



SECTION F
TECHNICAL SPECIFICATIONS

**CHINO AIRPORT
MONITORING WELLS**

FOR

CHINO, CALIFORNIA

PROJECT NO.: 10.10.0556

CHINO AIRPORT
SAN BERNARDINO COUNTY, CALIFORNIA
TECHNICAL SPECIFICATIONS
MONITORING WELL INSTALLATION

**SECTION 1 SCOPE OF WORK: DESCRIPTION AND SPECIFICATIONS
OF WORK TO BE PERFORMED**

1.1 DESCRIPTION OF SERVICES

The Contractor shall perform the services under this contract according to the general scope of work described below and detailed technical specifications in the following sections.

1.2 WORK TO BE PERFORMED

The work to be performed under this contract generally consists of furnishing equipment, materials, and labor required to drill and install monitoring wells on the Chino Airport property (Airport). The Airport is located at 7000 Merrill Avenue, Chino, California, in San Bernardino County (the County). Figure 1 presents a general vicinity map, and Figure 2 shows the site plan. Up to up to six (6) borings will be advanced using hollow-stem auger (HSA) drilling equipment at depths to approximately 120 feet bgs, and a monitoring well will be installed within each borehole. Up to six (6) proposed monitoring wells will be installed in Area of Concern (AOC) HH near Building A340 and AOC J-K (Figures 3 and 4). Tetra Tech, Inc. (Tetra Tech) will mark final drilling locations and provide field supervision, drilling oversight, and sampling and analysis on behalf of the County. Work will not take place without the Tetra Tech field representative on-site. Prior to finalizing any monitoring wells, a final inspection will be conducted by Tetra Tech. For this task, drilling and well installation will include the following general items:

- Mobilization of equipment and support vehicles to the Airport – all drivers on the Airport must have current Airport driver training and gate access prior to start
- Managing offsite investigation derived waste (IDW) disposal of drill cuttings and fluids, including delivery/pickup/rental and management of storage containers on the Airport
- Providing site security during drilling and well installation activities, if necessary
- Performing equipment cleanup, demobilization, and site restoration and decontaminating all drilling equipment

Work not included in this contract includes:

- Well permitting
- Obtaining right of entry (ROE) agreements or City right-of-way (ROW) permits
- Oversight by field geologist
- Laboratory analytical testing

1.3 TECHNICAL APPROACH

The Contractor must be a California C-57 licensed driller. Drilling will be performed using the HSA drilling method meeting the requirements specified herein. The Contractor will have the capabilities and available drill pipe and other equipment to drill up to a 10-inch borehole and should be equipped with a truck mounted HSA rig capable of producing 22,000 foot-pounds of rotary torque or greater (e.g., CME-85 or equivalent). Onboard engines must have current United States Environmental Protection Agency (EPA) Tier 3 emissions and South Coast Air Quality Management (SCAQMD) certification, as applicable.

All field activities will conform to city, county, state, and any other applicable regulatory agency requirements. Well installation procedures will follow guidelines from the California Department of Water Resources (DWR) Well Standards Bulletins 74-81 and 74-90 (1981, 1991) with applicable updates and Statewide Advisory: Sealing Materials for Water Wells, Monitoring Wells, Cathodic Protection Wells, and Geothermal Heat Exchange Wells (2015). The Contractor will prepare applicable well completion forms in accordance with DWR, submit to Tetra Tech for review, and file with DWR upon approval.

1.3.1 Permitting

Before field activities commence, Tetra Tech will submit well installation permits on behalf of the County. Well installation activities will not be conducted within the City ROW, and encroachment permitting is not anticipated.

1.3.2 Waste Management

The Contractor will furnish equipment, materials, labor, and supervision required to store, profile, and dispose of IDW produced during the well installation, as further discussed in Section 6. The Contractor will provide for the following items:

- Delivery of two (2) closed-top 20-cubic-yard bins for storage of soil cuttings
- Delivery of one (1) 10,000-gallon tank for storage of water generated
- Profiling and manifesting soil and water generated during well installation
- Transportation and disposal of IDW under manifest to treatment/disposal facility
- Cleanout of water tank and removal upon completion of use

1.4 DOCUMENT ORGANIZATION

The work to be completed as described in the SOW shall be performed in accordance with the following specifications included in this document:

Section 2	Mobilization, Site Restoration, and Demobilization
Section 3	Site Safety and Maintenance
Section 4	Drilling and Well Installation
Section 5	Site Protection and Security
Section 6	Waste Management

TECHNICAL SPECIFICATIONS

SECTION 2 MOBILIZATION, SITE RESTORATION, AND DEMOBILIZATION

2.1 RELATED WORK SPECIFIED ELSEWHERE

- Site Safety and Maintenance
- Drilling and Well Installation
- Site Protection and Security
- Waste Management

2.2 DESCRIPTION

Mobilization shall consist of preparatory work and operations, including but not limited to those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site and designated staging area. Site restoration shall consist of cleaning, collecting, and removing all debris from the construction area and any minor grading to restore the site to its original condition. Site restoration may include concrete or asphalt repairs or replacement, placement of sod and/or vegetation, and repairs of anything damaged by the Contractor.

The Contractor shall arrange a mobilization schedule with the County at least 10 days prior to initiation of work, decontaminate all equipment and tools prior to arrival onsite, and set up equipment at the staging location designated by Tetra Tech and the County.

Demobilization shall consist of post site activity work and operations, including, but not limited to, those necessary for the removal of personnel, equipment, supplies, and incidentals from the project site. Upon leaving the site at the completion of work, the Contractor shall clean and decontaminate tools and equipment in accordance with Section 3 "Site Safety and Maintenance." Solid and liquid waste from the final decontamination shall be disposed of as specified in Section 6 "Waste Management."

The Contractor shall arrange a demobilization schedule with the County at least five (5) days prior to completion of work. The Contractor shall clean all equipment and tools prior to leaving the site. Demobilization shall be completed within 10 days of the Contractor's final site restoration activities.

2.3 STAGING AREA

To the extent practical, drilling and staging locations will be selected by Tetra Tech and the County to allow ready access and minimal disruption of site activities and impacts to surrounding environmental conditions. A staging area will be designated for storage of drill cuttings and purge water, portable toilet, and well materials. The staging location will be determined based on access and available space and impacts to vegetation and wildlife. It is anticipated that equipment, supplies, and IDW containers may be staged near work area. However, if the area is insufficient, an alternate staging area may be designated before work commences. As needed, portable toilet facilities shall be supplied by the Contractor and shall be onsite prior to beginning work.

2.4 WORKING HOURS

A Tetra Tech representative must be onsite during all phases of well installation activities. Typical workdays shall be approximately 10 hours in duration between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday or as specified. No work shall be performed on major holidays.

Standby time will only be charged if delays during drilling are caused by Tetra Tech or the County. Standby time will not be charged to the County for any delays caused by the Contractor or any of their subcontractors. Standby time will not be charged for delays caused by difficult drilling conditions or health and safety-related meetings, tailgate briefings, or work stoppage due to health and safety concerns or incidents. Standby time will not be charged for delays in sampling caused by the formation (i.e., slow recharge conditions).

2.5 SITE RESTORATION OF WORK AREA

The Contractor shall avoid surface or subsurface contamination of all drilling sites. The Contractor shall not dump water, waste oil, rubbish, or other deleterious materials on the ground. The site will be inspected daily by the Contractor to remove trash and miscellaneous debris and enforced by the on-site Tetra Tech representative.

Upon completion of work, the Contractor shall remove all equipment, unused materials, temporary storage containers, roll-offs used to containerize drill cuttings and/or development water, temporary facilities, and other miscellaneous items resulting from or used in the operation, unless otherwise approved by the on-site Tetra Tech representative.

The Contractor shall restore drilling site and staging area to conditions at least equal to those existing prior to work on the project to the satisfaction of Tetra Tech and the County. All private and public property affected by Contractor's operations shall be restored to conditions of improvement at least equal to those prevailing prior to work on the individual sites. Restoration shall include cleanup of the work areas, repair, or replacement of any pavement (asphalt or concrete), placement of sod and/or vegetation, repair of irrigation piping damaged during the work, and any other activity necessary to restore the site to like original conditions. Restoration shall be complete prior to or concurrent with demobilization. If required, a punch list will be prepared by the on-site Tetra Tech representative specifying work required for site restoration.

TECHNICAL SPECIFICATIONS
SECTION 3 SITE SAFETY AND MAINTENANCE

3.1 RELATED WORK SPECIFIED ELSEWHERE

- Mobilization, Site Restoration, and Demobilization
- Drilling and Well Installation
- Site Protection and Security
- Waste Management

3.2 HEALTH AND SAFETY

The Contractor shall follow safety procedures while on the project site as specified in the Site-Specific Health and Safety Plan. The Contractor shall submit health and safety documentation for all personnel utilized for drilling and well installation including but not limited to the following:

- 1) Certification of 40-hour Hazardous Waste Emergency Response (HAZWOPER) training
- 2) Current 8-hour HAZWOPER refresher training
- 3) Medical fit-for-duty and respiratory evaluation letter signed by a physician
- 4) Training certification for forklift or other equipment operation as applicable

3.3 PERSONAL PROTECTIVE EQUIPMENT

Contractor field personnel shall wear Level D personal protective equipment (PPE) including hard hats, safety glasses, safety-toe boots, ear protection, and chemical resistant gloves. Level D will be the minimum required protection level at all times for personnel within the work zone. Upgrades to PPE may include splash protection such as suits and additional eye/face/skin protection if warranted. Chemical hazards anticipated during site activities should be minimal but additional levels of PPE may also include chemical resistant coveralls, boot covers, and/or respiratory protection. The Contractor will be responsible for ensuring that all personnel working on site have current HAZWOPER training and Level C PPE including respirators with organic vapor cartridges and current fit testing documentation.

3.4 SITE TRAFFIC CONTROL

Contractor is responsible for site traffic control and safety. Contractor will maintain through traffic and protect the work area at all times. Contractor shall conform to San Bernardino County Airport Operations Area training and equip overhead booms with lighting and/or airport flagging in accordance with Airport regulations at all times while performing work on the Airport property. All drivers on the Airport must have current Airport driver training and gate access prior to start.

TECHNICAL SPECIFICATIONS

SECTION 4 DRILLING AND WELL INSTALLATION

4.1 RELATED WORK SPECIFIED ELSEWHERE

- Mobilization, Site Restoration, and Demobilization
- Site Safety and Maintenance
- Site Protection and Security
- Waste Management

4.2 SUBMITTAL

The Contractor shall submit documentation and specifications for all materials used during drilling, construction, and development including but not limited to the following:

- 1) Certification of the quality of the casing, screen materials, and fill materials to be used for well installation and compliance with these specifications
- 2) Certification of the quality of the grout mix design ingredients and compliance with these specifications
- 3) Documentation of a current State of California C-57 license
- 4) Documentation of health and safety certification (see Section 3.2) and compliance with Tetra Tech's Site-Specific Health and Safety Plan for all site personnel

4.3 PRE-FIELD ACTIVITIES

Final boring locations will be determined and marked in the field by Tetra Tech prior to and/or during mobilization. Tetra Tech will coordinate all necessary permitting, Underground Service Alert (USA Dig Alert) notifications, and geophysical surveying as applicable.

4.4 DRILLING EQUIPMENT

Prior to mobilization, the Contractor shall certify that all equipment and materials being supplied by them are in good working order and suitable for the specified scope of work. The Contractor shall submit a copy of all required operating permits, such as SCAQMD permits, for any subject equipment, including verification that the serial number on the permit matches the equipment. The Contractor shall provide the HSA drilling rig meeting the requirements specified in Section 1.3 of these Technical Specifications complete with all tooling, accessories, power, water, and any other necessary equipment for completion of the work. The Contractor shall provide personnel trained and experienced in operating the HSA rig in a safe and efficient manner. The Contractor shall perform and document daily inspections of the drill rig and support vehicles to check for leaks. Any leaks identified by the Contractor shall be reported to the on-site Tetra Tech inspector and repaired immediately or be taken out of service. Any equipment found by the on-site inspector to be unsuitable for work shall be replaced at the Contractor's expense.

4.5 BOREHOLE DRILLING AND SAMPLING

Drilling of each boring and construction of monitoring wells will be completed using the Contractor-supplied HSA drilling rig. Immediately prior to drilling, each location shall be hand-augered by the Contractor using three points to a depth of six (6) feet bgs and width at least 4-6 inches greater than the diameter of the largest outer drill casing utilized.

The total depths of the boreholes are anticipated to be to approximately 120 feet bgs. The drilling contractor shall have sufficient drilling capacity on site to drill 10-inch borings to 200 feet bgs. During borehole drilling, soil samples will be collected at a minimum every five (5) feet using an 18-inch split spoon sampler. Additional samples may be collected back-to-back using the 18-inch split spoon sampler or a 5-foot continuous core barrel at the discretion of the on-site Tetra Tech geologist.

Groundwater samples will be collected using a drive-point sampler (e.g., Hydropunch® or equivalent) at approximately 10- to 20-foot intervals below the water table at the depths specified by the on-site Tetra Tech geologist. Up to five (5) groundwater samples per borehole are anticipated.

4.6 RECORDKEEPING

A record shall be maintained of any variation in the addition and quantity of chemical products during well installation activities. The depth at which such modifications are required shall be documented in the Contractor daily reports, copies of which shall be supplied to the on-site Tetra Tech representative daily.

4.7 MATERIALS

All downhole materials to be used during the performance of the work must be clean, reagent-free, and certified for use in water wells by the National Sanitation Foundation (NSF). Downhole materials shall conform to standards specified in the DWR Well Standards Bulletins 74-81 and 74-90 with applicable updates and the Statewide Advisory for Sealing Materials for Water Wells, Monitoring Wells, Cathodic Protection Wells, and Geothermal Heat Exchange Wells. Contractor shall have all materials onsite to complete the well installation, shall be able to procure and deliver all required materials to the site, and shall not charge for any materials not used. All materials must be inspected by the Contractor representative prior to performing work. The Contractor shall provide certification of quality of all concrete mix design ingredients, including admixtures with supporting test data, mill quality control results, and all information specified. The Contractor shall provide manufacturer's certification that well materials and wellhead completion materials meet or exceed minimum requirements as specified.

4.7.1 Well Casing

Blank casing for the installation of monitoring wells shall be seamless, 4-inch SCH 80 PVC with flush-threaded joints sealed with O-rings. During installation the casing shall be suspended at all times with casing clamps and shall not be allowed to rest on the bottom of the borehole at any time. Casing must be new and wrapped in plastic to keep from contacting the ground surface or any potential contaminants. Use of glue or solvents will not be allowed for well construction.

4.7.2 Well Screen

Well screens will be continuous-slot (wire-wrapped) type 304 or 316 stainless steel with 0.020-inch (0.5-mm) slot size or other slot size as specified by Tetra Tech based on field conditions.

Well screens will be 20 feet in length and may change depending on site conditions observed while drilling. Stainless steel wire-wrapped screen shall be installed across designated intervals in 10- or 20-foot lengths. Final sizing and material specifications and completion intervals for the well screens will be provided to the driller by Tetra Tech following the drilling of each borehole.

4.7.3 Stainless Steel End Cap

The stainless-steel well screen in each well will include a 4-inch-diameter stainless steel cap specifically manufactured as a bottom closure for the screen selected.

4.7.4 Filter pack

The filter pack material shall be washed, cleaned, bagged, and free of deleterious or organic material. It is anticipated that the primary #2/12 mesh silica sand will be used or an alternate mix for site-specific design, as specified by Tetra Tech. The transition sand (secondary filter pack) shall be clean, washed, and bagged #0/30 mesh silica sand or finer. Primary and secondary materials may be modified to suit the aquifer characteristics, under direction of Tetra Tech.

4.7.5 Bentonite Aquifer Isolation Seal

The bentonite aquifer isolation annular material shall consist of pure granular sodium bentonite. For applications requiring installation of seals beneath the water table, medium bentonite chips or coated pellets may be utilized. Bottom-hole abandonment seal (if needed) may also consist of medium bentonite chips or coated pellets. Bentonite will be allowed to hydrate according to manufacturer's specifications prior to emplacement of annular seal.

4.7.6 Grout Specifications/Annular Seal

Grout product and mixture specifications will follow the Statewide Advisory for Sealing Materials for Water Wells, Monitoring Wells, Cathodic Protection Wells, and Geothermal Heat Exchange Wells (DWR, 2015). Low-solids bentonite grout products are not approved for use within California. Grout mixture shall use the following proportions: The cement-sand slurry will consist of one 94-lb. bag of Portland Type II/V or American Petroleum Institute (API) Class A cement with 150 to 188 pounds of clean sand for every 7 gallons of potable water. Neat cement will consist of one 94-lb. sack of Portland Type II/V or API Class A cement to 7 gallons of potable water. Cement-bentonite slurry will consist of one 94-lb. sack of Portland Type II/V or API Class A cement with 2.5 pounds powdered bentonite to 7.5 gallons of potable water.

4.7.7 Wellhead and Access Box

The surface completion of each well will be installed with a flush-mount well box (e.g., EMCO Wheaton® 12-inch cast iron flush mount assembly or approved equivalent). Where asphaltic pavement or concrete is to be removed for wellhead installation and where pavement or concrete is to be replaced or resurfaced, the Contractor shall conform to any local requirements pertaining to such installations. No asphaltic pavement or concrete shall be removed or replaced in the absence of the Tetra Tech representative.

4.8 WELL CONSTRUCTION

It is estimated that the monitoring wells will be screened across the water table with at least 15 feet of screen submerged (depending on lithology and other observations by the onsite geologist during drilling). Well construction activities, including the installation of construction

tremie pipe, blank well casing, and well screens, shall be completed after drilling and finalization of well design. The final specification for construction and annular materials for each location will be provided to the driller by Tetra Tech upon completion of drilling each borehole. The final well completion intervals will be determined following drilling of each borehole to total depth.

All annular fill materials, including filter pack, and bentonite seal, shall be emplaced into the annulus via tremie method unless otherwise authorized by a Tetra Tech representative and in compliance with well standards. Construction tremie pipe may be installed in the boreholes prior to addition of backfilling materials. Tremie pipe shall be of standard, uniform lengths with threaded, box and pin joints. The tremie pipe shall be placed in the borehole such that its position during use does not wash out the borehole walls or displace the construction materials beneath it. The tremie pipe shall be positioned such that annular fill materials are not allowed to segregate during placement, and free falling of the annular fill is minimized.

All well casing and screen shall be joined with flush-threaded connections, as specified in the final design. In addition, individual lengths of casing shall be specified in the final design as "shoulder to shoulder" after connection. Each section of well screen and casing shall be accurately measured and numbered in the sequence of installation. A 4-inch diameter stainless steel threaded end cap will be placed on the bottom of the well screen.

The casing string and screen shall be installed as a single unit within each borehole, plumb and centered in the hole. There shall be a minimum of 3 inches of annular space between the casing or screen and the borehole wall. If, for any reason, the well cannot be landed in the correct position, or at a depth acceptable to Tetra Tech, the Contractor shall drill another hole immediately adjacent to the original location. The abandoned borehole shall be sealed in accordance with County and State requirements. If the casing/screen should fail prior to completion, it shall be withdrawn and replaced by the Contractor.

Filter pack sand (and all annular fill material) shall be placed by means of the tremie method in the annulus between the well casing and the borehole wall from approximately 1-foot below the screened interval to 2 feet above the top of screen. Installation of filter pack using tremie pipe may require the use of a piston-type gravel pump (P pump) or its equivalent. A transition sand shall be placed above the primary filter pack. The transition sand is intended to isolate the bentonite aquifer and seal material from the primary filter pack. The transition sand shall be #0/30 sand and shall be a minimum thickness of 1-foot. To prevent borehole collapse, filter pack and transition sand shall not be allowed to gravity fall more than 5 feet from the end of the tremie pipe or at any depth greater than 30 feet bgs.

Fresh potable water may be introduced through the tremie pipe during the filter pack installation to assist in the proper placement of the filter pack. When the desired depth of the filter pack material has been reached, a snug-fitting surge tool will be used inside the well screen to consolidate the filter pack. This procedure is intended to ensure that the appropriate volume and thickness of filter pack is installed in the annulus and to break down any bridging or voids in the material. Filter pack placement and swabbing will continue until no further settlement can be measured and the top of the filter pack is at the designed depth as determined by the Tetra Tech on-site inspector.

A bentonite aquifer isolation seal shall be placed in the annular space to isolate the screened interval and backfill the remaining annulus to near surface. The seal shall be a minimum of 3-feet in thickness. The seal shall be placed above the screened interval from the top of the transition sand and hydrated using potable water, with enough time elapsed to ensure complete

hydration. Care shall be taken not to displace the bentonite in the annular space when adding water to hydrate the bentonite in place.

After the bentonite seal has hydrated, the remaining annulus will be grouted using a cement-sand slurry, neat cement, or cement-bentonite slurry. The slurry will be pumped into the borehole using tremie pipe from the bottom up and allowed to settle, thus ensuring the integrity of the seal. The grout backfill shall extend from the top of the bentonite seal to near ground surface. All slurry shall be pumped through a tremie pipe to the bottom of the annulus, and pumping shall continue until the slurry has returned to the surface to ensure that the borehole is completely grouted and surface contaminants will not enter the annulus. Excess grout shall be removed and cleaned from the site prior to installing the surface completion. All newly installed wells shall be checked 24 to 48 hours after grout emplacement to determine whether curing is occurring properly. If settling has occurred, a sufficient amount of grout shall be added to fill the borehole to near ground surface.

The top of the casing shall be notched on the high point of the casing or on the north side for use as a surveying and water level measurement datum point, and the casing shall be sealed with a locking, vented well cap with an expandable seal (e.g., J-plug). For well head completion, cast-in-place concrete shall be ready-mixed with a maximum of 2- to 4-inch slump. The concrete pad shall be a minimum 24 by 24-inch, sloped away from the well casing, and a brass well tag shall be set flush into the corner of the concrete pad or apron in wet concrete as directed. The well number will be clearly marked on the well box cover by stamping the inside of the well box lid using a stamped tap. To facilitate drainage of surface water within the wellhead assembly, ¾-inch gravel bedding shall be firmly tamped around the top of the well casing and made smooth and level. The gravel bedding will be installed to a thickness of no more than 6 inches. The gravel shall be in contact with the surrounding native soil via the borehole walls. The well box skirt shall rest firmly on the gravel bed so that the top of the well box is approximately 1 inch above the surrounding ground surface. A Sonotube® concrete form or equivalent shall be placed around the well box and filled with concrete to form a minimum 4-inch-thick concrete apron finished to the existing grade with positive drainage away from the wellhead, unless otherwise directed by the enforcing agency. For a 12-inch well box, a 30-inch diameter Sonotube®/form is required. A minimum 3-inch vertical clearance will be maintained between the top of the well casing cap and the bottom of the lid assembly.

4.9 PLUMBNESS/ALIGNMENT OF THE WELLS

A test to determine the plumbness and alignment of the piezometer casing and screen may be requested by Tetra Tech subsequent to completion of each well and before its acceptance by Tetra Tech. Alignment of the casing shall be demonstrated by lowering a 10-foot-long dummy or bailer into the wells. The dummy shall consist of a rigid spindle of extra heavy pipe with three rings rigidly fixed to the pipe so that they cannot move longitudinally along the pipe. The rings shall be cylindrical and shall be placed one at each end of the dummy and one ring in the center. The rings shall be constructed of a material that will not damage the interior of the casing or screen while being lowered or raised.

4.10 WELL DEVELOPMENT

No sooner than 48 hours after completion, all newly installed wells will be developed to remove residual sediments and maximize flow of groundwater through the filter pack and screen. Monitoring wells will be developed using a variety of methods, including bailing, surging, and pumping/surging, depending on well depth and physical conditions, until wells are essentially

sediment-free. Development water will be containerized at the designated staging area for subsequent profiling and disposal, as further discussed below.

The purpose of development is to transmit direct mechanical energy within the screened intervals to remove residual drilling solids and formation particulate. Wells will be developed until the discharge water yields a turbidity value of less than 5 nephelometric turbidity units (NTUs) or until the turbidity has stabilized as determined by the Tetra Tech on-site inspector. Development of individual screened intervals may be completed with a fitted surge block, an airlift isolation tool, pumping, or a combination of these methods.

Step tests may be performed at each well using a submersible pump provided by the Contractor. Pumping shall begin at moderately low rates and be gradually increased to sufficiently stress the aquifer while water level measurements are being recorded. Pumping rates will be determined on a case-by-case basis. As the development water becomes sufficiently clear and visibly free of suspended particles, pumping shall cease periodically to surge the filter pack and loosen residual particulate in the filter pack sand and surrounding formation. A cycle of pumping and surging shall be continued until the discharge from the wells meets the required turbidity measurement (≤ 5 NTU). Development water will be containerized for subsequent profiling and disposal in accordance with specifications outlined in Section 6.

4.11 BOREHOLE BACKFILLING AND DESTRUCTION

If a borehole reaches the maximum depth to be determined by the results of drilling and sampling and depending upon the final well design provided by the on-site representative, backfilling may be required to seal the borehole up to a specified depth. Bottom borehole backfilling will use pure bentonite chips or coated pellets to reach the desired depth in which the piezometer will be installed.

If any well fails to conform to this Statement of Work, it shall be considered an abandoned hole, and the Contractor shall immediately start a new borehole at a nearby location designated by the on-site County representative.

Borehole/well destruction shall be treated as follows:

- 1) The Contractor may salvage as much casing and screen from the initial well as possible and use it in a new well if inspected and accepted by Tetra Tech and decontaminated.
- 2) Salvaged material shall remain the property of the Contractor.
- 3) The borehole/well shall be abandoned in accordance with all State and County requirements.
- 4) The borehole/well shall be backfilled using the tremie method and pressure grouting from the bottom up, if beneath the water table or more than 20 feet in depth.

TECHNICAL SPECIFICATIONS

SECTION 5 SITE PROTECTION AND SECURITY

5.1 RELATED WORK SPECIFIED ELSEWHERE

- Mobilization, Site Restoration, and Demobilization
- Site Safety and Maintenance
- Drilling and Well Installation
- Waste Management

5.2 SITE PROTECTION

The Contractor shall be solely responsible for the safety, security, efficiency, and adequacy of the equipment, appliances, and methods employed during well installation activities, and for any damage, which may result therefrom. Whenever work is undertaken all work shall be accomplished to cause the least amount of disturbance and a minimum amount of damage.

The Contractor shall protect and maintain all underground and above ground utilities and structures affected by the work and all lawns, shrubs, trees, fences, rockeries, etc., and parking strips on property crossed by or adjacent to the operation. Any damage shall be repaired and restored by the Contractor to the satisfaction of the County. The Contractor shall be responsible for all damages to roads, ditches, bulkheads, walls, bridges, culverts, utilities, barricades, lights, or other property, caused by the Contractor's work, whether such damage is at the sites of work or caused by transporting or hauling to or from the work sites. The Contractor shall repair or replace or arrange for the repair or replacement of all such damage to the satisfaction of the County. Any material damaged by the Contractor shall be replaced with new material. Streets, roads, adjacent property, and other works shall be protected throughout the work.

All equipment, including drilling rigs, augers, bits, and any other equipment brought onsite by the Contractor, shall be washed and cleaned as approved by the Tetra Tech representative prior to initiation of work and before leaving the site upon completion of work. The Contractor shall provide all necessary equipment for decontamination such as phosphate-free detergent (i.e., Micro-90), high pressure washer, buckets, brushes, ground coverings, etc.

5.3 SITE SECURITY

Site security for Contractor's equipment and materials remaining onsite or within the staging areas during performance of the designated scope of work shall be the sole responsibility of the Contractor. The Contractor shall use reasonable measures at all times during the progression of work to prevent vandalism or destruction of staged supplies and materials and boreholes security, including prevention of the introduction of foreign matter into the well casing or the borehole. The Contractor shall be responsible for any objectionable material that may fall into the well until the completion and acceptance of the work by the on-site inspector.

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SECTION 6 WASTE MANAGEMENT

6.1 RELATED WORK SPECIFIED ELSEWHERE

- Mobilization, Site Restoration, and Demobilization
- Site Safety and Maintenance
- Drilling and Well Installation
- Site Protection and Security

6.2 SPECIFICATIONS

Containers for soil and groundwater will be delivered by the Contractor to staging location as directed by the Tetra Tech representative and the County. The Contractor shall provide temporary storage of drill cuttings (hopper) and well fluids (portable tank/trailer) for transfer to IDW containers. Contractor shall arrange for the storage (up to 30 days) of waste material including drilling and decontamination fluids and drill cuttings. Contractor is responsible for disposing all other waste items such as well housing and other bulk items, miscellaneous trash, rubbish, and PPE utilized during the work.

6.3 PROCEDURES

Contractor shall provide for the appropriate disposal of all miscellaneous trash and wastes generated as a result of any services specified in this scope of work. Disposal methods must be approved and confirmed by the Tetra Tech representative and the County. All wastes shall be disposed of in accordance with county, state, and federal regulations. Contractor shall provide for the temporary storage and transportation to the staging area for all development and decontamination fluids and soil cuttings generated from services specified in this scope of work.

Two (2) closed-top 20-cubic-yard soil bins for storage of soil cuttings and one (1) 10,000-gallon tank for storage of purge water from well installation and development activities will be delivered to the staging area designated by the County. The Contractor will provide all equipment and personnel to place and set up waste storage containers in the locations as directed by the on-site Tetra Tech representative. The bin must be lined with 6-mil plastic liners designed for use in 20-cubic-yard bins prior to the start of drilling.

The on-site Tetra Tech representative will collect soil and water IDW samples and provide analytical data to the Contractor for profile and manifest documentation. The Contractor will dispose of trash and provide transportation and disposal services under manifest as non-hazardous waste at a minimum to an approved treatment/recycling/disposal facility for soil and water. The Contractor shall follow and obey all local, state, and federal rules governing the transport and disposal of waste, including but not limited to California and Federal Department of Transportation and SCAQMD Rule 403, governing items such as freeboard, spillage, and use of tarps/covers. Contractor will provide all equipment and personnel and shall pressure wash the empty water tank prior to transportation offsite after work is complete.