

IDENTIFICATION STAMP
 DIV. OF THE STATE ARCHITECT

APP: 04-122492 INC:
 REVIEWED FOR

SS FLS ACS

DATE: 01/03/2024

TECHNICAL SPECIFICATIONS

for

Rehabilitation of Existing Well No. 1 & 2

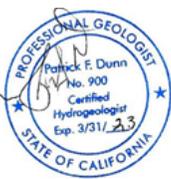
Campo Elementary School
 Mountain Empire Unified School District
 Campo, San Diego County, California

James F. Owens

Civil Engineer: _____
 James F. Owens, C66067
 Engineering Manager
 NV5, Inc.



Patrick F. Dunn



Hydrogeologist: _____
 Patrick F. Dunn, PG 7001, CHg. 900
 Hydrogeologist
 NV5, Inc.



Engineer Designated To Be
 General In Responsible
 Charge: _____
 Eric F. Rodriguez, S4617
 Lead Engineer
 NV5, Inc.

DATE SIGNED: 11/05/2023

By:
 NV5, Inc.

October 2023



DSA No. 04-122492
 PWS No. 3700018
 SWRCB/DFA Funding Agreement No. 000000000D2002006
 NV5 Project No. 21-0001154

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REDEVELOPMENT OF EXISTING WELL NO. 1 and 2

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Well Drilling Application for Well No. 1 – County of SD

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SDWAS WF-01

SDRSD G24A – Type A

SSPWC 600-3

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SECTION 01010

SUMMARY OF WORK, MOBILIZATION, AND SPECIAL CONDITIONS

PART 1 - GENERAL

1.1 OBJECTIVES

- A. An existing fire hydrant is located directly in front of the gate which provides access to Well No. 1.

The objectives associated with relocating the existing fire hydrant:

- Improve access to the Well No. 1 site for well and tank maintenance
- Add isolation valve to improve the system's operational control

The work associated with relocating the existing fire hydrant:

- Field-locate existing pipeline prior to construction to confirm depth, material, diameter, and orientation.
 - Demolish and remove existing pipeline
 - Install new 6" with pipeline, inline isolation valve, and relocated hydrant per SDWAS WF-01.
 - Install additional 8" isolation valve on mainline at point of connection.
- B. Based on the Well Completion Report the total depth Well No. 1 is 800 feet below ground surface (bgs) with 6-inch PVC Liner - inner casing extending to a depth of 120 feet bgs as well as a 12" steel casing extending to a depth of 52 feet bgs. Well No. 1 is reported to be an open-hole-bottom bedrock completion below the inner casing. Additional well completion details are provided in Section 02671, Table 1 – Campo Elementary School (CES) Well No. 1 Data.

The objectives associated with the rehabilitation activities in Well No. 1:

- Reduction in nitrate concentrations
- Sealing off nonproducing/deeper portions of well that have low pH.
- Extend the life cycle of the well and allow MEUSD to continue its use as a potable water source.

The work associated with the rehabilitation activities in Well No. 1:

- Over-ream and remove existing sanitary seal and casing
 - Replace sanitary seal
 - Install new 8 5/8” steel casing to 135’
 - Remove PVC casing.
 - Seal off the well below 200 feet below ground surface
 - Remove and reinstall well pump, motor, column piping, and cabling to perform work.
- C. Based on the Well Completion Report the total depth Well No. 2 is 198 feet below ground surface (bgs) with 6-inch PVC Liner - inner casing extending to a depth of 198 feet bgs as well as a 12” steel casing extending to a depth of 53 feet bgs. Additional well completion details are provided in Section 02671, Table 2 – Campo Elementary School (CES) Well No. 2 Data.

The objectives associated with the rehabilitation activities in Well No. 2:

- Improve access to wellhead for operation and maintenance.
- Extend the life cycle of the well and allow MEUSD to continue its use as a potable water source.

The work associated with the rehabilitation activities in Well No. 2:

- Remove and relocate existing concrete box surrounding wellhead to MEUSD maintenance yard at Mountain Empire High School. Delivery to be coordinated with MEUSD staff.
- Replace well casing above 3-4 feet bgs, field weld to competent material of existing casing
- Secure PVC casing and within the steel casing
- Extend concrete seal 6” above ground
- Remove bacterial stringers and clean plugged slots.
- Remove and reinstall well pump, motor, column piping, and cabling to perform work.

1.2 SUMMARY

- A. Scope of Work: This contract work includes the rehabilitation of Well No. 1 & 2 at the Mountain Empire Unified School District's – Campo Elementary School (CES) near Campo, San Diego County, California (see Drawings for location).
- B. Work shall conform to AWWA Standards for Water Wells, A100 (latest edition), AWWA C654-03, and DWR Bulletin 74-81. In case of conflict between the requirements of this section and those of the AWWA Standards or DWR Bulletin, the requirements of this Section shall prevail. The "Owner's Representative" is defined as the designated Owner's Staff, Engineer or Geologist that has been designated as responsible party for the oversight and approval of activities during well rehabilitation site operations.
- C. Work Site Location: Well No. 1 & 2 are located on campus in the northern and southern portions, respectively, of the CES (APN 655-030-30-00), approximately 650 feet west of Bucking Springs Road, Campo, CA. See Drawings for location and access/vehicle limitations and restrictions.

1.3 CONTRACT METHOD, MEASUREMENT AND PAYMENT

- A. Details are provided in Section 01025, MEASUREMENT AND PAYMENT, and the Bid Form.

1.4 OWNER, PERSONNEL, AND CONTRACTOR DEFINED

- A. Owner is: Jacob Mann, Director of Facilities and Construction, Mountain Empire Unified School District, 3291 Buckman Spring Road, CA 91962.
- B. For the purposes of this project and specification, the term Owner's Representative is synonymous with any person indicated below:
 - 1. Owner's Engineer: James Owens, P.E., NV5, Inc., 15092 Avenue of Science, Suite 200, San Diego, CA. Phone number is (858) 385-0500.
 - 2. Site Geologist: Pat Dunn, P.G. C.Hg , NV5, Inc., 15092 Avenue of Science, Suite 200, San Diego, CA. Phone number is (858) 385-0500.
- C. CONTRACTOR shall be a qualified Well Drilling CONTRACTOR with a valid California C-57 Well Drilling License held continuously throughout the execution of the Work.
- D. CONTRACTOR shall be continuously registered with the California Department of Industrial Relations (DIR).

1.5 PRECONSTRUCTION MEETING

- A. The CONTRACTOR shall contact the Owner's Representative, Pat Dunn (NV5, Inc.) to arrange for a meeting date and time. The meeting shall occur no later than 14 calendar days after the Execution of the Contract in the Campo area.
- B. The CONTRACTOR's superintendent for this project shall be present at the meeting and shall have reviewed the Contract Documents and be prepared to discuss the work and deliver the required submittals detailed below.
- 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, Well No. 1 & 2. Please note that Well No. 2 is located inside a concrete pump house structure inside a preschool play area. This concrete structure will need to be removed by the CONTRACTOR as part of the work and in order to access the well.
 - 3. Locations and methods for disposal of water from development and testing procedures (Water Disposal Plan).
 - 4. Temporary facilities to be established.

1.6 CONSTRUCTION WATER AND SANITARY FACILITIES

Construction water supply will be provided for the CONTRACTOR's sole or specific uses on site. Construction water will be provided by adjacent MEUSD-owned dry-barrel fire hydrants. CONTRACTOR shall provide a MEUSD-approved backflow preventer and temporary piping to convey water from the dry-barrel fire hydrant to the work site (approximately 10 feet south of Well No. 1 and 150 west of Well No. 2). Because the hydrant has a dry-barrel configuration, CONTRACTOR is requested to refrain from frequent engaging/disengaging of the hydrant.

Sanitary facilities are not allowed on-site. CONTRACTOR shall provide potable water supply to the site.

1.7 PROTECTION OF WORK AREAS AND TEMPORARY FENCING

CONTRACTOR shall provide means of protecting all work and water disposal areas, and all equipment. CONTRACTOR shall provide temporary fencing to protect equipment, materials, and water disposal locations.

1.8 RIGHT TO CANCEL WORK OR BID ITEMS

The Owner or Owner'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 work not performed.

1.9 SITE RESTORATION

- A. CONTRACTOR shall restore site to original condition. Restoration activities shall include, but not necessarily be limited to, the following:
1. Re-grade areas disturbed by CONTRACTOR's activities to pre-construction contours.
 2. Remove fencing and all other security devices furnished by CONTRACTOR.
 3. Remove rubbish, unused materials, and other unlike materials belonging to CONTRACTOR or used under CONTRACTOR's direction during construction.
 4. Remove all CONTRACTOR-provided equipment.

1.10 WORK HOURS

Note that site is a school. CONTRACTOR is encouraged to perform work during non-school hours to greatest reasonable extent.

Work hours are limited from 6:00AM to 6:00PM on weekdays, excluding holidays.

Saturday/Sunday work is encouraged to avoid work during school hours, but is limited from 8:00AM to 4:00PM, and is subject to limitations under this section. Any Saturday work or work beyond the weekday hours noted above requires prior approval from Owner. Owner reserves the right to further limit work hours and Saturdays during which work may be performed, at the sole discretion of the Owner.

CONTRACTOR is highly encouraged to conduct construction activities during CES's school holidays.

**** END OF SECTION ****

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SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 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.

1.3 BASE BID ITEM DESCRIPTIONS

A. Mobilization, Bonding, and Insurance – Bid Item No. 1

1. Description: This item includes, but is not necessarily limited to: obtaining and maintaining insurance coverages and bonding necessary for performing the work; furnishing all labor, equipment, material and supplies for the execution of the work but which are not to be incorporated in the work; acquiring well permits; contacting Underground Service Alert; preparation of water disposal plan; preparation of temporary laydown yards; and pre-construction and post-construction photographs of work areas.
2. Measurement: Shall be lump sum for the completed work described above. Bid Item No. 1 shall constitute no more than 5.0% of CONTRACTOR's total bid amount.
3. Payment: Based upon the lump sum amount.

B. Sheeting, Shoring, & Bracing – Bid Item No. 2

1. Description: This item includes, but is not necessarily limited to, all work for all excavation safety measures including sheeting, shoring and bracing, or equivalent method for the protection of life and limb in trenches and open excavation.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based upon the lump sum amount.

C. Remove and Reinstall Column Piping – Bid Item No. 3

1. Description: This item includes, but is not necessarily limited to, removal and reinstallation of column piping, pump/motor, and cabling in each well.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the lump sum amount.

D. Establish and Maintain Percolation Areas – Bid Item No. 4

1. Description: This item includes, but is not necessarily limited to, establishment of percolation areas within the ball field and landscaped area south of Well No. 2 as shown on the drawings, provision and installation of sprinkler conveyance piping system to facilitate dispersal of water within the areas, maintenance, monitoring, and adjustment of percolation areas.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the lump sum amount.

E. Pre-Rehabilitation Well Pumping, Sample Acquisitions, and Groundwater Level Measurement for Well No. 1 – Bid Item No. 5

1. Description: This item includes, but is not necessarily limited to all work for furnishing and installing a CONTRACTOR-supplied level sensor to measure static water level and a baseline measurement for drawdown using the existing pump and motor, as well as operating system for sample acquisitions by Owner; and provision of information to Owner's Representative.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the lump sum amount.

F. Remove and Relocate Existing Utility Box Housing Well No. 2 – Bid Item No. 6

1. Description: This item includes, but is not necessarily limited to, all work and equipment for the removal and relocation of the existing utility box housing existing Well No. 2 as shown on the Drawings including coordination with OWNER.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the lump sum amount.

G. Pre-Rehabilitation Well No. 1 and 2 Interior Video Inspections – Bid Item No. 7

1. Description: This item includes, but is not necessarily limited to, all labor, equipment, materials, incidentals, for the interior inspection of Well No. 1 and 2 from the surface to the upper limit of fill material; provision of video of each well inspection to the Owner's Representative.
2. Measurement: Shall be based on EA unit measured by the Owner's Representative
3. Payment: Based on the unit price/EA video completed.

H. Rehabilitation of Well No.1 – Remove Existing PVC Liner, Interior Sanitary Seal, steel casing, and exterior sanitary seal as shown on the Drawings – Bid Item No. 8

1. Description: This item includes removal of existing 4 ½" I.D. CL. 160 PVC Liner, interior cement seal, 8 5/8" I.D. x ¼" thick steel casing, and exterior 12" diameter sanitary seal as shown on the Drawings.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the lump sum amount.

- I. Rehabilitation of Well No. 1 – Drill a 15” (minimum) Conductor Casing Borehole and Install Conductor Casing and Sanitary Seal – Bid Item No. 9
1. Description: This item includes drilling the permanent conductor borehole with a minimum 15-inch diameter and furnishing and installing the conductor casing for one well comprised of 8 5/8-inch nominal diameter x 1/4” wall, ASTM A53 steel and also installing the cement grout sanitary seal as per the Drawings and as described in Section 02671.
 2. Measurement: Shall be based on vertical feet (VF) measured by the Engineer from ground surface.
 3. Payment: Based on the unit price/VF of conductor casing and sanitary seal completed and certified in conformance by the Engineer or Geologist.
- J. Rehabilitation of Well No. 1 - Geophysics, Caliper Survey, Plumbness, and Alignment Tests – Bid Item No. 10
1. Description: This item includes, but is not necessarily limited to, all work and submittals associated with the geophysical, caliper survey, plumbness, and alignment testing of the completed borehole, per Section 02671, WATER WELLS. Contractor shall provide required submittals, including but not necessarily limited to the geophysical electrical log and results, caliper log methodology and results, and test results for plumbness and alignment.
 2. Measurement: Shall be based on completion of geophysical logging performed as directed by the Engineer or Geologist for the borehole
 3. Payment: Based upon lump sum amount and certified in conformance by the Engineer or Geologist.
- K. Rehabilitation of Well No. 1 – Furnish and Install Concrete Seal in Bottom of Well and Transition Seal (30 Mesh Sand) – Bid Item No. 11
1. Description: This item includes, but is not necessarily limited to, all work and material associated with the installation of the concrete seal in the bottom of Well No. 1 and transitional seal as per the Drawings.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based on the lump sum amount.
- L. Rehabilitation of Well No. 1 – Equip Well – Reinstall Pump, Motor, and Column Piping – Bid Item No. 12
1. Description: This item includes, but is not necessarily limited to, all work associated with the re-installation of the existing pump/motor and column piping as per Section 02671.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based upon the lump sum amount.

- M. Rehabilitation of Well No. 1 – Constant Rate Drawdown Pump Test with Re-Installed Existing Well Pump – Bid Item No. 13
1. Description: This item includes, but is not necessarily limited to, all work associated with step drawdown pump testing per Section 02671.
 2. Measurement: Shall be based on hours of step drawdown pump testing performed as directed by the Engineer or Geologist.
 3. Payment: Based on the unit price/hour of step drawdown pump testing completed.
- N. Rehabilitation of Well No. 1 – Disinfection – Bid Item No. 14
1. Description: This item includes, but is not necessarily limited to, all work associated with the disinfection work as per Section 02671.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based upon the lump sum amount.
- O. Rehabilitation of Well No. 2 – Excavate As Required to Competent Casing Material – Bid Item No. 15
1. Description: This item includes, but is not necessarily limited to, all work associated with excavation around the existing wellhead including removal of the existing sanitary seal surrounding the well casing to find competent well casing material per Section 02671.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based upon the lump sum amount.
- P. Rehabilitation of Well No. 2 – Replace Steel Casing and Concrete Seal – Bid Item No. 16
1. Description: This item includes, but is not necessarily limited to, all work associated with replacing the existing 8 5/8” thick steel casing per the drawings, field welding at competent material, replacing the concrete seal as shown on the drawings and per Section 02671.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based upon the lump sum amount.
- Q. Rehabilitation of Well No. 2 – Place Cement Grout Seal to Secure Interior Casing– Bid Item No. 17
1. Description: This item includes, but is not necessarily limited to, all work associated with placing a cement grout seal between the existing inner PVC casing and the exterior steel casing per the drawings, placement of neoprene packer between PVC and cement grout as shown on the drawings and per Section 02671, and chemical and mechanical redevelopment of the well, disposal of utilized chemical offsite.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based upon the lump sum amount.

- R. Rehabilitation of Well No. 2 – Equip Well – Reinstall Pump, Motor, and Column Piping – Bid Item No. 18
1. Description: This item includes, but is not necessarily limited to, all work associated with the re-installation of the existing pump/motor and column piping as per Section 02671.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based upon the lump sum amount.
- S. Rehabilitation of Well No. 2 – Disinfection – Bid Item No. 19
1. Description: This item includes, but is not necessarily limited to, all work associated with the disinfection work as per Section 02671.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based upon the lump sum amount.
- T. Post-Rehabilitation Well Interior Video Inspections – Bid Item No. 20
1. Description: This item includes, but is not necessarily limited to, all labor, equipment, materials, incidentals, for the interior inspection of Well No. 1 & 2 from the surface to the upper limit of fill material; provision of video of each well inspection to the Owner’s Representative.
 2. Measurement: Shall be based on EA unit measured by the Owner’s Representative
 3. Payment: Based on the unit price/EA video completed.
- U. Post-Rehabilitation Well Pumping, Sample Acquisitions, and Groundwater Level Measurement - Well No. 1 & 2 – Bid Item No. 21
1. Description: This item includes, but is not necessarily limited to all work for furnishing and installing a CONTRACTOR-powered pump to extract water from the well and for sample acquisitions by Owner for Well No. 1 & 2; measurement of static water level and provision of information to Owner’s Representative.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based on the lump sum amount.
- V. Fencing and Gates at Well No. 1– Bid Item No. 22
1. Description: This item includes, but is not necessarily limited to, all work and equipment for the demo of existing fencing and gates and construction of new fencing and gates at Well No. 1 as shown on the Drawings.
 2. Measurement: Shall be lump sum for the completed work described above.
 3. Payment: Based on the lump sum amount.

W. Asphalt Repair Near Well No. 1 – Bid Item No. 23

1. Description: This item includes, but is not necessarily limited to, all work and equipment for the repair of asphalt near Well No. 1 as shown on the Drawings.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the unit price/EA square foot.

X. Relocation of Fire Hydrant Near Well No. 1 – Bid Item No. 24

1. Description: This item includes, but is not necessarily limited to, all work and equipment for removal and relocation of the existing fire hydrant near Well No. 1 including piping, valves, and thrust block as shown on the Drawings and per SDWAS WF-01.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the lump sum amount.

Y. Site Cleanup and Restoration, Demobilization – Bid Item No. 25

1. Description: This item includes, but is not necessarily limited to, all work for removing all debris and materials from the work site, restoring surface contours to pre-construction conditions; removal of all temporary facilities, equipment, material, and supplies from the site; clean up and removal of all construction debris.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the lump sum amount.

Z. Booster Pump Control Panel Replacement, VFD Installations, and Check Valve Replacements – Bid Item No. 26

1. Description: This item includes, but is not necessarily limited to, all work for removing existing booster pump control panel; furnishing and installing two new wall mounted variable frequency drives and one booster pump panel to power two existing booster pumps; preparation of submittal package including materials, shop drawings, and control logic; replacement of check valves; removal of existing and installation of new pressure transducer with analog output; removal and installation of conduits and wiring; removal of existing check valve and installation of blind flanges on irrigation supply water; creation of a physical disconnect to separate potable and irrigation water.
2. Measurement: Shall be lump sum for the completed work described above.
3. Payment: Based on the lump sum amount.

AA. Change Order Allowance – Bid Item No. 27

1. Description: This item includes, but is not necessarily limited to, an allowance, with a value of \$ 10,000.00 for Unforeseen Site Conditions. The allowance is to only be used at the written direction of the District or its representative Any unused portion of the allowance will be refunded to the District by deductive change order at the completion of the Project

2. Measurement: Shall be lump sum for the authorized and completed work described above.
3. Payment: Based on the authorized lump sum amount, which may be less than the pre-populated allowance value noted in the Bid Form.

** End of Section **

SECTION 01040
COORDINATION

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

- A. The CONTRACTOR shall coordinate all work under the Contract and work by others on the Project including, but not limited to, the following:
 - 1. General construction coordination and administration procedures.
 - 2. Work required by Utility Companies and Utility Company CONTRACTORS.
 - 3. Work by other CONTRACTORS on or adjacent to the site.
- B. Work to be performed by the CONTRACTOR will take place at a school site. CONTRACTOR shall provide, update, and adhere to his detailed schedule so that impact to students, facilities, and classroom learning are minimized.
- C. The CONTRACTOR shall take all precautions necessary to assure that no damage or unscheduled shutdowns occur to any facilities, including piping, utilities, traffic signals, roads, and structures that are to remain in operation and are not to be modified or replaced. It is the CONTRACTOR's responsibility to contact Underground Service Alert of Southern California (DigAlert), (8-1-1), no less than seven complete working days prior to any excavation for verification and location of utilities and notification of commencement of work. See plans for timeline to contact Underground Service Alert. Any temporary facilities, materials, equipment, and labor required to achieve this objective shall be provided by the CONTRACTOR at his own expense. At the completion of work, all such temporary facilities, materials, and equipment remaining shall be removed from the site.
- D. Regarding connections to existing buried piping and facilities at or adjacent to the site, it shall be the responsibility of the CONTRACTOR to uncover and verify their locations, elevations, materials, and dimensions prior to beginning construction or fabrication of any new materials or facilities that are dependent on the location of existing facilities.

1.2 RELATED SECTIONS

- A. The Work of the following Sections applies to the Work of this Section. Work of other Sections of the Specification, not referenced below, shall also apply to the extent required for proper performance of this Work.
 - 1. Section 01010, Summary of Work.
 - 2. Section 01510, Construction Sequence
 - 3. Section 02671, Development of Existing Well No. 1

1.3 GENERAL COORDINATION

- A. Coordinate construction operations to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that are dependent on each other for proper installation, connection, and operation.
1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 3. Make provisions to accommodate items scheduled for later installation.
 4. CONTRACTOR shall provide a “3 week look ahead” schedule at each progress meeting outlining upcoming construction activities.
 - a. Show working times outside of those allowed in 01010.
 - b. Show days when school is not in session
 - c. Show days where education/recreation areas will be impacted (ball field, play area near Well No. 2, ramp to classroom at fire hydrant near Well No. 1)
- B. The work shall be carried on at such places on the project and also in such order or precedence as may be found necessary by the CONSTRUCTION MANAGER to expedite the completion of the project. After work has begun on any part of the project, it shall be diligently pursued to its final completion, unless otherwise determined by the CONSTRUCTION MANAGER.

Insofar as possible, all equipment shall be tested and in operating condition before the final tie-ins are made to connect equipment to the existing facility.

The CONTRACTOR shall make provisions necessary to keep the existing pipelines in service until the new main sections have been completed and are ready for service. Connections shall not be made until the new lines have been installed, disinfected (water only), and tested. Refer also to Section 01510, Construction Sequence.

- C. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
1. Prepare similar memoranda for the CONSTRUCTION MANAGER and OWNER and other separate CONTRACTORS where coordination of their work is required.
- D. Staff Names: Within 15 working days of issuance of Notice to Proceed, submit a list of the CONTRACTOR’s principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers, and email addresses.
1. Post copies of the list in the Project meeting room, the temporary field offices, and each temporary telephone.

1.4 WATER SYSTEM SHUTDOWNS

- A. The work under this contract will require coordination of shutdowns to portions of the existing water distribution system. Refer to Section 01510, Construction Sequence. Shutdowns shall be coordinated to assure minimum disruption to the normal operations of the existing facilities. The following requirements shall apply:
1. Shutdowns will be coordinated with the CONSTRUCTION MANAGER and OWNER with a minimum of 10 days advance notice prior to commencement of construction that will impact the existing facilities and/or system.
 2. The CONTRACTOR shall have this portion of the work well planned and carefully coordinated with OWNER forces. The CONTRACTOR must satisfy the CONSTRUCTION MANGER that CONTRACTOR is prepared to complete the connection(s) successfully in the shortest practicable time.
 3. The CONTRACTOR shall be fully mobilized with all materials, equipment, and labor force at hand before the shutdown, shall commence making each connection immediately upon completion of the shutdown, and shall expeditiously prosecute the work without interruption until the connection is complete.
 4. The OWNER reserves the right to select the hours of the day, the day of the week, and the time of year on which it will make the shutdown(s).
 5. Existing water mains, fire hydrants, and water services shall be kept in service in lieu of highlining unless noted otherwise.
 6. At the existing connections, the CONTRACTOR shall pothole or perform other exploratory excavations sufficient to determine the exact location, elevation, orientation, size, and material existing pipeline(s).
 7. Shutdown and operations of facilities (pipelines, valves, tanks) shall be done by OWNER's forces or a designated representative only.
 8. CONTRACTOR shall perform all construction activities so as to avoid interference with operations of the facility and the work of others.
- B. The CONTRACTOR shall compile a detailed list of all items of work which must be accomplished during any shutdown. The CONTRACTOR shall coordinate his work to minimize the required number of shutdowns by accomplishing as many tasks as is possible during each shutdown period.

1.5 NOT USED

1.6 UTILITY COORDINATION

- A. Existing Facilities
1. The CONTRACTOR shall maintain required clearances from utility company facilities during the course of the Work.
 2. Support or relocation of existing utility company facilities to accommodate CONTRACTOR's means and methods of conducting the Work shall be coordinated directly with the utility company, and at no additional cost to the OWNER.

- B. The following is a list of projected connections to existing facilities. Additional items may be required for completion of work. CONTRACTOR is responsible for all connections, whether listed or not, at no additional cost to OWNER.
- Connection of Rehabilitated Well No. 1 to the existing transmission pipeline.
 - Connection of Rehabilitated Well No. 2 to the existing transmission pipeline.
 - Connection of proposed relocated fire hydrant to the existing fire water distribution pipeline.

1.7 COORDINATION WITH OTHER CONTRACTORS

- A. Other construction activities may be occurring on the Project Site concurrent to the Work under this Contract. The CONTRACTOR shall coordinate construction activities, schedule, and site accessibility to accommodate critical path elements of other CONTRACTORS.
- B. Submit detailed schedule of proposed connections, listing sequence and durations of all activities including shut-downs and tie-ins.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in a manner acceptable to the CONSTRUCTION MANAGER.
- B. CONTRACTOR to furnish equipment and personnel needed to remove and relocate the utility box housing Well No. 2 to the MEUSD's maintenance yard at Mountain Empire High School. CONTRACTOR to coordinate with MEUSD/CES staff for the relocation and arrange for a time and location of delivery that is suitable to MEUSD.

** END OF SECTION **

SECTION 01047

FIRE HYDRANT RELOCATION

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all construction necessary to remove and relocate the existing fire hydrant near Well No. 1 and relocate the hydrant as shown on the drawings including the connection of the relocated hydrant to the existing facilities and installation of an 8” inline gate valve as shown on the drawings.
- B. Minimize time of installation to keep existing facilities in operation as much as possible. Connections shall not be made until the new lines have been installed, disinfected (water only), and tested.
- C. Coordination with MEUSD, NV5, and Cal Fire San Diego regarding fire system shutdown to be scheduled when students are not present.

1.2 SEQUENCING AND OPERATIONS

- A. CONTRACTOR shall execute the work and shall prepare his bid and schedule according to the following construction sequence. CONTRACTOR may suggest alternative methods and sequencing construction, but they are not guaranteed to be accepted by the OWNER.
- B. CONTRACTOR shall submit a detailed schedule to NV5 to be reviewed and approved by MEUSD and Cal Fire San Diego.
- C. CONTRACTOR shall confirm means and procedure to isolate fire main, with support from MEUSD facilities staff, no less than 14 calendar days prior to disconnection of hydrant in addition to the schedule to be submitted.
- D. MEUSD to perform fire pump shutdown for relocation of existing hydrant, reconnection to the existing pipeline, and installation of inline isolation valve per the drawings.
- E. MEUSD to restart fire pump system and test fire pump.

1.3 SUBMITTALS

- A. Submit detailed schedule of timing for proposed connections, listing sequence and durations of all activities including shutdowns and tie-ins. Shutdown to be scheduled when students are not present.

1.4 CONNECTIONS TO EXISTING FACILITIES

- A. Location of isolation valves is unknown. Connection to existing fire water pipeline may require removal of some amount of water from the pipeline trench due to lack of a working local isolation valve.

- B. CONTRACTOR may need to modify the existing fire pump system to avoid any reaction of the system to pipe depressurization caused during fire hydrant relocation. Any modification shall be coordinated with MEUSD.
- C. Minimize time of installation to keep existing facilities in operation as much as possible. Connections shall not be made until the new lines have been installed and tested.
- D. Excavation shall be filled to provide access to Well No. 1.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

** END OF SECTION **

SECTION 01530

PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

- A. The CONTRACTOR shall be responsible for taking all precautions, providing all programs and taking all actions to protect the Work, property and all existing utilities and improvements not designated for removal. CONTRACTOR shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all as specified herein, and in accordance with the requirements of the Contract Documents.
- B. The CONTRACTOR's actions to prevent injury, damage, or loss shall include, but not be limited to, the following:
 - 1. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with the progress of the Work, the Work of any other CONTRACTOR, utility service company, or water storage and distribution system.
 - 2. Provide suitable storage facilities for all materials which are subject to damage by exposure to weather, sunlight, theft, breakage, or otherwise.
 - 3. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.
 - 4. Clean up frequently all refuse, rubbish, scrap materials, and debris caused by his operations, to the end that at all times the site of the Work shall present a safe, orderly and workmanlike appearance.
 - 5. Provide barricades and guard rails around openings, for scaffolding, for temporary stairs and ramps, around excavations, elevated walkways and other hazardous areas. Provide additional protection adequate to allow access to portable building utilized as a classroom adjacent to Well No. 1.
- C. The CONTRACTOR shall not, except with prior written consent from proper parties, enter or occupy privately-owned land with personnel, tools, materials or equipment or enter any other school area without MEUSD staff approval.
- D. CONTRACTOR shall assume full responsibility for the preservation of all facilities within the work sites. If any direct or indirect damage is done by or on account of any act, omission, neglect or misconduct in the execution of the Work by the CONTRACTOR, it shall be restored by the CONTRACTOR, at his expense, to a condition equal to or better than that existing before the damage was done.
- E. The CONTRACTOR shall verify the exact locations and depths of all utilities that may interfere with the work. All such exploratory excavations shall be performed as soon as practicable after award of the contract and, in any event, a sufficient time in advance of

construction to avoid possible delays to the CONTRACTOR's work. When such exploratory excavations show the utility location as shown to be in error, the CONTRACTOR shall so notify the CONSTRUCTION MANAGER.

1.2 RELATED SECTIONS

- A. Other Sections of the Specification, not referenced herein, shall apply to the extent required for proper performance of the Work.

1.3 DAMAGE AND PROTECTION

The CONTRACTOR shall immediately notify the CONSTRUCTION MANAGER and utility OWNER of any damage to a utility. The CONTRACTOR shall be responsible for the cost of repairing and/or relocating damaged utilities as follows:

Facilities apparent from visual inspection of the site or existing service laterals in appurtenances which can be inferred from the presence of other visible facilities such as buildings, meters, valve cans, junction boxes, etc., on or adjacent to the construction site.

1.4 UTILITY RELOCATION AND REARRANGEMENT

The right is reserved to the OWNER and the OWNERS of utilities or their authorized agents to enter upon the Work area for the purpose of making such changes as are necessary for the rearrangement of their facilities or for making necessary connections or repairs to their properties. The CONTRACTOR shall cooperate with forces engaged in such work and shall conduct its operations in such a manner as to avoid any unnecessary delay or hindrance to the work being performed by such forces and shall allow the respective utilities time to relocate their facility.

The CONTRACTOR assumes responsibility for the removal, relocation, or protection of existing facilities wherein said facilities are identified by the Contract Documents, correctly field located by a utility company, or as provided for in the General Requirements. The CONTRACTOR shall coordinate with the OWNER of utility facilities for the rearrangement of said facilities.

In the event that underground utilities are found that are not shown in the Contract Documents or are found to exist in a substantially different location than shown in the Contract Documents, the CONTRACTOR shall: (1) notify the CONSTRUCTION MANAGER of the existence of said facilities immediately in writing, and (2) take steps to ascertain the exact location of all underground facilities prior to doing work that may damage such facilities.

Requests for extensions of time arising out of utility rearrangement delays shall be reviewed by the CONSTRUCTION MANAGER. In accordance with Government Code Section 4215 the CONTRACTOR shall not be assessed liquidated damages for delay in completion of the project, when such delay is caused by the failure of the OWNER or

utility company to provide for the removal or relocation of facilities for which they are the responsible party as defined in Paragraph 1.3 of this Section, Damage and Protection.

Where it is determined by the CONSTRUCTION MANAGER that the rearrangement of an underground main, the existence of which is not shown on the Construction Drawings, Specifications, or in the General Requirements, is essential in order to accommodate the contemplated improvement, the CONSTRUCTION MANAGER will provide for the rearrangement of such facility by other forces or by the CONTRACTOR in accordance with the provisions of Paragraph 00700-8.07, Change Orders.

When the General Requirements, Specifications, or Construction Drawings indicate that a utility is to be relocated, altered or constructed by others, the OWNER will conduct all negotiations with the utility company and the work will be done at no cost to the CONTRACTOR.

Temporary or permanent service, relocation or alteration of utilities desired by the CONTRACTOR for its own convenience shall be the CONTRACTOR's responsibility and it shall make arrangements and bear all costs.

Except where the OWNER of a damaged utility has advised that it intends to repair the damage through its own forces or forces that it will retain or has retained, CONTRACTOR shall, within 24 hours of receipt from the OWNER or CONSTRUCTION MANAGER of notice to commence correction of damage, notify the CONSTRUCTION MANAGER in writing if CONTRACTOR intends to repair the damage. During nights and weekends when work is not in progress, the OWNER or CONSTRUCTION MANAGER may give such notice by telephone or by facsimile transmission to the CONTRACTOR's facsimile number designated. Such notice will be immediately effective. The CONTRACTOR's failure to provide timely written notification that it intends to repair the damage shall be deemed its agreement that the OWNER may repair the damage at CONTRACTOR's expense without further notice and without prejudice to any other remedy available to the OWNER. In such event, the CONTRACTOR may observe the Work if this can be done without in any way delaying the progress thereof, but may not contest any element of the expense of repair or the lack of further notice.

1.5 RESTORATION OF PAVEMENT

- A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents. All temporary and permanent pavement shall conform to the requirements of the affected pavement OWNER. All pavements which are subject to partial removal shall be replaced to previous condition and set forth herein at CONTRACTOR's expense.
- B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall

maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.

- C. **Permanent Resurfacing:** In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement. CONTRACTOR is responsible for the replacement of traffic detector loops damaged or removed during construction which are associated with existing traffic controls.

1.6 EXISTING UTILITIES AND APPURTENANCES

- A. **General:** The CONTRACTOR shall protect all underground utilities and appurtenances that may be affected or impaired during construction operations. The CONTRACTOR is responsible for ascertaining the actual location of all existing utilities and appurtenances that will be encountered during his construction operations, and to assure that such utilities or other improvements are adequately protected from damage from such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
- B. **Utilities to be Moved:** In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will be notified by the CONTRACTOR to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the utility OWNER or operator sufficiently in advance of the Work for the necessary measures to be taken to prevent interruption of service.
- C. **Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the CONTRACTOR shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the CONSTRUCTION MANAGER and the OWNER of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.**
- D. **OWNER's Right of Access:** The right is reserved to the OWNER and to the OWNERS of public utilities and franchises to enter the worksites at any time for the purpose of making changes in their property made necessary by the Work of this Contract.
- E. **Underground Utilities Indicated:** Existing utility lines that are indicated or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be

retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the CONTRACTOR.

- F. **Underground Utilities Not Indicated:** In the event that the CONTRACTOR damages any existing utility lines that are not indicated or the locations of which are not made known to the CONTRACTOR prior to excavation, a written report thereof shall be made immediately to the CONSTRUCTION MANAGER. If directed by the CONSTRUCTION MANAGER, repairs shall be made by the CONTRACTOR under the provisions for changes and extra work.
- G. All costs of locating, repairing damage not due to failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the work which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such work will be paid for as extra work in accordance with the contract provisions.
- H. **Approval of Repairs:** All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement OWNER before being concealed by backfill or other work.
- I. **Maintaining in Service:** All oil and gasoline pipelines, power, telephone communication cable ducts, natural gas and water mains, irrigation lines, drainage lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the Work shall remain continuously in service during all operations under the Contract, unless other arrangements satisfactory to the CONSTRUCTION MANAGER are made with the OWNER of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The CONTRACTOR shall be responsible for and shall repair all damage due to his operations, and the provisions of this Section shall not be abated even if such damage occurs after backfilling or is not discovered until after completion of the backfilling.

1.7 TREES WITHIN PROJECT LIMITS

- A. **General:** The CONTRACTOR shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or OWNER. All existing trees and shrubs damaged during construction shall be trimmed or replaced by the CONTRACTOR or a certified tree company under permit from the jurisdictional agency and/or the OWNER at no additional cost to OWNER. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.
- B. **Trimming:** Symmetry of the tree shall be preserved with no stubs, splits, or torn branches left; and clean cuts shall be made close to the trunk or large branch. Spikes

shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material specifically made for the purpose and as appropriate for the tree.

- C. Replacement: The CONTRACTOR shall immediately notify the OWNER and/or the CONSTRUCTION MANAGER, if any tree is damaged by the CONTRACTOR's operations. If, in the opinion of said agency or the CONSTRUCTION MANAGER, the damage is such that replacement is necessary, the CONTRACTOR shall replace the two trees for every tree removed at his own expense. The tree shall be of a like size and variety as the tree damaged or, if of a smaller size, the CONTRACTOR shall pay to the OWNER of said tree a compensatory payment acceptable to the tree OWNER, subject to the approval of the OWNER or CONSTRUCTION MANAGER

1.8 EXCAVATION NOTIFICATION BY THE CONTRACTOR

- A. Prior to any excavation in the vicinity of existing underground facilities, including all water, sewer, storm drain, gas, irrigation, petroleum products; or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way, the CONTRACTOR shall notify the respective authorities representing the OWNERS or agencies responsible for such facilities per Section 01040 1.1 C so that a representative of said OWNERS or agencies can locate the utilities and be present during such work if required. Underground Service Alert shall be contacted per Section 01040; otherwise the CONTRACTOR shall directly contact the OWNER.
 - 1. Known underground structures are shown for the assistance of the CONTRACTOR, in accordance with the best information available, but are not guaranteed to be correct or complete.
 - 2. The CONTRACTOR shall explore in advance of his trenching and excavation Work and shall uncover all obstructing underground structures sufficiently to determine their location, to prevent damage, to them and to prevent interruption to the services which such structures provide. If CONTRACTOR damages an underground structure, he shall restore it to original condition at his own expense.
 - 3. Necessary changes in the location of the Work may be directed by the CONSTRUCTION MANAGER to avoid unanticipated underground structures.
 - 4. If permanent relocation of an underground structure or other subsurface facility is required and is not otherwise provided for in the Contract Documents, the CONSTRUCTION MANAGER will direct CONTRACTOR, in writing, to perform the Work, which shall be paid for under the provisions of the General Conditions.

1.9 PROTECTION OF EXISTING STRUCTURES

- A. Underground Structures: Underground structures are defined to include, but are not limited to, all sewer, water, storm drain, gas, and other piping, and manholes, chambers, electrical and communications conduits, tunnels and other existing subsurface work located within or adjacent to the limits of the Work.

- B. Surface Structures: Surface structures are defined as all existing buildings, structures and other facilities above the ground surface, their foundations or any extension below the surface, and include, but are not limited to, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and other facilities visible above the ground surface.
- C. Protection of Underground and Surface Structures:
1. CONTRACTOR shall sustain in their places and protect from direct or indirect injury all underground and surface structures located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the work of sustaining and supporting such structure, CONTRACTOR shall satisfy the CONSTRUCTION MANAGER that the methods and procedures to be used have been approved by the party owning same.
 2. CONTRACTOR shall assume all risks attending the presence or proximity of all underground and surface structures within or adjacent to the limits of the Work. CONTRACTOR shall be responsible for all damage and expense for direct or indirect injury caused by his Work to any structure. CONTRACTOR shall repair immediately all damage caused by his Work, to the satisfaction of the OWNER of the damaged structure.
- D. All other existing surface facilities, including but not limited to, guard rails, posts, guard cables, signs, poles, markers, and curbs, which are temporarily removed to facilitate installation of the Work, shall be replaced and restored to their original condition at CONTRACTOR's expense.

1.10 NOT USED

1.11 PROTECTION OF INSTALLED PRODUCTS

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed prior to completion of Work. No extra payment will be allowed for this work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

** END OF SECTION **

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SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

- A. The CONTRACTOR shall be responsible for providing products and materials in conformance with the requirements of these Specifications, and for product delivery, storage, and handling in conformance with manufacturer's recommendations and as specified herein.
- B. Products are defined as material, machinery, components, equipment, fixtures, and systems incorporated into and forming the Work.

1.2 RELATED SECTIONS

- A. The Work of the following Sections apply to Work of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of the Work.
 - 1. Section 02671, Rehabilitation of Existing Well N. 1 & 2

1.3 SUBMITTALS

- A. Within 30 days after the start of the Project as established by the Notice to Proceed, submit a complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. Submit Shop Drawings and other submittals as required elsewhere in the Specifications.
- C. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 - 1. Show the relationship of components shown on separate Shop Drawings and staging requirements for component installation.
 - 2. Indicate required installation sequences.

1.4 PRODUCT DELIVERY

- A. CONTRACTOR to coordinate with MEUSD facilities staff at least 2 working days in advance of any delivery to the site. No deliveries shall be made during school pick-up or drop-off, or during lunch hours.

- B. The CONTRACTOR shall arrange with the United States Postal Service for a special mailing address for the project. All deliveries shall be made to that address. No deliveries will be accepted by the OWNER.
- C. Arrange deliveries of products in accordance with progress schedules and in sufficient time to allow for inspection by the CONSTRUCTION MANAGER prior to installation.
- D. Coordinate deliveries to avoid conflict with Work and conditions at site and to accommodate the following:
 - 1. Work of other CONTRACTORS, or OWNER.
 - 2. Limitations of storage space.
 - 3. Availability of equipment and personnel for handling products.
 - 4. OWNER's use of premises.
- E. Products shall not be shipped from the manufacturer's or fabricator's facility or delivered to project site until related Shop Drawings, including shop or factory test reports and records, have been accepted and returned as approved by the CONSTRUCTION MANAGER.
- F. Shipments of materials to CONTRACTOR or subcontractors shall be delivered to the site only during regular working hours. Shipments shall be addressed and consigned to the proper party with the name of CONTRACTOR, project, street number, and city. Shipments shall not be delivered to OWNER.
- G. Products shall not be delivered to the site until required storage facilities have been provided and installed by CONTRACTOR, and are ready to receive products for storage.
- H. Products shall be delivered to site in manufacturer's original, unopened, labeled containers. Keep CONSTRUCTION MANAGER informed of delivery of all equipment to be incorporated in the Work.
- I. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.
- J. Immediately upon delivery, inspect shipment to assure:
 - 1. Product complies with requirements of Contract Documents and reviewed submittals.
 - 2. Quantities are correct.
 - 3. Containers and packages are intact, and labels are legible.
 - 4. Products are properly protected and undamaged.
- K. Package or crate products to protect from damage during shipping, handling, and storage.
 - 1. Mark or tag outside of packing to indicate contents by name and equipment number, special precautions for handling, and recommended requirements for storage.
 - 2. Protect machined and unpainted parts subject to damage by the elements.

3. Transport and handle products in accordance with manufacturer's written instructions.
 4. Inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.
- L. Provide equipment and personnel necessary to handle products, including those provided by OWNER, to prevent soiling or damage to products or packaging.
- M. Provide additional protection during handling as necessary to prevent scraping, marring, or otherwise damaging products or surrounding surfaces.
- N. Handle products by methods to prevent bending or over stressing.
- O. Lift heavy components only at designated lifting points.
- P. Materials and equipment shall at all times be handled in a safe manner and as recommended by manufacturer or supplier so that no damage will occur to them. Do not drop, roll, or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

1.5 PRODUCT HANDLING

- A. Provide equipment and personnel necessary to handle products, including those provided by OWNER, by methods to prevent soiling or damage to products or packaging.
- B. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.
- C. Handle products by methods to prevent bending or over stressing.
- D. Lift heavy components only at designated lifting points.
- E. Materials and equipment shall at all times be handled in a safe manner and as recommended by manufacturer or supplier so that no damage will occur to them. Do not drop, roll or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

1.6 PRODUCT STORAGE

- A. Store and protect materials in accordance with manufacturer's recommendations and requirements of the Contract Documents.
- B. Manufacturer's product containers shall not be opened until time of installation.
- C. CONTRACTOR shall make all arrangements and provisions necessary for the storage of materials and equipment. Storage shall be only within fenced areas, secured away from

school and play areas. All excavated materials, construction equipment, and materials and equipment to be incorporated into the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be maintained at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Materials and equipment shall be kept neatly and compactly stored in locations that will cause a minimum of inconvenience to the OWNER, other CONTRACTORS, public travel, adjoining OWNERS, tenants and occupants. Arrange storage in a manner to provide easy access for inspection.

- D. Areas available on the construction site for storage of materials and equipment shall be within the project site or at other sites approved by the CONSTRUCTION MANAGER. Products shall not be stored inside the structures being constructed.
- E. Materials and equipment shall be stored to facilitate inspection and to ensure preservation of the quality and fitness of the Work, including proper protection against damage by freezing and moisture.
 - 1. Arrange storage to provide access for inspection and inventory control.
 - a. Periodically inspect to assure products are undamaged, and are maintained under required conditions.
 - b. Maintain an inventory of materials stored to facilitate inspection and estimate progress payments for materials delivered but not yet installed.
 - 2. Store products in accordance with manufacturer's written instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's written instructions.
- F. Products subject to damage by moisture, freezing, or other effects of the elements shall be stored inside weatherproof storage areas that are equipped with suitable temperature and moisture controls.
- G. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
- H. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- I. Lawns, grass plots, or other private property shall not be used for storage purposes without written permission of the OWNER or other person in possession or control of such premises.
- J. CONTRACTOR shall be fully responsible for loss, theft, or damage to stored materials and equipment.

- K. If necessary to move stored materials and equipment prior to or during construction, CONTRACTOR shall move materials and equipment without any additional compensation.
- L. PVC pipeline shall be stored completely covered from sunlight at all times. Failure to store PVC in such a manner shall be grounds for product rejection with replacement at no additional cost to OWNER.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENTS

- A. Provide new industrial quality products unless used or reuse of existing is specifically authorized in the Contract Documents.
- B. Provide standard catalog products of manufacturers regularly engaged in the manufacture of the products unless specifically authorized otherwise.
 - 1. Provide products that comply with specified requirements and that will function properly in their expected environment and under expected service conditions.
 - 2. Where two or more units of the same product class are provided, provide products from the same manufacturer that are interchangeable.
 - 3. Factory assemble equipment when practical.
 - 4. For equipment shipped unassembled, provide with assembly plans and written instructions. Match-mark or tag separate parts and assemblies to facilitate field assembly.
 - 5. Install products in accordance with requirements of Contract Documents and approved recommendations of manufacturer.
- C. The CONTRACTOR shall make all arrangements for transportation, delivery and handling of equipment and materials required for prosecution and completion of the Work.
- D. Product fabrication, manufacture, or purchase shall not begin until related Shop Drawings are accepted and returned without objection by the CONSTRUCTION MANAGER.

2.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Provide any product meeting those standards.
- B. Products Specified by Naming One or More Manufacturers: Submit a Substitution Request for any manufacturer not specifically named. Product fabrication, manufacture, or purchase shall not begin until Substitution Requests and subsequent related Shop Drawings are returned without objection by the CONSTRUCTION MANAGER.

2.3 PAYMENT

- A. CONTRACTOR shall not be compensated for product purchase or installation until such product is installed to satisfaction of CONSTRUCTION MANAGER.

PART 3 - EXECUTION

3.1 SYSTEMS DEMONSTRATION

- A. Prior to final inspection, demonstrate satisfactory operation of each system to CONSTRUCTION MANAGER and OWNER's personnel.

3.2 INSTRUCTION OF OWNER'S PERSONNEL

- A. CONTRACTOR shall Instruct OWNER's personnel in the operation, adjustment, and maintenance of equipment and systems, using operation and maintenance data as the basis of instruction.

** END OF SECTION **

SECTION 02510

ASPHALT CONCRETE PAVING

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

- A. This section specifies the work necessary to furnish and install asphalt concrete pavement consisting of aggregate base, asphaltic concrete, liquid asphalt, slurry coat, and associated materials where shown on the plans.
- B. This work shall be performed after hydrant relocation and after work at Well No. 1 is complete and well is operational.

1.2 QUALITY ASSURANCE

- A. References: The publications referred to hereinafter form a part of these specifications to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed standards, the requirements of this section shall prevail.

1. American Society for testing and Materials (ASTM) Publications

- a. ASTM D1557 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 kg) Rammer and 18 Inch (457 mm) Drop

2. Federal Specifications (Fed. Spec.)

- a. Fed. Spec. TT-P-115E Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 kg) Rammer and 18 Inch (457 mm) Drop

3. US Department of Commerce Standard (PS)

- a. PS20-70 American Softwood Lumber Standard

4. Standard Specifications for Public Works Construction (Greenbook), 2018 version

5. State of California, Department of Transportation (Caltrans) Publications

- a. Caltrans State Standard Specifications, State of California Business and Transportation Agency, Department of Transportation

- b. State Standard Specifications: Whenever this specification is referenced, the following is understood.

- (i) All references to statistical testing are deleted.

- (ii) Whenever a discrepancy occurs between the State Standard Specifications and this specification, it is understood that this specification governs.
- (iii) All references to measurement and payment are deleted.

6. San Diego Regional Standard Drawing G-24A – Type A

- B. Testing: Testing will be conducted by the OWNER's representative to determine compliance with the specified degree of compaction and moisture content. The OWNER's representative shall pay for testing costs.

1.3 SUBMITTALS

- A. The CONTRACTOR shall submit information to substantiate compliance with this specification. In addition, the following specific information shall be submitted.
 - 1. Samples: Representative samples of acceptable materials proposed for use in the mix shall be furnished for testing.
 - 2. Certificate of Compliance: Asphalt supplier certificate of compliance with Caltrans Certification Program for Supplier of Asphalt must be provided to the CONSTRUCTION MANAGER (Caltrans Std. Specs Sect. 92).
 - 3. Mix Design: An asphalt concrete mix design by an independent qualified laboratory.

PART 2 - PRODUCTS

2.1 ASPHALT CONCRETE PAVEMENT

- A. Aggregates: The grading and proportioning of aggregates shall be such that the combined mineral aggregate conforms to the specified requirements.
 - 1. Aggregate for asphaltic concrete shall conform to Section 39 of the State Standard Specifications, Type B for individual test result conforming to 3/4 in. maximum size gradation, medium.
- B. Asphaltic Materials
 - 1. Asphalt Cement: Section 92 of the State Standard Specifications, Grade AR-4000.
 - 2. Liquid Asphalt: Section 93 of the State Standard Specifications, SC-250.
 - 3. Asphaltic Emulsion: Section 94 of the State Standard Specifications, SS1, or SS1h.
- C. Paint: Paint shall comply with Section 84 of the State Standard Specifications, color as indicated.

2.2 ASPHALT SLURRY COAT

- A. General: Slurry coat shall be a Type II Rubberized Emulsion Aggregate Slurry (REAS) consisting of mixing and spreading an application of Rubberized Polymer Modified Emulsion (RPME), aggregate, water and Portland Cement.
- B. Materials: Materials shall conform to Section 203-5.5.2 of the Greenbook.
- C. RPME: RPME shall conform to Section 203-3.4.4 and all other applicable sub sections of 203-3 of the Greenbook.
- D. Mix Design: Mix Design shall conform to Section 203-5.2, of the Greenbook. The CONTRACTOR shall submit to the CONSTRUCTION MANAGER a Certificate of Compliance from the manufacturer of each material used in the mix design certifying that it complies with the requirements of this Specification.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Concrete walks, curbs and bases, buildings, fences, railings, and other improvements adjacent to the operations shall be protected. CONTRACTOR shall be responsible for damage caused by his employees or equipment and shall make necessary repairs. Building and other surfaces shall be covered with paper or other protection, where required. Damage to blacktop, outside of trench line, as a result of construction activity or equipment, shall be repaired by means acceptable to the OWNER's representative.

3.2 BASE COURSE

- A. Requirements: Native or fill material shall be compacted as specified on the drawings and in accordance with Section 15070, Piping Systems.
- B. Maintenance: Maintain the base course until the asphaltic pavement is in place. Maintenance shall include drainage, rolling, shaping, and water as necessary to maintain the course in proper condition. Maintain sufficient moisture at the surface to prevent a dusty condition by light sprinkling with water.
- C. Finish Surface: Trench line shall be restored to match existing surface treatment. Surface tolerance shall comply with Section 26 of the State Standard Specifications. The finish surface of base course, when tested for uniformity of slope, shall not deviate at any point more than 3/8 in. from bottom of a 10-foot straight edge laid in any direction. When base course is constructed in more than one layer, specified smoothness requirements shall apply to top surface.
- D. Weed Control: One day before the application or placement of bituminous material on the subgrade, the surface shall be sterilized with herbicide. Apply chemical at the rate of 4 lbs/100 ft². Apply to the surface dry or as a solution. If applied dry, add water to the

surface at a rate of 4 gal/100 ft². If applied as solution, dissolve chemical at the rate of 1 lb/gal of water and spray on at the rate of 4 gal of solution per 100 ft².

- E. Prime Coat: Prior to the application of the asphaltic concrete, apply a bituminous prime coat of liquid asphalt on the prepared compacted base at the rate of 0.25 gal/yd² in accordance with Sections 39 and 93 of the State Standard Specifications. Apply liquid asphalt by pressure distributors. Allow sufficient time before placing the asphalt concrete to permit the prime coat asphalt to penetrate the prepared compacted base.
- F. Paint Binder: Apply asphaltic emulsion to the existing pavement surfaces in accordance with Sections 39 and 94 of the State Standard Specifications.

3.3 ASPHALT CONCRETE

A. Requirements

1. The bituminous concrete shall consist of mineral aggregate, uniformly mixed with bituminous material in a central plant in accordance with Section 39 of the State Standard Specifications. The mixing plant and construction equipment shall conform to the requirements of Section 39 of the State Standard Specifications. Copies of the most recent laboratory testing results shall be provided by the plant to the OWNER's representative, or bituminous concrete shall be sampled by the OWNER's representative to be submitted for testing at a certified laboratory.
2. The percentage of asphalt cement binder in the road pavement shall be between 5% and 7%.
3. Minimum thickness of temporary asphalt paving shall be 6-inches.

B. Placing: Deliver bituminous mixtures to the roadbed at temperatures specified in Section 39 of the State Standard Specifications. Spread in accordance with Section 39 of the State Standard Specifications. Cover all loads with tarpaulin or other material during transportation.

C. Compaction: Initial or breakdown rolling and the final rolling of the uppermost layer of the asphalt concrete shall be in accordance with Section 39 of the State Standard Specifications. Compaction by vehicular traffic shall not be permitted. In no case shall the minimum compaction be less than 95% of maximum relative compaction.

D. Joining Pavement

1. Carefully make joints between old and new pavement or between successive days' work in such manner as to insure a continuous bond between old and new sections of the course. Expose and clean edges of existing pavement. Cut edge to straight, vertical surfaces. Paint all joints with a uniform coat of paint binder before the fresh mixture is placed. Prepare joints in the new pavement in accordance with Section 39 of the State Standard Specifications.
2. Where medium to large voids exist immediately adjacent to and outside of the cut edge, contractor shall apply asphalt to create as continuous and smooth of a surface as possible.

- E. Bond Coat: Provide a bond coat of bitumen between courses per State Standard Specifications, Section 39, applied uniformly at a rate of 0.10 gal/yd².
- F. Protection of Pavement: After final rolling, contractor shall not permit vehicular traffic of any kind shall be permitted on the pavement until it has cooled and hardened and in no case less than six hours. Contractor shall place traffic barricades that meet the approval of the OWNER's representative to protect pavement.
- G. Drainage: Asphalt concrete placed within 3 feet of all structures shall be sloped a minimum of 2% to drain water away from structures unless otherwise shown on the plans.

3.4 HEADERBOARDS

- A. Boards shall be 2-inches x 6-inches secured in place using 2-inch x 4-inch x 24-inch minimum length stakes spaced not more than 6 feet apart. All forms shall be set to true alignment and grade. Headerboard and stakes shall be either redwood (rough sawn construction heart grade), or pressure treated Douglas Fir at the CONTRACTOR's option, conforming to PS-20. Untreated headerboards shall be scored to prevent warping. Earth shall be placed against the outside shoulder of the forms and compacted sufficiently to prevent forms from spreading during the compaction of the pavements.

3.5 TEMPORARY COLD PATCH IN PIPELINE TRENCH

- A. CONTRACTOR shall cold patch all trenches before the end of each working day. CONTRACTOR shall place a cold patch with a thickness no less than 3.0 inches. Temporary asphalt surface shall be flush with adjoining concrete to prevent tripping hazard.

3.6 ASPHALT SLURRY COAT

- A. General: CONTRACTOR shall mix, transport, store, and apply asphalt slurry coat in accordance with Section 302-4.7 of the Greenbook. Application limits on site shall be as delineated on the Drawings.
- B. Work Site Mixing: Work site mixing of Rubberized Emulsion Aggregate Slurry (REAS) shall not be allowed. REAS shall be produced per Section 203-5.5.3, of the Greenbook.
- C. Spreading and Application: Spreading and application shall conform to Section 302-4.8 of the Greenbook.
- D. Finishing
 - 1. Rolling: After spreading REAS, and before opening to traffic, the CONTRACTOR shall roll the newly placed REAS with 3 passes of a pneumatic roller per Section 302-5.6 of the Greenbook
 - 2. Sweeping

- a. Day of REAS Coat: Sweep area the same day immediately prior to opening to traffic.
- b. Final Sweeping: Perform post-application sweeping 5-10 working days after final seal has been placed.

E. Performance Criteria

1. Should any area of the REAS prove defective or fail to perform properly as defined herein, within one (1) year after the date on which all construction operations are completed, the CONTRACTOR will be required to perform repair work at its own expense to the satisfaction of the OWNER.
2. The following performance and repair criteria will apply: Any single area of REAS greater than four (4) square feet that fails to meet the performance criteria due to raveling, bleeding or flushing or delaminating as defined herein will be considered defective and shall be repaired at the CONTRACTOR's expense to the satisfaction of the OWNER.
 - a. Raveling: Raveling is the wearing away (loss of aggregate) of the REAS surface, including areas affected by longitudinal and transverse streaking.
 - b. Bleeding or Flushing: Bleeding or flushing is the upward movement of asphalt that creates a film of asphaltic emulsion on the surface of the finished surface.
 - c. Delaminating: Delaminating is the loss of the bond between the REAS and the existing asphalt concrete pavement surface.

** END OF SECTION **

SECTION 02671

REHABILITATION OF EXISTING WELL NO. 1 & 2 (RECONSTRUCTION)

PART 1 - GENERAL

1.1 SUMMARY

The CES has two wells, Well No. 1 and Well No. 2 that are capable of delivering water to meet the system’s domestic demand and minimal irrigation needs after a replacement of failed pumps in 2017. These wells produce water with nitrate concentrations near the MCL, and Well No. 1 has exceeded the MCL in the past as a result of a faulty sanitary seal. However, it has been determined that blending of the water from these wells allows for suitable production of water that meets the MCL without the need for treatment. During rehabilitation, at least one well shall remain in service at all times to supply water to the distribution system.

A. CES – Well No. 1

This section includes products, materials, and procedures/services associated with the rehabilitation efforts to improve water quality of existing Well No. 1. The location of Campo Elementary School (CES) is provided in the Drawings (Sheet 1). The location of Well No. 1 is depicted on Sheet 2. Photos of the exterior of Well No. 1 are provided on Sheet 4. The objectives of the rehabilitation activities on Well No. 1 are listed in Section 01010, SUMMARY, MOBILIZATION, AND SPECIAL CONDITIONS.

Well No. 1 was constructed in 1991 as an open-hole-bottom bedrock well to potable water well standards and has a sanitary seal, which extends to 52 feet bgs. Note that Well No. 1 is one of two of CES’s potable water sources, and needs to be rehabilitated and returned to service expeditiously. See procedures herein. The California Department of Water Resources Well Completion Report (No. 491663) for Well No. 1 is included in Part 3 of these Technical Specifications and summarized in Table 1 below, along with additional information provided by MEUSD/CES.

Table 1 – CES Well No. 1 Data

	Well No. 1
Well Depth (ft)	800
Well Capacity (gpm) – 2018 Pumping Rate	20
Well Conductor #1 Casing Material	Steel
Well Conductor #1 Casing Diameter (in)	12”
Well Conductor #1 Casing/Annular Seal Depth (ft)	52
Inner Well Casing Material	PVC
Inner Well Casing Diameter (in)	4.5
Inner Well Casing Depth (ft)	120
Well Constructed	1991

Well No. 1 is located behind an existing fence chain link fence and fire hydrant to be removed and relocated per the Drawings which limit access to the wellhead.

CONTRACTOR shall remove and re-install the existing permanent well pump, motor, and column piping as part of this project.

The CONTRACTOR shall perform a video survey after the well rehabilitation efforts have been completed to ensure those efforts were effective and the well's integrity and function are as intended.

CONTRACTOR shall furnish and operate a temporary pump to obtain groundwater samples and to remove water from the well prior to sample acquisition at various stages throughout the project. CONTRACTOR should anticipate multiple installations and removals of this temporary pump. Pre- and post-rehabilitation groundwater samples will be collected by the Owner's Representative from Well No. 1, to assess the effectiveness of the rehabilitation efforts at improving water quality and to obtain water quality information. CES will be responsible acquisition of sample bottles and for transportation of samples to the laboratories and for direct payment of laboratory fees.

As depicted on the drawing M-05, rehabilitation work for Well No.1 will include abandonment steps as follows: 1) Abandonment of the open bottom portion of the existing well from 300 to 800 feet; 2) the original PVC inner well casing will be removed; and 3) the original conductor casing will be removed.

Reconstruction will include: 1) placement of a 6 inch neoprene packer from 135 feet to 140 feet for drilling of a 15 inch borehole to 135 feet; and 2) Replacement well will consist of 8 5/8 inch steel casing to a depth to approximately 135 feet. The new well intake interval will be open hole condition from 135 feet to 200 feet. Well No. 1 shall be disinfected upon completion of this work.

B. CES – Well No. 2

This section includes products, materials, and procedures/services associated with the rehabilitation efforts to improve the existing Well No. 2. The location of Campo Elementary School (CES) is provided in the Drawings (Sheet 1). The location of Well No. 2 is depicted on Sheet 3. Photos of the exterior of Well No. 2 are provided on Sheet 4. The objectives of the rehabilitation activities on Well No. 2 are listed in Section 01010, SUMMARY OF WORK, MOBILIZATION, AND SPECIAL CONDITIONS.

Well No. 2 was constructed in 1991 to potable water well standards and has a sanitary seal, which extends to 53 feet bgs. Note that Well No. 2 is one of two of CES's potable water sources, and needs to be rehabilitated and returned to service expeditiously. See procedures herein. The California Department of Water Resources Well Completion Report (No. 491666) for Well No. 2 is included in Part 3 of these Technical Specifications and summarized in Table 2 below, along with additional information provided by MEUSD/CES.

Table 2 – CES Well No. 2 Data

	Well No. 2
Well Depth (ft)	198
Well Capacity (gpm) – 2018 Pumping Rate	40
Well Conductor #1 Casing Material	Steel
Well Conductor #1 Casing Diameter (in)	12”
Well Conductor #1 Casing/Annular Seal Depth (ft)	53
Inner Well Casing Material	PVC
Inner Well Casing Diameter (in)	4.5
Inner Well Casing Depth (ft)	198
Well Constructed	1991

Well No. 2 is located behind an existing fence inside a playground area which will limit access for construction equipment to the site. Additionally, the wellhead is located inside of a utility box to be removed and relocated per the Drawings and as described in Section 01510 – 3.1 A and 01040 – 3.1 B. CONTRACTOR shall remove and re-install the existing permanent well pump, motor, and column piping as part of this project.

The CONTRACTOR shall perform a video survey after the well rehabilitation efforts have been completed to ensure those efforts were effective and the well’s integrity and function are as intended.

CONTRACTOR shall furnish and operate a temporary pump to obtain groundwater samples and to remove water from the well prior to sample acquisition at various stages throughout the project. CONTRACTOR should anticipate multiple installations and removals of this temporary pump. Pre- and post-rehabilitation groundwater samples will be collected by the Owner’s Representative from Well No. 2, to obtain water quality information. CES will be responsible acquisition of sample bottles and for transportation of samples to the laboratories and for direct payment of laboratory fees.

As depicted on the drawing M-05, rehabilitation work for Well No. 2 will include: 1) placement of neoprene packer in the between the borehole and the existing PVC casing; 2) remove existing conductor casing; 3) place plugs below 4 feet in annulus to excavate an increase in the size of surface seal placement to 15 inches to a depth of four feet; and 4) place cement grout for a new surface seal on the inside and outside of the steel conductor casing placed at approximately 52 feet to surface.

The inner existing PVC well will be then redeveloped with mechanical brushing and acid washing. Well No. 2 shall be disinfected upon completion of this work.

1.2 SITE ACCESS

- A. Access to and from the project site shall be through the gate off the paved entry road south of the Campo Elementary School (CES) campus (see Drawings). Access shall be coordinated with MEUSD/CES staff.

1.3 ENVIRONMENTAL REQUIREMENTS

There shall be no discharge to, equipment/vehicle traffic in, or other impact to the private property located to the north of Well No. 1.

- A. Water pumped from Well No. 1 during groundwater sampling and well development efforts shall be pumped to the ball field to the west of Well No. 1 as shown on the Drawings and per the Water Disposal Plan (per Paragraph 3.2 A, Environmental Control). Water pumped from Well No. 2 during groundwater sampling and additional well development efforts shall be pumped to the landscaping area to the south of Well No. 2. Pumped water should be released within these areas and dispersed with conveyance and a sprinkler system to be provided by the CONTRACTOR such that no lasting changes occur within the existing surfaces. Acid water quality discharge from development will be disposed of offsite by CONTRACTOR.
- B. Noise Abatement Control: The CONTRACTOR shall comply with applicable State of California and local noise control regulations. The CONTRACTOR shall conduct all work in a manner that avoids exceeding the legal noise limits specified in the regulations. The CONTRACTOR must provide temporary controls to limit construction noise. If necessary, acoustician shall submit plans via CONTRACTOR to the CONSTRUCTION MANAGER for mitigating construction noise impacts and complying with applicable noise criteria, including method of construction, equipment to be used, and acoustical treatment.
- C. Stormwater Discharge Control: The CONTRACTOR shall comply with all applicable storm water standards, orders, regulations, ordinances, or requirements.

The CONTRACTOR shall avoid erosion, turbidity, and siltation entering and leaving the work site by proper scheduling of Work and careful construction practices, and by employing Best Management Practices (BMPs) for erosion and sediment control.

The CONTRACTOR shall provide immediate erosion and sediment control protection for areas of the construction site that are not being actively graded or excavated, and all stockpile areas, and would be left exposed for a period of 7 calendar days or greater.

BMP maintenance will be the responsibility of the CONTRACTOR.

CONTRACTOR shall furnish, install, and remove at the end of the Work, a metal mud removal track to remove mud from tires on CONTRACTOR's vehicles and equipment. Place track at entrance to the site.

1.4 PERMITTING REQUIREMENTS

- A. San Diego County Well Drilling Permits shall be obtained by the contractor prior to the start of construction. Permit applications for each well are included in Part 3 of these Technical Specifications. Also see Section 1.5 for sequencing requirements below.

1.5 SEQUENCING REQUIREMENTS (EQUIPMENT AND EXECUTION SECTIONS PROVIDED BELOW)

A. SEQUENCE SUMMARY

1. Well Permits (San Diego County)
2. Relocation of Fire Hydrant
3. Designate non descaling water discharge area on site
4. Mobilize for the Well 2 seal replacement.
5. Complete mechanical brushing and acid washing of existing Well 2 PVC casing.
6. Fencing and Gates at Well No. 1 Site
7. Complete pre and post work camera and groundwater sampling
8. Mobilize for the reconstruction of Well 1 which includes replacement of conductor/well casing and abandonment of the lower 600 feet of the well.

- B. CONTRACTOR obtains San Diego County Well Drilling Permits prior to the start of construction at either well site.

- C. The CONTRACTOR's work required for the relocation of the existing fire hydrant near Well No. 1 and the rehabilitation and reconstruction efforts of Well No. 1 & 2 will be performed in accordance with the Construction Schedule to be provided per Section 01040. OWNER has limited capability to shut down the existing distribution system at the project site and wishes to minimize the duration of work taking place at the site. To minimize duration of work on site, the construction sequencing and scheduling requirements below are to be implemented.

Contractor shall execute the work and shall prepare his bid and schedule according to the following construction sequence. CONTRACTOR may suggest alternative methods and sequencing construction, but they are not guaranteed to be accepted by the OWNER.

- D. Complete all work related to the assistance of groundwater sampling and rehabilitation of Well No. 1 & 2, to the satisfaction of the Owner's Representative per Part 3.1 and Part 3.2 of this section.
- E. Relocate existing Fire Hydrant near existing Well No. 1. See Section 01047. Confirm means and procedure to isolate fire main, with support from MEUSD facilities staff, no less than 14 calendar days prior to disconnection of hydrant.
- F. Remove the existing fence to provide unimpeded access to Well No. 1 as shown on Sheet 5 of the Drawings (excavation to relocate hydrant shall be backfilled and resurfaced to provide access to fencing and Well No. 1).

- G. MEUSD to de-energize each wellsite prior to start of work. CONTRACTOR shall coordinate with MEUSD no less than seven calendar days prior to need for de-energization. Re-energize each wellsite immediately following completion of work at each wellsite.
1. Underground Service Alert to be contacted per Section 01040 prior to any pre-construction photographs or excavation.
 2. CONTRACTOR takes no less than 20 photographs of site conditions, including existing wellheads, storage tank and yard piping, buildings near Well No. 1, playground area near Well No. 2 including access route, fence, utility box structure, and hydrant conditions, adjacent asphalt and building conditions, and conditions of the surrounding areas. CONTRACTOR to provide photographs to OWNER's Representative prior to mobilization to site. Use of a commercially available imagery service, such as Google Earth, will not be acceptable to the OWNER.
- H. CONTRACTOR to establish area within ball field and within landscaping south of Well No. 2 for Disposal of Water Generated During development and Groundwater Sampling Activities per Water Disposal Plan. Waste containing acid from the descaling rehabilitation efforts shall be disposed of offsite and not disposed of within the ball field.
1. CONTRACTOR to provide temporary, above ground water conveyance piping, sprinkler system for land disposal, monitor percolation performance, and intrusion by people and animals.

Well No. 2

- I. Mobilize to Well No. 2 site.
1. Remove and relocate existing Well No. 2 utility box to Mountain Empire High School and remove and store column piping, electrical, and well pump/motor. Pumping of Well No. 2 to waste prior to removal may be required to ensure water quality of well if it has not been utilized consistently to supply the system. Provide temporary fencing and cover to prevent access to the well during non-working hours.
 2. CONTRACTOR shall store the column piping onsite prior to re-installation within the well upon completion of the well rehabilitation work. Column piping shall be stored on a trailer or other means to prevent piping from coming into contact with dirt, debris, and other material. Tarp shall be placed to cover ends of piping to prevent entry of wind-driven debris or entry of varmint.
- J. Pre-Rehabilitation Video Camera Survey Well No. 2
1. Perform a downhole video camera survey log of Well No. 2. Video camera survey to be conducted a minimum of 48 hours after removal of the pump, motor, and

column piping, and following any other disturbance within the well, in order to reduce turbidity for video clarity.

K. Complete Rehabilitation Work of Well No. 2

Rehabilitation activities should be scheduled and coordinated with Owner's Representative.

1. CONTRACTOR shall furnish equipment and labor necessary to access Well No. 2 (See Sheets 4 for photos of wellhead configuration and conditions) and remove the existing utility box enclosure, mechanical wellhead piping, and pump/motor/column piping to access the well. Well No. 2 will have the upper portion of the PVC casing secured with concrete, portion of steel conductor will be replaced. The inner PVC well will be redeveloped with brushing and acid washing.
2. CONTRACTOR shall perform rehabilitation work as described below in Part 2, in Section 01010, and as shown on the Drawings.

L. Post-Rehabilitation Video Camera Survey Well No. 2

1. Perform a downhole video camera survey log of Well No. 2. Video camera survey to be conducted no sooner than 48-hours after completion of well rehabilitation activities to allow for settlement and adequate water clarity for video.

Post-Rehabilitation Groundwater Sampling

2. After rehabilitation, the CONTRACTOR shall re-install and operate permanent submersible pump, electrical wiring, and shall furnish and install water level indicator, discharge tubing, flow-meter, sampling port, and labor to assist Owner's Representative in the collection of post-rehabilitation groundwater samples from Well No. 2. The pump intake shall be placed approximately 15 feet above the total depth of the well (or top of the fill material). Approximately one-and-a-half (1.5) borehole volumes of water will be removed from the well and discharged per the Water Disposal Plan to sample collection. The CONTRACTOR shall provide equipment and measure the flow rate and water levels during pumping and groundwater sampling activities. CONTRACTOR shall transport water to the surface for sample acquisition by MEUSD. Sample transport and laboratory testing fees shall be the responsibility of MEUSD. CONTRACTOR shall not obtain samples on a Saturday, Sunday, holiday, or after 11am on a Friday or day before a holiday. Concurrent with the post-rehabilitation efforts, CONTRACTOR shall note the static water level from top of casing and the date and time of measurement. Measurement shall be taken no less than 12 hours following cessation of any pumping in the well.

M. Disinfection of Well No. 2

1. Furnish equipment/materials and conduct disinfection of Well No. 2.

2. Upon completion of disinfection, conduct additional well development as necessary, using the reinstalled pump and column tubing, until the discharge water is clear of sand, silt, and mud, and turbidity is 5.0 NTUs or lower, and as directed by Owner's Representative. Convey pumped water directly to water disposal location, and not to potable water tank or pipeline network.
3. All disinfection shall conform to AWWA standard A100 and AWWA C654.
4. After successful startup of Well No. 2, the CONTRACTOR shall make the proposed connection to the existing transmission pipeline to the storage tank from Well No. 2 as shown on the drawings.

N. Return Well No. 2 Wellhead Site to Pre-Construction Conditions.

1. Return site to pre-rehabilitation conditions. Additional development water shall be disposed of in the areas established for water disposal and the site area cleaned up.
2. Regrade/fill and restore to original contours any disturbance caused by water disposal.

Well No. 1

O. Mobilize to Well No. 1 site.

1. Remove and relocate existing column piping, electrical, and well pump/motor to be stored onsite by CONTRACTOR. Pumping of Well No. 1 to waste prior to removal may be required to ensure water quality of well if it has not been utilized consistently to supply the system. Provide temporary fencing and cover to prevent access to the well during non-working hours.
2. The CONTRACTOR shall store the column piping onsite prior to re-installation within the well upon completion of the well rehabilitation work. Column piping shall be stored on a trailer or other means to prevent piping from coming into contact with dirt, debris, and other material. Tarp shall be placed to cover ends of piping to prevent entry of wind-driven debris or entry of varmint.

P. Pre-Rehabilitation Video Camera Survey Well No. 1

1. Perform a downhole video camera survey log of Well No. 1. Video camera survey to be conducted a minimum of 48 hours after removal of the pump, motor, and column piping, and following any other disturbance within the well, in order to reduce turbidity for video clarity.

Q. Pre-Rehabilitation Baseline Groundwater Sampling Well No. 1

1. CONTRACTOR shall assist the Owner's Representative in the collection of pre-rehabilitation groundwater samples from Well No. 1. The CONTRACTOR shall be

responsible for operating the existing well pump/motor and for furnishing and installing discharge tubing for Well No. 1 per the Water Disposal Plan.

R. Complete Rehabilitation (Reconstruction) Work of Well No. 1

Rehabilitation activities should be scheduled and coordinated with Owner's Representative.

1. CONTRACTOR shall furnish equipment and labor necessary to access Well No. 1 (See Sheets 4 for photos of wellhead configuration and conditions) and remove the existing utility box enclosure, mechanical wellhead piping, and pump/motor/column piping to access the well. Well No.1 will have the sanitary seal replaced to a depth of approximately 135 feet, and the bottom of the well from 200 to 800 feet of borehole will be sealed. The new well intake interval will be open hole from 135 feet to 200 feet.
2. CONTRACTOR shall perform rehabilitation work as described below in Part 2, in Section 01010 and as shown on the Drawings.

S. Post-Rehabilitation Video Camera Survey of Well No. 1

1. Perform a downhole video camera survey log of Well No. 1. Video camera survey to be conducted no sooner than 48-hours after completion of well rehabilitation activities to allow for settlement and adequate water clarity for video.
2. If video camera survey shows the well has not been sufficiently developed, at the sole judgement of the Owner's representative, CONTRACTOR shall further develop well and video inspect well at no additional cost to the Owner.

Post-Rehabilitation Groundwater Sampling

3. CONTRACTOR shall re-install and operate permanent submersible pump, electrical wiring, and shall furnish and install water level indicator, discharge tubing, flow-meter, sampling port, and labor to assist Owner's Representative in the collection of post-rehabilitation groundwater samples from Well No. 1. The pump intake shall be placed approximately 15 feet above the total depth of the well (or top of the fill material). Approximately one-and-a-half (1.5) borehole volumes of water will be removed from the well and discharged per the Water Disposal Plan to sample collection. The CONTRACTOR shall provide equipment and measure the flow rate and water levels during pumping and groundwater sampling activities. CONTRACTOR shall transport water to the surface for sample acquisition by MEUSD. Sample transport and laboratory testing fees shall be the responsibility of MEUSD. CONTRACTOR shall not obtain samples on a Saturday, Sunday, holiday, or after 11am on a Friday or day before a holiday. Concurrent with the post-rehabilitation efforts, CONTRACTOR shall note the static water level from top of casing and the date and time of measurement. Measurement shall be taken no less than 12 hours following cessation of any pumping in the well.

T. Disinfection of Well No. 1

1. Furnish equipment/materials and conduct disinfection of Well No. 1.
2. Upon completion of disinfection, conduct additional well development as necessary, using the reinstalled pump and column tubing, until the discharge water is clear of sand, silt, and mud, and turbidity is 5.0 NTUs or lower, and as directed by Owner's Representative. Convey pumped water directly to water disposal location, and not to potable water tank or pipeline network.
3. All disinfection shall conform to AWWA standard A100 and AWWA C654.
4. After successful startup of Well No. 1, the CONTRACTOR shall make the proposed connection to the existing transmission pipeline to the storage tank from Well No. 1 as shown on the drawings.

U. Return Well No. 1 Wellhead Site to Pre-Construction Conditions.

1. Return site to pre-rehabilitation conditions. Additional development water shall be disposed of in the areas established for water disposal and the site area cleaned up.
2. Regrade/fill and restore to original contours any disturbance caused by water disposal.

V. Furnish and install the proposed permanent fencing and gates as shown on Sheet 3 and 5 of the Drawings.

W. Replace pavement as shown on Sheet 5 of the Drawings.

1.6 QUALITY ASSURANCE

A. Referenced Standards

1. State of California
 - a. Bulletins 74-81/74-90 – Water Well Standards, Chapter II, Section 18-A for well development methods.
 - b. American Water Works Association, AWWA A100 Water Wells (latest edition).
 - c. AWWA Standard C654-03 (Disinfection of Wells).

1.7 REFERENCED DOCUMENTS

The documents and information listed and described below are incorporated into this specification by reference, and should be reviewed by the CONTRACTOR prior to engaging in any work. These documents can be found in Part 3 of these Technical Specifications.

- A. CRWA Engineering Report, dated August 2018
- B. BESST Reports (one for each well) – Final Dynamic Flow and Chemistry Profiling Report for Campo Elementary Well No. 1 and Well No. 2, each dated 3 November 2017
- C. Well Completion Report for Well No. 1 – No. 491664, dated 24 July 1991 by Acme Drilling Co. Inc. This report is a part of these contract documents.
- D. Well Completion Report for Well No. 2 – No. 491666, dated 25 July 1991 by Acme Drilling Co. Inc. This report is a part of these contract documents.
- E. Well Drilling Application for Well No. 1 – County of San Diego
- F. Well Drilling Application for Well No. 2 – County of San Diego

1.8 DISPOSAL

- A. The CONTRACTOR shall properly percolate/dispose of development, groundwater sampling, and additional well development water onsite in accordance with the Water Disposal Plan (per Part 3.2, Environmental Control). Water generated from Well No. 1 and 2 should be disposed of in the ball field as shown on the Drawings and in the landscaping area to the south of Well No. 2, respectively, during development or additional testing. Water containing acid from redevelopment effort in Well No. 2 shall be properly disposed of offsite.
- B. Trash and other unsuitable material resulting from CONTRACTOR'S operation shall be disposed of offsite at the CONTRACTOR'S expense.

1.9 SUBMITTALS

The CONTRACTOR shall submit for review the following specific information to the Owner's Representative. CONTRACTOR shall receive feedback from the Owner's Representative prior to any fieldwork.

- A. Procedures and equipment for the removal of the existing Well No. 2 pump house. For Well No. 1 & 2, procedures and equipment for pre- and post-rehabilitation groundwater sampling, rehabilitation, development, video camera survey, reinstallation of the pump, column tubing, and electrical wiring.
- B. Schedule for work, including utility box enclosure removal, pre- and post-rehabilitation groundwater sampling, rehabilitation (reconstruction) and development activities, video camera survey, reinstallation of pump and column tubing, and utility box enclosure assembly.
- C. Procedures, equipment, and products for disinfection, including methods (per Paragraph 3.1 G, Disinfection and per Section 15071).
- D. Water Disposal Plan (per Paragraph 3.2 A, Environmental Control).

PART 2 - EQUIPMENT AND PRODUCTS

2.1 EQUIPMENT

- A. Percolation area for Disposal of Water Generated During Development and Groundwater Sampling Activities
1. The CONTRACTOR shall provide conveyance piping and a sprinkler system for the disposal of water generated during the development, groundwater sampling, and additional well development activities.
- B. Partial Disassembly/Movement of Utility Box Enclosure
1. The CONTRACTOR shall provide the necessary equipment and operator to remove and relocate the utility box enclosure structure to provide access to Well No. 2, and to transport the structure to the MEUSD maintenance yard at Mountain Empire Highschool.
- C. Pre-Rehabilitation Video Camera Survey of Well No. 1 & 2
1. The camera used for the video survey of the entire casing and open-hole portion of the well shall be equipped with centralizers and proper downward and side lighting. The equipment used for the video survey shall produce a recording with an automatic depth indication.
 2. The video camera survey shall be in color and provide both a downward scan lens and the use of a rotatable, focusing side scan lens. Camera shall be capable of producing a Moving Picture Group (MPG) formatted video for electronic submittal.
- D. Reconstruction Methods for Well No. 1 as Depicted on the Drawings
1. The CONTRACTOR shall employ, and is not limited to, the following methods for rehabilitation of Well No. 1:
 - a. Placement of concrete seal and transitional sand below depth of 200' to the full depth of the well (800')
 - b. Equipment to remove 4 1/2" ID cl. 160 PVC liner and 8 5/8" ID x 1/4" thick steel casing
 - c. Equipment to ream well, including drilling out of exterior cement seal to a proposed borehole diameter of 15" min to a depth of 135'
 - d. Place proposed 8 5/8" ID x 1/4" thick A53 steel casing to a depth of 135'
 - e. Place 3" concrete seal around proposed well casing to a diameter of 15" min, extend above existing ground surface by 6" minimum, form/smooth concrete at surface
 - f. Install wellhead mechanical piping and appurtenances as shown on Drawings
 - g. Equipment for conveyance of discharged water to percolation area.

2. The CONTRACTOR shall employ, and is not limited to, the following methods for rehabilitation of Well No. 2:
 - a. Place neoprene packer between PVC and cement grout, cement grout seal between ex. PVC casing and steel casing as shown on the Drawings
 - b. Equipment to remove 8 5/8" ID x 1/4" thick steel casing above a depth of approximately 3', and cement seal above approximately 4'
 - c. Equipment to replace 8 5/8" ID x 1/4" thick steel casing down to a depth of approximately 4', with a continuous field weld all around competent casing
 - d. Place 3" concrete seal around proposed well casing to a diameter of 15" min. and to a depth of approximately 4', extend above existing ground surface by 6" minimum, form/smooth concrete at surface.
 - e. Install wellhead mechanical piping and appurtenances as shown on Drawings
 - f. Equipment for conveyance of discharged water to percolation area.

3. The CONTRACTOR shall employ, and is not limited to, the following methods, equipment, and chemicals for redevelopment of Well No. 2:
 - a. CONTRACTOR shall supply temporary storage vessels on-site for the collection of redevelopment water containing acid utilized for chemical redevelopment. Contractor shall place the vessels adjacent to the Well No. 2 site. Vessel contents shall be disposed of appropriately following well redevelopment. Vessels shall be immediately removed from site following successful completion of chemical redevelopment efforts, as determined by the OWNER's Representative.
 - b. Chemical Rehabilitation - A Liquid Descaler™ or equivalent shall be injected through a swab or other method directly into the perforated portions of the well. Liquid Descaler should remain in the well for 24-36 hours and should be agitated with a bailer, sure block or other tool in accordance with manufacturer recommendations. Upon completion of the chemical redevelopment activities, water from Well No. 2 containing spent acid and dissolved material shall be pumped into CONTRACTOR-furnished storage tank(s) at the surface until the pH of the well has stabilized. CONTRACTOR shall provide equipment for measurement of pH. Stabilization will be considered complete when the pH of the well has returned to the initial measured pH value prior to the addition of the Liquid Descaler (or equivalent). CONTRACTOR shall measure pH utilizing CONTRACTOR-owned and operated equipment. Owner's Representative will also utilize other water quality parameters (e.g. turbidity, conductivity) to evaluate well stabilization. CONTRACTOR shall confirm the volume of industrial wastewater estimated to be generated during the chemical redevelopment activities, but shall assume the volume will be no less than 4,000-gallons. The CONTRACTOR shall provide poly tank(s) or equivalent for storage of the industrial wastewater due to the caustic nature of the spent acid. The CONTRACTOR shall provide appropriate personal protective equipment (PPE) for workers handling the Liquid Descaler and wastewater.

4. Light Mechanical Redevelopment Methods

The CONTRACTOR may use, and is not limited to, the following light mechanical methods for redevelopment of the screened interval of Well No. 2:

- a. Swabbing to remove nodules and scaling on the sides of the inner well casing, and for removal of bacteria filaments.
 - b. Airlifting/Bailing equipment to remove bottom debris.
 - c. Surging/Jetting/Pumping to unblock perforations in the screened interval portion of the well.
 - d. Equipment for conveyance of discharged water to CONTRACTOR's temporary storage containers.
- E. Post-Rehabilitation Video Camera Survey of Well No. 1 & 2
1. The camera used for the video survey of the entire casing and open-hole portion of the well shall be equipped with centralizers and proper downward and side lighting. The equipment used for the video survey shall produce a recording with an automatic depth indication.
 2. The video camera survey shall be in color and provide both a downward scan lens and the use of a rotatable, focusing side scan lens. Camera shall be capable of producing a Moving Picture Group (MPG) formatted video for electronic submittal.
- F. Post-Rehabilitation Groundwater Sampling – Well Nos. 1 and 2
1. The CONTRACTOR shall provide a portable submersible pump, water level indicator, generator, and discharge piping fitted with a sampling port for the collection of a post-rehabilitation groundwater samples from Well No. 1 & 2 by the Owner's Representative. Contractor should anticipate repeat sampling over a period of several days and shall coordinate sampling efforts with the Owner's Representative.
- G. Return Well No. 1 & 2 Site to Pre-Construction Conditions
1. The CONTRACTOR shall provide the necessary equipment and personnel to return the site to pre-rehabilitation conditions. Additional development water shall be disposed of in accordance with the Water Disposal Plan and the site area cleaned up.
 2. Regrade/fill percolation area and well site to pre-construction contours.
- H. Install Fencing at Well No. 1 and 2 sites.
1. The CONTRACTOR shall provide the necessary equipment and personnel to install permanent fencing at Well No. 1 & 2 sites as shown on the drawings.
- I. Safety Equipment

1. The CONTRACTOR shall provide the necessary safety equipment for its personnel (i.e., personal protective equipment, eyewash station, etc.).

2.2 PRODUCTS

A. Disinfection

1. CONTRACTOR is responsible for removing or mitigating the effects of all materials introduced or dislodged into the well during the development activities. Unless prior approval is obtained for employing chemicals or other cleaning method, cleaning shall be by pumping and swabbing.
2. Chlorine solution used for disinfecting the well shall be of such volume, strength, and application that a concentration of at least 100 ppm of chlorine is obtained in all parts of the well water; however, not less than 15 lbs of 70% HTH, or its equivalent, shall be used. All disinfection shall conform to AWWA standard A100 and AWWA C654-03.

PART 3 - EXECUTION

3.1 WELL DEVELOPMENT

- A. Establish percolation area for Disposal of Water Generated During development and Groundwater Sampling Activities. Disposal area to be noted in Water Disposal Plan.
1. The CONTRACTOR is to install temporary conveyance piping sprinkler system to disperse water generated during the development, sampling activities, and pump testing. CONTRACTOR shall not dispose of water containing chemicals utilized in well redevelopment, i.e. acid. Sheets 2 & 3 depict the ball field and the landscaped area south of Well No. 2 which are the preferred locations of the percolation areas. CONTRACTOR to monitor periodically and relocate percolation area, monitor percolation performance, and intrusion by people and animals. At the end of the Work, contractor shall regrade/fill percolation area and well site to pre-construction contours.
 2. San Diego Vector Control Program
The CONTRACTOR shall ensure that BMPs and drainage areas do not create a potential mosquito breeding source. Any area that is capable of accumulating and holding at least 1/2-inch of water for more than 96 hours can support mosquito breeding and development. CONTRACTOR shall expedite the progress of the work so as to minimize the potential of the percolation pits to be mosquito breeding source.
 3. Removal and Relocation of Existing Utility Box Enclosure
The CONTRACTOR shall remove, transport, and relocate the existing Utility Box at Well No. 2 (See Sheet 4 for photos of current wellhead configuration and condition), column piping, and electrical/controls equipment. Remove interfering portions of surface mechanical piping.
- B. Pre-Rehabilitation Baseline Groundwater Sampling – Well No. 1
1. The CONTRACTOR shall assist the Owner’s Representative in the collection of pre-rehabilitation groundwater sample from Well No. 1. The CONTRACTOR shall be responsible for operating the existing well pump/motor and for furnishing and installing discharge tubing for Well No. 1 per the Water Disposal Plan. Groundwater samples will be collected by the Owner’s Representative from a sampling port in the discharge tubing at the surface after the removal of approximately one-and-a half (1.5) borehole volumes of water. The purged groundwater shall be discharged to the percolation area per the Water Disposal Plan.
 2. Owner shall be responsible for sample transport to the laboratory and payment of laboratory fees.

C. Development of Well No. 1

1. Pumping

- a. CONTRACTOR shall pump to waste per the Water Disposal Plan until water runs clear or at least three (3) borehole volumes of water, as directed by the ENGINEER.

D. Temporary Cover

- a. The CONTRACTOR shall cover and properly protect Well No. 1 & 2 during periods where no work is being done on the well. The cover shall be sufficiently strong and anchored to prevent vandalism, contamination, and foreign material from entering into the well and to protect the public from a potentially dangerous situation.
- b. During all non-working hours, the CONTRACTOR shall maintain the wellhead and lock the enclosure as well as provide temporary fencing to prevent access to each wellhead area.

E. Redevelopment and Rehabilitation of Well No. 2

1. Light Mechanical Redevelopment

Based on the age of the casing and condition of Well No. 2, the CONTRACTOR shall use lighter mechanical methods, such as swabbing, scraping, airlifting/bailing, and surging/jetting for the redevelopment of the well. Refer to State of California, Water Well Standards: Bulletin 74-81 and 74-90, Chapter II, Section 18-A for well redevelopment methods.

2. Preliminary Work

- a. Before any well redevelopment, the CONTRACTOR shall review record documents provided in the bidding documents and investigate the well's condition, details of construction, and whether or not potential obstructions in the well may interfere with the process of redevelopment.
- b. CONTRACTOR shall conduct a pre-redevelopment video inspection of the well's interior throughout the depth of the well. Provide an .mpg file on flash drive or via upload to Owner's Representative. Video efforts shall not commence within 24 hours of any disturbance within the well, to maximize water clarity.

3. Mechanical Methods

- a. Swabbing to remove nodules and scaling on the sides of the inner well casing.
- b. Airlifting/Bailing to remove bottom debris.

- c. Surging/Jetting/Pumping to unblock fractures in the open-hole bedrock portion of the well and to improve hydraulic communication between the geologic formation and the well.
 - d. Measure the total depth of the well to confirm effectiveness of airlifting/bailing efforts at removing fill/debris from the bottom of the well.
4. Chemical Methods - Injection of Liquid Descaler suitable for PVC through a swab (or equivalent) at the perforated portions of the well. The descaler shall be agitated, without discharge, by means of a swab or bailer for approximately three-to-four hours initially and subsequently agitated every 4 hours for a minimum period of one hour. The descaler shall be allowed to remain in the well for a minimum of 24-hours. The well shall then be airlifted or bailed and purged water emptied into the storage tank(s) to verify water quality, prior to disposal off-site as industrial wastewater. Airlifting or bailing shall continue until measured pH in the discharge water has stabilized, as measured by the CONTRACTOR and reviewed by the OWNER's Representative. Stabilization will be considered complete when the pH of the discharge water has returned to the initial measured pH value prior to the addition of the descaler.

See Part 3.2 for disposal requirements for redevelopment water containing chemical agent.

F. Pre and Post-Rehabilitation Videos – Well Nos. 1 and 2

1. The CONTRACTOR shall perform a video survey on Well No. 1 & 2 before after well rehabilitation efforts have been completed to ensure those efforts were successful and that the well integrity and function remain intact. Excessive bouncing, poor lighting, or unfocused video shall be grounds for rejection. The Owner's Representative shall determine adequacy of video. If video is rejected for any reason, CONTRACTOR shall re-videotape the well at no additional cost to owner until video quality is deemed satisfactory to the Owner's Representative. A minimum of 48-hours is required between the development and pumping activities in the well and the video survey to allow for settlement and improved water clarity.

G. Post-Rehabilitation Groundwater Sampling – Well Nos. 1 and 2

1. The CONTRACTOR shall re-install and operate permanent submersible pump, electrical wiring, and shall furnish and install water level indicator, discharge tubing, flow-meter, sampling port, and labor to assist Owner's Representative in the collection of post-rehabilitation groundwater samples from Well Nos. 1 and 2. The pump intakes shall be placed approximately 15 feet above the total depth of the well (or top of the fill material). Approximately one-and-a-half (1.5) borehole volumes of water will be removed from the well and discharged per the Water Disposal Plan to sample collection. The CONTRACTOR shall provide equipment and measure the flow rate and water levels during pumping and groundwater sampling activities. CONTRACTOR shall transport water to the surface for sample acquisition by MEUSD. Sample transport and laboratory testing fees shall be the responsibility of

MEUSD. CONTRACTOR shall not obtain samples on a Saturday, Sunday, holiday, or after 11 am on a Friday or day before a holiday. Concurrent with the post-rehabilitation efforts, CONTRACTOR shall note the static water level from top of casing and the date and time of measurement. Measurement shall be taken no less than 12 hours following cessation of any pumping in the well.

H. Post-Rehabilitation Pump Test

The CONTRACTOR shall re-install permanent pump/motor, electrical, and column piping, and furnish and install flow meter, flow regulating valve, surface piping, and temporary groundwater level sensor, and shall conduct a pump test for a duration of not less than four hours (240 minutes) with flow to be kept at approximately 5 gpm. CONTRACTOR and Owner's Representative shall note flow rates and groundwater levels at intervals to be determined by the Owner's Representative to determine an approximate flow rate for a permanent well and to gauge the level of drawdown in the well. Discharge of pump test water shall be directed to the percolation areas per the Water Disposal Plan.

I. Disinfection

1. CONTRACTOR is responsible for removing or mitigating the effects of all materials introduced or dislodged into the wells during the development activities.
2. Well No. 1 & 2 shall be disinfected in accordance with AWWA A100 (latest edition) and AWWA C654-03. CONTRACTOR shall disinfect the well as soon as development procedures have been completed and the well pump and column tubing has been cleaned, re-installed, and connected.
3. CONTRACTOR shall clean Well No. 1 & 2 jobsite immediately preceding disinfection where evidence indicates that construction and development work have not adequately cleaned the well. All oil, grease, soil, and other materials, which could harbor and protect bacteria from disinfectants, shall be removed from the well.
4. Chlorine solution used for disinfecting the wells shall be of such volume, strength, and application that a concentration of at least 100 ppm of chlorine is obtained in all parts of the well water; however, not less than 15 lbs of 70% HTH, or its equivalent, shall be used. Solution shall be added while the pump is in place and the well surged to help distribute the chlorine solution into the well and surrounding strata. Chlorine solution shall remain in the well at least four hours.
5. Owner shall measure chlorine concentration and test for bacteria at Well No. 1 & 2 upon completion of disinfection activities. CONTRACTOR shall furnish, install, and remove temporary pump for Owner's acquisition of samples. Test results indicated inadequate disinfection shall require CONTRACTOR to re-disinfect, conduct pumping for sample acquisitions, and payment of laboratory fees for testing

beyond the testing conducted by Owner following initial disinfection, all at no additional cost to Owner.

3.2 ENVIRONMENTAL CONTROL

A. Water Disposal Plan: Disposal of Development, Groundwater Testing, and Additional Well Development Water.

1. The CONTRACTOR shall electronically submit a Water Disposal Plan for approval by Owner's Representative prior to initiation of development. Sheet 2 & 3 shows the Owner's preferred area for percolation/disposal (ball field and landscape area to the south of Well No. 2). No surface discharge private property to the north of CES is allowed. CONTRACTOR's Water Disposal Plan shall note the proposed locations of CONTRACTOR's temporary vessels for the disposal of redevelopment water from Well No. 2 that contains chemical redevelopment agent. A paper copy of the approved plan shall be located on-site during all sampling and development activities. The Water Disposal Plan shall include a description of the sources of wastewater, methods of handling, equipment to be used, storage, disposal, safety procedures, etc. CONTRACTOR shall properly percolate/dispose of purged/development water on-site in accordance with the Water Disposal Plan. Water, including mud, sand, and debris pumped from the well during development and testing, shall be disposed of in such a manner as not to damage or interfere with work or property of others. CONTRACTOR to establish conveyance piping and sprinkler system for water disposal to disperse purged waters, move sprinklers to avoid erosion of disposal areas, and restore to pre-construction contours upon completion of development activities. Water from Well No. 2 may be able to be pumped to tank if well has been used to serve system on an ongoing basis and water quality is sufficient to the OWNER and Owner's representative since no work is proposed which would significantly disturb the well or negatively effect water quality.
2. The CONTRACTOR shall conform to all waste discharge requirements imposed on the Owner by the California Regional Water Quality Control Board-San Diego Region and other governing agencies, including but not limited to Water Quality Order No. R9-2019-0005. All actions necessary to conform to these requirements shall be performed by the CONTRACTOR as part of this contract.
3. A notice of intent is not required for this project per waiver No. 3 of Order No. R9-2019-0005. This does not relieve the contractor of the responsibility of complying with the applicable requirements of Order No. R9-2019-0005.

B. Disposal of Chemical Redevelopment Industrial Wastewater.

1. The wastewater from the chemical redevelopment of Well No. 2 shall be neutralized by the CONTRACTOR, if necessary, using soda ash or equivalent to bring the pH to approximately 7.0, and disposed of as industrial wastewater under a waste generator permit at the CONTRACTOR'S expense. The Owner's Representative

will prepare a waste generator permit application with the City of San Diego, assuming transportation and disposal by the CONTRACTOR to Pump Station #1, located at 3550 East Harbor Drive, San Diego, California. CONTRACTOR shall be responsible for review, signature, and submittal of permit application, and shall be responsible for payment of all fees. NV5 presumes less than 4,000-gallons of wastewater will require disposal off-site as industrial waste at the expense of the CONTRACTOR. CONTRACTOR shall advise NV5 if the anticipated volume is significantly different. Industrial wastewater samples shall be collected by the Owner's Representative and transported to a State of California certified testing laboratory for analysis in accordance with the permit requirements. The OWNER shall be responsible for paying for the waste profiling laboratory tests.

C. Disposal of Trash and Other Unsuitable Material.

1. Trash and other unsuitable material resulting from CONTRACTOR'S operation shall be collected and disposed of offsite at the CONTRACTOR'S expense.

3.3 GROUNDWATER SAMPLING PLAN

A. Pre, post-rehabilitation groundwater samples shall be collected from Well No. 1 & 2 by the Owner's Representative and transported to a State of California certified testing laboratory for analysis of the following:

1. Nitrate in accordance with EPA Test Method 300.0 (all samples).
2. Turbidity in accordance with EPA Test Method 180.1 (all samples).
3. Iron and manganese accordance with EPA Test Method 200.7 (final sample).
4. Uranium in accordance with EPA Test Method 200.8 (final sample).
5. Radium-226 with EPA Test Method 903.1 (final sample).
6. Radium-228 with EPA Test Method 904.0 (final sample).
7. Gross Alpha particle with Test Method SM-7110C (final sample).
8. Total dissolved solids in accordance with Test Method SM-2540C (final sample).

B. The laboratory testing will be conducted with standard turnaround times. The Owner shall be responsible for paying for the water quality tests and sample transport. The CONTRACTOR shall be responsible for pumping the water to the surface for sample collection by Owner. CONTRACTOR shall anticipate repeat sample acquisition over a period of several days for the pre-rehabilitation and post-rehabilitation sampling.

3.4 SCHEDULE

A. Prior to any mobilization of equipment or forces work, the CONTRACTOR shall have the following submittals provided to the CONSTRUCTION MANAGER, and shall receive an approval for each:

1. Construction Schedule
2. Schedule of Values
3. Pre-Construction Video Recordings and Photographs
4. Excavation Support Systems

5. Aggregate Materials and Import Materials
6. Asphalt Concrete
7. Asphalt Slurry Coat
8. Pipe and Fittings
9. Valves
10. Fencing and Gates
11. Well Casings
12. Sanitary Seals
13. Water Disposal Plan

PART 4 - MEASUREMENT AND PAYMENT

- A. Measurement and payment shall be per Section 01025, Measurement and Payment.

** END OF SECTION **

SECTION 15070

PIPING SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

This section specifies polyvinyl chloride and polypropylene pipe and fittings for pipe diameters greater than 4-inch, and gate valves, focusing on the Fire Hydrant Relocation area.

A. Pipe Designations

For use in this section, the following plastic pipe designation is defined:

<u>Designation</u>	<u>Definition</u>
PVC	Polyvinyl Chloride

1.2 QUALITY ASSURANCE

A. References

The publications referred to hereinafter form a part of these specifications to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and the listed standards, the requirements of this section shall prevail.

American Society for Testing Materials (ASTM) Publications:

ASTM A536	<i>Ductile Iron Castings</i>
ASTM D1784	<i>Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compound</i>
ASTM D1785	<i>Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120</i>
ASTM D2241	<i>Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR series)</i>
ASTM D2466	<i>Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40</i>
ASTM D2467	<i>Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80</i>
ASTM D2564	<i>Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping System</i>
ASTM D2774	<i>Underground Installation of Thermoplastic Pressure Piping</i>

ASTM D3212	<i>Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals</i>
ASTM F402	<i>Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings</i>
ASTM F477	<i>Elastomeric Seals (Gaskets) for Joining Plastic Pipe</i>
American Water Works Association (AWWA) Publications:	
AWWA C115	<i>Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges</i>
AWWA C605	<i>Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water</i>
AWWA C900	<i>Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. Through 12 in. for Water Distribution.</i>
AWWA C905	<i>Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 in. Through 36 in.</i>
AWWA C906	<i>Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 63 In. (1,575 mm), for Water Distribution and Transmission</i>

1.3 SUBMITTALS

The CONTRACTOR shall submit information to substantiate compliance with this specification. In addition, the following specific information shall be submitted.

A. Manufacturer's Data

Manufacturer's name and catalog number of all piping system products.

B. Certification

Manufacturer's certificates of compliance with the specified standards.

1.4 DEFINITIONS

Terms used in this Section and elsewhere in Division 15 are defined as follows:

1. Pressure Terms:

- a. Maximum: The greatest continuous pressure at which the piping system operates.
- b. Test: The hydrostatic pressure used to determine system acceptance.

2. Piping Exposure Terms:

- a. Buried: Pipe, which may be insulated, that is located below grade and in contact with backfill material; or pipe, which may be insulated, that is located below grade and is concrete encased.

- b. Not buried: Pipe that does not meet the definition of buried pipe.

PART 2 - PRODUCTS

2.1 GENERAL

Pipe sizes are nominal inside diameter unless otherwise noted. All sizes of pipe shall be as called out on the drawings and specified herein. All pipe appurtenances and specialties delivered to the jobsite shall be clearly marked to identify the material, class, thickness and Manufacturer. All material shall be new and free of blemishes.

Materials of like kind shall be one Manufacturer.

2.2 PVC PIPE

A. Pressure Pipe

PVC material for pipe shall conform to ASTM D1784, Class 12454-B. Pipe and fittings shall either be in accordance with ASTM D1785 or shall conform to AWWA C900 as specified on the Plans. Neoprene gaskets with push-on joints shall conform to ASTM F477.

Fittings for gasketed pipe shall be ductile iron or steel push-on IPS-sized pressure fittings rated for use with the specified class of PVC pipe. Unless otherwise specified, fittings shall be plastic wrapped with polyethylene film in tube form as specified in AWWA C105 and coated with a coal tar epoxy with a dry film thickness of 10 to 12 mils. Coating shall be Carboline Bitumastic 300 M or an approved equal.

AWWA C900 polyvinyl chloride pipe shall be of the pressure class specified on the plans. Outside diameter (OD) pipe dimension shall be manufactured to cast iron pipe (CIP) equivalent. The pipe shall be manufactured with thickened, integral bells. The bells shall include elastomeric gaskets to meet the requirements of ASTM F477 which shall be retained in an integral raceway formed as part of the bell.

B. Mechanically Restrained Joints

1. Restrained Push-on Joints: Where specified and shown on the plans, PVC pipe joints are to be restrained by a harness restraint device in lieu of a thrust block, tie-rods, and clamps. The restraint shall consist of three major components: the first part being a bell ring that fits behind the bell; the second part being a restraint ring that installs on the spigot; the third part being tie bars to connect parts one and two to facilitate the joint restraint.

Restraint rings shall be ductile iron conforming to ASTM A536 and shall have a factory applied thermoset epoxy coating. Restraint rings shall consist of

individually activated gripping surfaces to hold the spigot and maximize restraint capability. The harness restraint shall have a working pressure of at least 125 psi with a minimum safety factor of 2:1 and shall be EBAA Iron Megalug, Series 1500, 2800, or approved equal.

2. Restrained Flange Adapters: Restrained flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C115/A21.15. Restraint for the flange adapter shall consist of individually activated gripping surfaces to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of the gripping wedges. The flange adapters shall be capable of deflection during assembly or permit lengths of pipe to be field cut to allow at least 0.6 inch of gap between the end of the pipe and the mating flange without affecting the integrity of the seal. The flange adapter shall have a safety factor of at least 2:1 on the rated pressure of the pipe. The flange adapter shall be EBBA Iron Megaflange, Series 2100, or equal.
3. Mechanically restrained joints shall be designed to allow separation of the joint after installation. Internal restraints are not acceptable.
4. Mechanically restrained joints shall be coated with a coal tar epoxy with a dry film thickness of 10 to 12 mils. Coating shall be Carboline Bitumastic 300 M or an approved equal.

2.3 BRASS PIPE AND FITTINGS

Brass pipe and fittings shall meet the requirements of ASTM B 43, regular wall thickness with threads per ANSI B1.20.1.

2.4 BRONZE APPURTENANCES

All bronze appurtenances shall meet the requirements of ASTM B 62.

2.5 GATE VALVES

Gate valves to be installed per Section 01047 - Fire Hydrant Relocation. All ductile-iron fittings and valves require concrete support blocks to prevent the fitting or valve weight from being carried by the PVC pipe. Concrete thrust blocks shall be allowed to cure, undisturbed for a minimum of 20 hours. CONTRACTOR is responsible for ensuring that the concrete used for the thrust blocks meets all contract requirements and is suitable to withstand test and normal operating pressures.

A. General Requirements

1. Unless otherwise specified below or in the Drawings, these requirements shall apply to all gate valves.

2. Resilient Wedge Gate Valves (RWGVs) shall be ductile-iron in accordance with AWWA C509 and C515 except as modified herein.
3. RWGVs shall have smooth unobstructed waterways free from any sediment pockets.
4. RWGVs shall be leak-tight at their rated pressure.
5. RWGVs shall have a non-rising low-zinc bronze or stainless steel stem, opened by turning left (counterclockwise).
6. Stem seals shall be the O-ring type incorporating a minimum of two rings as required by AWWA C509.
7. Low-friction torque-reduction thrust washers or bearings shall be provided on the stem collar.
8. Wedge (gate) shall be fully encapsulated with a bonded-in-place Ethylene Propylene Diene Monomer (EPDM) elastomeric covering. Minimum thickness of the rubber seating area shall be 1/4-inch.
9. Valves for buried applications shall be provided with a 2-inch square operating nut.
10. RWGV interior and exterior surfaces (except for the encapsulated disc) shall be coated as described below.
11. All bolts and nuts used in the construction of RWGV's shall be Type 316 stainless steel.
12. Except as otherwise specified, valves shall be rated for the following working water pressures:

<u>Valve Size</u>	<u>Minimum Pressure (psig)</u>
3 in to 12 in	150

All valve bodies shall be hydrostatically tested to at least twice the rated working water pressure. In addition, valves shall be seat-tested bi-directional at the rated working pressure, with seat leakage not to exceed one fluid ounce per inch of valve diameter per hour. Provide certificates of testing.

13. Flanged valves to have face-to-face dimensions per ANSI B16.10 and flanges per ANSI/ASME B16.1.

B. Coating

1. Epoxy linings and coatings for valves shall be provided in accordance with AWWA C210, C213 and C550, with the following modifications:
 - a. Epoxy lining and coating of valve surfaces shall be performed by the valve manufacturer by qualified personnel in a facility where the environment can be controlled. Epoxy lining and coating of valves in the field is prohibited.
 - b. Surface preparation shall be as detailed in SSPC-SP10, Near White Blast Cleaning.
 - c. Liquid epoxy lining materials shall be listed in the NSF Listing for Drinking Water Additives, Standard 61, certified for use in contact for potable water.

- d. The minimum dry film thickness for epoxy linings shall be 0.203mm (0.008” or 8 mils). Liquid epoxy lining shall be applied in two (2) coats in accordance with AWWA C210 and application shall conform to the coating manufacturer’s recommendations.
2. Powder epoxy lining and coating materials shall contain one hundred percent (100%) solids in accordance with AWWA C213, shall be applied in one or more coats, and shall conform to the coating manufacturer’s recommendations.
3. Repairs made to manufacturer’s applied linings shall be performed by a company approved by the valve manufacturer, by qualified personnel, and in a facility where the environment can be controlled.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

Plastic piping shall be installed in accordance with AWWA C605, ASTM D2321, or ASTM D2774, as applicable, and as shown on the plans.

B. Support and Anchorage

Support and anchorage shall be as shown on the plans.

Fittings shall be lined and coated as specified.

C. Connections

Connections to different types of pipe shall be by means of flanges, specified adapters or transition fittings. Where sleeve type couplings are used, both shall be uniformly torqued in accordance with pipe manufacturer’s recommendation. Foreign material shall be removed from the pipe interior prior to assembly.

Mechanical joint restraints shall be installed in accordance with the manufacturer's instructions.

D. Hydrant

Hydrant relocation to be installed per SDWAS Drawing WF-01. CONTRACTOR to use mechanical joints where WF-01 gives option. In line valve adjacent to fire hydrant assembly to be installed per Drawings.

E. Bedding and Backfill

Bedding and backfill for buried piping shall be SE 30 sand compacted to 95% of ASTM

D1557 maximum density to 12” minimum above top of pipe with native material above. Piping shall be buried, unless specifically shown otherwise on the plans, to a minimum depth of cover of 36 inches over the top of the pipe. Piping shall be installed as specified except for adjustments to avoid architectural, structural, HVAC and other features and shall be coordinated with electrical construction.

3.2 TESTING

Hydrostatic testing of plastic piping shall be as specified in Section 7 of AWWA C605 except that test pressures and allowable leakage shall be as listed in Section 15071, WATER PIPELINE TESTING AND DISINFECTION.

****END OF SECTION****

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2. Hydrostatic pressure test of the complete pipeline, in segments as required to match pipe pressure class.

3.2 AIR TEST

- A. All double welded lap and butt strap joints shall be pressure tested to a minimum of 40-psi air pressure for a period of 10 minutes per AWWA C206. No air leakage will be allowed.
- B. Any joints that leak shall be repaired and retested.

3.3 HYDROSTATIC TESTING OF FIRE WATER PIPELINES

- A. Hydraulic testing of fire water pipelines shall be performed in accordance with SDWAS Standard Specification Section 15044. Before starting hydrostatic testing, all pipelines shall be flushed or blown out as appropriate. The CONTRACTOR shall test all pipelines either in sections or as a complete unit. No section of the pipeline shall be tested until all field-placed concrete or mortar has attained an age of 7 days. The test shall be made by placing temporary bulkheads in the pipe and filling the line slowly with water. Butterfly valves shall be protected from pipeline and joint testing pressures with bulkheads, as necessary. The CONTRACTOR shall be responsible for ascertaining that all test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, the adjacent pipe. Any unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test, to avoid movement and damage to piping and equipment. Backfilling shall be completed except at joints. The CONTRACTOR shall provide sufficient temporary air taps in the pipelines to allow for evacuation of all entrapped air in each pipe segment to be tested. After completion of the tests, such taps shall be permanently plugged and linings and coatings repaired. Care shall be taken to see that all air vents are open during filling.
- B. The pipeline shall be filled at a rate that will not cause any surges or exceed the rate at which the air can be released through the air valves at a reasonable velocity and all the air within the pipeline shall be properly purged. After the pipeline or section thereof has been filled, it shall be allowed to stand under a slight pressure for at least 48 hours to allow the concrete or mortar lining, as applicable, to absorb water and to allow the escape of air from any air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures satisfactory to the CONSTRUCTION MANAGER shall be taken.
- C. The hydrostatic test procedure and allowable leakage shall be per SDWAS Standard Specification 15044, Subsection 3.02, Field Test Procedure.
- D. If a pipeline or section of pipe fails to pass the hydrostatic test, the CONTRACTOR shall determine the cause of the leakage, take corrective measures necessary to repair the leaks, and shall repeat the test of the pipeline in accordance with the specified procedures.

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Final Dynamic Flow and Chemistry Profiling Report for Campo Elementary Well #1

Published Date: November 3rd, 2017

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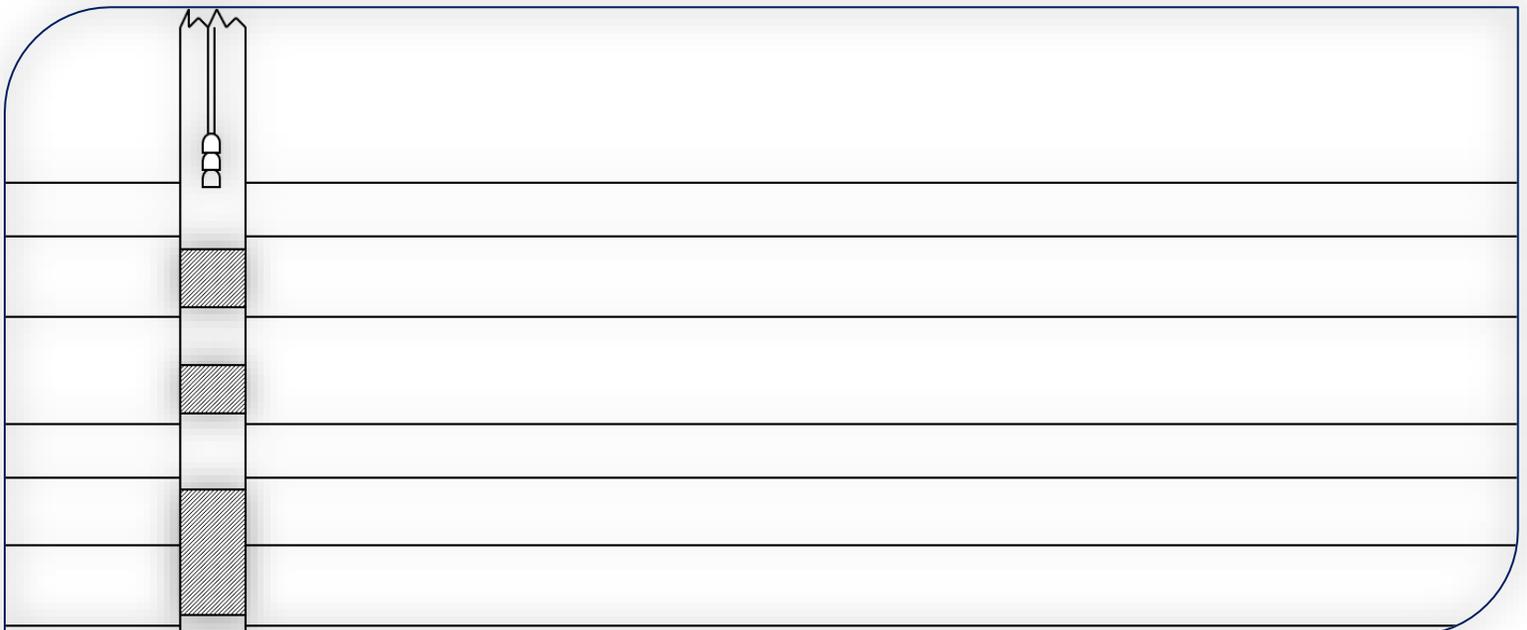


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Introduction

From 10/2/2017-10/5/2017, BESST, Inc. (BESST) performed a dynamic flow and water quality chemistry profile for California Rural Water Association (CRWA) on Well #1, located in Campo, California.

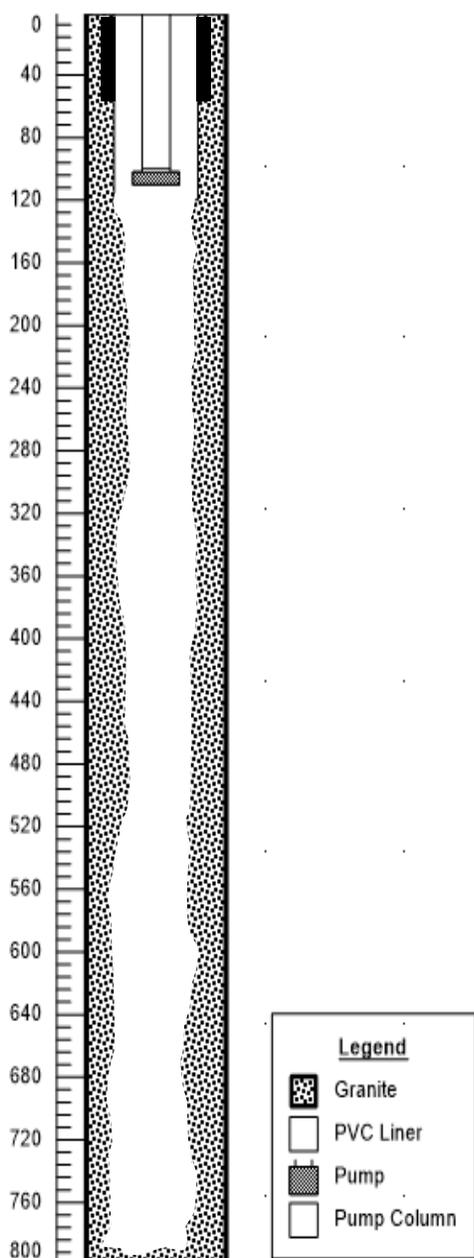
The purpose of this profiling event was to investigate inorganics and metals concentrations and document baseline zonal flow and water quality conditions.

The dynamic profile was performed using the USGS Tracer Pulse Dynamic Flow Profile method to measure zonal flow chemistry contributions below the PVC liner which terminates at 200 Ft. below ground surface (BGS) at the time of the field work. Dynamic flow profile results are shown in Figures 2 through 5. Dynamic flow profile data is presented in Appendix A.

The dynamic, depth dependent water quality sampling was performed under steady state conditions by using the BESST Hydrobooster pump. 3 samples were collected between the depths of 117'-135 Ft. BGS. In addition to the downhole samples, two well head samples were also collected from the discharge tap of the well. Prior to the start of field work, sampling depths were determined through assessment of the available well construction data (Figure 1) such as driller's reports as well as boring and geophysical logs. During the field effort, cumulative and zonal flow contribution data were evaluated and used to refine the sample depth locations inside the well. Sample results are shown by analyte in Appendix B. Chemical analysis was performed by BC Laboratories Inc.

Well Information Summary

The following information for Campo well #1 is based on technical information provided by the DWR well completion report



Well Information	Diameter Inches	GPM	Ft. BGS
Total Well Depth			800
Type of Pump (Electric Submersible)			
Pump Diameter	3		
Access Pipe Diameter	N/A		
Pump Column Diameter	2		
Pump Intake Depth			105
Static Water Level			43.3
Pumping Water Level*			70
Pumping Rate *		30	
Casing and Well Screen Intervals			
Cement Seal	8-5/8		0-52
Blank	4.5		0-120
Open borehole	~6		120-800

* During the time of testing

Figure 1: Well construction diagram based off the information from the DWR drillers log

Dynamic Flow Profile

The dynamic flow profile for Well #1 was performed using the USGS Tracer Pulse Dynamic Flow Profiling method to measure flow contribution below the PVC liner. (Figure 2 through Figure 5). The profile was conducted at an averaged flow rate of 30 gallons per minute (GPM) on 10/5/2017.

In-well flow velocities were calculated as the change in feet between injection points divided by the change in dye tracer return times (to a surface fluorometer) between sequential pairs of injection points. Once in-well, sectional velocities are calculated, the data is then used to calculate cumulative flows at each tracer injection depth. The algebraic difference between sequential cumulative flows equals the zonal flow contribution entering the well between the injection points. This calculation is performed iteratively throughout the well profile to produce the zonal flow graph shown in both GPM and percent of total contribution for each interval.

Calculations for Flow Contribution

Calculations were based upon well information provided by the client and field survey results Q_n (depth dependent cumulative flow value). Up to three measurements were collected at each discrete depth to determine an average cumulative flow.

Q_n (GPM): Depth dependent cumulative flow value

r_{cas} (Ft.): well casing inner radius

$\Delta Q_{n,n+1}$ (GPM): Zonal flow contribution between depths n and $n+1$

r_{col} (Ft.): outer radius of pump column

d_{n+1} (Ft.): upstream injection depth

V_n (Ft./min): depth dependent velocity value

d_n (Ft.): downstream injection depth

A (Ft.²): well cross-sectional area

t_{n+1} (min): return time of d_{n+1}

C : Constant conversion factor (ft³/min) to GPM

t_n (min): return time of d_n

Velocity (Ft./min)

$$1. \quad v_n = \frac{(d_a - d_c)}{(t_b - t_c)}, \frac{(d_b - d_c)}{(t_c - t_b)}, \frac{(d_c - d_d)}{(t_d - t_c)}, \dots, \frac{(d_n - d_{n+1})}{(t_{n+1} - t_n)}$$

For depths above intake, d_n, d_{n+1}, \dots are calculated up and away from intake

$$2. \quad v_n = \frac{(d_a - d_c)}{(t_b - t_c)}, \frac{(d_b - d_c)}{(t_c - t_b)}, \frac{(d_c - d_d)}{(t_d - t_c)}, \dots, \frac{(d_n - d_{n+1})}{(t_{n+1} - t_n)}$$

For depths below intake, d_n, d_{n+1}, \dots are calculated down and away from intake

Well Cross-Sectional Area (Ft.²)

$$3. \quad A = [\pi(r_{cas} - r_{col})]^2 \text{ If above pumping intake}$$

$$4. \quad A = \pi r_{cas}^2 \text{ If below pumping intake}$$

Cumulative Flow (GPM)

$$5. \quad Q_n = (v_a * A * C), (v_b * A * C), (v_c * A * C), \dots, (v_n * A * C)$$

Zonal Flow Contribution (GPM)

$$6. \quad \Delta Q_{n,n+1} = (Q_a - Q_b), (Q_b - Q_c), (Q_c - Q_d), \dots, (Q_n - Q_{n+1})$$

Dynamic Flow Profile Graphs

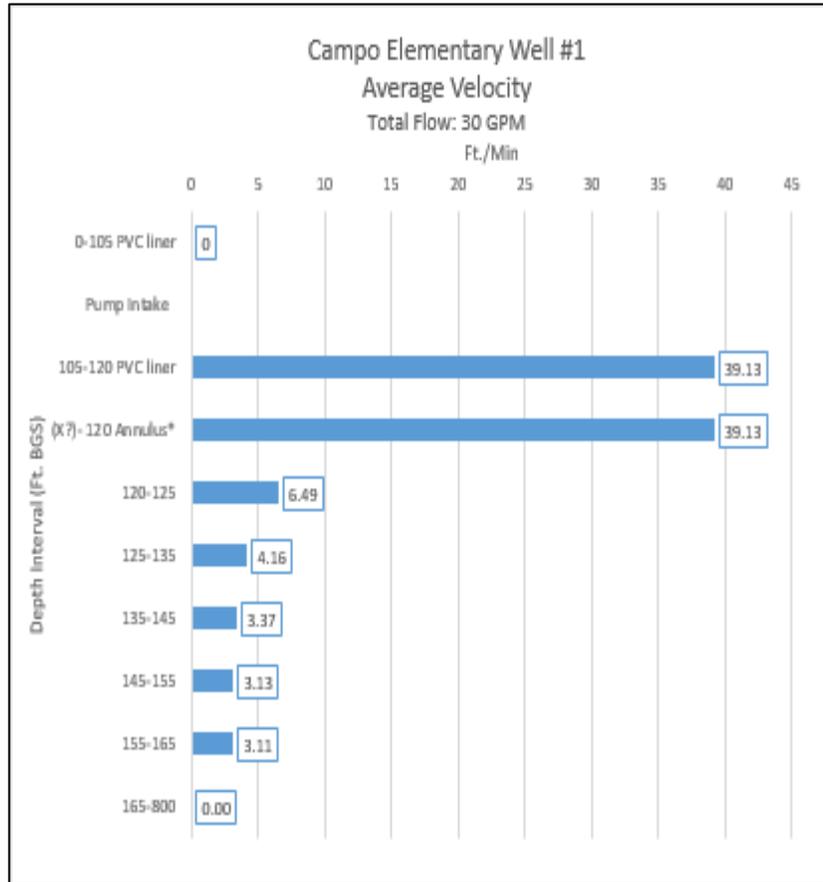


Figure 2: Campo Elementary Well #1 velocity profile

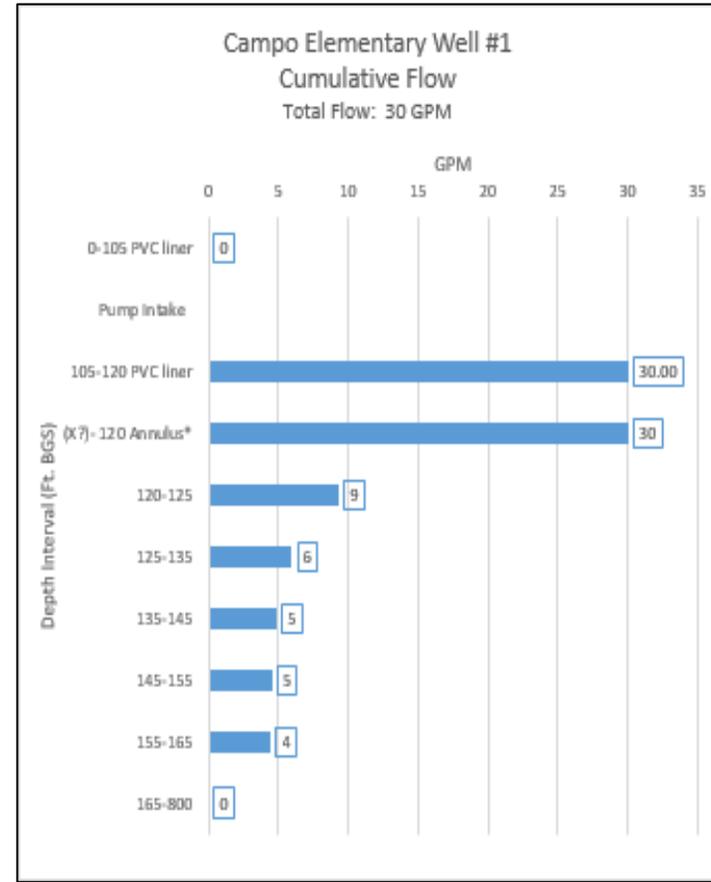


Figure 3: Campo Elementary Well #1 cumulative flow

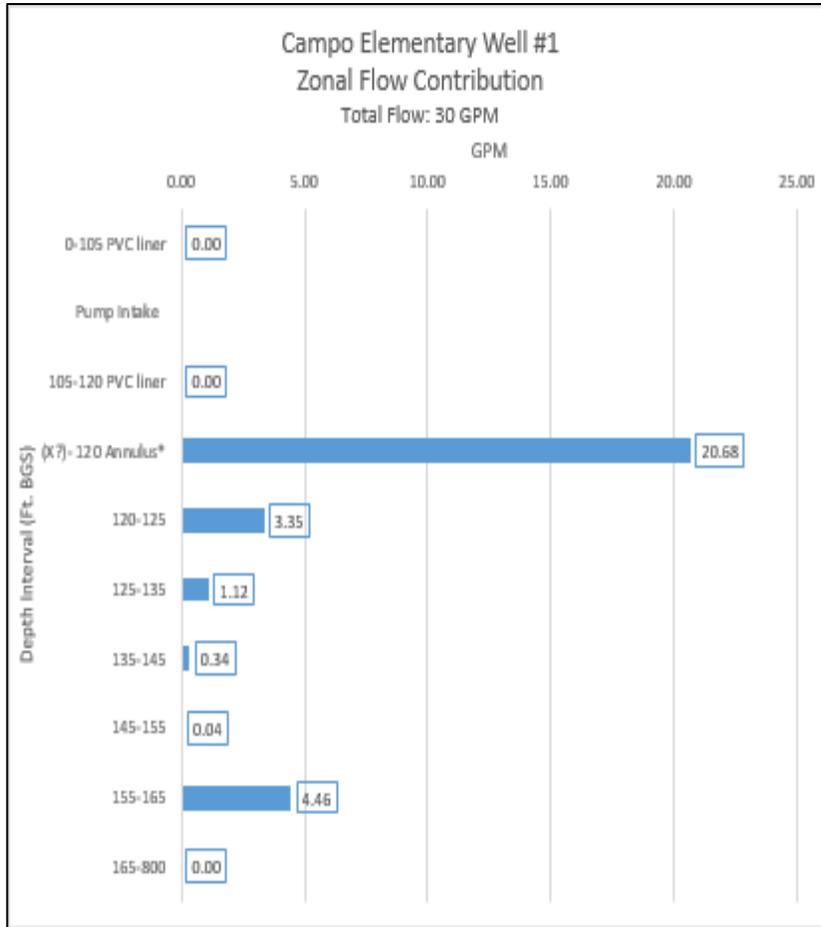


Figure 4: Campo Elementary Well #1 zonal flow contribution

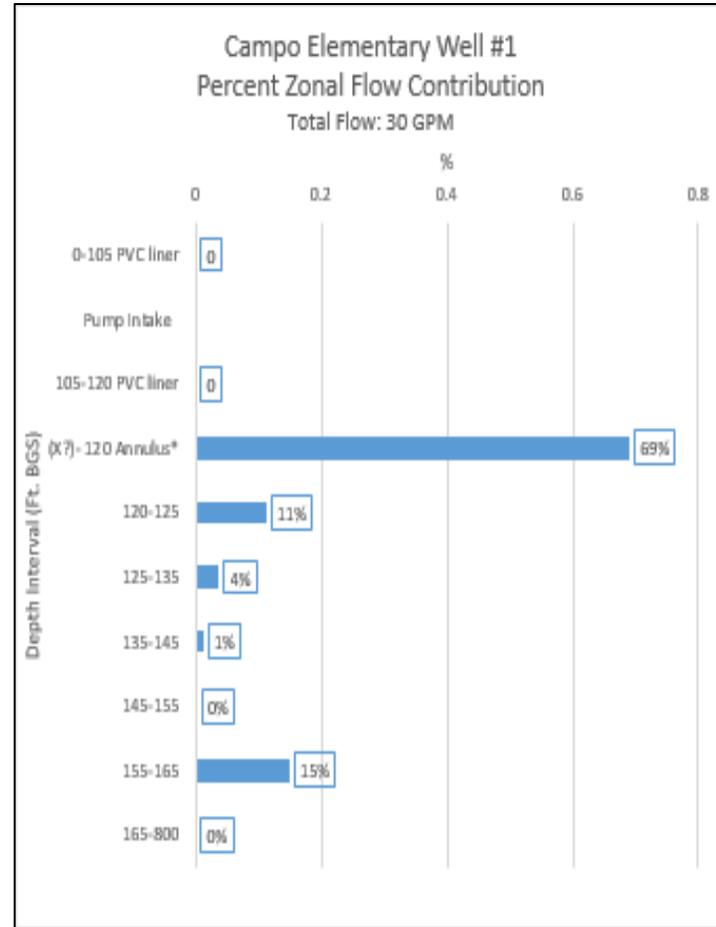


Figure 5: Campo Elementary Well #1 percent zonal flow contribution

Dynamic Chemistry Profile

Summary

The dynamic water quality sampling was performed using a Hydrobooster pump. Groundwater samples were obtained by using the fast cycle, multiple full-purge and sample method. 3 samples were collected between the depths 117-135 Ft. BGS. Sampling depths were determined through assessment of the flow contribution data and available well information (Figure 1).

The reported laboratory results for each analyte are listed in Appendix B. Analytes are listed below under Water Quality Data Analytes.

The sample results are used in conjunction with the flow calculations to determine zonal water quality concentration along the perforated intervals

Water Quality Data Analytes

- Bicarbonate
- Alkalinity
- Chloride
- Fluoride
- Nitrate as NO₃ and N
- Sulfate
- Electrical Conductivity
- Total Dissolved Solids
- Total Recoverable Metals

Flow Weighted Concentrations vs. Analytical Lab Results

The average zonal chemical contributions in the bar graphs below (Figures 6-24) are derived from applying the mass balance calculation to the cumulative contributions of flow and chemistry between any two vertically paired and consecutive water samples and then dividing by the zonal flow contribution for the same depth interval. This process is known as “flow-weighting” the data; whereby a weighted zonal average for each analyte is derived. =

After the mass balance results are calculated, BESST finalizes the results by comparing the theoretical well head average concentration with the actual well head average concentration to determine the percentage of agreement between results. Analytes are used to perform a QA/QC, reverse mass balance calculation to determine the percent agreement between the theoretical and actual well head averages.

Calculations for Zonal Chemical Contribution Concentrations

Q_n (GPM)= Depth dependent cumulative flow value

$\Delta Q_{n,n+1}$ (GPM)= Zonal flow contribution between depths n and n+1

C_n = Depth dependent lab concentration value

$\Delta C_{n,n+1}$ = Zonal chemical concentration between depths n and n+1

$$7. \Delta C_{n,n+1} = \frac{(Q_a * C_a) - (Q_b * C_b)}{(\Delta Q_{ab})}, \frac{(Q_b * C_b) - (Q_c * C_c)}{(\Delta Q_{bc})}, \frac{(Q_c * C_c) - (Q_d * C_d)}{(\Delta Q_{cd})}, \frac{(Q_n * C_n) - (Q_{n+1} * C_{n+1})}{(\Delta Q_{n,n+1})}$$

Calculations for Theoretical Average Analyte Chemistry

C_{tot} = Composite sample collected at Well head tap.

C_{avg} = Average analyte chemistry for all depth intervals to the nth degree.

Q_{tot} = Total cumulative discharge flowing out of the Well.

Theoretical Average Chemical Concentration

$$8. C_{avg} = \frac{(\Delta Q_{ab} * \Delta C_{ab}) + (\Delta Q_{bc} * \Delta C_{bc}) + (\Delta Q_{cd} * \Delta C_{cd}) + \dots + (\Delta Q_{n,n+1} * \Delta C_{n,n+1})}{Q_{tot}}$$

Zonal Chemical Contribution Graphs

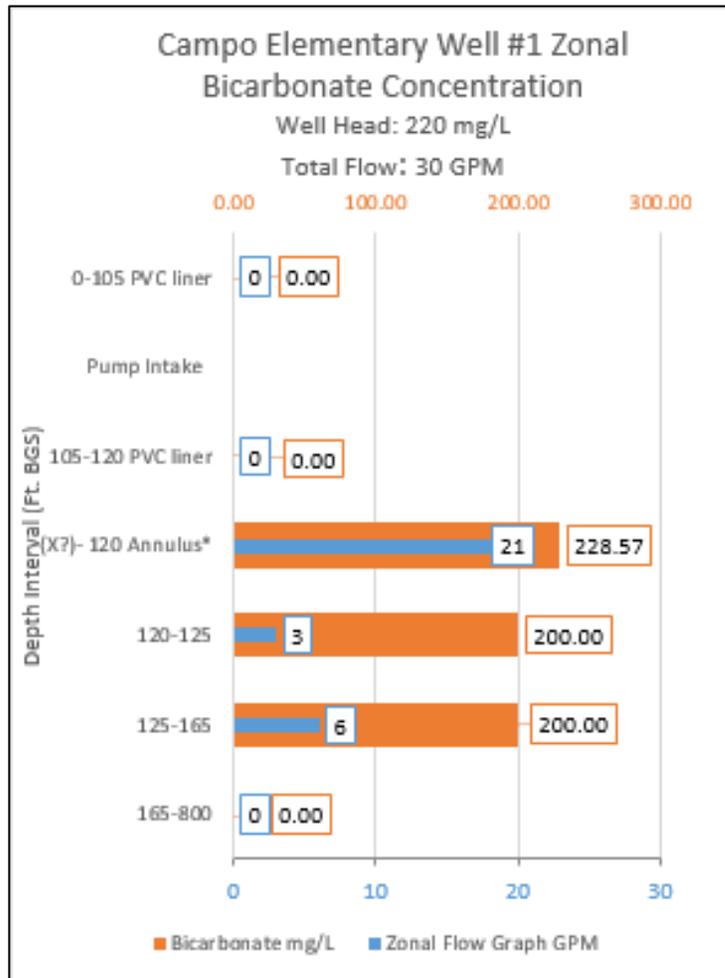


Figure 6: Campo Elementary Well #1 zonal bicarbonate concentration

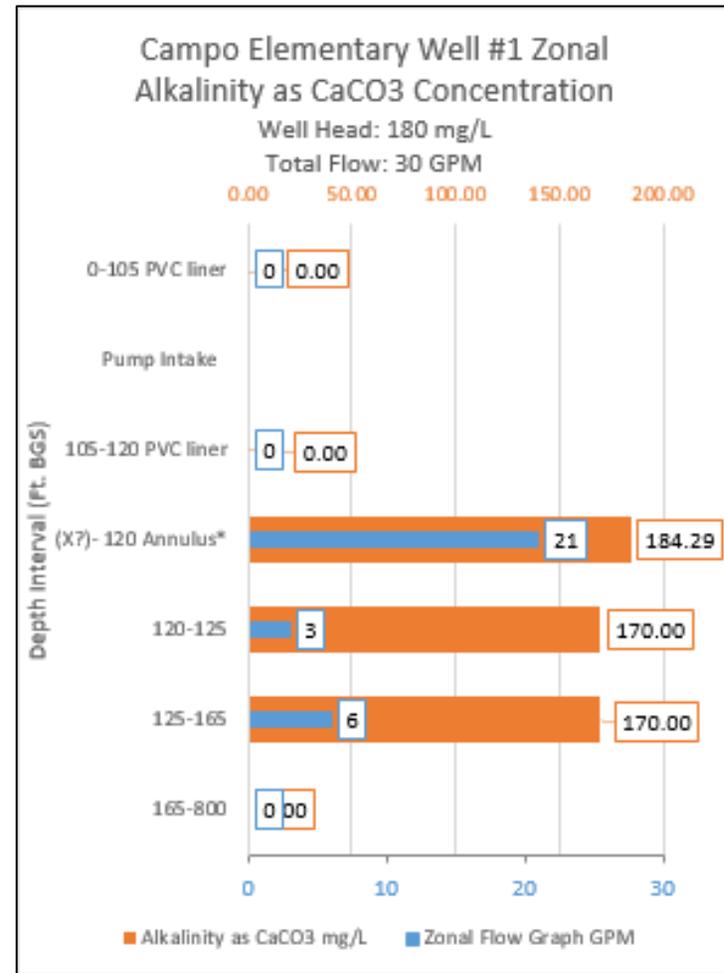


Figure 7: Campo Elementary Well #1 zonal alkalinity as CaCO3 concentration

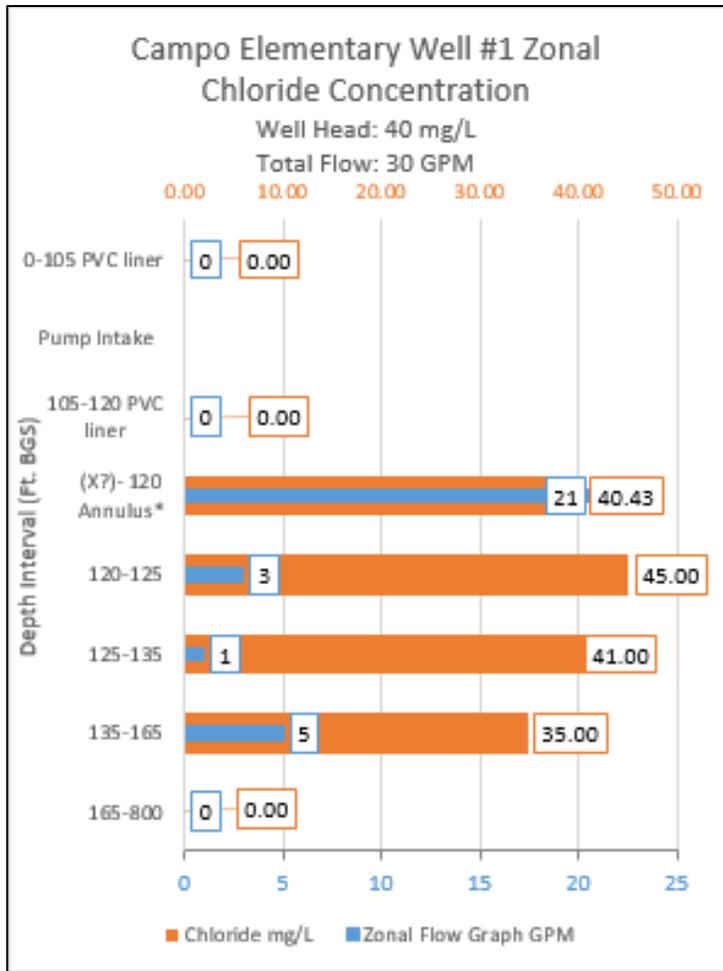


Figure 8: Campo Elementary Well #1 zonal chloride concentration

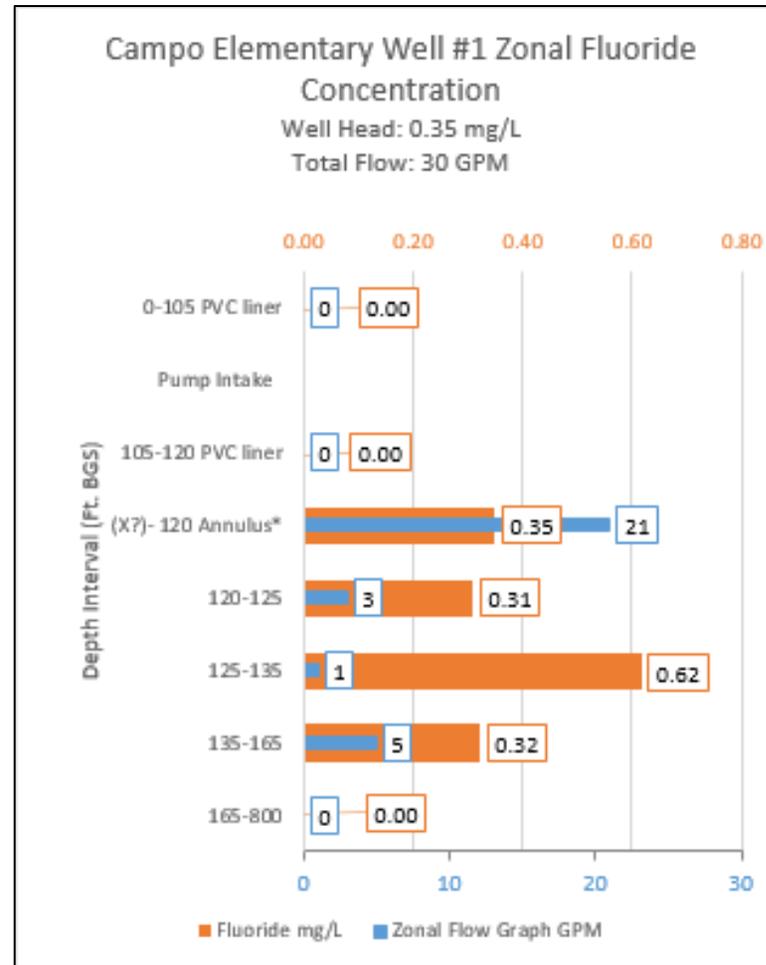


Figure 9: Campo Elementary Well #1 zonal fluoride concentration

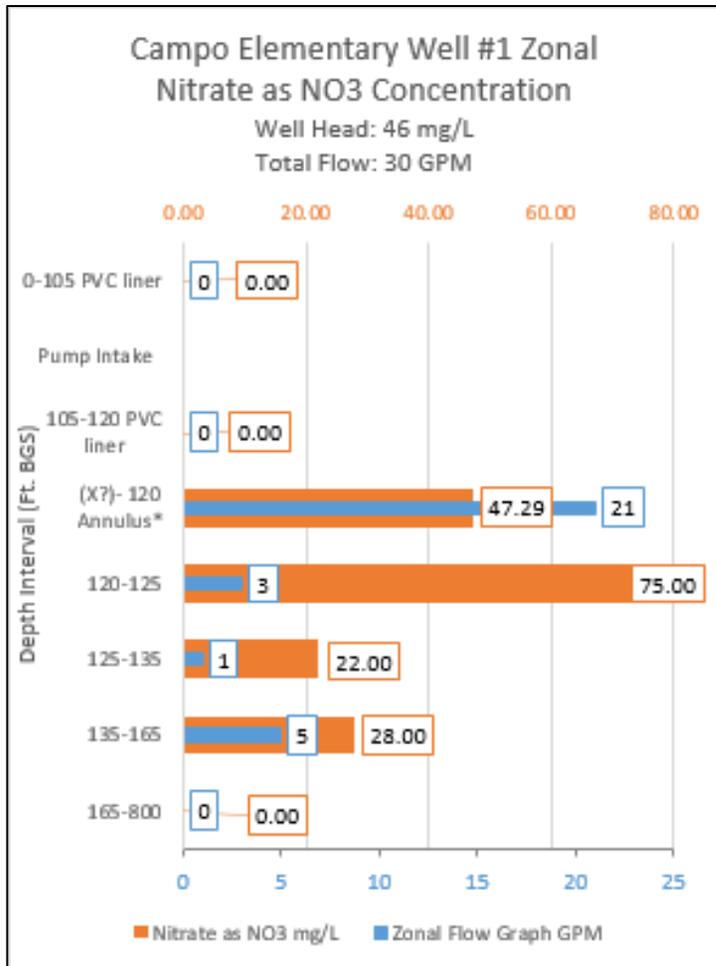


Figure 10: Campo Elementary Well #1 zonal nitrate as NO3 concentration: Note: One or both inflow zones below 135 Ft. BGS. produce approximately 35 mg/L NO3.

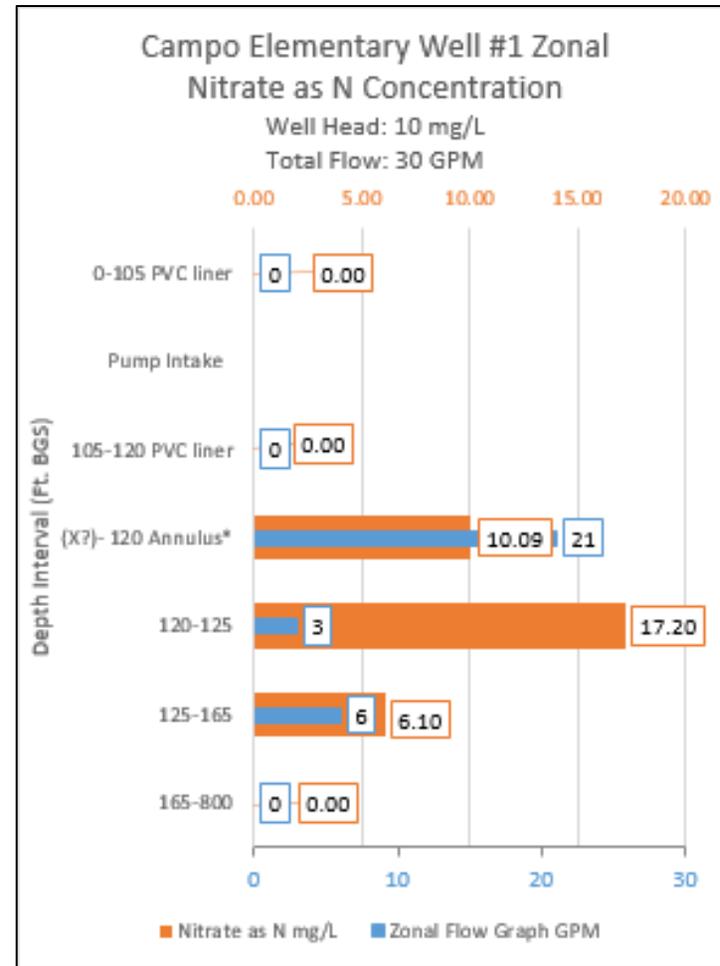


Figure 11: Campo Elementary Well #1 zonal nitrate as N concentration

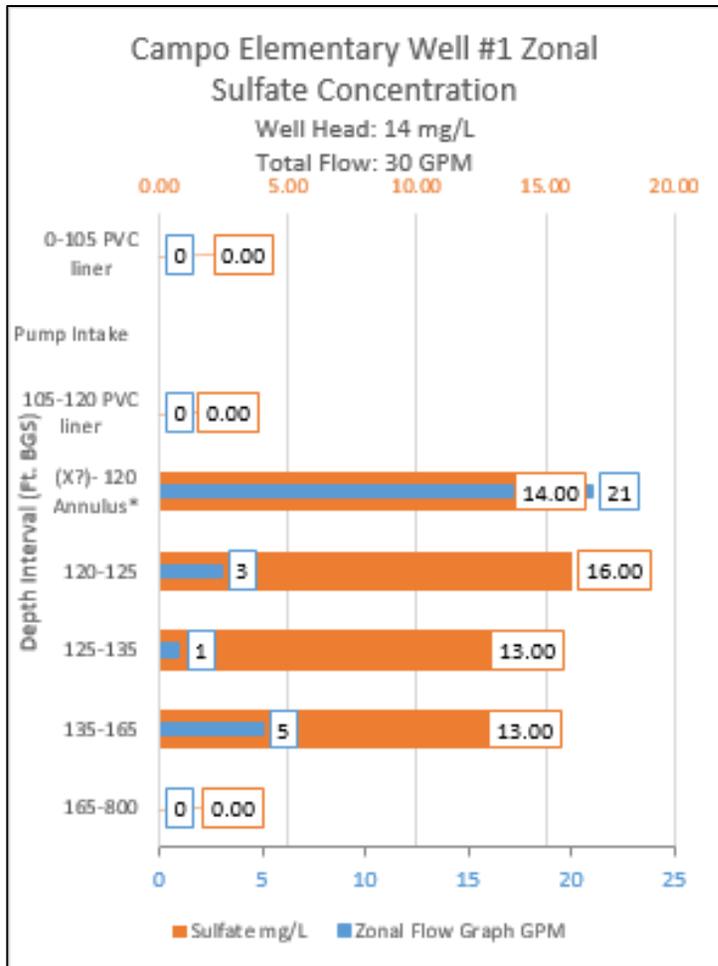


Figure 12: Campo Elementary Well #1 zonal sulfate concentration

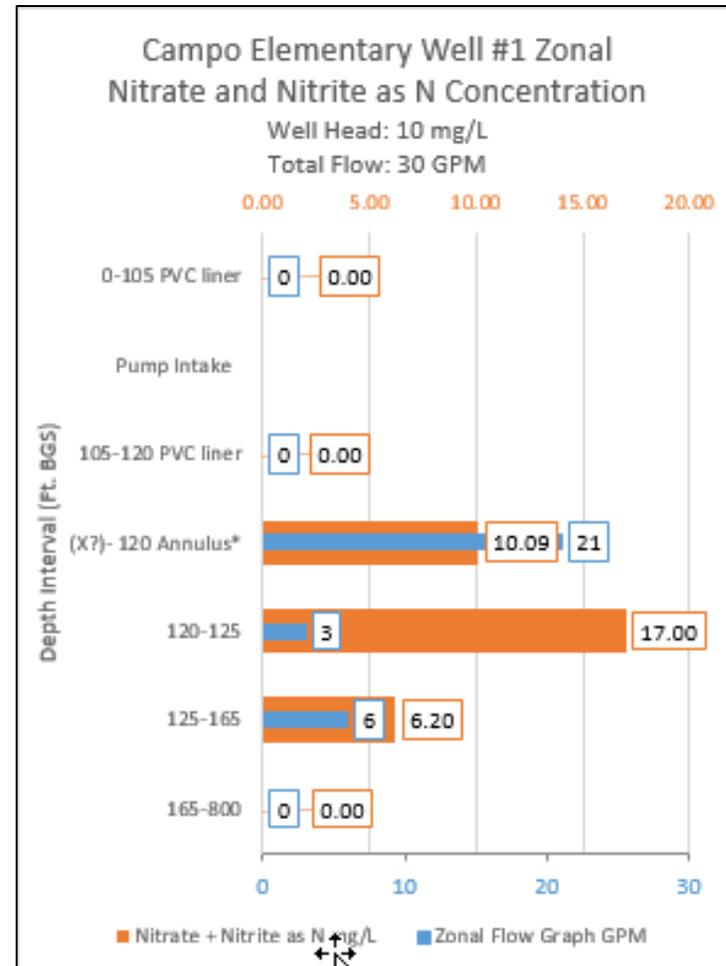


Figure 13: Campo Elementary Well #1 zonal nitrate and nitrite as N concentration

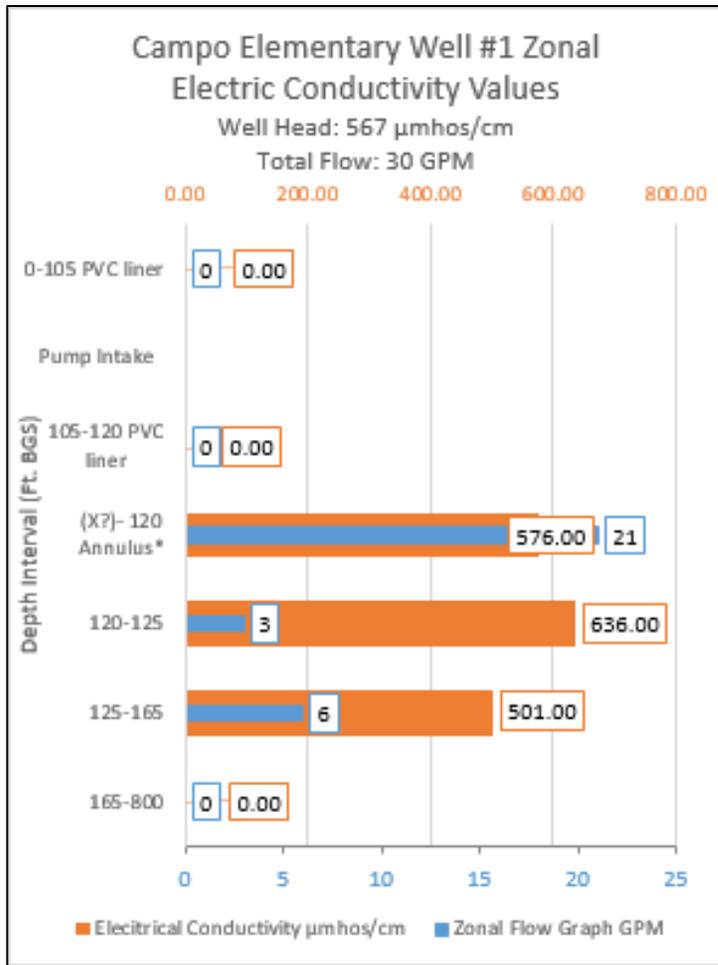


Figure 14: Campo Elementary Well #1 zonal electric conductivity values

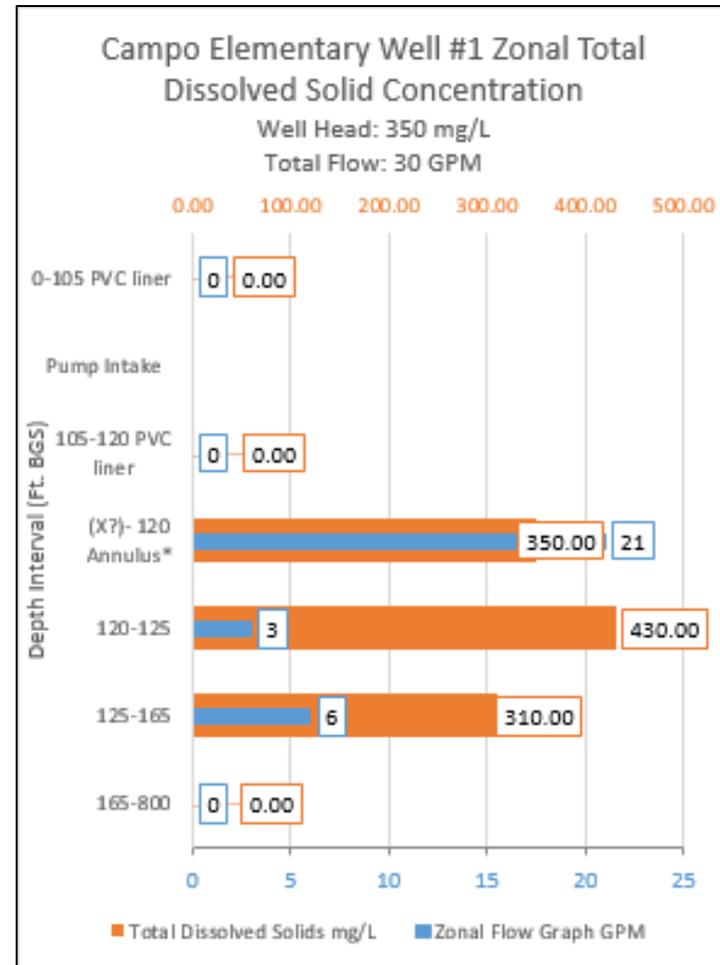


Figure 15: Campo Elementary Well#1 zonal total dissolved solids concentration

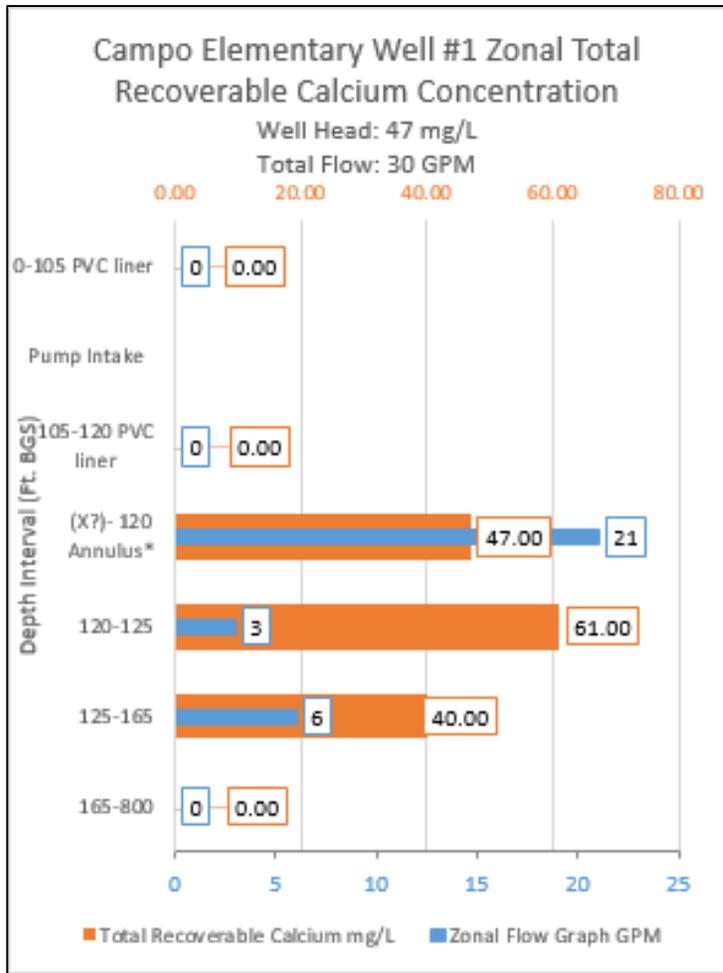


Figure 16: Campo Elementary Well #1 zonal total recoverable calcium concentration

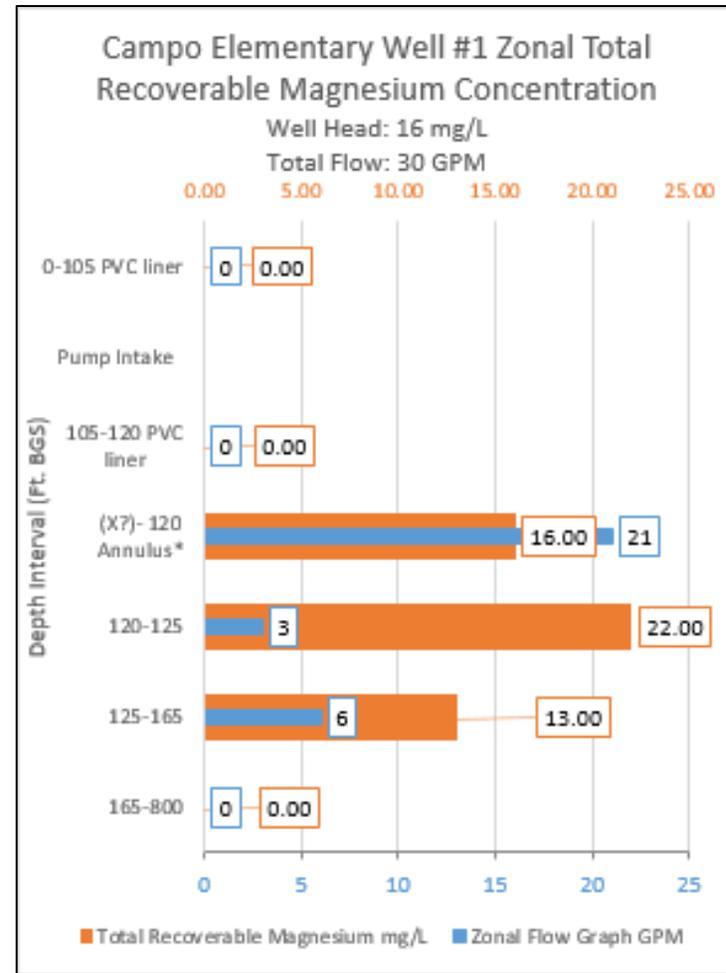


Figure 17: Campo Elementary Well #1 zonal total recoverable magnesium concentration

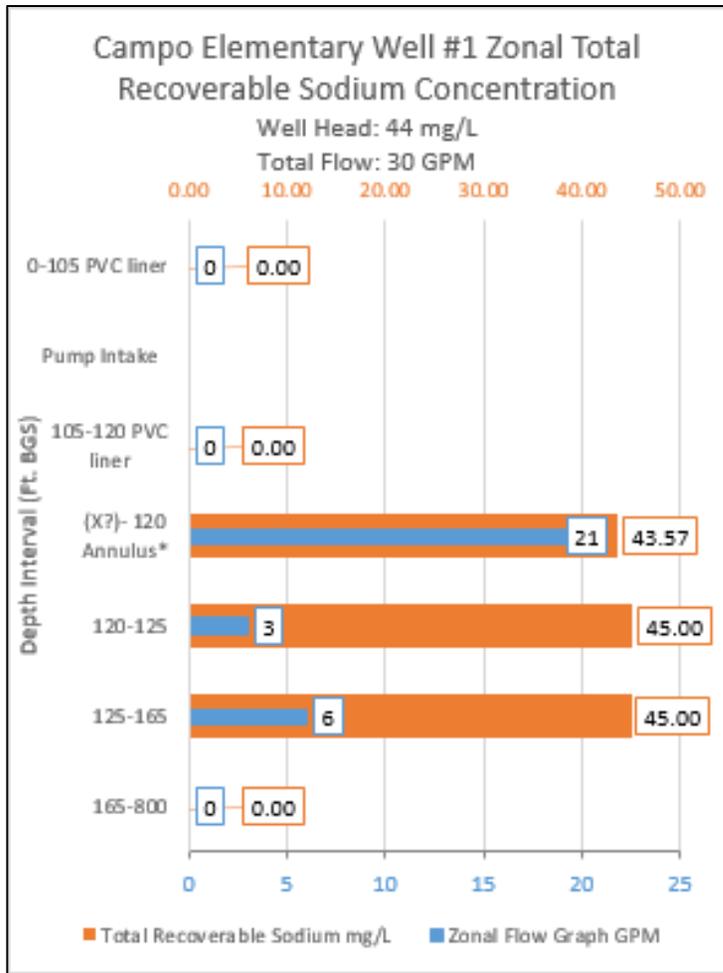


Figure 18: Campo Elementary Well #1 zonal total recoverable sodium concentration

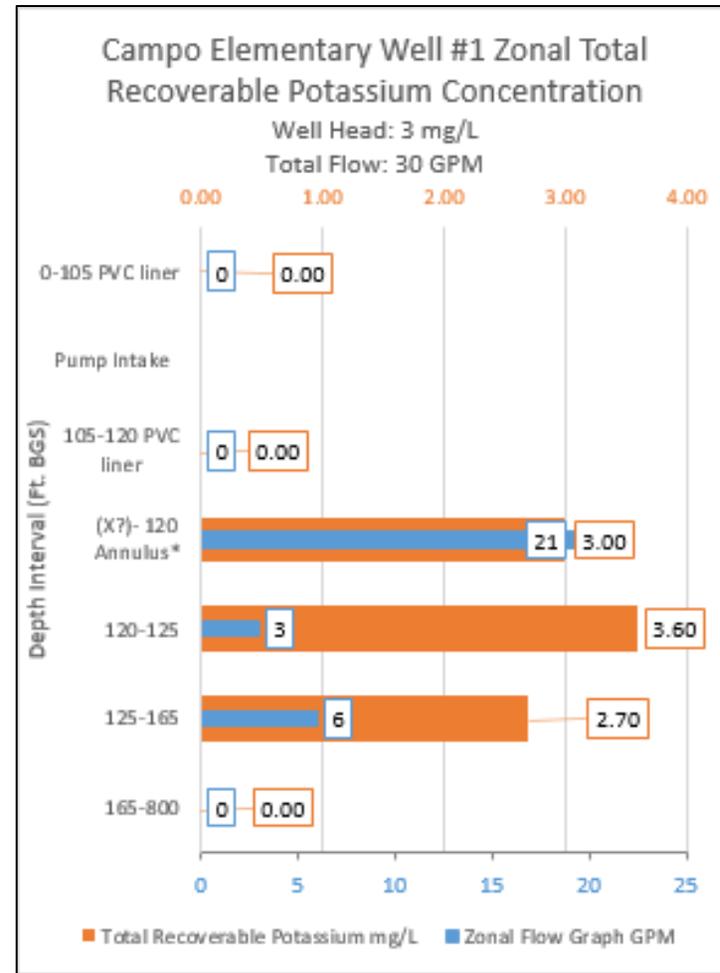


Figure 19: Campo Elementary Well #1 zonal total recoverable potassium concentration

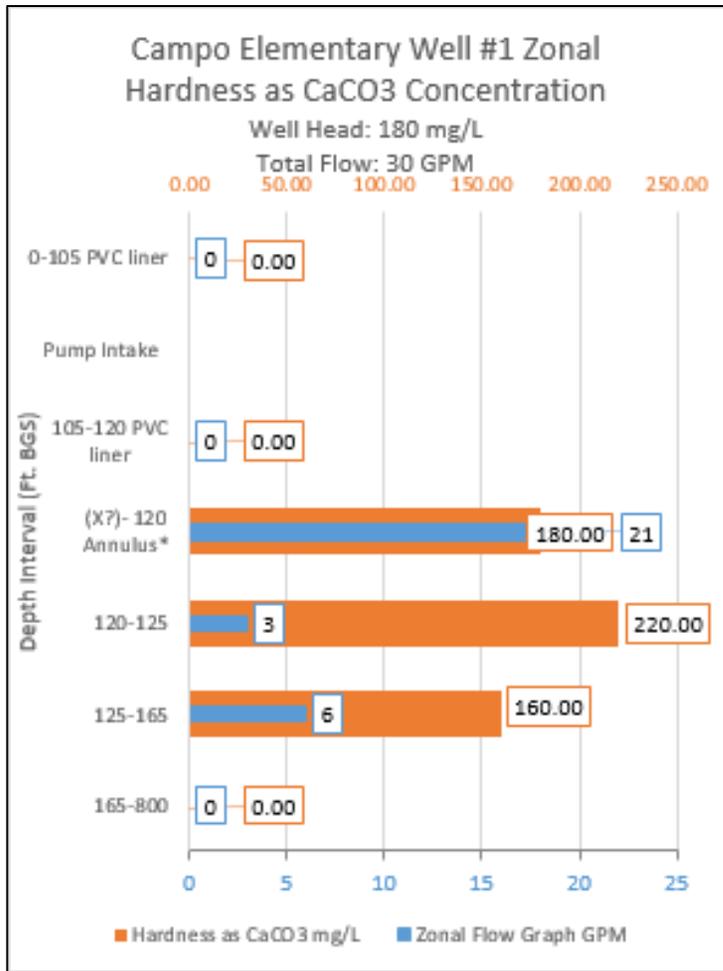


Figure 20: Campo Elementary Well #1 zonal hardness as CaCO₃ concentration

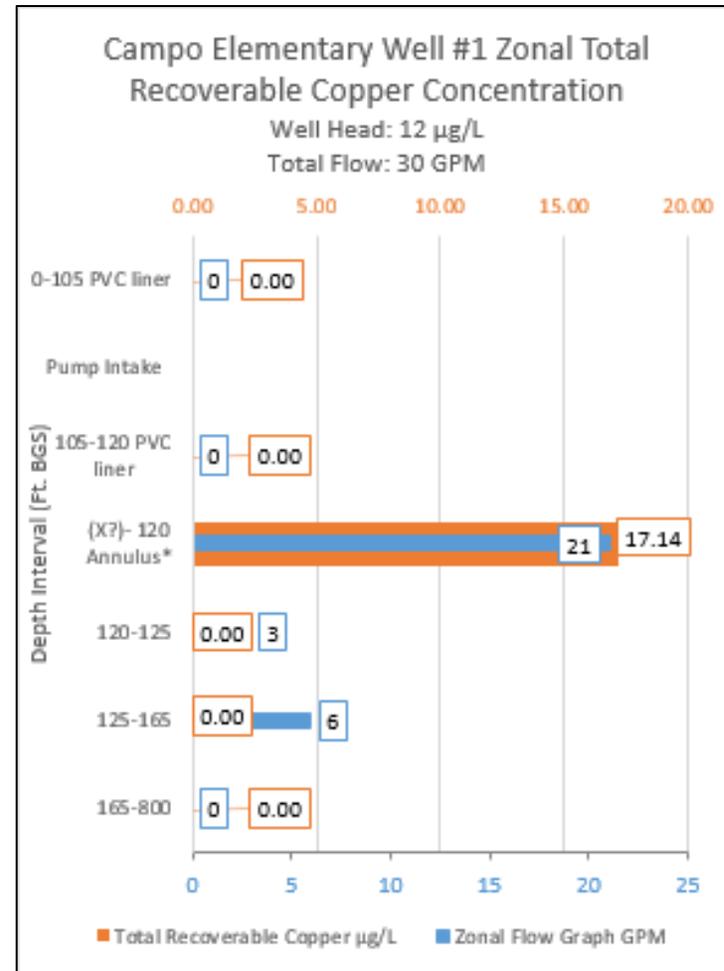


Figure 21: Campo Elementary Well #1 zonal total recoverable copper concentration

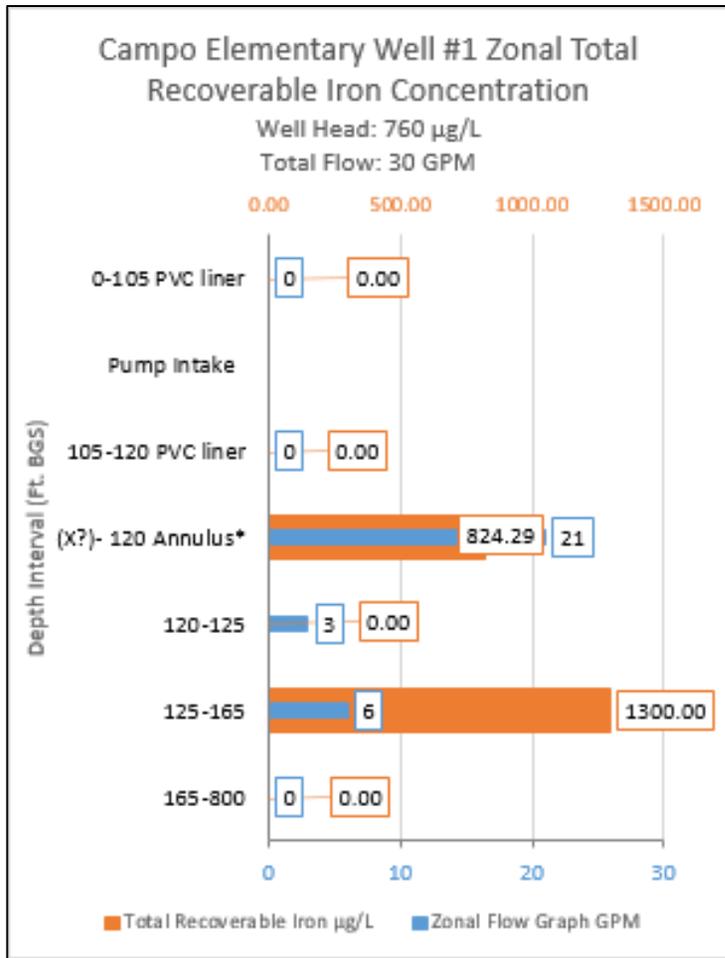


Figure 22: Campo Elementary Well #1 zonal total recoverable iron concentration

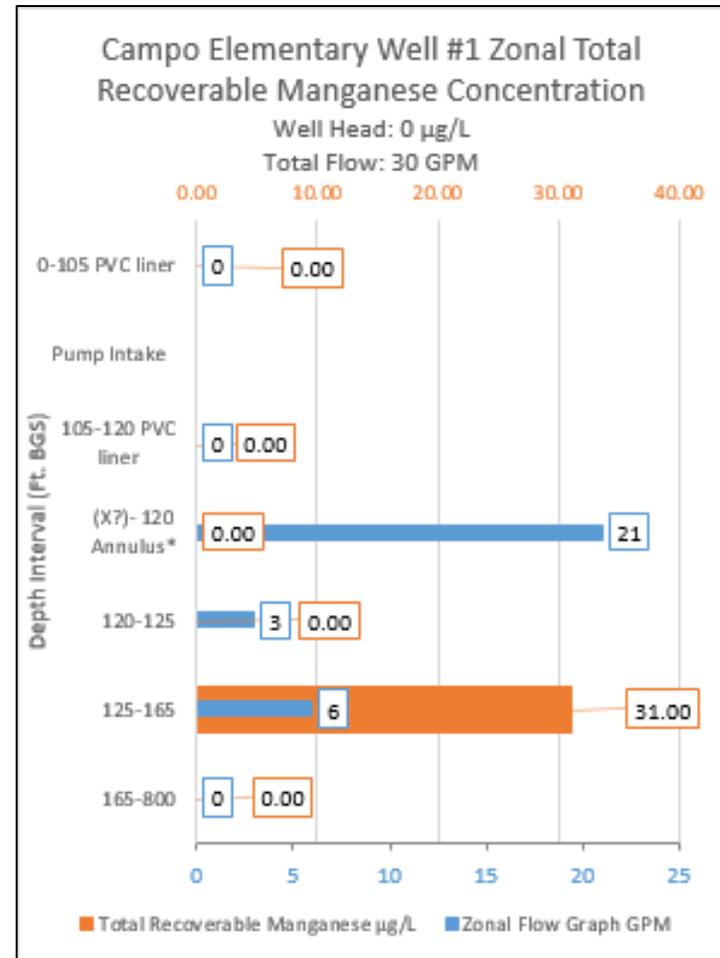


Figure 23: Campo Elementary Well #1 zonal total recoverable manganese concentration

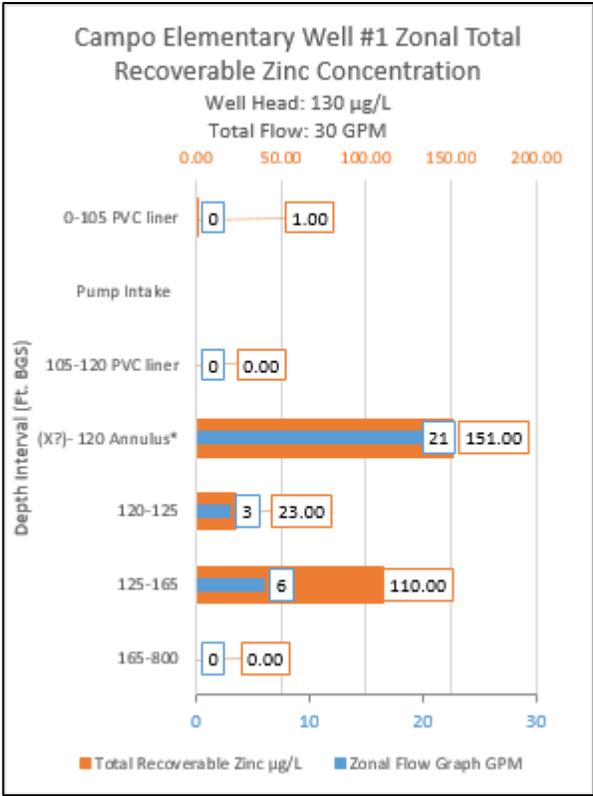


Figure 24: Campo Elementary Well #1 zonal total recoverable zinc concentration

Results and Conclusions

Campo Elementary School Well 1 consists of a 4.5" ID, PVC casing to a depth of approximately 120 Ft. BGS., and is an open borehole, approximately 6" in diameter, in fractured, crystalline bedrock to a depth of about 800 Ft. BGS. A standard electric submersible pump was positioned at 105 Ft. BGS., within the PVC cased portion of the well and run at 30 GPM during the test.

Results from the zonal flow profile show that a large percentage of the yield during the test (83%) was produced from fractured crystalline bedrock that flowed downward, through an open annulus around the outside of the PVC casing; and then entered the well immediately below the PVC casing bottom at 120 Ft. BGS. The idea that this groundwater was derived from bedrock around the (lower extremities of the) casing is supported by the driller's report for Well 1. The driller's report states that a cement seal was installed from ground surface to a depth of 52 Ft. BGS., but offers no construction details from the bottom of the cement seal to the bottom of the PVC casing. Therefore, we think that it is reasonable to assume that there are no annular sealing materials below 52 Ft. BGS and that the annulus is essentially open between the outside of the casing and the surrounding bedrock from 52 to 120 Ft. BGS.

The data shows that a large percentage of the groundwater entering Well 1 (69%) is derived from the annulus (as well as a large fraction of the nitrate mass). Water flow within the annulus is obviously downward toward the bottom of the casing located at 120 Ft. BGS.; which then must U-turn into the casing and move towards the pump intake. Other evidence that demonstrates that the annulus is very leaky were the visually identified air bubbles and water escaping from around the surface seal of the casing during the water sampling effort at 350 Ft. BGS. The air bubbles were produced as a result of the large volume of nitrogen gas that escaped from the Panacea pump when the field team was attempting to collect a groundwater sample. As a result of the high acidity, the o-ring in the foot valve was degraded to the point where it was impossible to obtain a water tight seal at the bottom fluid entrance to the pump. During each attempt, all of the groundwater and ensuing nitrogen gas from the pump and the tubing lines were forced into the borehole at 350 Ft. BGS. The bubble then floated through the water column, and entered the casing as well as the annulus around the outside of the casing. Approximately 11% of the production was obtained from the interval between 120 and 125 Ft. BGS. The remaining flow contribution (20%) was derived from localized, fractured intervals to a depth of 165 Ft. BGS.; below which no contribution was detected.

The primary analyte of concern for Well 1 is nitrate as NO₃. The profile results show that the majority of nitrate mass enters the well from the annulus surrounding the well casing as well as the interval from 120-125 Ft. BGS. The nitrate concentration flowing into the well from the annulus around the outside of the well casing was calculated to contribute 47 mg/L NO₃. The interval from 120 to 125 Ft. BGS. was calculated to contribute 67 mg/L NO₃. The small contributing zones between 135 to 165 Ft. BGS., collectively produce about 35 mg/L NO₃ (about 11% of total production). The dominance of non-compliant groundwater with respect to NO₃ contributed from around and just below the bottom of the well casing seems to be the key factor responsible for exceedance of the NO₃ concentration at the well head discharge; where at the time of testing was reported to be 46 mg/L.

Although there was no production below 165 Ft. BGS., BESST field scientists did try to obtain ambient grab water samples from the open borehole in order to coarsely characterize water quality below the vertical capture zone of the pump. The only depth below 165 feet where this was attempted was

located at 350 Ft. BGS. The attempted sampling effort from this depth was unsuccessful however due to the highly acidic conditions of the groundwater. This condition was surmised by the repeated but failed attempts to hold foot valve pressure inside the pump while attempting to pump water from the sample pump to the ground surface. Following each failed attempt, the pump was retrieved back to the ground surface where a “bucket” test was performed in order to observe the performance of the foot valve in a bucket filled with water. Each time the bucket test was performed, the field team observed bubbles leaking from the pump bottom, meaning the o-ring integrity in the foot valve was compromised. After three attempts, with three new o-rings consecutively failing, and based on similar problems at other sites with this specific type of pump failure, the field team concluded that the most plausible explanation was high acidity of the groundwater in the deeper reaches of Well 1. The field team then realized, that these conditions likely did not exist at shallower depths where potable groundwater was obtained. Therefore, the decision was made to not characterize water quality in the well below the 165 Ft. BGS.; which was the lowermost depth of groundwater capture from the pump during the test.

Recommendations

If the Campo Elementary School desires to salvage Well 1 as a backup, potable, drinking water supply to Well 2, and is interested in avoiding treatment, then the most prudent step would be to semi-isolate or block off the groundwater supply that is produced from the casing annulus and from the fractured bedrock below it to a depth of 130-135 Ft. BGS. Although the groundwater from 135 to 165 Ft. BGS. is collectively in the range of 28 mg/L, and within 17 mg/L of the nitrate MCL (45 mg/L), it is still compliant – and has enough statistical separation from the US EPA MCL to be a viable option.

Before any well modification strategy is employed over the long term for Well 1, we recommend first performing the following steps in the order presented below:

Step 1: Ambient pH Point Survey

The results of the dynamic steady state survey indicate that groundwater with respect to nitrate is compliant between 135 to 165 Ft. BGS. But, if the nitrate impacted zone from (annulus?) ≤120-135 Ft. BGS. is blocked off with an inflatable packer, then to what depth will the redirected suction force of the pump reach to (below the packer)? The answer to this question depends on the pumping rate used and the permeability of the fractures. As a backup well, it makes sense to achieve the same pumping rate (if possible) that was used for the test. At 40 GPM, the depth of hydraulic engagement may reach below 165 Ft. BGS. However, we are in the “dark” as to how deep the suction force will actually reach and moreover, we have no analytical chemistry data that would tell us whether or not a lower packer is required that would serve as the bottom boundary of the “new” production zone.

An important point in all of this is the single data point at 350 Ft. BGS.! Although there is no chemistry, we know that the pump failure at this depth is indicative of acidic (very low pH) conditions – possibly in the pH 2 range. Therefore, the inferred pH data from this depth alerts us to the fact that this is a zone that should not be hydraulically engaged. The remaining question is where do pH conditions in the borehole, between 165 and 350 Ft. BGS. change, to the point where the groundwater is undesirable (i.e. <6? For example)? The simplest and most cost-effective way to answer this question is to conduct an ambient pH survey. If a pH survey is performed, a reasonable approach would be to take static pH readings down-hole, every 10 feet, from 120 to 350 Ft. BGS. The depths at which the pH readings become consecutively undesirable would demarcate depth range to avoid in the well modification. If a bottom packer is used in the well modification, the location would not be placed directly at the transitional boundary, but at a buffer distance above the boundary to avoid short circuiting around the packer through bedrock fractures. The pH survey would likely take one-half day to complete.

Step 2: Straddle Packer Groundwater Sampling Survey

We can see from the dynamic flow profile that nitrate concentrations decrease with depth. This is good! Using a combination of the dynamic data and the depth locations of the fractured bedrock called out in the driller’s report, we recommend combining a limited straddle packer survey with the pH survey. The purpose is to hone in on the specific chemistry that the fractures will produce relative to pH and nitrate and then using this data to ensure that the lower boundary of desirable groundwater is established prior to well modification. The total survey may consist of 3 to 6 zones and likely take one to three days to complete (depending on the number of tested zones).

Step 3: Install Well Modification System: Double Packer Solution – With Engineered Suction

Using an inflatable single or straddle packer unit would be a relatively simple way to salvage Well 1. Packer technologies have been around for a long time and have improved in durability and longevity over the years. There are a number of companies that make packers, two of which are located in California. Over the years, we have purchased and installed packers made by Lansas out of Lodi, CA.

The decision to use a straddle packer assembly is more expensive and conservative than a single packer solution; but believe this is necessary considering the unknown length of the suction force from the pump when the intake is effectively relocated to 135 Ft. BGS. and when pumping at 30 GPM. A single packer cost would likely be in the range of \$10,000. This price would likely double for a straddle packer system (about \$20,000) for a 6-inch borehole.

The straddle packer selected would be a medium duty, fixed-end, low pressure system. The outside, uninflated diameter that we recommend would be approximately 5-inches – and would easily accommodate expansion to 6-inches to form a tight seal against the bedrock comprising the borehole wall. The packer rubber needs to be NSF 61 approved and we already know that Lansas can provide NSF 61 approved rubber based on our previous experience. The pass-through mandrill that extends through the packer should be made from 316 stainless steel in order to maximize corrosion resistance and longevity. The support pipe that runs between the upper and lower packer should also be made of 316 stainless steel and perforated along its entire length between the upper and lower packer. The name for this part of the system is called an “engineered suction”. Ideally, the length of the rubber packer gland should be approximately 4 to 5 feet for the upper and lower units. The packer inflation line should be a continuous, seamless strand made from 316 stainless steel and ¼” OD x 3/16” ID that runs from the top packer to the head packer head works at the ground surface. The connection to the top packer should be a 316 stainless steel, ¼” Swage-lok or Parker tube connection. Both packers will be inflated to the same pressure and therefore only a single packer inflation line is required. To accomplish this, the top packer’s inflation line will extend through the rubber gland of the packer and exit the bottom. A new section of 316, stainless steel, ¼” tubing will extend from the bottom connection port to the connection port located at the top of the bottom packer.

The drop pipe that extends from the pump to the top packer should be made from thick schedule PVC (120). Assuming that the electric submersible pump intake is located at 105 Ft. BGS., the run distance between the intake and the mandrill of the upper packer (about 128 feet) will be approximately 23 feet. The electric submersible pump must be fitted with a stainless steel cooling shroud that is welded (or threaded) to the outside of the pump – above the fluid intake. The shroud should extend to just below the pump and be fitted with a threaded sub that can attach to the PVC support pipe that runs between the pump and packer. Enough clearance must be allowed for between the shroud and the casing to allow the packer inflation line to pass to the surface.

The head works at the ground surface will consist of a small pressure gauge gallery and stainless steel shut-off valve to keep the pressure locked into the packers when they are inflated. The gauge and valve are mounted to a stainless steel plate close to the well head. The gauge and valve can be installed within a lock box that protects the apparatus from the ambient elements and vandalism. Optional items include a pressure sensor that triggers an air compressor or nitrogen gas source within an enclosed and

secured metal unit next to the well. If the sealing pressure should fall below the set pressure on the sensor, an electronic valve will open and allow the packer to be re-inflated to the sealing pressure. The valve will then close.



Figure 25: Inflatable Packer Head works.

Appendix A: Dynamic Flow Profile Data

Table 1: Campo Elementary Well #1 dynamic flow profile data

Dynamic Flow Profile Data					
Depth Interval	Average Velocity	Cumulative Flow	Zonal Flow		Samples
			Ft. BGS	Ft./min	
0-105 PVC liner	0.00	0.0	0.0	0%	
Pump Intake					
105-120 PVC liner	39.13	30.0	25.0	83%	117
120-125	6.49	5.0	1.8	6%	
125-135	4.16	3.2	0.6	2%	125
135-145	3.37	2.6	0.2	1%	135
145-155	3.13	2.4	0.0	0%	
155-165	3.11	2.4	2.4	8%	
165-800	0.00	0.0	0.0	0%	



Final Dynamic Flow and Chemistry Profiling Report for Campo Elementary Well #2

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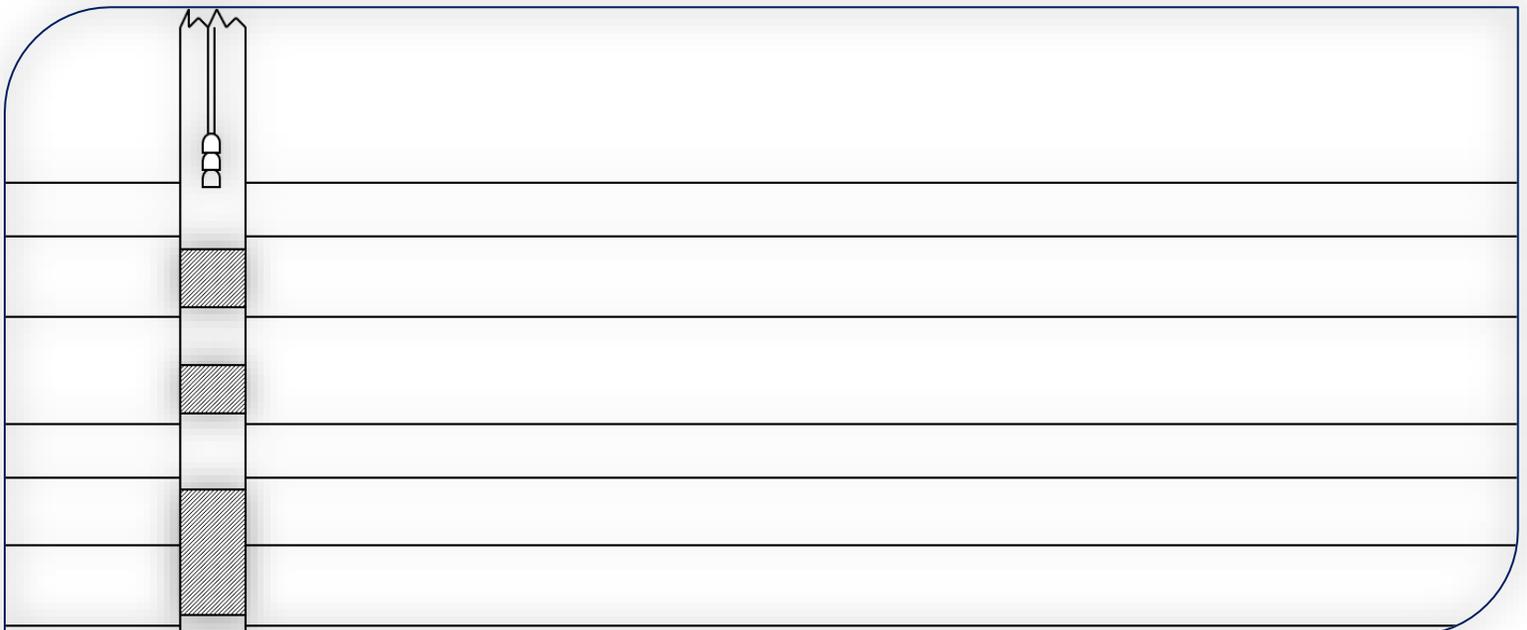


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Introduction

From 10/02/2017-10/05/2017, BESST, Inc. (BESST) performed a dynamic flow and water quality chemistry profile for California Rural Water Association (CRWA) on Well #2, located in Campo, California.

The purpose of this profiling event was to investigate organic and total recoverable metal concentrations and document baseline zonal flow and water quality conditions.

The dynamic profile was performed using the USGS Tracer Pulse Dynamic Flow Profile method to measure zonal flow chemistry contributions along the 60 ft. of screen inside the well. Dynamic flow profile results are shown in Figures 2 through 5. Dynamic flow profile data is presented in Appendix A.

The dynamic, depth dependent water quality sampling was performed under steady state conditions by using the BESST Hydrobooster pump. 8 samples were collected between the depths of 145-189' BGS. In addition to the downhole samples, two well head samples were also collected from the discharge tap of the well. Prior to the start of field work, sampling depths were determined through assessment of the available well construction data (Figure 1) such as driller's reports as well as boring and geophysical logs. Sample results are shown by analyte in Appendix B. Chemical analysis was performed by BC laboratories Inc.

Well Information Summary

The following information for Well #2 is based on technical information provided by Campo Elementary based off the Well Completion Report.

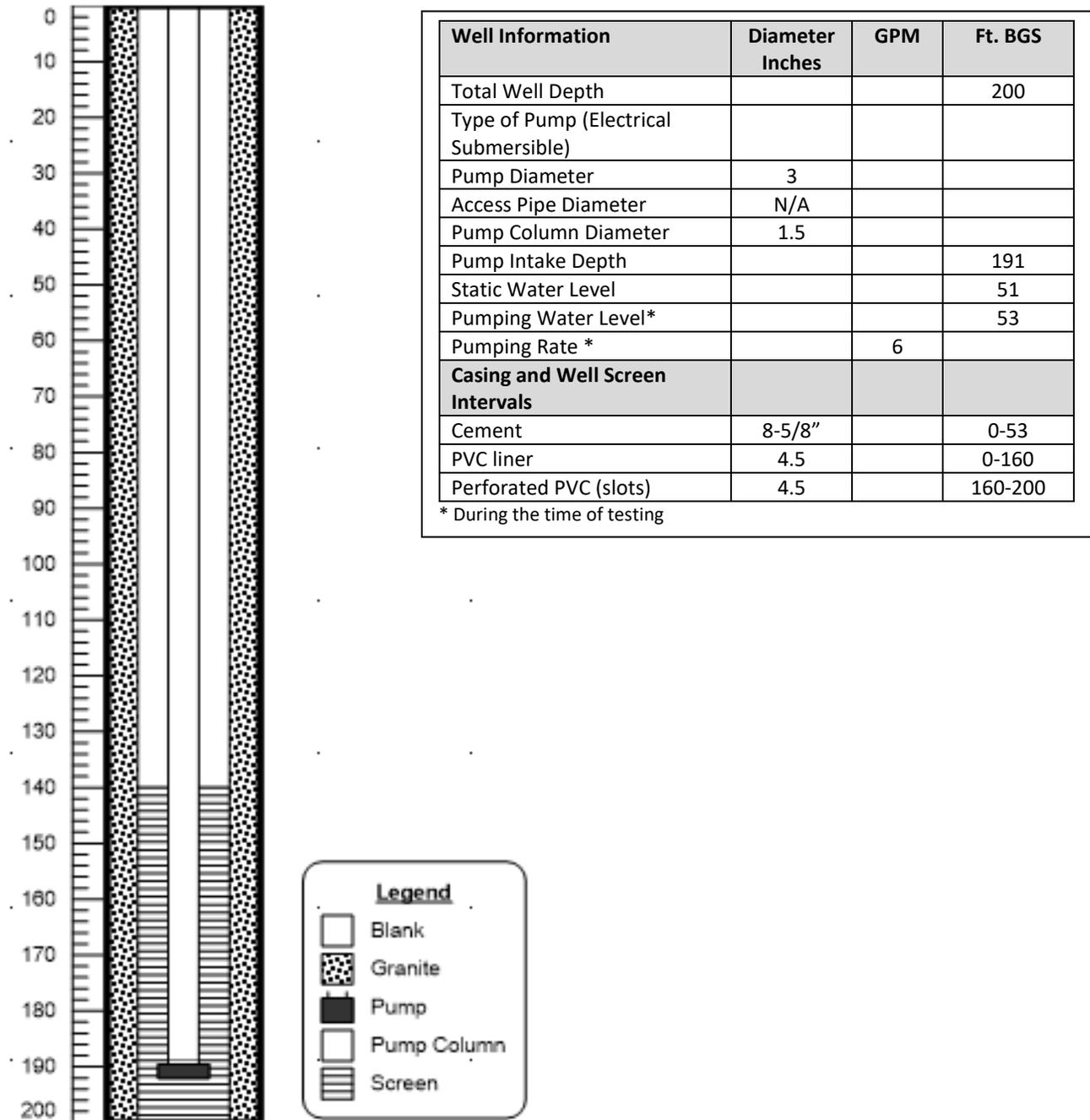


Figure 1: Campo Elementary Well #2 construction diagram and lithology based on the Well Completion Report.

Dynamic Flow Profile

The dynamic flow profile for Well #2 was performed using the USGS Tracer Pulse Dynamic Flow Profiling method to measure flow contribution along 60 feet of screened well casing. (Figures 2 through 5). The profile was conducted at an averaged flow rate of 6 gallons per minute (GPM) on 10/04/2017.

In-well flow velocities were calculated as the change in feet between injection points divided by the change in dye tracer return times (to a surface fluorometer) between sequential pairs of injection points. Once in-well, sectional velocities are calculated, the data is then used to calculate cumulative flows at each tracer injection depth. The algebraic difference between sequential cumulative flows equals the zonal flow contribution entering the well between the injection points. This calculation is performed iteratively throughout the well profile to produce the zonal flow graph shown in both GPM and percent of total contribution for each interval.

Calculations for Flow Contribution

Calculations were based upon well information provided by the client and field survey results Q_n (depth dependent cumulative flow value). Up to three measurements were collected at each discrete depth to determine an average cumulative flow.

Q_n (GPM): Depth dependent cumulative flow value

r_{cas} (Ft.): well casing inner radius

$\Delta Q_{n,n+1}$ (GPM): Zonal flow contribution between depths n and $n+1$

r_{col} (Ft.): outer radius of pump column

d_{n+1} (Ft.): upstream injection depth

V_n (Ft./min): depth dependent velocity value

d_n (Ft.): downstream injection depth

A (Ft.²): well cross-sectional area

t_{n+1} (min): return time of d_{n+1}

C : Constant conversion factor (ft³/min) to GPM

t_n (min): return time of d_n

Velocity (Ft./min)

$$1. v_n = \frac{(d_a - d_c)}{(t_b - t_c)}, \frac{(d_b - d_c)}{(t_c - t_b)}, \frac{(d_c - d_d)}{(t_d - t_c)}, \dots, \frac{(d_n - d_{n+1})}{(t_{n+1} - t_n)}$$

For depths above intake, d_n, d_{n+1}, \dots are calculated up and away from intake

$$2. v_n = \frac{(d_a - d_c)}{(t_b - t_c)}, \frac{(d_b - d_c)}{(t_c - t_b)}, \frac{(d_c - d_d)}{(t_d - t_c)}, \dots, \frac{(d_n - d_{n+1})}{(t_{n+1} - t_n)}$$

For depths below intake, d_n, d_{n+1}, \dots are calculated down and away from intake

Well Cross-Sectional Area (Ft.²)

$$3. A = [\pi(r_{cas} - r_{col})]^2 \text{ If above pumping intake}$$

$$4. A = \pi r_{cas}^2 \text{ If below pumping intake}$$

Cumulative Flow (GPM)

$$5. Q_n = (v_a * A * C), (v_b * A * C), (v_c * A * C), \dots, (v_n * A * C)$$

Zonal Flow Contribution (GPM)

$$6. \Delta Q_{n,n+1} = (Q_a - Q_b), (Q_b - Q_c), (Q_c - Q_d), \dots, (Q_n - Q_{n+1})$$

Dynamic Flow Profile Graphs

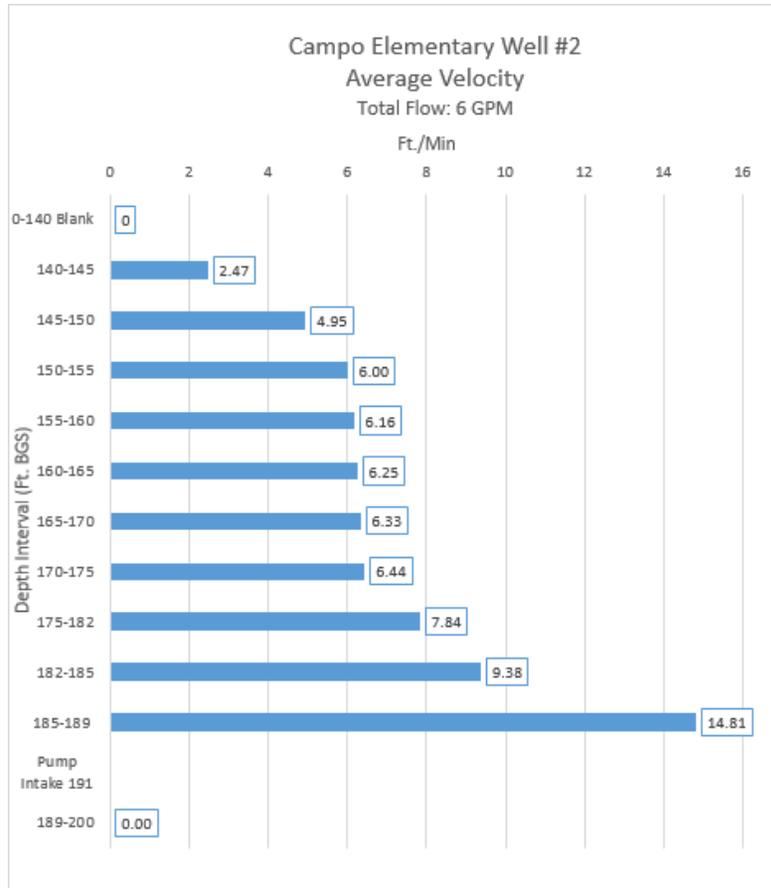


Figure 2: Campo Elementary Well #2 dynamic velocity profile

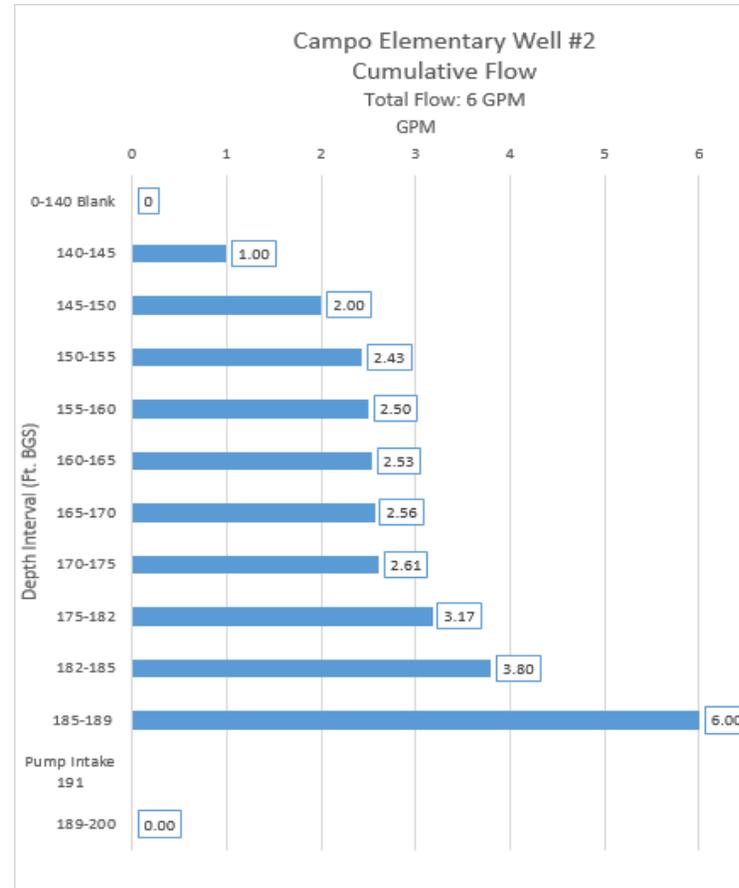


Figure 3: Campo Elementary Well #2 cumulative flow

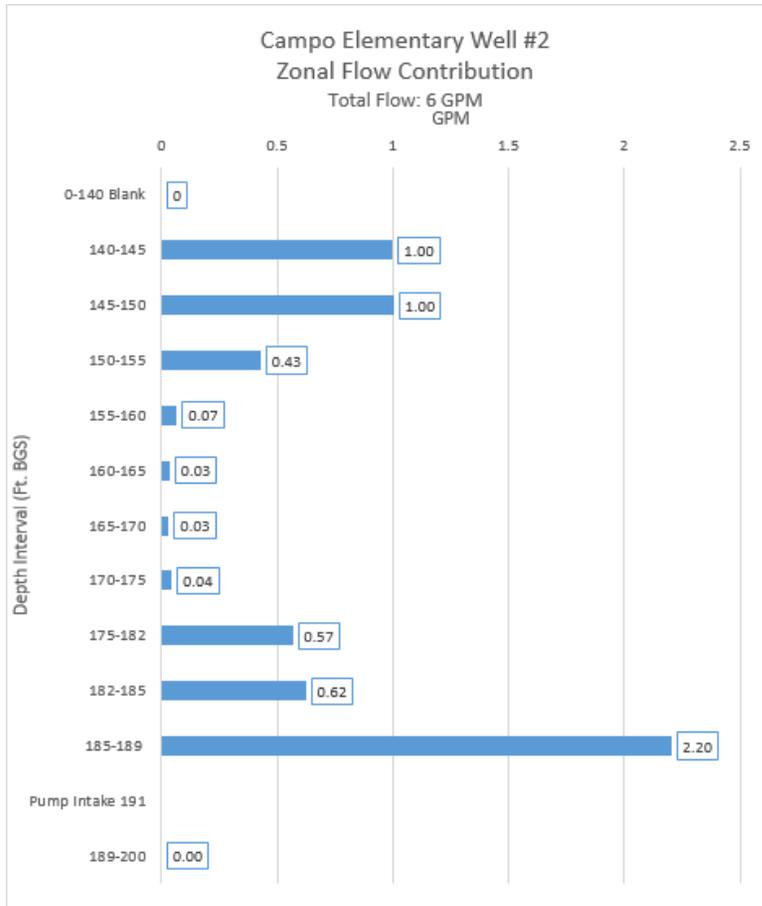


Figure 4: Campo Elementary Well #2 zonal flow contribution

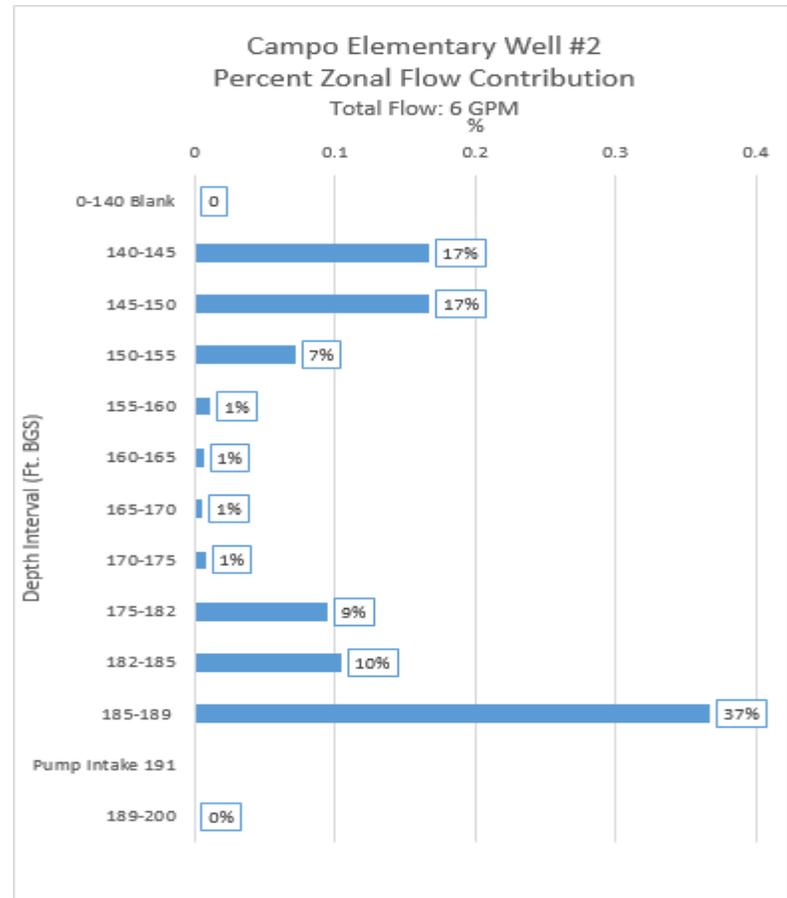


Figure 5: Campo Elementary Well #2 percent zonal flow contribution

Dynamic Chemistry Profile

Summary

The dynamic water quality sampling was performed using Hydrobooster pump. Groundwater samples were obtained by using the fast cycle, multiple full-purge and sample method. 8 samples were collected between the depths 145-189' BGS. Sampling depths were determined through assessment of the flow contribution data and available well information (Figure 1).

The reported laboratory results for each analyte are listed in Appendix B. Analytes are listed below under Water Quality Data Analytes.

The sample results are used in conjunction with the flow calculations to determine zonal water quality concentration along the perforated intervals

Water Quality Data Analytes

- Bicarbonates
- Alkalinity
- Nitrate as NO₃ and N
- Organics
- Electrical Conductivity
- Total Dissolved Solids
- Total Recoverable Metals

Flow Weighted Concentrations vs. Analytical Lab Results

The average zonal chemical contributions in the bar graphs below (Figures 6-24) are derived from applying the mass balance calculation to the cumulative contributions of flow and chemistry between any two vertically paired and consecutive water samples and then dividing by the zonal flow contribution for the same depth interval. This process is known as “flow-weighting” the data; whereby a weighted zonal average for each analyte is derived.

After the mass balance results are calculated, BESST finalizes the results by comparing the theoretical well head average concentration with the actual well head average concentration to determine the percentage of agreement between results. Analytes such as bicarbonate are used to perform a QA/QC, reverse mass balance calculation to determine the percent agreement between the theoretical and actual well head averages.

Calculations for Zonal Chemical Contribution Concentrations

Q_n (GPM)= Depth dependent cumulative flow value

$\Delta Q_{n,n+1}$ (GPM)= Zonal flow contribution between depths n and n+1

C_n = Depth dependent lab concentration value

$\Delta C_{n,n+1}$ = Zonal chemical concentration between depths n and n+1

$$7. \Delta C_{n,n+1} = \frac{(Q_a * C_a) - (Q_b * C_b)}{(\Delta Q_{ab})}, \frac{(Q_b * C_b) - (Q_c * C_c)}{(\Delta Q_{bc})}, \frac{(Q_c * C_c) - (Q_d * C_d)}{(\Delta Q_{cd})}, \frac{(Q_n * C_n) - (Q_{n+1} * C_{n+1})}{(\Delta Q_{n,n+1})}$$

Calculations for Theoretical Average Analyte Chemistry

C_{tot} = Composite sample collected at Well head tap.

C_{avg} = Average analyte chemistry for all depth intervals to the nth degree.

Q_{tot} = Total cumulative discharge flowing out of the Well.

Theoretical Average Chemical Concentration

$$8. C_{avg} = \frac{(\Delta Q_{ab} * \Delta C_{ab}) + (\Delta Q_{bc} * \Delta C_{bc}) + (\Delta Q_{cd} * \Delta C_{cd}) + \dots + (\Delta Q_{n,n+1} * \Delta C_{n,n+1})}{Q_{tot}}$$

Zonal Chemical Contribution Graphs

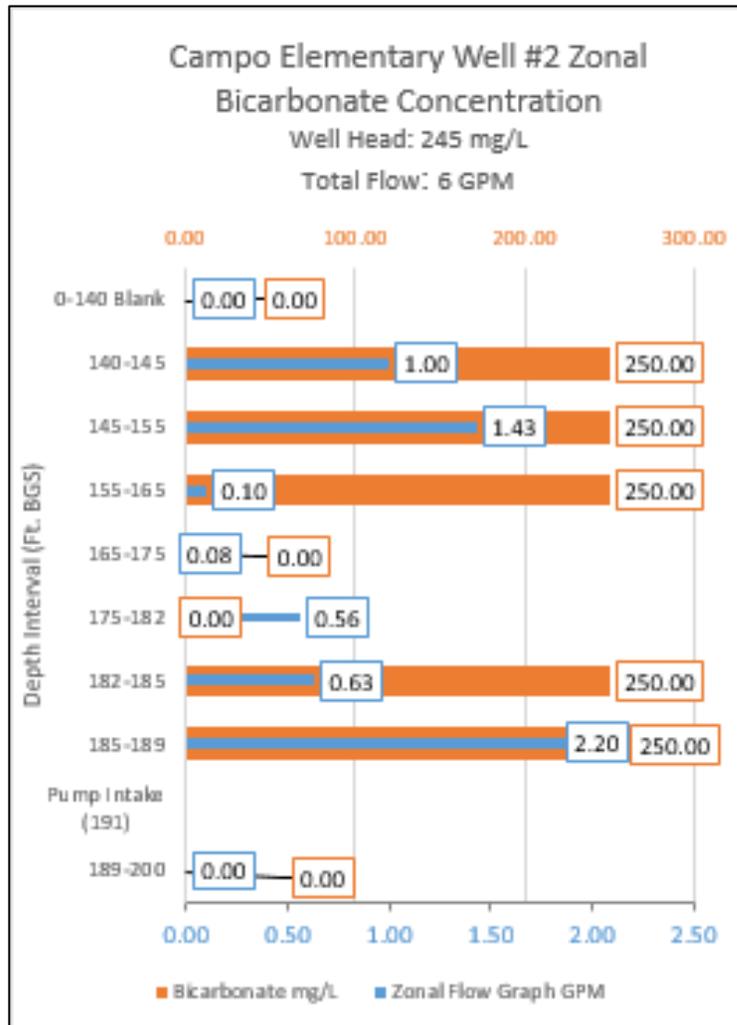


Figure 6: Campo Elementary Well #2 zonal bicarbonate concentration

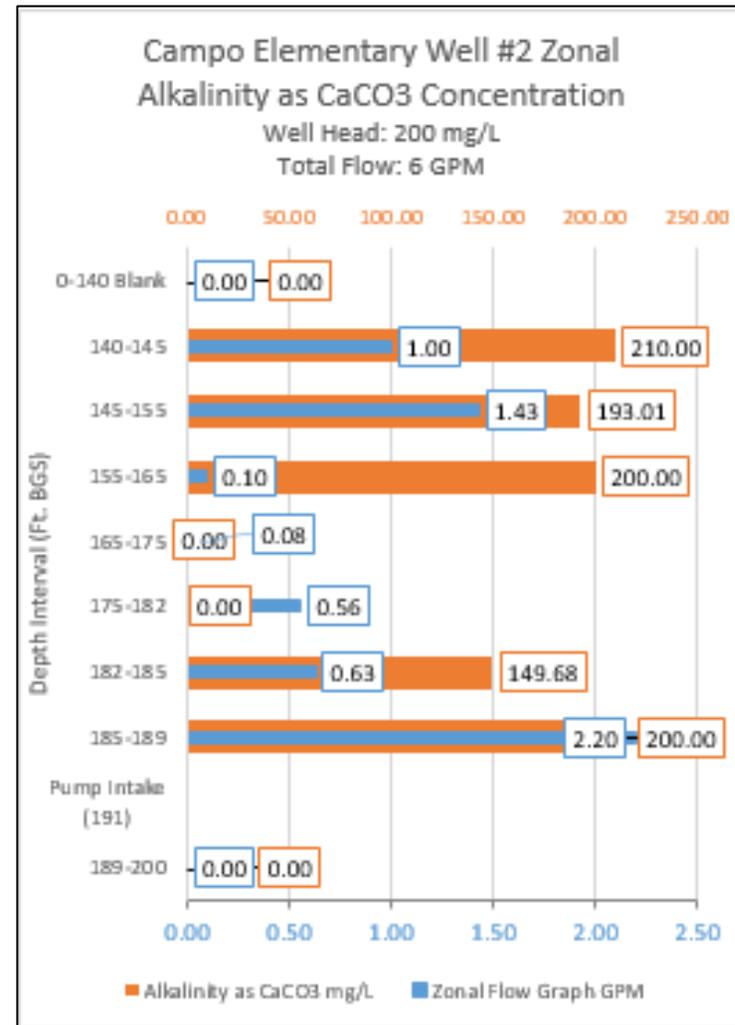


Figure 7: Campo Elementary Well #2 zonal alkalinity values

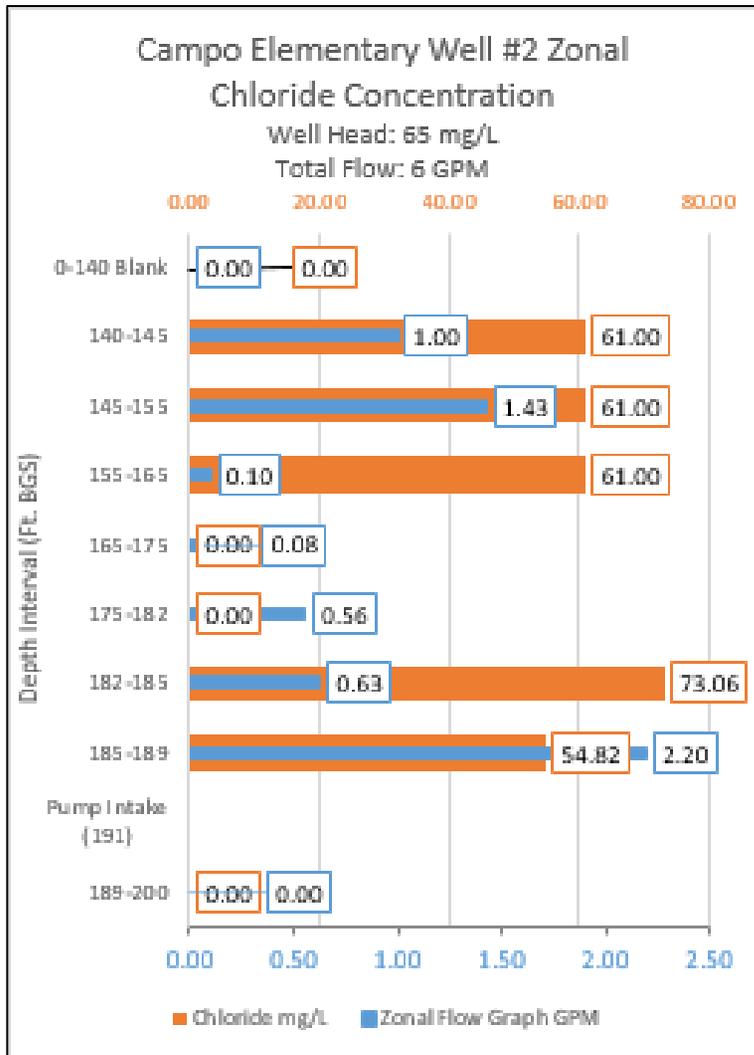


Figure 8: Campo Elementary Well #2 zonal chloride concentration

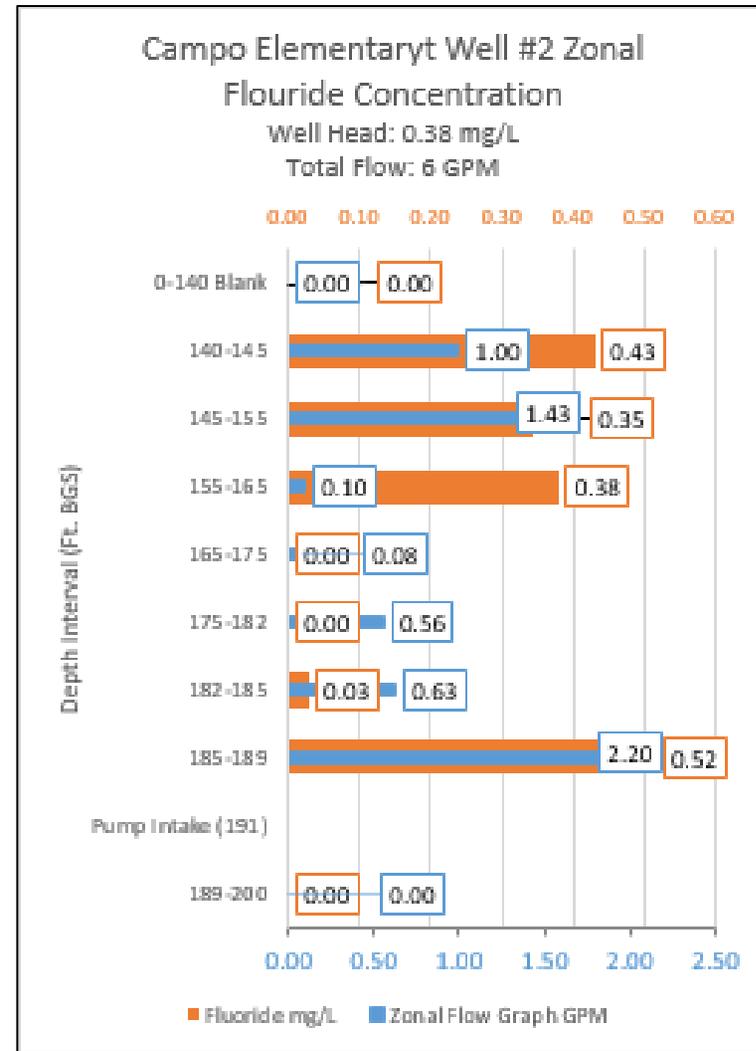


Figure 9: Campo Elementary Well #2 zonal fluoride concentration

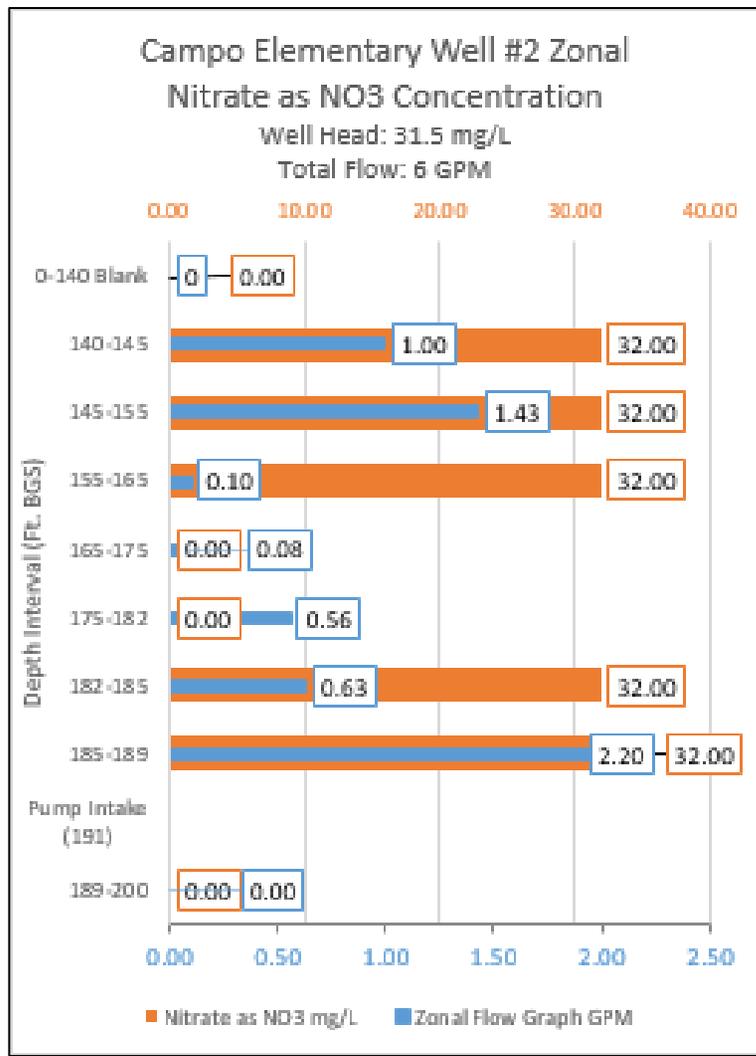


Figure 10: Campo Elementary Well #2 zonal nitrate as NO3 concentration

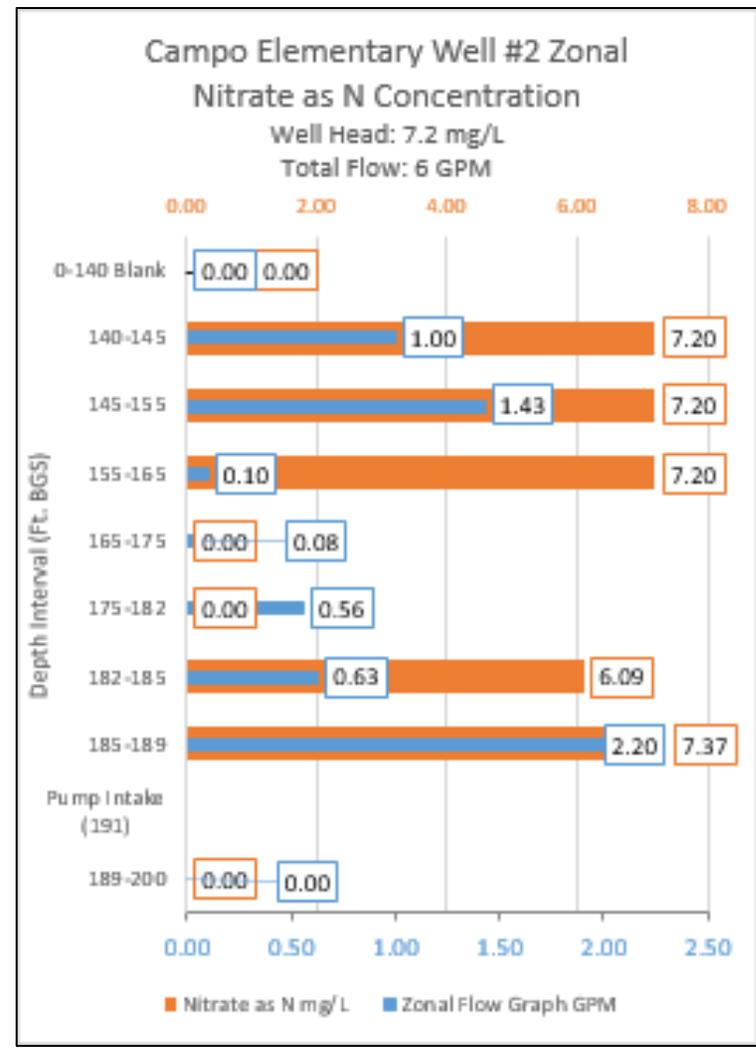


Figure 11: Campo Elementary Well #2 zonal nitrate as N concentration

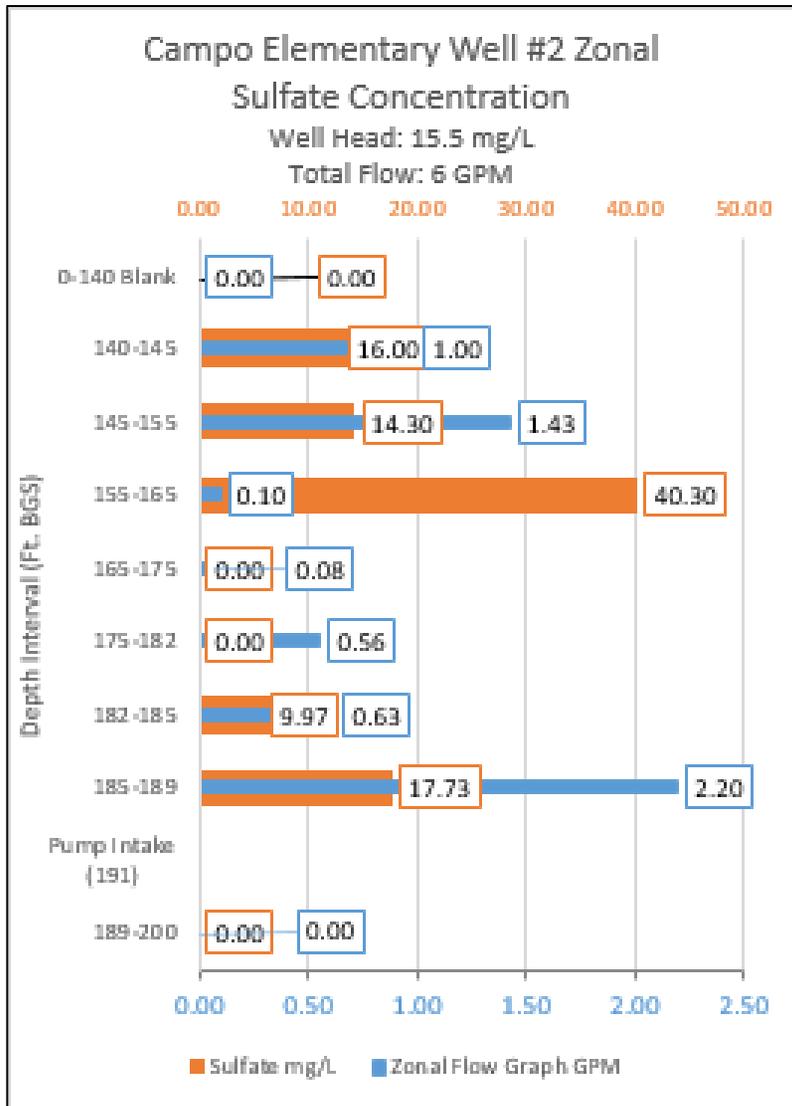


Figure 12: Campo Elementary Well #2 zonal sulfate concentration

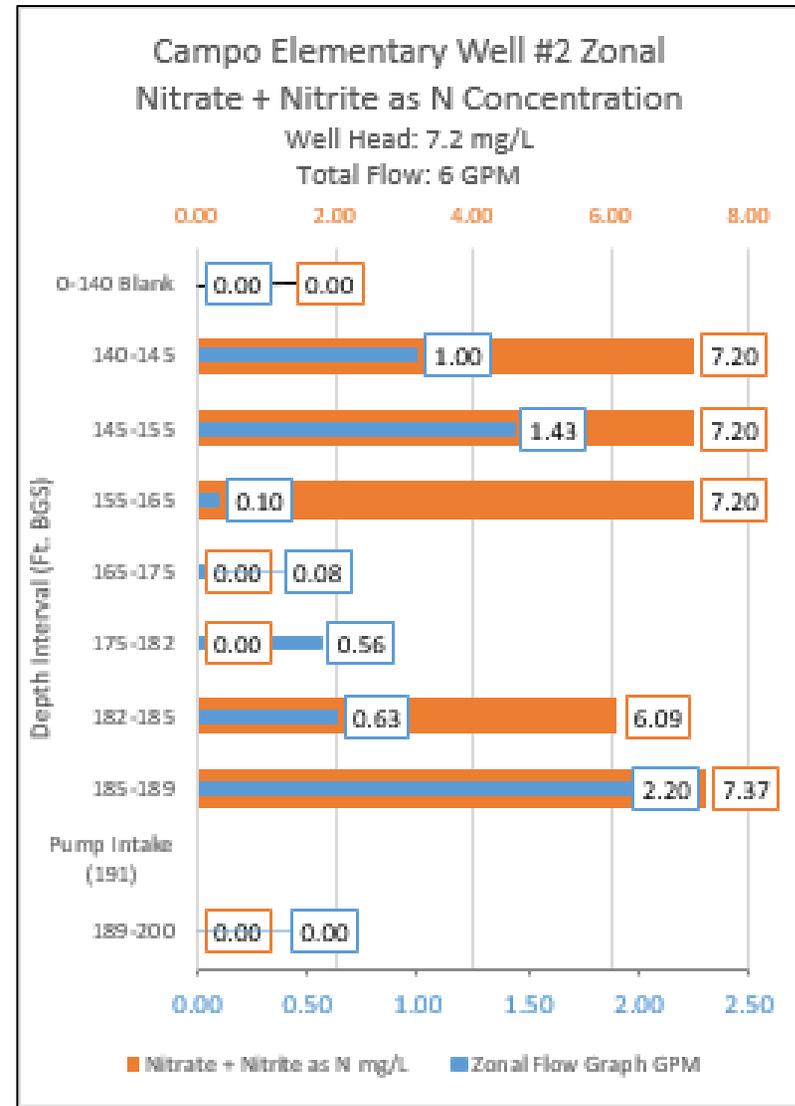


Figure 13: Campo Elementary Well #2 zonal nitrate + nitrite as N concentration

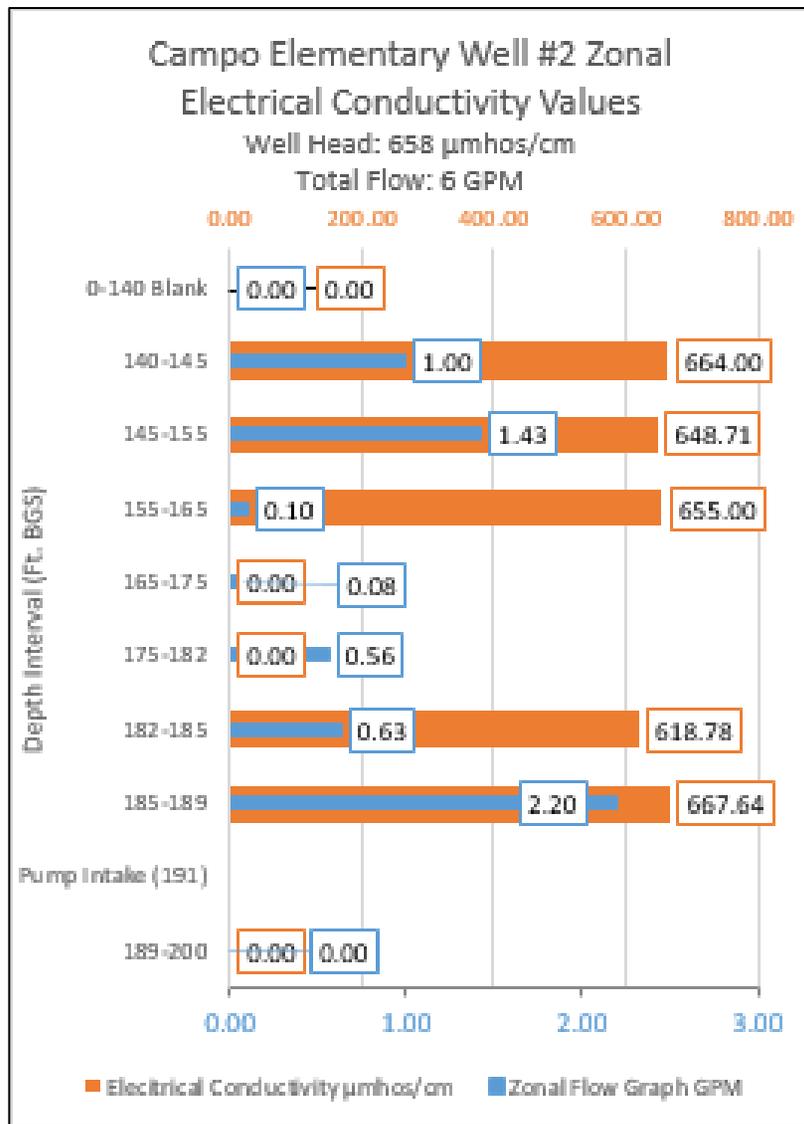


Figure 14: Campo Elementary Well #2 zonal electrical conductivity values

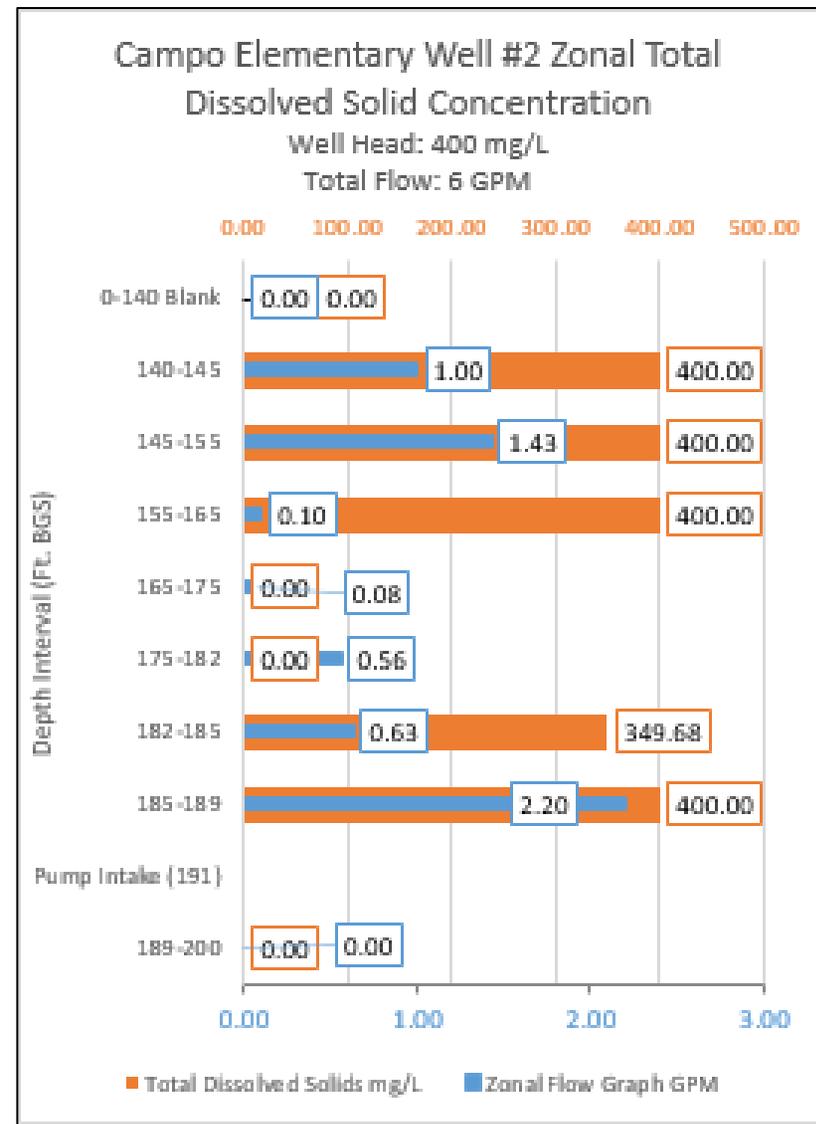


Figure 15: Campo Elementary Well #2 zonal total dissolved solid concentration

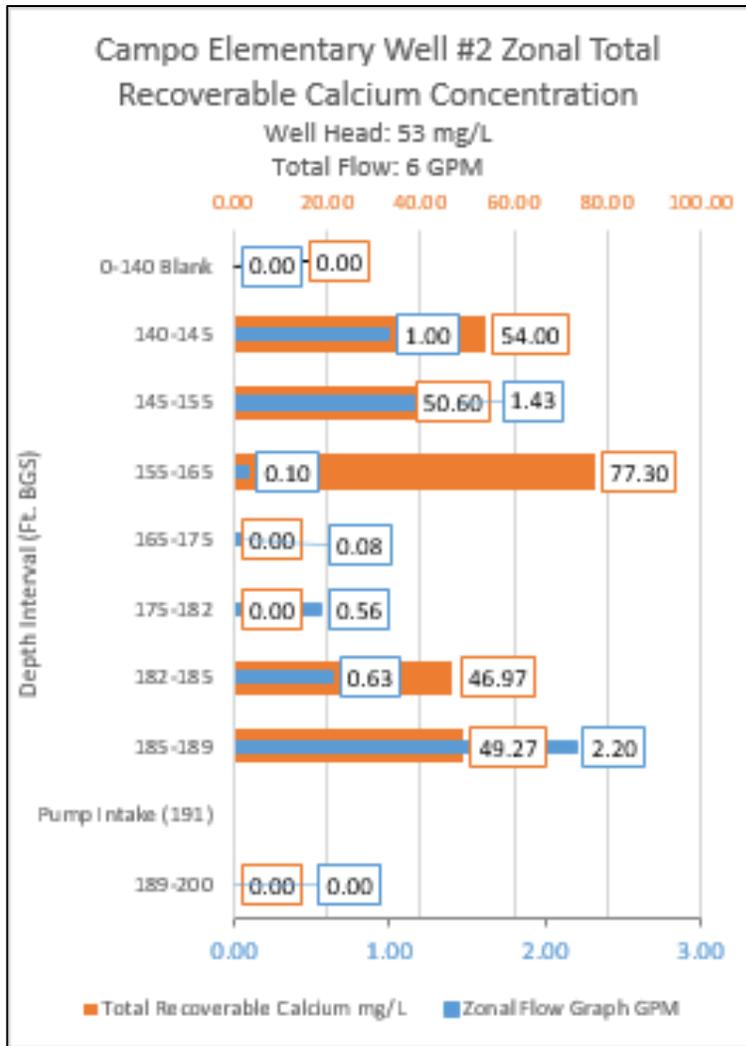


Figure 16: Campo Elementary Well #2 zonal total recoverable calcium concentration

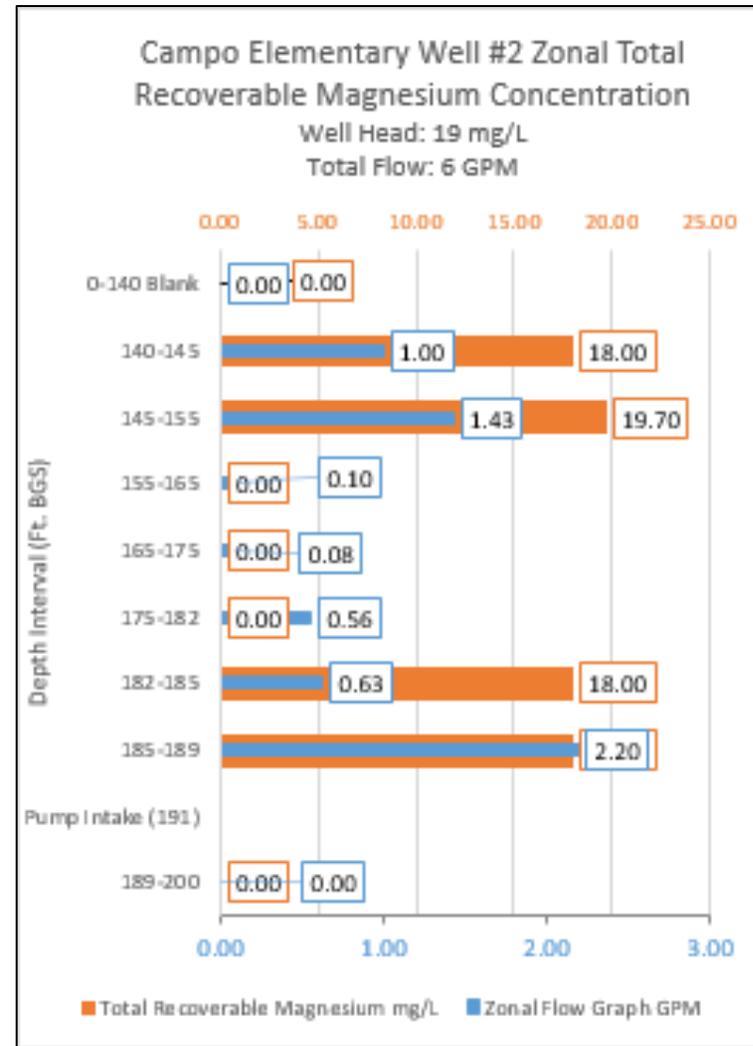


Figure 17: Campo Elementary Well #2 zonal total recoverable magnesium concentration

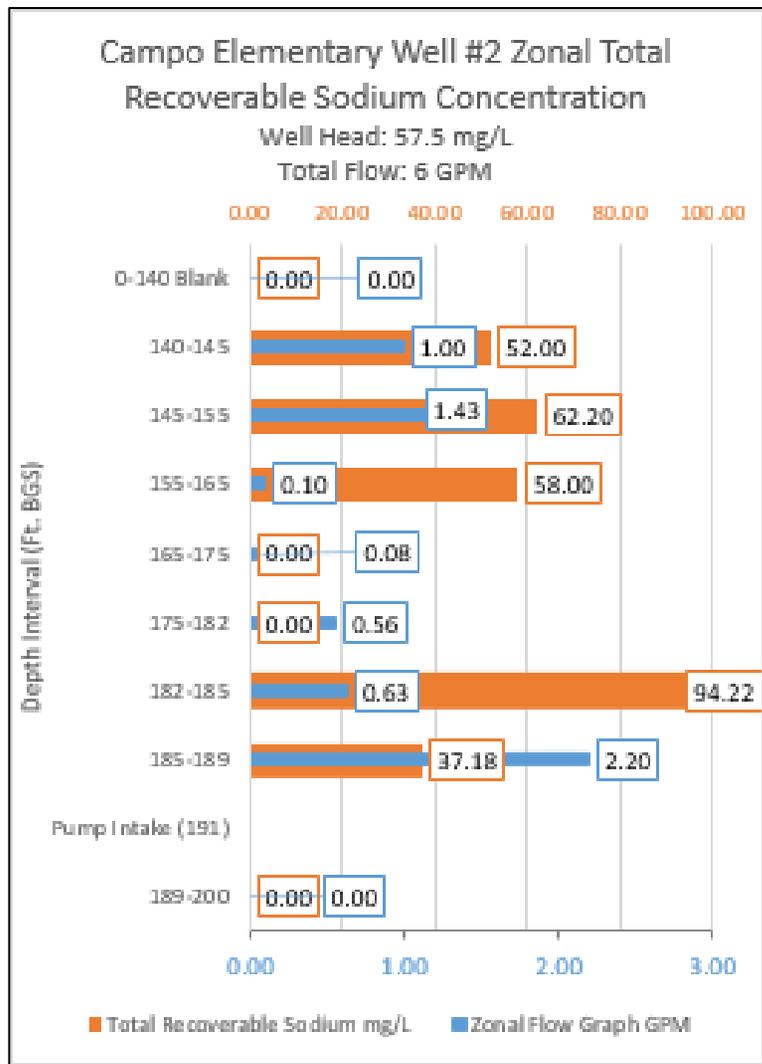


Figure 18: Campo Elementary Well #2 zonal total recoverable sodium concentration

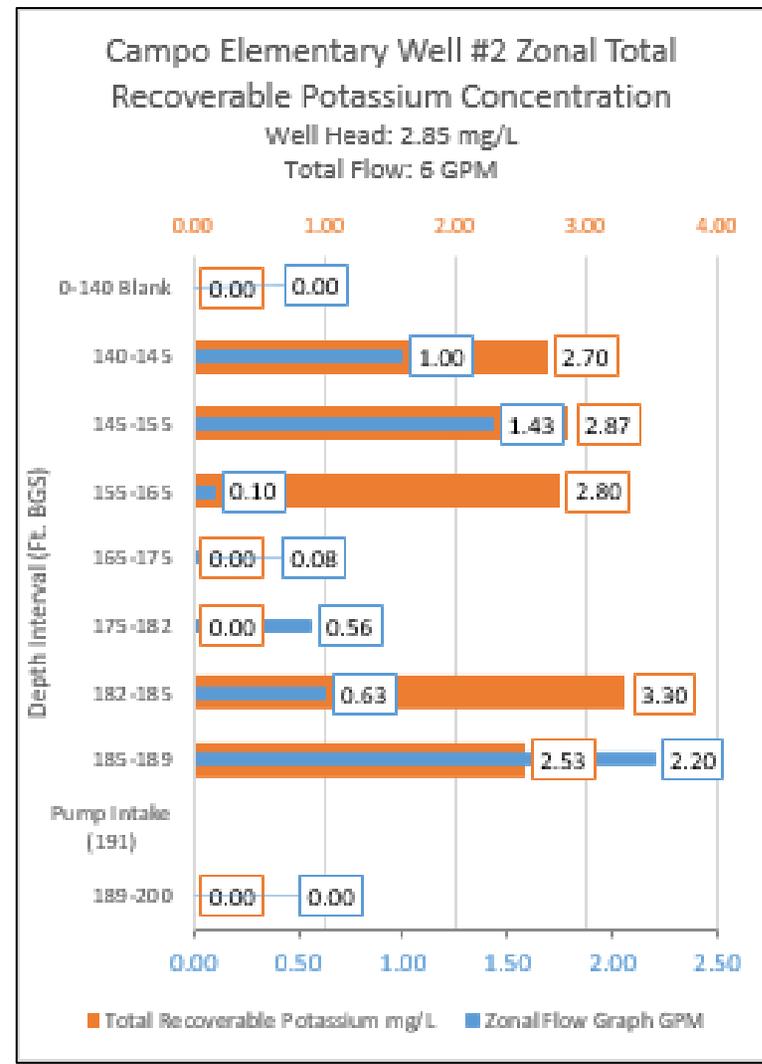


Figure 19: Campo Elementary Well #2 zonal total recoverable potassium concentration

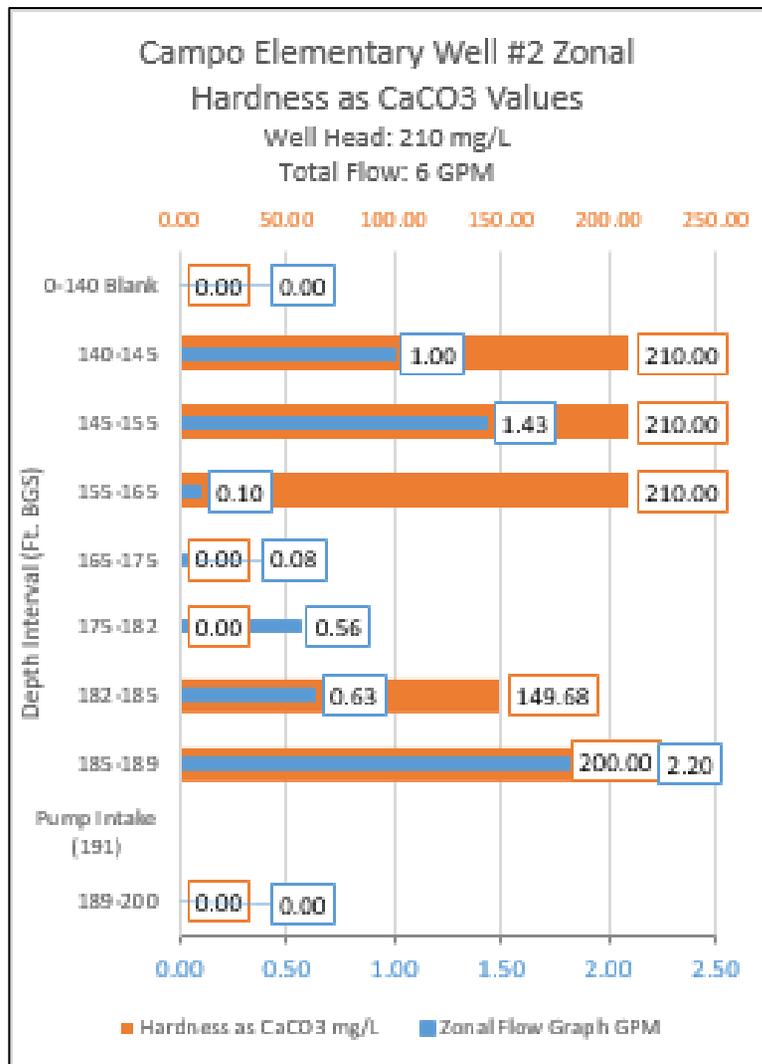


Figure 20: Campo Elementary Well #2 zonal hardness as CaCO3 concentration

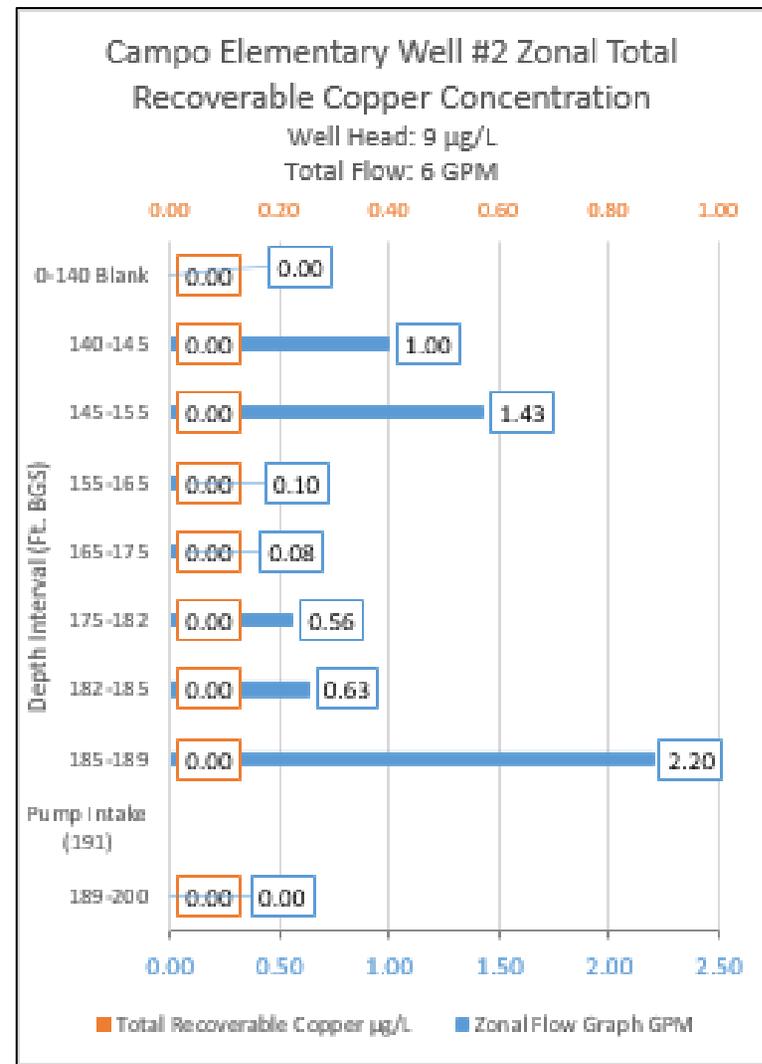


Figure 21: Campo Elementary Well #2 zonal total recoverable copper concentration

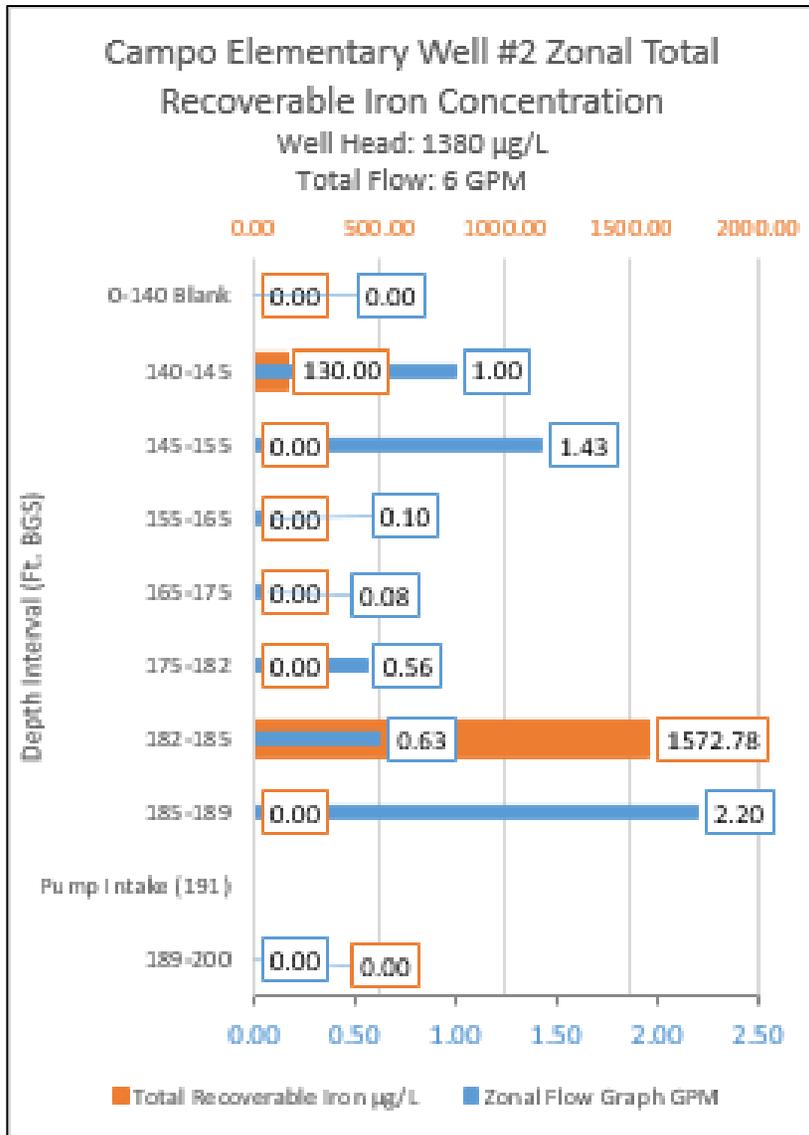


Figure 22: Campo Elementary Well #2 zonal total recoverable iron concentrations

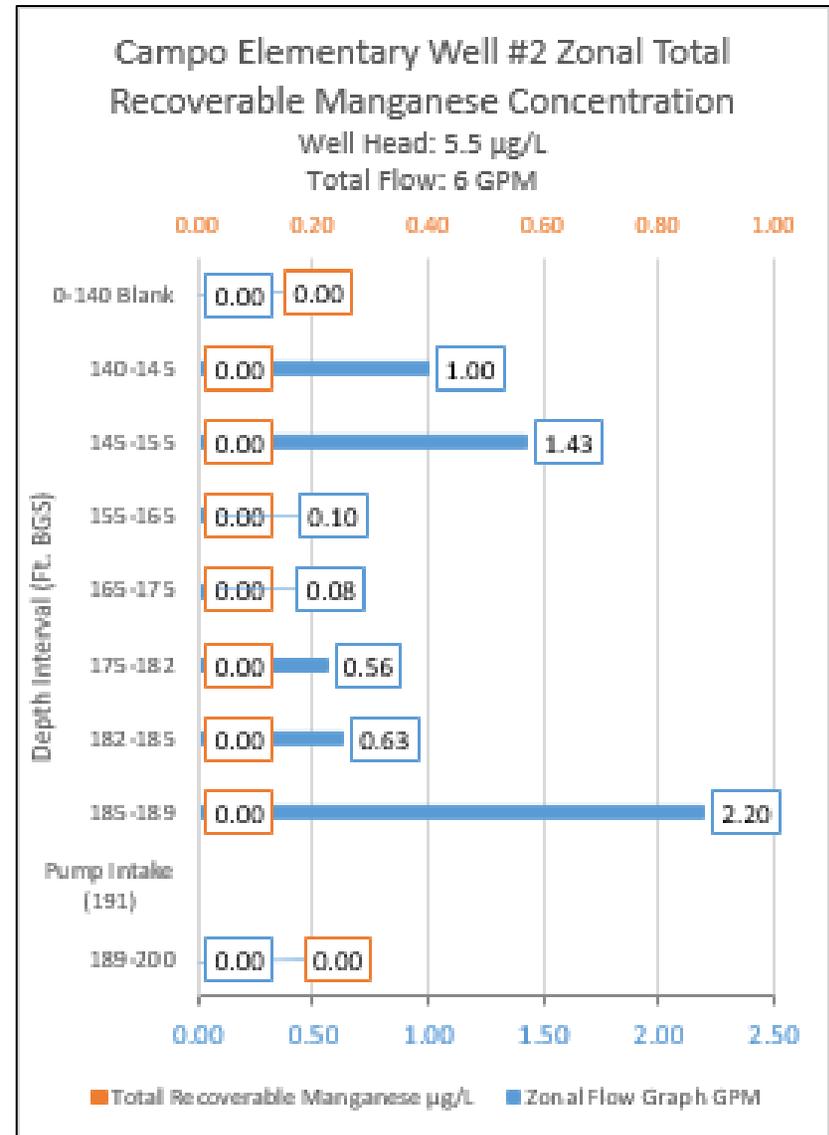


Figure 23: Campo Elementary Well #2 zonal total recoverable manganese concentration

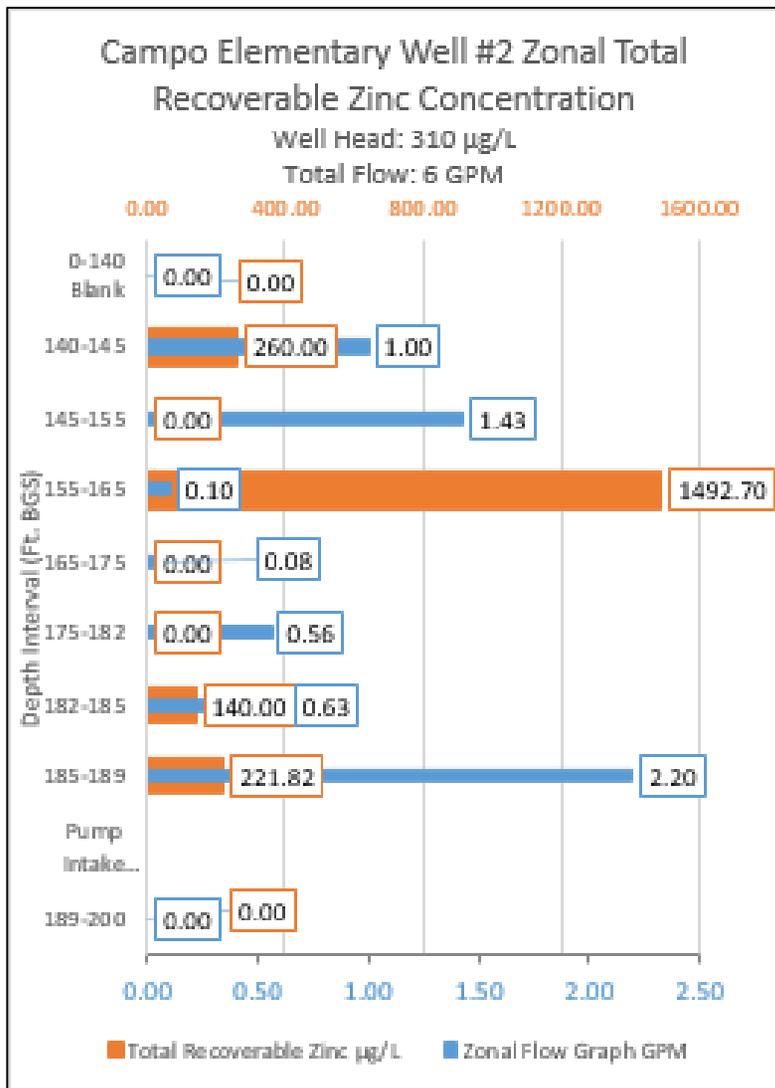


Figure 24: Campo Elementary Well #2 zonal total recoverable zinc concentration

Results and Conclusions

Campo Elementary School Well #2 consists of a 4.5" ID PVC casing that extends to a depth of 200 feet BGS. The PVC casing was set inside a 6" borehole that was drilled through fractured crystalline bedrock. BESST performed a video survey and determined that the depths from 140-200' BGS had 1/8" slots in the PVC. A 3" standard electric submersible pump was positioned at 191' BGS within the PVC well screen and pumped at 6 GPM during the test.

Results from the dynamic flow profile generally show two water producing zones along the length of the well screen. The upper zone stretches from 140-155' BGS, and produces about 41% of the wells yield. The second bottom zone is located from 175-189' BGS and produces 56% of the flow. The major inflow portions of the well correlates fairly well with the two fractured bedrock intervals that are documented in the well completion report. The upper fractured zone in the well completion report is called out from 133'-135' bgs. and the lower fracture zone identified from 163-165' BGS. Albeit that they are not exactly correlative, it is also possible that fracture intervals are not always easily identified in drilled rock chip samples from crystalline bedrock since they are sometimes quite fine (thin).

It's important to note that our survey reported little to no groundwater produced from below the pump. This is not too surprising in that no fractures were reported in the drillers log for the interval from 189 to 200 feet bgs. If fractures are present, then we can at least surmise that they are non productive.

From a water quality perspective, there are two analytes of concern. The first is iron and is of immediate concern and the second is nitrate which is elevated but not exceeding the mcl. The secondary MCL for iron is 0.3 mg/L and for comparison, the well head concentration reported for the dynamic test was 1.38 mg/L (1380 ug/L); slightly more than 4x the secondary mcl. Fortunately, the zonal location of the iron is stratigraphically limited to the interval between 182-185 feet bgs. Looking the nitrate data we can see that virtually the entire stratigraphic section around the well screen is impacted; with Nitrate as NO₃ and N approximately 32 and 7.2 mg/L, respectively throughout. Although there is a zinc spike located between 155-165 feet bgs., the zonal concentration is still far below the secondary mcl of 5 mg/L (5000 ug/L).

In terms of iron, we also have to consider other sources besides the formation. Since the well is made of PVC, we can certainly rule out casing scale as a cause of the iron spike. However, the pump column provided for the test was made from low carbon steel and could potentially be a source of an iron "nugget" effect. However, if the elevated iron did result from a nugget effect, from rusty pump column, then why was it associated with only one interval during the survey? In order to alleviate the uncertainty about this issue, it would be useful to go back and take a look at the historical well head concentrations for iron over the past couple of years. If present, then we can conclude that the issue is formational. If not, then we can conclude that the survey encountered a one-off nugget effect during the survey.

Recommendations

We believe that the first order of business would be to go back and look at historical concentrations for iron over the past two years. As mentioned above, if we see a similar concentration trend at the well head, then we can conclude that the presence of iron is a formational issue. If not, then we can conclude that it was an aberrant sampling event resulting from a nugget effect.

If iron is formational, then a simple solution to remove this problem would be to install a straddle packer from 180 to 185 feet bgs.; thereby avoiding iron treatment. The recommendation section for Well 1 provides many details as to how this would generally be accomplished.

Additional Thoughts (Nitrate)

The combined collective data from the Well 1 and Well 2 survey strongly suggest that the entire site between and around Wells 1 and 2 is impacted with nitrate. The depth of nitrate occurrence in Well 2 can be used as a predictor tool for what we can expect to find in the fractured bedrock from 135 to 200 feet bgs. in Well 2. The 28 mg/L nitrate (NO₃) that was detected in the deepest water sample obtained from Well 1 is similar enough to the 32 mg/L found through Well 2 to suggest that the nitrate is widespread at depth throughout the site. It also suggests that below 135 feet bgs. in Well 1, we should not expect to see an increase in nitrate concentrations with depth – and although elevated, the groundwater should be compliant as a potable water supply.

Appendix A: Dynamic Flow Profile Data

Table 1: Campo Elementary Well #2 dynamic flow profile data

Dynamic Flow Profile Data					
Depth Interval	Average Velocity	Cumulative Flow	Zonal Flow		Samples
			Ft. BGS	Ft./min	
0-140 Blank	0.00	0.00	0.00	0%	
140-145	2.47	1.00	1.00	17%	145
145-150	4.95	2.00	1.00	17%	
150-155	6.00	2.43	0.43	7%	155
155-160	6.16	2.50	0.07	1%	
160-165	6.25	2.53	0.03	1%	165
165-170	6.33	2.56	0.03	1%	
170-175	6.44	2.61	0.04	1%	175
175-182	7.84	3.17	0.57	9%	182
182-185	9.38	3.80	0.62	10%	185
185-189	14.81	6.00	2.20	37%	189
Pump Intake 191					
189-200	0.00	0.00	0.00	0%	

Appendix B: Laboratory Data

Table 2: Campo Elementary Well #2 laboratory data

LAB RESULTS		Analytes																		
SAMPLE #	Sample Depth	Bicarbonate	Alkalinity as CaCO3	Chloride	Fluoride	Nitrate as NO3	Nitrate as N	Sulfate	Nitrate + Nitrite as N	Electrical Conductivity	Total Dissolved Solids	Total Recoverable Calcium	Total Recoverable Magnesium	Total Recoverable Sodium	Total Recoverable Potassium	Hardness as CaCO3	Total Recoverable Copper	Total Recoverable Iron	Total Recoverable Manganese	Total Recoverable Zinc
Unit	Ft. BGS	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L
RL	-	5.00	4.10	0.50	0.05	0.44	0.10	1.00	0.1000	1.000	33.000	0.100	0.050	0.500	1.000	0.5000	10.000	50.0000	10.0000	50.0000
1	WH #1	240	200	69.00	0.39	31.0	7.1	15	7.1000	659	410	54.000	19	62.0000	2.900	210.000	18	2500	11	460.0000
10	WH #2	250	200	61.00	0.37	32.0	7.3	16	7.3000	657	390.00	52.000	19	53.0000	2.800	210.000	0.0	260	0	160.0000
N/A	WH avg	245	200	65	0	32	7	16	7	658	400	53	19	58	3	210	9	1380	6	310
2	145	250	210	61.0	0.43	32.0	7.2	16	7.2000	664	400	54.000	18	52.0000	2.700	210.000	0	130	0	260.0000
3	155	250	200	61.00	0.38	32.0	7.2	15	7.2000	655	400	52.000	19	58.0000	2.800	210.000	0	0	0	0.0000
4	165	250	200	61.00	0.38	32.0	7.2	16	7.2000	655	400	53.000	18	58.0000	2.800	210.000	0	0	0	59.0000
5	175	250	200	61.00	0.38	32.0	7.2	15	7.2000	658	400	53.000	18	59.0000	2.800	210.000	0	0	0	58.0000
6	182	250	210	61.00	0.45	32.0	7.3	16	7.3000	661	410	53.000	18	52.0000	2.700	210.000	0	95	0	140.0000
7	185	250	200	63.00	0.38	32.0	7.1	15	7.1000	654	400.00	52.000	18	59.0000	2.800	200.000	0	340	0	140.0000
8	189	250	200	60.00	0.43	32.0	7.2	16	7.2000	659	400	51.000	18	51.0000	2.700	200.000	0	58	0	170.0000

MASS BALANCE		Flow Data				Analytes																		
Sample Depth	Depth Interval	Cumulative Flow	Zonal Flow			Bicarbonate	Alkalinity as CaCO3	Chloride	Fluoride	Nitrate as NO3	Nitrate as N	Sulfate	Nitrate + Nitrite as N	Electrical Conductivity	Total Dissolved Solids	Total Recoverable Calcium	Total Recoverable Magnesium	Total Recoverable Sodium	Total Recoverable Potassium	Hardness as CaCO3	Total Recoverable Copper	Total Recoverable Iron	Total Recoverable Manganese	Total Recoverable Zinc
Ft. BGS	Ft. BGS	GPM	GPM	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Reporting Limit					5.000	4.100	0.500	0.050	0.440	0.100	1.000	0.100	1.000	33.000	0.100	0.050	0.500	1.000	0.500	1.000	10.000	50.000	10.000	50.000
Well Head #1					240.000	200.000	69.000	0.390	31.000	7.100	15.000	7.100	659.000	410.000	54.000	19.000	62.000	2.900	210.000	18.000	2500.000	11.000	460.000	
Well Head #2					250.000	200.000	61.000	0.370	32.000	7.300	16.000	7.300	657.000	390.000	52.000	19.000	53.000	2.800	210.000	0.000	260.000	0.000	160.000	
Actual Well Head Average					245.000	200.000	65.000	0.380	31.500	7.200	15.500	7.200	658.000	400.000	53.000	19.000	57.500	2.850	210.000	9.000	1380.000	5.500	310.000	
Theoretical Well Head Average					223	173	53.5	0.35	28.6	6.4	14	6.3792	585.963	352.05	45.347	16.2	47.9833	2.454	177.600	0.0	186.8083	0.0000	164.2450	
Percent Difference					10%	15%	22%	8%	10%	13%	8%	13%	12%	14%	17%	17%	20%	16%	18%	#DIV/0!	639%	#DIV/0!	89%	
WH	>140 Blan	0	0	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
145	140-145	1	1	17%	250.0	210.0	61.0	0.4	32.0	7.2	16.0	7.2	664.0	400.0	54.0	18.0	52.0	2.7	210.0	0.0	130.0	0.0	260.0	
155	145-155	2	1	24%	250.0	193.0	61.0	0.3	32.0	7.2	14.3	7.2	648.7	400.0	50.6	19.7	62.2	2.9	210.0	0.0	0.0	0.0	0.0	
165	155-165	3	0	2%	250.0	200.0	61.0	0.4	32.0	7.2	40.3	7.2	655.0	400.0	77.3	0.0	58.0	2.8	210.0	0.0	0.0	0.0	1492.7	
175	165-175	3	0	1%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
182	175-182	3	1	9%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
185	182-185	4	1	11%	250.0	149.7	73.1	0.0	32.0	6.1	10.0	6.1	618.8	349.7	47.0	18.0	94.2	3.3	149.7	0.0	1572.8	0.0	140.0	
189	185-189	6	2	37%	250.0	200.0	54.8	0.5	32.0	7.4	17.7	7.4	667.6	400.0	49.3	18.0	37.2	2.5	200.0	0.0	0.0	0.0	221.8	
		Pump Intake (191)																						
	189-200	0	0	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Appendix C: Zonal Chemical Contribution Data

Table 3: Campo Elementary Well #2 zonal chemical contribution data

North Well # 1

Notice of intent 57204 STATE OF CALIFORNIA
Requirements WDR + DWELL COMPLETION REPORT
3 8/5/91
11 No. 1 Began 6/28/91 Ended 7/11/91 No. 491663
Permit Agency San Diego County Health Services
Permit No. W 61451R Permit Date 6/24- Ext. 8363

WELL OWNER USE ONLY - DO NOT FILL IN
STATE WELL NO./STATION NO
LATITUDE LONGITUDE
APN TRS/OTHER

GEOLOGIC LOG WELL OWNER
Name Mountain Empire U.S.D.
Mailing Address 3291 Buckman Springs Rd.
Pine Valley, Ca. 92062
CITY STATE ZIP
WELL LOCATION
Address 1654 Buckman Springs Road
City Campo, Ca. 92006
County San Diego
APN Book 655 Page 030 Parcel 30
Township 18S Range 5E Section 4
Latitude Longitude
LOCATION SKETCH NORTH SOUTH
Completed well construction 8/7/91
Date inspected 7/30/91
Comments observed installation
Water Sample taken? YES
Sanitarian's approval: [Signature]
ACTIVITY ()
NEW WELL
MODIFICATION REPAIR
Deepen
Other (Specify)
DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
PLANNED USE(S)
MONITORING
WATER SUPPLY
Domestic
Public
Irrigation
Industrial
"TEST WELL"
CATHODIC PROTECTION
OTHER (Specify)
Community
DRILLING METHOD FLUID
WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH OF STAIN 10' 8"
WATER LEVEL (Ft.) & DATE MEASURED 7/16/91
ESTIMATED YIELD 15.31 (GPM) & TEST TYPE air-lift pump
TEST LENGTH 3 (Hrs.) TOTAL DRAWDOWN 4' 1" (Ft.)
* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	CASING(S)						ANNULAR MATERIAL			
		TYPE ()	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	DEPTH FROM SURFACE Ft. to Ft.	CE-MENT ()	BEN-TONITE ()	FILL ()	FILTER PACK (TYPE/SIZE)
0 to 52	12"	X	steel	8 5/8"	.250		0 to 52	XX			type 1
0 to 200	6"	X	PVC liner	4 1/2"	cl.160						

- ATTACHMENTS ()
- Geologic Log
 - Well Construction Diagram
 - Geophysical Log(s)
 - Soil/Water Chemical Analyses
 - Other
- ATTACH ADDITIONAL INFORMATION, IF IT EXISTS

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

Acme Drilling Co. Inc.
NAME (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
748 S. Vinewood Street-Suite B-Escondido, Ca. 92029-1929
ADDRESS CITY STATE ZIP
Signed Robert [Signature] 7/24/91 526886
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN, TRS, OTHER

Local Requirements

2 of 3

Owner's Well No. #1

No. 491664

Date Work Began 6/28/91, Ended 7/11/91

Local Permit Agency San Diego County Health Services

Permit No. W 61451R Permit Date 6/24/91-Extension

GEOLOGIC LOG

WELL OWNER

ORIENTATION (✓)		DEPTH TO FIRST WATER 58 (Ft.) BELOW SURFACE		DESCRIPTION <i>Describe material, grain size, color, etc.</i>
X VERTICAL				
DEPTH FROM SURFACE				
Ft.	to	Ft.		
158	165	158	165	Salt & pepper Granite
165	178	165	178	Numerous fractures in above w/ some Clay
178	193	178	193	Fractured weathered Granite
193	200	193	200	Salt & pepper Granite
200	207	200	207	Pink, orange Granite
207	256	207	256	Salt & pepper Granite
256	257	256	257	Fracture green, tan staining in salt & pepper Granite
257	260	257	260	Salt & pepper Granite
260		260		Fracture
260	262	260	262	Salt & pepper Granite
262	263	262	263	Fracture
263	274	263	274	Salt & pepper Granite
274	275	274	275	Fracture
275	280	275	280	Salt & pepper Granite
280		280		Small fracture
280	290	280	290	Salt & pepper Granite
290	298	290	298	Weathered, fractured s & p Granite
298	305	298	305	Salt & pepper Granite
305		305		Fracture
305	330	305	330	Salt & pepper Granite
330	332	330	332	Fractures in above
332	362	332	362	Salt & pepper Granite
362	378	362	378	Weathered Salt & pepper Granite
378	504	378	504	As above-several fractures & altered Granite
504	562	504	562	Salt & pepper Granite
562	563	562	563	Fracture-orange, tan weathered Granite

Name Mountain Empire U.S.D.
Mailing Address 3291 Buckman Springs Road
Pine Valley, Ca. 92062
CITY STATE ZIP

WELL LOCATION
Address 1654 Buckman Springs Road
City Campo,
County San Diego
APN Book 655 Page 030 Parcel 30
Township 18S Range 5E Section 4
Latitude Longitude

LOCATION SKETCH
NORTH SOUTH
Completed well construction
Date
Date inspected
Comments Observed inside
Water Sample taken?
Sanitarian's approval:
Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)
X NEW WELL
MODIFICATION/REPAIR
Deepen
Other (Specify)
DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
PLANNED USE(S)
MONITORING
WATER SUPPLY
Domestic
Public
Irrigation
Industrial
"TEST WELL"
CATHODIC PROTECTION
OTHER (Specify)
Community

DRILLING METHOD Air FLUID
WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH OF STATIC WATER LEVEL 40'8" (Ft.) & DATE MEASURED 7/16/91
ESTIMATED YIELD 31 (GPM) & TEST TYPE Pumped
TEST LENGTH 3 (Hrs.) TOTAL DRAWDOWN 34'1" (Ft.)
* May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING 800 (Feet)
TOTAL DEPTH OF COMPLETED WELL 120 Feet

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)					
		TYPE (✓)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	
Ft.	to	Ft.					
0	52	12"	X	steel	8 5/8	.250	
0	120	6"	X	PVC liner	4 1/2	cl.160	

DEPTH FROM SURFACE	ANNULAR MATERIAL		
	TYPE	CEMENT-BENTONITE FILL (✓) (✓) (✓)	FILTER PACK (TYPE/SIZE)
Ft.	to	Ft.	
0	52		Type 1

ATTACHMENTS (✓)

Geologic Log
Well Construction Diagram
Geophysical Log(s)
Soil/Water Chemical Analyses
Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Acme Drilling Co. Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
748 S. Vinewood Street-Suite B-Escondido, Ca. 92029-1929
ADDRESS CITY STATE ZIP
7/24/91 526886
Signed WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

12-21-90

TYPE OF WORK (Check) New Well <input checked="" type="checkbox"/> Repair or Modification <input type="checkbox"/> Time Extension <input type="checkbox"/> Destruction <input type="checkbox"/>	USE (Check) Individual Domestic <input type="checkbox"/> Agricultural <input type="checkbox"/> Industrial <input type="checkbox"/>	EQUIPMENT (Check) Rotary AIR <input checked="" type="checkbox"/> Cable Tool <input type="checkbox"/> Other <input type="checkbox"/>
---	--	---

PROPOSED WELL DEPTH Max. 800 Min. 100 (Feet)

PROPOSED CASING Type STEEL Depth 50' Diameter 8 5/8" Wall or Gage 1250"

PROPOSED SEALING ZONE(S)

From 0' to 50' Feet

From _____ to _____ Feet

From _____ to _____ Feet

PROPOSED PERFORATIONS OR SCREEN

From _____ to _____ Feet

SEALING MATERIAL (Check)

Neat Cement Grout Bentonite Clay

Sand Cement Grout Concrete

Other-Specify: _____

DATE OF WORK

Start 1-7-91

Completion 1-10-91

NAME OF WELL OWNER MOUNTAIN EMPIRE UNIFIED SCHOOL DISTRICT

NAME OF WELL DRILLER COURT WILLOUGHBY

LOCATION OF WELL 1654 BUCKMAN SPRINGS RD, CAMPO

COMPANY ACME DRILLING Co., INC.

DISPOSITION OF APPLICATION (FOR HEALTH OFFICERS USE ONLY)

APPROVED DENIED

APPROVED WITH CONDITIONS

Report Reason(s) for Denial or Necessary Conditions Here:

To be installed per county & state requirements for community supply wells.

Well must be tested and approved per community drinking water standards prior to delivery to the public.

Contact FHS at 565-5173 at least 48 hours prior to the pumping of the annular seal for observation.

Charles G. Hummel
HEALTH OFFICER

4/18/91
DATE

BUSINESS ADDRESS #206 365 W. 2nd, ESC. - 92025

LICENSE NUMBER 526986

Cash Deposit

Bond Posted

\$180.00 Fee paid on 12/21/90

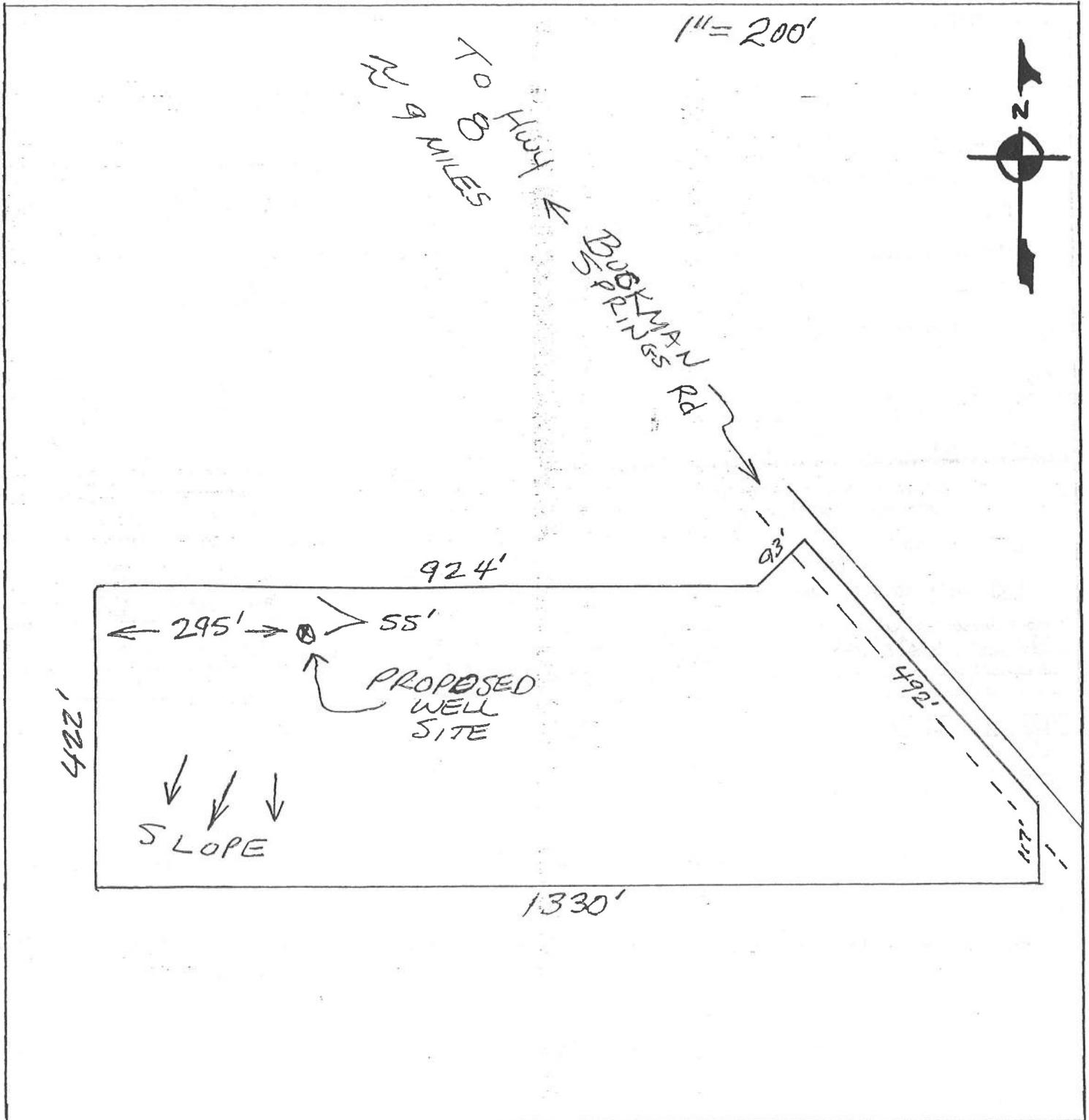
I hereby agree to comply with all regulations of the Department of Health Services and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction; repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Health Services with a complete and accurate log of the well.

Robert Lundberg
APPLICANT'S SIGNATURE

12/20/90
DATE

LOCATION

INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.



QUADRUPPLICATE
For Local Requirements

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Page 1 of 1

Owner's Well No. #2

No. 491666

Date Work Began 7/22/91, Ended 7/23/91

Local Permit Agency San Diego County Health Services

Permit No. W 16848 61848 Permit Date 7/22/91

GEOLOGIC LOG

WELL OWNER

DEPTH FROM SURFACE		DESCRIPTION
Ft.	to Ft.	
0	13	Light brown Decomposed Granite
13	17	Dark brown " "
17	20	Red-orange clay-like D.G.
20	31	Light orange D.G.
31	58	Firm grey D.G.
58	88	Weathered salt & pepper Granite w/ small fracture @ 58' w/ water 5 Gallons per minute
88		Fracture w/ water in above-measures 10-12 GPM
88	94	Weathered Granite
94		Fracture w/ water measures 25 GPM
94	102	Weathered salt & pepper Granite
102	104	Fractures in above
104	109	Weathered salt & pepper Granite
109	110	Fracture
110	133	Weathered salt & pepper Granite
133	135	Fractures w/ water measures 40 GPM
135	163	Weathered salt & pepper Granite
163	165	Fractures in above
165	178	Weathered salt & pepper Granite
178	198	Weathered salt & pepper Granite
		Total yield- 50 GPM
		Total dissolved solids- 200ppm
		Bottom hole bit gauge- 6 1/2"

Name Mountain Empire Unified School District
Mailing Address XR 3291 Buckman Springs Rd.
Pine Valley, Ca. 92029 62
CITY STATE ZIP

WELL LOCATION
Address 1654 Buckman Springs Road
City Campo
County San Diego
APN Book 655 Page 030 Parcel 30
Township 18S Range 5E Section 4
Latitude _____ Longitude _____
DEG. MIN. SEC. NORTH DEG. MIN. SEC. WEST

LOCATION SKETCH NORTH SOUTH
Completed well construction NEW WELL
Date _____
Date inspected 10/10/91
Comments seal installation
observed by EHS
Water Sample taken? NO
Sanitarian's approval: Charles Hummel (M.D.)
(See Ruffin file copy)
Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY ()
 NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
PLANNED USE(S) ()
___ MONITORING
WATER SUPPLY
___ Domestic
___ Public
___ Irrigation
___ Industrial
___ "TEST WELL"
___ CATHODIC PROTECTION
 OTHER (Specify) community

DRILLING METHOD air hammer FLUID _____
WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH OF STATIC WATER LEVEL 40-45 (Ft.) & DATE MEASURED 7/24/91
ESTIMATED YIELD 50 (GPM) & TEST TYPE air lift
TEST LENGTH _____ (Hrs.) TOTAL DRAWDOWN _____ (Ft.)
* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)					DEPTH FROM SURFACE	ANNULAR MATERIAL					
		TYPE ()				MATERIAL / GRADE		INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE		
Ft.	to Ft.	BLANK	SCREEN	CONDUCTOR	FILL PIPE		Ft.				to Ft.	CE-MENT ()	BEN-TONITE ()
0	53	12"	X			steel	8 5/8	.250				type 1	
0	198	6"	X	X		PVC liner	4 1/2"	cl.160	1/8"				

ATTACHMENTS ()
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other _____
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME Acme Drilling Co. Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 748 S. Vinewood Street-Suite B - Escondido, Ca. 92029-1929
CITY STATE ZIP
Signed _____ DATE SIGNED 7/25/91 C 57 LICENSE NUMBER 526886
WELL DRILLER/AUTHORIZED REPRESENTATIVE

8364

Control # ~~10618~~ 10618

TYPE OF WORK (Check) New Well <input checked="" type="checkbox"/> Repair or Modification <input type="checkbox"/> Time Extension <input checked="" type="checkbox"/> Destruction <input type="checkbox"/>		USE (Check) Individual Domestic <input type="checkbox"/> Agricultural <input type="checkbox"/> Industrial <input type="checkbox"/>		EQUIPMENT (Check) Rotary-air <input checked="" type="checkbox"/> Cable Tool <input type="checkbox"/> Other <input type="checkbox"/>	
		Community <input checked="" type="checkbox"/> Other _____			

PROPOSED WELL DEPTH Max. <u>800</u> Min. <u>100</u> (Feet)		PROPOSED CASING Type <u>Steel</u> Depth <u>50</u> Diameter <u>8 5/8"</u> Wall or Gage <u>.250</u>			
--	--	---	--	--	--

PROPOSED SEALING ZONE(S)

From 0 to 50 Feet

From _____ to _____ Feet

From _____ to _____ Feet

PROPOSED PERFORATIONS OR SCREEN

From _____ to _____ Feet

SEALING MATERIAL (Check)

Neat Cement Grout Bentonite Clay

Sand Cement Grout Concrete

Other-Specify: Type 1 cement & steel casing

DATE OF WORK

Start June (July) 1991

Completion July 1991

NAME OF WELL OWNER
Mountain Empire Unified School District

NAME OF WELL DRILLER
Court Willoughby

LOCATION OF WELL
1654 Buckman Springs Rd.- Campo

COMPANY
Acme Drilling Co. Inc.

DISPOSITION OF APPLICATION (FOR HEALTH OFFICERS USE ONLY)

APPROVED DENIED

APPROVED WITH CONDITIONS

Report Reason(s) for Denial or Necessary Conditions Here:

Well to be installed min. 150 ft. to existing and future trench lines and 50' to sewer lines. Installation of annular seal is to be observed by EHS staff.

Maureen White
HEALTH OFFICER
7/26/91
DATE

BUSINESS ADDRESS 748 S. Vinewood St.-Ste. B
Escondido, Ca. 92029-1929

LICENSE NUMBER 526886

Cash Deposit
Bond Posted

#220 Fee paid on ~~7/22/91~~ 7/22/91
rw

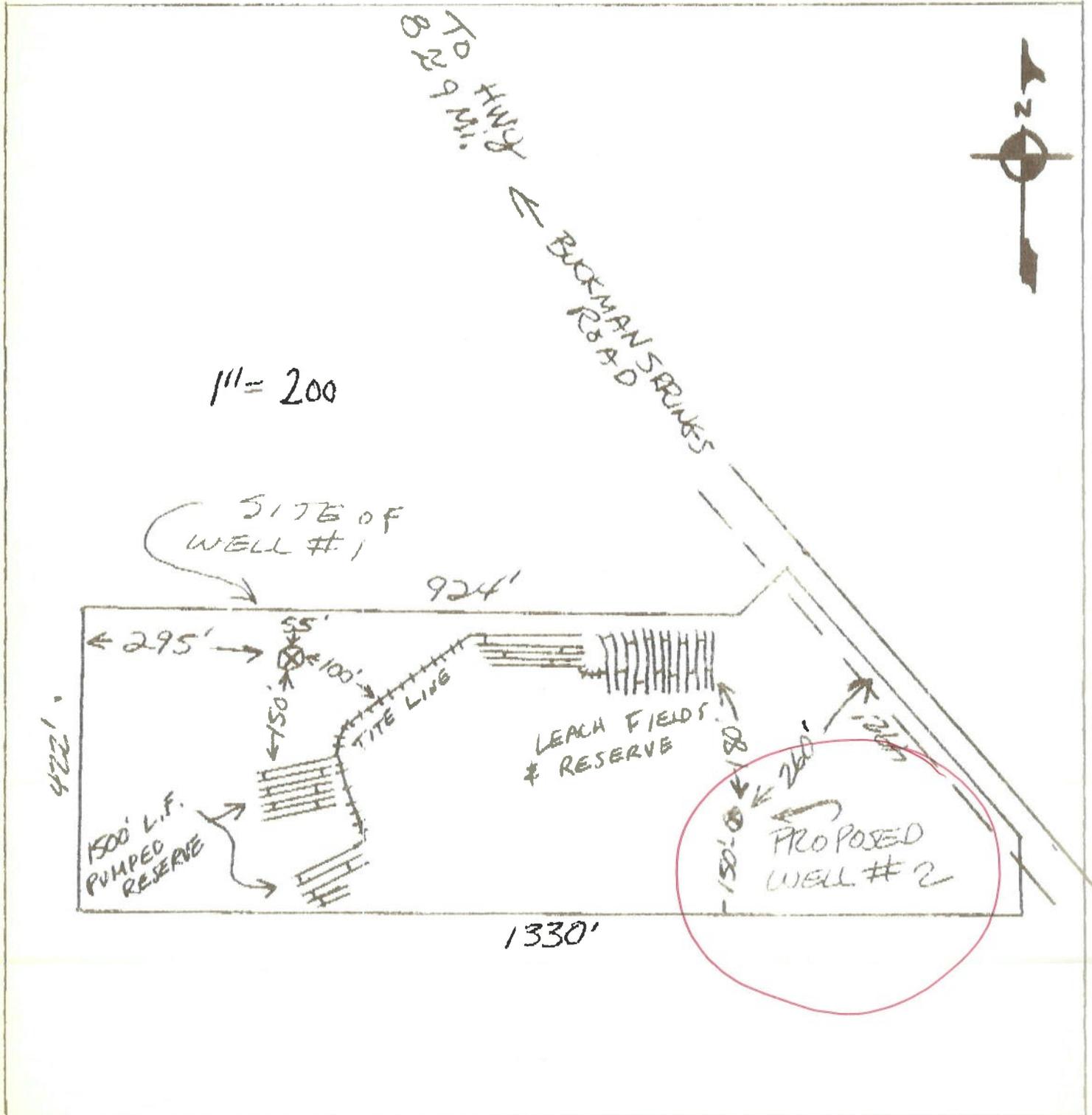
I hereby agree to comply with all regulations of the Department of Health Services and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Health Services with a complete and accurate log of the well.

Robert Lundberg
APPLICANT'S SIGNATURE

June 26, 1991
DATE

LOCATION

INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.





COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH & QUALITY
LAND AND WATER QUALITY DIVISION
Wells.DEH@sdcounty.ca.gov

WATER WELL PERMIT APPLICATION

DEHQ USE ONLY	
PERMIT #	_____
APN:	_____
FEE:	_____

PROPERTY OWNER: <u>Moutain Empire Unified School District</u>	Contact Person: <u>Gary Hobelman</u>
Mailing Address: <u>3291 Buckman Springs Road</u>	City: <u>Pine Valley</u> State: <u>_____</u> Zip: <u>91962</u>
E-Mail Address: <u>gary.hobelman@meusd.k12.ca.us</u>	Phone #: <u>619-473-9022 x 1136</u>

INDEMNIFICATION OBLIGATION: To the fullest extent permitted by law, County shall not be liable for, and Property Owner shall defend, indemnify and hold harmless the County and its Directors, officers, agents, employees and volunteers (collectively "County Parties"), against any and all actions, direct or third-party claims, deductibles, self-insured retentions, demands, liability, judgments, awards, fines, mechanics' liens or other liens, labor disputes, losses, damages, expenses, charges or costs of any kind or character, including attorneys' fees and court costs (hereinafter collectively referred to as "Claims"), which arise out of or are in any way connected to the issuance of this Permit or performance of any work pursuant to the Permit, including without limitation, any action brought to attack, set aside, void or annul the issuance of the Permit under the California Environmental Quality Act, Public Resources Code section 21000, et seq., or any other environmental law, and any action based on or alleging the damage, destruction, loss, or take of private property pursuant to Article I, Section 19, of the California Constitution or the Fifth Amendment to the U.S. Constitution, and further including, without limitation, any Claims caused by the sole passive negligence or the concurrent negligent act, error or omission, whether active or passive, of County Parties. Property Owner shall have no obligation, however, to defend or indemnify County Parties from a Claim if it is determined by a court of competent jurisdiction that such Claim was caused by the sole active negligence or willful misconduct of County Parties.

PROPERTY OWNER SIGNATURE: _____ DATED: _____

WELL LOCATION – ASSESSOR'S PARCEL NUMBER: <u>655-030-30</u>	
Site Address: <u>1654 Buckman Springs Rd</u>	City: <u>Campo</u> State: <u>_____</u> Zip: <u>91906</u>
Well Longitude: <u>-116.487696</u>	Well Latitude: <u>32.643204</u>
Water District: _____	or <input checked="" type="checkbox"/> N/A

DRILLING CONTRACTOR: _____	
Contact Person: _____	Valid C57 License #: _____
Mailing Address: _____	City: _____ State: _____ Zip: _____
E-Mail Address: _____	Phone #: _____

INTENDED USE	
<input type="checkbox"/> Domestic/Private	<input checked="" type="checkbox"/> Public
<input type="checkbox"/> Industrial	<input type="checkbox"/> Other _____
Will the proposed well provide less than 2-acre feet per year of groundwater for a domestic user or provide groundwater to a public water supply system?	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (If "No", additional requirements apply per Executive Order N-7-22.)	

TYPE OF WORK	
<input type="checkbox"/> New Well	<input checked="" type="checkbox"/> Reconstruction
<input type="checkbox"/> Destruction	<input type="checkbox"/> Other <u>See completion report attached, see well drawings attached</u>

WELL DESIGN		
Drilling Equipment: _____	Proposed Depth of Well (feet): <u>220</u>	Borehole Diameter (in.): <u>15</u>

Work: Over-ream well to remove existing casing and failing sanitary seal. Fill in bottom 600 feet of the well and install new well casing and sanitary seal.

<u>Casing</u>	<u>Conductor Casing</u>	<u>Filter/Filler Material</u>	<u>Perforations</u>	<u>Annular Seal</u>
Type: <u>A53 Steel</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	Material: <u>Concrete</u>
Diameter (in.): <u>8 5/8</u>	Diameter (in.): _____	From: _____ To: _____	From: _____ To: _____	_____
Depth (ft.): <u>135</u>	Depth (ft.): _____	From: _____ To: _____	From: _____ To: _____	Depth (ft.): <u>135</u>
Wall/Gauge: <u>1/4 in</u>	Wall/Gauge: _____	From: _____ To: _____	From: _____ To: _____	Thickness (in.): <u>3</u>

SITE MAP

All well applications must be accompanied by a Site Map. The Site Map must be to scale and include a north arrow. Within a 250-foot radius of the proposed water well location, the Site Map must include: parcel boundaries, easements, existing and/or proposed septic systems, existing structures, names of nearby streets/roads, transmission lines, water bodies/courses (ponds, lakes, and streams), drainage patterns, existing wells, sewer laterals, livestock/fowl enclosures, and other potential contamination sources.

On properties served by public water, contact the local water agency for meter protection requirements. A copy of this permit application will be provided to the water district, if applicable.

I have obtained all required permits related to the installation of the proposed water well from other agencies (if applicable). I hereby agree to comply with all regulations of the Department of Environmental Health & Quality (DEHQ), and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification, and destruction. Immediately upon completion of work, I will furnish the DEHQ with a complete and accurate log of the well (Well Driller's Report). I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Well Contractor's Signature: _____

Date: _____



County of San Diego

Department of Environmental Health & Quality

Land and Water Quality Division

5500 Overland Ave, Suite 210, San Diego, CA 92123

(858) 565-5173

www.sdcdeh.org

STORMWATER & DISCHARGE MANAGEMENT PLAN FOR WATER WELLS

Well Permit Number: LWELL- 8363	Assessor's Parcel Number: 655-030-30
---	--

GPS Coordinates: (map datum: WGS84, units: HDD) N: 32.643204 W: -116.487696

Section 1: Required Information from the Well Driller:

- Are there any watercourses or water bodies within 50 feet of the limits of soil disturbance? YES NO
- Does the plat show the project boundaries? (a "detail inset" is acceptable for a large parcel) YES NO
- Does the plat show footprints of any existing structures and facilities within 100 feet of the wellhead position? YES NO
- Does the plat show locations where run-off may enter storm drains, drainage courses and/or receiving waters? YES NO
- Is grading required to access site or install well? YES NO
- Does the project conform to the local grading ordinance? YES NO
- Will drilling additives be used to drill the well? YES NO
- Are the Best Management Practices attached to this permit application? YES NO

Section 2: Best Management Practices

The goal of stormwater and discharge control management planning while drilling and installing wells is to reduce pollution to the maximum extent practicable using Best Management Practices (BMPs). Construction related materials, sediments, chemical residues such as drilling foam, wastes, and spills must be retained within the property boundaries to eliminate transport from the site to nearby streets, drainage courses, receiving waters and adjacent properties. It is the responsibility of the property owner and the contractor to determine which BMPs will be used in order to ensure that all contaminants are retained on-site.

Examples of Best Management Practices to contain well installation run-off include, but are not limited to, installation of a sediment basin to contain run-off, using geotextile fabric to contain sediments and drilling mud, or eliminating the use of drilling foam. (Website information is available at www.projectcleanwater.org)

Section 3: Certification- I have read and understand the following: (Please check each box after concurrence.)

- Selected BMP's will be implemented so that water quality is not negatively impacted by well construction activities.
- I am aware the selected BMP's must be installed, maintained, monitored and revised as necessary so they are effective.
- I understand that non-compliance with the San Diego County Watershed Protection Ordinance may result in enforcement actions by the County. These may include fines, citations, stop-work orders, or other actions.
- DEHQ inspectors and personnel from other regulatory agencies are authorized to enter my property at any time for purposes associated with this well permit until such time the well is completed to the satisfaction of the DEHQ.
- Should the DEHQ determine during the field review that the well installation procedures contradict this Discharge Management Plan or the well permit application, the well drilling permit may be suspended or revoked. Further activity will require a new permit fee and amendment to the existing permit.

Signatures:

Contractor: _____ Date: _____

Property Owner: _____ Date: _____

Reviewed by DEHQ: _____ Date: _____



COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH & QUALITY
LAND AND WATER QUALITY DIVISION
Wells.DEH@sdcounty.ca.gov

WATER WELL PERMIT APPLICATION

DEHQ USE ONLY	
PERMIT #	_____
APN:	_____
FEE:	_____

PROPERTY OWNER: <u>Moutain Empire Unified School District</u>	Contact Person: <u>Gary Hobelman</u>
Mailing Address: <u>3291 Buckman Springs Road</u>	City: <u>Pine Valley</u> State: <u>_____</u> Zip: <u>91962</u>
E-Mail Address: <u>gary.hobelman@meusd.k12.ca.us</u>	Phone #: <u>619-473-9022 x 1136</u>

INDEMNIFICATION OBLIGATION: To the fullest extent permitted by law, County shall not be liable for, and Property Owner shall defend, indemnify and hold harmless the County and its Directors, officers, agents, employees and volunteers (collectively "County Parties"), against any and all actions, direct or third-party claims, deductibles, self-insured retentions, demands, liability, judgments, awards, fines, mechanics' liens or other liens, labor disputes, losses, damages, expenses, charges or costs of any kind or character, including attorneys' fees and court costs (hereinafter collectively referred to as "Claims"), which arise out of or are in any way connected to the issuance of this Permit or performance of any work pursuant to the Permit, including without limitation, any action brought to attack, set aside, void or annul the issuance of the Permit under the California Environmental Quality Act, Public Resources Code section 21000, et seq., or any other environmental law, and any action based on or alleging the damage, destruction, loss, or take of private property pursuant to Article I, Section 19, of the California Constitution or the Fifth Amendment to the U.S. Constitution, and further including, without limitation, any Claims caused by the sole passive negligence or the concurrent negligent act, error or omission, whether active or passive, of County Parties. Property Owner shall have no obligation, however, to defend or indemnify County Parties from a Claim if it is determined by a court of competent jurisdiction that such Claim was caused by the sole active negligence or willful misconduct of County Parties.

PROPERTY OWNER SIGNATURE: _____ DATED: _____

WELL LOCATION – ASSESSOR'S PARCEL NUMBER: <u>655-030-30</u>	
Site Address: <u>1654 Buckman Springs Rd</u>	City: <u>Campo</u> State: <u>_____</u> Zip: <u>91906</u>
Well Longitude: <u>-116.486666</u>	Well Latitude: <u>32.642480</u>
Water District: _____	or <input checked="" type="checkbox"/> N/A

DRILLING CONTRACTOR: _____	
Contact Person: _____	Valid C57 License #: _____
Mailing Address: _____	City: _____ State: _____ Zip: _____
E-Mail Address: _____	Phone #: _____

INTENDED USE

Domestic/Private Public Industrial Other _____

Will the proposed well provide less than 2-acre feet per year of groundwater for a domestic user or provide groundwater to a public water supply system?
 Yes No (If "No", [additional requirements](#) apply per Executive Order N-7-22.)

TYPE OF WORK

New Well Reconstruction Destruction Other See completion report attached, see well drawings attached

WELL DESIGN

Drilling Equipment: _____ Proposed Depth of Well (feet): 220 Borehole Diameter (in.): 15

Work: Replace upper portion of existing well casing, attached via field weld below ground surface to the existing casing. Place cement grout seal to stabilize inner well casing and add to existing sanitary seal as shown on drawings.

<u>Casing</u>	<u>Conductor Casing</u>	<u>Filter/Filler Material</u>	<u>Perforations</u>	<u>Annular Seal</u>
Type: <u>PVC</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	Material: <u>Concrete</u>
Diameter (in.): <u>4 1/2</u>	Diameter (in.): <u>8 5/8</u>	From: _____ To: _____	From: <u>140</u> To: <u>198</u>	_____
Depth (ft.): <u>210</u>	Depth (ft.): <u>53</u>	From: _____ To: _____	From: _____ To: _____	Depth (ft.): <u>53</u>
Wall/Gauge: _____	Wall/Gauge: <u>1/4 in</u>	From: _____ To: _____	From: _____ To: _____	Thickness (in.): <u>3</u>

SITE MAP

All well applications must be accompanied by a Site Map. The Site Map must be to scale and include a north arrow. Within a 250-foot radius of the proposed water well location, the Site Map must include: parcel boundaries, easements, existing and/or proposed septic systems, existing structures, names of nearby streets/roads, transmission lines, water bodies/courses (ponds, lakes, and streams), drainage patterns, existing wells, sewer laterals, livestock/fowl enclosures, and other potential contamination sources.

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Well Contractor's Signature: _____

Date: _____



County of San Diego
Department of Environmental Health & Quality
Land and Water Quality Division
5500 Overland Ave, Suite 210, San Diego, CA 92123
(858) 565-5173
www.sdcdeh.org

STORMWATER & DISCHARGE MANAGEMENT PLAN FOR WATER WELLS

Well Permit Number: LWELL- 8364	Assessor's Parcel Number: 655-030-30
---	---

GPS Coordinates: (map datum: WGS84, units: HDD) N: 32.642480 W: -116.486666

Section 1: Required Information from the Well Driller:

1. Are there any watercourses or water bodies within 50 feet of the limits of soil disturbance? YES NO
2. Does the plat show the project boundaries? (a "detail inset" is acceptable for a large parcel) YES NO
3. Does the plat show footprints of any existing structures and facilities within 100 feet of the wellhead position? YES NO
4. Does the plat show locations where run-off may enter storm drains, drainage courses and/or receiving waters? YES NO
5. Is grading required to access site or install well? YES NO
6. Does the project conform to the local grading ordinance? YES NO
7. Will drilling additives be used to drill the well? YES NO
8. Are the Best Management Practices attached to this permit application? YES NO

Section 2: Best Management Practices

The goal of stormwater and discharge control management planning while drilling and installing wells is to reduce pollution to the maximum extent practicable using Best Management Practices (BMPs). Construction related materials, sediments, chemical residues such as drilling foam, wastes, and spills must be retained within the property boundaries to eliminate transport from the site to nearby streets, drainage courses, receiving waters and adjacent properties. It is the responsibility of the property owner and the contractor to determine which BMPs will be used in order to ensure that all contaminants are retained on-site.

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Section 3: Certification- I have read and understand the following: (Please check each box after concurrence.)

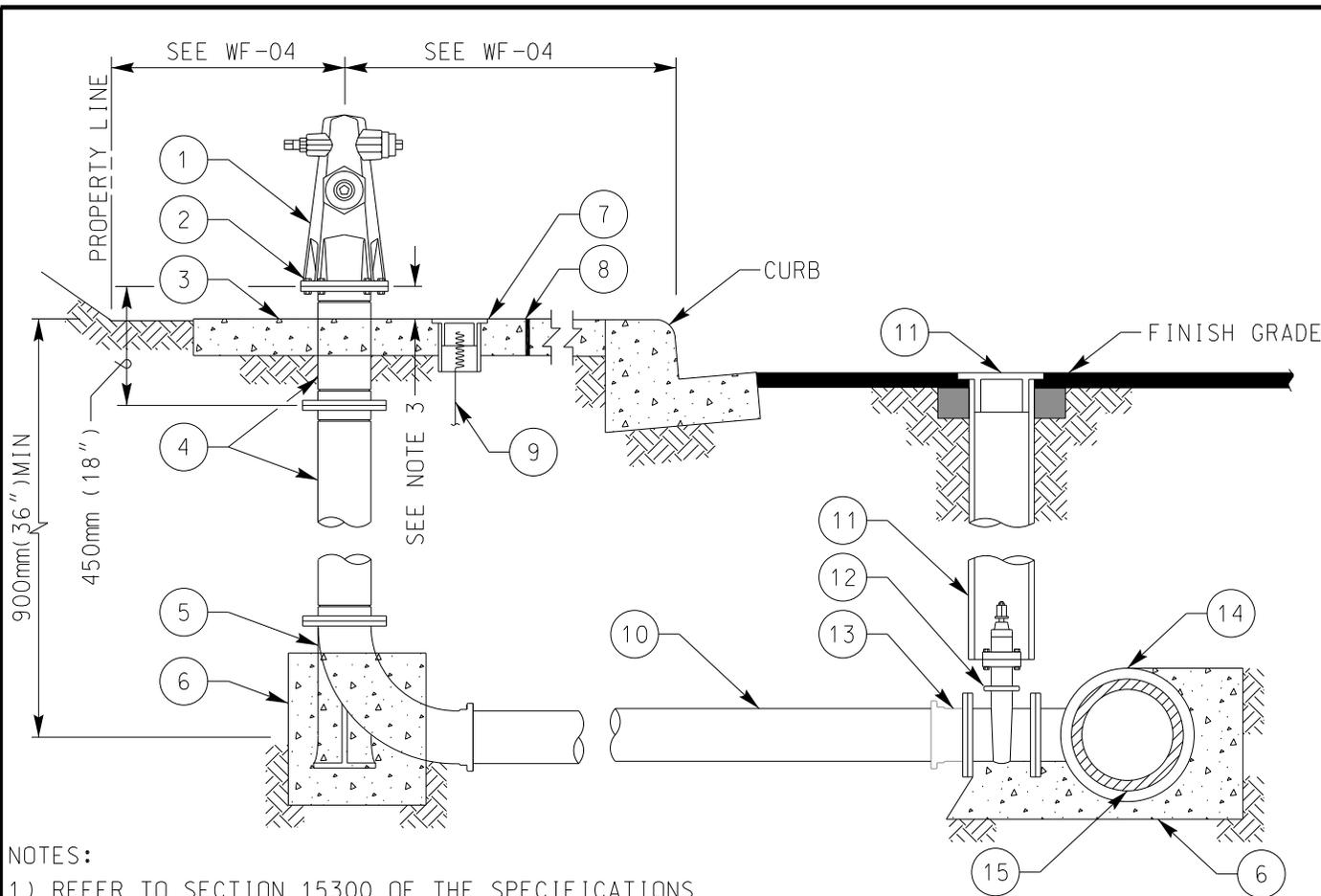
- Selected BMP's will be implemented so that water quality is not negatively impacted by well construction activities.
- I am aware the selected BMP's must be installed, maintained, monitored and revised as necessary so they are effective.
- I understand that non-compliance with the San Diego County Watershed Protection Ordinance may result in enforcement actions by the County. These may include fines, citations, stop-work orders, or other actions.
- DEHQ inspectors and personnel from other regulatory agencies are authorized to enter my property at any time for purposes associated with this well permit until such time the well is completed to the satisfaction of the DEHQ.
- Should the DEHQ determine during the field review that the well installation procedures contradict this Discharge Management Plan or the well permit application, the well drilling permit may be suspended or revoked. Further activity will require a new permit fee and amendment to the existing permit.

Signatures:

Contractor: _____ Date: _____

Property Owner: _____ Date: _____

Reviewed by DEHQ: _____ Date: _____



NOTES:

- 1) REFER TO SECTION 15300 OF THE SPECIFICATIONS
- 2) THE NUMBER AND SIZE OF OUTLETS SHALL BE AS SHOWN ON PLANS
- 3) FIRE HYDRANT FLANGE SHALL BE 150mm ± 25mm (6" ± 1") ABOVE TOP OF CURB OR SPLASH PAD SEE PLANS FOR ELEVATION
- 4) LOCATE FIRE HYDRANT AS SHOWN ON WF-04
- 5) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 6) FIRE HYDRANT FLANGE BOLTS SHALL BE A307 ZINC-PLATED BOLTS INSTALLED WITH NUTS ON TOP OF THE FLANGE.
- 7) CONNECTIONS TO STEEL MAINS SHALL BE IN ACCORDANCE WITH SECTION 15061
- 8) MATERIALS SHALL BE SELECTED FROM THE APPROVED MATERIALS LIST



LEGEND ON PLANS

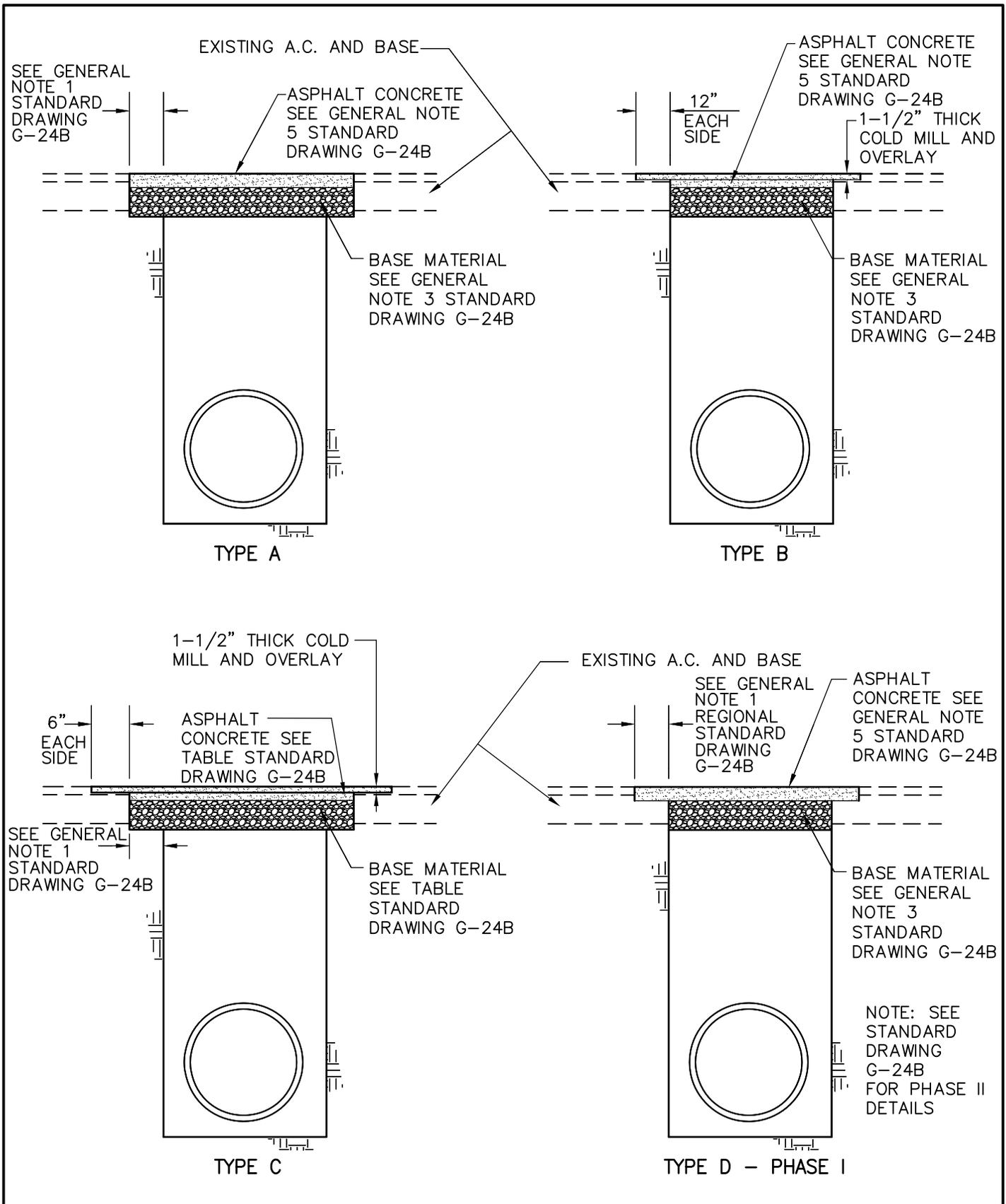
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	150mm (6") FIRE HYDRANT SEE NOTE 2	7	TRACER WIRE ACCESS PORT, 100mm (4") x 200mm (8") LONG SDR SEWER PIPE W/ CAP
2	BOLTS, SEE NOTE 6	8	COLD JOINT STRIP
3	1200mm x 1200mm x 150mm THICK (4' x 4' x 6" THICK) CONCRETE SPLASH PAD	9	TRACER WIRE PER WP-01
4	150mm (6") FLANGE DI HYDRANT EXTENSION SPOOL(S) WITH BREAK OFF GROOVES (MAXIMUM OF 2 SPOOLS)	10	150mm (6") C-900 PVC PIPE
5	150mm x 400mm (6" x 16") LONG RADIUS FLG x MJ/PO BURY ELL	11	200mm (8") GATE WELL SEE WV-01& WV-02
6	CONCRETE THRUST BLOCK SEE WT-01	12	150mm (6") FLG x MJ/PO/FLG RWGV
		13	150mm (6") FLG x MJ/PO ADAPTER (IF REQUIRED)
		14	SIZE x 150mm (6") MJ/PO/FLG x FLG TEE
		15	WATER MAIN

150mm (6") FIRE HYDRANT INSTALLATION

WATER AGENCIES STANDARDS

COMMITTEE APPROVAL: 12/16/2019

DRAWING NUMBER: WF-01



Revision	By	Approved	Date
ORIGINAL		PARKINSON	02/95
ADD METRIC		T. STANTON	03/03
REVIEWED		T. STANTON	04/06
UPDATED	MR	MR/CV	03/12
REVIEWED	CV	CV	12/15

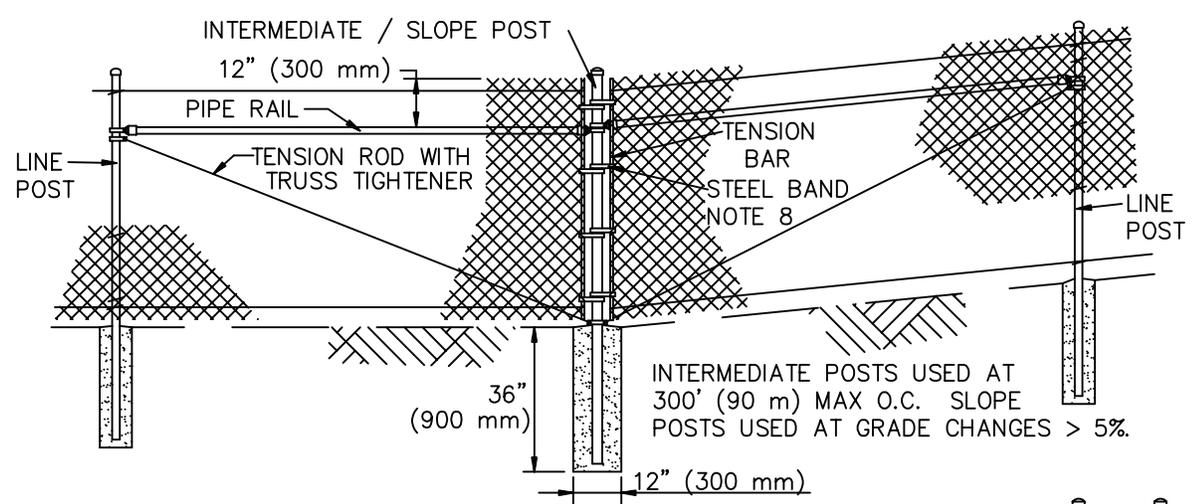
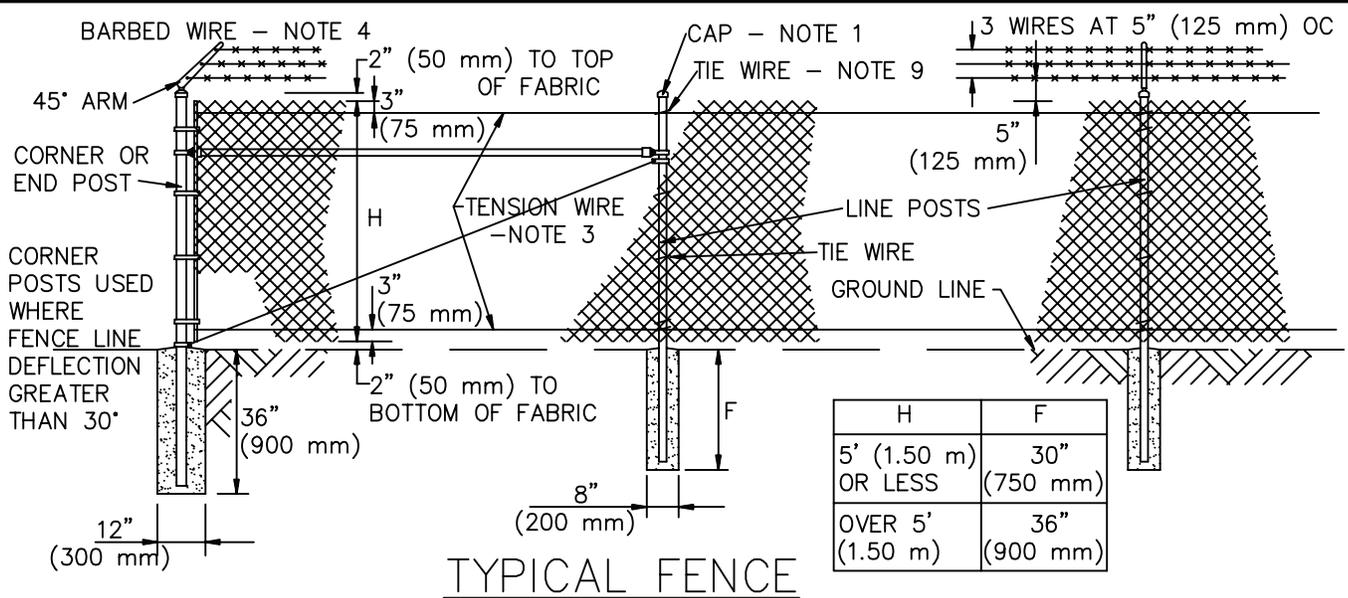
SAN DIEGO REGIONAL STANDARD DRAWING

TRENCH RESURFACING
ASPHALT CONCRETE STREETS

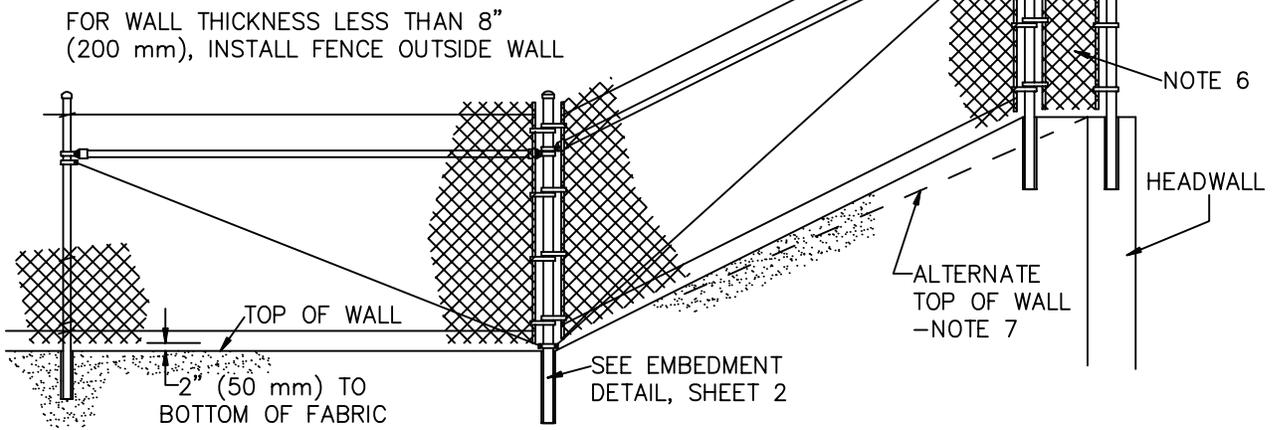
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

R.C.E. 10/25/2018
Chairperson R.C.E. 19246 Date

DRAWING NUMBER G-24A



INTERMEDIATE / SLOPE POST



CHANNEL WALL AND WINGWALL AT HEADWALL

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

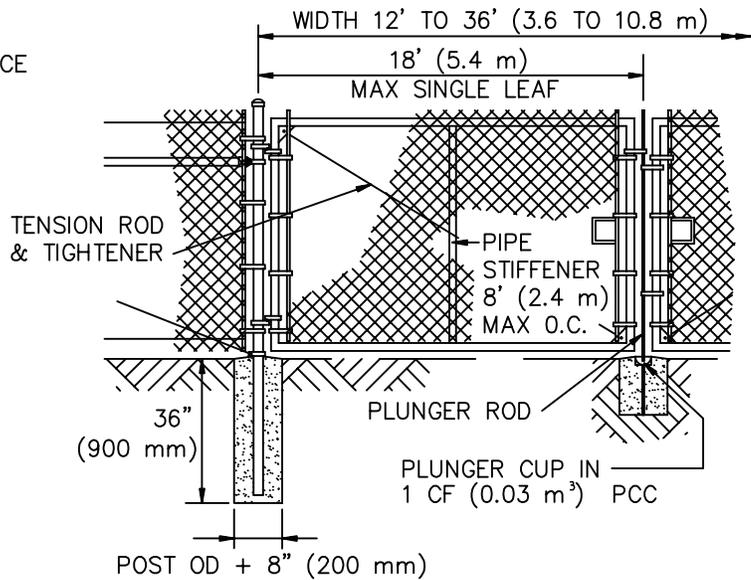
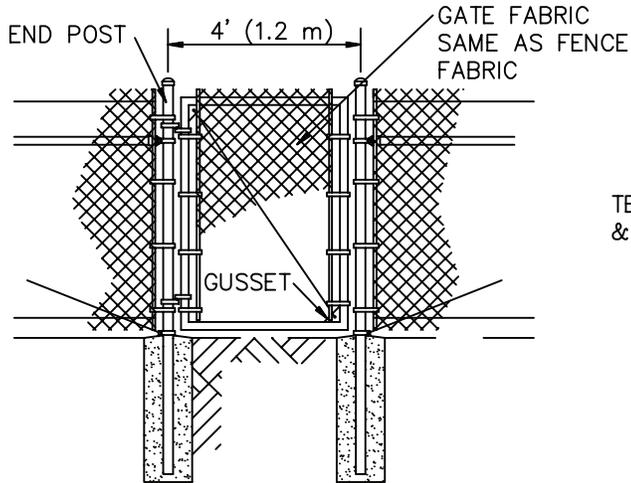
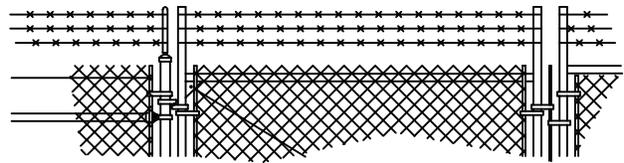
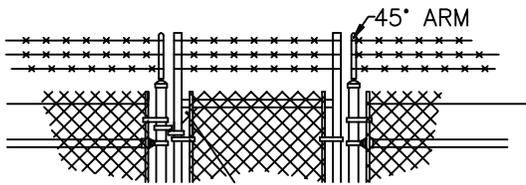
PROMULGATED BY THE
 PUBLIC WORKS STANDARDS INC.
 GREENBOOK COMMITTEE
 1984
 REV. 1996, 2005

CHAIN LINK FENCE AND GATES

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

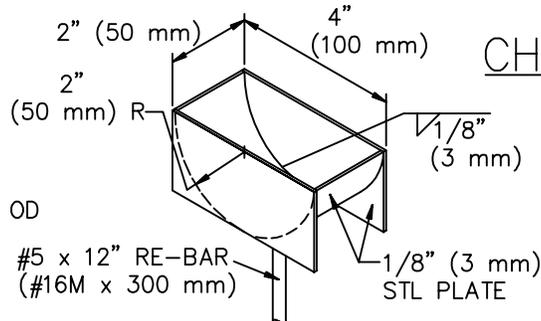
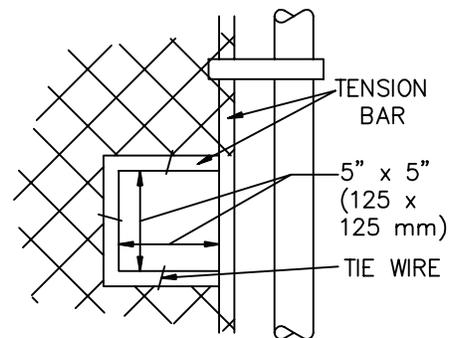
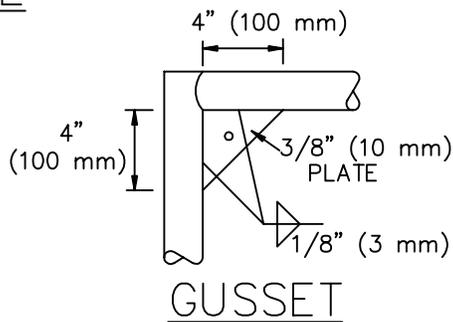
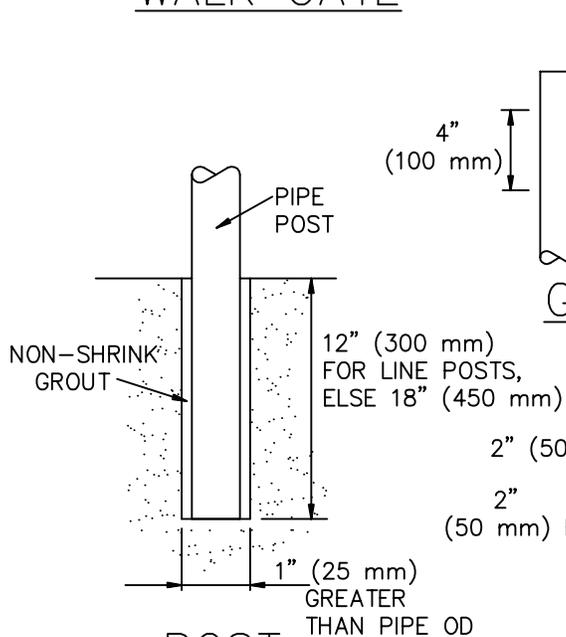
STANDARD PLAN
600-3
 SHEET 1 OF 3

BARBED WIRE - NOTE 4



WALK GATE

DRIVE GATE



POST EMBEDMENT

NOTES:

1. SECURE DRIVE-FIT GALVANIZED CAP TO POST WITH 1/4" (6 mm) ROUND-HEAD RIVET.
2. H DENOTES FABRIC WIDTH AND NOMINAL FENCE HEIGHT. H = 5' (1.5 m) UNLESS OTHERWISE NOTED.
3. IF FENCE WITH TOP RAIL IS SPECIFIED, DELETE STEEL TENSION WIRE AT TOP, AND PIPE RAILS AT INTERMEDIATE, SLOPE, END AND CORNER POSTS. EXTEND TENSION ROD TO TOP RAIL.
4. BARBED WIRE SHALL BE USED ONLY WHEN SPECIFIED.
5. POST SPACING IS MAXIMUM 10' (3.0 m).
6. FILL CLEAR OPENINGS GREATER THAN 3" (75 mm) WITH FABRIC. FOR OPENINGS LESS THAN 18" (450 mm), TIE FABRIC TO POSTS.
7. USE ONE POST FOR COMBINED SLOPE AND CORNER POST IF TOP OF CHANNEL WALL IS CONSTRUCTED AS SHOWN FOR "ALTERNATE".
8. STEEL BANDS AT TENSION BARS SHALL BE 1/8" x 1" (3 x 25 mm), MINIMUM, SPACED AT MAXIMUM 16" (400 mm).
9. SECURE TENSION WIRES TO EACH LINE POST WITH TIE WIRES.