SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. This section outlines in general the work to be done under the Contract at the South End Sewage Treatment Plant (SEWPCC).

B. Recognize that the Work is an upgrade and expansion of an existing wastewater treatment plant that must be kept in continuous uninterrupted operation. Plan and schedule the Work consistent with specified operational constraints and with the objective of uninterrupted operation of the existing plant.

C. Construct and test foundations, structures, roads, ducts, pipelines, buildings, tanks, equipment and other facilities shown on the Contract Drawings and specified herein.

D. Supervise, organize, coordinate and direct construction operations of Subcontractors, Standardization Vendors, System Integrator, Supply Contractors, Manufacturers, and suppliers.

E. Supply, install, and put in continuous successful operation of equipment and appurtenances specified herein. Include training, commissioning, and operating assistance to the City as described herein.

F. In addition to constructing the works shown on the Drawings, design, construct, and maintain, unless otherwise specified or shown on the Drawings, temporary works and facilities required for the construction of the works. Remove temporary works and facilities when construction is completed unless directed otherwise. Temporary works and facilities include, but are not limited to the following:

1. Excavation dewatering systems
2. All security fencing whether permanent or temporary
3. Sheeting and shoring systems for excavations whether part or all is left in place or not.
4. Construction roads, bridges, ramps, accesses, and similar items
5. Formwork for concrete
6. Falsework and bracing for formwork or for other parts of the works while under construction
7. Bracing and shoring for partially completed masonry, steelwork, precast concrete, or other assembly
8. Scaffolding
9. Process bypass installation
10. Channel bulkheads
11. Electrical, instrumentation, and water services

12. Snow removal
13. Blind flanges, valves, plugs necessary for conducting leak testing of tanks and piping.
14. Temporary Contractor trailers, including servicing (sewer, water, power, communications)
15. Temporary vehicular access and parking development, maintenance, and restoration
16. Traffic control and signs
17. Erosion control measures
18. Ramps and railings for access to facility exit doors impacted by the Work as shown on the Drawings and as otherwise required for safe access and egress to and from the facility.
19. Temporary covers for roof and floor openings in the areas of the Work to address safety hazards and water ingress. Supply and install temporary barriers and signage as required.
20. Interim handling of screenings and grit during Grit Building construction and during replacement of the existing bar screens.
21. Temporary RAS pumping, piping and valves during Secondary Clarifier and Bioreactor tie-ins and changeover.
22. Temporary sludge screening, storage, pumping and piping of biomass for seeding of Bioreactors. The biomass for the seeding will be supplied and delivered by the City from the West End Sewage Treatment Plant (WEWPCC) by hauling truck.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The completed Work will provide the City with an upgraded and expanded SEWPCC designed to meet the operating and effluent limits outlined in Environment Act License 2716 RR dated April 18, 2012, as well as accommodating year 2031 forecasted influent flows and loads. Work consists of an expansion of the existing facility from its present capacity of 278.5 ML/d to 420 ML/d. The Work includes all remaining civil, substructures, superstructures, architecture, mechanical equipment, process equipment, valves and piping, electrical and controls work required to complete the SEWPCC Upgrades.

B. The Work includes, but is not limited to the following and shall be read in conjunction with the Drawings and Specifications:
   1. Facility Area A – General
      a. Supply and installation of bypass concrete chambers
      b. Modifications to existing outfall pipe manholes
      c. Supply and installation of effluent monitoring station upgrades
   2. Facility Area B – Service Building
      a. Supply and installation of all demolition and upgrades within the existing Service Building as shown on the Drawings and Specifications. Demolition includes, but is not limited to the removal of the existing 85kW generator and ancillary equipment.
      b. Upgrades to existing 1000 kW natural gas generator, transfer switch, and controls.
      c. Upgrade existing distributed control system (DCS) to PLC based system (DCS migration)
   3. Facility Area C – Chemical / Electrical Building
      a. Excavation as necessary for the construction of the Electrical and Chemical Building and in areas to accommodate drain pipe, process pipe, bedding, and void form.
      b. Supply and install Electrical and Chemical Building concrete structures. Cut existing piles as necessary to accommodate construction.

   c. Supply and install new chemical dosing equipment for the preparation and feed of chemicals for the high rate clarification (HRC), biological nutrient removal (BNR) and thickening processes.
   d. Supply and install all mechanical, electrical, instrumentation and control equipment, and building finishes as specified on the Drawings and Specifications.
   e. Re-feed the existing main switchgear (SGR-C701 and SGR-C702) in the Secondary Clarifier main electrical room.
   f. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC) systems as well as plumbing and drainage systems.
   g. Supply and installation of diesel standby generators
   h. Supply and install Systems Integration Work
4. Facility Area D – Fermenters / Sludge Thickeners
   a. Convert two existing high purity oxygen (HPO) reactor trains to fermenters for primary sludge fermentation.
   b. Supply and install Rotary Drum Thickeners (RDT) for fermented primary sludge, HRC sludge and waste activated sludge (WAS) thickening.
   c. Supply and install filtrate handling facilities to return primary and HRC sludge filtrate to the BNR anaerobic basins and return filtrate from WAS thickening to the headworks.
   d. Supply and install new primary sludge pumps & motors to replace existing.
   e. Supply and install new sludge transfer pumps to replace existing.
   f. Supply and install new microwave sludge density meter to replace existing primary sludge nuclear density meter
   g. Supply and installation of all building and process mechanical equipment, piping, and valves as shown on the Drawings and Specifications.
   h. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
   i. Supply and Installation of all electrical, instrumentation and control systems as shown on the Drawings and Specifications
   j. Supply and install Systems Integration Work
   k. Asbestos abatement as shown on the Drawings and Specifications
5. Facility Area G – Headworks
   a. Excavation, shoring, and backfilling as necessary for the construction of the Grit and Screenings Building and in areas to accommodate drain pipe, process pipe, bedding, and void form.
   b. Supply and install precast concrete piles in the Grit and Screenings Building areas.
   c. Supply and install Grit and Screenings Building concrete structures.
   d. Replace one 80 ML/d raw sewage pump with a new larger 124 ML/d raw sewage pump complete with VFD.
   e. Replace associated pump suction and discharge piping, valving, and flowmeter.
   f. Replace existing 750 mm embed in the wet well wall with a 900 mm embed.
   g. Remove existing bar screens and supply and install four fine screens with 6 mm two-dimensional openings.
   h. Construct a new screen bypass channel adjacent to screen #1.
   i. Supply and install screening conveyance, washing and compaction.
   j. Construct new Grit & Screenings building and associated appurtenances.
   k. Modify existing grit influent channel

l. Supply and install two new vortex grit removal units to handle flows up to 220 ML/d.
m. Supply and install new grit handling and conveyance equipment.
n. Supply and install new grit blowers and channel aeration blowers.
o. Supply and install mechanical and electrical equipment to facilitate the construction of the grit and screenings building and the replacement of the existing screens as shown on the Drawings and Specifications
p. Supply and installation of all building and process mechanical equipment, piping, and valves as shown on the Drawings and Specifications.
q. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
r. Supply and installation of all electrical, instrumentation and control systems as shown on the Drawings and Specifications.
s. Revise/modify electrical equipment within the existing Grit Building electrical room G116 to accommodate new or modified equipment.
t. Upgrade existing distributed control system (DCS) to PLC based system (DCS migration)
u. Supply and install Systems Integration Work
v. Asbestos abatement as shown on the Drawings and Specifications

6. Facility Area K – High Rate Clarification Building
   a. Delivery receipt, possession, unloading, care and custody in accordance with the Supply Contractor's instructions of the City Supplied Equipment.
   b. Install new City Supplied Equipment in accordance with the Supply Contractor's installation instructions. City Supplied Equipment includes: High Rate Clarification Equipment (Bid Opportunity 873-2013)
   c. Supply and install all mechanical, electrical, instrumentation and control equipment, and building finishes shown on the Drawings and Specifications.
   d. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
   e. Supply and Installation of all electrical, instrumentation and control systems as shown on the Drawings and Specifications.
   f. Supply and install Systems Integration Work.
7. Facility Area M – Administration Building
   a. Supply and installation of a plant wide control/administration fibre network as shown on the Drawings and Specifications
   b. Supply and installation of Human Machine Interface (HMI) systems as shown on the Drawings and Specifications
   c. Modifications to existing Administration Building including reconfiguring Control Room / Server Rooms as shown on the Drawings and Specifications.
   d. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
   e. Upgrade existing distributed control system (DCS) to PLC based system (DCS migration)
   f. Modify and expand the existing intercom systems. Run new cabling in conduit from the head-end equipment located in the Administration Building, to all the new Facility Areas.
   g. Expand and modify the intercom head-end equipment located in the Administration Building electrical room.

   h. Supply and install Systems Integration Work
   i. Asbestos abatement as shown on the Drawings and Specifications
8. Facility Area P – Primary Clarifiers
   a. Supply and installation of all building and process mechanical equipment, piping and valves as shown on the Drawings and Specifications.
   b. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
   c. Supply and installation of all electrical, instrumentation and control systems as shown on the Drawings and Specifications.
   d. Upgrade existing distributed control system (DCS) to PLC based system (DCS migration).
   e. Supply and install Systems Integration Work.
   f. Asbestos abatement as shown on the Drawings and Specifications.
9. Facility Area R – Bioreactors and Blower Building
   a. Delivery receipt, possession, unloading, care and custody in accordance with the Supply Contractor's instructions of the City Supplied Equipment.
   b. Installation of City Supplied Equipment in accordance with the Supply Contractor's installation instructions. City Supplied Equipment includes: IFAS Equipment (Bid Opportunity 871-2013)
   c. Supply and installation of all building and process mechanical equipment, piping, and valves not supplied by the City as shown on the Drawings and Specifications.
   d. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
   e. Supply and install blowers, mixers, pumps, and piping for the aeration tanks and as shown on the Drawings and Specifications.
   f. Supply and installation of all electrical, instrumentation and control systems as shown on the Drawings and Specifications.
   g. Supply and install Systems Integration Work.
   h. Supply and install all mechanical, electrical, instrumentation and control equipment, and building finishes shown on the Drawings and Specifications.
10. Facility Area S – Secondary Clarifiers
   a. Supply and install new clarification equipment into Secondary Clarifiers 4 and 5.
   b. Supply and install new clarification equipment in existing Secondary Clarifiers 1 and 2.
   c. Supply and install all mechanical, electrical, instrumentation and control equipment, and building finishes shown on the Drawings and Specifications.
   d. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
   e. Supply and installation of all electrical, instrumentation and control systems as shown on the Drawings and Specifications.
   f. Upgrade existing distributed control system (DCS) to PLC based system (DCS migration).
   g. Supply and install Systems Integration Work.
   h. Asbestos abatement as shown on the Drawings and Specifications.
11. Facility Area T – Biofilter / Odour Control
   a. Supply and install a three-cell engineered media biofilter for odour control in one cell of the High Purity Oxygen (HPO) reactors to facilitate a biofilter as shown on the Drawings and Specifications.

b. Supply and installation of all building and process mechanical equipment, piping, and valves as shown on the Drawings and Specifications.
c. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
d. Supply and installation of all electrical, instrumentation and control systems as shown on the Drawings and Specifications.
e. Supply and install Systems Integration Work.
f. Asbestos abatement as shown on the Drawings and Specifications.

12. Facility Area U – UV Disinfection Building
    a. Supply and install new Ultraviolet (UV) disinfection system.
    b. Modify existing UV facility to accommodate new UV equipment as shown on the Drawings and Specifications.
    c. Supply and installation of all building and process mechanical equipment, piping, and valves as shown on the Drawings and Specifications.
    d. Supply and install building mechanical upgrades as indicated, including new and upgraded heating, ventilating, and air conditioning (HVAC).
    e. Supply and installation of all electrical, instrumentation and control systems as shown on the Drawings and Specifications.
    f. Modify existing UV electrical room to accommodate the electrical equipment.
    g. Disconnect and remove power supply from the UV building to the outfall building, and supply and install new power cabling via new route as shown on the Drawings and Specifications.
    h. Supply and install new UV electrical service and transformer ground grid.
    i. Supply and install Systems Integration Work.
    j. Asbestos abatement as shown on the Drawings and Specifications.
13. Facility Area Y – Yard / Electrical Substation
    a. Excavation and shoring as necessary for the 66kV Substation, site wide concrete duct banks, electrical power cable bus, by-pass chambers, and watermains, as shown on the Drawings and Specifications.
    b. Supply and installation of 66kV substation and exterior loadbank with fully redundant transformations to the 12.47 kV distribution voltage as shown on the Drawings and Specifications
    c. Disconnect and remove existing 12.47 kV Manitoba Hydro electrical service, and associated metering. Assist Manitoba Hydro in abandoning 12.47 kV Manitoba Hydro supply feeders.
    d. Supply and installation of a new 12.47kV electrical service and distribution system to each Facility Area.
    e. Supply and installation of concrete duct banks to convey power and communication feeders to new and existing plant areas from the new Electrical Building as shown on the Drawings and Specifications.
    f. Supply and installation of all yard piping and valves as shown on the Drawings and Specifications
    g. Supply and installation of all yard lighting, electrified parking stalls, electrical, instrumentation and control systems as shown on the Drawings and Specifications
    h. Supply and installation of backfilling, final grading, and landscaping as shown on the Drawings and Specifications.
    i. Supply and install final Site fencing including manual and motorized gates.

j. Supply and installation of asphalt and concrete paving as shown on the Drawings and Specifications.

14. SEWPCC Facility
    a. Supply and installation of PCS Demonstration System.
    b. Supply and installation of Standardized Goods.
    c. Water tightness testing of water containing structures, tanks, pipes installed under this contract.
    d. Cleaning of all piping, and equipment installed under this Contract, including piping and equipment that is supplied with City Supplied Equipment, in accordance with the technical specifications and in accordance with Supply Contactor's instructions. This includes on-site pickling and passivation.
    e. Supply and install all weldolets, threadolets, or other hardware required to mount I&C equipment to piping systems and supply and install all isolation valves required to isolate I&C equipment.
    f. Supply and installation of all pipe coatings, bandings, and touch up of all coatings on piping and equipment installed by the Contractor prior to Total Performance including touch up coatings for City Supplied Equipment using coatings supplied by the Supply Contractor.
    g. Supply and installation of instrument air piping, power, instrumentation and control wiring (regardless of voltage) to all equipment supplied pursuant to any Division of the Specifications and for all City Supplied Equipment, unless otherwise specified.
    h. Termination of all wiring and instrument air tubing, performing all loop checks and the calibration of all process instrumentation and controls, regardless of voltage and regardless of whether the equipment is City Supplied Equipment.
    i. For City Supplied Equipment and packaged Subcontractor control systems, supply and install all disconnects, standalone motor starters, power and control wiring identified as "field wiring" (or similar wording) on the Supply Contractor's Shop Drawings as not being supplied and installed by the Supply Contractor.
    j. Supply and install all VFDs, starters mounted in MCCs and standalone motor starters and disconnect switches as specified and shown on the Drawings.
    k. Supply and install all lighting, emergency lighting, fire alarm and detection systems, communication systems, and ancillary systems as specified and as shown on the Drawings.
    l. Replace all existing exit signs within the SEWPCC Facility. Provide new running man style exit signs to match exit signage in new Facility Areas.
    m. Replace existing exterior lights with new LED fixtures.
    n. Supply and install all metal platforms, steel stairs, pipe supports, monorails and cranes as specified and shown on the Drawings.
    o. All existing tagged equipment within the facility shall be re-identified to the new tag numbers shown on the drawings, and to conform to the City's WWD Identification Standard document.
    p. Re-identify the existing instruments listed in A-0102-AELI-A012 – Existing Instruments to Re-Identify.
    q. Re-identify existing electrical and automation equipment as shown on the Drawings.
    r. Re-identify existing process and mechanical equipment as shown on the Drawings.
    s. For all equipment to be re-identified, remove the existing identifier label and replace with a new identifier label. For equipment fed from an MCC, replace identifier on MCC as well as field tag. The new label shall be of the same type as the existing

(e.g. lamacoid, metal), and shall contain the new tag number, as well as the same additional information as on the existing label (e.g., voltage, phase, power, panel number).

t. Location plan drawings of the existing facilities are included for reference. However, the information on these drawings has not been site verified and may not show the actual site conditions. The Contractor shall coordinate the work with the Contract Administrator and City personnel to locate all existing equipment to be re-identified.

u. Replace the pilot lights on existing Automation Panels and MCCs to conform to the City's Automation Design Guide 612620-0013-40ER-0001 colour scheme.
   1) Replace all existing red "Running" lights with green lights
   2) Replace all existing green "Stopped" lights with blue lights
   3) Replace all existing red "Position Open" lights with green lights
   4) Replace all existing green "Position Closed" lights with blue lights

v. Automation Panels and MCCs to include, but not be limited to:
   1) MCP-1, FDP-B, FDP-G, FDP-P, FDP-S, Sump Pump Motor Starter Panels, Primary Clarifier Travelling Bridge Control Panels, and SCP-6
   2) MCC-2B, MCC-M, MCC-1G, MCC-2G, MCC-3G, MCC-4G, MCC-1P, MCC-2P, MCC-1S, and MCC-2S

w. Supply and install grounding systems for the entire Facility.

x. Supply and install plant wide lightning protection for new and existing buildings. Lightning protection terminals are as shown on the drawings. The UV building, and the Secondary Clarifiers do not require lightning terminals.
   1) Bond structural steel members to the ground system for the Secondary Clarifier 4 & 5 tanks, and the Bioreactors.
   2) Bond fencing to the ground system as indicated on the drawings.

y. Supply and install fibre optic cabling and associated network equipment, new PLC based Process Control System (PCS) for the SEWPCC Facility.

z. Replace the existing Infi90 Distributed Control System (DCS) with a new PLC-based PCS. Migrate controls and monitoring of existing equipment and connect new equipment to the new PLC-based PCS (DCS migration).

aa. Supply and install heating and hording as necessary in performing the Work, including frost removal at locations requiring localized excavation and or concrete work.

bb. Provide survey layout of the Work and periodic survey monitoring of existing shoring and structures for movement.

cc. Provide miscellaneous road maintenance during the performance of the work to maintain 24/7 access for operations staff and sludge haul trucks and leaving these roads in as good a condition as they were prior to Site work.

dd. Submittal of all documentation including Shop Drawings, as-constructed Drawings complete with survey in UTM (Northing, Easting, Elevation) coordinates, manuals, and other specific documentation as detailed by the Contract documents and required by the Contract Administrator.

ee. Coordinate construction activities and process tie-in work with the Contract Administrator and the City

ff. Maintain existing shoring systems and removal of shoring to facilitate construction

gg. Site dewatering and ground water depressurization.

hh. Environmental Protection during construction period

ii. Supply and install all chemicals, lubricants, and fuel for the first fill to facilitate the Functional, Demonstration tests, and Overall Facility Performance tests.
jj. Provide Demonstration Testing, Functional Testing, Performance Testing, Performance Verification for all equipment supplied and installed under this Contract.
kk. Provide Overall Facility Performance Verification as described in the Drawings and Specifications.
ll. Warranty as specified.

1.3 WORK NOT COVERED BY CONTRACT DOCUMENTS

A. Unless otherwise indicated, the following work is provided under separate contract, and does not constitute a part of the Work. Refer to Drawings for additional details.
1. High Rate Clarifier (HRC) concrete structure
2. Precast hollowcore and double ‘T’ HRC roof.
3. Vortex Grit Removal concrete structure
4. Vortex Grit Removal roof system
5. HRC Inlet Channel concrete structure
6. Bioreactors concrete structures.
7. Blower Building concrete structure.
8. Secondary Clarifiers concrete structure.
9. Concrete By-pass pipe
10. Demolition of existing Primary Clarifier stairwell, existing electrical, and associated pipe and ductwork
11. Re-routing of existing pipe and ductwork located in the Primary Clarifier stairwell enclosure
12. New Primary Clarifier stairwell, including electrical wiring and lighting
13. Installation of HRC bridge, and HRC Bridge grating and handrails
14. Backfill and rough grading for the High Rate Clarifier, Vortex Grit Removal area, Secondary Clarifiers 4 & 5, Bioreactors, and Blower Building.
15. Precast double ‘T’ Blower Building roof.
16. Piping embeds and all concrete openings in the HRC, Vortex Grit Removal, Bioreactor, Blower Building, and Secondary Clarifier concrete structures as shown on the drawings
17. Concrete encased piping in the HRC, Vortex Grit Removal, Bioreactor, Blower Building, and Secondary Clarifier concrete structures.
18. Water leak testing and backfill of structures provided under separate contract, including Bioreactors, Blower building, Secondary Clarifiers, by-pass and chambers and other miscellaneous water retaining tanks and channels.
19. City Supplied Equipment.

1.4 CITY SUPPLIED EQUIPMENT

A. Refer to Section 01 64 00, City-Supplied Equipment.

1.5 EQUIPMENT, MATERIAL, AND SERVICES PROVIDED BY THE CITY

A. The Contract documents allow for an area on-site for the Contractor's use. The boundary limits must be strictly adhered to in order to minimize the impact to the natural conditions. If additional space is required, obtain agreement in writing from the Contract Administrator.

B. The supply and cost of electricity, telephone, internet, gas, or other utilities, whether temporary or permanent, used for heating, lighting, power tools, testing, or other construction related purposes, fencing, security, and conveniences, will be the responsibility of the Contractor. No electrical connections will be provided by the City.

C. When required written notice is given, the City will take equipment out of service and isolate pipelines. A minimum of fourteen (14) Calendar Days notice shall be provided by the Contractor unless otherwise noted in the Specifications. Additional notice time may be required depending on the extent of service disruption.

D. Draining and flushing of pipelines, channels, and tanks before removal, modification or making connections is the Contractor's responsibility. The Contractor shall be responsible for the removal of deposited materials and cleaning as required to perform the Work.

1.6 CONTRACT DRAWINGS

A. The Drawings are prepared in SI metric units.

B. The Contract Drawings have been divided by process area, and into General, Demolition, Civil, Structural, Architectural, Process Mechanical, Plumbing, Electrical, and Automation, and laid out in ascending numerical order by facility. Read the Drawings as a whole, since details applicable to one section may appear on the Drawings of another section or sections.

C. Dimensions and locations of equipment and infrastructure (whether new or existing) shown on the Drawings shall be confirmed in the field by the Contractor prior to construction, as required.

D. Contract Drawings give general location of piping routes, ductwork routes, cable tray and raceway routes, and equipment. Except where specific dimensions are indicated, locate piping, ductwork, cable tray and raceway, and equipment to limit interference with existing equipment not to be removed, pedestrian access, crane routes, and required headroom.

E. The interfaces between the proposed infrastructure shown on the drawings and the existing structures are approximate. The contractor shall confirm existing site conditions and all points of interface and make adjustments as necessary to suit the requirements identified on each drawing(s).

F. Refer to Structural and Architectural Drawings for dimensions and details which are not indicated on Process, Mechanical, Building Mechanical, Electrical, or Instrumentation and Control Drawings.

G. Additional drawings showing details in accordance with which the Work is to be constructed may be supplied from time to time by the Contract Administrator. Such drawings are for the information of and assistance to the Contractor and will not become a basis for extra payment. The Contract Administrator may supply drawings covering additional work. These will be identified as additional work.

1.7 CONTRACT SPECIFICATIONS

A. The Contract Specifications are divided into divisions. Read the Specifications as a whole as details applicable to one division may appear in another division or divisions.

B. Coordinate and be responsible for the work, acts and, omissions done by Subcontractors.

1.8 WORK COMPLIANCE

A. Provide Work conforming to the lines, levels and grades specified or shown on the Contract Drawings.

B. Build Work in a thoroughly substantial and workmanlike manner, in accordance with the Contract Drawings and Specifications, subject to such modifications and additions as may be deemed necessary during its execution. In no case will payment be made for Work in excess of the requirements of the Drawings and Specifications, unless approved in writing by the Contract Administrator.

1.9 ENGINEER DESIGN

A. Where specifications require work to be designed by an engineer, engage an engineer licensed in the Province of Manitoba to design such work.

1.10 EXAMINATION OF EXISTING CONDITIONS

A. The Contractor's attention is directed to the difficulty of work involved in the running of piping and electrical raceway routes through the existing structures and plant. The contract documents indicate the extent of work. However, it is the Contractor's responsibility to examine on site during the time of tendering the proposed pipe and electrical routings to develop a full appreciation of the scope of work.

B. In most cases the Drawing do not specifically indicate the required cable route to be taken. It is the Contractor’s responsibility to determine the best route to feed the equipment, taking in to consideration: conflicts with other systems, cable tray requirements, cable ampacity and derating requirements, hazardous locations, voltage drop requirements, and any other relevant conditions that may affect the Work.

C. The routings are to be generally kept within existing tunnels and structures as far as practicable. The pipes and conduits are to be buried only in the absence of tunnel or building access to points shown on the drawings.

1.11 CITY’S STANDARD CONSTRUCTION SPECIFICATIONS AND DETAILS

A. City’s Standard Construction Specifications and Details referenced within the Contract Drawings and Specifications and those referenced therein form part of the Contract Documents.

B. The City’s Standard Construction Specifications and Details are available on The City’s Materials Management website at http://www.winnipeg.ca/matmgt/spec/default.stm.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 13

PROJECT COORDINATION

PART 1 GENERAL

1.1 RELATED WORK AT SITE

A. General:
   1. Other work that is either directly or indirectly related to scheduled performance of the Work under these Contract Documents, listed henceforth, is anticipated to be performed at Site by others.
   2. Coordinate the Work of these Contract Documents with work of others as specified in General Conditions.
   3. Include sequencing constraints specified herein as a part of progress schedule.

1.2 CITY SUPPLIED EQUIPMENT

A. Refer to Section 01 64 00, City Supplied Equipment.

1.3 UTILITY NOTIFICATION AND COORDINATION

A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during Work.
   1. Manitoba Hydro (electrical and natural gas):
   2. MTS (telephone):
   3. Contract Administrator
   4. South End Water Pollution Control Centre:
      a. Telephone: 204.986.6159

B. The Contractor shall plan and coordinate the Work knowing that Seniuk Road has spring road restrictions as defined by Manitoba Infrastructure and Transportation.

1.4 PROJECT MILESTONES

A. Section 01 52 10, Construction Sequencing as a part of the progress schedule required under Section 01 32 00, Construction Progress Documentation.

1.5 FACILITY OPERATIONS

A. Continuous performance and operation of the SEWPCC is of critical importance. Schedule and conduct activities to enable the SEWPCC to operate continuously, unless otherwise specified. In the event of conflict between construction activities and SEWPCC operations, SEWPCC operations have priority unless otherwise specified.

B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of SEWPCC operations. Continuous Work may require 24 hours per day,

7 days per week to complete the work within the specified time constraints. Coordinate with the Contract Administrator and City.

C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of the SEWPCC at no extra cost to The City.

D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization from the Contract Administrator. Such authorization will be considered within fourteen (14) days after receipt of Contractor's written request.

E. For construction constraints and sequence of construction, refer to Section 01 52 10, Construction Sequencing. Modifications to the Construction Sequencing is subject to the Contractor Administrator's approval.

F. Install and maintain temporary connections required to keep the SEWPCC operations on line. Sequences other than those specified will be considered upon written request to Contract Administrator, provided they afford equivalent continuity of operations.

G. Do not proceed with Work affecting the SEWPCC operation without obtaining Contract Administrator's advance approval of the need for and duration of such Work.

H. The Contractor shall respond to and correct within a 24-hour period any construction related items or issues that lead to unplanned operational constraints on the facility.

I. Relocation of Existing Facilities:
   1. During construction, it is expected that minor relocations of Work will be necessary.
   2. Provide complete relocation of existing structures and underground facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
   3. Use only new materials for relocated items. Match materials of existing items, unless otherwise shown or specified.
   4. Perform relocations to minimize downtime of existing facilities.
   5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Contract Administrator.

1.6 ADJACENT FACILITIES AND PROPERTIES

A. Examination:
   1. After effective date of the agreement and before Work at Site is started, Contractor, Contract Administrator, the City, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
   2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

B. Documentation:
   1. Record and submit documentation of observations made on examination inspections in accordance with paragraph 1.7 CONSTRUCTION PHOTOGRAPHS.
   2. Upon receipt, Contract Administrator will review, sign, and return one record copy of documentation to Contractor to be kept on file in field office.
   3. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and The City.

1.7 CONSTRUCTION PHOTOGRAPHS

A. The Contractor must photographically document all phases of the project including preconstruction, construction progress, and post-construction and submit photographs to the Contract Administrator.

B. Preconstruction and Post-construction:
   1. After effective date of the agreement and before Work at Site is started, and again upon issuance of Substantial Performance, take a minimum of 48 pictures of construction Site and property adjacent to perimeter of construction Site.
   2. Particular emphasis shall be directed to structures both inside and outside the Site.
   3. Format: Digital, minimum resolution of 1152 by 864 pixels and 24 bit.

C. Digital Images:
   1. Archive using a commercially available photograph management system.
   2. Label each storage media with Project and The City's name, and week and year images were produced.

1.8 AUDIO-VIDEO RECORDINGS

A. Prior to beginning Work on existing facilities and structures, and again within 10 days following date of Substantial Performance, record video of the existing facilities and structures.

B. In the case of preconstruction recording, no Work shall begin in the area prior to Contract Administrator's review and approval of content and quality of video for that area.

C. Particular emphasis shall be directed to physical condition of existing structures, concrete and pipework within pipeline or structure alignment.

D. Contract Administrator shall have right to select subject matter and vantage point from which videos are to be taken.

E. Videotaping shall be by a professional commercial videographer, experienced in shooting exterior and interior construction videos, in both good and inclement weather.

F. Video Format and Quality:
   1. Digital (MPEg-4), with sound.
   2. Video:
      a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.
      b. Electronically, and accurately display the month, day, year, and time of day of the recording.
   3. Audio:
      a. Audio documentation shall be done clearly, precisely, and at a moderate pace.
      b. Indicate date, Project name, and a brief description of the location of taping, including:
         1) Facility name;
         2) Process Area and Structure
         3) Direction of coverage, including engineering stationing, if applicable.

G. Documentation:
   1. Digital Video Disc (DVD) Label:
      a. Tape number (numbered sequentially, beginning with 001).
      b. Project Name.
         1) Facility name;
         2) Process Area and Structure
      c. Date and time of coverage.
   2. Project Video Log: Maintain an ongoing log that incorporates above noted label information for videotapes on Project.

1.9 REFERENCE POINTS AND SURVEYS

A. Existing base horizontal and vertical control points are designated on Drawings.

B. Locate, confirm, and protect control points. Preserve permanent reference points during construction.

C. Make no changes or relocations without prior written notice to the Contract Administrator.

D. Report to the Contract Administrator when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

E. Require Manitoba Land Surveyor to replace control points in accordance with the original survey control.

F. Contractor’s Responsibilities:
   1. Provide additional survey and layout required to layout the Work.
   2. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
   3. The Contractor shall review the current installations provided by others as it relates to the Work. Present any conflicts/interferences between the conditions shown on the Drawings and the existing structures to the Contract Administrator for resolution.
   4. Establish lines and levels; locate and lay out by instrumentation (GPS, Total Station, etc.)
   5. Stake for excavation, grading, and backfill.

6. Establish pipe invert and centerline elevations.
7. In event of discrepancy in data shown on the Drawings, request clarification before proceeding with the Work.
8. Maintain complete accurate log of survey Work as it progresses as a record document.
9. On request of Contract Administrator, submit documentation.
10. Provide competent employee(s), tools, total station equipment, stakes, and other equipment and materials to:
    a. Establish control points, lines, and easement boundaries.
    b. Check layout, survey, and measurement of Work.
    c. Measure quantities for payment purposes.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 SALVAGE OF MATERIALS

A. Materials to be salvaged include:
    1. Tyndal Stone
    2. 85kW generator
    3. UV equipment (ballast, controls)
    4. DCS modules, module mounting units and decommissioned termination units as indicated on the Drawings
    5. Liquid oxygen tank and controls is the property of Praxair. Coordinate the removal of equipment with Praxair. Buried piping and electrical shall be abandoned and noted as such on the as-built drawings.
    6. Main raw sewage G102-JT power consumption to DCS
    7. Main raw sewage G102-PSL seal water low pressure switch
    8. Main raw sewage G122-XV west well suction valve
    9. Main raw sewage G102-RSP magnetic flowmeter G112-FIT
    10. Main raw sewage G102-RSP motor
    11. Main raw sewage G102-RSP pump
    12. Main raw sewage G102-RSP variable speed drive ABB
    13. Main raw sewage G102-XSH2 pump vibration transmitter
    14. Primary sludge transfer P108-FIT magnetic flow transmitter
    15. Reactor 1 PE P401-ZIT valve position transmitter
    16. Reactor 1 PE P401-ZY valve positioner
    17. Reactor 1 PE P403-FIT flow transmitter
    18. Reactor 1 RAS S121-ZIT feed valve position transmitter
    19. Reactor 1 RAS S121-ZY feed valve positioner
    20. Reactor 1 RAS S125-FIT flow transmitter
    21. Reactor 2 PE P404-FIT flow transmitter
    22. Reactor 2 RAS S126-FIT flow transmitter
    23. Reactor 3 PE P409-FIT flow transmitter
    24. Reactor 3 RAS S127-FIT flow transmitter
    25. Reactor 4 PE P410-FIT flow transmitter

26. Reactor 4 RAS S128-FIT flow transmitter
27. Primary effluent P537-AK reactor 4 PE sampler & control station
28. Secondary clarifier final effluent S531-AK ASP sampler & control station
29. Secondary clarifier RAS header NaOCl chemical feed metering pump
30. Secondary clarifier 1 & 2 polymer chemical feed metering pump
31. Secondary clarifier 3 polymer chemical feed metering pump
32. Secondary clarifiers #1 and #2 scraper bridges.

B. Salvage materials for the City's use.
   1. Remove material with extreme care so as not to damage for future use.
   2. Promptly remove from Work area salvaged materials.
   3. Store materials where instructed by the Contract Administrator onsite.

C. Meet with Contract Administrator and the City prior to starting to dismantle equipment or piping designated to be salvaged. Contract Administrator will indicate locations where equipment is to be disconnected.

D. Provide new or repair equipment or material specified or indicated to be salvaged if damaged by the Contractor. Clean and protect equipment from dust, dirt, natural elements, and store as directed.

3.2 CUTTING, FITTING, AND PATCHING

A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.

B. Contractor shall provide a coring plan for all conduit and piping passing through existing walls. Coring shall be considered incidental to the work.

C. Obtain prior written authorization of Contract Administrator before commencing Work to cut or otherwise alter:
   1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
   2. Weather- or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   4. Work of others.

D. Restore existing work, underground utilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown.

E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.

F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 GENERAL

1.1 GENERAL

A. Contract Administrator will schedule meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 Business Days after each meeting to participants and parties affected by meeting decisions.

B. The location of the meeting shall be at the South End Water Pollution Control Centre (SEWPCC).

1.2 PRECONSTRUCTION MEETING

A. Contractor shall be prepared to discuss the following subjects, as a minimum:
1. Preliminary Baseline Schedule
2. Status of Bonds and insurance.
3. Sequencing of critical path work items.
4. Requirements of winter work and shutdown durations
5. Coordination requirements with the work performed by others.
6. Progress payment procedures.
7. Project changes and clarification procedures.
8. Requirements for use of Site, access, Site signs, office and storage areas, security, utilities, hoarding and temporary facilities.
9. Major product delivery and priorities.
10. Contractor’s safety plan and representative.
11. Contractor’s environmental management plan
12. Required Submittals.
13. Quality Control Plan.
14. Permits obtained by the City.
15. Permits obtained by the Contractor.

B. The Preconstruction Meeting shall take place no later than ten (10) Business Days after the issuance of the letter of intent and shall be held at the SEWPCC.

C. Attendees will include:
1. City’s representatives.
2. Contractor’s office representative.
3. Contractor’s resident superintendent.
4. Contractor’s quality control representative.
5. Contractor’s safety representative.
6. Subcontractors’ representatives whom Contractor may desire or Contract Administrator may request to attend.

7. Contract Administrator's representatives.
8. Others as appropriate.

1.3 PROGRESS MEETINGS

A. Contract Administrator will schedule regular progress meetings at Site, conducted weekly to review the following:
   1. Health and safety issues
   2. Review of any comments on the previous meeting summaries,
   3. Review of the progress of the Work including comments regarding the Baseline and Current schedule
   4. Schedule and status of Shop Drawing and Sample submittals
   5. Status of Contractor-issued requests for information
   6. Status of Contract Administrator-issued requests for quotation
   7. Status of change orders
   8. Status of Contractor claims
   9. Status of Payment Certificates
   10. Other matters needing discussion and resolution

B. Attendees will include:
   1. City's representative.
   2. Contractor, Subcontractors, and suppliers, as appropriate.
   3. Contract Administrator.
   4. Others as appropriate.

1.4 QUALITY CONTROL AND COORDINATION MEETINGS

A. Scheduled by Contract Administrator with the Progress Meetings and as necessary to review test and inspection reports, and other matters relating to quality control of the Work and work of other contractors.

B. Attendees will include:
   1. Contractor's Project Manager and Site Superintendent.
   2. Contractor's designated quality control representative.
   3. Subcontractors and suppliers, as necessary.
   4. Contract Administrator.

1.5 INSTRUMENTATION AND CONTROL SYSTEMS COORDINATION MEETINGS

A. Contract Administrator will schedule meetings at Site, conducted monthly and as required to review specific requirements of the instrumentation and control systems work.

B. Attendees will include:
   1. Contractor.
   2. Instrumentation and control systems sub-contractor(s)
   3. Systems Integrator
   4. City.
   5. Contract Administrator.

1.6 HEALTH AND SAFETY MEETINGS

A. Health and safety meeting shall be conducted with the Preconstruction Meeting and with subsequent Progress Meetings at the Site, to review health and safety on the Site.

B. Attendees will include:
   1. Contractor's Project Manager and Site Supervisor.
   2. Contractor's Health and Safety Manager.
   3. City's Representatives.
   4. Contract Administrator.

1.7 PREINSTALLATION MEETINGS

A. When required in individual Specification sections, convene at Site prior to commencing the Work of that section.

B. Require attendance of entities directly affecting, or affected by, the Work of that section.

C. Notify Contract Administrator 5 Business Days in advance of meeting date.

D. Provide suggested agenda to Contract Administrator to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

1.8 PRE-COMMISSIONING MEETINGS

A. The Contract Administrator will schedule monthly pre-Commissioning meetings beginning within one hundred and twenty (120) Calendar Days of Commissioning the Work or portions of the Work to review testing and Commissioning plans and schedules.

B. Attendees will include members of the Commissioning Team as defined in Section 01 91 14, Equipment Testing and Facility Startup.

1.9 COMMISSIONING MEETINGS

A. The Contract Administrator shall schedule Commissioning meetings as required prior to each Unit Process and Facility Area startup periods, which shall be attended by the Contractor. Prior to the meetings, the Commissioning Team, which includes the Contractor, shall develop and finalize a Unit Process or Facility Area startup plan(s) for incorporation into the Project Commissioning Plan as specified in Section 01 91 14, Equipment Testing and Facility Startup.

B. Agenda items shall include, but not be limited to, training requirements and plans, content and status of startup plans and the Project Commissioning Plan, coordination needed between various parties in attendance, and potential problems associated with startup.

C. Attendees will include:
   1. Contractor.
   2. Contractor's designated testing and startup representative.
   3. Subcontractors and equipment Manufacturer's Representatives whom Contractor deems to be directly involved in the startup.
   4. Supply Contractor, if required.
   5. Contract Administrator.
   6. City's operations personnel.
   7. Others as required by Contract Documents or as deemed necessary by the Commissioning Team.

1.10 OTHER MEETINGS

A. In accordance with Contract Documents and as may be required by Contract Administrator.

1.11 COORDINATION MEETINGS WITH OTHER CONTRACTORS

A. Scheduled by the Contract Administrator monthly or as necessary to review interfaces with the work of other contractors.

B. Attendees will include:
   1. Contractor's Project Manager and Site Superintendent.
   2. Subcontractors as necessary.
   3. Contract Administrator.
   4. Other contractor representatives.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 SUBMITTALS

A. Detailed Work Schedule:
   a. Submit detailed work schedule as per D20.

1.2 PRELIMINARY BASELINE SCHEDULE

A. In addition to the requirements outlined in D20, the Contractor shall prepare a preliminary Baseline Schedule for presentation and discussion at the Preconstruction Meeting. The preliminary Baseline Schedule shall depict the initial development of the Baseline Schedule and include critical work to illustrate the Contractor's understanding of the Work for discussion at the Preconstruction Meeting.

1.3 BASELINE AND CURRECT SCHEDULE

A. In addition to the requirements outlined in D20, the Contractor shall include the following in the Baseline Schedule and Current Schedule:
   1. Letter of Intent.
   2. Permits.
   3. Mobilization.
   4. Submittals, with review time. Contractor may use schedule of Shop Drawings and Samples specified in Section 01 33 00, Submittal Procedures
   5. Early procurement activities for long lead equipment and materials.
   6. Major equipment design, fabrication, factory testing, and delivery dates.
   7. Initial Site work, including equipment mobilization, material delivery, and Contractor trailer installation.
   8. Earthwork and pile installation.
   9. Specified Work sequences and construction constraints.
   10. Tie-in work with existing structures and facilities.
   11. City supplied equipment delivery dates or ranges of dates, as specified in Section 01 11 00, Summary of Work, and 01 64 00, City Supplied Equipment.
   12. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.
   13. Show complete interdependence and sequence of construction and work-related activities reasonably required to complete the Work.
   14. Identify the work of separate stages and other logically grouped activities, and clearly identify critical path of activities.
   15. Reflect sequences of the Work, restraints, delivery windows, review times, contract times and Critical Stages, Section 01 31 13, Project Coordination, Section 01 52 00, Construction Sequencing, Section 01 79 00, Demonstration and Training, and Section 01 91 14, Equipment Testing and Startup.

16. Project close-out summary.
17. Demobilization summary.

B. The Baseline and Current Schedule shall be a comprehensive computer-generated schedule using CPM, generally as outlined in Associated General Contractors of America (AGC) Publication No. 1107.1, "Construction Planning and Scheduling, latest edition. If a conflict occurs between the AGC publication and this specification, this specification shall govern.

C. Activity duration for Submittal review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from Contract Administrator.

D. Network Graphical Display:
1. Plot or print on paper not greater than 30 inches by 42 inches or smaller than 22 inches by 34 inches, unless otherwise approved.
2. Title Block: Show name of Project, The City, date submitted, revision or update number, and the name of the scheduler. Updated schedules shall indicate data date.
3. Identify horizontally across top of schedule the time frame by year, month, and day.
4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
5. Indicate the critical path.
6. Show, at a minimum, the controlling relationships between activities.
7. Plot activities on a time-scaled basis, with the length of each activity proportional to the current estimate of the duration.
8. Plot activities on an early start basis unless otherwise requested by Contract Administrator.
9. Provide a legend to describe standard and special symbols used.

E. Schedule Report:
1. On 8-1/2-inch by 11-inch white paper, unless otherwise approved.
2. List information for each activity in tabular format, including, at a minimum:
   a. Activity identification number.
   b. Activity description.
   c. Original duration.
   d. Remaining duration.
   e. Early start date (actual start on updated work schedules).
   f. Early finish date (actual finish on updated work schedules).
   g. Late start date.
   h. Late finish date.
   i. Total float.

F. Updated Current Schedule shall reflect:
1. Progress of Work to within 5 Business Days prior to submission.
2. Approved changes in Work scope and activities modified since submission.
3. Delays in submittals or resubmittals, deliveries, or Work.
4. Adjusted or modified sequences of Work.
5. Other identifiable changes.
6. Revised projections of progress and completion.
7. Report of changed logic.

G. Produce detailed sub-schedules during the Work, upon request of the Contract Administrator, to further define critical portions of the Work such as facility shutdowns.

H. If Contractor fails to complete activity by its latest scheduled completion date and this failure is anticipated to extend contract times, Contractor shall, within 7 Business Days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current work schedule. Actions by Contractor to complete the Work within contract times (or Critical Stages) will not be justification for adjustment to Contract Price or contract times.

I. The Contract Administrator may order Contractor to increase plant, equipment, labour force, or working hours if Contractor fails to:
   1. Complete a Critical Stage activity by its completion date.
   2. Satisfactorily execute Work as necessary to prevent delay to overall completion of the Work, at no additional cost to the City.

1.4 NARRATIVE PROGRESS REPORT

A. Format:
   1. Organize same as Current Schedule.
   2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.
   3. Provide narrative progress report monthly to Contract Administrator.

B. Contents:
   1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).
   2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.
   3. Contractor’s plan for management of Site (e.g., lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labour, and identification of potential Contract changes.
   4. Identification of new activities and sequences as a result of executed Contract changes.
   5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.
   6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.
   7. Changes to activity logic.
   8. Changes to the critical path.
   9. Identification of, and accompanying reason for, any activities added or deleted since the last report.
   10. Steps taken to recover the schedule from Contractor-caused delays.

1.5 SCHEDULE ACCEPTANCE

A. Contract Administrator's acceptance will demonstrate agreement that:
   1. Proposed schedule is accepted with respect to:
      a. Contract times, including completion and all Critical Stages are within the specified times.
      b. Specified Work sequences and constraints are shown as specified.
      c. Specified City Supplied Equipment or material arrival dates, or range of dates, are included.
      d. Access restrictions are accurately reflected.
      e. Functional, Demonstration, and Performance and testing times are as specified.
      f. Submittal review times are as specified.
   2. In all other respects, Contract Administrator's acceptance of Contractor's schedule indicates that, in Contract Administrator's judgement, schedule represents reasonable plan for constructing Work in accordance with the Contract Documents. Contract Administrator's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to Contract Administrator's attention in submittal. Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Work in accordance with the Contract Documents.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 DEFINITIONS

A. Submittal: Written and graphic information submitted by Contractor, that requires Contract Administrator's review. Submittals not meeting conditions of the Contract will be returned.

B. Shop Drawings: Custom drawings, product data, diagrams, illustrations, schedules, performance charts, brochures and other data, which are to be provided by the Contractor to illustrate details of a portion of the Work.

1.2 SUBMITTAL PROCEDURES

A. Direct submittals to the Contract Administrator.

B. The Contractor shall follow the City's procedures regarding submittals of electronic files in the City Document Management System (DMS), transmission of electronic submittals and identification of project specific documents and equipment at no cost to the City. Submittals shall follow the Winnipeg Sewage Treatment Program (WSTP) Project Document Numbering Standard. A copy of the numbering standard will be provided to the Contractor.

C. Electronic Submittals: Submittals made in electronic format shall be as follows:
   1. Each submittal shall be electronic file in Adobe Acrobat Portable Document Format (PDF), and native files (e.g. Word, Excel, AutoCAD, etc.). Use latest version available at time of execution of Agreement.
   2. Electronic files that contain more than 10 pages in PDF format shall contain internal book marking from index page to major sections of document.
   3. PDF files shall be set to open "Bookmarks and Page" view.
   4. Add general information to each PDF file, including title, subject, author, and keywords.
   5. PDF files shall be set up to print legibly at 8.5 inches by 11 inches, or 11 inches by 17 inches, or 22 inches by 34 inches. No other paper sizes will be accepted.
   6. Submit new electronic files for each resubmittal.
   7. Include copy of Transmittal of Contractor's Submittal form, located at end of section, with each electronic file.
   8. Contract Administrator will reject submittals that are not accompanied by an electronic copy.
   9. Provide authorization for Contract Administrator to reproduce and distribute each file as many times as necessary for Project documentation.
   10. Detailed procedures for handling electronic submittals will be discussed at Preconstruction Meeting.

D. Schedule of Submittals
   1. Prepare a table listing all anticipated submittals required to complete the Work and as required by D21.

2. For each specification section show, at a minimum, the following:
   a. Specification Section.
   b. Total Number of Submittals for each specification section.
   c. Identify each submittal by its submittal number in accordance with the numbering and tracking system as specified under Clause 1.2 E, Transmittal of Submittal.
   d. Identify each submittal by its name or title.
   e. Identify the estimated date of submission to the Contract Administrator.
   f. State the revision number and status for each submittal.
3. On a monthly basis, submit an updated Schedule of Submittals to the Contract Administrator if changes have occurred.

E. Transmittal of Submittal:
1. Contractor shall:
   a. Review each submittal and check for compliance with Contract prior to submission.
   b. Stamp each submittal with uniform approval stamp before submitting to Contract Administrator.
      1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with Contract.
      2) Contract Administrator will not review submittals that do not bear Contractor's approval stamp and will return them without action.
      3) Contract Administrator will not review submittals received directly from a Subcontractor and will return them without action.
2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form, attached at end of this section.
3. Identify each submittal with the following:
   a. Numbering and Tracking System:
      1) Sequentially number each submittal.
      2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
   b. Specification section and paragraph to which submittal applies.
   c. Project title and City Bid Opportunity number.
   d. Date of transmittal.
   e. Name of Contractor.
4. Identify and describe each deviation or variation from Contract.
5. Include Contractor's written response to each of Contract Administrator's review comments with resubmission of submittals stamped "Exceptions Noted, Resubmit".

F. Format:
1. Do not base Shop Drawings on reproductions of contract documents.
2. Package submittal information by individual Specification section. Do not combine different Specification sections together in submittal package, unless otherwise directed in Specification.
3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract.
4. Index with labeled tab dividers in orderly manner.

G. Timeliness:
   1. Schedule and submit in accordance with schedule of submittals, and requirements of individual Specification sections.
   2. Submit Shop Drawings and Samples well in advance of scheduled delivery date for associated equipment or material and in an orderly sequence so as to cause no delay in the Work.
   3. Failure to submit Shop Drawings and Samples in ample time is not to be considered sufficient reason for an extension of the schedule outlined in the Supplemental Conditions and no claim for extension by reason of such default will be allowed.

H. Processing Time:
   1. Time for review shall commence on Contract Administrator's receipt of submittal.
   2. Contract Administrator will act upon Contractor's submittal and transmit response to Contractor not later than 10 Working Days after receipt, unless otherwise specified.
   3. Resubmittals will be subject to same review time.

I. Resubmittals:
   1. Clearly identify each correction or change made and include revision date.
   2. No adjustment of the schedule or Contract Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmittals.
   3. No adjustment of the schedule outlined in the Supplemental Conditions or Contract Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmittals.
   4. The City may deduct cost of additional reviews from Contract Price.

J. Incomplete Submittals:
   1. Contract Administrator will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
   2. When any of the following are missing, submittal will be deemed incomplete:
      a. Contractor's review stamp, completed and signed.
      b. Transmittal of Contractor's Submittal, completed and signed.
      c. Insufficient number of copies.
      d. All requested information is not provided.
      e. Submittals missing professional engineer's seal and signature, where it is required.

K. Submittals not required by Contract:
   1. Will not be reviewed and will be returned stamped "RECEIVED FOR INFORMATION"
   2. Contract Administrator will keep one copy and return all remaining copies to Contractor.

L. Submittal Disposition:
   1. Contract Administrator will review, mark, and stamp as appropriate, and distribute marked-up copies or submittal review comment forms as noted:
      a. NO EXCEPTIONS TAKEN (NET):
         1) Contractor may incorporate product(s) or implement Work covered by submittal.
         2) Distribution:
            a) One copy furnished to the City.

b) One copy retained in Contract Administrator's file.
c) Remaining copies returned to Contractor appropriately annotated.

b. EXCEPTIONS NOTED (EN):
1) Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Contract Administrator's notations.
2) Distribution:
a) One copy furnished to the City.
b) One copy retained in Contract Administrator's file.
c) Remaining copies returned to Contractor appropriately annotated.

c. EXCEPTIONS NOTED - RESUBMIT (ENR):
1) Make corrections or obtain missing portions, and resubmit.
2) Contractor may not incorporate product(s) or implement Work covered by submittal, except portions where indicated Contractor may begin to incorporate product(s) or implement Work covered by the submittal in accordance with the Contract Administrator's notations.
3) Distribution:
a) One copy furnished to the City.
b) One copy retained in Contract Administrator's file.
c) Remaining copies returned to Contractor appropriately annotated.

M. Do not revise submittals after they have been reviewed and stamped "NO EXCEPTIONS TAKEN" or "EXCEPTIONS NOTED".

N. Contract Administrator will complete up to two reviews of each submittal at no cost to Contractor. The City may deduct cost of additional reviews from Contract Price.

1.3 SUBMITTALS

A. General:
1. Copies: Submit one electronic copy to Contract Administrator. Method of electronic submission to be coordinated with Contract Administrator after execution of the Contract. Submit hard copies only where specifically required under individual Specification sections.
2. Prepare and submit Submittals required by individual Specification sections.
3. Contract Administrator will review Submittals for general conformance with design concept and intent, and general compliance with Contract.
4. Contract Administrator's review does not relieve Contractor from compliance with requirements of Contract nor from errors in submittals or Contractor's design.
5. Contractor is responsible for confirmation of dimensions at jobsite; fabrication processes; means, methods, techniques, sequences and procedures of construction; coordination of work of all trades; and performance of Work in safe and satisfactory manner.
6. At Contract Administrator's option, Contract Administrator's review comments and review stamp will be placed either directly on submitted copies of Shop Drawings or on separate submittal review comment form.
7. Where work is to be designed by Contractor, comply with applicable codes and furnish submittals signed and sealed by professional engineer licensed in Province of Manitoba, as required by Specifications. If requested, calculations shall be submitted for review.

Calculations shall also be signed and sealed by a professional engineer registered in the Province of Manitoba.

B. Project Status Report:
   1. 1. Submit a typewritten status report at the end of each month to the Contract Administrator as per section 01 32 00, Clause 1.4 Narrative Progress Report.

C. Shop Drawings:
   1. Arrange for the preparation of clearly identified Shop Drawings as specified or as the Contract Administrator may reasonably request.
   2. Note compliance or deviation from Specifications with full explanation for any deviations.
   3. Copies: Eight (8) hard copies and one (1) electronic copy.
   4. Identify and Indicate:
      a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
      b. Equipment and Component Title: Identical to title shown on Drawings.
      c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
      d. Project-specific information drawn accurately to scale.
   5. Manufacturer’s standard schematic drawings and diagrams as follows:
      a. Modify to delete information that is not applicable to the Work.
      b. Supplement standard information to provide information specifically applicable to the Work.
   6. Product Data: Provide as specified in individual Specifications.
   7. Units: Submit all Shop Drawings in SI metric units.
   8. Functional Testing and Performance Verification Plans: Submit required equipment Functional Testing plans and Performance Verification plans as part of the Shop Drawing submittals for each piece of equipment.

D. Samples:
   1. Copies: Two (2), unless otherwise specified in individual Specifications.
   2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
      a. Contractor name.
      b. Model number.
      c. Material.
      d. Sample source.
   3. Manufacturer’s Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
   4. Full-size Samples:
      a. Size as indicated in individual Specification section.
      b. Prepared from same materials to be used for the Work.
      c. Cured and finished in manner specified.
      d. Physically identical with product proposed for use.
   5. Make Contract Administrator required changes in samples consistent with the Contract.
   6. Do not use materials in Work which are in any way inferior to Samples submitted and reviewed. Match accepted samples.

7. Review of samples notwithstanding, materials that are unsound or imperfect when delivered to Site will be rejected.
8. Retain reviewed samples on Site readily available to Contract Administrator.

E. Contractor-Design Data:
1. Written and graphic information.
2. List of assumptions.
3. List of performance and design criteria.
4. Summary of loads or load diagram, if applicable.
5. Calculations.
6. List of applicable codes and regulations.
7. Name and version of software.
8. Information requested in individual Specification section.
9. Seal and signature of professional engineer licensed in the province of the Manitoba.

F. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification sections.

G. Quality Control Documentation: As required in section 01 45 16.13, Quality Control.

H. Statement of Qualification: Evidence of qualification, certification, or registration as required in the Contract to verify qualifications of engineers, materials testing laboratories, specialty Subcontractors, trades, Specialists, consultants, and other professionals.

I. Submittals Required by Laws, Regulations, and Governing Agencies:
1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, provincial, or local governing agency or their representative.
2. Transmit to Contract Administrator for the City's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.

J. As-Built Documents: In accordance with Section 01 77 00, Closeout Procedures.

K. Shop Drawings for Temporary Works:
1. Submit for review shop drawings of temporary works which:
   a. Control the dimensions and locations of any part of the structures to be constructed under the contract.
   b. Impose loads on parts of the works which are still under construction or on existing structures.
2. Submit eight (8) copies of shop drawings for temporary works for review. Payment will not be made for work started or completed without the required drawing review. Submit shop drawings well in advance of the time when they are required for construction. Coordinate shop drawings prepared by different trades so that information is available to prevent conflict or errors where the work of one trade affects the work of another.
3. Of the eight (8) copies submitted, two (2) will be returned to the Contractor after review.

4. Shop drawings will be reviewed for general conformity with the required arrangement and dimensions of the permanent structures and for general conformity with the specifications.
5. If resubmittal is requested, discuss the comments made and resolve all issued raised by them, then resubmit the shop drawings amended accordingly.
6. Do not begin construction of temporary works until after the completion of review of the shop drawings.
7. Review of the Contractor's drawings does not relieve the Contractor of the responsibility for the results arising from errors or omissions of design or from the use or abuse of the temporary work.
8. Keep one (1) copy of each stamped, reviewed shop drawing at the Site of the work for reference during the time the construction work is in progress.
9. Make no change in drawings after they have been reviewed.
10. Submit shop drawings in SI metric units.

L. Test, Evaluation, and Inspection Reports:
1. General:
   a. Shall contain signature of person responsible for test or report.
   b. Complete an equipment report prior to the Site testing each item of rotating mechanical equipment. During testing complete the remainder of the equipment report.
   c. Before operating equipment, engage the services of a qualified manufacturer's service representative to inspect, operate, test, and adjust the equipment after installation.
2. Pile Tests by Manufacturer:
   a. Identification of product and Specification section, type of inspection or test with referenced standard or code.
   b. Date of test, Project title and number, and name and signature of authorized person.
      1) Date of test shall be communicated to the Contract Administrator at least ten (10) working days in advance of the test.
   c. Test results.
   d. If test or inspection deems material or equipment not in compliance with the Contract, identify corrective action necessary to bring into compliance.
   e. Provide interpretation of test results, when requested by Contract Administrator.
   f. Other items as identified in individual Specification sections.
3. Factory:
   a. Identification of product and Specification section, type of inspection or test with referenced standard or code.
   b. Date of test, Project title and number, and name and signature of authorized person.
   c. Description of inspection, test results, adjustments made, quantitative results, and suggestions for precautions to be taken for correct maintenance.
   d. If test or inspection deems material or equipment not in compliance with Contract, identify corrective action necessary to bring into compliance.
   e. Provide interpretation of test results, when requested by Contract Administrator.
   f. Verify that the equipment and its installation conforms to the requirements of the Contract for the service intended and is ready for permanent operation. Submit copies of report for binding into the installation, operation and maintenance manuals.

g. Other items and requirements as identified in individual Specification sections.

4. Field: As a minimum, include the following:
   a. Project title and number.
   b. Date and time.
   c. Record of temperature and weather conditions.
   d. Identification of product and Specification section.
   e. Type and location of test, Sample, or inspection, including referenced standard or code.
   f. Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
   g. If test or inspection deems material or equipment not in compliance with Contract, identify corrective action necessary to bring into compliance.
   h. Provide interpretation of test results, when requested by Contract Administrator.
   i. Other items as identified in individual Specification sections.
   j. Inspection Includes:
      1) Soundness (without cracked or otherwise damaged parts).
      2) Completeness of installation as specified and as recommended by manufacturer.
      3) Correctness of setting, alignment, and relative arrangement of various parts of system.
   k. Operate, test, and adjust equipment to prove it is correctly installed to operate under the intended conditions.
   l. Equipment will only be accepted after receipt of the manufacturer's representative's report.
   m. Submit notice in writing at least 48 hours before manufacturer's representative is scheduled to perform these services.
   n. Modify or replace equipment or materials failing required tests.
   o. Perform additional testing required due to changes of materials requested by Contractor or due to failure of materials or construction to meet specifications.

M. Maintenance Materials:
   1. Submit special tools, lubricants, maintenance materials, spare parts, Manuals, As-built Drawings, and reports to the Contract Administrator.
   2. Submissions to include a complete list of items delivered. Submissions must be acknowledged in writing as being received by the Contract Administrator.
   3. Acceptable maintenance manuals shall be submitted prior to commissioning of the equipment.
   4. Submission of manuals in a state as reviewed and accepted deficiency free is a prerequisite for Substantial Performance.

N. Testing and Startup Data: In accordance with Section 01 91 14, Equipment Testing and Facility Startup.

O. Training Data: In accordance with Section 01 79 00, Demonstration and Training.

P. Interference Drawings:
   1. Before installation of structural, mechanical, and electrical systems, prepare an integrated set of interference drawings in cooperation with all trades.

2. Show locations and relationship of all trades in mechanical and electrical equipment rooms, pipe spaces, tunnels, galleries, and basements, and all electrical conduits and pipes to be cast into structural slabs, wall, and columns.
3. Submit updated interference drawings as Work progresses.
4. Make necessary relocations due to interference between trades, as a result of incomplete interference drawings, at no cost to The City.

Q. Bills of Materials:
1. Provide two (2) copies of complete Bill of Materials for all equipment, valves, valve operators, and instrumentation.
2. Provide copies on letter size paper arranged and bound together alphabetically in separate three-ring binders.

R. Spare Parts and Loose Items List:
1. Submit recommended spare parts list together with the first shop drawings submittal for all designated equipment. The detailed specifications state which equipment requires recommended spare parts lists. Where not stated in specifications, provide manufacturer's recommended list of spare parts. Reference specification section number for each designated equipment on spare parts list.
2. The recommended spare parts list must include, but not limited to:
   a. Item number.
   b. Description of spare part or item.
   c. Equipment vendor or suppliers name.
   d. Reference specification section (and clause, if applicable).
   e. Quantity of item or part.
   f. Lead time.
   g. Date received.
   h. Date turned over to the City.
   i. Price of each part at time of submittal and delivery.
   j. Comments.
3. The recommended spare parts list will be used by the City as a guide for planning suitable spare parts inventory prior to acceptance of the equipment.
4. Submit updated spare parts list indicating spare parts handed over to the City.

S. Extra Materials List:
1. Submit recommended extra materials list with first submittal of designated items. The detailed specification state which items require extra materials. Reference specification section number for each item listed.
2. The extra materials list must include, but not limited to:
   a. Item number.
   b. Description of extra materials.
   c. Extra material supplier name.
   d. Reference specification section (and clause, if applicable).
   e. Quantity of extra material.
   f. Date received.
   g. Date turned over to the City.
   h. Comments.
3. Submit updated extra materials list indicating items handed over to the City.

T. Equipment Control Log:
   1. Submit log listing equipment installed under Contract referencing applicable specification section for each piece of equipment.
   2. Include in equipment control log:
      a. Equipment description.
      b. Reference specification section (and clause, if applicable).
      c. Equipment tag number.
      d. Equipment Vendor or supplier.
      e. Date required on Site.
      f. Date delivered to Site.
      g. Date installed.
      h. O&M Manual submitted and accepted.
      i. Training completed.
      j. Pre-start health and safety review completed.
      k. Start-up date.
      l. Comments.
   3. Submit updates as equipment is installed, or if schedule dates change.

1.4 SUPPLEMENTS

A. The supplements listed below, following “End of Section”, are part of this Specification.
   1. Forms: Transmittal of Contractor’s Submittal

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL
(ATTACH TO EACH SUBMITTAL)

DATE: _____

TO: _____

_____

_____

_____

_____

FROM: _____
Contractor

_____

_____

_____

Submittal No.: _____

☐ New Submittal ☐ Resubmittal

Project: South End Sewage Treatment Plant (SEWPCC) Upgrading / Expansion Project - Contract 4 – Sitewide Mechanical, Electrical, Concrete and Site Works
Project No.: Bid Op. 976-2016

Specification Section No.: _____
(Cover only one section with each transmittal)

Schedule Date of Submittal:

_____

SUBMITTAL TYPE:	☐ Shop Drawing	☐ Sample	☐ Informational

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract and requirements of laws and regulations and governing agencies.

By: _____
Contractor (Authorized Signature)

SECTION 01 35 13

SPECIAL PROJECT PROCEDURES

PART 1 GENERAL

1.1 ALTERATIONS TO EXISTING FACILITIES

A. Modify and connect to existing facilities as specified and as shown on the Drawings.

B. Obstruction of existing building exits shall be coordinated with and approved by the Contract Administrator. See Drawings for approved exit obstructions and requirements to maintain pedestrian access.

C. Make good and refinish all areas affected by work.

D. All areas to be cleaned to the condition of the area prior to the work being done.

E. For electrical work in existing facilities, refer to Division 26 and the Drawings.

1.2 HEALTH AND SAFETY PROCEDURES AND REQUIRMENTS

A. Refer to Section 01 35 29.01, Health and Safety.

1.3 MONITORING GROUNDWATER LEVELS

A. Refer to Section 31 23 19.01, Dewatering for detailed procedures.

B. Refer to CW 2030 for maintaining excavations free of water for the duration of the work.

1.4 MONITORING EXISTING STRUCTURES FOR ELEVATIONS

A. Pre-work elevations have been established around the Site for monitoring the movement of existing structures. Prior to commencing Work, the Contractor shall survey the existing benchmarks located on the existing buildings and shoring within the area of the work to establish a baseline of the existing conditions. Monitor for changes in elevation and lateral movement and report to the Contract Administrator weekly. If movement is identified, report to the Contractor Administrator immediately.

B. Engage a qualified survey technician to record the initial elevations and datum alignment and monitor elevation changes and changes in lateral position.

1.5 DEWATERING EXISTING HYDRAULIC STRUCTURES AND PIPELINES

A. The City will take out of service and initially drain existing tanks, channels, pipelines, and other hydraulic (liquid holding) structures by gravity to the extent that is practical and possible for the Works. The Contractor shall perform additional draining of liquids and removal of settled deposits via mechanical and manual methods after this initial draining at no additional

cost to the City. The Contractor shall assume additional dewatering and settled deposits removal will be required in the headworks wetwell, influent channels, screen channels, grit channels, clarifiers 1 and 2, HPO tanks, and grit tanks.

B. In existing hydraulic tanks (e.g, clarifiers and HPO tanks), plant staff will dewater existing processes, remove suspended biomass and hose down tanks and collector mechanisms. Any further or subsequent cleaning required to carry out the Work is the responsibility of the Contractor.

C. Be responsible for final draining and dewatering, and control liquid levels, in existing tanks, channels, pipelines, and other hydraulic structures as required to facilitate the Work.

D. Engineered temporary bulkheads may be required to enable construction of the Work. Supply and install temporary bulkheads in existing channels or conduits as required for completion of the Work.

E. Provide and install temporary bulkhead plates in existing guides.

F. Provide temporary pumps to dewater and control liquid levels in existing tanks, and channels, and other hydraulic structures as required to facilitate the Work.

G. Empty pipelines by draining to existing sumps, if available. Provide temporary sump and pump if an existing sump is not available. Flush pipelines clean of sludge prior to making connections.

H. Where temporary pumps are utilized, discharge pump flows to adjacent tanks of like process or channels in service upstream of the Work. Coordinate temporary pumping with Contract Administrator.

1.6 NEW OPENINGS OR HOLES IN EXISTING CONCRETE

A. For new holes or openings in existing concrete for piping, conduit, cables, or equipment use Ground Penetrating Radar (GPR) to examine the existing concrete for 3 diameters around the centre line of the proposed penetration. If no structural steel, piping, or electrical conduits are found at the proposed location, core the hole. If structural steel, piping, or electrical conduits are found, select an alternative location. If structural steel, piping, or electrical conduits are found, and an alternative location is not available or appropriate, do not core unless written permission from the Contract Administrator is received.

B. Do not drill into primary reinforcing bars. Primary reinforcing bars for the structural members are defined as follows:
   1. Beams: Horizontal longitudinal reinforcing located within top 100 mm or bottom 100 mm of the beam, and vertical stirrup reinforcing located within one-quarter of the span adjacent to supports.
   2. Columns: Vertical reinforcing located within 100 mm of the column sides on each face; locate all vertical reinforcements.
   3. Walls and Slabs: Subject to detailed review by the Contract Administrator.

1.7 PRECONSTRUCTION SURVEY

A. Carry out a preconstruction survey at a minimum of the existing facility Site and the buildings that are likely to be affected by construction activities, such as pile driving and dewatering. Note any identified structural cracks to the Contract Administrator for review and record.

B. Undertake a survey of existing surface finish condition and elevations of existing structures. Document findings with photographs and in writing to the Contract Administrator prior to commencing construction.

C. Be responsible for repairing damage due to construction activities.

D. Submit a labeled three (3) ring binder and digital PDF version with documentation, photographs, and comments.

E. Be responsible to establish the degree and level of detail for the preconstruction survey that will be required.

F. Provide minimum of 48 hours notice to the Contract Administrator before conducting a preconstruction survey.

1.8 DISPOSAL OF MATERIAL OFF-SITE

A. Material designated to be removed from the Site must be promptly removed.

B. Make necessary arrangements for environmentally safe transportation and ultimate disposal in compliance with all applicable Regulations and Guidelines at no cost to the City, unless noted otherwise.

C. Remove unwanted material, as classified by the Contract Administrator, from the Site and dispose of same at acceptable sites outside of the worksite.

1.9 ENVIRONMENTAL CONSIDERATIONS DURING CONSTRUCTION

A. Perform the Work in accordance with construction and restoration guidelines established by Manitoba Conservation.

B. The City’s Environmental Preservation and Compliance Statement shall be included in the environmental protection requirements. A copy is included in Appendix D.

C. Equipment Fueling:
   1. Designate an area within the working limits, a minimum of 30 meters away from open water courses, to be used exclusively for fueling construction equipment.
   2. Submit for review a plan for the interception and rapid cleanup of fuel spills should they occur.
   3. Maintain the apparatus for cleaning up fuel spills on Site.

D. Cleaning Equipment:
   1. Keep construction equipment clean so that no debris is deposited on the plant roadways or any public roadway.
   2. Contain construction debris in a designated area within the working limits.
   3. Dispose of debris off-site as specified.

E. Noise Control:
   1. Use only vehicles and equipment equipped with effective muffling devices. Provide noise barriers on stationary engines and compressors.
   2. Comply with City of Winnipeg Neighbouhood Liveability By-law No. 1/2008.
   3. Consider noise attenuation measures in the approach and submissions for pile driving and other noise generating activities.

F. Dust Control:
   1. Control dust on the Site at times by suitable means.
   2. Submit dust control plan detailing proposed methods to control dust on Site to the Contract Administrator.

G. Containing Surface Runoff:
   1. Intercept surface runoff within the working limits and divert into the existing ditches at the Site or suitable discharge location.

H. Tree Protection:
   1. Protect trees on Site within and adjacent to the working limits by placing and maintaining snow fencing around each tree at the "drip line". Do not pile excavated material around the base of existing trees. Remove material accidentally placed adjacent to trees.
   2. Remove only those trees that have been so designated and are indicated on the drawings to be removed. Review and confirm trees proposed to be removed with the Contract Administrator prior to removal.

1.10 MAINTAINING EXISTING ROAD AND PARKING AREAS

A. Be responsible for maintaining existing access to sludge storage bay, UV building, and sampling building after January 2, 2018. Access maintenance up to and including January 2, 2018 is by Bid Opportunity 899-2015 Contractor.

B. Be responsible for maintaining existing access to the snow dump, laydown and parking areas throughout the work of this Contract as shown in Appendix C and in accordance with E30.3 to E30.12 inclusive.

1.11 WATER FOR CONSTRUCTION AND TESTING

A. Obtain and pay for potable water required for construction purposes and leakage testing of liquid retaining structures.

B. Use of plant effluent water for leakage testing will not be permitted.

1.12 LEAKAGE TESTING – PIPES

A. For leakage testing of pipes, see Section 40 80 01, Piping Leakage Testing.

1.13 PROTECTION OF EXISTING STRUCTURES AND PROPERTY

A. The Contractor will be held fully responsible by The City for any damage to utilities, properties, shoring, buildings, homes or structures adjacent to or in the general area of the work, through settlement of ground, vibration or shock resulting from any cause relating to the work carried out under this Contract. Make good and repair such damage at own expense.

B. Control of Vibrations:
   1. Control vibration levels during construction to prevent damage to concrete work, existing structures, equipment, and utilities.
   2. For existing structures, pipelines, and utilities, control vibration producing equipment to a maximum peak particular velocity to 50 mm/sec.
   3. Control use of vibration producing construction techniques or equipment so that the ground adjacent to concrete has a resultant peak particle velocity (P.P.V.) not exceeding the following limits:

Age of Concrete (Hours)	Maximum Permissible Resultant P.P.V. (mm/s)
Less than 4	5
4 to 60	10
Over 60	50

   4. The City may retain the services of an independent inspection agency to monitor vibration effects.
   5. The Contract Administrator reserves the right to require additional restrictive limits for vibration control if recommended by the inspection agency.

C. Sustain in their places and protect from direct or indirect injury, water and gas mains, public and private sewers and drains, conduits, cables, service pipes, poles, sidewalks, curbs, embankments, structures, equipment and other property in the vicinity of the work.

D. Sustain and support structures that are uncovered, weakened, endangered, or threatened.

E. Prevent dust and dirt from entering existing buildings or areas where equipment is stored or is operating.

F. Prevent dust, water, or other deleterious substances from entering areas with existing electrical, heating ventilating, pumping, and other equipment.

G. Where existing wall sections are removed or where pipes are installed through existing walls or where any dust-generating operation is necessary, provide a suitable temporary wall or enclosure suitably reinforced and sealed to prevent dust entering the existing area. When work is completed remove temporary dust control device and thoroughly clean all areas affected by the work.

1.14 PROTECTION OF EXISTING AND NEW STRUCTURES

A. Be responsible for damage to utilities, property, buildings, or structures adjacent to or in the general area of the Works, through settlement of ground, vibration, shock, or changes to groundwater level resulting from any cause related to the Work carried out under this Contract. Make good and repair such damage at own expense.

B. Unless noted otherwise, loads from construction activities will not be permitted on existing structures, unless a complete assessment is carried out and an assessment report sealed and signed by a professional engineer licensed in the Province of Manitoba is submitted and acceptable to the Contract Administrator.

C. Where construction activities may impose loads onto existing structure, including but not limited to tower and mobile construction cranes, review structure for adequacy and provide protective measures as may be required to not cause damage to existing structure.

D. Retain a professional engineer licensed in the Province of Manitoba to assess and report on adequacy of existing structures, and design of protective measures. Submit report and design of protective measures bearing seal and signature of responsible professional engineer for information. Report and design of protective measures will be reviewed by Contract Administrator for general arrangement and conformance with contract documents and possible interferences.

1.15 PROTECTION AGAINST FREEZING

A. Furnish necessary equipment and fuel for heating buildings and structures during construction. Maintain a minimum temperature of 13 degrees C in interior areas for mechanical, electrical, masonry, painting, and other work susceptible to frost damage.

B. Drain pipelines in trench which may be left exposed in winter. Drain pipelines below concrete slabs or in areas too large to heat practicably.

C. Refer to Divisions 03, 04, 09, 40 and 23 as applicable for detailed cold-weather procedures for cast-in-place concrete, masonry, finishes, mechanical work, and electrical work respectively.

1.16 REMOVAL OF EXISTING GROUNDWATER WELLS

A. Where existing groundwater wells or groundwater level monitoring wells, are located within the limits of construction and are to be removed, they are to be decommissioned by a well installer licensed in the Province of Manitoba.

1.17 SMOKING IN DESIGNATED AREAS

A. Smoking is not permitted on Site except in designated smoking areas.

1.18 WORKING HOURS

A. General:
   1. The Work specified hereinafter will take place at the South End Water Pollution Control Centre, located at 100 Ed Spencer Drive, Winnipeg, MB, R2N 4G3.
   2. Work inside the operating facility will require operations to be present. The following working hours will be permitted:
      a. 8 hour shifts Monday through Friday, 7:30 a.m. to 4:00 p.m.
      b. No work is permitted on statutory holidays
   3. Additional hours for completing a phase of DCS Migration work that has commenced will be considered and will be subject to Contract Administrator approval
   4. Other schedule arrangements will be considered but must be planned in advance, reviewed a minimum two months ahead of the event, and confirmed two weeks ahead of the event.
   5. Exterior construction (outside of the operating facility) hours are not limited to plant operating hours; however, except as specified in subparagraph below, limit hours of operation to between 0700 and 1900 hours. Extended working hours may be permitted upon request from the Contractor and approved by the Contract Administrator.
   6. Weekend work will be permitted when necessary to achieve the contract milestone dates. Night work during the weekdays beyond 1900 hours will be permitted upon approval of the Contract Administrator. Refer to General Conditions for further details.
   7. Winter work identified in Section 01 52 10 Construction Sequencing between the months of November and February will require isolation of parts of the plant for extended periods and will be permitted by the Contract Administrator. The Contractor shall conduct the work as necessary to complete the identified work activities within the permitted time (i.e. November 1, 2018 to February 28, 2019, November 1, 2019 to February 28, 2020, and November 1, 2020 to February 28, 2021). Submit a detailed work plan and schedule as detailed in section 01 33 00, Submittal Procedures.

B. Special Conditions, Shutdowns, or Tie-ins to Existing Plant
   1. Any required temporary shutdowns of services to the SEWPCC, tie- ins between the existing plant and new construction, or any other activity affecting normal plant operation to accommodate completion of the Work shall be planned well in advance and limited in duration and subject to the following conditions:
      a. Any Work requiring temporary shutdown of plant operations to complete shall be coordinated through the Contract Administrator and the operators of the SEWPCC a minimum of two (2) weeks in advance of the planned Work.
      b. Temporary shutdowns shall be no greater than 6 hours in duration in any given twenty-four (24) hour period.
      c. Temporary shutdowns for service tie-ins shall be scheduled during nonpeak plant operation hours, scheduled to begin at 0300 hours (or later when approved by the Contract Administrator) with normal plant operations scheduled to resume no later than 0900 hours.
   2. Submit a detailed work plan and schedule as detailed in section 01 33 00, Submittal Procedures. Detailed work plan shall include when City operations staff are to be present.
   3. All temporary works, including but not limited to structures, equipment, construction consumables, fluids, energy, special pumping and conveying of deviated flows etc. required for the execution of the Work are included in Contractor’s scope.

4. Costs shall be incidental to the Work. No additional payment will be made to the Contractor.

1.19 FACILITY OPERATION REQUIREMENTS

A. The facilities related to the Work are critical to the treatment of wastewater for the City of Winnipeg. Under no condition shall equipment or power be shut down without prior permission of the Contract Administrator. Similarly, coordination and approval are required prior to returning the equipment back into service. The Contractor is responsible for preparing shutdown schedules in conjunction with the Contract Administrator and The City. The Contractor shall work within the schedule and any procedures given, and shall advise the Contract Administrator of any issues or concerns, prior to performing the Work.

B. The Work shall be scheduled and performed such that there is minimal disturbance to SEWPCC plant operation.

C. The Contractor shall respond to and correct within a 24-hour period any construction related items or issues that lead to unplanned operational constraints on the Facility.

D. Hot work shall end no less than one (1) hour prior to end of shift and area inspected prior to daily departure by the Contractor’s site supervisor and/or tradesman.

E. Some of the Work will require shutdown of equipment. All equipment shutdown requirements require 14 days’ notice. Coordinate the work to minimize the amount of time that equipment shutdown will be required. In addition, the Contractor shall be flexible to work around specific City operational requirements. Specific requirements that the Contractor is required to adhere to include:
   1. All equipment will be isolated by the City personnel.
   2. Any electrical shutdowns affecting more than one branch circuit must be less than two hours in duration. Any longer shutdown which may be required must be coordinated with the Contract Administrator.
   3. In case of accidental equipment shutdown, the Contractor must notify the Contract Administrator and SEWPCC staff immediately for their corrective action. Under no circumstances shall the Contractor start or restart equipment.
   4. Other process and safety requirements, as identified by the City or Contract Administrator.

F. It is possible that equipment failure within the SEWPCC, or another unforeseen condition, could cause an event where construction must be stopped immediately and equipment brought back online. The City, upon their sole discretion, may delay or stop the Work at any time, require the Contractor to return all or equipment into service as soon as possible, and reschedule the Work.

1.20 CONSTRUCTION TOWER CRANE (IF REQUIRED)

A. Locate temporary construction tower crane at a location where it does not impose loading on existing facilities, including buried utilities.

B. Design and provide foundation for construction tower crane independent of the structural foundation where possible. Where tower foundation is proposed to be located within the structural foot print, construct the foundation below the structural foundation. Provide design, details, and calculations, if requested, to demonstrate proposed details are at least equal to or greater than that detailed on contract documents, including but not limited to structural load capacity, water tightness, finish, and other properties..

C. Where proposed location of temporary construction tower crane also interferes with construction of other components of the structure above foundation level, provide working drawings of related proposed modifications and details for completion of structure following removal of tower crane.

D. Submit shop drawings including but not limited to proposed location plan, foundation details, loading working drawings for other interferences, and inspection report, bearing seal and signature of responsible professional engineer registered in the Province of Manitoba for review by the Contract Administrator.

E. Obtain and submit for information only the necessary inspections and permits prior to the erection of the tower crane. Monitor adjacent existing structures for movement as specified herein.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 35 29.01

HEALTH AND SAFETY

PART 1 GENERAL

1.1 REFERENCES

A. Manitoba Workplace Safety and Health Act and associated regulations.

B. Applicable National Fire Protection Association Codes and Standards.

C. City of Winnipeg Contractor Safety Health and Environment Orientation Plan - CD-PMPC-03 (Appended to this section)

1.2 CONSTRUCTION – SAFETY MEASURES

A. The Contractor shall be designated as the “Prime Contractor” as defined by the Manitoba Workplace Safety and Health Act.

B. Observe and enforce all construction safety measures required by code, Workers' Compensation Board, Manitoba Workplace Safety and Health, and all applicable statutes. Appoint a suitably qualified employee who has sole responsibility on-site on behalf of the Contractor, for compliance with the requirements and so advise the City in writing with copy to the Contract Administrator.

C. In case of an emergency, the Contractor shall immediately contact the shift operator at 204-479-5299 (7:00 AM to 4:30 PM) or the North End Water Pollution Control Centre Central Control Contact Number 204-986-4798 (4:30 PM to 7:00 AM). Secondary emergency contact number is 204-794-4468.

D. Meet or exceed the latest revision of all local, federal, provincial laws, regulations, standards, and industry best practices relating to health and safety.

E. Be solely responsible for safety of the Work under this Contract and for complying with and ensuring that every person on the Site complies with the requirements contained within the Contract documents and regulatory requirements.

F. Perform the Work, or ensure that it is performed, in a manner to avoid risk of injury, security or damage to persons or property, adjacent property, or environment.

G. Perform a health and safety pre-qualification of all lower-tiered subcontractors prior to contract award and only accept lower-tiered subcontractors that have demonstrated an ability to comply with health and safety requirements and are below industry average for incidents.

H. Provide safe access, egress, and equipment in accordance with Occupational Health and Safety Regulations for entry into all areas by employees, subcontractors, the City, and the

Contract Administrator or representative. Where hazardous areas or confined space entry exists, implement procedures defined by the latest revision of the applicable regulations.

I. Designate a qualified safety representative at the Project Site with responsibility for preventing accidents and implementing and supervising the Safety Plan and other safety programs. The safety representative shall attend all project safety meetings, participate fully in all activities outlined in the Safety Plan and shall devote whatever time is necessary to perform such duties properly. Contractor's safety representative shall provide Contract Administrator with requested information and shall have the authority to immediately correct safety deficiencies.

J. Prior to the commencement of the Work, review and become fully familiarized with all local, provincial, and federal regulatory requirements and the following documentation:
   1. South End Water Pollution Control Centre site safety rules, emergency evacuation, spill response procedures, permits, and other applicable procedures.
   2. Contract Documents.

K. In event of a conflict between any provisions of the various regulatory requirements, the most stringent provision shall govern.

L. Ensure that all employees and subcontractors are competent, as prescribed by the applicable legislation, in performing the Work and have been trained accordingly.

M. Prior to commencement of any Work, throughout the Work as required, and at the Contract Administrator's request, make the following documentation available:
   1. A copy of the Contractor's project specific Health and Safety Plan.
   2. Emergency response and evacuation procedures, including local contact names and numbers.
   3. Procedures in the event of a spill including local contact names and numbers.
   4. Training and orientation training records of employees or subcontractors.
   5. Applicable Material Safety Data Sheets.

N. Provide and maintain first aid, hygiene, washrooms, potable water, and fire prevention equipment, at the Site in accordance with the applicable regulatory requirements.

O. Establish, maintain, and mark clear paths of access and egress for routine and emergency personnel and vehicles.

P. Erect signage acceptable to the Contract Administrator at all entry points to the Site identifying the name, address, and telephone number of the Contractor and to advise personnel and visitors entering the Site of the requirements respecting entry.

Q. Ensure adequate coordination and communication between all parties on Site in regards to safety.

R. In addition to the Manitoba Workplace Health and Safety Act and applicable Regulations reporting requirements, report all incidents, near misses, spills, environmental damage, and property damage to the City and Contract Administrator immediately. An incident

investigation must be conducted and a copy of the complete report provided to the City and Contract Administrator within 24 hours.

S. Provide a copy of all Ministry of Labour inspection reports, orders, and charges to the City and the Contract Administrator immediately.

1.3 SPECIAL PROTECTION AND PRECAUTIONS

A. Comply with the South End Water Pollution Control Centre Health and Safety Procedures where necessary. The City will provide facility orientation materials to the Contractor. Provide orientation training to all Contractor's staff, subcontractors, Contract Administrator, and visitors on Site and maintain a record of this training.

1.4 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM

A. Comply with applicable health and safety regulatory requirements, including but not limited to Workplace Hazardous Materials Information System (WHMIS) regulations.

B. Maintain a copy of the current Material Safety Data Sheets (MSDSs) for all hazardous chemicals or substances brought onsite by Contractor or any lower-tiered subcontractors.

C. If such materials or substances are part of any item requiring a shop drawing or other submittal, provide the MSDS with the submittal.

D. Provide and maintain a copy of MSDSs to the City and Contract Administrator.

1.5 DESIGNATED SUBSTANCES

A. Designated substances may be present on Site. Known designated substances will be noted in the Drawings, and Specifications, and in Appendix L – 2015 Asbestos Bulk Sampling Report (Pinchin, 2015). Refer to Sections 02 82 11, 02 82 12 and 02 82 13 for instructions on asbestos abatement.

B. If a designated substance which has not been identified in the Drawings and Specifications is located during the performance of the Work, stop Work in that area and immediately notify the Contract Administrator.

1.6 MATERIAL HANDLING

A. Store, stack, place, remove, and handle materials on Site in a stable and secure manner so as not to endanger the safety of personnel or cause damage to property.

B. Secure materials which, by virtue of their configuration or weight, cannot be stored or stacked in a secure and stable manner, against tipping, collapse, or falling by use of appropriate bracing systems, structures, or equipment.

C. Ensure that vehicles, construction machinery, and materials handling equipment are only operated on the Project by persons suitably qualified to do so.

1.7 CITY'S HEALTH AND SAFETY AUDITOR

A. The Contractor acknowledges that the City may employ the services of an occupational health and safety auditor, an environmental inspector, or other authorized inspector knowledgeable in the local statutes, laws, or by laws for the purpose of conducting inspections of the Site.

B. Grant the auditor, inspector, or any other inspector full and unimpeded access to the Site, at all times, and immediately comply with any direction issued by the auditor, inspector, the City, or any other inspector.

C. This provision does not change the Contractor's role and responsibility as the General Contractor. The auditor is the City's method for ensuring due diligence is exercised.

D. The Contractor's health and safety representative shall accompany the safety auditor on Site visits where requested.

E. The safety auditor will report any observations made during inspections and audits and assign these to the Contractor. The Contractor will be granted access to these documents. It will be the responsibility of the Contractor to review these documents and take whatever action is necessary to fulfill its responsibility as the General Contractor.

1.8 WORK IN HAZARDOUS AREAS

A. Work in Confined Spaces:
   1. Work activities in confined spaces must be in accordance with the latest revision of the Occupational Health and Safety Act and applicable Regulations

B. Hazardous Areas Classification in Existing Structures:
   1. The following areas in existing structures at the South End Water Pollution Control Centre for the purpose of this Contract are considered to be hazardous areas and classified as Class I Division 1 Group D locations per CSA C22.1, Canadian Electrical Code:
      a. Grit Building

C. Hazardous Areas Classification in New Structures:
   1. Areas considered to be hazardous and classified as Class I Division I Group D or as Class I Division 2 Group D per CSA C22.1, Canadian Electrical Code are indicated on the Drawings.
   2. After start-up of operations, work performed in these locations must proceed in accordance with applicable regulatory requirements.

1.9 FIRE PROTECTION

A. Provide adequate supplementary fire protection facilities including but not limited to ample hand-operated 15 to 20 pound multipurpose dry chemical extinguishers in each facility. Provide temporary hose lines in areas where construction is in progress until the permanent fire protection is placed into service. Do not block hydrant hose connections and other fire fighting equipment by construction equipment and make readily accessible at all times.

B. Dispose of all combustible rubbish promptly and safely. Prompt disposal is particularly needed for material subject to spontaneous ignition such as oily waste and paint rags.

C. Monitor and control probable ignition sources as necessary to prevent the threat of fire.

D. Minimize hot work including but not limited to operations involving open flames, heat, or sparks such as brazing, cutting, grinding, soldering, and torching. If there is a practical and safer way to do the work without hot work, the alternative method shall be used.

E. Hot work shall end no less than one (1) hour prior to end of shift and area inspected prior to daily departure by the Contractor's site supervisor and / or tradesman.

1.10 EXPLOSION-PROOF CONSTRUCTION

A. Certain areas may be designated on the Drawings as "explosion proof", "hazardous", or may be classified under CSA C22.1, Canadian Electrical Code. Where areas have such designation, provide explosion proof electrical equipment that meets the requirements of CSA C22.1, Canadian Electrical Code.

B. In hazardous areas as defined above, provide intrinsically safe mechanical devices and equipment such as non-sparking aluminum wheels for fans, pneumatic operators for dampers and aluminum clappers for check valves on pipelines conveying gaseous fuels.

C. Temporary structures such as fabrication shops, storage areas, and offices will not be permitted within existing facility structures unless approved by the Contract Administrator.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

Winnipeg Sewage Treatment Program
Integrated Management System

Contractor Safety Health and Environment Orientation Plan

DOCUMENT NUMBER: CD-PM-PC-03

Rev	Prepared by	Reviewed by	Date	Approved by	Date
	B. Willemsen		13/07/25		

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1. INTRODUCTION

The Contractor Safety, Health and Environment Orientation Plan shall be regarded as the minimum standard that all contractors and their employees must be oriented with, prior to working on a WSTP project site.

The purpose of the Contractor Safety, Health and Environment Orientation Plan is to:

(a) Present an overview of the facilities and its known hazards;

(b) Identify environmental preservation and compliance requirements; and

(c) Provide relevant safe work procedures for existing plant works.

The Contractor Safety, Health and Environment Orientation Plan will be reviewed by the WSTP Program Team at least annually to adjust for changing conditions

Contractors have the same obligations to their employees as any other employer in

Manitoba. Where safety issues arise concerning contractor employees a safety concern will always be taken to the supervisor of the employees involved.

It is the right of the City of Winnipeg to require the contractor to resolve any safety issue raised to the City's satisfaction before work continues. This decision belongs to the city's Project Manager responsible for the project with support from any safety resource needed.[1]

Contractors can review the City of Winnipeg Workplace Safety & Health Program for Contractors at http://winnipeg.ca/matmgt/Safety/

2. SITE ORIENTATIONS

2.1 General

Before contract work begins, site specific known hazards and controls, safe work and emergency procedures, access control and reporting requirements will be communicated as minimum requirements to the contractor and his employees by plant operations or contract administrators in consultation with departmental safety resources as needed.

In addition, contractors working within the plant shall undergo a Safety Walkthrough of applicable plant areas with designated Plant Operations personnel to receive area specific safety orientation. The purpose of the walkthrough is to familiarize the workers with hazards specific to the work area.

All contractor employees must sign-off acknowledging receipt and understanding of orientation information provided by City of Winnipeg Water and Waste Department.

2.2 Hazards

Contractors and their employees must become familiar with hazards in the plant areas they are working in and in addition shall complete their own risk assessments prior to undertaking the work.

The following listing although not exhaustive identifies hazards that contractors can expect to encounter while performing works within the wastewater treatment plants. Contractors and their employees must observe and obey all signage posted within the wastewater treatment plant.

[1] Organizational Safety Code of Practice COW

(a) Open Tank areas- be aware of potential for slips , trips and falls due to wash down hoses or wet floors, know where the life safety floatation devices are located;

(b) Automatic Controls- be aware that equipment can start and stop automatically and as such stay clear of equipment;

(c) Excessive Noise-be aware of areas within the plant that have the potential to generate loud noise necessitating the use of hearing protection;

(d) Hazardous Atmospheres-fixed gas detectors with strobe lights are mounted in various areas of the plant. Contractors shall also monitor for H2S & LEL gases through use of personal detectors in these designated areas and confined spaces. If detectors or strobe lights go into alarm, contractors shall leave the area, notify the lead operator of the alarm and obtain clearance from the lead operator prior to re-entry into the work area;

(e) Biological Hazards- Personal Hygiene through frequent hand washing after working in process areas will help prevent spread of germs. Minor cuts and scrapes should be attended to immediately to prevent infection from occurring. Do not drink water from hoses or taps in the plant;

(f) Confined Spaces-Be aware of the locations of confined spaces within the plant;

(g) Arc Flash- be aware of the location of high voltage equipment;

(h) Working from Heights- be aware of fall protection requirements when working above stipulated heights; and

(i) Hazardous Materials- be aware of WHMIS relative to the worksite.

2.3 Personal Protective Equipment (PPE)

The following PPE minimum requirements shall be adhered to by contractors when working at the wastewater treatment plants.

(a) Approved safety footwear;

(b) Safety Glasses;

(c) Hard Hats;

(d) High Visibility vests;

(e) Hearing Protection in designated areas; and

(f) Personal locks for Lockout Tag out of equipment.

2.4 Codes of Practice

Contractors shall comply with The Workplace Safety and Health Act W210 , Manitoba Regulations 217/2006 and utilize the following Codes of Practice and Guidelines as minimum requirements. It is Contractors responsibility to ensure the most recent Code of Practice or Guideline is being utilized.

(a) Code of Practice for Confined Space Entry (Nov 2006).

(b) Guideline for Fall Protection (July 2008).

(c) Water and Waste Department Lockout Tag Out Procedure

2.5 Safety Equipment

Contractors shall provide their own critical safety equipment including but not limited to: personal LEL detectors, self- retracting lanyards, portable man hoists, fire extinguishers, portable eyewash units, first aid kits etc. Use of City owned safety equipment by contractor personnel is not permitted.

2.6 Emergency Procedures

Contractors working within the plant must have emergency procedures in place to deal with situations that could arise as a result of their own work activities. Lists containing the names and contact numbers of project and emergency respondents should be conspicuously posted around the work areas.

Contractors working within the plant's various areas shall take note of where the emergency exit locations are located. If and when a Fire Alarm sounds, immediately evacuate to a designated muster point. The Contractor is accountable for his own staff and must report to the Wastewater Treatment Plant's Chief Fire Warden with confirmation that Contractor workers have vacated the plant..

2.7 Access Control

Access to the work site will be the designated plant entry point door identified during the orientation.

The Contractor will take all steps reasonable to ensure that any visitor to the construction site receives appropriate orientation and supervision to ensure that they are not put at risk.

2.8 Permitting

Control of construction and installation work at an operating plant requires clear, concise and documented communication among contractors, contract administrators and plant operators. Contractors shall prepare and utilize the following permits as applicable and obtain necessary sign-offs prior to undertaking the associated work.

(a) Hot Work permit; and

(b) Confined Space Entry permit.

The above listed Permit templates, when required, will be provided to Contractor during the site orientation.

2.9 Environmental

The Worksite is part of the City of Winnipeg Wastewater System. Safe handling and storage of fuel, oils, and chemicals shall be of the highest priority and care. Contractors shall review and understand the City of Winnipeg Environmental Management Policy , associated Preservation and Compliance documentation and Environmental Accident Reporting Regulation Any spill or release shall be immediately reported to the Contract Administrator.

The Contract Administrator shall immediately notify the City of such spills in accordance with established City of Winnipeg protocols and monitor the Contractors containment and remediation actions. The Contract Administrator shall obtain copies of Contractors incident report and investigation.

2.10 Definitions

City of Winnipeg

Refers to The City of Winnipeg, as continued under, The City of Winnipeg Act, Statutes of Manitoba 1989-90, C-10, and any subsequent amendments thereto.

H2S Hydrogen Sulfide

LEL Lower Explosive Limit

LOTO Lockout Tag Out Procedure

PPE – Personal Protective Equipment

To be worn at all times while on the worksite or adjacent areas where work is being undertaken.

WSTP Program Team

Team comprised of both Veolia and City of Winnipeg personnel

Project

The location or locations at which the Work is to be performed, including rights of way, leases and temporary working spaces, and in Definitions (Act W.210), page 2.

Workplace Safety and Health Act W.210, MR217/2006

Governing Health and Safety in the province of Manitoba or those regulations that are in effect at the time of the work.

WSTP Winnipeg Sewage Treatment Program

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SUBMITTALS

A. Quality Control Submittals: Submit certificates from inspecting authorities for electrical work, pressure piping, and gas piping among others.

1.2 APPLICABLE CODES

A. Comply with the latest edition of the codes and standards referenced in Contract Documents and following statutes and codes and all amendments thereto:
   1. The Manitoba Nuisance Act
   2. The Public Health Act
   3. The Manitoba Building Code Act and Regulations.
   4. National Building Code of Canada.
   5. Occupational Health and Safety Act and Regulations for Construction Projects, covering safety, hazardous materials, and Workplace Hazardous Material Information.
   6. Manitoba Plumbing Code.
   7. Canadian Environmental Protection Act
   8. Canadian Electrical Code.
   9. Manitoba Workplace Safety and Health Act

B. For purposes of the Manitoba Workplace Safety and Health Act, the Contractor will be designated the “Prime Contractor” and assumes the responsibility of the Prime Contractor as set out in the Act and its regulations.

1.3 PERMITS, APPROVALS, AND LICENCES

A. The City will obtain and pay only for the following permits and approvals:
   1. Excavation Permit
   2. Building Permit

B. A copy of each approval or permit will be available at Contract Administrator’s office for review. Contractor shall examine the approvals and permits and conform to the requirements contained therein and such requirements are hereby made a part of these Contract documents as fully and completely as though the same were set forth herein. Failure to examine the approvals and permits will not relieve Contractor from compliance with the requirements stated therein.

C. Apply for, obtain, and pay for all other permits, approvals, licences and governmental inspections required for the performance of the Work.

D. Contract Administrator will provide Contractor with a clean set of Drawings and Specifications, as necessary, for each application.

E. Where electrical enclosures and panels do not have CSA labels, arrange for each such electrical enclosure or panel to be inspected by the electrical authority having jurisdiction.

F. Arrange for all other regulatory inspections and final inspections required.

G. The Contractor shall be solely responsible, without limitations, for any delays arising from the Contractor's failure to plan for the required inspections and to ascertain the availability of the Permit/Approval/Licensing Inspectors to complete the required inspections for the Works under this Contract. The related costs and expenses incurred by the Contractor shall be borne by the Contractor, with no change in the Contract Price and/or Contract Time.

1.4 NOISE CONTROL ON-SITE

A. Abide by all local ordinances. Adjust hours of operation accordingly.

B. All plant and equipment supplied by the Contractor for use on the Work shall be effectively "sound-reduced" by means of silencers, mufflers, acoustic linings or shields or acoustic sheds or screens to a level of 85 decibels (dBA) measured outside the nearest occupied property or to the satisfaction of the Contract Administrator.

1.5 DUST CONTROL ON-SITE

A. Perform dust control measures to minimize dust generation.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 43 33

CONTRACTOR FIELD SERVICES

PART 1 GENERAL

1.1 SUBMITTALS

A. Submittals:
1. Qualifications of Contractor's Representative
2. Contractor's Certificate of Compliance
3. Form 100: Certificate of Equipment Delivery
4. Form 101: Certificate of Readiness to Install
5. Functional and Performance Test Plans, including manufacturers' startup forms and checklists
6. Equipment Training Materials and Agendas as per Section 01 79 00 Demonstration and Training
7. Form T-1: Certificate of Satisfactory Classroom Training, and Form T-2: Certificate of Satisfactory Field Training as per Section 01 79 00 Demonstration and Training
8. Functional Testing results and Form 102: Certificate of Satisfactory Installation as per Section 01 91 14 Equipment Testing and Facility Startup
9. Performance Test reports and Forms 103: Certificate of Equipment Satisfactory Performance, as per Section 01 91 14 Equipment Testing and Facility Startup
10. Form 104: Certificate of Satisfactory Process Demonstration, and Form 105 Certificate of Satisfactory Process Performance as per Section 01 91 14 Equipment Testing and Facility Startup
11. Form 106 Certificate of Overall Facility Performance Verification as per Section 01 91 14 Equipment Testing and Facility Startup

1.2 REQUIRED FIELD SERVICES

A. The Contractor shall provide authorized Manufacturer Representative field services to assist in the training, testing, startup and Commissioning of the process mechanical, building mechanical and electrical Work. All costs associated with providing Manufacturer Representative field services, including but not limited to travel, accommodations and meals, shall be borne by the Contractor.

B. The Contractor shall provide field engineering services to measure quantities, layout the Work, confirm subsurface conditions, and record as-built conditions.

1.3 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

A. Authorized Manufacturer's Representative, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment Manufacturer to issue the certifications required of the Manufacturer. Additional qualifications may be specified elsewhere.

B. Representative subject to acceptance by Contract Administrator. No substitute representatives will be allowed unless prior written approval by such has been given.

1.4 SURVEY REFERENCE POINTS

A. Existing base horizontal and vertical control points are designated on Drawings.

B. Locate, confirm, and protect control points. Preserve permanent reference points during construction.

C. Make no changes or relocations without prior written notice to the Contract Administrator.

D. Report to the Contract Administrator when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

E. Engage and pay for a Manitoba Land Surveyor to replace control points in accordance with the original survey control.

1.5 SURVEY REFERENCE POINTS

A. Establish lines and levels; locate and lay out by instrumentation (GPS, Total Station, etc.)

B. Stake for excavation, grading, and backfill.

C. Establish building elevations, equipment locations, road layout, pipe invert and centerline elevations.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 CONTRACTOR’S CERTIFICATE OF COMPLIANCE

A. A Contractor’s Certificate of Compliance, a copy of which is attached to this Section, shall be completed in full and submitted prior to shipment of product or material or execution of the services.

B. Contract Administrator may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted Certificate of Compliance.

C. The form shall certify that the proposed product or material specified conforms to or exceeds specifications. Attach supporting reference data, affidavits, and certifications as appropriate.

D. May reflect recent or previous test results on material or product, if acceptable to Contract Administrator.

3.2 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

A. Provide Manufacturers' services when required by an individual Specification section, to meet the requirements of this Section.

B. Where time is necessary in excess of that stated in the Specifications for Manufacturers' services, or when a minimum time is not specified, the time required to perform the specified services shall be considered incidental.

C. Schedule Manufacturer' services to avoid conflict with other onsite testing or other Manufacturers' onsite services.

D. Determine, before scheduling services, that all conditions necessary to allow successful testing have been met.

E. Only those days of service approved by Contract Administrator will be credited to fulfill the specified minimum services.

F. When specified in individual specification sections, Contractor shall arrange for the Manufacturer's onsite services to provide:
   1. Inspection and checking as required following delivery as warranted by Manufacturer and necessary to sign off on Certificate of Equipment Delivery Form 100.
   2. Instruction to the Contractor of the specific requirements related to equipment installation, and the Contractor and Manufacturer's representative sign off on Certificate of Readiness to Install Form 101.
   3. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
   4. Revisiting the site as required to correct problems and until installation and operation are acceptable to Contract Administrator.
   5. Resolution of assembly or installation problems attributable to, or associated with, respective Manufacturer's products and systems.
   6. Assistance during equipment Functional Testing and Performance Testing, as per Section 01 91 14 Equipment Testing and Facility Startup.
   7. Assistance during Unit Process and Facility Demonstration Testing and Performance Verification as per Section 01 91 14 Equipment Testing and Facility Startup.
   8. Training of the City's personnel in the operation and maintenance of respective product as per Section 01 79 00 Demonstration and Training.
   9. Additional requirements may be specified elsewhere.

3.3 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

A. When specified in individual Specification section, submit prior to shipment of product or material.

B. Contract Administrator may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

C. Signed by product Manufacturer certifying that product or material specified conforms to or exceeds specified. Attach supporting reference data, affidavits, and certifications as appropriate.

D. May reflect recent or previous test results on material or product, if acceptable to Contract Administrator.

3.4 FORM 100 CERTIFICATE OF EQUIPMENT DELIVERY

A. When so specified, a FORM 100 CERTIFICATE OF EQUIPMENT DELIVERY, a copy of which is attached to this section, shall be completed and signed by the equipment Manufacturer's representative and the Contractor.

B. Such form shall certify that the signing party is a duly authorized representative of the Manufacturer, is empowered by the Manufacturer to inspect the equipment to certify that the equipment was delivered to the Contractor in satisfactory condition, with no visible evidence of exterior damage or defects.

3.5 FORM 101 CERTIFICATE OF READINESS TO INSTALL

A. When so specified, a FORM 101 CERTIFICATE OF READINESS TO INSTALL, a copy of which is attached to this section, shall be completed and signed by the equipment Manufacturer's representative and the Contractor.

B. Such form shall certify that the signing party is a duly authorized representative of the Manufacturer, is empowered by the Manufacturer to familiarize the Contractor with specific requirements related to equipment installation, and to verify that the Contractor understands the required installation procedures prior to equipment installation.

3.6 TRAINING

A. Refer to Section 01 79 00, Demonstration and Training.

3.7 EQUIPMENT TESTING AND FACILITY STARTUP

A. Refer to Section 01 91 14, Equipment Testing and Facility Startup.

3.8 SUPPLEMENTS

A. The supplements listed below, following “End of Section”, are part of this Specification.
   1. Contractor’s Certificate of Compliance
   2. Form 100: Certificate of Equipment Delivery
   3. Form 101: Certificate of Readiness to Install

END OF SECTION

CONTRACTOR'S CERTIFICATE OF COMPLIANCE

CITY _____

PRODUCT, MATERIAL OR SERVICE SUBMITTED:_____

PROJECT NAME:_____

PROJECT NO:_____

COMMENTS:_____

_____

_____

_____

_____

_____

Comments:_____

_____

_____

_____

_____

I hereby certify that the above-referenced product, material, or service called for by the Contract for the named Project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the Contract requirements, and are in the quantity shown.

Date of Execution:_____, 20___

Contractor:_____

By Contractor's Authorized Representative *(print)*: _____

_____

(Authorized Signature)

Water and Waste Department • Service des eaux et des déchets

Form 100

CERTIFICATE OF EQUIPMENT DELIVERY

We certify that the equipment listed below has been delivered into the care and custody of the Contractor. The equipment has been found to be in satisfactory condition. There is no visible evidence of exterior damage or defects.

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

Print Name Signature Date
(Authorized Representative of Manufacturer)

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Water and Waste Department • Service des eaux et des déchets

Form 101

CERTIFICATE OF READINESS TO INSTALL

We have familiarized the installing contractor of the specific requirements related to the equipment listed below and am satisfied that the installing contractor understands the required installation procedures.

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

Print Name Signature Date
(Authorized Representative of Manufacturer)

We certify that we have received satisfactory installation instructions from the equipment Manufacturer/vendor.

Print Name Signature Date
(Authorized Representative of Contractor)

SECTION 01 45 16.13

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 INSPECTION

A. Allow Contract Administrator access to Work. If part of Work is in preparation at locations other than place of Work, allow access to such Work whenever it is in progress.

B. Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Contract Administrator instructions.

C. If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

D. Contractor Administrator may order part of Work to be examined if Work is suspected to not be in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with the Contract Documents, the City will pay cost of examination and replacement if necessary.

1.2 QUALITY CONTROL

A. The City will provide inspection services to perform the following routine quality control services, at no cost to the Contractor:
   1. Compaction of backfill.
   2. Pile installation
   3. Cast-in-place concrete items.
   4. Subgrade examination for load bearing capability if required.

B. The City’s tests do not relieve Contractor of their own quality control.

C. Contract Administrator may request samples at any reasonable time.

D. Additional testing required to prove the adequacy of construction shall be at Contractor's expense, where the routine test shows the construction to be inadequate or where Contractor's materials and procedures have not been as specified or when work has proceeded without observation.

E. Such additional testing or retesting will be performed by a testing agency approved by Contract Administrator.

1.3 PROCEDURES

A. Notify Contract Administrator in advance of requirement for tests, in order that attendance arrangements can be made.

B. Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

C. Provide labour and facilities to obtain and handle samples and materials on Site. Provide sufficient space to store and cure test samples.

1.4 REJECTED WORK

A. Remove deficient Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Contract Administrator as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

B. Make good other Contractor's work damaged by such removals or replacements promptly.

1.5 REPORTS

A. Submit one electronic (PDF) copy of inspection and test reports to Contract Administrator.

1.6 TESTS AND MIX DESIGNS

A. Furnish test results and mix designs as specified, and as requested by the Contract Administrator.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUBMITTALS

A. Informational Submittals:
   1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
   2. Temporary Utility Submittals:
      a. Electric power supply and distribution plans.
   3. Temporary Construction Submittals:
      a. Contractor's field office, storage yard, and storage building plans, including gravel-surfaced area.
      b. Staging area location plan.
      c. Traffic control and routing plans: As specified herein, and proposed revisions thereto.
      d. Plan for maintenance of existing plant operations.
      e. Tower crane location plan if a tower crane is to be used.
   4. Temporary Control Submittals:
      a. Noise control plan.
      b. Plan for disposal of waste materials and intended haul routes.
      c. Plan for sediment control and storm water management.
      d. Plan for dewatering and drainage.
   5. Submit shop drawings for temporary equipment in accordance with Section 01 33 00, Submittal Procedures.
   6. Submit operations and maintenance data for temporary equipment in accordance with Section 01 78 23, Operations and Maintenance Data, Submittal Procedures.

1.2 MOBILIZATION

A. Mobilization shall include, but not be limited to, these principal items:
   1. Obtaining required permits that are not obtained by the City.
   2. Moving Contractor's field office and equipment required for first month operations onto Site.
   3. Installing temporary construction power, wiring, and lighting facilities.
   4. Providing onsite communication facilities, including telephones and internet.
   5. Providing onsite sanitary facilities and potable water facilities as specified and as required by governing agencies.
   6. Providing sedimentation and erosion control measures, including silt fencing and straw bale flow checks and the maintenance and repair (if necessary) of these facilities
   7. Posting Workplace Health and Safety Act required notices and establishing safety programs and procedures.
   8. Having Contractor's superintendent at Site full time.

B. Use area designated for Contractor's temporary facilities as shown on Drawings.

1.3 ACCESS TO SITE

A. The SEWPCC will be in operation during the course of the Work. The City has the process authority. Coordinate all access and construction activities that may affect facility operations with the City and the Contract Administrator.

B. The Contractor will not be given keys for the existing facilities and will organize access with the Contract Administrator.

1.4 CONTRACTOR'S OFFICE

A. Accommodation for the Contractor's office, plant, tools, equipment, and materials (including fuel) shall be the responsibility of the Contractor. Such accommodation at the Site shall be located after consultation with the Contract Administrator. The Contractor shall be responsible for the protection of its plant, tools, equipment, and materials stored on-site. Materials stored on the City's premises shall be neatly stacked and protected from the weather.

B. The Contractor shall confine their activities to the minimum area necessary for undertaking and completing the Work. Material and equipment storage areas shall be at locations acceptable to the Contract Administrator.

C. The Contractor's construction activities shall not encroach or enter onto private property without written consent from the owner of the property concerned. The Contractor shall provide the Contract Administrator with a copy of the written agreement with the property owner.

1.5 SITE SECURITY

A. The Contractor is responsible for all material and equipment related to the Contract stored on the Site. The City will not provide security forces to the plant Site.

B. The Contractor shall ensure the operating plant is secure at the end of each shift to prevent unauthorized entry during off-work hours. Should securing the operating plant not be possible, the Contractor shall provide security personnel to prevent unauthorized entry during off-work hours at no additional cost to the City.

C. The Contractor shall cover all openings at the end of the work shift to protect against weather and entry of wildlife.

1.6 SCAFFOLDING

A. Provide and maintain adequate scaffolding as required. Scaffolding is to be rigid, secure, and constructed to ensure adequate safety for workers. Erect without damage to the building or finishes.

B. Scaffolding in accordance with CAN/CSA-S269.2.

1.7 GUARD RAILS AND BARRICADES

A. Supply and install secure, rigid guardrails and barricades around deep excavations, open shafts, open stairwells, open edges of floors and roofs, and any other fall hazards.

B. Provide as required by governing authorities.

1.8 FIRST AID ROOM

A. Provide and maintain on the site in a clean orderly condition, a completely equipped first aid room readily accessible at all times to everyone on the job site in accordance with Manitoba Workplace Safety and Health Act W210/MR217.

B. Designate properly instructed employees to be in charge of first aid. At least one such employee shall always be available on site while work is in progress.

C. Conspicuously post a telephone list for summoning aid, such as doctors, ambulance, and rescue squads.

1.9 PROTECTION OF WORK AND PROPERTY

A. Comply with the City's requirements all other applicable health and safety rules for contractors while working on the City's property.

B. Provide and maintain suitable storage areas and storage buildings as required to protect products and equipment in accordance with Section 01 61 00 Common Product Requirements.

C. Keep the Contract Administrator informed of serious onsite accidents and related claims.

D. Traffic Control Plan:
   1. Prepare and submit a traffic control plan to be reviewed and accepted by the Contract Administrator. Changes to this plan shall be made only by written approval of the Contract Administrator.

E. The Contractor shall be responsible for snow clearance operations for:
   1. Their designated access roads, parking, staging and laydown areas as shown on the Prime Contractor and Snow Clearing Requirements Drawing in Appendix C.
   2. All temporary roads within the Site as shown on the drawing in Appendix C.
   3. Provide snow removal as required to perform the work of the Contract. Perform snow removal promptly and efficiently by means of suitable equipment whenever necessary for safety, and as may be directed by the Contract Administrator.

PART 2 PRODUCTS

2.1 PROJECT SIGN

A. Contractor shall obtain Contract Administrator approval for installation and location of Contractor signage.

B. Upon completion of the Work, the Contractor is responsible for the removal of the signboards and the return of the signboards to the location of origin. No other signs or notices other than those required for the purposes of warning or indicating danger to the public in connection with their Work may be exhibited by the Contractor on the Site without the prior express approval of the Contract Administrator.

2.2 TEMPORARY SCREENINGS AND GRIT HANDLING WORKS

A. Temporary Conveyor
1. Supply and install a temporary belt conveyor (conveyor will become the property of the City of Winnipeg) to transfer screenings from below the existing screenings collection clam to the new temporary grit/screenings bin, supplied by others.
2. Install the temporary belt conveyor following construction of the new overhead door on the eastern wall of the existing Screen Building, construction of the new road access to the eastern overhead door, and prior to obstructing access to the existing southerly overhead door.
3. Conveyor Equipment
   a. The conveyor equipment shall consist of conveyor belt pans, tracks and supports, take up and drive stations, and control panel.
   b. The centerline length of the conveyor(s) shall be approximately 4.59 m, with 0.66 m wide belt pans and shall travel at 6.71 m/min.
   c. Loading onto the conveyor(s) shall be distributed evenly and shall not exceed the design load capacity of 599 kg per hour.
   d. The conveyor(s) shall have a watertight modular conveying surface with a 20-degree troughed cross section at the outside of the belt width.
   e. Each modular conveying section shall have a convolution that permits the assembled belt to make continuous vertical, horizontal and helical turns that will flatten out as it goes over the drive station, and allows for continuous belt cleaning with a pre-tensioned scraper bar.
   f. The modular belt pan section shall be reinforced with nonmetallic stiffeners molded into each modular belt section to achieve troughing.
   g. The conveyor(s) shall be designed in such a way that all moving parts of the system, except for the drive and tension station components will pass a single designated point along the conveying path which may be used for maintenance and/or service of the conveyor(s).
   h. All conveyor components including panels shall meet requirements of a Class I Division 1 or 2 Installation.
4. Conveyor Belt and Chain
   a. The conveying surface will consist of individually replaceable modular belt pan sections molded of moldable plastic rubber (MPR). The belt pans shall be fastened approximately every 200 mm and supported by a nylon attachment and two (2) durable enhanced, plastic guide (and wear) blocks bolted to a case hardened alloy steel chain.
   b. The chain shall have a minimum breaking strength of 155.7 kN (35,000 lb.).
   c. Each modular belt pan section will have a cleat like convolution at least 38 mm high, permanently molded into the rubber. The closed link alloy steel chain, with alternating horizontal and vertical links will allow for movement in two or more

directions. The 100 mm pitch chain will be guided by the guide blocks bolted bilaterally to each vertical chain link.

d. The belt pan attachments and guide blocks shall be shipped assembled on the chain. The chain and guide blocks will operate in a UHMWPE track consisting of a base, two sides and two top containment angles.

5. Tracks and Supports
   a. The structural frame of the conveyor system shall be structural I beam construction.
   b. The top and bottom flanges of the I beam shall have the UHMWPE track, with bilaterally positioned angles to contain the guide blocks as they are pulled through the track system by the steel chain.
   c. The structural I beam shall be fabricated from minimum 4 mm (1/8”) thick, 304 stainless steel.
   d. The guide blocks shall stabilize the belt pan surface in the event of unbalanced material loading.
   e. The conveyor frame and the conveyor supports shall be structural steel conforming to ASTM A36. All shop welding shall conform to the latest standards of the American Welding Society.
6. Drive Unit
   a. The fully assembled drive station shall consist of a 2 horsepower, 575VAC, 3Ph, 60Hz, TEFC energy efficient motor, a durable corrosion resistant UHMW polyethylene sprocket, gear reducer, V belt, sheaves, and steel sprockets which in combination give the proper belt speed for the load indicated.
   b. A single chain drive between the reducer and the steel sprocket shaft shall be provided for further power and speed reduction. The belt drive sheaves shall be interchangeable in order to provide a different speed by means of other size sheaves. Directly coupled drive motor gear reducer combinations is not acceptable.
   c. A mechanical ratcheting clutch shall be incorporated into the drive design to prevent or mitigate damage to any of the drive components/drive structure.
   d. Any type of over-torque condition created by product overloading or jamming conditions shall cause the ratcheting clutch to release, isolating the power from the electric motor to the gearbox and other power transmission components. The torque setting is adjustable and shall be properly set at the factory for the conveyor application.
7. Chain Tensioning Station
   a. The fully assembled tension station shall consist of a durable corrosion resistant UHMW polyethylene chain sprocket, a constant pressure spring loaded chain tensioner adjustable by a single ratchet, and track all fabricated and assembled in a structural frame ready for installation.
8. Skirt Boards
   a. Conveyor vertical skirt boards shall be provided along the entire conveyor per dimensions shown on the drawings. Skirts shall be 10 mm thick HDPE and shall be supported by brackets from the conveyor frame. Brackets shall be made from 4 mm (1/8”) thick, 304 stainless steel.
9. Drip Pans
   a. 16 gauge, galvanized steel sheet drip pans, with A36 steel support brackets, shall be provided below the conveyor and shall be sloped and piped to drain as indicated on the drawings.

10. Safety Stop Switch
    a. Flag arm safety pull cord switches on each side of the conveyor with orange protective coated cable running the entire length of the conveyor.
    b. NEMA 7 (Explosion Proof) single pole, double throw circuit.
11. Zero Motion Speed Switch
    a. Located on the tension station, the zero speed sensor is to be hardwired to the conveyor control circuit.
    b. NEMA 7 (Explosion Proof), 10-second start delay. Electro Sensors SCP 1000 pre-settable speed switch in an explosion proof housing with a PVC split collar magnet pulsar wrap, or approved equal in accordance with B8.
12. Belt Scraper
    a. A pre-tensioned scraping mechanism, with a replaceable rubber blade and UHMWPE backing plate to continuously remove most material from the conveying surface shall be provided at the conveyor discharge.
13. Hardware
    a. All nuts, bolts and washers shall be type 304 stainless steel.
14. Factory Finish
    a. All mild steel fabricated components shall be hot dipped galvanized to ASTM 123-892 specifications.
    b. All stainless steel components mill finish.
    c. All OEM supplied equipment w with their factory-applied finish.
15. Control Panel
    a. Control Panel shall include, at a minimum, the following requirements:
        1) Class I Division 1 or 2 Installation Capability
        2) NEMA 7 Rated Wall-Mount Enclosure
        3) Main Circuit Breaker with Door-Interlocked Operating Handle
        4) Sprecher & Schuh PCS Series Softstarter Sized for 2HP 575VAC 3PH Incline Conveyor Motor
        5) Emergency Stop Pushbutton; Emergency Stop Fault Indicator Light
        6) Conveyor Hand-Off-Auto Selector Switch
        7) Conveyor Running Indicator Light; Motor Overload Fault Indicator Light
        8) Conveyor Zero Speed Fault Indicator Light; System Fault Reset Pushbutton
        9) Conveyor Auto Run Timer; Interface Relays & SCADA Status Contacts
        10) Run command external interface, as well as run and fault status contacts for connection to the plant DCS.
        11) Fused 120V Control Transformer; Terminal Blocks for Field Connections
        12) UL698B & CSA Listed Assembled Control Panel
        13) Modifications to the existing DCS for a run command signal, and run and fault status signals for the temporary conveyor to be performed by the City forces. All required power and automation wiring, and connections shall be provided by the Contractor in accordance with the Drawings and Specifications.
16. Spare Parts
    a. One set of spare parts, consisting of 5 belt pans, 10 guide blocks, 5 chain attachments, and 2 rubber scraper blades.
17. Acceptable Product:
    a. Pathwinder (P2) Conveyor manufactured by Serpentix Conveyor Corporation.

18. Fabrication and Installation
    a. All temporary conveyor equipment and associated Works shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with detailed drawings, specifications, engineering data, instructions, and recommendations furnished by the Manufacturer. Final assembly of the entire conveyor unit may require the cutting and re-drilling of some of the components, such as track sections, drip pans and covers in order to conform to any Site deviations. This work shall be performed on Site by the Contractor.
    b. Installation of all parts shall be done by the Contractor in a workmanlike manner and in accordance with the detailed technical installation procedures supplied by the conveyor Manufacturer. It shall be the Contractor's responsibility to handle, store, and install the conveyor operation mechanism and accessories in strict accordance with the Manufacturer's drawings and recommendations.
    c. In order to minimize operational interruptions to the screenings and grit facilities, the Contractor shall pre-assemble the conveyor and equipment to the greatest extent possible. The Manufacturer shall provide inspection and Functional Testing of components, to the greatest extent possible, prior to locating the equipment in the Screen Building for final installation.
    d. Once assembled and verified, the City will temporarily stop the screenings and grit conveyance system, and remove the existing screenings and grit bin through the existing southerly overhead door in the Screen Building, and the Contractor shall relocate the fully assembled equipment into the building and complete the final connections, including all electrical and automation connections required.
    e. Following final installation of the conveyor, the City will install the new temporary screenings bin through the new overhead door on the eastern wall of the existing Screen Building.
    f. Temporary conveyor shall be installed to allow adequate space for the regular removal and replacement of the temporary bin.
19. Equipment Testing and Facility Startup
    a. Contractor and Manufacturer shall complete the Functional Testing and the Performance Testing of the equipment, in accordance with Section 01 91 14, Equipment Testing and Facility Startup upon installation. Complete and sign Form 102 and Form 103 upon successful completion if each tests.
    b. Demonstration Testing and Performance Verification of the temporary belt conveyor system, complete with bin filling, removal and replacement, shall be performed in accordance with Section 01 91 14, Equipment Testing and Facility Startup, and shall include operating the system, without faults for a period of at least 3 days, and at least 2 grit and screening removal cycles prior to permanent obstruction of the southerly overhead door. Complete and sign Form 104 and Form 105 upon successful completion of the Demonstration Testing and Performance Verification, respectively.
    c. The City will take over operation of the temporary conveyor and associated works after the successful completion of the site training, and of the Demonstration Testing and Performance Verification, and acceptance of the Operations and Maintenance Data.
20. Training: The Contractor shall arrange for pre-startup and post startup training in accordance with Section 01 79 00, Demonstration and Training.

21. Contractor's Field Services:
    a. Present at Site or classroom designated by the City, for minimum person days listed below, travel time excluded:
        1) 1 person day for pre-startup classroom or Site training.
        2) 1 person day for inspection prior to final installation, installation assistance, for functional and performance testing, and completion of Manufacturer's Certificate of Proper Installation.
        3) 1 person days for post startup training of the City's personnel.
        4) Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by Contract Administrator.

B. Temporary Mobile Waste Bins and Liners
1. Following demolition of the existing screenings and grit belt conveyor, the Contractor shall be responsible for capturing and collecting screenings in temporary mobile waste bins, complete with leak-proof flexible intermediate bulk container (FIBC) bulk bag.
2. The Contractor shall supply and install a hopper from each screen discharge to direct screenings into the mobile waste bins.
3. Temporary Mobile Waste Bins
    a. Supply four (4) mobile waste bins with a maximum storage capacity of 1.1 m^3 each.
    b. Mobile waste bins shall be supplied with castors to allow relocation and changeover of bins.
    c. Alternatively, the Contractor may supply four (4) mobile stainless steel bag carrier frames, designed to allow the FIBC to be removed by the existing overhead crane. Contractor shall submit bag carrier frame design to Contract Administrator for review prior to acceptance.
4. FIBC Bulk Bags
    a. FIBC bulk bags shall be sized to match the dimensions of the Temporary mobile bins or bag carrier frames.
    b. FIBC bulk bags shall be waterproof, with lifting loops suitable to allow bag removal by the overhead crane.
    c. Minimum capacity of 6000 kg.
    d. MiniBulk 315-B or approved equal in accordance with B8.
5. Contractor's Field Services
    a. The Contractor shall be responsible for monitoring grit and screening levels in the bulk bags, transferring full bulk bags to the screenings bin using the existing overhead crane, and installing new empty bags in the mobile waste bins or frames for the duration of the new screen installation Work.
    b. Maximum allowable loading of the slab is 5kN/m^2 as indicated on the Drawings.
    c. Maximum capacity of the overhead crane is 2000 kg.

2.3 TEMPORARY RAS LINE WORKS

A. The Contractor shall coordinate all temporary RAS related Works with the Contract Administrator and the City.

B. Contractor shall supply and install a temporary Return Activated Sludge (RAS) line and pump, including are required fittings, valves, supports and thrust restraint, to facilitate Commissioning and changeover of the Biological Nutrient Removal (BNR or Bioreactors)

from the HPO. Any and all shutdowns required to install the Temporary RAS Line Works shall be coordinated with the Contract Administrator and the City in accordance with Section 01 35 13, Special Project Provisions.

C. Refer to Section 01 52 10, Construction Sequencing for additional details on anticipated bioreactor/HPO seeding and changeover sequencing.

D. Refer to Temporary RAS Line Modifications Figure 1, Figure 2 and Figure 3 located in the Supplements of this Section for proposed routing, valving, and tie-in locations for the temporary RAS Line. Final routing to be coordinated in the field with City and the Contract Administrator.

E. Where required, install tees, isolation valves and blind flanges on existing lines during the bypass of the secondary treatment, to minimize operational interruptions later on in the Work. Coordinate with the Contract Administrator and the City.

F. Supply and install isolation valves as shown in Figure 1, Figure 2 and Figure 3 located in the Supplements of this Section, and as shown on the Drawings.

G. The temporary RAS line and fittings shall meet the following minimum requirements:
   1. Minimum diameter: 450 mm
   2. Anticipated length: 160 m (approximate)
   3. Pressure Rating: 200 kPa
   4. Material: HDPE
   5. Hazen-Williams Coefficient (C) 120 or greater
   6. Process commodity: Return Activated Sludge (RAS)

H. Temporary Clarifier 2 RAS Pump
   1. Horizontal split-case centrifugal pump to match existing RAS pumps P-S101, P-S102 and P-S103.
   2. Design Capacity: 20.7 ML/d at 7.6m TDH
   3. 1175 rpm 575V, 3Ph, 30kW Motor
   4. Supply and install a VFD locally to manually control the temporary RAS pump. Provide run and fault status signals back to the facility control system, including an alarm signal for when the pump is not running but the Secondary Clarifier associated with the pump is running.
   5. Contractor shall supply and install all required appurtenances for the proper installation and operation of the pump, including but not limited to equipment pad, drain lines, pipe connections, flanges and fittings, pressure gauges, isolation and check valves, panels, power and automation wiring and conduit, and spare parts and tools.
   6. In order to minimize operational interruptions, install the new pump suction line and suction isolation valve during the bypass of the secondary treatment.

I. Contractor’s Field Services
   1. Contractor shall be responsible for supply, installation, and Commissioning of the temporary RAS line, valves and temporary clarifier 2 RAS pump.
   2. During the bioreactor seeding operation, the Contractor shall be responsible operation of the temporary RAS line, valves and temporary pump and associated works.

J. Following changeover of the temporary RAS line from feeding the bioreactors to feeding the HPO (Step 5 to Step 6), the temporary clarifier 2 RAS pump and associated works may be decommissioned, and operation of the temporary RAS line and valves may be handed over to the City. Refer to Section 01 52 10, Construction Sequencing for additional details on anticipated Bioreactor/HPO seeding and changeover.BNR (BIOREACTOR) SEEDING TEMPORARY WORKS

1. The Contractor shall supply and install a temporary screen, transfer tank, and progressive cavity pump, associated equipment and hoses to screen and transfer the City-supplied waste activated sludge (WAS) from the hauling trucks to the aerated zone of the new bioreactors. All temporary equipment used for seeding the bioreactors shall remain the property of the Contractor and be removed from Site upon completion of seeding.
2. The Contractor shall supply two (2) temporary submersible centrifugal pumps with associated equipment and hoses to transfer liquids between the bioreactor tanks to facilitate seeding.
3. The screen, tank and pumps shall be installed such that the City sludge hauling trucks will be able to discharge the WAS by gravity into the screen, where it shall flow by gravity into the transfer tank. The anticipated truck discharge is 8" male quick coupler connection, with height from grade to centerline of charge of approximately 1125 mm. Contractor to confirm discharge elevation and connection size and type prior to installation of the screen and tank.
4. In order to achieve gravity flow from truck discharge, through screen into tank, the Contractor may be required to install tank below grade, and supply and install suitable support system for screen assemble to prevent undue stresses and loads being applied to the transfer tank.
5. The Contractor shall supply temporary power for the progressive cavity pump and for the submersible centrifugal pumps during operation.
6. Coordinate installation location(s) in the field with Contract Administrator.
7. Screen
   a. Perforated stainless steel plates
      1) 6 mm diameter holes with 4 mm spacing
      2) OSHA Catwalk
      3) Structural frame material: aluminum
      4) 200 mm (8 inch) Inlet Manifold, Centerline elevation: approximately 760 mm (29 13/16 in) above ground level
      5) 200 mm (8 inch) cam outlet
      6) Supply and install equipment support in accordance with Manufacturer’s recommendations.
      7) Supply screen cleaning tools as recommended by the Manufacturer.
      8) Acceptable Equipment: Screenco Systems Mega Screen, or approved equal in accordance with B8.
      9) Supply and install all necessary equipment, isolation valves, hoses, and fittings for a complete and operational system.
8. Low-profile Tank
   a. Low profile polyethylene tank
   b. Minimum capacity: 7 m^3
   c. Inlet diameter to match screen discharge
   d. Outlet diameter to match pump suction
   e. 100 mm air vent

9. Progressive Cavity Pump
    a. Capacity: 500 L/min at 5.5 m TDH
    b. Process commodity: Waste Activated Sludge (WAS), 30 g/L total solids mass
    c. Supply and install all necessary equipment, power supply, isolation valves, hoses, and fittings for a complete and operational system.
10. Centrifugal Submersible Pumps
    a. Two (2) submersible centrifugal pumps
    b. Capacity: 30 m^3/hr at 10 m TDH
    c. Power 1.5 kW (2HP)
    d. Process commodity: Waste Activated Sludge (WAS), 30 g/L total solids mass
    e. Supply and install all necessary equipment, power supply, isolation valves, hoses, and fittings for a complete and operational system.
11. Contractor's Field Services
    a. During seeding of the bioreactors the City will supply 2 to10 truckloads of WAS per day from the WEWPCC, depending on thickness of WAS received from the WEWPCC. Anticipated truck volume is 28 m^3 each. The process is anticipated to take 6 to 11 days per bioreactor.
    b. Contractor shall be responsible for supply, installation, testing and Commissioning and operation of the temporary screen and pumps.
    c. During the seeding operation, the Contractor shall be responsible for receiving the City hauling trucks, screening the WAS, pumping the WAS to the Bioreactors, and cleaning the screened solids from the screen between truckloads. Contract Administrator will assist in coordinating WAS delivery.
    d. During transfer of WAS between bioreactor tanks, the Contractor shall be responsible for supplying, installing and operating the submersible pumps.

2.4 TEMPORARY AUTOMATION WORK

A. Provide temporary network architectures to allow for the required construction and Commissioning sequencing. Maintain a redlined markup set of Drawings of the current network architectures throughout the entire construction process. Provide temporary patching and cables as required. See drawings 1-0102-ANET-AT01 to AT05 for proposed temporary fibre network architectures.

B. Provide temporary wiring and relays in CP-S821 (FDP-S) for the inclusion of run and high torque signals from CM-S110 and CM-S120 prior to the DCS migration in the Secondary Clarifiers.

C. Provide temporary connection of NGW-S944 to the existing Modicon MW-BM85-00 in CP-S821 (FDP-S) for communication to the control system network prior to the UV building upgrades.

2.5 TEMPORARY CONTROL SYSTEM LOGIC PROGRAMMING

A. Provide temporary programming as required to facilitate the phased commissioning of the upgrades at the SEWPCC facility. See A-0102-AELI-A022 for the signals associated with this programming. Temporary programming is to include, but not be limited to:
   1. Monitoring of the existing 85 kW standby generator and associated equipment in the Service Building until the standby generator is decommissioned.
   2. Monitoring of the power meter signals for the existing main switchgear until the switchgear is fed from the new 12.47 kV switchgear.
   3. Secondary Clarifier flow control, RAS pumping and flow control, and associated valves and instrumentation to accommodate start up of the BNR system. The bioreactor transition will occur in six steps (refer to Section 01 52 10, Construction Sequencing for additional details on anticipated Bioreactor/HPO seeding and changeover):
      a. Steps 1 and 2 – Operate existing HPO with new Clarifiers 4 and 5 and existing Clarifier 1
      b. Step 3 – Operate existing HPO with Clarifiers 1, 4 and 5. Operate Bioreactor 1 with Clarifier 2.
      c. Step 4 – Operate existing HPO with Clarifiers 1, 4 and 5. Operate Bioreactors 1 and 2 with Clarifier 2 and 3.
      d. Step 5 – Operate existing HPO with Clarifiers 1 and 4. Operate Bioreactors 1, 2 and 3 with Clarifier 2, 3 and 5.
      e. Step 6 – Operate existing HPO with Clarifier 4. Operate Bioreactors 1, 2, and 3 with Clarifier 1, 2, 3, and 5.
   4. Monitoring and control for signals from the UV Building to the new Secondary Clarifier controller after the Secondary Clarifier DCS migration and prior to the UV Building upgrades being completed.
   5. Monitoring and control for signals for the Primary Clarifier sludge transfer pumps after the Primary Clarifier DCS migration and prior to the upgrades to these pumps is complete, if required.
   6. Monitoring and control for the signals for the Secondary Clarifier sludge loadout/recirculation pumps after the Secondary Clarifier DCS migration and prior to the upgrades to these pumps is complete, if required.
   7. Monitoring and control of the existing raw sewage pump P-G102, if required.

B. Temporary programming required for the existing DCS to facilitate the transition of the plant processes will be completed by City forces. Advise the City of all temporary programming required. Coordinate with the Contract Administrator to allow ample time for the City to complete the programming. Temporary programming will included, but not be limited to:
   1. Monitoring and control for the signals for the temporary grit and screenings conveyor.
   2. Modifications to allow operation of the existing screens with the existing conveyor removed.
   3. Automatic start up of Grit Tanks 3 and 4 for high influent flow to the plant once headworks upgrades have been complete and prior to the Headworks DCS migration.
   4. Modifications to the DCS displays as DCS gets migrated to the new control system. See DCS Migration Plan document S0926-01CA-PLA-0001 for details.
   5. Modifications to the DCS for logic moving from one PCU to another to facilitate DCS migration procedure. See DCS Migration Plan document S0926-01CA-PLA-0001 for details.

6. Modifications to the DCS for signals being rewired from the existing Reactor PCUs to the Secondary Clarifier PCUs, including thermal oxidizer and junction chamber exhaust fan signals.

PART 3 EXECUTION

3.1 TEMPORARY UTILITIES

A. Power:
1. Power requirements for this Contract shall be the responsibility of the Contractor. Supply and install all temporary electric power service, metering equipment, and pay all costs for the electric power used during the Work period.
2. The City will not be responsible, or entertain any claims, for the delay of work resulting from power interruptions to the Site or loss of utility supply.
3. The Contractor shall provide their own source of power (propane or other) for heating their construction trailers. Temporary electricity from the City is not available.

B. Lighting:
1. Provide temporary lighting to meet all applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.
2. The Contractor shall secure all temporary lighting and wiring from damage, falling or tripping hazards.

C. Heating, Cooling, and Ventilating:
1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage due to temperature or humidity. Costs for temporary heat shall be borne by the Contractor.
2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
3. Pay all costs of installation, maintenance, operation, removal, and fuel consumed to execute the Work.
4. Provide portable unit heaters, complete with controls, oil- or gas-fired, and suitably vented to outside as required for protection of health and property.
5. If permanent natural gas piping is used for temporary heating units, do not modify or reroute gas piping without approval of utility company. Provide separate gas metering as required by utility.
6. The Contractor shall provide 24-hour monitoring of temporary heating, cooling and ventilating equipment.

D. Water:
   1. Hydrant Water:
      a. Is available from nearby hydrants. Secure written permission for connection and use from the City and meet requirements for use. Notify fire department before obtaining water from fire hydrants.
      b. Use only special hydrant-operating wrenches to open hydrants. Make certain that hydrant valve is open full, since cracking the valve causes damage to the hydrant. Repair damaged hydrants and notify appropriate agency as quickly as possible. Hydrants shall be completely accessible to fire department at all times.
   2. Provide temporary facilities and piping required to bring water to point of use, and remove when no longer needed. Install an acceptable metering device and pay for water used at the City's current rate.
   3. The Contractor shall provide hoses as required. The Contractor shall repair any damage caused during use of existing water outlets.

E. Sanitary and Personnel Facilities:
   1. Provide and maintain facilities for Contractor's employees and Subcontractors, in accordance with Manitoba Workplace Safety and Health Act W210/MR217. Service, clean, and maintain facilities and enclosures.
   2. Use of the City's existing sanitary facilities by construction personnel will not be allowed.

F. Communication Services:
   1. Supply onsite telephone and internet service for the sole use of the Contractor during construction. Pay costs of installation and monthly bills. Contractor shall reinstate service outages resulting from construction activities within one business day.

G. Fire Protection:
   1. Supply and maintain on site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).

3.2 PROTECTION OF WORK AND PROPERTY

A. General:
   1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
   2. No residence or business shall be cut off from vehicular traffic unless special arrangements have been made.
   3. Schedule the Work so construction will not interfere with irrigation of cultivated lands. Construction may proceed during irrigation season, provided Contractor constructs temporary irrigation ditches, turnouts, and miscellaneous structures acceptable to property owners.
   4. Maintain in continuous service all existing gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and all other utilities encountered along line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.

5. Where completion of the Work requires temporary or permanent removal and/or relocation of existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.
6. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
7. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
8. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.
9. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance.
    a. Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
10. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
11. Maintain original Site drainage wherever possible.
12. Prevent dust and dirt from entering existing buildings or areas where equipment is stored or is operating. Prevent dust, water or other deleterious substances from entering areas with existing electrical, heating ventilating, pumping, and other equipment.

B. Equipment Fueling: Designate area within working limits to be used exclusively for fueling construction equipment. Maintain apparatus on Site for cleanup of fuel spills.

C. Equipment Cleaning: Keep construction equipment clean so that no debris is deposited on plant roadways or any public roadway. Contain construction debris in designated area within working limits. Dispose of debris off-site as specified.

D. Trees and Plantings:
1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work, which are designated on the Drawings to remain undisturbed.
    a. Where practical, tunnel beneath trees when on or near line of trench.
    b. Employ hand excavation as necessary to prevent tree injury.
    c. Do not stockpile materials or permit traffic within drip lines of trees.
    d. Provide and maintain temporary barricades around trees.
    e. Cover temporarily exposed roots with wet burlap, and keep burlap moist until soil is replaced around roots.
    f. No trees, except those specifically shown on Drawings to be removed, shall be removed without written approval of the Contract Administrator.
    g. Dispose of removed trees in a legal manner off the Site.

2. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.
3. Replace each plant that dies as a result of construction activities.

E. Waterways:
1. Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

F. Dewatering:
1. In accordance with requirements of Section 31 23 19.01, Dewatering construct, maintain, and operate sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

3.3 TEMPORARY CONTROLS

A. Air Pollution Control:
1. Minimize air pollution from construction operations.
2. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.
4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists.

B. Water Pollution Control:
1. Divert sanitary sewage and non-storm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.
2. Prior to commencing excavation and construction, obtain Contract Administrator’s agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and stormwater flow, including dewatering pump discharges.
3. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

C. Erosion, Sediment, and Flood Control:
   1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.
   2. Contractor shall take steps to prevent sediments from disturbed surfaces being transported by surface runoff to existing creeks or storm drainage systems.
   3. Silt fences, straw bales and rock flow check dams shall be placed as required and maintained in place. Any sediments collected shall be disposed off Site. Silt fences and straw bales shall be repaired or replaced as needed during Work and shall be removed when new surfaces have been placed and stabilized.

3.4 ACCESS ROADS

A. Construct access roads as necessary to access the Work. Submit alignments for new routes to Contract Administrator for review.

B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.

C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.

D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.

E. Upon completion of construction, leave access roads in condition suitable for future use by the City. Replace damaged or broken culverts with new culvert pipe of same diameter and material.

3.5 PARKING AREAS

A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, City’s operations, or construction operations.

B. Contractor shall park in area designated by the Contract Administrator. No employee or equipment parking will be permitted on the City’s or the Contract Administrator’s parking areas.

C. Upon completion of construction, leave parking areas in condition suitable for future use by the City.

3.6 VEHICULAR TRAFFIC

A. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.

3.7 CLEANING DURING CONSTRUCTION

A. In accordance with General Conditions, as may be specified in Specification sections, and as required herein.

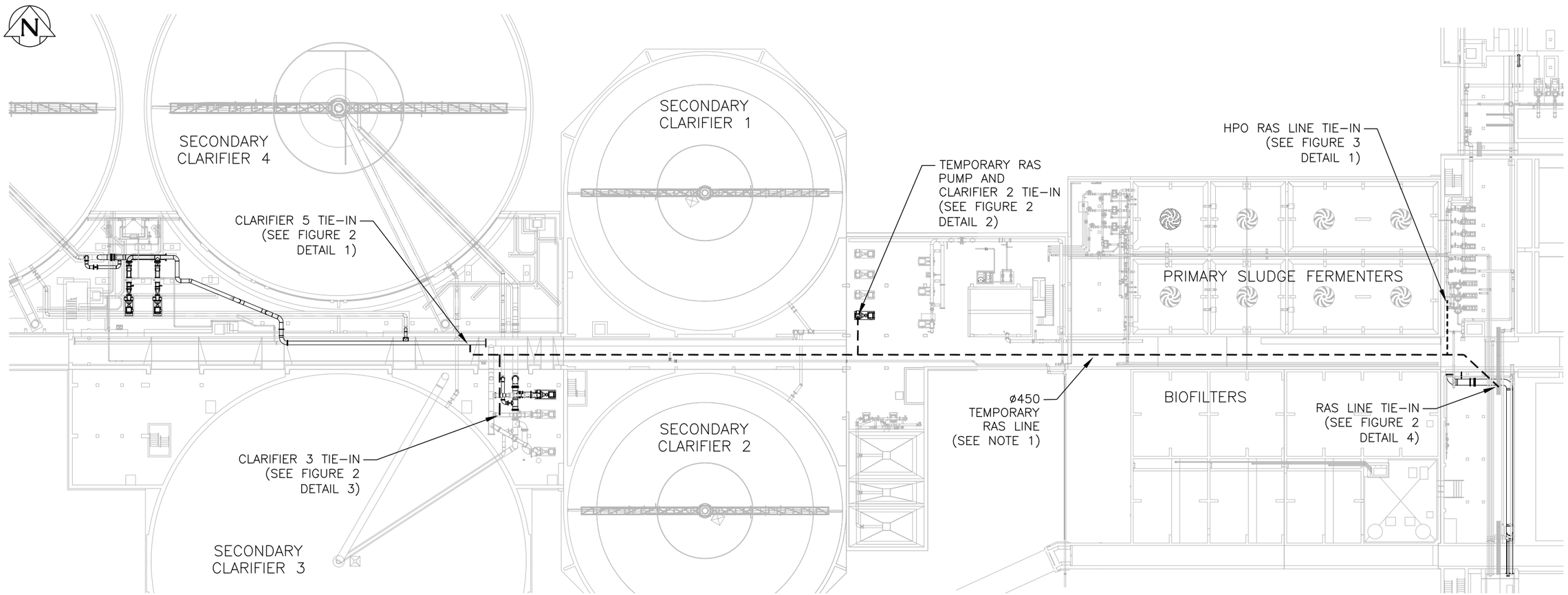
B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep all floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up all debris and dispose.

C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

3.8 SUPPLEMENTS

A. The Supplements listed below, following “End of Section”, are part of this Specification.
   1. Figure 1 – Temporary RAS Line Modifications
   2. Figure 2 – Temporary RAS Line Modifications
   3. Figure 3 – Temporary RAS Line Modifications

END OF SECTION



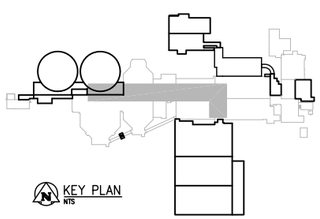
0.0 5.0 10.0 15.0 20.0 25.0m

TEMPORARY RAS LINE PLAN

SCALE 1:500

NOTES

1. RAS LINE ROUTING IS APPROXIMATE AND SHOWN FOR ILLUSTRATION PURPOSES ONLY. FINAL ROUTING TO BE FIELD DETERMINED.
2. FOR INSTALLATION AND SUPPORT COORDINATE WITH CONTRACT ADMINISTRATOR.



SEWPCC UPGRADING/EXPANSION PROJECT

Temporary RAS Line Modifications

Figure 1

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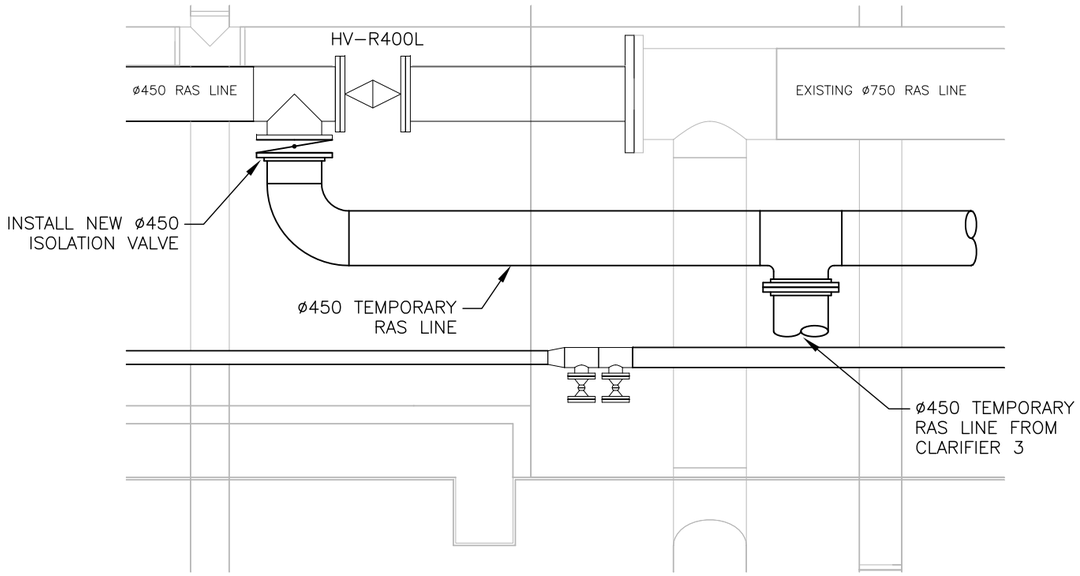
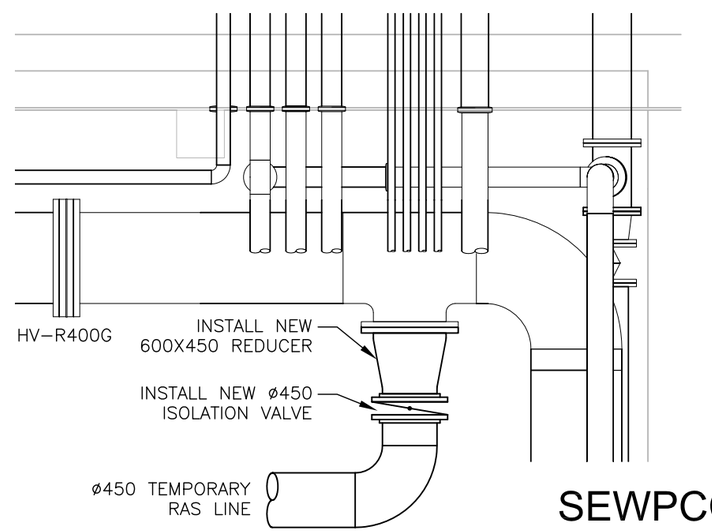


1 – CLARIFIER 5 TIE-IN
NTS

2 – TEMPORARY RAS PUMP AND CLARIFIER 2 TIE-IN
NTS

3 – CLARIFIER 3 TIE-IN
NTS



4 – RAS LINE TIE-IN
NTS

NOTES
1. RAS LINE ROUTING IS APPROXIMATE AND SHOWN FOR ILLUSTRATION PURPOSES ONLY. FINAL ROUTING TO BE FIELD DETERMINED.
2. TEMPORARY RAS PUMP PIPING AND ARRANGEMENT IS APPROXIMATE AND SHOWN FOR ILLUSTRATION PURPOSES ONLY.
3. FOR INSTALLATION AND SUPPORT COORDINATE WITH CONTRACT ADMINISTRATOR.

SEWPCC UPGRADING/EXPANSION PROJECT

Temporary RAS Line Modifications
Figure 2

474248

1 TEMPORARY RAS TIE-IN
–
NTS

NOTES
1. EXACT TIE-IN LOCATION AND REMOVAL EXTENT TO BE COORDINATED ON SITE.

SEWPCC UPGRADING/EXPANSION PROJECT

Temporary RAS Line Modifications
Figure 3

474248

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SECTION 01 52 10

CONSTRUCTION SEQUENCING

PART 1 GENERAL

1.1 SUBMITTALS

A. The Contractor shall incorporate the specified sequence of construction into their progress schedule. The Contractor may propose an alternative sequence of construction to accelerate the construction schedule for review and approval by the Contract Administrator

1.2 INTENT

A. This Section includes construction sequencing constraints and a sequence of construction that will satisfy the constraints required in the execution of the Work.

B. The sequence of construction described herein is general in nature and illustrates the design intent with respect to execution of the Work. Prepare and submit a proposed sequence of construction for review by the City and Contract Administrator. This review will serve to satisfy the City and Contract Administrator that all mandatory construction sequencing constraints have been properly addressed by Contractor in the proposed sequence of construction, but shall in no way absolve the Contractor of complete responsibility for execution of the Work in accordance with the requirements of the Contract Documents.

C. The descriptions of construction activities as outlined in this Section are not intended to be comprehensive or all-inclusive. Many other construction activities and work components, although not specifically noted in this Section, are integral parts of the Work and shall be scheduled and completed by Contractor in accordance with the Contract Documents.

D. The broad grouping of parts of the Work under phases, stages, or similar divisions in the sequence of construction is intended to illustrate the general sequence for execution of the Work as envisioned by Contract Administrator. Such grouping shall in no way absolve Contractor of complete responsibility for the construction means, methods, techniques, sequences, and procedures of construction, or the safety precautions and programs incidental thereto.

1.3 COORDINATION

A. The facility will be maintained in continuous operation without interruption throughout the duration of the Contract. Cooperate with the City and do not interfere unnecessarily with the day-to-day operations of the Facility. At all times provide the City with unhindered access to all portions of the Facility that are in operation.

B. Coordinate the requirements of this Section with the other requirements of the Contract Documents.

1.4 SERVICES PROVIDED BY CONTRACTOR

A. Provide all necessary temporary power, pumping facilities, pipes, valves, fittings, diversions, equipment, and temporary bulkhead systems as required during construction and changeover of process flows and materials from one tank, channel, pipe, process, or sewer to another.

B. In general, place into service all new tankage, pumping facilities, electrical connections, piping, sewers, channels, and similar facilities before removing any existing parallel facilities from service.

C. In general, the City will remove from service process units, tanks, sewers, channels, pipelines, and similar facilities only once, unless otherwise specified.

1.5 SEQUENCE OF CONSTRUCTION

A. The sequence of construction described herein is based on Contract Administrator's knowledge of the design components of the Project and not on experience in the construction of such Work. Contract Administrator assumes no responsibility for the time required to construct the Work following the sequence of construction.

B. Contractor may on their own initiative submit an alternate proposed sequence of construction to Contract Administrator for review. Such review shall in no way make Contract Administrator responsible for the time or costs required to construct the Work following Contractor's alternate sequence of construction.

C. For tie-ins to existing process units that require interruption to, or temporary shutdown of, processes or equipment, carefully plan and sequence such tie-ins well in advance for approval by the Contract Administrator and the City in accordance with Section 01 35 13 Special Project Procedures. Such tie-ins and connections may be subject to change by the City and the Contract Administrator due to weather conditions and higher than anticipated plant flows.

D. Incorporate the construction constraints and sequence of construction in the Baseline and Current Schedules required in Section 01 32 00 Construction Progress Documentation

E. Construct the Work in stages to allow for the City's continuous occupancy and uninterrupted operation and maintenance of the existing facilities during construction. Be responsible for all temporary connections required to maintain the City's operations. Unless specifically indicated otherwise, new systems or subsystems, as appropriate, must be placed into service before existing systems are taken out of service and made available for use by Contractor.

F. Include in the sequence of construction and Baseline / Current Schedule operations requiring actions by the City, such as the redirection of flows, isolation or draining of tanks, channels, and pipelines, and short-term process and power outages. Submit written request for such scheduled operations to Contract Administrator a minimum of 14 Calendar days in advance, for consideration by the City and Contract Administrator, describing the reasons for, anticipated duration of, and areas affected by any process and power outages. Provide temporary means as required to maintain utilities such as power, gas, fuel oil, air, and water as appropriate to critical facility components if requested by the City and Contract Administrator.

G. For operations requiring action by the City, allow a reasonable time period in the Baseline / Current Schedule (minimum of 4 days unless noted otherwise) for the City to take out of service individual tanks or channels before to making them available to Contractor.

H. Perform the work continuously and expeditiously during process and power outages, critical connections and changeovers, and as required to minimize interruption of the City's operations.

I. Coordinate the proposed work with the City and Contract Administrator prior to Unit Process shutdowns. Do not stop the work at the end of a normal working day under any circumstances if such action may cause a cessation of any Facility operating process. In such cases, remain on site until the necessary work is complete.

J. Do not open or close valves, isolate pipes or channels, or take any other action that may affect the operation of new or existing facilities without written approval from the Contract Administrator. Give the City and Contract Administrator at least 14 Calendar days written notice of any activities that may affect the operations of the Facility.

K. The sequence of construction describes in general the sequence of installation and Commissioning of major structures, processes, and equipment items. Where not otherwise specified, be responsible for determining which ancillary services, such as electrical, instrumentation, plumbing, drainage, heating, and ventilation are also required to be completed to permit Commissioning of the structures, processes, and equipment as described.

L. Carefully examine the existing utility services at the Site to determine the difficulty of the work and the number and type of pipelines and cables required to be re-routed or protected from damage during construction of the work.

M. Prior to making major tie-ins to existing process units and structures, demonstrate that the equipment installed in all new structures is fully functional and all other prerequisites required for the tie-in are met. Connections to existing works will not be permitted until all equipment in the new adjacent works operates to the satisfaction of Contract Administrator. No claim for delay will be entertained due to unsatisfactory operation of any equipment.

1.6 MONITORING AND EMERGENCY RESPONSE

A. Have the necessary resources, materials, personnel, and equipment readily available to provide continuous 24 hour per day, 7 day per week monitoring and emergency repair of sheeting, shoring, stop log installations, bypass pumping operations, and other such temporary systems that are used to control process flows where, in the opinion of the City or Contract Administrator, the failure of such temporary systems could adversely impact plant operations.

B. Provide and operate temporary systems as required to contain and remove leakage through gates, valves, stop logs, and other such isolation devices that are used to accommodate scheduled construction activities.

1.7 ELECTRICAL AND TEMPORARY POWER

A. To minimize the duration of shutdowns and keep the facility in continuous operation, maintain, to the maximum extent possible, existing electrical systems in operation while new electrical components are installed, or the existing systems are modified or replaced as required for the final electrical system configuration. Where this is not possible, provide temporary power in the form of overhead lines or portable generators at no additional cost to the City.

B. Prior to commencement of the Work, provide and check all necessary temporary services required to ensure that the existing facility will operate in an uninterrupted fashion during the construction period. Make connections on an individual, rather than group, basis in order to minimize shutdowns. Prior to proceeding, provide a schedule with a written description of each operation for Contract Administrator's review.

1.8 FIRE PROTECTION

A. Do not introduce combustibles into any facility until full fire protection is in service.

B. Maintain existing fire protection systems, fire walls, fire doors, and other separations in service as long as possible. Notify Contract Administrator and the City in writing minimum 14 days prior to disrupting or dismantling existing fire protection services.

C. Place new fire protection systems in service as soon as possible and notify Contract Administrator upon completion of new fire protection services.

PART 2 PRODUCTS

2.1 GENERAL

A. Unless specifically stated otherwise, provide all labour, materials, and equipment necessary to accomplish the work of this Section.

PART 3 EXECUTION

3.1 CONSTRAINTS

A. Schedule and complete connections to existing services within the following time constraints:
   1. Shutdowns and the associated connection work shall be scheduled to begin at 0300 hours and normal plant operation will be scheduled to resume no later than 0900 hours.

B. Seniuk Road is subject to seasonal road restrictions as defined by Manitoba Infrastructure (MI). Contractor shall coordinate the Work and or obtain approvals from MI to allow the Contractor to haul normal weights during restriction periods to minimize delay or disruption in the performance of the Work.

C. Contractor shall maintain safe access to the Site at all times.

D. Take following construction and equipment delivery activities performed under separate contract into account when developing the Baseline Schedule, as described in Section 01 32 00 Construction Progress Documentation:
   1. City-Supplied Equipment: Refer to 01 64 00 City-Supplied Equipment for anticipated delivery dates for High Rate Clarification equipment (Bid Opportunity 873-2013) and IFAS equipment delivery dates (Bid Opportunity 871-2013).
   2. Access to Bid Opportunity 899-2015 construction site: March 5, 2018.

E. Existing plant facilities will remain in operation except as noted below:
   1. During the UV weir wall modification, the secondary treatment will need to be bypassed. To accomplish this, the HRC shall be Commissioned, including the completion of Form 104 – Certificate of Process Satisfactory Demonstration, and will be used as a chemically enhanced primary treatment process for flows up to 270 ML/day during bypassing of secondary treatment during the UV weir wall modifications.

F. Schedule and complete the following construction and Commissioning activities within the following time constraints:
   1. Inspection of HPO tank between November 1, 2017 and February 28, 2018.
   2. Supply and install Primary sludge nuclear density meter and Demonstration Test complete by March 31, 2018.
   3. Secondary clarifiers 1 & 2 supply and installation of clarifier mechanisms, electrical, instrumentation and control, and Demonstration Test shall be completed between November 1, 2018 and February 28, 2019;
   4. Supply and install screen inlet channel gates, supply and install new inlet channel aeration piping and concrete benching, and Demonstration Test between November 1, 2018 and February 28, 2019;
   5. Tie-in grit influent channel from grit tanks 1 & 2, install concrete dividing wall, stop logs and gates, and Demonstration Test between November 1, 2018 and February 28, 2019;
   6. Supply and install grit tanks 1, 2, 3, and 4 influent channel air piping, diffusers, and channel modifications, and Demonstration Test between November 1, 2018 and February 28, 2019;
   7. Supply and installation of the substation, electrical building, switchgear, diesel gensets, and Demonstration Tests complete by May 24, 2019;
   8. Supply and install all ductbanks complete by July 1, 2019;
   9. Supply and install grit and screenings handling building, including all equipment, new channel aeration blowers, electrical, instrumentation and control; and supply and install equipment, electrical, instrumentation and control for grit tanks 1 & 2; and Demonstration Tests complete by July 29, 2019;
   10. Grit Tanks 3 and 4 complete and commissioned by February 7, 2020;
   11. Supply and Install new screens, associated channel modifications, and Demonstration Test complete between November 1, 2019 and February 28, 2020;
   12. Supply and install clarifier mechanisms, bridges, mechanical equipment, electrical equipment, instrumentation and control, and Demonstration Tests for secondary clarifiers 4 and 5 complete by July 10, 2019;
   13. Install City Supplied high rate clarification equipment and supply and install ancillary mechanical, electrical, instrumentation and control equipment, and building and architectural finishes for the high rate clarification building, and Demonstration Test complete by March 17, 2020;

14. Supply and install chemical building, mechanical, electrical, instrumentation and control equipment, architectural finishes, and Demonstration Test complete by March 17, 2020;
15. Biological nutrient removal system including the supply and installation of blower and mixing equipment, piping, electrical, instrumentation and control, chemical feed equipment, architectural finishes for the bioreactor tanks and blower building, installation of City Supplied Equipment in the bioreactor tanks, and Demonstration Test using chemical addition for phosphorus removal complete by July 21, 2020
16. Supply and install raw sewage pump #2, and associated piping, electrical, instrumentation and control work, and Demonstration Test complete between November 1, 2020, and February 28, 2021;
17. Modify the existing HPO tanks for conversion to fermenters and biofilter. Modify the existing PSA building for conversion to thickening system. Modifications to the existing HPO tanks and PSA building shall not proceed until completion of 3.1.F.15. Supply and install all mechanical equipment, electrical, instrumentation and control equipment, and Demonstration Test with biological nutrient removal system without chemical addition for phosphorus removal complete by June 28, 2021.
18. By-passing of the secondary treatment to complete the UV weir wall modifications (and) shall not exceed 20 working days.

G. Construct and Commission the following portions of the work in the following sequences indicated to allow for the City's continuous occupancy of the Facility and for uninterrupted operation during construction:
   1. Headworks (Facility Area G):
      a. New Grit and Screenings Building construction prerequisites:
         1) Relocate hydrant outside headworks area.
         2) Remove catch basin and 200 mm diameter sewer line under and to the east of New Grit and Screenings Building between manhole north-east of standby power building to manhole north-east of pump building. Provide temporary means to block pipe openings in manholes.
         3) Provide temporary means to pump sewage between remaining manholes.
         4) Reinforce roof of Grit Tanks 3 and 4.
         5) New overhead door in existing pump and screenings building installed and commissioned, and paved truck access road to the overhead door completed.
         6) Temporary screenings handling system, including but not limited to temporary conveyor and screenings bin installed and commissioned.
      b. New Grit and Screenings Building Commissioning prerequisites:
         1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water, non-potable water.
         2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to potable water, flushing water, and non-potable water. Glycol is available for heat recovery system.
         3) Grit vortex tanks 1 and 2, and grit channel modifications are complete and ready to commission.
         4) The following process tie-ins completed:
            a) Discharge piping from new grit slurry pumps to grit classifiers.
            b) Process drains from grit classifiers and washer/compactors to screens influent and effluent channel.

5) 66kV Substation and 12.47kV service installed and operating
6) Electrical Building complete and operational
7) New electrical infrastructure installed for the Grit and Screenings Building, including but not limited to lighting, and system ready to be energized.
8) Overhead doors operational.

c. Grit Tanks 1 and 2 Commissioning prerequisites:
1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water, non-potable water, and process air.
2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to hot water and glycol
3) New hot water pumps in Service Building commissioned.
4) New channel air blowers ready to be commissioned.
5) Process tie-ins for New Grit and Screening Building completed.
6) Process tie-ins completed:
a) New channel air blowers to air supply duct completed.
b) Discharge piping from new grit slurry pumps to grit classifiers.
c) Grit tanks 1 and 2 to grit influent and effluent channel tie-ins.
d) Installation of dividing wall, gates, stop logs, and channel air piping and diffusers in the grit influent channel.
e) Process drain from grit influent channel to header connecting to the inlet structure.
f) Process drains from grit classifiers and washer/compactors to screens influent and effluent channel.
7) New electrical infrastructure installed for the Grit Tanks 1 and 2 area, including but not limited to lighting, and system ready to be energized.
8) Substation and 66 kV service installed and commissioned.
9) Electrical Building complete and operational

d. Grit Tanks 3 and 4 Commissioning Prerequisites:
1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water, non-potable water, and process air.
2) New Grit and Screenings Building and Grit Tanks 1 and 2 commissioned.
3) New channel air blowers commissioned.
4) New grit blowers ready to be commissioned.
5) The following process tie-ins completed:
a) Suction piping from grit tanks 3 and 4 to new grit slurry pumps installed.
b) Discharge piping from new grit slurry pumps to grit classifiers installed.
c) Gates and channel air piping and diffusers in the effluent channel installed.
d) Channel air piping and diffusers for the influent channel installed.
e) New air supply ducting for the new grit blowers to the existing ducting.
f) New grit blowers and new air discharge piping to tanks 3 and 4 installed.
6) Electrical systems at the Grit and Screenings Building are operational, including but not limited to the power supplies/starters for grit slurry pumps.
7) Grit blowers out of the existing grit electrical room G116 (MCC-G710, MCC-G720) connected.

e. Screen Installation Prerequisites:
1) New Grit and Screenings Building, grit tanks 1, 2, 3 and 4 commissioned.

2) The following process tie-ins completed:
   a) Construction of sluice and sluice platform from new Grit and Screenings Building to screens room to support the new screens as required.
   b) New inlet gates in screen channels installed.
   c) New outlet stop logs for screen channel 4 installed.
   d) Temporary wiring for the existing screens complete, to allow the existing belt conveyor and wiring to be removed.
   e) Temporary screening collection bins and liners supplied.
   f) Removal of belt conveyor completed.
3) Existing DCS logic modified so that the screens can operate without the conveyor.
4) New electrical infrastructure is in place for the Grit and Screening Building and systems.

f. Screen Commissioning Prerequisites:
   1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water, non-potable water, and process air available.
   2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to hot water, glycol
   3) Construct wall thickening and fill bypass weir opening in screen channel 4 (prerequisite for the installation of screen no. 4).
   4) New bypass channel completed.
   5) The following process tie-ins completed, as required for each screen:
      a) Screen, air piping and diffusers installed.
      b) Bypass weirs and baffles installed.
      c) Extension of sluice and service platform completed.
      d) Temporary and permanent connections to sluice completed.
      e) Sluice water pumps installed and ready to operate.
      f) New bypass channel (prerequisite for Commissioning screen no. 1)
   6) New electrical infrastructure is in place for the screens.

g. Raw Sewage Pump No. 2 Commissioning Prerequisites:
   1) Not to be completed during the same winter season as the grit removal upgrades or the screens upgrades.
   2) Recycle loop shall be in place prior to removing pump 3 (P-G103) from service.
   3) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to non-potable water
   4) The following process tie-ins completed:
      a) Existing pump, suction valve, associated piping removed.
      b) New raw sewage pump and VFD installed.
      c) New influent pump suction piping/bell mouth, and suction isolation gate valve installed.
      d) Discharge piping, existing flowmeter, and piping to the wet well grit pump installed.
      e) Piping to existing raw sewage sampler completed.
   5) New electrical infrastructure is in place for the Grit and Screening building, and systems can be energized.
   6) Existing headworks DCS migration complete

2. Chemical Building and Electrical Building (Facility Area C):
    a. Commissioning of Chemical System Prerequisites (Mixed Polymer, Ferric Chloride, Sodium Hypochlorite, Sodium Hydroxide, Sodium Bisulphite):
        1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water, non-potable water, and potable water.
        2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to natural gas, non-potable water, and diesel fuel
        3) Building mechanical and electrical components commissioned.
        4) Chemical building and HRC will be commissioned concurrently. The HRC system must be ready to receive chemical prior to chemical systems sending chemicals.
        5) Delivery of Commissioning chemicals complete.
        6) Safety system commissioned (shower, eyewash, chemical ventilation, containment, alarms).
        7) Tie-ins of chemical lines to their respective process complete.
        8) New flushing water pump commissioned.
        9) New electrical and automation infrastructure is in place for the requisite process areas.
    b. Commissioning of Sodium Bisulphite Dispersion Pumps Prerequisites
        1) UV Disinfection upgrades complete.
        2) Tie-in of suction to the UV outfall chamber completed during shutdown for UV weir wall modifications.
3. High Rate Clarification (HRC) (Facility Area K)
    a. High Rate Clarification (HRC) Commissioning Prerequisites:
        1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water and non-potable water.
        2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to glycol, hot water, potable water, and non-potable water
        3) Building mechanical and electrical components commissioned.
        4) New screens have been commissioned
        5) Chemical system are ready to be commissioned with chemicals.
        6) The following process tie-ins completed:
            a) HRC influent and effluent channels completed and tie-ins complete.
            b) HRC waste sludge pipe to primary clarifiers completed and tie-ins complete.
        7) New electrical infrastructure installed in both the Electrical Building, and the HRC Electrical room.
4. Ultraviolet Disinfection (UV) (Facility Area U):
    a. UV Construction Prerequisites:
        1) HRC commissioned and ready to operate so that the plant can bypass the secondary treatment during shutdown for construction of the weir wall extension in UV bypass channel.
        2) SBS dispersion pumps suction installed (not a prerequisite for UV but tie-in could be completed during this time)

b. UV Upgrades Commissioning Prerequisites:
   1) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to natural gas.
   2) Building mechanical and electrical components installed and commissioned.
   3) The following process tie-ins completed:
      a) New UV channels/equipment installed.
      b) Weir wall extension completed.
   4) New electrical infrastructure is installed in both the Secondary Clarifier 4 and 5 electrical room and the UV electrical room.

5. Primary Clarifiers (Facility Area P):
   a. New Primary Sludge Pumps Commissioning Prerequisites:
      1) New primary sludge pumps and VFDs installed
      2) Non-potable water shall be connected and verified
      3) Pump drains installed
      4) New electrical infrastructure is in place.
      5) Primary Clarifier DCS has been migrated
   b. Primary Clarifiers DCS Migration”
      1) HPO tanks have been decommissioned.
6. Secondary Clarifiers (Facility Area S):
   a. Secondary Clarifiers Commissioning Prerequisites:
      1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water and non-potable water
      2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to non-potable water, potable water, natural gas, and glycol
      3) Building mechanical and electrical components commissioned.
      4) Scum trough infrared heaters installed and ready to operate, if required to be used at the time of Commissioning.
      5) The following process tie-ins completed:
         a) New RAS pumps installed and tie-ins to existing RAS header completed
         b) Mixed liquor channel extension completed.
         c) Secondary Clarifier 4 and 5 influent and effluent drop shafts completed.
         d) New process drains from Secondary Clarifiers 4 and 5 to the header connecting to the inlet structure.
         e) Scum header to WAS sump and pipe cross connections between new scum header and existing scum headers
      6) New electrical infrastructure installed.
      7) Service Building DCS has been migrated.
   b. Secondary Clarifiers DCS Migration Prerequisites:
      1) Secondary Clarifiers 4 and 5 commissioned.
      2) Secondary Clarifiers 1, 2, and 3 are out of service.
7. Bioreactors (Facility Area R)
   a. Bioreactor Commissioning Prerequisites:
      1) The Bioreactors shall not be commissioned until the UV weir wall modification is complete.

2) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water and process air
3) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to non-potable water, potable water, natural gas, and glycol.
4) Ferric chloride system ready to be Commissioned.
5) Sodium hypochlorite ready to be Commissioned.
6) Mixed polymer system ready to be Commissioned.
7) New 6 mm perforated plate screens commissioned (required for IFAS).
8) Process air blowers commissioned.
9) IFAS media available.
10) Temporary works for seeding with WAS from WEWPCC, as per as per 01 50 00 Temporary Facilities and Controls.
11) The following process tie-ins completed:
    a) Bioreactor influent and effluent channels completed.
    b) Temporary RAS line and pumping installed as per 01 50 00 Temporary Facilities and Controls.
    c) HPO operating with Secondary Clarifiers 1, 4 and 5.
12) New process drains completed.
13) New electrical infrastructure installed.
14) DCS migration of existing Secondary Clarifiers completed.

b. Anticipated Bioreactor Transition Sequencing Steps:
1) Prerequisites:
    a) Complete Functional Testing and Performance Testing of equipment in Bioreactor area.
2) Step 1: Operational transfer of Secondary Clarifiers 1, 4 and 5 to operation with HPO
    a) Secondary Clarifiers 1, 4, and 5 configured to operate with HPO tanks using the existing 750 mm diameter RAS line.
    b) Secondary Clarifiers 2 and 3 removed from service, drained, cleaned, and made available for operation with Bioreactor in subsequent steps.
3) Step 2: Seeding of Bioreactor 1
    a) The aeration zone of Bioreactor 1 to be filled with screened (6 mm) WAS from the WEWPCC by the Contractor, and continuously aerated with process air.
    b) Transfer of primary effluent from the bioreactor bypass channel to aeration zone of Bioreactor 1 with a temporary pump.
    c) Installation of IFAS media to be coordinated with IFAS Supply Contractor.
    d) Estimated Duration: 10 days
4) Step 3: Biomass growth phase of Bioreactor 1, seeding Bioreactor 2
    a) Secondary Clarifier 2 configured to operate with Bioreactor 1 and the temporary RAS line and temporary RAS pump. Operation and maintenance of the temporary RAS line and temporary RAS pump are the responsibility of the Contractor.
    b) Operation of Bioreactor 1 with ferric chloride addition for biological phosphorus removal.

c) The aeration zone of Bioreactor 2 to be filled with screened (6 mm) WAS from the WEWPCC by the Contractor, and continuously aerated with process air.
d) Transfer the primary effluent from the bioreactor bypass channel to aeration zone of Bioreactor 2 with a temporary pump, as per 01 50 00 Temporary Facilities and Controls.
e) Installation of IFAS media to be coordinated with IFAS Supply Contractor.
f) Estimated Duration: 20 days

5) Step 4: Biomass growth phase of Bioreactor 1 and 2, seeding Bioreactor 3
   a) Continue operation of Bioreactor 1 with secondary clarifier 2.
   b) Configure Secondary Clarifier 3 and Bioreactor 2 to operate with Bioreactor 1, Secondary Clarifier 2 and the temporary RAS line works.
   c) Operation of Bioreactor 1 and 2 with ferric chloride addition for biological phosphorus removal.
   d) The aeration zone of Bioreactor 3 to be filled with screened (6 mm) WAS from the WEWPCC by the Contractor, and continuously aerated with process air.
   e) Transfer primary effluent from the bioreactor bypass channel to aeration zone of Bioreactor 3.
   f) Installation of IFAS media to be coordinated with IFAS Supply Contractor.
   g) Estimated Duration: 20 days
6) Step 5: Biomass growth phase of Bioreactors 1, 2 and 3
   a) Continue operation of Bioreactor 1 and 2 with Secondary Clarifiers 2 and 3.
   b) Secondary Clarifier 5 removed from service, drained and cleaned. Secondary Clarifier 5 and Bioreactor 3 configured to operate with Bioreactor 1 and 2, Secondary Clarifiers 2 and 3, and temporary RAS works.
   c) Operation of Bioreactors 1, 2, and 3 with ferric chloride addition for biological phosphorus removal.
   d) Estimated Duration: 10 days
7) Step 6: Phase out of HPO operation
   a) Secondary Clarifiers 1 removed from service, drained and cleaned and made available for operation with Bioreactor.
   b) Shutdown RAS pumps, RAS header, and temporary RAS header to:
      (1) Re-configure temporary RAS line to feed HPO from Secondary Clarifier 4.
      (2) Decommission temporary RAS pump.
      (3) Complete permanent connection between existing 750 mm RAS header and new permanent Bioreactor RAS header.
   c) HPO operates with Secondary Clarifier 4, Bioreactor operates with Secondary Clarifiers 2, 3, 5 and 1 as required during phase out of HPO operation.
   d) HPO tanks removed from service, drained, and cleaned.
   e) Decommission HPO plant.

8. Odour Control (Facility Area T)
    a. Odour Control Unit Commissioning Prerequisites:
        1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to glycol, natural gas, flushing water, potable water
        2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to natural gas.
        3) Building mechanical and electrical components installed and commissioned.
        4) Independent process can be undertaken in parallel with other startup activities but startup must be completed before Commissioning sludge thickeners and fermenters.
        5) Validation of the biofilters shall not be completed until the sludge thickeners and fermenters have been commissioned.
        6) Process tie-ins of foul air ducts complete for:
            a) East and west wet well raw sewage pump station.
            b) Screen channels and screen influent channel.
            c) Grit influent and effluent channels.
            d) Existing grit tanks 3 and 4.
            e) Primary clarifier 1, 2, and 3 influent channels, scum hoppers, and launders.
            f) Sluice.
            g) Washer/Compactors.
            h) Grit classifiers.
            i) New grit tanks 1 and 2.
        7) RDTs installed and tie-ins completed.
        8) Primary sludge fermenters installed and tie-ins completed.
        9) New electrical infrastructure installed.
9. Sludge Thickening (Facility Area D):
    a. Sludge Thickening Construction Prerequisites:
        1) Bioreactor operation is stable and performance has been verified.
        2) HPO tanks have been decommissioned.
    b. Waste Activated Sludge (WAS) Sludge Thickening Commissioning Prerequisites:
        1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water and non-potable water
        2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to natural gas
        3) Building mechanical and electrical components installed and commissioned.
        4) Odour control units have been commissioned.
        5) WAS RDT polymer systems ready to be commissioned.
        6) Process tie-ins have been completed for:
            a) Thickened sludge pumps to sludge holding tanks completed.
            b) RDT filtrate tie-ins to primary clarifier influent channels and bioreactors 1, 2, and 3 completed.
            c) Mixed liquor channel, RAS channel, and scum headers to new WAS sump
            d) WAS pumps switchover completed.
            e) SEWPCC thickened sludge tie-in to sludge holding tanks completed.
            f) New sludge transfer pumps installed.
            g) New process drains completed.

7) New electrical infrastructure installed.

c. Fermented Sludge (FSL) Thickening Commissioning Prerequisites:
   1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water and non-potable water
   2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to natural gas
   3) Building mechanical and electrical components installed and commissioned.
   4) Odour control units have been commissioned.
   5) Fermenters ready to be commissioned.
   6) RDT polymer systems ready to be commissioned.
   7) Process tie-ins have been completed for:
      a) HPO tanks converted into fermenters and thickeners.
      b) Thickened sludge pumps to sludge holding tanks completed.
      c) FSL RDT filtrate tie-ins to primary clarifier influent channels and bioreactors 1, 2, and 3 completed.
      d) SEWPCC thickened sludge tie-in to sludge holding tanks completed.
      e) New sludge transfer pumps installed.
      f) New process drains completed.
   8) New electrical infrastructure installed.

10. Primary Sludge Fermentation (Facility Area D):
    a. Primary Sludge Fermentation Construction Prerequisites:
       1) Bioreactor operation is stable and performance has been verified.
       2) HPO tanks have been decommissioned.
    b. Primary Sludge Fermentation Commissioning Prerequisites:
       1) Process commodities supplied from outside of the building area shall be connected and verified, including but not limited to flushing water and non-potable water.
       2) Building commodities supplied from outside of the building area shall be connected and verified, including but not limited to natural gas
       3) Building mechanical and electrical components installed and commissioned.
       4) Odour control units have been commissioned.
       5) Thickeners tested and ready for startup with fermented sludge.
       6) Process tie-ins completed for:
          a) HRC WAS line to fermenters.
          b) Primary sludge to fermenters.
          c) New process drains.
       7) New electrical infrastructure installed.
11. Administration Building (Facility Area M)
    a. DCS Migration Prerequisites:
       1) Service Building, Headworks Area, Primary Clarifiers Area, and Secondary Clarifier Area DCS migration completed
12. Service Building (Faclity Area B)
    a. New Hot Water Pumps Commissioning Prerequisites:
       1) Service Building DCS migration completed
       2) New electrical infrastructure installed.

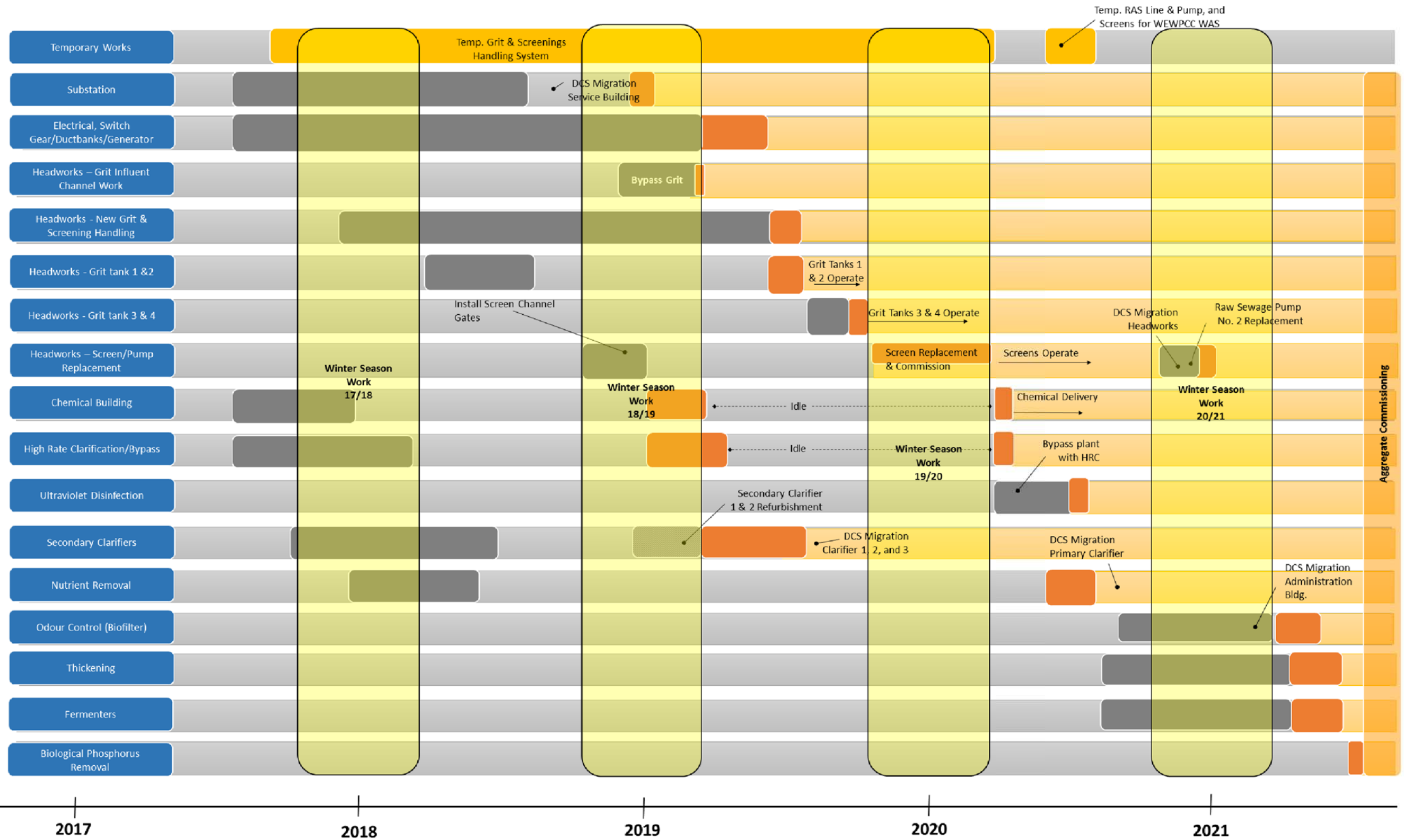
3.2 SUGGESTED SEQUENCE OF CONSTRUCTION

A. Refer to Figure 1 - Suggested Sequence of Construction located in the Supplements.

3.3 SUPPLEMENTS

A. The Supplements listed below, following “End of Section”, are part of this Specification.
   1. Figure 1 – Suggested Sequence of Construction.

END OF SECTION



Legend

- Winter Work Period – Nov 1 to Feb 28
- Construction Period
- Process or upgrades have not been commissioned
- Commissioning period
- Process in Operation
- Temporary works in operation

Note: This figure is not to scale.

SEWPCC UPGRADING/EXPANSION PROJECT

Suggested Sequence of Construction

Figure 1

474248

ch2m

SECTION 01 61 00

COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

A. Canadian Standards Association (CSA):
   1. C22.2 No. 100-04, Motors and Generators – Sixth Edition.

B. Manufacturers Standardization Society of the Valves and Fitting Industry:
   1. SP-6, Standard Finishes for Contact of Pipe Flanges and Connecting – End Flanges of Valves and Fittings.

C. National Building Code, with Manitoba Building Code amendments.

1.2 DEFINITIONS

A. Products:
   1. New items for incorporation in the Work, whether purchased by Contractor or the City for the Project, or taken from previously purchased stock and may also include existing materials or components required for reuse.
   2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
   3. Items identified by Manufacturer's product name, including make or model designation, indicated in Manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.3 ENVIRONMENTAL REQUIREMENTS

A. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of -45 degrees C to 45 degrees C, unless otherwise specified.

1.4 PREPARATION FOR SHIPMENT

A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.

B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.

C. Extra Materials, Special Tools, Test Equipment, and Expendables:
   1. Furnish as required by individual Specifications.
   2. Schedule:
      a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
      b. Transfer to the City shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
   3. Packaging and Shipment:
      a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
      b. Prominently displayed on each package, the following:
         1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
         2) Applicable equipment description.
         3) Quantity of parts in package.
         4) Equipment manufacturer.
   4. Deliver materials to Site.
   5. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to the City.

D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Contract Administrator of anticipated date and place of equipment arrival.

E. Factory Test Results: Reviewed and accepted by Contract Administrator before product shipment as required in individual Specification sections.

1.5 DELIVERY AND INSPECTION

A. Deliver products in accordance with accepted current progress schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.

B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable. Include ULC and CSA labels on products so specified.

C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Inspect for completeness and evidence of damage during shipment.

D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.6 HANDLING, STORAGE, AND PROTECTION

A. Handle and store products in accordance with Manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards, warehouses, or sheds provided in accordance with Section 01 50 00, Temporary Facilities and Controls. Provide Manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by the City.

B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.

C. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 15 degrees C. Protect electrical, instrumentation, and control products, and insulation against moisture, water, and dust damage. Connect and operate continuously all space heaters furnished in electrical equipment.

D. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

E. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.

F. Hazardous Materials: Prevent contamination of personnel, storage building, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

1.7 QUALITY

A. Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

B. Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection. Should disputes arise as to quality or fitness of products, decision rests strictly with the Contract Administrator based upon requirements of Contract Documents.

C. Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

D. Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.8 METRIC PROJECT

A. Unless otherwise noted, this project has been designed and is to be constructed in the International System (SI) of Units metric system of measurements.

B. During construction, when specified metric elements are unattainable at the time they are required to meet the construction schedule, the Contractor shall notify the Contract Administrator in writing and suggest alternative substitutions. Costs due to these substitutions shall be borne by the Contractor.

1.9 MANUFACTURER’S INSTRUCTIONS

A. Unless otherwise indicated in specifications, install or erect products in accordance with Manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

B. Notify the Contract Administrator in writing, of conflicts between specifications and Manufacturer's instructions, so that the Contract Administrator will establish the course of action.

C. Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Contract Administrator require removal and re-installation at no increase in Contract Price or Contract Time.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide manufacturer’s standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.

B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer’s products must meet the performance specifications.

C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer’s services, and implement same or similar process instrumentation and control functions in same or similar manner.

D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.

F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable Workplace Safety and Health, provincial, and local health and safety regulations.

G. Regulatory Requirement: Coating materials shall meet federal, provincial, and local requirements limiting the emission of volatile organic compounds and for worker exposure.

H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, stainless steel, or hot-dip galvanized or aluminum coated 12 mm mesh expanded steel. Provide hot-dip galvanized or stainless steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water. Eliminate sharp edges with suitable borders neatly welded.

I. Provide materials and equipment listed by ULC and CSA wherever standards have been established by that agency.

J. Equipment Finish:
   1. Provide manufacturer's standard finish and color, except where specific finish or color is indicated.

K. Special Tools and Accessories: Furnish to the City, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.

L. Lubricants:
   1. Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by the City.
   2. Provide Canadian made lubricants readily available in Canada. To the extent possible, provide lubricants compatible with products currently used in the City's maintenance operations.
   3. Furnish lubricants in original sealed containers, correctly identified as to brand and grade.

M. Nameplates:
   1. Provide for all equipment and motors, securely mounted in a readily visible location.
   2. 16-gauge stainless steel with 6 mm high die-stamped inscriptions.
   3. Inscriptions to include the following as a minimum:
      a. Motors: In accordance with the requirements of C22.2 No. 100.
      b. Equipment: Model number, serial number, size, performance data at rated capacity, impeller diameter, speed, efficiency, and other pertinent data, as applicable.
   4. Data in SI metric units.

N. Bolted Connections: Project bolt ends minimum 3 mm but not more than one bolt diameter beyond nut faces.

O. Flanges: Arrange with bolt holes straddling vertical centreline. Provide flanges finished in accordance with MSS SP-6.

P. Bearings: Unless otherwise specified, provide bearings for rotating equipment suitable for ABMA B-10 life expectancy of minimum 100,000 working hours at rated conditions of service.

2.2 FABRICATION AND MANUFACTURE

A. General:
1. Manufacture parts to North American standard sizes and gauges.
2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
3. Design structural members for anticipated shock and vibratory loads.
4. Modify standard products as necessary to meet performance Specifications.

B. Lubrication System:
1. Require no more than weekly attention during continuous operation.
2. Convenient and accessible. Oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

C. Equipment Base Plates:
1. Common base plate for equipment and driver, fabricated from heavy cast iron or welded structural steel section minimum 13 mm thick.
2. Provided with mounting plates minimum 19 mm thick for equipment and driver with mounting surfaces machined to average arithmetical roughness height of 3.0 microns maximum.
3. Provided with grout holes, vent holes, and anchor bolt holes.
4. For equipment where leakage or condensation may occur, equipped with drip lip or gutter, 25 mm NPT bossed drain connection at low point, and drain piping to building drainage system.

2.3 SOURCE QUALITY CONTROL

A. Where Specifications call for factory testing to be witnessed by Contract Administrator, notify Contract Administrator not less than 14 days prior to scheduled test date, unless otherwise specified.

B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).

C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 EXECUTION

3.1 WORKMANSHIP

A. Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify the Contract Administrator if required Work is such as to make it impractical to produce required results.

B. Do not employ anyone unskilled in their required duties. The Contract Administrator reserves the right to require dismissal from Site, workers deemed incompetent or careless.

C. Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with the Contract Administrator, whose decision is final.

3.2 INSPECTION

A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor’s control.

3.3 INSTALLATION

A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. No shimming between machined surfaces is allowed.

C. Repaint painted surfaces that are damaged prior to equipment acceptance.

D. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer’s instructions, and as may be specified. Retain a copy of manufacturers’ instruction at Site, available for review at all times.

E. For material and equipment specifically indicated or specified to be reused in the Work:
   1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
   2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.4 FIELD FINISHING

A. In accordance with Section 09 90 00, Painting and Coating and individual Specification sections.

3.5 ADJUSTMENT AND CLEANING

A. Perform required adjustments, tests, operation checks, and other startup activities.

3.6 LUBRICANTS

A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by the City.

END OF SECTION

SECTION 01 64 00

CITY-SUPPLIED EQUIPMENT

PART 1 GENERAL

1.1 CITY-SUPPLIED EQUIPMENT

A. RFP 871-2013 - Free Moving Media, Screens, and Aeration System:
   1. Estimated date of arrival of Screens, Aeration system, and appurtenances: Between December 1, 2017 and January 31, 2018.
   2. Estimated date of arrival of Free Moving Media: Between February 1, 2018 and April 2, 2018.
   3. Associated special services to be provided by the Supply Contractor:
      a. Installation manuals and guidance.
      b. Certification of proper installation.
      c. Functional testing assistance.
      d. Performance testing assistance.
      e. Training of City's personnel.

B. RFP 873-2013 – High Rate Clarification Equipment:
   1. Estimated date of arrival of all equipment except the bridge (bridge was installed under Bid Op 601-2015): Between December 1, 2017 and January 31, 2018.
   2. Associated special services to be provided by the Supply Contractor:
      a. Installation manuals and guidance.
      b. System Integration support.
      c. Certification of proper installation
      d. Functional testing assistance.
      e. Performance testing assistance
      f. Training of City's personnel

1.2 CITY STANDARDIZED PRODUCTS

A. The City has entered into agreements with manufacturers to standardize equipment for the City of Winnipeg wastewater treatment facilities. The goods to be supplied and installed by the Contractor under the standardization contracts include:
   1. Control System and Motor Control Equipment – RFP 756-2013
   2. Electric Valve Actuators – RFP 331-2014
   3. Gas Detection Systems – RFP 123-2014
   4. Instrumentation – RFP 449-2014

1.3 UNLOADING, STORAGE AND MAINTENANCE

A. General:
   1. The Contractor shall have complete responsibility for unloading the City-Supplied Equipment. Unload product in accordance with the City supplied instructions, and as instructed by the Supply Contractor.

2. In cooperation with the Supply Contractor, the Contractor shall complete Form 100 – Certificate of Equipment Delivery. An example of this Form is appended as a supplement to this section.
3. The Contractor shall provide Supply Contractor's recommended maintenance during storage, installation, and until products are accepted for use by the City.

B. Free Moving Media, Screens, and Aeration System:
1. The Contractor shall follow the requirements laid out in Appendix L, Supply Contractor's Handling, Storage and Installation Manual.
2. Free Moving Media:
   a. The Contractor shall handle and store free moving media in accordance with Supply Contractor's written instructions and in a manner to prevent damage.
   b. The free moving media will arrive on site in bags. The free moving media bags must not be stacked more than 2 bags high.
   c. The free moving media bags are UV light sensitive and must be protected from direct sunlight.
      1) If a cover is used to protect the free moving media bags, the cover must not be placed directly on the bags, but shall be placed such that air circulation maintained.

1.4 SCHEDULING AND SEQUENCING

A. Include sequencing constraints specified herein as part of Baseline schedule.
1. Estimated date of arrival of Screens, Aeration system, and appurtenances: Between December 1, 2017 and January 31, 2018.
2. Estimated date of arrival of Free Moving Media: Between February 1, 2018 and April 2, 2018.
3. Estimated date of arrival of all equipment except the bridge (bridge was installed under Bid Op 601-2015): Between December 1, 2017 and January 31, 2018.

B. Contract Administrator will confirm delivery date with Contractor 10 Business Days prior to scheduled delivery, and within 24 hours of expected delivery time.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 ROLES AND RESPONSIBILITIES

A. Refer to the Responsibilities Matrix attached as a Supplement to this Section.

3.2 INSTALLATION

A. Install products in conformance with the City supplied shop drawings and installation instructions and as per Section 46 01 01, Installation of City Supplied Equipment.

B. Supply and install all interconnecting structures and equipment as applicable.

C. In cooperation with the Supply Contractor, the Contractor shall complete Form 101 – Certificate of Readiness to Install and Form 102 – Certificate of Satisfactory Installation. Examples of these Forms are appended as supplements to this section.

3.3 SUPPLEMENTS

A. The Supplements listed below, following "End of Section", are part of this Specification.
   1. Responsibilities Matrix
   2. Form 100 – Certificate of Equipment Delivery
   3. Form 101 – Certificate of Readiness to Install
   4. Form 102 – Certificate of Satisfactory Installation

END OF SECTION

SECTION 01 64 00, CITY-SUPPLIED EQUIPMENT – SUPPLEMENT

RESPONSIBILITIES MATRIX

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Contractor	Contract Administrator
	ADMINISTRATION				
1	Insurances	X	X	X	X
2	Performance Security	X	X	X	
3	Overall SEWPCC Upgrading / Expansion project schedule			X	X
4	Schedule of Submittals	X	X		
5	HRC/IFAS system monthly status report	X	X		
6	Contract drawings for HRC & IFAS facility construction				X
7	Submission of product samples	X	X		
8	Supply Contractor design data	X	X		
9	Supply Contractor's instructions for equipment offloading and storage	X	X		
10	Supply Contractor's instructions for equipment installation	X	X		
11	Material Safety Data Sheets	X	X		
12	Special tools lists	X	X		
13	Spare parts lists	X	X		
14	Ballast technical specification, if applicable		X		
15	Qualifications of Supply Contractor's representative	X	X		
16	Training session recordings	X	X	X	
17	O&M manuals	X	X		
18	Performance guarantees	X	X		
19	Warranty	X	X	X	
	ENGINEERING AND DESIGN SERVICES				
20	Design support to Contract Administrator	X	X		
21	Development of final plant-wide P&IDs incorporating shop drawing P&IDs submitted by Contractor				X
22	Review and validation of final plant-wide P&IDs		X		
23	Programming support to System Integrator		X		
24	Engage engineer licensed in Manitoba for work required to be designed by an engineer	X	X		

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Contractor	Contract Administrator
25	Shop Drawings including general arrangement drawings	X	Supply X		
26	“As-Built” shop drawings	X	X		
27	“As-Built” drawings for the constructed HRC & IFAS facilities			X	
28	Electrical single-line diagram				X
29	Design of the HRC master control panel				X
30	Control narrative / control philosophy		X (HRC)		X (IFAS)
31	Post-disaster structure design certification		X		
	HRC EQUIPMENT SUPPLY AND DELIVERY				
32	Concrete tanks			X	
33	Mixers and motors		X		
34	Mixer support concrete slabs			X	
35	Sludge scraper assemblies and drives (circular or rectangular)		X		
36	Circular sludge scraper assembly support bridges with grating and handrails		X		
37	Rectangular sludge scraper access platforms			X	
38	Grating and handrail (other than for circular sludge scraper assembly support bridges)			X	
39	Lamella modules and supports		X		
40	Effluent troughs, weirs and supports		X		
41	Air scour blower with suction and discharge isolation valves		X		
42	Air scour flow control valves		X		
43	Air scour piping and supports below the lamella packs and air supply piping to the edge of the HRC tank		X		
44	Air supply piping beyond the HRC tank			X	
45	Recirculation pumps with suction and discharge isolation valves and discharge check valve (if recommended)		X		
46	Motorized cross-connection valves if shared standby recirculation pump configuration is used		X		
47	Recirculation piping			X	
48	Ballast (if applicable)		X		

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Contractor	Contract Administrator
49	Ballast addition system including slurry control valves (if applicable)		X		
50	Ballast recovery system (if applicable)		X		
51	Ballast slurry and ballast/sludge piping			X	
52	Plant effluent water (W3) booster pump system (if required)			X	
53	Internal tank fabricated metal components such as transfer chutes, draft tubes, mixing tank baffles, polymer distribution ring, etc.		X		
54	Scum removal system		X		
55	Scum piping beyond the HRC tank			X	
56	Sludge wasting flow control valves (if applicable)		X		
57	Sludge sampling system (if required)		X		
58	Anchors and hardware		X		
59	Coagulant storage and metering system			X	
60	Polymer storage and metering system			X	
61	Alkalinity addition system			X	
62	Anti-foam system			X	
63	Sludge wasting and scum pumps			X	
64	HRC system inlet and outlet valves/gates			X	
65	Flow meters			X	
66	Pressure indicating transmitters			X	
67	Level indicating transmitters			X	
68	Sludge blanket indicators		X		
69	Turbidimeters		X		
70	pH meters		X		
71	Other interconnecting piping and connections to processes beyond the HRC			X	
72	Tank drain valves			X	
73	MCCs, VFDs, electrical panels, wires/cables and associated installation			X	
74	Supply of the HRC master control panel			X	
75	Fabrication of HRC equipment in accordance with approved shop drawings		X		

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Contractor	Contract Administrator
76	Factory test and inspection reports and other QC documentation		X		
77	Contractor's Certificate of Compliance with the specifications		X		
78	PLC programming of the HRC master control panel			X	
79	Participation in Factory Acceptance Testing of the HRC master control panel programming		X	X	X
80	Equipment and spare parts delivery, f.o.b. Site		X		
81	Equipment offloading and storage			X	
82	Delivered equipment inspection and completion of Form 100		X		
IFAS EQUIPMENT SUPPLY AND DELIVERY					
83	Concrete tanks			X	
84	Air flow control valves			X	
85	Air piping (headers, drop legs) and supports below the water surface and up to the edge of the BNR tanks	X			
86	Air supply piping beyond the BNR tanks			X	
87	Air diffusers, fasteners, and supports	X			
88	Media retention screens	X			
89	Free Floating Plastic Media	X			
90	Media addition system			X	
91	Anchors and hardware	X			
92	Other interconnecting piping and connections to processes beyond the BNR			X	
93	Anoxic Zone Mixers			X	
94	Swing Zone Aeration System			X	
95	Internal Mixed Liquor Recycle Pumps			X	
96	Process Air Flow Control Valves			X	
97	Process Instrumentation and Control System			X	
98	Process Aeration Blower Systems			X	
99	Embedded Wall Castings			X	
100	MCCs, VFDs, electrical panels, wires/cables and associated installation			X	
101	Fabrication of equipment in accordance with approved shop drawings	X			

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Contractor	Contract Administrator
102	Contractor's Certificate of Compliance with the specifications	X			
103	Equipment delivery, f.o.b. Site	X			
104	Equipment offloading and storage			X	
105	Delivered equipment inspection and completion of Form 100	X		X	X
	SITE SERVICES				
106	Abide by City's Health & Safety requirements	X	X	X	X
107	Training of the Installation Contractor and completion of Form 101	X	X		
108	Installation of all City-Supplied Equipment, materials and equipment			X	
109	Field welding, field assembly, field painting and coating, and coating touch-ups to field damaged finishes			X	
110	Supervision and inspection of installation and completion of Form 102	X	X		X
111	Development of approved training materials	X	X		
112	Training of City staff and completion of forms T-1 and T-2	X	X		X
113	Performance Demonstration Plan	X	X		
114	Unit process startup forms	X	X		
115	Attendance at a HRC facility startup meeting		X	X	X
116	Attendance at a BNR facility startup meeting	X		X	X
117	Perform functional testing			X	
118	Functional testing support and completion of equipment test reports and completion of Form 103	X	X		
119	Management of performance testing, recording of any additional data and completion of Form 104	X	X		
120	Select an independent lab for performance test sample analysis.				X
121	Conduct performance testing and furnish all needed samplers and temporary instruments			X	
122	Write and submit Performance Test Report	X	X		

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Contractor	Contract Administrator
123	Pay for costs of functional and performance testing (except performance test sample analysis)			X	
124	Collect performance test samples, ship and pay for laboratory analysis		X		X
	WARRANTY				
125	Replace defective City-Supplied Equipment during the warranty period	X	X		
126	Replace defective Contractor-Supplied Equipment during the warranty period			X	

Form 100
CERTIFICATE OF EQUIPMENT DELIVERY

We certify that the equipment listed below has been delivered into the care and custody of the Installation Contractor. The equipment has been found to be in satisfactory condition. There is no visible evidence of exterior damage or defects.

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

Print Name Signature Date
(Authorized Representative of Supply Contractor)

Print Name Signature Date
(Authorized Representative of Installation Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Form 101
CERTIFICATE OF READINESS TO INSTALL

We have familiarized the installing contractor of the specific requirements related to the equipment listed below and am satisfied that the installing contractor understands the required installation procedures.

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

Print Name Signature Date
(Authorized Representative of Supply Contractor)

We certify that we have received satisfactory installation instructions from the equipment manufacturer/vendor.

Print Name Signature Date
(Authorized Representative of Installation Contractor)

Form 102
CERTIFICATE OF SATISFACTORY INSTALLATION

We have completed our checks and inspection of the installation of our equipment as listed below and confirm that it is satisfactory and that any defects have been remedied except any as noted below.

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:
Outstanding Defects:

Print Name Signature Date
(Authorized Representative of Supply Contractor)

Print Name Signature Date
(Authorized Representative of Installation Contractor)

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUBMITTALS

A. Informational Submittals:
1. Submit prior to application for final payment.
   a. As-Built Documents: As required in General Conditions.
   b. Reviewed Shop Drawings and Samples: As required in the General Conditions.
   c. Special Bonds, Special Guarantees, and Service Agreements.
   d. Releases or Waivers of Liens and Claims: As required in General Conditions.
   e. Extra Materials / Spare Parts: As required by individual Specification sections.

1.2 AS-BUILT DOCUMENTS

A. Quality Assurance:
1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain as-built documents.
2. Accuracy of Records:
   a. Coordinate changes within as-built documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
   b. Purpose of Project as-built documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
4. Prior to submitting each request for progress payment, request Contract Administrator's review and approval of current status of as-built documents. Failure to properly maintain, update, and submit as-built documents may result in a deferral by Contract Administrator to recommend whole or any part of Contractor's Application for Payment, either partial or final.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 MAINTENANCE OF AS-BUILT DOCUMENTS

A. General:
1. Promptly following commencement, secure from Contract Administrator at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.

2. Delete Contract Administrator title block and seal from all documents.
3. Label or stamp each as-built document with title, “AS-BUILT DOCUMENTS,” in neat large printed letters.
4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:
1. Maintain documents in a clean, dry, legible condition and in good order. Do not use as-built documents for construction purposes.
2. Make documents and Samples available at all times for observation by Contract Administrator.

C. Making Entries on Drawings:
1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
   a. Color Coding:
      1) Green when showing information deleted from Drawings.
      2) Red when showing information added to Drawings.
      3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by “cloud” drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
   a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
   b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
   c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
   d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
   e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and Contract Administrator’s written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
5. Dimensions on Schematic Layouts: Show on as-built drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
   a. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.
   b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).
   c. Make identification so descriptive that it may be related reliably to Specifications.

3.2 FINAL CLEANING

A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for Certificate of Substantial Performance; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire Site or parts thereof, as applicable.
   1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to The City and Contract Administrator.
   2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
   3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
   4. Clean all windows.
   5. Clean and wax wood, vinyl, or painted floors.
   6. Broom clean exterior paved driveways and parking areas.
   7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
   8. Rake clean all other surfaces.
   9. Remove snow and ice from access to buildings.
   10. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
   11. Leave water courses, gutters, and ditches open and clean.

B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Detailed information for the preparation, submission, and Contract Administrator's review of operations and maintenance (O&M) data, as required by individual Specification sections.

1.2 DEFINITIONS

A. Preliminary Data: Initial and subsequent submissions for Contract Administrator's review.

B. Final Data: Contract Administrator-accepted data, submitted as specified herein.

C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations include but are not limited to lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

D. Instructional Manual: An organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual systems, subsystems and components as specified in individual sections of this specification.

1.3 SEQUENCING AND SCHEDULING

A. Equipment and System Data:
   1. Preliminary Data:
      a. Do not submit until Shop Drawing for equipment or system has been reviewed and returned stamped "NO EXCEPTIONS TAKEN" or "EXCEPTIONS NOTED" by Contract Administrator.
      b. Submit prior to shipment date.
   2. Final Data:
      a. Submit Instructional Manual not less than 30 days prior to equipment or system field Functional Testing.
      b. Submit Compilation Formatted and Electronic Media Formatted data prior to Substantial Performance of Project.

1.4 DATA FORMAT

A. Preliminary Manual Format:
   1. Binder: Commercial quality, permanent, three-ring binders with durable plastic cover.
      a. Three hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data
   2. Size: 8-1/2 inches by 11 inches, minimum.

3. Cover: Identify manual with typed or printed title "OPERATION AND MAINTENANCE DATA, VOLUME NO. ___ OF ___"," and list:
   a. Project title.
   b. Contractor's name, address, and telephone number.
   c. If entire volume covers equipment or system provided by one supplier include the following:
      1) Identity of general subject matter covered in manual.
      2) Identity of equipment number and Specification section.
4. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.
5. Table of contents neatly typewritten, arranged in a systematic order:
   a. Include list of each product, indexed to content of each volume.
   b. Designate system or equipment for which it is intended.
   c. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
6. Section Dividers:
   a. Heavy, 80 pound cover weight, tabbed with numbered plastic index tabs.
   b. Fly-Leaf:
      1) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
      2) List with each product:
         a) Name, address, and telephone number of Subcontractor, supplier, installer, and maintenance contractor, as appropriate.
         b) Identify area of responsibility of each.
         c) Provide local source of supply for parts and replacement.
      3) Identity of separate structure as applicable.
      4) Maintenance Summary (Format in accordance with paragraph 1.6.D)
7. Assemble and bind material in same order as specified in the Contract Documents.
8. Material shall be suitable for reproduction, with quality equal to original.

B. Final Instructional Manual Format:
   1. Compile all Contract Administrator-accepted preliminary O&M data into a hard-copy, hard-bound set as detailed in Section B above and in electronic media format as described in paragraph C.

C. Electronic Media Format:
   1. Portable Document Format (PDF):
      a. After all preliminary data has been found to be acceptable to Contract Administrator, upload electronic copies of O&M data to the City's DMS (Aconex) in PDF format and in native file format as applicable
      b. Files to be exact duplicates of Contract Administrator-accepted preliminary data. Arrange by specification number and name.
      c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.
      d. PDF files to be indexed and searchable.
      e. CD Cover: Identify with typed or printed title "OPERATION AND MAINTENANCE DATA, VOLUME NO. ___ OF ___"," and list:
         1) Project title.
         2) Contractor's name, address, and telephone number.

3) Identity of equipment number and Specification section.

1.5 SUBMITTALS

A. Informational:
1. Data Outline: Submit an electronic copy of a detailed outline of proposed organization and contents of final data prior to preparation of preliminary data.
2. Preliminary Data:
a. Submit three (3) hard copies for Contract Administrator's review.
b. If data meets conditions of the Contract:
1) One (1) copy will be returned to Contractor.
2) One (1) copy will be forwarded to The City.
3) One (1) copy will be retained in Contract Administrator's file.
c. If data does not meet conditions of the Contract:
1) Two (2) copies will be returned to Contractor with Contract Administrator's comments (on separate document) for revision.
2) One (1) copy with comments will be retained in Contract Administrator's file.
3) Resubmit three (3) copies revised in accordance with Contract Administrator's comments.
3. Final Data: Submit six (6) hard copies in format(s) specified herein.

1.6 DATA FOR SYSTEMS, SUBSYSTEM AND COMPONENTS

A. Content For Each Unit (or Common Units) and System unless otherwise specified:
1. Product Data:
a. Include only those sheets that are pertinent to specific product.
b. Clearly annotate each sheet to:
1) Identify specific product(s) or part(s) installed.
2) Identify data applicable to installation.
3) Delete references to inapplicable information.
c. Function, normal operating characteristics, and limiting conditions.
d. Serial Numbers
e. Performance curves, engineering data, nameplate data, and tests reports for all pumps.
f. Complete nomenclature and commercial number of replaceable parts.
g. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
h. Spare parts ordering instructions.
i. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
a. Format:
1) Provide reinforced, punched, binder tab; bind in with text.
2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.

3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
4) Identify Specification section and product on Drawings and envelopes.

b. Relations of component parts of equipment and systems.
c. Control and flow diagrams.
d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.

5. Instructions and Procedures: Within text, as required to supplement product data.
   a. Format:
      1) Organize in consistent format under separate heading for each different procedure.
      2) Provide logical sequence of instructions for each procedure.
      3) Provide information sheet for The City's personnel, including:
         a) Proper procedures in event of failure.
         b) Instances that might affect validity of guarantee or Bond.
   b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
   c. Operating Procedures:
      1) Startup, break-in, routine, and normal operating instructions.
      2) Test procedures and results of factory tests where specified.
      3) Regulation, control, stopping, and emergency instructions.
      4) Description of operation sequence by control manufacturer.
      5) Shutdown instructions for both short and extended duration.
      6) Summer and winter operating instructions, as applicable.
      7) Safety precautions.
      8) Special operating instructions.
   d. Maintenance and Overhaul Procedures:
      1) Routine maintenance.
      2) Guide to troubleshooting.
      3) Disassembly, removal, repair, reinstallation, and re-assembly.
6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, Closeout Procedures.

B. Content for Each Electric or Electronic Item or System:
   1. Description of Unit and Component Parts:
      a. Function, normal operating characteristics, and limiting conditions.
      b. Performance curves, engineering data, nameplate data, and tests.
      c. Complete nomenclature and commercial number of replaceable parts.
      d. Interconnection wiring diagrams, including control and lighting systems.
   2. Circuit Directories of Panelboards:
      a. Electrical service.
      b. Controls.
      c. Communications.
   3. List of electrical relay settings, and control and alarm contact settings.
   4. Electrical interconnection wiring diagram, including control and lighting systems.
   5. As-installed control diagrams by control manufacturer.
   6. ISA S20 data sheets for all instruments.
   7. Operating Procedures:
      a. Routine and normal operating instructions.

b. Sequences required.
c. Safety precautions.
d. Special operating instructions.

8. Maintenance Procedures:
   a. Routine maintenance.
   b. Guide to troubleshooting.
   c. Adjustment and checking.
   d. List of relay settings, control and alarm contact settings.
9. Manufacturer's printed operating and maintenance instructions.
10. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

C. Content for Programmable Devices/Components/Sub-systems:
1. The following requirements are minimum requirements applicable to programmable equipment such as VFDs, ASDs, microprocessor based devices, PLCs, Human-Machine-Interfaces, computers, and other programmable devices. Additional requirements may be specified elsewhere.
2. As-Constructed version of shop drawings.
3. Functional description.
4. Wiring details.
5. Configuration Records; record of switch settings, program listings and parameter settings, after commissioning.
6. Maintenance manuals.
7. User guides, technical reference and programming manuals.
8. CD-ROMs copies of:
   a. Manuals.
   b. Settings, databases and templates. Include both native format of files and ASCII-exported version.
   c. Application programs.
9. Cable and software for use on The City's notebook computer for revising/downloading the settings and software.

D. Maintenance Summary:
1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
   a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
   b. Each Maintenance Summary may take as many pages as required.
   c. Use only 8-1/2-inch by 11-inch size paper.
   d. Complete using typewriter or electronic printing. Hand-written and hand-printed entries are will not be accepted.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
   a. Data to be consistent with manufacturer's bill of materials/parts list furnished in O&M manuals.

b. “Unit” is the unit of measure for ordering the part.
c. “Quantity” is the number of units recommended.
d. “Unit Cost” is the current purchase price.

1.7 DATA FOR MATERIALS AND FINISHES

A. Content for Architectural Products, Applied Materials, and Finishes:
1. Manufacturer’s data, giving full information on products:
a. Catalog number, size, and composition.
b. Color and texture designations.
c. Information required for reordering special-manufactured products.
2. Instructions for Care and Maintenance:
a. Manufacturer’s recommendation for types of cleaning agents and methods.
b. Cautions against cleaning agents and methods that are detrimental to product.
c. Recommended schedule for cleaning and maintenance.

B. Content for Moisture Protection and Weather Exposed Products:
1. Manufacturer’s data, giving full information on products:
a. Applicable standards.
b. Chemical composition.
c. Details of installation.
2. Instructions for inspection, maintenance, and repair.

1.8 SUPPLEMENTS

A. The supplements listed below, following “End of Section”, are part of this Specification.
1. Forms: Maintenance Summary Form.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____
2. MANUFACTURER _____
3. MODEL _____
4. SERIAL NUMBER_____
5. EQUIPMENT/TAG NUMBER(S) _____
6. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 45 KG)_____
7. NAMEPLATE DATA (hp, voltage, speed, etc.) _____
8. MANUFACTURER'S LOCAL REPRESENTATIVE _____
   a. Name_____ Telephone No. _____
   b. Address _____
9. MAINTENANCE REQUIREMENTS

MAINTENANCE OPERATION COMMENTS	FREQUENCY	LUBRICANT (IF APPLICABLE)
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

REFERENCE SYMBOL	[SHELL]	[STANDARD OIL]	[GULF]	[ARCO]	APPROVED EQUAL IN ACCORDANCE WITH B8
List symbols used in No. 7. above.	List lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR THE CITY'S INVENTORY.

PART NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST
Note: Identify parts provided by this Contract with two asterisks.				

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 DESCRIPTION

A. This section contains requirements for training the City staff, by persons retained by the Contractor specifically for the purpose of proper operation and maintenance of all equipment supplied and installed under this Contract, including City-Supplied Equipment.

B. The Contract Administrator will develop the overall training plans for Unit Processes and Facility Areas with input from the Contractor, Manufacturers or vendors, and the City. The Contractor shall be responsible for providing qualified training instructors, classroom and field lesson plans as detailed in the Specifications and as described herein.

C. The Contract Administrator will also coordinate the HRC and IFAS Supply Contractor training with the Contractor and the City. Training for HRC and IFAS will take place during the three (3) week period preceding their respective Functional Testing.

D. Arrange for Manufacturers' Representatives to supply detailed classroom and hands-on training to the City's operations personnel, maintenance personnel, and select on-call personnel on operation and maintenance of specified product (system, subsystem, and component) and as may be required in applicable Specifications.

E. The City will require training for at least two (2) shifts for each specified training session. Allow at least the minimum specified number of hours or days of training for each City staff shift for each specified product (system, subsystem, and component).

F. To facilitate scheduling of the City personnel, the City may elect to divide sessions into operation-specific topics and maintenance-specific topics as applicable, to allow operations/on-call staff and maintenance staff to attend separately. The Contractor shall coordinate with the Contract Administrator and the City.

G. Training will be scheduled at least four weeks in advance of the respective training sessions.

H. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with the City and familiar with operation and maintenance manual information specified in Section 01 78 23, Operation and Maintenance Data.

I. Training sessions to be conducted by qualified Manufacturers' Representatives of the various equipment suppliers, with a minimum of two years' experience. Manufacturers' Representatives shall be familiar with facility operation and maintenance requirements as well as with specified equipment.

J. The Contract Administrator has the authority to determine if the training is sufficient based on the lesson plan submitted by the Contractor.

K. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

1.2 SUBMITTALS

A. Submit the following information to the Contract Administrator 30 days prior to the first training session. The material will be returned as either “NO EXCEPTIONS TAKEN”, “EXCEPTIONS NOTED” or “EXCEPTIONS NOTED - RESUBMIT”.
   1. Lesson plan and supplemental training manuals, handouts, visual aids and other reference material required for each training session.
   2. Submit proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.
   3. Lesson Plan: When training of the City personnel is specified, prepare for each required course, a lesson plan containing but not limited to the following information:
      a. Title and objectives.
      b. Recommended types of attendees (e.g., managers, engineers, operators, maintenance).
      c. Course description and outline of course content.
      d. Format (e.g., lecture, self-study, demonstration, hands-on).
      e. Instruction materials and equipment requirements, including supplemental training manuals, handouts, visual aids and other reference material required for each training session.
      f. Resumes of instructors providing the training.
   4. Training Schedule:
      a. Submit not less than 21 calendar days prior to start of equipment installation and revise as necessary for acceptance.
      b. List specified equipment and systems that require training services and show:
         1) Respective manufacturer.
         2) Estimated dates for installation completion.
         3) Estimated training dates.
      c. Adjust schedule to ensure training of appropriate personnel as deemed necessary by the City, and to allow full participation by Manufacturers’ Representatives. Adjust schedule for interruptions in operability of equipment.
      d. Coordinate with Section 01 32 00, Construction Progress Documentation, and Section 01 91 14, Equipment Testing and Facility Start-up.
      e. Individual sessions shall not exceed 4 hours. A break should be incorporated into sessions that exceed 2 hours. Training session anticipated to exceed 4 hours can be assigned to multiple-sessions; however, no more than one 3-hour and one 4-hour sessions (7 hours total) may be delivered to the same participants in a single day. Two successive 4-hour sessions may be delivered to alternating shifts of attendees in a single day (i.e., one group of attendees in the morning, and a second group of attendees in the afternoon). Training sessions requiring more than 7 hours may be delivered on separate days.
      f. Classes shall not be scheduled concurrently.

1.3 LOCATION AND TRAINING FACILITIES

A. The City will provide the classroom training facilities.

B. Field training sessions shall take place at the equipment location.

1.4 FORMAT AND CONTENT

A. The training sessions shall be comprised of both classroom training and field training. As a minimum, they shall cover the following topics for each item of equipment or system:
   1. Training will cover:
      a. Familiarization
         1) Safety
         2) Operation
         3) Troubleshooting
         4) Preventative and predictive maintenance
         5) Corrective maintenance
         6) Parts
         7) Local representation
      b. Classroom Training
         1) As a minimum, classroom equipment/system training must be completed prior to Functional Testing and will include:
            a) The specific equipment location in the plant and operational overview. Use slides and drawings to aid discussion.
            b) Purpose and function of the equipment/system.
            c) The operating theory of the equipment/system.
            d) Start-up, shutdown, normal operation and emergency operating procedures, including system integration and electrical interlocks, if any.
            e) Safety items, standard operation procedures (SOPs), and safe work procedures (SWPs) related to operation of the equipment.
            f) Routine and preventative and predictive maintenance
            g) Disassembly and assembly of equipment if applicable
            h) Normal and major repair procedures
            i) Inspection and troubleshooting procedures including the use applicable test instruments and the “pass” and “no pass” test instrument readings
            j) Calibration procedures
         2) The Contractor shall integrate a PCS Demonstration System into any classroom training course where:
            a) The content includes equipment monitoring and control via the HMI;
            b) The content includes alarming and alarm response;
            c) The content includes coordination of maintenance events and states to PCS/HMI status indications; or
            d) The use of the PCS Demonstration System would clarify and/or aid in the training of the Training Participants.
            e) Where use of the PCS Demonstration System is included in a training course, the Contractor shall:
               (1) Provide the PCS Demonstration System in accordance with the Specifications;
               (2) Make certain that the PCS Demonstration System in no way impacts the actual operating PCS or in any other way expose the PCS to any risk of inadvertent operation; and

(3) Provide a second projector and screen to display the HMI Operator Workstation to all participants.

c. Field Training

1) As a minimum, field equipment training for operations personnel shall include

a) Identification of equipment: location of primary element; location of instrument readout; discussion on purpose, basic operation, and information interpretation.

b) Discussion and demonstration of standard operating procedures, safe work procedure, and daily visual inspection of system operations.

c) Discussion and demonstration of the preventative maintenance activities, and predictive maintenance activities where applicable.

d) Discussion and demonstration of start-up and shutdown procedures.

e) Demonstration of routine disassembly and assembly of equipment if applicable.

f) Identification and review of safety items and demonstration of safety procedures, if feasible.

g) Review of Contractor prepared Operation and Maintenance Manuals.

h) Demonstration of operating parameter adjustment for optimized equipment/system operation.

1.5 VIDEO RECORDING

A. The Contractor shall notify all training providers that the training sessions will be videotaped.

B. Supply video recording of instruction sessions, including manufacturers' representatives' hands-on equipment instruction and classroom sessions.

C. Arrange for and carry the cost of videotaping one complete training session for each item of equipment and each system.

D. The video record of training shall be provided in MPEG-4(.mp4) format. The digital file must be named with course title and reference to the training plan. The files shall be fully indexed and cataloged with file labels stating equipment or system, classroom or field session, and date recorded.

E. Videotaping shall be by a professional commercial videographer, experienced in shooting training videos, in both good and inclement weather.

F. Video Format and Quality:

1. Digital (MPEG-4), with sound.
2. Video:
   a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.
   b. Electronically, and accurately display the month, day, year, and time of day of the recording.
3. Audio:
   a. Audio recorded during documentation shall be done clearly, precisely, and at a moderate pace.

G. Documentation:
   1. Digital Video Disc (DVD) Label:
      a. Tape number (numbered sequentially, beginning with 001).
      b. Project Name.
         1) Facility name;
         2) Process area and equipment

H. The digital files shall be fully indexed and cataloged with file labels stating equipment or system, classroom or field session, and date recorded.

I. Acceptable videographer is McNeill Media Creations (Don McNeill, (204) 224-2578, mmc@shaw.ca) or approved equal in accordance with B8.

1.6 EQUIPMENT AND SYSTEMS FOR TRAINING

A. Provide Training for the equipment and systems listed in the following table, and as otherwise Specified:

Equipment / System	Specification Reference	Minimum Number of Person Days for Training, per Shift
Temporary Conveyor	01 50 00	2 person days
SBS-Modified Bituminous Membrane Roofing	07 52 16	1/2 person days
Wet-Pipe Sprinkler Systems	21 13 13	1 person day
Generator Fuel Oil System	23 11 10	1 1/2 person days
HVAC Fans	23 34 00	2 person days
Exhaust System and Stacks	23 51 01	1 1/2 person days
Heat Exchanger	23 57 00	1 person day
Air Handling Units	23 77 00	2 person days
Unitary Air Conditioning Equipment	23 81 00	2 person days
Terminal Heating and Cooling Units	23 82 00	2 person days
Primary Switchgear Assembly to 15 kV	26 13 18	2 person days
Low Voltage Switchgear	26 23 00	2 person days
Motor Control Centre	26 24 19	3 person days
Ground Fault Protection	26 28 18	2 person days
Variable Frequency Drives	26 29 23	2 person days
Diesel, Electric Generating Units (Liquid Cooled)	26 32 10	2 person days
Static Uninterruptible Power Supply	26 33 53	4 hours/UPS system
Active Harmonic Filter Power Factory Correction	26 35 33	2 person days
Central Emergency Lighting System	26 52 02	2 person days
Multiplex Fire Alarm Systems	28 31 02	1 person day
Fabricated Slide Gates and Stop Logs	35 20 16.25	4 person days
Instrumentation and Control Components	40 91 01	3 person days
Programmable Logic Controller	40 95 33	8 person days
Applications Software	40 96 00	30 person days
Overhead and Gantry Cranes	41 22 13.13	2 person days

Equipment / System	Specification Reference	Minimum Number of Person Days for Training, per Shift
Monorail Hoists	41 22 23.19	1 person day
Steel Platform Truck Weigh Scales	41 24 40	2 person days
Multistage Centrifugal Blowers	43 11 15.13	3 person days
High Speed Turbo Blowers	43 11 15.15	3 person days
Rotary Lobe Air Blowers	43 12 03	3 person days
Screw Induced Flow Centrifugal Pumps	43 21 13.13	4 person days
Horizontal Split-Case Centrifugal Pumps	43 21 13.16	2 person days
Non-Clog Dry-Pit Centrifugal Pumps	43 21 13.19	6 person days
Horizontal End Suction Centrifugal Pumps	43 21 13.23	4 person days
Induced Flow (Recessed Impeller) Centrifugal Pumps	43 21 13.29	4 person days
Submersible Axial Flow Pumps	43 21 38	1 person day
Submersible Pumps	43 21 39.13	1 person day
Chopper Pumps	43 21 39.16	1 person day
Process Electric Water Heater	43 40 03	2 person days
Biofilter Odour Control System	44 31 21	2 person days
Rotary Lobe Pumps	44 42 56.14	4 person days
Motorized Automatic Strainers	44 43 33	3 person days
Screening Equipment	46 21 11	6 person days
Vortex Grit Chamber Equipment	46 23 23	4 person days
Cyclone Separator and Grit Washer	46 23 27	4 person days
Dry Polymer Make Down and Feed Systems	46 33 33.03	Two ½ person days/polymer system
Chemical Metering Diaphragm Pump Skids	46 33 42	1 person-day/chemical system
Chemical Metering Gear Pump Skids	46 33 42.13	1 person-day/chemical system
Submersible Mixers	46 41 23	4 person days
Fermenter Mixers	46 41 24	7 person days
Hydraulic Mixing Equipment	46 41 48	1 person day
Secondary Clarifier Mechanism	46 43 16.13	4 person days
Coarse Bubble Air Diffusers for Channels	46 51 21.13	2 person days
Coarse Bubble Air Diffuser System for Tanks	46 51 21.16	4 person days
UV Disinfection System	46 66 20	4 person days
RDT Wash Water Boosting System	46 70 01	3 person days
Rotary Drum Thickeners	46 71 33	6 person days

1.7 TRAINING COMPLETION FORMS

A. Form T-1 to be signed by the trainer, the Contract Administrator, and by a City Staff representative for each City shift when classroom training has been completed. One (1) form is to be used for each item of equipment and each system for which training has been provided. Once all classroom training sessions have been completed, Form T1 is to be submitted to the Contract Administrator.

B. Form T-2 to be signed by the trainer, the Contract Administrator, and by a City Staff representative for each City shift when field training has been completed. One (1) form is to be used for each item of equipment and each system for which training has been provided. Once all field training sessions have been completed, Form T2 is to be submitted to the Contract Administrator.

C. The supply of adequate training, including completion of Forms T-1 and T-2 is a required prerequisite for handover of equipment, Unit Processes and Facility Areas as appropriate to the City.

1.8 SUPPLEMENT

A. Supplements listed below, following "End of Section," is a part of this Specification:
   1. Form T-1 Certificate of Satisfactory Classroom Training
   2. Form T-2 Certificate of Satisfactory Field Training

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

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Form T-1

CERTIFICATE OF SATISFACTORY CLASSROOM TRAINING

We have completed classroom training in the operation and maintenance of the equipment as listed below.

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

List of Attendees:

Print Name Signature Date
(Trainer)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form T-2

CERTIFICATE OF SATISFACTORY FIELD TRAINING

We have completed field training in the operation and maintenance of our equipment as listed below.

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

List of Attendees:

Print Name	Signature	Date
(Trainer)		
Print Name	Signature	Date
(Authorized Representative of Contract Administrator)		
Print Name	Signature	Date
(Authorized Representative of City)		

SECTION 01 91 14

EQUIPMENT TESTING AND FACILITY STARTUP

PART 1 GENERAL

1.1 SUBMITTALS

A. Informational Submittals:
   1. Completed Manufacturer's Certificate of Proper Installation, and completed Form 102 – Certificate of Satisfactory Installation as required by individual Specification sections. Submit prior to beginning Facility Startup procedures.
   2. Testing:
      a. Functional Test, Performance Test. Demonstration Test, and Performance Verification plans, procedures, and log formats: Submit as part of Shop Drawing submittal for the respective piece of equipment.
      b. Functional Test, Performance Test, Demonstration Tests, and Performance Verification schedules: Submit at least 14 days prior to start of related testing.
      c. Unit Process, Facility Area and Facility startup and performance evaluation plans: Incorporated into the Project Commissioning Plan at least 21 days prior to commencement of respective startup and Demonstration Testing.
   3. Certification of calibration for testing equipment, when so specified.
   4. Documentation of HVAC systems balancing results, when so specified.

1.2 COORDINATION WITH EXISTING SYSTEM SUBSYSTEM AND/OR COMPONENTS

A. Commissioning of Unit Processes and Facility Areas and components must be coordinated with existing facilities as agreed upon by the Contract Administrator and the City.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 GENERAL

A. Contractor-supplied equipment: The Contractor shall be responsible for Functional Testing, Performance Testing, Demonstration Testing, and Performance Verification of equipment and or Unit Processes supplied under this Contract as described herein, and as required by the various equipment Specifications.

B. City Supplied Equipment: The Contractor shall be responsible for Functional Testing, Performance Testing, Demonstration Testing, and Performance Verification of City-Supplied Equipment. Supply Contractor will assist the Contractor in performing the Functional and Performance Testing of this equipment as defined in Bid Opportunity 871-2013 and Bid Opportunity 873-2013.

C. The general sequence of Commissioning, testing and startup events is summarized by the following table, and in the Commissioing Structure flow chart included as a Supplement to this Section. Due to the phased nature of construction, this sequence of events will be further developed by the Commissioning Team to suit specific equipment, Unit Processes, Facility Areas, and critical events.

Sequence Item	Description
A. Testing prior to Equipment Shipment	1) Factory Acceptance Testing (FAT) completed when specified in individual Specification section 2) Submit Manufacturer's Certificate of Compliance when specified in individual Specification section
B. Testing Prerequisites	1) Functional Test and Performance Test Plans submitted and reviewed as part of Shop Drawing submittals 2) Supply Contractor or Manufacturer's Representative, Contract Administrator, and Contractor inspect equipment delivery 3) Contractor accepts equipment delivery 4) Supply Contractor or Manufacturer's Representative, Contractor, and Contract Administrator complete Form 100 – Certificate of Equipment Delivery 5) Contractor stores equipment on Site or in Contractor warehouse 6) Supply Contractor or Manufacturers' Representatives to provide installation instructions/training to Contractor 7) Supply Contractor or Manufacturers Representative, and Contractor to complete Form 101 – Certificate of Readiness to Install 8) Contractor to complete equipment installation and Unit Process and/or Facility Area construction 9) Supply Contractor or Manufacturers Representative, and Contractor to submit O&M Instructional Manuals not less than 30 days prior to Functional Testing 10) Relevant Classroom Training has been completed, and Form T-1 signed and submitted prior to equipment Functional Testing
C. Functional Testing	1) Supply Contractor or Manufacturers' Representatives inspect installation 2) Supply Contractor or Manufacturers' Representatives, and

Sequence Item	Description
	Contractor to complete Functional Testing of equipment 3) Submit Manufacturer's Certificate of Proper Installation Form 4) Supply Contractor or Manufacturers' Representatives, and Contractor complete and sign Form 102- Certificate of Satisfactory Installation
D. Performance Testing	1) Supply Contractor or Manufacturers' Representatives to conduct all necessary checks prior to confirming equipment is ready to run 2) Supply Contractor or Manufacturers' Representatives, and Contractor begin equipment startup and Performance Testing process 3) Supply Contractor and/or Manufacturers' Representatives, and/or Contractor complete equipment field training of City staff prior to, or in conjunction with equipment Performance Testing, unless otherwise specified and complete and submit Form T-2 Certificate of Satisfactory Field Training for each piece of equipment specified. 4) Supply Contractor or Manufacturers' Representatives, and Contractor complete Performance Test on each piece of equipment as specified. 5) Contractor shall complete equipment related deficiency items identified, and retest equipment as required. 6) All required parties sign Form 103 – Certificate of Equipment Satisfactory Performance for each piece of equipment. 7) Contractor submit completed Form(s) 103 – Certificate of Equipment Satisfactory Performance
E. Demonstration Testing	1) With assistance from the Commissioning Team, the Contractor shall complete Unit Process and Facility Area Classroom Training of City staff prior to Demonstration Testing and complete and submit Form T-1 Certificate of Satisfactory Classroom Training for each Unit Process, Facility Area required 2) With assistance from the Commissioning Team, the Contrator shall complete Unit Process and Facility Area field training of City staff prior to, or in conjunction with Demonstration Testing and complete and submit Form T-2 Certificate of Satisfactory Field Training for each Unit Process, Facility Area required 3) Unit Process, Facility Area and Facility Startup and Performance Evaluation Forms incorporated into the Project Commissioning Plan

Sequence Item	Description
	prior to respective startup and Demonstration Testing 4) The Contractor shall review the Demonstration Testing operational requirements (output and performance) with Contract Administrator and the City 5) Contractor shall confirm required City staff is available 6) Contractor shall review safety procedures as required with Contract Administrator and the City 7) With assistance from the Commissioning Team, the Contractor shall commence Demonstration Testing of Unit Process or Facility Area (Contractor, Supply Contractor and/or Manufacturers' Representatives operate equipment during Demonstration Testing, unless otherwise agreed to by the Commissioning Team, under the supervision and direction of the City) 8) Contractor shall complete Performance Testing and sign-off Form 104 – Certificate of Satisfactory Process Demonstration 9) Contractor shall complete process related deficiency list items 10) After Forms T-1, T-2, 100, 101, 102, 103 and 104 are completed, City to operate and maintain Unit Process and/or Facility Area
F. Performance Verification	1) Contractor shall review Performance Verification operational requirements (output & performance) with the Commissioning Team 2) Contractor shall assist the Commissioning Team to commence Performance Verification of Unit Process or Facility Area (Contractor, Supply Contractor and/or Manufacturers' Representatives operate equipment during Performance Verification, unless otherwise agreed to by the Commissioning Team, under the supervision and direction of the City) 3) Contractor shall complete Performance Verification (may be conducted in conjunction with Demonstration Testing if flows and loading allow) 4) Contractor shall complete and Submit process Startup and Performance Evaluation Forms 5) Commissioning Team to sign and submit Form 105 – Certificate of Satisfactory Process Performance 6) Contractor shall complete process related deficiency list items

Sequence Item	Description
G. Overall Facility Performance Verification	1) Contractor shall verify that training, Demonstration Testing and Performance Verification Testing for all Unit Processes and Facility Areas have been completed, and all Forms T-1, T-2, 104, and 105 have been signed and submitted 2) Contractor shall review Overall Facility Performance Verification operational requirements (output & performance) with the Commissioning Team 3) Commissioning Team to commence Overall Facility Performance Verification of Unit Process or Facility Area (City to operate equipment) 4) Complete Overall Facility Performance Verification. 5) Commissioning Team to sign and submit Form 106 – Certificate of Overall Facility Performance 6) Contractor shall complete deficiency list items

3.2 ROLES AND RESPONSIBILITIES

A. Refer to the Responsibilities Matrix attached as a Supplement to this Section.

B. Contractor's Responsibilities:
   1. Designate and furnish one or more Contractor's personnel to act as the Contractor's testing and startup representative to coordinate and expedite Commissioning.
      a. Such person or persons shall be present during Commissioning meetings specified in Section 01 31 19, Project Meetings, and shall be available at all times during the equipment, process and facility testing and verification period(s).
   2. As part of the Commissioning Team, assist the City and Contract Administrator in developing the Project Commissioning Plan as required.
   3. Coordinate with and report directly to the Contract Administrator.
   4. Attend Commissioning meetings in Winnipeg, Manitoba.
   5. Meet with the Supply Contractors and Manufacturers' Representatives and be trained on the installation of all equipment. Sign-off Form 101: Certificate of Readiness to Install.
   6. Maintenance of equipment and subsystems until hand-over to the City.
   7. List of all personnel who the Contractor plans to provide for Demonstration Testing and hand-over with information indicating their qualifications for this work.
   8. Operate and/or provide operating assistance of all equipment installed under this Contract, and with the assistance of the Supply Contractors and Manufacturers' Representatives as required, to complete all testing (Functional, Performance, Demonstration) and Performance Verification.
   9. Liaise with the Supply Contractors and Manufacturers' Representatives as required during installation and Functional Testing to ensure proper equipment installation, and sign-off Form 102: Certificate of Satisfactory Installation.

10. Correct all installation deficiencies as required by the Supply Contractors and Manufacturers' Representatives.
11. Red tag, lockout and maintain control of all power supplies, valves, etc., associated with the equipment being tested.
12. Provide personnel representing the appropriate sub-contractors and equipment Manufacturers during training and Commissioning period as per the Current Schedule and Specifications, and as directed by the Contract Administrator.
13. Operate all equipment under the direction of the Supply Contractors and Manufacturers' Representatives as required during equipment Performance Testing. Issue and sign Form 103: Certificate of Equipment Satisfactory Performance.
14. Operate all equipment under the direction of the Supply Contractors and Manufacturers' Representatives as required during process Demonstration Testing. Issue and sign Form 104: Certificate of Satisfactory Process Demonstration.
15. After completion of Form 104 and all related site Training, green tag, and turn over control of all power supplies, valves, etc., to the City and Contract Administrator.
16. If Performance Verification is performed in conjunction with the process Demonstration Testing, operate all equipment under the direction of the Supply Contractors and Manufacturers' Representatives as required during process Performance Verification. If Performance Verification is performed at a later date due to inadequate flows or loading at the time of Demonstration Testing, furnish Manufacturer's Representative and provide operational support to the City as required.
17. Issue and sign Form 105: Certificate of Satisfactory Process Performance.
18. Furnish Manufacturer's Representative and provide operational support to the City as required during Overall Facility Performance Verification.
19. Issue and sign Form 106: Certificate of Overall Facility Performance Verification.
20. Provide the Contract Administrator with red-lined as-built Drawings.
21. Additional responsibilities as specified in other sections.

C. The City Responsibilities:
1. As part of the Commissioning Team, assist the Contractor and Contract Administrator in developing the Project Commissioning Plan as required.
2. Provide water, power, and other items as required for testing and facility startup, unless otherwise indicated. The Contractor shall supply and install all chemicals, lubricants, and fuel required for the first fill.
3. Operate Unit Processes and devices, with support of the Contractor and Manufacturer's Representative as required during Performance Verification of Unit Processes and Facility Areas, if Performance Verification is performed separately from the Demonstration Testing.
4. Operate Process Units and devices, with support of the Contractor, Supply Contractor and Manufacturer's Representative as required during the Overall Facility Performance Verification.
5. Provide labor and materials as required for sampling and laboratory analyses. Initial sampling and testing will be paid for by the City. Any required re-testing due to non-compliance will be borne by the Contractor.
6. Furnish Supply Contractor Representative(s) on City-Supplied equipment for assistance.
7. Make available spare parts, special tools, and operation and maintenance information for City equipment, and City-Supplied equipment as applicable.

3.3 COMMISSIONING, STARTUP AND TESTING PLANS

A. Project Commissioning Plan

1. The Commissioning Team, including the Contractor, will develop a detailed Project Commissioning Plan at least ninety (90) Calendar Days prior to planned start of equipment Performance Testing.
2. The Project Commissioning Plan will provide a description of the overall Commissioning requirements for the Work.
3. The Project Commissioning Plan will include the following descriptions and requirements as they relate to Commissioning:
   a. Makeup of the Commissioning Team and the responsibilities of the various stakeholders.
   b. Detailed schedule of events, including but not limited to the schedule and durations for completion of testing of all component parts of the system.
   c. Facility Areas of the plant and their respective functions.
   d. Treatment objectives including regulatory requirements.
   e. Required startup sequence of the various upgrades to bring the upgraded SEWPCC into full operations.
   f. General construction completion sequence needed to support the startup sequence.
   g. Testing and startup phases that will need to occur to facilitate the overall startup sequence.
   h. Sampling and analytical program for tests necessary to verify compliance with specified performance criteria.
   i. Procedures for system tie-ins that will need to be executed to facilitate the integration of the new and existing plant systems.
   j. Workplace Health and Safety Plan.
   k. Chemical handling procedures and responsibilities.
   l. Contingency plans in the event of a process malfunction.
   m. Drawings and sketches as required to illustrate the planned sequence of events.
   n. Commissioning procedures and supporting documents appended to the Plan and also found in other parts of the specification documents.
   o. Training plans and schedule for training provided to the City by the Contractor, Supply Contractors, Manufacturers, and Contract Administrator.
   p. Elements required for temporary operations to enable continuous plant operation during construction and Commissioning.
4. A copy of the Project Commissioning Plan document has been included in Appendix AA. The attached Project Commissioning Plan is a work in progress, and was developed by the Contract Administrator and the City based on information known at the completion of the detailed design.
5. The Contractor shall be familiar with and remain current with the Project Commissioning Plan, and use the document in coordination with the Specifications and Drawings to support the Commissioning.
6. As part of the Commissioning Team, the Contractor shall assist the Contract Administrator and the City in updating and developing the Project Commissioning Plan based on the execution of the Work, and the specific materials, means and methods that the Contractor intends to employ.
7. The Contractor shall, during the execution of the Work, supply information and documentation to the Contract Administrator as may be required to update the Project

Commissioning Plan to be consistent with the actual project execution at no extra cost to the City.

8. The Project Commissioning Plan or specific components, which the Commissioning Team will collaboratively update based on the specific materials, means and methods that the Contractor intends to employ will serve to define the Contractor's scope of work for the Commissioning and startup of the SEWPCC, and shall be adopted by the Contractor as part of the overall Contract at no extra cost to the City.

3.4 EQUIPMENT TESTING

A. Preparation:
   1. General:
      a. Complete installation of each unit and related processes before testing, including all related Manufacturer's Representative services.
      b. Furnish qualified Manufacturer's Representatives, when required by individual Specification sections, to assist in testing.
      c. Obtain from Manufacturer's Representative the Manufacturer's Certificate of Proper Installation Form, and signed Form 102 – Certificate of Satisfactory Installation in accordance with Section 01 43 33, Contractor's Field Services, as specified by individual Specification sections.
      d. Notify the City, Contract Administrator, and Manufacturer's Representative in writing at least 14 days prior to scheduled date of testing.
      e. Schedule equipment testing and facility startup meetings to discuss test schedule, plan of test, materials, chemicals and liquids required, facilities operations interface, and City involvement.
      f. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required to conduct testing.
      g. Provide written documentation of Functional Test and Performance Test results on Contractor's form for each piece of equipment tested. Provide space on form for Contract Administrator's signature verifying that testing has been completed as per specification.

B. Functional Test:
   1. Conduct as specified in individual Specification sections.
   2. Provide written test report form for each item of equipment to be tested, to include the minimum information:
      a. Owner/Project Name.
      b. Equipment or item tested.
      c. Date and time of test.
      d. Type of test performed (Functional or Performance).
      e. Test conditions.
      f. Test results.
      g. Signature space for Contractor, Manufacturer's Representative and Contract Administrator representatives.
   3. An example of the Functional Test plan form is appended at the end of this section.
   4. For specific requirements for the testing and Commissioning of electrical and automation systems, refer to the following Sections, and incorporate requirements defined therein into the procedures described in this Section as and where appropriate.

a. 26 08 05 Acceptance Testing – Electrical
b. 40 99 92 Automation Testing and Commissioning.

5. Prior to Functional Testing, the following conditions shall be met for that particular piece of equipment or sub-system:
   a. O&M Instructional Manuals have been completed and submitted not less than 30 days prior to Functional Testing, in accordance with Section 01 78 23 Operation and Maintenance Data.
   b. Construction completed as necessary to provide working equipment, systems and subsystems, with safety features in working order.
   c. Equipment, piping, electrical wiring, and instrumentations are installed.
   d. All gearboxes, bearings, etc. have been checked for first fill of oil to manufacturer's recommended level.
   e. Water containing structures shall have passed a water tightness test. Leakage tests and piping hydraulic tests completed and any leaks repaired.
   f. Tagging, signage, pipe labels, panel identification, and wiring identification have been completed to the extent necessary to identify items being testing.
   g. Safety devices and equipment are installed, fully functional, adjusted, and tested including the operation and setting of safety valves.
   h. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by Manufacturer in accordance with the Specification and Drawings.
   i. Electrical system installation checks have been completed including all specified electrical equipment and cable tests and grounding system tests
   j. Automation system installation checks have been completed, including I/O checks and individual loop tests. Instrument calibration and scaling will be performed where applicable.
   k. Mechanical/civil checks : equipment location & fixing alignment, tagging, gland packing & lubrication, pipe support inspections, tank hydrostatic tests, pattern tests, rotation tests.
   l. Pipework installation & pressure tests.
   m. Painting & insulation inspection records.
   n. Cleaning, rinsing, and flushing of pipework
   o. Calibrate testing equipment in accordance with Manufacturer's instructions.
   p. Turn rotating equipment by hand when possible, and safe to do so, to confirm that equipment is not bound.
   q. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
   r. Adjust clearances and torque.
   s. Balance HVAC systems, measuring airflow (L/s) static pressure, and component pressure losses in coordination with the requirements specified in individual sections.
6. Ready-to-test determination will be by Contract Administrator based at least on the following:
   a. Notification by Contractor of equipment readiness for testing.
   b. Acceptable testing plan.
   c. Acceptable Operation and Maintenance Manuals.
   d. Receipt of Manufacturer's Certificate of Proper Installation.

e. Adequate completion of Work adjacent to, or interfacing with, equipment to be tested, including items to be supplied by the City.
f. Availability and acceptability of Manufacturer's Representative, when specified, to assist in testing of respective equipment.
g. Satisfactory fulfillment of other specified Manufacturers' responsibilities.
h. Equipment and electrical tagging complete.
i. Delivery of all spare parts and special tools.

7. Form 102 Certificate of Satisfactory Installation:
   a. Form 102 Certificate of Satisfactory Installation shall be completed and signed by the equipment Manufacturer's Representative and the Contractor. Such form shall certify that the signing party is a duly authorized representative of the Manufacturer, is empowered by the Manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to assure that the equipment is installation has been completed satisfactorily and that any defects have been remedied prior to equipment Performance Testing.
   b. When, in Contract Administrator's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to Performance Testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Contract Administrator's signature on the Equipment Test Report and on Form 102 – Certificate of Satisfactory Installation, a copy of which is attached to this section.

C. Performance Testing:
1. Conduct as specified in individual Specification sections.
2. Notify Contract Administrator at least 14 days prior to scheduled date of test.
3. Performance Testing shall not commence until equipment has been approved by Contract Administrator as having satisfied Functional Test requirements specified, and Form 102 – Certificate of Satisfactory Installation had been signed by all required parties.
4. Follow approved testing plan and detailed procedures specified.
5. Source and type of fluid, gas, or solid for testing shall be as specified.
6. Unless otherwise indicated, supply all labor, materials, and supplies for conducting the test and taking all Samples and performance measurements.
7. Prepare performance test report summarizing test method and results.
8. Unless otherwise specified, equipment performance tests shall consist of a minimum of one (1) hour of continuous operation of the equipment while meeting its specified operating criteria.
9. When, in Contract Administrator's opinion, equipment meets performance requirements specified, such equipment will be accepted as conforming to Contract requirements. Such acceptance will be evidenced by Contract Administrator's signature on the Equipment Test Report and completion of Form 103 – Certificate of Satisfactory Performance.
10. Complete and sign Form 103 – Certificate of Equipment Satisfactory Performance upon satisfactory completion of each equipment Performance Test.

3.5 PROCESS DEMONSTRATION AND PERFORMANCE VERIFICATION

A. General:
1. In order to facilitate continuous operation of the SEWPCC Facility and staging of the Work, Demonstration Testing and Performance Verification of the Unit Processes and

Facility Areas will occur in a staged manner, as described in 01 52 10 Construction Sequencing.

2. Demonstration Testing and Performance Verification plans and evaluation criteria will be developed collaboratively by the Commissioning Team.
3. Contractor, Supply Contractor and/or Manufacturers' Representatives shall operate equipment during Demonstration Testing and Performance Verification, unless otherwise agreed to by the Commissioning Team, under the supervision and direction of the City.
4. Sequence startup of each piece of equipment and each sub-process to the point that the complete process area is operational for evaluation of Unit Process and Facility Area performance.
5. Include City-Supplied Equipment.
6. Provide Subcontractor and equipment Manufacturers' staff as specified, and adequate to prevent delays.
7. Schedule ongoing Work so as not to interfere with or delay the completion of Process Demonstration and Performance Verification Testing.
8. Copies of Form 104 and Form 105 are included as Supplements to this Section. These Supplements contain Form 104s and Form 105s specific to a number of critical Unit Processes and Facility Areas. Additional Form 104s and 105s may be required.

B. Demonstration Testing:
1. The Demonstration Testing is intended to demonstrate the reliable operation of the individual Unit Processes and Facility Areas.
2. The Demonstration Test shall comprise of running the identified Facility Area and/or Unit Process continuously for a minimum of 3-days at pre-determined operating conditions without interruption, or as otherwise specified.
3. Contractor, Supply Contractor and/or Manufacturers' Representatives shall operate equipment during Demonstration Testing, unless otherwise agreed to by the Commissioning Team, under the supervision and direction of the City.
4. Equipment must be accepted by Contract Administrator as having met requirements of specified Functional and Performance Testing prior to the Demonstration Testing.
5. Demonstrate proper operation of required interfaces within and between individual Unit Processes.
6. Demonstration Testing of any Unit Process or Facility Area shall be considered complete when, in opinion of Contract Administrator, Unit Process or Facility Area has operated in the manner intended for 3 (three) continuous days without significant interruption, unless otherwise specified. This period is in addition to training, Functional, or Performance Testing periods specified elsewhere.
   a. Significant Interruption: May include any of the following events:
      1) Failure of Contractor to provide and maintain qualified onsite personnel as scheduled.
      2) Failure to meet specified performance for more than 2 (two) consecutive hours.
      3) Failure of any critical equipment or unit process that is not satisfactorily corrected within five (5) hours after failure.
      4) Failure of any noncritical equipment or unit process that is not satisfactorily corrected within eight (8) hours after failure.
      5) As determined by Contract Administrator.
   b. A significant interruption will require Demonstration Test then in progress to be stopped and restarted after corrections are made.

7. Verify that each unit process is capable of performing its intended function(s), including fully automatic and computerized operation.
8. When, in the Contract Administrator's opinion, the Demonstration Test has been completed successfully, such Unit Process or Process Area will be accepted as conforming to Contract requirements. Upon such acceptance, Form 104 – Certificate of Satisfactory Process Demonstration shall be signed by all required parties, and the City will take over operation and maintenance of the identified Unit Process or Facility Area.
9. After the Unit Process or Facility Area is operating, complete, Performance Testing of those items of equipment not previously tested, where agreed upon by Contract Administrator.

C. Performance Verification
1. Performance Verification is intended to demonstrate that the individual Unit Processes and Facility Areas meet the intended design hydraulic and treatment requirements.
2. The Performance Verification shall comprise of running the identified Facility Area and/or Unit Process between their specified minimum and maximum operating conditions over a 1-day period, or as otherwise specified, when flows and load conditions allow (e.g. low temperatures, high flows, and rain storm events).
3. Evaluate the full capabilities of the Unit Process and Facility Areas, including, but not limited to the performance of the computer system.
4. Contractor, Supply Contractor and/or Manufacturers' Representatives shall operate equipment during Performance Verification, unless otherwise agreed to by the Commissioning Team, under the supervision and direction of the City.
5. The Performance Verification may take place in conjunction with the Demonstration Test, if conditions and flows allow.
6. Upon successful completion of each Performance Verification, a copy of Form 105 – Certificate of Satisfactory Process Performance shall be signed by all required parties.

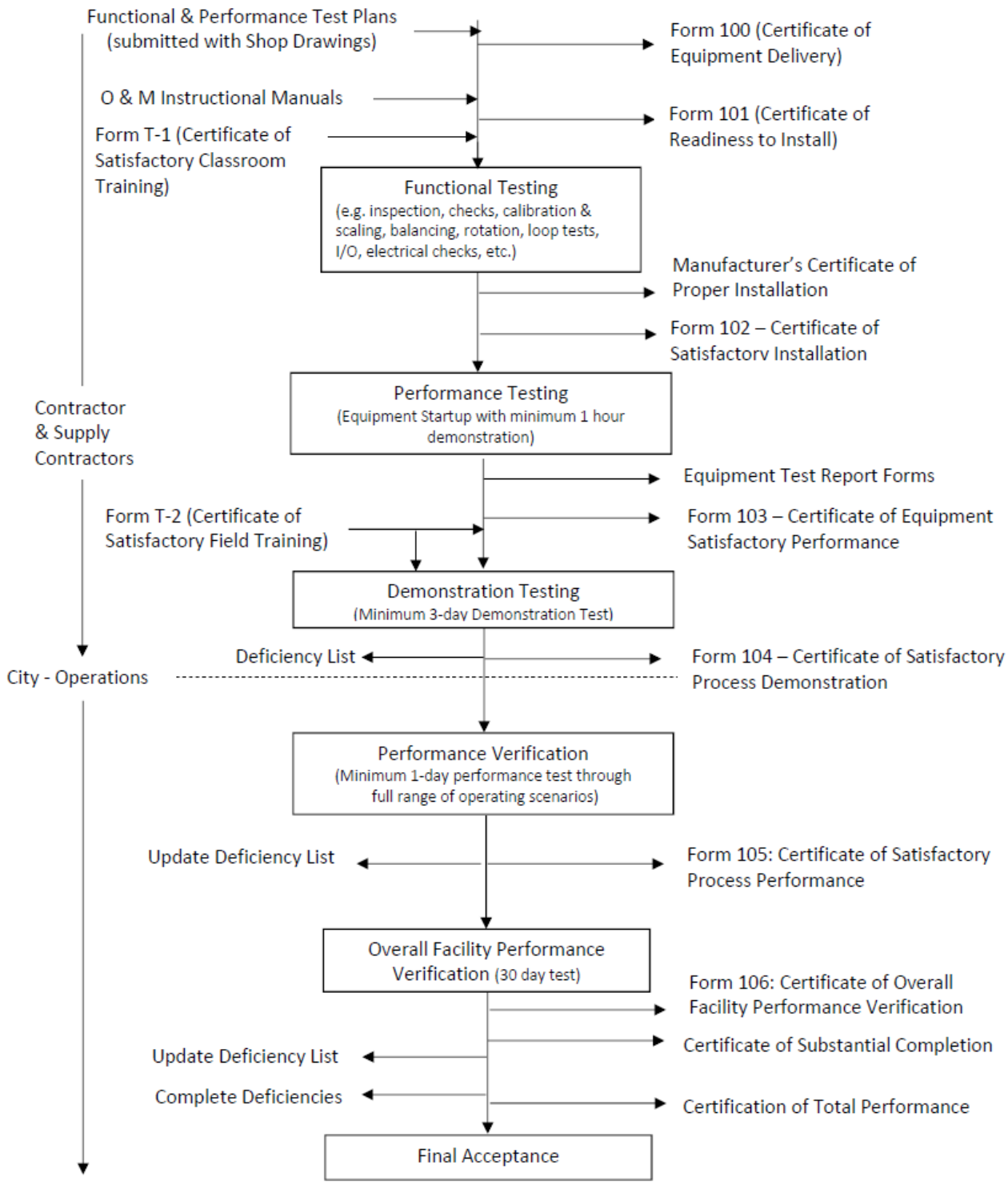
D. Overall Facility Performance Verification
1. Following the acceptance of all Unit Process and Facility Area Performance Verification testing, the SEWPCC will undergo the 30-day Overall Facility Performance Verification.
2. The Overall Facility Performance Verification will be performed under guidance of the Commissioning Team, which includes the Contractor.
3. The purpose of the Over Facility Performance Verification is to demonstrate and confirm that all new equipment, Unit Processes, subsystems and/or components function with all existing Facility Areas in accordance with the Drawings and Specifications.
4. Conduct a performance evaluation for the purpose of evaluating the full capabilities of the overall Facility, and performance of the computer system to verify that all Unit Processes are operable and under control of the computer system.
5. The Overall Facility Performance Verification shall comprise of successfully running the SEWPCC for a minimum of 30-days consecutively. Successful completion of the Overall Facility Performance Verification is a requirement for issuance of Substantial Performance.
6. Upon successful completion of the Overall Facility Performance Verification, a copy of Form 106 – Certificate of Satisfactory Overall Facility Performance shall be signed by all required parties.

3.6 SUPPLEMENT

A. Supplements listed below, following "End of Section," are a part of this Specification:
   1. Commissioning Structure
   2. Responsibilities Matrix
   3. Example of Functional (or Performance) Test Plan Form
   4. Form 102 Certificate of Satisfactory Installation
   5. Form 103 Certificate of Equipment Satisfactory Performance
   6. Form 104(s) Certificate(s) of Satisfactory Process Demonstration
   7. Form 105(s) Certificate(s) of Satisfactory Process Performance
   8. Form 106 Certificate of Overall Facility Performance Verification

END OF SECTION

Commissioning Structure



01 91 14 EQUIPMENT TESTING AND FACILITY STARTUP – SUPPLEMENT

RESPONSIBILITIES MATRIX

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Manufacturer	Contractor	Contract Administrator	The City
ADMINISTRATION							
1	Insurances	X	X		X	X	
2	Performance Security	X	X		X		
3	Overall SEWPCC Upgrading / Expansion project schedule				X	X	
4	Schedule of Submittals	X	X		X		
5	Submission of product samples	X	X	X	X		
6	Supply instructions for equipment offloading and storage	X	X	X			
7	Supply instruction to Contractor for equipment installation	X	X	X			
8	Material Safety Data Sheets	X	X	X	X		
9	Special tools lists	X	X	X	X		
10	Spare parts lists	X	X	X	X		
11	Qualifications of representative	X	X	X			
12	Training session recordings	X	X	X	X		
13	O&M manuals	X	X	X	X		
14	Performance guarantees	X	X	X	X		
15	Warranty	X	X	X	X		

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Manufacturer	Contractor	Contract Administrator	The City
EQUIPMENT SUPPLY AND DELIVERY							
16	Participation in Factory Acceptance Testing and reporting		X	X	X	X	
17	Equipment and spare parts delivery, f.o.b. Site	X	X	X	X		
18	Equipment offloading and storage				X		
19	Delivered equipment inspection and completion of Form 100	X	X	X	X		
SITE SERVICES							
20	Abide by City's Health & Safety requirements	X	X	X	X	X	X
21	Training of the Installation Contractor and completion of Form 101	X	X	X	X		
22	Installation of all materials and equipment				X		
23	Field welding, field assembly, field painting and coating, and coating touch-ups to field damaged finishes				X		
24	Development of Project Commissioning Plan				X	X	X
25	Supervision and inspection of installation	X	X	X	X	X	
26	Development of approved training materials for equipment	X	X	X	X		

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Manufacturer	Contractor	Contract Administrator	The City
27	Development of approved training materials for Facility, Facility Areas, and Unit Processes				X	X	X
28	Classroom Training of City staff and completion of forms T-1.	X	X	X	X	X	X
29	Development of Functional and Performance Test Plans	X	X	X	X	X	X
30	Attendance at a pre-startup meetings	X	X	X	X	X	X
31	Perform Functional Testing, and completion of Form 102	X	X	X	X	X	
32	Pay for costs of Functional and Performance Testing (except sampling and sample analysis)				X		
33	Collect test samples, ship and pay for laboratory analysis						X
34	Field Training of City staff and completion of forms T-2.	X	X	X	X	X	X
35	Perform equipment Performance Testing, completion of equipment test reports and completion of Form 103	X	X	X	X	X	X

Item	Description	IFAS Supply Contractor	HRC Supply Contractor	Manufacturer	Contractor	Contract Administrator	The City
36	Write and submit Performance Test Report	X	X	X	X	X	X
37	Perform process Demonstration Testing, completion of equipment test reports and completion of Form 104	X	X	X	X	X	X
38	Perform process Performance Verification Testing, and completion of reports and of Form 105	X	X	X	X	X	X
39	Write and submit Performance Verification Reports	X	X	X	X	X	
40	Perform Overall Facility Performance Verification testing, and completion of reports and of Form 106				X	X	X
WARRANTY							
41	Replace defective City-Supplied Equipment during the warranty period	X	X				
42	Replace defective Contractor-Supplied Equipment during the warranty period			X	X		

EXAMPLE of FUNCTIONAL (or PERFORMANCE)
TEST PLAN FORM
OWNER:_____ **PROJECT:**_____

Unit Process Description: (Include description and equipment number of all equipment and devices):

_____

_____

_____

_____

Startup Procedure (Describe procedure for sequential startup and evaluation, including valves to be opened/closed, order of equipment startup, etc.):

_____

_____

_____

_____

_____

Startup Requirements (Water, power, chemicals, etc.):

_____

_____

Evaluation Comments:_____

_____

_____

Contractor Certification that Unit Process is capable of performing its intended function(s), including fully automatic operation:

Firm Name:_____

Startup Representative:_____ **Date**:_____, **20**
(Authorized Signature)

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Form 102

CERTIFICATE OF SATISFACTORY INSTALLATION

We have completed our checks and inspection of the installation of our equipment as listed below and confirm that it is satisfactory and that any defects have been remedied except any as noted below.

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:
Outstanding Defects:

Print Name Signature Date
(Authorized Representative of Manufacturer)

Print Name Signature Date
(Authorized Representative of Contractor)

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Form 103

CERTIFICATE OF EQUIPMENT SATISFACTORY PERFORMANCE

We certify that the equipment listed below has been continuously operated for a minimum of one (1) consecutive hour and that the equipment operates satisfactorily and meets its specified operating criteria. No defects in the equipment were found and as such are classified as "conforming".

Project: SEWPCC Upgrading/Expansion Project
Equipment Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

Print Name Signature Date
(Authorized representative of Manufacturer)

Print Name Signature Date
(Authorized representative of Contractor)

Print Name Signature Date
(Authorized representative of Contract Administrator)

Winnipeg

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Temporary Grit and Screenings Handling (Conveyor, overhead door, etc.)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	New Primary Sludge Microwave Density Meter
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Clarifiers 1 & 2 Upgrades
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Screen Inlet Channel (Gates, aeration piping, concrete benching, etc.)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Tie-in grit influent channel from grit tanks 1 & 2 (stop logs, gates, etc.)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Winnipeg

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Grit Channel Aeration Blowers, and Channel Modifications (Influent channel air piping, diffusers, and channel dividing wall, etc.)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Grit Tanks 1 & 2 and Grit Handling System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Screens, Screenings Conveyance & Handling System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Secondary Clarifiers 4 & 5
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Chemical System and Building
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Electrical Building, Equipment and Substation
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	High Rate Clarification System and Facility Area
Equipment Supply Bid Opp. No.:	873-2013
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Ultraviolet Disinfection System and Facility Area
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Biological Nutrient Removal (chem. P-removal) & Blower Building (Facility Area R)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Winnipeg

Water and Waste Department • Service des eaux et des déchets

Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Odour Control System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Sludge Thickening System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Fermentation System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Raw sewage pump #2 and recycle loop on pump #1
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 104

CERTIFICATE OF SATISFACTORY PROCESS DEMONSTRATION

We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Bio-P phosphorus removal (Bioreactor system without chemical addition for P-removal)
Equipment Supply Bid Opp. No.:	871-2013
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 104

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We certify that the process system listed below has been continuously operated for a minimum of three (3) consecutive days and tested as per the Specifications using process fluid and that the process meets its Demonstration Testing criteria. No defects in the process system were found and as such are classified as “conforming”.

Project: SEWPCC Upgrading/Expansion Project
Process/Facility Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 105

CERTIFICATE OF SATISFACTORY PROCESS PERFORMANCE

We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Temporary Grit and Screenings Handling (Conveyor, overhead door, etc.)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	New Primary Sludge Microwave Density Meter
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Clarifiers 1 & 2 Upgrades
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Screen Inlet Channel (Gates, aeration piping, concrete benching, etc.)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Tie-in grit influent channel from grit tanks 1 & 2 (stop logs, gates, etc.)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Grit Channel Aeration Blowers, and Channel Modifications (Influent channel air piping, diffusers, and channel dividing wall, etc.)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Grit Tanks 1 & 2 and Grit Handling System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Screens, Screenings Conveyance & Handling System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Secondary Clarifiers 4 & 5
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
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Print Name Signature Date
(Authorized Representative of Contract Administrator)

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(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Chemical System and Building
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
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Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Electrical Building, Equipment and Substation
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
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Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Winnipeg

Water and Waste Department • Service des eaux et des déchets

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CERTIFICATE OF SATISFACTORY PROCESS PERFORMANCE

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	High Rate Clarification System and Facility Area
Equipment Supply Bid Opp. No.:	873-2013
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

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Water and Waste Department • Service des eaux et des déchets

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We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Ultraviolet Disinfection System and Facility Area
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

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Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Biological Nutrient Removal (chem. P-removal) & Blower Building (Facility Area R)
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

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We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Odour Control System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

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CERTIFICATE OF SATISFACTORY PROCESS PERFORMANCE

We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Sludge Thickening System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

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CERTIFICATE OF SATISFACTORY PROCESS PERFORMANCE

We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Fermentation System
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

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We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Raw sewage pump #2 and recycle loop on pump #1
Equipment Supply Bid Opp. No.:	976-2016
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

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CERTIFICATE OF SATISFACTORY PROCESS PERFORMANCE

We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project:	SEWPCC Upgrading/Expansion Project
Process/Facility Description:	Bio-P phosphorus removal (Bioreactor system without chemical addition for P-removal)
Equipment Supply Bid Opp. No.:	871-2013
Equipment Install Bid Opp. No.:	976-2016
Equipment Tag No.:	
Specification Reference:	

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

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We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project: SEWPCC Upgrading/Expansion Project
Process/Facility Description:
Equipment Supply Bid Opp. No.:
Equipment Install Bid Opp. No.: 976-2016
Equipment Tag No.:
Specification Reference:

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)

Water and Waste Department • Service des eaux et des déchets

Form 106

CERTIFICATE OF OVERALL FACILITY PERFORMANCE VERIFICATION

We certify that the process system listed below has been continuously operated and tested as per the Specifications using process fluid and that the equipment meets its Performance Verification criteria. No defects in the process system were found and as such are classified as "conforming".

Project: SEWPCC Upgrading/Expansion Project
Process/Facility Description: SEWPCC

Print Name Signature Date
(Authorized Representative of Contractor)

Print Name Signature Date
(Authorized Representative of Contract Administrator)

Print Name Signature Date
(Authorized Representative of City)