Specifications

Division 01 – General Requirements

Section 011000 Summary

1.0 DOCUMENTS

1.1 This section forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts of the Contract Documents.

1.2 The Specifications have been divided into approximate trade sections. However, the division of the Specifications into sections shall not operate to define or limit the responsibility of any Subcontractor.

2.0 COORDINATION AND COOPERATION

2.1 The Contractor shall coordinate the work of his Subcontractors with efficient and continuous supervision and be fully aware of the Work requirements including, without limitation, those of the Specifications and Drawings.

2.2 The Contractor is responsible for determining which Subcontractor shall perform Work. Differences in interpretation of the Specifications or Drawings as to which Subcontractor shall perform certain Work shall not be grounds for claims for extras.

2.3 The Contractor shall coordinate the use of Products and Construction Equipment, including cranes, hoists, ladders and scaffolds, and access to the Place of the Work, with the work of Subcontractors. The cost of use of Construction Equipment and Products by Subcontractors shall be governed by the agreements between the Contractor and the Subcontractors.

3.0 DAILY RECORD

3.1 From the day of commencement of the Work, the Contractor shall maintain a careful daily record of the progress of the Work on his standard record form, with applicable trades listed. This record shall be open to the Regional District's inspections at all reasonable times. A copy of the record shall be turned over to the Regional District at weekly intervals.

3.2 Contractor's diary shall record all pertinent data such as:

3.2.1 Daily weather conditions, including maximum and minimum temperatures.

3.2.2 Commencement, progress and completion of various portions of the Work.

3.2.3 Dates of visits or inspections by government authorities, inspectors, and any other visitors to the Site.

3.2.4 Record of work force employed, and work performed thereby.

4.0 DISRUPTION NOTIFICATIONS

4.1 Public Notifications, the Contractor shall be responsible for public relations including, but not limited to:

4.1.1 A minimum of fourteen (14) days prior to commencing work, provide written notices, pre-approved by the Owner, to area residents introducing the project including information about expected occurrences of detours and/or access restrictions.

4.1.2 A minimum of 48 hours prior to construction, provide written notification, pre-approved by the Owner, to affected residents of any disruption to access and/or other service inconveniences.

4.1.3 A minimum of 48 hours prior provide written notification, pre-approved by the Owner, to affected residents of impending water service interruption. Affected consumers to be identified in conjunction with the Owner. No services shall be interrupted for more than 8-hours in any one (1) day. If necessary, then temporary service must be provided.

4.2 Operation of any existing water valves to be completed by the Regional District only.

4.3 Emergency Services Notifications

4.3.1 A minimum of 48 hours prior, provide written notice to Emergency Services of any water system shutdown or inactivation of hydrants.

5.0 PERMITS AND FEES

5.1 The Contractor shall obtain and pay for the following anticipated permits and licenses required for the Work:

5.1.1 Ministry of Transportation and Infrastructure Traffic Control Permits, Technical Safety BC Electrical Permit and all other required permits and inspections not listed will be the responsibility of the Contractor to procure.

5.2 The Regional District will obtain the following permits:

5.2.1 Ministry of Transportation and Infrastructure Permit to Construct, Use, and Maintain Works Within the Right-of-Way.

5.2.2 Vancouver Coastal Health.

5.2.3 Archeology.

5.3 The Contractor shall conform to the codes, ordinances, regulations, terms and conditions and orders of all authorities having jurisdiction over the performance of the Work. Should conflicts arise, the Contractor shall forthwith request clarification from the Regional District.

6.0 ARCHEOLOGICAL MONITORING

6.1 If during the course of the Works an archaeological site is identified, work must cease, and the Heritage Conservation Act must be adhered to. Next steps may include:

6.1.1 Permitting and First Nation Consultation –Consultation with the Shíshálh Nation and Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) is necessary to facilitate fieldwork. Work within Shíshálh Nation and Sḵwx̱wú7mesh Traditional Territory requires a Shíshálh Nation or Sḵwx̱wú7mesh Úxwumixw Heritage Inspection Permit and a minimum 30-day notice prior to commencement. As part of consultation, In Situ will facilitate the Shíshálh Nation and/or Squamish Nation's participation in fieldwork, as needed.

6.1.2 Monitoring – An archaeological crew will be on site to monitor all ground-disturbing works until such time that the potential for encountering archaeological materials is eliminated. The standard crew complement will consist of one (1) archaeologist and one (1) archaeological technician. Additional crew may be added as needed to accommodate the workplan and archaeological observations, or if multiple project components require excavation at once. The area in purple below does not require archeological inspection due to previous inspections completed.

6.1.3 Trenching – The excavator operator must communicate fully with the archaeologist on site prior to and during any excavation activities to ensure that a plan is in place and is understood by all parties. Where cultural (archaeological) materials are encountered, excavation will be limited to 10 cm lifts or at the discretion of the Field Director. The archaeologist will direct the relocation of material for screening. Where non-archaeological sediments are encountered (e.g., pavement, construction fill, culturally sterile clays, sand, or till), excavation may proceed at a pace suitable to the Contractor.

6.1.4 Trench excavation will be monitored and, where suspected cultural materials are encountered, the archaeologist will direct the excavator operator to pause until the nature of the sediments can be confirmed as disturbed, intact, or non-archaeological. Once identified, excavation may proceed according to the procedures below. Non-archaeological sediment should be kept separate from the cultural sediment stockpile(s) during excavation.

6.1.5 Once sediments are stockpiled, the archaeologist will facilitate the continuation of the trenching. Sample screening will be conducted separately from monitoring. Non-archaeological sediments may be directly loaded into a truck and removed from the site.

6.1.6 Treatment of Disturbed Archaeological Materials – Sediments identified by the archaeologist as disturbed archaeological material may be excavated in 10 cm lifts and set aside for sample screening. A 25% sample of this material will be screened.

6.1.7 Treatment of Intact Archaeological Materials – Where intact deposits are identified; the archaeologist will direct the excavator operator in removing sediment along the trench to expose the top of the intact layer and determine the extent of the intact deposit. It is expected that one (1) evaluation will be conducted per five (5) m3 of intact archaeological deposits. The archaeologist will decide when/where evaluative units will be placed in consultation with Shíshálh Nation and Sḵwx̱wú7mesh Úxwumixw. Trenching or other work may continue elsewhere while the evaluative unit is excavated (typically 8-12 hours of hand excavation). The archaeologist will determine where the sediments can continue to be excavated and stockpiled. Once the evaluative unit is complete, the mechanical excavation can continue at that location.

6.1.8 An evaluative unit typically measures 1 m x 1 m square, and is hand excavated until the termination of archaeological deposits is reached, or to the depth required by the development, whichever comes first. Intact archaeological sediments will be 100% screened for discretionary artifact collection.

7.0 WORK AREA

7.1 The Work and the operation of vehicles and machinery, storage of equipment, materials and/or supplies will be contained within the Place of the Work.

7.2 Streets beyond the limits of the work and other construction areas shall be kept clean.

7.3 The Contractor is responsible for dust control within the Place of the Work and roadways beyond the limits of the Place of the Work that have been affected during construction. While performing the Work the Contractor shall control dust originating from the Work and shall take immediate corrective action if directed by the Regional District.

7.4 The Contractor shall provide for efficient drainage of all sections of the work during all stages of construction at his own expense. The Contractor will be held responsible for all damage which may be caused through his failure to provide proper drainage facilities. The Contractor shall restore any existing drainage works which are disturbed as a result of his construction activities.

7.5 The Contractor will give the Regional District at least 48 hours' notice in writing before requiring any baselines or benchmarks in connection with the work. The Contractor shall clearly state in such notice the exact location where levels, lines, or stakes are required. The Contractor will satisfy himself before commencing any work as to the meaning and correctness of all stakes and marks, and no claim will be entertained by the Regional District for or on account of any alleged inaccuracies, unless the Contractor notified the Regional District of such inaccuracies in writing before commencing the work.

7.6 The Contractor will be held responsible for the preservation of all stakes and marks in their proper positions, and where any of them are disturbed, lost or destroyed, it shall at once notify the Regional District in writing, and all expenses incurred in replacing such stakes or marks will be billed against the Contractor and if not paid by the Contractor will be deducted from any monies due the Contractor under the Contract.

7.7 All stakes and marks set will not in every case represent all the grades, levels, lines, angles or surfaces in the finished work and in this regard the Contractor shall ensure that such stakes and marks are read correctly and used in a manner consistent with the plans, details, specifications and directions of the Regional District. Should the Contractor discover or suspect any errors in stakes, lines, and grades which have been established for its use, the Contractor shall at once discontinue the work until such suspicions are investigated and any errors or misunderstanding rectified, but no claims shall be made or allowed on this account, or because of any resulting delay.

7.8 The Contractor shall assume full responsibility for alignment, elevations, and dimensions of each and all parts of the Work, regardless of whether the Contractor's layout work has been checked by the Regional District.

7.9 The Contractor shall furnish the Regional District or any of his assistants with all reasonable help which may be required at any time in driving stakes or laying out the work. The Contractor will receive no additional compensation for this.

7.10 In order to satisfy the Regional District that the Contractor has addressed concerns regarding traffic control and safety it will be required to submit a sketch indicating its proposed method of barricades and/or signage for each of the work sites included in the Contract. This information shall be available for review and approval by the Regional District at the Contract pre-construction meeting.

7.11 Emergency access and pedestrian access to all properties shall be maintained at all times. Access for local traffic shall be maintained at all times. Dusty materials shall be transported in covered haulage vehicles. Wet materials shall be transported in suitable watertight haulage vehicles. The Contractor will ensure there is not any tracking of mud or debris along any traveled roadways and will be responsible for street sweeping to ensure the paved roadway is clear of any debris from the project site.

7.12 The Contractor shall be responsible to ensure there is not any tracking of mud or debris on the roadways at all times.

8.0 CONSTRUCTION SCHEDULE

8.1 To co-ordinate the work, the Contractor or person(s) authorized to act for the Contractor will attend regular meetings with the Regional District or his representative during the period over which the work under the Contract is carried out, at a time and place to be decided by the Regional District.

8.2 The Contractor must provide a comprehensive Project Schedule depicting all the work activities and durations, critical path schedule, lead and lag times for all procured material. The schedule must be updated at least monthly or more often as required by the Regional District.

8.3 The Contractor shall commence the Work within five (5) working days after receiving Notice to Proceed from the Regional District.

9.0 PRECONSTRUCTION MEETING

9.1 The Contractor shall attend a meeting with the Subcontractors, field inspectors, supervisors and the Regional District to discuss and resolve administrative procedures and responsibilities, and scheduling prior to commencing the Work.

9.2 Items to be discussed at such meeting shall include, but shall not necessarily be limited to the following:

9.3 Confirmation of authorized representatives of the Regional District, consultants working behalf of the Regional District and the Contractor and the name of the Contractor's Construction Safety Officer.

9.4 Construction Schedule.

9.5 Site security.

9.6 Contractor Emergency Procedures and Notifications.

9.7 Project Substantial completion, physical completion, holdbacks, holdback release, and project acceptance.

9.8 Monthly progress payment requests, administrative procedures and holdbacks.

10.0 PROGRESS MEETINGS

10.1 The Contractor shall hold progress meetings every week with the Regional District’s in person or via TEAMS/Zoom calls throughout the duration of the Work.

10.2 The Contractor and Subcontractors involved in the Work shall attend all the weekly progress meetings.

10.3 The Regional District will record minutes of weekly progress meetings and circulate same to attending parties within three (3) days of meeting.

11.0 CONSTRUCTION SAFETY

11.1 The Contractor shall be considered the prime Contractor until such time as substantial completion is issued on the project.

11.2 The Contractor shall comply with the Workers' Compensation Prevention Regulations of British Columbia (latest edition) and provide all necessary safety requirements as prescribed by such regulations.

12.0 SECURITY

12.1 The Contractor shall be responsible for security of the Work and at the Place of the Work. The Contractor shall secure the work area and materials by installation of a minimum six-foot-high metal fence fully enclosing the work perimeter at the worksite prior to commencing the Work and until the Work is complete and approved by the Regional District.

12.2 The Contractor and his Subcontractors shall make their own arrangements to ensure the security of their own equipment and materials.

12.3 The Regional District, and/or their respective representatives will not be liable for any loss or damage to materials, equipment or other property of the Contractor, unless caused by their negligence.

13.0 CONCEALED OR UNKNOWN CONDITIONS

13.1 Before commencing any Work at the Place of the Work, the Contractor shall be responsible to locate in three (3) dimensions all underground utilities and structures indicated on the Contract Documents as being at the Place of Work. The Contractor shall also be responsible to consult with all utility providers that provide electricity, communication, gas, or other utility services in the area of the Place of Work, to locate in three (3) dimensions all underground utilities for which they have records. The Contractor shall also locate in three (3) dimensions any other utilities or underground structures that are reasonably apparent in an inspection of the Place of the Work.

14.0 OPERATING AND MAINTENANCE MANUALS

14.1 Upon Substantial Performance of the Work, the Contractor shall compile, generate and submit to the Regional District two (2) copies of operational manuals for the newly installed equipment and appurtenances in a three-ring binder, with each chapter clearly labeled, containing pertinent information on maintenance, inspection, and emergency procedures, receipts, test reports, warranties, equipment catalogue sheet of all equipment and finish schedules, and other Work information. The Contractor shall also provide two (2) pdfs of the completed and accepted operational manuals to the Regional District.

15.0 RECORD DRAWINGS

15.1 The Contractor shall keep one (1) set of current white hard copy prints of all Drawings and all addenda, revisions, clarifications, change orders, and reviewed shop drawings in the site office; and have always them available for inspection by the Regional District. Payments will not be made to the contactor if Record drawings are incomplete and lacking in detail.

15.2 At completion of the Work, the Contractor shall employ competent personnel to transfer all deviations, including those required by addenda, revisions, clarifications, shop drawings, change directive and change order, to a set of white prints. Each as- built print shall bear the Contractor's identification, the date of record and the notation, “We hereby certify that these drawings represent the work Record Drawings'.” The Contractor's signature shall be placed below that notation.

15.3 The Regional District shall transcribe the “Record Drawings” and create and full set of “Record Drawings” depicting the work completed.

16.0 SUBSTANTIAL PERFORMANCE

16.1 Prior to or at the time of applying for a review to establish Substantial Performance of Work, the Contractor shall submit to the Regional District the following completed items:

16.1.1 Letters of Assurance from the Contractor, attesting to the successful installation, startup testing, and commissioning of the submersible pump and motor assembly and pitless adaptor assembly. Reports of pipes and mechanical instruments pressure testing, chlorination and bacteriological testing.

16.1.2 All required, completed and signed off manufacturer's inspections, certifications, guarantees, warranties as specified in the Contract Documents.

16.1.3 All maintenance manuals, operating instructions, maintenance and operating tools, replacement parts or materials as specified in the Contract Documents.

16.1.4 Certificates of completion issued by all permit issuing authorities indicating approval of all installations requiring permits.

16.1.5 Certificates issued by all testing, commissioning, cleaning, inspection authorities and associations as specified in the Contract Documents.

16.1.6 All Record Drawings and as-installed documents in the form specified in the Contract Documents.

16.1.7 A certificate issued by Workers Compensation Board confirming that the Contractor has paid all assessments.

17.0 PROJECT COMMISSIONING

17.1 The Contractor shall:

17.1.1 Prior to final inspection, the Contractor shall coordinate, execute and demonstrate operation of each system component, including the reinstalled submersible pump and motor, pitless adaptor unit, the flow control valve and the hypochlorite system and reconnection to the satisfaction of the Regional District engineer and shall instruct personnel in operation, adjustment, and maintenance of equipment and systems, using data provided by operation and maintenance manuals.

17.2 The Contractor must coordinate, execute, and successfully complete the startup testing and commissioning of the reinstalled pump and motor assembly, including the hypochlorite system, the electronic interface flow metering valve, and demonstrate for a duration of 24 hours of successful and uninterrupted operation of the reinstalled pump and motor and pitless adaptor assembly. The Contractor will submit a commissioning program and checklist at least 10 calendar days in advance of the requested start up commissioning including checklists and verifications to be conducted during the continuous 24-hour test. The Contractor shall promptly correct deficiencies and defects identified by the Regional District. Should any part of the commission fail, the startup 24-hour test shall recommence at time zero and must run for 24 hours continuously without fault to be considered a successful commission. During commissioning, the Contractor shall have all pertinent field personnel on site on the Coast and available to respond to any inadvertent fault(s) to ensure the commissioning can resume. A commissioning final report will be submitted to the Regional District after the successful commissioning for review and comment.

17.3 The Contractor will submit to the Regional District a schedule and a demonstration program at least two (2) weeks prior to foreseen time of demonstration. The Contractor must coordinate and schedule all trades and equipment manufacturer’s representatives to be on site concurrently the day of start-up and commissioning. For estimating purposes, the Contractor should anticipate a minimum of a 4-hour training session on site for final start up and commissioning including staff training with a question-and-answer period.

17.4 Review maintenance manual contents (operation, maintenance instructions, record drawings, spare parts, materials) for completeness.

17.5 Submit required documentation such as statutory declarations, Workers' Compensation certificates, warranties, certificates of approval or acceptance from regulating bodies.

17.6 Attend “end-of-work” testing and break-in or start-up demonstrations.

17.7 Review inspection and testing reports to verify that the findings conform to the intent of the documents and that changes, repairs or replacements have been completed.

17.8 Review condition of equipment that has been used in the course of the Work to ensure turning over at completion in “as new condition” with warranties, dated and certified from time of Substantial Performance of the Work.

17.9 Arrange and coordinate instruction of Regional District's staff in care, maintenance and operation of building systems and finishes by suppliers or Subcontractors. The duration of the instruction shall be a minimum of four-hours of Regional District instruction.

17.10 Provide ongoing review, inspection and attendance to Regional District call back, and maintenance, and repair problems during the warranty periods.

18.0 FIELD SERVICES

18.1 The Contractor shall be responsible for providing survey services to measure and stake the Site and survey services to establish and confirm alignment and grade measurements for the Work prior to excavation and ordering of material. Unless otherwise stipulated in the Contract Documents, all Work is to be laid out by the Contractor. The layout will consist of horizontal and vertical baseline controls.

18.2 The Contractor’s surveyor is to locate, confirm and protect control points prior to starting site work and preserve permanent reference points during construction. No changes or relocations are permitted without prior written notice to the Regional District. Report to the Regional District when a reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

18.3 Survey Requirements:

18.3.1 Establish at least two (2) additional permanent benchmarks on Site, referenced to established benchmarks by survey control points.

18.3.2 Establish lines and levels, locate and lay out, by instrumentation.

18.3.3 Stake for excavation, pipe laying, road construction, etc.

18.3.4 Provide completed cut sheets and grade sheets to the Regional District at least 24 hours prior to the start of each section.

18.3.5 Maintain a complete, accurate log of control and survey work as it progresses. On request of the Contract Administrator, submit documentation to verify accuracy of field work.

18.4 Promptly notify the Regional District in writing if subsurface conditions at the Place of the Work differ materially from those indicated in the Contract Documents, or a reasonable assumption of probable conditions based thereon. After prompt investigation, should the Contract Administrator determine that the conditions do differ materially, instructions will be issued for changes in the Work as provided in the General Conditions.

18.5 The Contractor, upon entering the site for the purpose of beginning Work, shall locate all reference points and take all necessary precautions to prevent their destruction. The Contractor shall be charged with the cost of verifying or replacing any legal survey pins, monuments, or reference stakes damaged during construction operations. If the Contractor requires the removal of any legal survey markers for the Work, the cost of replacement will be borne by the Contractor for reestablishment, and rerecording of the survey pin(s), provided the written consent of the Regional District is first received and the pin has been adequately referenced by a BCLS. The Contractor shall provide and pay for a licensed surveyor, all stakes, markers and tools.

END OF SECTION

Section 011100 Summary of Work

1.0 GENERAL

1.1 Existing Conditions

The existing Chaster Well and Pump Station was constructed in 1970 and consists of a 300 mm steel well casing, which contains inside it, a 250mm, a 200mm, a 150 mm well casings. Housed within the 150 mm pipe casing is a 150mm dia. 22.37 kW (30HP) 12 stage submersible pump and motor manufactured by Pentair model 6T30-225. The discharge pump column is 100 mm dia. that is connected to the 100 mm distribution system. A copy of the Pentair 12 stage pump and motor is provided as an Appendix .

The station has a daily flow rate of approximately 400 to 500 m3/day in the peak season (May to September) and the well is not usually operated during the fall and winter seasons.

1.2 Work Covered by Contract Documents

1.2.1 The work to be completed under this Contract will generally consist of providing all the labour, equipment, material, including completion of civil, mechanical, and electrical improvements for the completion and construction and installation of the following:

1.2.1.1 Removal of the utility valve vault, slab and footings, and disposal of same.

1.2.1.2 Installation to above grade a drinking water well pitless adaptor wellhead and well head seal assembly,

1.2.1.3 Excavation, installation, and backfill for a shallow precast valve vault to house the flow control meter, piping, and appurtenances.

1.2.1.4 The removal and disposal of the existing and interfering portions of the 100mm discharge piping, valves, and appurtenances.

1.2.1.5 The upsizing of the discharge piping from 100 mm to 200 mm Class 52 ductile iron.

1.2.1.6 The replacement of the existing distribution gate valves with new 200 mm valves.

1.2.1.7 Installation of an electronic interface flow control valve assembly, and an electronic flow controller complete with the SCADA point of connection, and with necessary wiring and conduit work.

1.2.1.8 Removal, disassembly, cleaning, reassembly and reinstallation of the existing submersible well pump and motor, including redevelopment of the existing well should the Regional District elect to undertake the optional work.

Additional Work: certified well redevelopment services by a qualified well driller and a professional hydrogeologist, and materials required to complete a vertical submersible well pump and motor removal using a certified water well removal, well redevelopment and installation Contractor along with the completion of Certified factory cleaning, testing, and redevelopment of the Chaster Well. All work will be completed in accordance with these Contract Documents and Drawings.

The Scope of Work includes, but is not limited to, the following elements:

1.2.2 All other work required for the completion of a fully operational and functioning well, pitless adapter, and the electronic interface flow metering valve, complete.

1.2.3 The Work shall not be deemed complete until the Work is accepted by the Regional District. The Work, unless specifically stated otherwise, shall include the furnishing of all labour, supervision, management, materials, supplies, services, Contractor's Plant and Equipment, receiving and handling, transportation, foreign, federal, provincial, and municipal taxes and duties of whatsoever kind, permits and licenses, and other things necessary for and incidental to the performance of all the Work.

1.2.4 Any minor or incidental item of the Work not called for in the Specifications or shown on the Drawings but clearly required to meet the intent of design and normally provided for the proper operation of the Work shall be provided as if specifically called for in the Contract Documents. The intent is that the Contractor provides a complete Project.

1.3 The Work of the Contract consists of the construction of all Work described and as shown in the Contract Documents and by implication.

1.4 The Work may commence at the Site immediately following the issuance of a Notice to Proceed and in compliance with the project milestones dates provided in the RFP requirements Section 1.3. The Work is to be substantially complete by the date indicated in Section 013200 – Construction Progress Documentation.

1.5 Contract Method

1.5.1 The Contractor shall construct the Work under a unit price Contract.

1.6 Responsibility

1.6.1 The Contractor shall be responsible for the safe keeping of the Regional District's materials and shall immediately replace or repair lost or damaged Regional District's Materials, including any associated equipment, appurtenances and accessories to the complete satisfaction of the Regional District and Regional District at no cost to the Regional District.

1.6.2 All Regional District Materials damaged by the Contractor shall be immediately repaired or replaced by the Contractor to the satisfaction of the Regional District, at no cost to the Regional District.

1.6.3 The Contractor shall be responsible for all mechanical and electrical interface connections for Regional District Materials and appurtenant connections.

1.6.4 The Contractor shall be responsible for final assembly and alignment, and shall provide the necessary labour, supervision, materials, to ensure that the equipment meets the alignment tolerance specified for the pump and motor equipment.

1.6.5 The Contractor is responsible for providing all labour, equipment and supplemental specialist support necessary to ensure the proper installation, trial operation, performance testing and proof of successful operation to achieve the designated requirements.

1.6.6 The Contractor is responsible for providing a hydrogeologist to oversee the installation of the reassembled pump and motor, the well redevelopment, and the determination of the well chemical prescription components and concentrations.

1.7 Permits

1.7.1 It is the Contractor's responsibility to obtain all required electrical, Technical Safety BC, Work Safe BC, and all other permits. The Regional District will procure the archeological, Vancouver Coastal Health and MoTI right of way encroachment permits.

1.7.2 The Contractor shall provide additional written notice to Ministry of Transportation and Infrastructure's (MoTI) Area Manager a minimum of seven (7) days prior to restrictions for residential access and lane closure through a MoTI H1080 form. The content and form of the written notifications shall be reviewed and approved by the Regional District prior to delivery. The Contractor will be responsible for preparation and submission of a traffic control plan to the Ministry and be responsible for providing the required traffic control as required by the Ministry

2.0 Products

2.1 Product specifications is as specified within these Contract Documents.

3.0 Execution

3.1 Execution of work is as specified within these Contract Documents.

END OF SECTION

Section 011400 Work Restrictions

1.0 GENERAL

1.1 SPECIAL PROJECT NOTE:

1.1.1 The Contractor shall not modify the existing pump and motor assembly nor take the well out of operating condition between May 15th and October 15th, as this time period is the peak summer usage period when limited water supply is available. The Contractor may perform all other work during this period of time but under no circumstances shall the Chaster Well be operated between May 15th and October 15th.

1.1.2 The Contractor should also note the complete ban on all outdoor water use, including construction water, during the Sunshine Coast Regional District's imposed Stage four (4) water restrictions which can be imposed any time after July 15. See Sunshine Coast Regional District Bylaw 422 for a summary of the Sunshine Coast Regional District Drought Policy and outdoor water restriction program, https://web.scrd.ca/wp-content/uploads/2023/04/422-Water-Rates-and-Regulations-consolidated-to-include-422.42-in-effect-from-2023-JAN-12-to-present.pdf

2.0 PRODUCTS

Not Applicable.

3.0 EXECUTION

Not Applicable.

END OF SECTION

Section 012900 Payment Procedures

1.0 GENERAL

1.1 Measurement and Payment

1.1.1 The Work, including any Materials, equipment and services, will be paid for in accordance with the prices set out in Schedule of Prices , Specifications and in the RFP Document. Prices and any further breakdown do not limit the Work to the items listed therein. The Contractor has allowed for sufficient amounts to cover the cost of any Work or Materials not specifically listed in Schedule of Quantities but included in the Drawings and Specifications by either direct mention or implication, by including all such amounts in the items to which they pertain most closely in Schedule of Prices. Costs of a general nature that do not pertain to any one (1) item have been distributed among all the items.

1.2 Applications for Payment

1.2.1 Refer to contract payment provisions.

1.2.2 The Contractor shall use standard forms for submission of progress claims in the format agreed prior to the first application for payment.

1.2.3 Show previous amount claimed and the amount claimed for the period ending.

1.2.4 Show percentage of Work completed to date and holdback retained.

1.3 Changes in the Work

1.3.1 Refer to Part PART 6 CHANGES IN THE WORK (CCCD2 2020)

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SECTION

Section 013200 Construction Progress Documentation

1.0 GENERAL

1.1 Description

1.1.1 Prior to the Regional District's approval for the Contractor to commence Work at the Site, the Contractor shall produce and submit a detailed Baseline Schedule, acceptable to the Regional District, which demonstrates the conformance to the requirements agreed to above and elsewhere in this Section. Once finalized and agreed to by the Regional District, this schedule will be deemed the Contract Schedule, to which the Contractor shall base all future updates and from which further detail will be developed.

1.1.2 Specifically, the Contract Schedule shall include, but not be limited to, a level of detail conforming to the following:

1.1.2.1 Identify the work of both the Contractor and other Contractors that access the Site.

1.1.2.2 Include submission, review and approval of critical shop drawings, product data, samples, etc. The Contractor shall manage the cycle(s) of all other Submittals using a compatible spreadsheet or database program. Refer to Section 013300 – Submittals.

1.1.2.3 Include performance testing, verification, start-up and demonstration procedures by the Contractor, allowing appropriate intervals for commissioning by third parties, and for integrated system certification.

1.1.3 The Contractor shall base the scheduled duration of each activity on the Work being performed during the work week established and agreed upon as of the date of the Notice of Award with allowances made for legal holidays and normal weather conditions.

1.1.4 The Contractor shall advise the Regional District within two (2) days of any problems anticipated by any activity shown in the Contract Schedule.

1.1.5 The Contractor shall revise the schedule to reflect changes in the actual sequence and the future sequence of Work, should the actual sequence of Work performed by the Contractor deviate from the planned sequence indicated in the accepted Contract Schedule.

1.2 Submissions

1.2.1 The Contractor shall provide Submittals in accordance with Section 013300 – Submittals Procedures and with the requirements noted herein.

1.2.2 The Regional District's acceptance of any schedule submission does not relieve the Contractor from any of its contractual responsibilities.

1.2.3 For the initial submission of project controls documents, the Contractor shall submit one (1) electronic copy of the following:

1.2.3.1 Critical Path Schedule in bar chart and time scaled logic diagram formats.

1.2.4 The Contractor shall submit monthly schedule status reports with the monthly progress claim consisting of two (2) hard copies and one (1) electronic copy of the following project control documents:

1.2.4.1 Update of Critical Path Schedule in bar chart and time scaled logic diagram formats.

1.2.5 The Contractor shall show the percentage of completion of each item or activity as projected for the last day of the month for which the schedule is issued. Modify the timing and duration of future activities to indicate current planning.

1.2.6 The Contractor shall submit proposed revisions to the accepted Contract Schedule to the Regional District for review. Changes in timing for activities may be modified with agreement of the Contractor and Regional District. A change affecting the Contract Price, the completion time and sequencing of the Work may be made only by approved Change Order.

1.3 Project Milestone Dates

1.3.1 The Contractor should schedule the Work in accordance with the following Project Milestone Dates:

1.3.2 Substantial Completion by March 15th, 2025

1.3.3 Total Performance by April 30th, 2025

2.0 PRODUCTS

Not Applicable.

3.0 EXECUTION

Not Applicable.

END OF SECTION

Section 013300 Submittal Procedures

1.0 GENERAL

1.1 General Requirements

1.1.1 Unless otherwise noted, make submittals to the Regional District for review.

1.1.2 Make submittals with reasonable promptness and in an orderly sequence to avoid any delay in the Work. Failure to submit in ample time is not considered cause for an extension of Contract Time, and no claim for extension by reason of such default will be allowed.

1.1.3 Do not proceed with Work affected by submittals until review is complete.

1.1.4 The submittal reviews do not authorize changes in cost or time. Changes involving cost or time are authorized only by a signed change order.

1.2 Shop Drawings

1.2.1 Arrange for the preparation of clearly identified shop drawings as specified or as the Regional District may reasonably request. Shop drawings are to clearly indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work. Where articles or equipment attach or connect to other articles or equipment, clearly indicate that all such attachments and connections have been properly coordinated, regardless of the trade under which the adjacent articles or equipment will be supplied and installed. Shop drawings will be submitted with the appropriate Specification Sections attached. Notify the Regional District in writing of any deviations in shop drawings from the requirements of the Contract Documents.

1.2.2 Examine all shop drawings prior to submission to the Regional District to ensure that all necessary requirements have been determined and verified and that each shop drawing has been checked and coordinated with the requirements of the Work and the Contract Documents. Examination of each shop drawing shall be indicated by stamp, date and signature of a responsible person for the Subcontractor for supplied items and of the Contractor for fabricated items. Shop drawings not stamped, signed and dated will be returned without being reviewed and stamped "Resubmit".

1.2.3 The Regional District will review and return shop drawings in accordance with the schedule agreed upon or otherwise with reasonable promptness so as to cause no delay in the Work. Allow sufficient time for review and consideration by the Regional District. Claims for costs or contract extensions due to such review time will not be allowed.

1.2.4 Submit a reproducible original or digital copy, minimum of one (1) electronic copies of white prints and two (2) copies of all fixture cuts and brochures. If the Contractor needs more copies for his own distribution purposes, additional copies should be submitted.

1.2.5 Shop drawing review by the Regional District is solely to ascertain conformance with the general design concept. Responsibility for approval of detail design inherent in shop drawings rests with the Contractor and review by the Regional District shall not imply such approval.

1.2.6 Review of Shop Drawings by the Regional District shall not relieve the Contractor of his responsibility for errors or omissions in shop drawings or for proper completion of the Work in accordance with the Contract Documents.

1.2.7 Responsibility for verification and correlation of field dimensions, fabrication processes, techniques of construction, installation and coordination of all parts of the Work rests with the Contractor.

1.2.8 Shop drawings will be returned to the Contractor with one (1) of the following notations:

1.2.8.1 When stamped “NO EXCEPTIONS TAKEN”, distribute additional copies as required for execution of the Work.

1.2.8.2 When stamped “MAKE CORRECTIONS NOTED”, ensure that all copies for use are modified and distributed, same as specified for “NO EXCEPTIONS TAKEN”. Resubmit for final records.

1.2.8.3 When stamped “REVISE RESUBMIT”, make the necessary revisions, as indicated, consistent with the Contract Documents and submit again for review.

1.2.8.4 When stamped “REJECTED”, submit other drawings, brochures, etc. for review consistent with the Contract Documents.

1.2.8.5 Only shop drawings bearing “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED” shall be used on the Work unless otherwise authorized by the Regional District.

1.2.8.6 It is understood that the following is to be read in conjunction with the wording on the Regional District's shop drawing review stamp applied to each and every data sheet or drawing submitted:

"THESE (SHOP DRAWINGS) (SUBMITTALS), (PLANS)

HAVE BEEN REVIEWED FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS. NO RESPONSIBILITY IS ASSUMED BY THE REGIONAL DISTRICT FOR QUANTITIES, CORRECTNESS OR DIMENSIONS OR DETAILS."

This does not mean that the Regional District approves the detail design inherent in the shop drawings, responsibility for which remains with the Contractor, and such review does not relieve the Contractor of the responsibility for errors or omissions in the shop drawing or of his responsibility for meeting all requirements of the Contract Documents. Be responsible for confirming and correlating dimensions at the Place of the Work, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all sub-trades."

1.2.9 After submittals are stamped "NO EXCEPTIONS TAKEN", no further revisions are permitted unless re-submitted to the Regional District for further review.

1.2.10 Any adjustments made on the shop drawings by the Regional District are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract Price, clearly state as such in writing prior to proceeding with fabrication and installation of work.

1.2.11 Make changes in shop drawings which the Regional District may require consistent with Contract Documents. When re-submitting, notify the Regional District in writing of any revisions other than those requested by the Regional District.

1.2.12 Shop drawings indicating design requirements not included in the Contract Documents require the seal of a qualified Professional Engineer registered in British Columbia and review by the Regional District.

1.3 Record Drawings

1.3.1 After award of the Contract, the Regional District will provide a complete set of drawings for the purpose of maintaining Project record drawings. These drawings shall consist of a full-size white paper copy.

1.3.2 Record on the whiteprints on a daily basis, work constructed differently than shown on the Contract Documents. Record all changes in the Work caused by site conditions, or originated by the Regional District, the Regional District, the Contractor, or a Subcontractor and by addenda, supplemental drawings, site instructions, supplementary instructions, change orders, correspondence, and directions of regulatory authorities. Do not use these drawings for daily working purposes and make the set available for periodic inspection by the Regional District.

1.3.3 Accurately record the location of concealed mechanical services and electrical main feeders, junction boxes and pull boxes. Do not conceal critical Work until its location has been recorded.

1.3.4 Dimension the installed locations of concealed service lines on the site or within the structure by reference from the center line of the service to structure column lines or other main finished faces or other structural points easily identified and located in the finished Work.

1.3.5 Make records in a neat and legibly printed manner with a non-smudging medium.

1.3.6 Identify drawings as “Project Record Copy”. Maintain in good condition and make available for inspection on site by Regional District at all times.

1.3.7 At completion of operational testing, neatly transfer notations to the second set of prints and submit both sets of record drawings to the Regional District.

1.3.8 Failure to provide acceptable “Record Drawings” may delay acceptance of the project by the Regional District. The Regional District may assess against the Contract a sum based on their calculations of costs to prepare such plans.

1.3.9 The Regional District will transcribe the Contractor provided Record Drawings and create a set of “Record Drawings.”

2.0 PRODUCTS

Not Applicable.

3.0 EXECUTION

Not Applicable.

END OF SECTION

Section 015000 Temporary Facilities and Controls

1.0 GENERAL

1.1 Temporary Facilities

1.1.1 Installation/Removal

1.1.1.1 The Contractor shall:

1.1.1.1.1 Provide temporary toilet facilities for the Site.

1.1.2 Maintenance of Public Utilities

1.1.2.1 The Contractor shall:

1.1.2.1.1 Arrange Work to avoid interruption of utilities serving the Regional District and the public. Pay all penalties and costs including legal fees and other expenses imposed on the Regional District as a result of actions of the Contractor, its employees, or subcontractors.

1.2 Site Requirements – General

1.2.1 Sanitary Facilities

1.2.1.1 The Contractor shall:

1.2.1.1.1 Provide temporary portable toilet facilities for the use of the Contractor's, subcontractors' and Regional District’s work forces.

1.2.1.1.2 Disinfect facilities frequently.

1.2.1.1.3 Dispose of sanitary wastes, in accordance with the applicable regulations.

1.2.1.1.4 Contain all wastewater and later dispose of it offsite at an approved facility at the Contractor's cost.

1.2.1.1.5 Keep the Site and premises in a sanitary condition.

1.2.1.1.6 Post notices and take such precautions as required by local health authorities or other public agency having jurisdiction.

1.2.2 Construction Power

1.2.2.1 Coordinate the supply of an electrical power supply for construction purposes with BC Hydro.

1.2.2.2 The Contractor shall:

1.2.2.2.1 Locate construction power at the designated location.

1.2.2.2.2 Provide and distribute construction power and lighting as required for the execution of the Work.

1.2.2.2.3 Pay for its power connection, routing, consumption and similar costs.

1.2.2.2.4 Provide its own source of construction power to operate other equipment when or where necessary.

1.2.2.2.5 Supply and pay for its own independent power for the Work.

1.2.2.2.6 Install and maintain temporary facilities for power such as pole lines and underground cables to approval of local inspection authority.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SECTION

Section 017500 Starting and Adjusting

1.0 GENERAL

1.1 Project Commissioning

1.1.1 The Contractor shall:

1.1.1.1 Promptly correct deficiencies and defects identified by the Owner.

1.1.1.2 Review maintenance manual contents (operation, maintenance instructions, record drawings, spare parts, materials) for completeness.

1.1.1.3 Submit required documentation such as statutory declarations, Workers' Compensation certificates, warranties, certificates of approval or acceptance from regulating bodies.

1.1.1.4 Attend the “end-of-work” testing and break-in or start-up demonstrations.

1.1.1.5 Review inspection and testing reports to verify that the findings conform to the intent of the documents and that changes, repairs or replacements have been completed.

1.1.1.6 Review condition of equipment that has been used in the course of the Work to ensure turning over at completion of the work is in “as new condition” with warranties, dated and certified from time of Substantial Performance of the Work.

1.1.1.7 Arrange and coordinate instruction of Owner's staff in care, maintenance and operation of building systems and finishes by suppliers or Subcontractors.

1.1.1.8 When partial occupancy of uncompleted Project is required by the Owner, coordinate Owner's uses, requirements and access with Contractor's requirements to complete Project.

1.1.1.9 Provide ongoing review, inspection and attendance to project call back, and maintenance, and repair problems during the warranty periods.

1.1.1.10 Provide training during the Equipment Performance Testing period for the following equipment and systems:

1.1.1.10.1 Pump and motor start up testing including performance pump curve and Flow control valve operation and testing.

1.1.2 All components of the above and below mentioned systems as described within these contract documents and any identified equipment and systems in all Divisions.

1.2 Training Completion Forms and Payment

1.2.1 One (1) copy of Form 101 and will be required to demonstrate the pump and motor assembly is operating correctly and without deficiencies.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

3.1 The Contractor shall demonstrate to the Regional District satisfactory start up testing and operation of the submersible pump and motor by completion of the following Form 101.

FORM 101

CERTIFICATE OF SATISFACTORY EQUIPMENT PERFORMANCE

I certify that the equipment listed below has been continuously operated for at least two (2) full operating cycles and that the equipment operates satisfactorily and meets its specified operating criteria. No defects in the equipment were found. The equipment is therefore classed as “conforming”.

PROJECT:

ITEM OF EQUIPMENT:

SERIAL NO:

REFERENCE

SPECIFICATION:

(Authorized Contractor Signature) Date

(Authorized Signing Representative of the Regional District) Date

END OF SECTION

Section 017800 Closeout Submittals

1.0 General

1.1 SECTION INCLUDES

1.1.1 Record Drawings, samples, and specifications.

1.1.2 Equipment and systems.

1.1.3 Product data, materials and finishes, and related information.

1.1.4 Operation and maintenance data.

1.1.5 Spare parts, special tools and maintenance materials.

1.1.6 Warranties and bonds.

1.1.7 Final site survey.

1.2 SUBMISSION

1.2.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

1.2.2 A copy will be returned after final inspection, with Engineer's comments.

1.2.3 Revise content of documents as required prior to final submittal.

1.2.4 Two (2) weeks prior to Substantial Performance of the Work, submit to the Engineer, two (2) final hardcopies of operating and maintenance manuals and one (1) digital version in PDF-A format in English.

1.2.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of the same quality and manufacture as products provided in Work.

1.2.6 If requested, furnish evidence as to type, source and quality of products provided.

1.2.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.2.8 Pay costs of transportation.

1.3 FORMAT

1.3.1 Organize data in the form of an instructional manual.

1.3.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

1.3.3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.

1.3.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

1.3.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

1.3.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

1.3.7 Text: Manufacturer's printed data, or typewritten data.

1.3.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - EACH VOLUME

1.4.1 Table of Contents: provide title of project:

1.4.1.1 Date of submission; names.

1.4.1.2 Addresses, and telephone numbers of Engineer and Contractor with name of responsible parties.

1.4.1.3 Schedule of products and systems, indexed to content of volume.

1.4.2 For each product or system:

1.4.2.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local sources of supplies and replacement parts.

1.4.3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

1.4.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

1.5 RECORD DRAWINGS AND SAMPLES

1.5.1 In addition to requirements in General Conditions, maintain at the site for Engineer one (1) record copy of:

1.5.1.1 Contract Drawings.

1.5.1.2 Specifications.

1.5.1.3 Addenda.

1.5.1.4 Change Orders and other modifications to the Contract.

1.5.1.5 Reviewed shop drawings, product data, and samples.

1.5.1.6 Field test records.

1.5.1.7 Inspection certificates.

1.5.1.8 Manufacturer's certificates.

1.5.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

1.5.3 Label record documents and files in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

1.5.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

1.5.5 Keep record documents and samples available for inspection by the Engineer.

1.6 RECORDING ACTUAL SITE CONDITIONS

1.6.1 Record information on a set of black line opaque drawings and digitally for all record drawings and surveys.

1.6.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

1.6.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

1.6.4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:

1.6.4.1 Measured depths of elements of foundation in relation to finish first floor datum.

1.6.4.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

1.6.4.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

1.6.4.4 Field changes of dimension and detail.

1.6.4.5 Changes made by change orders.

1.6.4.6 Details not on original Contract Drawings.

1.6.4.7 References to related shop drawings and modifications.

1.6.5 Specifications: legibly mark each item to record actual construction, including:

1.6.5.1 Manufacturer, trade name, and catalogue number of each product actually installed particularly optional items and substitute items.

1.6.5.2 Changes made by Addenda and change orders.

1.6.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.7 FINAL SURVEY

1.7.1 Submit final site survey certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.8 EQUIPMENT AND SYSTEMS

1.8.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

1.8.2 Panel board circuit directories:

1.8.2.1 provide electrical service characteristics,

1.8.2.2 controls, and

1.8.2.3 communications.

1.8.3 Include installed colour coded wiring diagrams.

1.8.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.

1.8.5 Maintenance Requirements:

1.8.5.1 include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

1.8.5.2 Provide servicing and lubrication schedule, and list of lubricants required.

1.8.5.3 Include manufacturer's printed operation and maintenance instructions.

1.8.5.4 Include sequence of operation by controls manufacturer.

1.8.5.5 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

1.8.5.6 Provide installed control diagrams by controls manufacturer.

1.8.5.7 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

1.8.5.8 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

1.8.5.9 Provide a list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

1.8.5.10 Provide an asset and life cycle list for all equipment.

1.8.5.11 Additional requirements: as specified in individual specification sections.

1.9 MATERIALS AND FINISHES

1.9.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

1.9.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

1.9.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

1.9.4 Additional Requirements: as specified in individual specifications sections.

1.10 MAINTENANCE MATERIALS

1.10.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

1.10.2 Provide items of same manufacture and quality as items in Work.

1.10.3 Deliver to site specified items packaged to prevent damage, place and store.

1.10.4 Receive and catalogue all items. Identify, on carton or package, colour, room number, system or area, as applicable, where item is to be used. Submit inventory listing to Engineer. Include approved listings in Maintenance Manual.

1.10.5 Obtain receipt for delivered products and submit prior to final payment.

1.11 SPECIAL TOOLS

1.11.1 Provide special tools, in quantities specified in individual specification section.

1.11.2 Provide items with tags identifying their associated function and equipment.

1.11.3 Deliver to site, place and store.

1.11.4 Receive and catalogue all items. Submit inventory listing to Engineer. Include approved listings in Maintenance Manual.

1.12 STORAGE, HANDLING AND PROTECTION

1.12.1 Store spare parts, maintenance materials, and special tools in a manner to prevent damage or deterioration.

1.12.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

1.12.3 Store components subject to damage from weather in weatherproof enclosures

1.12.4 Store paints and freezable materials in a heated and ventilated room.

1.12.5 Remove and replace damaged products at own expense and to satisfaction of Engineer.

1.13 WARRANTIES AND BONDS

1.13.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

1.13.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.13.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

1.13.4 Except for items put into use with Regional District's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

1.13.5 Verify that documents are in proper form, contain full information, and are notarized.

1.13.6 Co-execute submittals when required.

1.13.7 Retain warranties and bonds until time specified for submittal.

2.0 Part 2 Products

2.1 Not Used.

3.0 Part 3 Execution

3.1 Not Used.

END OF SECTION

Division 02 Existing conditions

Section 024113 Demolition

Part 1 General

1.0 REFERENCES

1.1 Canadian Federal Legislation

1.1.1 Canadian Environmental Protection Act (CEPA).

1.1.2 Canadian Environmental Assessment Act (CEAA).

1.1.3 Transportation of Dangerous Goods Act (TDGA)

1.1.4 Motor Vehicle Safety Act (MVSA).

1.2 United States Environmental Protect Agency

1.2.1 CFR 86.098-10, Emission Standards for 1998 and Later Model Year Otto-Cycle Heavy Duty Engines and Vehicles.

1.2.2 CFR 86.098-11, Emission Standards for 1998 and Later Model Year Diesel Heavy Duty Engines and Vehicles.

Part 2 Measures

2.0 STORAGE AND PROTECTION

2.1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Regional District and at no cost to Regional District.

2.2 In all circumstances ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

2.3 Do not dispose of waste of volatile materials such as, mineral spirits, oil, petroleum-based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout the project.

2.4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

2.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

2.6 Protect trees, plants and foliage on site and adjacent properties where indicated.

Part 3 Execution

3.0 PREPARATION

3.1 Inspect site with the Regional District and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

3.2 All items indicated to be removed or salvaged shall be disposed of by the Contractor unless requested by the Regional District.

3.3 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

3.4 Notify and obtain approval of utility companies before starting demolition.

4.0 SEQUENCES OF OPERATION

4.1 Removal

4.1.1 Remove items as indicated.

4.1.2 Do not disturb items designated to remain in place.

4.1.3 When removing pipes under existing or future pavement area, excavate at least 300 mm below pipe invert.

4.1.4 Remove only as many trees as required during demolition. Obtain written approval of Engineer prior to removal of any trees not designated.

4.1.5 All cleared trees shall be disposed of as directed in 2019 MMCD Section 31 11 01 – Clearing and Grubbing.

4.1.6 Stockpile topsoil for final grading and landscaping. Provide erosion control and seeding if not immediately used.

4.2 Removal from Site

4.2.1 Interim removal of stockpiled material will be required by the Regional District, if it is deemed to interfere with the operations of Engineer or other contractors.

4.2.2 Remove stockpiles of like materials by an alternate disposal option once collection of that material is complete.

4.2.3 Only dispose of specified material by selected alternative disposal option as provided by Engineer. Do not dispose of these materials in a landfill or a waste stream destined for landfill. Additional disposal options will be provided by the Engineer's on-site representative prior to disposal.

4.3 Salvage

4.3.1 Carefully dismantle items containing materials for salvage and stockpile salvaged materials at locations as directed by the Regional District.

4.4 Sealing

4.4.1 Seal pipe ends and walls of manholes or catch basins as indicated. Secure plug to form watertight seal.

4.5 Disposal of Material

4.5.1 Dispose of materials not designated for salvage or reuse on site at authorized facilities.

5.0 RESTORATION

5.1 Restore areas and existing works outside areas of demolition to match the condition of adjacent, undisturbed areas.

5.2 Use only soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

6.0 CLEANUP

6.1 Upon completion of work, remove debris, trim surfaces and leave the work site clean.

6.2 Use only cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

7.0 REPORTING

7.1 Record off-site removal of debris and materials and provide the following information regarding removed materials to Engineer within 24 hours.

7.1.1 Time and date of removal.

7.1.2 Type of material.

7.1.3 Weight and quantity of materials.

7.1.4 Final destination of materials.

7.2 The Contractor is responsible for ensuring all reporting requirements are fulfilled to the satisfaction of Engineer.

8.0 COORDINATION

8.1 Coordinate disposal activities with Engineer's on-site representative.

8.2 Potential volumes of divertible materials, a list of verified alternate disposal options, and a collection outline upon award of contract will be provided by Engineer on request.

8.3 The Contractor is responsible for ensuring all coordination requirements are fulfilled to the satisfaction of the Engineer.

END OF SECTION

Division 03 Concrete

Section 033000 Cast-In-Place- Concrete

1.0 GENERAL

1.1 Description

1.1.1 The extent of concrete work is shown on the drawings. This section covers cast-in -place concrete including formwork, shoring for concrete and installation into formwork of items such as anchor bolts, and other items to be embedded in concrete.

1.2 Quality Assurance

1.2.1 Codes and Standards - Comply with the provisions of the following codes, specifications and standards, except as otherwise shown or specified.

1.2.2 American Society for Testing and Materials (ASTM)

1.2.2.1 C33 “Standard Specification for Concrete Aggregate.”

1.2.2.2 C94 “Standard Specification for Ready-Mixed Concrete.”

1.2.2.3 C150 “Standard Specification for Portland Cement.”

1.2.3 Forming

1.2.3.1 The Contractor shall be solely responsible for the adequacy of the forming, shoring and bracing design.

1.2.3.2 Any formwork installed by the Contractor shall be solely at Contractor’s risk. The Engineer’s review will not lessen or diminish the Contractor’s liability.

1.3 Concrete Mix Designs

1.3.1 All concrete materials shall be proportioned so as to produce a workable mixture in which the water content will not exceed the maximum specified.

1.4 Ready-mixed Concrete

1.4.1 Ready-mixed concrete shall conform to the requirements of ACI 301 and ASTM C94. In case of conflict, ACI 301 shall govern.

2.0 PRODUCTS

2.1 Concrete Composition

2.1.1 Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, water, and specified additives so proportioned and mixed as to produce a plastic workable mixture in accordance with requirements of this section of the specification and suitable to the specific conditions of placement.

2.2 Portland Cement

2.2.1 Portland cement shall be from an approved source and shall conform to the requirements of the current ASTM Specification C150, for Type II cement. Only one (1) brand of cement from one (1) manufacturing plant may be used. The use of ground granulated blast furnace slag is not allowed.

2.3 Water

2.3.1 Water for mixing shall be clean, fresh and free from injurious amounts of oil, acid, chlorides, sulfates, alkali or organic matter. Water shall conform to ACI 301.

2.4 Proportioning Normal Concrete

2.4.1 Unless indicated otherwise on the Drawings, concrete shall be of the following classes, each meeting the mix and compressive strength requirements as specified hereafter, and shall be used as follows:

2.4.1.1 Class “C” Foundations and slabs, columns, column footings, and beams and appurtenances.

2.5 Measurement

2.5.1 All measurements shall be by weight. However, Contractor, at his own expense, may increase the cement content at a corresponding reduction in weight of aggregate and sand, whenever he is concerned that the minimum strength and mix ratio requirements under these specifications cannot be met. The amount of water to be used shall be the amount necessary to produce a plastic mixture of the specified slump.

2.5.2 The slump shall be between two (2) " and four (4) " when tested in accordance with ASTM Specifications C143. Variations in the slump range may be allowed by the Engineer if admixtures, such as water reducers or superplasticizers, are utilized in the concrete mix. Regardless of the measured slump, the maximum allowable water-cement ratios as specified herein shall be strictly adhered to.

2.6 Compressive Strength, Water and Cement Content

2.6.1 Notwithstanding what has been stated here-before, and unless shown otherwise on the Drawings, the concrete shall meet the following requirements:

		Class C
1. Min. Compressive Strength		4,000 psi
2. Max. Water Content (gallon per 94 lb. sack of cement)		4.5 gal.
3. Min. Cement Content (94 lb. sack of cement per cubic yard of solid concrete)		6.0 sacks
4. The cement content is required irrespective of strength. Up to a maximum of 15% of cementitious material may be fly ash in accordance with ASTM C618. The use ground granulated blast furnace slag is not allowed.		
5. The total chloride ion content of hardened concrete shall be less than 0.06% by weight of cement.		

2.7 Curing Compound

2.7.1 All horizontal, screeded and floated surfaces, exposed to drying winds and sunlight, shall be sprayed with ATLAS QUANTUM-CURE as manufactured by Atlas Construction Supply, Inc. (application rate: 200 sf/gallon) or equivalent. Application of the curing compound shall conform to the requirements specified within this Section

2.7.2 Alternate curing compounds will be accepted if they are pigmented or colored, such as white, at the time of application and are non-toxic to potable water. Regardless of the type of curing compound used, Contractor shall assume complete responsibility for its adequacy.

3.0 EXECUTION

3.1 Concrete Quality

3.1.1 Concrete shall conform to the requirements specified within this Section. The required proportions shall be assembled, well mixed, transported, placed, consolidated, finished and cured as here-in-after specified. Concrete shall be uniformly dense and sound, free from faults, cracks, voids, honeycomb and other imperfections.

3.1.2 If not called for specifically, and unless specified otherwise, concrete requirements shall follow ACI 301 where applicable.

3.2 Mixing

3.2.1 Concrete shall be batched in fully automatic or semi-automatic stationary plants or approved portable batch type plants and mixed in stationary or truck mixers. Mixing equipment and mixing procedures shall be subject to the approval of the Engineer.

3.2.2 Ready-mixed Concrete

3.2.2.1 Provide central-mixed concrete conforming to ASTM C94 except as modified by these Specifications.

3.2.2.2 Limit the haul time of central-mixed concrete so that the specified slump is attained without the onsite addition of water which will cause the mix design water-cement ratio to be exceeded. In no event shall the time exceed 90 minutes from the batch plant to the completion of the pour, unless specifically approved by the Engineer.

3.2.2.3 Use truck-transported, dry-batched concrete or mix on the jobsite when haul time is excessive. Do not re-temper partially hardened concrete.

3.2.3 Cold joints in slabs and in wall-footings shall be avoided at all costs.

3.2.4 If avoidable, do not place concrete during rainstorms. Protect concrete placed immediately before rain to prevent rainwater from coming in contact with it. The Contractor will keep sufficient protective covering on hand at all times for this purpose.

3.3 Surface Finishes

3.3.1 Steel Trowel Finish

3.3.1.1 This shall be an integral finish obtained by trowelling with a steel trowel after the surface has been floated and allowed to stand until all water-sheen has disappeared.

3.3.1.2 Final trowelling shall be done after the concrete has hardened sufficiently to prevent drawing moisture and fine materials to the surface and when the concrete is sufficiently hard that no mortar accumulates on the trowel.

3.3.1.3 Cement or mixture of cement and sand shall not be spread on surfaces to absorb excess water or to stiffen the concrete.

3.3.1.4 Trowelling shall produce a dense, smooth, impervious surface free from defects and blemishes.

3.3.1.5 All finished top surfaces of wall and wall-corbel (if required), column-footings (if required) and slabs shall receive a smooth, even, level and hard (so called "burnt") steel trowel finish. The entire wall footing surface, particularly along each side of the circumferential waterstop in the area to receive neoprene pads, shall also receive a hard steel trowel finish.

3.3.2 Schedule of Finishes

Surface Description:

Slab on Grade: Smooth Steel Troweled Finish

3.4 Curing

3.4.1 The Contractor shall begin curing immediately after initial concrete set has occurred. Exposed concrete surfaces shall be kept moist during finishing operations prior to initiating specified curing procedures.

3.4.2 Curing of the slabs shall be made by covering the slab with curing blankets, which incorporate a water containing felt or burlap element and a white plastic cover and kept continuously wet for a period of no less than three (3) days. After removal of curing blankets the slab shall be sprayed with a curing compound.

3.4.3 All other horizontal, screeded and floated surfaces, exposed to drying winds and sunlight, shall be sprayed with a curing compound at an application rate of 200 sf per gallon or more as recommended by the manufacturer.

3.4.4 Water for curing shall be generally clean and free from any elements which might cause staining or discoloration of the concrete.

3.4.5 Cracked or damaged visible concrete surface shall be repaired appropriately for a completely smooth finished surface to the satisfaction of the Regional District.

END OF SECTION

Division 09 Painting and Coating

Section 099100 Painting

1.0 GENERAL

1.1 SUMMARY

1.1.1 This Sections requirements pertain to the painting of any exposed ferrous pipe and appurtenances. This section includes:

1.1.1.1 Field applied paints and coatings for normal exposures.

1.1.1.2 Painting Accessories.

1.1.2 Related sections:

1.1.2.1 The Contract Documents are complementary; what is called for by one (1) is as binding as if called for by all.

1.1.2.2 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.

1.1.2.3 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.

1.1.2.3.1 Section 013300 - Submittal Procedures.

1.2 SUBMITTALS

1.2.1 General: Submit as specified in Section 013300.

1.2.2 Shop drawings: Include schedule of where and for what use coating materials are proposed in accordance with requirements for Product Data.

1.2.3 Product data: Include description of physical properties of coatings including solids content and ingredient analysis, VOC content, temperature resistance, typical exposures and limitations, and manufacturer's standard color chips.

1.2.4 Samples: Include 8-” square drawdowns or brush-outs of topcoat finish when requested. Identify each sample as to finish, formula, color name and number and sheen name and gloss units.

1.2.5 Paint Schedule: Provide schedule of all proposed paint products for the items to be painted in format matching the Schedule provided in Part 3 of this Section.

1.2.6 Paint Draw Down Samples: Submit two (2) painted samples, illustrating selected colors for each color and system selected. Submit on heavy paper card stock, 8" x 10" in size.

1.3 QUALITY ASSURANCE

1.3.1 Products: First line or best grade.

1.3.2 Materials for each paint system: By single manufacturer.

1.3.3 Applicator qualifications: Applicator of products similar to specified products with minimum five (5) years’ experience.

1.3.4 Regulatory requirements:

1.3.4.1 Comply with by using paints that do not exceed governing agency's VOC limits or do not contain lead.

1.3.4.2 Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.3.5 Field samples:

1.3.5.1 Paint one (1) complete surface of each color scheme to show colors, finish texture, materials, and workmanship.

1.3.5.2 Obtain approval before painting other surfaces.

1.4 PROTECTION

1.4.1 Protect adjacent surfaces from paint and damage. Repair damage resulting from inadequate or unsuitable protection.

1.4.2 Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.

1.4.3 Place cotton waste, cloths, and material that may constitute fire hazard in closed metal containers and remove daily from site.

1.4.4 Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations.

1.4.5 Carefully store, clean and replace on completion of painting in each area.

1.4.6 Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finish.

1.5 EXTRA MATERIALS

1.5.1 Extra materials: Deliver a minimum one (1) gallon of each type and color of coating applied:

1.5.1.1 When manufacturer packages material in gallon cans, deliver unopened labeled cans as comes from factory.

1.5.1.2 When manufacturer does not package material in gallon cans, deliver material in new gallon containers, properly sealed and identified with typed labels indicating brand, type, and color.

2.0 PRODUCTS

2.1 MANUFACTURERS

2.1.1 Paints.

2.1.2 Paint shall be Tnemec, or approved equal: Tnemec Co., Kansas City, MO.

2.2 PRETREATMENT, PRIMERS, AND PRIMER-SEALERS

2.2.1 Ferrous metal primer:

2.2.1.1 Tnemec: Series 104.

2.2.2 Galvanized metal surface pretreatment materials:

2.2.2.1 Carboline: Surface Cleaner 3.

2.2.3 Galvanized metal surface primer:

2.2.3.1 Tnemec: Series 104.

2.2.4 Wood primer for opaque finish paint, interior exposure: One (1) of following or equal:

2.2.4.1 Carboline: Sanitile 120.

2.2.4.2 S/W: PrepRite Latex Primer B28W111.

2.2.5 Wood primer for opaque finish paint, exterior exposure: One (1) of following or equal:

2.2.5.1 Carboline: Sanitile 120.

2.2.5.2 S/W: A-100 Primer B42W.

2.3 METAL SURFACES

2.3.1 High solids epoxy (self-priming) not less than 72% solids by volume:

2.3.1.1 Tnemec: HS Epoxy Series 104.

2.3.1.2 Well Head Metal Kiosk to be painted “Forest Green.”

3.0 EXECUTION

3.1 INSPECTION

3.1.1 Thoroughly examine surfaces scheduled to be painted before starting work.

3.1.2 Start painting when unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

3.2.1 Prepare surfaces in accordance with paint manufacturer's instructions or when none, the following:

3.2.1.1 Canvas and cotton insulation coverings: Remove dirt, grease, and oil.

3.2.1.2 Galvanized surfaces:

3.2.1.2.1 Remove surface contamination and oils and wash with degreasers.

3.2.1.2.2 Apply coat of etching type primer.

3.2.1.3 Zinc coated surfaces: Remove surface contamination and oils and prepare for priming in accordance with metal manufacturer's recommendations.

3.2.1.4 Unprimed steel and iron: Remove grease, rust, scale, dirt and dust by wire brushing, sandblasting or other necessary methods.

3.2.1.5 Shop primed steel:

3.2.1.5.1 Sand and scrape to remove loose primer and rust.

3.2.1.5.2 Feather out edges to make touch-up patches inconspicuous.

3.2.1.5.3 Clean surfaces.

3.2.1.5.4 Prime bare steel surfaces.

3.2.1.6 Wood:

3.2.1.6.1 Sandpaper to smooth even surface.

3.2.1.6.2 Wipe off dust and grit prior to priming.

3.2.1.6.3 Spot coat knots, pitch streaks, and sappy sections with sealer.

3.2.1.6.4 Fill nail holes and cracks after primer has dried and sand between coats.

3.3 APPLICATION

3.3.1 Apply each coat at proper consistency.

3.3.2 Tint each coat of paint slightly darker than preceding coat.

3.3.3 Sand lightly between coats to achieve the required finish.

3.3.4 Do not apply finishes on surfaces that are not sufficiently dry.

3.3.5 Allow each coat of finish to dry before the following coat is applied, unless directed otherwise by manufacturer.

3.3.6 Where clear finishes are required ensure tint fillers match wood.

3.3.6.1 Work fillers well into grain before set.

3.3.6.2 Wipe excess from surface.

3.3.7 Backprime exterior woodwork, which is to receive paint finish, with exterior primer paint.

3.3.8 Backprime interior woodwork, which is to receive paint or enamel finish, with enamel undercoat paint.

3.3.9 Prime top and bottom edges of metal doors with enamel undercoat when they are to be painted.

3.4 MECHANICAL AND ELECTRICAL EQUIPMENT

3.4.1 Identify equipment, ducting, piping, and conduit in accordance with Related Sections.

3.4.2 Remove grilles, covers, and access panels for mechanical and electrical system from location and paint separately.

3.4.3 Finish paint primed equipment with color selected by the Engineer.

3.4.4 Prime and paint insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars, and supports, except where items are plated or covered with prefinished coating.

3.4.5 Replace identification markings on mechanical or electrical equipment when painted over or spattered.

3.4.6 Paint dampers exposed immediately behind louvers, grilles, convector, and baseboard cabinets to match face panels.

3.4.7 Paint exposed conduit and electrical equipment occurring in finished areas with color and texture to match adjacent surfaces.

3.4.8 Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

3.4.9 Color code equipment, piping, conduit, exposed ductwork, and apply color banding and identification, such as flow arrows, naming and numbering, in accordance with the Contract Documents.

3.5 SURFACES NOT REQUIRING FINISHING

3.5.1 Stainless steel, brass, bronze, copper, monel, chromium, anodized aluminum: Specially finished articles such as porcelain enamel, plastic coated fabrics, and baked enamel.

3.5.2 Items completely finished at factory, such as preformed metal roof and wall panels, aluminum frames, toilet compartments, sound control panels, acoustical tiles, shower compartments, folding partition, and flagpole.

3.6 CLEANING

3.6.1 As work proceeds and upon completion, promptly remove paint where spilled, splashed, or spattered.

3.6.2 During the progress of work, keep premises free from unnecessary accumulation of tools, equipment, surplus materials, and debris.

3.6.3 Upon completion of work, leave premises neat and clean.

3.7 INTERIOR PAINT SCHEDULE

3.7.1 Metal, galvanized: two (2) coats of following finish paints over specified primer:

3.7.1.1 High Solids Epoxy:

3.7.1.1.1 Surfaces not scheduled otherwise.

3.7.2 Metal, non-galvanized ferrous: two (2) coats of following finish paints over specified primer:

3.7.2.1 High Solids Epoxy: TNEMEC or equivalent.

END OF SECTION

Division 22 Plumbing

Section 220500 Common Results for Plumbing

1.0 GENERAL

1.1 REFERENCE STANDARDS

1.1.1 2018 BC Plumbing Code, BCPC.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

1.2.1 Submit in accordance with Section 013300 - Submittal Procedures.

1.2.2 Product Data:

1.2.2.1 Submit manufacturer's instructions, printed product literature and data sheets for material and include product characteristics, performance criteria, physical size, finish and limitations.

1.2.3 Shop Drawings:

1.2.3.1 Indicate on drawings:

1.2.3.1.1 Mounting arrangements.

1.2.3.1.2 Operating and maintenance clearances.

1.2.3.2 Shop drawings and product data accompanied by:

1.2.3.2.1 Detailed drawings of bases, supports, and anchor bolts.

1.2.3.2.2 Acoustical sound power data, where applicable.

1.2.3.2.3 Points of operation on performance curves.

1.2.3.2.4 Manufacturer to certify current model production.

1.2.3.2.5 Certification of compliance to applicable codes.

1.2.3.3 In addition to transmittal letter referred to in Section 013300 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

1.3 CLOSEOUT SUBMITTALS

1.3.1 Submit in accordance with Section 017800 - Closeout Submittals.

1.3.2 Operation and Maintenance Data: submit operation and maintenance data for plumbing fixtures and equipment for incorporation into manual.

1.3.2.1 Operation and maintenance manual approved by, and final copies deposited with, Regional District before final inspection.

1.3.2.2 Operation data to include:

1.3.2.2.1 Control schematics for systems including, where applicable, environmental controls.

1.3.2.2.2 Description of systems and their controls.

1.3.2.2.3 Description of operation of systems at various loads together with reset schedules and seasonal variances.

1.3.2.2.4 Operation instruction for systems and components.

1.3.2.2.5 Description of actions to be taken in the event of equipment failure.

1.3.2.2.6 Valves schedule and flow diagram.

1.3.2.2.7 Color coding chart.

1.3.2.3 Maintenance data to include:

1.3.2.3.1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.

1.3.2.3.2 Data to include schedules of tasks, frequency, tools required and task time.

1.3.3 Performance data to include:

1.3.3.1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.

1.3.3.2 Equipment performance verification test results.

1.3.3.3 Special performance data as specified.

1.3.4 Approvals:

1.3.4.1 Submit (2) copies of draft Operation and Maintenance Manual to Regional District for approval. Submission of individual data will not be accepted unless directed by the Regional District.

1.3.4.2 Make changes as required and re-submit as directed by the Regional District.

1.3.5 Additional data:

1.3.5.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

1.3.6 Site records:

1.3.6.1 The Regional District will provide one (1) set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur.

1.3.6.2 Transfer information to reproducibles, revising reproducibles to show work as actually installed. Maintain at least one (1) copy at the site trailer for review by the Regional District.

1.3.6.3 Use different color waterproof ink for each service.

1.3.6.4 Make available for reference purposes and inspection.

1.3.7 Record drawings:

1.3.7.1 Prior to start of Testing, Adjusting and Balancing for plumbing, finalize production of as-built drawings.

1.3.7.2 Identify each drawing in the lower right-hand corner in letters at least 12 mm high as follows: - "Record DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

1.3.7.3 Submit to the Regional District for approval and make corrections as directed.

1.3.7.4 Perform testing, adjusting and balancing for plumbing using as-built drawings.

1.3.7.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

1.3.8 Submit copies of as-built drawings for inclusion in final TAB report.

1.4 MAINTENANCE MATERIAL SUBMITTALS

1.4.1 Submit in accordance with Section 017800 - Closeout Submittals.

1.4.2 Furnish spare parts as follows:

1.4.2.1 One (1) set of packing for each pump.

1.4.2.2 One (1) casing joint gasket for each size pump.

1.4.2.3 One (1) glass for each gauge glass.

1.4.3 Provide one (1) set of special tools required to service equipment as recommended by manufacturers.

2.0 Basic Product Requirements

2.1 DELIVERY, STORAGE AND HANDLING

2.1.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

2.1.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

2.1.3 Storage and Handling Requirements:

2.1.3.1 Store materials indoors in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

2.1.3.2 Store and protect fixtures from nicks, scratches, and blemishes.

2.1.3.3 Replace defective or damaged materials with new.

3.0 PRODUCTS

3.1 NOT USED

4.0 EXECUTION

4.1 EXAMINATION

4.1.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for fixture installation in accordance with manufacturer's written instructions.

4.1.1.1 Visually inspect substrate in presence of the Regional District.

4.1.1.2 Inform the Regional District of unacceptable conditions immediately upon discovery.

4.1.1.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Regional District.

4.2 SYSTEM CLEANING

4.2.1 Clean interior and exterior of existing building and all systems including strainers. Vacuum interior of ductwork and air handling units.

4.3 CLEANING

4.3.1 Progress Cleaning:

4.3.1.1 Leave Work area clean at end of each day.

4.3.1.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

4.3.1.3 Waste Management: separate waste materials for recycling in accordance with Recycle BC guidelines.

4.3.1.3.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

4.4 PROTECTION

4.4.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Division 22 Plumbing

Section 221429 Sump Pump

1.0 PART 1 GENERAL

1.1 DESCRIPTION

1.1.1 The section provided the specifications and requirement for the Manhole vault sump pump. Pump shall be manufactured by Zoeller Pump Company, M 53 or approved equal.

1.2 RELATED WORK

1.2.1 Section 010000, GENERAL REQUIREMENTS.

1.2.2 Section 013300, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

1.2.3 Section 330810, GENERAL COMMISSIONING REQUIREMENTS.

1.3 SUBMITTALS

1.3.1 Submittals, including number of required copies, shall be submitted in accordance with Section 013300, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

1.3.2 Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.

1.3.2.1 Pump:

1.3.2.1.1 Manufacturer and model. Pump shall be manufactured by Zoeller, M 53 or approved equal

1.3.2.1.2 Operating speed (rpm).

1.3.2.1.3 Capacity.

1.3.2.1.4 Characteristic performance curves.

1.3.2.2 Electric Motor:

1.3.2.2.1 Manufacturer, frame and type.

1.3.2.2.2 Speed.

1.3.2.2.3 Current Characteristics and W (HP).

1.3.2.2.4 Efficiency.

1.3.2.3 Control panel

1.3.2.4 Sensors

1.3.3 Certified copies of all the factory and construction site test data sheets and reports.

2.0 PART 2 - PRODUCTS

2.1 SUMP PUMP

2.1.1 The fully automatic sump pump is designed to remove unwanted groundwater in basement sump applications. The pump horsepower is to be of a professional-grade, 3/10 HP. The pump is to have a fully automatic float-operated sump pump. The white polypropylene float is solid so it cannot become waterlogged. This ensures that it is always buoyant and able to turn the pump on when necessary.

2.1.2 The pump's switch case, motor housing, and pump housing are to be constructed of cast iron. The corrosion resistant engineered plastic vortex impeller will have a smooth surface allowing water and solids to pass freely through the pump. The pump's identification tag, float guard, handle, switch arm, and hardware are to be made of non-corrodible stainless steel.

2.1.3 The pump is to conform to the following specifications:

2.1.3.1 Dimensions: Height 10 ¼" x Width 7 ¾" x Length 10 ¼" .

2.1.3.2 Horsepower: 3/10 HP.

2.1.3.3 Voltage:115 V.

2.1.3.4 Amps: 9.7.

2.1.3.5 Hertz: 60 Hz.

2.1.3.6 RPM: 1550.

2.1.3.7 Discharge: 1-1/2" NPT.

2.1.3.8 Solids Handling: 1/2" (12 mm) spherical solids.

2.1.3.9 On/Off Points: 7-1/4" (18.4 cm) / 3" (7.6 cm) measured from the bottom elevation of the PVC sump pump basin.

2.1.3.10 Impeller Material: Engineered plastic.

2.1.3.11 Impeller Type: Vortex.

2.1.3.12 Cord Length: 9’ (2.7 m).

2.1.3.13 PVC Sump Pump Basin size: Min 450 mm min diameter x 200 mm depth.

3.0 PART 3 - EXECUTION

3.1 STARTUP AND TESTING

3.1.1 Pump installation to comply with ANSI/HI 1.4 for sump pumps.

3.1.2 Contractor to provide 115 VAC from Pump Control room to power the sump pump and install a Ground Fault Circuit Interrupter (CFGI) inside the manhole.

3.1.3 Leak Test: Charge piping system and test for leaks. Test until there are no leaks. Make tests as recommended by product manufacturer and listed standards and under actual or simulated operating conditions and prove full compliance with design and specified requirements. Tests of the various items of equipment shall be performed simultaneously with the system of which each item is an integral part.

3.1.4 The tests shall include system capacity and all control and alarm functions.

3.1.5 When any defects are detected, correct defects and repeat test.

3.1.6 The Regional District will observe startup and Contractor testing of selected equipment. Coordinate the startup and Contractor testing schedules with Regional District.

3.1.7 The Contractor shall provide a minimum of 5 working days prior to startup and testing.

3.1.8 Make certain that the receptacle is within the reach of the pump’s power supply cord. DO NOT USE AN EXTENSION CORD.

3.1.9 Make sure the pump electrical supply circuit is equipped with fuses or circuit breakers of proper capacity. A separate branch circuit is recommended, sized according to the “National Electrical Code” for the current shown on the pump nameplate.

3.1.10 Testing for ground. As a safety measure, each electrical outlet should be checked for ground using an Underwriters Laboratory Listed circuit analyzer which will indicate if the power, neutral and ground wires are correctly connected to your outlet. If they are not, call a qualified, licensed electrician.

3.1.11 For Added Safety. Pumping and other equipment with a 3-prong grounded lug must be connected to a 3-prong grounded receptacle.

3.1.12 For added safety the receptacle may be protected with a ground-fault circuit interrupter.

3.1.13 The pump must be connected in a watertight junction box. The plug can be removed and spliced to the supply cable with proper grounding. For added safety this circuit may be protected by a ground-fault circuit interrupter. The complete installation must comply with the National Electrical Code and all applicable local codes and ordinances.

3.1.14 The tank is to be vented in accordance with local plumbing code. Pumps must be installed in accordance with the National Electrical Code and all applicable local codes and ordinances.

3.1.15 Installation and servicing of electrical circuits and hardware should be performed by a qualified licensed electrician.

3.1.16 Pump installation and servicing must be performed by a qualified person.

3.1.17 The Contractor to verify the power source is capable of handling the voltage requirements of the motor, as indicated on the pump name plate.

3.1.18 The pump case and impeller must be covered with liquid before connecting the discharge pipe to the check valve and no inlet carries air to the pump intake.

3.2 DEMONSTRATION AND TRAINING

3.2.1 Provide services of manufacturer's technical representative for one (1) hour to instruct the Regional District Personnel in operation and maintenance of units.

END OF SECTION

Division 26 Electrical

Section 260553 Identification for Electrical Systems

1.0 GENERAL

1.1 SUMMARY

1.1.1 Section includes:

1.1.1.1 Identification of electrical equipment, devices and components.

1.1.1.2 Material, manufacturing and installation requirements for identification devices.

1.2 SYSTEM DESCRIPTION

1.2.1 Nameplates:

1.2.1.1 Provide a nameplate for each piece of electrical equipment and devices, control panel and control panel components.

1.2.1.2 Provide all nameplates of identical style, color, and material throughout the facility.

1.2.1.3 Device nameplates information:

1.2.1.3.1 Designations as indicated on the Drawings and identified on the Process and Instrumentation Drawings.

1.2.2 Wire numbers:

1.2.2.1 Coordinate the wire numbering system with all vendors of equipment so that every field wire has a unique number associated with it for the entire system:

1.2.2.1.1 Wire numbers shall correspond to the wire numbers on the control drawings or the panel and circuit numbers for receptacles and lighting.

1.2.2.1.2 Wire numbers shall correspond to the terminal block number to which they are attached in the control panel.

1.2.2.1.3 Internal panel wires on a common terminal shall have the same wire number.

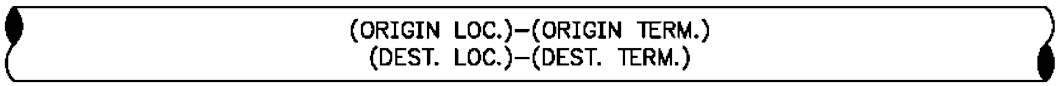
1.2.2.1.4 Multi-conductor cables shall be assigned a cable number that shall be attached to the cable at intermediate pull boxes and stub-up locations beneath freestanding equipment. All multi-conductor and instrumentation cables shall be identified at pull points as described above:

1.2.2.1.5 Label all armored multi-conductor cable using the conduit number as indicated on the Contractor supplied electrical Drawings.

1.2.2.2 Provide the following wiring numbering schemes throughout the project for field wires between process control module, (RTU), vendor control panels, (VCP).

1.2.2.2.1

OR



Where:

ORIGIN LOC.= Designation for originating panel or device ORIGIN TERM.= Terminal designation at originating panel or device DEST. LOC.= Designation for destination panel or device

DEST. TERM.= Terminal designation at destination panel or device or PLCI/O address at destination panel

1.3 SUBMITTALS

1.3.1 Furnish submittals as specified in Sections 013300.

1.3.2 Product data:

1.3.2.1 Nameplates:

1.3.2.1.1 Color.

1.3.2.1.2 Size:

1.3.2.1.2.1 Outside dimensions.

1.3.2.1.2.2 Lettering.

1.3.2.1.3 Material.

1.3.2.1.4 Mounting means.

1.3.2.2 Nameplate schedule:

1.3.2.2.1 Show exact wording for each nameplate.

1.3.2.2.2 Include nameplate and letter sizes.

1.3.2.3 Wire numbers:

1.3.2.3.1 Manufacturer’s catalog data for wire labels and label printer.

1.3.3 Record documents:

1.3.3.1 Update the conduit schedule to reflect the exact quantity of wire numbers including spares and destination points for all wires.

2.0 PRODUCTS

2.1 MANUFACTURERS

2.1.1 Nameplates and signs:

2.1.1.1 One (1) of the following or equal:

2.1.1.1.1 Brady.

2.1.1.1.2 Seton.

2.1.2 Conductor and cable markers:

2.1.2.1 Heat-shrinkable tubing:

2.1.2.1.1 One (1) of the following or equal:

2.1.2.1.1.1 Raychem.

2.1.2.1.1.2 Brady.

2.1.2.1.1.3 Thomas & Betts.

2.1.2.1.1.4 Kroy.

2.1.3 Conduit and raceway markers:

2.1.3.1 One (1) of the following or equal:

2.1.3.1.1 Almetek: Mini Tags.

2.1.3.1.2 Lapp Group: Maxi System.

2.2 MATERIALS

2.2.1 Nameplates:

2.2.1.1 Fabricated from white-center and red face or black-center, white face laminated plastic engraving stock:

2.2.1.1.1 3/32” thick material.

2.2.1.1.2 Two-ply.

2.2.1.1.3 With chamfered edges.

2.2.1.1.4 Block style engraved characters of adequate size to be read easily from a distance of six (6) feet:

2.2.1.1.4.1 No characters smaller than 1/8-” in height.

2.2.2 Signs:

2.2.2.1 Automatic equipment and high voltage signs:

2.2.2.1.1 Suitable for exterior use.

2.2.2.1.2 In accordance with OSHA regulations.

2.2.3 Conductor and cable markers:

2.2.3.1 Machine printed black characters on white tubing.

2.2.3.2 Ten-point type or larger.

2.2.4 Conduit and raceway markers:

2.2.4.1 Non-metallic:

2.2.4.1.1 UV resistant holder and letters.

2.2.4.1.2 Black letters on yellow background.

2.2.4.1.3 Minimum letter height: 1/2-”.

2.2.4.1.4 Adhesive labels are not acceptable.

2.2.4.1.5 Sump Pump Power Receptacle to be watertight.

2.3 SOURCE QUALITY CONTROL

2.3.1 Nameplates:

2.3.1.1 Provide all nameplates for control panel operator devices (e.g. pushbuttons, selector switches, pilot lights, etc.).

2.3.1.2 Same material and same color and appearance as the device nameplates, in order to achieve an aesthetically consistent and coordinated system.

3.0 EXECUTION

3.1 INSTALLATION

3.1.1 Nameplates:

3.1.1.1 Attach nameplates to equipment with rivets, bolts or sheet metal screws, approved waterproof epoxy-based cement or install metal holders welded to the equipment.

3.1.1.2 On NEMA Type 4, or NEMA Type 4X enclosures, use epoxy-based cement to attach nameplates.

3.1.1.3 Nameplates shall be aligned and level or plumb to within 1/64 “ over the entire length:

3.1.1.3.1 Misaligned or crooked nameplates shall be remounted or provide new enclosures at the discretion of the Engineer.

3.1.2 Conductor and cable markers:

3.1.2.1 Apply all conductor and cable markers before termination.

3.1.2.2 Heat-shrinkable tubing:

3.1.2.2.1 Tubing shall be shrunk using a heat gun that produces low temperature heated air.

3.1.2.2.2 Tubing shall be tight on the wire after it has been heated.

3.1.2.2.3 Characters shall face the open panel and shall read from left to right or top to bottom.

3.1.2.2.4 Marker shall start within 1/32" of the end of the stripped insulation point.

3.1.3 Conduit markers:

3.1.3.1 Furnish and install conduit markers for every conduit in the electrical system that is identified in the conduit schedule or part of the process system:

3.1.3.2 Conduit markings shall match the conduit schedule.

3.1.3.2.1 Mark conduits at the following locations:

3.1.3.2.2 Each end of conduits that are greater than 10 feet in length.

3.1.3.2.3 Where the conduit penetrates a wall or structure.

3.1.3.2.4 Where the conduit emerges from the ground, slab, etc.

3.1.3.2.5 The middle of conduits that are 10 feet or less in length.

3.1.3.3 Mark conduits after the conduits have been fully painted.

3.1.3.4 Position conduit markers so that they are easily read from the floor.

3.1.3.5 Attach non-metallic conduit markers with nylon cable ties:

3.1.3.5.1 Provide ultraviolet resistant cable ties for conduit markers exposed to direct sunlight.

3.1.3.6 Mark conduits before construction review by Engineer for punch list purposes.

3.1.4 Signs and labeling:

3.1.4.1 Furnish and install permanent warning signs at mechanical equipment that may be started automatically or from remote locations:

3.1.4.1.1 Fasten warning signs with round head stainless steel screws or bolts. Locate and mount in a manner to be clearly legible to operations personnel.

3.1.4.2 Furnish and install warning signs on equipment that has more than one (1) source of power.

3.1.4.2.1 Place warning signs to identify every panel and circuit number of the disconnecting means of all external power sources.

3.1.4.3 Place warning signs on equipment that has 120 VAC control voltage source used for interlocking.

3.1.4.3.1 Identify panel and circuit number or conductor tag for control voltage source disconnecting means.

3.1.4.4 Contractor to install and route from electrical control room, 115-volt alternating current to the inside of the manhole to power the submersible sump pump.

END OF SECTION

SECTION 310000 Earthwork and Erosion Control and Clay Seal

GENERAL

Part 1 SUMMARY

1.0 SUMMARY

Section includes:

1.1 Loosening, excavating, filling, grading, borrow, hauling, preparing subgrade, compacting in final location, wetting and drying, and operations pertaining to site grading for the removal of the underground valve vaults, manhole, and other facilities.

1.2 Backfilling and compacting under and around the new well head and water line, and manhole structures.

1.3 Installation of the Clay Bentonite Well head seal.

1.4 Construction of erosion control siltation fences and rocked construction entrance.

1.5 Sealing of the Well Head with a Bentonite Clay Seal.

Related sections:

1.6 The Contract Documents are complementary; what is called for by one (1) is as binding as if called for by all.

1.7 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.

1.8 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.

1.8.1 Section 31_05_15 - Soils and Aggregates for Earthwork.

REFERENCES

1.9 ASTM International (ASTM):

1.9.1 D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.

1.9.2 D 1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft3 (2,700 kN m/m3)).

1.9.3 D 6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

DEFINITIONS

Backfill adjacent to structure: Backfill within volume bounded by the exterior surfaces of structure, the surface of undisturbed soil in the excavation around structure, and finish grade around structure.

Excavation: Consists of loosening, removing, loading, transporting, depositing, and compacting in final location, wet and dry materials, necessary to be removed for purposes of construction of manhole structure, waterline ditches, grading, and such other purposes as are indicated on the Drawings.

SYSTEM DESCRIPTION

1.10 Performance requirements:

1.10.1 Where mud or other soft or unstable material is encountered, remove such material, and refill space with stabilization material. Wrap stabilization material with stabilization fabric.

1.10.2 Obtain acceptable import material from other sources if surplus obtained within Project site do not conform to specified requirements or are not sufficient in quantity.

1.10.3 No extra compensation will be made for hauling of fill materials nor for water required for compaction.

SUBMITTALS

1.11 Excavation plan.

1.12 Testing lab: Submit Contractor's proposed testing laboratory capabilities and equipment.

1.13 Test reports:

1.13.1 Submit certified test reports of all tests specified to be performed by the Contractor.

QUALITY ASSURANCE

1.14 Initial compaction demonstration:

1.14.1 Adequacy of compaction equipment and procedures: Demonstrate adequacy of compaction equipment and procedures before exceeding any of following amounts of earthwork quantities:

1.14.1.1 50 cubic yards of backfill adjacent to structures.

1.14.1.2 100 cubic yards of embankment work.

1.14.1.3 100 cubic yards of fill.

1.14.1.4 50 cubic yards of roadway base material.

1.14.1.5 100 cubic yards of road fill.

1.14.2 Compaction sequence requirements: Until the specified degree of compaction on previously specified amounts of earthwork is achieved, do not perform additional earthwork of the same kind.

1.14.3 After satisfactory conclusion of initial compaction demonstration and at any time during construction, provide confirmation tests as specified under "FIELD QUALITY CONTROL."

SEQUENCING AND SCHEDULING

1.15 Schedule earthwork operations to meet requirements specified in this Section for excavation and uses of excavated material.

1.16 If necessary, stockpile excavated material in order to use it at specified locations.

1.17 Excavation, backfilling, and filling: Perform excavation, backfilling, and filling during construction in manner and sequence that provides drainage at all times.

PART 2PRODUCTS

2.0 MATERIALS

2.1 Water for compacting: Use water from source acceptable to Engineer.

2.2 Soil and rock materials:

2.3 General:

2.3.1 Provide aggregate base course, native material, sand, and select material where specified or indicated on the Drawings.

2.3.2 If suitable surplus materials are available, obtain native material and select material from cut sections or excavations imported materials.

2.4 Aggregate base course materials: As specified in the plans.

2.5 Bentonite sealant: Bentonite used to prepare slurries for sealing the well head shall be specifically designed for this purpose. All bentonite slurries shall be prepared and installed according to the manufacturer's instructions. Active solids content (bentonite) shall be 20% by weight or greater in all bentonite slurries. The active solids shall be checked by using the following formula:

Weight of Bentonite (lbs) / (Weight of Bentonite (lbs) + Gallons of water X 8.33 lbs/gal) X 100=% Solids.

Unhydrated bentonite including pelletized, granulated, powder, or chip bentonite may be used in the construction of seals. The bentonite material shall be specifically designed for sealing and be within the industry tolerances for dry western sodium bentonite. Placement of bentonite shall conform to the manufacturer's specifications and result in a seal free of voids or bridges. (c) All bentonite used in any well shall be certified by NSF/ANSI approval standards for use in potable water supply wells. The product shall be clearly labeled as meeting these standards.

3.0 PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Verification of conditions:

3.1.1.1 Character and quantity of material:

3.1.1.1.1 Verify character and quantity of rock, gravel, sand, silt, water, and other inorganic or organic materials to be encountered in work to be performed.

3.1.1.1.2 Determine gradation and shrinkage, and swelling of soil, and suitability of material for use intended in work to be performed.

3.1.1.1.3 Determine quantity of material, and cost thereof, required for construction of backfills, cuts, embankments, excavations, fills, and roadway fills, whether from onsite excavations, or imported materials. Include in cost of work to be performed.

3.1.1.1.4 Include wasting of excess material, if required, in cost of work to be performed.

3.2 PREPARATION

3.2.1 Backfills:

3.2.1.1 After clearing and excavation are completed, scarify entire areas which underlie backfills or structures to a depth of six (6) " and until surface is free of ruts, hummocks, and other features which would prevent uniform compaction by equipment to be used.

3.2.1.2 Recompact scarified areas to density specified before placing backfill material or concrete.

3.2.2 Embankments:

3.2.2.1 After clearing is completed, scarify entire areas which underlie embankments to a depth of six (6) " and until surface is free of ruts, hummocks, and other features which would prevent uniform compaction by equipment to be used.

3.2.2.2 Recompact scarified areas to density specified for embankments before placing of embankment material.

3.2.3 Fills:

3.2.3.1 After clearing is completed, scarify entire areas which underlie fill sections or structures to a depth of six (6) " and until surface is free of ruts, hummocks, and other features which would prevent uniform compaction by equipment to be used.

3.2.3.2 Recompact scarified areas to density specified for compacted fills before placing of fill material or concrete.

3.3 INSTALLATION

3.3.1 General:

3.3.1.1 Dispose of excavated materials which are not required or are unsuitable for fill and backfill in lawful manner.

3.3.1.2 Dispose of surplus material on private property only when written permission agreement is furnished by owner of property. Submit copies of such agreements.

3.3.1.3 Obtain material required in excess of suitable material produced by cuts and excavation, from borrow areas subject to the material requirements specified.

3.3.1.4 Rocks, broken concrete, or other solid materials larger than four (4) " in greatest dimension: Remove from project site at no additional cost to Owner.

3.3.1.5 Stabilization of subgrade: Provide materials used, or perform work required, to stabilize subgrade so it can withstand loads which may be placed upon it by Contractor's equipment.

3.3.1.6 Install a rocked construction entrance and well drilling rig pad in accordance with the plans.

3.3.1.7 Install siltation fences, a minimum of two (2) along Knight Road to prevent sediment laden run off from entering and open ditches.

3.3.2 Borrow area: There is no borrow area on Project site.

3.3.2.1 Where material is required, import material from source located off Project site selected by the Contractor and subject to acceptance by the Engineer.

3.3.2.2 There will be no additional cost to the Contract for use of imported material.

3.3.3 Compaction:

3.3.3.1 Provide specified compaction for backfills, cuts, embankments, fills, roadway fills, and other earthwork.

3.3.3.2 Perform confirmation tests to verify and confirm that work has complied, and is complying at all times, with compaction requirements specified in this Section for initial compaction demonstration and field quality control testing.

3.3.3.3 In-place density of compacted backfills, cuts, embankments, fills, and roadway fills determined in accordance with ASTM D 1556, or with ASTM D 6938.

3.3.3.4 Maximum density obtained in laboratory when tested in accordance with ASTM D 1557.

3.3.3.5 To prevent damage to structures due to backfilling operations, place backfill with equipment that does not exceed H20 feet loading, within a distance from the face of the structure of not less than 1/2 the depth of backfill. The depth of backfill is the distance between the level being compacted and the bottom of the excavation. Outside this distance, heavier compaction equipment may be used.

3.3.3.6 Compact to percentage of maximum density as follows:

3.3.3.6.1 Backfill adjacent to structures: 95%.

3.3.3.6.2 Backfilling voids: 95%.

3.3.3.6.3 Other areas: 85%.

3.3.3.6.4 Under present and future structures: 95%.

3.3.3.6.5 Under roadways, parking and storage areas, curbs, and sidewalks: 95%.

3.3.3.6.6 Upper six (6) " of cuts: 95%.

3.3.3.6.7 Fills: 95%.

3.3.4 Excavation:

3.3.4.1 Excavations for structures:

3.3.4.1.1 Provide excavations conforming to dimensions and elevations indicated on the Drawings for each structure, including trenching for piping and all work incidental thereto. For the waterline installation, the Contractor is to excavate to the widths and depths as shown in the plans and in accordance with the details provided.

3.3.4.1.2 After clearing is complete, excavate the structure, down to the elevation indicated on the Drawings. Unless directed by Engineer, do not carry excavations below elevation indicated on the Drawings.

3.3.4.1.3 Where soil is encountered having unsuitable bearing value, Engineer may direct in writing that excavation be carried to elevations below those indicated on the Drawings.

3.3.4.1.4 Where excavations are made below elevations indicated on the Drawings, adjust elevations of excavations in accordance with the following requirements:

3.3.4.1.4.1 Under slabs: Restore to proper elevation in accordance with procedure specified for backfill in this Section.

3.3.4.1.4.2 Under footings: Restore to the proper elevation using one (1) of the following:

3.3.4.1.4.2.1 Aggregate base-course.

3.3.4.1.5 Excavation width:

3.3.4.1.5.1 Extend excavations at least 0.75 m clear from walls and foundations of structures to allow for placing and removal of forms, installation of services, and inspection.

3.3.4.1.5.2 Do not undercut slopes.

3.3.4.1.6 Difficulty of excavation: No extra compensation will be made for removal of rock or any other material due to difficulty of excavation.

3.3.4.2 Excavation of lined channels:

3.3.4.2.1 Excavations in open cut for lined channels may be made so as to place concrete directly against excavated surfaces providing faces of excavations are:

3.3.4.2.1.1 Firm and unyielding.

3.3.4.2.1.2 Will stand or can be made to stand without sloughing.

3.3.4.2.2 Excavations to provide subgrade for lined channel or subdrainage material: Excavate to lines and grades indicated on the Drawings.

3.3.4.3 Excavation of Manholes:

3.3.4.3.1 Excavate to lines and grades indicated on the Drawings.

3.3.4.3.2 Perform excavation and grading so that finish surfaces are in uniform planes with no abrupt breaks in surface.

3.3.4.4 Excavation of waterlines:

3.3.4.4.1 Cut waterline ditches accurately to cross sections and grades indicated on the Drawings.

3.3.4.4.2 Take care not to excavate ditches and gutters below grades indicated on the Drawings.

3.3.4.4.3 Backfill excessive ditch and gutter excavations to grade with suitable material acceptable to Engineer that is thoroughly compacted.

3.3.4.4.4 Do not deposit any material within three (3) feet of edge of ditch unless otherwise indicated on the Drawings.

3.3.4.5 Necessary over excavation:

3.3.4.5.1 Where it becomes necessary to excavate beyond normal lines of excavation in order to remove boulders or other interfering objects, backfill voids remaining after removal as specified in backfilling of voids below, or as acceptable to the Engineer.

3.3.4.5.2 Backfill voids with material acceptable to the Engineer:

3.3.4.5.2.1 With acceptance of the Engineer, backfill with one (1) of the following:

3.3.4.5.2.1.1 Aggregate base course.

3.3.4.5.2.1.2 Controlled low strength material.

3.3.5 Materials for backfills, embankments, fills, roadway fills:

3.3.5.1 General:

3.3.5.1.1 Obtain import material from other sources if surplus materials from cuts and excavations obtained from within Project site do not conform to specified requirements or are not sufficient in quantity for construction of Project.

3.3.5.2 Backfills:

3.3.5.2.1 Backfill adjacent to structures, slabs, or walls: Native material, or imported material meeting the requirements of native material unless otherwise specified or indicated on the Drawings.

3.3.5.2.2 Backfill material under concrete structures: Aggregate base course material, except in areas where controlled low strength material or concrete encasement are indicated on the Drawings.

3.3.5.2.3 Extend backfill in any area under concrete structures from undisturbed soil or rock to the bottom aggregate base course material layer.

3.3.5.3 Embankments:

3.3.5.3.1 Select material, or imported material meeting the requirements of select material unless otherwise specified or indicated on the Drawings.

3.3.5.4 Fills:

3.3.5.4.1 Native material, or imported material meeting the requirements of native material unless otherwise specified or indicated on the Drawings.

3.3.5.4.2 Extend fill in any area under concrete structures from undisturbed soil or rock to the bottom aggregate base course material layer.

3.3.6 Placement:

3.3.6.1 General:

3.3.6.1.1 Lines and grades:

3.3.6.1.1.1 Construct backfills, embankments, fills, and road fills, at locations and to lines and grades indicated on the Drawings.

3.3.6.1.1.2 Overbuild all permanent fill slopes by at least one (1) foot and then cut to final grade to provide adequate compaction of the remaining fill.

FIELD QUALITY CONTROL (NOT USED)

3.4 ADJUSTING

3.4.1 Finish grades of excavations, backfills, and fills:

3.4.2 Repair and re-establish grades to required elevations and slopes due to any settlement or erosion that may occur from action of the elements or any other cause prior to final acceptance.

3.5 PROTECTION

3.5.1 Finish grades of backfills, cuts, excavations, and fills:

3.5.1.1 Protect newly graded areas from erosion and deterioration by action of the elements.

3.5.2 Waterline Ditches:

3.5.2.1 Maintain waterline ditches free from detrimental quantities of debris that might inhibit drainage until final acceptance.

END OF SECTION

Division 33 Utilities

SECTION 330513 Valve Vault

GENERAL

1.0 SECTION INCLUDES

CONTRACTOR to furnish and install a shallow precast reinforced waterproofed valve complete with a triple door hatch, complete.

REFERENCES

The following is a list of standards which may be referenced in this section: ASTM International (ASTM) A48/A48M, Standard Specification for Gray Iron Castings, C150, Standard Specification for Portland Cement, C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.

1.1 SUBMITTALS

1.1.1 Contractor shall submit manufacturer's technical descriptions of manhole sections, steps, rings, and covers.

1.1.2 Contractor shall submit repair materials and methods to Engineer for review and approval.

1.1.3 Material and procedures to be used in structure abandonment shall be approved by Engineer.

2.0 PART 2 PRODUCTS

2.1 MATERIALS.

2.1.1 Precast Reinforced Valve Vault:

2.1.1.1 Precast reinforced valve vault shall a shallow profile vault as fabricated by Langley Concrete Group, or approved equal.

2.1.1.2 Joints: All precast concrete joints shall be made with a preformed joint sealer or grout. All joints that are made with the joint sealer shall also be pointed with mortar on the inside of the section. Mortar used in jointing precast concrete manhole sections shall be composed of one (1) part Portland cement and not more than three (3) nor less than two (2) parts of fine aggregate. Portland cement shall meet the requirements of ASTM C150, Type II. Hydrated lime or masonry cement shall not be used. Fine aggregate shall consist of well-graded natural sand having clean, hard, durable, uncoated grains, free from organic matter, soft or flaky fragments or other deleterious substances such as calcium chloride. The fine aggregate shall be thoroughly washed and shall be uniformly graded from coarse to fine with a minimum of 95% passing the #4 sieve and a maximum of 7% passing the #100 sieve. All mortar shall be fresh for the WORK at hand. Mortar that has begun to set shall not be used. Joint Seals: All joint seals shall be flexible neoprene rubber free from kinks and any defects.

2.1.2 Valve Vault Steel Access Lid:

2.1.2.1 The valve vault steel access is to be a triple opening hatch configuration with an assisted closing damper assembly. The steel hatch must be AASHTO H20 traffic loaded and shall be slip resistant diamond plated.

3.0 PART 3 EXECUTION

3.1 GENERAL

3.1.1 The valve vault shall be constructed on a properly compacted subgrade and in such a manner that the center of the manhole coincides with the intersection of the projected centerlines of the inlet and discharge pipelines. The surface shall be level to permit proper construction of the riser sections. Changes in size and grade of channels for gravity pipelines shall be made gradually and evenly using concrete made with ASTM C150, Type II Portland cement. The floor of the valve vault shall be sloped towards the invert of the discharge drain line that shall discharge all water to the finish grade on Knight Road.

3.2 INSTALLATION

3.2.1 Placement valve vault must be plumb. Lifting Holes: Fill all lifting holes with mortar and sanded smooth. The interior valve vault walls must be painted white, two (2) coats with a cement water proof paint. All pipe and conduit penetrations thorough the manhole must be core drilled and the annual space between the pipe and the manhole wall filled with waterproof flexible sealant. The interior walls and floor of the valve vault must be painted with a “WHITE” Cement based paint, with a minimum of two (2) coats.

3.3 FIELD QUALITY CONTROL

3.3.1 The vault shall be watertight from infiltration and exfiltration of water. The Contractor shall inspect and repair all visible leaks and damp spots.

3.4 ABANDONMENT

3.4.1 Well vaults to be removed and disposed of by the Contractor, any and all pipes entering or exiting the structure that are to be abandoned are to be plugged with lean concrete or controlled low strength material backfill the existing valve vaults shall be removed to the grade and width specified and backfilled with the material as shown on the plans. Surface restoration shall be completed to match the surrounding areas. Well vault aluminum hatch shall be salvaged, stored, and delivered to the Regional District Mason Road Works yard by the Contractor.

END OF SECTION

Section 330810 Commissioning of Water Utilities

GENERAL

1.0 GENERAL INFORMATION

1.1 The Contractor shall be responsible for successful Preliminary Adjustments and Testing, and Commissioning of the completed facility. Commissioning will be completed after a continuous 48-hour operational test without any fault. The Contractor shall arrange for, and pay for all costs associated with the services of the manufacturer's representatives to assist with startup and testing of the systems and/or equipment.

2.0 Execution

2.1 PRELIMINARY ADJUSTMENTS AND TESTING

2.1.1 The Contractor is required to submit a Preliminary Adjustments, Testing and Commissioning program, to include verification and installation forms, schedule and detail on any qualified professional presence.

2.1.2 All systems and/or equipment shall be tested, calibrated, and adjusted by the manufacturer's representative prior to placement in operation.

2.1.3 Preliminary adjustment and testing shall include, but not be limited to, visual inspection for damage or missing parts, lubrication, alignment check, calibration, and functional testing. Any malfunctioning equipment or systems shall be immediately repaired and/or replaced and/or adjusted and revised.

2.1.4 Due to operational considerations, it may not be possible to run systems and/or equipment under actual operating conditions during the initial site visit by the manufacturer's field representative. The Contractor shall anticipate that multiple site visits by the manufacturer's field representative may be necessary to complete preliminary adjustments and testing.

2.1.5 The Engineer will not approve the beginning of the 4-hour Commissioning test until all preliminary adjustments and testing have been completed and documented. The Contractor shall provide to the Engineer written confirmation from the manufacturer's field representative that the applicable system and/or equipment has been tested, the results of the tests, and that the system and/or equipment is ready for operation.

2.1.6 At a minimum, it is required that the Supplier's and/or Manufacturer's Representative perform Preliminary Adjustments and Testing for the equipment specified in the following Specification Section 460000 Vertically Suspended Submersible Well Pump and Motor and Pitless Adapter Assembly.

2.1.7 The Contractor shall provide the services of the manufacturer's field representative for Preliminary Adjustments and Testing for the number of site visits and duration of on-site time as required to complete Preliminary Adjustments and Testing. If, during commencement of the Facility Operational Test, the Engineer determines that the facility is not ready for operational testing and startup, the Contractor shall complete Preliminary Adjustments and Testing before proceeding with the Commissioning 4-hours test, during which the Contractor will be present for monitoring (for performance and faults) and assistance.

2.2 COMMISSIONING 4 HOURS OPERATIONAL TEST

2.2.1 The Contractor shall provide written notice to the Engineer when Preliminary Adjustments and Testing of the facility has been completed. The Contractor shall certify that all systems have been tested and are operational. This certification is required before Commissioning 4-hours Test will be performed.

2.2.2 The Contractor's valve control area representative in the presence of the Regional District staff will perform the Commissioning 4-hours Test to verify that all systems perform in accordance with the Contract Documents.

2.2.3 The Contractor shall coordinate the services of the manufacturer's representatives, as required, to assist with the Commissioning 4-hours Test. Manufacturer's representatives shall include, but not be limited to, technical support staff for electronically controlled valves, motors/pumps, and sensor equipment. The Contractor shall anticipate that Commissioning 4-hours Test activities may hinder or delay the Contractor. No additional compensation will be paid, or extension of Contract Time will be made to the Contractor, for assistance or delays caused by, or resulting from, the Commissioning 48 hours Test.

2.2.4 The Contractor shall immediately correct deficiencies discovered during the Commissioning 4-hours Test. The Contractor shall anticipate that the Engineer may re-test deficient systems to determine if the corrections are satisfactory.

2.2.5 The Contractor shall provide sufficient water supply during Commissioning 4-hours Testing, at a flow rate range as specified within these contract documents.

2.2.6 The Contractor shall minimize the down time how long the existing well is out of service. The Regional District will allow no more than seven (7) calendar days that the well and pump are out of service and the Pump and Well cannot be out of service between May 15th, 2024, and October 15, 2024. The Contractor will complete the removal of the existing well and motor from the well, the well casing assessment, the reinstallation of the pump and motor, the piping modifications, the motor control work, and the SCADA improvements and successful well and station start up within the seven (7) calendar days.

END OF SECTION

Division 40 Process Interconnections

Section 400567 Electronic-Control Valve and Valve Controller

INTRODUCTION

This specification covers the design, manufacture, and testing of eight (8) ". (200 mm) Control Valve and the required valve controller.

1.0 PRODUCTS GENERAL

1.1 Standard products - use the same manufacturer for multiple units of same type.

1.2 "Tying" of equipment into packages for the purpose of thwarting competition shall be considered to be in non-compliance with these specifications.

1.3 Manufacturers shall price items under different subsections or sections separately.

2.0 ELECTRONIC FLOW CONTROL VALVE

2.1 FUNCTION

2.1.1 The Electronic Flow Control Valve shall be capable of controlling downstream pressure, rate of flow, upstream pressure sustaining, tank level control (altitude and modulating), valve position, blending, pressure management or select combinations of any of these applications. Solenoid pilot controls equipped onto the control valve are actuated by electrical signals received from a valve controller. The solenoid pilots either add or relieve line pressure from the cover chamber of the control valve, causing it to open or close, ensuring the process variable signal follows the set-point command signal. This enables remote control over the electronic control valve operations.

The process variable signal would come from a flow meter, pressure sensor or other monitoring instrumentation. Upon receiving the remote setpoint command from the valve controller, the valve controller shall command the valve to modulate and maintain the desired setpoint value. When the feedback signal deviates from the setpoint, the appropriate opening or closing solenoid on the valve will pulse. As the feedback signal approaches the setpoint, this on/off pulse time will gradually decrease to smoothly modulate the valve to setpoint. When the feedback signal is within a programmable dead band, the opening and closing solenoids will lock the cover and the electronic valve will maintain position.

The Control Valve shall be equipped with inlet and outlet valve-mounted pressure transmitters, and a valve-mounted position transmitter.

The Control valve must have a CS3 electronic interface and have the check valve with cock option.

The electronic valve controller shall be able to calculate the flow rate through the control valve using an algorithm and the readings received from the pressure and position transmitters.

The valve controller shall provide 4-20mA analog outputs giving the ability to retransmit the calculated flow, measured inlet pressure, measured outlet pressure, and measured valve position. The valve controller shall also have the ability to log all data to a local SD card which can be exported in CSV file format for analysis.

The valve controller will come equipped with a 4.3” Color TFT-LCD to graphically display valve and application information locally. An easy to use five (5) press-button operator interface keypad provides simple navigation through software menus.

Two (2) pipe support stands shall support the control Valve, one (1) of each side of the valve. If the stands are not stainless steel, they are to be painted Blue by TNEMEC.

2.2 MATERIALS

2.2.1 Material Specification for the Pressure Reducing Control Valves Main Valve as follows:

Component	Material
Body & Cover	Ductile Iron-ASTM A536
Main Valve Trim	Bronze, Stainless Steel
Seat	Bronze, Stainless Steel
Stem, Nut and Spring	Stainless Steel
Seal Disc	Buna-N® Rubber
Diaphragm	Nylon Reinforced Buna-N® Rubber
Internal Trim Parts	Stainless Steel: Bronze; Brass
End Detail	Flanged (8”)
Pressure Rating	Class 150 lb. (250psi Max.)
Temperature Range	Water to 180°F
Any other wetted metallic parts	Stainless Steel; Bronze; Brass
Coating	Fusion Bonded Epoxy Coating (Interior and Exterior); ANSI / NSF 61 Approved, AWWA coating specifications C116-03.

2.3 MANUFACTURE

2.3.1 Main Valve:

2.3.1.1 The main valve shall be hydraulically operated, single diaphragm actuated, globe or angle pattern. The valve shall consist of three (3) major components; the body with seat installed, the cover with bearing installed and the diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating the operating pressure from line pressure. Packing glands, stuffing boxes and/or rolling diaphragm technology will not be permitted and there shall be no pistons operating the main valve or pilot controls. No fabrication or welding shall be used in the manufacturing process. Y-pattern valves shall not be permitted. The main valve shall be certified by NSF/ANSI Standard 61 as a safe drinking water system component.

2.3.2 End Connections:

2.3.2.1 End Connections for control valve shall be flanged per ASME/ANSI B16.42, Class 150 (8”).

2.3.3 Main Valve Body:

2.3.3.1 No separate chamber(s) below the diaphragm shall be allowed between the main valve cover and body. No fabrication or welding shall be used in the manufacturing process.

2.3.3.2 The valve shall contain a resilient, synthetic rubber disc with a rectangular cross-section contained on three- and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. No O-ring type discs (circular, square, or quad type) shall be permitted as the seating surface. The disc guide shall be of the contoured type to permit smooth transition of flow and shall hold the discs firmly in place. The disc retainer shall be of a sturdy one-piece design capable of withstanding opening and closing shocks. It must have straight edge sides and a radius at the top edge to prevent excessive diaphragm wear as the diaphragm flexes across this surface. No hour-glass shaped disc retainers shall be permitted and no V-type or slotted-type disc guides shall be used.

2.3.3.3 The diaphragm assembly containing a non-magnetic stainless-steel stem; of sufficient diameter to withstand high hydraulic pressures and shall be fully guided at both ends by a bearing in the main valve cover and an integral bearing in the valve seat. The valve seat shall be a solid, one-piece design and shall have a minimum five-degree taper on the seating surface for a positive, drip-tight shut off. No center guides shall be permitted. The stem shall be drilled and tapped in the cover end to receive and affix such accessories as may be deemed necessary. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating the operating pressure from the line pressure. No bolts or cap screws shall be permitted for use in the construction of the diaphragm assembly.

2.3.3.4 The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The diaphragm's center hole for the main valve stem must be sealed by the vulcanized process or a rubber grommet sealing the center stem hole from the operating pressure. The diaphragm must withstand a Mullins Burst Test of a minimum of 600 X per layer of nylon fabric and shall be cycled tested 100,000 times to insure longevity. The diaphragm shall not be used as the seating surface. The diaphragm shall be fully supported in the valve body and covered by machined surfaces which support no less than one-half of the total surface area of the diaphragm in either the fully opened or fully closed position. Bellofram type rolling diaphragms shall not be permitted.

2.3.3.5 The main valve seat and stem bearing in the valve cover shall be removable. The valve seat in the eight (8) inch and larger size valves shall be retained by flat head machine screws for ease of maintenance. The lower bearing of the valve stem shall be contained concentrically within the seat and shall be exposed to the flow on all sides to avoid deposits. To ensure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Cover bearing, disc retainer and seat shall be made of the same material. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. The valve shall be designed such that both the cover assembly and internal diaphragm assembly can be disassembled and lifted vertically straight up from the top of a narrow opening/vault. Y-pattern valves shall not be permitted. The seat shall be a solid one-piece design. Two-piece seats or seat inserts shall not be permitted. Packing glands and/or stuffing boxes shall not be permitted.

2.3.4 Pilot Control System:

2.3.4.1 The pilot control shall be through two (2) direct acting two-way solenoid pilot valves controlled by an external power source. The pilot control system shall include strainers and solenoid manual by-pass valves. The pilot control system shall utilize copper control tubing and brass fittings. The solenoid pilot valves either add or relieve line pressure from the cover chamber of the main valve, causing it to open or close as directed by the electronic controller. Solenoids shall have NEMA IV enclosures.

2.3.5 Material Specification for Solenoid Pilot Controls:

Component	**Material**
Body	Brass B283 (standard)
Pilot Trim	Brass & 303 Stainless Steel
Seals and Disc	NBR
Core and Plugnut	430F Stainless Steel
Core Springs	302 Stainless Steel
Shading Coil	Copper
Disc-Holder	CA
Core Guide	CA
Connections	FNPT
Pressure rating	400 psi Max.
Temperature Range	AC: Water to 125°F Max.
	DC: Water to 104°F Max.
Power Supply	120VAC / 60 Hz (standard)
Enclosure	NEMA Type 1, General Purpose, Watertight (standard)
Control Tubing	Copper
Control Fittings	Brass

Material Specification for Inlet and Outlet Pressure Gauges

The valve is to be equipped with an inlet and outlet pressure gauge conforming to the following specifications.

- Glycerin Oil Liquid-Filled Gauges- one (1) inlet. One (1) outlet side of the valve.
- Scale (PSI).
- Long-Life Stainless-Steel Construction.

- Tamper-Resistant Design.
- 2 1⁄2" Diameter Size.
- Isolation Valve Included.

The Cla-Val Model X141 Pressure Gauge Option consists of two (2) glycerin-filled pressure gauges with the Cla-Val Logo and 1⁄4" CK2 Bronze Isolation Valves on the main valve inlet and outlet. Cla-Val gauges are waterproof, shock resistant, and fully enclosed with a stainless steel case and bronze wetted parts. Ambient temperature ratings are -4 Degrees F to +140 Degrees F (-20 Degrees C to +60 Degrees C).

All gauges have dual scale (PSI) and are supplied with a 1/4" NPT bottom connection.

2.3.6 Factory Assembly:

2.3.6.1 Each control valve shall be factory assembled.

2.3.6.2 The Quality Management System of the factory shall be certified in accordance with ISO 9001: 2008.

2.3.6.3 For all control valves, the factory assembly shall include the complete main valve, pilot valve(s), and all associated accessories and control equipment.

2.3.6.4 During factory assembly the control valve manufacturer shall make all necessary adjustments and correct any defects.

2.3.7 Nameplates:

2.3.7.1 Each Control Valve and associated pilot(s) shall be provided with an identifying nameplate.

2.3.7.2 Nameplates, depending on type and size of control valve, shall be mounted in the most practical position possible, typically on the inlet side of the valve body.

2.3.7.3 Nameplates shall be brass and a minimum of 3/32" thick, ¾" high and 2-3/4" long.

2.3.7.4 Pertinent control valve data shall be etched or stamped into the nameplate. Data shall include control valve Catalog number, function, size, material, pressure rating, end-connection details, type of pilot controls used and control adjustment range.

2.3.8 Factory Testing:

2.3.8.1 Each control valve shall be factory tested.

2.3.8.2 The Quality Management System of the factory shall be certified in accordance with ISO 9001: 2008

2.3.8.3 Tests shall conform to approved test procedures.

2.3.8.4 The standard factory tests shall include a valve body and cover leakage test, seat leakage test and a stroke test. Control valves and pilot valves, in the partially open position, with both ends closed off with blind flanges (valves) and pipe plugs (pilots), shall be subject to an air test. The applied air pressure shall be 90 psi minimum. All air pressure tests shall be applied for a minimum of 15 minutes. No visible leakage is permitted through the valve seat, the pressure boundary walls of the valve body, valve cover, pilot body, pilot cover or the body-cover joint.

2.3.8.5 Control valve manufacturer shall, upon request, offer additional testing, such as high-pressure hydrostatic testing, positive material inspection testing, ferrite testing, liquid penetration inspection testing, magnetic particle examination testing and radiographic examination testing.

2.4 PRODUCT DATA

2.4.1 The following information shall be provided:

2.4.1.1 Control Valve manufacturer’s technical product data.

2.4.1.2 Control Valve manufacturer’s Installation, Operation and Maintenance manual (IOM).

2.4.2 The control valve manufacturer shall provide a computerized cavitation analysis report which shows flow rate, differential pressure, and percentage of valve opening. Cv factor, system velocity, and if there will be cavitation damage.

2.4.3 The manufacturer must also provide valve noise levels according to International Standards over the flow range of the valve. The noise calculation program will be specific to the control valve manufacturer, and based upon tests conducted by a third party, independent laboratory and will be able to provide dBA values for octave band frequencies between 31.5 and 8000 Hz. (Valves with KO trim calculations are per another industry accepted standard without the octave band frequency noise levels). Generic, third-party noise calculation for non-specific control valves will not be accepted.

3.0 ELECTRONIC FLOW VALVE CONTROLLER

3.1 INTRODUCTION

3.1.1 This specification covers the design, manufacture, and testing of Electronic Flow Valve Controller.

3.1.2 Standard products - use the same manufacturer for multiple units of same type.

3.1.3 "Tying" of equipment into packages for thwarting competition shall be considered to be in noncompliance with these specifications.

3.1.4 Manufacturers shall price items under different subsections or sections separately.

3.2 PRODUCTS ELECTRONIC FLOW VALVE CONTROLLER

3.2.1 GENERAL FUNCTION

3.2.1.1 The electronic flow valve controller shall provide the interface between a remote computer system and the hydraulic control valve with the ability to tie into SCADA Systems. Preinstalled with standard valve application templates allowing the Electronic Valve Controller to easily be configured to perform a wide range of control valve individual or multiple functions to match the single or multiple application(s) desired of the valve in the piping system. Designed to provide fully programmable monitoring and hydraulic valve control for rate of flow, pressure reducing, pressure sustaining, level control (altitude and modulating), valve position, blending, pressure management or select combinations of any of these applications. Custom valve applications can be programmed upon request.

3.2.2 ELECTRONIC TWO SOLENOID CONTROL

3.2.2.1 Solenoid pilot controls equipped onto the control valve are actuated by electrical signals received from the Electronic Valve Controller which enables remote computer control over the diaphragm valve operations. The solenoid pilots either add or relieve line pressure from the cover chamber of the valve, causing it to open or close as directed by the electronic valve controller. The electric solenoid pilot controls can also be combined with hydraulic or electronic motorized pilot controls to create dual function, or fail-safe capability. The electronic valve controller shall accept an analog 4-20mA feedback signal. Upon receiving the remote setpoint command from the computer system or local command from the operator, the electronic valve controller shall provide proper signals to modulate and maintain the valve at the desired setpoint value. When the feedback signal deviates from the setpoint, using a proprietary Cla-Val PID algorithm, the appropriate opening or closing solenoid on the valve will pulse. As the feedback signal approaches the setpoint, this on/off pulse time will gradually decrease to smoothly modulate the valve to setpoint. Each solenoid is controlled by a solid-state relay with zero switching voltage. The total cycle time between each pulse shall be programmable. When the feedback signal is within a programmable dead band, the opening and closing solenoids will lock the cover and the valve will maintain position.

3.2.3 ELECTRONIC MOTORIZED PILOT CONTROL

3.2.3.1 Electronic valve control via direct / indirect positioning pilot control (CPC) or via electronic actuated hydraulic pilot control(s) (34 Series), the control valve is actuated using a DC powered 4-20 mA analog command signal received from the Electronic Valve Controller. The controller shall also accept an analog 4-20mA feedback signal. Upon receiving the remote setpoint command from SCADA or local command from the operator, the electronic valve controller shall provide a 4-20 mA analog or digital signal to the electronic motorized pilot(s) to maintain the desired setpoint. This enables simple remote setpoint control over the electronic pilot actuator(s). Upon loss of power, the DC powered motor will become non-operational, leaving the hydraulic set point in its last position. The electronic motorized control scheme can also be combined with hydraulic solenoid pilot(s) and/or hydraulic controls to create dual function, or fail-safe capability.

3.2.4 CONTROLLER TECHNICAL INFORMATION

3.2.4.1 The electronic valve controller shall have remote communication capabilities. The controller shall include six (6) configurable 4-20mA analog inputs; six (6) dry contact digital inputs; four (4) 4-20mA analog outputs; two (2) solid-state relays and two (2) mechanical relays. All inputs and outputs shall have a configuration menu which programs signal name, scaling, engineering units, precision, & filtering. When a setpoint or feedback signal has been lost, the controller shall be configured to maintain some known value. When local mode is selected, the controller shall have the ability to output a signal & screen warning noting a local condition.

3.2.4.2 The controller shall include a maximum of four (4) PID loops for multi-function control, with local or remote set point inputs. Each loop shall have the ability to be broken into (4) different control zones with customizable PID parameters in each. The controller shall have a programmable set point ramping feature which linearly changes a set point over time until the desired value is achieved. The electronic valve controller shall have real time dynamic charting capability to compare set point vs feedback signals. Each PID loop shall have an independent output limiting feature which limits the duration a solenoid can remain energized, providing ultimate system protection. In the event of a signal loss, the PID shall have the ability to lock valve in last position, close valve, or open valve.

3.2.4.3 The electronic controller shall have relay outputs capable of Alarm indication to SCADA and shall be capable of generating and sending signal loss warnings and other configurable control actions. Actions (alarm) can include valve failures, other valves to open/close

3.2.4.4 The controller shall include a built-in flow rate calculator. Using a valve position transmitter & DP transmitter (or inlet/outlet pressure transducers), the electronic controller shall calculate and display flow rate. A graphical menu allows the operator to easily select valve size and seat type. A built-in totalizer keeps track of total volume as a function of time. Customizable units and reset functionality allow for simplified setup and configuration.

3.2.4.5 The electronic valve controller shall come equipped with Control Curves valuable in making relationships against other signals, internal variables, or time. Using a graphical function, coordinates can be added, removed or moved making relationship adjustments convenient.

3.2.4.6 The electronic valve controller shall have the ability to retransmit any input signal, variable, or calculation to a SCADA system.

3.2.4.7 The electronic valve controller shall have a high-speed logging feature which captures all I/O at a maximum sample rate of 1 Hz. Captured data shall be downloadable in .csv file format to a portable memory device such as a USB drive or FTP server.

3.2.4.8 The controller shall have a color TFT screen to graphically display the valve application with real-time system information. The controller display shall have the ability to show all I/O signal readings, PID settings, I/O configuration settings, along with customizable graphics for various warnings. Each signal displayed on the “home” screen is color coded representing normal or lost signal. “Home” screen graphics shall have the ability to be customized.

3.2.4.9 An easy to use five (5) press-button operator interface keypad provides simple navigation through software menus. Security key codes shall be provided to protect against unauthorized changes. An IP-68 rated enclosure shall be provided to house the controller for environmental protection.

3.2.4.10 Each controller enclosure and supporting AC/DC power supply conversion box enclosure (where required), shall be provided standard with an anodized aluminum universal mounting bracket(s), allowing for versatile installation to system piping (horizontally or vertically), wall mounting, panel / cabinet enclosures, Unistrut, valves, & other configurations. Sufficient clearance around controller enclosure should be made for adequate access/wiring. Considerations should be made to comply with all the various local codes, standards and best practices.

3.2.5 MULTI FUNCTION CONTROL

3.2.5.1 The electronic valve controller shall have the ability to perform multiple functions (PID loops) at once. Ultimately there is only one (1) PID loop in control at a given time, with the remaining loops computing in the background. Advanced Cla-Val algorithms provide seamless crossover between loops, simulating multiple hydraulic pilots. Additionally, using digital inputs or internal variables, PID loops can manually be selected to shift between various types of control.

3.2.6 COMMUNICATIONS

3.2.6.1 The electronic valve controller shall come standard with Modbus protocol. This protocol defines a message structure that PLC's will recognize and use, regardless of the type of networks over which they communicate. The valve controller can be configured to communicate on standard Modbus networks using a Modbus RTU. Users shall have the ability to select the desired mode, along with communication parameters (IP address, subnet mask, baud rate, etc.). The electronic valve controller shall have a built-in VNC server.

3.2.7 MATERIALS

3.2.7.1 Material Specification for the Electronic Valve Controllers as follows:

Component	**Material**
Enclosure	
Enclosure Material	Flame retardant UL rated PC/ABS plastic UV Resistant
Enclosure Connections	(2) ½" Cable Gland Knockouts, (10) 3/8" Cable Gland Knockouts IP-68 USB Type A & Type B Connection IP-68 Ethernet Port
Environmental	IP-68, 2 meter for 48 hours IP-65 NEMA Type 4 IP-20 Panel Mount
Enclosure Dimensions	8.75" (223 mm) H x 6" (153 mm) W x 3.5" (89 mm) D
Enclosure Weight	3 lbs. (1.37 kg)
Mounting Bracket	Anodized Aluminum
Display	
Display Type	4.3" Color TFT-LCD, 480 x 272 pixels with Polycarbonate screen, scratch resistant
Display Update Rate	500ms
Programming Method	Mechanical Push Button VNC
Password	5 digit
Mass Data Storage	
Type	4GB SD Card
Language	English
Temperature	14°F to 158°F (-10°C to 70° C)

Humidity	90% RH, non-condensing
Memory Protection	10 year life lithium battery
Power Requirement	
Power	300 mA @ 24VDC (Steady State)
Voltage Input	12-24 VDC – Full Function (standard)
90-264VAC 47-440Hz (optional power supply)	
Cla-Val X143 Series Power Generators (optional)	
Power Protection	Max. 32 VDC over voltage Reverse polarity & short circuit
Fuse Type	3A Fuse recommended
Inputs	
Analog	(6) Inputs (4-20mA / 0-5 V / 0-10 V)
Resolution	10 bit
Digital	(6) digital inputs (Dry contact)
Units	Configurable
Decimal Point	0 / 0.0 / 0.00
Signal Filter	Configurable 0 to 99 %
Totalizer	Configurable Input and Units
Totalizer Reset	Yes
I/O Connection	Screw Terminals
Outputs	
Analog	(4) Outputs (4-20mA)
Resolution	10 bit
Solenoid	(2) Solid State Relay, Zero Switching Voltage
Relay	(2) Mechanical Relay, Rated Voltage 250VAC, Rated Current 6A
Logging	
Configurable	Yes
Logging Speed	1 Second or Greater
Event Memory	128 Mbytes rolling memory up to 80,000,000 values capacity (extended to 4GB by SD card)
Output	CSV format suitable for exporting to MS Excel
Control Parameters	
Control Input	4-20mA full scale / digital (dry contact)
Proportional Band	0-100% (50% default) adjustable in 1% increments
Independently for opening and closing	
Dead band	Adjustable 0 to full scale of setpoint signal
Cycle Time	0 to 60 seconds in 1 sec. increments

Integral Band	Adjustable 0 to 60 seconds
Derivative Band	Adjustable 0 to 60 seconds
Loop Zoning	Adjustable up to (4) zones
PID Loops	4 Configurable
Control Curves	4
Retransmission	4 Analog (4-20mA signal)
Actions (Alarms)	4 (1 or 2 triggering conditions)
Communication	
Local	Mechanical Push Button
Remote	VNC Server
Interfaces	GPRS Modem Quad Band / Ethernet / RJ-45 / RS-232 / RS-485
Protocols	ModbusRTU / VNC
Approvals	
Conformity Marking	CE marking

3.2.8 MANUFACTURE

3.2.8.1 Each Electronic Valve Controller shall be factory assembled by the control valve manufacturer.

3.2.8.2 Each Electronic Valve Controls shall be provided with an identifying nameplate.

3.2.8.3 Each Electronic Valve Controller shall undergo full factory functional and operational testing.

3.2.9 PRODUCT DATA

3.2.9.1 Electronic Valve Controller manufacturer's technical product data shall be provided.

3.2.9.2 The Electronic Valve Controller manufacturer shall warrant the controller to be free of defects in material and workmanship for a period of one (1) year from date of shipment provided the controller is installed and used in accordance with all applicable instructions.

3.2.9.3 The Electronic Flow Valve Controller shall be the CLA-VAL Company Model No. VC-22D, as manufactured by Cla-Val Co., Costa Mesa, CA 92627-4416.

4.0 PART 4 - EXECUTION

4.1 DELIVERY, STORAGE AND HANDLING

4.1.1 Delivery

4.1.1.1 The Manufacture shall deliver the control valves to the Contractor to be delivered to the work site for installation.

4.1.1.2 Upon delivery, control valves are to be unloaded and stored by the Contractor until installation of the product.

4.1.2 Packing and Shipping

4.1.2.1 Control valves specified herein shall be factory assembled. Any control valve appurtenances, accessories, parts and assemblies that are shipped unassembled shall be packaged and tagged in a manner that will protect the equipment from damage and facilitate the final assembly in the field.

4.1.2.2 Care shall be taken in loading, transporting and unloading to protect control valves, appurtenances, or coatings from damage. Equipment shall not be dropped. All control valves and appurtenances shall be examined before installation and no piece shall be installed which is found to be defective. Any damage(s) shall be repaired.

4.1.2.3 Prior to shipping, the control valves and all associated accessories should be acceptably packaged and covered to prevent entry of foreign material.

4.1.2.4 All packaged control valves shall be shipped, remain covered and stored on site until they are installed and put into use.

4.1.2.5 The Contractor must provide and complete all the necessary electrical connections to the valve controller and ensure the full operation including the opening and closing of the solenoids on the flow control valve and the Valve controller is achieved from the from the point of connection to the Regional District's SCADA point of connection, located in the Well head controller room. This includes the Contractor installing a new 50 mm Schedule 80 solvent welded electrical conduit, including all sweeps and providing the excavation, and manhole penetrations for the new conduit and wiring inside the conduit from the point of connection in the well control room to the flow control valve and the valve controller landing points located in the manhole structure. Contractor to also complete the manhole penetrations for the electrical conduit and power cable routing.

4.1.2.6 The Valve controller must be mounted on the panel inside the well head control room at the point of connection to the Regional Districts' SCADA point of connection. The source of power for the valve controller will be from the Regional District's SCADA 4-20 ma output/input SCADA point of connection terminal.

4.2 FIELD TESTING

4.2.1 A direct factory representative shall be made available by the equipment supplier for start-up service, inspection and necessary adjustments for a complete and operating system free of malfunction.

4.2.2 The Flow Control Valve and Valve controller manufacturer shall warrant the valve and the controller to be free of defects in material and workmanship for a period of three (3) years from date of shipment provided the valve is installed and used in accordance with all applicable instructions. Electrical components shall have a one (1)year warranty.

4.2.3 The Flow control valve (supplied with VC-22D valve controller) shall be CLA-VAL Company Model No. 133-AV.

END OF SECTION

Division 40 Process Interconnections

Section 400578 Air /Vacuum Valves for Water Service

1.0 PART 1 - GENERAL

1.1 This specification is intended to cover the design, manufacture, and testing of 1/2 in. (13 mm) through six (6)" (150 mm)

1.1.1 Air Release Valves suitable for clean or raw water service with pressures up to 740 psi (5100 kPa)

1.2 Air Release Valves shall be automatic float operated valves designed to release accumulated air from a piping system while the system is in operation and under pressure. The capacity and pressure rating of the valve is dependent on the diameter of the precision orifice in the cover. A large inlet connection is required for proper air and water exchange.

2.0 PART 2 - PRODUCTS

2.1 Valves shall be manufactured and tested in accordance with American Water Works Association (AWWA) Standard C512.

2.2 Valves used in potable water service shall be certified to NSF/ANSI 61 Drinking Water System Components – Health Effects.

2.3 The manufacturer shall have a quality management system that is certified to ISO 9001 by an accredited, certifying body.

2.4 Models 15A and 22 shall be Factory Mutual Approved and Underwriters Laboratories Listed for fire protection.

2.5 The cover shall be bolted to the valve body and sealed with a flat gasket. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating.

2.6 Floats shall be unconditionally guaranteed against failure including pressure surges. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure. Simple lever designs shall consist of a single pivot arm and a resilient orifice button. Compound lever designs shall consist of two (2) levers and an adjustable threaded resilient orifice button.

2.7 The valve body and cover shall be constructed of ASTM A126 Class B cast iron for working pressures up to 300 psi. Higher pressure rated valves shall be constructed of ASTM A536 Grade 65-45-12 ductile iron.

2.8 The orifice, float and linkage mechanism shall be constructed of Type 316 stainless steel. Non-metallic floats or linkage mechanisms are not acceptable. The orifice button shall be Viton for simple lever valves and Buna-N for compound lever designs.

2.9 The valve shall have a vacuum check on the outlet to prevent air from re-entering the system during negative pressure conditions.

2.10 A screened hood on the outlet shall be provided.

2.11 A fully ported brass ball valve shall be provided when specified to isolate the air release valve from the piping system.

2.12 Valve interiors and exteriors shall be coated with an NSF/ANSI 61 certified fusion bonded epoxy in accordance with AWWA C550 .

2.13 The Air (Release, Vacuum, etc) Valve installed in the manhole shall include an inflow preventer to prevent the introduction of contaminated water through the air valve outlet. The inflow preventer shall allow the admittance and exhausting of air while preventing contaminated water from entering during normal operating conditions. The inflow preventer shall be flow tested by an independent third party to certify performance. The third-party shall be an approved testing lab of the American Society of Sanitary Engineers.

2.14 The manufacturer shall demonstrate a minimum of five (5) years' experience in the manufacture of air valves. The manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.

2.15 The exterior of the valve shall be coated with a universal alkyd primer.

2.16 The Air Release/Vacuum Valve shall Model No. 102 S as manufactured by Val-Matic Valve and Manufacturing Corporation, Elmhurst, Il, USA or approved equal.

3.0 PART 3 – EXECUTION

3.1 Valves three (3)" (76mm) and smaller shall be threaded with NPT inlets and outlets. The body inlet connection shall be hexagonal for a wrench connection. Larger valves shall have ANSI Class 125 flanged inlets.

3.2 The valve shall have two (2) additional NPT connections for the addition of gauges, testing, and draining.

END OF SECTION

Division 46 Process Equipment

Section 460000 Vertically Suspended Submersible Well Pump and Motor and Pitless Adapter Unit

1.0 GENERAL

1.1 Vertical turbine well pump and Motor and the Pitless Adapter with features as shown in the Contract drawings. This section includes the removal, disassembly of the existing 12 stage Pentair 150 mm submersible pump and motor, cleaning, well redevelopment and cleaning, cleaning, painting of the pump and motor assembly, pump reassembly, reinstallation of the pump and motor assembly, testing, and commissioning of the pump and motor assembly. Work also includes the installation of an epoxy coasted pitless adapter well head assembly, “Baker Monitor” or approved equal to grade, Work also includes removal of the existing well head, and well vault, replacement of the undersized 100 mm discharge piping, and inline isolation valves followed by the replacement of 200 mm ductile iron piping all as shown in accordance with these plans and specifications

1.2 Qualifications.

1.2.1 Work under this section may only be completed by a qualified well pump installer and well hydrogeologist as defined in the British Columbia Ground Water Protection Regulation. Qualified well pump installers and hydrogeologists are to be registered with the British Columbia Ground Water Association.

2.0 Products

2.1 The pitless adapter is to be a “Baker Model Monitor PS Industrial Pitless Unit” or approved equal.

2.2 Coatings

2.2.1 Coat exterior of pump, interior/exterior of the pitless well unit, drop pipe and check valve with liquid epoxy in accordance with the requirements of AWWA C210. All welds shall be cleaned of flux and spatter and ground smooth. Sandblast all interior surfaces to SSPC-SP10 (near white) and all exterior surfaces to SSPC-SP6 (commercial blast). Ensure a surface profile of 2 - 2.5 mils. Coat all surfaces to a total dry film thickness of 12 mils in accordance with one (1) of the following options. Welds shall be brush striped prior to coating. Apply two (2)coats of Interline Amido - Amine Epoxy (manufactured by International Paint) in accordance with the manufacturer's instructions or approved equal.

2.2.2 The pump and motor shall be given a standard non-witnessed running test and a hydrostatic test of the discharge head and bowl assembly, all in accordance with Section 5.2 of the AWWA Standard for Vertical Turbine Pumps E102 (current edition).

2.2.3 Nameplate.

2.2.3.1 The pumping unit shall have a stainless steel or aluminum nameplate located in an easily visible location on the pitless adapter (rivet in place) and a second spare loose nameplate (for mounting in the control cabinet). The nameplate shall include at least the following data:

2.2.3.1.1 pump model, manufacturer.

2.2.3.1.2 year of manufacture.

2.2.3.1.3 serial number.

2.2.3.1.4 number of stages.

2.2.3.1.5 rpm (at rated capacity).

2.2.3.1.6 design condition (head and flow) .

2.2.3.1.7 shut off head.

2.2.3.1.8 bearing numbers.

2.2.3.1.9 weight (pump, column, shaft and discharge column).

2.2.3.2 The motor shall have a stainless steel or aluminum nameplate located in an easily visible location on the pitless adaptor and a second spare loose nameplate (for mounting in the control cabinet). The nameplate shall include at least the following data:

2.2.3.2.1 Motor model, manufacturer.

2.2.3.2.2 Serial number.

2.2.3.2.3 Voltage, amperage.

2.2.3.2.4 Frequency.

2.2.3.2.5 Power factor.

2.2.3.2.6 Insulation class.

2.2.3.2.7 Horsepower.

2.2.3.2.8 RPM.

2.2.3.2.9 Service factor.

2.2.3.2.10 Locked rotor current.

2.2.3.2.11 Weight.

3.0 EXECUTION

3.1 The pump and motor assembly shall be removed from the well and the Contractor shall inspect the equipment and report immediately any damage. The pumping unit and motor shall be transported from the work site to pump installer/servicer yard and back again to work site. Pump and motor to be de-staged, disassembled, cleaned, painted, mechanical and electrical tested by a qualified pump installer at the pump installer's pump yard. Pump installer shall transport pump and motor assembly from well site to pump yard and then back again to the site after completion of pump and motor cleaning and testing, then execute the reassembly and reinstall the pump and motor assembly back into the cleaned and disinfected well. Contractor to successfully complete a 4-hour continuous well stress test in the presence of a hydrogeologist. The hydrogeologist is to be provided by the Contractor. The hydrogeologist is to determine the well redevelopment chemical concentrations and dosing as part of the well redevelopment work.

Pump installation and well testing must be performed by a Qualified Pump Installer (QPI) or Qualified Well Drillers (QWD), respectively, registered with the Province of British Columbia. The Contractor will provide the hydrogeologist at key points throughout the installation and testing, as described below. In no case, will the QPI or QWD complete activities without pre-approval from the Contractor's Hydrogeologist, where the procedural specifications indicate involvement from the Contractor's Hydrogeologist

3.2 The "Well Identification Plate" is a requirement of the B.C. Ground Water Regulation for all wells. The plate shall be secured to the top of the pitless unit. If the plate already exists on the existing well casing it shall be removed and transferred to the completed well head after the casing has been trimmed. The plate shall be 38 mm x 75 mm SS and include the unique Well Identification Number issued by the Province. The plate shall be secured to the well within completion of the work. Confirmation of the plate installation including location on the well head and the Well Identification Number shall be included on the record drawings and in the O&M manuals submitted by the Contractor.

3.3 The pumping unit, drop pipe, and pitless unit shall be assembled by a qualified machinist or millwright. A copy of the pumps' operations and installation manual will be supplied to the Contractor. The pitless well unit shall be welded onto the well casing. The Contractor shall ensure that the orientation of the pitless unit is correct relative to the centreline of the discharge piping. The contractor shall verify the bury and connection dimension of the pitless adaptor prior to fabrication.

3.4 The steel drop pipe shall be assembled in approximately three (3) m (10-foot) sections using extra strong half couplings. The Contractor shall ensure that each connection and joint is properly tightened using strap or chain wrenches with suitable extension handles. The interior pipe coating must not be damaged during installation of the pumping unit. Any damage to the exterior coating must be kept to a minimum. All threaded connections shall have "never seize" applied to the threads to ensure the coupling can be dismantled at a later date.

3.5 During the installation of the pump, motor and drop pipe, care must be taken to ensure the power and electrode cables, and water level tubing are not damaged or pinched against the sides of the well casing. The power cable shall be tested for continuity during installation as outlined in the installation instructions. Testing for continuity and checking the splice and insulation resistance shall be carried out in accordance with the manufacturer's instructions.

3.6 The plastic tubing for the water level sensor and depth sounding shall be secured to the drop pipe with nylon electrical tie wraps at one (1) m intervals.

3.7 The power cables to the submersible motor shall be secured to the drop pipe with stainless steel punch lock banding complete with a 3-conductor cable guard at each banding location. Alternate methods of banding the power cable will require prior approval of the Regional District Representative. The power cable shall be supported independently from the plastic tubing. The later items shall be fastened to the drop pipe after the power cable is secured in place.

3.8 The pumping unit shall be tested in accordance with the applicable sections of the Hydraulic Institute Standards (current edition). Upon successful completion of the initial test, the Regional District Representative is to be contacted to witness the final test. In particular, the following items shall be tested and/or confirmed with the Engineer in presence: .1 Correct rotation of pumping unit; .2 Current draw and voltage at all operating conditions; .3 Flow and drawdown in the well when the pumping unit is operating; .4 Response to all control functions both in the “hand” and “automatic mode”; and .5 The submersible pump power supply cables shall be tested with a megger during the pump installation to check the insulation resistance The insulation resistance must conform to the manufacturer’s requirements and under no circumstances shall the resistance be below two (2) million ohms or any of the three (3) legs deviate significantly. If the readings are imbalanced or below two (2) million ohms the pump shall be removed and the problem rectified.

3.9 Test well riser piping to 1,035 kPa (150 psi) for two (2) hours. Leakage shall not exceed allowable leakage for the pump check valve Provide a written report to the Departmental Representative summarizing the results of the pressure and leakage testing for each section. The report will include the type of test, duration, allowable leakage rate, and actual leakage. The Contractor shall coordinate the start-up with the Regional District.

END OF SECTION

Division 33 – Utilities

33 21 00 – Water Supply Wells

33 21 13 – Well Rehabilitation

WELL CLEANING AND TESTING PROCEDURAL SPECIFICATIONS

1.0 Pre-well cleaning Aquifer Test:

1.1 In coordination with the Regional District, the existing pump will be turned off.

1.2 Three (3) static groundwater levels, five (5) minutes apart, will be measured and recorded by the Contractor's QPI/QWD. The results must be provided to the Regional District.

1.3 Following approval from the Hydrogeologist, remove the existing pump and install the temporary testing pump. The temporary testing pump will be provided by the QWD / QPI.

1.4 Once the temporary pump has been installed, allow for one-hour for water levels to stabilize. Then, collect and record three (3) groundwater levels, five (5) minutes apart. Provide the data to Contractor's hydrogeologist to confirm stable groundwater levels have been achieved.

1.5 A discharge hose will run directly from the groundwater supply well to a nearby drainage ditch located approximately 30 m from the pump station at the corner of King and Chaster road. Barricades will be installed by the QWD/QPI to ensure that pedestrian traffic does not walk, step or depress the discharge hose, to allow for a constant flow rate during testing.

1.6 The QPI in the presence of the Regional District will turn on the pump and measure and record flow rates and groundwater levels according to the following schedule, and as directed by Contractor's hydrogeologist:

1.6.1 0-5 minutes: every 30 seconds.

1.6.2 5-10 minutes: every minute.

1.6.3 10-20 minutes: every two (2) minutes.

1.6.4 20-50 minutes: every five (5) minutes.

1.6.5 50-100 minutes: every 10 minutes.

1.6.6 100-180 minutes: every 20 minutes

1.6.7 180-240 minutes: every 30 minutes

1.7 The test will proceed to 240 minutes (4-hours). The pump can be shut off only after confirmation from Contractor's hydrogeologist.

1.8 When the pump is shut off, measure and record the recovering groundwater levels according to the same schedule above and until confirmation from the Contractor's Hydrogeologist. Assume one (1) hour of recording.

2.0 Pre-Cleaning Camera Survey:

2.1 The QPI will install and operate a downhole optical well camera.

2.2 The camera will descend to the bottom of the screen and view and record the condition of the well screen and well casing to the surface.

2.3 Footage from the survey will be made available to the Regional District on USB or DVD.

2.4 Record the measurement to top of the well screen, bottom of the well screen, bottom of well and any observation about the well casing and screen condition / integrity, along with the corresponding depths.

3.0 Well Cleaning:

3.1 The QWD will mount a cable-tool drill rig over the wellhead.

3.2 To complete the physical/mechanical cleaning of the screens, the cable tool will gently mechanically agitate the well screens using surge-and-bail techniques that include the use of a surge block, a bailer, and a pump or similar techniques. The pump will discharge disturbed groundwater and debris that is anticipated to be loosened from the Well screen. The physical/mechanical cleaning will be complete when the bailer removes no more observed debris, the discharge is clear, and the Hydrogeologist confirms the cleaning is complete. It will be the responsibility of the QWD / QPI to safely dispose of any debris and solids that are discharged.

3.3 Following this, a variety of chemicals agents can be used to clean the well screen. Various companies have de-scalers. The chemicals are a proprietary blend and can be purchased following the completion of the camera survey. The chemicals chosen by the QWD or QPI will be approved by the Hydrogeologist prior to use. The de-scaling agent will need to be injected across the length of the well screen via a tremie pipe and will remain in the well, undisturbed, for up to 24-hours. The prescription for the chemical cleaning is to be determined by the Contractor's hydrogeologist.

3.4 Once the chemicals have cleaned the well screen over a period of 24-hours, pumping will be started.

3.5 Discharge water shall be neutralized, conservatively, to meet the British Columbia Approved Water Quality Guidelines for maximum exposure, controlled, intermittent concentrations for Marine and Estuarine Aquatic Life pH, turbidity and chlorine (0.40 mg/L1 for chlorine, a pH between 7.0 and 8.7 2), before discharge. If the guidelines are exceeded, turbidity management and continued treatment will be initiated by the QWD. Once the discharge water meets applicable guidelines, it can be discharged to ground through a nearby drainage ditch located approximately 30m from the site at the corner of King and Chaster Road.

4.0 Post-Cleaning Aquifer Test

4.1 A discharge hose will run directly from the groundwater supply well to a nearby drainage ditch located approximately three (3)m from the pump station at the corner of King and Chaster road.

4.2 The static groundwater level will be measured and recorded the QPI will turn on the pump at a rate of 11.4 L/s (180 US gpm), or adjusted to a different pump rate, if recommended by the hydrogeologist, and measure and record flow rates and groundwater levels according to the following schedule, and as directed by the Contractor's contracted field and certified hydrogeologist:

4.2.1 0-5 minutes: every 30 seconds.

4.2.2 5-10 minutes: every minute.

4.2.3 10-20 minutes: every two (2) minutes.

4.2.4 20-50 minutes: every five (5) minutes

4.2.5 50-100 minutes: every 10 minutes

4.2.6 100-180 minutes: every 20 minutes

4.2.7 180-240 minutes: every 30 minutes

4.3 The test will proceed to 240 minutes (4-hours). The pump can be shut off only after confirmation from the Contractor's Hydrogeologist.

4.4 When the pump is shut off, measure recovering groundwater levels according to the same schedule above and until confirmation from Contractor's Hydrogeologist. Assume one (1) hour of recording.

5.0 TEMPORARY TEST PUMP REMOVAL AND PERMANENT PUMP INSTALLATION

5.1 The QPI will mount their truck on the grass to the southeast of the well.

5.2 The temporary test pump will be removed from the Well. A permanent vertical turbine pump assembly (pump assembly) will be collected from the Regional District's maintenance building to replace the existing pump assembly.

5.3 The static groundwater level will be measured and recorded. The permanent pump supplied by Regional District will be installed into the groundwater supply well with the pump intake installed as per the IFC drawings. The installation depth will be confirmed by the Contractor's Hydrogeologist and the actual pump intake depth recorded.

5.4 Along with the permanent pump, two (2) schedule 40 PVC, 38 mm nominal ID sounding tubes will be installed. The sounding tubes will extend from the top of casing to the top of the pump intake. The bottom meter of the sounding tubes will be slotted with maximum five (5) mm perforations and an end cap will be secured to the bottom end of the tubes. The sounding tubes will be installed at the same time as the pump by the Contractor.

6.0 WELL DISINFECTION PROCEDURAL SPECIFICATIONS

6.1 Following pump installation, diluted liquid sodium hypochlorite (household bleach), at a concentration to be determined by the hydrogeologist, will be poured into the well to shock chlorinate direct the discharge and kill any bacteria. Contractor's Hydrogeologist will determine the volume of chlorine. The QWD / QPI will direct discharge water back into the well casing, cleaning the sodium hypochlorite from the casing, drop-pipe, and wiring. Once chlorine is present in the discharge line, the chlorine will be considered wholly circulated. Pumping will

stop for 12-hours to allow for sufficient contact time between the chlorine solution, the well screen, and surrounding aquifer.

6.2 The well water will be pumped to storage containers and treated with sodium thiosulphate to remove chlorine. Dechlorinated water shall meet the British Columbia Approved Water Quality Guidelines for maximum exposure, controlled, intermittent concentrations for Marine and Estuarine Aquatic Life for chlorine.

6.3 Once the water quality has been dechlorinated to maximum concentrations of 0.40 mg/L for chlorine, a pH between 7.0 and 8.7, and the concentration results have been reviewed with Contractor's Hydrogeologist, the dechlorinated well water can be discharged to ground at the drainage ditch located approximately 30m from the site at the corner of King and Chaster road. Solids from the tank(s) shall be disposed of by the Contractor in accordance with local legislation.

6.4 Disinfection procedures shall be in accordance with AWWA C654 standard for disinfection of wells and will be undertaken after the permanent pump, drop pipe and pump wire will be been installed into the groundwater supply well.

7.0 ANALYSIS REQUIREMENTS

7.1 Samples for bacteriological analysis shall be collected at the pump discharge in sterile laboratory provided sampling bottles and analyzed for coliform organisms.

7.2 After sterilization, the well shall be pumped at open discharge to an aboveground storage holding tank. The water shall be pumped until chlorine odour cannot be detected, and the chlorine concentration is <0.40 mg/L. The well will be pumped free of chlorine before the water samples are collected for laboratory analysis.

7.3 Water samples shall be collected from the well on two (2) successive days for laboratory analysis of coliform organisms. Laboratory results will indicate that the samples are free from coliform organisms with each sample before the well is accepted for potable water use.

7.4 The first samples shall be collected by the Contractor and the second by the Regional District in the laboratory provided sampling bottles, ordered by the Contractor. The coliform organism analysis and approval shall be made by the laboratory, and the Regional District shall be furnished with a copy of the laboratory report.

7.5 If any coliform organisms are found present in the samples, the QWD / QPI shall re-sterilize the well and have the water resampled, as stated above until such time as no coliform organisms are found present in a water sample analysis.

7.6 All expenses of sterilization of the pump and laboratory analyses for coliform organisms shall be borne by the QWD / QPI.

8.0 MATERIAL SPECIFICATIONS

8.1 38 mm nominal schedule 40 PVC to be used for two (2) 45 m sounding tubes.

8.2 Aboveground storage tank(s) for pump and treat to neutralize/dechlorinate well water prior to discharge.

8.3 The down-hole optical well camera will need an on-board lighting array, side view with 180° swivel, down-view, and the ability to record time-stamped footage. The camera will need to be able to descend to a depth of 115 m.

8.4 Well descaling/cleaning (proprietary acid blend) and disinfection (6-8% sodium hypochlorite) chemicals.

8.5 Neutralizing chemicals:

8.5.1 Sodium thiosulphate for chlorine.

8.5.2 Soda ash for pH.

8.6 Water-tight bin for collecting solids and debris from well.

9.0 FIELD QUALITY CONTROL

9.1 Witnessing: All field testing shall be supported by telephone from a Hydrogeologist; provide advanced notice of field testing as specified in Section 014000.

9.2 Inspection and checkout: As specified in Sections 01 40 00.

9.3 Equipment performance test: Test level as scheduled; test as specified in Section 014000.

10.0 REGIONAL DISTRICT'S FIELD SERVICE

10.1 Require Regional District’s Water Utility Operations Department, and Engineer of Record, to view the permanent pumping system and set-up before initial start-up to observe in conjunction with the Contractor the system has been correctly installed and prepared for start-up as specified in this Section and in other pertinent Sections. The Contractor is to be responsible for the correctness and scheduling of the setup. The Regional District will complete the necessary SCADA modifications to the SCRD owned and operated SCADA control system, The

Contractor must complete all other control valve work including connection to the Regional District SCADA point of connection inside the Well Control Room.

END OF SECTION