Quantification of Nitrogen Removal Under Recycled Water Ponds

Prepared for **Eastern Municipal Water District**
Perris, California

May 25, 2007

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1. Background

Daniel B. Stephens & Associates, Inc. (DBS&A) was commissioned by Eastern Municipal Water District (EMWD) to evaluate the ability of the soils beneath EMWD recycled water recharge ponds in removing nitrogen through assimilation. This project is being conducted in response to Basin Plan Objective amendments, adopted on January 22, 2004 by the Santa Ana Regional Water Quality Control Board (SARWQCB), that EMWD must meet. The Basin Plan was approved by the Office of Administrative Law (OAL) and became effective on January 24, 1995. On January 22, 2004, the SARWQCB adopted a Resolution No. R8 2004 0001 amending the Basin Plan to incorporate revised boundaries for groundwater sub-basins now termed management zones. The SARWQCB and OAL approved the total inorganic nitrogen (TIN) Amendment on September 30, 2004. The SARWQCB provides a default value of 25 percent nitrogen uptake by the soil.

The Basin Plan TIN Amendment was prompted by the SARWQCB determination that the soils beneath the sub-basins have very little, if any, capacity to assimilate the TIN that is present in the recycled water, as evidenced by exceedances of water quality objectives for nitrogen. According to the SARWQCB, of the eight management zones in EMWD's area, six have no assimilative capacity; the remaining two have very little assimilative capacity. The effect of the Basin Plan amendment, by adopting a default 25 percent reduction in nitrogen concentrations, is to severely restrict the use of recycled water; however, if greater nitrogen losses can be demonstrated through actual site-specific studies, then a higher uptake value can be used, thereby providing EMWD with greater operational flexibility.

To demonstrate the possible uptake of nitrogen by soils, EMWD retained DBS&A to evaluate the subsurface underneath the recycled water storage ponds. The following major tasks were undertaken by DBS&A:

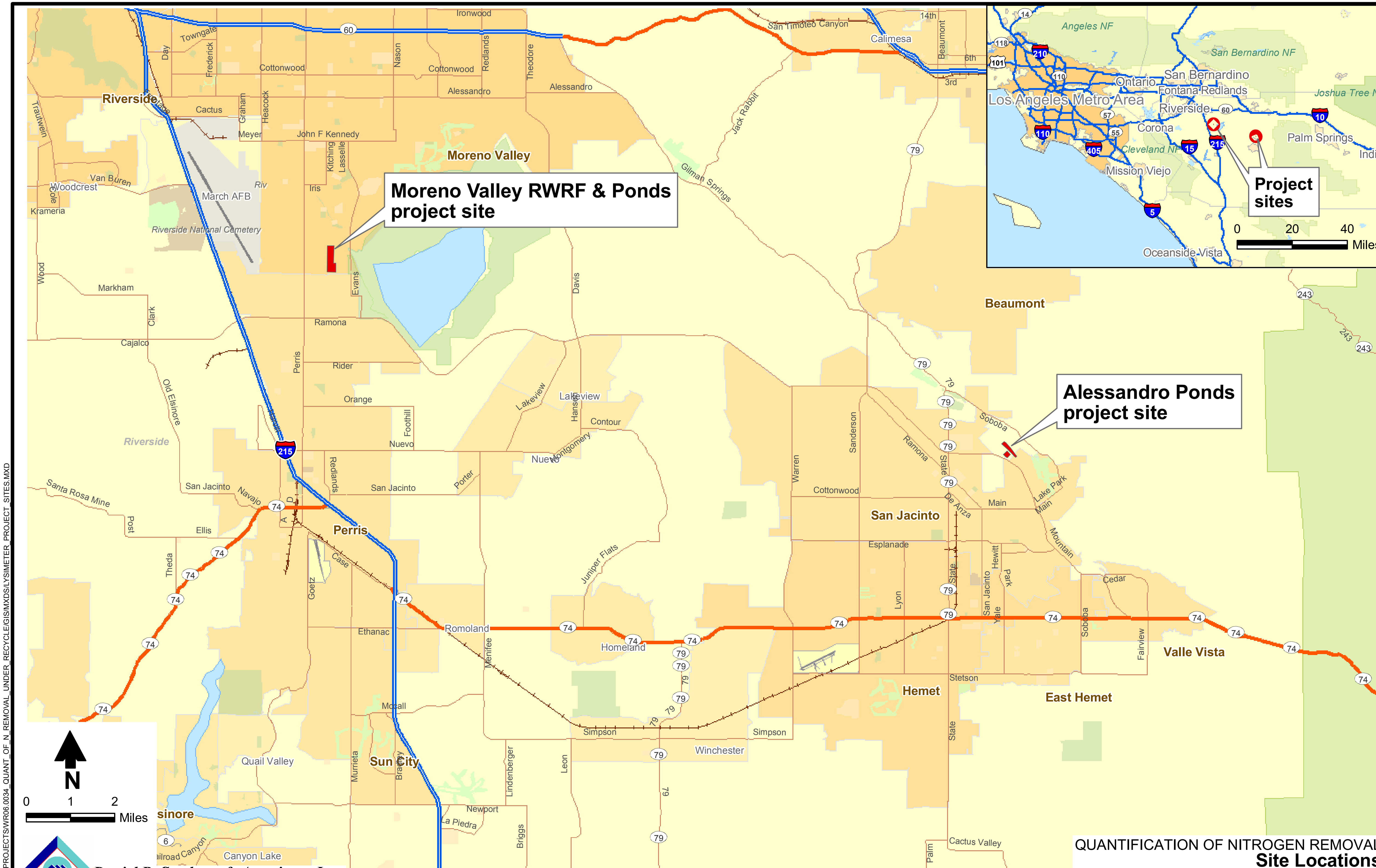
- Task 1 – Collection and review of existing data
- Task 2 – Sampling and analysis plan
- Task 3 – Lysimeter installation, amended to include monitoring well drilling and construction

- Task 4 – Lysimeter sampling
- Task 5 – Laboratory analyses
- Task 6 – Report preparation
- Task 7 – Data management
- Task 8 – Project meetings and public participation
- Task 9 – Project management

This report documents the conceptual site models and the installation of lysimeters at two EMWD facilities: the Moreno Valley Regional Water Reclamation Facility (MVRWRF) in Moreno Valley, California and the Alessandro Ponds in San Jacinto, California (Figure 1). The lysimeter installations documented in the report include drilling and soil sampling, lysimeter and sampling station construction, analysis of soil sample chemical and physical properties, and lysimeter elevations and location surveying.

Results of the analyses of pore water samples collected from the lysimeters are issued herein for review by stakeholders and the public advisory group, which last convened on February 27, 2007 at the (final) public meeting for this project. This final report includes available data from the completion of the cycle of monitoring by DBS&A and the initial lysimeter sampling by EMWD personnel, as well as both the lysimeter installation report and the monitoring well construction summary of operations report as appendices. Any data available hereafter will be presented in addendum format. Verbal reports, presentations, and meetings have also been held to communicate findings on an ongoing basis.

Also, DBS&A contracted with EMWD to construct two groundwater monitoring wells at the MVRWRF: MV-1 and MV-2, which were drilled and constructed in October 2006. Monitoring well MV-1 is located north of the recycled ponds, while MV-2 is located south of the ponds (Figure 2). Reports detailing the construction of these monitoring wells are included as appendices to this report.



QUANTIFICATION OF NITROGEN REMOVAL
Site Locations

Figure 1

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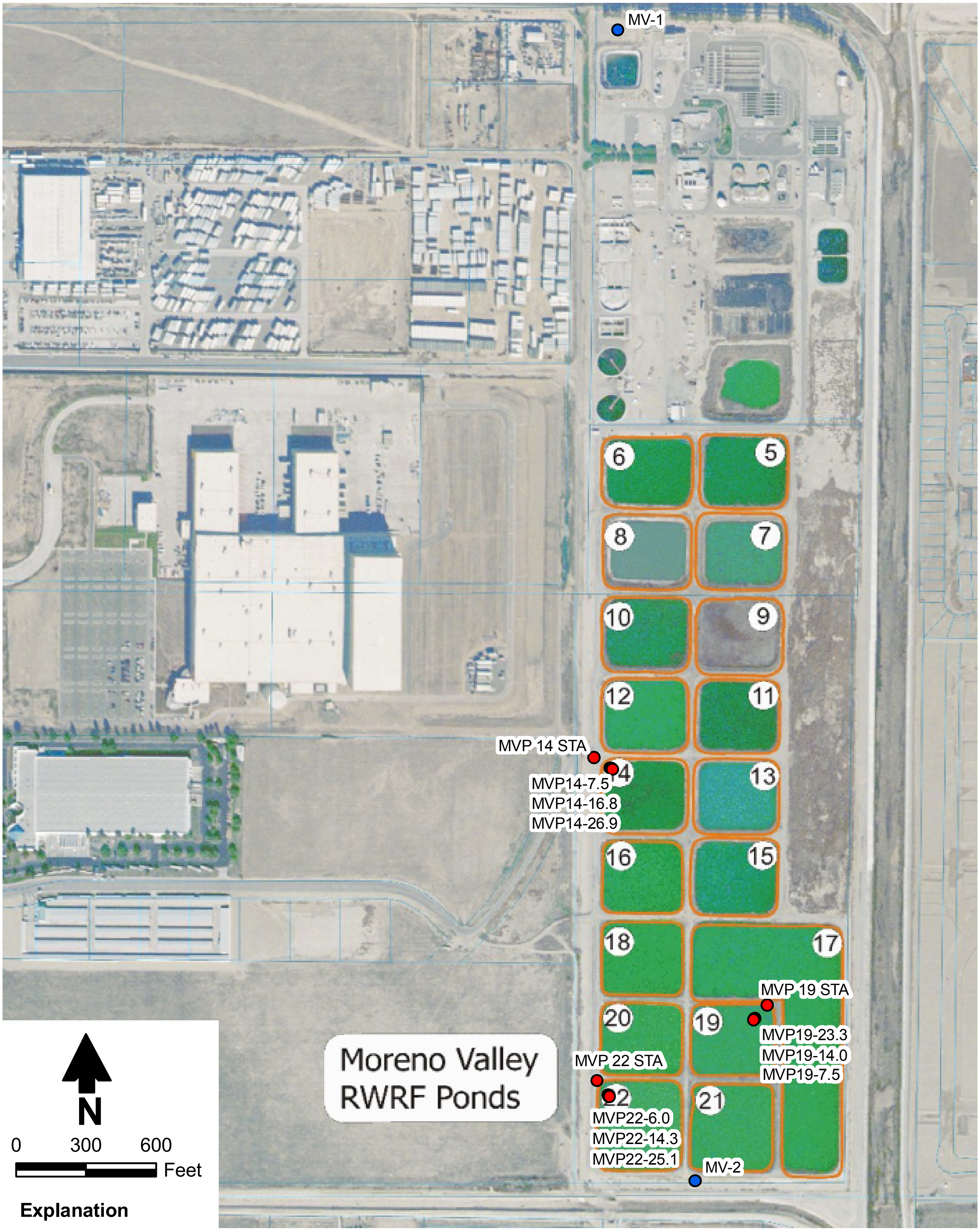
12/08/2006
JN WR06.0034

S:/PROJECTS/WR06.0034_QUANT_OF_N_REMOVAL_UNDER_RECYCLE/GIS/MXDS/LYSIMETER_PROJECT_SITES.MXD



Explanation

- Monitor well (October 2006)
- Lysimeter location and ID

Source: Aerial photograph from C. Reber, Eastern Municipal Water District.

QUANTIFICATION OF NITROGEN REMOVAL

Monitor Well and Lysimeter Locations at Moreno Valley Regional Water Reclamation Facility

Daniel B. Stephens & Associates, Inc.

4/13/2007

JN WR06.0034

Figure 2

S:/PROJECTS/WR06.0034_QUANT_OF_N_REMOVAL_UNDER_RECYCLE/GIS/MXDS/LYSIMETERS_MORENO_VALLEY.MXD

1.1 Alessandro Ponds

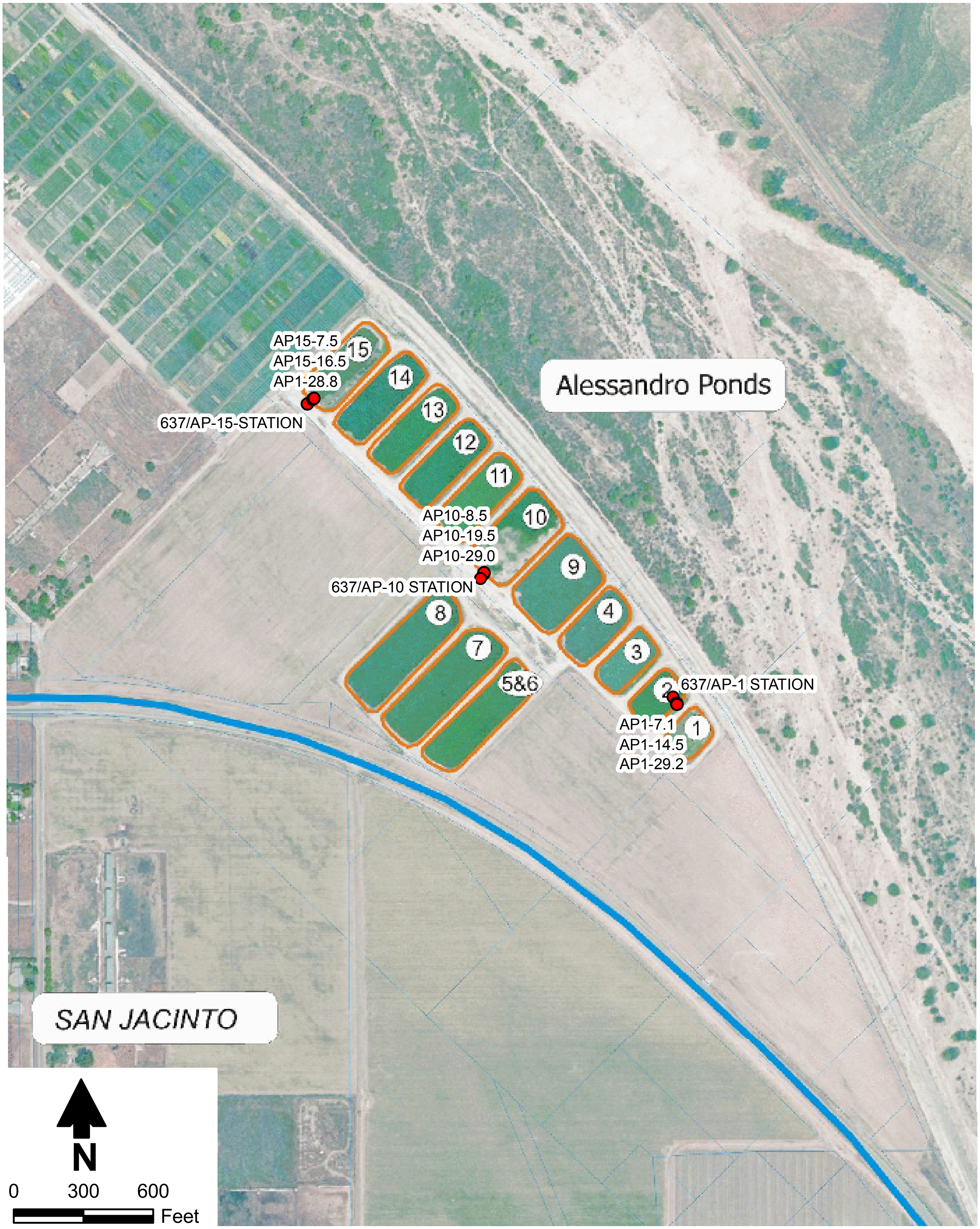
The Alessandro Ponds are used as a storage facility for tertiary-treated water processed by the San Jacinto Valley Regional Water Reclamation Facility (SJVRWRF) located approximately 3 miles west of the Alessandro Ponds site. The Alessandro Ponds comprise approximately 36 acres located between the Ramona Expressway and the San Jacinto River adjacent to and northeast of the city of San Jacinto. At this facility, 15 numbered ponds exist or have existed, with variable numbers of ponds active at any time due to maintenance and operations of the facility. The Alessandro Ponds have been in use since the mid-1960s; older ponds are to the southeast (Pond 1) and the younger ponds are to the northwest (Pond 15). All ponds have been present since the late 1970s; therefore, conditions were likely favorable for monitoring assimilative capacities of soils underlying the ponds under active scenarios. The estimated maximum capacity of the Alessandro Ponds is 55 million gallons. During dry periods, recycled water is sold for agricultural irrigation. Recycled water sales peak in the hot summer months and fall during wet winter months.

Figure 3 presents an aerial view of the Alessandro Ponds and shows the locations of the lysimeters and monitoring stations described in this report and used in this study.

1.2 Moreno Valley Regional Water Reclamation Facility

The MVRWRF is an active wastewater reclamation facility where raw wastewater is subject to primary, secondary, and tertiary treatment. The MVRWRF is located at 17040 Kitching Street in Moreno Valley and comprises approximately 146 acres located adjacent to the Perris Valley Drain, west of Lake Perris. A total of 22 numbered ponds exist or have existed at the MVRWRF since the mid 1970s, with variable numbers of ponds active at any time due to maintenance and operations of the facility. Ponds (14, 19, and 22) included in this study have been in use since the mid-1990s; therefore, conditions were likely favorable for monitoring assimilative capacities of soils underlying the ponds under active scenarios. Typically, fewer ponds are active in summer months as the demand for recycled water for irrigation is increased and there is less need to store water in the ponds.

Figure 2 presents an aerial view of the MVRWRF and indicates the locations of the lysimeters and monitoring stations described in this report and used in this study.



Explanation

Lysimeter location and ID

Source:
Aerial photograph from C. Reber, Eastern Municipal Water District.

QUANTIFICATION OF NITROGEN REMOVAL

Lysimeter Locations at the Alessandro Ponds

Daniel B. Stephens & Associates, Inc.
12/08/2006
JN WR06.0034

Figure 3

S:/PROJECTS/WR06.0034_QUANT_OF_N_REMOVAL_UNDER_RECYCLE/GIS/MXDS/LYSIMETERS_ALESSANDRO_PONDS.MXD

2. Hydrogeology

Like much of the EMWD service area, Alessandro Ponds and the MVRWRF are located within the Peninsular Ranges geomorphic province of California, within the approximately 20-mile-wide downdropped block (graben) between the Elsinore Fault Zone and the San Jacinto Fault Zone known as the Perris Block. Crystalline (largely Cretaceous granitic) bedrock formations are exposed in the San Jacinto Mountains to the northeast and the Santa Ana Mountains to the southwest of this graben, as well as in several hills and elevated features within the Perris Block itself. Most of the valley is filled with Tertiary and Quaternary alluvial material, ranging in thickness up to several thousand feet. Several intragraben hills and highlands affect groundwater flow within the alluvium of the area. These hills and highlands are incorporated into the design of surface water reservoirs such as Lake Perris.

2.1 Regional Hydrogeology

Groundwater within the San Jacinto Watershed Basin occurs largely within the alluvial sediments that fill the valleys. This is a closed basin that under natural (pre-development) conditions contained confined aquifers that flowed under artesian pressure when tapped by early (until circa 1930) wells. Groundwater flow within the undeveloped basin meandered around bedrock highs and discharged to surface water at various points, with the highest amounts of discharge occurring near Lake Elsinore. Pre-development water quality was excellent, but has since declined in certain areas and in upper aquifers due to drafting of the basin and land uses such as agricultural, dairy, and industrial activity, and the importation and recharge of Colorado River water. When pumping began, groundwater elevations began to decline, and flow primarily occurred within local sub-basins with a majority of the discharge going to pumped wells. Importation of Colorado River water and State Water Project water to the basin has been able to locally offset some of the effects of pumping on historical groundwater levels.

2.2 Alessandro Ponds Site Hydrogeology

The Alessandro Ponds overlie the Upper Pressure sub-basin of the San Jacinto Basin. Immediately to the southeast of this sub-basin is the area referred to as the Canyon sub-basin. These two sub-basins form a northwest-trending subsurface trough between the San Jacinto Fault and the Casa Loma Fault. The Casa Loma fault separates the Hemet sub-basin and higher bedrock to the southwest on the upthrown side of the fault. Collectively, these three sub-basins are referred to as the Hemet/San Jacinto area. The ephemeral San Jacinto River flows from the southeast to the northwest in the area of these sub-basins. River flow is the major source of recharge during wet years, and the ponds themselves contribute a smaller component of recharge to the local groundwater basin.

Alluvium in the vicinity of the ponds ranges in grain size from clay and silt to sand and gravels. Finer-grained units appear to exist as discontinuous lenses of various thicknesses. Deposition and subsequent deformation are subject to the local tectonic regime, with many strata tilting down to the northeast. A majority of the strata appear to dip toward this northeast direction and when they act as perching layers, the perched groundwater may likely follow a respective northeastward flow path. Where the perching strata are absent (discontinuous), percolating water migrates downward within sand and gravel strata. These perched aquifers are also referred to herein as the shallow perched or shallow aquifers. Conversely, the aquifers typically targeted for groundwater production by agricultural interests or municipal suppliers within the Hemet/San Jacinto area are referred to herein as the deep aquifers.

During the drilling and lysimeter installation process, alluvium was encountered underneath the Alessandro Ponds consisting of silty sands to well-graded sands with gravels to poorly graded sands from the ground surface (pond bottom) to 30 feet below ground surface (bgs). Trace low-plasticity clay lenses were encountered sporadically, and the only significant silt/clay lens was found at Alessandro Pond 10 at 16 to 17 feet bgs. Perched groundwater was encountered at depths of 3, 7.5, and 8 feet bgs in each of the initial (deepest) lysimeter borings in Ponds 15, 10, and 1, respectively. The lack of significant presence of silt/clay lenses beneath Alessandro Ponds also supports the interpretation that lateral flow of pond water recharge is minimal and that flow is primarily downward.

2.2.1 Water Levels

DBS&A collected and reviewed several years of water level data from numerous groundwater production wells that are perforated through the deeper regional aquifer units. These data were used to generate water level contour maps for spring conditions in the years 1955 (representing conditions prior to the majority of spreading, which began in 1965), 1991 (representing post-spreading dry year conditions), and 2005 (representing recent, post-spreading wet year conditions).

Prior to the contribution of recharge by the Alessandro Ponds, a nearly flat groundwater gradient is observed generally flowing to the northwest in the vicinity of the study area. In the Canyon sub-basin area, where the basin is narrower, the groundwater gradient is slightly steeper. In 1991, near the end of a regional drought that lasted approximately 6 years, and well after the onset of pond spreading operations, groundwater contours indicate a significant mound below the pond area and a significant trough in the southern portion of the Upper Pressure sub-basin. In 2005, a year during which near-record rainfall was recorded during the early winter months, a return to significant recharge from the San Jacinto River was observed.

2.2.2 Water Quality

DBS&A collected water quality data from various sources and created Stiff water quality diagrams for recent water samples collected from production wells (similar to those used in the water level analysis) throughout the area.

Virtually all of the wells in the wider area surrounding the Alessandro Ponds produce groundwater of a calcium-bicarbonate water quality character. In the near vicinity of the ponds, however, the sulfate component of the deep groundwater is higher than in other areas. Stiff diagrams of pond water quality indicate a high sulfate component (see figures in Appendix A). Because of this parallel and because of the discontinuous nature of the fine-grained strata in the pond vicinity, it is interpreted that the downward migration of pond water is as significant a component of the pond water infiltration as the lateral component of this flow. If the lateral flow in the shallow zone was predominant, it would be expected that sulfate concentrations in groundwater produced by the local wells would display a wider areal distribution. These site historical water quality data support the interpretation that lateral flow of pond water recharge to the regional aquifer is minimal and that the flow is primarily downward.

2.2.3 Summary of Site Hydrogeologic Conditions

Based on DBS&A's review of water quality, water levels, and contour maps, the direction of water percolation in the vadose zone beneath the ponds is primarily downward with a smaller component of lateral migration. The recharge from the ponds is seen in the patterns of groundwater flow only in the immediate vicinity of the ponds; outside of this immediate area, the regional features of groundwater flow dominate. Regional groundwater exists at a depth on the order of 200 feet below the ponds, with the groundwater flow direction to the northwest.

2.3 MVRWRF Site Hydrogeology

The MVRWRF ponds overlie the Perris North sub-basin of the San Jacinto Watershed Basin. This sub-basin represents the alluvium of the northwestern portion of the Perris Block and is one of five sub-basins in the area known as the West San Jacinto area.

Alluvium in the vicinity of the ponds ranges in grain size from clay and silt to sand and gravels. Finer-grained units appear to exist as relatively continuous lenses of various thicknesses. Sediments within the area of the MVRWRF are largely reflective of low-energy type of deposition and include silts, sands and clays. Most strata in the MVRWRF vicinity overlap the crystalline bedrock of the nearby hills as opposed to being in faulted contact with adjacent formations. Hence, most strata are subhorizontal to horizontal in orientation.

Alluvium is relatively thin in the vicinity of the MVRWRF. In 1999, EMWD commissioned Hydroscience & Technology (HST) to drill a test hole at MVRWRF that reportedly encountered decomposed bedrock at a depth of 192 feet on the west side of the facility between Ponds 14 and 16. Based on DBS&A's review of the geophysical log from that exploratory borehole, interbedded sands and silts appear to dominate the alluvial lithology.

During the drilling and lysimeter installation process in this scope of work, alluvium was encountered beneath the MVRWRF ponds consisting of silts, clays, silty and clayey sands to well-graded sands with gravels to poorly graded sands from the ground surface (pond bottom) to 25 or 30 feet bgs. Fine-grained strata are relatively thick and capable of perching groundwater, which was encountered at depths of 13.8, 4, and 17 feet bgs in the initial (deepest) lysimeter borings in Ponds 14, 19, and 22, respectively. Note that these depths are correlative with depths to water encountered during previous investigations, as the reference point for the lysimeter installation borings was the pond bottoms, roughly 20 feet below local ground surfaces.

2.3.1 Water Levels

DBS&A collected and reviewed several years of water level data from numerous groundwater production wells in the MVRWRF vicinity that are perforated through the deeper regional aquifer units, and generated hydrographs representative of the regional aquifer. A composite hydrograph of the Perry Wells from 1954 through the present indicates a significant rise in water levels following the construction and use of Lake Perris and the MVRWRF circa 1980 (Appendix B). In addition to the Lake Perris recharge, recharge from the Perris Valley Storm Drain and the MVRWRF ponds are likely contributors to the local groundwater.

Perched groundwater is known to be present in the vicinity of the MVRWRF. In addition to the reported encounter of perched water at a depth of approximately 30 feet bgs in the HST exploratory borehole, other geotechnical borings have intersected perched water between 30 and 60 feet bgs at various locations on the property. Data from a nearby leaking underground fuel tank site (Pulliam Family Trust, 1569 Nandina Avenue) indicate a minimum and maximum depth to water of 21.27 feet and 25.87 feet (over three years of quarterly monitoring), respectively.

2.3.2 Summary of Site Hydrogeologic Conditions

Based on DBS&A's review of local geology, water quality, and water levels and contour maps, the major water percolation in the vadose zone beneath the MVRWRF ponds is likely lateral along perching layers with a smaller component of vertical migration. The depth-to-water data indicate that perching layers are relatively laterally extensive and continuous. The extent and primary directions of the perched water flow are unknown at this time. At depth, the regional groundwater flow is predominantly southerly with a component of westerly flow from Lake Perris and the MVRWRF ponds. The regional groundwater level is static at a depth on the order of 50 to 100 feet below the ponds, and groundwater flows to the west and south (Appendix B).

DBS&A conducted all project-related tasks beginning February 2006 and continuing through the date of this publication. Table 1 lists, by task, the approximate key milestone dates involved in the completion of each individual task.

Table 1. Approximate Schedule for Completion of Project Tasks

Task No.	Description	Begin Date	Completion Date
1	Collection and Review of Existing Data	February 1, 2006	February 28, 2006
2	Preparation of Sampling and Analysis Plan	February 14, 2006	May 1, 2006
3	Lysimeter Installation	June 26, 2006	August 8, 2006
	Monitoring Well Installation	October 4, 2006	October 19, 2006
4	Lysimeter and Pond Sampling	July 6, 2006	May 31, 2007
5	Laboratory Analysis of Samples	June 30, 2006	May 31, 2007
6	Project Report	November 2006	April 11, 2007 projected
7	Data Management	June 30, 2006	April 1, 2007 projected
8	Project Meetings and Public Participation	February 27, 2006	February 27, 2007
9	Project Management and Administration	February 1, 2006	April 15, 2007

2.4 Task 1.0 - Collection and Review of Existing Data

DBS&A collected, compiled, and reviewed available data, maps, engineering drawings, reports and documents related to recycled water pond storage, percolation, water quality and general hydrogeologic conditions within the project area. Sources of data included DBS&A's in-house files for regional information, published data, and information available from the EMWD. DBS&A reviewed these data for pertinent information that affected the placement and design of the lysimeter clusters.

Task 1 culminated with the issuance of technical memoranda for each facility, the Alessandro Ponds and the MVRWRF, describing the hydrogeologic conceptual models indicating flow paths of recycled water emerging from the ponds at each facility. Regional features were included and considered in these memoranda. These memoranda are appended to this report as Appendix A and Appendix B.

2.5 Task 2.0 - Sampling and Analysis Plan

DBS&A worked with EMWD laboratory staff to prepare a sampling and analysis plan (SAP) based on and incorporating the results of Task 1.0. The SAP was prepared to document final locations, facilities requirements, forms, required digital data formats, drilling, lysimeter installation, sampling and analysis methods and procedures to complete project work. The plan identified specific work tasks and schedule of work to be completed by EMWD, DBS&A and construction contractors.

The portion of the SAP that guided the pore water sampling and analysis is presented as Appendix C.

2.6 Task 3.0 - Lysimeter Installation

Lysimeter installation commenced in the field on June 26, 2006. Details of the process are presented in the attached lysimeter installation report (Appendix D).

Two monitoring wells at the MVRWRF, MV-1 and MV-2, were constructed in October 2006. Reports documenting this construction are attached as Appendix E and Appendix F, respectively.

2.7 Task 4.0 - Lysimeter and Pond Sampling

Under EMWD direct management and upon completion of lysimeter installation, ponds initially drained were refilled and lysimeter and pond sampling commenced within one week of completion of lysimeter installation at each facility. DBS&A completed sampling on a weekly basis for the initial quarter (13 events) and monthly for a second quarter (3 events). A total of 18 lysimeter samples and 6 pond water samples were collected during each round of sampling, with duplicate sampling undertaken at selected points of the process. DBS&A trained EMWD staff on the sampling procedures and protocols documented in the SAP (Task 2.0), the manufacturer's recommended procedures for lysimeter care and maintenance, and the practical application of the sampling experience over the first six months of the project.

2.7.1 Lysimeter Sampling

During the week following installation, each of the lysimeters was tested for in-place functionality, and was purged and sampled. Note that this testing represents the fourth and final time the lysimeters were tested prior to their use in sampling events. The first was at the manufacturer's facility, the second was at DBS&A's laboratory, and the third was following addition of the pressure/vacuum and sample lines. EMWD added water to the ponds where lysimeters were installed within a few days of lysimeter installation to allow for sampling of the pond water and infiltration of the recycled water in the ponds.

DBS&A personnel sampled the lysimeters weekly for the first quarter and monthly for the second quarter following installation; thereafter, EMWD personnel sampled the lysimeters on a monthly schedule. A total of 9 lysimeter samples and 3 pond water samples were collected during each round of sampling at each facility. Over the course of the project, DBS&A staff made 20 visits to the facilities for the express purpose of lysimeter sampling. Each visit was summarized in a field memorandum; these memoranda are collectively presented in Appendix G.

Lysimeter sampling required a 3-step process within an approximate 24-hour period:

- *Step I - Purging.* To ensure the integrity of the samples, each lysimeter was purged before drawing a sample into the chamber. Typically, all valves were opened and a portable reversible vacuum pump was connected to the black polyethylene vacuum/pressure tube and a positive pressure was applied. This process cleared any water that entered the system between samples. When no further condensation evacuated from the sampling tube, the sampling ball valve was closed. Because the majority of the lysimeters for this project were installed in saturated media, there was often a full sample volume of this purged water.

- *Step 2 - Charging.* Leaving the pump connected to the black polyethylene vacuum/pressure tube, the sampling technician switched the pump to the vacuum function and applied a vacuum until the pressure gauge read approximately 20 pounds per square inch (psi) (or as close as possible). The vacuum tube ball valve was then closed and vacuum pump turned off. The lysimeter was allowed to remain charged at a negative pressure for an adequate period of time to collect a pore water sample from the formation. At Alessandro Ponds, where relatively coarse-grained materials are present and saturated, the charging was effectively complete after only a few minutes. At MVRWRF, where finer-grained soils and aquifer materials exist, the charging remained in place for approximately 24 hours prior to sample collection.

- *Step 3 - Discharge and Sample Collection.* To collect a water sample, the sampling technician inserted the sampling tube into a clean, pre-labeled sample bottle. The portable reversible pump was then attached to the black polyethylene vacuum/pressure tube, both ball valves were opened, and a positive pressure was applied. Water collected in the lysimeter was emptied into the sample bottle. When no more fluid was ejected, the pump was powered off and both valves were closed. If greater volumes of sample were required than that produced by the initial effort, additional lifts or cycles of lysimeter charging and discharging were required.

2.7.2 Pond Sampling

A sample of recycled water was collected from each pond adjacent to a lysimeter cluster on the same day the lysimeters were sampled. An individual pond water sample consisted of a composite of 3 grab samples collected near a lysimeter cluster. The grab samples were composited in the field prior to delivery to the laboratory. In the event that a pond under which lysimeters were installed had insufficient water for pond sampling, an adjacent pond was surrogated for the sampling event, as noted on the field memoranda.

2.7.3 Sample Handling, Documentation, and Tracking Procedures

Water samples were labeled with the following information:

- Project name and number
- Sampling station name and ID
- Sample date and time
- Sampler's initials
- Analyses required
- ID -- EMWD Regional Water Resources Database (RWRD) integer station ID assigned to sampling station (pond, lysimeter, or borehole)

Water samples were collected in appropriate containers provided by the EMWD laboratory. Sample containers were new and certified clean by the laboratory. Collected samples were stored in a cooler chilled to approximately 4°C.

Field observations and data were recorded in a weatherproof field notebook. Copies of the notes were submitted to EMWD with the sampling memorandum prepared for each round of sampling. Field data relevant to each sample were written on the sample label. Field notes for each sample documented:

- Project name and number
- Sample collection date and time
- Sample identification number and depth (if applicable)
- Sample type and matrix
- Analyses to be performed
- Number and volume of samples
- Description of quality assurance/quality control (QA/QC) samples collected
- Sampling methods
- Sample handling
- Field observations and data
- Personnel and equipment present

A complete chain of custody (COC) form was prepared for each round of monitoring for samples delivered to the laboratory. The COC was sealed in a plastic bag and taped to the inside of the cooler lid. Copies of the COC forms generated during each round of sampling were included with the sampling memorandum submitted to EMWD. The COC form included the following information:

- Project name and number
- Sample collection date and time
- Sample identification number
- Sample type and matrix
- Analyses requested
- Number of containers
- Person to contact regarding analyses
- Signature of persons relinquishing custody, dates, and times
- Signature of persons accepting custody, dates, and times

2.8 Task 5.0 - Laboratory Analyses of Soil and Water Samples

DBS&A submitted soil samples collected during lysimeter installation for chemical analysis at Calscience Engineering Laboratories, Inc. (Calscience), of Garden Grove, California, a state-certified laboratory known for high quality work. DBS&A utilized our in-house laboratory to conduct the analyses of physical properties of the soils. The water samples collected from the lysimeters and recycled water storage ponds were analyzed by the EMWD laboratory or a state-certified laboratory retained by EMWD. Analyses include the quantification of the physical and chemical properties of the drilled soil, quality of the recycled water stored in ponds, and data required to quantify nitrogen loss in the zones underlying the ponds. Samples of soil and water were handled according to established protocol, including proper labeling, maintenance of COC documentation, and sample preservation.

Details of the laboratory analyses of the soil physical and chemical properties are presented in the lysimeter installation report (Appendix D).

Water samples collected from lysimeters and ponds for analysis of the chemical constituents were delivered to the EMWD laboratory. Results of the sample analyses as received from EMWD are included as Appendix H. Appendix I provides tables that present relevant water quality data for the nitrogen species for Alessandro Ponds 1, 10, and 15 and MVRWRF Ponds 14, 19, and 22. Chemical parameters analyzed during the weekly sampling schedule included:

- Total dissolved solids (standard method 2540C)
- Ammonia (EPA method 350 1)
- Nitrate-N and nitrite-N (EPA method 354.1)
- Organic nitrogen (EPA method 351.2, calculated)
- Total Kjeldahl nitrogen (EPA method 351.2)
- Dissolved organic carbon (standard method 5310C)

Additional analyses, conducted on a less frequent basis, included:

- General minerals
- Boron and chloride

2.9 Task 6.0 - Project Report

DBS&A prepared and submitted a draft final project report to EMWD staff and the Public Advisory Committee for review and comment. DBS&A incorporated the comments received from EMWD into this final report. The final report includes descriptions of all tasks accomplished, salient findings, conclusions, and recommendations, and is supported by several appendices that further detail project efforts.

2.10 Task 7.0 - Data Management

DBS&A has submitted all data, drawings, maps, and documents generated by or prepared for the project to EMWD. Formats of data transfer have included paper deliverables, transmission via electronic mail, and the like in file formats suitable for import into the EMWD RWRD, Enterprise Geographic Information System (GIS), and Enterprise Document Management System (DMS).

DBS&A has coordinated with EMWD on an ongoing basis regarding specific file formats required for specific data and document types. As an example, DBS&A submitted survey data in State Plane Coordinates (NAD83), with the exception of datum for elevation data which were provided in NAVD88 along with the previously submitted lysimeter installation report (Appendix D).

2.11 Task 8.0 - Project Meetings and Public Participation

DBS&A prepared for and attended project meetings to inform participating agencies and the public of project goals and objectives, scope of work, interim progress and results, and final project results. EMWD staff contacted agencies, organizations and individuals with a potential interest in project results and invited their representatives to attend project meetings. These meetings included:

- Project startup meeting: February 27, 2006
- Teleconference meeting regarding conceptual modeling: March 28, 2006
- Project field meeting during initial date of lysimeter installation: June 26, 2006 (occasional additional field follow-up meetings)
- Interim project meeting for presentation of in-progress project results: September 21, 2006
- Final meeting for presentation of preliminary to-date project results: February 27, 2006

Because project meetings provide key input to reporting, DBS&A will made available a copy of this final project report to participating organizations and individuals. Commentary received was incorporated into the final report and completed the public participation element of this project.

DBS&A worked with EMWD staff to prepare and deliver meeting minutes to be distributed to meeting participants via electronic mail. Minutes of the in-person public participation meetings are presented as Appendix J.

2.12 Task 9.0 - Project Management and Administration

DBS&A managed and administered all work completed under the contract involving work performed by DBS&A's staff, subconsultants, and subcontractors. Invoices for equipment, materials and services were submitted in a format acceptable to EMWD and included certified payrolls for work completed under prevailing wages.

EMWD staff managed the overall project with respect to interface with DWR staff, EMWD field personnel, and facilities operations, stakeholders, public participation and other entities. EMWD staff also took the leads on interaction with the regulatory agencies, management of grant funds, and management of laboratory analyses of water samples.

3. Summary of Findings and Conclusions

Nine topics for findings and conclusions were specifically targeted for this investigation. Details of these are presented in the following subsections.

3.1 Depth-Specific Trends in Soil Properties

In each of the three ponds selected for lysimeter installation at Alessandro Ponds (Pond 1, Pond 10, and Pond 15) and MVRWRF (Ponds 14, 19, and 22), a single deep boring was sampled, geologically logged, and utilized in the design of two deeper borings and all lysimeters drilled in the same pond and drilled from roughly the same pond bottom datum. Discrete samples were collected on roughly 5-foot intervals for these purposes. Based on the logged soil types, moisture content, and sample availability, a total of 9 samples from Alessandro Ponds and 11 samples from MVRWRF were selected for chemical and physical analyses. Details are presented in the lysimeter installation report (Appendix D).

Physical properties for which samples were analyzed were initial moisture content, dry bulk density, calculated porosity, saturated hydraulic conductivity, particle size distribution by wet sieve and hydrometer, and particle density.

3.1.1 Alessandro Ponds

At Alessandro Ponds, soil types were found to be relatively uniform, consisting of silty sands, sands, and gravelly sands throughout, with the lone exceptions being a centimeters-thin clay lens at 6 feet in the Pond 1 boring and a silt stratum encountered at 16 feet Pond 10.

Moisture content of soil samples were generally near saturation, ranging from 10.7 to 20.5 percent by weight in most samples and 33.1 percent in the silt sample at AP10-15. Volumetric moisture content ranged from 16.9 to 33.3 percent in most samples and 47.3 percent in the silt sample from AP10-15.

Dry bulk density ranged from 1.43 to 1.83 grams per cubic centimeter (g/cm^3) and was lower in the siltier samples. Wet bulk density ranged from 1.75 to 2.07 g/cm^3. These ranges are thought to be relatively uniform and consistent with sediment derived from granitic provenance.

Porosity of the samples from Alessandro ponds ranged from 32.4 to 47.5 percent, with the highest value from the AP10-15 silt.

Saturated hydraulic conductivity, as measured by constant head analysis, ranged from 2.8×10^{-5} centimeters per second (cm/s) to 8.2×10^{-3} cm/s in the sandy material, and the silt at AP10-15 yielded a value of 4.3×10^{-6} cm/sec. Relative to depth, the shallowest and deepest samples revealed higher conductivity values. Generally, the conductivity appears to be lower than the soil types would indicate; these values may be associated with mineral precipitation, natural in-place soil compaction by the weight of overburden, thin silt or clay lenses present in the sample interval but not observed in the field, or specific sorting of the samples.

Thickness-weighted average hydraulic conductivities of soils from each of the borings are as follows:

- Pond 1: 0.00347 cm/s
- Pond 10: 0.00357 cm/s
- Pond 15: 0.00111 cm/s

These values relate to the relative permeability of water percolating from the ponds to the regional groundwater aquifers. In the absence of detailed, continuous lithologic and hydrologic testing of the sediments over the entire column of the vadose zone, these values relate to fate and transport of percolating water by demonstrating a residence time prior to the presence in the regional aquifer. At this time, it is considered appropriate to discuss these numbers to express a rough, relative travel time to groundwater knowing that additional detail should be obtained prior to determining absolute travel time values.

Particle size distribution analyses indicated a classification of the samples as sands and loamy sands. An exception to this was the AP10-15 sample, classified as a silt loam.

Particle density testing revealed a narrow range of densities from 2.67 to 2.72 g/cm^3. Sample AP10-15, the silt stratum, was the densest sample.

3.1.2 MVRWRF

At MVRWRF, soil types were found to be variable and stratified, generally finer-grained than those encountered at Alessandro Ponds. MVRWRF samples consisted of silts, clays, and sands with variable amounts of clay to gravel-sized particles.

Moisture content of soil samples was generally near saturation and greater with depth, ranging from 8.5 to 55.0 percent by weight in most samples (14.0 to 59.2 percent by volume).

Dry bulk density ranged from 1.06 to 1.96 g/cm^3 and was lower in the finest-grained samples. Wet bulk density ranged from 1.67 to 2.21 g/cm^3. These ranges are thought to be relatively variable and as expected, given the variable stratigraphy at the MVRWRF site.

Porosity of the samples from MVRWRF ranged from 27.5 to 60.5 percent, with the highest value from the deeper clays at Ponds 14 and 22 (25-foot-deep samples).

Saturated hydraulic conductivity, as measured by constant head or falling head analysis, ranged from 1.7 x 10^{-6} cm/s to 2.4 x 10^{-3} cm/s. Generally, the conductivity appears to be as expected based on soil types.

Thickness-weighted average hydraulic conductivities of soils from each of the borings are as follows:

- Pond 14: 0.00052 cm/s
- Pond 19: 0.000028 cm/s
- Pond 22: 0.000052 cm/s

These values relate to the relative permeability of water percolating from the ponds to the regional groundwater aquifers. In the absence of detailed, continuous lithologic and hydrologic testing of the sediments over the entire column of the vadose zone, these values relate to fate and transport of percolating water by demonstrating a residence time prior to the presence in the regional aquifer. At this time, it is considered appropriate to discuss these numbers to express a rough, relative travel time to groundwater knowing that additional detail should be obtained prior to determining absolute travel time values.

Particle size distribution analyses indicated a classification of the MVRWRF samples as sandy loams, loamy sands, silt loams and silty clay loam. Only MVP14-5 was classified as a sand and only MVP14-25 was classified as a loam.

Particle density testing revealed a narrow range of densities from 2.65 to 2.77 g/cm^3.

3.2 Variability in Pond Water Quality

Variability in pond water quality is to be expected based on several factors. Source water is of slightly inconsistent quality based on demands and sources of that water itself. Residence time in ponds, contact with flora and fauna on both a time and population basis, and evaporation are also factors affecting pond water quality. During the course of the project, maintenance of the ponds areas included denuding the vegetation in and adjacent to the ponds.

3.2.1 Alessandro Ponds

Pond water quality varied over the course of the project in all ponds. Total nitrogen (ammonia, nitrate, nitrite, and organic nitrogen) concentration was used as an indicator of pond water quality. Total nitrogen concentrations in Pond 1 ranged from 3 to 23 milligrams per liter (mg/L), with an average of 11.7 mg/L. In Pond 10, total nitrogen concentrations ranged from 3 to 19 mg/L, with an average of 9.5 mg/L. In Pond 15, total nitrogen concentrations ranged from 1 to 13 mg/L, with an average of 7.1 mg/L.

Trends over time of this indicator compound suggest that nitrogen concentrations were higher in the beginning of the monitoring program (summer), were lower in autumn, and rose slightly in the winter period. These trends are likely due to variability in water volume availability, and may have some correlation with natural factors, such as evaporation and migration patterns of fowl that use the ponds as habitat and contribute some degree of nitrogen to the pond water.

3.2.2 MVRWRF

Pond water quality varied over the course of the project in all ponds. Total nitrogen concentrations in Pond 14 ranged from 8 to 20 mg/L, with an average of 13.4 mg/L. In Pond 19, total nitrogen concentrations ranged from 6 to 20 mg/L, with an average of 12.3 mg/L. In Pond 22, total nitrogen concentrations ranged from 1 to 20 mg/L, with an average of 10.9 mg/L. It is useful to note that the average total nitrogen concentration decreases with distance from the treatment facility, possibly due to attenuation of the nitrogen compounds during increased residence time in distal ponds.

Trends over time of this indicator compound suggest that nitrogen concentrations were higher in the beginning of the monitoring program (summer), were lower in autumn, and rose slightly in the winter period. These trends are likely due to variability in water volume availability, and may have some correlation with natural factors, such as evaporation and migration patterns of fowl that use the ponds as habitat and contribute some degree of nitrogen to the pond water.

3.3 Depth-Specific Trends in Lysimeter Water Quality

Generally, the samples collected from the lysimeters decreased in total nitrogen content with depth. Anomalous values were observed at intermediate-depth samples from Pond 15 in the Alessandro Ponds and Pond 22 at the MVRWRF. Acute changes in concentrations were observed with changes in pond residence time, changes in source water concentrations, and with the removal of vegetation from near the water's edges on the banks of the ponds. Graphical depictions of the water quality samples are presented in Appendix K.

3.4 Lysimeter Water Quality Trends Associated with Pond Filling and Drying

Throughout the sampling period, the ponds contained at least some water on a consistent basis.

Pond 1 at Alessandro Ponds and Pond 14 at MVRWRF were the only areas that experienced the lowest water conditions. Evaporation is believed to be uniform over the ponds at each facility, so the variability in water levels between ponds is more a factor of input and percolation.

3.4.1 Alessandro Ponds

Only Pond 1 was found to become closest to dryness during the monitoring period. Along with Pond 15, Pond 1 is near the periphery of the recycled water storage property. Hence, of the monitored ponds, the wetting/drying conditions are most variable at these ponds relative to the centrally located Pond 10.

Based on the water quality data at Alessandro Ponds, any correlation between filling and drying indicates that the greatest, shallowest, and sharpest reductions in nitrogen occurred beneath the ponds with consistent saturated conditions during the monitoring period (Pond 10). This is likely the result of the presence of a stable bacteriological environment with nitrogen-consuming species existing in relative equilibrium with carbon and nitrogen in the source recycled water.

3.4.2 MVRWRF

Only Pond 14 came close to dryness during the DBS&A monitoring period. Along with Pond 22, Pond 14 is near the western perimeter of the pond area. In contrast, Pond 19 is centrally located and surrounded by ponds where conditions remained wettest throughout the lysimeter installation and monitoring project phases.

Based on the water quality data at MVRWRF, any correlation between filling and drying indicates that the greatest, shallowest, and most acute reductions in nitrogen occurred beneath the ponds with consistent saturated conditions during the monitoring period (Pond 19). This is representative of a stable bacteriological environment with nitrogen-consuming species in relative equilibrium with the source recycled water.

3.5 Travel Time of Water from Pond to Water Table

Estimates of vertical travel times of water from the pond bottoms to a sub-basin-contiguous aquifer for each of the ponds drilled and sampled during this investigation were calculated. This compares to a virtually nil travel time from pond to “water table” in that the distance from the pond to the water table(s) of perched aquifer(s) exist at effectively 0 feet from the pond during operating conditions. These calculations are presented in Appendix L.

3.5.1 Alessandro Ponds

Regionally significant, target production aquifers are present (and monitored via water supply wells and some monitoring wells) at depths below 200 feet in the vicinity of Alessandro Ponds. Hence, below an approximately 5-foot-deep pond, the vertical travel distance is 195 feet. Three soil samples were collected from each of the three ponds, to provide physical parameters. Based on correlation of soil types and measured saturated hydraulic conductivities of samples, DBS&A established an average hydraulic conductivity (after Bouwer, 1994; Fetter, 1988) of the soil column below each pond; this value is assumed to be representative of the entire column of material between the pond bottom and the local aquifer.

Based on these assumptions and measured values, DBS&A estimates that the vertical travel time from the pond bottom to the local aquifer is between 7 days (Pond 1) and 23 days (Pond 15). Calculation spreadsheets are presented as Appendix L.

3.5.2 MVRWRF

Regionally significant, target production aquifers are present (and monitored via water supply wells and deeper monitoring wells) at depths below 70 feet in the vicinity of MVRWRF. Hence, below an approximately 20-foot-deep pond, the vertical travel distance is 50 feet. Soil samples were collected from each of the three ponds to provide physical parameters. Based on correlation of soil types and measured saturated hydraulic conductivities of samples, DBS&A established an average hydraulic conductivity of the soil column below each pond; this value is then assumed to be representative of the entire column of material between the pond bottom and the local aquifer.

Based on these assumptions and measured values, DBS&A estimates that the vertical travel time from the pond bottom to the local aquifer is between 130 days (Pond 22) and 173 days (Pond 19). A faster vertical percolation rate was calculated for MVP14 (12 days); however, there were only two samples analyzed for hydraulic conductivity in that pond, as opposed to more complete representations (four and five samples) from MVP19 and MVP22. Calculation spreadsheets are presented as Appendix L.

3.6 Comparison of Soils at Monitoring Sites to Other Sites

Soils encountered at the lysimeter boring locations during this investigation ranged from clays to gravelly sands—effectively a full range of likely potential soil types for the region. It is likely that other EMWD pond locations possess similar types of soil to the ranges of those observed at either MVRWRF or Alessandro Ponds. Detailed review of existing data or additional sampling will corroborate this comparison.

3.7 Calculation of Nitrogen Loss Coefficients at Monitoring Sites

Calculations of nitrogen losses are based on the sheets shown in the tables presented as Appendix M. Several approaches to determining reduction coefficients were considered, but based on communication with the SARWQCB, the daily concentrations are to be considered rather than comparing long- or short-term average source concentrations.

3.7.1 Alessandro Ponds

Within the Alessandro Ponds, lysimeter water quality has varied over time in response to the pond water quality and reduction in nitrogen in the subsurface. A trend or “lag time” between peak concentrations of pond water quality and the peak response in nitrogen concentrations in the deeper lysimeters appeared to follow when compared graphically (Appendix K). Such a trend would indicate a need to average the source concentration as a baseline over time (over at least about five weeks). However, based on input from the SARWQCB, for the purposes of statistical analysis, the "source water" concentration for the pond water is assumed to be an absolute concentration of the pond water at the time of lysimeter sampling.

At Alessandro Ponds, the average reductions in total nitrogen concentrations at each pond, over the course of monitoring through January 2007, are as follows:

- *Pond 1*. 7.1 feet: –31.8 percent reduction, 14.5 feet: 63.7 percent reduction, 29.2 feet: 66.7 percent reduction
- *Pond 10*. 8.5 feet: 34.1 percent reduction, 19.5 feet: 77.2 percent reduction, 29 feet: 76.4 percent reduction
- *Pond 15*. 7.5 feet: 70.4 percent reduction, 16.5 feet: –62.4 percent reduction, 28.8 feet: 48.8 percent reduction

Negative numbers indicate a relative higher average concentration, not necessarily an increase in concentration. Outlier values skew the pond water and lysimeter water sample data; these effects are more profound when the snapshot data approach is used. Effects are not as profound and negative numbers do not result when a five-week moving average of pond water concentrations is used to compare with lysimeter samples.

- *Alessandro Ponds Averages*. Shallow lysimeters: 24.2 percent reduction, Intermediate%, intermediate depth lysimeters: 26.2 percent reduction, deep lysimeters: 64.0 percent reduction

As can be seen above, averages of snapshot pond to lysimeter concentrations increased in two of the lysimeters (Pond 1 at 7.1 feet and Pond 15 at 16.5 feet), but reduced overall. Such an apparent increase can be due to several factors, including lower concentrations of nitrogen in surface water due to a lack of residence time in a pond, an isolated biomass buildup, conduits between zones, etc. Reduction coefficients are greater and more consistent with depth, and are also larger when an averaged source concentration is considered.

3.7.2 MVRWRF

Within the MVRWRF Ponds, lysimeter water quality has varied over time in response to the pond water quality and reduction in nitrogen in the subsurface. A trend or “lag time” between peak concentrations of pond water quality and the peak response in nitrogen concentrations in the deeper lysimeters appeared to follow when compared graphically. Such a trend would indicate a need to average the source concentration as a baseline over time (over at least about five weeks) (see comments above). However, based on input from the SARWQCB, for the purposes of statistical analysis, the “source water” concentration for the pond water is an absolute concentration of the pond water at the time of lysimeter sampling.

At MVRWRF Ponds, the average reductions in total nitrogen concentrations at each pond, over the course of monitoring through January 2007, are as follows:

- *Pond 14.* 7.5 feet: 32.4 percent reduction, 16.8 feet: 36.7 percent reduction, 26.9 feet: 84.7 percent reduction
- *Pond 19.* 7.5 feet: 82.2 percent reduction, 14.0 feet: 88.3 percent reduction, 23.3 feet: 85.6 percent reduction
- *Pond 22.* 6.0 feet: 77.3 percent reduction, 14.3 feet: –62.7 percent reduction, 25.1 feet: 50.2 percent reduction
- *MVRWRF Ponds Averages.* Shallow lysimeters: 64.0 percent reduction, intermediate depth lysimeters: 20.8 percent reduction, deep lysimeters: 73.5 percent reduction

As can be seen above, averages of snapshot pond to lysimeter concentrations increased in one of the lysimeters (Pond 22 at 14.3 feet), but reduced overall. Such an apparent increase can be due to several factors, including lower concentrations of nitrogen in surface water due to a variable residence time in a pond, an isolated biomass buildup, conduits between zones, limited sample availability etc. Reduction coefficients are greater and more consistent with depth, and are also larger when an averaged source concentration is considered.

Negative numbers indicate a relative higher average concentration, not necessarily an increase in concentration. Outlier values skew the pond water and lysimeter water sample data; these effects are more profound when the snapshot data approach is used. Effects are not as profound and negative numbers do not result when a five-week moving average of pond water concentrations is used to compare with lysimeter samples.

3.8 Estimation of Nitrogen Loss Coefficients at Other Pond Locations

Because the conditions at the two locations in this study are relatively different, and the results of reduction in the upper 30 or so feet are relatively constant, it can be concluded that similar conditions exist beneath similarly operated ponds at other locations within the EMWD service area. Hence, an estimated range of total nitrogen reductions would likely be in the 60 to 80 percent range at such facilities.

3.9 Identification of Additional Work Required

Initial work required to correlate soil and water conditions at other pond locations begins with a review of available data, and generation of conceptual models to determine if the sites fit into a deep regional groundwater type of environment with high vertical rates of percolation, a perched type of environment where lateral migration predominates, or a combination thereof; this characteristic is important because vertical travel time to the regional aquifers is shorter where perching strata are absent, thin, or discontinuous. A review of pond operation to determine wetting/drying patterns would be required. Verification testing of the nitrogen reduction with the installation of at least one set of monitoring wells (if saturated) or lysimeters (if likely temporally unsaturated) would also be useful.

4. Recommendations

During this study, DBS&A has concluded that a 60 to 80 percent reduction in total nitrogen concentrations can be expected at MVRWRF, Alessandro Ponds, and similar facilities where recycled water is stored and recharged via ponds. Recommendations are provided herein to strengthen the confidence in the calculated reduction values. Based on the findings and conclusions of this study, DBS&A recommends the following additional efforts associated with the recycled water storage ponds.

4.1 Bacteriological Samples and Analysis

To determine the bacteriological components at work in the lysimeters and the surrounding soils, we recommend collecting samples and submitting them to the specialized biological laboratory for analysis (listed below). Analyses will confirm the biogeochemical reduction of nitrogen in the sub-pond system, or possibly suggest other mechanisms of nitrogen loss. Optimization of system operation based on major bacteria species presence could also possibly add to the reduction in nitrogen. For example, alternate wetting and drying cycles of ponds or treatment modification can be implemented to ensure survival and population increase of salient bacteria.

The following assessments are recommended:

- Bacterial assessment
  - Heterotrophic plate count
  - Cell count made by analysis for adenosine triphosphate (ATP) method
  - Bacterial identification for the two major populations
  - Assessment of aerobic and anaerobic growth
  - Assessment of sulfate reducing bacteria (SRB), iron oxidizing bacteria
  - Microscopic evaluation
  - Assessment of total and *E. coli* coliform bacteria

- Virus sampling

Monitoring for trace compounds (so-called emerging contaminants) may also be a useful tool.

4.2 Additional Sample Analysis through October 2007

To complete a full year of monitoring to include wetting and drying cycles at the MVRWRF and Alessandro Ponds and provide a repeated temporal section over a portion of the year, DBS&A recommends continuing the lysimeter sampling program through October 2007. Data review, incorporation into the existing data management files, analysis, scheduling, and reporting should also be conducted as necessary.

4.3 Hydrogeologic Evaluations of Other Facilities

DBS&A recommends an evaluation of the hydrogeology of the areas of several other recycled water facilities in a similar fashion to that conducted by DBS&A during the preparation of the SAP for the current project. The data collection efforts, review, analysis, analytical modeling of recharge, and reporting via technical memoranda should be conducted for each considered facility.

4.4 Tracer Studies

To more accurately assess the flow from individual ponds or other sources, a tracer study is recommended. This study would corroborate indirectly measured pathways and add certainty to the source of sampled lysimeter and monitoring well water, as well as the water produced by nearby production wells, if sampled for tracers. This can be accomplished with a highly variable level of effort, and can be as simple as adding specific, unique compounds to individual ponds and monitoring for those compounds in lysimeters and monitoring wells or as complex as generating a detailed work plan for time-series releases of specific conservative tracers with sensitive automated monitoring programs.

Isotopes of nitrogen and oxygen, in addition to sulfur hexafluoride and other naturally occurring tracers such as boron and chloride and the ratios thereof, will add to the understanding of the overall impact of the recycled water on the regional water quality.

Regulatory partnership should be secured, and the results would likely have an increased level of defensibility based on the level of detail of the known hydrogeology of the sites.

4.5 CMT/Sonic Drilled Deep Depth-Discrete Monitoring Well (Alessandro Ponds)

Although initially recommended during the early tasks, no monitoring wells were constructed at Alessandro Ponds for this project. To monitor deeper zones at discrete depths for the areas underlying the ponds at given facilities, a multiple depth, discretely screened monitoring well is considered. For example, a continuous multiport tubing (CMT) system, by which one can monitor up to seven zones of groundwater or vadose zone, can be installed in a single boring drilled via sonic methods that allow for continuous geologic logging of the lithology. Preparation, well design, permitting, geologic oversight, well construction, and reporting for a 200-foot-deep well are estimated to total approximately $40,000 to $45,000. Thereafter, monitoring could be conducted on a regular basis by either DBS&A (for additional costs) or EMWD personnel.

4.6 Network of Shallow Monitoring Wells (MVRWRF)

To monitor perched zones for the areas underlying the ponds at MVRWRF where lateral migration of recycled water in the subsurface most likely outpaces vertical migration, DBS&A recommends installing a network of shallow (less than 50 feet) monitoring wells. Lysimeter data can provide water quality in the perched zones beneath the source of the recycled water, but heads are assumed based on pond water elevations. Hence, a few wells should be drilled in the pond area, a few around the property perimeter, and several at distal areas off the property.

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Appendix A

Alessandro Ponds
Conceptual Model Memorandum

MEMORANDUM

TO: Dr. Fakhri Manghi, P.E., Hydrologist, Eastern Municipal Water District

FROM: Jordan Kear

DATE: April 12, 2006

SUBJECT: San Jacinto Alessandro Ponds Sampling and Analysis Plan Summary

Introduction and background

In accordance with your request, Daniel B. Stephens and Associates, Inc. (DBS&A) presents this memorandum to transmit an updated conceptual site model (CSM) summary of anticipated site conditions, hydrologic relationship of the Alessandro Ponds to the local groundwater supply, and recommendations for final locations and depths of lysimeter clusters at the Alessandro Ponds. Our work is authorized by EMWD Agreement No. 46093 entered February 14, 2006, which references the DBS&A proposal dated August 25, 2005. The location of the Alessandro Ponds site is illustrated on Figure 1.

On January 22, 2004, the Santa Ana Regional Water Quality Control Board adopted Basin Plan amendments, which may limit or preclude the use of recycled water in most EMWD subbasins. It was determined that there is very little, if any, assimilative capacity for total inorganic nitrogen (TIN) because the water quality objectives were being exceeded. Of the eight subbasins in EMWD's area, six subbasins have no assimilative capacity. The remaining two subbasins have very little assimilative capacity. The effect of the Basin Plan amendment is to severely restrict the use of recycled water (by adopting a default value of 25% concentration reduction) unless it can be demonstrated that there is greater uptake of nitrogen by the soils or an approved offset plan is implemented.

To demonstrate the possible uptake of nitrogen by soils, EMWD retained DBS&A to perform a subsurface evaluation underneath recycled water storage ponds. This project involves data collection and review, conceptual modeling, lysimeter and monitoring well installation, sampling, analysis and reporting.

The information presented herein is based on a review and analysis of data provided by EMWD, data collection from other published and unpublished sources, discussions among personnel present at the February 27, 2006 project kickoff meeting, discussions with EMWD staff at the teleconference meeting on March 2, 2006, and our experience in conducting similar investigations.

This memorandum addresses the CSM and installation of lysimeters for the Alessandro Ponds. DBS&A will issue a separate memorandum describing the planned analysis and installation of lysimeters for the Moreno Valley ponds.

Previous Investigations

Significant sources of data and information for this study included:

1) EPA's 1971 "Study of Reutilization of Wastewater Recycled Through Groundwater" document

2) Well construction, water quality and water level data provided by EMWD

3) The Wildermuth Environmental, Inc., 2003 "Final Technical Report for the Lysimeter Study of the Redlands Discharge Ponds"

In 1971, the Environmental Protection Agency (EPA), then the Division of Water Supply of the U.S. Public Health Service, authorized EMWD to undertake a study of water quality factors for a planned program of wastewater treatment and recharge. The objectives of the study were to evaluate water quality, infiltration rates, and procedures for recharging treated wastewater through pond percolation and irrigation.

The major objectives of the EPA (1971) study were to demonstrate the feasibility and safety of recycling water via the Alessandro Ponds. To determine this, investigators conducted extensive drilling, water level monitoring, water quality monitoring, and temperature probe surveys to trace the lateral migration of the recharged water. Major conclusions of that study indicated no effect on the water produced by surrounding water wells after recharging 5,380 acre-feet of water over a six and one-half year period from 1965 to 1971. Another key conclusion from that study was the delineation of the limit of lateral migration of recharged water. This limit is presented on Figure 2, and indicates that the lateral spreading of water recharging from the ponds is constrained to a finite area within the near vicinity of the Ponds. EPA concluded, and the data indicates, that the minimal spreading of pond recharge water thus indicates that water percolating from the Ponds moves primarily in the vertical direction.

Conceptual Site Model

Regional Geology

The Alessandro Ponds are located within the Peninsular Ranges geomorphic province of California within the approximately 20-mile-wide downdropped block (graben) between the Elsinore Fault Zone and the San Jacinto Fault Zone known as the Perris Block. Crystalline (largely Cretaceous granitic) bedrock formations are exposed in the San Jacinto Mountains to the northeast and in the Santa Ana Mountains to the Southwest of this graben, as well as in several hills and elevated features within the graben itself. Most of the valley is filled with Tertiary and Quaternary alluvial material, ranging in thickness up to several thousand feet. Several intra-graben faults exist in the area, including the proximal Casa Loma Fault, along which movement of both bedrock and alluvial formations are observed. In the immediate vicinity of the ponds, a narrower (less than 3-mile-wide) graben between the Casa Loma Fault and the San Jacinto Fault provides a displacement of over 10,000 feet with a majority of the northwest-trending trough being filled with sedimentary rock and in the upper 2,000 feet or so, with recent sediments.

Regional hydrogeology

Groundwater within the San Jacinto Watershed Basin occurs largely within the alluvial sediments that fill the valleys. This is a closed basin which, under natural (pre-development) conditions contained confined aquifers which flowed under artesian pressure when tapped by early (until circa 1930) wells. Groundwater flow within the undeveloped basin meandered around bedrock highs and discharged to surface water at various points with the highest amounts of discharge near Lake Elsinore. Pre-development water quality was excellent, and has since declined in certain areas and in upper aquifers due to importation of Colorado River water to the Basin, drafting of the basin and land uses such as agricultural, dairy, and industrial activity. Upon pumping, groundwater elevations began to decline and flow occurred primarily within local sub-basins with a majority of the discharge going to pumped wells.

Site Hydrogeology

The Alessandro ponds overlie the Upper Pressure sub-basin of the San Jacinto Watershed Basin. Immediately to the southeast of this sub-basin is the area referred to as the Canyon sub-basin (Figure 1). These two sub-basins form a northwest-trending subsurface trough between the San Jacinto Fault and the Casa Loma Fault, the latter which separates the Hemet sub-basin and higher bedrock to the southwest on the upthrown side of the fault. Collectively these three sub-basins are referred to as the East Valley area. The ephemeral San Jacinto River flows from the southeast to the northwest in the area of the sub-basins. River flow is the major source of recharge during wet years, and the ponds themselves contribute a smaller component of recharge to the local groundwater basin. The maximum capacity of the Alessandro Ponds is 55 million gallons. During dry periods recycled water is sold for agricultural irrigation.

Alluvium in the vicinity of the ponds ranges in grain size from clay and silt to sand and gravels. Finer grained units appear to exist as discontinuous lenses of various thicknesses. Deposition and subsequent deformation are subject to the local tectonic regime, with many strata tilting down to the northeast. A majority of the strata appear to dip to this northeast direction and when they act as perching layers, the perched groundwater likely follows a respective northeastward flow path. Where the perching strata are absent (discontinuous), percolating water migrates downward within sand and gravel strata. These perched aquifers are also referred to herein as the shallow perched or shallow aquifers. Conversely, the aquifers typically targeted for groundwater production by agricultural interests or municipal suppliers within the East Valley Area are referred to herein as the deep aquifers.

Water Levels

DBS&A collected and reviewed water level data from numerous groundwater production wells that are perforated through the deeper regional aquifer units over several years and generated water level contour maps for spring of the years 1955 (representing conditions prior to the majority of spreading which began in 1965), 1991 (representing dry year conditions), and 2005, (representing recent and wet year conditions). These maps are presented as Figures 4, 5, and 6, respectively.

Prior to significant recharge operations via the Alessandro Ponds, as shown on the 1955 groundwater contour map (Figure 4), a nearly flat groundwater gradient is observed generally flowing to the northwest in the vicinity of the study area. In the Canyon Sub-basin area, the groundwater gradient is slightly steeper where the basin is narrower. In 1991 (Figure 5), near the end of a regional drought which lasted approximately 6 years, groundwater contours indicate a significant mound below the pond area and a significant trough in the southern portion of the Upper Pressure sub-basin. In 2005, a year during which near-record rainfall was recorded during the early winter months, a return to significant recharge from the San Jacinto River was observed.

Water Quality

DBS&A collected water quality data from various sources and created Stiff Water Quality Diagrams for recent water samples collected from production wells (similar to those used in our water level analysis) throughout the area. These data are presented on Figure 7.
Virtually all of the wells in the wider area of the general vicinity of the Alessandro Ponds produce groundwater of a calcium-bicarbonate water quality character. In the near vicinity of the ponds, however, the sulfate component of the deep groundwater quality character is higher than in other areas. Stiff water quality diagrams of pond water quality indicate a high sulfate component. Because of this parallel, and because of the discontinuous nature of the fine-grained strata in the pond vicinity, it is interpreted that the downward migration of pond water is as significant a component of the pond water infiltration as the lateral component of this flow. If the lateral flow in the shallow zone was a significant factor, it would be expected that sulfate concentrations in groundwater produced by the local wells would display a wider areal distribution. This site historical water quality data supports the interpretation that lateral flow of pond water recharge is minimal and that the flow is primarily downward.

Summary of Site Hydrogeologic Conditions

Based on DBS&A's review of water quality, water levels and contour maps, the major water percolation in the vadose zone beneath the ponds is primarily downward with a smaller component of lateral migration. The recharge from the ponds is seen in the patterns of groundwater flow only in the localized area in the immediate vicinity of the ponds; outside of this immediate area, the regional features of groundwater flow predominate. Regional groundwater exists at a depth on the order of 200 feet below the ponds, with the groundwater flow direction to the northwest.

Figure 3 presents a graphical depiction of the conceptual flow path of percolating pond water through the vadose zone and the relationship to the groundwater in the local sub-basin.

Therefore, the quality sampling of a vertical profile of the shallow perched groundwater within the mound will provide a consistent monitoring pathway by which to quantify nitrogen removal from the percolating groundwater.

Sampling and analysis plan

The following is a summary of the study sampling strategy, monitoring point locations, depths, and sampling frequency. In a subsequent task, a more detailed sampling and analysis plan will be developed that details the fieldwork and analytical regimen for soil and water samples.

Technical Approach

DBS&A's technical approach to quantifying nitrogen removal beneath the ponds consists of drilling and installing lysimeters to monitor the soils within the upper 30 feet where saturated or unsaturated conditions may exist. Below the lysimeters, DBS&A will install groundwater monitoring wells to intercept downward percolating groundwater along the flow path at perched aquifers to depths as deep as 150 feet. Alluvial materials encountered during the drilling and installation of the monitoring devices will be logged geologically and geophysically, and sampled and analyzed for chemical and physical properties. Monitoring wells and lysimeters will be sampled at regular intervals for key water quality parameters. Details are discussed below and will be further addressed in DBS&A's forthcoming Sampling and Analysis Plan.

Anticipated shallow drilling conditions

DBS&A anticipates that site conditions at the Alessandro Ponds in Upper Pressure sub-basin will be adequate for drilling and installation of lysimeters and monitoring wells on the berms which border each of the ponds.

The Alessandro ponds Nos. 1, 5/6, and 15 have been selected for installing monitoring wells and lysimeters. Locations of each cluster are shown on Figure 8. This schedule assumes that the berms, which bound selected ponds, will be adequately dry and stable to support ingress and egress of drilling equipment, materials, and personnel. Berms are assumed to be between 5 and 15 feet above each pond bottom.

DBS&A anticipates encountering predominantly sand material in the upper portions of each boring at the San Jacinto facility, underlain by interbedded, discontinuous and northeast-dipping silt and sand strata to the total depths of drilling for this project. In the Alessandro Pond 1 borings, we anticipate an increase in the abundance and thickness of silt strata at a depth of 15 feet. In the Alessandro Pond 5/6 borings, we anticipate an increase in the abundance and thickness of silt strata at a depth of about 20 feet. In the Alessandro Pond 15 borings, we anticipate an increase in the abundance and thickness of the silt strata at a depth of 30 feet.

Monitoring Point Cluster Locations/Depths

Each cluster of monitoring points will be drilled on the relatively flat portion of the tops of the berm adjacent to the respective pond, adjacent to the sloping berms that form the pond walls.

Lysimeter/monitoring well location selections are based on: a goal of obtaining spatial distribution of data, anticipated lithology, pond operational history, pond availability, and anticipated vadose zone percolation patterns.

DBS&A has selected the locations for the three lysimeter/monitoring well clusters at the Alessandro Ponds as follows: 1) adjacent to the northeast corner of Pond 1, 2) adjacent to the south corner of Pond 5/6 for monitoring wells and the north corner for the lysimeters, and 3) in the north corner of Pond 15.

Targeted depths of each lysimeter are selected based on an attempt to collect percolating water data at regular intervals above the initial (shallowest) perching stratum beneath each pond or, in the case where the perching stratum is shallow, at depths within interbedded permeable deposits between silt/clay strata.

Because the low permeability strata are discontinuous beneath the ponds, there is a significant portion of vertical downward migration of pond recharge water within the groundwater mound indicated and evidenced by water quality and water level analyses. To sample water along this flow path, DBS&A has targeted and planned deeper monitoring wells between the ponds and the regional water table to quantify nitrogen removal in the groundwater flowing vertically as the result of the mound underneath the ponds. Monitoring wells are recommended to consist of 4-inch-diameter PVC casings with screened intervals of approximately 10 feet and 5-foot-long cellar pipes beneath the screened interval.

DBS&A anticipates that the lysimeter borings and monitoring well borings can both be drilled and installed using one hollow-stem auger drill rig. And since the equipment need not be installed in the pond bottom, a full-sized truck mounted rig will be utilized on the pond berms.

DBS&A will install three lysimeters and three monitoring wells per cluster in the Alessandro Ponds. Exact depths of each lysimeter and well will be determined based on lithology encountered in the initial pilot boring. Preliminary depths relative to pond bottoms are based on geologic and geophysical logs from previous wells and monitoring points near the ponds. The planned depths of lysimeter and monitoring well installation are:

Pond 1:

- Lysimeter at 7 feet, 15 feet, and 30 feet
- Monitoring wells at 60, 90, and 150 feet.

Pond 5/6:

- Lysimeter at 6 feet, 12 feet, and 20 feet
- Monitoring wells at 50, 80, and 120 feet.

Pond 15:

- Lysimeters at 8 feet, 19 feet, and 30 feet
- Monitoring Wells at 60, 80, and 120 feet

Schedule

Currently, the scheduled dates for drilling and installation of the monitoring points are June 5 to 16, 2006.

Continuous coring via hollow-stem auger of the deepest boring for purposes of geologic logging will be conducted. During the drilling of the second deepest boring, samples will be obtained via split-spoon sampler for geotechnical and chemical analyses at depths specified based on the lithology encountered in the first boring. The third boring will be drilled for monitoring well installation purposes only, followed by the drilling of the three borings for lysimeter installation. Following completion of the monitoring wells, the deepest well will be logged via focused dual induction methods for medium and deep focused conductivity measurements that provide the reciprocal resistivity equivalent. Along with spontaneous potential (SP) and gamma-ray measurements, this data will provide excellent bed definition for geologic log corroboration and correlation to previously existing geophysical logs, especially in areas where geologic logs from previous borings are incomplete or absent.

Scheduled sampling dates for the program will initiate on a weekly basis on approximately June 23, 2006 and continue weekly until September 22, 2006. Monthly sampling will occur on or about the 20th of October, November, and December 2006. Sampling of each monitoring point cluster will include collection of lysimeter pore liquids and purging/sampling of groundwater from the monitoring wells. Surface water grab samples will be collected from each adjacent pond. Collection of depth to water, pH, temperature, and oxidation-reduction potential data in the monitoring wells will also be conducted concurrent at each monitoring event.

Laboratory Analysis

Soil samples collected for analysis of physical properties will be delivered to the DBS&A laboratory. Properties to be evaluated and analytical methods employed will include:

- Native soil permeability to water (vertical, cm/sec), fluid saturation (% pore volume), porosity, grain and bulk density (g/cc) and volumetric moisture content using API RP40 and ASTM D2216/D5084.
- Grain size analysis (ASTM-D422 and/or 4464M) with the method used being dependent on the grain size of the soil sample.
- Total organic carbon (fraction organic carbon - mg/kg or weight percent) using Walkley-Black.
- Soil moisture characteristic curves to provide the basis for estimating the van Genuchten parameters and conductivity-water content relationship.

Soil samples collected for analysis of chemical properties will be delivered to Severn-Trent Laboratories, Inc. Samples will be analyzed for leachable (chemical) concentrations using a modified Title 22 Wet Extraction Test method with de-ionized water (DIWET Method). The method will be modified to eliminate the grinding and sieving of the soil samples prior to extraction to minimize the mechanical destruction of the soil prior to leaching. Because the leaching test will not be conducted under in-situ soil conditions through an undisturbed soil column, the modified DIWET method is expected to provide a conservative estimate of leachable residual salts and nitrogen from the soils, Chemical parameters analyzed will include:

- Total dissolved solids using EPA Test Method 160.1.
- Inorganic nitrogen (as nitrate, nitrite and ammonia) using EPA Test Method 300/350..3,
- Major cations and anions using Standard Method 2320B and 300.0 and 6010. The cations analyzed will be sodium, potassium, calcium and magnesium.. The anions analyzed will be nitrate/nitrite, sulfate, total alkalinity and bicarbonate alkalinity.

Water samples collected from lysimeters, monitoring wells, and ponds for analysis of chemical constituents will be delivered to the EMWD laboratory. Chemical parameters analyzed will include:

- General Mineral/General Physical
- Total Dissolved Solids (Standard Method 2540C)
- Ammonia (EPA Method 350 1)
- Nitrate-N and Nitrite-N (EPA Method 300.0)
- Organic nitrogen (EPA Method 351.2, Calculated)
- Total Kjeldahl Nitrogen (EPA Method 351.2)
- Total Organic Carbon (Standard Method 5310C)

Reporting

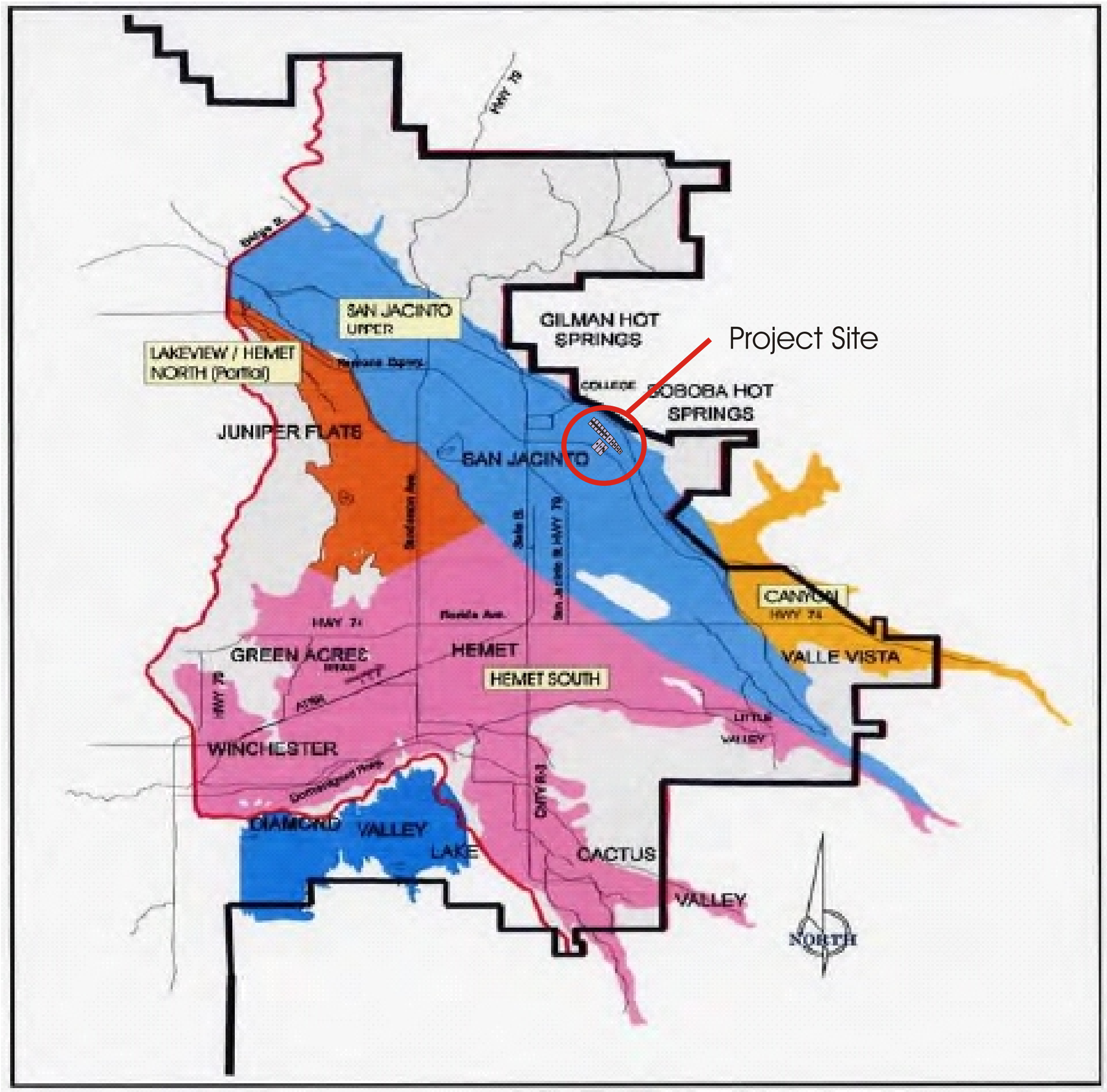
DBS&A will prepare and submit draft and final project reports to EMWD for review, comment and distribution. The report will include:

- Scope, conduct and schedule of completion of project activities
- Summary of findings
- Conclusions and recommendations
- Data Appendixes

DBS&A will present in hard copy and pdf format the sampling results via tabulated, mapped, and graphed methods and evaluated to assess patterns, processes and trends including:

- Depth-specific trends in physical and chemical properties of the soils sampled at the sites drilled
- Differences and trends in pond water quality by location and time
- Depth-specific trends in lysimeter water quality over time and between lysimeter clusters at different locations
- Lysimeter water quality trends associated with pond filling and drying (as applicable to sampling conditions)

- Travel time of water from pond to water table
- Comparison of soils at monitoring sites to soils at other EMWD pond locations
- Calculation of nitrogen loss coefficients at monitoring sites
- Estimation of nitrogen loss coefficients at other pond locations based upon comparison of soils properties and quality of recycled water stored
- Identification of additional work required to verify soil and water conditions and nitrogen loss coefficients at other pond locations



EASTERN MUNICIPAL WATER DISTRICT

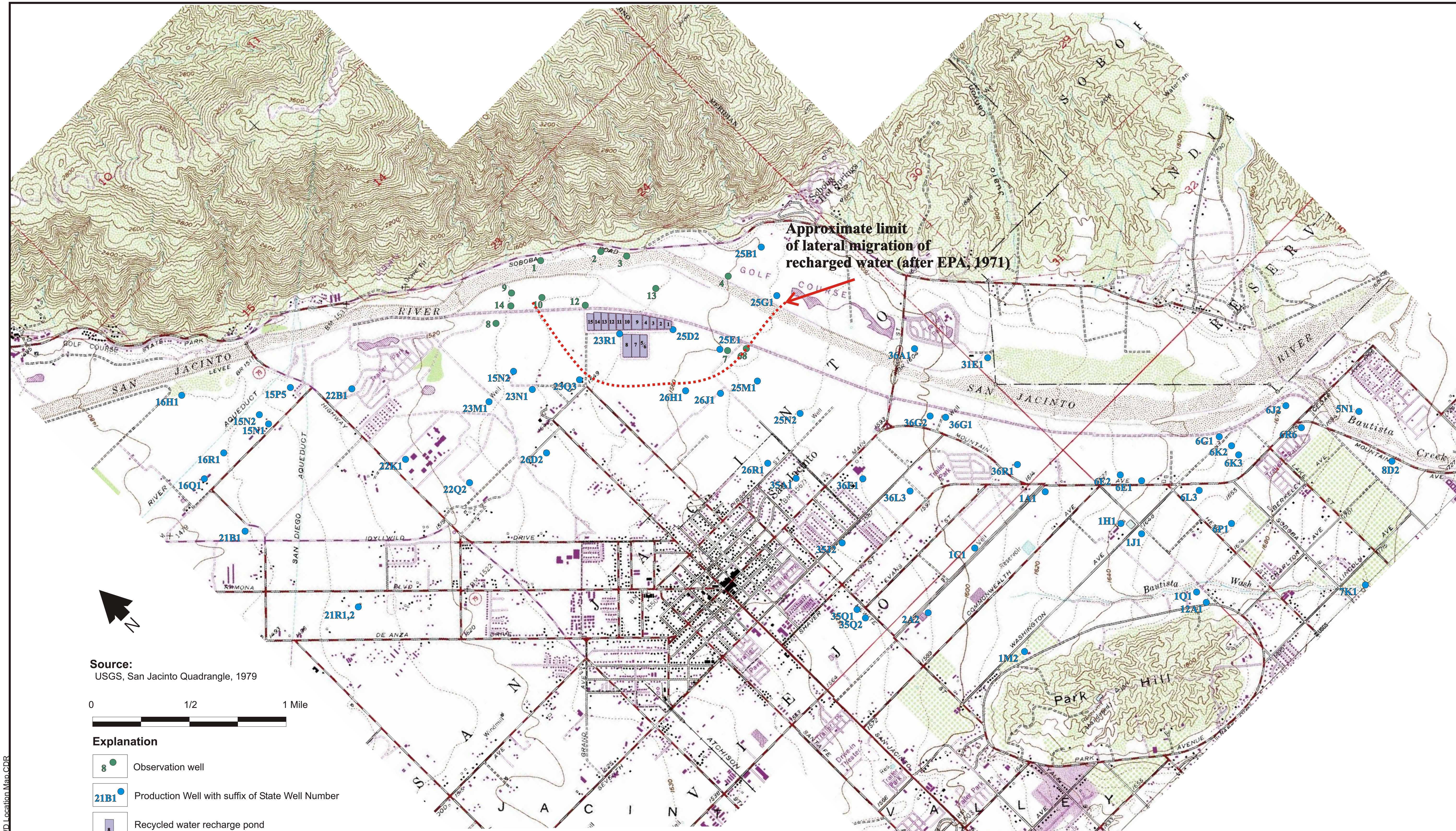
Project Location/Groundwater Sub-Basin Map

Daniel B. Stephens & Associates, Inc.

3-31-06 WR06.0031.00

Figure 1

K:\PROJECTS\WR\EMWD\SJ PROJ LOC MAP



Source:
USGS, San Jacinto Quadrangle, 1979

0 1/2 1 Mile

Explanation

- 8 Observation well
- 21B1 Production Well with suffix of State Well Number
- Recycled water recharge pond

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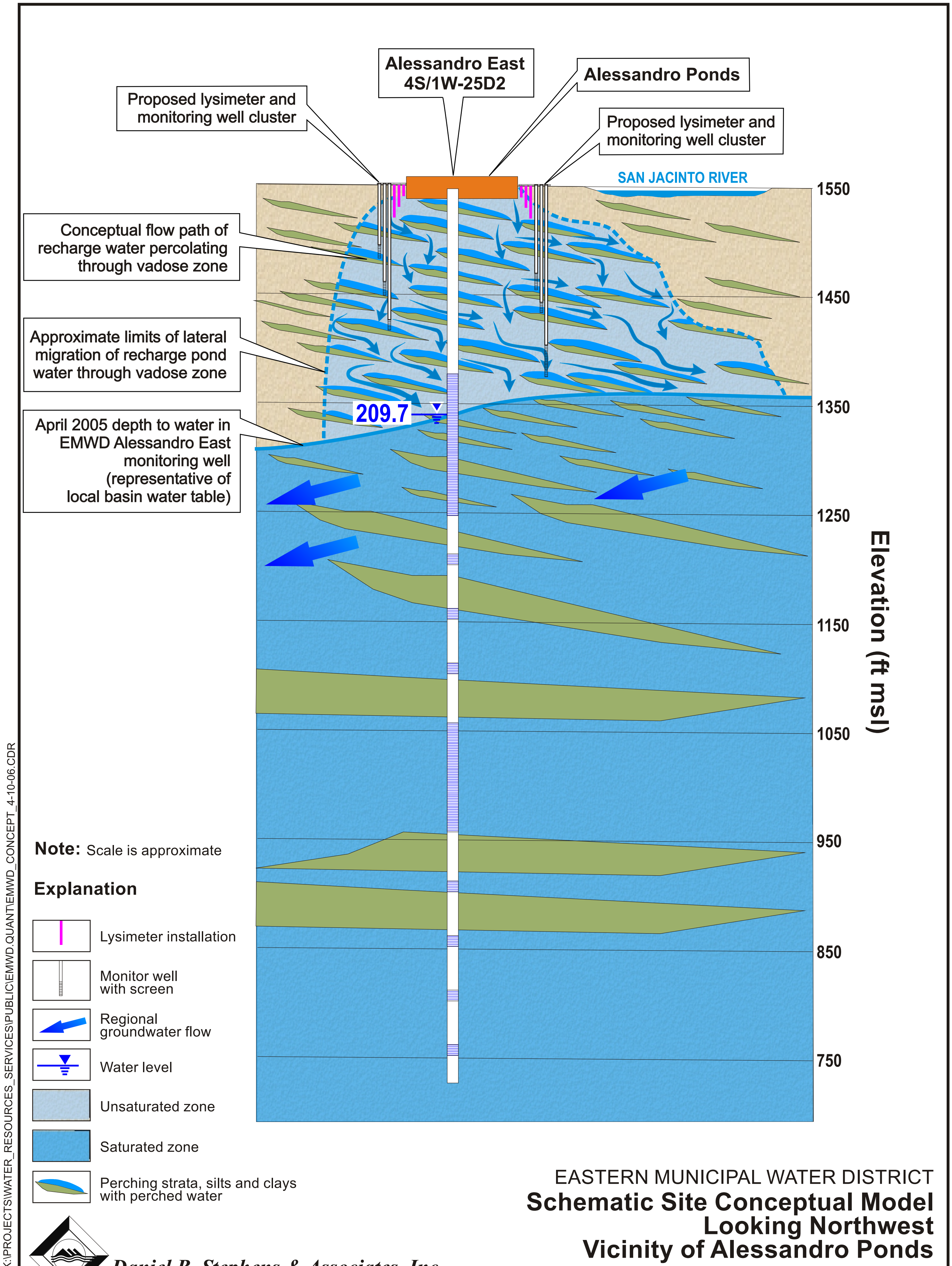
Daniel B. Stephens & Associates, Inc.
3-27-06 WR06.0034.00

EASTERN MUNICIPAL WATER DISTRICT
Alessandro Ponds Location Map

Figure 2

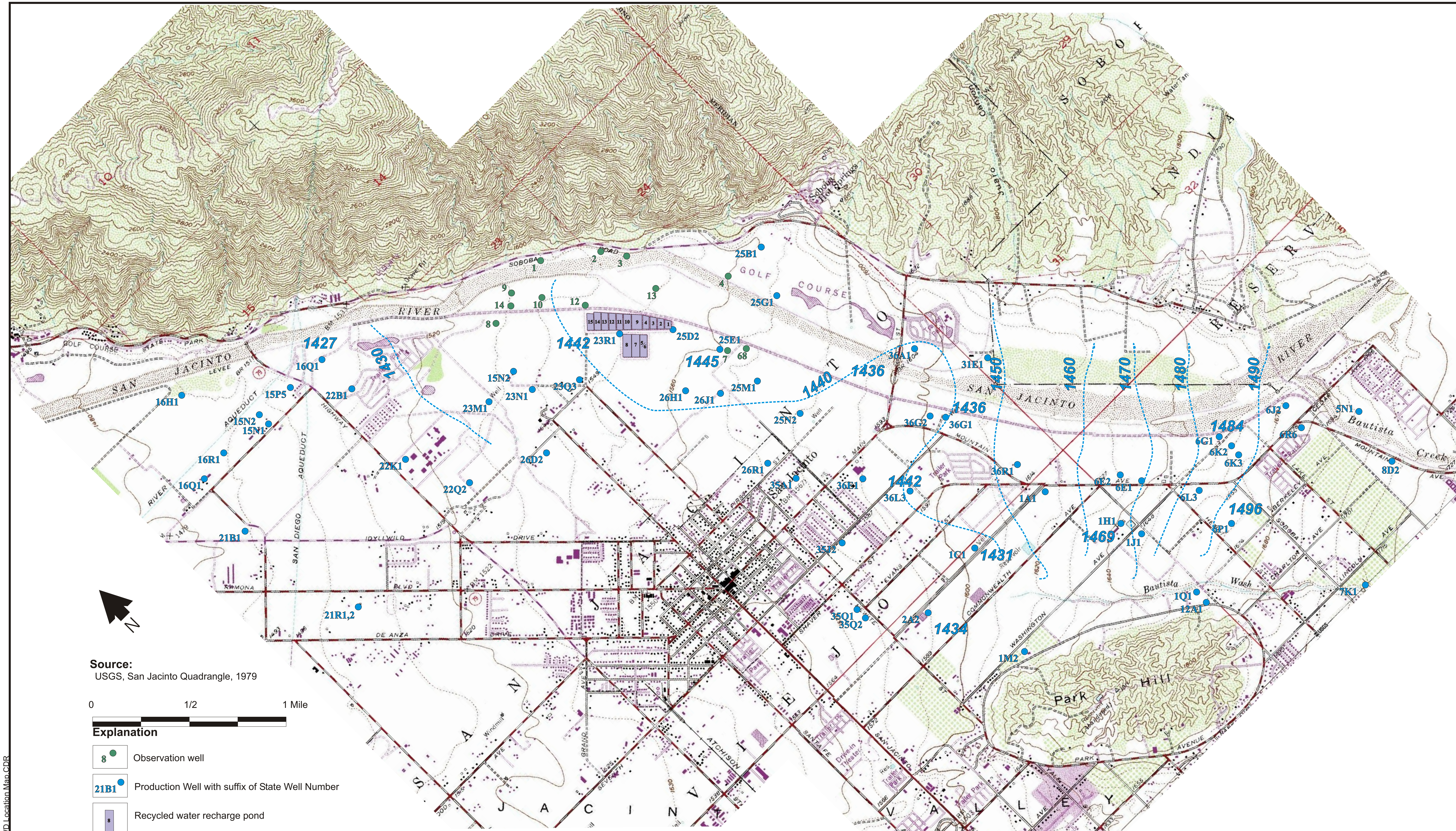


EASTERN MUNICIPAL WATER DISTRICT

Schematic Site Conceptual Model
Looking Northwest
Vicinity of Alessandro Ponds

Daniel B. Stephens & Associates, Inc.
4-12-06 WR06.0031.00

Figure 3



Source:
USGS, San Jacinto Quadrangle, 1979

0 1/2 1 Mile

Explanation

8	Observation well
21B1	Production Well with suffix of State Well Number
	Recycled water recharge pond
1427	Groundwater elevation, feet above mean seal level
	Groundwater potentiometric surface elevation contour

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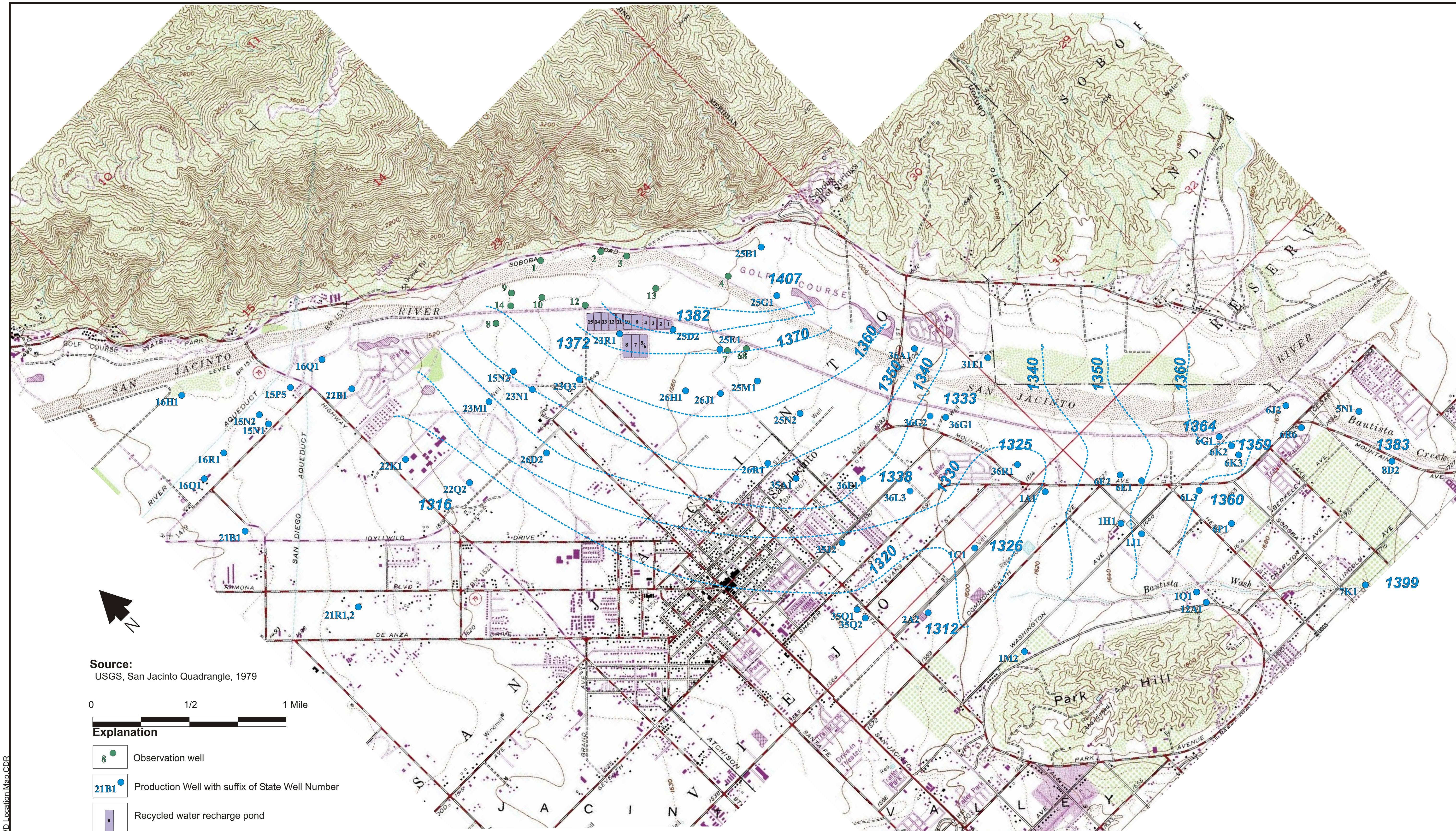
3-27-06 WR06.0034.00

EASTERN MUNICIPAL WATER DISTRICT
Spring 1955 Groundwater Contour Map

Figure 4



Source:
USGS, San Jacinto Quadrangle, 1979

0 1/2 1 Mile

Explanation

8 Observation well

21B1 Production Well with suffix of State Well Number

Recycled water recharge pond

1427 Groundwater elevation, feet above mean seal level

Goundwater potentiometric surface elevation contour

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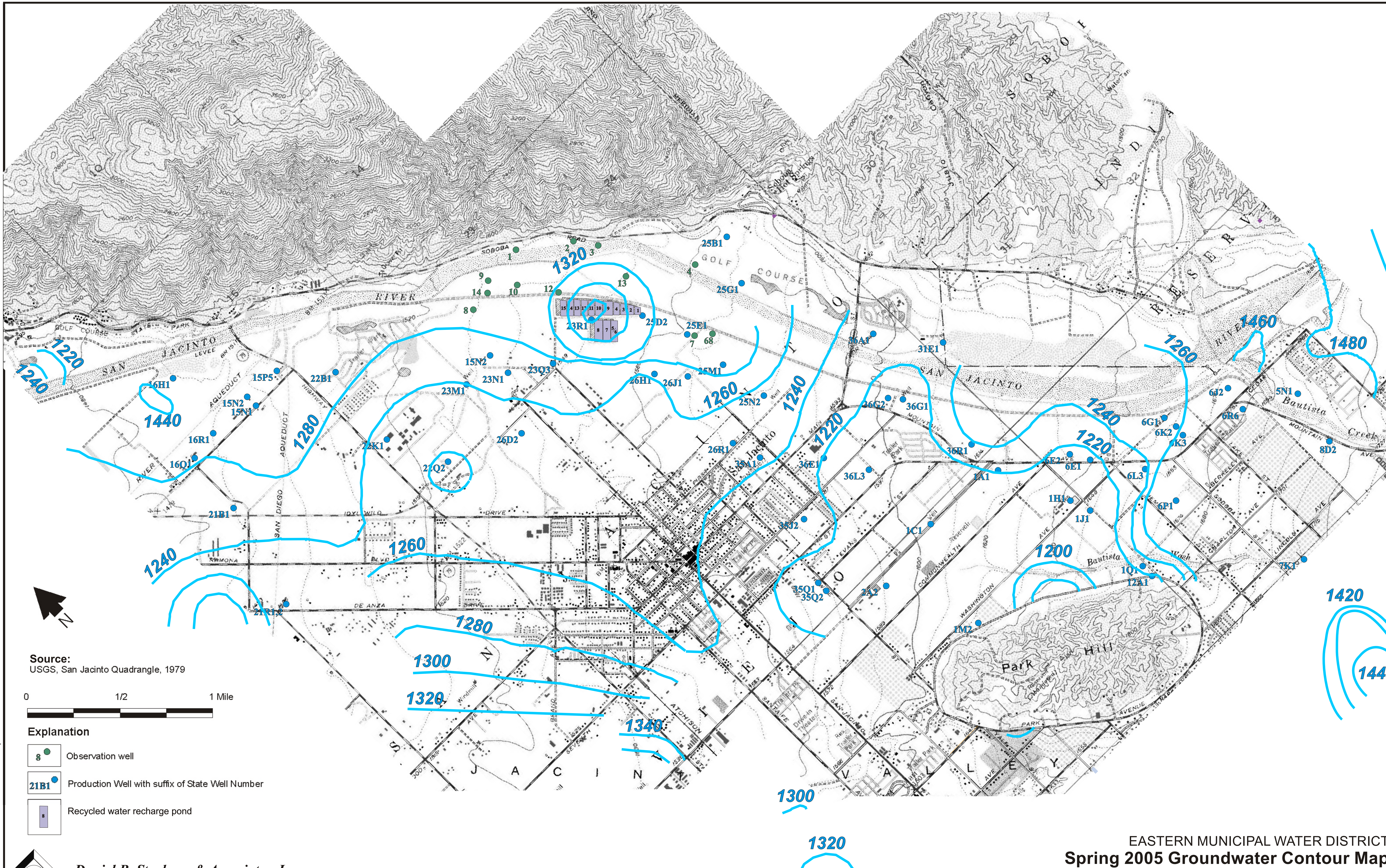
3-27-06 WR06.0034.00

EASTERN MUNICIPAL WATER DISTRICT
Spring 1991 Groundwater Contour Map

Figure 5



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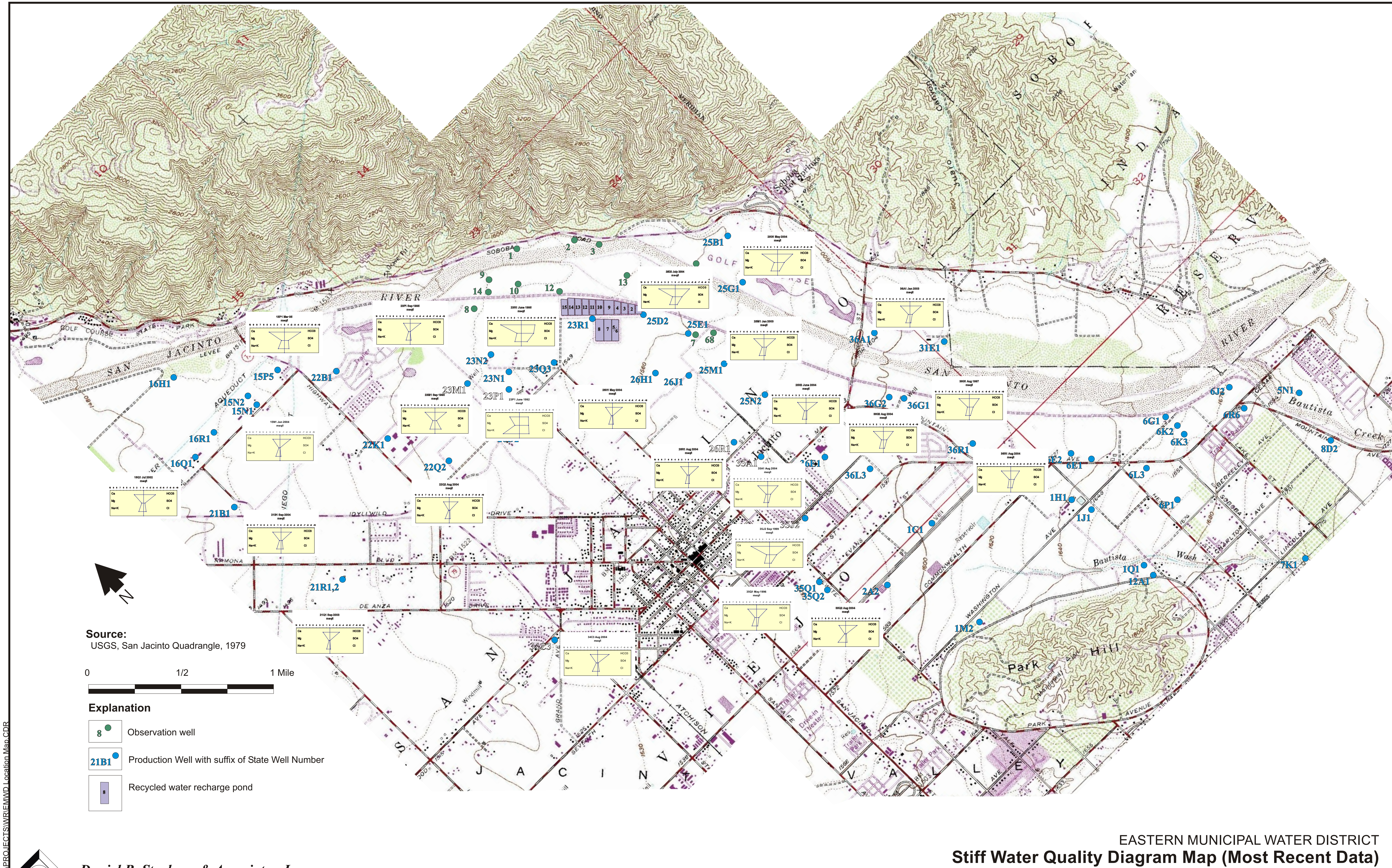
4-12-06
WR06.0031.00

EASTERN MUNICIPAL WATER DISTRICT
Spring 2005 Groundwater Contour Map

Figure 6

K:\PROJECTS\WR\EMWD Location Map.CDR



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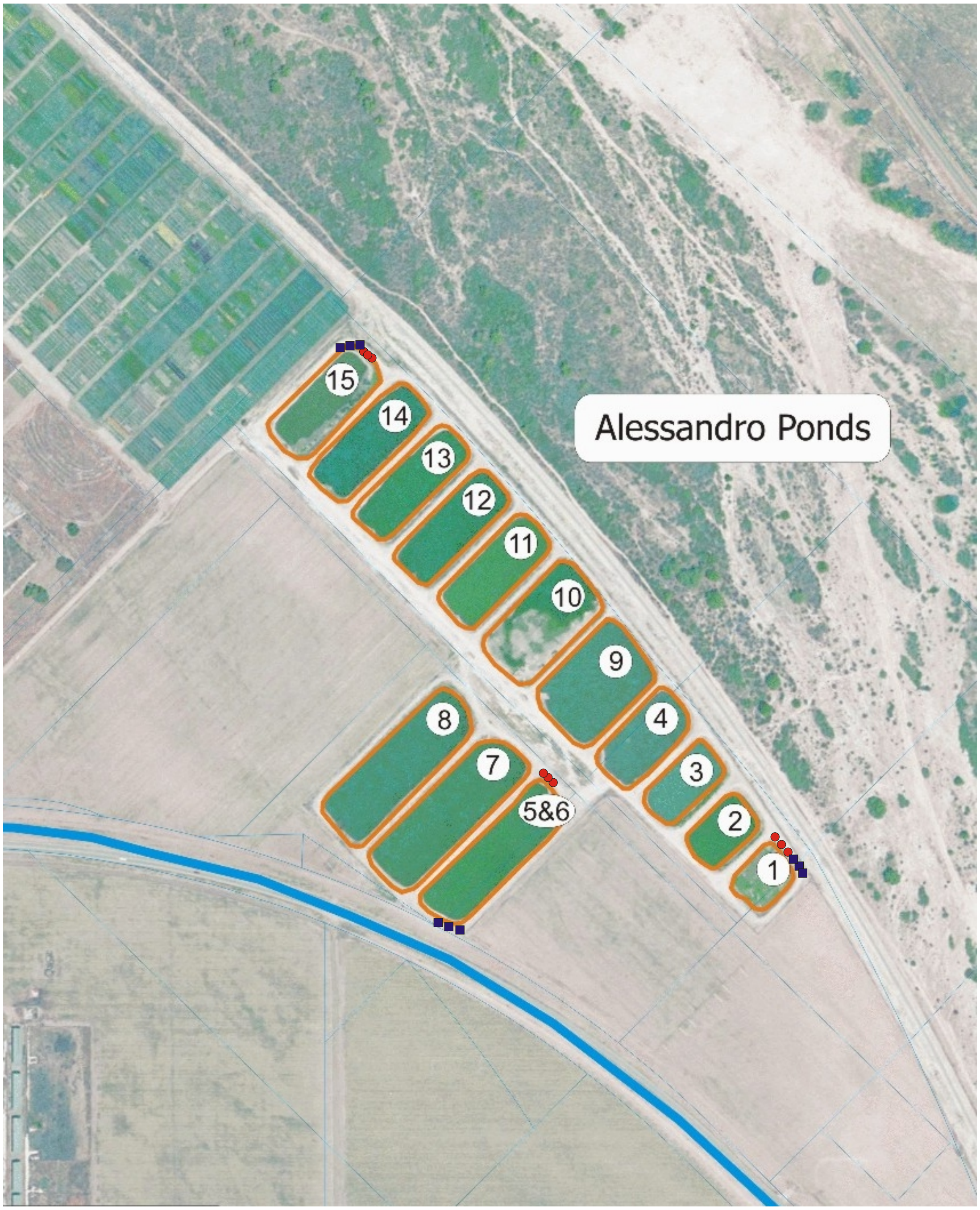
3-27-06 WR06.0034.00

EASTERN MUNICIPAL WATER DISTRICT
Stiff Water Quality Diagram Map (Most Recent Data)

Figure 7



= Recommended lysimeter cluster

= Recommended monitoring well cluster

EASTERN MUNICIPAL WATER DISTRICT

Recommended Locations of Lysimeter/Monitoring Wells

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3-31-06 WR06.0031.00

Figure 8

K:\PROJECTS\WR\EMWD\MW&LYS LOC MAP

Appendix B

MVRWRF Conceptual Model Memorandum

MEMORANDUM

TO: Dr. Fakhri Manghi, P.E., Hydrologist, Eastern Municipal Water District

FROM: Jordan Kear

DATE: April 14, 2006

SUBJECT: Moreno Valley Ponds Sampling and Analysis Plan Summary

Introduction and background

In accordance with your request, Daniel B. Stephens and Associates, Inc. (DBS&A) presents this memorandum to transmit an updated conceptual site model (CSM) summary of anticipated site conditions, hydrologic relationship of the Moreno Valley (MV) Ponds to the local groundwater supply, and recommendations for final locations and depths of lysimeter clusters at the MV Ponds. Our work is authorized by EMWD Agreement No. 46093 entered February 14, 2006, which references the DBS&A proposal dated August 25, 2005.

On January 22, 2004, the Santa Ana Regional Water Quality Control Board adopted Basin Plan amendments, which may limit or preclude the use of recycled water in most EMWD subbasins. It was determined that there is very little, if any, assimilative capacity for total inorganic nitrogen (TIN) because the water quality objectives were being exceeded. Of the eight subbasins in EMWD's area, six subbasins have no assimilative capacity. The remaining two subbasins have very little assimilative capacity. The effect of the Basin Plan amendment is to severely restrict the use of recycled water (by adopting a default value of 25% concentration reduction) unless it can be demonstrated that there is a greater uptake of nitrogen by the soils or an approved offset plan is implemented.

To demonstrate the possible uptake of nitrogen by soils, EMWD retained DBS&A to perform a subsurface evaluation underneath recycled water storage ponds. This project involves data collection and review, conceptual modeling, lysimeter and monitoring well installation, sampling, analysis and reporting.

The information presented herein is based on a review and analysis of data provided by EMWD, data collection from other published and unpublished sources, discussions among personnel present at the February 27, 2006 project kickoff meeting, discussions with EMWD staff at the teleconference meeting on March 2, 2006, and our experience in conducting similar investigations.

This memorandum addresses the plan analysis and installation of lysimeters for the MV Ponds. DBS&A has issued a separate memorandum describing the planned analysis and installation of lysimeters for the Alessandro Ponds in San Jacinto.

Previous Investigations

Significant sources of data and information for this study included:

1) The HydroScience & Technology, Inc. (HST) "Results of exploratory drilling and sampling, Moreno Valley Reclaimed Water Reclamation Facility (MVRWRF), Moreno Valley, California," dated February 1999

2) Geotechnical borings and reporting data associated with the construction at the MVRWRF

3) Well construction, water quality, and water level data provided by EMWD

4) The Wildermuth Environmental, Inc., 2003 "Final Technical Report for the Lysimeter Study of the Redlands Discharge Ponds"

Conceptual Site Model

Regional Geology

The MVRWRF is located within the Peninsular Ranges geomorphic province of California within the approximately 20-mile-wide downdropped block (graben) between the Elsinore Fault Zone and the San Jacinto Fault Zone known as the Perris Block. Crystalline (largely Cretaceous granitic) bedrock formations are exposed in the San Jacinto Mountains to the northeast and the

Santa Ana Mountains to the Southwest of this graben, as well as in several hills and elevated features within the Perris Block itself. Most of the valley is filled with Tertiary and Quaternary alluvial material, ranging in thickness up to several thousand feet. Several intra-graben hills and highlands exist in the area, including the hills to the east of the facility, which affect groundwater flow within the alluvium of the area. These hills and highlands are also incorporated into the design of earthen construction to store water in surface water reservoirs (such as Lake Perris).

Regional hydrogeology

Groundwater within the San Jacinto Watershed Basin occurs largely within the alluvial sediments that fill the valleys. This is a closed basin which, under natural (pre-development) conditions contained confined aquifers which flowed under artesian pressure when tapped by early (until circa 1930) wells. Groundwater flow within the undeveloped basin meandered around bedrock highs and discharged to surface water at various points with the highest amounts of discharge near Lake Elsinore. Pre-development water quality was excellent, and has since declined in certain areas and upper aquifers due to drafting of the basin and land uses such as agricultural, dairy, and industrial activity. Upon pumping, groundwater elevations began to decline and flow was primarily within local sub-basins with a majority of the discharge going to pumped wells. Importation of Colorado River water to the Basin has been able to overcome the effects of pumping on historical groundwater levels.

Site Hydrogeology

The MVRWRF ponds overlie the Perris North sub-basin of the San Jacinto Watershed Basin (Figure 1). This sub-basin represents the alluvium of the northwestern portion of the Perris Block, and is one of five sub-basins in the AB3030 area known as the West San Jacinto area.

Alluvium in the vicinity of the ponds ranges in grain size from clay and silt to sand and gravels. Finer grained units appear to exist as discontinuous lenses of various thicknesses. Sediments within the area of the MVRWRF are largely reflective of the low-energy type of deposition, and include silts, sands and clays. Silt and clay strata are generally thicker and more laterally contiguous in such environments, when compared to higher energy depositional environments near rivers. Most strata in the MVRWRF vicinity onlap to crystalline bedrock of the nearby hills as opposed to being in faulted contact with adjacent formations. Hence, most strata are subhorizontal to horizontal in orientation.

Alluvium is relatively thin in the vicinity of the MVRWRF. In 1999, HST reportedly encountered decomposed bedrock at a depth of 192 feet drilled on the west side of the facility between Ponds 14 and 16. Based on DBS&A's review of the geophysical log from that exploratory borehole, interbedded sands and silts appear to predominate the alluvial lithology.

Water Levels

DBS&A collected and reviewed water level data from numerous groundwater production wells that are perforated through the deeper regional aquifer units over several years and generated hydrographs for those representative of the regional aquifer. Figure 3 presents a composite hydrograph of the Perry Wells from 1954 through the present, which indicates a significant rise in water levels following the construction and use of Lake Perris. In addition to the Lake Perris recharge, recharge from the Perris Valley Storm Drain and the MVRWRF Ponds are likely contributors to the local groundwater.

Perched groundwater is known to be present in the vicinity of the ponds. In addition to the reported encounter of perched water at a depth of approximately 30 feet in the HST exploratory borehole, other geotechnical borings have encountered perched water at various locations on the property between 30 and 60 feet bgs. Data from a nearby leaking underground fuel tank site (Pulliam Family Trust, 1569 Nandina Avenue) indicate minimum depth to water of 21.27 feet and maximum depths to water of 25.87 feet. In addition to providing depth to water data, this information indicates that perching layers are relatively laterally extensive and continuous.

Summary of Site Hydrogeologic Conditions

Based on DBS&A's review of local geology, water quality, water levels and contour maps, the major water percolation in the vadose zone beneath the MVRWRF ponds is likely lateral along perching layers with a smaller component of vertical migration. The extent or primary directions of the perched water flow are unknown at this writing. At depth, the regional groundwater westerly flow predominates, dominated by flow from Lake Perris and the MVRWRF Ponds. Static water levels of regional groundwater exist at a depth on the order of 50 to 100 feet below the ponds, with the groundwater flow direction to the west and south.

Sampling and analysis plan

The following is a summary of the study sampling strategy, monitoring point locations, depths, and sampling frequency. In a subsequent task, a more detailed sampling and analysis plan will be developed that details the fieldwork and analytical regimen for soil and water samples.

Technical Approach

DBS&A's technical approach to quantifying nitrogen removal beneath the MVRWRF ponds consists of drilling and installing lysimeters to monitor the soils within the upper 36 feet where saturated or unsaturated conditions may exist. In addition to the lysimeters, DBS&A will install monitoring wells to monitor the lateral migration of groundwater along the perching strata at two depth intervals, roughly 40 and 60 feet. These data may be correlated, if possible to off-site monitoring wells such as those of the Pulliam Trust. Alluvial materials encountered during the drilling and installation of the monitoring devices will be logged geologically and geophysically, and sampled and analyzed for chemical and physical properties. Monitoring wells and lysimeters will be sampled on a regular basis for key water quality parameters. DBS&A will also investigate the possibility of gaining access to the Pulliam Trust site wells to gauge elevation in order to determine the groundwater gradient. Details are discussed below and will be further addressed in DBS&A's forthcoming Sampling and Analysis Plan

Anticipated shallow drilling conditions

DBS&A anticipates that site conditions at the MV RWRF Ponds will be adequate for drilling and installation of the lysimeters and monitoring banks in the selected ponds without significant delays during July 2006. Selected ponds for lysimeter installation are Nos. 14 and 19. This schedule assumes that the bottoms of selected ponds will be adequately dry to support ingress and egress of drilling equipment, materials, and personnel.

At the MV RWRF, DBS&A anticipates encountering a generally finer-grained stratigraphy than at the Alessandro Ponds. Interbedded sand, silt, and clay are anticipated to comprise the lithology in various compositions. Importantly, these strata are anticipated to be relatively horizontal and laterally contiguous.

Monitoring Point Cluster Locations/Depths

Each cluster of monitoring wells and lysimeters will be drilled on the relatively flat portion of the tops of the berm adjacent to the respective pond, adjacent to the sloping berms that form the pond walls.

Lysimeter/monitoring well location selections are based on: a goal of obtaining spatial distribution of data, anticipated lithology, pond operational history, pond availability, and anticipated vadose zone percolation patterns.

DBS&A has selected the locations for the two lysimeter clusters at the Moreno Valley RWRF Ponds near the northwest corner of Pond 14 and near the central portion of the northern bank of Pond 19. Monitoring wells will be located near ponds 6, 9, 18, and 17 as depicted on Figure 4.

Depths of each lysimeter are based on an attempt to collect percolating water data at regular intervals above the initial (shallowest) perching stratum beneath each pond or, in the case where the perching stratum is shallow, at depths within interbedded permeable deposits between silt/clay strata.

Because the low permeability strata are anticipated to be relatively continuous beneath the ponds, there is likely a significant portion of lateral migration of pond recharge water within the subsurface. To sample water along this flow path, a network of monitoring wells have been selected to quantify nitrogen removal in the groundwater flowing laterally and vertically as the result of the mound underneath the ponds. Monitoring wells will consist of 4-inch-diameter PVC casings with screened intervals of approximately 10 feet and 5-foot-long cellar pipes beneath the screened interval. Based on discussions with EMWD personnel, and the relative dearth of deep wells with water level or water quality data in the immediate vicinity of the MV RWRF Ponds, DBS&A will drill and install the monitoring wells to the deepest depth possible with the hollow stem auger drilling rig, or to confirm the presence of granitic bedrock, whichever is shallower.

DBS&A anticipates that all borings for lysimeter and monitoring well installation can be drilled with a full-sized truck mounted rig.
As shown on Figure 4, DBS&A will install a cluster of four lysimeters at two locations and a cluster of four monitoring wells at four locations in the area of the MVRWRF Ponds. Exact depths of each lysimeter and well will be determined based on lithology encountered in the initial pilot boring. Preliminary lysimeter depths relative to pond bottoms are based on geologic and geophysical logs from previous wells and borings near the ponds. Proposed monitoring well depths are relative to tops of berms . The planned depths of lysimeter and monitoring well installations are:

- Lysimeters at 8 feet, 16 feet, and 28 feet
- Monitoring wells at 40, 60, 120 and 180 feet.

Schedule

Currently, the scheduled dates for drilling and installation of the monitoring points are in July 2006.

Continuous coring via hollow-stem auger of the deepest boring for purposes of geologic logging will be conducted. During the drilling of the second deepest boring, samples will be obtained via split-spoon sampler for geotechnical and analytical properties at depths specified based on the lithology encountered in the first boring. Subsequent borings would be drilled for installation purposes only. Following completion of the monitoring wells, the deepest well will be logged via focused dual induction methods for medium and deep focused conductivity measurements that provide the reciprocal resistivity equivalent. Along with spontaneous potential (SP) and gamma-ray measurements, this data will provide excellent bed definition for geologic log corroboration and correlation to previously existing geophysical logs.

Scheduled sampling dates for the program will initiate on a weekly basis during late July 2006 and continue weekly until late October 2006. Monthly sampling will occur on or about the 20th of November and December 2006 and January 2007. Sampling of each monitoring point cluster will include collection of lysimeter pore liquids and purging/sampling of groundwater from the monitoring wells. Surface water grab samples will be collected from each adjacent pond. Collection of depth to water pH, temperature, and oxidation-reduction potential data in the monitoring wells will also be conducted at each monitoring event.

Laboratory Analysis

Soil samples collected for analysis of physical properties will be delivered to the DBS&A laboratory. Properties to be evaluated and analytical methods employed will include:

- Native soil permeability to water (vertical, cm/sec), fluid saturation (% pore volume), porosity, grain and bulk density (g/cc), and volumetric moisture content using API RP40 and ASTM D2216/D5084
- Grain size analysis (ASTM-D422 and/or 4464M) with the method used being dependent on the grain size of the soil sample
- Total organic carbon (fraction organic carbon - mg/kg or weight percent) using Walkley-Black
- Soil Moisture characteristic curves to provide the basis for estimating the van Genuchten parameters and conductivity-water content relationship

Soil samples collected for analysis of chemical properties will be delivered to Severn-Trent Laboratories, Inc. Samples will be analyzed for leachable (chemical) concentrations using a modified Title 22 Wet Extraction Test method with de-ionized water (DIWET Method). The method will be modified to eliminate the grinding and sieving of the soil samples prior to extraction to minimize the mechanical destruction of the soil prior to leaching. Because the leaching test will not be conducted under in-situ soil conditions through an undisturbed soil column, the modified DIWET method is expected to provide a conservative estimate of leachable residual salts and nitrogen from the soils. Chemical parameters analyzed will include:

- Total dissolved solids using EPA Test Method 160.1
- Inorganic nitrogen (as nitrate, nitrite and ammonia) using EPA Test Method 300/350.3
- Major cations and anions using Standard Method 2320B and 300.0 and 6010. The cations analyzed will be sodium, potassium, calcium, and magnesium. The anions analyzed will be nitrate/nitrite, sulfate, total alkalinity and bicarbonate alkalinity.

Water samples collected from lysimeters, monitoring wells, and ponds for analysis of chemical constituents will be delivered to the EMWD laboratory. Chemical parameters analyzed will include:

- General Mineral/General Physical
- Total Dissolved Solids (Standard Method 2540C)
- Ammonia (EPA Method 350 1)
- Nitrate-N and Nitrite-N (EPA Method 300.0)
- Organic nitrogen (EPA Method 351.2, Calculated)
- Total Kjeldahl Nitrogen (EPA Method 351.2)
- Total Organic Carbon (Standard Method 5310C)

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DBS&A will prepare and submit draft and final project reports to EMWD for review, comment and distribution. The report will include:

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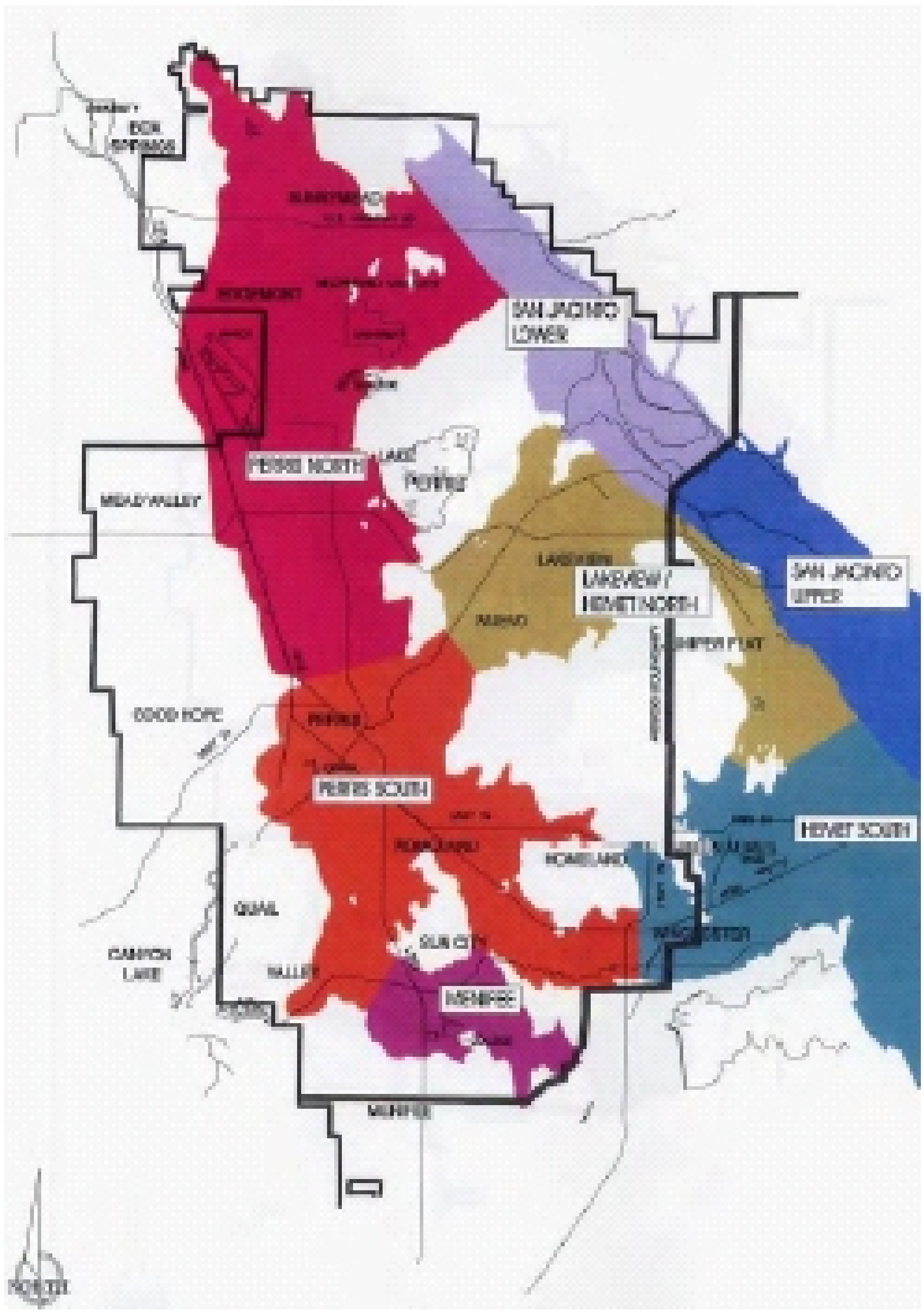
- Summary of findings

- Conclusions and recommendations
- Data Appendixes

DBS&A will present in hard copy and pdf format the sampling results via tabulated, mapped, and graphed methods evaluated to assess patterns, processes and trends including:

- Depth-specific trends in physical and chemical properties of the soils sampled at the sites drilled
- Differences and trends in pond water quality by location and time
- Depth-specific trends in lysimeter water quality over time and between lysimeter clusters at different locations
- Lysimeter water quality trends associated with pond filling and drying (as applicable to sampling conditions)
- Travel time of water from pond to water table
- Comparison of soils at monitoring sites to soils at other EMWD pond locations
- Calculation of nitrogen loss coefficients at monitoring sites
- Estimation of nitrogen loss coefficients at other pond locations based upon comparison of soils properties and quality of recycled water stored
- Identification of additional work required to verify soil and water conditions and nitrogen loss coefficients at other pond locations



EASTERN MUNICIPAL WATER DISTRICT

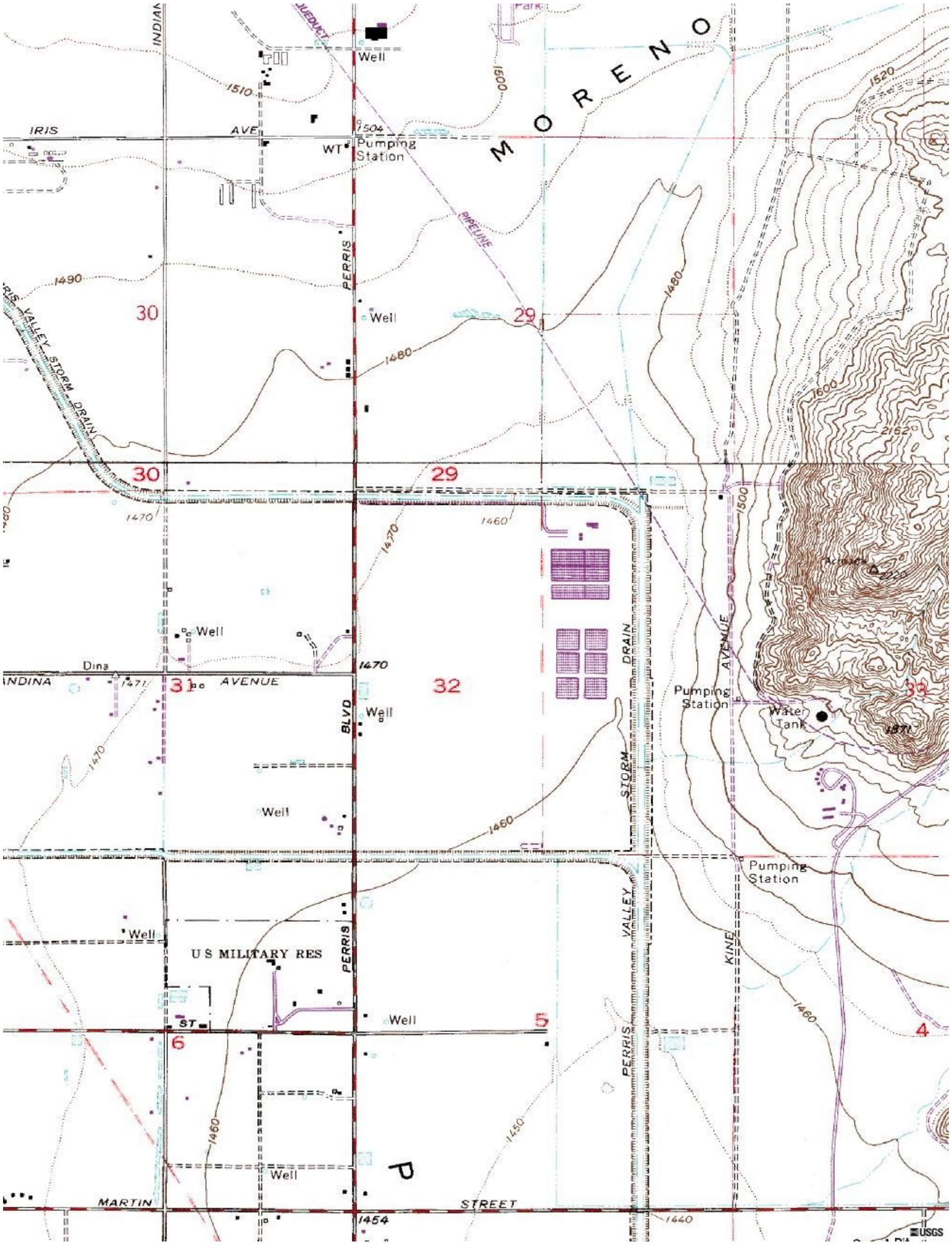
Map of Local Groundwater Sub-Basins

Daniel B. Stephens & Associates, Inc.

7-27-05 WR06.0031.00

Figure 1

VDR10-VDR-PROJECTS\SCMWC Shippee Prelim Design.CDR



Source:
USGS, Sunnymead Quadrangle, 1979 and Perris Quadrangle, 1979

0 1/2 1 Mile

Explanation

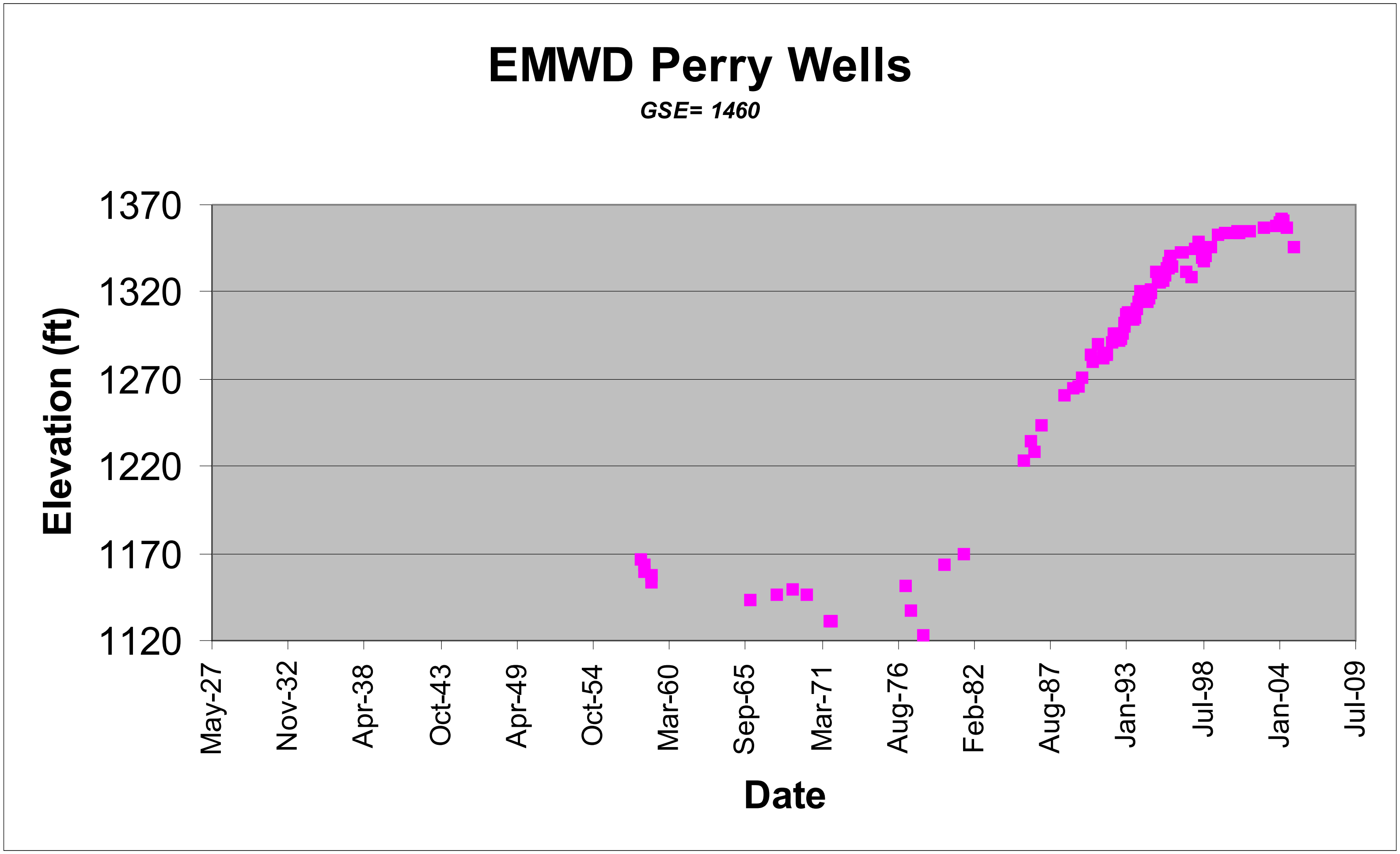
K\PROJECTS\WR\EMWD Location Map.CDR

EASTERN MUNICIPAL WATER DISTRICT
Moreno Valley Ponds Location Map

Daniel B. Stephens & Associates, Inc.
3-27-06 WR06.0034.00

Figure 2

VDR\0-VDR-PROJECTS\SCMWC Shippee Prelim Design.CDR



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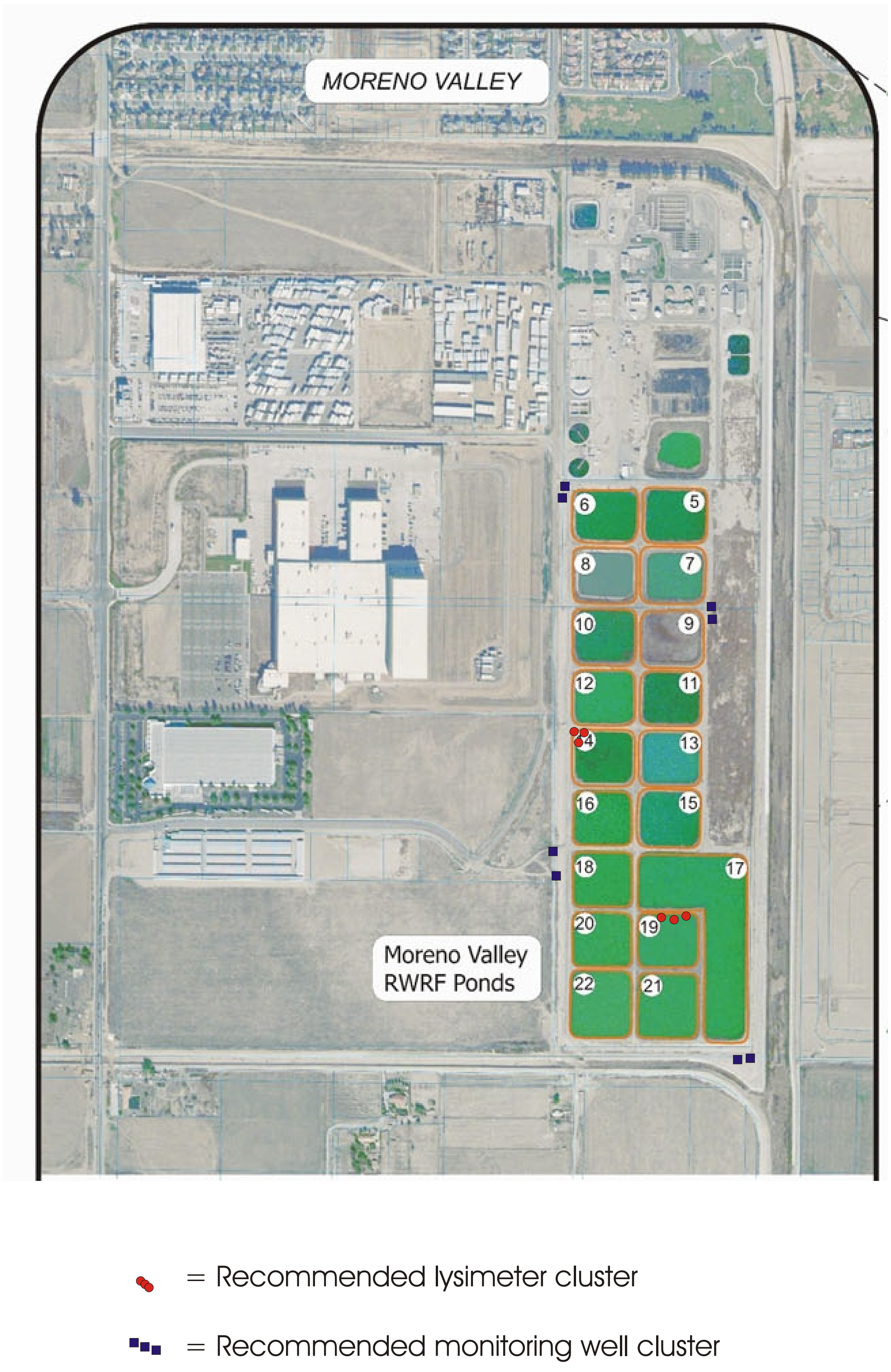
4-12-06
WR06.0031.00

EASTERN MUNICIPAL WATER DISTRICT
Water Level Hydrograph, Perry Street Wells

Figure 3



VDR10-VDR-PROJECTS\SCMWC Shippee Prelim Design.CDR

EASTERN MUNICIPAL WATER DISTRICT

Recommended Locations of Lysimeter/Monitoring Wells

Daniel B. Stephens & Associates, Inc.

7-27-05

WR06.0031.00

Figure 4

Appendix C

Sampling and Analysis Plan

Nitrogen Removal Study
2006

TDS	$	15.00	
Ammonia-N	$	15.00	
Nitrate-N	$	10.00	
Nitrite-N	$	10.00	
Organic-N	Calculation		
Total Kjeldahl-N	$	40.00	
TOC	$	40.00	
General Minerals			$ 130.00
Anions: Cl, F, SO4	$	30.00	
Cations: Ca, Mg, Na, K	$	60.00	
Alkalinity	$	10.00	
pH	$	10.00	
EC	$	10.00	$ 120.00
Total	$	250.00	

No. of lysimeters	18

	1st Quarter	2ndQuarter	3rd Quarter	4th Quarter	
No. of samples	216	54	54	54	
	$ 28,080	$ 7,020	$ 7,020	$ 7,020	$ 49,140
General Minerals					
	$240.00	$240.00	$240.00	$240.00	$ 960
			Total $$ =		**$ 50,100**

Appendix D

Lysimeter Installation Report

DRAFT

Lysimeter Installation

Alessandro Ponds and

Moreno Valley Regional Water Reclamation Facility

Prepared for **Eastern Municipal Water District**
Perris, California

December 11, 2006

Daniel B. Stephens & Associates, Inc.

5951 Encina Road, Suite 208 • Goleta, California 93117

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Appendix

1. Introduction

Under Agreement 46093 with the Eastern Municipal Water District (EMWD), as amended by Revision 1 dated May 12, 2006, Daniel B. Stephens & Associates, Inc. (DBS&A) is evaluating the ability of the soils beneath EMWD recycled water recharge ponds to remove nitrogen through assimilation. This project is being conducted in response to Basin Plan amendments adopted on January 22, 2004 by the Santa Ana Regional Water Quality Control Board (SARQWCB) that may limit or preclude the use of recycled water in most EMWD sub-basins.

The Basin Plan amendment was prompted by the SARWQCB determination that the soils beneath the sub-basins have very little, if any, capacity to assimilate the total inorganic nitrogen (TIN) that is present in the recycled water, as evidenced by exceedances of water quality objectives for nitrogen. According to the SARWQCB, of the eight sub-basins in EMWD's area, six have no assimilative capacity and the remaining two have very little assimilative capacity. The effect of the Basin Plan amendment is to severely restrict the use of recycled water (by adopting a default 25 percent reduction in nitrogen concentrations) unless it can be demonstrated that uptake of nitrogen by the soils is greater than believed or an approved offset plan is implemented.

To demonstrate the possible uptake of nitrogen by soils, EMWD retained DBS&A to evaluate the subsurface underneath the recycled water storage ponds. The project involves data collection and review, conceptual modeling, lysimeter and monitoring well installation, sampling, analysis, and reporting. This report documents the installation of lysimeters at two EMWD facilities: the Moreno Valley Regional Water Reclamation Facility (MVRWRF) in Moreno Valley, California and the Alessandro Ponds in San Jacinto, California (Figure 1). The lysimeter installations documented in this report represent a portion of Tasks 3 and 5 of the project and included drilling and soil sampling, lysimeter and sampling station construction, analysis of soil sample chemical and physical properties, and lysimeter elevations and location surveying.

Results of the analyses of pore water samples collected from the lysimeters are to be issued in mid-2007 after the completion of the cycle of monitoring by both DBS&A and EMWD personnel.

Verbal reports, presentations and meetings have also been held to communicate findings on an ongoing basis.

Under Task 3, DBS&A also constructed two groundwater monitoring wells at the MVRWRF. These wells, MV-1 and MV-2 were drilled and constructed in October 2006 and a separate report of their construction will be issued at a future date.

1.1 Alessandro Ponds

The Alessandro Ponds are used as a storage facility for tertiary-treated water processed by the Hemet-San Jacinto Regional Water Reclamation Facility (HSJRWRF) located approximately 3 miles west of the Alessandro Ponds. The Alessandro Ponds comprise approximately 36 acres located between the Ramona Expressway and the San Jacinto River adjacent to and northeast of the city of San Jacinto. At this facility 15 numbered ponds exist or have existed, with variable numbers of ponds active at any time due to maintenance and operations of the facility. The maximum capacity of the Alessandro Ponds is 55 million gallons. During dry periods, recycled water is sold for agricultural irrigation. Again, fewer ponds are typically active in the summer months due to increased demand for recycled water and thus decreased need for storage.

Figure 2 presents an aerial view of the Alessandro Ponds and indicates the locations of the lysimeters and monitoring stations described in this report and used in this study.

1.2 Moreno Valley Regional Water Reclamation Facility

The MVRWRF is an active wastewater reclamation facility where raw wastewater is subject to primary, secondary, and tertiary treatment. The MVRWRF is located at 17040 Kitching Street in Moreno Valley and comprises approximately 146 acres located adjacent to the Perris Valley Drain, west of Lake Perris. A total of 22 numbered ponds exist or have existed at the MVRWRF, with variable numbers of ponds active at any time due to maintenance and operations of the facility. Typically, fewer ponds are active in summer months as the demand for recycled water for irrigation is increased and there is less need to store water in the ponds.

Figure 3 presents an aerial view of the MVRWRF and indicates the locations of the lysimeters and monitoring stations described in this report and used in this study.

2. Soil Investigation and Lysimeter Installation

DBS&A conducted a soil investigation and lysimeter installation at the Alessandro Ponds and MVRWRF over eight field days during late June through early August 2006. The chronology of the field work is summarized in Table 1. Prior to drilling, DBS&A staked the locations of the proposed borings, notified Underground Service Alert for utility clearance, and held meetings and discussions with EMWD personnel familiar with the site utilities. No underground utilities were found at the locations of the lysimeter borings, trenches, or monitoring stations.

The soil investigation consisted of drilling one soil boring in each pond targeted for lysimeter installation to a total depth of 25 to 30 feet below ground surface (bgs). Using data from the investigational borings, DBS&A designed the three lysimeters for each pond, with the deepest lysimeter installed in the investigation boring and two shallower lysimeters installed in other shallower individual borings. After reaching the total depth, each boring was completed as a lysimeter. A total of 18 borings and lysimeters were drilled and constructed for the project; note that only the deepest boring in each cluster was logged and hence only six boring logs are provided. Naming conventions for the lysimeters follow facility name (AP for Alessandro Ponds and MVP for the ponds at MVRWRF) and pond number; each individual lysimeter is further indicated with the depth of the bottom of the lysimeter below the bottom of the pond. For example, Lysimeter AP1-7.1 represents the shallowest lysimeter at Pond 1 at Alessandro Ponds in San Jacinto, with the bottom of the porous cup 7.1 feet below the bottom of the pond.

Drilling was accomplished using a CME-75 rotary rig equipped with 8½-inch outside-diameter hollow stem augers. Prior to drilling each soil boring, the augers and associated downhole apparatus were steam-cleaned. During drilling, soil samples were collected at approximate 5-foot intervals using a split-spoon sampler that was decontaminated before each sampling event using a distilled water, non-phosphate detergent solution. Drilling activities were observed by a DBS&A scientist, under the oversight of a Professional Geologist registered in California, who maintained detailed lithologic logs of materials encountered during drilling of the deepest boring in each pond. Drilling logs are provided in Appendix A.

2.1 Soil Sampling and Analysis

During drilling, three full 6-inch-long, 2-inch-diameter brass rings were recovered from each sampling interval using the split spoon sampler. One ring containing the soil sample from each sampling interval was retained for logging, one was retained for analyses of soil physical properties, and another was retained for chemical analysis. After removal from the split spoon sampler, the rings were end-capped with Teflon tape and plastic caps. Each ring was labeled with the boring number, depth, date and time of sampling, and sampler's initials. Soil samples were retained upright and preserved on ice in an insulated cooler during transport to the laboratory. Samples were accompanied by full chain-of-custody documentation at all times.

2.1.1 Physical Properties Analyses

Selected soil samples were analyzed for physical properties in accordance with ASTM or other applicable industry standards by DBS&A's Hydrologic Testing Laboratory in Albuquerque, New Mexico. The samples were analyzed for the following physical properties: initial moisture content, dry bulk density, calculated porosity, saturated hydraulic conductivity, particle size distribution by wet sieve and hydrometer, and particle density. A total of 20 samples were subjected to physical properties analyses, 11 from the MVRWRF and 9 from Alessandro Ponds (Table 2). Samples were selected to obtain a representative spatial and lithologic distribution of characteristics based on several factors, including sample availability, field indications of lithology, and moisture content.

Complete laboratory reports, including tests and methods references and chain-of-custody records, are presented as Appendix B for samples from Alessandro Ponds and Appendix C for samples from MVRWRF.

2.1.2 Chemical Properties Analyses

Chemical laboratory analyses of soil samples were conducted to determine the concentrations of general mineral constituents and nitrogen species, plus total organic carbon. Table 3 presents the concentrations of specific analytes in the nine samples from Alessandro Ponds and

11 samples from the MVRWRF. Laboratory reports and chain-of-custody documentation are provided in Appendix D.

2.1.3 Radiocarbon Dating

Based on a significant percentage of charcoal present in sample collected from the lysimeter boring at MVP19 at 14.5 feet, this sample was sent to Dr. Tien Lee at the University of California Riverside for radiocarbon isotope dating by the University and/or the USGS. The purpose of the analysis was to determine a date of burial of the strata at that depth and to estimate a sedimentation rate for the overlying approximately 30 feet of material. A portion of these sediments were removed during the excavation of the ponds. As of the date of this report, no radiocarbon dating results have been received by DBS&A.

2.2 Lysimeter Installation

Lysimeters were installed in each of the soil borings upon reaching the total depth of the boring. Each lysimeter assembly was constructed by attaching pressure/vacuum and sample tubing onto stainless steel lysimeters (Soil Measurement Systems, Part No. SMS-070) using Swage-lok connectors. Each lysimeter was tested once in the lab prior to going to the field and once again in the field. Each lysimeter, connection, and tubing was pressure tested in the field to ensure that no sampling system leaks were present and that a sample could be collected through the lysimeters. Each lysimeter consists of a 0.3-foot-long, porous, stainless steel cup attached to a valved sample chamber and steel ports for pressure/vacuum application and sample collection. A 1-inch-diameter schedule 40 PVC pipe was threaded over the pressure/vacuum and sample tubing, which were color coded to indicate the depth and purpose of each tube. The PVC was screwed into the head of the lysimeter, and the assembly was lowered to the desired depth, through the hollow stems of the augers in the deepest borings and into an open hole in the shallower borings.

Due to the saturated and near-saturated nature of the soils, a filter pack consisting of No. 3 Monterey sand was emplaced in the annulus from the bottom of each boring to nominally 1 foot (actual range from 0.6 to 4.8 feet) above the top of the porous cup of the lysimeter. A minimum

1-foot-thick bentonite seal was emplaced on top of the filter pack in the annular space of each lysimeter. The remaining annulus was grouted with a cement/bentonite slurry to within 2 feet of the bottom of the pond.

Following completion of the lysimeter installation, a minimum 2-foot-wide trench was excavated along a line from the shallowest (pond-ward) lysimeter, to the intermediate (middle) lysimeter, and then to the deepest (proximal to bank) lysimeter, directly toward the top of the pond berm where a monitoring station was constructed.

Each 1-inch-diameter pipe was cut flush to the base of the trench. Pressure/vacuum and sample tubing were threaded through, and the pipe was connected to a reducer and then to a tee or 90-degree 2-inch-diameter PVC tubing assembly, which was connected to a 2-inch-diameter PVC pipe that was laid in the trench over an approximately 4-inch-thick bed of native (Alessandro Ponds) or imported (MVRWRF) sand. All six tubes were manifolded into a single 2-inch-diameter PVC pipe in this manner and then attached to a riser at the monitoring station. Following emplacement of the 2-inch-diameter PVC pipe in each trench, a 4-inch-thick bed of native sand (Alessandro Ponds) or imported sand (MVRWRF) was laid on top of the pipe. The upper portion of each trench was then filled with native soil, compacted using a tamping hammer on a backhoe, and wheel-rolled using the backhoe.

At the Alessandro Ponds facility, the 2-inch-diameter pipe rises inside an 8-inch-diameter steel monument casing (monitoring station) encased in concrete. At MVRWRF, each 2-inch-diameter PVC pipe tees into a riser that allows access to each set of pressure/vacuum and sample tubing, set in a flush-mounted steel vault (monitoring station). Each monitoring station is surrounded by crash posts, painted in a reflective safety yellow and fitted with reflective tape. Over the course of several months following installation, monitoring station maintenance included lid modification, riser upkeep and labeling, crash post painting and recoating of the crash posts, and reflective tape replacement.

Figures 4 through 6 illustrate the schematic as-built features of the lysimeters at Alessandro Ponds, and Figures 7 through 9 illustrate the schematic as-built features of the lysimeters at MVRWRF.

2.3 Lysimeter Bank and Station Survey

Surface elevations and global positions of each lysimeter and monitoring station were surveyed relative to mean sea level and the North American Vertical Datum 1988 (NAVD 88) by The Thomsen Company, Inc., of San Jacinto, California. Surveying was conducted using local benchmarks near each facility following completion of the lysimeters either during or prior to trenching operations (Table 1).

To establish the location and elevation of the ground surface (pond bottom) of each lysimeter, a flat board was laid across the open trench and the surveying tool was placed directly over the 1-inch-diameter PVC associated with each lysimeter. The location of each monitoring station was estimated to be at the top of each berm adjacent to the pond as pointed out by DBS&A personnel.

2.4 Lysimeter Sampling and Analysis

During the week following installation, each of the lysimeters was tested for in-situ functionality and purged and sampled. EMWD added water to the ponds where lysimeters were installed within a few days of lysimeter installation to allow for sampling of the pond water and infiltration of the recycled water in the ponds.

DBS&A personnel sampled the lysimeters weekly for the first quarter and monthly for the second quarter following installation; thereafter, EMWD personnel will sample the lysimeters on a monthly schedule.

The sampling and analyses, along with an interpretation of the data, will be detailed in a future report.

3. Hydrogeology

Like much of the EMWD service area, Alessandro Ponds and the MVRWRF are located within the Peninsular Ranges geomorphic province of California within the approximately 20-mile-wide downdropped block (graben) between the Elsinore Fault Zone and the San Jacinto Fault Zone known as the Perris Block. Crystalline (largely Cretaceous granitic) bedrock formations are exposed in the San Jacinto Mountains to the northeast and the Santa Ana Mountains to the southwest of this graben, as well as in several hills and elevated features within the Perris Block itself. Most of the valley is filled with Tertiary and Quaternary alluvial material, ranging in thickness up to several thousand feet. Several intra-graben hills and highlands affect groundwater flow within the alluvium of the area. These hills and highlands are incorporated into the design of surface water reservoirs such as Lake Perris.

3.1 Regional Hydrogeology

Groundwater within the San Jacinto Watershed Basin occurs largely within the alluvial sediments that fill the valleys. This is a closed basin that under natural (pre-development) conditions contained confined aquifers that flowed under artesian pressure when tapped by early (until circa 1930) wells. Groundwater flow within the undeveloped basin meandered around bedrock highs and discharged to surface water at various points, with the highest amounts of discharge occurring near Lake Elsinore. Pre-development water quality was excellent, but has since declined in certain areas and in upper aquifers due to drafting of the basin and land uses such as agricultural, dairy, and industrial activity. When pumping began, groundwater elevations began to decline, and flow primarily occurred within local sub-basins with a majority of the discharge going to pumped wells. Importation of Colorado River water to the basin has been able to locally overcome the effects of pumping on historical groundwater levels.

3.2 Alessandro Ponds Site Hydrogeology

The Alessandro Ponds overlie the Upper Pressure sub-basin of the San Jacinto Watershed Basin. Immediately to the southeast of this sub-basin is the area referred to as the Canyon sub-basin. These two sub-basins form a northwest-trending subsurface trough between the San Jacinto Fault and the Casa Loma Fault, the latter of which separates the Hemet sub-basin and higher bedrock to the southwest on the upthrown side of the fault. Collectively, these three sub-basins are referred to as the East Valley area. The ephemeral San Jacinto River flows from the southeast to the northwest in the area of these sub-basins. River flow is the major source of recharge during wet years, and the ponds themselves contribute a smaller component of recharge to the local groundwater basin.

Alluvium in the vicinity of the ponds ranges in grain size from clay and silt to sand and gravels. Finer-grained units appear to exist as discontinuous lenses of various thicknesses. Deposition and subsequent deformation are subject to the local tectonic regime, with many strata tilting down to the northeast. A majority of the strata appear to dip toward this northeast direction and when they act as perching layers, the perched groundwater may likely follow a respective northeastward flow path. Where the perching strata are absent (discontinuous), percolating water migrates downward within sand and gravel strata. These perched aquifers are also referred to herein as the shallow perched or shallow aquifers. Conversely, the aquifers typically targeted for groundwater production by agricultural interests or municipal suppliers within the East Valley area are referred to herein as the deep aquifers.

3.2.1 Water Levels

DBS&A collected and reviewed several years of water level data from numerous groundwater production wells that are perforated through the deeper regional aquifer units. These data were used to generate water level contour maps for spring conditions in the years 1955 (representing conditions prior to the majority of spreading, which began in 1965), 1991 (representing post-spreading dry year conditions), and 2005 (representing recent, post-spreading wet year conditions) (Figures 10 through 12).

Prior to the contribution of recharge by the Alessandro Ponds, a nearly flat groundwater gradient is observed generally flowing to the northwest in the vicinity of the study area (Figure 10). In the Canyon sub-basin area, where the basin is narrower, the groundwater gradient is slightly steeper. In 1991, near the end of a regional drought that lasted approximately 6 years, and well after the onset of pond spreading operations, groundwater contours indicate a significant mound below the pond area and a significant trough in the southern portion of the Upper Pressure sub-basin (Figure 11). In 2005, a year during which near-record rainfall was recorded during the early winter months, a return to significant recharge from the San Jacinto River was observed (Figure 12).

3.2.2 Water Quality

DBS&A collected water quality data from various sources and created Stiff water quality diagrams for recent water samples collected from production wells (similar to those used in the water level analysis) throughout the area (Figure 13).

Virtually all of the wells in the wider area surrounding the Alessandro Ponds produce groundwater of a calcium-bicarbonate water quality character. In the near vicinity of the ponds, however, the sulfate component of the deep groundwater is higher than in other areas. Stiff diagrams of pond water quality indicate a high sulfate component (Figure 13). Because of this parallel and because of the discontinuous nature of the fine-grained strata in the pond vicinity, it is interpreted that the downward migration of pond water is as significant a component of the pond water infiltration as the lateral component of this flow. If the lateral flow in the shallow zone was a significant factor, it would be expected that sulfate concentrations in groundwater produced by the local wells would display a wider areal distribution. These site historical water quality data support the interpretation that lateral flow of pond water recharge to the regional aquifer is minimal and that the flow is primarily downward.

3.2.3 Summary of Site Hydrogeologic Conditions

Based on DBS&A's review of water quality, water levels, and contour maps, the direction of water percolation in the vadose zone beneath the ponds is primarily downward with a smaller component of lateral migration. The recharge from the ponds is seen in the patterns of groundwater flow only in the immediate vicinity of the ponds; outside of this immediate area, the regional features of groundwater flow dominate. Regional groundwater exists at a depth on the order of 200 feet below the ponds, with the groundwater flow direction to the northwest.

During the drilling and lysimeter installation process, alluvium was encountered underneath the Alessandro Ponds, consisting of silty sands to well graded sands with gravels to poorly graded sands from the ground surface (pond bottom) to 30 feet bgs. Trace low-plasticity clay lenses were encountered sporadically, and the only significant silt/clay lens was found at Alessandro Pond 10 at 16 to 17 feet bgs. Perched groundwater was encountered at 3, 7.5, and 8 feet bgs in each of the initial (deepest) lysimeter borings in Ponds 15, 10, and 1, respectively. The lack of significant presence of silt/clay lenses beneath Alessandro Ponds also supports the interpretation that lateral flow of pond water recharge is minimal and that flow is primarily downward.

3.3 MVRWRF Site Hydrogeology

The MVRWRF ponds overlie the Perris North sub-basin of the San Jacinto Watershed Basin. This sub-basin represents the alluvium of the northwestern portion of the Perris Block and is one of five sub-basins in the area known as the West San Jacinto area.

Alluvium in the vicinity of the ponds ranges in grain size from clay and silt to sand and gravels. Finer-grained units appear to exist as relatively continuous lenses of various thicknesses. Sediments within the area of the MVRWRF are largely reflective of low-energy type of deposition and include silts, sands and clays. Most strata in the MVRWRF vicinity overlap the crystalline bedrock of the nearby hills as opposed to being in faulted contact with adjacent formations. Hence, most strata are sub-horizontal to horizontal in orientation.

Alluvium is relatively thin in the vicinity of the MVRWRF. In 1999, Hydroscience & Technology (HST) reportedly encountered decomposed bedrock at a depth of 192 feet on the west side of the facility between Ponds 14 and 16. Based on DBS&A's review of the geophysical log from that exploratory borehole, interbedded sands and silts appear to dominate the alluvial lithology.

3.3.1 Water Levels

DBS&A collected and reviewed several years of water level data from numerous groundwater production wells in the MVRWRF vicinity that are perforated through the deeper regional aquifer units and generated hydrographs for those representative of the regional aquifer. A composite hydrograph of the Perry Wells from 1954 through the present (Appendix F) indicates a significant rise in water levels following the construction and use of Lake Perris and the MVRWRF circa 1980. In addition to the Lake Perris recharge, recharge from the Perris Valley Storm Drain and the MVRWRF ponds are likely contributors to the local groundwater.

Perched groundwater is known to be present in the vicinity of the MVRWRF. In addition to the reported encounter of perched water at a depth of approximately 30 feet in the HST exploratory borehole, other geotechnical borings have intersected perched water between 30 and 60 feet bgs at various locations on the property. Data from a nearby leaking underground fuel tank site (Pulliam Family Trust, 1569 Nandina Avenue) indicate a minimum and maximum depth to water of 21.27 feet and 25.87 feet, respectively. The depth to water data indicate that perching layers are relatively laterally extensive and continuous.

3.3.2 Summary of Site Hydrogeologic Conditions

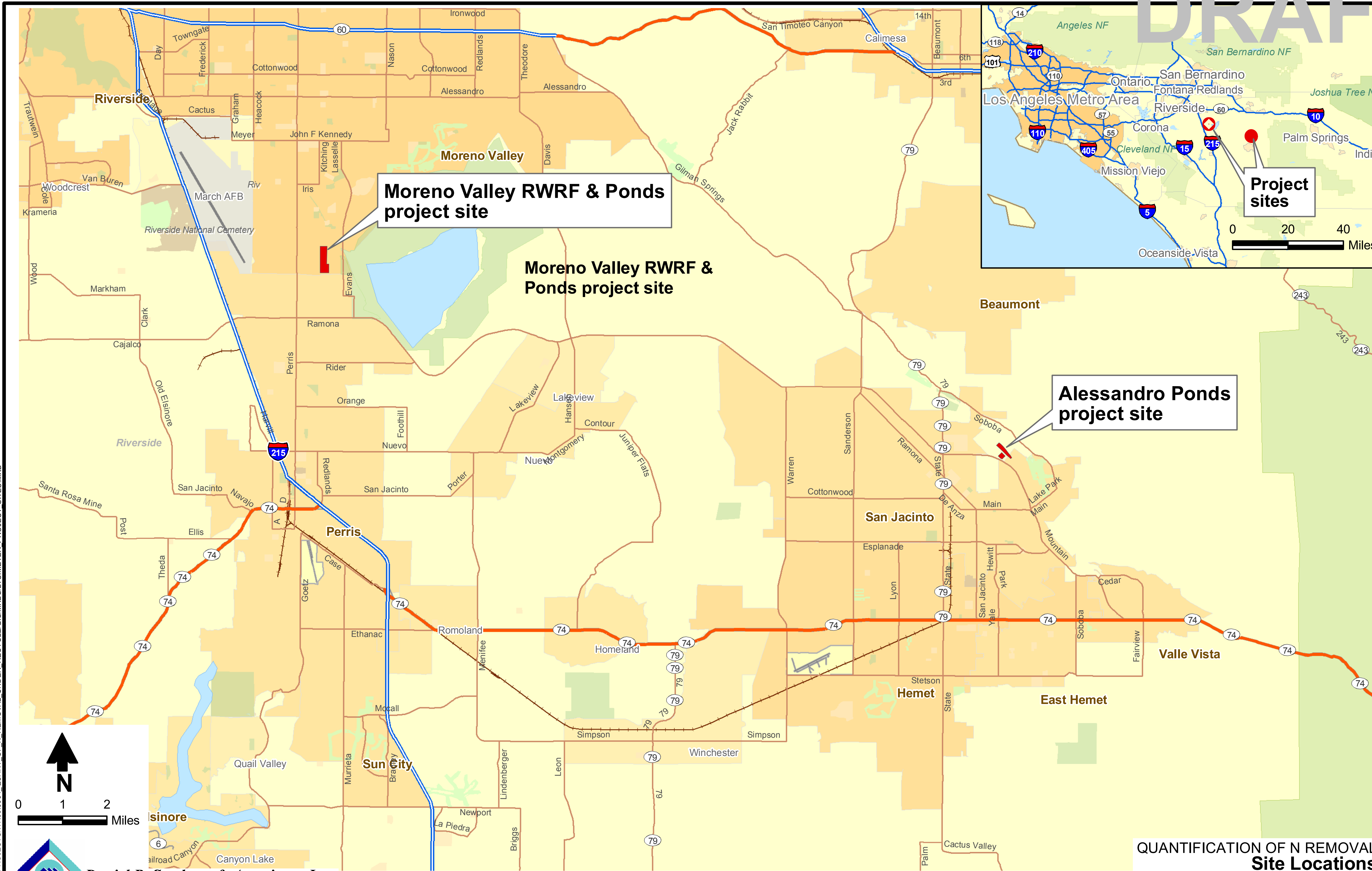
Based on DBS&A's review of local geology, water quality, and water levels and contour maps, the major water percolation in the vadose zone beneath the MVRWRF ponds is likely lateral along perching layers with a smaller component of vertical migration. The extent and primary directions of the perched water flow are unknown at this time. At depth, the regional groundwater flow is predominantly southerly with a component of westerly flow from Lake Perris and the MVRWRF ponds. The regional groundwater level is static at a depth on the order of 50 to 100 feet below the ponds, and groundwater flows to the west and south.

During the drilling and lysimeter installation process, alluvium was encountered beneath the MVRWRF ponds, consisting of silts, clays, silty and clayey sands to well graded sands with gravels to poorly graded sands from the ground surface (pond bottom) to 25 or 30 feet bgs. Fine-grained strata are relatively thick and capable of perching groundwater, which was encountered at 13.8, 4, and 17 feet bgs in the initial (deepest) lysimeter borings in Ponds 14, 19, and 22, respectively. Note that these depths are correlative with depths to water encountered during previous investigations, as the reference point for the lysimeter installation borings was the pond bottoms, roughly 20 feet below local ground surfaces.

4. Summary

Based upon data and information collected during the on-site investigation (Section 2), a total of 18 functional lysimeters have been installed at the Alessandro Ponds and MVRWRF. These lysimeters should last for years and can be used in numerous research projects, with the initial project being this quantification of nitrogen removal. To date, the lysimeters have provided several months of sampling rounds and those data are under review. Quantification of the nitrogen removal as determined by sample analyses will be presented in a future report.

Figures

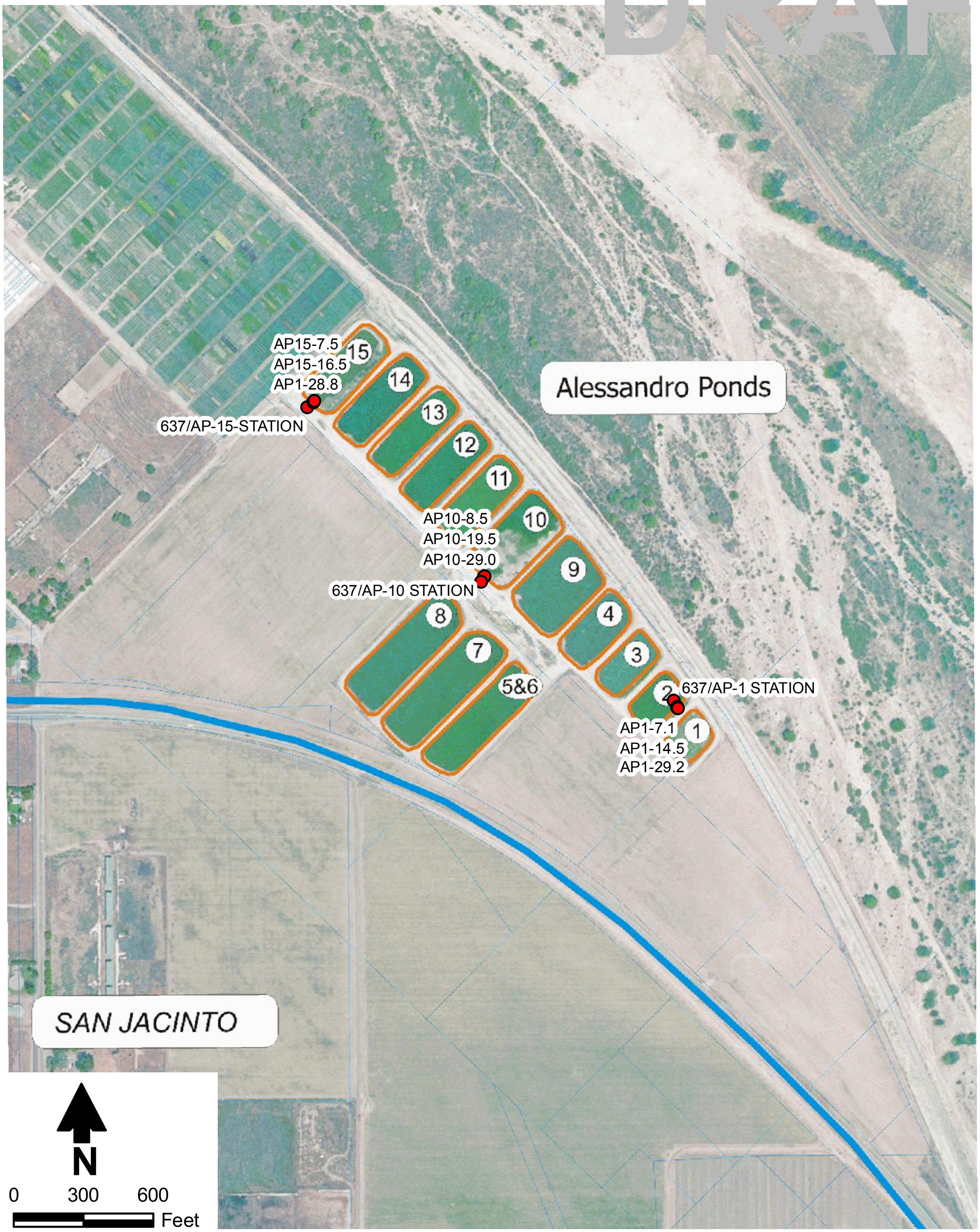


Daniel B. Stephens & Associates, Inc.
12/08/2006
JN WR06.0034

S:/PROJECTS/WR06.0034_QUANT_OF_N_REMOVAL_UNDER_RECYCLE/GIS/MXDS/LYSIMETER_PROJECT_SITES.MXD

QUANTIFICATION OF N REMOVAL
Site Locations

Figure 1



Explanation

Lysimeter location and ID

Source:

Aerial photograph from C. Reber, Eastern Municipal Water District.

Preliminary Subject to Revision

QUANTIFICATION OF N REMOVAL

Lysimeter Locations at the Alessandro Ponds

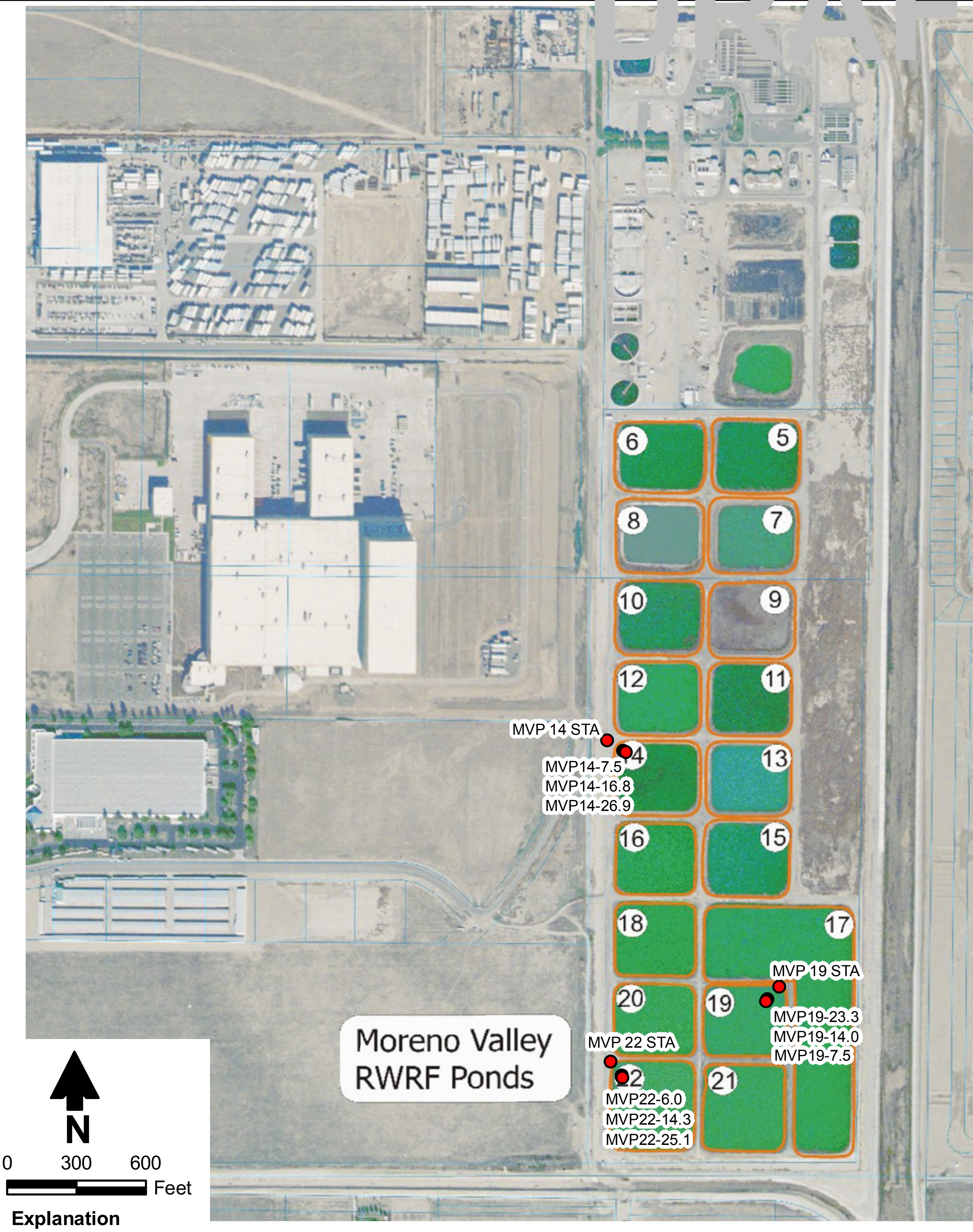
Daniel B. Stephens & Associates, Inc.

12/08/2006

JN WR06.0034

Figure 2

S:/PROJECTS/WR06.0034_QUANT_OF_N_REMOVAL_UNDER_RECYCLE/GIS/MXDS/LYSIMETERS_ALESSANDRO_PONDS.MXD



Explanation

● Lysimeter location and ID

Source:

Aerial photograph from C. Reber,
Eastern Municipal Water District.

Preliminary Subject to Revision

QUANTIFICATION OF N REMOVAL

Lysimeter Locations at Moreno Valley Regional Water Reclamation Facility

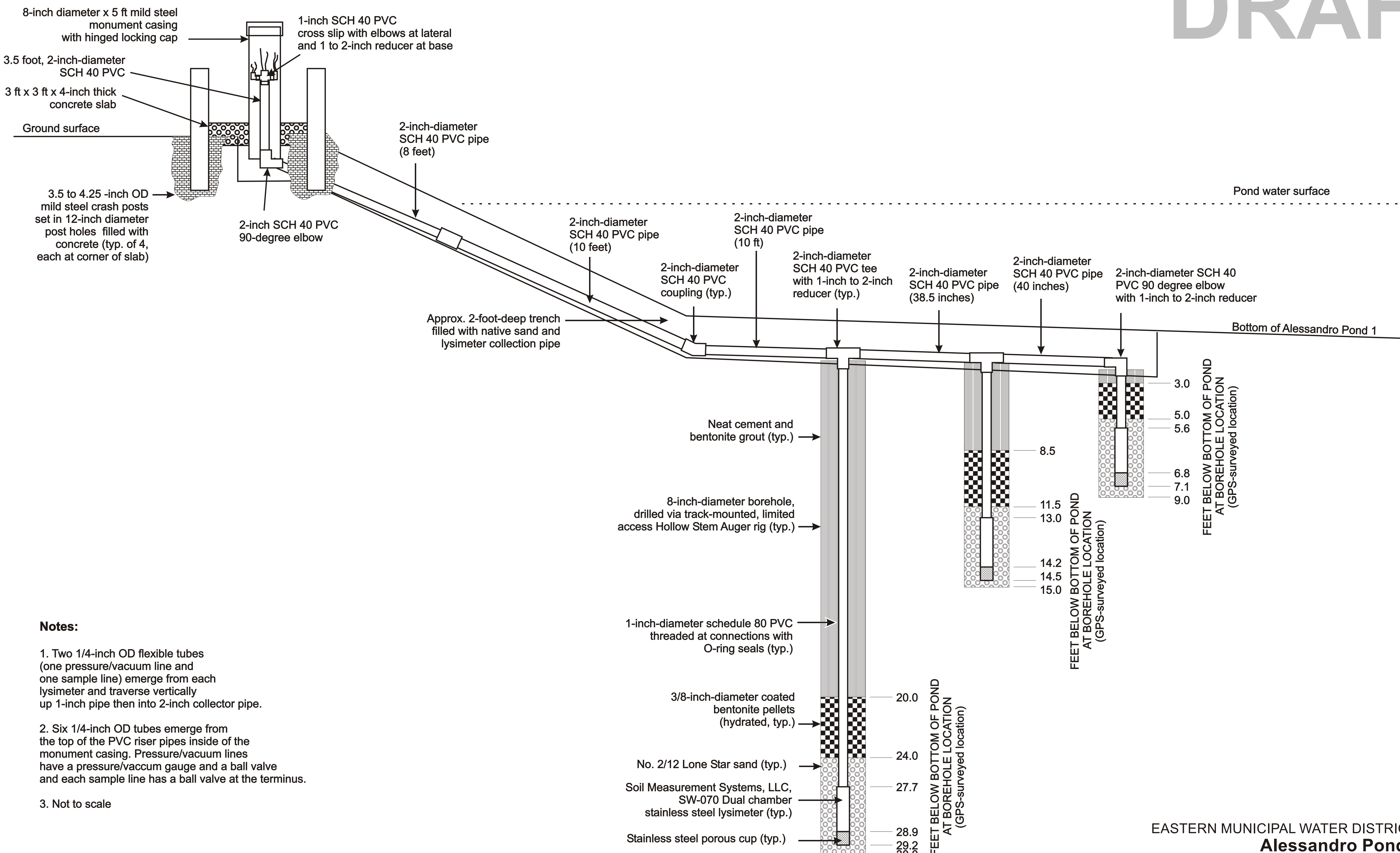
Daniel B. Stephens & Associates, Inc.

12/08/2006

JN WR06.0034

Figure 3

S:/PROJECTS/WR06.0034_QUANT_OF_N_REMOVAL_UNDER_RECYCLE/GIS/MXDS/LYSIMETERS_MORENO_VALLEY.MXD



Notes:

1. Two 1/4-inch OD flexible tubes (one pressure/vacuum line and one sample line) emerge from each lysimeter and traverse vertically up 1-inch pipe then into 2-inch collector pipe.

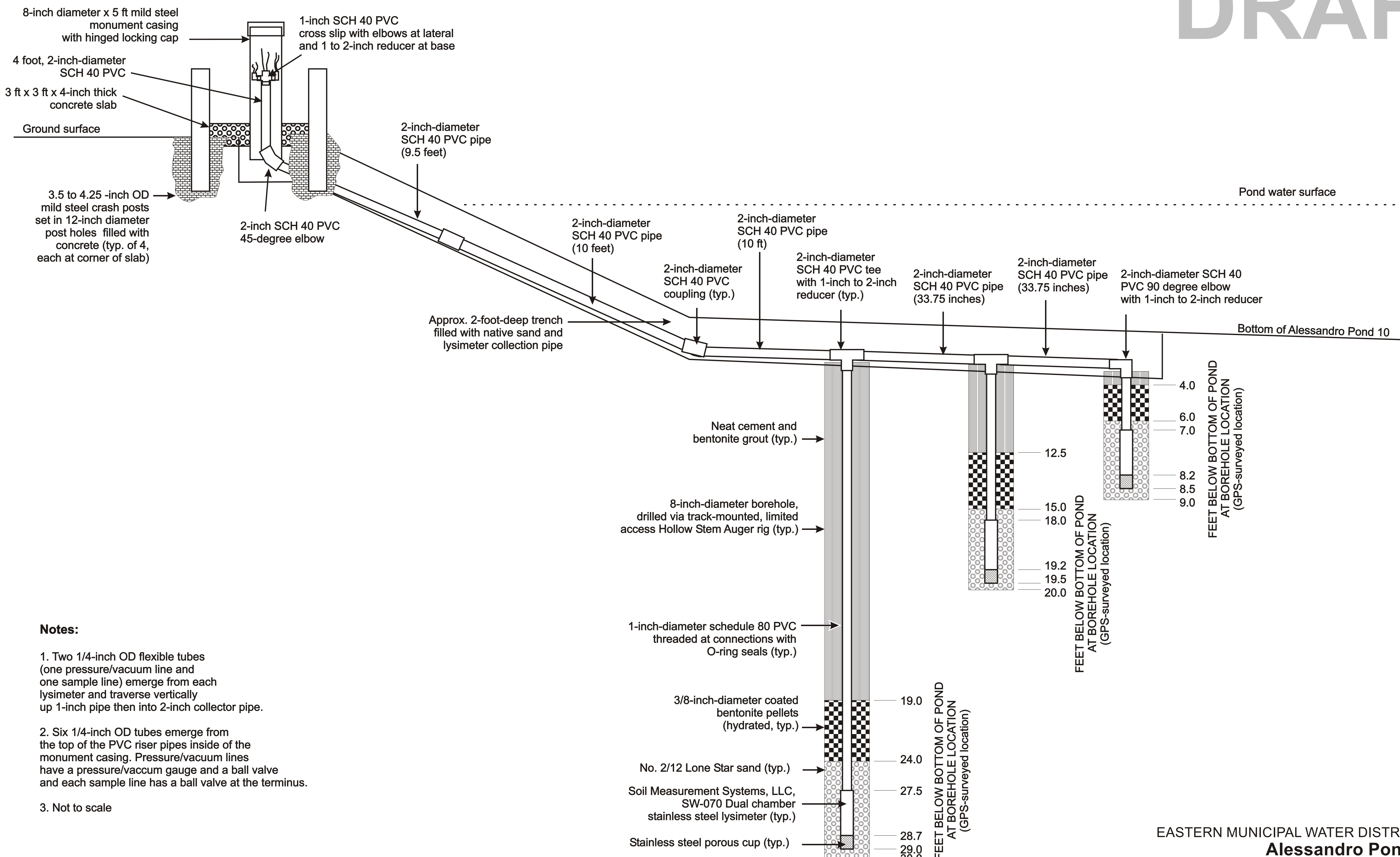
2. Six 1/4-inch OD tubes emerge from the top of the PVC riser pipes inside of the monument casing. Pressure/vacuum lines have a pressure/vaccum gauge and a ball valve and each sample line has a ball valve at the terminus.

3. Not to scale

EASTERN MUNICIPAL WATER DISTRICT
Alessandro Ponds
Pond No. 1 Lysimeter Bank As-Built

Daniel B. Stephens & Associates, Inc.
6-30-06 WR06.0034.00

Figure 4



Notes:

1. Two 1/4-inch OD flexible tubes (one pressure/vacuum line and one sample line) emerge from each lysimeter and traverse vertically up 1-inch pipe then into 2-inch collector pipe.

2. Six 1/4-inch OD tubes emerge from the top of the PVC riser pipes inside of the monument casing. Pressure/vacuum lines have a pressure/vaccum gauge and a ball valve and each sample line has a ball valve at the terminus.

3. Not to scale

EASTERN MUNICIPAL WATER DISTRICT

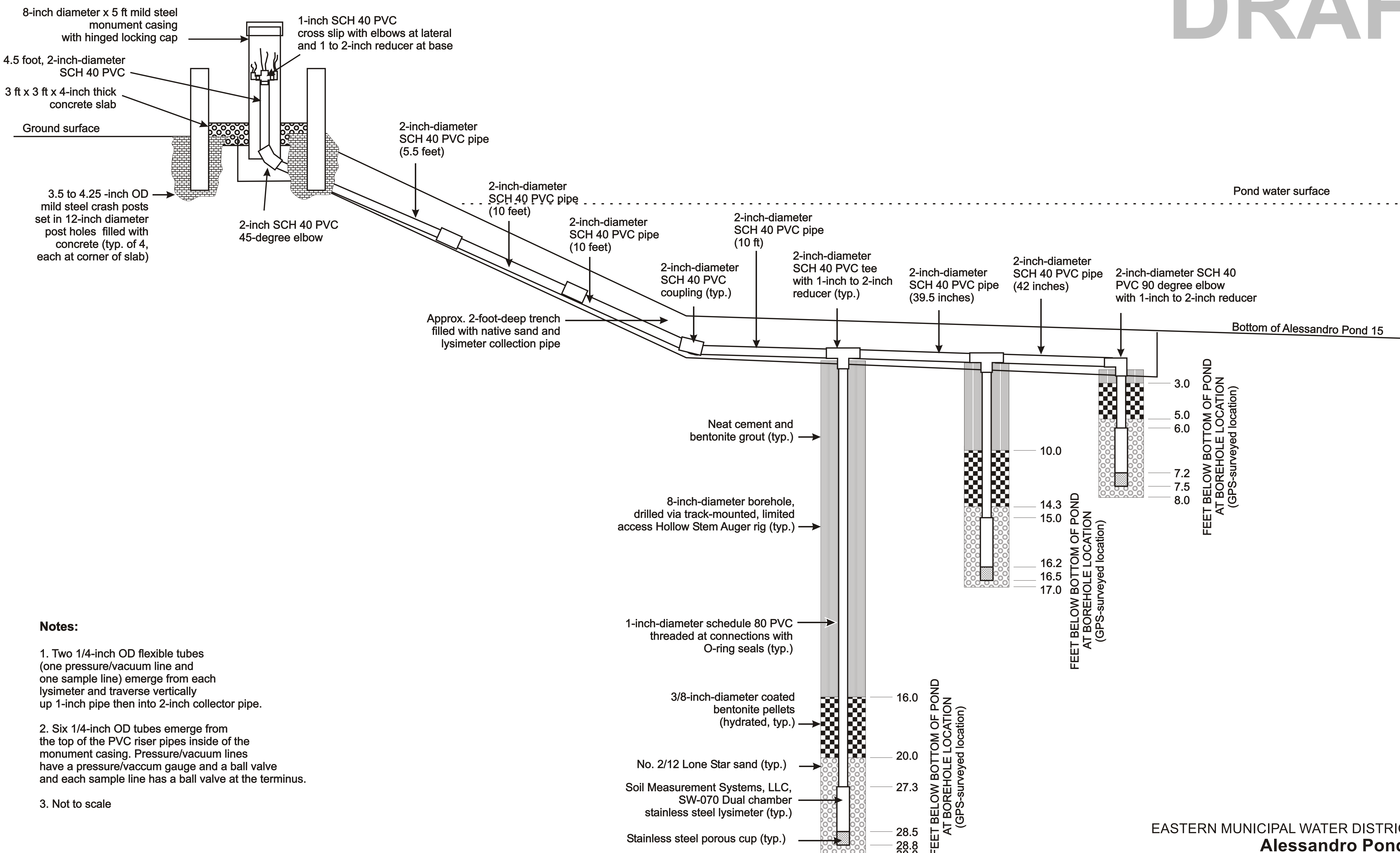
Alessandro Ponds

Pond No. 10 Lysimeter Bank As-Built

Daniel B. Stephens & Associates, Inc.

6-30-06 WR06.0034.00

Figure 5



Notes:

1. Two 1/4-inch OD flexible tubes (one pressure/vacuum line and one sample line) emerge from each lysimeter and traverse vertically up 1-inch pipe then into 2-inch collector pipe.

2. Six 1/4-inch OD tubes emerge from the top of the PVC riser pipes inside of the monument casing. Pressure/vacuum lines have a pressure/vaccum gauge and a ball valve and each sample line has a ball valve at the terminus.

3. Not to scale

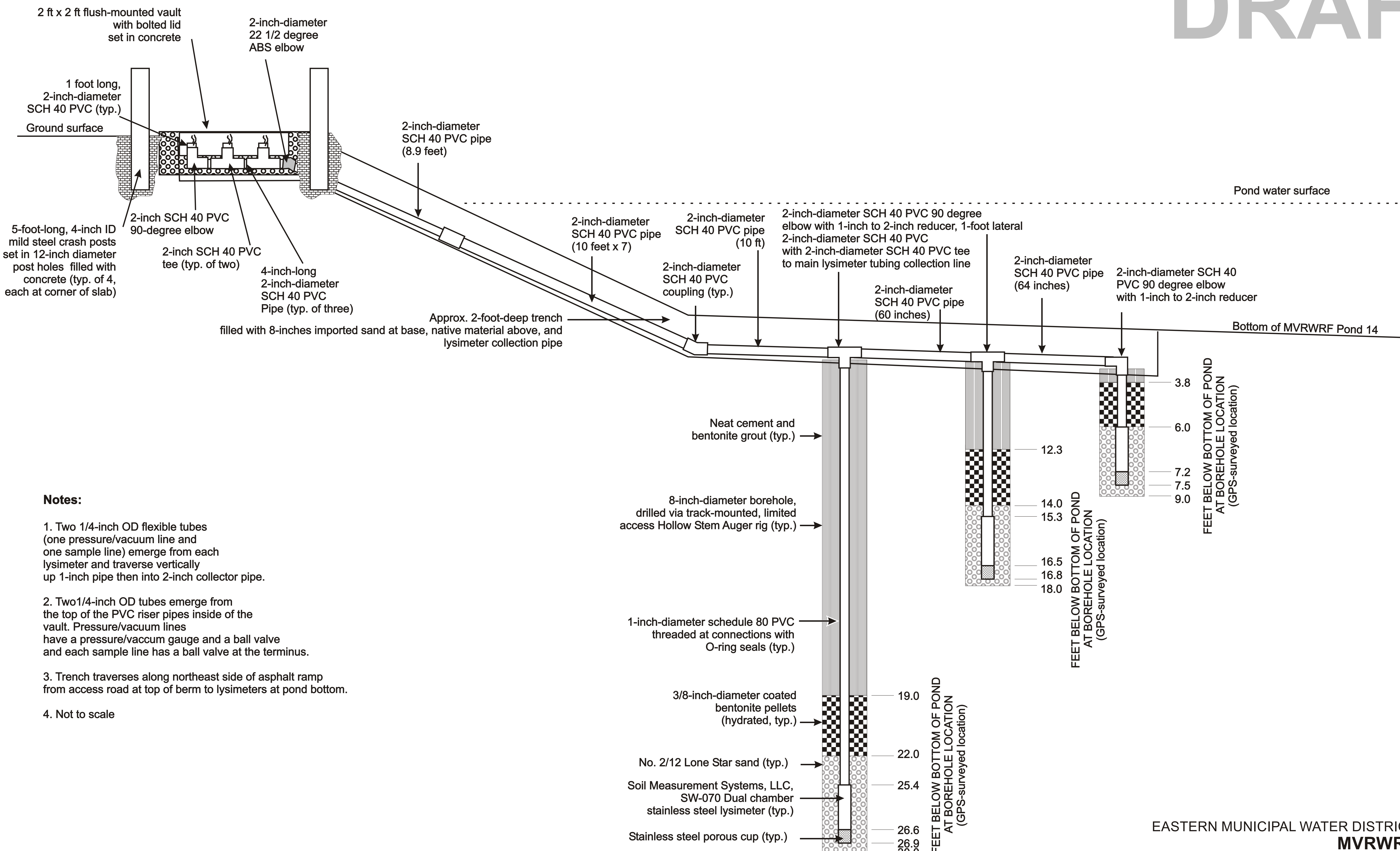
EASTERN MUNICIPAL WATER DISTRICT

Alessandro Ponds
Pond No. 15 Lysimeter Bank As-Built

Daniel B. Stephens & Associates, Inc.
6-30-06 WR06.0034.00

Figure 6

K:\Projects\Water Resource Services\Public\EMWD NO3 Quant\Alessandro Lysimeter Installation\AP15as built 7-7-06.cdr



Notes:

1. Two 1/4-inch OD flexible tubes (one pressure/vacuum line and one sample line) emerge from each lysimeter and traverse vertically up 1-inch pipe then into 2-inch collector pipe.

2. Two1/4-inch OD tubes emerge from the top of the PVC riser pipes inside of the vault. Pressure/vacuum lines have a pressure/vaccum gauge and a ball valve and each sample line has a ball valve at the terminus.

3. Trench traverses along northeast side of asphalt ramp from access road at top of berm to lysimeters at pond bottom.

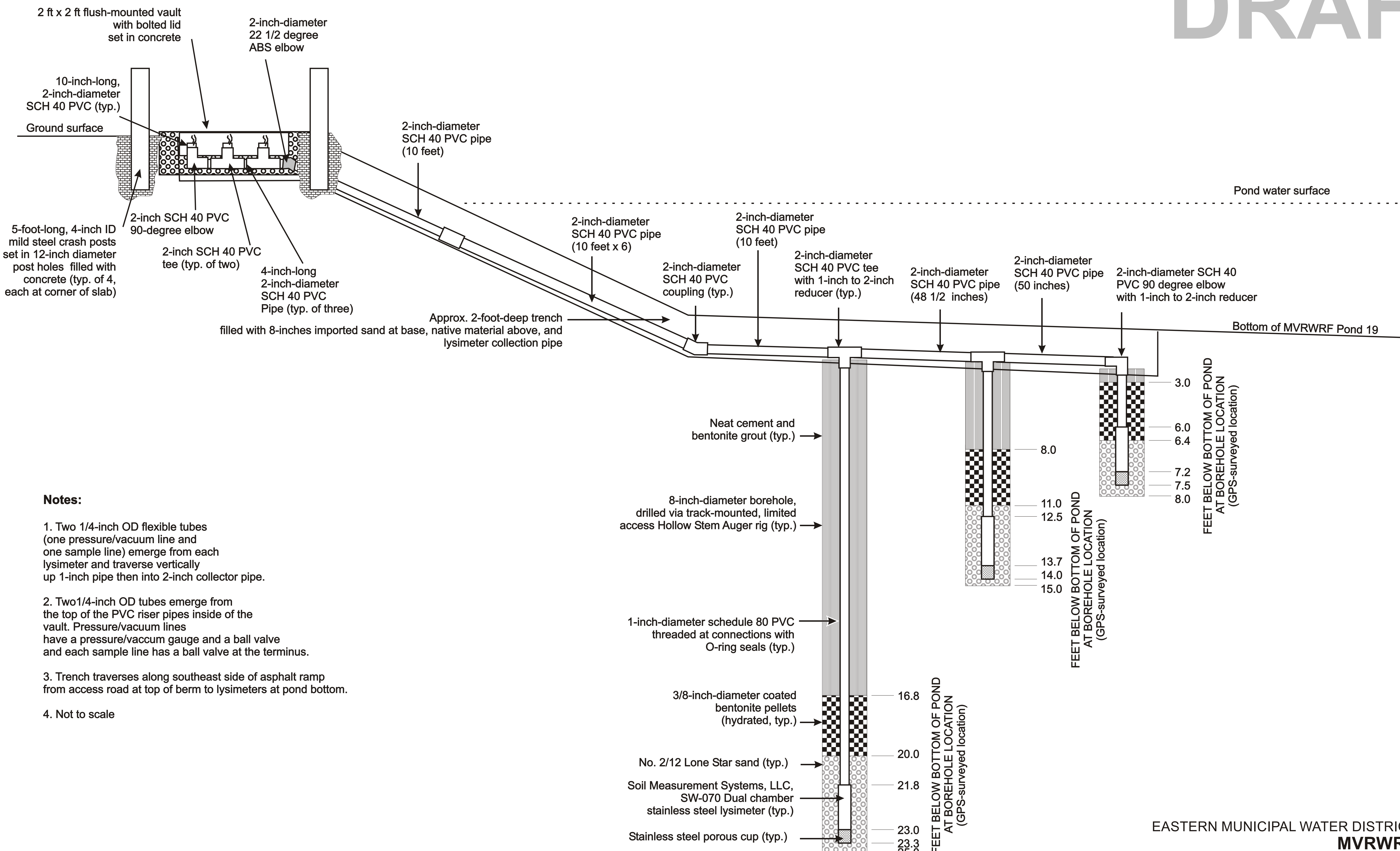
4. Not to scale

EASTERN MUNICIPAL WATER DISTRICT
MVRWRF
Pond No. 14 Lysimeter Bank As-Built

Daniel B. Stephens & Associates, Inc.
8-21-06 WR06.0034.00

Figure 7

K:\Projects\Water Resource Services\Public\EMWD NO3 Quant\MVRWRF Lysimeter Installation\MVP14-as built.cdr



Notes:

1. Two 1/4-inch OD flexible tubes (one pressure/vacuum line and one sample line) emerge from each lysimeter and traverse vertically up 1-inch pipe then into 2-inch collector pipe.

2. Two1/4-inch OD tubes emerge from the top of the PVC riser pipes inside of the vault. Pressure/vacuum lines have a pressure/vaccum gauge and a ball valve and each sample line has a ball valve at the terminus.

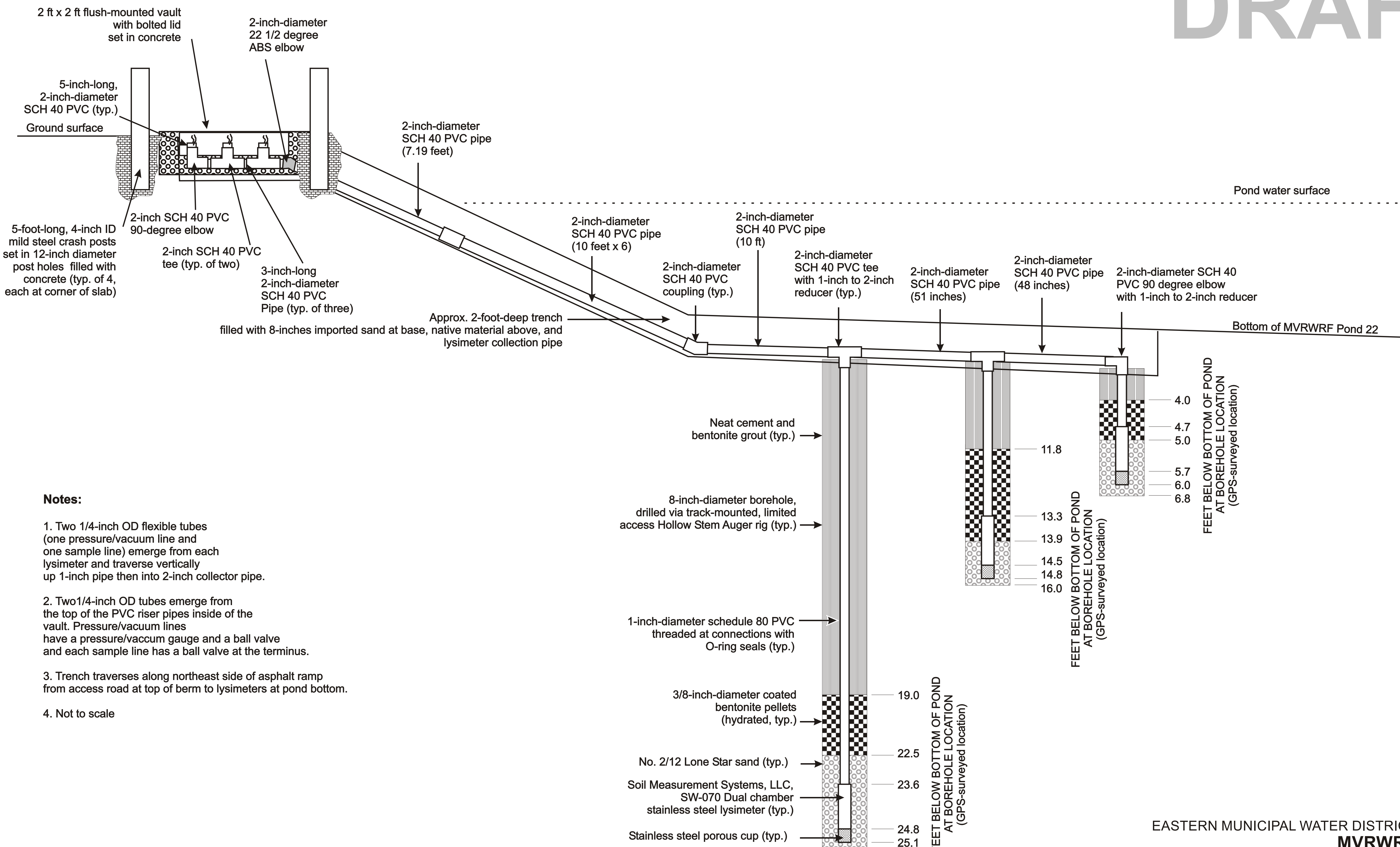
3. Trench traverses along southeast side of asphalt ramp from access road at top of berm to lysimeters at pond bottom.

4. Not to scale

EASTERN MUNICIPAL WATER DISTRICT
MVRWRF
Pond No. 19 Lysimeter Bank As-Built

Daniel B. Stephens & Associates, Inc.
8-21-06 WR06.0034.00

Figure 8



Notes:

1. Two 1/4-inch OD flexible tubes (one pressure/vacuum line and one sample line) emerge from each lysimeter and traverse vertically up 1-inch pipe then into 2-inch collector pipe.

2. Two1/4-inch OD tubes emerge from the top of the PVC riser pipes inside of the vault. Pressure/vacuum lines have a pressure/vaccum gauge and a ball valve and each sample line has a ball valve at the terminus.

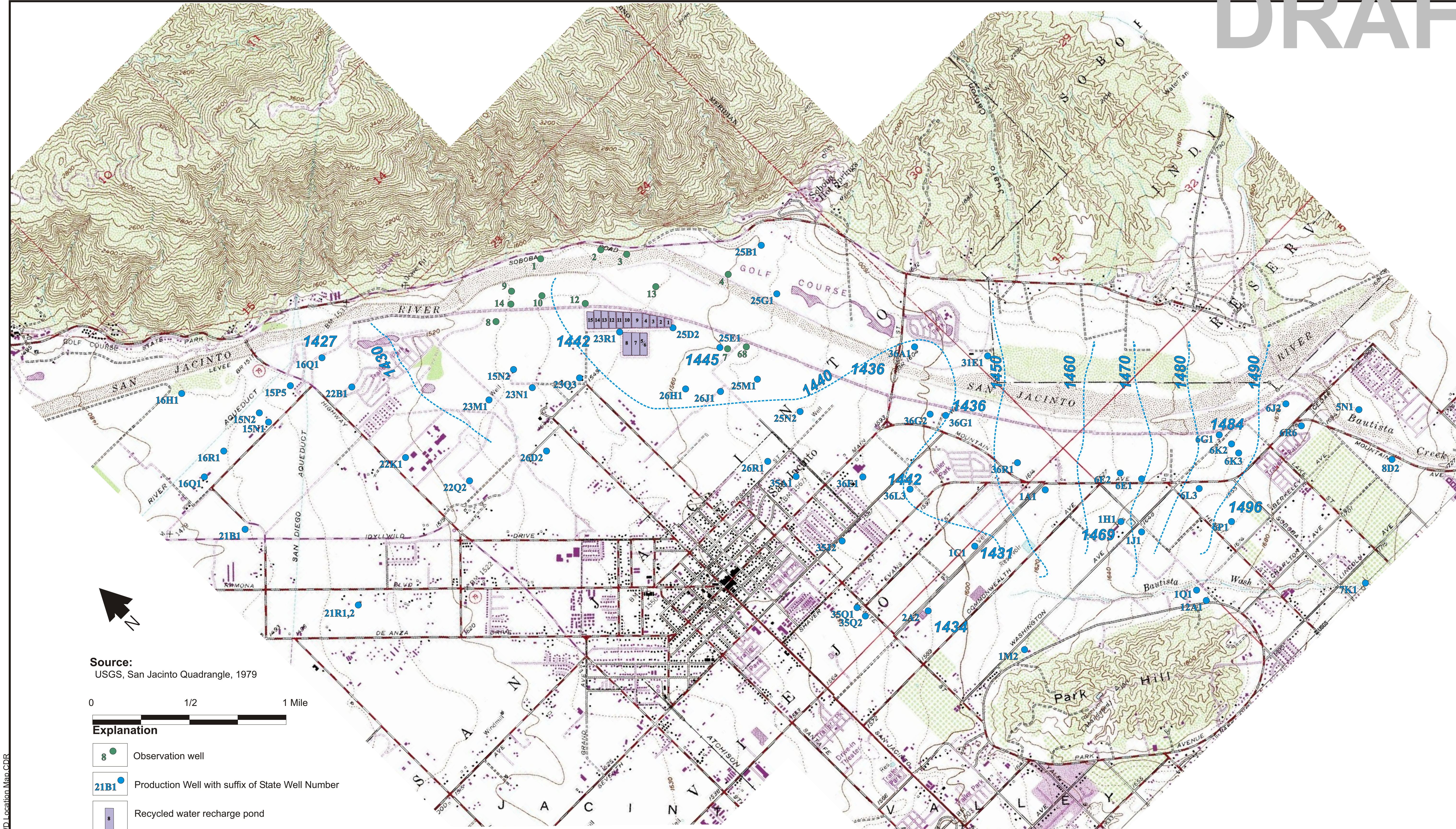
3. Trench traverses along northeast side of asphalt ramp from access road at top of berm to lysimeters at pond bottom.

4. Not to scale

EASTERN MUNICIPAL WATER DISTRICT
MVRWRF
Pond No. 22 Lysimeter Bank As-Built

Daniel B. Stephens & Associates, Inc.
8-21-06 WR06.0034.00

Figure 9



Source:
USGS, San Jacinto Quadrangle, 1979

0 1/2 1 Mile

Explanation

- 8 Observation well
- 21B1 Production Well with suffix of State Well Number
- Recycled water recharge pond
- *1427* Groundwater elevation, feet above mean seal level
- Groundwater potentiometric surface elevation contour

K:\PROJECTS\WR\EMWD Location Map.CDR

Daniel B. Stephens & Associates, Inc.
3-27-06 WR06.0034.00

EASTERN MUNICIPAL WATER DISTRICT
Spring 1955 Groundwater Contour Map

Figure 10

Source:
USGS, San Jacinto Quadrangle, 1979

0 1/2 1 Mile

Explanation

8 Observation well

21B1 Production Well with suffix of State Well Number

Recycled water recharge pond

1427 Groundwater elevation, feet above mean seal level

Groundwater potentiometric surface elevation contour

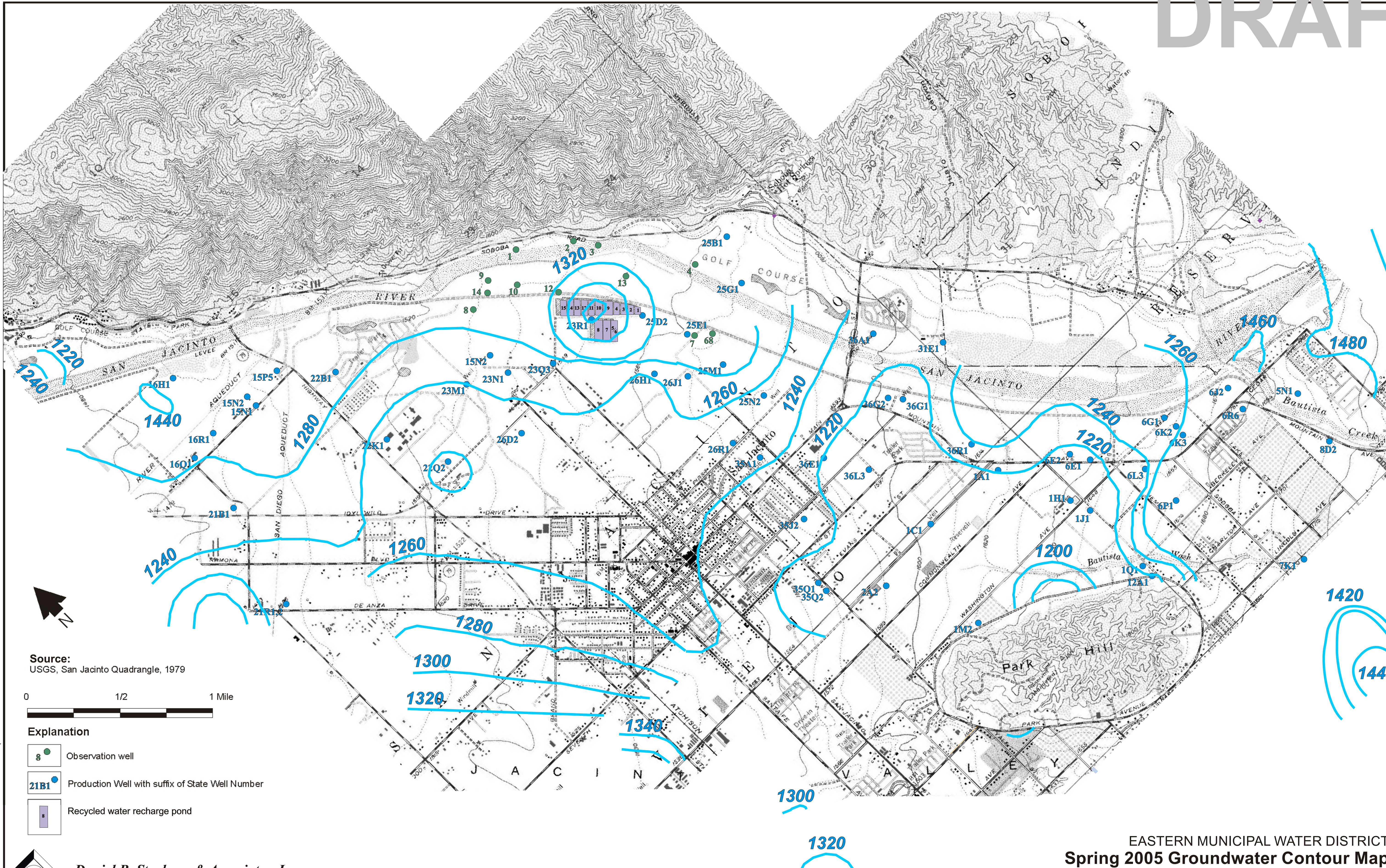
K:\PROJECTS\WR\EMWD Location Map.CDR

Daniel B. Stephens & Associates, Inc.
3-27-06 WR06.0034.00

EASTERN MUNICIPAL WATER DISTRICT
Spring 1991 Groundwater Contour Map

Figure 11

DRAFT



Source:
USGS, San Jacinto Quadrangle, 1979

0 1/2 1 Mile

Explanation

8 Observation well

21B1 Production Well with suffix of State Well Number

8 Recycled water recharge pond

K:\PROJECTS\WR\EMWD Location Map.CDR

Daniel B. Stephens & Associates, Inc.
4-12-06 WR06.0031.00

EASTERN MUNICIPAL WATER DISTRICT
Spring 2005 Groundwater Contour Map

Figure 12

DRAFT

Source:
USGS, San Jacinto Quadrangle, 1979

0 1/2 1 Mile

Explanation

8 Observation well

21B1 Production Well with suffix of State Well Number

8 Recycled water recharge pond

K:\PROJECTS\WR\EMWD Location Map.CDR

EASTERN MUNICIPAL WATER DISTRICT

Stiff Water Quality Diagram Map (Most Recent Data)

Daniel B. Stephens & Associates, Inc.
3-27-06 WR06.0034.00

Figure 13

Tables

Table 1. Chronology of Lysimeter Installation Activities

Date	Field Activity
Alessandro Ponds	
June 26, 2006	Mobilize limited access (LA) hollow-stem-auger (HSA) drilling rig to Alessandro Ponds site, drill boreholes, log and sample soils, install lysimeters AP15-A to 28.8 feet and AP10-A to 29.0 feet.
June 27, 2006	Drill boreholes and install lysimeters AP15-B to 16.5 feet, AP15-C to 7.5 feet, AP10-B to 19.5 feet, and AP10-C to 8.5 feet.
June 28, 2006	Drill boreholes, log and sample soils, and install lysimeters AP1-A to 29.2 feet, AP1-B to 14.5 feet, and AP1-C to 7.1 feet.
June 29, 2006	Dig trench, install collection piping, backfill and compact trench, construct monitoring stations, survey elevation and position of lysimeters and monitoring stations, clean up and demobilize from site.
MVRWRF	
July 25, 2006	Mobilize full-size HSA drilling rig to MVRWRF, drill boreholes, log and sample soils, install lysimeters MVP14-A to 26.9 feet, MVP14-B to 16.8 feet and MVP14-C to 7.5 feet. Demobilize full-size HSA drilling rig.
July 31, 2006	Mobilize LA HSA drilling rig to site, drill boreholes, log and sample soils, install lysimeters MVP19-A to 23.3 feet, MVP19-B to 14.0 feet, MVP19-C to 7.5 feet, MVP22-A to 25.1 feet, MVP22-B to 14.8 feet, and MVP22-C to 6.0 feet. Demobilize LA HSA drilling rig.
August 1, 2006	Survey elevation and position of lysimeters and monitoring stations.
August 14, 2006	Dig trench, install collection piping, backfill and compact trench, construct monitoring stations.
August 15, 2006	Complete trenching and backfill, construct monitoring stations, clean up and demobilize from site.

Table 2. Summary of Soil Physical Property Results

Sample No.	Date Sampled	Parameter Results											
		Initial Moisture Content		Bulk Density (g/cm^3)		Calculated Porosity (%)	Percent Saturation (%)	Saturated Hydraulic Conductivity (cm/s)	Particle Size Distribution (mm)				
		% g/g	cm^3/cm^3	Dry	Wet				d_{10}	d_{50}	d_{60}	C_u	C_c
AP1-5	6/28/06	16.5	27.9	1.69	1.97	37.2	75.0	1.1×10^{-3}	0.060	0.45	0.66	11	0.91
AP1-10	6/28/06	13.5	24.6	1.83	2.07	32.4	75.9	4.5×10^{-5}	0.026	0.26	0.39	15	1.2
AP1-25	6/28/06	14.2	25.7	1.81	2.06	32.9	78.1	5.6×10^{-3}	0.12	0.52	0.67	5.6	1.2
AP10-5	6/26/06	19.7	33.3	1.69	2.03	37.0	90.1	2.8×10^{-5}	0.013	0.15	0.23	18	1.5
AP10-15	6/26/06	33.1	47.3	1.43	1.90	47.5	99.7	4.3×10^{-6}	0.00098	0.028	0.037	38	3.3
AP10-20	6/26/06	15.1	25.8	1.71	1.97	36.5	70.6	8.2×10^{-3}	0.11	0.39	0.51	4.6	0.94
AP15-5	6/26/06	20.5	33.0	1.61	1.94	39.6	83.5	8.1×10^{-4}	0.019	0.19	0.27	14	1.8
AP15-15	6/26/06	10.7	16.9	1.58	1.75	41.1	41.0	1.2×10^{-3}	0.23	1.0	1.3	5.7	1.1
AP15-25	6/26/06	10.9	19.5	1.79	1.99	33.2	58.6	1.9×10^{-3}	0.088	0.53	0.72	8.2	1.2
MVP14-5	7/25/06	8.5	14.0	1.65	1.79	37.7	37.2	2.4×10^{-3}	0.085	0.39	0.49	5.8	1.9
MVP14-10	7/25/06	10.9	20.8	1.91	2.12	29.3	70.9	6.1×10^{-4}	0.00077	0.17	0.33	429	9.8
MVP14-15	7/25/06	27.7	46.3	1.67	2.13	38.0	121.8	1.2×10^{-4}	0.019	0.47	0.74	39	1.8
MVP14-20	7/25/06	26.9	41.4	1.54	1.95	44.4	93.2	1.7×10^{-6}	0.00098	0.013	0.020	20	1.3
MVP14-25	7/25/06	46.8	54.5	1.16	1.71	57.6	94.5	1.3×10^{-4}	0.00092	0.061	0.37	402	0.18
MVP19-5	7/31/06	19.2	32.0	1.67	1.99	38.5	83.2	5.7×10^{-6}	0.016	0.22	0.29	18	2.6
MVP19-20	7/31/06	11.7	23.2	1.98	2.21	27.5	84.2	4.0×10^{-5}	0.0082	0.36	0.56	68	1.9
MVP22-10	7/31/06	16.0	28.2	1.76	2.04	34.9	80.8	1.4×10^{-4}	0.0047	0.26	0.46	98	2.4
MVP22-15	7/31/06	21.7	36.7	1.69	2.06	38.0	96.6	4.5×10^{-5}	0.010	0.078	0.12	12	1.8
MVP22-20	7/31/06	34.7	47.3	1.36	1.84	50.1	94.4	2.1×10^{-6}	0.0013	0.031	0.051	39	0.83
MVP22-25	7/31/06	55.0	59.2	1.08	1.67	60.5	97.9	2.3×10^{-6}	0.00040	0.0043	0.0082	21	0.69

g/g = Grams per gram
cm^3/cm^3 = Cubic centimeter per cubic centimeter
g/cm^3 = Grams per cubic centimeter
cm/s = Centimeters per second

mm = Millimeters
d_{10} = Diameter of particle size of which 10 percent of sample, by weight, is finer
d_{50} = Median particle diameter

d_{60} = Diameter of particle size of which 60 percent of sample, by weight, is finer
C_u = Uniformity coefficient (d_{60}/d_{10})
C_c = Coefficient of curvature [$(d_{30})^2/(d_{10} * d_{60})$]

Table 3. Summary of Chemical Analyses Results

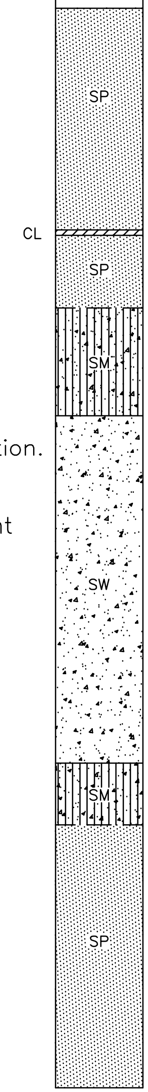
Sample ID	Date Sampled	Concentration (milligrams per liter, mg/L) Calcium	Magnesium	Potassium	Sodium	Total Dissolved Solids	Fluoride	Chloride	Nitrite (as N)	Bromide	Nitrate (as N)	ortho-Phosphate	Sulfate	Ammonia (as N)	Total Organic Carbon	Total Alkalinity (as $CaCO_3$)	Bicarbonate (as $CaCO_3$)
	Reporting Limit	*5*	*5*	*25*	*25*	*10*	*1*	*10*	*1*	*1*	*1*	*1*	*10*	*5*	*500*	*5*	*5*
AP1-5	28-Jun-06	868	1,780	2,210	102	2,930	---	14	---	---	1.3	2.8	27	---	---	25	25
AP1-15	28-Jun-06	963	1,390	1,600	105	4,030	1.2	12	---	---	1.1	1.9	84	---	800	55	55
AP1-25	28-Jun-06	1,810	3,050	3,770	124	7,130	2.4	14	---	---	---	2.4	76	---	600	140	120
AP10-5	26-Jun-06	1,190	2,150	2,490	103	3,790	3.0	42	---	2.3	---	3.6	34	---	500	210	210
AP10-15	26-Jun-06	1,660	2,580	2,910	112	4,740	3.2	43	---	---	---	4.2	57	---	1,200	320	320
AP10-25	26-Jun-06	7,050	4,710	4,930	147	10,800	3.8	23	1.1	1.5	1.5	1.2	180	---	4,000	650	620
AP15-5	26-Jun-06	1,240	2,790	3,130	110	4,980	2.6	33	---	---	---	3.1	95	---	1,000	120	120
AP15-15	26-Jun-06	812	1,540	1,790	73.4	2,770	1.6	24	---	1.7	---	2.0	36	---	---	90	90
AP15-30	26-Jun-06	9,150	6,110	6,580	181	15,200	2.0	23	---	1.0	---	1.5	93	---	3,300	330	300
MVP14-5	25-Jul-06	709	1,850	1,740	94	42,400	3.4	16	---	4.1	1.3	1.4	200	39	1,000	130	130
MVP14-15	25-Jul-06	1,080	2,080	2,240	92	10,500	1.4	13	---	1.4	---	2.1	82	28	---	110	100
MVP14-20	25-Jul-06	2,940	3,120	3,140	149	28,300	2.4	16	---	3	---	2.5	85	14	500	230	210
MVP14-25	25-Jul-06	36,700	11,000	7,320	391	7,330	0.18	2.8	---	0.11	---	0.14	9.4	17	---	760	720
MVP19-5	31-Jul-06	1,420	2,850	1,940	167	32,100	6	23	---	---	1.2	2.8	310	17	---	80	80
MVP19-10	31-Jul-06	3,210	7,210	6,230	323	18,400	6.9	13	---	---	1.2	4.3	320	---	900	80	80
MVP19-15	31-Jul-06	717	823	766	104	6,770	1.7	22	---	---	---	1.4	73	---	500	100	100
MVP19-20	31-Jul-06	2,030	5,370	6,210	377	17,200	2.8	14	---	---	---	1.4	140	---	950	15	15
MVP22-5	31-Jul-06	2,000	5,340	2,770	246	28,400	5.1	13	---	---	1.1	3.3	260	22	---	130	120
MVP22-15	31-Jul-06	1,310	3,750	3,280	163	4,170	1.4	17	---	---	---	1	91	11	---	140	120
MVP22-25	31-Jul-06	4,590	10,800	6,080	380	9,630	1.3	20	---	---	---	1.4	84	22	900	170	160

Appendix A

Boring Logs

DRAFT

S:\PROJ\WR06.0034_QUANT_OF_N_REMOVAL_UNDER_RECYCLE\VR\WR06_0034_01K.DWG



See figure 4 for lysimeter completion. Separate borings drilled for two shallower adjacent lysimeters.

Depth	Time	Blow Counts	Sampling Device	Sample Recovery	Sample Interval (feet bgs)	USCS Symbol	Comm... Lith...ogy
0							0 Pond bottom soil at ground surface
5	9:08	9,12,14	2.5" ø Modified California Split Spoon	1.5'	5.5–6.5	SP	5 Sand with fine gravel, olive gray (5YR 5/2), medium to course sand, 10% fine gravel, subangular, micaceous, moist
6							6 Silty clay lense, clay <1 cm thick thick, moderate plasticity, micaceous, trace charcoal, olive gray (5YR 4/2)
8							8 Groundwater encountered at 8 feet bgs
10	9:20	15,20,20	2.5" ø Modified California Split Spoon	1.5'	10.5–11.5	SM	10 Silty sand, dark olive gray (5YR 3/2), fine to coarse sand, 25% silt, micaceous, wet, subangular grains
15	9:30	23,25,30	2.5" ø Modified California Split Spoon	0.5'	15.5–16.0	SW	
16							16 Sand as above at 5 feet
20	9:45	23,27,32	2.5" ø Modified California Split Spoon	1.0'	20.5–21.5	SW	20 Gravelly sand as above
21							21 Silty sand, olive (5YR 4/2), very fine– to fine–grained, 35% silt, moist to wet
25	9:54	29,35,40	2.5" ø Modified California Split Spoon	1.5'	25.5–26.5	SP	25 Sand, olive gray (5YR 5/2), fine to coarse gravel, subangular, micaceous, very dense, wet
29	10:06	27,28,32	2.5" ø Modified California Split Spoon	0.0'	NA	SP	
30							30 No recovery

Geologist: J. Kear
Driller: WDC
Date completed: 6–28–06

Drilling method: Hollow stem auger
Bit diameter: 8" O.D.
Lysimeters 1.5 feet; 0.3' porous cup at base
Note: WDC attempted uncoated pellets for seal, bridged into auger.
Re–drilled same boring for installation after retesting lysimeter.

Eastern Municipal Water District
Quantification of Nitrogen Removal

Boring Log: AP1

Daniel B. Stephens & Associates, Inc.
7–21–06
JN WR06.0034

S:\PROJ\WR06.0034_QUANT_OF_N_REMOVAL_UNDER_RECYCLE\VR\WR06_0034_01K.DWG

DRAFT

See figure 5 for lysimeter completion. Separate borings drilled for two shallower adjacent lysimeters.

Depth	Graphic Log	Time	Blow Counts	Sampling Device	Sample Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments on Lithology
0	SP							0 Pond bottom soil at ground surface
5		12:15	19,11,15	2.5" ø Modified California Split Spoon	1.5'	5.0–6.5	SP	5 Sand, gray (5YR 6/1), fine– to coarse–grained, micaceous, subangular, moist
6	SM							6 Silty sand, olive gray (5YR 5/2), fine– to medium–grained sand, 20% silt, micaceous
7.5								7.5 Groundwater encountered at 7.5 feet bgs
10	SP	12:55	20,27,30	2.5" ø Modified California Split Spoon	1.5'	10.0–11.5	SP	10 Sand with gravel, olive gray (5YR 4/2), fine to very coarse sand, wet
15		1:30	19,22,25	2.5" ø Modified California Split Spoon	1.5'	15.0–16.0	SP	15 Same as above
16	ML							16 Silt, olive gray (5YR 4/2), low plasticity, micaceous, stiff, moist
20	SW	1:40	22,25,28	2.5" ø Modified California Split Spoon	1.0'	20.5–21.5	SW	20 Gravelly sand
21	SP							21 Sand, olive (5YR 4/2), fine– to medium–grained, roots, wet
25		1:50	27,30,35	2.5" ø Modified California Split Spoon	1.5'	25.0–26.5	SP	
26	SM							26 Silty sand, olive gray (5YR 4/2), fine– to medium–grained sand, wet
29		2:05	20,25,28	2.5" ø Modified California Split Spoon	0.0'	NA	SM	29 No recovery
30								

Geologist: J. Kear
Driller: WDC
Date completed: 6–26–06

Drilling method: Hollow stem auger
Bit diameter: 8" O.D.
Lysimeters 1.5 feet; 0.3' porous cup at base
Note: Sand locked sampler in auger re–reamed with wood plug

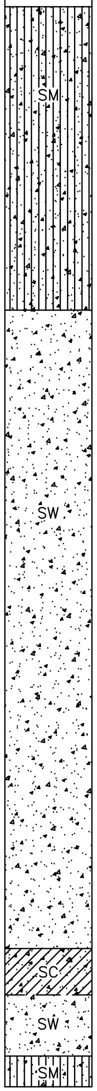
Eastern Municipal Water District
Quantification of Nitrogen Removal

Boring Log: AP10

Daniel B. Stephens & Associates, Inc.
7–24–06
JN WR06.0034

See figure 6 for lysimeter completion. Separate borings drilled for two shallower adjacent lysimeters.

Graphic Log



Depth	Time	Blow Counts	Sampling Device	Sample Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
3							3 Standing water at 3 feet in hollow stem
5	8:35	3,3,4	2.5" ø Modified California Split Spoon	1.5'	5.0–6.5	SM	5 Silty sand, olive gray (5YR 4/2), fine– to coarse–grained sand, subangular, at least 30% mica, some fine–grained lenses, roots, wet, no odor
10	8:50	19,21,25	2.5" ø Modified California Split Spoon	1.5'	10.0–11.5	SW	10 Sand, olive gray (5YR 5/2), fine to very coarse gravel, about 10% gravel, subangular, micaceous granite detritus, roots, wet
15	9:10	18,23,27	2.5" ø Modified California Split Spoon	1.5'	15.0–16.0	SW	15 Sand, gray (5YR 5/1), fine to very coarse sand, 20% gravel, subangular, micaceous, granite provenance, root, wet
20	9:19	21,24,27	2.5" ø Modified California Split Spoon	1.5'	20.0–21.5	SW	20 Sand, gray (5YR 5/1), fine to very coarse with gravel (20%), subangular, micaceous granite debris, some lenses finer
25	9:35	22,28,30	2.5" ø Modified California Split Spoon	1.5'	25.0–26.5	SW	
26							26 Clayey sand, dark gray (5YR 4/1), fine– to medium–grained, subangular, 15% low plasticity clay, wet
28.5	9:45	28,30,32	2.5" ø Modified California Split Spoon	1.5'	28.5–30.0	SW	
29							29 Sand as at 20 feet, wet
30							30 Silty sand, dark gray (5 YR 4/1), very fine to fine sand, 25% silt, wet

Geologist: J. Kear
Driller: WDC
Date completed: 6–26–06

Drilling method: Hollow stem auger
Bit diameter: 8" O.D.
Lysimeters 1.5 feet; 0.3' porous cup at base
Note: Groundwater encountered at 3 feet bgs. Standing water at 10.75 feet in HSA with auger bit at 28.5 feet.

AP15 30P = red
AP15 30S = white

Eastern Municipal Water District
Quantification of Nitrogen Removal

Boring Log: AP15

Daniel B. Stephens & Associates, Inc.
7–24–06
JN WR06.0034

See figure 7 for lysimeter completion. Separate borings drilled for two shallower adjacent lysimeters.

Depth (ft)	Graphic Log	Time	Blow Counts	Sampling Device	Sample Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
0	SP							0 Pond bottom at surface, cracked dry clay/evaporite
2	SP						SP	2 Sand, yellowish brown (10YR 5/6), fine- to medium-grained, subrounded, moist, very dense
5	SC	7:30	30,20,18	2.5" ø Modified California Split Spoon	1.5'	4.0–5.0		5 Clayey sand, dark grayish brown (2.5Y 4/2), medium to regular coarse-grained, 15% low plasticity clay, moist, very dense
7	SC						SC	
9	SC							9 Clayey sand as above
10	SM	7:45	8,10,15	2.5" ø Modified California Split Spoon	1.0'	9.0–10.0		10 Silty sand, olive brown (2.5Y 4/3), very fine- to medium-grained sand, trace clay, occasional gravel, moist, dense
11	SM						SM	
13.8	SW							13.8 Groundwater encountered at 13.8 ft bgs
14	SW						SW	14 Gravelly sand, olive brown (2.5Y 4/4), fine to very coarse sand, 15% gravel to ⅜" diameter, K-spar gravel, wet, dense
15	SW	7:55	10,14,18	2.5" ø Modified California Split Spoon	1.5'	14.0–15.0		
18	ML						ML	18 Clayey silt, light olive brown (2.5Y 5/3), low plasticity, moist, firm to hard
20	CL	8:05	17,15,25	2.5" ø Modified California Split Spoon	1.5'	19.0–20.0		
24	CL							24 Sandy clay, light olive brown (2.5Y 5/3), low plasticity, 40% medium to very coarse sand, subrounded granite detritus, moist to wet, dense, occasional gravel to ⅜" diameter. Note: sands heaved into augers, added minor water
25	CL	8:16	6,9,18	2.5" ø Modified California Split Spoon	1.5'	24.0–25.0	CL	
28	CL	8:43	6,15,17	2.5" ø Modified California Split Spoon	1.5'	29.0–30.0		
30								30 Silty clay, light yellowish brown (2.5Y 6/3), low plasticity, firm, 10% medium to coarse sand, moist to wet

Geologist: J. Kear
Driller: WDC
Date completed: 7-25-06

Drilling method: Hollow stem auger (Full Size CME 75 rig)
Bit diameter: 8" O.D.
Lysimeters 1.5 feet; 0.3' porous cup at base
Note: Perched groundwater encountered at 13.8 feet

Eastern Municipal Water District
Quantification of Nitrogen Removal

Boring Log: MVP14

Daniel B. Stephens & Associates, Inc.
7-24-06
JN WR06.0034

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DRAFT

See figure 8 for lysimeter completion. Separate borings drilled for two shallower adjacent lysimeters.

Graphic Log	Depth (feet)	Time	Blow Counts	Sampling Device	Sample Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
	0							0 Foliage at pond bottom surface
	1							
SP	2						SP	
	3							3 Sand, olive gray (5Y 4/2), fine– to medium–grained, moist to wet, loose
	4	3:30	8,12,14	2.5" ø Modified California Split Spoon	1.0'	4.0–5.0		4 Groundwater encountered at 4.0 feet bgs
	5							5 Clayey sand, olive (5Y 4/7), fine– to very coarse–grained sand, 30% low plasticity clay, moist, dense
SC	6						SC	
	7							
	8							8 Gravelly sand, yellowish brown (10YR 5/6), fine– to very coarse–grained, wet
SW	9						SW	
	10	3:37	15,10,21	2.5" ø Modified California Split Spoon	0.8'	9.5–10.0		10 Sandy clay, dark yellowish brown (10YR 4/4) with black charcoal lenses, low plasticity, moist
CL	11						CL	
	12							
SP	13						SP	13 Sand, olive brown (2.5Y 4/3), fine– to medium–grained, dense, wet
	14	3:48	21,21,24	2.5" ø Modified California Split Spoon	1.0'	14.0–15.0		
	15							15 Sandy clay, dark yellowish brown (10YR 4/4), low plasticity clay, 40% fine– to coarse–grained sand, moist, very hard charcoal
CL	16						CL	
	17							
	18							
	19	3:55	27,31	2.5" ø Modified California Split Spoon	1.0'	19.0–20.0		19 Gravelly sand with clay, olive brown (2.5Y 4/3), fine to very coarse sand, gravel to ¼" diameter, 10% low plasticity clay, moist to wet
	20							
	21							
SW	22						SW	
	23							
	24			2.5" ø Modified California Split Spoon	NONE	NONE		
	25							25 No recovery (lithology assumed)

Geologist: J. Kear
Driller: WDC
Date completed: 7–31–06

Drilling method: Hollow stem auger
Bit diameter: 8" O.D.
Lysimeters 1.5 feet; 0.3' porous cup at base
Note: Perched groundwater encountered at 4.0 feet

Eastern Municipal Water District
Quantification of Nitrogen Removal

Boring Log: MVP19

Daniel B. Stephens & Associates, Inc.
7–24–06
JN WR06.0034

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DRAFT

See figure 9 for lysimeter completion. Separate borings drilled for two shallower adjacent lysimeters.

Graphic Log	Depth	Time	Blow Counts	Sampling Device	Sample Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments / Lithology
	0							0 Cracked, dry pond bottom at surface
	1							
	2							2 Clayey soils noted in cuttings
CL							CL	
	3							
	4	11:35	35,39,40	2.5" ø Modified California Split Spoon	1.0'	4.5–5.0		4 Sandy clay, olive (5Y 4/3), fine to coarse sand, 40%, low plasticity, moist, very dense
	5							5 Gravelly sand, olive gray (5Y 4/2), fine to very coarse sand, moist, very dense
	6							
SW							SW	
	7							
	8							
	9	11:43	21,23,25	2.5" ø Modified California Split Spoon	1.0'	9.0–10.0		9 Silty gravelly sand, olive gray (5Y 4/2), very fine to very coarse sand, 25% silt, some lenses of silt, very dense, moist
	10							
	11							
SM							SM	
	12							
	13							
	14	11:50	25,27,31	2.5" ø Modified California Split Spoon	1.5'	14.0–15.0		14 Silty sand as above, less gravel, dark grayish brown (2.5Y 4/2), moist to wet
	15							15 Gravelly sand, dark grayish brown (2.5Y 4/2), very fine– to very coarse–grained, gravel to ½" diameter, moist to wet
	16							
SW	17						SW	17 Perched groundwater encountered at 17.0 feet bgs
	18							
	19	11:59	19,27,47	2.5" ø Modified California Split Spoon	1.5'	19.0–20.0		
	20							20 Silt, olive (5Y 4/3), very dense, firm, moist
	21							
ML	22						ML	
	23							
	24	12:10	50/6"	2.5" ø Modified California Split Spoon	0.5'	23.5–24.0		24 Silt, as above but with sand, fine–grained, moist to wet
	25							
	25.5							

Geologist: J. Kear
Driller: WDC
Date completed: 7–31–06

Drilling method: Hollow stem auger
Bit diameter: 8" O.D.
Lysimeters 1.5 feet; 0.3' porous cup at base
Note: Perched groundwater encountered at 17.0 feet

Eastern Municipal Water District
Quantification of Nitrogen Removal

Boring Log: MVP22

Daniel B. Stephens & Associates, Inc.
7–24–06
JN WR06.0034

Appendix B

Alessandro Ponds Physical Properties

Laboratory Report for

Daniel B. Stephens & Associates

WR06.0036.00, Task 5A

AP Samples

July 26, 2006
Reprint
August 29, 2006

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

July 26, 2006

Mr. Jordan Kear
Daniel B. Stephens & Associates, Inc.
5951 Encina Rd., Suite 208
Goleta, CA 93117
(805) 512-1516

Re: DBS&A Laboratory Report for Quantification of Nitrogen Removal (WR06.0034.00 - AP Samples)

Dear Mr. Kear:

Enclosed is the final report for the Quantification of Nitrogen Removal (WR06.0034.00 - AP Samples) project. Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed final report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the final report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service to Jordan Kear and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
LABORATORY / TESTING FACILITY

Joleen Hines
Laboratory Supervising Manager

Enclosure

Daniel B. Stephens & Associates, Inc.
6020 Academy NE, Suite 100 505-822-9400
Albuquerque, NM 87109 FAX 505-822-8877

Summaries

Daniel B. Stephens & Associates, Inc.

Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties[1] (θ, ρ_d, ϕ)	Saturated Hydraulic Conductivity[2]		Moisture Characteristics[3]					Unsaturated Hydraulic Conductivity	Particle Size[4]			Effective Porosity	Particle Density	Air Permeability	1/3, 15 Bar Points and Water Holding Capacity	Atterberg Limits	Proctor Compaction
		CH	FH	HC	PP	TH	WP	RH		DS	WS	H						
AP1-5	X	X									X	X		X				
AP1-10	X	X									X	X		X				
AP1-25	X	X									X	X		X				
AP10-5	X	X									X	X		X				
AP10-15	X	X									X	X		X				
AP10-20	X	X									X	X		X				
AP15-5	X	X									X	X		X				
AP15-15	X	X									X	X		X				
AP15-25	X	X									X	X		X				

[1] θ = Initial moisture content, ρ_d = Dry bulk density, ϕ = Calculated porosity
[2] CH = Constant head, FH = falling head
[3] HC = Hanging column, PP = Pressure plate, TH = Thermocouple psychrometer, WP = Water activity meter, RH = Relative humidity box
[4] DS = Dry sieve, WS = Wet sieve, H = Hydrometer

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content: As Received Gravimetric (%, g/g)	Moisture Content: As Received Volumetric (%, cm^3/cm^3)	Moisture Content: Remolded Gravimetric (%, g/g)	Moisture Content: Remolded Volumetric (%, cm^3/cm^3)	Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
AP1-5	16.5	27.9	---	---	1.69	1.97	37.2
AP1-10	13.5	24.6	---	---	1.83	2.07	32.4
AP1-25	14.2	25.7	---	---	1.81	2.06	32.9
AP10-5	19.7	33.3	---	---	1.69	2.03	37.0
AP10-15	33.1	47.3	---	---	1.43	1.90	47.5
AP10-20	15.1	25.8	---	---	1.71	1.97	36.5
AP15-5	20.5	33.0	---	---	1.61	1.94	39.6
AP15-15	10.7	16.9	---	---	1.58	1.75	41.1
AP15-25	10.9	19.5	---	---	1.79	1.99	33.2

NA = Not analyzed

--- = This sample was not remolded

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis	
			Constant Head	Falling Head
AP1-5	1.1E-03	NA	X	
AP1-10	4.5E-05	NA	X	
AP1-25	5.6E-03	NA	X	
AP10-5	2.8E-05	NA	X	
AP10-15	4.3E-06	NA	X	
AP10-20	8.2E-03	NA	X	
AP15-5	8.1E-04	NA	X	
AP15-15	1.2E-03	NA	X	
AP15-25	1.9E-03	NA	X	

Daniel B. Stephens & Associates, Inc.

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
AP1-5	0.060	0.45	0.66	11	0.91	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand †	
AP1-10	0.026	0.26	0.39	15	1.2	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
AP1-25	0.12	0.52	0.67	5.6	1.2	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand	
AP10-5	0.013	0.15	0.23	18	1.5	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
AP10-15	0.00098	0.028	0.037	38	3.3	WS/H	Classification by ASTM 2487 requires Atterberg test	Silt Loam	(Est)
AP10-20	0.11	0.39	0.51	4.6	0.94	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand	
AP15-5	0.019	0.19	0.27	14	1.8	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
AP15-15	0.23	1.0	1.3	5.7	1.1	WS/H	Poorly-graded sand (SP)	Sand †	
AP15-25	0.088	0.53	0.72	8.2	1.2	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand †	

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Summary of Particle Density Tests

Sample Number	Particle Density (g/cm^3)
AP1-5	2.69
AP1-10	2.70
AP1-25	2.69
AP10-5	2.69
AP10-15	2.72
AP10-20	2.69
AP15-5	2.67
AP15-15	2.68
AP15-25	2.69

Laboratory Data and Graphical Plots

Initial Properties

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content: As Received: Gravimetric (%, g/g)	Moisture Content: As Received: Volumetric (%, cm^3/cm^3)	Moisture Content: Remolded: Gravimetric (%, g/g)	Moisture Content: Remolded: Volumetric (%, cm^3/cm^3)	Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
AP1-5	16.5	27.9	---	---	1.69	1.97	37.2
AP1-10	13.5	24.6	---	---	1.83	2.07	32.4
AP1-25	14.2	25.7	---	---	1.81	2.06	32.9
AP10-5	19.7	33.3	---	---	1.69	2.03	37.0
AP10-15	33.1	47.3	---	---	1.43	1.90	47.5
AP10-20	15.1	25.8	---	---	1.71	1.97	36.5
AP15-5	20.5	33.0	---	---	1.61	1.94	39.6
AP15-15	10.7	16.9	---	---	1.58	1.75	41.1
AP15-25	10.9	19.5	---	---	1.79	1.99	33.2

NA = Not analyzed

--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: AP1-5
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample* (g):	415.90	
Tare weight, ring (g):	105.49	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	266.35	
Sample volume (cm^3):	157.95	
Measured particle density (g/cm^3):	2.69	

Gravimetric Moisture Content (% g/g):	16.5
Volumetric Moisture Content (% vol):	27.9
Dry bulk density (g/cm^3):	1.69
Wet bulk density (g/cm^3):	1.97
Calculated Porosity (% vol):	37.2
Percent Saturation:	75.0

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: AP1-10
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	10-Jul-06	---
Field weight of sample* (g):	555.33	
Tare weight, ring (g):	136.23	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	369.31	
Sample volume (cm^3):	202.21	
Measured particle density (g/cm^3):	2.70	

Gravimetric Moisture Content (% g/g):	13.5
Volumetric Moisture Content (% vol):	24.6
Dry bulk density (g/cm^3):	1.83
Wet bulk density (g/cm^3):	2.07
Calculated Porosity (% vol):	32.4
Percent Saturation:	75.9

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP1-25
Ring Number:	NA
Depth:	NA

	As Received	Remolded
Test Date:	10-Jul-06	---
Field weight of sample* (g):	585.20	
Tare weight, ring (g):	144.95	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	385.34	
Sample volume (cm^3):	213.48	
Measured particle density (g/cm^3):	2.69	
Gravimetric Moisture Content (% g/g):	14.2	
Volumetric Moisture Content (% vol):	25.7	
Dry bulk density (g/cm^3):	1.81	
Wet bulk density (g/cm^3):	2.06	
Calculated Porosity (% vol):	32.9	
Percent Saturation:	78.1	

Laboratory analysis by:	D. O'Dowd
Data entered by:	D. O'Dowd
Checked by:	J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP10-5
Ring Number:	NA
Depth:	6'-6.5'

	As Received	Remolded
Test Date:	10-Jul-06	---
Field weight of sample* (g):	439.38	
Tare weight, ring (g):	109.04	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	276.05	
Sample volume (cm^3):	162.89	
Measured particle density (g/cm^3):	2.69	
Gravimetric Moisture Content (% g/g):	19.7	
Volumetric Moisture Content (% vol):	33.3	
Dry bulk density (g/cm^3):	1.69	
Wet bulk density (g/cm^3):	2.03	
Calculated Porosity (% vol):	37.0	
Percent Saturation:	90.1	

Laboratory analysis by:	D. O'Dowd
Data entered by:	D. O'Dowd
Checked by:	J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: AP10-15
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	10-Jul-06	---
Field weight of sample* (g):	431.67	
Tare weight, ring (g):	112.39	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	239.81	
Sample volume (cm^3):	168.02	
Measured particle density (g/cm^3):	2.72	
Gravimetric Moisture Content (% g/g):	33.1	
Volumetric Moisture Content (% vol):	47.3	
Dry bulk density (g/cm^3):	1.43	
Wet bulk density (g/cm^3):	1.90	
Calculated Porosity (% vol):	47.5	
Percent Saturation:	99.7	

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP10-20
Ring Number:	NA
Depth:	NA

	As Received	Remolded
Test Date:	10-Jul-06	---
Field weight of sample* (g):	654.53	
Tare weight, ring (g):	167.50	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	423.23	
Sample volume (cm^3):	247.41	
Measured particle density (g/cm^3):	2.69	
Gravimetric Moisture Content (% g/g):	15.1	
Volumetric Moisture Content (% vol):	25.8	
Dry bulk density (g/cm^3):	1.71	
Wet bulk density (g/cm^3):	1.97	
Calculated Porosity (% vol):	36.5	
Percent Saturation:	70.6	

Laboratory analysis by:	D. O'Dowd
Data entered by:	D. O'Dowd
Checked by:	J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP15-5
Ring Number:	NA
Depth:	5.5'

	As Received	Remolded
Test Date:	10-Jul-06	---
Field weight of sample (g):*	534.81	
Tare weight, ring (g):	132.59	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	333.80	
Sample volume (cm^3):	207.04	
Measured particle density (g/cm^3):	2.67	
Gravimetric Moisture Content (% g/g):	20.5	
Volumetric Moisture Content (% vol):	33.0	
Dry bulk density (g/cm^3):	1.61	
Wet bulk density (g/cm^3):	1.94	
Calculated Porosity (% vol):	39.6	
Percent Saturation:	83.5	

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP15-15
Ring Number:	NA
Depth:	10'-11'

	As Received	Remolded
Test Date:	10-Jul-06	---
Field weight of sample* (g):	486.71	
Tare weight, ring (g):	135.18	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	317.55	
Sample volume (cm^3):	201.37	
Measured particle density (g/cm^3):	2.68	
Gravimetric Moisture Content (% g/g):	10.7	
Volumetric Moisture Content (% vol):	16.9	
Dry bulk density (g/cm^3):	1.58	
Wet bulk density (g/cm^3):	1.75	
Calculated Porosity (% vol):	41.1	
Percent Saturation:	41.0	

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP15-25
Ring Number:	NA
Depth:	NA

	As Received	Remolded
Test Date:	10-Jul-06	---
Field weight of sample* (g):	542.86	
Tare weight, ring (g):	104.29	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	395.61	
Sample volume (cm^3):	220.63	
Measured particle density (g/cm^3):	2.69	
Gravimetric Moisture Content (% g/g):	10.9	
Volumetric Moisture Content (% vol):	19.5	
Dry bulk density (g/cm^3):	1.79	
Wet bulk density (g/cm^3):	1.99	
Calculated Porosity (% vol):	33.2	
Percent Saturation:	58.6	

Laboratory analysis by:	D. O'Dowd
Data entered by:	D. O'Dowd
Checked by:	J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Saturated Hydraulic Conductivity

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis	
			Constant Head	Falling Head
AP1-5	1.1E-03	NA	X	
AP1-10	4.5E-05	NA	X	
AP1-25	5.6E-03	NA	X	
AP10-5	2.8E-05	NA	X	
AP10-15	4.3E-06	NA	X	
AP10-20	8.2E-03	NA	X	
AP15-5	8.1E-04	NA	X	
AP15-15	1.2E-03	NA	X	
AP15-25	1.9E-03	NA	X	

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	10.70
Sample number:	AP1-5	*Sample length* (cm):	5.45
Ring Number:	NA	*Sample diameter* (cm):	6.07
Depth:	NA	*Sample x-sectional area* (cm^2):	28.98

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
14-Aug-06	10:29:28	21.0	1.6	13.6	2.9	306	1.1E-03	1.1E-03
14-Aug-06	10:34:34							
Test # 2:								
14-Aug-06	14:04:01	21.0	1.8	24.1	13.4	1266	1.1E-03	1.1E-03
14-Aug-06	14:25:07							
Test # 3:								
14-Aug-06	14:32:10	21.0	2.0	23.8	13.1	1040	1.2E-03	1.2E-03
14-Aug-06	14:49:30							

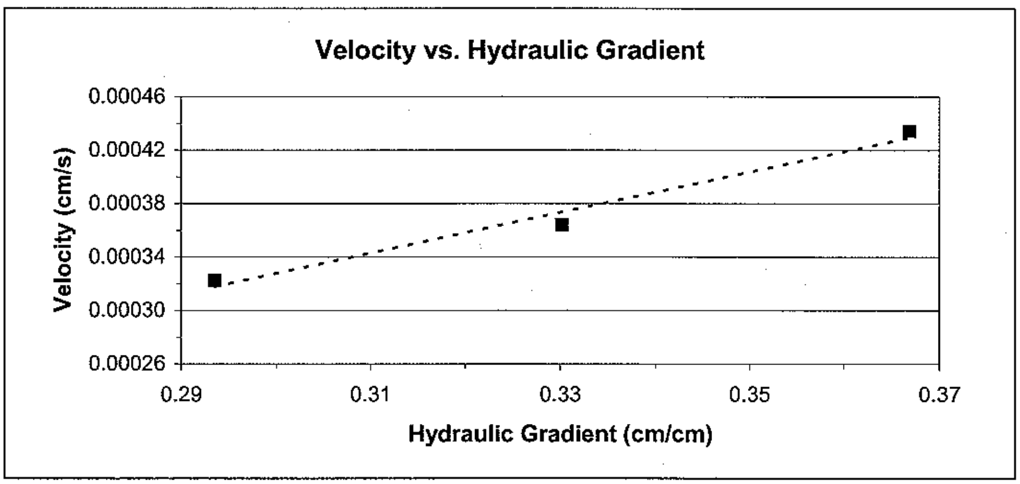
***Average Ksat* (cm/sec): 1.1E-03**

***Oversize Corrected Ksat* (cm/sec): NA**

Comments:

— = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

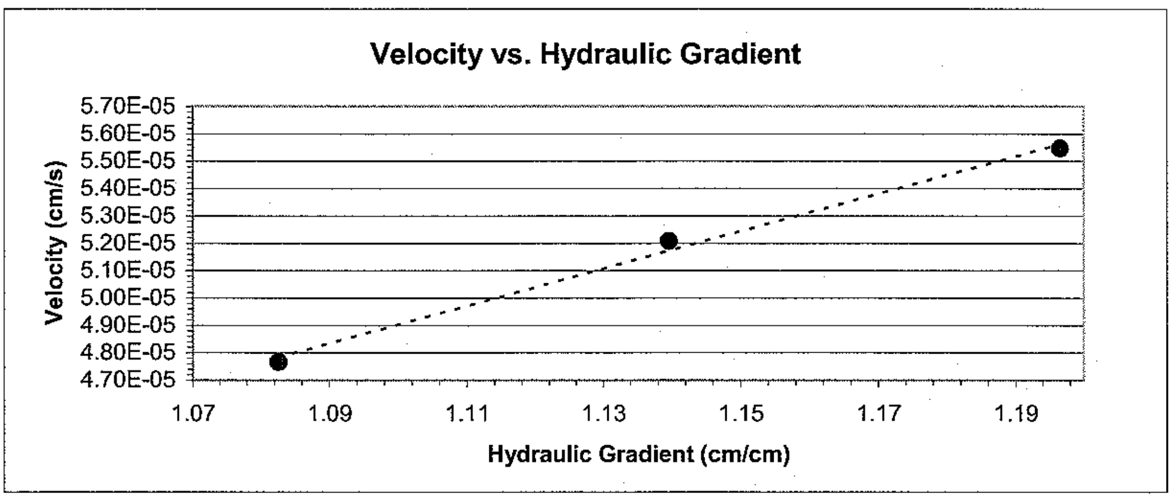
Checked by: J. Hines

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	11.92
Sample number:	AP1-10	*Sample length* (cm):	7.02
Ring Number:	NA	*Sample diameter* (cm):	6.06
Depth:	NA	*Sample x-sectional area* (cm^2):	28.80

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
13-Jul-06	13:45:24	20.5	7.6	12.9	0.9	692	4.4E-05	4.3E-05
13-Jul-06	13:56:56							
Test # 2:								
13-Jul-06	15:09:14	20.5	8.0	12.6	0.7	460	4.6E-05	4.5E-05
13-Jul-06	15:16:54							
Test # 3:								
13-Jul-06	15:32:12	20.5	8.4	13.0	1.1	701	4.6E-05	4.6E-05
13-Jul-06	15:43:53							

***Average Ksat* (cm/sec): 4.5E-05**



Comments:

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

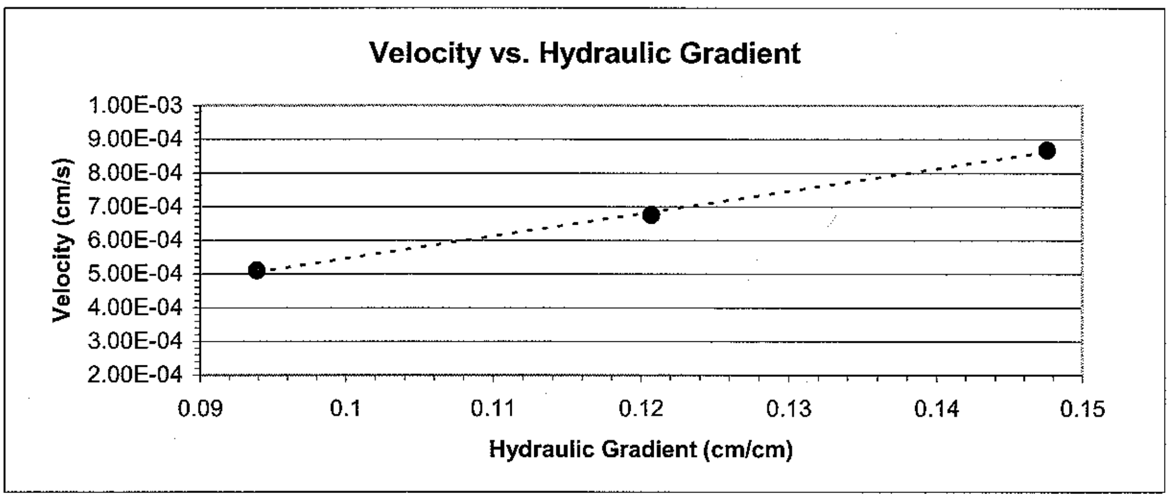
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	10.70
Sample number:	AP1-25	*Sample length* (cm):	7.45
Ring Number:	NA	*Sample diameter* (cm):	6.04
Depth:	NA	*Sample x-sectional area* (cm^2):	28.64

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
13-Jul-06	14:40:47	20.5	0.7	19.2	8.5	584	5.4E-03	5.4E-03
13-Jul-06	14:50:31							
Test # 2:								
13-Jul-06	15:08:44	20.5	0.9	16.3	5.6	287	5.6E-03	5.5E-03
13-Jul-06	15:13:31							
Test # 3:								
13-Jul-06	15:31:52	20.5	1.1	17.3	6.6	267	5.9E-03	5.8E-03
13-Jul-06	15:36:19							

***Average Ksat* (cm/sec): 5.6E-03**



Comments:

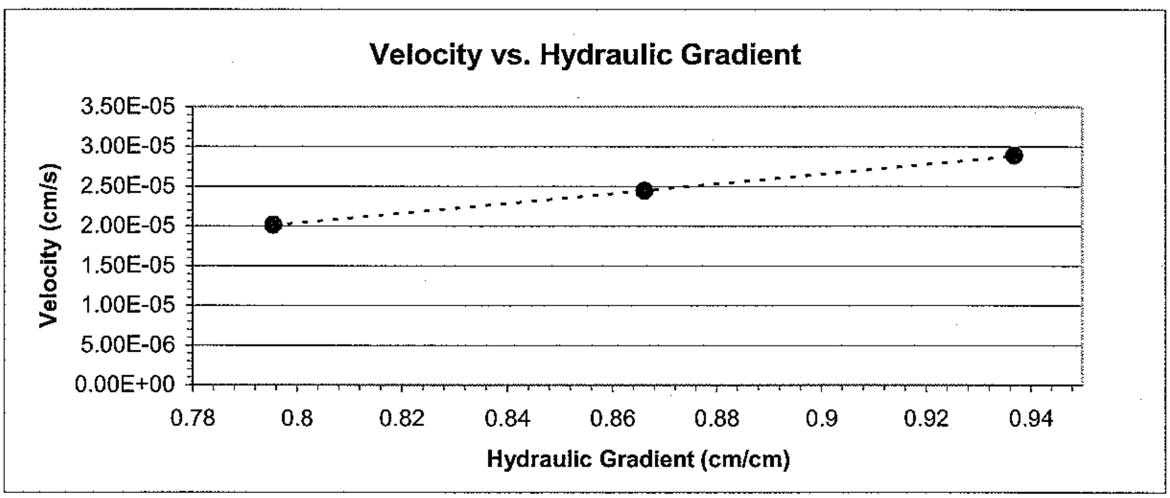
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	6.37
Sample number:	AP10-5	*Sample length* (cm):	5.66
Ring Number:	NA	*Sample diameter* (cm):	6.06
Depth:	6'-6.5'	*Sample x-sectional area* (cm^2):	28.80

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
13-Jul-06	14:45:55	20.5	4.5	6.8	0.5	794	2.5E-05	2.5E-05
13-Jul-06	14:59:09							
Test # 2:								
13-Jul-06	15:07:43	20.5	4.9	6.7	0.3	455	2.8E-05	2.8E-05
13-Jul-06	15:15:18							
Test # 3:								
13-Jul-06	15:34:48	20.5	5.3	6.7	0.4	433	3.1E-05	3.0E-05
13-Jul-06	15:42:01							

***Average Ksat* (cm/sec): 2.8E-05**



Comments:

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

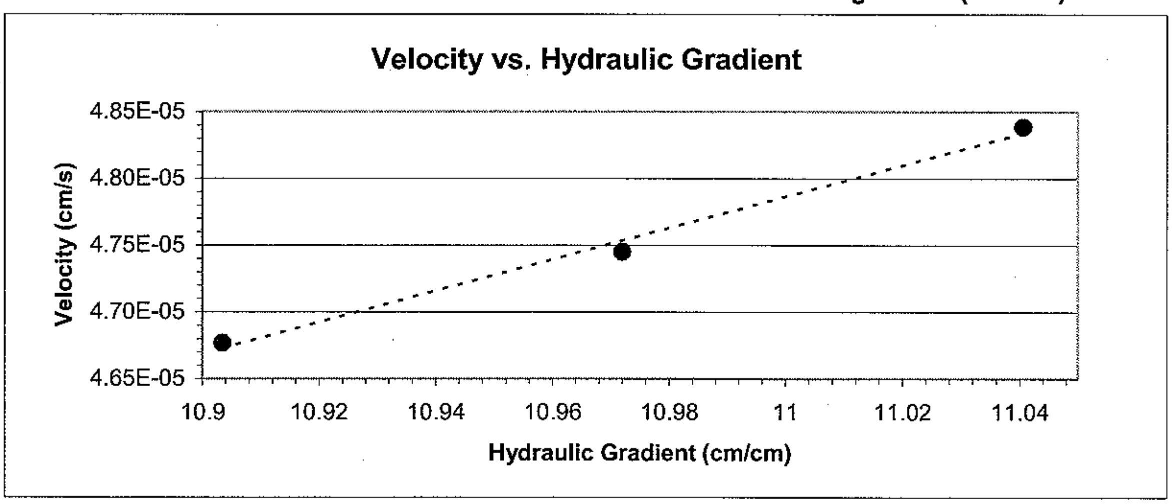
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	6.64
Sample number:	AP10-15	*Sample length* (cm):	5.83
Ring Number:	NA	*Sample diameter* (cm):	6.06
Depth:	NA	*Sample x-sectional area* (cm^2):	28.80

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
13-Jul-06	14:40:17	20.5	63.6	7.7	1.0	772	4.3E-06	4.2E-06
13-Jul-06	14:53:09							
Test # 2:								
13-Jul-06	15:07:04	20.5	64.0	7.4	0.8	578	4.3E-06	4.3E-06
13-Jul-06	15:16:42							
Test # 3:								
13-Jul-06	15:31:38	20.5	64.4	7.4	0.8	574	4.4E-06	4.3E-06
13-Jul-06	15:41:12							

***Average Ksat* (cm/sec): 4.3E-06**



Comments:

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

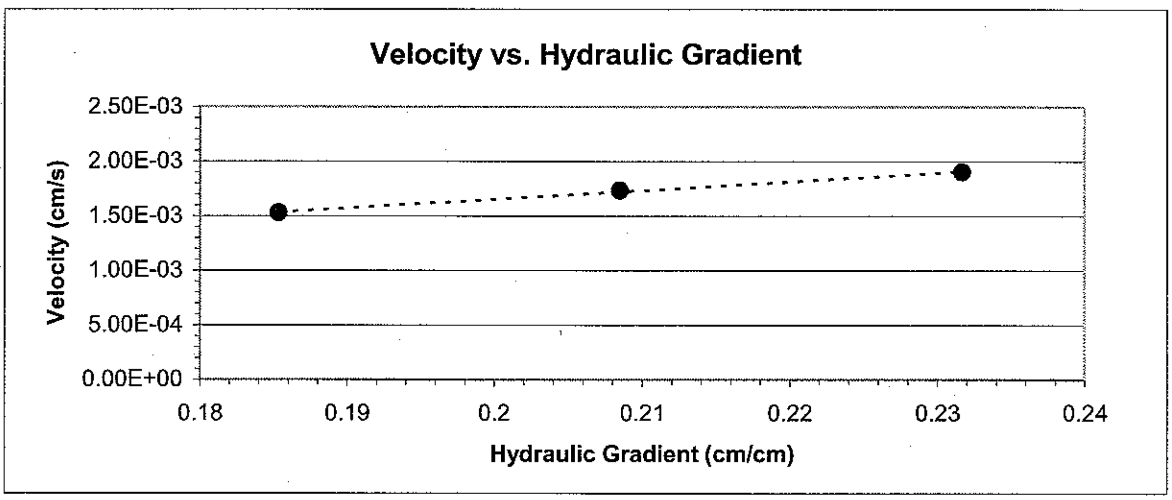
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	11.30
Sample number:	AP10-20	*Sample length* (cm):	8.63
Ring Number:	NA	*Sample diameter* (cm):	6.04
Depth:	NA	*Sample x-sectional area* (cm^2):	28.66

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
13-Jul-06	14:41:18	20.5	1.6	34.4	23.1	527	8.3E-03	8.1E-03
13-Jul-06	14:50:05							
Test # 2:								
13-Jul-06	15:08:20	20.5	1.8	25.0	13.7	276	8.3E-03	8.2E-03
13-Jul-06	15:12:56							
Test # 3:								
13-Jul-06	15:32:32	20.5	2.0	19.7	8.4	154	8.2E-03	8.1E-03
13-Jul-06	15:35:06							

***Average Ksat* (cm/sec): 8.2E-03**



Comments:

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

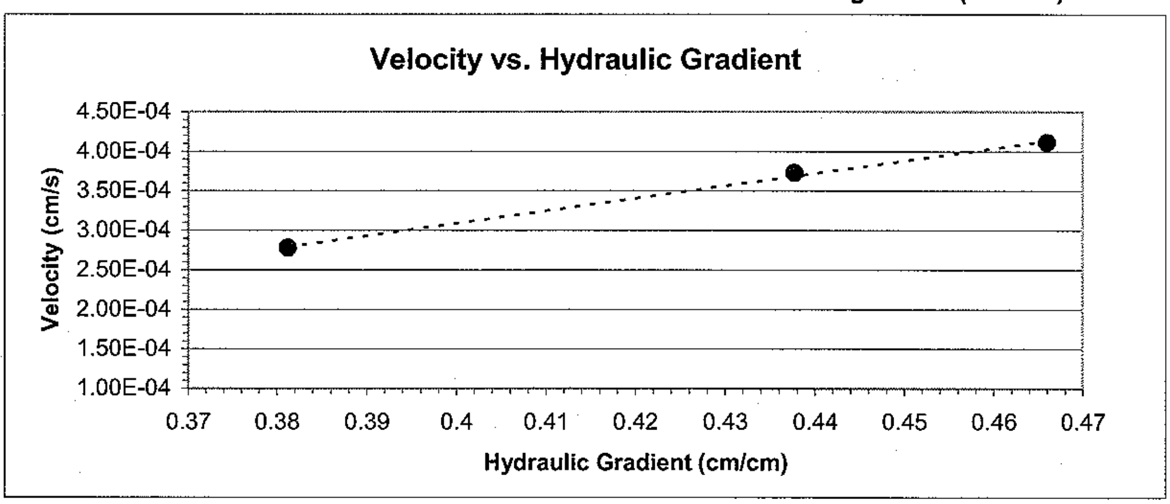
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	4.62
Sample number:	AP15-5	*Sample length* (cm):	7.08
Ring Number:	NA	*Sample diameter* (cm):	6.10
Depth:	5.5'	*Sample x-sectional area* (cm^2):	29.23

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
13-Jul-06	14:42:22	20.5	2.7	9.1	4.4	547	7.3E-04	7.2E-04
13-Jul-06	14:51:29							
Test # 2:								
13-Jul-06	15:08:01	20.5	3.1	9.5	4.9	447	8.5E-04	8.4E-04
13-Jul-06	15:15:28							
Test # 3:								
13-Jul-06	15:33:03	20.5	3.3	8.9	4.3	356	8.8E-04	8.7E-04
13-Jul-06	15:38:59							

***Average Ksat* (cm/sec): 8.1E-04**



Comments:

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

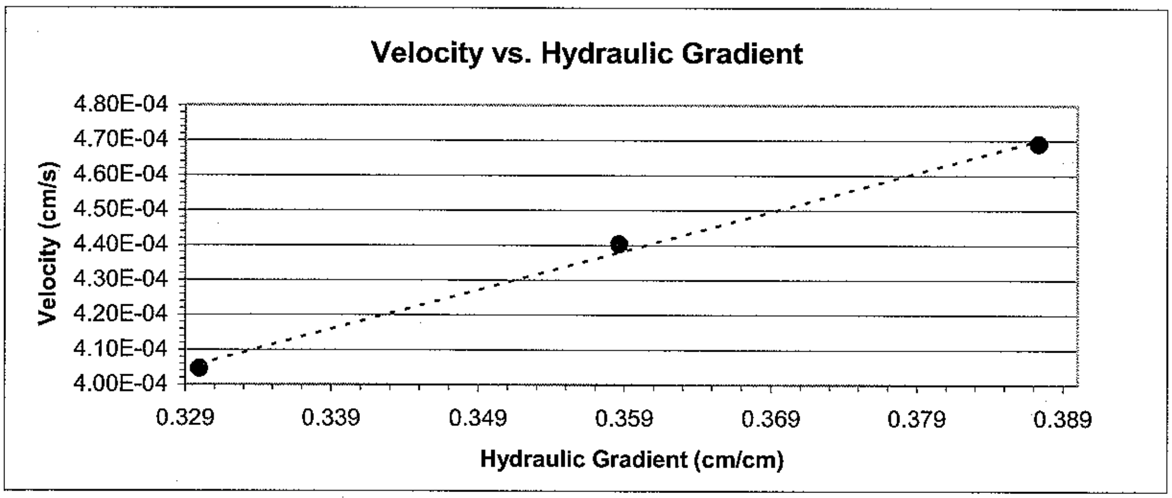
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	6.59
Sample number:	AP15-15	*Sample length* (cm):	6.97
Ring Number:	NA	*Sample diameter* (cm):	6.07
Depth:	10'-11'	*Sample x-sectional area* (cm^2):	28.89

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
13-Jul-06	14:42:44	20.5	2.3	13.0	6.4	551	1.2E-03	1.2E-03
13-Jul-06	14:51:55							
Test # 2:								
13-Jul-06	15:07:36	20.5	2.5	11.5	4.9	386	1.2E-03	1.2E-03
13-Jul-06	15:14:02							
Test # 3:								
13-Jul-06	15:33:19	20.5	2.7	12.0	5.4	400	1.2E-03	1.2E-03
13-Jul-06	15:39:59							

Average Ksat **(cm/sec):** **1.2E-03**



Comments:

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

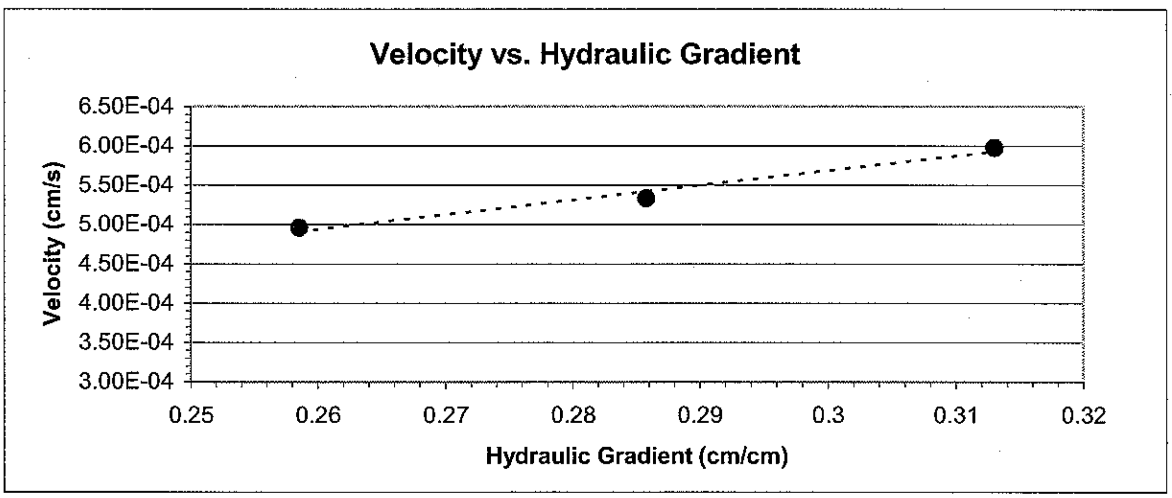
Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	6.43
Sample number:	AP15-25	*Sample length* (cm):	7.35
Ring Number:	NA	*Sample diameter* (cm):	6.18
Depth:	NA	*Sample x-sectional area* (cm^2):	30.03

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
13-Jul-06	14:42:01	20.5	1.9	14.4	7.9	532	1.9E-03	1.9E-03
13-Jul-06	14:50:53							
Test # 2:								
13-Jul-06	15:08:09	20.5	2.1	12.5	6.0	376	1.9E-03	1.8E-03
13-Jul-06	15:14:25							
Test # 3:								
13-Jul-06	15:32:47	20.5	2.3	11.9	5.5	307	1.9E-03	1.9E-03
13-Jul-06	15:37:54							

***Average Ksat* (cm/sec): 1.9E-03**



Comments:

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Particle Size Analysis

Daniel B. Stephens & Associates, Inc.

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
AP1-5	0.060	0.45	0.66	11	0.91	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand †	
AP1-10	0.026	0.26	0.39	15	1.2	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
AP1-25	0.12	0.52	0.67	5.6	1.2	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand	
AP10-5	0.013	0.15	0.23	18	1.5	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
AP10-15	0.00098	0.028	0.037	38	3.3	WS/H	Classification by ASTM 2487 requires Atterberg test	Silt Loam	(Est)
AP10-20	0.11	0.39	0.51	4.6	0.94	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand	
AP15-5	0.019	0.19	0.27	14	1.8	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
AP15-15	0.23	1.0	1.3	5.7	1.1	WS/H	Poorly-graded sand (SP)	Sand †	
AP15-25	0.088	0.53	0.72	8.2	1.2	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand †	

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Removal	*Initial Dry Weight of Sample (g):*	266.35
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	228.47
Sample Number:	AP1-5	*Weight Retained #10 (g):*	37.88
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	51.44
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	59.97
Test Date:	15-Aug-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	266.35	100.00
	2"	50	0.00	0.00	266.35	100.00
	1.5"	38.1	0.00	0.00	266.35	100.00
	1"	25	0.00	0.00	266.35	100.00
	3/4"	19.0	0.00	0.00	266.35	100.00
	3/8"	9.5	0.00	0.00	266.35	100.00
	4	4.75	3.50	3.50	262.85	98.69
	10	2.00	34.38	37.88	228.47	85.78
-10			(Based on calculated sieve wt.)			
	20	0.85	11.41	19.94	40.03	66.75
	40	0.425	10.98	30.92	29.05	48.44
	60	0.250	7.74	38.66	21.31	35.54
	140	0.106	10.17	48.83	11.14	18.58
	200	0.075	2.51	51.34	8.63	14.39
	dry pan		0.52	51.86	8.11	
	wet pan			8.11	0.00	

d_{10} (mm):	0.060	d_{50} (mm):	0.45
d_{16} (mm):	0.086	d_{60} (mm):	0.66
d_{30} (mm):	0.19	d_{84} (mm):	1.8

Median Particle Diameter--d_{50} (mm): 0.45
Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 11
Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.91
Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.78

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Sand †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

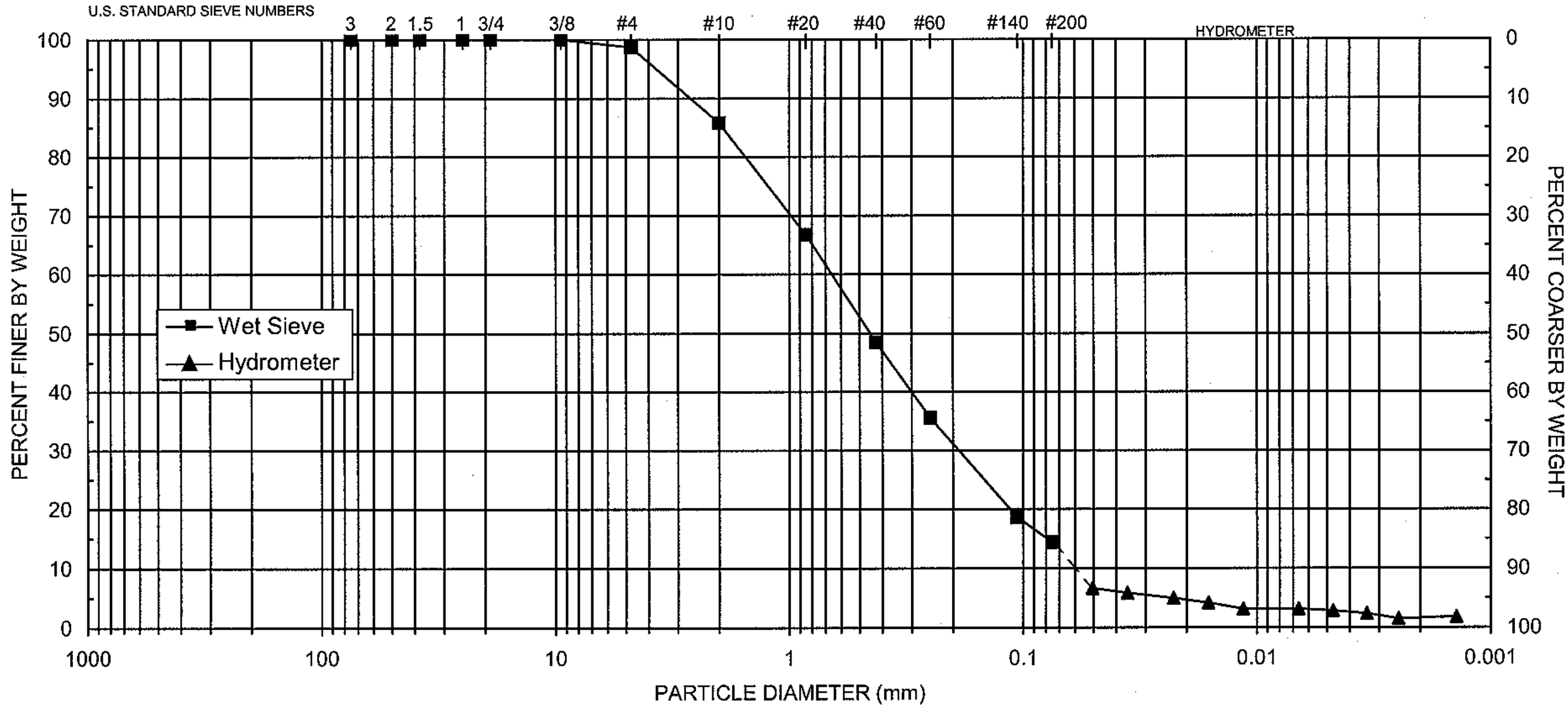
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	AP1-5	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.69
Depth:	NA	*Initial Wt. (g):*	51.44
Test Date:	15-Aug-06	*Total Sample Wt. (g):*	266.35
Start Time:	9:27	*Wt. Passing #10 (g):*	228.47

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
16-Aug-06	1	21.9	9.5	5.5	4.0	14.7	0.05058	7.7	6.6
	2	21.9	9.0	5.5	3.5	14.8	0.03587	6.7	5.8
	5	21.9	8.5	5.5	3.0	14.9	0.02275	5.8	5.0
	10	21.9	8.0	5.5	2.5	15.0	0.01613	4.8	4.1
	20	21.8	7.5	5.6	1.9	15.1	0.01145	3.7	3.1
	60	21.5	7.5	5.6	1.9	15.1	0.00663	3.7	3.1
	120	20.9	7.5	5.8	1.7	15.1	0.00472	3.3	2.8
	240	19.9	7.5	6.1	1.4	15.1	0.00338	2.7	2.3
	452	19.7	7.0	6.1	0.9	15.2	0.00248	1.7	1.5
17-Aug-06	1388	20.4	7.0	5.9	1.1	15.2	0.00140	2.1	1.8

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY	
		Coarse	Fine	Coarse	Medium	Fine		

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.060**	d_{30} = **0.19**	d_{50} = **0.45**	d_{60} = **0.66**	C_u = **11**	C_c = **0.91**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP1-5	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sand †**

† Greater than 10% of sample is coarse material

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Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Re[illegible]	*Initial Dry Weight of Sample (g):*	629.31
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	576.71
Sample Number:	AP1-10	*Weight Retained #10 (g):*	52.60
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	57.37
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	62.60
Test Date:	10-Jul-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	629.31	100.00
	2"	50	0.00	0.00	629.31	100.00
	1.5"	38.1	0.00	0.00	629.31	100.00
	1"	25	0.00	0.00	629.31	100.00
	3/4"	19.0	0.00	0.00	629.31	100.00
	3/8"	9.5	0.00	0.00	629.31	100.00
	4	4.75	3.63	3.63	625.68	99.42
	10	2.00	48.97	52.60	576.71	91.64
-10			(Based on calculated sieve wt.)			
	20	0.85	9.29	14.52	48.08	76.80
	40	0.425	9.34	23.86	38.74	61.88
	60	0.250	7.83	31.69	30.91	49.37
	140	0.106	13.03	44.72	17.88	28.56
	200	0.075	3.81	48.53	14.07	22.48
	dry pan		0.38	48.91	13.69	
	wet pan			13.69	0.00	

d_{10} (mm):	0.026	d_{50} (mm):	0.26
d_{16} (mm):	0.055	d_{60} (mm):	0.39
d_{30} (mm):	0.11	d_{84} (mm):	1.3

Median Particle Diameter--d_{50} (mm): 0.26

Uniformity Coefficient, Cu--[d_{60}/d_{10}] (mm): 15

Coefficient of Curvature, Cc--[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 1.2

Mean Particle Diameter--[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.54

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Loamy Sand

Laboratory analysis by: C. Krous

Data entered by: C. Krous

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

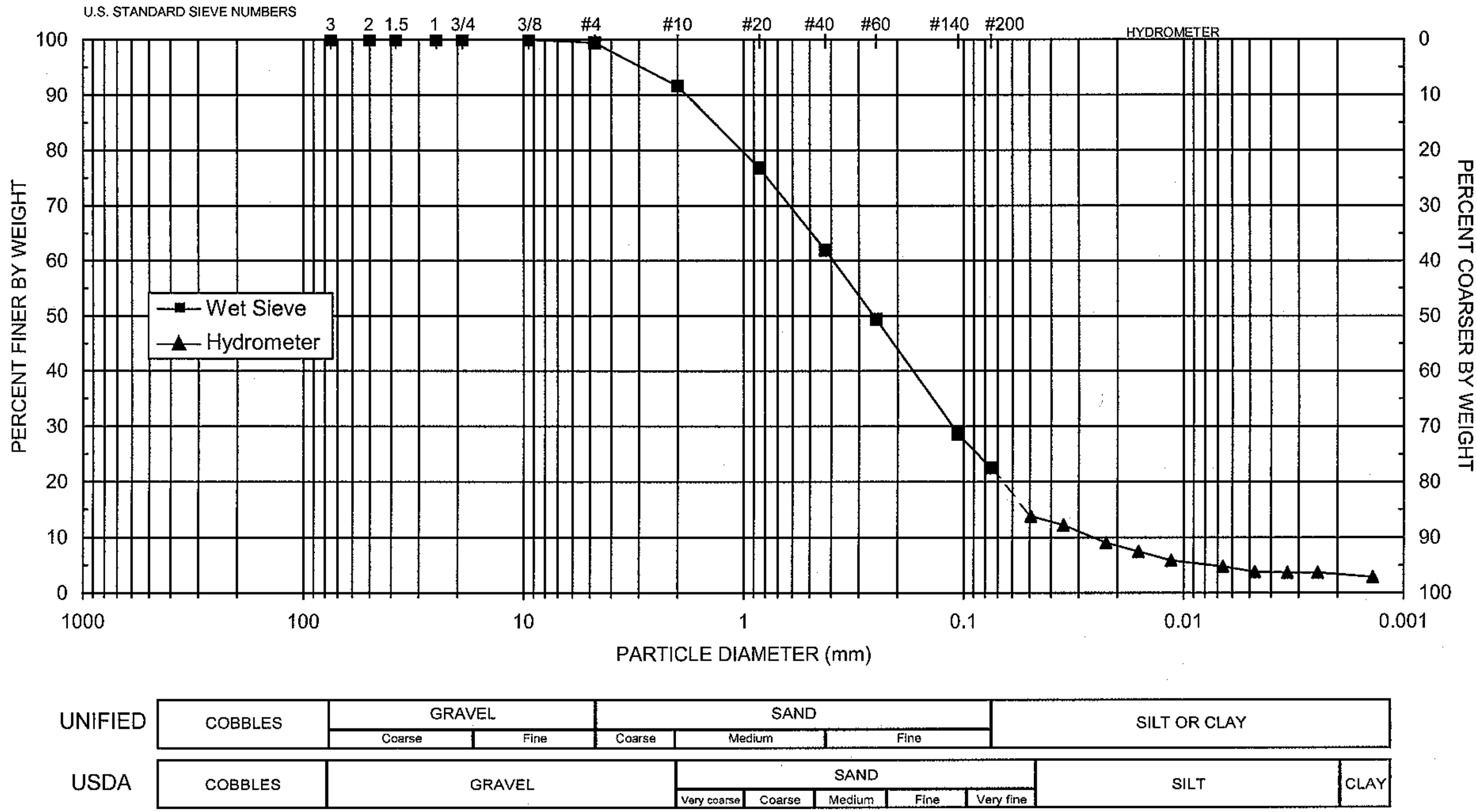
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	AP1-10	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.70
Depth:	NA	*Initial Wt. (g):*	57.37
Test Date:	20-Jul-06	*Total Sample Wt. (g):*	629.31
Start Time:	9:18	*Wt. Passing #10 (g):*	576.71

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
20-Jul-06	1	20.9	14.5	5.8	8.7	13.9	0.04947	15.0	13.8
	2	20.9	13.5	5.8	7.7	14.1	0.03519	13.3	12.2
	5	20.9	11.5	5.8	5.7	14.4	0.02251	9.8	9.0
	10	20.9	10.5	5.8	4.7	14.6	0.01601	8.1	7.4
	20	20.8	9.5	5.8	3.7	14.7	0.01140	6.4	5.9
	60	20.3	9.0	6.0	3.0	14.8	0.00664	5.2	4.7
	120	19.7	8.5	6.1	2.4	14.9	0.00475	4.1	3.8
	240	19.3	8.5	6.2	2.3	14.9	0.00337	4.0	3.6
	447	19.8	8.5	6.2	2.3	14.9	0.00246	4.0	3.6
21-Jul-06	1415	19.9	8.0	6.2	1.8	15.0	0.00138	3.1	2.8

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



d_{10} = **0.026**	d_{30} = **0.11**	d_{50} = **0.26**	d_{60} = **0.39**	C_u = **15**	C_c = **1.2**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP1-10	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Loamy Sand**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Re	*Initial Dry Weight of Sample (g):*	588.91
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	544.01
Sample Number:	AP1-25	*Weight Retained #10 (g):*	44.90
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	57.35
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	62.08
Test Date:	10-Jul-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	588.91	100.00
	2"	50	0.00	0.00	588.91	100.00
	1.5"	38.1	0.00	0.00	588.91	100.00
	1"	25	0.00	0.00	588.91	100.00
	3/4"	19.0	0.00	0.00	588.91	100.00
	3/8"	9.5	0.00	0.00	588.91	100.00
	4	4.75	3.23	3.23	585.68	99.45
	10	2.00	41.67	44.90	544.01	92.38
-10			(Based on calculated sieve wt.)			
	20	0.85	14.35	19.08	43.00	69.26
	40	0.425	17.18	36.26	25.82	41.59
	60	0.250	12.35	48.61	13.47	21.70
	140	0.106	8.59	57.20	4.88	7.86
	200	0.075	1.22	58.42	3.66	5.90
	dry pan		0.02	58.44	3.64	
	wet pan			3.64	0.00	

d_{10} (mm):	0.12	d_{50} (mm):	0.52
d_{16} (mm):	0.18	d_{60} (mm):	0.67
d_{30} (mm):	0.31	d_{84} (mm):	1.5

Median Particle Diameter --d_{50} (mm): 0.52

Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): 5.6

Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 1.2

Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.73

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Sand

Laboratory analysis by: C. Krous

Data entered by: C. Krous

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: AP1-25
Ring Number: NA
Depth: NA

Test Date: 20-Jul-06
Start Time: 9:54

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.69

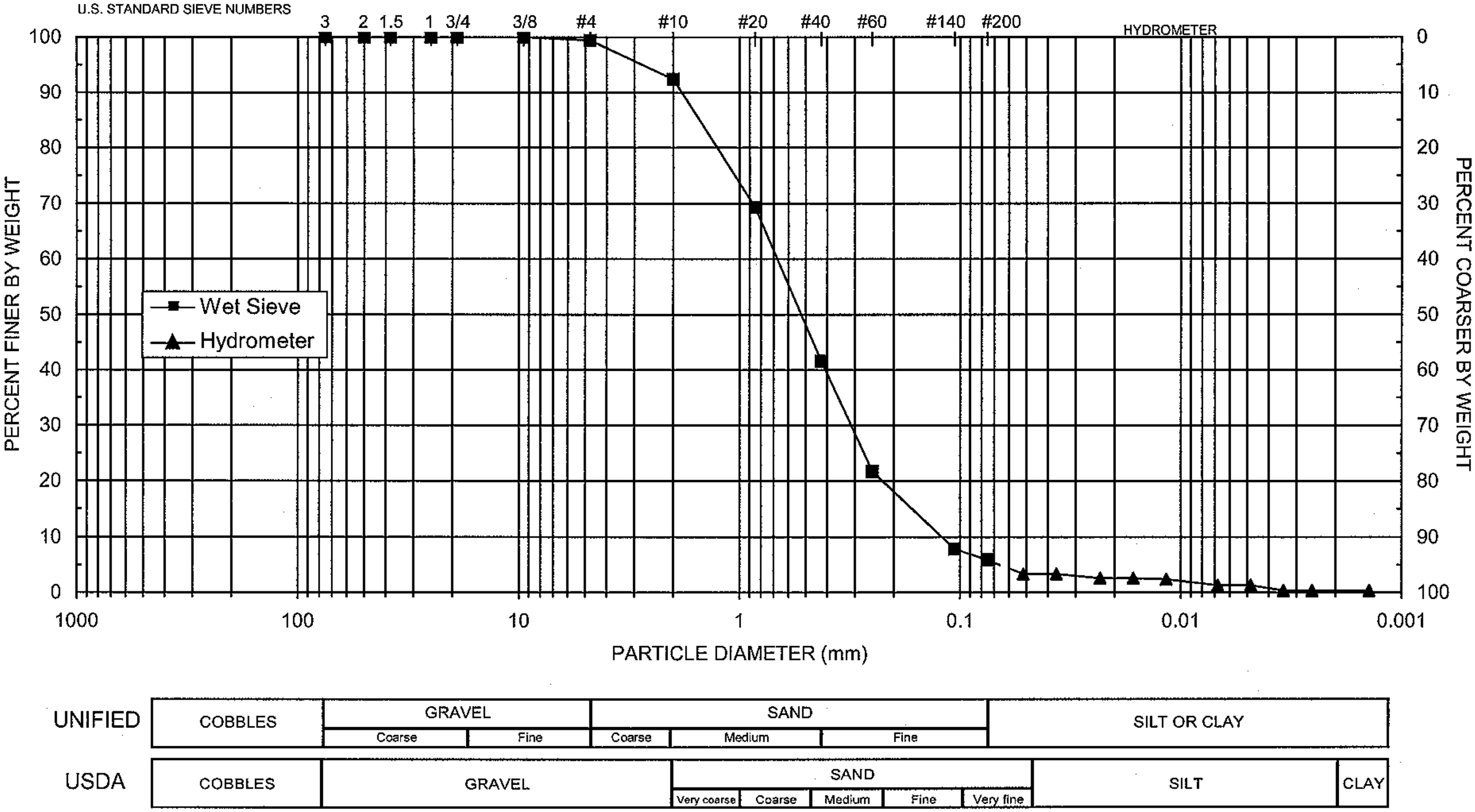
Initial Wt. (g)*:* 57.35
Total Sample Wt. (g)*:* 588.91
Wt. Passing #10 (g): 544.01

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
20-Jul-06	1	20.5	8.0	5.9	2.1	15.0	0.05176	3.6	3.3
	2	20.5	8.0	5.9	2.1	15.0	0.03660	3.6	3.3
	5	20.5	7.5	5.9	1.6	15.1	0.02321	2.8	2.6
	10	20.5	7.5	5.9	1.6	15.1	0.01641	2.8	2.6
	20	20.3	7.5	6.0	1.5	15.1	0.01163	2.6	2.4
	60	19.6	7.0	6.2	0.8	15.2	0.00680	1.4	1.3
	120	19.3	7.0	6.2	0.8	15.2	0.00483	1.4	1.3
	240	19.1	6.5	6.3	0.2	15.2	0.00343	0.3	0.3
	428	19.8	6.5	6.3	0.2	15.2	0.00255	0.3	0.3
21-Jul-06	1408	19.8	6.5	6.3	0.2	15.2	0.00140	0.3	0.3

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



d_{10} = **0.12**	d_{30} = **0.31**	d_{50} = **0.52**	d_{60} = **0.67**	C_u = **5.6**	C_c = **1.2**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP1-25	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sand**

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Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Rem[illegible]	*Initial Dry Weight of Sample (g):*	574.50
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	559.01
Sample Number:	AP10-5	*Weight Retained #10 (g):*	15.49
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	54.45
Depth:	6'-6.5'	*Calculated Weight of Sieve Sample (g):*	55.96
Test Date:	10-Jul-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	574.50	100.00
	2"	50	0.00	0.00	574.50	100.00
	1.5"	38.1	0.00	0.00	574.50	100.00
	1"	25	0.00	0.00	574.50	100.00
	3/4"	19.0	0.00	0.00	574.50	100.00
	3/8"	9.5	0.00	0.00	574.50	100.00
	4	4.75	0.84	0.84	573.66	99.85
	10	2.00	14.65	15.49	559.01	97.30
-10			(Based on calculated sieve wt.)			
	20	0.85	4.60	6.11	49.85	89.08
	40	0.425	7.53	13.64	42.32	75.63
	60	0.250	7.25	20.89	35.07	62.67
	140	0.106	12.26	33.15	22.81	40.76
	200	0.075	4.53	37.68	18.28	32.67
	dry pan		0.92	38.60	17.36	
	wet pan			17.36	0.00	

d_{10} (mm):	0.013	d_{50} (mm):	0.15
d_{16} (mm):	0.030	d_{60} (mm):	0.23
d_{30} (mm):	0.068	d_{84} (mm):	0.65

Median Particle Diameter--d_{50} (mm): 0.15

Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 18

Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 1.5

Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.28

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Loamy Sand

Laboratory analysis by: C. Krous

Data entered by: C. Krous

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: AP10-5
Ring Number: NA
Depth: 6'-6.5'

Test Date: 20-Jul-06
Start Time: 9:42

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.69

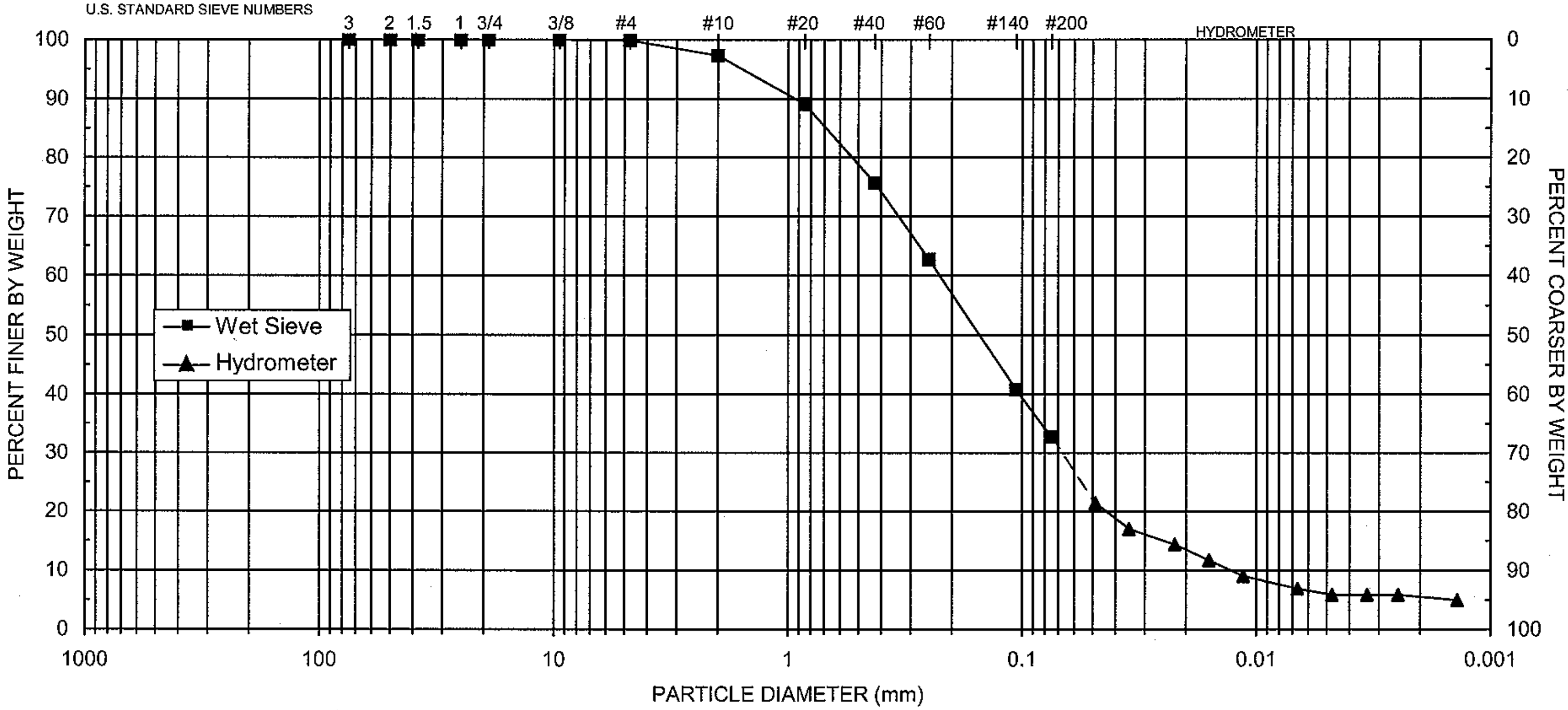
Initial Wt. (g): 54.45
Total Sample Wt. (g): 574.50
Wt. Passing #10 (g): 559.01

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
20-Jul-06	1	20.7	18.0	5.9	12.1	13.3	0.04876	22.0	21.4
	2	20.7	15.5	5.9	9.6	13.8	0.03500	17.5	17.0
	5	20.7	14.0	5.9	8.1	14.0	0.02233	14.7	14.3
	10	20.7	12.5	5.9	6.6	14.3	0.01593	12.0	11.7
	20	20.5	11.0	5.9	5.1	14.5	0.01139	9.3	9.0
	60	19.9	10.0	6.1	3.9	14.7	0.00667	7.1	6.9
	120	19.5	9.5	6.2	3.3	14.7	0.00475	6.0	5.8
	240	19.3	9.5	6.2	3.3	14.7	0.00337	6.0	5.8
	436	19.8	9.5	6.2	3.3	14.7	0.00248	6.0	5.8
21-Jul-06	1399	19.9	9.0	6.2	2.8	14.8	0.00139	5.1	5.0

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.013**	d_{30} = **0.068**	d_{50} = **0.15**	d_{60} = **0.23**	C_u = **18**	C_c = **1.5**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP10-5	**6'-6.5'**	**Classification by ASTM 2487 requires Atterberg test**	**Loamy Sand**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Removal	*Initial Dry Weight of Sample (g):*	474.81
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	472.23
Sample Number:	AP10-15	*Weight Retained #10 (g):*	2.58
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	54.82
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	55.12
Test Date:	10-Jul-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	474.81	100.00
	2"	50	0.00	0.00	474.81	100.00
	1.5"	38.1	0.00	0.00	474.81	100.00
	1"	25	0.00	0.00	474.81	100.00
	3/4"	19.0	0.00	0.00	474.81	100.00
	3/8"	9.5	0.00	0.00	474.81	100.00
	4	4.75	0.00	0.00	474.81	100.00
	10	2.00	2.58	2.58	472.23	99.46
-10			(Based on calculated sieve wt.)			
	20	0.85	0.41	0.71	54.41	98.71
	40	0.425	0.47	1.18	53.94	97.86
	60	0.250	0.71	1.89	53.23	96.57
	140	0.106	4.34	6.23	48.89	88.70
	200	0.075	3.95	10.18	44.94	81.53
	dry pan		2.47	12.65	42.47	
	wet pan			42.47	0.00	

d_{10} (mm):	0.00098	d_{50} (mm):	0.028
d_{16} (mm):	0.0030	d_{60} (mm):	0.037
d_{30} (mm):	0.011	d_{84} (mm):	0.084

Median Particle Diameter--d_{50} (mm): 0.028
Uniformity Coefficient, Cu--[d_{60}/d_{10}] (mm): 38
Coefficient of Curvature, Cc--[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 3.3
Mean Particle Diameter--[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.038

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Silt Loam

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

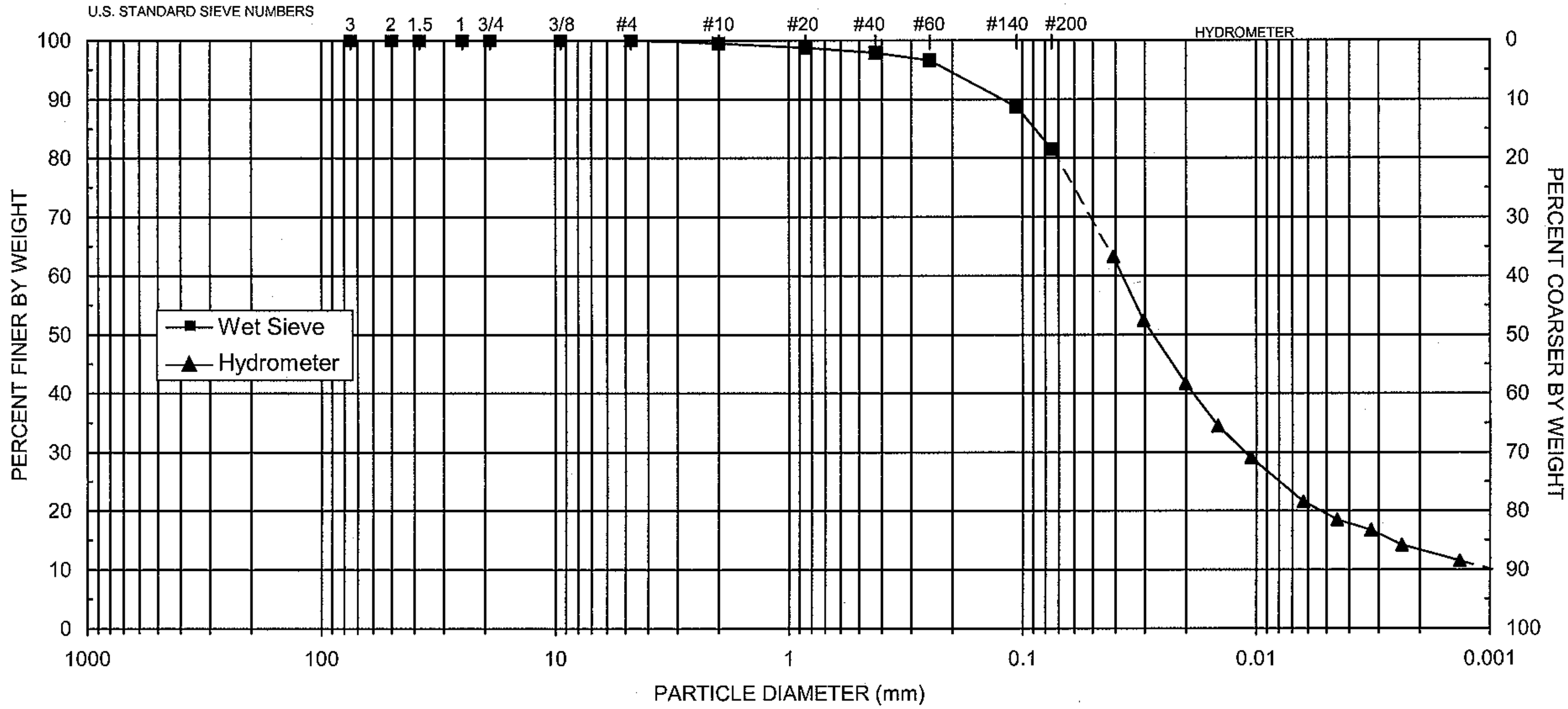
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	AP10-15	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.72
Depth:	NA	*Initial Wt. (g):*	54.82
Test Date:	20-Jul-06	*Total Sample Wt. (g):*	474.81
Start Time:	9:30	*Wt. Passing #10 (g):*	472.23

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
20-Jul-06	1	20.9	41.0	5.8	35.2	9.6	0.04089	63.6	63.2
	2	20.9	35.0	5.8	29.2	10.6	0.03036	52.7	52.4
	5	20.9	29.0	5.8	23.2	11.5	0.02007	41.9	41.7
	10	20.9	25.0	5.8	19.2	12.2	0.01459	34.7	34.5
	20	20.9	22.0	5.8	16.2	12.7	0.01052	29.3	29.1
	60	20.2	18.0	6.0	12.0	13.3	0.00628	21.7	21.6
	121	19.6	16.5	6.2	10.3	13.6	0.00450	18.6	18.5
	240	19.3	15.5	6.2	9.3	13.8	0.00323	16.8	16.7
	442	19.9	14.0	6.1	7.9	14.0	0.00238	14.3	14.2
21-Jul-06	1408	19.9	12.5	6.1	6.4	14.3	0.00135	11.6	11.5

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.00098**	d_{30} = **0.011**	d_{50} = **0.028**	d_{60} = **0.037**	C_u = **38**	C_c = **3.3**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP10-15	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Silt Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Removal	*Initial Dry Weight of Sample (g):*	522.23
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	488.21
Sample Number:	AP10-20	*Weight Retained #10 (g):*	34.02
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	57.22
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	61.21
Test Date:	10-Jul-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	522.23	100.00
	2"	50	0.00	0.00	522.23	100.00
	1.5"	38.1	0.00	0.00	522.23	100.00
	1"	25	0.00	0.00	522.23	100.00
	3/4"	19.0	0.00	0.00	522.23	100.00
	3/8"	9.5	0.00	0.00	522.23	100.00
	4	4.75	1.38	1.38	520.85	99.74
	10	2.00	32.64	34.02	488.21	93.49
-10			(Based on calculated sieve wt.)			
	20	0.85	9.28	13.27	47.94	78.32
	40	0.425	15.12	28.39	32.82	53.62
	60	0.250	12.93	41.32	19.89	32.50
	140	0.106	14.17	55.49	5.72	9.35
	200	0.075	1.71	57.20	4.01	6.55
	dry pan		0.05	57.25	3.96	
	wet pan			3.96	0.00	

d_{10} (mm): 0.11 d_{50} (mm): 0.39

d_{16} (mm): 0.14 d_{60} (mm): 0.51

d_{30} (mm): 0.23 d_{84} (mm): 1.2

Median Particle Diameter--d_{50} (mm): 0.39

Uniformity Coefficient, Cu--[d_{60}/d_{10}] (mm): 4.6

Coefficient of Curvature, Cc--[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 0.94

Mean Particle Diameter--[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.58

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Sand

Laboratory analysis by: C. Krous

Data entered by: C. Krous

Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

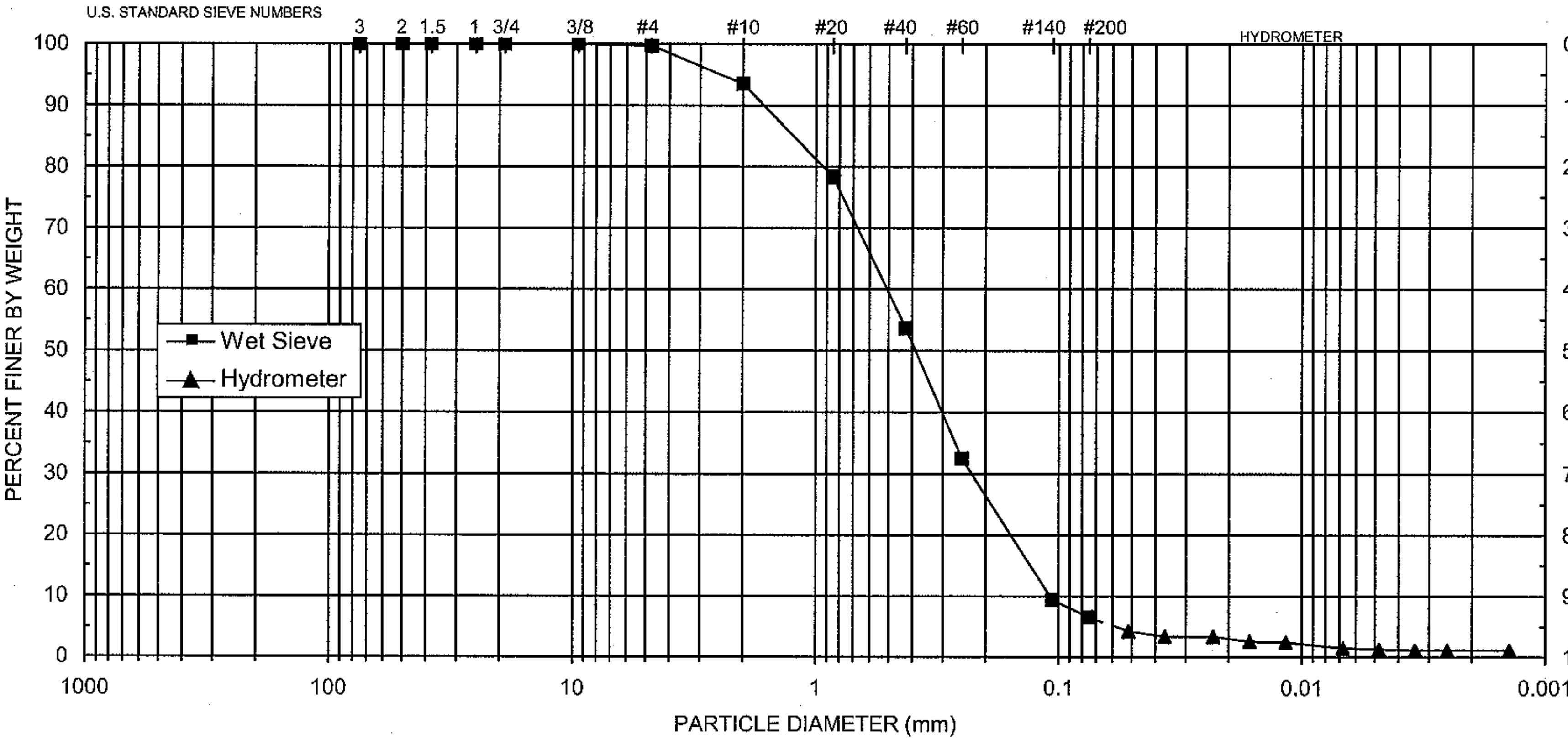
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	AP10-20	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.69
Depth:	NA	*Initial Wt. (g):*	57.22
Test Date:	20-Jul-06	*Total Sample Wt. (g):*	522.23
Start Time:	9:48	*Wt. Passing #10 (g):*	488.21

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
20-Jul-06	1	20.5	8.5	5.9	2.6	14.9	0.05158	4.5	4.2
	2	20.5	8.0	5.9	2.1	15.0	0.03657	3.6	3.4
	5	20.5	8.0	5.9	2.1	15.0	0.02313	3.6	3.4
	10	20.5	7.5	5.9	1.6	15.1	0.01640	2.8	2.6
	20	20.3	7.5	6.0	1.5	15.1	0.01163	2.6	2.4
	60	19.9	7.0	6.1	0.9	15.2	0.00677	1.6	1.5
	120	19.4	7.0	6.2	0.8	15.2	0.00482	1.4	1.3
	240	19.1	7.0	6.3	0.7	15.2	0.00342	1.2	1.1
	432	19.8	7.0	6.3	0.7	15.2	0.00253	1.2	1.1
21-Jul-06	1401	19.8	7.0	6.3	0.7	15.2	0.00140	1.2	1.1

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY	
		Coarse	Fine	Coarse	Medium	Fine		

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.11**	d_{30} = **0.23**	d_{50} = **0.39**	d_{60} = **0.51**	C_u = **4.6**	C_c = **0.94**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP10-20	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sand**

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Quantification of Nitrogen Re[illegible]
Job Number: WR06.0034.00
Sample Number: AP15-5
Ring Number: NA
Depth: 5.5'
Test Date: 10-Jul-06

Initial Dry Weight of Sample (g): 439.72
Weight Passing #10 (g): 423.07
Weight Retained #10 (g): 16.65
Weight of Hydrometer Sample (g): 56.22
Calculated Weight of Sieve Sample (g): 58.43

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	439.72	100.00
	2"	50	0.00	0.00	439.72	100.00
	1.5"	38.1	0.00	0.00	439.72	100.00
	1"	25	0.00	0.00	439.72	100.00
	3/4"	19.0	0.00	0.00	439.72	100.00
	3/8"	9.5	0.00	0.00	439.72	100.00
	4	4.75	0.94	0.94	438.78	99.79
	10	2.00	15.71	16.65	423.07	96.21
-10			(Based on calculated sieve wt.)			
	20	0.85	5.99	8.20	50.23	85.96
	40	0.425	8.18	16.38	42.05	71.96
	60	0.250	8.21	24.59	33.84	57.91
	140	0.106	15.12	39.71	18.72	32.04
	200	0.075	3.64	43.35	15.08	25.81
	dry pan		0.83	44.18	14.25	
	wet pan			14.25	0.00	

d_{10} (mm): 0.019
d_{16} (mm): 0.042
d_{30} (mm): 0.095
d_{50} (mm): 0.19
d_{60} (mm): 0.27
d_{84} (mm): 0.77

Median Particle Diameter --d_{50} (mm): 0.19
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 14
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 1.8
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.33

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Loamy Sand

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

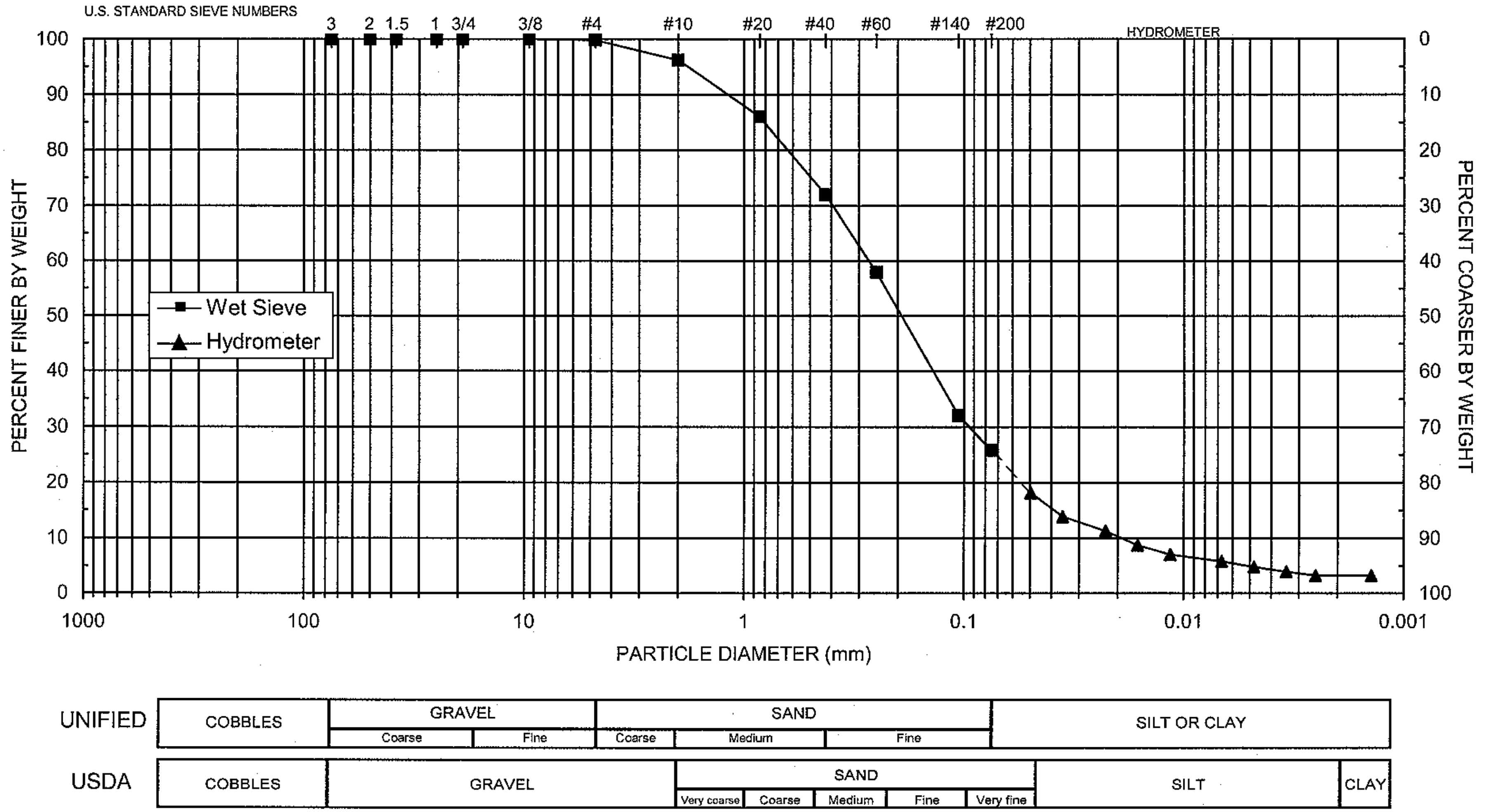
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	AP15-5	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.67
Depth:	5.5'	*Initial Wt. (g):*	56.22
Test Date:	20-Jul-06	*Total Sample Wt. (g):*	439.72
Start Time:	9:36	*Wt. Passing #10 (g):*	423.07

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
20-Jul-06	1	20.6	16.5	5.9	10.6	13.6	0.04959	18.9	18.1
	2	20.6	14.0	5.9	8.1	14.0	0.03559	14.4	13.9
	5	20.6	12.5	5.9	6.6	14.3	0.02270	11.7	11.3
	10	20.6	11.0	5.9	5.1	14.5	0.01619	9.1	8.7
	20	20.6	10.0	5.9	4.1	14.7	0.01151	7.3	7.0
	60	20.0	9.5	6.1	3.4	14.7	0.00672	6.0	5.8
	120	19.6	9.0	6.2	2.8	14.8	0.00479	5.0	4.8
	240	19.3	8.5	6.2	2.3	14.9	0.00341	4.1	3.9
	439	19.9	8.0	6.1	1.9	15.0	0.00251	3.4	3.3
21-Jul-06	1404	19.9	8.0	6.1	1.9	15.0	0.00140	3.4	3.3

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



d_{10} = **0.019**	d_{30} = **0.095**	d_{50} = **0.19**	d_{60} = **0.27**	C_u = **14**	C_c = **1.8**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP15-5	**5.5'**	**Classification by ASTM 2487 requires Atterberg test**	**Loamy Sand**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Quantification of Nitrogen Remobilization
Job Number: WR06.0034.00
Sample Number: AP15-15
Ring Number: NA
Depth: 10'-11'

Test Date: 10-Jul-06

Initial Dry Weight of Sample (g): 525.33
Weight Passing #10 (g): 403.46
Weight Retained #10 (g): 121.87
Weight of Hydrometer Sample (g): 54.79
Calculated Weight of Sieve Sample (g): 71.34

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	525.33	100.00
	2"	50	0.00	0.00	525.33	100.00
	1.5"	38.1	0.00	0.00	525.33	100.00
	1"	25	0.00	0.00	525.33	100.00
	3/4"	19.0	0.00	0.00	525.33	100.00
	3/8"	9.5	6.22	6.22	519.11	98.82
	4	4.75	8.79	15.01	510.32	97.14
	10	2.00	106.86	121.87	403.46	76.80
-10			(Based on calculated sieve wt.)			
	20	0.85	24.11	40.66	30.68	43.01
	40	0.425	15.90	56.56	14.78	20.72
	60	0.250	7.26	63.82	7.52	10.54
	140	0.106	4.66	68.48	2.86	4.01
	200	0.075	0.61	69.09	2.25	3.15
	dry pan		0.03	69.12	2.22	
	wet pan			2.22	0.00	

d_{10} (mm): 0.23 d_{50} (mm): 1.0
d_{16} (mm): 0.33 d_{60} (mm): 1.3
d_{30} (mm): 0.57 d_{84} (mm): 2.7

Median Particle Diameter--d_{50} (mm): 1.0
Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 5.7
Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 1.1
Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 1.3

ASTM Soil Classification: Poorly-graded sand (SP)
USDA Soil Classification: Sand †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

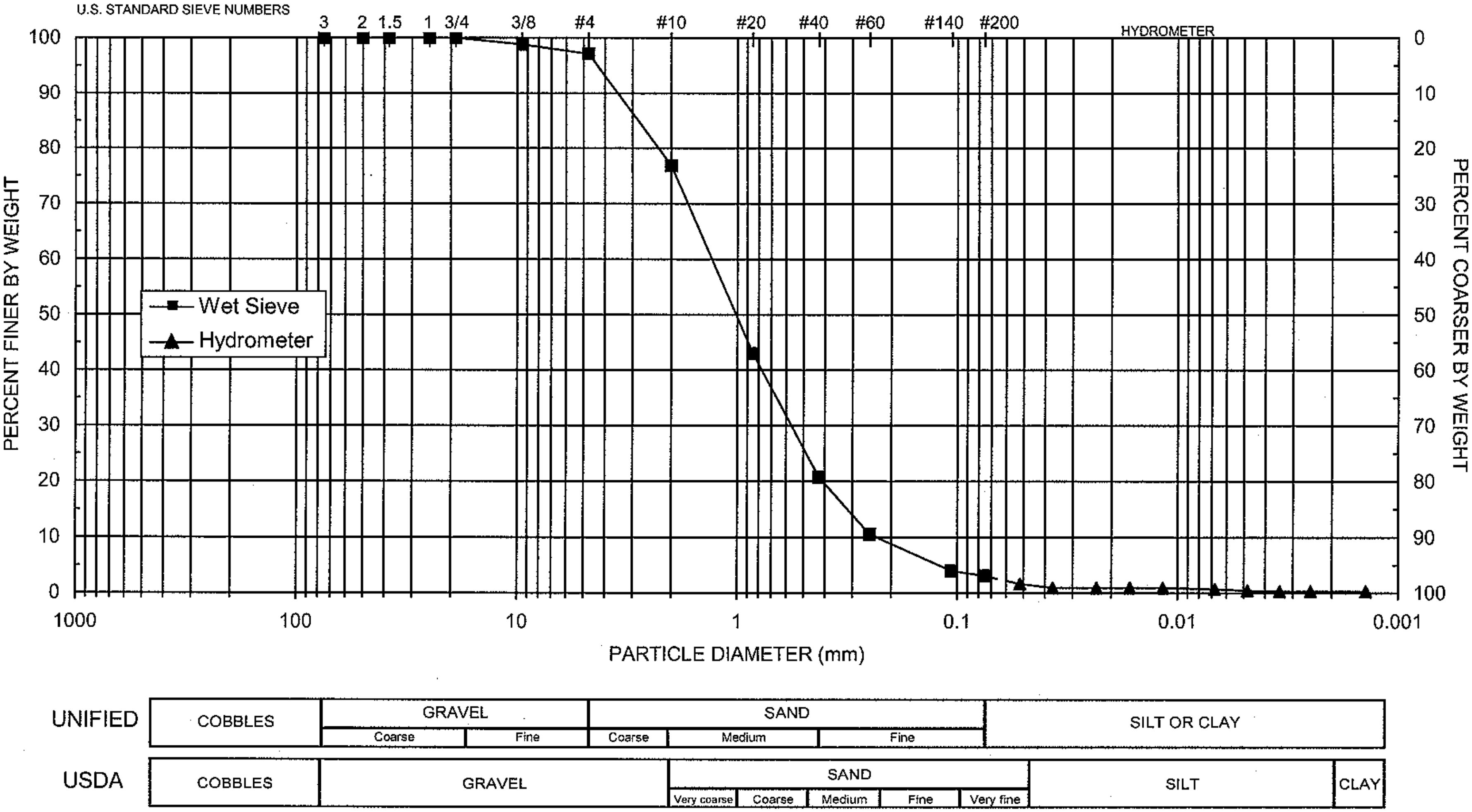
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	AP15-15	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.68
Depth:	10'-11'	*Initial Wt. (g):*	54.79
Test Date:	20-Jul-06	*Total Sample Wt. (g):*	525.33
Start Time:	9:12	*Wt. Passing #10 (g):*	403.46

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
20-Jul-06	1	21.0	7.0	5.8	1.2	15.2	0.05193	2.2	1.7
	2	21.0	6.5	5.8	0.7	15.2	0.03682	1.3	1.0
	5	21.0	6.5	5.8	0.7	15.2	0.02329	1.3	1.0
	10	21.0	6.5	5.8	0.7	15.2	0.01647	1.3	1.0
	20	20.8	6.5	5.8	0.7	15.2	0.01167	1.3	1.0
	60	20.3	6.5	6.0	0.5	15.2	0.00678	0.9	0.7
	121	19.6	6.5	6.2	0.3	15.2	0.00482	0.5	0.4
	240	19.2	6.5	6.3	0.2	15.2	0.00344	0.4	0.3
	450	19.8	6.5	6.3	0.2	15.2	0.00249	0.4	0.3
21-Jul-06	1420	19.9	6.5	6.3	0.2	15.2	0.00140	0.4	0.3

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



d_{10} = **0.23**	d_{30} = **0.57**	d_{50} = **1.0**	d_{60} = **1.3**	C_u = **5.7**	C_c = **1.1**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP15-15	**10'-11'**	**Poorly-graded sand (SP)**	**Sand** †

† Greater than 10% of sample is coarse material

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: AP15-25
Ring Number: NA
Depth: NA
Test Date: 10-Jul-06

Initial Dry Weight of Sample (g): 643.64
Weight Passing #10 (g): 548.48
Weight Retained #10 (g): 95.16
Weight of Hydrometer Sample (g): 56.92
Calculated Weight of Sieve Sample (g): 66.80

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	643.64	100.00
	2"	50	0.00	0.00	643.64	100.00
	1.5"	38.1	0.00	0.00	643.64	100.00
	1"	25	0.00	0.00	643.64	100.00
	3/4"	19.0	0.00	0.00	643.64	100.00
	3/8"	9.5	1.80	1.80	641.84	99.72
	4	4.75	11.38	13.18	630.46	97.95
	10	2.00	81.98	95.16	548.48	85.22
-10			(Based on calculated sieve wt.)			
	20	0.85	13.17	23.05	43.75	65.50
	40	0.425	15.40	38.45	28.35	42.44
	60	0.250	10.77	49.22	17.58	26.32
	140	0.106	10.05	59.27	7.53	11.27
	200	0.075	1.54	60.81	5.99	8.97
	dry pan		0.14	60.95	5.85	
	wet pan			5.85	0.00	

d_{10} (mm): 0.088
d_{16} (mm): 0.14
d_{30} (mm): 0.28
d_{50} (mm): 0.53
d_{60} (mm): 0.72
d_{84} (mm): 1.9

Median Particle Diameter--d_{50} (mm): 0.53
Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 8.2
Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 1.2
Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.86

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Sand †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: AP15-25
Ring Number: NA
Depth: NA

Test Date: 20-Jul-06
Start Time: 9:24

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.69

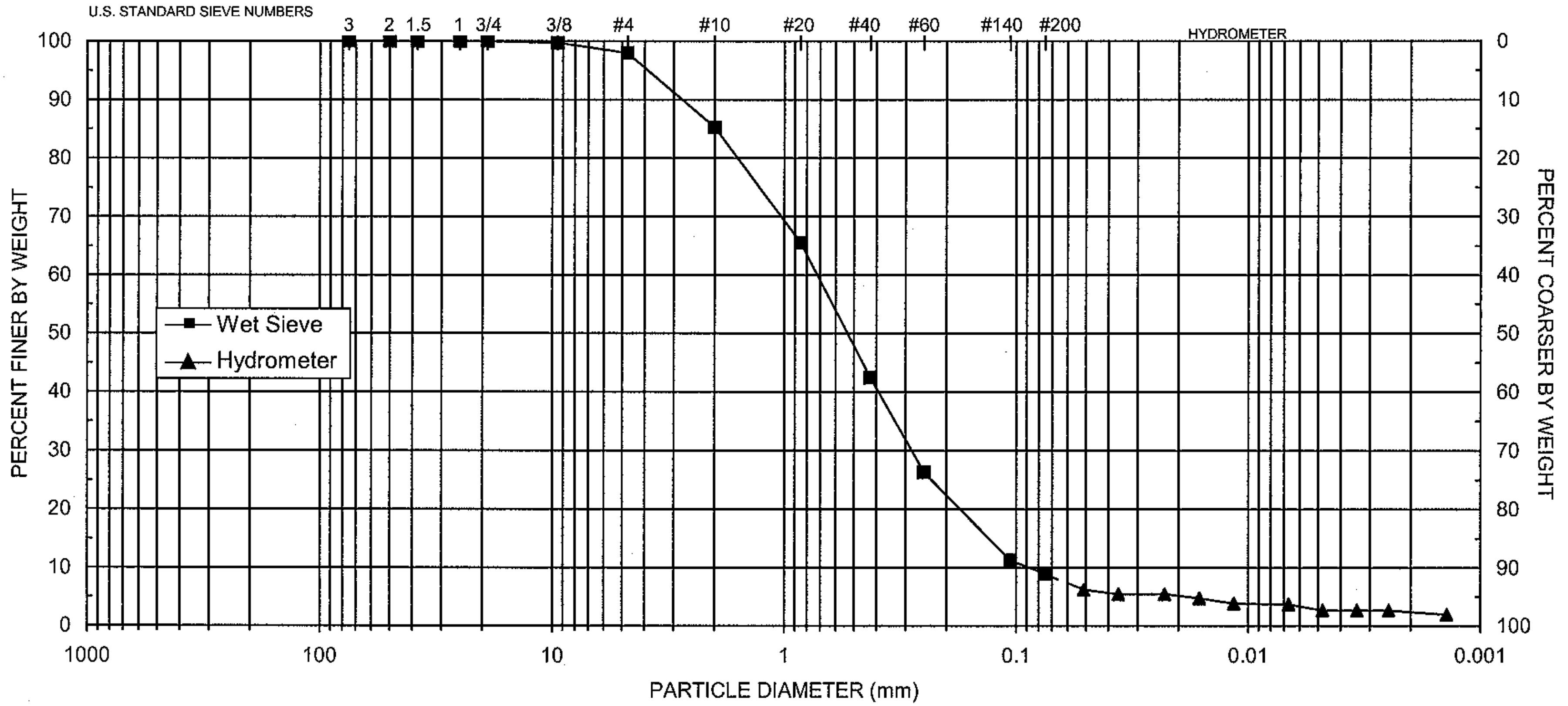
Initial Wt. (g): 56.92
Total Sample Wt. (g): 643.64
Wt. Passing #10 (g): 548.48

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
20-Jul-06	1	20.8	10.0	5.8	4.2	14.7	0.05111	7.3	6.2
	2	20.8	9.5	5.8	3.7	14.7	0.03624	6.4	5.5
	5	20.8	9.5	5.8	3.7	14.7	0.02292	6.4	5.5
	10	20.8	9.0	5.8	3.2	14.8	0.01625	5.6	4.7
	20	20.6	8.5	5.9	2.6	14.9	0.01155	4.5	3.9
	60	20.2	8.5	6.0	2.5	14.9	0.00670	4.3	3.7
	120	19.6	8.0	6.2	1.8	15.0	0.00479	3.1	2.7
	240	19.3	8.0	6.2	1.8	15.0	0.00340	3.1	2.7
	445	19.8	8.0	6.2	1.8	15.0	0.00248	3.1	2.7
21-Jul-06	1412	19.9	7.5	6.2	1.3	15.1	0.00140	2.3	1.9

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL: Coarse	GRAVEL: Fine	SAND: Coarse	SAND: Medium	SAND: Fine		SILT OR CLAY
USDA	COBBLES	GRAVEL	SAND: Very coarse	SAND: Coarse	SAND: Medium	SAND: Fine	SAND: Very fine	SILT / CLAY

d_{10} = **0.088**	d_{30} = **0.28**	d_{50} = **0.53**	d_{60} = **0.72**	C_u = **8.2**	C_c = **1.2**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
AP15-25	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sand †**

† Greater than 10% of sample is coarse material

Daniel B. Stephens & Associates, Inc.

Particle Density

Summary of Particle Density Tests

Sample Number	Particle Density (g/cm^3)
AP1-5	2.69
AP1-10	2.70
AP1-25	2.69
AP10-5	2.69
AP10-15	2.72
AP10-20	2.69
AP15-5	2.67
AP15-15	2.68
AP15-25	2.69

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP1-5
Ring Number:	NA
Depth:	NA
Test Date:	18-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	100.49
Weight of pycnometer filled w/soil (g):	150.75
Weight of pycnometer filled w/soil & water (g):	381.20
Weight of pycnometer filled w/water (g):	349.54
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.70
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.70

Trial 2

Weight of pycnometer filled w/air (g):	100.36
Weight of pycnometer filled w/soil (g):	151.83
Weight of pycnometer filled w/soil & water (g):	381.76
Weight of pycnometer filled w/water (g):	349.40
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.69
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.69

***Average Particle Density* (g/cm^3): 2.69**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP1-10
Ring Number:	NA
Depth:	NA
Test Date:	19-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	91.45
Weight of pycnometer filled w/soil (g):	142.26
Weight of pycnometer filled w/soil & water (g):	372.41
Weight of pycnometer filled w/water (g):	340.32
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.71
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.71

Trial 2

Weight of pycnometer filled w/air (g):	92.48
Weight of pycnometer filled w/soil (g):	144.10
Weight of pycnometer filled w/soil & water (g):	374.00
Weight of pycnometer filled w/water (g):	341.48
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.70
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.70

***Average Particle Density* (g/cm^3): 2.70**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP1-25
Ring Number:	NA
Depth:	NA
Test Date:	18-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	100.08
Weight of pycnometer filled w/soil (g):	150.43
Weight of pycnometer filled w/soil & water (g):	380.89
Weight of pycnometer filled w/water (g):	349.17
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.70
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.70

Trial 2

Weight of pycnometer filled w/air (g):	92.11
Weight of pycnometer filled w/soil (g):	142.29
Weight of pycnometer filled w/soil & water (g):	372.57
Weight of pycnometer filled w/water (g):	341.04
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.68
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.69

***Average Particle Density* (g/cm^3): 2.69**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP10-5
Ring Number:	NA
Depth:	6'-6.5'
Test Date:	19-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	93.33
Weight of pycnometer filled w/soil (g):	143.41
Weight of pycnometer filled w/soil & water (g):	373.85
Weight of pycnometer filled w/water (g):	342.28
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.70
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.70

Trial 2

Weight of pycnometer filled w/air (g):	99.26
Weight of pycnometer filled w/soil (g):	150.48
Weight of pycnometer filled w/soil & water (g):	380.51
Weight of pycnometer filled w/water (g):	348.37
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.68
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.68

***Average Particle Density* (g/cm^3):** **2.69**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP10-15
Ring Number:	NA
Depth:	NA
Test Date:	19-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	102.42
Weight of pycnometer filled w/soil (g):	152.58
Weight of pycnometer filled w/soil & water (g):	383.18
Weight of pycnometer filled w/water (g):	351.46
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.71
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.71

Trial 2

Weight of pycnometer filled w/air (g):	99.58
Weight of pycnometer filled w/soil (g):	150.89
Weight of pycnometer filled w/soil & water (g):	381.07
Weight of pycnometer filled w/water (g):	348.61
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.72
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.72

***Average Particle Density* (g/cm^3): 2.72**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP10-20
Ring Number:	NA
Depth:	NA
Test Date:	18-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	99.20
Weight of pycnometer filled w/soil (g):	149.91
Weight of pycnometer filled w/soil & water (g):	380.14
Weight of pycnometer filled w/water (g):	348.18
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.70
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.70

Trial 2

Weight of pycnometer filled w/air (g):	102.02
Weight of pycnometer filled w/soil (g):	152.97
Weight of pycnometer filled w/soil & water (g):	383.16
Weight of pycnometer filled w/water (g):	351.12
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.69
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.69

***Average Particle Density* (g/cm^3): 2.69**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP15-5
Ring Number:	NA
Depth:	5.5'
Test Date:	18-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	91.23
Weight of pycnometer filled w/soil (g):	141.49
Weight of pycnometer filled w/soil & water (g):	371.60
Weight of pycnometer filled w/water (g):	340.14
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.67
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.67

Trial 2

Weight of pycnometer filled w/air (g):	90.80
Weight of pycnometer filled w/soil (g):	140.83
Weight of pycnometer filled w/soil & water (g):	371.05
Weight of pycnometer filled w/water (g):	339.74
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.66
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.67

***Average Particle Density* (g/cm^3): 2.67**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP15-15
Ring Number:	NA
Depth:	10'-11'
Test Date:	18-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	89.42
Weight of pycnometer filled w/soil (g):	139.81
Weight of pycnometer filled w/soil & water (g):	370.13
Weight of pycnometer filled w/water (g):	338.46
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.68
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.69

Trial 2

Weight of pycnometer filled w/air (g):	99.90
Weight of pycnometer filled w/soil (g):	151.88
Weight of pycnometer filled w/soil & water (g):	381.37
Weight of pycnometer filled w/water (g):	348.82
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.67
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.67

***Average Particle Density* (g/cm^3): 2.68**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	AP15-25
Ring Number:	NA
Depth:	NA
Test Date:	19-Jul-06

Trial 1

Weight of pycnometer filled w/air (g):	99.29
Weight of pycnometer filled w/soil (g):	149.40
Weight of pycnometer filled w/soil & water (g):	379.81
Weight of pycnometer filled w/water (g):	348.31
Observed temperature (°C):	23.90
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.69
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.69

Trial 2

Weight of pycnometer filled w/air (g):	90.94
Weight of pycnometer filled w/soil (g):	142.26
Weight of pycnometer filled w/soil & water (g):	372.22
Weight of pycnometer filled w/water (g):	339.99
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.68
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.68

***Average Particle Density* (g/cm^3): 2.69**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Laboratory Tests and Methods

Tests and Methods

Dry Bulk Density:	ASTM D4531; ASTM D6836
Moisture Content:	ASTM D2216; ASTM D6836
Calculated Porosity:	Klute, A. 1986. Porosity. Chp.18-2.1, pp. 444-445, in A. Klute (ed.), Methods of Soil Analysis, American Society of Agronomy, Madison, WI
Saturated K:	
Constant Head:	ASTM D 2434 (modified apparatus)
Particle Size Analysis:	ASTM D422
Particle Density	ASTM D854

Appendix C

MVRWRF
Physical Properties

Laboratory Report for
Daniel B. Stephens & Associates

WR06.0036.00, Task 5A

MVP Samples

August 31, 2006

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

August 31, 2006

Mr. Jordan Kear
Daniel B. Stephens & Associates, Inc.
5951 Encina Rd., Suite 208
Goleta, CA 93117
(805) 512-1516

Re: DBS&A Laboratory Report for Quantification of Nitrogen Removal (WR06.0034.00 - MVP Samples)

Dear Mr. Kear:

Enclosed is the final report for the Quantification of Nitrogen Removal (WR06.0034.00 - MVP Samples) project. Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed final report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the final report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service to Jordan Kear and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
LABORATORY / TESTING FACILITY

Joleen Hines
Laboratory Supervising Manager

Enclosure

Summaries

Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties[1] (θ, ρ_d, ϕ)	Saturated Hydraulic Conductivity[2]		Moisture Characteristics[3]					Unsaturated Hydraulic Conductivity	Particle Size[4]			Effective Porosity	Particle Density	Air Permeability	1/3, 15 Bar Points and Water Holding Capacity	Atterberg Limits	Proctor Compaction
		CH	FH	HC	PP	TH	WP	RH		DS	WS	H						
MVP 14-5	X	X									X	X		X				
MVP 14-10	X	X									X	X		X				
MVP 14-15	X	X									X	X		X				
MVP 14-20	X		X								X	X		X				
MVP 14-25	X	X									X	X		X				
MVP 19-5	X		X								X	X		X				
MVP 19-20	X	X									X	X		X				
MVP 22-10	X	X									X	X		X				
MVP 22-15	X	X									X	X		X				
MVP 22-20	X		X								X	X		X				
MVP 22-25	X		X								X	X		X				

[1] θ = Initial moisture content, ρ_d = Dry bulk density, ϕ = Calculated porosity
[2] CH = Constant head, FH = falling head
[3] HC = Hanging column, PP = Pressure plate, TH = Thermocouple psychrometer, WP = Water activity meter, RH = Relative humidity box
[4] DS = Dry sieve, WS = Wet sieve, H = Hydrometer

Summary of Initial Moisture Content, Dry Bulk Density
Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content: As Received Gravimetric (%, g/g)	Moisture Content: As Received Volumetric (%, cm^3/cm^3)	Moisture Content: Remolded Gravimetric (%, g/g)	Moisture Content: Remolded Volumetric (%, cm^3/cm^3)	Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
MVP 14-5	8.5	14.0	---	---	1.65	1.79	37.7
MVP 14-10	10.9	20.8	---	---	1.91	2.12	29.3
MVP 14-15	27.7	46.3	---	---	1.67	2.13	38.0
MVP 14-20	26.9	41.4	---	---	1.54	1.95	44.4
MVP 14-25	46.8	54.5	---	---	1.16	1.71	57.6
MVP 19-5	19.2	32.0	---	---	1.67	1.99	38.5
MVP 19-20	11.7	23.2	---	---	1.98	2.21	27.5
MVP 22-10	16.0	28.2	---	---	1.76	2.04	34.9
MVP 22-15	21.7	36.7	---	---	1.69	2.06	38.0
MVP 22-20	34.7	47.3	---	---	1.36	1.84	50.1
MVP 22-25	55.0	59.2	---	---	1.08	1.67	60.5

NA = Not analyzed
--- = This sample was not remolded

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis: Constant Head	Method of Analysis: Falling Head
MVP 14-5	2.4E-03	NA	X	
MVP 14-10	6.1E-04	NA	X	
MVP 14-15	1.2E-04	NA	X	
MVP 14-20	1.7E-06	NA		X
MVP 14-25	1.3E-04	NA	X	
MVP 19-5	5.7E-06	NA		X
MVP 19-20	4.0E-05	NA	X	
MVP 22-10	1.4E-04	NA	X	
MVP 22-15	4.5E-05	NA	X	
MVP 22-20	2.1E-06	NA		X
MVP 22-25	2.3E-06	NA		X

Daniel B. Stephens & Associates, Inc.

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
MVP 14-5	0.085	0.39	0.49	5.8	1.9	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand	
MVP 14-10	0.00077	0.17	0.33	429	9.8	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam †	(Est)
MVP 14-15	0.019	0.47	0.74	39	1.8	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand †	
MVP 14-20	0.00098	0.013	0.020	20	1.3	WS/H	Classification by ASTM 2487 requires Atterberg test	Silt Loam	(Est)
MVP 14-25	0.00092	0.061	0.37	402	0.18	WS/H	Classification by ASTM 2487 requires Atterberg test	Loam †	(Est)
MVP 19-5	0.016	0.22	0.29	18	2.6	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
MVP 19-20	0.0082	0.36	0.56	68	1.9	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand †	
MVP 22-10	0.0047	0.26	0.46	98	2.4	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam †	
MVP 22-15	0.010	0.078	0.12	12	1.8	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam	
MVP 22-20	0.0013	0.031	0.051	39	0.83	WS/H	Classification by ASTM 2487 requires Atterberg test	Silt Loam †	(Est)
MVP 22-25	0.00040	0.0043	0.0082	21	0.69	WS/H	Classification by ASTM 2487 requires Atterberg test	Silty Clay Loam	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Summary of Particle Density Tests

Sample Number	Particle Density (g/cm^3)
MVP 14-5	2.65
MVP 14-10	2.70
MVP 14-15	2.69
MVP 14-20	2.77
MVP 14-25	2.75
MVP 19-5	2.71
MVP 19-20	2.73
MVP 22-10	2.70
MVP 22-15	2.73
MVP 22-20	2.73
MVP 22-25	2.72

Laboratory Data and Graphical Plots

Initial Properties

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content: As Received: Gravimetric (%, g/g)	Moisture Content: As Received: Volumetric (%, cm³/cm³)	Moisture Content: Remolded: Gravimetric (%, g/g)	Moisture Content: Remolded: Volumetric (%, cm³/cm³)	Dry Bulk Density (g/cm³)	Wet Bulk Density (g/cm³)	Calculated Porosity (%)
MVP 14-5	8.5	14.0	---	---	1.65	1.79	37.7
MVP 14-10	10.9	20.8	---	---	1.91	2.12	29.3
MVP 14-15	27.7	46.3	---	---	1.67	2.13	38.0
MVP 14-20	26.9	41.4	---	---	1.54	1.95	44.4
MVP 14-25	46.8	54.5	---	---	1.16	1.71	57.6
MVP 19-5	19.2	32.0	---	---	1.67	1.99	38.5
MVP 19-20	11.7	23.2	---	---	1.98	2.21	27.5
MVP 22-10	16.0	28.2	---	---	1.76	2.04	34.9
MVP 22-15	21.7	36.7	---	---	1.69	2.06	38.0
MVP 22-20	34.7	47.3	---	---	1.36	1.84	50.1
MVP 22-25	55.0	59.2	---	---	1.08	1.67	60.5

NA = Not analyzed

--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-5
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample (g):*	321.77	
Tare weight, ring (g):	64.38	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	237.27	
Sample volume (cm^3):	143.43	
Measured particle density (g/cm^3):	2.65	

Gravimetric Moisture Content (% g/g):	8.5
Volumetric Moisture Content (% vol):	14.0
Dry bulk density (g/cm^3):	1.65
Wet bulk density (g/cm^3):	1.79
Calculated Porosity (% vol):	37.7
Percent Saturation:	37.2

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-10
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample (g):*	351.64	
Tare weight, ring (g):	60.81	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	262.33	
Sample volume (cm^3):	137.20	
Measured particle density (g/cm^3):	2.70	
Gravimetric Moisture Content (% g/g):	10.9	
Volumetric Moisture Content (% vol):	20.8	
Dry bulk density (g/cm^3):	1.91	
Wet bulk density (g/cm^3):	2.12	
Calculated Porosity (% vol):	29.3	
Percent Saturation:	70.9	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-15
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample (g):*	306.45	
Tare weight, ring (g):	52.63	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	198.79	
Sample volume (cm^3):	118.98	
Measured particle density (g/cm^3):	2.69	
Gravimetric Moisture Content (% g/g):	27.7	
Volumetric Moisture Content (% vol):	46.3	
Dry bulk density (g/cm^3):	1.67	
Wet bulk density (g/cm^3):	2.13	
Calculated Porosity (% vol):	38.0	
Percent Saturation:	121.8	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:The Sample was received in a supersaturated state.

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-20
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample (g):*	268.74	
Tare weight, ring (g):	50.40	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	172.10	
Sample volume (cm^3):	111.74	
Measured particle density (g/cm^3):	2.77	
Gravimetric Moisture Content (% g/g):	26.9	
Volumetric Moisture Content (% vol):	41.4	
Dry bulk density (g/cm^3):	1.54	
Wet bulk density (g/cm^3):	1.95	
Calculated Porosity (% vol):	44.4	
Percent Saturation:	93.2	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 14-25
Ring Number:	NA
Depth:	NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample (g):*	248.52	
Tare weight, ring (g):	51.56	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	134.18	
Sample volume (cm^3):	115.25	
Measured particle density (g/cm^3):	2.75	
Gravimetric Moisture Content (% g/g):	46.8	
Volumetric Moisture Content (% vol):	54.5	
Dry bulk density (g/cm^3):	1.16	
Wet bulk density (g/cm^3):	1.71	
Calculated Porosity (% vol):	57.6	
Percent Saturation:	94.5	

Laboratory analysis by:	D. O'Dowd
Data entered by:	C. Krous
Checked by:	J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 19-5
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample* (g):	264.92	
Tare weight, ring (g):	48.85	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	181.25	
Sample volume (cm^3):	108.72	
Measured particle density (g/cm^3):	2.71	

Gravimetric Moisture Content (% g/g):	19.2	
Volumetric Moisture Content (% vol):	32.0	
Dry bulk density (g/cm^3):	1.67	
Wet bulk density (g/cm^3):	1.99	
Calculated Porosity (% vol):	38.5	
Percent Saturation:	83.2	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 19-20
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample* (g):	296.06	
Tare weight, ring (g):	50.32	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	219.97	
Sample volume (cm^3):	111.17	
Measured particle density (g/cm^3):	2.73	
Gravimetric Moisture Content (% g/g):	11.7	
Volumetric Moisture Content (% vol):	23.2	
Dry bulk density (g/cm^3):	1.98	
Wet bulk density (g/cm^3):	2.21	
Calculated Porosity (% vol):	27.5	
Percent Saturation:	84.2	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 22-10
Ring Number:	NA
Depth:	NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample* (g):	249.56	
Tare weight, ring (g):	45.04	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	176.30	
Sample volume (cm^3):	100.21	
Measured particle density (g/cm^3):	2.70	
Gravimetric Moisture Content (% g/g):	16.0	
Volumetric Moisture Content (% vol):	28.2	
Dry bulk density (g/cm^3):	1.76	
Wet bulk density (g/cm^3):	2.04	
Calculated Porosity (% vol):	34.9	
Percent Saturation:	80.8	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 22-15
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample (g):*	277.57	
Tare weight, ring (g):	49.91	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	187.14	
Sample volume (cm^3):	110.47	
Measured particle density (g/cm^3):	2.73	
Gravimetric Moisture Content (% g/g):	21.7	
Volumetric Moisture Content (% vol):	36.7	
Dry bulk density (g/cm^3):	1.69	
Wet bulk density (g/cm^3):	2.06	
Calculated Porosity (% vol):	38.0	
Percent Saturation:	96.6	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 22-20
Ring Number:	NA
Depth:	NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample (g):*	249.48	
Tare weight, ring (g):	48.77	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	149.04	
Sample volume (cm^3):	109.26	
Measured particle density (g/cm^3):	2.73	
Gravimetric Moisture Content (% g/g):	34.7	
Volumetric Moisture Content (% vol):	47.3	
Dry bulk density (g/cm^3):	1.36	
Wet bulk density (g/cm^3):	1.84	
Calculated Porosity (% vol):	50.1	
Percent Saturation:	94.4	

Laboratory analysis by:	D. O'Dowd
Data entered by:	C. Krous
Checked by:	J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Daniel B. Stephens & Associates, Inc.

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 22-25
Ring Number: NA
Depth: NA

	As Received	Remolded
Test Date:	13-Aug-06	---
Field weight of sample (g):*	232.38	
Tare weight, ring (g):	49.05	
Tare weight, pan/plate (g):	0.00	
Tare weight, other (g):	0.00	
Dry weight of sample (g):	118.24	
Sample volume (cm^3):	109.91	
Measured particle density (g/cm^3):	2.72	

Gravimetric Moisture Content (% g/g):	55.0
Volumetric Moisture Content (% vol):	59.2
Dry bulk density (g/cm^3):	1.08
Wet bulk density (g/cm^3):	1.67
Calculated Porosity (% vol):	60.5
Percent Saturation:	97.9

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Saturated Hydraulic Conductivity

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis	
			Constant Head	Falling Head
MVP 14-5	2.4E-03	NA	X	
MVP 14-10	6.1E-04	NA	X	
MVP 14-15	1.2E-04	NA	X	
MVP 14-20	1.7E-06	NA		X
MVP 14-25	1.3E-04	NA	X	
MVP 19-5	5.7E-06	NA		X
MVP 19-20	4.0E-05	NA	X	
MVP 22-10	1.4E-04	NA	X	
MVP 22-15	4.5E-05	NA	X	
MVP 22-20	2.1E-06	NA		X
MVP 22-25	2.3E-06	NA		X

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	6.41
Sample number:	MVP 14-5	*Sample length* (cm):	4.76
Ring Number:	NA	*Sample diameter* (cm):	6.20
Depth:	NA	*Sample x-sectional area* (cm^2):	30.15

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
14-Aug-06	13:22:48	21.0	1.6	41.9	35.5	1433	2.4E-03	2.4E-03
14-Aug-06	13:46:41							
Test # 2:								
14-Aug-06	14:01:38	21.0	1.8	27.9	21.5	781	2.4E-03	2.4E-03
14-Aug-06	14:14:39							
Test # 3:								
14-Aug-06	14:28:32	21.0	2.2	29.9	23.5	674	2.5E-03	2.4E-03
14-Aug-06	14:39:46							

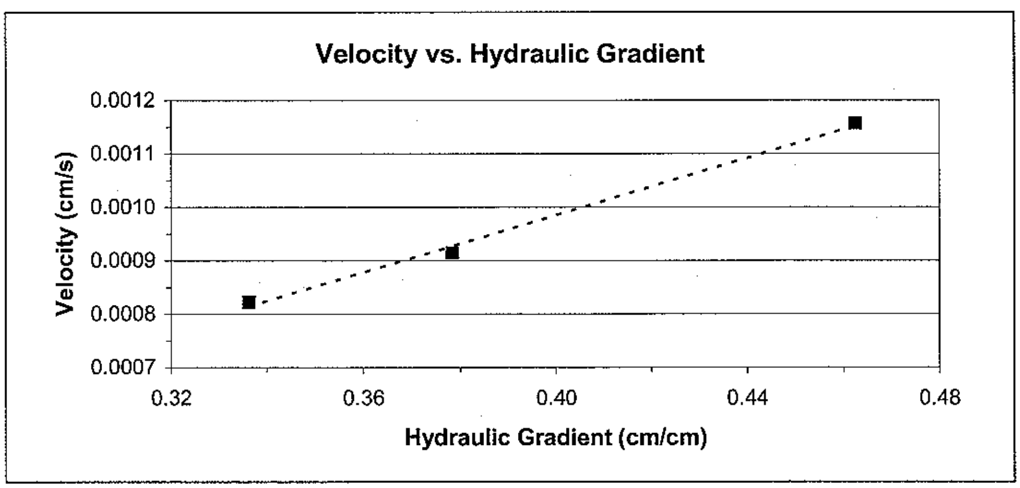
Average Ksat **(cm/sec):** **2.4E-03**

Oversize Corrected Ksat **(cm/sec):** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	4.70
Sample number:	MVP 14-10	*Sample length* (cm):	4.57
Ring Number:	NA	*Sample diameter* (cm):	6.18
Depth:	NA	*Sample x-sectional area* (cm^2):	30.04

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
14-Aug-06	13:24:14	21.0	2.3	18.5	13.8	1415	6.5E-04	6.3E-04
14-Aug-06	13:47:49							
Test # 2:								
14-Aug-06	14:02:18	21.0	2.7	16.0	11.3	1030	6.2E-04	6.0E-04
14-Aug-06	14:19:28							
Test # 3:								
14-Aug-06	14:31:14	21.0	3.1	15.2	10.5	850	6.0E-04	5.9E-04
14-Aug-06	14:45:24							

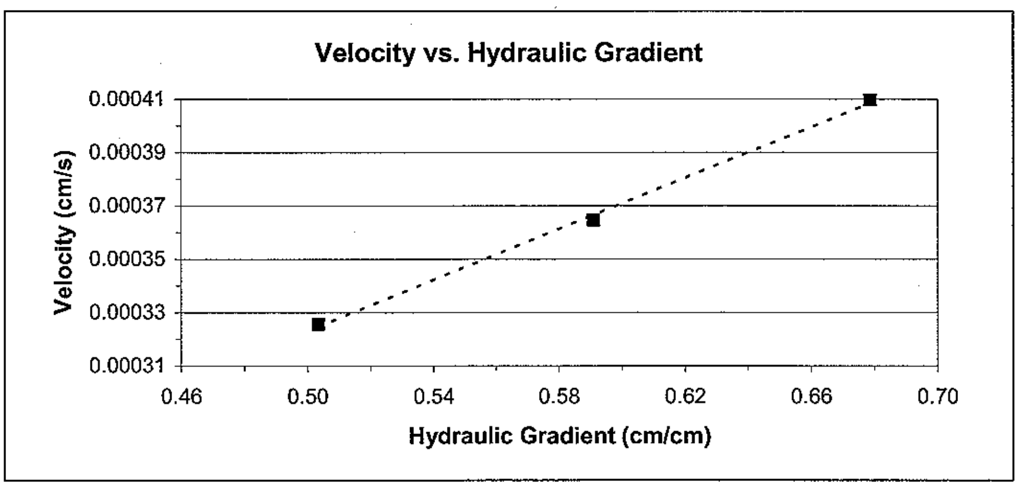
Average Ksat **(cm/sec):** **6.1E-04**

Oversize Corrected Ksat **(cm/sec):** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	4.76
Sample number:	MVP 14-15	*Sample length* (cm):	3.95
Ring Number:	NA	*Sample diameter* (cm):	6.17
Depth:	NA	*Sample x-sectional area* (cm^2):	29.92

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
14-Aug-06	13:23:13	21.0	1.8	7.0	2.2	1388	1.2E-04	1.1E-04
14-Aug-06	13:46:21							
Test # 2:								
14-Aug-06	14:01:14	21.0	2.0	6.4	1.6	838	1.3E-04	1.3E-04
14-Aug-06	14:15:12							
Test # 3:								
14-Aug-06	14:27:54	21.0	1.6	5.8	1.0	630	1.3E-04	1.3E-04
14-Aug-06	14:38:24							

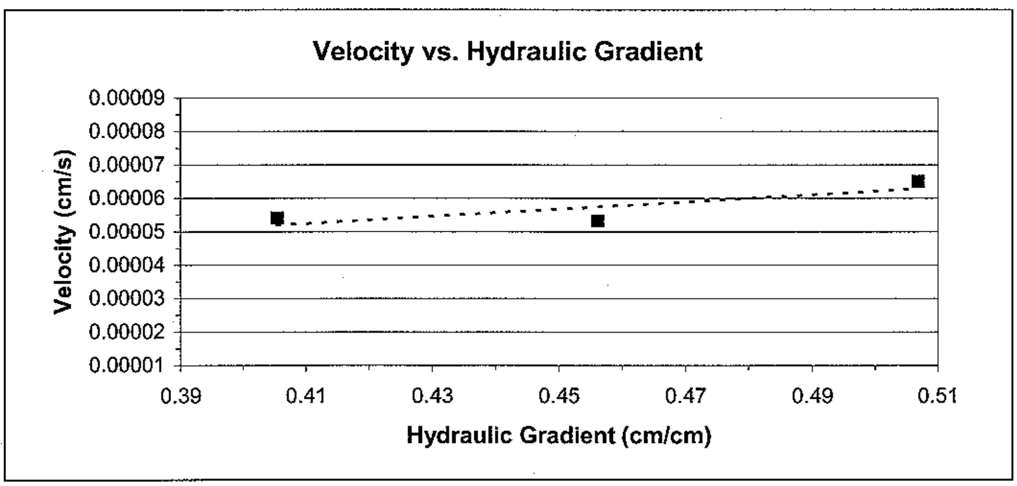
Average Ksat **(cm/sec):** **1.2E-04**

Oversize Corrected Ksat **(cm/sec):** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Falling Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Backpressure* (psi):	0.0
Sample number:	MVP 14-20	*Offset* (cm):	1.3
Ring Number:	NA	*Sample length* (cm):	3.78
Depth:	NA	*Sample x-sectional area* (cm^2):	29.60
		Reservoir x-sectional area (cm^2):	0.70

Date	Time	Temp (°C)	Reservoir head (cm)	Corrected head (cm)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:							
14-Aug-06	09:21:40	21.0	31.3	30.0	3308	1.9E-06	1.8E-06
14-Aug-06	10:16:48	21.0	29.3	28.0			
Test # 2:							
14-Aug-06	10:16:48	21.0	29.3	28.0	3726	1.6E-06	1.6E-06
14-Aug-06	11:18:54	21.0	27.4	26.1			
Test # 3:							
14-Aug-06	11:18:54	21.0	27.4	26.1	2756	1.6E-06	1.6E-06
14-Aug-06	12:04:50	21.0	26.2	24.9			

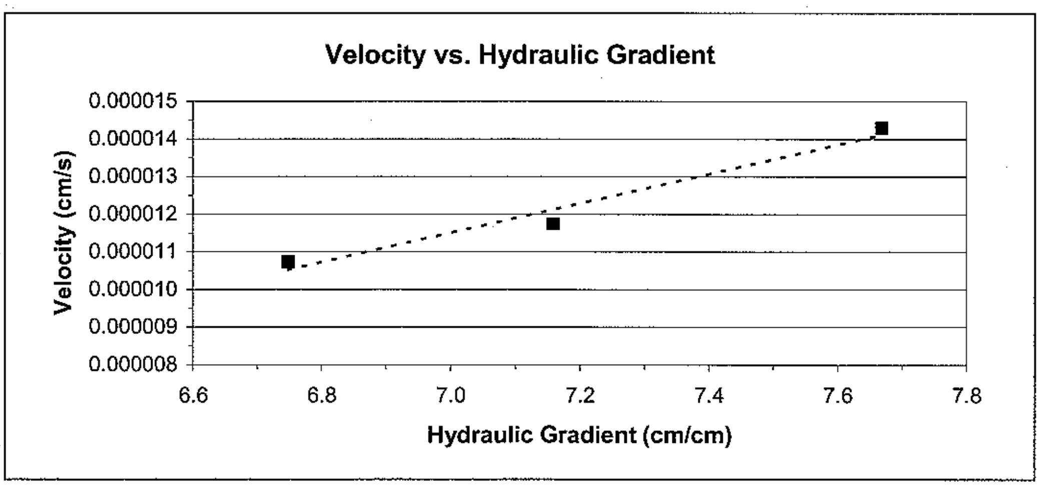
***Average Ksat* (cm/sec):** **1.7E-06**

***Oversize Corrected Ksat* (cm/sec):** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	11.52
Sample number:	MVP 14-25	*Sample length* (cm):	3.87
Ring Number:	NA	*Sample diameter* (cm):	6.16
Depth:	NA	*Sample x-sectional area* (cm^2):	29.76

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
14-Aug-06	11:57:16	21.0	1.3	13.3	1.7	1338	1.3E-04	1.3E-04
14-Aug-06	12:19:34							
Test # 2:								
14-Aug-06	14:03:46	21.0	1.7	13.5	2.0	1199	1.3E-04	1.3E-04
14-Aug-06	14:23:45							
Test # 3:								
14-Aug-06	14:31:52	21.0	2.1	13.8	2.3	987	1.4E-04	1.4E-04
14-Aug-06	14:48:19							

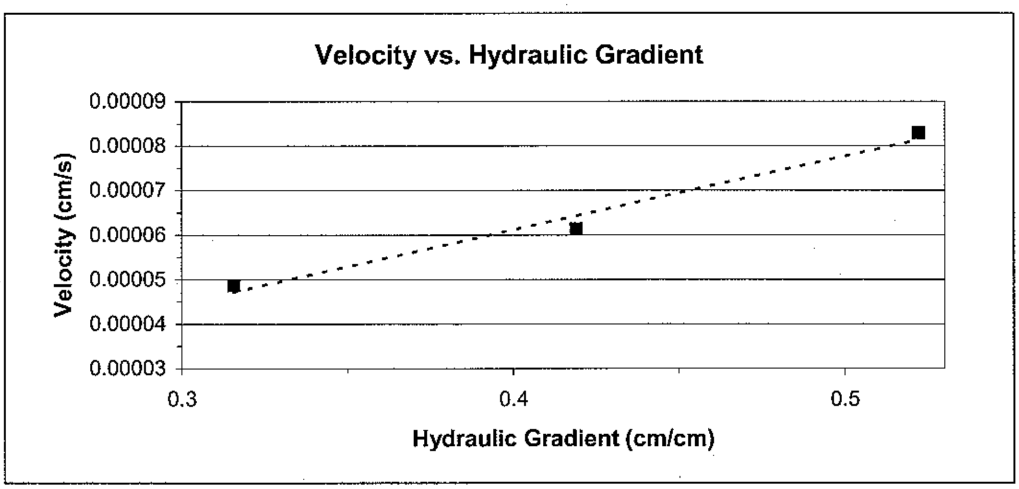
Average Ksat **(cm/sec): 1.3E-04**

Oversize Corrected Ksat **(cm/sec): NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Falling Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Backpressure* (psi):	0.0
Sample number:	MVP 19-5	*Offset* (cm):	1.0
Ring Number:	NA	*Sample length* (cm):	3.67
Depth:	NA	*Sample x-sectional area* (cm^2):	29.66
		Reservoir x-sectional area (cm^2):	0.70

Date	Time	Temp (°C)	Reservoir head (cm)	Corrected head (cm)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:							
14-Aug-06	10:16:25	21.0	33.2	32.2	1538	6.5E-06	6.3E-06
14-Aug-06	10:42:03	21.0	29.7	28.7			
Test # 2:							
14-Aug-06	10:42:03	21.0	29.7	28.7	2195	5.6E-06	5.5E-06
14-Aug-06	11:18:38	21.0	25.9	24.9			
Test # 3:							
14-Aug-06	11:18:38	21.0	25.9	24.9	2764	5.3E-06	5.1E-06
14-Aug-06	12:04:42	21.0	22.0	21.0			

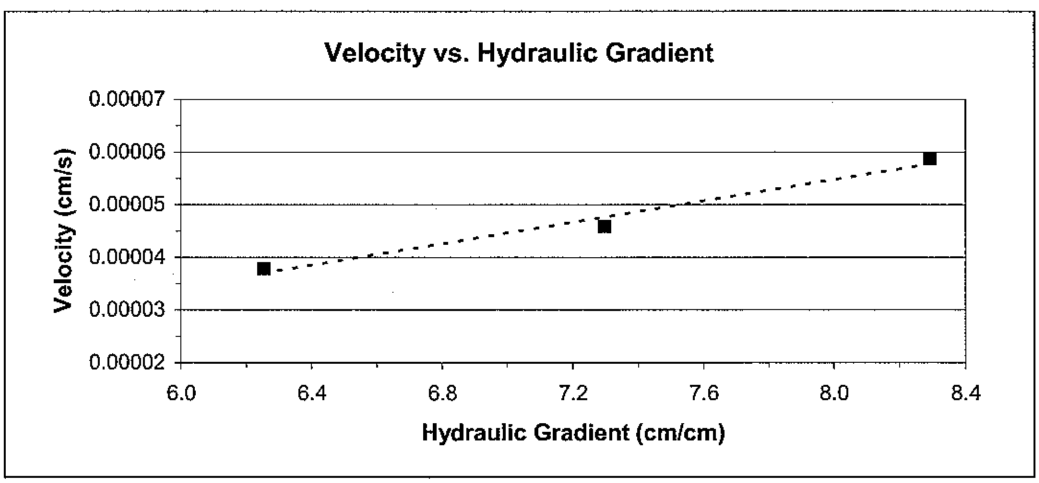
***Average Ksat* (cm/sec): 5.7E-06**

***Oversize Corrected Ksat* (cm/sec): NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	4.62
Sample number:	MVP 19-20	*Sample length* (cm):	3.77
Ring Number:	NA	*Sample diameter* (cm):	6.13
Depth:	NA	*Sample x-sectional area* (cm^2):	29.46

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
14-Aug-06	13:25:02	21.0	7.9	8.2	3.6	1428	4.1E-05	4.0E-05
14-Aug-06	13:48:50							
Test # 2:								
14-Aug-06	14:03:01	21.0	8.3	7.7	3.1	1170	4.1E-05	4.0E-05
14-Aug-06	14:22:31							
Test # 3:								
14-Aug-06	14:31:38	21.0	8.7	7.1	2.5	900	4.1E-05	4.0E-05
14-Aug-06	14:46:38							

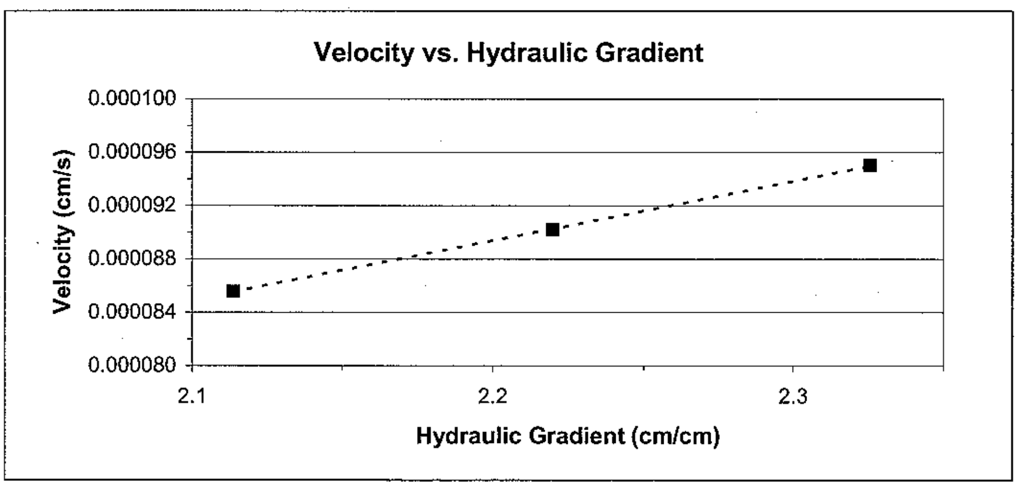
Average Ksat **(cm/sec):** **4.0E-05**

Oversize Corrected Ksat **(cm/sec):** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	6.43
Sample number:	MVP 22-10	*Sample length* (cm):	3.39
Ring Number:	NA	*Sample diameter* (cm):	6.13
Depth:	NA	*Sample x-sectional area* (cm^2):	29.55

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
14-Aug-06	13:23:56	21.0	1.6	9.1	2.7	1413	1.3E-04	1.3E-04
14-Aug-06	13:47:29							
Test # 2:								
14-Aug-06	14:02:10	21.0	2.0	9.2	2.7	1133	1.4E-04	1.4E-04
14-Aug-06	14:21:03							
Test # 3:								
14-Aug-06	14:31:01	21.0	2.4	9.0	2.6	799	1.5E-04	1.5E-04
14-Aug-06	14:44:20							

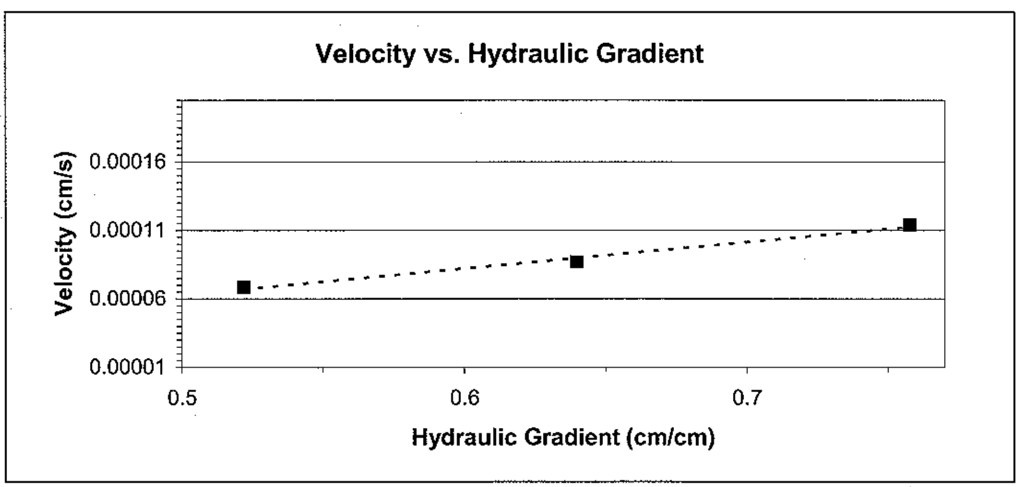
***Average Ksat* (cm/sec):** **1.4E-04**

***Oversize Corrected Ksat* (cm/sec):** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Constant Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Collection vessel tare* (g):	4.73
Sample number:	MVP 22-15	*Sample length* (cm):	3.73
Ring Number:	NA	*Sample diameter* (cm):	6.14
Depth:	NA	*Sample x-sectional area* (cm^2):	29.61

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
14-Aug-06	13:23:15	21.0	5.3	7.5	2.8	1435	4.6E-05	4.5E-05
14-Aug-06	13:47:10							
Test # 2:								
14-Aug-06	14:01:26	21.0	5.7	6.4	1.7	783	4.7E-05	4.5E-05
14-Aug-06	14:14:29							
Test # 3:								
14-Aug-06	14:30:41	21.0	5.9	6.2	1.5	687	4.6E-05	4.5E-05
14-Aug-06	14:42:08							

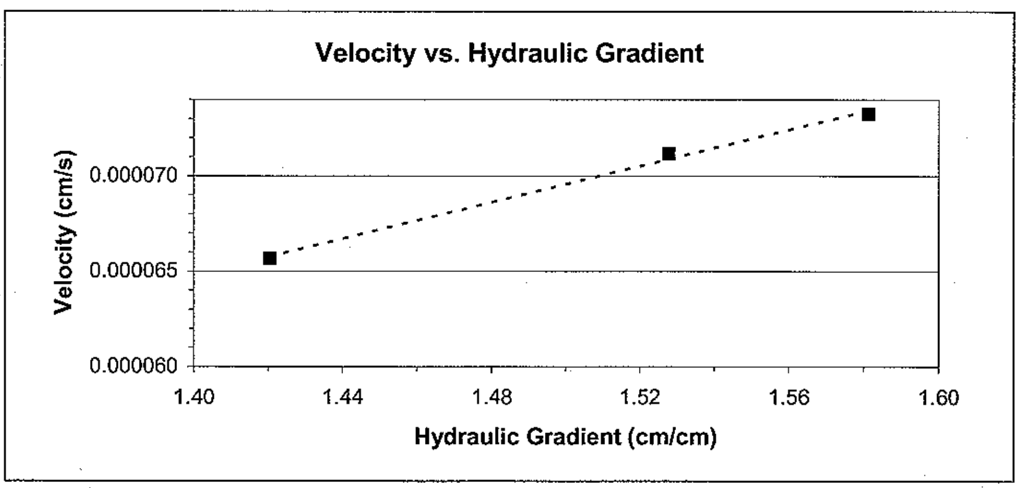
Average Ksat **(cm/sec):** **4.5E-05**

Oversize Corrected Ksat **(cm/sec):** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Falling Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Backpressure* (psi):	0.0
Sample number:	MVP 22-20	*Offset* (cm):	2.4
Ring Number:	NA	*Sample length* (cm):	3.65
Depth:	NA	*Sample x-sectional area* (cm^2):	29.91
		Reservoir x-sectional area (cm^2):	0.70

Date	Time	Temp (°C)	Reservoir head (cm)	Corrected head (cm)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:							
14-Aug-06	09:21:00	21.0	28.2	25.8	3305	2.2E-06	2.1E-06
14-Aug-06	10:16:05	21.0	26.1	23.7			
Test # 2:							
14-Aug-06	10:16:05	21.0	26.1	23.7	3735	2.1E-06	2.1E-06
14-Aug-06	11:18:20	21.0	24.0	21.6			
Test # 3:							
14-Aug-06	11:18:20	21.0	24.0	21.6	2770	2.1E-06	2.0E-06
14-Aug-06	12:04:30	21.0	22.6	20.2			

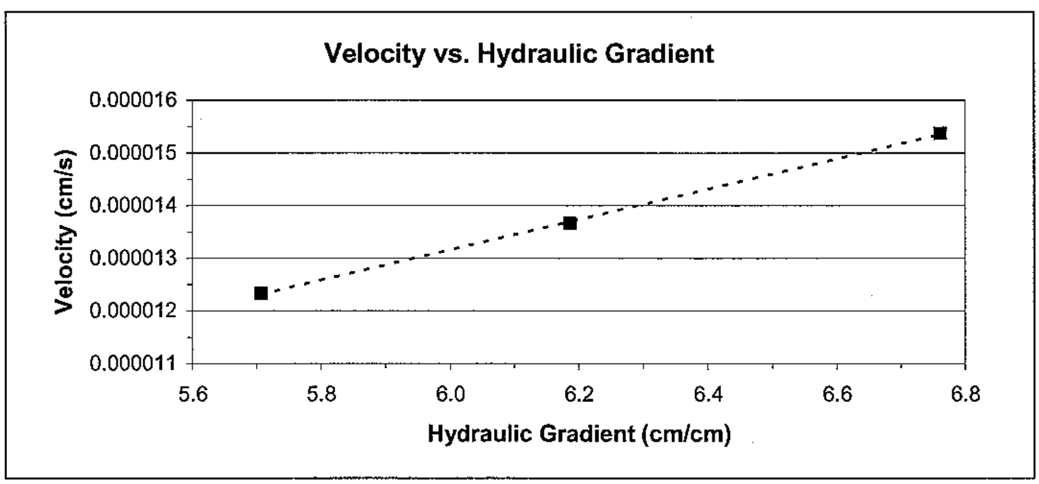
***Average Ksat* (cm/sec):** **2.1E-06**

***Oversize Corrected Ksat* (cm/sec):** **NA**

Comments:

— = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Falling Head Method

Job name:	Quantification of Nitrogen Removal	*Type of water used:*	TAP
Job number:	WR06.0034.00	*Backpressure* (psi):	0.0
Sample number:	MVP 22-25	*Offset* (cm):	2.9
Ring Number:	NA	*Sample length* (cm):	3.67
Depth:	NA	*Sample x-sectional area* (cm^2):	29.95
		Reservoir x-sectional area (cm^2):	0.70

Date	Time	Temp (°C)	Reservoir head (cm)	Corrected head (cm)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:							
14-Aug-06	09:38:25	21.0	28.6	25.7	2318	2.7E-06	2.6E-06
14-Aug-06	10:17:03	21.0	26.8	23.9			
Test # 2:							
14-Aug-06	10:17:03	21.0	26.8	23.9	3729	2.2E-06	2.2E-06
14-Aug-06	11:19:12	21.0	24.6	21.7			
Test # 3:							
14-Aug-06	11:19:12	21.0	24.6	21.7	2751	2.1E-06	2.0E-06
14-Aug-06	12:05:03	21.0	23.2	20.3			

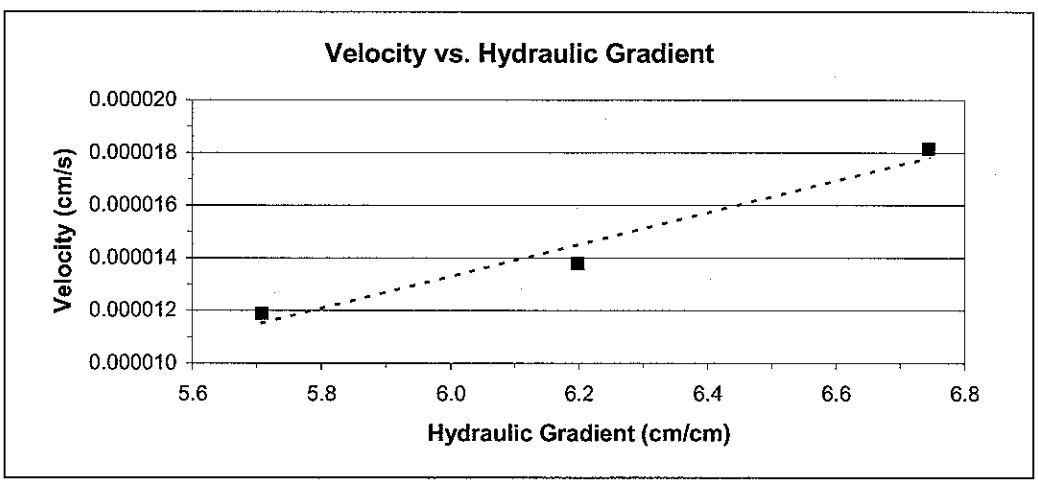
***Average Ksat* (cm/sec): 2.3E-06**

***Oversize Corrected Ksat* (cm/sec): NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not analyzed



Laboratory analysis by: D. O'Dowd

Data entered by: D. O'Dowd

Checked by: J. Hines

Particle Size Analysis

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
MVP 14-5	0.085	0.39	0.49	5.8	1.9	WS/H	Classification by ASTM 2487 requires Atterberg test	Sand	
MVP 14-10	0.00077	0.17	0.33	429	9.8	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam †	(Est)
MVP 14-15	0.019	0.47	0.74	39	1.8	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand †	
MVP 14-20	0.00098	0.013	0.020	20	1.3	WS/H	Classification by ASTM 2487 requires Atterberg test	Silt Loam	(Est)
MVP 14-25	0.00092	0.061	0.37	402	0.18	WS/H	Classification by ASTM 2487 requires Atterberg test	Loam †	(Est)
MVP 19-5	0.016	0.22	0.29	18	2.6	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
MVP 19-20	0.0082	0.36	0.56	68	1.9	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand †	
MVP 22-10	0.0047	0.26	0.46	98	2.4	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam †	
MVP 22-15	0.010	0.078	0.12	12	1.8	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam	
MVP 22-20	0.0013	0.031	0.051	39	0.83	WS/H	Classification by ASTM 2487 requires Atterberg test	Silt Loam †	(Est)
MVP 22-25	0.00040	0.0043	0.0082	21	0.69	WS/H	Classification by ASTM 2487 requires Atterberg test	Silty Clay Loam	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-5
Ring Number: NA
Depth: NA

Test Date: 9-Aug-06

Initial Dry Weight of Sample (g): 361.87
Weight Passing #10 (g): 340.12
Weight Retained #10 (g): 21.75
Weight of Hydrometer Sample (g): 49.59
Calculated Weight of Sieve Sample (g): 52.76

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	361.87	100.00
	2"	50	0.00	0.00	361.87	100.00
	1.5"	38.1	0.00	0.00	361.87	100.00
	1"	25	0.00	0.00	361.87	100.00
	3/4"	19.0	0.00	0.00	361.87	100.00
	3/8"	9.5	0.00	0.00	361.87	100.00
	4	4.75	1.47	1.47	360.40	99.59
	10	2.00	20.28	21.75	340.12	93.99
-10			(Based on calculated sieve wt.)			
	20	0.85	6.68	9.85	42.91	81.33
	40	0.425	14.14	23.99	28.77	54.53
	60	0.250	15.88	39.87	12.89	24.43
	140	0.106	7.17	47.04	5.72	10.84
	200	0.075	0.70	47.74	5.02	9.51
	dry pan		0.02	47.76	5.00	
	wet pan			5.00	0.00	

d_{10} (mm): 0.085 d_{50} (mm): 0.39
d_{16} (mm): 0.15 d_{60} (mm): 0.49
d_{30} (mm): 0.28 d_{84} (mm): 1.0

Median Particle Diameter--d_{50} (mm): 0.39
Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 5.8
Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 1.9
Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.51

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Sand

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

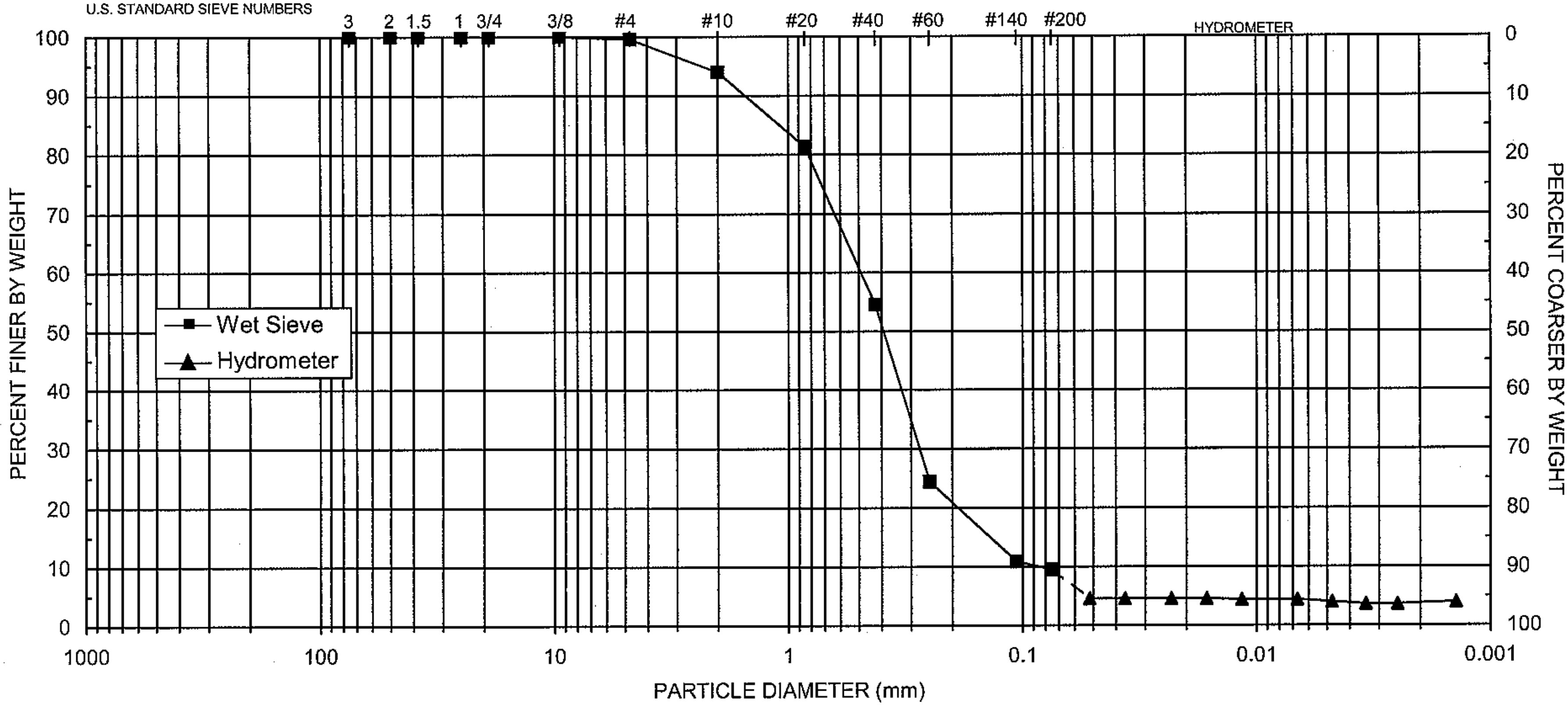
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with* H_2O_2*:*	NA
Sample Number:	MVP 14-5	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.65
Depth:	NA	*Initial Wt. (g):*	49.59
Test Date:	9-Aug-06	*Total Sample Wt. (g):*	361.87
Start Time:	9:15	*Wt. Passing #10 (g):*	340.12

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
16-Aug-06	1	21.5	8.0	5.6	2.4	15.0	0.05172	4.8	4.5
	2	21.5	8.0	5.6	2.4	15.0	0.03657	4.8	4.5
	5	21.5	8.0	5.6	2.4	15.0	0.02313	4.8	4.5
	10	21.5	8.0	5.6	2.4	15.0	0.01636	4.8	4.5
	20	21.4	8.0	5.7	2.3	15.0	0.01158	4.6	4.4
	60	21.1	8.0	5.7	2.3	15.0	0.00671	4.6	4.4
	120	20.7	8.0	5.9	2.1	15.0	0.00477	4.2	4.0
	240	19.8	8.0	6.1	1.9	15.0	0.00341	3.8	3.6
	447	19.8	8.0	6.1	1.9	15.0	0.00250	3.8	3.6
17-Aug-06	1394	20.4	8.0	5.9	2.1	15.0	0.00140	4.2	4.0

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.085**	d_{30} = **0.28**	d_{50} = **0.39**	d_{60} = **0.49**	C_u = **5.8**	C_c = **1.9**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 14-5	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sand**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Re[illegible]	*Initial Dry Weight of Sample (g):*	408.37
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	352.05
Sample Number:	MVP 14-10	*Weight Retained #10 (g):*	56.32
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	53.80
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	62.41
Test Date:	9-Aug-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	408.37	100.00
	2"	50	0.00	0.00	408.37	100.00
	1.5"	38.1	0.00	0.00	408.37	100.00
	1"	25	0.00	0.00	408.37	100.00
	3/4"	19.0	0.00	0.00	408.37	100.00
	3/8"	9.5	5.31	5.31	403.06	98.70
	4	4.75	11.12	16.43	391.94	95.98
	10	2.00	39.89	56.32	352.05	86.21
-10			(Based on calculated sieve wt.)			
	20	0.85	6.62	15.23	47.18	75.60
	40	0.425	7.17	22.40	40.01	64.11
	60	0.250	5.70	28.10	34.31	54.98
	140	0.106	7.38	35.48	26.93	43.15
	200	0.075	2.50	37.98	24.43	39.15
	dry pan		0.23	38.21	24.20	
	wet pan			24.20	0.00	

d_{10} (mm): 0.00077 d_{50} (mm): 0.17

d_{16} (mm): 0.0057 d_{60} (mm): 0.33

d_{30} (mm): 0.050 d_{84} (mm): 1.7

Median Particle Diameter--d_{50} (mm): 0.17

Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 429

Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 9.8

Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.63

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Sandy Loam †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous

Data entered by: C. Krous

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

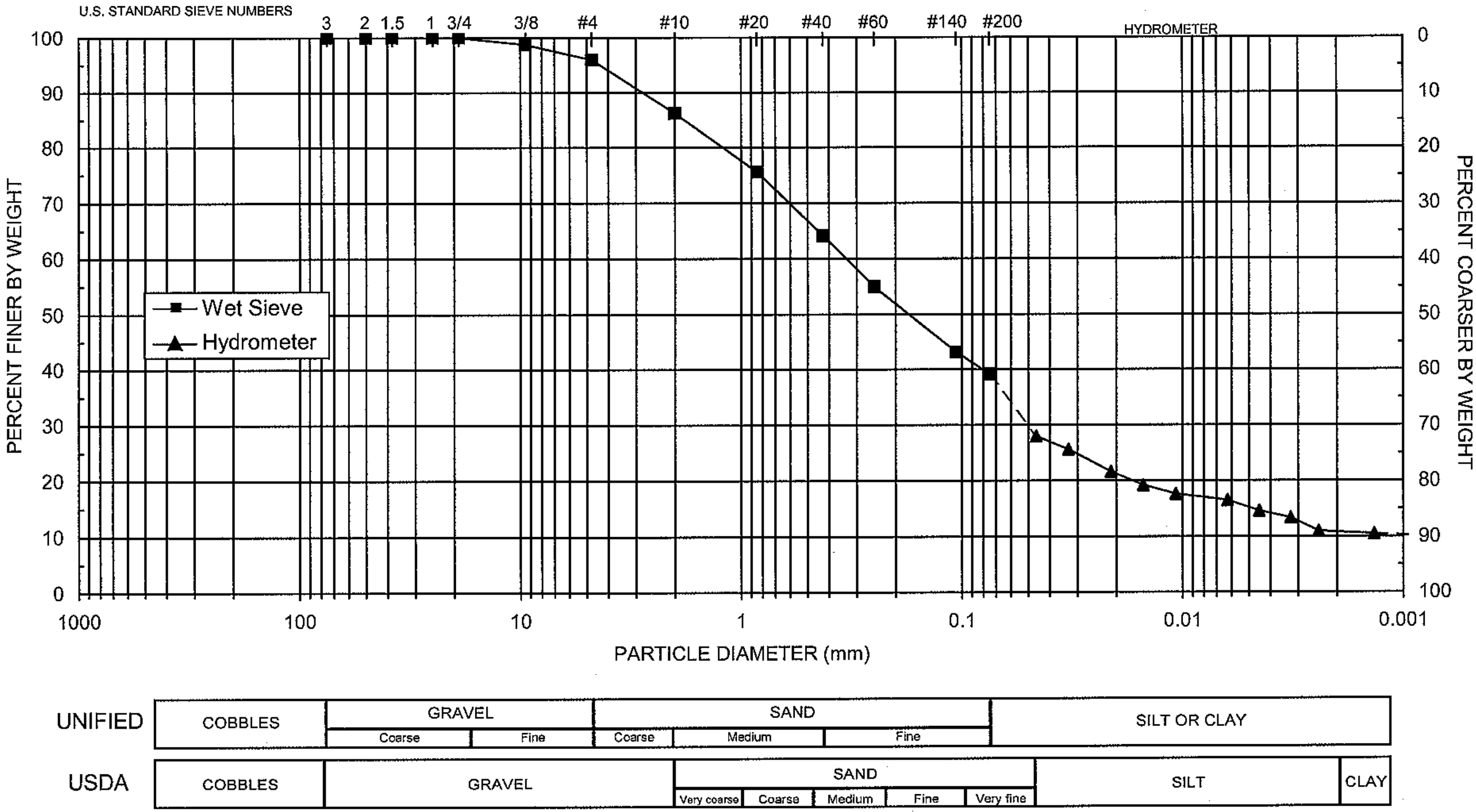
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	MVP 14-10	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.70
Depth:	NA	*Initial Wt. (g):*	53.80
Test Date:	9-Aug-06	*Total Sample Wt. (g):*	408.37
Start Time:	9:45	*Wt. Passing #10 (g):*	352.05

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
16-Aug-06	1	22.5	23.0	5.4	17.6	12.5	0.04604	32.4	27.9
	2	22.5	21.5	5.4	16.1	12.8	0.03288	29.6	25.5
	5	22.5	19.0	5.4	13.6	13.2	0.02112	25.0	21.6
	10	22.5	17.5	5.4	12.1	13.4	0.01508	22.3	19.2
	20	22.3	16.5	5.4	11.1	13.6	0.01075	20.4	17.6
	60	21.8	16.0	5.6	10.4	13.7	0.00626	19.1	16.5
	120	21.0	15.0	5.8	9.2	13.8	0.00450	16.9	14.6
	240	19.8	14.5	6.1	8.4	13.9	0.00324	15.5	13.3
	439	19.7	13.0	6.1	6.9	14.2	0.00242	12.7	10.9
17-Aug-06	1379	20.4	12.5	5.9	6.6	14.3	0.00136	12.1	10.5

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



d_{10} = **0.00077**	d_{30} = **0.050**	d_{50} = **0.17**	d_{60} = **0.33**	C_u = **429**	C_c = **9.8**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 14-10	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sandy Loam †**

† Greater than 10% of sample is coarse material

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Quantification of Nitrogen Re
Job Number: WR06.0034.00
Sample Number: MVP 14-15
Ring Number: NA
Depth: NA

Test Date: 9-Aug-06

Initial Dry Weight of Sample (g): 467.82
Weight Passing #10 (g): 376.39
Weight Retained #10 (g): 91.43
Weight of Hydrometer Sample (g): 53.11
Calculated Weight of Sieve Sample (g): 66.01

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	467.82	100.00
	2"	50	0.00	0.00	467.82	100.00
	1.5"	38.1	0.00	0.00	467.82	100.00
	1"	25	0.00	0.00	467.82	100.00
	3/4"	19.0	0.00	0.00	467.82	100.00
	3/8"	9.5	0.00	0.00	467.82	100.00
	4	4.75	12.90	12.90	454.92	97.24
	10	2.00	78.53	91.43	376.39	80.46
-10			(Based on calculated sieve wt.)			
	20	0.85	11.60	24.50	41.51	62.88
	40	0.425	9.80	34.30	31.71	48.04
	60	0.250	7.01	41.31	24.70	37.42
	140	0.106	9.39	50.70	15.31	23.19
	200	0.075	2.23	52.93	13.08	19.81
	dry pan		0.32	53.25	12.76	
	wet pan			12.76	0.00	

d_{10} (mm): 0.019
d_{16} (mm): 0.057
d_{30} (mm): 0.16
d_{50} (mm): 0.47
d_{60} (mm): 0.74
d_{84} (mm): 2.4

Median Particle Diameter--d_{50} (mm): 0.47
Uniformity Coefficient, Cu--[d_{60}/d_{10}] (mm): 39
Coefficient of Curvature, Cc--[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 1.8
Mean Particle Diameter--[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.98

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Loamy Sand †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-15
Ring Number: NA
Depth: NA

Test Date: 9-Aug-06
Start Time: 9:51

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.69

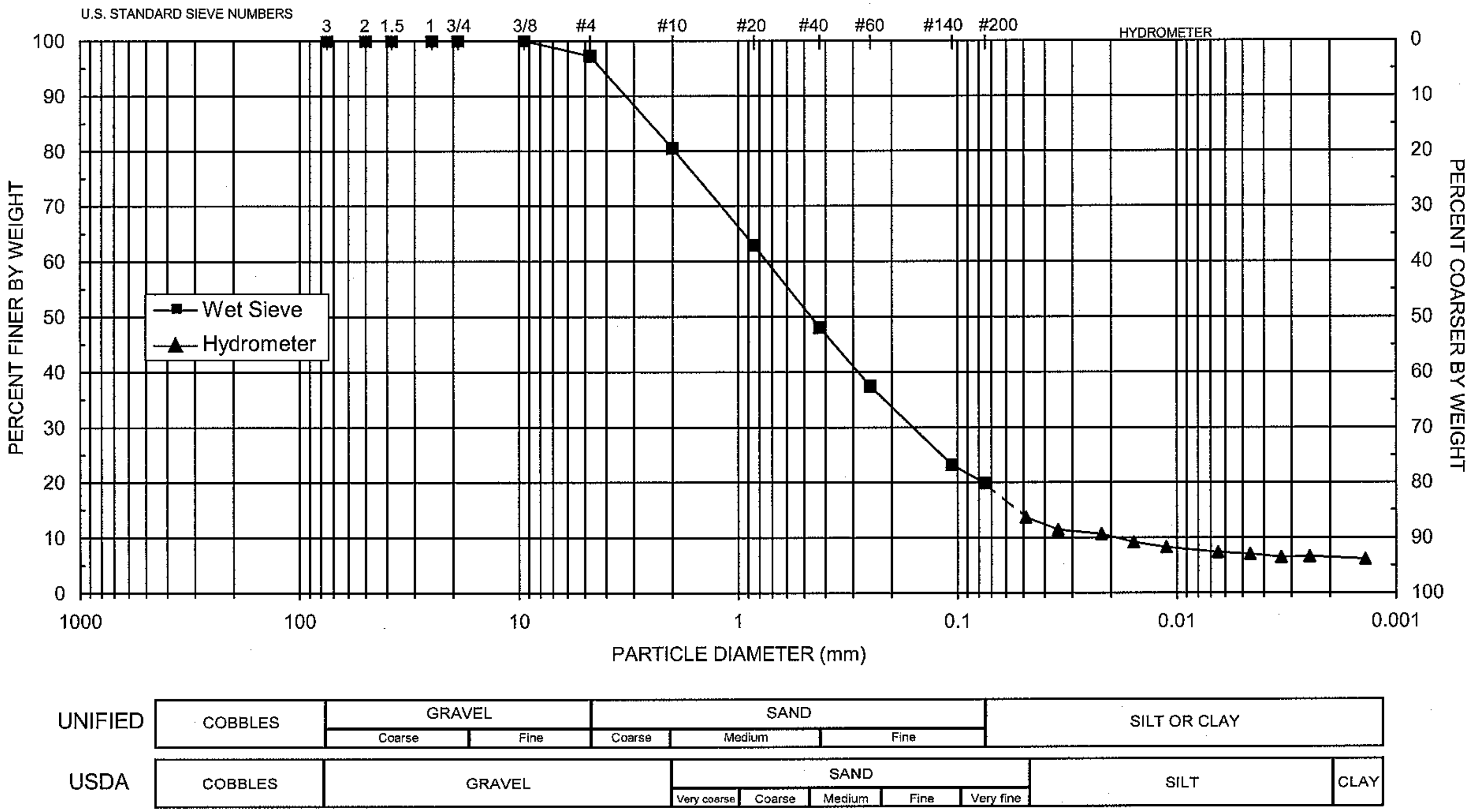
Initial Wt. (g): 53.11
Total Sample Wt. (g): 467.82
Wt. Passing #10 (g): 376.39

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
16-Aug-06	1	22.3	14.5	5.4	9.1	13.9	0.04880	17.0	13.6
	2	22.3	13.0	5.4	7.6	14.2	0.03481	14.2	11.4
	5	22.3	12.5	5.4	7.1	14.3	0.02208	13.2	10.6
	10	22.3	11.5	5.4	6.1	14.4	0.01570	11.4	9.1
	20	22.1	11.0	5.5	5.5	14.5	0.01116	10.3	8.2
	60	21.7	10.5	5.6	4.9	14.6	0.00649	9.1	7.3
	120	20.9	10.5	5.8	4.7	14.6	0.00464	8.8	7.0
	240	19.6	10.5	6.2	4.3	14.6	0.00333	8.0	6.4
	434	19.7	10.5	6.1	4.4	14.6	0.00248	8.2	6.6
17-Aug-06	1376	20.4	10.0	5.9	4.1	14.7	0.00138	7.6	6.1

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



d_{10} = **0.019**	d_{30} = **0.16**	d_{50} = **0.47**	d_{60} = **0.74**	C_u = **39**	C_c = **1.8**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 14-15	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Loamy Sand †**

† Greater than 10% of sample is coarse material

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Removal	*Initial Dry Weight of Sample (g):*	359.43
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	359.11
Sample Number:	MVP 14-20	*Weight Retained #10 (g):*	0.32
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	50.24
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	50.28
Test Date:	9-Aug-06	*Shape:*	Angular
		Hardness:	Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	359.43	100.00
	2"	50	0.00	0.00	359.43	100.00
	1.5"	38.1	0.00	0.00	359.43	100.00
	1"	25	0.00	0.00	359.43	100.00
	3/4"	19.0	0.00	0.00	359.43	100.00
	3/8"	9.5	0.00	0.00	359.43	100.00
	4	4.75	0.00	0.00	359.43	100.00
	10	2.00	0.32	0.32	359.11	99.91
-10			(Based on calculated sieve wt.)			
	20	0.85	0.43	0.47	49.81	99.06
	40	0.425	0.68	1.15	49.13	97.70
	60	0.250	0.64	1.79	48.49	96.43
	140	0.106	1.55	3.34	46.94	93.35
	200	0.075	1.41	4.75	45.53	90.54
	dry pan		0.22	4.97	45.31	
	wet pan			45.31	0.00	

d_{10} (mm): 0.00098 d_{50} (mm): 0.013

d_{16} (mm): 0.0024 d_{60} (mm): 0.020

d_{30} (mm): 0.0050 d_{84} (mm): 0.060

Median Particle Diameter--d_{50} (mm): 0.013

Uniformity Coefficient, Cu--[d_{60}/d_{10}] (mm): 20

Coefficient of Curvature, Cc--[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 1.3

Mean Particle Diameter--[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.025

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Silt Loam

Laboratory analysis by: C. Krous

Data entered by: C. Krous

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

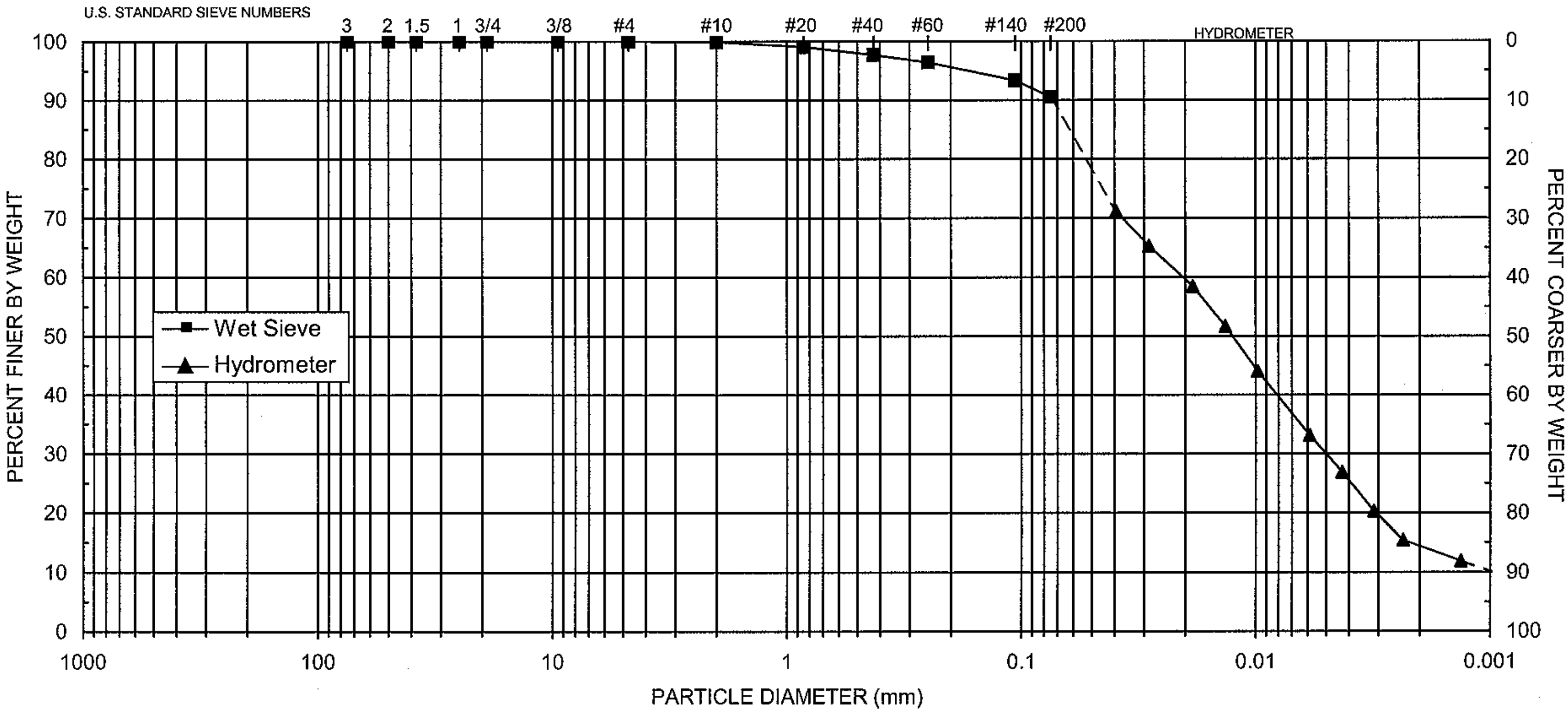
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	MVP 14-20	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.77
Depth:	NA	*Initial Wt. (g):*	50.24
Test Date:	9-Aug-06	*Total Sample Wt. (g):*	359.43
Start Time:	9:39	*Wt. Passing #10 (g):*	359.11

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
16-Aug-06	1	22.1	42.0	5.5	36.5	9.4	0.03934	71.2	71.1
	2	22.1	39.0	5.5	33.5	9.9	0.02853	65.3	65.3
	5	22.1	35.5	5.5	30.0	10.5	0.01856	58.5	58.5
	10	22.1	32.0	5.5	26.5	11.1	0.01348	51.7	51.6
	20	22.2	28.0	5.4	22.6	11.7	0.00980	44.1	44.0
	60	22.0	22.5	5.5	17.0	12.6	0.00588	33.2	33.1
	120	21.2	19.5	5.7	13.8	13.1	0.00428	26.9	26.9
	240	20.0	16.5	6.1	10.4	13.6	0.00313	20.3	20.3
	443	19.7	14.0	6.1	7.9	14.0	0.00235	15.4	15.4
17-Aug-06	1381	20.4	12.0	5.9	6.1	14.3	0.00133	11.9	11.9

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		Coarse	Fine	Coarse	Medium	Fine			

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.00098**	d_{30} = **0.0050**	d_{50} = **0.013**	d_{60} = **0.020**	C_u = **20**	C_c = **1.3**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 14-20	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Silt Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-25
Ring Number: NA
Depth: NA
Test Date: 9-Aug-06

Initial Dry Weight of Sample (g): 259.70
Weight Passing #10 (g): 195.13
Weight Retained #10 (g): 64.57
Weight of Hydrometer Sample (g): 57.74
Calculated Weight of Sieve Sample (g): 76.85
Shape: Angular
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	259.70	100.00
	2"	50	0.00	0.00	259.70	100.00
	1.5"	38.1	0.00	0.00	259.70	100.00
	1"	25	0.00	0.00	259.70	100.00
	3/4"	19.0	0.00	0.00	259.70	100.00
	3/8"	9.5	7.54	7.54	252.16	97.10
	4	4.75	20.40	27.94	231.76	89.24
	10	2.00	36.63	64.57	195.13	75.14
-10			(Based on calculated sieve wt.)			
	20	0.85	6.78	25.89	50.96	66.31
	40	0.425	4.14	30.03	46.82	60.93
	60	0.250	2.53	32.56	44.29	57.63
	140	0.106	2.87	35.43	41.42	53.90
	200	0.075	1.04	36.47	40.38	52.55
	dry pan		0.07	36.54	40.31	
	wet pan			40.31	0.00	

d_{10} (mm): 0.00092
d_{16} (mm): 0.0024
d_{30} (mm): 0.0078
d_{50} (mm): 0.061
d_{60} (mm): 0.37
d_{84} (mm): 3.4

Median Particle Diameter--d_{50} (mm): 0.061
Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 402
Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.18
Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 1.2

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Loam †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-25
Ring Number: NA
Depth: NA
Test Date: 9-Aug-06
Start Time: 9:57

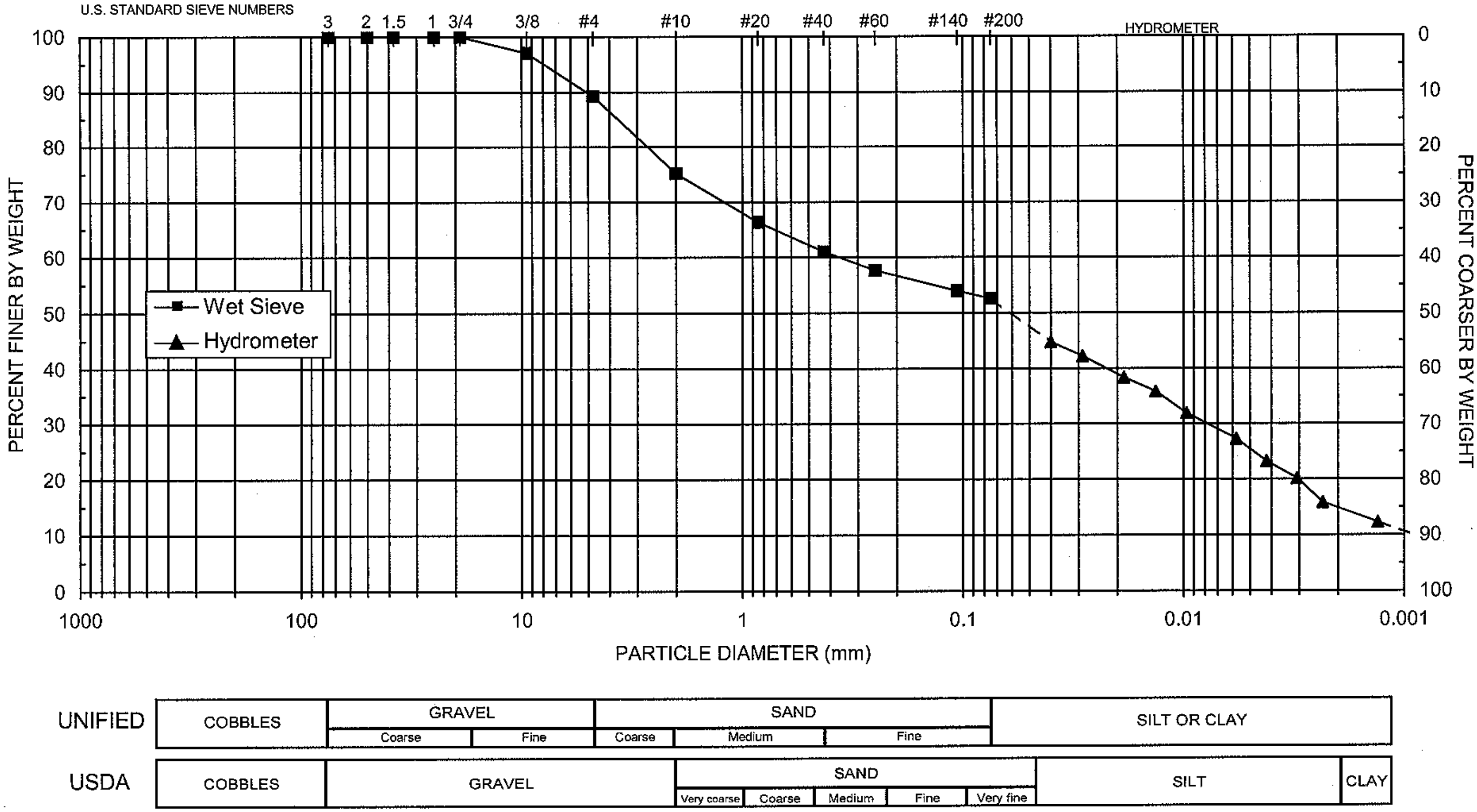
Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.75
Initial Wt. (g): 57.74
Total Sample Wt. (g): 259.70
Wt. Passing #10 (g): 195.13

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
16-Aug-06	1	22.3	40.5	5.4	35.1	9.7	0.04002	59.6	44.8
	2	22.3	38.5	5.4	33.1	10.0	0.02878	56.2	42.2
	5	22.3	35.5	5.4	30.1	10.5	0.01864	51.1	38.4
	10	22.3	33.5	5.4	28.1	10.8	0.01339	47.7	35.8
	20	22.0	30.5	5.5	25.0	11.3	0.00971	42.4	31.9
	60	21.6	27.0	5.6	21.4	11.9	0.00578	36.3	27.3
	120	20.8	24.0	5.8	18.2	12.4	0.00421	30.9	23.2
	240	19.6	22.0	6.2	15.8	12.7	0.00306	26.8	20.1
	430	19.7	18.5	6.1	12.4	13.3	0.00234	21.0	15.8
17-Aug-06	1372	20.4	15.5	5.9	9.6	13.8	0.00132	16.3	12.2

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



d_{10} = **0.00092**	d_{30} = **0.0078**	d_{50} = **0.061**	d_{60} = **0.37**	C_u = **402**	C_c = **0.18**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 14-25	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Loam** †

† Greater than 10% of sample is coarse material

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Quantification of Nitrogen Re
Job Number: WR06.0034.00
Sample Number: MVP 19-5
Ring Number: NA
Depth: NA

Test Date: 9-Aug-06

Initial Dry Weight of Sample (g): 424.89
Weight Passing #10 (g): 420.03
Weight Retained #10 (g): 4.86
Weight of Hydrometer Sample (g): 60.39
Calculated Weight of Sieve Sample (g): 61.09

Shape: Angular
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	424.89	100.00
	2"	50	0.00	0.00	424.89	100.00
	1.5"	38.1	0.00	0.00	424.89	100.00
	1"	25	0.00	0.00	424.89	100.00
	3/4"	19.0	0.00	0.00	424.89	100.00
	3/8"	9.5	0.00	0.00	424.89	100.00
	4	4.75	0.00	0.00	424.89	100.00
	10	2.00	4.86	4.86	420.03	98.86
-10			(Based on calculated sieve wt.)			
	20	0.85	6.02	6.72	54.37	89.00
	40	0.425	8.57	15.29	45.80	74.97
	60	0.250	12.95	28.24	32.85	53.77
	140	0.106	15.58	43.82	17.27	28.27
	200	0.075	3.20	47.02	14.07	23.03
	dry pan		0.22	47.24	13.85	
	wet pan			13.85	0.00	

d_{10} (mm): 0.016 d_{50} (mm): 0.22
d_{16} (mm): 0.054 d_{60} (mm): 0.29
d_{30} (mm): 0.11 d_{84} (mm): 0.66

Median Particle Diameter--d_{50} (mm): 0.22
Uniformity Coefficient, Cu--[d_{60}/d_{10}] (mm): 18
Coefficient of Curvature, Cc--[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 2.6
Mean Particle Diameter--[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.31

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Loamy Sand

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 19-5
Ring Number: NA
Depth: NA

Test Date: 9-Aug-06
Start Time: 9:38

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.71

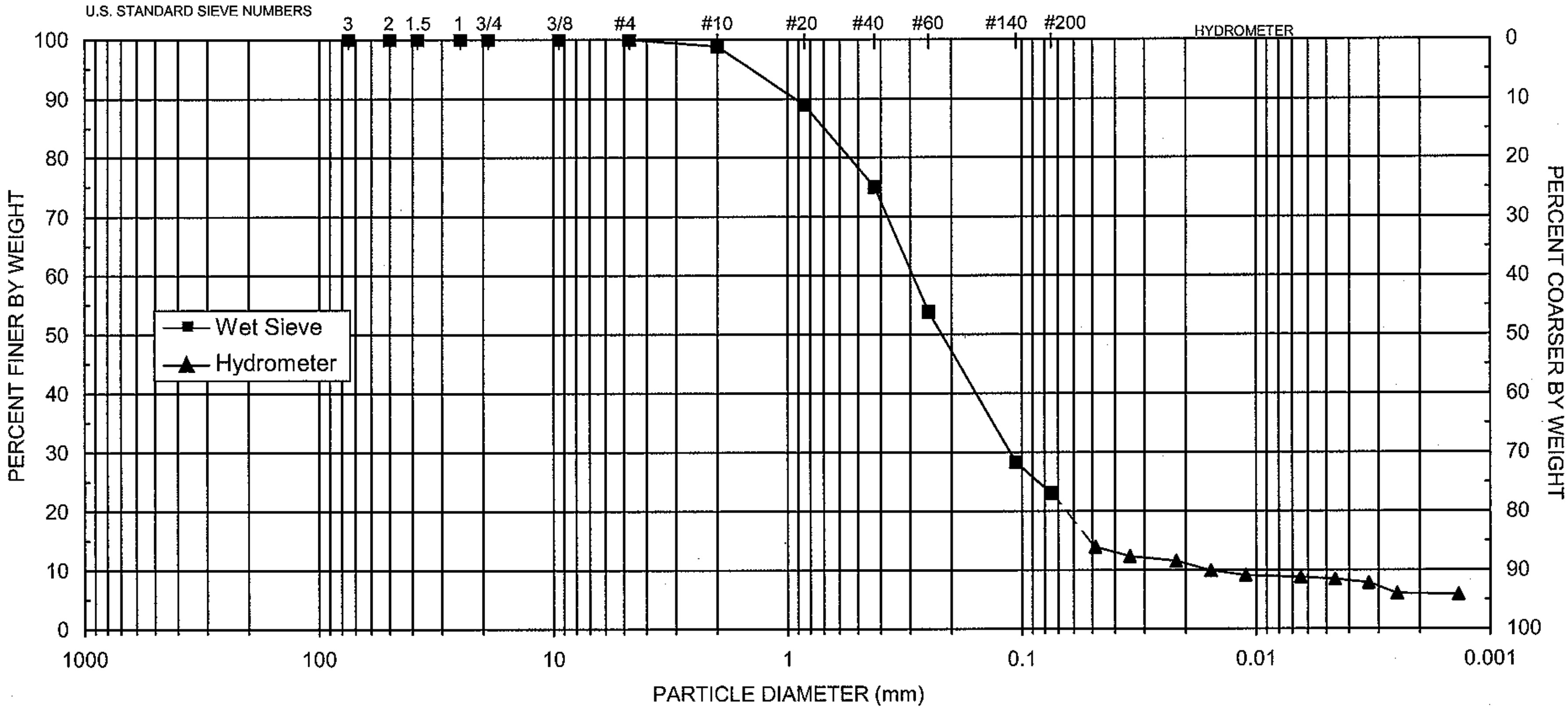
Initial Wt. (g): 60.39
Total Sample Wt. (g): 424.89
Wt. Passing #10 (g): 420.03

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
15-Aug-06	1	22.5	14.0	5.4	8.6	14.0	0.04859	14.1	13.9
	2	22.5	13.0	5.4	7.6	14.2	0.03456	12.5	12.3
	5	22.5	12.5	5.4	7.1	14.3	0.02192	11.6	11.5
	10	22.5	11.5	5.4	6.1	14.4	0.01559	10.0	9.9
	20	22.4	11.0	5.4	5.6	14.5	0.01107	9.2	9.1
	60	21.7	11.0	5.6	5.4	14.5	0.00644	8.9	8.8
	120	20.9	11.0	5.8	5.2	14.5	0.00460	8.5	8.4
	242	19.5	11.0	6.2	4.8	14.5	0.00330	7.9	7.8
	429	19.2	10.0	6.3	3.7	14.7	0.00250	6.1	6.0
16-Aug-06	1398	20.5	9.5	5.9	3.6	14.7	0.00137	5.9	5.8

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.016**	d_{30} = **0.11**	d_{50} = **0.22**	d_{60} = **0.29**	C_u = **18**	C_c = **2.6**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 19-5	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Loamy Sand**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Re	*Initial Dry Weight of Sample (g):*	420.20
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	363.53
Sample Number:	MVP 19-20	*Weight Retained #10 (g):*	56.67
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	51.04
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	59.00
Test Date:	9-Aug-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	420.20	100.00
	2"	50	0.00	0.00	420.20	100.00
	1.5"	38.1	0.00	0.00	420.20	100.00
	1"	25	0.00	0.00	420.20	100.00
	3/4"	19.0	0.00	0.00	420.20	100.00
	3/8"	9.5	0.00	0.00	420.20	100.00
	4	4.75	1.02	1.02	419.18	99.76
	10	2.00	55.65	56.67	363.53	86.51
-10			(Based on calculated sieve wt.)			
	20	0.85	9.91	17.87	41.13	69.72
	40	0.425	9.36	27.23	31.77	53.85
	60	0.250	6.72	33.95	25.05	42.46
	140	0.106	6.73	40.68	18.32	31.05
	200	0.075	1.81	42.49	16.51	27.98
	dry pan		0.35	42.84	16.16	
	wet pan			16.16	0.00	

d_{10} (mm): 0.0082 d_{50} (mm): 0.36

d_{16} (mm): 0.021 d_{60} (mm): 0.56

d_{30} (mm): 0.094 d_{84} (mm): 1.8

Median Particle Diameter--d_{50} (mm): 0.36

Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 68

Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 1.9

Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.73

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Loamy Sand †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 19-20
Ring Number: NA
Depth: NA

Test Date: 9-Aug-06
Start Time: 9:26

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.73

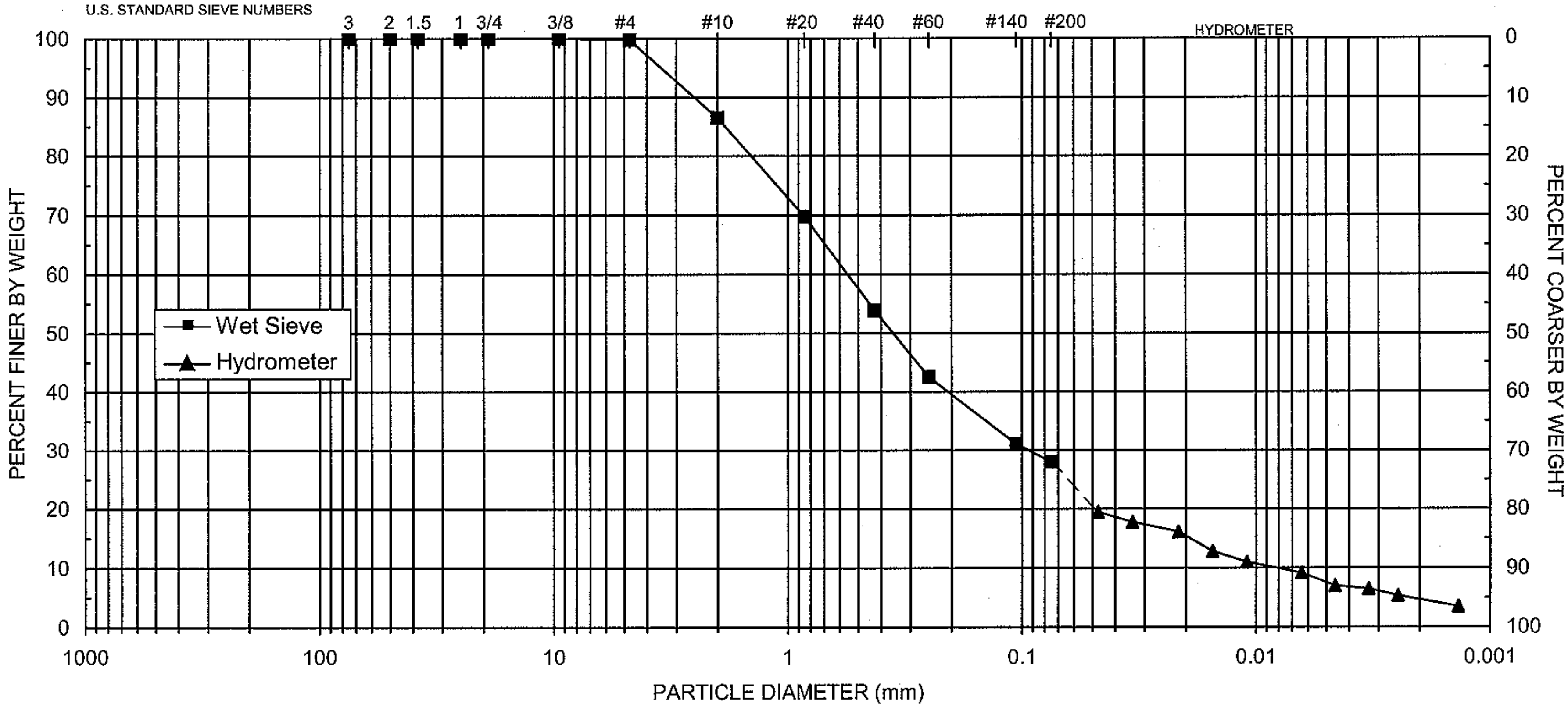
Initial Wt. (g): 51.04
Total Sample Wt. (g): 420.20
Wt. Passing #10 (g): 363.53

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
15-Aug-06	1	22.6	17.0	5.3	11.7	13.5	0.04741	22.5	19.4
	2	22.6	16.0	5.3	10.7	13.7	0.03372	20.5	17.8
	5	22.6	15.0	5.3	9.7	13.8	0.02146	18.6	16.1
	10	22.6	13.0	5.3	7.7	14.2	0.01535	14.8	12.8
	20	22.4	12.0	5.4	6.6	14.3	0.01094	12.7	11.0
	60	21.9	11.0	5.5	5.5	14.5	0.00639	10.6	9.1
	120	21.0	10.0	5.8	4.2	14.7	0.00459	8.1	7.0
	240	19.7	10.0	6.1	3.9	14.7	0.00330	7.5	6.5
	437	19.2	9.5	6.3	3.2	14.7	0.00247	6.1	5.3
16-Aug-06	1402	20.6	8.0	5.9	2.1	15.0	0.00137	4.0	3.5

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.0082**	d_{30} = **0.094**	d_{50} = **0.36**	d_{60} = **0.56**	C_u = **68**	C_c = **1.9**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 19-20	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Loamy Sand †**

† Greater than 10% of sample is coarse material

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Re[illegible]	*Initial Dry Weight of Sample (g):*	436.74
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	371.90
Sample Number:	MVP 22-10	*Weight Retained #10 (g):*	64.84
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	57.23
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	67.21
Test Date:	9-Aug-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	436.74	100.00
	2"	50	0.00	0.00	436.74	100.00
	1.5"	38.1	0.00	0.00	436.74	100.00
	1"	25	0.00	0.00	436.74	100.00
	3/4"	19.0	0.00	0.00	436.74	100.00
	3/8"	9.5	0.00	0.00	436.74	100.00
	4	4.75	6.20	6.20	430.54	98.58
	10	2.00	58.64	64.84	371.90	85.15
-10			(Based on calculated sieve wt.)			
	20	0.85	9.74	19.72	47.49	70.66
	40	0.425	8.20	27.92	39.29	58.46
	60	0.250	6.08	34.00	33.21	49.41
	140	0.106	9.56	43.56	23.65	35.19
	200	0.075	3.02	46.58	20.63	30.70
	dry pan		0.16	46.74	20.47	
	wet pan			20.47	0.00	

d_{10} (mm):	0.0047	d_{50} (mm):	0.26
d_{16} (mm):	0.023	d_{60} (mm):	0.46
d_{30} (mm):	0.072	d_{84} (mm):	1.9

Median Particle Diameter--d_{50} (mm): 0.26

Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 98

Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 2.4

Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.73

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Sandy Loam †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

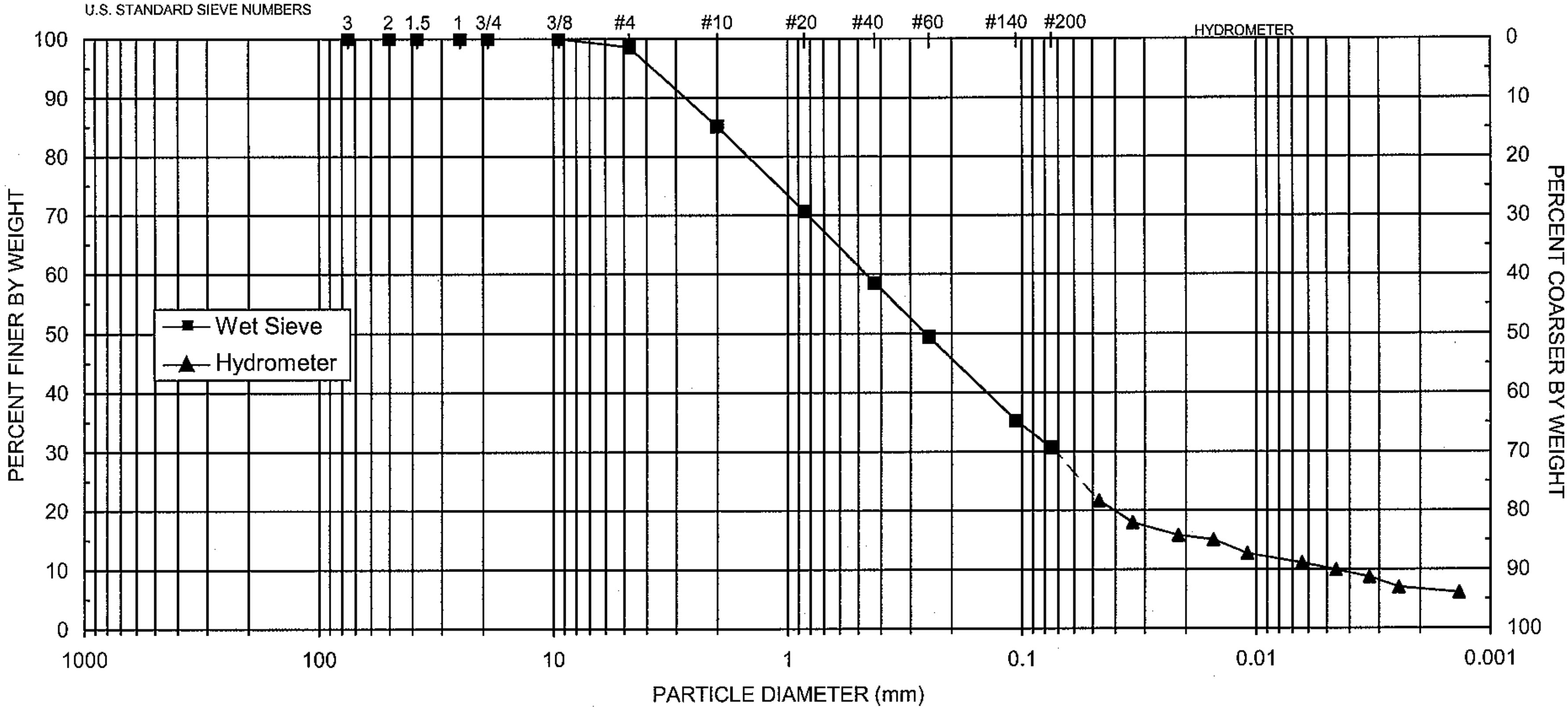
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with* H_2O_2:	NA
Sample Number:	MVP 22-10	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.70
Depth:	NA	*Initial Wt. (g):*	57.23
Test Date:	9-Aug-06	*Total Sample Wt. (g):*	436.74
Start Time:	9:20	*Wt. Passing #10 (g):*	371.90

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
15-Aug-06	1	22.6	20.0	5.3	14.7	13.0	0.04693	25.4	21.7
	2	22.6	17.5	5.3	12.2	13.4	0.03371	21.1	18.0
	5	22.6	16.0	5.3	10.7	13.7	0.02151	18.5	15.8
	10	22.6	15.5	5.3	10.2	13.8	0.01526	17.6	15.0
	20	22.4	14.0	5.4	8.6	14.0	0.01091	14.9	12.7
	60	21.9	13.0	5.5	7.5	14.2	0.00637	13.0	11.0
	120	21.0	12.5	5.8	6.7	14.3	0.00457	11.6	9.9
	240	19.8	12.0	6.1	5.9	14.3	0.00329	10.2	8.7
	440	19.1	11.0	6.3	4.7	14.5	0.00247	8.1	6.9
16-Aug-06	1401	20.6	10.0	5.9	4.1	14.7	0.00136	7.1	6.0

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY				
		Coarse	Fine	Coarse	Medium	Fine					
USDA	COBBLES	GRAVEL	SAND					SILT	CLAY		
			Very coarse	Coarse	Medium	Fine	Very fine				

d_{10} = **0.0047**	d_{30} = **0.072**	d_{50} = **0.26**	d_{60} = **0.46**	C_u = **98**	C_c = **2.4**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 22-10	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sandy Loam** †

† Greater than 10% of sample is coarse material

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Re	*Initial Dry Weight of Sample (g):*	417.96
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	394.52
Sample Number:	MVP 22-15	*Weight Retained #10 (g):*	23.44
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	54.22
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	57.44
Test Date:	9-Aug-06	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	417.96	100.00
	2"	50	0.00	0.00	417.96	100.00
	1.5"	38.1	0.00	0.00	417.96	100.00
	1"	25	0.00	0.00	417.96	100.00
	3/4"	19.0	0.00	0.00	417.96	100.00
	3/8"	9.5	0.00	0.00	417.96	100.00
	4	4.75	4.88	4.88	413.08	98.83
	10	2.00	18.56	23.44	394.52	94.39
-10			(Based on calculated sieve wt.)			
	20	0.85	4.45	7.67	49.77	86.64
	40	0.425	4.17	11.84	45.60	79.39
	60	0.250	3.70	15.54	41.90	72.94
	140	0.106	9.08	24.62	32.82	57.14
	200	0.075	4.68	29.30	28.14	48.99
	dry pan		0.58	29.88	27.56	
	wet pan			27.56	0.00	

d_{10} (mm):	0.010	d_{50} (mm):	0.078
d_{16} (mm):	0.021	d_{60} (mm):	0.12
d_{30} (mm):	0.046	d_{84} (mm):	0.66

Median Particle Diameter--d_{50} (mm): 0.078

Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 12

Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 1.8

Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.25

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Sandy Loam

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

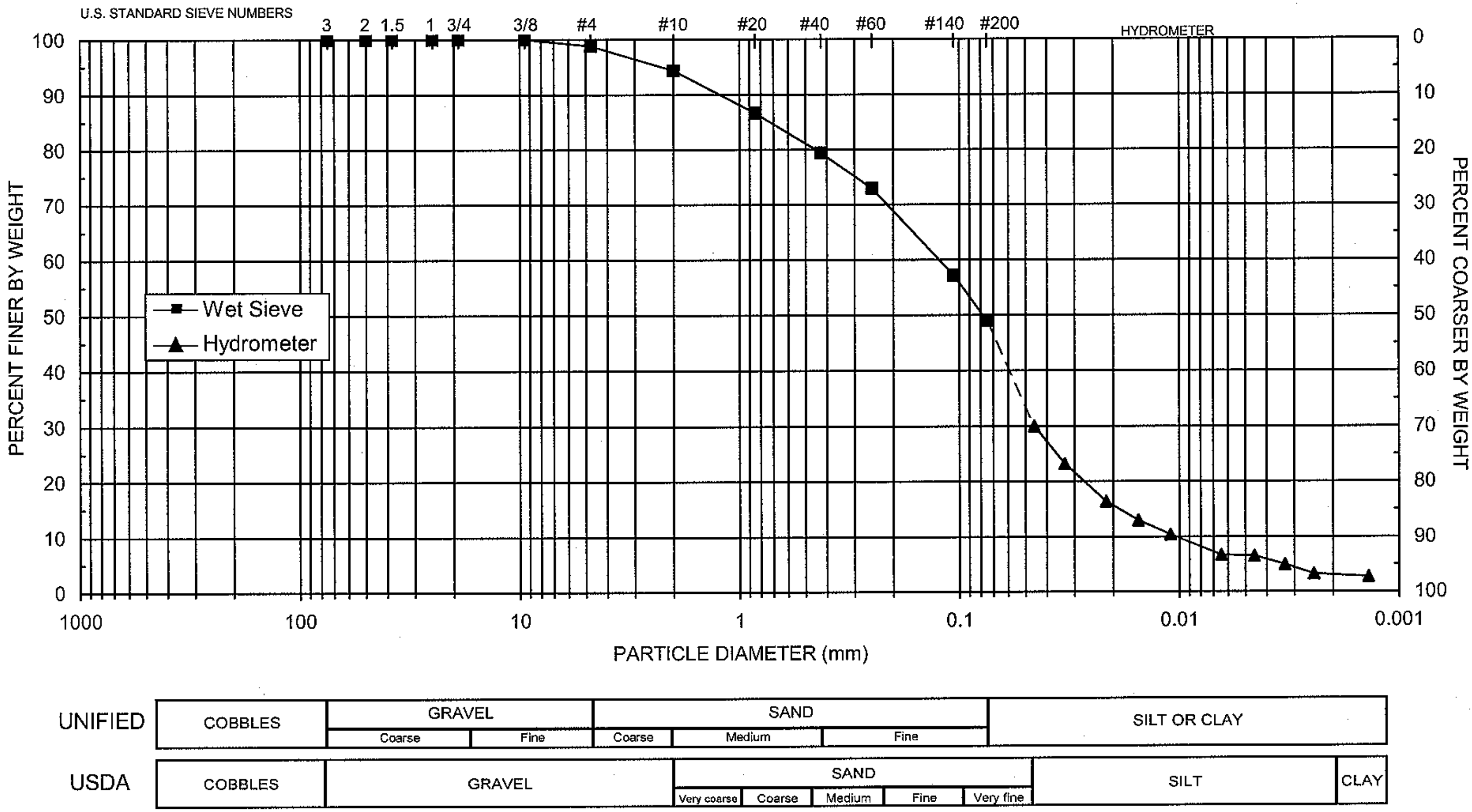
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	MVP 22-15	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.73
Depth:	NA	*Initial Wt. (g):*	54.22
Test Date:	9-Aug-06	*Total Sample Wt. (g):*	417.96
Start Time:	9:33	*Wt. Passing #10 (g):*	394.52

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
16-Aug-06	1	22.4	23.0	5.4	17.6	12.5	0.04574	31.8	30.0
	2	22.4	19.0	5.4	13.6	13.2	0.03318	24.6	23.2
	5	22.4	15.0	5.4	9.6	13.8	0.02150	17.4	16.4
	10	22.4	13.0	5.4	7.6	14.2	0.01538	13.7	13.0
	20	22.3	11.5	5.4	6.1	14.4	0.01098	11.0	10.4
	60	21.8	9.5	5.6	3.9	14.7	0.00645	7.0	6.7
	122	21.1	9.5	5.7	3.8	14.7	0.00456	6.9	6.5
	240	19.9	9.0	6.1	2.9	14.8	0.00331	5.2	4.9
	448	19.8	8.0	6.1	1.9	15.0	0.00244	3.4	3.2
17-Aug-06	1385	20.5	7.5	5.9	1.6	15.1	0.00138	2.9	2.7

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



d_{10} = **0.010**	d_{30} = **0.046**	d_{50} = **0.078**	d_{60} = **0.12**	C_u = **12**	C_c = **1.8**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 22-15	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sandy Loam**

Daniel B. Stephens & Associates, Inc.

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Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Quantification of Nitrogen Removal	*Initial Dry Weight of Sample (g):*	363.73
Job Number:	WR06.0034.00	*Weight Passing #10 (g):*	310.45
Sample Number:	MVP 22-20	*Weight Retained #10 (g):*	53.28
Ring Number:	NA	*Weight of Hydrometer Sample (g):*	49.64
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	58.16
Test Date:	9-Aug-06	*Shape:*	Angular
		Hardness:	Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	363.73	100.00
	2"	50	0.00	0.00	363.73	100.00
	1.5"	38.1	0.00	0.00	363.73	100.00
	1"	25	0.00	0.00	363.73	100.00
	3/4"	19.0	0.00	0.00	363.73	100.00
	3/8"	9.5	0.00	0.00	363.73	100.00
	4	4.75	20.68	20.68	343.05	94.31
	10	2.00	32.60	53.28	310.45	85.35
-10			(Based on calculated sieve wt.)			
	20	0.85	2.01	10.53	47.63	81.90
	40	0.425	2.06	12.59	45.57	78.35
	60	0.250	1.47	14.06	44.10	75.83
	140	0.106	2.35	16.41	41.75	71.79
	200	0.075	1.34	17.75	40.41	69.48
	dry pan		0.35	18.10	40.06	
	wet pan			40.06	0.00	

d_{10} (mm): 0.0013　　d_{50} (mm): 0.031

d_{16} (mm): 0.0027　　d_{60} (mm): 0.051

d_{30} (mm): 0.0074　　d_{84} (mm): 1.4

Median Particle Diameter --d_{50} (mm): 0.031

Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 39

Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.83

Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.48

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: Silt Loam †

† Greater than 10% of sample is coarse material

Laboratory analysis by: C. Krous

Data entered by: C. Krous

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 22-20
Ring Number: NA
Depth: NA

Test Date: 9-Aug-06
Start Time: 9:21

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.73

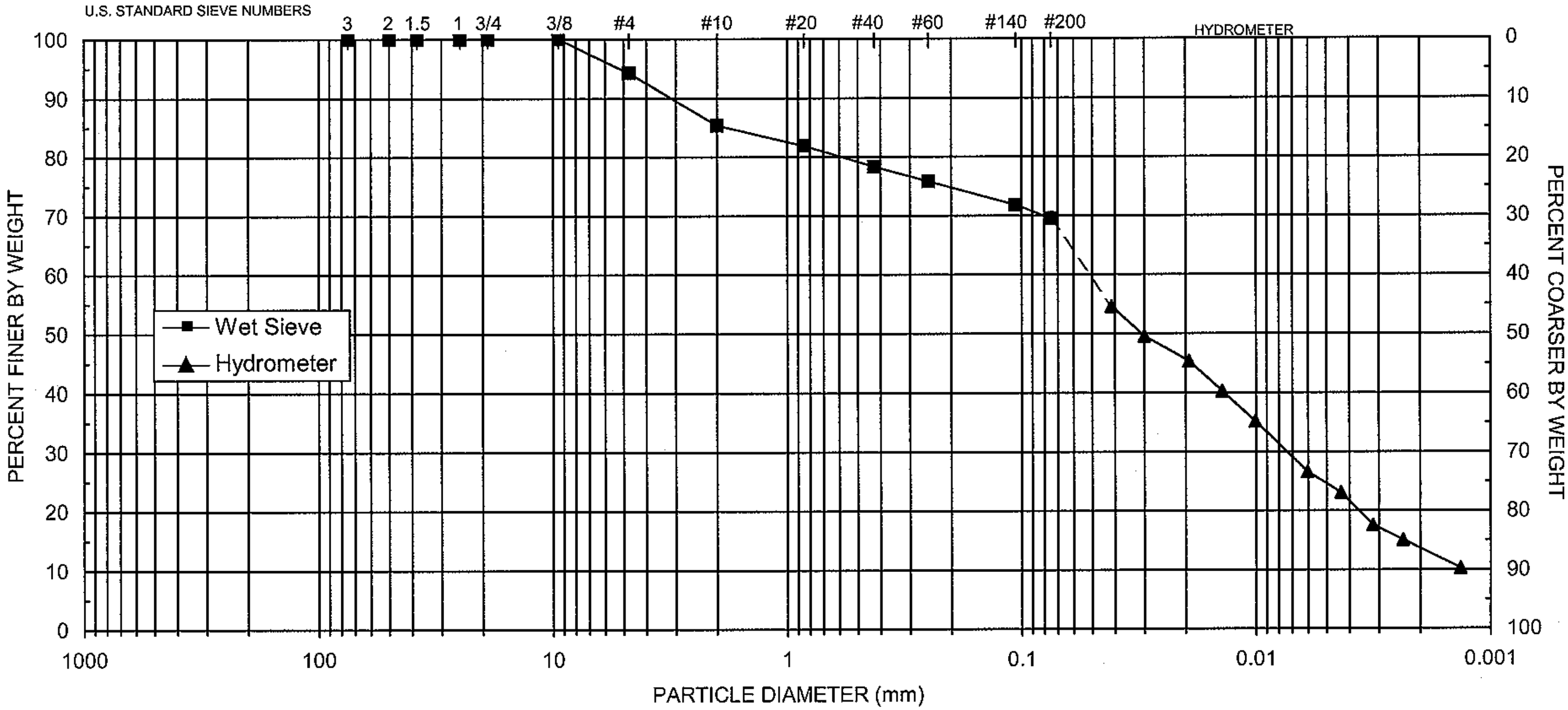
Initial Wt. (g): 49.64
Total Sample Wt. (g): 363.73
Wt. Passing #10 (g): 310.45

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
16-Aug-06	1	21.6	38.0	5.6	32.4	10.1	0.04136	64.0	54.6
	2	21.6	35.0	5.6	29.4	10.6	0.02995	58.0	49.5
	5	21.6	32.5	5.6	26.9	11.0	0.01931	53.1	45.3
	10	21.6	29.5	5.6	23.9	11.5	0.01395	47.2	40.3
	20	21.6	26.5	5.6	20.9	12.0	0.01008	41.3	35.2
	60	21.2	21.5	5.7	15.8	12.8	0.00604	31.2	26.6
	120	20.9	19.5	5.8	13.7	13.1	0.00434	27.0	23.1
	240	19.8	16.5	6.1	10.4	13.6	0.00317	20.5	17.5
	442	19.7	15.0	6.1	8.9	13.8	0.00236	17.6	15.0
17-Aug-06	1391	20.4	12.0	5.9	6.1	14.3	0.00134	12.0	10.3

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY				
		Coarse	Fine	Coarse	Medium	Fine					
USDA	COBBLES	GRAVEL		SAND					SILT	CLAY	
				Very coarse	Coarse	Medium	Fine	Very fine			

d_{10} = **0.0013**	d_{30} = **0.0074**	d_{50} = **0.031**	d_{60} = **0.051**	C_u = **39**	C_c = **0.83**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 22-20	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Silt Loam** †

† Greater than 10% of sample is coarse material

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Quantification of Nitrogen Remova*Initial Dry Weight of Sample (g):* 237.73
Job Number: WR06.0034.00
Sample Number: MVP 22-25
Ring Number: NA
Depth: NA
Test Date: 9-Aug-06

Weight Passing #10 (g): 237.49
Weight Retained #10 (g): 0.24
Weight of Hydrometer Sample (g): 52.16
Calculated Weight of Sieve Sample (g): 52.21
Shape: Angular
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	237.73	100.00
	2"	50	0.00	0.00	237.73	100.00
	1.5"	38.1	0.00	0.00	237.73	100.00
	1"	25	0.00	0.00	237.73	100.00
	3/4"	19.0	0.00	0.00	237.73	100.00
	3/8"	9.5	0.00	0.00	237.73	100.00
	4	4.75	0.00	0.00	237.73	100.00
	10	2.00	0.24	0.24	237.49	99.90
-10			(Based on calculated sieve wt.)			
	20	0.85	0.33	0.38	51.83	99.27
	40	0.425	0.63	1.01	51.20	98.06
	60	0.250	0.56	1.57	50.64	96.99
	140	0.106	1.25	2.82	49.39	94.59
	200	0.075	0.82	3.64	48.57	93.02
	dry pan		0.13	3.77	48.44	
	wet pan			48.44	0.00	

d_{10} (mm): 0.00040
d_{16} (mm): 0.00059
d_{30} (mm): 0.0015
d_{50} (mm): 0.0043
d_{60} (mm): 0.0082
d_{84} (mm): 0.050

Median Particle Diameter--d_{50} (mm): 0.0043
Uniformity Coefficient, Cu--$[d_{60}/d_{10}]$ (mm): 21
Coefficient of Curvature, Cc--$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.69
Mean Particle Diameter--$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.018

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Silty Clay Loam

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

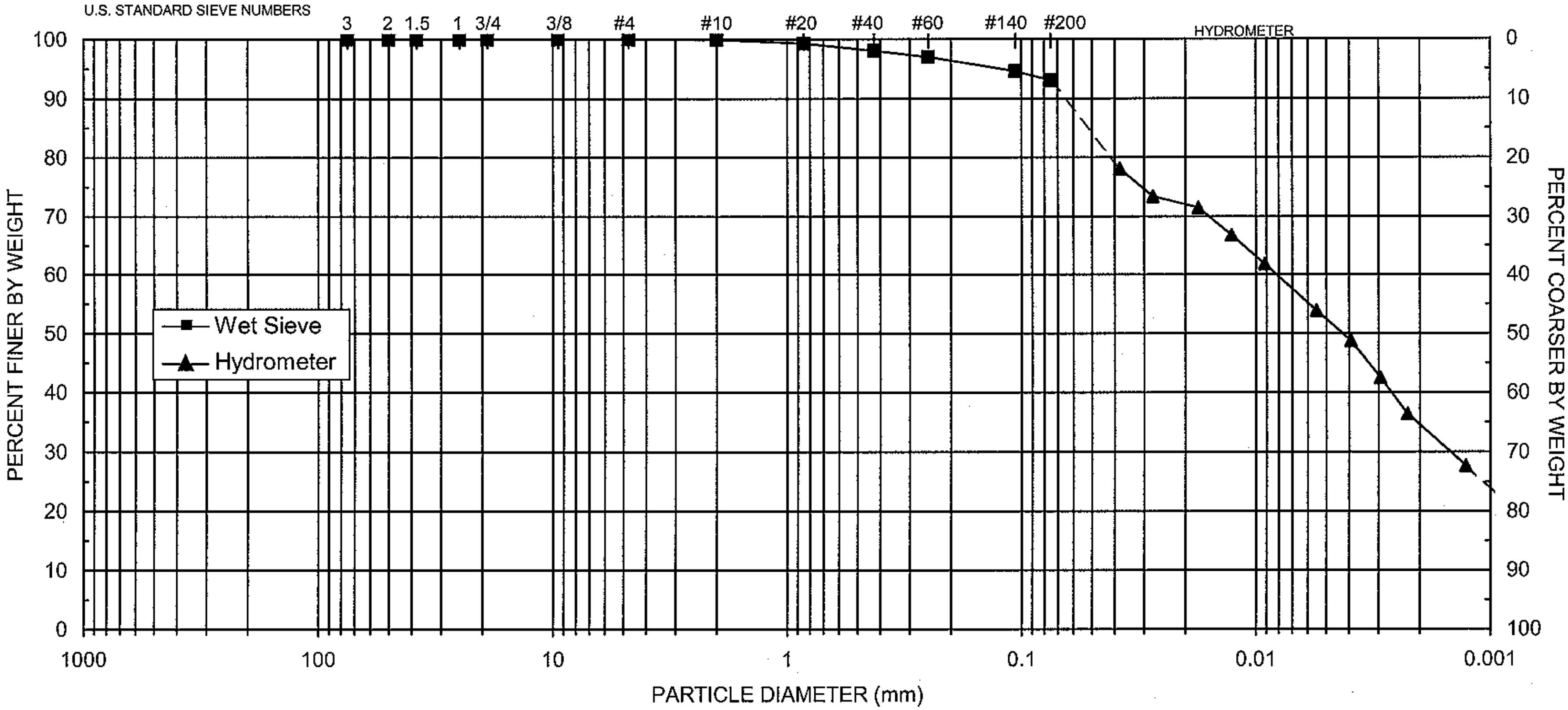
Job Name:	Quantification of Nitrogen Removal	*Type of Water Used:*	DISTILLED
Job Number:	WR06.0034.00	*Reaction with H_2O_2:*	NA
Sample Number:	MVP 22-25	*Dispersant*:*	$(NaPO_3)_6$
Ring Number:	NA	*Measured particle density:*	2.72
Depth:	NA	*Initial Wt. (g):*	52.16
Test Date:	9-Aug-06	*Total Sample Wt. (g):*	237.73
Start Time:	9:32	*Wt. Passing #10 (g):*	237.49

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
15-Aug-06	1	22.6	46.5	5.3	41.2	8.7	0.03806	78.2	78.1
	2	22.6	44.0	5.3	38.7	9.1	0.02754	73.5	73.4
	5	22.6	43.0	5.3	37.7	9.3	0.01758	71.6	71.5
	10	22.6	40.5	5.3	35.2	9.7	0.01270	66.8	66.7
	20	22.4	38.0	5.4	32.6	10.1	0.00919	61.9	61.8
	60	21.7	34.0	5.6	28.4	10.7	0.00552	53.9	53.8
	125	20.9	31.5	5.8	25.7	11.1	0.00394	48.8	48.7
	240	19.7	28.5	6.1	22.4	11.6	0.00295	42.5	42.5
	433	19.2	25.5	6.3	19.2	12.1	0.00225	36.4	36.4
16-Aug-06	1400	20.5	20.5	5.9	14.6	12.9	0.00127	27.7	27.7

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		Coarse	Fine	Coarse	Medium	Fine			

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.00040**	d_{30} = **0.0015**	d_{50} = **0.0043**	d_{60} = **0.0082**	C_u = **21**	C_c = **0.69**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
MVP 22-25	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Silty Clay Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Density

Summary of Particle Density Tests

Sample Number	Particle Density (g/cm^3)
MVP 14-5	2.65
MVP 14-10	2.70
MVP 14-15	2.69
MVP 14-20	2.77
MVP 14-25	2.75
MVP 19-5	2.71
MVP 19-20	2.73
MVP 22-10	2.70
MVP 22-15	2.73
MVP 22-20	2.73
MVP 22-25	2.72

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 14-5
Ring Number:	NA
Depth:	NA
Test Date:	16-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	85.91
Weight of pycnometer filled w/soil (g):	137.04
Weight of pycnometer filled w/soil & water (g):	366.91
Weight of pycnometer filled w/water (g):	335.09
Observed temperature (°C):	22.80
Density of water at observed temperature (g/cm^3):	0.9976
Particle Density (g/cm^3):	2.64
Correction factor, K:	0.9994
Particle Density at 20°C (g/cm^3):	2.64

Trial 2

Weight of pycnometer filled w/air (g):	100.08
Weight of pycnometer filled w/soil (g):	150.92
Weight of pycnometer filled w/soil & water (g):	381.03
Weight of pycnometer filled w/water (g):	349.23
Observed temperature (°C):	23.00
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.66
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.67

***Average Particle Density* (g/cm^3):** **2.65**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 14-10
Ring Number:	NA
Depth:	NA
Test Date:	14-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	99.30
Weight of pycnometer filled w/soil (g):	149.06
Weight of pycnometer filled w/soil & water (g):	379.75
Weight of pycnometer filled w/water (g):	348.35
Observed temperature (°C):	23.40
Density of water at observed temperature (g/cm^3):	0.9974
Particle Density (g/cm^3):	2.70
Correction factor, K:	0.9992
Particle Density at 20°C (g/cm^3):	2.71

Trial 2

Weight of pycnometer filled w/air (g):	92.48
Weight of pycnometer filled w/soil (g):	142.86
Weight of pycnometer filled w/soil & water (g):	373.30
Weight of pycnometer filled w/water (g):	341.52
Observed temperature (°C):	23.30
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.70
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.70

***Average Particle Density* (g/cm^3): 2.70**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name: Quantification of Nitrogen Removal
Job Number: WR06.0034.00
Sample Number: MVP 14-15
Ring Number: NA
Depth: NA

Test Date: 14-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	91.22
Weight of pycnometer filled w/soil (g):	142.39
Weight of pycnometer filled w/soil & water (g):	372.45
Weight of pycnometer filled w/water (g):	340.17
Observed temperature (°C):	23.30
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.70
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.70

Trial 2

Weight of pycnometer filled w/air (g):	99.58
Weight of pycnometer filled w/soil (g):	150.01
Weight of pycnometer filled w/soil & water (g):	380.31
Weight of pycnometer filled w/water (g):	348.64
Observed temperature (°C):	23.40
Density of water at observed temperature (g/cm^3):	0.9974
Particle Density (g/cm^3):	2.68
Correction factor, K:	0.9992
Particle Density at 20°C (g/cm^3):	2.68

***Average Particle Density* (g/cm^3): 2.69**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 14-20
Ring Number:	NA
Depth:	NA
Test Date:	16-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	102.02
Weight of pycnometer filled w/soil (g):	152.43
Weight of pycnometer filled w/soil & water (g):	383.49
Weight of pycnometer filled w/water (g):	351.19
Observed temperature (°C):	22.80
Density of water at observed temperature (g/cm^3):	0.9976
Particle Density (g/cm^3):	2.78
Correction factor, K:	0.9994
Particle Density at 20°C (g/cm^3):	2.78

Trial 2

Weight of pycnometer filled w/air (g):	92.47
Weight of pycnometer filled w/soil (g):	142.79
Weight of pycnometer filled w/soil & water (g):	373.68
Weight of pycnometer filled w/water (g):	341.53
Observed temperature (°C):	23.00
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.76
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.76

***Average Particle Density* (g/cm^3): 2.77**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 14-25
Ring Number:	NA
Depth:	NA
Test Date:	14-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	90.80
Weight of pycnometer filled w/soil (g):	140.32
Weight of pycnometer filled w/soil & water (g):	371.30
Weight of pycnometer filled w/water (g):	339.79
Observed temperature (°C):	23.30
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.74
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.75

Trial 2

Weight of pycnometer filled w/air (g):	102.01
Weight of pycnometer filled w/soil (g):	152.00
Weight of pycnometer filled w/soil & water (g):	382.99
Weight of pycnometer filled w/water (g):	351.15
Observed temperature (°C):	23.40
Density of water at observed temperature (g/cm^3):	0.9974
Particle Density (g/cm^3):	2.75
Correction factor, K:	0.9992
Particle Density at 20°C (g/cm^3):	2.75

***Average Particle Density* (g/cm^3): 2.75**

Comments:

Laboratory analysis by:	C. Krous
Data entered by:	C. Krous
Checked by:	J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 19-5
Ring Number:	NA
Depth:	NA
Test Date:	14-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	90.98
Weight of pycnometer filled w/soil (g):	141.46
Weight of pycnometer filled w/soil & water (g):	371.93
Weight of pycnometer filled w/water (g):	340.14
Observed temperature (°C):	23.50
Density of water at observed temperature (g/cm^3):	0.9974
Particle Density (g/cm^3):	2.69
Correction factor, K:	0.9992
Particle Density at 20°C (g/cm^3):	2.70

Trial 2

Weight of pycnometer filled w/air (g):	91.45
Weight of pycnometer filled w/soil (g):	142.22
Weight of pycnometer filled w/soil & water (g):	372.52
Weight of pycnometer filled w/water (g):	340.35
Observed temperature (°C):	23.40
Density of water at observed temperature (g/cm^3):	0.9974
Particle Density (g/cm^3):	2.72
Correction factor, K:	0.9992
Particle Density at 20°C (g/cm^3):	2.72

***Average Particle Density* (g/cm^3): 2.71**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 19-20
Ring Number:	NA
Depth:	NA
Test Date:	16-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	93.33
Weight of pycnometer filled w/soil (g):	143.60
Weight of pycnometer filled w/soil & water (g):	374.20
Weight of pycnometer filled w/water (g):	342.34
Observed temperature (°C):	23.00
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.72
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.73

Trial 2

Weight of pycnometer filled w/air (g):	99.91
Weight of pycnometer filled w/soil (g):	150.16
Weight of pycnometer filled w/soil & water (g):	380.80
Weight of pycnometer filled w/water (g):	348.89
Observed temperature (°C):	23.00
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.73
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.73

***Average Particle Density* (g/cm^3): 2.73**

Comments:

Laboratory analysis by:	C. Krous
Data entered by:	C. Krous
Checked by:	J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 22-10
Ring Number:	NA
Depth:	NA
Test Date:	16-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	99.29
Weight of pycnometer filled w/soil (g):	150.40
Weight of pycnometer filled w/soil & water (g):	380.50
Weight of pycnometer filled w/water (g):	348.38
Observed temperature (°C):	22.80
Density of water at observed temperature (g/cm^3):	0.9976
Particle Density (g/cm^3):	2.69
Correction factor, K:	0.9994
Particle Density at 20°C (g/cm^3):	2.69

Trial 2

Weight of pycnometer filled w/air (g):	91.45
Weight of pycnometer filled w/soil (g):	141.99
Weight of pycnometer filled w/soil & water (g):	372.33
Weight of pycnometer filled w/water (g):	340.38
Observed temperature (°C):	23.00
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.71
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.71

***Average Particle Density* (g/cm^3): 2.70**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 22-15
Ring Number:	NA
Depth:	NA
Test Date:	14-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	85.19
Weight of pycnometer filled w/soil (g):	136.06
Weight of pycnometer filled w/soil & water (g):	366.70
Weight of pycnometer filled w/water (g):	334.33
Observed temperature (°C):	23.30
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.74
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.74

Trial 2

Weight of pycnometer filled w/air (g):	100.49
Weight of pycnometer filled w/soil (g):	150.43
Weight of pycnometer filled w/soil & water (g):	381.18
Weight of pycnometer filled w/water (g):	349.58
Observed temperature (°C):	23.30
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.72
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.72

***Average Particle Density* (g/cm^3): 2.73**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 22-20
Ring Number:	NA
Depth:	NA
Test Date:	16-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	100.37
Weight of pycnometer filled w/soil (g):	151.21
Weight of pycnometer filled w/soil & water (g):	381.74
Weight of pycnometer filled w/water (g):	349.48
Observed temperature (°C):	22.80
Density of water at observed temperature (g/cm^3):	0.9976
Particle Density (g/cm^3):	2.73
Correction factor, K:	0.9994
Particle Density at 20°C (g/cm^3):	2.73

Trial 2

Weight of pycnometer filled w/air (g):	99.26
Weight of pycnometer filled w/soil (g):	150.13
Weight of pycnometer filled w/soil & water (g):	380.75
Weight of pycnometer filled w/water (g):	348.43
Observed temperature (°C):	23.00
Density of water at observed temperature (g/cm^3):	0.9975
Particle Density (g/cm^3):	2.74
Correction factor, K:	0.9993
Particle Density at 20°C (g/cm^3):	2.74

***Average Particle Density* (g/cm^3): 2.73**

Comments:

Laboratory analysis by: C. Krous
Data entered by: C. Krous
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Density

Job Name:	Quantification of Nitrogen Removal
Job Number:	WR06.0034.00
Sample Number:	MVP 22-25
Ring Number:	NA
Depth:	NA
Test Date:	16-Aug-06

Trial 1

Weight of pycnometer filled w/air (g):	98.68
Weight of pycnometer filled w/soil (g):	140.24
Weight of pycnometer filled w/soil & water (g):	374.71
Weight of pycnometer filled w/water (g):	348.39
Observed temperature (°C):	22.90
Density of water at observed temperature (g/cm^3):	0.9976
Particle Density (g/cm^3):	2.72
Correction factor, K:	0.9994
Particle Density at 20°C (g/cm^3):	2.72

Trial 2

Weight of pycnometer filled w/air (g):	90.95
Weight of pycnometer filled w/soil (g):	141.04
Weight of pycnometer filled w/soil & water (g):	371.81
Weight of pycnometer filled w/water (g):	340.07
Observed temperature (°C):	22.90
Density of water at observed temperature (g/cm^3):	0.9976
Particle Density (g/cm^3):	2.72
Correction factor, K:	0.9994
Particle Density at 20°C (g/cm^3):	2.72

***Average Particle Density* (g/cm^3): 2.72**

Comments:

Laboratory analysis by:	C. Krous
Data entered by:	C. Krous
Checked by:	J. Hines

Laboratory Tests and Methods

Tests and Methods

Dry Bulk Density:	ASTM D4531; ASTM D6836
Moisture Content:	ASTM D2216; ASTM D6836
Calculated Porosity:	Klute, A. 1986. Porosity. Chp.18-2.1, pp. 444-445, in A. Klute (ed.), Methods of Soil Analysis, American Society of Agronomy, Madison, WI
Saturated K:	
Constant Head:	ASTM D 2434 (modified apparatus)
Falling Head: (Rigid Wall)	Klute, A. and C. Dirkson. 1986. Hydraulic Conductivity and Diffusivity: Laboratory Methods.Chp. 28, pp. 200-203, in A. Klute (ed.), Methods of Soil Analysis, American Society of Agronomy, Madison, WI
Particle Size Analysis:	ASTM D422
Particle Density	ASTM D854

Appendix D

Chemical Laboratory Analyses

Calscience Environmental Laboratories, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Supplemental Report 1

July 12, 2006

Jordan Kear
Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Subject: **Calscience Work Order No.: 06-07-0002**
Client Reference: WR06.0034.00

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 7/1/2006 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of any subcontracted analysis is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Don Burley

Calscience Environmental
Laboratories, Inc.
Don Burley
Project Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 07/01/06
Work Order No: 06-07-0002
Preparation: EPA 3050B
Method: EPA 6010B
Units: mg/kg

Project: WR06.0034.00

Page 1 of 1

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP1-5	**06-07-0002-1**	**06/28/06**	**Solid**	**07/03/06**	**07/05/06**	**060703L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	868	5	1		Potassium	2210	25	1	
Magnesium	1780	5	1		Sodium	102	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP1-15	**06-07-0002-3**	**06/28/06**	**Solid**	**07/03/06**	**07/05/06**	**060703L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	963	5	1		Potassium	1600	25	1	
Magnesium	1390	5	1		Sodium	105	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP1-25	**06-07-0002-5**	**06/28/06**	**Solid**	**07/03/06**	**07/05/06**	**060703L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	1810	5	1		Potassium	3770	25	1	
Magnesium	3050	5	1		Sodium	124	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	**097-01-002-7,819**	**N/A**	**Solid**	**07/03/06**	**07/05/06**	**060703L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	ND	5.00	1		Potassium	ND	25.0	1	
Magnesium	ND	5.00	1		Sodium	ND	25.0	1	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates	Date Received:	07/01/06
5951 Encina Road, Suite 208	Work Order No:	06-07-0002
Goleta, CA 93117-6252		

Project: WR06.0034.00

Page 1 of 2

Client Sample Number	Lab Sample Number	Date Collected	Matrix
AP1-5	**06-07-0002-1**	**06/28/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	2930	10	1		mg/kg	N/A	07/05/06	EPA 160.1M
Fluoride	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Chloride	14	10	1		mg/kg	N/A	07/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Nitrate (as N)	1.3	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
o-Phosphate (as P)	2.8	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Sulfate	27	10	1		mg/kg	N/A	07/03/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/10/06	07/10/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	07/10/06	EPA 9060
Alkalinity, Total (as CaCO3)	25	5.0	1		mg/kg	07/05/06	07/05/06	SM 2320B M
Bicarbonate (as CaCO3)	25	5.0	1		mg/kg	07/05/06	07/05/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
AP1-15	**06-07-0002-3**	**06/28/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	4030	10	1		mg/kg	N/A	07/05/06	EPA 160.1M
Fluoride	1.2	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Chloride	12	10	1		mg/kg	N/A	07/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Nitrate (as N)	1.1	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
o-Phosphate (as P)	1.9	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Sulfate	84	10	1		mg/kg	N/A	07/03/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/10/06	07/10/06	EPA 350.2M
Carbon, Total Organic	800	500	1		mg/kg	N/A	07/10/06	EPA 9060
Alkalinity, Total (as CaCO3)	55	5.0	1		mg/kg	07/05/06	07/05/06	SM 2320B M
Bicarbonate (as CaCO3)	55	5.0	1		mg/kg	07/05/06	07/05/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 07/01/06
Work Order No: 06-07-0002

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
AP1-25	**06-07-0002-5**	**06/28/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	7130	10	1		mg/kg	N/A	07/05/06	EPA 160.1M
Fluoride	2.4	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Chloride	14	10	1		mg/kg	N/A	07/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
o-Phosphate (as P)	2.4	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Sulfate	76	20	2		mg/kg	N/A	07/05/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/10/06	07/10/06	EPA 350.2M
Carbon, Total Organic	600	500	1		mg/kg	N/A	07/10/06	EPA 9060
Alkalinity, Total (as CaCO3)	140	5.0	1		mg/kg	07/05/06	07/05/06	SM 2320B M
Bicarbonate (as CaCO3)	120	5.0	1		mg/kg	07/05/06	07/05/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
Method Blank		**N/A**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	ND	1.0	1		mg/kg	N/A	07/05/06	EPA 160.1M
Fluoride	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Chloride	ND	10	1		mg/kg	N/A	07/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
o-Phosphate (as P)	ND	1.0	1		mg/kg	N/A	07/03/06	EPA 300.0
Sulfate	ND	10	1		mg/kg	N/A	07/03/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/10/06	07/10/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	07/10/06	EPA 9060
Alkalinity, Total (as CaCO3)	ND	5.0	1		mg/kg	07/05/06	07/05/06	SM 2320B M
Bicarbonate (as CaCO3)	ND	5.0	1		mg/kg	07/05/06	07/05/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received:	07/01/06
Work Order No:	06-07-0002
Preparation:	EPA 3050B
Method:	EPA 6010B

Project WR06.0034.00

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
AP1-5	**Solid**	**ICP 3300**	**07/03/06**	**07/05/06**	**060703S04**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Calcium	4X	4X	75-125	4X	0-20	Q
Magnesium	4X	4X	75-125	4X	0-20	Q
Potassium	4X	4X	75-125	4X	0-20	Q
Sodium	103	96	75-125	5	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-07-0002

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	MS% REC	MSD % REC	%REC CL	RPD	RPD CL	Qualifiers
Fluoride	EPA 300.0	AP1-25	07/03/06	N/A	97	96	63-141	1	0-24	
Chloride	EPA 300.0	AP1-25	07/03/06	N/A	100	96	51-135	4	0-7	
Nitrite (as N)	EPA 300.0	AP1-25	07/03/06	N/A	94	93	59-137	1	0-10	
Bromide	EPA 300.0	AP1-25	07/03/06	N/A	100	100	80-116	1	0-6	
Nitrate (as N)	EPA 300.0	AP1-25	07/03/06	N/A	98	98	68-128	0	0-3	
o-Phosphate (as P)	EPA 300.0	AP1-25	07/03/06	N/A	102	99	60-138	2	0-17	
Sulfate	EPA 300.0	AP1-25	07/03/06	N/A	102	101	41-149	2	0-8	
Carbon, Total Organic	EPA 9060	AP1-5	07/10/06	N/A	118	113	70-130	4	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience
Environmental
Laboratories, Inc.

Quality Control - Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-07-0002

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	QC Sample ID	Date Analyzed	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
Alkalinity, Total (as CaCO3)	SM 2320B M	AP1-15	07/05/06	55	54	2	0-25	
Bicarbonate (as CaCO3)	SM 2320B M	AP1-15	07/05/06	55	54	2	0-25	
Hydroxide (as CaCO3)	SM 2320B M	AP1-15	07/05/06	ND	ND	NA	0-25	
Carbonate (as CaCO3)	SM 2320B M	AP1-15	07/05/06	ND	ND	NA	0-25	
Ammonia (as N)	EPA 350.2M	AP1-25	07/10/06	ND	ND	NA	0-25	
Solids, Total Dissolved	EPA 160.1M	AP1-25	07/05/06	7130	7770	9	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

Daniel B. Stephens & Associates		Date Received:	N/A
5951 Encina Road, Suite 208		Work Order No:	06-07-0002
Goleta, CA 93117-6252		Preparation:	EPA 3050B
		Method:	EPA 6010B

Project: WR06.0034.00

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	Lab File ID	LCS Batch Number
097-01-002-7,819	**Solid**	**ICP 3300**	**07/05/06**	**060703-I-04**	**060703L04**

Parameter	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Calcium	25.0	22.9	92	80-120	
Magnesium	25.0	23.7	95	80-120	
Potassium	250	253	101	80-120	
Sodium	250	285	114	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-07-0002

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	Quality Control Sample ID	Date Extracted	Date Analyzed	LCS % REC	LCSD % REC	%REC CL	RPD	RPD CL	Qual
Fluoride	EPA 300.0	099-08-002-123	N/A	07/03/06	100	102	80-116	1	0-11	
Chloride	EPA 300.0	099-08-002-123	N/A	07/03/06	95	94	84-108	0	0-3	
Nitrite (as N)	EPA 300.0	099-08-002-123	N/A	07/03/06	92	92	77-119	0	0-19	
Bromide	EPA 300.0	099-08-002-123	N/A	07/03/06	101	100	87-111	0	0-8	
Nitrate (as N)	EPA 300.0	099-08-002-123	N/A	07/03/06	98	98	87-111	0	0-14	
o-Phosphate (as P)	EPA 300.0	099-08-002-123	N/A	07/03/06	108	96	85-115	12	0-12	
Sulfate	EPA 300.0	099-08-002-123	N/A	07/03/06	98	100	88-112	1	0-7	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-07-0002

Project: WR06.0034.00

Matrix : Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Carbon, Total Organic	EPA 9060	099-06-013-158	07/10/06	N/A	6000	5900	98	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 06-07-0002

Qualifier	Definition
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Don Burley

From: Bentley, Loretta [lbentley@dbstephens.com]
Sent: Wednesday, July 12, 2006 9:07 AM
To: Don Burley
Subject: Change of sample date

Don,

Please see notes below. Thank you.

Loretta Bentley
Daniel B. Stephens & Associates, Inc.
5951 Encina Rd, Suite 208
Goleta, CA 93117
Phone: (805) 683-2409, x1400
Fax: (805) 683-2419
Email: lbentley@dbstephens.com

-----Original Message-----
From: Kear, Jordan
Sent: Wednesday, July 12, 2006 8:50 AM
To: Bentley, Loretta
Subject: RE: Don Burley's response

Whoops!

I forgot to change that date for those samples on the COC.

Please note that all samples from AP1 were collected on June 28th, and change reporting accordingly.

Thanks.

Jordan Kear
California Certified Hydrogeologist No. 749
(805)683-2409
Fax (805)683-2419
Mobile (805)512-1516
Learn more about DBS&A's Water Resources Capabilities...
http://www.dbstephens.com/water_resources.php

-----Original Message-----
From: Bentley, Loretta
Sent: Tuesday, July 11, 2006 4:06 PM
To: Kear, Jordan
Subject: Don Burley's response

Jordan,

I called Don Burley to tell him that you were requesting him to make all AP-1's to have the date of the 28th. He asked me to check this against the chain of custody. I told him I would check and call him back. The chain of custody reports it the way he has it (the 26th), so I will wait for your instructions before calling him back.

Loretta Bentley
Daniel B. Stephens & Associates, Inc.
5951 Encina Rd, Suite 208
Goleta, CA 93117
Phone: (805) 683-2409, x1400
Fax: (805) 683-2419
Email: lbentley@dbstephens.com

Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY CLIENT: Daniel B. Stephens & Associates, Inc.	CLIENT PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 5951 Encina Road, Suite 208	P.O. NO.:
CITY: Goleta, CA 93117	PROJECT CONTACT: Jordan Kear
TEL: 805-683-2409	QUOTE NO.: 949443
FAX: 805-683-2419	SAMPLER(S): (SIGNATURE) [signature]
E-MAIL: jkear@dbstephens.com	LAB USE ONLY: 07-0002

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____/____

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Please list tests required	EPA 160.1M TDS	EPA 300.0 Anions	EPA 350.2M Ammonia	Ca, Mg, K, Na By EPA 6010	SM2320B Alkalinity/Bicarbonate	Total Organic Carbon
	AP1-5		06/28/06	908	soil	1		X	X	X	X	X	X
	AP1-10		06/28/06	920	soil	1							
	AP1-15		06/26/06	930	soil	1		X	X	X	X	X	X
	AP1-20		06/26/06	945	soil	1							
	AP1-25		06/26/06	954	soil	1		X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature]	[signature] (G.S.O.) 4:32 6-30-06		
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature) [signature]	Date: 7/1/6	Time: 900

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 06 - 0 7 - 0 0 0 2

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: DANIEL B STEPHENS & ASSOC DATE: 7/1/6

TEMPERATURE – SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

- ____ Chilled, cooler with temperature blank provided.
- ____ Chilled, cooler without temperature blank.
- ____ Chilled and placed in cooler with wet ice.
- ____ Ambient and placed in cooler with wet ice.
- ____ Ambient temperature.
- ____ °C Temperature blank.

LABORATORY (Other than Calscience Courier):

- ____ °C Temperature blank.
- 3.8 °C IR thermometer.
- ____ Ambient temperature.

Initial: KN

CUSTODY SEAL INTACT:

Sample(s): ____ Cooler: ✓ No (Not Intact) : ____ Not Applicable (N/A): ____

Initial: KN

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples	✓		
Sampler's name indicated on COC	✓		
Sample container label(s) consistent with custody papers	✓		
Sample container(s) intact and good condition	✓		
Correct containers and volume for analyses requested	✓		
Proper preservation noted on sample label(s)			✓
VOA vial(s) free of headspace			✓
Tedlar bag(s) free of condensation			✓

Initial: KN

COMMENTS:

Calscience Environmental Laboratories, Inc.

July 10, 2006

Jordan Kear
Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Subject: **Calscience Work Order No.: 06-06-1677**
Client Reference: WR06.0034.00

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 6/28/2006 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of any subcontracted analysis is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Don Burley

Calscience Environmental
Laboratories, Inc.
Don Burley
Project Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates	Date Received: 06/28/06
5951 Encina Road, Suite 208	Work Order No: 06-06-1677
Goleta, CA 93117-6252	Preparation: EPA 3050B
	Method: EPA 6010B
	Units: mg/kg

Project: WR06.0034.00

Page 1 of 1

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP10-5	**06-06-1677-1**	**06/26/06**	**Solid**	**06/29/06**	**06/30/06**	**060629L06**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	1190	5	1		Potassium	2490	25	1	
Magnesium	2150	5	1		Sodium	103	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP10-15	**06-06-1677-3**	**06/26/06**	**Solid**	**06/29/06**	**06/30/06**	**060629L06**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	1660	5	1		Potassium	2910	25	1	
Magnesium	2580	5	1		Sodium	112	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP10-25	**06-06-1677-5**	**06/26/06**	**Solid**	**06/29/06**	**06/30/06**	**060629L06**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	7050	5	1		Potassium	4930	25	1	
Magnesium	4710	5	1		Sodium	147	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP15-5	**06-06-1677-6**	**06/26/06**	**Solid**	**06/29/06**	**06/30/06**	**060629L06**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	1240	5	1		Potassium	3130	25	1	
Magnesium	2790	5	1		Sodium	110	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP15-15	**06-06-1677-8**	**06/26/06**	**Solid**	**06/29/06**	**06/30/06**	**060629L06**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	812	5	1		Potassium	1790	25	1	
Magnesium	1540	5	1		Sodium	73.4	25.0	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
AP15-30	**06-06-1677-11**	**06/26/06**	**Solid**	**06/29/06**	**06/30/06**	**060629L06**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	9150	5	1		Potassium	6580	25	1	
Magnesium	6110	5	1		Sodium	181	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	**097-01-002-7,811**	**N/A**	**Solid**	**06/29/06**	**06/30/06**	**060629L06**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	ND	5.00	1		Potassium	ND	25.0	1	
Magnesium	ND	5.00	1		Sodium	ND	25.0	1	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 06/28/06
Work Order No: 06-06-1677

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
AP10-5	**06-06-1677-1**	**06/26/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	3790	10	1		mg/kg	06/30/06	06/30/06	EPA 160.1M
Fluoride	3.0	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Chloride	42	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Bromide	2.3	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
o-Phosphate (as P)	3.6	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Sulfate	34	20	2		mg/kg	N/A	06/29/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/05/06	07/05/06	EPA 350.2M
Carbon, Total Organic	500	500	1		mg/kg	N/A	07/06/06	EPA 9060
Alkalinity, Total (as CaCO3)	210	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M
Bicarbonate (as CaCO3)	210	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
AP10-15	**06-06-1677-3**	**06/26/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	4740	10	1		mg/kg	06/30/06	06/30/06	EPA 160.1M
Fluoride	3.2	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Chloride	43	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
o-Phosphate (as P)	4.2	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Sulfate	57	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/05/06	07/05/06	EPA 350.2M
Carbon, Total Organic	1200	500	1		mg/kg	N/A	07/06/06	EPA 9060
Alkalinity, Total (as CaCO3)	320	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M
Bicarbonate (as CaCO3)	320	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 06/28/06
Work Order No: 06-06-1677

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
AP10-25	**06-06-1677-5**	**06/26/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	10800	100	1		mg/kg	06/30/06	06/30/06	EPA 160.1M
Fluoride	3.8	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Chloride	23	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrite (as N)	1.1	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Bromide	1.5	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrate (as N)	1.5	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
o-Phosphate (as P)	1.2	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Sulfate	180	20	2		mg/kg	N/A	06/29/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/05/06	07/05/06	EPA 350.2M
Carbon, Total Organic	4000	500	1		mg/kg	N/A	07/06/06	EPA 9060
Alkalinity, Total (as CaCO3)	650	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M
Bicarbonate (as CaCO3)	620	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
AP15-5	**06-06-1677-6**	**06/26/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	4980	10	1		mg/kg	06/30/06	06/30/06	EPA 160.1M
Fluoride	2.6	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Chloride	33	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
o-Phosphate (as P)	3.1	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Sulfate	95	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/05/06	07/05/06	EPA 350.2M
Carbon, Total Organic	1000	500	1		mg/kg	N/A	07/06/06	EPA 9060
Alkalinity, Total (as CaCO3)	120	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M
Bicarbonate (as CaCO3)	120	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 06/28/06
Work Order No: 06-06-1677

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
AP15-15	**06-06-1677-8**	**06/26/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	2770	10	1		mg/kg	06/30/06	06/30/06	EPA 160.1M
Fluoride	1.6	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Chloride	24	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Bromide	1.7	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
o-Phosphate (as P)	2.0	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Sulfate	36	20	2		mg/kg	N/A	06/29/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/05/06	07/05/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	07/06/06	EPA 9060
Alkalinity, Total (as CaCO3)	90	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M
Bicarbonate (as CaCO3)	90	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M

AP15-30	**06-06-1677-11**	**06/26/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	15200	100	1		mg/kg	06/30/06	06/30/06	EPA 160.1M
Fluoride	2.0	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Chloride	23	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Bromide	1.0	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
o-Phosphate (as P)	1.5	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Sulfate	93	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/05/06	07/05/06	EPA 350.2M
Carbon, Total Organic	3300	500	1		mg/kg	N/A	07/06/06	EPA 9060
Alkalinity, Total (as CaCO3)	330	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M
Bicarbonate (as CaCO3)	300	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 06/28/06
Work Order No: 06-06-1677

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
Method Blank		**N/A**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	ND	1.0	1		mg/kg	06/30/06	06/30/06	EPA 160.1M
Fluoride	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Chloride	ND	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
o-Phosphate (as P)	ND	1.0	1		mg/kg	N/A	06/28/06	EPA 300.0
Sulfate	ND	10	1		mg/kg	N/A	06/28/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	07/05/06	07/05/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	07/06/06	EPA 9060
Alkalinity, Total (as CaCO3)	ND	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M
Bicarbonate (as CaCO3)	ND	5.0	1		mg/kg	06/30/06	06/30/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Daniel B. Stephens & Associates		Date Received:	06/28/06
5951 Encina Road, Suite 208		Work Order No:	06-06-1677
Goleta, CA 93117-6252		Preparation:	EPA 3050B
		Method:	EPA 6010B

Project WR06.0034.00

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
06-06-1724-1	**Solid**	**ICP 3300**	**06/29/06**	**06/30/06**	**060629S06**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Calcium	4X	4X	75-125	4X	0-20	Q
Magnesium	4X	4X	75-125	4X	0-20	Q
Potassium	4X	4X	75-125	4X	0-20	Q
Sodium	89	93	75-125	1	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-06-1677

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	MS% REC	MSD % REC	%REC CL	RPD	RPD CL	Qualifiers
Fluoride	EPA 300.0	06-06-1685-1	06/29/06	N/A	101	101	63-141	0	0-24	
Chloride	EPA 300.0	06-06-1685-1	06/29/06	N/A	102	104	51-135	2	0-7	
Nitrite (as N)	EPA 300.0	06-06-1685-1	06/29/06	N/A	95	97	59-137	1	0-10	
Bromide	EPA 300.0	06-06-1685-1	06/29/06	N/A	101	100	80-116	1	0-6	
Nitrate (as N)	EPA 300.0	06-06-1685-1	06/29/06	N/A	99	99	68-128	0	0-3	
o-Phosphate (as P)	EPA 300.0	06-06-1685-1	06/29/06	N/A	101	102	60-138	1	0-17	
Sulfate	EPA 300.0	06-06-1685-1	06/29/06	N/A	104	104	41-149	0	0-8	
Carbon, Total Organic	EPA 9060	06-06-1579-1	07/06/06	N/A	100	102	70-130	2	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-06-1677

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	QC Sample ID	Date Analyzed	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
Alkalinity, Total (as CaCO3)	SM 2320B M	AP10-5	06/30/06	210	210	0	0-25	
Bicarbonate (as CaCO3)	SM 2320B M	AP10-5	06/30/06	210	210	0	0-25	
Hydroxide (as CaCO3)	SM 2320B M	AP10-5	06/30/06	ND	ND	NA	0-25	
Carbonate (as CaCO3)	SM 2320B M	AP10-5	06/30/06	ND	ND	NA	0-25	
Ammonia (as N)	EPA 350.2M	AP15-30	07/05/06	ND	ND	NA	0-25	
Solids, Total Dissolved	EPA 160.1M	AP15-15	06/30/06	2770	2890	4	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

Daniel B. Stephens & Associates	Date Received: N/A
5951 Encina Road, Suite 208	Work Order No: 06-06-1677
Goleta, CA 93117-6252	Preparation: EPA 3050B
	Method: EPA 6010B

Project: WR06.0034.00

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	Lab File ID	LCS Batch Number
097-01-002-7,811	**Solid**	**ICP 3300**	**06/30/06**	**060629-I-06**	**060629L06**

Parameter	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Calcium	25.0	27.3	109	80-120	
Magnesium	25.0	24.7	99	80-120	
Potassium	250	258	103	80-120	
Sodium	250	260	104	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-06-1677

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	Quality Control Sample ID	Date Extracted	Date Analyzed	LCS % REC	LCSD % REC	%REC CL	RPD	RPD CL	Qual
Fluoride	EPA 300.0	099-08-002-120	N/A	06/28/06	100	101	80-116	0	0-11	
Chloride	EPA 300.0	099-08-002-120	N/A	06/28/06	95	95	84-108	0	0-3	
Nitrite (as N)	EPA 300.0	099-08-002-120	N/A	06/28/06	93	95	77-119	2	0-19	
Bromide	EPA 300.0	099-08-002-120	N/A	06/28/06	100	100	87-111	1	0-8	
Nitrate (as N)	EPA 300.0	099-08-002-120	N/A	06/28/06	97	97	87-111	0	0-14	
o-Phosphate (as P)	EPA 300.0	099-08-002-120	N/A	06/28/06	101	102	85-115	1	0-12	
Sulfate	EPA 300.0	099-08-002-120	N/A	06/28/06	100	100	88-112	0	0-7	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-06-1677

Project: WR06.0034.00

Matrix : Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Carbon, Total Organic	EPA 9060	099-06-013-157	07/06/06	N/A	6000	5900	98	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 06-06-1677

Qualifier	Definition
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

7440 Lincoln Way, Garden Grove, CA 92841-1427 · TEL:(714) 895-5494 · FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY CLIENT: Daniel B. Stephens & Associates, Inc.			CLIENT PROJECT NAME / NUMBER: WR06.0034.00	P.O. NO.:
ADDRESS: 5951 Encina Road, Suite 208			PROJECT CONTACT: Jordan Kear	QUOTE NO.: 949443
CITY: Goleta, CA 93117			SAMPLER(S): (SIGNATURE)	LAB USE ONLY: 06-1677
TEL: 805-683-2409	FAX: 805-683-2419	E-MAIL: jkear@dbstephens.com		

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____/____

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Please list tests required	EPA 160.1M TDS	EPA 300.0 Anions	EPA 350.2M Ammonia	Ca, Mg, K, Na By EPA 6010	SM2320B Alkalinity/Bicarbonate	TOTAL ORGANIC CARBON
1	AP10-5		06/26/06	1245	soil	1		X	X	X	X	X	X
2	AP10-10		06/26/06	1255	soil	1							
3	AP10-15		06/26/06	130	soil	1		X	X	X	X	X	X
4	AP10-20		06/26/06	140	soil	1							
5	AP10-25		06/26/06	150	soil	1		X	X	X	X	X	X
6	AP15-5		06/26/06	835	soil	1		X	X	X	X	X	X
7	AP15-10		06/26/06	850	soil	1							
8	AP15-15		06/26/06	901	soil	1		X	X	X	X	X	X
9	AP15-20		06/26/06	919	soil	1							
10	AP15-25		06/26/06	935	soil	1							
11	AP15-30		06/26/06	945	soil	1		X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
	(G.S.O.)	6-27-06	4:55 pm
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature) GSO	Received by: (Signature)	Date: 6-28-06	Time: 11:15

Calscience Environmental Laboratories, Inc.

WORK ORDER #: **06 - 06 - 1677**

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: Daniel Stephens + Assoc   DATE: 6.28.06

TEMPERATURE – SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

- ____ Chilled, cooler with temperature blank provided.
- ____ Chilled, cooler without temperature blank.
- ____ Chilled and placed in cooler with wet ice.
- ____ Ambient and placed in cooler with wet ice.
- ____ Ambient temperature.
- ____ °C Temperature blank.

LABORATORY (Other than Calscience Courier):

- ____ °C Temperature blank.
- 10.2 °C IR thermometer.
- ____ Ambient temperature.

Initial: SF

CUSTODY SEAL INTACT:

Sample(s): ____ Cooler: ____ No (Not Intact) : ____ Not Applicable (N/A): ✓

Initial: SF

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples	✓		
Sampler's name indicated on COC	✓		
Sample container label(s) consistent with custody papers	✓		
Sample container(s) intact and good condition	✓		
Correct containers and volume for analyses requested	✓		
Proper preservation noted on sample label(s)			✓
VOA vial(s) free of headspace			✓
Tedlar bag(s) free of condensation			✓

Initial: SF

COMMENTS:

Calscience Environmental Laboratories, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

August 03, 2006

Jordan Kear
Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Subject: **Calscience Work Order No.: 06-07-1345**
Client Reference: WR06.0034.00

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 7/27/2006 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of any subcontracted analysis is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Don Burley

Calscience Environmental
Laboratories, Inc.
Don Burley
Project Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 07/27/06
Work Order No: 06-07-1345
Preparation: EPA 3050B
Method: EPA 6010B
Units: mg/kg

Project: WR06.0034.00

Page 1 of 1

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP14-5	**06-07-1345-1**	**07/25/06**	**Solid**	**07/28/06**	**07/31/06**	**060728L12**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	709	5	1		Potassium	1740	25	1	
Magnesium	1850	5	1		Sodium	94.0	25.0	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP14-15	**06-07-1345-3**	**07/25/06**	**Solid**	**07/28/06**	**07/31/06**	**060728L12**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	1080	5	1		Potassium	2240	25	1	
Magnesium	2080	5	1		Sodium	92.0	25.0	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP14-20	**06-07-1345-4**	**07/25/06**	**Solid**	**07/28/06**	**07/31/06**	**060728L12**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	2940	5	1		Potassium	3140	25	1	
Magnesium	3120	5	1		Sodium	149	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP14-25	**06-07-1345-5**	**07/25/06**	**Solid**	**07/28/06**	**07/31/06**	**060728L12**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	36700	5	1		Potassium	7320	25	1	
Magnesium	11000	5	1		Sodium	391	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	**097-01-002-7,937**	**N/A**	**Solid**	**07/28/06**	**07/31/06**	**060728L12**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	ND	5.00	1		Potassium	ND	25.0	1	
Magnesium	ND	5.00	1		Sodium	ND	25.0	1	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 07/27/06
Work Order No: 06-07-1345

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP14-5	**06-07-1345-1**	**07/25/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	42400	100	1		mg/kg	N/A	08/01/06	EPA 160.1M
Fluoride	3.4	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Chloride	16	10	1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Bromide	4.1	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrate (as N)	1.3	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
o-Phosphate (as P)	1.4	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Sulfate	200	50	5		mg/kg	N/A	07/27/06	EPA 300.0
Ammonia (as N)	39	5	1		mg/kg	08/01/06	08/01/06	EPA 350.2M
Carbon, Total Organic	1000	500	1		mg/kg	N/A	08/01/06	EPA 9060
Alkalinity, Total (as CaCO3)	130	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M
Bicarbonate (as CaCO3)	130	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP14-15	**06-07-1345-3**	**07/25/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	10500	100	1		mg/kg	N/A	08/01/06	EPA 160.1M
Fluoride	1.4	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Chloride	13	10	1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Bromide	1.4	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
o-Phosphate (as P)	2.1	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Sulfate	82	10	1		mg/kg	N/A	07/27/06	EPA 300.0
Ammonia (as N)	28	5	1		mg/kg	08/01/06	08/01/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	08/01/06	EPA 9060
Alkalinity, Total (as CaCO3)	110	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M
Bicarbonate (as CaCO3)	100	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 07/27/06
Work Order No: 06-07-1345

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP14-20	**06-07-1345-4**	**07/25/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	28300	100	1		mg/kg	N/A	08/01/06	EPA 160.1M
Fluoride	2.4	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Chloride	16	10	1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Bromide	3.0	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
o-Phosphate (as P)	2.5	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Sulfate	85	20	2		mg/kg	N/A	07/27/06	EPA 300.0
Ammonia (as N)	14	5	1		mg/kg	08/01/06	08/01/06	EPA 350.2M
Carbon, Total Organic	500	500	1		mg/kg	N/A	08/01/06	EPA 9060
Alkalinity, Total (as CaCO3)	230	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M
Bicarbonate (as CaCO3)	210	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP14-25	**06-07-1345-5**	**07/25/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	7330	10	1		mg/kg	N/A	08/01/06	EPA 160.1M
Fluoride	0.18	0.10	0.1		mg/kg	N/A	07/27/06	EPA 300.0
Chloride	2.8	1.0	0.1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrite (as N)	ND	0.10	0.1		mg/kg	N/A	07/27/06	EPA 300.0
Bromide	0.11	0.10	0.1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrate (as N)	ND	0.10	0.1		mg/kg	N/A	07/27/06	EPA 300.0
o-Phosphate (as P)	0.14	0.10	0.1		mg/kg	N/A	07/27/06	EPA 300.0
Sulfate	9.4	1.0	0.1		mg/kg	N/A	07/27/06	EPA 300.0
Ammonia (as N)	17	5	1		mg/kg	08/01/06	08/01/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	08/01/06	EPA 9060
Alkalinity, Total (as CaCO3)	760	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M
Bicarbonate (as CaCO3)	720	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 07/27/06
Work Order No: 06-07-1345

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
Method Blank		**N/A**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	ND	1.0	1		mg/kg	N/A	08/01/06	EPA 160.1M
Fluoride	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Chloride	ND	10	1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
o-Phosphate (as P)	ND	1.0	1		mg/kg	N/A	07/27/06	EPA 300.0
Sulfate	ND	10	1		mg/kg	N/A	07/27/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	08/01/06	08/01/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	08/01/06	EPA 9060
Alkalinity, Total (as CaCO3)	ND	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M
Bicarbonate (as CaCO3)	ND	5.0	1		mg/kg	07/28/06	07/28/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received:	07/27/06
Work Order No:	06-07-1345
Preparation:	EPA 3050B
Method:	EPA 6010B

Project WR06.0034.00

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
06-07-1382-4	**Solid**	**ICP 3300**	**07/28/06**	**07/31/06**	**060728S12**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Calcium	4X	4X	75-125	4X	0-20	Q
Magnesium	4X	4X	75-125	4X	0-20	Q
Potassium	4X	4X	75-125	4X	0-20	Q
Sodium	100	94	75-125	2	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-07-1345

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	MS% REC	MSD % REC	%REC CL	RPD	RPD CL	Qualifiers
Fluoride	EPA 300.0	MVP14-5	07/27/06	N/A	96	98	63-141	2	0-24	
Chloride	EPA 300.0	MVP14-5	07/27/06	N/A	94	94	51-135	0	0-7	
Nitrite (as N)	EPA 300.0	MVP14-5	07/27/06	N/A	83	85	59-137	2	0-10	
Bromide	EPA 300.0	MVP14-5	07/27/06	N/A	105	102	80-116	3	0-6	
Nitrate (as N)	EPA 300.0	MVP14-5	07/27/06	N/A	100	100	68-128	0	0-3	
o-Phosphate (as P)	EPA 300.0	MVP14-5	07/27/06	N/A	103	96	60-138	8	0-17	
Sulfate	EPA 300.0	MVP14-5	07/27/06	N/A	99	99	41-149	0	0-8	
Carbon, Total Organic	EPA 9060	MVP14-5	08/01/06	N/A	126	104	70-130	18	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-07-1345

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	QC Sample ID	Date Analyzed	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
Alkalinity, Total (as CaCO3)	SM 2320B M	MVP14-15	07/28/06	110	110	0	0-25	
Bicarbonate (as CaCO3)	SM 2320B M	MVP14-15	07/28/06	100	100	0	0-25	
Hydroxide (as CaCO3)	SM 2320B M	MVP14-15	07/28/06	ND	ND	NA	0-25	
Carbonate (as CaCO3)	SM 2320B M	MVP14-15	07/28/06	10	10	0	0-25	
Ammonia (as N)	EPA 350.2M	MVP14-15	08/01/06	28	25	11	0-25	
Solids, Total Dissolved	EPA 160.1M	MVP14-25	08/01/06	7330	8340	13	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Daniel B. Stephens & Associates	Date Received: N/A
5951 Encina Road, Suite 208	Work Order No: 06-07-1345
Goleta, CA 93117-6252	Preparation: EPA 3050B
	Method: EPA 6010B

Project: WR06.0034.00

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
097-01-002-7,937	**Solid**	**ICP 3300**	**07/28/06**	**07/31/06**	**060728L12**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Calcium	113	115	80-120	1	0-20	
Magnesium	100	102	80-120	2	0-20	
Potassium	100	100	80-120	0	0-20	
Sodium	102	109	80-120	7	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-07-1345

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	Quality Control Sample ID	Date Extracted	Date Analyzed	LCS % REC	LCSD % REC	%REC CL	RPD	RPD CL	Qual
Fluoride	EPA 300.0	099-08-002-132	N/A	07/27/06	94	95	80-116	1	0-11	
Chloride	EPA 300.0	099-08-002-132	N/A	07/27/06	94	93	84-108	1	0-3	
Nitrite (as N)	EPA 300.0	099-08-002-132	N/A	07/27/06	88	87	77-119	1	0-19	
Bromide	EPA 300.0	099-08-002-132	N/A	07/27/06	102	100	87-111	2	0-8	
Nitrate (as N)	EPA 300.0	099-08-002-132	N/A	07/27/06	97	97	87-111	0	0-14	
o-Phosphate (as P)	EPA 300.0	099-08-002-132	N/A	07/27/06	102	94	85-115	8	0-12	
Sulfate	EPA 300.0	099-08-002-132	N/A	07/27/06	98	98	88-112	0	0-7	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

Daniel B. Stephens & Associates	Date Received:	N/A
5951 Encina Road, Suite 208	Work Order No:	06-07-1345
Goleta, CA 93117-6252		

Project: WR06.0034.00

Matrix : Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Carbon, Total Organic	EPA 9060	099-06-013-162	08/01/06	N/A	6000	6700	111	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience
Environmental
Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 06-07-1345

Qualifier	Definition
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Calscience Environmental Laboratories, Inc.

7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY CLIENT: Daniel B. Stephens & Associates, Inc.	CLIENT PROJECT NAME / NUMBER: WR06.0034.00	P.O. NO.:
ADDRESS: 5951 Encina Road, Suite 208	PROJECT CONTACT: Jordan Kear	QUOTE NO.: 949443
CITY: Goleta, CA 93117	SAMPLER(S): (SIGNATURE)	LAB USE ONLY: 07-1345
TEL: 805-683-2409 FAX: 805-683-2419 E-MAIL: jkear@dbstephens.com		

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Please list tests required	EPA 160.1M TDS	EPA 300.0 Anions	EPA 350.2M Ammonia	Ca, Mg, K, Na By EPA 6010	SM2320B Alkalinity/Bicarbona	Total Organic Carbon
	MVP 14-5		25 Jul 06	7:30	soil	1		X	X	X	X	X	X
	MVP 14-10		25 Jul 06	7:45	soil	1							
	MVP 14-15		25 Jul 06	7:55	soil	1		X	X	X	X	X	X
	MVP 14-20		25 Jul 06	8:05	soil	1		X	X	X	X	X	X
	MVP 14-25		25 Jul 06	8:16	soil	1		X	X	X	X	X	X
	MVP 14-30		25 Jul 06	8:43	soil	1							
					soil	1							
					soil	1							
					soil	1							
					soil	1							
					soil	1							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature]	[signature] Driver #5956	26 Jul 06	4:26pm
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature) [signature] GSO	Received by: (Signature) [signature] Cel	7-27-06	1015

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 06 - 0 7 - 1 3 4 5

Cooler 1 **of** 1

SAMPLE RECEIPT FORM

CLIENT: DANIEL STEPHENS + ASSO. **DATE:** 7-27-06

TEMPERATURE – SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

_______ Chilled, cooler with temperature blank provided.
_______ Chilled, cooler without temperature blank.
_______ Chilled and placed in cooler with wet ice.
_______ Ambient and placed in cooler with wet ice.
_______ ~~Ambient temperature.~~
_______ °C Temperature blank.

LABORATORY (Other than Calscience Courier):

_______ °C Temperature blank.
4.1 °C IR thermometer.
_______ Ambient temperature.

Initial: WB

CUSTODY SEAL INTACT:

Sample(s): _______ Cooler: _______ No (Not Intact) : _______ Not Applicable (N/A): ✓

Initial: WB

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples	✓		
Sampler's name indicated on COC		✓	
Sample container label(s) consistent with custody papers	✓		
Sample container(s) intact and good condition	✓		
Correct containers and volume for analyses requested	✓		
Proper preservation noted on sample label(s)			✓
VOA vial(s) free of headspace			✓
Tedlar bag(s) free of condensation			✓

Initial: WB

COMMENTS:

Calscience Environmental Laboratories, Inc.

August 10, 2006

Jordan Kear
Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Subject: **Calscience Work Order No.: 06-08-0191**
Client Reference: WR06.0034.00

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 8/3/2006 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of any subcontracted analysis is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Calscience Environmental
Laboratories, Inc.
Don Burley
Project Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates		Date Received:	08/03/06
5951 Encina Road, Suite 208		Work Order No:	06-08-0191
Goleta, CA 93117-6252		Preparation:	EPA 3050B
		Method:	EPA 6010B
		Units:	mg/kg
Project: WR06.0034.00			Page 1 of 1

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP19-5	**06-08-0191-1**	**07/31/06**	**Solid**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	1420	5	1		Potassium	1940	25	1	
Magnesium	2580	5	1		Sodium	167	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP19-10	**06-08-0191-2**	**07/31/06**	**Solid**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	3210	5	1		Potassium	6230	25	1	
Magnesium	7210	5	1		Sodium	323	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP19-15	**06-08-0191-3**	**07/31/06**	**Solid**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	717	5	1		Potassium	766	25	1	
Magnesium	823	5	1		Sodium	104	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP19-20	**06-08-0191-4**	**07/31/06**	**Solid**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	2030	5	1		Potassium	6210	25	1	
Magnesium	5370	5	1		Sodium	377	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP22-5	**06-08-0191-5**	**07/31/06**	**Solid**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	2000	5	1		Potassium	2770	25	1	
Magnesium	5340	5	1		Sodium	246	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP22-15	**06-08-0191-7**	**07/31/06**	**Solid**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	1310	5	1		Potassium	3280	25	1	
Magnesium	3750	5	1		Sodium	163	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
MVP22-25	**06-08-0191-9**	**07/31/06**	**Solid**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	4590	5	1		Potassium	6080	25	1	
Magnesium	10800	5	1		Sodium	380	25	1	

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	**097-01-002-7,977**	**N/A**	**Solid**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Calcium	ND	5.00	1		Potassium	ND	25.0	1	
Magnesium	ND	5.00	1		Sodium	ND	25.0	1	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 08/03/06
Work Order No: 06-08-0191

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP19-5	**06-08-0191-1**	**07/31/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	32100	100	1		mg/kg	N/A	08/07/06	EPA 160.1M
Fluoride	6.0	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Chloride	23	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrate (as N)	1.2	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
o-Phosphate (as P)	2.8	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Sulfate	310	50	5		mg/kg	N/A	08/03/06	EPA 300.0
Ammonia (as N)	17	5	1		mg/kg	08/08/06	08/08/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	08/08/06	EPA 9060
Alkalinity, Total (as CaCO3)	80	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M
Bicarbonate (as CaCO3)	80	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP19-10	**06-08-0191-2**	**07/31/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	18400	100	1		mg/kg	N/A	08/07/06	EPA 160.1M
Fluoride	6.9	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Chloride	13	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrate (as N)	1.2	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
o-Phosphate (as P)	4.3	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Sulfate	320	50	5		mg/kg	N/A	08/03/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	08/08/06	08/08/06	EPA 350.2M
Carbon, Total Organic	900	500	1		mg/kg	N/A	08/08/06	EPA 9060
Alkalinity, Total (as CaCO3)	80	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M
Bicarbonate (as CaCO3)	80	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 · TEL:(714) 895-5494 · FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 08/03/06
Work Order No: 06-08-0191

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP19-15	**06-08-0191-3**	**07/31/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	6770	10	1		mg/kg	N/A	08/07/06	EPA 160.1M
Fluoride	1.7	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Chloride	22	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
o-Phosphate (as P)	1.4	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Sulfate	73	20	2		mg/kg	N/A	08/03/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	08/08/06	08/08/06	EPA 350.2M
Carbon, Total Organic	500	500	1		mg/kg	N/A	08/08/06	EPA 9060
Alkalinity, Total (as CaCO3)	100	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M
Bicarbonate (as CaCO3)	100	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP19-20	**06-08-0191-4**	**07/31/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	17200	100	1		mg/kg	N/A	08/07/06	EPA 160.1M
Fluoride	2.8	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Chloride	14	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
o-Phosphate (as P)	1.4	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Sulfate	140	20	2		mg/kg	N/A	08/03/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	08/08/06	08/08/06	EPA 350.2M
Carbon, Total Organic	950	500	1		mg/kg	N/A	08/08/06	EPA 9060
Alkalinity, Total (as CaCO3)	15	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M
Bicarbonate (as CaCO3)	15	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates		Date Received:	08/03/06
5951 Encina Road, Suite 208		Work Order No:	06-08-0191
Goleta, CA 93117-6252			

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP22-5	**06-08-0191-5**	**07/31/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	28400	100	1		mg/kg	N/A	08/07/06	EPA 160.1M
Fluoride	5.1	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Chloride	13	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrate (as N)	1.1	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
o-Phosphate (as P)	3.3	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Sulfate	260	50	5		mg/kg	N/A	08/03/06	EPA 300.0
Ammonia (as N)	22	5	1		mg/kg	08/08/06	08/08/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	08/08/06	EPA 9060
Alkalinity, Total (as CaCO3)	130	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M
Bicarbonate (as CaCO3)	120	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP22-15	**06-08-0191-7**	**07/31/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	4170	10	1		mg/kg	N/A	08/07/06	EPA 160.1M
Fluoride	1.4	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Chloride	17	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
o-Phosphate (as P)	1.0	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Sulfate	91	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Ammonia (as N)	11	5	1		mg/kg	08/08/06	08/08/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	08/08/06	EPA 9060
Alkalinity, Total (as CaCO3)	140	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M
Bicarbonate (as CaCO3)	120	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 08/03/06
Work Order No: 06-08-0191

Project: WR06.0034.00

Client Sample Number	Lab Sample Number	Date Collected	Matrix
MVP22-25	**06-08-0191-9**	**07/31/06**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	9630	10	1		mg/kg	N/A	08/07/06	EPA 160.1M
Fluoride	1.3	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Chloride	20	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
o-Phosphate (as P)	1.4	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Sulfate	84	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Ammonia (as N)	22	5	1		mg/kg	08/08/06	08/08/06	EPA 350.2M
Carbon, Total Organic	900	500	1		mg/kg	N/A	08/08/06	EPA 9060
Alkalinity, Total (as CaCO3)	170	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M
Bicarbonate (as CaCO3)	160	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M

Client Sample Number	Lab Sample Number	Date Collected	Matrix
Method Blank		**N/A**	**Solid**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Total Dissolved	ND	1.0	1		mg/kg	N/A	08/07/06	EPA 160.1M
Fluoride	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Chloride	ND	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrite (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Bromide	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Nitrate (as N)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
o-Phosphate (as P)	ND	1.0	1		mg/kg	N/A	08/03/06	EPA 300.0
Sulfate	ND	10	1		mg/kg	N/A	08/03/06	EPA 300.0
Ammonia (as N)	ND	5.0	1		mg/kg	08/08/06	08/08/06	EPA 350.2M
Carbon, Total Organic	ND	500	1		mg/kg	N/A	08/08/06	EPA 9060
Alkalinity, Total (as CaCO3)	13	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M
Bicarbonate (as CaCO3)	ND	5.0	1		mg/kg	08/04/06	08/04/06	SM 2320B M

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: 08/03/06
Work Order No: 06-08-0191
Preparation: EPA 3050B
Method: EPA 6010B

Project WR06.0034.00

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
MVP19-20	**Solid**	**ICP 3300**	**08/04/06**	**08/07/06**	**060804S04**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Calcium	4X	4X	75-125	4X	0-20	Q
Magnesium	4X	4X	75-125	4X	0-20	Q
Potassium	4X	4X	75-125	4X	0-20	Q
Sodium	99	94	75-125	2	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-08-0191

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	MS% REC	MSD % REC	%REC CL	RPD	RPD CL	Qualifiers
Fluoride	EPA 300.0	MVP19-5	08/03/06	N/A	98	100	63-141	2	0-24	
Chloride	EPA 300.0	MVP19-5	08/03/06	N/A	93	93	51-135	0	0-7	
Nitrite (as N)	EPA 300.0	MVP19-5	08/03/06	N/A	99	101	59-137	2	0-10	
Bromide	EPA 300.0	MVP19-5	08/03/06	N/A	100	102	80-116	2	0-6	
Nitrate (as N)	EPA 300.0	MVP19-5	08/03/06	N/A	96	96	68-128	1	0-3	
o-Phosphate (as P)	EPA 300.0	MVP19-5	08/03/06	N/A	102	104	60-138	2	0-17	
Sulfate	EPA 300.0	MVP19-5	08/03/06	N/A	99	98	41-149	0	0-8	
Carbon, Total Organic	EPA 9060	MVP19-5	08/08/06	N/A	107	106	70-130	1	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-08-0191

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	QC Sample ID	Date Analyzed	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
Alkalinity, Total (as CaCO3)	SM 2320B M	MVP22-25	08/04/06	170	160	3	0-25	
Bicarbonate (as CaCO3)	SM 2320B M	MVP22-25	08/04/06	160	150	3	0-25	
Hydroxide (as CaCO3)	SM 2320B M	MVP22-25	08/04/06	1.1	ND	NA	0-25	
Carbonate (as CaCO3)	SM 2320B M	MVP22-25	08/04/06	1.1	10	160	0-25	X
Ammonia (as N)	EPA 350.2M	06-08-0298-1	08/08/06	1100	1200	8	0-25	
Solids, Total Dissolved	EPA 160.1M	MVP22-25	08/07/06	9630	10900	12	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received:	N/A
Work Order No:	06-08-0191
Preparation:	EPA 3050B
Method:	EPA 6010B

Project: WR06.0034.00

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
097-01-002-7,977	**Solid**	**ICP 3300**	**08/04/06**	**08/07/06**	**060804L04**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Calcium	110	114	80-120	4	0-20	
Magnesium	110	110	80-120	0	0-20	
Potassium	104	106	80-120	1	0-20	
Sodium	111	111	80-120	0	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-08-0191

Project: WR06.0034.00

Matrix: Solid

Parameter	Method	Quality Control Sample ID	Date Extracted	Date Analyzed	LCS % REC	LCSD % REC	%REC CL	RPD	RPD CL	Qual
Fluoride	EPA 300.0	099-08-002-135	N/A	08/03/06	97	97	80-116	1	0-11	
Chloride	EPA 300.0	099-08-002-135	N/A	08/03/06	95	95	84-108	0	0-3	
Nitrite (as N)	EPA 300.0	099-08-002-135	N/A	08/03/06	100	99	77-119	1	0-19	
Bromide	EPA 300.0	099-08-002-135	N/A	08/03/06	101	100	87-111	1	0-8	
Nitrate (as N)	EPA 300.0	099-08-002-135	N/A	08/03/06	96	97	87-111	1	0-14	
o-Phosphate (as P)	EPA 300.0	099-08-002-135	N/A	08/03/06	96	99	85-115	4	0-12	
Sulfate	EPA 300.0	099-08-002-135	N/A	08/03/06	97	105	88-112	9	0-7	X

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

Daniel B. Stephens & Associates
5951 Encina Road, Suite 208
Goleta, CA 93117-6252

Date Received: N/A
Work Order No: 06-08-0191

Project: WR06.0034.00

Matrix : Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Carbon, Total Organic	EPA 9060	099-06-013-164	08/08/06	N/A	6000	6300	105	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 06-08-0191

Qualifier	Definition
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY CLIENT: Daniel B. Stephens & Associates, Inc.	CLIENT PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 5951 Encina Road, Suite 208	P.O. NO.:
CITY: Goleta, CA 93117	PROJECT CONTACT: Jordan Kear
TEL: 805-683-2409	QUOTE NO.: 940443
FAX: 805-683-2419	SAMPLER(S): (SIGNATURE)
E-MAIL: jkear@dbstephens.com	LAB USE ONLY: 08-0191

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Please list tests required	EPA 160.1M TDS	EPA 300.0 Anions	EPA 350.2M Ammonia	Ca, Mg, K, Na By EPA 6010	SM2320B Alkalinity/Bicarbona	Total Organic Carbon
	MVP 19-5		31 July	3:30	soil	1		X	X	X	X	X	X
	MVP 19-10		31 July 06	337	soil	1		X	X	X	X	X	X
	MVP 19-15		31 July 06	348	soil	1		X	X	X	X	X	X
	MVP 19-20		31 July 06	3:55	soil	1		X	X	X	X	X	X
	MVP 22-5		31 July 06	1135	soil	1		X	X	X	X	X	X
	MVP 22-10		31 July 06	1143	soil	1							
	MVP 22-15		31 July 06	1150	soil	1		X	X	X	X	X	X
	MVP 22-20		31 July 06	1159	soil	1							
	MVP 22-25		31 July 06	1210	soil	1		X	X	X	X	X	X
					soil	1							
					soil	1							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
	(G.S.O) 8-2-06 4:35 p.m.	2 AUG 06	1636
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date: 8/3/06	Time: 1000

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 06 - 0 8 - 0 1 9 1

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: Daniel

DATE: 8/3/06

TEMPERATURE – SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

_______ Chilled, cooler with temperature blank provided.
_______ Chilled, cooler without temperature blank.
_______ Chilled and placed in cooler with wet ice.
_______ Ambient and placed in cooler with wet ice.
_______ Ambient temperature.
_______ °C Temperature blank.

LABORATORY (Other than Calscience Courier):

_______ °C Temperature blank.
5.1 °C IR thermometer.
_______ Ambient temperature.

Initial: JP

CUSTODY SEAL INTACT:

Sample(s): _______ Cooler: _______ No (Not Intact) : _______ Not Applicable (N/A): ✓

Initial: JP

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples	✓		
Sampler's name indicated on COC	✓		
Sample container label(s) consistent with custody papers	✓		
Sample container(s) intact and good condition	✓		
Correct containers and volume for analyses requested	✓		
Proper preservation noted on sample label(s)			✓
VOA vial(s) free of headspace			✓
Tedlar bag(s) free of condensation			✓

Initial: JP

COMMENTS:

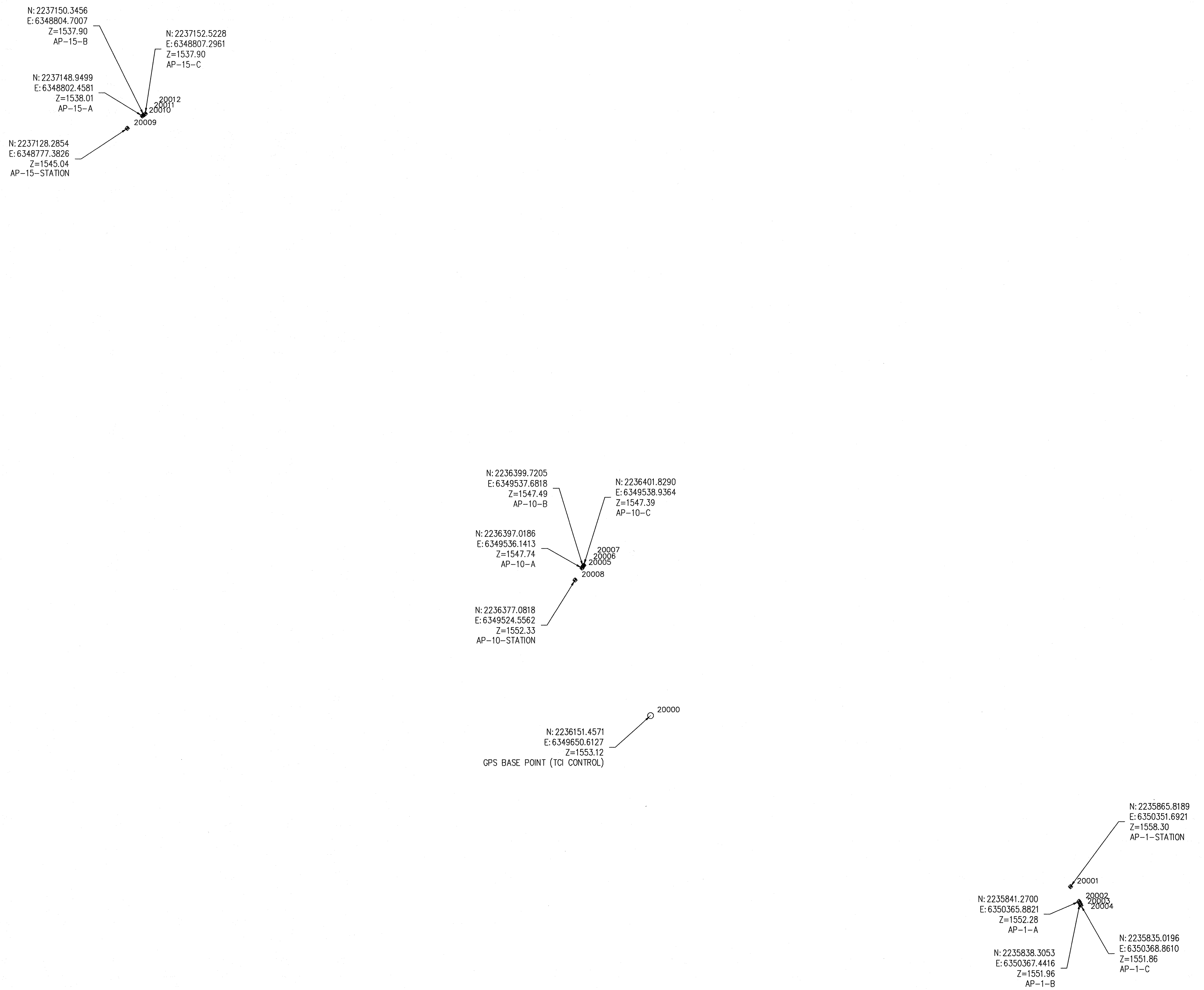
Appendix E

Survey Data

IN THE COUNTY OF RIVERSIDE, CITY OF SAN JACINTO, STATE OF CALIFORNIA

TOPOGRAPHIC SURVEY

FOR DBS&A/EMWD MONITORING PROJECT



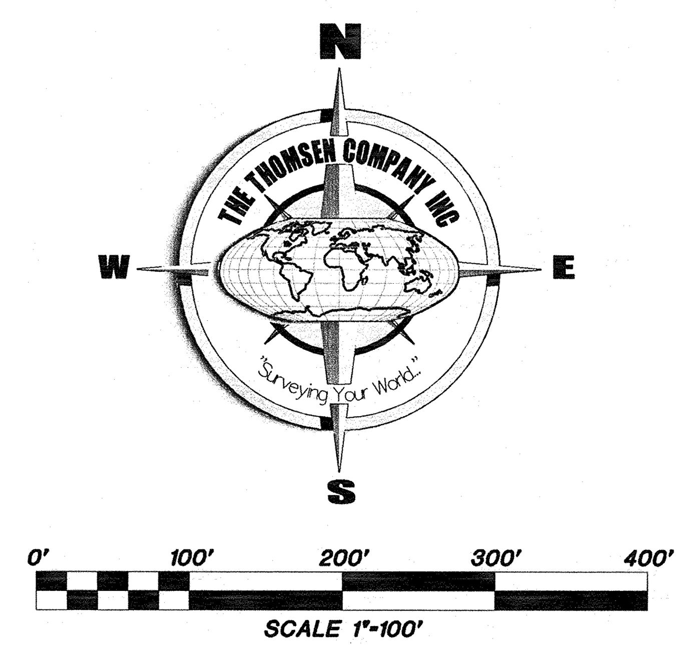
NOTES:

THIS FILE HAS BEEN PROCESSED AGAINST THE CORS STATIONS AT DIAMOND VALLEY RESERVOIR (WHICH ARE STORED IN THIS DRAWING). THE ELEVATIONS DERIVED (FROM THE CORS) ARE NAVD88 DATUM. THE ELEVATION OF BENCHMARK H-1-19 RESET 1973, IS 1519.33 (ALSO 1988 DATUM) PER NGS DATA SHEET AND THE PROCESSED ELEVATION IS 1516.13, A DIFFERENCE OF 3.2'.

List Points Report 07/10/2006 12:55
File> K:\00 JOBS\TCI-06\06032-DBSA Monitoring\DATA\06032-BASE-CORS-ROVER-ELEVATED TO BM.crd
Job Description> DBS&A MONITORING SITE IN SAN JACINTO, CA
Job Number> 0.000 Job Date> 07/10/2006

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
20000	2236151.4571	6349650.6127	1553.12	646/base
20001	2235865.8189	6350351.6921	1558.30	637/AP-1 STATION
20002	2235841.2700	6350365.8821	1552.28	637/AP-1-A
20003	2235838.3053	6350367.4416	1551.96	637/AP-1-B
20004	2235835.0196	6350368.8610	1551.86	637/AP-1-C
20005	2236397.0186	6349536.1413	1547.74	637/AP-10-A
20006	2236399.7205	6349537.6818	1547.49	637/AP-10-B
20007	2236401.8290	6349538.9364	1547.39	637/AP-10-C
20008	2236377.0818	6349524.5562	1552.33	637/AP-10 STATION
20009	2237128.2854	6348777.3826	1545.04	637/AP-15-STATION
20010	2237148.9499	6348802.4581	1538.01	637/AP-15-A
20011	2237150.3456	6348804.7007	1537.90	637/AP-15-B
20012	2237152.5228	6348807.2961	1537.90	637/AP-15-C
20013	2236226.0937	6342215.9191	1519.33	631/H-1-19 RIVCO SURV RESET 197

Number of points listed> 14



Underground Service Alert
Call: TOLL FREE
1-800-227-2600
DIAL BEFORE YOU DIG
TWO WORKING DAYS BEFORE YOU DIG
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

Revisions:

No.	Date:	By:	Description:	Approved:

Designed: ——— Drawn: T.M.T. Checked: R.F.T.

Prepared Under The Supervision Of:

Date: ________ THOMAS M. THOMSEN
PROFESSIONAL LAND SURVEYOR NO. 7200
REGISTRATION EXPIRES: 12\31\07

Approved By:

Date: ________

SEAL
PROFESSIONAL LAND SURVEYOR
THOMAS M. THOMSEN
REGISTRATION EXPIRES 12-31-07
NO. 7200
STATE OF CALIFORNIA

THE THOMSEN COMPANY, INC.
·CYRAX 3-D LASER SCANNING
·GPS & ROBOTIC SURVEYING
·GEOMATIC ENGINEERING
·CIVIL ENGINEERING
·LAND PLANNING
2587 SOUTH SAN JACINTO AVE. SAN JACINTO, CA. 92583
PHONE: (951) 925-3070 · FAX: (951) 925-7469 · WEB: www.thethomsencompany.com

Scale: 1"=100'

Date: JULY 2006

Bench Mark:
RIV. CO. BM # H-1-19 (RESET 1973), NW COR RAMONA EXPWY AND STATE ST.; 41' N'LY OF RAMONA AND 82' W'LY OF STATE. BRASS DISK ON CONC POST UP 0.1'
EL:= 1519.33 NAVD 88 (PER NGS DATA SHEET.

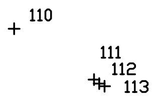
IN THE CITY OF SAN JACINTO
TOPOGRAPHIC SURVEY
FOR
EMWD MONITORING SITE 1 IN SAN JACINTO
DBS&A

Dwg. Info:

Sheet No. 1
OF 1 SHEETS
FILE NO. 06032

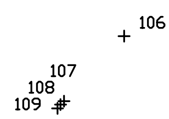
Date: 14 Jul 06 - 1:26 pm
File: K:\00 JOBS\TCI-06\06032-DBSA Monitoring\DATA\06032-BASE-CORS-ROVER.dwg
User: Tom

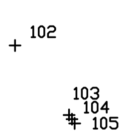
Date: 14 Jul 06 - 1:26 pm File: K:\00 JOBS\TCI-06\06032-DBSA Monitoring\DATA\06032-BASE-CORS-ROVER.dwg



POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
102	2258135.755	6268113.601	1464.18	MVP 22 STA
103	2258075.200	6268160.918	1445.18	MVP 22 A
104	2258071.580	6268163.431	1444.76	MVP 22 B
105	2258067.879	6268165.815	1444.28	MVP 22 C
106	2258461.498	6268843.320	1464.06	MVP 19 STA
107	2258404.806	6268790.931	1446.03	MVP 19 A
108	2258401.851	6268787.944	1445.64	MVP 19 B
109	2258398.573	6268785.303	1445.22	MVP 19 C
110	2259524.370	6268100.124	1466.08	MVP 14 STA
111	2259480.040	6268169.494	1446.86	MVP 14 A
112	2259476.585	6268174.011	1446.50	MVP 14 B
113	2259474.222	6268178.651	1446.36	MVP 14 C

BENCH MARK:
A BRASS DISK ONSITE SET IN CONCRETE STAMPED "ELEV 1460.23'"
SAID BENCHMARK IS PLANT DATUM ELEVATION.

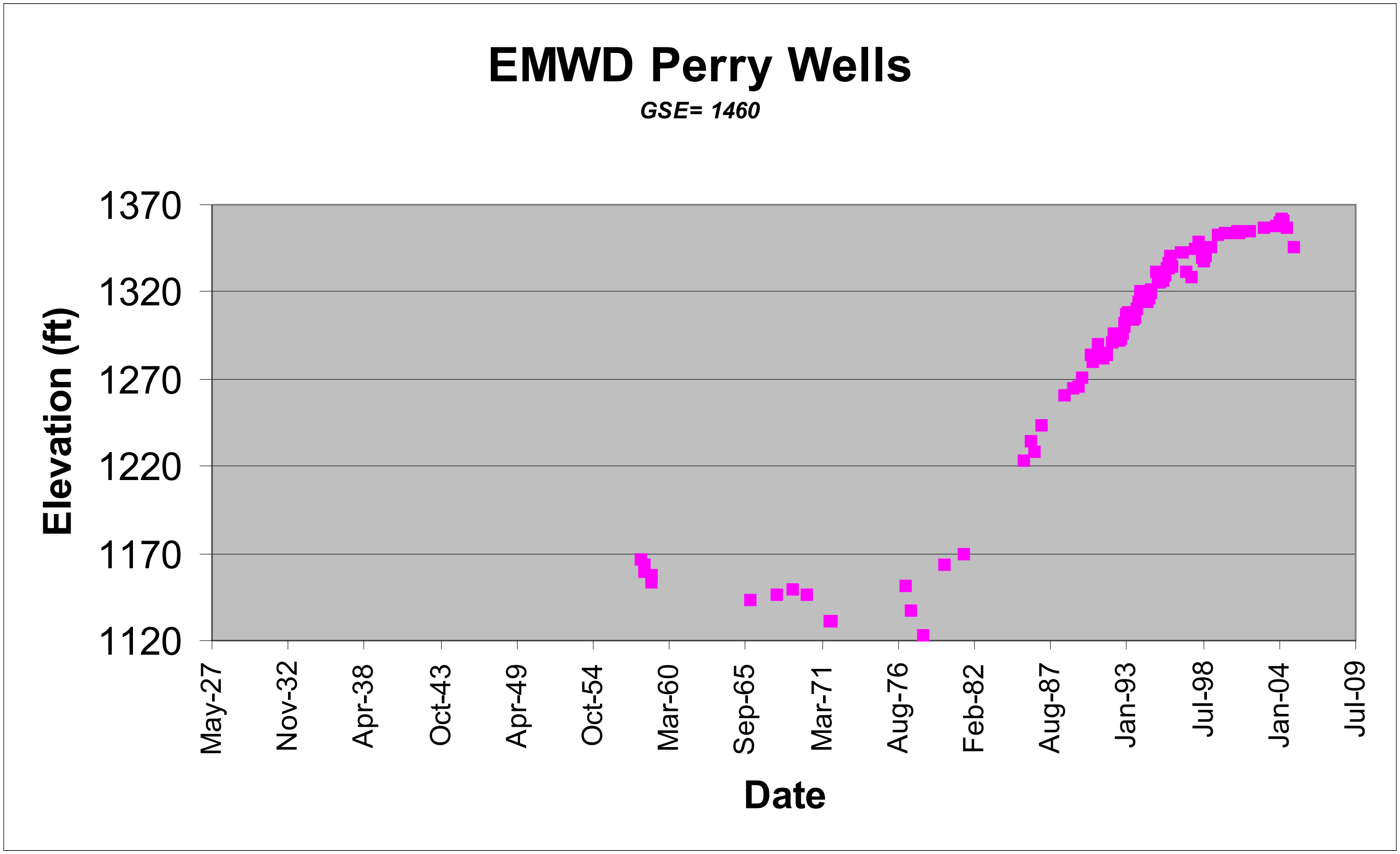




Appendix F

MVRWRF Area Hydrographs

VDR\0-VDR-PROJECTS\SCMWC Shippee Prelim Design.CDR



EASTERN MUNICIPAL WATER DISTRICT

Water Level Hydrograph, Perry Street Wells

Daniel B. Stephens & Associates, Inc.

4-12-06

WR06.0031.00

Figure 3

DRAFT

Appendix E

MV-1 Well Construction Report

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e055357

Page 1 of 1

Owner's Well Number MV-1

Date Work Began 10/04/2006 Date Work Ended 10/19/2006

Local Permit Agency Riverside County Department of Environmental Health

Permit Number 32374 Permit Date 09/22/2006

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Direct Rotary Drilling Fluid Bentonite mud

Depth from Surface Feet	to Feet	Description (Describe material, grain size, color, etc)
0	4	Gravel Fill
4	10	Sand, yellowish brown
10	15	Gravelly sand, occasional clay lens
15	20	Clayey sand
20	30	Silty sand, yellowish brown, medium grained
30	54	Gravelly sand, yellowish brown
54	56	Soft brown clay
56	66	Gravelly sand, yellowish brown
66	67	Soft brown clay
67	74	Gravelly sand, yellowish brown
74	100	Interbedded clayey sand and sandy clay
100	116	Clayey sand with nodular concretions
116	130	Sand, medium to coarse grained

Total Depth of Boring 130 Feet

Total Depth of Completed Well 120 Feet

Well Owner

Name Eastern Municipal Water District

Mailing Address 2270 Trumble Road

City Perris State CA Zip 92572

Well Location

Address 17040 Kitching Street

City Moreno Valley County Riverside

Latitude 33 52 17 N (Deg. Min. Sec.) Longitude 117 13 30 W (Deg. Min. Sec.)

Datum NAD83 Decimal Lat. Decimal Long.

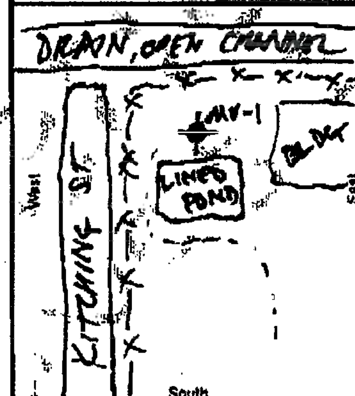
APN Book Page Parcel

Township 3S Range 3W Section 32B

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North



West East South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

Activity

◉ New Well
○ Modification/Repair
○ Deepen
○ Other
○ Destroy
Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

○ Water Supply
☐ Domestic ☐ Public
☐ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
◉ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other

Water Level and Yield of Completed Well

Depth to first water 20 (Feet below surface)

Depth to Static Water Level 38 (Feet) Date Measured 10/17/2006

Estimated Yield * 10 (GPM) Test Type Constant Rate

Test Length (Hours) Total Drawdown (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size If Any (Inches)
0	20	24	Conductor	Low Carbon Steel	3/8	20		
0	70	12	Blank	PVC Sch. 40		4		
70	110	12	Screen	PVC Sch. 40		4	Milled Slots	0.035
110	120	12	Blank	PVC Sch. 80		4		

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	20	Cement	Conductor seal
0	20	Cement	Annular seal
20	130	Filter Pack	Lone Star 6X16

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☑ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name Sam Crum Drilling, Inc. (Person, Firm or Corporation)

PO BOX 879 (Address) Hemet (City) CA (State) 92546 (Zip)

Signed (C-57 Licensed Water Well Contractor) Nov. 25 06 (Date Signed) 593583 (C-57 License Number)

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

PACIFIC SURVEYS

ELECTRIC LOG
GAMMA RAY

Job No. 12822	Company	SAM CRUM WELL DRILLING
	Well	MV-1
	Field	MORENO VALLEY
File No.	County	RIVERSIDE State CA

Location:

KITCHING RD.
EMWD PLANT

Sec. Twp. Rge.

Other Services:

NONE

Permanent Datum	G.L.		Elevation	Elevation
Log Measured From	G.L.	0'	above perm. datum	K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	10-13-06		
Run Number	ONE		
Depth Driller	130'		
Depth Logger	126'		
Bottom Logged Interval	125'		
Top Log Interval	15'		
Casing Driller	16" @ 20'		
Casing Logger	20'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	9.6 @ 77F		
Rmf @ Meas. Temp	10.5 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	N/A		
Time Logger on Bottom	6:15 AM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-2		
Location	L.A.		
Recorded By	LAPORTE		
Witnessed By	K. CHAPMAN		

<<< Fold Here >>>

All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

ELOG Calibration Report

Serial: D1
Model: DTQ

Shop Calibration Performed:	Tue Aug 01 12:21:23 2006
Before Survey Verification Performed:	Tue Aug 01 12:20:23 2006
After Survey Verification Performed:	Tue Aug 01 12:20:53 2006

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	7.913	99.350		10.200	102.200	Ohm-m	1.006	2.238
Long	6.484	96.090		10.200	102.200	Ohm-m	1.027	-17.567
IEE	103.705	4668.852	counts	0.113	5.110	A		
VSN	7.884	5226.093	counts	0.150	99.681	V		
VLN	126.600	1393.972	counts	2.415	26.588	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	8.407	99.675		6.767	99.630	Ohm-m	1.017	-1.787
Long	419.427	106.300		106.299	106.299	Ohm-m	1.049	-5.162
IEE	106.074	4729.556	counts	0.116	5.176	A		
VSN	10.019	5296.417	counts	0.191	101.023	V		
VLN	124.963	1412.120	counts	2.384	26.934	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	8.048	99.680		8.407	99.675	Ohm-m	0.996	0.391
Long	420.004	106.304		106.300	106.300	Ohm-m	0.998	0.190
IEE	105.787	4734.505	counts	0.116	5.181	A		
VSN	9.565	5302.234	counts	0.182	101.134	V		
VLN	124.796	1413.645	counts	2.380	26.964	V		

After Survey Verification compared to Before Survey Calibration

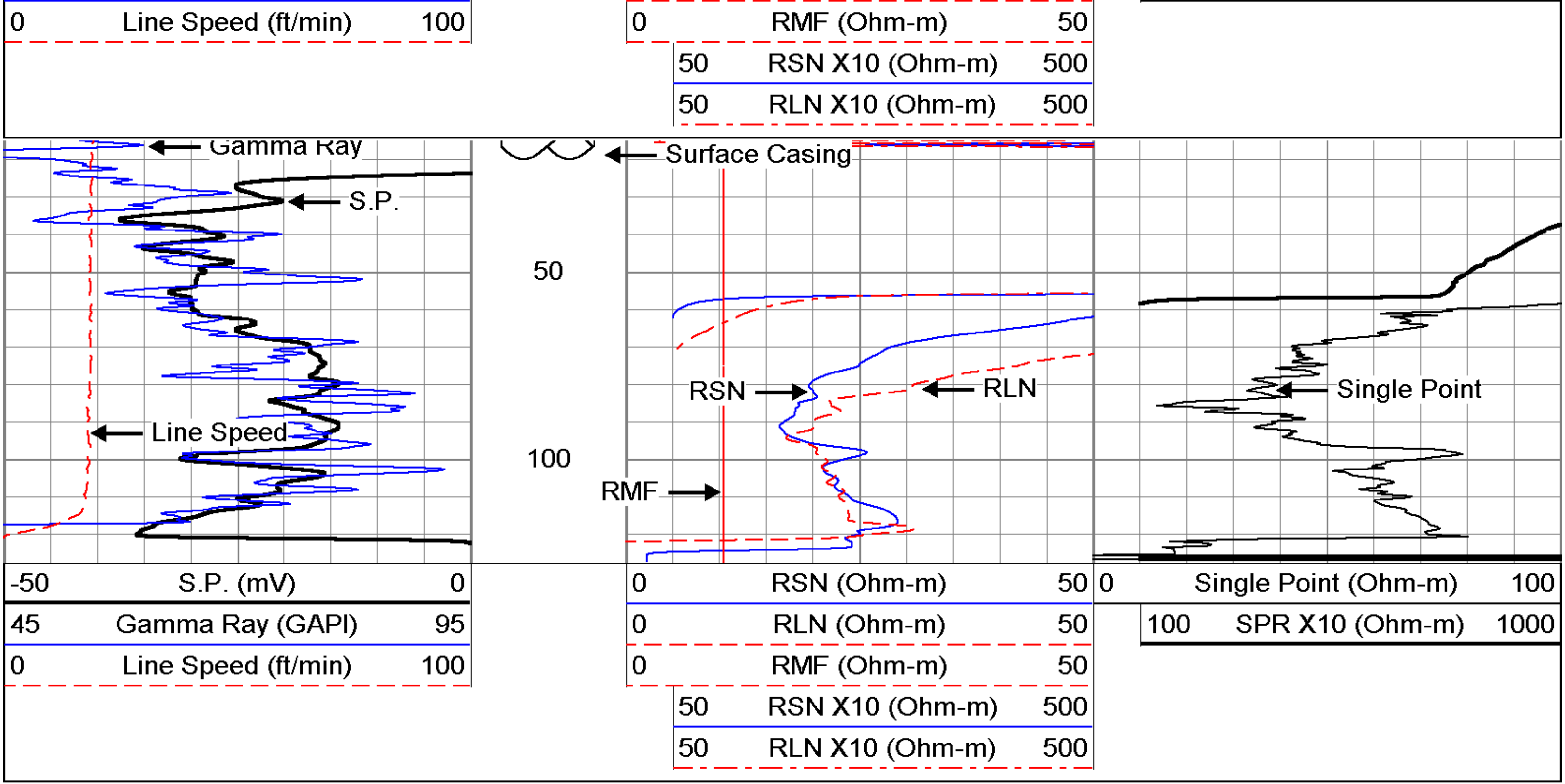
	Zero			Cal		
	Before	After		Before	After	
Short	6.767	8.407	Ohm-m	99.630	99.675	Ohm-m
Long	434.627	419.427	Ohm-m	106.299	106.300	Ohm-m

Gamma Ray Calibration Report

Serial Number:	D1	
Tool Model:	ELOG	
Performed:	Tue Aug 01 12:19:10 2006	
Calibrator Value:	162	GAPI
Background Reading:	167.616	cps
Calibrator Reading:	722.887	cps
Sensitivity:	0.291745	GAPI/cps

Database File:	12822.db
Dataset Pathname:	Crum/well/run1/Elog.1
Presentation Format:	ELOG2
Dataset Creation:	Fri Oct 13 06:48:55 2006 by Calc 6.0
Charted by:	Depth in Feet scaled 1:600

-50	S.P. (mV)	0	0	RSN (Ohm-m)	50	0	Single Point (Ohm-m)	100
45	Gamma Ray (GAPI)	95	0	RLN (Ohm-m)	50	100	SPR X10 (Ohm-m)	1000



0 Line Speed (ft/min) 100
0 RMF (Ohm-m) 50
50 RSN X10 (Ohm-m) 500
50 RLN X10 (Ohm-m) 500
Gamma Ray
Surface Casing
S.P.
50
RSN
RLN
Single Point
Line Speed
100
RMF
-50 S.P. (mV) 0
45 Gamma Ray (GAPI) 95
0 Line Speed (ft/min) 100
0 RSN (Ohm-m) 50
0 RLN (Ohm-m) 50
0 RMF (Ohm-m) 50
50 RSN X10 (Ohm-m) 500
50 RLN X10 (Ohm-m) 500
0 Single Point (Ohm-m) 100
100 SPR X10 (Ohm-m) 1000

Appendix F

MV-2 Well Construction Report

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e055357

Page 1 of 1

Owner's Well Number MV-2

Date Work Began 10/04/2006 Date Work Ended 10/19/2006

Local Permit Agency Riverside County Department of Environmental Health

Permit Number 32375 Permit Date 09/22/2006

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N Latitude W Longitude

APN/TRS/Other

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Direct Rotary Drilling Fluid Bentonite mud

Depth from Surface Feet	to Feet	Description (Describe material, grain size, color, etc)
0	4	Silty Sand
4	9	Clayey Sand, clay lens
10	16	Clayey silt
15	20	Sandy Clay
20	30	Sand, brown, medium grained
30	60	Sand with clay
60	70	Sandy gravel, poorly sorted, dark yellowish brown
70	80	Sand, dark yellowish brown
80	90	Sand with clay, dark yellowish brown
90	130	Sand, brown, medium to coarse grained

Total Depth of Boring 130 Feet

Total Depth of Completed Well 120 Feet

Well Owner

Name Eastern Muinicipal Water District

Mailing Address 2270 Trumble Road

City Perris State CA Zip 92572

Well Location

Address 17040 Kitching Street

City Moreno Valley County Riverside

Latitude 33 Deg. 51 Min. 5 Sec. N Longitude 117 Deg. 12 Min. 55 Sec. W

Datum NAD83 Decimal Lat. Decimal Long.

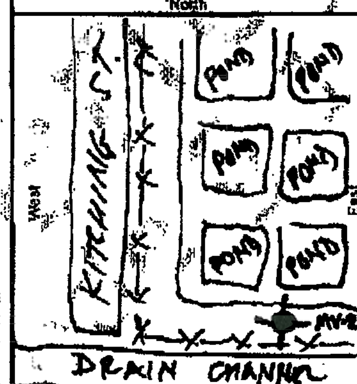
APN Book Page Parcel

Township 3S Range 3W Section 32K

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North



West East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

Activity

◉ New Well

○ Modification/Repair

○ Deepen

○ Other

○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

○ Water Supply

☐ Domestic ☐ Public

☐ Irrigation ☐ Industrial

○ Cathodic Protection

○ Dewatering

○ Heat Exchange

○ Injection

◉ Monitoring

○ Remediation

○ Sparging

○ Test Well

○ Vapor Extraction

○ Other

Water Level and Yield of Completed Well

Depth to first water 20 (Feet below surface)

Depth to Static Water Level 38 (Feet) Date Measured 10/17/2006

Estimated Yield * 10 (GPM) Test Type Constant Rate

Test Length (Hours) Total Drawdown (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	20	24	Conductor	Low Carbon Steel	3/8	20		
0	70	12	Blank	PVC Sch. 40		4		
70	110	12	Screen	PVC Sch. 40		4	Milled Slots	0.035
110	120	12	Blank	PVC Sch. 80		4		

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	20	Cement	Conductor seal
0	60	Cement	Annular seal
60	62	Bentonite	Coated Pellets
62	130	Filter Pack	Lone Star 6X16

Attachments

☐ Geologic Log

☐ Well Construction Diagram

☑ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name Sam Crum Drilling, Inc.

Person, Firm or Corporation

PO Box 577 Hemet CA 92546

Address City State Zip

Signed C-57 Licensed Water Well Contractor 5-25-07 593583

Date Signed C-57 License Number

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

PACIFIC SURVEYS

ELECTRIC LOG
GAMMA RAY

Job No. 12826	Company	SAM CRUM WELL DRILLING
	Well	MV-2
	Field	MORENO VALLEY
File No.	County	RIVERSIDE State CA

Location:

KITCHING RD.
EMWD PLANT

Sec.   Twp.   Rge.

Other Services:

NONE

Permanent Datum	G.L.		Elevation above perm. datum	Elevation
Log Measured From	G.L.	0'		K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	10-17-06		
Run Number	ONE		
Depth Driller	130'		
Depth Logger	126'		
Bottom Logged Interval	125'		
Top Log Interval	15'		
Casing Driller	16" @ 20'		
Casing Logger	20'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	9.9 @ 77F		
Rmf @ Meas. Temp	11.1 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	N/A		
Time Logger on Bottom	7:15 AM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-2		
Location	L.A.		
Recorded By	LAPORTE		
Witnessed By	K. CHAPMAN		

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Comments

ELOG Calibration Report

Serial: D1
Model: DTQ

Shop Calibration Performed:	Tue Aug 01 12:21:23 2006
Before Survey Verification Performed:	Tue Aug 01 12:20:23 2006
After Survey Verification Performed:	Tue Aug 01 12:20:53 2006

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	7.913	99.350		10.200	102.200	Ohm-m	1.006	2.238
Long	6.484	96.090		10.200	102.200	Ohm-m	1.027	-17.567
IEE	103.705	4668.852	counts	0.113	5.110	A		
VSN	7.884	5226.093	counts	0.150	99.681	V		
VLN	126.600	1393.972	counts	2.415	26.588	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	8.407	99.675		6.767	99.630	Ohm-m	1.017	-1.787
Long	419.427	106.300		106.299	106.299	Ohm-m	1.049	-5.162
IEE	106.074	4729.556	counts	0.116	5.176	A		
VSN	10.019	5296.417	counts	0.191	101.023	V		
VLN	124.963	1412.120	counts	2.384	26.934	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	8.048	99.680		8.407	99.675	Ohm-m	0.996	0.391
Long	420.004	106.304		106.300	106.300	Ohm-m	0.998	0.190
IEE	105.787	4734.505	counts	0.116	5.181	A		
VSN	9.565	5302.234	counts	0.182	101.134	V		
VLN	124.796	1413.645	counts	2.380	26.964	V		

After Survey Verification compared to Before Survey Calibration

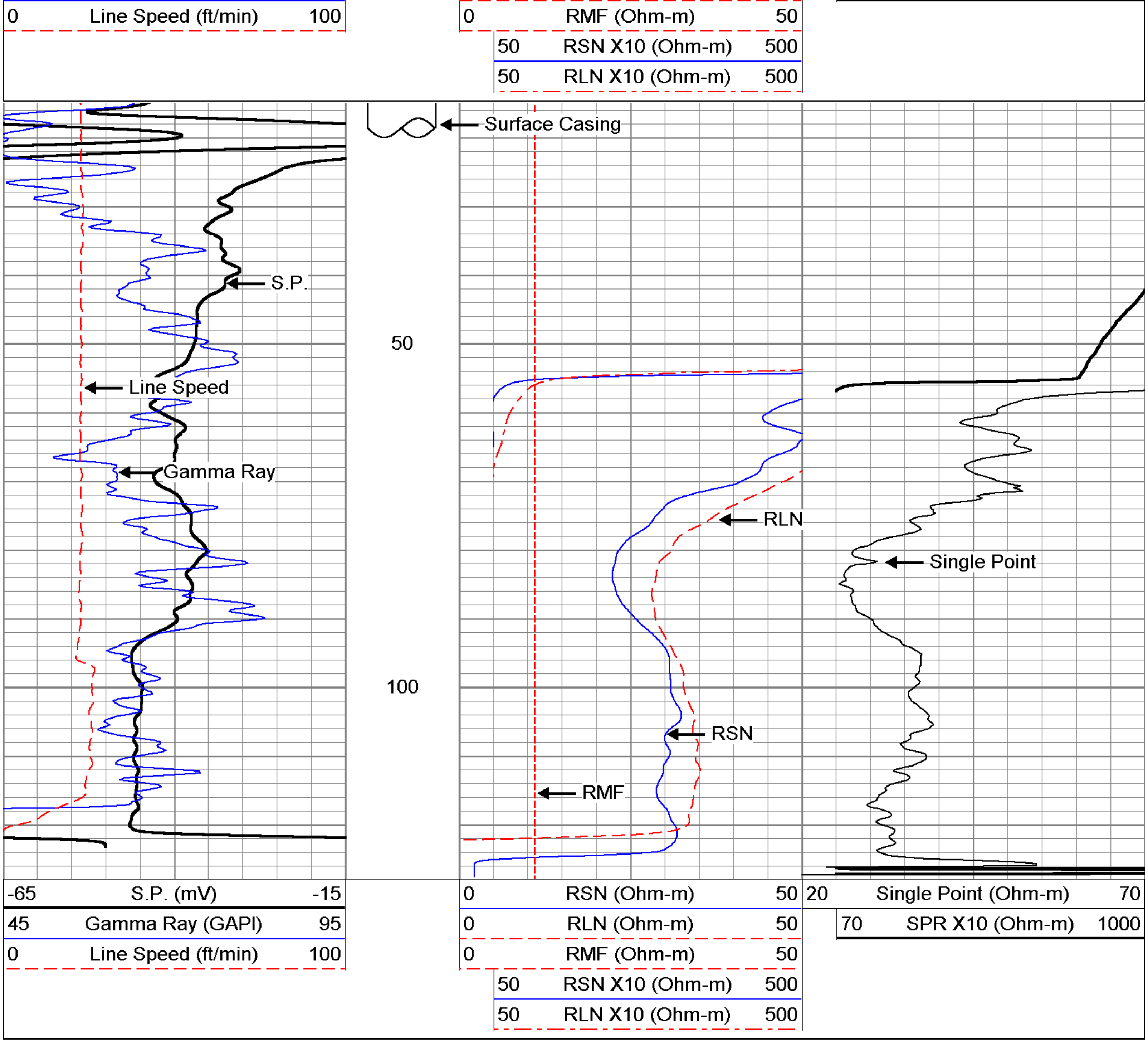
	Zero			Cal		
	Before	After		Before	After	
Short	6.767	8.407	Ohm-m	99.630	99.675	Ohm-m
Long	434.627	419.427	Ohm-m	106.299	106.300	Ohm-m

Gamma Ray Calibration Report

Serial Number:	D1	
Tool Model:	ELOG	
Performed:	Tue Aug 01 12:19:10 2006	
Calibrator Value:	162	GAPI
Background Reading:	167.616	cps
Calibrator Reading:	722.887	cps
Sensitivity:	0.291745	GAPI/cps

Database File:	12826.db
Dataset Pathname:	Crum/MV2/run1/Elog
Presentation Format:	ELOG2
Dataset Creation:	Tue Oct 17 07:25:27 2006 by Log 6.0
Charted by:	Depth in Feet scaled 1:240

-65	S.P. (mV)	-15	0	RSN (Ohm-m)	50	20	Single Point (Ohm-m)	70
45	Gamma Ray (GAPI)	95	0	RLN (Ohm-m)	50	70	SPR X10 (Ohm-m)	1000



0 Line Speed (ft/min) 100
0 RMF (Ohm-m) 50
50 RSN X10 (Ohm-m) 500
50 RLN X10 (Ohm-m) 500
Surface Casing
S.P.
50
Line Speed
Gamma Ray
RLN
Single Point
100
RSN
RMF
-65 S.P. (mV) -15
45 Gamma Ray (GAPI) 95
0 Line Speed (ft/min) 100
0 RSN (Ohm-m) 50
0 RLN (Ohm-m) 50
0 RMF (Ohm-m) 50
50 RSN X10 (Ohm-m) 500
50 RLN X10 (Ohm-m) 500
20 Single Point (Ohm-m) 70
70 SPR X10 (Ohm-m) 1000

Appendix G

Lysimeter Sampling
Field Memoranda

FIELD MEMORANDUM No. 1

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: July 10, 2007

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Alessandro Ponds, July 6, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Samples collected:

Pond water samples from Ponds 1, 10, and 15
Soil water samples from lysimeters at each of three depths at Ponds 1, 10, and 15.
All samples collected without incident as presented in attached field notes.
All samples labeled and recorded on chain-of-custody (copy attached).
Samples delivered to EMWD Laboratory July 7, 2006.

Equipment repairs/completions:

Cross-slips and couplings installed on PVC riser pipes to separate depth-specific pressure/vacuum lines and sample tubes for each lysimeter.
Lysimeters purged of one chamber and tubing volume prior to pulling samples.

Site status:

Ponds 10 and 15 were partially filled with water above the lysimeters upon DBS&A personnel arrival; Pond 1 was being filled throughout the day.

Next site visit:

July 13, 2006, Alessandro Ponds

Additional work or repairs planned:

Complete lysimeter head assembly, paint crash posts and apply reflective tape.

7/6/06

9:30 A1 - getting water beginning this morning
- lysimeter location dry at surface
- surface H_2O about 30 ft away

A10 - receiving H_2O from 7/5/06 stopped ~15:00 & began again this morning
- lysimeters submerged

A15 - receiving H_2O from 7/5/06 stopped ~15:00 & began again this morning ~9:30
- lysimeter location at edge of water

10:00 hooked up ~~tubing~~ tubing manifold

7/6/06

10:12 began pulling vacuum on deep lysimeter and kept it for ~2 min & clamped it off

began vacuum on mid depth lysimeter 10:18 for too long • saw water in vacuum pump

pumped ~20 oz from the deep lys
AP1 - 30

put vacuum on AP1 - 15 for 2 min
10:33 - 10:35

Purge recovery

AP1 - 29.2 ~~20~~ 10 oz
AP1 - 14.5 ~ 3 oz each two times
AP1 - 7.1 ~ 12 oz

7/6/06

Pond ~~1~~ sampling (3 min vacuum)

vacuum on AP 1 - ~~28~~ 29.2 11:00 - 11:03
AP 1 - ~~15~~ 14.5 ~~11:03~~ - 11:07
AP 1 - ~~8~~ 7.1 11:08 - 11:11

sampling will be done after lunch

Pond 10

Purge ~~set vacuum at 11:24 - 11:27 pr~~
Set vacuum on each for 3 min
AP10 - 29.0 11:24 - 11:27
AP 10 - 19.5 11:28 - 11:31
AP10 - 8.5 11:32 - 11:35

Purge Recovery
AP 10 - 29.0 21 oz.
AP 10 - 19.5 21 oz.
AP 10 - 8.5 16 oz.

7/6/06

Pond 10 sampling 3 min vacuum

AP10 - 29.0 11:48 - 11:51 vacuum
AP10 - 19.5 11:55 - 11:58 "
AP10 - 8.5 11:59 - 12:02 "

POND 15

Purge 3 min vacuum
AP15 - 28.8 12:12 - 12:15
AP15 - 16.5 12:17 - 12:20
AP15 - 7.5 12:21 - 12:24

Purge recovery
AP15 - 28.8 23. oz.
AP15 - 16.5 21 oz.
AP15 - 7.5 20 oz.

Pond 15 Sampling 3 min vacuum
AP15 - 28.8 12:35 - 12:38
AP15 - 16.5 12:44 - 12:47
AP15 - 7.5 12:49 - 12:52

7/6/06

15:15 Pond 1 sampling

~~2nd vacuum~~

Sample	29.2	14.5	7.1	SW
time	15:15	~~15:00~~ ~~15:14-15:17~~	15:45	
2nd vac	15:53	~~15:17~~ 15:20	15:57	16:09 - 16:05
2nd sam	16:08	16:12		3 2 1
3rd vac		16:00	~~16:01~~	MS
3rd sample		16:17		
4th vac		16:19		
4th samp.		16:23		

16:34 Pond 10

	29.0	19.5	8.5	SW
1st sample	16:45	16:40	16:34	16:51 16:52
2nd vac		16:49	16:36	
2nd samp	15:04	15:00 ~~16:51~~ PK	16:54	MS 1 2 3

Assembled pond 10 tubing manifold in monitoring casing

7/6/06

Pond 15 Sampling

	28.8	16.5	7.5	SW
1st sampling	17:27	17:38	17:34	17:42 - 17:43
2nd vac	17:32	17:36	17:41	17
2nd sampling	17:47		17:51	MS 1 2 3

7/6/06 PK

Surface H_2O sample summary

Pond 1 The only edge of the pond w/ H_2O was the NW face. The three samples were taken at the middle w/ the others ~20 ft on either side. The water was too shallow to totally submerse the bottles and get 1 L samples

Pond 10 Water was collected near the lysimeters and on both sides of the concrete ramp where the inflow of H_2O occurs

Pond 15 the pond was filling and the lysimeter trench was barely submerged the ground surface created little inlets or "bays" of H_2O near the trench. H_2O was taken from 3 inlets near the installation point.

DANIEL B. STEPHENS & ASSOCIATES, Inc.
5951 Encina Road Suite 208
Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE: 7/7/06

PAGE: 1 OF 1

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S) (SIGNATURE): Phil Kaiser
	LAB USE ONLY:

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL __/__/__

SPECIAL INSTRUCTIONS

Three sample containers designated with "-SW" to be composited before analyses

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Total Organic Carbon (SM 5310C)
	AP1-SW		07/06/06	16:00	W	3					X	X	X	X	X	X	X
	AP1-7.1		07/06/06	15:45	W	1					X	X	X	X	X	X	X
	AP1-14.5		07/06/06	15:00	W	1					X	X	X	X	X	X	X
	AP1-29.2		07/06/06	15:15	W	1					X	X	X	X	X	X	X
	AP10-SW		07/06/06	16:51	W	3					X	X	X	X	X	X	X
	AP10-8.5		07/06/06	16:34	W	1					X	X	X	X	X	X	X
	AP10-19.5		07/06/06	16:40	W	1					X	X	X	X	X	X	X
	AP10-29.0		07/06/06	16:45	W	1					X	X	X	X	X	X	X
	AP15-SW		07/06/06	17:42	W	3					X	X	X	X	X	X	X
	AP15-7.5		07/06/06	17:34	W	1					X	X	X	X	X	X	X
	AP15-16.5		07/06/06	17:38	W	1					X	X	X	X	X	X	X
	AP15-28.8		07/06/06	17:27	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	Maria E. Selby	7-July-06	0900
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 2

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: July 14, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Alessandro Ponds, July 13, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Site status:

Ponds 10 and 15 were partially filled with water about one foot lower in both ponds than the week before. The pond water was no longer above the lysimeters upon DBS&A personnel arrival. Pond 10 was being filled at a low rate for part of the morning. Pond 1 was dry.

Samples collected:

Pond water samples from Ponds 2, 10, and 15
 -Pond 2 water samples were taken as a surrogate for Pond 1 being dry.
Soil water samples from lysimeters at each of three depths at Ponds 1, 10, and 15.
All samples collected without incident as presented in attached field notes.
All samples labeled and recorded on chain-of-custody (copy attached).
Samples delivered to EMWD Laboratory July 13, 2006.

Equipment repairs/completions:

Pressure gauges for the pressure/vacuum (P/V) lines and ball valves for the P/V and sample lines were added prior to sampling.
.

Next site visit:

July 20, 2006, Alessandro Ponds

Additional work or repairs planned:

Complete lysimeter head assembly, paint crash posts and apply reflective tape.

9:00 AM

Arrived & Found the water lower than I left it last week.
- Pond 15 is down ~1 ft and the lysimeter trench is exposed.
- POND 10 is ~1 ft lower and the shoreline is right at the lysimeter trench. Water is coming in.
- POND 1 is completely dry

Water is flowing into POND 10 but not PONDS 1 & 15.

Pictures were taken at all 3 ponds.

SAMPLING PROCEDURE

- A 3 minute vacuum is ~~will be~~ applied to the lysimeter PV line and the lysimeter is then allowed to sit for ~10 min

- The vacuum is broken and air is pumped into the PV-line until all of the sample is collected

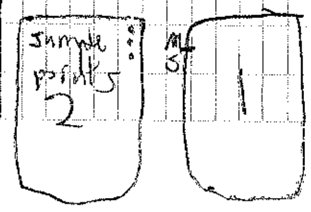
- A vacuum is applied again for 3 minutes and the procedure is repeated until enough sample has been collected

Pond I

Lysimeter

	29.2	14.5	7.1	~~[illegible]~~
1st vacuum	9:54	9:50	9:58	
1st sample	10:16	10:08	10:21	
2nd V	10:21	10:16	10:28	
2nd S	10:38	10:26	10:45	
3rd V		10:31	10:48	
3rd S		10:41	11:11	
4th V		10:44		*
4th S		11:06		20 psig applied at 11:08
5th V		12:16		same pressure at 12:14
5th S		12:35		
6th V		12:43		
6th S		12:46		
7th V		12:48		
7th S		14:06		
8th V		14:09	← leave all week to see response	

purge first thing next week

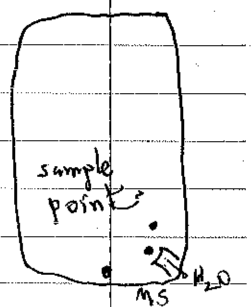


surrogate SW sampling

POND 10

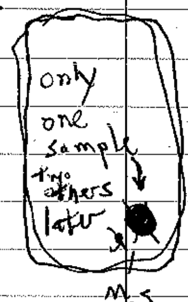
LYSIMETER

EVENT	29.0	19.5	8.5
1st Vac	11:31	11:40	11:46
1st Samp	11:58	12:02	12:06
2nd V	12:00	12:05	12:09
2nd S	12:23	pk ~~12:25~~	12:25
2nd S		12:28	



POND 15

Event	28.8	16.5	7.5
1st Vac	13:00	13:07	13:19
1st Samp	13:20	13:25	13:37
2nd V	13:24	13:38	13:40
2nd S	13:32	13:42	13:57



Only one location to safely collect SW

Pressure Gauges + ball valves were added the the lysimeter equipment

Added reflective tape and reflective paint to crash poles

TESTED AP1 - 14.5

Applied pressure to the P-V line w/ the sample valve closed

The pressure gauge showed 20-21 psig at 11:08 and showed no decrease in psig at 12:14

There were no leaks in the system.

A vacuum was applied at the end of the day to see what size sample could be drawn w/ a long waiting period.

DANIEL B. STEPHENS & ASSOCIATES, Inc.
5951 Encina Road Suite 208
Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Phil Kason
	LAB USE ONLY:

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

Three sample containers designated with "-SW" to be composited before analyses

E060713 23

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Total Organic Carbon (SM 5310C)
01	AP2-SW		07/13/06	14:12	W	3					X	X	X	X	X	X	X
02	AP1-7.1		07/13/06	10:21	W	1					X	X	X	X	X	X	X
03	AP1-14.5		07/13/06	10:09	W	1					X	X	X	X	X	X	X
04	AP1-29.2		07/13/06	10:16	W	1					X	X	X	X	X	X	X
05	AP10-SW		07/13/06	10:48	W	3					X	X	X	X	X	X	X
06	AP10-8.5		07/13/06	11:46	W	1					X	X	X	X	X	X	X
07	AP10-19.5		07/13/06	11:40	W	1					X	X	X	X	X	X	X
08	AP10-29.0		07/13/06	11:58	W	1					X	X	X	X	X	X	X
09	AP15-SW		07/13/06	13:12	W	3					X	X	X	X	X	X	X
10	AP15-7.5		07/13/06	13:37	W	1					X	X	X	X	X	X	X
11	AP15-16.5		07/13/06	13:25	W	1					X	X	X	X	X	X	X
12	AP15-28.8		07/13/06	13:20	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kason	Maria E. Seltz	7/11/06	1550
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 2

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: July 24, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Alessandro Ponds, July 20, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Site status:

Water levels in all the ponds were up from the previous week. The depth stick in Pond 1 read a half a foot above the bottom and water extended to cover the lysimeters. Ponds 10 and 15 were partially filled with water about a half of a foot above their respective levels from the week before. No additions of water occurred during sampling.

Samples collected:

Pond water samples from Ponds 1, 10, and 15. Three samples were collected from each pond for compositing.
Soil water samples from lysimeters at each of three depths at Ponds 1, 10, and 15.
All samples collected without incident as presented in attached field notes.
All samples labeled and recorded on chain-of-custody (copy attached).
Samples delivered to EMWD Laboratory July 20, 2006.

Equipment repairs/completions:

The last of the crash poles were painted with a fluorescent yellow
The last of the crash poles had reflective tape added.
.

Next site visit:

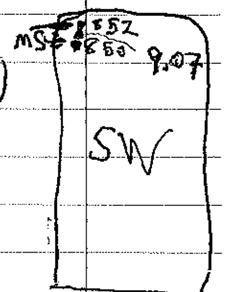
July 27, 2006, Alessandro Ponds

Additional work or repairs planned:

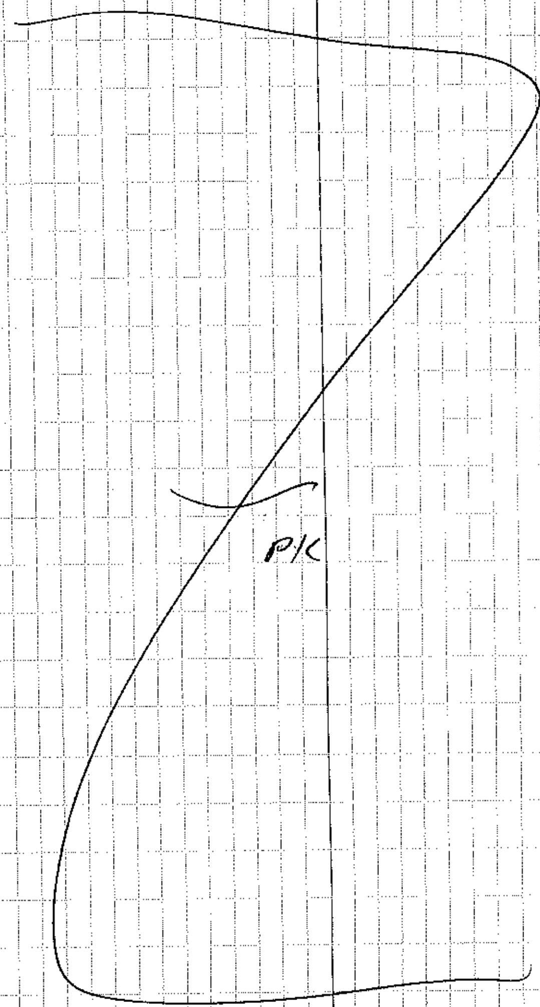
Complete lysimeter head assembly at Pond 15.

POND I

	Lysimeter Depth (ft)		
	29.2	14.5	7.1
1st Vac	8:22	8:18	8:26
1st Sampling	8:41	8:35	8:45
2nd Vac	8:44	8:38	8:48
2nd Samp	9:10	9:00	9:14
3rd V		9:03	
3rd S		9:17	
4th V		9:21	
4th S		9:40	



Pond I has H_2O w/ depth gauge reading 0.5 ft above bottom.

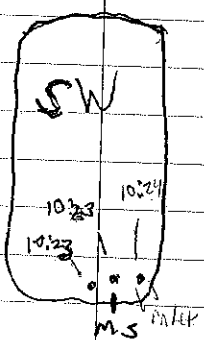


7/20

P.K

POND 10

	Lysimeter Depths 29.0	19.5	8.5
1st Vacuum	9:53	9:58	10:02
1st Sample	10:07	10:12	10:18
2nd V	10:10	10:17	10:22
2nd S	10:30	10:32	10:39



Pond 10 H_2O Level to 2" below base of ramp overhang, & halfway up pipe coming from the main road

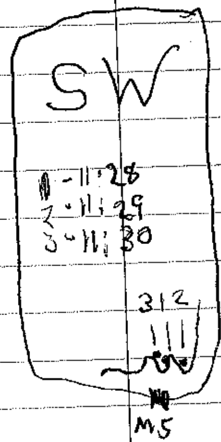
7/20

PK.

PK
7/20

POND 15

	Lysimeter Depth (Ft)		
	28.8	16.5	7.5
1st Vacuum	10:50	10:55	10:58
1st Sample	11:13	11:19	11:24
2nd V	11:18	11:23	11:27
2nd S	11:37	11:39	11:41



POND 15

H_2O level covering lysimeters, barely. It is a few inches higher than last week

No water was administered to any of the 3 ponds while I was on site.

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Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaiser
LAB USE ONLY:

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS
Three sample containers designated with "-SW" to be composited before analyses

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Total Organic Carbon (SM 5310C)							
	AP1-SW		07/20/06	8:52	W	3							X	X	X	X	X	X	X							
	AP1-7.1		07/20/06	8:26	W	1							X	X	X	X	X	X	X							
	AP1-14.5		07/20/06	8:18	W	1							X	X	X	X	X	X	X							
	AP1-29.2		07/20/06	8:22	W	1							X	X	X	X	X	X	X							
	AP10-SW		07/20/06	10:23	W	3							X	X	X	X	X	X	X							
	AP10-8.5		07/20/06	10:02	W	1							X	X	X	X	X	X	X							
	AP10-19.5		07/20/06	9:58	W	1							X	X	X	X	X	X	X							
	AP10-29.0		07/20/06	9:53	W	1							X	X	X	X	X	X	X							
	AP15-SW		07/20/06	11:28	W	3							X	X	X	X	X	X	X							
	AP15-7.5		07/20/06	10:58	W	1							X	X	X	X	X	X	X							
	AP15-16.5		07/20/06	10:55	W	1							X	X	X	X	X	X	X							
	AP15-28.8		07/20/06	10:50	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 4

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: July 28, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Alessandro Ponds, July 27, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Site status:

Water levels in all the ponds were the same or slightly lower than the previous week. The depth stick in Pond 1 read 0.2 ft above the base, 0.3 ft lower than a week ago, and the water's edge extended to the lysimeters. Pond 10 was down about 0.5 ft and the lysimeters do not have surface water above them. Pond 15's water level was the same as the previous week. No additions of water occurred during sampling. A tree has fallen over at Pond 15 and is laying at the edge of the pond where surface water samples are taken.

Samples collected:

Pond water samples from Ponds 1, 10, and 15. Three samples were collected and composited on-site.
Soil water samples from lysimeters at each of three depths at Ponds 1, 10, and 15.
All samples collected without incident as presented in attached field notes.
All samples labeled and recorded on chain-of-custody (copy attached).
Samples delivered to EMWD Laboratory July 27, 2006.

Equipment repairs/completions:

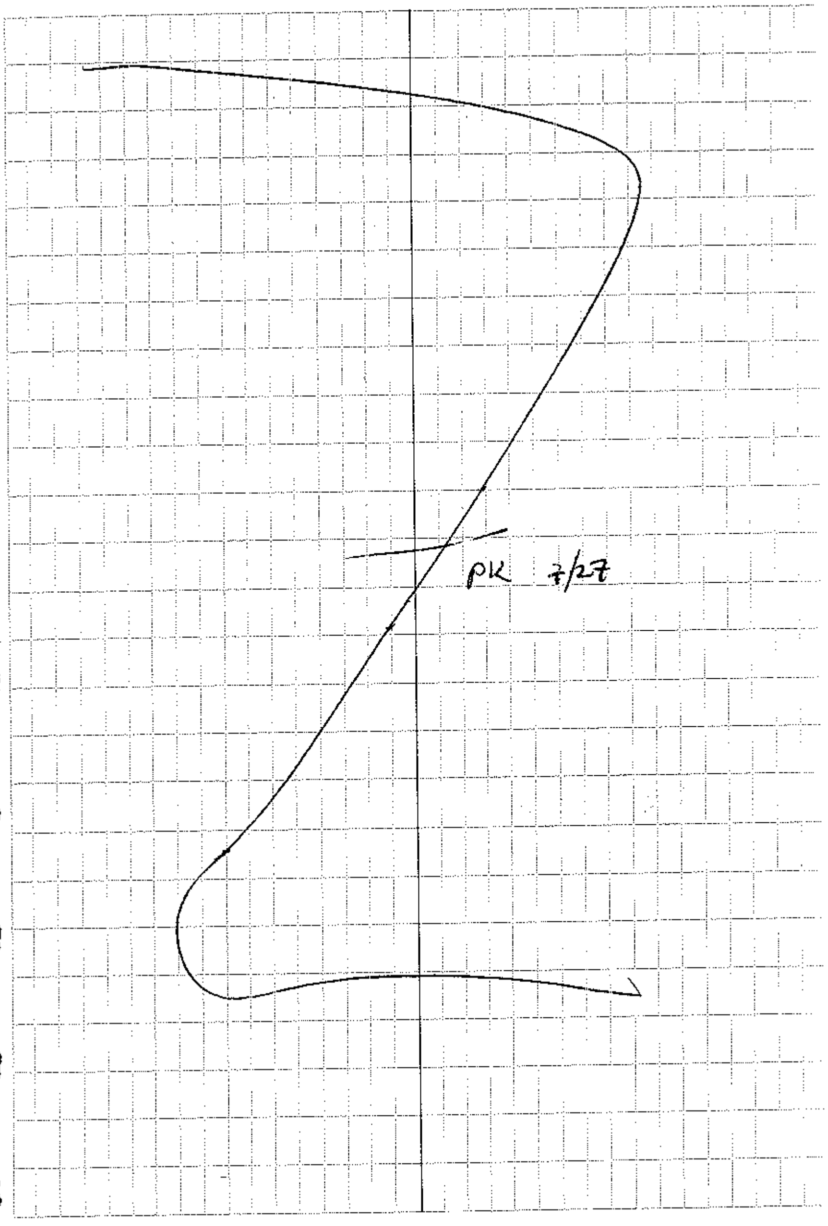
The last of the monitoring station assemblies, at Pond 15, was completed.
.

Next site visit:

Thursday August 3 for both Allesandro Ponds and MVRWRF

Additional work or repairs planned:

Completion of trenching and monitoring stations at MVRWRF.


pk 7/27

7/27

POND 1

P Kaiser

Lysimeter Depth (ft)

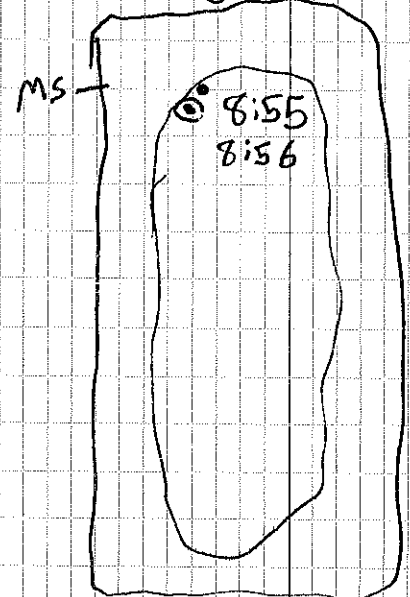
	7.1	14.5	24.2
1st Vacuum	8:31	8:23	8:27
1st Sample	8:50	8:36	8:42
2nd V	8:53	8:40	8:47
2nd S	9:11	9:03	9:07
3rd V		9:06	
3rd S		9:19	
4th V		9:22	
4th S		9:35	

valves left open for week so the well was purged before sampling

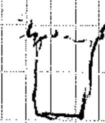
P.K.

7/27

Water level down to 0.2 ft, but water in base of pond. Shoreline right by lysimeters. Water line marks show the pond had H_2O ~3 ft and ~5 ft above current levels sometime within the last week showing good infiltration. PICTURES were taken showing the previous water levels.

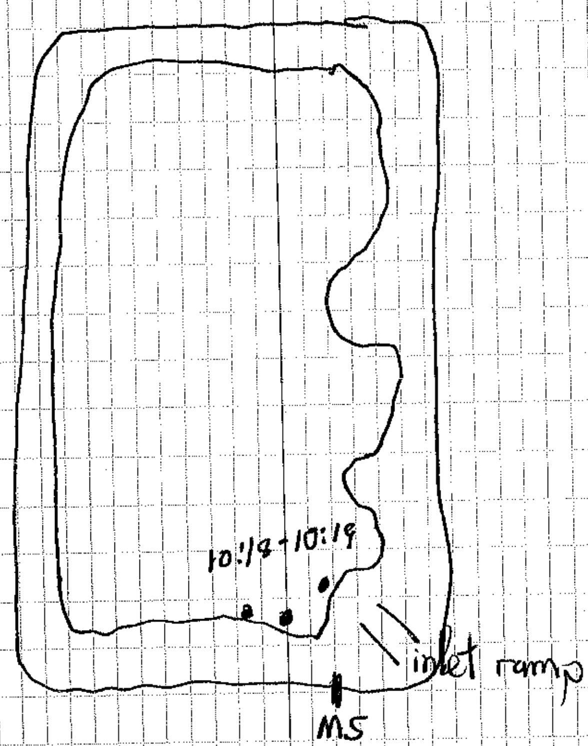


samples taken w/ separate 8 oz cups, dipped twice into pond at each location & filled up to 1/2" from the top



7/27	LYSIMETER	Depth (Ft)	
	8.5	19.5	29.0
1st Vacum	9:56	9:50	9:46
1st Sample	10:13	10:06	10:01
2nd V	10:16	10:10	10:02
2nd V	10:29	10:26	10:22
3			

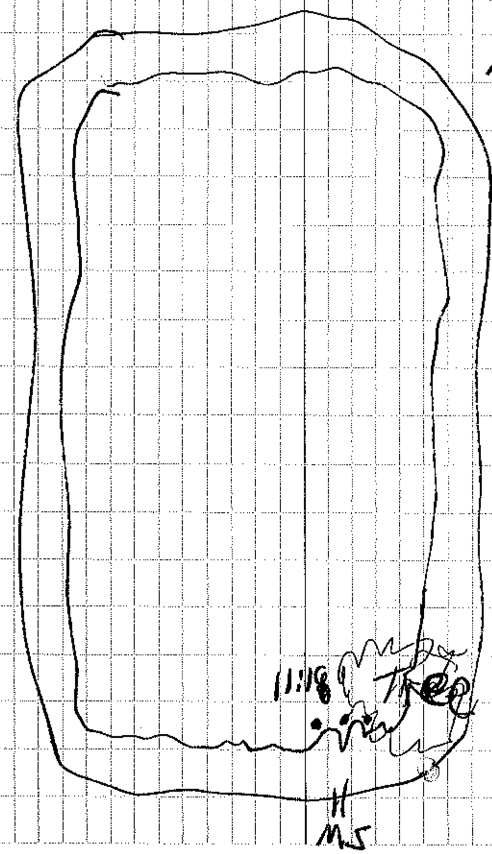
Water level is down about 7".
Lysimeters are not under water, they are about 5Ft from the shore.
The wind pushes the algae to this corner of the pond



	LYSIMETER Depth (ft)		
	7.5	16.5	28.8
1st Vacuum	10:~~49~~54 PK	10:~~[illegible]~~49 PK	10:45
1st Sample	11:15	11:11	11:06
2nd V	11:19	11:14	11:09
2nd S	11:35	11:30	11:27

I decided that water may get into the lysimeters even w/ the valves closed. I purged all 3 lysimeters before sampling and will do that for all lysmeters in the future.

Pond 15 may be a few inches higher than last week. A tree has fallen across are where surface water samples are taken, partially blocking the area. Samples were still taken for compositing.



A picture of the tree that fell over was taken

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CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaiser
LAB USE ONLY:

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

Three sample containers designated with "-SW" to be composited before analyses

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Total Organic Carbon (SM 5310C)
	AP1-SW		07/27/06	8:55	W	1					X	X	X	X	X	X	X
	AP1-7.1		07/27/06	8:50	W	1					X	X	X	X	X	X	X
	AP1-14.5		07/27/06	8:36	W	1					X	X	X	X	X	X	X
	AP1-29.2		07/27/06	8:42	W	1					X	X	X	X	X	X	X
	AP10-SW		07/27/06	10:18	W	1					X	X	X	X	X	X	X
	AP10-8.5		07/27/06	10:13	W	1					X	X	X	X	X	X	X
	AP10-19.5		07/27/06	10:06	W	1					X	X	X	X	X	X	X
	AP10-29.0		07/27/06	10:01	W	1					X	X	X	X	X	X	X
	AP15-SW		07/27/06	11:18	W	1					X	X	X	X	X	X	X
	AP15-7.5		07/27/06	11:06	W	1					X	X	X	X	X	X	X
	AP15-16.5		07/27/06	11:[illegible]1	W	1					X	X	X	X	X	X	X
	AP15-28.8		07/27/06	11:15	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[signature]	7/27/06	1330

FIELD MEMORANDUM No. 5

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: August 7, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Alessandro Ponds, August 4, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Site status:

Pond 1 was almost dry with a group of pools in the middle confined in a region with about a 100 ft diameter as seen in the field notes. The water level in Pond 10 was higher than a week earlier by about 1 ft to 1.5 ft. Pond 15's water level was about 0.5 ft to 0.75 ft lower than the previous week. At Pond 15, I cut away the upper reaches of the fallen tree to allow access to the pond to take surface water samples.

Samples collected:

Pond water samples from Ponds 2, 10, and 15. Three samples were collected and composited on-site. The Pond 2 was a surrogate location for Pond 1 since it was effectively dry.
Soil water samples from lysimeters at each of three depths at Ponds 1, 10, and 15.
All samples collected without incident as presented in attached field notes.
All samples labeled and recorded on chain-of-custody (copy attached).
Samples delivered to EMWD Laboratory August 4, 2006.

Equipment repairs/completions:

The pressure/vacuum gauge on the Pond 15-16.5 ft lysimeter is inoperative and will be replaced on first sampling event after the part comes in. The part should be received in time to replace the gauge during the sampling event on August 10. The lysimeter is still functional.
.

Next site visit:

Thursday August 10 for both Alessandro Ponds and MVRWRF

Additional work or repairs planned:

Completion of trenching and monitoring stations at MVRWRF is scheduled for the middle of the week of August 7.

8/4

POND 1

P. KAKER

LYSIMETER DEPTH

all pre purged

	7.1	14.5	29.2
1st Vacum	8:28	8:20	8:24
1st Sample	8:43	8:32	8:40
2nd V	8:47	8:34	8:43
2nd S	9:00	8:48	8:55
3rd V		8:51	
3rd S		9:02	
4th V		9:05	
4th			

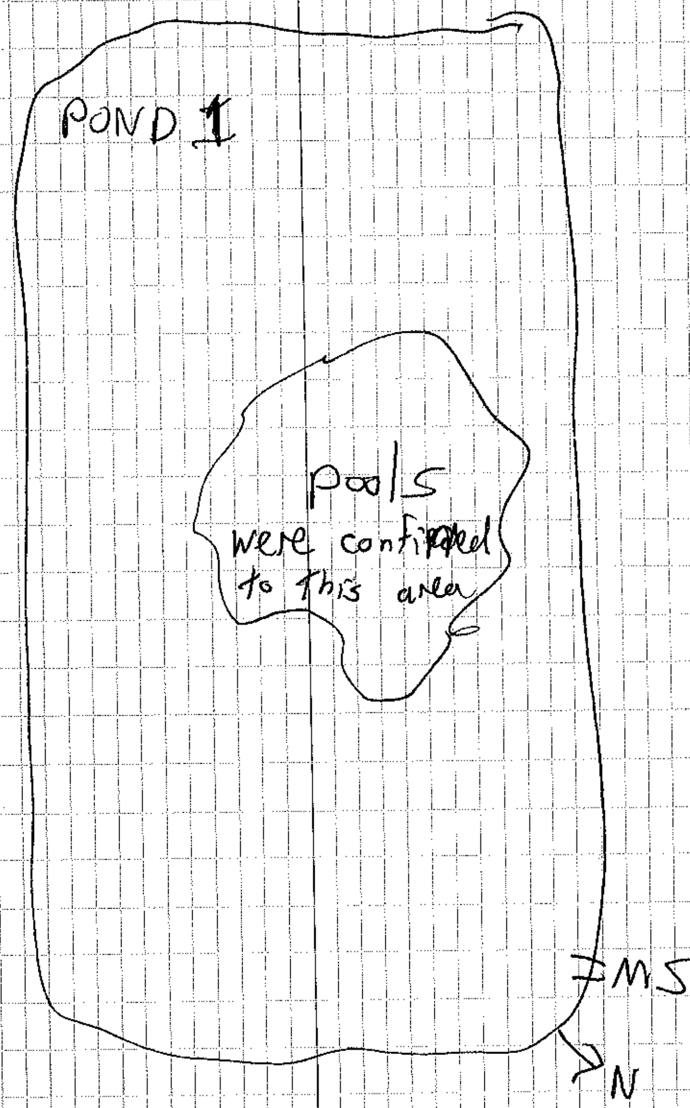
lysimeters were pressure purged to remove collected water

- Pond is practically empty. There a group of pools in a circular region ~ 50ft radius ~~no~~ 70ft from lysimeters
- Pond 2 is being sampled for surface water as a surrogate, 5ft apart

AP2-SW samps @ 8:52

N

PK



28 POND 10 PK

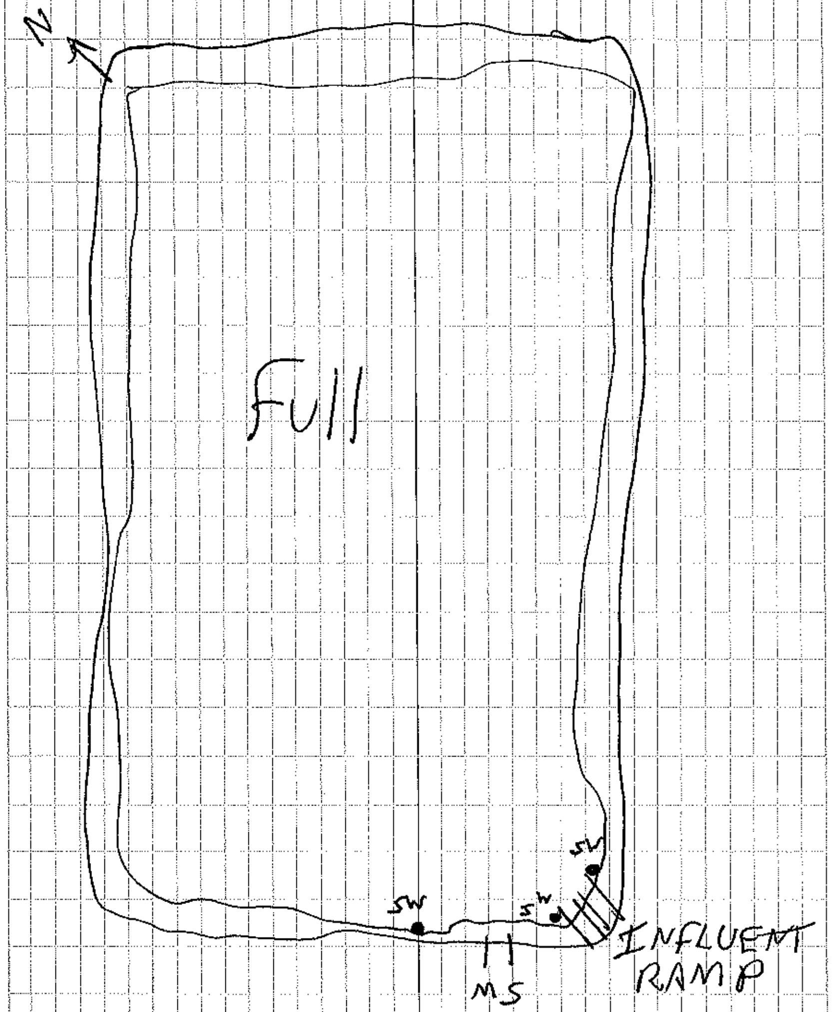
8/4

	Lysimeter Depth		
	8.5	19.5	29.0
1st Vacuum	9:42	9:37	9:33
1st Sample	9:50	9:54	9:46
2nd V	9:53	9:57	9:49
2nd S	10:06	10:08	10:03

all lysimeters pre-purged w/ pressure to remove collected water
POND is ~1 ft higher than maybe 1.5 ft higher. Depth stick reads from the top and is at 4ft.

PK 29

8/4



SW samples 9:58-9:59
~11 oz each

Pond 15

P.K.: P. KAISER

	Lysimeter Depth 7.5	16.5	28.8
1st Vacuum	10:37	10:32	10:28
1st Sample	10:56	10:51	10:45
2nd V	11:01	10:57	10:51
2nd S	11:14	11:10	11:07

all lysimeters pre-purged by pressurizing lysimeter to remove collected water

The pond is about 9 inches below last week. A sampling point is difficult to get to. I cut away parts of the fallen tree to get a sampling location

pressure gauge on 16.5 ft PV line is inoperative

DANIEL B. STEPHENS & ASSOCIATES, Inc.
5951 Encina Road Suite 208
Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
QUOTE NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
SAMPLER(S): (SIGNATURE)
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS
Three sample containers designated with "-SW" to be composited before analyses at sampling site

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Total Organic Carbon (SM 5310C)							
	AP2-SW		8/4/2006	8:52	W	1							X	X	X	X	X	X	X							
	AP1-7.1		8/4/2006	8:43	W	1							X	X	X	X	X	X	X							
	AP1-14.5		8/4/2006	8:32	W	1							X	X	X	X	X	X	X							
	AP1-29.2		8/4/2006	8:40	W	1							X	X	X	X	X	X	X							
	AP10-SW		8/4/2006	9:58	W	1							X	X	X	X	X	X	X							
	AP10-8.5		8/4/2006	9:50	W	1							X	X	X	X	X	X	X							
	AP10-19.5		8/4/2006	9:54	W	1							X	X	X	X	X	X	X							
	AP10-29.0		8/4/2006	9:46	W	1							X	X	X	X	X	X	X							
	AP15-SW		8/4/2006	10:40	W	1							X	X	X	X	X	X	X							
	AP15-7.5		8/4/2006	10:56	W	1							X	X	X	X	X	X	X							
	AP15-16.5		8/4/2006	10:51	W	1							X	X	X	X	X	X	X							
	AP15-28.8		8/4/2006	10:45	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Karas	Stella Denison	8/4	1252

Daniel B. Stephens & Associates, Inc.

FIELD MEMORANDUM No. 6

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: August 11, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Alessandro Ponds and Moreno Valley Ponds, August 10, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 was almost dry with a large pool in the middle and along the northwest face. The water level in Pond 10 was lower than a week earlier by about 0.33 ft. Pond 15's water level was about 1 foot lower than the previous week. All of the trees in Pond 15 were cut down and removed, possibly requiring the lower water levels encountered.

Moreno Valley Ponds: The lysimeters were all sampled from the base of the ponds. Ponds 14, 19, and 22, which contain lysimeters, do not have water in them at this time pending completion of the lysimeter monitoring stations.

Samples collected:

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site. Pond 15 was sampled from only two locations before compositing with 2/3 of the water from the point closest to the lysimeters.
Moreno Valley Pond water samples were collected from adjacent ponds in the corner nearest the respective lysimeter assemblies. A single sample was taken from each surrogate pond (Pond 12 surrogate for Pond 14, Pond 17 surrogate for Pond 19, and Pond 20 surrogate for pond 22).
Soil water samples from lysimeters at each of three depths at Alessandro Ponds 1, 10, and 15 and Moreno Valley Ponds 14, 19, and 22. All of the lysimeters were purged of standing water collected before sampling.
All samples collected without incident as presented in attached field notes.

All samples labeled and recorded on chain-of-custody (copy attached).
Samples delivered to EMWD Laboratory August 10, 2006.

Equipment repairs/completions:

The pressure/vacuum gauge on the Pond 15-16.5 ft lysimeter was replaced before sampling.

Next site visit:

Wednesday August 16, 2006 to Thursday August 17, 2006 for both Alessandro Ponds and MVRWRF Ponds.

Additional work or repairs planned:

Completion of trenching and monitoring stations at MVRWRF is scheduled for Monday August 14, 2006.

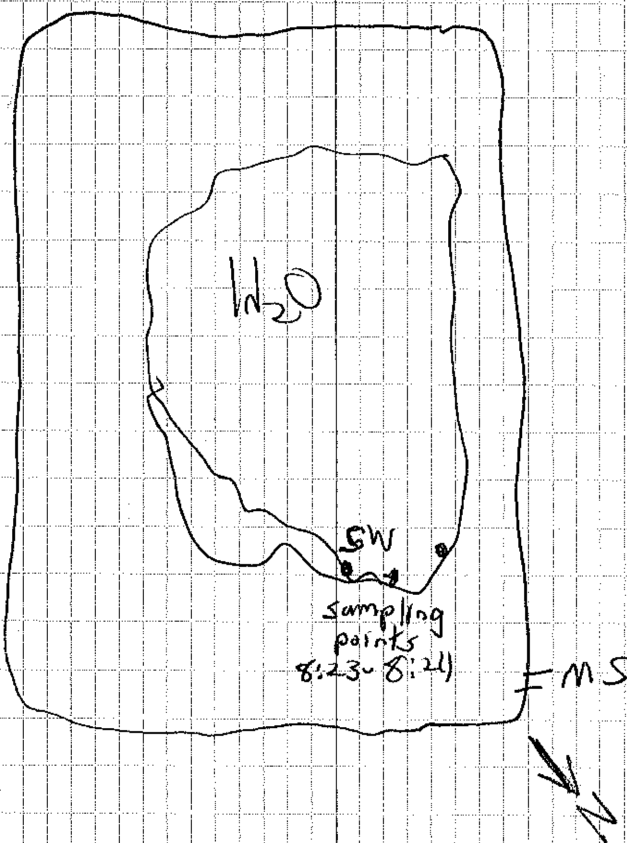
8/10

	Lysimeter Depth ft 7.1	14.5	29.2
1st Vacuum	8:20	8:12	8:16
1st Sample	8:36	8:28	8:31
2nd V	8:41	8:31	8:36
2nd S	8:51	8:41	8:48
3rd V		8:45	
3rd S		8:57	
4th V		8:58	
4th S		9:10	

- pressure purging was done on the 3 lysimeters to remove collected H_2O
- Pond has more H_2O than last week, but the ground above the lysimeters is still not under H_2O.

SW samples were taken near the lysimeters ~~s~~ positions as seen on the map

8/10



34 | AP 10 | PK

8/10

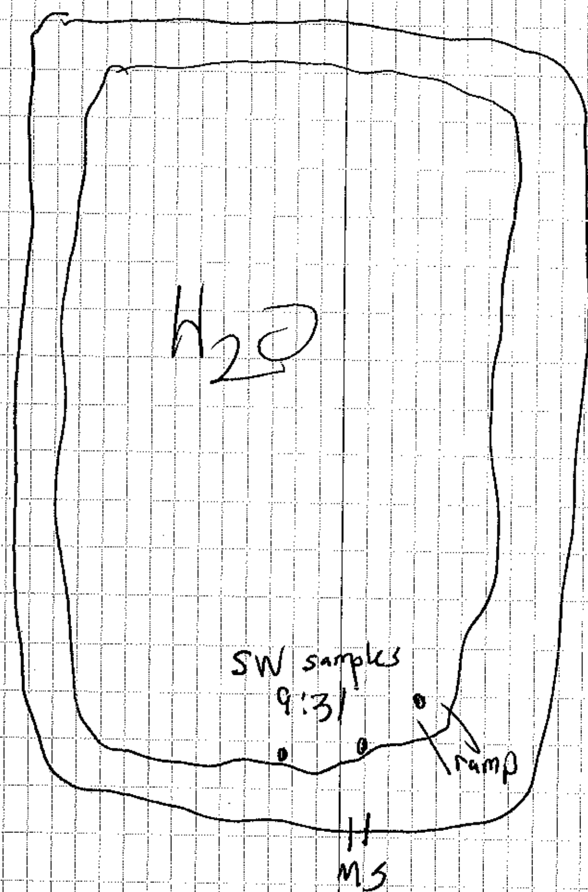
	8.5	19.5	29.0
1st Vacuum	9:34	9:25	9:21
1st Sample	9:47	9:40	9:37
2nd V	9:50	9:44	9:40
2nd S	10:00	9:58	9:54

- pressure purging was done on the 3 lysimeters to remove collected H_2O
- POND 10 is about 0.33 Ft below last week. Lysimeter trench is still submerged

PK

35

8/10



8/10

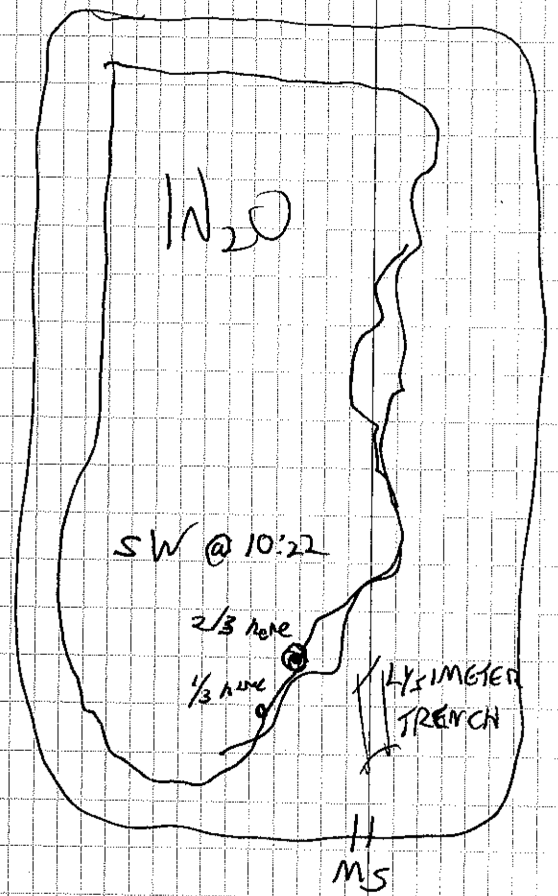
AP15

		7.5	16.5	28.8
1st	Vacuum	10:20	10:31	10:12
1st	Sample	10:32	10:38	10:26
2nd	V	10:35	10:41	10:28
2nd	S	10:46	10:53	10:44

all 3 lysimeters had pressure applied ~~bef~~ to remove what was collected during the week. This was done before the first vacuum was pulled.

Pond is about 1 ft lower than last week. All the trees were removed Wed 8/9

8/10



8/10

MV 14 PIC

	Lysimeter Depth (ft)		
	7.5	16.8	26.9
1st Vacuum	12:36	14:45	14:53
1st Sample	16:11	16:06	16:04
2nd V	virtually no sample		
2nd S			
depth to grout	2'6"	4'9"	2'2"

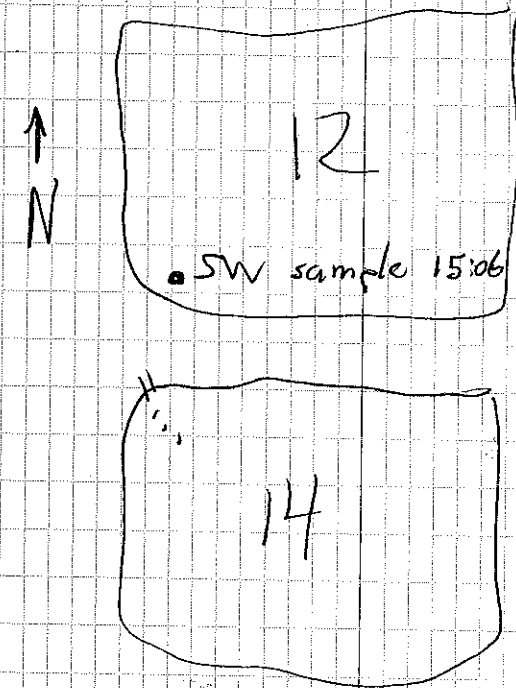
~~mid depth~~

Vacuum pulled on shallow lysometer ~~w/o~~ after purging, to see if there ~~are~~ ~~conten~~ is water at that depth. This provides ~~extra~~ extra time to collect a sample while I sample other ponds

returned & purged other two to let sit after pulling a 5 min vacuum on each

PK

8/10



8/10

MV 19

PR

	Lysimeter Depth (ft) 7.5	14.0	23.3
1st Vacuum	13:12	13:16	13:23
1st Sample	13:24	13:28	13:36
2nd V	13:27	13:32	13:41
2nd S	13:43	15:25	15:27
3rd V	13:45		enough
3rd S	15:31		

all 3 purged w/ pressure before 1st Vacuum

PR

8/10

Depth to ground

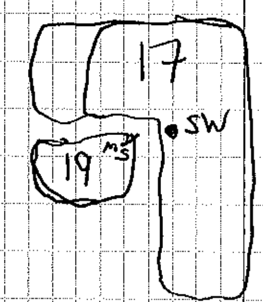
7.5 ft - 1' 1"

14.0 ft - 1' 4"

23.3 ft - 2' 5"

SW sample taken from pond 17

↑ N



@ 13.59

8/10

MV 22

PK

		6.0	14.8	25.1
1st	Vacuum	12:52	14:17	14:24
1st	Sample	15:50	15:48	15:45
2nd	V			
2nd	S			

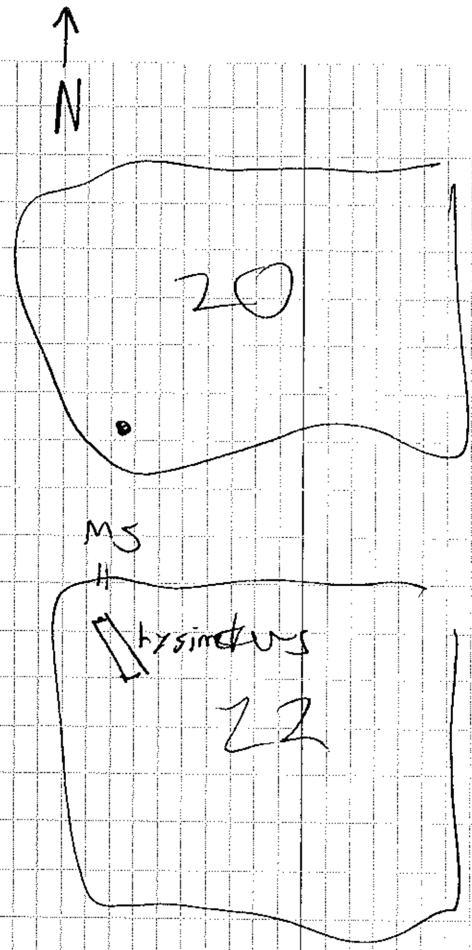
shallow purged w/ pressure then pulled vacuum and let sit to allow time for maximum sample

purge vol.		~25mL	~25mL	normalish x100mL

returned + purged other two to let sit after pulling a 5 min vacuum

PR

8/10



depth to grout

Lys	6.0	14.8	25.1
depth	1'7"	2'5"	2'2"

DANIEL B. STEPHENS & ASSOCIATES, Inc.
5951 Encina Road Suite 208
Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:
PAGE: 1 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaiser
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS
Three sample containers designated with "-SW" to be composited on-site before analyses

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350 1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351 2)	Organic N (EPA Method 351 2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	AP1-SW		08/10/06	8:23	W	1							X	X	X	X	X	X	X							
	AP1-7.1		08/10/06	8:36	W	1							X	X	X	X	X	X	X							
	AP1-14.5		08/10/06	8:28	W	1							X	X	X	X	X	X	X							
	AP1-29.2		08/10/06	8:31	W	1							X	X	X	X	X	X	X							
	AP10-SW		08/10/06	9:31	W	1							X	X	X	X	X	X	X							
	AP10-8.5		08/10/06	9:47	W	1							X	X	X	X	X	X	X							
	AP10-19.5		08/10/06	9:40	W	1							X	X	X	X	X	X	X							
	AP10-29.0		08/10/06	9:37	W	1							X	X	X	X	X	X	X							
	AP15-SW		08/10/06	10:22	W	1							X	X	X	X	X	X	X							
	AP15-7.5		08/10/06	10:32	W	1							X	X	X	X	X	X	X							
	AP15-16.5		08/10/06	10:38	W	1							X	X	X	X	X	X	X							
	AP15-28.8		08/10/06	10:26	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[signature]	8/10/06	16:50

DANIEL B. STEPHENS & ASSOCIATES, Inc.
5951 Encina Road Suite 208
Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 / FAX: (951) 928-6143 / E-MAIL: marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Phil Kaiser
	LAB USE ONLY:

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

Three sample containers designated with "-SW" to be composited on-site before analyses

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	MVP12-SW		08/10/06	15:06	W	1					X	X	X	X	X	X	X
	MVP14-7.5		08/10/06	16:11	W	1					X	X	X	X	X	X	X
	MVP14-16.8		08/10/06	16:06	W	1					X	X	X	X	X	X	X
	MVP14-26.9		08/10/06	16:04	W	1					X	X	X	X	X	X	X
	MVP17-SW		08/10/06	13:59	W	1					X	X	X	X	X	X	X
	MVP19-7.5		08/10/06	13:12	W	1					X	X	X	X	X	X	X
	MVP19-14.0		08/10/06	13:16	W	1					X	X	X	X	X	X	X
	MVP19-23.3		08/10/06	13:23	W	1					X	X	X	X	X	X	X
	MVP20-SW		08/10/06	15:57	W	1					X	X	X	X	X	X	X
	MVP22-6.0		08/10/06	15:50	W	1					X	X	X	X	X	X	X
	MVP22-14.8		08/10/06	16:48	W	1					X	X	X	X	X	X	X
	MVP22-25.1		08/10/06	15:45	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	Bryan Watkins	8/10/06	16:50
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 7

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: August 17, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Alessandro Ponds and Moreno Valley Ponds, August 16, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 was receiving water upon arrival at 12:20 PM which stopped at 3:15 PM and the water level went up 0.5 ft while on site. The water level was 0.45 ft when sampling began and the water's edge covered the whole pond. The water level in Pond 10 was the same as a week earlier with more growth around the edges. The water level in Pond 15 was the highest it has been by about 1.5 ft. The pond was receiving water upon arrival and the flow was reduced at 3:15 PM and shut off at 3:45 PM.

Moreno Valley Ponds: The lysimeters were all sampled from the completed monitoring stations. Ponds 14, 19, and 22, which contain lysimeters, do not have water in them, but some water was added to Pond19 between completion of the monitoring stations Tuesday and sampling on Wednesday morning.

Samples collected:

Soil water samples from lysimeters at each of three depths at Alessandro Ponds 1, 10, and 15 and Moreno Valley Ponds 14, 19, and 22. Before sampling, all of the lysimeters were purged of standing water collected during the previous week. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling. MVRWRF Pond Lysimeters were purged of standing water on Tuesday, August 15, 2006 after which a vacuum was applied to allow for soil water to enter the lysimeter over a 18 + hour period prior to sampling Thursday August 16. EMWD sampling personnel Steve Shockey was trained in the purging and vacuum application procedure at MVRWRF on August 15, 2006. Arrangements were made with Jeff Hale to schedule a time he could receive the same training.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site.

Moreno Valley Pond water samples for Pond 14 and Pond 22 were collected from adjacent ponds in the corner nearest the respective lysimeter assemblies. A single sample was taken from each surrogate pond (Pond 12 surrogate for Pond 14 and Pond 20 surrogate for pond 22). Three of the puddles created when water was added to Pond 19 were used to collect the surface water sample.

All samples collected without incident as presented in attached field notes.

All samples labeled and recorded on chain-of-custody (copy attached).

Samples delivered to EMWD Laboratory August 16, 2006.

Equipment repairs/completions:

The monitoring stations and backfilling of Pond 14's trench were completed on Tuesday August 15. Two of the four crash posts at each monitoring station, the two closest to the road, were painted.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday August 23, 2006 to purge and set a vacuum to each of the lysimeters. Thursday August 24, 2006 sampling will be conducted at both Alessandro Ponds and MVRWRF Ponds by DBS&A personnel.

Additional work or repairs planned:

Completion of painting the crash posts and applying the reflective safety tape will be done at the MVRWRF Ponds. New pressure gauges will be added to replace the broken ones at MVP19-23.3 and AP10-29.0. Both lysimeters are still in operation.

8/16

MV 14 P

P. KAISER

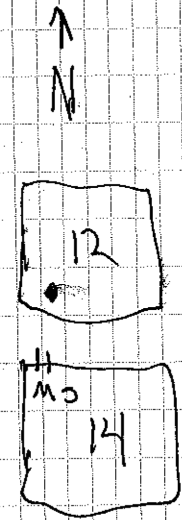
	Lysimeter Depth (Ft)		
	7.5	16.8	26.9
1st Vacuum	Previous Afternoon		
1st Sample	8:48	8:35	8:23

No water yet, SW sample from adjacent corner of MVP12

the two outer crash posts were painted

PK

8/16



MV12-SW
@ 8:58

MV P19

PK

8/16

	lysimeter depth (Ft)		
	7.5	14.0	23.3
1st Vacuum	Wed afternoon		
1st Sample	9:48	9:33	9:22

~~No~~ LITTLE water yet, ~~(SW sample from adjacent pond 17)~~ PK
Most seeped into ground. A few puddles + visibly moist spots.

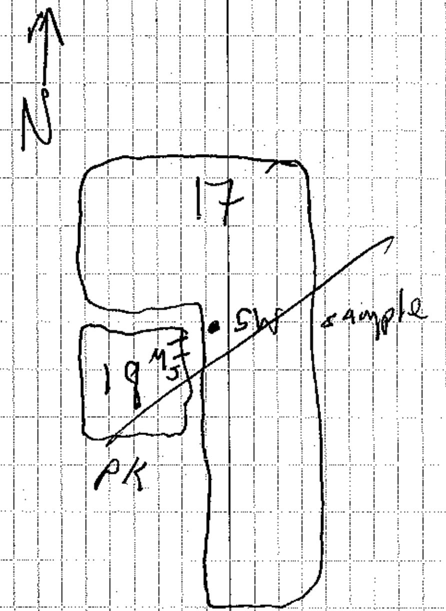
the outer two crash posts were painted

There was water or moisture in the bottoms of the cracks in the base of the pond.

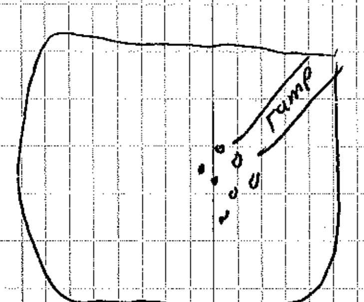
The pressure gauge on the deep lysimeter failed and was taken off-line, but the lysimeter is still in operation

PK

8/16



Enough water was collected from the puddles in pond 19



puddles all near base of ramp

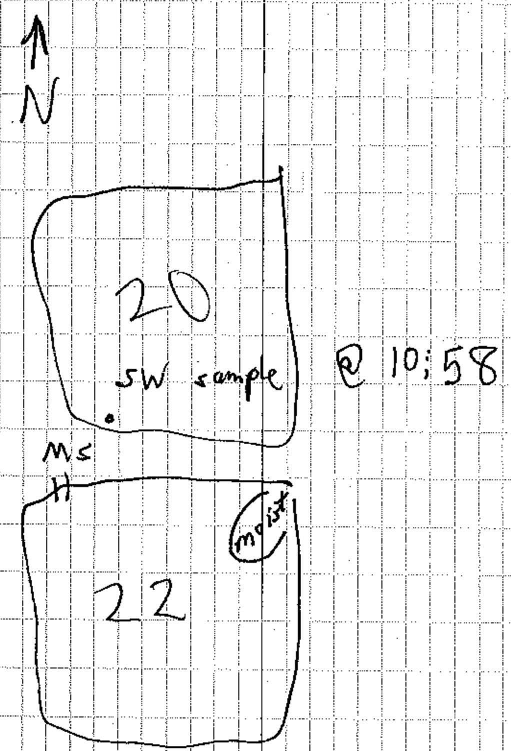
8/16

	Lysimeter depth (ft)		
	6.0	14.8	25.1
1st Vacuum	Wednesday morning		
1st Sample	10:56	10:36	10:27
	Few mLs		

No water in pond, but it appears some water was added in the NE corner where the soil looks moist. ~~SW~~ The surface water sample will be taken from the closest spot at pond 20 to the monitoring station

8/17 post script: I learned after the fact that ~~this~~ moisture in the northeast corner of the pond has been present since installation of the lysimeters

8/16



8/16

AP1

PK

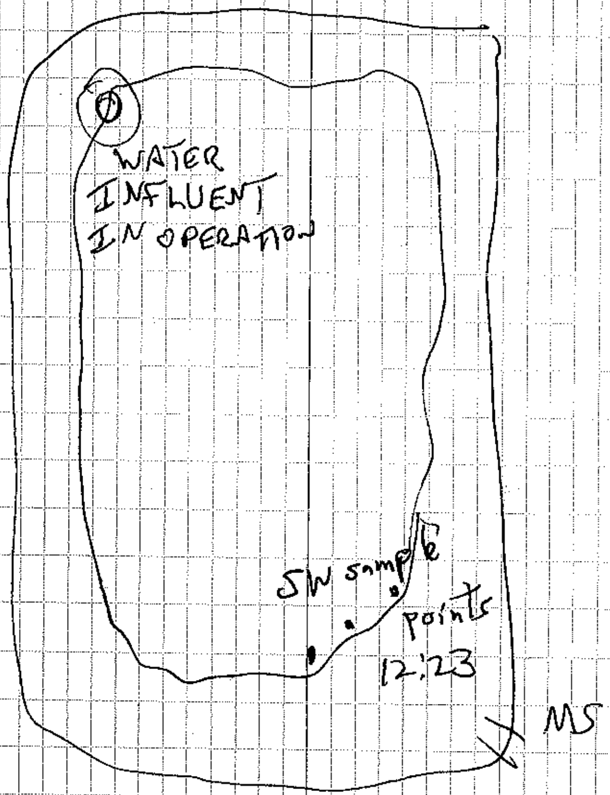
pressure purged before first vacuum

	Lysimeter depth (Ft) 7.1	14.5	29.2
1 Vacuum	12:32	12:22	12:27
1 Sample	12:51	12:38	12:47
2 V	13:06	hand pump 12:41	12:51
2 S	13:20	12:44	13:10
3 V	13:24	12:47	13:15
3 S	13:30	12:54	13:27
4 V	13:34	12:57	
4 S	13:38	12:59	
5 V		13:03	
5 S		13:05	
6 V		13:11	
6 S		13:17	
7 V		13:19	
7 S		13:24	
8 V		13:27	
8 S		13:35	
9 S		no vacuum 14:01	

Water stick reads 0.45 Ft @ 12:34
Pond surface covered w/ H_2O
but very shallow
water stick read 0.65 Ft @ 13:40
Pond level stick read 0.95 Ft @ 16:15

PK

8/16



52 AP10 PK
8/16

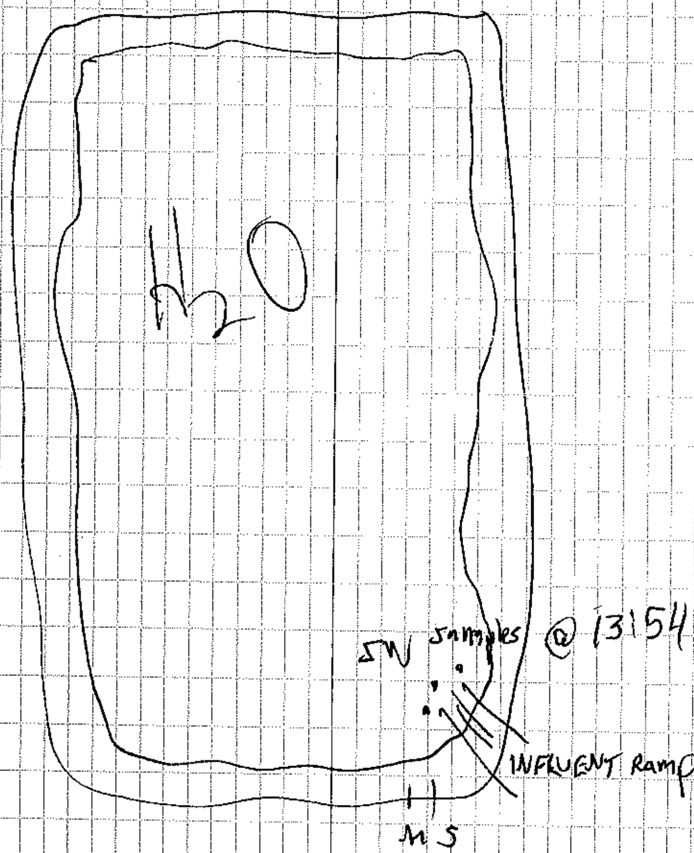
		Lysimeter Depth (Ft)		
		8.5	19.5	29.0
1st	Vacuum	13:57	13:50	13:53
1st	Sample	14:14	14:05	14:10
2nd	V	14:16	14:09	14:13
2nd	S	14:28	14:20	14:25
3rd	V	14:31	14:23 (Rmsp)	14:27
3rd	S	14:40	14:33	13:36

Pond is at the same height as last week, More plants along edges.

pressure purged before first vacuum

Pressure gauge broke on AP 10-29.0, but lysimeter is still in operation

PK 53
8/16



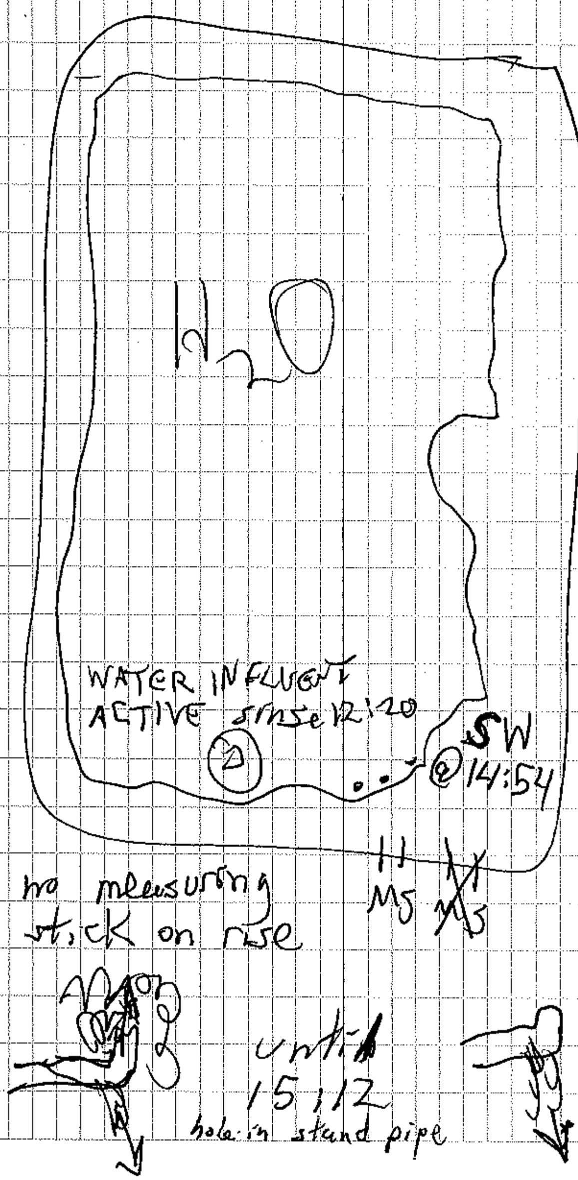
8/16

	Lysimeter depth (Ft) 7.5	16.5	28.8
1st Vacuum	14:57	14:53	14:48
1st Sample	15:12	15:08	15:02
2nd V	15:15	15:11	15:04
2nd S	15:22	15:24	15:20
3rd V	15:31	15:27	15:22
3rd S	15:39	15:37	15:32

Pond is receiving water @ 12:20 upon entry to site

water to pond shut off by EMWD staff at 15:35

8/16



DANIEL B. STEPHENS & ASSOCIATES, Inc.
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TEL: (805) 683-2409 , FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 2

E0608168

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaira
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS
Three sample containers designated with "-SW" to be composited on-site before analyses

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
01	AP1-SW		08/16/06	12:23	W	1			X	X	X	X	X	X	X	X	X	X	X							
02	AP1-7.1		08/16/06	12:51	W	1			X	X	X	X	X	X	X	X	X	X	X							
03	AP1-14.5		08/16/06	12:22	W	1			X	X	X	X	X	X	X	X	X	X	X							
04	AP1-29.2		08/16/06	12:27	W	1			X	X	X	X	X	X	X	X	X	X	X							
05	AP10-SW		08/16/06	13:54	W	1			X	X	X	X	X	X	X	X	X	X	X							
06	AP10-8.5		08/16/06	14:05	W	1			X	X	X	X	X	X	X	X	X	X	X							
07	AP10-19.5		08/16/06	14:10	W	1			X	X	X	X	X	X	X	X	X	X	X							
08	AP10-29.0		08/16/06	14:14	W	1			X	X	X	X	X	X	X	X	X	X	X							
09	AP15-SW		08/16/06	15:12	W	1			X	X	X	X	X	X	X	X	X	X	X							
10	AP15-7.5		08/16/06	15:08	W	1			X	X	X	X	X	X	X	X	X	X	X							
11	AP15-16.5		08/16/06	14:59	W	1			X	X	X	X	X	X	X	X	X	X	X							
12	AP15-28.8		08/16/06	15:02	W	1			X	X	X	X	X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaira	Larry Falk	8/16/06	1640
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

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5951 Encina Road Suite 208
Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

ED0608017

8 1283 1640

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Phil Kaser
	LAB USE ONLY:

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

Three sample containers designated with "-SW" to be composited on-site before analyses

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
01	MVP12-SW		08/16/06	8:57	W	1							X	X	X	X	X	X	X							
02	MVP14-7.5		08/16/06	8:48	W	1							X	X	X	X	X	X	X							
03	MVP14-16.8		08/16/06	8:35	W	1							X	X	X	X	X	X	X							
04	MVP14-26.9		08/16/06	8:23	W	1							X	X	X	X	X	X	X							
05	MVP19-SW PK		08/16/06	9:58	W	1							X	X	X	X	X	X	X							
06	MVP19-7.5		08/16/06	9:48	W	1							X	X	X	X	X	X	X							
07	MVP19-14.0		08/16/06	9:33	W	1							X	X	X	X	X	X	X							
08	MVP19-23.3		08/16/06	9:22	W	1							X	X	X	X	X	X	X							
09	MVP20-SW		08/16/06	10:56	W	1							X	X	X	X	X	X	X							
10	MVP22-6.0		08/16/06	10:51	W	1							X	X	X	X	X	X	X							
11	MVP22-14.8		08/16/06	10:36	W	1							X	X	X	X	X	X	X							
12	MVP22-25.1		08/16/06	10:27	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature) Phil Kaser	Received by: (Signature) Larry Volk	Date: 8/16/06	Time: 1640
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 8

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: August 25, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds and Alessandro Ponds, August 24, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 was receiving water upon arrival at 11:15 PM which stopped at 1:15 PM and the water level went up 0.2 ft while on site. The water level was 0.25 ft when sampling ended and the water's edge just covered the spot where the lysimeters are buried. The water level in Pond 10 was the about 0.2 ft lower than a week earlier. The water level in Pond 15 was about 1.0 ft below the previous week and the ground above the lysimeters was exposed.

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative depths from the bottoms, assuming the base is 20 ft below ground level are 5 ft, 11 ft, and 14 ft for Ponds 14, 19, and 22 respectively.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Before sampling, all of the lysimeters were purged of standing water collected during the previous week. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, August 23, 2006 after which a vacuum was applied to allow for soil water to enter the lysimeter over a 22 + hour period prior to sampling Thursday August 24. EMWD sampling personnel Steve Shockey received additional training in sampling and took part at all three ponds at MVRWRF. Arrangements were made with Jeff Hale to schedule a time he could receive the same training.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

Samples delivered to EMWD Laboratory August 24, 2006.

Equipment repairs/completions:

The last two of the four crash posts at MVP 22 monitoring station were painted. A new pressure gauge was installed at Alessandro Pond 10-29.0.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday August 30, 2006 to purge and set a vacuum to each of the lysimeters. Thursday August 31, 2006 sampling will be conducted at both Alessandro Ponds and MVRWRF Ponds by DBS&A personnel.

Additional work or repairs planned:

Additional painting the crash posts and applying the reflective safety tape will be done at the MVRWRF Ponds. A new pressure gauge will be added to replace the broken one at MVP19-23.3. The lysimeter remains in operation.

8/24

MVP 22

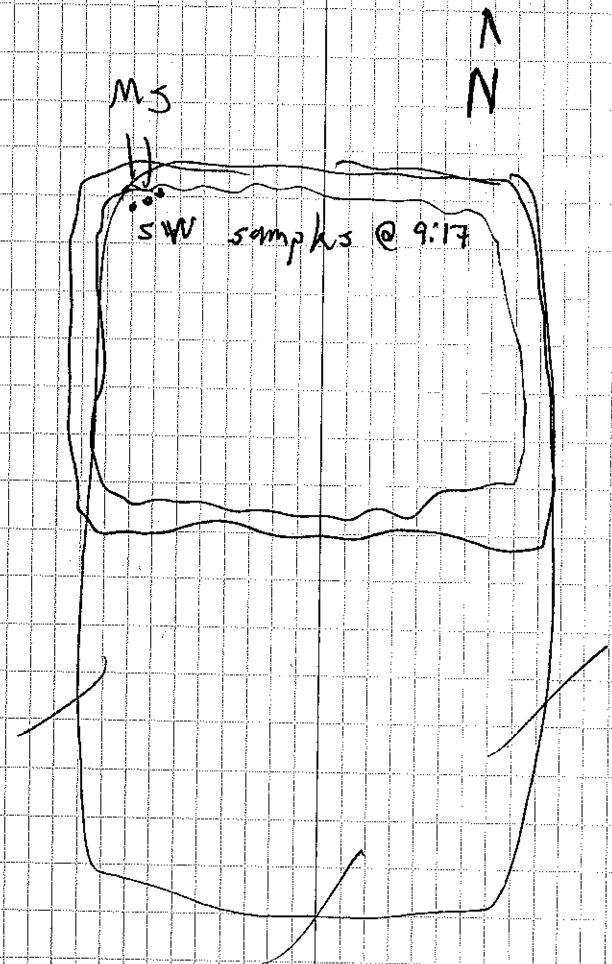
P. KABER
S. Shockey

	Lysimeter depth (Ft)		
	6.0	14.8	25.1
Vacuum	Wednesday AM		
Sample	9:14	9:12	9:01

Pond has H_2O to 6' from ground surface. It recently had H_2O 2' higher as seen by moist slopes.

P12
5S

8/24



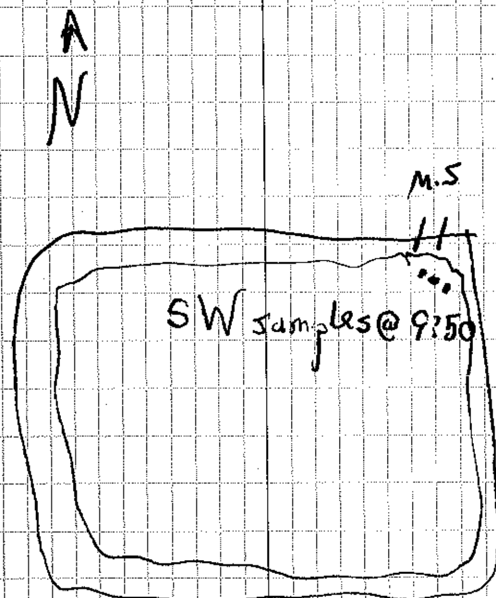
MVP 19

P.K.
S.S.

	Lysimeter depth		
	23.3	14.0	7.5
Vacuum Sample	WEdnesda AM		
	9:42	9:46	9:50

Water in pond. Wind pushes surface material to north side near where the surface water sample is taken

PK
SS



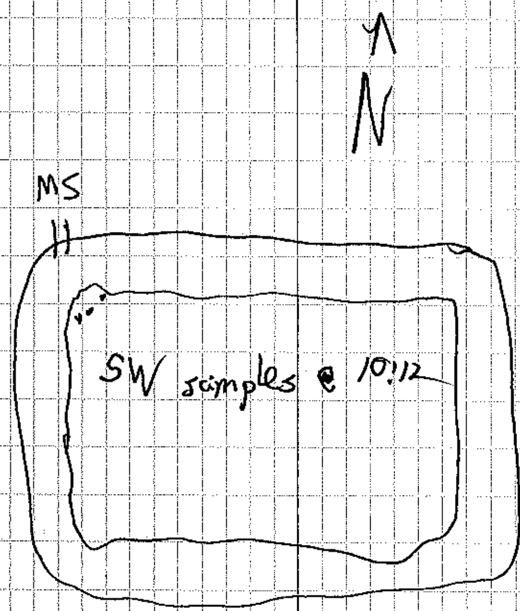
MVP 14

PK
55

	Lysimeter Depth (ft)		
	7.5	16.8	26.9
Vacuum	Wed. AM		
Sample	10:12	10:08	10:05

Pond has H_2O to 15 ft below ground surface. The dirt above the water surface is dry and shows no evidence of having been below water.

PK
SShockey



62
8/24

AP 1

pk

	Lysimeter depth (Ft)		
	7.1	14.5	29.2
1st Vacuum	11:34	11:22	11:30
1st Sample	11:48	11:38	11:44
2nd V	11:50	11:40	11:47
2nd S	12:05	11:54	12:02
3rd V		11:57	
3rd S		12:10	

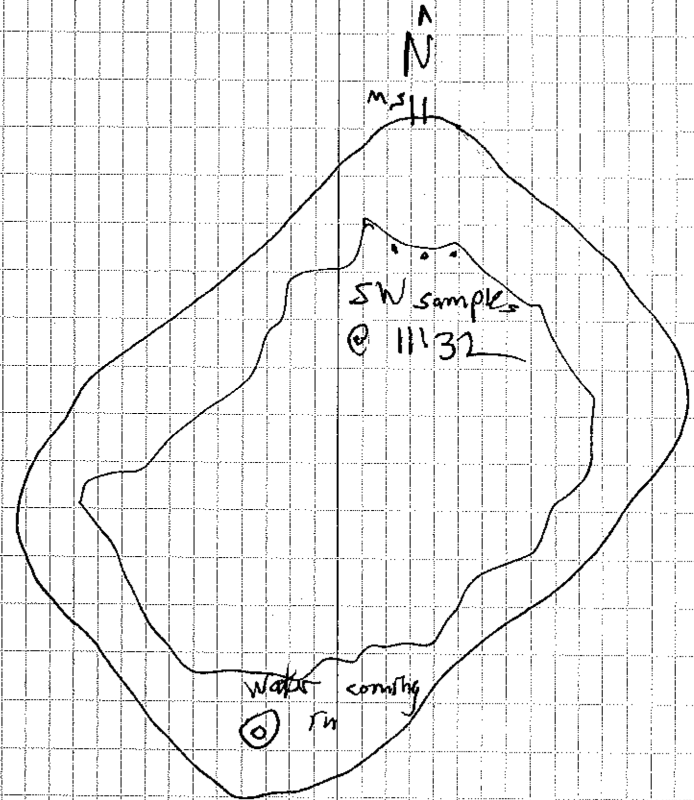
all 3 lysimeters were pressure purged before applying a vacuum

Water lower than last week by about 0.9 Ft. Most of base covered w/ lysimeters at waters edge. Low steady flow ~~enter~~ entering. Depth @ 12:09 = 0.2 ft

Influent shut off at 13:15

pk

63
8/24



measuring stick dry at ground

AP 10

PK

8/24

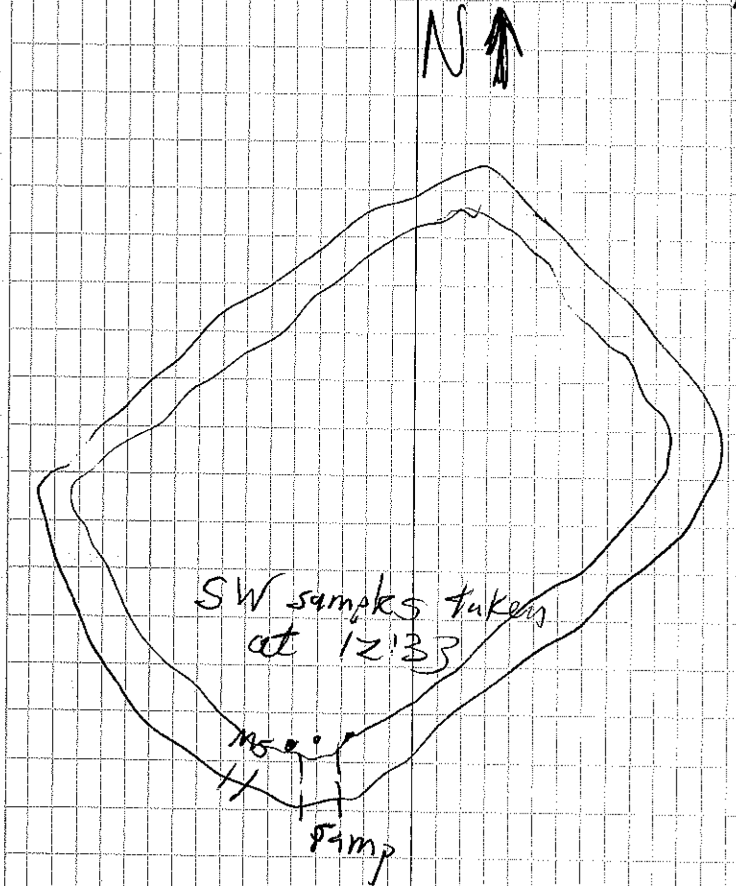
	Lysimeter dept (Ft)		
	8.5	19.5	29.0
1st Vacuum	12:32	12:28	12:24
1st Sample	12:48	12:42	12:37
2nd V	12:51	12:44	12:40
2nd S	13:02	12:58	12:55

- lysimeters were pressure purged before first vacuum

- pond is a 0.1 - 0.2 Ft lower than last week

PK

8/24



8/24

AP 15

PK

		Lysometer depth (ft)		
		7.5	16.5	28.8
1st	Vacuum	13:21	13:17	13:13
1st	Sample	13:34	13:30	13:27
2nd	V	13:38	13:34	13:30
2nd	S	13:49	13:46	13:44

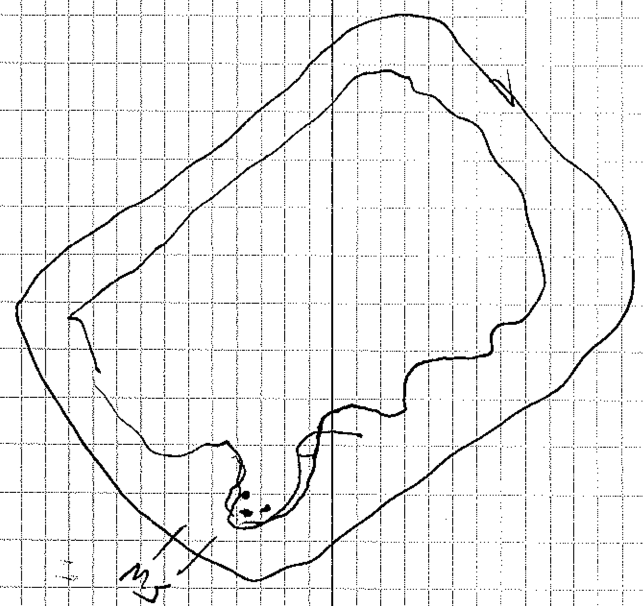
all lysimeters pressure purged before first vacuum

water in pond about 1 ft lower than last week

P. KAISER

8/24

N



SW samples taken at 13:22

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CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaiser
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	AP1-SW		08/24/06	11:32	W	1							X	X	X	X	X	X	X							
	AP1-7.1		08/24/06	11:48	W	1							X	X	X	X	X	X	X							
	AP1-14.5		08/24/06	11:38	W	1							X	X	X	X	X	X	X							
	AP1-29.2		08/24/06	11:44	W	1							X	X	X	X	X	X	X							
	AP10-SW		08/24/06	12:33	W	1							X	X	X	X	X	X	X							
	AP10-8.5		08/24/06	12:48	W	1							X	X	X	X	X	X	X							
	AP10-19.5		08/24/06	12:42	W	1							X	X	X	X	X	X	X							
	AP10-29.0		08/24/06	12:37	W	1							X	X	X	X	X	X	X							
	AP15-SW		08/24/06	13:22	W	1							X	X	X	X	X	X	X							
	AP15-7.5		08/24/06	13:27	W	1							X	X	X	X	X	X	X							
	AP15-16.5		08/24/06	13:31	W	1							X	X	X	X	X	X	X							
	AP15-28.8		08/24/06	13:34	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[illegible signature]	8/25/06	1520

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CHAIN OF CUSTODY RECORD

DATE:

PAGE: 2 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT

ADDRESS: 2270 Trumble Road

CITY: Perris, CA 92570

TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00

P.O. NO.:

PROJECT CONTACT: Jordan Kear jkear@dbstephens.com

QUOTE NO.:

SAMPLER(S) (SIGNATURE): Phil Karan

LAB USE ONLY:

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont		Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300 0)	Nitrite N (EPA Method 300 0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	MVP14-SW (pk 9)		08/24/06	10:12	W	1						X	X	X	X	X	X	X							
	MVP14-7.5		08/24/06	10:12	W	1						X	X	X	X	X	X	X							
	MVP14-16.8		08/24/06	10:08	W	1						X	X	X	X	X	X	X							
	MVP14-26.9		08/24/06	10:05	W	1						X	X	X	X	X	X	X							
	MVP17-SW (pk 9)		08/24/06	9:50	W	1						X	X	X	X	X	X	X							
	MVP19-7.5		08/24/06	9:50	W	1						X	X	X	X	X	X	X							
	MVP19-14.0		08/24/06	9:46	W	1						X	X	X	X	X	X	X							
	MVP19-23.3		08/24/06	9:42	W	1						X	X	X	X	X	X	X							
	MVP22-SW (pk 2)		08/24/06	9:17	W	1						X	X	X	X	X	X	X							
	MVP22-6.0		08/24/06	9:14	W	1						X	X	X	X	X	X	X							
	MVP22-14.8		08/24/06	9:12	W	1						X	X	X	X	X	X	X							
	MVP22-25.1		08/24/06	9:01	W	1						X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Karan	[signature]	8/24/06	1520
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 9

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: September 5, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds and Alessandro Ponds, August 31, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 had water to a depth of 0.4 ft based on the metering stick. The water level in Pond 10 was the about 0.9 ft higher than a week earlier. The water level in Pond 15 was about 1.0 ft below the previous week and the ground above the lysimeters remains exposed.

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative heights of the water are determined from the tops of the ramps. The water levels in Ponds 14, 19, and 22 are 6.7 ft, 6.3 ft, and 8.8 ft respectively.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Before sampling, all of the lysimeters were purged of standing water collected during the previous week. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, August 30 2006 after which a vacuum was applied to allow for soil water to enter the lysimeter over a 22 + hour period prior to sampling Thursday August 31.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

Samples delivered to EMWD Laboratory August 31, 2006.

Equipment repairs/completions:

The last two of the four crash posts at MVP 19 monitoring station were painted. Additional paint was applied to the previously painted crash posts to provide a more uniform cover. A new bolt was added to the MVP 22 vault. A new pressure gauge was installed at Moreno Valley Pond 19-23.3.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday September 6, 2006 to purge and set a vacuum to each of the lysimeters. Thursday September 7, 2006 sampling will be conducted at both Alessandro Ponds and MVRWRF Ponds by DBS&A personnel.

Additional work or repairs planned:

Additional painting of the crash posts with a first coat being applied to the last two post and applying the reflective safety tape will be done at the MVRWRF Ponds. Work will begin on repairs to the one vault plate that won’t fit into its frame.

MVP 19

P. KAISER

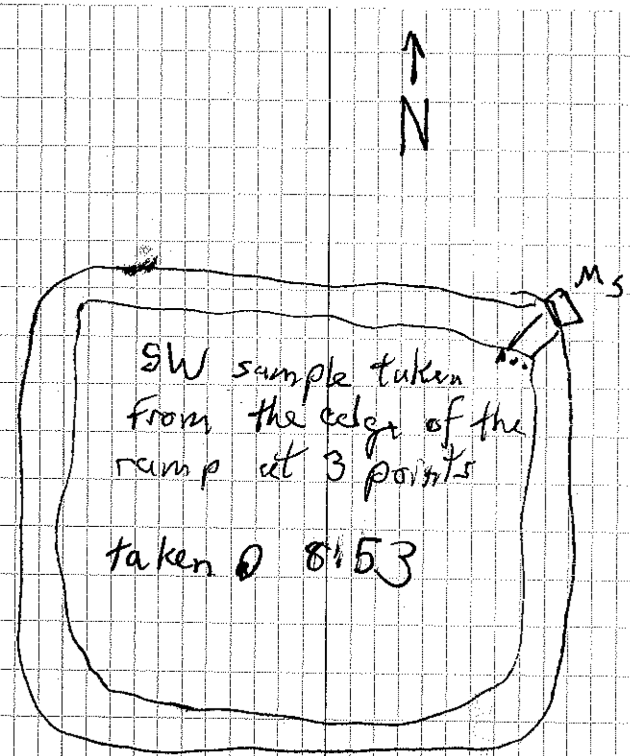
8/31

	Lysimeter Depth (Ft)		
	7.5	14.0	23.3
Vacuum	Wed 8/30 AM		
Sample	8:50	8:38	8:23

H_2O is 23' from the top of the ramp at 16° incline ⇒ 63 from top.

RK.

8/31



70
8/31

MVP2R

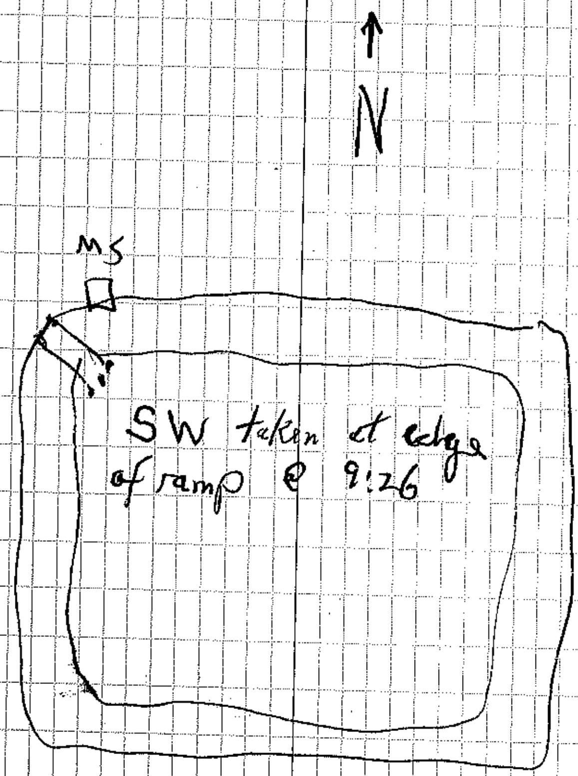
P.K.

	Lysimeter Depth (ft)		
	6.0	14.8	25.1
Vacuum	Wed	8/30	AM
Sample	9:23	9:18	9:14
	~100 mL		

PJK

71

8/31



23' to H_2O from top of ramp at 15° inclination
→ 8.8 H_2O depth from top of ramp
top of ramp ~ 0.5 ft below concrete pad.

8/31

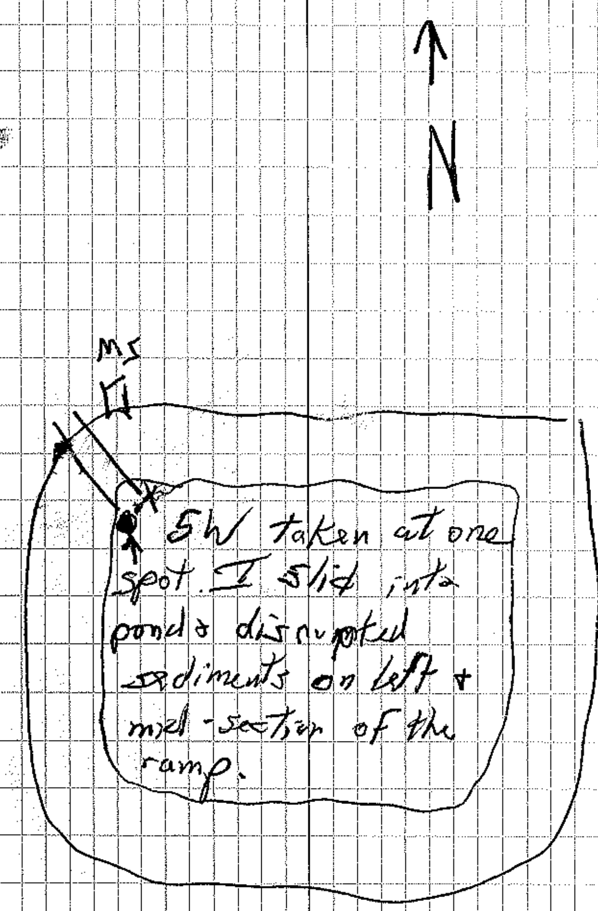
MVP 14

PK

	Lysimeter depth (ft)		
	7.5	16.8	26.9
Vacuum Sample	10:01	9:56	9:49

PK

8/31



H_2O is 34' from top of ramp at a 17° inclination ⇒ 6.7ft from top of ramp

74

8/31

AP 1

PK

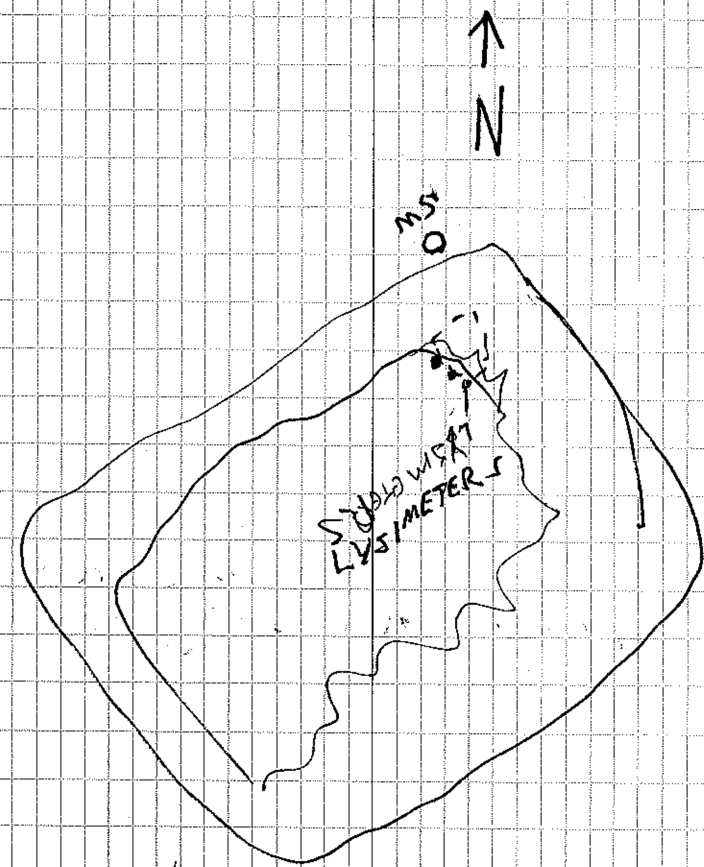
		7,1	14.5	29.2
1st	Vacuum	11:15	11:07	11:11
1st	Sample	11:28	11:19	11:24
2	V	11:31	11:23	11:27
2	S	11:47	11:38	11:44
3	V		11:43	
3	S		11:50	
4	V			
4	S			

all lysimeter were pressure purged before pulling a vacuum

PK

75

8/31



SW samples taken at 11:32

depth stick reads 0.4 ft from base

8/31

AP 10

pk

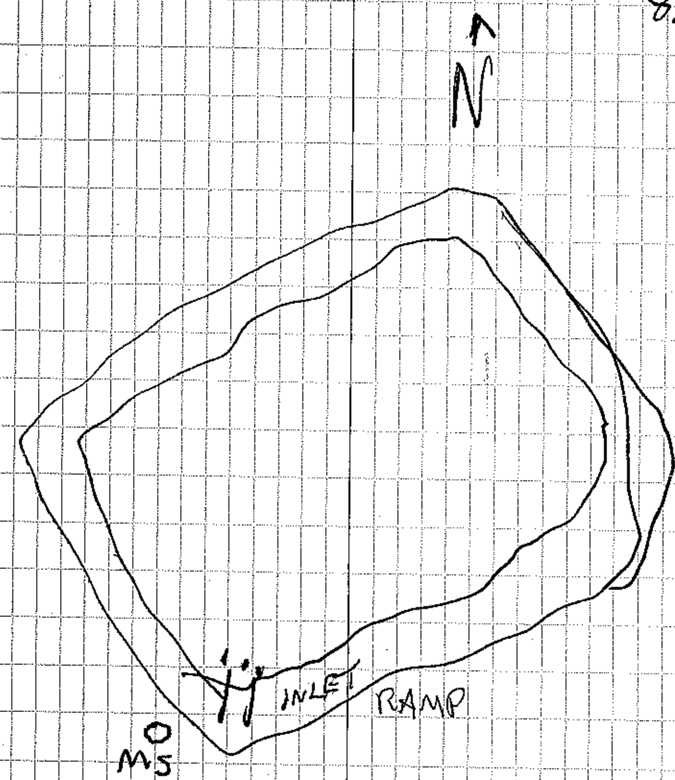
	8.5	19.5	29.0
1st Vacuum	12:10	12:06	12:02
1st Sample	12:23	12:20	12:17
2nd V	12:26	12:23	12:19
2nd S	12:36	12:34	12:32

all lysimeters were pressure purged before pulling a vacuum

H_2O Level up ~0.9 Ft From last week

pk

8/31



SW sampler @ 12:13

AP15

PK

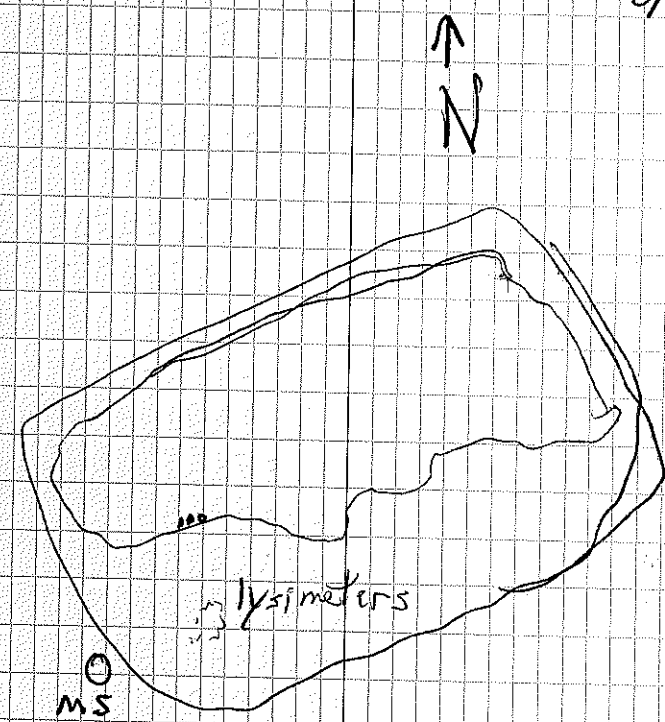
	7.5	16.5	28.8
1st Vacuum	12:55	12:51	12:47
1st Sample	13:06	13:03	13:00
2nd V	13:10	13:06	13:02
2nd S	13:20	13:17	13:14

all lysimeters pressure purged before the first vacuum

pond is ~1 ft below last week

P. KAISER

8/31



SW sample at 12:57

DANIEL B. STEPHENS & ASSOCIATES, Inc.
5951 Encina Road Suite 208
Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Phil Kaser
	LAB USE ONLY

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	MVP14-SW		08/31/06	10:08	W	1					X	X	X	X	X	X	X
	MVP14-7.5		08/31/06	10:01	W	1					X	X	X	X	X	X	X
	MVP14-16.8		08/31/06	9:56	W	1					X	X	X	X	X	X	X
	MVP14-26.9		08/31/06	9:49	W	1					X	X	X	X	X	X	X
	MVP19-SW		08/31/06	8:53	W	1					X	X	X	X	X	X	X
	MVP19-7.5		08/31/06	8:50	W	1					X	X	X	X	X	X	X
	MVP19-14.0		08/31/06	8:38	W	1					X	X	X	X	X	X	X
	MVP19-23.3		08/31/06	8:23	W	1					X	X	X	X	X	X	X
	MVP22-SW		08/31/06	9:26	W	1					X	X	X	X	X	X	X
	MVP22-6.0		08/31/06	9:23	W	1					X	X	X	X	X	X	X
	MVP22-14.8		08/31/06	9:18	W	1					X	X	X	X	X	X	X
	MVP22-25.1		08/31/06	9:14	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaser	[signature]	8/31/06	14:43

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Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 2 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaiser
LAB USE ONLY:

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	AP1-SW		08/31/06	11:32	W	1							X	X	X	X	X	X	X							
	AP1-7.1		08/31/06	11:28	W	1							X	X	X	X	X	X	X							
	AP1-14.5		08/31/06	11:19	W	1							X	X	X	X	X	X	X							
	AP1-29.2		08/31/06	11:24	W	1							X	X	X	X	X	X	X							
	AP10-SW		08/31/06	12:13	W	1							X	X	X	X	X	X	X							
	AP10-8.5		08/31/06	12:26	W	1							X	X	X	X	X	X	X							
	AP10-19.5		08/31/06	12:20	W	1							X	X	X	X	X	X	X							
	AP10-29.0		08/31/06	12:17	W	1							X	X	X	X	X	X	X							
	AP15-SW		08/31/06	12:57	W	1							X	X	X	X	X	X	X							
	AP15-7.5		08/31/06	13:06	W	1							X	X	X	X	X	X	X							
	AP15-16.5		08/31/06	13:03	W	1							X	X	X	X	X	X	X							
	AP15-28.8		08/31/06	13:00	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[signature]	8/31/06	14:43
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 10

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: September 8, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds and Alessandro Ponds, September, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 had water to a depth of 1.4 ft based on the metering stick. The water level in Pond 10 was the about the same as a week earlier coming up the concrete spillway about 7 ft. The water level in Pond 15 was about 1.5 ft above the previous week and the ground above the lysimeters was submerged.

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative heights of the water are determined from the tops of the ramps. The water levels in Ponds 14, 19, and 22 are 11.3 ft, 7.4 ft, and 6.9 ft respectively.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Before sampling, all of the lysimeters were purged of standing water collected during the previous week. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, August 30 2006 after which a vacuum was applied to allow for soil water to enter the lysimeter over a 22 + hour period prior to sampling Thursday September 7.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

Samples delivered to EMWD Laboratory August 31, 2006.

Equipment repairs/completions:

The last two of the four crash posts at MVP 14 monitoring station were given a first coat of paint. Additional paint was applied to the previously painted crash posts to provide a more uniform cover. Dimensions were taken of the vaults at MVRWRF Ponds and of the vault lid at MVP14. These values are needed to correct the tolerances so the lids will close.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday September 13, 2006 to purge and set a vacuum to each of the lysimeters. Thursday September 14, 2006 sampling will be conducted at both Alessandro Ponds and MVRWRF Ponds by DBS&A personnel. DBS&A staff acquired an access card for the automatic entry device at MVRWRF.

Additional work or repairs planned:

Additional painting of the crash posts with additional coats being applied as necessary. Reflective safety tape will be added to the crash posts at the MVRWRF Ponds. Both of these tasks will be completed Wednesday September 20. Repairs to the one vault plate that won't fit into its frame will be completed concurrent with the installation of the new wells.

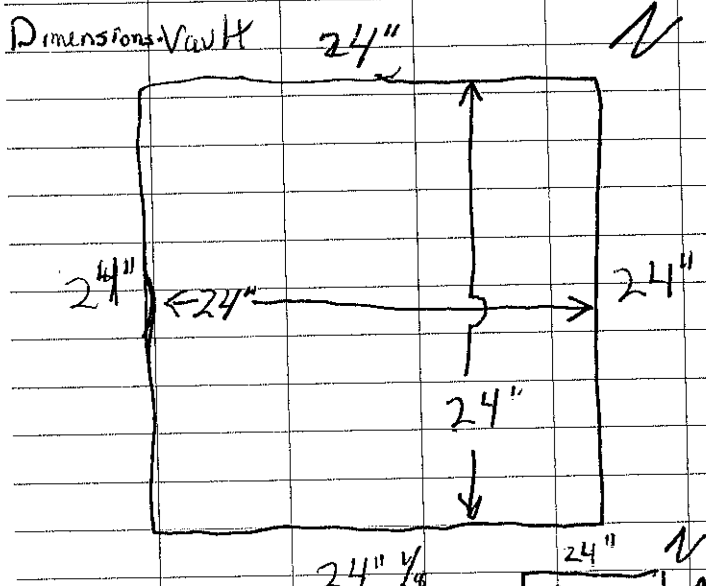
1
9/7

MVP 14

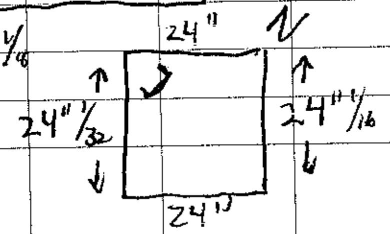
P.KAISER pK

	Lysimeter Depth ft		
	7.5	16.8	26.9
Vacuum Sample	Wednesday AM		
	9:52	9:49	9:19

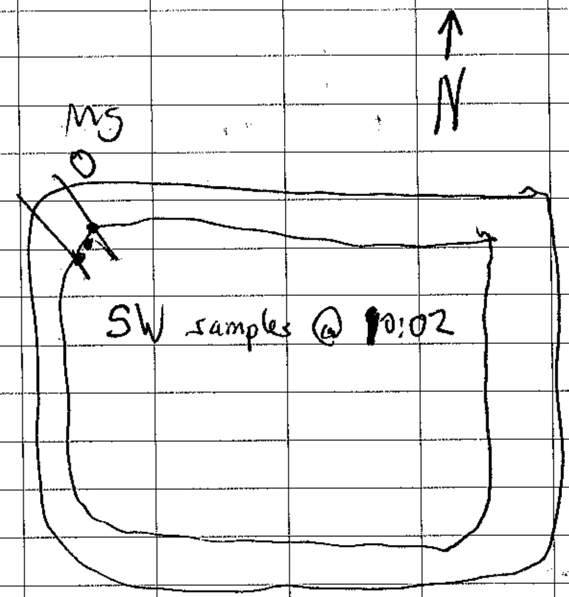
Dimensions-Vault



Dimensions- LID

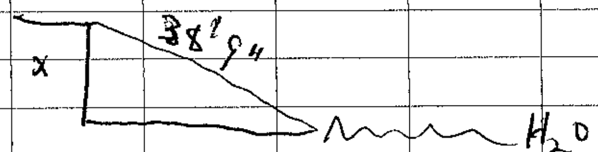


2
9/7



The H_2O level is 38'9" from the top of the ramp ⇒

x = water level below base
$x = 38.75 \sin(17°) = \underline{11.3 ft}$



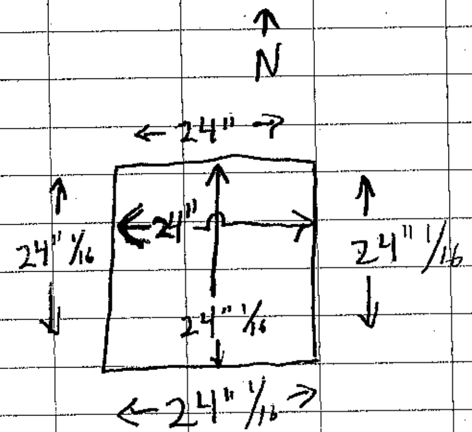
9/7

MVP 19

PR PR

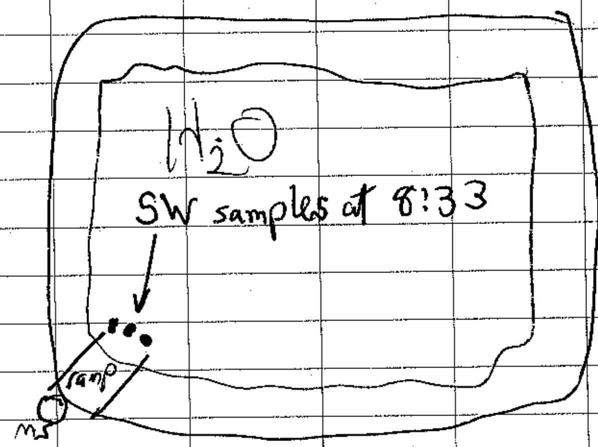
	LYSIMETER Depth (Ft)		
	7.5	14.0	23.3
Vacuum	Wednesday		AM
Sample	8:27	8:23	8:17

Vault dimensions



9/7

N

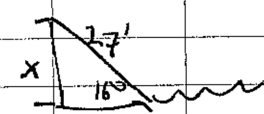


The H_2O level is 27 Ft from the top of the ramp or

x = Water level below the base

x = 27 sin (16°)

x = 7.4 Ft

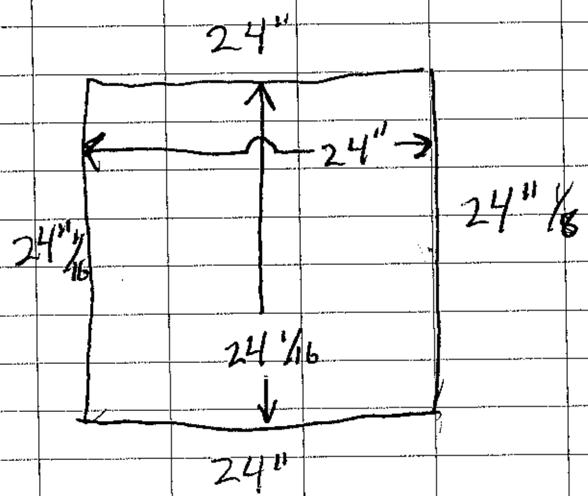


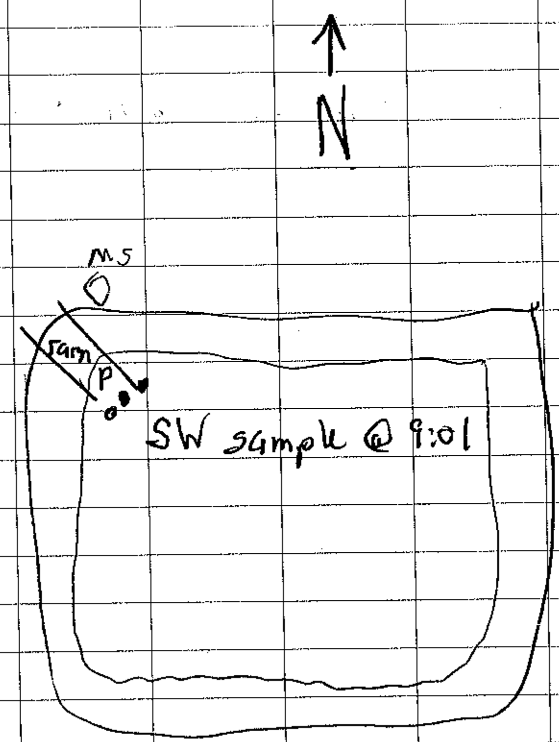
MVP 22 PK PK

	Lysimeter Depth (Ft)		
	6.0	14.8	25.1
Vacuum Sample	Wednesday AM		
	8:58	8:54	8:49

The 25.1 ft sample smelled of H_2S

Vault dimensions





The H_2O level is 26'8" From the top of the ramp or

x = H_2O level below base

$x = 26.67 \sin 15°$

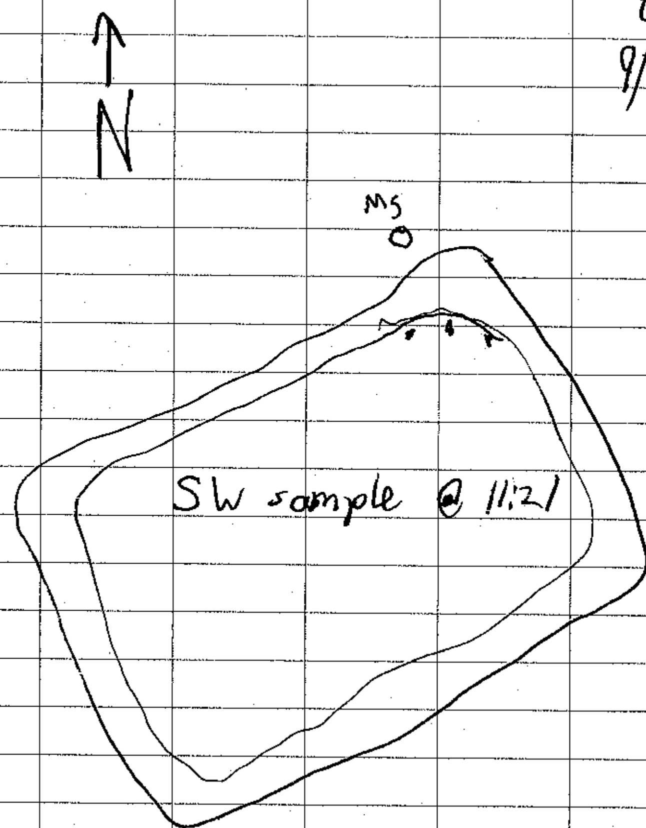
$x = 6.9$ Ft

AP1

		Lysimeter Depth (ft)		
		7.1	14.5	29.2
1st	Vacuum	11:20	11:12	11:16
1st	Sample	11:34	11:24	11:30
2nd	V	11:38	11:28	11:34
2nd	S	11:50	11:38	11:47
3rd	V		11:42	
3rd	S		11:53	

all lysimeters were pressure purged before pulling the first vacuum

PK PK



Depth stick is @ 1.4 ft from the bottom

9/7

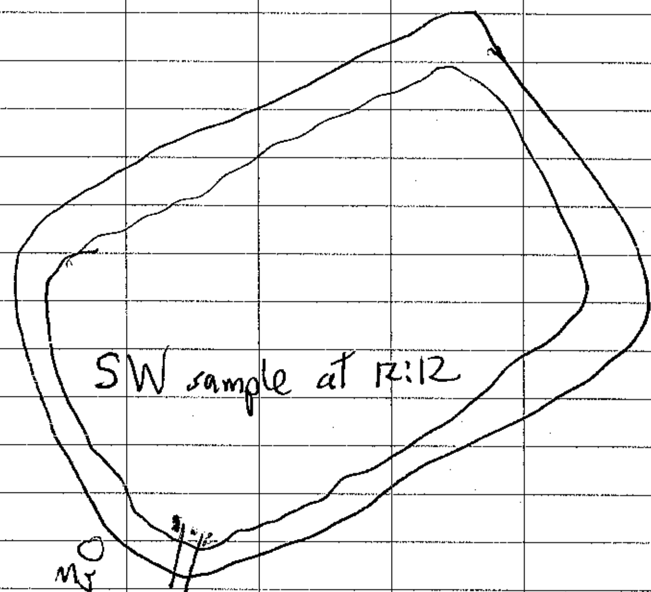
AP10

		Lysimeter Depth (ft)		
		8.5	19.5	29.0
1st	Vacuum	12:11	12:07	12:03
1st	Sample	12:23	12:19	12:16
2nd	V	12:26	12:22	12:18
2nd	S	12:36	12:33	12:31

all lysimeters were pressure purged before the first vacuum

9/7

N



H_2O level in pond is about the same as last week, coming about 7 ft up spillway

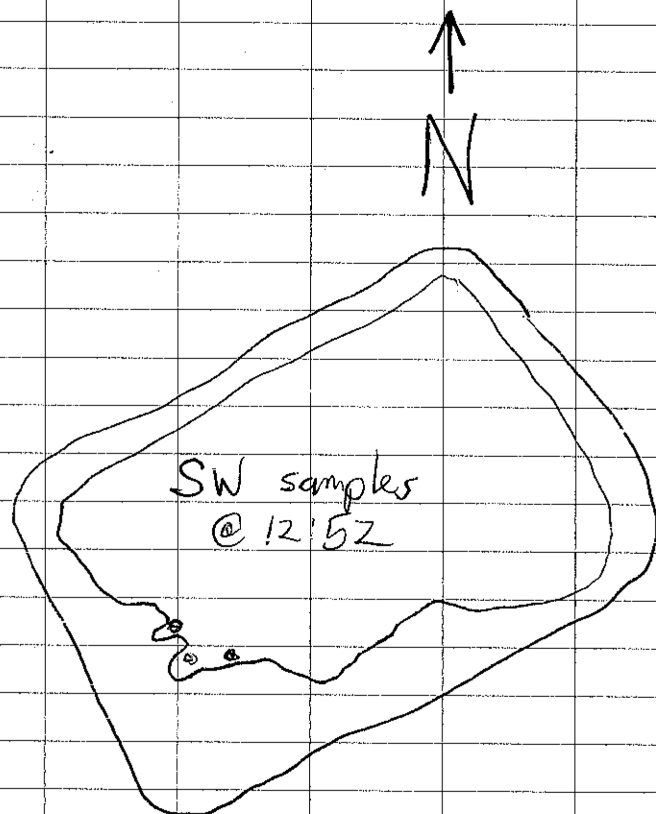
9/7

	Lysimeter depth (ft)		
	7.5	16.5	28.8
1st Vacuum	12:54	12:49	12:45
1st Sample	13:04	13:00	12:57
2nd V	13:07	13:03	12:59
2nd S	13:17	13:13	13:11

all lysimeters pressure purged before pulling first vacuum

PK P. KAISER

9/7



H_2O level about 1.5 ft above last week

DANIEL B. STEPHENS & ASSOCIATES, Inc.
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TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaveir
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
		E06090720																								
-01	MVP14-SW		09/07/06		W	1							X	X	X	X	X	X	X							
-02	MVP14-7.5		09/07/06	9:52	W	1							X	X	X	X	X	X	X							
-03	MVP14-16.8		09/07/06	9:49	W	1							X	X	X	X	X	X	X							
-04	MVP14-26.9		09/07/06	9:19	W	1							X	X	X	X	X	X	X							
-05	MVP19-SW		09/07/06	8:33	W	1							X	X	X	X	X	X	X							
-06	MVP19-7.5		09/07/06	8:27	W	1							X	X	X	X	X	X	X							
-07	MVP19-14.0		09/07/06	8:23	W	1							X	X	X	X	X	X	X							
-08	MVP19-23.3		09/07/06	8:17	W	1							X	X	X	X	X	X	X							
-09	MVP22-SW		09/07/06	9:01	W	1							X	X	X	X	X	X	X							
10	MVP22-6.0		09/07/06	8:58	W	1							X	X	X	X	X	X	X							
11	MVP22-14.8		09/07/06	8:54	W	1							X	X	X	X	X	X	X							
12	MVP22-25.1		09/07/06	8:49	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaveir	Larry Jook	9/7/06	14:41

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CHAIN OF CUSTODY RECORD

DATE:

PAGE: 2 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
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CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kearn
LAB USE ONLY:

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
		E0609 0719																								
-01	AP1-SW		09/07/06	11:21	W	1							X	X	X	X	X	X	X							
-02	AP1-7.1		09/07/06	11:34	W	1							X	X	X	X	X	X	X							
-03	AP1-14.5		09/07/06	11:24	W	1							X	X	X	X	X	X	X							
-04	AP1-29.2		09/07/06	11:30	W	1							X	X	X	X	X	X	X							
-05	AP10-SW		09/07/06	12:12	W	1							X	X	X	X	X	X	X							
-06	AP10-8.5		09/07/06	12:23	W	1							X	X	X	X	X	X	X							
-07	AP10-19.5		09/07/06	12:19	W	1							X	X	X	X	X	X	X							
-08	AP10-29.0		09/07/06	12:16	W	1							X	X	X	X	X	X	X							
-09	AP15-SW		09/07/06	12:52	W	1							X	X	X	X	X	X	X							
10	AP15-7.5		09/07/06	13:04	W	1							X	X	X	X	X	X	X							
11	AP15-16.5		09/07/06	13:20	W	1							X	X	X	X	X	X	X							
12	AP15-28.8		09/07/06	12:57	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kearn	Larry Jack	9/7/06	14:41

FIELD MEMORANDUM No. 10

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: September 15, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds and Alessandro Ponds, September 14, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 had water flowing into it while staff was on site, 10:30 to 14:00. The pond started nearly dry and measured a depth of 0.5 ft based on the metering stick with the ground above the lysimeters being dry. The water level in Pond 10 was the about 1.5 ft below the level from a week earlier. The water level in Pond 15 was about 1.5 ft below the previous week and the ground above the lysimeters was exposed.

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative heights of the water are determined from the tops of the ramps. The water levels in Ponds 14, 19, and 22 are 13.1 ft, 8.4 ft, and 7.8 ft respectively.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Before sampling, all of the lysimeters were purged of standing water collected during the previous week. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, September 13, 2006 after which a vacuum was applied to allow for soil water to enter the lysimeter over a 22 + hour period prior to sampling Thursday September 14.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site, except pond 15 where access only allowed two sample points.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

Samples delivered to EMWD Laboratory September 14, 2006.

Equipment repairs/completions:

Additional paint was applied to the previously painted crash posts to provide a more uniform cover.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Tuesday September 19, 2006 to purge and set a vacuum to each of the lysimeters. Wednesday September 20, 2006 sampling will be conducted at both Alessandro Ponds and MVRWRF Ponds by DBS&A personnel, with nitrite samples being stored separately. An additional set of samples will be taken from the Moreno Valley Ponds and composited with the previous day's samples to provide enough volume for general parameters analysis. Alessandro Pond samples and nitrite samples from Moreno Valley will be delivered to the lab Wednesday and the other samples will be delivered Thursday.

Additional work or repairs planned:

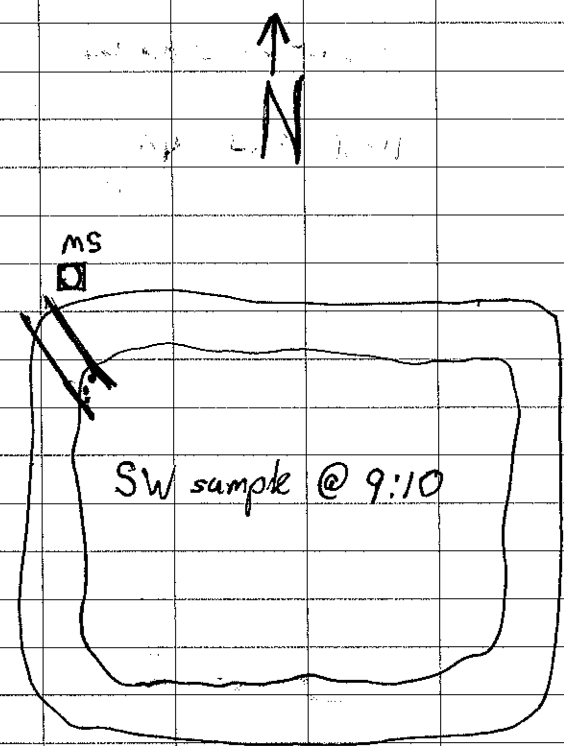
Additional painting of the crash posts with additional coats being applied as necessary. Reflective safety tape will be added to the crash posts at the MVRWRF Ponds. Both of these tasks will be completed Wednesday September 20. Repairs to the one vault plate that won't fit into its frame will be completed concurrent with the installation of the new wells.

MVP14

P.KAISER PK

MVP14

	Lysimeter depth (ft)		
	7.5	16.8	26.9
Vacuum	Wed 9/13 AM		
Sample	9:25	9:19	9:15

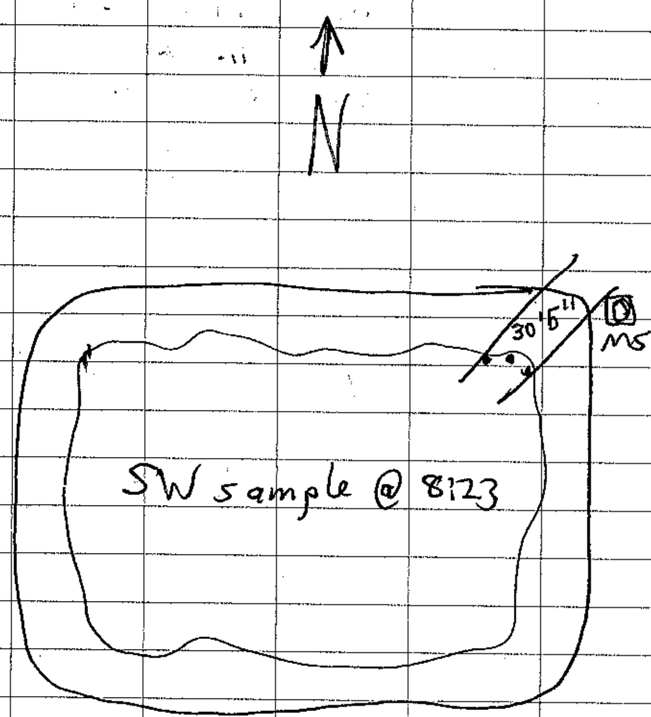


H_2O level is 44'10" From the top of the ramp

9/14

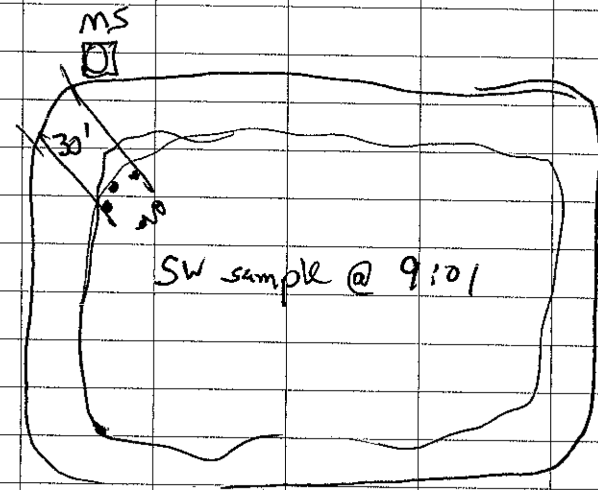
	Lysimeter Depth (ft)		
	7.5	14.0	23.3
Vacuum	Wed 9/13 AM		
Sample	8:19	8:15	8:11

9/14



H_2O is 30'5" down the ramp

	Lysimeter Depth (Ft)		
	8.0	14.8	25.1
Vacuum	Wed	9/13 AM	
Sample	8:53	8:48	8:43



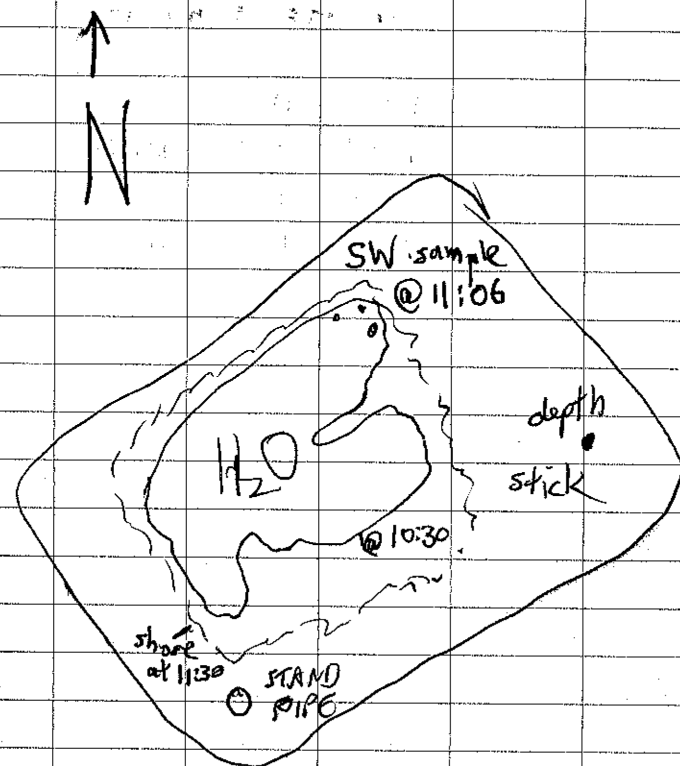
H_2O level is 30'0" from top of the ramp

API

	Lysimeter Depth (ft)		
	7.1	14.5	29.2
1st Vacuum	10:49	10:41	10:45
1st Sample	10:02	10:51	10:57
2nd V	11:04	10:56	11:00
2nd S	11:19	11:08	11:15
3rd V		11:12	
3rd S		11:23	

all lysimeters were pressure purged before the first vacuum was pulled

API



H_2O Flowing in at 10:30 at a moderate (?) rate

depth stick is dry

14:00 Water still entering
depth stick @ 0.5 Ft

9/14

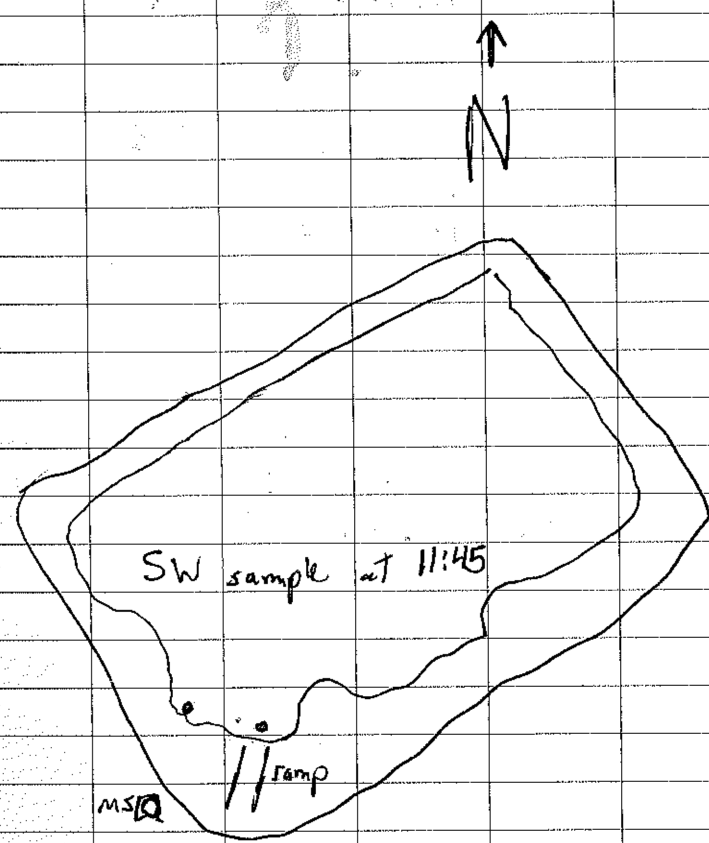
AP10

	Lysimeter Depth (ft)		
	8.5	19.5	29.0
1st Vacuum	11:41	11:37	11:33
1st Sample	11:54	11:52	11:48
2nd V	11:58	11:54	11:45
2nd S	12:08	12:06	11:59

all lysimeters were pressure purged before pulling the first vacuum

AP10

9/14

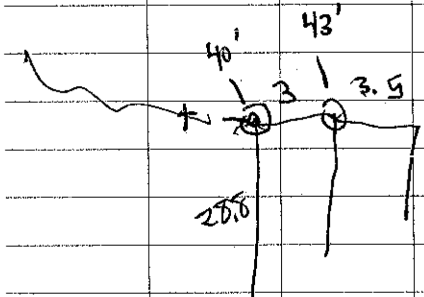


H_2O level about 1.5 ft below last week

9/14

	Lysimeter Depth (Ft)		
	7.5	16.5	28.8
1st Vacuum	12:27	12:23	12:19
1st Sample	12:41	12:39	12:31
2nd V	12:46	12:42	12:34
2nd S	13:02	12:59	12:46

all lysimeters were pressure purged before pulling first vacuum



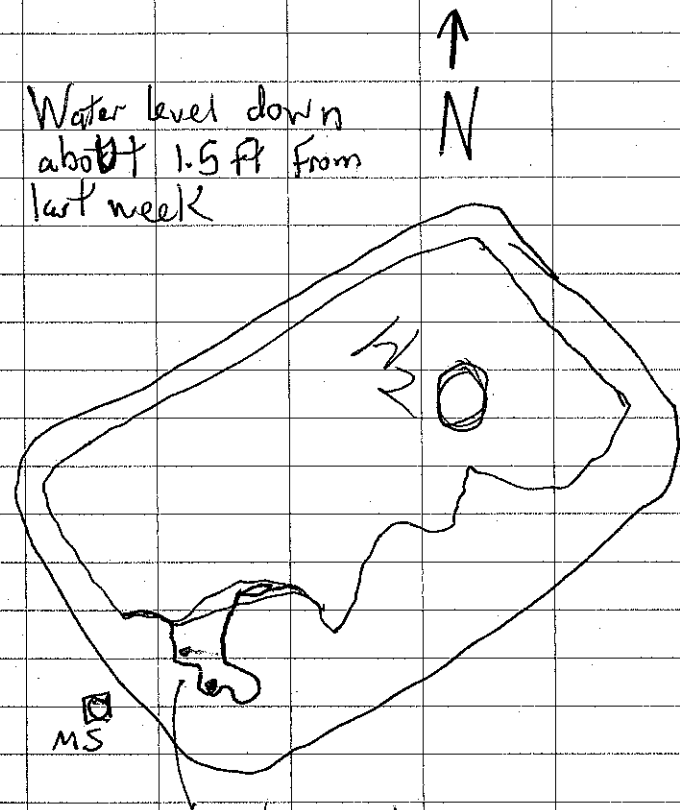
length of line to lysimeters

deep	28.8	+ ? (≈40)	40'
mid	19.5	+ ?	43'10"
shallow	14	+ ?	43'

* lines measurement catches at the bends

9/14

Water level down about 1.5 ft from last week



SW sample at 12:26

Only two locations due to shallow water. I couldn't get the bottle low enough to get more w/o disturbing sediment

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5951 Encina Road Suite 208
Goleta, CA 93117
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CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaiser
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	MVP14-SW		09/14/06	9:10	W	1							X	X	X	X	X	X	X							
	MVP14-7.5		09/14/06	9:25	W	1							X	X	X	X	X	X	X							
	MVP14-16.8		09/14/06	9:19	W	1							X	X	X	X	X	X	X							
	MVP14-26.9		09/14/06	9:15	W	1							X	X	X	X	X	X	X							
	MVP19-SW		09/14/06	8:23	W	1							X	X	X	X	X	X	X							
	MVP19-7.5		09/14/06	8:19	W	1							X	X	X	X	X	X	X							
	MVP19-14.0		09/14/06	8:15	W	1							X	X	X	X	X	X	X							
	MVP19-23.3		09/14/06	8:11	W	1							X	X	X	X	X	X	X							
	MVP22-SW		09/14/06	9:01	W	1							X	X	X	X	X	X	X							
	MVP22-6.0		09/14/06	8:53	W	1							X	X	X	X	X	X	X							
	MVP22-14.8		09/14/06	8:48	W	1							X	X	X	X	X	X	X							
	MVP22-25.1		09/14/06	8:43	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser 9/14/06	[illegible signature]	9/14/06	1514
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
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P.O. NO.:
QUOTE NO.:
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

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	AP1-SW		09/14/06	10:06	W	1					X	X	X	X	X	X	X
	AP1-7.1		09/14/06	10:02	W	1					X	X	X	X	X	X	X
	AP1-14.5		09/14/06	10:51	W	1					X	X	X	X	X	X	X
	AP1-29.2		09/14/06	10:57	W	1					X	X	X	X	X	X	X
	AP10-SW		09/14/06	11:45	W	1					X	X	X	X	X	X	X
	AP10-8.5		09/14/06	11:54	W	1					X	X	X	X	X	X	X
	AP10-19.5		09/14/06	11:52	W	1					X	X	X	X	X	X	X
	AP10-29.0		09/14/06	11:48	W	1					X	X	X	X	X	X	X
	AP15-SW		09/14/06	12:26	W	1					X	X	X	X	X	X	X
	AP15-7.5		09/14/06	12:41	W	1					X	X	X	X	X	X	X
	AP15-16.5		09/14/06	12:39	W	1					X	X	X	X	X	X	X
	AP15-28.8		09/14/06	12:31	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser 9/14/06	[illegible]	9/14/06	1514

FIELD MEMORANDUM No. 10

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: September 22, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds and Alessandro Ponds, September 14, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 had water flowing into it from 12:00 to 14:00. The pond started dry and the metering stick remaining dry. The water level in Pond 10 was the about the same from a week earlier. The water level in Pond 15 was about the same as the previous week and the ground above the lysimeters was exposed at 12:00. Water was flowing steadily at a low flow rate into the pond from an inlet in the western corner of the pond. The level rose to cover the ground above the lysimeters before staff left the site at 15:45.

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative heights of the water are determined from the tops of the ramps. The water levels in Ponds 14, 19, and 22 are 12.8 ft, 9.0 ft, and 8.4 ft respectively.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Before sampling, all of the lysimeters were purged of standing water collected during the previous week. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling on Wednesday September 20. MVRWRF Pond Lysimeters were purged of standing water on Tuesday, September 19, 2006 after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22 + hour period prior to sampling Wednesday September 20. A vacuum was pulled on the lysimeters after taking the initial sample for sampling on Thursday September 21. About 60 ml for nitrite analysis was decanted from the MVRWRF samples for delivery to the lab on Wednesday September 20.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

MVRWRF nitrite samples and Alessandro Ponds samples delivered to the EMWD Laboratory on September 20. Samples for all other analyses from MVRWRF were delivered to the EMWD Laboratory on September 21.

Equipment repairs/completions:

Additional paint was applied to the previously painted crash posts to provide a more uniform cover. Reflective tape was added to the crash posts at MVRWRF Pond 14.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday September 27, 2006 to purge and set a vacuum to each of the lysimeters. Thursday September 28, 2006 sampling will be conducted at both Alessandro Ponds and MVRWRF Ponds by DBS&A personnel. All of the samples will be delivered to the EMWD Laboratory on Thursday September 28.

Additional work or repairs planned:

Additional painting of the crash posts with additional coats being applied as necessary. Reflective safety tape will be added to the crash posts at the MVRWRF Ponds 19 and 22. Both of these tasks will be conducted Thursday September 20. Repairs to the one vault plate that won't fit into its frame will be completed concurrent with the sampling.

9/20
9/21

MVP 14

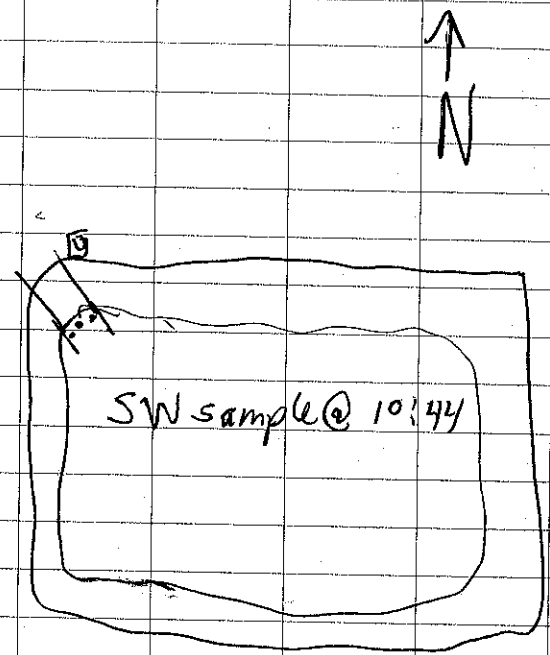
P. KALSEPIK

	LYSIMETER Depth (Ft) 7.5	16.8	26.9
1st Sample	only for 10:38	10:32	10:24
2nd Vacuum	nitrite 10:42	10:35	10:26
2nd Sample 9/21	8:08	8:25	8:18
3rd Vacuum	8:17		
3rd Sample	8:54 vacuum w/ pump for 6 minutes		

For sampling procedure
see page 27

MVP14-7.5 started over on 9/21 because another sample was added to the bottle

9/20
9/21



H_2O level is 43.75 Ft below the top of the ramp

$43.75 (\sin 17^\circ) = 12.8$ Ft below the top of the ramp

27
9/20
9/21

MVP19

PK PK

	Lysimeter Depth (ft)		
	7.5	14.0	23.3
1st Sample	9:04	8:59	8:49
2nd Vacuum	9:12	9:04	8:56
2nd Sample 9/21	7:28	7:24	7:21

vacuum w/ pump for 6 minutes

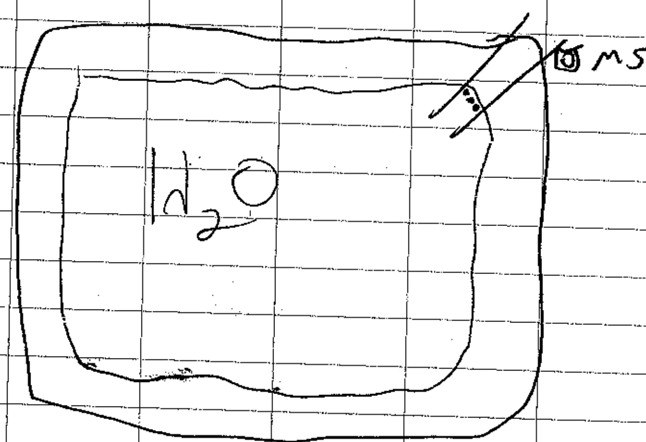
LYSIMETER SAMPLES: After sample recovery, about 60mL poured into a separate bottle for nitrite analysis & delivery to lab on 9/20 other samples delivered after adding 2nd sample on 9/21.

SW SAMPLES: SW samples were taken in their entirety & delivered to the lab on 9/20

28
9/20
9/21

↑ N

SW sample at 9:09



H_2O level ~ 32.5 ft below top of the ramp

$32.5 \sin(16°) = 9.0$ ft

H_2O level is 9.0 ft below the top of the ramp

29
9/20
9/21

MVP 22

PJL PJL

	Lysimeter Depth (Ft)		
	6.0	14.8	25.1
1st sample	9:59	9:53	9:49
2nd Vacuum	10:10	10:02	9:53
2nd Sample 9/21	7:59	~~7:47~~ * pjl	7:41

vacuum w/ pump for 6 minutes

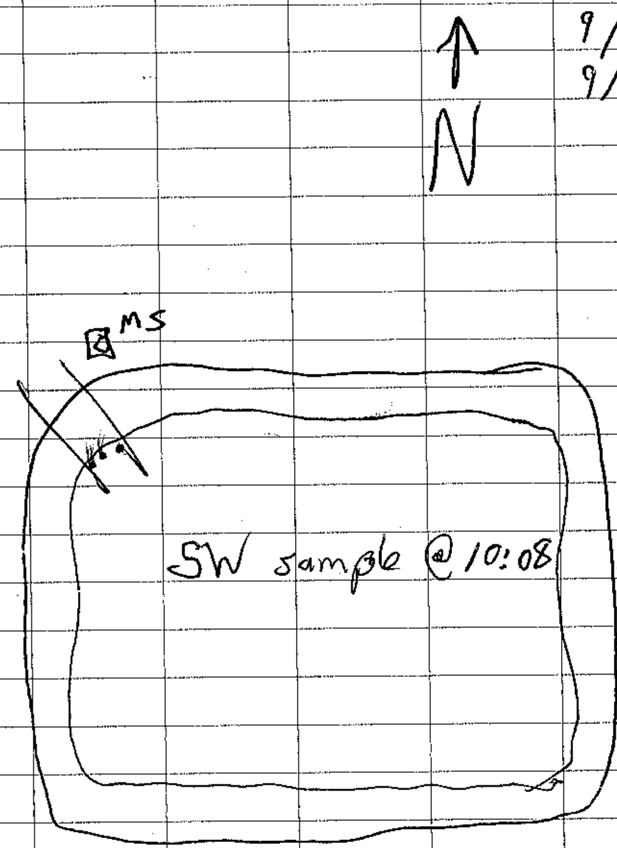
For sampling procedure see page 27

* bottle problems, 2nd 9/21 sample added to 9/20 sample

	14.8 Ft
3rd Vacuum	7:53
3rd Sample	8:47

The deep & middle depth lysimeter samples smelled of H_2S

30
9/20
9/21



H_2O level is ~32.5 Ft below top of ramp which translates to $32.5 \sin(15°) = 8.4$ below the top of the ramp.

31
9/20

AP 1

	7.1	14.5	29.2
1st Vacuum	12:43	12:33	12:39
1st Sample	13:02	12:51	12:58
2nd V	13:09	12:56	13:01
2nd S	13:21	13:12	13:17
3rd V		13:16	
3rd S		13:26	

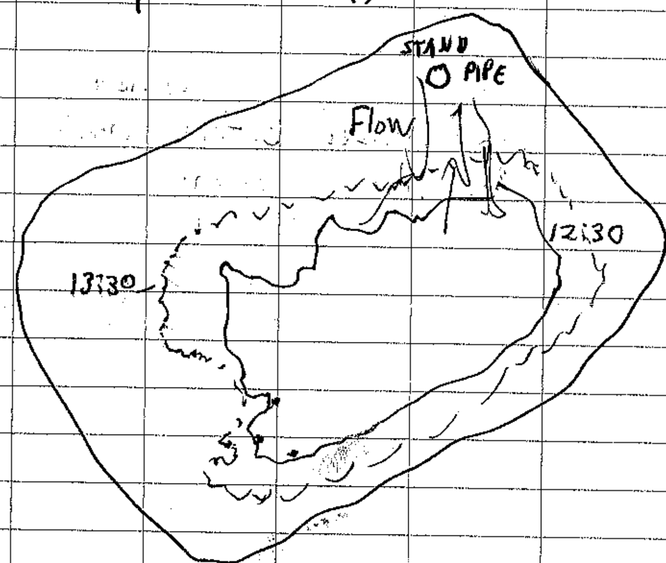
all lysimeters pressure pre-purged before pulling the first vacuum

PK PIZ

32
9/20

↑
N

SW sample at 12:49



H_2O started flowing into a dry pond at about noon 12:00

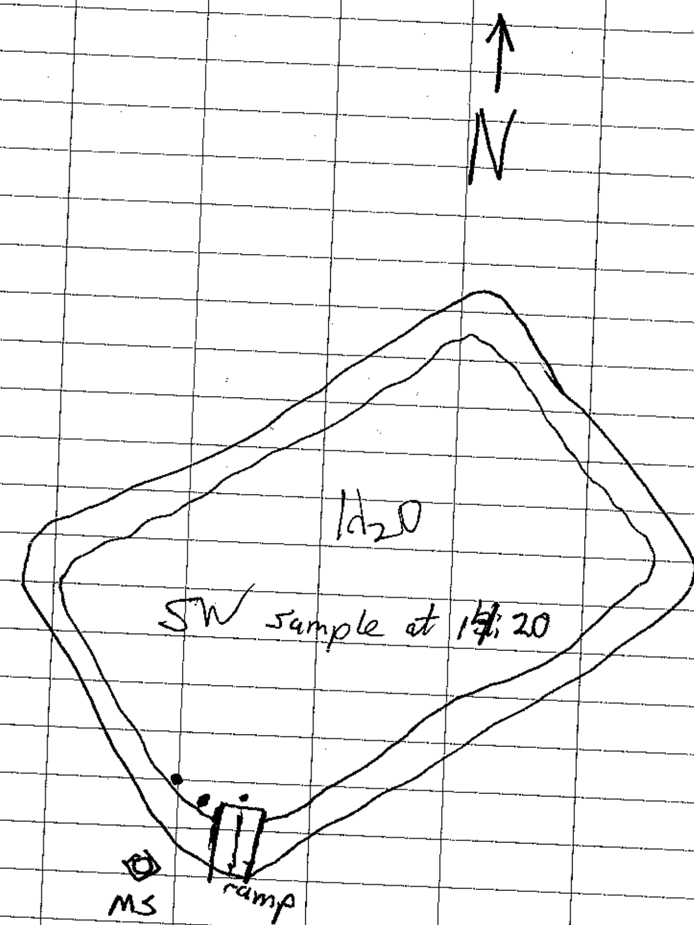
AP 10

pK

	8.5	19.5	29.0
1st Vacuum	14:01	13:57	13:52
1st Sample	14:16	14:09	14:06
2nd V	14:19	14:15	14:09
2nd S	14:34	14:30	14:27

all lysimeters pressure pre-purged before pulling the first vacuum

pK



35 AP 15 PK

9/20

	7.5	16.5	28.8
1st Vacuum	15:03	14:57	14:48
1st Sample	15:23	15:11	15:06
2nd V	15:26	15:18	15:09
2nd S	15:46	15:40	15:32

all lysimeters pressure pre-purged before pulling the first vacuum

The lysimeters were pressure test to verify depths are what they are labelled to be.

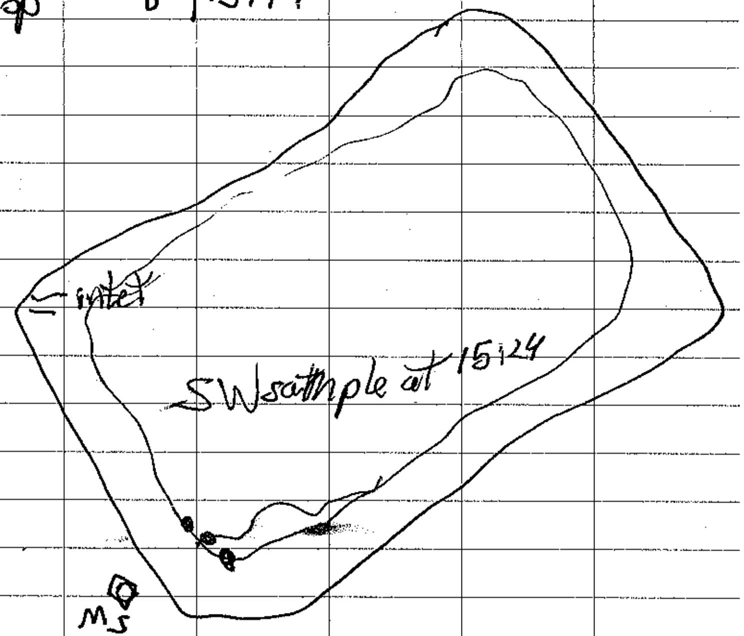
Pressure was applied to provide flow and then no more pressure was applied. The flow stopped as the pressure dropped below the level to be a sufficient driving force. The pressure as flow decreased & stopped was recorded

P. KAISER 36

9/20

Pressure (psig)	7.5	16.5	28.8
flow	9	17	19
drip	8	16	18
stop	8	15	17

N



low flow into pond from at least 14:45 through leaving

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PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S): (SIGNATURE) Phil Kaiser
LAB USE ONLY:

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

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	MVP14-SW pic		9/20	10:44	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP14-7.5			10:38	W	1					X	X	X	X	X	X	X
	MVP14-16.8			10:32	W	1					X	X	X	X	X	X	X
	MVP14-26.9			10:24	W	1					X	X	X	X	X	X	X
	MVP19-SW PK			9:09	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP19-7.5			9:04	W	1					X	X	X	X	X	X	X
	MVP19-14.0			8:59	W	1					X	X	X	X	X	X	X
	MVP19-23.3			8:49	W	1					X	X	X	X	X	X	X
	MVP22-SW PK			10:08	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP22-6.0			9:59	W	1					X	X	X	X	X	X	X
	MVP22-14.8			9:53	W	1					X	X	X	X	X	X	X
	MVP22-25.1		9/20	9:49	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature) Phil Kaiser 9/20/06	Received by: (Signature) Larry Jack	Date: 9/20/06	Time: 16:40 5°C
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

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	AP1-SW		09/20/06	12:49	W	1						X	X	X	X	X	X	X							
	AP1-7.1		09/20/06	13:02	W	1						X	X	X	X	X	X	X							
	AP1-14.5		09/20/06	12:51	W	1						X	X	X	X	X	X	X							
	AP1-29.2		09/20/06	12:58	W	1						X	X	X	X	X	X	X							
	AP10-SW		09/20/06	14:20	W	1						X	X	X	X	X	X	X							
	AP10-8.5		09/20/06	14:19	W	1						X	X	X	X	X	X	X							
	AP10-19.5		09/20/06	14:09	W	1						X	X	X	X	X	X	X							
	AP10-29.0		09/20/06	14:06	W	1						X	X	X	X	X	X	X							
	AP15-SW		09/20/06	15:29	W	1						X	X	X	X	X	X	X							
	AP15-7.5		09/20/06	15:23	W	1						X	X	X	X	X	X	X							
	AP15-16.5		09/20/06	15:11	W	1						X	X	X	X	X	X	X							
	AP15-28.8		09/20/06	15:06	W	1						X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser 9/20/06	Larry Polk	9/20/06	16:40

4°C

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5951 Encina Road Suite 208
Goleta, CA 93117
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CHAIN OF CUSTODY RECORD

DATE:
PAGE: 1 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
SAMPLER(S) (SIGNATURE): Phil Kasen
P.O. NO.:
QUOTE NO.:
LAB USE ONLY:

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont		Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	~~MVP14-SW~~ PK 9/21		~~09/21/06~~		~~W~~	~~1~~						~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	MVP14-7.5		09/21/06	8:08	W	1		X	X	X	X	X	X	X	X	X	X	X
	MVP14-16.8		09/21/06	8:25	W	1		X	X	X	X	X	X	X	X	X	X	X
	MVP14-26.9		09/21/06	8:18	W	1		X	X	X	X	X	X	X	X	X	X	X
	~~MVP19-SW~~ PK 9/21		~~09/21/06~~		~~W~~	~~1~~						~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	MVP19-7.5		09/21/06	7:28	W	1		X	X	X	X	X	X	X	X	X	X	X
	MVP19-14.0		09/21/06	7:24	W	1		X	X	X	X	X	X	X	X	X	X	X
	MVP19-23.3		09/21/06	7:21	W	1		X	X	X	X	X	X	X	X	X	X	X
	~~MVP22-SW~~ PK 9/21		~~09/21/06~~		~~W~~	~~1~~						~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	MVP22-6.0		09/21/06	7:59	W	1		X	X	X	X	X	X	X	X	X	X	X
	MVP22-14.8		09/21/06		W	1		X	X	X	X	X	X	X	X	X	X	X
	MVP22-25.1		09/21/06	7:41	W	1		X	X	X	X	X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kasen 9/21	Larry K. Jock	9/21/06	9:40
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

7°C

FIELD MEMORANDUM No. 13

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: October 3, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds and Alessandro Ponds, September 28, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 was full and the metering stick read 1.65 ft. The water level in Pond 10 was about 0.75 ft lower than a week earlier. The water level in Pond 15 was about 0.5 ft below the previous week.

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative depths to water are determined trigonometrically by measuring the linear distance along the ramp to the water edge from the tops of the ramps. The vertical depth to water levels in Ponds 14, 19, and 22 are 13.3 ft, 9.8 ft, and 9.2 ft below the tops of ponds, respectively. MVRWRF Ponds are each approximately 20 feet deep.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Prior to sampling, all of the lysimeters were purged of standing water collected during the previous week. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling on Thursday September 28, 2006. In Alessandro Pond 10, DBS&A Personnel collected an additional set of samples to represent a repeated sample set. This repeat set was collected after the lysimeters in AP10 had been purged a total of three times, but the second and third "purges" were collected as the standard samples. Repeat samples were labeled with a suffix of "-2" while the original, standard set of samples were labeled with the suffix "-1" as shown on the chain-of-custody record. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, September 27, 2006 by EMWD personnel after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22 + hour period prior to sampling Thursday September 28.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each Ponds 1 and 10 and composited on-site. Only two samples were collected at Pond 15 due to limited accessibility, but the total volume was equivalent to that from the other ponds and these samples were composited on site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

MVRWRF samples and Alessandro Ponds samples were delivered to the EMWD Laboratory on September 28, 2006.

Equipment repairs/completions:

Additional paint was applied to the previously painted crash posts to provide a more uniform cover. The lid to the vault at MVP 22 was resized to fit more easily into the vault casing.

Next site visit:

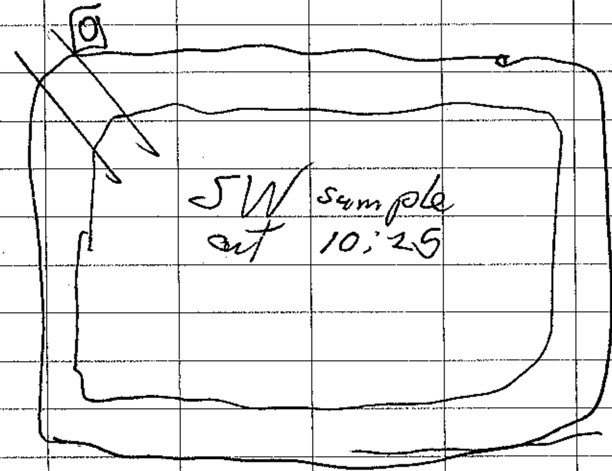
EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday October 4, 2006 to purge and set a vacuum to each of the lysimeters. Thursday October 5, 2006 sampling will be conducted at the MVRWRF Ponds by DBS&A personnel. All of the samples will be delivered to the EMWD Laboratory on Thursday October 5. Weekly sampling at Alessandro Ponds has ended for this project and will be performed monthly by DBS&A personnel, beginning on October 26, 2006 through December.

Additional work or repairs planned:

Additional painting of the crash posts with additional coats being applied as necessary. Reflective safety tape will be added to the crash posts at the MVRWRF Ponds 19 and 22. Both of these tasks will be conducted Thursday October 5. Finishing of the repairs to the one vault plate that won't fit into its frame will be completed concurrent with the October 5, 2006 sampling event.

	Lysimeter Depth (Ft)		
	7.5	16.8	26.9
Vacuum	Wed 9/27 AM		
Sample	10:40	10:35	10:31

Grinding to reduce the dimensions of the vault lid was begun, The batteries died and the process will be completed during the next visit



The depth to water along the ramp is 45.5 Ft
which translates to a vertical depth to H_2O of 13.3 Ft

39 MVP 19 PK

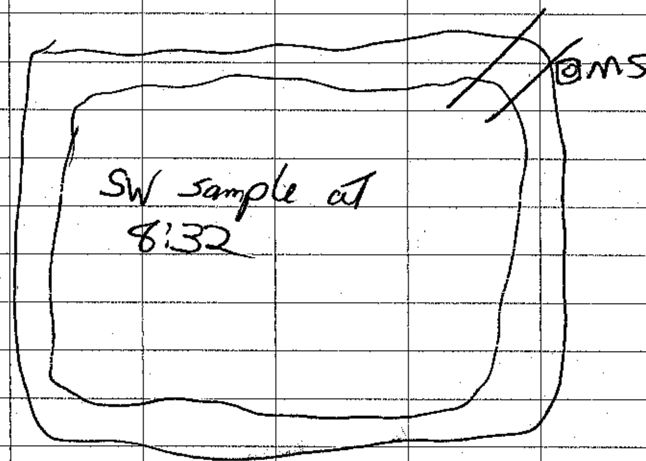
9/28

	LYSIMETER DEPTH (Ft)		
	7.5	14.0	23.3
Vacuum	WED.	9/27	AM
Sample	9:05	9:00	8:53

All of the foliage has been removed from ponds 13-22. This includes bushes and such along the sides of the ponds.

PK 40

9/28



The depth to H_2O along the ramp is 35.5 Ft which translates to a vertical depth to H_2O of 9.8 Ft

9/28

MVP22

PK

	Lysimeter Depth (Ft)		
	6.0	14.8	25.1
Vacuum	Wed	9/27	AM
Sample	9:50	9:45	9:37

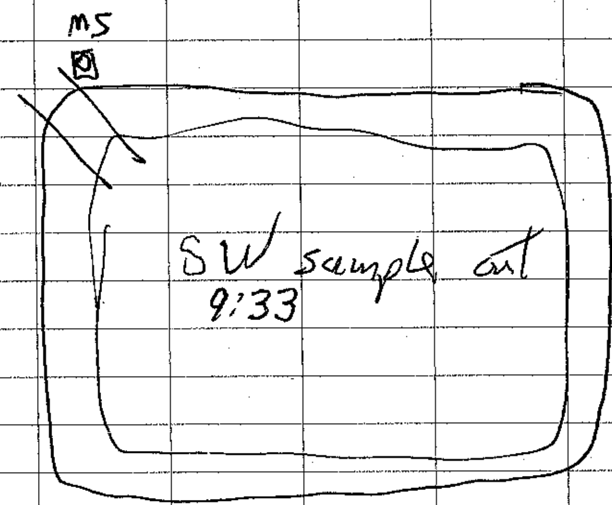
MVP22-6.0 yielded virtually no sample ~2mL

I noticed an H_2S odor from MVP22-14.8 + MVP22-6.0

The lid was ground down to fit within the vault.

PK

9/28



The depth to water along the sampis 35.5 ft which translates to a vertical depth to water of 9.2 ft

43
9/28

AP1

PK

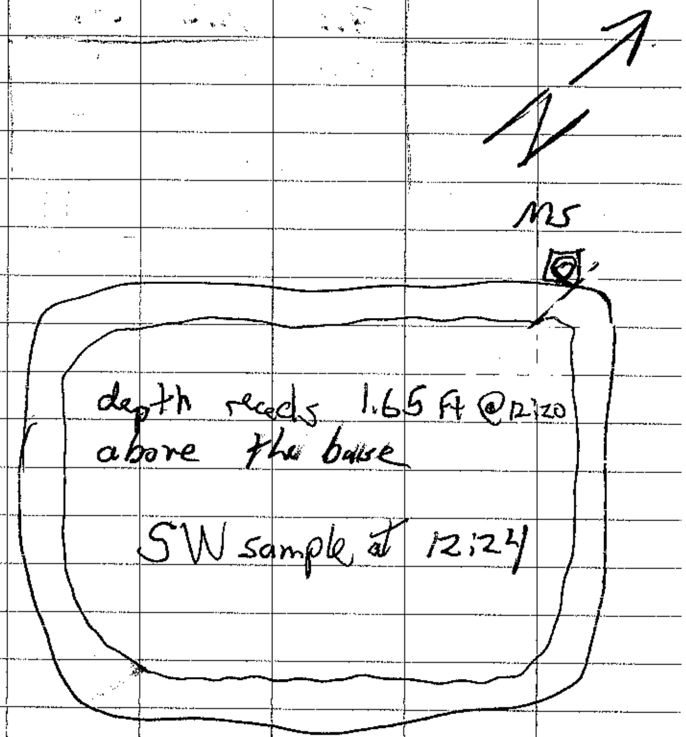
	Lysimeter Depth (Ft)		
	7.1	14.5	29.2
1st Vacuum	12:25	12:16	12:20
1st Sample	12:36	12:29	12:32
2nd V	12:39	12:31	12:35
2nd S	12:55	12:43	12:53
3rd V		12:46	
3rd S		12:58	

all lysimeters pressure purged before applying the first vacuum

H_2O level much higher than last week when the depth stick was dry

PK

44
9/28



~~The depth to water along the ramp is which translates to a vertical depth to water of~~

PK 9/27 15:35

9/28

AP10

PK

		Lysimeter Depth (Ft)		
		8.5	19.5	29.0
1st	Vacuum	13:20	13:16	13:12
1st	Sample	13:35	13:31	13:26
2nd	V	13:37	13:33	13:28
2nd	S	13:52	13:49	13:44

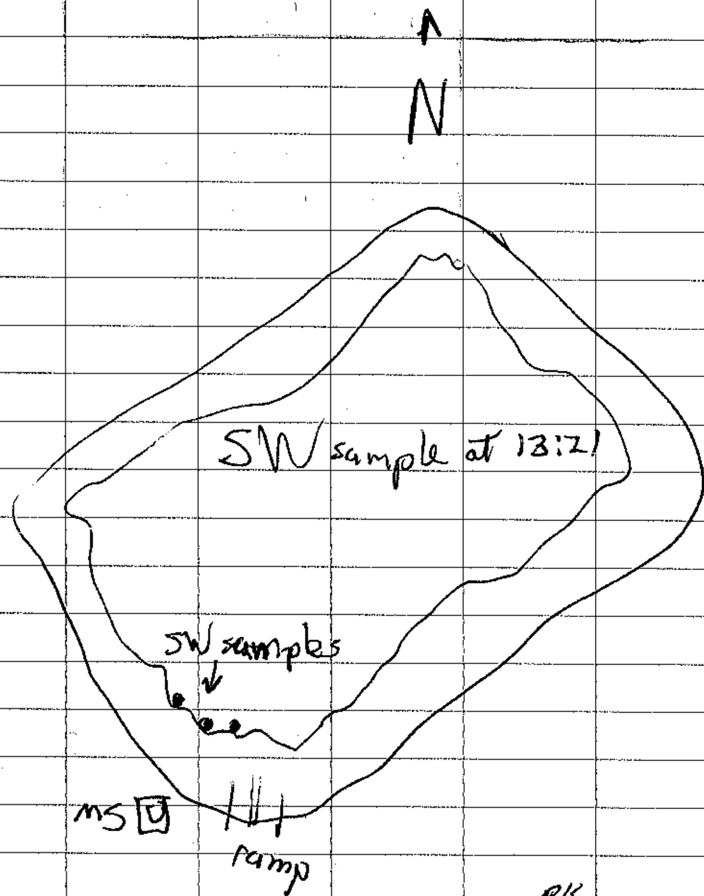
All 3 lysimeters pressure purged before sampling

QA Duplicates
the previous (earlier today) sampling is the purge

		Lysimeter Depth (Ft)		
		8.5	19.5	29.0
1st (3rd)	Vacuum	13:56	13:52	13:48
1st (3rd)	Sample	14:08	14:04	14:00
2nd (4th)	V	14:11	14:06	14:02
2nd (4th)	S	14:19	14:16	14:13

PK

9/28



H_2O Level down ~ ~~0.6~~ 0.75 ft PK
from last week

9/28

AP 15

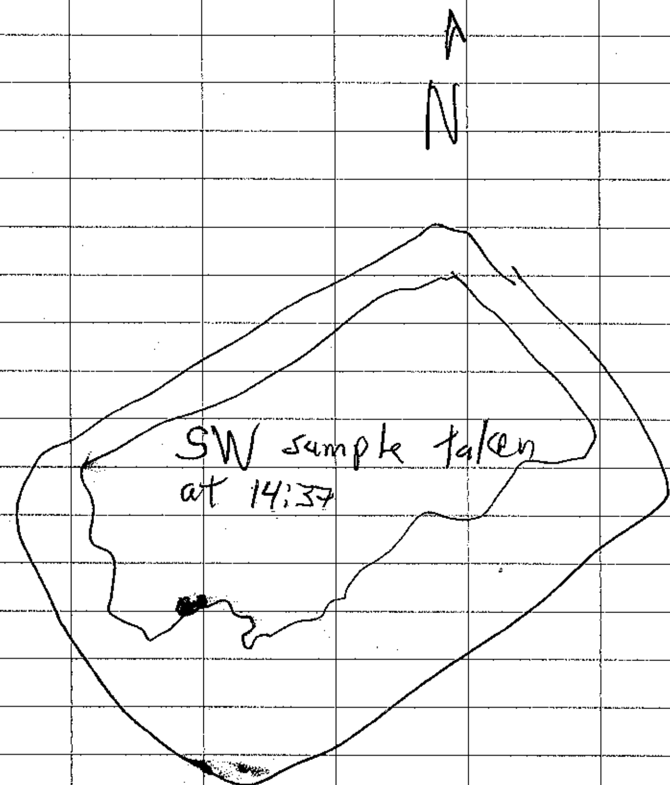
PK

		Lysimeter Depth (Ft) 7.5	16.5	28.8
1st	Vacuum	14:36	14:32	14:28
1st	Sample	14:52	14:49	14:43
2nd	V	14:55	14:51	14:46
2nd	S	15:08	15:04	15:00

all 3 lysimeters purged before pulling the first vacuum

p.KABER

9/28



SW sample from only 2 points ~ 1.5 ft apart. It was the only accessable spot at the pond

..IEL B, STEPHENS & ASSOCIATES, Inc.
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CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 3

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
SAMPLER(S): (SIGNATURE) Phil Kaser
P.O. NO.:
QUOTE NO.:
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)						
	MVP14-SW		09/28/06	10:25	W	1							X	X	X	X	X	X	X						
	MVP14-7.5		09/28/06	10:40	W	1							X	X	X	X	X	X	X						
	MVP14-16.8		09/28/06	10:35	W	1							X	X	X	X	X	X	X						
	MVP14-26.9		09/28/06	10:31	W	1							X	X	X	X	X	X	X						
	MVP19-SW		09/28/06	8:32	W	1							X	X	X	X	X	X	X						
	MVP19-7.5		09/28/06	9:05	W	1							X	X	X	X	X	X	X						
	MVP19-14.0		09/28/06	9:00	W	1							X	X	X	X	X	X	X						
	MVP19-23.3		09/28/06	8:53	W	1							X	X	X	X	X	X	X						
	MVP22-SW		09/28/06	9:33	W	1							X	X	X	X	X	X	X						
	MVP22-6.0		09/28/06	9:50	W	1							X	X	X	X	X	X	X						
	MVP22-14.8		09/28/06	9:45	W	1							X	X	X	X	X	X	X						
	MVP22-25.1		09/28/06	9:37	W	1							X	X	X	X	X	X	X						

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaser	Larry Jelk	9/28/06	16:05
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

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Goleta, CA 93117
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CHAIN OF CUSTODY RECORD

DATE:
PAGE: 2 OF 3

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Phil Kaiser
	LAB USE ONLY:

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	AP1-SW		09/28/06	12:24	W	1			X			X	X	X	X	X	X	X	X							
	AP1-7.1		09/28/06	12:36	W	1			X			X	X	X	X	X	X	X	X							
	AP1-14.5		09/28/06	12:29	W	1			X			X	X	X	X	X	X	X	X							
	AP1-29.2		09/28/06	12:32	W	1			X			X	X	X	X	X	X	X	X							
	AP10-SW		09/28/06	13:21	W	1			X			X	X	X	X	X	X	X	X							
	AP10-8.5 -1		09/28/06	13:35	W	1			X			X	X	X	X	X	X	X	X							
	AP10-19.5 -1		09/28/06	13:31	W	1			X			X	X	X	X	X	X	X	X							
	AP10-29.0 -1		09/28/06	13:26	W	1			X			X	X	X	X	X	X	X	X							
	AP15-SW		09/28/06	14:37	W	1			X			X	X	X	X	X	X	X	X							
	AP15-7.5		09/28/06	14:52	W	1			X			X	X	X	X	X	X	X	X							
	AP15-16.5		09/28/06	14:49	W	1			X			X	X	X	X	X	X	X	X							
	AP15-28.8		09/28/06	14:43	W	1			X			X	X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	Larry Falk	9/28/06	16:05
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

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Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:
PAGE: 3 OF 3

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
CITY: Perris, CA 92570	SAMPLER(S): (SIGNATURE) Phil Kaser
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL marshallk@emwd.org	P.O. NO.: QUOTE NO.: LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	AP10-8.5-~~dup~~ -2		09/28/06	14:08	W	1			X			~~X~~	X	X	X	X	X	X	X
	AP10-19.5-~~dup~~ -2		09/28/06	14:04	W	1			X			~~X~~	X	X	X	X	X	X	X
	AP10-29.0-~~dup~~ -2		09/28/06	14:00	W	1			X			~~X~~	X	X	X	X	X	X	X

Relinquished by: (Signature) Phil Kaser	Received by: (Signature) [signature]	Date: 9/28/06	Time: 16:05
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 14

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: October 9, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds, October 5, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative depths to water are determined trigonometrically by measuring the linear distance along the ramp to the water edge from the tops of the ramps. The vertical depth to water levels in Ponds 14, 19, and 22 are 17.4 ft, 10.5 ft, and 10.2 ft below the tops of ponds, respectively. MVRWRF Ponds are each approximately 20 feet deep.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22. Prior to sampling, all of the lysimeters were purged of standing water collected during the previous week. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, October 4, 2006 by EMWD personnel after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22+ hour period prior to sampling Thursday October 5.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

MVRWRF samples were delivered to the EMWD Laboratory on October 5, 2006.

Equipment repairs/completions:

Additional paint was applied to the previously painted crash posts to provide a more uniform cover. The lid to the vault at MVP 14 was resized to fit more easily into the vault casing.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday October 11, 2006 to purge and set a vacuum to each of the lysimeters. Thursday October 12, 2006 sampling will be conducted at the MVRWRF Ponds by DBS&A personnel. All of the samples will be delivered to the EMWD Laboratory on Thursday October 12.

Additional work or repairs planned:

Additional painting of the crash posts with additional coats being applied as necessary. Reflective safety tape will be added to the crash posts at the MVRWRF Ponds 19 and 22. Both of these tasks will be conducted Thursday October 12.

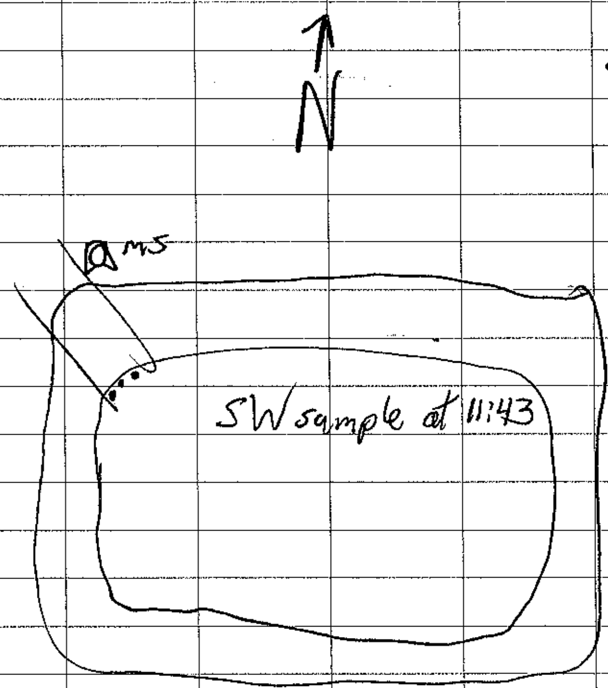
MVP14

P.KAISER

	Lysimeter Depth (ft)		
	7.5	16.8	26.9
1st Vacuum	Wednesday 10/4		AM
1st Sample	11:49	11:55	12:00
2nd V	11:53	11:56	
2nd S	12:47	12:49	

First week of only Moreno Valley sampling effort

PK

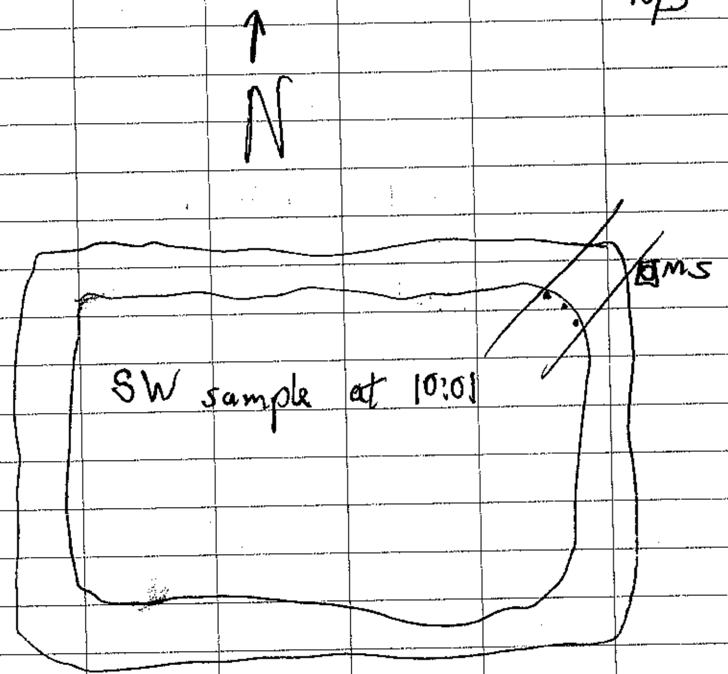


The depth to H_2O along the ramp is 59.5 Ft which translates to a depth to H_2O of 17.4 Ft.

5.1 MVP 19 PK
10/5

	Lysimeter Depth (Ft)		
	7.5	14.0	23.3
1st Vacuum	WEDNESDAY 10/4 AM		
1st Sample	10:16	10:13	10:05
2nd V	10:18		
2nd S	11:25		

PK 52
10/5



The depth to H_2O is 38.0 Ft down the ramp which translates to a depth to H_2O of 10.5 Ft

10/5

MVP 22

PK

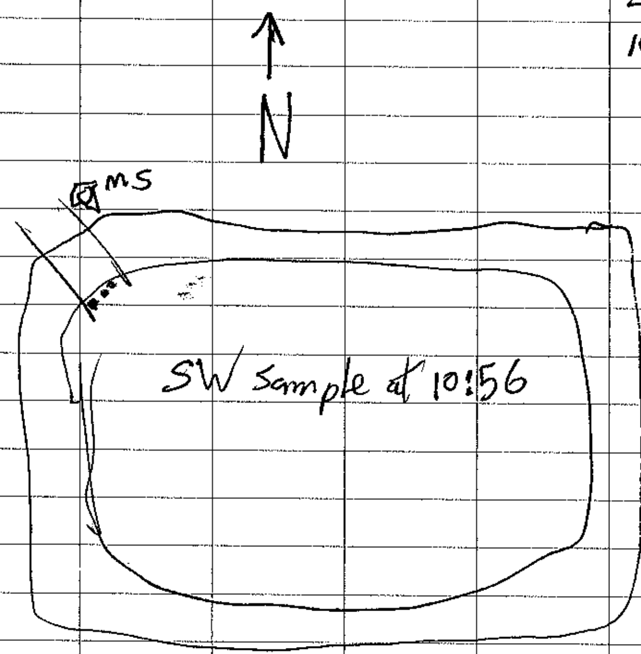
	Lysimeter Depth (Ft)		
	6.0	14.8	25.1
Vacuum	Wednesday 10/4 AM		
Sample	10:47	11:11	10:07
2^{nd} Vacuum	10:51		
2^{nd} Sample	11:15		

I noticed an H_2S odor ~~from~~ while sampling the lysimeter at 6.0 Ft

The lysimeter MVP14-6.0 yielded very little sample after two cycles. ~ 5 mL

P. KAISER

10/5



The depth to H_2O along the ramp is 39.5 Ft. which translates to a depth to water of 10.2 Ft

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5951 Encina Road Suite 208
Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:
PAGE: 1 OF

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Phil Kaiser
	LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300 0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	MVP14-SW		10/05/06	11:43	W	1							X	X	X	X	X	X	X							
	MVP14-7.5		10/05/06	11:49	W	1							X	X	X	X	X	X	X							
	MVP14-16.8		10/05/06	11:55	W	1							X	X	X	X	X	X	X							
	MVP14-26.9		10/05/06	12:00	W	1							X	X	X	X	X	X	X							
	MVP19-SW		10/05/06	10:01	W	1							X	X	X	X	X	X	X							
	MVP19-7.5		10/05/06	10:16	W	1							X	X	X	X	X	X	X							
	MVP19-14.0		10/05/06	10:13	W	1							X	X	X	X	X	X	X							
	MVP19-23.3		10/05/06	10:05	W	1							X	X	X	X	X	X	X							
	MVP22-SW		10/05/06	10:56	W	1							X	X	X	X	X	X	X							
	MVP22-6.0		10/05/06	10:47	W	1							X	X	X	X	X	X	X							
	MVP22-14.8		10/05/06	11:11	W	1							X	X	X	X	X	X	X							
	MVP22-25.1		10/05/06	11:07	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[signature]	10/5/06	14:30
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

19°C

FIELD MEMORANDUM No. 15

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: October 13, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds, October 12, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative depths to water are determined trigonometrically by measuring the linear distance along the ramp to the water edge from the tops of the ramps. The vertical depth to water levels in Ponds 14, 19, and 22 are 18.5 ft, 11.0 ft, and 11.1 ft below the tops of ponds, respectively. MVRWRF Ponds are each approximately 20 feet deep. Pond 14 has plant stalks sticking out of the water, showing that the water is getting shallow.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22. Prior to sampling, all of the lysimeters were purged of standing water collected during the previous week. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, October 11, 2006 by EMWD personnel after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22+ hour period prior to sampling Thursday October 12.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

MVRWRF samples were delivered to the EMWD Laboratory on October 12, 2006.

Equipment repairs/completions:

The lids to the vaults at MVP 14 and MVP 22 were resized to fit easily into the vault casing.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday October 18, 2006 to purge and set a vacuum to each of the lysimeters. Thursday October 19, 2006 sampling will be conducted at the MVRWRF Ponds by DBS&A personnel. All of the samples will be delivered to the EMWD Laboratory on Thursday October 19.

Additional work or repairs planned:

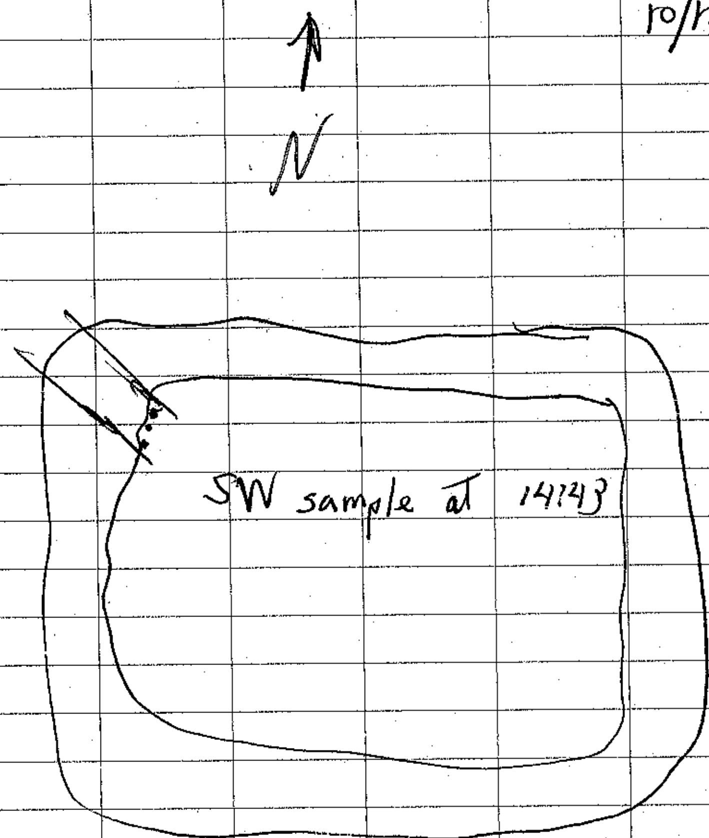
The crash posts will all be repainted with brush on paint. The work will be performed at MVRWRF during the week beginning Monday October 16. The repainting will be done at the Alessandro Ponds on Thursday October 26. Reflective tape will be applied to the crash posts on the following visit for each site.

10/12

	LYSIMETER DEPTH (Ft)		
	7.5	16.8	26.9
1ST Vacuum	Wed 10/11 AM		
1ST Sample	14:22	14:26	14:37
2nd V	14:23	15:19	
2nd S	15:16	15:26	

plants stalks were sticking up out of the water as a visual sign that the pond is nearly dry

10/12



The depth to water along the ramp is 63'4" which translates to a vertical depth to H_2O of 18.5 Ft.

57
10/12

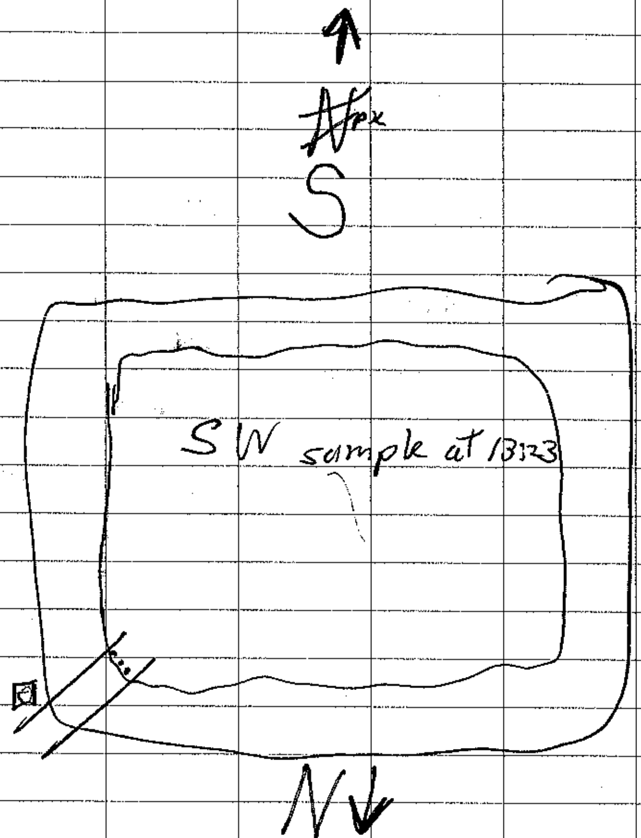
MVP 19

PK

	Lysimeter Depth (Ft)		
	7.5	14.0	23.3
1st Vacuum	Wed 10/11 AM		
1st Sample	13:14	13:17	13:09
2nd V	13:16		
2nd S	13:20		

PK

58
10/12



The depth to H_2O along the ramp is 40 Ft which translates to a vertical depth to H_2O of 11.0 Ft.

pk

MVP22

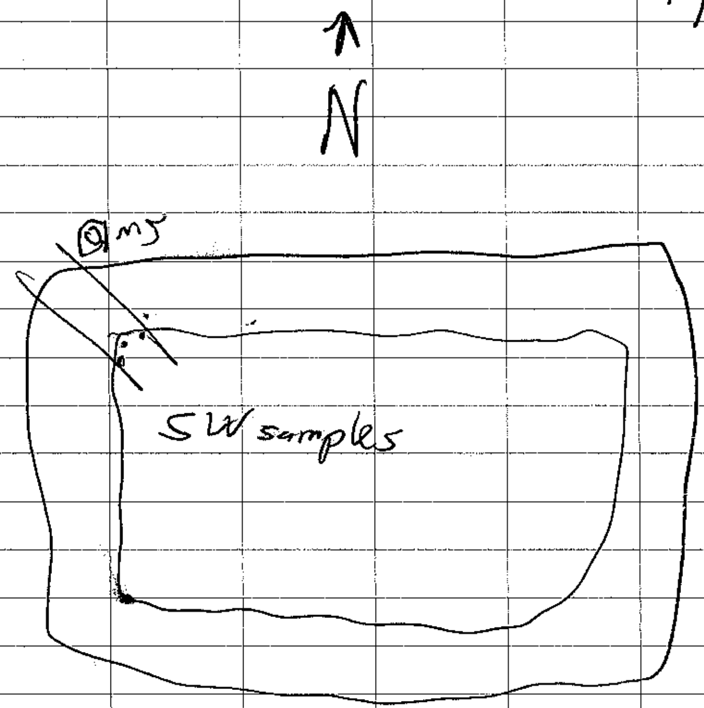
PK

	Lysimeter depth (ft) 6.0	14.8	25.1
1st Vacuum	Wed 10/11 Am		
1st Sample	13:58	14:04	14:08
2nd V	13:59	14:06	14:11
2nd S	15:13	15:07	15:10

6.0 lysimeter had a H_2S smell

P. KAISER

10/12



The depth to H_2O along the ramp is 42'10" which translates to a vertical depth to H_2O of 11.1 ft.

FIELD MEMORANDUM No. 16

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: October 20, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds, October 19, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Moreno Valley Ponds: All three ponds had water in them at varying depths. The relative depths to water are determined trigonometrically by measuring the linear distance along the ramp to the water edge from the tops of the ramps. The vertical depth to water levels in Ponds 14, 19, and 22 are 17.2 ft, 8.3 ft, and 11.7 ft below the tops of ponds, respectively. MVRWRF Ponds are each approximately 20 feet deep. The plant stalks visible from the bottom of Pond 14 were submerged. Water was being pumped into pond 14 from the northwest corner for about 30 minutes, but without making a measurable change in the water level.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22. Prior to sampling, all of the lysimeters were purged of standing water collected during the previous week. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, October 18, 2006 by EMWD personnel after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22+ hour period prior to sampling Thursday October 19. A vacuum pump was used to pull the vacuum and will be the procedure from now on.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

MVRWRF samples were delivered to the EMWD Laboratory on October 19, 2006.

Equipment repairs/completions:

The crash posts at the MVRWRF were repainted with a using a safety yellow color.

Next site visit:

EMWD staff will visit the MVRWRF Pond lysimeters on Wednesday October 25, 2006 to purge and set a vacuum to each of the lysimeters. Thursday October 26, 2006 sampling will be conducted at the MVRWRF Ponds and Alessandro Ponds by DBS&A personnel. An extra set of samples will be collected from the lysimeters at the Alessandro Pond 10. All of the samples will be delivered to the EMWD Laboratory on Thursday October 26. DBS&A personnel will be assisted while sampling for training purposes by EMWD staff.

Additional work or repairs planned:

The crash posts at the Alessandro Ponds will all be repainted during the upcoming site visit on October 26 and touch-ups to the crash posts at the MVRWRF will be done he repainting will be done on the same day. Reflective tape will be applied to the crash posts on the following visit for each site.

63

10/19

MVP 14

P. KAISER

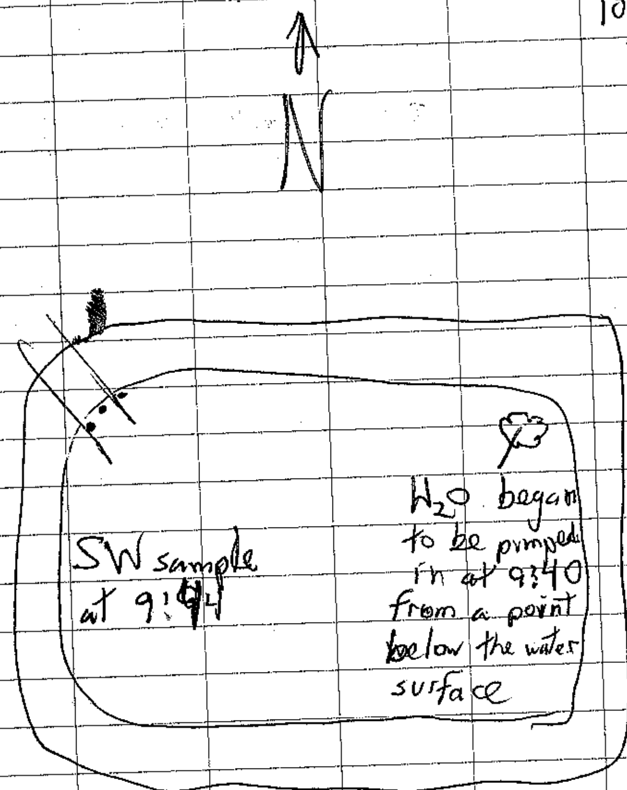
	Lysimeter Depth (Ft) 7.5	16.8	26.9
1st Vacuum	WED	10/18	AM
1st Sample	9:32 PK	9:38	9:51
2nd V	9:36		
2nd S	9:55		

The amount of H_2O pumped into the pond did not effect the depth to H_2O in a measurable way.

P.K.

64

10/19



The depth to water along the ramp is 59 ft which translates to a vertical depth to H_2O of 1~~7~~.2 ft

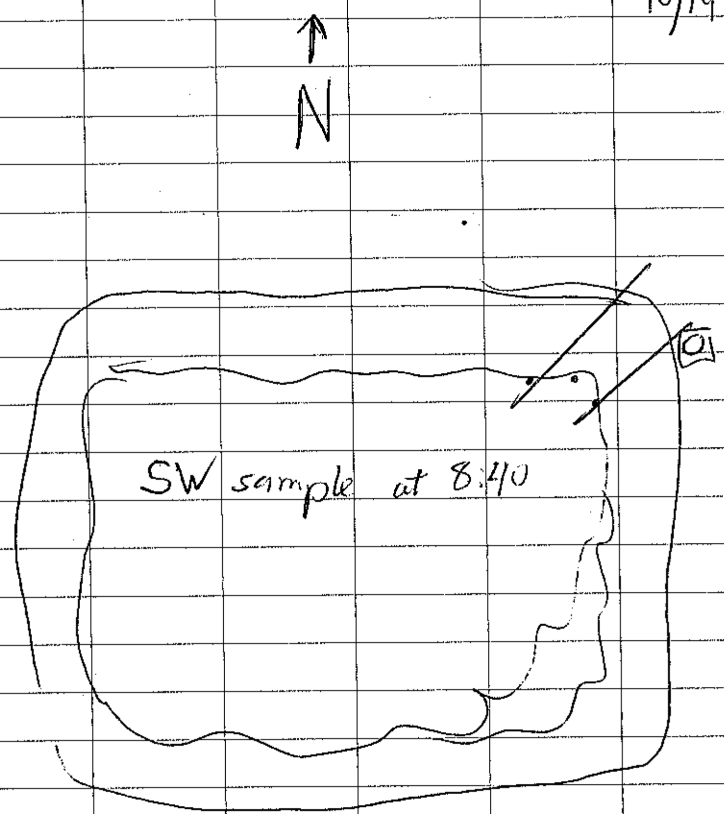
65 MVP19 pk

10/19

	LYSIMETER DEPTH (Ft)		
	7.5	14.0	23.3
Vacuum	WED	10/18	AM
Sample	8:23	8:28	8:33

pk 66

10/19



The depth to water along the ramp is 30.2 Ft. which translates to a vertical depth to water

pk

of ~~[illegible]~~ Ft.

8.3

MVP 22

PK

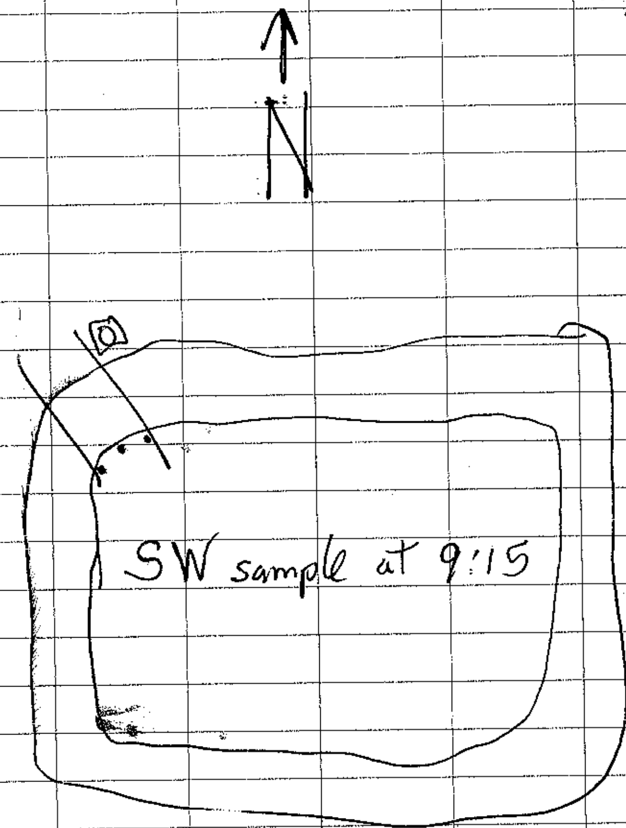
	Lysimeter Depth (ft)		
	6.0	14.8	25.1
1st Vacuum	Wed 10/18 AM		
1st Sample	8:53	9:05	9:10
2nd V	9:01		
2nd S	9:21		

no H_2S odor from MVP22-6.0

the second vacuum on MVP22-6.0 was pulled for 19 minutes w/o increasing volume of sample

P. Kaiser

10/19



The depth to H_2O along the ramp is 45.25 ft, which translates to a vertical depth of 11.7 ft.

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CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 1

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Phil Kaser
	LAB USE ONLY:

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	MVP14-SW		10/19/06	8:40	W	1					X	X	X	X	X	X	X
	MVP14-7.5		10/19/06	8:23	W	1					X	X	X	X	X	X	X
	MVP14-16.8		10/19/06	8:28	W	1					X	X	X	X	X	X	X
	MVP14-26.9		10/19/06	8:33	W	1					X	X	X	X	X	X	X
	MVP19-SW		10/19/06	9:15	W	1					X	X	X	X	X	X	X
	MVP19-7.5		10/19/06	8:52	W	1					X	X	X	X	X	X	X
	MVP19-14.0		10/19/06	9:05	W	1					X	X	X	X	X	X	X
	MVP19-23.3		10/19/06	9:10	W	1					X	X	X	X	X	X	X
	MVP22-SW		10/19/06	9:44	W	1					X	X	X	X	X	X	X
	MVP22-6.0		10/19/06	9:33	W	1					X	X	X	X	X	X	X
	MVP22-14.8		10/19/06	9:38	W	1					X	X	X	X	X	X	X
	MVP22-25.1		10/19/06	9:51	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaser	[illegible] Watts	10/19/06	11:10 Am
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

FIELD MEMORANDUM No. 17

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: October 27, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

Moreno Valley Ponds, October 26, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 was not full had water forming a large puddle approximately 50 ft by 50 ft. Pond 10 was full with the water level coming up to 3 in. below the base of the influent ramp. Pond 15 had water levels about 1.5 ft higher than the previous month.

Moreno Valley Ponds: The relative depths to water are measured as length down the ramp, then trigonometrically converted to vertical depth from the top of the ponds. The vertical depth to water levels in Ponds 14, 19, and 22 are 13.6 ft, 5.9 ft, and 12.4 ft below the tops of ponds, respectively. The water levels were up 3.6 ft, up 2.4 ft, and down 0.7 ft respectively from the previous week. MVRWRF Ponds are each approximately 20 feet deep.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Prior to sampling, all of the lysimeters were purged of standing water collected during the previous week. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, October 25, 2006 by EMWD personnel after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22+ hour period prior to sampling Thursday October 26. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling on October 26.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

MVRWRF samples were delivered to the EMWD Laboratory on October 26, 2006.

Equipment repairs/completions:

Reflective Safety tape was added to the crash posts at the MVRWRF. The crash posts at the Alessandro Ponds were repainted with a using a safety yellow color.

Next site visit:

EMWD staff will visit the MVRWRF Ponds lysimeters on Wednesday November 29, 2006 to purge and set a vacuum to each of the lysimeters. Thursday November 30, 2006 sampling will be conducted at the MVRWRF Ponds and Alessandro Ponds by DBS&A personnel. All of the samples will be delivered to the EMWD Laboratory on Thursday November 30. DBS&A personnel plan to be assisted by EMWD staff while sampling for training purposes.

Additional work or repairs planned:

Touch-ups to the crash posts at the Alessandro Ponds will be done and reflective tape will be applied to the crash posts.

10/26

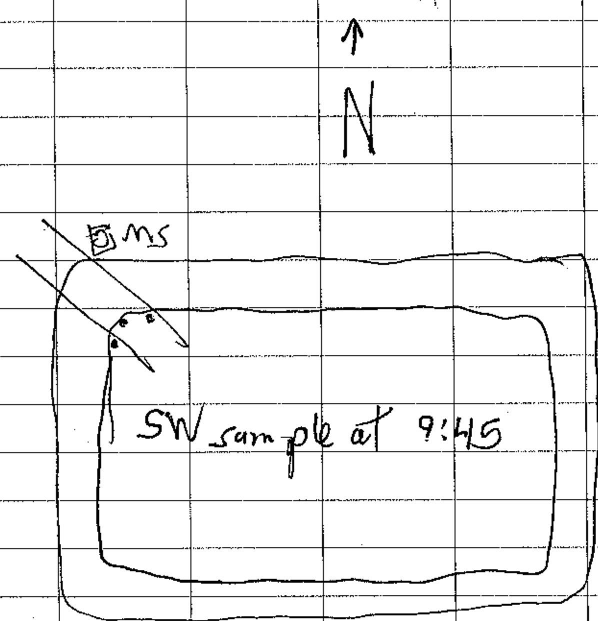
MVP 1H

P. KAISER

	LYSIMETER DEPTH (Ft)		
	7.5	16.8	26.9
1st Vacuum	WED 10/25 AM		
1st Sample	9:27	9:31	9:39

PIL

10/26



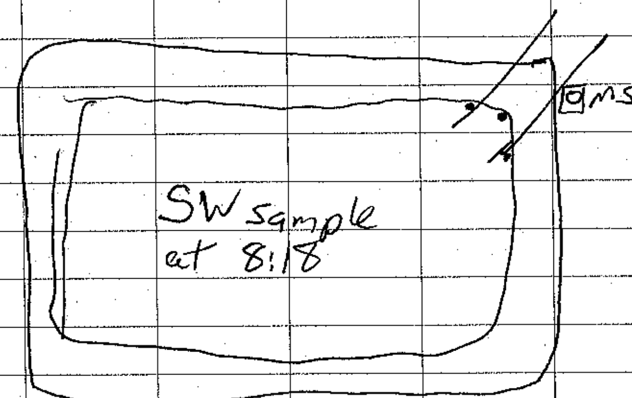
The depth to H_2O along the ramp is 46.5 Ft, which translates to vertical depth to H_2O of 13.6 Ft.

10/26

	Lysimeter Depth (Ft)		
	7.5	14.0	23.3
1st Vacuum	WED 10/25 AM		
1st Sample	8:12	8:20	8:25

10/26

↑
N



The depth to H_2O along the ramp is 21'7" ~~ft~~, which translates to a vertical depth to H_2O of 5.9 ft.

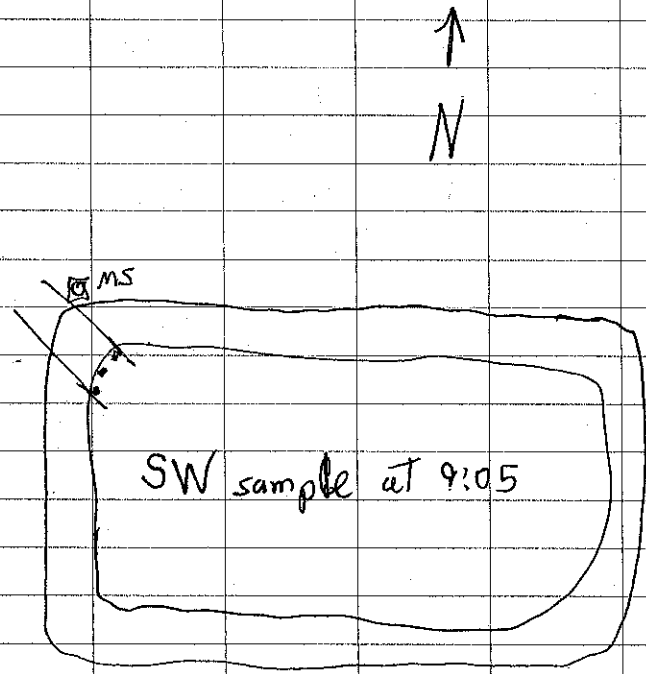
10/26

	Lysimeter Depth (ft)		
	6.0	14.8	25.1
1st Vacuum	WED 10/25 AM		
1st Sample	8:46	8:51	8:57
2nd V	8:49		
2nd S	9:10		

The second vacuum was left on for 20 minutes.

The total sample for MVP22 - 6.0 is ≤ 5 mL

10/26



The depth to H_2O along The ramp is 47.75 ft, which translates to a vertical depth to water of 12.4 ft.

75
10/26

AP1

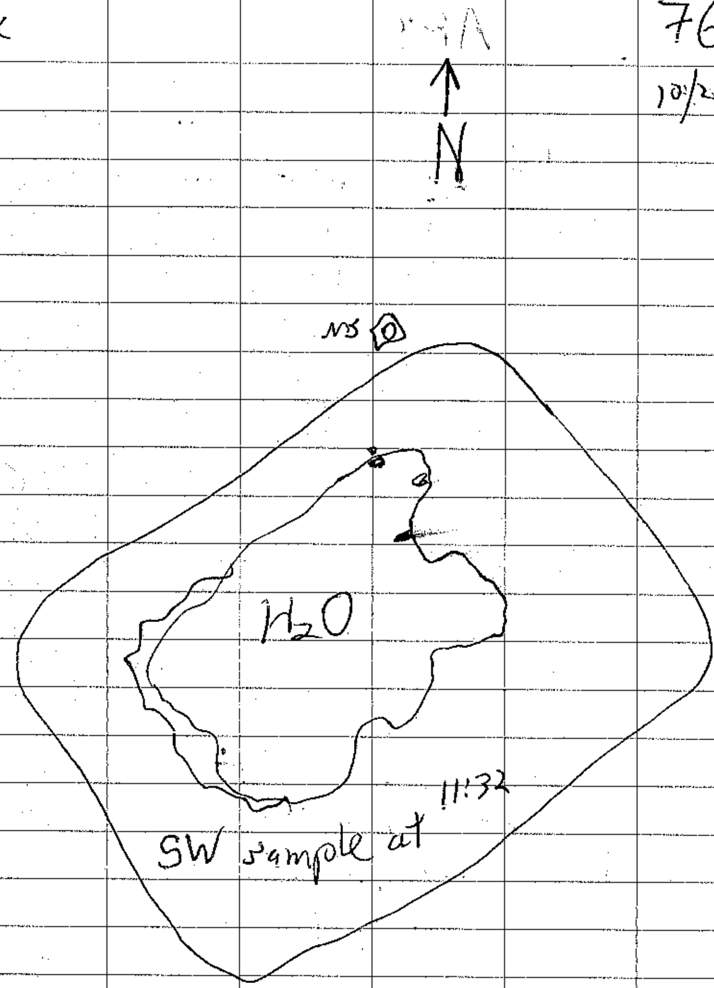
PK

	Lysimeter Depth (Ft)		
	7.1	14.5	29.2
1st Vacuum	11:03	10:55	10:59
1st Sample	11:28	11:09	11:19
2nd V	11:32	11:12	11:22
2nd S	11:47	11:25	11:40
3rd V	~~11:4~~	11:27	
3rd S		11:42	
4th V		11:46	
4th S		11:52	

all of the lysimeters were pressure purged before applying the First vacuum

PK

76
10/26



depth stick is dry

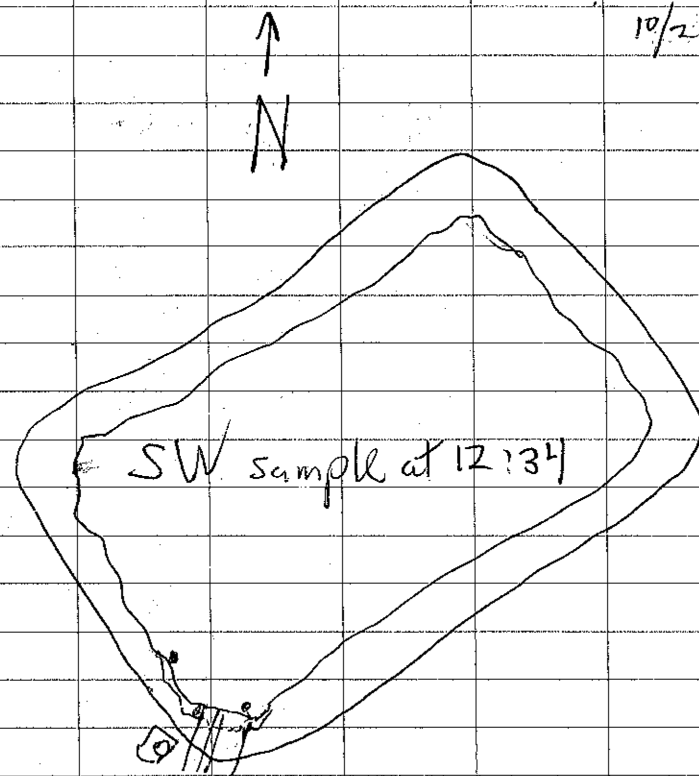
10/26

	Lysimeter Depth (ft) 8.5	19.5	29.0	
1st Vacuum	12:10	12:06	12:02	
1st Sample	12:24	12:21	12:17	1
2nd V	12:28	12:24	12:20	
2nd S	12:44	12:40	12:37	
3rd V	12:47	12:43	12:39	
3rd S	12:59	12:56	12:53	2
4th V	13:03	12:59	12:55	
4th S	13:13	13:08	13:11	

all of the lysimeters were pressure purged before pulling the first vacuum.

11 tapes

10/26



H_2O level is 3 in = 0.25 ft below end of ramp

AP15

PJL

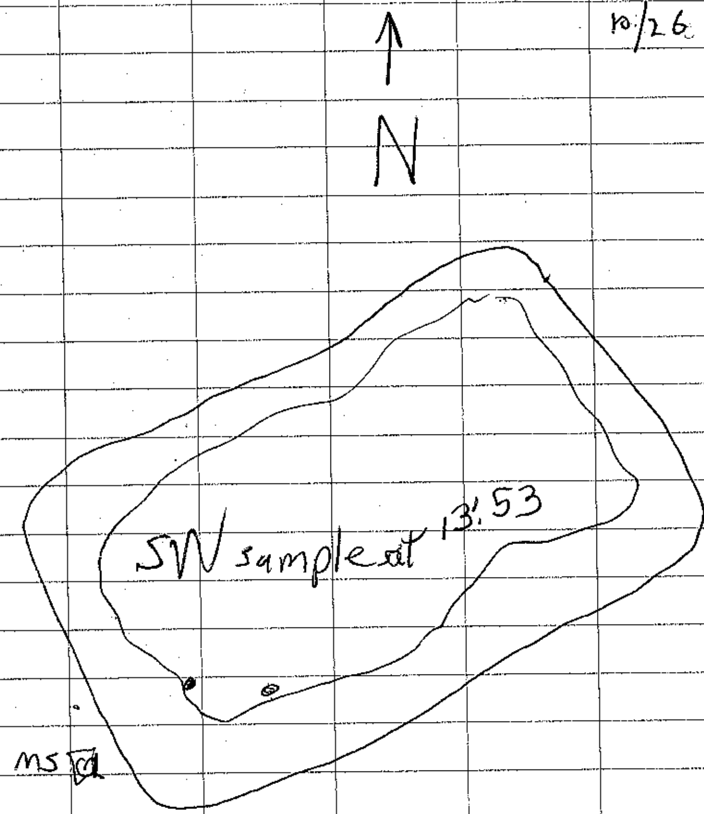
10/26

	LYSIMETER DEPTH (ft)		
	8.5	16.5	28.8
1st Vacuum	13:29	13:25	13:21
1st Sample	13:43	13:39	13:35
2nd V	13:47	13:43	13:38
2nd S	14:03	14:01	13:59

all of the lysimeters were pressure purged before pulling the first vacuum

P: KAISER

10/26



H_2O was at least as high as last month, call it 0.5 ft higher

DANIEL B. STEPHENS & ASSOCIATES, Inc.
5951 Encina Road Suite 208

Goleta, CA 93117

TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 3

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT

ADDRESS: 2270 Trumble Road

CITY: Perris, CA 92570

TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00

P.O. NO.:

PROJECT CONTACT: Jordan Kear jkear@dbstephens.com

QUOTE NO.:

SAMPLER(S): (SIGNATURE) Phil Kaiser

LAB USE ONLY:

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	MVP14-SW		10/26/06	9:45	W	1	X			X	X	X	X	X	X	X	X
	MVP14-7.5		10/26/06	9:27	W	1	X			X	X	X	X	X	X	X	X
	MVP14-16.8		10/26/06	9:31	W	1	X			X	X	X	X	X	X	X	X
	MVP14-26.9		10/26/06	9:39	W	1	X			X	X	X	X	X	X	X	X
	MVP19-SW		10/26/06	8:18	W	1	X			X	X	X	X	X	X	X	X
	MVP19-7.5		10/26/06	8:12	W	1	X			X	X	X	X	X	X	X	X
	MVP19-14.0		10/26/06	8:20	W	1	X			X	X	X	X	X	X	X	X
	MVP19-23.3		10/26/06	8:25	W	1	X			X	X	X	X	X	X	X	X
	MVP22-SW		10/26/06	9:05	W	1	X			X	X	X	X	X	X	X	X
	MVP22-6.0		10/26/06	8:46	W	1	X			X	X	X	X	X	X	X	X
	MVP22-14.8		10/26/06	8:51	W	1	X			X	X	X	X	X	X	X	X
	MVP22-25.1		10/26/06	8:57	W	1	X			X	X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[signature] Clar	10/26/06	15:30

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CHAIN OF CUSTODY RECORD

DATE:
PAGE: 2 OF 3

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL marshalik@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE)
	LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	AP1-SW		10/26/06	11:32	W	1					X	X	X	X	X	X	X
	AP1-7.1		10/26/06	11:28	W	1					X	X	X	X	X	X	X
	AP1-14.5		10/26/06	11:09	W	1					X	X	X	X	X	X	X
	AP1-29.2		10/26/06	11:19	W	1					X	X	X	X	X	X	X
	AP10-SW		10/26/06	12:34	W	1					X	X	X	X	X	X	X
	AP10-8.5 -1		10/26/06	12:24	W	1					X	X	X	X	X	X	X
	AP10-19.5 -1		10/26/06	12:21	W	1					X	X	X	X	X	X	X
	AP10-29.0 -1		10/26/06	12:17	W	1					X	X	X	X	X	X	X
	AP15-SW		10/26/06	13:53	W	1					X	X	X	X	X	X	X
	AP15-7.5		10/26/06	13:43	W	1					X	X	X	X	X	X	X
	AP15-16.5		10/26/06	13:39	W	1					X	X	X	X	X	X	X
	AP15-28.8		10/26/06	13:35	W	1					X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[signature]	10/26/30	10/26/06
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

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Goleta, CA 93117
TEL: (805) 683-2409 . FAX: (805)683-2419

CHAIN OF CUSTODY RECORD

DATE:
PAGE: 3 OF 3

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
SAMPLER(S): (SIGNATURE) Phil Kaiser
P.O. NO.:
QUOTE NO.:
LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	AP10-8.5-2		10/26/06	12:59	W	1							X	X	X	X	X	X	X							
	AP10-19.5-2		10/26/06	12:56	W	1							X	X	X	X	X	X	X							
	AP10-29.0-2		10/26/06	12:53	W	1							X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[signature]	10/26/06	15:30

FIELD MEMORANDUM No. 18

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: December 1, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

MVRWRF and Alessandro Ponds, November 30, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 was being filled upon arrival at 12:00 PM and was nearly dry at that time. Filling continued throughout the visit and was a maximum of one and half feet deep at 3:30 PM. Pond 10 was nearly dry with two large exposed areas in the center. Pond 15 had water levels about 0.5 ft higher than the previous month.

Moreno Valley Ponds: The relative depths to water are measured as length down the ramp then converted trigonometrically to vertical depth from the top of the ponds. The vertical depth to water levels in Ponds 14, 19, and 22 are 14.7 ft, 12.1 ft, and 10.9 ft below the tops of ponds, respectively. The water levels were down 1.6 ft, down 6.2 ft, and up 1.5 ft respectively from the previous month. MVRWRF Ponds are each approximately 20 feet deep. An obvious (approximate tenfold) increase in the numbers of birds was noted this month in comparison to previous sampling events. Foliage removed in late September and early October 2006 has yet to recover.

Samples collected:

DBS&A personnel were assisted at MVRWRF by EMWD personnel.

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Prior to sampling, all of the lysimeters were purged of standing water collected during the previous week. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, October 29, 2006 by EMWD personnel after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22+ hour period prior to sampling Thursday November 29. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling on November 30.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from Ponds 14 and 22 and composited on-site. Two samples were collected from Pond 19 due to limited access and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

MVRWRF samples were delivered to the EMWD Laboratory on November 30, 2006.

Equipment repairs/completions:

Labeled couplings were added to the PVC risers at the MVRWRF to better identify the sample lines. Reflective Safety tape was added to the crash posts at the Alessandro Ponds. Aluminum tags, labeled D,M, or S, were affixed to each pair of P/V and sample lines identifying the lysimeter as deep, mid-depth, or shallow. The tags were applied at both the MVRWRF and the Alessandro Ponds.

Next site visit:

EMWD staff will visit the MVRWRF Ponds lysimeters on Tuesday December 19, 2006 to purge and set a vacuum to each of the lysimeters. Wednesday and Thursday December 20 and 21, 2006 sampling will be conducted at the MVRWRF Ponds and Alessandro Ponds by DBS&A personnel. Most of the samples will be delivered to the EMWD Laboratory on Wednesday December 20. The remaining samples will be collected at the MVRWRF and delivered to the EMWD Laboratory on Thursday December 21. DBS&A personnel plan to be assisted by EMWD staff at the Alessandro Ponds while sampling for training purposes.

Additional work or repairs planned:

Reflective tape will be applied to the remaining crash posts at the Alessandro Ponds. The pressure gauge on one lysimeter needs to be replaced at the MVRWRF Pond 19. It broke after sampling and will be installed Tuesday December 19, 2006 prior to purging.

#81
11/30

MVP14

P Kaiser
S. Sheckey

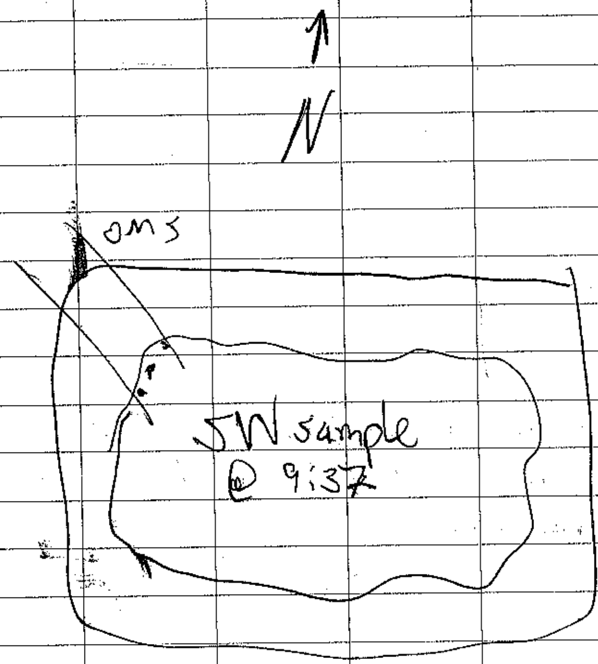
	Lysimeter Depth (Ft)		
	7.5	16.8	26.9
1st Vacuum	Wed 11/29 AM		
1st Sample	9.33	9:36	9:42

all lysimeters were pressure purged before pulling the first vacuum

sample bottle	2/3 full	3/4 full	2/3 full

P. KAISER
S.S

#82
11/30



Depth to H_2O along the ramp is 50.25 Ft

83 MVpl9 PK 55

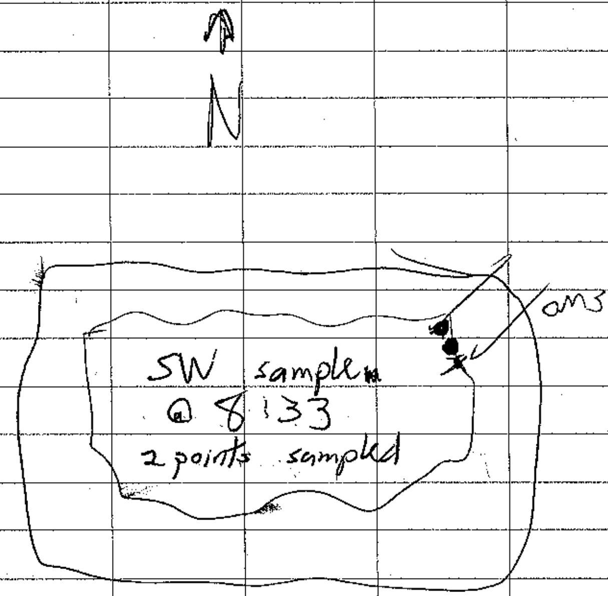
11/30

	Lysimeter Depth (Ft)		
	7.5	14.0	23.3
1st Vacuum	Wed	11/29	AM
1st Sample	8:27	8:21	8:17
	2/3 Full	2/3 Full	3/4 Full

all the lysimeters were pressure purged before pulling the first vacuum

PK 55 84

11/30



depth to water along ramp
≈ 43.75 Ft

Olny two spots were accessable for getting a pond sample due to mud

85
11/30

MVP 22

PK
SS

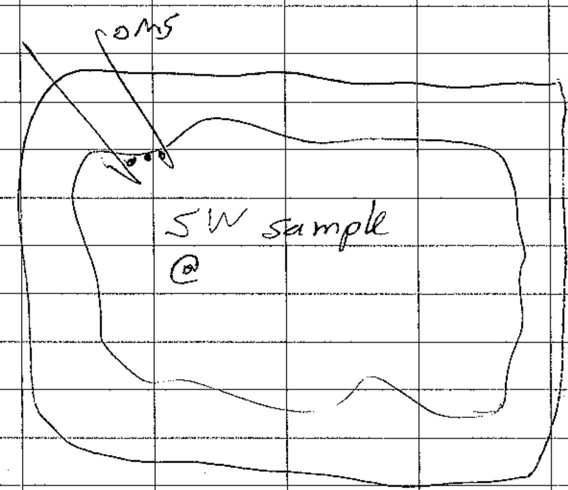
	Lysimeter Depth (Ft)		
	6.0	14.8	25.1
1st Vacuum	Wed 11/29 AM		
1st Sample	8:59	9:05	9:07
2nd V	9:01		
2nd S	9:20		
	5 mLs	2/3 Full	2/3 Full

all the lysimeters were pressure purged before pulling the first vacuum

PK
S.Shockey

86
11/30

N



H_2O level is 4/2 ft from top of ramp

87
11/30

AP1

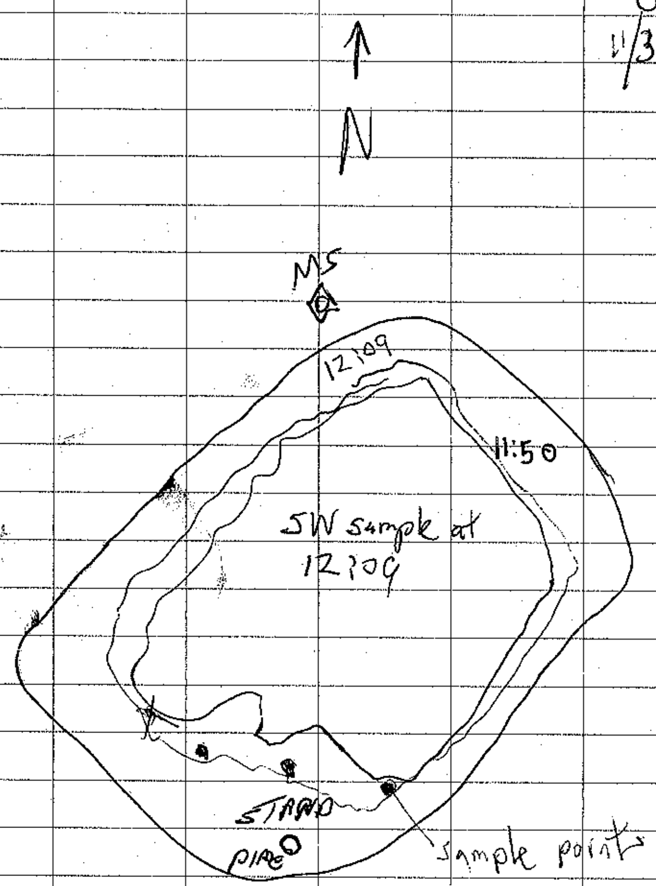
		Lysimeter Depth (ft)		
		7.1	14.5	29.2
1st Vacuum		11:57	11:47	11:53
1st Sample		12:18	12:01	12:12
2nd	V	12:21	12:05	12:15
2nd	S	12:36	12:16	12:29
3rd	V	12:40	12:18	
3rd	S	13:00	12:24	
4th	V	13:03	12:31	
4th	S	13:16	12:36	
5th	V		12:40	
5th	S		12:45	
6th	V		12:48	
6th	S		12:55	
7th	V		12:58	
7th	S		13:13	
8th	V		13:15	
8th	S		13:20	

all lysimeters were pressure purged before pulling the first vacuum

PK

PK

88
11/30



pond was dry at arrival
H_2O Flowing in a high rate.
Fountain extend ~ 3Ft above
pipe.
@15:30 H_2O still Flowing ~~in~~ at the same
rate (visual inspection)

APIO

PK

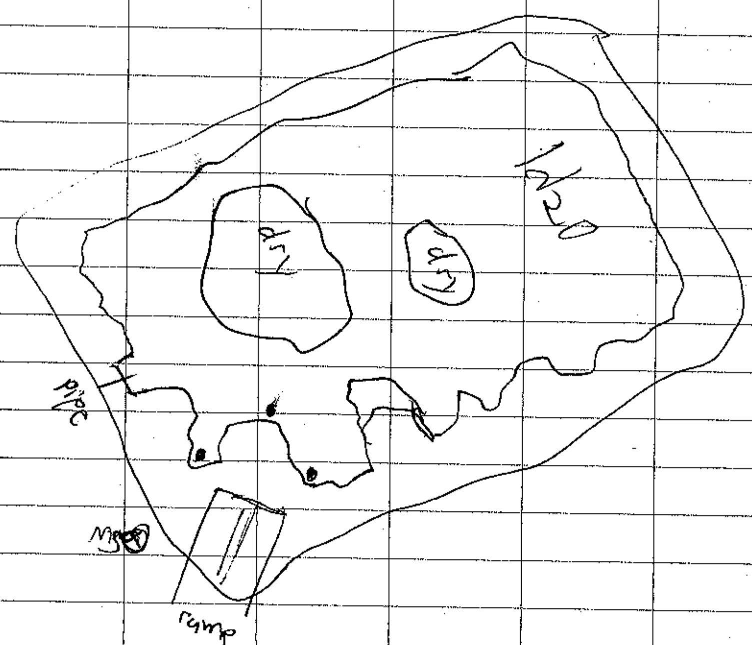
		Lysimeter Depth (ft)		
		8.5	18.5	29.0
1st	Vacuum	13:43	13:38	13:34
1st	Sample	14:02	13:57	13:51
2nd	V	14:05	14:00	13:54
2nd	S	14:23	14:16	14:13
3rd	V			14:15
3rd	S			14:20

all the lysimeters were pressure purged before pulling the first vacuum

PK

N

SW sample at 13:40



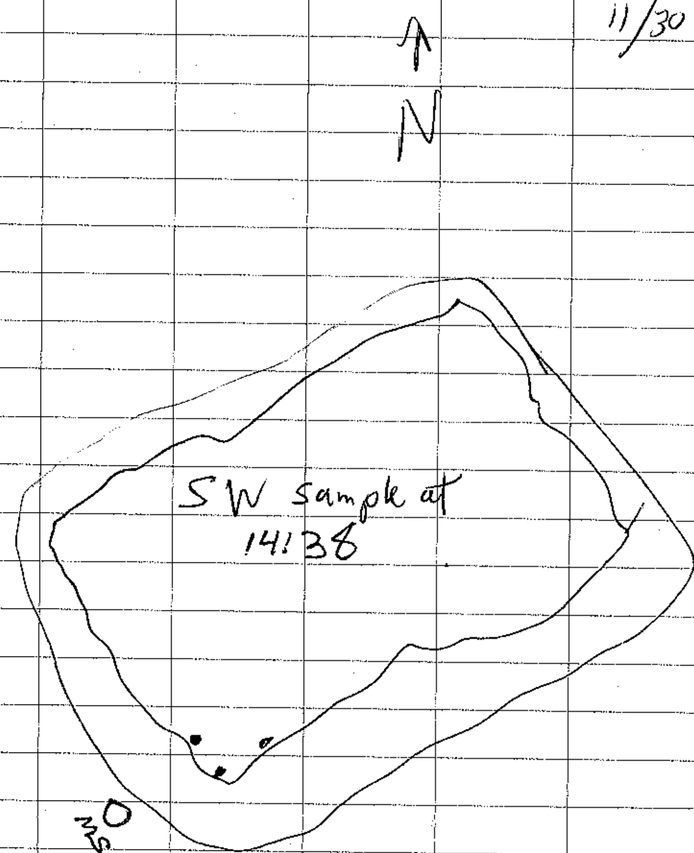
Water level is the lowest it's been for months. There ~~was~~ no point to estimate from, probably 0.5 ft - 1 ft lower than last month

AP15

PK D. KAISER

	Lysimeter Depth (ft)		
	7.5	16.5	28.8
1st Vacuum	14:41	14:36	14:31
1st Sample	15:00	14:55	14:50
2nd V	15:04	14:59	14:54
2nd S	15:23	15:18	15:13
3rd V			
3rd S			

all lysimeters were pressure purged before pulling the first vacuum



pond is about 0.5 ft higher than last month

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CHAIN OF CUSTODY RECORD

DATE:
PAGE: 1 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT		DBS&A PROJECT NAME / NUMBER: WR06.0034.00	P.O. NO.:
ADDRESS: 2270 Trumble Road		PROJECT CONTACT: Jordan Kear jkear@dbstephens.com	QUOTE NO.:
CITY: Perris, CA 92570		SAMPLER(S): (SIGNATURE) Phil Kaiser	LAB USE ONLY:
TEL: 951-928-3777	FAX: (951) 928-6143	E-MAIL: marshallk@emwd.org	

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont		Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	MVP14-SW		11/30/06	9:37	W	1						X	X	X	X	X	X	X							
	MVP14-7.5		11/30/06	9:33	W	1						X	X	X	X	X	X	X							
	MVP14-16.8		11/30/06	9:36	W	1						X	X	X	X	X	X	X							
	MVP14-26.9		11/30/06	9:42	W	1						X	X	X	X	X	X	X							
	MVP19-SW		11/30/06	8:33	W	1						X	X	X	X	X	X	X							
	MVP19-7.5		11/30/06	8:27	W	1						X	X	X	X	X	X	X							
	MVP19-14.0		11/30/06	8:21	W	1						X	X	X	X	X	X	X							
	MVP19-23.3		11/30/06	8:17	W	1						X	X	X	X	X	X	X							
	MVP22-SW		11/30/06	9:03	W	1						X	X	X	X	X	X	X							
	MVP22-6.0	NO_3-N only	11/30/06	8:59	W	1						X	X	X	X	X	X	X							
	MVP22-14.8		11/30/06	9:05	W	1						X	X	X	X	X	X	X							
	MVP22-25.1		11/30/06	9:07	W	1						X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	Stella Dempson	30NOV06	1624 -1624
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

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PAGE: 2 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
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TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
P.O. NO.:
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
QUOTE NO.:
SAMPLER(S) (SIGNATURE): Phil Kaiser
LAB USE ONLY:

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	AP1-SW		11/30/06	12:09	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP1-7.1		11/30/06	12:18	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP1-14.5		11/30/06	12:01	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP1-29.2		11/30/06	12:12	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP10-SW		11/30/06	13:40	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP10-8.5		11/30/06	14:02	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP10-19.5		11/30/06	13:57	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP10-29.0		11/30/06	13:51	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP15-SW		11/30/06	14:38	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP15-7.5		11/30/06	15:00	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP15-16.5		11/30/06	14:55	W	1			X	X	X	X	X	X	X	X	X	X	X							
	AP15-28.8		11/30/06	14:50	W	1			X	X	X	X	X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	Atilla Dennison	30NOV06	1625

FIELD MEMORANDUM No. 19

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: December 22, 2006

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

MVRWRF and Alessandro Ponds, December 20 and 21, 2006.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Alessandro Ponds: Pond 1 was nearly dry with water covering about half of the base and the soil over the lysimeters was exposed. Pond 10 had water covering the entire surface and was about 0.5-1.0 ft above last month's level. Pond 15 had water levels about 1.5 ft higher than the previous month.

Moreno Valley Ponds: The relative depths to water are measured as length down the ramp then converted trigonometrically to vertical depth from the top of the ponds. The vertical depth to water levels in Ponds 14, 19, and 22 are 19.2 ft, 13.5 ft, and 14.1 ft below the tops of ponds, respectively. The water levels were down 4.5 ft, down 1.4 ft, and down 3.2 ft respectively from the previous month. MVRWRF Ponds are each approximately 20 feet deep. Foliage removed in late September and early October 2006 has yet to recover.

Samples collected:

DBS&A personnel were assisted at MVRWRF by EMWD personnel at the Alessandro Ponds.

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22 and Alessandro Ponds 1, 10, and 15. Prior to sampling, all of the lysimeters were purged of standing water collected during the previous week. MVRWRF Pond Lysimeters were purged of standing water on Tuesday, December 19, 2006 by EMWD personnel after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22+ hour period prior to sampling Wednesday December 20. Purging of the water in Alessandro Ponds lysimeters was conducted immediately prior to sampling on December 20. Five of the MVRWRF lysimeters were not able to provide enough sample on December 20, 2006, so an additional vacuum was pulled and these five lysimeters were sampled again on Thursday, December 21 and composited with the previous day's sample.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

Alessandro Pond water samples were taken from Ponds 1, 10, and 15. Three samples were collected from each Ponds 1 and 10 and composited on-site. Only one sampling location was accessible for Pond 15.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

Seven MVRWRF samples and all of the Alessandro Ponds samples were delivered to the EMWD Laboratory on December 20, 2006. The five other samples from MVRWRF, comprising samples collected on both December 20 and 21, 2006 were delivered to the EMWD Laboratory on December 21, 2006. These composite samples were subject to analyses with low sensitivity to holding time.

Equipment repairs/completions:

A new pressure gauge and coupling were applied to the MVP19-23.3 lysimeter by EMWD personnel prior to purging on Tuesday, December 19, 2006.

Next site visit:

Tentatively, EMWD staff will visit the MVRWRF Ponds lysimeters on Wednesday January 24, 2007 to purge and set a vacuum to each of the lysimeters. Thursday January 25, 2007 sampling will be conducted at the MVRWRF Ponds by DBS&A personnel. This is the last scheduled sampling by DBS&A personnel. EMWD will begin sampling lysimeters at the Alessandro Ponds in January and at both sites in February and beyond. The samples will be delivered to the EMWD Laboratory on Thursday January 20.

Additional work or repairs planned:

No additional work or repairs are needed at this time.

~~12/20~~ 12/21

MVP 14

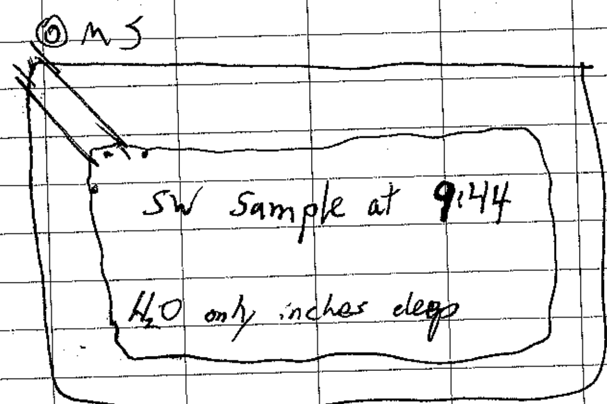
P. KALER PIX

	Lysimeter Depth (Ft)		
	7.5	16.8	26.9
1st Vacuum	Tues	12/19	AM
1st Sample	9:24	9:28	9:33
2nd V	9:28	9:35	9:42
2nd S	10:47	10:44	10:38
3rd V	10:56	10:49	10:42
3rd S 12/21	8:16	8:19	8:24

All 6 ponds at both sites had all their lysimeters pressure purged before ~~applying pulling the applying~~ pulling the first vacuum

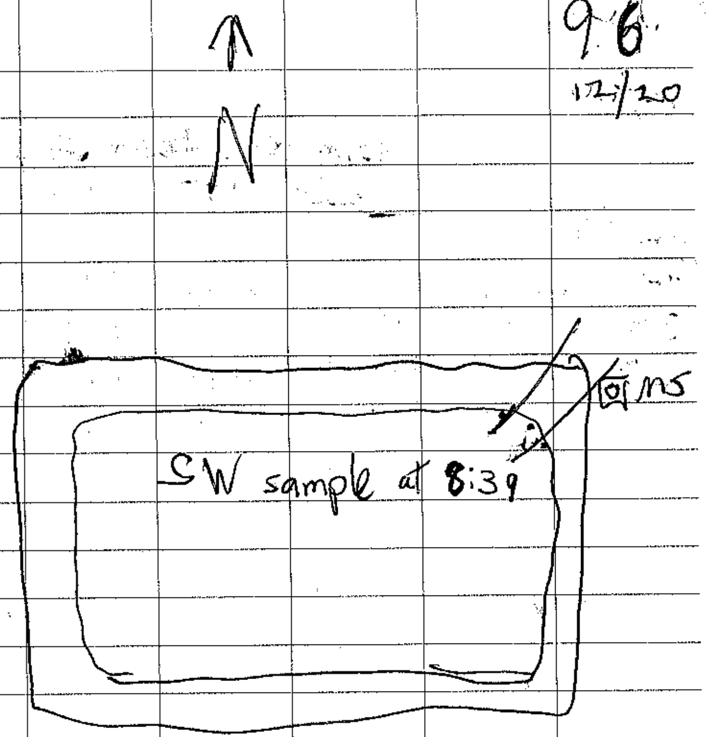
12/20

↑ N



The depth to H_2O along the ramp is 65.5ft, which translates to a vertical depth of 19.2ft

		Lysimeter Depth (ft)		
		7.5	14.0	23.3
1st	Vacuum	Tues	12/19	AM
1st	Sample	8:05	8:24	8:30
2nd	V	8:21	8:29	8:37
2nd	S	9:53	9:58	10:04
3rd	V	9:56	10:03	
3rd 12/21	S	8:01	8:06	



The depth to H_2O along the ramp is 49.0 ft, which translates to a vertical depth of 13.5 ft

97 MVP 22 PK PK

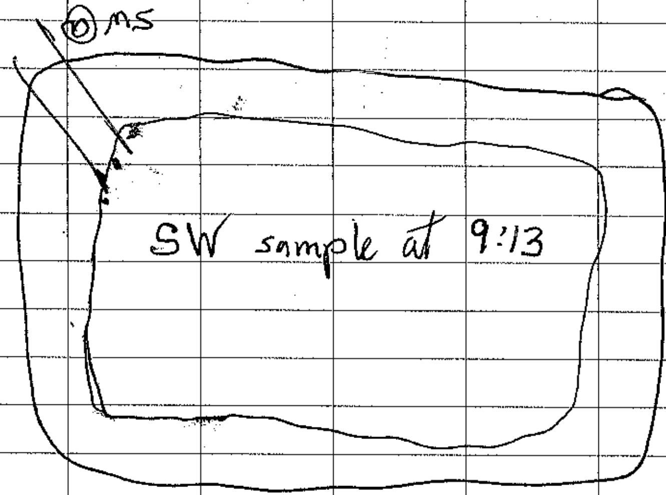
12/20

	Lysimeter Depth (Ft)		
	6.0	14.8	25.1
1st Vacuum	Tues	12/19	AM
1st Sample	8:53	8:59	9:05
2nd V	8:56	9:02	9:11
2nd S	10:28	10:18	10:24

98

12/20

N



The depth to H_2O along the ramp is 54.5 Ft, which translates to a vertical depth of 14.1 Ft

99

12/20

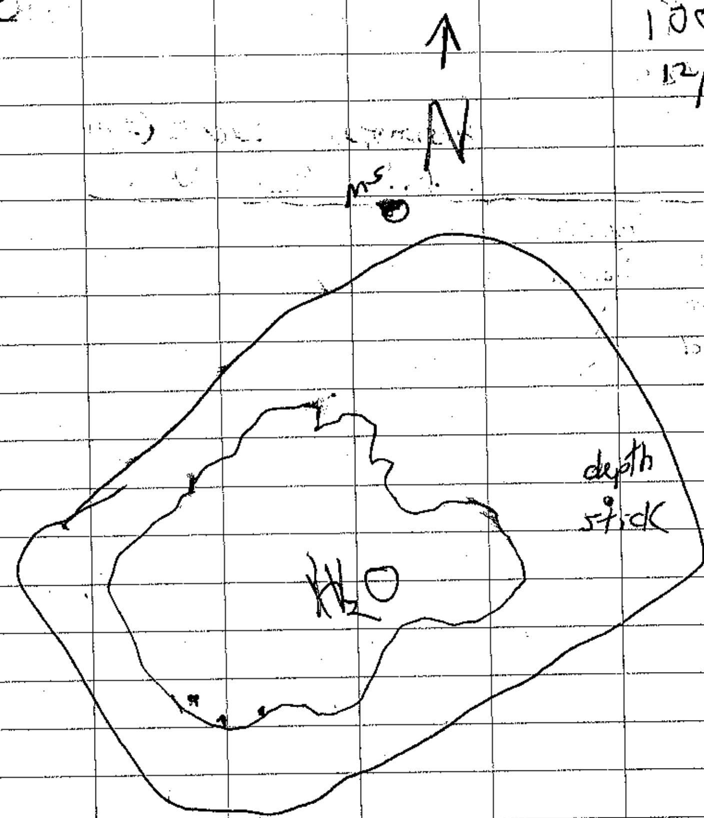
AP 1

	Lysimeter Depth (Ft)		
	7.1	14.5	29.2
1st Vacuum	12:18	12:08	12:13
1st Sample	12:38	12:28	12:35
2nd V	12:42	12:33	12:39
2nd S	12:56	13:01	12:56
3rd V			
3rd S			

PK PK

100

12/20



SW sample at 12:25

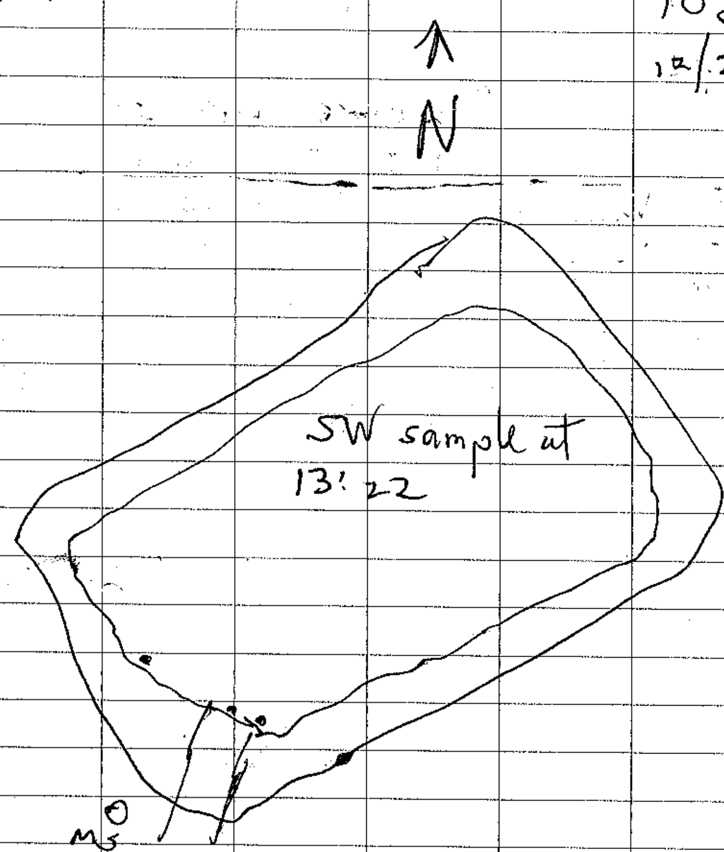
12/20

AP1-O

PK PK

	Lysimeter Depth (ft)		
	8.5	19.5	29.0
1st Vacuum	13:19	13:14	13:09
1st Sample	13:32	13:30	13:25
2nd V	13:33		13:28
2nd S	13:36		13:35

12/20



H_2O is ~ 0.5 - 1 ft higher Than last month coming to edge of ramp ~ 0.5 ft below ramp.

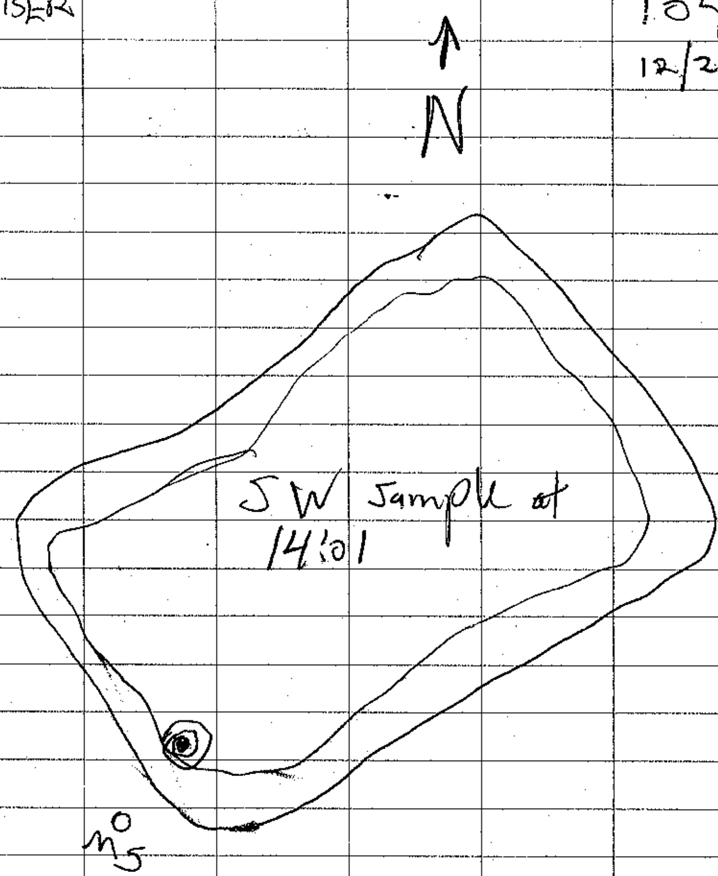
12/20

API 5

PK ?, KAISER

	Lysimeter Depth (Ft)		
	7.5	16.5	28.8
1st Vacuum	13:59	13:54	13:49
1st Sample	14:21	14:15	14:11
2nd V			
2nd S			

12/20



H_2O ~ 1.5 Ft higher than last month

only 1 surface spot was sampled, the ground was too soft everywhere else tried

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CHAIN OF CUSTODY RECORD

DATE:
PAGE: 1 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT	DBS&A PROJECT NAME / NUMBER: WR06.0034.00
ADDRESS: 2270 Trumble Road	P.O. NO.:
CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777	QUOTE NO.:
FAX: (951) 928-6143	SAMPLER(S): (SIGNATURE) Phil Kaiser
E-MAIL: marshallk@emwd.org	LAB USE ONLY

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	MVP14-SW		12/20	9:44	W	1	X	X	X	X	X	X	X	X	X	X	X
	~~MVP14-7.5~~				~~W~~	~~1~~					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	~~MVP14-16.8~~				W	1	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	~~MVP14-26.9~~				W	1	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	MVP19-SW		12/20	8:39	W	1	X	X	X	X	X	X	X	X	X	X	X
	~~MVP19-7.5~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	~~MVP19-14.0~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	MVP19-23.3		12/20	8:30	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP22-SW		12/20	9:13	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP22-6.0		12/20	8:53	W	1							X				
	MVP22-14.8		12/20	8:59	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP22-25.1		12/20	9:05	W	1	X	X	X	X	X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[signature]	12/20/06	1520
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

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CHAIN OF CUSTODY RECORD

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PAGE: 2 OF 2

LABORATORY: EASTERN MUNICIPAL WATER DISTRICT
ADDRESS: 2270 Trumble Road
CITY: Perris, CA 92570
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL: marshallk@emwd.org

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

DBS&A PROJECT NAME / NUMBER: WR06.0034.00
PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
SAMPLER(S): (SIGNATURE) Phil Kaiser
P.O. NO.:
QUOTE NO.:
LAB USE ONLY: __ __ - __ __ __ __

REQUESTED ANALYSIS

B & Cl

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont			Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)							
	AP1-SW		12/20	12:25	W	1			X			X	X	X	X	X	X	X	X							
	AP1-7.1			12:38	W	1			X			X	X	X	X	X	X	X	X							
	AP1-14.5			12:28	W	1			X			X	X	X	X	X	X	X	X							
	AP1-29.2			12:35	W	1			X			X	X	X	X	X	X	X	X							
	AP10-SW			13:22	W	1			X			X	X	X	X	X	X	X	X							
	AP10-8.5			13:32	W	1			X			X	X	X	X	X	X	X	X							
	AP10-19.5			13:30	W	1			X			X	X	X	X	X	X	X	X							
	AP10-29.0			13:25	W	1			X			X	X	X	X	X	X	X	X							
	AP15-SW			14:01	W	1			X			X	X	X	X	X	X	X	X							
	AP15-7.5			14:21	W	1			X			X	X	X	X	X	X	X	X							
	AP15-16.5			14:25	W	1			X			X	X	X	X	X	X	X	X							
	AP15-28.8			14:11	W	1			X			X	X	X	X	X	X	X	X							

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[illegible]	12/20/06	1520

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CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S) (SIGNATURE) Phil Kaiser
	LAB USE ONLY

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	~~MVP14-SW~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	MVP14-7.5		12/20	9:24	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP14-16.8		12/20	9:28	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP14-26.9		12/20	9:33	W	1	X	X	X	X	X	X	X	X	X	X	X
	~~MVP19-SW~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	MVP19-7.5		12/20	8:05	W	1	X	X	X	X	X	X	X	X	X	X	X
	MVP19-14.0		12/20	8:24	W	1	X	X	X	X	X	X	X	X	X	X	X
	~~MVP19-28.3~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	~~MVP22-SW~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	~~MVP22-6.0~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	~~MVP22-14.8~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
	~~MVP22-25.1~~				W	1					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[illegible]	12/21	0925
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Daniel B. Stephens & Associates, Inc.

FIELD MEMORANDUM No. 20

TO: Dr. Fakhri Manghi, P.E.

FROM: Phil Kaiser

DATE: January 29, 2007

SUBJECT: **EMWD Lysimeter Sampling**

Sampling location and date:

MVRWRF Ponds, January 25, 2007.

DBS&A Sampling Personnel:

Phil Kaiser, Staff Engineer

Sites status:

Moreno Valley Ponds: The relative depths to water are measured as length down the ramp then converted trigonometrically to vertical depth from the top of the ponds. The vertical depth to water levels in Ponds 14, 19, and 22 are 19.0 ft, 13.4 ft, and 12.3 ft below the tops of ponds, respectively. The water levels were up 0.2 ft, down 0.1 ft, and 1.8 ft respectively from the previous month. MVRWRF Ponds are each approximately 20 feet deep. Foliage removed in late September and early October 2006 has yet to recover.

Samples collected:

Soil water samples from lysimeters at each of three depths at Moreno Valley Ponds 14, 19, and 22. Prior to sampling, all of the lysimeters were purged of standing water collected during the previous week. MVRWRF Pond Lysimeters were purged of standing water on Wednesday, January 24,2007 by EMWD personnel after which a vacuum was pulled to allow for soil water to enter the lysimeter over a 22+ hour period prior to sampling Wednesday December 20.

Moreno Valley Pond water samples were taken from Ponds 14, 19, and 22. Three samples were collected from each pond and composited on-site.

All samples were collected without incident as presented in attached field notes.

All samples were labeled and recorded on chain-of-custody (copy attached).

All of the MVRWRF Ponds samples were delivered to the EMWD Laboratory on January 25, 2007.

Equipment repairs/completions:

The last of the crash posts at the Alessandro Ponds had reflective tape added on Thursday January 25, 2007.

Next site visit:

The January 25, 2007 sampling event represents the last one currently scheduled for DBS&A staff. EMWD personnel are scheduled to continue sampling the lysimeters at both Alessandro Ponds and MVRWRF on a monthly basis for the next several months.

Additional work or repairs planned:

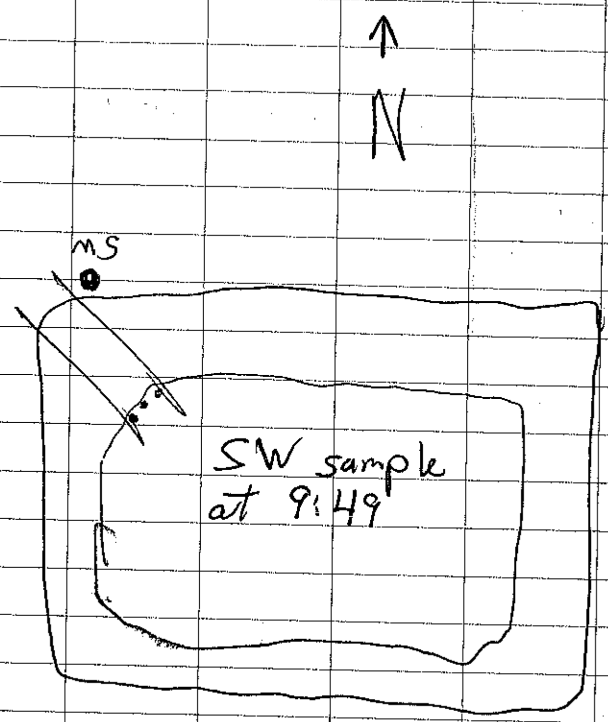
No additional work or repairs are needed at this time.

1/25/07

	Lysimeter Depth (ft)		
	7.5	16.8	26.9
1st Vacuum	Wednesday 1/24 AM		
1st Sampling	9:33	9:37	9:44
2nd V	9:35	9:41	
2nd S	9:50	9:53	

All the lysimeters at all 3 ponds were pressure purged before the first vacuum was pulled.

1/25



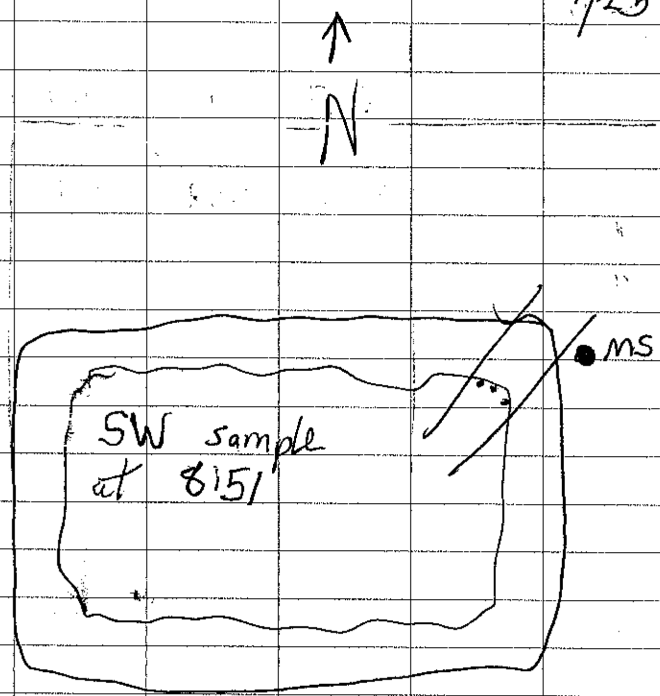
The depth to water along the ramp is 65.0 ft, which translates to a vertical depth to H_2O is 19.0 ft.

MVP 19

PK

	Lysimeter Depth (ft)		
	7.5	14.0	23.3
1st Vacuum	Wednesday 1/24 AM		
1st Sampling	8:32	8:38	8:43
~~2nd V~~ NA			
~~2nd S~~ NA			

PK



The depth to H_2O along the samp is 48.75 ft, which translates to a depth to H_2O of 13.4 ft.

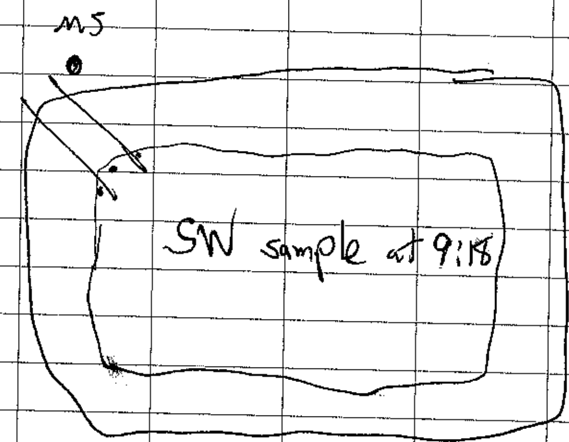
109
1/25

M[illegible]P 22

RK. P.Kaiser

	Lysimeter Depth (ft)		
	6.0	14.8	25.1
1st Vacuum	Wednesday 1/24 AM		
1st Sampling	9:00	9:06	9:11
~~2nd V~~	NA		
~~2nd S~~	NA		

110
1/25



The depth to H_2O along the ramp is 47.5 ft, which translates to a vertical depth to H_2O of 12.3 ft.

DANIEL B. STEPHENS & ASSOCIATES, Inc.
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PAGE: 1 OF

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CITY: Perris, CA 92570	PROJECT CONTACT: Jordan Kear jkear@dbstephens.com
TEL: 951-928-3777 FAX: (951) 928-6143 E-MAIL marshallk@emwd.org	QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Phil Kaiser
	LAB USE ONLY:

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☒ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____/____

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Chloride	General Physical	General Mineral	Boron	TDS (SM 2540C)	Ammonia N (EPA Method 350.1)	Nitrate N (EPA Method 300.0)	Nitrite N (EPA Method 300.0)	Total Kjeldahl N (EPA Method 351.2)	Organic N (EPA Method 351.2, calculated)	Dissolved Organic Carbon (SM 5310C)
	MVP14-SW		01/25/07	9:49	W	1	X			X	X	X	X	X	X	X	X
	MVP14-7.5		01/25/07	9:33	W	1	X			X	X	X	X	X	X	X	X
	MVP14-16.8		01/25/07	9:37	W	1	X			X	X	X	X	X	X	X	X
	MVP14-26.9		01/25/07	9:44	W	1	X			X	X	X	X	X	X	X	X
	MVP19-SW		01/25/07	8:51	W	1	X			X	X	X	X	X	X	X	X
	MVP19-7.5		01/25/07	8:32	W	1	X			X	X	X	X	X	X	X	X
	MVP19-14.0		01/25/07	8:38	W	1	X			X	X	X	X	X	X	X	X
	MVP19-23.3		01/25/07	8:43	W	1	X			X	X	X	X	X	X	X	X
	MVP22-SW		01/25/07	9:18	W	1	X			X	X	X	X	X	X	X	X
	MVP22-6.0		01/25/07	9:00	W	1	X			X	X	X	X	X	X	X	X
	MVP22-14.8		01/25/07	9:06	W	1	X			X	X	X	X	X	X	X	X
	MVP22-25.1		01/25/07	9:11	W	1	X			X	X	X	X	X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Phil Kaiser	[illegible signature]	1/25	11:30

Water Level Relative to the Base of the Pond

8/10//06 POND	POND Angle degrees	EXPOSED RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	ponds all dry	20
MVP19	16		20
MVP22	15		20

8/16//06 POND	POND Angle degrees	EXPOSED RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	ponds all dry	20
MVP19	16		20
MVP22	15		20

8/24//06 POND	POND Angle degrees	EXPOSED RAMP distance (ft)	WATER LEVEL below base (ft) visual estimates
MVP14	17	not measured	5
MVP19	16	not measured	6
MVP22	15	not measured	6

8/31//06 POND	POND Angle degrees	EXPOSED RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	34	9.9
MVP19	16	23	6.3
MVP22	15	23	6.0

9/7//06 POND	POND Angle degrees	EXPOSED RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	38.75	11.3
MVP19	16	27	7.4
MVP22	15	26.67	6.9

	Pond 14		**Pond 19**		**Pond 22**	
Date	Depth to Water (ft)	Height of Water Column (ft)	Depth to Water (ft)	Height of Water Column (ft)	Depth to Water (ft)	Height of Water Column (ft)
8/10/2006	20	0	20	0	20	0
8/16/2006	20	0	20	0	20	0
8/24/2006	5	15	6	14	6	14
8/31/2006	10	10	6	14	6	14
9/7/2006	11	9	7	13	7	13
9/14/2006	13	7	8	12	8	12
9/20/2006	13	7	9	11	8	12
9/28/2006	13	7	10	10	9	11
10/5/2006	17	3	10	10	10	10
10/12/2006	19	1	11	9	11	9
10/19/2006	17	3	8	12	12	8
10/26/2006	14	6	6	14	12	8
11/30/2006	15	5	12	8	11	9
12/21/2006	19	1	14	6	14	6

9/14//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	44.833	13.1
MVP19	16	30.4167	8.4
MVP22	15	30	7.8

9/20-21//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	43.75	12.8
MVP19	16	32.5	9.0
MVP22	15	32.5	8.4

9/28//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	45.5	13.3
MVP19	16	35.5	9.8
MVP22	15	35.5	9.2

10/5//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	59.5	17.4
MVP19	16	38	10.5
MVP22	15	39.5	10.2

10/12//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	63.33	18.5
MVP19	16	40	11.0
MVP22	15	42.83	11.1

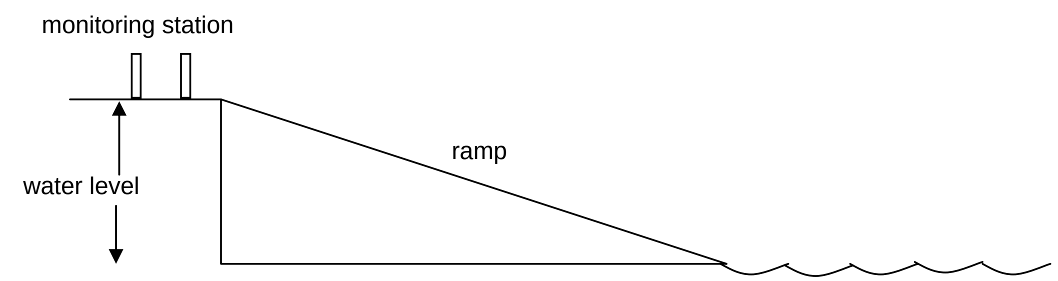
10/19//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	59	17.2
MVP19	16	30.25	8.3
MVP22	15	45.25	11.7

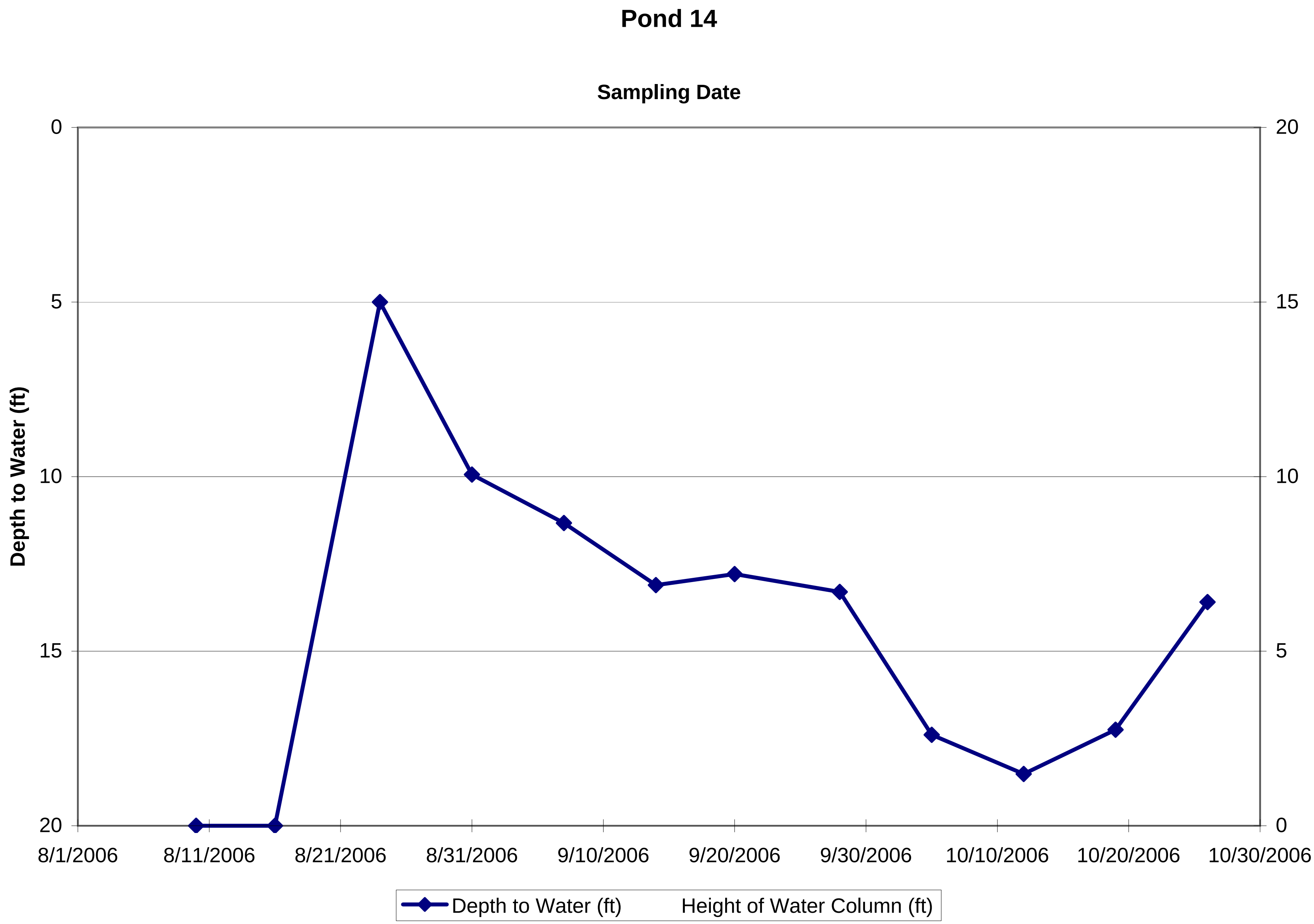
10/26//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	46.5	13.6
MVP19	16	21.4	5.9
MVP22	15	47.75	12.4

11/30//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	50.25	14.7
MVP19	16	43.75	12.1
MVP22	15	42.0	10.9

12/20//06 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	65.5	19.2
MVP19	16	49	13.5
MVP22	15	54.5	14.1

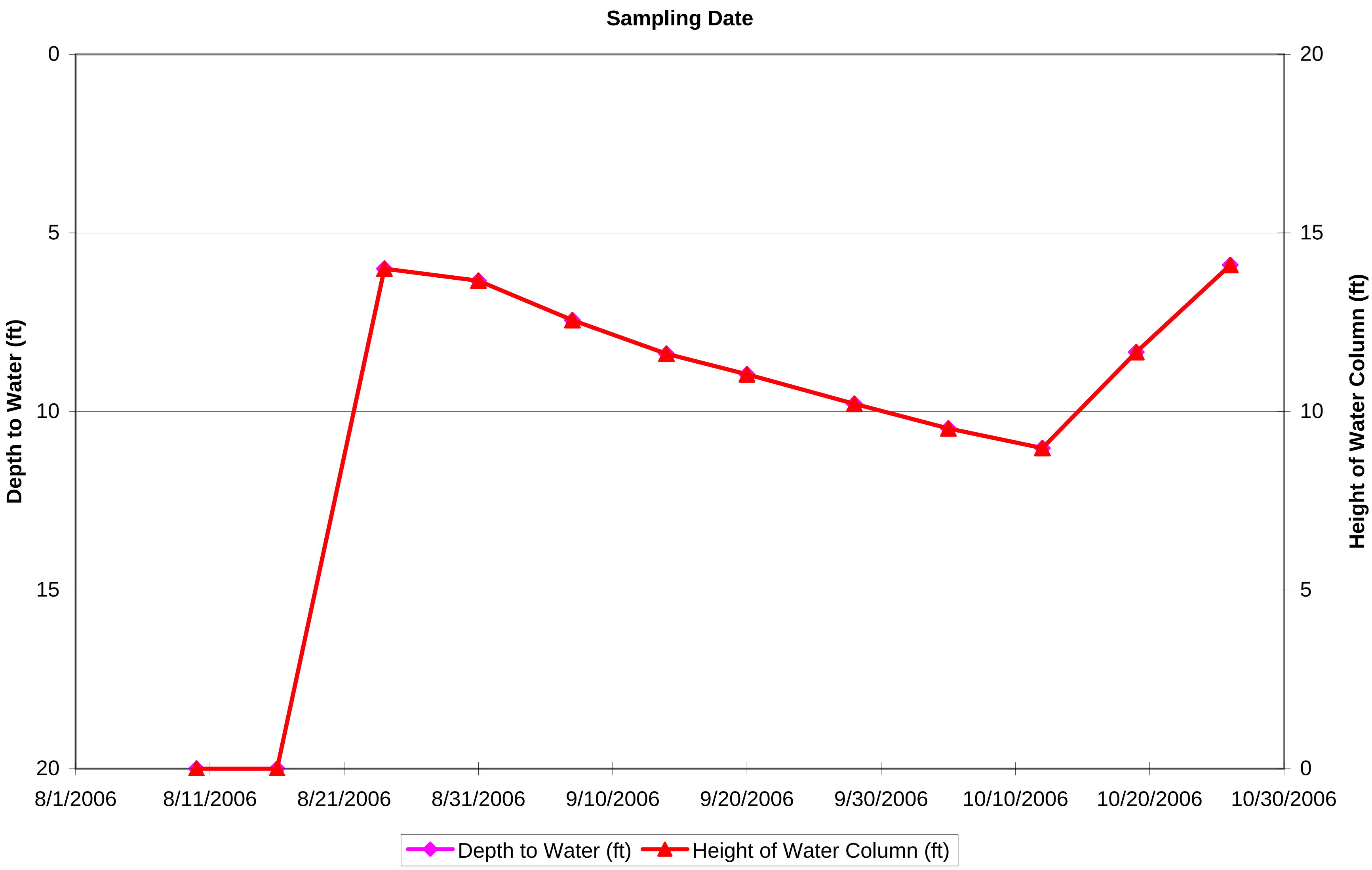
1/25/07 POND	POND Angle degrees	RAMP distance (ft)	WATER LEVEL below base (ft)
MVP14	17	65	19.0
MVP19	16	48.75	13.4
MVP22	15	47.5	12.3



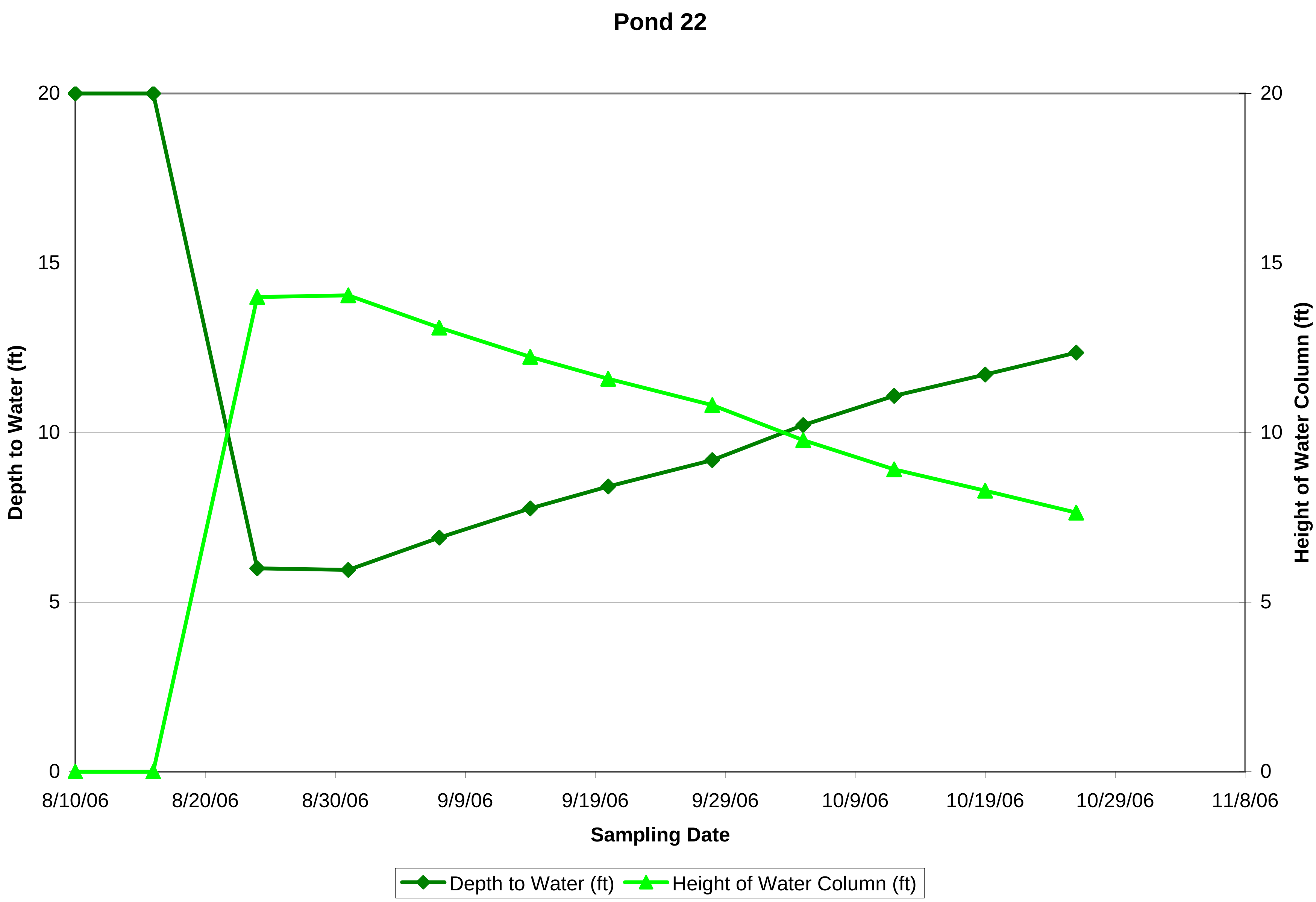


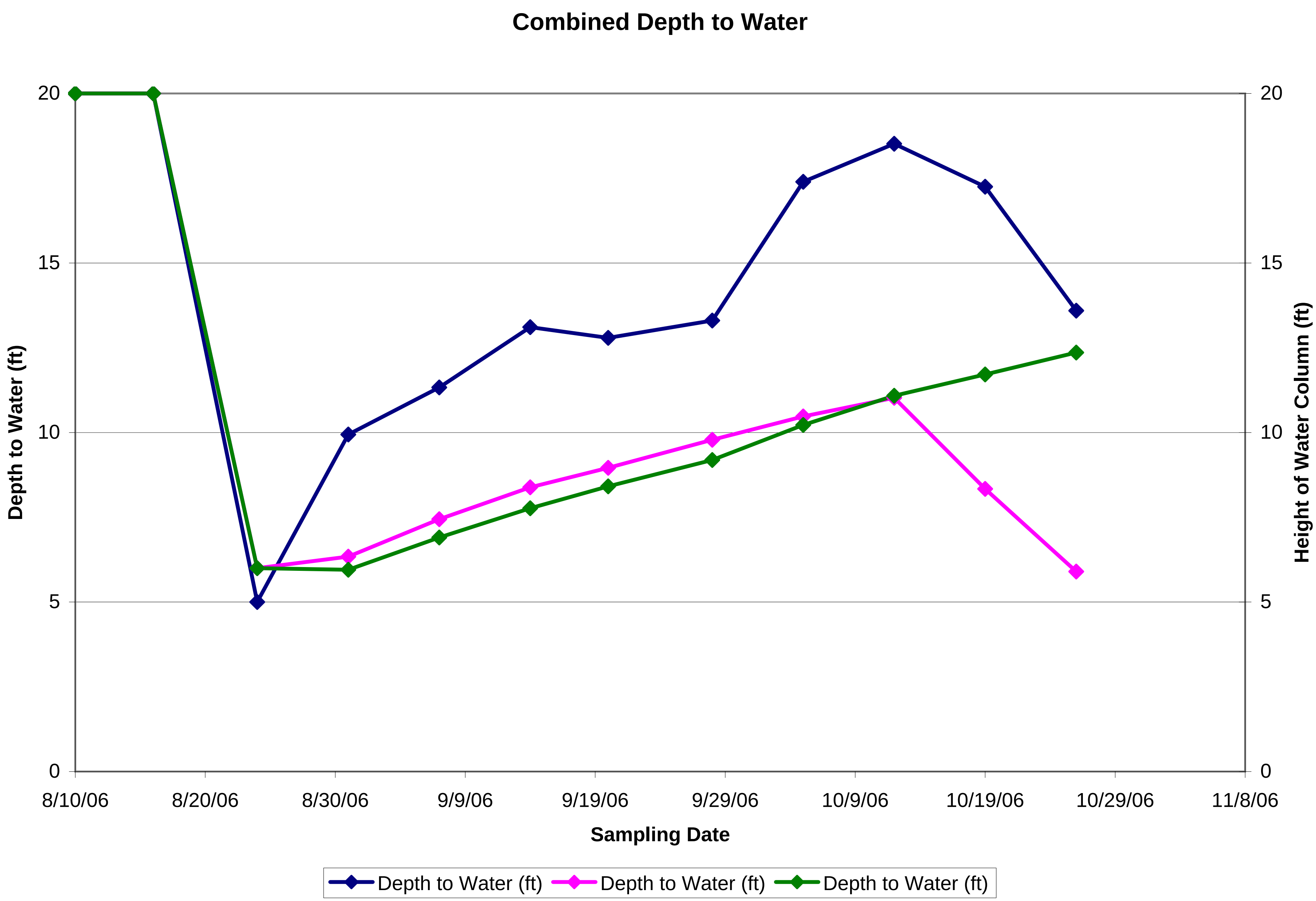
Pond 14
Sampling Date
Depth to Water (ft)
Height of Water Column (ft)
0
5
10
15
20
8/1/2006
8/11/2006
8/21/2006
8/31/2006
9/10/2006
9/20/2006
9/30/2006
10/10/2006
10/20/2006
10/30/2006
Depth to Water (ft)
Height of Water Column (ft)

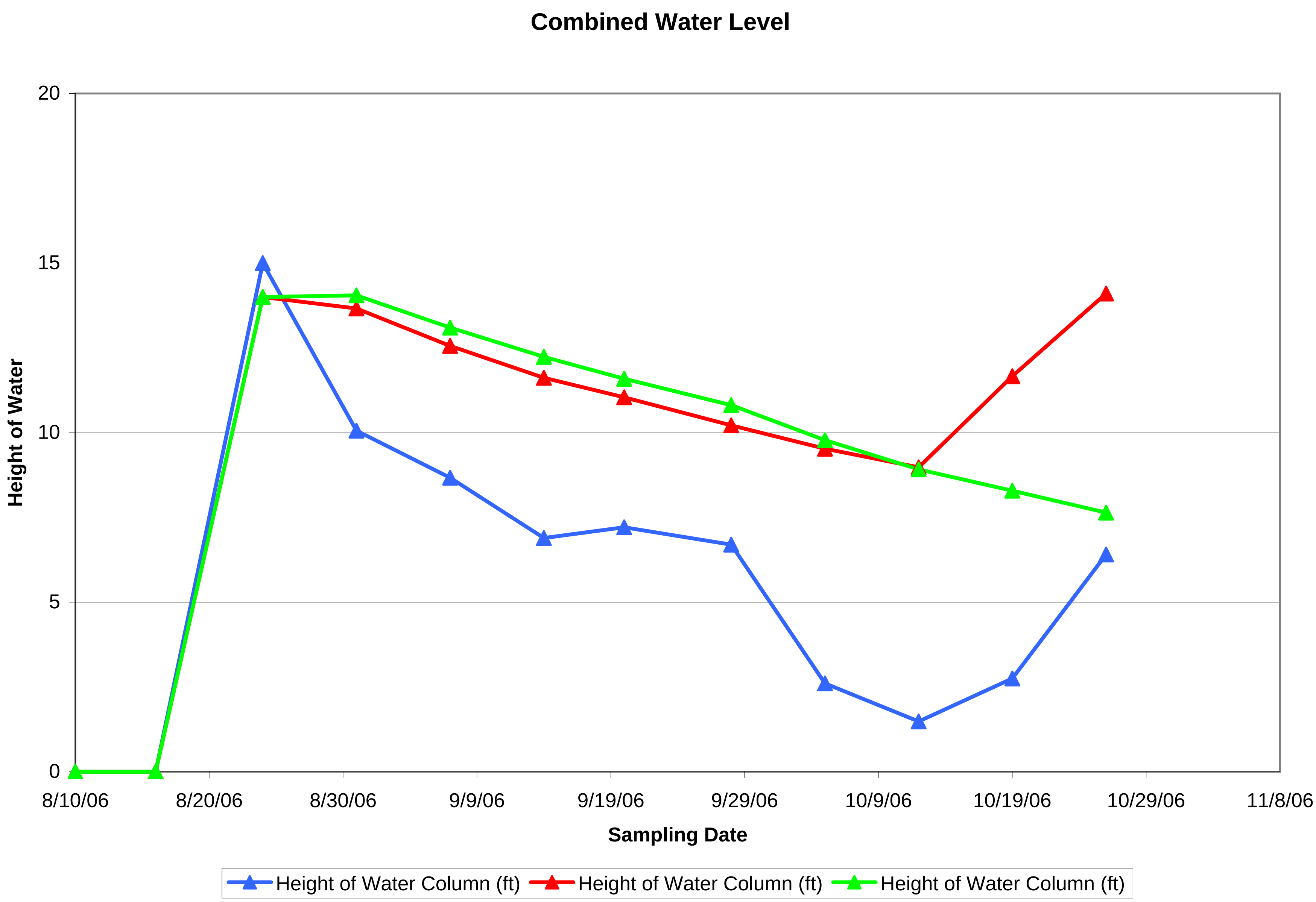
Pond 14



Sampling Date
0
5
10
15
20
20
15
10
5
0
Depth to Water (ft)
Height of Water Column (ft)
8/1/2006
8/11/2006
8/21/2006
8/31/2006
9/10/2006
9/20/2006
9/30/2006
10/10/2006
10/20/2006
10/30/2006
Depth to Water (ft)
Height of Water Column (ft)


Pond 22
Depth to Water (ft)
Height of Water Column (ft)
20
15
10
5
0
8/10/06
8/20/06
8/30/06
9/9/06
9/19/06
9/29/06
10/9/06
10/19/06
10/29/06
11/8/06
Sampling Date
Depth to Water (ft)
Height of Water Column (ft)


Combined Depth to Water
20
15
10
5
0
Depth to Water (ft)
Height of Water Column (ft)
8/10/06
8/20/06
8/30/06
9/9/06
9/19/06
9/29/06
10/9/06
10/19/06
10/29/06
11/8/06
Sampling Date
Depth to Water (ft)
Depth to Water (ft)
Depth to Water (ft)


Combined Water Level
Height of Water
20
15
10
5
0
8/10/06
8/20/06
8/30/06
9/9/06
9/19/06
9/29/06
10/9/06
10/19/06
10/29/06
11/8/06
Sampling Date
Height of Water Column (ft)
Height of Water Column (ft)
Height of Water Column (ft)

Appendix H

As-Received Water Quality Analytical Data

				Bicarbonate (HCO3) mg/L Reported As	Boron mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Color units Reported As	Copper ug/L Reported As	Dissolved Organic Carbon mg/L Reported As	Electrical Conductance umhos/cm Reported As
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/06/06 03:00 PM								8.6	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/06/06 03:15 PM								4.2	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/06/06 03:45 PM								26	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/06/06 04:00 PM								23	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/06/06 04:34 PM								7.7	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/06/06 04:40 PM								4.4	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/06/06 04:45 PM								5.2	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/06/06 04:51 PM								17	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/06/06 05:27 PM								5.1	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/06/06 05:34 PM								6.4	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/06/06 05:38 PM								6.6	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/06/06 05:42 PM								22	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/13/06 10:09 AM								6.7	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/13/06 10:16 AM								3.8	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/13/06 10:21 AM								13	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/13/06 10:48 AM								17	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/13/06 11:40 AM								7.2	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/13/06 11:46 AM								8.5	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/13/06 11:58 AM								4.7	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/13/06 01:12 PM								29	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/13/06 01:20 PM								5.3	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/13/06 01:25 PM								6.5	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/13/06 01:37 PM								6.8	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/13/06 02:12 PM								16	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/20/06 12:00 AM								15	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/20/06 12:00 AM								12	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/20/06 12:00 AM								7.2	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/20/06 12:00 AM								3.9	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/20/06 12:00 AM								19	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/20/06 12:00 AM								8.8	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/20/06 12:00 AM								8.2	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/20/06 12:00 AM								4.7	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/20/06 12:00 AM								18	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/20/06 12:00 AM								6.8	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/20/06 12:00 AM								5.9	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/20/06 12:00 AM								4.9	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/27/06 08:36 AM								7	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/27/06 08:42 AM								3.9	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/27/06 08:50 AM								11	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/27/06 08:55 AM								18	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/27/06 10:01 AM								4.6	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/27/06 10:06 AM								13	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/27/06 10:13 AM								8.6	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/27/06 10:18 AM								21	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/27/06 11:06 AM								8.1	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/27/06 11:11 AM								5.2	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/27/06 11:15 AM								4.9	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/27/06 11:18 AM								18	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/04/06 08:32 AM								6	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/04/06 08:40 AM								2.6	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/04/06 08:43 AM								10	
HSJ-RWRF	ALESSANDRO POND 2	P2 aRECYCLE WATER	08/04/06 08:52 AM								13	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/04/06 09:46 AM								3.2	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/04/06 09:50 AM								6.8	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/04/06 09:54 AM								8.6	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/04/06 09:58 AM								14	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/04/06 10:40 AM								19	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/04/06 10:45 AM								4	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/04/06 10:51 AM								4.8	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/04/06 10:56 AM								5.5	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/10/06 12:00 AM									
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/10/06 12:00 AM								6.7	

				Bicarbonate (HCO3) mg/L Reported As	Boron mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Color units Reported As	Copper ug/L Reported As	Dissolved Organic Carbon mg/L Reported As	Electrical Conductance umhos/cm Reported As
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/10/06 12:00 AM									
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/10/06 12:00 AM								38	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/10/06 12:00 AM								13	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/10/06 12:00 AM									
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/10/06 12:00 AM									
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/10/06 12:00 AM								3.4	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/10/06 12:00 AM								17	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/10/06 12:00 AM									
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/10/06 12:00 AM								6.4	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/10/06 12:00 AM								6.5	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/10/06 12:00 AM								16	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/10/06 12:00 AM								9.3	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/10/06 12:00 AM								5.6	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/10/06 12:00 AM								2.7	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/10/06 12:00 AM								17	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/10/06 12:00 AM								5.6	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/10/06 12:00 AM								15	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/10/06 12:00 AM								3.8	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/10/06 12:00 AM								22	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/10/06 12:00 AM								4.6	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/10/06 12:00 AM								6.2	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/10/06 12:00 AM								4.2	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/16/06 08:23 AM								5.6	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/16/06 08:35 AM								4.6	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/16/06 08:48 AM								Not enough sample	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/16/06 08:57 AM								12	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/16/06 09:22 AM								3.4	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/16/06 09:33 AM								3.9	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/16/06 09:48 AM								6.1	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/16/06 09:58 AM								70	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/16/06 10:27 AM								5.6	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/16/06 10:36 AM								5.7	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/16/06 10:51 AM								Not enough sample	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/16/06 10:58 AM								12	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/16/06 12:22 PM	260	0.7	97	<3	164	>25		5.8	1120
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/16/06 12:23 PM	200	0.7	72	<3	161	18		11	1100
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/16/06 12:27 PM	360	0.5	130	<3	151	5		2.5	1250
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/16/06 12:51 PM	200	0.8	74	<3	165	18		10	1160
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/16/06 01:54 PM	300	0.9	110	<3	187	>25		8.4	1300
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/16/06 02:05 PM	120	0.8	68	26	177	20		16	1070
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	270	1	110	<3	192	12		4.8	1220
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	280	0.6	110	<3	170	>25		3.3	1150
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	200	0.9	71	<3	188	>25		4.5	1100
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	0.6	110	<3	177	>25		4.5	1160
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/16/06 03:08 PM	260	0.7	91	<3	178	>25		4.2	1120
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/16/06 03:12 PM	190	0.8	73	<3	183	18		13	1160
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/24/06 09:01 AM								6.8	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/24/06 09:12 AM								31	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/24/06 09:14 AM								Not enough sample	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/24/06 09:17 AM								11	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/24/06 09:42 AM								4.4	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/24/06 09:46 AM								4.7	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/24/06 09:50 AM								8.6	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/24/06 09:50 AM								6.3	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/24/06 10:05 AM								5.5	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/24/06 10:08 AM								5.6	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/24/06 10:12 AM								19	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/24/06 10:12 AM								12	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/24/06 11:32 AM								13	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/24/06 11:38 AM								6.4	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/24/06 11:44 AM								3.6	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/24/06 11:48 AM								9.4	

				Bicarbonate (HCO3) mg/L Reported As	Boron mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Color units Reported As	Copper ug/L Reported As	Dissolved Organic Carbon mg/L Reported As	Electrical Conductance umhos/cm Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/24/06 12:22 PM								14	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/24/06 12:27 PM								7.5	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/24/06 12:31 PM								6.1	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/24/06 12:33 PM								14	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/24/06 12:34 PM								4.8	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/24/06 12:37 PM								4.1	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/24/06 12:42 PM								7.5	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/24/06 12:48 PM								5.2	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/31/06 12:00 AM								23	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/31/06 12:00 AM								11	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/31/06 12:00 AM								4.9	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/31/06 12:00 AM								12	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/31/06 12:00 AM								14	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/31/06 12:00 AM								5.7	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/31/06 12:00 AM								3.5	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/31/06 12:00 AM								3.6	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/31/06 12:00 AM								10	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/31/06 12:00 AM									
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/31/06 12:00 AM								14	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/31/06 12:00 AM								5.5	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/31/06 12:00 AM								11	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/31/06 12:00 AM								6.7	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/31/06 12:00 AM								4.8	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/31/06 12:00 AM								3	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/31/06 12:00 AM								9.8	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/31/06 12:00 AM								4.5	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/31/06 12:00 AM								7.3	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/31/06 12:00 AM								3.7	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/31/06 12:00 AM								14	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/31/06 12:00 AM								4.5	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/31/06 12:00 AM								5	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/31/06 12:00 AM								3.9	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/07/06 12:00 AM								12	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/07/06 08:17 AM								3.6	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/07/06 08:23 AM								4.3	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/07/06 08:27 AM								7.6	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/07/06 08:33 AM								15	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/07/06 08:49 AM								6.5	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/07/06 08:54 AM								11	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/07/06 08:58 AM								Not enough sample	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/07/06 09:01 AM								11	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/07/06 09:19 AM								5	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/07/06 09:49 AM								9.6	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/07/06 09:52 AM								17	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/07/06 11:21 AM								10	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/07/06 11:24 AM								4.5	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/07/06 11:30 AM								2.9	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/07/06 11:34 AM								7.6	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/07/06 12:12 PM								11	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/07/06 12:16 PM								3.1	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/07/06 12:19 PM								5	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/07/06 12:23 PM								4.4	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/07/06 12:52 PM								10	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/07/06 12:57 PM								3.8	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/07/06 01:00 PM								4.7	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/07/06 01:04 PM								4.2	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/14/06 08:11 AM								4.4	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/14/06 08:15 AM								4.3	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/14/06 08:19 AM								7	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/14/06 08:23 AM								15	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/14/06 08:43 AM								6.3	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/14/06 08:48 AM								10	

				Bicarbonate (HCO3) mg/L Reported As	Boron mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Color units Reported As	Copper ug/L Reported As	Dissolved Organic Carbon mg/L Reported As	Electrical Conductance umhos/cm Reported As
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/14/06 08:53 AM								Not enough sample	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/14/06 09:01 AM								11	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/14/06 09:10 AM								15	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/14/06 09:15 AM								4.6	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/14/06 09:19 AM								10	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/14/06 09:25 AM								15	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/14/06 10:51 AM								4.3	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/14/06 10:57 AM								2.5	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/14/06 11:02 AM								7.5	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/14/06 11:05 AM								16	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/14/06 11:45 AM								12	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/14/06 11:48 AM								2.5	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/14/06 11:52 AM								5.6	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/14/06 11:54 AM								4.6	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/14/06 12:26 PM								14	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/14/06 12:31 PM								4.9	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/14/06 12:39 PM								4.9	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/14/06 12:41 PM								4	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/20/06 09:09 AM	200	0.4	46	<3	151	>25		15	1080
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/20/06 10:08 AM	150	0.3	33	11	140	>25		11	920
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/20/06 10:44 AM	210	0.4	40	<3	139	>25		17	1000
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/20/06 12:49 PM								28	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/20/06 12:51 PM								5.1	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/20/06 12:58 PM								2.9	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/20/06 01:02 PM								7.7	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/20/06 02:06 PM								3	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/20/06 02:09 PM								5.7	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/20/06 02:19 PM								3.8	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/20/06 02:20 PM								16	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/20/06 03:06 PM								4.1	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/20/06 03:11 PM								5.1	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/20/06 03:23 PM								4.4	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/20/06 03:29 PM								16	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/21/06 07:21 AM	280	0.3	77	<3	159	12		4.2	1180
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/21/06 07:24 AM	320	0.4	74	<3	160	>25		5.4	1230
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/21/06 07:28 AM	450	0.4	110	<3	166	>25		7.1	1420
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/21/06 07:41 AM	260	0.5	58	<3	147	7.5		5.6	1110
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/21/06 07:59 AM	NOT ENOUGH SAMPLE			NOT ENOUGH SAMPLE	393	not enough sample			NOT ENOUGH SAMPLE
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/21/06 08:08 AM	440	0.5	98	<3	150	>25		14	2670
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/21/06 08:18 AM	270	0.5	70	<3	185	25		4.5	1240
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/21/06 08:25 AM	360	0.5	68	<3	139	20		11	1300
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/21/06 08:47 AM	340	0.4	53	<3	134	>25		11	1130
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/28/06 08:32 AM		0.4			154			14	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/28/06 08:53 AM		0.4			160			4.6	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/28/06 09:00 AM		0.4			162			4.9	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/28/06 09:05 AM		0.5			174			7.3	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/28/06 09:33 AM		0.4			142			11	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/28/06 09:37 AM		0.5			149			5.7	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/28/06 09:45 AM		0.4			147			9.5	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/28/06 09:50 AM		NO SAMPLE			No sample				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/28/06 10:25 AM		0.4			148			18	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/28/06 10:31 AM		0.6			188			4.8	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/28/06 10:35 AM		0.6			143			12	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/28/06 10:40 AM		0.5			153			14	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/28/06 12:21 PM		0.7			186			18	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/28/06 12:24 PM		0.6			157			12	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/28/06 12:24 PM		0.7			151			4.7	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/28/06 12:32 PM		0.5			163			2.8	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/28/06 12:36 PM		0.6			150			7.7	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/28/06 01:26 PM		0.5			171			3.3	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/28/06 01:31 PM		0.9			197			5.4	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/28/06 01:35 PM		0.9			193			4.3	

				Bicarbonate (HCO3) mg/L Reported As	Boron mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Color units Reported As	Copper ug/L Reported As	Dissolved Organic Carbon mg/L Reported As	Electrical Conductance umhos/cm Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/28/06 02:37 PM		0.8			210			19	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/28/06 02:43 PM		0.6			177			4.2	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/28/06 02:49 PM		0.8			179			5	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/28/06 02:52 PM		0.7			180			5.4	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/05/06 10:01 AM								14	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/05/06 10:05 AM								4.7	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/05/06 10:13 AM								5.3	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/05/06 10:16 AM								7.7	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/05/06 10:47 AM								NO SAMPLE	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/05/06 10:56 AM								11	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/05/06 11:07 AM								5.7	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/05/06 11:11 AM								10	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/05/06 11:43 AM								20	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/05/06 11:49 AM								13	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/05/06 11:55 AM								13	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/05/06 12:00 PM								4.4	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/12/06 01:09 PM								5.1	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/12/06 01:14 PM								8	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/12/06 01:17 PM								5.8	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/12/06 01:23 PM								13	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/12/06 01:58 PM									
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/12/06 02:04 PM								9.2	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/12/06 02:08 PM								5.7	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/12/06 02:13 PM								10	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/12/06 02:22 PM								14	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/12/06 02:26 PM								15	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/12/06 02:37 PM								4.7	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/12/06 02:43 PM								11	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/19/06 12:00 AM								14	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/19/06 12:00 AM								15	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/19/06 12:00 AM								4.3	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/19/06 12:00 AM								13	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/19/06 12:00 AM								8.4	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/19/06 12:00 AM								8.2	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/19/06 12:00 AM								5.9	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/19/06 12:00 AM								5.6	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/19/06 12:00 AM								10	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/19/06 12:00 AM								8.8	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/19/06 12:00 AM								5.9	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/26/06 08:12 AM		0.4			148			8.8	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/26/06 08:18 AM		0.3			122			10	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/26/06 08:20 AM		0.4			147			6.5	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/26/06 08:25 AM		0.4			145			6.2	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/26/06 08:46 AM		Not enough sample			NO SAMPLE				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/26/06 08:51 AM		0.3			136			9.1	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/26/06 08:57 AM		0.4			133			6.7	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/26/06 09:05 AM		0.4			139			11	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/26/06 09:27 AM		0.3			129			14	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/26/06 09:31 AM		0.5			145			15	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/26/06 09:39 AM		0.5			166			4.8	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/26/06 09:45 AM		0.3			114			13	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	10/26/06 11:09 AM								5.1	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	10/26/06 11:19 AM								3	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	10/26/06 11:28 AM								6.6	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	10/26/06 11:32 AM								15	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	10/26/06 12:17 PM								3.2	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	10/26/06 12:21 PM								3.8	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	10/26/06 12:24 PM								5.2	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	10/26/06 12:34 PM								11	
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 29	10/26/06 12:53 PM								3.2	
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 19	10/26/06 12:56 PM								3.6	
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 8.	10/26/06 12:59 PM								4.8	

				Bicarbonate (HCO3) mg/L Reported As	Boron mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Color units Reported As	Copper ug/L Reported As	Dissolved Organic Carbon mg/L Reported As	Electrical Conductance umhos/cm Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	10/26/06 01:35 PM								4	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	10/26/06 01:39 PM								4.9	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	10/26/06 01:43 PM								4.6	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	10/26/06 01:53 PM								11	
SUBBASE-PERRIS NORTH	MVRWRF_SOUTH	MVRWRF SOUTH	11/30/06 08:08 AM	280	0.45	61	<3	166		<10		1200
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	11/30/06 08:17 AM								6.8	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	11/30/06 08:21 AM								6.7	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	11/30/06 08:27 AM								8.8	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	11/30/06 08:33 AM								11	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	11/30/06 08:59 AM									
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	11/30/06 09:03 AM								11	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	11/30/06 09:05 AM								9.5	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	11/30/06 09:07 AM								6.8	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	11/30/06 09:33 AM								13	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	11/30/06 09:36 AM								13	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	11/30/06 09:37 AM								12	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	11/30/06 09:42 AM								5	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	11/30/06 12:01 PM	230	0.6	86	<3	157	12		4.5	1020
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	11/30/06 12:09 PM	160	0.8	58	14	157	18		12	1160
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	11/30/06 12:12 PM	340	0.4	120	<3	164	5		3.1	1320
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	11/30/06 12:18 PM	180	0.7	57	<3	150	15		7.1	1040
SUBBASE-PERRIS NORTH	MVRWRF_NORTH	MVRWRF NORTH	11/30/06 12:25 PM	300	5	130	<3	521		<10		2800
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	11/30/06 01:40 PM	27	0.8	33	19	176	>25		14	990
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	11/30/06 01:51 PM	280	0.7	100	<3	178	20		3.6	1260
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	11/30/06 01:57 PM	280	0.9	100	<3	188	>25		4	1320
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	11/30/06 02:02 PM	210	0.4	70	<3	155	12		5	1070
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	11/30/06 02:38 PM	170	0.8	64	20	171	>25		11	1160
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	11/30/06 02:50 PM	280	0.7	88	<3	178	>25		4.4	1200
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	11/30/06 02:55 PM	260	0.9	74	<3	189	>25		5.4	1220
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	11/30/06 03:00 PM	320	0.7	95	<3	191	18		6.5	1320
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	12/20/06 08:30 AM	160	0.4	47	<3	134	40		6	900
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	12/20/06 08:39 AM	124	0.4	35	5	129	40		12	900
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	12/20/06 08:53 AM					NOT ENOUGH SAMPLE				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	12/20/06 08:59 AM	181	0.3	33	<3	136	20		8.4	900
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	12/20/06 09:05 AM	222	0.4	54	<3	141	5		6.9	1000
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	12/20/06 09:13 AM	218	0.3	36	<3	140	30		11	900
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	12/20/06 09:44 AM	266	0.4	37	<3	134	60		16	900
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	12/20/06 12:25 PM		1			200			13	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	12/20/06 12:28 PM		0.5			150			4.9	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	12/20/06 12:35 PM		0.4			160			3.3	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	12/20/06 12:38 PM		0.8			174			7.7	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	12/20/06 01:22 PM		0.9			176			13	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	12/20/06 01:25 PM		0.6			174			4.3	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	12/20/06 01:30 PM		0.8			177			4.4	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	12/20/06 01:32 PM		0.5			150			5.9	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	12/20/06 02:01 PM		0.8			177			12	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	12/20/06 02:11 PM		0.7			192			4.9	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	12/20/06 02:15 PM		0.8			203			6.5	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	12/20/06 02:21 PM		0.7			215			14	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	12/21/06 08:05 AM	368	0.3	64	<3	133	30		7.9	1200
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	312	0.3	63	<3	146	18		6.8	1100
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	12/21/06 09:24 AM	283	0.3	49	<3	132	30		13	1200
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	190	0.3	49	<3	152	25		11	1000
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	306	0.6	66	<3	173	10		5.2	1200
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	300	5	130	<3	594		<10		2728
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	280	0.5	61	<3	187		<10		999
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	01/24/07 09:05 AM									
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	01/24/07 09:22 AM									
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	01/24/07 09:25 AM									
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	01/24/07 09:47 AM									
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	01/24/07 10:01 AM									
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	01/24/07 10:29 AM									

				Bicarbonate (HCO3) mg/L Reported As	Boron mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Color units Reported As	Copper ug/L Reported As	Dissolved Organic Carbon mg/L Reported As	Electrical Conductance umhos/cm Reported As
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	01/24/07 10:34 AM									
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	01/24/07 10:59 AM									
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	01/24/07 11:11 AM									
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	01/24/07 11:17 AM									
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	01/24/07 11:38 AM									
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	01/24/07 12:01 PM									
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	01/25/07 08:32 AM		0.3			130				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	01/25/07 08:38 AM		0.3			140				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	01/25/07 08:43 AM		0.3			130				
MV-RWRF	POND 19	MVP19 LYSIMETER RECY	01/25/07 08:51 AM		0.3			160				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	01/25/07 09:00 AM									
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	01/25/07 09:06 AM		0.3			140				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	01/25/07 09:11 AM		0.4			140				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	01/25/07 09:18 AM		0.3			150				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	01/25/07 09:33 AM		0.3			150				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	01/25/07 09:37 AM		0.2			150				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	01/25/07 09:44 AM		0.6			170				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	01/25/07 09:49 AM		0.4			170				

				Fluoride mg/L Reported As	Hardness mg/L Reported As	Hydroxide (OH) mg/L Reported As	Iron ug/L Reported As	Magnesium mg/L Reported As	Manganese ug/L Reported As	Nitrate as N mg/L Reported As	Nitrite as N mg/L Reported As	Total Kjeldahl Nitrogen mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/06/06 03:00 PM							<0.1	0.02	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/06/06 03:15 PM							0.9	0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/06/06 03:45 PM							38	0.5	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/06/06 04:00 PM							4.2	0.2	17
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/06/06 04:34 PM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/06/06 04:40 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/06/06 04:45 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/06/06 04:51 PM							3.3	0.2	14
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/06/06 05:27 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/06/06 05:34 PM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/06/06 05:38 PM							<0.1	<0.01	8.1
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/06/06 05:42 PM							2.6	0.1	11
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/13/06 10:09 AM							0.1	0.1	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/13/06 10:16 AM							0.9	0.02	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/13/06 10:21 AM							5	0.2	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/13/06 10:48 AM							2	0.2	13
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/13/06 11:40 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/13/06 11:46 AM							3.3	0.08	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/13/06 11:58 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/13/06 01:12 PM							0.3	0.07	34
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/13/06 01:20 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/13/06 01:25 PM							<0.1	<0.01	7.7
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/13/06 01:37 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/13/06 02:12 PM							<0.1	0.01	8.8
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/20/06 12:00 AM							1.8	0.4	11
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/20/06 12:00 AM							3.7	0.2	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/20/06 12:00 AM							0.9	0.6	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/20/06 12:00 AM							1	0.04	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/20/06 12:00 AM							0.3	0.1	7.3
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/20/06 12:00 AM							7.9	0.5	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/20/06 12:00 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/20/06 12:00 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/20/06 12:00 AM							0.9	0.2	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/20/06 12:00 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/20/06 12:00 AM							<0.1	<0.01	11
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/20/06 12:00 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/27/06 08:36 AM							2.1	0.3	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/27/06 08:42 AM							2.2	0.2	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/27/06 08:50 AM							0.5	0.07	5.8
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/27/06 08:55 AM							0.2	0.1	6.2
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/27/06 10:01 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/27/06 10:06 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/27/06 10:13 AM							0.4	0.04	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/27/06 10:18 AM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/27/06 11:06 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/27/06 11:11 AM							<0.1	0.03	5.1
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/27/06 11:15 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/27/06 11:18 AM							0.3	0.1	7.4
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/04/06 08:32 AM							1.2	0.02	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/04/06 08:40 AM							1.9	0.03	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/04/06 08:43 AM							1	0.2	11
HSJ-RWRF	ALESSANDRO POND 2	P2 aRECYCLE WATER	08/04/06 08:52 AM							<0.1	0.2	10
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/04/06 09:46 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/04/06 09:50 AM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/04/06 09:54 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/04/06 09:58 AM							0.4	0.1	20
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/04/06 10:40 AM							<0.1	0.03	7.9
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/04/06 10:45 AM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/04/06 10:51 AM							<0.1	<0.01	5.8
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/04/06 10:56 AM							<0.1	<0.01	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/10/06 12:00 AM							0.7		
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/10/06 12:00 AM							<0.1	<0.01	

				Fluoride mg/L Reported As	Hardness mg/L Reported As	Hydroxide (OH) mg/L Reported As	Iron ug/L Reported As	Magnesium mg/L Reported As	Manganese ug/L Reported As	Nitrate as N mg/L Reported As	Nitrite as N mg/L Reported As	Total Kjeldahl Nitrogen mg/L Reported As
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/10/06 12:00 AM							<0.1	0.01	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/10/06 12:00 AM							<0.1	<0.01	5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/10/06 12:00 AM							0.2	0.4	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/10/06 12:00 AM							<0.1	0.01	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/10/06 12:00 AM							<0.1	<0.01	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/10/06 12:00 AM							0.1	0.02	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/10/06 12:00 AM							<0.1	<0.01	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/10/06 12:00 AM							0.4		
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/10/06 12:00 AM							<0.1	<0.01	NOT ENOUGH SAMPLE
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/10/06 12:00 AM							<0.1	0.02	NOT ENOUGH SAMPLE
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/10/06 12:00 AM							0.5	0.2	12
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/10/06 12:00 AM							0.4	0.04	6.1
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/10/06 12:00 AM							0.3	0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/10/06 12:00 AM							1.2	0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/10/06 12:00 AM							<0.1	0.04	9.5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/10/06 12:00 AM							4.7	0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/10/06 12:00 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/10/06 12:00 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/10/06 12:00 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/10/06 12:00 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/10/06 12:00 AM							<0.1	0.03	5.1
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/10/06 12:00 AM							<0.1	0.01	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/16/06 08:23 AM							<0.1	<0.01	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/16/06 08:35 AM							0.1	0.01	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/16/06 08:48 AM							<0.1	NOT ENOUGH SAMPLE	NOT ENOUGH SAMPLE
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/16/06 08:57 AM							0.1	0.2	15
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/16/06 09:22 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/16/06 09:33 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/16/06 09:48 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/16/06 09:58 AM							<0.1	7.1	13
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/16/06 10:27 AM							<0.1	<0.01	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/16/06 10:36 AM							<0.1	<0.01	8.5
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/16/06 10:51 AM							1.7	NOT ENOUGH SAMPLE	NOT ENOUGH SAMPLE
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/16/06 10:58 AM							0.5	0.2	16
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/16/06 12:22 PM	0.5	280	<3		8.4		0.3	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/16/06 12:23 PM	0.5	220	<3		8.8		3.1	0.9	13
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/16/06 12:27 PM	0.2	400	<3		18		0.7	0.02	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/16/06 12:51 PM	0.5	220	<3		9.8		7.6	0.3	11
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/16/06 01:54 PM	0.3	340	<3		17		<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/16/06 02:05 PM	0.4	200	<3		8.4		0.9	0.2	9.6
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	0.5	310	<3		10		0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	0.4	340	<3		16		<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	0.4	220	<3		9.6		<0.1	0.04	6.8
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	0.3	320	<3		14		<0.1	0.02	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/16/06 03:08 PM	0.4	290	<3		15		<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/16/06 03:12 PM	0.6	220	<3		8.8		2.1	0.3	10
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/24/06 09:01 AM							<0.1	0.1	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/24/06 09:12 AM							0.1	0.08	7.1
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/24/06 09:14 AM							2.4	3.3	NOT ENOUGH SAMPLE
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/24/06 09:17 AM							0.1	0.2	19
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/24/06 09:42 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/24/06 09:46 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/24/06 09:50 AM							<0.1	0.3	17
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/24/06 09:50 AM							<0.1	<0.01	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/24/06 10:05 AM							<0.1	0.2	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/24/06 10:08 AM							<0.1	1.2	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/24/06 10:12 AM							<0.1	9.4	<5
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/24/06 10:12 AM							0.7	0.6	19
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/24/06 11:32 AM							1.7	0.6	14
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/24/06 11:38 AM							0.6	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/24/06 11:44 AM							0.5	0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/24/06 11:48 AM							2.6	1.1	6.3

				Fluoride mg/L Reported As	Hardness mg/L Reported As	Hydroxide (OH) mg/L Reported As	Iron ug/L Reported As	Magnesium mg/L Reported As	Manganese ug/L Reported As	Nitrate as N mg/L Reported As	Nitrite as N mg/L Reported As	Total Kjeldahl Nitrogen mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/24/06 12:22 PM							0.2	0.2	7
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/24/06 12:27 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/24/06 12:31 PM							<0.1	0.07	6.1
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/24/06 12:33 PM							0.1	0.05	5.8
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/24/06 12:34 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/24/06 12:37 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/24/06 12:42 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/24/06 12:48 PM							1.9	0.09	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/31/06 12:00 AM							<0.1	2.8	6.5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/31/06 12:00 AM							0.3	0.8	7.3
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/31/06 12:00 AM							<0.1	0.4	<5
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/31/06 12:00 AM							<0.1	0.02	17
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/31/06 12:00 AM							<0.1	<0.01	18
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/31/06 12:00 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/31/06 12:00 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/31/06 12:00 AM							<0.1	<0.01	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/31/06 12:00 AM							<0.1	0.2	18
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/31/06 12:00 AM							4	0.6	5.5
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/31/06 12:00 AM							<0.1	<0.01	9.6
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/31/06 12:00 AM							<0.1	0.6	7.2
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/31/06 12:00 AM							0.4	2.3	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/31/06 12:00 AM							0.1	0.02	6.4
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/31/06 12:00 AM							1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/31/06 12:00 AM							0.5	0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/31/06 12:00 AM							0.1	1.3	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/31/06 12:00 AM							1.6	0.3	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/31/06 12:00 AM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/31/06 12:00 AM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/31/06 12:00 AM							<0.1	0.09	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/31/06 12:00 AM							<0.1	0.02	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/31/06 12:00 AM							<0.1	0.09	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/31/06 12:00 AM							<0.1	<0.01	<5
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/07/06 12:00 AM							<0.1	0.03	14
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/07/06 08:17 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/07/06 08:23 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/07/06 08:27 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/07/06 08:33 AM							<0.1	<0.01	15
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/07/06 08:49 AM							<0.1	1.7	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/07/06 08:54 AM							<0.1	<0.01	7.7
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/07/06 08:58 AM							5.6	0.8	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/07/06 09:01 AM							<0.1	0.02	14
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/07/06 09:19 AM							<0.1	0.2	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/07/06 09:49 AM							0.2	0.08	6.8
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/07/06 09:52 AM							<0.1	0.3	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/07/06 11:21 AM							0.6	0.09	INSUFFICIENT SAMPLE
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/07/06 11:24 AM							0.8	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/07/06 11:30 AM							0.8	0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/07/06 11:34 AM							0.4	0.04	9
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/07/06 12:12 PM							<0.1	0.03	14
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/07/06 12:16 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/07/06 12:19 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/07/06 12:23 PM							1	0.3	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/07/06 12:52 PM							<0.1	0.02	INSUFFICIENT SAMPLE
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/07/06 12:57 PM							<0.1	<0.01	INSUFFICIENT SAMPLE
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/07/06 01:00 PM							<0.1	0.09	INSUFFICIENT SAMPLE
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/07/06 01:04 PM							<0.1	<0.01	INSUFFICIENT SAMPLE
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/14/06 08:11 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/14/06 08:15 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/14/06 08:19 AM							<0.1	0.02	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/14/06 08:23 AM							<0.1	<0.01	12
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/14/06 08:43 AM							0.2	0.7	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/14/06 08:48 AM							<0.1	0.08	8.2

				Fluoride mg/L Reported As	Hardness mg/L Reported As	Hydroxide (OH) mg/L Reported As	Iron ug/L Reported As	Magnesium mg/L Reported As	Manganese ug/L Reported As	Nitrate as N mg/L Reported As	Nitrite as N mg/L Reported As	Total Kjeldahl Nitrogen mg/L Reported As
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/14/06 08:53 AM							4.4	1.6	NOT ENOUGH SAMPLE
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/14/06 09:01 AM							<0.1	0.01	15
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/14/06 09:10 AM							<0.1	0.02	12
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/14/06 09:15 AM							<0.1	0.3	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/14/06 09:19 AM							0.4	0.1	6.5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/14/06 09:25 AM							13	0.3	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/14/06 10:51 AM							0.4	0.02	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/14/06 10:57 AM							0.5	0.03	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/14/06 11:02 AM							0.3	0.09	7.8
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/14/06 11:05 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/14/06 11:45 AM							<0.1	0.04	6.8
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/14/06 11:48 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/14/06 11:52 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/14/06 11:54 AM							0.3	0.2	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/14/06 12:26 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/14/06 12:31 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/14/06 12:39 PM							<0.1	0.07	6.3
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/14/06 12:41 PM							<0.1	0.01	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/20/06 09:09 AM	0.2	190	<3		18		<0.1	0.01	10
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/20/06 10:08 AM	0.2	140	<3		13		<0.1	0.8	11
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/20/06 10:44 AM	0.2	170	<3		17		<0.1	0.1	14
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/20/06 12:49 PM							2	0.4	7.5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/20/06 12:51 PM							0.3	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/20/06 12:58 PM							0.6	0.04	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/20/06 01:02 PM							0.1	0.02	7.8
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/20/06 02:06 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/20/06 02:09 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/20/06 02:19 PM							2.3	0.3	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/20/06 02:20 PM							0.3	0.07	10
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/20/06 03:06 PM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/20/06 03:11 PM							<0.1	0.02	5.9
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/20/06 03:23 PM							<0.1	0.02	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/20/06 03:29 PM							<0.1	0.05	5.2
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/21/06 07:21 AM	0.6	300	<3		28		<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/21/06 07:24 AM	0.5	300	<3		29		<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/21/06 07:28 AM	0.3	450	<3		42		<0.1	0.03	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/21/06 07:41 AM	1	250	<3		26		0.2	0.09	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/21/06 07:59 AM	0.8		NOT ENOUGH SAMPLE				3.8	1.1	8
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/21/06 08:08 AM	0.5	380	<3		34		9.3	0.1	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/21/06 08:18 AM	1.6	300	<3		29		<0.1	0.09	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/21/06 08:25 AM	0.3	300	<3		32		0.2	0.06	6
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/21/06 08:47 AM	0.4	240	<3		25		<0.1	0.05	9.2
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/28/06 08:32 AM							<0.1	0.1	7.9
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/28/06 08:53 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/28/06 09:00 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/28/06 09:05 AM							<0.1	0.06	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/28/06 09:33 AM							0.1	3.7	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/28/06 09:37 AM							1.4	0.3	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/28/06 09:45 AM							<0.1	2	7.3
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/28/06 09:50 AM							No sample	not enough sample	NOT ENOUGH SAMPLE
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/28/06 10:25 AM							<0.1	0.2	9.2
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/28/06 10:31 AM							<0.1	0.2	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/28/06 10:35 AM							1.1	0.2	6.4
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/28/06 10:40 AM							6	0.5	5.2
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/28/06 12:21 PM							<0.1	0.02	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/28/06 12:24 PM							2.2	0.2	15
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/28/06 12:24 PM							0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/28/06 12:32 PM							0.9	0.02	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/28/06 12:36 PM							1.6	0.1	6.2
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/28/06 01:26 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/28/06 01:31 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/28/06 01:35 PM							3.5	0.4	<5

				Fluoride mg/L Reported As	Hardness mg/L Reported As	Hydroxide (OH) mg/L Reported As	Iron ug/L Reported As	Magnesium mg/L Reported As	Manganese ug/L Reported As	Nitrate as N mg/L Reported As	Nitrite as N mg/L Reported As	Total Kjeldahl Nitrogen mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/28/06 02:37 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/28/06 02:43 PM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/28/06 02:49 PM							<0.1	0.09	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/28/06 02:52 PM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/05/06 10:01 AM							<0.1	0.03	8.7
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/05/06 10:05 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/05/06 10:13 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/05/06 10:16 AM							<0.1	0.2	NOT ENOUGH SAMPLE
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/05/06 10:47 AM							0.2	NO SAMPLE	NOT ENOUGH SAMPLE
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/05/06 10:56 AM							<0.1	1.3	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/05/06 11:07 AM							0.6	0.2	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/05/06 11:11 AM							<0.1	1.6	NOT ENOUGH SAMPLE
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/05/06 11:43 AM							<0.1	0.2	10
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/05/06 11:49 AM							3.7	0.1	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/05/06 11:55 AM							0.4	0.02	9.2
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/05/06 12:00 PM							<0.1	0.1	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/12/06 01:09 PM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/12/06 01:14 PM							<0.1	0.3	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/12/06 01:17 PM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/12/06 01:23 PM							<0.1	0.2	5.8
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/12/06 01:58 PM							0.6		
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/12/06 02:04 PM							<0.1	1.2	8.5
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/12/06 02:08 PM							0.4	0.3	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/12/06 02:13 PM							<0.1	0.5	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/12/06 02:22 PM							3.6	0.5	5.3
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/12/06 02:26 PM							0.3	0.2	9.8
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/12/06 02:37 PM							<0.1	0.1	<5
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/12/06 02:43 PM							0.4	0.7	7.4
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/19/06 12:00 AM							0.3	0.08	5.3
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/19/06 12:00 AM							0.4	0.02	11
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/19/06 12:00 AM							<0.1	0.04	<5
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/19/06 12:00 AM							1.6	0.8	11
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/19/06 12:00 AM							1.1	1.6	7
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/19/06 12:00 AM							<0.1	0.3	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/19/06 12:00 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/19/06 12:00 AM							<0.1	<0.01	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/19/06 12:00 AM							<0.1	0.4	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/19/06 12:00 AM							0.2	0.2	7.7
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/19/06 12:00 AM							1.2	0.3	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/26/06 08:12 AM							<0.1	0.3	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/26/06 08:18 AM							2	2.8	8
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/26/06 08:20 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/26/06 08:25 AM							<0.1	<0.01	<5
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/26/06 08:46 AM							NO SAMPLE	NOT ENOUGH SAMPLE	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/26/06 08:51 AM							1.8	0.1	7
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/26/06 08:57 AM							1.8	0.2	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/26/06 09:05 AM							<0.1	0.08	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/26/06 09:27 AM							0.8	0.2	7
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/26/06 09:31 AM							1.3	0.1	10
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/26/06 09:39 AM							0.2	<0.01	<5
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/26/06 09:45 AM							3.7	1.7	13
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	10/26/06 11:09 AM				350			0.3	0.05	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	10/26/06 11:19 AM				20			1.4	0.03	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	10/26/06 11:28 AM				440			0.5	0.1	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	10/26/06 11:32 AM				28			<0.1	0.03	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	10/26/06 12:17 PM							0.2	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	10/26/06 12:21 PM							0.4	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	10/26/06 12:24 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	10/26/06 12:34 PM							1.4	0.3	<5
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 29	10/26/06 12:53 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 19	10/26/06 12:56 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 8.	10/26/06 12:59 PM							<0.1	<0.01	6

				Fluoride mg/L Reported As	Hardness mg/L Reported As	Hydroxide (OH) mg/L Reported As	Iron ug/L Reported As	Magnesium mg/L Reported As	Manganese ug/L Reported As	Nitrate as N mg/L Reported As	Nitrite as N mg/L Reported As	Total Kjeldahl Nitrogen mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	10/26/06 01:35 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	10/26/06 01:39 PM							<0.1	0.2	9
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	10/26/06 01:43 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	10/26/06 01:53 PM							0.9	0.09	9
SUBBASE-PERRIS NORTH	MVRWRF_SOUTH	MVRWRF SOUTH	11/30/06 08:08 AM	1	230	<3	30	19	110	0.1	<0.01	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	11/30/06 08:17 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	11/30/06 08:21 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	11/30/06 08:27 AM							<0.1	0.3	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	11/30/06 08:33 AM							2.8	1.9	9.7
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	11/30/06 08:59 AM							0.2		
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	11/30/06 09:03 AM							3.1	0.4	7.4
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	11/30/06 09:05 AM							2.4	0.2	5.6
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	11/30/06 09:07 AM							1.4	0.2	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	11/30/06 09:33 AM							1.5	0.02	7.1
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	11/30/06 09:36 AM							4.3	0.4	6.4
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	11/30/06 09:37 AM							0.5	0.5	9.7
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	11/30/06 09:42 AM							0.4	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	11/30/06 12:01 PM	0.5	250	<3		7.6		3.5	0.1	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	11/30/06 12:09 PM	0.5	170	<3		7		0.8	0.6	11
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	11/30/06 12:12 PM	0.2	370	<3		17		0.7	0.03	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	11/30/06 12:18 PM	0.4	180	<3		8.3		0.2	0.2	6
SUBBASE-PERRIS NORTH	MVRWRF_NORTH	MVRWRF NORTH	11/30/06 12:25 PM	2.1	450	<3	3000	33	76	10	<0.01	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	11/30/06 01:40 PM	0.5	98	<3		3.6		<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	11/30/06 01:51 PM	0.4	310	<3		15		<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	11/30/06 01:57 PM	0.3	330	<3		17		<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	11/30/06 02:02 PM	0.5	200	<3		7.2		<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	11/30/06 02:38 PM	0.4	200	<3		9.7		0.2	0.5	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	11/30/06 02:50 PM	0.3	270	<3		12		<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	11/30/06 02:55 PM	0.4	230	<3		10		<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	11/30/06 03:00 PM	0.3	300	<3		14		0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	12/20/06 08:30 AM	0.6	190	<3		17		<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	12/20/06 08:39 AM	0.2	140	<3		14		4.2	0.3	8.2
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	12/20/06 08:53 AM	NOT ENOUGH SAMPLE						NOT ENOUGH SAMPLE		
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	12/20/06 08:59 AM	0.3	150	<3		16		0.5	0.1	7
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	12/20/06 09:05 AM	0.5	230	<3		24		0.6	0.1	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	12/20/06 09:13 AM	0.2	140	<3		14		1.2	0.1	11
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	12/20/06 09:44 AM	0.2	150	<3		14		3.4	0.2	6.4
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	12/20/06 12:25 PM							1.8	0.3	21
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	12/20/06 12:28 PM							3.1	0.08	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	12/20/06 12:35 PM							0.9	0.03	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	12/20/06 12:38 PM							62	1.8	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	12/20/06 01:22 PM							0.8	0.2	13
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	12/20/06 01:25 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	12/20/06 01:30 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	12/20/06 01:32 PM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	12/20/06 02:01 PM							1.1	0.2	10
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	12/20/06 02:11 PM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	12/20/06 02:15 PM							0.1	0.03	5.6
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	12/20/06 02:21 PM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	12/21/06 08:05 AM	0.3	260	<3		25		<0.1	0.2	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	0.4	260	<3		26		<0.1	<0.01	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	12/21/06 09:24 AM	0.5	190	<3		17		0.6	0.03	7.3
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	0.2	220	<3		23		1.4	0.2	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	1.6	280	<3		29		0.3	0.04	<5
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	2.4	470	<3	6200	34	110	12	<0.01	
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	1	230	<3	8	20	110	<0.1	<0.01	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	01/24/07 09:05 AM							2.5	0.1	12
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	01/24/07 09:22 AM							19	0.1	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	01/24/07 09:25 AM							3.8	0.1	12
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	01/24/07 09:47 AM							4.2	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	01/24/07 10:01 AM							0.3	0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	01/24/07 10:29 AM							0.9	<0.01	<5

				Fluoride mg/L Reported As	Hardness mg/L Reported As	Hydroxide (OH) mg/L Reported As	Iron ug/L Reported As	Magnesium mg/L Reported As	Manganese ug/L Reported As	Nitrate as N mg/L Reported As	Nitrite as N mg/L Reported As	Total Kjeldahl Nitrogen mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	01/24/07 10:34 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	01/24/07 10:59 AM							<0.1	<0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	01/24/07 11:11 AM							<0.1	0.01	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	01/24/07 11:17 AM							2.8	0.09	10
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	01/24/07 11:38 AM							2.4	0.2	<5
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	01/24/07 12:01 PM							0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	01/25/07 08:32 AM							<0.1	0.2	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	01/25/07 08:38 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	01/25/07 08:43 AM							<0.1	<0.01	<5
MV-RWRF	POND 19	MVP19 LYSIMETER RECY	01/25/07 08:51 AM							3.8	0.1	10
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	01/25/07 09:00 AM							<0.1		
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	01/25/07 09:06 AM							0.8	0.4	5
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	01/25/07 09:11 AM							0.7	0.2	<5
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	01/25/07 09:18 AM							2.7	0.1	13
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	01/25/07 09:33 AM							<0.1	0.03	5
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	01/25/07 09:37 AM							<0.1	0.07	<5
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	01/25/07 09:44 AM							0.4	0.02	<5
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	01/25/07 09:49 AM							1	0.4	16

				Ammonia as N mg/L Reported As	Odor at 60° C TON Reported As	Organic-Nitrogen mg/L Reported As	pH pH units Reported As	Potassium mg/L Reported As	Silica mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As	Temperature at Collection deg C Reported As
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/06/06 03:00 PM	1.1		1.58						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/06/06 03:15 PM	<1		0.14						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/06/06 03:45 PM	<1		2.68						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/06/06 04:00 PM	11		5.91						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/06/06 04:34 PM	1.5		0.25						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/06/06 04:40 PM	<1		-0.35						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/06/06 04:45 PM	<1		-0.45						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/06/06 04:51 PM	6.4		7.38						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/06/06 05:27 PM	<1		0.93						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/06/06 05:34 PM	<1		0						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/06/06 05:38 PM	7.1		0.98						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/06/06 05:42 PM	3.6		7.15						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/13/06 10:09 AM	1.2		0.14						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/13/06 10:16 AM	<1		0.28						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/13/06 10:21 AM	1.4		-0.02						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/13/06 10:48 AM	5.5		7.57						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/13/06 11:40 AM	1.1		-1.13						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/13/06 11:46 AM	1.8		0.56						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/13/06 11:58 AM	<1		0.27						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/13/06 01:12 PM	1.1		32.65						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/13/06 01:20 PM	1.3		-1.41						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/13/06 01:25 PM	7.2		0.53						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/13/06 01:37 PM	<1		-0.92						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/13/06 02:12 PM	<1		7.82						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/20/06 12:00 AM	6.4		4.38						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/20/06 12:00 AM	<1		2.92						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/20/06 12:00 AM	<1		3.62						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/20/06 12:00 AM	<1		2.19						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/20/06 12:00 AM	1.8		5.49						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/20/06 12:00 AM	1.4		2.91						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/20/06 12:00 AM	<1		1.93						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/20/06 12:00 AM	<1		2.28						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/20/06 12:00 AM	<1		3.77						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/20/06 12:00 AM	<1		2.74						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/20/06 12:00 AM	6		4.65						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/20/06 12:00 AM	<1		2.4						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/27/06 08:36 AM	<1		1.55						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/27/06 08:42 AM	<1		1.01						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/27/06 08:50 AM	5.2		0.57						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/27/06 08:55 AM	3.8		2.4						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/27/06 10:01 AM	<1		1.63						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/27/06 10:06 AM	<1		1.46						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/27/06 10:13 AM	<1		2.11						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/27/06 10:18 AM	<1		4.26						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/27/06 11:06 AM	1.9		0.83						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/27/06 11:11 AM	4.4		0.77						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/27/06 11:15 AM	<1		0.28						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/27/06 11:18 AM	5.5		1.93						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/04/06 08:32 AM	<1		1						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/04/06 08:40 AM	<1		1.1						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/04/06 08:43 AM	8.2		2.5						
HSJ-RWRF	ALESSANDRO POND 2	P2 aRECYCLE WATER	08/04/06 08:52 AM	8.8		1.8						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/04/06 09:46 AM	<1		0.6						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/04/06 09:50 AM	<1		0.8						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/04/06 09:54 AM	<1		0.1						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/04/06 09:58 AM	14		5.1						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/04/06 10:40 AM	5.5		2.4						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/04/06 10:45 AM	<1		0.3						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/04/06 10:51 AM	5.2		0.6						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/04/06 10:56 AM	<1		0.5						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/10/06 12:00 AM									
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/10/06 12:00 AM	3.4								

				Ammonia as N mg/L Reported As	Odor at 60° C TON Reported As	Organic-Nitrogen mg/L Reported As	pH pH units Reported As	Potassium mg/L Reported As	Silica mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As	Temperature at Collection deg C Reported As
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/10/06 12:00 AM									
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/10/06 12:00 AM	<1		4.58						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/10/06 12:00 AM	<1		4.33						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/10/06 12:00 AM									
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/10/06 12:00 AM	NOT ENOUGH SAMPLE								
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/10/06 12:00 AM	<1		0.66						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/10/06 12:00 AM	<1		3.78						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/10/06 12:00 AM									
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/10/06 12:00 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/10/06 12:00 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/10/06 12:00 AM	8.9		2.9						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/10/06 12:00 AM	6.2		-0.5						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/10/06 12:00 AM	<1		1.84						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/10/06 12:00 AM	<1		-0.04						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/10/06 12:00 AM	7		2.48						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/10/06 12:00 AM	<1		0.21						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/10/06 12:00 AM	<1		-0.8						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/10/06 12:00 AM	<1		-0.02						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/10/06 12:00 AM	<1		2.63						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/10/06 12:00 AM	<1		-0.48						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/10/06 12:00 AM	4.2		0.92						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/10/06 12:00 AM	<1		-0.77						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/16/06 08:23 AM	1.7		0.07						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/16/06 08:35 AM	3.7		1.13						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/16/06 08:48 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/16/06 08:57 AM	18		1.64						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/16/06 09:22 AM	<1		0.67						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/16/06 09:33 AM	<1		-0.44						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/16/06 09:48 AM	<1		1.02						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/16/06 09:58 AM	5.5		7.64						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/16/06 10:27 AM	2.3		0.53						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/16/06 10:36 AM	4.8		3.69						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/16/06 10:51 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/16/06 10:58 AM	19		1.11						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/16/06 12:22 PM	1.1	NOT ENOUGH SAMPLE	0.92	8	22	36	120	91	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/16/06 12:23 PM	9.6	4	3.59	7.8	21	31	120	100	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/16/06 12:27 PM	<1	1	2.25	7.7	12	34	120	112	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/16/06 12:51 PM	8.3	2	2.76	7.4	25	40	120	114	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/16/06 01:54 PM	<1	2	3.32	7.7	13	37	150	133	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/16/06 02:05 PM	5.7	2	3.911	8.8	23	30	130	103	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	<1	2	3.14	7.7	25	35	130	101	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	<1	2	1.73	7.8	6.6	31	120	97	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	5.2	4	1.62	7.6	14	42	130	86	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	<1	4	2.06	7.9	8.8	40	110	72	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/16/06 03:08 PM	<1	2	1.56	7.9	18	29	120	78	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/16/06 03:12 PM	6.8	4	3.52	7.8	23	31	130	114	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/24/06 09:01 AM	1.7		1.66						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/24/06 09:12 AM	5.1		5.07						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/24/06 09:14 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/24/06 09:17 AM	17		2.36						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/24/06 09:42 AM	<1		3.48						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/24/06 09:46 AM	<1		1.69						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/24/06 09:50 AM	13		4.08						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/24/06 09:50 AM	<1		3.21						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/24/06 10:05 AM	1		2.19						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/24/06 10:08 AM	2.2		2.49						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/24/06 10:12 AM	<1		-0.02						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/24/06 10:12 AM	15		3.87						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/24/06 11:32 AM	12		1.27						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/24/06 11:38 AM	<1		0.8						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/24/06 11:44 AM	<1		0.88						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/24/06 11:48 AM	5.6		0.72						

				Ammonia as N mg/L Reported As	Odor at 60° C TON Reported As	Organic-Nitrogen mg/L Reported As	pH pH units Reported As	Potassium mg/L Reported As	Silica mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As	Temperature at Collection deg C Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/24/06 12:22 PM	4.2		2.8						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/24/06 12:27 PM	<1		1.62						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/24/06 12:31 PM	4.6		1.52						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/24/06 12:33 PM	2.7		3.05						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/24/06 12:34 PM	<1		1.21						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/24/06 12:37 PM	<1		0.79						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/24/06 12:42 PM	<1		0.52						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/24/06 12:48 PM	<1		0.34						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/31/06 12:00 AM	2.1		4.34						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/31/06 12:00 AM	4.7		2.67						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/31/06 12:00 AM	<1		3.74						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/31/06 12:00 AM	12		4.56						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/31/06 12:00 AM	12		5.33						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/31/06 12:00 AM	1.4		-0.53						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/31/06 12:00 AM	<1		2.17						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/31/06 12:00 AM	<1		2.6						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/31/06 12:00 AM	14		4.1						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/31/06 12:00 AM			Not Enough Sample						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/31/06 12:00 AM	6.1		3.44						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/31/06 12:00 AM	1.7		5.54						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/31/06 12:00 AM	<1		-0.19						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/31/06 12:00 AM	7.2		0.81						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/31/06 12:00 AM	<1		-2.24						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/31/06 12:00 AM	<1		0.53						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/31/06 12:00 AM	1.7		0.21						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/31/06 12:00 AM	<1		-1.48						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/31/06 12:00 AM	<1		-0.3						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/31/06 12:00 AM	<1		-0.95						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/31/06 12:00 AM	<1		0.58						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/31/06 12:00 AM	<1		-0.53						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/31/06 12:00 AM	4.9		-3.78						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/31/06 12:00 AM	<1		-1.43						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/07/06 12:00 AM	12		2.23						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/07/06 08:17 AM	<1		0.06						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/07/06 08:23 AM	<1		0.21						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/07/06 08:27 AM	1.8		-0.72						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/07/06 08:33 AM	9.4		5.84						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/07/06 08:49 AM	<1		1.41						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/07/06 08:54 AM	6.5		1.15						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/07/06 08:58 AM	2.8		1.53						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/07/06 09:01 AM	13		1.66						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/07/06 09:19 AM	1.5		-0.34						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/07/06 09:49 AM	5.5		1.38						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/07/06 09:52 AM	2.1		2.77						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/07/06 11:21 AM	14		not enough sample						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/07/06 11:24 AM	<1		0.27						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/07/06 11:30 AM	<1		0.44						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/07/06 11:34 AM	7.5		1.11						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/07/06 12:12 PM	11		2.79						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/07/06 12:16 PM	<1		2.73						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/07/06 12:19 PM	<1		-0.05						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/07/06 12:23 PM	<1		1.27						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/07/06 12:52 PM	<1		not enough sample						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/07/06 12:57 PM	1.6		not enough sample						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/07/06 01:00 PM	4.7		not enough sample						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/07/06 01:04 PM	<1		not enough sample						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/14/06 08:11 AM	<1		1.5						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/14/06 08:15 AM	<1		-0.2						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/14/06 08:19 AM	1.7		1.7						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/14/06 08:23 AM	8.4		3.3						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/14/06 08:43 AM	<1		3.2						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/14/06 08:48 AM	6		2.2						

				Ammonia as N mg/L Reported As	Odor at 60° C TON Reported As	Organic-Nitrogen mg/L Reported As	pH pH units Reported As	Potassium mg/L Reported As	Silica mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As	Temperature at Collection deg C Reported As
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/14/06 08:53 AM	1.4		NOT ENOUGH SAMPLE						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/14/06 09:01 AM	11		4.2						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/14/06 09:10 AM	9.2		3.1						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/14/06 09:15 AM	1.8		0.7						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/14/06 09:19 AM	4.7		1.8						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/14/06 09:25 AM	2.2		1.5						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/14/06 10:51 AM	1.5		1.8						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/14/06 10:57 AM	<1		1.1						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/14/06 11:02 AM	7		1.2						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/14/06 11:05 AM	2		1.3						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/14/06 11:45 AM	3.3		3.5						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/14/06 11:48 AM	1.3		0.1						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/14/06 11:52 AM	<1		2.9						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/14/06 11:54 AM	<1		2.2						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/14/06 12:26 PM	<1		4.5						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/14/06 12:31 PM	1		0.1						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/14/06 12:39 PM	4.9		1.4						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/14/06 12:41 PM	<1		0.6						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/20/06 09:09 AM	8.6	>4	1.9	8.1	24	21	110	116	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/20/06 10:08 AM	9	>4	2.1	8.5	20	18	100	73	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/20/06 10:44 AM	9	>4	5.3	8.2	23	20	100	90	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/20/06 12:49 PM	<1		7.6						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/20/06 12:51 PM	<1		2.3						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/20/06 12:58 PM	<1		0.2						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/20/06 01:02 PM	3		4.6						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/20/06 02:06 PM	<1		2.6						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/20/06 02:09 PM	<1		<5						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/20/06 02:19 PM	<1		4.6						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/20/06 02:20 PM	6		3.7						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/20/06 03:06 PM	<1		3.5						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/20/06 03:11 PM	4		2.2						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/20/06 03:23 PM	<1		1.2						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/20/06 03:29 PM	<1		4.8						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/21/06 07:21 AM	<1	>4	-0.3	7.6	2.1	44	120	124	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/21/06 07:24 AM	<1	>4	0.5	7.7	2.4	37	130	117	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/21/06 07:28 AM	<1	>4	1	7.6	12	50	170	208	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/21/06 07:41 AM	1	>4	2.8	7.6	6.3	49	120	115	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/21/06 07:59 AM	INSUFFICIENT SAMPLE	not enough sample	NOT ENOUGH SAMPLE	NOT ENOUGH SAMPLE				269	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/21/06 08:08 AM	2	>4	2.8	7.6	32	28	430	751	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/21/06 08:18 AM	<1	>4	0.9	7.7	4.1	52	120	109	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/21/06 08:25 AM	5.6	>4	0.4	7.5	13	47	140	148	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/21/06 08:47 AM	6	>4	2.8	7.7	13	54	120	80	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/28/06 08:32 AM	5.4		2.4						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/28/06 08:53 AM	<1		0.5						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/28/06 09:00 AM	1.3		0						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/28/06 09:05 AM	<1		0.7						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/28/06 09:33 AM	1.6		2.8						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/28/06 09:37 AM	<1		0.2						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/28/06 09:45 AM	4.7		2.6						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/28/06 09:50 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/28/06 10:25 AM	5.7		3.5						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/28/06 10:31 AM	1		0						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/28/06 10:35 AM	3.2		3.2						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/28/06 10:40 AM	2.4		2.8						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/28/06 12:21 PM	1.6		2.2						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/28/06 12:24 PM	14		1						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/28/06 12:24 PM	<1		0						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/28/06 12:32 PM	<1		-0.2						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/28/06 12:36 PM	5.5		0.7						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/28/06 01:26 PM	<1		-0.1						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/28/06 01:31 PM	<1		-0.7						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/28/06 01:35 PM	<1		-0.4						

				Ammonia as N mg/L Reported As	Odor at 60° C TON Reported As	Organic-Nitrogen mg/L Reported As	pH pH units Reported As	Potassium mg/L Reported As	Silica mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As	Temperature at Collection deg C Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/28/06 02:37 PM	<1		0.8						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/28/06 02:43 PM	<1		-0.8						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/28/06 02:49 PM	4.8		-0.6						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/28/06 02:52 PM	<1		-0.05						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/05/06 10:01 AM	5.8		2.9						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/05/06 10:05 AM	<1		0.2						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/05/06 10:13 AM	<1		1.5						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/05/06 10:16 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/05/06 10:47 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/05/06 10:56 AM	1.4		2.8						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/05/06 11:07 AM	1.4		0.2						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/05/06 11:11 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/05/06 11:43 AM	7.3		2.9						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/05/06 11:49 AM	3.4		1.2						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/05/06 11:55 AM	7.1		2.1						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/05/06 12:00 PM	1.3		0.07						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/12/06 01:09 PM	<1		1.6						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/12/06 01:14 PM	<1		2.6						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/12/06 01:17 PM	<1		0.5						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/12/06 01:23 PM	3.5		2.3						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/12/06 01:58 PM									
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/12/06 02:04 PM	5		3.2						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/12/06 02:08 PM	1		1.4						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/12/06 02:13 PM	<1		1						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/12/06 02:22 PM	2.5		2.8						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/12/06 02:26 PM	7.1		2.6						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/12/06 02:37 PM	1.1		0.4						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/12/06 02:43 PM	3.8		3.6						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/19/06 12:00 AM	4.6		0.7						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/19/06 12:00 AM	9.4		1						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/19/06 12:00 AM	1.4		-0.9						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/19/06 12:00 AM	10		0.8						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/19/06 12:00 AM	5.9		1						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/19/06 12:00 AM	1.2		0.5						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/19/06 12:00 AM	<1		0						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/19/06 12:00 AM	<1		-1						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/19/06 12:00 AM	<1		0.2						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/19/06 12:00 AM	7		0.7						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/19/06 12:00 AM	1.1		-2						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/26/06 08:12 AM	<1		1						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/26/06 08:18 AM	5.5		3						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/26/06 08:20 AM	<1		1						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/26/06 08:25 AM	<1		2						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/26/06 08:46 AM	NOT ENOUGH SAMPLE		NOT ENOUGH SAMPLE						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/26/06 08:51 AM	3.7		3						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/26/06 08:57 AM	<1		2						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/26/06 09:05 AM	<1		2						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/26/06 09:27 AM	4.3		3						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/26/06 09:31 AM	6.5		4						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/26/06 09:39 AM	<1		1						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/26/06 09:45 AM	9.2		4						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	10/26/06 11:09 AM	<1		3						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	10/26/06 11:19 AM	<1		2						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	10/26/06 11:28 AM	4		0.05						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	10/26/06 11:32 AM	<1		4						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	10/26/06 12:17 PM	<1		4						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	10/26/06 12:21 PM	<1		2						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	10/26/06 12:24 PM	<1		4						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	10/26/06 12:34 PM	<1		4						
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 29	10/26/06 12:53 PM	<1		4						
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 19	10/26/06 12:56 PM	<1		3						
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 8.	10/26/06 12:59 PM	<1		5						

				Ammonia as N mg/L Reported As	Odor at 60° C TON Reported As	Organic-Nitrogen mg/L Reported As	pH pH units Reported As	Potassium mg/L Reported As	Silica mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As	Temperature at Collection deg C Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	10/26/06 01:35 PM	<1		4						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	10/26/06 01:39 PM	4		5						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	10/26/06 01:43 PM	1		3						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	10/26/06 01:53 PM	4		5						
SUBBASE-PERRIS NORTH	MVRWRF_SOUTH	MVRWRF SOUTH	11/30/06 08:08 AM	<1			7.4	1.2	55	130	55	17
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	11/30/06 08:17 AM	<1		1.9						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	11/30/06 08:21 AM	<1		2.2						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	11/30/06 08:27 AM	<1		1.9						
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	11/30/06 08:33 AM	4.8		4.9						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	11/30/06 08:59 AM									
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	11/30/06 09:03 AM	4.3		3						
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	11/30/06 09:05 AM	2.9		2.7						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	11/30/06 09:07 AM	1.1		2						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	11/30/06 09:33 AM	3.3		3.8						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	11/30/06 09:36 AM	1.3		5.1						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	11/30/06 09:37 AM	7.3		2.4						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	11/30/06 09:42 AM	1		3						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	11/30/06 12:01 PM	<1	>4	1.9	8	20	29	110	97	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	11/30/06 12:09 PM	6.2	>4	4.6	8.6	20	27	120	92	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	11/30/06 12:12 PM	<1	>4	2.5	7.8	11	34	110	103	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	11/30/06 12:18 PM	3.1	>4	2.9	7.6	18	26	110	86	
SUBBASE-PERRIS NORTH	MVRWRF_NORTH	MVRWRF NORTH	11/30/06 12:25 PM	<1			7.4	2.3	67	390	247	22
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	11/30/06 01:40 PM	1.1	>4	3.8	9.3	19	20	120	98	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	11/30/06 01:51 PM	<1	>4	0.2	7.8	6.9	29	110	93	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	11/30/06 01:57 PM	<1	>4	0.2	7.8	11	<1	120	101	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	11/30/06 02:02 PM	2.6	>4	0	7.7	18	31	100	78	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	11/30/06 02:38 PM	1.6	>4	0.3	8.7	22	32	120	87	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	11/30/06 02:50 PM	<1	>4	2.4	7.7	10	41	110	59	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	11/30/06 02:55 PM	5	>4	0	7.6	15	40	120	61	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	11/30/06 03:00 PM	<1	>4	0.3	7.8	17	29	120	75	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	12/20/06 08:30 AM	<1	4	2.4	7.4	1.4	40	97	69	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	12/20/06 08:39 AM	5.4	8	2.8	8.4	20	21	98	68	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	12/20/06 08:53 AM								NOT ENOUGH SAMPLE	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	12/20/06 08:59 AM	6.6	4	0.5	7.4	12	39	100	41	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	12/20/06 09:05 AM	1.6	4	1.6	7.5	6.2	51	120	88	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	12/20/06 09:13 AM	7.9	4	2.8	7.3	19	22	120	66	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	12/20/06 09:44 AM	1.2	20	5.2	7.5	19	11	140	81	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	12/20/06 12:25 PM	10		11						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	12/20/06 12:28 PM	<1		1.9						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	12/20/06 12:35 PM	1		1.3						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	12/20/06 12:38 PM	2.1		1.1						
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	12/20/06 01:22 PM	4.5		8.6						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	12/20/06 01:25 PM	<1		2						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	12/20/06 01:30 PM	1.2		0.8						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	12/20/06 01:32 PM	2.4		1.3						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	12/20/06 02:01 PM	4.8		5.7						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	12/20/06 02:11 PM	1.4		1.3						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	12/20/06 02:15 PM	3.9		1.7						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	12/20/06 02:21 PM	2.1		1.1						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	12/21/06 08:05 AM	<1	4	0.8	7.8	8.3	40	120	79	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	<1	4	1.6	7.8	2	34	110	109	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	12/21/06 09:24 AM	5	20	2.7	7.8	18	19	200	238	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	4	4	0	7.4	12	36	94	119	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	1	8	0	7.7	3.7	55	120	102	
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	<1			7.5	2.7	82	380	291	
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	<1			7.5	1	55	130	56	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	01/24/07 09:05 AM	4		7.7						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	01/24/07 09:22 AM	<2		1.5						
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	01/24/07 09:25 AM	8		4.2						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	01/24/07 09:47 AM	<2		1.8						
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	01/24/07 10:01 AM	<2		0.1						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	01/24/07 10:29 AM	<2		1.8						

				Ammonia as N mg/L Reported As	Odor at 60° C TON Reported As	Organic-Nitrogen mg/L Reported As	pH pH units Reported As	Potassium mg/L Reported As	Silica mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As	Temperature at Collection deg C Reported As
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	01/24/07 10:34 AM	<2		0.4						
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	01/24/07 10:59 AM	<2		0.6						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	01/24/07 11:11 AM	<2		2.6						
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	01/24/07 11:17 AM	<2		9.7						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	01/24/07 11:38 AM	<2		2.5						
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	01/24/07 12:01 PM	<2		3.2						
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	01/25/07 08:32 AM	<2		0.9						
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	01/25/07 08:38 AM	<2		0.5						
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	01/25/07 08:43 AM	<2		0.4						
MV-RWRF	POND 19	MVP19 LYSIMETER RECY	01/25/07 08:51 AM	7		2.6						
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	01/25/07 09:00 AM									
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	01/25/07 09:06 AM	4		1.5						
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	01/25/07 09:11 AM	<2		1.2						
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	01/25/07 09:18 AM	10		3.2						
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	01/25/07 09:33 AM	5		0.4						
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	01/25/07 09:37 AM	<2		3.6						
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	01/25/07 09:44 AM	<2		0.6						
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	01/25/07 09:49 AM	13		3						

				Total Alkalinity as CaCO3 mg/L Reported As	Total Chlorine Residual mg/L Reported As	Total Dissolved Solids mg/L Reported As	Total Inorganic Nitrogen mg/L Reported As	Total Organic Carbon mg/L Reported As	Turbidity NTU Reported As	Zinc ug/L Reported As
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/06/06 03:00 PM			580				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/06/06 03:15 PM			700		3.4		
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/06/06 03:45 PM			1100		35		
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/06/06 04:00 PM			700		43		
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/06/06 04:34 PM			650		6.6		
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/06/06 04:40 PM			640		3.2		
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/06/06 04:45 PM			720		4.2		
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/06/06 04:51 PM			660		18		
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/06/06 05:27 PM			650		4.2		
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/06/06 05:34 PM			640		6.1		
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/06/06 05:38 PM			580		5		
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/06/06 05:42 PM			720		48		
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/13/06 10:09 AM			590		6		
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/13/06 10:16 AM			720		2.8		
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/13/06 10:21 AM			790		13		
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/13/06 10:48 AM			670		19		
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/13/06 11:40 AM			680		6.7		
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/13/06 11:46 AM			800		7.2		
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/13/06 11:58 AM			700		4		
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/13/06 01:12 PM			710		29		
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/13/06 01:20 PM			660		4.1		
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/13/06 01:25 PM			580		5.3		
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/13/06 01:37 PM			620		6		
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/13/06 02:12 PM			600		18		
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/20/06 12:00 AM			600				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/20/06 12:00 AM			660				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/20/06 12:00 AM			620				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/20/06 12:00 AM			720				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/20/06 12:00 AM			550				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/20/06 12:00 AM			890				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/20/06 12:00 AM			650				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/20/06 12:00 AM			660				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/20/06 12:00 AM			610				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/20/06 12:00 AM			660				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/20/06 12:00 AM			590				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/20/06 12:00 AM			540				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	07/27/06 08:36 AM			690				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	07/27/06 08:42 AM			720				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	07/27/06 08:50 AM			600				
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	07/27/06 08:55 AM			580				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	07/27/06 10:01 AM			680				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	07/27/06 10:06 AM			760				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	07/27/06 10:13 AM			760				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	07/27/06 10:18 AM			620				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	07/27/06 11:06 AM			710				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	07/27/06 11:11 AM			600				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	07/27/06 11:15 AM			660				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	07/27/06 11:18 AM			620				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/04/06 08:32 AM			660				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/04/06 08:40 AM			760				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/04/06 08:43 AM			620				
HSJ-RWRF	ALESSANDRO POND 2	P2 aRECYCLE WATER	08/04/06 08:52 AM			640				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/04/06 09:46 AM			670				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/04/06 09:50 AM			720				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/04/06 09:54 AM			720				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/04/06 09:58 AM			600				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/04/06 10:40 AM			670				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/04/06 10:45 AM			680				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/04/06 10:51 AM			590				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/04/06 10:56 AM			680				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/10/06 12:00 AM							
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/10/06 12:00 AM			620				

				Total Alkalinity as CaCO3 mg/L Reported As	Total Chlorine Residual mg/L Reported As	Total Dissolved Solids mg/L Reported As	Total Inorganic Nitrogen mg/L Reported As	Total Organic Carbon mg/L Reported As	Turbidity NTU Reported As	Zinc ug/L Reported As
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/10/06 12:00 AM							
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/10/06 12:00 AM			880				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/10/06 12:00 AM			550				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/10/06 12:00 AM							
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/10/06 12:00 AM							
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/10/06 12:00 AM			620				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/10/06 12:00 AM			760				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/10/06 12:00 AM							
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/10/06 12:00 AM			590				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/10/06 12:00 AM							
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/10/06 12:00 AM			620				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/10/06 12:00 AM			590				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/10/06 12:00 AM			640				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/10/06 12:00 AM			740				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/10/06 12:00 AM			620				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/10/06 12:00 AM			720				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/10/06 12:00 AM			820				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/10/06 12:00 AM			660				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/10/06 12:00 AM			680				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/10/06 12:00 AM			640				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/10/06 12:00 AM			630				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/10/06 12:00 AM			670				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/16/06 08:23 AM			780				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/16/06 08:35 AM			580				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/16/06 08:48 AM			NOT ENOUGH SAMPLE				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/16/06 08:57 AM			440				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/16/06 09:22 AM			650				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/16/06 09:33 AM			610				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/16/06 09:48 AM			790				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/16/06 09:58 AM			3520				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/16/06 10:27 AM			730				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/16/06 10:36 AM			610				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/16/06 10:51 AM			NOT ENOUGH SAMPLE				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/16/06 10:58 AM			510				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/16/06 12:22 PM	220		677			6.5	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/16/06 12:23 PM	160		613			0.8	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/16/06 12:27 PM	300		740			0.3	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/16/06 12:51 PM	160		672			0.9	
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/16/06 01:54 PM	250		790			11	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/16/06 02:05 PM	150		635			3.1	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	220		728			0.4	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	230		681			12	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	170		633			13	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	260		675			18	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/16/06 03:08 PM	210		632			8.5	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/16/06 03:12 PM	160		660			2.3	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/24/06 09:01 AM			740				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/24/06 09:12 AM			1220				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/24/06 09:14 AM			INSUFFICIENT SAMPLE				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/24/06 09:17 AM			640				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/24/06 09:42 AM			670				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/24/06 09:46 AM			630				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/24/06 09:50 AM			590				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/24/06 09:50 AM			790				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/24/06 10:05 AM			750				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/24/06 10:08 AM			580				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/24/06 10:12 AM			3010				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/24/06 10:12 AM			500				
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/24/06 11:32 AM			630				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/24/06 11:38 AM			670				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/24/06 11:44 AM			740				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/24/06 11:48 AM			550				

				Total Alkalinity as CaCO3 mg/L Reported As	Total Chlorine Residual mg/L Reported As	Total Dissolved Solids mg/L Reported As	Total Inorganic Nitrogen mg/L Reported As	Total Organic Carbon mg/L Reported As	Turbidity NTU Reported As	Zinc ug/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/24/06 12:22 PM			630				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/24/06 12:27 PM			710				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/24/06 12:31 PM			620				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/24/06 12:33 PM			610				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/24/06 12:34 PM			660				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/24/06 12:37 PM			660				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/24/06 12:42 PM			760				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/24/06 12:48 PM			730				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	08/31/06 12:00 AM			2970				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	08/31/06 12:00 AM			910				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	08/31/06 12:00 AM			750				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	08/31/06 12:00 AM			530				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	08/31/06 12:00 AM			600				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	08/31/06 12:00 AM			800				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	08/31/06 12:00 AM			640				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	08/31/06 12:00 AM			630				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	08/31/06 12:00 AM			470				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	08/31/06 12:00 AM							
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	08/31/06 12:00 AM			830				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	08/31/06 12:00 AM			710				
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	08/31/06 12:00 AM			590				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	08/31/06 12:00 AM			600				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/31/06 12:00 AM			680				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/31/06 12:00 AM			740				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	08/31/06 12:00 AM			620				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	08/31/06 12:00 AM			730				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/31/06 12:00 AM			760				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/31/06 12:00 AM			660				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	08/31/06 12:00 AM			640				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	08/31/06 12:00 AM			640				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/31/06 12:00 AM			630				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/31/06 12:00 AM			650				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/07/06 12:00 AM			512				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/07/06 08:17 AM			618				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/07/06 08:23 AM			650				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/07/06 08:27 AM			822				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/07/06 08:33 AM			584				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/07/06 08:49 AM			668				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/07/06 08:54 AM			718				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/07/06 08:58 AM			1488				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/07/06 09:01 AM			475				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/07/06 09:19 AM			716				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/07/06 09:49 AM			806				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/07/06 09:52 AM			2182				
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/07/06 11:21 AM			605				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/07/06 11:24 AM			672				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/07/06 11:30 AM			754				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/07/06 11:34 AM			594				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/07/06 12:12 PM			656				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/07/06 12:16 PM			696				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/07/06 12:19 PM			760				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/07/06 12:23 PM			811				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/07/06 12:52 PM			672				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/07/06 12:57 PM			661				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/07/06 01:00 PM			623				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/07/06 01:04 PM			661				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/14/06 08:11 AM			668				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/14/06 08:15 AM			776				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/14/06 08:19 AM			920				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/14/06 08:23 AM			596				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/14/06 08:43 AM			696				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/14/06 08:48 AM			702				

				Total Alkalinity as CaCO3 mg/L Reported As	Total Chlorine Residual mg/L Reported As	Total Dissolved Solids mg/L Reported As	Total Inorganic Nitrogen mg/L Reported As	Total Organic Carbon mg/L Reported As	Turbidity NTU Reported As	Zinc ug/L Reported As
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/14/06 08:53 AM			Not enough sample				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/14/06 09:01 AM			501				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/14/06 09:10 AM			550				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/14/06 09:15 AM			746				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/14/06 09:19 AM			720				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/14/06 09:25 AM			1752				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/14/06 10:51 AM			666				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/14/06 10:57 AM			738				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/14/06 11:02 AM			610				
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/14/06 11:05 AM			583				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/14/06 11:45 AM			627				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/14/06 11:48 AM			661				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/14/06 11:52 AM			761				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/14/06 11:54 AM			804				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/14/06 12:26 PM			746				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/14/06 12:31 PM			652				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/14/06 12:39 PM			624				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/14/06 12:41 PM			669				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/20/06 09:09 AM	170		580			3	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/20/06 10:08 AM	140		479			2	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/20/06 10:44 AM	170		533			4	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/20/06 12:49 PM			710				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/20/06 12:51 PM			630				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/20/06 12:58 PM			730				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/20/06 01:02 PM			610				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/20/06 02:06 PM			670				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/20/06 02:09 PM			750				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/20/06 02:19 PM			730				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/20/06 02:20 PM			600				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/20/06 03:06 PM			660				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/20/06 03:11 PM			610				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/20/06 03:23 PM			650				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/20/06 03:29 PM			620				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/21/06 07:21 AM	230		694			3	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/21/06 07:24 AM	260		748			20	
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/21/06 07:28 AM	370		998			40	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/21/06 07:41 AM	220		659			0.6	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/21/06 07:59 AM	NOT ENOUGH SAMPLE		Not enough sample			not enough sample	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/21/06 08:08 AM	360		1778			0.6	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/21/06 08:18 AM	220		726			6.7	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/21/06 08:25 AM	290		775			0.9	
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/21/06 08:47 AM	280		634			10	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	09/28/06 08:32 AM			604				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	09/28/06 08:53 AM			742				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	09/28/06 09:00 AM			762				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	09/28/06 09:05 AM			1044				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	09/28/06 09:33 AM			512				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	09/28/06 09:37 AM			672				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	09/28/06 09:45 AM			628				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	09/28/06 09:50 AM			Not enough sample				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	09/28/06 10:25 AM			606				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	09/28/06 10:31 AM			740				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	09/28/06 10:35 AM			908				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	09/28/06 10:40 AM			1592				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	09/28/06 12:21 PM			623				
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	09/28/06 12:24 PM			548				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	09/28/06 12:24 PM			656				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	09/28/06 12:32 PM			742				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	09/28/06 12:36 PM			640				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	09/28/06 01:26 PM			656				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	09/28/06 01:31 PM			752				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	09/28/06 01:35 PM			760				

				Total Alkalinity as CaCO3 mg/L Reported As	Total Chlorine Residual mg/L Reported As	Total Dissolved Solids mg/L Reported As	Total Inorganic Nitrogen mg/L Reported As	Total Organic Carbon mg/L Reported As	Turbidity NTU Reported As	Zinc ug/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	09/28/06 02:37 PM			696				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	09/28/06 02:43 PM			648				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	09/28/06 02:49 PM			616				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	09/28/06 02:52 PM			656				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/05/06 10:01 AM			589				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/05/06 10:05 AM			808				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/05/06 10:13 AM			754				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/05/06 10:16 AM			982				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/05/06 10:47 AM			Not enough sample				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/05/06 10:56 AM			504				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/05/06 11:07 AM			668				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/05/06 11:11 AM			616				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/05/06 11:43 AM			580				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/05/06 11:49 AM			1700				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/05/06 11:55 AM			1100				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/05/06 12:00 PM			684				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/12/06 01:09 PM			820				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/12/06 01:14 PM			910				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/12/06 01:17 PM			740				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/12/06 01:23 PM			570				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/12/06 01:58 PM							
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/12/06 02:04 PM			550				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/12/06 02:08 PM			640				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/12/06 02:13 PM			510				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/12/06 02:22 PM			1630				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/12/06 02:26 PM			1380				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/12/06 02:37 PM			700				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/12/06 02:43 PM			690				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/19/06 12:00 AM			840				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/19/06 12:00 AM			1470				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/19/06 12:00 AM			660				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/19/06 12:00 AM			470				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/19/06 12:00 AM			510				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/19/06 12:00 AM			800				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/19/06 12:00 AM			720				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/19/06 12:00 AM			810				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/19/06 12:00 AM			470				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/19/06 12:00 AM			480				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/19/06 12:00 AM			620				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	10/26/06 08:12 AM			780				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	10/26/06 08:18 AM			490				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	10/26/06 08:20 AM			720				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	10/26/06 08:25 AM			750				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	10/26/06 08:46 AM			NOT ENOUGH SAMPLE				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	10/26/06 08:51 AM			510				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	10/26/06 08:57 AM			670				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	10/26/06 09:05 AM			510				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	10/26/06 09:27 AM			1020				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	10/26/06 09:31 AM			1360				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	10/26/06 09:39 AM			690				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	10/26/06 09:45 AM			400				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	10/26/06 11:09 AM			710				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	10/26/06 11:19 AM			760				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	10/26/06 11:28 AM			600				
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	10/26/06 11:32 AM			500				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	10/26/06 12:17 PM			690				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	10/26/06 12:21 PM			700				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	10/26/06 12:24 PM			610				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	10/26/06 12:34 PM			550				
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 29	10/26/06 12:53 PM			660				
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 19	10/26/06 12:56 PM			690				
HSJ-RWRF	ALESSANDRO POND 10	DUP P10 LYSIMETER 8.	10/26/06 12:59 PM			640				

				Total Alkalinity as CaCO3 mg/L Reported As	Total Chlorine Residual mg/L Reported As	Total Dissolved Solids mg/L Reported As	Total Inorganic Nitrogen mg/L Reported As	Total Organic Carbon mg/L Reported As	Turbidity NTU Reported As	Zinc ug/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	10/26/06 01:35 PM			660				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	10/26/06 01:39 PM			630				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	10/26/06 01:43 PM			680				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	10/26/06 01:53 PM			610				
SUBBASE-PERRIS NORTH	MVRWRF_SOUTH	MVRWRF SOUTH	11/30/06 08:08 AM	230		630	0.6	3.8		25
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	11/30/06 08:17 AM			650				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	11/30/06 08:21 AM			710				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	11/30/06 08:27 AM			710				
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	11/30/06 08:33 AM			470				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	11/30/06 08:59 AM							
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	11/30/06 09:03 AM			460				
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	11/30/06 09:05 AM			510				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	11/30/06 09:07 AM			680				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	11/30/06 09:33 AM			1210				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	11/30/06 09:36 AM			830				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	11/30/06 09:37 AM			500				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	11/30/06 09:42 AM			710				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	11/30/06 12:01 PM	190		610			2	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	11/30/06 12:09 PM	150		580			1	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	11/30/06 12:12 PM	280		710			0.3	
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	11/30/06 12:18 PM	150		540			2	
SUBBASE-PERRIS NORTH	MVRWRF_NORTH	MVRWRF NORTH	11/30/06 12:25 PM	250		1540	10	2.1		26
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	11/30/06 01:40 PM	53		510			4	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	11/30/06 01:51 PM	230		680			6	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	11/30/06 01:57 PM	230		710			8	
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	11/30/06 02:02 PM	170		570			0.6	
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	11/30/06 02:38 PM	170		630			3	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	11/30/06 02:50 PM	230		640			20	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	11/30/06 02:55 PM	210		460			9	
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	11/30/06 03:00 PM	270		710			3	
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	12/20/06 08:30 AM	131		500			10	
MV-RWRF	POND 19	MVP19 aRECYCLED WATER	12/20/06 08:39 AM	109		460			8	
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	12/20/06 08:53 AM							
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	12/20/06 08:59 AM	149		460			3	
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	12/20/06 09:05 AM	182		590			1	
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	12/20/06 09:13 AM	179		450			10	
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	12/20/06 09:44 AM	218		490			20	
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	12/20/06 12:25 PM			610				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	12/20/06 12:28 PM			620				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	12/20/06 12:35 PM			690				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	12/20/06 12:38 PM			960				
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	12/20/06 01:22 PM			590				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	12/20/06 01:25 PM			710				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	12/20/06 01:30 PM			730				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	12/20/06 01:32 PM			590				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	12/20/06 02:01 PM			640				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	12/20/06 02:11 PM			670				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	12/20/06 02:15 PM			670				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	12/20/06 02:21 PM			850				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	12/21/06 08:05 AM	301		610			20	
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	256		630			6	
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	12/21/06 09:24 AM	232		810			3	
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	155		560			6	
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	251		680			4	
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	250		1620	12	1.8		25
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	230		630	0.6	3.7		<5
HSJ-RWRF	ALESSANDRO POND 10	P10 aRECYCLE WATER	01/24/07 09:05 AM			620				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 07.1 FT	01/24/07 09:22 AM			790				
HSJ-RWRF	ALESSANDRO POND 1	P1 aRECYCLE WATER	01/24/07 09:25 AM			690				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	01/24/07 09:47 AM			710				
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	01/24/07 10:01 AM			790				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 08.5 FT	01/24/07 10:29 AM			660				

				Total Alkalinity as CaCO3 mg/L Reported As	Total Chlorine Residual mg/L Reported As	Total Dissolved Solids mg/L Reported As	Total Inorganic Nitrogen mg/L Reported As	Total Organic Carbon mg/L Reported As	Turbidity NTU Reported As	Zinc ug/L Reported As
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	01/24/07 10:34 AM			700				
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	01/24/07 10:59 AM			680				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 07.5 FT	01/24/07 11:11 AM			850				
HSJ-RWRF	ALESSANDRO POND 15	P15 aRECYCLE WATER	01/24/07 11:17 AM			670				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	01/24/07 11:38 AM			670				
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	01/24/07 12:01 PM			600				
MV-RWRF	POND 19	MVP19 LYSIMETER 07.5	01/25/07 08:32 AM			600				
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	01/25/07 08:38 AM			620				
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	01/25/07 08:43 AM			470				
MV-RWRF	POND 19	MVP19 LYSIMETER RECY	01/25/07 08:51 AM			490				
MV-RWRF	POND 22	MVP22 LYSIMETRER 06.0	01/25/07 09:00 AM							
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	01/25/07 09:06 AM			500				
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	01/25/07 09:11 AM			590				
MV-RWRF	POND 22	MVP22 aRECYCLED WATER	01/25/07 09:18 AM			490				
MV-RWRF	POND 14	MVP14 LYSIMETER 07.5	01/25/07 09:33 AM			710				
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	01/25/07 09:37 AM			540				
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	01/25/07 09:44 AM			700				
MV-RWRF	POND 14	MVP14 aRECYCLED WATER	01/25/07 09:49 AM			540				

Appendix I

Water Quality Summary Tables

Table I-1. Alessandro Pond 1
Analytical Results, Pond and Pore Water

			Concentration (mg/L)																					
			1st quarter (DBS&A Samples)													2nd quarter (DBS&A Samples)			3rd quarter (EMWD Samples)			4th quarter (EMWD samples)		
		Sample Date:	7/6/2006	7/13/2006	7/20/2006	7/27/2006	8/4/2006	8/10/2006	***8/16/2006***	8/24/2006	8/31/2006	9/7/2006	9/14/2006	9/21/2006	**9/28/2006**	10/26/2006	***11/30/2006***	**12/20/2006**	1/24/2007	***2/22/2007***	**3/29/2007**	4/26/2007	***5/31/2007***	**6/28/2007**
Analyte	**PQL**	**Sample ID:**																						
TDS	100	AP1-SW	700	600	600	580	640	620	613	630								610	690					
		AP1-7.1	1100	790	660	600	620	590	672	550								960	790					
		AP1-14.5	580	590	620	690	660	640	677	670								620	710					
		AP1-29.2	700	720	720	720	760	740	740	740								690	790					
Ammonia N	1	AP1-SW	11	<1	6.4	3.8	8.8	8.9	9.6	12	<1	14	2	<1	14	<1	6.2	10	8					
		AP1-7.1	0.5	1.4	0.5	5.2	8.2	6.2	8.3	5.6	1	7.5	7	3	5.5	4	3.1	2.1	<2					
		AP1-14.5	1.1	1.2	0.5	0.5	0.5	<1	1.1	0.5	<1	<1	1.5	<1	<1	<1	<1	<1	<2					
		AP1-29.2	0.5	<1	0.5	0.5	0.5	0.5	0.5	0.5	<1	<1	<1	<1	<1	<1	<1	1	<2					
Nitrate N	0.1	AP1-SW	4.2	<0.1	1.8	0.2	0.05	0.5	3.1	1.7	0.4	0.6	<0.1	2	2.2	<0.1	0.8	1.8	3.8					
		AP1-7.1	38	5	3.7	0.5	1	0.4	7.6	2.6	0.1	0.4	0.3	0.1	1.6	0.5	0.2	62	19					
		AP1-14.5	<0.1	0.1	0.9	2.1	1.2	0.3	0.3	0.6	1	0.8	0.4	0.3	0.1	0.3	3.5	3.1	4.2					
		AP1-29.2	0.9	0.9	1	2.2	1.9	1.2	0.7	0.5	0.5	0.8	0.5	0.6	0.9	1.4	0.7	0.9	0.3					
Nitrite N	0.1	AP1-SW	0.2	0.01	0.4	0.1	0.2	0.2	0.9	0.6	2.3	0.09	<0.01	0.4	0.2	0.03	0.6	0.3	0.1					
		AP1-7.1	0.5	0.2	0.2	0.07	0.2	0.04	0.3	1.1	0.02	0.04	0.09	0.02	0.1	0.1	0.2	1.8	0.1					
		AP1-14.5	0.02	0.1	0.6	0.3	0.02	0.01	0.005	0.005	0.01	<0.01	0.02	<0.01	<0.01	0.05	0.1	0.08	<0.01					
		AP1-29.2	0.01	0.02	0.04	0.2	0.03	0.01	0.02	0.01	0.01	0.01	0.03	0.04	0.02	0.03	0.03	0.03	0.01					
Total Kjeldahl N	5	AP1-SW	17	8.8	11	6.2	10	12	13	14	<5	INSUFFICIENT SAMPLE	<5	7.5	15	<5	11	21	12					
		AP1-7.1	<5	<5	<5	5.8	11	6.1	11	6.3	6.4	9	7.8	7.8	6.2	<5	6	<5	<5					
		AP1-14.5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
		AP1-29.2	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Organic N	1	AP1-SW	5.91	7.82	4.38	2.4	1.8	2.9	3.59	1.27	-0.19	not enough sample	1.3	7.6	1	4	4.6	11	4.2					
		AP1-7.1	2.68	-0.02	2.92	0.57	2.5	-0.5	2.76	0.72	0.81	1.11	1.2	4.6	0.7	0.05	2.9	1.1	1.5					
		AP1-14.5	1.58	0.14	3.62	1.55	1	1.84	0.92	0.8	-2.24	0.27	1.8	2.3	0	3	1.9	1.9	1.8					
		AP1-29.2	0.14	0.28	2.19	1.01	1.1	-0.04	2.25	0.88	0.53	0.44	1.1	0.2	-0.2	2	2.5	1.3	0.1					
Total Organic C	1	AP1-SW	43	16.106	15	18	13	16	11				16	28										
		AP1-7.1	35	12.912	12	11	10	9.3	10				7.5	7.7										
		AP1-14.5		6.746	7.2	7	6	5.6	5.8				4.3	5.1										
		AP1-29.2	3.4	3.796	3.9	3.9	2.6	2.7	2.5				2.5	2.9										

Notes: Bold, italicized sample dates indicate general mineral (including boron and chloride) suite was run on subject samples. Bold sample dates indicate boron and chloride analyses were run on samples.
PQL = Practicial Quantification Limit. Pond 2 surface water presented as surrogate for Pond 1 water when Pond 1 was dry.

Table I-2. Alessandro Pond 10
Analytical Results, Pond and Pore Water

			Concentration (mg/L)																					
			1st quarter (DBS&A Samples)													2nd quarter (DBS&A Samples)			3rd quarter (EMWD Samples)			4th quarter (EMWD samples)		
		Sample Date:	7/6/2006	7/13/2006	7/20/2006	7/27/2006	8/4/2006	8/10/2006	8/10/2006	8/24/2006	8/31/2006	9/7/2006	9/14/2006	9/21/2006	9/28/2006	10/26/2006	11/30/2006	12/20/2006	1/24/2007	2/22/2007	3/29/2007	4/26/2007	5/31/2007	6/28/2007
Analyte	PQL	Sample ID:																						
TDS	100	AP10-SW	660	670	550	620	600	620	790	610	620	656	627	600	623	550	510	590	620					
		AP10-8.5	650	800	890	760	720	720	635	730	730	811	804	730	760	610	570	590	660					
		AP10-19.5	640	680	650	760	720	820	728	760	760	760	761	750	752	700	710	730	700					
		AP10-29.0	720	700	660	680	670	660	681	660	660	696	661	670	656	690	680	710	680					
Ammonia N	1	AP10-SW	6.4	5.5	1.8	0.5	14	7	0.5	2.7	1.7	11	3.3	6	1.6	<1	1.1	4.5	4					
		AP10-8.5	1.5	1.8	1.4	0.5	0.5	0.5	5.7	0.5	<1	<1	<1	<1	<1	<1	2.6	2.4	<2					
		AP10-19.5	0.5	1.1	0.5	0.5	0.5	0.5	0.5	0.5	<1	<1	<1	<1	<1	<1	<1	1.2	<2					
		AP10-29.0	0.5	<1	0.5	0.5	0.5	0.5	0.5	0.5	<1	<1	1.3	<1	<1	<1	<1	<1	<2					
Nitrate N	0.1	AP10-SW	3.3	2	0.3	0.05	0.4	0.05	0.05	0.1	0.1	<0.1	<0.1	0.3	<0.1	1.4	<0.1	0.8	2.5					
		AP10-8.5	0.05	3.3	7.9	0.4	0.05	4.7	0.9	1.9	1.6	1	0.3	2.3	3.5	<0.1	<0.1	<0.1	0.9					
		AP10-19.5	0.05	<0.1	0.05	0.05	0.05	0.05	0.1	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1					
		AP10-29.0	0.05	<0.1	0.05	0.05	0.05	0.05	0.05	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1					
Nitrite N	0.1	AP10-SW	0.2	0.2	0.1	0.01	0.1	0.04	0.01	0.05	1.3	0.03	0.04	0.07	0.02	0.3	<0.01	0.2	0.1					
		AP10-8.5	0.01	0.08	0.5	0.04	0.01	0.01	0.2	0.09	0.3	0.3	0.2	0.3	0.4	<0.01	<0.01	<0.01	<0.01					
		AP10-19.5	0.005	<0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					
		AP10-29.0	0.005	<0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					
Total Kjeldahl N	5	AP10-SW	14	13	7.3	<5	20	9.5	<5	5.8	<5	14	6.8	10	<5	<5	<5	13	12					
		AP10-8.5	<5.0	<5	<5	<5	<5	<5	9.6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
		AP10-19.5	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
		AP10-29.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Organic N	0	AP10-SW	7.38	7.57	5.49	4.26	5.1	2.48	3.32	3.05	0.21	2.79	3.5	3.7	2.2	4	3.8	8.6	7.7					
		AP10-8.5	0.25	0.56	2.91	2.11	0.8	0.21	3.911	0.34	-1.48	1.27	2.2	4.6	-0.4	4	0	1.3	1.8					
		AP10-19.5	-0.35	-1.13	1.93	1.46	0.1	-0.8	3.14	0.52	-0.3	-0.05	2.9	<5	-0.7	2	0.2	0.8	0.4					
		AP10-29.0	-0.45	0.27	2.28	1.63	0.6	-0.02	1.73	0.79	-0.95	2.73	0.1	2.6	-0.1	4	0.2	2	0.6					
Total Organic C	1	AP10-SW	18	16.895	19	21	14	17	8.4															
		AP10-8.5	6.6	8.483	8.8	8.6	6.8	5.6	16															
		AP10-19.5	3.2	7.245	8.2	13	8.6	15	4.8															
		AP10-29.0	4.2	4.707	4.7	4.6	3.2	3.8	3.3															

Notes: Bold, italicized sample dates indicate general mineral (including boron and chloride) suite was run on subject samples. Bold sample dates indicate boron and chloride analyses were run on samples.
PQL = Practicial Quantification Limit

Table I-3. Alessandro Pond 15
Analytical Results, Pond and Pore Water

			Concentration (mg/L)																					
			1st quarter (DBS&A Samples)													2nd quarter (DBS&A Samples)			3rd quarter (EMWD Samples)			4th quarter (EMWD samples)		
		Sample Date:	7/6/2006	7/13/2006	7/20/2006	7/27/2006	8/4/2006	8/10/2006	***8/16/2006***	8/24/2006	8/31/2006	9/7/2006	9/14/2006	9/21/2006	**9/28/2006**	10/26/2006	***11/30/2006***	**12/20/2006**	1/24/2007	***2/22/2007***	**3/29/2007**	4/26/2007	***5/31/2007***	**6/28/2007**
Analyte	**PQL**	**Sample ID:**																						
TDS	100	AP15-SW	720	710	610	620	670	680	660	630	640	672	746	620	696	610	630	640	670					
		AP15-7.5	640	620	660	710	680	640	632	710	640	661	669	650	656	680	710	850	850					
		AP15-16.5	580	580	590	600	590	630	633	620	630	623	624	610	616	630	460	670	670					
		AP1-28.8	650	660	540	660	680	670	675	660	650	661	652	660	648	660	640	670	600					
Ammonia N	1	AP15-SW	3.6	1.11	0.5	5.5	5.5	0.5	6.8	4.2	<1	<1	<1	<1	<1	4	1.6	4.8	<2					
		AP15-7.5	0.5	<1	0.5	1.9	0.5	0.5	0.5	0.5	<1	<1	<1	<1	<1	1	<1	2.1	<2					
		AP15-16.5	7.1	7.2	6	4.4	5.2	4.2	5.2	4.6	4.9	4.7	4.9	4	4.8	4	5	3.9	<2					
		AP1-28.8	0.5	1.3	0.5	0.5	0.5	0.5	0.5	0.5	<1	1.6	1	<1	<1	<1	<1	1.4	<2					
														0.5										
Nitrate N	0.1	AP15-SW	2.6	0.3	0.9	0.3	0.05	0.05	2.1	0.2	<0.1	<0.1	<0.1	0.05	<0.1	0.9	0.2	1.1	2.8					
		AP15-7.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	<0.1	<0.1	<0.1	0.005	<0.1	<0.1	0.1	<0.1	<0.1					
		AP15-16.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	0.1	2.4					
		AP1-28.8	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	0.1					
Nitrite N	0.1	AP15-SW	0.1	0.07	0.2	0.1	0.03	0.005	0.3	0.2	0.09	0.02	<0.01	0.05	<0.01	0.09	0.5	0.2	0.09					
		AP15-7.5	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.02	<0.01	0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.01					
		AP15-16.5	0.005	0.005	0.005	0.03	0.005	0.03	0.04	0.07	0.09	0.09	0.07	0.02	0.09	0.2	<0.01	0.03	0.2					
		AP1-28.8	0.005	0.005	0.005	0.005	0.01	0.01	0.02	0.005	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01	<0.01					
Total Kjeldahl N	5	AP15-SW	11	4.38	<5	7.4	7.9	<5	10	7	<5	INSUFFICIENT SAMPLE	<5	5.2	<5	9	<5	10	10					
		AP15-7.5	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	INSUFFICIENT SAMPLE	<5	<5	<5	<5	<5	<5	<5					
		AP15-16.5	8.1	7.7	11	5.1	5.8	5.1	6.8	6.1	<5	INSUFFICIENT SAMPLE	6.3	5.9	<5	9	<5	5.6	<5					
		AP1-28.8	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	INSUFFICIENT SAMPLE	<5	<5	<5	<5	<5	<5	<5					
Organic N	0	AP15-SW	7.15	3.3	3.77	1.93	2.4	2.63	3.52	2.8	0.58	not enough sample	4.5	4.8	0.8	5	0.3	5.7	9.7					
		AP15-7.5	0	-0.92	2.74	0.83	0.5	-0.48	1.56	1.62	-0.53	not enough sample	0.6	1.2	-0.05	3	0.3	1.1	2.6					
		AP15-16.5	0.98	0.53	4.65	0.77	0.6	0.92	1.62	1.52	-3.78	not enough sample	1.4	2.2	-0.6	5	0	1.7	2.5					
		AP1-28.8	0.93	-1.41	2.4	0.28	0.3	-0.77	2.06	1.21	-1.43	not enough sample	0.1	3.5	-0.8	4	2.4	1.3	3.2					
Total Organic C	1	AP15-SW	48	28.8375	18	18	19	22	13															
		AP15-7.5	6.1	6.793	6.8	8.1	5.5	4.6	4.2															
		AP15-16.5	5	6.502	5.9	5.2	4.8	6.2	4.5															
		AP1-28.8	4.2	5.275	4.9	4.9	4	4.2	4.5															

Notes: Bold, italicized sample dates indicate general mineral (including boron and chloride) suite was run on subject samples. Bold sample dates indicate boron and chloride analyses were run on samples.
PQL = Practicial Quantification Limit

Table I-4. Moreno Valley Regional Water Reclamation Facility Pond 14
Analytical Results, Pond and Pore Water

			Concentration (mg/L)																					
			1st quarter (DBS&A Samples)													2nd quarter (DBS&A Samples)			3rd quarter (EMWD Samples)			4th quarter (EMWD samples)		
		Sample Date:	8/4/2006	8/10/2006	8/16/2006	8/24/2006	8/31/2006	9/7/2006	9/14/2006	***9/21/2006***	9/28/2006	10/5/2006	10/12/2006	10/19/2006	**10/26/2006**	11/30/2006	***12/21/2006***	**1/25/2007**	2/22/2007	***3/29/2007***	**4/26/2007**	5/31/2007	***6/28/2007***	**7/26/2007**
Analyte	**PQL**	**Sample ID:**																						
TDS	100	MVP14-SW		880	440	500	530	512	550	533	606	580	690	470	400	500	490	540						
		MVP14-7.5			n/a	3010	2970	2182	1752	1778	1592	1700	1630	840	1020	1210	810	710						
		MVP14-16.8		620	580	580	910	806	720	775	908	1100	1380	1470	1360	830	560	540						
		MVP14-26.9			780	750	750	716	746	726	740	684	700	660	690	710	680	700						
Ammonia N	1	MVP14-SW		<1	18	15	12	12	9.2	9	5.7	7.3	3.8	10	9.2	7.3	1.2	13						
		MVP14-7.5			n/a	<1	2.1	2.1	2.2	2	2.4	3.4	2.5	4.6	4.3	3.3	5	5						
		MVP14-16.8		3.4	3.7	2.2	4.7	5.5	4.7	5.6	3.2	7.1	7.1	9.4	6.5	1.3	4	<2						
		MVP14-26.9			1.7	1	<1	1.5	1.8	<1	1	1.3	1.1	1.4	<1	1	1	<2						
Nitrate N	0.1	MVP14-SW		<0.1	0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	1.6	3.7	0.5	3.4	1						
		MVP14-7.5		0.7	<0.1	<0.1	<0.1	<0.1	13	9.3	6	3.7	3.6	0.3	0.8	1.5	0.6	<0.1						
		MVP14-16.8		<0.1	0.1	<0.1	0.3	0.2	0.4	0.2	1.1	0.4	0.3	0.4	1.3	4.3	1.4	<0.1						
		MVP14-26.9		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.4	0.3	0.4						
Nitrite N	0.1	MVP14-SW		<0.01	0.2	0.6	0.02	0.03	0.02	0.1	0.2	0.2	0.7	0.8	1.7	0.5	0.2	0.4						
		MVP14-7.5			n/a	9.4	2.8	0.3	0.3	0.1	0.5	0.1	0.5	0.08	0.2	0.02	0.03	0.03						
		MVP14-16.8		<0.01	0.01	1.2	0.8	0.08	0.1	0.06	0.2	0.02	0.2	0.02	0.1	0.4	0.2	0.07						
		MVP14-26.9		0.01	<0.01	0.2	0.4	0.2	0.3	0.09	0.2	0.1	0.1	0.04	<0.01	<0.01	0.04	0.02						
Total Kjeldahl N	5	MVP14-SW		5	15	19	17	14	12	14	9.2	10	7.4	11	13	9.7	6.4	16						
		MVP14-7.5			n/a	<5	6.5	<5	<5	<5	5.2	<5	5.3	5.3	7	7.1	7.3	5						
		MVP14-16.8			<5	<5	7.3	6.8	6.5	6	6.4	9.2	9.8	11	10	6.4	<5	<5						
		MVP14-26.9			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5						
Organic N	1	MVP14-SW		4.58	1.64	3.87	4.56	2.23	3.1	5.3	3.5	2.9	3.6	0.8	4	2.4	5.2	3						
		MVP14-7.5			NOT ENOUGH SAMPLE	-0.02	4.34	2.77	1.5	2.8	2.8	1.2	2.8	0.7	3	3.8	2.7	0.4						
		MVP14-16.8			1.13	2.49	2.67	1.38	1.8	0.4	3.2	2.1	2.6	1	4	5.1	0	3.6						
		MVP14-26.9			0.07	2.19	3.74	-0.34	0.7	0.9	0	0.07	0.4	-0.9	1	3	0	0.6						
Total Organic C	1	MVP14-SW		38	12																			
		MVP14-7.5			Not enough sample																			
		MVP14-16.8		6.7	4.6																			
		MVP14-26.9			5.6																			
Chloride	1	MVP14-SW								139	148				114		134	170						
		MVP14-7.5								150	153				129		132	150						
		MVP14-16.8								139	143				145		152	150						
		MVP14-26.9								185	188				166		173	170						
Boron	1	MVP14-SW								0.4	0.4				0.3		0.4	0.4						
		MVP14-7.5								0.5	0.5				0.3		0.3	0.3						
		MVP14-16.8								0.5	0.6				0.5		0.3	0.2						
		MVP14-26.9								0.5	0.6				0.5		0.6	0.6						

Notes: Bold, italicized sample dates indicate general mineral (including boron and chloride) suite was run on subject samples. Bold sample dates indicate boron and chloride analyses were run on samples.
PQL = Practicial Quantification Limit. Analytical results for surrogated ponds are italicized: Pond 12 for Pond 14, Pond 17 for Pond 19, and Pond 20 for Pond 22

Table I-5. Moreno Valley Regional Water Reclamation Facility Pond 19
Analytical Results, Pond and Pore Water

			Concentration (mg/L)																					
			1st quarter (DBS&A Samples)													2nd quarter (DBS&A Samples)			3rd quarter (EMWD Samples)			4th quarter (EMWD samples)		
		Sample Date:	8/4/2006	8/10/2006	8/17/2006	8/24/2006	8/31/2006	9/7/2006	9/14/2006	9/21/2006	9/28/2006	10/5/2006	10/12/2006	10/19/2006	10/26/2006	11/30/2006	12/20/2006	1/25/2007	2/22/2007	3/29/2007	4/26/2007	5/31/2007	6/28/2007	7/26/2007
Analyte	PQL	Sample ID:																						
TDS	100	MVP19-SW		550	3520	590	600	584	596	580	604	589	570	510	490	470	460	490						
		MVP19-7.5			790	790	800	822	920	998	1044	982	910	800	780	710	610	600						
		MVP19-14.0			610	630	640	650	776	748	762	754	740	720	720	710	630	620						
		MVP19-23.3		620	650	670	630	618	668	694	742	808	820	810	750	650	500	470						
Ammonia N	1	MVP19-SW		<1	5.5	13	12	9.4	8.4	8.6	5.4	5.8	3.5	5.9	5.5	4.8	5.4	7						
		MVP19-7.5			<1	<1	1.4	1.8	1.7	<1	<1	NOT ENOUGH SAMPLE	<1	1.2	<1	<1	<1	<2						
		MVP19-14.0		NOT ENOU	<1	<1	<1	<1	<1	<1	1.3	<1	<1	<1	<1	<1	<1	<2						
		MVP19-23.3		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2						
Nitrate N	0.1	MVP19-SW		0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.1	2	2.8	4.2	3.8						
		MVP19-7.5		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
		MVP19-14.0		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
		MVP19-23.3		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
Nitrite N	0.1	MVP19-SW		0.4	7.1	0.3	<0.01	<0.01	<0.01	0.01	0.1	0.03	0.2	1.6	2.8	1.9	0.3	0.1						
		MVP19-7.5		0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.03	0.06	0.2	0.3	0.3	0.3	0.3	0.2	0.2						
		MVP19-14.0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01						
		MVP19-23.3		0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01						
Total Kjeldahl N	5	MVP19-SW		<5	13	17	18	15	12	10	7.9	8.7	5.8	7	8	9.7	8.2	10						
		MVP19-7.5			<5	<5	<5	<5	<5	<5	<5	NOT ENOUGH SAMPLE	<5	<5	<5	<5	<5	<5						
		MVP19-14.0			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5						
		MVP19-23.3		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5						
Organic N	1	MVP19-SW		4.33	7.64	4.08	5.33	5.84	3.3	1.9	2.4	2.9	2.3	1	3	4.9	2.8	2.6						
		MVP19-7.5			1.02	3.21	-0.53	-0.72	1.7	1	0.7	NOT ENOUGH SAMPLE	2.6	0.5	1	1.9	0.8	0.9						
		MVP19-14.0			-0.44	1.69	2.17	0.21	-0.2	0.5	0	1.5	0.5	0	1	2.2	1.6	0.5						
		MVP19-23.3		0.66	0.67	3.48	2.6	0.06	1.5	-0.3	0.5	0.2	1.6	-1	2	1.9	2.4	0.4						
Total Organic C	1	MVP19-SW																						
		MVP19-7.5																						
		MVP19-14.0																						
		MVP19-23.3																						
Chloride	1	MVP19-SW								151	154				122		129	160						
		MVP19-7.5								166	174				148		133	130						
		MVP19-14.0								160	162				147		146	140						
		MVP19-23.3								159	160				145		134	130						
Boron	1	MVP19-SW								0.4	0.4				0.3		0.4	0.3						
		MVP19-7.5								0.4	0.5				0.4		0.3	0.3						
		MVP19-14.0								0.4	0.4				0.4		0.3	0.3						
		MVP19-23.3								0.3	0.4				0.4		0.4	0.3						

Notes: Bold, italicized sample dates indicate general mineral (including boron and chloride) suite was run on subject samples. Bold sample dates indicate boron and chloride analyses were run on samples.
PQL = Practicial Quantification Limit. Analytical results for surrogated ponds are italicized: Pond 12 for Pond 14, Pond 17 for Pond 19, and Pond 20 for Pond 22

Table I-6. Moreno Valley Regional Water Reclamation Facility Pond 22
Analytical Results, Pond and Pore Water

			Concentration (mg/L)																					
			1st quarter (DBS&A Samples)													2nd quarter (DBS&A Samples)			3rd quarter (EMWD Samples)			4th quarter (EMWD samples)		
		Sample Date:	8/4/2006	8/10/2006	8/17/2006	8/24/2006	8/31/2006	9/7/2006	9/14/2006	***9/21/2006***	9/28/2006	10/5/2006	10/12/2006	10/19/2006	**10/26/2006**	11/30/2006	***12/20/2006***	**1/25/2007**	2/22/2007	***3/29/2007***	**4/26/2007**	5/31/2007	***6/28/2007***	**7/26/2007**
Analyte	**PQL**	**Sample ID:**																						
TDS	100	MVP22-SW		760	510	640	470	475	501	479	512	504	510	470	510	460	450	490						
		MVP22-6.0			IS	iS		1488	IS	IS	IS	IS			IS									
		MVP22-14.3		590	610	1220	830	718	702	634	628	616	550	480	510	510	460	500						
		MVP22-25.1			730	740	710	668	696	659	672	668	640	620	670	680	590	590						
Ammonia N	1	MVP22-SW		<1	19	17	14	13	11	9	1.6	1.4	<1	<1	<1	4.3	7.9	10						
		MVP22-6.0			IS	IS		2.8	1.4	IS	IS	IS			IS									
		MVP22-14.3		IS	4.8	5.1	6.1	6.5	6	6	4.7	IS	5	7	3.7	2.9	6.6	4						
		MVP22-25.1		IS	2.3	1.7	1.7	<1	<1	1	<1	1.4	1	1.1	<1	1.1	1.6	<2						
Nitrate N	0.1	MVP22-SW		<0.1	0.5	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	3.1	1.2	2.7						
		MVP22-6.0		0.4	1.7	2.4	4	5.6	4.4	3.8	NS	0.2	0.6		NS	0.2	IS	<0.1						
		MVP22-14.3		<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	1.8	2.4	0.5	0.8						
		MVP22-25.1		<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	1.4	0.6	0.4	1.2	1.8	1.4	0.6	0.7						
Nitrite N	0.1	MVP22-SW		<0.01	0.2	0.2	0.2	0.02	0.01	0.8	3.7	1.3	0.5	0.4	0.08	0.4	0.1	0.1						
		MVP22-6.0		IS	IS	3.3	0.6	0.8	1.6	1.1	IS	NS			IS									
		MVP22-14.3		<0.01	<0.01	0.08	<0.01	<0.01	0.08	0.05	2	1.6	1.2	0.2	0.1	0.2	0.1	0.4						
		MVP22-25.1		0.02	<0.01	0.1	0.6	1.7	0.7	0.09	0.3	0.2	0.3	0.3	0.2	0.2	0.1	0.2						
Total Kjeldahl N	5	MVP22-SW		<5	16	19	18	14	15	11	<5	<5	<5	<5	<5	7.4	11	13						
		MVP22-6.0		IS	IS	IS	5.5	<5	IS	8	IS	IS												
		MVP22-14.3		IS	8.5	7.1	9.6	7.7	8.2	9.2	7.3	IS	8.5	7.7	7	5.6	7	5						
		MVP22-25.1		IS	<5	<5	7.2	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5						
Organic N	1	MVP22-SW		3.78	1.11	2.36	4.1	1.66	4.2	2.1	2.8	2.8	1	0.2	2	3	2.8	3.2						
		MVP22-6.0			IS	IS	IS	1.53	IS	IS	IS	IS			IS									
		MVP22-14.3		IS	3.69	5.07	3.44	1.15	2.2	2.8	2.6	IS	3.2	0.7	3	2.7	0.5	1.5						
		MVP22-25.1		IS	0.53	1.66	5.54	1.41	3.2	2.8	0.2	0.2	1.4	-2	2	2	1.6	1.2						
Total Organic C	1	MVP22-SW																						
		MVP22-6.0																						
		MVP22-14.3																						
		MVP22-25.1																						
Chloride	1	MVP22-SW								140	142				139		140	150						
		MVP22-6.0								393	NS				NS	IS	IS							
		MVP22-14.3								134	147				136		136	140						
		MVP22-25.1								147	149				133		141	140						
Boron	1	MVP22-SW								0.3	0.4				0.4		0.3	0.3						
		MVP22-6.0									NS				IS									
		MVP22-14.3								0.4	0.4				0.3		0.3	0.3						
		MVP22-25.1								0.5	0.5				0.4		0.4	0.4						

Notes: Bold, italicized sample dates indicate general mineral (including boron and chloride) suite was run on subject samples. Bold sample dates indicate boron and chloride analyses were run on samples. IS = Insufficient sample
PQL = Practicial Quantification Limit. Analytical results for surrogated ponds are italicized: Pond 12 for Pond 14, Pond 17 for Pond 19, and Pond 20 for Pond 22 NS = No sample

Appendix J

Minutes of Public Meetings

Date: May 05, 2006

From: Fakhri Manghi, Project Manager
To: Public Advisory Committee Member

Subject: Quantification of Nitrogen Removal Under Recycled Water Recharge Ponds Project – Kick-off Meeting February 27, 2006

Meeting Participants:

Ms. Hope Smythe	Regional Water Board
Mr. Jerry Thibeault	Regional Water Board
Mr. Bruce Scott	Farmers
Dr. Scott Bradford	US Department of Agricultural
Dr. Tien-Chang Lee	University of California at Riverside
Dr. Stephen Cullen	D. B. Stephens & Associates Consultants:
Mr. Jordan Kear	D. B. Stephens & Associates Consultant
Mr. Mark Norton	SAWPA

EMWD:

Ms. Jayne Joy	EMWD
Dr. Behrooz Mortazavi	EMWD
Mr. Ralph Phraner	EMWD
Mr. Dean Mathes	EMWD
Mr. Ken Marshall	EMWD
Dr. Fakhri Manghi	EMWD

Dr. Manghi opened the meeting, welcomed the participants, and reviewed the background and the objectives of the project. He mentioned that the Santa Ana Regional Water Quality Control Board has adopted Basin Plan Objectives, which may impact the use of recycled water in some of the subbasins in EMWD's service area; the Board provides a default value of 25% nitrogen uptake by the soil (unsaturated zone). He stated that EMWD applied for a grant from the California Department of Water Resources to evaluate and quantify nitrogen losses in the vadose zone being recharged by recycled water ponds. One of the easiest ways to demonstrate the possible uptake of nitrogen by soil is to perform a subsurface evaluation underneath recycled water storage ponds. He also mentioned that EMWD is considering to apply for waiver of the default value of 25% nitrogen uptake by the soil, if the results of the actual site-specific studies demonstrate greater nitrogen losses. Dr. Manghi defined the objectives of this and future meetings related to the project. The objectives are to:

● Inform participants of project objectives, scope-of-work, interim progress and results, and final project results
● Exchange information/knowledge with local experts
● Review the Conceptual Site Model (CSM)
● Review the Sampling and Analysis Plan (SAP).

Discussion:

1. Flow and Nitrogen Transport Concepts in the Vadose Zone

Dr. Cullen explained the phenomenon that influences the rise of fluid in a capillary tube, which is a combination of adhesion forces (between the wall and the fluid) and cohesive forces of fluid. He explained how the ratio of these forces determines the angle that the fluid forms when it comes into contact with the solid. Also, he explained the relationships between soil water content and soil water suction for different soil types (soil water characteristic curves). As part of the Sampling and Analysis Plan (Task 2.0), Dr. Cullen explained the functional and technical differences between ceramic lysimeters and stainless steel porous lysimeters. For example, the specified stainless steel lysimeters have an air entry value of 0.5 bars, while the air entry value of commonly used ceramic lysimeters is 2.0 bars. In unsaturated soils, once the air entry value is exceeded, air will enter the sampler and the vacuum will be lost eliminating the sampling gradient and the ability of the sampler to collect pore liquids. He recommended using stainless steel lysimeters for the project. He explained the Diffuse Double Layer caused by the negative charge of soil particles, primarily on clay, to a much lesser extent on silt, and to a still lesser extent on sand particles. In the first "layer", solute cations closely associate with the negative charge on clay particles. The second layer is diffuse and the cationic charge density in the pore liquid solution decreases with distance away from the clay particle surface. The inverse relationship exists with anionic species. The concentration of cations in pore liquid solution decreases with distance away from clay particle surfaces. Therefore, sampling strategies, which employ low vacuum-induced gradients result in the highest pore liquid concentrations of anions such as nitrate.

2. Project Conceptual Site Model

The data evaluation and assessment will take place at two sites of Alessandro and Moreno Valley.

Alessandro Site

Mr. Kear discussed the technical issues of the anticipated site conditions, final locations of lysimeters, depth of individual lysimeters within a cluster, and scheduling for installing lysimeters for the Alessandro site (Task 3.0). Mr. Kear indicated, after reviewing water levels/quality and geology information, that the major water percolation in the vadose zone beneath the Alessandro ponds is downward with a smaller component of lateral migration. He mentioned that the recharge from the ponds is seen in the patterns of groundwater flow only in the localized area in the immediate vicinity of the ponds; and outside of this immediate area, the regional features of groundwater flow predominate. Also, he mentioned that regional groundwater exists at a depth on the order of 200 feet below the ponds, with groundwater flow direction to the northwest. Mr. Kear suggested installing three lysimeters and three monitoring wells per cluster at the Alessandro site, and the exact depths of each lysimeter and well will be determined based on the lithlogy encountered in the initial pilot boring. Lysimeters will be installed in the ponds No. 1, 5&6, and 15.

Moreno Valley Site

Mr. Kear discussed the technical issues of anticipated site conditions, final locations of lysimeters, depths of individual lysimeters within a cluster, and scheduling for installing lysimeters for the Moreno Valley site (Task 3.0). Mr. Kear indicated, after reviewing water levels/quality and geologic information, that the major water percolation in the vadose zone beneath the Moreno Valley ponds is likely lateral along perched layers with a smaller component of vertical migration. He mentioned that groundwater levels exist at a depth on the order of 50 to 100 feet below the ponds, with groundwater flow direction to the west and south. Mr. Kear recommended drilling and installing lysimeters within the upper 36 feet for the Moreno Valley site. He also suggested installing monitoring wells to monitor lateral migration of groundwater along the perched strata at different depths. Pond Nos. 14, 19, & 5/7 were suggested for installing lysimeters and monitoring wells. Lysimeters will be installed in the ponds No. 14, 19.

3. Technical Issues by Participants

Dr. Bradford asked if temporal changes in the infiltration rate at the bottom of the pond were expected due to clogging from wastewater constituents. Dr. Manghi explained that the percolation results for year 2003 showed uniform infiltration rates for most of the recycled ponds at both sites. Dr. Bradford suggested installing lysimeters in the vicinity of the recycled ponds since lateral flow is an important component of the flow system. Also, he suggested using a combination of computer models and lysimeters at different depths to evaluate the flow path length required to meet regulatory standards. Dr. Manghi clarified that the current scope-of-work is not tasked for computer modeling efforts.

Mr. Scott suggested installing lysimeters at the outer edges of the ponds to detect later flow movement away from the ponds. He mentioned that the conversion of N to gas at depths could likely be shallower than estimated in larger surface area and not just under the pond footprint. He thought this would benefit conversion without wet / dry /wet / dry management practice.

Ms. Smythe, RWQCB, suggested using tracer elements to detect vertical movement of the recycled water. She also suggested installing the lysimeters in the vicinity of the recycled ponds. When questions were asked about what does 25% nitrogen removal represent, she mentioned that the 25% should be applied on regional groundwater.

There were discussions on using lysimeters at depths that are deep enough in order to evaluate actual nitrogen removal. The concern was that if the proposed deepest lysimeters were not showing any denitrification, then the study might have no conclusive results. It was suggested to use one deeper lysimeter to verify loses in the areas above it.

The meeting was adjourned at 12:00 noon.

This letter is to confirm the new Conceptual Site Model (CSM) for the lysimeters for the Alessandro and Moreno Valley sites. On June 7, 2006, EMWD staff (Jayne Joy, Behrooz Mortazavi, Ralph Phraner, and Fakhri Manghi) met with Hope Smythe of the Regional Water Board at the Regional Board office in Riverside. Also, Steve Cullen and Jordan Kear of the DBS& Associate participated in the meeting through the telephone. During the meeting, EMWD staff presented the changes in the CSM that includes the installation schedule, total number, locations, and depths of lysimeters; and monitoring wells. The lysimeters for the Alessandro site are scheduled to be installed between the 19th and the 22nd of June, 2006. The lysimeters for the Moreno Valley site are anticipated to be installed during the 3rd week of July 2006. There are three clusters of lysimeters for each of the Alessandro and Moreno Valley sites, and each cluster comprises of three lysimeters. The total number of lysimeters for both the Alessandro and Moreno Valley sites is 18. The proposed depths of the lysimeters vary from 7’ to 30’; however, the actual depths of the lysimeters depend on the field situation. For the Alessandro site, lysimeters will be installed in the ponds #1, #11, and #15. For the Moreno Valley site, lysimeters will be installed in the ponds #14, #19, and #22. The monitoring wells will be installed at the Moreno Valley site, and the proposed depths vary between 80’ and 120’. Water samples from the lysimeters will be collected every week for the first quarter, and then once a month. The second Public Advisory Committee is anticipated to be held next September, and the consultant is expected to present some results.

Alessandro Ponds Sampling and Analysis Plan Summary

Introduction

To demonstrate the possible uptake of nitrogen by soils, EMWD retained DBS&A to perform a subsurface evaluation underneath recycled water storage ponds. This project involves data collection and review, conceptual modeling, lysimeter and monitoring well installation, sampling, analysis and reporting.

This document includes updated Conceptual Site Model (CSM), anticipated site conditions, hydrologic relationship of the Alessandro Ponds to the local groundwater supply, recommendations on the final locations for the lysimeters, and depths of lysimeter clusters at the Alessandro Ponds. Also, this document addresses the plan analysis and installation of lysimeters for the MV Ponds.

Previous Investigations

Significant sources of data and information for this study included:

1) EPA's 1971 "Study of Reutilization of Wastewater Recycled Through Groundwater" document

2) Well construction, water quality and water level data provided by EMWD

3) The Wildermuth Environmental, Inc., 2003 "Final Technical Report for the Lysimeter Study of the Redlands Discharge Ponds"

In 1971, the Environmental Protection Agency (EPA), then the Division of Water Supply of the U.S. Public Health Service, authorized EMWD to undertake a study of water quality factors for a planned program of wastewater treatment and recharge. The objectives of the study were to evaluate water quality, infiltration rates, and procedures for recharging treated wastewater through pond percolation and irrigation.

The major objectives of the EPA (1971) study were to demonstrate the feasibility and safety of recycling water via the Alessandro Ponds. To determine this, investigators conducted extensive drilling, water level monitoring, water quality monitoring, and temperature probe surveys to trace the lateral migration of the recharged water. Major conclusions of that study indicated no effect on the water produced by surrounding water wells after recharging 5,380 acre-feet of water over a six and one-half year period from 1965 to 1971. Another key conclusion from that study was the delineation of the limit of lateral migration of recharged water, which is constrained to a finite area within the near vicinity of the Ponds. EPA concluded, and the data indicates, that the minimal spreading of pond recharge water thus indicates that water percolating from the Ponds moves primarily in the vertical direction.

Conceptual Site Model

Regional Geology

The Alessandro Ponds are located within the Peninsular Ranges geomorphic province of California within the approximately 20-mile-wide downdropped block (graben) between the Elsinore Fault Zone and the San Jacinto Fault Zone known as the Perris Block. Crystalline (largely Cretaceous granitic) bedrock formations are exposed in the San Jacinto Mountains to the northeast and in the Santa Ana Mountains to the Southwest of this graben, as well as in several hills and elevated features within the graben itself. Most of the valley is filled with Tertiary and Quaternary alluvial material, ranging in thickness up to several thousand feet. Several intra-graben faults exist in the area, including the proximal Casa Loma Fault, along which movement of both bedrock and alluvial formations are observed. In the immediate vicinity of the ponds, a narrower (less than 3-mile-wide) graben between the Casa Loma Fault and the San Jacinto Fault provides a displacement of over 10,000 feet with a majority of the northwest-trending trough being filled with sedimentary rock and in the upper 2,000 feet or so, with recent sediments.

Regional hydrogeology

Groundwater within the San Jacinto Watershed Basin occurs largely within the alluvial sediments that fill the valleys. This is a closed basin, which under natural (pre-development) conditions contained confined aquifers that flowed under artesian pressure when tapped by early (until circa 1930) wells. Groundwater flow within the undeveloped basin meandered around bedrock highs and discharged to surface water at various points with the highest amounts of discharge near Lake Elsinore. Pre-development water quality was excellent, and has since declined in certain areas and in upper aquifers due to importation of Colorado River water to the Basin, drafting of the basin and land uses such as agricultural, dairy, and industrial activity. Upon pumping, groundwater elevations began to decline and flow occurred primarily within local sub-basins with a majority of the discharge going to pumped wells.

Site Hydrogeology

The Alessandro ponds overlie the Upper Pressure sub-basin of the San Jacinto Watershed Basin. Immediately to the southeast of this sub-basin is the area referred to as the Canyon sub-basin. These two sub-basins form a northwest-trending subsurface trough between the San Jacinto Fault and the Casa Loma Fault. The Casa Loma Fault, which separates the Hemet sub-basin and higher bedrock to the southwest on the upthrown side of the fault. Collectively these three sub-basins are referred to as the East Valley area. The ephemeral San Jacinto River flows from the southeast to the northwest in the area of the sub-basins. River flow is the major source of recharge during wet years, and the ponds themselves contribute a smaller component of recharge to the local groundwater basin. The maximum capacity of the Alessandro Ponds is 55 million gallons. During dry periods recycled water is sold for agricultural irrigation.

Alluvium in the vicinity of the ponds ranges in grain size from clay and silt to sand and gravels. Finer grained units appear to exist as discontinuous lenses of various thicknesses. Deposition and subsequent deformation are subject to the local tectonic regime, with many strata tilting down to the northeast. A majority of the strata appear to dip to this northeast direction and when they act as perching layers, the perched groundwater likely follows a respective northeastward flow path. Where the perching strata are absent (discontinuous), percolating water migrates downward within sand and gravel strata. These perched aquifers are also referred to herein as the shallow perched or shallow aquifers. Conversely, the aquifers typically targeted for groundwater production by agricultural interests or municipal suppliers within the East Valley Area are referred to herein as the deep aquifers.

Water Levels

DBS&A collected and reviewed water level data from numerous groundwater production wells that are perforated through the deeper regional aquifer units over several years and generated water level contour maps for spring of the years 1955 (representing conditions prior to the majority of spreading which began in 1965), 1991 (representing dry year conditions), and 2005, (representing recent and wet year conditions).

Prior to significant recharge operations via the Alessandro Ponds a nearly flat groundwater gradient is observed generally flowing to the northwest in the vicinity of the study area. In the Canyon Sub-basin area, the groundwater gradient is slightly steeper where the basin is narrower. In 1991, near the end of a regional drought, which lasted approximately 6 years, groundwater contours indicate a significant mound below the pond area and a significant trough in the southern portion of the Upper Pressure sub-basin. In 2005, a year during which near-record rainfall was recorded during the early winter months, a return to significant recharge from the San Jacinto River was observed.

Water Quality

DBS&A collected water quality data from various sources and created Stiff Water Quality Diagrams for recent water samples collected from production wells (similar to those used in our water level analysis) throughout the area. Virtually all of the wells in the wider area of the general vicinity of the Alessandro Ponds produce groundwater of a calcium-bicarbonate water quality character. In the near vicinity of the ponds, however, the sulfate component of the deep groundwater quality character is higher than in other areas. Stiff water quality diagrams of pond water quality indicate a high sulfate component. Because of this parallel, and because of the discontinuous nature of the fine-grained strata in the pond vicinity, it is interpreted that the downward migration of pond water is as significant a component of the pond water infiltration as the lateral component of this flow. If the lateral flow in the shallow zone was a significant factor, it would be expected that sulfate concentrations in groundwater produced by the local wells would display a wider areal distribution. This site historical water quality data supports the interpretation that lateral flow of pond water recharge is minimal and that the flow is primarily downward.

Summary of Site Hydrogeologic Conditions

Based on DBS&A’s review of water quality, water levels and contour maps, the major water percolation in the vadose zone beneath the ponds is primarily downward with a smaller component of lateral migration. The recharge from the ponds is seen in the patterns of groundwater flow only in the localized area in the immediate vicinity of the ponds; outside of this immediate area, the regional features of groundwater flow predominate. Regional groundwater exists at a depth on the order of 200 feet below the ponds, with the groundwater flow direction to the northwest.

Therefore, the quality sampling of a vertical profile of the shallow perched groundwater within the mound will provide a consistent monitoring pathway by which to quantify nitrogen removal from the percolating groundwater.

Sampling and analysis plan

The following is a summary of the study sampling strategy, monitoring point locations, depths, and sampling frequency. In a subsequent task, a more detailed sampling and analysis plan will be developed that details the fieldwork and analytical regimen for soil and water samples.

Technical Approach

DBS&A's technical approach to quantifying nitrogen removal beneath the ponds consists of drilling and installing lysimeters to monitor the soils within the upper 30 feet where saturated or unsaturated conditions may exist. Alluvial materials encountered during the drilling and installation of the monitoring devices will be logged geologically and sampled and analyzed for chemical and physical properties. Lysimeters will be sampled at regular intervals for key water quality parameters. Details are discussed below.

Anticipated shallow drilling conditions

DBS&A anticipates that site conditions at the Alessandro Ponds in Upper Pressure sub-basin will be adequate for drilling and installation of lysimeters and monitoring wells on the berms which border each of the ponds.

The Alessandro ponds Nos. **1**, **11**, and **15** have been selected for installing lysimeters (Please see attached file: Alessandro_Lysimeters.pdf). This schedule assumes that the berms, which bound selected ponds, will be adequately dry and stable to support ingress and egress of drilling equipment, materials, and personnel.

DBS&A anticipates encountering predominantly sand material in the upper portions of each boring at the San Jacinto facility, underlain by interbedded, discontinuous and northeast-dipping silt and sand strata to the total depths of drilling for this project. In the Alessandro Pond **1** borings, we anticipate an increase in the abundance and thickness of silt strata at a depth of 15 feet. In the Alessandro Pond **11** borings, we anticipate an increase in the abundance and thickness of silt strata at a depth of about 25 feet. In the Alessandro Pond **15** borings, we anticipate an increase in the abundance and thickness of the silt strata at a depth of 30 feet.

Monitoring Point Cluster Locations/Depths

Each cluster of monitoring points will be drilled on the relatively flat portion of the respective pond, approximately 3 to 9 feet from the sloping berms that form the pond walls.

Lysimeter location selections are based on: a goal of obtaining spatial distribution of data, anticipated lithology, pond operational history, pond availability, and anticipated vadose zone percolation patterns.

DBS&A has selected the locations for the three lysimeter clusters at the Alessandro Ponds as follows: 1) adjacent to the northwest corner of Pond **1**, 2) adjacent to the south corner of Pond **11**, and 3) in the south corner of Pond **15**.

Targeted depths of each lysimeter are selected based on an attempt to collect percolating water data at regular intervals above the initial (shallowest) perching stratum beneath each pond or, in the case where the perching stratum is shallow, at depths within interbedded permeable deposits between silt/clay strata.

DBS&A anticipates that the lysimeter borings can be drilled and installed using a track-mounted, hollow-stem auger drill rig.

DBS&A will install three lysimeters per cluster in the Alessandro Ponds. Exact depths of each lysimeter and well will be determined based on lithology encountered in the initial pilot boring. Preliminary depths relative to pond bottoms are based on geologic and geophysical logs from previous wells and monitoring points near the ponds. The planned depths of lysimeter and monitoring well installation are:

Pond **1**:

- Lysimeter at 7 feet, 15 feet, and 30 feet

Pond **11**:

- Lysimeters at 8 feet, 19 feet, and 30 feet

Pond **15**:

- Lysimeters at 8 feet, 19 feet, and 30 feet

Schedule

Currently, the scheduled dates for drilling and installation of the monitoring points are June 26 to 29, 2006.

During the drilling of the deepest boring, samples will be obtained via split-spoon sampler for geotechnical and chemical analyses and for purposes of geologic logging. The second and third borings will be drilled for lysimeter installation purposes only.
Scheduled sampling dates for the program will initiate on a weekly basis on approximately July 6, 2006 and continue weekly until September 28, 2006. Monthly sampling will occur on or about the 20th of October, November, and December 2006. Sampling of each monitoring point cluster will include collection of lysimeter pore liquids. Surface water grab samples will be collected from each adjacent pond.

Laboratory Analysis

Soil samples collected for analysis of physical properties will be delivered to the DBS&A laboratory. Properties to be evaluated and analytical methods employed will include:

- Native soil permeability to water (vertical, cm/sec), fluid saturation (% pore volume), porosity, grain and bulk density (g/cc) and volumetric moisture content using API RP40 and ASTM D2216/D5084.
- Grain size analysis (ASTM-D422 and/or 4464M) with the method used being dependent on the grain size of the soil sample.
- Total organic carbon (fraction organic carbon - mg/kg or weight percent) using Walkley-Black.
- Soil moisture characteristic curves to provide the basis for estimating the van Genuchten parameters and conductivity-water content relationship.

Soil samples collected for analysis of chemical properties will be delivered to Severn-Trent Laboratories, Inc. Samples will be analyzed for leachable (chemical) concentrations using a modified Title 22 Wet Extraction Test method with de-ionized water (DIWET Method). The method will be modified to eliminate the grinding and sieving of the soil samples prior to extraction to minimize the mechanical destruction of the soil prior to leaching. Because the leaching test will not be conducted under in-situ soil conditions through an undisturbed soil column, the modified DIWET method is expected to provide a conservative estimate of leachable residual salts and nitrogen from the soils, Chemical parameters analyzed will include:

- Total dissolved solids using EPA Test Method 160.1.

- Inorganic nitrogen (as nitrate, nitrite and ammonia) using EPA Test Method 300/350..3,
- Major cations and anions using Standard Method 2320B and 300.0 and 6010. The cations analyzed will be sodium, potassium, calcium and magnesium.. The anions analyzed will be nitrate/nitrite, sulfate, total alkalinity and bicarbonate alkalinity.

Water samples collected from lysimeters and ponds for analysis of chemical constituents will be delivered to the EMWD laboratory. Chemical parameters analyzed will include:

- General Mineral/General Physical
- Total Dissolved Solids (Standard Method 2540C)
- Ammonia (EPA Method 350 1)
- Nitrate-N and Nitrite-N (EPA Method 300.0)
- Organic nitrogen (EPA Method 351.2, Calculated)
- Total Kjeldahl Nitrogen (EPA Method 351.2)
- Total Organic Carbon (Standard Method 5310C)

EASTERN MUNICIPAL WATER DISTRICT

ALESSANDRO PONDS

14 **Pond Number**

● **Location of Proposed Lysimeter Cluster**

NORTH

C. Reber EMWD

Eastern Municipal Water District

Since 1950

Moreno Valley Ponds Sampling and Analysis Plan Summary

Introduction

To demonstrate the possible uptake of nitrogen by soils, EMWD retained DBS&A to perform a subsurface evaluation underneath recycled water storage ponds. The project involves data collection and review, conceptual site modeling, lysimeter and monitoring well installation, sampling, analysis and reporting.

This document includes updated Conceptual Site Model (CSM), anticipated site conditions, hydrologic relationship of the Moreno Valley (MV) Ponds to the local groundwater supply, recommendations on the final locations for the lysimeters, and depths of lysimeter clusters at the MV Ponds. Also, this document addresses the plan analysis and installation of lysimeters for the MV Ponds.

Previous Investigations

Significant sources of data and information for this study included:

1) The HydroScience & Technology, Inc. (HST) “Results of exploratory drilling and sampling, Moreno Valley Reclaimed Water Reclamation Facility (MVRWRF), Moreno Valley, California,” dated February 1999

2) Geotechnical borings and reporting data associated with the construction at the MVRWRF

3) Well construction, water quality, and water level data provided by EMWD

4) The Wildermuth Environmental, Inc., 2003 “Final Technical Report for the Lysimeter Study of the Redlands Discharge Ponds”

Conceptual Site Model

Regional Geology

The MVRWRF is located within the Peninsular Ranges geomorphic province of California within the approximately 20-mile-wide downdropped block (graben) between the Elsinore Fault Zone and the San Jacinto Fault Zone known as the Perris Block. Crystalline (largely Cretaceous granitic) bedrock formations are exposed in the San Jacinto Mountains to the northeast and the Santa Ana Mountains to the Southwest of this graben, as well as in several hills and elevated features within the Perris Block itself. Most of the valley is filled with Tertiary and Quaternary alluvial material, ranging in thickness up to several thousand feet. Several intra-graben hills and highlands exist in the area, including the hills to the east of the facility, which affect groundwater flow within the alluvium of the area. These hills and highlands are also incorporated into the design of earthen construction to store water in surface water reservoirs (such as Lake Perris).

Regional hydrogeology

Groundwater within the San Jacinto Watershed Basin occurs largely within the alluvial sediments that fill the valleys. This is a closed basin which, under natural (pre-development) conditions contained confined aquifers which flowed under artesian pressure when tapped by early (until circa 1930) wells. Groundwater flow within the undeveloped basin meandered around bedrock highs and discharged to surface water at various points with the highest amounts of discharge near Lake Elsinore. Pre-development water quality was excellent, and has since declined in certain areas and upper aquifers due to drafting of the basin and land uses such as agricultural, dairy, and industrial activity. Upon pumping, groundwater elevations began to decline and flow was primarily within local sub-basins with a majority of the discharge going to pumped wells. Importation of Colorado River water to the Basin has been able to overcome the effects of pumping on historical groundwater levels.

Site Hydrogeology

The MVRWRF ponds overlie the Perris North sub-basin of the San Jacinto Watershed Basin. This sub-basin represents the alluvium of the northwestern portion of the Perris Block, and is one of five sub-basins in the AB3030 area known as the West San Jacinto area.

Alluvium in the vicinity of the ponds ranges in grain size from clay and silt to sand and gravels. Finer grained units appear to exist as discontinuous lenses of various thicknesses. Sediments within the area of the MVRWRF are largely reflective of the low-energy type of deposition, and include silts, sands and clays. Silt and clay strata are generally thicker and more laterally

contiguous in such environments, when compared to higher energy depositional environments near rivers. Most strata in the MVRWRF vicinity onlap to crystalline bedrock of the nearby hills as opposed to being in faulted contact with adjacent formations. Hence, most strata are subhorizontal to horizontal in orientation.
Alluvium is relatively thin in the vicinity of the MVRWRF. In 1999, HST reportedly encountered decomposed bedrock at a depth of 192 feet drilled on the west side of the facility between Ponds 14 and 16. Based on DBS&A's review of the geophysical log from that exploratory borehole, interbedded sands and silts appear to predominate the alluvial lithology.

Water Levels

DBS&A collected and reviewed water level data from numerous groundwater production wells that are perforated through the deeper regional aquifer units over several years and generated hydrographs for those representative of the regional aquifer. Figure 3 presents a composite hydrograph of the Perry Wells from 1954 through the present, which indicates a significant rise in water levels following the construction and use of Lake Perris. In addition to the Lake Perris recharge, recharge from the Perris Valley Storm Drain and the MVRWRF Ponds are likely contributors to the local groundwater.

Perched groundwater is known to be present in the vicinity of the ponds. In addition to the reported encounter of perched water at a depth of approximately 30 feet in the HST exploratory borehole, other geotechnical borings have encountered perched water at various locations on the property between 30 and 60 feet bgs. Data from a nearby leaking underground fuel tank site (Pulliam Family Trust, 1569 Nandina Avenue) indicate minimum depth to water of 21.27 feet and maximum depths to water of 25.87 feet. In addition to providing depth to water data, this information indicates that perching layers are relatively laterally extensive and continuous.

Summary of Site Hydrogeologic Conditions

Based on DBS&A's review of local geology, water quality, water levels and contour maps, the major water percolation in the vadose zone beneath the MVRWRF ponds is likely lateral along perching layers with a smaller component of vertical migration. The extent or primary directions of the perched water flow are unknown at this writing. At depth, the regional groundwater westerly flow predominates, dominated by flow from Lake Perris and the MVRWRF Ponds.

Static water levels of regional groundwater exist at a depth on the order of 50 to 100 feet below the ponds, with the groundwater flow direction to the west and south.

Sampling and analysis plan

The following is a summary of the study sampling strategy, monitoring point locations, depths, and sampling frequency.

Technical Approach

DBS&A's technical approach to quantifying nitrogen removal beneath the MVRWRF ponds consists of drilling and installing lysimeters to monitor the soils within the upper 36 feet where saturated or unsaturated conditions may exist. In addition to the lysimeters, EMWD is scoping two monitoring wells to monitor the regional groundwater between 80 and 120 feet below grade. These data may be correlated, if possible, to off-site monitoring and production wells. Alluvial materials encountered during the drilling and installation of the monitoring devices will be logged geologically and geophysically, and sampled and analyzed for chemical and physical properties. Monitoring wells and lysimeters will be sampled on a regular basis for key water quality parameters. Details are discussed below.

Anticipated shallow drilling conditions

DBS&A anticipates that site conditions at the MV RWRF Ponds will be adequate for drilling and installation of the lysimeters and monitoring banks in the selected ponds without significant delays during July 2006. Selected ponds for lysimeter installation are Nos. **14, 19**, and **22**. This schedule assumes that the bottoms of selected ponds will be adequately dry to support ingress and egress of drilling equipment, materials, and personnel. If the ponds are not dry, however, the drilling will occur on the sloping banks of the ponds.

At the MV RWRF, DBS&A anticipates encountering a generally finer-grained stratigraphy than at the Alessandro Ponds. Interbedded sand, silt, and clay are anticipated to comprise the lithology in various compositions. Importantly, these strata are anticipated to be relatively horizontal and laterally contiguous.

Monitoring Point Cluster Locations/Depths

Each cluster of lysimeters will be drilled on the relatively flat portion of the respective pond bottoms, adjacent to the sloping berms that form the pond walls.

Lysimeter location selections are based on: a goal of obtaining spatial distribution of data, anticipated lithology, pond operational history, pond availability, and anticipated vadose zone percolation patterns.

DBS&A has selected the locations for the three lysimeter clusters at the Moreno Valley RWRF Ponds near the northwest corner of Pond **14** and **22** and near the northeast corner of Pond **19**.

Depths of each lysimeter are based on an attempt to collect percolating water data at regular intervals above the initial (shallowest) perching stratum beneath each pond or, in the case where the perching stratum is shallow, at depths within interbedded permeable deposits between silt/clay strata.

Because the low permeability strata are anticipated to be relatively continuous beneath the ponds, there is likely a significant portion of lateral migration of pond recharge water within the subsurface. DBS&A anticipates that all borings for lysimeter and monitoring well installation can be drilled with a track-mounted hollow stem auger drilling rig.

DBS&A will install a cluster of three lysimeters at three locations (Please see attached file: MorenoValley_Lysimeters.pdf). Exact depths of each lysimeter will be determined based on lithology encountered in the initial pilot boring. Preliminary lysimeter depths relative to pond bottoms are based on geologic and geophysical logs from previous wells and borings near the ponds. Proposed monitoring well depths are relative to bottoms of ponds. The planned depths of lysimeter installations are:

- Lysimeters at 8 feet, 16 feet, and 28 feet

Schedule

Currently, the scheduled dates for drilling and installation of the monitoring points are in July 2006.

Continuous coring via hollow-stem auger of the deepest boring for purposes of will be conducted. During the drilling of the deepest boring, samples will be obtained via split-spoon sampler for geologic logging and geotechnical and analytical properties. Subsequent borings would be drilled for installation purposes only. Following completion of the monitoring wells, the well will be logged via focused dual induction methods for medium and deep focused conductivity measurements that provide the reciprocal resistivity equivalent. Along with spontaneous potential (SP) and gamma-ray measurements, this data will provide excellent bed definition for geologic log corroboration and correlation to previously existing geophysical logs. Scheduled sampling dates for the program will initiate on a weekly basis during late July 2006 and continue weekly until late October 2006. Monthly sampling will occur on or about the 20th of November and December 2006 and January 2007. Sampling of each monitoring point cluster will include collection of lysimeter pore liquids and purging/sampling of groundwater from the monitoring wells. Surface water grab samples will be collected from each adjacent pond. Collection of depth to water pH, temperature, and oxidation-reduction potential data in the monitoring wells will also be conducted at each monitoring event.

Laboratory Analysis

Soil samples collected for analysis of physical properties will be delivered to the DBS&A laboratory. Properties to be evaluated and analytical methods employed will include:

- Native soil permeability to water (vertical, cm/sec), fluid saturation (% pore volume), porosity, grain and bulk density (g/cc), and volumetric moisture content using API RP40 and ASTM D2216/D5084
- Grain size analysis (ASTM-D422 and/or 4464M) with the method used being dependent on the grain size of the soil sample
- Total organic carbon (fraction organic carbon - mg/kg or weight percent) using Walkley-Black
- Soil Moisture characteristic curves to provide the basis for estimating the van Genuchten parameters and conductivity-water content relationship

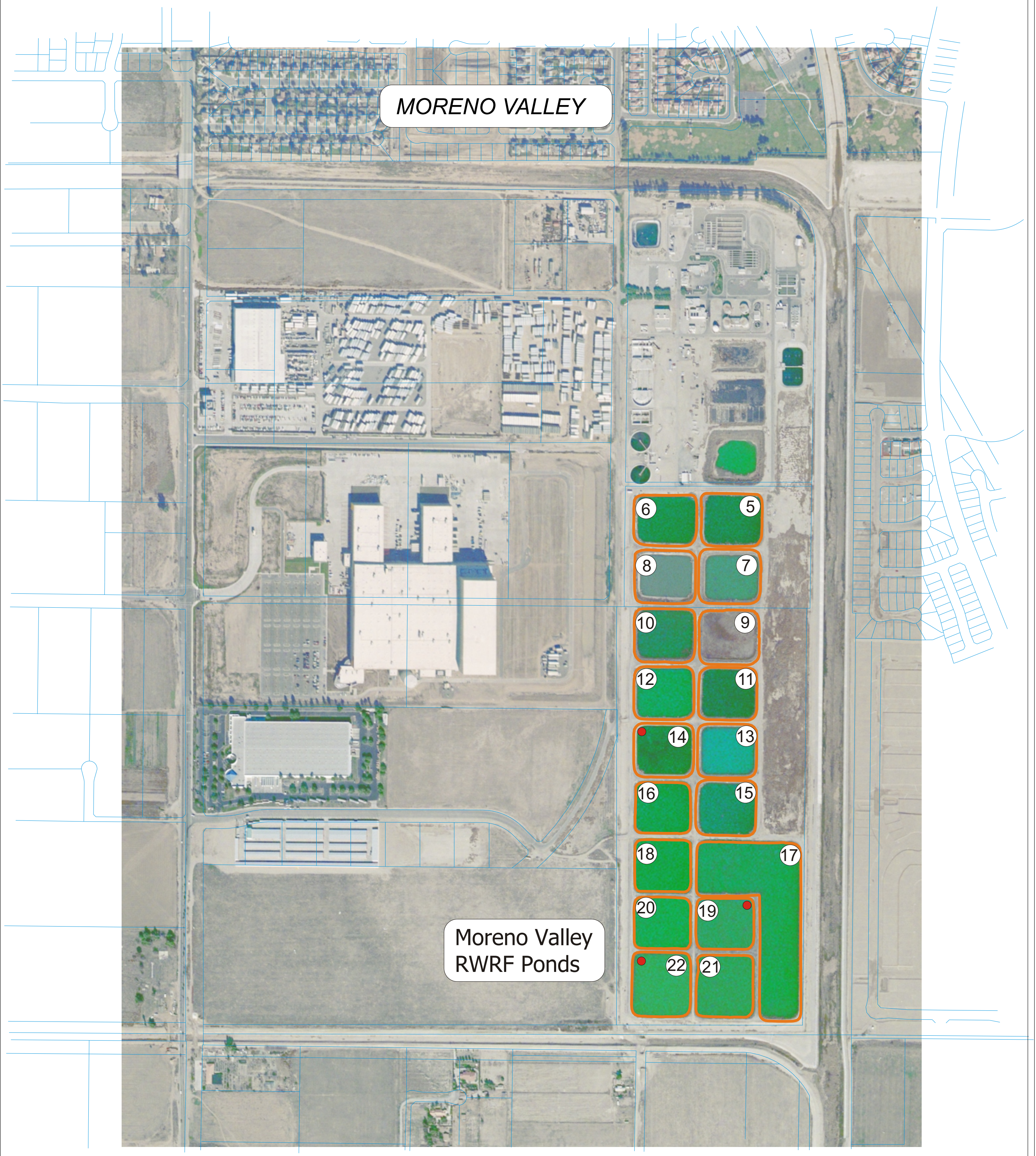
Soil samples collected for analysis of chemical properties will be delivered to Severn-Trent Laboratories, Inc. Samples will be analyzed for leachable (chemical) concentrations using a modified Title 22 Wet Extraction Test method with de-ionized water (DIWET Method). The method will be modified to eliminate the grinding and sieving of the soil samples prior to extraction to minimize the mechanical destruction of the soil prior to leaching. Because the leaching test will not be conducted under in-situ soil conditions through an undisturbed soil column, the modified DIWET method is expected to provide a conservative estimate of leachable residual salts and nitrogen from the soils. Chemical parameters analyzed will include:

- Total dissolved solids using EPA Test Method 160.1
- Inorganic nitrogen (as nitrate, nitrite and ammonia) using EPA Test Method 300/350.3
- Major cations and anions using Standard Method 2320B and 300.0 and 6010. The cations analyzed will be sodium, potassium, calcium, and magnesium. The anions analyzed will be nitrate/nitrite, sulfate, total alkalinity and bicarbonate alkalinity.

Water samples collected from lysimeters, monitoring wells, and ponds for analysis of chemical constituents will be delivered to the EMWD laboratory. Chemical parameters analyzed will include:

- General Mineral/General Physical
- Total Dissolved Solids (Standard Method 2540C)
- Ammonia (EPA Method 350 1)
- Nitrate-N and Nitrite-N (EPA Method 300.0)
- Organic nitrogen (EPA Method 351.2, Calculated)
- Total Kjeldahl Nitrogen (EPA Method 351.2)
- Total Organic Carbon (Standard Method 5310C)

EASTERN MUNICIPAL WATER DISTRICT
MORENO VALLEY RWRF



21 **Pond Number**

● **Location of Proposed Lysimeter Cluster**

NORTH

C. REBER EMWD

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

Date: September 21, 2006

From: Fakhri Manghi, Project Manager
To: Public Advisory Committee Member

Subject: Quantification of Nitrogen Removal Under Recycled Water Recharge Ponds Project – Second Public Advisory Meeting Notes

Meeting Participants:

Ms. Cindy Li	Regional Water Board
Dr. Scott Bradford	US Department of Agricultural
Dr. Laosheng Wu	University of California at Riverside
Dr. Tien-Chang Lee	University of California at Riverside
Dr. Stephen Cullen	D. B. Stephens & Associates
Mr. Jordan Kear	D. B. Stephens & Associates
Dr. Phil Kaiser	D. B. Stephens & Associates
Mr. Mark Norton	SAWPA

EMWD:

Ms. Jayne Joy	EMWD
Mr. Mike Garner	EMWD
Dr. Behrooz Mortazavi	EMWD
Mr. Ralph Phraner	EMWD
Mr. Ken Marshall	EMWD
Dr. Fakhri Manghi	EMWD

Dr. Mortazavi opened the meeting, welcomed the participants, and reviewed the background of the denitrification project. He mentioned that in the last Public Advisory Committee meeting (February 27, 2006), Dr. Cullen and Mr. Kear (Consultant) presented the Site Conceptual Model (SCM) for the Alessandro and Moreno Valley Sites, including the number and locations of the lysimeters. He showed the locations of the Alessandro and Moreno Valley Sites on a wall-map. He illustrated that the Alessandro Site is located in the San Jacinto Upper Pressure Subbasin, and the Moreno Valley site is located in the Perris Subbasin. He mentioned that the original SCM included a total of 16 lysimeters for the Alessandro and Moreno Valley Sites, eight lysimeters each. He said that after feedback was received in the first Public Advisory Committee meeting, specifically from the Regional Water Quality Control Board, the Site Conceptual Model was revised, and the number of lysimeters was increased from 16 to 18, nine lysimeters for each site. He also, mentioned that, based on comments by the Public Advisory Committee and following discussions with the Regional Water Quality Control Board, the monitoring system was extended to include the saturated zone by adding two monitoring wells. The two monitoring wells will be constructed at the Moreno Valley Regional Water Reclamation Facility site to collect samples from the saturated zone. He mentioned that on July 7, 2006, EMWD met with the Regional Water Quality Control Board to discuss the new SCM and the addition of the new monitoring wells for the saturated zone

Discussion:

Mr. Kear provided an overview of the project tasks. He mentioned that Task 1 (Data Review) & Task 2 (Sampling and Analysis Plan) culminated with two technical memoranda for the Alessandro and Moreno Valley Sites, summarizing the criteria used for determining lysimeter location, site hydrogeology, groundwater levels, and groundwater quality.

1. Lysimeter Installation

Mr. Kear mentioned that precautions were taken to test for leaks in the lysimeters before installation. The lysimeters were inspected and tested for leaks in the Daniel B. Stephens & Associates office in Santa Barbara, California. They were also inspected and tested on site for leaks at both the Alessandro and Moreno Valley sites, and none of the lysimeters failed. He demonstrated the lysimeter installation process using videotape, including drilling, hole annular filling, collector trenches, and construction of the lysimeter monitoring stations.

2. Soil Sampling and Analysis (Chemical/physical properties)

Mr. Kear showed a graph of the chemical properties of the soil column for the lysimeters at Alessandro Pond No. 1. The graph shows the concentrations of Calcium, Magnesium, Potassium, and Sodium; Total Dissolved Solids (TDS); and Total Organic Carbon (TOC). In general, the trend of the concentrations of the constituents increases as depths increase. The nitrogen species including Nitrate, Nitrite, and Ammonia were analyzed at Moreno Valley Pond No. 19 for numerous samples, and a graph illustrating the concentrations of these constituents was presented . In general, the levels of the nitrogen species concentrations are less than 1.0 mg/l for depths that are greater than 15 feet measuring below the bottom of the pond. He showed two graphs for water velocity versus hydraulic gradient, and particle size distribution classification by ASTM 2487.

3. Lysimeters Water Sampling

Mr. Kear mentioned that weekly lysimeter water sampling at the Alessandro Site was started in July 2006 and will be completed at the end of September 2006. Lysimeter water sampling by DBS&A personnel for the second quarter will be once a month and will start in October and end on December 31, 2006 for the Alessandro Site, and EMWD Personnel will conduct the sampling thereafter. Weekly lysimeter water sampling for the Moreno Valley Site was started in August 2006 and will be completed at the end of October 2006. Monthly lysimeter water sampling by DBS&A personnel will start in November and will be

completed at the end of January 2007, and EMWD Personnel will conduct the sampling thereafter. Weekly lysimeter water sampling includes nitrogen species, Total Dissolved Solids, and Dissolved Organic Carbon. Constituents that are analyzed quarterly include general minerals, general physical characteristics, and Boron. Boron and chloride will be sampled twice quarterly.
Mr. Kear showed graphs for total Nitrogen reduction (Nitrate, Nitrite, and Kjeldahl Nitrogen) for Alessandro Pond Nos. 1 and 10 and a composite, time-averaged graph of nitrogen reductions across the Alessandro Ponds. Generally speaking, the results show that the total nitrogen reduction is between 63-87% for depths that are greater than 10 feet measuring from the bottom of the pond. He showed a graph of the Boron (X 1,000)/Chloride ratio for all lysimeter samples at the Alessandro Ponds, which is greater than 3.0. He demonstrated a Stiff Diagram for the water that was sampled on August 16, 2006, for Alessandro Pond No.1 and for three depths below the pond bottom. For pond water and a shallow depth (7.5 ft), the dominant species are Sodium (Na), Potassium (K), and Chloride (Cl); while the Calcium (Ca) and Hydrocarbons (HCO3) are the dominant species for deep depths (29.2 ft below the pond bottom).

4. Technical Issues by Participants

Dr. Bradford asked if it is possible to use different tracers to determine if the denitrification was caused by dilution or by the denitrification process in the soil zone below the ponds. Mr. Kear said that the processes in the soil zone cause the denitrification. He added that, based on information presented in the USGS Publications for the local subbasins, if the ratio of the Boron (X 1,000) to Chloride is greater than 3.0, then the sample is representative of recycled water. B/Cl ratios of less than 3.0 indicate that groundwater has some fraction of native components. In the case of the Alessandro Ponds, these indicators suggest the water sampled via the lysimeters is reclaimed water.

Dr. Wu asked if a moisture-sensing device is used for measuring water content along the lysimeter's depths. Mr. Kear said that the water content profile along the depth is at or close to a saturation condition. Dr. Wu also asked if the water movement in the unsaturated zone could be related to the pond water depth, which was discussed in relation to infiltration velocity and residence time of percolating waters.

Mr. Garner wondered if high Ammonia in the upper layer (less than 5.0 feet below the pond bottom) of Moreno Valley Pond No. 19 was because of the decay of organic materials in the upper layer. Mr. Kear mentioned that the interaction between pond water, shallow groundwater, and soil matrix is a complex geochemical process. He said our focus at this time is to quantify reduction in nitrogen, and added that the high ammonia is related to the nitrification and denitrification processes. Mr. Garner mentioned that the mode of operation for Moreno Valley Regional Water Reclamation Facility (RWRF) is different from the San Jacinto RWRF. He explained that at the Moreno Valley RWRF the mode of operation is to completely nitrify and partially denitrify (biological nutrient removal), while the San Jacinto RWRF operates as a conventional activated sludge plant with only partial nitrification.

Dr. Manghi briefed the Committee on the project schedule and budget. He mentioned that EMWD has sent three Status Reports to the California Department of Water Resources (DWR). These Reports were sent in February, April, and August of 2006. He concluded that the project schedule and budget are with the work plan.

Appendix K

Graphical Depictions of Water Quality Data

440	hco3	200	3.278
916	ca	72	3.5928
927	mg	8.8	0.724152
929	na	120	5.22
937	k	21	0.53718
940	cl	161	4.54181
945	so4	100	2.082
		3.5928	6
		0.724152	4
		5.75718	2
		-4.54181	2
		3.5928	6
		-3.278	6
		-2.082	4
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		0.724152	4
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		0	1

AP1-SW 16 Aug 2006
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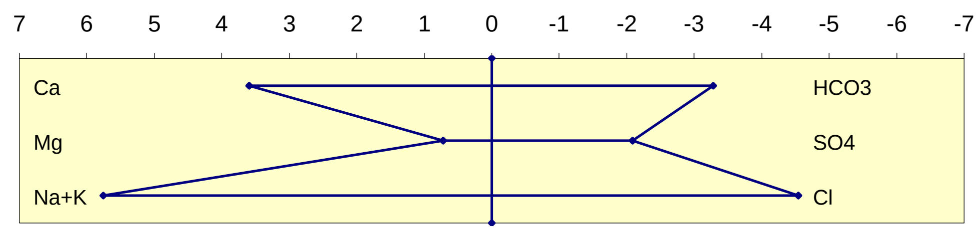

				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/16/06 12:22 PM	260	97	<3	164	8.4	22	120	91
HSJ-RWRF	**ALESSANDRO POND 1**	**P1 RECYCLE WATER**	**08/16/06 12:23 PM**	**200**	**72**	**<3**	**161**	**8.8**	**21**	**120**	**100**
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/16/06 12:27 PM	360	130	<3	151	18	12	120	112
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 7.1 FT	08/16/06 12:51 PM	200	74	<3	165	9.8	25	120	114
HSJ-RWRF	ALESSANDRO POND 10	P10 RECYCLE WATER	08/16/06 01:54 PM	300	110	<3	187	17	13	150	133
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 8.5 FT	08/16/06 02:05 PM	120	68	26	177	8.4	23	130	103
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	270	110	<3	192	10	25	130	101
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	280	110	<3	170	16	6.6	120	97
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	200	71	<3	188	9.6	14	130	86
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	110	<3	177	14	8.8	110	72
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 7.5 FT	08/16/06 03:08 PM	260	91	<3	178	15	18	120	78
HSJ-RWRF	ALESSANDRO POND 15	P15 RECYCLE WATER	08/16/06 03:12 PM	190	73	<3	183	8.8	23	130	114

440	hco3	200	3.278
916	ca	74	3.6926
927	mg	9.8	0.806442
929	na	120	5.22
937	k	25	0.6395
940	cl	165	4.65465
945	so4	114	2.37348
		3.6926	6
		0.806442	4
		5.8595	2
		-4.65465	2
		3.6926	6
		-3.278	6
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		0	1

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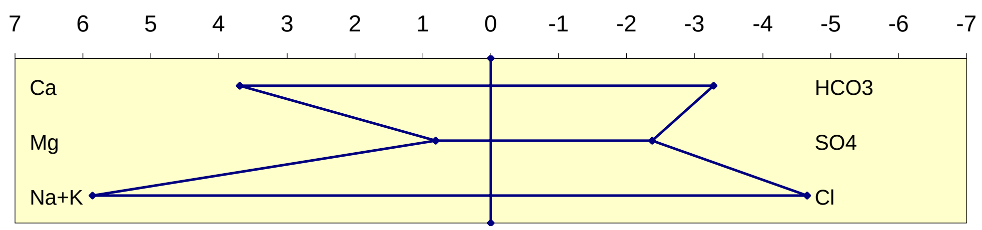

				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/16/06 12:22 PM	260	97	<3	164	8.4	22	120	91
HSJ-RWRF	ALESSANDRO POND 1	P1 RECYCLE WATER	08/16/06 12:23 PM	200	72	<3	161	8.8	21	120	100
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/16/06 12:27 PM	360	130	<3	151	18	12	120	112
HSJ-RWRF	**ALESSANDRO POND 1**	**P1 LYSIMETER 7.1 FT**	**08/16/06 12:51 PM**	**200**	**74**	**<3**	**165**	**9.8**	**25**	**120**	**114**
HSJ-RWRF	ALESSANDRO POND 10	P10 RECYCLE WATER	08/16/06 01:54 PM	300	110	<3	187	17	13	150	133
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 8.5 FT	08/16/06 02:05 PM	120	68	26	177	8.4	23	130	103
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	270	110	<3	192	10	25	130	101
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	280	110	<3	170	16	6.6	120	97
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	200	71	<3	188	9.6	14	130	86
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	110	<3	177	14	8.8	110	72
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 7.5 FT	08/16/06 03:08 PM	260	91	<3	178	15	18	120	78
HSJ-RWRF	ALESSANDRO POND 15	P15 RECYCLE WATER	08/16/06 03:12 PM	190	73	<3	183	8.8	23	130	114

440	hco3	260	4.2614
916	ca	97	4.8403
927	mg	8.4	0.691236
929	na	120	5.22
937	k	22	0.56276
940	cl	164	4.62644
945	so4	91	1.89462
		4.8403	6
		0.691236	4
		5.78276	2
		-4.62644	2
		4.8403	6
		-4.2614	6
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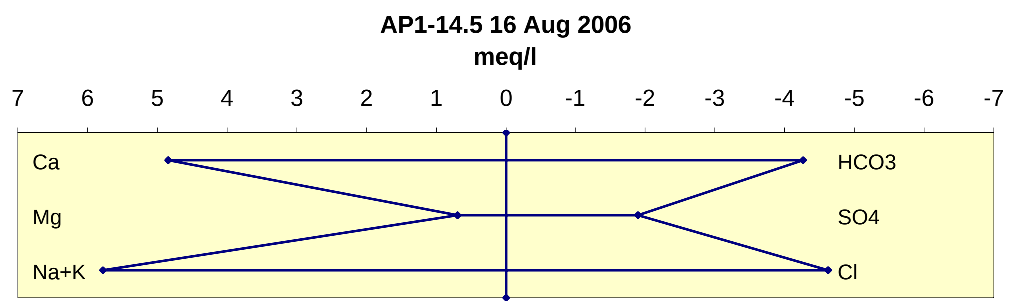
		0	1



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HSJ-RWRF	**ALESSANDRO POND 1**	**P1 LYSIMETER 14.5 FT**	**08/16/06 12:22 PM**	**260**	**97**	**<3**	**164**	**8.4**	**22**	**120**	**91**
HSJ-RWRF	ALESSANDRO POND 1	P1 RECYCLE WATER	08/16/06 12:23 PM	200	72	<3	161	8.8	21	120	100
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 29.2 FT	08/16/06 12:27 PM	360	130	<3	151	18	12	120	112
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 7.1 FT	08/16/06 12:51 PM	200	74	<3	165	9.8	25	120	114
HSJ-RWRF	ALESSANDRO POND 10	P10 RECYCLE WATER	08/16/06 01:54 PM	300	110	<3	187	17	13	150	133
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 8.5 FT	08/16/06 02:05 PM	120	68	26	177	8.4	23	130	103
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	270	110	<3	192	10	25	130	101
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	280	110	<3	170	16	6.6	120	97
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	200	71	<3	188	9.6	14	130	86
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	110	<3	177	14	8.8	110	72
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 7.5 FT	08/16/06 03:08 PM	260	91	<3	178	15	18	120	78
HSJ-RWRF	ALESSANDRO POND 15	P15 RECYCLE WATER	08/16/06 03:12 PM	190	73	<3	183	8.8	23	130	114

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929	na	120	5.22
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940	cl	151	4.25971
945	so4	112	2.33184
		6.487	6
		1.48122	4
		5.52696	2
		-4.25971	2
		6.487	6
		-5.9004	6
		-2.33184	4
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		0	1

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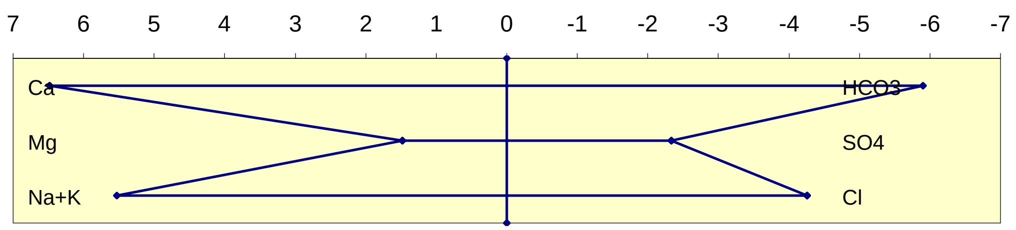

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HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 14.5 FT	08/16/06 12:22 PM	260	97	<3	164	8.4	22	120	91
HSJ-RWRF	ALESSANDRO POND 1	P1 RECYCLE WATER	08/16/06 12:23 PM	200	72	<3	161	8.8	21	120	100
HSJ-RWRF	**ALESSANDRO POND 1**	**P1 LYSIMETER 29.2 FT**	**08/16/06 12:27 PM**	**360**	**130**	**<3**	**151**	**18**	**12**	**120**	**112**
HSJ-RWRF	ALESSANDRO POND 1	P1 LYSIMETER 7.1 FT	08/16/06 12:51 PM	200	74	<3	165	9.8	25	120	114
HSJ-RWRF	ALESSANDRO POND 10	P10 RECYCLE WATER	08/16/06 01:54 PM	300	110	<3	187	17	13	150	133
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 8.5 FT	08/16/06 02:05 PM	120	68	26	177	8.4	23	130	103
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	270	110	<3	192	10	25	130	101
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	280	110	<3	170	16	6.6	120	97
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	200	71	<3	188	9.6	14	130	86
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	110	<3	177	14	8.8	110	72
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 7.5 FT	08/16/06 03:08 PM	260	91	<3	178	15	18	120	78
HSJ-RWRF	ALESSANDRO POND 15	P15 RECYCLE WATER	08/16/06 03:12 PM	190	73	<3	183	8.8	23	130	114

440	hco3	300	4.917
916	ca	110	5.489
927	mg	17	1.39893
929	na	150	6.525
937	k	13	0.33254
940	cl	187	5.27527
945	so4	133	2.76906
		5.489	6
		1.39893	4
		6.85754	2
		-5.27527	2
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		-4.917	6
		-2.76906	4
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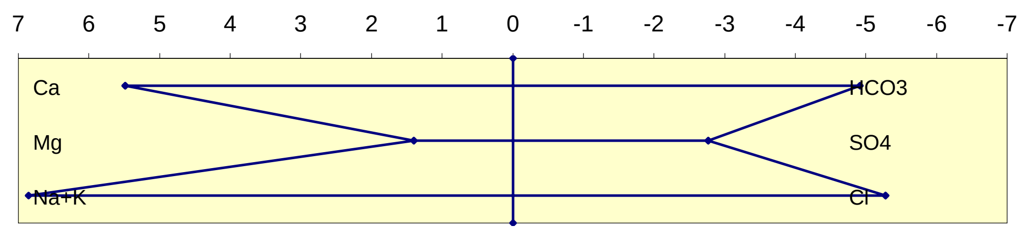

				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	**ALESSANDRO POND 10**	**P10 RECYCLE WATER**	**08/16/06 01:54 PM**	**300**	**110**	**<3**	**187**	**17**	**13**	**150**	**133**
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 8.5 FT	08/16/06 02:05 PM	120	68	26	177	8.4	23	130	103
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	270	110	<3	192	10	25	130	101
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	280	110	<3	170	16	6.6	120	97

440	hco3	177	2.90103
916	ca	68	3.3932
927	mg	8.4	0.691236
929	na	130	5.655
937	k	23	0.58834
940	cl	177	4.99317
945	so4	103	2.14446
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		0.691236	4
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		3.3932	6
		-2.90103	6
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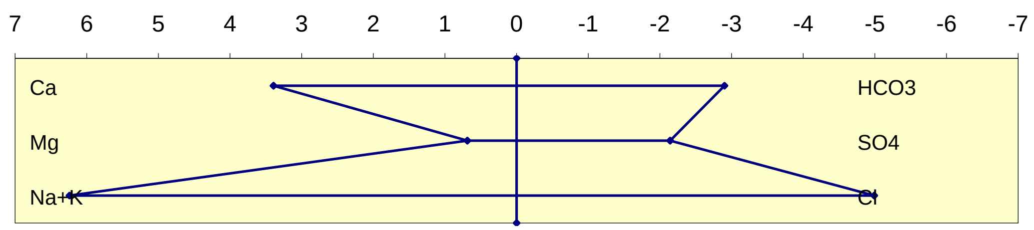

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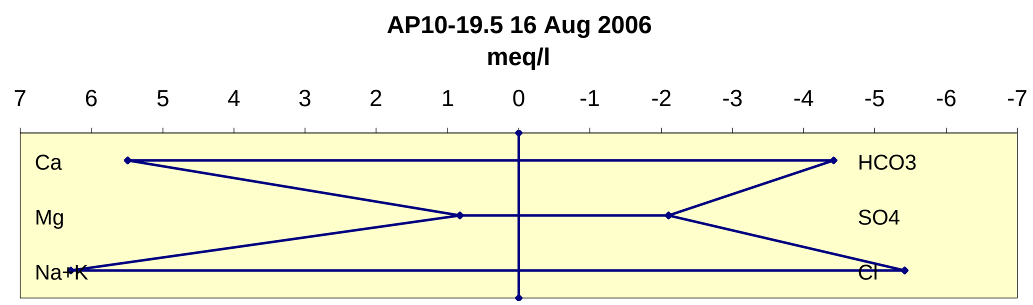
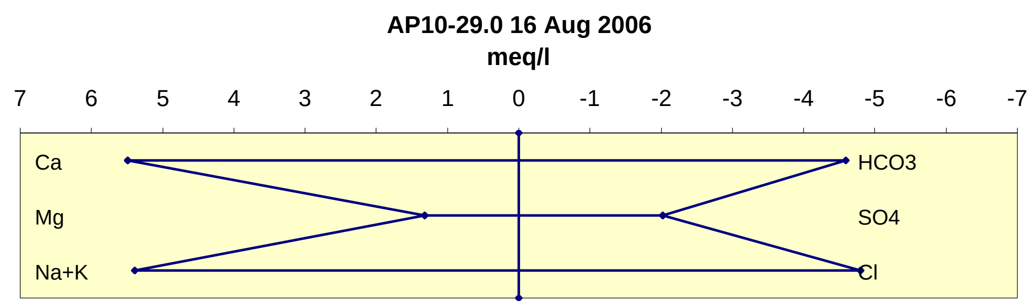
HSJ-RWRF	ALESSANDRO POND 10	P10 RECYCLE WATER	08/16/06 01:54 PM	300	110	<3	187	17	13	150	133
HSJ-RWRF	**ALESSANDRO POND 10**	**P10 LYSIMETER 8.5 FT**	**08/16/06 02:05 PM**	**120**	**68**	**26**	**177**	**8.4**	**23**	**130**	**103**
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 19.5 F	08/16/06 02:10 PM	270	110	<3	192	10	25	130	101
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	280	110	<3	170	16	6.6	120	97

440	hco3	270	4.4253
916	ca	110	5.489
927	mg	10	0.8229
929	na	130	5.655
937	k	25	0.6395
940	cl	192	5.41632
945	so4	101	2.10282
		5.489	6
		0.8229	4
		6.2945	2
		-5.41632	2
		5.489	6
		-4.4253	6
		-2.10282	4
		-5.41632	2
		0.8229	4
		-2.10282	4
		0	7
		0	1



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	**ALESSANDRO POND 10**	**P10 LYSIMETER 19.5 F**	**08/16/06 02:10 PM**	**270**	**110**	**<3**	**192**	**10**	**25**	**130**	**101**
HSJ-RWRF	ALESSANDRO POND 10	P10 LYSIMETER 29 FT	08/16/06 02:14 PM	280	110	<3	170	16	6.6	120	97

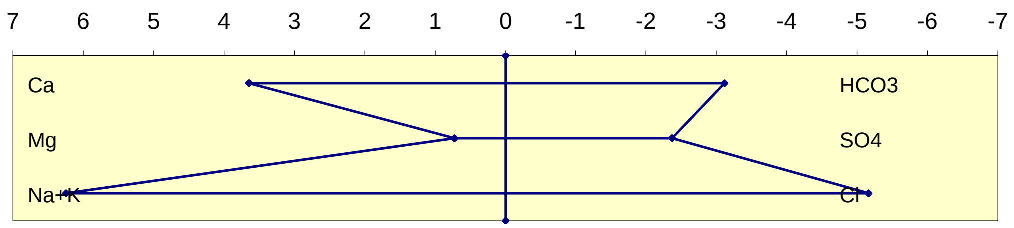
440	hco3	280	4.5892
916	ca	110	5.489
927	mg	16	1.31664
929	na	120	5.22
937	k	6.6	0.168828
940	cl	170	4.7957
945	so4	97	2.01954
		5.489	6
		1.31664	4
		5.388828	2
		-4.7957	2
		5.489	6
		-4.5892	6
		-2.01954	4
		-4.7957	2
		1.31664	4
		-2.01954	4
		0	7
		0	1



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	**ALESSANDRO POND 10**	**P10 LYSIMETER 29 FT**	**08/16/06 02:14 PM**	**280**	**110**	**<3**	**170**	**16**	**6.6**	**120**	**97**

440	hco3	190	3.1141
916	ca	73	3.6427
927	mg	8.8	0.724152
929	na	130	5.655
937	k	23	0.58834
940	cl	183	5.16243
945	so4	114	2.37348
		3.6427	6
		0.724152	4
		6.24334	2
		-5.16243	2
		3.6427	6
		-3.1141	6
		-2.37348	4
		-5.16243	2
		0.724152	4
		-2.37348	4
		0	7
		0	1

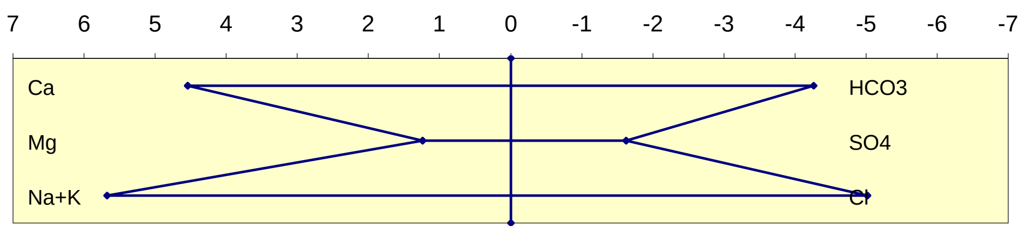
AP15-SW 16 Aug 2006
meq/l



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	200	71	<3	188	9.6	14	130	86
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	110	<3	177	14	8.8	110	72
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 7.5 FT	08/16/06 03:08 PM	260	91	<3	178	15	18	120	78
HSJ-RWRF	**ALESSANDRO POND 15**	**P15 RECYCLE WATER**	**08/16/06 03:12 PM**	**190**	**73**	**<3**	**183**	**8.8**	**23**	**130**	**114**

440	hco3	260	4.2614
916	ca	91	4.5409
927	mg	15	1.23435
929	na	120	5.22
937	k	18	0.46044
940	cl	178	5.02138
945	so4	78	1.62396
		4.5409	6
		1.23435	4
		5.68044	2
		-5.02138	2
		4.5409	6
		-4.2614	6
		-1.62396	4
		-5.02138	2
		1.23435	4
		-1.62396	4
		0	7
		0	1

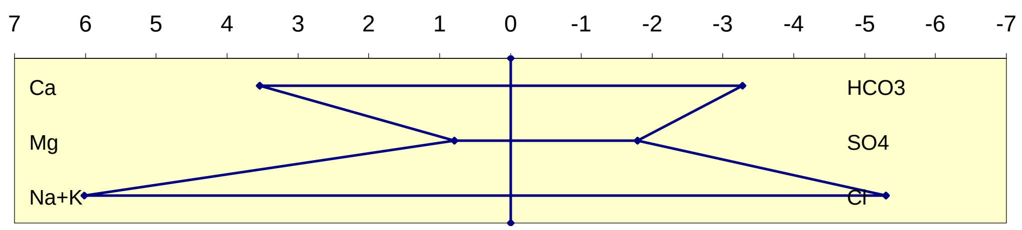
AP15-7.5 16 Aug 2006
meq/l



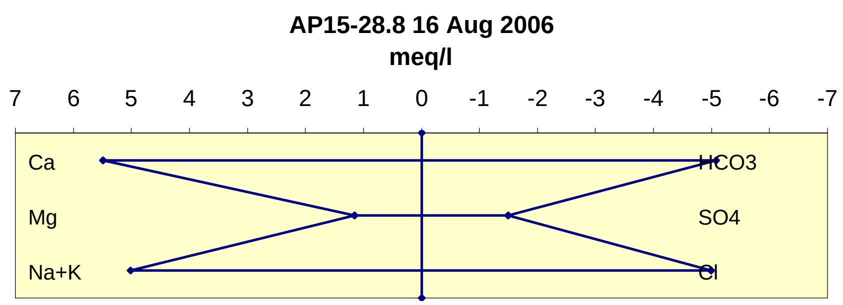
				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 16.5 F	08/16/06 02:54 PM	200	71	<3	188	9.6	14	130	86
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	110	<3	177	14	8.8	110	72
HSJ-RWRF	**ALESSANDRO POND 15**	**P15 LYSIMETER 7.5 FT**	**08/16/06 03:08 PM**	**260**	**91**	**<3**	**178**	**15**	**18**	**120**	**78**

440	hco3	200	3.278
916	ca	71	3.5429
927	mg	9.6	0.789984
929	na	130	5.655
937	k	14	0.35812
940	cl	188	5.30348
945	so4	86	1.79052
		3.5429	6
		0.789984	4
		6.01312	2
		-5.30348	2
		3.5429	6
		-3.278	6
		-1.79052	4
		-5.30348	2
		0.789984	4
		-1.79052	4
		0	7
		0	1

AP15-16.5 16 Aug 2006
meq/l



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	**ALESSANDRO POND 15**	**P15 LYSIMETER 16.5 F**	**08/16/06 02:54 PM**	**200**	**71**	**<3**	**188**	**9.6**	**14**	**130**	**86**
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	110	<3	177	14	8.8	110	72

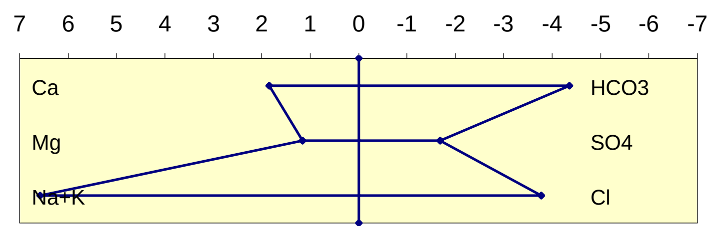


440	hco3	310	5.0809
916	ca	110	5.489
927	mg	14	1.15206
929	na	110	4.785
937	k	8.8	0.225104
940	cl	177	4.99317
945	so4	72	1.49904
		5.489	6
		1.15206	4
		5.010104	2
		-4.99317	2
		5.489	6
		-5.0809	6
		-1.49904	4
		-4.99317	2
		1.15206	4
		-1.49904	4
		0	7
		0	1

				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
HSJ-RWRF	ALESSANDRO POND 15	P15 LYSIMETER 28.8 F	08/16/06 03:02 PM	310	110	<3	177	14	8.8	110	72

440	hco3	266	4.35974
916	ca	37	1.8463
927	mg	14	1.15206
929	na	140	6.09
937	k	19	0.48602
940	cl	134	3.78014
945	so4	81	1.68642
		1.8463	6
		1.15206	4
		6.57602	2
		-3.78014	2
		1.8463	6
		-4.35974	6
		-1.68642	4
		-3.78014	2
		1.15206	4
		-1.68642	4
		0	7
		0	1

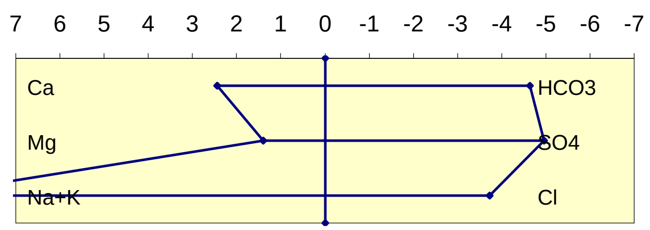
MVP14 Pond Water Dec 2006
meq/l



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 14	MVP14 RECYCLED WATER	12/20/06 09:44 AM	266	37	<3	134	14	19	140	81

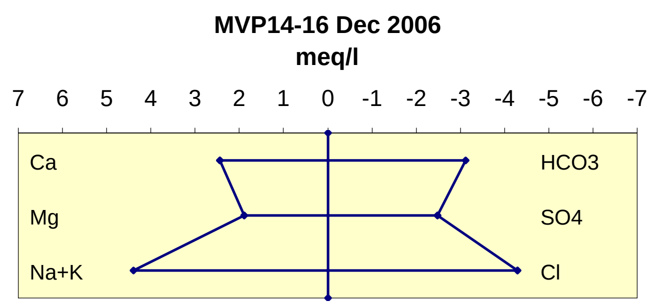
440	hco3	283	4.63837
916	ca	49	2.4451
927	mg	17	1.39893
929	na	200	8.7
937	k	18	0.46044
940	cl	132	3.72372
945	so4	238	4.95516
		2.4451	6
		1.39893	4
		9.16044	2
		-3.72372	2
		2.4451	6
		-4.63837	6
		-4.95516	4
		-3.72372	2
		1.39893	4
		-4.95516	4
		0	7
		0	1

MVP14-7.5 Dec 2006
meq/l



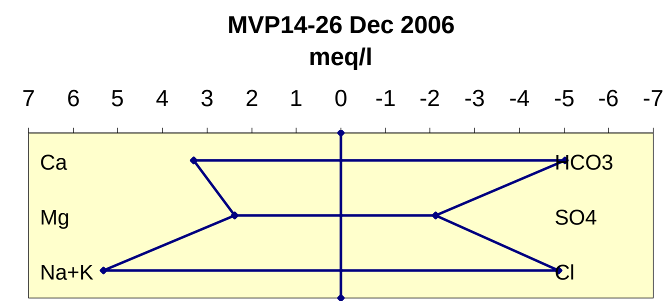
				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 14	MVP14 LYSIMETER 7.5	12/21/06 09:24 AM	283	49	<3	132	17	18	200	238

440	hco3	190	3.1141
916	ca	49	2.4451
927	mg	23	1.89267
929	na	94	4.089
937	k	12	0.30696
940	cl	152	4.28792
945	so4	119	2.47758
		2.4451	6
		1.89267	4
		4.39596	2
		-4.28792	2
		2.4451	6
		-3.1141	6
		-2.47758	4
		-4.28792	2
		1.89267	4
		-2.47758	4
		0	7
		0	1



					Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 14	MVP14	LYSIMETER 16.	12/21/06 09:28 AM	190	49	<3	152	23	12	94	119

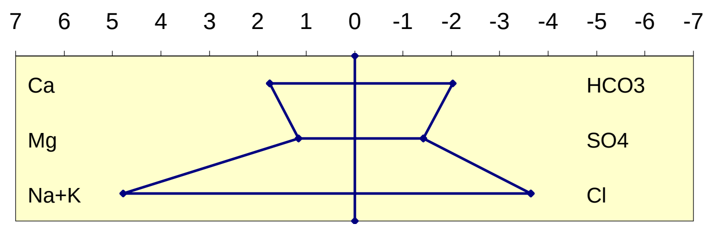
440	hco3	306	5.01534
916	ca	66	3.2934
927	mg	29	2.38641
929	na	120	5.22
937	k	3.7	0.094646
940	cl	173	4.88033
945	so4	102	2.12364
		3.2934	6
		2.38641	4
		5.314646	2
		-4.88033	2
		3.2934	6
		-5.01534	6
		-2.12364	4
		-4.88033	2
		2.38641	4
		-2.12364	4
		0	7
		0	1



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	306	66	<3	173	29	3.7	120	102

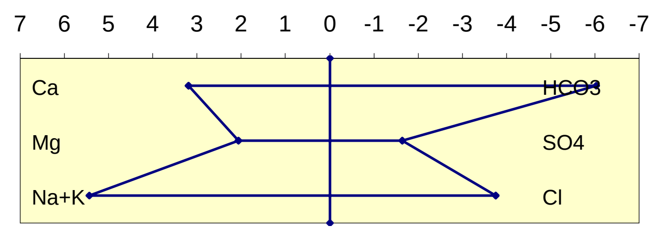
440	hco3	124	2.03236
916	ca	35	1.7465
927	mg	14	1.15206
929	na	98	4.263
937	k	20	0.5116
940	cl	129	3.63909
945	so4	68	1.41576
		1.7465	6
		1.15206	4
		4.7746	2
		-3.63909	2
		1.7465	6
		-2.03236	6
		-1.41576	4
		-3.63909	2
		1.15206	4
		-1.41576	4
		0	7
		0	1

MVP19 Pond Water Dec 2006
meq/l



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 19	MVP19 RECYCLED WATER	12/20/06 08:39 AM	124	35	5	129	14	20	98	68

MVP19-7.5 Dec 2006
meq/l

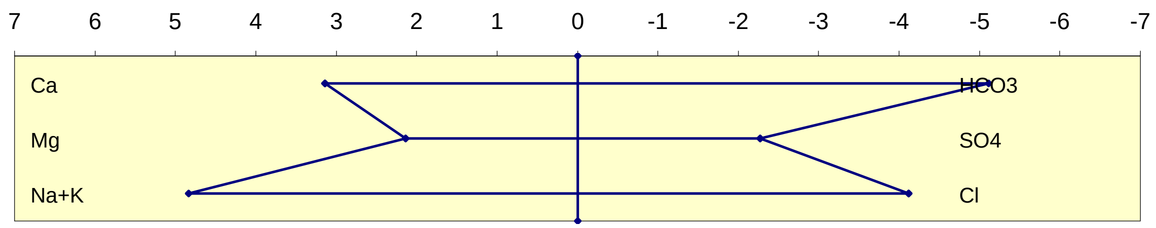


440	hco3	368	6.03152
916	ca	64	3.1936
927	mg	25	2.05725
929	na	120	5.22
937	k	8.3	0.212314
940	cl	133	3.75193
945	so4	79	1.64478
		3.1936	6
		2.05725	4
		5.432314	2
		-3.75193	2
		3.1936	6
		-6.03152	6
		-1.64478	4
		-3.75193	2
		2.05725	4
		-1.64478	4
		0	7
		0	1

				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 19	MVP19 LYSIMETER 7.5	12/21/06 08:05 AM	368	64	<3	133	25	8.3	120	79

440	hco3	312	5.11368
916	ca	63	3.1437
927	mg	26	2.13954
929	na	110	4.785
937	k	2	0.05116
940	cl	146	4.11866
945	so4	109	2.26938
		3.1437	6
		2.13954	4
		4.83616	2
		-4.11866	2
		3.1437	6
		-5.11368	6
		-2.26938	4
		-4.11866	2
		2.13954	4
		-2.26938	4
		0	7
		0	1

MVP19-14 Dec 2006
meq/l



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	312	63	<3	146	26	2	110	109
MV-RWRF	POND 14	MVP14 LYSIMETER 7.5	12/21/06 09:24 AM	283	49	<3	132	17	18	200	238
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	190	49	<3	152	23	12	94	119
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	306	66	<3	173	29	3.7	120	102
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	300	130	<3	594	34	2.7	380	291
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	280	61	<3	187	20	1	130	56

440	hco3	160	2.6224
916	ca	47	2.3453
927	mg	17	1.39893
929	na	97	4.2195
937	k	1.4	0.035812
940	cl	134	3.78014
945	so4	69	1.43658
		2.3453	6
		1.39893	4
		4.255312	2
		-3.78014	2
		2.3453	6
		-2.6224	6
		-1.43658	4
		-3.78014	2
		1.39893	4
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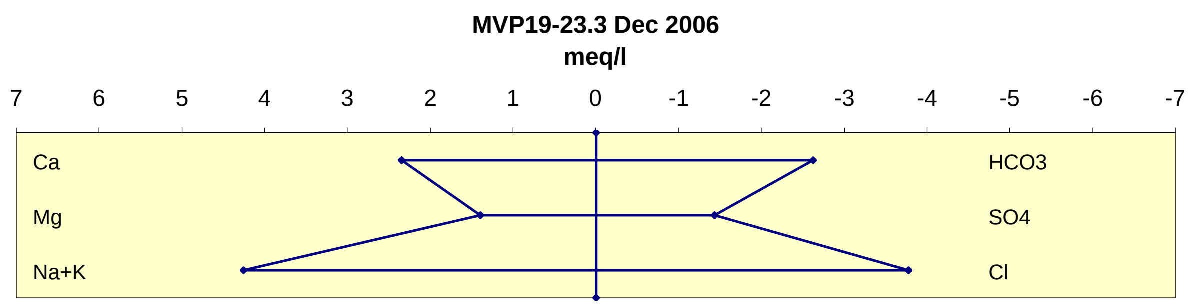
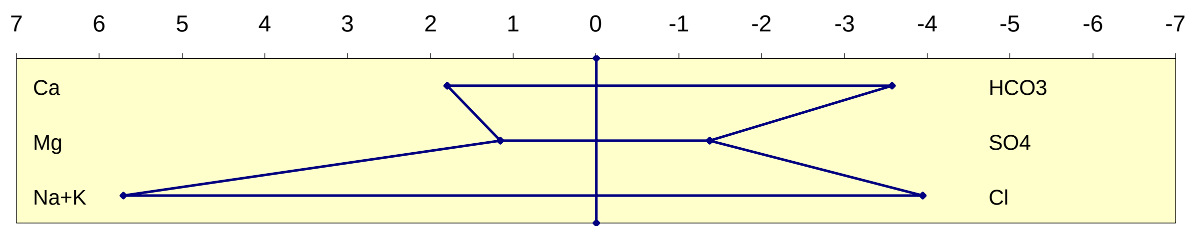
		0	1



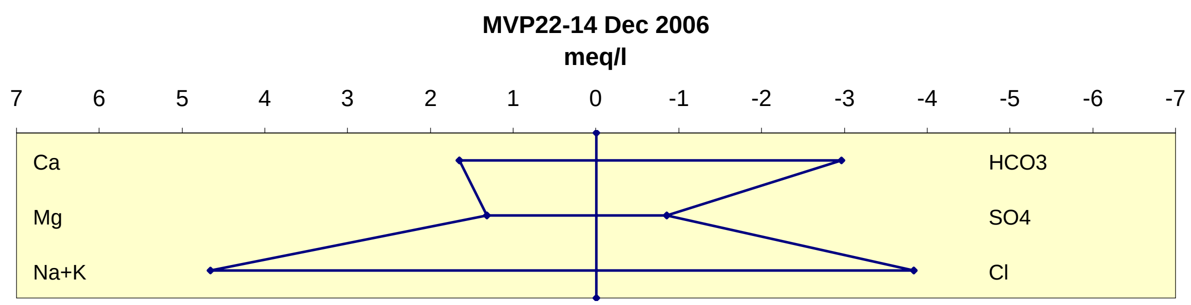
				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 19	MVP19 LYSIMETER 23.3	12/20/06 08:30 AM	160	47	<3	134	17	1.4	97	69
MV-RWRF	POND 19	MVP19 RECYCLED WATER	12/20/06 08:39 AM	124	35	5	129	14	20	98	68
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	12/20/06 08:59 AM	181	33	<3	136	16	12	100	41
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	12/20/06 09:05 AM	222	54	<3	141	24	6.2	120	88
MV-RWRF	POND 22	MVP22 RECYCLED WATER	12/20/06 09:13 AM	218	36	<3	140	14	19	120	66
MV-RWRF	POND 14	MVP14 RECYCLED WATER	12/20/06 09:44 AM	266	37	<3	134	14	19	140	81
MV-RWRF	POND 19	MVP19 LYSIMETER 7.5	12/21/06 08:05 AM	368	64	<3	133	25	8.3	120	79
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	312	63	<3	146	26	2	110	109
MV-RWRF	POND 14	MVP14 LYSIMETER 7.5	12/21/06 09:24 AM	283	49	<3	132	17	18	200	238
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	190	49	<3	152	23	12	94	119
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	306	66	<3	173	29	3.7	120	102
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	300	130	<3	594	34	2.7	380	291
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	280	61	<3	187	20	1	130	56

440	hco3	218	3.57302
916	ca	36	1.7964
927	mg	14	1.15206
929	na	120	5.22
937	k	19	0.48602
940	cl	140	3.9494
945	so4	66	1.37412
		1.7964	6
		1.15206	4
		5.70602	2
		-3.9494	2
		1.7964	6
		-3.57302	6
		-1.37412	4
		-3.9494	2
		1.15206	4
		-1.37412	4
		0	7
		0	1

MVP22 Pond Water Dec 2006
meq/l



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 22	MVP22 RECYCLED WATER	12/20/06 09:13 AM	218	36	<3	140	14	19	120	66
MV-RWRF	POND 14	MVP14 RECYCLED WATER	12/20/06 09:44 AM	266	37	<3	134	14	19	140	81
MV-RWRF	POND 19	MVP19 LYSIMETER 7.5	12/21/06 08:05 AM	368	64	<3	133	25	8.3	120	79
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	312	63	<3	146	26	2	110	109
MV-RWRF	POND 14	MVP14 LYSIMETER 7.5	12/21/06 09:24 AM	283	49	<3	132	17	18	200	238
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	190	49	<3	152	23	12	94	119
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	306	66	<3	173	29	3.7	120	102
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	300	130	<3	594	34	2.7	380	291
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	280	61	<3	187	20	1	130	56

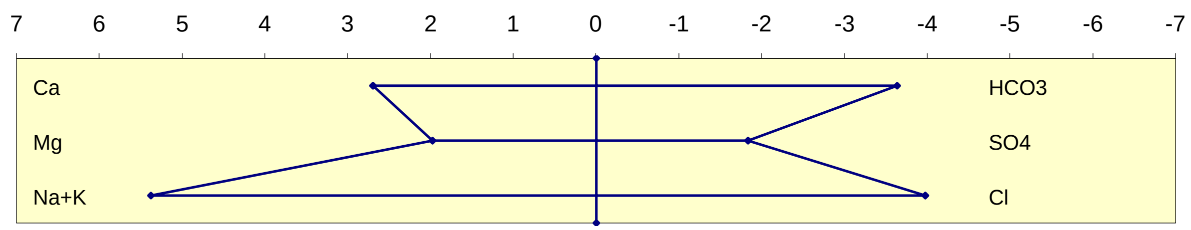


440	hco3	181	2.96659
916	ca	33	1.6467
927	mg	16	1.31664
929	na	100	4.35
937	k	12	0.30696
940	cl	136	3.83656
945	so4	41	0.85362
		1.6467	6
		1.31664	4
		4.65696	2
		-3.83656	2
		1.6467	6
		-2.96659	6
		-0.85362	4
		-3.83656	2
		1.31664	4
		-0.85362	4
		0	7
		0	1

				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 22	MVP22 LYSIMETRER 14.	12/20/06 08:59 AM	181	33	<3	136	16	12	100	41
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	12/20/06 09:05 AM	222	54	<3	141	24	6.2	120	88
MV-RWRF	POND 22	MVP22 RECYCLED WATER	12/20/06 09:13 AM	218	36	<3	140	14	19	120	66
MV-RWRF	POND 14	MVP14 RECYCLED WATER	12/20/06 09:44 AM	266	37	<3	134	14	19	140	81
MV-RWRF	POND 19	MVP19 LYSIMETER 7.5	12/21/06 08:05 AM	368	64	<3	133	25	8.3	120	79
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	312	63	<3	146	26	2	110	109
MV-RWRF	POND 14	MVP14 LYSIMETER 7.5	12/21/06 09:24 AM	283	49	<3	132	17	18	200	238
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	190	49	<3	152	23	12	94	119
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	306	66	<3	173	29	3.7	120	102
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	300	130	<3	594	34	2.7	380	291
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	280	61	<3	187	20	1	130	56

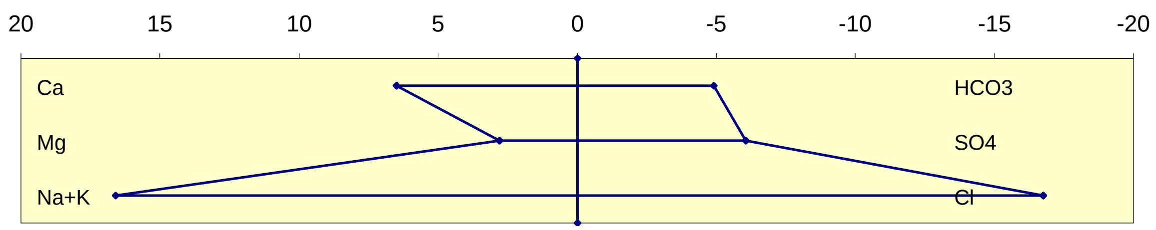
440	hco3	222	3.63858
916	ca	54	2.6946
927	mg	24	1.97496
929	na	120	5.22
937	k	6.2	0.158596
940	cl	141	3.97761
945	so4	88	1.83216
		2.6946	6
		1.97496	4
		5.378596	2
		-3.97761	2
		2.6946	6
		-3.63858	6
		-1.83216	4
		-3.97761	2
		1.97496	4
		-1.83216	4
		0	7
		0	1

MVP22-25.1 Dec 2006
meq/l



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
MV-RWRF	POND 22	MVP22 LYSIMETRER25.1	12/20/06 09:05 AM	222	54	<3	141	24	6.2	120	88
MV-RWRF	POND 22	MVP22 RECYCLED WATER	12/20/06 09:13 AM	218	36	<3	140	14	19	120	66
MV-RWRF	POND 14	MVP14 RECYCLED WATER	12/20/06 09:44 AM	266	37	<3	134	14	19	140	81
MV-RWRF	POND 19	MVP19 LYSIMETER 7.5	12/21/06 08:05 AM	368	64	<3	133	25	8.3	120	79
MV-RWRF	POND 19	MVP19 LYSIMETER 14.0	12/21/06 08:24 AM	312	63	<3	146	26	2	110	109
MV-RWRF	POND 14	MVP14 LYSIMETER 7.5	12/21/06 09:24 AM	283	49	<3	132	17	18	200	238
MV-RWRF	POND 14	MVP14 LYSIMETER 16.	12/21/06 09:28 AM	190	49	<3	152	23	12	94	119
MV-RWRF	POND 14	MVP14 LYSIMETER 26.	12/21/06 09:33 AM	306	66	<3	173	29	3.7	120	102
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	300	130	<3	594	34	2.7	380	291
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	280	61	<3	187	20	1	130	56

MV-1 Monitoring Well Dec 2006
meq/l

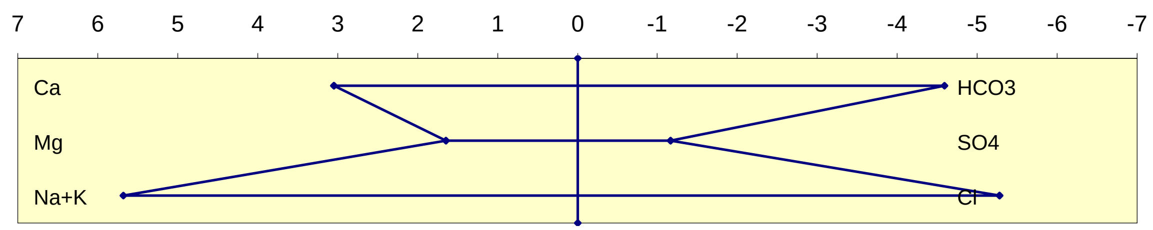


440	hco3	300	4.917
916	ca	130	6.487
927	mg	34	2.79786
929	na	380	16.53
937	k	2.7	0.069066
940	cl	594	16.75674
945	so4	291	6.05862
		6.487	6
		2.79786	4
		16.599066	2
		-16.75674	2
		6.487	6
		-4.917	6
		-6.05862	4
		-16.75674	2
		2.79786	4
		-6.05862	4
		0	7
		0	1

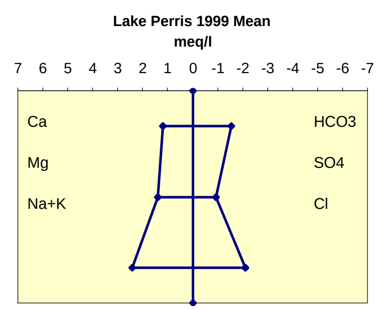
				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_NORTH	EMWD MVRWRF NORTH	12/28/06 08:55 AM	300	130	<3	594	34	2.7	380	291
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	280	61	<3	187	20	1	130	56

440	hco3	280	4.5892
916	ca	61	3.0439
927	mg	20	1.6458
929	na	130	5.655
937	k	1	0.02558
940	cl	187	5.27527
945	so4	56	1.16592
		3.0439	6
		1.6458	4
		5.68058	2
		-5.27527	2
		3.0439	6
		-4.5892	6
		-1.16592	4
		-5.27527	2
		1.6458	4
		-1.16592	4
		0	7
		0	1

MV-2 Monitoring Well Dec 2006
meq/l



				Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
SUBBASE-PERRIS NORTH	EMWD_MVRWRF_SOUTH	EMWD MVRWRF SOUTH	12/28/06 08:58 AM	280	61	<3	187	20	1	130	56



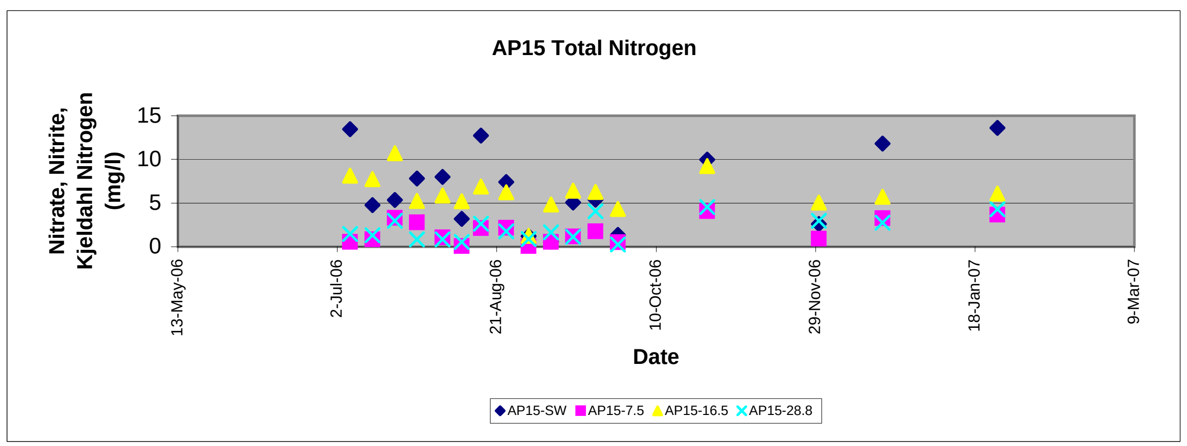
440	hco3	95	1.55705
916	ca	24	1.1976
927	mg	17	1.39893
929	na	55	2.3925
937	k	1	0.02558
940	cl	75	2.11575
945	so4	45	0.9369
		1.1976	6
		1.39893	4
		2.41808	2
		-2.11575	2
		1.1976	6
		-1.55705	6
		-0.9369	4
		-2.11575	2
		1.39893	4
		-0.9369	4
		0	7
		0	1

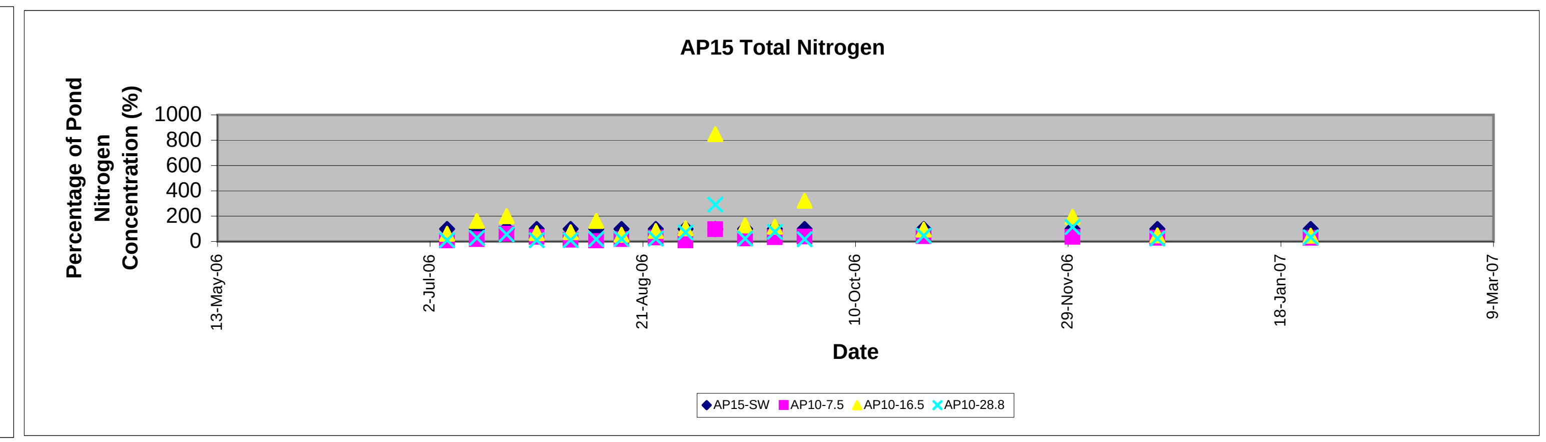
	Bicarbonate (HCO3) mg/L Reported As	Calcium mg/L Reported As	Carbonate (CO3) mg/L Reported As	Chloride mg/L Reported As	Magnesium mg/L Reported As	Potassium mg/L Reported As	Sodium mg/L Reported As	Sulfate mg/L Reported As
LAKE PERRIS 1999 MEAN	95	24	<3	75	17	1	55	45

source: http://wwwomwq.water.ca.gov/PublicationsPage/Documents/WQA9899.pdf

Table 9- AP15

									Percent Present				Percent Present			
Total Nitrogen (Nitrate+Nitrite+Ammonia+Organic Nitrogen)																
Date	AP15-SW	AP15-7.5	AP15-16.5	AP15-28.8	0	7.5	16.5	28.8	AP15-SW	AP10-7.5	AP10-16.5	AP10-28.8	0	7.5	16.5	28.8
7/6/2006	13.45	0.56	8.135	1.485	13.45	0.56	8.135	1.485	100	4.163568773	60.48327138	11.04089219	100	4.163568773	60.48327138	11.04089219
7/13/2006	4.762	0.835	7.735	1.325	4.762	0.835	7.735	1.325	100	17.53464931	162.4317514	27.82444351	100	17.53464931	162.4317514	27.82444351
7/20/2006	5.37	3.295	10.705	2.955	5.37	3.295	10.705	2.955	100	61.3594041	199.3482309	55.02793296	100	61.3594041	199.3482309	55.02793296
7/27/2006	7.83	2.785	5.25	0.835	7.83	2.785	5.25	0.835	100	35.56832695	67.04980843	10.66411239	100	35.56832695	67.04980843	10.66411239
8/4/2006	7.98	1.055	5.855	0.86	7.98	1.055	5.855	0.86	100	13.22055138	73.37092732	10.77694236	100	13.22055138	73.37092732	10.77694236
8/10/2006	3.185	0.075	5.2	0.56	3.185	0.075	5.2	0.56	100	2.354788069	163.2653061	17.58241758	100	2.354788069	163.2653061	17.58241758
8/16/2006	12.72	2.115	6.91	2.63	12.72	2.115	6.91	2.63	100	16.62735849	54.32389937	20.67610063	100	16.62735849	54.32389937	20.67610063
8/24/2006	7.4	2.175	6.24	1.765	7.4	2.175	6.24	1.765	100	29.39189189	84.32432432	23.85135135	100	29.39189189	84.32432432	23.85135135
8/31/2006	1.22	0.04	1.26	0.875	1.22	0.04	1.26	0.875	100	3.278688525	103.2786885	71.72131148	100	3.278688525	103.2786885	71.72131148
9/7/2006	0.57	0.555	4.84	1.655	0.57	0.555	4.84	1.655	100	97.36842105	849.122807	290.3508772	100	97.36842105	849.122807	290.3508772
9/14/2006	5.055	1.16	6.42	1.155	5.055	1.16	6.42	1.155	100	22.94757666	127.0029674	22.84866469	100	22.94757666	127.0029674	22.84866469
9/21/2006	5.4	1.77	6.27	4.06	5.4	1.77	6.27	4.06	100	32.77777778	116.1111111	75.18518519	100	32.77777778	116.1111111	75.18518519
9/28/2006	1.355	0.505	4.34	0.24	1.355	0.505	4.34	0.24	100	37.26937269	320.295203	17.71217712	100	37.26937269	320.295203	17.71217712
10/26/2006	9.99	4.055	9.25	4.555	9.99	4.055	9.25	4.555	100	40.59059059	92.59259259	45.5955956	100	40.59059059	92.59259259	45.5955956
11/30/2006	2.6	0.905	5.055	2.955	2.6	0.905	5.055	2.955	100	34.80769231	194.4230769	113.6538462	100	34.80769231	194.4230769	113.6538462
12/20/2006	11.8	3.255	5.73	2.76	11.8	3.255	5.73	2.76	100	27.58474576	48.55932203	23.38983051	100	27.58474576	48.55932203	23.38983051
1/25/2007	13.59	3.66	6.1	4.305	13.59	3.66	6.1	4.305	100	26.93156733	44.88594555	31.67770419	100	26.93156733	44.88594555	31.67770419





13.45	0.56	8.135	1.485
4.762	0.835	7.735	1.325
5.37	3.295	10.705	2.955
7.83	2.785	5.25	0.835
7.98	1.055	5.855	0.86
3.185	0.075	5.2	0.56
9.2	0.555	5.29	0.57
4.6	0.555	4.72	0.555

Table 9- AP15

Total Nitrogen Percent Reduction

Date	AP15-SW	AP10-7.5	AP10-16.5	AP10-28.8
7/6/2006	0	95.83643123	39.51672862	88.95910781
7/13/2006	0	82.46535069	-62.43175136	72.17555649
7/20/2006	0	38.6405959	-99.34823091	44.97206704
7/27/2006	0	64.43167305	32.95019157	89.33588761
8/4/2006	0	86.77944862	26.62907268	89.22305764
8/10/2006	0	97.64521193	-63.26530612	82.41758242
8/16/2006	0	83.37264151	45.67610063	79.32389937
8/24/2006	0	70.60810811	15.67567568	76.14864865
8/31/2006	0	96.72131148	-3.278688525	28.27868852
9/7/2006	0	2.631578947	-749.122807	-190.3508772
9/14/2006	0	77.05242334	-27.00296736	77.15133531
9/21/2006	0	67.22222222	-16.11111111	24.81481481
9/28/2006	0	62.73062731	-220.295203	82.28782288
10/26/2006	0	59.40940941	7.407407407	54.4044044
11/30/2006	0	65.19230769	-94.42307692	-13.65384615
12/20/2006	0	72.41525424	51.44067797	76.61016949
1/25/2007	0	73.06843267	55.11405445	68.32229581

Percent Reduction

0	7.5	16.5	28.8
0	95.83643123	39.51672862	88.95910781
0	82.46535069	-62.43175136	72.17555649
0	38.6405959	-99.34823091	44.97206704
0	64.43167305	32.95019157	89.33588761
0	86.77944862	26.62907268	89.22305764
0	97.64521193	-63.26530612	82.41758242
0	83.37264151	45.67610063	79.32389937
0	70.60810811	15.67567568	76.14864865
0	96.72131148	-3.278688525	28.27868852
0	2.631578947	-749.122807	-190.3508772
0	77.05242334	-27.00296736	77.15133531
0	67.22222222	-16.11111111	24.81481481
0	62.73062731	-220.295203	82.28782288
0	59.40940941	7.407407407	54.4044044
0	65.19230769	-94.42307692	-13.65384615
0	72.41525424	51.44067797	76.61016949
0	73.06843267	55.11405445	68.32229581

Average Reduction

Depth	% Reduction
0	
7.1	70.36606
14.5	-62.4041
29.2	48.84827

15.4	39	2.02	0.61
1.017	6.632	1.436	1.86
8.6	4.4	2	1.54
4.1	5.77	2.9	2.9
9.05	9.4	1.72	2.43
9.6	6.64	4.81	1.71

Table 10- MVP14

Total Nitrogen (Nitrate+Nitrite+Ammonia+Organic Nitrogen)

Date	MVP14-SW	MVP14-7.5	MVP14-16.	MVP14-26.9
8/10/2006	5.135	0.7	3.45	0.06
8/16/2006	19.94	5	4.94	1.825
8/24/2006	20.17	9.93	5.94	3.44
8/31/2006	16.63	9.29	8.47	4.69
9/7/2006	14.31	5.22	7.16	1.75
9/14/2006	12.37	17	7	2.85
9/21/2006	14.45	14.2	6.26	1.54
9/28/2006	9.45	11.7	7.7	1.25
10/5/2006	10.45	8.4	9.62	1.52
10/12/2006	8.5	9.4	10.2	1.65
10/19/2006	13.2	5.68	10.82	0.59
10/26/2006	18.6	8.3	11.9	1.705
11/30/2006	10.7	8.62	11.1	4.405
12/20/2006	10	8.33	5.6	1.34
1/25/2007	17.4	5.48	4.72	2.02

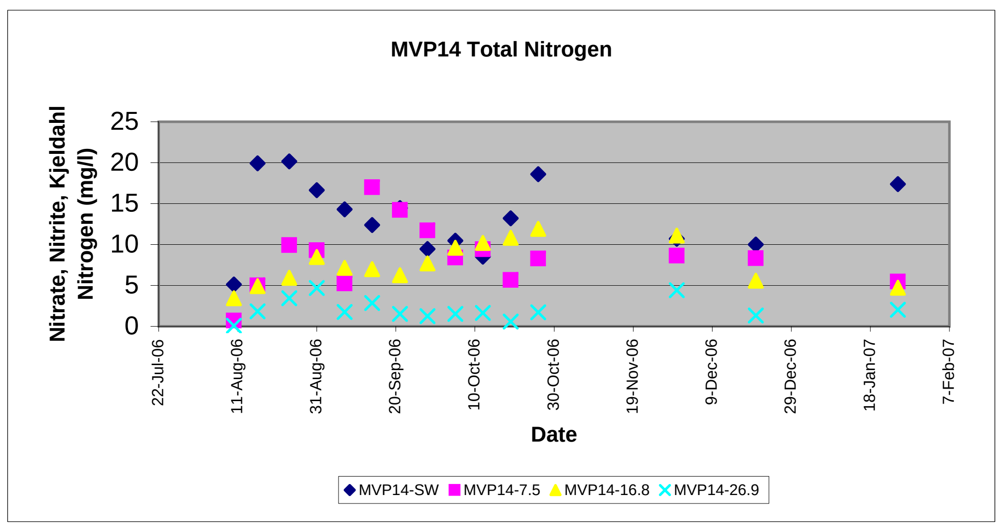
0	7.5	16.8	26.9
5.135	0.7	3.45	0.06
19.94	5	4.94	1.825
20.17	9.93	5.94	3.44
16.63	9.29	8.47	4.69
14.31	5.22	7.16	1.75
12.37	17	7	2.85
14.45	14.2	6.26	1.54
9.45	11.7	7.7	1.25
10.45	8.4	9.62	1.52
8.5	9.4	10.2	1.65
13.2	5.68	10.82	0.59
18.6	8.3	11.9	1.705
10.7	8.62	11.1	4.405
10	8.33	5.6	1.34
17.4	5.48	4.72	2.02

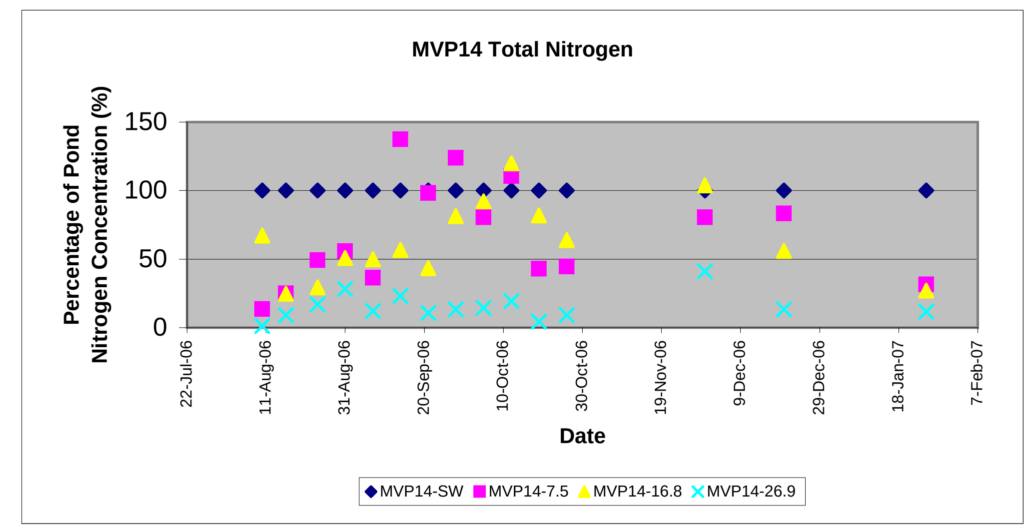
Percent Present

MVP14-SW	MVP14-7.5	MVP14-16.	MVP14-26.9
100	13.63194	67.18598	1.168452
100	25.07523	24.77432	9.152457
100	49.23153	29.44968	17.05503
100	55.8629	50.93205	28.20204
100	36.47799	50.03494	12.22921
100	137.4293	56.58852	23.03961
100	98.2699	43.3218	10.65744
100	123.8095	81.48148	13.22751
100	80.38278	92.05742	14.54545
100	110.5882	120	19.41176
100	43.0303	81.9697	4.469697
100	44.62366	63.97849	9.166667
100	80.56075	103.7383	41.16822
100	83.3	56	13.4
100	31.49425	27.12644	11.6092

Percent Present

0	7.5	16.8	26.9
100	13.63194	67.18598	1.168452
100	25.07523	24.77432	9.152457
100	49.23153	29.44968	17.05503
100	55.8629	50.93205	28.20204
100	36.47799	50.03494	12.22921
100	137.4293	56.58852	23.03961
100	98.2699	43.3218	10.65744
100	123.8095	81.48148	13.22751
100	80.38278	92.05742	14.54545
100	110.5882	120	19.41176
100	43.0303	81.9697	4.469697
100	44.62366	63.97849	9.166667
100	80.56075	103.7383	41.16822
100	83.3	56	13.4
100	31.49425	27.12644	11.6092





13.45	0.56	8.135	1.485
4.762	0.835	7.735	1.325
5.37	3.295	10.705	2.955
7.83	2.785	5.25	0.835
7.98	1.055	5.855	0.86
3.185	0.075	5.2	0.56
9.2	0.555	5.29	0.57
4.6	0.555	4.72	0.555

Table 10- MVF
Total Nitrogen

	Percent Reduction				Percent Reduction			
Date	MVP14-SW	MVP14-7.5	MVP14-16.8	MVP14-26.9	0	7.5	16.8	26.9
8/10/2006	0	86.36806232	32.81402142	98.8315482	0	86.36806232	32.81402142	98.8315482
8/16/2006	0	74.92477432	75.22567703	90.84754263	0	74.92477432	75.22567703	90.84754263
8/24/2006	0	50.76846802	70.55032226	82.94496777	0	50.76846802	70.55032226	82.94496777
8/31/2006	0	44.13710162	49.06794949	71.7979555	0	44.13710162	49.06794949	71.7979555
9/7/2006	0	63.52201258	49.9650594	87.77078966	0	63.52201258	49.9650594	87.77078966
9/14/2006	0	-37.42926435	43.41147939	76.96038804	0	-37.42926435	43.41147939	76.96038804
9/21/2006	0	1.730103806	56.67820069	89.34256055	0	1.730103806	56.67820069	89.34256055
9/28/2006	0	-23.80952381	18.51851852	86.77248677	0	-23.80952381	18.51851852	86.77248677
10/5/2006	0	19.61722488	7.942583732	85.45454545	0	19.61722488	7.942583732	85.45454545
10/12/2006	0	-10.58823529	-20	80.58823529	0	-10.58823529	-20	80.58823529
10/19/2006	0	56.96969697	18.03030303	95.53030303	0	56.96969697	18.03030303	95.53030303
10/26/2006	0	55.37634409	36.02150538	90.83333333	0	55.37634409	36.02150538	90.83333333
11/30/2006	0	19.43925234	-3.738317757	58.8317757	0	19.43925234	-3.738317757	58.8317757
12/20/2006	0	16.7	44	86.6	0	16.7	44	86.6
1/25/2007	0	68.50574713	72.87356322	88.3908046	0	68.50574713	72.87356322	88.3908046

Average Reduction

Depth	% Reduction
0	
7.5	32.41545097
16.8	36.75739105
26.9	84.76648244

15.4	39	2.02	0.61
1.017	6.632	1.436	1.86
8.6	4.4	2	1.54
4.1	5.77	2.9	2.9
9.05	9.4	1.72	2.43
9.6	6.64	4.81	1.71

Table 11- MVP19

Total Nitrogen (Nitrate+Nitrite+Ammonia+Organic Nitrogen)

Date	MVP19-SW	MVP19-7.5	MVP19-14.	MVP19-23.3
8/10/2006	5.43	0.06	*0.3*	0.62
8/16/2006	20.29	1.575	0.115	1.225
8/24/2006	17.43	3.765	2.245	4.035
8/31/2006	17.385	0.925	2.725	3.155
9/7/2006	15.295	1.135	0.765	0.555
9/14/2006	11.755	3.47	0.355	2.055
9/21/2006	10.56	1.58	1.055	0.255
9/28/2006	7.95	1.31	1.355	1.055
10/5/2006	8.78	*2*	2.055	0.755
10/12/2006	6.05	3.45	1.055	2.155
10/19/2006	9.6	2.05	0.555	0.555
10/26/2006	13.3	1.85	1.555	2.555
11/30/2006	14.4	2.75	2.755	2.455
12/20/2006	12.7	1.55	2.155	2.955
1/25/2007	13.5	2.15	1.55	1.455

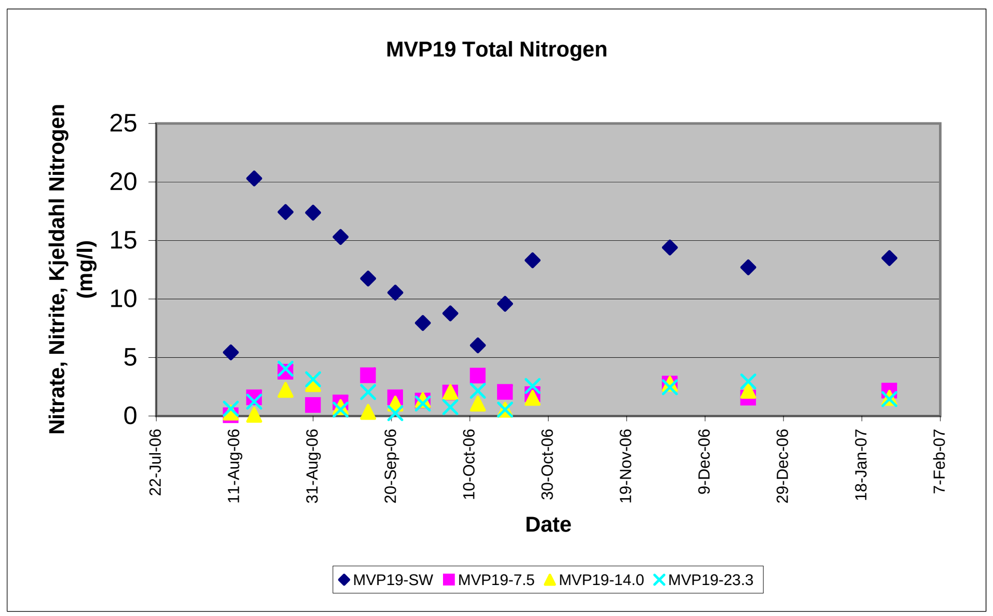
0	7.5	14	23.3
5.43	0.06	0.3	0.62
20.29	1.575	0.115	1.225
17.43	3.765	2.245	4.035
17.385	0.925	2.725	3.155
15.295	1.135	0.765	0.555
11.755	3.47	0.355	2.055
10.56	1.58	1.055	0.255
7.95	1.31	1.355	1.055
8.78	2	2.055	0.755
6.05	3.45	1.055	2.155
9.6	2.05	0.555	0.555
13.3	1.85	1.555	2.555
14.4	2.75	2.755	2.455
12.7	1.55	2.155	2.955
13.5	2.15	1.55	1.455

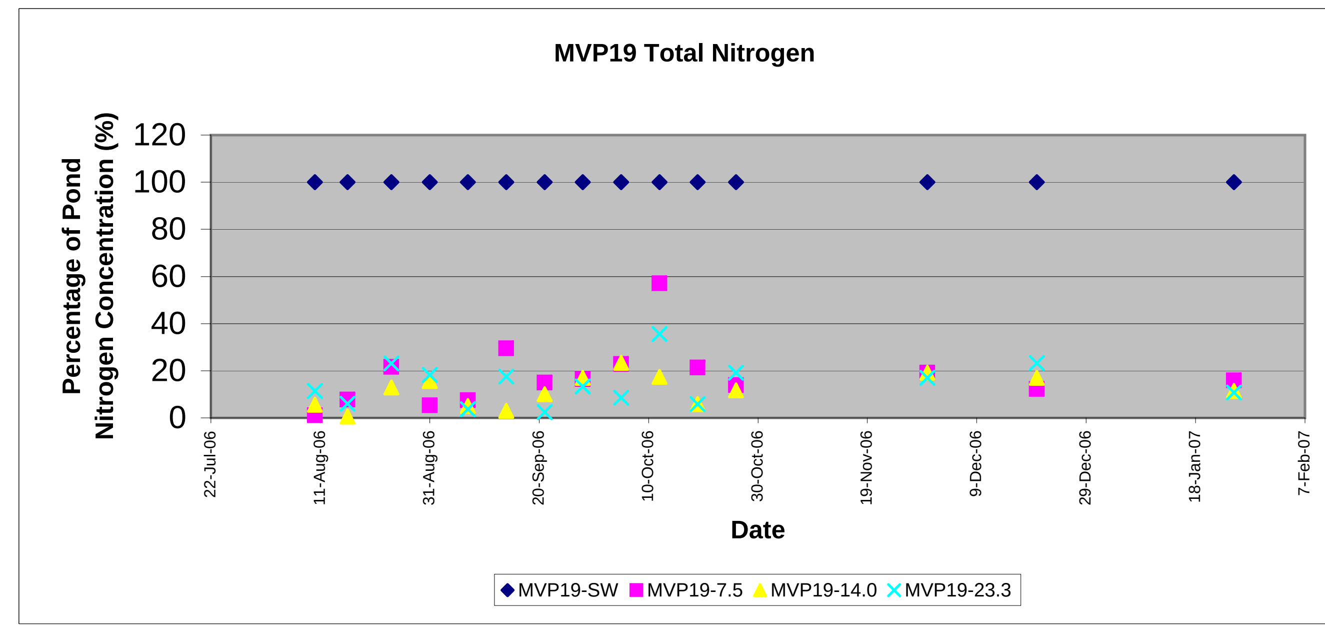
Percent Present

MVP19-SW	MVP19-7.5	MVP19-14.0	MVP19-23.3
100	1.104972376	5.524861878	11.41804788
100	7.762444554	0.566781666	6.037456875
100	21.60068847	12.8800918	23.14974182
100	5.320678746	15.67443198	18.14782859
100	7.420725727	5.001634521	3.628636809
100	29.51935347	3.019991493	17.48192259
100	14.96212121	9.990530303	2.414772727
100	16.47798742	17.04402516	13.27044025
100	22.77904328	23.40546697	8.599088838
100	57.02479339	17.43801653	35.61983471
100	21.35416667	5.78125	5.78125
100	13.90977444	11.69172932	19.21052632
100	19.09722222	19.13194444	17.04861111
100	12.20472441	16.96850394	23.26771654
100	15.92592593	11.48148148	10.77777778

Percent Present

0	7.5
100	1.104972376
100	7.762444554
100	21.60068847
100	5.320678746
100	7.420725727
100	29.51935347
100	14.96212121
100	16.47798742
100	22.77904328
100	57.02479339
100	21.35416667
100	13.90977444
100	19.09722222
100	12.20472441
100	15.92592593





13.45	0.56	8.135	1.485
4.762	0.835	7.735	1.325
5.37	3.295	10.705	2.955
7.83	2.785	5.25	0.835
7.98	1.055	5.855	0.86
3.185	0.075	5.2	0.56
9.2	0.555	5.29	0.57
4.6	0.555	4.72	0.555

Table 11- MVF

Total Nitrogen			Percent Reduction				Percent Reduction			
Date	14	23.3	MVP19-SW	MVP19-7.5	MVP19-14.0	MVP19-23.3	0	7.5	14	23.3
8/10/2006	5.524861878	11.41804788	0	98.89502762	94.47513812	88.58195212	0	98.89503	94.47514	88.58195
8/16/2006	0.566781666	6.037456875	0	92.23755545	99.43321833	93.96254312	0	92.23756	99.43322	93.96254
8/24/2006	12.8800918	23.14974182	0	78.39931153	87.1199082	76.85025818	0	78.39931	87.11991	76.85026
8/31/2006	15.67443198	18.14782859	0	94.67932125	84.32556802	81.85217141	0	94.67932	84.32557	81.85217
9/7/2006	5.001634521	3.628636809	0	92.57927427	94.99836548	96.37136319	0	92.57927	94.99837	96.37136
9/14/2006	3.019991493	17.48192259	0	70.48064653	96.98000851	82.51807741	0	70.48065	96.98001	82.51808
9/21/2006	9.990530303	2.414772727	0	85.03787879	90.0094697	97.58522727	0	85.03788	90.00947	97.58523
9/28/2006	17.04402516	13.27044025	0	83.52201258	82.95597484	86.72955975	0	83.52201	82.95597	86.72956
10/5/2006	23.40546697	8.599088838	0	77.22095672	76.59453303	91.40091116	0	77.22096	76.59453	91.40091
10/12/2006	17.43801653	35.61983471	0	42.97520661	82.56198347	64.38016529	0	42.97521	82.56198	64.38017
10/19/2006	5.78125	5.78125	0	78.64583333	94.21875	94.21875	0	78.64583	94.21875	94.21875
10/26/2006	11.69172932	19.21052632	0	86.09022556	88.30827068	80.78947368	0	86.09023	88.30827	80.78947
11/30/2006	19.13194444	17.04861111	0	80.90277778	80.86805556	82.95138889	0	80.90278	80.86806	82.95139
12/20/2006	16.96850394	23.26771654	0	87.79527559	83.03149606	76.73228346	0	87.79528	83.0315	76.73228
1/25/2007	11.48148148	10.77777778	0	84.07407407	88.51851852	89.22222222	0	84.07407	88.51852	89.22222

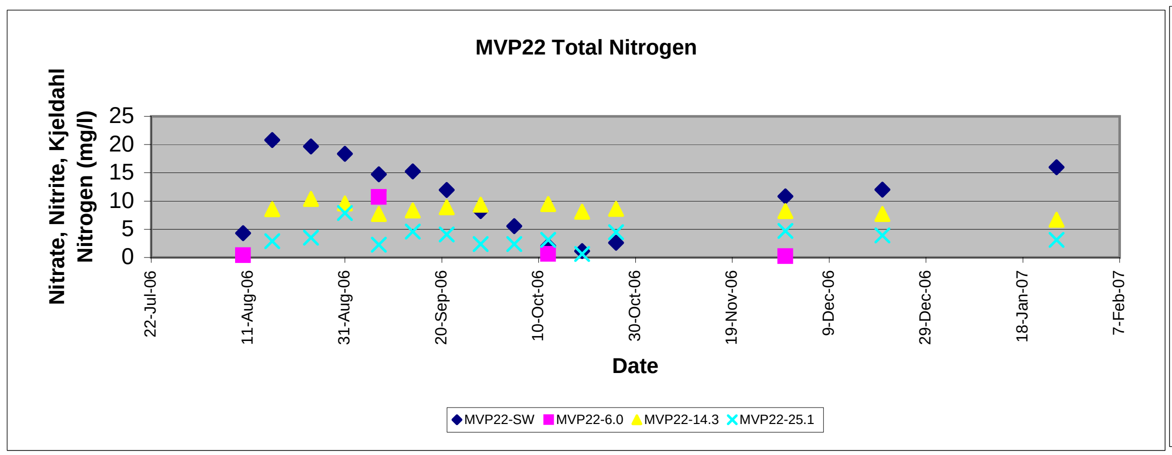
Average Reduction	
Depth	% Reduction
0	
7.5	82.23569185
14	88.2932839
23.3	85.60975648

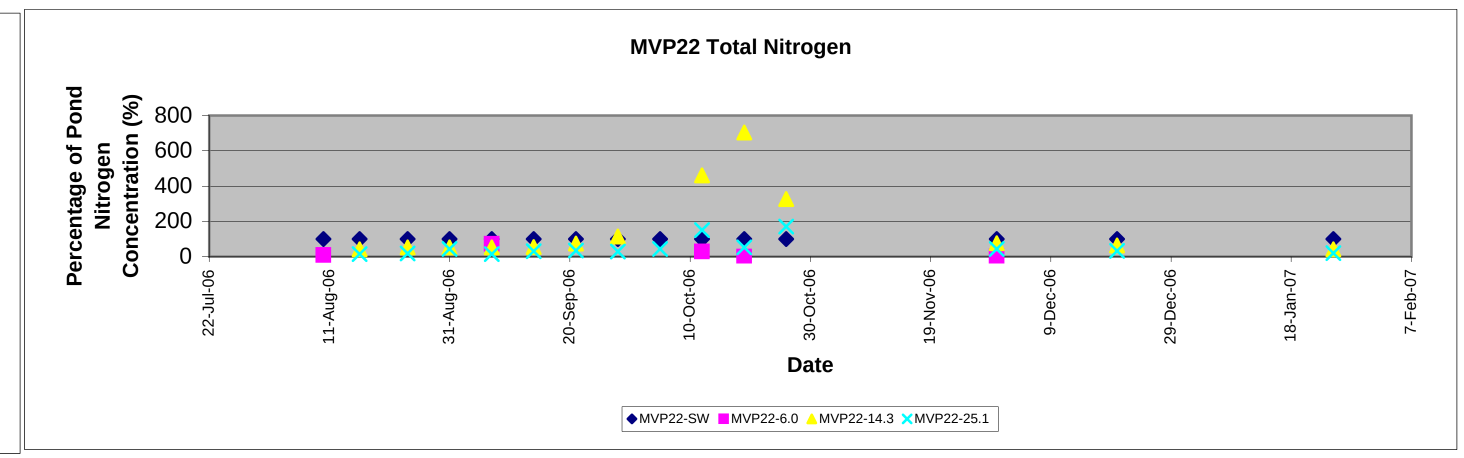
15.4	39	2.02	0.61
1.017	6.632	1.436	1.86
8.6	4.4	2	1.54
4.1	5.77	2.9	2.9
9.05	9.4	1.72	2.43
9.6	6.64	4.81	1.71

Table 12- MVP22

Total Nitrogen (Nitrate+Nitrite+Ammonia+Organic Nitrogen)

									Percent Present				Percent Present	
Date	MVP22-SV	MVP22-6.(	MVP22-14.	MVP22-25.1	0	6	14.3	25.1	MVP22-SW	MVP22-6.0	MVP22-14.3	MVP22-25.1	0	6
8/10/2006	4.335	0.4			4.335	0.4			100	9.2272203			100	9.22722
8/16/2006	20.81		8.545	2.885	20.81		8.545	2.885	100		41.06198943	13.86352715	100	
8/24/2006	19.66		10.35	3.51	19.66		10.35	3.51	100		52.64496439	17.85350966	100	
8/31/2006	18.35		9.595	7.89	18.35		9.595	7.89	100		52.28882834	42.9972752	100	
9/7/2006	14.73	10.73	7.705	2.25	14.73	10.73	7.705	2.25	100	72.84453496	52.30821453	15.27494908	100	72.84453
9/14/2006	15.26		8.33	4.6	15.26		8.33	4.6	100		54.58715596	30.14416776	100	
9/21/2006	11.95		8.9	4.09	11.95		8.9	4.09	100		74.47698745	34.22594142	100	
9/28/2006	8.2		9.35	2.4	8.2		9.35	2.4	100		114.0243902	29.26829268	100	
10/5/2006	5.55			2.4	5.55			2.4	100			43.24324324	100	
10/12/2006	2.05	0.6	9.45	3.1	2.05	0.6	9.45	3.1	100	29.26829268	460.9756098	151.2195122	100	29.26829
10/19/2006	1.15		8.1	0.6	1.15		8.1	0.6	100	0	704.3478261	52.17391304	100	0
10/26/2006	2.63		8.6	4.5	2.63		8.6	4.5	100		326.9961977	171.1026616	100	
11/30/2006	10.8	0.2	8.2	4.7	10.8	0.2	8.2	4.7	100	1.851851852	75.92592593	43.51851852	100	1.851852
12/20/2006	12		7.7	3.9	12		7.7	3.9	100		64.16666667	32.5	100	
1/25/2007	16		6.7	3.1	16		6.7	3.1	100		41.875	19.375	100	





13.45	0.56	8.135	1.485
4.762	0.835	7.735	1.325
5.37	3.295	10.705	2.955
7.83	2.785	5.25	0.835
7.98	1.055	5.855	0.86
3.185	0.075	5.2	0.56
9.2	0.555	5.29	0.57
4.6	0.555	4.72	0.555

Table 12- MVP:

Total Nitrogen (

Date	14.3	25.1
8/10/2006		
8/16/2006	41.06199	13.86353
8/24/2006	52.64496	17.85351
8/31/2006	52.28883	42.99728
9/7/2006	52.30821	15.27495
9/14/2006	54.58716	30.14417
9/21/2006	74.47699	34.22594
9/28/2006	114.0244	29.26829
10/5/2006		43.24324
10/12/2006	460.9756	151.2195
10/19/2006	704.3478	52.17391
10/26/2006	326.9962	171.1027
11/30/2006	75.92593	43.51852
12/20/2006	64.16667	32.5
1/25/2007	41.875	19.375

Percent Reduction

MVP22-SW	MVP22-6.0	MVP22-14.	MVP22-25.1
0	90.77278		
0		58.93801	86.13647
0		47.35504	82.14649
0		47.71117	57.00272
0	27.15547	47.69179	84.72505
0		45.41284	69.85583
0		25.52301	65.77406
0		-14.02439	70.73171
0			56.75676
0	70.73171	-360.9756	-51.21951
0	100	-604.3478	47.82609
0		-226.9962	-71.10266
0	98.14815	24.07407	56.48148
0		35.83333	67.5
0		58.125	80.625

Percent Reduction

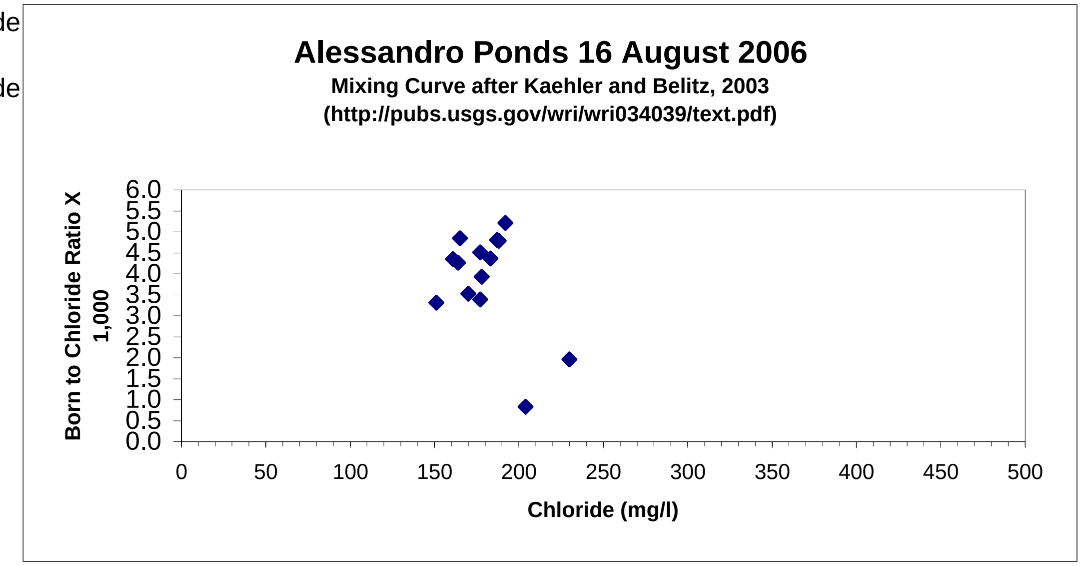
0	6	14.3	25.1
0	90.77278		
0		58.93801	86.13647
0		47.35504	82.14649
0		47.71117	57.00272
0	27.15547	47.69179	84.72505
0		45.41284	69.85583
0		25.52301	65.77406
0		-14.02439	70.73171
0			56.75676
0	70.73171	-360.9756	-51.21951
0	100	-604.3478	47.82609
0		-226.9962	-71.10266
0	98.14815	24.07407	56.48148
0		35.83333	67.5
0		58.125	80.625

Average Reduction

Depth	% Reduction
0	
6	77.36162
14.3	-62.7446
25.1	50.23139

15.4	39	2.02	0.61
1.017	6.632	1.436	1.86
8.6	4.4	2	1.54
4.1	5.77	2.9	2.9
9.05	9.4	1.72	2.43
9.6	6.64	4.81	1.71

		Boron mg/L Reported As	Chloride mg/L Chloride	B/CL x1000 ride Ratio T	Chloride mg/L Chloride
P1 aRECYCLE WATER	AP1-SW	0.7	161	4.347826	161
P1 LYSIMETER 07.1 FT	AP1-7.1	0.8	165	4.848485	165
P1 LYSIMETER 14.5 FT	AP1-14.5	0.7	164	4.268293	164
P1 LYSIMETER 29.2 FT	AP1-29.2	0.5	151	3.311258	151
P10 aRECYCLE WATER	AP10-SW	0.9	187	4.812834	187
P10 LYSIMETER 08.5 FT	AP10-8.5	0.8	177	4.519774	177
P10 LYSIMETER 19.5 F	AP10-19.5	1	192	5.208333	192
P10 LYSIMETER 29 FT	AP10-29.0	0.6	170	3.529412	170
P15 aRECYCLE WATER	AP15-SW	0.8	183	4.371585	183
P15 LYSIMETER 07.5 FT	AP15-7.5	0.7	178	3.932584	178
P15 LYSIMETER 16.5 F	AP15-16.5	0.9	188	4.787234	188
P15 LYSIMETER 28.8 F	AP15-28.8	0.6	177	3.389831	177

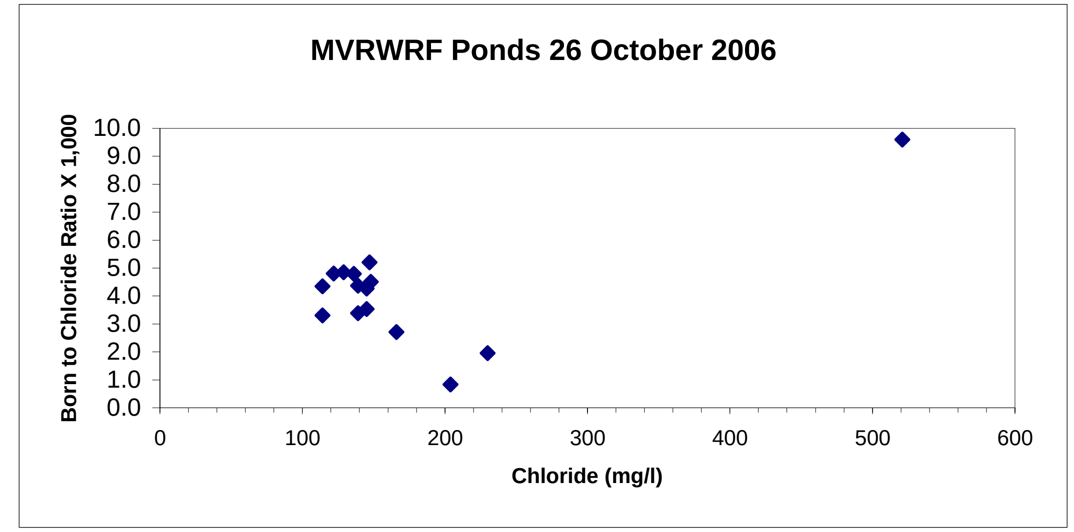


Sample	Chloride	loride Ration X 1,000
AP1-SW	161	4.347826
AP1-7.1	165	4.848485
AP1-14.5	164	4.268293
AP1-29.2	151	3.311258
AP10-SW	187	4.812834
AP10-8.5	177	4.519774
AP10-19.5	192	5.208333
AP10-29.0	170	3.529412
AP15-SW	183	4.371585
AP15-7.5	178	3.932584
AP15-16.5	188	4.787234
AP15-28.8	177	3.389831

AP1-SW	161	4.35	
AP1-7.1	165	4.85	
AP1-14.5	164	4.27	
AP1-29.2	151	3.31	
AP10-SW	187	4.81	
AP10-8.5	177	4.51	
AP10-19.5	192	5.21	
AP10-29.0	170	3.53	
AP15-SW	183	4.37	
AP15-7.5	178	3.93	
AP15-16.5	188	4.79	
AP15-28.8	177	3.39	
New Perry	230	1.96	1.96
Ethanac	204	0.83	

New Perry	1.956522
Ethanac	0.833333

	Boron mg/L Reported A:	Chloride mg/L Chloride	B/CL x1000 ride Ratio T	Chloride mg/L Chloride
MVP14-SW	0.3	114	2.631579	114
MVP14-7.5	0.3	129	2.325581	129
MVP14-16.8	0.5	145	3.448276	145
MVP14-26.9	0.3	114	2.631579	114
MVP19-SW	0.3	122	2.459016	122
MVP19-7.5	0.4	148	2.702703	148
MVP19-14.0	0.4	147	2.721088	147
MVP19-23.3	0.4	145	2.758621	145
MVP22-SW	0.4	139	2.877698	139
MVP22-14.3	0.3	136	2.205882	136
MVP22-25.1	0.4	139	2.877698	139



Sample	Chloride	Boron/Chloride Ration X 1,000
MVP14-SW	114	2.631578947
MVP14-7.5	129	2.325581395
MVP14-16.8	145	3.448275862
MVP14-26.9	114	2.631578947
MVP19-SW	122	2.459016393
MVP19-7.5	148	2.702702703
MVP19-14.0	147	2.721088435
MVP19-23.3	145	2.75862069
MVP22-SW	139	2.877697842
MVP22-14.3	136	2.205882353
MVP22-25.1	139	2.877697842

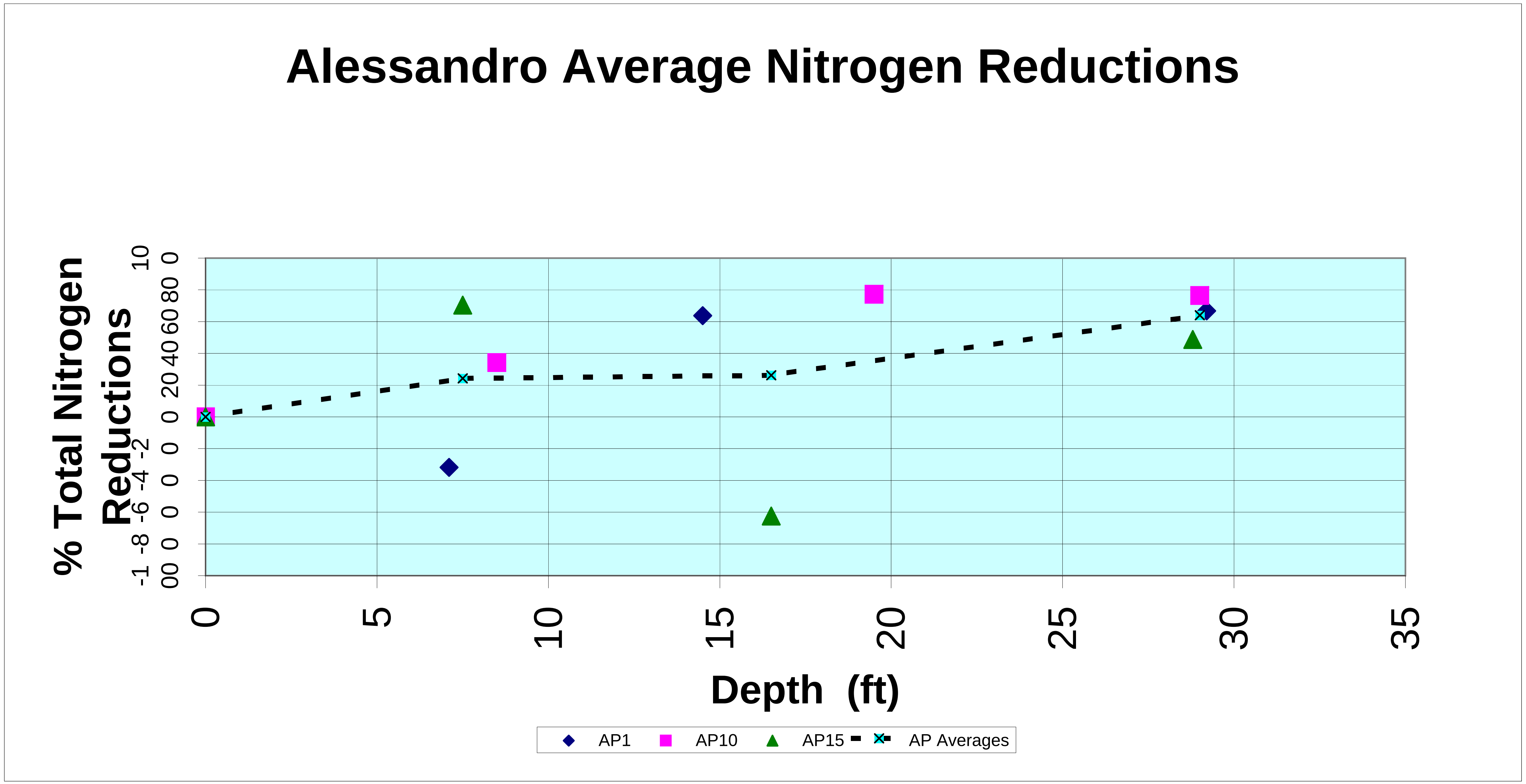
MVP14-SW	114	4.35
MVP14-7.5	129	4.85
MVP14-16.8	145	4.27
MVP14-26.9	114	3.31
MVP19-SW	122	4.81
MVP19-7.5	148	4.51
MVP19-14.0	147	5.21
MVP19-23.3	145	3.53
MVP22-SW	139	4.37
MVP22-14.3	136	4.79
MVP22-25.1	139	3.39

New Perry	1.956522
Ethanac	0.833333
MV-1	9.596929
MV-2	2.710843

New Perry	230	1.96	1.96
Ethanac	204	0.83	
MV-1	521	9.6	
MV-2	166	2.71	

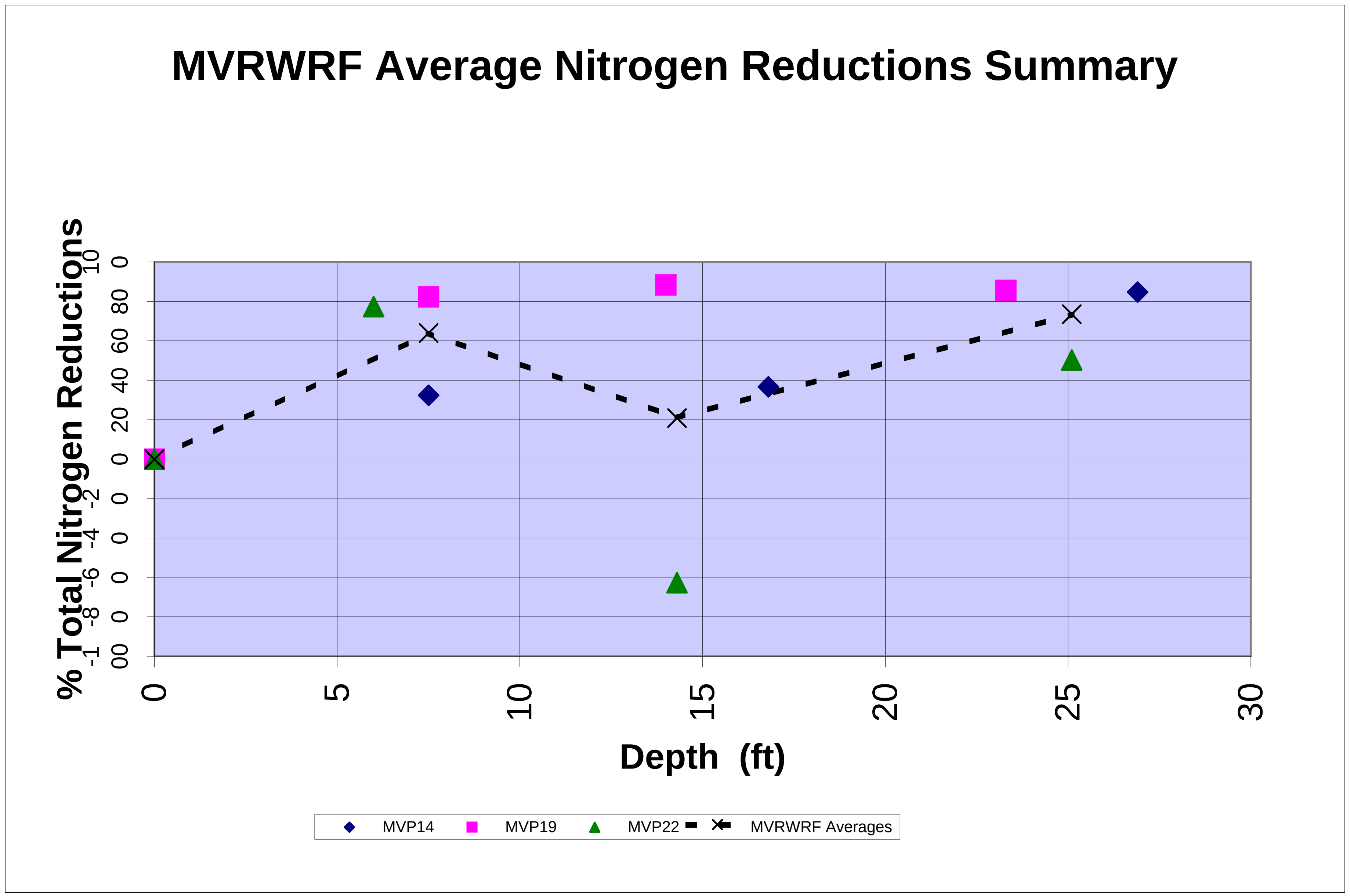
Average Percent Nitrogen Reductions per depth

Depth	AP1	AP10	AP15	AP Averages
0	0	0	0	0
7.5			70.4	24.2
16.5			-62.4	26.2
29		76.4		64
7.1	-31.8			
8.5		34.1		
14.5	63.7			
19.5		77.2		
28.8			48.8	
29.2	66.7			



Average Percent Nitrogen Reductions per depth

Depth	MVP14	MVP19	MVP22	MVRWRF Averages
0	0	0	0	0
7.5		82.2		63.96666667
14.3			-62.7	20.76666667
25.1			50.23	73.51
6			77.3	
7.5	32.4			
14		88.3		
16.8	36.7			
23.3		85.6		
26.9	84.7			



Appendix L

Travel Time Calculation Sheets

Recycled water storage pond	Avg K_{sat} (ft/day)	Total Pressure Head (H_T)	Thickness of hydrologic unit (b)	Vertical Gradient (I)	Darcy Flow (q)	Seepage Velocity (v_s)	Porosity (n)	travel time (t), days	Avg ksat (cm/sec)	ksat cm/day	
	Lab tests, thickness averaged	Distance from top of pond to Regional aquifer	Distance from bottom of pond to regional aquifer	I = HT/b	q = Ksat X I	vs = q/n	Lab test, average of all samples from pond	t = b/vs			
AP1	9.84	200.00	195.00	1.03	10.09	29.53	0.34	6.60	0.00347	299.808	30.48
AP10	10.12	200.00	195.00	1.03	10.38	25.73	0.40	7.58	0.00357	308.448	
AP15	3.15	200.00	195.00	1.03	3.23	8.50	0.38	22.94	0.00111	95.904	
MVP14	1.47	60.00	50.00	1.20	1.77	4.27	0.41	11.70	0.00052	44.928	
MVP19	0.08	60.00	50.00	1.20	0.10	0.29	0.33	173.24	0.000028	2.4192	
MVP22	0.15	60.00	50.00	1.20	0.18	0.39	0.46	129.68	0.000052	4.4928	

Ref: EPA Region 4, 2007: http://www.epa.gov/region4/water/uic/downloads/ra/app_4.pdf

GREEN AND AMPT SOLUTION
TRAVEL TIME FOR WETTING FRONT UNDER CONSTANT PONDED HEAD

INPUT	AP1	AP10	AP15	MVP14	MVP19	MVP22	Units	
Initial Matric Potential (h_i)	100	100	100	100	100	100	cm	from lab data? Could estimate from average natural recharge and Van Genucthen parameters
Brooks and Corey Critical Head (h_{cr})	5.9	5.9	5.9	5.9	5.9	5.9	cm	from lab data? Can estimate from VG parameters
Brooks and Corey λ parameter	1.6	1.6	1.6	1.6	1.6	1.6	- -	from lab data? Can estimate from VG parameters
Constant ponding depth (d)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	cm	
Depth to groundwater (L)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	cm, bgs	
Saturated hydraulic conductivity	300	308	96	45	2	4	cm/day	
Total porosity (ϕ)	0.342	0.403	0.380	0.414	0.330	0.459	- -	

OUTPUT	AP1	AP10	AP15	MVP14	MVP19	MVP22	Units
Brooks and Corey η parameter	4.25	4.25	4.25	4.25	4.25	4.25	- -
Matric potential at wetting front (hf)	4.08	4.08	4.08	4.08	4.08	4.08	cm
Time to reach specified depth of infiltration for constant ponded head	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	days
	7	8	23	12	173	130	

<- could enter directly and skip Brooks and Corey parameters and initial matric potential; values published in Rawls and Brakensiek, 1983 for typical soils (or Handbook of Hydrology, 1992), neither of which I have

References

Brooks, R.H. and A.T. Corey. 1964. Hydraulic properties of porous media. Hydrology Papers, Colorado State University, Ft. Collins

Selker, J. S., C. K. Keller, and J. T. McCord, 1999, Vadose Zone Processes, Lewis Publishers, Boca Raton, FL, 339 pp.

Rawls, W. J., Brakensiek, D. L., and Miller, N. (1983). "Green-Ampt infiltration parameters from soils data". Journal of Hydraulic Engineering, 109(1), 62-70.

GREEN AND AMPT SOLUTION
TRAVEL TIME FOR WETTING FRONT UNDER CONSTANT PONDED HEAD

INPUT	AP1	AP10	AP15	MVP14	MVP19	MVP22	Units
Constant ponding depth (d)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	cm
Depth to groundwater (L)	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	cm, bgs
Saturated hydraulic conductivity	300	308	96	45	2	4	cm/day
Total porosity (ϕ)	0.342	0.403	0.380	0.414	0.330	0.459	- -

OUTPUT	AP1	AP10	AP15	MVP14	MVP19	MVP22	Units	
Matric potential at wetting front (hf)	4.08	4.08	4.08	4.08	4.08	4.08	cm	<- could enter directly and skip Brooks and Corey parameters and initial matric potential; values published in Rawls
Time to reach specified depth of infiltration for constant ponded head	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	#NAME?	days	and Brakensiek, 1983 for typical soils (or Handbook of Hydrology, 1992), neither of which I have
	7	8	23	12	173	130		

References

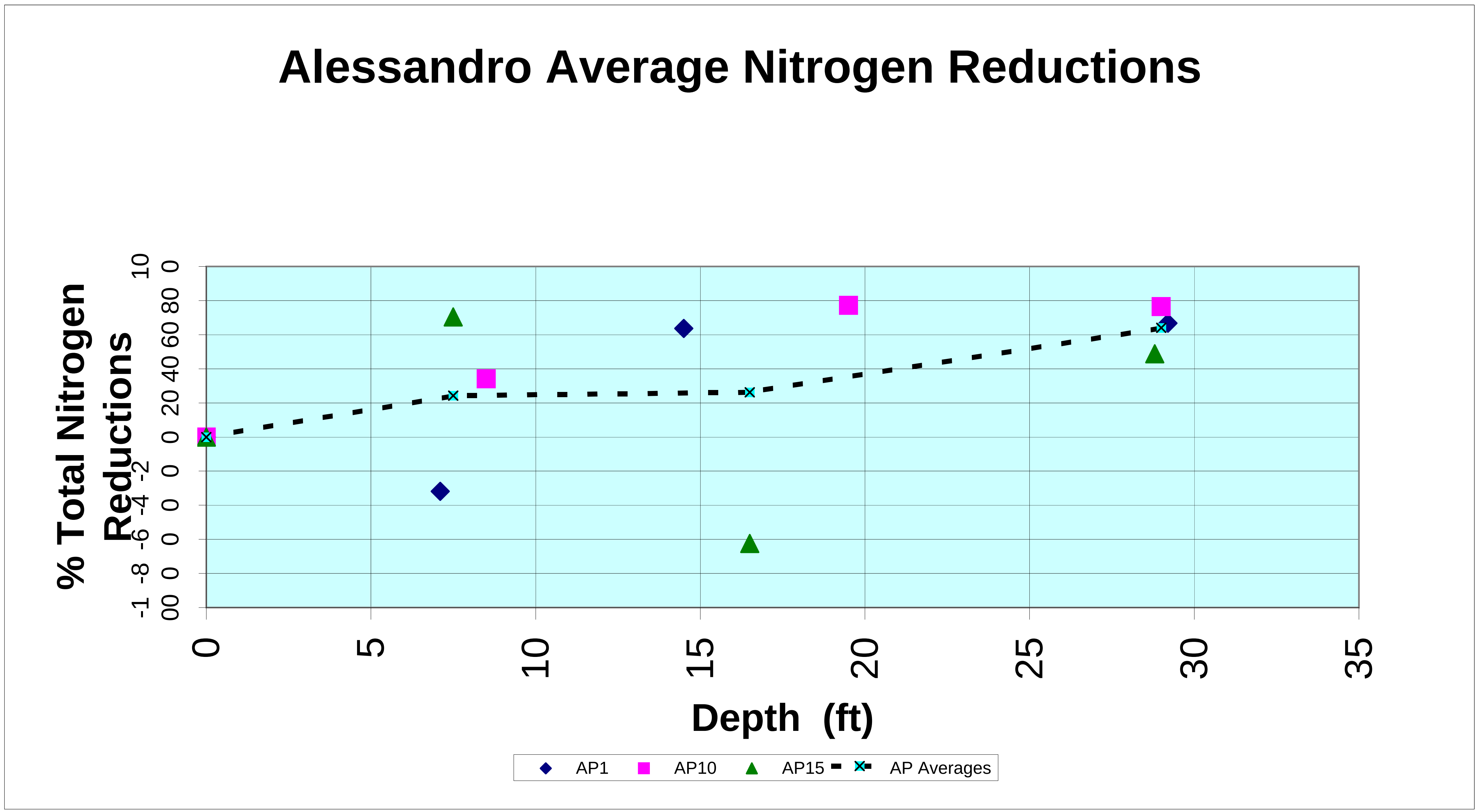
Brooks, R.H. and A.T. Corey. 1964. Hydraulic properties of porous media. Hydrology Papers, Colorado State University, Ft. Collins
Selker, J. S., C. K. Keller, and J. T. McCord, 1999, Vadose Zone Processes, Lewis Publishers, Boca Raton, FL, 339 pp.
Rawls, W. J., Brakensiek, D. L., and Miller, N. (1983). "Green-Ampt infiltration parameters from soils data". Journal of Hydraulic Engineering, 109(1), 62-70.

Appendix M

Calculations of Nitrogen Losses

Average Percent Nitrogen Reductions per depth

Depth	AP1	AP10	AP15	AP Averages
0	0	0	0	0
7.5			70.4	24.2
16.5			-62.4	26.2
29		76.4		64
7.1	-31.8			
8.5		34.1		
14.5	63.7			
19.5		77.2		
28.8			48.8	
29.2	66.7			



Average Percent Nitrogen Reductions per depth

Depth	MVP14	MVP19	MVP22	MVRWRF Averages
0	0	0	0	0
7.5		82.2		63.96666667
14.3			-62.7	20.76666667
25.1			50.23	73.51
6			77.3	
7.5	32.4			
14		88.3		
16.8	36.7			
23.3		85.6		
26.9	84.7