REHABILITATION OF WELL NO. 5

TECHNICAL SPECIFICATIONS

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Identification and summary description of the Project, the Work, location, Owner-furnished products, activities by others, coordination, and early occupancy by Owner.

B. Related section:
   1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
   2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
   3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.
      a. Section 11313I - Submersible Pumps.

1.02 THE WORK

A. The Work consists of Well 5 rehabilitation, mechanical and electrical installation of an owner supplied submersible pump and column pipe, and reconnection of the well pump to existing piping. All the work specified in the bid proposal and these technical provisions shall be done in accordance with the provisions of the latest edition of the District's Standards, California Well Standards and the Standard Specifications for Public Works Construction ("Green Book"), unless superseded by these specifications, and all amendments thereto, adopted by the Joint Cooperative Committee of Southern California Chapter, American Public Works Association and Southern California District, Associated General Contractors of California; hereinafter referred to as the "Standard Specifications".

B. The well will be rehabilitated by chemical treatment and redevelopment. The well is located in the City of Beverly Hills near Santa Monica Blvd and Cannon Dr. Treatment, redevelopment, and well installation will generally include, but not be limited to, the following:
   1. Move equipment on (and off) the site.
   2. Air-lifting or suction-bailing of fill from the bottom of the well.
   3. Conduct color video surveys as necessary to evaluate progress of chemical treatment.
   4. Provide two 21,000 gallon storage tanks.
   5. Provide hydrochloric acid and acid enhancer, and introduce into the well by double swab to insure acid flows through the well perforations and into the filter pack and formation. Agitate the well to distribute the chemical. Collect water samples from the well to check pH. Replenish acid as necessary to maintain

pH of 4.0 or lower for the first 6 hours of treatment. Provide a minimum of 12-hours and a maximum of 36-hours of contact time.

6. Remove the acid by air lifting through a perforated double swab, contain discharge water, test and neutralize as necessary prior to discharge to the local drain.
7. Provide 5,000-gallon vacuum trucks to haul fluids not meeting discharge limits from the site for proper disposal.
8. Provide sodium hypochlorite and chlorine enhancer and introduce into the well by double swab to force chlorine through the well perforations. Agitate the well to disperse the chemical. Provide a minimum of 12-hours and a maximum of 24-hours of contact time.
9. Remove the chlorine by air lifting through a perforated double swab, contain discharge water, test and neutralize as necessary prior to discharge to the local drain.
10. Conduct mechanical redevelopment by swabbing and air lifting.
11. Conduct pumping development by the pump and surge method.
12. Conduct step drawdown and constant rate pumping tests.
13. Conduct spinner survey and depth-specific water sampling.
14. Conduct color video survey and well disinfection.
15. Installation of the owner provided permanent pump, motor, column pipe, and well head connections; provide startup test.
16. Conduct final well disinfection with the permanent pump in place.
17. Complete site cleanup and repair of damaged facilities as necessary.

C. Submission of a bid by the bidder shall constitute acknowledgment that, if awarded the contract, he has relied and is relying on his own examination of (a) the site of the work, (b) access to the site, (c) the conditions under which the work is to be performed, and (d) all other data and matters requisite to the fulfillment of the Work and on his knowledge of existing facilities on and in the vicinity of the site of the work to be constructed under the contract.

D. Except as specifically noted otherwise, provide and pay for:
   1. Insurance and bonds.
   2. Labor, materials, and equipment.
   3. Tools, equipment, and machinery required for construction.
   4. Utilities required for construction.
   5. Temporary facilities including sheeting and shoring.
   6. Traffic control and dust control measures.
   7. Other facilities and services necessary for proper execution and completion of the Work.

E. Secure and pay for all permits including OSHA excavation permits, Department of Transportation permits, government fees, and licenses.

F. Comply with codes, ordinances, regulations, orders, and other legal requirements of public authorities having bearing on the performance of the Work.

1.03 LOCATION OF PROJECT

A. The Work is located near the intersection of Santa Monica Blvd. and Canon Dr.

1.04 ACTIVITIES BY OTHERS

A. Owner, utilities, and others may perform activities within Project area while the Work is in progress.
   1. Schedule the Work with Owner, utilities, and others to minimize mutual interference.

B. Cooperate with others to minimize interference and delays.
   1. When cooperation fails, submit recommendations and perform Work in coordination with work of others.

1.05 COORDINATION OF WORK

A. Maintain overall coordination of the Work.

B. Obtain construction schedules from each subcontractor, and require each subcontractor to maintain schedules and coordinate modifications.

1.06 EARLY OCCUPANCY OF PORTIONS OF WORK

A. Certificates of Substantial Completion will be executed for each designated portion of Work prior to Owner occupancy.
   1. Such certificate of Substantial Completion will describe the portion of the Work to be occupied by Owner, items that may be incomplete or defective, date of occupancy by Owner, and other information required by Owner and Contractor.

B. After Owner occupancy, allow access for Owner's personnel, access for others authorized by Owner, and Owner operation of equipment and systems.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

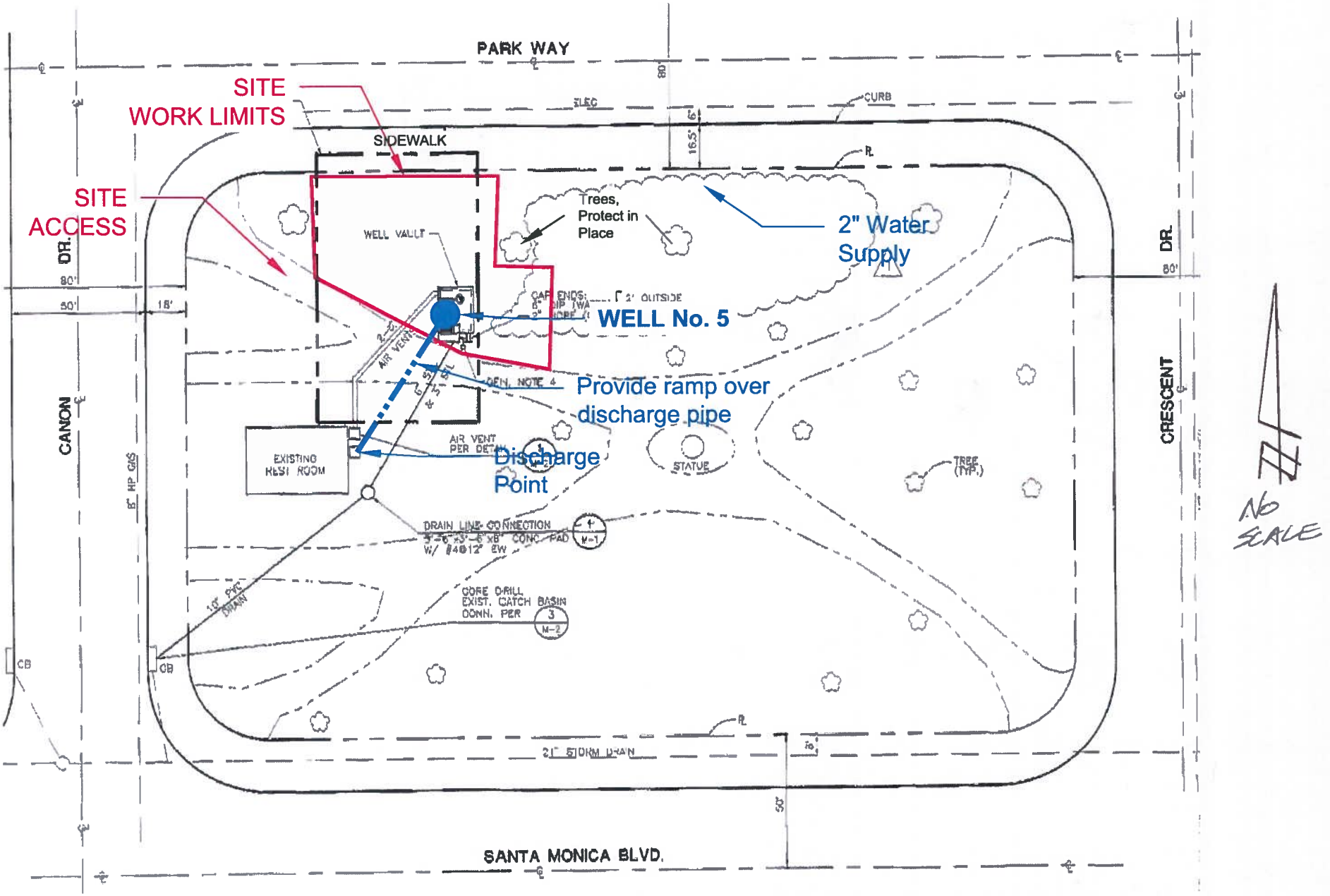

PARK WAY
SITE
WORK LIMITS
SITE
ACCESS
SIDEWALK
CURB
ELEC
Trees,
Protect in
Place
2" Water
Supply
WELL VAULT
WELL No. 5
Provide ramp over
discharge pipe
Discharge
Point
AIR VENT
PER DETAIL
EXISTING
REST ROOM
STATUE
TREE
(TYP.)
DRAIN LINE CONNECTION
CORE DRILL
EXIST. CATCH BASIN
CONN. PER
CANON DR.
CRESCENT DR.
8" HP GAS
10" PVC DRAIN
CB
21" STORM DRAIN
SANTA MONICA BLVD.
NO SCALE

TABLE 1

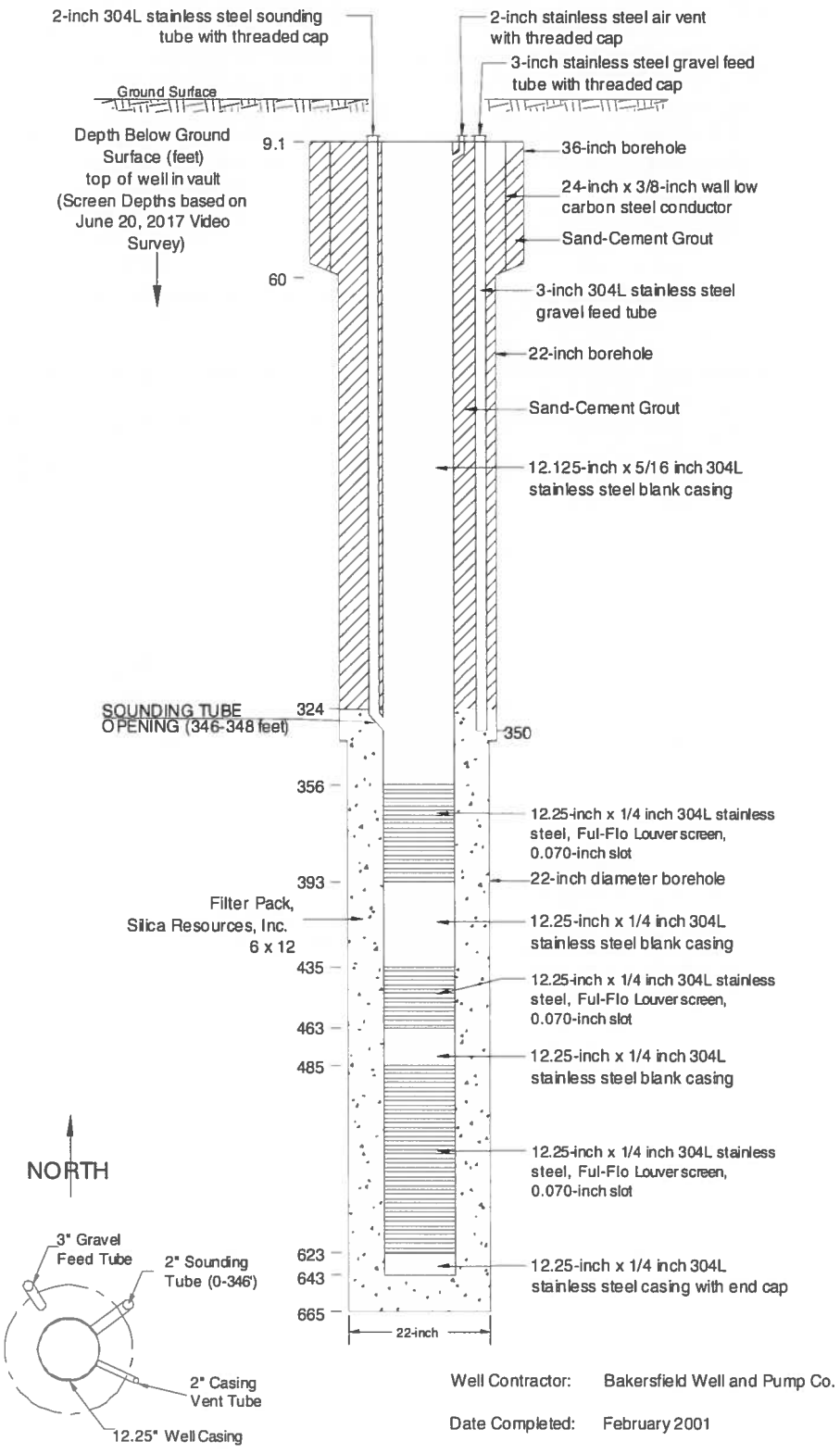
WELL No. 5 CASING SCHEDULE

Item	Depth Interval[1] (feet)	Size	Type
Conductor Casing	0-60	24-inch	Mild Steel
Pilot Hole	60-697	17.5-inch	- - -
Final Ream	60-665	22-inch	- - -
Well Casing[2]	0-350	12.25-inch x 5/16-inch	304L Stainless Steel Blank
	356-393	12.25-inch x 1/4-inch	304L Stainless Steel Ful-Flo Louvers
	393-435	12.25-inch x 1/4-inch	304L Stainless Steel Blank
	435-463	12.25-inch x 1/4-inch	304L Stainless Steel Ful-Flo Louvers
	463-485	12.25-inch x 1/4-inch	304L Stainless Steel Blank
	485-623	12.25-inch x 1/4-inch	304L Stainless Steel Ful-Flo Louvers
	623-643	12.25-inch x 1/4-inch	304L Stainless Steel End Cap
Cement Seal	0-324		Sand-Cement Grout
Filter Pack	324-665		SRI 6 x 12
Sounding Tube	0-348	2-inch	304L Stainless Steel
Gravel Feed Tube	0-350	3-inch	304L Stainless Steel
Air Vent Tube	0-11	2-inch	304L Stainless Steel

Notes: 1. Depth below ground surface. Top of well casing/flange in vault is 9.1 feet below ground surface.

2. Screen interval depths based on video survey 6-20-17.

As-Built Well Completion Schematic
Beverly Hills Well No. 5



Well Contractor: Bakersfield Well and Pump Co.

Date Completed: February 2001

SECTION 01146

CONSTRUCTION NOISE ABATEMENT

PART 1 - GENERAL

A. Scope

The Contractor is advised that the rehabilitation of Well No. 5 will take place approximately 100 feet from residential properties located on the north side of the project site. It shall be the Contractor's responsibility to comply with the following local noise level restrictions as defined in the City's municipal ordinance.

8 a.m. to 6 p.m.	Exceed ambient noise level at the property line by 5 dBa
6 p.m. to 8 a.m.	No Work Allowed

The above noise levels are those measured from any parcel other than the property from which the noise is being generated. No work after 6:00 p.m. will be allowed.

B. Payment

No separate payment for noise abatement will be made. Payment for noise abatement shall be included in the other unit bid items.

PART 2 - EXECUTION

The Contractor shall take all steps necessary to keep within the listed noise level requirements as defined in the City's municipal code.

END OF SECTION

SECTION 01410

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Regulatory authorities and codes.

1.02 APPLICABLE CODES AND PERMITS

A. National Pollutant Discharge Elimination System (NPDES) permit (refer to attachment 1).

B. California Code of Regulations (CCR), California Building Standards Code, CCR Title 24:
   1. Electrical code:
      a. California Electrical Code (CEC), Title 24, Part 3 – 2013.
   2. Fire code:
      a. California Fire Code (CFC), Title 24, Part 9 – 2013.
   3. Mechanical code:
      a. California Mechanical Code (CMC), Title 24, Part 4 – 2013.

C. Industrial Wastewater Discharge Permit.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01756

COMMISSIONING AND PROCESS START-UP

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements for the Planning, Commissioning, and Process Start-Up phases for the Project equipment/system and/or facility.

B. Related sections:
   1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
   2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
   3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.
      a. Section 01140 - Work Restrictions.
      b. Section 15050 - Common Work Results for Mechanical Equipment.
      c. Section 15958 - Mechanical Equipment Testing.

1.02 DEFINITIONS

A. Commissioning – The process of testing the installation for compliance with contract requirements and demonstrating, through documented verification, that the project has successfully met the Contractual requirements and the Project is ready for Process Start-up.

B. Component – A basic building block of equipment, subsystems, and systems that requires installation or functional testing but does not have an electrical connection or internal electronics. (Examples: filter effluent piping and manual isolation valves).

C. Device – A basic building block of equipment, subsystems, and systems that requires installation or functional testing and does have an electrical connection or internal electronics. (Examples: filter level transmitter or water pump pressure transmitter).

D. Equipment – An assembly of component(s) and devices(s) that requires installation or functional testing. (Examples: Pump, motor, VFD, Ozone Generator, UV Disinfection System, etc.).

E. Facility – A grouping of process areas, systems, subsystems, equipment, components, and devices (Example: Treatment Plant, Pump Station, etc.).

F. Installation Testing – Testing to demonstrate that subsystem component (piping, power, networks, devices, etc.) is ready and meet the project requirements in advance of functional testing. Installation testing also includes manufacturers' certification of installation and other requirements as specified to prepare

equipment/system for Functional Testing. Also referred to as Field Acceptance Testing.

G. Manufacturer's Certificate of Source Testing – When applicable, the form is used during Source Testing for the manufacturer to confirm that the applicable source tests have been performed and results conform to the Contract Documents. The form is provided at the end of this Section.

H. Process Area – A grouping of systems, subsystems, equipment, components, and devices that divide a facility into functional areas. (Examples: Filter Process Area or Chemical Area).

I. Product – A system, subsystem or component.

J. Process Start-Up – Activities conducted after commissioning that are necessary to place systems or process areas into operational service.

K. Source Testing – Quality control testing conducted at the source or point of assembly to demonstrate components, devices, equipment/systems, and software meets specified performance requirements prior to shipment. Also referred to as factory testing or factory acceptance testing (FAT).

L. Subsystem – A building block of systems made up from a grouping of components, devices, and equipment that perform a definable function. (Examples: Filter No. 1 Backwash Subsystem, Sedimentation Basin No. 1 Hoseless Sludge Removal Subsystem).

M. System – A grouping of subsystems, equipment, components, and devices that perform a definable function. (Examples: Filter No. 1, Sedimentation Basin).

1.03 SERVICES OF MANUFACTURER'S REPRESENTATIVES

A. Qualification of manufacturer's representative as specified in the Contract Documents technical sections include the following:
   1. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment/system with full authority by the equipment/system manufacturer to issue the certifications required of the manufacturer.
   2. Competent, experienced technical representatives of equipment/system manufacturers for assembly, installation, testing guidance, and training.
   3. Additional qualifications may be specified in the individual Specification sections.
   4. Submit qualifications of the manufacturer's representative no later than 30 days in advance of required observations.
   5. Representative subject to acceptance by Owner and Engineer.
   6. No substitute representatives will be allowed until written acceptance by Owner and Engineer has been obtained.

B. Completion of manufacturer on-site services: Engineer acceptance required.

C. Manufacturer is responsible for determining the time required to perform the specified services.

1. Minimum times specified in the Contract Documents are estimates.
2. No additional costs associated with performing the required services will be approved.
3. Manufacturer required to schedule services in accordance with the Contractor's project schedule up to and including making multiple trips to project site when there are separate milestones associated with installation of each occurrence of manufacturer's equipment.

D. Manufacturer's on-site services as specified in the Contract Documents include the following:
   1. Assistance during Commissioning and Process Start-up.
   2. Provide weekly copies of manufacturers' representatives field notes and data to Engineer.
   3. Other requirements as specified in the Contract Documents.

1.04 COMMISSIONING PHASE

A. Overview of Commissioning Phase:
   1. General:
      a. Include specified Source Testing, Owner Training, Installation Testing, Functional Testing, Clean Water Facility Testing, and Closeout Documentation required by this Section and the technical sections.
   2. Supplier responsibilities:
      a. Prior to testing, verify equipment protective devices and safety devices have been installed, calibrated, and tested.
      b. Acceptable tests: Demonstrate the equipment/system performance meets the requirements stated in the Contract Documents.
         1) When the equipment/system fails to meet the specified requirements, perform additional, more detailed, testing to determine the cause, correct, repair, or replace the causative components and repeat the testing that revealed the deficiency.

B. Source Testing:
   1. Also referred to as factory testing or factory acceptance testing (FAT).
   2. Test components, devices, and equipment/system for proper performance at point of manufacture or assembly as specified in the technical specifications.
   3. Notify the Engineer in writing when the equipment/system is ready for source inspection and testing.
   4. Source Test Plan:
      a. As specified in this Section and other technical sections.
      b. Source Testing requirements as specified in technical sections.
         1) Non-witnessed: Provide Manufacturer's Certificate of Source Testing
         2) Witnessed: 1 Owner's representative and 1 Engineer's representative present during testing unless otherwise specified and provide Manufacturer's Certificate of Source Testing.
      c. Provide the following items for each Source Test:
         1) Purpose and goals of the test.
         2) Identification of each item of equipment/system, including system designation, location, tag number, control loop identifier, etc.
         3) Description of the pass/fail criteria that will be used.
         4) Listing of pertinent reference documents (Contract Documents and industry standards or specifications applicable to the testing).

5) Complete description, including drawings, of test stands and/or test apparatuses.
6) Credentials of test personnel.
7) Descriptions of test equipment to be used, product information, and all appropriate calibration records for the test equipment.
8) Test set-up procedures.
9) Detailed, step-by-step test procedures.
    a) The level of detail shall be sufficient for any witness with a rudimentary technical aptitude to be able to follow the steps and develop confidence that the tests were being performed as planned.
    b) All steps are significant and all steps shall be included in the procedures.
10) Sample data logs and data recording forms. Sample computations or analyses with the results in the same format as the final report to demonstrate how data collected will be used to generate final results.
    a) Complete disclosure of the calculation methodologies.
    b) Include a sample for each type of computation required for the test and analysis of the results.
11) Detailed outline of the Source Test report.
12) Sample test reports.

d. Submit Source Test Plan and forms as specified in the technical specifications.
    1) Submit a copy of the Source Test Plan at least 21 days before any scheduled test date.
    2) Engineer acceptance of Source Test Plan required prior to beginning source testing.
    3) Schedule the testing after acceptance of the test procedures submittal.

e. Indicate the desired dates for source inspection and testing.
    1) Notify the Engineer of the scheduled tests a minimum of 15 days before the date of the test.

5. Test results:
    a. Prepare and submit test results with collected data attached.
6. Contractor is responsible for costs associated with Owner's representatives and Engineer's representative witnessing Source Tests.
    a. Include costs for at least the following:
        1) Transportation:
            a) Travel 1 day on commercial airline to site including air flight costs and $1,600 allowance per person per day.
            b) Travel 1 day on commercial airline from site including air flight costs and $1,600 allowance per person per day.
            c) Rental car from hotel to and from the test site.
        2) Hotel costs at a facility with an American Automobile Association 4 star rating or equivalent for single occupancy room per person per day.
        3) Meal allowance of $60 per person per day.
        4) On-site time: 1 day at the site, unless specified otherwise, including $1,600 allowance per person per day.
    b. If Source Test is not ready when the witnesses arrive or if the Source Test fails, the witnesses will return home with Contractor responsible for costs associated with the trip including costs described above. Contractor is

responsible for rescheduling the Source Test and witnesses' costs associated with the second trip including costs described above.

c. Contractor is responsible for witnesses' costs associated with retests including costs described above.

7. Contractor is responsible for providing fuel, chemicals, and other consumables needed for Source Test.

C. Owner training:
   1. Training instruction format:
      a. The training for operations and maintenance personnel shall be provided as one entity.
      b. Training shall be on site.
   2. Class logistics:
      a. Delivery time minimum: 1 hours.
      b. Delivery time maximum: 2 hours.
         1) Longer time requires Engineer approval.
      c. Schedule specific sessions:
         1) Minimum of 30 days in advance to allow Owner staffing arrangements to take place.
         2) At the times requested by the Owner, within the period 8 a.m. to 4 p.m. Monday through Friday.
            a) Times scheduled will be at Owner's discretion.
         3) Owner approval and confirmation required for session schedules.

D. Installation Testing:
   1. Perform subsystem testing according to accepted Subsystem Testing Plan.
   2. Initiate the Manufacturer's Certificate of Installation and Functionality Compliance.
      a. Manufacturer's Certificate of Installation and Functionality Compliance is included in this Section.
      b. Manufacturer's Certificate of Installation and Functionality Compliance certifies the equipment meets the following requirements:
         1) Has been properly installed, adjusted, aligned, and lubricated.
         2) Is free of any stresses imposed by connecting piping or anchor bolts.
   3. Perform pressure and leakage testing as specified in individual component Sections and Sections 15956.
   4. Perform mechanical equipment Installation Testing: As specified below and in individual equipment Sections, such as Sections 15050 and 15958:
      a. Remove rust preventatives and oils applied to protect equipment during construction.
      b. Flush lubrication systems and dispose of flushing oils.
         1) Recharge lubrication system with lubricant recommended by manufacturer.
      c. Flush fuel system and provide fuel for testing and art-up.
      d. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
      e. Remove temporary supports, bracing, or other foreign objects installed to prevent damage during shipment, storage, and erection.
      f. Check rotating machinery for correct direction of rotation and for freedom of moving parts before connecting driver.
      g. Perform cold alignment and hot alignment to manufacturer's tolerances.
         1)

h. Tighten leaking flanges or replace flange gasket.
    1) Inspect screwed joints for leakage.
i. Ensure that the point of disposal for well production water has been identified and permitted prior to testing.

5. Electrical devices and subsystems Installation Testing: As specified below, in Section 16222 and the technical sections.
    a. Perform insulation resistance tests on all wiring except wiring and control wiring inside electrical panels.
    b. Perform grounding resistance tests on grounding systems.
    c. Test and set relays and circuit breaker trip units for proper operation.
    d. Perform direct current high potential tests on all cables that will operate at more than 2,000 volts.
    e. Motors:
        1) Windings energized to 1,000 volts DC for 1 minute.
            a) Motor resistance measured at the end of the test and recorded.
        2) Check motors for actual full load amperage draw and proper rotation.

E. Functional Testing:
1. Perform subsystem testing according to accepted Subsystem Testing Plan.
2. Notify the Engineer 5 days prior to when the Work is ready for Functional Testing.
    a. Perform testing in the presence of the Engineer.
3. Determine Functional Testing durations with Owner's input.
    a. Durations will vary depending on the availability of water for testing.
    b. Target minimum Functional Test duration: 8 hours.
        1) Identify equipment/system that cannot be tested for a minimum of 8 hours as specified in technical sections.
4. Perform Functional Testing as specified in Contract Documents technical sections.
    a. Perform Functional Testing in addition to the other tests specified in the technical sections.
    b. Perform Functional Testing to demonstrate that the component equipment functions as an entire system in accordance with the design requirements.
    c. Perform Functional Testing to demonstrate that the unit process has operated in a manner necessary to demonstrate equipment/system functions manually in local, manually in remote (or remote manual), and automatically in remote (in remote auto).
    d. Repair or replace parts which operate improperly and retest.
    e. Owner and Engineer provide acceptance of Functional Testing results.
5. Provide completed Manufacturer's Certificate of Installation and Functionality Compliance.
    a. Manufacturer's Certificate of Installation and Functionality Compliance is included in this Section.
    b. Manufacturer's Certificate of Installation and Functionality Compliance certifies the equipment/system meets the following requirements:
        1) Is suitable for satisfactory full-time operation under full load conditions.
        2) Operates within the allowable limits for vibration and noise.
        3) Electrical and instrumentation requirements:
            a) Electrical equipment, instrumentation, and control panels are properly installed, calibrated, and functioning.

b) Electrical Installation Testing is complete and test results have been accepted by the Engineer.
   (1) Noted deficiencies have been corrected.
   (2) Relays, circuit breakers, and other protective devices are set.
c) Motor control is calibrated and tested.

F. Closeout documentation:
   1. Submittals:
      a. Provide records generated during commissioning and process start-up phase of Project.
         1) Required documents include but are not limited to:
            a) Training documentation.
            b) Manufacturer's Certificate of Source Testing.
            c) Manufacturer's Certificate of Installation and Functionality Compliance.
            d) Daily logs of equipment/system testing identifying tests conducted and outcome.
            e) Test forms and documentation.
            f) Logs of time spent by manufacturer's representatives performing services on the job site.
            g) Equipment lubrication records.
            h) Electrical phase, voltage, and amperage measurements.
            i) Insulation resistance measurements.
            j) Bearing temperature measurements.
         2) Due date: Within 14 calendar days of Substantial Completion.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

MANUFACTURER'S CERTIFICATE OF
INSTALLATION AND FUNCTIONALITY COMPLIANCE

OWNER _____EQPT/SYSTEM___
PROJECT NAME _____EQPT TAG NO.___
PROJECT NO. _____EQPT SERIAL NO. ___
SPECIFICATION NO. _____
SPECIFICATION TITLE. _____

I hereby certify that the above-referenced equipment/system has been: (Check Applicable)

- ☐ Installed in accordance with manufacturer's recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical/Instrumentation and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functionally tested.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (Complete system of 1 manufacturer.)

NOTES:
Attach test results with collected data and test report.

Attach written certification report prepared by and signed by the electrical and/or instrumentation subcontractor.

Comments: _____

_____

I, the undersigned manufacturer's representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate this equipment/system and (iii) authorized to make recommendations required to assure that the equipment/system furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____ , 20 ____

Manufacturer: _____

Manufacturer's Authorized Representative Name *(print):* _____

By Manufacturer's Authorized Representative: _____
(Authorized Signature)

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Contract closeout requirements including:
   1. Final cleaning.
   2. Waste disposal.
   3. Touch-up and repair.
   4. Disinfection of systems.
   5. Preparation and submittal of closeout documents.
   6. Final completion certification.

B. Related sections:
   1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
   2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
   3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.
      a. Section 01324C - Progress Schedules and Reports.

1.02 REFERENCES

A. American Water Works Association (AWWA).

1.03 FINAL CLEANING

A. Perform final cleaning prior to inspections for Final Acceptance.

B. Employ skilled workers who are experienced in cleaning operations.

C. Use cleaning materials which are recommended by manufacturers of surfaces to be cleaned.

D. Prevent scratching, discoloring, and otherwise damaging surfaces being cleaned.

E. Broom clean exterior paved surfaces and rake clean other surfaces of site work:
   1. Police yards and grounds to keep clean.

F. Remove dust, cobwebs, and traces of insects and dirt.

G. Clean grease, mastic, adhesives, dust, dirt, stains, fingerprints, paint, blemishes, sealants, plaster, concrete, and other foreign materials from sight-exposed surfaces, and fixtures and equipment.

H. Remove non-permanent protection and labels.

I. Probes, elements, sample lines, transmitters, tubing, and enclosures have been cleaned and are in like-new condition.

1.04 WASTE DISPOSAL

A. Arrange for and dispose of surplus materials, waste products, and debris off-site:
   1. Prior to making disposal on private property, obtain written permission from Owner of such property.

B. Do not create unsightly or unsanitary nuisances during disposal operations.

C. Maintain disposal site in safe condition and good appearance.

D. Complete leveling and cleanup prior to final acceptance of the Work.

1.05 TOUCH-UP AND REPAIR

A. Touch-up or repair finished surfaces on structures, equipment, fixtures, and installations that have been damaged prior to inspection for Final Acceptance.

B. Refinish or replace entire surfaces which cannot be touched-up or repaired satisfactorily.

1.06 CLOSEOUT DOCUMENTS

A. Submit following Closeout Submittals upon completion of the Work and at least 7 days prior to submitting Application for Final Payment:
   1. Evidence of Compliance with Requirements of Governing Authorities.
   2. Project Record Documents.
   3. Operation and Maintenance Manuals.
   4. Warranties and Bonds.
   5. Release of claims as outlined in Conditions of the Contract.
   6. Certificate of Final Completion.

1.07 PROJECT RECORD DOCUMENTS

A. Maintain at Project site, available to Owner and Engineer, 1 copy of the Contract Documents, shop drawings, and other submittals in good order:
   1. Mark and record field changes and detailed information contained in submittals and change orders.
   2. Make annotations in hardcopy format with erasable colored pencil conforming to the following color code:

Additions:	**Red**
Deletions:	**Green**
Comments	**Blue**
Dimensions:	**Graphite**

B. Maintain documents separate from those used for construction:
   1. Label documents "RECORD DOCUMENTS."

C. Keep documents current:
   1. Record required information at the time the material and equipment is installed and before permanently concealing.

D. Affix civil engineer's or professional land surveyor's signature and registration number to Record Drawings to certify accuracy of information shown.

E. Deliver Record Documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

F. Record Documents will be reviewed monthly to determine the percent complete for the monthly pay application.

G. Updated Record Documents are a condition for Engineer's recommendation for progress payment.

H. During progress meetings, Record Documents will be reviewed to ascertain that changes have been recorded.

1.08 CERTIFICATE OF FINAL COMPLETION

A. When Functional Test has been successfully completed, Engineer will certify that new facilities can be utilized for the purposes for which it is intended, therefore the Project has reached Substantial Completion.
   1. Engineer will submit a list of known items (punch list) still to be completed or corrected prior to contract completion.

B. List of items to be completed or corrected will be amended as items are resolved by Contractor.

C. When all items have been completed or corrected, submit written certification that the entire work is complete in accordance with the Contract Documents and request final inspection.

D. Upon completion of final inspection, Engineer will either prepare a written acceptance of the entire work or advise Contractor of work not complete. If necessary, inspection procedures will be repeated.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 02529

MOBILIZATION, DEMOBILIZATION, AND SITE CLEAN-UP

PART 1 - GENERAL

A. Description

This section includes the mobilization and demobilization of equipment, material and personnel for the well site.

B. Related Work Specified Elsewhere

1. Noise Ordinance: See Special Provisions.
2. Protection of Site: See Special Provisions.

C. Measurement and Payment

1. Payment for mobilization shall be made at the lump sum price bid.

2. Payment for demobilization and site clean-up shall be made at the lump sum price bid. Payment will not be made until the site restoration has been approved by the Owner or the Owner's Representative.

PART 2 - EXECUTION

A. Mobilization

Mobilization shall include the purchase of Contract bonds and insurances; transportation of personnel, equipment, and operation supplies to and from the site; establishment of portable sanitary facilities, and other necessary facilities at the site; and other preparatory work at the site, as well as all work at the site necessary to conduct well rehabilitation, chemical treatment, development, and testing operations.

Mobilization shall include making and submitting a pre-mobilization video of the project site thoroughly depicting the as-is conditions of the site and facilities, including: access gates, driveway, perimeter wall/fence, structures, piping, electrical panels, etc.

Mobilization shall include moving associated well head improvements to provide access for well treatment, redevelopment and test pumping equipment. Mobilization includes providing one small, low-profile tank, and two large (21,000 gallon) storage tanks for containment of displacement fluids and for use as settling tanks during development. Contractor will be responsible for protecting and repairing all surfaces, including pavement and curbs, and landscaping.

Other preparatory work shall include traffic abatement barricades, signs, ramps, as well as all necessary soundproofing and proper equipment mufflers. No noise abatement barriers are anticipated for this project.

The mobilization phase will be deemed complete when all items necessary to conduct field operations are on site and operable. The Contractor's Field Superintendent will provide 48-hours notification to the Owner's Representative prior to the start of removal of fill from the bottom of the well. The Contractor's Field Superintendent will notify the Owner's Representative when the mobilization phase, in his terms, is complete. No stand-by time will be allowed during the mobilization phase of the Contract.

B. Demobilization

Demobilization shall include installation of the permanent pump and operation of the pump as observed by the Owner's Representative. Demobilization includes removal of all equipment, materials, and temporary facilities installed during mobilization, well treatment and redevelopment phases of the work. Demobilization will also include restoration of the site to its original or better condition and will include those items specified in the initial site report.

C. Site Clean-up

1. Developed Site

Demobilization and site restoration from a developed site will include, but not be limited to repair of the paved and unpaved ground surface disturbed during mobilization and rehabilitation operations; repair of the concrete pump pedestal that occurs during operations; reconstruction of fences, walls, berms, drains, or other surface features; sweeping of paved areas; repair or replacement of damaged asphalt pavement or concrete curb; and replacement of bushes, trees, or ground cover, which were present prior to commencement of work.

END OF SECTION

SECTION 10020

BRUSHING

PART 1 - GENERAL

A. Scope

The Contractor will clean the entire length of the well casing below the static water level (170 feet) by brushing after chlorine is introduced into the well. The Contractor is advised that 12.25-inch diameter casing extends from the top of casing (9.1 feet below ground level) to the bottom of the sand cellar at depth 643 feet. Approximately 470 feet of casing will be brushed.

B. Payment

Payment shall be made at the hourly price bid for time spent brushing the well. No payment will be made for setting up equipment, assembling the brush, changing the brush or lowering the brush into the well. No payment shall be made to replace the brush to insure the proper brush diameter and that the brush fits tightly in the well.

PART 2 - EXECUTION

The Contractor shall introduce and disperse 10 gallons of sodium hypochlorite (30% active chlorine) throughout the well below the static water level. The Contractor then shall provide a new, wire-brush that fit tightly inside the 12.25-inch casing. The wire-brush will be constructed by drawing wire rope through holes in a 10-foot long section of pipe approximately 8-inches smaller in diameter than the well casing. The brush will be fitted with a swivel at the top to improve cleaning action. Brushing will be performed by using short strokes (1 to 2 feet) with a cable tool rig or pump rig. Brushing will continue for approximately 5 minutes for each 10-foot long interval of casing or screen for a total of 4 hours. Brushing should be accomplished with experienced personnel and care should be taken to not damage the well. Any fluids and debris removed from the well will be temporarily contained to allow the field geologist to observe and sample the material. Discharge on the site will not be allowed to reach the storm drain or otherwise cause a nuisance or unacceptable discharge.

END OF SECTION

SECTION 10025

REMOVE FILL

PART 1 - GENERAL

A. Scope

Following brushing, the Contractor shall suction bail or air lift all fill material collected at the bottom of the well. Approximately 30 feet of fill should be anticipated.

B. Payment

Payment shall be made at the lump sum price bid.

PART 2 - EXECUTION

The Contractor shall remove the fill by suction bailing or air-lifting. Use of a large diameter, heavy scow will not be permitted. Fluids and debris will be temporarily contained to allow the field geologist to observe and sample the material. Fluid and debris discharged on site shall not be allowed to reach the drain inlet or otherwise cause a nuisance or unacceptable discharge. Clear fluid meeting NPDES discharge limits and free of chlorine will be discharged to the onsite drain inlet upon approval of the Owner's Representative.

END OF SECTION

SECTION 10035

CHLORINE CHEMICAL WELL TREATMENT

PART 1 - GENERAL

A. Description

Following acid chemical treatment, the well should be treated using a pH-adjusted chlorination treatment of 200 ppm chlorine dose in a pH range of 6.5 to 7.0. The volume of the disinfection solution should be equivalent to 1.5 times the standing well volume of 2,900, or 4,400 gallons. This work will consist of introducing sodium hypochlorite and NW-410 chlorine enhancer into the well adjacent to the blank casing and screen intervals through a double swab. Swabbing will force the chemical through the well screen into the filter pack and formation.

B. Related Work Specified Elsewhere

1. Solids and Liquid Waste Disposal per NPDES permit (Section 01410)
2. Safety Plan (Section 01329) submitted one week prior to start of acid treatment.

C. Measurement and Payment

1. Payment for chlorine chemical well treatment shall be made at the lump sum price bid.
2. Work shall include chemical dispersal by jetting, double swabbing and removal by air-lifting.

PART 2 MATERIALS

A. Mix and introduce sodium hypochlorite (12 percent available chlorine) and NW-410 chlorine enhancer into the well at a dose of 4 gallons of chlorine and 2 gallons of NW-410 per 1,000 gallons of well volume. A total of 18 gallons of 12 percent sodium hypochlorite and 13 gallons of NW-410 shall be used.

PART 3 - EXECUTION

A. Notify the City 48 hours prior to the start of acid treatment.

B. Contractor shall maintain a record of chemical volumes, mixing, chemical concentrations, and chlorine testing/monitoring in the well. A copy of the field record shall be submitted to the City.

C. The disinfection solution should be blended above ground as follows: fill mixing tank with potable water, add NW-410 and blend thoroughly, check pH (5.5 to 6.0), add liquid chlorine

and mix, and verify pH and chlorine concentration. The chemical mixture shall be introduced into the well through a 10-foot long double swab suspended on a drop pipe, beginning at the top of the well. Disperse the disinfection solution evenly throughout the well with the double swab and lightly agitate throughout the well column. Following agitation, check the chlorine residual within the well to ensure sufficient strength is present. If the chlorine residual has diminished below 100 ppm, add additional sodium hypochlorite to raise it to that level.

D. A small volume of chlorine solution will be placed down the sounding tube and flushed with potable water. The disinfecting agent shall be left in the well overnight (minimum 12 hours).

E. After the minimum contact time (12 hours) and at the direction of the geologist, the chemical should be removed from the well by double-swab and air-lifting. The perforated double swab shall not exceed 10-feet in length between two tight fitting rubber swabs (12.3-inch diameter). Begin evacuation of the well by swabbing and airlifting from the bottom, working upwards, until a minor residual (<10 ppm) is present and all debris has been evacuated from the well, as identified by visible turbidity. Swabbing and airlifting shall continue for 8 to 12 hours. The discharge shall be contained in settling tanks to allow the removal of sediment (settleable and suspended) and dechlorination with sodium thiosulfate, prior to discharge in accordance with the owner's NPDES Permit. At no time will the chemicals be neutralized in the well. Swabbing and air-lifting will be directed by the geologist and is estimated to require 12 hours to remove the chlorine. Air-lifting equipment shall be capable of a minimum of 250 gpm.

END OF SECTION

SECTION 10401

WELL DEVELOPMENT

PART 1 - GENERAL

A. Description

This section covers the redevelopment of the well using double swab and air-lift, and a test pump.

B. Related Work Specified Elsewhere

1. NPDES Permit – Special Provisions and Section 01410.

C. Measurement and Payment

1. Payment for well development will be made at the unit price bid per hour.

2. Payment for containing and treating well development discharge water for proper disposal to the local storm drain system shall be included in the unit price bid per hour for well development. The contractor shall comply with the owner's NPDES discharge permit.

3. Payment for temporary discharge piping will be included in the unit price bid per hour of well development.

4. The time required for well development will be recorded by the hour with 15-minute intervals as the smallest unit of recorded time. The time recorded for payment shall commence when the equipment installed in the well is placed in operation and shall end when development, pumping or testing are stopped at the direction of the Owner's Representative. No payment will be made for running equipment into or out of the well.

5. No payment will be made for delays resulting from (1) equipment stuck in the hole; (2) equipment breakdown; (3) arranging major equipment, pumping or testing apparatus; or (4) failure to conduct the operations in a diligent and workmanlike manner by which the desired results could ordinarily be expected.

PART 2 - MATERIALS

A. Swab

Swabbing of the well shall be done with a close fitting double swab whose outside diameter of the surge blocks shall be approximately 12.3-inches. The perforated section between the surge blocks shall measure no less than 10 feet and no more than 15 feet in length. Individual perforations shall be small and distributed evenly throughout the circumference and length of the swab tool. Total open area of the perforations shall not exceed the inside cross-sectional area of the pipe.

B. Eductor Pipe

The eductor pipe used to support the double swab shall have an inside diameter that allows an air lift pumping rate of 300 gpm.

C. Temporary Water Containment

The Contractor shall provide adequate containment of all discharge waters to permit settlement of suspended solids to a level acceptable by the owner's representative for discharge to the local storm drain system or approved discharge point.

D. Discharge Line

The Contractor shall provide the temporary discharge piping required to convey well development water to the appropriate disposal area.

E. Test Pump and Flow Meter

The pump furnished shall be of the deep well turbine type capable of pumping up to 1,000 gallons per minute (gpm) from a depth of 340 feet. The test pump diameter shall accommodate installation of a 2-inch diameter access pipe (spinner and depth-specific sampling tools) extending below the pump suction. A satisfactory throttling device shall be provided downstream of the flow meter and manometer so that the discharge can be reduced to 300 gpm. An in-line flow meter with 6-digit straight reading totalizer and rate of flow indicator dial, which reads in gallons per minute, will be installed in the discharge pipe.

F. Test Engine

The test engine shall perform consistently and continuously without erratic or variable rpm. The test engine shall be equipped with mufflers and additional sound proofing at the engine to meet the noise reduction requirements as required by the City's municipal code. The test engine shall not expel oil, fuel or hydraulic fluids from the blow-by or exhaust.

PART 3 - EXECUTION

A. Record Keeping

1. The Contractor shall prepare a daily log documenting the start and end time of development, flow rates, field water quality parameters of discharge water (pH, temperature, electrical conductivity, turbidity, chlorine residual), and sand content.

2. A copy of the daily field log shall be submitted to the Owner at the conclusion of air lift development and after pumping development.

B. Development with Air-Lift Swab

1. The Contractor shall commence development with air-lift swab equipment within 12 hours after completion of the chlorine treatment and chlorine removal.

2. Air-lift swab development shall proceed from the top of the screen to the bottom of the screen. Swabbing shall continue for the full depth of the well.

3. The double swab shall be raised and lowered for a minimum of 20 minutes every 20 feet of screen. Simultaneously, water shall be lifted with air inside the drop pipe. After the water becomes free of sediment and there is no more movement of the gravel pack, the swab shall be lowered to the next interval.

4. The Contractor shall run clean water continuously down the gravel feed tube during the operation and add gravel as needed.

5. The Contractor shall suction bail or air-lift sediment from the bottom of the well as required.

6. It is anticipated that surging and air lifting shall continue for approximately 24 hours or until all sand and mud have been washed through screened sections of the well to the satisfaction of the Owner's Representative. Upon completion of this procedure, the well shall again be bailed or air lifted clean of all accumulated sediment to its full depth.

C. Development with Test Pump

1. Within 2 to 5 days after completion of well development using the air-lift swab, the Contractor shall commence well development by using the test pump.

2. The quantity of water being pumped from the well at commencement of development pumping shall be limited and gradually increased as the water clears. From time to time, the pump shall be stopped and the water in the pump column allowed to flow back through the pump bowls and through the screened sections of the well into the aquifers. This procedure, with increasing pumping rates, shall be repeated as development of the well continues and shall be done in a manner

satisfactory to the Owner's Representative.

3. Development of the well shall be continued for approximately 24 hours or until the well produces not more than 2 parts per million of sand by volume, 15 to 20 minutes after surging at a pumping rate of 800 to 900 gpm.

4. During the development, the rate of sand production shall be measured by the Contractor using a centrifugal sand separating meter as described in the Journal of American Water Works Association, Volume 46, No. 2, February 1954. The centrifugal sand-separating meter shall be furnished by the Contractor. The results of all sand production tests shall be expressed in parts per million at 5 minute intervals and shall be provided to the Owner's Representative immediately. The final sand production test shall be conducted in the Owner's Representative's presence.

5. Clean water shall be added continuously down the gravel feed tube during development.

6. If, during the development operations, there is any indication of settlement of the gravel envelope, more gravel shall be added as needed and the quantity recorded and reported to Owner's Representative.

7. After completion of development pumping, the Contractor shall measure the depth of the well to determine the amount of sediment deposited in the bottom. If the amount of sediment is greater than 10 feet, the Contractor shall pull the pump and clean the well of all accumulated sediment and foreign material and reinstall the pump.

END OF SECTION

SECTION 10405

FLOW METER SURVEY AND DEPTH-SPECIFIC SAMPLING

PART 1 - GENERAL

A. Description

This section covers the performance of a vertical spinner flow meter survey to determine the relative production from each screen interval. The flow meter survey shall be performed during the end of the constant discharge pumping test. Depth-specific water samples shall be collected based on the results of the spinner survey.

B. Submittal

Contractor shall submit the name and qualifications of the firm retained to conduct the flow meter survey with the Bid Documents.

C. Measurement and Payment

1. Payment for the flow meter survey shall be made at the lump sum price bid and shall include the cost for pulling the pump, cleaning the well, and reinstalling the pump.

2. Payment for depth-specific water samples will be made at the unit cost bid.

3. No additional payment will be made for pump crew, pump time or idle time while the survey is being run.

PART 2 MATERIALS

A. The spinner flowmeter equipment shall be run on a wire line and capable of both static measurements and dynamic down-well runs, to continuously measure and record vertical flow (fluid velocity) in the well. The equipment shall be equipped with a line speed indicator that is recorded on the log for each dynamic down run.

PART 3 - EXECUTION

A. Upon completion of any required well cleaning after pumping development, the Contractor shall reinstall the pumping equipment used for well development along with 2-inch diameter access tube. The flow meter survey shall be performed during the last hours of the constant discharge pumping test.

B. The flow meter survey shall be conducted from the base of the 2-inch access to the top of the sand cellar. The survey shall be run at a constant discharge rate that will be determined in the field by the Owner's Representative. Both static and dynamic tests shall be made from the base of the 2-inch sounding tube/temporary access tube to the bottom of the well, as directed by the Owner's Representative. Each static test shall consist of two-minute readings made at 10-foot increments. Three dynamic runs in the downward direction shall be conducted at varying line speeds selected in the field to optimize deflection on the spinner rates. The record for each test shall indicate either meter speed or percentage of total meter speed with depth. The meter used for the survey shall be calibrated within the uppermost and lowermost blank sections of the well casing.

C. The flow meter survey shall become the property of the Owner at the time the survey is completed. The survey shall be run in the presence of the Owner's Representative. The Contractor shall provide **four (4) field copies** of the survey to the Owner's Representative immediately upon completion. The Contractor and his Subcontractor will provide an analysis of the flow data estimating relative production. Provide a profile of the relative production at minimum of 1-foot increments where zonal percentage of flow and fluid velocity can be derived over any given interval (intervals shall be determined by Owner's Representative). Provide **seven final copies** of the spinner logs and within 7-days of completion, at no additional cost. Flow meter survey measurements shall be run on digital/analog equipment. Results of the spinner survey shall be provided in the following electronic digital formats on CD/DVD: TIFF, DWG or DXF (compatible with AutoCAD) and ASCII.

D. The Contractor shall be required to provide whatever assistance may be required to accomplish the flow meter survey.

E. Depth-specific water samples shall be collected at depths determined by the Owner's Representative after reviewing the spinner log. The contractor shall obtain up to 2 liters of sample at each depth. The sampler shall be placed under vacuum pressure to obtain discrete samples at the specified depth. The sample equipment shall be disassembled and thoroughly cleaned prior to collecting each sample.

F. After the flow meter survey, the Contractor shall remove all sediment from the bottom of the well and demonstrate that the well has been properly cleaned by measuring the depth of the well in the presence of the Owner's Representative.

END OF SECTION

SECTION 10410

WELL PRODUCTION AND AQUIFER TESTS

PART 1 - GENERAL

A. Description

This section covers pumping tests that include the step drawdown test with increasing discharge rate; a constant rate discharge test; and time-recovery test.

B. Measurement and Payment

1. Payment for testing will be made at the unit price bid per hour.

2. Payment for containing and treating pumping test discharge water for proper disposal to the local storm drain system or approved discharge point shall be included in the unit price bid per hour for test pumping.

3. Payment for temporary discharge piping will be included in the unit price bid for test pumping.

4. The time required for testing will be recorded at one-half hour intervals as the smallest unit of recorded time. The time recorded for payment shall commence when the equipment installed in the well is placed in operation and shall end when the operation is stopped at the direction of the Owner's Representative.

5. No payment will be made for delays resulting from (1) equipment stuck in the hole; (2) equipment breakdown; (3) arranging major drilling, pumping or testing apparatus; or (4) failure to conduct the operations in a diligent and workmanlike manner by which the desired results could ordinarily be expected.

PART 2 - MATERIALS

A. Discharge Line and Meter

The Contractor shall provide the temporary discharge piping required to convey well testing water to the appropriate discharge point as shown on the project plans. The discharge pipe shall include an in-line meter with 6-digit, straight reading totalizer, registering in units of 100 gallons with a rate of flow indicator dial which reads in gallons per minute, and is suitable for a flow range of 300 to 2000 gpm. **The flow meter shall be factory calibrated at three different rates (500, 750, and 1000 gpm) prior to use on this job. The Contractor shall furnish results of the manufacturer's calibration to the Owner's**

Representative prior to conducting the pumping tests. The discharge line shall also include a tap not more than 20 feet from the well with a valve to take water samples and measuring sand content.

C. Test Pump

The pump furnished shall be of the deep well turbine type capable of pumping up to 1000 gallons per minute (gpm) from an estimated maximum pumping level of 320 feet. A satisfactory throttling device shall be provided downstream of the flow meter so that the discharge can be reduced to 300 gpm.

D. Water Level Probe

The Contractor shall furnish an electrical depth gage capable of indicating changes in the well water level to the nearest one-hundredth foot and shall furnish and install an air line with direct reading gage calibrated in feet. The Contractor shall provide whatever assistance may be required by the Owner's Representative.

PART 3 - EXECUTION

A. General

Within 48 hours after the completion of well development with a test pump, the Contractor shall commence the well production and aquifer tests. The Contractor shall schedule all tests in advance so that the Owner's Representative can be on site throughout each testing period.

B. Step Drawdown Test

1. The well shall be "step" tested at rates of approximately 1/2, 3/4, 1, and 1-1/4 times the capacity of the well, unless otherwise directed by the Owner's Representative. The original capacity of the well was 1,000 gpm.

2. The complete test for the well is estimated to require approximately 12 hours.

3. The Contractor shall operate the pump and change the discharge rate as directed by the Owner's Representative.

4. Discharge rate from the pump shall be controlled by both a gate valve and engine throttle. The discharge shall be controlled and maintained at approximately the desired discharge for each step with an accuracy of at least plus or minus 5 percent.

5. During the test, the Contractor will record the time, pumping level, discharge rate, and rate of sand production every 15 minutes.

6. The rate of sand production will be measured by the Contractor using a centrifugal sand separating meter as described in the Journal of American Water Works Association, Volume 46, No. 2, February 1954. Rate of sand production will be determined at 5-minute intervals. The results of all sand production tests will be expressed in parts per million at 5 minute intervals. The centrifugal sand-separating meter shall be furnished and installed by the Contractor.

C. Constant Discharge Test

1. A constant discharge test shall commence not less than 12 hours after completion of the step drawdown test. The rate of pumping shall be determined by the Owner's Representative. The Contractor shall insure that the pumping rate selected remains constant throughout the test. The test duration shall be approximately 12 hours. When the test is completed and the pump stopped, the Owner's Representative will measure recovery of the water level in the well for a period of approximately 24 hours.

2. During the drawdown and recovery tests, the Contractor will record the discharge rate, sand production rate, the time and measure the water level in the pumped well at 15 minute intervals.

3. The Contractor shall provide experienced and qualified personnel on a 24-hour basis during both the step drawdown and constant discharge pumping tests to assure proper operation of the pumping test equipment and assist Owner's Representative when necessary.

4. No payment will be made to the Contractor for pumping tests interrupted by the malfunctioning or failure of pumping equipment. If the test is interrupted, the water levels will be allowed to fully recover, after which the test will be restarted.

5. When the production tests are complete, Contractor shall remove the pump and clean the well of all accumulated sediment and foreign material. The Contractor shall demonstrate that the well has been properly cleaned by measuring the depth of the well in the Owner's presence.

END OF SECTION

SECTION 10510

VIDEO CAMERA SURVEY

PART 1 - GENERAL

A. Description

This section covers the performance of a color video camera survey over the full depth of the well. The camera survey will be run by a firm retained by the Contractor and approved by the Owner's Representative.

B. Submittal

1. The Contractor shall submit the name and qualifications of the firm retained to perform the camera survey with the Bid Documents.

2. The DVD disks shall be provided to the Owner's Representative at the time the survey is completed.

C. Measurement and Payment

1. The payment for the survey shall be at the bid lump sum price.

2. There will be no additional payment for rig time or idle time while the survey is being run.

PART 2 - MATERIALS

A. Camera

The camera used for the survey shall be equipped with centralizers and dual lens to provide both vertical (axial) and side scan without the use of mirrors. High resolution 3.5-inch diameter camera should be provided to access the open well and/or permanent 4-inch diameter sounding tube with camera port. The equipment used by the firm for the color video camera survey shall produce a recording with an automatic depth indication.

B. Digital Video Disks

The Contractor shall provide the Owner's Representative with four (4) DVD disks of the camera survey.

PART 3 - EXECUTION

A. Prior to conducting the camera survey, all tools shall be pulled and the well allowed to remain idle for at least 24 hours. During this period and the camera survey, 15 gpm of clear water shall be run in to the well below the water surface. The camera survey shall be run for the full depth of the well. The survey shall be run in the presence of the Owner's Representative. If the water clarity prevents a clear video survey, the survey will be rerun after corrective measures are implemented by the Contractor.

B. The Contractor shall be required to provide whatever assistance may be required to accomplish the camera survey.

C. The video survey shall become the property of the Owner's Representative at the time each survey is completed.

END OF SECTION

SECTION 10520

WELL DISINFECTION

PART 1 - GENERAL

A. Description

This section covers the disinfection of the well using chlorine per the State of California Water Well Standards and AWWA Standard C654-13.

B. Payment

Payment shall be made at the lump sum price bid.

PART 2 - MATERIALS

The disinfectant shall be sodium hypochlorite (12.5 percent available chlorine) in liquid form, used at a dose of 1 gallon per 1,000 gallons of well volume, and pH adjustment with NW-410 at a dose of 1 gallon per 1,000 gallons of well volume.

PART 3 - EXECUTION

A. The disinfecting agent and NW-410 shall be premixed and shall be uniformly applied throughout the entire water depth of the well using a drop pipe or perforated double swab. The dispersion of the disinfectant shall be assisted by pouring into the well a volume of water equal to the volume of water contained in the well, after the disinfectant has been emplaced. This will cause the disinfectant to flow out of the well into the area adjacent to the screen. A small volume of disinfection solution shall be placed down the sounding tube.

B. All accessible portions of the well above the water level shall be maintained in a damp condition with water containing the required concentration of disinfecting agent for a period of not less than 20 minutes. The disinfecting agent shall be left in the well.

END OF SECTION

SECTION 11313I

SUBMERSIBLE PUMPS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Submersible well pumps.

B. Tag numbers: As specified in Pump Schedule.

C. Related section:
   1. Section 01330 - Submittal Procedures.
   2. Section 01600 - Product Requirements.
   3. Section 01756 - Commissioning.
   4. Section 15050 - Common Work Results for Mechanical Equipment.
   5. Section 15958 - Mechanical Equipment Testing.

D. The submersible pump, column pipe, motor, and well head connections are OWNER provided. The CONTRACTOR is responsible for all installation, disinfection, and testing of the new well pump.

1.02 REFERENCES

A. American Water Works Association (AWWA):
   1. C654 - Disinfection of Wells.

B. ASTM International (ASTM):
   1. A48 - Standard Specification for Gray Iron Castings.
   2. A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   3. A276 – Standard Specification for Stainless Steel Bars and Shapes.
   4. A283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
   5. A516 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service.
   6. A536 - Standard Specification for Ductile Iron Castings.
   7. A582 - Standard Specification for Free Machining Stainless Steel Bars.
   8. B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
   9. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
   10. F594 - Standard Specification for Stainless Steel Nuts.

C. The Hydraulic Institute (HI):
   1. 2.1-2.2 - Rotodynamic (Vertical) Pumps for Nomenclature and Definitions.
   2. 2.3 - Rotodynamic (Vertical) Pumps for Design and Applications.
   3. 2.4 - Rotodynamic (Vertical) Pumps for Manual Describing Installation, Operations, and Maintenance.

4. 9.1-9.5 - Pumps - General Guidelines for Types, Definitions, Application, Sound Measurement and Decontamination.
5. 14.6 – Rotodynamic Pumps for Hydraulic Performance Acceptance Tests.

D. National Electrical Manufacturers Association (NEMA).

E. NSF International (NSF):
1. Standard 61 - Drinking Water System Components - Health Effects.

1.03 DEFINITIONS

A. Pump head (total dynamic head, TDH), flow capacity, pump efficiency, net positive suction head available (NPSHa), and net positive suction head required (NPSHr): As defined in HI 2.1-2.2, 2.3, 2.4, 9.1-9.5, and 14.6 and as modified in the Specifications. The pump head and efficiency are evaluated at the outlet of the discharge head and include the net losses in the pump column and discharge.

B. Flow, head, efficiency, and motor horsepower specified in this Section are minimums unless stated otherwise.

C. Suction head: Gauge pressure available at pump intake flange or bell in feet of fluid above atmospheric.

D. Tolerances: This Section and related sections contain tolerances that may be more stringent than Hydraulic Institute Standard tolerances. Where tolerances are not mentioned, Hydraulic Institute Standards 2.1-2.2, 2.3, 2.4, and 9.1-9.5 shall apply.

1.04 SUBMITTALS

A. Submit as specified in Section 01330.

B. Commissioning submittals:
1. Provide Manufacturer's Certificate of Source Testing as specified in Section 01756.
2. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756.

1.05 SYSTEM DESCRIPTION

A. Product requirements as specified in Section 01600 and Section 15050.

1.06 WARRANTY

A. As specified in the General Conditions.

PART 2 PRODUCTS

A. Permanent pump, column pipe, electric motor, and well head connections will be provided by the OWNER.

PART 3 EXECUTION

3.01 STERILIZATION

A. Disinfection procedures shall be in accordance with AWWA C654.

B. Samples for bacteriological analysis shall be collected in a sterile container at the pump discharge, and a test made for coliform organisms.
   1. After sterilization, the well shall be pumped at open discharge until at least 100,000 gallons of water have been pumped before the samples are collected.
   2. Water samples shall be collected from the well on 3 successive days and analyzed for coliform organisms with each sample showing that no organisms were found before the well is accepted for showing the water is coliform free.
   3. The samples shall be collected by a laboratory approved by the Owner and the test for coliform organisms shall be made by the laboratory, and the Owner shall be furnished a copy of the laboratory report.
   4. If any coliform organisms are found present in the samples, the Contractor shall re-sterilize the pump and have the water resampled as stated above until such time as no coliform organisms are found present in a water samples collected after at least 100,000 gallons of water have been pumped from the well following sterilization, or until such time as the Owner becomes convinced that coliform organisms exist naturally in the water-bearing formation and are not present in water produced from the well as a result of the operations of the Contractor.
   5. All expenses of sterilization of the pump and laboratory analyses for coliform organisms shall be borne by the Contractor.

C. The water discharged by the pump following disinfection shall be dechlorinated to a level of 2.0 or less milligrams per liter chlorine before it is allowed to leave the site.

3.02 COMMISSIONING

A. As specified in Section 01756 and this Section.

B. Functional testing: As specified in Pump Schedule.
   1. Process test.

3.03 PUMPS SCHEDULE

Tag Numbers	Well 5
General Characteristics:	
Application	Drinking Water
Well No.	5
Service	Raw Well Water
Quantity	1
Inner / Outer Casing Diameter at land surface, inches	
Estimated static water level, feet[1]	

Tag Numbers	Well 5
Estimated field head at 500 gpm, feet	
Column pipe, air line and pressure transducer setting, feet[1]	
Maximum Pumped Fluid Degrees Fahrenheit	
Pump Characteristics:	
Number of Stages	Per Manufacturer
Maximum diameter of motor, inches	Per Manufacturer
Maximum diameter pump bowl assembly, inches	Per Manufacturer
Maximum Column Section Lengths, Feet	40
Column pipe internal diameter, inches	5 inches
Speed Control	Variable Frequency Drive
Maximum Pump rpm	1800
Field Quality Control Testing:	
Performance Test Level	3
Vibration Test Level	None
Noise Test Level	None

END OF SECTION