SPECIFICATIONS FOR

COUNTY OF NEVADA

McCOURTNEY ROAD LANDFILL
WATER SUPPLY WELL
DRILLING, INSTALLATION, DEVELOPMENT AND PUMP TESTING

14741 WOLF MOUNTAIN ROAD
GRASS VALLEY, CALIFORNIA

OCTOBER 2021

PREPARED FOR:

COUNTY OF NEVADA
DEPARTMENT OF PUBLIC WORKS
950 MAIDU AVENUE
NEVADA CITY, CA 95959
(530) 265-6911

PREPARED BY:

PROFESSIONAL GEOLOGIST
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SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SUMMARY

Section Includes: Description of bid items, measurement and payment.

1.02 MEASUREMENT AND PAYMENT

All measurements will be based on completed work performed in strict accordance with the Specifications. Payment will be made for bid items only. Bid item amounts shall include materials, equipment and labor necessary to complete the Work and all incidentals.

1.03 BASE BID ITEM DESCRIPTION (TEST HOLE NO. 1)

A. Contractor mobilization/demobilization and obtaining drilling permit – Bid Item No. 1

1. Description: This item includes, but is not necessarily limited to, all work associated with the test hole permitting, site access and site preparation, onsite disposal of air rotary drill cuttings and water, mud pit construction (if necessary), safety and site control, site preparation and restoration. Contractor shall contact Underground Service Alert, have all utilities marked by respective utility owners, pay all required fees, and shall notify Engineer of any conflicts seven days prior to any excavation.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based upon the lump sum bid amount.

B. Drill 8.5-inch minimum diameter borehole – Bid Item No. 2

1. Description: This item includes, but is not necessarily limited to, all work associated with the drilling of the 8.5-inch minimum diameter borehole per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.
2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.
3. Payment: Based on the unit price and VF of drilling.

C. Set temporary 6-inch diameter PVC casing with rubber boot at bottom of 8.5-inch minimum diameter borehole – Bid Item No. 3

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing and installing temporary 6-inch diameter PVC casing within the 8.5-inch minimum diameter borehole per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of final depth of 8.5-inch borehole.

D. Drill 6-inch minimum diameter borehole from bottom of 8.5-inch borehole – Bid Item No. 4

1. Description: This item includes, but is not necessarily limited to, all work associated with the drilling of the 6-inch minimum diameter borehole and installation of the temporary conductor casing per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of drilling.

E. Collect composite groundwater samples –Bid Item No. 5

1. Description: This item includes, but is not necessarily limited to, all work associated with collecting composite groundwater samples from water leaving fracture zones in the borehole as directed by the County's representative. Sample bottles, handling, and testing will be providing by the County.

2. Measurement: Each time drilling operations are suspended and air lifting is undertaken to produce a measurable flow of water to accommodate sample testing will be considered as one unit of sample taking regardless of number of sample bottles filled.

3. Payment: Based on the unit price per sampling event.

F. Well development and air lift testing – Bid Item No. 6

1. Description: This item includes, but is not necessarily limited to, all work associated with test hole development at new water bearing zones (up to 3) to facilitate collection of a low turbid groundwater sample and air lift water flow testing of the completed borehole.

2. Measurement: Shall be based on hours of air lift testing performed as directed by County's Representative.

3. Payment: Based on an hourly rate.

G. Drill 12-inch minimum diameter borehole (If directed by County or County's Representative) – Bid Item No. 7

1. Description: This item includes, but is not necessarily limited to, all work associated with the drilling of the 12-inch minimum diameter borehole and installation of the permanent conductor casing per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of drilling.

H. Furnish and install 6-inch minimum diameter steel conductor casing (If directed by County or County's Representative) – Bid Item No. 8

1. Description: This item includes, but is not necessarily limited to, all work associated with installation of the conductor casing per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of casing installed and certified in conformance by the County's Representative.

I. Install grout seal for conductor casing (If directed by County or County's Representative) – Bid Item 9

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing and installing the grout seal per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of grout seal installed and certified in conformance by the County's Representative.

J. Drill/Ream 6-inch minimum diameter boring from the bottom of the conductor casing to target well depth (estimated 500 feet), hard rock drilling (If directed by County or County's Representative) – Bid Item No. 10

1. Description: This item includes, but is not necessarily limited to, all work associated with the drilling of the well per Section 02671, CONDUCTOR CASING INSTALLATION, WELL DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on VF measured by the County's Representative from bottom of conductor casing borehole.

3. Payment: Based on the unit price and VF of drilling completed.

K. Optional video camera survey, plumbness and alignment testing – Bid Item No. 11

1. Description: This item includes, but is not necessarily limited to, all work associated with the video camera survey and the plumbness and alignment testing for one test hole as described in Section 02672, VIDEO CAMERA SURVEY, PLUMBNESS AND ALIGNMENT TESTS (WITH ABANDONMENT PROCEDURES).

2. Measurement: Shall be based on the entire suite of logs completed. If all logs are not completed to the satisfaction of County's Representative, the amount will be pro-rated and reduced based on tests not performed.

3. Payment: Based on the lump sum bid amount.

L. Furnish pump, flow meter and appurtenances for test pumping, 10 day test – Bid Item No. 12 (Optional)

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing the pump, discharge piping, flow meter, power, and appurtenances for the performance of capacity step-testing and a 10 day constant test pumping as described in Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING. (CCR, Title 22, Section 64554). The County will provide the labor for running the tests and data logging equipment.

2. Measurement: Shall be based on lump sum for the completed work described above.

3. Payment: Based on the lump sum bid amount.

1.04 ALTERNATE BID ITEMS (TEST HOLE NO. 1) IN LIEU OF BID ITEM L UNDER SECTION 1.03

A. Furnish pump, flow meter and appurtenances for test pumping, 72 hour test – Alternate Bid Item No. 13

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing the pump, discharge piping, flow meter, power, and appurtenances for the performance of capacity step-testing and a 72 hour constant test pumping as described in Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING. (CCR, Title 22, Section 64554). The County will provide the labor for running the tests and data logging equipment.

2. Measurement: Shall be based on lump sum for the completed work described above.

3. Payment: Based on the lump sum bid amount.

B. Furnish pump, flow meter and appurtenances for test pumping, 24 hour test – Alternate Bid Item No. 14

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing the pump, discharge piping, flow meter, power, and appurtenances for the performance of capacity step-testing and a 72 hour constant test pumping as described in Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING. (CCR, Title 22, Section 64554). The County will provide the labor for running the tests and data logging equipment.

2. Measurement: Shall be based on lump sum for the completed work described above.

3. Payment: Based on the lump sum bid amount.

1.05 ADDITIVE BID ITEMS (TEST HOLE NO. 1)

A. Furnish and install 4-inch blank and screened well casing, filter pack, annular seals and all incidentals required to complete cased well (if casing is deemed necessary) – Additive Bid Item Nos. A1 through A3.

1. Description: This item includes, but is not necessarily limited to, all work associated with the placement of well casing, filter pack, annular seals and all incidentals, should the well be cased, per Figure 3 and Section 02671, CONDUCTOR CASING INSTALLATION, WELL DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on completion of cased well per foot in accordance with Figure 3 and as directed by the County's Representative.

3. Payment: Based on the unit price and VF of cased well completed.

B. Borehole abandonment – Additive Bid Item No. A4

1. Description: This item includes, but is not necessarily limited to, all work associated with the borehole abandonment in accordance with Section 02672, VIDEO CAMERA SURVEY, PLUMBNESS AND ALIGNMENT TESTS (WITH ABANDONMENT PROCEDURES).

2. Measurement: Shall be based on VF measured by the County's Representative.

3. Payment: Based on the unit price/VF installed.

1.06 ADDITIVE BID ITEMS (TEST HOLE NO. 2); TO BE LOCATED ON SITE.

A. Contractor mobilization/demobilization, obtaining drilling permit, furnish temporary conductor casing – Bid ItemNo. B1

1. Description: This item includes, but is not necessarily limited to, all work associated with the test hole permitting, site access and site preparation, onsite disposal of air rotary drill cuttings and water, mud pit construction (if necessary), safety and site control, site preparation and restoration. Contractor shall contact Underground Service Alert, have all utilities marked by respective utility owners, pay all required fees, and shall notify Engineer of any conflicts seven days prior to any excavation.

2. Measurement: Shall be lump sum for the completed work described above.

3. Payment: Based upon the lump sum bid amount.

B. Drill 8.5-inch minimum diameter borehole – Bid Item No. B2

1. Description: This item includes, but is not necessarily limited to, all work associated with the drilling of the 8.5-inch minimum diameter borehole per

Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of drilling.

C. Set temporary 6-inch diameter PVC casing with rubber boot at bottom of 8.5-inch minimum diameter borehole – Bid Item No.B3

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing and installing temporary 6-inch diameter PVC casing within the 8.5-inch minimum diameter borehole per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of final depth of 8.5-inch borehole.

D. Drill 6-inch minimum diameter borehole from bottom of 8.5-inch borehole – Bid Item No. B4

1. Description: This item includes, but is not necessarily limited to, all work associated with the drilling of the 6-inch minimum diameter borehole and installation of the temporary conductor casing per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of drilling.

E. Collect composite groundwater samples –Bid Item No. B5

1. Description: This item includes, but is not necessarily limited to, all work associated with collecting composite groundwater samples from water leaving fracture zones in the borehole as directed by the County's representative. Sample bottles, handling, and testing will be providing by the County.

2. Measurement: Each time drilling operations are suspended and air lifting is undertaken to produce a measurable flow of water to accommodate sample testing will be considered as one unit of sample taking regardless of number of sample bottles filled.

3. Payment: Based on the unit price per sampling event.

F. Well development and air lift testing – Bid Item No. B6

1. Description: This item includes, but is not necessarily limited to, all work associated with test hole development at new water bearing zones (up to 3) to

facilitate collection of a low turbid groundwater sample and air lift water flow testing of the completed borehole.

2. Measurement: Shall be based on hours of air lift testing performed as directed by County's Representative.

3. Payment: Based on an hourly rate.

G. Drill 12-inch minimum diameter borehole (If directed by County or County's Representative) – Bid Item No. B7

1. Description: This item includes, but is not necessarily limited to, all work associated with the drilling of the 12-inch minimum diameter borehole and installation of the permanent conductor casing per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of drilling.

H. Furnish and install 6-inch minimum diameter steel conductor casing (If directed by County or County's Representative) – Bid Item No. B8

1. Description: This item includes, but is not necessarily limited to, all work associated with installation of the conductor casing per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of casing installed and certified in conformance by the County's Representative.

I. Install grout seal for conductor casing (If directed by County or County's Representative) – Bid Item B9

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing and installing the grout seal per Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on vertical foot (VF) measured by the County's Representative from ground surface.

3. Payment: Based on the unit price and VF of grout seal installed and certified in conformance by the County's Representative.

J. Drill/Ream 6-inch minimum diameter boring from the bottom of the conductor casing to target well depth (estimated 500 feet), hard rock drilling (If directed by County or County's Representative) – Bid Item No. B10

1. Description: This item includes, but is not necessarily limited to, all work associated with the drilling of the well per Section 02671, CONDUCTOR CASING INSTALLATION, WELL DRILLING AND TEST PUMPING.
2. Measurement: Shall be based on VF measured by the County's Representative from bottom of conductor casing borehole.
3. Payment: Based on the unit price and VF of drilling completed.

K. Optional video camera survey, plumbness and alignment testing – Bid Item No. B11

1. Description: This item includes, but is not necessarily limited to, all work associated with the video camera survey and the plumbness and alignment testing for one well as described in Section 02672, VIDEO CAMERA SURVEY, PLUMBNESS AND ALIGNMENT TESTS (WITH ABANDONMENT PROCEDURES).
2. Measurement: Shall be based on the entire suite of logs completed. If all logs are not completed to the satisfaction of County's Representative, the amount will be pro-rated and reduced based on tests not performed.
3. Payment: Based on the lump sum bid amount.

L. Furnish pump, flow meter and appurtenances for test pumping, 10 day test – Bid Item No. B12

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing the pump, discharge piping, flow meter, power, and appurtenances for the performance of capacity step-testing and a 10 day constant test pumping as described in Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING. (CCR, Title 22, Section 64554). The County will provide the labor for running the tests and data logging equipment.
2. Measurement: Shall be based on lump sum for the completed work described above.
3. Payment: Based on the lump sum bid amount.

1.07 ALTERNATE BID ITEMS (TEST HOLE NO. 2) IN LIEU OF BID ITEM L UNDER SECTION 1.06

A. Furnish pump, flow meter and appurtenances for test pumping, 72 hour test – Alternate Bid Item No. B13

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing the pump, discharge piping, flow meter, power, and appurtenances for the performance of capacity step-testing and a 72 hour constant test pumping as described in Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING. (CCR, Title 22, Section 64554). The County will provide the labor for running the tests and data logging equipment.

2. Measurement: Shall be based on lump sum for the completed work described above.

3. Payment: Based on the lump sum bid amount.

B. Furnish pump, flow meter and appurtenances for test pumping, 24 hour test – Alternate Bid Item No. B14

1. Description: This item includes, but is not necessarily limited to, all work associated with furnishing the pump, discharge piping, flow meter, power, and appurtenances for the performance of capacity step-testing and a 24 hour constant test pumping as described in Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING. (CCR, Title 22, Section 64554). The County will provide the labor for running the tests and data logging equipment.

2. Measurement: Shall be based on lump sum for the completed work described above.

3. Payment: Based on the lump sum bid amount.

1.08 ADDITIVE BID ITEMS (TEST HOLE NO. 2)

A. Furnish and install 4-inch blank and screened well casing, filter pack, annular seals and all incidentals required to complete cased well (if casing is deemed necessary) – Additive Bid Item Nos. C1 through C3.

1. Description: This item includes, but is not necessarily limited to, all work associated with the placement of well casing, filter pack, annular seals and all incidentals, should the well be cased, per Figure 3 and Section 02671, CONDUCTOR CASING INSTALLATION, WELL DRILLING AND TEST PUMPING.

2. Measurement: Shall be based on completion of cased well per foot in accordance with Figure 3 and as directed by the County's Representative.

3. Payment: Based on the unit price and VF of cased well completed.

B. Borehole abandonment – Additive Bid Item No. C4

1. Description: This item includes, but is not necessarily limited to, all work associated with the borehole abandonment in accordance with Section 02672, VIDEO CAMERA SURVEY, PLUMBNESS AND ALIGNMENT TESTS (WITH ABANDONMENT PROCEDURES).

2. Measurement: Shall be based on VF measured by the County's Representative.

3. Payment: Based on the unit price/VF installed.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01110
SUMMARY, MOBILIZATION AND SPECIAL CONDITIONS

PART 1 – GENERAL

1.01 SUMMARY

A. Scope of Work: This contract work includes the permitting, drilling, construction, development, and pump testing of a test hole for the McCourtney Road Landfill in Nevada County, California (see Figure 1). A second test hole will be drilled on site if the first borehole fails to meet the design demand. Test holes may be converted to an uncased or cased well, as appropriate.

B. Work shall conform to American Water Works Association (AWWA) Standards for Water Wells, A100 (latest edition). In case of conflict between the requirements of this section and those of the AWWA Standards, the requirements of this Section shall prevail. The "County's Representative" is defined as the County staff, or the engineer or geologist that has been designated as responsible party for the oversight and approval of activities during site operations.

C. The work shall be complete and include all labor, materials, and services not expressly shown or called for in the Contract Documents which may be necessary for the complete and proper construction. Work in good faith shall be completed and performed, furnished, and installed by the Contractor as though originally so specified or shown, at no increase in cost to the County.

1. Work sequence and items per Contract Documents:

   The work required for the construction of a test hole and well with an intended use as a potable water supply will include, but not be limited to, the following items (see Figure 2):

   a. Contact Underground Services Alert (USA) so they can advise their subscribers of the planned drilling activities.
   b. Mobilize to provide temporary facilities and demobilize from site.
   c. Clear the site of all obstructions as necessary for completion of the work.
   d. Drill test hole to locate water
      1) At the designated location and to the depth directed by the County's Representative, drill 6-inch minimum diameter test hole with temporary conductor casing using an air rotary or equivalent method; collect the drill cuttings at 10-foot intervals and when changes in lithology type are detected. Prepare a lithologic log for each location.
      2) Collect composite water samples as water bearing fractures are encountered during air rotary drilling only.
      3) Develop well and flow testing by air lifting.

4) Perform plumbness and alignment surveys for the pump chamber of the well (optional if directed by County's Representative).
5) Perform a video camera survey of the well (optional if directed by County's Representative).

e. Perform a 24 hour or 72 hour or 10 day constant pumping test as outlined in these specifications.
f. Install conductor casing:
   1) Drill 12-inch borehole to approximately 100 feet or as directed by the County's Representative.
   2) Install 6-inch conductor casing, bentonite seal and 10.3 sack cement seal.
g. Case the well, if necessary, per the specifications.
h. Disinfect the well.
i. Provide and install locking cover to the well casing and threaded end caps for the filter fill and sounding pipes.
j. Return site to pre-drilling conditions. Any excavations shall be emptied and backfilled with compacted suitable materials.
k. Abandon borehole if directed.

D. Related Specifications
   1. Section 02671, CONDUCTOR CASING INSTALLATION, WELL DRILLING AND TEST PUMPING
   2. Section 02672, VIDEO CAMERA SURVEY, PLUMBNESS AND ALIGNMENT TESTS (WITH ABANDONMENT PROCEDURES)

E. Measurement and payment is discussed in Section 01025, MEASUREMENT AND PAYMENT. All bid items and quantities are optional items. Actual work items and quantities will be as directed by the County's Representative.

F. Test Hole Site Location: See Figure 2.

1.02 CONTRACT METHOD, MEASURE AND PAYMENT

The Work shall be performed using a bid price determined from this packet outlined within. Contracting shall be with the County as referenced in Paragraph 1.03. All materials and subcontractors are also to be contained within Contractor's bid. Measurement and paymentdetails are provided in Section 01025, MEASUREMENT AND PAYMENT, and the Bid Form.

1.03 OWNER, PERSONNEL AND CONTRACTOR DEFINED

A. Owner is:

County of Nevada
Department Of Public Works
950 Maidu Avenue
Nevada City, CA 95959
Attn: David Garcia, Program Manager

B. For the purposes of this project and specification, the term County's Representative is synonymous with any person indicated below:

1. Heidi Cummings, NV5, Inc., 792 Searls Avenue, Nevada City, CA 95959. Phone: (530) 894-2487.
2. Craig Bourne, P.G., or to be determined, NV5 Inc., 792 Searls Avenue, Nevada City, CA 95959. Phone: (530) 478-1305.

C. Contractor shall be a qualified Well Drilling Contractor with a valid California C-57 Well Drilling License with the required experience in similar well installation and development.

1.04 PRECONSTRUCTION MEETING

A. The Contractor shall contact the County's Representative to arrange for a meeting date and time. The meeting shall occur no later than 14 calendar days after the Award of the Contract.

B. The Contractor's superintendent for this project shall be present and shall have reviewed the Contract Documents and be prepared to discuss the work and deliver submittals.

C. The Contractor shall submit the following at or before the preconstruction meeting.

1. Construction schedule consistent with the contract time of completion and anticipated sequence of work.
2. Methods of access to the construction site and working hours.
3. Methods for disposal of drill cuttings.
4. Methods for disposal of water from development and testing procedures.
5. Methods of sample collection.
6. Temporary facilities and water sources.
7. Drilling permits.
8. Physical and chemical properties of products, casing, and sealing material.

1.05 SUBMITTALS (Refer to Section 02671 through 02672 for detail)

The County's Representative shall review and return submittals to the Contractor in a prompt and diligent fashion; however, the Contractor should allow ten working days for review of submittals from the time of receipt by County's Representative. Upon request, expedited review of select submittals can be provided to meet project schedules; however, the County's Representative must be informed of the items that require an expedited submittal review during the preconstruction meeting. All submittals shall be provided to the County's Representative within 10 business days of the contract start date.

1.06 PERMITS

A. The Contractor shall obtain all permits in accordance with the laws and regulations governing the work.

B. A well permit is required from Nevada County.

1.07 PERSONNEL AND EQUIPMENT

Air rotary drilling equipment shall be in good condition and of sufficient equipment capacity to perform the work required by these specifications. All drilling equipment, including mast and draw works, drilling fluid pumps, drill pipe, etc., must be of the size, capacity, and condition to drill and set casing to required depths. Contractor shall furnish documentation regarding capacity of various components of the drilling equipment. Rigs shall be equipped with a weight indicator. Drill rigs shall have the ability to lift and land anticipated casing loads without the use of float plugs or similar devices.

Contractor shall employ competent workmen for project execution. Contractor shall designate one person, who shall have full decision making authority, to be his representative on the jobsite on a daily basis. This person shall serve as Drilling Superintendent and his phone number shall be given to the County's Representative for emergency notification.

1.08 PERFORMANCE OF WORK

Should a test hole be lost due to fault of the Contractor, that hole shall be abandoned and another hole constructed in the immediate area. New drilling sites shall be approved by the County's Representative prior to drill rig setup. Cost of extending substitute test holes to the depth and status of the lost test hole shall not be considered for payment.

1.09 PROTECTION OF WORK

Contractor shall provide means of protecting the test holes and casing assemblies, when installed, from entrance of foreign objects.

1.10 DRILLING FLUID, WATER DISPOSAL, AND DRAINAGE

The effluent produced by the drilling, developing, and testing shall not be discharged onto streets or into off site drainage ways. In general the effluent water will be directed to an onsite drainage course adjacent to the test hole site that flows to an existing detention basin on the County's property.

1.11 TEMPORARY SITE CONTROL

Work activities shall not require special security. Contractor shall provide temporary site control to protect equipment and materials.

1.12 RIGHT TO CANCEL WORK OR BID ITEMS

The County or County's Representative may choose to cancel a portion or all of the work associated with this Contract and shall provide no compensation to the Contractor for worknot performed.

1.13 SITE RESTORATION

Contractor shall restore site to original condition. Restoration activities shall include, but not necessarily be limited to, the following:

A. Any pits orsurface excavations shall be backfilled and compacted with properly moisture-conditioned material. Compact to at least 90 percent relative compaction of ASTMD1557-02.

B. Shovel and rake cuttings to blend in with surrounding surface soils.

C. Re-grade areas disturbed by drilling activities.

D. Remove rubbish, unused materials, and other unlike materials belonging to Contractor or used under Contractor's direction during construction.

E. Secure well site with new fencing as shown on the drawings.

END OF SECTION

SECTION 02671
CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the labor, material, transportation, supplies, equipment and appurtenances necessary for the drilling and construction of up to two wells including the following major components:

1. Mobilization with temporary surface casing.
2. Drill with air rotary in soil and weathered rock underlain by greenstone (metamorphic) bedrock.
3. Installation of Conductor Casing to a depth of at approximately 100 feet, or as directed by the County's Representative based on the encountered borehole conditions.
4. Drilling one 6-inch diameter boring, approximately 500 feet deep. Cleaning of boring as necessary.
5. Completion of composite sampling during drilling. Sample bottles will be provided by the County's Representative.
6. Abandonment of first borehole and drilling of second borehole, if necessary, shall be based on borehole geology and findings during drilling and as directed by County's Representative.
7. Ream and case borehole if necessary, based on borehole geology and findings during drilling and as directed by County's Representative.

B. Related Specification Sections

1. Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING
2. Section 02672, VIDEO CAMERA SURVEY, PLUMBNESS AND ALIGNMENT TESTS (WITH ABANDONMENT PROCEDURES)

C. Measurement and payment details are provided in Section 01025,MEASUREMENT AND PAYMENT.

1.02 QUALITY ASSURANCE

A. **Referenced Standards**

1. ASTM International (ASTM)
   a. ASTM A 53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

b. ASTM A139 – Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe

c. ASTM C150 – Portland Cement

d. ASTM C33 – Concrete Aggregates

e. ASTM D1784 – Standard Specification for Rigid PVC Compounds and Chlorinated PVC Compounds.

f. ASTM F480 – Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios(SDR), SCH 40 and SCH 80.

2. American Water Works Association (AWWA)

   a. AWWA C-654 – Disinfection of Wells

   b. AWWA A-100 – Standard for Water Wells

3. State of California

   a. Bulletin 74-81 – Water Well Standards

   b. Bulletin 74-90 – Water Well Standards (Supplement to Bulleting74-81)

   c. Central Valley Regional Water Quality Control Board, ResolutionNo. R5-2013-0145, Approving Waiver Of Reports Of Waste Discharge And Waste Discharge Requirements For Specific TypesOf Discharge Within The Central Valley Region

4. Environmental Protection Agency (EPA)

   a. Manual of Water Well Construction Standards

1.03 SUBMITTALS

The Contractor shall submit information to substantiate compliance with these specifications to the County's Representative. In addition the following specificinformation shall be required:

A. Conductor casing: materials, dimensions, details, and appurtenances.

B. Drilling fluid or foam additives.

C. Composite well sampling procedures during drilling

D. Complete driller's log report.

E. Disinfection product and method of use.

F. Abandonment method and materials

PART 2 – PRODUCTS

2.01 MATERIALS

A. General

All chemicals and products that will be added to or come in contact with drinking

water, including but not limited to the conductor casing, shall be certified to meet NSF International (NSF) Standard 60 for direct additives or NSF Standard 61 for indirect additives.

B. Conductor Casing

1. The steel plate used in the fabrication of the conductor casing shall be new and have a minimum thickness of ¼-inch and shall meet the requirements of ASTM A53, Grade B, or ASTM A139, Grade B.
2. No hydrostatic testing of the conductor casing is required for this project.
3. The steel conductor casing shall have the following dimensions and/orproperties:
    a. 12-inch minimum inside diameter (I. D.) or as needed to drill a 11-inch minimum diameter hole into lower portion of the borehole.
    b. The conductor casing shall be in lengths of not less than 10 feet unless a short piece is required to obtain the specified casing amount.
    c. The steel pipe shall be manufactured with collars for field welding.

C. Surface Sanitary Seal for Conductor Casing

Cement seals shall be composed of 10.3 sack cement mix grout. The Contractor may use quick-setting cement, retardants to setting, and other additives including hydrated lime (up to 10% of the volume of the cement) to make the mix more fluid. Bentonite, at a rate not to exceed 5% of the cement volume, may be used to make the mix more fluid and reduce shrinkage.

High solid bentonite chips or slurry can be used for the intermediate and transitional seals placed below a depth of 100 feet.

D. Well Casing

Steel Well Casing shall be 6-inch I.D. steel casing with minimum 1/4-inch wall thickness. Casing metal shall conform to ASTM A139 Grade B, and contain not less than 0.20% copper by ladle analysis. Welding shall be by automatic submerged-arc process using at least one pass and completed by a certified welder. Casing shallbe as manufactured by Roscoe Moss Company, or approved equal.

Polyvinyl Chloride (PVC) Well Casing shall be fabricated from Schedule 80 PVC, 4-inch I.D. and flush threaded with O-ring seals. Casing shall be as manufactured by Monoflex, or approved equal.

Casings stored at the jobsite shall be elevated and not in contact with the groundsurface.

E. Well Screen

The PVC well screen shall be fabricated from Schedule 80 PVC, 4-inch I.D. and flush threaded with O-ring seals. Casing shall be as manufactured by Monoflex, or approved equal.

Screen openings in the casing shall be machine made, horizontal to the casingaxis, 0.030-inch aperture size, with a spacing of ¼ inch.

Screens stored at the jobsite shall be elevated and not in contact with the ground surface. Plastic covering shall be used to protect the casing.

F. Annular Space Requirements – Cased Well

The annular space requirements are the following: (1) the annular space shall be open to the borehole wall. No filter pack or bentonite seal is required.

G. Gravel Pack – Not Required

H. Water

Water shall be from an approved source that meets California Code of Regulations Title 22 water quality standards for a community water system. Water from agricultural wells or non-potable sources shall not be used during drilling. Water from County's well may be used with authorization from the County.

I. Development and Pump Test Equipment

The Contractor shall furnish development and pumping equipment including swabbing, air development equipment, a 4-inch submersible variable frequency drive (VFD) pump and an electrical water level sounder capable of indicating changes in the well water level to the nearest 0.01 feet. The objective of the pump test is to determine the sustained well yield, and a pump that is capable of variable pumping rated from approximately 1-gpm to 100-gpm will be required.

2.02 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Schedule delivery of products as required for timely installation.

B. Deliver products in manufacturer's original, unbroken cartons or other containers, clearly and fully marked and identified as to the manufacturer, item, installation, location and instructions for assembly, use, and storage.

C. Store products in location to avoid physical damage to items while in storage.Protect all materials in accordance with manufacturer's recommendations.

D. Handle products in accordance with manufacturer's recommendations and instructions.

E. All equipment shall be disinfected on site prior to use.

PART 3 – EXECUTION

3.01 SITE PREPARATION, CONDUCTOR CASING, AND DRILLING

It is the Contractor's responsibility to get equipment to the drilling site along the designated access ways.

3.02 DRILLING

The boring shall be constructed in the following manner and sequence. Deviations must be approved by the County's Representative before execution.

Boreholes shall be constructed using air rotary drilling equipment; other drilling methods may be used if approved by the County's Representative.

Boreholes shall be constructed with at least one pass of 6-inch minimum diameter drill bit for an open hole well completion. Borehole conditions may not require well casing placement.

Drilling fluid or foam additives other than those defined and approved in accordance with Paragraph 2.02, Drilling Additives, shall not be permitted in construction of the boreholes. Additionally, sumps shall not be agitated so as to develop a viscous drilling fluid.

The driller shall have a method of determining water production within the borehole. Groundwater production will be a key indicator of fracture zones and will be used as a criterion for stopping drilling and initiating zone sampling. Upon reaching the final boring depth, a video survey will be completed and a zone sample will be taken. At the discretion of the County's Representative, a zone sample may be taken prior reaching the final depth depending upon the depth and ground water production within the borehole.

To obtain an accurate lithologic log of the materials encountered during the drilling process, the Contractor is to arrange for the drilling returns to be safely accessible for sampling by the County's Representative. Drilled cuttings removed during advancement of the borehole are to be contained within a segregated area of the site for subsequent use in backfilling of any localized surface depressions as indicated by County personnel and/or for subsequent appropriate disposal by the Contractor. The Contractor should plan to use only a small portion of the drilled cuttings for backfilling of localized areas and the balance of these materials are to be spread onsite as directed by the County's Representative.

Work shall be completed using personal protective equipment appropriate for the operation.

An accurate log of the materials penetrated shall be recorded by the Contractor to determine the depths and thicknesses of the various underlying formations.

Formation samples from the borehole shall be collected at least every 10 feet and more frequently if necessary to accurately log the hole.

Samples from drill cuttings shall be collected by the Contractor and provided to the County's Representative. The sampling methods shall be consistent with accepted procedures for that specific method.

3.03 COMPOSITE GROUNDWATER SAMPLING

The contractor will collect an anticipated three composite groundwater samples from fracture zones encountered during drilling. The composite groundwater samples will be collected from the saturated zones which contain fractures, as determined by drilling characteristics such as drill stem chatter, faster drilling rates, greater groundwater production or other drilling characteristics familiar to the Contractor. Groundwater will be sampled by drilling 5 to 10 feet past the fracture zones to create a temporary chamber. At this point the temporary sampling chamber will be "developed" by the airlift method until water being produced is relatively clean. The purpose of drilling just slightly past the fractures is to prevent sealing of potential water bearing zones contained within the fractures by the pressurized air used in the airlift method. After determining the rate of production for the combined zone flow, a preferred low turbid sample will be collected. The groundwater samples will be placed in appropriate sampling bottles by the onsite geologist or County Representative. Consequently, the contractor must provide a safe location or sampling port, from which groundwater samples will be collected.

3.04 DRILLING CONDUCTOR BORE AND INSTALLING CONDUCTOR CASINGS

The borehole for the conductor casing shall be installed prior to well drilling. A 12-inch diameter borehole shall be drilled to a minimum depth of 100 feet. This borehole shall be used to lower a nominal 6.750-inch O.D. conductor casing for placement and sealing.

Conductor casings shall be securely welded in accordance with American Welding Society standards. All peep holes or alignment holes shall be filled by welding.

Casing shall be centered in borehole with guides consisting of four welding straps centered on the casing.

The first set of guides shall be placed 5 feet above the bottom of the casing string. Second (and third, if required) set of guides shall be placed at 40 feet intervals above the first set of guides.

Cement grout (sealing material) shall be injected between casing and boreholes by means of a tremie pipe. Grout shall extend throughout the bore. Cement grout material shall be placed by a positive displacement method using pumping equipment.

Grout tremie pipe may be slowly raised as grout is placed, but the discharge end must be submerged in the grout until grouting is completed. Grout tremie pipe shall be maintained full until completion of the grouting. No work shall be performed in the borehole for a minimum of 24 hours after completion of the grouting.

3.05 WELL CONSTRUCTION

If necessary per borehole conditions, and as directed by the County's Representative, 6-

inch, schedule 80 well casing, screen, gravel pack and zone isolation seals will be installed.

A. Install Casing

The Contractor shall insure that all cuttings have been removed from the borehole. A tremie pipe having a minimum inside diameter of 1.5 inch, shall be run into the borehole to the proposed casing installation depth to allow for successful gravel packing operations. The pump to be used for gravel packing shall circulate water from the sump with the same viscosity as that in the borehole. Circulation shall begin thirty minutes prior to casing installation and continue during the installation. With the tremie pipe remaining in the borehole, casing installation shall proceed in accordance with final design.

Casing shall be suspended from the surface by means of an appropriate hanger or clamp. Float plugs to land and set casing shall not be permitted. Casing shall be terminated above the bottom of the reamed hole without any contact with the bottom of the hole. This requirement shall be confirmed by observation of the weight indicator showing weight suspended from the drill rig.

If the casing cannot be landed in the correct position or at a depth acceptable to the County's Representative, the Contractor shall remove the casing from the borehole and re-ream the borehole. Contractor shall not attempt to drive or "spud" the casing and screen assembly. If problems arise which prevent the Contractor from completing the borehole, it shall be considered rejected.

3.06 WELL DEVELOPMENT

Development shall consist of airlift pumping of each completed zone following gravel packing, bailing of materials introduced into the casing during development, and pumping and surging of the zone until fully developed. Sufficient time shall be allowed for bentonite seals to hydrate before development begins.

The Contractor shall continue development of the zone until the discharged water is clear of sand, silt, and mud and turbidity has decreased to a goal of 5 NTU. Samples will also be filtered in the field for metal sample result verification.

Refer to Section 3.07 for proper disposal of development water. Development water discharge shall be managed such that the project remains in compliance with Central Valley Regional Water Quality Control Board (Water Board) Resolution No. R5-2013-0145 requirements specific to "test pumping of fresh water wells" (i.e. development water).

A. Air Lift Pumping

The borehole shall be cleaned of all fluids, cake, and substances that would impair flow of water into the borehole and the quality thereof. Cleaning shall be initially accomplished by airlift pumping. Air compressor, eductor pipe, air pipe, and equipment used for pumping shall be capable of 50 gpm during development.

Development water shall be managed in accordance with Water Board Resolution No. R5-2013-0145. In general the discharge of development water will be to an onsite drainage course adjacent to the test hole site that flows to an existing detention basin on the County's property.

B. Pumping and Surging

Upon completion of airlift pumping operations, the Contractor shall install a test pump with appropriate appurtenant equipment. Foot valves installed on the pump or drivers with non-reverse ratchets installed shall not be allowed. Generator diesel engine shall be equipped with a residential silencer muffler. Contractor shall furnish and install necessary discharge piping to transport pumped water to a designated discharge point.

Contractor shall furnish necessary valves, flow meters, sand testing equipment, and other equipment required to accurately measure flow rate, water levels, and time of pumping. Installation of flow meters shall be as recommended by the manufacturer for this installation and shall provide reliable test information. In addition to any orifice or flow meter, the discharge assembly shall be equipped with a ¾ inch female coupling for installation of a velocity probe by the County's Representative.

Water level measurements shall be made with an electric sounder, air line, pneumatic transducer, or other equipment approved by the County's Representative. If an air line or pneumatic transducer is utilized, depth of air line or transducer shall be verified with an electric sounder prior to any well testing and readout equipment shall be sufficiently accurate to record pressure changes of 0.1 psi.

Test pump used for development and testing shall consist of up to 450 feet of column assembly and a pump unit capable of producing up to 50 gpm from a pumping water level of 300 feet below ground surface. The test pump and appurtenant equipment shall be capable of continuous pumping at the maximum desired flow rate and pumping level. A four inch diameter Grundfos SP brand pump or approved equivalent shall be used.

Turbidity of 5 NTU shall be the goal. Development water shall be managed in accordance with Water Board Resolution No. R5-2013-0145.

C. Records

Development records shall contain readings at half-hour maximum intervals showing production rate pumping level, drawdown, sand production, and all other pertinent information concerning well development.

D. Bailing

Contractor shall bail the discrete zone as needed to prevent accumulation of material above the lowest portion of the screen at all times. Preferred sampling will be done through the pump at low flow rates of less than five gallons per minute.

E. Sampling

Sampling will occur after development is complete. Sample turbidity of 5 NTU will be the goal. A sampling tap or other low flow valve shall be installed so a minimally disturbed sample can be taken. Bailer samples can be collected if approved and if low flow rates cannot be achieved with pumping. Sampling and delivery of the sample to the lab will be the responsibility of the County's Representative.

3.07 SAMPLING AND RECORDS

A. Logs and Samples

Contractor shall furnish daily records or logs which shall give depth, thickness, and nature of the strata penetrated, water level, and other information that may be requested by the State of California. Driller's report form shall be in the format required by the State of California.

Contractor shall store samples of all strata penetrated in containers with the depth of strata and thickness noted on the containers as previously described. Samples shall be stored a minimum of 30 days after submittal of the driller's report to the County's Representative for review. Following the minimum 30 day storage period and after acceptance of the borehole, at the written direction of the County's Representative, the samples shall either be delivered to the County's Representative or disposed of by the Contractor.

B. Water Analysis

Contractor shall take precautionary measures at all times to prevent contamination of the discrete zones with the use of air compressor and other drilling equipment. Upon 24 hour advance notification from the Contractor, the County's Representative shall collect the sediment-free water samples and transport to a State of California certified laboratory to test the sample for the following at a minimum:

1. EPA Method 524.2 Regulated and unregulated organic chemicals.
2. Title 22 - General Mineral.
3. Title 22 - General Physical.
4. Title 22 - Inorganic.
5. Title 22 - Radioactivity.
6. Title 22 – Nitrate/Nitrite.

The County or County's Representative shall be responsible for ordering and paying for the water quality tests. The Contractor shall be responsible for obtaining the samples.

3.08 COMPLETION AND CLEANUP

A. Capping Well

Except when drilling is in progress, boreholes or discrete zone well casing shall be kept covered or capped in such a manner as to prevent either tampering with the borehole or allowing the entrance of foreign matter.

Upon completion of all work in connection with development and test pumping, the well shall be capped with an appropriate steel well cap on the conductor casing extension. Temporary capping shall be provided whenever the well casing is otherwise exposed prior to completion of the work. Capping shall meet requirements of the State of California, Department of Industrial Safety, and the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor, and as directed by the County's Representative.

B. Abandonment of Borehole

If abandonment is directed by County Representative, for permanent abandonment of the borehole, the hole shall be completely filled with bentonite clay or sand cement slurry and the casing removed to a depth of atleast 50 feet below ground surface. Abandoned boreholes shall be treated in accordance with State Water Well Standards (Bulletin 74-81 and 74-90) and localordinances. Sealing of hole shall comply with all regulations or requirements of agencies with jurisdiction in this matter.

A 10.3 sack cement mix grout shall be pumped down hole through a tremie pipe in the annular space between the casing and the borehole, from the bottom to the top of the specified interval, by a positive displacement method using pumping equipment.

C. Cleanup

Following completion of work, Contractor shall remove from jobsite all excess materials, tools, and equipment, and shall dispose of all debris resulting from the work.

3.09 ENVIRONMENTAL CONTROL

A. Drilling Fluid Containment

Drilling fluid shall be managed such that the project remains in compliance with Water Board Resolution No. R5-2013-0145 requirements specific to drilling muds/boring wastes. In order to maintain the waiver for a Report of Waste Discharge and Waste Discharge Requirements, the Contractor must ensure:

1. Drilling operations are in uncontaminated soils
2. Drilling mud must be considered non-hazardous and contain no halogenated solvents.

3. Buried drilling muds must first be dried and the site restored to pre-sump conditions and covered with at least one foot of clean soil.
4. Sump must be greater than 100 feet from nearest surface water and bottom of the sump must be at least 5 feet above highest groundwater.
5. If the above conditions cannot be met, drilling fluids shall be completely contained in watertight portable basins. Cuttings shall be removed regularly to assure that the fluid volume is sufficient for settling cuttings out of solution. The mud tank shall have a volume of at least three times greater than the final borehole volume. The mud tank shall be located within the area outlined and labeled "Limits of Construction" on the plans.
6. In all cases, the driller's mud shall become the property of the driller, and shall be disposed of at his expense. The Contractor is responsible for obtaining all necessary easements, rights, and permits pertaining to such disposal.

B. Disposal of Development and Pump Test Water

Development water discharge shall be managed such that the project remains in compliance with Water Board Resolution No. R5-2013-0145 requirements specific to “test pumping of fresh water wells” (i.e. development water). In order to maintain the waiver for a Report of Waste Discharge and Waste Discharge Requirements, the Contractor must control development water such that “discharge [must be] limited to on-site property…” and “discharge shall not be conducted in a manner such as to cause nuisance conditions or threaten surface waters.” Use of portable tanks may be necessary depending upon terrain and the volume of water produced during development. There is no sanitary sewer in the area to dispose of water generated during pumping test.

Contractor shall submit a water disposal plan for County’s Representative's approval prior to initiation of development pumping. Water, including mud, sand, and debris pumped from the borehole during development and testing, shall be disposed of in such a manner as not to damage or interfere with work or property of others.

Provisions for energy dissipation of the pumped water shall be employed prior to entering the basins to assure quiescent settling conditions in the basins. Baffles or multiple cells in portable sumps may accomplish this function. Removal of settling basins and sediment shall be accomplished after well development by the Contractor.

The Contractor shall conform to all waste discharge requirements imposed on the County by the Water Control Board and other governing agencies. All actions necessary to conform to these requirements shall be performed by the Contractor as part of this contract.

C. Cuttings and Drilling Fluid Disposal

All fluids and cuttings shall be disposed of according to Item A of this section or removed from the site and legally disposed of at the Contractor's expense.

D. Spillage During Hauling

Spillage resulting from hauling operations along or across any public traveled way (pedestrian or vehicular) shall be removed immediately at the Contractor's expense.

E. Sound Control Requirements

The Contractor shall comply with all local sound control and noise level rules, regulations, and ordinances which apply to any work performed pursuant to the Contract.

Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

The Contractor shall submit a plan for abatement of excessive noise at the well site during drilling operations. Noise level shall be 65 decibel maximum at the property line of the nearest homes.

3.10 SURFACE COMPLETION

The 6-inch diameter conductor casing shall protrude a minimum of 36 inches above the ground surface. Grout seal shall be flush with the ground surface.

END OF SECTION

SECTION 02672

VIDEO CAMERA SURVEY, PLUMBNESS AND ALIGNMENT TESTS(WITH ABANDONMENT PROCEDURES)

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes products, materials and procedures/services associated with the well boring(s) holes.

B. Related Specification Sections

1. Section 02671, CONDUCTOR CASING INSTALLATION, DRILLING AND TEST PUMPING

C. Measurement and payment details are provided in Section 1025, MEASUREMENT AND PAYMENT.

1.02 QUALITY ASSURANCE

A. Referenced Standards

1. State of California

a. Bulletin 74-81 – Water Well Standards

b. Bulletin 74-90 – Water Well Standards (Supplement to Bulleting 74-81)

2. American Petroleum Institute (API) standards

a. Standards for calibration of equipment

3. ANSI/AWWA A100 (current edition), Standard for Water Wells, Section 4.7 Well Construction

1.03 SUBMITTALS

A. The Contractor shall list a firm in the Subcontractor list provided as part of the Bid Package the name and qualifications of the firm retained to perform the camera survey.

B. CDs and tapes shall be provided to the County's Representative within 48 hoursafter the survey is complete.

C. Two copies of the completed video camera survey on DVD shall be submitted to the County's Representative.

Upon review of the CD, if the County's Representative determines that any portion of the video record is incomplete or of inadequate quality, i.e. clarity, to allow visual inspection of the inside of the well, the Contractor shall rerun the survey at his expense. Clarity of video should be of sufficient quality to evaluate the integrity of all

joints, screen openings, the sounding port, and the entire inside surface of the casing assembly.

1.04 PRODUCT DELIVERY

A. Store products in a location to avoid physical damage to items while in storage. Protect all materials in accordance with manufacturer's recommendations.

B. Handle products in accordance with manufacturer's recommendations and instructions.

PART 2 – PRODUCTS

2.01 EQUIPMENT

A. Video Camera

1. The camera used for the survey shall be equipped with centralizers. The equipment used by the firm for the video survey shall produce a tape with an automatic depth indication.

2. The video camera survey shall be in color and provide for the use of afocusing side scan lens.

B. Plumbness and Alignment

1. Pipe or Dummy for Alignment. The dummy will be a minimum diameter of 1-inch or less than the inside diameter of the well pipe or borehole to test the alignment. The length will not be less than 40 feet. Preferred testing will occur with the well casing and the test portion of the dummy will be ½" diameter less than the well casing or bore hole.

PART 3 – EXECUTION

3.01 OPTIONAL VIDEO CAMERA SURVEY

A. Sequences of Operations

1. Survey (general)

a. Prior to running the survey, the Contractor shall develop the well. (Not applicable to existing wells).

b. During the downward pass, the entire depth of the well shall be surveyed using the down view mode. The maximum speed of this survey shall not exceed 30 feet per minute. The depth of the sounding port inlet and any anomalies shall be thoroughly viewed in the downward position and be noted for detailed inspection on the upward side scan pass.

c. On the upward pass, the entire depth of well shall be surveyed using the side scan mode. For the well screen, the camera must be rotated while the survey continues upward in order to allow for complete viewing of all perforated sections. At each casing joint, upward motion of the camera

shall be stopped, and a 360-degree inspection of the joint shall be conducted. At the depth of any anomalies noted in the downward pass, upward motion of the camera shall be stoppedand the anomaly shall be completely inspected. The sounding port inlet shall also be completely inspected with the side scan.

B. Survey Evaluation of Proposed Well

1. The County's Representative shall evaluate the acceptance of the proposedwell based on the video survey. Casing breaks shall be recognized and, if adequate repairs cannot be made, the well will be abandoned and replaced.

3.02 OPTIONAL PLUMBNESS AND ALIGNMENT TESTING

A. Sequences of Operations

1. Survey (general)

a. Construct completed well plumb and true to line in accordance with AWWA A100 Appendix D for the Plumbness and Alignment Procedure for Testing.

b. The well shall be true to line. The alignment test shall be performed by lowering a dummy pipe down the borehole. The dummy shall be 1-inch in diameter smaller than the borehole and of length such that the plumbness and alignment requirements below can be met. Should the dummy fail to move freely, then the Contractor shall undertake corrective measures.

B. Survey Evaluation

1. The County's Representative shall evaluate the tolerances:

a. Plumbness: maximum allowable horizontal deviation (drift) of well from the vertical shall not exceed two-thirds of smallest inside diameter of that part of the well being tested per 100 feet of depth.

b. Alignment: alignment must be satisfactory for successful operation of permanent pumping equipment.

c. Should the borehole fail to meet plumbness and alignment requirements, County's Representative will designate a location for a new hole. The new borehole shall be drilled at the expense of the Contractor.

d. The Contractor shall guarantee that the well, when completed, shall be sufficiently aligned and plumb for the free installation of a submersible pump.

3.03 BOREHOLE ABANDONMENT

A. A sand-cement slurry shall be utilized, as requested or necessary, for an abandoned and/or collapsed borehole. The borehole may be abandoned and could be considered atemporary installation. The borehole and casings, if casing is used, shall be abandoned using a pressure grouting technique from the lowest portion of the

hole upward. The upper 10 feet of casing shall be removed and brought to grade with cement concrete prior to final abandonment. State and local regulatory requirements must be followed.

B. Refer to State of California, Water Well Standards: Bulletin 74-81, Part III.

END OF SECTION

Bid Tab for County of Nevada McCourtney Road Landfill
Water Supply Well

BASE BID SCHEDULE (TEST HOLE NO. 1)

Bid Item	Item Description	Unit*	Estimated Quantity	Unit Rate	Extended Rate
1	Mob/Demob, Permit, temporary conductor and Permit	LS	1	$ -	$ -
2	Drill 8.5-inch Minimum Diameter Borehole	VF	100	$ -	$ -
3	Set Temporary 6-inch PVC Casing with Rubber Boot to 100 feet	VF	100	$ -	$ -
4	Drill 6-inch Minimum Diameter Borehole	VF	500	$ -	$ -
5	Collect Composite Groundwater Samples	EA	3	$ -	$ -
6	Air Lift Testing (Well Development) for each composite sample and final well	HR	12	$ -	$ -
7	Drill 12-inch Minimum Diameter Borehole for conductor casing of final well if capacity is acceptable	VF	100	$ -	$ -
8	Furnish and install 6-inch Minimum Diameter Conductor Casing with Locking Lid (permanent)	VF	105	$ -	$ -
9	Furnish and install 10.3 sack cement mix grout annular seal	VF	100	$ -	$ -
10	Drill/Ream existing 6" borehole to depth of 400 from bottom of conductor	VF	400	$ -	$ -
11	Video Camera Survey, Plumbness and Alignment	LS	1	$ -	$ -
12	Furnish Pump, Flow Meter and Appertunances for Test Pumping, 10-Day Test (Optional)	LS	1	$ -	$ -
	TOTAL BASE BID SCHEDULE (TEST HOLE No. 1) BID ITEMS 1-10				**$ -**
EA = EACH, HR = HOURLY RATE, LS = LUMP SUM, VF = VERTICAL FEET					

ALTERNATE BID ITEMS (TEST HOLE NO. 1)

Bid Item	Item Description	Unit*	Estimated Quantity	Unit Rate	Extended Rate
13	Furnish Pump, Flow Meter and Appertunances for Test Pumping	LS	1	$ -	$ -
14	Furnish Pump, Flow Meter and Appertunances for Test Pumping	LS	1	$ -	$ -
LS = LUMP SUM					

ADDITIVE BID ITEMS (TEST HOLE NO. 1)

A1	Furnish and install flush threaded, 4-inch, Schedule 80 PVC casing	VF	275	$ -	$ -
A2	Furnish and install flush threaded, 4-inch PVC 30 slot well screen	VF	120	$ -	$ -
A3	Furnish and install flush threaded, 4-inch PVC Famale Cap	VF	1	$ -	$ -
A4	Borehole abandonment to 500 ft Depth, Hard Rock Drilling	VF	500	$ -	$ -
	TOTAL ADDITIVE BID SCHEDULE (TEST HOLE No. 1) BID ITEMS A1-A4				**$ -**
EA = EACH, HR = HOURLY RATE, LS = LUMP SUM, VF = VERTICAL FEET					

Bid Tab for County of Nevada McCourtney Road Landfill
Water Supply Well

ADDITIVE BID ITEMS (TEST HOLE NO. 2)

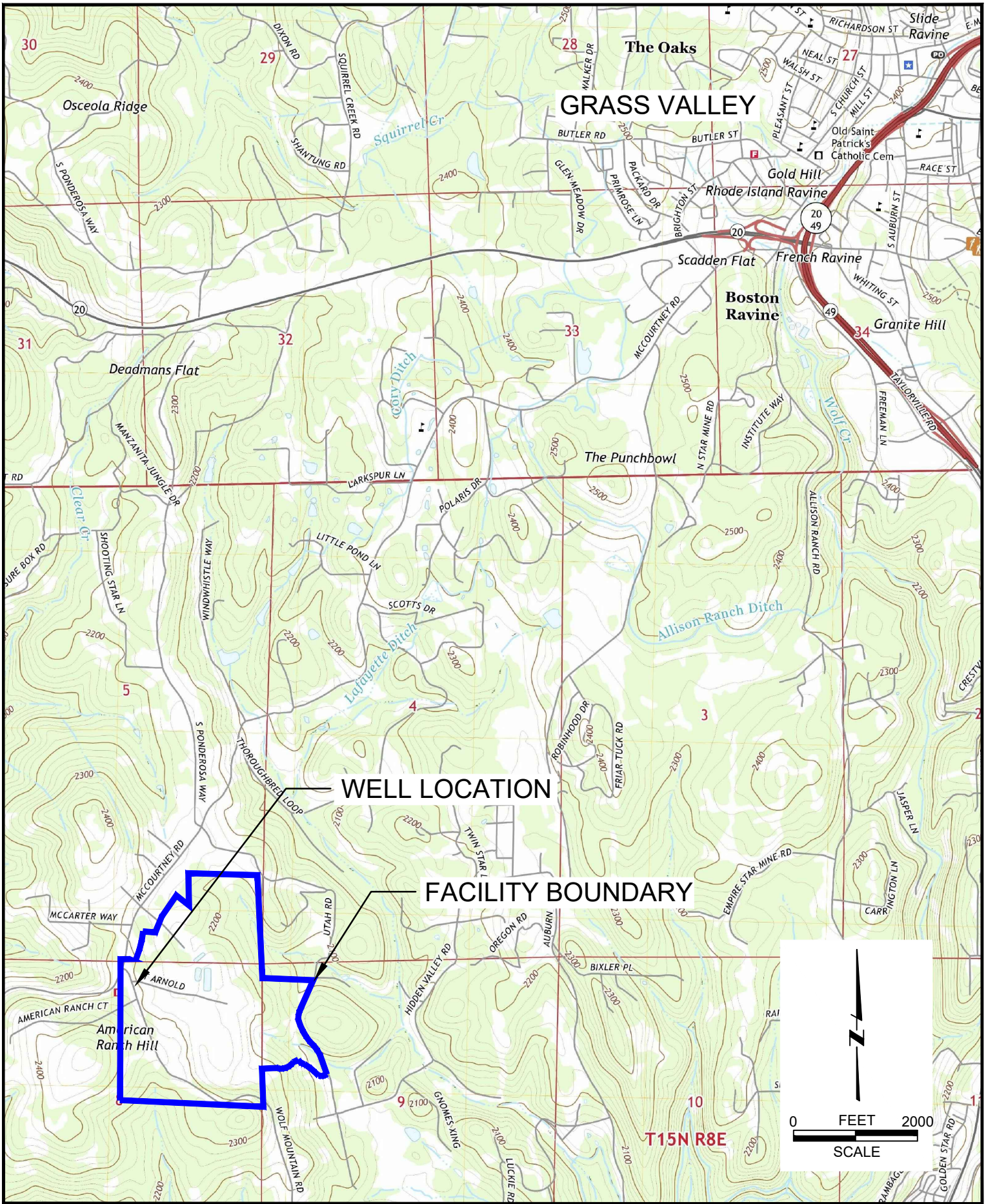
Bid Item	Item Description	Unit*	Estimated Quantity	Unit Rate	Extended Rate
B1	Mob/Demob, Permit, temporary conductor and Permit	LS	1	$ -	$ -
B2	Drill 8.5-inch Minimum Diameter Borehole	VF	100	$ -	$ -
B3	Set Temporary 6-inch PVC Casing with Rubber Boot to 100 feet	VF	100	$ -	$ -
B4	Drill 6-inch Minimum Diameter Borehole	VF	500	$ -	$ -
B5	Collect Composite Groundwater Samples	EA	3	$ -	$ -
B6	Air Lift Testing (Well Development) for each composite sample and final well	HR	12	$ -	$ -
B7	Drill 12-inch Minimum Diameter Borehole for conductor casing of final well	VF	100	$ -	$ -
B8	Furnish and install 10-inch Minimum Diameter Conductor Casing with Locking Lid (permanent)	VF	105	$ -	$ -
B9	Furnish and install 10.3 sack cement mix grout	VF	100	$ -	$ -
B10	Drill/Ream existing 6" borehole to depth of 400 from bottom of conductor	VF	400	$ -	$ -
B11	Video Camera Survey, Plumbness and Alignment (Optional)	VF	1	$ -	$ -
B12	Furnish Pump, Flow Meter and Appertunances for Test Pumping, 10-Day Test (Optional)	LS	1	$ -	$ -
TOTAL BASE BID SCHEDULE (TEST HOLE No. 2) BID ITEMS B1-B11					**$ -**
EA = EACH, HR = HOURLY RATE, LS = LUMP SUM, VF = VERTICAL FEET					

ALTERNATE BID ITEMS (TEST HOLE NO. 2)

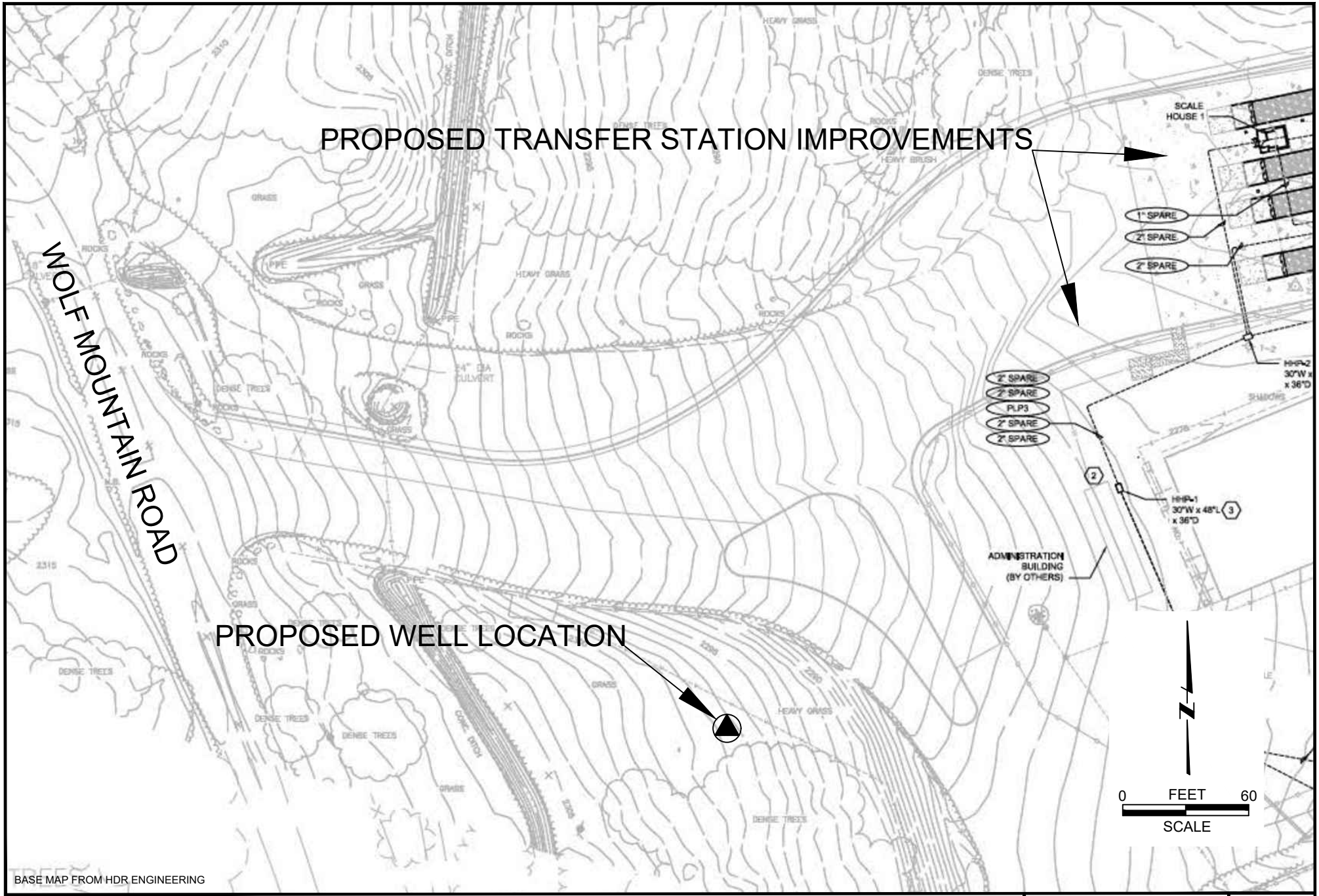
Bid Item	Item Description	Unit*	Estimated Quantity	Unit Rate	Extended Rate
B13	Furnish Pump, Flow Meter and Appertunances for Test Pumping, 72-Hour Test	LS	1	$ -	$ -
B14	Furnish Pump, Flow Meter and Appertunances for Test Pumping, 24-Hour Test	LS	1	$ -	$ -
LS = LUMP SUM					

ADDITIVE BID ITEMS (TEST HOLE NO. 2)

C1	Furnish and install flush threaded, 4-inch, Schedule 80 PVC casing	VF	275	$ -	$ -
C2	Furnish and install flush threaded, 4-inch PVC 30 slot well screen	VF	120	$ -	$ -
C3	Furnish and install flush threaded, 4-inch PVC Famale Cap	VF	1	$ -	$ -
C4	Borehole abandonment to 500 ft Depth, Hard Rock Drilling	VF	500	$ -	$ -
TOTAL ADDITIVE BID SCHEDULE (TEST HOLE No. 2) BID ITEMS C1-C4					**$ -**
EA = EACH, HR = HOURLY RATE, LS = LUMP SUM, VF = VERTICAL FEET					



N V 5	LOCATION MAP MCCOURTNEY ROAD LANDFILL NEVADA COUNTY, CALIFORNIA
DRAWN BY:	CWB
CHECKED BY:	MUIR
PROJECT:	4142N.07.01
DATE:	OCTOBER 2021
FIGURE	1



BASE MAP FROM HDR ENGINEERING

NV5

PROPOSED PRODUCTION WELL LOCATION

MCCOURTNEY ROAD LANDFILL

NEVADA COUNTY, CALIFORNIA

DRAWN BY:	CWB
CHECKED BY:	MUIR
PROJECT:	4142N.07.01
DATE:	OCTOBER 2021

FIGURE 2

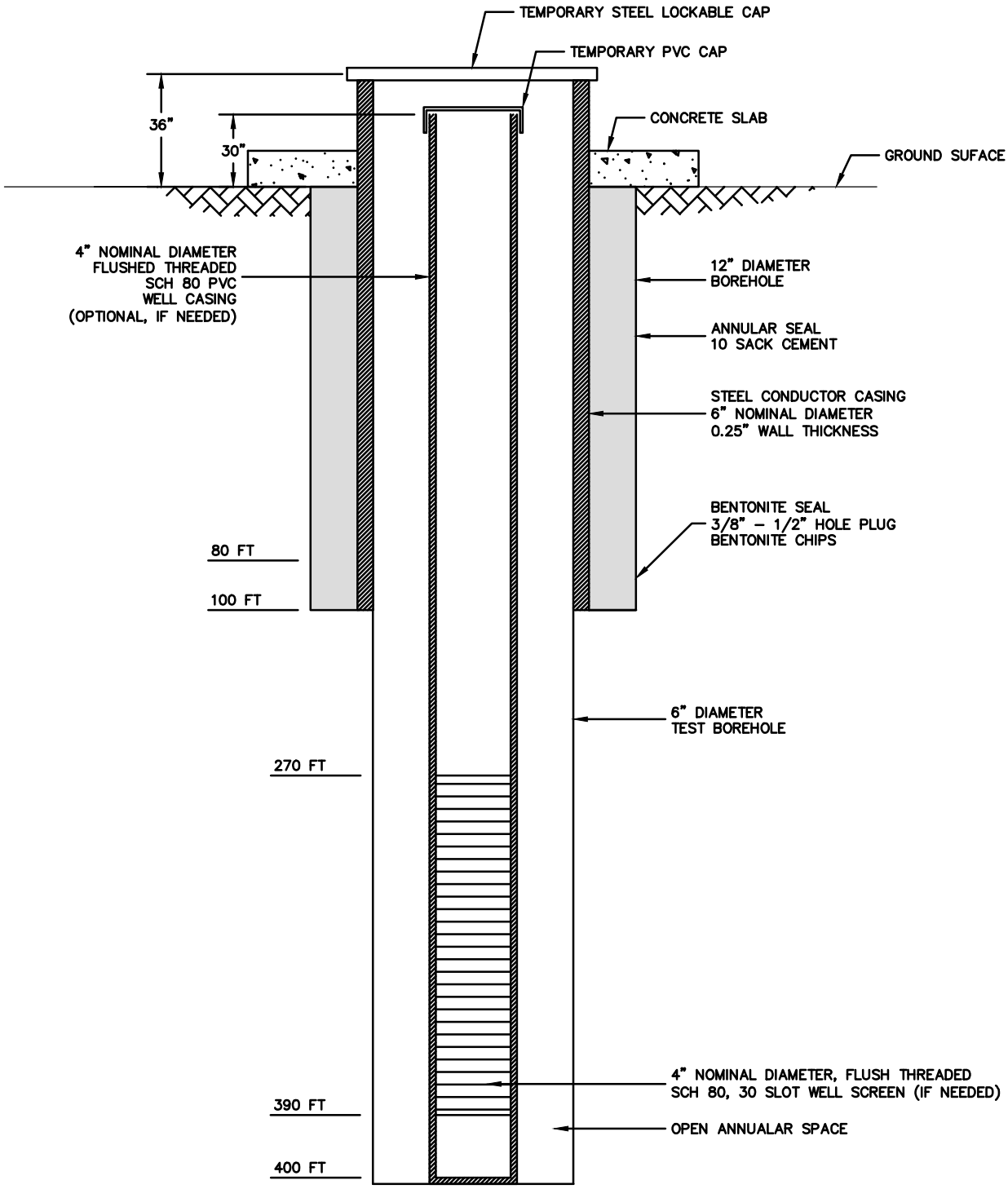


FIGURE 3

McCourtney Road Landfill

WELL SCHEMATIC

NV5