Riverside County
Waste Management Department

SPECIAL PROVISIONS

COMPLETION OF GROUNDWATER MONITORING WELL CONSTRUCTION

AT THE

BADLANDS SANITARY LANDFILL

AND

CLOSED MEAD VALLEY SANITARY LANDFILL

FEBRUARY 2015

RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT

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SECTION 1. SCOPE OF WORK SUMMARY

1.1 GENERAL

The work to be performed under the provisions of these Special Provisions shall consist of furnishing all materials, equipment and tools, the performance of all necessary labor, for the subject public works construction project. The construction project is known as the Completion of Groundwater Monitoring Well Construction at the Badlands Sanitary Landfill and the Closed Mead Sanitary Landfill (hereinafter referred to as the "Project").

1.1.1 Site Information

The Badlands Sanitary Landfill and the Closed Mead Valley Sanitary Landfills are owned by the Riverside County Waste Management Department (County). The Badlands Sanitary Landfill is located at 31125 Ironwood Avenue, in the Moreno Valley area of unincorporated Riverside County. Refer to Map 1 – Badlands Sanitary Landfill Vicinity Map to view the landfill location with respect to major surrounding roads and freeways. The Closed Mead Valley Sanitary Landfill is located at 22376 Forrest Road, in the Perris area of unincorporated Riverside County. Refer to Map 2 – Mead Valley Closed Sanitary Landfill Vicinity Map to view the landfill location with respect to major surrounding roads and freeways. Map 3 – Badlands and Mead Valley Landfills illustrates the location of the two landfills with respect to each other.

1.1.2 Site Conditions

Both landfills can experience severe weather conditions, ranging from near freezing conditions to high temperatures in excess of 100°F. The CONTRACTOR shall be aware of these weather conditions and be prepared to work in these conditions.

1.2 EXECUTION

The work to be performed under these Special Provisions shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the CONTRACTOR from all applicable Federal, State, and local regulations pertaining to construction of this Project.

1.3 GENERAL SCOPE OF WORK

The Work to be performed and bid complete herein, shall be as shown and specified in the Contract Documents and is generally described as supplying all labor, equipment, materials and forces necessary to construct groundwater monitoring wells MV-13 and MV-14 at the Closed Mead Valley Sanitary Landfill and groundwater monitoring well BH-25 at the Badlands Sanitary Landfill.

Each well borehole shall be drilled by a method chosen by the CONTRACTOR. Limitations and/or conditions for different drilling methods are specified in SECTION 6 BOREHOLE DRILLING AND SAMPLING.

Wells MV-13 and MV-14 shall be constructed in the County Right-of-Way southeast of the Closed Mead Valley Sanitary Landfill. The proposed location for MV-13 is within the Forrest Road Right-of-Way. The proposed location for MV-14 is within the San Jacinto Avenue Right-of-Way. The proposed well depth for MV-13 and MV-14 is 35 feet below the existing ground

surface (bgs). The proposed boring depths and well construction details are shown graphically on Figure 1 – MV-13 and MV-14 Groundwater Well Details. The proposed well locations for MV-13 and MV-14 are shown on Map 4 – Groundwater Wells MV-13 and MV-14 Location Map.

Well BH-25 shall be constructed in the Badlands Sanitary Landfill property. The proposed location for BH-25 is within the western sedimentation basin spillway. The proposed well depth for BH-25 is 237 feet bgs. The proposed boring depth and well construction details are shown graphically on Figure 2 – BH-25 Groundwater Well Detail. The proposed well location for BH-25 is shown on Map 5 – Groundwater Well BH-25 Location Map.

The final depths and well screen intervals are subject to change based upon the subsurface conditions encountered during construction. The Engineer will provide the CONTRACTOR with final drilling depths during drilling, as subsurface field conditions are revealed, and well construction details upon completion of drilling.

The wells shall be constructed in compliance with the latest editions of State of California Water Well Standards, Bulletin No. 74-81, dated December 1981, and Bulletin No. 74-90, dated June 1991, and Sections 13800 through 13806 of the California Water Code.

All construction materials shall be new prior to delivery onsite. Construction and equipment substitutions require written notification at the time of bid and shall not be accepted anytime thereafter, unless by written authorization from the Engineer. The CONTRACTOR's scope of work for this project will generally include, but not be limited to, the following:

1. Meet all applicable Federal, State and local air, water and waste discharge requirements.
2. Drill boreholes to the approximate depth specified in Figure 1 and Figure 2. Final drilling depths will be provided by the Engineer to the CONTRACTOR based on the subsurface field conditions encountered.
3. Drilling cuttings from the two offsite wells near the Closed Mead Valley Sanitary Landfill will be contained in 55-gallon drums. The CONTRACTOR will transport the drums to the Closed Mead Valley Sanitary Landfill (Map 4) at the end of each drilling work day. The County shall be responsible for the final handling, transportation and disposal of drilling cuttings once the CONTRACTOR has placed the drums on the landfill property.
4. Drilling cuttings from BH-25 will be stockpiled adjacent to the well location. The County shall be responsible for the final handling, transportation and disposal of drilling cuttings.
5. Provide means and assist the Engineer in collecting representative subsurface samples at a minimum of 5-foot depth intervals and at lithologic changes during drilling.
6. Construct wells as shown on Figure 1 and Figure 2. Final well design will be provided by the Engineer to the CONTRACTOR based on the subsurface field conditions encountered.
7. Furnish and install 4-inch diameter, Schedule 80, PVC casing and screen.
8. Furnish and install filter pack material and annular grout seals via a flush-threaded tremie (herein referred to as "tremie").

9. Furnish and install cement sanitary seal via tremie.
10. Provide well head protection for all three wells.
11. Develop wells by flushing, bailing, and airlifting/pumping.
12. Arrange for temporary storage of all fluids resulting from well development operations from MV-13 and MV-14. The CONTRACTOR will transport the temporarily stored fluids to the Closed Mead Valley Sanitary Landfill (Map 4) at the end of each day. The Engineer will direct the CONTRACTOR to discharge the development water or the Engineer will dispose of the development fluids.
13. Arrange for temporary storage of all fluids resulting from well development operations from BH-25. The Engineer will direct the CONTRACTOR to discharge the development water or the Engineer will dispose of the development fluids.
14. Maintain drilling site areas during construction and perform final site cleanup and restoration to original condition.
15. Provide all records, as required herein.

END OF SECTION

SECTION 2. CONDITIONS

2.1 GENERAL

2.1.1 Standard Specifications

The term Standard Specifications is a direct reference to the publication entitled "A Standard Specifications for Public Works Construction" (2003 edition) written and promulgated by the Joint Cooperative Committee of the Southern California Chapter American Public Works Association and Southern California Districts Associated General Contractors of California and all subsequent amendments, supplements, and additions. This publication is also known as the "Greenbook". The U.S. Standard Measures, also called the U.S. Customary System is the method of measurement to be used at all times.

2.1.2 Order of Precedence

In case of conflict between the Contract Documents, the following order of governing documents shall be followed:

1. Special Provisions
2. General Provisions
3. Project Drawings
4. Standard Specifications

2.1.3 Errors and Omissions in the Project Drawings

The written dimensions on the Project Drawings are presumed to be correct, but the CONTRACTOR shall be required to check carefully all dimensions before beginning work. If errors or omissions are discovered, the County immediately shall be so advised in writing and will make the proper corrections. No extra work shall be performed on this contract on account of errors and omissions without the express and written authorization by the County.

2.1.4 Material Substitutions

Reference is made to Section 4.2 of the General Provisions.

2.1.5 Abbreviations

AISC:	American Institute of Steel Construction
ANSI:	American National Standards Institute
AQMD:	Air Quality Management District
ASTM:	American Society for Testing and Materials
AWS:	American Welding Society
BGS:	Below Ground Surface
BOP:	Bottom Of Pipe
CL:	Center Line
CMP:	Corrugated Metal Pipe

COND:	Condensate
CS:	Carbon Steel
DIA:	Diameter
ELEV:	Elevation
GB:	Grade Break
LEL:	Lower Explosive Limit
LFG:	Landfill Gas
NFPA:	National Fire Protection Association
NIC:	Not in Contract
NMHC:	Non-Methane Hydrocarbons
NMOC:	Non-Methane Organic Compounds
NPT:	National Pipe Thread
NTS:	Not to Scale
O&M:	Operation and Maintenance
OSHA:	Occupational Safety and Health Administration
PPM:	Parts per Million
PVC:	Polyvinyl Chloride
RWQCB:	Regional Water Quality Control Board
SCAQMD:	South Coast Air Quality Management District
SCH:	Schedule
STL:	Steel
SWANA:	Solid Waste Association of North America
TYP:	Typical

2.1.6 Definitions

Whenever the following terms are used in these Special Provisions, the intent and meaning shall be interpreted as follows:

Calendar Days:	Each day of the year.
Night Hours:	Thirty minutes after sunset to 30 minutes prior to sunrise.

2.1.7 Contact

For information or technical questions, please contact the following. This contact, or his designated person, shall serve as the Engineer for the Project.

Todd D. Shibata, P.E., Senior Civil Engineer
Riverside County Waste Management Department
14310 Frederick Street
Moreno Valley, California 92553
(951) 486 - 3261
tshibata@co.riverside.ca.us

2.1.8 Contractor Qualifications

The CONTRACTOR shall be, at the time of bidding, and throughout the period of the Contract, licensed by the State of California to do the type of work required under terms of these Contract Documents. The CONTRACTOR, or the CONTRACTOR's personnel, shall hold appropriate certificates, licenses, and permits necessary to perform the work.

2.1.9 Allowances

The CONTRACTOR shall provide allowances for unforeseen circumstances which may arise from conditions unknown at the time of bidding. These allowances shall be for the purpose of providing necessary time and expense involved in completing the work within the time and budget given in the Contract Documents.

2.1.10 Time of Completion

The CONTRACTOR shall diligently and continuously work to complete the entire project before the expiration of 28 calendar days. The first calendar day shall be considered the first calendar day following the CONTRACTOR's receipt of the BOS approved and executed contract. The working day shall be as set forth in section 6.6 of the General Provisions. The length of each working day shall be from 7:00 AM to 4:00 PM, including one hour for lunch break, unless otherwise approved in writing by the County. The CONTRACTOR shall not be permitted to work on the following days designated by the County as holidays:

New Year's Day	January 1 and 2, 2015
Martin Luther King Jr. Day	January 19, 2015
Lincoln's Birthday	February 12, 2015
Presidents' Day	February 16, 2015
Memorial Day	May 25, 2015
July 4th	July 3, 2015
Labor Day	September 7, 2015
Columbus Day	October 12, 2015
Thanksgiving	November 26 and 27, 2015
Christmas	December 25, 2015

In case all the work called for and all the conditions and requirements of the project are not completed within the number of calendar days specified above, liquidated damages of five hundred dollars ($500.00) for each additional calendar day required to properly complete the project in excess of the allowed number of calendar days shall be paid by the CONTRACTOR to the County.

2.1.11 Payment Terms

Payment includes full compensation for all required labor, products, materials, tools, equipment, plant, transportation, sale taxes, services and incidentals, erection, application or installation of an item of the work, overhead and profit. This includes costs for preparation and delivery of all required submittals including, but not limited to, the following items: construction schedule, supplemental and required inspection reporting forms, health and safety plan, and certified payroll. Costs for these items are considered incidental and are to be included in the various items of work. Full compensation for all expenses shall be considered as included in the unit prices paid for the line items of work specified in Exhibit A of the Contract Documents and no additional compensation will be allowed therefore.

The method of measurement and payment is for each line item of work that appears in the CONTRACTOR's Proposal. Payments for unit price items shall be made on the basis of measured quantity in place/constructed as determined by the County. Payment for lump-sum items shall be paid as a pro rata portion of the entire lump sum based upon an estimated percent completion of the item, as approved by the County.

The County will make monthly progress payments as the work progresses, in accordance with the General Provisions, and upon final completion of construction. The CONTRACTOR's invoice shall be similar in form to Exhibit A of the Contract Documents, shall specify the amount of units claimed completed (quantity) for each line item of Exhibit A for the period invoiced and for the total amount of units claimed completed for each line item of Exhibit A for all invoices. The CONTRACTOR may be requested by the County to prepare supporting documentation certifying work completed by the CONTRACTOR. Monthly progress payments shall be paid by the County, less 10 percent retention, which shall be calculated by the CONTRACTOR and shown on the monthly invoice. Final payment for retention shall be made by the County in accordance with the General Provisions.

Upon receipt of an invoice (payment request), the County shall review the request as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request and any payment request determined not to be a proper request suitable for payment shall be returned to the CONTRACTOR as soon as practicable, but not later than seven calendar days after receipt. The returned request for payment shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper. Any progress payment which is undisputed and properly submitted and remains unpaid for thirty (30) calendar days after receipt by County shall accrue interest to the CONTRACTOR equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the California Code of Civil Procedure. The number of days available to the County to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the County exceeds the seven day return requirement set forth above.

Failure or lack of cooperation by the CONTRACTOR to prepare or to submit reports, progress schedules, or plans for changes contemplated in the CONTRACTOR's operations, or to participate in preparation of same promptly, as required, shall be cause for withholding all or parts of the progress payment then pending until such time as the CONTRACTOR has met all requirements to the satisfaction of the County.

If any of the work is performed on a cost-reimbursable, unit price or hourly rate basis, the CONTRACTOR shall maintain, and require all Subcontractors and vendors to maintain, full and detailed accounts of actual quantities and hours on a form acceptable to the County. The CONTRACTOR's field representative shall obtain signature of approval by the County on the submitted form within one work day of performance of the work. Work paid for on a reimbursable or chargeable basis, the County will include, as part of the Contract, special terms and conditions setting forth all chargeable and non-chargeable cost items and procedures for the payment of costs and CONTRACTOR's fees related thereto.

All records of quantity computations or labor hours expended to perform the work against estimated (or non-estimated) material quantities or time shall be subject to audit by the County at any time during the Contract. The CONTRACTOR shall at all times cooperate with the County to amend or change any accounting procedure for cost plus work found to be unsatisfactory.

The CONTRACTOR shall agree to accept the Contract Price as full compensation for all work embraced in the Contract and for all losses or damages arising out of the nature of the work, the action of the elements, or from any unforeseen or unknown difficulties or obstructions which may arise or be encountered in the prosecution of the work until its acceptance, and for all risks of every description connected with the work.

2.1.12 Regulatory Requirements

The CONTRACTOR shall be familiar with and comply with all regulatory requirements associated with the work including, but not limited to, Cal OSHA, South Coast Air Quality Management District (SCAQMD), California State Water Resources Contract Board, Regional Water Quality Control Board, Santa Ana Region (RWQCB-SAR), California Integrated Waste Management Board (CIWMB), Riverside County Department of Environmental Health and the Riverside County Waste Management Department. All expenses incurred as a result of non-compliance with regulations shall be borne by the CONTRACTOR.

All work is subject to inspection by the governmental agencies that have jurisdiction over the work. The CONTRACTOR and all Subcontractors shall be responsible for complying with all of the requirements of the governmental agencies' permit(s).

2.1.13 Existing Conditions

The Project Drawings cover existing conditions in an approximate manner only. The CONTRACTOR shall be responsible for determining the existing site conditions prior to bid submission and at all times during execution of the work; and this shall be reflected in the CONTRACTOR's proposal.

2.1.14 Site Security

The work area used for material storage and drilling operations, including areas occupied by the construction equipment, engines and motors, shall be secured at the CONTRACTOR's discretion. The Engineer shall not be responsible for loss or damage of the CONTRACTOR's materials or equipment.

Damage to construction machinery and installation equipment by accident, vandalism, or acts of nature shall be borne by the CONTRACTOR. The CONTRACTOR shall be able to store the drill rig, support vehicle or equipment within the landfill site at night and on weekends during the duration of this Project. However, the County takes no responsibility for any damage, vandalism or theft that may occur to the CONTRACTOR's vehicles or equipment while parked at the Badlands Sanitary Landfill or the closed Mead Valley Sanitary Landfill.

Damage or loss of materials, parts and components of the construction work, which occur before final acceptance by the County, shall be borne by the CONTRACTOR.

CONTRACTOR shall close access to the work area prior to performing other work and shall maintain the closure until construction in that area is complete. In order to ensure the effectiveness of the closure, CONTRACTOR shall provide, at the CONTRACTOR's expense,suc h means as are necessary, including but not limited to fences, barricades, posting of signs, or any other means deemed prudent by the CONTRACTOR. The area where work is performed shall be protected daily to prevent access by unauthorized personnel.

2.1.15 Construction Site Maintenance

The CONTRACTOR shall keep all areas clear of debris, refuse or construction materials that render the construction area an eye-sore or odor source.

Throughout the period of construction, the CONTRACTOR shall keep the work site clean of all rubbish and debris, and shall promptly remove from any portion of the site, or from property adjacent to the site of the work, all unused materials, and debris.

Upon completion of the work, and prior to final acceptance, the CONTRACTOR shall remove from the vicinity of the work all surplus material and equipment belonging to the CONTRACTOR or used under the CONTRACTOR's direction during construction, shall clean the site, and remove rubbish and debris to an appropriate permitted disposal facility.

2.1.16 Water

The County does not have water available at the Closed Mead Valley Sanitary Landfill site to use for construction. During past construction projects at the Closed Mead Valley Sanitary Landfill, CONTRACTORs have brought water onsite for construction projects.

For landfill operations at the Badlands Sanitary Landfill, the Department utilizes water from a fire hydrant located at the southwest corner of the intersection of Ironwood Avenue and Theodore Street. The CONTRACTOR shall be able to obtain water from this fire hydrant free of charge.

END OF SECTION

SECTION 3. WARRANTY OF WORK

3.1 GENERAL

The CONTRACTOR shall warrant and guarantee the performance of all work. The CONTRACTOR shall be responsible for the correction of all deficiencies of work, including detailed design and fabrication performed by the CONTRACTOR, all Subcontractors, vendors, and suppliers.

The CONTRACTOR's warranty period shall be a minimum of two years from the date of final project acceptance by the County, except where longer warranty periods are specifically stated by the manufacturer of individual components or required in the Special Provisions.

The CONTRACTOR shall assign all warranties and guarantees of equipment vendors which extend the minimum warranty to the County. Point of sale/purchase and date of purchase of equipment items shall be submitted.

The CONTRACTOR shall guarantee all materials and workmanship suitable for the service intended and that said materials shall be free from all inherent defects in design and workmanship. All costs to correct defects shall be at the CONTRACTOR's expense.

The performance of guarantee and conditions specified in this section shall be secured by a surety bond per Section 5.14 of the General Provisions.

3.2 EXECUTION

All work which has been rejected or defects discovered after project close-out shall be remedied, or removed and replaced, by the CONTRACTOR at the CONTRACTOR's own expense, with work conforming to the Project Drawings and Special Provisions. Latent defects which become apparent after lapse of the warranty period shall be corrected by CONTRACTOR at its sole cost and expense provided County notifies CONTRACTOR of such defect within two (2) months after discovery thereof by County. Failure to inspect work at any stage shall not relieve the CONTRACTOR from an obligation to perform sound and reliable work as herein described.

The County will endeavor to locate errors or defective materials of workmanship and call them to the attention of the CONTRACTOR prior to subsequent work being performed. However, the County is under no obligation to do so, and neither the County shall be held liable because errors or defective material or workmanship by the CONTRACTOR are not discovered by the County prior to subsequent work. Any omission or failure on the part of the County to discover, or notify the CONTRACTOR of, or to condemn defective work or material at the time of construction shall not be deemed an acceptance, and the CONTRACTOR will be required to correct defective work or material.

During the warranty period, should the CONTRACTOR fail to remedy defective material or workmanship, or to make replacements within five (5) working days after written notice by the County, it is agreed that the County may (but is not bound to) make such repairs and replacements and the actual cost of the required labor and materials shall be chargeable to and payable by the CONTRACTOR.

In the event that immediate repairs are required by a regulatory agency due to system failure caused by or due to defective material or workmanship, repairs and/or replacements may be made by County if CONTRACTOR does not respond upon notification or cannot be contacted.

The actual cost of the required labor and materials shall be chargeable to and payable by the CONTRACTOR.

The warranty provided herein shall not be in lieu of, but shall be in addition to any warranties or other obligations otherwise imposed by law. The remedies provided herein shall not be exclusive and the County shall be entitled to any and all remedies provided by law.

END OF SECTION

SECTION 4. SAFETY

4.1 GENERAL

The CONTRACTOR shall comply with Provisions of Occupational Safety and Health Administration Regulations for Construction, 29 CFR, 1926/1910 and CFR 1910.120, the California Department of Industrial Relations, Division of Industrial Safety (Safety Orders), with the additional Safety Provisions in the CONTRACTOR's Safety Plan, and all other applicable Federal, State, County and local laws, ordinances, codes, the requirements set forth herein, and any regulations that may be specified in other parts of this Contract. If any of these requirements are in conflict, the more stringent requirement shall apply. The CONTRACTOR's failure to be thoroughly familiarized with the aforementioned safety and health provisions shall not relieve the CONTRACTOR of responsibility for full compliance with the obligations and requirements set forth herein.

The CONTRACTOR shall have sole responsibility for the safety, efficiency, and adequacy of the CONTRACTOR's equipment and methods, and for any damage or injury resulting from their failure, or improper maintenance, use, or operation. The CONTRACTOR shall be solely and completely responsible for the conditions at the work area arising from the CONTRACTOR's execution of the work, including safety and health of all authorized persons and property involved in the performance of the work. This requirement shall apply continuously and not be limited to normal working hours. The County's review of the CONTRACTOR's performance does not relieve the CONTRACTOR of responsibility for compliance with applicable laws, regulations and requirements.

The CONTRACTOR shall observe and comply with all applicable laws, regulations for hazardous waste operations, employee safety and health requirements set forth in these Special Provisions or otherwise applicable to the work. Such information, interpretation, or representation of laws, regulations or ordinances referenced in the Contract Document shall not take precedence over the laws, regulation or ordinance itself.

4.2 MATERIALS

Not Used.

4.3 EXECUTION

4.3.1 Health and Safety Plan (HASP)

The CONTRACTOR shall develop and maintain for the duration of work activities at the site, a written, ***site specific*** Health and Safety Plan (HASP). A separate HASP shall be prepared for each landfill. The HASP shall incorporate and implement all applicable requirements, with due consideration given to the known hazardous posed by an active and closed landfill, depending on the site. The HASP shall be prepared under the direction of an industrial hygienist or equivalent and shall be submitted by the CONTRACTOR to the County within 7 calendar days after receiving the Award of the Contract. The HASP shall assess all known and potential hazards and specify appropriate health and safety actions and measures to mitigate those hazards, including risk of occupational injuries and illnesses.

The County shall review the HASP and shall have the right to require the CONTRACTOR to amend it if necessary. The CONTRACTOR shall make the recommended corrections and resubmit to the County for review and final acceptance. The CONTRACTOR shall under no

circumstances commence work prior to the County's final acceptance of the HASP. Acceptance of the HASP by the County does not release the CONTRACTOR of liability in the event of an accident or injury, nor does it place any liability on the County. The CONTRACTOR is solely responsible for the HASP and its implementation. The CONTRACTOR shall assume full responsibility to ensure that all employees and Subcontractors adhere to the HASP.

Should the County or an applicable regulatory agency determine that the HASP has not been implemented properly, or that deficiencies in the HASP exist during performance of the work, the CONTRACTOR shall immediately correct the identified issue(s). In the event the CONTRACTOR fails or refuses to promptly correct the identified issue(s), the County may issue an order to stop all or any part of the work. When compliance with the directive issue is accomplished, an order to resume work will be issued. The CONTRACTOR shall not be entitled to any extension of the time or any claim for damage to or any compensation for either the directive or the work suspension order. Failure of the County to order discontinuance of any or all of the CONTRACTOR's operations shall not relieve the CONTRACTOR of his sole responsibility for safety.

At a minimum, he HASP shall address the following items:

1. The CONTRACTOR shall provide appropriate gas detection monitoring equipment (e.g. flammable and/or explosive gas meters) during invasive construction activities. The use of the gas detection equipment (e.g. permissible threshold concentrations) shall be specified in the site specific Health and Safety Plan.
2. No smoking is permitted within 100 feet of the borehole.
3. The CONTRACTOR shall require of all personnel on the site to wear the appropriate field gear, which may include but is not limited to, steel toe boots, hard hats and orange safety vests.
4. The CONTRACTOR shall secure all work areas and close any open holes or excavations when not working by marking with ribbons and cones, and posting of signs indicating to the public to stay away due to the existence of a deep open excavation.
5. The CONTRACTOR shall close access to the work area prior to performing other work and shall maintain the closure until construction in that area is complete. The CONTRACTOR shall provide such means as are necessary to ensure the effectiveness of the closure, including but not limited to: fences, barricades, posting of signs.
6. The HASP shall have provisions for all aspects of protection against bodily injury from heavy construction equipment, tools and equipment required to for the work.

END OF SECTION

SECTION 5. MOBILIZATION, DEMOBILIZATION AND SITE CLEAN-UP

5.1 GENERAL

5.1.1 Description

This section includes the mobilization and demobilization of equipment, material and personnel to the well sites.

5.1.2 Related Work Specified Elsewhere

Section 2.1.14 - Site Security

SECTION 4 - SAFETY

5.1.3 Submittals

1. Evidence of Insurance
2. Contract Bonds
3. Site Specific Health and Safety Plan
4. Construction Calendar

5.1.4 Measurement and Payment

1. Payment for mobilization shall be made at the lump sum bid price for Bid Item No 1.1 and 1.2.
2. Payment for demobilization and site cleanup shall be made at the lump sum bid price for Bid Item No.13. Payment will not be made until the Engineer has approved site restoration.

5.2 EXECUTION

5.2.1 Mobilization

CONTRACTOR shall submit the required evidence of insurance, Contract bonds, a site-specific health and safety plan and a construction schedule to the County within 7 calendar days following receipt of the BOS approved and executed contract. Work will not be allowed to start until the County receives, reviews and accepts the required submittals. The County shall issue the CONTRACTOR a Notice to Proceed following receipt, review and approval of the required submittals.

Mobilization shall also include the transportation of personnel, equipment, and operating supplies to and from the site; establishment of portable sanitary facilities, drinking water, and other necessary facilities at the site; and other preparatory work at the site, as well as all work at the site necessary to conduct drilling, construction and development operations.

The mobilization phase will be deemed complete when all items necessary to conduct field operations are onsite and operable. The CONTRACTOR will notify the Engineer when the mobilization phase, in his terms, is complete. The Engineer, upon site inspection and approval, will then allow drilling to commence the following morning at 7:00 AM. If the Engineer does not approve the well site mobilization, drilling will not commence the

following day and the CONTRACTOR will re-notify the Engineer for additional site inspections. No stand-by time will be allowed during the mobilization phase of the Contract.

The Engineer shall obtain a well construction permit from the Riverside County Department of Environmental Health for the subject project. The CONTRACTOR shall sign the well construction permit prepared by the Engineer and abide by the permit conditions. The CONTRACTOR shall keep a copy of the well construction permit onsite at all times during the project.

5.2.2 Initial Site Report

The CONTRACTOR will prepare an initial site report which will include a written account of all alterations and preparations that must be made to the site to make the site accessible and suitable for drilling, and to restore the site to its previous condition. The initial site report shall specifically include out-of-ordinary costs.

The mobilization and demobilization bid items should take into account ordinary site restoration costs for the drilling locations, as visual observed during the pre-bid.

Out-of-ordinary costs are those restoration items that are could not be visually recognized during the pre-bid meeting at site, and may be unforeseen prior to the commencement of mobilization. Out-of-ordinary items should be identified by the CONTRACTOR and brought to the attention of the Engineer.

The County shall pay a reasonable fee for out-of-ordinary costs. Where the CONTRACTOR utilizes a Subcontractor, the items invoiced for site restoration (demobilization bid item) will be paid at an invoiced cost plus an additional 15 percent. The County will not be responsible for payment of charges not specified in the initial site report and subsequently approved in writing by the County.

5.3 PROTECTION AND RESTORATION OF EXISTING FACILITIES

The CONTRACTOR will be responsible for the protection of public and private properties adjacent to the work and will exercise due caution to avoid damage to such properties. The CONTRACTOR will repair or replace all existing improvements that are damaged or removed as a result of his operations. Such improvements include curbs, gutters, sidewalks, pavement, utility installations, structures, lawns, etc. Repair and replacements will be at least equal to existing improvements and will match them in finish and dimension. All cuts in asphalt and concrete shall be repaired by saw cutting around the damaged area and replacing it with the appropriate patching material. Repair or replacement of asphalt, concrete, or other existing features damaged due to CONTRACTOR's shall be the sole responsibility of the CONTRACTOR. Damaged asphalt will be properly repaired as required by governing city or county agency.

5.3.1 Project Demobilization

Demobilization shall include removal of all equipment, materials, and temporary facilities installed during mobilization, well drilling, completion, and development phases of the Work. Demobilization will also include restoration of the sites to their original condition and will include those items specified in the initial site report.

5.3.2 General Site Clean-up

The CONTRACTOR shall provide all equipment and personnel to restore the site as required by the individual site conditions. Demobilization and site restoration will include, but not be limited to, grading, pavement restoration, re-fencing, etc. All restoration and resurfacing work will be deemed acceptable upon approval of the Engineer. Payment for site clean-up will not be made until the site restoration has been approved by the Engineer and the wellhead has been completely installed. If the site is not accepted, the CONTRACTOR will make the necessary adjustments to make the site acceptable.

5.3.3 Non-Hazardous Materials Site Clean-up

Cleanup of the site will include complete removal and disposal of all solids, liquids and substances either used or generated during mobilization, demobilization, drilling, completion, and development operations. All materials will be properly disposed by the CONTRACTOR.

Drilling cuttings and well development water are the only exceptions to the list of materials described above. Drilling cuttings and well development water shall be disposed as specified in SECTION 6 and SECTION 12, respectively.

5.3.4 Hazardous Materials Site Clean-up

Any materials suspected by the Engineer of being contaminated due to ambient and/or existing conditions, which did not result from the CONTRACTOR's actions, will be analyzed by the Engineer for potential contaminants. Materials that contain levels of contaminants in excess of Federal and/or State disposal standards shall be properly disposed of by the Engineer.

CONTRACTOR shall perform necessary work to contain/control leaking equipment. Generation of hazardous materials by the CONTRACTOR during the course of work caused by his normal operational procedures or negligence (e.g., oil, and/or hydraulic spills or leaks) shall be cleaned, removed, and properly disposed of at the sole cost of the CONTRACTOR. Any materials suspected of contamination due to CONTRACTOR negligence will be submitted by the CONTRACTOR to a State-certified laboratory for analysis at the CONTRACTOR's sole expense. The sample shall be analyzed by approved Federal and/or State methods to determine if the sample contains hazardous materials. The County reserves the right to request additional testing if the methods requested by the CONTRACTOR are insufficient to determine the types of potentially hazardous materials. Tests must be run within 24 working hours of suspected contamination and must be requested at expedited turn-around times, as quick as possible considering the analytical method. The test results shall be provided to the Engineer as soon as available by the CONTRACTOR. The CONTRACTOR, in accordance with applicable Federal and State laws, shall properly dispose of any material that contains levels of contaminants in excess of Federal or State disposal standards within 48 working hours of receiving test results. This will include preparation of a hazardous materials disposal manifest by the CONTRACTOR, and the CONTRACTOR, not the County shall be listed as the generator of the hazardous waste on all manifests. The CONTRACTOR shall provide the County with a copy of the initial manifest and the final manifest, which indicates waste receipt by the disposal site.

5.3.5 Final Inspection

The Engineer shall make an inspection of the site following completion of all site cleanup and restoration work by the CONTRACTOR, including setting of the above-ground well head. The CONTRACTOR shall also be present to acknowledge any items that require additional work to make the site acceptable to the Engineer.

Final payment for the Work shall not be granted until the site and contract work has been determined acceptable to the Engineer. A Notice of Completion will be filed and retention released to the CONTRACTOR.

END OF SECTION

SECTION 6. BOREHOLE DRILLING AND SAMPLING

6.1 GENERAL

6.1.1 Description

This section includes the drilling of a borehole. The purpose of the well borehole is to determine the thickness and nature of all formations penetrated, the location of water bearing strata, other hydrological and geological information, and for well construction.

The CONTRACTOR shall drill the well borehole with one pass to a depth specified in this Contract Documents in Exhibit A, or as directed by the Engineer

6.1.2 Related Work Specified Elsewhere

None.

6.1.3 Submittals

1. Alternative drilling method description, if applicable.
2. Daily construction progress report.

6.1.4 Measurement and Payment

Payment for drilling and sampling of the well borehole shall be based on vertical feet drilled (first pass) measured from the ground surface. It shall include all materials, labor, tools, and equipment required to drill the borehole, collect formation samples, maintain circulation (depending on drilling method chosen) and protect the borehole from caving. No payment will be made for temporary surface casings installed at the CONTRACTOR's option.

Payment for the borehole corrections will be included in the unit price for Bid Item No 2.1 and 2.2 for drilling the borehole.

Payment will only be made for the CONTRACTOR's first pass successful drilling method. If the CONTRACTOR chooses drilling method(s) that are unsuccessful, the County will not make additional payment for vertical feet drilled for second, third or any subsequent passes by the CONTRACTOR to obtain the required borehole depth.

Payment for stand-by time will be at the unit price for Bid Item No 11.

Payment for rock clause drilling will be at the unit price for Bid Item No. 12.

6.2 MATERIALS

6.2.1 General

All equipment supplied by the CONTRACTOR shall be available for inspection by the Engineer prior to the beginning of drilling operations. If, in the opinion of the Engineer, any of the equipment is not suitable for drilling operations, either because of mechanical problems, excessive noise, deviation from the specifications, or the build-up of substances which could cause borehole contamination (i.e., from oil, diesel, hydraulic leaks or exhaust residue, etc.), the CONTRACTOR shall adjust, replace or decontaminate it with suitable equipment at CONTRACTOR's expense.

6.2.2 Drill Rig

The drilling rig, drilling type/method is at the CONTRACTOR's discretion. All associated drilling equipment shall be in good condition and have sufficient capacity to drill to the depths specified in these Contract Documents, Exhibit A

If the CONTRACTOR chooses to use a drilling method, other than auger drilling or air rotary drilling, the CONTRACTOR shall submit a written description of the proposed drilling method to the Engineer, prior to drilling equipment mobilization. The Engineer shall review the written submittal and may amend the Contract Documents to account for the proposed drilling method. The scope of any amendments will be limited to specifications to ensure the environmental integrity of the borehole. The Engineer shall authorize the proposed drilling method in writing. Following the CONTRACTOR's receipt of written approval, the CONTRACTOR may mobilize drilling equipment. The Engineer's approval of a CONTRACTOR's alternative drilling method does not relieve the CONTRACTOR of his responsibility to drill the boreholes to the depths specified in these Contract Documents, or to construct the monitoring well. The Engineer's authorization does not constitute approval or agreement that the alternative drilling method will allow the CONTRACTOR to successfully complete the project. As stated previously, **the drilling rig, drilling type/method is at the CONTRACTOR's discretion.**

The boreholes for MV-13 and MV-14 shall be drilled in the Right-of-Way of Forrest Road and San Jacinto Avenue, respectively, southeast of the Closed Mead Valley Sanitary Landfill. The County does not have any information about drilling conditions in the vicinity of the proposed borehole locations. The table below summarizes the drilling method, total depth and depth to bedrock for each groundwater monitoring well installed previously at the Closed Mead Valley Sanitary Landfill. Refer to Appendix A for a copy of the groundwater well boring logs and a site map showing where the groundwater wells are located at the site.

Well ID	Drilling Method	Total Depth of Borehole	Depth To Bedrock from Ground Surface
MV-1	Speedstar Air Rotary	44 feet bgs	26 feet bgs
MV-3	Speedstar Air Rotary	45 feet bgs	7 feet bgs
MV-4	Speedstar Air Rotary	25 feet bgs	7 feet bgs
MV-5	Speedstar Air Rotary	25 feet bgs	13 feet bgs
MV-6	Speedstar Air Rotary	35 feet bgs	No bedrock
MV-7	Speedstar Air Rotary	85 feet bgs	13.5 feet bgs
MV-8	Speedstar Air Rotary	40.5 feet bgs	4 feet bgs
MV-9	TLS PortaDrill/Air Rotary	36 feet bgs	11.5 feet bgs
MV-10	D.H. Hammer/Air Rotary	60 feet bgs	0 feet bgs
MV-11	D.H. Hammer/Air Rotary	25 feet bgs	0.75 feet bgs
MV-12	D.H. Hammer/Air Rotary	40 feet bgs	0.75 feet bgs

The County proposed to install BH-25 in the uppermost aquifer of the San Timoteo Formation. The San Timoteo Formation is composed of siltstones, sandstones and conglomerate. The table below summarizes the drilling method, total depth and depth to bedrock for several groundwater monitoring wells installed previously at the Badlands

Sanitary Landfill. Refer to Appendix B for a copy of the groundwater well boring logs and a site map showing where the groundwater wells are located at the site.

Well ID	Drilling Method	Total Depth of Borehole	Depth To Bedrock from Ground Surface
BL-3	Speedstar Air Rotary	398.5 feet bgs	49.0 feet bgs
BD-4	Air Rotary	277 feet bgs	No bedrock
BH-11	Hollow Stem Auger	25 feet bgs	No bedrock
BH-20	RT 1800 Air Rotary	450 feet bgs	No bedrock
BH-21	RT 1800 Air Rotary	460 feet bgs	No bedrock
BH-22	Tricone Air Rotary	113 feet bgs	No bedrock
BH-23	Tricone Air Rotary	370 feet bgs	No bedrock
BH-24	Tricone Air Rotary	280 feet bgs	No bedrock

The CONTRACTOR shall provide all tools, accessories, air compressor, power, fuel, materials, supplies, lighting, water, and other equipment, and experienced personnel necessary to conduct safe and efficient drilling operations. A drilling superintendent (tool pusher) shall be available at all times at the request of the Engineer.

The mast and all running gear (hoists, cables, etc.) of the drill rig shall have a proven, sufficient and demonstrated capacity to lift three times the buoyant weight of the drill string.

6.2.3 Drill Pipe/Auger

If the CONTRACTOR chooses to use the drilling pipe/auger drilling method, the drilling pipe/auger shall be in good condition and shall be connected by standard tool joints. CONTRACTOR shall not use drilling pipe equipped with external air lines. The drill pipe/auger shall be steam-cleaned prior to its arrival at the well site. Drill pipe/auger suspected of being contaminated shall be removed and steam-cleaned at the CONTRACTOR's expense prior to its use at the site. Pipe dope or other lubricating material such as "Gimmie the Green Stuff" or other environmentally safe material, as pre-approved by the Engineer, can be used on the threads of the drill pipe/auger and tremie.

6.2.4 Air Rotary Drilling Equipment

If the CONTRACTOR chooses to use the air rotary drilling method, the CONTRACTOR shall utilize an oil-less, filtered air compressor with the capability of properly drilling to the minimum depth proposed herein. The CONTRACTOR shall use an air cyclone or other acceptable method, pre-approved by the Engineer, for the collection of drill cuttings at the point where air is returned to the surface (i.e., flow directed out of the discharge pipe). The air cyclone shall function to allow the Engineer to collect representative samples of the subsurface. If samples cannot be adequately collected, drilling will cease until the problem can be corrected to the satisfaction of the Engineer.

6.2.5 Conductor Casing

If the CONTRACTOR chooses to use a conductor casing with the air rotary drilling method, the drilling conductor casing shall be in good condition and shall be connected by standard tool joints. The conductor casing shall be decontaminated prior to its arrival at the well site.

Conductor casing suspected of being contaminated shall be decontaminated at the CONTRACTOR's expense prior to its use at the site. Pipe dope or other lubricating material such as "Gimmie the Green Stuff" or other environmentally safe material, as pre-approved by the Engineer, can be used on the threads of the conductor casing if necessary.

6.3 EXECUTION

6.3.1 Borehole Drilling

1. The CONTRACTOR shall not start drilling without the Engineer onsite to confirm the location of the borehole.
2. The CONTRACTOR shall drill the borehole to the total depth specified in Figure 1 and Figure 2. The borehole diameter shall be a minimum of 10-inches. The Engineer will be onsite during the drilling process to specify the exact depth of the borehole to be drilled based on drilling cuttings, the geologic log and the depth to groundwater encountered during drilling. The exact depth specified by the Engineer may be more or less than the total depth specified in Figure 1 and Figure 2.
3. The CONTRACTOR shall take all measures necessary to protect the borehole from caving or raveling during drilling operations.
4. Drilling cuttings from the two offsite wells near the Closed Mead Valley Sanitary Landfill will be drummed in 55-gallon drums. The CONTRACTOR will transport the drums at the Closed Mead Valley Sanitary Landfill (Map 4) and the end of each drilling work day, before leaving the site. The County shall be responsible for the final handling, transportation and disposal of drill cuttings, following the CONTRACTOR's demobilization from the site.
5. Drilling cuttings from BH-25, at the Badlands Sanitary Landfill, will be stockpiled adjacent the well drilling location. Soil drilling cuttings shall be placed on plastic sheeting, minimum 10-mil thickness. At the end of each drilling work day, the soil drilling cutting stockpile shall be secured covered with plastic sheeting, minimum 10 thickness. The County shall be responsible for the final handling, transportation and disposal of drill cuttings, following the CONTRACTOR's demobilization from the site.
6. When drilling is completed, as determined by the Engineer, the CONTRACTOR shall take all measures necessary to protect the borehole from caving or raveling.
7. Upon completion of drilling a specific borehole to the depth specified in these Contract Documents or as directed by the Engineer, the Engineer will provide, within 24 hours, the CONTRACTOR with well construction details or request that the CONTRACTOR drill deeper.
8. The CONTRACTOR shall be paid for stand-by time for each working hour beyond the 24 hour assessment period that the Engineer does not provide the CONTRACTOR with well construction details or the request to drill deeper.
9. The CONTRACTOR may discharge minor volumes of nuisance groundwater generated during drilling directly to the ground surface adjacent to the well site, as

permitted by the State Water Resources Control Board Water Quality Order No. 97-03-DWQ. The CONTRACTOR shall implement appropriate best management practices (BMPs) to mitigate the discharge of sediment laden groundwater. Where necessary, BMPs shall also be implemented to mitigate groundwater discharge related erosion. The discharge of groundwater shall also be controlled to prevent contact with significant materials or equipment, including those of the CONTRACTOR and County.

6.3.2 Rock Clause

The Rock Clause shall go into effect ONLY after notification of the Engineer by the CONTRACTOR that the drilling advancement rate is less than 5 feet per hour. A recording device such as a "geolograph" shall be required to document Rock Clause time. The decrease in the drilling rate shall be due to natural causes such as hard formations caused by gravel and boulders. Borehole caving problems and decreased penetration rates due to improper air flow rates or choice of drilling bits are not acceptable causes to invoke the Rock Clause. The CONTRACTOR is cautioned to practice proper drilling techniques for gravel alluvium drilling environments. Reduction in drilling rate due to worn bits will not be grounds for invoking the Rock Clause.

6.3.3 Subsurface Formation Sampling

The CONTRACTOR shall, at each change of formation, at five (5)-foot intervals between changes in formation, and at intervals requested by the Engineer, collect a representative sample of the interval or new formation. Each sample shall be given to the Engineer for proper logging and storage.

If the CONTRACTOR chooses to drill with hollow stem auger, the CONTRACTOR shall collect relatively undisturbed soil samples with a California Modified or Standard Penetration Test split spoon sampler.

If the CONTRACTOR chooses to drill with a form of air rotary, the CONTRACTOR shall provide an acceptable means to the Engineer whereby the CONTRACTOR can safely obtain representative samples of formation cuttings from the air stream. The ground surface around the sampling area shall be kept graded and free from stockpiled drilling cuttings and shall be kept free of trash, equipment and other debris. If samples cannot be adequately collected, drilling will cease until the problem is corrected to the satisfaction of the Engineer.

6.3.4 Cleanup

Any waste that is generated by the CONTRACTOR, which is incidental to the drilling activities, shall be collected and properly disposed by the CONTRACTOR. The procedure for collecting and handling soil drilling cuttings is specified in 6.3.1, above.

6.3.5 Daily Construction Progress Report

The driller shall prepare a daily record of drilling activities completed each working day that drilling is completed. The Daily Construction Progress Report shall identify the first pass vertical footage drilled, approved Rock Clause hours, and approved stand-by time hours.

The report shall be provided to the Engineer for review and approval at the conclusion of each working day.

END OF SECTION

SECTION 7. WELL CASING AND SCREEN

7.1 GENERAL

7.1.1 Description

This section describes the supply and installation of the blank well casing and screen. All materials installed under this Contract, unless specified, shall be furnished by the CONTRACTOR. These materials shall be new and conform to these Specifications, except as specified otherwise.

The CONTRACTOR shall use good practice during installation, backfilling and well development to ensure the integrity of the screen and casing is maintained.

The proposed well casing and screen lengths are specified in Figure 1 – MV-13 and MV-14 Groundwater Well Details and Figure 2 – BH-25 Groundwater Well Detail. These lengths are subject to change, as specified by the Engineer, based on the subsurface conditions encountered during drilling.

7.1.2 Related Work Specified Elsewhere

None.

7.1.3 Submittals

Daily construction progress report.

7.1.4 Measurement and Payment

1. Payment for well screen installation shall be based on measurement of vertical feet of well screen installed, exclusive of well casing, complete and in place at the unit price for Bid Item No 3.
2. Payment for blank casing installation shall be based on measurement of vertical feet of blank well casing installed, complete and in place, which includes furnishing and installing centralizers, at the unit price for Bid Item No 4.

7.2 MATERIALS

7.2.1 General

The well casings shall be nominal 4-inch diameter, schedule 80, ASTM D1785 (latest edition) PVC. Well screens shall be nominal 4-inch diameter, schedule 80, ASTM D1785 (latest edition) PVC with a machined 0.020-inch slot (20-slot).

A typical well design will consist of a 20 to 30-foot long interval of well screen with approximately five (5) feet of blank casing below (silt trap) and the remainder of the blank casing located above the screen and extending to the ground surface. The lengths and intervals of each casing type shall be determined by the Engineer at the completion of drilling and is generally estimated as shown in Figure 1 and Figure 2.

7.2.2 Blank Casing

1. The blank casing shall be nominal 4-inch inner diameter, schedule 80, PVC as specified in ASTM D1785 (latest edition), equipped with threaded joints at the ends of the blank casing section. The blank casings shall be factory-assembled.
2. Threaded joints shall be machined with beveled/interference compression fit shoulder seals to increase compressional strength.
3. O-ring seals shall be provided within the threaded joints to mitigate leakage and contaminants from entering at the threaded joint.
4. In all cases, the blank casing used in conjunction with the screen shall have the same inner diameter as the screen to ensure that the inside diameter of the blank casing matches the inside diameter of the screen.
5. The bottom of the well casing for BH-25 shall be fitted with a threaded end cap. The end cap shall be of the same chemical and physical properties as the PVC screen.
6. All casing material shall be new.

7.2.3 Slotted Well Screen

1. Slotted well screens shall be nominal 4-inch diameter, schedule 80, PVC as specified in ASTM D1785 (latest edition), equipped with threaded joints at the ends of the slotted well screen section. The screen shall be factory-assembled.
2. The slotted well screen shall be machined 0.020-inch slot (20-slot).
3. Threaded joints shall be machined with beveled/interference compression fit shoulder seals to increase compressional strength.
4. O-ring seals shall be provided within the threaded joints to mitigate leakage and contaminants from entering at the threaded joint.
5. In all cases, the blank casing used in conjunction with the screen shall have the same inner diameter as the screen to ensure that the inside diameter of the blank casing matches the inside diameter of the screen.
6. The bottom of the well casing for BH-25 shall be fitted with a threaded end cap. The end cap shall be of the same chemical and physical properties as the PVC screen.
7. All screen casing material shall be new.

7.3 EXECUTION

7.3.1 General

The Engineer will submit the final well design depths/lengths to the CONTRACTOR within one (1) working day after the Engineer directs the CONTRACTOR to terminate drilling at a specific well location. While the well design is being completed, no additional payment for stand-by time shall be made, except where specified in SECTION 6BOREHOLE DRILLING

AND SAMPLING. The final well design will specify where the casing and screen intervals, filter pack intervals, seal intervals and sanitary seal will be placed in the borehole.

The CONTRACTOR is cautioned to properly secure/stabilize the borehole during all phases of construction. Improper or poor security/stabilization of the borehole may lead to borehole collapse and delays prior to or during backfilling. Such collapse or delays will be the responsibility of the CONTRACTOR and the Engineer shall not pay any costs associated with such. During casing installation the CONTRACTOR shall measure and record the lengths of the casing and screen as it is being installed into the borehole.

7.3.2 Joints

All field joints, where blank casings and/or screen casing are joined together, shall be connected via the machine threaded ends.

7.3.3 Installation of Casing and Screen

1. The CONTRACTOR shall ensure that the tremie and well casing are sufficiently aligned to prevent binding while raising the tremie during annular fill material installation.
2. The well casing string shall be suspended at all times in tension from the surface by means of a clamp, landing plate, or equivalent method. The bottom of the casing string shall be at a sufficient distance above the bottom of the borehole to ensure that it is not supported by the bottom of the borehole.
3. The CONTRACTOR will measure and record the lengths of the casing as it is being installed into the borehole. The casing lengths will be such that the screens are placed per the design interval and the total installed length of the casing is as specified in the design.
4. Two (2) centralizers shall be installed around the screen section, one (1) near the bottom and one (1) approximately mid-height. One (1) centralizer shall be installed around the blank casing, at approximately mid-height.
5. Prior to backfilling the annular space around the casing string, the CONTRACTOR shall measure the bottom of each casing to verify its total depth. If for any reason the casing cannot be placed in the correct position, or at a depth acceptable to the Engineer, the CONTRACTOR shall take whatever measures are necessary to properly construct the well at his own expense, including abandoning the borehole.
6. If any of the casings should collapse or break prior to well completion, they shall be withdrawn and replaced at the CONTRACTOR's expense.
7. All work required to be repeated because of the CONTRACTOR, and all additional materials, labor, and equipment required, shall be furnished at the expense of the CONTRACTOR and no claim for additional compensation shall be made or be allowed therefore, except as specifically provided herein.
8. The well casing shall be completed at ground surface. Extra casing length should be added to allow for landing of the casing at the depth/heights specified in

SECTION 11 WELL HEAD COMPLETION. Following completion of backfilling and development, the casing stick-up will be modified as specified in SECTION 11 WELL HEAD COMPLETION.

7.3.4 Well Capping

Upon completion of all work in connection with well construction and development, the well shall be capped by placing a lockable J-plug on the top of the casing.

END OF SECTION

SECTION 8. FILTER PACK

8.1 GENERAL

8.1.1 Description

This section covers the supply and installation of the filter pack to the depths and intervals specified by the Engineer.

8.1.2 Submittal

A description and recent certified sieve analysis of filter pack to be used must be submitted and approved by the Engineer prior to the anticipated date of shipment from the supplier.

8.1.3 Measurement and Payment

1. The payment for filter pack will be based on measurement of vertical feet of filter pack installed from the bottom to the top of each specified interval at the unit price for Bid Item No 5.
2. The payment for transition sand will be based on measurement of vertical feet of transition sand installed from the bottom to the top of each specified interval at the unit price for Bid Item No 6.

8.1.4 Related Work Specified Elsewhere

None.

8.2 MATERIALS

8.2.1 Filter Pack

All sand/gravel for packing shall be hard, water or air worn gravels, washed clean of silt, sand, dirt and foreign matter, crushed gravel will not be accepted. It shall be well rounded, graded, and shall have a coefficient of uniformity less than 2.5. All gravel is subject to approval by the Engineer prior to use in the packing process. Gravel shall be of the type provided by Oglebay Norton Industrial Sands, Inc. (formerly known as Colorado Silica Sand, Inc.), or approved equal. For bidding purposes, a non-mixed (i.e., pure silica) #3 gradation blend of Oglebay Norton Industrial Sands, Inc. is proposed at this time. The #3 gradation blend shall meet the sieve analyses parameters specified below.

Sieve #	Sieve Opening (mm)	Cumulative Percent Passing
½-Inch	12.5	100
4	4.75	100
6	3.35	100
8	2.36	100-98
12	1.7	89-55
16	1.18	46-10
20	0.85	13-1
30	0.60	5-0

8.2.2 Transition Sand

All sand for packing shall be hard, water or air worn gravels, washed clean of silt, dirt and foreign matter, crushed gravel will not be accepted. All sand is subject to approval by the Engineer prior to use in the packing process. Sand shall be a non-mixed (i.e., pure silica) #60 gradation blend. The transition sand shall be of the type provided by Oglebay Norton Industrial Sands, Inc. or approved equal. The #60 gradation blend shall meet the sieve analyses parameters specified below.

Sieve #	Sieve Opening (mm)	Cumulative Percent Passing
20	0.85	100
30	0.60	100
40	0.425	100-94
50	0.30	60-25
70	0.212	15-5
100	0.15	4-0

8.3 EXECUTION

8.3.1 General

Once drilling is completed, the bottom of the borehole is stabilized, if necessary, and the casing string is installed within the borehole, the installation of the filter pack can proceed. A general schematic diagram of the well construction, including location of annual seals, is provided in Figure 1 – MV-13 and MV-14 Groundwater Well Details and Figure 2 – BH-25 Groundwater Well Detail.

8.3.2 Installation of Filter Pack

1. The gravel, if stockpiled onsite, shall be kept free of all foreign matter. Gravel suspected of being contaminated with dust, oil or other contaminants will not be accepted and shall be removed at the CONTRACTOR's expense prior to the arrival of new gravel onsite.

2. Each gravel envelope shall be pumped into the annulus of the well through a tremie. The gravel shall not be allowed to freefall more than 20 feet from the bottom of the tremie to the top of the gravel. The gravel envelope shall be installed from the bottom of the borehole to approximately five (5) feet above the top of screen.

3. A device approved by the Engineer shall be used to measure the level of the gravel throughout the backfilling process. Backfilling shall not begin until the measurement method is proved to be accurate by an acceptable method. Upon completion of installation of each gravel envelope, or portion thereof, no additional work will be performed until the depth to the top of that gravel has been determined by use of proven, accurate equipment.

4. Throughout the backfilling process, the CONTRACTOR shall complete calculations to determine the amount of gravel necessary to backfill the specified

interval. The CONTRACTOR shall record all calculations and volumes of material used to backfill the specified interval, as well as soundings obtained after each gravel placement and verify those calculations with the Engineer.

5. Prior to installing the overlying annular seal materials, the CONTRACTOR shall consolidate the gravel envelope by gently surging the well screen with a tight-fitting surge block. CONTRACTOR shall then re-measure the top of the gravel envelope and install additional gravel envelope material to design depth as determined by the Engineer.

6. Following the installation of the gravel envelope for BH-25, the CONTRACTOR shall install an approximate 5-foot layer of transition sand.

END OF SECTION

SECTION 9. ANNULAR SEAL

9.1 GENERAL

9.1.1 Description

This section includes the installation of the annular seal, which seal the annular space between the borehole wall and the well casing. One seal composed of medium-sized coated bentonite pellets shall be installed in the annulus of the well to hydraulically separate the aquifer penetrated by the well casings.

9.1.2 Measurement and Payment

Payment for annular seal materials, bentonite pellets, will be based on measurement of vertical feet of seal installed from the bottom to top of the specified interval at the unit price for Bid Item No 7.

9.1.3 Related Work Specified Elsewhere

None.

9.2 MATERIALS

9.2.1 Annular Seals

An approximate five (5) foot seal consisting of dry non-coated medium-sized bentonite chips or tablets shall be installed above the screened interval, or as otherwise specified. Coated bentonite pellets, chips or tablets shall not be used to construct these seals. The bentonite chips or tablets shall be certified NSF/ANSI Standard 60, Drinking Water Treatment Chemicals - Health Effects.

9.3 EXECUTION

9.3.1 General

Once the filter pack or transition sand, depending on the specific well being constructed, is installed above the screened well casing, the annular seal can be installed. A general schematic diagram of the well construction, including location of the annual seal, is provided in Figure 1 – MV-13 and MV-14 Groundwater Well Details and Figure 2 – BH-25 Groundwater Well Detail.

9.3.2 Annual Seal Installation

1. An approximate five (5) foot thick seal, consisting of bentonite chips or tablets, shall be installed by gravity via a tremie above the filter pack.
2. Seal materials not be allowed to freefall more than 20 feet from the bottom of the tremie to the depth established from previous measurement. The seal or portion thereof shall be placed from the bottom of each interval to the top, in a continuous operation.
3. The CONTRACTOR shall measure the seal to verify the location of the top of the seal after each load of seal mixture has been installed. Upon complete installation

of the annular seal, or portion thereof, no additional work will be performed until the depth to the top of that seal has been accurately measured.

4. The CONTRACTOR shall calculate the amount of seal material necessary to backfill a specified interval. The CONTRACTOR shall record all calculations and volumes of seal mixture used, and the measurements obtained after the seal placement and verify those calculations with the Engineer.

END OF SECTION

SECTION 10. SANITARY SEAL

10.1 GENERAL

10.1.1 Description

This section includes the completion of the sanitary seal, sealing the annular space between the borehole and the well casing in the upper portion of the borehole.

10.1.2 Submittals

Delivery receipts and certified cement mix design receipts for cement placed for sanitary seal, if applicable.

10.1.3 Measurement and Payment

Payment for the sanitary seal will be based on measurement of vertical feet of sanitary seal installed at the unit price for Bid Item No 8. No stand-by time will be paid for any down-time between the placement of the final annular seal and the installation of the sanitary seal, or during the 24 hours the sanitary seal is curing.

10.1.4 Related Work Specified Elsewhere

None.

10.2 MATERIALS

10.2.1 Sanitary Seal

1. Cement used for the sanitary seal shall be a Type II Portland cement conforming to ASTM C150 (latest edition).
2. The cement mix used for the sanitary seal shall be a 10.5-sack sand-cement grout. There shall be not more than two parts by weight of sand to one part by weight of cement. The water-cement ratio shall be 7 gallons per sack of cement (94 pounds).
3. Water used for the cement mix shall be clean and of potable quality.
4. Materials used as additives for Portland cement mixtures in the field shall meet the requirements of ASTM C494 (latest edition), "Standard Specifications for Chemical Admixtures for Concrete."
5. Special quick-setting cement, retardants to setting, and other additives, including hydrated lime to make the mix fluid (up to 10 percent of the volume of cement) may be used.

10.3 EXECUTION

10.3.1 General

After placement of the casings, screens, gravel envelopes and the final lift of the annular seal, the sanitary seal shall be installed. The annular space between the well casing and the borehole shall be grouted by tremie with sanitary seal material from the top of the annular

seal to the ground surface. A general schematic diagram of the well construction, including location of annual seals, is provided in Figure 1 – MV-13 and MV-14 Groundwater Well Details and Figure 2 – BH-25 Groundwater Well Detail.

10.3.2 Sanitary Seal Installation

1. The grout pipe shall extend from the ground surface to the bottom of the zone to be grouted. Grout shall be placed from bottom to top, in a continuous operation. The grout pipe shall be slowly raised as the grout is placed, but the discharge end of the grout pipe must be submerged in the emplaced grout at all times until grouting is completed.

2. The CONTRACTOR shall take whatever precautions are necessary to prevent borehole and/or casing collapse during placement of the sanitary seal. In the event any borehole and/or casing collapses prior to completion of the sanitary seal, the CONTRACTOR shall take whatever steps are necessary to reopen the borehole, replace the casing and place the seal as specified. Any such remedial action shall be conducted at the CONTRACTOR's expense.

3. The CONTRACTOR shall calculate the amount of grout necessary to complete the sanitary seal. The volume placed shall not be less than the calculated volume of the annular space between the borehole and the well casing. The CONTRACTOR shall record all calculations and volumes used, and measurements obtained after each interval is pumped. The CONTRACTOR shall provide the calculations and volumes to the Engineer for his review and approval.

4. No activity shall occur directly adjacent to the well site, nor will stand-by time be granted, during a minimum 24-hour period immediately following the placement of the sanitary seal. The casings shall be adequately secured such that no damage or contamination will occur during this period.

END OF SECTION

SECTION 11. WELL HEAD COMPLETION

11.1 GENERAL

11.1.1 Description

The CONTRACTOR shall provide well head completion by installing a traffic rated vault at ground level.

11.1.2 Measurement and Payment

Payment of the well completion shall be made at the unit price for Bid Item No 9.

11.1.3 Related Work Specified Elsewhere

SECTION 7 WELL CASING AND SCREEN

11.1.4 Submittals

1. The CONTRACTOR shall submit a schematic drawing of the surface vault assembly and documentation from the manufacturer that the surface vault meets the requirements of this Section.
2. Prior to, or at the time of delivery to the site, the CONTRACTOR shall submit to the Engineer a copy of the purchase order placed with the vault manufacturer for the vault to be supplied for the project.
3. Prior to, or at the time of delivery to the site, a Bill of Lading (or invoice) shall be submitted to the Engineer certifying that the vault being delivered to the CONTRACTOR and hence to the well site, is the vault ordered by the CONTRACTOR per the specifications in this Section.

11.2 MATERIALS

11.2.1 Ground Level Vault Installation

1. The vault and lid shall be Petroleum Equipment Manufacturing Company, Inc. (www.pemcofl.com) locking monitoring well vault model no. 104242424WT or County approved equal. The vault contains a recessed locking device with a bolted cover which is designed to keep out dirt and debris. The vault features a steel frame, diamond plate steel cover, 16 gauge galvanized steel skirt and carries the H-20 load rating. The vault is nominally 24-inches by 24-inches by 24-inches and is water tight.
2. A clean, crushed rock material shall be used for the rock base that will support the vault.

11.3 EXECUTION

11.3.1 Vault Installation

1. Upon completion of well development, the CONTRACTOR shall excavate around the well casing to a minimum of six inches below the base of the proposed

vault. The CONTRACTOR shall also be excavate a sufficient width to facilitate the installation of the vault.

2. The top of the well casing shall be 6 to 12 inches below the bottom of the vault lid. The top of the well casing shall be smooth and free of burs, sharp edges/corners and protrusions.

3. The CONTRACTOR shall equip to top of each well casing with a lockable, fitted J-plug.

4. The CONTRACTOR shall install a minimum 6-inch thick layer of crushed rock base in the bottom area between the well casing and the excavation walls to support the vault. The rock base shall be compacted and leveled to provide a supportive surface.

5. The CONTRACTOR shall install an additional approximate six-inch thick layer of crushed rock base in the space between the vault and the casing. The rock base shall be compacted and leveled within the vault to provide a supportive surface free of trip hazards.

6. The CONTRACTOR shall install and compact base material between the vault and the excavation walls, from the top of the rock base to the top of the vault. Alternatively, in lieu of compacted base material, the CONTRACTOR may use concrete to backfill this space.

END OF SECTION

SECTION 12. WELL DEVELOPMENT

12.1 GENERAL

12.1.1 Description

This Section specifies the initial development of the well by employing flushing, bailing, airlifting and pumping. The actual well development procedure may vary from well to well dependent upon actual characteristics of the formations encountered during drilling. The following is a basic procedure recommended for developing these wells.

12.1.2 Measurement and Payment

1. Payment for well development will be made at the unit price bid per hour for Bid Item No 10.
2. The time required for well development will be recorded by the hour with 15-minute intervals as the smallest unit of recorded time. The time recorded for payment shall commence when the equipment installed in the well is placed in operation and shall end when development has stopped at the direction of the Engineer.
3. No payment will be made for delays resulting from (1) equipment stuck in the well casing; (2) equipment breakdown; (3) arranging major drilling, pumping or testing apparatus; (4) failure to conduct the operations in a diligent and workmanlike manner by which the desired results could ordinarily be expected; or (5) additional development that is required as a result of damaged well casing or screen, voids in the gravel envelope, or any construction related defect resulting in additional well development.

12.1.3 Submittals

1. If the Contractor utilizes a holding tank that previously contained other liquids (i.e. a tank that is notne w), laboratory test results of the holding tank rinsate shall be provided to the Engineer, prior to the delivery of the subject holding tank to the site. The tank rinsate shall be tested for volatile organic compounds by EPA Test Method 8260B, volatile fuel hydrocarbons by EPA Test Method 8015M and extractable fuel hydrocarbons by EPA Test Method 8015M, by a laboratory certified by the State Water Resources Control Board, Environmental Laboratory Accreditation Program. None of the subject compounds shall be detected above the method detection limit.
2. Daily well development reports recording time and procedures completed during each shift, as well as total chargeable hours for each day and total gallons generated, shall be submitted to the Engineer on a daily basis.
3. Daily well development records recording flow rates, EC, TDS, nephelometric turbidity units (NTU), pH, airline length, and all other information as required by the Engineer for the period of well development shall be submitted on a daily basis.

12.1.4 Related Work Specified Elsewhere

None.

12.2 MATERIALS

12.2.1 Bailer

A suction bailer shall be provided with the appropriate fittings to allow for the removal of debris, which might accumulate in the bottom of each well casing.

12.2.2 Air Compressor, Airline, and Eductor Pipe

An air compressor with airline, eductor pipe and appropriate fittings shall be onsite during the initial airlifting phase of the well development. The air compressor shall be of ample size for maximum airlifting capabilities. The air compressor shall have an effective external air-oil separator. Eductor pipe used in the development of the monitoring wells shall be a maximum 4-inch pipe size (i.e., well casing diameter). The size of the airline shall be a maximum 3/4-inch inner diameter to ensure good flow rates through the eductor pipe (i.e., well casing), and shall be fitted with a dump valve capable of discharging "downhole" air to the atmosphere.

Additional materials necessary to complete secondary development shall include a flow meter, pH and EC/TDS meters, and a water level tape. The flow meter shall be capable of measuring a maximum of 20 cfm of air, such as Dwyer Instruments Inc., Series RM Rate-Master Flow meter Model No. RMC-10-inch scale, or approved equal. The flow meter shall be mounted on the airline leading from the air compressor to the well in conjunction with a pressure gauge capable of measuring maximum air pressure on the airline, and fittings for a dump valve to discharge air to the atmosphere.

12.2.3 Submersible Pump

A submersible pump compatible with the well casing size shall be used to pump each well as a final step in the well development process.

12.2.4 Holding Tanks

The CONTRACTOR shall use a drum(s) or tank(s) to store water generated during well development activities. It is anticipated that flow rates shall be five (5) gallons per minute (gpm) while performing well development. The CONTRACTOR shall anticipate/provide adequate containment volume (e.g., number of drums) to maintain efficient operations.

The well development water shall be temporarily stored at the Closed Mead Valley and Badlands Sanitary landfills.

12.2.5 Discharge Piping

The CONTRACTOR shall provide the temporary discharge piping required to convey well development water to the appropriate holding tank(s).

12.2.6 Screen Brush

The CONTRACTOR shall provide a nylon brush to remove fine grained materials from the screened interval of the wells.

12.3 EXECUTION

12.3.1 Development Procedures

1. The CONTRACTOR shall commence initial development no sooner than 24 hours after completion of the sanitary seal.
2. The CONTRACTOR will place a tremie down to the bottom of each casing open-ended, flush the well casing with at least two casing volumes of fresh water, at the discretion of the Engineer, and then airlift until clean. Once airlifting is complete the CONTRACTOR shall remove the tremie, unless bailing is necessary, as directed by the Engineer.
3. Each casing shall be bailed of sediment, as required to clean casing to bottom. If the sediment thickness is greater than five feet, then the CONTRACTOR may be asked to utilize eductor pipe to airlift the sediment.
4. Following bailing, the CONTRACTOR shall measure and record the static water level in the casing and prepare for airlifting. The CONTRACTOR will be required to fabricate an airlift discharge head to accommodate return flow and airline. An airline submergence of at least 60 percent and 80 percent maximum is recommended. The CONTRACTOR shall airlift and surge each well casing and record water quality parameters and purging data. Data shall be recorded at 15-minute intervals until development of a well casing is deemed complete and/or as directed by the Engineer. The well casing shall be surged at 15-minute intervals or as directed by the Engineer. During development the CONTRACTOR shall keep development records. This procedure will be repeated for each of the well casings.
5. Should airlifting not be feasible due to the depth to groundwater or low specific capacity, a submersible pump may be used in-lieu of airlifting. The submersible pump inlet shall be set as close to the screened interval as possible.
6. Once all well casings have been developed by airlifting, the CONTRACTOR shall sound the bottom of each well. If the level of sediment is within or above the perforation interval then the CONTRACTOR shall bail the well until the perforations are clear of sediment.
7. Well development shall continue until the turbidity is similar to existing groundwater wells at the site. The target turbidity for well development at the Badlands and Mead Valley landfills will be 4 NTU and less than 2 NTU, respectively.
8. The CONTRACTOR shall continue well development activities until the Engineer directs the CONTRACTOR to stop.

12.3.2 Well Development Water

1. All fluids generated during well development shall be temporarily contained by the CONTRACTOR in holding tank(s) provided by the CONTRACTOR. At the completion of each day of well development work, the CONTRACTOR shall transport the holding tank(s) to a location within the fenced landfill area. Well development holding tank(s) for BH-25 shall be transported to the Badlands Sanitary Landfill. Well development holding tank(s) for MV-13 and MV-14 shall be transported to the Closed Mead Valley Sanitary Landfill. The holding tanks shall be transported to the general location shown on Map 4 and Map 5.

2. The County shall be responsible for the final disposal of the development water.

3. If the CONTRACTOR chooses to retrieve the holding tank(s) that were used to temporarily store the development water, the County shall empty the holding tank(s) within 7 working days following completion of well development activities. The County shall dispose of the development water only. The County shall not clean or decontaminate the holding tank(s).

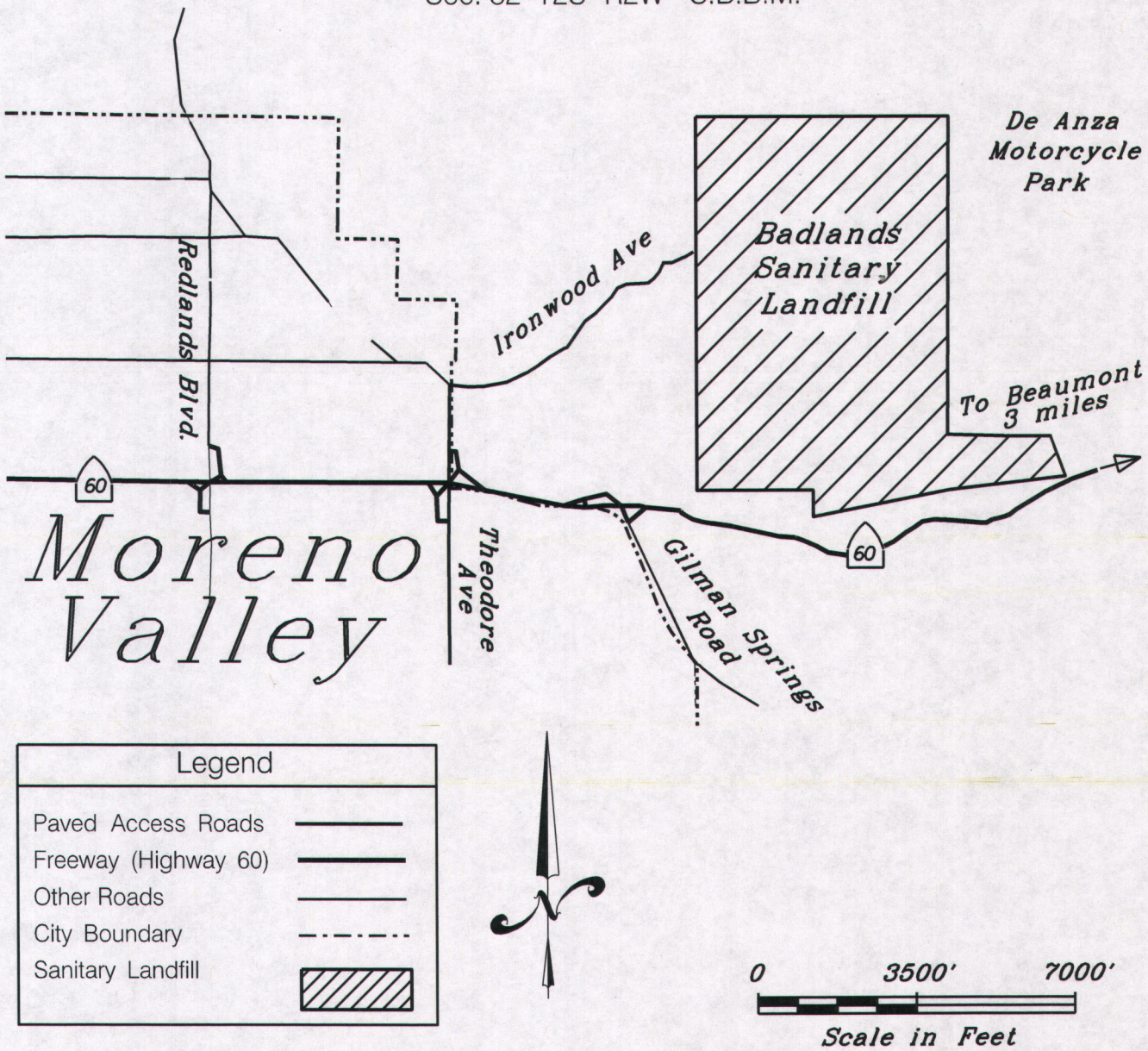
END OF SECTION

Map 1 – Badlands Sanitary Landfill Vicinity Map

Badlands Sanitary Landfill
Vicinity Map

Por. Secs. 4 & 5 T3S R2W &

Sec. 32 T2S R2W S.B.B.M.



Riverside County
Waste Management Department

Badlands Sanitary Landfill
Vicinity Map
Map 1

File Directory: //waste 1/envr/data /sites /badlands vicinity map. dgn

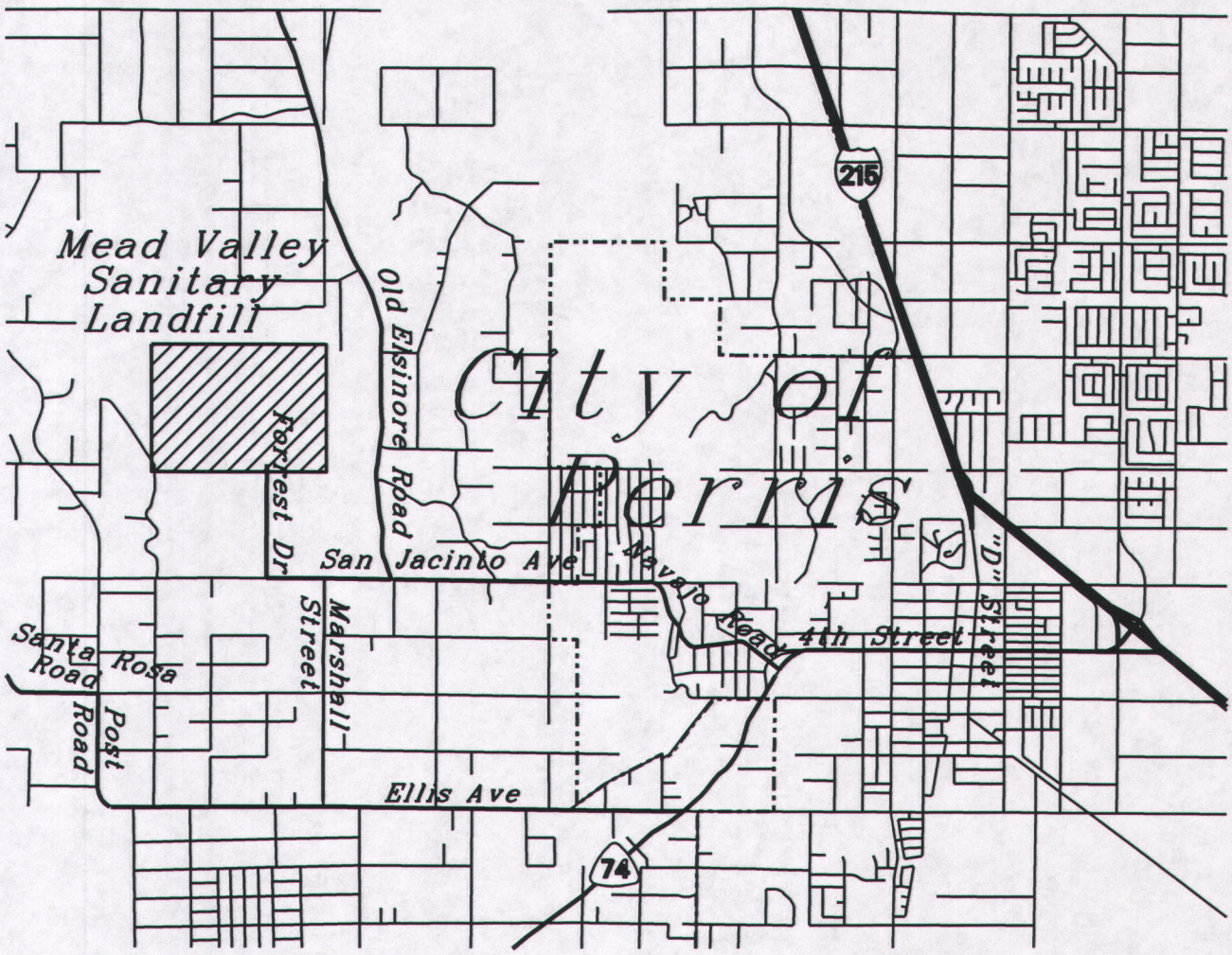
Date: February 2008

Scale : 1" = 3500'

Map 2 – Mead Valley Closed Sanitary Landfill Vicinity Map

Mead Valley Closed Sanitary Landfill
Vicinity Map

Por. Sec. 27 T4S R4W S.B.B.M.



Legend

- Freeway (I–215)
- Paved Access Road
- Other Roads
- City Boundary
- Sanitary Landfill

0 4000' 8000'

Scale in Feet

Riverside County
Waste Management Department

Mead Valley Sanitary Landfill

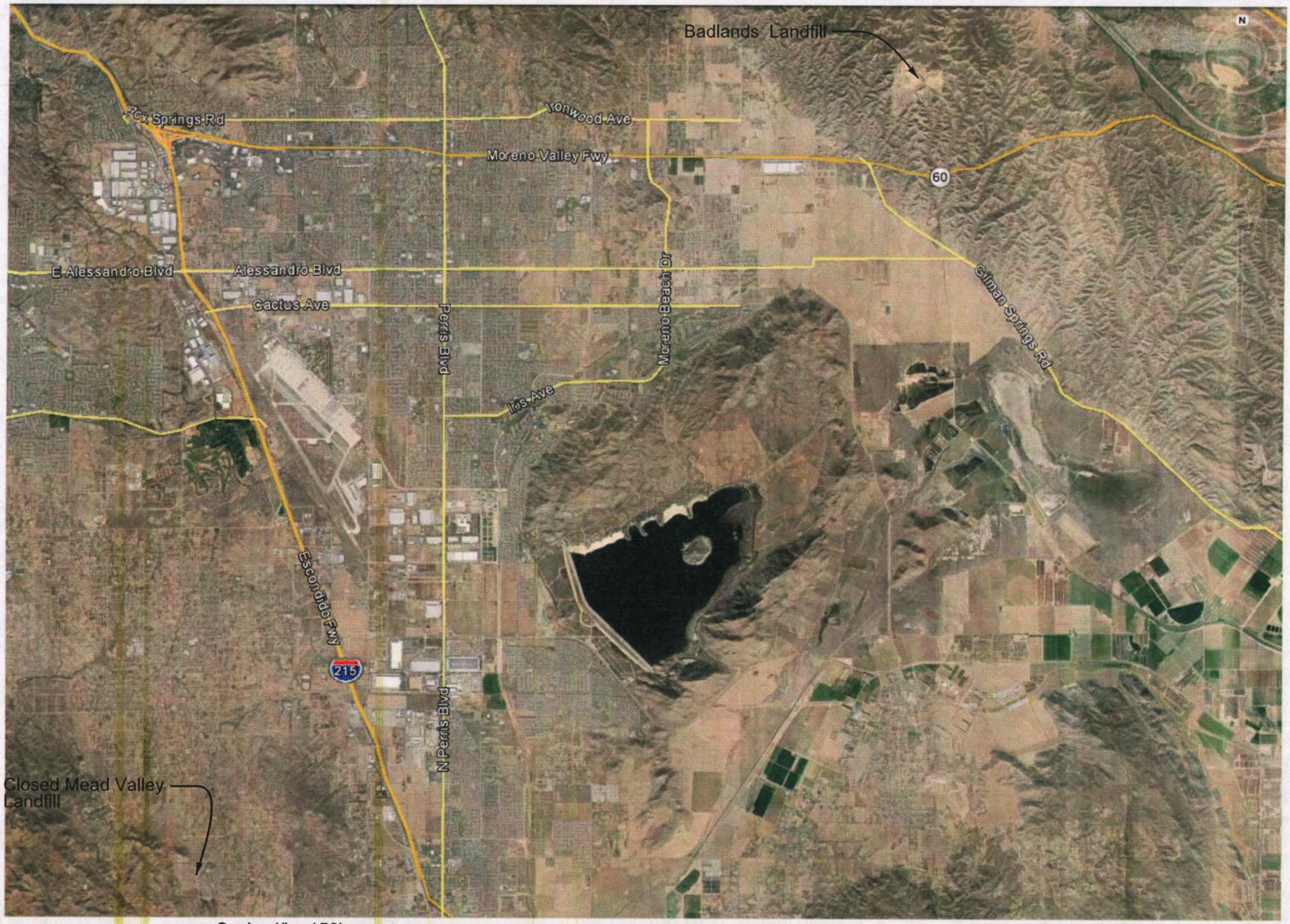
Vicinity Map

Map 2

File Directory://waste 1 /envr/data/sites/mead/meadvicinity.dgn

Date: February 2008 | Scale : 1"=4000'

Map 3 – Badlands and Mead Valley Landfills Locations



Scale: 1" = 150'

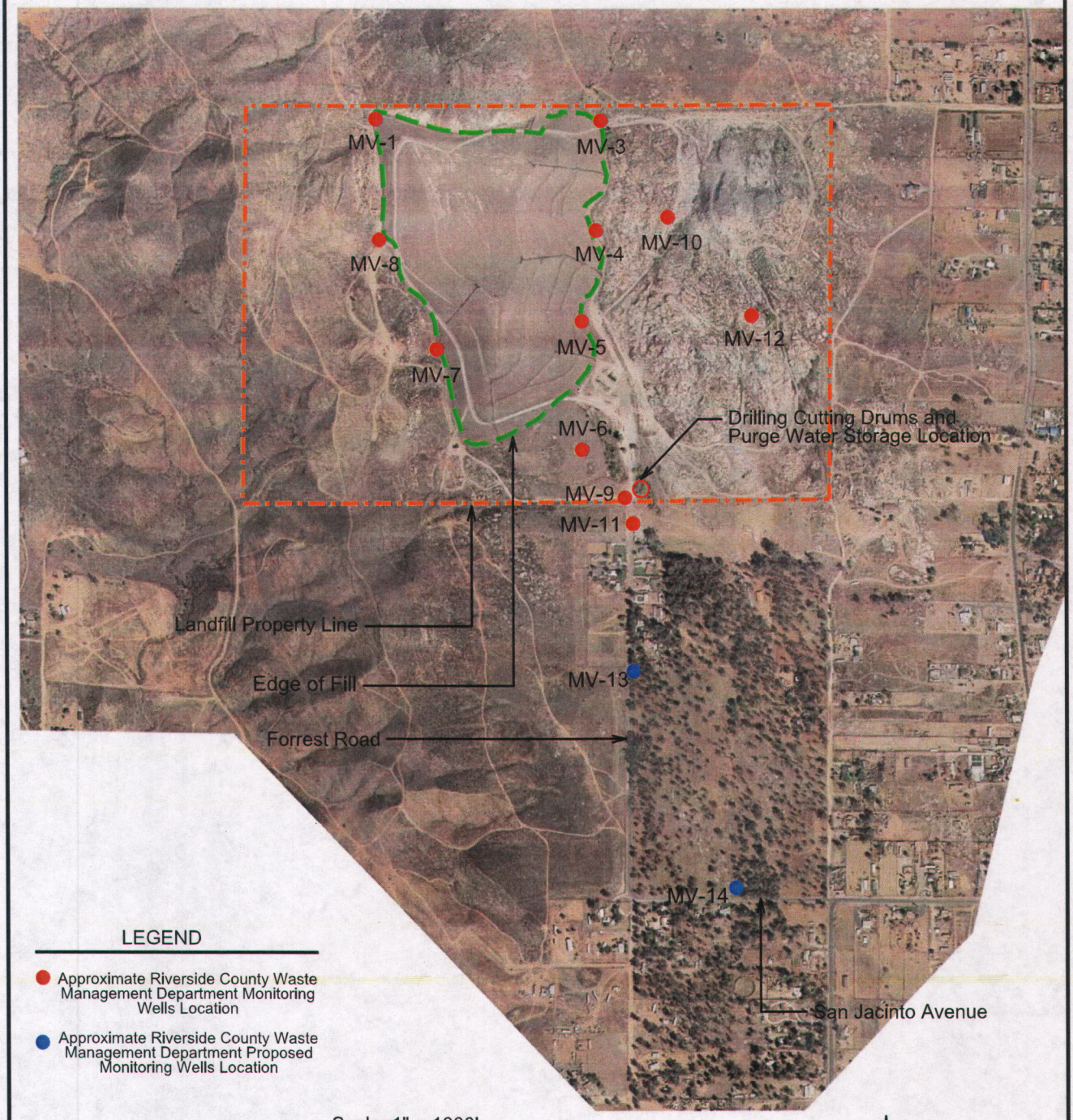
0 150 300 450 600 750

Datum is mean sea level

Riverside County Waste Management Department

Map 3 - Badlands and Closed Mead Valley Landfill Locations

Map 4 – Groundwater Wells MV-13 and MV-14 Location Map



Riverside County
Waste Management Department

Mead Valley Sanitary Landfill

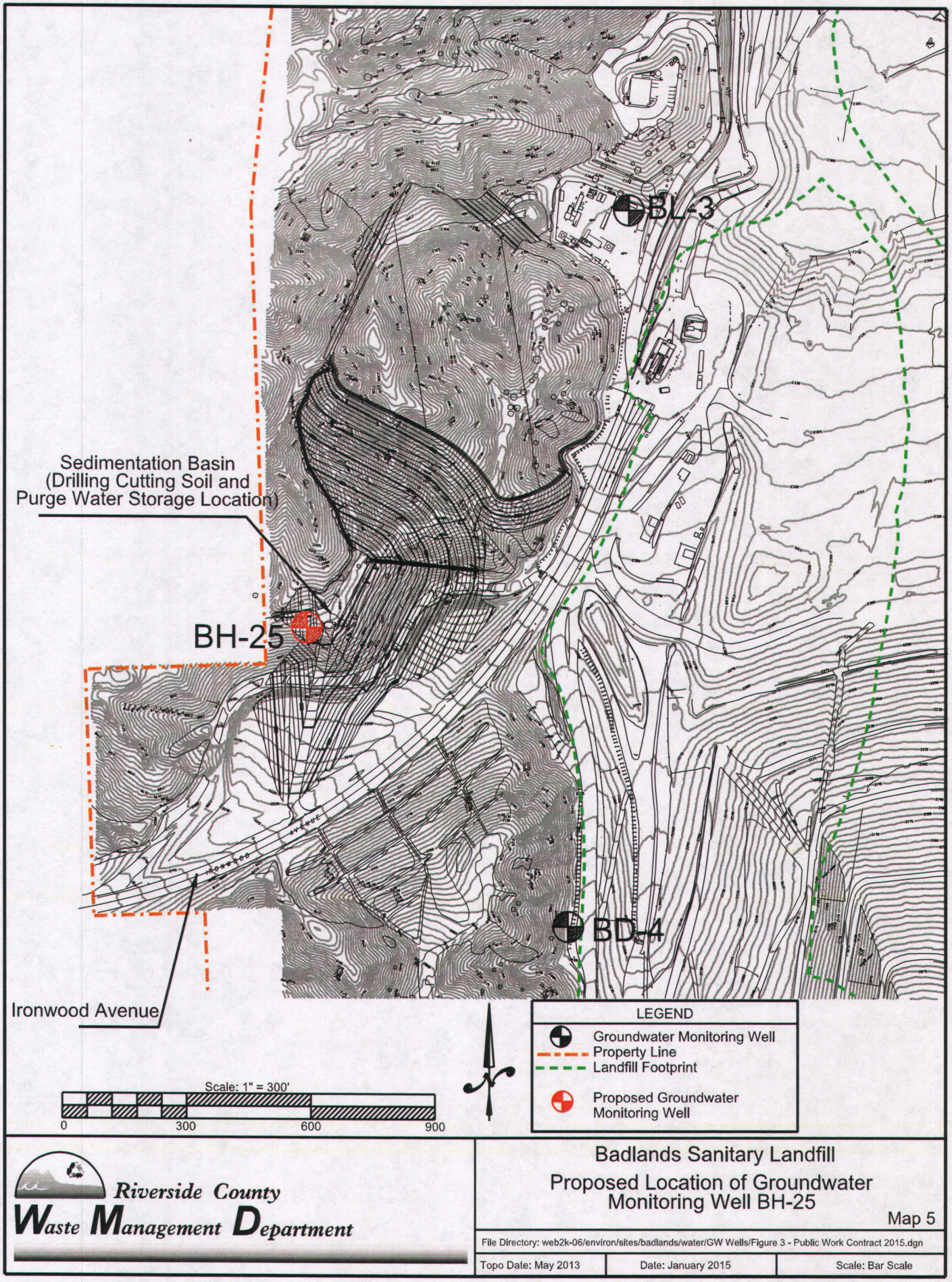
Proposed Groundwater Wells MV-13 and MV-14 Location Map

Map 4

File Directory: web2k-06/Environ/sites/mead/water/Map 4 - location for mv12 mv13.dgn

Photo Date: March 2007	Date: January 2015	Scale: Scale Bar

Map 5 – Groundwater Well BH-25 Location Map



Riverside County
Waste Management Department

Badlands Sanitary Landfill

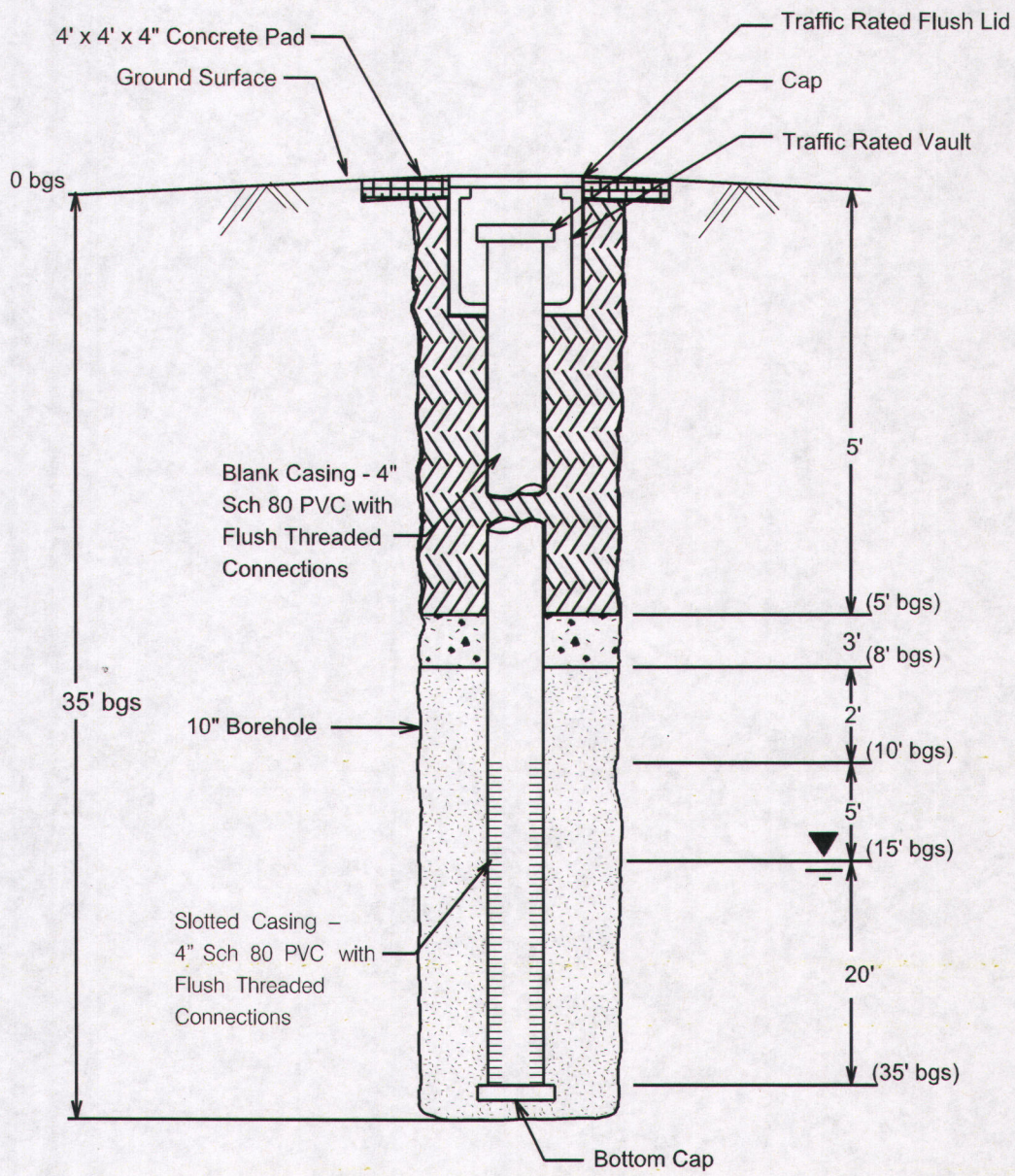
Proposed Location of Groundwater Monitoring Well BH-25

Map 5

File Directory: web2k-06/environ/sites/badlands/water/GW Wells/Figure 3 - Public Work Contract 2015.dgn

Topo Date: May 2013	Date: January 2015	Scale: Bar Scale

Figure 1 – MV-13 and MV-14 Groundwater Well Details



LEGEND

- Cement
- Bentonite
- Filter Pack

bgs: Below Ground Surface

Riverside County
Waste Management Department

Close Mead Valley Sanitary Landfill

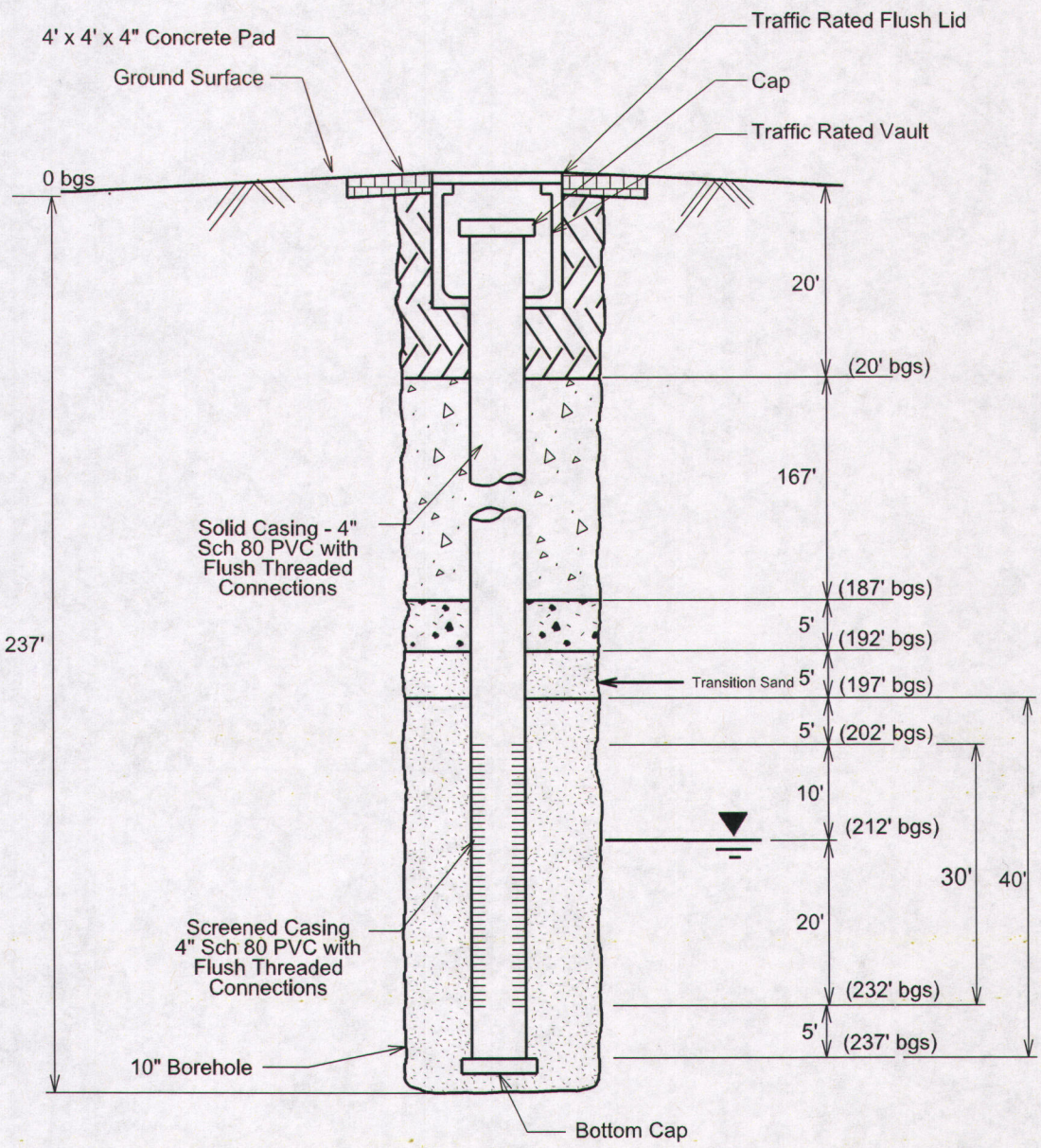
Proposed MV-13 and MV-14 Well Details

Figure 1

Date: August 2014 | Scale : NTS

File Directory: web2k-06/environ/sites/mead/water/MV-13 and MV-13/Figure 1 - proposed details

Figure 2 – BH-25 Groundwater Well Detail



LEGEND

- Cement
- Grout
- Bentonite
- Filter Pack

bgs: Below Ground Surface

Riverside County
Waste Management Department

Badlands Sanitary Landfill

Proposed BH-25 Well Details

Figure 2

Date: March 2014	Scale: NTS	

File Directory: /environ/sites/badlands/water/BH-25/2014-03 attachment 3 for BH-25 letter.dgn

Appendix A – Closed Mead Valley Sanitary Landfill Groundwater Boring Logs

LEGEND

- Groundwater Monitoring Well
- Landfill Footprint
- Property Line

Scale: 1" = 500'

0 500 1000 1500 2000 2500

Datum is mean sea level

Riverside County
Waste Management Department

Mead Valley (Closed) Sanitary Landfill

Groundwater Monitoring Well Locations

Date: April 29, 2004	Photo Date : March 2002	Scale : 1"=500'

File Directory: /Waste_1/environ/sites/mead/water/gwlocations2004.dgn