February 2025

TECHNICAL SPECIFICATIONS

Construction, Development, and Testing of Well 11B02

Prepared for:

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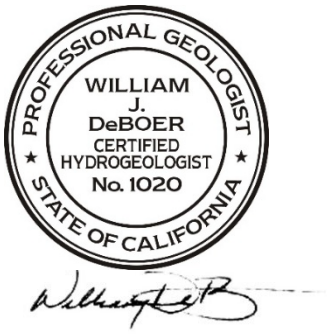

MONTGOMERY & ASSOCIATES

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1 GENERAL SPECIFICATIONS

These technical specifications describe the minimum standards for completion and acceptance of the work described herein and serve as the basis for bidding. The term CONTRACTOR is used herein to refer to the drilling contractor, their subcontractors and subconsultants; the term AGENCY is used to refer to Monterey County Water Resources Agency, their designated representative, or consultant. The technical specifications establish minimum requirements to be met.

1.1 Summary of Work

The work to be conducted by CONTRACTOR includes the furnishing of all labor, material, tools, supplies, equipment, transportation, appurtenances, and services—unless specifically excluded herein—necessary to complete the installation, development and testing of Well 11B02 (Section 2) as described herein. The work site is located near Rodgers Road in Salinas, Monterey County, California.

The following figures are provided in support of these technical specifications:

- Figure 1. Site Location Map
- Figure 2. Site Features
- Figure 3. Preliminary Schematic for Well 11B02
- Figure 4. Pump Pad Schematic

The pilot borehole shall be advanced to a depth 750 feet below ground surface (bgs) to confirm site geology and perform downhole geophysical surveys. AGENCY will provide CONTRACTOR a final well design for construction within 48 hours of receipt of the downhole geophysical results and formation sieve results.

1.2 Performance Requirements

These performance requirements are intended to objectively measure the suitability of the well for the intended purpose. CONTRACTOR shall be solely responsible for meeting the performance requirements for plumbness (Section 2.23), cement bond log (Section 2.24), and video survey (Section 2.25).

If the well does not meet these performance requirements CONTRACTOR shall, at their own expense, do all work necessary to cause the well to meet the performance requirements. If the well does not meet performance requirements after such efforts, AGENCY may reject the well. If rejected, CONTRACTOR will be responsible for appropriate destruction of the rejected well and installation of a new well at their sole expense.

1.3 Performance Objectives

AGENCY endeavors to achieve the following outcomes for Well 11B02: CONTRACTOR is specifically not responsible for meeting these outcomes.

Sand Content: Sand content of pumped water shall be measured at the design capacity of the well unless otherwise determined by AGENCY, and shall be measured with a centrifugal ("Rossum") sand sampler in accordance with ANSI/AWWA A100-20. The target average sand content of water pumped over any five (5)-minute period is equal to or less than five (5) parts per million (ppm) over the first 30 minutes of pumping, and thereafter equal to or less than one (1) ppm.

Turbidity: Turbidity of pumped water shall be measured at design capacity of the well unless otherwise determined by AGENCY. The target turbidity of pumped water is equal to or less than five (5) NTU.

Yield: The target sustainable design capacity of the well is 2,000 gallons per minute.

While not responsible for meeting these outcomes, AGENCY intends to work collaboratively with CONTRACTOR to achieve these goals. CONTRACTOR is encouraged to discuss any worries regarding the final well design or other aspects of the project if they are concerned with achieving these desired outcomes. Similarly, CONTRACTOR is encouraged to support AGENCY with additional work to achieve these goals. Any additional work and cost impacts shall be coordinated with and approved by AGENCY in writing prior to being performed.

1.4 Site Conditions

Well 11B02 will be located approximately 55 feet to the east of existing Well 11B01, as shown on Figure 2. The well site encompasses private property on Rodgers Road to which the AGENCY has been granted both a long-term well easement and a temporary construction easement, both of which are shown on Figure 2, with a rectangular working footprint approximately 100 feet by 150 feet. The AGENCY will survey and mark the extent of both easements prior to start of work.

The site is accessible by heading South on Rodgers Road from Espinosa Road. Rodgers Road makes a sharp turn to the west and continues for approximately 0.8 mile before turning to the southwest. The Well 11B02 location is approximately a quarter mile past this bend to the southwest. Rodgers Road is a public right-of-way and must remain open to traffic during construction. It is not a through street; CONTRACTOR will need to enter and exist as described via Rodgers Road by way of Espinosa Road. The site is currently composed of existing well 11B01 and its related infrastructure.

CONTRACTOR shall keep all work activities, materials, and equipment within the work area as surveyed in the field by the AGENCY, unless otherwise approved by the AGENCY. No work activities, material storage, or equipment staging shall occur outside of the easement.

Overhead electrical power lines are located near the work site. CONTRACTOR shall maintain clearances in accordance with applicable laws and utility company requirements. CONTRACTOR shall be responsible for notifying Underground Service Alert (USA) at 800-642-2444 prior to any digging. The CONTRACTOR shall bear all responsibility and cost for determining the location of all utilities found on the work site prior to any digging.

The well site and CONTRACTOR work area is within actively farmed, privately owned agricultural fields, actively used private farm roads, privately owned and operated irrigation and electrical equipment, and public utility facilities. CONTRACTOR shall fully cooperate with farm personnel to allow access to private lands and facilities and utility personnel to allow access to public utilities within and adjacent to the work site and staging area for their respective essential duties.

CONTRACTOR shall be responsible for protecting existing facilities from damage caused by the work. CONTRACTOR shall be responsible for repairing any damage to such facilities caused by CONTRACTOR's personnel or equipment. Privately grown crops exist immediately adjacent the work area and the CONTRACTOR shall be responsible for reimbursing the grower for any damage to crops, soils, or structures caused by CONTRACTOR's personnel, equipment, or performance of work occurring outside of the easement.

1.5 Schedule and Working Hours

A project baseline schedule is required prior to beginning mobilization to the site, and updates to the baseline schedule are due the first Friday of each month. Project 3-week look-ahead schedules are due weekly on Fridays.

In general, site activities shall progress chronologically in the order they are presented in these technical specifications. Deviations from this order require prior AGENCY approval.

To the extent feasible, construction activities shall be limited to daytime hours between 0800 and 1800, Monday through Friday. However, 24-hour operations are required during certain aspects of the installation process. Table 1 outlines the critical scope components and the anticipated work schedule of each.

Table 1. Anticipated Work Schedule

Bid Item No(s).	Activity	Anticipated Schedule		
		Daytime Hours, Mon through Fri[a]	24-hour Work Required[b]	Weekends allowable
1	Pre-mobilization and Mobilization	X		
2	Water Supply System	X		
3	Groundwater Discharge System	X		
4	Surface Casing and Sanitary Seal	X		
5	Intermediate Casing and Annular Seal		X	
6-8	Pilot Borehole Drilling, Geophysical Surveys, Backfill		X	X
9 and 10	Borehole Reaming and Caliper Survey		X	X
11-14	Furnish and Install Casing, Screen, Filter Pack and Transition Sands		X	X
15	Furnish and Install Annular Seal		X	
16	Initial Mechanical Development		X	X
17	Final Mechanical/Chemical Development[c]	X		
18 and 19	Test Pump Installation and Pumping Development	X		
20 and 21	Variable Rate Pumping Test and Constant Rate Discharge Test		X	
22 and 23	Dynamic Spinner Survey and Groundwater Sampling		X	
24	Test Pump Removal	X		
25-27	Gyroscopic, Cement Bond Log and Video Surveys	X		
28	Well Disinfection	X		
29	Surface Completion and Pump Pad Installation	X		
30	Demobilization and Cleanup	X		

Notes:
[a]Excludes Agency holidays unless specifically allowed
[b]Includes weekends when necessary
[c]24-hour schedule and/or weekend days may be allowable with Agency approval

Deviations from this schedule require prior AGENCY approval. Daytime work on Saturday or Sunday may be permitted when requested by CONTRACTOR and approved by AGENCY and is limited to the hours between 0800 and 1800.

1.6 Standards

CONTRACTOR shall follow procedures described in *State of California Water Well Standards, Bulletin No. 74-81* (December 1981) and *Bulletin No. 74-90* (June 1991), including any later supplements or revisions; Monterey County Ordinance Chapter 15.08 relating to water wells; California Environmental Quality Act (CEQA) mitigation requirements; and other California state agency guidance, which are incorporated herein by reference.

Materials used in this work must have applicable NSF/ANSI Standard 60 (Drinking Water Treatment Chemicals) and/or NSF/ANSI Standard 61 (Drinking Water System Components)

certifications, including but not limited to drilling fluid additives, disinfection chemicals, well steel and filter pack sands.

1.7 Contractor Responsibilities

CONTRACTOR shall submit applications, pay requisite fees, and obtain and comply with all appropriate permits required to complete the scope of work.

CONTRACTOR shall confine drilling and construction operations to AGENCY's easement.

CONTRACTOR is fully responsible for maintaining security of all work areas at all times. CONTRACTOR shall take such measures as are necessary to prevent access of unauthorized persons or animals onto the site. Such measures shall include fencing, posting of signs, temporary closure of excavations, or other means, including hiring private security as needed, and shall be maintained throughout the course of work. All barriers shall be in accordance with applicable site safety standards.

CONTRACTOR shall contain and dispose of construction-related trash, maintain an organized and safe work site, provide adequate sanitation facilities, and ensure vehicles leaving unpaved sites do not track mud onto public rights-of-way.

CONTRACTOR shall provide all necessary equipment, tools, and appurtenances for the timely completion of the work. CONTRACTOR's equipment shall be in complete and safe operating condition and shall be appropriately maintained and operated during the project.

CONTRACTOR shall be solely responsible for the condition of their equipment and shall maintain an inventory of necessary spare parts for the timely repair of equipment in the event of a failure or breakdown. No payment shall be made for standby time or equipment rental caused by a breakdown or failure of CONTRACTOR's equipment.

CONTRACTOR shall remove trackable mud, cuttings, sand, grout, and other materials from undercarriages, tires, and other surfaces of equipment prior to moving equipment on or across public roads and pathways. CONTRACTOR shall immediately clean public rights-of-way.

CONTRACTOR shall maintain copies of all project permits at the construction site.

CONTRACTOR shall at all times maintain the borehole in a sanitary manner and prevent potential entry of pests or contaminants.

1.8 Qualifications and Quality Assurance

CONTRACTOR shall hold a valid Class C-57 California CONTRACTOR's License.

1.9 Submittals

A list of required submittals is included with each Bid Item. In addition, CONTRACTOR shall be responsible for receiving acceptance for all required equipment and information referenced elsewhere in these technical specifications. All submittals required from CONTRACTOR shall be considered part of the scope of work. Submittals shall be reviewed and comments provided by AGENCY within 5 business days of receipt. All submittals are subject to acceptance by AGENCY; submittal requirements shall be satisfied upon acceptance.

All submittals shall be emailed to bdeboer@elmontgomery.com as 1 complete PDF per submittal. Submittal name shall be clearly included in the subject line; 1 submittal per email.

1.10 Sanitation

CONTRACTOR shall provide and maintain adequate sanitation facilities appropriate to the number of personnel working on the site.

1.11 Construction Water and Power

Water used for drilling purposes will be sourced from the existing Well 11B01, located adjacent to the proposed Well 11B02 location (Figure 2). CONTRACTOR will be responsible for conveyance of water to point of use in accordance with Section 2.2 of these technical specifications. Appendix A provides details for the existing Well 11B01.

CONTRACTOR shall provide all necessary power for completion of the work scope through temporary means such as generators.

1.12 Discharge of Generated Groundwater

Discharges shall be applied to the farm field south of the easement away from the well site in a manner that does not cause erosion or ponding (i.e. sprinklers, diffuser). CONTRACTOR shall collect water quality samples from the discharge water to ensure compliance. The turbidity of the water at the point of discharge shall not exceed 100 NTU, sand content shall not exceed the 2% maximum, and total residual chlorine concentration as measured in the field shall not exceed 0.1 milligram per liter (mg/L) unless otherwise approved by AGENCY.

Prior to beginning development, CONTRACTOR shall mobilize to the site a treatment system capable of treating water generated and discharged during well development activities to comply with turbidity, sand content and chlorine levels allowed. Conveyance of discharged water to the designated point shall be achieved using closed pipe; adequate energy dissipation, and erosion control measures shall be installed at the discharge point.

It is imperative that no delays occur during well development while still meeting the discharge requirements. CONTRACTOR shall mobilize a treatment system and sufficient on-site storage so that the well development process can progress continuously without delays due to discharge exceedances, lack of storage, or otherwise.

When turbidity of development water falls below 100 NTU with a sand content 2% or below and residual chlorine is less than 0.1 mg/L, development water can bypass the treatment system and be discharged directly to point of discharge.

1.13 Drilling Fluids Management

CONTRACTOR is responsible for the containment, hauling, and legal disposal of drilling fluids from the site.

1.14 Drilling Cuttings Management

Drill cuttings shall be in a managed pile within the construction area on site and will be disposed of by AGENCY at a later time.

1.15 Records

CONTRACTOR shall collect the measurements and keep records described in this section, as well as any required measurements or records described elsewhere in these Technical Specifications. All work conducted by CONTRACTOR to execute these Technical Specifications shall be recorded in the driller daily log and/or on approved forms. Requirements for field measurements and records include those listed below.

Driller's Daily Log: International Association of Drilling Contractors or American Petroleum Institute (API) standard daily logs, or similar, shall be maintained and used to record all site activities. Any hourly items shown in the Bid Schedule shall be clearly identified for quantity verification. The daily logs shall indicate personnel present; shifts worked; depths drilled, reamed, developed, or bailed; accurate depths, thicknesses, and nature of the strata penetrated; drilling rates; water levels; length of tremie pipe installed in well; volume and depth intervals cemented or sealed with bentonite; downtime due to equipment issues; and results obtained from any and all caliper surveys, borehole geophysical logs, etc.

Drilling Fluids and Makeup Water: CONTRACTOR shall obtain regular measurements of drilling fluid properties, which shall be monitored at a minimum frequency of every 4 circulation hours or every 100-foot drilled interval, whichever is more frequent, when drilling fluids are being circulated. All drilling fluid samples shall be obtained at the flow line where fluid enters and recirculates down the borehole. Records of drilling fluid properties shall be in accordance with the requirements of applicable sections.

Borehole Assembly: The measured length of each section of the drill pipe assembly shall be recorded and correlated with the depth drilled below ground surface. The outside diameter and type of each bit, reamer, hole opener, sub, drill pipe, etc., shall be recorded. The outside diameter of each bit, reamer, and hole opener must be measured on site and demonstrated to have an outside diameter within 5% of what is specified in the final well design prior to use, unless AGENCY approves otherwise.

Miscellaneous: Records shall include any notable event or activity including accidents, violations, visitors, weather conditions, etc.

CONTRACTOR shall maintain records on a regular basis and in a legible, professional format.

1.16 Noise Control

Sound walls are not required for this project. General best practice noise suppression efforts shall be implemented at all times to minimize disturbance to nearby residents, workers, and the general public. The work site shall be managed and arranged to minimize noise to the extent practicable, including use of mufflers, shielding, and by placing noise-producing equipment away from sensitive receptors, as feasible.

1.17 Spills, Leaks, and Releases

CONTRACTOR shall not cause the release of any hazardous or nuisance substances to the environment and shall use plastic sheeting or oil absorbent mats to protect the well site from spills of hydraulic oil, fuel, lubricants, or coolants from the drilling and support equipment. If a release occurs, CONTRACTOR shall contain and properly dispose of affected media and shall be responsible for all costs associated with remedial or corrective actions to mitigate the release. CONTRACTOR shall contact the relevant regulatory agency/agencies for appropriate reporting.

1.18 Foreign and Lost Material Downhole

The placement of any foreign material down the hole must be approved by AGENCY. This includes, but is not limited to, all drilling materials and fluids.

CONTRACTOR shall be responsible for all consequences of material lost down the hole. Every attempt shall be made by CONTRACTOR to retrieve lost material downhole within a timeframe and to the satisfaction of AGENCY. If the borehole becomes damaged as a result of this investigation in the opinion of AGENCY, CONTRACTOR shall properly abandon the borehole in accordance with permitting requirements and drill another borehole adjacent to the abandoned borehole at no additional expense to AGENCY.

1.19 Project Closeout

After completion of the work required in these specifications, CONTRACTOR shall remove all debris, waste, trash, and unused materials or supplies; shall remove all signs of temporary construction facilities such as temporary work areas, temporary structures, and stockpiles of materials; and shall restore the site, as nearly as possible, to its original condition. Final cleanup shall be completed per Section 2.28.

Upon completion of the scope of work and submittal of all specified submittals, AGENCY will perform final site inspections prior to release of final payment.

1.20 Payment

Costs for this project shall be defined by the completed and accepted Bid Schedule. The completed Bid Schedule shall be submitted by CONTRACTOR according to instruction from AGENCY.

Payment will be made according to the line items in the Bid Schedule based on the actual unit quantities expended as determined by AGENCY. Payment for lump sum items shall be made only upon satisfactory completion of the entire task.

2 WELL 11B02 CONSTRUCTION, DEVELOPMENT AND TESTING

In general, site activities shall progress chronologically in the order they are presented in these technical specifications. Deviations from this order require prior AGENCY approval.

The Well 11B02 location is shown on Figure 2, the preliminary well design is shown on Figure 3, and Appendix A contains supporting documentation for the existing site Well 11B01 (to be retained).

2.1 Pre-Mobilization and Mobilization (Bid Item 1)

CONTRACTOR shall mobilize and set up all material and equipment, and perform all labor required to perform the scope of work. Equipment needed for the first 30 days of work shall be on site at start of the work.

2.1.1 Submittals

The following submittals are required before beginning any site activities:

- Project baseline schedule (updates due the first Friday of each month)
- Project 3-week look-ahead schedule (updates due weekly on Fridays)
- Site Plan including a scale drawing with proposed site layout
- Well installation permit
- Other applicable permits, including but not limited to Underground Service Alert ticket(s)

Note the well installation permit will be provided to CONTRACTOR by AGENCY.

2.1.2 Materials

Well 11B02 shall be drilled by the flooded reverse-rotary drilling method with drilling equipment of sufficient capacity to drill the hole required by these specifications. Drilling equipment including, but not limited to, mast and drawworks, air compressors, drilling fluid pumps, drill pipe, etc., must be of requisite size, sufficient capacity, and suitable condition to drill and set casing to the anticipated depths.

The drill rig utilized must have the ability to fully lift and land the anticipated casing loads without the use of float plugs or other similar methods. All drill pipe must utilize threaded flush or upset tool joints, or equal, as approved by AGENCY.

2.1.3 Execution

CONTRACTOR's drilling equipment, temporary facilities, and operations shall be within the construction limits of the site. CONTRACTOR shall set up work facilities in a neat and orderly manner within the designated area.

2.2 Water Supply System (Bid Item 2)

As stated in Section 1.11, existing site Well 11B01 is to be used for construction water supply. Details regarding the condition of this well are provided in Appendix A. This well is not currently equipped with a pump. CONTRACTOR shall furnish all material and equipment and provide all labor necessary to extract water for project needs without causing project delays. CONTRACTOR shall supply and install a temporary pump, motor, cable, drop pipe, pump discharge head and all other accessories required to provide and establish the water supply. This bid item includes system installation, maintenance, and removal.

2.2.1 Submittals

The following submittals are applicable to this section:

- Pump information including type, depth, and capacity
- Temporary water storage plan
- Sand filtration methods

2.2.2 Materials

The following materials are applicable to this section:

- Temporary pump and all necessary accessories for pump installation and function including motor, cable, drop pipe etc.
- In-line digital flow meter registering in units of gallons per minute, together with a totalizer which reads in units of gallons, and capable of measuring pump discharge within plus or minus 5% of true flow rate
- Sand filtration mechanism or device

2.2.3 Execution

CONTRACTOR shall furnish and install a temporary pump, sand filtration, and above ground storage sufficient to provide necessary water for drilling activities. It is imperative that the system provides enough water to prevent any delays in the project.

CONTRACTOR shall take such measures as are necessary to prevent access to animals, debris, and other foreign objects into the well, and shall fully remove all installed material from the well at the conclusion of its use. Details of Section 1.18 additionally apply to Well 11B01.

2.3 Groundwater Discharge System (Bid Item 3)

CONTRACTOR shall furnish all material and equipment necessary to discharge pumped groundwater to the farm field south of the easement using sprinklers or AGENCY approved equivalent in a manner that does not cause erosion or ponding. CONTRACTOR is responsible for installing removing a system adequate to discharge flows between 400 and 3,000 gallons per minute. This bid item includes installation, maintenance, and removal of the system.

2.3.1 Submittals

- Discharge treatment system details including product data, drawings and dimensions
- Discharge Piping:
    - Size and length to conduct not less than 3,000 gpm water to discharge location and be approved by AGENCY
    - Include an in-line meter with 6-digit, straight reading totalizer, registering in units of gallons, together with a rate of flow indicator dial, which reads in units of gallons per minute and capable of measuring pump discharge within plus or minus 5% of true flow rate.
- Pumped Groundwater Discharge:
    - Tank(s): Provide sufficient size and construction to accommodate development discharge.
    - Pump(s): Provide sufficient size and horsepower to continuously pump stored discharge water as required from tank(s) to discharge point.
    - Layout: Diagram describing discharge layout, number and type of sprinklers (including flow and nozzle size)

2.3.2 Execution

CONTRACTOR is responsible for ensuring that no erosion or nuisance conditions result from pumping discharges. The discharge piping shall be installed to the satisfaction of AGENCY.

Coordinate with AGENCY to install and operate sprinkler system sufficient to handle discharge needs in a way that does not cause issues for the farming operation to the south or the AGENCY easement. CONTRACTOR is responsible for making sure the capacity of the system is sufficient to prevent delays in development and pump testing stages. CONTRACTOR is responsible for

maintaining an operational sprinkler discharge system and will not be compensated for any downtime resulting from an insufficient system.

2.4 Surface Casing and Sanitary Seal (Bid Item 4)

CONTRACTOR shall furnish all materials and equipment, and perform all labor required to install a permanent surface casing and place the sanitary seal. Surface casing borehole shall be advanced using bucket auger or similar methods.

2.4.1 Submittals

The following submittals are applicable to this section:

- Mill Certificate for Control Casing
- Type and content of proposed sealing material
- Concrete weight tickets upon delivery to the job site
- Valid welder certifications appropriate to the standards and positions required for casing installation

2.4.2 Materials

Spiral welded mild steel well casing material shall be composed of new material conforming to ASTM A-139 specifications. The surface casing shall have a minimum outside diameter of 42 inches, wall thickness of not less than ½ inch and length of not less than 50 feet. Unless otherwise approved by AGENCY and except for end pieces, all sections of casing shall be a minimum length of 20 feet.

Sealing material shall consist of batch plant mixed 10.3 sack sand cement grout consisting of a mixture of ASTM C150 Type II cement, sand, and water. Accelerators, retardants, bentonite, and other additives shall not be used without prior approval by AGENCY.

2.4.3 Methods

CONTRACTOR shall drill a minimum 54-inch diameter borehole to a minimum depth of 50 feet bgs. The borehole shall be sufficiently plumb and of sufficient diameter that the surface casing can be installed plumb, and with a minimum annular thickness of 3 inches around the entire circumference of the surface casing.

CONTRACTOR shall collect and preserve 1 set of drill cutting samples at 10-foot intervals during the drilling of the control casing borehole. Samples shall be placed in 1-gallon, heavy

weight, resealable plastic bags and labeled with the sample depth interval. Collected samples shall be stored in a manner to prevent breakage or loss.

CONTRACTOR shall be solely responsible for determining depth and diameter of surface seal required to ensure stability during drilling, to prevent upward or downward seepage of water or drilling fluids outside the surface casing, to prevent bypass of the surface seal by drilling fluids, and/or to prevent soil erosion beneath the drilling rig. CONTRACTOR shall be solely responsible for any damage caused by an insufficient or ineffective seal, or any additional work required to remedy any adverse condition created by an inadequate surface seal.

2.4.4 Placement

CONTRACTOR shall install the surface casing plumb and centered in the borehole.

Casing joints shall be watertight and shall be appropriate for the material used so that the resulting joint possesses the same structural integrity as the casing itself. Unless otherwise approved by AGENCY, all casing joints shall be welded in accordance with AWWA C206 and American Welding Society Standards, conducted by an AWS Certified Welder with valid and current certification for metal arc-welding on mild steel in the horizontal lap and horizontal groove weld positions.

Centering guides shall be no less than 2 inches wide, welded to the conductor casing, and include a minimum of 2 sets, each consisting of 4 guides (8 in total) equally spaced circumferentially around the casing. Guides shall be composed of the same material as the casing to which they are affixed and placed 5 feet from the top and bottom of the conductor casing.

Sealing material shall be placed in the presence of AGENCY and in compliance with permit requirements. CONTRACTOR shall notify AGENCY a minimum of 48 hours in advance of planned sealing material placement.

Sealing material shall be placed using the tremie method from the bottom of the borehole and shall be completed in a manner that prevents freefall, bridging, or separation. Placement shall be completed in 1 continuous operation from the bottom of the borehole to ground surface.

Upon installation of the sealing material and unless approved otherwise by AGENCY, CONTRACTOR shall not operate heavy equipment on the site for a minimum of 48 hours. The 48-hour curing period shall not be regarded as standby time.

Fluids displaced during placement of the conductor casing and sanitary seal operations shall be appropriately managed.

2.5 Intermediate Casing and Annular Seal (Bid Item 5)

CONTRACTOR shall furnish all materials and equipment, and perform all labor required to install a permanent intermediate casing and place the annular seal. Conductor casing annular seal shall be installed using the Bradenhead (squeeze cementing) method.

2.5.1 Submittals

The following submittals are applicable to this section:

- Mill Certificate for intermediate casing
- Type and content of proposed sealing material
- Concrete weight tickets upon delivery to the job site
- Name and qualifications of the proposed cement pumping subcontractor
- Valid welder certifications appropriate to the standards and positions required for casing installation
- The name and qualifications of the firm proposed for completing caliper survey
- Two field hardcopies of the caliper survey, which shall be also provided in a digital data format—both as PDF and LAS files—and shall have a vertical scale of fifty (50) feet per inch and horizontal scale appropriate to the log type and response values

2.5.2 Borehole Drilling

CONTRACTOR shall drill a 36-inch diameter borehole from the bottom of the surface casing (Section 2.4) to a depth of 350 feet below ground surface. The borehole shall be sufficiently plumb and of sufficient diameter that the intermediate casing can be installed plumb and meet the permit requirements for annular thickness.

CONTRACTOR shall collect and preserve 1 set of drill cutting samples at 10-foot intervals during the drilling of the intermediate borehole. Samples shall be placed in 1-gallon, heavy weight, resealable plastic bags and labeled with the sample depth interval. Collected samples shall be stored in a manner to prevent breakage or loss.

2.5.3 Caliper Survey

The CONTRACTOR shall furnish professional logging services for the caliper survey of the final reamed borehole.

The caliper tool must be of sufficient arm capacity to measure borehole diameters to 48 inches for the entire length of the reamed borehole. The caliper survey shall include calculations of the theoretical annular volumes required.

If the caliper survey shows the borehole to be less than the specified diameter(s) at any point or the final borehole is less than the specified depth, the borehole shall be re-reamed and re-surveyed at the CONTRACTOR's expense.

2.5.4 Intermediate Casing

Mild steel well casing material shall be composed of new material conforming to ASTM A-139 specifications. The intermediate casing shall have a minimum inside diameter of 28 inches with wall thickness of not less than 3/8 inch. Unless otherwise approved by AGENCY and except for end pieces, all sections of casing shall be a minimum length of 20 feet.

CONTRACTOR shall install the intermediate casing plumb and centered in the conductor casing borehole. The conductor casing shall be suspended in tension from the surface throughout installation.

Casing joints shall be watertight and shall be appropriate for the material used so that the resulting joint possesses the same structural integrity as the casing itself. Unless approved otherwise by AGENCY, all casing joints shall be welded in accordance with AWWA C206 and American Welding Society Standards, conducted by an AWS Certified Welder with valid and current certification for metal arc-welding on mild steel in the horizontal lap and horizontal groove weld positions.

Centering guides shall be no less than 2 inches wide, welded to the conductor casing and include a minimum of 2 sets, each consisting of 4 guides (8 in total) equally spaced circumferentially around the casing. Guides shall be composed of the same material as the casing to which they are affixed and placed 5 feet from the top and bottom of the conductor casing.

2.5.5 Cementing

Sealing material shall consist of API Class G cement grout or AGENCY approved equivalent. Sealing material shall be placed in the presence of AGENCY and in compliance with permit requirements. CONTRACTOR shall notify AGENCY a minimum of 48 hours in advance of planned sealing material placement.

Sealing material shall be placed by Bradenhead (squeeze cementing) methods as follows:

- Install tremie pipe inside the intermediate casing

- Seal the top of the intermediate conductor casing by appropriate means, install a pressure gauge and ensure fittings and welds are airtight prior to pumping cement.
- Pump cement in one continuous operation.
- After cement is witnessed in the returns, close the valve and verify system pressure using the pressure gauge. Maintain system pressure for not less than 2 hours.
- Pull sufficient tremie so that the bottom portion is out of cement. Do not remove all tremie.
- The annular seal shall be allowed to cure undisturbed for 24 hours prior to continuing work.

Placement shall be completed in one continuous operation from the bottom of the borehole to ground surface. The cement grout shall be pumped until it reaches ground surface for the entire circumference of the intermediate casing and borehole.

Fluids displaced during placement of the intermediate casing and sanitary seal operations shall be appropriately managed.

2.6 Pilot Borehole Drilling (Bid Item 6)

CONTRACTOR shall furnish all material and equipment and perform all labor to drill a maximum 17.5-inch diameter pilot borehole from the bottom of the intermediate casing to a minimum depth of 750 feet bgs, unless otherwise directed by AGENCY. CONTRACTOR shall furnish all material and equipment and provide all labor necessary to temporarily backfill the pilot borehole while design is being finalized.

2.6.1 Submittals

The following submittals are applicable to this section:

- Description of the drilling and fluid system including the types of fluid to be used, weights, viscosities, sand and solids contents, water loss control, and the name of the drilling fluid supplier
- Name and qualifications of the on-call Drilling Fluid (Mud) Engineer
- Formation samples every 10 feet (bagged)
- Sieve results of up to 5 formation samples, selected by AGENCY

2.6.2 Methods

The pilot borehole shall be drilled using the flooded reverse-rotary method. Although a maximum diameter of 17.5 inches is specified, CONTRACTOR shall determine the appropriate borehole diameter based on their preference, provided it is of sufficient diameter to complete downhole geophysical surveys required (see Section 2.7). A directional survey shall be made every 100 feet the pilot is advanced using a mechanical drift indicator. If the directional survey shows deviation from the plumb line, CONTRACTOR shall make efforts to prevent ongoing deviation.

2.6.3 Formation Sampling

CONTRACTOR shall collect and preserve 1 set of drill cutting samples at 10-foot intervals during the drilling of the pilot borehole. Samples shall be placed in 1-gallon, heavy weight, re-sealable plastic bags and labeled with the sample depth interval. Collected samples shall be stored in a manner to prevent breakage or loss. The method of collection shall be approved by AGENCY prior to collection. The sample collection system must allow for collection of representative lithology (e.g., sluice box). Samples shall not be collected off the shale shaker or using a mesh strainer without prior approval by AGENCY.

2.6.4 Drilling Fluids

Potable water shall be used to mix a bentonite-based drilling fluid designed to adequately maintain bore wall, minimize invasion of drilling fluid into the formation, and permit recovery of representative samples of cuttings. Soda ash may be used to increase pH of the water used to mix drilling fluids. The drilling fluid shall possess such characteristics that it can be readily removed from the borehole during development of the well. **Drilling with clear water alone shall not be permitted.**

Drilling fluid additives must be standard materials used in the water well drilling industry and must be used in accordance with the manufacturer's recommendations. The methods and materials that CONTRACTOR would utilize in the event of borehole stability problems and/or loss of circulation must be approved by AGENCY and on site at the start of drilling. In no case shall materials be added to the drilling fluid system or drill hole without prior approval of such materials by AGENCY. Addition of unapproved materials to the drill hole or fluid system may be cause for rejection of the well.

Excavation of pits on site for drilling fluids are prohibited, and surface containment (i.e., tanks and/or bins) of drilling fluids are required.

It is the responsibility of CONTRACTOR to ensure that sizing and configuration of the fluid system is adequate to meet the drilling fluid properties outlined below. In the event CONTRACTOR cannot attain these properties, drilling shall be halted and the mud replaced at no cost to AGENCY.

Proper control of the drilling fluid must remain in compliance with these specifications and CONTRACTOR may be required to retain or employ an experienced, qualified Drilling Fluid (Mud) Engineer to supervise and maintain drilling fluid characteristics at no cost to AGENCY. If at any time during borehole drilling, drilling fluid properties are not within the ranges specified below, CONTRACTOR shall cease drilling and shall circulate and condition the drilling fluid until it falls within the specified ranges.

AGENCY may measure drilling fluid properties periodically during borehole drilling. These measurements are intended to independently verify and check CONTRACTOR's measurements, and do not relieve CONTRACTOR of the responsibility to measure drilling fluid properties.

CONTRACTOR must provide at the drilling site at all times Standard API measurement devices in proper working order, along with qualified personnel to operate them, to determine the following drilling fluid properties:

- Drilling fluid weight
- Drilling fluid viscosity
- Drilling fluid sand content
- 30-minute water loss/filter cake

CONTRACTOR must additionally include appropriate devices for evaluating the make-up water suitability, including but not limited to:

- pH test strips or other reliable pH monitoring device
- Meter or test strips for checking water hardness

The properties of the drilling fluid leaving the circulation tank must be recorded by CONTRACTOR at a minimum of 4-hour intervals or every 50 feet of drilling, whichever is more frequent and whenever conditions appear to change or problems arise. The drilling fluid shall be within the following ranges unless otherwise approved by AGENCY:

- Weight – maximum of 9.6 pounds per gallon
- Marsh Funnel Viscosity – minimum of 28 and maximum of 38 seconds per quart
- Sand Content – maximum of 1% by volume

- Water Loss and Filter Cake – maximum 15 cubic centimeters (cc) with maximum thickness of 2/32 inches

CONTRACTOR shall conduct all tests and shall maintain a log showing the drilling fluid properties set forth herein including date, time, depth, viscosity, drilling fluid weight, sand content, water loss, and filter cake thickness and any other pertinent comments.

All measurements for depths shall be referenced to existing ground surface at the well site. All drilling records shall be delivered to AGENCY upon completion of the well.

In addition, CONTRACTOR shall keep an accurate record of the types and quantities of all drilling fluid additives, including time used and mixture, Marsh funnel viscosity before and after use, and the rate, times, and duration of makeup water injection. Rate of makeup water injection shall also be recorded when drilling fluids are not being circulated so that an evaluation can be made of the ability of the borehole to accept water.

2.7 Downhole Geophysical Surveys (Bid Item 7)

CONTRACTOR shall furnish all material and equipment and provide all labor to perform a geophysical log of the pilot borehole. CONTRACTOR shall employ **Pacific Surveys, LLC**, for this activity, unless otherwise approved by AGENCY. The geophysical log shall include measurements of the following:

- Spontaneous potential
- Electrical resistivity (single-point, 16-inch normal, 64-inch normal, and focused guard)
- Natural gamma ray
- Temperature
- Deviation

2.7.1 Submittals

The following submittals are applicable to this section:

- Two field hardcopies of the geophysical log. The geophysical log shall also be provided in a digital data format, both as PDF and data files. Geophysical logs shall have a vertical scale of 50 feet per inch and horizontal scale appropriate to the log type and response values.

2.7.2 Execution

CONTRACTOR shall ensure that the pilot borehole is properly conditioned by circulating drilling fluids in preparation for geophysical logging, and that the pilot borehole is continually filled with fluid during logging operations.

Standby time will not be paid for additional cleaning and conditioning of the pilot borehole to enable logging operations to proceed.

If the logging probe fails to descend to the desired depth, CONTRACTOR, at their own expense, shall condition the pilot borehole to permit the logging probe to descend to the bottom of the hole.

2.8 Pilot Borehole Temporary Backfill (Bid Item 8)

CONTRACTOR shall furnish all material and equipment to temporarily backfill the pilot borehole to maintain borehole stability during final well design and material procurement.

2.8.1 Submittals

The following submittals are applicable to this section:

- Origin, type, and quantity of backfill material

2.8.2 Materials

Temporary backfill material shall consist of washed pea gravel or AGENCY approved equivalent. Crushed gravel will not be accepted.

2.8.3 Execution

Immediately following geophysical surveys (Section 2.7), the CONTRACTOR shall backfill the pilot borehole with approved backfill material using the tremie method from the bottom of the borehole to not less than the bottom depth of the intermediate casing. The tremie pipe shall be installed within 10 feet of the bottom of the borehole before placement of backfill material begins and shall be withdrawn as the backfill material is placed. The tremie pipe shall be no more than 40 feet above the top of the backfill material during placement. Backfill material shall be hydraulically placed with the circulating drilling fluid using 1 or more positive displacement pumps. Under no circumstances shall the backfill material be allowed to free fall. The CONTRACTOR shall exercise care to avoid creating a fluid density inversion during placement of the backfill material.

The CONTRACTOR shall not demobilize or reposition the drilling rig while waiting for the final well design.

2.9 Borehole Reaming (Bid Item 9)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to ream the pilot borehole by flooded reverse-rotary methods to diameters shown on the final well design. **Reaming shall not begin until all well casing, filter pack, and all other well materials and equipment necessary to construct a completed well are on site and have been approved by the AGENCY, excluding sanitary sealing material.**

2.9.1 Submittals

Submittals are not required for this section.

2.9.2 Drilling Fluids

Drilling fluids shall be consistent with Section 2.6.4.

2.9.3 Execution

After completion of the drilling of the pilot borehole, ream by the flooded reverse-rotary methods to final diameters as specified in the final well design. Reaming shall continue on a continuous 24-hour per day, 7-day per week basis without interruption. Any significant delays in reaming may be cause for rejection of the well.

2.10 Caliper Survey (Bid Item 10)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to conduct a caliper survey of the final reamed borehole. CONTRACTOR shall employ **Pacific Surveys, LLC**, for this activity, unless otherwise approved by AGENCY.

2.10.1 Submittals

The following submittals are applicable to this section:

- Two field hardcopies of the caliper and alignment logs. The logs shall also be provided in a digital data format, both as PDF and data files. Logs shall have a vertical scale of 50 feet per inch and horizontal scale appropriate to the log type and response values.

2.10.2 Execution

The CONTRACTOR shall furnish professional logging services for the caliper survey of the final reamed borehole.

The caliper tool must be of sufficient arm capacity to measure borehole diameters to 48 inches for the entire length of the reamed borehole. The caliper survey shall include calculations of the theoretical annular volumes required for completion of the well.

If the caliper survey shows the reamed borehole to be less than the specified diameter(s) at any point or the final borehole is less than the specified depth, the borehole shall be re-reamed and re-surveyed at the CONTRACTOR's expense.

If the caliper survey shows excessive washouts necessitating the purchase and transport of additional filter sands beyond those mention in Section 2.12, CONTRACTOR shall immediately procure and deliver to the site the additionally required materials at their expense.

2.11 Furnish and Install Well Casing (Bid Item 11), Screen (Bid Item 12), and Cellar (Bid Item 13)

CONTRACTOR shall furnish all materials and work necessary to manufacture, deliver, and install well casing, screens, and cellar per the final well design and in accordance with these technical specifications.

CONTRACTOR shall provide all necessary equipment and labor to transport well materials to the site for review and acceptance by AGENCY. If CONTRACTOR determines there to be insufficient space on the site for the staging of this material, CONTRACTOR shall, at their expense, arrange for a secure temporary staging area within 25 miles of the site.

2.11.1 Submittals

The following submittals are applicable to this section:

- Applicable Mill certificate(s) before delivering the casing, screen, and centralizers to the job site
- Casing schedule for well casing materials, welding collars, and centralizers
- Valid welder certifications appropriate to the standards and positions required for casing installation

2.11.2 Materials

Material specifications are detailed individually in the sections below.

2.11.2.1 Well Casing

Well casing (collared) shall be spiral welded Type 304L stainless steel composed of new material manufactured and purchased from **Roscoe Moss Company**. The well casing shall have an inside diameter of 16 inches and wall thickness of not less than 3/8 inch.

2.11.2.2 Well Screen

Well screen (collared) shall be Type 304L stainless steel composed of new material manufactured in accordance with ASTM A-778 and be purchased from **Roscoe Moss Company**. The well screen shall have an inside diameter of 16 inches. The well screen shall be continuous slot wire wrap designed and manufactured to withstand tensile and collapse pressures appropriate to the final well design. An aperture size of 0.060 inch can be assumed for bidding purposes.

2.11.2.3 Well Cellar

Well cellar (collared) shall be spiral welded with a semi-elliptical head Type 304L stainless steel composed of new material manufactured in accordance with ASTM A-778 and be purchased from **Roscoe Moss Company**. The well casing shall have an inside diameter of 16 inches and wall thickness of not less than 3/8 inch.

2.11.2.4 Centralizers and Spacers

Centralizers and spacers shall be Type 304L stainless steel and be purchased from **Roscoe Moss Company**. Centralizers shall be no less than 2 inches wide, composed of the same material as the casing to which they are affixed and placed at intervals of not more than 50 feet within the screened casing and at intervals of not more than 80 feet within the blank casing. Centralizers shall be designed to have minimum bore wall contact of 12 inches and extend from the casing not less than 2.5 inches. For screened intervals, C-type centralizers shall be affixed to collars, not in the screen.

2.11.3 Drilling Fluids

CONTRACTOR shall condition drilling fluids prior to placement of the well materials until it has the following properties:

- Weight – maximum of 9.1 pounds per gallon
- Marsh Funnel Viscosity – maximum of 30 seconds per quart
- Sand Content – maximum of 1% by volume

Maintain circulation of drilling fluid until casing is set unless CONTRACTOR judges circulation to be unnecessary.

2.11.4 Placement

A clean construction tremie pipe shall be installed prior to the well casing and screen to facilitate placement the annular materials.

The well casing and screen shall be installed such that a minimum 2-inch spacing is maintained between the well casing and feed tube, between casing/tubes and the bore wall, and between casing/tube and the conductor casing.

The casing and screen shall be plumb and centered in the hole. The well casing and screen assembly, when installed to the specified depth, shall extend 3 feet above ground surface. All field joints shall be properly lap welded during installation with a minimum of 2 passes per circumference. Centralizers shall be welded to the casing, each set consisting of 4 centralizers equally spaced circumferentially around the casing, placed at intervals of not more than 50 feet in the screened section and 80 feet in the blank section.

The casing shall be suspended in tension from the surface by means of an appropriate hanger or clamp. The bottom of the casing shall be at a sufficient distance above the bottom of the reamed hole to ensure that the casing is not supported from the bottom of the hole. The use of float plugs to land and set casing will not be permitted. Fluids displaced during placement on the well casing shall be controlled and discharged to temporary storage tanks for off-site disposal.

If, for any reason, the casing cannot be landed in the correct position or at a depth acceptable to AGENCY, or any of the casings or screens collapse prior to well completion, CONTRACTOR shall construct another well adjacent to the original location and complete this well in accordance with the specifications at no additional cost to AGENCY. The first hole shall be destroyed by sealing in accordance with AGENCY requirements pertaining to proper well destruction. All work required to be repeated, and all additional materials, labor, and equipment required, shall be furnished at the expense of CONTRACTOR and no claim for additional compensation shall be made or be allowed, except as specifically provided herein.

To avoid collapse or deformation of casing, all annular materials, including cement, filter pack, fill materials, and fluids used during installation of annular materials, shall be installed in proper increments and sequence. CONTRACTOR shall document and verify the proper increments to use to prevent casing damage and shall, at its own expense, replace any damaged casing and repair, or remedy, any other associated damage to the well.

The top of the casing shall be provided with secured caps at all times when personnel are not on site.

Field welding shall be conducted by a certified welder in accordance with AWWA C206 and American Welding Society Standards, conducted by an AWS Certified Welder with valid and current certification for metal arc-welding on ASTM A778 and A1024 base metals in the horizontal lap and horizontal groove weld positions.

The following field welding procedures shall apply:

- A length shall be lowered into the well with the collar facing upward.
- The plain end of the following length shall be inserted in the collar. True contact of the 2 joints must be verified by observation through the alignment holes.
- Join by a continuous full fillet weld of thickness equal to thickness of coupling. Two passes shall be applied. Alignment holes shall be completely filled by welding.
- Upon completion of welding, remove weld splatter, flux, slag, and burrs.

It is CONTRACTOR's responsibility to ensure that the appropriate type and size of electrodes are used for the various types of casing materials.

2.12 Furnish and Install Filter Pack and Transition Sands (Bid Item 14)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to install filter media and transition sand as described within these specifications.

2.12.1 Submittals

The following submittals are applicable to this section:

- A gradation description, sample, and sieve analysis of the filter pack media
- Sodium hypochlorite safety data sheet
- Copies of weigh tickets for filter material delivered on site
- Copies of weight tickets for transition sand material delivered on site

2.12.2 Materials

Filter pack material shall be **P.W. Gillibrand** Raptor Filter Sands. RFS 4 (8 by 16) gradation can be assumed for purposes of bidding. Filter pack materials shall be hard, water worn, at least 90% silica, and washed clean of silt, dirt, and foreign matter. Crushed gravel will not be accepted. Filter pack materials shall be well rounded with a high sphericity and graded. CONTRACTOR

shall submit a sieve analysis of a recent production run from the manufacture for confirmation of gradation.

The filter pack materials shall be contained in super sacs and, if stockpiled at the well site, shall be protected, and kept free of all foreign matter.

CONTRACTOR shall procure not less than 110% of the calculated filter sand volume required for well construction based on the final well design, as rounded upwards to the nearest super sac. Any necessary filter pack in excess of 110% of that required by the final design is the CONTRACTOR's responsibility. Items which may result in this scenario include but are not limited to CONTRACTOR use of a larger than agreed upon diameter reaming bit, borehole washout, or excessive over-drill.

Sodium hypochlorite: liquid sodium hypochlorite solution; regular household bleach may not be used. No fragranced products or other products with additives will be allowed. Sodium hypochlorite shall be provided in the original sealed container. Sodium hypochlorite shall be recently purchased and properly stored to ensure the concentration of the solution has not degraded.

Transition sand shall be #60 mesh plaster sands and consist of sound, non-reactive material. Crushed aggregate will not be accepted. The sand shall be free of vegetative matter.

2.12.3 Placement

Filter pack, as specified, shall be installed in the annular space between the reamed hole and the well screen through a construction tremie pipe. Place filter pack by hydraulically pumping through the tremie pipe from the bottom of the annulus upward to the depth specified by AGENCY. The placement shall proceed without interruption until complete. During placement of the filter pack in the annulus, liquid sodium hypochlorite shall be added at a uniform rate of 1 gallon of 12.5% solution per cubic yard of filter pack. A circulating system with 1 or more positive displacement pumps utilizing fresh water shall be used for the purpose of introducing the filter pack into the annulus. Under no circumstances will the filter pack be allowed to freefall down into the annular space.

An AGENCY-approved device shall be used to measure the level of the filter pack during placement.

Following placement of the filter pack to the depth specified in the final well design, a dual swab tool shall be used across the well screen to settle the filter pack. CONTRACTOR shall measure the level of the filter pack and continue swab activities until no measurable change in filter pack

level is noted. Additional filter pack shall be added as needed to comply with the final well design.

A 10-foot layer of #60 mesh plaster sand shall be installed immediately above the top of the filter pack to separate the annular seal from the filter pack.

CONTRACTOR shall contain and appropriately manage displaced fluids during the well installation process.

2.13 Furnish and Install Annular Seal (Bid Item 15)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to install an annular seal in accordance with AGENCY permit conditions, and DWR Bulletin No. 74-81 and its supplement Bulletin 74-90, including any later supplements or revisions. The annular seal shall be installed from a depth immediately above the top of the transition sand to surface.

2.13.1 Submittals

The following submittals are applicable to this section:

- Type and content of proposed sealing material
- Copy of the concrete weight ticket upon delivery to the job site; concrete weight tickets shall include the origin and type of sealing material used

2.13.2 Materials

Sealing material shall consist of batch plant mixed 10.3 sack sand cement grout consisting of a mixture of ASTM C150, Type II cement, sand, and water. Accelerators, retardants, bentonite, and other additives shall not be used without prior approval by the AGENCY. Fly ash is not allowed to be included in the sand cement grout.

2.13.3 Execution

Sealing material shall be placed in the presence of AGENCY, and in compliance with permit requirements. CONTRACTOR shall notify AGENCY inspector a minimum of 24 hours in advance of planned sealing material placement, or as otherwise required by the well permit.

Sealing material shall be placed using the tremie method from the bottom of the borehole and shall be completed in a manner that prevents freefall, bridging, or separation. Placement shall be

completed in 1 continuous operation from the bottom of the borehole to the top. The cement pump shall be capable of pumping the sand cement grout under pressure to the specified depth.

Upon installation of the sealing material and unless approved otherwise by AGENCY, CONTRACTOR shall not operate heavy equipment on the site for a minimum of 24 hours. The 24-hour curing period shall not be regarded as standby time.

CONTRACTOR shall contain and appropriately manage displaced fluids during well sealing operations.

2.14 Initial Mechanical Well Development (Bid Item 16)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to perform initial well development by means of open-ended airlifting and swabbing with airlifting. Activities conducted under this bid item shall be completed with the drilling rig prior to its removal from the site. **Work shall continue on a 24-hour schedule until complete.**

2.14.1 Submittals

The following submittals are applicable to this section:

- Well development progress logs

2.14.2 Materials

The following materials are applicable to this section:

1. Dual Swab Tooling:
   a) Two swabs separated by not more than 10 feet of slotted pipe with sufficient slots and appropriate air compressor capacity to air lift at a rate of 250 gallons per minute (gpm)
   b) Outside diameter of flanges not more than 1 inch smaller than inside diameter of screen section of well
   c) Eductor Pipe, fitted with airline to allow airlift pumping

2.14.3 Execution

Static water level shall be recorded at the beginning of each shift.

CONTRACTOR shall begin initial development not less than 24 hours and no more than 48 hours after placing annular seal. If not begun within 48 hours, additional swab and airlift

development may be required—without additional cost to the AGENCY—for the length of time between 48 hours since placing annular seal and time that development was initiated, in addition to normal development time.

Install open-ended drill pipe with intake in the cellar interval and begin airlifting. This shall be done to remove drilling muds and solids from the well and shall be completed for a minimum of 4 hours or until drilling fluid has been removed from the well (visual).

Following open-ended airlifting, the well shall be developed by swabbing and airlifting with the dual swab tool from the top of the screen to the bottom, then from the bottom of the screen to the top. The screen shall be swabbed in 20-foot sections while simultaneously airlifting. Each 20-foot screen section shall be worked until successive swabbing produces little change in color and discharge is relatively clear, estimated to be approximately 30 minutes for each 20-foot interval of screen. This period may be extended or shortened by AGENCY based on condition of discharge water. Upon completion of an interval, move to the next 20-foot interval and repeat until all screened intervals have been swabbed.

The well cellar shall be cleaned of accumulated material using open-ended airlifting if necessary following initial mechanical development.

CONTRACTOR shall be compensated according to the hourly well development bid item for work conducted in well screen sections only. The time required to move tooling through the unperforated well-casing section(s) shall not be considered development and therefore will not be paid for by AGENCY.

2.15 Final Mechanical and Chemical Well Development (Bid Item 17)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to develop the well by mechanical and chemical development. This activity shall commence within 5 calendar days after completion of initial mechanical well development (Bid Item 16) and be conducted during daytime work hours Monday through Friday (Table 1), unless otherwise approved by AGENCY.

2.15.1 Submittals

The following submittals are applicable to this section:

- Well development progress logs

2.15.2 Materials

Materials shall be consistent with Section 2.14.2 and also include the following:

- Sodium Hypochlorite: Liquid sodium hypochlorite solution in accordance with the latest revision of AWWA C654. Sodium Hypochlorite shall be used in a concentration of 1,000 parts per million (ppm) to the volume of water in the screened sections and annulus. Regular household bleach may not be used. No fragranced products or other products with additives will be allowed. Sodium hypochlorite shall be provided in the original sealed container. Sodium hypochlorite shall be recently purchased and properly stored to ensure the concentration of the solution has not degraded.
- Chemical Dispersant: Nu-Well 220 (NW-220, manufactured by Johnson Screens) or AquaClear PFD (manufactured by Baroid Industrial Drilling Products), or approved equal, shall be used in a concentration of 1 gallon per 500 gallons of water in the screen sections.

2.15.3 Execution

The well shall be developed by swabbing and airlifting from the top of the screen to the bottom using the dual swab tool. The screen shall be swabbed in 20-foot sections while simultaneously airlifting. Each 20-foot screen section shall be worked until successive swabbing produces little change in color and discharge is relatively clear, estimated to be approximately 30 minutes for each 20-foot interval of screen. This period may be extended or shortened by AGENCY based on the condition of discharge water. Upon completion of an interval, move to the next 20-foot interval and repeat until all screened intervals have been swabbed.

After reaching the bottom of the well, a chlorine solution shall be swabbed into the screen sections from the bottom to the top as the dual swab tool is removed at a rate of 15 minutes for each 20 feet of screen. Chlorine solution shall be sufficient to achieve a concentration of 1,000 ppm throughout the well screen.

Upon reaching the uppermost screen section, the development tools shall be left in the well for a minimum period of 12 hours. Screen sections shall then be developed in 20-foot intervals by swabbing and simultaneous airlifting at a rate of 30 minutes for each 20 feet of screen. This process shall be repeated throughout the entire length of all screened zones, beginning at the top and working down to the bottom.

After reaching bottom, the development tools shall be utilized to inject NW-220, or approved equal, incrementally into the screen sections. The total amount of NW-220 introduced to the well shall be equal to the quantity necessary to achieve a NW-220 concentration of 1 gallon per 500 gallons of water in the screened section(s). The NW-220 solution shall be swabbed at a rate of 15 minutes for each 20 feet of screen into each progressively shallower screen section as piping is removed.

Upon reaching the uppermost screen section, the development tools shall be left in the well for a minimum period of 24 hours. After this period, the airlifting and swabbing development procedure at a rate of 15 minutes for each 20 feet of screen described in the preceding paragraphs shall be repeated to bottom and then back to the top again.

The well cellar shall be cleaned of accumulated material using open-ended airlifting if necessary following mechanical development.

CONTRACTOR shall be compensated according to the hourly well development bid item for work conducted in well screen sections only. The time required to move tooling through the unperforated well casing section(s) shall not be considered development and therefore will not be paid for by AGENCY.

2.16 Test Pump Installation (Bid Item 18)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to install a test pump and associated discharge piping as specified below.

2.16.1 Submittals

The following submittals are applicable to this section:

- Test pump details including pump intake depth, bowl specifics including number of stages and diameter, pump column diameter, and all other applicable dimensions.

2.16.2 Materials

The following materials are applicable to this section:

1. Vertical Turbine Pump installed to a depth of 400 feet bgs (subject to change by AGENCY:
   a) Capable of producing up to 3,000 gpm from the well
   b) Do not equip with a foot valve, which would prevent backspin and interfere with surging.
2. In-line digital flow meter registering in units of gallons per minute, together with a totalizer which reads in units of gallons, and capable of measuring pump discharge within plus or minus 5% of true flow rate.

3. Throttling Valve: Suitable to accurately regulate pumping rates throughout required range
4. Rossum Sand Tester to measure amount of sand produced from well
5. Access Tubes:
    a) One 1-inch inside diameter with perforations 10 feet along the bottom and including an end cap, adequate for insertion of water level sensing devices into well before, during, and after test pumping. Must allow free passage of pressure transducers that are 0.75-inch diameter and approximately 8 inches long.
    b) One 2-inch inside diameter Spinner/Flow Profile Access Tube terminating below the pump intake and adequate for insertion of the profile tooling.
    c) Securely fastened to pump column assembly

2.16.3 Execution

CONTRACTOR shall install in the well a variable-speed turbine pump to complete pumping development. The pump shall not be equipped with a foot valve or other backflow preventers. Pump intake shall be set at a depth of 400 feet bgs unless otherwise directed by AGENCY.

2.17 Pumping Development (Bid Item 19)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to develop the well by means of pumping and surging.

2.17.1 Submittals

The following submittals are applicable to this section:

- Well development progress logs

2.17.2 Execution

Static water level shall be recorded at the beginning of each day of well development before any water has been moved.

Development pumping shall be conducted by alternately pumping (turning the pump on) and surging (turning the pump off and letting the water in the column pipe fall back into the well) at a specific flow rate, until pumping and surging at that flow rate produces visibly clear water and until no significant improvements in specific capacity are observed, as determined by AGENCY. Surging operations shall include 3 surges after 60 minutes of continuous pumping unless otherwise approved by AGENCY. Pump the well at an initial rate not to exceed 400 gpm or as low as is feasible. Discharge rate shall be incrementally increased up to 3,000 gpm, or as directed by AGENCY.

Development pumping shall continue for a minimum of 40 hours unless otherwise approved by AGENCY. Flow rate, water level, and sand content shall be recorded at intervals of 15 minutes after the start of pumping following a surge cycle.

At the conclusion of development pumping, CONTRACTOR shall determine the required settings to obtain the flow rates for well and aquifer testing, as determined by AGENCY, based on well development records.

2.18 Variable Rate Pumping Test (Bid Item 20)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to complete a variable rate pumping test as described herein. CONTRACTOR shall also keep records on the type of pumping equipment used including engines, drive components, bowls, lines, and shafts. CONTRACTOR shall keep records of operation of equipment during the test including engine revolutions per minute and horsepower, fuel use, and other essential information that will be useful in designing a pump system.

2.18.1 Submittals

The following submittals are applicable to this section:

- Pumping test logs

2.18.2 Materials

The temporary pump used for well development shall be used for performance testing unless other pumps and equipment are necessary to satisfy the requirements of this specification or as determined by AGENCY.

2.18.3 Execution

A variable rate pumping (step drawdown) test shall be conducted following well development activities and shall be scheduled to begin when the water level has recovered to static groundwater level as determined by AGENCY.

The well shall be tested at rates of approximately ½, ¾, 1, 1¼, and 1 ½ times the design capacity of 2,000 gpm, or as directed by AGENCY. The variable rate pumping test shall be conducted for a total duration of 10 hours (120 minutes each step). CONTRACTOR shall operate the pump and change the discharge rate as directed by AGENCY. An electric water level meter will be furnished by AGENCY. Sand content measurement shall be recorded at 1-hour intervals by CONTRACTOR using a Rossum sand tester. CONTRACTOR shall be responsible for

maintaining the desired pump operation schedule. If necessary, adjustments in the pumping rate shall be made using an in-line butterfly valve, not engine throttle. **CONTRACTOR shall not make adjustments to the pumping rate after the first 2 minutes of pumping at each rate without approval from AGENCY**.

Measure depth to water at the following intervals, unless otherwise specified by AGENCY:

1. 1 minute to 10 minutes: Measure at 1-minute intervals
2. 10 minutes to 20 minutes: Measure at 2-minute intervals
3. 20 minutes to 30 minutes: Measure at 5-minute intervals
4. 30 minutes to 60 minutes: Measure at 10-minute intervals
5. 60 minutes to 120 minutes: Measure at 15-minute intervals

After the pump is stopped, the temporary test pump shall remain in the well undisturbed, unless otherwise specified by AGENCY. CONTRACTOR shall not be responsible for monitoring groundwater levels during recovery period.

2.19 Constant Rate Discharge Test (Bid Item 21)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to complete a constant rate pumping test as described herein. CONTRACTOR shall also keep records on the type of pumping equipment used including engines, drive components, bowls, lines, and shafts. CONTRACTOR shall keep records of operation of equipment during the test including engine revolutions per minute and horsepower, fuel use, and other essential information that may be useful in designing a pump system.

2.19.1 Submittals

The following submittals are applicable to this section:

- Pumping test logs

2.19.2 Materials

The temporary pump used for well development shall be used for performance testing unless other pumps and equipment are necessary to satisfy the requirements of this specification or as determined by AGENCY.

CONTRACTOR is responsible to ensure that no erosion or nuisance conditions result from pumping discharges. The discharge piping shall be installed to the satisfaction of AGENCY.

2.19.3 Execution

A constant rate discharge test shall be conducted by pumping the well at the design rate of 2,000 gpm for a period of not less than 24 hours, or less if AGENCY terminates the test. CONTRACTOR shall ensure the pumping rate remains within plus or minus 5% of the target rate. If necessary, adjustments to the pumping rate shall be made using an in-line butterfly valve, not engine throttle. **CONTRACTOR shall not make adjustments to the pumping rate after the first 2 minutes of pumping without approval from AGENCY**.

CONTRACTOR shall test and record sand content using a Rossum sand tester every hour of pumping. AGENCY may require CONTRACTOR to do additional redevelopment work if the hourly accumulation of sand exceeds 2 ppm at any point during the test. The turbidity of pumped water shall additionally not exceed 5 NTU.

Measure depth to water at the following intervals, unless otherwise specified by AGENCY:

1. 1 minute to 10 minutes: Measure at 1-minute intervals
2. 10 minutes to 20 minutes: Measure at 2-minute intervals
3. 20 minutes to 30 minutes: Measure at 5-minute intervals
4. 30 minutes to 60 minutes: Measure at 10-minute intervals
5. 60 minutes to 90 minutes: Measure at 15-minute intervals
6. 90 minutes to end of test: Measure at 30-minute intervals

2.19.4 Recovery Monitoring

After the pump is stopped, the temporary test pump shall remain in the well undisturbed for the full recovery period of 24 hours, or as specified by AGENCY. CONTRACTOR shall not be responsible for monitoring groundwater levels during recovery period.

2.19.5 Aborted Test

Whenever continuous pumping at a uniform rate has been specified, failure of pumping operation for a period greater than 1% of the elapsed pumping time shall require suspension of the test until the water level in the pumped well has recovered to its original level. Recovery shall be considered complete after the well has been allowed to rest for a period at least equal to the elapsed pumping time of the aborted test, except if any 3 successive water level measurements spaced at least 20 minutes apart show no further rise in the water level in the pumped well. Under this exception, the test may be resumed immediately. AGENCY shall be the sole judge as to whether this latter condition exists. CONTRACTOR will not be paid for any

retesting done if the specified time or recovery requirements of AGENCY for the aborted test are not first met. These tests are invalid and will not be construed as a test.

2.20 Groundwater Quality Sampling and Analysis (Bid Item 22)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to collect a groundwater sample and submit for laboratory analysis all the constituents listed in Table 2.

2.20.1 Submittals

The following submittals are applicable to this section:

- Water quality laboratory test results

2.20.2 Execution

Toward the end of the constant rate discharge test but prior to conducting the spinner survey (Bid Item 23), collect and submit a water quality test specifying an "AG waiver panel" to the Monterey County Consolidated Chemistry Laboratory located at the County of Monterey Health Department.

Submit the sample under appropriate chain-of-custody to the AGENCY approved laboratory per Table 2:

Table 2. Summary of Analyses

Ag Waiver Panel Analyses
Calcium – Method ASTM6919-09
Chloride – Method EPA300.0 REV
Conductivity – Method SM2510 B-201
Magnesium – Method ASTM6919-09
Nitrate Nitrogen – Method EPA300.0
NO3 (Nitrate) – Method EPA300.0 REV
pH (Laboratory) – Method SM4500H+ B-2
Potassium – Method ASTM6919-09
SO4 (Sulfate) – Method EPA300.0 REV
Sodium – Method ASTM6919-09
Total Alkalinity (as CaCO3) – Method SM2320 B-201
Total Dissolved Solids (TDS) – Method SM2540 C-201

Water quality results shall be submitted to the AGENCY as a single comprehensive report.

2.21 Dynamic Spinner Survey (Bid Item 23)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to conduct a dynamic spinner survey of the well near the end of constant-rate discharge test but only after collection of the water quality sample. CONTRACTOR shall employ **Pacific Surveys, LLC**, for this activity, unless otherwise approved by AGENCY.

2.21.1 Submittals

The following submittals are applicable to this section:

- Two field hardcopies of the spinner/flow profile log. The log shall also be provided in a digital data format, both as PDF and LAS files. Spinner/flow profile shall have a vertical scale of 50 feet per inch and horizontal scale appropriate to the log type and response values.

2.21.2 Execution

CONTRACTOR shall furnish professional logging services for the dynamic spinner survey. CONTRACTOR is responsible for completing the survey before the end of the constant rate discharge test. AGENCY is not responsible for costs incurred by CONTRACTOR to extend pumping period beyond 24 hours to accommodate a complete spinner survey.

2.22 Test Pump Removal (Bid Item 24)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to remove the well pump and associated discharge piping. CONTRACTOR shall not remove pump from well until performance testing, including recovery monitoring, is complete.

2.22.1 Submittals

Submittals are not required for this section.

2.22.2 Execution

The test pump may be removed when all of the following conditions are met:

1. The laboratory confirms receipt of all collected samples as specified in Table 2.
2. AGENCY receives and approves results of the dynamic spinner survey (Bid Item 23).
3. AGENCY determines recovery monitoring of groundwater level is complete.

When all of the above conditions are met, CONTRACTOR may remove the well pump and associated discharge piping.

2.23 Gyroscopic Survey (Bid Item 25)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to complete a gyroscopic survey to determine the plumbness and alignment of the well casing after the well has been completed and before its acceptance. CONTRACTOR shall employ **Pacific Surveys, LLC**, for this activity, unless otherwise approved by AGENCY.

The completed well shall be sufficiently plumb and straight so that there will be no interference with installation, alignment, operation, or future removal of the permanent well pump.

2.23.1 Submittals

The following submittals are applicable to this section:

- Two field hardcopies of the gyroscopic survey. The gyroscopic survey results shall also be provided in a digital data format, both as PDF and LAS files. Alignment/deviation shall have a vertical scale of 50 feet per inch and horizontal scale appropriate to the log type and response values.

2.23.2 Execution

CONTRACTOR shall furnish professional logging services for the gyroscopic survey and shall comply with AWWA A-100 standards. The maximum allowable horizontal deviation (drift) of the well from the vertical shall not exceed two thirds of the smallest inside diameter of that part of the well being tested per 100 feet of depth. AGENCY may reject the well if the above tolerances are exceeded.

Plumbness testing shall be conducted by lowering the plumbness tool into the well from the ground surface to the full well depth. Measurements shall include station depth, inclination, azimuth, true vertical depth, departures, and plane of closure (displacement). Measurements shall be made every 10 feet from ground surface to the topmost well screen section. Measurements shall be made every 50 feet from the topmost well screen section to the full depth.

2.24 Cement Bond Log Survey (Bid Item 26)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to complete a cement bond log survey through the full depth of the conductor casing (Section 2.5)

before its acceptance. CONTRACTOR shall employ **Pacific Surveys, LLC**, for this activity, unless otherwise approved by AGENCY.

2.24.1 Submittals

The following submittals are applicable to this section:

- Two field hardcopies of the survey. The survey results shall also be provided in a digital data format, both as PDF and LAS files.

2.24.2 Execution

CONTRACTOR shall furnish professional logging services for the cement bond log survey. Survey results must demonstrate a complete seal throughout the entire interval surveyed, which is free of voids or other defects.

2.25 Color Video Camera Survey (Bid Item 27)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to complete a color video of the well prior to acceptance of the well by AGENCY. CONTRACTOR shall employ **Pacific Surveys, LLC**, for this activity, unless otherwise approved by AGENCY. The color video survey shall verify that the well is constructed in accordance with the final well design and that the well is free of structural defects and clear of all debris throughout the entire depth of the well prior to acceptance of the well by AGENCY. If any defects or debris are found, CONTRACTOR shall make repairs to, or remove debris from, the well as necessary, prior to acceptance of the well by AGENCY.

2.25.1 Submittals

The following submittals are applicable to this section:

- One copy of the video survey in AVI format and 2 copies of the written report

2.25.2 Execution

If necessary, airlift the well clean of debris prior to conducting the survey, then allow the well to remain idle for at least 24 hours. Introduce sufficient quantity of clear water into well prior to—and if necessary during—survey to produce clear viewing conditions. Run a dynamic vertical downhole view video from top of well to the bottom of well at a speed not exceeding 30 feet per minute. Video shall be in color, with side-scan capabilities, and include an automatic depth indicator to the nearest 0.1 foot.

If survey fails to produce a clear picture of internal casing condition, introduce clear, potable water and conduct survey to AGENCY's satisfaction until a clear video is obtained.

2.26 Well Disinfection (Bid Item 28)

CONTRACTOR shall furnish all material and equipment and provide all labor necessary to disinfect the well.

2.26.1 Submittals

The following submittals are applicable to this section:

- Disinfection products and procedures
- Name and qualifications of the proposed water quality laboratory
- Water quality laboratory test results

2.26.2 Materials

Liquid sodium hypochlorite solution shall be used in accordance with the latest revision of AWWA C654. Regular household bleach may not be used. No fragranced products or other products with additives will be allowed. Sodium hypochlorite shall be provided in the original sealed container. Sodium hypochlorite shall be recently purchased and properly stored to ensure the concentration of the solution has not degraded.

2.26.3 Execution

Disinfect well prior to final capping by adding sufficient sodium hypochlorite solution to achieve 100 ppm chlorine concentration in the well. The well shall be disinfected by swabbing the chlorine solution into the water column using a surge block, nylon brush or other AGENCY-approved method.

No sooner than 24 hours after disinfection, the residual concentration in the well shall be measured and a sample collected by CONTRACTOR using a disposable bailer. CONTRACTOR shall submit the sample to an appropriate laboratory for analysis of total coliform (presence/absence), fecal coliform (presence/absence) and heterotrophic plate count.

A non-detect result is needed to mark completion of well disinfection. A bacteria presence detected result will require re-dosing the well with a Chlorine Solution.

2.27 Surface Completion and Pump Pad Installation (Bid Item 29)

CONTRACTOR shall furnish all materials necessary to construct a graded and reinforced concrete pad that prevents water from pooling at the well head as described per these specifications.

2.27.1 Submittals

The following submittals are applicable to this section:

- Concrete mix design
- Data sheet(s) for rebar and any other material used to complete this task.

2.27.2 Materials

2.27.2.1 CONCRETE

The Concrete used shall meet the minimum compressive strength in 28 days of 4000 psi.

- ASTM C150 Type II Portland Cement with aggregate no larger than ¾ inch diameter
- Minimum cement per cubic yard is 6 sacks. One sack = 94lbs of cement.
- Max Water/Cement ratio of 0.45 (by weight).
- Slump shall be 6 inches $\pm$1 inch.

2.27.2.2 FORMS

The form materials shall be either Douglas Fir or Yellow Pine lumber, new waterproof plywood, or metal approved for concrete use.

2.27.2.3 REBAR

The rebar shall be #5. Six bars shall be equally spaced each way, top and bottom. Rebar cover shall be 3 inches. See Figure 4. Rebar shall be cut to fit with no splicing.

Wire ties shall be made with No. 14 Wire with one tie per 2 running feet. Wires shall be staggered and tied in such a manner as to not slip.

2.27.2.4 CONCRETE FINISH

The pad finish shall be a U4 finish by the Unformed Surface Finish Schedule. A steel trowel finish giving a non-skid surface at completion shall be provided. Finished concrete shall be sloped away from the well casing.

2.27.3 Execution

CONTRACTOR shall install the Concrete Pump Pad per these specifications and Figure 4. The pad shall be flush with the top of the casing. The concrete pad shall slope away from the well casing all around. CONTRACTOR shall install a Sole Plate attached to the casing edge and grouted into the pump pad.

CONTRACTOR shall install a secure well cap to prevent unauthorized opening of the well. The cap shall be robust and prevent any person from removing or accidentally falling into the well. This shall be with a lockable cap or a temporarily tack-welded cap.

CONTRACTOR shall slope the ground around the pump pad to provide drainage of water away from the pad and prevent water from pooling at the pad base.

2.28 Demobilization and Cleanup (Bid Item 30)

CONTRACTOR shall remove all material and equipment from the site following acceptance of the well by AGENCY.

2.28.1 Submittals

The following submittals are applicable to this section:

- Closed well permit
- State of California Well Completion Report

2.28.2 Execution

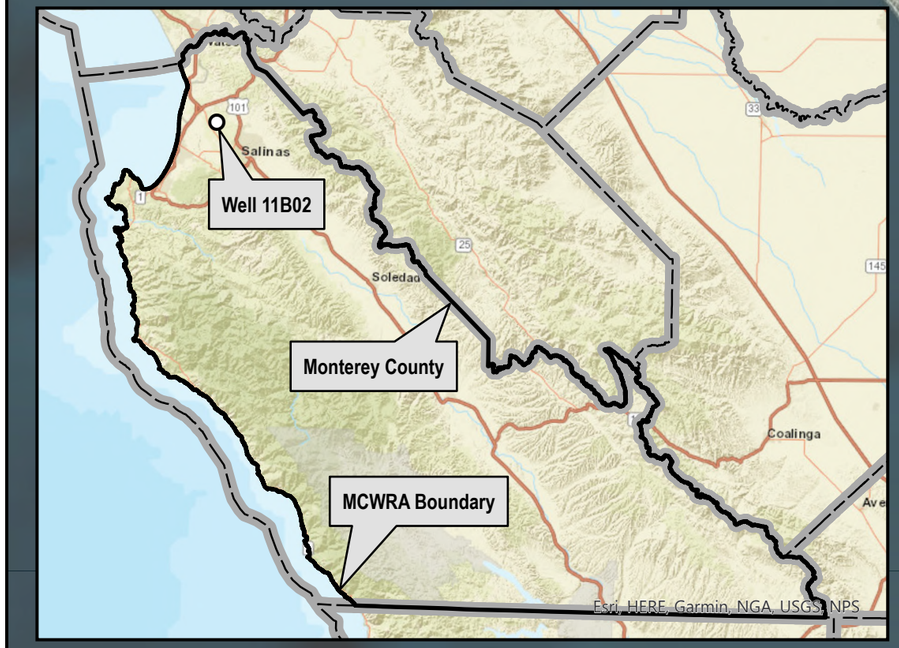
Complete removal of all material, temporary facilities, drilling fluids, cuttings, and municipal waste from the site to the satisfaction of AGENCY. CONTRACTOR shall notify AGENCY at the completion of demobilization and site cleanup activities.

2.29 Standby (Bid Item 31)

During the progress of drilling operations, it may be necessary for AGENCY to perform work that will require CONTRACTOR to stand idle (“standby time”). In such an event, AGENCY shall request in writing CONTRACTOR to cease operations and shall state the anticipated extent or duration thereof. CONTRACTOR shall promptly furnish such assistance and cease operations.

MONTGOMERY & ASSOCIATES

FIGURES



Monterey Bay

Watsonville

San Juan Bautista

Hollister

Well 11B02

Marina

Salinas

Seaside

Monterey

Del Rey Oaks

Carmel By The Sea

bing

© 2025 Microsoft Corporation Earthstar Geographics SIO

EXPLANATION

- MCWRA Well 11B02
- Monterey County Water Resources Agency
- Counties

N

0 2.5 5 7.5 10

Miles

Monterey County Water Resources Agency
Monterey County, California

Figure 1. Site Location Map

MONTGOMERY & ASSOCIATES

2025

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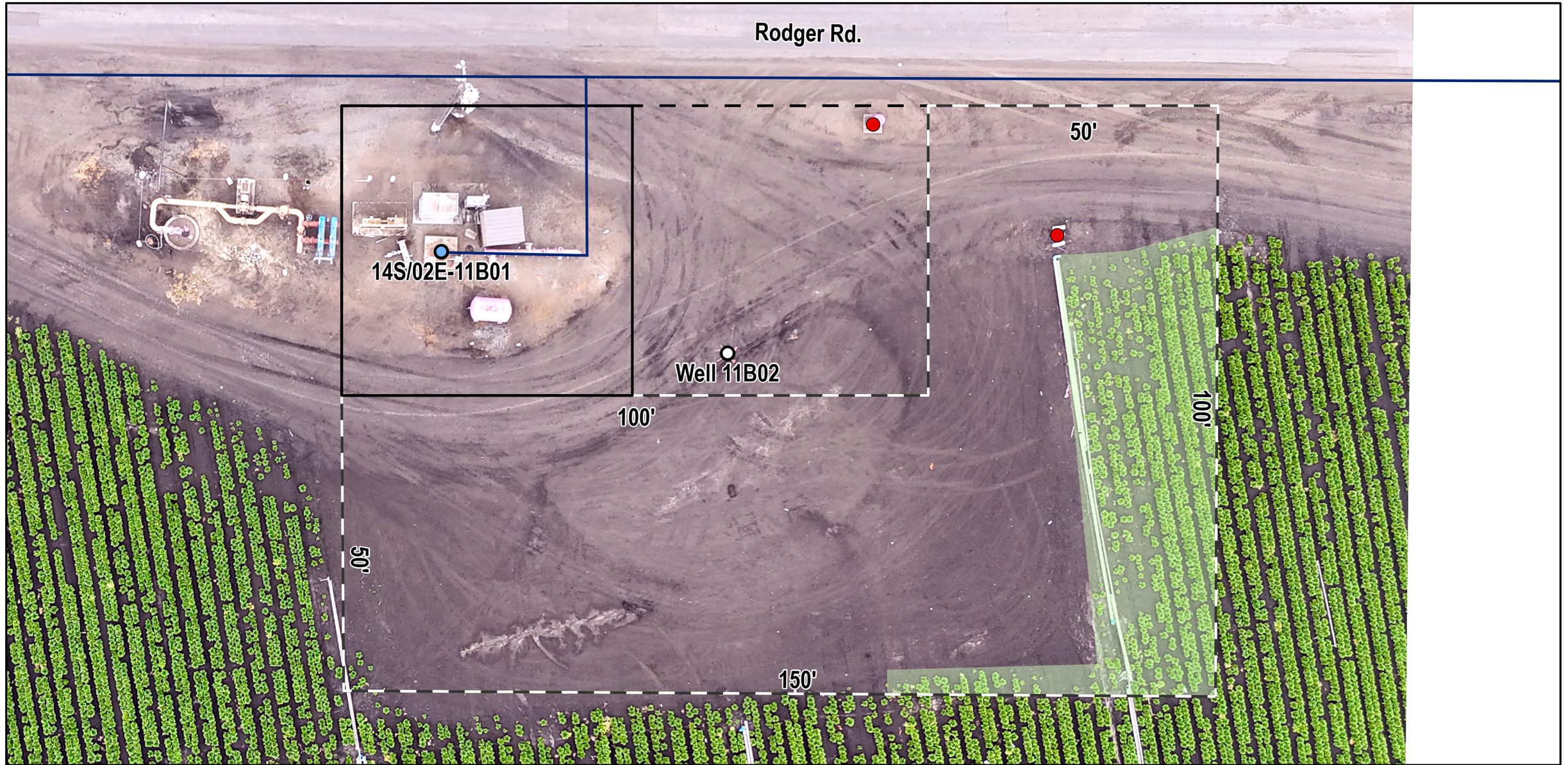

EXPLANATION

- Well 11B02
- 14S/02E-11B01
- Obstacles
- CSIP Pipeline
- Crops
- Current Well Easements
- Easement Extention
- Construction Easements

N

0 25 50 75 100

Feet

Monterey County Water Resources Agency
Monterey County, California

Figure 2. Well Site Features

MONTGOMERY & ASSOCIATES

2025

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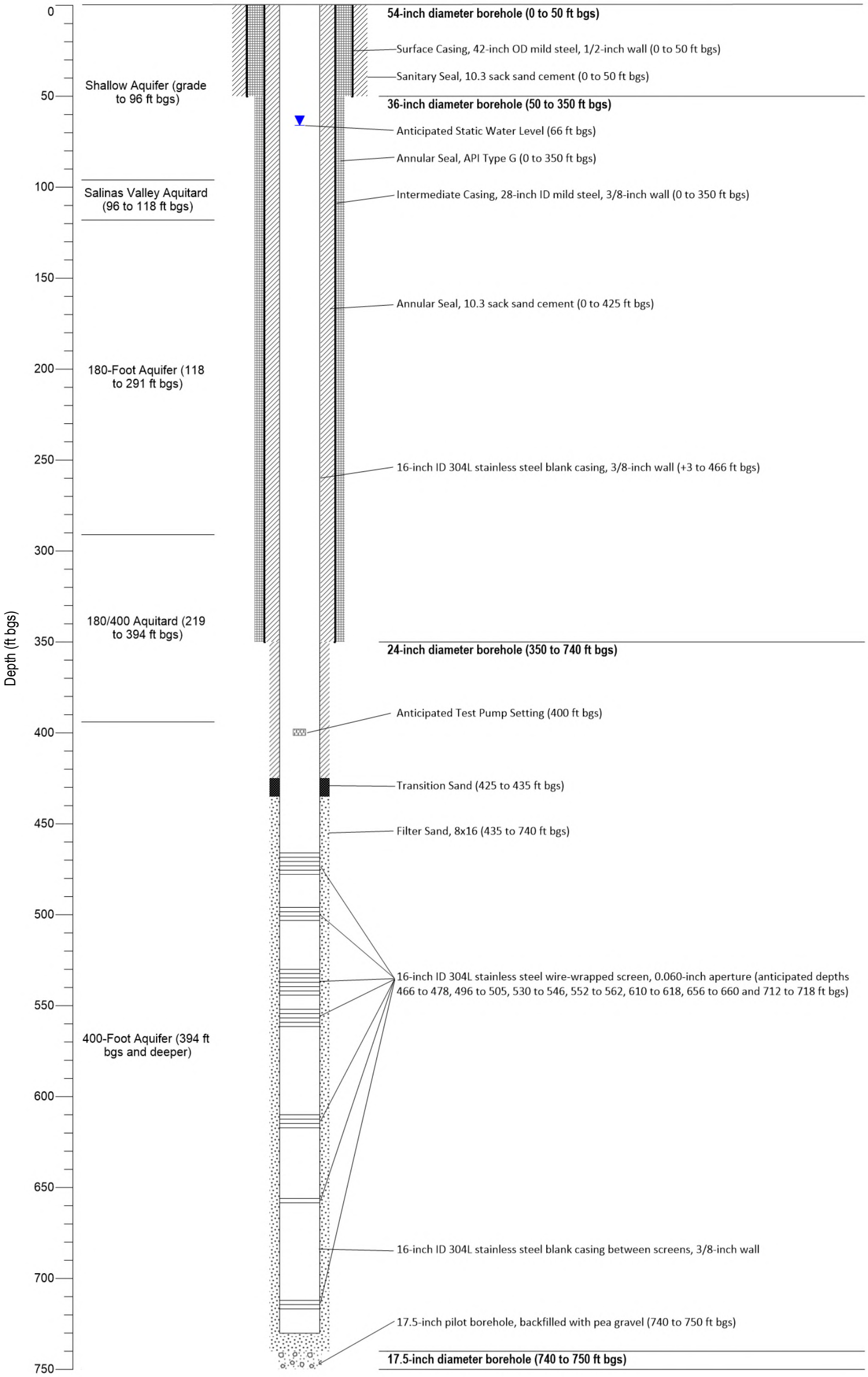

Monterey County Water Resources Agency

Monterey County, California

MONTGOMERY & ASSOCIATES

2025

Figure 3. Preliminary Schematic for Well 11B02

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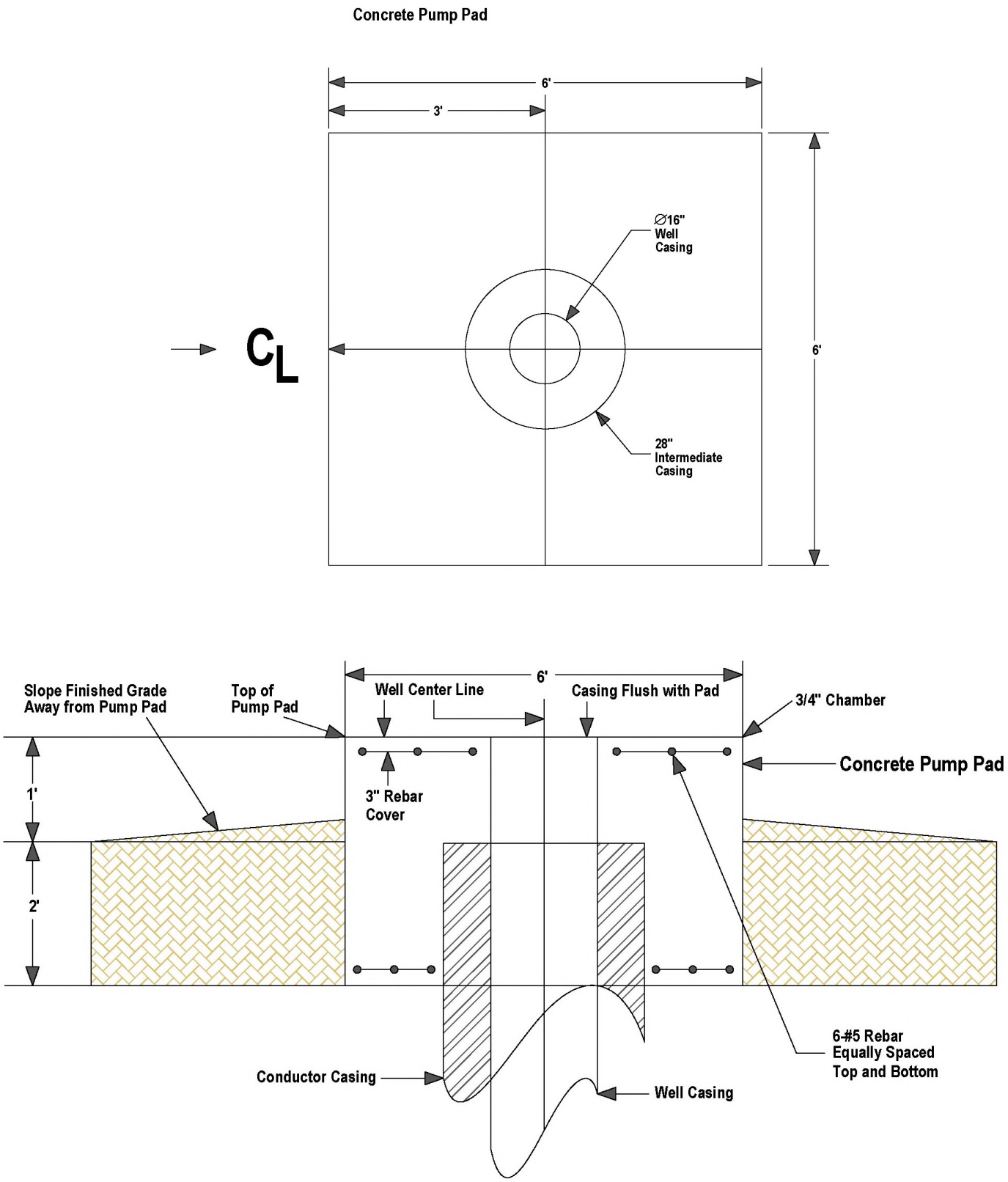

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Monterey County Water Resources Agency
Monterey County, California

MONTGOMERY & ASSOCIATES

2025

Figure 4. Pump Pad Schematic

Appendix A: Information on Existing Well 11B01 Including Well Completion Report, Color Video Survey

Well 11B01 is a cable tool, 16-inch diameter well drilled in 1992. The well is drilled in the 180/400 Foot Pressure Aquifers, while only being perforated in the 400-foot aquifer. The borehole was drilled to a depth of 822 feet and completed to that same depth. The well has a 300-foot cement sanitary seal, and perforations intermittently from 466 feet to 718 feet below grade. The original well design flow was for a production capacity of 1700 GPM with mills knife perforations of an undisclosed aperture slot.

In March 2024, the well was reported by the onsite recycled water user to be pumping large quantities of sand into their irrigation system, clogging their valves and irrigation lines. The well pump was pulled to investigate, and the well was discovered to have collapsed at 487 feet bgs. This was just below the first set of perforations.

At the time of the collapse, the well was being pumped at 1,500 gpm using a 10-inch vertical line shaft pump, 200 horsepower motor and pump intake of 390 feet bgs. Sand testing using this configuration and a Rossum Sand Tester showed high sand production, filling the tester tube in approximately 5 seconds. AGENCY believes sand production will be significantly lower during use as a drilling water supply when configured for a lower flow requirement and shallower pump setting. However, CONTRACTOR is advised this configuration has not been tested by AGENCY to date.

14S/2E-11B1

QUADRUPLICATE
Use to comply with local requirements

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in

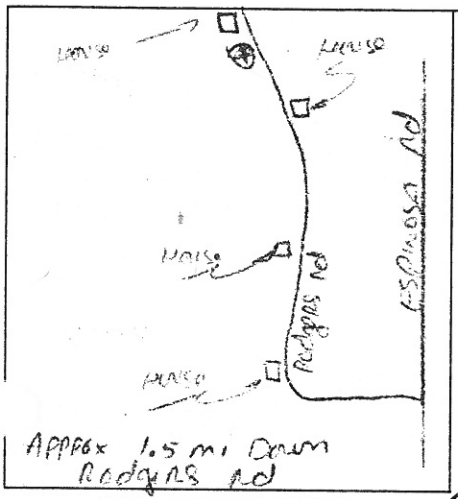
No. 361841

tice of Intent No.
Local Permit No. or Date # 6736

State Well No. 14S/2E-11B1
Other Well No. 400FOOTAQUIFER

(1) OWNER: Name CHATTEN & BOGGIOTTO
Address P.O. BOX 2166
City SALINAS CA ZIP 93902

(2) LOCATION OF WELL (See instructions):
County MONTEREY Owner's Well Number
Well address if different from above Rodgers Road
Township Range Section
Distance from cities, roads, railroads, fences, etc.



Approx 1.5 mi Down Rodgers Rd
WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☑ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☐
Irrigation ☑
Industrial ☐
Test Well ☐
Municipal ☐
Other ☐
(Describe)

(5) EQUIPMENT:
Rotary ☐ Reverse ☐
Cable ☑ Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☐ No ☑ Size
Diameter of bore
Packed from ft. to ft.

(7) CASING INSTALLED:
Steel ☑ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
0	52	24	10/250
0	300	20	10/250
0	518	16	10/250

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Slot size
466	478	
505	514	
530	546	

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☑ No ☐ If yes, to depth 52 ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval ft.
Method of sealing NEAT CEMENT

(10) WATER LEVELS:
Depth of first water, if known ft.
Standing level after well completion ft.

(11) WELL TESTS:
Was well test made? Yes ☑ No ☐ If yes, by whom? AESOP PUMP
Type of test Pump ☑ Bailer ☐ Air lift ☐
Depth to water at start of test 134 ft. At end of test 134 ft.
Discharge 2400 gal/min after 8 hours Water temperature
Chemical analysis made? Yes ☒ No ☐ If yes, by whom?
Was electric log made Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 522 ft. Completed depth 522 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	3	TOPSOIL
3	26	Yellow white clay
26	32	Sandy yellow clay
32	76	Yellow Sand (DRY)
76	84	Sand Fine Gravel (WATER)
84	94	Fine Brown Sand
94	96	Yellow Clay
96	114	Blue Clay
114	118	Blue yellow clay
118	124	Yellow clay
124	128	Sand fine gravel
128	134	Hard yellow clay
134	152	Sand red clay
152	214	Red hard Hard spots
214	288	Yellow Clay, sandstone
288	291	Fine gravel
291	324	Yellow brown clay
324	328	Sandy red clay
328	394	Yellow red clay
394	409	Yellow red clay
409	426	Sand fine gravel clay
426	435	White yellow clay
435	440	White clay
440	448	Tight Sand fine gravel (1")
448	458	Yellow clay
458	462	White clay
462	466	Tight Sand fine gravel
466	478	Sandy brown clay
478	496	Hard Sand 1" gravel
496	505	Yellow white clay
505	514	Sand fine gravel
514	518	Yellow white clay
518	530	Sand gravel clay
530	546	Packed Sand
546		Sand gravel, clay 3-4" Rock

Work started 5-29-92 19 Completed 8-6 19 92

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Signed (Well Driller)
NAME BOB AESOP PUMP & DRILLING INC (Person, firm, or corporation) (Typed or printed)
Address 1502 ABBOTT ST.
City SALINAS, CA ZIP 93901
License No. 569945 Date of this report 1/10/92

DWR 188 (REV. 12-86) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM 86 96355

B+W

14S/2E-11B1

QUADRUPLICATE
Use to comply with local requirements

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Do not fill in
No. 361842

Notice of Intent No. _____
Local Permit No. or Date # 6736

State Well No. _____
Other Well No. 400 FOOT AQUIFER

(1) OWNER: Name GUGLIERMO & BOGGIOTTO
Address P.O. BOX 2266
City SALINAS, CA ZIP 93902

(2) LOCATION OF WELL (See instructions):
County MONTEREY Owner's Well Number _____
Well address if different from above Rodgers Road
Township _____ Range _____ Section _____
Distance from cities, roads, railroads, fences, etc. _____

(3) TYPE OF WORK:
New Well ☑ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☑
Irrigation ☑
Industrial ☐
Test Well ☐
Municipal ☐
Other ☑
(Describe)

WELL LOCATION SKETCH

(5) EQUIPMENT:
Rotary ☐ Reverse ☐
Cable ☑ Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☐ No ☑ Size: _____
Diameter of bore _____
Packed from _____ to _____ ft.

(7) CASING INSTALLED:
Steel ☐ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Slot size
552	562	
610	618	
656	660	
712	718	

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☐ No ☐ If yes, to depth _____ ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval _____ ft.
Method of sealing _____

(10) WATER LEVELS:
Depth of first water, if known _____ ft.
Standing level after well completion _____ ft.

(11) WELL TESTS:
well test made? Yes ☐ No ☐ If yes, by whom? _____
e of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test _____ ft. At end of test _____ ft.
Discharge _____ gal/min after _____ hours Water temperature _____
Chemical analysis made? Yes ☐ No ☐ If yes, by whom? _____
Was electric log made Yes ☐ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth 822 ft. Completed depth 822 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
546	552	YELLOW WHITE Clay
552	562	Sand, fine gravel, Clay
562	602	Red Clay
602	606	Red Course Sand Clay
606	610	Brown WHITE Course Sand
610	618	WHITE sand fine gravel
618	626	Brown Clay
626	640	Sand
640	646	RED Clay, some gravel
646	650	YELLOW Red Clay
650	656	Sand
656	660	Sand, Gravel 2" PACK
660	674	Sandy Clay / Clay
674	712	WHITE Brown clay, layers of Sandstone
712	718	Sand, gravel 1-2" PACK
718	726	Brown Clay
726	744	WHITE Brown Clay layers of Sandstone
744	748	packed Sand
748	822	YELLOW Brown Clay Layers of Sandstone

Pg 2 of 2

Work started 5-29-92 19 Completed 8-6 19 92

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Signed _____ (Well Driller)
NAME BOB ALSOP PUMP & DRILLING, INC (Person, firm, or corporation) (Typed or printed)
Address 1508 ABBOTT ST
City SALINAS, CA ZIP 93901
License No. 562615 Date of this report 9/10/92

CONFIDENTIAL NOT FOR PUBLIC USE WATER CODE SEC. 13752

DWR 188 (REV. 12-86) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM 86 96355

Newman Well Surveys

Video Survey Report

Company:	Salinas Pump Company	**Date:**	3-Apr-24
Well:	CSIP # 11B01	**Run No.**	Three
Field:	Castroville	**Job Ticket:**	76350
State:	California	**Total Depth:**	487.8 ft
		Water Level:	66.3 ft
Location:	Rodgers Rd, Salinas, CA	**Elevation:**	41.0 ft
		lat 36.736099°	lon -121.714380°
Zero Datum:	Top of casing	**Tool Zero:**	Side view lens (Add 1.5 ft. to downward view)
Reason for Survey:	General Inspection		

Depth	Remarks
0.0 ft	15 ½" Steel casing.
66.3 ft	Water level.
472.2 ft	Perforations begin, continue to bottom.
487.8 ft	Casing collapse, camera cannot continue