

PART 1 - GENERAL

1.1 Description of Work

- .1 The Work shall consist of all labour, materials, consumable and equipment necessary for the supply and installation of a pumping and control systems for an existing spray pad. Include everything requisite and necessary to properly complete the entire system, notwithstanding that every item may not be specifically mentioned.
 - .1 Co-ordinate backflow prevention valve (BFP-101) installation with the City. NOTE: Supply of Watts Series 957 backflow prevention valves is by City of Winnipeg. Contractor responsible for installation of backflow prevention device (BFP-102) on the splash pad supply piping.
 - .1 Be responsible to advise the City's installer of preferred location of valve and provide stand to support weight of units to floor.
 - .2 Underground Works consisting of:
 - .1 New 100 mm PVC piping from the rain diverter outlet connected to the existing 100 mm PVC splash pad drain from the debris chamber located inside the building crawlspace (see project drawings). NOTE: Connect new 100 mm PVC rain diverter piping to the existing 100 mm PVC drain piping such that a consistent grade of a minimum of 1% can be maintained for the entire length of the pipe from the debris chamber to the connection to the sewer in the basement. Work will require coring a new hole in the west side of the building for the 100 mm rain diverter piping from the debris chamber and realigning the existing 100 mm drain piping in the basement crawlspace.
 - .2 New 100 mm PVC graded drain line from existing debris trap drain outlet to new manhole.
 - .3 New manhole to operate as surge tank.
 - .4 New 100 mm PVC graded pump discharge line from pump in manhole to existing strainer inside building basement.
 - .5 Wiring from:
 - .1 New control panel in basement to existing splash pad controller for emergency stop.
 - .2 Existing splash pad controller to building basement area to signal splash pad program is operating for start/stop control of splash pad re-circulation pumping system control.
 - .3 Ultrasonic controller in manhole.
 - .4 Drain water pump in manhole.
 - .3 Hire Splash Pad Supplier (Vortex Aquatic Structures International) to provide programming on a plug in device suitable to upload to existing controller. New programming to provide a 24 VDC or 24VAC signal that indicates the splash pad controller is running a program and water flow is required.
 - .4 Securely mount the drain water pump, guide rails and other piping in the manhole using a slide away coupler system to allow easy pump removal.

- .5 Supply and install on/off actuated rain diverter valve (BUV-102) for splash pad drain connection to sanitary sewer.
- .6 Supply and install 4-20 mA modulating valve (BUV-101) for surge tank (manhole) liquid level control.
- .7 Alter piping to provide a single spool piece to allow water supply to the splash pad to be either from the City water service or pool water treatment system in a re-circulation mode.
- .8 Control panel to:
 - .1 Control two actuated valves.
 - .2 Start/stop existing splash pad pump and new drain water pump. NOTE: Mag starter is existing for splash pad supply pump.
 - .3 Interlock existing inground pool pumps (2) to stop if water level in surge tank (manhole) is too low.
 - .4 Allow operator to select splash pad supply to be either City water service or inground pool re-circulation system.
 - .5 Allow operator to select winter position so that valves are properly positioned.
 - .6 Dial out an alarm condition to the City of Winnipeg Central Control.
- .9 Complete all plumbing, mechanical and electrical systems.
- .10 Provide auto dialer to dial out the following alarms conditions:
 - .1 Emergency stop has been activated.
 - .2 High water level in the surge tank/MH.
 - .3 Low water level in the surge tank/MH.
- .11 Repair existing wading pool fill system to provide a proper air gap.
- .12 Alter discharge piping of existing pool filtration pumps to increased size after the pump discharge flange and to have pressure gauges for each discharge.
- .13 Building available electrical supply: See Section 16010 item 1.1.
- .14 Start up, commissioning and training: See Section 01820.

1.2 Work Included

- .1 The following list generally describes the scope of supply and installation of Works under this section:
 - .1 Underground piping and manhole.
 - .2 Drain water pumping system.
 - .3 Actuated valves (2).
 - .4 Level sensor.
 - .5 Control panel.
 - .6 Pressure gauges.
 - .7 All connecting piping, valves and fittings.

- .8 Wading pool fill system repairs.
- .9 Alterations to pool filtration pumps discharge lines.

1.3 Existing System
and Upgrades

.1 The following list generally describes the scope and operation of the system in place and describes existing issues being addressed under this Contract.

.1 Debris control system:

.1 Existing: The existing debris control chamber is set up to operate as a simple debris trap/strainer basket with two outlets. One outlet is presently piped into the basement with 150 mm PVC SDR 35 piping that leaves the debris chamber at an invert elevation of approximately 237.17 m, and a second outlet that is intended as a rain diverter feature. The rain diverter feature is currently a stubbed pipe out of the chamber at an invert elevation of 236.98 m (about 190 mm lower) but serves no function. Presently, at all times, all water from the splash pad drains through the debris chamber and then direct to the sewer in a flow to drain type configuration. The sewer connection is in the basement of the existing building.

.2 Proposed: To gain the functionality of the rain diverter feature of the debris chamber, the following Work items are to be completed:

.1 Excavate to the current rain diverter pipe stub and install new 100 mm PVC piping from the rain diverter connection on the debris chamber to the existing 100 mm PVC piping (located inside the basement crawlspace) that currently acts as the splash pad drain to the building crawlspace as shown in attached Plans. Core new hole through building to connect the 100 mm PVC piping from the rain diverter stub to the existing 100 mm PVC drain piping from the splash pad located in the basement crawlspace. Realign the existing 100 mm PVC drain piping in the crawlspace as necessary to ensure a minimum grade of 1.00% from debris chamber to the building sewer. Piping installed through cored hole on the outside wall of the building to be grouted in place to provide a watertight seal.

.2 In addition to the rain diverter piping, new 100 mm PVC piping from the lower outlet connection of the debris chamber shall be installed to the proposed manhole as shown in Plan C1. The piping shall be graded at a minimum of 1.00%. Install a 200 mm x 100 mm reducer will be required at the Debris Chamber.

.3 Upgrade the existing manual butterfly valve and the splash pad drain piping to the sewer as necessary inside the building. Replace the existing valve with the specified butterfly valve and electric actuator (BUV-102) on the rain diverter piping to sewer. Provide control for the actuated valve (BUV-102) in the building basement as follows:

.1 Valve to be in closed position under following conditions:

.1 When splash pad is in normal operating mode using the splash pad pump and Westdale Pool

- pumps and filters in a recirculation type splash pad operating configuration.
- .2 Valve to be in open position under following conditions:
 - .1 During periods when splash pad is not in operation such as rain events.
 - .2 During off hours.
 - .3 Immediately upon activation of the emergency stop signal for the splash pad. **Note:** Activation of the emergency stop signal shall be after emergency button is held for 5 seconds.
 - .3 Using available output contacts from the existing splash pad controller, a new control panel will be installed to provide control of the valve BUV-102 as stipulated above. Install wires between the splash pad controller, control panel and actuated valve as required, and supply power to operate the valve.
- .3 Existing splash pad controller: The supplier of the existing splash pad controller will provide and upload a DataKey to reprogram the existing controller to engage a set of contacts to indicate that a program requiring water supply is running.
- .2 Splash Pad Process supply pump
- .1 Existing:
 - .1 Presently there is no electrical interconnection between the existing splash pad controller and existing splash pad process pump. Both run independent of each other. Thus the existing splash pad process pump is turned on by a City Operator and the existing splash pad controller which controls the spray features is turned on by the Public.
 - .2 The existing splash pad process pump has a suction connection to the existing inground pool discharge line. The discharge piping of the splash pad process pump is connected to the splash pad supply manifold located in an exterior cabinet adjacent to the splash pad. There are various control, regulating and backflow prevention valves installed on the supply piping to the manifold.
 - .1 In addition, there is a 50 mm PVC pipe connected to the splash pad discharge line that connects back to the suction side of the inground pool to provide water flow through the splash pad process pump in the event the splash pad is not in operation. This return flow is controlled by a manual valve. Any opening of the manual valve will rob the splash pad features of available flow.
 - .3 The existing splash pad drain is connected to the suction line of the inground pool pumps for the purpose of treating and reusing the water. However, since the drain is a gravity drain the inground pool pumps can draw air from atmosphere and lose prime. If the inground

pool pumps lose prime the entire system related to the inground pool water treatment system and supply to the splash pad becomes in-operational.

- .2 Proposed: To gain the functionality of the re-circulation system of the existing water treatment system, the following Work items are to be completed:
 - .1 Remove the 50 mm PVC pipe connected to the splash pad discharge line that connects back to the suction side of the inground pool as shown on Plan P1.
 - .2 Remove existing balancing valve on the splash pad discharge line and other existing pressure regulators and backflow prevention valves in the splash pad controller cabinet as these valves are not required and provide additional pressure losses. All removed equipment to remain the property of the City. Neatly place all salvaged valves/equipment in a location as directed by the Contract Administrator.
 - .3 Add pressure gauges on the suction and discharge sides of the splash pad process pump.
- .4 Surge Tank and Control: To address the splash pad drain piping connected to the inground pool pump suction line being open to atmosphere, a surge tank shall be installed on the splash pad drain piping. This Work consists of the following:
 - .1 Install a new 1.219 m diameter x 2.7 m deep concrete manhole as shown on the plans.
 - .1 Top of manhole- ground level is 238.06.
 - .2 Bottom of manhole is 235.35.
 - .3 Basement floor level in building is at elevation 235.42 m.
 - .4 **Note:** The Contract Administrator will provide layout of the MH by means of grade stakes using the project bench mark as outlined in Plan C1.
 - .2 The outlet piping from the debris chamber will flow by gravity into the manhole, and a Zoeller Model N6292 drain water pump (DWP-101) will pump water from the manhole through an existing strainer and then to a connection to the existing inground pool pump suction line. A new modulating butterfly valve (BUV-101) will be installed on the drain water pump discharge piping and will modulate to maintain water level in the manhole.
 - .3 The drain water pump (DWP-101) discharge line shall connect to the existing strainer that connects to the inground pool pump suction pipe. Gauges will be added on the inlet and outlet sides of the strainer to monitor the condition and need for cleaning of the basket.
 - .4 Supply and install a 20 mm sample tap (boiler drain) connection off of the drain water pump discharge line prior to butterfly valve (BUV-101) to allow a hose to be connected in the event that the surge tank must be pumped out due to a contamination event or for winterizing procedures.

- .5 The drain water pump (DWP-101) (new) and the splash pad supply pump (SPSP-101) (existing) should both start and stop together based on the position of the rain diverter valve. If the rain diverter valve is open the two pumps are not to run. If the rain diverter valve is closed both pumps are to run.
 - .1 An interconnection to the inground pool pumps is also required to ensure that the drain water pump (DWP-101) (new) and the splash pad supply pump (SPSP-101) (existing) cannot run unless the inground pool pumps are operating.
- .2 An ultrasonic level transmitter shall be installed in the manhole to monitor and maintain liquid level. Transmitter to include a level indicator display that will be installed inside the building (on control panel face).
 - .1 Provide a high water alarm such that if water rises above 236.75 m the operator is notified by a red light and horn. It is expected that the strainer (on piping to inground pump suction line) will need cleaning which will be the source of high level alarms if the drain water pump is fully operational. If the water level continues to rise to 237.00 a high level alarm should shut down operation of the splash pad and dial out an alarm condition to the City of Winnipeg central control.
 - .2 Valve BUV- 101 is to modulate to maintain a water level of 236.50 m in the surge tank/manhole.
 - .3 Provide a low level alarm to protect the drain water pump (DWP-101) in the event that actuated valve (BUV-102) were to fail. Set low water level alarm at 235.75 m. Shut down drain water pump (DWP-101), activate alarm light and dial out an alarm condition to the City of Winnipeg central control upon low water level.
 - .1 For low water level condition in the MH, the operator shall manually close butterfly valve BUV-101 to prevent the inground pool pumps from drawing air. Provide detailed instructions in the Operation and Maintenance manual for low water level condition in the surge tank/MH.
 - .2 Provide a starter for the drain water pump and a pilot light to indicate when the pump is in operation.
- .3 Drain water pump (DWP-101) (new): The pump is installed in the manhole using a guidebar assembly such that the pump can be removed through the manhole access hatch without personnel entering the manhole. The pump discharge line is to be approximately 0.5 m below grade (field determined) and is to be graded at minimum 1% to the building basement area.
 - .1 When the splash pad is operating, a control signal from the existing splash pad panel to the new control panel will be configured to operate the pump continuously and the actuated butterfly valve on the splash pad drain piping will modulate to control flow of water into the pool supply piping to maintain a liquid level of 236.50 in the manhole. The actuated valve (BUV-101) will close as required to prevent air from entering the pipe upon lower water levels in the manhole.

- .3 Backflow prevention:

- .1 Existing: The following backflow prevention valves are existing as shown in plans.
 - .1 See Plans P1, RP1 and RP2.
- .2 Proposed: Replacing and removing existing backflow prevention valves are required as per the following:
 - .1 City of Winnipeg will remove existing backflow prevention valve and install new 65 mm reduced pressure backflow prevention valve (BFP-101) horizontally on the wall at no cost to this Contract. See Plans P1, RP1 and RP2.
 - .2 The contactor will be responsible for the installation of the second 65 mm reduced pressure backflow prevention valve (BFP-102) on the splash pad supply line. City of Winnipeg to supply backflow prevention valve. See Plans P1, RP1 and RP2.
- .4 Control panel: Provide a control system to complete functions as described above.
 - .1 Use the existing splash pad supply pump magnetic starter but add control as required.
 - .2 Splash pad calling for water in re-circulation mode: PlayQuest Recreation has quoted a price of \$1,575.00 to supply and upload a DataKey to alter the existing program to provide a 24 VDC or 24VAC signal to a set of contacts that will advise the new control panel that the splash pad controller is running a sequence. This signal will be used for start/stop control of the re-circulation water supply system to the splash pad. Contractor responsible to confirm pricing with PlayQuest Recreation.
 - .1 Provide a field adjustable time (0-300 seconds) that will maintain operation of the re-circulation water supply system equipment when the signal that the splash pad controller is running a sequence is opened (stopped). This is to allow time for the splash pad to be reactivated by a person after the timed cycle stops without stopping and cycling the splash pad recirculation water supply system.
 - .3 Provide a three position switch for rain diverter valve (BUV-102) as follows:
 - .1 AUTO: Splash Pad water supplied by Splash Pad Process pump. Allows splash pad pump, inground pool pumps, drain water pump, modulating valve and rain diverter valve to be controlled by the sequences described.
 - .2 HAND: Splash Pad water supplied by City water service. Opens rain diverter valve. Modulating valve to close. No other control required.
 - .3 OFF: Splash Pad supply pump does not operate- basically used when the splash pad is out of season for use and rain diverter valve is required to be open. Should ensure rain diverter valve is open and after 1 minute turn off power supply to valve actuator.
 - .4 Rain diverter valve is to be open at all times that the splash pad controller is not running a program.
 - .5 Rain diverter valve is to be open when emergency stop button on splash pad is activated.

- .1 Provide a red light for rain diverter valve opened due to emergency stop signal and a manual reset pushbutton.
- .4 Provide a two position switch on the control panel for seasonal use as follows:
 - .1 All water treatment and pumping systems are “OFF” due to out of season:
 - .1 Turns off electrical control sequence to all controls.
 - .2 Opens rain diverter valve and turns off electric power after it is open.
 - .3 Opens modulating valve and turns off electric power after it is open.
 - .4 All water treatment and pumping systems are “ON” due to in season. Allows all control sequences as described to operate.
- .5 Provide the following for the rain diverter valve (BUV-102):
 - .1 Green open light based on limit switch position.
 - .2 Red closed light based on limit switch position.
- .6 Provide the following for the modulating valve (BUV-101):
 - .1 Green open light based on closed limit switch position not being engaged.
 - .2 Red closed light based on limit switch position.
- .7 Provide a three position switch for manhole drain water pump as follows:
 - .1 AUTO: Control is by control panel as described.
 - .2 HAND: Pump operates by by-passing all control features. The switch for the rain diverter valve (BUV-102) shall also be placed in hand. As an example if there were a fecal event that may have a possibility of such matter contained in the manhole the drain water pump (DWP-101) could be operated to empty the manhole to the sewer through the provided hose connection off the manhole drain piping in the basement.
 - .3 OFF: Pump does not operate, basically used when the MH drain pump is out use for the season.
- .8 Provide a two position switch for the splash pad supply pump as follows:
 - .1 AUTO: Control is by control panel as described.
 - .2 OFF: Pump does not operate, basically used when the splash pad is out of use for the season.
- .9 Provide a three position switch for inground pool pumps as follows:
 - .1 AUTO: Splash pad pump operational. Control of inground pool pumps is by control panel.
 - .1 Provide a red light in panel to indicate “low water level in surge chamber (manhole)”.

- .2 HAND: Allows inground pool pumps to operate with the existing features and control functions.
- .3 OFF: Pumps do not operate, basically used when the inground pool pumps are out of use for the season.
- .10 Provide a UPS sized for the purpose of opening rainwater drain valve (BUV-102) and closing drain water valve (BUV-101) upon an electrical power outage. Resume normal operating parameters when power is restored.
- .5 Emergency Stop:
 - .1 Existing: Currently configured, the splash pad does not have an emergency stop function in case of events such as a fouling of the splash pad. In the past the button existed but was removed due to many false alarms. Since the system was flow to drain there was no need to have a separate process action for such an emergency.
 - .2 Proposed: The following describes the strategy proposed to re-implement the emergency stop button function for the splash pad:
 - .1 Wire emergency stop button to new control panel to allow programming of a selectable amount of time the emergency stop button must be pushed down to create an actual “emergency” signal that requires complete shutdown of the splash pad. See required sign wording below.
 - .2 Install the new or existing emergency stop button on the existing pole beside the existing splash pad controller cabinet not less than 1.524 m (5 ft) from the ground surface to prevent accidental activations of the button by children. The existing pole is currently used to house the rain sensor.
 - .1 New wiring from the push button to the new control panel.
 - .1 Upon actual emergency stop being activated immediately stop splash pad supply pump, close modulating valve (BUV-101) on drain pump outlet, stop drain pump and open rain diverter valve (BUV-102).
 - .2 Provide contacts and wiring from new control panel to emergency stop input in splash pad controller. This will close all water supply valves supplying spray features.
 - .3 New wiring from the push button to the new control panel is required.
 - .4 Upon activation of the emergency stop, an alarm condition shall be dialed out to the City of Winnipeg central control.
 - .5 Program the button (from the new control panel) such that it must remain pressed and held for 5 seconds to activate the emergency stop function to further reduce false alarms. Signage displaying instructions must be installed at the stop button location that reads as follows:

EMERGENCY STOP

**HOLD BUTTON DOWN FOR 5
SECONDS TO ACTIVATE
EMERGENCY STOP.**

**TO BE USED ONLY IN CASE OF
EMERGENCY**

- .1 Sign to be 0.064 aluminum; white lettering on a dark blue background.
 - .2 Sign to be minimum 450 mm x 600 mm with required lettering font, style and format as displayed above.
 - .6 Provide the following control in the event that the emergency stop button is activated:
 - .1 The splash pad control panel shuts down the program sequence and/or feed to the splash pad. This is part of the existing program.
 - .2 BUV-102 opens immediately to allow water to drain to sewer. This is part of new control panel programming.
 - .3 BUV-101 closes immediately such that some contaminated water may be contained in the manhole and remaining drain water is diverted to sewer.
 - .4 The splash pad supply pump and drain water pump (DWP-101) shuts off.
 - .5 Install a connection on the MH discharge piping that can be used to attach a 20 mm hose to pump contaminated water from the manhole direct to the sewer with the MH drain pump and rain diverter valve (BUV-102) both placed in the "HAND" position.
 - .7 A "spool piece" inserted into the splash pad water fill line shall be used to initially get the splash pad re-started as a flow-to-drain system using City water.
- .6 Spool Piece:
- .1 Piping and fittings are to be utilized to have the Operator install a single spool piece with a single inlet and outlet (with flanged ends) that provide for the following as shown on the P&ID drawing.
 - .1 City water supply: Spool piece is used to connect water supply to the splash pad to be only from the City water supply and the splash pad operates as flow to drain. There is a reduced pressure backflow preventer supplied by the City that shall be installed by the contractor on the city water supply piping to the splash pad (see Plan P1).

.2 Water treatment system supply: Spool piece is used to connect water supply to the splash pad to be only from the water treatment system using the splash pad supply pump. The splash pad system operates as re-circulation system. There is no backflow preventer on this piping.

.7 Rain sensing system:

.1 The splash pad has a rain sensing device (Hunter Mini-Clik installation instructions are available upon request) with a set of wires in the control cabinet. The Contract Administrator has been advised that the rain sensor is a “simple switch that is open when raining and closed when not raining. It was designed to be installed in series with the activator so that if it was raining it would not activate the pad.” Be responsible to wire the splash pad activator and rain sensor to operate as indicated.

1.4 Compliances

- .1 Complete Works in compliance with local regulations & codes, national and international standards, applicable health codes, and authorities having jurisdiction.
- .2 Manufacture components in accordance with CSA or CUL certified and bear the appropriate approval stamp in a visible location.
- .3 Provide National Sanitation Foundation (NSF) 50 or equivalent approvals of equipment supplied, where applicable.

1.5 Record Drawings

- .1 Obtain separate set of drawings and mark the variations as the Work progresses in order to complete a record of equipment and services installed at variance with locations and methods shown on original drawings.

1.6 Use of Existing Pipe and Valves

- .1 Valves that are near new condition and of the proper size can be reused upon approval of Contract Administrator. Do not use a pipe coupling within 300 mm of a valve that is being reused.
- .2 Existing pipe that in a useable position and of a suitable size can be reused upon approval of Contract Administrator. One example is the existing piping that extends from the present splash pad debris trap to the sanity sewer within the crawl space and basement area.

1.7 Accessibility

- .1 Install equipment and piping with adequate clearances for head room, passage, operation and service.

1.8 Tests

- .1 Provide tests on equipment, systems and materials as may be requested by the Contract Administrator.

- .2 Carry out tests for such lengths of time and at such a time as determined by Contract Administrator. Before final completion and acceptance of Work to verify performance requirements.
- .3 Completion of tests is not evidence of acceptance of tested part of contract.
- .4 No claim for damage will be made for injury or breakage of parts due to tests.

1.9 Electrical

- .1 Electrical equipment supplied under this section shall be CSA approved and bear CSA labels. Motors shall be tested to NEMA MG.1 standards or CSA C22.2 #52 and shall conform to insulation and dielectric strength.
- .2 Motors shall have conduit terminal boxes and adequate starting protective equipment as defined by the local power utility and as outlined in the Manitoba Electrical Code.
- .3 Existing electrical supply is 120/240 V 3 phase 4 wire. Provide motors and electrical equipment as required and suitable for available electrical supply that is existing.

1.10 System Start Up

- .1 Be responsible to review Section 01730 and 01820. Include requirements as outlined in scope of Work.
- .2 Retain fully qualified operators to start up all systems.
- .3 Cycle all components of the complete system to duplicate normal operating conditions and test all water chemistry control system components.

1.11 Training

- .1 Be responsible to review Section 01730 and 01820. Include training requirements as outlined.
- .2 Training shall include spring start-up, typical weekly maintenance and operation, and winterization duties.

1.12 Electrical Supply

- .1 Use existing electrical breaker panel(s).

1.13 Approved Equals

- .1 Provide request for approved alternative equal in accordance with B7 SUBSTITUTES for any specific product listed below products.

1.14 Submittals

- .1 Submit for review in accordance with Section 01340, engineering drawings showing the following.
 - .1 Complete description in sufficient detail to permit comparison with the specifications.
 - .2 Dimensions and installation requirements.
 - .3 Descriptive information including catalogue cuts and manufacturers' specifications for all major components.
 - .4 Electrical schematics and layouts.

- .2 Submit for O&M manuals in accordance with Section 01730.

PART 2 - PRODUCTS

2.1 Drain Water Pump (DWP-101)

- .1 Submersible pump with Dual Mechanical Shaft Seals - Upper carbon/ceramic, Lower silicon carbide/carbon.
- .2 Horsepower: 1/2.
- .3 Comes with lifting bail and stainless steel lifting cable.
- .4 Cord length- 25 ft is standard.
- .5 Shut off head minimum 40 ft. minimum TDH of 11ft @ 120 gpm.
- .6 Minimum water depth: 250 mm.
- .7 Electrical supply to motor: 230 V three phase.
- .8 Standard of Acceptance.
 - .1 Zoeller Model N6292 pump or approved equal in accordance with B7.

2.2 Manhole and Gravity Piping

- .1 As per City of Winnipeg Standard Construction Specifications CW 2130, 2130 and SD-010- without benching.

2.3 Ultrasonic Level Control and Measurement

- .1 Utilize ultrasonic level controller c/w remote transmitter suitable for modulating valve to maintain level in surge tank (manhole).
- .2 Properties.
 - .1 Range: 10 cm to 3 m.
 - .2 Beam width: 5 cm.
 - .3 Accuracy: $\pm 0.2\%$ of range.
 - .4 Resolution: 0.5 mm.
 - .5 Signal output: 4-20 mA, two-wire.
 - .6 Cable type: 4-conductor, shielded.
 - .7 Mount gasket: Viton®.
 - .8 Supply voltage: 24 VDC (loop).
 - .9 Enclosure rating: Type 6P, encapsulated, corrosion resistant & submersible.
 - .10 Software for configuration c/w FOB USB adapter.
 - .11 NPT tapping.

- .12 CSA, CUL or CFM approved.
- .13 Flowline LU27-01 or approved equal.
- .3 Surge Tank Level Monitor/ indicator display:
 - .1 Rated for -40°C to 65°C, suitable for outdoor mounting.
 - .2 LCD main display with secondary unit and bar graph display.
 - .3 Windowed NEMA 4X box suitable for outdoor installation.
 - .4 Provide relay to energize alarm strobe when tank is near fill.
 - .5 Flowline L125 display with LM92-1001 enclosure or approved equal. NOTE: Control panel supplied may provide an alternate display that provides a read out of the water level in the manhole.
- .4 Set and operate as per levels identified above.
- .5 Provide PVC fittings to adapt to tank opening size.
- .6 Provide 4-20 mA to controller utilized in control system.
- .7 Flowline LU27 or approved equal in accordance with B7.

2.4 Access Door Cover and Frame

- .1 Access door unit shall be of single leaf construction with an opening size as shown on the plans.
- .2 Door leaf to be 6 mm (1/4") thick diamond pattern aluminum plate with reinforcing on the underside to withstand a live load of 14.34kN/m² (300lb/ft²) with a maximum deflection of 1/150th of the span.
- .3 Angle frame to be 6 mm (1/4") aluminum with strap anchors around perimeter and overall depth of 150 mm as shown on the drawings. Provide mill finish on exposed surfaces with bituminous coating applied to exterior of frame.
- .4 Equipped with heavy forged stainless steel hinges and stainless steel pins.
- .5 All hardware to be stainless steel.
- .6 Hinges to be through bolted to the cover door with stainless steel tamperproof lock bolts and bolted to the frame with stainless steel bolts and lock nuts.
- .7 Equipped with enclosed spring operators/mechanisms to achieve ease of operation through the entire arc of opening.
- .8 Equipped with a stainless steel automatic hold open arm with positive locking device. Door shall open to 90° and automatically lock in the open position.
- .9 Door cover shall close flush with the frame and have a lift handle that is designed to be flush with the top surface when door is closed.
- .10 Locking Mechanism: Provide recessed padlock hasp covered by a hinged lid flush with surface.
- .11 Provide a peel-off protective covering on the top surface of the door leaf and frame.
 - .1 Peel off protective covering and clean during commissioning.

- .12 Provide bottom drain through frame that allows drainage to the chamber.
- .13 Provide an aluminum frame skirt welded to access hatch frame for ease of casting into concrete manhole cover.
- .14 Unit to be Bilco K series, U.S.F. Fabrication Type APS 150 series or approved pre-manufactured equal in accordance with B7.

2.5 Pressure and Vacuum Gauges

- .1 To be calibrated with minimum 2% accuracy.
- .2 To have minimum 65 mm face.
- .3 Pressure gauges: 63mm, 316 stainless steel case, glycerin filled with a range of 0-60 psi.
- .4 Vacuum gauges: 63mm, 316 stainless steel case, glycerin filled with a range of 30-0" Hg and +/- 2% accuracy. Vacuum gauges shall be installed on the suction ends of the pumps.
- .5 To have a scale of 0-60 psi unless otherwise noted on plans or specified elsewhere in the specifications.
 - .1 Gauges on drain water pump discharge line to be 0-30 psi.
- .6 Gauges on suction lines to have dual scale display range (psi/kPa)
- .7 Provide shut off valves as required to allow servicing of gauges.
- .8 To be glycerin filled.
- .9 Mount gauges onto brass saddles i.e. Ford S70.
- .10 Standard of Acceptance.
 - .1 ENFM, 7211 or 7214 Series.
 - .2 Marshall Instruments Inc.- Severe Service or approved equal in accordance with B7

2.6 Hangers and Supports

- .1 All pipe hangers, supports and brackets to be galvanized steel or stainless steel.
- .2 Hangers for piping off walls and ceilings to be Anvil-Strut or Uni-Strut type.
- .3 Submit shop drawings for approval on all hangers and supports for piping.

2.7 Safety Signage

- .1 Provide safety signs in 0.040 aluminum with a baked enamel finish 10"x7" in size.
- .2 Individual sign messages as per OSHA standards are available from "REVERE - SETON" (toll free 1-800-263-1635), Brady (as distributed by Acklands), North Safety Products or approved equal in accordance with B7 and as follows.
 - .1 Danger - Chemical Storage (# S0043)
 - .2 Notice – No Smoking (# S0604)
 - .3 Safety First - Eyewash Station (#S0549)
 - .4 Caution - Eye and Glove Protection Must Be Worn When Handling Chemicals (#S0281)

2.8 Process Flow

Diagram Display

- .1 Provide one mounted single mat frames for process flow drawing.
 - .1 Select grade: chemically treated to reduce acidity when the pulp is still in liquid form.
 - .2 Mounting board: Secure diagram to a foam board that has a self-adhesive side, ensure no air bubbles.
- .2 Black metal grooved frame 25 mm wide, overall frame dimensions 610 mm x 914 mm.
- .3 40 mm wide light grey matte with beveled edge (white).
- .4 Acrylic: anti glare glazing, drawing to be raised.
- .5 Provide Contract Administrator with red-lined flow diagram, full valve tag list. List each valve on re-line drawing.
- .6 Contract Administrator to revise process flow diagram to record and provide Contractor with paper copy with dimensions of approximately 559 mm x 864 mm.
- .7 Hanging: Plastic coated wire, hangers for attaching wire to frame and two wall bumpers.
- .8 Provide shop drawings.
- .9 Hang frame on mechanical room building wall with two supports, location field determined by Contract Administrator.

PART 3 - EXECUTION

3.1 Surge Tank Level

Indicator Mounting

- .1 Hang transducer on stainless steel wall bracket with wire through side of manhole. Locate transducer to allow the signal to be unaffected by surrounding appurtenances. Ensure that “deadband” distance is considered in vertical mounting position.
- .2 Program unit to display liquid level in meters with 3 decimal places and % full.
- .3 Mount display inside building on control panel face.
- .4 Provide written copy of program parameters entered after unit is commissioned. Include such programming as part of the electrical “record drawings”.

3.2 Drain Water Pump

- .1 Install equipment and piping in accordance with manufacturers' recommendations.
- .2 Ensure pump is properly aligned and plumb under access door.
- .3 Install guide bars perfectly vertical and in the manner specified by pump manufacturer.
- .4 Co-operate and co-ordinate with electrical contractors on all Works.
- .5 Provide all connections and appurtenances necessary for a complete operating system.
- .6 Set anchor bolts, nuts, washers, and fasteners in conformance with templates or drawings supplied by the manufacturer. All anchor bolts, studs, fasteners, washers and nuts shall be Type 316 stainless steel.

- .7 Brace all piping, fittings and valves inside the surge chamber to restrain movement in the horizontal and vertical directions.

3.3 Existing Inground Pool Pumps

- .1 Increase pipe size at discharge outlet from 64 to 150 mm and install tees with pressure gauges as shown on the drawings.

3.4 Alignment

- .1 Install piping true and plumb.

3.5 Hangers and Brackets

- .1 Install hangers, brackets and brackets to support all piping and equipment.
- .2 Use sufficient hangers to restrain all piping and equipment from movement.
- .3 Shall be secured to the wall, floor and ceiling in a firm manner.
- .4 Ensure all brackets and hangers used are constructed of rust proof materials.

3.6 Piping, Valves and Fittings

- .1 Install all piping, make all piping connections.
- .2 Remove all scale, dirt and other foreign material from piping and equipment.

3.7 Wading Pool Fill Line

- .1 Existing wading pool fill line does not meet code as an air gap is not as per code.
- .2 Support and re-align piping to provide air gap in accordance with Manitoba Health and National Plumbing Code regulations.

3.8 Piping through Manhole

- .1 Neatly cut hole through manhole wall to provide a constant size opening with a clearance around pipe not to exceed 10 mm.
- .2 Grout 75 mm galvanized discharge piping through manhole in place to ensure water tight.
- .3 Install 75 mm galvanized pipe from the pump discharge and through the manhole at an elevation to be determined in field.
- .4 Provide threaded connection from the 75mm galvanized piping to the 100 mm PVC piping outside the manhole as shown in plans.

3.9 Winterizing

- .1 Provide drain valves for complete gravity drain type winterizing of all equipment and piping whether drain valves are shown on the plans or not.
- .2 Provide red line drawings to Contract Administrator for any drain valves added to the system c/w tag number.

3.10 Works in Existing
Building

- .1 Process Flow Diagram: Attach picture frame on building wall (frame height and exact location to be field determined by Contract Administrator).
- .2 Maintain operation of all existing building domestic water supply including all existing hose bibs, washrooms, etc.
- .3 Relocate existing piping as required to install new equipment.
- .4 Make connections watertight and neat.

3.11 Testing

- .1 Test pumps, equipment and all process operation.
- .2 Test pressure shall be 350 kPa. Test pressure shall be maintained without loss for a period of one hour. Isolate all low pressure equipment and instruments prior to testing. Operate all valves and other devices during the test period.

End Section 15200