 616 ACRES
ARIZONA CROSSING (TYP)
EXST LAKE MINERALS ROAD
FLUSH LINE (TYP)
RE-ROUTE LAKE MINERALS ROAD TO NEW PERIMETER BERM (TYP)
LATERAL (TYP)
(3) SHALLOW FLOOD SUBMAINS
PERIMETER DRAIN
HDPE MODIFIED WHIPLINES (TYP)
DMU DISCHARGE PIPE
MAINTENANCE ACCESS ROAD (TYP)
NEW BERM/ROAD
NEW RIPRAP
T1A-3
CHANNEL AREA
RE-ROUTE LAKE MINERALS ROAD TO NEW PERIMETER BERM (TYP)
REPLACE EXST CULVERTS
EXISTING LAKE MINERALS ROAD TO BE IMPROVED ACROSS CHANNEL AREA
PERIMETER DRAIN
DMU DISCHARGE PIPE
EXST T2-4 SHALLOW FLOOD
MAX CONTROL WATER LEVEL EL 3565.00
SPILLWAY EL 3562.50
EXST T2-5 SHALLOW FLOOD
T1A-4-1
T1A-4-2
T1A-4-3
T1A-4-4
T1A-4-5
T1A-4-6
T1A-4-7A
T1A-4-7B
T1A-4-8
T1A-4-9
T1A-4-10
T1A-4-11
T1A-4-12
T1A-4-13
EXST ROAD
SPILLWAY EL 3560.80
MAX CONTROL WATER LEVEL EL 3560.50
EXST T10-3 SHALLOW FLOOD
EXST T8W PERIMETER DRAIN PIPING
EXST T8W SHALLOW FLOOD
MAX CONTROL WATER LEVEL EL 3560.50 (BOTH BASINS)
EXST BERM/ROAD IMPROVEMENT
EXST DRAINWATER SUBMAIN
DMU 83 DISCHARGE PIPE
EXST T8W SHALLOW FLOOD
EXST TURNOUT MAINLINE
(3) SHALLOW FLOOD SUBMAINS
FLUSH LINE HEADER
FLUSH LINE COLLECTOR
EXST DRAIN PIPING
FLUSH LINE COLLECTOR (TYP)
CULVERT SET (TYP)
EXISTING LAKE MINERALS ROAD TO BE REMOVED WITHIN T1A-4
FLUSHWATER MAINLINE (EXST SURFACE PIPE)
(3) SHALLOW FLOOD SUBMAINS
IMPROVE ROAD SURFACE
NEW TURNOUT FACILITY
EXST MANAGED VEGETATION
IMPROVE ROAD SURFACE
BRADY HWY (EXST ZONAL MAINLINE)
LONE PINE
LEGEND:
PROJECT LOCATION THIS DRAWING
KEELER
EXISTING PROJECT PHASES
LADWP SULFATE OPERATIONS & MAINTENANCE FACILITIES
BRADY HIGHWAY (ZONAL MAINLINE)
OWENS LAKE
LOS ANGELES AQUEDUCT
EXISTING PROJECT PHASES
DIRTY SOCKS CONTRACTOR STAGING AREA
CARTAGO
OLANCHA
LOCATION MAP
NTS
CDM Smith
REVISIONS
REFERENCES
SCALE AS SHOWN
DESIGNER C. KNATZ 5/13
ASSISTANT D. BEREKOFF 5/13
DRAWN BY C. BILDERBACK 5/13
CHECKED BY L. VOELZ 5/13
RECOMMENDED LOUIS G. RUBALCABA 5/13
WILLIAM T. VANWAGONER 5/13
APPROVED
AS TO DESIGN MARTIN L. ADAMS 5/13
AS TO OPERATIONS MARTIN L. ADAMS 5/13
GENERAL MANAGER AND CHIEF ENGINEER
FILE NAME 5887Z014M.DWG
5/31/13
OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN T1A-4 AREA – SHALLOW FLOOD
DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES
DRAWING NUMBER D5887-Z-14M



CDM Smith

5/31/13

REVISIONS					
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REFERENCES

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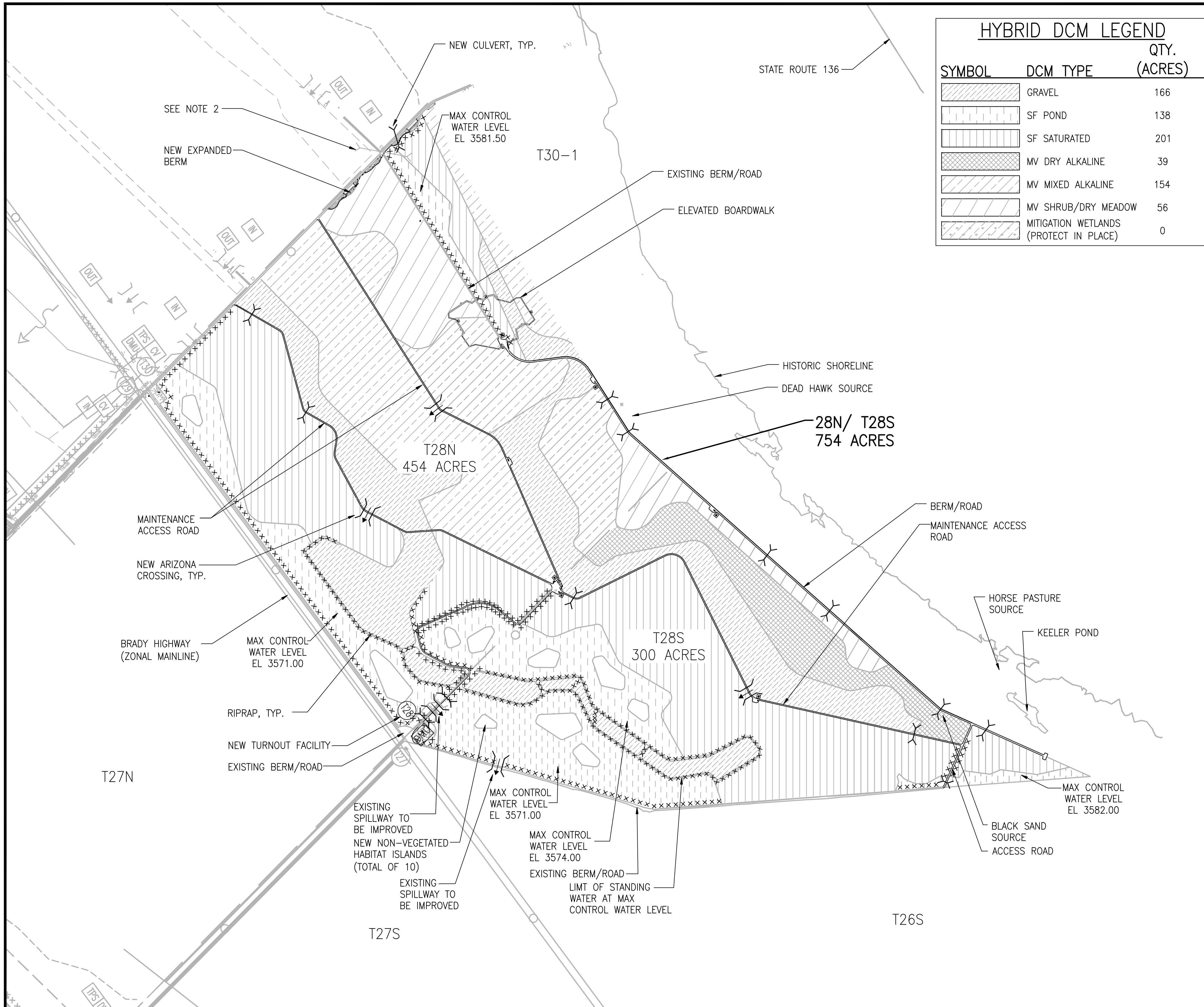
DESIGNER	C. KNATZ	5/13
ASSISTANT	D. BEREKOFF	5/13
DRAWN BY	C. BILDERBACK	5/13
CHECKED BY	L. VOELZ	5/13
LAST UPDATE		5/13
RECOMMENDED	LOUIS G. RUBALCABA	5/13
	WILLIAM T. VANWAGONER	5/13

APPROVED	DATE
AS TO DESIGN MARTIN L. ADAMS	5/13
AS TO OPERATIONS MARTIN L. ADAMS	5/13
GENERAL MANAGER AND CHIEF ENGINEER	

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN
T12–1 AREA – TILLAGE

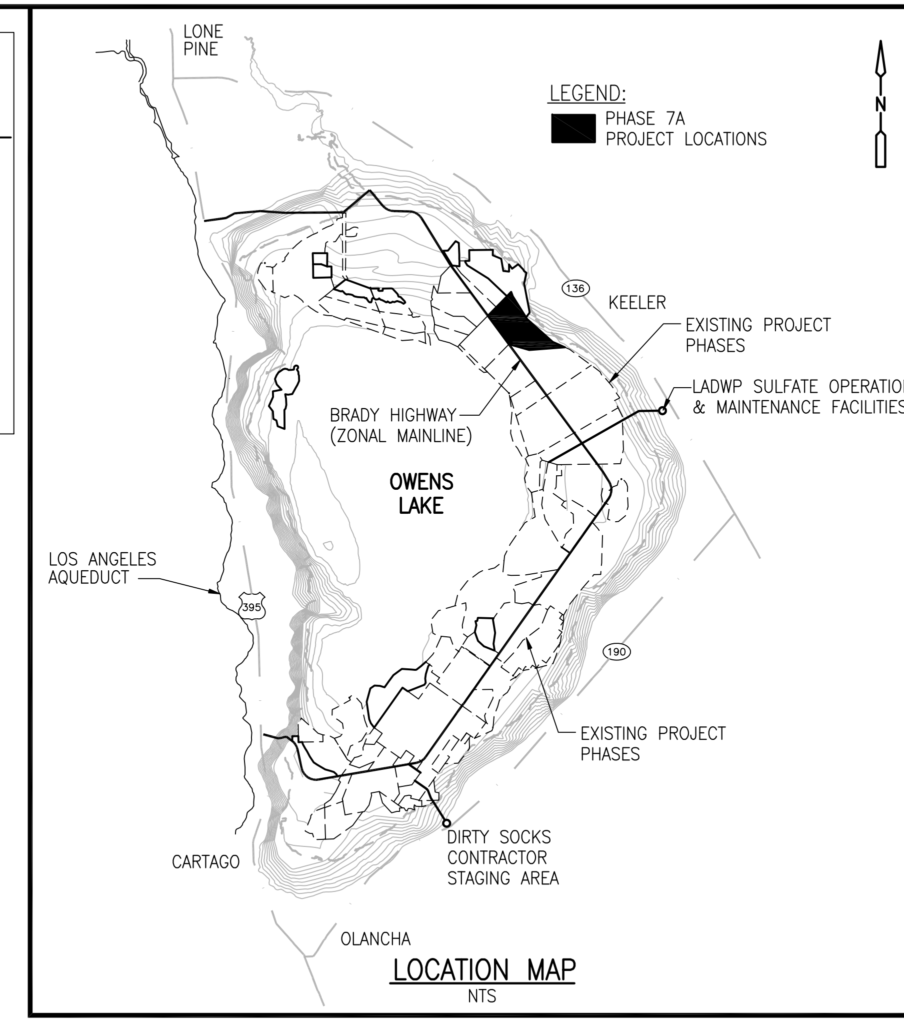
DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER
D5887–Z–15M



HYBRID DCM LEGEND

SYMBOL	DCM TYPE	QTY. (ACRES)
	GRAVEL	166
	SF POND	138
	SF SATURATED	201
	MV DRY ALKALINE	39
	MV MIXED ALKALINE	154
	MV SHRUB/DRY MEADOW	56
	MITIGATION WETLANDS (PROTECT IN PLACE)	0



DESIGN CRITERIA – T28N

	EXISTING ACRES	TARGET ACRES	PROPOSED ACRES
SHALLOW FLOOD			
MAIN POND	454	58	58
SATURATED	0	96	96
MANAGED VEGETATION			
SHRUB DOMINATED	0	42	42
SEEDED MEADOW (MIXED ALKALINE)	0	154	154
SEEDED MEADOW (DRY ALKALINE)	0	0	0
OTHER			
GRAVEL	0	104	104

DESIGN CRITERIA – T28S

	EXISTING ACRES	TARGET ACRES	PROPOSED ACRES
SHALLOW FLOOD			
MAIN POND	300	80	80
SATURATED	0	105	105
MANAGED VEGETATION			
SHRUB DOMINATED	0	14	14
SEEDED MEADOW (MIXED ALKALINE)	0	0	0
SEEDED MEADOW (DRY ALKALINE)	0	39	39
OTHER			
GRAVEL	0	62	62

CDM Smith

IN ASSOCIATION WITH MIA LEHRER + associates landscape architecture

5/31/13

REVISIONS: NUMBER | DATE | INITIALS | LOCATION | DESCRIPTION | APPROVED

REFERENCES

FILE NAME 5887Z016M.dwg

		DATE
SCALE	AS SHOWN	
DESIGNER	M. Lehrer	5/13
ASSISTANT	J. Dyer	5/13
DRAWN BY	D. Dyer	5/13
CHECKED BY	J. Hutchins	5/13
LAST UPDATE		5/13
RECOMMENDED	LOUIS G. RUBALCABA	5/13
	WILLIAM T. VANWAGONER	5/13

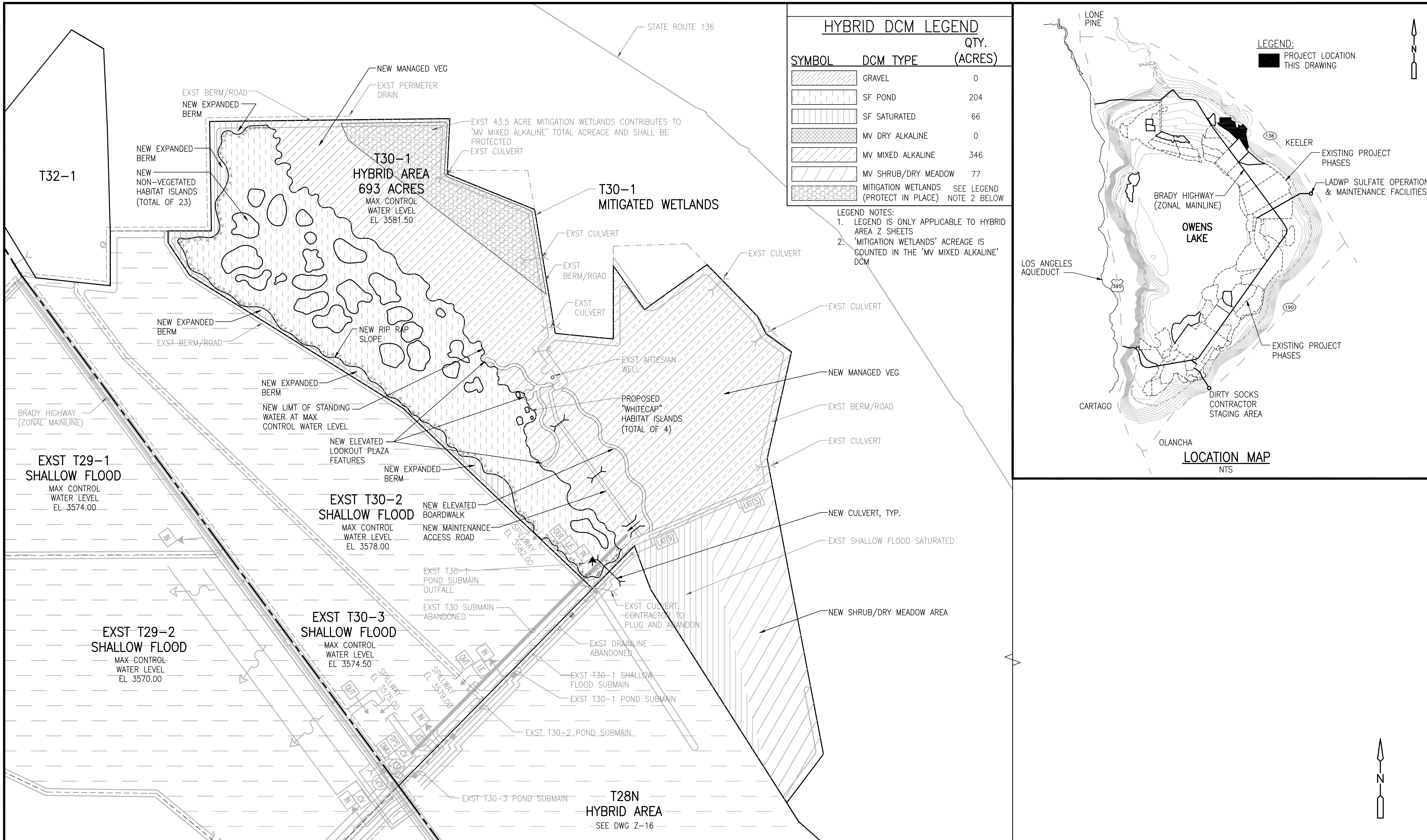
APPROVED	DATE
AS TO DESIGN MARTIN L. ADAMS	5/13
AS TO OPERATIONS MARTIN L. ADAMS	5/13
GENERAL MANAGER AND CHIEF ENGINEER	

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a

OVERALL SITE PLAN T28 N/S AREA – NORTH (1 OF 1)

DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER D5887–Z–16M



CDM Smith

IN ASSOCIATION WITH NŪVIS LANDSCAPE ARCHITECTURE AND PLANNING
FX: 714.754.7346
PH: 714.754.7311

5/31/13

REVISIONS					
NUMBER	DATE	INITIALS	LOCATION	DESCRIPTION	APPROVED

REFERENCES

File Name 5887Z018M.dwg

Scale	AS SHOWN	Date
Designer	P. CARDOZA	5/13
Assistant	T. MUNOZ	5/13
Drawn By	K. HOBBS	5/13
Checked By	R. STONE	5/13
Last Update		5/13
Recommended	LOUIS G. RUBALCABA	5/13
	WILLIAM T. VANWAGONER	5/13

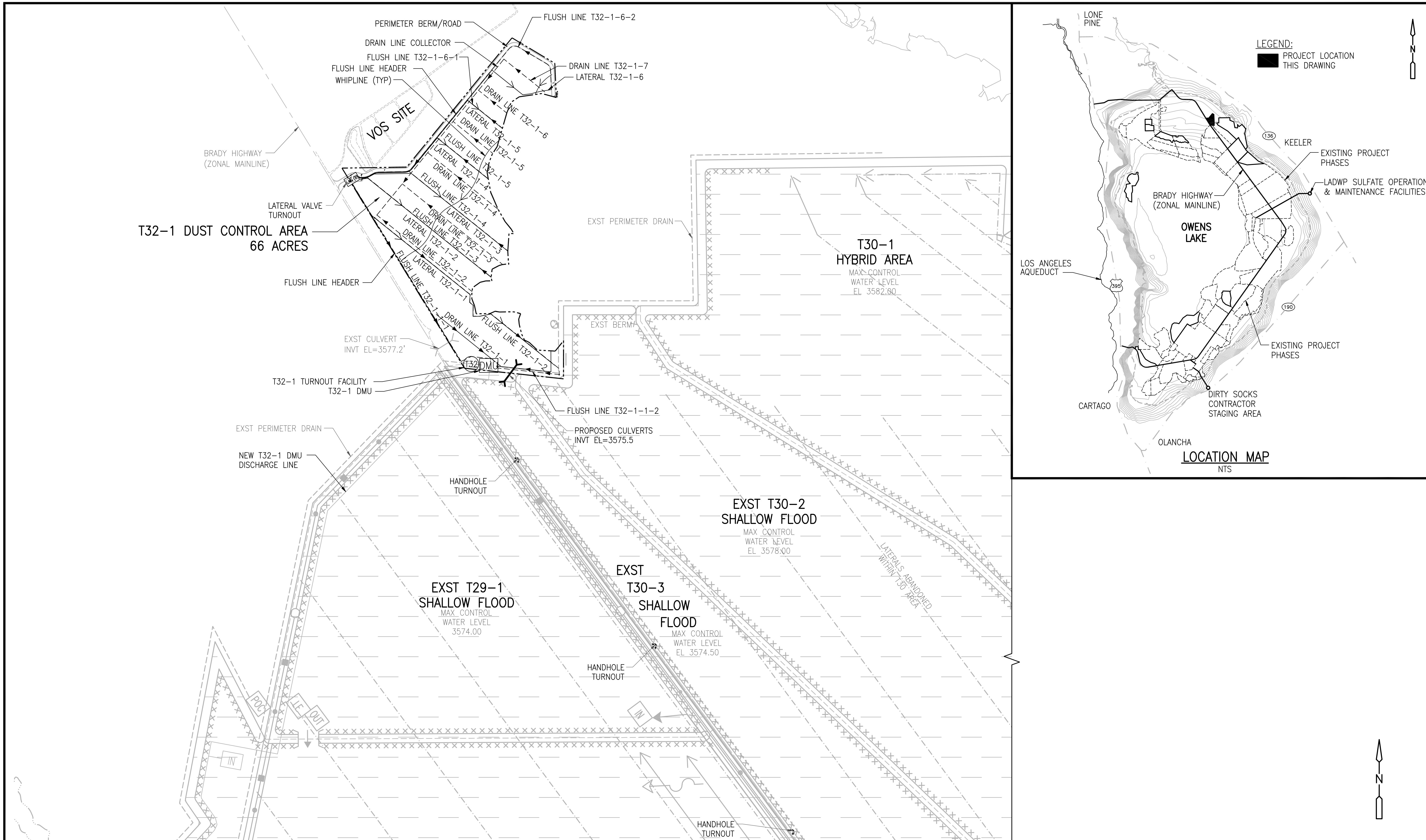
APPROVED	DATE
As To Design MARTIN L. ADAMS	5/13
As To Operations MARTIN L. ADAMS	5/13
General Manager And Chief Engineer	

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN T30-1 AREA – HYBRID

DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER D5887-Z-18M

D5887-Z-20P



CDM Smith

5/31/13

REVISIONS					
NUMBER	DATE	INITIALS	LOCATION	DESCRIPTION	APPROVED

REFERENCES

FILE NAME 5887Z020P.dwg

		DATE
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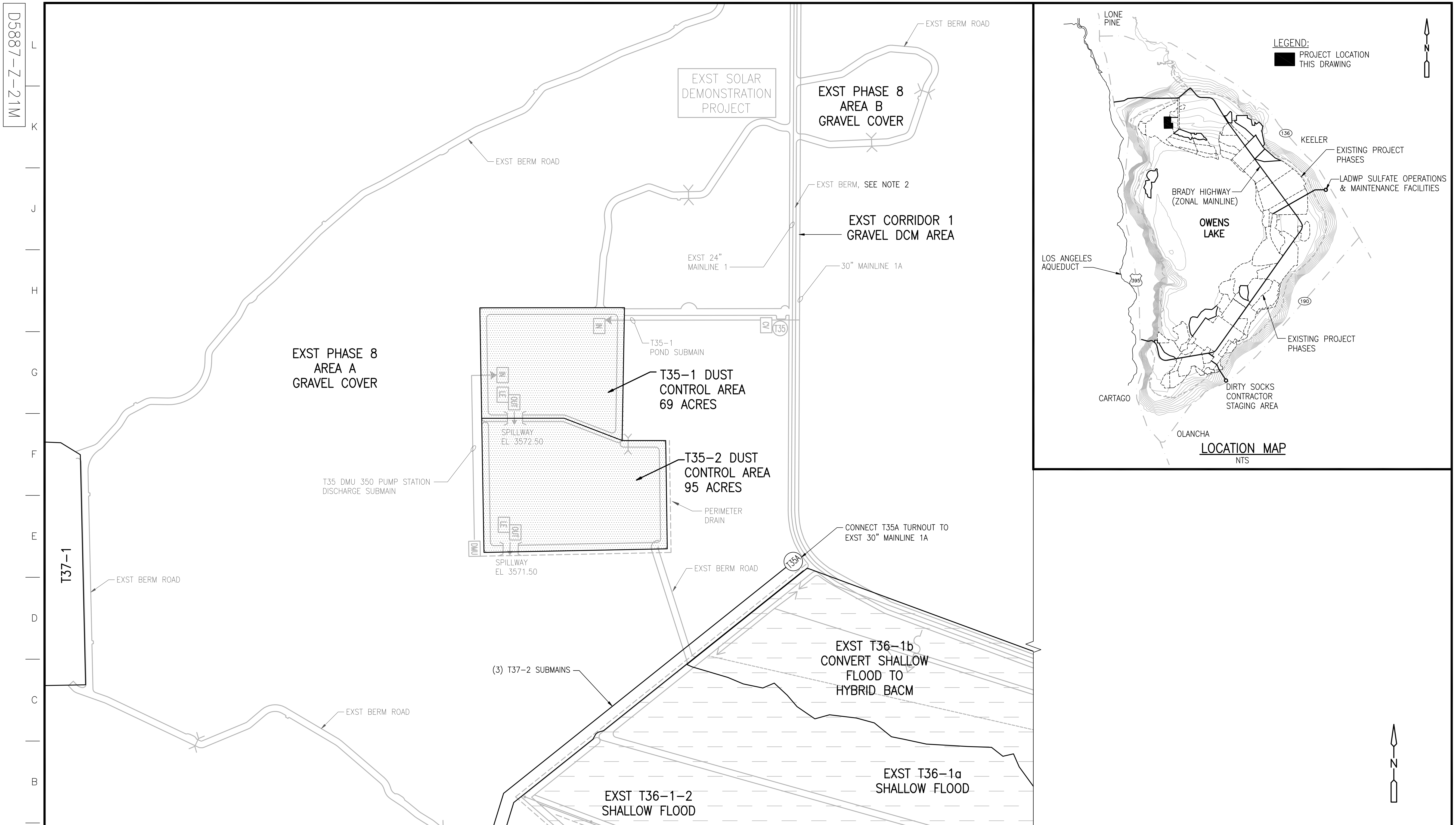
DESIGNER	D. GINS	5/13
ASSISTANT	D. GINS	5/13
DRAWN BY	D. GINS	5/13
CHECKED BY	V. BAPNA	5/13
LAST UPDATE		5/13
RECOMMENDED	LOUIS G. RUBALCABA	5/13
	WILLIAM T. VANWAGONER	5/13

APPROVED	DATE
AS TO DESIGN MARTIN L. ADAMS	5/13
AS TO OPERATIONS MARTIN L. ADAMS	5/13
GENERAL MANAGER AND CHIEF ENGINEER	

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN
T32-1 AREA – MANAGED VEGETATION

DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER D5887-Z-20P



CDM Smith

REVISIONS					
NUMBER	DATE	INITIALS	LOCATION	DESCRIPTION	APPROVED

5/31/13

REFERENCES

FILE NAME 5887Z021M.dwg

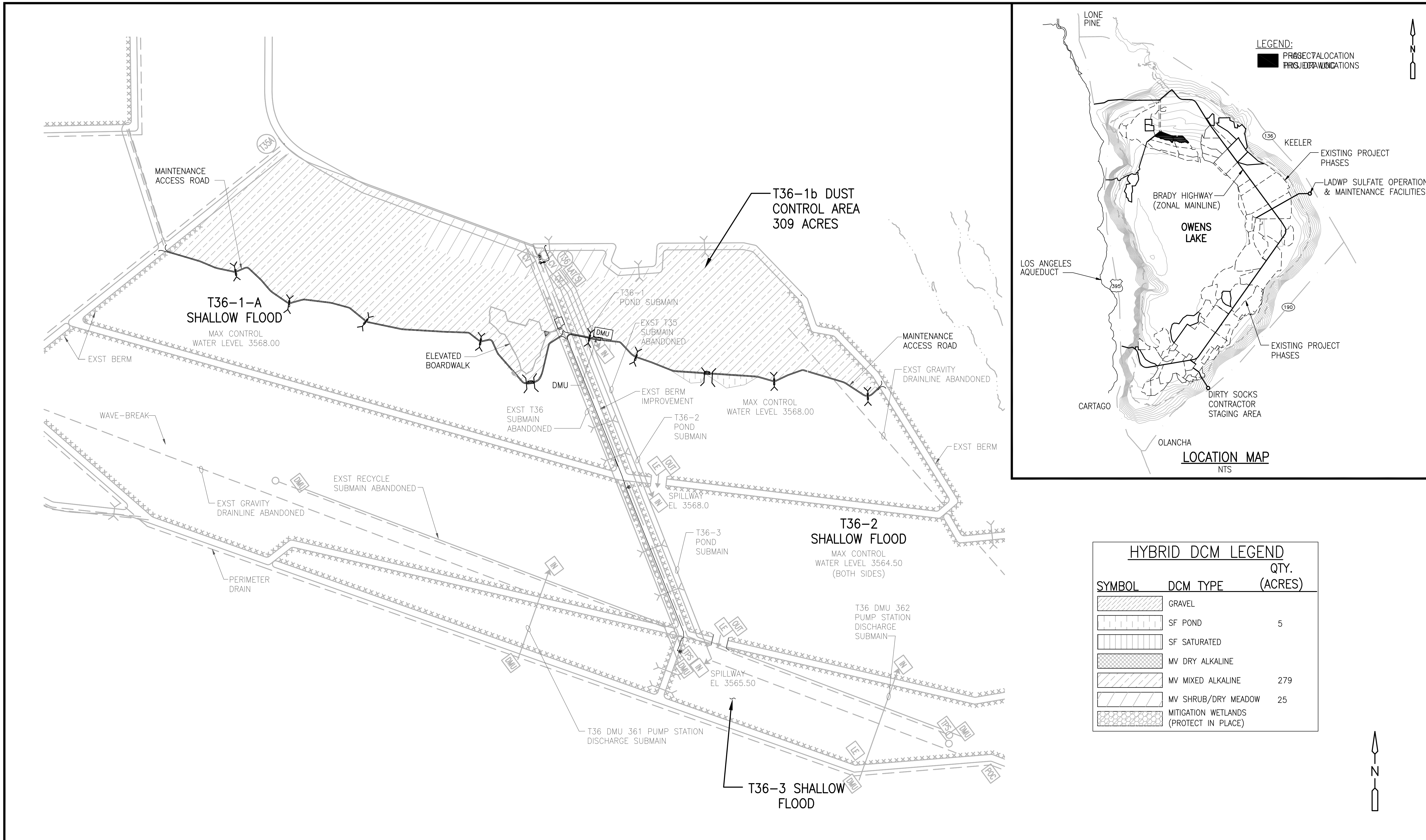
		DATE
SCALE	AS SHOWN	
DESIGNER	C. KNATZ	5/13
ASSISTANT	D. BEREKOFF	5/13
DRAWN BY	C. BILDERBACK	5/13
CHECKED BY	L. VOELZ	5/13
LAST UPDATE		5/13
RECOMMENDED	LOUIS G. RUBALCABA	5/13
	WILLIAM T. VANWAGONER	5/13

APPROVED	DATE
AS TO DESIGN MARTIN L. ADAMS	5/13
AS TO OPERATIONS MARTIN L. ADAMS	5/13
GENERAL MANAGER AND CHIEF ENGINEER	

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN T35-1 AND T35-2

DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER D5887-Z-21M



HYBRID DCM LEGEND

SYMBOL	DCM TYPE	QTY. (ACRES)
	GRAVEL	
	SF POND	5
	SF SATURATED	
	MV DRY ALKALINE	
	MV MIXED ALKALINE	279
	MV SHRUB/DRY MEADOW	25
	MITIGATION WETLANDS (PROTECT IN PLACE)	

CDM Smith

IN ASSOCIATION WITH AHBE LANDSCAPE ARCHITECTS
8729 WASHINGTON BOULEVARD CULVER CITY, CALIFORNIA 90232 T 310 838 0448 F 310 204 2664

5/31/13

REVISIONS: NUMBER | DATE | INITIALS | LOCATION | DESCRIPTION | APPROVED

REFERENCES

FILE NAME 5887Z022M.dwg

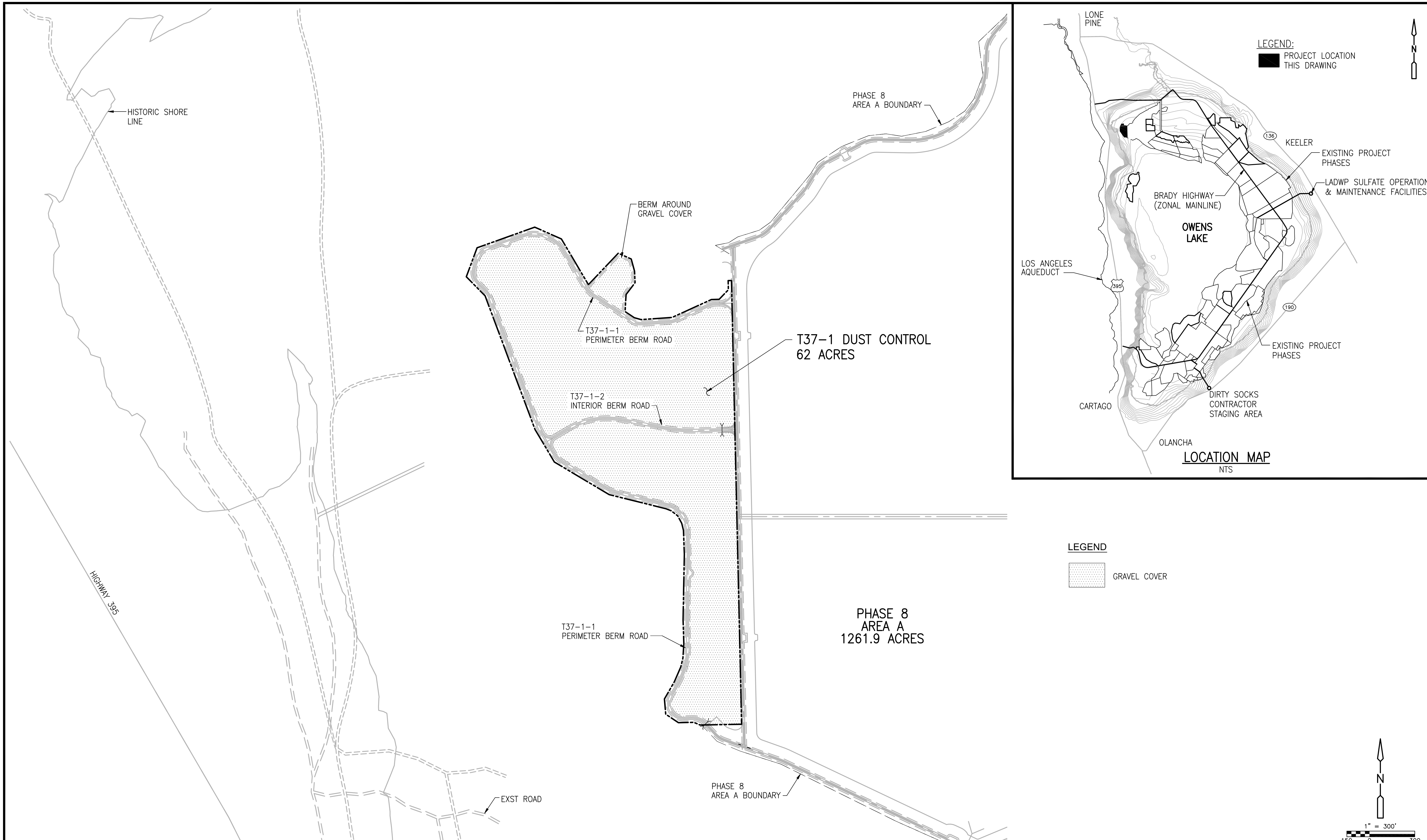
SCALE	AS SHOWN	DATE
DESIGNER		5/13
ASSISTANT		5/13
DRAWN BY		5/13
CHECKED BY		5/13
LAST UPDATE		5/13
RECOMMENDED LOUIS G. RUBALCABA		5/13
WILLIAM T. VANWAGONER		5/13

APPROVED	DATE
AS TO DESIGN MARTIN L. ADAMS	5/13
AS TO OPERATIONS MARTIN L. ADAMS	5/13
GENERAL MANAGER AND CHIEF ENGINEER	

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN T36-1b AREA-HYBRID

DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER D5887-Z-22M



CDM Smith

IN ASSOCIATION WITH

E2 Consulting Engineers, Inc.

5/31/13

REVISIONS

NUMBER	DATE	INITIALS	LOCATION	DESCRIPTION	APPROVED

REFERENCES

FILE NAME 5887Z024P.dwg

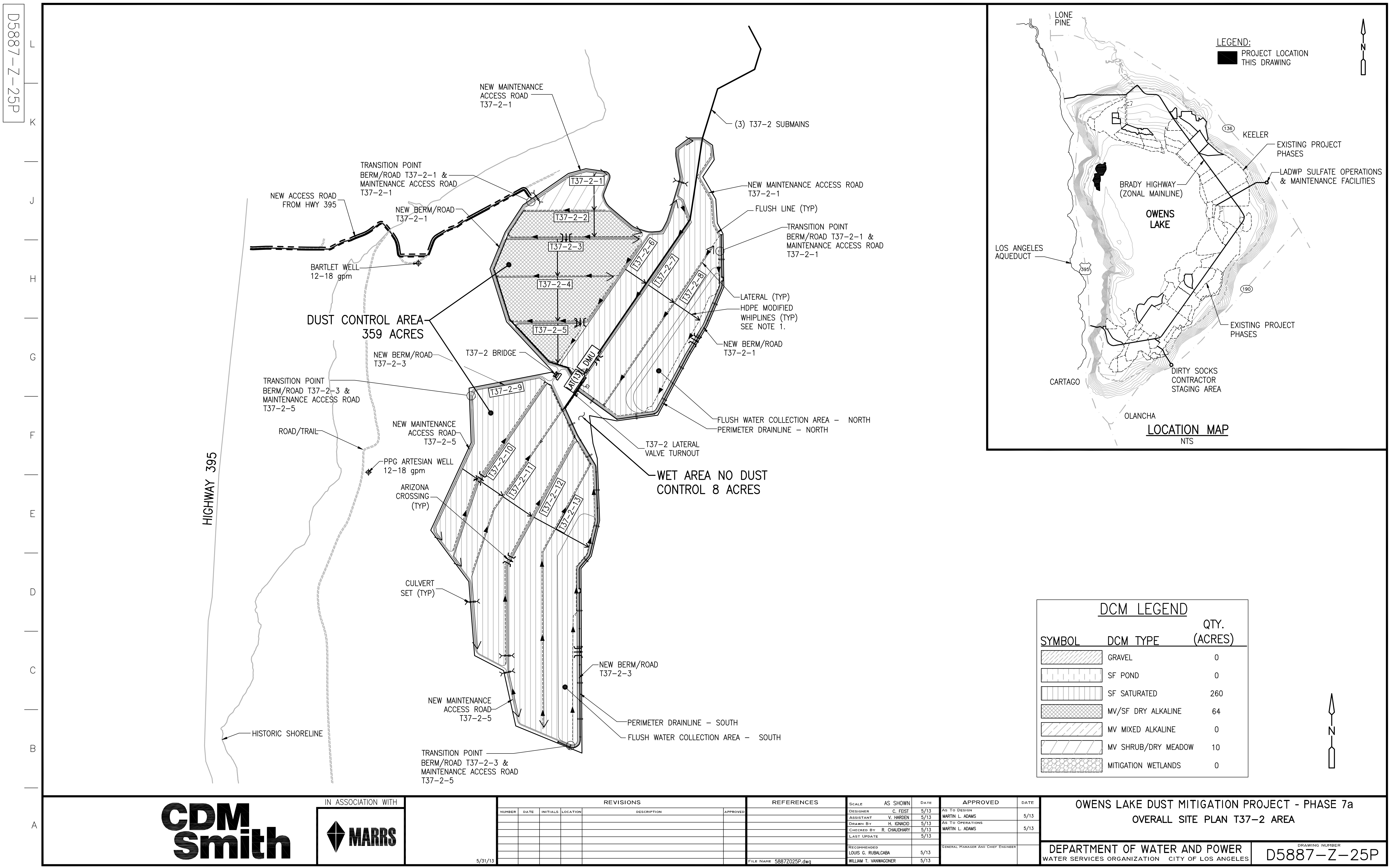
SCALE	AS SHOWN	DATE
DESIGNER	L. WEINBRENNER	5/13
ASSISTANT	–	5/13
DRAWN BY	B. HARRIS	5/13
CHECKED BY	V. BADANI	5/13
LAST UPDATE		5/13
RECOMMENDED LOUIS G. RUBALCABA		5/13
WILLIAM T. VANWAGONER		5/13

APPROVED	DATE
AS TO DESIGN MARTIN L. ADAMS	5/13
AS TO OPERATIONS MARTIN L. ADAMS	5/13
GENERAL MANAGER AND CHIEF ENGINEER	

OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN
T37-1 AREA – GRAVEL COVER

DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES

DRAWING NUMBER D5887-Z-24P


D5887-Z-25P
NEW MAINTENANCE ACCESS ROAD T37-2-1
(3) T37-2 SUBMAINS
TRANSITION POINT BERM/ROAD T37-2-1 & MAINTENANCE ACCESS ROAD T37-2-1
NEW ACCESS ROAD FROM HWY 395
NEW BERM/ROAD T37-2-1
NEW MAINTENANCE ACCESS ROAD T37-2-1
FLUSH LINE (TYP)
TRANSITION POINT BERM/ROAD T37-2-1 & MAINTENANCE ACCESS ROAD T37-2-1
BARTLET WELL 12-18 gpm
LATERAL (TYP)
HDPE MODIFIED WHIPLINES (TYP) SEE NOTE 1.
DUST CONTROL AREA 359 ACRES
NEW BERM/ROAD T37-2-1
NEW BERM/ROAD T37-2-3
T37-2 BRIDGE
TRANSITION POINT BERM/ROAD T37-2-3 & MAINTENANCE ACCESS ROAD T37-2-5
FLUSH WATER COLLECTION AREA - NORTH
PERIMETER DRAINLINE - NORTH
NEW MAINTENANCE ACCESS ROAD T37-2-5
ROAD/TRAIL
T37-2 LATERAL VALVE TURNOUT
PPG ARTESIAN WELL 12-18 gpm
WET AREA NO DUST CONTROL 8 ACRES
HIGHWAY 395
ARIZONA CROSSING (TYP)
CULVERT SET (TYP)
NEW BERM/ROAD T37-2-3
NEW MAINTENANCE ACCESS ROAD T37-2-5
PERIMETER DRAINLINE - SOUTH
FLUSH WATER COLLECTION AREA - SOUTH
HISTORIC SHORELINE
TRANSITION POINT BERM/ROAD T37-2-3 & MAINTENANCE ACCESS ROAD T37-2-5
T37-2-1
T37-2-2
T37-2-3
T37-2-4
T37-2-5
T37-2-6
T37-2-7
T37-2-8
T37-2-9
T37-2-10
T37-2-11
T37-2-12
T37-2-13
AT13 DMU
LONE PINE
LEGEND:
PROJECT LOCATION THIS DRAWING
KEELER
EXISTING PROJECT PHASES
LADWP SULFATE OPERATIONS & MAINTENANCE FACILITIES
BRADY HIGHWAY (ZONAL MAINLINE)
OWENS LAKE
LOS ANGELES AQUEDUCT
EXISTING PROJECT PHASES
DIRTY SOCKS CONTRACTOR STAGING AREA
CARTAGO
OLANCHA
LOCATION MAP
NTS
DCM LEGEND
SYMBOL
DCM TYPE
QTY. (ACRES)
GRAVEL 0
SF POND 0
SF SATURATED 260
MV/SF DRY ALKALINE 64
MV MIXED ALKALINE 0
MV SHRUB/DRY MEADOW 10
MITIGATION WETLANDS 0
CDM Smith
IN ASSOCIATION WITH
MARRS
REVISIONS
NUMBER DATE INITIALS LOCATION DESCRIPTION APPROVED
REFERENCES
FILE NAME 5887Z025P.dwg
5/31/13
SCALE AS SHOWN
DESIGNER C. FEIST 5/13
ASSISTANT V. HARDEN 5/13
DRAWN BY H. IGNACIO 5/13
CHECKED BY R. CHAUDHARY 5/13
LAST UPDATE 5/13
RECOMMENDED LOUIS G. RUBALCABA 5/13
WILLIAM T. VANWAGONER 5/13
APPROVED DATE
AS TO DESIGN MARTIN L. ADAMS 5/13
AS TO OPERATIONS MARTIN L. ADAMS 5/13
GENERAL MANAGER AND CHIEF ENGINEER
OWENS LAKE DUST MITIGATION PROJECT - PHASE 7a
OVERALL SITE PLAN T37-2 AREA
DEPARTMENT OF WATER AND POWER
WATER SERVICES ORGANIZATION CITY OF LOS ANGELES
DRAWING NUMBER
D5887-Z-25P

Great Basin Unified Air Pollution Control District

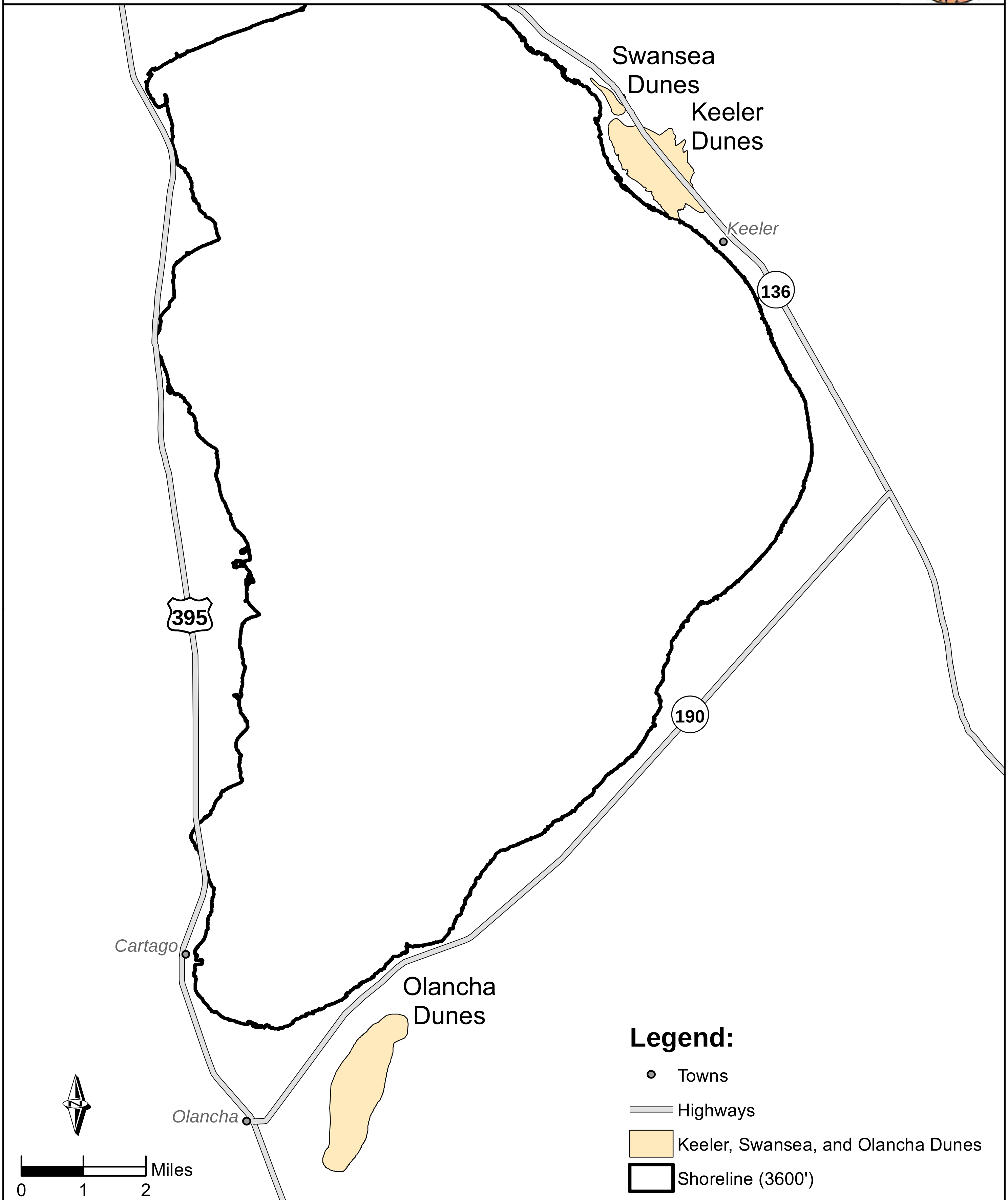
2013 Amendment to the Owens Valley PM_{10} SIP

Board Order 130916-01

Exhibit 8: Map of Keeler and Other Dune Areas

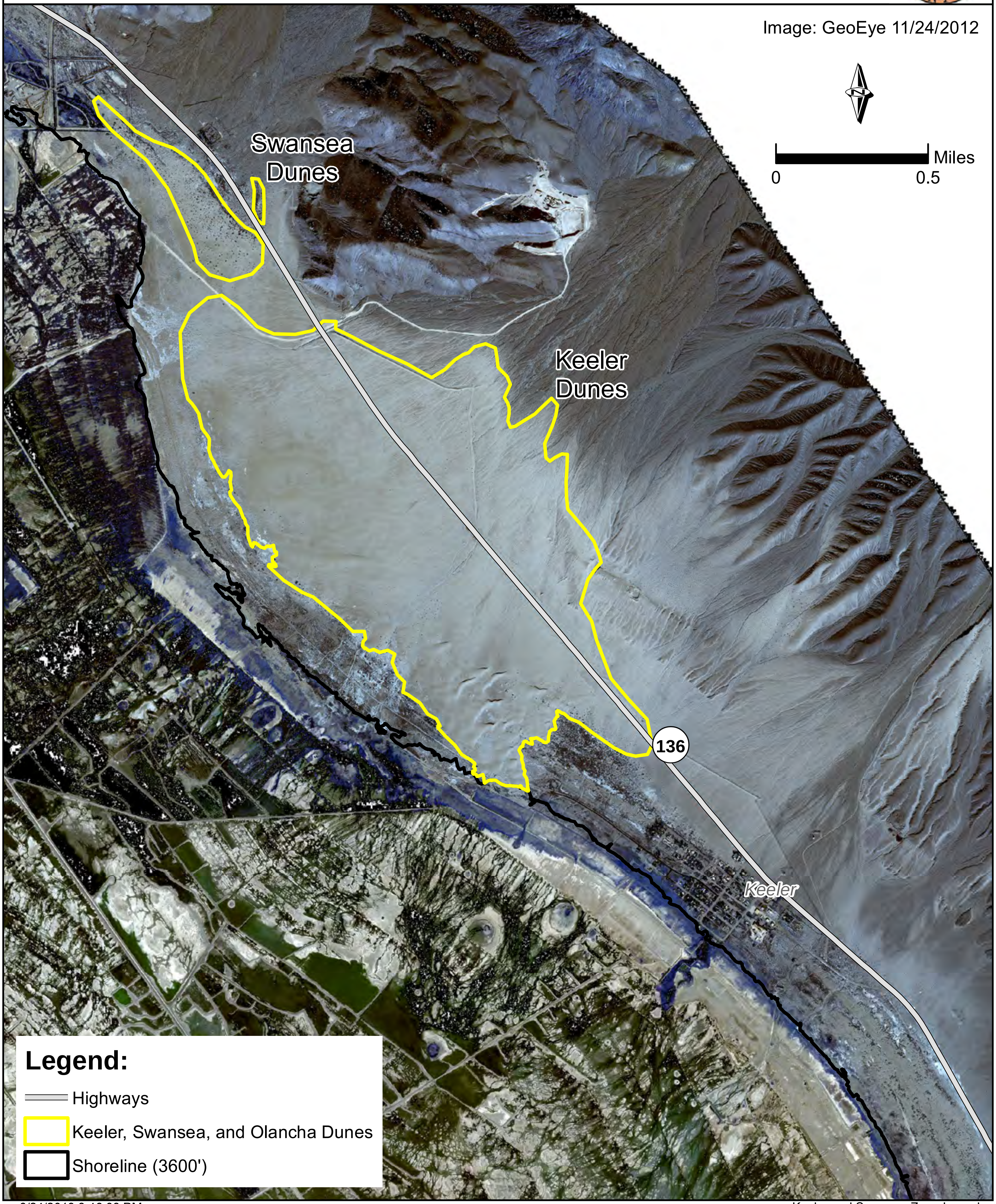
Great Basin Unified Air Pollution Control District

Keeler, Swansea, and Olancha Dunes



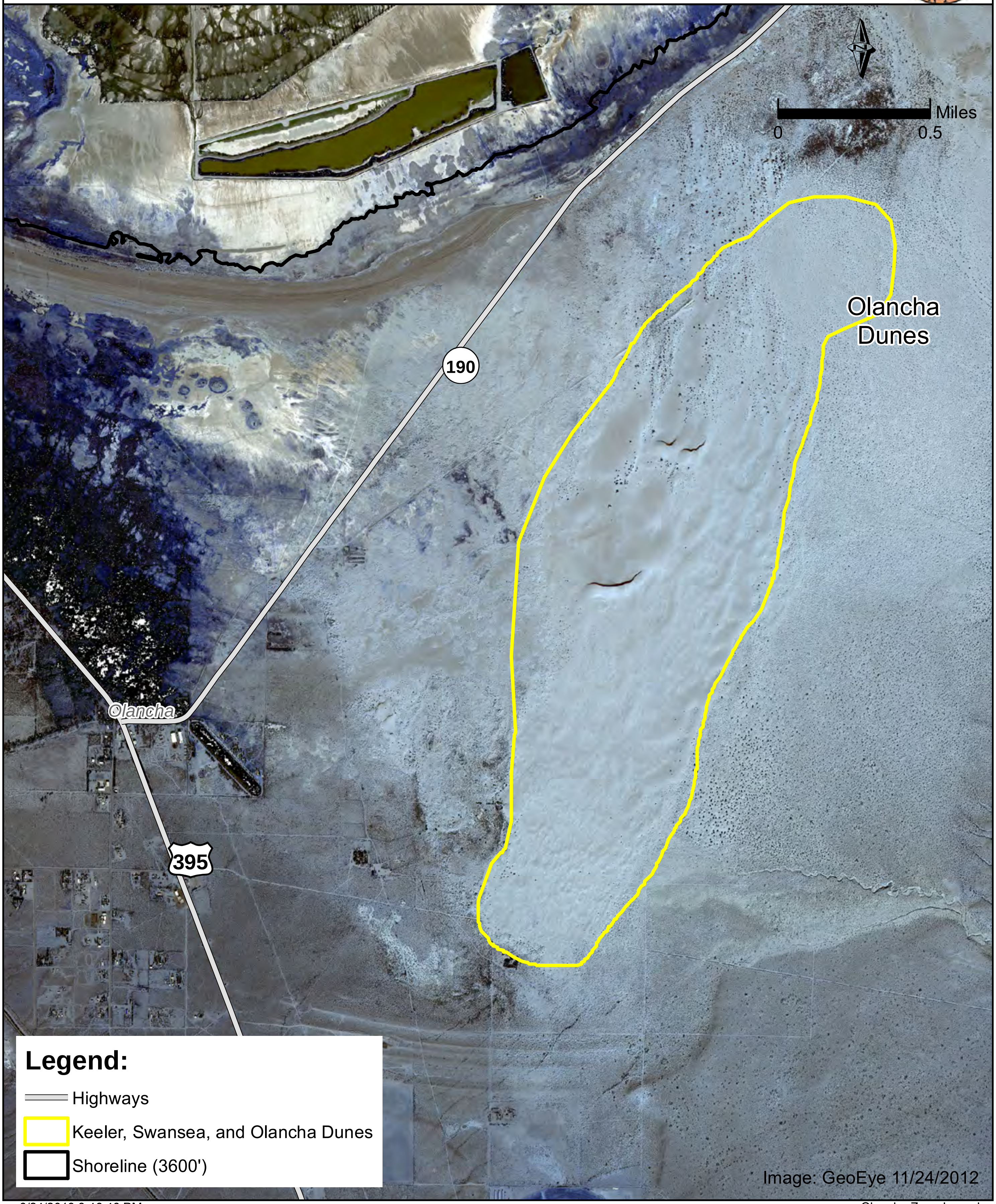
Great Basin Unified Air Pollution Control District

Keeler and Swansea Dunes - Detail



Great Basin Unified Air Pollution Control District

Olancha Dunes - Detail



APPENDIX F
GBUAPCD FUGITIVE DUST RULES
(400, 401, 402)

RULE 400. RINGELMANN CHART

Adopted: 09/05/74 Revised: 01/18/79

A person shall not discharge into the atmosphere from any single source of emission whatsoever, any air contaminant for a period or periods aggregating more than three minutes in any one hour which is:

A. As dark or darker in shade as that designated as No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines; or

B. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subsection (A) of this rule.

  1. "An observer" is defined as either a human observer or a certified, calibrated, in-stack opacity monitoring system.

[Intentionally left blank.]

RULE 401. FUGITIVE DUST

Adopted: 09/05/74 Revised: 03/10/76, 12/04/06

A. A person shall take reasonable precautions to prevent visible particulate matter from being airborne, under normal wind conditions, beyond the property from which the emission originates. Reasonable precautions include, but are not limited to:

1. Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;

2. Application of asphalt, water, or suitable chemicals on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dusts;

3. Installation and use of hoods, fans, and fabric filters, to enclose and vent the handling of dusty materials. Adequate contaminant methods shall be employed during such handling operations;

4. Use of water, chemicals, chuting, venting, or other precautions to prevent particulate matter from becoming airborne in handling dusty materials to open stockpiles and mobile equipment; and

5. Maintenance of roadways in a clean condition.

B. This rule shall not apply to emissions discharged through a stack.

C. [Reserved]

D. The City of Los Angeles shall implement dust control measures as ordered by the Board of the Great Basin Unified Air Pollution Control Board (Board), on any wind-blown dust source areas on the bed of Owens Lake (elevation less than 3,600 feet above mean sea level) that cause or contribute to monitored exceedances of the State PM-10 standards at residences within communities zoned for residential use in the latest Inyo County General Plan Land Use Diagrams. Acceptable dust control measures for Owens Lake shall:

1. Include Best Available Control Measures for Owens Lake as approved by the Board or any other control method that the APCO deems sufficient to reduce PM-10 impacts from the lake bed to below the state PM-10 standards within community boundaries.

2. Be fully implemented according to a schedule ordered by the Board.

[Intentionally left blank.]

RULE 402. NUISANCE
Adopted: 09/05/74

A person shall not discharge from any source whatsoever, such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property.

[Intentionally left blank.]

APPENDIX G
GBUAPCD OFF-LAKE PM_{10} REDUCTIONS MEMORANDUM (OCTOBER 9, 2015)

Phillip L. Kiddoo
Air Pollution Control Officer

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street, Bishop, California 93514-3537
760-872-8211 Fax: 760-872-6109

October 9, 2015

MEMORANDUM

Subject: Off-lake PM10 Reductions in Areas Adjacent to Lakebed Dust Controls

From: Duane Ono and Chris Howard

To: Phill Kiddoo, Grace Holder, Nik Barbieri, Ken Richmond and Julia Lester

ABSTRACT

Windblown dust in the Owens Lake area can be generated from the exposed lakebed as well as from off-lake areas. Most of the off-lake dust source areas are located near the lakebed. These are primarily areas where windblown sand and dust originating from the lakebed were deposited. An investigation of the history and morphology of the Keeler Dunes found that the natural dune area expanded following the drying of Owens Lake, which exposed the barren lakebed to wind erosion. Observations of the Keeler Dunes found that following the implementation of shallow flood dust control measures in 2001 in the area west of the dunes, the dunes not only stopped expanding, but began to erode along the upwind edge after the sand source was cut off. Similar to the Keeler Dunes, other off-lake dust source areas are closely tied to erosion activity in adjacent lakebed areas. With the limited supply of sand and dust in these off-lake areas, PM10 that is present in the deposited soil is expected to be winnowed out over time, resulting in lower PM10 emissions and ambient impacts. Such a decrease in PM10 emissions and impacts were observed at Owens Lake near the Dirty Socks PM10 monitor site. A comparison of off-lake and lakebed PM10 impacts measured at the Dirty Socks monitor site in this study found that dust from off-lake areas was closely linked to dust activity in adjacent lakebed areas. The results showed that the downward trends in on-lake PM10 exceedance numbers and concentration levels closely matched the trends in off-lake areas. A projection of this relationship found that if lakebed source areas cause no new federal exceedances, as expected for the required dust controls on the Owens Lake bed, then the off-lake areas would also show compliance with the federal standard.

INTRODUCTION

Windblown dust in the Owens Lake area can be generated from the exposed lakebed as well as from off-lake areas. Most of the off-lake dust source areas are located adjacent to and or near the lakebed. These are primarily areas where windblown sand and dust originating from the lakebed were deposited. An investigation of the history and morphology of the Keeler Dunes found that the natural dune area expanded following the drying of Owens Lake, which exposed the barren lakebed to wind erosion. Similar to the Keeler Dunes, many of the off-lake dust source areas adjacent to the lakebed were created as a result of transported windblown lakebed soils. (GBUAPCD, 2012)

If off-lake deposits were created as a result of material transported from the exposed lakebed, it would make sense that cutting off the source of transported soil would stop the growth of the off-lake dust areas. Indeed, observations of the Keeler Dunes found that following the implementation of shallow flood dust control measure in 2001 in the area west of the dunes, the dunes not only stopped expanding, but began to erode along the upwind edge. This was especially observed on the northern margin of the dunes where some dunes disappeared, exposing the underlying rocky alluvial fan. (GBUAPCD, 2012)

With the limited supply of sand and dust in these off-lake areas, much of the PM10 in the dunes should be winnowed out over time, and we would expect to see lower PM10 emissions and ambient impacts as the dunes shrink. In this study, a comparison of off-lake and lakebed PM10 impacts measured at the Dirty Socks monitor site was performed to evaluate how off-lake PM10 impacts changed after dust controls were implemented on the lakebed. The Dirty Socks site is one of seven PM10 monitor sites currently operating near the Owens Lake shoreline. This site is unique because of its long history of data collection before and after implementation of nearby dust controls, and the high number of exceedances caused by both lakebed and off-lake dust source areas. Its location and history made it especially useful for this study.

METHODOLOGY

PM10 monitoring data collected at the Dirty Socks monitor site from July 1999 through December 2012 was separated into exceedance days (PM10 > 150 $\mu g\ m^{-3}$) that were caused by windblown dust generated from lakebed source areas and those that were caused by dust from off-lake areas. Continuous PM10 data was collected using a federally-approved TEOM (Tapered Element Oscillating Microbalance) PM10 monitor. Hourly PM10 and wind direction data were paired to determine which hours had PM10 generated from lakebed source areas, which were assumed to be when the wind direction was greater than 234 degrees, or less than 50 degrees. Hours when dust was assumed to be generated from off-lake areas were the remaining hours. A 24-hour average PM10 concentration for each exceedance day was calculated for lakebed sources and off-lake sources by assuming that the PM10 concentration was 20 $\mu g\ m^{-3}$ for the off-lake wind direction hours for lakebed exceedance days, and conversely, 20 $\mu g\ m^{-3}$ for the lakebed wind direction hours for off-lake exceedance days. The resulting off-lake and lakebed exceedance days were then evaluated to determine how the exceedance frequency and concentration values changed over time, especially before and after the implementation of dust control measures on the southern portion of the lakebed starting in 2003. The map in Figure 1 shows the location of the Dirty Socks monitor at Owens Lake and the adjacent dust control areas and when they were completed. Dust controls near the Dirty Socks monitor were primarily shallow flooding and managed vegetation. The area marked as the Olancha Dunes is the approximate location of a natural dune formation. The primary off-lake dust source areas that impact the Dirty Socks site are not distinctly mapped, but are scattered along a band approximately 2-km in width adjacent to the southeast shoreline.

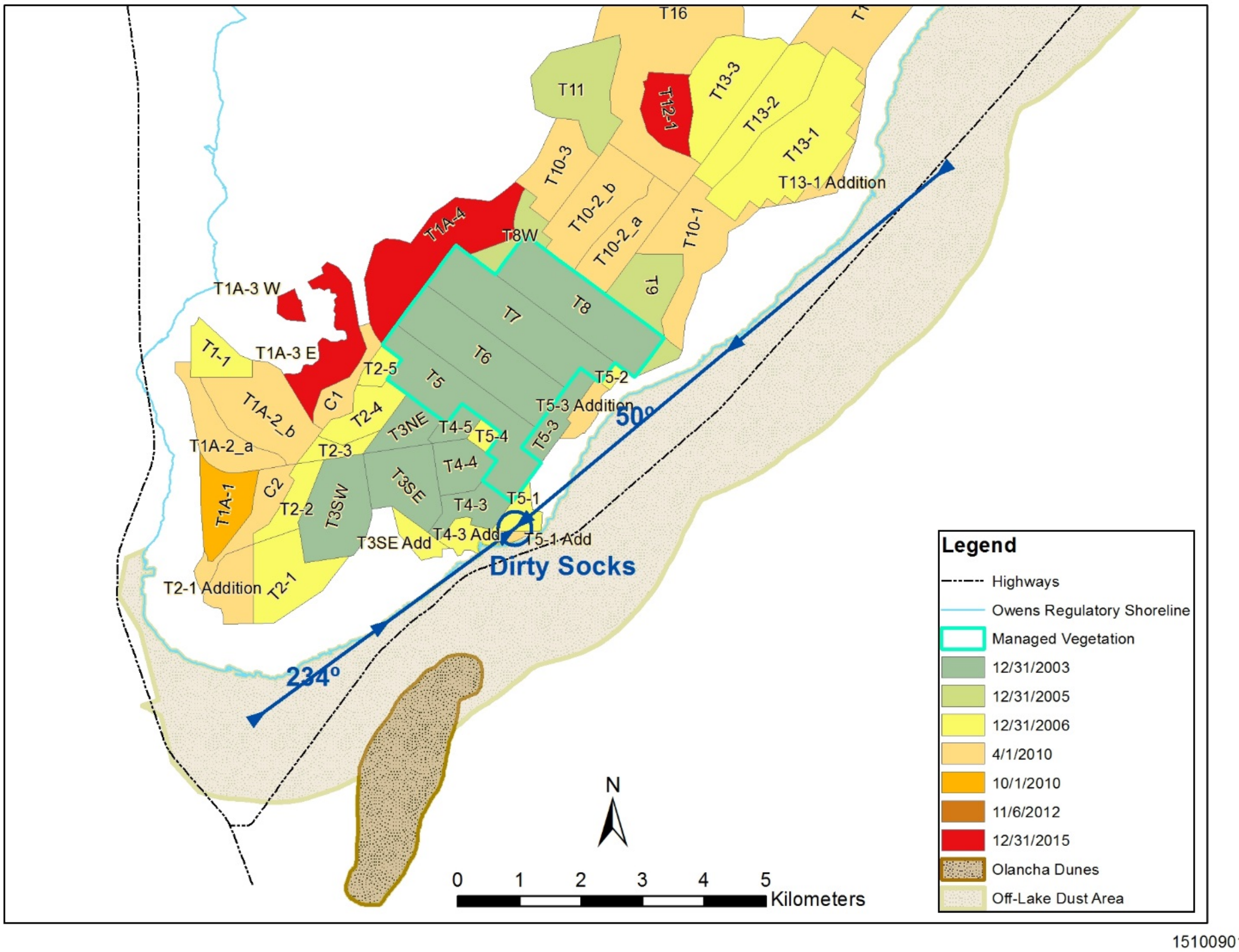


Figure 1. Location of the Dirty Socks PM10 monitor and dust control areas with their completion date in the southern portion of Owens Lake.

RESULTS AND DISCUSSION

The concentrations for off-lake and lakebed-caused exceedances at the Dirty Socks monitor site are plotted in Figure 2. The solid markers indicate data collected before dust control measures were implemented, and the hollow markers are for data collected after dust control measures were implemented. PM10 concentrations on the Y-axis are plotted on a log scale in order to show the concentration trend more clearly over the large range of PM10 values. It can clearly be seen that the frequency of PM10 exceedances for both off-lake and lakebed exceedances decreased significantly after 2003 when the managed vegetation and shallow flood dust control measures were completed in the area north of the Dirty Socks monitor. The frequency of exceedances also declined after dust control measures were completed in 2006. Figure 1 shows the locations of dust control areas near Dirty Socks and their dates of completion.

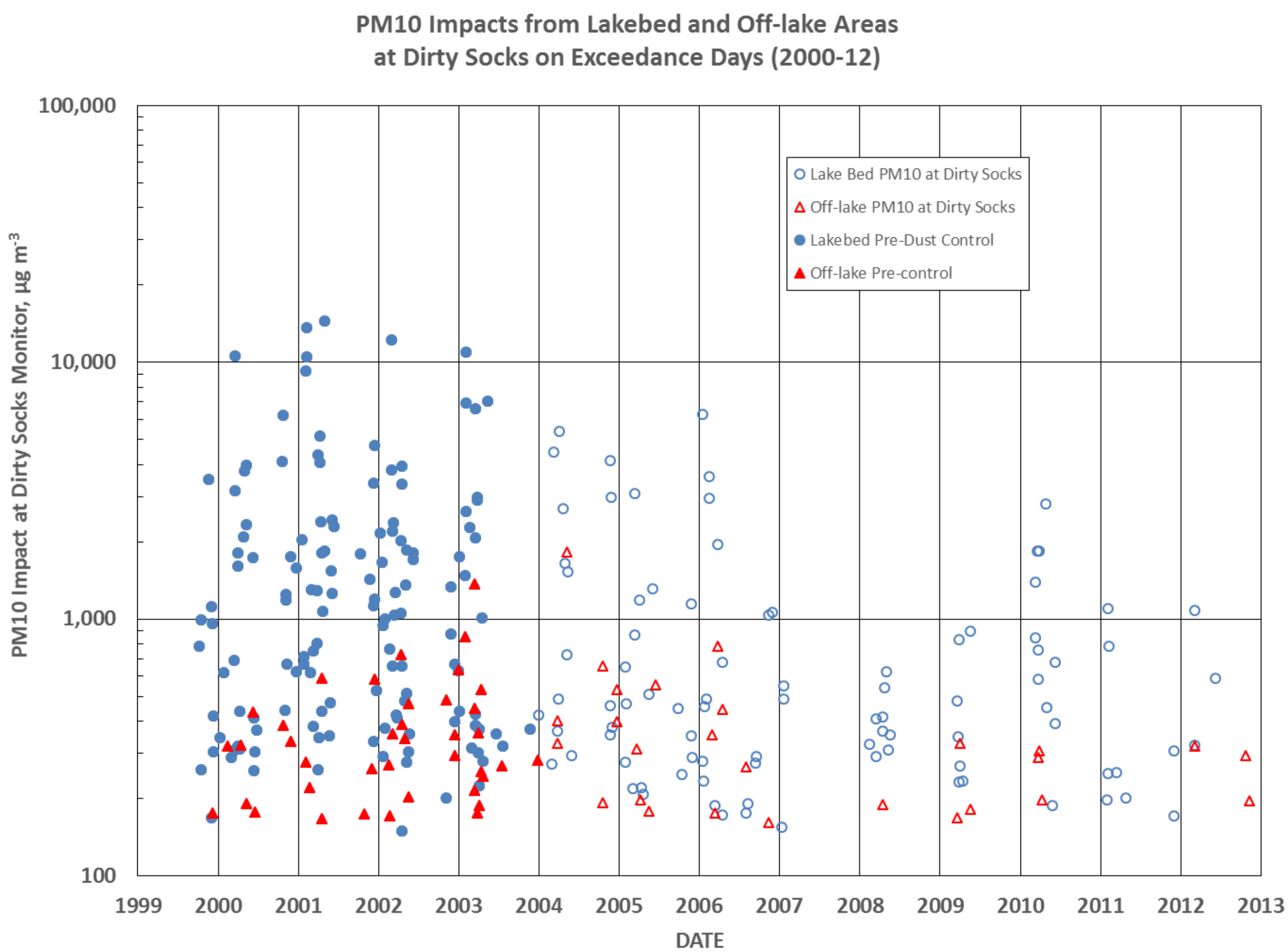


Figure 2. The frequency and magnitude of PM10 exceedances at the Dirty Socks monitor site decreased after the completion of dust control measures on the lakebed in 2003.

It should be noted that the Dirty Socks monitor site was shut down from January 2013 through December 2014, and that there were no monitored exceedances at Dirty Socks when the site resumed operation during the first six months in 2015 which included the more active spring dust period. Although the lack of exceedances in early 2015 may indicate that dust controls might have succeeded in mitigating both the on-lake and off-lake exceedances, six months of data is insufficient to evaluate long-term trends, especially following a two-year data gap. Therefore, the 2015 data is not included in this report, and the analysis period concludes at the end of 2012.

The annual number of exceedances for off-lake and lakebed areas is plotted in Figure 3. It shows that the frequency of exceedances has decreased over time, especially following the completion of dust control measures using managed vegetation and shallow flooding in 2003 and 2006. The downward trend in the number of exceedances is more clearly seen in Figure 4 with the 3-year average number of exceedances. The 3-year average is comparable to the method used to determine attainment with the federal PM10 standard, which must average one PM10 exceedance-day or less over the last three years.

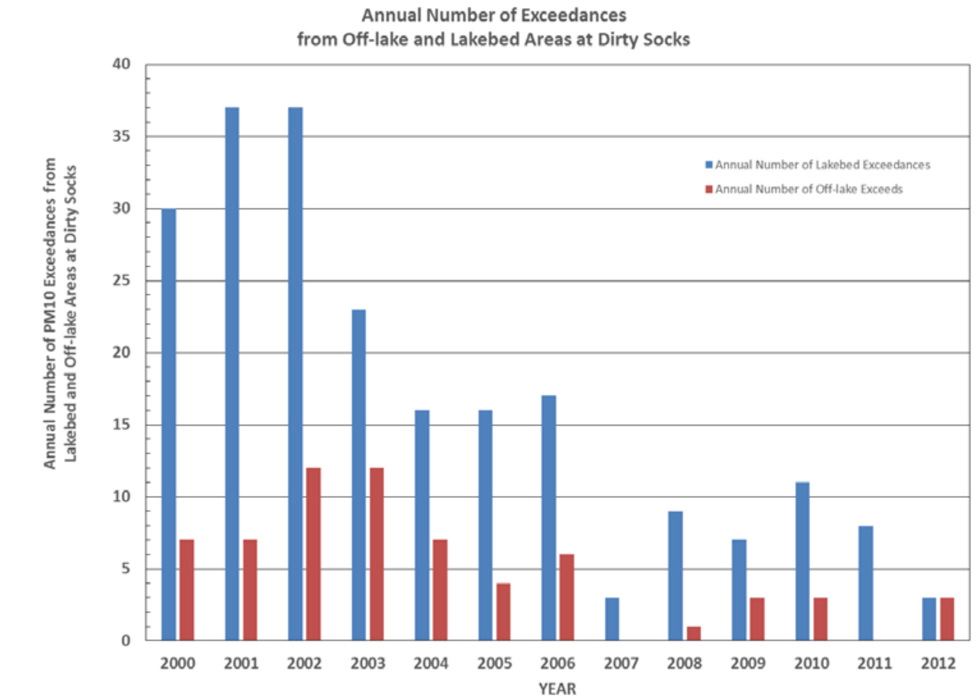


Figure 3. The annual number of exceedances at Dirty Socks caused by lakebed source areas dropped after the completion of dust control measures in 2003 and in 2006.

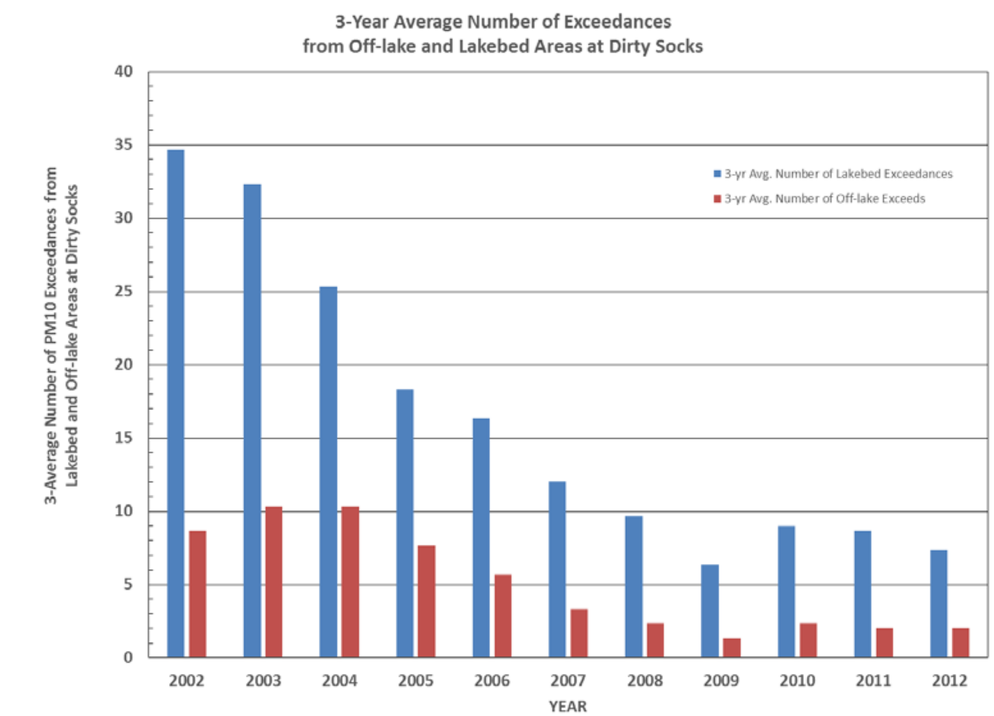


Figure 4. The long-term trend for the number of exceedances is seen by calculating a 3-year rolling average.

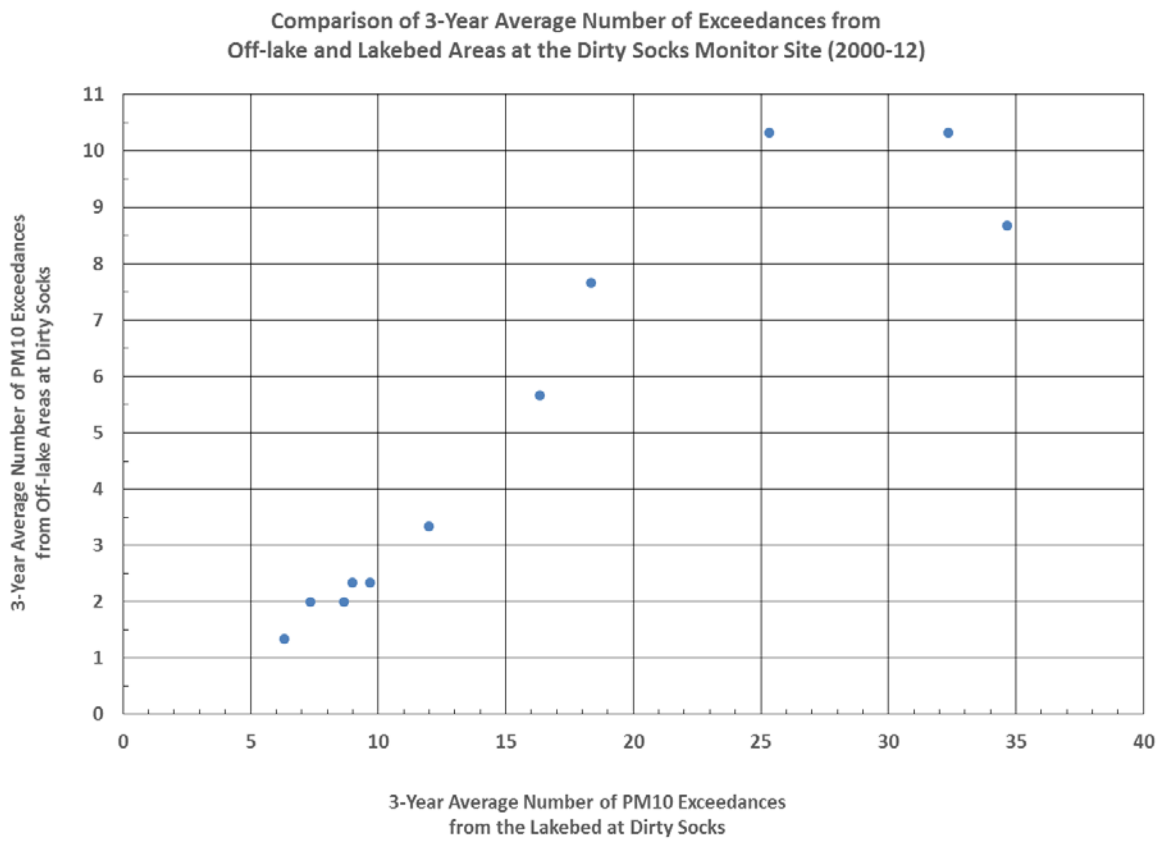


Figure 5. A comparison of the 3-year rolling average number of exceedances shows that the frequency of off-lake exceedances tracks closely with the frequency of lakebed-caused exceedances.

A variation on Figure 4 is seen by plotting the average number of exceedances for off-lake and lakebed source areas against each other as shown in Figure 5. By assuming a linear relationship and extrapolating this trend to less frequent lakebed exceedances, it projects that if the average number of lakebed-caused exceedances is less than one, then the number of off-lake exceedances would be less than one as well. Dust control requirements for lakebed areas at Owens Lake are intended to cause zero exceedances at the shoreline, therefore the average number of exceedances caused by off-lake sources would be expected to be less than zero following the extrapolation of the trend, or zero for the practical purpose of projecting compliance with the federal standard.

The PM10 concentration trend as seen in Figure 2 indicates that the magnitude of exceedances from lakebed sources is going down, but it also appears to indicate that, that downward trend also applies to impacts from off-lake sources. Similar to the 3-year average for the number of exceedances, a 3-year rolling average for the exceedance values was plotted for off-lake and lakebed areas in Figure 6. Since the magnitude of exceedances caused by off-lake source areas appears to follow the concentrations from lakebed areas, this comparison provides additional support for the idea that off-lake and lakebed dust source areas are connected, and that controlling lakebed source areas will have corresponding benefits for controlling dust from off-lake areas.

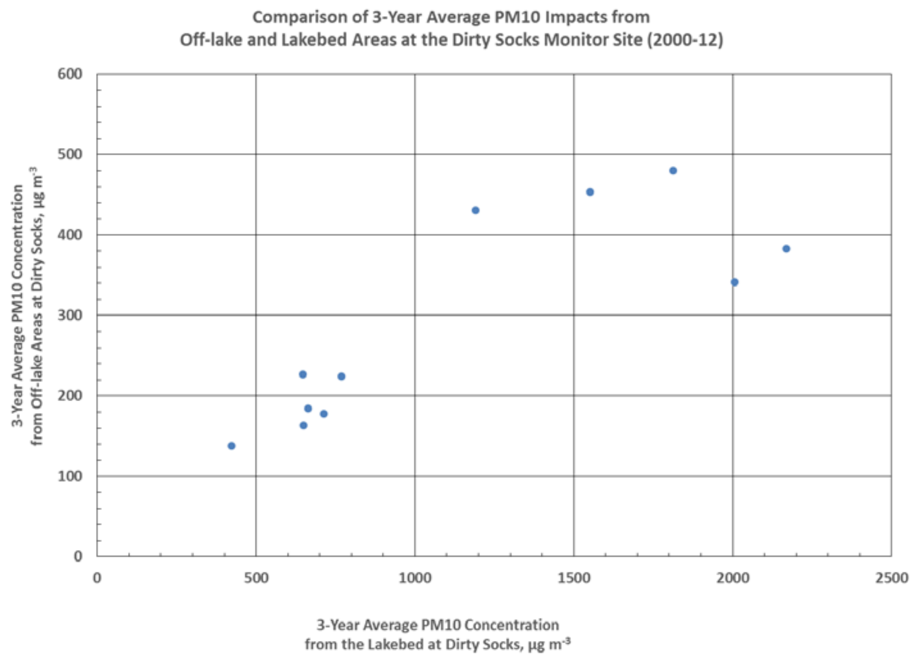


Figure 6. A comparison of the 3-year rolling average of PM10 exceedance concentrations for off-lake areas shows that it follows the exceedance concentrations caused by lakebed areas.

CONCLUSION

This analysis provides evidence that off-lake and lakebed dust source areas at Owens Lake are connected, and that controlling lakebed source areas will have corresponding benefits for controlling dust from off-lake areas. A comparison of off-lake and lakebed PM10 impacts measured at the Dirty Socks monitor site showed a linear relationship between the on-lake and off-lake impacts. This analysis indicates that if lakebed source areas are no longer causing exceedances of the federal PM10 standard, as expected for the required dust controls at Owens Lake, then the adjacent off-lake areas would also be in compliance with the federal standard.

REFERENCES

GBUAPCD, 2012. Great Basin Unified Air Pollution Control District, “Final Staff Report On the Origin and Development of the Keeler Dunes,” Bishop, CA, November 16, 2012. http://www.gbuapcd.org/keelerdunes/originanddevelopment/finalstaffreport/Final%20Staff%20Report_Final20121116%20complete.pdf

APPENDIX VI-1
2016 DESCRIPTION OF MANAGED VEGETATION FOR PM_{10} CONTROL ON OWENS LAKE

2016 Description of Managed Vegetation For PM10 Control on Owens Lake

Great Basin Unified Air Pollution Control District
157 Short Street, Bishop, CA 93514
Telephone (760) 872-8211
www.gbuapcd.org

January 2016

2016 Description of Managed Vegetation For PM10 Control

Great Basin Unified Air Pollution Control District

January 2016

Description of Managed Vegetation for PM_{10} Control

The primary purpose of Managed Vegetation areas is to provide surface stabilization of areas on the lake bed to reduce PM_{10} emissions. Vegetated surfaces are resistant to soil movement and thus provide protection from PM_{10} emissions. Vegetative cover that is sufficiently dense and uniform (particularly avoiding large, contiguous barren expanses) provides an effective barrier that keeps surface wind speeds from reaching the threshold friction velocity required to generate emissions and traps sand and sand-sized soil particles.

Vegetation on the Owens Lake bed has naturally become established where sufficient water quantity and quality is available on or near the surface of the lake bed to leach the saline lake bed soils and sustain plant growth. Natural saltgrass-dominated (Distichlis spicata) meadows and wetland areas around the playa margins and the scattered spring mounds found on the playa are examples of such areas (Figure 1). Observation and monitoring of these naturally vegetated areas has shown that, with sufficient vegetated cover, very little dust emissions are generated from them. In addition to directly protecting the lake bed surface, saltating particles moving from an adjacent source area into vegetated areas are trapped thereby preventing further emissions.

The Managed Vegetation dust control measure is modeled on these naturally protective vegetated areas found along the margins of the lake bed. Successful dust control using Managed Vegetation relies on soil types and conditions suitable for plant growth. Generally, the barren lake bed soils are not suitable for vegetation establishment without prior reclamation to reduce the high salinity levels present. These conditions may be created by leaching and installing subsurface drainage in order to remove leached salts from the rooting zone. Aerial and ground-level views of existing Managed Vegetation PM_{10} controls constructed by the Los Angeles Department of Water and Power (LADWP or City) are shown in Figures 2 and 3.

Figure 1. Photo of natural saltgrass meadow (foreground) and wetland (midground) at Swede's Pasture along the eastern shore of Owens Lake.

Figure 2. Photo of Managed Vegetation planted by the City in the T30-1 dust control area.

Figure 3. Photo of Managed Vegetation in the T5 through T8 dust control area on the southern portion of Owens Lake bed.

The design of Managed Vegetation control areas has changed over time as more is learned about irrigation and plant growth on the lake bed. The first Managed Vegetation control measure area was implemented in 2002 by the City as an approximately 3.5 square mile contiguous block on the southern portion of the lake bed by constructing and operating farm-like drip irrigated facilities to transform the emissive playa surface into a stable saltgrass meadow. The next Managed Vegetation area implemented on the lake bed in 2006 was located on the northeastern portion of the lake bed. This Managed Vegetation area was created in a Shallow Flooding area that utilized sheet flow irrigation and was planted with a more diverse array of native plants to create a more diverse habitat in addition to providing dust control[1]. The most recent Managed Vegetation areas associated with the 2015 Phase 7a project are irrigated with sprinklers and are planted with a mix of up to 48 different species of native plants. All species of plants are approved by the District and the California State Lands Commission for dust control projects on Owens Lake (GBUAPCD, 2015).

Managed Vegetation Implementation, Operation and Maintenance

Most of the soils on the bed of Owens Lake require leaching and reclamation to reduce the salinity level in the soil prior to implementation of Managed Vegetation. Reclamation is generally completed by application of relatively fresh water to lower the salt concentration within the root zone. The "root

[1] The Managed Vegetation area established in the T30-1 dust control area was originally designed as a mitigation measure required in the 2003 SIP EIR (GBUAPCD, 2003b). Originally, 40 acres were planted as a functional wetland. However, due to the favorable conditions in the northeast portion of the lake bed, native vegetation became established on several hundred acres of the area.

zone" is the soil volume in which active rooting, and uptake of water and nutrients, occurs. Managed Vegetation is sustainable at Owens Lake only if salts present in the soils and shallow groundwater are prevented from reaching critically high concentrations in the root zone. Surface and subsurface drainage systems may be necessary to facilitate this process, and are a mandatory requirement in some soil types that have poor natural drainage. Water must be applied to satisfy both the plants' uptake needs and the soil reclamation requirements.

Excess applied water may exceed that which can practically be moved downward through the soil. When that occurs, the soil can become waterlogged, and salinity levels may increase to concentrations that can damage plants. Managed Vegetation sites are managed to minimize the volume of excess water present through managing the volume of applied irrigation water and, where needed, providing good artificial subsurface drainage. Subsurface drainage facilities are designed to collect subsurface water into perforated pipes or gravel channels so that the excess water can be collected and removed.

Collected water is pumped from the subsurface drain system and placed into storage ponds where it can be used for Shallow Flooding or Brine BACM, or mixed with fresh irrigation water for re-application on Managed Vegetation. Drains installed near naturally occurring wetlands must be operated so as not to cause significant groundwater drawdown or loss of surface water extent in the adjacent wetland areas. Drainage systems are to be operated with the goal of not decreasing the amount and or changing the type of existing natural wetlands.

In some cases, it is possible to reduce root-zone salinity to levels that are too low. In clay dominated soils, irrigation with low-salinity or fresh water may cause the soil structure to collapse, reducing the ability of the soil to move water through for plant uptake. The City's existing T-5, T-6, T-7 and T-8 Managed Vegetation sites have a target applied water salinity of approximately 9 deciSiemens per meter[2]. Prolonged irrigation of clay soils on Owens Lake with freshwater, where attempted, has not been observed to cause dramatic immediate effects. Over time, however, there does appear to be a consolidation of very large soil prisms (unfractured clays), limiting water flow, aeration, and rooting to the surfaces of those prisms. Therefore, where this is considered a risk on Owens Lake, irrigation water salinity must be controlled (i.e. salts are mixed into irrigation water to achieve the desired salinity level) to avoid creating this undesirable condition.

Operational experience indicates that applied water of approximately 1.2 feet per year is required to maintain sufficient protective vegetative cover of saltgrass on the T-5 through T-8 Managed Vegetation area. The Managed Vegetation areas irrigated with sprinklers and built as part of Phase 7a project are expected to need less water to maintain compliant vegetation cover due to more efficient irrigation techniques. During the first year of Managed Vegetation implementation, a somewhat greater volume of

[2] Electrical conductivity is used as a measure of the salinity of water. Common units used to read electrical conductivity are deciSiemens per meter (dS/m). Seawater has an electrical conductivity of about 35 dS/m.

applied water is required for land reclamation and plant establishment than what is needed to maintain an established plant stand.

Vegetative cover requirements cannot be met until vegetation has had time to develop target surface coverage. In areas controlled by Managed Vegetation, a two year period, after completion of Managed Vegetation infrastructure and planting, is allowed in order to achieve required target plant coverages. This makes it especially important that site-specific soil type, irrigation, drainage and planting strategies be developed and implemented to ensure full compliance by the required dates. Some areas of the playa may prove extremely hard or impossible to vegetate and must be controlled by some other type of BACM.

The primary purpose of Managed Vegetation areas is to provide sufficient vegetation cover of the surface in order to stabilize the lake bed to reduce PM_{10} emissions. However, the LADWP has been working with interested stakeholders through the Owens Lake Master Project and has incorporated design features in the new Managed Vegetation control areas to increase the habitat value, aesthetics and recreation access that are unrelated to dust control. Such features include components such as watering points to enhance or maintain wildlife habitat values or trails and access points for bird watching. These non-dust control elements are designed in a manner that does not compromise components required for plant establishment and maintenance.

PM_{10} Control Effectiveness for Managed Vegetation

Based on the results of a series of vegetation tests conducted by the District in the 1990's, the initial performance requirement for vegetation cover required for a minimum of 50% ground cover on every acre of Managed Vegetation areas (GBUAPCD, 1998 and 2003a). Even though portions of the first Managed Vegetation site implemented on the lake bed in 2002 had high vegetation cover, most of the site did not meet the strict cover requirement in 2006 despite many efforts by the City to replant and make improvements to the area. However, based on monitoring data it was determined that the site as a whole achieved a high level of PM_{10} control (AirSciences, 2006).

The District and City engaged in comprehensive plant and PM_{10} monitoring and analysis of dust control efficiency of the Managed Vegetation area. This collaborative effort formed the basis for refinement of the performance specifications for Managed Vegetation adopted by the District in 2011 (GBUAPCD, 2011). The control efficiency for the Managed Vegetation control measure is for 99 percent as it is with most of the other control areas on the lake bed. The refined performance cover specifications are described below.

A 2007 study by AirSciences (AirSciences, 2007) showed that, on the basis of the sand motion data and air quality modeling following the procedures in the Dust ID protocol, the first Managed Vegetation site met the required level of PM_{10} control and did not cause or contribute to an exceedance of the federal 24-hour PM_{10} standard at the 3,600 foot regulatory shoreline. The refined vegetative cover performance specifications (average vegetative cover and spatial distribution requirements) for Managed Vegetation at Owens Lake were developed based on the effectiveness monitoring results incorporating an appropriate margin of safety.

Managed Vegetation Performance Requirements

The primary performance requirement for Managed Vegetation BACM is based on the amount of surface cover provided by the vegetation present across the area. The vegetation cover is measured both as the overall average as well as the variation in spatial distribution across each contiguous Managed Vegetation control area.

Areas controlled with Managed Vegetation BACM shall maintain a minimum overall average vegetation cover of 37 percent for each contiguous Managed Vegetation area. However, it is recognized that over-control in some portions of a control area can offset under-control in other areas, as long as under-controlled areas are not large enough to become emissive. Table 1 provides a range of allowable vegetation covers across multi-sized grids to ensure coverage distributions are sufficient to prevent PM_{10} emissions. The cover at any point within a Managed Vegetation control area can vary from the average as set forth in Table 1.

TABLE 1. Managed Vegetation BACM vegetative cover criteria

Grid Scale	Average	5 cover	10 cover	20 cover
(acres)	(minimum % cover)	(minimum % of DCM area)		
0.1	37	92	83	65
1	37	94	87	68
10	37	95	89	74
100	37	95	90	77

Managed Vegetation BACM areas will be subdivided by grids imposed at four scales, beginning at 0.1 acre, and increasing tenfold in area for the three subsequent grid scales (to 1, 10, and 100 acres). Vegetative cover distributions measured across a Managed Vegetation site using the multiple grid scales will be characterized to determine if they meet the threshold levels given in Table 1.

Vegetative cover compliance is to be determined based on a satellite image of the area taken in the fall between September 21 and December 21 of each year. The image shall be ground-truthed, calibrated, and validated by reference to measurements made by point frame or by equivalent methods approved at the sole discretion of the APCO. The vegetation planted for dust control shall consist only of locally-adapted native species approved by both the APCO and the California State Lands Commission (CSLC). As of January 1, 2016, a plant list of 48 native species has been approved (GBUAPCD, 2015). Other appropriate species may be approved only upon written request of the City and written approval of the APCO and the CSLC.

Excess surface water and shallow groundwater above the root zone depths that reach the lower boundary of the dust control areas shall be collected and recirculated for reapplication to dust control areas or otherwise lawfully discharged. The DCM areas shall contain excess waters in the control areas and isolate the dust control measure areas from each other and from areas not controlled by the use of lateral boundary edge berms and/or drains or other equally effective measures. Drains shall be designed and constructed so that they may be regulated such that groundwater levels, surface water extent and wetlands in adjacent uncontrolled areas are not impacted.

To protect the Managed Vegetation BACM control measure from flood damage and alluvial deposition, the City shall incorporate stormwater and siltation control facilities into and around Managed Vegetation areas adequate to maintain the dust mitigation function of Managed Vegetation. The Managed Vegetation protection facilities shall be designed to dissipate flood waters and capture the alluvial material carried by flood waters, so as to avoid greater than normal water flows and deposition of alluvial material into the Owens Lake brine pool._The City shall remove all exotic pest plants, including salt cedar (Tamarix spp.), that invade any of the areas designated for control by Managed Vegetation BACM.

If data from air quality monitoring or modeling shows an exceedance or exceedances of the PM_{10} NAAQS at or above the Regulatory Shoreline as a result of emissions from bare or vegetated areas and the APCO determines that existing PM_{10} control measures require a higher level of control efficiency, the City shall increase the control efficiency of those measures upon written determination by the APCO. The City shall inform the District within 36 months of the written determination if enhancing, restoring or establishing necessary vegetation coverage or within 1 to 6 months if stabilizing areas by other means. The City may comment upon the APCO's determination, but shall not appeal or contest that determination in any administrative or judicial forum, under any law, statute or legal theory whatsoever including Health & Safety Code Section 42316.

The following portions of the areas designated for control with Managed Vegetation are exempted from the vegetation cover requirements set forth above:

1. Portions consistently inundated with water, such as reservoirs, ponds and canals;
2. Roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive; and
3. Portions used as floodwater diversion channels or desiltation/retention basins.

“Substantially non-emissive” shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

Cited References

Air Sciences Inc. 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. July, 2006 (Appendix 3 of this BACM Proposal).

Air Sciences Inc. 2007. Demonstration of 99% Control Efficiency for the Managed Vegetation Dust Control Measure. Prepared for the Los Angeles Department of Water & Power, Los Angeles, California. June, 2007 (Appendix 4 of this BACM Proposal).

GBUAPCD, 1998. Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan, Great Basin Unified Air Pollution Control District, November 1998.

GBUAPCD, 2003a. Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision, Great Basin Unified Air Pollution Control District, November 2003.

GBUAPCD, 2003b. 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan, Integrated Environmental Impact Report, State Clearinghouse Number 2002111020, prepared for Great Basin Unified Air Pollution Control District by Sapphos Environmental, INC., Pasadena, CA, February 2004.

GBUAPCD, 2011. Revision of the Managed Vegetation Best Available Control Measure Description Contained in the 2008 Owens Valley PM10 Nonattainment Area Demonstration of Attainment State Implementation Plan. July 18, 2011.

GBUAPCD, 2015. Letter from Mr. Phill Kiddoo, APCO of GBUAPCD, to Mr. Milad Taghavi, LADWP, dated November 23, 2015, regarding Approval of Owens Lake Best Available Control Measures Vegetation Species List.

APPENDIX VI-2
OWENS LAKE DUST MITIGATION PROGRAM PHASE 9/10 PROJECT
FINAL ENVIRONMENTAL IMPACT REPORT (MAY 2015)

Owens Lake Dust Mitigation Program
Phase 9/10 Project
Final Environmental Impact Report

May 2015

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Section 1
Introduction

1.1 INTRODUCTION TO THE FINAL ENVIRONMENTAL IMPACT REPORT

This document, together with the separately bound Draft Environmental Impact Report (Draft EIR), constitute the Final EIR for the Owens Lake Dust Mitigation Program Phase 9/10 Project. The City of Los Angeles Department of Water and Power (LADWP) is currently implementing the Owens Lake Dust Mitigation Program (OLDMP) on Owens Lake in order to reduce emissions of particulate matter less than 10 microns in diameter (PM_{10}). LADWP constructs and operates dust control measures (DCMs) on the lake in compliance with Agreements with the Great Basin Unified Air Pollution Control District (GBUAPCD) under the authority of California Health & Safety Code Sec. 42316, legal settlement agreements with GBUAPCD, lease agreements for use of state lands (administered by the California State Lands Commission (CSLC)), and other regulatory approvals. LADWP proposes to expand the OLDMP by construction and operation of the Phase 9/10 Project (proposed Project) in compliance with a 2014 Stipulated Judgment with GBUAPCD (Superior Court of the State of California Case No. 34-2013-800001451-CU-WM-GDS).

This document is organized as follows:

- **Section 1** provides an Introduction to the Final EIR and a summary of the California Environmental Quality Act (CEQA) Process for the Project.

- **Section 2** provides additions and corrections to the Draft EIR. Additions include information on dynamic water management, a lakewide Best Available Control Measures (BACM) map, salinity information for T18S, the results of cultural resources surveys on private parcels, and additional bird distribution and nesting information. Corrections to the Draft EIR include corrections to minor errors, updates, or amplifications of statements in the Draft EIR.

- **Section 3** includes a summary of oral comments received on the Draft EIR at the public meeting for the Project, a list of commenters who provided written comments, copies of written comments, and responses to comments.

1.2 CEQA PROCESS

1.2.1 Notice of Preparation

In July 2014 a CEQA Initial Study was prepared by LADWP based on State CEQA Guidelines Appendix G, to determine whether construction and operation of the proposed Project would result in significant effects on the environment. Since potentially significant effects were identified, LADWP determined that an EIR was needed to analyze those effects. A Notice of Preparation (NOP) of the EIR, along with the Initial Study, was prepared and filed with the State Clearinghouse on July 17, 2014. The NOP/Initial Study was distributed to 29 entities, including potential responsible and trustee agencies, and interested organizations and individuals including 10 Native American tribal representatives. An additional 27 interested parties received a Notice of Availability (NOA) of the NOP/Initial Study. Reference copies were available at LADWP offices in Los Angeles and Bishop, at five libraries in Inyo County, and via a link on the LADWP website.

A copy of the NOP/Initial Study is included in Appendix A of the Draft EIR. Comments on the scope and content of the EIR were received on the NOP from seven regulatory agencies (Appendix B of the Draft EIR).

1.2.2 Public Meeting on the Notice of Preparation of an EIR

A public scoping meeting for the Phase 9/10 Project was held on July 29, 2014 at the LADWP office in Keeler, California. Notice of the meeting was provided in the NOP. Representatives from LADWP, GBUAPCD, the U.S. Bureau of Land Management (BLM), local industry, and Native American tribes attended the meeting. Comments received focused on definition of alternatives, identification of BACM for specific areas, the federal process for environmental review and specifically for cultural resources assessment, and Project schedule.

1.2.3 Draft Environmental Impact Report

A Draft EIR was prepared and distributed for public review on February 11, 2015. Fifteen copies of the document were distributed through the State Clearinghouse. The document was also directly distributed to 29 agencies, Native American tribes, and organizations. At the beginning of the public review period, the document was made available for review at LADWP offices in Los Angeles and Bishop, and at five public libraries in the project area (Bishop, Lone Pine, Big Pine, Independence and Cerro Coso Community College). A NOA of the Draft EIR was distributed to 35 agencies and organizations. The close of the public review period was March 30, 2015.

1.2.4 Public Meeting on the Draft Environmental Impact Report

Notice of a public meeting on the Phase 9/10 Project was provided in the NOA of the Draft EIR. Additionally, a notice of the meeting was published in the Inyo Register on February 10, 2015. The public meeting was held at 5:00 p.m. on March 5, 2015 at the LADWP office in Keeler, California. LADWP staff presented the project background, project description, CEQA process, environmental topics analyzed in the Draft EIR, project alternatives, and the alternative identified as environmentally superior. In addition to staff from LADWP and MWH, representatives from BLM, California Department of Fish and Wildlife (CDFW), and California Native Plant Society attended the meeting. Comments received at the public meeting are summarized in Section 3 of this document.

1.2.5 Adoption of the Phase 9 10 Project

Analysis of the impacts of the Phase 9/10 Project as originally proposed is presented in the Draft EIR. Significant impacts of the original proposed Project that could not be mitigated to less than significant levels were identified for cultural resources. All other impacts were found to be beneficial, less than significant or less than significant as mitigated. Several alternatives to the proposed Project were defined with a focus on avoidance of significant impacts to cultural resources and on alternative methods and combinations of BACM. Based on the analysis presented in the Draft EIR, the Avoidance Alternative was identified as the environmentally superior alternative.

LADWP's determination of the environmentally superior alternative, which includes avoidance on approximately 278 acres on State lands plus additional acreage on federal parcels (approximately an additional 75 acres), recognizes the importance of protecting cultural resources and complying with the 2014 Stipulated Judgment. The Avoidance Alternative was identified as the environmentally superior alternative since it would reduce impacts on significant cultural resources to less than significant while providing dust control on approximately 3.2 square miles of Owens Lake that are currently uncontrolled. This area is considered the maximum dust control area feasible with avoidance of the known significant cultural resources.

Since preparation of the Draft EIR, a second review of the eligibility of the known archaeological sites has been conducted (Basgall, 2015). Based on the review by the designated second archaeologist, nine of 14 sites (12 sites discussed on the Draft EIR and 2 sites partially located on BLM property) were confirmed for recommendation as California Register of Historical Resources (CRHR)/National Register of Historic Properties (NRHP) eligible. While recommended as eligible for the CRHR, the determination of eligibility will be conducted by the State Office of Historic Preservation. Following the established procedure in the 2013 Stipulated Order for Abatement and the 2014 Stipulated Judgment, GBUAPCD considers the nine confirmed sites, plus the necessary buffers, as Eligible Cultural Resource (ECR) areas that can be removed from the Phase 9/10 Project so that a recommendation may be developed by the CRTF on the timing and method of their treatment. A change in eligibility status from eligible to ineligible was recommended for one site. As described in Section 2, LADWP concurs with this assessment and will amend the Phase II cultural resources report to reflect that determination. As described in Section 2, the Avoidance Alternative is revised to exclude 11 cultural resources sites on state lands recommended as eligible for the CRHR; one site, CA-INY-6065, is considered fully mitigated by previously conducted Phase II investigations.

The second archaeologist recommended additional investigation in order to determine the eligibility for four sites. Based on on-going negotiations between LADWP and GBUAPCD, it is anticipated that LADWP will apply to the CSLC and the BLM for permission to conduct Phase II Archaeological Investigations of the four sites recommended for additional assessment. The boundaries of the four sites recommended for further assessment may be refined based on the results of the Phase II testing; however, the total area of significant cultural sites and buffer that would be excluded from the Project under the Avoidance Alternative is on the order of about 350 acres.

Additionally, LADWP has received comments from BLM on the Phase II cultural resources report for the Project. While additional consideration of existing data, cultural report revisions and/or additional field investigations may be conducted in collaboration with tribal representatives and State and/or federal agencies, LADWP's conclusions regarding the significance of the known cultural resources sites on federal lands in the Project area are unchanged. Future evaluation of these sites may refine the site boundaries and could impact the total acreage of the Avoidance Alternative. However, any refinements to site boundaries would be done in collaboration with BLM, and CSLC, as appropriate.

Prior to adoption of the Phase 9/10 Project, the Board of Water and Power Commissioners will consider which project most effectively balances and protects the competing interests of protecting air quality while ensuring the protection and preservation of cultural resources. The Board will consider the Draft EIR, comments on the Draft EIR and responses to those comments prior to adopting the Phase 9/10 Project as originally proposed or an alternative to the Phase 9/10 Project. The Phase 9/10 Project as originally proposed was found to have significant impacts on cultural resources. A Phase III data recovery investigation was considered as mitigation for these impacts but was found to not reduce impacts on cultural resources to less than significant levels. However, since publication of the Draft EIR, cultural resources sites confirmed as recommended eligible for the CRHR have been removed from the area requiring dust mitigation by GBUAPCD, and therefore removed from the Project by LADWP. Additional investigation of the four sites recommended for further assessment by the second archaeologist is on-going. However, based on assessment already conducted, LADWP has determined that these sites are significant resources and implementation of dust control in these areas would result in significant impacts. Adoption and implementation of the Avoidance Alternative would result in less than significant impacts to cultural resources.

Section 2
Additions and Corrections

The following section summarizes additions and corrections to clarify and amplify information presented in the Draft EIR.

2.1 ADDITIONS

Based on comments received on the Draft EIR (see Section 3), the following additions are made to the document.

2.1.1 Dynamic Water Management

Draft EIR Section 3.1.8.4 is expanded to include the following paragraph.

An analysis of Owens Lake ambient air quality, meteorological and sand flux data along with lake bed field observations during the past 15 years has revealed that the Shallow Flood BACM dust season may be shortened for certain areas of the lake bed that have historically shown little dust activity in the early and/or late portions of the October through June dust season. In addition, wetness cover requirements to achieve the required Minimum Dust Control Efficiency may also vary depending on seasonal conditions that may affect salinity of the surface water and the formation of erosion-resistant brine crusts. Modifications to the dust season for certain areas are currently being considered by GBUAPCD and LADWP to address the commitment in the 2014 Stipulated Judgment to implement a Dynamic Water Management Plan in order to reduce water use on the lake bed. Dynamic Water Management could include modifications to the existing ramping schedules for flow operations and could apply to existing Shallow Flooding dust control areas (DCAs) as well as new areas of Shallow Flooding proposed under the Phase 9/10 Project (T10-1-L1, T37-2-L1, T37-2-L2, T37-2-L3, and T37-2-L4).

2.1.2 Lakewide Dust Control Map

Figure 2-2 included in Draft EIR Section 2.4 indicates existing and proposed DCMs by phase. In response to comments, **Figure 2-3** has been added to indicate existing and proposed dust control methods included in the OLDMP without separating the information by phase. Existing DCAs, DCAs under construction as part of the Phase 7a Project, Phase 9/10 Project DCAs and the 11 DCAs included in the TwB2 Project are included. To protect resources, areas with significant cultural resources excluded from the dust control project are not indicated. **Figure 2-3** also indicates the locations of culverts proposed as part of the Phase 9/10 Project.

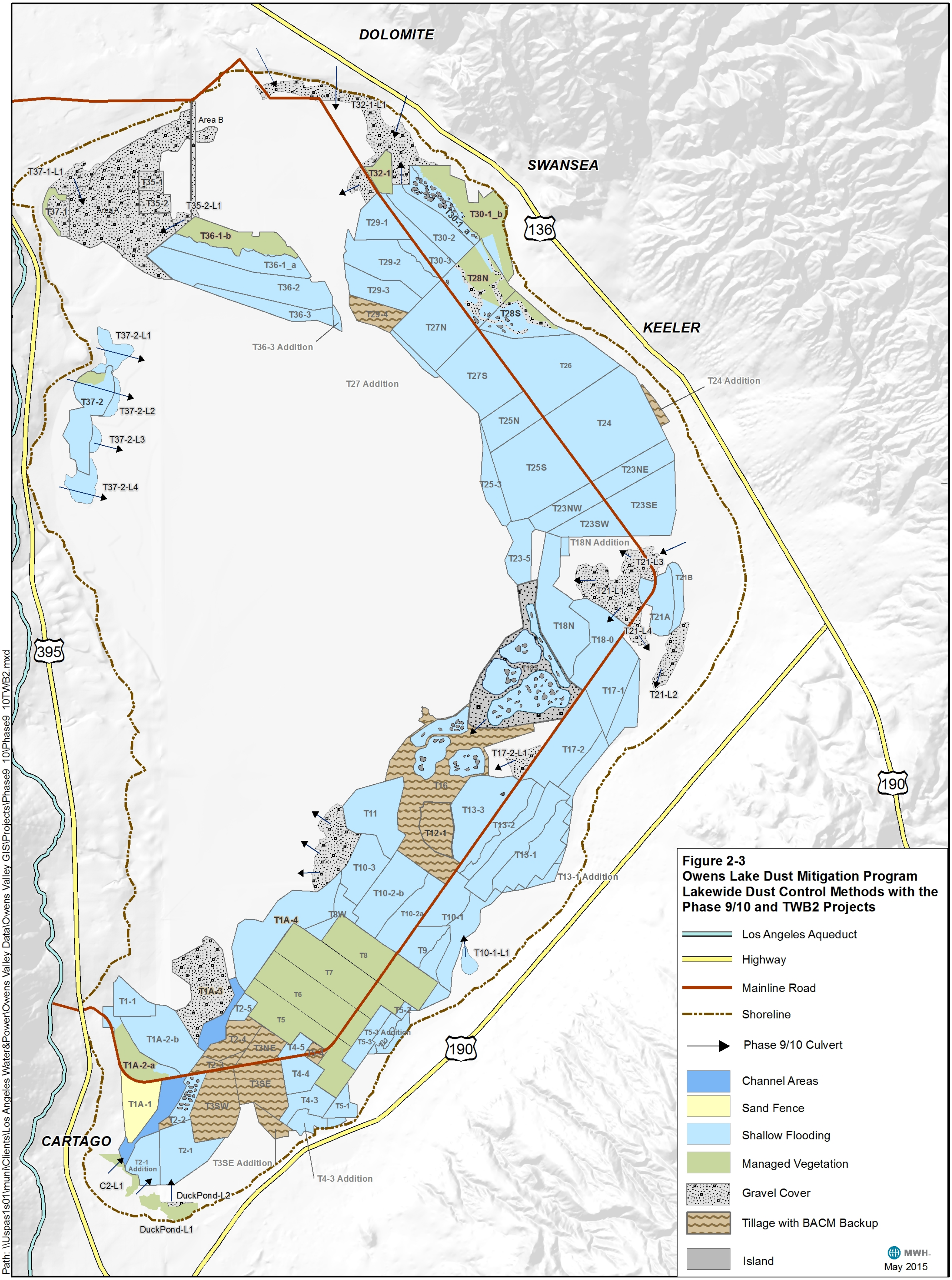

Figure 2-3
Owens Lake Dust Mitigation Program Lakewide Dust Control Methods with the Phase 9/10 and TWB2 Projects

Path: \\Uspas1s01\muni\Clients\Los Angeles Water&Power\Owens Valley Data\Owens Valley GIS\Projects\Phase9_10\Phase9_10TWB2.mxd

2.1.3 Salinity in Transition Area T18S

Additional information on salinity in transition area T18S is added to the paragraph on Diving Waterbirds presented in Draft EIR Section 4.3.5.2 (Draft EIR page 4.3-39).

Table 4.3-9 presents the salinity in transition area T18S in spring.

Table 4.3-9
Salinity in T18S in Spring

Year	Salinity in T18S in Spring (Electroconductivity mhos cm)
2009	48.8
2010	26
2011	28.8
2012	25.8
2013	54.2
2014	36.3

2.1.4 Cultural Resources on Private Parcels

Privately-owned parcels contained within the Phase 9/10 Project footprint were surveyed for cultural resources on October 23, 2014; Dec. 30, 2014; January 2, 2015; and January 5, 2015. Three of the cultural properties recorded during the survey of the private parcels are isolated artifacts. However, isolated artifacts do not meet the definition of unique archaeological or historical resources, so they do not receive further consideration for avoidance or mitigation. One site was recorded during the survey; this site is an extension of a previously recorded site that has already been determined ineligible for inclusion on the CRHR/NRHP. Additional testing and/or evaluation is not warranted for the site extension. Therefore, Draft EIR mitigation measure CR-2 has been deleted. Construction on privately-owned lands would still be subject to mitigation measures CR-1, CR-3, CR-4 and CR-5.

2.1.5 References

The following references are added to Draft EIR Section 8.1 References and Bibliography:

Allen, Aaron. 2015. Personal Communication with M. Taghavi. Email from U.S. Army Corps of Engineers Regulatory Division to LADWP. February 17, 2015.

Basgall, Mark. 2015. An Assessment of Previous Management Recommendations for Select Archaeological Sites Subject to Impacts from Dust Mitigation Measures Being Implemented at Owens Lake, Inyo County, California. Prepared for the Los Angeles Department of Water and Power. Final Report. April 2015.

California Fish and Game Commission. 1994. Miscellaneous Policies. Department of Fish and Game Recommended Wetland Definition, Mitigation Strategies, and Habitat Value Assessment Methodology. Available: http://www.fgc.ca.gov/policy/p4misc.aspx.

California Department of Transportation (Caltrans). 2013. 2013 Traffic Volumes on the California State Highway System. Prepared in Cooperation with the U.S. Department of Transportation Federal Highway Administration. Sacramento, California.

LADWP. 2010. 2010 Owens Lake Biological Compliance Monitoring Report.

-----. 2013. 2013 Owens Lake Biological Compliance Monitoring Report.

-----. 2014a. 2014 Owens Lake Biological Compliance Monitoring Report.

-----. 2014b. Annual and Second Semi-annual Monitoring Report for 2014, Southern Zones Dust Control Project Owens Lake Dust Mitigation Program Owens Lake, California.

2.1.6 Acronyms

The following acronym is added to Draft EIR Section 8.3, Acronyms and Abbreviations:

TwB2 Tillage with Shallow Flooding BACM Backup

2.2 CORRECTIONS TO THE DRAFT EIR

The following text edits are corrections to minor errors, updates, or amplifications of statements in the Draft EIR. Text inserts are shown as underlined and deletions are shown in ~~strikethrough~~ format. Draft EIR section numbers and names are noted in [brackets].

[**Draft EIR Section 2.9 Project Approvals**]

After consultation with the U.S. Army Corps of Engineers (USACE) on permitting issues for the Owens Lake Dust Mitigation Program, the agency has indicated that the boundaries of the Phase 9/10 Project are outside the regulatory jurisdiction of USACE under Section 404 of the Clean Water Act (Allen, pers. comm. 2015). Therefore, Draft EIR Section 2.9 is revised to delete the following text.

~~LADWP would consult with the U.S. Army Corps of Engineers regarding an amendment to existing Clean Water Act Section 404 permit SPL-2008-00582-BAH for the Phase 7 Project to include construction, operations, and maintenance associated with the Phase 9/10 Project.~~

In response to comment letter #4 (see Section 3), the following text from Draft EIR Section 2.9 is revised.

- A lease amendment for use of state lands from the CSLC prior to Project construction. GBUAPCD has committed to work with LADWP to secure approval for all proposed

BACM controls (letter from Mr. Ted Schade, GBUAPCD Air Pollution Control Officer, to Mr. Martin Adams, LADWP Director of Water Operations, February 15, 2013).

As part of this process, CSLC could ~~would~~ transfer portions of the U.S. Borax mineral lease area to DCA. An amendment to the U.S. borax lease could ~~would~~ delete the approved DCA from the mineral lease legal description. U.S. Borax may quitclaim the portion of its lease needed for cell T10-3-L1; this option would not require LADWP to resubmit its lease amendment application, but rather, the quitclaim component of the proposed Project could be incorporated into the CSLC's consideration of Project approval overall.

[**Draft EIR Section 4.1.4.1 Visual Impacts During Construction**]

In response to comment letter #8, the following text from Draft EIR Section 4.1.4.1 is expanded.

4.1.4.1 Visual Impacts During Construction

Construction activities for the Project include site preparation (excavation, soil conditioning, and land leveling), preparation of gravel stockpile areas, raised roadway and irrigation pipeline installation, installation of electrical and mechanical equipment related to the irrigation systems, installation of the geotextile and gravel, and planting activities. Throughout the construction period, additional vehicles including gravel haul trucks from the mines would be present on the lakebed. Views of the Project site during construction would include over 100 vehicles – including dozers, scrapers, flatbed trucks, backhoes, water trucks, fuel trucks, gravel haul trucks, and light duty trucks. Limited lighting may temporarily be used in the immediate area of Project construction or for emergency repairs. However, after construction is completed there will be no permanent nighttime lighting on the lakebed. The level of construction activity required for the Phase 9/10 Project would alter views of the Project site. However, within the context of the construction and maintenance activity ongoing on the lakebed, the impact of ground disturbance associated with installation of Project facilities would be temporary and less than significant on the visual character of the Project site.

[**Draft EIR Section 4.2.2.1 Federal Regulations**]

After consultation with the USACE on permitting issues for the Owens Lake Dust Mitigation Program, the agency has indicated that the boundaries of the Phase 9/10 Project are outside the regulatory jurisdiction of USACE under Section 404 of the Clean Water Act (Allen, pers. comm., 2015). ~~LADWP anticipates requesting an amendment to existing Clean Water Act Section 404 permit SPL-2008-00582-BAH from the U.S. Army Corps of Engineers (issued for OLDMP Phase 7 Project) to include construction, operations, and maintenance associated with Phase 9/10 Project. Based on past practices, LADWP does not expect the U.S. Army Corps of Engineers to assume jurisdiction over the Project.~~ However, BLM will, prior to issuing right-of-way agreement for use of federal lands, conduct a federal conformity analysis since the Project is in a federal nonattainment area for PM_{10}. Since the proposed Project is expected to decrease the frequency and severity of existing federal particulate matter violations, it is anticipated that the Project will be found in conformance.

[**Draft EIR Section 4.3.3.3 Existing Biological Resources Setting**]

The following corrections are made to Draft EIR Section 4.3.3.3.

Wetlands, including created wetlands, present at the time of survey in the Phase 9 DCAs and the 25-foot buffer areas are summarized in **Table 4.3-2**. Species present in wetland areas include wirerush (~~*Juba*~~ *Juncus* sp.) saltgrass, saltbush, and Mojave seablite, among other species. No wetlands are present in the Phase 10 DCAs or their buffer areas. Vegetation mapping for the Project areas is provided in **Appendix D**.

Sensitive Species. Based on the CNDDB listings for the Project area (CDFW, 2013, 2014), and LADWP knowledge of the areas, sensitive plant and animal species with the potential to occur on or near the Project sites are summarized in **Tables 4.3-4** (Listed Species), **4.3-5** (Sensitive Species) and **4.3-6** (Locally Important Species). Occurrence information from 2008 is also provided for additional reference. Species not included in these tables due to change in regulatory status are: Double-crested Cormorant (*Phalacrocorax auritus*), White-faced Ibis (*Plegadis chihi*), Osprey (*Pandion haliaetus*), Sharp-shinned Hawk (*Accipiter striatus*) Cooper's Hawk (*Accipiter cooperi*) Ferruginous Hawk (*Buteo regalis*), Merlin (*Falco columbarius*), Prairie Falcon (*Falco mexicanus*) Long-billed Curlew (*Numenius americanus*), California Gull (*Larus californicus*), and Virginia's Warbler (*Oreothlypis virginiae*~~*luciae*~~). Additionally, the Project area is outside the breeding range for the sensitive subspecies of California Horned Lark (*Eremophila alpestris actia*), Bell’s Sage Sparrow (*Artemisiospiza belli canescens*) and Tricolored Blackbird *(Agelaius tricolor)*. Southern grasshopper mouse (*Onychomys torridus ramona*) ~~and Bell’s Sage Sparrow (*Artemisiospiza belli belli*)~~ are not present in the Project area.

LeConte’s Thrasher. The Special Status for LeConte’s Thrasher (*Toxostoma lecontei*) only applies to the population of Le Conte’s Thrashers breeding in the San Joaquin Valley of California (*T. lecontei macmillanorum*).

[**Draft EIR Section 4.3.3.4 Avian Use of the Project Area**]

In response to information requests from the CDFW (comment letter #5), Draft EIR Section 4.3.3.4 is revised in its entirety. Additional information on bird distribution and nesting on Owens Lake is provided.

4.3.3.4 Avian Use of Project Vicinity

A designated Nationally Significant Important Bird Area by the National Audubon Society and America Bird Conservancy, Owens Lake serves as a migratory stop-over site for shorebirds and waterfowl during spring and fall migration. American Avocets, Western and Least Sandpipers dominate during migration. Wilson’s and Red-necked Phalaropes are common during migration particularly in fall. Owens Lake is also an important site for waterfowl and supports large numbers of Northern Shoveler and Ruddy Ducks, particularly in migration. Use of the Project vicinity by various waterbirds is much less notable in summer and winter. However, Snowy Plover and American Avocets commonly breed in dust control areas and around lake-fringing wetlands.

Multiple bird surveys per year were conducted in order to document use of the dust control project area by all Owens Lake guilds. In 2012, 2013, and 2014, the surveys consisted of:

- Two annual spring surveys – conducted within the last two weeks of both March and April
- One Snowy Plover/all species breeding survey – conducted in late May
- Three fall surveys – conducted in the last two weeks of August, September, and October
- One winter survey – conducted in January

Results of the bird counts in 2011, 2012 and 2013 are summarized by Owens Lake Guild in **Appendix D**. Data from 2012 to 2014 are provided below. 2010 bird data were used to calibrate the Habitat Suitability Model.

T18S Bird Species

The 2012-2014 bird use data were analyzed for bird use in T18S, an existing Shallow Flood DCA included in the Project. The following trends were observed (**Figures 4.3-1** through **4.3-3**). Bird use in T18S appears high in part due to the large size of the DCA. When bird use in T18S is compared to other DCAs on a per acre basis (**Figure 4.3-4** to **4.3-7**), T18S has moderate bird use.

- Diving waterbird use (including Eared Grebe, Ruddy Duck and Bufflehead) was high in T18S. Other high diving waterbird use cells are T16, T1A-2 and the T30s.

- Shorebird (including Snowy Plover, American Avocet, Black-necked Stilt and Killdeer) use of Transition Area T18S was moderate to high compared to other DCAs where shorebirds were found. These individuals represent adults observed during the breeding season and may include many non-breeding individuals.

- Waterfowl use in T18S during the breeding season (which may consist of non-breeding individuals including Gadwall, Cinnamon Teal and Mallard) was low to moderate compared to other DCAs. T29-1 had high breeding waterfowl use.

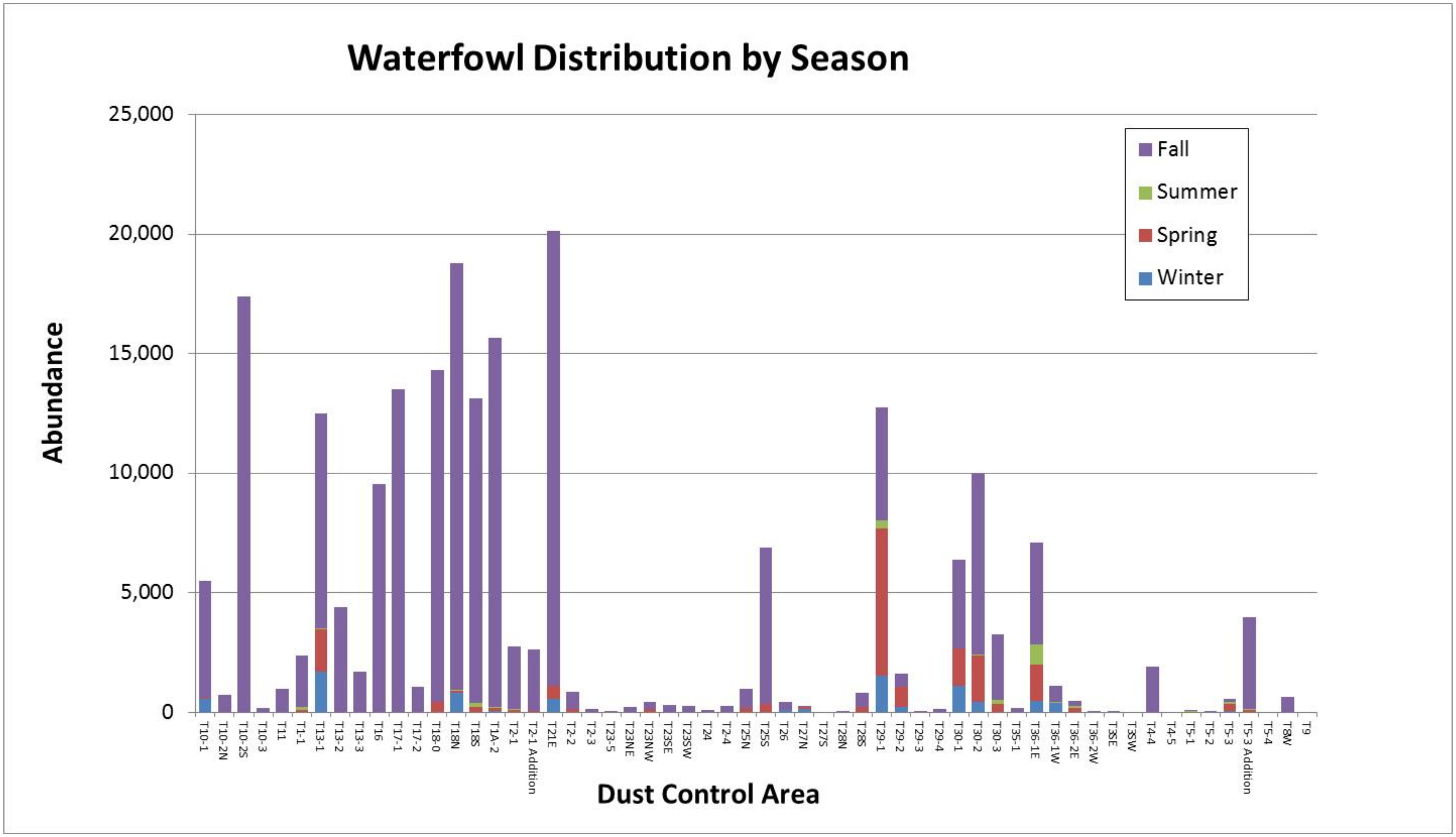

Figure 4.3-1
Owens Lake Waterfowl Distribution by Season

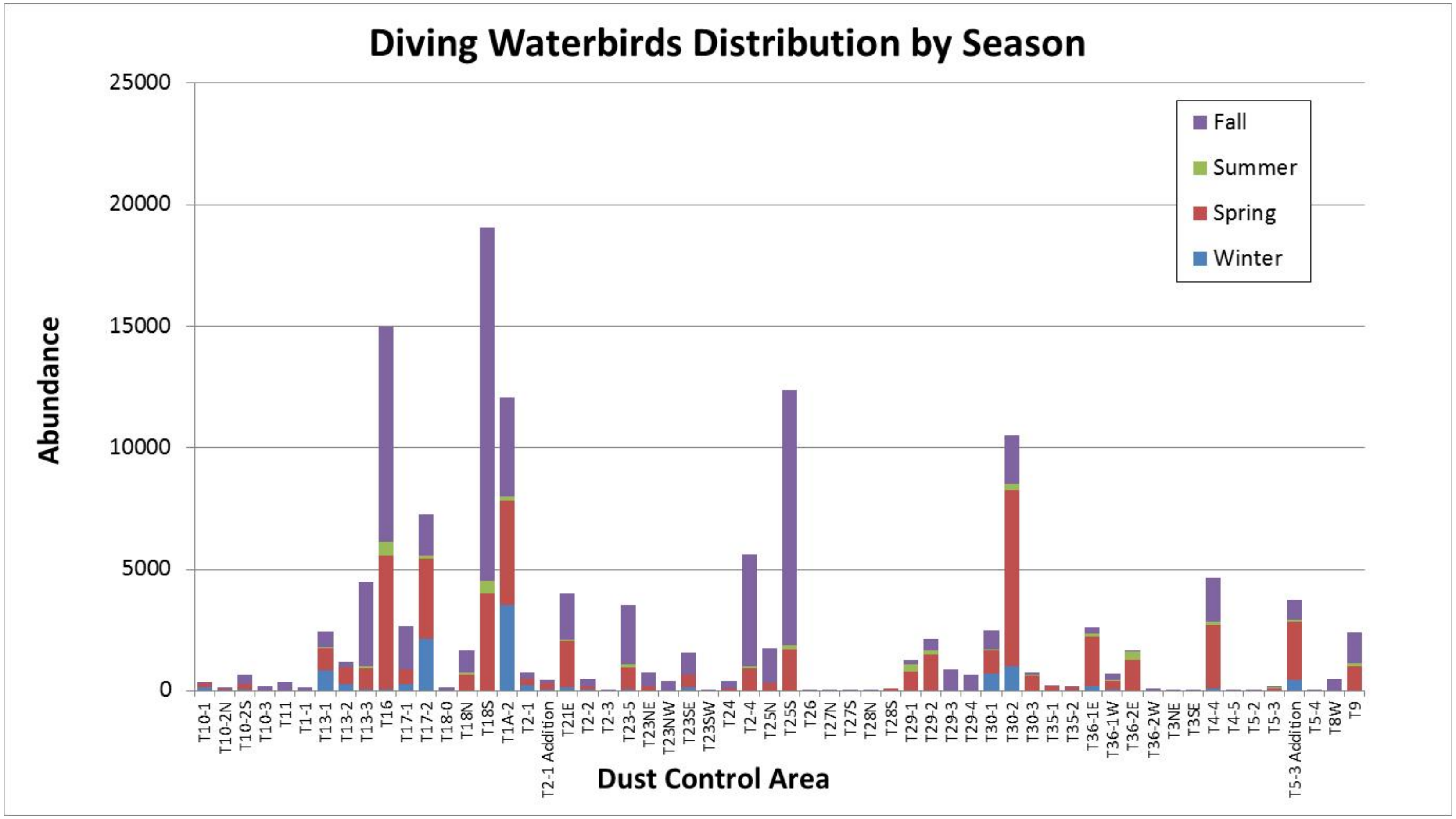

Figure 4.3-2
Owens Lake Diving Waterbirds Distribution by Season

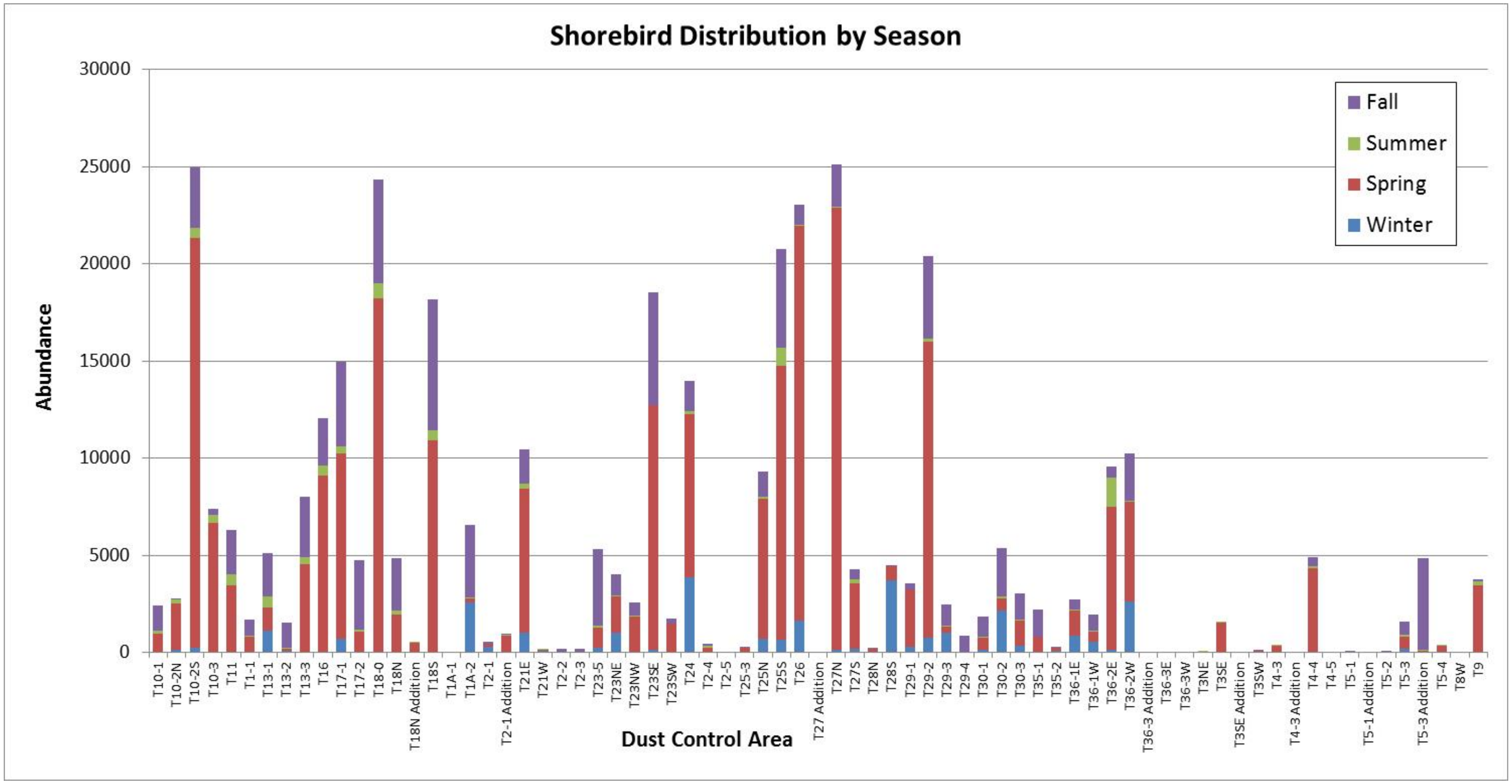

Figure 4.3-3
Owens Lake Shorebird Distribution by Season

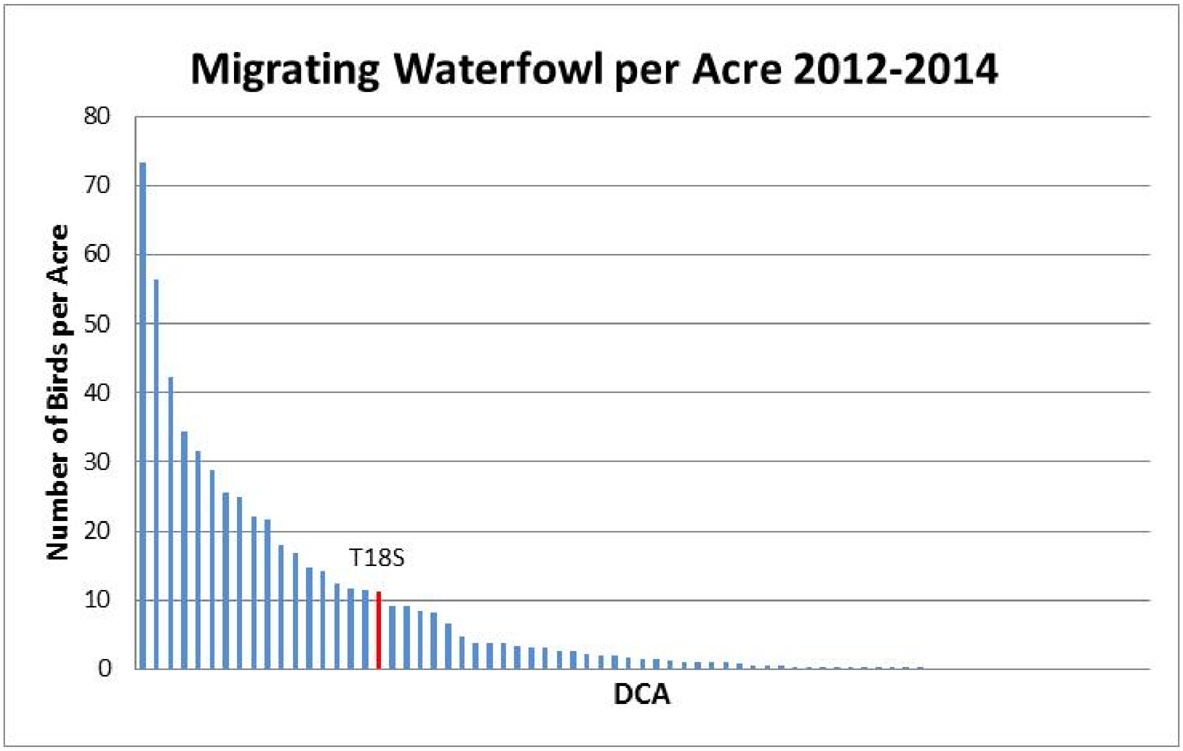

Figure 4.3-4
Owens Lake Migrating Waterfowl per Acre 2012-2014

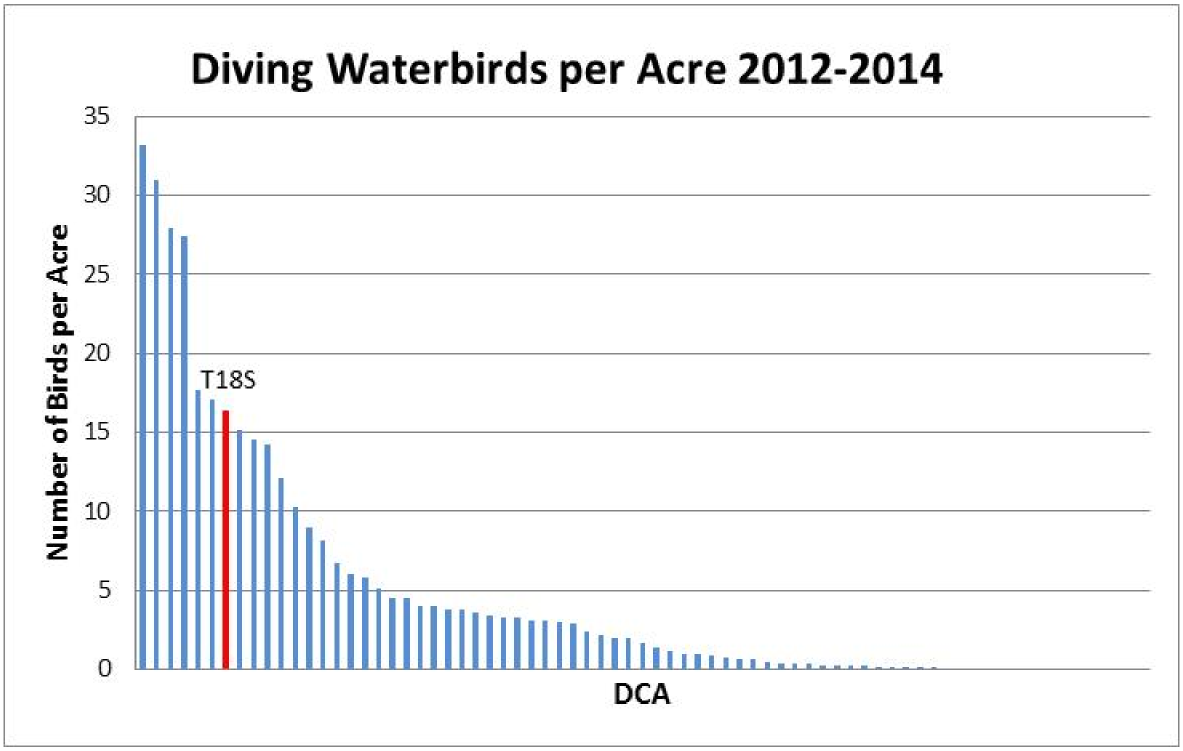

Figure 4.3-5
Owens Lake Diving Waterbirds per Acre 2012-2014

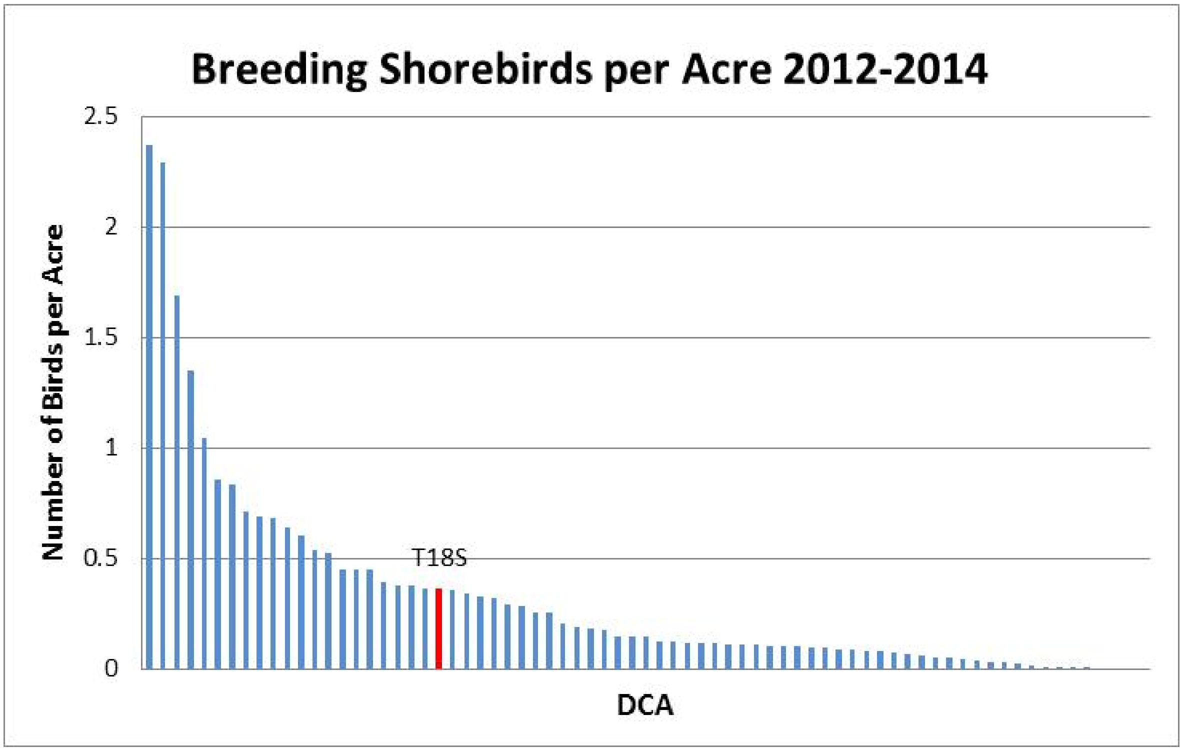

Figure 4.3-6
Owens Lake Breeding Shorebirds per Acre 2012-2014

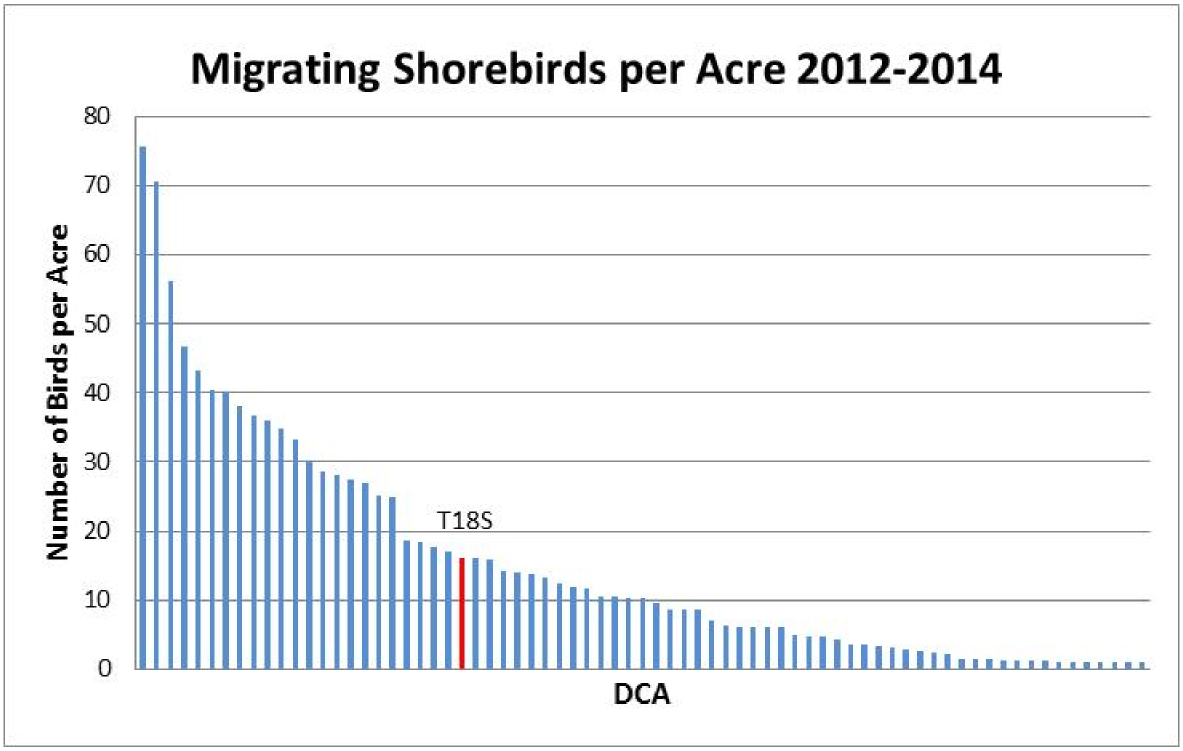

Figure 4.3-7
Owens Lake Migrating Shorebirds per Acre 2012-2014

Tables 4.3-6a through **4.3-6d** show the species abundance (species sorted into guilds) in T18S in spring, summer, fall and winter. The data show the variability of avian surveys. **Table 4.3-6e** shows all other species (not in the HSM habitat guilds) seen in T18S in 2012-2014 surveys.

Table 4.3-6a
Total Guild Species Observed in T18S During Spring Surveys

	Survey Year		
	2012	**2013**	**2014**
Total Waterfowl	6	151	42
Total Diving Waterbirds	144	3503	343
Total Shorebirds	1340	9353	164
Spring Species Composition			
	Survey Year		
Waterfowl	**2012**	**2013**	**2014**
Gadwall	3	25	40
Mallard	3		
Cinnamon Teal		13	1
Northern Shoveler		113	1
Diving Waterbirds	**2012**	**2013**	**2014**
Ring-necked Duck		1	
Lesser Scaup		3	
Bufflehead		3	
Ruddy Duck	58	665	
Eared Grebe	86	2831	343
Shorebirds	**2012**	**2013**	**2014**
Black-bellied Plover	2	1	
Snowy Plover	6		1
Semipalmated Plover	3	6	
American Avocet	459	965	75
Greater Yellowlegs	3	38	
Willet		4	1
Western Sandpiper	720	100	
Least Sandpiper	120	350	5
Dunlin		10	
Calidris sp.		7430	62
Long-billed Dowitcher	4		2
Unidentified Dowitcher		6	
Wilson's Phalarope		150	
Red-necked Phalarope	23	43	
Phalarope sp.		250	18

Note: Data reflect results from two spring surveys per year.

Table 4.3-6b
Total Guild Species Observed in T18S During Summer Survey

	Survey Year		
	2012	**2013**	**2014**
Total Waterfowl	23	41	109
Total Diving Waterbirds	173	274	55
Total Shorebirds	302	167	57
Summer Species Composition			
	Survey Year		
Waterfowl	**2012**	**2013**	**2014**
Gadwall	21	35	46
American Wigeon			1
Mallard		2	12
Blue-winged Teal			1
Cinnamon Teal		4	6
Northern Shoveler	2		10
Green-winged Teal			33
Diving Waterbirds	**2012**	**2013**	**2014**
Redhead	8		
Ruddy Duck	4	2	2
Eared Grebe	160	272	53
Western Grebe	1		
Shorebirds	**2012**	**2013**	**2014**
Snowy Plover	2	9	5
American Avocet	214	143	48
Spotted Sandpiper	2		1
Marbled Godwit			4
Sanderling	5		1
Western Sandpiper		12	
Wilson's Phalarope			3
Red-necked Phalarope	81	12	

Notes: Data reflect results from one summer survey per year.
Of the species observed during summer surveys, nesting habitat in cell is only currently present for Snowy Plover and American Avocet.

Table 4.3-6c
Total Guild Species Observed in T18S During Fall Surveys

	Survey Year		
	2012	**2013**	**2014**
Total Waterfowl	1638	6309	4793
Total Diving Waterbirds	2708	5815	6028
Total Shorebirds	533	3600	2596
Fall Species Composition			
Waterfowl	**2012**	**2013**	**2014**
Gadwall		212	47
American Wigeon			2
Blue-winged Teal	2		
Cinnamon Teal	3	10	16
Northern Shoveler	1618	5775	4676
Northern Pintail	14	8	24
Green-winged Teal	1	304	28
Diving Waterbirds	**2012**	**2013**	**2014**
Ruddy Duck	147	281	24
Eared Grebe	2560	5534	6004
Western Grebe	1		
Shorebirds	**2012**	**2013**	**2014**
Black-bellied Plover		1	
Snowy Plover	10		4
Semipalmated Plover	1	1	
Killdeer	4	4	13
Black-necked Stilt			2
American Avocet	142	1215	2230
Spotted Sandpiper			1
Greater Yellowlegs	1	20	5
Willet		1	
Sanderling			1
Western Sandpiper	140	977	39
Least Sandpiper	203	806	215
Baird's Sandpiper	15	2	6
Dunlin		15	1
Calidris sp.	15	58	72
Long-billed Dowitcher		4	
Wilson's Phalarope		21	6
Red-necked Phalarope	2	475	
Red Phalarope			1

Notes: Data reflect results from three fall surveys per year.

Table 4.3-6d
Total Guild Species Observed in T18S During Winter Survey

	Survey Year		
	2012	**2013**	**2014**
Total Waterfowl		28	
Total Diving Waterbirds	24	9	
Total Shorebirds	27	38	
Winter Species Composition			
	Survey Year		
Waterfowl	**2012**	**2013**	**2014**
Gadwall		28	
Diving Waterbirds	**2012**	**2013**	**2014**
Ruddy Duck	21	9	
Eared Grebe	3		
Shorebirds	**2012**	**2013**	**2014**
Snowy Plover	3		
Least Sandpiper	24	38	

Notes: Data reflect results from one winter survey per year.

Table 4.3-6e
2012-2014 Other Species Observations in T18S

Species	2012	2013	2014
White-faced Ibis		2	
American Coot	22	431	123
Sabine's Gull			3
Bonaparte's Gull		1	1
Franklin's Gull	1		1
Ring-billed Gull	3		
California Gull	468	2175	927
Peregrine Falcon		1	1
Common Raven	2	2	2
Horned Lark	25	64	3
Cliff Swallow	3	6	
Barn Swallow		2	20
Rock Wren		1	1
American Pipit		3	2
Common Yellowthroat		1	
Yellow-rumped Warbler		1	
Savannah Sparrow		1	1
Red-winged Blackbird		2	
Western Meadowlark	1		

Note: Data reflect results from seven surveys per year.

Table 4.3-6f lists the existing DCAs adjacent to each Phase 9/10 Project DCA.

Table 4.3-6f
Adjacent DCAs to Phase 9 10 Project Areas

Project Area	Adjacent DCAs
C2-L1	T2-1 Addition
DuckPondL1	T2-1
T10-1-L1	T10-1, T10-9
T17-2-L1	T13-3
T18S	T18N, T18-0, T16
T21-L1	T21
T21-L2	T21
T32-1-L1	T30-1, T30-2
T35-2-L1	T36-1W
T37-1-L1	
T37-2-L1	
T37-2-L2	
T37-2-L3	
T37-2-L4	
T21-L3	T21
T21-L4	T21
T10-3-L1	T10-3, T11

Table 4.3-6g shows the species composition (by Owens Lake Guild) in adjacent cells. **Table 4.3-6h** shows special status species in adjacent cells. The species observations are survey data and may not indicate separate individuals.

Table 4.3-6g
2012-2014 Bird Data by Guild in Adjacent Cells to Project Areas

DCA	HSM Group	2012	2013	2014
T10-1	Diving Waterbirds	126	227	1
	Shorebird	636	589	1204
	Waterfowl	3852	1087	553
T-11	Diving Waterbirds	155	36	153
	Shorebird	1877	3263	1172
	Waterfowl	26	945	
T13-3	Diving Waterbirds	1500	1027	1951
	Shorebird	1462	2271	4296
	Waterfowl	85	707	906
T16	Diving Waterbirds	4740	9046	1187
	Shorebird	3854	5018	3196
	Waterfowl	6477	2276	814
T18-0	Diving Waterbirds	56	23	52
	Shorebird	8688	4974	10671
	Waterfowl	5215	3132	5984
T18N	Diving Waterbirds	383	874	387
	Shorebird	918	2000	1926
	Waterfowl	8427	3530	6822
T2-1	Diving Waterbirds	437	204	94
	Shorebird	448	94	11
	Waterfowl	1839	654	258
T2-1 Addition	Diving Waterbirds	242	262	374
	Shorebird	1718	220	28
	Waterfowl	1760	3220	308
T21E	Diving Waterbirds	1247	1858	888
	Shorebird	2946	5950	1543
	Waterfowl	8129	6241	5765
T21W	Diving Waterbirds			
	Shorebird	60		99
	Waterfowl			
T30-1	Diving Waterbirds	569	1657	260
	Shorebird	140	1722	
	Waterfowl	3933	1621	820
T30-2	Diving Waterbirds	1730	3442	5328
	Shorebird	2182	1850	1334
	Waterfowl	131	5441	4431
T36-1W	Diving Waterbirds	193	464	49
	Shorebird	700	733	512
	Waterfowl	336	539	258

Note: Data reflect results from seven surveys per year.

Table 4.3-6h
2012-2014 Special Status Species Observations in Adjacent Cells to Project Areas

DCA	Common Name	Grand Total
T10-1	Snowy Plover	24
T11	Snowy Plover	15
	Black Tern	
T13-3	Snowy Plover	4
	Willet	2
	Black Tern	
	Peregrine Falcon	
T16	American White Pelican	501
	Snowy Plover	39
	Black Tern	
T18-0	Northern Harrier	3
	Snowy Plover	8
T18N	Snowy Plover	2
	Willet	9
	Franklin's Gull	2
	Peregrine Falcon	2
T2-1	Peregrine Falcon	1
	Yellow-headed Blackbird	3
T2-1 Addition	Northern Harrier	2
	Snowy Plover	12
T21E	Northern Harrier	1
	Snowy Plover	53
T21W	Snowy Plover	5
T30-1	Northern Harrier	6
	Willet	7
	Peregrine Falcon	2
	Loggerhead Shrike	2
T30-2	Redhead	
	Northern Harrier	1
	Golden Eagle	1
	Willet	12
T36-1W	American White Pelican	14
	Northern Harrier	2
	Snowy Plover	
	Willet	1
	Peregrine Falcon	2
	Bank Swallow	3

Note: Data reflect results from seven surveys per year.

Snowy Plover Nest Data in T18S

Figure 4.3-8 shows Snowy Plover nests found in and around transition area T18S. Most of the nests were found prior to 2012-2014 on perimeter roads with gravel. Other species nests that were found were American Avocet and California Gull. **Figures 4.3-9** through **4.3-17** show Snowy Plover nests in the vicinity of other proposed Project areas.

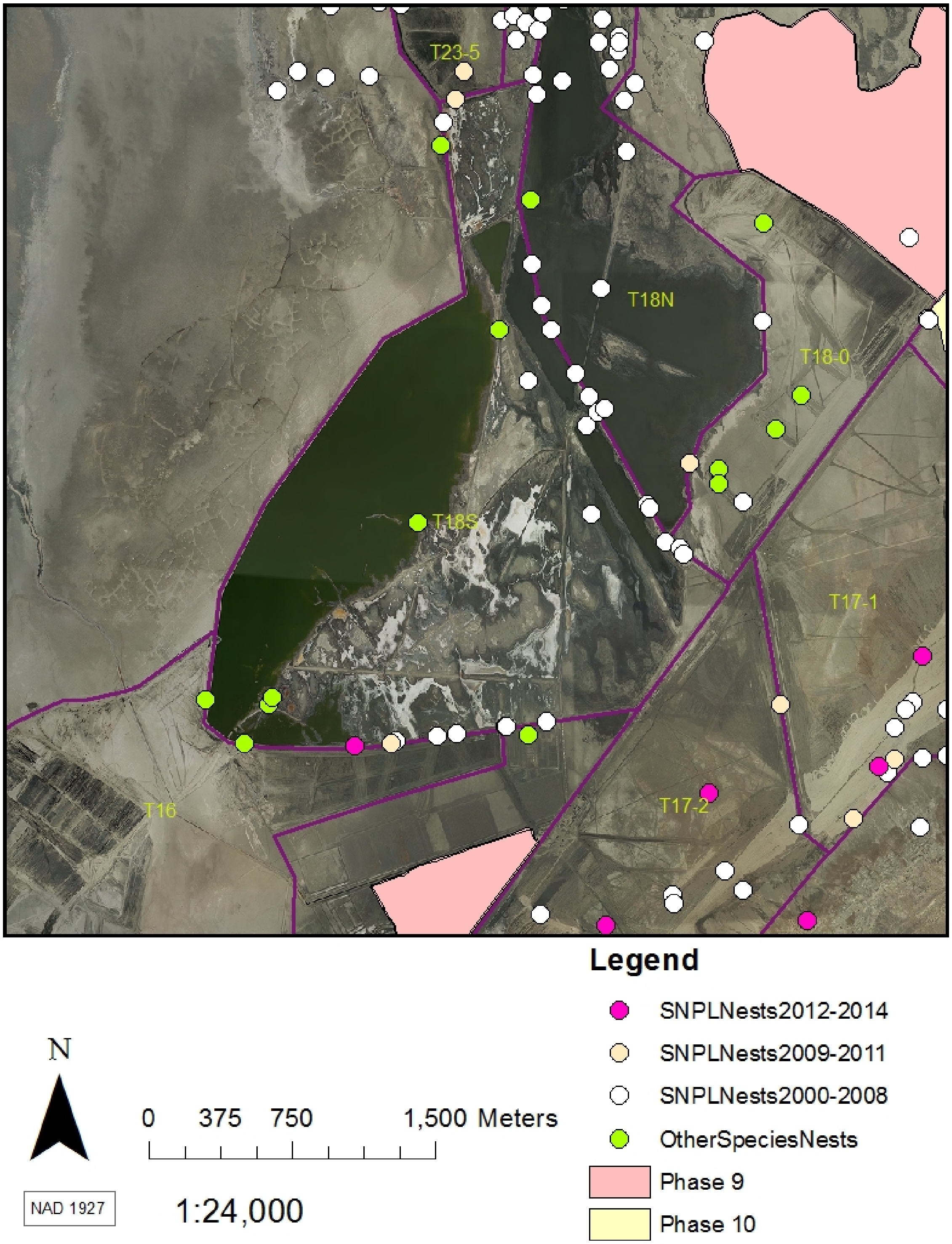

Figure 4.3-8. Owens Lake Snowy Plover Nests in Vicinity of T18S

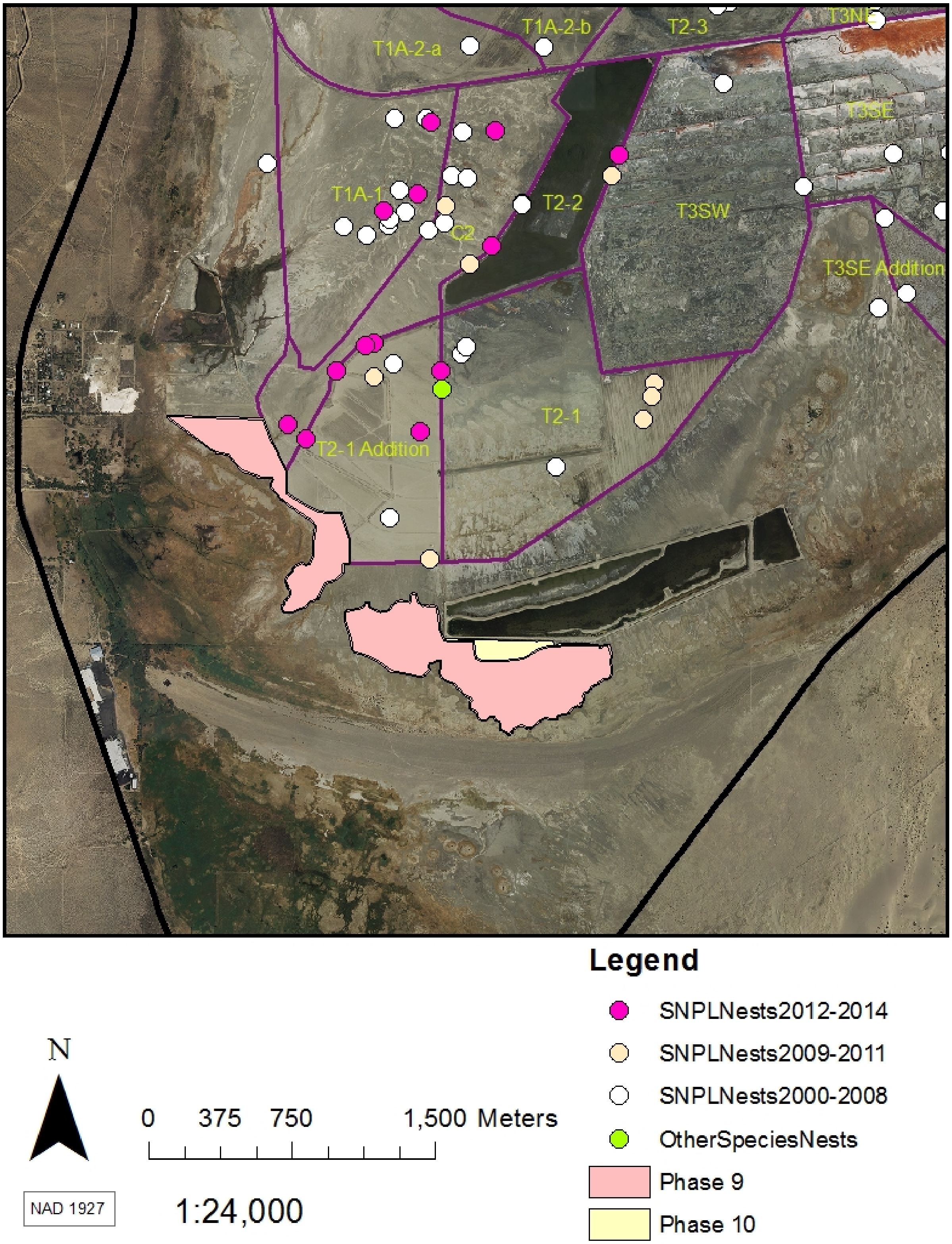

Figure 4.3-9. Snowy Plover Nests in Vicinity of C2 and DuckPond

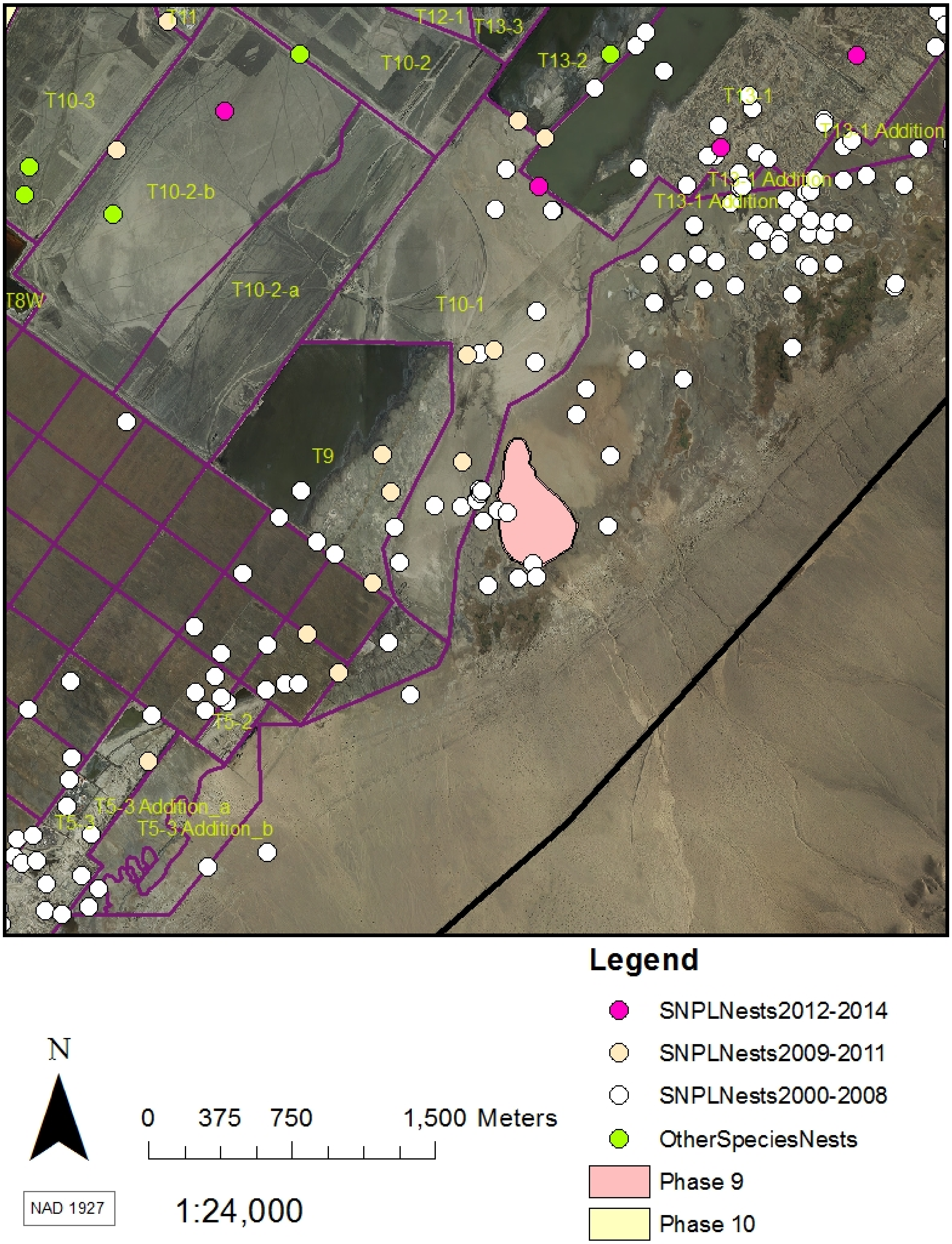

Figure 4.3-10. Snowy Plover Nests in Vicinity of T10-1-L1

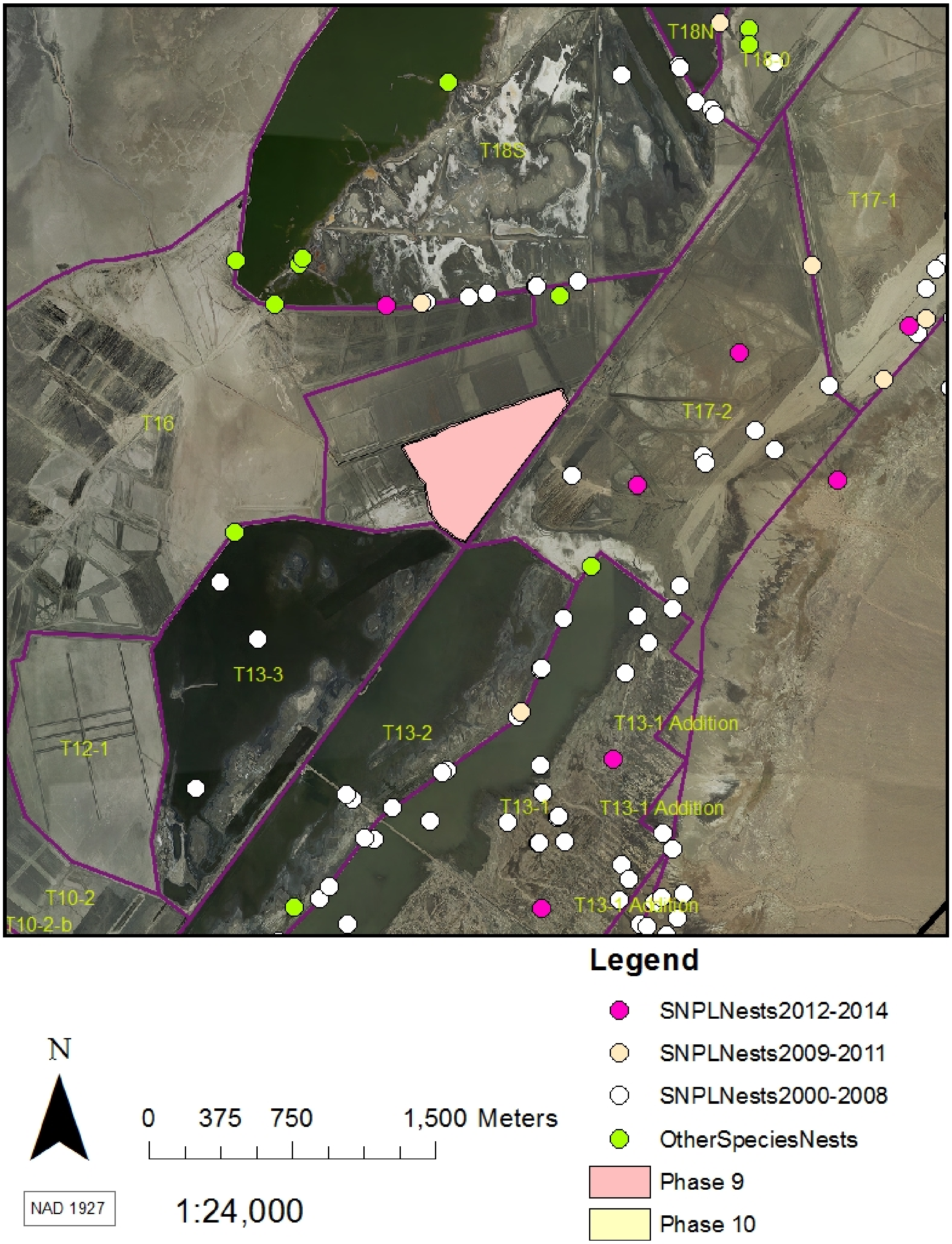

Figure 4.3-11. Snowy Plover Nests in Vicinity of T17-2-L1

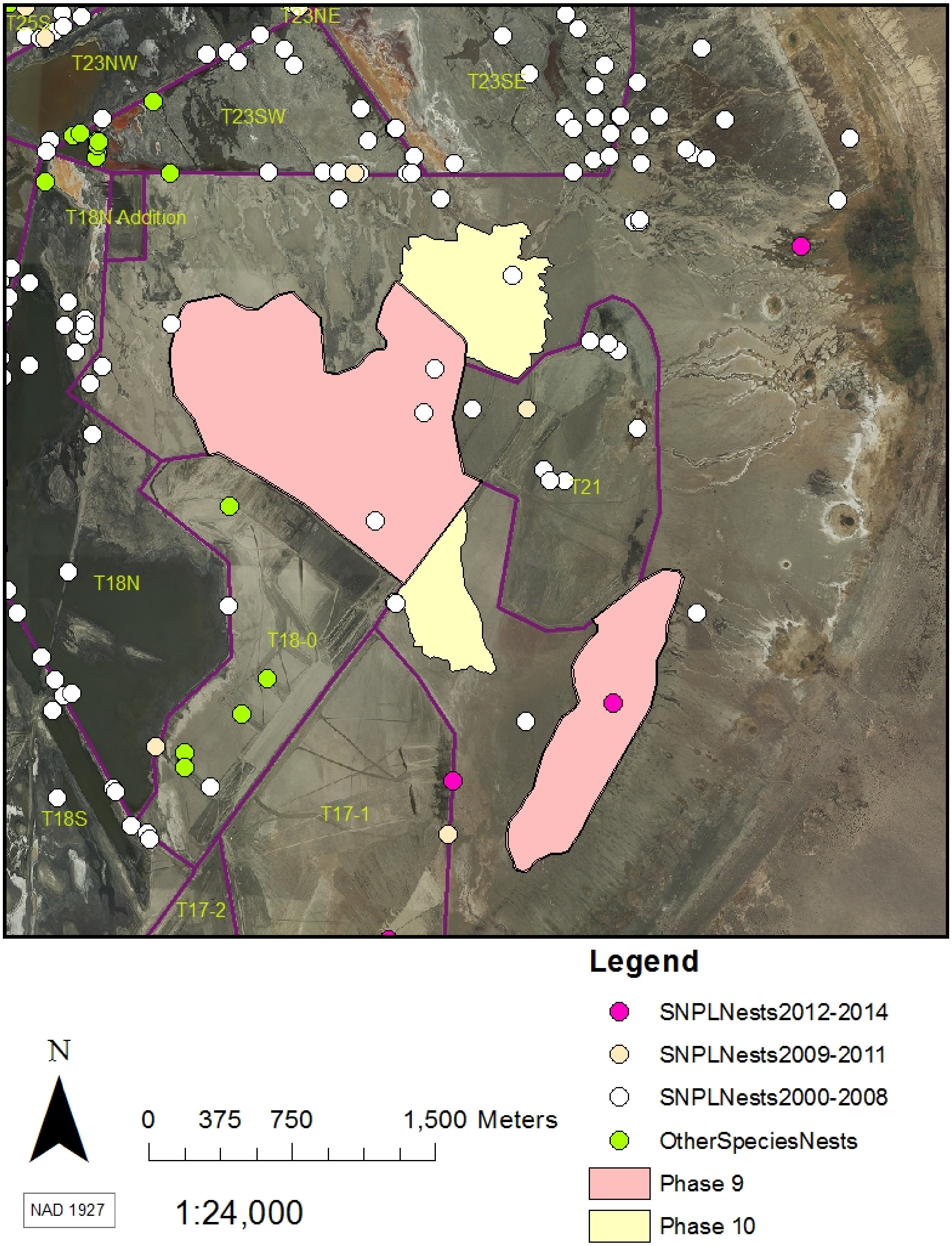

Figure 4.3-12. Snowy Plover Nests in Vicinity of T21-L1, -L2, -L3 and -L4

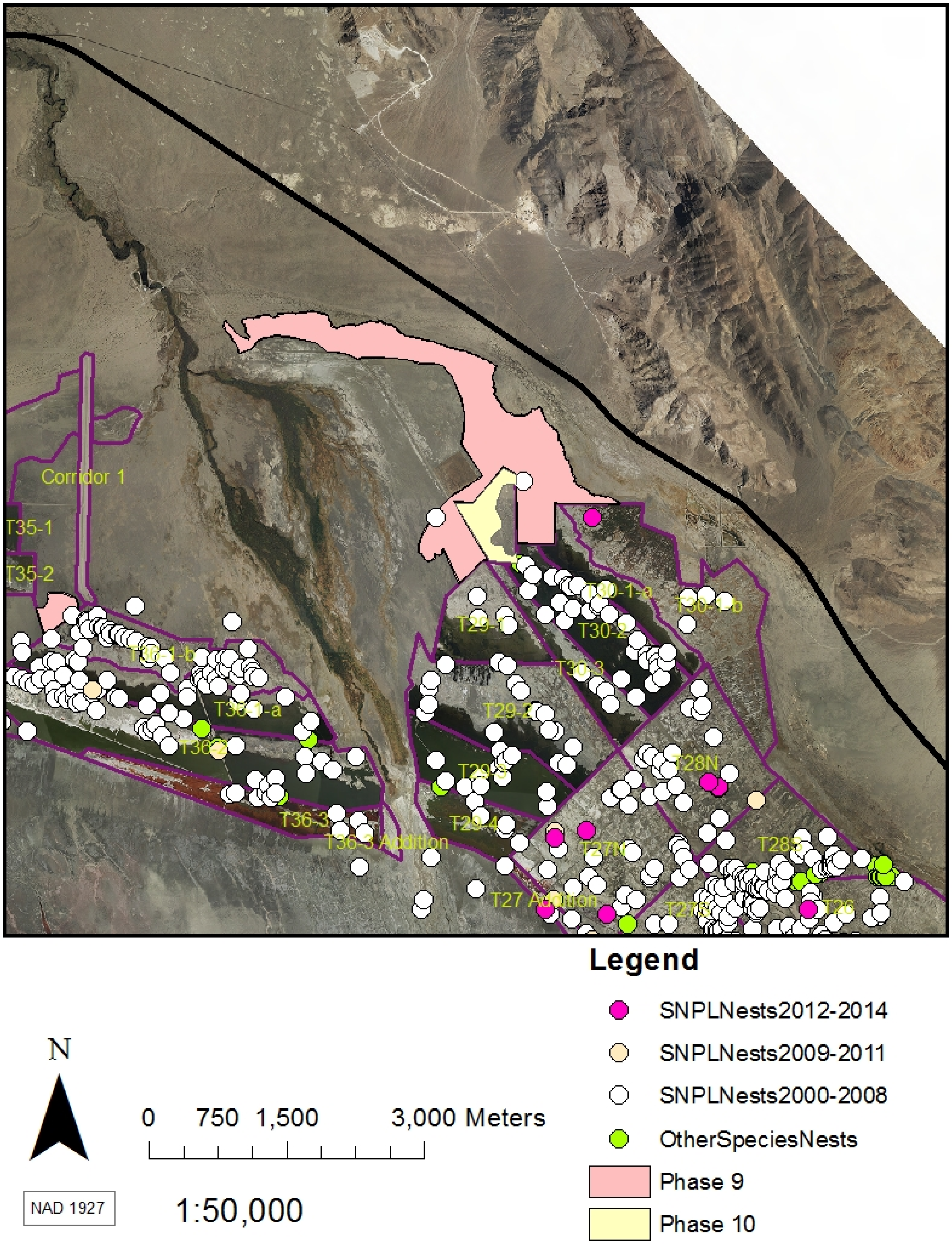

Figure 4.3-13. Snowy Plover Nests in Vicinity of T32-1-L1

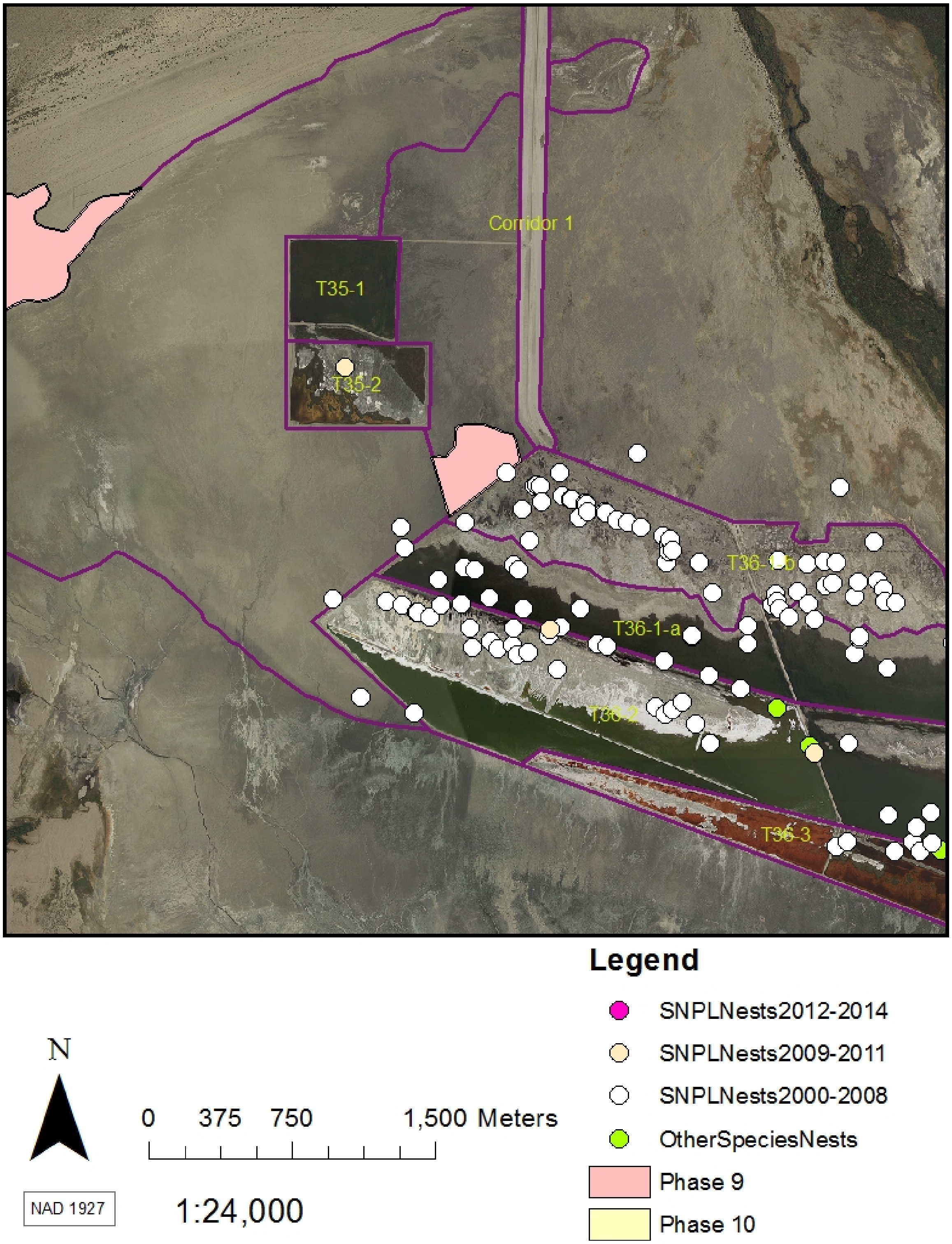

Figure 4.3-14. Snowy Plover Nests in Vicinity of T35-2-L1

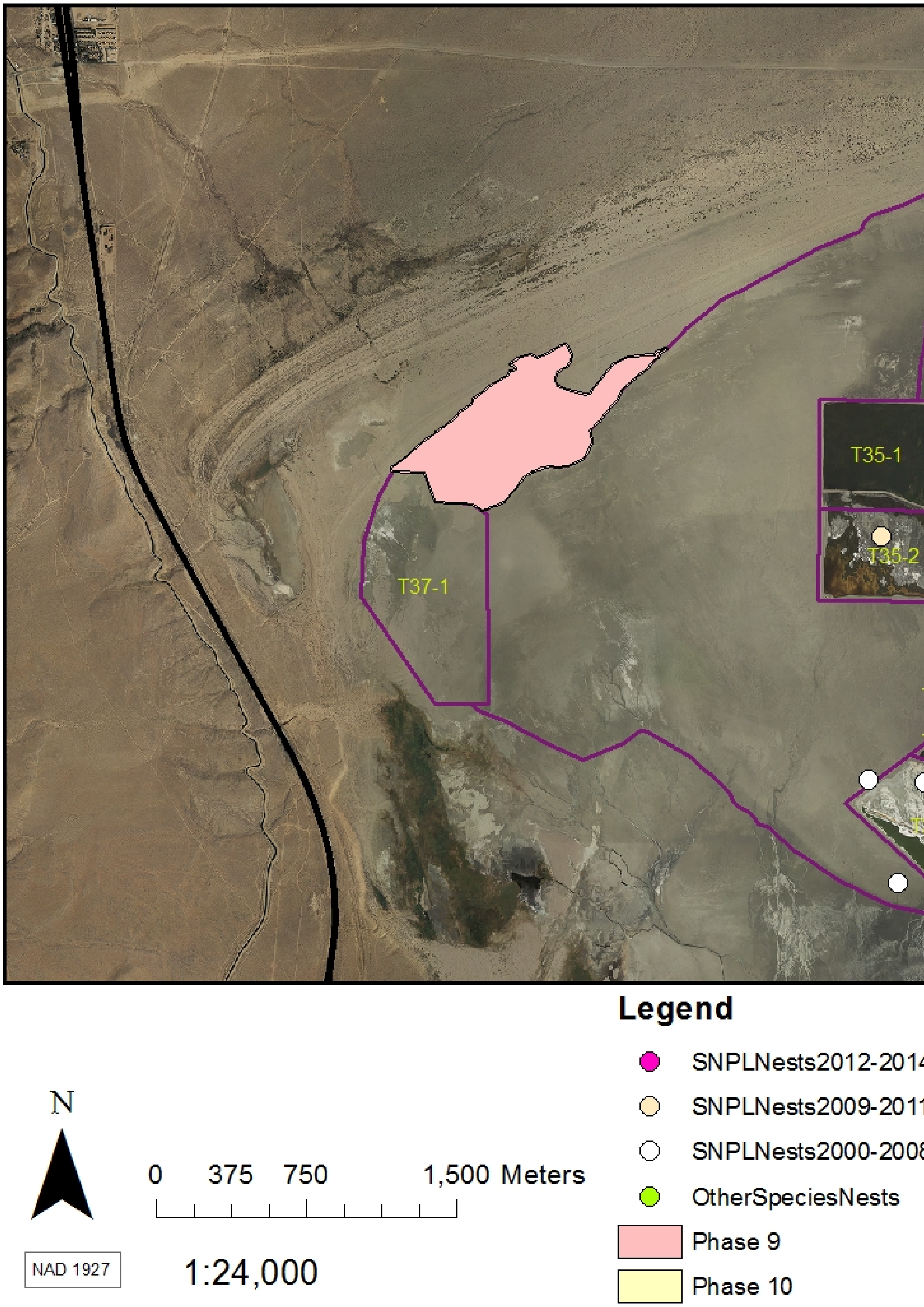

Figure 4.3-15. Snowy Plover Nests in Vicinity of T37-1-L1

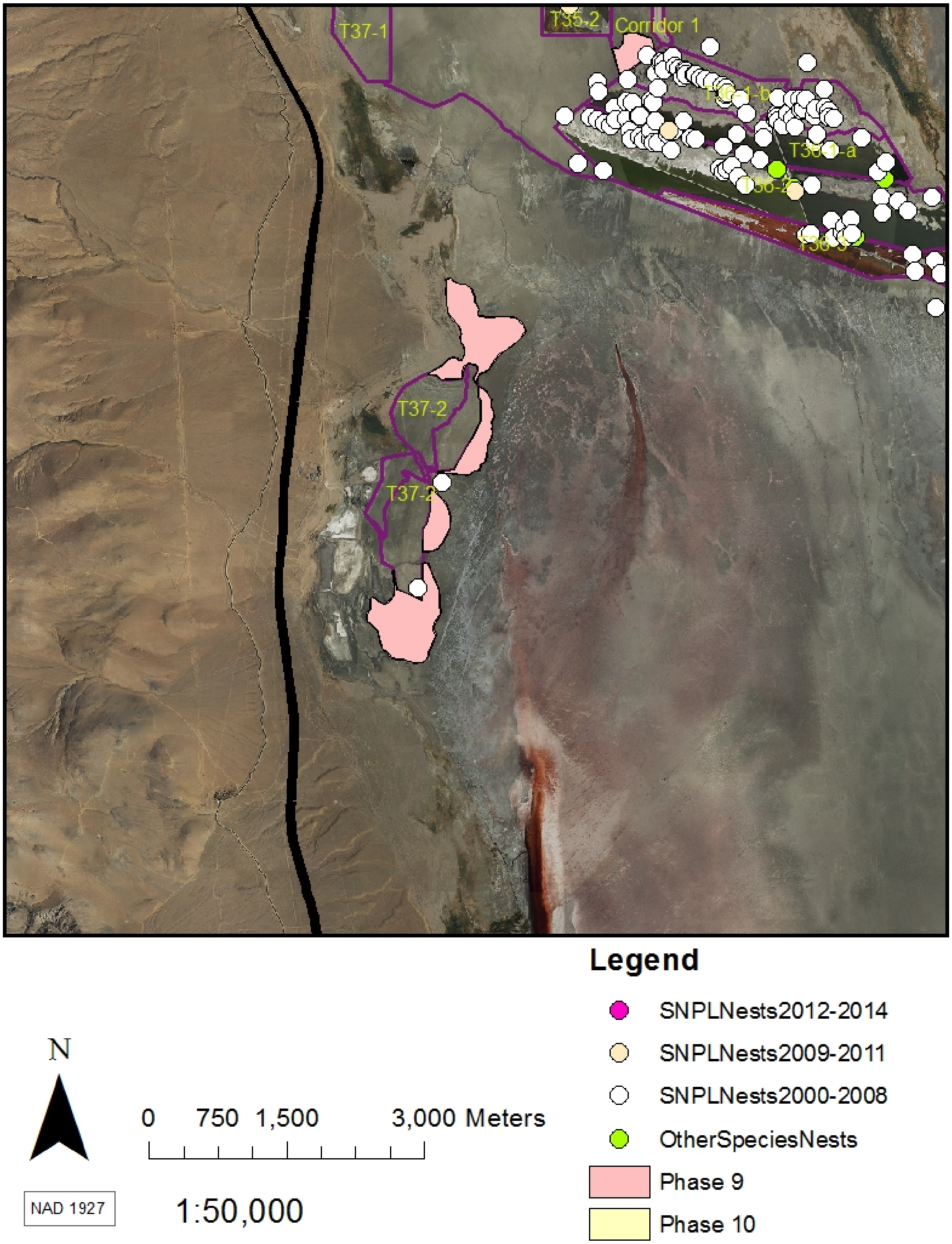

Figure 4.3-16. Snowy Plover Nests in Vicinity of T37-2-L1, -L2, -L3 and -L4

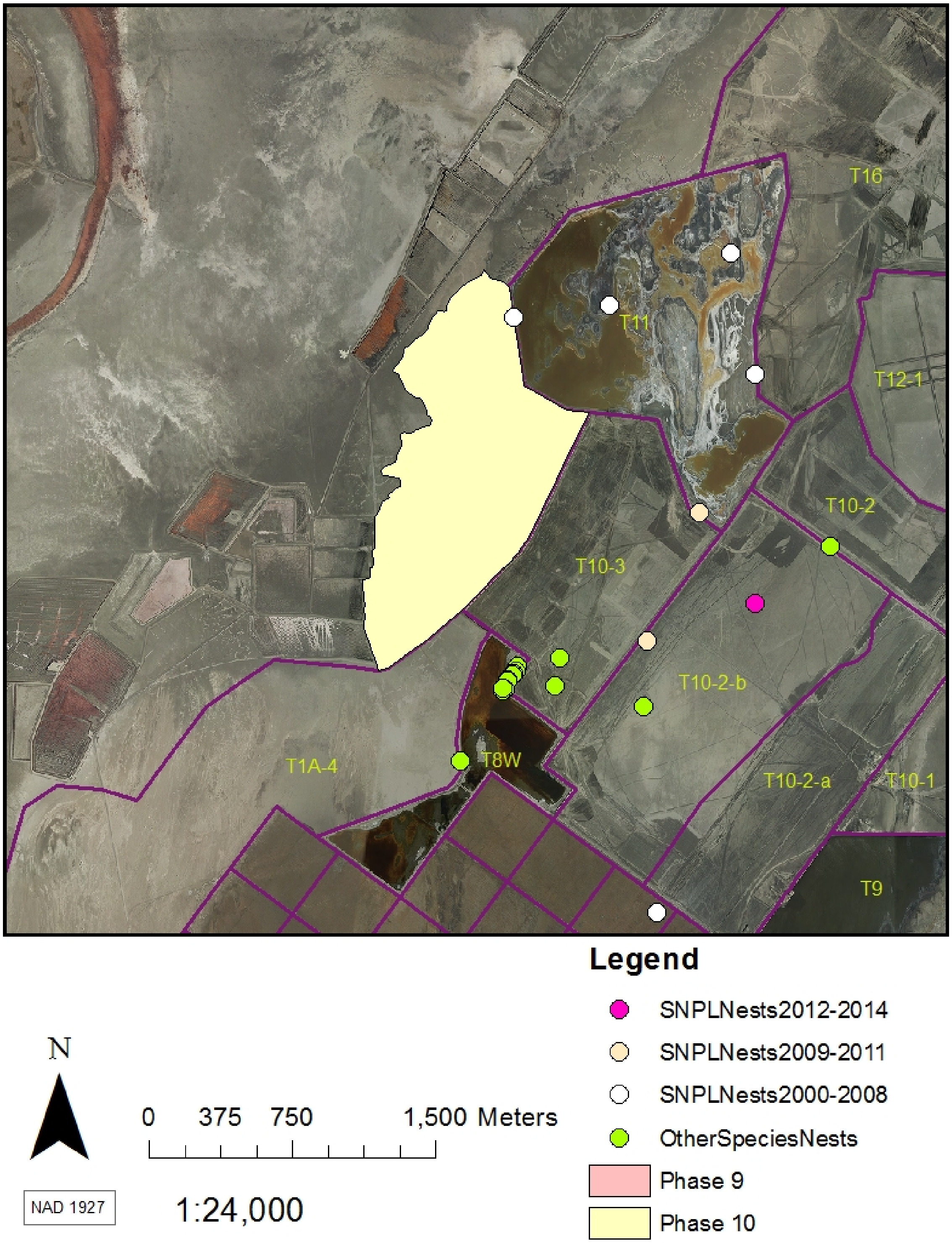

Figure 4.3-17. Snowy Plover Nests in Vicinity of T10-3-L1

[**Draft EIR Section 4.4.7.5 Phase II Cultural Resources Evaluations, CRHR Eligibility**]

Although identified as recommended eligible in the Phase II cultural resources report for the Project, site CA-INY-6065 is mostly contained in a Phase 7a DCA (T36-1-b). During Phase 7a construction monitoring, the site was considered eligible but fully mitigated by Phase II investigations completed previously (Jones & Stokes, 2002). Over approximately 90 percent of the site has since been disturbed during Phase 7a construction. Therefore, the remaining portion in the Phase 9 area is considered fully mitigated by the previously completed Phase II investigations; the text of the cultural resources report will be revised accordingly. Therefore, there are a total of 11 sites on state lands recommended as eligible in the Phase 9/10 Project area. There are an additional two sites on federal and states lands in the Project area recommended as eligible for the CRHR. The total area of significant cultural sites and buffer that would be excluded from the Project under the Avoidance Alternative is on the order of about 350 acres.

The text in Section 4.4.7.5 is revised as follows:

Evaluative testing, archival research, and review of existing cultural resources records revealed that ~~12~~ 11 sites on state lands in the Phase 9/10 Project areas contain dense, intact, primary cultural deposits that have yielded information important to the prehistory of the local area and California (Criterion 4), and are therefore eligible for listing under the CRHR (**Table 4.4-6**). The criteria for eligibility for the CRHR are based upon NRHP criteria, and they are nearly identical. An evaluation of each of the Phase 9 resources recommended eligible for listing under the CRHR indicates that each is recommended as significant as a historic property under the NRHP. One of the DCAs contains eight of the significant resources and should be considered exceptionally sensitive both for archaeological values and for traditional cultural values.

Most, if not all of the prehistoric/ethnographic archaeological resources at Owens Lake that meet the CRHR/NRHP's criteria can be considered contributors to a multiple property historic district. ~~However, the appropriate state/federal agency with jurisdiction would need to certify the recommendation~~. The associated property types include *village, long-term residence, short-term residence*, *ideological*, *ethnographic*, *historic*, and *unknown*. Each of the sites is recommended significant under Criterion 4/D for their potential to yield important information about the prehistory of Owens Lake. Some sites are also recommended eligible for the CRHR/NRHP under Criterion 1/A for their association with the Indian War era of 1861-1867 at Owens Lake, considered an important period in California history. The chronological context includes sites within one or more of the following periods: Paleo-Indian Complex (10,000 to 8,000 cal BC); Lake Mojave Period (9,000 to 6,000 BP) and Little Lake Period (6,000 to 3,150 BP); Newberry Period (3,150 to 1,350 BP); Haiwee Period (1,350 to 650 BP); Marana Period (650 BP to Contact ~1782); and Historic (Post-Contact~1782). Geographic parameters include related historic properties with direct geographical context within and surrounding Owens Lake flanked by the foothills of the Inyo-White and Sierra Nevada mountain ranges.

[**Draft EIR Table 4.4-6, Summary of Significant Cultural Resources Located within the Phase 9/10 Project Areas**]

Table 4.4-6 is revised to delete the entry for CA-INY-6065.

~~CA-INY-6065~~	~~Sparse lithic scatter with a diversity of artifact types representing tool manufacture and habitation debris~~	~~Unknown~~	~~The site is eligible under Criterion 4/D because it represents a primary deposit with sufficient density, diversity, and integrity of its archaeological constituents and contains information important to understanding prehistoric use of the Owens Lake shoreline.~~

References in other sections of the Draft EIR, including the description of the Avoidance Alternative in Draft EIR Section 5.9, to 12 sites on state lands recommended as eligible for listing under the CRHR are revised to state that 11 sites on state lands are recommended as eligible for listing under the CRHR and are significant cultural resources.

[**Draft EIR Section 4.4.10.2 Mitigation Measures to be Incorporated as part of the Phase 9/10 Project**]

Since cultural resources evaluations on private property within the Phase 9/10 Project area have been completed and significant resources have not been identified, mitigation measure CR-2 is deleted in its entirety (Draft EIR Table 1-2 and Section 4.4.10.2).

~~**CR-2. Cultural Resources on Private Parcels**~~

~~As of January 2015, all of the private parcels included in the Phase 9/10 Project have been surveyed for cultural resources. Due to the time delay resulting from securing permissions to survey the sites, evaluations of the significance of observed cultural resources are pending. Prior to construction on private lands, a qualified archaeologist shall conduct evaluative testing (Phase II investigation), if recommended by the Project archaeologist.~~

~~Under the Avoidance Alternative to the proposed Project, the treatment plan for significant archaeological resources identified on private parcels shall describe avoidance/preservation in place. If the Avoidance Alternative is not adopted, and the proposed Project for the entire 3.61 square miles of dust control is adopted by LADWP, and if avoidance of significant archaeological resources on private parcels is deemed infeasible, a data recovery plan shall be implemented for the resources and the impact on archaeological resources would be significant with mitigation.~~

In response to comments from the CSLC, cultural resources mitigation measures CR-3 and CR-5 are revised to delete the requirement for CSLC approval of the Project archaeologist and paleontologist.

The first bullet of CR-3 is modified as follows:

- The retention of a qualified archaeologist to implement a monitoring and recovery program. The "qualified archaeologist" shall meet the U. S. Secretary of the Interior's Historic Preservation Professional Qualification Standards for Archaeology. ~~The qualifications of the archaeologist shall be submitted to the responsible agency (CSLC) for approval.~~

The following additional bullet is added:

- An Unanticipated Discovery Evaluation Protocol shall be developed by the qualified archaeologist. Prior to the evaluation of any newly discovered resources on state lands, the California State Lands Commission shall be afforded an opportunity to comment on the research design, including research questions and evaluation methodologies, included in the Unanticipated Discovery Evaluation Protocol. Prior to evaluation of any newly discovered resources on federal lands, the BLM shall be afforded an opportunity to comment on the Unanticipated Discovery Evaluation Protocol.

The first bullet of CR-5 is modified as follows:

- LADWP shall retain a qualified paleontologist to implement the mitigation plan and maintain professional standards of work. A "qualified paleontologist" is defined as a practicing scientist who meets the qualifications established by the SVP. ~~The qualifications of the paleontologist shall be submitted to the responsible agency (CSLC) for approval.~~

[**Draft EIR Section 4.4.10.2 Table 4.2-3**]

Draft EIR Table 4.2-3 is replaced in its entirety, to clarify footnotes and delete a duplicate entry for the Lone Pine monitoring station.

Table 4.2-1
Air Quality Data for the Owens Lake Area (2007-2013)

Air Quality Indicator	2007	2008	2009	2010	2011	2012	2013
Ozone (O_3)[1]							
Peak 1-hour value (ppm)	0.107	0.098	0.098	0.081	0.084	0.082	0.080
Days above state standard (0.09 ppm)	3	1	1	0	0	0	0
Peak 8-hour value (ppm)	0.094	0.094	0.086	0.076	0.079	0.078	0.074
Days above state standard (0.070 ppm)	35	21	4	2	20	8	5
Days above federal standard (0.075 ppm)[2]	18	5	2	1	3	1	0
Particulate matter less than or equal to 10 microns in diameter (PM_{10})							
Olancha Monitoring Station							
Peak 24-hour value (μg/m^3)	114	357	650	577	779	485	276
Days above state standard (50 μg/m^3)	*	*	*	*	*	*	*
Days above federal standard (150 μg/m^3)	*	5	2	7.3	4	3	6
Dirty Socks Monitoring Station							
Peak 24-hour value (μg/m^3)	497	499	556	1437	914	858	*
Days above state standard (50 μg/m^3)	*	*	*	*	*	*	*
Days above federal standard (150 μg/m^3)	*	9	7	*	8.1	5.9	*
Lone Pine Monitoring Station							
Peak 24-hour value (μg/m^3)	66	399	264	142	134	168	137
Days above state standard (50 μg/m^3)	*	*	*	*	*	*	*
Days above federal standard (150 μg/m^3)	*	1	2	0	0	*	0
Ash Point							
Peak 24-hour value (μg/m^3)	104	198	1506	285	277	232	120
Days above state standard (50 μg/m^3)	*	*	*	*	*	*	*
Days above federal standard (150 μg/m^3)	0	1	5	1	*	3	0
Shell Cut							
Peak 24-hour value (μg/m^3)	136	693	397	842	393	2149	447
Days above state standard (50 μg/m^3)	*	*	*	*	*	*	*
Days above federal standard (150 μg/m^3)	*	5.1	3	4	4	10	3
Flat Rock							
Peak 24-hour value (μg/m^3)	727	532	389	871	424	-	-
Days above state standard (50 μg/m^3)	*	*	*	*	*	-	-
Days above federal standard (150 μg/m^3)	*	3	5.1	3	*	-	-
Lizard Tail							
Peak 24-hour value (μg/m^3)	*	633	395	4570	3444	3916	283

Air Quality Indicator	2007	2008	2009	2010	2011	2012	2013
Days above state standard (50 µg/m^3)	*	*	*	*	*	*	*
Days above federal standard (150 µg/m^3)	*	2.2	6.1	16	7.6	12	2
North Beach							
Peak 24-hour value (µg/m^3)	*	40	1406	2067	937	1535	*
Days above state standard (50 µg/m^3)	*	*	*	*	*	*	*
Days above federal standard (150 µg/m^3)	*	*	9.1	8.0	10.1	8.3	*
Particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$)^3							
Peak 24-hour value (µg/m^3)	57	58	69	106.2	208	99	93.6
Days above federal standard (35 µg/m^3)	2	4	4	5	9	4	8.2
Annual Average value (ppm)	5.8	7.1	6.8	7.1	8.1	6.6	7.8
Hydrogen Sulfide (H_2S) ^{4}							
Peak 1-hour value (ppm)	0.003	0.003	0.006	0.005	0.007	0.008	0.005
Days above state standard (0.03 ppm)	0	0	0	0	0	0	0

Notes: (1) Data from the Death Valley monitoring station.
(2) The federal O_3 standard was revised downward in 2008 to 0.075 ppm.
(3) Data from the Keeler – Cerro Gordo Road monitoring station.
(4) Data from the Coso Junction – Hwy 395 Rest Area monitoring station.
ppm = parts per million; µg/m^3 = micrograms per cubic meter
* insufficient data available to determine the value

Source: CARB, 2014

Section 3
Responses to Comments on the Draft EIR

3.1 ORAL COMMENTS RECEIVED AT THE PUBLIC MEETING AND RESPONSES TO COMMENTS

A public meeting for the Phase 9/10 Project was held at 5:00 p.m. on March 5, 2015 at LADWP's office in Keeler, California. In addition to staff from LADWP and MWH, attendees included representatives of BLM, CDFW, and California Native Plant Society. The meeting included a presentation to review the project background, project description, CEQA process, environmental topics analyzed in the Draft EIR, project alternatives, and the alternative identified as environmentally superior.

Comments made during the meeting and responses to comments are summarized in **Table 3-1**.

Table 3-1
Responses to Comments Received at the Public Meeting

Oral Comments	Responses to Comments
• What are the six guilds considered for Owens Lake biological resources evaluations?	Biological resources assessment for the proposed Project included review of the following six guilds: diving waterbirds, breeding waterfowl, migrating waterfowl, breeding shorebirds, migrating shorebirds, and alkali meadow species.
• It was noted that the federal property included in the Project footprint would be addressed via a federal environmental review document.	Comment noted.
• What is the timeframe for the federal environmental document?	The federal environmental review process is expected to start in 2015. The specific type of federal environmental document for the Phase 9/10 Project has not been determined.
• Where is the federal land?	As noted in Draft EIR Section 4.5, federal land is located in T32-1-L1, Duck Pond L-1 and Duck Pond L-2.
• What is the source of the Project water supply?	The Los Angeles Aqueduct and the Lower Owens River are the sources of the Project water supply.
• Is the Duck Pond DCA near the duck club?	Yes
• Is infrastructure needed for engineered roughness?	Tillage being implemented on Owens Lake as part of a related project includes the infrastructure necessary for Shallow Flood backup.
• What monitoring is planned for biological resources?	Monitoring for habitat value is described in Draft EIR Section 4.3.5.3.

3.2 WRITTEN COMMENTS RECEIVED ON THE DRAFT EIR AND RESPONSES TO COMMENTS

Eight comment letters were received on the Draft EIR. Copies of the letters are followed by responses to comments. **Table 3-2** is a list of persons, organizations, and public agencies that provided written comments on the Draft EIR.

Table 3-2
List of Persons, Organizations and Public Agencies Commenting in Writing on the Draft EIR

Comment Letter Number	Organization	Commenter
1	Private land owner	John Connolly
2	Great Basin Unified Air Pollution Control District	Duane Ono
3	Rio Tinto	Paul Lamos, Superintendent Owens Lake Operations
4	California State Lands Commission	Cy. R. Oggins, Chief Division of Environmental Planning and Management
5	California Department of Fish and Wildlife	Curt Taucher, Environmental Program Manager II
6	California Department of Parks and Recreation Office of Historic Preservation	Carol Roland-Nawi, State Historic Preservation Officer
7	Lahontan Regional Water Quality Control Board	Patrice Copeland, Senior Engineering Geologist
8	Local resident	Earl Wilson

Comment #1

3-17-2015

1-1 Hi David Porter, I was looking through the draft EIR for the phase 9/10 project and noticed some hard-stance wording regarding private land owners whose property might fall within the project scope.

To summarize: (somewhere around page 235)

1. Obtain approval for dust control installation (or)
2. Purchase private properties (or)
3. Pursue condemnation through eminent domain

Frankly, I don't care for your tone regarding our property. I've been working in good faith with local LADWP staff in Bishop, CA to find out the best way to work out dust control on our lake-front lot. Furthermore, condemning this property in the benefit of 'public interest' is a stretch. I'd suggest some re-wording to not sound like a bully.

Thanks for the opportunity to comment,

J. Connolly

John Connolly

Comment Letter #1
John Connolly
P.O. Box 9037
Mammoth Lakes, CA 93546-9037

1-1 As noted in Draft EIR Section 4.5.1.4, the process of eminent domain would only be pursued as a last resort to acquire necessary land rights for the construction of dust control on private parcels. LADWP appreciates the cooperation shown by Mr. Connolly in allowing LADWP to survey his land for cultural resources. As the project proceeds, LADWP will continue to work with Mr. Connolly regarding installation of dust control on private lands included in the Phase 9/10 Project area.

Comment #2

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
157 Short Street, Bishop, California 93514-3537
Tel: 760-872-8211

March 26, 2015

Mr. Milad Taghavi
Manager of Owens Lake Planning
Los Angeles Department of Water and Power
111 N. Hope Street
Los Angeles, CA 90012

RE: Draft Environmental Impact Report for the Phase 9/10 Project

Dear Mr. Taghavi:

We appreciate the opportunity to submit comments on the Draft Environmental Impact Report (DEIR) and encourage you to integrate the recommended changes into your Final EIR.
The District acknowledges that LADWP is the California Environmental Quality Act (CEQA) lead agency for the Phase 9/10 Project and also the agency responsible for constructing and operating dust control measures (DCMs) on Owens Lakes in compliance with Orders from the District under the authority of California Health & Safety Code Sec. 42316 and the California Superior Court 2014 Stipulated Judgment. The District supports LADWP's proposed Phase 9/10 Project which will expand and modify the existing system of dust controls on the lake by installing Best Available Control Measures (BACM) on 3.61 square miles of area identified as emissive by the District. Also supported by the District, is the additional approximately 1.82 square miles of existing Shallow Flooding dust control area (DCA) that will be transitioned to approximately 0.81 square miles of Gravel Cover and 1.02 square miles of Shallow Flooding to minimize dust while conserving water use on Owens Lake.

The following comments relate to specific sections of the DEIR.

2-1

1) Section 2.7.5 Intended Uses of the EIR. The District intends to act as a responsible agency and use the City's Phase 9/10 CEQA/NEPA documents to act on the 2015 State Implementation Plan (SIP) revision as specified in Article 11 of the 2014 Stipulate Judgment. The District suggests that the analysis in the DEIR be extended to cover all elements of the Stipulated Judgment to be included in the 2015 SIP, including but not limited to all proposed control measures. Paragraphs A – E of Article 11 of the 2014 Stipulated Judgment is quoted in entirety below.

> ***11. 2015 SIP revision and CEQA/NEPA compliance***
> *A. By July 1, 2015, the City shall prepare and consider for certification the*

2-1

environmental impact analysis documents required by the California Environmental Quality Act ("CEQA") and, if applicable, the National Environmental Policy Act ("NEPA") necessary to proceed with Phase 9/10 Project.

B. By December 31, 2015, the District shall prepare a SIP revision that consists of the 2008 SIP Order and the provisions of this Stipulated Judgment ("2015 SIP Order"). The City shall support and not challenge the adoption of the 2015 SIP Order by the District Governing Board, CARB and EPA, except that the City may challenge any new term that the City has not agreed to in advance, and that is not contained in the 2008 SIP Order as modified by this Stipulated Judgment.

C. The City shall not appeal or contest the 2015 SIP Order that contain the terms of this Stipulated Judgment now or in the future in any administrative or judicial forum, under any law, statute or legal theory whatsoever including CEQA or Section 42316, and agrees that the terms of that 2015 SIP Order are valid and reasonable under Section 42316.

D. The District intends to act as a responsible agency and use the City's Phase 9/10 CEQA/NEPA documents to act on the SIP revision. If the City's CEQA/NEPA document is not adequate for the District's approval purposes, the District shall have until December 31, 2016 to act on the SIP revision.

E. The Parties have developed the terms of this Stipulated Judgment with the intention that its provisions will be incorporated into the 2015 SIP Order and are consistent with applicable provisions of federal, state and local law, including Section 42316, including all applicable provisions of federal law regarding attainment of the NAAQS and exceptional events.

2-2

2) <u>Section 6.1.1.5 Future Dust Control Areas.</u> As specified in Article 3 of the 2014 Stipulated Judgment, additional BACM contingency measures may be necessary to meet the National Ambient Air Quality Standard (NAAQS) in the Owens Valley Planning Area (OVPA). Any future dust control projects associated with these additional BACM contingency measures will require additional review under CEQA. The District suggests that the analysis in the DEIR be extended to cover all elements of those future control areas, including but not limited to all areas (and potential contingency areas) that are the subject of the Stipulated Judgment and to be included in the 2015 SIP. Paragraphs A – F of Article 3 of the 2014 Stipulated Judgment is quoted in entirety below.

3. <u>Additional BACM Contingency Measures</u>

A. To provide the emission reductions necessary to meet the NAAQS in the OVPA, the District's Air Pollution Control Officer ("APCO") may order the City on or any time after January 1, 2016 to implement additional BACM contingency measure controls on up to 4.8 square miles (which need not be contiguous) of the dried Owens Lake bed ("BACM Contingency Measures"). If the City implements the entire 4.8 square miles of BACM Contingency Measure controls, there will be a total of 53.4 square miles of dust controls on the Owens Lake bed. Any BACM Contingency Measure orders shall be based on evidence presented to the APCO that the area considered for such order has caused or contributed to an exceedance of the NAAQS or State Standard. Areas that are deferred for controls under the procedures in Paragraph 2.B because of the presence of significant cultural resources, then re-ordered for controls per those procedures, shall not be counted as part of the 4.8 square miles allowed for BACM Contingency Measures. Although the City may provide comment on a proposed BACM Contingency Measures order by the APCO, the City shall not appeal or contest the APCO's order for dust controls included in the combined 53.4 square miles now or in the future in any administrative or judicial forum, under any law, statute or legal theory whatsoever including Section 42316.

B. Except for the 4.8 square mile BACM Contingency Measure area and any area re-ordered for control under Paragraph 2.B of this Judgment, the District shall not issue any further orders for mitigation measures to the City under Section 42316 or any other law,

2-2

including but not limited to SCRDs, requiring the City to control windblown dust emissions (including PM 10, PM 2.5 or any speciated components or products of PM) from any areas on the dried Owens Lake bed beyond the combined 53.4 square miles. The provisions in this paragraph do not apply to fee orders issued to the City under Section 42316, or any orders for areas that are not on the dried Owens Lake bed.

C. The BACM Contingency Measures provided under this paragraph will be limited to the Owens Lake bed below elevation 3,600.00 feet above mean sea level ("amsl") and above the natural brine pool at elevation 3,553.55 feet amsl.

D. The BACM Contingency Measures areas will be controlled with waterless or water-neutral dust control measures by offsetting any new or increased water use with water savings elsewhere on the lakebed.

E. The BACM Contingency Measures shall be installed by the City and be operational within three years of the date that the APCO orders City to implement the BACM Contingency Measures, except that if the City selects the use of managed vegetation for its BACM for any of the areas ordered for BACM Contingency Measures, the City will be allowed an additional two years to achieve full vegetation-cover compliance for those areas. The implementation deadline set forth in this paragraph is subject to the Force Majeure and Stipulated Penalties provisions set forth in Paragraphs 14 and 15 below. The City shall be solely responsible for all CEQA compliance, and to the extent joint documents are prepared under CEQA and NEPA, for CEQA/NEPA compliance, and all lease and permit requirements associated with any Contingency Measures.

F. Within 60 days of the date that the APCO orders City to implement the BACM Contingency Measures, the City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a RAP that provides for the completion of those measures by the time deadlines provided in Paragraph 3.E above. The plan shall contain intermediate milestones specifying the completion dates for CEQA/NEPA compliance, construction bid award and control measure compliance.

2-3

3) Section 5 Project Alternatives. As required by Article 7, paragraph A, of the 2014 Stipulated Judgment, "Dynamic Water Management" actions will be incorporated into the District's 2015 SIP revision. Technical staff of both the District and LADWP have been working to determine specific areas with potential and develop a dynamic water management strategy for potential delayed fall and early spring shoulder season shallow flood ramping flow operations. In light of these actions, an additional alternative in Section 5 should be included which is specific to Dynamic Water Management. Article 7 of the 2014 Stipulated Judgment is quoted in entirety below.

7. Lake-wide efforts to reduce water use

A. The City and the District commit to work together to jointly develop and propose "Dynamic Water Management" actions for incorporation into the 2015 SIP revision referenced in Paragraph 11. These actions may include "early water ramp-down" in non-emissive years. TwB2 is not a Dynamic Water Management concept. The proposed actions shall set forth the conditions upon which the APCO can approve the City's application to undertake these dynamic water management actions.

We look forward to completion of the Phase 9/10 by December 31, 2017 and appreciate the chance to comment on this Draft Environmental Impact Report. Please call me at (760) 872-8211 if you have any questions.

Sincerely,

Original signed by

Duane Ono
Acting Air Pollution Control Officer

cc: Phill Kiddoo
Nik Barbieri
Grace Holder
Chris Lanane

Comment Letter #2
Mr. Duane Ono
GBUAPCD
157 Short Street
Bishop, California 93514-3537

2-1 LADWP understands that GBUAPCD is a responsible agency for the proposed Project and intends to use the City's CEQA document to act on the 2015 State Implementation Plan (SIP) revision. Note that NEPA documentation would be prepared by the BLM prior to issuance of a right-of-way to construct dust control on federal parcels under their management that are included in the Project area, which will be subject to a federal NEPA compliance document to support the BLM's consideration of that portion of the project. Elements of the Stipulated Judgment that depend on a federal approval are beyond the scope of LADWP's authority.

The analysis in the EIR, however, covers all physical aspects of the Project proposed to be constructed and operated by LADWP. Procedural requirements of the 2014 Stipulated Judgment are noted, however GBUAPCD has not identified what additional environmental effects beyond those described in the Draft EIR would be related to these requirements.

2-2 Future expansion of the OLDMP to include up to an additional 4.8 square miles of BACM is noted in the Draft EIR as a related project (Draft EIR Section 6.1.1.5). However, the necessity to install BACM on these locations is not currently known, the specific locations are not identified, and the timing for dust control on this additional acreage is not known. Thus, whether further BACM will be necessary and, if so, what those might entail are speculative at this time. Further, without specific locations, LADWP cannot select site-appropriate BACM, nor perform surveys for biological or cultural resources. Therefore, additional review under CEQA would be performed for any future phases of the OLDMP at the time they are defined if and when additional BACM contingency measures are triggered.

2-3 During the past 15 years, the City of Los Angeles has been mitigating dust emissions from Owens Lake through implementation of three types of BACM. These BACMs – Shallow Flooding, Managed Vegetation, and Gravel Cover – were primarily established in 1998. DCAs that are mitigated via Managed Vegetation and Gravel Cover are generally maintained throughout the year. DCAs that are mitigated via Shallow Flooding are generally operated during the dust season (October 16th through June 30th).

An analysis of Owens Lake ambient air quality, meteorological and sand flux data along with lake bed field observations during the past 15 years has revealed that the Shallow Flood BACM dust season may be shortened for certain areas of the lake bed that have historically shown little dust activity in the early and/or late portions of the October through June dust season. In addition, wetness cover requirements to achieve the required Minimum Dust Control Efficiency can vary depending on seasonal conditions that may affect salinity of the surface water and the formation of erosion-resistant brine crusts. Modifications to the dust season for certain areas are currently being considered by GBUAPCD and LADWP to address the commitment in the Stipulated Judgment to implement a Dynamic Water Management Plan in order to reduce water use on the lake bed. With the anticipated modifications to the Shallow Flood dust season, LADWP can continue to meet the National Ambient Air Quality Standards (NAAQS) at the regulatory shoreline, while also conserving precious water resources.

Dynamic Water Management could include modifications to the existing ramping schedules for flow operations and could apply to existing Shallow Flooding DCAs as well as new areas of Shallow Flooding proposed under the Phase 9/10 Project (T10-1-L1, T37-2-L1, T37-2-L2, T37-2-L3, and T37-2-L4). Implementation of Dynamic Water Management would be part of general OLDMP operations, not an alternative to the proposed Project or a separate project under CEQA. Note that seasonal water availability is one of the habitat parameters considered for the HSM, so management of the Phase 9/10 DCAs will take seasonal water availability into account. As described in Draft EIR Section 4.3.5.3, LADWP will conduct a Habitat Value Acre (HVA) review to confirm predicted habitat impacts.

Section 3.1.8 of the Draft EIR has been modified to include a reference to the on-going development of Dynamic Water Management as part of OLDMP operations (see Final EIR Section 2).

RioTinto

Comment #3

Thursday, March 26, 2015

Los Angeles Department of Water and Power
Environmental Planning and Assessment
111 North Hope Street, Room 1050
Los Angeles CA 90012
Attention: David Porter

Via Fax 213 367-4710

Re: DEIR Proposed Owens Lake Duct Mitigation Program Phase 9/10 Project

Dear Mr. Porter:

3-1 Thank you for the opportunity to review and provide comments on the Los Angeles Department of Water and Power's Draft Environmental Impact Report (DEIR) for Owens Lake Dust Mitigation Program – Phase 9/10 Project (Project). Rio Tinto Minerals supports the Project and use of Brine and its variations as discussed in the DEIR. The use of Brine and its variations for lake-wide dust mitigation purposes are effective, efficient and environmentally sustainable method for meeting ambient air quality standards.

Sincerely,

Paul Lamos

Paul Lamos

Superintendent
Owens Lake Operations

Comment Letter #3
Mr. Paul Lamos
Rio Tinto
P.O. Box 37
Lone Pine, California 93545

3-1 Rio Tinto's support of Brine Shallow Flood for dust control on Owens Lake is noted. LADWP will continue to work with Rio Tinto to develop a brine application method and with GBUAPCD to develop a BACM standard for salt crust deposit using Brine Shallow Flood.

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

JENNIFER LUCCHESI, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
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Comment #4

March 30, 2015

File Ref: SCH #2014071057
PRC 8079.9

Los Angeles Department of Water and Power
Attention: Milad Taghavi
111 North Hope Street, Room 1044
Los Angeles, CA 90012

Subject: Comments on the Draft Environmental Impact Report (EIR) for the Owens Lake Dust Mitigation Program - Phase 9/10 Project, Inyo County

Dear Mr. Taghavi:

The California State Lands Commission (CSLC) staff has reviewed the subject Draft EIR for the Owens Lake Dust Mitigation Program - Phase 9/10 Project (Project), which is being prepared by the Los Angeles Department of Water and Power (LADWP). The LADWP, as a public agency proposing to carry out a project, is the lead agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). The CSLC is a trustee agency because of its trust responsibility for projects that could directly or indirectly affect sovereign lands and their accompanying Public Trust resources or uses. Additionally, because the Project involves work on sovereign lands, the CSLC will act as a responsible agency.

CSLC JURISDICTION AND PUBLIC TRUST LANDS

The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The CSLC also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6301, 6306). All tidelands
4-1 and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust.

As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat

4-1 preservation, and open space. On navigable non-tidal waterways, including lakes, the State holds fee ownership of the bed of the waterway landward to the ordinary low water mark and a Public Trust easement landward to the ordinary high water mark except where the boundary has been fixed by agreement or a court. Such boundaries may not be readily apparent from present day site inspections.

4-2 The proposed Project involves the historic bed of Owens Lake, which is ungranted sovereign land under the jurisdiction of the CSLC. On May 1, 1999, the CSLC authorized Lease No. PRC 8079.9 to LADWP for construction and operation of dust control measures on the bed of Owens Lake. The lease has since been amended 15 times to allow for dust control measures on more areas of the lake bed. Because the Project is located on sovereign land, CSLC authorization in the form of a lease amendment will be required. On January 27, 2015, LADWP submitted an application to amend Lease No. PRC 8079.9 for the proposed Phase 9/10 Dust Control Project. On February 26, 2015, CSLC staff notified LADWP that the lease amendment application was incomplete; however, CSLC staff continues to review the available information while waiting for the additional requested information.

4-3 Please note that on August 15, 2014, the CSLC staff submitted comments on the Notice of Preparation (NOP) for the "Owens Dry Lake 2011 Supplemental Control Requirements Determination (SCRD) and 2012 SCRD Dust Control Measures Projects" (enclosed). However, while the subject Draft EIR appears to be for the same proposed activities based on the project description, the title for this document is the "Owens Lake Dust Mitigation Program - Phase 9/10 Project EIR." Considerable confusion may result due to the modification of the Project title in regards to public review. CSLC staff suggests that, in the future, LADWP endeavor to be more consistent with project titles.

4-4

PROJECT DESCRIPTION

The Project includes implementation of new dust control measures on 2,312 acres (3.61 square miles) in 17 Dust Control Areas (DCAs) and 1,166 acres (1.82 square miles) of transitioned dust control in one existing DCA. Implementation of the proposed Project would use a mix of the three approved Best Available Control Measures (BACM): shallow flooding, managed vegetation, and gravel cover. Activities would require land leveling; berm creation; gravel application; seeding and planting; installation of surface and/or subsurface irrigation pipelines; excavation for pond creation and installation of associated electrical, mechanical and communication systems.

From the Project Description, CSLC staff understands the Project would include the following design components:

- <u>New DCAs</u>. Implementation of 2,312 acres of dust control in 17 new DCAs, including:
    - Shallow Flooding in T37-2-L1, T37-2-L2, T37-2-L3, T37-2-L4, and T10-1-L1;
    - Managed Vegetation in C2-L1 and Duck Pond-L1;
    - Gravel Cover in T37-1-L1, T35-2-L1, T32-1-L1, T21-L1, T21-L2, and T17-2-L1 (within Phase 9); and T21-L3, T21-L4, T10-3-L1, and Duck Pond-L2 (Phase 10).

- Transition Area. Conversion of 1,166 acres of existing shallow flood dust control in DCA T18S to:
  - Two deep water ponds (125 and 126 acres);
  - Two shallow ponds (315 and 85 acres);
  - Gravel Cover (516 acres); and
  - A visitor overlook area as a recreation amenity.

4-4 The Project also includes: construction of drainage management unit pump stations, lateral control valve facilities, and pipe outfalls; new berm and access roads; new rip-rap to improve existing berms; and new submains to convey water from T2-1 DCA to Duck Pond-L1 and C2-L1 DCAs.

The Draft EIR identifies the Avoidance Alternative as the environmentally superior alternative. Under the environmentally superior alternative, BACM would not be installed on approximately 278 acres (plus any acreage of significant archaeological sites on federal or private land, or significant sites identified during construction) of the 3.61 square miles of DCAs identified for dust control.

ENVIRONMENTAL REVIEW

CSLC staff requests that LADWP consider the following comments on the Project's Draft EIR.

Previous Comments not Addressed in the Draft EIR

Although page 2-12 of the Draft EIR states that "Information included in this EIR responds to the comments raised at the public meeting and in the comment letters on the NOP," several comments provided by CSLC staff on the NOP have not been addressed in the Draft EIR.

4-5

1. Construction Detail: CSLC staff requested that detail be provided for the construction of particular improvements, mentioned in the NOP, so that they could be adequately analyzed in the EIR. Examples provided were the use of a gravel conveyor and components of the proposed drainage system.

   CSLC staff requests discussion of how a conveyor would be used during gravel distribution and whether any impacts would result, to avoid the need for subsequent CEQA review.

2. Drainage: CSLC staff's previous NOP comment letter requested that LADWP evaluate potential impacts to the existing drainage patterns, both surface and subsurface, and analyze the potential impacts to mining activities by U.S. Borax under CSLC Lease No. PRC 5464.1 (Borax Lease) on the Lakebed from any changes in drainage patterns. This evaluation, however, does not appear to be included in the Draft EIR. 4-6

   CSLC staff requests, therefore, that LADWP revise the EIR to include a discussion of this issue prior to taking action on the EIR or the Project.

3. Greenhouse Gas Emissions (GHGs): CSLC staff's previous NOP comment letter stated that "The analysis in the EIR should also evaluate the possibility of cumulative impacts of GHG emissions (e.g., with other phases of the Owens Lake Dust Mitigation Program, proposed projects in the developing Owens Lake Master Project, and Lakebed mining activities)." In addition, the Draft EIR (p. 4.2-3) states that "As individual sources, Project GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, the impact of proposed GHG emissions to climate change is discussed in the context of cumulative impacts." However, the cumulative impacts analysis mentions neither cumulatively considerable GHGs nor the potential significance of construction and maintenance emissions from multiple, gravel-heavy projects on the Lake bed built within several years of one another.

   4-7 The EIR for Phase 7A evaluated the potential significance of the Project's GHG emissions by combining the estimated annual construction emissions (amortized over 30 years) with those associated with maintenance, which assumed annual replacement of 2 percent of the total Project gravel. That analysis then compared the total (1,196 metric tons CO_2 equivalent) with interim or recommended thresholds for industrial projects from both the South Coast Air Quality Management District (SCAQMD) (10,000 metric tons/year) and the California Air Resources Board (CARB) (7,000 metric tons/year). The projected amortized emissions from the Phase 7a Project were below both thresholds. The 2010 Mitigated Negative Declaration (MND) prepared for Phase 8 also assumed construction-related GHGs to be amortized over 30 years. Because the gravel portions of the Phase 9/10 Project are proposed to be complete by 2016, separate, amortized GHG evaluations for multiple dust control projects occurring within the same amortization period give an incomplete representation of the cumulative contributions of relying on gravel for new and transitioned dust control.

   CSLC staff requests, therefore, that the cumulative impacts analysis evaluate all dust control-related GHGs over the course of the amortization period.

4. Salt Extraction: The NOP (p. 2-28) discussed the "implementation of a brine method DCM (dust control measure)" that would use salts extracted from the area subject to the Borax Lease. A previous comment from CSLC staff requested that the method be analyzed and that the EIR discuss how the method would be accomplished and whether additional infrastructure would be needed. In addition, page 3-10 of the Draft EIR includes a paragraph describing "Brine Shallow Flood" and indicates that LADWP will continue to work with Great Basin Unified Air Pollution Control District to develop
   4-8 a BACM standard for salt crust deposit using Brine Shallow Flood.

   CSLC staff requests that clarification as to whether the brine method mentioned in the NOP is equivalent to the Brine Shallow Flood BACM indicated above. In regard to the overlap between a portion of the Project area (cell T10-3-L1) and the existing CSLC lease with U.S. Borax, page 2-14 of the Draft EIR states that "CSLC would transfer portions of the U.S. Borax mineral lease area to DCA." CSLC staff understands that U.S. Borax may be open to a quitclaim of the portion of its lease needed for cell T10-3-L1; this option would not require LADWP to resubmit its lease amendment

4-8 application, but rather, the quitclaim component of the proposed Project could be incorporated into the CSLC's consideration of Project approval overall.

5. Transportation and Traffic: An impact to transportation and traffic was found to be significant in the NOP, and Mitigation Measure Trans-1 was proposed that would develop and implement a Traffic Work Safety Plan. CSLC's NOP comment letter requested that the EIR address how the gravel hauling tracks (when approximately one truck would cross SR 136 every 3 minutes) would affect posted speed limits in the area, which could be of concern to the local population over the Project construction period. Despite the identified impact and the potential for additional impacts, transportation and traffic resources were not carried forward into the Draft EIR for a more detailed analysis, nor did the Draft EIR address CSLC staff's comment.

4-9

Because impacts to transportation and traffic were not carried forward for a more detailed analysis of the identified and potential impacts, CSLC staff requests that this analysis be included in the final document.

6. Reliance on Habitat Suitability Model (HSM): As stated in its NOP comment letter and as discussed at the meeting between CSLC and LADWP staffs on January 15, 2015, CSLC staff remains concerned that dust control projects on the lakebed are being proposed in a piecemeal fashion rather than in the context of the Master Project. The Master Project is the product of years of collaboration with many agencies and interested stakeholders, and is designed to address preservation/maintenance of important values in a comprehensive way. This is why the CSLC has required integration of new areas such as Phases 9 and 10 into the Master Project planning process (see Fifteenth Amendment to Lease No. PRC 8079.9, for "Tillage with BACM Backup" (TWB2, section 2, paragraph c).

4-10

With LADWP's continued efforts to reduce water use, the preservation of habitat values on the lakebed have become a focal issue, and has resulted in the development of the HSM. While CSLC staff believes the HSM can be a valuable tool for measuring whether habitat values can be maintained when used in combination with bird count data and adaptive management, the HSM was developed as a lake-wide strategy and its value or appropriateness for use on a project-by-project basis has not been evaluated or agreed to.

Comments on the Draft EIR

Lake Wide Map

7. To improve clarity for the reader, CSLC staff requests that Figures 1-1 and 2-2 be revised or supplemented with additional maps that show the total area currently using the different dust control methods without distinguishing the construction phase. Distinguishing by construction phase tends to obscure the bigger picture of what portions of the lake are committed to the various dust control methods. For example show all the existing or approved gravel areas in one color or shading, all the managed vegetation in another, etc. For shallow flooding, please distinguish between

4-11

shallow ponds and the 11 cells that were approved by the CSLC in the Fifteenth
Amendment to Lease No. PRC 8079.9 to be transitioned to "Tillage with BACM
4-11 Backup" (TWB2). Although CSLC staff recognizes that TWB2 is considered "Shallow
Flooding" from a regulatory standpoint, from an environmental perspective,
particularly for aesthetics and habitat, TWB2 is very different from shallow flooding
that makes ponds.

Aesthetics

8. <u>Gravel Cover</u>: Page 1-21 of the Draft EIR states that "The application of Gravel Cover
would alter views of the site; however, the use of gravel from local sources will be
consistent in coloration with the Lakebed." The Draft EIR also states that
improvements such as meandering edges and transitions to soften the historically
straight lines of the berm roads and ponding areas, etc. would be used to reduce
aesthetic impacts. Generally, CSLC staff remains concerned that Gravel Cover does
4-12 not protect or promote the Public Trust uses and values of the lake, has little or no
value in restoring or protecting wildlife habitat, would eliminate wildlife habitat, and
does not facilitate public access and use for public trust purposes. Although LADWP
has taken steps to increase the aesthetic appeal of gravel, LADWP correctly
acknowledges in Section 1.11.1 on page 1-26 of the Draft EIR that the CSLC must
review the use of gravel cover on a case-by-case basis for consistency with Public
Trust principles, values and needs specific to that location. See additional comment
on gravel cover under "Land Use and Planning," below.

Air Quality

9. <u>Best Management Practices (BMPs)</u>: Mitigation Measure Air-1 (p. 4.2-18) lacks
specific criteria to ensure the proposed Dust Control Plan, when developed, will be
stringent enough to avoid PM-10 emissions that exceed air quality thresholds.
LADWP should identify the criteria the Plan will meet (e.g., what qualifies as a "high
wind event?" In what instance would tillage be used?) to ensure implementation of the
Plan would be adequate mitigation for construction impacts. In addition to ensuring
the Plan provides sufficient mitigation, the Draft EIR should clarify how LADWP will
4-13 ensure that the Plan's BMPs, such as tillage, do not have unintended significant
environmental consequences themselves. More specifically, information on the
effects of the BMPs on wildlife movement, cultural resources, and scenic vistas
should be discussed. Without restrictions in place, measures such as the construction
of tillage or the placement of sand fencing may disturb identified or undiscovered
cultural resources or impact wildlife by impeding movement. Details on location
restrictions, use of specific BMPs with design components, and standard practices
used to minimize environmental disturbance could assist in this analysis.

Biological Resources

10. <u>Wetland Habitat Impacts</u>: The Draft EIR discusses the anticipated impacts to 1.2
4-14 acres of wetlands and 3.3 acres of created wetlands within the Project area. The
Draft EIR determines that these impacts would be less than significant because the
"enhancement of habitat values in the 152 acres of Managed Vegetation proposed

4-14 under the Project would be anticipated to more than offset the loss of 1.2 acre of wetland and 3.3 acres of created wetland in the Gravel Cover DCAs." This less-than-significant conclusion appears unsupported by a clear and logical chain of evidence, especially since the Draft EIR also states that "Since the success rate of vegetation establishment is unknown, and since the hydrologic regime will be determined based on dust compliance, the exact acreage of wetlands created under the Project cannot be predicted (p. 4.3-47)."

Without incorporating a specific analysis, impacts to existing wetlands are potentially significant. Additionally, the Draft EIR should identify and discuss when the compensation areas would be fully functional, and whether those temporal effects are, or contribute to, a significant effect.

4-15

11. Habitat Value Projections: Given the importance of the habitat maintenance objective for a number of responsible agencies and other Owens Lake stakeholders, and given the potential for the Project to provide a case study for using the HSM in the Master Project, CSLC staff requests that LADWP provide more detailed information explaining the basis for the habitat impact conclusions. While the existing and projected habitat value acres for the proposed new and transition DCAs were provided in Table 4.3-8 (p. 4.3-38 in the Draft EIR), the proposed/target Habitat Suitability Index values for each habitat component (e.g., salinity, water depth, vegetation, etc.), from which these totals were calculated, do not appear in the Draft EIR. Without these calculations, the Draft EIR provides insufficient evidence to conclude that the Project would actually attain its stated objectives, including "maintaining existing habitat values" (p. 1-3). CSLC staff requests that LADWP add an appendix that includes the HSM calculations that were performed for each of the guilds so that staff can review the Habitat Suitability Index values that were used to derive the projected overall value acres for each DCA.

4-16

12. Adaptive Management/Long-term Success: The Draft EIR states on page 4.3-41 that success of the habitat maintenance requirement will be based on a review of the calculated Habitat Value Acres for each guild and that "measurements within 10 percent of baseline will be considered maintenance of habitat value." CSLC staff respectfully reminds LADWP staff that the CSLC requires that successful habitat maintenance be measured by both Habitat Value Acre measurements and actual bird use. CSLC staff has consistently communicated this position to LADWP in Master Project meeting discussions, and this requirement was further described in the Fifteenth Amendment to Lease No. PRC 8079.9, section 2, paragraph f, which requires the preparation of an Adaptive Management Plan that contains monitoring and remediation protocols and also states, "the Adaptive Management Plan shall further describe replacement habitat to be provided by [LADWP] should the TWB2 DCAs not meet the identified performance standard... as measured by both the [HSM] and actual habitat use by the target guilds..." (emphasis in original). In addition, LADWP indicates on page 4.3-41:

Project design, along with biological monitoring and adaptive management, would result in a long-term benefit to wildlife over existing conditions. Under the Phase 9/10 Project, LADWP is committing to the Master Project concepts of *designing, maintaining and adaptively managing new DCAs and the T18S Transition Area for habitat value, public use, and other resources, and not solely for dust mitigation.*

4-16 While CSLC staff appreciates the collaborative spirit in which the Master Project is being pursued, the Master Project has not been fully developed as of this date, and has not yet undergone public review or approval by LADWP and other agencies. As a result, it is not appropriate to rely on the Master Plan concepts, by themselves, to meet the requirement under CEQA that mitigation be specific, feasible, and enforceable (see State CEQA Guidelines, § 15126.4). Instead, the Draft EIR should be revised to include one or more mitigation measures that describe an adaptive management framework or plan that will ensure impacts to biological resources on the Lake are less than significant. CSLC staff cautions against widespread reliance on the HSM outside the context of the Master Project effort without further discussion and consultation with CSLC and California Department of Fish and Wildlife staffs and development of a robust adaptive management and compliance plan.

13. Dust Control Area T18S: CSLC staff has several concerns about LADWP's proposal to transition T18S to a combination of gravel cover and ponded areas. First, while CSLC staff understands LADWP's objective to carry out the Project in a "water neutral" fashion, meaning that the water used to shallow flood certain new DCAs would be offset by transitioning other existing DCAs to a less water-intensive method, the transition of T18S is not, per se, required by the Great Basin Unified Air Pollution Control District. Rather, LADWP selected T18S because it "is of the necessary size and was redesigned to include Gravel Cover and pond areas of various depths with habitat islands providing more varied habitat conditions while saving water." (Draft EIR, p. 5-1). However, page 4.3-29 of the Draft EIR also describes T18S as supporting the highest species richness and one of the most used of all DCAs.

4-17 During the development of the Owens Lake Master Plan, now the Master Project, on which CSLC staff participates, LADWP indicated that low habitat value/low bird use shallow flood DCAs would be targeted for transition to achieve water savings. The selection of T18S for this Project does not appear to be consistent with these prior statements, does not consider or provide a discussion of alternatives to the transition of T18S, and does not explain why transitioning alternative cells is not feasible. CSLC staff believes one of the main benefits of the Habitat Value Acreage approach to mitigation on Owens Lake is that it provides LADWP considerable flexibility in how it might increase or maintain habitat value acreage across Owens Lake, and that other DCAs with lower bird use and diversity should be considered to achieve the targeted 1,569 acre-feet per year water savings identified by LADWP as necessary under the Project Objectives.

If the transition of DCAs other than T18S to achieve desired water savings is truly infeasible, which the Draft EIR does not explain is the case, CSLC staff encourages LADWP to consider alternative water saving methods, like TWB2, rather than large expanses of gravel cover. As stated elsewhere in this letter, the CSLC has repeated its concern about the use of Gravel Cover in several of its decisions, and has indicated it may not approve requests for Gravel Cover in the future because, among other reasons, gravel is a highly permanent dust control measure and limits future flexibility should circumstances, including the need to maintain bird habitat/use, become necessary. In September 2014, the CSLC approved the transition of T16 to TWB2, in part, because the method would achieve both dust control and water savings without permanently covering the playa with gravel. Despite this recent approval of a less concerning but effective method of dust control, the Draft EIR for the Project does not consider nor discuss an alternative that would implement this or a similar method in place of gravel on T18S, instead only considering the proposed transition, or no transition.

4-17 Lastly, CSLC staff is concerned that the proposed T18S transition to gravel and ponds is not consistent with the current planning efforts on the Master Project and the expectations of the stakeholders, and as a result, may undermine the Master Project's progress by foreclosing other options for comprehensive Lake wide management. In particular, T18S is depicted on the "Conceptual Land Cover Plan" contained in LADWP's April 2013 Owens Lake Master Project overview documents as "curving tillage" with ponds, not gravel cover with ponds. As indicated above, one of the reasons CSLC staff supported the transition of T16 was that TWB2 was consistent with the Conceptual Land Cover Plan for the Master Project. CSLC staff requests LADWP explore the option of transitioning T18S gravel areas to TWB2 to be consistent with the Master Project concepts.

14. Drainage System. In regard to the drainage system, page 3-35 of the Draft EIR states the following: "Drainage systems would be installed beneath Managed Vegetation fields and/or on the margins of Shallow Flood areas. New drainage laterals to be installed would be perforated plastic pipes (heavy duty corrugated polyethylene) in
4-18 covered trenches placed 5 to 9 feet below the ground surface." CSLC staff requests that more detail be provided regarding how the trenches would be covered, and what measures would be implemented during construction to avoid entrapment of species in the trenches.

Cultural Resources

15. Jurisdiction: CSLC staff acknowledges the Section 106 responsibilities of federal agencies, and at this time we are not aware of any conflict between federal and state law regarding cultural resources. Nevertheless, because of the position taken by the Bureau of Land Management that the entire Phase 9/10 Project is considered a federal undertaking (referenced on p. 4.4-3) and the Project footprint includes State lands under the jurisdiction of the CSLC, we wish to clarify that the CSLC retains jurisdiction over cultural resources on State property and that State law applies on
4-19 these lands. CSLC staff previously requested to receive information about the Section 106 process so that we might coordinate more efficiently with the State Historic Preservation Officer (SHPO) if consultation by the CSLC is required.

Eligibility Determinations to the California Register of Historical Resources/National Register of Historic Places (CRHR/NRHP): CSLC staff requests that cultural resources be fully evaluated for eligibility under all the criteria of the CRHR/NRHP and for all property types. CSLC staff is unaware of any requirement "to certify the

4-19 recommendation" as discussed at the bottom of p. 4.4-36. CSLC staff notes that the SHPO specifically recommended that Owens Lake archaeological sites "be evaluated in the context as possible contributors to an archaeological district, Traditional Cultural Property, and potential cultural landscape," in consultation with tribes. Information in the Draft EIR indicates that tribal representatives have made clear they believe Owens Lake is a Traditional Cultural Property (see discussion at the top of p. 4.4-46 and long paragraph on p. 4.4-48).

4-20

<u>Mitigation Measures</u>:

- **CR-3**: Please remove the provision for the CSLC to approve project archaeologists. The requirement for the archaeologist(s) to meet the Secretary of the Interior's Professional Qualification Standards for Archaeology is sufficient.
- **CR -5**: Please remove the provision for the CSLC to approve project paleontologists. A qualified paleontologist as defined is sufficient.
- Please add to the appropriate mitigation measures a statement that the CSLC must approve the disposition of cultural resource artifacts and paleontological specimens collected from lands under the jurisdiction of the CSLC.

4-21

- **CR-2**, Cultural Resources on Private Parcels (p. 4.4-49): Under this mitigation measure, the Draft EIR states:

  > *As of January 2015, all of the private parcels included in the Phase 9/10 Project have been surveyed for cultural resources. Due to the time delay resulting from securing permissions to survey the sites, evaluations of the significance of observed cultural resources are pending. Prior to construction on private lands, a qualified archaeologist shall conduct evaluative testing (Phase II investigation), if recommended by the Project archaeologist.*

  The determination whether the resources are historical resources is mandatory under CEQA and "must be made sometime before the final EIR is certified" (*Madera*, *supra*, 199 Cal.App.4th at page 53) to avoid the improper deferral of evaluation of these sites. Although it is understood that this may have delayed the release of the document, these sites should have been evaluated and the results presented in this Draft EIR.

Land Use and Planning

4-22

16. <u>Public Trust</u>: Owens Lake is State sovereign land held in trust for the people of the State under the Public Trust Doctrine. This common law doctrine ensures the public's right to use California's waterways for navigation, fishing, boating, and other water-oriented activities. Preservation of lands in their natural state to protect scenic and wildlife habitat values is also an appropriate Public Trust use. (*Marks v. Whitney* (1971) 6 Cal.3d 251.) Uses that do not protect or promote Public Trust values, are not water dependent or oriented, and exclude rather than facilitate public access and use are not consistent with the Public Trust Doctrine. The CSLC has the responsibility to manage Owens Lake on behalf of the public to protect these rights and values.

CSLC staff has expressed its concerns about the use of gravel on the Owens lake bed for over 20 years. It continues to be the CSLC's position that placement of Gravel Cover on the lake bed does not protect or promote the Public Trust uses and values of Owens Lake (Tenth Amendment of Lease No. PRC 8079.9, section 2(k), 2011); moreover, it precludes future enhancement of public trust values on sovereign lands more permanently than other BACM. As LADWP acknowledged in prior lease agreements with CSLC, there is no assurance that future use of Gravel Cover will be allowed (see e.g., Tenth Amendment of Lease No. PRC 8079.9, section 2(k)) and Fourteenth Amendment of Lease No. PRC 8079.9, section 2(h)(i).

In addition to the aesthetic impacts discussed above, CSLC staff has repeatedly commented that gravel has "...little or no value in restoring or protecting wildlife habitat..." and "...would eliminate wildlife habitat." (CSLC Letter to Great Basin Unified Air Pollution Control District, dated September 20, 1994; Calendar Item 50, 12/10/10 CSLC meeting, respectively). Gravel Cover also does not facilitate public

4-22 access and use for public trust purposes.

The CSLC allowed the placement of 2.03 square miles of Gravel Cover in Phase 8 conditioned on mitigation to offset the loss of public trust enhancement opportunities in the Phase 8 area by depositing funds in the Kapiloff Land Bank Fund to be used "for the acquisition, management, maintenance and improvement of real property located adjacent or within the bed of Owens Lake for the Public Trust purposes of ecological preservation, open space, wildlife habitat and public access" (Calendar Item 50, 12/10/10 CSLC Meeting). The use of Gravel Cover in Phase 7a (1.47 square miles of Gravel Cover) was also subject to a similar evaluation by CSLC, taking into account all relevant factors, including other components of the Project that may enhance Public Trust uses and values.

While CSLC staff readily acknowledge that reduction in air pollutant emissions from implementation of dust controls will result in an improvement to public health and safety, staff cautions LADWP against asserting that the use of Gravel Cover as a dust control measure should be considered consistent with the Public Trust Doctrine (Draft EIR Section 4.5-8), as only the CSLC can make this determination.

Alternatives Analysis

17. Avoidance Alternative: Under the Avoidance Alternative, "Evaluation of Additional Dust Control Methods," the Draft EIR (p. 5-25) states that LADWP is conducting a soil binder study to determine the efficacy of the method and to investigate unknown effects such as impacts to surface cultural materials and biological resources. CSLC staff asks that in addition to the study components described in the Draft EIR, LADWP

4-23 also evaluate the feasibility of a partial-coverage soil binder alternative, in which soil binders are sprayed on the avoidance areas only from existing roads, which would likely control more than the Avoidance Alternative, without the secondary impacts from construction of new access roads. Moreover, assuming the borders of the avoidance area were designed with a buffer between construction activities and cultural resource sites, there would be a reduced likelihood of the binder chemicals contacting and impacting the resources directly. CSLC staff continues to be open to

4-23 further discussion and investigation into the use of soil binders on the lakebed as an alternative to gravel; even a more limited soil binder alternative may provide valuable data on the effectiveness and impacts of soil binders, which in turn may inform future proposals for use of soil binders. If such an alternative were found feasible, it could provide the impact avoidance advantages of the Avoidance Alternative while better attaining the Project objective to meet regulatory dust requirements.

4-24 18. Transition of T18S: As stated in Comment 13 above, CSLC staff is concerned that LADWP did not include as an alternative the transition of DCAs other than T18S, or the transition of T18S to TWB2, to achieve the Project's targeted water savings. CSLC staff believes that this alternative would feasibly accomplish the project objectives while reducing an identified significant impact (biological resources/ habitat), and as such, should have been analyzed. Without such an analysis, CSLC staff disagrees that such an alternative is infeasible, and further, if the alternative was shown to be both feasible and environmentally superior to the proposed Project, CEQA requires that alternative to be adopted by the lead agency, LADWP.

4-25 Thank you for the opportunity to comment on the Draft EIR for the Project. As a responsible and trustee agency, we request that you address our comments in the Final EIR.

Please send copies of future Project-related documents, including electronic copies of the Final EIR, Mitigation Monitoring and Reporting Program (MMRP), Notice of Determination (NOD), CEQA Findings and, if applicable, Statement of Overriding Considerations, when they become available, and refer questions concerning environmental review to Cynthia Herzog, Senior Environmental Scientist, at (916) 574-1310 or via e-mail at Cynthia.Herzog@slc.ca.gov. For questions concerning CSLC leasing jurisdiction, please contact Drew Simpkin, Public Land Management Specialist, at (916) 574-2257, or via email at Drew.Simpkin@slc.ca.gov.

Sincerely,

Cy R. Oggins, Chief
Division of Environmental Planning
and Management

Enclosure

cc: Office of Planning and Research
D. Simpkin, CSLC
C. Herzog, CSLC
J. DeLeon, CSLC
P. Griggs, CSLC

Comment Letter #4
California State Lands Commission
Mr. Cy R. Oggins, Chief
Division of Environmental Planning
100 Howe Street, Suite 100-South
Sacramento, California 95825-8202

4-1 CSLC jurisdiction is noted; a description of CLSC jurisdiction is provided in Draft EIR Section 2.2.3.

4-2 LADWP is compiling the requested information necessary to complete the lease application for the Phase 9/10 Project and will be submitting this information to CSLC.

4-3 As noted by the commenter, the NOP of an EIR identified the project as the Owens Lake 2011 SCRD and 2012 SCRD Dust Control Measures Projects, in reference to the GBUAPCD nomenclature of “Supplemental Control Requirements Determination”. In an effort to be consistent with previous dust control projects on Owens Lake, the project has been more simply named as the Phase 9/10 Project.

4-4 A detailed project description for the Phase 9/10 Project is included as Section 3 of the Draft EIR.

4-5 CSLC comments on the NOP for the Project (Draft EIR Appendix B) were reviewed during preparation of the Draft EIR, and have been addressed to the extent necessary to address the physical environmental effects of the Project under CEQA.

As described in Draft EIR Section 3.1.3.2, depending on site conditions, conveyors may be used internally within individual DCAs or to move gravel from the stockpiles. The construction contractor may or may not elect to use electric-powered conveyors during construction in Gravel Cover areas. Note that conveyors were not employed during construction of the Phase 7a Project. The description of the construction vehicles provided in the Draft EIR (Appendix C) is based on a worst-case assumption that no conveyors would be used. Use of conveyors would have the benefit of reducing air pollutant emissions from vehicle exhaust. The impact assessment considered complete disturbance of project DCAs and since conveyors would be located internally within the DCAs, they would not result in adverse environmental effects.

4-6 The Initial Study prepared for the proposed Project described impacts related to drainage (Draft EIR Appendix A Section 2.3.9). Construction of new DCAs would result in localized changes to drainage patterns in the vicinity of the Phase 9/10 Project DCAs. Construction of the raised berms / access roadways around the DCAs would alter the existing stormwater drainage pattern in the immediate area of each affected DCA. Berm heights would vary from 3 to 5 ft or less above existing ground surface. Stormwater intercepted by the roadways would be routed toward existing channels through culverts to minimize changes to downstream flow patterns. In response to the comment, please see **Figure 2-3** included in Final EIR Section 2 for the locations of new culverts proposed as part to the Phase 9/10 Project. Note that there are three culverts proposed for T10-3-L1, a Gravel Cover DCA located adjacent to the active Rio Tinto mining operations. Drainage is designed to maintain current drainage patterns and not interrupt them. Similar to existing DCA design, stormwater would continue to flow toward the brine pool. Experience with this design has shown that modifications in the drainage pattern resulting from the Project would not result in substantial erosion, siltation, or flooding. Similarly, the Project is not expected to add a substantial source of polluted runoff. Because the drainage pattern from the Project sites flows in the same direction as existing conditions and eventually to the brine pool, the impact on drainage pattern and stormwater drainage would be similar to baseline and less than significant. Since impacts on drainage were found to be less than significant in the Initial Study, additional analysis was not presented in the Draft EIR.

LADWP has coordinated its activities frequently with U.S. Borax (parent company Rio Tinto Mining). Current collaborations are related to investigation of a Brine Shallow Flooding method to develop a salt crust. Past coordination resulted in re-routing of Lake Minerals Road (near T1A-4) during the Phase 7a Project. Rio Tinto has written in support of the Project as proposed in the Draft EIR (see comment letter 3).

4-7 Climate Change under CEQA differs from most other types of impacts in that, by definition, significant impacts arise not from the greenhouse gas (GHG) emissions from individual projects, but rather from emissions generated globally on a cumulative basis. The relevant air district for the Project area, GBUAPCD, has not established thresholds of significance for GHGs for individual construction projects. Therefore, thresholds developed by other agencies are referenced. Absent such thresholds, the CEQA lead agency must make such significance determinations on a case-by case basis. Numeric bright line thresholds are specific numeric thresholds above the baseline operations that, if exceeded for a particular project, would produce a significant cumulative impact. Multiple agencies have applied bright line thresholds. For example, the South Coast Air Quality Management District (SCAQMD), the Bay Area Air Quality Management District (BAAQMD), and the San Luis Obispo Air Pollution Control District (SLOAPCD) have established a 10,000 MTCO2E per year CEQA significance threshold for stationary sources. This bright-line threshold is based on a goal of a 90 percent emission capture rate that is low enough to capture a substantial fraction of future stationary source projects while setting the threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions. These emission thresholds consider the emission levels for which an individual project’s emissions would be cumulatively considerable. If an individual project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in potentially significant adverse air quality impacts. Because GHG gas analysis is by its nature a cumulative impact assessment, the method does not call for addition of predicted emissions from other projects for comparison to the thresholds. Therefore, additional analysis to assess cumulative impacts is not necessary.

As noted by the commenter, GHG emissions from construction have been estimated and disclosed for the Phase 8 Project (LADWP, 2012), the Phase 7a Project (LADWP, 2013), and the proposed Phase 9/10 Project. Construction of Phase 8 Project is complete and construction of Phase 7a will be complete prior to the start of the Phase 9/10 Project. Those are separate projects, each of which was found to have less than cumulatively considerable GHG emissions from project construction. As cumulative projects, the Phase 7a and 8 projects are already contemplated under the bright-line thresholds adopted by various agencies and applied here.

Please also note that, although unquantified, GHG sequestration is anticipated to occur in the areas of Managed Vegetation proposed under the Project.

4-8 The Brine Shallow Flood approved as BACM by the GBUAPCD Governing Board in Board Order 130916-01 (September 16, 2013) must meet the requirements for saturated soils as described for Shallow Flood (Draft EIR Section 3.1.1). Therefore, Brine Shallow Flood included in the proposed Project would meet the saturated soils requirement. Development of a Brine Shallow Flood method that relies on the creation of salt crust to suppress dust emissions is an on-going effort between GBUAPCD and LADWP, in collaboration with Rio Tinto. In the future, if this method is approved by GBUAPCD as BACM, LADWP may propose to implement Brine Shallow Flood with salt crust development.

In response to your comment, additional information regarding the U.S. Borax mineral lease and the potential for a quitclaim for a portion of that lease has been added to Section 2 of the Final EIR.

4-9 As described in the Initial Study (Draft EIR Appendix A), in the Owens Lake area, U.S. 395, SR 136, and SR 190 all operate at a level of service of LOS A, which is well within capacity for these roadway segments (Caltrans, 2013). Per the Highway Capacity Manual, the capacity of a two lane-highway is 3,200 pc/h for both directions of travel combined. In 2013, average annual daily traffic (AADT - total traffic volume for the year divided by 365 days) for SR 136 ranged between 540 vehicles at the junction of U.S. 395 and approximately 430 vehicles at the junction with SR 190, well within the 1,600 pc/hr capacity for each direction of travel. The AADT on SR 190 at SR 136 was 240 to 540 in 2013 (Caltrans, 2013). The temporary addition of an estimated 100 roundtrip gravel haul trips per day would not substantially degrade the level of service on these roadways and project-related impacts on traffic would be less than significant. Note that the Inyo County General Plan Circulation Element Policy RH-1.4 is: Maintain a minimum level of service (LOS) "C" on all roadways and highways in the County (Inyo County, 2001). Since the proposed Project would not degrade the LOS on any roadway below C, additional analysis is not warranted. Additionally, since gravel is currently being hauled for the Phase 7a Project, gravel hauling for the Phase 9/10 Project would result in similar traffic conditions as existing conditions.

4-10 The Phase 9/10 Project was designed to follow the Master Project concepts for meeting ambient air quality standards while maintaining habitat values on Owens Lake and conserving water. In order to mitigate dust emissions and logistically implement the Master Project, each step would balance habitat values. Every portion of the dust mitigation project that LADWP has implemented has been required to maintain or enhance habitat values, and those goals have been achieved in the course of implementing past projects. While CEQA does not compel LADWP to improve the physical environment above baseline conditions, LADWP has undertaken this approach to meet ambient air quality standards ordered by GBUAPCD in the 2011 and 2012 SCRDs and subsequently memorialized in the 2014 Stipulated Judgment. Given the success of past project-by-project activities and use of the HSM approach for maintaining or enhancing habitat values, there is no evidence that an alternative approach is warranted at this time.

4-11 In response to your comment, please see new **Figure 2-3**, included in Section 2 of the Final EIR. To protect cultural resources, areas with significant cultural resources excluded from the dust control project are not indicated.

4-12 CSLC's future review of Gravel Cover for consistency with Public Trust principles, values and needs is noted. LADWP has determined that Gravel Cover, a designated BACM by GBUAPCD, will not impede public access, will not create a significant aesthetic impact, and will improve air quality. Under the Project, public access to T18S will be enhanced with a new visitor overlook area. As a whole, construction of the Phase 9/10 Project is predicted to maintain or enhance habitat value for all six wildlife guilds considered. LADWP has not identified any impacts of the Phase 9/10 Project that are inconsistent with public trust values. Per LADWP's analysis, the Project would achieve the public interest goals of meeting air quality objectives, maintaining habitat values, maintaining access, and conserving water. Review of the Phase 8 Project (2.03 square mile of Gravel Cover) and Phase 7a Project (1.5 square miles of Gravel Cover), determined that these OLDMP Phases were consistent with the Public Trust. Similarly, LADWP has concluded that the Phase 9/10 Project is consistent with Public Trust principles, values and needs; although LADWP understands that the CSLC is the agency that will determine the consistency of the Phase 9/10 Project with the Public Trust Doctrine.

4-13 The Dust Control Plan for the Phase 9/10 Project would be prepared by the Construction Contractor and submitted to GBUAPCD for its review and approval. In accordance with GBUAPCD Rule 401 – Fugitive Dust, the Contractor is required to take reasonable precautions to prevent visible particulate matter from becoming airborne. In the past, implementation of the Dust Control Plan has been considered by GBUAPCD to demonstrate that reasonable precautions are being taken. Based on the Rule 401 standards, the Construction Contractor is responsible to determine when high wind conditions necessitate the cessation of construction activity.

It is assumed that the Dust Control Plan for the Phase 9/10 Project would be similar to the Plan recently approved and currently being implemented for the Phase 7a Project. The Dust Control Plan will detail control measures from the following construction areas/activities:

- Road shoulders and parking areas – dust control measures to be implemented at the termination of the project

- Diesel engine idling – Limits diesel engine idling (for vehicles with a gross vehicle weight over 10,000 pounds) to less than 5 minutes as practicable
- Main access roads – speed controls, watering
- Soil stockpiles – blending of wet and dry soils
- Excavation and pipe installation – blending of upper dry and excavated damp soils
- Specific work areas – sand fence installation for specific DCAs as detailed in the construction specifications

In addition, temporary tillage may be used, as directed by the LADWP Engineer, in combination with sand fences and interior berms to minimize dust emissions in all DCAs. Temporary tillage is used where soil conditions are suitable and temporary dust control is needed. Temporary tillage is typically oriented perpendicular to the direction of predominant winds, and therefore reduces the likelihood that particulate matter will become airborne.

As described in Draft EIR Section 3.1.5, sand fences may be temporarily installed during construction in order to limit the movement of sand from construction zones to adjacent areas of the lakebed. Sand fences were previously used during construction for Phase 7 and 7a Projects. Since biological and cultural resources assessments were conducted on each project DCA plus a buffer area, temporary installation of sand fences or temporary tillage to control construction dust would not have additional impacts beyond those described in the Draft EIR. Wildlife presence in active construction zones is not anticipated; therefore significant impacts to wildlife movement are not anticipated. Sand fences have been in place permanently in T1A-1 since 2010 and tillage has been implemented in multiple areas. Monitoring has not shown any impacts to movement of wildlife in these areas. Under the Avoidance Alternative, sand fencing would not be installed within the boundaries of, or the buffer area associated with, significant cultural resources. Under the originally proposed project, Phase III Data Recovery would be conducted prior to construction activity (including installation of sand fences) in areas with significant cultural resources. As discussed in Draft EIR Section 4.1.4.1, temporary construction activity over 5.43 square miles of the lake would not significantly alter views of the site, and the visual impacts of temporary tillage and temporary sand fences would be less than significant.

4-14 Permanent impacts to virtually all of the existing natural wetlands and about half of the created wetland areas located in the Phase 9/10 Project footprint will be avoided by design. The proposed Managed Vegetation DCAs would be managed for successful dust control, and, as demonstrated in T30-1, approximately 125 acres of hydrophytic vegetation is projected to meet the minimum needed for dust control standards. Further, the diverse suite of native wetland species that would be seeded in the Project area would enhance the species diversity of the alkali meadow habitat. With project irrigation, the Managed Vegetation areas would have increased productivity and habitat value in the entire emissive area compared to current conditions of small areas of wetland that receive sand infiltration and salt deposition during wind storms from adjacent emissive playa. After construction of irrigation systems and seeding are complete, it is anticipated that vegetation would be established in the Managed Vegetation DCAs within 36 months. Given the relative quality in the functions and values of Managed Vegetation areas to be created, impacts to the small areas of existing fragmented wetland areas would therefore be temporary and less than significant. A wetland delineation and analysis specific to the proposed Project are summarized in the Draft EIR and detailed in the biological resources report for the project. A copy of this report will be provided to CSLC.

4-15 Details regarding the HSM analysis are available in the report entitled *Supplemental Control Requirements Determination 2011 and 2012 Dust Control Measures Projected Habitat Value* (LADWP, 2014a). This report was referenced in the EIR and a copy will be provided to CSLC. Results from the habitat suitability modeling conducted for the Phase 9/10 Project are presented in Draft EIR Section 4.3.5.2.

4-16 Observed bird use will be used to inform the habitat model and management of the DCAs. Use of habitat created by the dust control project by highly mobile migratory wildlife depends on numerous factors outside the control of LADWP. Some of the factors that can affect wildlife use of a particular area at any given time include changes in migration patterns, land management, drought, harsh winters, severe storms, pesticide use changes, and hunting in breeding and wintering areas. Local weather variability in the Owens Valley area can also influence when the birds arrive and what areas they choose to use while they are here. A severe storm can cause birds to fly south earlier than expected or shelter in a different area and therefore they may not be observed during a specific survey period. These confounding factors make bird counts a poor and possibly misleading performance metric.

However, multiple bird counts sustained below the historical range of variability could give an indication that habitat values for a given wildlife guild are declining. If this occurs, an analysis will be performed based on monitoring data to relate low wildlife counts to potential changes in habitat values for each wildlife guild. Confounding factors will also be part of the analysis, and any declines in habitat use due to changes in habitat will be managed accordingly through adaptive management.

As noted by the commenter, concepts developed as part of the Master Project process were used to design Phase 9/10 Project features with the goal of maintaining overall habitat value. However, to meet the requirements of CEQA, a site-specific impact assessment of the Phase 9/10 Project was conducted for biological resources, and this EIR does not rely on a future Master Project process. Based on the inclusion of areas of Managed Vegetation, Shallow Flooding and design of four ponds in Transition Area T18S, habitat suitability modeling projects that habitat values will be maintained or enhanced under the proposed Project. As described in Draft EIR Section 4.3.5.3 Habitat Value Monitoring, an adaptive management framework has been established to ensure a long-term benefit to wildlife over existing conditions. The monitoring program and review of the HSM are included as part of the proposed Project; additional mitigation measures are not warranted.

4-17 Since T18S is one of the largest DCAs, overall bird use compared to other DCAs is high. However, on a per acre basis, T18S is moderate in bird use. T18S ranks between 7 and 24 of all DCAs, depending on which wildlife guild is considered (see Final EIR Section 2). Transition of a series of smaller Shallow Flood DCAs could impact cells with greater per-acre bird use. Additionally, transition of a series of smaller Shallow Flood DCAs to Gravel Cover with ponds may not be constructable (i.e., feasible) within the timeframes mandated by GBUAPCD and is therefore not proposed. Please also see response to comment 5-9.

The concept for the Master Project included Tillage in T18S with two ponds totaling approximately 290 acres. The proposed Phase 9/10 Project includes transition of T18S to Gravel Cover with four ponds totaling 651 acres. While not identical to the conceptual land cover plan for the Master Project, the Phase 9/10 project would provide more than double the acreage of ponds with a larger number of habitat islands and greater variability of water depth. Since significant unmitigable impacts to biological resources were not identified for the proposed Project with transition of T18S, alternative transition areas were not considered. TwB2 in lieu of the Gravel Cover areas in T18S is not proposed since this could increase the water demand for the project.

4-18 The construction steps for lateral pipeline installation include:

- Excavate a trench to an approximate depth of 4 feet. Place the spoil pile next to the trench. Trench lengths will be limited to the amount of pipe that can be installed and backfilled each day.
- Dewater the trench as necessary.
- Fuse 50 ft sticks of HDPE pipe at a stationary location.
- Drag 200 ft lengths of fused pipe and place next to the open trench.
- Field fuse the 200 ft lengths with other 200 ft lengths and push into the trench.
- Backfill and compact soil above the pipe.

The trenches would be backfilled with native soil on a daily basis. Since wildlife movement in active construction zones is not anticipated, animal entrapment in trenches is not expected.

4-19 CSLC jurisdiction regarding cultural resources on State property is noted. Regarding updates to the federal Section 106 process, CSLC is encouraged to coordinate directly with the BLM.

Consistent with State and federal requirements, the cultural resources identified on the project areas were evaluated and eligibility recommendations were made after review of NRHP and CRHR criteria. The criteria for eligibility for the CRHR are based upon NRHP criteria, and they are nearly identical. All of the evaluated archaeological sites were analyzed under all four NRHP criteria and all four CRHR criteria, as discussed on a site-by-site basis in Section 12.2 of the Owens Lake Dust Mitigation Program 2011 Supplemental Control Requirements Determination Phase II Archaeological Testing and Evaluation Report and Section 10.2 of the Owens Lake Dust Mitigation Program 2012 Supplemental Control Requirements Determination Phase II Archaeological Testing and Evaluation Report. Site evaluations in Table 4.4-6 of the Draft EIR summarize the criteria under which each site was found eligible, but not the criteria that were not applicable to that site. An evaluation of each of the Phase 9 resources recommended eligible for listing under the CRHR indicates that each is recommended as significant as a historic property under the NRHP.

The methods used for identification, evaluation, and classification of cultural resources within the Phase 9/10 Project area are, by design, consistent with those used in earlier phases of the dust mitigation program. These methods include the classification of archaeological deposits as discrete entities rather than as a continuous cultural landscape or district. It is agreed that cultural resources on Owens Lake share a common cultural heritage, and the contribution that each site might make to the overall understanding of prehistoric lifeways at Owens Lake was considered during the evaluation of CRHR eligibility. The current analysis assumes that maintaining the current research and evaluation methodology, which has remained consistent over past phases, will allow the successful integration of Phase 9/10 Project cultural resources with our current understanding of Owens Lake history. Therefore, the methodology used for the Phase 9/10 Project cultural resources evaluations is as suitable as an evaluation of resources within the context of an archaeological district, cultural landscape, or Traditional Cultural Property.

In response to the CSLC comment, the paragraph in Draft EIR Section 4.4.7.5 at the bottom of page 4.4-36 has been modified to delete the statement that state/federal agency certification of historic districts would be required (see Final EIR Section 2).

4-20 In response to the comments, cultural resources mitigation measures CR-3 and CR-5 have been revised (see Final EIR Section 2).

4-21 Since cultural resources review of private parcels contained in the Phase 9/10 Project area has been completed, Mitigation Measure CR-2 has been deleted (see Final EIR Section 2).

4-22 As stated in Draft EIR Section 4.5.4.1, LADWP acknowledges that CSLC is charged with managing and protecting lands subject to the public trust, and has the authority to balance public trust values. However, since the proposed Project would accomplish air pollution mitigation, protect and enhance biological resources, maintain public access, and protect the state’s scare water resources, LADWP has concluded that the physical impact of the Phase 9/10 Project on land use and planning is consistent with the common law public trust doctrine and less than significant under CEQA. Further, with implementation of dust control since 2000, vegetation has increased in areas of Owens Lake that were formally barren playa, Shallow Flooding has supported invertebrate populations, and large numbers of birds have been attracted to the lake.

4-23 As noted, LADWP is currently investigating the efficacy of soil binders for dust control on Owens Lake. Since study of potential binders is on-going, and since acceptance of soil binders as BACM by GBUAPCD has not occurred, soil binders are not included in the proposed Phase 9/10 Project. After additional study and coordination with applicable regulatory agencies, application of soil binders on DCAs, environmentally sensitive areas, and/or the buffers around those areas may be proposed. To date, however, the efficacy of soil binders as a meaningful alternative is speculative, and thus it is unclear whether it would avoid any possible impacts and still achieve project objectives.

4-24 The biological resources mitigation measures identified in the Draft EIR are focused on construction-related effects, not Project design, because habitat values of the Project areas are anticipated to be maintained or enhanced. With incorporation of mitigation measures for construction impacts, unmitigated significant impacts on biological resources are not identified for the proposed Phase 9/10 Project. Therefore, an alternative focused on reducing impacts to biological resources was not defined; any alternative except for No Project would require biological resources mitigation measures during construction. Please also see response to comment 4-17. Regarding the reasons for selection of T18S as the transition area, please see response to comment 5-9.

4-25 Electronic copies of future Project-related documents will be distributed as requested.

[CSLC NOP correspondence attached; available in Draft EIR Appendix B.]

March 30, 2015

Mr. David Porter
Los Angeles Department of Water and Power
Environmental Planning and Assessment
111 North Hope Street, Room 1050
Los Angeles, CA 90012

Comment #5

Via mail and email: David.Porter2@ladwp.com

Comments on the Draft Environmental Impact Report (DEIR) for the Owens Lake Dust Mitigation Program - Phase 9/10 Project

Dear Mr. Porter:

The California Department of Fish and Wildlife (CDFW) has reviewed the Draft Environmental Impact Report (DEIR) for the Owens Lake Dust Mitigation Program – Phase 9/10 Project, Inyo County, California (State Clearinghouse Number: 2014071057), hereinafter referred to as the "Project". The City of Los Angeles Department of Water and Power (LADWP) is conducting environmental review of the previously proposed 2011 SCRD and 2012 SCRD projects on Owens Lake, now referred to as the Owens Lake Dust Mitigation Program – Phase 9/10 Project. CDFW appreciates this opportunity to comment on the DEIR for the Project.

CDFW is responding to the DEIR as a Trustee Agency for fish and wildlife resources (California Fish and Game Code Sections 711.7 and 1802, and the California Environmental Quality Act [CEQA] Guidelines Section 15386), and as a Responsible Agency regarding any discretionary actions (CEQA Guidelines Section 15381), such as the issuance of a Lake or Streambed Alteration Agreement (California Fish and Game Code Sections 1600 et seq.) and/or a California Endangered Species Act (CESA) Permit for Incidental Take of Endangered, Threatened, and/or Candidate species (California Fish and Game Code Sections 2080 and 2080.1).

The proposed Project is to install best available control measures (BACM) to control PM_{10} dust emissions on 17 Dust Control Areas (DCAs) as follows: Duck Pond-L1, Duck Pond-L2, C2-L1, T10-1-L1, T10-3-L1, T17-2-L1, T21-L1, T21-L2, T21-L3, T21-L4, T32-1-L1, T35-2-L1, T37-1-L1, T37-2-L1, T37-2-L2, T37-2-L3, and T37-2-L4; totaling 2,313 acres of Owens Lake. BACM would include Gravel Cover, Shallow Flooding, and Managed Vegetation. Additionally, the project would include transition of 1,166 acres of existing shallow flood in DCA T18S to approximately 516 acres of Gravel Cover and 650 acres of Shallow Flooding.

CDFW Comments on the Project DEIR

5-1 Many of CDFW concerns discussed in detail here regarding the Project DEIR were first expressed in our August 18, 2014 Comment Letter on the Notice of Preparation for the "Owens Lake 2011 SCRD and 2012 SCRD Dust Control Measures." Between the NOP and the DEIR, the project name changed to Owens Lake Dust Mitigation Program - Phase 9/10 Project. For clarity, CDFW recommends that project names remain consistent through the CEQA process.

Inadequate assessment of impact to biological resources

More information and evaluation is needed to determine the finding of no significant impact to biological resources. LADWP has conducted more than five years of biological monitoring on Owens Lake, and this extensive dataset needs to be comprehensively included in any evaluation of impacts to biological resources on Owens Lake.

The following data should be included in the evaluation of this project and fully disclosed and described in the Project DEIR:

5-2
- All LADWP Owens Lake Biological Monitoring Reports (2010-2014) should be included in the literature cited and the review of biological impacts.

5-3
- The results of all LADWP's surveys for each dust control area of the proposed project should be considered in the evaluation of biological impacts. This includes the species present, the abundance of each species, and general locations within the dust control areas. This also includes all observed nesting birds and maps showing the locations of the nests by species. CDFW understands that many of the 'new' dust control areas may only have limited survey information, but any transition areas, such as T18S, should have extensive data for at least five years. This information could be added to Table 4.3-3 or to Appendix D.

5-4
- The results of all LADWP's surveys for each dust control area ADJACENT to the proposed project (as requested in August 14, 2014 CDFW comment letter). This includes the species present, the abundance of each species, and general locations within the dust control areas. This also includes all observed nesting birds and maps showing the locations of the nests by species. This data will help inform the cumulative impacts of the project and could be added to Table 4.3-3 or to Appendix D.

5-5
- Any additional opportunistic observations by LADWP staff or reported to LADWP staff of wildlife within or adjacent to the project area.

5-6 Furthermore, as described in the CDFW 2014 NOP Comment Letter, mitigation based on the collaboratively developed Habitat Suitability Models (HSM) is problematic when applied in a piecemeal fashion to projects instead of using a well-developed lake-wide approach. The Habitat Value Acreage (HVA) approach requires rigorous monitoring and a specific adaptive management process, which ideally, will include review by a third party with proven quantitative capacity to evaluate these habitat suitability models. Until a lake-wide plan, including these components is in place, habitat value and use by birds should be maintained within transition dust control areas. The CDFW 2014 comment letter on the NOP states:

> *For example, DCA cell T18S was previously designated for Shallow Flood and has observed significant use by Snowy Plover, American Avocets, and California Gulls, with other waterbirds and waterfowl also being documented in previous year's monitoring reports. Transitioning over 75% of this cell to Gravel Cover may significantly impact bird use for this cell and possibly Owens Lake. Objectives for the cell should include, at minimum, maintaining baseline use by all birds, including waterbirds and waterfowl, and not just "maintaining existing habitat value"; e.g. the EIR should document the specific habitat locations serving to mitigate this conversion in both acreage and value."*

5-7 Although recommended in detail in our comment letter, the DEIR still fails to, "*...include a jurisdictional delineation that includes wetlands identification pursuant to the U. S. Fish and Wildlife Service wetland definition*[1] *as adopted by CDFW*[2]." CDFW review of cell T18S clearly indicates the cell would be classified as state wetlands if the appropriate jurisdictional delineation were completed. Also as has been explained in detail regarding use of the HSM prior to an approved lake-wide approach, compensatory mitigation could be required for Project impacts which result in a direct loss of state wetlands beyond just HVA. 5-8 Although the percentage of gravel cover on T18S has been reduced in consideration of the HSM in the DEIR, LADWP is still responsible for maintaining, at minimum, baseline use by all birds. If bird use were not to return to baseline in T18S, the DEIR should propose a traditional wetland mitigation location at the ratio of 1:5 based on the high use by birds of T18S.

Based on the inadequate evaluation and inadequate mitigation described above, CDFW does not concur with LADWP's finding that the Project will have no significant impact to biological resources.

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[1] Cowardin, Lewis M., et al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service.

[2] California Fish and Game Commission Policies: Wetlands Resources Policy; Wetland Definition, Mitigation Strategies, and Habitat Value Assessment Strategy; Amended 1994

Inadequate consideration of biological alternatives

5-9 The transition of T18S is not required by Great Basin Air Quality Control District to manage dust emission; it has been selected for transition by LADWP for water savings. Between 2001 and 2014, LADWP has found 29 Snowy Plover nests and documented the highest overall bird diversity and abundance at T18S compared to any other dust control area. Due to the high bird use observed at T18S, alternative sites for water savings and transition should be considered. One of the main benefits of the Habitat Value Acreage approach to mitigation on Owens Lake is that it provides LADWP considerable flexibility in how they might increase or maintain habitat value acreage across Owens Lake. However, the DEIR provides no alternative for water saving except the transition of T18S. At many of the Owens Lake meetings, LADWP specified they would be targeting areas of low bird use and low habitat value for transition. However, dust control area T18S has the highest ranked bird diversity and bird abundance of any dust control area (LADWP 2014 Owens Lake Biological Monitoring Report Figure 19). Some possible alternative dust control areas to target for transition that have shown lower bird use and diversity include: T2-2, T2-3, T2-5, T3SE, T3SW, T3NE, T23SE, T23NE, T36-3E, T36-3E, T36-3W as well as many others. In fact any other dust control area on Owens Lake would have lower bird abundance and diversity. Also, several of the cells above are already identified for water saving in LADWP's TwB2 project. The water saving from these cells, along with the entire TwB2 project, will significantly exceed the water demand for the new DCAs of the Phase 9/10 Project. This exceedance in water savings should be disclosed in the DEIR, and the DEIR alternative analysis should include an alternative project which could fully address dust mitigation requirements for all new DCA's in Phase 9/10 without any need to transition T18S.

5-10 In addition, CDFW recommends LADWP provide an alternative to gravel to control dust at T21-L2. This dust control area had a snowy plover nest in 2012 and several other nests found in the area in 2001 in 2007. Given the flexibility of the Habitat Value Acreage approach, LADWP should be able to provide at least three biological alternatives that will provide the same water savings and habitat value acreage as the current project.

Additional Comments and Questions

5-11

- Provide numerical support for the statement that salinity in T18S has been increasing in recent years as well as logistical evidence that the salinity cannot be managed in the current configuration (p. 4.3-39). How would infrastructure, management, and water distribution have to be altered to allow LADWP to maintain the salinity T18S? Can bird use be correlated with the change in salinity to date?

5-12 - Provide specific data on water costs and water savings associated with all dust control areas. How many acres feet per year per acre is required to maintain T18S as it is? How many acres feet per year per acre will be needed to maintain T18S after transition?

5-13 - Include all specific Habitat Suitability Model equations and categorical parameter values (e.g. water depth of 0.8m has a value of 1 for the diving waterbird guild).

Thank you for this opportunity to comment on the DEIR. Questions regarding this letter and further coordination on these issues should be directed to Ms. Lacey Greene, Environmental Scientist, at (760) 872-1128 or by electronic mail at Lacey.Greene@wildlife.ca.gov.

Sincerely,

for / Curt Taucher
Environmental Program Manager II

cc: State Clearinghouse, Sacramento
H. Calvert, CDFW
B. Kinney, CDFW
L. Greene, CDFW
J. DeLeon, SLC
J. Zimmerman, LRWQCB

Comment Letter #5

California Department of Fish and Wildlife
Mr. Curt Taucher
Environmental Program Manager II
Inland Deserts Region
3602 Inland Empire Blvd., Suite C-220
Ontario, California 91764

5-1 As noted by the commenter, the NOP of an EIR identified the project as the Owens Lake 2011 SCRD and 2012 SCRD Dust Control Measures Projects, in reference to the GBUAPCD nomenclature of "Supplemental Control Requirements Determination". In an effort to be consistent with previous dust control projects on Owens Lake, the project has been more simply named as the Phase 9/10 Project.

5-2 The 2011 and 2012 reports are included in the references section of the Draft EIR (Section 8.1). Please see revisions to Draft EIR Section 8.1 to include the 2010, 2013 and 2014 Owens Lake Biological Monitoring Reports (Final EIR Section 2). Data included in these reports were considered as part of impact assessment for the Phase 9/10 Project.

5-3 Each of the DCAs included in the Phase 9/10 Project were surveyed for biological resources; the results of these recent, as well as previous, surveys were considered as part of biological resources evaluations. Bird count data were evaluated for the most recent survey period (2014) and assessments of nesting using all current data were performed. In response to CDFW comments, Draft EIR Section 4.3.3.4 (Avian Use of Project Vicinity) has been revised (see Final EIR Section 2). Mitigation measures to protect nesting birds are described in Draft EIR Section 4.3.6.

5-4 In response to your comments, Draft EIR Section 4.3.3.4 (Avian Use of Project Vicinity) has been revised (see Final EIR Section 2). Where Phase 9/10 Project DCAs share a border with an adjacent DCA, survey data for the adjacent areas are provided. The DCAs are separated by wide roadway berms currently used by operations vehicles; therefore no direct impacts from construction on adjacent parcels are anticipated. Many of the Phase 9/10 Project DCAs are adjacent to areas of barren playa, where few biological resources are present. Mitigation measures to reduce temporary impacts from construction activity are defined in Draft EIR Section 4.3.6. Note that no other sensitive species habitat is present within areas adjacent to Project areas.

5-5 Wildlife observations are reported in Draft EIR Table 4.3-3. Special status species seen during any of the project surveys are listed in Table 4.3-4, 4.3-5 and 4.3-6. Additional data that were considered as part of the impact assessment have been summarized and included in Section 2 of the Final EIR.

5-6 The Phase 9/10 Project was designed to follow the Master Project concepts for maintaining and enhancing habitat value while meeting water conservation goals. In order to maintain dust control and logistically implement the Master Project, each phase or step would balance habitat value within a subset of DCAs. Every portion of the dust control project that LADWP has implemented has been required to maintain or enhance habitat values. When habitat values are enhanced (as has been the case for past program activities), a new baseline is established that is maintained by LADWP. In this respect, phased dust control has been effective at achieving CDFW's wildlife goals. Further, this approach is required to meet the time commitments included in the 2014 Stipulated Judgment.

Note that the concept for the Master Project included Tillage in T18S with two ponds totaling approximately 290 acres. The proposed Phase 9/10 Project includes transition of T18S to Gravel Cover with four ponds totaling 651 acres. While not identical to the conceptual land cover plan for the Master Project, the Phase 9/10 project would provide more than double the acreage of ponds with a larger number of habitat islands and greater variability of water depth. As described in the Draft EIR Section 4.3.5.3, habitat values in the Phase 9/10 Project area would be enhanced with transition of T18S.

As described in Draft EIR Section 4.3.5.3, rigorous monitoring and an adaptive management process is defined for the Phase 9/10 Project. LADWP will conduct a Habitat Value Acre (HVA) review to confirm predicted habitat impacts. After several years of Project operation, the assessment of 2013 HVA will be compared with actual HVA for each guild. The HVA review will incorporate the results of the HSM validation to be conducted for the Phase 7a Project. The validation is being conducted to determine if the identified parameters are effectively providing habitat for target guilds. Modifications in the HSM identified during the Phase 7a validation will be incorporated into future HVA reviews for the Phase 9/10 Project.

5-7 A wetland delineation using the Wetland Delineation Manual (USACE, 1987) revised by the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE, 2008) using hydrophytic status of plant species from a recently revised plant list (Lichvar, 2013) has determined that 0.1 acres of T18S are created jurisdictional wetlands, but USACE has declined to assert jurisdiction over this project (Allen, pers. comm. 2015). Further, even projects with federal approvals and potential take of federally-listed species are not required to conduct an independent wetland delineation under the U.S. Fish and Wildlife Service definition. And as noted by the California Fish and Game Commission Miscellaneous Policies (1994), the California Fish and Game Wetlands Resources Policy was never intended to have enforceable regulatory effect. Regardless, the physical functions and values of the wetted areas within the Project area have been described and evaluated in the Draft EIR. Virtually all of the habitat value in T18S was created by LADWP's dust control project. If LADWP was not implementing dust control in these areas, there would be virtually no habitat value and essentially no use by wildlife. The Project provides for the infrastructure and commitment by LADWP to maintain what has been created by designing, constructing and managing for sustained habitat value. The Phase 9/10 Project fully mitigates any potential impacts to biological resources and commits to maintain habitat values into the future.

LADWP will avoid 19.1 acres of wetland with this project. All of the wetland in C2-L1 (7.1 acres), Duck Pond-L1 (10.9 acres), and T10-1 L1 (1.1 acres) will be avoided.

5-8 Observed bird use will be used to inform the habitat model and management of the DCAs. LADWP has no control over whether birds use the habitat created by the dust control project. Many factors can affect wildlife use of a particular area at any given time including changes in migration patterns, land management, drought, harsh winters, severe storms, pesticide use changes, and hunting in breeding and wintering areas. Local weather variability in the Owens Valley area can also influence when the birds arrive and what areas they choose to use while they are here. A severe storm can cause birds to fly south earlier than expected or shelter in a different area and therefore they may not be observed during a specific survey period. Additionally, changing weather conditions during bird surveys can change where birds are observed throughout the day. These confounding factors make bird counts a poor performance metric.

The Phase 9/10 Project has been designed to install new areas of dust control while maintaining overall habitat value, and conserving water. The assessment of biological resources included all Project DCAs, including transition area T18S. Designing the dust phases to maintain bird use of each specific DCA would be inconsistent with a lakewide approach. However, over the long-term, decreased bird use of T18S is not predicted. With over 650 acres of ponds graded to important foraging depths, many habitat islands, more diverse topography, increased nesting area, and increased shoreline length, the transition of T18S is specifically focused on the habitat needs of the Owens Lake Wildlife Guilds.

5-9 While other areas may exist that may have less bird use than T18S, any area would similarly have to be designed to maintain habitat value and be managed accordingly. In order to meet mandated Project deadlines, achieve water conservation goals, and maintain habitat value, T18S was the best choice for a transition area for the Phase 9/10 Project.

Since T18S is one very large management unit (1,167 acres), it will be logistically easier to shut-down and construct the Phase 9/10 Project elements within the mandated time-frame. The selection of alternative transition areas would require construction in more locations, increased time for design and planning, and overall longer construction.

Since T18S is one of the largest DCAs, overall bird use compared to other DCAs is high. However, on a per acre basis, T18S is moderate in bird use. T18S ranks between 7 and 24 of all DCAs, depending on which wildlife guild is considered. Since abundance is highly correlated to diversity (i.e., when there are more birds there are often more species), this acreage relationship is also true of diversity.

Given the size of T18S and the capacity constraints of the water delivery system, this DCA is also the best transition area to obtain Project water conservation goals. Under existing conditions, water delivery to T18S starts in August. Since this creates more evaporation and loss, this DCA provides a greater opportunity for water conservation than other cells.

Several alternative transition DCAs recommended in the comment letter are part of the TwB2 project (T2-2, T2-3, T3SE, T3SW, T3NE). Other DCAs are part of mitigation from previous streambed alteration agreements and are required to be maintained as Shallow Flood (T-23SE, T-23NE). Lastly, the DCAs in T36-3 (T36-3E, T36-3W) have brine that would be difficult to dry out to accommodate construction; these DCAs are also needed for the upgradient (and higher habitat value) Managed Vegetation area created as part of the Phase 7a Project (T36-1-b). Further, it is not clear that transition of any of these areas would provide any significant environmental advantages over T18S.

Since the Phase 9/10 Project would maintain or enhance habitat values for the six wildlife guilds considered, impacts on avian use of the sites were found to be less than significant, as were impacts to other biological resources. The biological resources mitigation measures identified in the Draft EIR are focused on construction-related effects, not Project design. With incorporation of these mitigation measures, significant impacts on biological resources are not identified for the proposed Phase 9/10 Project. Habitat values of the Project areas are anticipated to be maintained or enhanced. Therefore, an alternative focused on reducing impacts to biological resources was not defined.

Water demand for the Project is described in Draft EIR Section 3.1.4. The anticipated water savings of 283 acre-feet per year is a small step towards overall water conservation on Owens Lake. Water savings anticipated with the TWB2 Project, approximately 8,620 acre-feet per year, are described in Draft EIR Section 6.1.1.3. In the context of California's current historic drought conditions, this level of water conservation is not considered an exceedance of water savings.

5-10 Snowy Plover may nest anywhere within 0.5 miles of water. Mitigation measures have been proposed to reduce potential impacts to nesting birds during project construction. Because T21-L2 is emissive, any Snowy Plover currently nesting in this area would be subject to blowing sand that could cause nest abandonment or destruction. Placement of Gravel Cover in this area will decrease this blowing sand and provide additional microtopography that plovers often nest within, including Project berms, staging areas and roads. For example, of the 29 Plover nests seen in T18S, only two were on playa, the rest were on perimeter berms with some amount of gravel protection (see Final EIR Section 2 Figure 4.3-8).

5-11 In response to your comment, a table showing salinity measurements in T18S has been added to Final EIR Section 2. Values have been variable, however, two of the three highest salinity measurements in spring have occurred in the most recent years. The infrastructure for the proposed Project will allow for salinity management along with the commitment to monitor and maintain this salinity into the future. In general, ponds with salinity beyond the preferred range have both lower habitat value and habitat use by waterfowl and shorebirds (LADWP, 2015). Given that T18S is a lower elevation pond, physics dictate that water carrying salt will tend to accumulate in T18S from upgradient

Shallow Flood areas when occasional spillover occurs; a process that increases salinity over time. Flushing the existing large T18S DCA would take a much larger amount of water than the multiple smaller ponds included in the transition area design for the Phase 9/10 Project.

5-12 Draft EIR Section 3.1.4 provides an estimate of water demand for the Phase 9/10 Project. With approximately 4 feet per acre per year of water demand, transition area T18S currently requires approximately 4,664 acre-feet of water per year. With implementation of the Phase 9/10 Project, the proposed 651 acres of ponds in T18S would require approximately 2,604 acre-feet of water per year.

5-13 The Project Habitat Value report (2014a) and the Biological Resources Survey Report (LADWP, 2015) for the Phase 9/10 Project will be provided to CDFW.

STATE OF CALIFORNIA – THE NATURAL RESOURCES AGENCY

EDMUND G. BROWN, JR., Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
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Comment #6

March 30, 2015

David Porter
Environmental Planning and Assessment
Los Angeles Department of Water and Power
111 North Hope Street, Room 1050
Los Angeles, CA 90012
Sent via Fax to LADWP (213) 367-4710 on 3/30/2015 at 1:00 p.m.

Dear Mr. Porter,

RE: **OWENS LAKE DUST MITIGATION PROGRAM PHASE 9/10 PROJECT**

Thank you for including the California Office of Historic Preservation (OHP) in the environmental review process for the proposed Owens Lake Dust Mitigation Program Phase 9/10 Project (proposed project). Pursuant to the National Historic Preservation Act and the California Public Resources Code, the State Historic Preservation Officer (SHPO) and the OHP have a broad responsibility for the implementation of federal and state historic preservation programs in California. Our comments are offered with the intent of protecting historic and cultural resources, while allowing the Los Angeles Department of Water and Power (Lead Agency) to meet its program needs. The following comments are based on the information included in the Draft Environmental Impact Report (DEIR).

The proposed project includes the installation of dust control mitigation measures that may include shallow flooding, gravel cover, and managed vegetation. Under the proposed project, these systems require the creation of berms, installation of irrigation piping, and spreading of gravel using heavy machinery. All of these proposed actions have potential to cause irreparable damage to non-renewable, irreplaceable cultural and historical resources.

DESCRIPITION AND EVALUTION OF CULTURAL RESOURCES

6-1 The DEIR states that "...cultural resources associated with the lake are not individual discrete resources, but rather, the lake in its entirety is considered a culturally significant place....Recognizing portions of the Owens Lake as a Cultural Landscape would help clarify the inter-relationships between archeological resources and other aspects of the landscape that are important to local tribal communities."

6-1 Despite this statement, the DEIR proceeds to identify and analyze the archaeological resources within the Phase 9/10 Project Area as individual discrete artifact deposits devoid of any physical, contextual, or temporal relationship with each other or among the whole. These artifact deposits are also treated without regard to their larger relationship to a lakeshore cultural landscape identified in earlier phases of the dust mitigation program. Although the dust mitigation is a phased project, the cultural resources of the lakeshore share a common cultural heritage which bears on the meaning and significance of archaeological and historical sites that cannot be artificially segmented.

6-2 The research design employed to evaluate cultural resources in the project area relies on dated archaeological investigations while ignoring more recent and relevant work on prehistoric cultural chronologies that have since been modernized and revised, and it relies on questionable and unsound methodologies that reveal a general unfamiliarity with the archaeology of the Owens Valley.

6-3 The SHPO finds that the identification and analysis of the phase 9/10 sites fails to analyze the potential for an archaeological district, a cultural landscape and/or a Traditional Cultural Property and, despite Native American consultation, does not appropriately take into consideration native values that may be attached to the identified archaeological sites. It also fails to address whether the potentially eligible Area 9/10 sites contribute to a larger and more comprehensive cultural landscape that can be identified outside the immediate phased project boundaries. I reiterate the recommendation from correspondence in my previous letter from August 6, 2014 to the effect that archaeological sites should be evaluated as contributors to an archaeological district, Traditional Cultural Property, and potential cultural landscape.

6-4 Further, archeological sites must be evaluated under all four National and California Register Criteria of Eligibility (A/1-4/D). Two historic sites are evaluated under Criterion A/1 for their association with the Owens Lake Indian War Period. The nine archeological sites associated with Native American occupation of the Phase 9/10 project area are evaluated only under Criterion D for their potential to contribute to scientific knowledge. Mitigation under Criterion D/4 generally requires extensive and invasive testing and/or excavation and recovery of artifacts. The SHPO considers such treatment destructive of the intact site(s) and a significant impact on the cultural resource in and of itself. It should be used only in situations where avoidance or non-destructive treatments are infeasible.

6-5 The proposed project as described in the DEIR included several previous phased projects (including the Phase 7 Project, the Phase 7a Project, the Phase 8 Project, etc.). However, pursuant to CEQA Guidelines § 15378, a "'Project' means the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change..." When taken together, phases 7, 7a, 8 and 9/10 will involve installation of dust control measures on approximately 48.6 square miles. The impacts on the cultural and historical resources in the Phase 9/10 project, if not mitigated below a level of significance will cumulatively

6-5 contribute to a substantial loss of historical resources and to the archaeological, cultural landscape, and Traditional Cultural Property of the larger Owens Lake area.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

6-6 The State Office of Historic Preservation strongly urges the lead agency to adopt the environmentally superior alternative presented in the DEIR. It offers the best opportunity to avoid impacts to significant archaeologically and historically sensitive resources while reasonably achieving the goals of the project. To implement this alternative the lead agency needs to prepare a detailed treatment plan that both addresses the deficiencies of the existing significance evaluations and outlines best practices for protection and avoidance of the resources. The proposal to hire a second peer reviewer archaeologist is an appropriate step to this end. Continued consultation with the Office of Historic Preservation, the Cultural Advisory group, and Native Americans can assist in developing best practices.

6-7 We would note that as the Owens Lake Dust Mitigation Program (OLDMP) requires a Federal permit to be issued from the Bureau of Land Management (BLM), pursuant to 36 CFR § 800, the regulations that implement Section 106 of the National Historic Preservation Act (NHPA) of 1966, the OLDMP meets the criteria to be considered an Undertaking as defined in 36 CFR § 800.16(y) and is therefore subject to NHPA

If you have questions, please contact Brendon Greenaway of the Archaeology and Environmental Compliance Unit at (916) 445-7036 or at Brendon.Greenaway@parks.ca.gov or Sean deCourcy of the Local Government and Environmental Compliance Unit, at (916) 445-7042 or at Sean.deCourcy@parks.ca.gov.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer

Comment Letter #6

Dr. Carol Roland-Nawi, State Historic Preservation Officer
State Office of Historic Preservation
1726 23rd Street, Suite 100
Sacramento, California 95816-7100

6-1 The methods used for identification, evaluation, and classification of cultural resources within the Phase 9/10 Project area are, by design, consistent with those used in earlier phases of the dust mitigation program. These methods include the classification of archaeological deposits as discrete entities rather than as a continuous cultural landscape or district. It is agreed that cultural resources on Owens Lake share a common cultural heritage, and the contribution that each site might make to the overall understanding of prehistoric lifeways at Owens Lake was considered during the evaluation of CRHR eligibility. Therefore, the methodology used for the Phase 9/10 Project cultural resources evaluations is as suitable and appropriate as an evaluation of resources within the context of an archaeological district, cultural landscape, or Traditional Cultural Property. The current analysis assumes that maintaining the current research and evaluation methodology, which has remained consistent over past phases, will allow the successful integration of Phase 9/10 Project cultural resources with our current understanding of Owens Lake history.

6-2 The consultant team that conducted the cultural resources evaluations for the Phase 9/10 Project has extensive experience on Owens Lake, having worked on the Phases 7, 7a and 8 Projects in addition to the proposed Phase 9/10 Project. As discussed in the response to comment 6-1, emphasis has been placed on maintaining a consistent research and evaluation methodology over time in order to ensure that current findings are consistent and comparable to findings from earlier phases. Note that the research design and testing plan used to evaluate resources in the Phase 9/10 Project areas was reviewed and approved by the land owner (CSLC); permits for archaeological investigations were issued without objection. Nevertheless, it is understood that scientific knowledge develops over time, and future research must evolve in a way that integrates updated cultural chronologies, recent findings from the surrounding region, and advances in archaeological theory. In response to your comments, Mitigation Measure CR-3 is revised to clarify that the CSLC would be consulted regarding future research design and testing protocols for cultural sites on state lands (see also Final EIR Section 2):

The Cultural Resource Construction Monitoring Program shall include:

- An Unanticipated Discovery Evaluation Protocol shall be developed by the qualified archaeologist. Prior to the evaluation of any newly discovered resources on state lands, the CSLC shall be afforded an opportunity to comment on the research design, including research questions and evaluation methodologies, included in the Unanticipated Discovery Evaluation Protocol.

6-3 Please see response to comment 6-1. In addition, ongoing archaeological research in the Owens Lake area, including unanticipated discoveries and site evaluations associated with various phases of the dust mitigation program, continue to provide additional information about the spatial and temporal distribution of resources on the lake bed. Because of this, the boundaries and Period of Significance of a proposed archaeological district, Traditional Cultural Property, or cultural landscape cannot currently be accurately defined. These resources would be more effectively addressed as a group in the future, once research associated with dust mitigation nears completion and the nature and distribution of sites on the lake are better understood. At present, however, those specific sites satisfying eligibility criteria have been delineated and addressed.

6-4 All of the evaluated archaeological sites were analyzed under all four CRHR criteria, as discussed on a site-by-site basis in Section 12.2 of the Owens Lake Dust Mitigation Program 2011 Supplemental Control Requirements Determination Phase II Archaeological Testing and Evaluation Report and Section 10.2 of the Owens Lake Dust Mitigation Program 2012 Supplemental Control Requirements Determination Phase II Archaeological Testing and Evaluation Report. Site evaluations in Table 4.4-6 of the Draft EIR summarize the criteria under which each site was found eligible, but not the criteria that were not applicable to that site.

Note that excavation and recovery of artifacts have not been proposed as mitigation for significant impacts to cultural resources. Under the Avoidance Alternative to the proposed Project, significant cultural sites and an appropriate buffer would be excluded from the dust control area and protected from disturbance during construction in surrounding areas. Please also see Section 1 of this Final EIR regarding removal of the significant cultural sites, and buffers, from the area ordered for dust mitigation by GBUAPCD.

6-5 As identified in Section 6.2.4 of the Draft EIR, implementation of the Phase 9/10 Project as proposed would have cumulatively considerable impacts on cultural resources. However, implementation of the Avoidance Alternative and the mitigation measures outlined in Section 4.4 of the Draft EIR, and mitigation as applicable by future related projects would reduce significant impacts on cultural resources to below a level of significance. The combined impact of the Avoidance Alternative and related projects would be less than cumulatively considerable. Further, while the Phases 7, 7a, 8, and 9/10 are related, each has independent utility and are being pursued as independent projects. Thus, these four phases are not considered a single project for purposes of CEQA review. Again, however, because they are considered together for cumulative impact purposes, the EIR has not avoided evaluation of possible adverse effects when these projects are considered together.

6-6 The Draft EIR, comments received on the Draft EIR, and responses to comments will be presented to the LADWP Board of Water and Power Commissioners for their consideration. Prior to adoption of the Phase 9/10 Project, the Board of Water and Power Commissioners will consider which project most effectively balances and protects the competing interests of protecting air quality while ensuring the protection and preservation of cultural resources. The Commissioners may adopt the originally proposed

Phase 9/10 Project or an alternative to the proposed Project. The State Office of Historic Preservation's support for the Avoidance Alternative is noted and will be considered by the Commissioners. Please also see Section 1 of this Final EIR regarding removal of the significant cultural sites, and buffers, from the area ordered for dust mitigation by GBUAPCD.

Since the cultural resources evaluations conducted for the Phase 9/10 Project were consistent with past evaluations, and the research design plan was reviewed and approved by the land owner (CSLC), the evaluations were appropriate to determine site significance under the CRHR. Therefore, development of a detailed treatment plan to revisit the significance evaluations is not proposed. However, as noted in response to comment 6-2, the CSLC and BLM, as relevant, will be afforded an opportunity to comment on future research design, including research questions and evaluation methodologies, as part of the Unanticipated Discovery Evaluation Protocol. Additionally, as noted in Final EIR Section 1, LADWP has received comments from BLM on the Phase II cultural resources report for the Project. Additional consideration of existing data, cultural report revisions and/or additional field investigations may therefore be conducted for select sites in collaboration with tribal representatives and State and/or federal agencies.

6-7 As described in Draft EIR Sections 2.3, 2.9, 4.1.1.3 and 4.5.1.3, a right-of-way from BLM is required prior to installation of dust control on federal lands included in the Phase 9/10 Project; LADWP submitted an application for right-of-way to BLM in June 2014. BLM has indicated (letter dated August 7, 2014, included in Appendix B of the Draft EIR) that the proposed action is subject to land use conformance and other requirements under the Federal Land Policy and Management Act (FLPMA), environmental review requirements under the National Environmental Policy Act (NEPA), and federal regulations and requirements related to the protection of cultural resources pursuant to Section 106 of the National Historic Preservation Act (NHPA). This initial correspondence from BLM indicated that FLPMA and NEPA compliance requirements may be limited to consideration of the project footprint on federal land, but NHPA requirements could extend over the entire project footprint regardless of jurisdiction. Coordination with BLM has been on-going since submittal of the right-of-way application. The decision to issue or deny a right-of-way for installation of dust control measures on federal lands will be made by BLM.

California Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

Lahontan Regional Water Quality Control Board

March 26, 2015

File: Environmental Doc Review
Inyo County

David Porter
Los Angeles Department of Water and Power
Environmental Planning and Assessment
111 North Hope Street, Room 1050
Los Angeles, CA 90012
Fax: (213) 367-4710

Comment #7

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED OWENS LAKE DUST MITIGATION PROGRAM PHASE 9/10 PROJECT, INYO COUNTY, STATE CLEARINGHOUSE NO. 2014071057

California Regional Water Quality Control Board, Lahontan Region (Water Board) staff received the Draft Environmental Impact Report (DEIR) for the above-referenced (Project) on February 17, 2015. The DEIR was prepared by the Los Angeles Department of Water and Power (LADWP) and submitted in compliance with provisions of the California Environmental Quality Act (CEQA). Water Board staff, acting as a responsible agency, is providing these comments to specify the scope and content of the environmental information germane to our statutory responsibilities pursuant to CEQA Guidelines, California Code of Regulations, title 14, section 15096. Based on our review of the DEIR, we have determined that: (1) the environmental document has not adequately evaluated the Projects potential impacts to water quality; (2) construction and operation of Phase 9/10 will require amending Board Order No. R6V-2006-0036 issued to LADWP for the Owens Lake Dust Mitigation Program; and (3) it appears that there may be considerably more wetland acres on the Project site and consequently more wetland impacts than what was reported and identified in the DEIR. Our comments on the DEIR and Project are outlined below.

PROJECT DESCRIPTION

LADWP is currently implementing the Owens Lake Dust Mitigation Program to reduce dust emissions. Since 2006, LADWP has constructed and currently manages dust control measures on approximately 45 square miles in and around the lake bed. The proposed dust control measures for the Phase 9/10 Project are similar to that being used in other areas around the lake and include shallow flooding, managed vegetation, and gravel cover. The Phase 9/10 Project will increase the total area of dust control by an additional 3.61 square miles.

WATER BOARD'S AUTHORITY

All groundwater and surface waters are considered waters of the State. Surface waters include streams, lakes, ponds, and wetlands, and may be ephemeral, intermittent, or perennial. All waters of the State are protected under California law. State law assigns responsibility for protection of water quality in the Lahontan Region to the Lahontan Water Board. Some waters of the State are also waters of the U.S. The Federal Clean Water Act (CWA) provides additional protection for those waters of the State that are also waters of the U.S.

The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) contains policies that the Water Board uses with other laws and regulations to protect the quality of waters of the State within the Lahontan Region. The Basin Plan sets forth water quality standards for surface water and groundwater of the Region, which include designated beneficial uses as well as narrative and numerical objectives which must be maintained or attained to protect those uses. The Basin Plan can be accessed via the Water Board's web site at http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.shtml.

COMMENTS ON PROPOSED PROJECT

Our specific comments on the Project and DEIR are outlined below.

7-1

1. The existing Owens Lake Dust Mitigation Program utilizes recycled return water from the irrigation areas and reverse osmosis water treatment brine as source waters for dust control measures. In addition, chemicals are added to these source waters to control algae growth and scale formation. Recycled return water, brine wastes, and chemical additives can contain constituents at concentrations that have the potential to degrade the quality of groundwater beneath the Project site as well as pose a threat to wildlife. These source waters were not identified in the DEIR, and the potential impacts to water quality as a result of these discharges were not identified in the environmental review. All potential water quality impacts need to be evaluated in the DEIR and adequate mitigation must be identified to reduce the potential impacts to a less than significant level. Obtaining a permit and conducting monitoring does not constitute adequate mitigation. Development and implementation of acceptable mitigation is required.

7-2

2. Combined, the dust mitigation phases cover a significant portion of Owens Dry Lake, and the cumulative impacts of these phases on water quality and hydrology over time have not been fully evaluated. **We urge LADWP to provide a more thorough analysis of cumulative impacts in the environmental document.** The analysis should consider the point impacts of phases planned and constructed and evaluate, at minimum, the potential impacts to groundwater recharge due to compacted soils, changes in the hydrology of the respective watershed(s) and potential flooding implications, cumulative changes in groundwater quality and chemistry, and habitat connectivity. The cumulative

7-2 impacts analysis should identify both regional and project-specific mitigation measures that, when implemented, will reduce potential impacts to a less than significant level.

7-3

3. The Water Board currently regulates discharges from the Owens Lake Dust Mitigation Program under Waste Discharge Requirements, Board Order No. R6V-2006-0036 (Board Order). The proposed Project is an expansion of the activities currently regulated by the Water Board; therefore, we anticipate that construction and operation of Phase 9/10 will require amending the Board Order to ensure that Project activities continue to be protective of wildlife and water quality.

7-4

4. Section 4.3.5.6 of the DEIR provides a discussion of existing wetland resources within the Project area and potential Project impacts. A wetland delineation report prepared for the Project in 2014 identified approximately 22 acres of wetland within the 3,500 acre Project site. However, the National Wetland Inventory mapping indicates that approximately 2,700 acres of wetlands occur within the Project area, which is several orders of magnitude greater than what is reported in the 2014 wetland delineation report. Please address the apparent inconsistency between the acreage of wetlands reported in the 2014 wetland delineation report and those reported by the National Wetland Inventory.

7-5

5. Construction of Phase 9/10 will require Water Board authorization either under CWA, section 401 water quality certification (401 WQC) for impacts to federal waters (waters of the U.S.), or dredge and fill waste discharge requirements for impacts to non-federal waters. We request that LADWP consult with the United States Army Corps of Engineers (USACE) and obtain the necessary determination to verify presence or absence of federal waters within the Project site.

7-6

6. The Water Board requires that impacts to water resources be **avoided** where feasible and **minimized** to the extent practical. Compensatory mitigation will be required for all unavoidable permanent impacts to surface water resources. Water Board staff coordinate all mitigation requirements with staff from other federal and state regulatory agencies, including the USACE and the California Department of Fish and Wildlife. In determining appropriate mitigation ratios for impacts to waters of the State, Water Board staff considers Basin Plan requirements (minimum 1.5:1 mitigation ratio for impacts to wetlands) and utilizes *12501-SPD Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios*, published December 2012 by the USACE, South Pacific Division.

7-7

7. Land disturbance of more than 1 acre may require a CWA, section 402(p) storm water permit, including a National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit, Water Quality Order (WQO) 2009-0009-DWQ, obtained from the State Water Board, or individual storm water permit obtained from the Lahontan Water Board.

7-8 8. Water diversion and/or dewatering activities during construction may be subject to discharge and monitoring requirements under either NPDES General Permit, Limited Threat Discharges to Surface Waters, Board Order R6T-2008-0023, or General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality, WQO-2003-0003, both issued by the Lahontan Water Board.

REQUEST FOR REVISED REPORT OF WASTE DISCHARGE

The California Water Code (CWC) requires the Water Board to regulate discharges of waste to land or waters of the State to protect the designated beneficial uses. Any person discharging waste or proposing to discharge waste that could affect the quality of waters of the State must file a ROWD with the Water Board (CWC, section 13260). The ROWD must fully describe the proposed discharge and be filed with the Water Board at least 140 days before the discharge occurs (CWC, section 13264). Failure to file a complete ROWD before discharging, or discharging without regulatory authorization, may result in substantial civil or criminal penalties (CWC, section 13261).

7-9 Water Board staff has determined that the proposed Project is an expansion of the activities currently regulated by the Water Board under the Board Order and requests that LADWP submit a revised Report of Waste Discharge (ROWD) providing information necessary to revise the WDRs for the Owens Lake Dust Mitigation Program. The revised ROWD must contain complete information on all proposed and existing activities that may affect water quality. Be sure to include information required for compliance with any applicable region-wide or state-wide general permits that are currently active or those in which you intend to seek coverage under. Specifically, the following information must be submitted with the revised ROWD for the Owens Lake Dust Mitigation Program.

1. Complete Form 200 (see Enclosure). The person legally responsible for the Facility, such as the General Manager, must sign the Form 200 and not the engineer, architect, consultant, or other delegated person. An electronic copy of Form 200 can be accessed online at http://www.waterboards.ca.gov/lahontan/publications_forms/forms/index.shtml.

2. Government Code section 84308(c) requires all applicants for WDRs to include a statement disclosing any contributions made by the applicant to any Water Board member, if the contribution(s) amounted to $250 or more. For your information, the current Water Board members are: Amy Horn, Keith Dyas, Eric Sandel, Peter Pumphrey, Don Jardine, and Kimberly Cox.

Thank you for the opportunity to comment. If you have any questions regarding this letter, please contact Jan Zimmerman, Engineering Geologist at (760) 241-7376 (jzimmerman@waterboards.ca.gov) or me at (760) 241-7404 (pcopeland@waterboards.ca.gov).

Patrice J. Copeland

Patrice J. Copeland, P.G.
Senior Engineering Geologist

Enc.: Form 200

cc: State Clearinghouse (SCH 2014071057) (state.clearinghouse@opr.ca.gov)
Heidi Calvert, CA Dept. of Fish and Wildlife (Heidi.Calvert@wildlife.ca.gov)
Katherine Rubin, LADWP (Katherine.Rubin@LADWP.com)
Erin Hanlon, USACE (Erin.M.Hanlon@usace.army.mil)

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Comment Letter #7
Lahontan Regional Water Quality Control Board
Ms. Patrice J. Copeland, PG
Senior Engineering Geologist
14440 Civic Drive, Suite 200
Victorville, California   92392

7-1 Although mentioned in the original permit for the project, reverse osmosis water treatment brine is not used on Owens Lake as part of the dust mitigation program. The Waste Discharge Requirements (WDRs) explain that recycled return water from Managed Vegetation does go into "Operation Ponds." This occurs primarily when the irrigation lines are flushed in the spring and fall, and underground collection lines take brine from beneath the Managed Vegetation areas and transfer the brine to T8-West. The removal of underground brine improves conditions in the Managed Vegetation areas by providing more tolerable salt levels for the salt grass, thus allowing the salt grass to grow. Draft EIR Section 3.1.1.1 references the use of fresh and/or recycled water in Shallow Flood DCAs.

Originally, chemical addition in the T5-T8 Managed Vegetation DCAs included fertilizers, chemicals (chlorine, chloramines, bromine) to prevent fouling of drip irrigation systems, and polyphosphonate to prevent scale buildup. Monitoring has not detected any adverse effects from chemical use, and use in the existing Managed Vegetation areas has reduced as operation has continued. Note that these areas are not part of the Phase 9/10 Project.

The proposed Phase 9/10 Project does not include any drip irrigation systems, therefore chemical use related to those systems is not proposed.

Draft EIR Section 4.3.3.5 summarizes the ongoing ecological monitoring at the lake in compliance with the Regional Board's Amended Monitoring and Reporting Program (AMRP).

Groundwater quality degradation is not anticipated to result from Project operations; please see response to comment 7-2, below.

7-2 As described in the Initial Study for the proposed Project (Draft EIR Appendix A), construction of new areas of Shallow Flood may result in localized changes to shallow groundwater flow patterns. As part of the Owens Lake Groundwater Evaluation Project (OLGEP), MWH conducted an analysis of the effects of dust control on the hydrologic regime of the Owens Lake (MWH, 2011b). MWH reviewed historical groundwater level data from GPUAPCD shallow piezometers and other deeper monitoring wells before and after implementation of dust control. A review of hydrographs suggests that DCAs influence groundwater levels only immediately adjacent to the DCAs, and only in the very shallow piezometers on the lakebed. Comparison of water levels in shallow and deep monitoring wells generally indicates a consistent upward groundwater gradient, which implies that groundwater is flowing toward the ground surface, where it is ultimately consumed by evaporation.

The effect of dust control on groundwater appears to be limited to thin sand layers on the surface of the lake, because DCAs have no apparent effect on deeper aquifer zones. The presence of strong upward vertical gradients and relatively impermeable lakebed clays prohibits water from DCAs migrating downward into deeper aquifers. A review of groundwater level measurements before and after construction of dust control suggests that water from DCAs is not affecting flow directions or the amount of groundwater in storage in deeper aquifers. This is consistent with the fact that the DCAs are underlain by a large thickness of relatively impermeable clays which effectively isolate them from the deeper groundwater system (MWH, 2011b). Monitoring data show that the groundwater quality has not been affected over time (LADWP, 2014b). For these reasons, impacts on groundwater would be less than significant. Similarly, these conditions would limit cumulative impacts on groundwater; cumulatively considerable impacts to groundwater quality or quantity are not predicted. Additionally, ecological monitoring will continue on Owens Lake, although, threats to wildlife from dust control source waters have not been documented.

Regarding flooding, as described in the Initial Study for the proposed Project (Draft EIR Appendix A), a 100-year floodplain has been delineated on the Owens River and most of Owens Lake below the shoreline (Federal Emergency Management Agency [FEMA], 1986). Therefore, most of the Phase 9/10 Project DCAs are located within the mapped 100-year floodplain. However, the redirection of flood flows would not risk habitable structures since none are present on the lake. No levees or dams are present on the project sites and no off-site levees or dams would be modified as part of project implementation. The project would have no direct or cumulative impacts on flooding related to housing or habitable structures.

Cumulative impacts on biological resources are discussed in Draft EIR Section 6.2.3. Cumulatively, the Phase 7a Project, TwB2 and the Phase 9/10 Project are all predicted to maintain or enhance habitat values. Therefore, continued use of the HSM together with monitoring of the habitat values of the dust control areas is anticipated to maintain or enhance habitat values over existing conditions. Please note that the Owens Lake Habitat Management Plan has been developed to avoid direct and cumulative impacts to native wildlife communities that may result from the Dust Control Program. The Phase 9/10 Project, when considered in conjunction with past, present, and reasonably foreseeable future projects, is not expected to have any cumulatively considerable impacts on biological resources.

7-3 LADWP is aware that the original WDRs were developed during a time when the Lahontan Regional Board staff was primarily concerned with the effects of pollutants such as fertilizers, pesticides, herbicides, solvents, fuels, etc., on surface waters and ground waters. For this reason Lahontan chose to permit only the Southern Zones of the Lakebed. Subsequently Lahontan allowed other regions of the lakebed to be developed without a WDR because no fertilizer usage or other chemical addition was proposed in the other areas. As noted in Draft EIR Section 2.9, it is anticipated that construction and operation of the Phase 9/10 Project would also be done in conformance with the existing Board Order.

7-4 The National Wetland Inventory (NWI) parcels are barren types (e.g. Lacustrine, littoral, unconsolidated shore, seasonally flooded). Hydrophytic vegetation is absent for areas with less than 5 percent total vegetation cover, regardless of species. Given the absence of hydrophytic vegetation, jurisdictional wetlands are absent. The 2,700 acres referenced in the NWI are typically barren playa.

The DEIR provides wetland mapping in Appendix D starting on p. D-16 using the Wetland Delineation Manual (USACE, 1987) and revised in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE, 2008) using hydrophytic status of plant species from a recently revised plant list (Lichvar, 2013). The National Wetland inventory is a reconnaissance-level estimation of the location, type and size of wetland resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation used in the NWI depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted.

7-5 LADWP has received correspondence from USACE stating that it will not take jurisdiction over the Phase 9/10 Project area (Allen, pers. comm. 2015). LADWP is applying for a WDR from the Regional Board.

7-6 Implementation of the proposed Project is not anticipated to result in significant impacts on wetlands and the ability of the flood areas to promote beneficial uses will be maintained or enhanced. Thus, compensatory mitigation has not been required (Draft EIR Section 4.3.5.6). Design of the proposed Project will avoid 19.1 acres of wetland; all of the wetland in C2-L1 (7.1 acres), Duck Pond-L1 (10.9 acres), and T10-1 L1 (1.1 acres) will be avoided. Please see response to comment 5-7.

7-7 As noted in Draft EIR Section 2.9, construction of the Phase 9/10 Project would require a NPDES Construction Stormwater permit and implementation of BMPs as defined in a SWPPP. LADWP acknowledges that the project will require coverage under the General Construction Stormwater Permit, and will file a Notice of Intent.

7-8 Existing Shallow Flood DCA T18S would be drained prior to the start of construction activities in this DCA. However, no water diversions from surface waters are required for Project construction. LADWP intends to only discharge to land, not the brine pool, natural wetlands, or streams. Dewatering during construction would be conducted in conformance with Specifications Section 01563 Control of Water:

a. Discharge water into shallow flood basins or to the land surface within the work area limits shown on the drawings. Water discharged to the land surface may flow out of the work area limits onto the open playa to infiltrate and evaporate. Coordinate discharges to the land surface to avoid impacts to construction activities and existing dust control facilities.

b. Dewatering water shall not flow, be discharged, or be impounded within 500 feet of wetlands, snowy plover nests, or existing above-grade dust control facilities.

2. Implement best management practices (BMPs), such as retention basins in the dewatering discharge area, in accordance with the approved Regional Water Quality Control Board (RWQCB) National Pollutant Discharge Elimination System (NPDES) General Construction permit and its associated Storm Water Pollution Prevention Plan (SWPPP).

3. Comply with all procedures required by the RWQCB's National Pollutant Discharge Elimination System (NPDES) General Construction permit and its associated SWPPP, including sampling, inspections, training, BMPs maintenance, and corrective actions. Comply with the requirements of the Guidance Document for Storm Water Compliance water analysis and reporting. The Guidance Document for Storm Water Compliance is included in the SWPPP template. Water analysis shall be conducted by a certified laboratory as defined by the RWQCB.

4. Comply with procedures outlined in the RWQCB's "Lahontan Region (Basin Plan), Guidelines for Erosion Control".

7-9 LADWP will prepare the Report of Waste Discharge in order to amend the existing WDRs, and looks forward to working in a collaborative manner to develop the amended WDRs.

Earl Wilson
PO Box 830,
Lone Pine, CA
93545-0830

Comment #8

Los Angeles Department of Water and Power
Environmental Planning and Assessment
111 North Hope Street, Room 1050
Los Angeles, CA 90012

Attention: David Porter

Ref: Review and comments of Owens Lake "Draft EIR Phase 9/10 Project - Feb 2015"

Notes:
Headings w/document locations in ( ).
Bold/underlined = specific wording or topic in text.
n) = Question or comment in bold italics.

8-1

Section 1 – Summary

Figure 1-1 (pg 1-5)

#1) Suggest a separate Figure that shows the Phase 9/10 work areas in real life colors with crosshatch for one phase as opposed to the other i.e. Green for Vegetation, Blue for Flooding, Dark gray for Gravel and Brown for Tillage.

8-2

Table 1-2 (pg 1-5)

#2) Aesthetics: Should add that "after construction is completed there will be no constant burn nighttime lighting on the lakebed and temporary nighttime lighting will only be used when a person is actively working at that location or during emergency repairs".

8-3 ***#3) Air Quality: Release of methane from deep excavation and deep tillage is not addressed.***

8-4 ***#4) BIO-4: Lighting Best Management Practices. Same as #1.***

8-5 ***#5) Cultural Resources: The "Avoidance Alternative" should be approved to assure Less than Significant Impacts.***

8-6 ***#6) Greenhouse Gas Emissions: Same as #3.***

8-7 ***#7) Transportation and Traffic: Truck and employee traffic will also be impacting US 395.***

8-8

1.6
RELATED PROJECTS AND CUMULATIVE IMPACTS (pg 1-21, para 2)

Aesthetics. The proposed projects listed in Section 6.1 have the potential to alter aesthetics and views of the lake. The proposed Project plus the existing dust control and the Phase 7a Project (currently under construction), would total appr oximately 48.6 square m iles of DCAs on the lake. Under **TwB2** and the Owens Lake Master Pr oject, additional areas of Tillage and Gravel

#8) Tw2B not defined in: "ACRONYMS AND ABBREVIATIONS"

8-9

Section 3 – Project Description

Concrete Block Mat

#9) Even as used only as replacement for rip-rap this may be seen as an barrier by animals and birds such as a cattle guard. Additionally the gaps between the blocks could act as foot traps for animals trying to access the DCM areas i.e. coyote or fox etc.

8-10

Section 4.1 – Aesthetics

#10) Section does not address "Light and Glare".

Figure 4.1-4
8-11 **Dolomite Gravel and Playa Color Comparison** (Page 4.1- 7)

#11) Add a reference as to scale: elevation above surface i.e. 1000 ft. – 1 meter etc.

Section 4.2 – Air Quality

Table 4.2-3 (Page 4.2-8 & 9)

8-12 ***#12) There are 2 "Lone Pine Stations listed. Where is the other location and who operates it ??***

#13) Why are not ALL of the "Notes:" included here ??

#14) Why has the "Days above state standard (50 □g/m3)" data been removed/modified from this chart when credited to "Source: CARB, 2014" ??

Table 4.2-5 (Page 4.2-14, bullets 5 & 6)

Delivery trucks, support vehicles, and **<u>worker vehicles</u>** would travel 90 miles per day round trip to the site.

#15) After review of Appendix C – Table C-4, (Ref**<u>. Vehicle Class</u>** – "**<u>Passenger Vehicle</u>**") ***I am concerned that "Passenger vehicles" are not representative of the actual vehicles used by the majority of construction workers. Obviously no one has done an***
8-13 ***actual survey for this data which could have been done by a simple drive-by during current construction activities. This renders these calculations as being questionable.***

Average mileage per worker assumes 50 percent of workers are from Lone Pine (5 miles from Project site), 20 percent from Ridgecrest (48 miles from Project site), **<u>20 percent from Bishop</u>** (61 miles from Project site), and **<u>10 percent from Los Angeles</u>** (200 miles from Project site).

#16) After review of Appendix C – Table C-4. What type of vehicles do the Bishop operations workers drive from Bishop ??

#17) After review of Appendix C – Table C-4. Are the workers comminuting from LA using air transportation ??

Section 7 Additional CEQA Analyses

7.2.2 Biological Resources (pg 7-5)

BIO-4. Lighting Best Management Practices.

---(March 15 to August 15). **<u>All lighting, in par ticular any permanent lighting, on newly built facilities shall be minimized to the greatest extent possible</u>**, while still being in compliance with all applicable safety requirements. Required lighting shall be shielded so th at light is
8-14 directed downward and away from vegetation or playa areas.

#18) Should add that "after construction is completed there will be no constant burn nighttime lighting on the lakebed and temporary nighttime lighting will only be used when a person is actively working at that location or during emergency repairs".

Comment: The "greatest extent possible" is to turn off the light when no one is there !!

Conclusions: ***I am only referring this to the digital version of the document that I down loaded from the DWP web site - since I do not have easy access to the printed version. The editing in the document is atrocious <u>throughout</u>, with gaps and spaces between words that will give you a headache after about an hour of reading. See examples attached to next page. PDF Bookmarks do not***
8-15 ***work properly or not at all and either do not link as identified or just go to "blank" pages.***

DWP should be ashamed for releasing this DEIR to free range in the public domain. If I worked at the clearinghouse I would send it home for remedial adjustments !!

Thank you for the opportunity to make comments concerning this document,

Earl Wilson
Lone Pine - Resident

EXAMPLES:

2.1 LEAD AGENCY

LADWP is required to act as lead agency for the EIR , in accordance with State CEQA Guidelines Section 15367 (California Code of Regulations, 2011). LADWP is the largest municipal utility in th e nation. Established m ore than 100 years ago, LADWP's m ission is to deliver reliable, safe water and ele ctricity supplies to app roximately 4 m illion residents and businesses in Los Angeles. A five-m ember Board of W ater and Power Comm issioners establishes policy for LADWP. The Board members are appointed by the Mayor and confirm ed by the City Council for 5-year term s. The Board is the decision-m aking body for the consideration and adoption of the p roposed Project, EIR, Mitigation Monitoring and Reporting Program (MMRP), and Findings of Fact.

6.1.3.2 Owens Lake Groundwater Evaluation Project

The OLDMP Shallow Flooding and Managed V egetation DCAs are supplied with Los Angeles Aqueduct and Lower Owens River water, conveyed via the Lower Owens River Project (LORP) pump station. With the goal of ensuring the future availability of water supply for the DCMs and protecting the environm ent of Owens Lake, LADWP is studying the potential of using groundwater for a portion of dus t suppression activities. Since March 2009, LADWP staff have partnered with the Inyo County Water Department (ICWD), GBUAPCD, and MWH to develop a conceptual and num erical hydrogeological m odel of the Owens Lake groundwater basin. The Owens Lake Groundwater Evaluation Project (O LGEP) developed a data base of relevant groundwater information, formulated a conceptu al hydrogeological m odel, and im plemented a field monitoring program (including the dril ling of m onitoring wells) (MWH, 2012). The conceptual hydrogeological m odel was based on th e extensive previous studies of the Owens Lake groundwater basin and existing geol ogic and water quality inform ation. The conceptualization characterizes water budget, hydrostratigraphy, depositional history, water quality, aquifer parameters, structural geology, fa ulting, groundwater levels and flow gradients, springs and seeps, sensitive hab itats, and land subsidence. The conceptual model also involves a 3D visualization of the groundwater basin th rough the importation of lithologic logs into a groundwater modeling system (GMS).

Comment Letter #8
Mr. Earl Wilson
PO Box 830
Lone Pine, CA 93545-0830

8-1 In response to your comment, please see **Figure 2-3** included in Section 2 of the Final EIR. To protect cultural resources, areas with significant cultural resources excluded from the dust control project are not indicated.

8-2 Table 1-2 provides an overall impact summary for each environmental topic. In response to the comment, text in Draft EIR Section 4.1.4.1 has been expanded (please see Final EIR Section 2). Please also note that light and glare related to the proposed Project were described in the Initial Study (Draft EIR Appendix A).

8-3 While methane releases from wetlands, leakage from natural gas systems and the raising of livestock have been documented to contribute to greenhouse gas emissions, substantial release of methane from excavation or tillage of playa soils has not been observed during construction of earlier phases of the OLDMP and is not anticipated for the Phase 9/10 Project.

8-4 Please see response to comment 8-2.

8-5 The Draft EIR, comments received on the Draft EIR, and responses to comments will be presented to the LADWP Board of Water and Power Commissioners for their consideration. Prior to adoption of the Phase 9/10 Project, the Board of Water and Power Commissioners will consider which project most effectively balances and protects the competing interests of protecting air quality while ensuring the protection and preservation of cultural resources. The Commissioners may adopt the originally proposed Phase 9/10 Project or an alternative to the proposed Project. Your support for the Avoidance Alternative is noted and will be considered by the Commissioners. Please also see Section 1 of this Final EIR regarding removal of the significant cultural sites, and buffers, from the area ordered for dust mitigation by GBUAPCD.

8-6 Please see response to comment 7-3.

8-7 As described in the Initial Study for the proposed Project (Draft EIR Appendix A), traffic related to the Project would have less than significant impacts on Highway 395.

8-8 TwB2 is the acronym for Tillage with Shallow Flooding BACM Backup. It is defined in Section 5.6.1 of the Draft EIR. In response to your comment, Section 8.3 of the Draft EIR has been updated to include this acronym (see Section 2 of the Final EIR).

8-9 As described in Draft EIR Section 4.3.5.4, the concrete blocks are small (6.5 inches x 6.5 inches x 2.25 inches) with 1.5-inch spacing between the blocks to give the mat flexibility and to allow contouring to the land. The blocks would be tapered to the gaps such that the 1.5-inch spacing between blocks would not impede or strand plover or other shorebird chicks. Similarly, larger animals such as coyotes or fox would not be impeded or stranded by concrete block mat.

8-10 Light and glare are discussed in the Initial Study for the proposed Project (Appendix A of the Draft EIR). Impacts related to light or glare that could affect day or nighttime views of the project area would be less than significant. Mitigation for potential impacts to wildlife related to lighting is defined in Draft EIR Section 4.3.6 (Measure BIO-4 Lighting Best Management Practices).

8-11 Figure 4.1-4 is provided for color comparison of playa to dolomite gravel. All photographs were taken at ground level. The specific elevation of the locations was not noted at the time the photos were taken, but would not add additional information as to the color comparison.

8-12 Draft EIR Table 4.2-3 provides a summary of background air quality data for Owens Lake. In response to your comments, Table 4.2-3 has been revised to clarify footnotes and to delete a duplicate entry for the Lone Pine monitoring station (see Final EIR Section 2). Regarding the results for days above the state standard, according to CARB iADAM air quality statistics, there were insufficient (or no) data available to determine the values.

8-13 Regarding the mileage assumptions for construction workers, the percentages are based on an assumption that some workers may commute daily, or more likely weekly, to somewhat distant locations. An average of 90 vehicle miles traveled per day is a conservative assumption which results in greater estimated temporary vehicle emissions than an assumption of a local-only workforce. Please note that emission rates for passenger vehicles encompass cars, small pickup trucks and other vehicles below 8,500 pounds. Although LADWP staff from Bishop would occasionally visit the lake during construction of the Project (driving cars and trucks), these trips would be similar to existing conditions. Day-to-day management of the construction project would be performed by staff located in Keeler, and remotely from Los Angeles.

8-14 Please see response to comment 8-2.

8-15 LADWP regrets your experience with the electronic files of the Draft EIR and encourages you to reach out to LADWP staff with any technical issues concerning future electronic documents. The contact person for the Phase 9/10 Project environmental documents, as noted in the Notice of Availability, is David Porter.

APPENDIX VII-1
AIR QUALITY MODELING REPORT

DRAFT FINAL

Prepared for:

Great Basin Unified Air Pollution Control District
Bishop, California

Prepared by:

Ramboll Environ US Corporation
Lynnwood, Washington

Date:

February 2016

Project Number:

03-20823

2016 OWENS VALLEY PLANNING AREA PM_{10} STATE IMPLEMENTATION PLAN

AIR QUALITY MODELING REPORT

RAMBOLL ENVIRON

CONTENTS

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SUMMARY

A Hybrid Model combining predictions from the CALPUFF dispersion modeling system with PM_{10} monitoring data was applied to simulate dust events at Owens Lake to support the 2016 Owens Valley Planning Area (OVPA) PM_{10} State Implementation Plan (SIP). The modeling approach focused on days from July 2009 to June 2014 where PM_{10} sampling data were over the 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS). On each of these days, the District used data collected by the Dust ID Program to estimate both an observed component and a contribution coming from source areas on the lakebed and the Keeler Dunes.

One hundred and eighty-eight days at 10 monitoring sites with a sufficient length of record around the lakebed were identified in the five-year period where PM_{10} concentrations were above 150 µg/m^3. Using wind direction screening techniques, the PM_{10} data were divided into “in-network” and “out-of-network” components where the “network” refers to the areas covered by the Dust ID sand motion monitoring program. The out-of-network portion of the observed PM_{10} on these days was typically around 20 µg/m^3, but for 53 of the 188 days the out-of-network component alone exceeded 150 µg/m^3.

Source activity measurements on the lakebed and within the Keeler Dunes are collected by the Dust ID Program and the contribution to observed PM_{10} concentrations at shoreline monitoring sites from such areas can be reconciled using dispersion modeling with the CALPUFF modeling system. Windblown PM_{10} emissions from lakebed source areas and the Keeler Dunes were estimated using a simple relationship based on sand fluxes measured at a single height above the surface and an empirical constant referred to as a “K-factor”. The District has conducted a field program at Owens Lake since January 2000 to identify PM_{10} emission source areas, estimate PM_{10} emission fluxes, and to model downwind PM_{10} concentrations using the CALPUFF modeling system. These techniques have been used in the 2003 SIP, the 2008 SIP, and in Supplemental Control Requirement Determinations since the 2008 SIP.

Model performance for both the CALPUFF predicted component and the total Hybrid Model predictions were assessed for the exceedance days in the July 2009 to June 2014 baseline period. The CALPUFF simulations of the data collected by the Dust ID Program were found to provide conservative estimates for the higher observed PM_{10} concentrations coming from the lakebed and the Keeler Dunes. The Hybrid Model improved the CALPUFF model’s performance by combining the daily out-of-network components. Seventy-two percent of the predictions were within a factor-of-two and 45 percent of the geometric variance was explained when the samples were paired in time and by monitoring site. The upper-end of the observed frequency distribution was slightly biased towards over-prediction, providing conservative estimates to help ensure the NAAQS will be attained in the future.

The Hybrid Model was applied to assess controls implemented on the lakebed since June 2014 and those planned in the future. CALPUFF model predicted source contributions from the 5-year baseline period were scaled by control efficiencies developed for each subsequent year as different Dust Control Measures are implemented. For the purposes of the attainment demonstration, it was assumed off-lake source area contributions would likely decline with a time scale of 3-years as nearby lakebed and Keeler Dune source area controls are implemented. The interrelationship between the primary and secondary source areas is based on an examination of PM_{10} sampling data

measured at Dirty Socks at the southern end of the lakebed, showing concentrations from off-lake source areas will decline after controls are implemented in adjacent lakebed source areas.

The Hybrid Model predicts the OVPA would be in attainment by dust year 2017/2018 following the implementation of the last set of controls on the lakebed in 2016. The highest future year predictions are at Lizard Tail, because this site had the highest initial design concentration and due to the proximity of this site to nearby lakebed sources controlled at later implementation years.

1. INTRODUCTION AND RATIONALE

This report describes dispersion modeling studies conducted to support the Owens Valley Planning Area (OVPA) PM_{10}[1] State Implementation Plan for 2016 (2016 SIP). A Hybrid Model combining dispersion model simulations with the CALPUFF modeling system and observations at the monitoring sites surrounding the lakebed was used to diagnostically aid in the identification of source areas, to develop PM_{10} emission flux algorithms, and to simulate the effects of different control strategies. The Hybrid Model simulations formed the basis of the attainment demonstration required by the US Environmental Protection Agency (USEPA) for the 2016 SIP. After providing some background information, the remainder of this report gives an overview of the field program and describes hybrid modeling methodologies used to assess a control strategy for attainment.

1.1 Background

The purpose of the 2016 SIP is to provide a plan to (1) attain the National Ambient Air Quality Standard (NAAQS) for PM_{10} as required by the Clean Air Act (CAA) and its 1990 Amendments and (2) implement the provisions of the 2014 Stipulated Judgment between the Great Basin Unified Air Pollution Control District (GBUAPCD or “District”) and the City of Los Angeles (“City”) (“2014 Stipulated Judgment”). The 2014 Stipulated Judgment provides for the continued operation of existing dust control measures and for the implementation of additional control measures in order to attain and maintain compliance with state and federal air quality standards (City of Los Angeles, et al. v California Air Resources Board, Sacramento County Superior Court, Case No. 34-2013-80001451-CU-WM-GDS).

The 2016 SIP revises the requirements contained in the 2008 OVPA PM_{10} SIP (2008 SIP) prepared in response to a finding by the USEPA that the OVPA did not attain the NAAQS for PM_{10} by December 31, 2006, as mandated by the CAA (USEPA, 2007). As required by CAA Sections 188(e) and 189(d), the 2008 SIP provided for attainment as soon as practicable and committed to achieving at least a five percent annual reduction in PM_{10} emissions starting from a 2006 emission inventory base year. The 2016 SIP revision continues the commitment to attain the NAAQS by providing a control strategy to implement control measures on additional areas at Owens Lake and to approve the use of new dust control measures to augment the existing Best Available Control Measures (BACM) that were available in the 2008 SIP.

Air Quality dispersion modeling has been used as a tool to identify source areas contributing to high daily PM_{10} concentrations observed within the OVPA, develop control strategies, and assess attainment of the NAAQS since the 1998 OVPA SIP (GBUAPCD, 1998). Starting with the 2003 SIP (GBUAPCD, 2004), the CALPUFF modeling system has been applied to simulate data collected by the District since January 2000. These data include sand motion measurements, meteorological observations, video camera imagery, and source area delineation. The modeling techniques and the data collection, referred to as the Dust ID Program (Ono, et. al., 2003; Gillette, et. al. 2004), have been used to support the 2003 SIP, 2008 SIP, and the Supplemental Control Requirement Determinations (SCRD) conducted since the 2008 SIP. The modeling methodology can also be found on the USEPA’s website as *OTM 30 - Method to Quantify Particulate Matter Emissions from Windblown Dust* http://www3.epa.gov/ttn/emc/prelim.html (USEPA, 2012).

[1] Particulate matter less than 10 microns in diameter (PM10)

The OVPA dispersion modeling techniques have evolved as more Dust ID Program data have been collected including: more resolved source area delineations; 5-minute records of sand motion and meteorological data; additional PM_{10}, meteorological, and sand motion sampling sites; and increased video camera surveillance. Modeling methods have also changed in response to feedback from the City, the advice from an Expert Panel formed following the 2008 SIP, and more recently meetings with CARB and USEPA staff. With the control of the largest source areas on the lakebed starting in 2001, the Dust ID program has adapted in response to the increased influence of smaller sources on the lakebed and relative contributions from off-lake sources surrounding the lakebed.

The dispersion modeling techniques applied for the 2016 SIP attainment demonstration mark a change in the methods used in previous assessments. A Hybrid Model was applied placing more influence on the PM_{10} monitoring data and the sources of windblown dust not captured within the sand motion monitoring network. The rationale for the Hybrid Model is proved in the next section.

1.2 Hybrid Model Rationale

A Hybrid Model was applied to assess attainment and to evaluate control strategies for the 2016 OVPA PM_{10} SIP. The Hybrid Model consists of two components: simulations of lakebed and Keeler Dune source areas with the CALPUFF modeling system using data from the Dust ID Program; and an observed portion derived from the PM_{10} monitoring data on days exceeding the PM_{10} NAAQS. The baseline period for the assessment was July 2009 to June 2014, the last 5 years of Dust ID Program measurements analyzed by the District.

The rationale for the hybrid modeling approach was based on many years of Dust ID Program measurements, recent meetings with USEPA and CARB staff, and many previous studies conducted in the Owens Valley over the last 40 years by multiple investigators. As discussed in the 2016 SIP, emission inventory estimates for days with high PM_{10} concentrations in the OVPA are dominated by windblown dust sources. The primary sources of windblown dust include source areas on the lakebed, the Keeler Dunes, the Olancha Dunes, secondary source areas close to the historic 3600' shoreline, intermittent sources near the lakebed caused by flash flood deposits, and occasionally large scale regional events associated with the passing of a severe frontal system. Measurements and observations have shown there are no significant sources of windblown dust within the OVPA outside the immediate area of the lakebed (Holder, 2016).

As lakebed sources have been controlled since 2001, the number of exceedance events and magnitude of PM_{10} concentrations observed at monitors surrounding the lake have been greatly reduced (GBUAPCD, 2015). The lakebed source influence has declined and now the Keeler Dunes, Olancha Dunes and secondary sources of windblown dust near the shoreline comprise a larger fraction of the PM_{10} on days exceeding the NAAQS.

Ono and Howard (2015) conducted a study of the link between lakebed sources and off-lake sources. Visual observations and other data from the Dust ID Program suggests most of the off-lake dust source areas in the OVPA are located near the lakebed primarily along the southern, eastern, and northern shorelines. An investigation of the history and morphology of the Keeler Dunes found the natural dune area expanded following the drying of Owens Lake. Observations of the Keeler Dunes found that following the implementation of shallow flood dust control measures in 2001 in the area west of the dunes, the dunes not only stopped expanding, but began to erode along the upwind edge after the sand source was cut off (GBUAPCD, 2012).

Similar to the Keeler Dunes, other off-lake dust source areas are thought to be closely tied to erosion activity in adjacent lakebed areas (i.e. shore lands adjacent to the northern and southeastern portions of the historic lake bed). With the limited supply of sand and dust in these off-lake areas, PM_{10} present in the deposited soil is expected to be winnowed out over time, resulting in lower PM_{10} emissions. Such a decrease in PM_{10} emissions and downwind concentrations were observed at Owens Lake near the Dirty Socks PM_{10} monitor site. A comparison of off-lake and lakebed PM_{10} impacts measured at the Dirty Socks monitor site found dust from off-lake areas was closely linked to dust activity in adjacent lakebed areas (Ono and Howard, 2015). The results showed the downward trends in on-lake PM_{10} exceedance numbers and concentration levels closely matched the trends in off-lake areas based on a three year averaging time.

Prior to deciding on the hybrid modeling approach, the District attempted to apply the CALPUFF dispersion model to off-lake areas outside the sand motion monitoring network in a fashion similar to the techniques used for the Keeler Dunes and lakebed sources. Unlike the lakebed source areas, there is an absence of sand motion data for most off-lake areas so for those areas, PM_{10} emissions were based on sand motion estimates using the Gillette Model for sand flux (Ono, 2006). However, this approach did not satisfactorily simulate emissions from the off-lake areas and therefore the off-lake dispersion model performed poorly in predicting PM_{10} concentrations at the monitoring sites.

In the absence of reliable simulations for the off-lake source areas except the Keeler Dunes, a Hybrid Model was developed to combine model predictions with monitoring data on exceedance days at the PM_{10} sampling sites. The attainment demonstration only examines compliance at these locations. However, the PM_{10} sampling sites were selected to be downwind of the largest PM_{10} source areas or in communities of interest, and therefore monitor concentrations are representative of PM_{10} impacts in the areas of the expected highest impact and in the communities. During the modeling period, there were ten monitoring sites surrounding the lakebed, several sites located on the lakebed and a number of off-lake locations where portable PM_{10} monitors were sited when dust events were forecasted. Compliance at the monitoring locations and the hybrid modeling approach using dispersion and receptor-based modeling is consistent with the USEPA's SIP Development Guideline (USEPA, 1987).

The remainder of this section provides: an overview of the Dust ID Program, describes the methods used to estimate the contributions from sources outside the Dust ID sand motion monitoring network, summarizes dispersion modeling techniques with CALPUFF, and presents attainment demonstration methods and results.

2. OVERVIEW OF THE DUST ID PROGRAM

The District started a field monitoring program at Owens Lake in January 2000 to identify PM_{10} emission source areas, and to estimate their PM_{10} emissions and downwind concentrations at the shoreline. The Dust ID Program was designed based on previous observations and field studies suggesting PM_{10} emissions are related to the flux of saltating sand-sized particles. These data have been used to support development of both the 2003 and 2008 SIPs. The District has also used the data combined with dispersion modeling to identify candidate source areas for further supplemental control since the 2008 SIP. The data used in the 2016 SIP were collected during July 2009 through June 2014 using the methods described in the Owens Lake Dust ID Field Manual (GBUAPCD, 2007), 2008 SIP, and 2011 to 2014 SCRDs.

Figure 1 and Figure 2 are maps of Owens Lake showing the locations of the meteorological, sand motion, and PM_{10} monitoring stations during July 2009 and July 2013, respectively. Features of the Dust ID Program are as follows:

- Co-located Sensits and Cox Sand Catchers (CSCs) were used to estimate 5-minute sand flux rates at the monitoring sites shown in Figure 1 and Figure 2. Sensits measure the kinetic energy and the particle counts of sand-sized particles as they saltate (bounce) across the surface. CSCs are passive instruments used to collect sand-sized particles blown across the surface during a dust event. For a given period, the total mass of saltating sand was based on the CSC catch. The Sensits were then used to time-resolve the horizontal sand flux (Ono, et al., 2003, Gillette, et al., 2004). The sand motion monitoring network is constantly evolving with the addition of sites located to examine new source areas as they become active and with the removal of sites as source areas are controlled. During July 2009 through June 2014 the number of sand motion sites in the Dust ID network ranged from 200 to 230 locations.
- At different times during July 2009 through June 2014, hourly PM_{10} concentration data were collected at 33 sites around Owens Lake using Tapered Element Oscillating Microbalance (TEOM) PM_{10} monitors. TEOMs are a USEPA-designated equivalent method for measurement of PM_{10} concentration. The TEOMs are used to assess compliance at 13 off-lake monitoring sites. Additional special purpose monitoring on the lakebed at 20 different sites has been used to aid in the identification of source areas, examine the effectiveness of control measures, assess model performance, and refine PM_{10} emission fluxes.

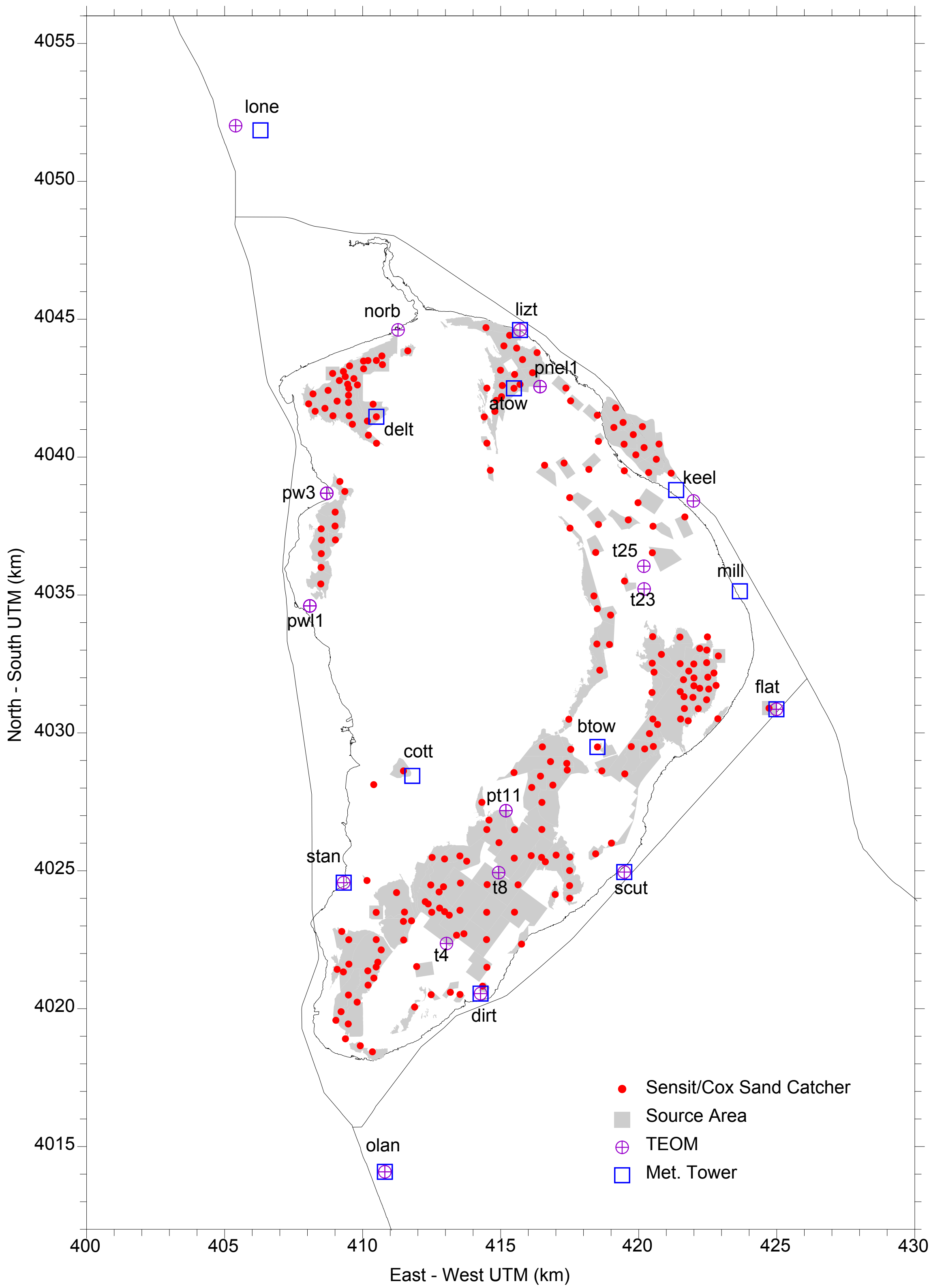

Figure 1: Dust ID Network for July 2009

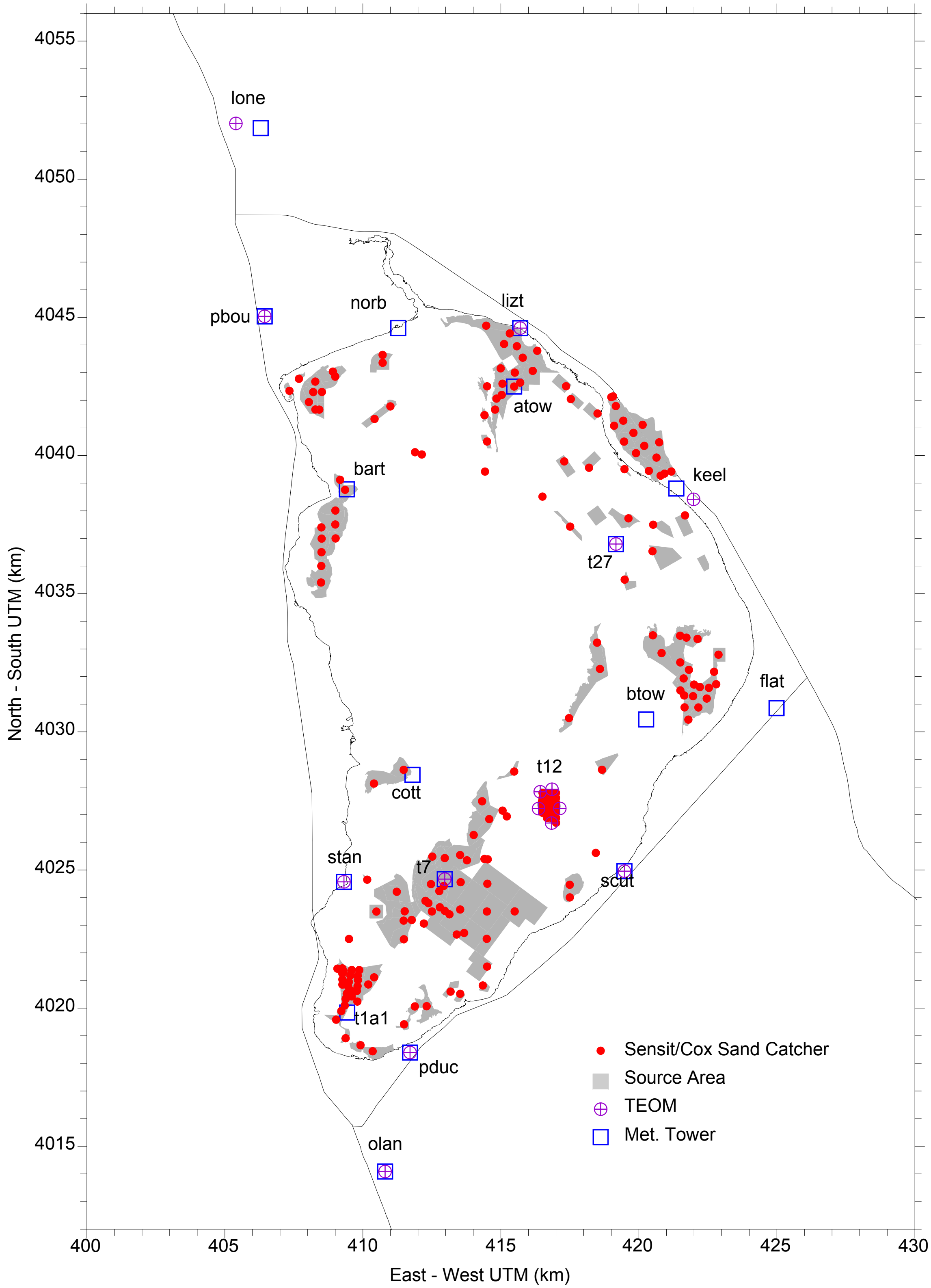

Figure 2: Dust ID Network for July 2013

- Five-minute and hourly surface meteorological data were collected at up to 16 District stations within the domains shown in **Figure 1** and **Figure 2**. These data were augmented by two additional District sites south of the domain and several sites operated by the City during periods of the five-year study.
- To help verify the location of dust source areas, for the last 10 years 16 time-lapse video cameras were installed to continuously record dust events during daylight hours. Initially three human observers mapped dust source areas and plumes during the storms on regular workdays. In later years, techniques were developed to map source areas on the lake from the video camera archive. In addition, the erosion boundaries of source areas were mapped with the aid of a field crew using a Global Positioning System (GPS) after dust storms following procedures in the Dust ID protocol (GBUAPCD, 2007).
- Two additional video camera views in the northern portion of the OVPA outside of the modeling domain were installed in October 2013 at the Owens Valley site to record regional transport into the domain from the north. The cameras at this site are also used to identify local source areas in the northern OVPA not included in the current sand motion monitoring network on and adjacent to the lake bed. Most of the southern portion of the OVPA in and around Owens Lake is visible from the cameras located within the modeling domain. (Holder, 2016)

A large Geographic Information System (GIS) database was constructed using observations collected during the Dust ID Program. The Owens Lake Dust ID Field Manual provides further detail (GBUAPCD, 2007). Using the GIS database, the District prepared maps displaying sand movement, winds, visually observed plume and source area boundaries, and PM_{10} concentrations for dust events at Owens Lake during the 2016 SIP study period. Many aspects of the database are accessible to the public through the District's website (http://www.gbuapcd.org/owenslake.htm).

3. EXCEEDANCE DAYS, OUT-OF-NETWORK CONTRIBUTION, AND BACKGROUND

Dust ID Program data were examined to identify "exceedance days" for the PM_{10} monitoring sites surrounding the lakebed from July 2009 to June 2014. For the purposes of the OVPA attainment demonstration, USEPA required in the approval of the 1998 Owens Valley SIP that the standard be met at the historic shoreline located at the 3,600 foot elevation (64 FR 34178). Special purpose sampling at the portable TEOM locations and sites on the lakebed were not included in the analysis. Special purpose monitor sites are denoted by a "p" for portable and "t" for temporary as the first character in the site names shown in Figure 1 and Figure 2. For the remaining 10 sites, every day exceeding 150 µg/m^3 was selected for further analysis. A summary of the 188 exceedance days with at least 18 hours of valid data is shown in Table 1. Note the Flat Rock monitor was relocated to the Mill Site in 2012.

Table 1: Summary of Exceedance Day PM_{10} Concentrations for July 2009 to June 2014

Site Name	ID [1]	Years	N > 150 µg/m^3	Maximum PM_{10} (µg/m^3)	Design PM_{10} (µg/m^3) [2]
Dirty Socks	dirt	3	26	1,437	998
Flat Rock	flat	2	9	871	233
Keeler	keel	5	33	2,994	518
Lizard Tail	lizt	5	42	4,571	1,654
Lone Pine	lone	4	1	169	#N/A
Mill Site	mill	1	7	754	712
North Beach	norb	3	17	1,536	385
Olancha	olan	5	22	779	310
Shell Cut	scut	5	23	2,149	395
Stanley	stan	5	8	286	180

Notes:

[1] TEOM locations are shown in Figure 1 and Figure 2.

[2] Design day based on n+1 highest in n years. For example the 6th highest in 5 years or the 2nd highest in 1 year.

Wind direction screening was applied to apportion daily exceedance PM_{10} concentrations into in-network versus out-of-network contributions. Hours with wind directions towards the TEOMs from the lakebed and Keeler Dune Sensit network were considered in-network hours. The daily average PM_{10} concentrations from all other wind directions were assumed to be the out-of-network contribution to be added to dispersion model predictions for the same day and TEOM site. The wind direction screening limits for each PM_{10} sampling site are shown in **Table 2**.

Table 3 summarizes the out-of-network contributions to daily average PM_{10} contributions on exceedance days during July 2009 to June 2014. Some of the highest contributions occur during some of the larger regional events. However, the median or typical contributions are much smaller and range from 4 µg/m^3 to 223 µg/m^3, at Dirty Socks and Shell Cut, respectively. The overall median or most likely daily PM_{10} contribution for out-of-network sources is 19 µg/m^3, close to the background concentration of 20 µg/m^3 used in the 2003 SIP, 2008 SIP, and all the SCRD analyses. The background concentration used in previous studies was derived from the lowest PM_{10} concentrations at any site in the Dust ID Program on days where any site in the network exceeded 150 µg/m^3 (Ono, 2002). The previous analysis also applied wind direction screening to remove hours within the daily averages from lakebed source areas.

Table 2: Wind Direction Screening Angles Used to Assess Winds from the Dust ID Sensit Network to PM_{10} Sampling Sites

TEOM [1]	Meteorological Tower [1]	Min. Wind Direction [2]	Max. Wind Direction [2]	Spans North?
Lone Pine	Lone Pine	126	176	No
Keeler	Keeler	151	330	No
Flat Rock	Flat Rock	224	345	No
Shell Cut	Shell Cut	227	33	Yes
Dirty Socks	Dirty Socks	234	50	Yes
Olancha	Olancha	333	39	Yes
Stanley	Stanley	349	230	Yes
North Beach	North Beach	55	250	No
Lizard Tail	Lizard Tail	128	288	No
Mill Site	Mill Site	157	333	No

Notes:

[1] TEOM and Meteorological Tower locations are shown in **Figure 1** and **Figure 2**.

[2] Degrees from North.

Table 3: Out-of-Network Source Contribution Summary on Exceedance Days for July 2009 to June 2014

Site Name	ID [1]	Median PM_{10} ($\mu g/m^3$)	Maximum PM_{10} ($\mu g/m^3$)	N > 150 $\mu g/m^3$
Dirty Socks	dirt	4	244	4
Flat Rock	flat	41	652	2
Keeler	keel	16	2,979 [2]	4
Lizard Tail	lizt	18	3,444 [2]	14
Lone Pine	lone	165	165	1
Mill Site	mill	9	350	2
North Beach	norb	21	570	5
Olancha	olan	8	293	1
Shell Cut	scut	223	2,125 [3]	16
Stanley	stan	133	277	4
All Sites		19		

Notes:

[1] TEOM locations are shown in Figure 1 and Figure 2.

[2] Occurred during December 1, 2011 Dust Event

[3] Occurred on May 25, 2012

The Hybrid Model uses actual measured background to account for the sources not included in the dispersion modeling analysis as opposed to a constant of 20 $\mu g/m^3$ used in previous regulatory analyses. The out-of-network contributions are typically around 19 $\mu g/m^3$, but as shown in Table 3 can be much higher. Half the out-of-network daily contributions are lower than used in the 2003 SIP, 2008 SIP, and SCRDs and some are as low as no contribution.

For the purposes of conservative estimates in the attainment demonstration, the out-of-network contribution was not allowed to be lower than 20 $\mu g/m^3$. This limit is about double the average hourly PM_{10} concentration within the Dust ID network for all hours with wind speeds less than 6 m/s between 1993 and 2015 (Howard, 2016). A typical background for non-windblown sources affecting sampling sites in the OVPA appears to be around 10 $\mu g/m^3$ and on windy days the contribution of the out-of-network sources increases to about 20 $\mu g/m^3$. Conceptually, the increase is assumed to be caused by wind suspension from “natural” desert surfaces on windy days. Contributions above 20 $\mu g/m^3$ are assumed to be the result of either local wind suspension from secondary sources close to the shoreline or from very large scale regional events that affect the entire OVPA.

4. DISPERSION MODELING APPROACH

The Hybrid Model combines an observed PM_{10} component representing sources not within the District sand motion monitoring network with dispersion model predictions from source areas on the lakebed and within the Keeler Dunes where the District observes sand motion every 5-minutes at over 200 locations. This section summarizes the dispersion modeling component of the Hybrid Model used to assess attainment.

The CALPUFF modeling system was selected for assessing lakebed and Keeler Dune source contributions to observed PM_{10} concentrations on exceedance days for the 2016 SIP. The subsequent reduction in contributions from these sources as controls are implemented, combined with the out-of-network components, were used to assess attainment in future years.

CALPUFF is the USEPA recommended modeling approach for long-range transport studies (40 CFR Part 51, Appendix W). USEPA also recommends application of the modeling system on a case-by-case basis to near-field dispersion problems when the three-dimensional qualities of the wind field and/or non-steady state dispersion phenomena are of interest. Observations during the Dust ID Program indicate dust events on Owens Lake are sometimes influenced by complex wind patterns, with plumes from the northern source areas traveling in different directions than plumes from the southern source areas. In some of the more extreme events, westerly downslope and gap winds over portions of the Sierras result in a large eddy forming over the modeling domain.

CARB and the USEPA approved the application of CALPUFF during their review of the modeling protocol for the 2003 SIP and their approval of the 2010 PM_{10} Maintenance Plan and Redesignation Request for the Coso Junction Planning Area (USEPA, 2004; 75 FR 36026). CARB Staff assessments of the SCRDs also conclude the CALPUFF model as part of the Owens Lake Dust Identification Protocol is consistent with USEPA's technical guidance (CARB, 2012).

The CALPUFF modeling techniques for the lakebed and Keeler Dunes follows the same general methods as applied in the 2003 SIP, 2008 SIP, and SCRD modeling analyses. The major differences are as follows:

- Five-minute sand motion and meteorological data were used as the basis for the simulations. Simulations performed with these data are more chaotic than simulations with hourly data and tend to more closely resemble the characteristics depicted in imagery from dust storms observed in the OVPA. The District has also conducted several different model performance analyses as part of the SCRDs and the results suggest the more stochastic simulations slightly improve model performance.
- A later Version 6.42 of the CALPUFF modeling system was employed that could utilize the 5-minute emissions and wind data.
- Features of the source characterization have changed slightly. Source areas were better resolved, especially near the historic 3,600’ shoreline. Source areas were divided to account for internal changes of land ownership or the presence of Eligible Cultural Resource (ECR) areas to allow a more refined tracking of source contributions.
- The methods used to estimate PM_{10} emissions from sand motion data were modified slightly with revised default seasonal constants based on 5-minute simulations of the baseline period and seven general source regions on the lakebed.

Further details concerning the CALPUFF simulations are provided in the remainder of this section.

4.1 Preparation of the Meteorological Data

Preparation of the meteorological data for the dispersion modeling followed the same basic procedures used in the 2003 and 2008 SIPs except later versions of the CALPUFF modeling system were employed to utilize available 5-minute surface observations. Three-dimensional wind fields at 5-minute intervals for CALPUFF were constructed from surface and upper air observations using Version 6.4.0 of the CALMET meteorological preprocessor. CALMET combines surface observations, upper air observations, terrain elevations, and land-use data into the format required by CALPUFF. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model.

4.1.1 Model Domain

The model domain shown in **Figure 3** is a 34 km-by-48 km (21 by 30 mile) area centered on Owens Lake. The extent of the model domain was selected to include the "data rich" study area, important emission source areas, terrain features that act to channel winds, and receptor areas of interest. The meteorological grid used a one-kilometer horizontal mesh size with ten vertical levels ranging geometrically from the surface to four kilometers aloft.

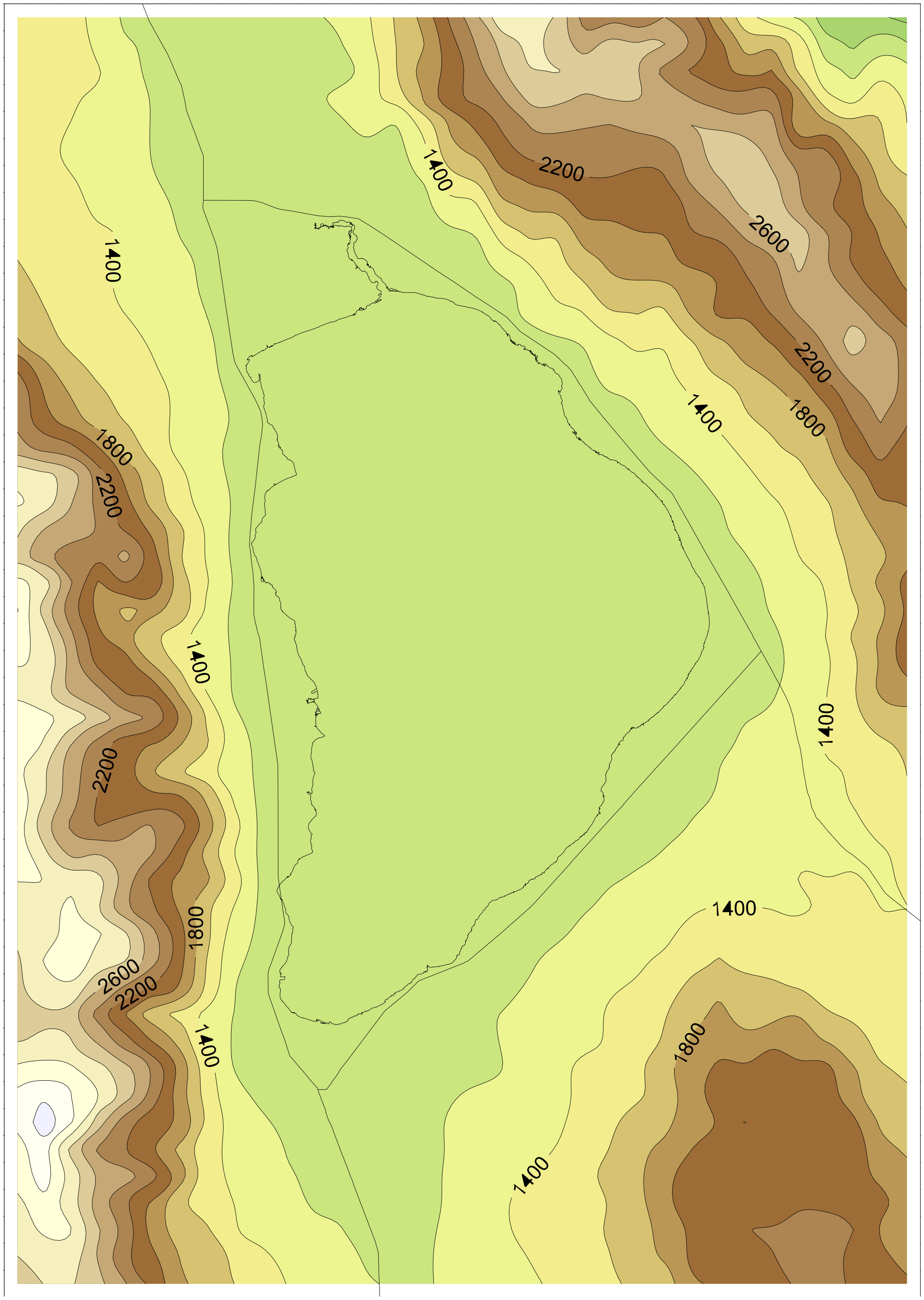

Figure 3: CALPUFF Model Domain and 1-km Mesh Size Terrain Contours (m)

4.1.2 Surface Observations

The majority of the necessary surface meteorological data came from the District's network of ten-meter towers shown in **Figure 1** and **Figure 2** and two District stations south of the domain at Coso Junction and Coso Gate. Very few periods of missing data were contained in the District's database. Periods of missing data were flagged and CALMET constructed the wind fields using the data from the remaining stations. In addition to the District's network, surface data from the City's field programs at Owens Lake were used when available. Five-minute observations from both District and City surface sites were used whenever available.

4.1.3 Cloud Cover

CALMET requires cloud cover and ceiling height observations. Cloud cover is a variable used to estimate the surface energy fluxes and, along with ceiling height and wind speed is used to calculate the Pasquill stability class. The Pasquill stability class is a measure of atmospheric stability and influences the predicted dispersion of dust plumes by CALPUFF. Hourly cloud cover and ceiling height observations were collected from the surrounding surface airways observations at China Lake and Bishop Airport. During dust event conditions, the sensitivity of the CALPUFF modeling system to these variables is reduced, as the stability class becomes neutral under moderate to high winds. Algorithms within the modeling system depending on the surface energy fluxes are dominated by the momentum flux and tend to be insensitive to cloud cover under high winds. For these reasons, the absence of local cloud cover and ceiling height measurements are not expected to significantly affect the results of the modeling study.

4.1.4 Upper Air Data

The upper air data for CALMET included regional twice-daily upper air soundings from Las Vegas, Reno, Desert Rock Airport (Mercury, Nevada), and China Lake Naval Air Station. China Lake and Desert Rock observations were used prior to July 2010; Reno observations were used from July 2010 to December 2010; and Las Vegas soundings have been used since January 2011. The twice daily soundings provide upper level temperature profiles and lapse rates used by CALMET to estimate the depth of the boundary layer.

CALMET options were selected to estimate upper level winds within the domain by extrapolating local surface wind measurements aloft. The power law exponents used to construct the profiles are based on Wind Profiler measurements conducted at Owens Lake from January 2001 to June 2004. During this period, a 915 MHz Radar Wind Profiler and Radio Acoustic Sounding System were used to collect upper level wind and temperature measurements at two different locations within the modeling domain. Wind profile characteristics based on measurements from windy periods during the field study have been used in CALPUFF modeling studies to estimate upper level winds since the Wind Profiler was decommissioned in June 2004.

4.1.5 CALMET Options

The options employed for the application of CALMET to construct the wind fields are the same as used in the 2003 SIP, 2008 SIP, and SCRD modeling analyses. The majority of the selected model options are based on the defaults incorporated in the code by the model author. Notable model options include:

- Ten vertical levels varying geometrically from the surface to 4000 m. The geometric spacing provides better resolution near the surface and the upper limit is high enough to be above the boundary layer height.

- Vertical extrapolation of surface winds aloft using the results of the Wind Profiler studies as discussed above.
- Less than default smoothing of wind fields. City consultants suggested less smoothing of the wind fields by CALMET after review of the 2003 SIP Modeling Protocol.

The wind fields constructed with CALMET were randomly checked with the CALDESK™ software package and by plotting the resultant fields and the surface observations on a base map.

4.2 PM_{10} Emissions and Source Characterization

This section describes the methods used to calculate 5-minute windblown PM_{10} emission fluxes for dispersion model simulations at Owens Lake. PM_{10} emission fluxes from lakebed source areas and Keeler Dunes were calculated using 5-minute sand flux activity data and the following simple relationship:

$$Q_a = K_f \times q_{15} \qquad \text{Equation 1}$$

Q_a = vertical PM_{10} emission flux (g/(cm^{2}hour))

K_f = an empirical constant (referred to as the K-factor)

q_{15} = the horizontal sand flux measured at 15 cm above the surface (g/(cm^{2}hour))

Field data at Owens Lake suggest the horizontal sand flux at a single measurement height is proportional to the total horizontal sand flux and is a good indicator of wind erosion processes generating PM_{10} emissions. The total horizontal sand flux is a strong function of both the surface shear stress and the properties of the soil at the time of the event. Rather than trying to predict the horizontal sand flux using wind speed and properties of the soil, sand movement on the lake was parameterized using the network of paired Sensit and CSC measurements from the Dust ID Program.

4.2.1 K-factor Estimates

Experimental and theoretical evidence suggest K_f is a property associated with the binding energies of the soil and is relatively independent of the surface stress induced by wind speed. On Owens Lake this empirical constant appears to vary by season, due to the presence or absence of protective salt crusts, and by source regions grouped together by surface soil textures. In the Dust ID Program K_f was inferred using the modeling practices described by Ono, et al. (2003). The general steps in the method are as follows:

- Dust ID Program GIS data are used to provide outlines of the source areas on the lakebed. A source configuration was developed for different periods using the techniques discussed more fully in the following sub-section.
- For each source area, a sand motion monitoring site is assigned to characterize PM_{10} emissions.
- A 5-minute variable emissions file is constructed according to Equation 1 using the horizontal sand motion database and an assumed initial K_f of 5×10^{-5}.
- The CALPUFF modeling system is used to simulate dust events using the initial PM_{10} emission fluxes and provide predictions at each PM_{10} monitoring site.
- Ensemble statistics derived from paired hourly predictions and observations are used to infer or adjust the initial K_f estimate during periods of interest. The periods selected are based on a set of screening criteria to ensure PM_{10} emissions affecting the monitor were likely caused by windblown dust from the lakebed and Keeler Dunes.

- The data pairs passing the initial screen are then grouped in seven sets based on the locations of the sources predicted to contribute to the observations. The seven general source regions selected based on common surface soil properties are the Northwest Area, Northeast Area, Keeler Area, Keeler Dunes, Central Area, Managed Vegetation Area, and the South Area. These general source regions are shown in **Figure 4**.

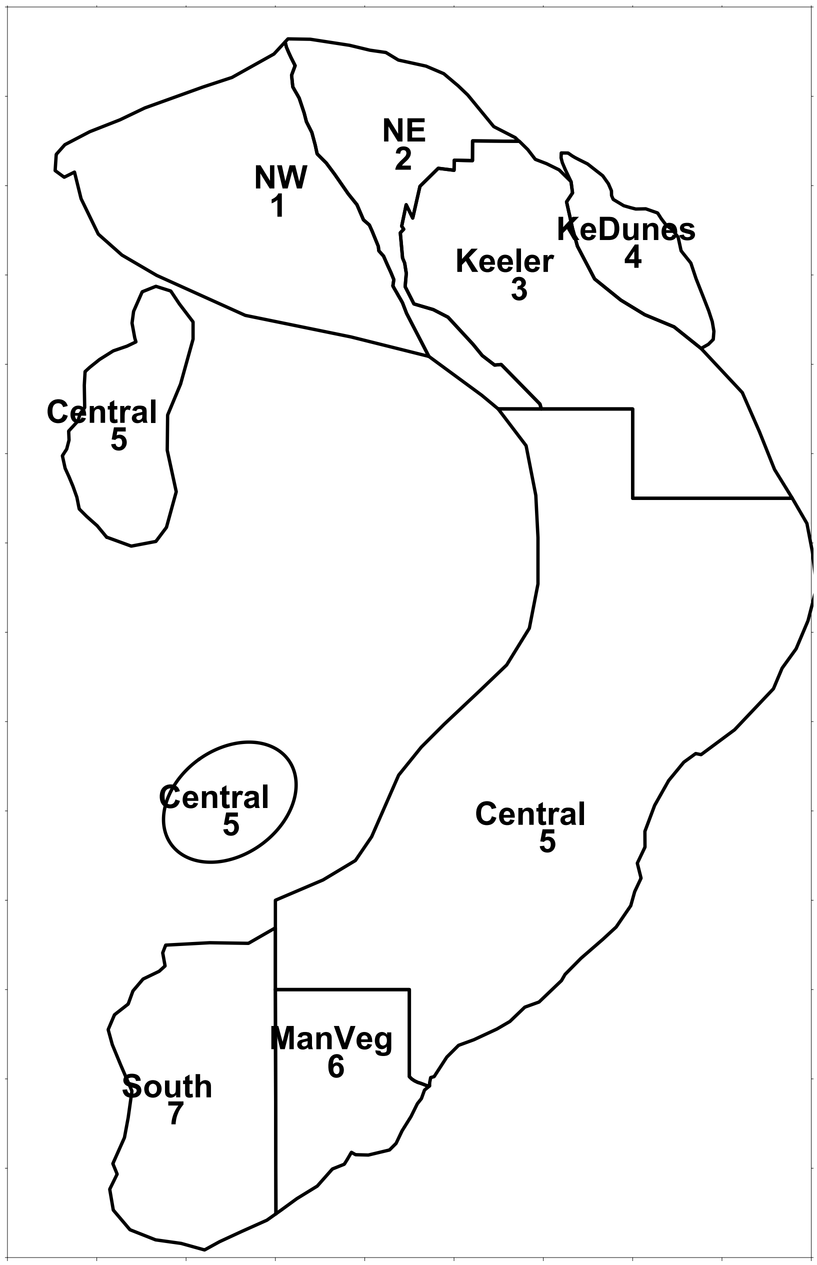

Figure 4: General Source Regions for K-factors

- The K_f data for each general source region are then subject to a second set of screening criteria. The criteria require sources affecting the monitor are relatively close, upwind, and contribute to the majority of the prediction at the monitor. Data are also removed from consideration when sources with missing sand motion data are upwind of the monitoring site or when PM_{10} observations at an upwind monitoring site are over 50 percent of the downwind PM_{10} monitoring concentration. The later criterion is applied to remove the influence of sources outside the sand motion network on the K_f estimates.
- Time series plots of the revised K_f estimates are then prepared for each general source region. The District then inspects the plots for seasonality and divides the data set into periods. The periods are subjectively based on inspection of the variability exhibited in time series plots and considerations of the precipitation-temperature history thought to affect surface crusting, surface erodibility, and the formation of efflorescent salts on the surface.
- For each period and general source region in **Figure 4** with nine or more hourly K_f estimates remaining, a revised *Kf* is derived based on the 75th percentile of the ensemble.
- During periods and for general source regions where nine data pairs are not available, seasonal K_f defaults for the areas are used. The defaults were derived from all K_f estimates during the 2016 SIP modeling period divided into two seasons: May to November and December to April. The seasonal default Kf by source region are shown in **Table 4**.

Table 4: Seasonal Default K-factors

	Seasonal Default K-factors ($x10^{-5}$) by General Source Region [1]						
Period	**NW**	**NE**	**Keeler**	**Keeler Dunes**	**Central**	**Managed Veg.**	**South**
May to November	6.6	6.0	2.2	2.4	5.5	4.2	4.3
December to June	17.1	20.7	2.2	2.4	18.2	4.0	7.0

Notes:

[1] General source regions are shown in **Figure 4**

- **Appendix A** includes lists of the seasonal K_f estimates used in the 2016 SIP from the data collected during the five year period and the methods outlined above. **Figure 5** shows the temporal variability of the *Kf* estimates assigned to each of the seven general source regions.

4.2.2 Area Source Configuration

The CALPUFF simulations at Owens Lake are sensitive to source area configuration. Emissions were varied every 5-minutes according to Equation 1 and supplied to CALPUFF in a large input file for every area source in the simulations. The paired Sensit and CSC measurements were assumed to be representative of the horizontal sand flux for irregularly shaped source areas near the sand flux site. The following general rules were used to characterize and map source areas on the lakebed:

- Actual source boundaries were used when available to delineate emission sources in the simulations. Actual source boundaries were derived using a weight-of-evidence approach considering visual observations, GPS mapping, mapping from the video camera images, and surface erosive characteristics. Erosive characteristics considered when defining a source boundary include properties of the soil, surface crusting, wetlands, and the proximity of the brine pool.
- Source boundaries were also defined based on the dust control measure (DCM) locations. For example, sand flux measurements outside the DCM were assumed to apply up to the boundary of the DCM. Sand flux measurements inside the DCM were assumed to apply to the area inside the DCM.
- Source areas were represented by a series of 100 m-by-100 m cells conforming to the actual shape of the source area sharing the same 5-minute sand flux rates as the sand flux site representing the source area. Smaller 50 m-by-50 m squares were used in some instances near the shoreline to better represent source areas where predicted concentrations are expected to be particularly sensitive to the source area configuration. The small cells sizes were also used in the Keeler Dunes and in source areas where future controls within the area might vary by ownership or if the source area contained an ECR area.

Thirteen different source area configurations were used to describe lakebed and Keeler Dunes sources during July 2009 to June 2014. As an example, **Figure 6** shows the source configuration used for the July 1, 2013 to February 28, 2014 CALPUFF simulations. The number of individual irregular source areas tracked in the simulations for each period varied from 330 to 650 sources characterized by 7,200 to 10,100 square cells for the 13 periods of the simulation. The total simulated area ranged from 41 to 73 square kilometers.

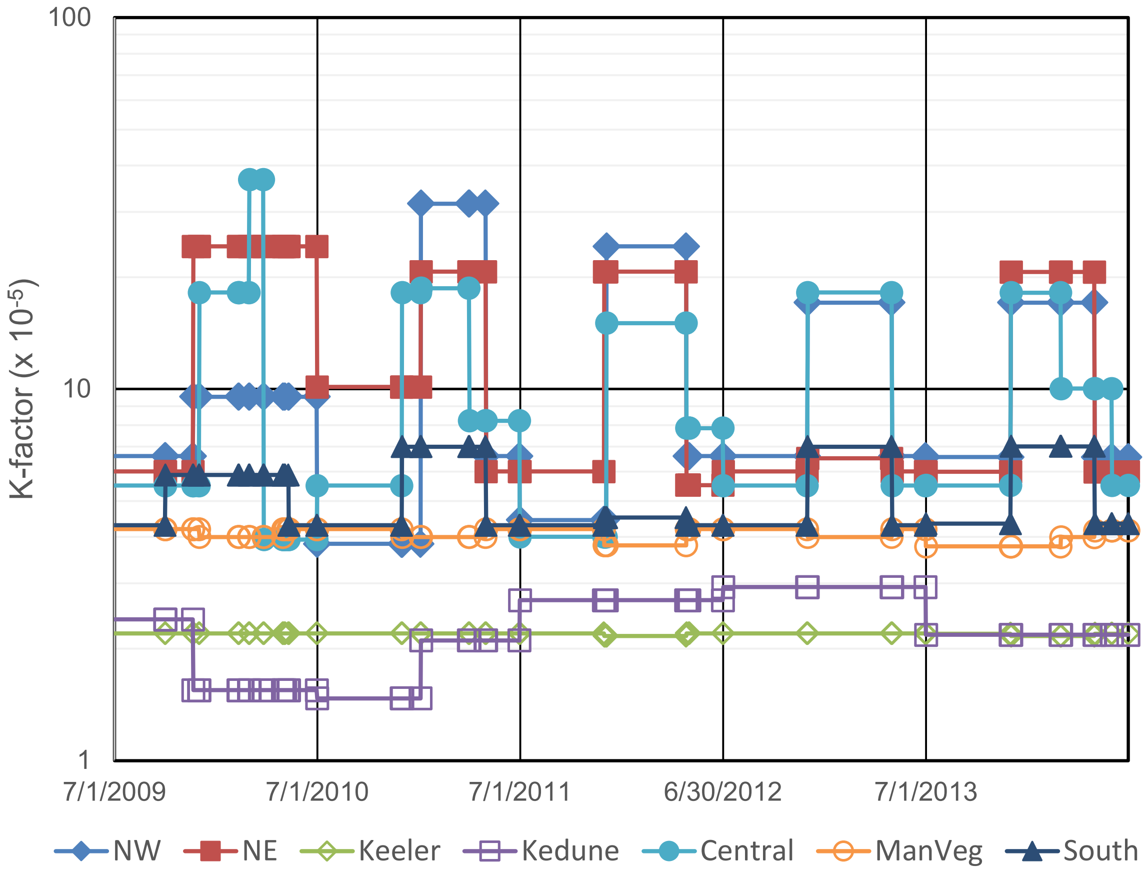

Figure 5: Seasonal 75th Percentile K-factors by General Source Region

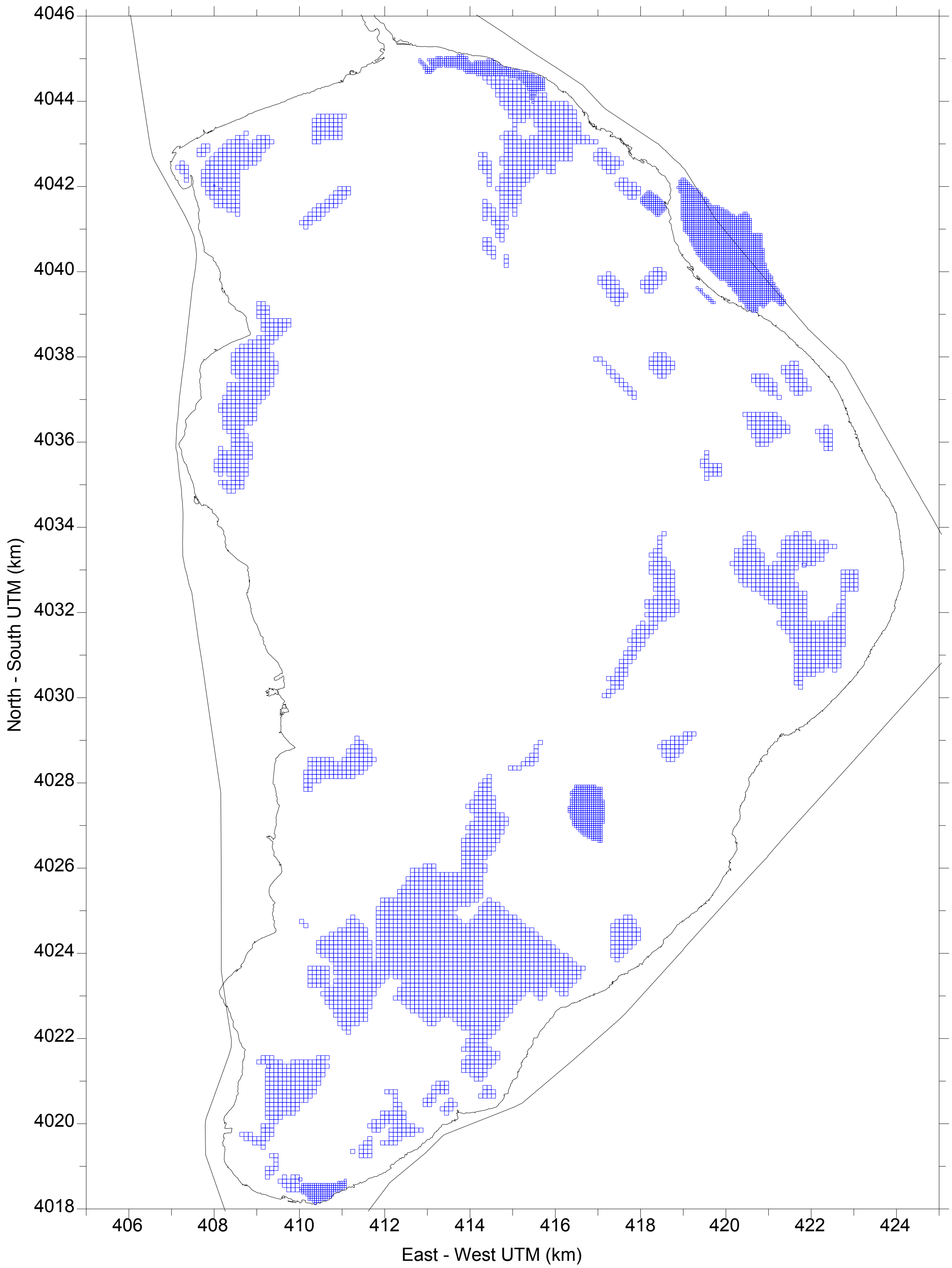

Figure 6: Area Source Configuration for July 2013

4.3 CALPUFF Options and Application

CALPUFF version 6.42 was used for the 2016 SIP simulations of the 5-minute meteorological fields and area source emissions. The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, dispersion options also affect predicted PM_{10} concentrations. In this study, the following options were selected for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves. Early in the Dust ID Program, sensitivity tests were performed by applying CALPUFF with dispersion routines based on Similarity Theory and estimated surface energy fluxes. These tests did not indicate improved performance over the Pasquill-Gifford based simulations.
- Near-field puffs modeled as Gaussian puffs, not elongated “slugs.” CALPUFF contains a computation intensive “slug” algorithm for improved representation of plumes when wind directions vary rapidly in time. This option was tested, but did not significantly influence the CALPUFF predictions.
- Consideration of dry deposition and depletion of mass from the plume. The particle size data used were based on measurements taken within dust plumes on Owens Lake as discussed below.

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, the CALPUFF simulations assumed a lognormal distribution with a geometric mean diameter of 3.5 µm and a geometric standard deviation of 2.2 (Niemeyer, et al., 1999). These variables are based on the average of 13 dust plume size distributions reported by Niemeyer between June 1995 and March 1996 at different locations within the OVPA. This same particle size distribution has been used in the 2003 SIP, the 2008 SIP, and each of the SCRDs.

5. HYBRID MODEL PERFORMANCE EVALUATION

The 2016 SIP model performance evaluation was requested by USEPA. Model performance evaluations were performed for the 2003 SIP and each of the SCRD modeling analyzes, but not for the 2008 SIP. The model performance evaluation was conducted for the Hybrid Model using the PM_{10} observations and predictions from daily periods exceeding 150 µg/m^3 during the five-year SIP period. The dataset used in the evaluation was described in **Section 1** and included the 188 samples used to characterize exceedance days during July 2009 to June 2014; plus two additional periods observed at a portable sampler located at the Duck Club ("pduc" shown in **Figure 2**).

The Hybrid Model contains both observed and predicted components. The model performance evaluation examined both the CALPUFF predicted component from the lakebed source areas and Keeler Dune simulations, and the combined prediction. **Table 5** displays statistics based on the observed in-network component versus the CALPUFF predictions of the daily PM_{10} from days exceeding 150 µg/m^3 during the SIP baseline period.[2] **Figure 7** shows a log-log scatter diagram for the same dataset where the solid line show a perfect prediction and the dashed lines show over-prediction by a factor-of-two, and under-prediction by a factor-of-two.

Table 5: Statistics for In-Network Daily PM10 Observations vs CALPUFF Model Predictions on Exceedance Days During July 2009 to June 2014

Statistic [1]	Observed	Predicted
Mean (µg/m^3)	399	486
Geometric Mean (µg/m^3) [2]	258	213
Median (µg/m^3)	234	244
98th Percentile (µg/m^3)	1,806	2,674
Maximum (µg/m^3)	4,573	5,472
N > 150 µg/m^3	132	100
Paired Statistic [1]		
Linear Correlation Coef.	0.831	
Geom. Correlation Coef. [2]	0.613	
Factor-of-2 [2]	57%	

Notes:

1 Based on 190 samples where total daily observations are greater than 150 µg/m^3.

2 Based on 150 samples where in-network observations and CALPUFF predictions were greater than 5 µg/m^3 on days where the total daily observations are greater than 150 µg/m^3.

2 The dataset contains both predicted and observed in-network concentrations equal to zero. Several of the statistical measures in the analysis use either the ratio of predicted to observed or the log of these variables. In order to avoid numerical problems the data set was trimmed using only samples where both the prediction and observation are greater than 5 µg/m3. This lower limit is sometimes used as a test of significance for 24-hour PM_{10} concentrations in New Source Review.

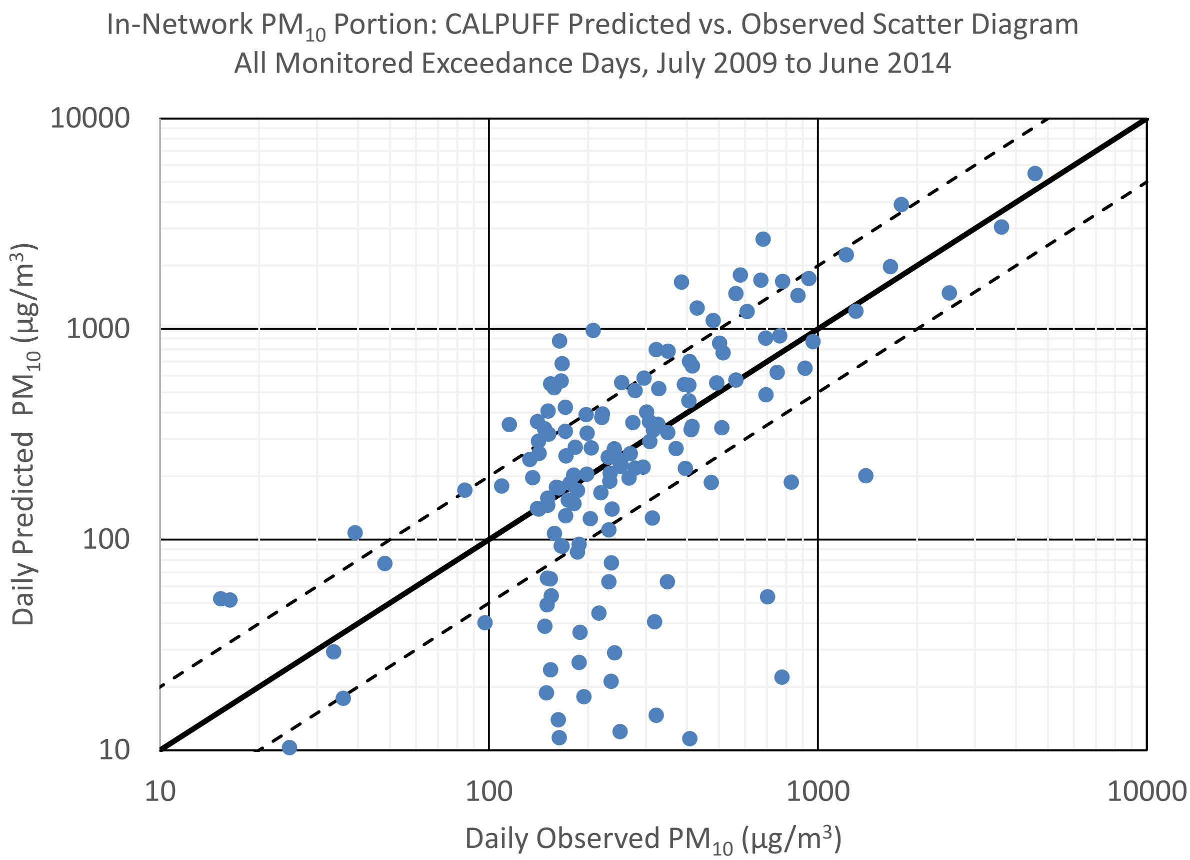

Figure 7: In-Network PM_{10} Portion: Predicted vs. Observed Scatter Diagram

Quantile-quantile (QQ) plots were constructed for samples unpaired in time and space. QQ plots test the ability of the modeling procedures to represent the entire frequency distribution of the observations. QQ plots are simple ranked pairings of predicted and observed concentrations, such that any rank of the predicted concentration is plotted against the same ranking of the observed concentration. A QQ plot constructed from the observed in-network component and CALPUFF predictions is shown in **Figure 8**.

The CALPUFF predictions are relatively unbiased and are within a factor-of-two of the observations for more than half of the exceedance days. The upper end of the observed frequency distribution is over-predicted for concentrations above about 250 µg/m^3, primarily because conservative 75^{th} percentile seasonal K-factors were selected for estimating Keeler Dunes and lakebed PM_{10} emission fluxes. The CALPUFF predictions explain about 38 percent of the geometric variance when the samples are paired in time and space.

The CALPUFF predictions were combined with derived out-of-network components and the total Hybrid Model predictions compared to observed daily PM_{10} concentrations on exceedance days from the SIP baseline period. **Table 6** shows the model evaluation statistics constructed from Hybrid Model predictions and daily PM_{10} observations. **Figure 9** and **Figure 10** display a log-log scatter diagram and a QQ plot for the same dataset, respectively.

As might be expected, the combined Hybrid Model performance is better than the CALPUFF component due the incorporation of a daily variable out-of-network component. Seventy-two percent of the predictions are within a factor-of-two and 45 percent of the geometric variance is explained when the samples are paired in time and by monitoring site. The upper-end of the observed frequency distribution is slightly biased towards over-prediction and the application of the Hybrid Model provides conservative estimates for the attainment demonstration. The behavior shown in **Figure 10** at the lower end of the frequency distribution is caused by the non-symmetrical trimming of the data set using the observations only for selection of sample pairs.

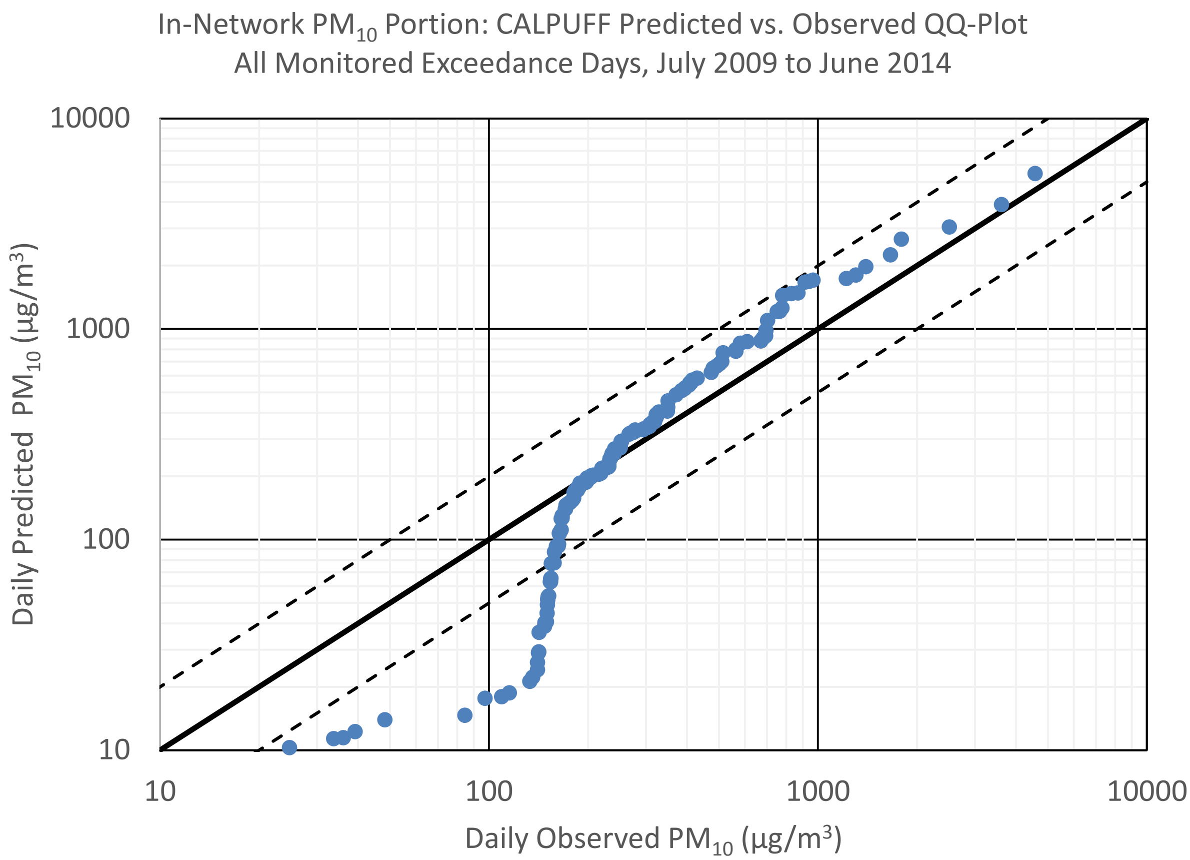

Figure 8: In-Network PM_{10} Portion: Predicted vs Observed QQ-Plot

Table 6: Statistics for Daily PM_{10} Observations vs Hybrid Model Predictions on Exceedance Days During July 2009 to June 2014

Statistic [1]	Observed	Predicted
Mean (µg/m³)	456	527
Geometric Mean (µg/m³)	321	287
Median (µg/m³)	250	270
98th Percentile (µg/m³)	2,624	3,101
Maximum (µg/m³)	4,571 [2]	5,492
N > 150 µg/m³	190	150
Paired Statistic [1]		
Linear Correlation Coef.	0.858	
Geom. Correlation Coef.	0.671	
Factor-of-2	72%	

Notes:

1 Based on 190 samples where observations are greater than 150 µg/m³.

2 The maximum observation of the combined daily total PM_{10} is slightly less than the in-network component in **Table 5** because the out-of-network portion was slightly negative. A negative contribution can occur for a few hours following a large event as moisture evaporates from the mass sampled by the TEOM.

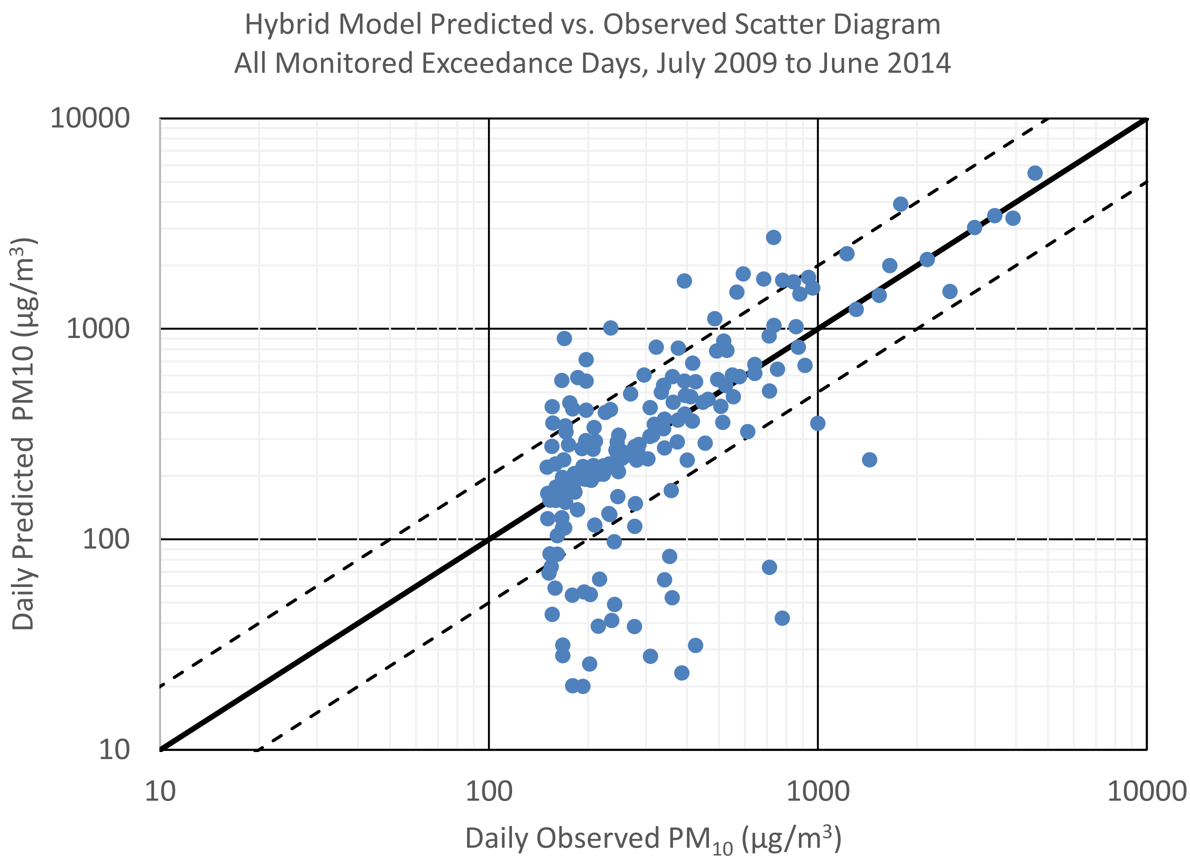

Figure 9: Hybrid Model Predicted vs Observed Scatter Diagram

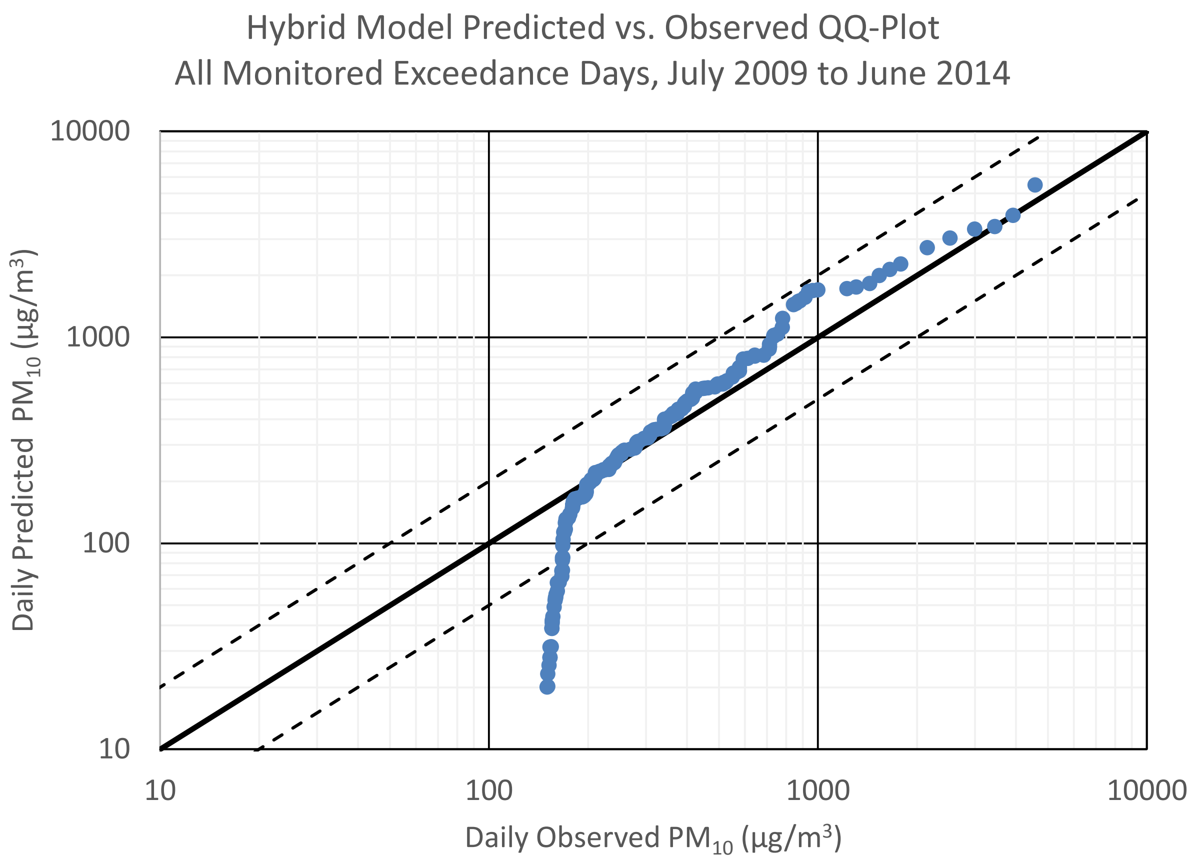

Figure 10: Hybrid Model Predicted vs Observed QQ-Plot

6. ATTAINMENT DEMONSTRATION

The Hybrid Model described in the preceding sections was applied to assess future year compliance with the 24-hour PM_{10} NAAQS. For each exceedance day and assumed set of controls, dispersion model contributions from lakebed and the Keeler Dunes were scaled and combined with out-of-network contributions. The contributions were derived from a five-year baseline period of July 2009 to June 2014. The methods used for the dispersion modeling were discussed in Section 1 and derivation of the out-of-network contributions was presented in Section 1. The remainder of this section describes the control efficiencies assigned for future years and the results of the Hybrid Model assessment of compliance with the NAAQS.

6.1 Control Efficiencies

The attainment demonstration applies the Hybrid Model to assess control efficiencies for future years. The effects of these controls on lakebed and Keeler Dune source areas were assessed by applying controls to the source area contributions estimated for each of 13 different source configurations from July 2009 to June 2014. Control efficiencies for future years were assigned based on the type of control measure and the year of implementation as shown in Table 7. The locations of the control measures are shown for each of the 13 periods are in the figures contained in Appendix B.

Table 7: Control Efficiencies for Future Years

Control Area [1]	7/2015-6/2016	7/2017-6/2018	7/2019-6/2020
Phases 1-8	Yes (varies by BACM)	Yes (varies by BACM)	Yes (varies by BACM)
Phases 9 & 10	0%	Yes (varies by BACM)	Yes (varies by BACM)
Lakebed ECRs [2]	0%	100%	100%
Keeler Dunes ECR [2]	0%	100%	100%
Keeler Dunes DCA	95%	95%	95%
Contingency Areas	0%	100%	100%

Notes:

1 The Control Areas for each source confugration period are shown in in Appendix B.

2 The ECR are not shown on any of the maps to protect these sensitive areas.

ECR Areas and Contingency Areas were assumed to be fully controlled in the attainment demonstration. Contingency Areas refer to areas on the lakebed initially identified as candidates for control based on the dispersion modeling supporting the SCRDs. Although dispersion modeling suggested potential high PM_{10} concentrations downwind from such areas, other observations within the Dust ID Program and uncertainty regarding the important variables used to characterize emissions led the District to remove these areas from the final SCRD areas. ECR Areas and Contingency Areas would be covered under the District's contingency measures outlined in the 2016 SIP. Note the areas excluded from the model due to emissions uncertainty is approximately 0.5 square miles, much less than the 4.8 square miles that can be ordered in the future under the District contingency measure program.

Figure 11 shows the control measures and control efficiencies expected to be in place by Dust Year 2017/2018. For each of 13 different source configurations from July 2009 to June 2014, dispersion model contributions by source area were reduced accordingly for each future year control case. The revised contributions were summed and combined with the out-of-network contribution to obtain a prediction for each exceedance day and future year.

The Hybrid Model also considered the secondary effects of lakebed and Keeler Dunes controls on the out-of-network contributions to PM_{10} for each exceedance day. For purposes of the attainment demonstration, these contributions are assumed to be primarily the result of emissions from areas surrounding the shoreline close to the monitoring sites where sand has migrated and PM_{10} deposited over a period of years. The attainment demonstration assumes as controls are implemented on the lakebed and Keeler Dunes, emissions from these secondary source areas would also be reduced over time. The reduction in contribution from such areas was specified via:

$$C_T = (C_{out} - C_b)\left(e^{\frac{-\Delta T}{T_s}}\right) + C_b \qquad \text{Equation 2}$$

C_T = PM_{10} contribution from out-of-network sources in future year T (µg/m^3)

C_{out} = PM_{10} contribution from out-of-network sources during the baseline period from July 2009 to June 2014 (µg/m^3)

C_b = background PM_{10} concentration of 20 µg/m^3 (See **Section 1**)

ΔT = number of years from the implementation of controls on the lakebed and/or Keeler Dune from nearby sources during the baseline period

T_s = time scale for decay assumed to be about 3 years

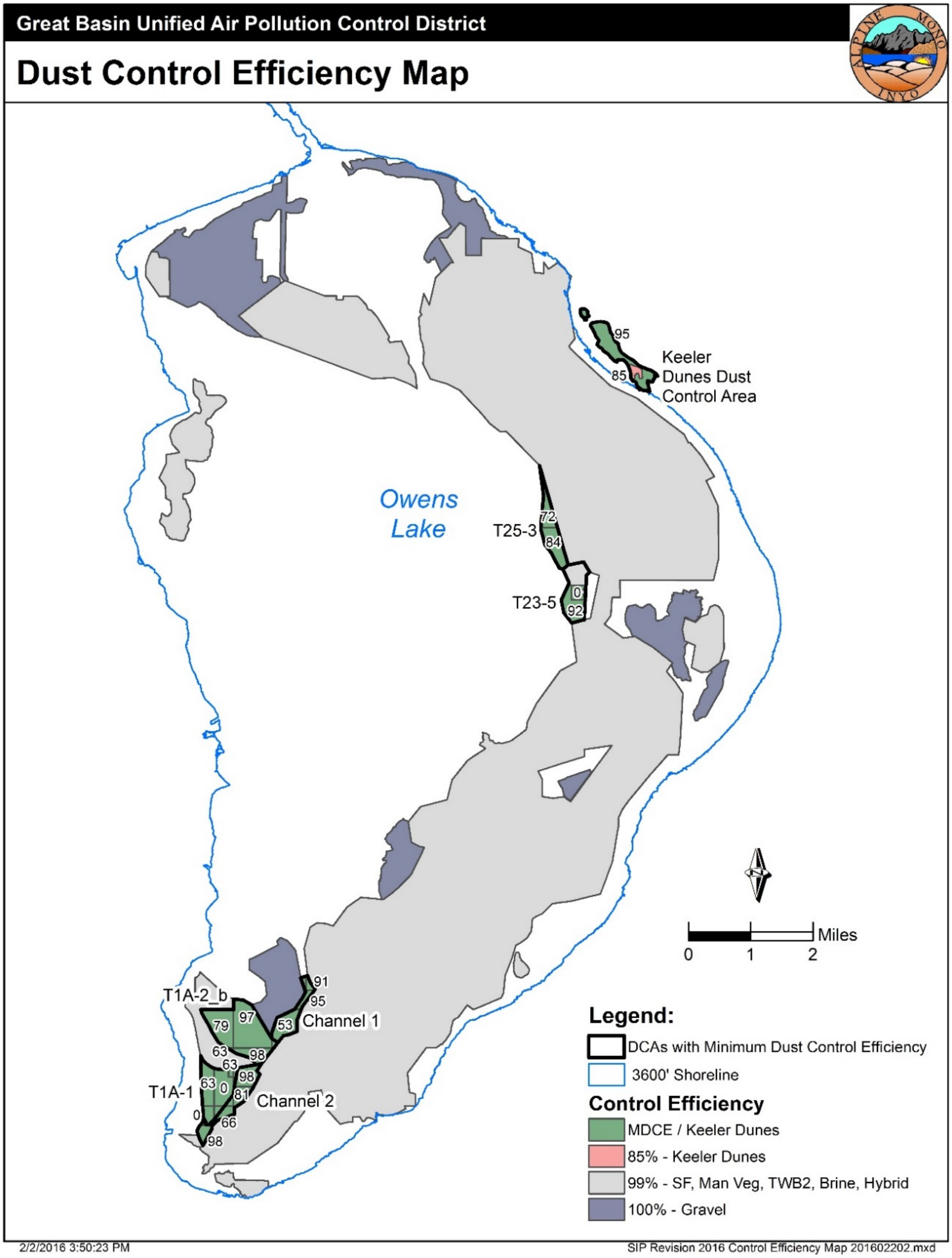

Figure 11: Dust Control Efficiency Map

The out-of-network contributions were calculated for exceedance days according to the methods outlined in **Section 1**. As further controls are implemented after the baseline period of July 2009 to June 2014, the out-of-network contributions were reduced according to an assumed Dust Control date and time scale. The Dust Control dates assumed for the attainment demonstration are shown in Figure 12. For the purposes of the attainment demonstration, the time scale was assumed to be 3 years based on the analysis of PM_{10} concentrations observed at Dirty Socks (Ono and Howard, 2015).

6.2 Attainment Demonstration Results

Table 8 and **Figure 13** display design concentrations predicted by the Hybrid Model for each future year and PM_{10} monitoring site above the 24-hour NAAQS during the baseline period. Design concentrations depend on the number of years each site operated during the 5-year baseline. Twenty-four hour PM_{10} NAAQS compliance is assessed based on the 6th highest in five years, the 5th highest in 4 years, and so on. The number of years for each site used to calculate design concentrations is shown in **Table 1**.

The Hybrid Model predicts the OVPA would be in attainment by dust year 2017/2018 following the implementation of the last set of controls on the lakebed source areas starting in 2016. The highest future year predictions are at Lizard Tail, because this site had the highest initial design concentration and due to the proximity of this site to nearby lakebed sources controlled during later implementation years.

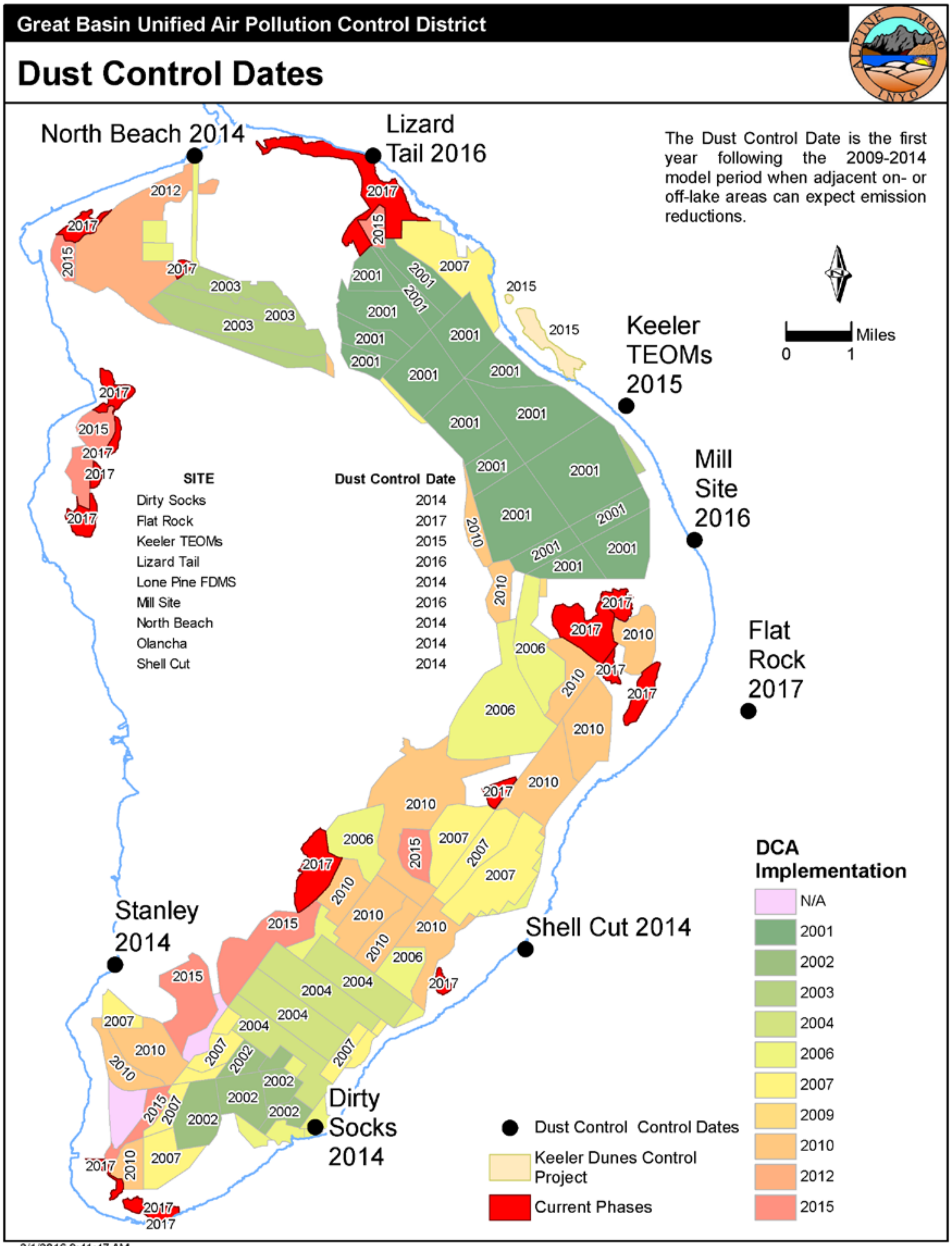

Figure 12: Dust Control Dates

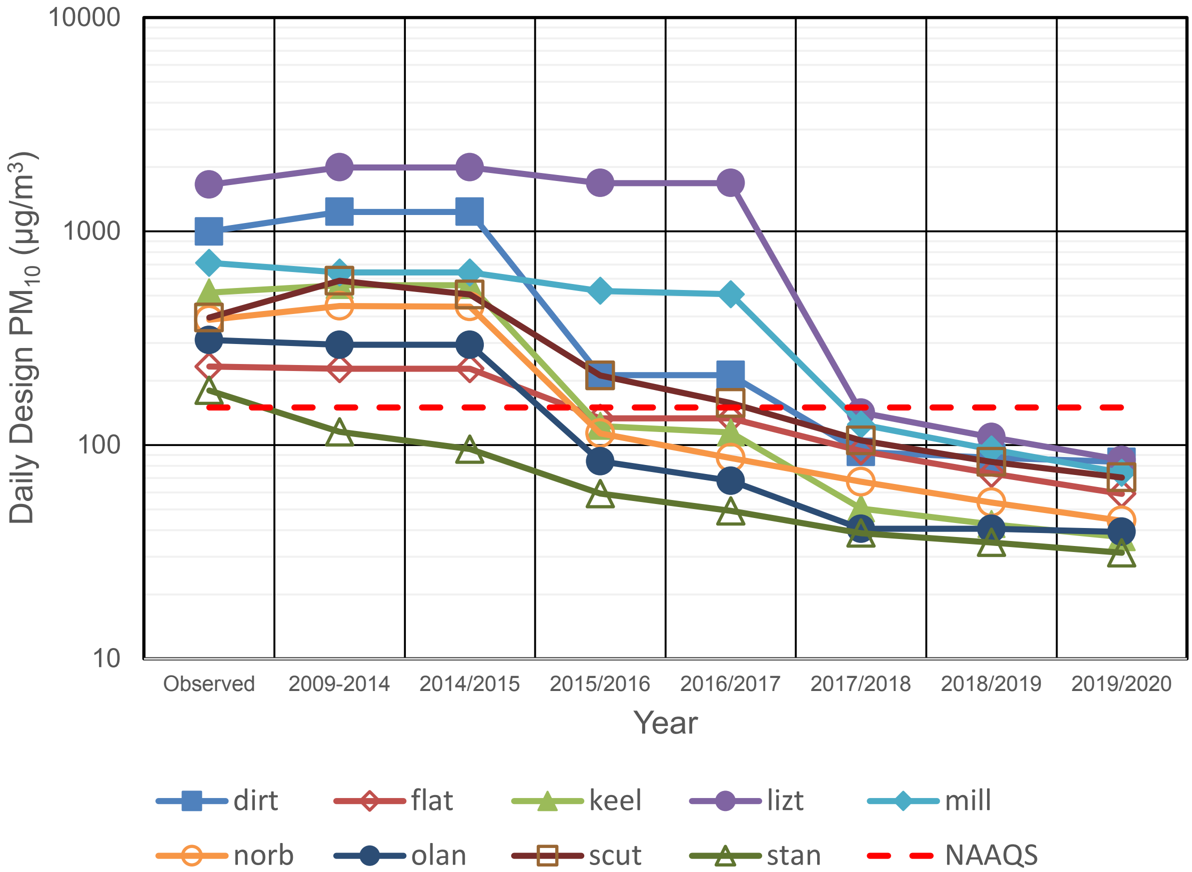

Figure 13: Owens Valley Model Forecast, Future Year PM_{10} Design Concentrations

Table 8: PM_{10} Design Concentration Predictions

Site ID [1]	Obs. 7/2009-6/2014	Hybrid Model Design Concentration Predictions ($\mu g/m^3$) by Year 7/2009-6/2014	7/2014-6/2015	7/2015-6/2016	7/2016-6/2017	7/2017-6/2018	7/2018-6/2019	7/2019-6/2020
dirt	998	1,235	1,235	213	213	93	87	83
flat	233	228	228	133	133	94	74	59
keel	518	560	560	123	115	50	43	37
lizt	1,654	1,993	1,993	1,684	1,684	142	109	85
mill	712	642	642	526	508	125	95	74
norb	385	448	445	114	87	67	54	44
olan	310	294	294	84	68	41	41	39
scut	395	586	506	212	157	105	83	70
stan	180	115	96	59	49	39	35	31

Notes:

[1] TEOM locations are shown in Figure 1 and Figure 2.

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APPENDIX A
SEASONAL 75TH PERCENTILE K-FACTORS

2016 SIP 75th Percentile K-factors ($x10^{-5}$) By General Source Area							
Date	NW Area	NE Area	Keeler Area	KeelerDunes	Cent. Area	Man. Veg.	South Area
5/1/2009	6.6	6.0	2.2	2.4	5.5	4.2	4.3
9/30/2009	6.6	6.0	2.2	2.4	5.5	4.2	4.3
10/1/2009	6.6	6.0	2.2	2.4	5.5	4.2	5.9
11/19/2009	6.6	6.0	2.2	2.4	5.5	4.2	5.9
11/20/2009	9.5	24.2	2.2	1.5	5.5	4.2	5.9
11/30/2009	9.5	24.2	2.2	1.5	5.5	4.2	5.9
12/1/2009	9.5	24.2	2.2	1.5	18.2	4.0	5.9
2/9/2010	9.5	24.2	2.2	1.5	18.2	4.0	5.9
2/10/2010	9.5	24.2	2.2	1.5	18.2	4.0	5.9
2/28/2010	9.5	24.2	2.2	1.5	18.2	4.0	5.9
3/1/2010	9.5	24.2	2.2	1.5	36.7	4.0	5.9
3/26/2010	9.5	24.2	2.2	1.5	36.7	4.0	5.9
3/27/2010	9.5	24.2	2.2	1.5	3.9	4.0	5.9
4/30/2010	9.5	24.2	2.2	1.5	3.9	4.0	5.9
5/1/2010	9.5	24.2	2.2	1.5	3.9	4.2	5.9
5/3/2010	9.5	24.2	2.2	1.5	3.9	4.2	5.9
5/4/2010	9.5	24.2	2.2	1.5	3.9	4.2	5.9
5/10/2010	9.5	24.2	2.2	1.5	3.9	4.2	5.9
5/11/2010	9.5	24.2	2.2	1.5	3.9	4.2	4.3
6/30/2010	9.5	24.2	2.2	1.5	3.9	4.2	4.3
7/1/2010	3.8	10.1	2.2	1.5	5.5	4.2	4.3
11/30/2010	3.8	10.1	2.2	1.5	5.5	4.2	4.3
12/1/2010	3.8	10.1	2.2	1.5	18.2	4.0	7.0
1/3/2011	3.8	10.1	2.2	1.5	18.2	4.0	7.0
1/4/2011	31.6	20.7	2.2	2.1	18.7	4.0	7.0
3/31/2011	31.6	20.7	2.2	2.1	18.7	4.0	7.0

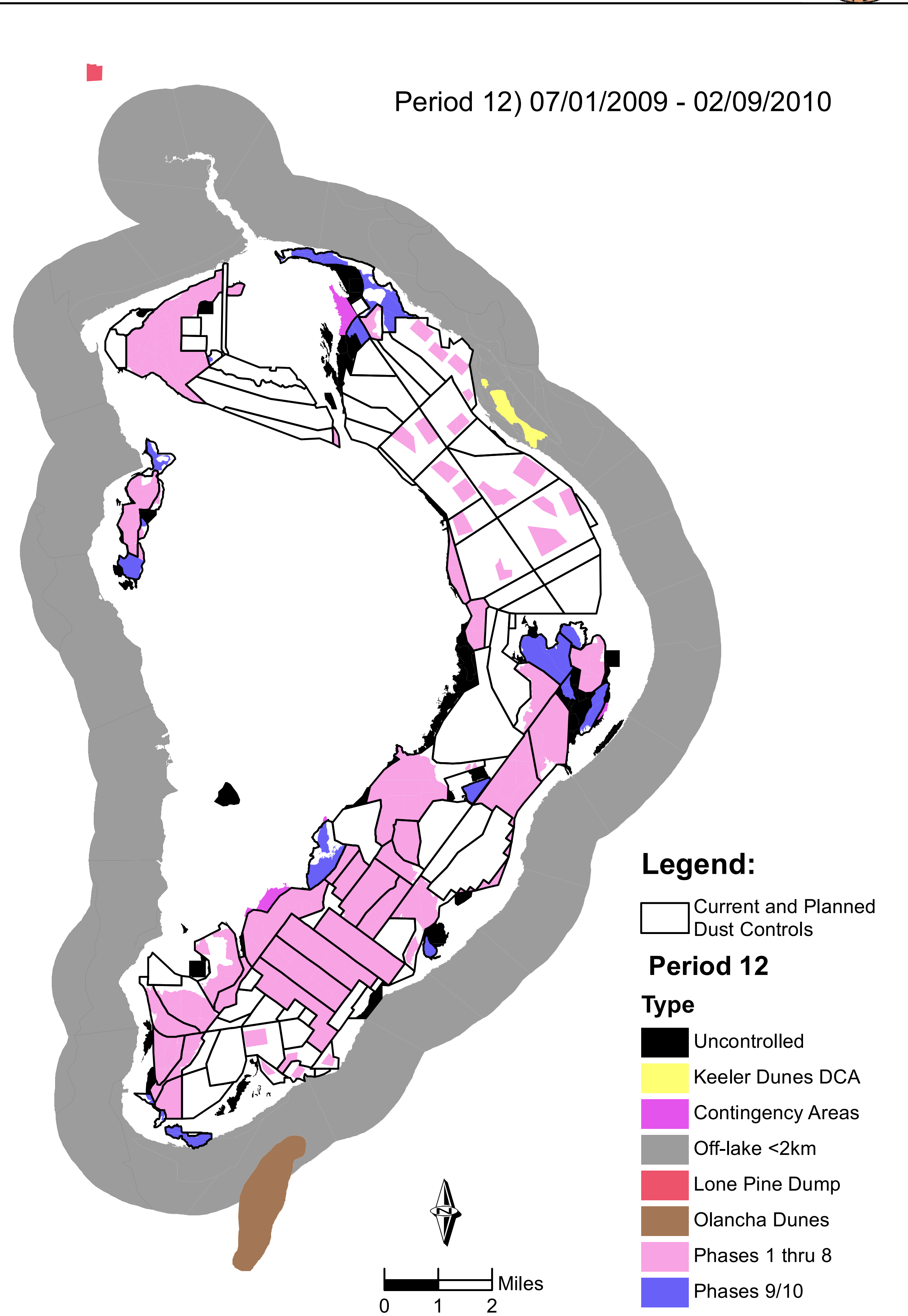
2016 SIP 75th Percentile K-factors ($x10^{-5}$) By General Source Area							
Date	NW Area	Date	NW Area	Date	NW Area	Date	NW Area
4/1/2011	31.6	20.7	2.2	2.1	8.2	4.0	7.0
4/30/2011	31.6	20.7	2.2	2.1	8.2	4.0	7.0
5/1/2011	6.6	6.0	2.2	2.1	8.2	4.2	4.3
6/30/2011	6.6	6.0	2.2	2.1	8.2	4.2	4.3
7/1/2011	4.4	6.0	2.2	2.7	4.0	4.2	4.3
11/29/2011	4.4	6.0	2.2	2.7	4.0	4.2	4.3
11/30/2011	4.4	20.7	2.2	2.7	4.0	3.8	4.5
12/3/2011	4.4	20.7	2.2	2.7	4.0	3.8	4.5
12/4/2011	24.2	20.7	2.2	2.7	15.1	3.8	4.5
4/25/2012	24.2	20.7	2.2	2.7	15.1	3.8	4.5
4/26/2012	6.6	5.5	2.2	2.7	7.9	4.2	4.3
4/30/2012	6.6	5.5	2.2	2.7	7.9	4.2	4.3
5/1/2012	6.6	5.5	2.2	2.7	7.9	4.2	4.3
6/30/2012	6.6	5.5	2.2	2.7	7.9	4.2	4.3
7/1/2012	6.6	6.0	2.2	2.9	5.5	4.2	4.3
11/29/2012	6.6	6.0	2.2	2.9	5.5	4.2	4.3
11/30/2012	17.1	6.5	2.2	2.9	18.2	4.0	7.0
4/30/2013	17.1	6.5	2.2	2.9	18.2	4.0	7.0
5/1/2013	6.6	6.0	2.2	2.9	5.5	4.2	4.3
6/30/2013	6.6	6.0	2.2	2.9	5.5	4.2	4.3
7/1/2013	6.6	6.0	2.2	2.2	5.5	3.8	4.3
11/30/2013	6.6	6.0	2.2	2.2	5.5	3.8	4.3
12/1/2013	17.1	20.7	2.2	2.2	18.2	3.8	7.0
2/28/2014	17.1	20.7	2.2	2.2	18.2	3.8	7.0

2016 SIP 75th Percentile K-factors ($x10^{-5}$) By General Source Area							
Date	NW Area	Date	NW Area	Date	NW Area	Date	NW Area
3/1/2014	17.1	20.7	2.2	2.2	10.0	4.0	7.0
4/30/2014	17.1	20.7	2.2	2.2	10.0	4.0	7.0
5/1/2014	6.6	6.0	2.2	2.2	10.0	4.2	4.3
5/31/2014	6.6	6.0	2.2	2.2	10.0	4.2	4.3
6/1/2014	6.6	6.0	2.2	2.2	5.5	4.2	4.3
6/30/2014	6.6	6.0	2.2	2.2	5.5	4.2	4.3

APPENDIX B
CONTROL EFFICIENCY TYPES

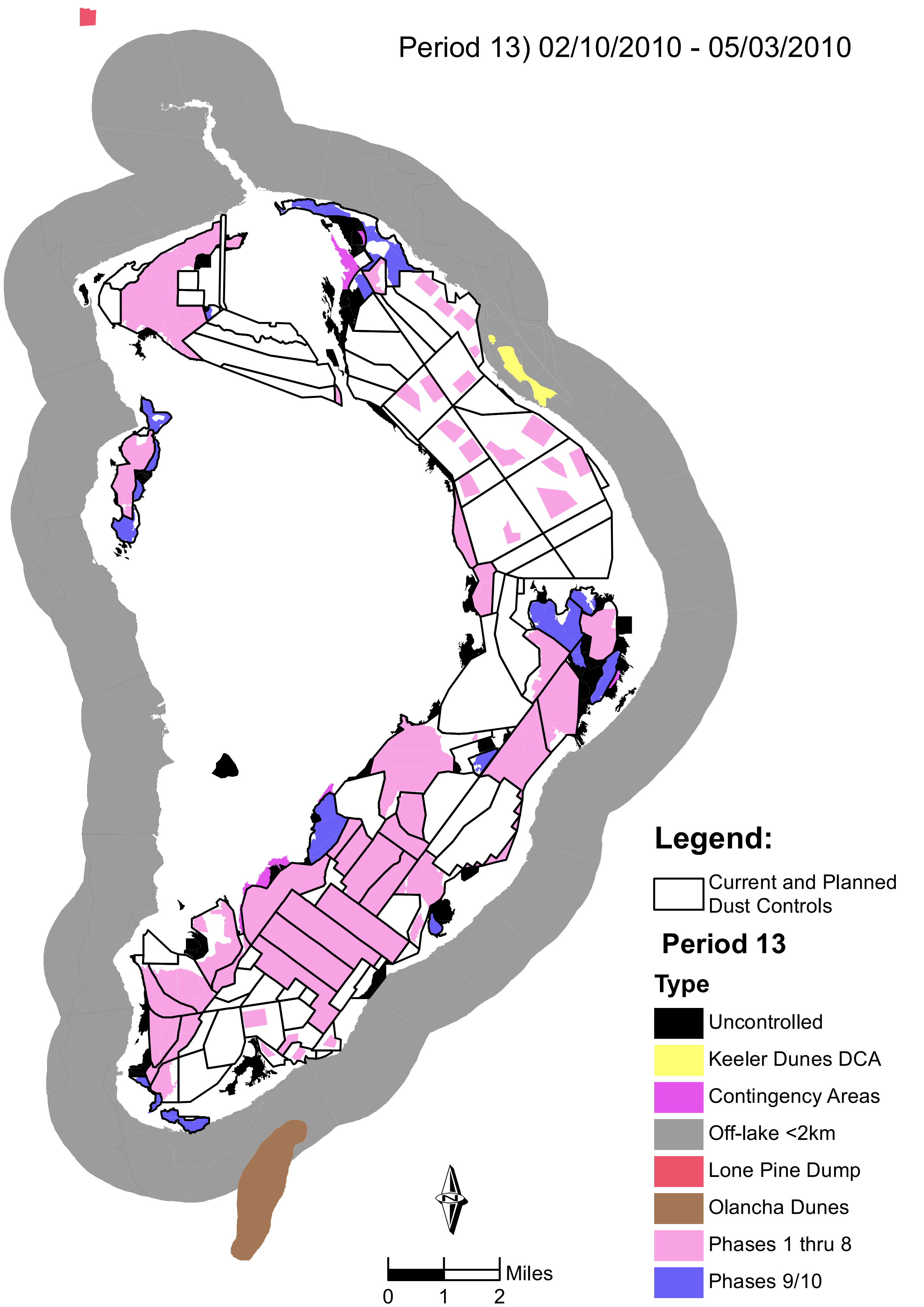
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 12



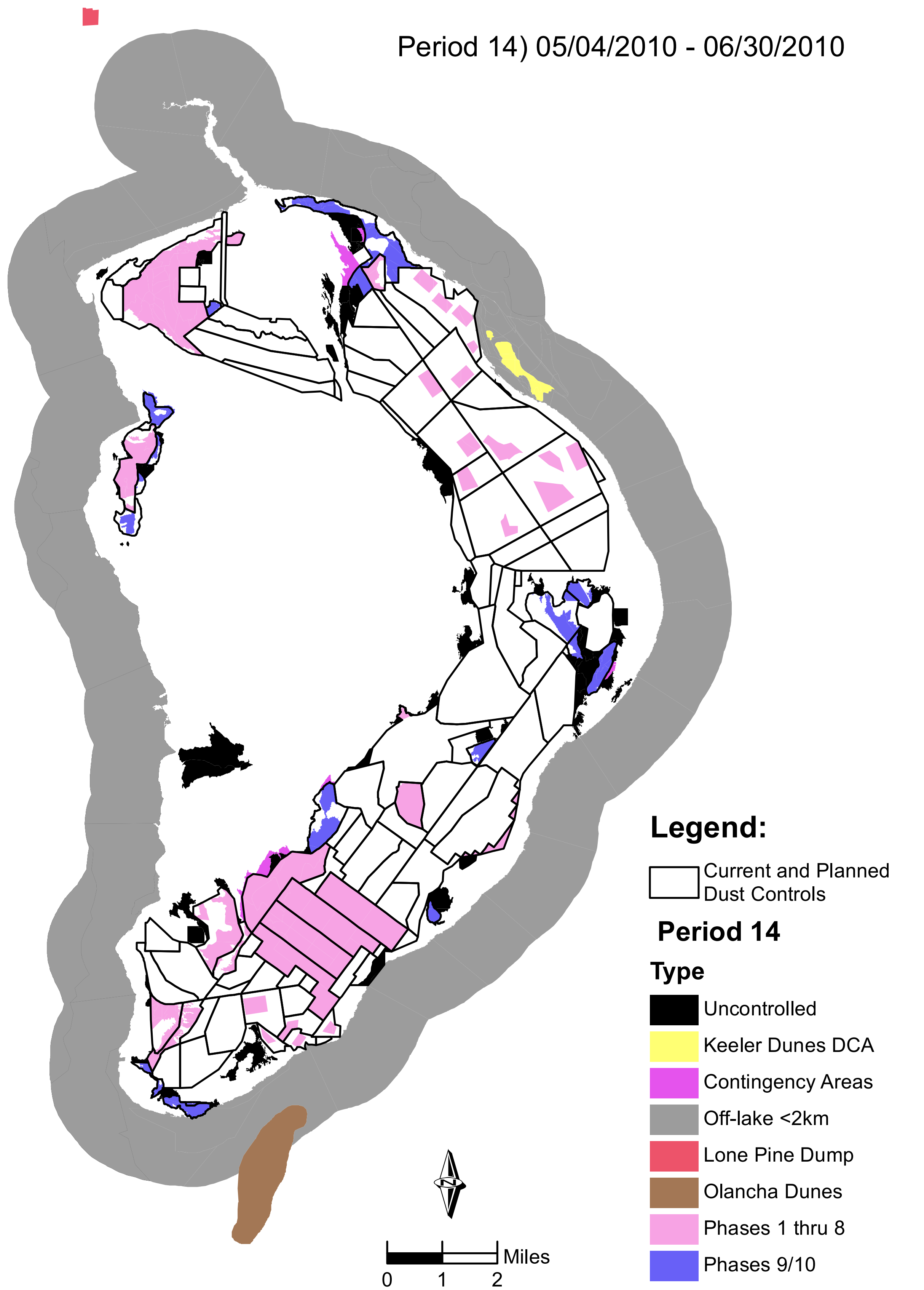
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 13



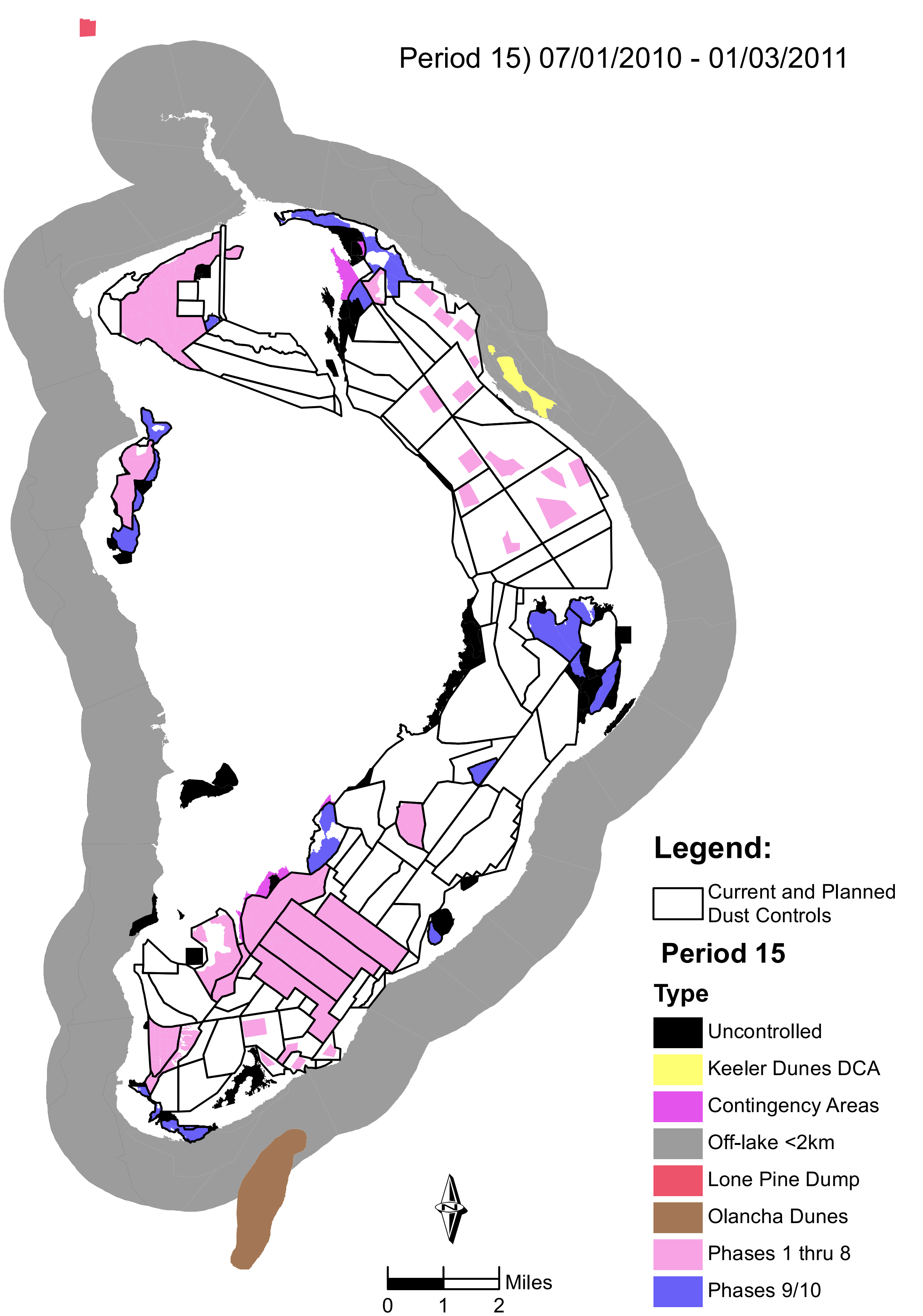
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 14



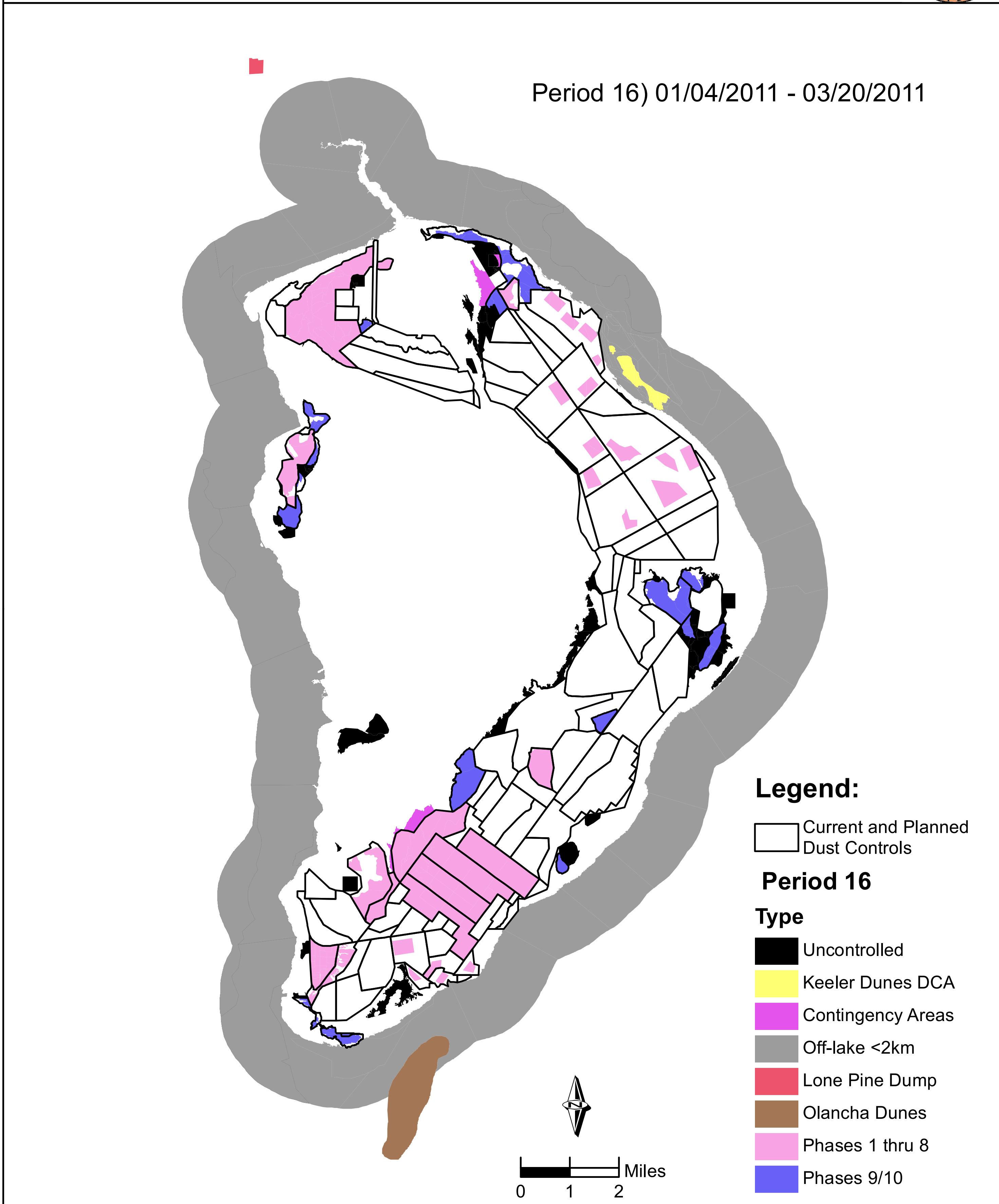
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 15



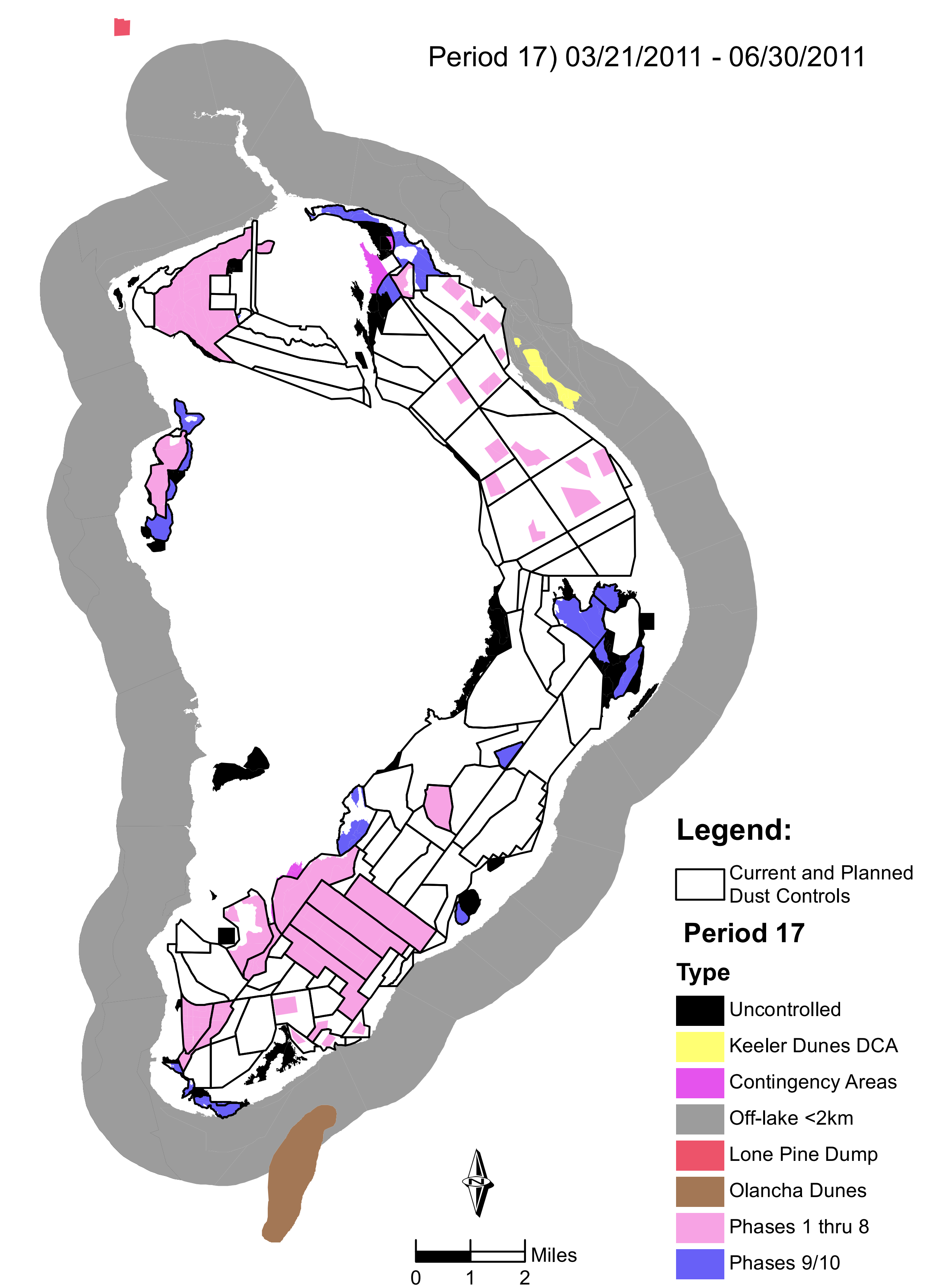
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 16



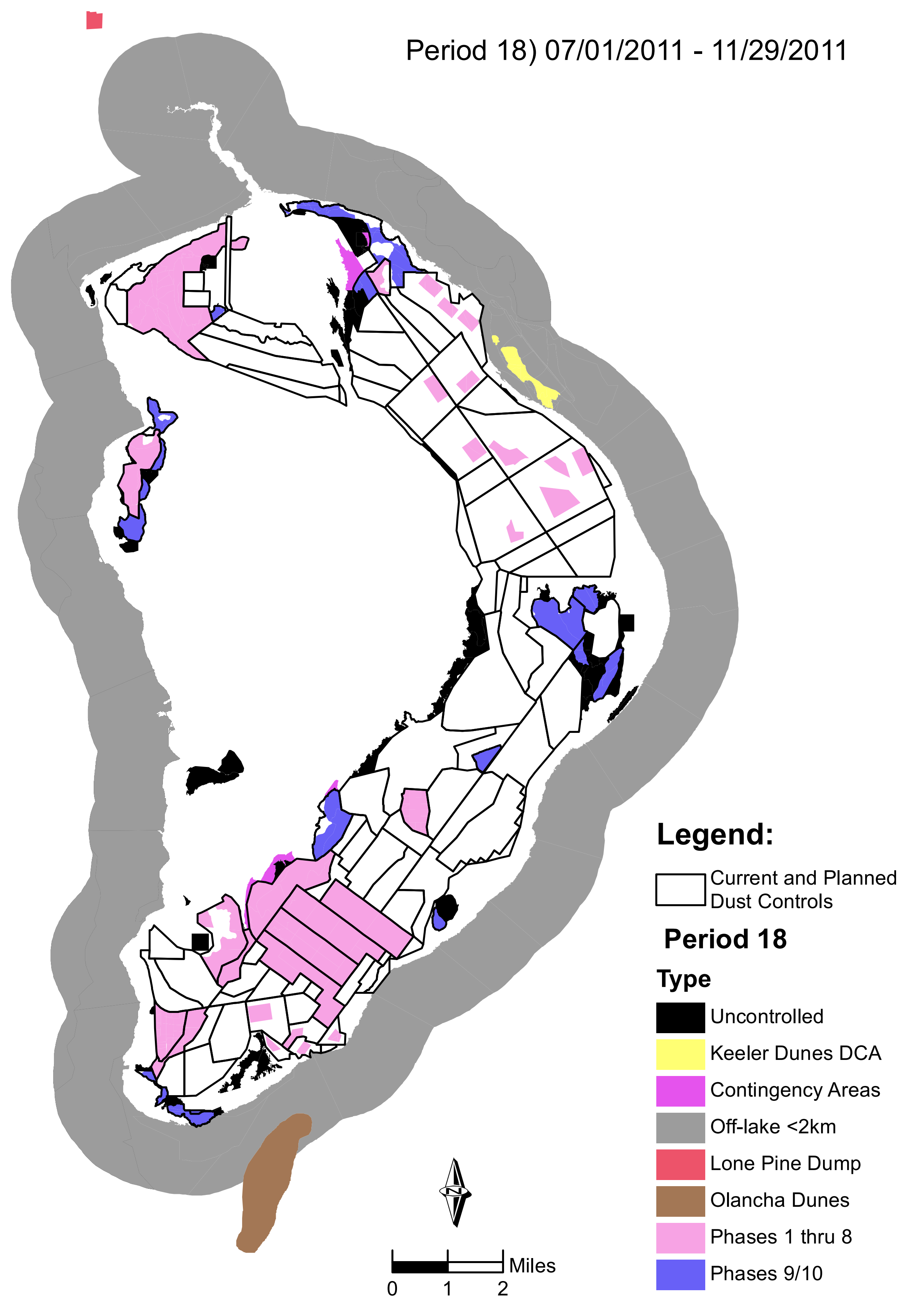
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 17



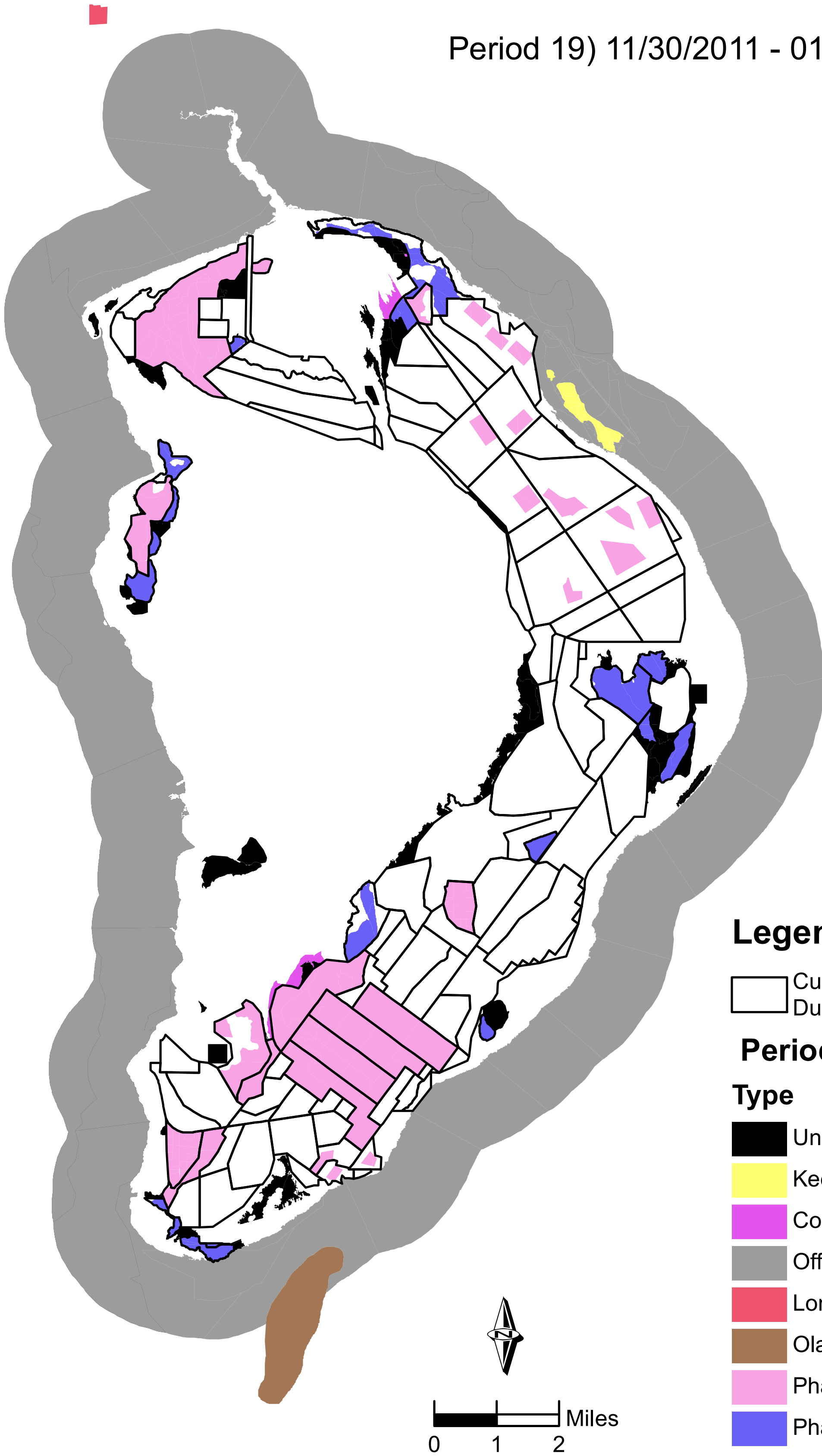
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 18



Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 19



Legend:

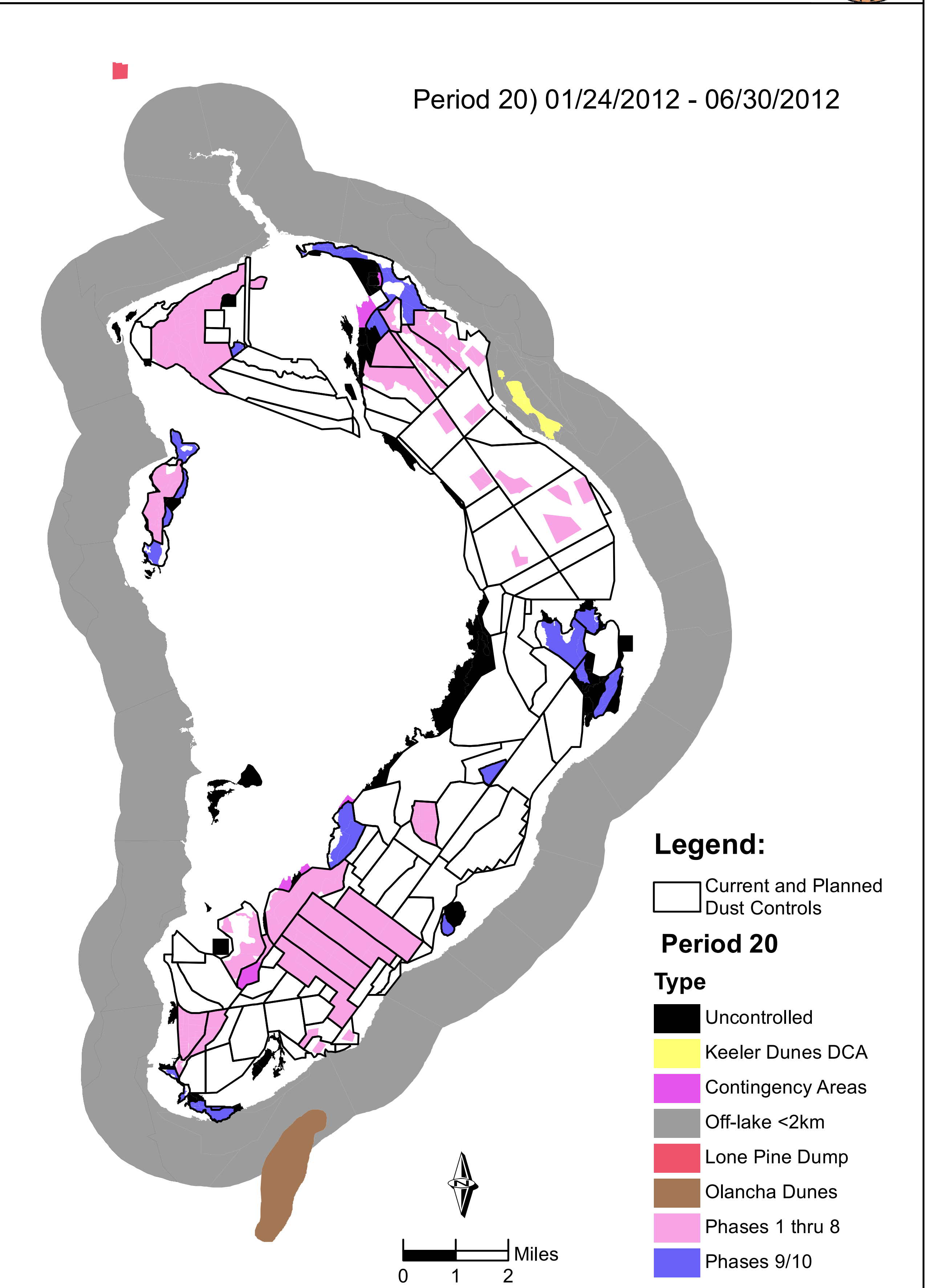
Current and Planned Dust Controls

Period 19

Type

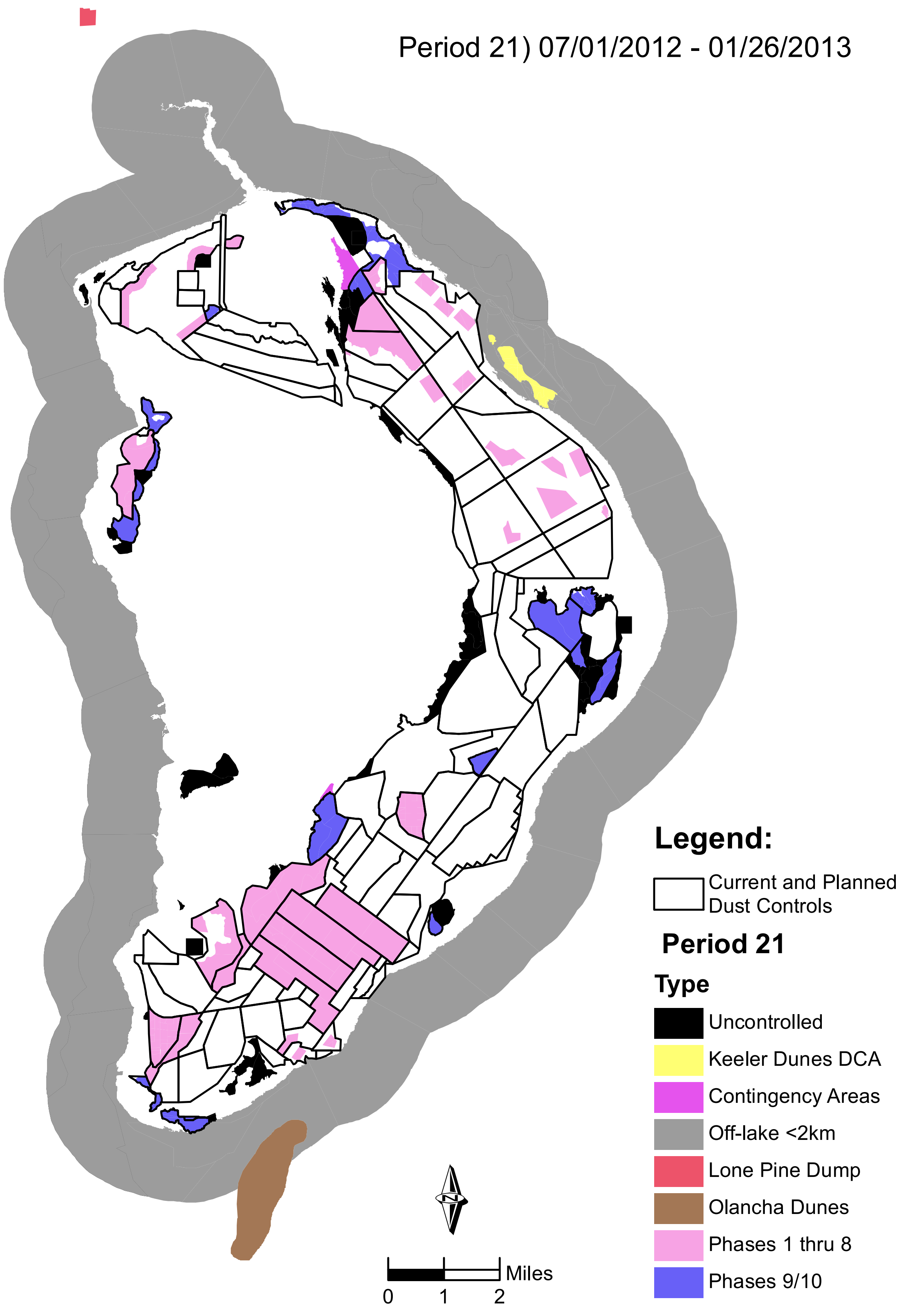
- Uncontrolled
- Keeler Dunes DCA
- Contingency Areas
- Off-lake <2km
- Lone Pine Dump
- Olancha Dunes
- Phases 1 thru 8
- Phases 9/10

Control Efficiency Types - Period 20



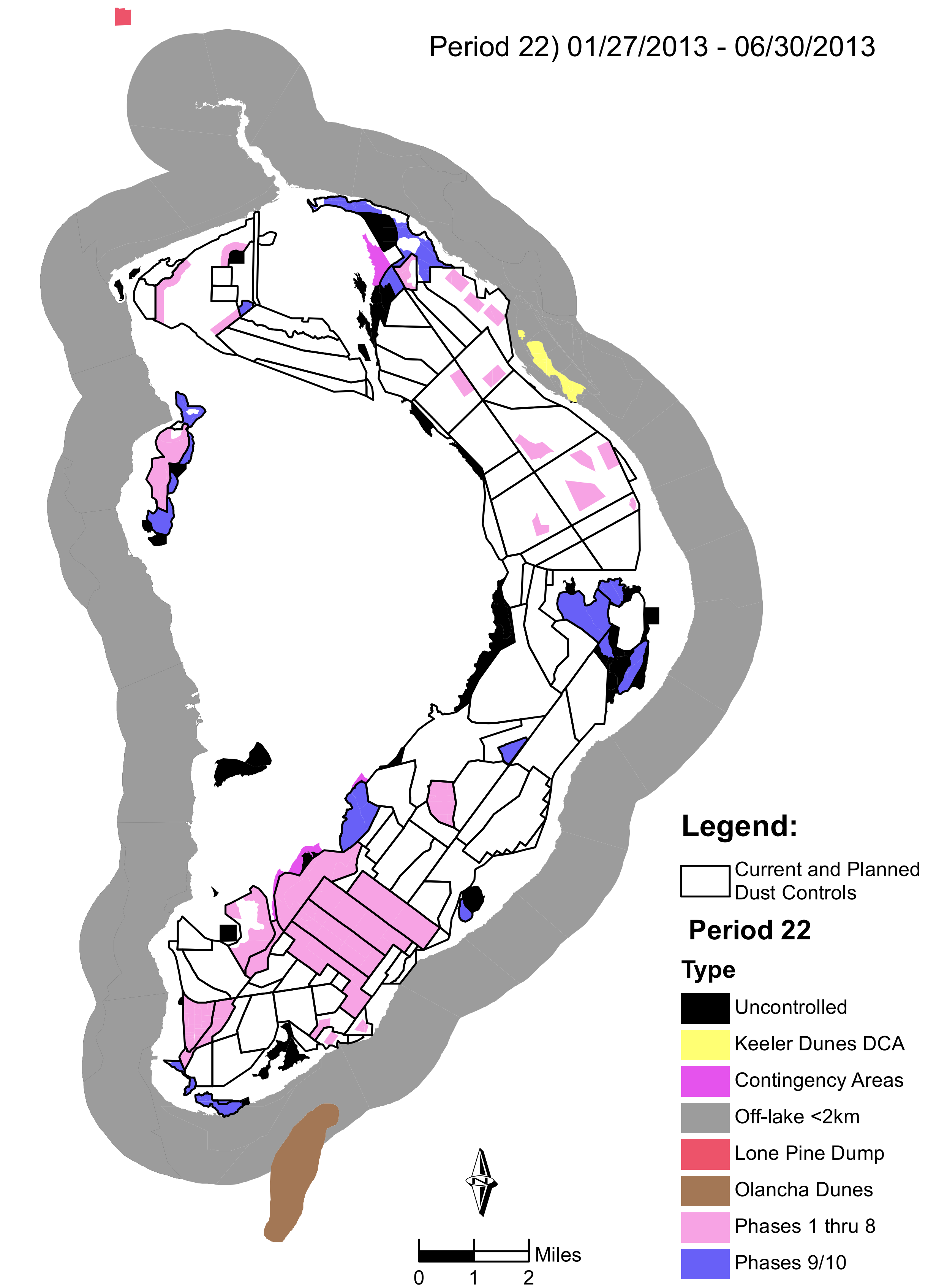
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 21



Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 22



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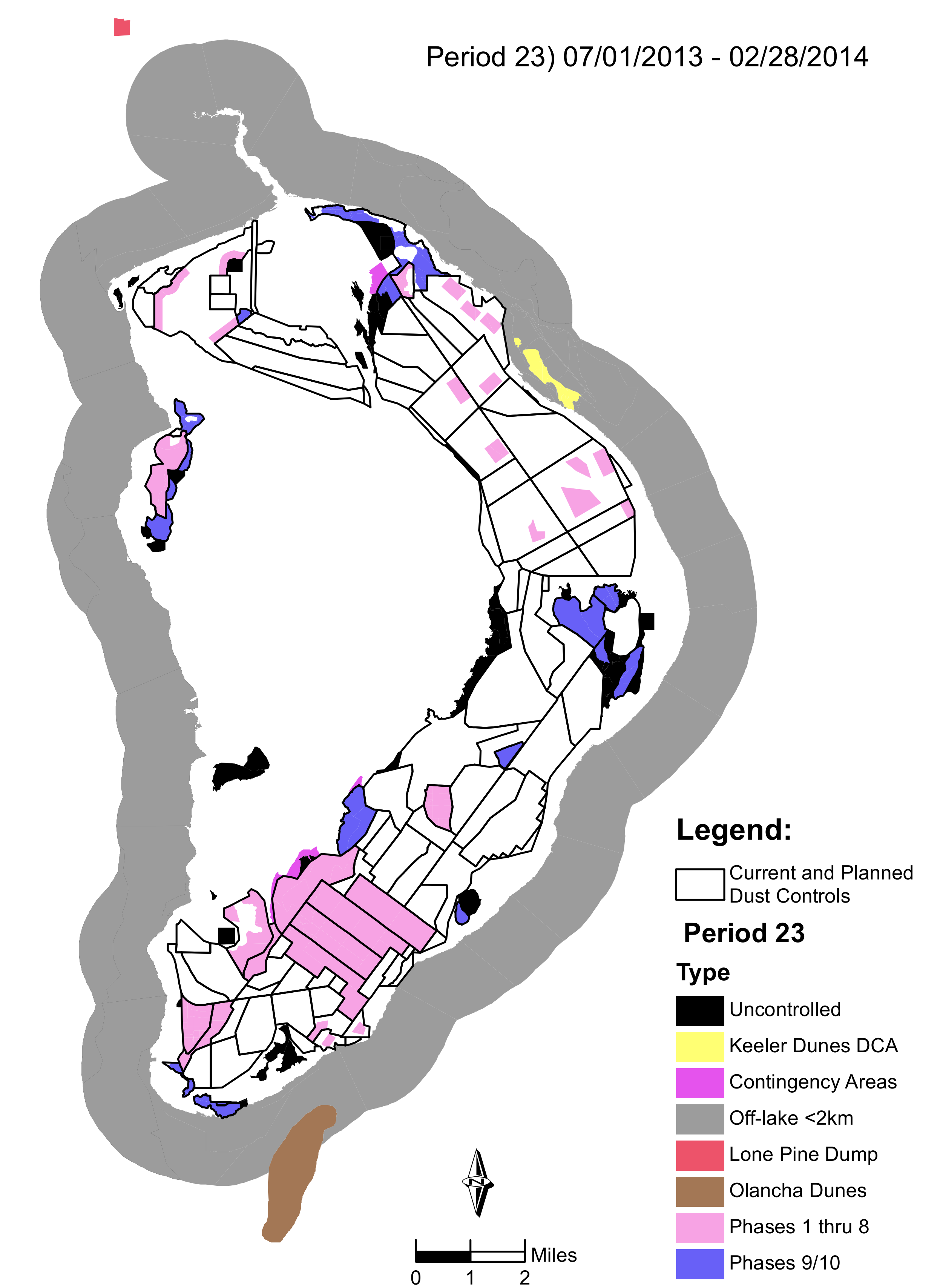
Control Efficiency Types - Period 22.mxd

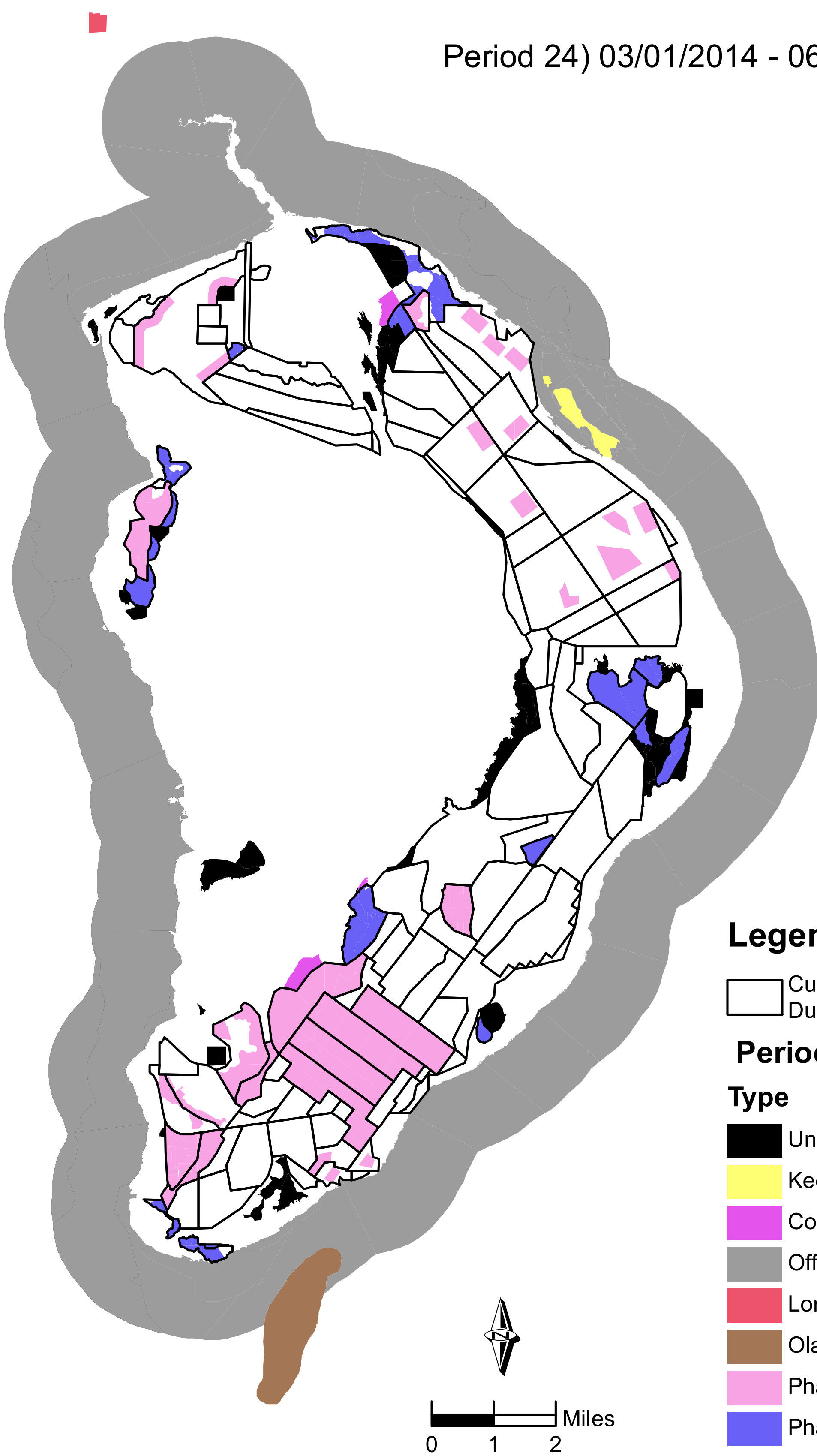
Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 23



Great Basin Unified Air Pollution Control District

Control Efficiency Types - Period 24



Legend:

Current and Planned Dust Controls

Period 24

Type

- Uncontrolled
- Keeler Dunes DCA
- Contingency Areas
- Off-lake <2km
- Lone Pine Dump
- Olancha Dunes
- Phases 1 thru 8
- Phases 9/10

APPENDIX X-1
GBUAPCD PROPOSED RULE 433

RULE 433. CONTROL OF PARTICULATE EMISSIONS AT OWENS LAKE

Adopted: 04/13/2016 (Proposed)

The purpose of this regulation is to effectuate a regulatory mechanism under the federal Clean Air Act to attain the National Ambient Air Quality Standards ("NAAQS") and to implement the Stipulated Judgment between the Great Basin Unified Air Pollution Control District ("District") and the City of Los Angeles ("City") dated December 30, 2014 and entered by the Superior Court of the State of California, County of Sacramento. This regulation does not alter or supersede any provision in the Stipulated Judgment, nor does it relieve any party from full compliance with the requirements of the Stipulated Judgment. This regulation sets the basic requirements for the Best Available Control Measures ("BACM") and defines the areal extent of these controls at Owens Lake required in order to meet the NAAQS. This regulation does not preclude the City or the District from implementing more stringent or additional mitigation pursuant to the Stipulated Judgment.

A. DEFINITIONS

1. "BACM PM_{10} Control Areas" are areas on the dried bed of Owens Lake at or below the Regulatory Shoreline elevation of 3,600 feet and at or above Owens Lake's ordinary high water elevation of 3,553.55 feet on which BACM PM_{10} Control Measures shall be implemented, and

   BACM PM_{10} Control Areas are:

   a. Areas, as shown on the map in Exhibit 1 – Dust Control Area Map, including:

      i. 29.8 square miles of the Owens Lake Bed with approved BACM PM_{10} Control Measures ("2003 Dust Control Area");

      ii. 13.2 square miles of the Owens Lake Bed with approved BACM PM_{10} Control Measures, except for Eligible Cultural Resource Areas where PM_{10} BACM selection and implementation dates will be deferred as set forth in Paragraph C.3. ("2006 Dust Control Area" and "Channel Area");

      iii. 2.0 square miles of the Owens Lake Bed with approved BACM PM_{10} Control Measures ("Phase 8 Area");

      iv. 3.62 square miles of the Owens Lake Bed with approved BACM PM_{10} Control Measures to be installed by December 31, 2017, except for Eligible Cultural Resource Areas, where PM_{10} BACM selection and implementation dates will be deferred as set forth in Paragraph C.3. ("Phase 9/10 Area"); and

   b. Additional areas as designated pursuant to Section C., "CONTINGENCY MEASURES" of this rule.

2. “BACM PM_{10} Control Measures” are best available control measures designed to reduce PM_{10} emissions to Control Efficiency (“CE”) levels specified below. The following BACM PM_{10} Control Measures are approved to be used.

   a. “BACM Shallow Flooding” means the application of water to the surface of the lake bed in accordance with the performance standards for shallow flooding in Attachment A, Section I - Performance Requirements for BACM Shallow Flooding. Water shall be applied in amounts and by means sufficient to meet a CE level of 99% or CE targets for Minimum Dust Control Efficiency Areas.

   b. “Tillage with BACM (Shallow Flood) Backup or TWB^2” means the roughening of a soil surface using mechanical methods in accordance with the specifications in Attachment A, Section IV – Performance Requirements for Tillage with BACM Back-up, and to utilize BACM shallow flooding as a back-up control method in order to prevent NAAQS violations. BACM Shallow Flooding must be implemented in TWB^2 areas if the erosion threshold as defined in Paragraph A.2.h is exceeded. Water shall be applied in amounts and by means sufficient to meet the CE level of 99% or CE targets for Minimum Dust Control Efficiency areas.

   c. “Brine BACM” means the application of brine and the creation of wet and/or non-emissive salt deposits sufficient to meet the CE level of 99% as described in Attachment A, Section V – Performance Requirements for Brine BACM. BACM Shallow Flooding must be implemented in Brine BACM areas if the erosion threshold as defined in Paragraph A.2.h is exceeded.

   d. “BACM Managed Vegetation” means planting surfaces of the BACM PM_{10} Control Areas with protective vegetation to meet the CE level of 99% by maintaining overall average vegetation cover of at least 37% for each contiguous Managed Vegetation area and an areal distribution based on vegetation cover thresholds and grid size.

   e. “BACM Gravel Blanket” means the application of a layer of gravel sufficient to meet the CE level of 100% by covering the control area with

      - a layer of gravel at least four inches thick with gravel screened to a size greater than ½ inch in diameter, or
      - a layer of gravel at least two inches thick with gravel screened to ½ inch in diameter underlain with a permanent permeable geotextile fabric.

   f. “Dynamic Water Management or DWM” is a BACM Shallow Flooding operational modification that allows delayed start dates and/or earlier end dates required for shallow flooding in specific areas that have historically had low PM_{10} emissions within the modified time periods. The truncated dust control periods allows for water savings while achieving the required CE level. Areas eligible for the DWM program and their modified start and/or end dates for shallow flooding are identified in

Attachment A, Section VI – Performance Requirements for Dynamic Water Management. If any DWM area becomes susceptible to wind erosion outside of the modified dust control period the area will be required to be flooded to meet the required CE for that area. BACM Shallow Flooding must be implemented in DWM areas if the erosion threshold as defined in Paragraph A.2.h is exceeded.

g. "Minimum Dust Control Efficiency or MDCE" BACM is a dust control measure for which the control efficiency target is adjusted to match the required control level based on air quality modeling for the 2006 dust control areas as shown on the map in Exhibit 2 – Dust Control Efficiency Requirements. The control efficiency targets may be less than 99%, but the level of control in all areas is intended to prevent exceedances of the NAAQS. MDCE BACM includes:

   i. Shallow flood areas where the wetness cover is adjusted following the curve in Exhibit 3 - Shallow Flood Control Efficiency and Wetness Cover Curve,

   ii. Channel Area - a state-regulated wetland area as shown in Exhibits 1 and 2 where vegetation cover is enhanced by irrigation and seeding with native plants in a manner sufficient to prevent windblown dust from causing exceedances of the NAAQS, and

   iii. Sand Fence Area – an area as shown in Exhibits 1 and 2 located in area T1A-1 where sand fences, vegetation and natural water runoff combine to provide sufficient protection to prevent windblown dust from causing exceedances of the NAAQS.

h. "Erosion Threshold" is applicable to TWB^2, DWM, and Brine BACM to trigger BACM Shallow Flooding which must be implemented to comply with the shallow flood CE target for that area. The erosion threshold is determined from sand flux measurements or the Induced Particulate Erosion Test (IPET) test method as described in Attachment A, Paragraphs IV.C.2 and IV.C.4. BACM Shallow Flooding must be implemented in TWB^2, DWM or Brine BACM areas if any of the following thresholds are exceeded as determined using the methods described in Attachment A:

   i. Sand flux measured at 15 cm above the surface exceeds 5.0 grams per square centimeter per day on DWM or Brine BACM areas or 1.0 gram per square centimeter per day on TWB^2 areas, or

   ii. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height.

i. "Approved BACM" includes the control measures specified above and other measures approved by the APCO and the US Environmental Protection Agency as equivalent to these methods.

3. "Eligible Cultural Resource Area or ECR Area" is an area or areas where dust control measures will be implemented on a deferred schedule due to the presence of significant cultural resources that make the areas eligible for listing under the California Register of Historic Resources.

B. REQUIREMENTS

1. For the 2003 Dust Control Area the City shall continuously operate and maintain any mix of approved BACM PM_{10} Control Measures as defined above in Section A to meet the 99% efficient CE level. Selection of the type and location of BACM PM_{10} Control Measures within the area is solely the responsibility of the City.
2. For the 2006 Dust Control Area the City shall continuously operate and maintain approved BACM PM_{10} Control Measures defined above in Section A to meet the CE target specified in Exhibit 2, except for ECR Areas where BACM PM_{10} Control Measure selection and implementation dates will be deferred as set forth in Paragraph C.3., and any areas of BACM Managed Vegetation, for which the City shall comply with the minimum 37% average vegetation cover target and areal distribution requirements by December 31, 2017.
3. For the Phase 8 Area consisting of 2.0 square miles the City shall continue to operate and maintain BACM Gravel Blanket.
4. For the Phase 9/10 Project Area consisting of 3.62 square miles the City shall select and install BACM PM_{10} Control Measures by December 31, 2017, except for ECR Areas, where PM_{10} BACM selection and implementation dates will be deferred as set forth in Paragraph C.3.
5. In areas containing infrastructure capable of achieving and maintaining compliant BACM Shallow Flooding the City may implement TWB[2], Brine Shallow Flooding or Dynamic Water Management as alternatives to BACM Shallow Flooding or MDCE BACM shallow flooding.

C. CONTINGENCY MEASURES

1. At least once each calendar year, the District shall determine whether additional areas of the lake bed require BACM PM_{10} Control Measures in order to attain or maintain the PM_{10} NAAQS.
2. If the District has not demonstrated attainment with the PM_{10} NAAQS on or before December 31, 2017, or has not met reasonable further progress milestones, the District shall order the City to apply one or more BACM PM_{10} Control Measures as set forth in

Paragraphs A.2 and C.4 on those areas of the Owens Lake bed that cause or contribute to exceedances of the PM_{10} NAAQS.

3. If monitoring and/or modeling demonstrates BACM PM_{10} Control Measures are needed in an ECR Area(s) to attain or maintain the PM_{10} NAAQS after BACM PM_{10} Control Measures are implemented in adjacent areas, the District shall order the City to select and implement BACM PM_{10} Control Measures set forth in Paragraph A.2.
4. The District may order the City to implement, operate and maintain a total of up to 53.4 square miles of waterless or water-neutral BACM PM_{10} Control Measures on the Owens Lake bed below the Regulatory Shoreline (elev. 3,600 feet) and above the ordinary high water level of Owens Lake (elev. 3,553.55 feet).
5. As expeditiously as practicable and not more than three years after any such order for additional BACM PM_{10} Control Measures, the City shall install, operate and maintain BACM PM_{10} Control Measures that achieve a control efficiency of 99%. If BACM Managed Vegetation is chosen up to two additional years for vegetation growth is allowed to achieve the 37% vegetation cover requirement.

EXHIBIT 1 – Dust Control Area Map

EXHIBIT 2 – Dust Control Efficiency Requirements

EXHIBIT 3 – Shallow Flood Control Efficiency and Wetness Cover Curve

ATTACHMENT A – Performance Requirements for BACM

Rule 433 – Attachment A
Performance Requirements for BACM

I. BACM Shallow Flooding

A. The “BACM Shallow Flooding” PM_{10} control measure will apply water to the surface of those areas of the lake bed where shallow flooding is used as a PM_{10} control measure. Water shall be applied in amounts and by means sufficient to achieve the performance standards set forth in Paragraphs I.B and I.C of this attachment. The dates by which BACM Shallow Flooding areas are to comply with these performance standards may be modified by the Dynamic Water Management provisions set forth in Rule 433.A.2.f and Paragraph VI.B.

B. For all BACM Shallow Flooding areas except those within the 2006 DCA:

1. At least 75 percent of each square mile designated as BACM Shallow Flooding areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. For these BACM Shallow Flood dust control areas, 75 percent of each entire contiguous area shall consist of substantially evenly distributed standing water or surface- saturated soil.
2. Beginning May 16 and through May 31 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 70 percent.
3. Beginning June 1 and through June 15 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 65 percent.
4. Beginning June 16 and through June 30 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 60 percent.

C. For BACM Shallow Flooding areas within the 12.7 square-mile 2006 DCA:

1. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (Exhibit 3) to achieve the control efficiency levels in the Minimum Dust Control Efficiency (MDCE) Map (Exhibit 2).
2. For only those BACM Shallow Flooding areas with control efficiencies of 99 percent or more:
   a. Beginning May 16 and through May 31 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 70 percent.

b. Beginning June 1 and through June 15 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 65 percent.

c. Beginning June 16 and through June 30 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 60 percent.

II. BACM Managed Vegetation

The “BACM Managed Vegetation” PM_{10} control measure requires planting surfaces of the BACM PM_{10} control areas with protective vegetation to meet the control efficiency level of 99% by maintaining an overall average vegetation cover of 37% for each contiguous managed vegetation area.

III. BACM Gravel Blanket

The BACM Gravel Blanket” PM_{10} control measure requires the application of a layer of gravel sufficient to meet the control efficiency level of 100% by one of the following means:

- covering 100% of the control area with a layer of gravel at least four inches thick with gravel screened to a size greater than ½ inch in diameter, or
- covering 100% of the control area with a layer of gravel at least two inches thick with gravel screened to ½ inch in diameter underlain with a permanent permeable geotextile fabric.

IV. Tillage with BACM (Shallow Flood) Backup (or TWB^2)

A. The City of Los Angeles (“City”) may implement or transition BACM Shallow Flood areas to “Tillage with BACM (Shallow Flood) Back-up (TWB^2),” which shall consist of (1) soil tilling within all or portions of BACM Shallow Flood PM_{10} control areas (TWB^2 Areas), and (2) the installation of all necessary shallow flood infrastructure so that the TWB^2 Areas can be shallow-flooded if the erosion threshold is exceeded or the performance criteria are not met.

B. Construction of TWB^2 Areas

1. Tillage shall create rows and furrows in roughly east to west directions in order to create maximum surface roughness for winds from the north and south. Additional roughness to protect surfaces from west winds shall be created in tilled areas

sufficient to prevent emissions from east and west winds.

2. The tilled surfaces will also be armored with soil clods of 1/2 inch diameter or larger covering 60 percent or more of the tilled surface.
3. TWB^2 areas shall be constructed with ridge heights (RH) averaged on 40-acre blocks at or above 1.25 feet (furrow depth to ridge top difference at least 2.5 feet) and row spacing (RS) sufficient to provide a ratio of the row spacing to ridge height (RS/RH) below 10, e.g. distance between rows is 12.5 feet with average ridge height greater than 1.25 feet.

C. Monitoring and Maintenance

1. Surface Roughness
   a. Lidar, aerial photography or other field measurement methods with equivalent accuracies will be used by the City to measure RS/RH ratio and ridge height. Roughness measurements will be made in the north-to-south direction --- the direction of the primary dust producing winds. Roughness measurements may also be made in other directions. Roughness measurements will be reported to the APCO within 30 days of measurement.
   b. The RS/RH ratio and ridge height measurements will be made at 6 month, or more frequent, intervals. Inverse roughness and ridge height for a TwB^2 Area will be tracked and plotted as a function of time. Where feasible, field measurements may also be taken to confirm Lidar or other remotely sensed results. The City will conduct roughness measurements at least once every 6 months and report the measurements within 30 days to the APCO. The District reserves the right to conduct its own roughness measurements at any time.
   c. Assuming that degradation of the tilled ridges may occur over time, tillage maintenance will be performed by the City if the average RS/RH roughness ratio is between 10.1 and 12.0 or if the average ridge height is less than 1.1 feet in a tilled area.
   d. The City shall re-flood a TWB^2 area to comply with the required BACM Shallow Flood control efficiency for the area if the RS/RH ratio is greater than 12.0 (12/1) or the ridge height falls below 1.0 feet for any defined 40-acre averaging area.
   e. The City shall measure clod coverage using the point-intercept method (U.S. Bureau of Land Management, Sampling Vegetation Attributes, Method G,

Technical Reference BLM/RS/ST-96/002+1730) or other field measurement methods with equivalent accuracy. Clod cover will be measured concurrently with surface roughness at least once every 6 months and reported to the APCO within 30 days of measurement.

2. Sand Flux
    a. The City shall monitor each TWB^2 area with at least four Sensits and Cox sand catchers (CSCs) with inlets set at 15 cm above untilled surfaces (circular pads with 3 m radius) in the general northern, southern, eastern and western portions of a tillage. In TWB^2 areas greater than 320 acres the City shall install one Sensit and CSC pair per 80 acres.
    b. The City will pair CSCs with Sensits, radio equipment and dataloggers programmed to record 5-minute sand motion data. All Sensit data will be reported daily to the District. Sand motion data from the CSCs and Sensits will be processed to track sand flux at each site.
    c. All sand flux monitoring equipment will be installed prior to the start of tillage activities.
    d. High sand flux values recorded during maintenance activities or from non-tillage sand flux sources shall be excluded from the sand flux data. Maintenance activities and non-tillage sand flux sources may include, but are not limited to, rain-splatters, bugs, adjacent grading and road construction activities, as well as vehicle traffic. Sensits should be placed so as to minimize impacts from non-tillage sand flux sources.
    e. When (other than during maintenance activities taking place in the "tillage area" which is defined as the tilled portion of the TWB^2 area) the sand flux exceeds 0.50 g/cm^2/day, the City will perform maintenance in the tillage area, which may include surface wetting, re-establishment of the surface roughness, or full or partial reflooding of a TWB^2.

3. PM_{10} Monitoring
    a. Each TWB^2 area will be assigned upwind and downwind PM_{10} monitors (not necessarily at the TwB^2 Area boundary) to monitor PM_{10} emissions from the tillage area. For a given wind direction, the downwind monitors shall be within

22 degrees (±11.5°) of the upwind monitors. Upwind/downwind monitor assignments will be requested by the City and approved by the APCO. Existing monitors operated by the District may be used as upwind/downwind monitors. Additional EPA reference and equivalent method PM_{10} monitors (40 CFR Part 53) shall be operated by the City, unless mutually agreed otherwise.

b. If a monitor is operated by the City, its operation and maintenance must follow District procedures and data collection must be incorporated into the District communications network. The District reserves the right to audit monitors and monitoring data collected by the City. The District also reserves the right to install and operate or require the City to install and operate additional PM_{10} monitors to adequately monitor the PM_{10} emissions coming from tilled areas.

c. All PM_{10} monitoring equipment will be in place as soon as practicable as shallow flood areas dry, but no later than the start of tillage activities.

d. Impacts caused by maintenance activities and non-tillage sources shall be excluded from the PM_{10} data. Maintenance activities and non-tillage PM_{10} sources may include, but are not limited to, adjacent grading and road construction activities, as well as vehicle traffic. PM_{10} monitors should be placed so as to minimize impacts from non-tillage sources.

e. When the daily downwind to upwind PM_{10} concentration difference for any dust event (other than during maintenance activities in the tillage area) exceeds 50 $\mu g/m^3$ and there is no evidence to show that the additional downwind PM_{10} did not come from the TWB[2] Area, maintenance will be performed in the tillage area.

4. Induced Particulate Erosion Test

a. The Induced Particulate Erosion Test (IPET) method will be used to determine if tilled area surfaces are starting to become emissive. The IPET method uses a small radio-controlled helicopter-type craft (Radio-Controlled Wind Induction Device or RCWInD) to create wind on the surface. Each RCWInD craft shall be pre-tested to determine the test height above the surface (H_t) at which the craft creates a target maximum horizontal wind speed (TWS) measured at 1 centimeter ($U_{0.01}$) above a flat surface equal to 11.3 meters per second (m/s). If the payload on a craft is changed, e.g. a different camera is used, then H_t must be re-determined for the new payload since it will affect the amount of thrust needed to keep the RCWInD aloft.

b. Testing to determine H_t and TWS will be done on a smooth flat surface, e.g. concrete or asphalt pavement or plywood test platform with calm ambient winds (< 2 m/s). H_t is measured from the bottom of the rotor blade to the surface. The maximum wind speed for any flight height is taken at a height one centimeter above the surface at a point that is one rotor blade length away from the point beneath the center of the fastest rotor blade taken on a line extending outward from the rotor arm. The wind speed measurement is taken with a pitot tube pointing toward the center of the rotor blade. The RCWInD must be flown in a stationary position to get a sustained wind speed measurement.

c. When the craft is flown over a ridged surface H_t is measured from the bottom of the craft's rotor blades to the highest surface projection anywhere directly below the craft.

d. Three erosion alert levels are set using the IPET method: 1) an early warning of possible clod and surface stability deterioration, 2) a warning level to alert the City of a potential breakdown of the surface stability and to advise voluntary maintenance efforts, and 3) a mitigation action level to require re-tilling and/or re-flooding of all or part of a TWB[2], DWM or Brine BACM Area.

e. The IPET method will be used to determine erosion alert levels as follows:

- Level 1 – An erosion early warning is indicated when any visible dust is observed to be emitted from a surface or particles are dislodged when the RCWInD is flown at a height below one half of H_t. Voluntary mitigation may be appropriate to prevent further surface degradation.
- Level 2 – An erosion warning is indicated when any visible dust is observed to be emitted from a surface when the RCWInD is flown at a height below H_t and above one half of H_t. Voluntary mitigation is advised to prevent further surface degradation.
- Level 3 – Mitigation action is required if visible dust is observed to be emitted from a surface when the RCWInD is flown at a height of H_t or higher.

D. The City shall re-flood TwB[2] areas to comply with the BACM Shallow Flood control efficiency target for that area, if either of the following erosion thresholds are exceeded as determined using the sand flux and IPET measurements described in Paragraphs IV.C.2 and IV.C.4.

1. Sand flux measured at 15 cm above the surface exceeds 1.0 gram per square centimeter per day, or
2. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height, H_t.

V. Brine BACM

A. Stable surfaces for Brine BACM shall be defined as consisting of standing water, evaporite salt deposit, and capillary brine salt crust as follows:

1. Water: Standing water or hydrologically saturated surface as defined by BACM Shallow Flooding, regardless of salinity level.
2. Evaporite Salt Deposit: A crystalline deposit of salt minerals precipitated on the surface of the lakebed from evaporation of Owens Lake brine. The evaporite salt deposit does not include the development of salt crust by upward capillary movement of saline fluids through the soil column. The evaporite salt deposit must have an average thickness of 1.5 centimeters or greater and may be either wet or dry.
3. Capillary Brine Salt Crust: A crust enriched in salt minerals formed at the soil surface by upward capillary movement of water through the soil. The capillary brine crust typically consists of a mix of salt minerals and soil particles in various proportions, and must meet the following three conditions:
   a. The capillary brine salt crust within a Brine BACM area must have an average thickness of 10 centimeters or greater and may be either wet or dry,
   b. a capillary brine salt crust must be accompanied by either water and/or an evaporite salt deposit, and
   c. the proportion of qualifying capillary brine crust within a Brine BACM area cannot exceed one-third of the required total compliant cover within a Brine BACM area.

B. Each Brine BACM area shall be operated such that the total areal extent of the surface cover of the qualifying surfaces are maintained such that they meet or exceed those as defined by the Shallow Flooding Control Efficiency Curve in Exhibit 3. The combined mosaic of stable Brine BACM surfaces shall cover the entire dust control area.

C. Brine BACM can be used by the City of Los Angeles (City) throughout the Owens Lake bed where backup BACM Shallow Flood infrastructure exists and can be implemented, as set forth in this protocol, to ensure that Brine BACM areas do not cause or contribute to exceedance of the NAAQS for PM_{10}.

D. The boundaries for each Brine BACM area will be pre-defined by the City prior to implementation. Each Brine BACM area will be monitored separately to determine compliance with required surface cover conditions.

E. The City will monitor each Brine BACM area with at least one sand flux monitor (SFM) site instrumented with paired Cox Sand Catchers (CSCs) and Sensits with inlets positioned 15 cm above the surface, radio equipment, and dataloggers programmed to record 5-minute sand motion data. SFM sites will primarily be located in portions of Brine BACM areas covered with a capillary crust. All Sensit data will be reported daily to the District. Sand motion data from the CSCs and Sensits will be processed to track sand flux at each site.

F. Brine BACM areas will be monitored using the IPET method following the procedures used for Tillage with BACM Back-up areas in Paragraph IV.C.4.

G. The City shall re-flood Brine BACM areas to comply with the BACM Shallow Flood control efficiency target for that area, if either of the following erosion thresholds are exceeded as determined using the sand flux and IPET measurements described in Paragraphs IV.C.2 and IV.C.4.

   1. Sand flux measured at 15 cm above the surface exceeds 5.0 grams per square centimeter per day, or

   2. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height, H_t.

VI. Dynamic Water Management

A. Areas that are eligible for Dynamic Water Management (DWM) must meet the following sand flux history criteria:

   1. 5 years or more of sand flux data from before dust control implementation, and

2. The frequency of significant sand flux ($\geq$5 g/cm^2/day) taking place outside of the modified shallow flood dust control period did not occur in more than one calendar year over any continuous six year period.

B. The modified dust seasons for DWM have three different start dates in the beginning of the season that reflect the delayed start of source area activity across the lakebed. The modified start dates are applicable to certain dust control areas based on the sand flux history as evaluated in Paragraph VI.A and the method of shallow flooding using conventional flooding or sprinkler irrigation.

1. For areas shallow flooded by methods other than sprinkler irrigation, the standard and modified dust control periods are:

   Standard Dust Season

   October 16 to June 30 (with ramping of 99% control areas after May 15)

   Modified Dust Seasons for Dynamic Water Management

   October 16 – April 30

   December 1 – April 30

   January 16 – April 30

2. For eligible areas that are shallow flooded with sprinkler irrigation, the modified DWM seasons shall be adjusted to provide water two weeks earlier in the beginning of the dust season to simulate ramp up as applied in conventional BACM Shallow Flood areas and one month later at the end of the dust season due to the lack of wetness during the dry down period with conventional BACM Shallow Flood areas. The adjustments to the DWM seasons for sprinkler irrigated shallow flooding areas are provided below.

   Modified Dust Seasons Adjusted for Sprinkler Irrigated Shallow Flooding Areas

   October 16 – May 31

   November 16 – May 31

   January 1 – May 31

3. In areas approved for DWM, the City of Los Angeles (City) shall meet the shallow flood control efficiency and wetness targets indicated in Exhibits 2 and 3 by or before the applicable start dates in Paragraph VI.B and water may be shut off with no spring ramping at the end of the modified season.

C. Each DWM area will be instrumented by the City with sand flux monitoring (SFM) sites using paired Sensits and Cox Sand Catchers (CSCs) during the modified start and end periods. The locations of SFM sites shall be determined by the City in coordination with the District.

1. The number of SFM sites at the modified start of the dust season will be proportional to the areal extent of the DWM area. All DWM areas will require at least one SFM site however; the APCO may require proportionally more SFM sites for DWM areas greater than 320 acres such that there is approximately one SFM site per 160 acres of DWM area.
2. During the modified end period of the dust season, the LADWP shall install SFM sites incrementally in stages as a DWM area dries. The number of SFM sites is provided in Table 1 below.

Table 1. Number of SFM sites required per DWM area during the modified end of the dust season.

Drying Stage	Exposed Lakebed	Number of SFM sites
1	Less than 50 acres	0
2	50 – 160 acres	1
3	>160 acres	1 per every 160 acres

3. The City will pair CSCs with Sensits with inlets positioned at 15 cm above the surface, radio equipment and dataloggers programmed to record 5-minute sand motion data. All Sensit data will be reported daily to the District. Sand motion data from the CSCs and Sensits will be processed to track sand flux at each site.
4. During the modified start of the dust season all sand flux monitoring equipment will be placed by the City no later than October 16. During the modified end of the dust season all SFM sites will be placed by the City within 7 calendar days of reaching each drying stage. The City shall inform the District of all SFM site installations within 7 days of installation.
5. SFM sites installed for monitoring in the modified beginning dust season may be removed from a DWM area once the modified dust season has started for each DWM area or once the site location is endanger of getting flooded. The City shall inform the District of all SFM site removals within 7 calendar days of their removal

date. SFM sites installed for monitoring of the modified end of the dust season may be removed from a DWM area after June 30.

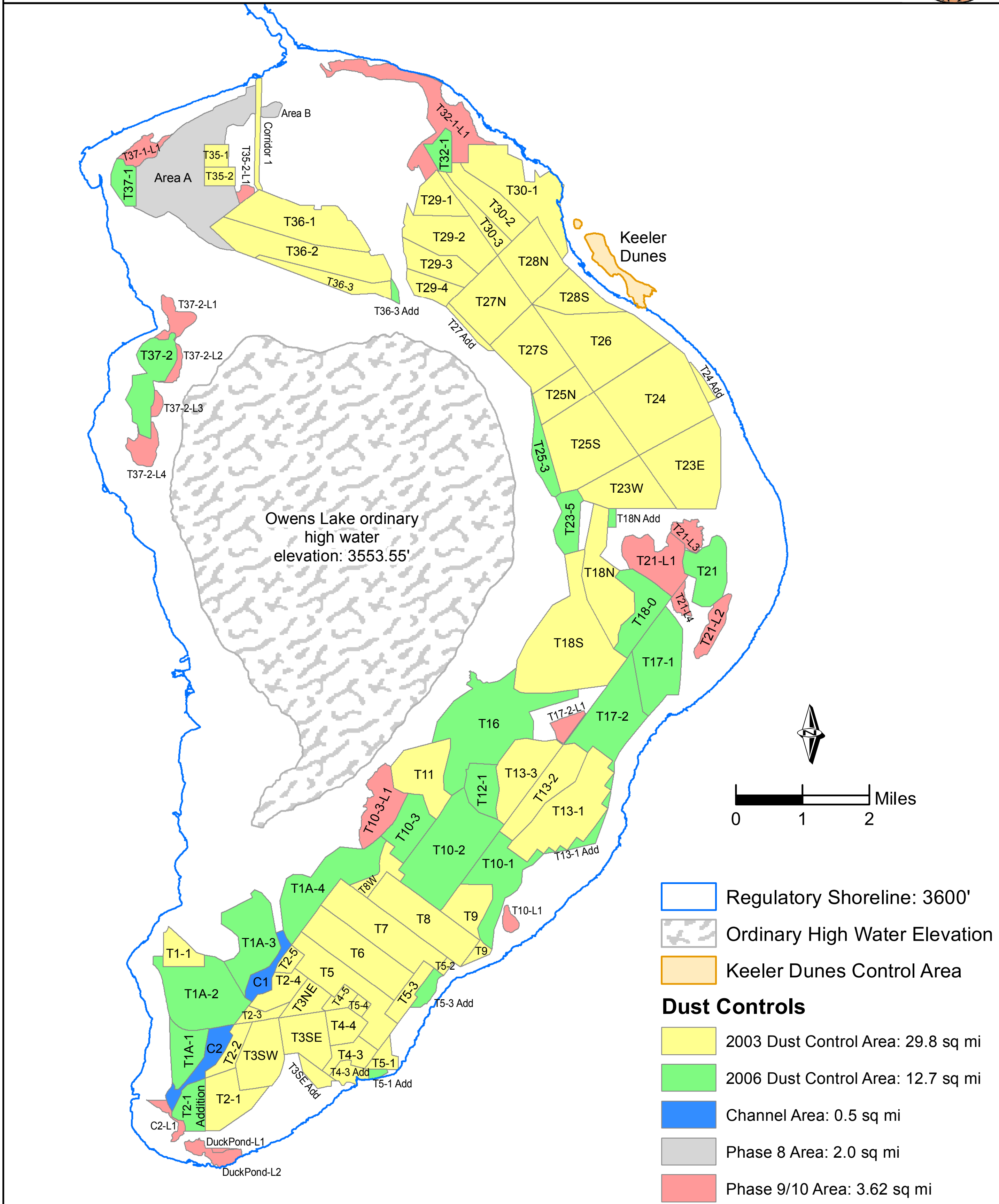
D. DWM areas will be monitored using the IPET method following the procedures used for Tillage with BACM Back-up areas in Paragraph IV.C.4.

E. The City shall re-flood a DWM area or sub-area as indicated by the available information to comply with the BACM Shallow Flood control efficiency target for that area, if either of the following erosion thresholds are exceeded as determined using the sand flux and IPET measurements described in Paragraphs IV.C.2 and IV.C.4.

    1. Sand flux measured at 15 cm above the surface exceeds 5.0 grams per square centimeter per day, or
    2. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height, H_{t}.

F. If any DWM area exceeds either erosion threshold in Paragraph VI.E in more than one calendar year over any continuous six-year period, that area will revert to the standard BACM Shallow Flood dust season as shown in Paragraph VI.B.1 since the area will no longer meet the DWM criteria in Paragraph VI.A.

Exhibit 1 - PM10 Dust Control Areas



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SIP Revision 2016 Exhibit 1 Dust Control Map 20160202.mxd

Great Basin Unified Air Pollution Control District

Exhibit 2 - Dust Control Efficiency Map

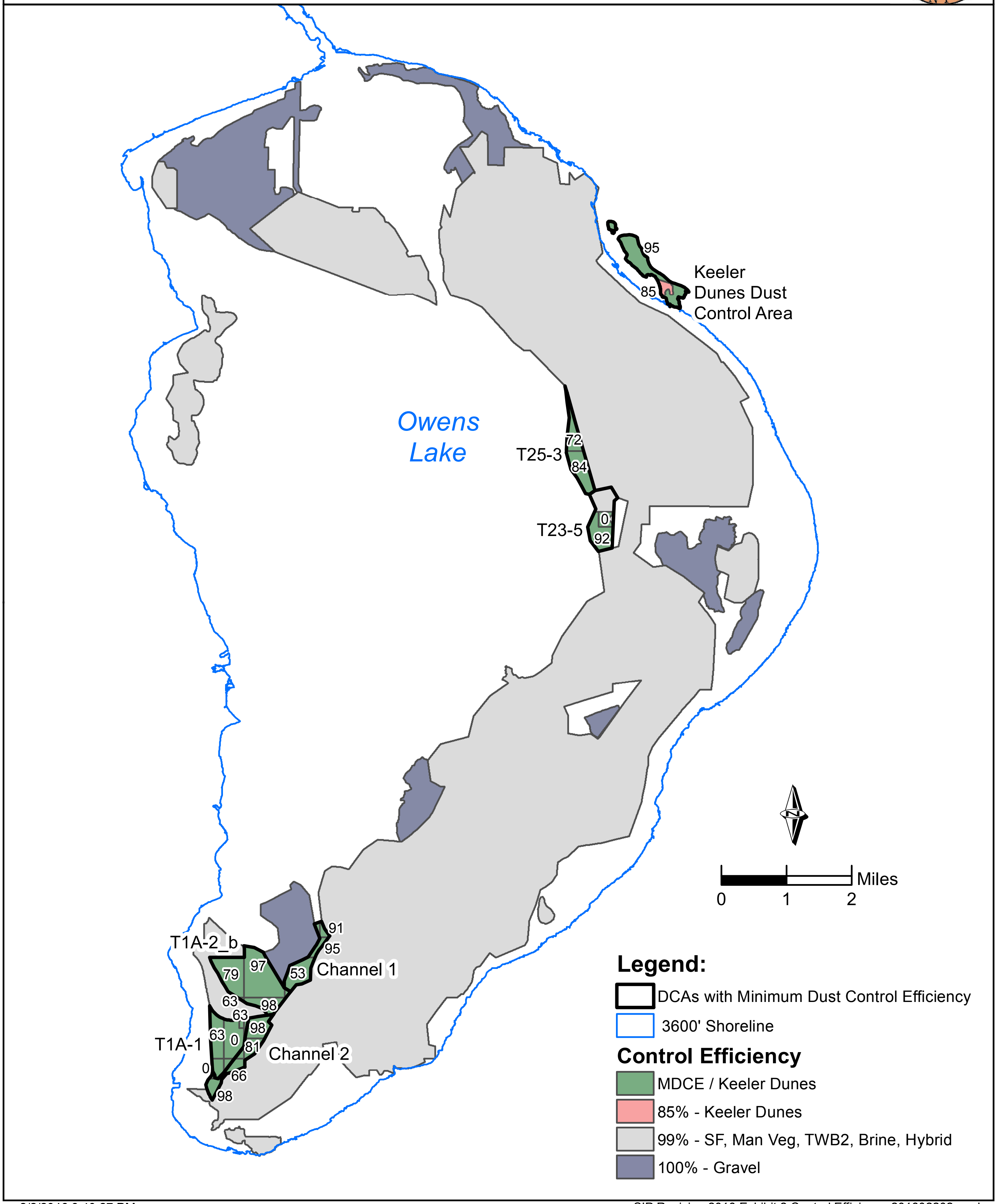

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Exhibit 3 - Shallow Flood control efficiency curve