SECTION 35 20 16.25

FABRICATED SLIDE GATES AND STOP LOGS

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this section:
   1. American Society for Testing and Materials (ASTM):
      a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
      b. A193, Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
      c. A240, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
      d. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
      e. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
      f. D2000, Standard Classification System for Rubber Products in Automotive Applications.
      g. D4020, Standard Specification for Ultra-High-Molecular-Weight Polyethylene Molding and Extrusion Materials.
   2. American Water Works Association (AWWA):
      a. C513, Open Channel, Fabricated-Metal Slide Gates and Open Channel, Fabricated-Metal Weir Gates.
      b. C542, Electric Motor Acutators for Valves and Slide Gates.
      c. C561, Fabricated Stainless Steel Slide Gates.
   3. Canadian Electrical Code (CEC).
   4. National Electrical Manufacturers Association (NEMA):
      a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
      b. MG 1, Motors and Generators.
      1. 2010 National Building Code of Canada, with 2011 Manitoba Amendments (NBC).

1.2 DEFINITIONS

A. Submersible: The ability to exclude water when submerged under a 6 meter head of fresh water for 24 hours and still maintain electrical integrity.

B. Slenderness Ratio: The ratio of the maximum unsupported stem length to the stem cross-section radius of gyration.

C. Self-Contained: The arrangement of the gate operator, supported by the gate frame, such that operating thrust loads are not applied external to the assembly.

1.3 SUBMITTALS

A. Shop Drawings:
1. Make, model, weight, and horsepower of each equipment assembly.
2. Manufacturer's catalog information, descriptive literature, specifications, identification of materials of construction, and cross-sectional details of gate operator and gate.
3. Detailed structural, mechanical, and electrical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and locations of connections to other work, and weights of associated equipment associated therewith.
4. Calculations: Gate operator and stem calculations for each gate and service condition. Gate opening and closing thrust forces that will be transmitted to the support structure with operator at extreme positions and load.
5. External utility requirements such as air, water, power, drain, etc., for each component.
6. Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.
7. Power and control wiring diagrams, including terminals and numbers.
8. Performance Test Procedures.

B. Information Submittals:
1. Manufacturer's Certificate of Compliance.
2. Special shipping, storage and protection, and handling instructions.
3. Manufacturer's written/printed installation instructions.
4. Routine maintenance requirements prior to plant startup.
5. Manufacturer's Certificate of Proper Installation in accordance with Section 01 43 33, Contractor Field Services.
6. Operation and maintenance manual.
7. Service records for maintenance performed during construction.
8. Submit written certification from Professional Engineer licensed in the Province of Manitoba stating that support systems, anchorage, and equipment have been designed according to requirements of the NBC for post-disaster structures at time of Shop Drawing submittals.

1.4 SYSTEM DESCRIPTION

A. Coordinate such that electric motor operators are fully assembled and tested, including motor, at the factory.

1.5 EXTRA MATERIALS

A. Furnish, tag, and box for shipment and storage the following spare parts and special tools:

Item		Quantity
Stem collars for all gate stems		One of each different size
Bronze lift nuts		One of each different size
Indicator lights		One dozen

Item		Quantity
Special tools required to maintain or dismantle		One complete set

B. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Equipment specified in this section shall be the products of:
1. Fontaine-Aquanox.
2. Dynamic.
3. Orbinox.
4. Waterman Industries.
5. Hydro Gate.

B. No "or-equal" or substitute products will be considered.

2.2 SUPPLEMENTS

A. See supplements to this section for additional product information.

2.3 MATERIALS

A. Stainless Steel:
1. Plate, Sheet, and Strip: ASTM A240, Type 316L.
2. Bars and Shapes: ASTM A276, Type 316L.

B. All stainless steel welds shall be pickled and passivated.

C. Aluminum Stop Logs:
1. Plate: ASTM B209, alloy 5083-H32.
2. Bars and Shapes: ASTM B209, alloy 6061-T6.

D. Ultra-high Molecular Weight Polyethylene (UHMWPE): ASTM D4020.

E. Elastomer Seals: ASTM D2000.

2.4 PERFORMANCE REQUIREMENTS

A. Leakage:
1. Slide Gates and Weir Gates:
a. Maximum 0.60 L/min per meter of seating perimeter under design seating head.
b. Maximum 1.25 L/min per meter of seating perimeter under design unseating head.

2. Stop Logs: Maximum 1.25 L/min per meter of stop log perimeter under design seating head.

B. Design Seating/Unseating Head: As shown in Schedules at end of section.

C. Gates and stop logs installed in outdoor locations shall be suitable for low temperature operation in ambient temperatures down to minus 35 degrees C.

D. Design equipment, anchorage, and support systems for vertical and lateral loading in accordance with NBC.

2.5 SLIDE GATES

A. Assembly Style: Rising or non-rising stem type, as indicated in Slide Gate Schedule, with assembly styles designated as follows:
1. Style A: Upward opening type for surface mounting on concrete wall.
2. Style B: Upward opening type for channel mounting with concrete-embedded frame and flush bottom.
3. Style C: Upward opening type for channel mounting with surface-mounted frame.
4. Style D: Downward opening weir type for surface mounting on concrete wall.

B. Guide Frames:
1. Type 316L stainless steel, open frame or self-contained as indicated in Slide Gate Schedule.
2. Vertical Guides:
   a. Design for maximum rigidity, and extend in one continuous piece from gate invert to such height as to retain and support at least two thirds (2/3) of vertical height of gate disc in fully open position, and to form posts for support of gate operators on self-contained gates.
   b. Where guides extend above operating floor, they shall be sufficiently strong so that no further reinforcements are required.
   c. Thickness: 6 mm minimum.
   d. Incorporate replaceable UHMW polyethylene bearing strip in retainer slot on downstream side (unseating head side) of gate.
3. Frame Invert:
   a. For flush bottom gates, furnish neoprene insert to function as seating surface for gate disc.
   b. Thickness: 6 mm minimum.
   c. Join vertical guide frames and invert with factory welded corners.
4. Size guide slot to provide a minimum disc engagement of 25 mm on each side.
5. Wall surface mounted frames to include EPDM gasket or non-shrink grout between frame and concrete surface.
6. Channel surface mounted frames to include non-shrink grout between frame and concrete surface.
7. Channel embedded frames to be installed with concrete block-out in channel wall and floor and packed with non-shrink grout.

C. Gate Slide:
   1. One-piece Type 316L stainless steel with minimum thickness of 6 mm.
   2. Reinforce as required such that gate slide will not deflect more than 1/360 of gate span under specified design seating and unseating heads.
   3. Reinforce gate slide with one-piece Type 316L stainless steel angles or channels welded to gate slide. Bolted reinforcements will not be permitted.

D. Operator Support Yoke:
   1. For self-contained gate operators, attached to vertical extensions of guide frames.
   2. Constructed from at least two Type 316L stainless steel angles, or two other suitable shapes, and bolt in place to provide a rigid assembly.
   3. Maximum Deflection: Not to exceed 6 mm under full operator applied loading.

E. Stems:
   1. 25 mm minimum diameter, ASTM A276, Type 316 stainless steel.
   2. Threads: Acme type with RMS surface roughness of 160 micron or less on flanks for manually operated gates and 81 micron or less on flanks for electrically operated gates. Extend threaded portion of stem 50 mm above operator when gate is in closed position.
   3. Slenderness ratio shall not exceed 200.
   4. Stems shall withstand in compression, without damage, thrust equal to at least 2.5 times rated output of manual hoisting mechanism, with a 178 N effort applied to handwheel or crank.
   5. Design electric motor-driven floor stands to withstand at least 1.25 times output thrust of motor in stalled condition.
   6. Equip operating stems with Type 316 stainless steel bushed stem guides, adjustable in two directions and spaced such that L/r ratio does not exceed 200.
   7. Adjustable stop collar for CLOSED position.
   8. Connect stems to gate slide with yoke, bolted to stem and welded to gate slide.
   9. Slide gates having width greater than twice the height, or width greater than 2.1 m, shall have dual stems. For downward opening weir type gates, locate stems near outside edges of gate.

F. Stem Covers:
   1. Transparent plastic, vented pipe stem cover and cap.
   2. Provide with OPEN/CLOSED designators with 25 mm graduations on clear mylar pressure sensitive, adhesive tape, suitable for outdoor application.

2.6 GATE OPERATORS

A. Dual-Stem Gate Operators:
   1. Enclosed, geared floor or bench stands.
   2. Interconnected so operators will work as a unit from single point with crank lever or interconnecting electric operator.
   3. Compatible with use of portable electric drill gate operators
   4. Interconnecting Shafts:
      a. Stainless steel with flexible couplings at ends.
      b. Diameter sufficient to prevent sagging.
      c. Include flanged coupling to allow precision weir leveling.

B. Type 1, Handwheel-Operated Bench Stands:
   1. Sealed, ball thrust, roller or needle bearing type and equipped with bronze lift nut, internally threaded with Acme threads.
   2. Furnish mechanical seals at housing penetrations.
   3. Compatible with use of portable electric drill gate operator.
   4. Handwheel and Baseplate: Cast iron or cast aluminum.
   5. Manual Crank Effort: Not to exceed 178 N.

C. Type 2, Crank-Operated Bench Stands:
   1. Weatherproof housing mounted on cast aluminum or cast iron base to top horizontal member of self-contained gates as described under paragraph Operator Support Yoke.
   2. Solid Bronze Lift Nut: Integrally threaded with Acme threads.
   3. Compatible with use of portable electric drill gate operator.
   4. Ball Thrust or Tapered Roller Bearings:
      a. Locate above and below operating nut flange to support opening and closing thrusts.
      b. Include grease lubrication fittings and input pinions.
   5. Manual Crank Effort: Not to exceed 178 N.

D. Type 3, Crank-Operated Floor Stands:
   1. Weatherproof housing with solid bronze lift nut.
   2. Mount on high strength cast iron pedestal or base.
   3. Compatible with use of portable electric drill gate operator.
   4. Lift Nut: Internally threaded with Acme threads.
   5. Gears to be bevel style. Orient to suit location of gate.
   6. Manual Crank Effort: Not to exceed 178 N.

E. Type 4, Electric Motor Operators:
   1. General:
      a. Comply with AWWA C542.
      b. Controls integral with the actuator and fully equipped as specified in AWWA 542.
      c. Stem protection for rising stem gates.
      d. Lubricant shall be NSF 61 certified for potable water application.
      e. Capable of functioning properly in ambient temperature range of minus 33 degrees C to 70 degrees C and up to 100 percent relative humidity.
      f. Provide intermediate gear box if required to meet gate torque requirements. Gear box shall be of same manufacturer as actuator.
      g. Design that allows gear case to be opened for inspection or disassembly without releasing stem thrust or taking gate out of service.
      h. Equipped with side-mounted handwheel for manual operation. Include automatic clutch to positively disengage handwheel when drive motor control is energized. Design handwheel operator such that failure of motorized gearing will not prevent hand operation of gate.
      i. Circuitry which ensures motor turns in correct direction irrespective of supply polarity connected to power terminal; gate and operator to suffer no damage due to incorrect power connection.
      j. Instantaneous reversal protection whereby automatic time delay circuit limits current surges when actuator is signaled to instantaneously reverse direction.

k. Anti-hammer protection whereby electronic torque limitation switches off actuator when preset load is reached due to obstruction or end of travel.
l. Bi-metal thermostat embodied in motor control transformer windings to prevent overheating due to extensive use.
m. Jammed gate motor protection whereby logic circuit protects motor from overheating by de-energizing motor if gate does not move after developing maximum torque.
n. Opto-isolators incorporated to interface with remote control inputs to protect logic circuits from high voltage transients appearing at actuator terminals.
o. Actuator shall include diagnostic module which will store and enable download of historical actuator data to permit analysis of changes in actuator or valve performance. Retrieval of this information must be demonstrated in the field.
p. Provide minimum of six independently configurable latching relays for remote indication as follows:
    1) Relay 1 shall make when gate is fully CLOSED.
    2) Relay 2 shall make when gate is fully OPEN.
    3) Relay 3 shall break when gate is fully CLOSED.
    4) Relay 4 shall break when gate is fully OPEN.
    5) Relay 5 for collective FAULT (torque fault and other electrical faults).
    6) Relay 6 shall indicate when REMOTE is selected.

2. Actuator Operation - General:
    a. Suitable for use on rising or non-rising stem gates.
    b. Manual override handwheel.
    c. Gate position indication.
    d. Sized for gate travel speed of 300 mm per minute, unless indicated otherwise in Slide Gate Schedule.
    e. Non-Intrusive Electronics: Local controls, diagnostics, and calibration, including limit and torque switch settings, shall be accomplished non-intrusively. Electronic gate position display with capability to show continuous torque output. If applicable, provide two hand-held configuration units for every 10 actuators provided, two minimum.
3. Open-Close/Throttling Service:
    a. Capable of 60 starts per hour.
    b. Size for minimum 1.5 safety factor based on maximum unseating and seating torque of gate. Safety factor shall be demonstrated and documented in Shop Drawings submittals and at time of commissioning under real service conditions using actuator software and torque display on actuator. Motor stall torque not to exceed capacity of gate.
    c. Actuator suitable for throttling operation of gate at intermediate positions.
    d. Controls and Indicators:
        1) PROFIBUS DP interface, unless otherwise noted.
        2) LOCAL-OFF-REMOTE selector switch, padlockable in each position.
        3) Integral OPEN-STOP-CLOSE momentary pushbuttons with seal-in circuits to control gate in LOCAL position.
        4) Remote OPEN-STOP-CLOSE momentary control dry contact inputs in REMOTE position. Integral seal-in circuits for remote OPEN and CLOSE commands; gate travel stops when remote STOP contact opens.

5) Auxiliary contact that closes in REMOTE position.
6) OPEN and CLOSED indicating lights.

e. Integral reversing motor starter with built-in overload protection. Control transformer for 120-volt or 24-volt control voltage.

f. Gate shall remain in last position on loss of operator power.

4. Modulating Service:

a. Size motors for continuous duty.

b. Actuators to be sized with minimum 2.0 safety factor based on maximum unseating and seating torque of gate. Safety factor shall be demonstrated and documented at time of commissioning under real service conditions using actuator software. Motor stall torque not to exceed torque capacity of gate.

c. Feedback potentiometer and integral electronic positioner/comparator circuit to maintain gate position.

d. Controls and Indicators:

1) PROFIBUS DP interface, unless otherwise noted.
2) LOCAL-OFF-REMOTE selector switch, padlockable in each position.
3) Integral OPEN-STOP-CLOSE momentary pushbuttons with seal-in circuits to control gate in LOCAL position.
4) 4-20 mA dc input signal to control gate in REMOTE position.
5) Auxiliary contact that closes in REMOTE position.
6) OPEN and CLOSED indicating lights.

e. Gate shall close upon loss of signal unless indicated otherwise.

f. Ac motor with solid state reversing starter or dc motor with solid state reversing controller, and built-in overload protection. Non-solid state compliant equipment will not be acceptable. Controller capable of 1200 starts per hour.

g. Duty cycle limit timer and adjustable band width, or equivalent, to prevent actuator hunting.

h. Gate position output converter controlled by a modulating analog signal with feedback signal in proportion to gate position, either through a PROFIBUS DP interface or 4-20 mA signals.

5. Actuator Power Supply:

a. 600-volt ac, three-phase, 60 HZ unless indicated otherwise.

b. Control power transformer, 24-volt or 120-volt secondary.

c. Externally operable power disconnect switch.

6. Enclosure:

a. Unless indicated otherwise, provide enclosure as defined in NEMA 250, Type 6P.

b. Contain 120-volt space heaters, or electrical compartment shall be non-breathing to prevent condensation.

7. Limit Switches:

a. Single-pole, double-throw (SPDT) type, field adjustable, with contacts rated for 5 amps at 120 volts ac.

b. Each actuator to have minimum of two transfer contacts at end position, one for gate fully OPEN and one for gate fully CLOSED.

c. Housed in actuator control enclosure.

8. Control Features: Furnish in accordance with operator control styles listed below and specified in Slide Gate Schedule:

Feature	Description
A	Integral local OPEN/STOP/CLOSE weatherproof pushbutton station.
B	End position limit switches; OPEN and CLOSED position switches shall be normally open contacts that close at end position; contacts shall be dry and rated for 5 amps, 120V ac.
C	LOCAL/REMOTE weatherproof selector switch and provisions for remote OPEN/STOP/CLOSE or modulating operation; PROFIBUS DP interface (open-close); remote commands will be by way of hard-wire circuit.
D	Continuous position output; PROFIBUS DP interface (modulating).

   a. Operator Control Styles:
      1) Style 1: Includes control features A and B.
      2) Style 2: Includes control features A, B, and C.
      3) Style 3: Includes control features A, B, C and D.
9. Product Standardization:
   a. This product was standardized by the City via RP 331-2014.
   b. No alternates or substitutes will be accepted.
   c. All requests for purchase or quotation shall reference RP 331-2014 to receive standardized pricing that the City has negotiated with the vendor.
   d. Manufacturer and Series:
      1) Rotork; IQ3.

F. Remote Control Stations:
1. Provide remote control stations where indicated in Slide Gate Schedule, and for electric motor actuators where local controls on actuator are inaccessible and/or more than 2100 mm above ground or operating platform.
2. Enclosure:
   a. Non-hazardous Locations: NEMA 250 Type 4X, Type 316 stainless steel.
   b. Hazardous Locations: NEMA 250 Type 7, cast ferrous metal with electro-galvanized finish, or copper-free aluminum, with drilled and tapped conduit entrances, hinged cover.
   c. CSA approved.
3. Provide stanchion for floor-mounting control station where wall-mounting is not practical.
4. Control station shall be supplied with terminal strip that corresponds with actuator terminals. Control will be wired from plant PLC to control station, then to actuator.
5. All control stations shall contain a Local/Remote selector switch and a “Remote Selected” contact to be wired in series with remote-selected contact in actuator.

6. For Open/Close actuators, control station shall include “OPEN” and “CLOSE” momentary pushbuttons, red indicating light for OPEN, yellow indicating light for mid-position, green indicating light for CLOSED, and emergency “STOP” pushbutton.
7. For Modulating actuators, control station shall include “OPEN” and “CLOSE” hold-to-run pushbuttons, red indicating light for OPEN, yellow indicating light for mid-position, green indicating light for CLOSED, and two digital displays, one for input commanded position and one for output valve position indication.
8. All pushbuttons, lights and digital displays shall be properly labeled with lamacoids.
9. Remote control stations shall be supplied by electrical contractor.

G. Identification Tagging Requirements:
1. For each gate operator, heavy stainless tag bearing gate tag number shown in Slide Gate Schedule.
2. Attach tag to gate frame or operator such that tag cannot be removed. Use block type numbers and letters with 6 mm minimum high numbers and letters stamped on and filled with black enamel.

2.7 STOP LOGS

A. Frame Mounting Style: As indicated in Stop Log Schedule, with frame mounting styles designated as follows:
1. Style A: Surface mounted on concrete wall.
2. Style B: Channel mounted with concrete-embedded frame and flush bottom.
3. Style C: Channel mounted with surface-mounted frame.

B. Stop Logs:
1. Horizontal aluminum or stainless steel sections, as indicated in Stop Log Schedule, suitable for vertical stacking.
2. Minimum 6 mm thick, reinforced as required to limit deflection to not more than 1/360 of span under specified design head. Reinforce stainless steel logs with stainless steel angles or channel welded to plate.
3. Each stop log shall have welded lifting bars or brackets to facilitate lifting and removal with lifting devices.
4. Resilient seals for seating surface of stop log against the frame, invert, and between stop logs to form watertight seal. Seal strips to ensure leakage rate in accordance with AWWA C501.
5. Interchangeable, so they can operate in any order of placement.
6. Designed for channel size and differential head shown on Stop Log Schedule.

C. Guide Frames:
1. Guide frames and invert shall be Type 316L stainless steel, minimum 6 mm thick.
2. Frame invert shall be flush bottom type. Logs to stop on bottom plate and sealed with resilient seal.
3. Vertical guides designed for maximum rigidity, and shall extend in one continuous piece from channel invert to top of channel wall. Coordinate location and dimensions of guide frames with manufacturer of open grating or checkered plate channel covers and associated angle frames.
4. Vertical guide frames and inverts shall be joined with factory welded corners.

5. Channel surface mounted and wall surface mounted frames to include EPDM gasket or non-shrink grout between frame and concrete surface.
6. Channel embedded frames to be installed in concrete block-out in channel wall and floor and packed with non-shrink grout.

D. Anchor Bolts and Hardware: All necessary attaching bolts, anchor bolts, mounting and assembly hardware shall be Type 316 stainless steel and shall be furnished by stop log manufacturer.

E. Lifting Devices: Provide one Type 316 stainless steel lifting device for each different log width, complete with latch to engage and disengage logs and suitable for attaching to an overhead hoist.

F. Identification Tagging Requirements: Furnish each stop log with rectangular, riveted stainless steel tag with stop log span and depth shown. Tag shall also state “Water Side” and be riveted to water side of log.

2.8 APPURTENANCES

A. Lifting Lugs: Furnish suitably attached for equipment assemblies and components weighing over 45 kilograms.

B. Anchor Bolts: ASTM A193, Type 316 stainless steel sized by equipment manufacturer and at least 13 mm in diameter, or as shown, and as specified in Section 05 50 00, Metal Fabrications (Basic).

C. Staff Gauges: Furnish for downward acting weir gates, graduated in 6 mm intervals and marked every 50 mm and meter.

D. Portable Electric Drill Gate Operators:
1. Furnish one 115-volt, single-phase, 60-Hz, heavy-duty universal electric drill, complete with overload release clutch and lightweight, adjustable tripod support assembly.
2. Suitable for operating slide gates specified in this section.
3. Complete with adapting chuck to fit gate operator shafts, minimum 7 m long electrical cord, grounding plug with weatherproof cover, and reversing switch.
   a. Plug: Conforming to Twist-Lock NEMA Configuration L5-30P.
4. Commercial grade.
5. Capable of delivering minimum 68 N-m of torque and maintaining minimum speed of 60 rpm under full load conditions.
6. Motors: Suitable for 15-minute operation under full load when rested for same period of time between operations.
7. Manufacturers:
   a. Makita
   b. Milwaukee.
   c. Dewalt.

PART 3 EXECUTION

3.1 INSTALLATION

A. In accordance with the manufacturer's written instructions.

B. Disassemble factory assembled gate components before installation.

C. Field mount operators after installing gates.

D. Brace thimbles internally during concrete placement.

E. Accurately place anchor bolts using templates furnished by the manufacturer and as specified in Section 05 50 00, Metal Fabrications (Basic).

F. Lubricate stems before operating.

3.2 FIELD QUALITY CONTROL

A. Functional Tests: Conduct on each slide gate.

B. Performance Test:
   1. Conduct on each slide gate.
   2. Perform under actual or approved simulated operating conditions.
   3. Test for a continuous 3-hour period without malfunction.
   4. Adjust, realign, or modify units and retest if necessary.

3.3 MANUFACTURER'S SERVICES

A. Manufacturer's Representative: Present at Site or classroom designated by the City, for minimum person-days listed below, travel time excluded:
   1. 5 person-days for installation assistance and inspection.
   2. 10 person-days for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
   3. 2 person-days for prestartup classroom or Site training.
   4. 2 person-days for facility startup.
   5. 2 person-days for post-startup training of the City's personnel. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by the City and Contract Administrator.

B. See Section 01 43 33, Contractor Field Services and Section 01 91 14, Equipment Testing and Facility Startup.

C. Provide manufacturer's representative at Site in accordance with Section 01 43 33, Contractor Field Services, for installation assistance, inspection and certification of proper installation, equipment testing, startup assistance, and training of the City's personnel for specified component, subsystem, equipment, or system.

3.4 SUPPLEMENTS

A. The supplements listed below, following "End of Section," are a part of this Specification.
   1. Slide Gate Schedule.
   2. Stop Log Schedule.

END OF SECTION

SEWPCC UPGRADING/EXPANSION PROJECT

Slide Gate Schedule

Location / Description	Tag Number	P&ID Number	Assembly Style [Note 1]	Rising or Non-rising Stem	Open Frame or Self-contained	Size of Wall Opening / Gate W x H or Ø (mm)	Opening / Channel Invert Elevation (m)	Operating Floor Elevation (m)	High Water Elevation (m)	Design Seating / Unseating Heads (m)	Operator Type [Note 2]	NEMA 250 Type	Voltage/ Phase	Rated Power (kW)	Service [Note 3]	Control Style [Note 4]	Remarks
AREA G - HEADWORKS																	
Screening																	
Mechanical Screen SCR-G211 Channel Inlet	XV-G2111	1-0102-PPID-G201	A	Rising	Self-contained	±1830 x 2130	±232.867	±235.880	235.000	2.4 / 2.4	4	7	575/3	0.75	M	3	Bottom of gate slide in fully open position: EL 235.450. Top of stem in fully open position: Not to exceed EL 241.100. Top of gate slide in closed position: EL 235.00 (will function as emergency overflow weir when in closed position). Provide NEMA 7 remote control station.
Mechanical Screen SCR-G212 Channel Inlet	XV-G2121	1-0102-PPID-G201	A	Rising	Self-contained	±1830 x 2130	±232.867	±235.880	235.000	2.4 / 2.4	4	7	575/3	0.75	M	3	Bottom of gate slide in fully open position: EL 235.450. Top of stem in fully open position: Not to exceed EL 241.100. Top of gate slide in closed position: EL 235.00 (will function as emergency overflow weir when in closed position). Provide NEMA 7 remote control station.
Mechanical Screen SCR-G213 Channel Inlet	XV-G2131	1-0102-PPID-G202	A	Rising	Self-contained	±1830 x 2130	±232.867	±235.880	235.000	2.4 / 2.4	4	7	575/3	0.75	M	3	Bottom of gate slide in fully open position: EL 235.450. Top of stem in fully open position: Not to exceed EL 241.100. Top of gate slide in closed position: EL 235.00 (will function as emergency overflow weir when in closed position). Provide NEMA 7 remote control station.
Mechanical Screen SCR-G214 Channel Inlet	XV-G2141	1-0102-PPID-G202	A	Rising	Self-contained	±1680 x 2130	±232.867	±235.880	235.000	2.4 / 2.4	4	7	575/3	0.75	M	3	Bottom of gate slide in fully open position: EL 235.450. Top of stem in fully open position: Not to exceed EL 241.100. Top of gate slide in closed position: EL 235.00 (will function as emergency overflow weir when in closed position). Provide NEMA 7 remote control station.
Grit Removal																	
Grit Tanks TK-G331 & TK-G332 Influent Flow Control	LV-G3201	1-0102-PPID-G301	C	Rising	Self-contained	1374 x 1830	±232.867	±235.880	234.700	1.9 / 1.9	4	7	575/3	0.75	M	3	Bottom of gate slide in fully open position: EL 235.100. Top of stem in fully open position: Not to exceed EL 241.100. Top of gate slide in closed position: EL 234.70 (will function as emergency overflow weir when in closed position). Provide NEMA 7 remote control station.
Grit Tank TK-G321 Inlet	HV-G3212	1-0102-PPID-G301	B	Rising	Self-contained	1120 x 2300	232.867	235.306	234.700	2.3 / 2.3	2	-	-	-	-	4	Suitable for outdoor service.
Grit Tank TK-G322 Inlet	HV-G3222	1-0102-PPID-G301	B	Rising	Self-contained	1120 x 2300	232.867	235.306	234.700	2.3 / 2.3	2	-	-	-	-	4	Suitable for outdoor service.
Grit Tanks TK-G331 & TK-G332 Effluent Channel	XV-G3331	1-0102-PPID-G303	C	Non-rising	Self-contained	1019 x 1640	±232.562	±235.306	234.200	1.7 / 1.7	4	7	575/3	0.75	O/C	2	Bottom of gate slide in fully open position: EL 234.500. Top of gate slide in closed position: EL 234.20 (will function as emergency overflow weir when in closed position). Provide NEMA 7 remote control station.
Grit Tanks TK-G331 & TK-G332 Effluent Channel	XV-G3332	1-0102-PPID-G303	C	Non-rising	Self-contained	1729 x 1640	±232.562	±235.306	234.200	1.7 / 1.7	4	7	575/3	0.75	O/C	2	Bottom of gate slide in fully open position: EL 234.500. Top of gate slide in closed position: EL 234.20 (will function as emergency overflow weir when in closed position). Provide NEMA 7 remote control station.
AREA R - BIOREACTORS / BLOWER BUILDING																	
Bioreactor 1																	
Anaerobic Zone Chimney	W-R102	1-0102-PPID-R101	D	Rising	Self-contained	1525 x 1300	232.800	234.400	233.230	1.7 / 1.7	2	-	-	-	-	-	Suitable for outdoor service.
Anoxic Zone Chimney	W-R103	1-0102-PPID-R101	D	Rising	Self-contained	1525 x 1300	232.800	234.400	233.230	1.7 / 1.7	2	-	-	-	-	-	Suitable for outdoor service.
Recycle Pump P-R156 Outlet	SG-R103A	1-0102-PPID-R101	A	Rising	Open Frame	1000 x 1500	226.000	234.400	233.160	7.0 / 7.0	2	-	-	-	-	-	With top seal. Suitable for outdoor service.
Anoxic Zone to IFAS Zone Cross Connection	SG-R103B	1-0102-PPID-R102	A	Rising	Open Frame	1000 x 1300	226.000	234.400	233.160	7.0 / 7.0	2	-	-	-	-	-	With top seal. Suitable for outdoor service.
Bioreactor 2																	
Anaerobic Zone Chimney	W-R112	1-0102-PPID-R103	D	Rising	Self-contained	1525 x 1300	232.800	234.400	233.230	1.7 / 1.7	2	-	-	-	-	-	Suitable for outdoor service.
Anoxic Zone Chimney	W-R113	1-0102-PPID-R103	D	Rising	Self-contained	1525 x 1300	232.800	234.400	233.230	1.7 / 1.7	2	-	-	-	-	-	Suitable for outdoor service.
Recycle Pump P-R156 Outlet	SG-R113A	1-0102-PPID-R103	A	Rising	Open Frame	1000 x 1500	226.000	234.400	233.160	7.0 / 7.0	2	-	-	-	-	-	With top seal. Suitable for outdoor service.
Anoxic Zone to IFAS Zone Cross Connection	SG-R113B	1-0102-PPID-R104	A	Rising	Open Frame	1000 x 1300	226.000	234.400	233.160	7.0 / 7.0	2	-	-	-	-	-	With top seal. Suitable for outdoor service.
Bioreactor 3																	
Anaerobic Zone Chimney	W-R122	1-0102-PPID-R105	D	Rising	Self-contained	1525 x 1300	232.800	234.400	233.230	1.7 / 1.7	2	-	-	-	-	-	Suitable for outdoor service.
Anoxic Zone Chimney	W-R123	1-0102-PPID-R105	D	Rising	Self-contained	1525 x 1300	232.800	234.400	233.230	1.7 / 1.7	2	-	-	-	-	-	Suitable for outdoor service.
Recycle Pump P-R156 Outlet	SG-R123A	1-0102-PPID-R105	A	Rising	Open Frame	1000 x 1500	226.000	234.400	233.160	7.0 / 7.0	2	-	-	-	-	-	With top seal. Suitable for outdoor service.
Anoxic Zone to IFAS Zone Cross Connection	SG-R123B	1-0102-PPID-R106	A	Rising	Open Frame	1000 x 1300	226.000	234.400	233.160	7.0 / 7.0	2	-	-	-	-	-	With top seal. Suitable for outdoor service.
Miscelleaneous																	
Bioreactor Bypass Channel 2 Inlet	FV-R1306	1-0102-PPID-R107	B	Rising	Self-contained	2500 x 2000	232.105	234.400	233.290	1.7 / 1.7	4	4X	575/3	0.75	M	3	With top seal to make it air tight when closed. Suitable for outdoor service.

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Slide Gate Schedule

Location / Description	Tag Number	P&ID Number	Assembly Style [Note 1]	Rising or Non-rising Stem	Open Frame or Self-contained	Size of Wall Opening / Gate W x H or Ø (mm)	Opening / Channel Invert Elevation (m)	Operating Floor Elevation (m)	High Water Elevation (m)	Design Seating / Unseating Heads (m)	Operator Type [Note 2]	NEMA 250 Type	Voltage/ Phase	Rated Power (kW)	Service [Note 3]	Control Style [Note 4]	Remarks
Mixed Liquor Channel Outlet	LV-R1301	1-0102-PPID-R107	C	Rising	Self-contained	3544 x 1200	231.800	233.527	232.850	1.5 / 1.5	4	4X	575/3	0.75	M	3	This is an upward opening baffle gate with travel from 231.8 m to 233 m elevation. Provide a stainless steel bird screen around the exposed frame outside. Suitable for outdoor service.
Scum Gate to WAS Sump	LV-R1302	1-0102-PPID-R107	D	Rising	Self-contained	900 x 1500	232.500	234.400	232.850	1.5 / 1.5	4	8	575/3	0.75	M	3	Downward opening gate with travel from 234 m to 232.5 m, Class 1 Zone 2. Suitable for outdoor service.
RAS Channel to WAS Sump	FV-R1801-1	1-0102-PPID-R108	D	Rising	Self-contained	750 x 1200	233.600	235.400		0 / 1.2	4	4X	575/3	0.75	M	3	Suitable for outdoor service.
RAS Channel to WAS Sump	FV-R1801-2	1-0102-PPID-R108	D	Rising	Self-contained	750 x 1200	233.600	235.400		0 / 1.2	4	4X	575/3	0.75	M	3	Suitable for outdoor service.
AREA U - UV DISINFECTION BUILDING																	
UV Effluent Channel	FV-U2105	1-0102-PPID-U201	D	Rising	Open Frame	1420 x 1800	229.000	230.300	231.685	3.8/3.8	4	4X	575/3	0.75	M	3	UV supplier to provide a new actuator. New gate provided and installed by GC.
UV Effluent Channel	FV-U2205	1-0102-PPID-U201	D	Rising	Open Frame	1420 x 1800	229.000	230.300	231.685	3.8/3.8	4	4X	575/3	0.75	M	3	UV supplier to provide a new actuator. New gate provided and installed by GC.
Surface Runoff Ditch	XV-U192	1-0102-PPID-U101				XXXX x XXXX					4	4X	575/3	0.75	O/C	3	Provide a new actuator for existing gate.
AREA K - HIGH RATE CLARIFIERS																	
HRC Influent Channel 1 Inlet Isolation	XV-G3621	1-0102-PPID-K101	B	Rising	Self-contained	1400 x 2300	232.300	235.306	234.110	2.3	4	7	575/3	0.75	O/C	2	Suitable for outdoor service.
HRC Influent Channel 2 Inlet Isolation	XV-G3631	1-0102-PPID-K101	B	Rising	Self-contained	1400 x 2300	232.300	235.306	234.110	2.3	4	7	575/3	0.75	O/C	2	Suitable for outdoor service.
HRC Train 1 Inlet Flow Control	FV-K1102	1-0102-PPID-K101	D	Rising	Self-contained	1200 x 2100	232.300	234.392	234.100	2.1	4	7	575/3	0.75	M	3	
HRC Train 2 Inlet Flow Control	FV-K1202	1-0102-PPID-K101	D	Rising	Self-contained	1200 x 2100	232.300	234.392	234.100	2.1	4	7	575/3	0.75	M	3	
HRC Train 1 Scum Weir Gate	HV-K110A	1-0102-PPID-K102	D	Rising	Self-contained	1000 x 700	233.439	234.392	233.690	0.7	2	-	-	-	-	-	
HRC Train 2 Scum Weir Gate	HV-K120A	1-0102-PPID-K104	D	Rising	Self-contained	1000 x 700	233.439	234.392	233.690	0.7	2	-	-	-	-	-	
HRC Effluent Flow Control	FV-K1511	1-0102-PPID-K106	D	Rising	Self-contained	2000 x 1800	232.106	234.392	233.360	1.8	4	4X	575/3	0.75	M	3	
HRC Effluent Isolation	XV-K1513	1-0102-PPID-K106	B	Rising	Self-contained	3000 x 1800	232.106	234.392	233.360	1.8	4	4X	575/3	0.75	O/C	2	

Notes:

1. Assembly Style:
   - A = Upward opening type for surface mounting on concrete wall (with top seal where indicated in Remarks column)
   - B = Upward opening type for channel mounting with concrete-embedded frame and flush bottom
   - C = Upward opening type for channel mounting with surface-mounted frame
   - D = Downward opening weir type for surface mounting on concrete wall (with top seal where indicated in Remarks column)
2. Operator Type (see specification for details):
   - 1 = Handwheel-operated bench stand
   - 2 = Crank-operated bench stand
   - 3 = Crank-operated floor stand
   - 4 = Electric motor operator
3. Service (see specification for details):
   - O/C = Open-Close
   - M = Modulating
4. Control Style (see specification for details):
   - 1 = OPEN/STOP/CLOSE pushbuttons, OPEN and CLOSED limit switches
   - 2 = OPEN/STOP/CLOSE pushbuttons, OPEN and CLOSED limit switches, LOCAL/REMOTE selector switch, PROFIBUS DP interface (on/off)
   - 3 = OPEN/STOP/CLOSE pushbuttons, OPEN and CLOSED limit switches, LOCAL/REMOTE selector switch, PROFIBUS DP interface (modulating)
   - 4 = OPEN and CLOSED explosion proof limit switches

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Stop Log Schedule

Location / Description	Tag Number	P&ID Number	Frame Mounting Style [Note 1]	Channel Width (mm)	Channel Invert Elevation (m)	Top of Channel Elevation (m)	High Water Elevation (m)	Design Seating Head (m)	Number of Frames Required	Number of Stop Logs Required [Note 2, 3]	Stop Log Material	Number of Lifting Devices Required	Remarks
AREA G - HEADWORKS													
Screening													
Mechanical Screen SCR-G214 Channel Outlet	SL-G214A	1-0102-PPID-G202	A	1380	±232.867	±235.880	234.700	1.8	1	1 set	Aluminum	1	
Grit Removal													
Grit Tanks TK-G321 & TK-G322 Influent Channel Inlet	SL-G320B	1-0102-PPID-G301	C	1374	±232.867	±235.880	234.700	1.8	1	1 set	Aluminum	1	
Grit Tanks TK-G331 & TK-G332 Influent Channel Inlet	SL-G320A	1-0102-PPID-G301	C	1374	±232.867	±235.880	234.700	1.8	1	1 set	Aluminum	-	
Grit Tanks TK-G321 & TK-G322 Influent Channel Outlet	SL-G322D	1-0102-PPID-G301	C	1374	±232.867	±235.306	234.700	1.8	1	1 set	Aluminum	-	
Grit Tanks TK-G331 & TK-G332 Influent Channel Outlet	SL-G333D	1-0102-PPID-G303	C	1374	±232.867	±235.306	234.700	1.8	1	1 set	Aluminum	-	
Grit Tank TK-G321 Outlet	SL-G321A	1-0102-PPID-G301	A	1400	233.800	235.306	234.110	0.5	1	1 set	Aluminum	1	
Grit Tank TK-G321 Outlet	SL-G321B	1-0102-PPID-G301	A	1400	233.800	235.306	234.110	0.5	1	1 set	Aluminum	-	
Grit Tank TK-G321 Outlet	SL-G321C	1-0102-PPID-G301	A	1400	233.800	235.306	234.110	0.5	1	1 set	Aluminum	-	
Grit Tank TK-G322 Outlet	SL-G322A	1-0102-PPID-G301	A	1400	233.800	235.306	234.110	0.5	1	1 set	Aluminum	-	
Grit Tank TK-G322 Outlet	SL-G322B	1-0102-PPID-G301	A	1400	233.800	235.306	234.110	0.5	1	1 set	Aluminum	-	
Grit Tank TK-G322 Outlet	SL-G322C	1-0102-PPID-G301	A	1400	233.800	235.306	234.110	0.5	1	1 set	Aluminum	-	
AREA R - BIOREACTORS / BLOWER BUILDING													
Bioreactor 1													
Anaerobic Zone Inlet	SL-R102A	1-0102-PPID-R101	B	1000	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Anoxic Zone Inlet	SL-R103A	1-0102-PPID-R101	B	1000	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Bioreactor 2													
Anaerobic Zone Inlet	SL-R112A	1-0102-PPID-R103	B	1000	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Anoxic Zone Inlet	SL-R113A	1-0102-PPID-R103	B	1000	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Bioreactor 3													
Anaerobic Zone Inlet	SL-R122A	1-0102-PPID-R105	B	1000	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Anoxic Zone Inlet	SL-R123A	1-0102-PPID-R105	B	1000	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Miscelleaneous													
Bioreactor Influent Channel	SL-R130B	1-0102-PPID-R107	B	1674	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Bioreactor Influent Channel	SL-R130C	1-0102-PPID-R107	B	1674	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Bioreactor Bypass Channel 2 Inlet	SL-R130A	1-0102-PPID-R107	B	2500	232.105	234.400	233.290	1.7	1	1 set	Aluminum	-	
Bioreactor Bypass Channel 2 Outlet	SL-R130F	1-0102-PPID-R107	B	2500	231.038	234.400	232.850	1.7	1	1 set	Aluminum	-	
Mixed Liquor Channel Outlet		1-0102-PPID-R107	B	2500	232.224	234.400	232.850	N/A	1	1 set	Aluminum	-	Bird screen 25 mm x 25 mm mesh
Mixed Liquor Channel Outlet	SL-R130D	1-0102-PPID-R107	B	2500	231.038	234.400	232.850	2.5	1	1 set	Aluminum	-	
Scum Gate to WAS Sump	SL-R130E	1-0102-PPID-R107	A	900	232.000	233.527	232.850	1.5	1	1 set	Aluminum	-	
RAS Channel Upstream Gate LV-R1801-1	SL-R180A	1-0102-PPID-R108	A	750	233.600	235.400		1.8	1	1 set	Aluminum	-	
RAS Channel Upstream Gate LV-R1801-2	SL-R180B	1-0102-PPID-R108	A	750	233.600	235.400		1.8	1	1 set	Aluminum	-	
AREA S - SECONDARY CLARIFIERS													
Clarifier 4 ML Inlet	SL-S100S	1-0102-PPID-S101	B	1700	231.039	233.470	232.850	1.9	1	1 set	Aluminum	-	With surface mount bottom
Clarifier 5 ML Inlet	SL-S100N	1-0102-PPID-S101	B	1700	231.039	233.470	232.850	1.9	1	1 set	Aluminum	-	With surface mount bottom
Mixed Liquor Channel	SL-S100O	1-0102-PPID-S101	B	1382	231.039	233.470	232.850	1.9	1	1 set	Aluminum	-	With surface mount bottom
Mixed Liquor Channel	SL-S100P	1-0102-PPID-S101	B	1700	231.039	233.470	232.850	1.9	1	1 set	Aluminum	-	With surface mount bottom
Mixed Liquor Channel	SL-S100R	1-0102-PPID-S101	B	1382	231.039	233.470	232.850	1.9	1	1 set	Aluminum	-	With surface mount bottom
AREA U - UV DISINFECTION BUILDING													
Outfall Chamber	SL-U190	1-0102-PPID-S101		1800	227.800	232.850		4.1	1	1 set	Aluminum	-	Existing guides to be reused. Contractor to review existing stop log and take field measurements prior to shop drawings preparation.
AREA K - HIGH RATE CLARIFIERS													

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Stop Log Schedule

Location / Description	Tag Number	P&ID Number	Frame Mounting Style [Note 1]	Channel Width (mm)	Channel Invert Elevation (m)	Top of Channel Elevation (m)	High Water Elevation (m)	Design Seating Head (m)	Number of Frames Required	Number of Stop Logs Required [Note 2, 3]	Stop Log Material	Number of Lifting Devices Required	Remarks
HRC Influent Channel 1 Inlet	SL-G362A	1-0102-PPID-K101	B	1400	232.300	235.306	234.110	2.3	1	1 set	Aluminum	1	
HRC Influent Channel 2 Inlet	SL-G363A	1-0102-PPID-K101	B	1400	232.300	235.306	234.110	2.3	1	1 set	Aluminum	-	
HRC Effluent Channel 1 Outlet	SL-K151A	1-0102-PPID-K106	B	1200	232.106	234.392	233.360	1.8	1	1 set	Aluminum	1	
HRC Effluent Channel 2 Outlet	SL-K151B	1-0102-PPID-K106	B	1200	232.106	234.392	233.360	1.8	1	1 set	Aluminum	-	
HRC Effluent Channel Isolation	SL-K151C	1-0102-PPID-K106	B	3000	232.106	234.392	233.360	1.8	1	1 set	Stainless steel	1	

Notes:

1. Frame Mounting Style:
   A = Surface mounted on concrete wall
   B = Channel mounted with concrete-embedded frame and flush bottom
   C = Channel mounted with surface-mounted frame
2. Provide sufficient number of stop logs for full height of channel from channel invert to top of channel elevations indicated.
3. Height of stop logs shall be determined by manufacturer such that the weight of each individual log does not exceed 45 kg.
4. Manufacturer to confirm dimensions with Contractor prior to fabrication.