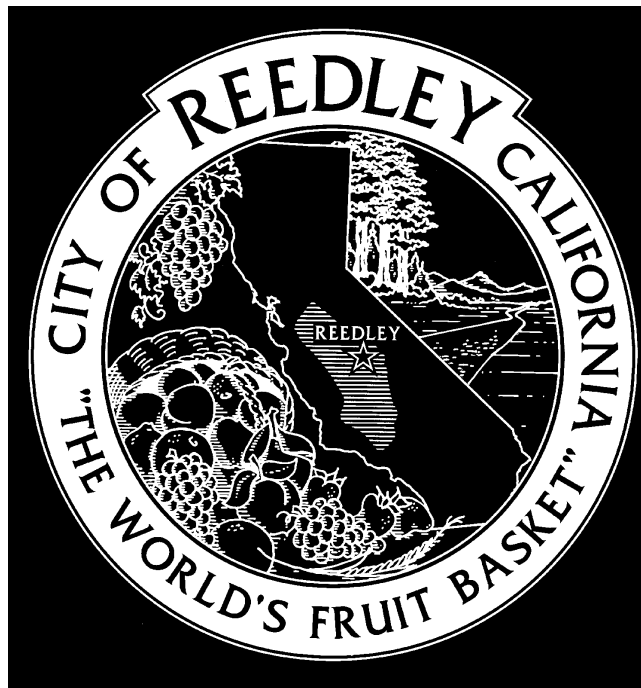


SEWER LIFT STATION

Appendix A



February, 2020

SECTION 1

GENERAL

All work involved in constructing sewer pump stations shall conform to the applicable provisions of the California Department of Transportation Standard Specifications, current edition, hereinafter referred to as Standard Specifications, City Standards, the improvement plans and these specifications.

The following specifications represent the minimum specifications allowable for a duplex sewer pump station. Additional features or specifications may be required as needed.

SECTION 2

REINFORCED CONCRETE

Scope of Work:

The work included herein shall conform to Section 51 "Concrete Structures" and Section 90 "Portland Cement Concrete" of the Standard Specifications. This work shall consist of furnishing all labor, tools, equipment and materials necessary for the installation of all structural concrete, minor concrete and mortar as shown on the plans and specified herein.

Structural Concrete:

Strength:

The minimum ultimate (28 days) compressive strength of all structural concrete shall be 4000 psi.

Concrete Mix:

All structural concrete shall be Class "A" (564 pounds of cement/cubic yards of concrete) with Type II Portland Cement. The maximum size of aggregate shall be 1½ inches.

Slump:

The amount of water used for mixing (including free moisture carried by the aggregate) shall not exceed the maximum necessary to produce a 4-inch slump as determined by ASTM test method C-143.

Placing:

Concrete shall be placed in accordance with Section 51-1.03D "Placing Concrete" of the Standard Specifications.

Forms:

All formwork shall conform to Section 51-1.03C(2) "Forms" of the Standard Specifications.

Defective Concrete:

Concrete not meeting the minimum strength requirement, not formed as indicated, not true to intended alignment, which has large voids or rock pockets, which has wood or other debris embedded which has a surface deviation greater than 1/8 inch in 10'-0", or does not fully conform

to the specifications shall be deemed defective, and if so directed by the Engineer, shall be removed and replaced with concrete complying with the drawings and specifications.

Minor Concrete:

Concrete Mix:

All minor concrete shall be Class "A" (564 pounds of cement/cubic yards of concrete) with Type II Portland Cement. The maximum size of aggregate shall be 1 inch.

Formwork:

Earthen forms for exterior concrete surfaces shall be allowed only upon approval by the Engineer. The acceptability of the earthen forms shall be solely decided upon by the Engineer.

Mortar:

All mortar shall conform for Section 51-1.02F "Mortar" of the Standard Specifications.

Non-Shrink Grout and Drypack:

Non-Shrink grout shall conform to Section 50-1.03B(2)(d), "Bonding and Grouting" of the Standard Specifications with a required admixture using the following proportions:

Portland Cement.....	1 part by Wt.
Sand (100% Passing #8 Sieve.....	1 part by Wt.
Water.....	4 ½ - 5 ½ gal./sack cement
Sika "Intraplast" N Admixture.....	1 % by Wt. of cement

Drypack shall be composed as for grout except that only enough water shall be added to wet the mixture (no free water and no slump). Drypack shall be tamped into place and cured as specified for concrete in this section.

Contractor shall not use non-shrink grout or drypack that has been mixed longer than 30 minutes. No retamping shall be allowed.

Finishes on Concrete Surfaces:

Entire pump station shall be built on concrete surface. All surface areas (including sump and vault areas) shall be flush with 2% maximum grade sloping towards drains. The contractor shall give a monolithic finish to the concrete surfaces on all floors and slabs within and adjacent to the structures which are to be constructed under this contract. All concrete surfaces to be so finished shall be thoroughly worked, brought to a uniform smooth finish and given a final brush finish.

Curing:

All newly placed concrete shall be kept moist for the first seven (7) days after the concrete has been placed. This shall be achieved by one of the following methods:

1. Ponding

2. Cotton mats, rugs or carpets kept continuously wet.
3. Kraft paper or plastic film with joints dealing or tapered. The perimeter of the paper shall be sprinkled once daily.
4. Curing compound method: All exposed cast in place concrete shall be cured with white pigmented curing compound (Type 2) in accordance with Section 90-1.03B “Curing Concrete”, of the Standard Specifications.

Forms may be used to cure formed portions in accordance with Section 90-1.03B(5) “Forms-In-Place Methods” of the Standard Specifications. If the forms are removed prior to seven (7) days after the pour, the newly exposed areas shall be cured for the remainder of the seven (7) days by one of the above methods.

SECTION 3 METAL WORK

Scope of Work:

The work included herein shall conform to Sections 52-“Reinforcement”, 55 - “Steel Structures” and 75 - “Miscellaneous Metal” of the Standard Specifications. This work shall consist of furnishing all labor, tools, equipment and materials necessary for the installation of all reinforcing steel, structural steel and miscellaneous metal as shown on the plans and specified herein and as directed by the Engineer.

Reinforcing Steel:

Materials:

1. Bars shall be deformed bars conforming to ASTM A-615, as follows:

<u>Bar Size</u>	<u>Grade</u>
#4 and smaller	Grade 40
#5 and larger	Grade 60

2. All reinforcing steel shall be new, clean, free from oil, dirt, loose mill scale, excessive rust, mortar, or other coatings that would destroy or reduce the bond.

Placing Reinforcement:

The bending and placing of all reinforcement shall conform to the “Manual of Standard Practice” of the American Concrete Institute. Bends shall be made around a pin having a diameter of not less than four (4) times the bar diameter for stirrups and ties, six (6) times the bars except for bars larger than 1" which shall be eight (8) times the bar diameter. Bars shall be bent cold.

Reinforcing shall be accurately placed in accordance with the drawings and shall be securely tied in position with at least No. 16 gauge annealed wire at all bar intersections. Metal chairs and bolsters shall be used to hold all steel above the form bottoms at the proper distance. Metal spacers shall be used to secure the proper spacing of the steel. Precast concrete blocks shall be used to support reinforcing steel off the ground in footings and off the soffit of concrete exposed to weather. The clear distance between parallel bars shall not be less than 1 ½ times the bar diameter, but in no case less than 1 ½ inches nor less than 1 ⅓ times the maximum size of coarse aggregate.

Splices shall be made with a lap of at least 30 bar diameters unless noted otherwise. The bars shall be placed and wired together in such a manner as to maintain a clearance of not less than the minimum clear distance to the other bars and to the surface of the concrete. Minimum clear distance to all concrete surfaces shall be 2 inches unless otherwise noted on the plans.

Pump Access Covers:

The wet well shall be equipped with a pump access cover for each pump as shown on the plans. Access covers shall be stainless steel-fitted aluminum construction, designed for access to submersible pumps. Pump access cover shall be equipped with spring door operators and automatic hold open arms. Safety grate shall be installed over sump. Covers shall be equipped with a guide bar bracket, safety chain hook, electric cable support, and a hasp for a padlock. Covers shall be of a size compatible with the pumps. Safety grate shall be installed over sump.

Valve Box Access Cover:

Cover shall be double leaf, channel frame aluminum construction with stainless steel hardware and a hasp for a padlock. Cover shall be of a size compatible with valve box opening, minimum size shall be 8' x 8'. The cover shall withstand a live-load of at least 300 pounds per square foot and be equipped with spring door operators and automatic hold open arms. The cover construction shall have a mill finish with Bituminous Coating applied to exterior of the frame.

Access Ladders:

All valve boxes shall be equipped with stainless steel access ladders with three foot (3') tall extension handle.

Anchor Bolts and Concrete Anchors:

Concrete anchorage devices shall be installed in the concrete as shown on the plans so that the attached equipment will bear firmly against the concrete. The concrete anchors for the pump discharge mount shall be RED HEAD RED-CHEM STAINLESS STEEL CONCRETE ANCHORS, $\frac{3}{4}$ " Diameter, or approved equal.

Bolted Connections:

All bolts, nuts and washers within the wet well shall be stainless steel.

SECTION 4 PAINTING

Scope of Work:

Under this item, the Contractor shall furnish and apply to the satisfaction of the Engineer, protective coatings in colors as selected by the Engineer. All exposed interior and exterior metal surfaces, except aluminum, galvanized steel, stainless steel and chrome plated metal, shall be coated. All concrete shall be coated except concrete exposed and above grade.

All coatings shall be delivered in original containers and shall be applied in strict accordance with the recommendations of the manufacturer.

Preparation of Surfaces:

Concrete Surfaces:

Concrete surfaces which shall be coated for the purpose of protecting the concrete surface, shall have all air pockets or other imperfections in the concrete filled, so that a smooth concrete surface results, after the forms have been removed, it shall be accomplished soon after the removal of the forms to promote adequate adhesion. Covering over the surface with a thin layer of mortar shall not be acceptable.

Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with profile to meet as a minimum ICRI CSP 4-CSP 6 profile and porosity to provide a strong bond between the protective coating and the substrate. Use high-pressure water cleaning equipment capable of a minimum of 4,000 psi at 3.5 gpm with a turbo head jet nozzle, high pressure water jetting (refer to SSPC-SP13/NACE No. 6), abrasive blasting, shot blasting, grinding scarifying or acid etching may be used.

Metal Surfaces:

All metal work to be coated shall be absolutely clean and free of all rust and grease, and prepared per surface preparation standards SSPC-SP10.

Completion of Surface Preparation:

After the Contractor has completed the job of preparing all surfaces to be painted, the surfaces shall be inspected and approved by the Engineer prior to the application of any protective coatings.

Materials:

Under these specifications, all coating products to be furnished for application shall be as manufactured by Koppers, or approved equal.

Coating System (New/Smooth Concrete Wet Well):

- A. Apply Raven 175, penetrating primer, or approved equal, per manufacturer's specifications.
- B. Apply Raven 405, or approved equal, per manufacturer's specifications. The completed surface shall have a dry film thickness of at least 80 mil.
- C. Spark test coating in the presence of the City inspector prior to final acceptance.

Exterior Concrete Coating:

Coating System A shall be used to paint the wet well and valve box exterior surfaces in contact with the soil.

Interior Concrete Coating:

After surface preparation, the Contractor shall paint all submerged concrete surfaces, surfaces exposed to sewage fumes, and all valve box interior with coating System B. Coating must be spark tested in the presence of the responsible City staff prior to acceptance.

Wet Well Metalwork Coating:

All exposed metalwork surfaces which are submerged or subjected to sewage fumes shall be painted with coating System B. Metal located within water containing compartments shall be considered submerged. The pumps, pump discharge, pump power cables and lifting cables are not to be coated. Also, the access covers are not to be coated.

Valve Box Metalwork Coating:

All exposed metalwork surfaces in the valve box shall be coated with coating System C. The access cover is not to be coated.

SECTION 5 PIPEWORK

Scope of Work:

Under this section, the Contractor shall furnish all labor and materials for, and shall install, complete and test as specified, all pipework and appurtenances constructed under this contract.

Shop drawings are required to be submitted by the Contractor to the Engineer for all fabricated pipework, valves and special fittings.

Materials:

PVC Gravity Sewer Pipe:

PVC sewer pipe shall conform to City of Reedley standards and the requirements of ASTM D3034, SDR 35, and shall have gasketed joints.

PVC Force Main:

PVC force main shall conform to AWWA C900 and shall be class 150.

Ductile Iron Pipe (D.I.):

Ductile iron pipe and fittings shall be ceramic epoxy lined. Pipe joints shall be flanged as shown on the plans. Applicable sections of the following standards apply.

<u>Standard</u>	<u>Item</u>
AWWA C151	Ductile Iron Pipe
AWWA C110	Fittings
AWWA C111	Rubber Gasket Joints

Cast Iron Fittings (C.I.):

Cast iron fittings shall be in accordance with the American Water Works Association Standard C110-77, "Ductile-Iron and Gray-Iron fittings"

Couplings and Flanges:

In the locations shown on the plans, flanged coupling adaptors shall be Ford Style FFCA and flexible couplings shall be Ford Style FCI or approved equal.

Flanges shall be of a size and pattern to fit valves and other piping to which they are to be connected.

Small Piping and Fittings:

These specifications shall apply to all metal pipe four inches (4") in diameter and smaller, other than cast iron piping, and shall also apply to all valves and cocks, unions, fittings, and connecting devices, and to pipe lines furnished as a part of the piping and equipment items within the pump station. Small pipe shall include all nuts, bolts, gaskets, hangers, supports, the drilling of holes and flanges, and all materials and labor that may be necessary to the best installation of this class of work.

Fittings:

All screwed fittings shall be "American Standard Malleable Iron Screwed Fittings", 300 lb. W.O.G. of standard form and dimensions. Malleable iron shall conform to current standard specifications for malleable iron.

Castings, as adopted by the American Society for Testing Materials. All fittings shall be galvanized to correspond with pipe on which they are installed.

All fittings necessary for the satisfactory alignment and arrangement of piping and all necessary unions and cleanouts shall be furnished by the Contractor.

Plug Valve:

All plug valves shall have standard flanged ends. Each valve shall have a 2" square operating nut. Valves shall correspond in size with the run of pipe on which it is installed, except as otherwise noted. Plug valves shall be AWWA, C517-16, or approved equal.

Swing Check Valve:

Check valves shall be flanged, iron body, bronze-mounted check valves. Hinge pins shall be stainless steel or other noncorrodible metal, and the stuffing box assembly shall be made of bronze, securely screwed to the valve body. Swing check valves shall be Mueller check valves catalog number A-2600-6.02 or approved equal.

Pipework in Concrete:

Where formed holes are left in the concrete, the Contractor shall be responsible for the accuracy of their location and for sealing with Link-Seal ® (stainless steel hardware or approved equal) around pipes to produce water tightness where necessary. Contractor shall also provide any necessary pipeline openings through the concrete which may have been omitted.

Domestic Water Service:

The Contractor shall provide and install all items as shown on the plans and as needed to supply 2" water service per City of Reedley Standard Plan W-5.

Reduced Pressure Backflow Preventer:

The backflow preventor shall be a reduced pressure principle type and shall be suitable for supply pressure up to 175 psi. The backflow preventor shall be designated for inline servicing. The device shall be Febco Model 825Y for a 2" service, or approved equal.

Domestic Water Spigots:

Contractor shall supply one (1) spigot as shown on the plans.

Wet Well Water Stops:

All cored openings in the wet well wall shall be sealed with Link-Seal ® (or approved equal) water stops secured by stainless steel hardware and non-shrink grout as specified in Section 2.

Discharge Wash-Down Assembly:

Wash-down assemblies as shown on the plans shall use 8" x 1" Tap Rockwell 323 Double Strap bronze saddles, or approved equal.

Wet Well Construction:

Wet well shall be constructed using Class IV reinforced concrete pipe sections manufactured to meet ASTM Standards C76, C443, and C655 and shall be sized accordingly depending on the hydraulics' calculations and as approved by the City Engineer. The wet well shall be constructed with no more than three pipe sections. The lower wet well section shall be a minimum of 6 feet in length.

Interior surfaces shall be seal coated prior to the installation of pumps. The discharge connection mating surface shall be kept clean and free of all coatings.

Sewer Manholes:

The Contractor shall construct the sewer manholes as shown on the plans per City of Reedley Standard Plan S-4.

SECTION 6 MECHANICAL EQUIPMENT

Scope of Work:

Under this section the Contractor shall furnish and install all mechanical equipment and appurtenances for this project as shown on the plans and hereinafter specified. All such equipment shall be placed by the Contractor in satisfactory operating condition as an integral part of the construction of the project.

The Contractor shall provide and install all necessary items and appurtenances required for the proper placement and functioning of the project components as intended, whether such items and appurtenances are directly specified or not.

All equipment shall be designed, manufactured and assembled in such a manner so as to perform satisfactorily within housings, enclosures and the environment into which it is to be installed and operated. All items shall be tested in place. Required supervision for installing, testing and starting shall be furnished by factory-trained personnel at no charge.

The Contractor shall verify all actual dimensions of existing and new construction equipment areas, bases and mountings; and shall be responsible for ensuring proper fit of the equipment selected for installation. The Contractor shall be fully responsible for the compatibility of furnished mechanical, electrical, pipework and structural items and appurtenances.

Pump Warranty:

The pump manufacturer shall warrant the pumps and motors being supplied to the owner against defects in workmanship and materials for a period of one (1) year under normal use, operation and service. The warranty shall be in printed form and shall apply to all similar units.

Submersible Pumps, Motor and Slide-away Coupling

The Contractor shall furnish and install a totally submersible non-clog or chopper pump, as shown on the plans and as described hereinafter. The pumping unit selected shall be a result of design calculations and as approved by the City Engineer.

Manufacturer	
Model Number	
Size	
Number of Pumps	
Horsepower	
RPM	
Phase	
GPM	
Volt	

Pump casing shall be constructed of ASTM A48 Class 30 grey iron and shall be completely open from suction to discharge with no wearing rings or impeller face plates required. All internal case clearances shall be equal to the discharge diameter so that all material which will pass through the discharge can pass through the pump.

The impeller shall be of the recessed design, constructed of ASTM A48 Class 30 grey iron and shall be mounted completely out of the flow path between the pump inlet and discharge connection, so that the solids pumped are not required to flow through the impeller. The impeller shall be keyed to the motor shaft and secured by an impeller bolt.

The motor shall be provided with thrust and radial bearings to carry the entire load which may be imposed upon it under all operating conditions. Motor shall be approved by Underwriters Laboratory for operation in a Class I, Group D, Division I hazardous location.

The motor shall have two mechanical seals - the lower on the outside of the motor and protecting the upper on which is an oil-filled chamber. Moisture detector probes in the oil-filled seal chamber shall be connected to a customer-supplied alarm to indicate the presence of moisture in the seal chamber. Thermal over-load protectors shall be imbedded in the motor windings and connected to the starter to disconnect the motor in the event of overload.

The slide-away coupling shall consist of a foot-mounted discharge elbow and adaptor, steel baseplate, upper and lower rail supports, lifting yoke and cable. All metal to metal interfaces where movement might occur shall be non-sparking. The foot-mounted discharge elbow and adaptor shall conform to ASTM A48 Class 30 grey iron.

Lifting cable and hardware shall be stainless steel. Cable shall have a minimum working load of 2,400 lbs. and shall be supplied by the pump manufacturer.

PERFORMANCE

Each pump shall have design calculations submitted specifying the following:

First design point = _____ GPM @ _____ ' TDH.

Second design point = _____ GPM @ _____ ' TDH.

(Maximum) (Maximum) shut off = _____ feet.

Impeller selected shall be capable of operating at all three design points without exceeding BHP.

Minimum clearance through case = _____ Inches

City Engineer to approve pumps.

Pump Test:

The pump manufacturer shall perform the following inspections and tests on each pump before shipment from factory.

1. Impeller, motor rating and electrical connections shall first be checked for compliance to the customer's purchase order.
2. A motor and cable insulation test for moisture content or insulation defects.
3. Prior to submergence, the pump shall be run dry to establish correct rotation and mechanical integrity.
4. The pump shall be run for 30 minutes submerged, a minimum of 6 feet under water.
5. After operational test No. 4, the insulation test (No. 2) is to be performed again.

A written report stating the foregoing have been done shall be supplied with each pump at the time of shipment.

The pump cable end will then be fitted with a shrink fit rubber boot to protect it prior to electrical installation.

Documentation:

Standard drawings supplied shall include pump outlines, controls, access frames and typical installation guides. Electrical control wiring diagrams shall be supplied. Instruction and maintenance manuals and pump parts list for the pumps installed shall also be supplied.

Acceptance Tests:

After installation, each pumping unit shall be given a running test, during which it shall demonstrate its ability to operate without vibration, overheating or excessive current draw, and to pump the capacity and head specified. These tests are to be conducted by the Contractor in the presence of the Engineer. The Engineer shall be given at least 24 hours' notice in advance of each test.

During the tests, observations shall be made of motor input, vibration, noise and overheating to detect any defects in the equipment. Written results of each test shall be submitted by the Contractor to the Engineer prior to approval of the tested pumps.

The Contractor shall provide at his expense the necessary water, gauges, meters, piping and labor necessary for conducting the tests. All adjustments needed to place the equipment in satisfactory working order shall be made at the time of the tests. All defects or defective equipment revealed by or noted during a test shall be corrected or replaced promptly at the expense of the Contractor, and if necessary, tests shall be repeated until satisfactory results are obtained.

In case the Contractor is unable to demonstrate to the satisfaction of the Engineer that the units will satisfactory perform the service required, and that they will operate free from vibration and overheating, the units may be rejected. The Contractor shall then remove and replace the equipment at his own expense.

SECTION 7 ELECTRICAL WORK

Scope of Work:

The Contractor shall provide all the required labor, project equipment, materials, tools, construction equipment, safety equipment, transportation, and test equipment, to satisfactorily complete all the electrical work shown on the drawings and included in these specifications.

The electrical work for this project includes the providing of all electrical materials and equipment required for a complete and fully operating facility. The Contractor shall provide temporary power for system testing.

Included in this work is the providing of all required conduits, conductors, and cables including those specified; shown on the drawing; and neither specified nor shown on the drawings but nonetheless required for satisfactory interconnection and operations of all electrical, mechanical and instrumentation equipment either shown on the respective drawings, specified in the respective portions of the specifications, or otherwise required.

Codes:

All the electrical equipment and materials, including their installations, shall conform to the following applicable codes:

1. National Electrical Code, Latest Edition
2. State Electrical Code, Latest Edition, Title 24 Part 3
3. Occupational Safety and Health Act Standards
4. City of Reedley Codes and Ordinances

Variances:

In instances where two codes are at variance, the more restrictive requirements shall apply.

Standards:

Equipment shall conform to the applicable EIA, IEEE, and NEMA Standards.

Drawings:

The electrical drawings shall govern the general layout of the completed construction. Except where special details are used to illustrate the method of installation of a particular piece or type of equipment or materials, the requirements or descriptions in these specifications shall take precedence in the event of conflict.

SCADA Compliance:

Pump station shall be in compliance with the City SCADA system. The following equipment will be required at a minimum for connection to the system, however, additional items may be necessary:

1. PLC Modicon Quantum M340 with additional input/output (I/O) to make the necessary connections.
2. Antenna to support the new radio system. A radio telemetry survey will need to be conducted to determine what type of antenna and components will be needed to ensure a viable signal is sent the waste water treatment plant.
3. Motor starters shall be Square D Solid State Reduce Voltage Starters.
4. VFD's that are Square D equipped with Ethernet communication cards.
5. Surge protector for 120V AC, 24V DC and one analog output.
6. 900 MHz Orbit radio or cell based telemetry. City Engineer to direct on this feature.
7. NEMA 4X PLC Panel with enough space to support a storage area for a spill kit and miscellaneous supplies.
8. Wiring to ATS and Generator to enable I/O.

Contact City Engineer for additional information as needed.

Pump Station Control System:

Contractor shall furnish and install ultra-sonic level control for the two pump stations. System shall be the Milltronics Hydro Ranger 200 as described in manuals by Siemens Milltronics Process Instruments Inc., 1954 Technology Drive, P.O. Box 4225 Peterborough, Ontario Canada, K9J7B1. Enclosure shall be Type 4X/NEMA 4X/IP65 poly carbonate, 9.5" x 6.9"x3.5". A.C. power shall be 240V ac, 50/60 Hz, 36 VA (17W). Fuse: F3: 2G, slow blow, 0.375A, 250V. Temperature sensor fuse F2: Belling Lee, L754, 4000A HRC, ceramic type, 50mA, 250V. Mount enclosure at shoulder height in ambient temperatures between -20°C to 50°C (-5°F to 122°F) in relative humidity suitable for outdoors (Type/NEMA 4X, IP65 enclosure). If mounted in secondary enclosure provide louvers and ventilation by fan to maintain ambient temperature within operating limits. Mounting to provide easy access for hand programmer and avoid exposure to direct sunlight and proximity to high voltage, current runs & variable frequency motor speed controls.

Output from the ultra-sonic control system shall display flow, pump run hours, alarm, pump control and actuate the emergency power system for the stations operation.

Contractor shall furnish and install one ultra-sonic Milltronics Hydro-Ranger 200 control system and control panel (conforming to NEMA 3R and 12 standard) with a hinged inner door (dead front) fabricated from 5052-H32 0.080 thick marine alloy aluminum. The inner door shall be held closed by two hand operated ¼ turn fasteners and shall contain the control instruments and indicators. The tamper proof outer door shall be lockable using a hasp. Ventilation shall be provided by air inlet louvers on one side of the enclosure together with a temperature activated cooling fan with capacity of 16 ft³/sec., the thermostatically controlled fan shall be manually adjustable to turn on between 32°C and 50°C with a differential of not more than 6° C between turn on and turn off. The cabinet fan circuit shall be fused at 125 percent of ampacity of the fan motor installed. The air inlet louvers and air outlet openings shall be located to direct the bulk of the air flow over the

Hydro-Ranger 200 Controller. Enclosure shall be a double compartment NEMA and contain space for service entrance equipment on the left side.

Control Panel:

The entire control panel shall be UNDERWRITERS LABORATORY LISTED and furnished with a UL LABEL. Each component shall be factory mounted, wired, inspected and tested. A wiring diagram and heater chart shall be enclosed in the panel. A red "High Voltage Inside" nameplate shall be fastened to the door covering the high voltage compartment. All components including indicating lights, switches, buttons, relays and accessories, to be permanently identified as to their function with the components. The identifications shall be in the form of photo etching, silk screening or engraving. All terminal blocks shall be identified by both number and graphic symbols which clearly indicate the purpose of each terminal block. All control wiring shall be numbered at each termination. The panel enclosure shall be free standing and mounted on a reinforced concrete pad. The lower compartment shall have a lockable access door and be flush with the concrete pad.

The enclosure shall be constructed of 14-gauge steel, weather-proofed so it is protected from the outside elements and include a 2' x 2' storage closet. It shall be air conditioned when required by the City Engineer. The entire unit shall be degreased, cleaned and treated with a phosphatizing process, then primed and painted inside and out with corrosion-resistant, industrial-grade baked enamel. The finish coat shall be ASA-61 Gray.

Control System Operation:

Controls System must be compatible with and communicate with the existing City SCADA system (Phase III or current) contractor to coordinate with the City Engineer for the current City Standards.

The control system shall provide total automatic control for two (2) motor driven pumps operating on 480 volts, 3 phase, 60 Hz wire service. The wet well level shall be monitored and controlled as follows:

- Level 5 - High Level
- Level 4 - Start Lag Pump
- Level 3 - Start Lead Pump
- Level 2 - Stop Lag Pump
- Level 1 - Stop Lead Pump

Contingent upon the wet well level, the control system shall cause the liquid level indicator/controller to energize the appropriate control contacts. Upon wet well level rise, the lead pump start contact (Level 3) shall be energized causing a relay in the pump logic controller to start the lead pump. If the level continues to rise to the lag pump start control (Level 4), the controller shall energize a relay to start the lag pump, and both pumps shall run simultaneously. The liquid level shall be lowered until the lag pump stop contact (Level 2) is reached, stopping the lag pump. The lead pump shall continue to run lowering the wet well level until the lead pump stop contact (Level 1) is reached. Upon the next wet well level rise, the lead pump selection shall be alternated.

If the wet well level rises to high level contact (Level 5), it shall energize a relay in the pump logic controller to operate the alarm system and indicate a high water condition.

The control system shall be built in such a manner that the owner will have the ability to select high level alarm activation at a separate specific level or have it activated when start lag pump level is reached. The owner shall have the ability to select independent start and stop for the lead and lag pumps, or a common stop for both pumps.

Liquid Level Indicator/Controller

The liquid level indicator/controller shall be equipped with manual testing capability located on the inner door. The operator shall be able to simulate rising and falling liquid level.

Monitoring and control of the liquid level in the wet well shall be by transducers installed in the wet well above the liquid as recommended by the manufacturers. The echo from the output at the transducer is processed back through to the Hydro Ranger 200 control panel and controller which generates output to relays in the control panel turning the pumps on/off as programmed as well as controlling programmed alarms and emergency power actuation.

Logic Controls

The duplex logic control system shall consist of the logic chassis mounted on the subpanel and the logic panel mounted on the dead front door. The logic chassis shall be a pre-wired assembly constructed of anodized aluminum containing logic and alarm circuits. The logic chassis shall interface with the wet well level liquid indicator/controller. The logic chassis shall contain a three point terminal block for 120 VAC supply power, a power on-off switch for 120 vac power, a 15 amp circuit breaker to protect 120 VAC power; a 120/24 VAC control transformer, a 3 position lead pump selector switch that can operate in either "automatic alternation"; "lead pump #1 - Lag pump #2 - lag pump #1" positions. Relays shall be square base, plug-in type, 3 pole double throw rated at 10 amp, 240 VAC with epoxy encapsulated coil and clear dust cover and shall be directly interchangeable. Five LED status indicator lights shall be mounted adjacent to the relay sockets and wired in parallel with the relay coils to indicate that the power is applied to the coils. All relays shall have mechanical hold-down bales.

All terminals on the logic chassis shall be of the barrier clamp plate type rated at 15 amp at 300 VAC and accept two (2) AWG #14 wires. Terminal blocks shall be provided for interfacing output from the liquid level indicator/controller to the logic chassis via a multi-conductor cable shall be identified with yellow heat shrink tubing with black nomenclature. Labels shall read as follows: High level alarm, start lag pump, start lead pump, stop lag pump, stop lead pump, and common.

The logic panel shall be constructed of corrosion resistant anodized aluminum, and connected to the logic chassis via a multi-conductor cable. The logic panel shall be mounted on the inner door. The logic panel shall have the following components: Two "hand-off automatic" selector switches for pumps, two "pump run" green LED Indicators, one 24 VAC "power on" yellow LED indicator, one "start lag pump" yellow LED indicator, one red push button for audible alarm silence, one "high level alarm" red LED indicator and one red push button for visible alarm reset. Provide two 6-digit non-resettable, dust tight, oil tight and moisture resistant running time meters.

Back-Up System for Liquid Level Control

A backup control system shall be provided consisting of a system of float switches (SM-2 floats). The float system shall be turned on and off by one switch at the control panel. The float switches (mercury switches) shall be installed at levels shown on the design drawings to be activated at the water surface elevations shown in the wet well actuating installed relays in the control panel turning the pumps on and off in the same sequence as the ultra-sonic system. The float activated control system shall remain in the off mode till manually turned on at the control panel by a single switch.

Power Handling

Main lugs of the appropriate size shall be furnished for connecting the incoming supply power. The lugs shall be suitable for use with aluminum or copper conductors. Ground lugs of appropriate size shall be bolted to the sub-panel. Motor circuit protection shall be either type and shall contain self-test magnetic motor circuit protectors. Either type shall contain a self-test "Trip Selector" permitting a mechanical simulation of the over current tripping device. The protector operating mechanisms shall be quick-mate, quick-break and trip-free type. Thermal magnetic breakers shall comply with Federal SPE.W-C 357a as Class Two breakers. Symmetrical amperes interrupting ratings shall be 10,000 amps minimum for 250 volt rated breakers and 15,000 amps minimum for 480 volt rated breakers. Magnetic motor circuit protectors shall provide instantaneous clearing of faults to a minimum of 10,000 amperes, RMS, symmetrical and shall have an adjustable instantaneous trip settings. Q-Frame type circuit breakers are not acceptable.

Circuit breaker toggles shall be operable through external extension handles that will interlock with the dead front door.

Each motor starter shall be NEMA rated, FVNR, with three overload relays and reset button. The contractor shall feature double break, silver cadmium oxide contacts, pressure type terminals, and barriers, free floating armature-magnet frame, molded continuous duty coils and stainless steel springs sized for the specific pumps supplied under this contract. Definite purpose contractors, horsepower rated motor starters, and fractional NEMA sizes are not acceptable. Motor starter overload reset operators shall be reset without opening the dead front door.

A 100 watt strip heater and separate thermostat set at the appropriate temperature to prevent corrosion-causing condensation and freezing shall be supplied.

A control transformer, adequately sized for the connected load shall be provided on 3 phase, 3 wire systems. The transformer shall be protected by fuses or circuit breaker. The control transformer may be eliminated on 4-wire and single phase systems providing that the control voltage is protected by a circuit breaker and is wiped per N.E.C. standards.

The unit shall be equipped with the capability to connect an emergency backup natural gas engine.

Optional Equipment: (As required)

Provide a NEMA 4X, red Lexan, break resistant globe and 75 watt lamp.



ITEM	ELEVATION PUMP STA.
TOP ELEV. *	
INFLUENT PIPE (INVERT) *	
HIGH WATER ALARM *	
START LEAD PUMP *	
START LAG PUMP *	
PUMP OFF *	
BOTTOM OF WETWELL *	
BOTTOM OF STATION SLAB *	

NOTE: ALL VERTICAL WORK SHALL BE TO CITY OF REEDLEY DATUM

ITEM	VALUE PUMP STA.
DESIGN FLOW **	
DESIGN FLOW (FROM PUMP CURVE) *	
DESIGN HEAD (FROM PUMP CURVE) *	
REQUIRED FLOW ***	
REQUIRED HEAD (TDH) ***	
VOLTAGE ****	
PHASE	
HORSEPOWER *	
RPM *	

PREFERRED PUMP IS FLYGT (OR EQUAL)

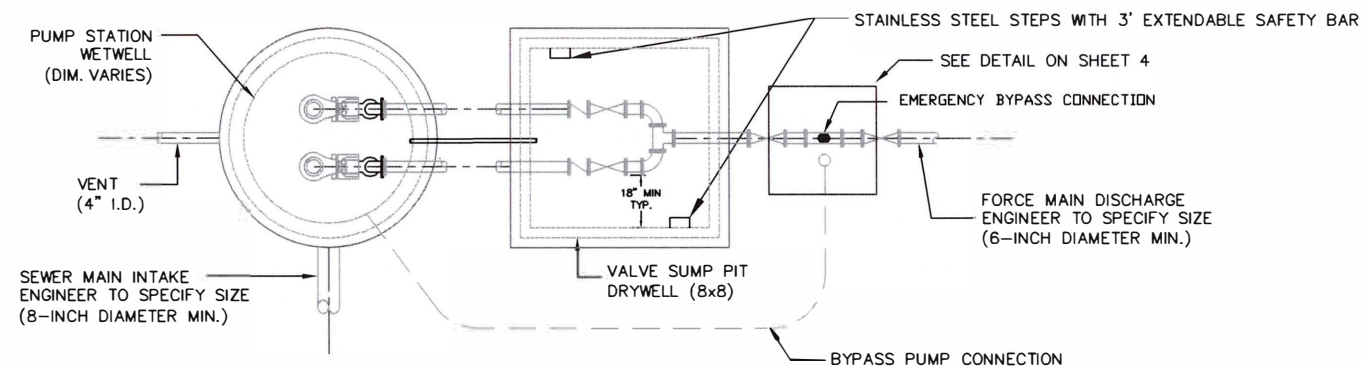
PREFERRED GENERATOR IS CUMMINS POWER SYSTEMS MODEL GG-SERIES (NATURAL GAS) WITH OPTIONAL WEATHER-PROTECTIVE AND SOUND-ATTENUATED HOUSING (OR EQUAL), CONTACT PHONE No. (661)326-4002

PUMP STATION WETWELL AND VALVE VAULT WILL BE SIZED BASED ON DESIGN CALCULATIONS. (VALVE VAULT MIN. 8' x 8')

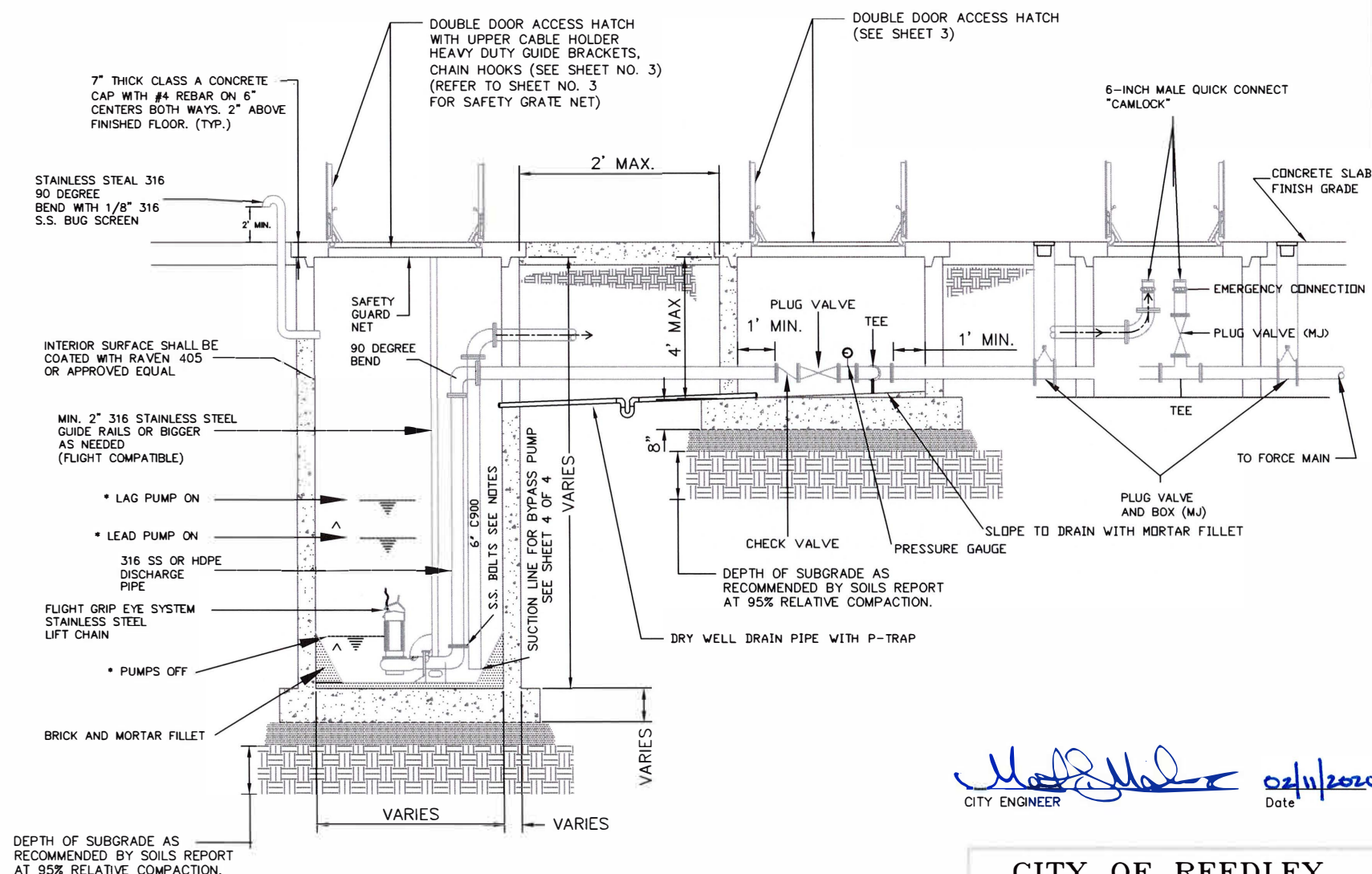
- * ENGINEER TO SPECIFY BASED ON LIFT STATION REQUIREMENTS
- ** DESIGN FLOW IS DETERMINED FROM THE CALCULATED LOADING (IE. # OF LOTS SERVED AND ZONING)
- *** REQUIRED DISCHARGE FLOW & HEAD ARE CALCULATED CONDITIONS BASED UPON FIELD CONDITIONS OF DESIGN.
- **** VOLTAGE REQUIREMENT (____ VOLTS, __ PHASE)

NOTES:

- SAFETY GRATE NET MANUFACTOR U.S.F FABRICATION INC.
- ALL FLANGE BOLTS SHALL BE 316 STAINLESS STEEL BOLTS.
- PRESSURE GAUGE IN VALVE VAULT SHALL HAVE SHUT OFF VALVE.



PUMP STATION - PLAN
NOT TO SCALE



PUMP STATION - SECTION
NOT TO SCALE

[Signature] 02/11/2020
CITY ENGINEER Date

CITY OF REEDLEY			
DATE 02/06/20	DRAWN BY S.R.	ENGINEER M.S.M.	SCALE NONE
TITLE-DESCRIPTION SEWER LIFT STATION			
PROJECT		DRAWING NUMBER 2 OF 4	

1				
NO.	REVISION	DATE	APPROVED BY	

NOTES:

STYLE "ANGLE FRAME – SERIES S" ACCESS HATCH, AS MANUFACTURED BY HALLIDAY PRODUCTS OR APPROVED EQUAL.

MATERIAL SHALL BE 6061-T6 ALUMINUM FOR BARS ANGLES, AND EXTRUSIONS. 1/4-INCH DIAMOND PLATE SHALL BE 5086 ALUMINUM.

DESIGN OF EACH ACCESS HATCH SHALL CONFORM TO O.S.H.A. STANDARD 1910.23.

UNIT DESIGNED LIGHT DUTY, FOR A MINIMUM LIVE LOAD OF 300 LBS./SQ.FT. DEFLECTION SHALL NOT EXCEED 1/150th OF THE SPAN.

EACH DOOR SHALL BE SUPPLIED WITH A HEAVY DUTY, STAINLESS STEEL PNEUMATIC-SPRING, FOR EASE OF OPERATION WHEN OPENING COVER. COVER SHALL BE COUNTERBALANCED, SO ONE PERSON CAN EASILY OPEN THE HATCH DOOR. SPRING DESIGN SHALL ACCOMMODATE EASE OF MAINTENANCE.

EACH DOOR SHALL BE EQUIPPED WITH AN ALUMINUM HOLD OPEN ARM. DOOR SHALL LOCK OPEN IN THE 90 DEGREE POSITION. EACH HOLD OPEN ARM SHALL HAVE A RED VINYL GRIP HANDLE. HOLD OPEN ARM SHALL BE FASTENED TO THE FRAME WITH 1-1/2 INCH GRADE 316 STAINLESS STEEL BOLTS.

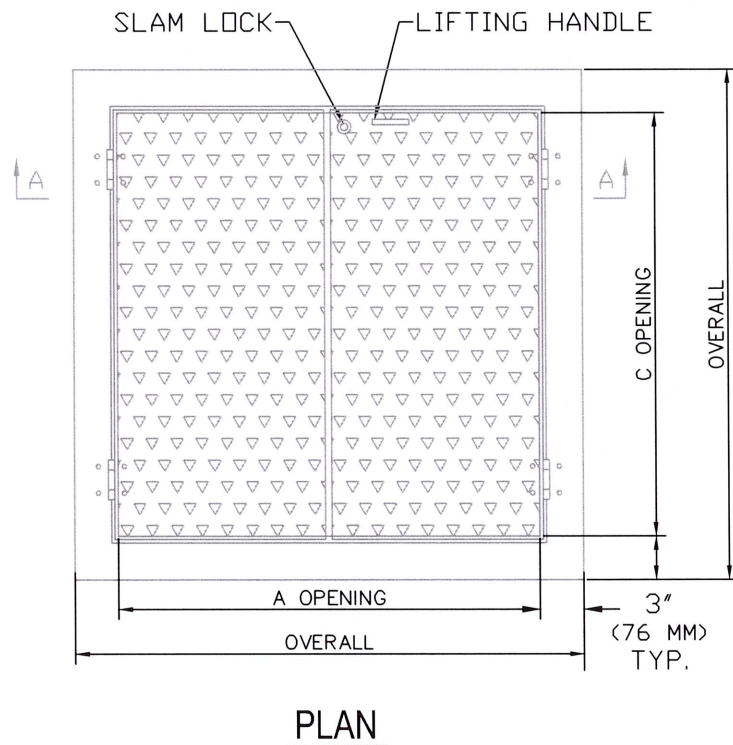
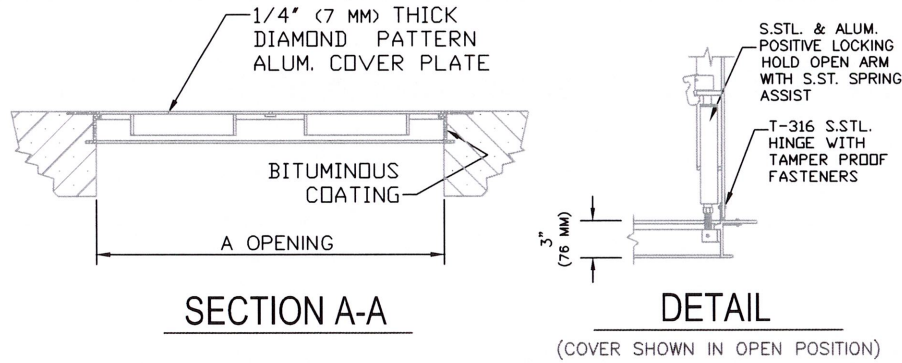
ANGLE FRAME SHALL BE OF EXTRUDED ALUMINUM, WITH A CONTINUOUS 1-1/2" ANCHOR FLANGE. ANGLE FRAME SHALL BE A MINIMUM OF 1/4" THICK.

ALL HARDWARE NOT OTHERWISE SPECIFIED SHALL BE STAINLESS STEEL.

EACH HATCH SHALL BE SUPPLIED WITH A GRADE 316 STAINLESS STEEL SLAM LOCK, WITH KEY WAY PROTECTED BY A THREADED ALUMINUM PLUG. PLUG SHALL BE FLUSH WITH THE TOP OF THE 1/4" DIAMOND PLATE. SLAM LOCK SHALL BE FASTENED WITH FOUR GRADE 316 STAINLESS STEEL BOLTS, NUTS AND WASHERS.

EACH HATCH SHALL BE EQUIPPED WITH AN ALUMINUM LIFT HANDLE. THE LIFT HANDLE SHALL BE FLUSH WITH THE TOP OF THE 1/4" DIAMOND PLATE.

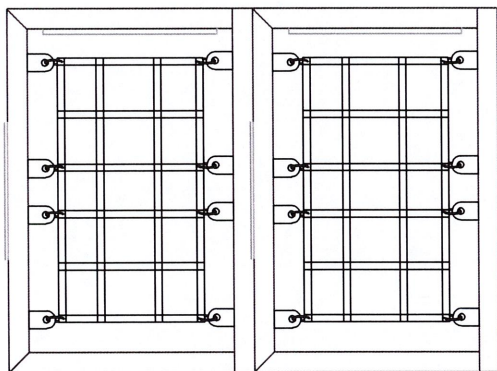
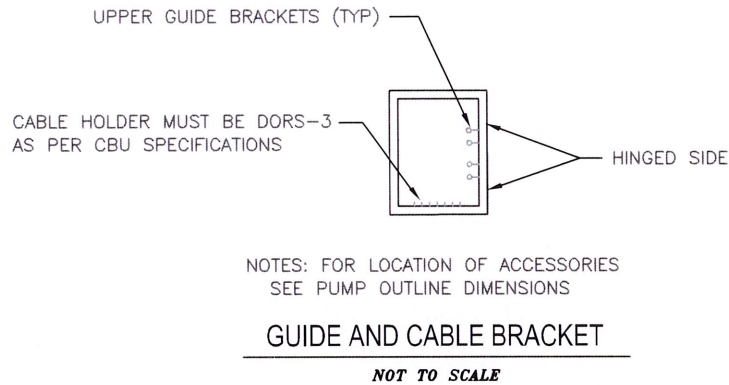
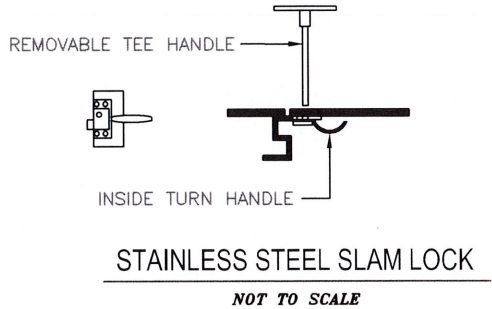
EACH MANHOLE SHALL BE EQUIPPED WITH STAINLESS STEEL STEPS WITH 3-FOOT MINIMUM COLLAPSIBLE EXTENSION LADDER



MODEL NO.	DIMENSION IN INCHES
ALUMINUM	A x C
S2S4842	48" x 42"

LIGHT DUTY DOUBLE ALUMINUM DOOR HATCH
AND ACCESS FRAME AND COVER

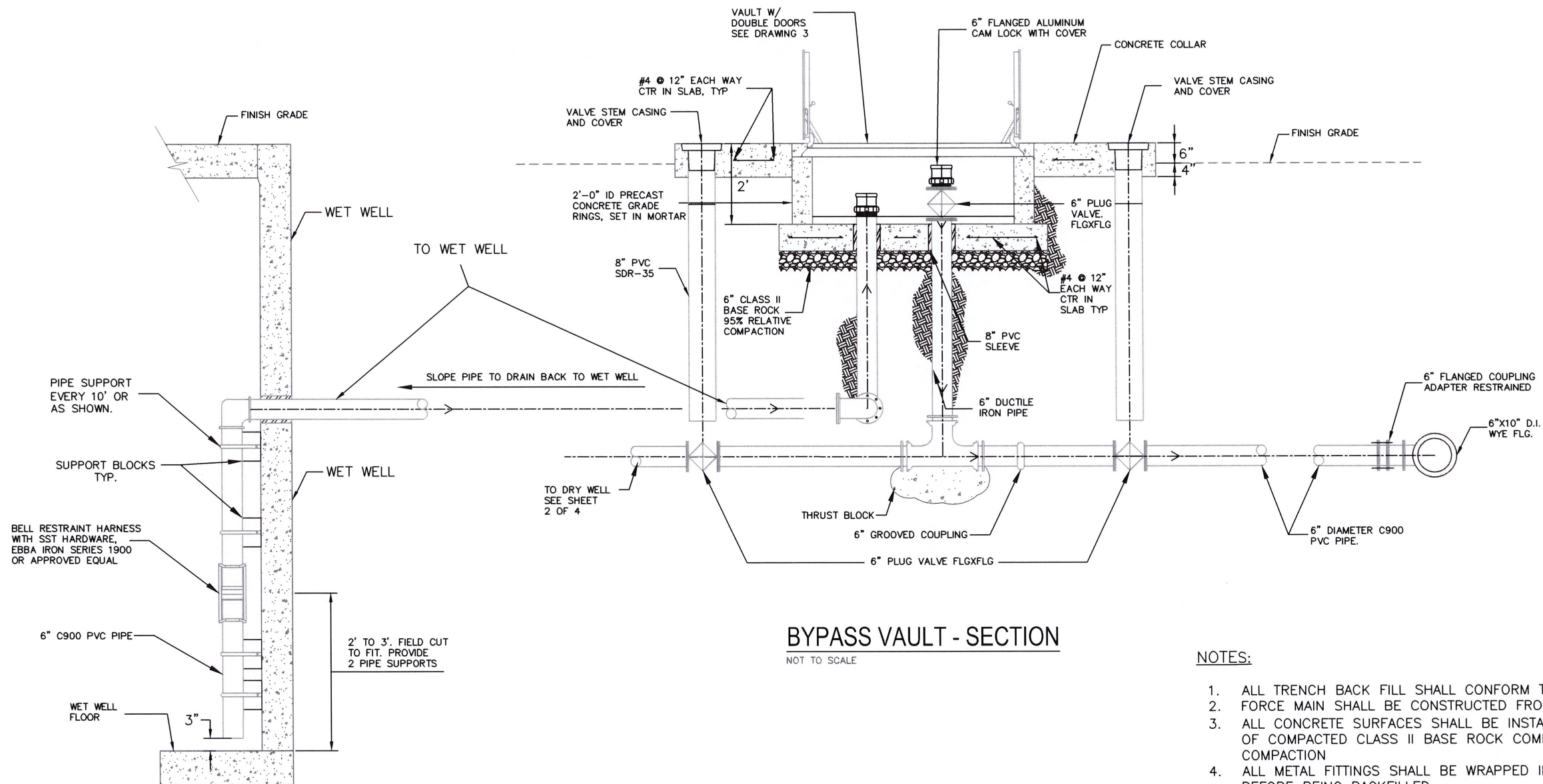
NOT TO SCALE



DUAL SAFETY GRATE NET DETAIL
NOT TO SCALE
(MANUFACTURE BY U.S.F. FABRICATION INC. OR EQUAL)

 02/11/2020
CITY ENGINEER Date

CITY OF REEDLEY			
DATE 02/06/20	DRAWN BY S.R.	ENGINEER M.S.M.	SCALE NONE
TITLE-DESCRIPTION SEWER LIFT STATION			
PROJECT		DRAWING NUMBER 3 OF 4	
NO.	REVISION	DATE	APPROVED BY



[Signature] 02/11/2020
CITY ENGINEER Date

CITY OF REEDLEY			
DATE	DRAWN BY	ENGINEER	SCALE
02/06/20	S.R.	M.S.M.	NONE
TITLE-DESCRIPTION			
SEWER LIFT STATION			
PROJECT		DRAWING NUMBER	
		4 OF 4	

NO.	REVISION	DATE	APPROVED BY