|  |  |  |
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| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | September 22,2009 | Insertion of the pre-approved suppliers/manufacturers names and review/update of document cross-references |
| 3 | April 15, 2013 | Final Draft – Consolidated Comments Spec Update Project |
| 4 | June 17, 2013 | Finalized for Legal Review. Incorporation of new Commissioning and Computerized Maintenance Management System Data Requirements Specification cross references. |
| 5 | June 2, 2014 | Incorporation of Legal Comments (AV) |
| 6 | July 15, 2014 | Amended to reflect changes related to commissioning specification and name change (AV) |
| 7 | September 24, 2014 | Updated, Finalized Specification – Reference eDOCS #1029450 v5 (AV) |
| 8 | February 18, 2015 | Updated standards (AV) |
| 9 | March 2, 2015 | Updated, Finalized Specification – Legal Reference eDOCS #5043369 v12 (AV) |
| 10 | March 18, 2016 | Updated AWWA Standards |
| 11 | February 14, 2017 | Updated standards references. Updated acceptable manufacturers (CPD PMO, OMM) (AV) |
| 12 | March 1, 2017 | Updated for references to NSF 372. (AV) |
| 13 | January 12, 2022 | Updated for pump testing project (Q-18-300) (BM) |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# GENERAL

## Scope of Work

### This Section covers the supply, delivery, supervision of installation, and the commissioning of submersible well pumps and accessories.

### Unit Responsibility: The work requires that the submersible well pump systems, complete with all accessories be the end Product of one system manufacturer or responsible system supplier. Unless otherwise indicated in the Contract Documents, the Contractor shall obtain each system from the supplier of the equipment, which supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment into operation in conformance with the specified performance, features and functions without altering or modifying the Contractor’s responsibilities under the Contract Documents. The Contractor is responsible to be in accordance with the operational requirements set out in Division 13 – SCADA and Instrumentation and the Process Narrative/Process Control Narratives included in the SCADA appendices. [*Please ensure that the Process Narrative/Process Control Narratives are attached as appendix documents to the Contract]*

## Related Sections

### [Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.

### Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.

### This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]

### [List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

### [List Sections specifying products installed but not supplied under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

### [List Sections specifying related requirements.]

### Section 01060 – Regulatory Requirements.

### Section 01425 – Computerized Maintenance Management System Data Requirements.

### Section 01430 – Operation and Maintenance Data.

### Section 01750 – Disinfection and Testing of Water Retaining Structures and Process Piping.

### Section 01810 – Equipment Testing and Facility Commissioning.

### Section 11010 – Equipment General Requirements.

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

## References

### Comply with the latest edition of the following codes and standards, and all amendments thereto:

#### American Water Works Association (AWWA)

##### ANSI/AWWA A100-15, Water Wells.

##### ANSI/AWWA D100-11, Welded Carbon Steel Tanks for Water Storage.

##### ANSI/AWWA D102-14, Coating Steel Water - Storage Tanks.

##### ANSI/AWWA E102-06, Submersible Vertical Turbine Pumps.

#### Canadian Standards Association (CSA):

##### CSA B137 Series-17, (B137.1-02, Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services).

##### CSA B137.3-02, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.

#### American Society for Testing and Materials (ASTM):

##### ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

#### Hydraulic Institute (HI)

##### ANSI/HI11.6-2016- American National Standard for Rotodynamic Pumps for Hydraulic Performance, Hydrostatic Pressure, Mechanical, and Electrical Acceptance Tests

##### ANSI/HI 9.6.4-2016- Rotodynamic Pumps for Vibration Measurements and Allowable Values

#### NSF International (NSF)

##### NSF 60-2013 Drinking Water Treatment Chemicals- Health Effects

##### NSF 61-2013 Drinking Water System Components- Health Effects

##### NSF 372-2011 Drinking Water System Components – Lead Content

## Submittals

### Shop Drawings

#### Make, model, weight and kW (horsepower) of each equipment assembly.

#### Dimensional drawing showing the pump layout and sections together with the motor.

#### Equipment including connections, piping, fittings, strainers, control assemblies and ancillaries, identifying factory and field assembled components.

#### Wiring as assembled and schematically.

#### Pump curves illustrated in metric units with all necessary information.

#### Characteristic curves for variable speed pumps for maximum pump speed and for speeds required to obtain minimum pump flow and head conditions specified and indicated. Identify curves by speed and provide all curves on one sheet. Provide NPSHr curve for each speed.

#### Well breakdown schematic as defined by the Consultant.

#### All ancillary equipment to be provided by the supplier shall be listed.

#### Special accessories or tools for the adjustment or removal of parts required for any piece of equipment shall be listed and furnished as part of the supply.

### Informational Submittals

#### Test plans, results and reports of all equipment provided for proper operation, construction, electrical connection and function. Test reports shall be submitted to the Consultant for approval and to the Region for sign-off.

#### Special shipping, storage, protection, and handling instructions.

#### Manufacturer’s printed installation instructions.

#### Manufacturer’s Certificate of Proper Installation.

#### Operational and Maintenance Data: As specified in Section 01430 – Operation and Maintenance Data.

#### Furnish all spare parts in accordance with Section 01780 – Contract Closeout.

#### A list of suggested spare parts required to maintain the equipment in service for a period of five years. Include a list of any special tools required for checking, testing, parts replacement, and maintenance with current price information. Provide a list of any special tools required with details for use or cross-reference to O&M manuals in an electronic format suitable for upload to the Region’s CMMS (Maximo).

#### List any special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.

#### All other required information as detailed in the equipment information template. Submit the information in an electronic format suitable for upload to the Region’s CMMS (Maximo) as defined by Section 01430 – Operation and Maintenance Data. Refer to Section 01425 – Computerized Maintenance Management System Data Requirements for additional requirements.

#### Service records for the maintenance performed during construction and up to the commissioning shall be submitted in an electronic format suitable for uploading into the Region’s CMMS (Maximo). Refer to Section 01425 – Computerized Maintenance Management System Data Requirements.

#### Shop and field testing procedures, pump and piping set up, equipment to be used and ANSI/HI testing tolerances to be followed.

## Warranty

### The Contractor warrants that all equipment covered by or supplied under this Contract shall:

#### Comply with the Specification Sections for the said equipment.

#### Be free from defects in design, manufacture, workmanship or materials.

#### Perform efficiently and without unwanted interruption for a period of 24 months after the date of the Total Performance of the Work. The date of Total Performance of the Work shall be established by the Consultant and is as defined in the General Conditions of the Contract.

#### Repair, at the Contractor’s own expense, any breakage, damage, defects or deterioration that is reported to the Contractor during the warranty period.

## Quality Assurance

### Pumps shall be the product of one manufacturer.

### Pumps shall be manufacturer’s standard cataloged product and modified to provide compliance with the drawings, specifications and the service conditions specified and indicated.

### The Contractor shall obtain the pumps, motors, discharge columns, discharge heads, suction cans and appurtenances from the pump manufacturer, as a complete and integrated package to insure proper coordination and compatibility and operation of the system.

### Variable frequency motor controllers can be supplied by the Contractor or the pump manufacturer at the Contractor’s option. The pumping system shall be a complete and integrated package to insure proper coordination and compatibility and operation of the system.

#### The Contractor shall coordinate the variable frequency motor controllers with the pump and motor manufacturer and submit as part of the shop drawings a written statement signed by the Contractor, pump manufacturer, motor manufacturer and variable frequency motor controller manufacturer that the variable frequency motor controller manufacturer has received the required information from the pump and motor manufacturers and that all parties have reviewed the system and coordinated the equipment selection. Also include all motor data and information that has been used for the coordination.

### If equipment proposed is heavier or taller, than specified and indicated; provide all structural, architectural, mechanical, electrical and plumbing revisions at no additional cost to the Region.

### If equipment is heavier than specified, the Contractor shall provide all hoisting equipment sized to maintain the minimum safety factor between the specified maximum equipment weight and the lifting capacity of the hoisting equipment indicated and specified.

## Measurement and Payment

*[Choose one of the following payment language provisions that best suits the individual project.*

*If this Section is not specifically referenced by an item in the Bid Form, please use the following language:*

.1 The work of this Section will not be measured separately for payment. All costs associated with the work of this Section shall be included in the Contract Price.

*OR If this Section is specifically referenced in the Bid Form, use the following language and identify the relevant item in the Bid Form:*

.1 All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

*If the work of this Section is to be measured and paid for by several different methods, please amend the standard wording given above to reflect the different methods of measurement and payment.*]

# PRODUCTS

## General

### Each well pump system shall include a check valve, sand slinger, intake screen, sanitary well seal cap, well vent, piping, water level safety switch, relays and switches, pit-less adaptor; air and vacuum valve, all as shown on the Contract Drawings or as specified in this Section. All equipment information shall be submitted in an electronic format suitable for uploading into the Region’s CMMS (Maximo)

### All lubricants to be used shall be food grade lubricants suitable for potable water supply and certified NSF 60 and/or 61 and/or NSF 372 (as applicable) with certificates and SDS being provided to the Consultant. All such documentation shall be in an electronic format suitable for uploading into the Region’s CMMS (Maximo). Refer to Section 01425 – Computerized Maintenance Management System Data Requirements.

### The Contractor shall fully coordinate all equipment to be placed inside the well casing and ensure that all components fit inside the wells.

### The Contractor shall ensure that all relevant sections of the MECP’s Water Supply Wells – Requirements and Best Management Practices (April 2015) are complied with as approved by the Consultant.

### Contractor to ensure all work complies with Section 01060 – Regulatory Requirements.

## Well

### Casing inside diameter: [Consultant to confirm casing sizes].

### Total depth: [ ] [Consultant to confirm well depths].

### Static water level below well head: [Consultant to confirm water levels].

### Yield: [ ] [Consultant to insert yields].

## Pump Requirements

### Pump: Submersible vertical turbine type in accordance with AWWA E102-17 and the requirements specified herein and MECP Design Guidelines for Drinking Water Systems, latest edition for applicable sections relevant to submersible pumps.

### Capacity:

#### See Table 1 Data Form for Performance Requirements of Submersible Well Pumps (attached as a supplement to this Section).

#### Pumps to be suitable for insertion into well casing, diameter: [ ]. *[Consultant to confirm size]*

.3 Motor efficiency meeting requirements.

### Construction: [Consultant to detail motor rating and motor assembly materials. Assembly materials are to be corrosion resistant and compatible with water being pumped]

### Acceptable Manufacturers:

#### Flowserve Canada (Plueger)

#### Xylem (Goulds)

#### Grundfos Canada Inc.

#### Pentair Inc.

#### Or Equivalent

### The following two Data Forms are attached as supplements to this Specification:

#### Table 1 Data Form: Performance Requirement of Submersible Well Pumps.

#### Table 2 Data Form: Submersible Well Pumps.

#### The Contractor must return completed copies of the Table 2 Data Form with its shop drawing submission following award of the Contract, with the blank spaces completed, together with any other necessary additional information and/or supplementary pages including expected or design performance curves.

## Product Description

### The pump(s) shall have the following features:

#### Submersible Motor:

##### Materials: Construction materials shall be suitable for its intended application, particularly with regard to corrosion resistance, mechanical performance, and approval under NSF 61 and NSF 372 for potable water installations, following the requirements below.

|  |  |
| --- | --- |
| Pump Shaft | Material  -ASTM A582, Type 416 Stainless Steel  -ASTM A582, Type 420 Stainless Steel  -17-4 pH Stainless Steel |
| Impellers | Type  -Turbine  Material  -Aluminum Bronze ASTM B148, no lead content  -Stainless steel ASTM A743 CF8M |
| Discharge Pipe | Material  -Steel ASTM A53 Grade B |

##### Design: The motor shall be high efficiency squirrel cage induction type, water filled and suitable for 575 volt, 3-phase, 60 cycle supply. The motor shall be capable of continuous operation and its nominal kW rating shall not be exceeded at any point of the system-head curve. The stator windings shall be insulated with waterproof non-aging material for high di-electric strength to withstand a test potential of 2,500 volts when impressed in water. Insulation resistance shall be not less than 100 mega-ohms. The rotor shall be statically and dynamically balanced. The motor shall be provided with a means for draining and filling it with water. The motor shall be water-cooled and the bearings shall be water lubricated. The guide bearings shall be made of lead bronze or a graphite compound.

##### Thrust Bearing: a replaceable self-aligning thrust bearing of ample capacity to carry the weight of all rotating parts plus the hydraulic thrust shall be an integral part of the driver. The bearing shall be of such a size that the average life rating is based on 50,000 hours continuous operation. It shall also have ample capacity to permit the pump to operate for short periods with the discharge valve closed. A mechanical shaft seal shall be provided.

##### For all 15 kW (20 HP) motors and above, provide six thermistors or equivalent temperature sensing devices embedded in the starter windings of each motor (two per phase) compatible with Siemens 3UN2100, 120 V, 60 Hz tripping relay or Equivalent. Temperature sensor leads brought out to a separate terminal box. Identify temperature sensors as to phase rotation. Provide the tripping relay to the switchgear supplier for installation in the appropriate MCC starter sections. Ensure all thermistor outputs are conveyed to the SCADA system with the appropriate labels and graphics for real-time monitoring.

##### Foreign Matter: suitable precautions shall be taken to restrict sand, silt, or foreign material from entering the motor.

#### Submersible Cable:

##### Conductors: the submersible motor cable shall conform to the current Canadian Electrical Code, Part 1 governing flexible submersible applications and be type SJOOW cable.

##### Supports: the cable shall be suitably supported from the column at a number of points adequate for the type of cable used with corrosion-resistant clamps at 3 m minimum spacing.

##### Fittings: all cable fittings and terminals shall be watertight at the pressure encountered during use.

##### Length: cable shall be a suitable length to extend from the motor to the surface plate at the top of the well casing. No splices shall be allowed. For each 15 m of setting, 300 mm of extra cable shall be allowed to compensate for the possible twisting or sagging of the cable during installation; 1 m of extra cable shall be provided beyond the surface plate.

##### Shielding: the electrical conductors shall be protected by a corrosion-resistant shield where they pass the pump bowls.

#### Well Seal:

##### A water-tight well seal complete with a supporting clamp shall be provided as detailed on the Contract Drawings. The supporting clamp shall be provided to support the weight of the pump, motor assembly, and discharge column complete with suspended parts when filled with water.

##### The well seal shall be provided with suitable openings for the discharge pipe, power cable and well level probes (minimum one [19 mm] International Pipe Standard (IPS) for permanent well level probe plus one additional [25 mm] IPS with plug for installation of manual well probe or inspection).

#### Strainer:

##### A stainless steel strainer shall have a net inlet area equal to at least three times the impeller inlet area. The maximum unit opening shall not be more than 75 percent of the minimum opening of the water passage through the bowl or impeller.

#### Discharge Pipe:

##### The discharge column pipe shall be a stainless steel pipe adequately pressure rated, in random lengths of approximately 6 m and shall be coupled with threaded type couplings. Pipe size shall be a minimum of [ ]. *[Consultant to confirm maximum lengths and diameter of discharge column]*

#### Pump Bowls:

##### The pump bowl castings shall be close-grained cast iron, free of blow holes, sand holes, and other detrimental defects. The bowls shall be capable of withstanding a hydrostatic pressure equal to twice the head at the rated capacity or 1-1/2 times the shutoff head, whichever is greater. The bowls shall be equipped with replaceable seal rings in the suction side of enclosed impellers.

##### Impellers:

###### 1. The impellers shall be made of bronze, of the enclosed type and shall be in static and dynamic balance. The impeller shaft shall be made of stainless steel. The impeller shall be securely fastened to the shaft by keys, tapered bushing or split-tapered sleeve.

#### Pump-Motor Coupling

##### The pump-motor coupling shall be of a non-corrosion material and shall be capable of transmitting the total torque and total thrust of the unit in either direction.

#### Shop Painting

##### All ferrous parts of the pump excluding stainless steel shall be protected against corrosion by a baked-on epoxy coating (NSF certified polyamide epoxy coating) or an approved equivalent.

##### The complete exterior of the pump unit shall be painted before shipment in the manufacturer's standard quality enamel or an approved equivalent.

# execution

## Installation

### Install well pump system in accordance with ANSI/AWWA A100-15.

## Electrical Installation

### Mount motor control equipment in pump house as indicated in the Contract Documents.

### Install disconnect in weatherproof housing as indicated in the Contract Documents.

## Piping

### Pipe well pump system as indicated and connect to the well water header system in the well water pump house.

## Testing

### The standard non-witnessed performance test of the pump units shall be performed at the factory by taking readings at a minimum of seven capacity points, including one point at the design capacity specified (duty point) in accordance with ANSI E103-15, Section 5 - Verification and Appendix B – Field Testing of Pumps (which is not a part of ANSI/AWWA 103-15) and ANSI/AWWA E102-17 Submersible Vertical Turbine Pumps Section 5 Verification

### Test pumps assembled with a nominal minimum of 10 feet (3000 mm) of column.

### Run pump at full speed rating point for 60 minutes prior to start of any testing.

### Take readings to determine flow, differential pressure, rpm, horsepower, and efficiency.

### Operate each pump for not less than one hour and take readings to determine that the pump will operate as specified and indicated without cavitation at the specified minimum head condition with not more than the specified NPSH available. Test with the job submergence as indicated.

### Variable speed tests:

#### Conduct tests as specified above for full speed at reduced speeds except that tests for cavitation at run out are not required.

#### Run one speed test at speed required to discharge the minimum rating point specified and indicated with one point of test at the minimum rating point.

#### Run a second test at a speed approximately midway between full and minimum speed.

#### Run addition tests for each reduced speed operating condition specified and indicated.

### At the conclusion of the test, six certified copies of the test data sheet shall be supplied to the Consultant for review before the equipment is delivered to the Site.

### The acceptance of the pump unit(s) will be based on the achievement of test results satisfactory to the Region. If the efficiency of the pump and motor is more than 3% below the level which is guaranteed, the Region reserves the right to reject the equipment.

### Pump testing shall also comply with the requirements of the Hydraulic Institute Rotodynamic Pumps for Hydraulic Performance Acceptance (ANSI/HI11.6-2017) Tests Level 1U.

### Commissioning shall be performed in accordance with Section 01810 – Equipment Testing and Facility Commissioning.

## Shop Testing

### Conduct motor efficiency and power factor tests at full load 100 and 50, 75 percent load.

### Test pump casings under a hydrostatic head of at least 75 psi (500 kPa) or 150 percent of rated shutoff head, whichever is greater. Test casing with pump assembled.

### Test pumps at the conditions specified and indicated and take not less than seven operating points between shut-off and run out. Test points must be at the conditions specified and indicated.

### Take readings to determine flow, differential pressure, rpm, horsepower, and wire to water efficiency.

### Operate each pump for not less than one hour and take readings to determine that the pump will operate as specified and indicated without cavitation at the specified minimum head condition with not more than the specified NPSH available.

### Run all tests in accordance with the latest standards of the Hydraulic Institute and as specified.

### Variable speed tests:

#### Conduct tests as specified above for full speed at reduced speeds except that tests for cavitation at run out are not required.

#### Run one speed test at speed required to discharge the minimum rating point specified and indicated with one point of test at the minimum rating point.

#### Run a second test at a speed approximately midway between full and minimum speed.

#### Run addition tests for each reduced speed operating condition specified and indicated.

#### Test motor integrity in a submerged condition.

#### Pump testing shall also comply with the requirements of the Hydraulic Institute Rotodynamic Pumps for Hydraulic Performance Acceptance (ANSI/HI11.6-2017) Tests Level 1U.

### Testing Tolerances

#### ANSI/HI 1.6 Acceptance Level A.

#### Tolerance: Pump test results shall be judged at rated rate of flow and rpm with designed total head and efficiency as defined by ANSI/HI 1.6 for the pump conditions specified and indicated.

#### Tolerance: Pump test results may be judged at rated total head and rpm versus rate of flow as defined by ANSI/HI 1.6 for the pump conditions specified and indicated.

#### If pumps do not meet the tolerances specified, trim the impeller and retest until the specified results are obtained.

## Field Testing

### Test piping connections to prove the discharge nozzle are installed with the pipe in a free supported state and without need to apply vertical or horizontal pressure to align piping with pump nozzles. This shall be performed and the piping acceptable prior to any field performance testing.

### Field testing will not be conducted without an accepted procedure, calibration certificates for all testing equipment, gauges and flow meters and a completed and signed pretesting check list.

### After installation of pumping equipment, and after inspection, operation, testing and adjustment have been completed by the manufacturer’s field service technician, conduct running test for each pump in presence of the Consultant to determine its ability to operate within the vibration and temperature limits specified, and to deliver its rated capacity under specified conditions.

### During tests, observe and record head, capacity, pump bearing housings and motor bearing temperature, noise and vibration and motor inputs.

### Provide vibration signature test data for each pump and drive assembly.

#### Vibration Limits: 50% of the limits provided in ANSI/HI 9.6.4.

### Bearing Temperature: Bearing temperature not to exceed 180 degrees F.

### Test Duration: Determined by the Consultant, but not less than three hours of continuous operation at each condition specified and indicated.

### Run each pump for minimum four hours prior to taking temperature readings of the pumps, motors, and shafting.

### Immediately correct or replace all defects or defective equipment revealed by or noted during tests at no additional cost to the Owner.

### Repeat tests until specified results are obtained.

### Owner reserves the right to perform independent vibration testing to verify contractors test results prior to acceptance of the pumping unit.

### Contractor to provide all water labor, piping, equipment, flow meters and test gauges for conducting tests.

#### Contractor shall provide calibrated test gauges for all permanently installed gauges and portable calibrated flow meters for all pumping systems even in those cases where permanent flow meters are installed.

#### All calibrations shall be within 30 days of the field testing.

#### The testing will not be started and will not be accepted until the calibrated testing equipment stated above is operational and all certifications have been submitted.

#### Contractor is responsible for delivery and disposal of water used for testing.

### Make all adjustments necessary to place equipment in specified working order at time of above tests.

### Test pump on product only. If product is not available, test with water. Water for testing furnished by Contractor.

### Remove all replace equipment at no additional cost to the Region with equipment that will meet all requirements specified and indicated if unable to demonstrate to the satisfaction of the Consultant that equipment will perform the service specified, indicated and as submitted.

## Disinfection

### The well shall be disinfected with chlorine after the work is completed in accordance with Section 01750 – Disinfection and Testing of Water Retaining Structures and Process Piping.

## Supplements

### The supplements listed below, attached following “End of Section”, forms part of this Section:

#### Table 1 Data Form for Performance Requirements of Submersible Well Pumps.

#### Table 2 Data Form for Submersible Well Pumps.

**END OF SECTION**

**YORK REGION ENVIRONMENTAL SERVICES**

**TABLE 1 DATA FORM**

**for**

**PERFORMANCE REQUIREMENTS OF**

**SUBMERSIBLE WELL PUMPS**

YORK Project No. Contract No.

Location and Jobsite:

T1. 1.0 NOTES

.1 This table covers the specific requirements of the equipment for the above Contract.

.2 A properly completed Table 2 Data Form must be accompanied for each pump.

T1 2.0 PUMP CHARACTERISTICS

.1 Number of Pumps Required ­­­­

.2 Pump Reference

.3 Pump Type

.4 Pump Application

.5 Liquid Pumped

.6 Water Temperature (max/min)

.7 Diameter of Well Casing

T1 3.0 PUMP MECHANICAL FEATURES

.1 Maximum permissible outside diameter of pump

.2 Maximum speed (synch)

.3 Service (continuous/intermittent)

.4 Check valve in pump

.5 Approximate total length of discharge column pipe,

pump and suction

.6 Auxiliary opening discharge head required

(openings for well level probes)

**TABLE 1 DATA FORM CONTINUED...2**

T1 4.0 PUMP MOTOR FEATURES

.1 Voltage

.2 Frequency

.3 Phase

.4 Starter

.5 Cable Type

.6 Cable Length

T1 5.0 PUMP GUARANTEED PERFORMANCE

.1 Design point capacity

.2 Design point total head

(Pump discharge and column

pipe losses include)

T1 6.0 PUMP OPERATING CONDITIONS

.1 System head curve included

T1 7.0 SPECIAL REQUIREMENTS

.1 High efficiency motor

Issued by: Date:

**YORK REGION ENVIRONMENTAL SERVICES**

**TABLE 2 DATA FORM**

(Provide 1 form for each pump, as in Table 1)

**for**

**SUBMERSIBLE WELL PUMPS**

York Region Project No. Contract No.

Location and Jobsite

Contractor & Equipment Supplier’s Name, Address and Phone Number

T2. 1.0 PUMP MECHANICAL REQUIREMENTS

.1 Pump Reference

.2 Pump make

.3 Model number

.4 Speed (rpm)

.5 Bowls No. / size (mm)

.6 Impeller size (mm)

.7 Impeller type

.8 Discharge column diameter (mm)

.9 Discharge diameter (mm)

.10 Pump weight (kg)

.11 Motor weight (kg)

.12 NPSH required (m)

**TABLE 2 DATA FORM CONTINUED...2**

T2 2.0 PUMP MOTOR DETAILS

.1 Motor kW/rpm

.2 Motor make and type

.3 Starting KVA (Full Voltage)

.4 2 Load Efficiency

.5 3/4 Load Efficiency

.6 Full Load Efficiency

T2 3.0 PUMP OPERATING CHARACTERISTICS

Pump capacity (L/s)

.1 Pump Design - Guaranteed Capacity

.2 Pump operating min capacity

.3 Pump operating max capacity

.4 Pump run-out capacity

Total Head (m)

.5 Total shut off head

.6 Pump Design Guaranteed Head

.7 Pump operating min. head

.8 Pump operating max. head

.9 Pump run-out head

Efficiency at Design Point (%)

.10 Pump efficiency

.11 Total efficiency

(Pump and motor)

**TABLE 2 DATA FORM CONTINUED...3**

T2 3.0 PUMP OPERATING CHARACTERISTICS CONTINUED

kW Required

.12 kW at run-out

.13 Guaranteed kW at

design point

.14 kW at run-out

.15 Minimum submergence (metres)

.16 Performance curve includes

T2 4.0 DEVIATIONS

List all exceptions to the specification on a separate sheet. State “REFER TO ATTACHED SHEET” or if none, state ”NO DEVIATIONS”.

T2 5.0 ALTERNATIVES

Submit in covering letter or separately. If none state “NONE PROPOSED”.

Submitted by:

Signature:

Date:

#### All data shall be listed in accordance with the above Tables in addition to the equipment information as defined by Section 01430 – Operation and Maintenance Data. All data shall be submitted in a format capable for upload to the Region’s CMMS (Maximo). Refer to Section 01425 – Computerized Maintenance Management System Data Requirements.