CONSTRUCTION PROGRESS SCHEDULES

1. GENERAL

1.1 Description

.1 Section includes administrative and procedural requirements for planning, monitoring and documenting the progress of construction during performance of the Work.

.2 Contractor shall prepare and submit to Contract Administrator for review within fourteen (14) days after Notice to Proceed, a construction progress schedule.

.3 No work shall be done between 4:00 p.m. and 7:00 a.m. nor on Sundays, Saturdays, or legal holidays without written permission of City. However, emergency work that may result in injury or damage to the equipment or facilities if not addressed may be done without prior permission. The Contract Administrator is to be informed when starting emergency work.

.4 The Contractor has the obligation and responsibility at all times to plan and monitor all of its activities, anticipating and scheduling its staff, materials, plant and Work methods in a manner that is likely to ensure completion of the Work in accordance with the terms and conditions of the Contract and at a rate that will allow it to be completed within the Contract Time.

1.2 Form of Schedules

.1 Prepare schedules in form of a horizontal bar chart.

.1 Provide separate horizontal bar for each trade or operation.

.2 Horizontal Time Scale: Identify first work day of each week.

.3 Scale and spacing to allow space for notations and future revisions.

.4 Schedule to meet the conditions and requirements of Appendix A: The Migration Plan.

.5 Schedule to allow for full length of review periods and notice lead time in Appendix A: The Migration Plan and as specified.

.2 Format of Listings: Chronological order of start of each item of work.

.3 Identification of Listings: By major specification section numbers.

.4 Computer scheduling software: Use Microsoft Project.

1.3 Content of Schedules

.1 Construction Progress Schedule:

.1 Show complete sequence of construction by activity.

.2 Show dates for beginning and completion of each major element of construction and installation dates for major items of equipment. Elements shall include, but not be limited to, the following:

.1 Shop Drawing receipt from supplier/manufacturer submitted to Contract Administrator, review and return to supplier/manufacturer.

.2 Material and equipment order, manufacturer, delivery, installation, and checkout.

.3 Performance tests and supervisory services activity.

.4 City review.

.5 Factory Acceptance Test.

.6 System Integration Function Test.

.7 Wiring installation.

.8 Panel installation

.9 Electrical work activity.

.10 Subcontractor's items of work.

.11 Operator switchover notice lead time.

.12 Site Acceptance Test.

.13 Site Integration Test.

.14 Functional Testing.

.15 Start-up.

.16 Commissioning.

.17 Performance testing.

.18 Training.

.19 Final cleanup.

.20 Allowance for inclement weather or process conditions.

.21 Demolition.

.22 Development of Operations and Maintenance Manuals.

.23 Development of As-Builts.

.3 Show projected percentage of completion for each item as of first day of each month.

1.4 Schedule Revisions

.1 Every thirty (30) calendar days the Contractor shall revise construction schedule to reflect changes in progress of work.

.2 Indicate progress of each activity at date of submittal.

.3 Show changes occurring since previous submittal of schedule.

.1 Major changes in scope.

.2 Activities modified since previous submittal.

.3 Revised projections of progress and completion.

.4 Other identifiable changes.

.4 Provide a narrative report as needed to define:

.1 Problem areas, anticipated delays, and impact on schedule.

.2 Corrective action recommended and its effect.

.3 Effect of changes on schedules of other Contractors.

.5 Recovery Schedule:

.1 When periodic update indicates the Work is fourteen (14) or more calendar days behind the current accepted schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

.2 If, at any time, the Work is behind schedule with respect to the progress schedule currently in force, and if the Contract Administrator believes there is a risk of the Work not being completed within the Contract Time as a result of such delay, the Contractor shall take all necessary measures to make up for such delay either by increasing staff, plant or facilities, or by amending its Work methods, whichever is applicable, with no change to the Contract Price.

1.5 Submittal Requirements

.1 For initial submittal of construction schedule and subsequent revisions thereof, furnish six copies of schedule at the next Progress Meeting. Provide electronic copies to the Contract Administrator upon development.

.2 Format for Submittals: Submit required submittals in the following format:

.1 Working electronic copy of schedule file, where indicated.

.2 PDF electronic file.

1.6 Contractor's Look-Ahead Schedules

.1 The Contractor shall provide short interval "look ahead" schedules bi-weekly, identifying Work that has been performed during the past two weeks and activities that are planned for the next four (4) weeks. The short interval schedule shall be consistent with the progress schedule currently in force.

.2 The Look-Ahead Schedules shall generally reflect the Work associated with the Detailed Progress Schedule. The activities in the Look-Ahead Schedules shall be identified by the same number coding as the Detailed Progress Schedule and revised as necessary.

2. PRODUCTS (NOT USED)

3. EXECUTION (NOT USED)

END OF SECTION

SUBMITTALS

1. GENERAL

1.1 Description

.1 Submit to Contract Administrator submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.1 Allow ten (10) Working Days for review of submittals by the Contract Administrator.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present Shop Drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Contract Administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Contract Administrator, in writing at time of submission for review, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator’s review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator review.

.10 The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.

.11 After Contract Administrator’s review and return of copies, distribute copies to sub-trades as appropriate. Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "Shop Drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 The Contractor shall arrange for the preparation of clearly identified Shop Drawings as specified or as the Contract Administrator may reasonably request. Shop Drawings are to clearly indicate materials, weights, dimensions, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work. Where articles or equipment attach or connect to

other articles or equipment, clearly indicate that all such attachments and connections have been properly coordinated, regardless of the trade under which the adjacent articles or equipment will be supplied and installed. Shop Drawings are to indicate their relationship to design Drawings and Specifications. Notify the Contract Administrator in writing of any deviations in Shop Drawings from the requirements of the Contract Documents.

.3 Have Shop Drawings stamped, signed and dated by a Professional Engineer licensed to practice in the Province of Manitoba where required in the Specifications or by the Contract Administrator.

.4 The Contractor shall examine all Shop Drawings prior to submission to the Contract Administrator to ensure that all necessary requirements have been determined and verified and that each Shop Drawing has been checked and coordinated with the requirements of the Work and the Contract Documents. Examination of each Shop Drawing shall be indicated by stamp, date and signature of a responsible person of the sub-contractor for supplied items and of the General Contractor for fabricated items. Shop Drawings not stamped, signed and dated will be returned without being reviewed and stamped "Re-submit". Ensure that the following are verified:

.1 Field measurements.

.2 Field construction criteria.

.3 Catalogue numbers and similar data.

.4 Submittals shall be one electronic PDF copy.

.5 Shop Drawing reviews by the Contract Administrator is solely to ascertain conformance with the general design concept. Responsibility for approval of detail design inherent in Shop Drawings rests with the Contractor and review by the Contract Administrator shall not imply such approval.

.6 Shop Drawings will be returned to the Contractor with one of the following notations:

.1 When stamped "REVIEWED" or "NO EXCEPTIONS TAKEN", distribute additional copies as required for execution of the Work.

.2 When stamped "REVIEWED AS MODIFIED" or "MAKE NOTED CORRECTIONS", ensure that all copies for use are modified and distributed, same as specified for "REVIEWED".

.3 When stamped "REVISE AND RESUBMIT", make the necessary revisions, as indicated, consistent with the Contract Documents and submit again for review.

.4 When stamped "NOT REVIEWED" or "REJECTED", submit other Drawings, brochures, etc., for review consistent with the Contract Documents.

.5 Only Shop Drawings bearing "REVIEWED", "NO EXCEPTIONS TAKEN", "MAKE NOTED CORRECTIONS", or "REVIEWED AS MODIFIED" shall be used on the Work unless otherwise authorized by the Contract Administrator.

.7 After submittals are stamped "REVIEWED", "NO EXCEPTIONS TAKEN", "MAKE NOTED CORRECTIONS" or "REVIEWED AS MODIFIED", no further revisions are permitted unless re-submitted to the Contract Administrator for further review.

.8 Any adjustments made on Shop Drawings by the Contract Administrator are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract Price, clearly state as such in writing prior to proceeding with fabrication and installation of Work.

.9 Make changes in Shop Drawings, which the Contract Administrator may require, consistent with Contract Documents. When re-submitting, notify the Contract Administrator in writing of any revisions other than those requested by the Contract Administrator.

.10 Only two (2) reviews of Shop Drawings will be made by the Contract Administrator at no cost. Each additional review will be charged to the Contractor at the Contract Administrator's scheduled rates. The Contract Administrator's charges for the additional Work will be deducted from the Contractor's Progress Certificates.

.11 Accompany submissions with transmittal letter, containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Identification and quantity of each Shop Drawing, product data and sample.

.5 Specification Section, Title, Number, and Clause

.6 Other pertinent data.

.7 Date and revision dates.

.8 Project title and Bid Opportunity number.

.9 Name of:

.1 Contractor

.2 Subcontractor

.3 Supplier

.4 Manufacturer

.5 Separate detailer when pertinent

.6 Identification of product of material.

.7 Relation to adjacent structure or materials.

.8 Field dimensions, clearly identified as such.

.9 Specification section name, number and clause number or drawing number and detail/section number.

.10 Applicable standards, such as CSA or CGSB numbers.

.11 Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

1.3 PROCEDURES

.1 The Contractor shall, if required by the Contract Administrator, submit for the review of the Contract Administrator method statements which describe in detail, supplement with Drawings where necessary, the methods to be adopted for executing any portion of Work.

.2 These statements shall also include details of constructional plant and labour to be employed. Acceptance by the Contract Administrator shall not relieve the Contractor of any of his responsibilities, nor shall reasonable refusal to approve entitle the Contractor to extra payment or an extension of time.

.3 Other Considerations :

.1 Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent Shop Drawings and resubmit.

.2 Material and equipment delivered to the site of the works will not be paid for at least until pertinent Shop Drawings have been submitted and reviewed.

.3 Incomplete Shop Drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.

.4 No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of Shop Drawings.

2. PRODUCTS (NOT USED)

3. EXECUTION (NOT USED)

END OF SECTION

QUALITY REQUIREMENTS

1. GENERAL

1.1 Description

.1 This Section covers Quality Assurance and Quality Control requirements for this Contract.

.2 The Contractor is responsible for controlling the quality of work, including work of its subcontractors, and suppliers and for assuring the quality specified in the Technical Specifications is achieved.

1.2 Summary

.1 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.

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

.3 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.

.4 The Contract Administrator will order part of Work to be examined if Work is suspected to be not 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 Contract Documents, the City shall pay.

1.3 Independent Inspection Agencies

.1 Independent Inspection/Testing Agencies may be engaged by the City for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the City. Costs of additional tests required due to defective Work shall be paid by the Contractor.

.2 All equipment required for executing inspection and testing will be provided by the respective agencies.

.3 Employment of inspection/testing agencies does not relieve or relax responsibility to perform Work in accordance with Contract Documents. If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Contract Administrator at no cost to the City. Pay costs for retesting and re-inspection.

1.4 Submittals

.1 Submit draft inspection and test reports to Contract Administrator, prior to inclusion with the O&M manuals, in accordance with Section 01 33 00 - Submittal Procedures.

1.5 Access to Work

.1 The City, the Contract Administrator, and other authorities having jurisdiction shall have access to the work.

1.6 Rejected Work

.1 Remove defective 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.

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

.3 If in opinion of the Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the City will deduct from Contract Price difference in value between Work performed and that called for by Contract

2. PRODUCTS (NOT USED)

3. EXECUTION (NOT USED)

END OF SECTION

TEMPORARY FACILITIES

1. GENERAL

1.1 Scope of Work

.1 The Contractor shall provide all temporary facilities for the proper completion of the work, as required and as specified.

.1 Section Includes:

.1 User Charges:

.1 Electric.

.2 Temporary heat.

.2 Project identification.

.3 Temporary Facilities:

.1 Field offices and trailers as required.

.2 Office for Contract Administrator with two (2) workstations.

.3 Office for the City with two (2) workstations.

.4 Site meeting room that can accommodate ten (10) attendees.

.4 Equipment.

.5 Support facility installation.

.6 Security and Protection:

.7 Operation, termination, and removal.

1.2 References

.1 American National Standards Institute (ANSI):

.1 A 117.1: Accessible and Usable Buildings and Facilities.

.2 American Society for Testing and Materials (ASTM):

.1 E84: Standard Test Method for Surface Burning Characteristics of Building Materials

.2 E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 deg. C.

.3 Canadian Electrical Code.

1.3 Use Charges

.1 General: Costs for installation, removal and use of temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, City's construction forces, Contract Administrator, occupants of Project, testing agencies, and authorities having jurisdiction.

.2 Sewer Service: Provide a portable washroom for usage by all entities for construction operations.

.1 The Contractor shall provide adequate sanitary facilities for the use of those employed on the Work. Such facilities shall be made available when the first employees arrive on the site of the Work, shall be properly secluded from observation, and shall be maintained during the progress of the Work in suitable numbers and at such points and in such manner as may be required by pertinent health and safety regulations.

.2 The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. The Contractor shall rigorously prohibit the committing of nuisances on the site of the Work, on the lands of the City, or on adjacent property.

.1 The Contractor shall not use the City’s sanitary facilities.

.3 Potable Water Service: Provide potable water for usage by all entities for construction operations.

.4 Electrical Power Service: Provide connections and extensions of services as required for construction operations. Perform all coordination necessary with Manitoba Hydro.

.1 The Contractor shall make all necessary applications and arrangements for electrical energy for power and light necessary for the proper completion of the Work and during its entire progress. The Contractor shall provide and pay for all temporary wiring, switches, connections, and meters.

.2 The Contractor shall provide sufficient electric lighting so that all work may be done in a workmanlike manner when there is not sufficient daylight.

.3 Any electrical power required beyond the available power in section 3.2 shall be provided by the Contractor.

.5 Notwithstanding the availability of potable water and effluent water services from the existing system, the Contractor shall be solely responsible for the provision of water for leakage and other testing, for concrete protection and to prevent freezing of equipment, as required by the Contract.

.6 Temporary Heat:

.1 If temporary heat is required for the protection of the Work, the Contractor shall provide and install suitable heating apparatus, shall provide adequate and proper fuel, and shall maintain heat as required. Costs for temporary heating, cooling, and ventilating required to execute the Work shall be borne by the Contractor.

.2 Temporary heating apparatus shall be installed and operated in such manner that finished work will not be damaged thereby. After the permanent heating system has been installed, tested, and made ready for operation, the Contractor may, at his own risk and expense, use it for providing heat for protection of the Work. He shall provide and pay for all fuel and care necessary, and, when the Work is ready for acceptance, he shall, at his own expense, put the system into first-class condition, even to the extent of replacing worn or damaged parts.

.3 If permanent natural gas piping is used for temporary heating units, the Contractor shall not modify or reroute gas piping without the prior approval of the natural gas supplier. The Contractor shall provide separate gas metering as required by the natural gas supplier.

.4 The Contractor shall provide 24-hour monitoring of temporary heating, cooling and ventilating equipment.

1.4 Project Identification

.1 Project Identification Sign:

.1 One (1) sign of construction, design, and content.

.2 Three sq m area.

.3 Content:

.1 Project number, title, logo and name of City as indicated on Contract Documents.

.2 Names and titles of authorities.

.3 Names and titles of Contract Administrator.

.4 Name of Prime Contractor.

.4 No other signs are allowed without City permission except those required by law.

.2 Design sign and structure to withstand 100 km/hr wind velocity.

.3 Finishes: Adequate to withstand weathering, fading, and chipping for duration of construction.

.4 Maintenance: Maintain signs and supports clean, repair deterioration and damage.

.5 Removal: Remove signs, framing, supports, and foundations at completion of Project and restore the area.

1.5 Traffic Regulation

.1 Signs, Signals, and Devices:

.1 Traffic Cones as required.

.2 Flag Person Equipment: As required by local jurisdictions.

.2 Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

.3 Haul Routes:

.1 Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.

.4 Removal:

.1 Remove equipment and devices when no longer required.

.2 Repair damage caused by installation.

1.6 Submittals

.1 Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

.2 Fire-Safety Program: Show compliance with requirements of authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

.3 Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

.1 Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.

.2 Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

.3 Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

1.7 Quality Assurance:

.1 Electric Service: Comply with NECA, NEMA, and CSA standards and regulations for temporary electric service. Install service to comply with the Canadian Electrical Code.

1.8 Project Conditions

.1 During adverse weather and against the possibility thereof, the Contractor shall take all necessary precautions so that the Work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and building-paper shelters, or other suitable means.

.2 During cold weather, materials shall be preheated, if required, and the materials and adjacent structure into which they are to be incorporated shall be made and kept sufficiently

warm so that a proper bond will take place and a proper curing, aging, or drying will result. Protected spaces shall be artificially heated by suitable means which will result in a moist or a dry atmosphere according to the particular requirements of the work being protected. Ingredients for concrete and mortar shall be sufficiently heated so that the mixture will be warm throughout when used.

2. PRODUCTS

2.1 Temporary Facilities

.1 Field Offices, General: Mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

.2 The Contractor shall maintain a temporary field office near the work for his own use during the period of construction at which readily accessible copies of all contract documents and schedules shall be kept. The office shall be located where it will not interfere with the progress of the work. In charge of this office there shall be a competent superintendent of the Contractor as specified under "Supervision of Work" in the Tender documents.

.3 Temporary Storage Yards: The Contractor shall construct temporary storage yards for storage of Products that are not subject to damage by weather conditions.

.4 Temporary Storage Buildings:

.1 The Contractor shall provide environmental control systems that meet the recommendations of Suppliers and manufacturers of the equipment and materials stored.

.2 The Contractor shall arrange for a chain link partition fence to provide security of contents and ready access for inspection and inventory.

.5 The Contractor shall store combustible materials (paints, solvents, fuels) in a well ventilated and remote building meeting all applicable safety standards.

.6 Minimum Field Office Area: 16’ x 32’

.7 Field Office standard minimum quality:

.1 Willscot Modular Office Trailer.

2.2 Office For Contract Administrator

.1 Within 14 Calendar Days of starting work at the site, the Contractor shall provide and equip four (4) suitable offices for the exclusive use of the Contract Administrator and the City, and the Contractor shall maintain this office thereafter until the completion of the work to be done under this contract. This office shall be a separate building located where it will not interfere with the progress of the work. An acceptable, suitably constructed and equipped trailer of adequate size and design for the purpose may be furnished as the Contract Administrator's office.

.1 The office and furniture shall be relatively new and in good condition.

.2 The equipment, supplies, and services furnished shall be acceptable to the Contract Administrator.

.2 Each Office shall be of suitable height and of ample size to accommodate the furniture and equipment listed below, without crowding 50 sq. ft. of floor area). It shall be weathertight and acceptably insulated and suitably ventilated to maintain occupancy in all weather; the floor shall be tight and of sufficient construction to withstand the loads imposed upon it.

.1 Each room will have a door, with lock and key, and a minimum of two (2) screened windows which can be both opened and locked shut.

.2 The office shall have one (1) exterior door, with cylinder locks and keys.

.3 The Contractor shall furnish the following furniture, equipment, supplies, and services:

.1 Four (4) office chair.

.2 One (1) Broom and dustpan.

.3 Four (4) desks for general office use, about 3 feet by 5 feet, all with a desk chair of the armchair swivel type.

.4 Two (2) plan storage cabinet and bookcase.

.5 One (1) Class ABC type fire extinguisher of at least four (4) pound capacity. Maintain the inspection of the fire equipment.

.6 Supply of drinking water in a suitable dispenser, with hot and cold supply and refrigerator space.

.7 Paper cups, paper towels, liquid soap, and toilet paper; each with suitable dispenser or holder.

.8 A waste basket for each desk, and a supply of appropriately sized plastic trash bags.

.9 Thermostatically controlled heating unit or system of adequate capacity to maintain a minimum temperature of not less than 20°C under all cold weather conditions. The Contractor shall provide all fuel used and service necessary.

.10 Thermostatically controlled, refrigerant type, air conditioner of adequate capacity to maintain a maximum temperature of not more than 20°C under all hot weather conditions. The Contractor shall provide all service necessary and provide all power used.

.11 The Contractor shall arrange for complete janitor service to be provided every two weeks.

.12 One copying and printing machine with supplies and service. Machine shall be capable of copying 8.5 x 11, 8.5 x 14 and 11 x 17 paper sizes. Copy rate shall be at least twenty (20) copies per minute for 8.5 x 11 paper size.

.4 The Contractor shall provide office space and facilities until the office, furnishings, and equipment described above are ready for use, but by so doing he shall not be relieved of his obligation to provide and equip the specified Contract Administrator's office as promptly as possible.

.5 The Contract Administrator Office shall include a site meeting room that can accommodate ten (10) attendees. Provide a boardroom table, chairs, projector with HDMI input, and projector screen.

.6 Provide available to the City and Contract Administrator a password protected wireless internet connection:

.1 Minimum measured speed throughout Office: 75 Mb/s download; 10Mb/s Upload. Provide documents demonstrating the purchased and maintained internet speed upon request.

.7 Unless otherwise directed by the Contract Administrator, after the date of completion of the Work as stated in the final estimate, the Contractor shall remove the office and all such temporary facilities from the site, the same to become his property, and leave the premises in a condition acceptable to the Contract Administrator.

.8 Remove snow and ice as required to minimize accumulations.

.9 Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

.1 Store combustible materials apart from building.

.10 Minimum Contract Administrator Office Area: 16' x 32'

.11 Contractor Administrator Office standard minimum quality:

.1 Willscot Modular Office Trailer.

2.3 Equipment

.1 Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

3. EXECUTION

3.1 Installation, General

.1 Locate facilities in the open space West of the South-West Corner of the Centrate Facility where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

3.2 Temporary Utility Installation

.1 General: Install temporary service or connect to existing service.

.1 Arrange with utility company, City, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

.2 Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

.1 Toilets: Use of City's existing toilet facilities is prohibited.

.3 Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

.4 Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

.1 Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.

.5 Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

.6 Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

3.3 Support Facilities Installation

.1 General: Comply with the following:

.1 Maintain support facilities until Contract Administrator schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to City.

.2 All roads within the plant are used simultaneously by vehicles and pedestrians. The speed limit of 15 km/h applies throughout the plant, including the access roads and parking lots. Failure to comply with speed limit or to operate vehicles safely will result in possible removal of the staff from the plant.

.2 Parking: Provide temporary parking areas for construction personnel. The Contractor shall not use public roads or undesignated areas for parking.

.3 Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

.4 Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

.1 Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.5 Operation, Termination and Removal

.1 Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

.2 Maintenance: Maintain facilities in good operating condition until removal.

.1 Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

END OF SECTION

DELIVERY, STORAGE AND HANDLING

1. GENERAL

1.1 General Requirements

.1 This Section specifies the general requirements for the delivery handling, storage and protection for all items required in the construction of the work. Specific requirements, if any, are specified with the related item.

1.2 Transportation and Delivery

.1 Transport and handle items in accordance with manufacturer's printed instructions.

.2 Ship equipment, material and spare parts complete except where partial disassembly is required by transportation regulations or for protection of components.

.3 Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended. All spare parts shall be cross-referenced to their applicable the Specification Section.

.4 Carefully pack and crate equipment for shipment. Protect polished and machined metal surfaces from corrosion and damage during shipment and installation. Specially pack electrical equipment to prevent damage by moisture. Cover equipment having exposed bearings and glands to exclude foreign matter. Carefully pack machines for shipment and protect electrical equipment from moisture damage. Protect bearings, seals and glands from grit and dirt.

.5 Identify each component with durable identifying labels or tags securely attached to each piece of equipment, crate or container.

.6 Finished surfaces of all exposed flanges shall be protected by fiberboard blank flanges strongly built and securely bolted thereto.

.7 Deliver spare parts at same time as pertaining equipment. Deliver spare parts to City after completion of Work.

.8 Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.

.9 Deliver products to the site in manufacturer's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting and installing.

.10 Assume responsibility for equipment material and spare parts just before unloading from carrier at site.

.11 All items delivered to the site shall be unloaded and placed in a manner which will not hamper the Contractor's normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.

.12 Provide equipment and personnel to unload all items delivered to the site.

.13 Promptly inspect shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by others (i.e. City, other Contractors), perform inspection in the presence of the Contract Administrator. Notify Contract Administrator verbally, and in writing, of any problems.

.14 Pay all demurrage charges if failed to promptly unload items.

1.3 Storage and Protection

.1 Store and protect products and equipment in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instruction shall be studied by the Contractor and may be reviewed by the Contract Administrator. Instructions shall be carefully followed and a written record of this kept by the Contractor for each product and pieces of equipment.

.2 Arrange storage of products and equipment to permit access for inspection. Periodically inspect to make sure products and equipment are undamaged and are maintained under specified conditions.

.3 Store loose granular materials on solid flat surface in a well-drained area. Prevent mixing with foreign matter.

.4 All mechanical and electrical equipment and instruments shall be covered with canvas and stored in a weathertight building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it shall be satisfactory to the Contract Administrator. Building shall be provided with adequate ventilation to prevent condensation. Maintain temperature and humidity within range required by manufacturer and to prevent condensation on the equipment being stored.

.1 Prior to acceptance of the equipment, the Contractor may have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

2. PRODUCTS (NOT USED)

3. EXECUTION (NOT USED)

END OF SECTION

CLEANING UP

1. GENERAL

1.1 Summary

.1 Execute cleaning during progress of Work and at completion of Work.

.2 Refer to Specification Sections for specific cleaning for Products or Work.

1.2 Disposal Requirements

.1 Conduct cleaning and disposal operations to comply with local codes, ordinances, regulations, and anti-pollution laws. Do not burn or bury rubbish or waste materials on Project site. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

2. PRODUCTS

2.1 Materials

.1 Use only those cleaning materials which will not create hazards to property and persons or damage surfaces of material to be cleaned.

.2 Use only cleaning materials recommended by manufacturer of surface to be cleaned.

3. EXECUTION

3.1 Cleaning During Construction

.1 Comply with General Conditions.

.2 At all times maintain areas covered by the contract and adjacent properties and public access roads free from accumulations of waste, debris, and rubbish caused by construction operations.

.3 During execution of work, clean site, adjacent properties, and public access roads and dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish. Unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.

.4 Wet down dry materials and rubbish to lay dust and prevent blowing dust.

.5 Cover or wet excavated material leaving and arriving at the site to prevent blowing dust. Clean the public access roads to the site of any material falling from the haul trucks.

.6 Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes structures, work done under this contract, or elsewhere during the course of the Contractor’s operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, pipes, structures, and work, etc., shall, upon completion of the work, be left in a clean and neat condition.

.7 On or before the completion of the work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.

.8 Provide on-site containers for collection and removal of waste materials, debris, and rubbish in accordance with applicable regulations.

3.2 Final Cleaning

.1 General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

.1 Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

.1 Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

.2 Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

.3 Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

.4 Remove tools, construction equipment, machinery, and surplus material from Project site.

.5 Remove snow and ice to provide safe access to building.

.6 Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

.7 Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

.8 Sweep concrete floors broom clean in unoccupied spaces.

.9 Vacuum clean concrete/tile floors in occupied spaces.

.10 Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.

.11 Remove labels that are not permanent.

.12 Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

.13 Vacuum inside and outside of all new and existing electrical panels, MCCs, variable speed drives, etc., which have been affected by dust or dirt due to construction activities.

.14 Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

.15 Leave Project clean and ready for occupancy.

.2 Touch-up paint or repaint damaged finishes on electrical items delivered to Project with finish coat of paint. Contract Administrator will make final determination of items to be repainted or touched-up.

.3 Prior to substantial completion, Contractor with Contract Administrator and City**,** shall conduct inspection of sight-exposed interior and exterior surfaces and work areas to verify Work and site is clean.

END OF SECTION

CONTRACT CLOSEOUT

1. GENERAL

1.1 Related Documents

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 Summary

.1 Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

.1 Substantial Completion procedures.

.2 Final completion procedures.

.3 Warranties.

.4 Final cleaning of equipment and site.

.5 Repair of defective and deficient Work.

1.3 References

.1 Canadian Electrical Code.

.2 Manitoba Amendments to the Canadian Electrical Code.

.3 City of Winnipeg By-laws.

.4 Manitoba Building Code.

.5 City of Winnipeg Automation Design Guide.

.6 City of Winnipeg Electrical Design Guide.

1.4 Submittals

.1 Submit Shop Drawings as required.

.2 Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

.3 Certified List of Incomplete Items: Final submittal at Final Completion.

.4 Certificates of Release: From authorities having jurisdiction.

.5 Certificate of Insurance: For continuing coverage.

.6 Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

.7 Certificate of Payment: For payment of sub-trades and release of hold-back.

1.5 Substantial Completion Procedures

.1 Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

.2 Submittals Prior to Substantial Completion: Complete the following a minimum of ten (**10)** days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

.1 Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting City unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

.2 Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.

.3 Submit closeout submittals specified in individual Divisions 02 through 42 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

.4 Submit maintenance material submittals specified in individual Divisions 02 through 42 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Contract Administrator. Label with manufacturer's name and model number where applicable.

.1 Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Contract Administrator signature for receipt of submittals.

.5 Submit test/adjust/balance records.

.6 Submit changeover information related to City's occupancy, use, operation, and maintenance.

.7 Submit the approved commissioning checklist and commissioning plan that have been completed and signed off by the Contract Administrator as completed and that all tests have been successfully performed.

.3 Procedures Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

.1 Advise City of pending insurance changeover requirements.

.2 Complete start-up and testing of systems and equipment.

.3 Perform preventive maintenance on equipment used prior to Substantial Completion.

.4 Instruct City's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

.5 Terminate and remove temporary facilities from Project site, along with mock-ups, construction tools, and similar elements.

.6 Complete final cleaning requirements, including touch-up painting.

.7 Touch-up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

.4 Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Contract Administrator will either proceed with inspection or notify Contractor of unfulfilled requirements. Contract Administrator will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Contract Administrator, that must be completed or corrected before certificate will be issued.

.1 Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

.2 Results of completed inspection will form the basis of requirements for final completion.

1.6 Starting of Systems

.1 Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

.2 Verify wiring and support components for equipment are complete and tested.

.3 When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, approve equipment or system installation prior to start-up, to supervise placing equipment or system in operation, and to train the City’s staff.

.4 Submit a written report that equipment or system has been properly installed and is functioning correctly.

1.7 Demonstration and Instructions

.1 Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with City's personnel in detail to explain all aspects of operation and maintenance.

.2 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment.

.3 Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.8 Testing, Adjusting and Balancing

.1 Adjust operating Products and equipment to ensure smooth and unhindered operation.

.2 Reports will be submitted to the Contract Administrator indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.9 Project Records Documents

.1 The Contractor shall record any actual revisions to the Work and maintain one set of the following Project Record Documents on Site:

.1 Contract Drawings, Specifications, and Addenda.

.2 Change Orders, Field Orders, and other written notices.

.3 Shop drawings, Product data, and samples.

.4 Records of surveying and layout Work.

.5 Project Record Drawings.

.2 The Contractor shall record information on the Project Record Documents concurrent with construction progress and store these documents separately from the documents used for construction.

.1 The City will supply a set of Contract Drawings. The Contractor shall mark thereon all revisions as the Work progresses in order to produce a set of as-built drawings.

.2 The Contractor shall note any changes made during construction by any of the Contractor's forces or those of any Subcontractors.

.3 The Contractor shall dimension the locations of buried or concealed Work, especially piping and conduit, with reference to exposed structures.

.4 The Contractor shall dimension the installed locations of concealed service lines on the Site or within the structure by reference from the centre line of the service to the structure column lines, or other main finished faces, or other structural points which are easily identified and located in the finished Work.

.5 Certificates of Substantial Performance and Total Performance shall not be issued until as-built drawings are complete and submitted, and the Contractor has satisfied all requirements for Substantial Performance and Total Performance of the Work.

.3 For Project Record Documents and Record Shop Drawings, the Contractor shall legibly mark each item to record actual construction including:

.1 Field changes of dimensions and details.

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

.3 Measured locations of internal utilities and appurtenances which are concealed in construction, referenced to visible and accessible features of the Work.

.4 Changes in the Work caused by Site conditions, or originated by the City, the Contract Administrator, the Contractor, Preselected Equipment Vendors, or Subcontractors and by addenda, supplemental drawings, Site instructions, supplementary instructions, change orders, correspondence, and directions of any regulatory authorities.

.5 Record the location of concealed mechanical services and electrical main feeders, junction boxes and pullboxes.

.4 Upon completion of the Work, the Contractor shall prepare two (2) USB drives of the Record Shop Drawings, and index, and a physical printed and bound copy.

.5 The Record Shop Drawings CD-ROM index shall identify the City's project number, project name, and Contract number and the contents of each USB in the following format:

.1 The index shall include the following columns of information for each Record Shop Drawing:

.1 USB number.

.2 Specification Section number.

.3 Specification title.

.4 Shop drawing transmittal number.

.5 Shop drawing equipment description including Preselected Equipment Vendor and Supplier.

.2 The index shall be printed by the following two sorts:

.1 Primary sort: Specification Section number. Secondary sort: Shop Drawing transmittal number.

.2 Primary sort: USB number. Secondary sort: Specification Section number.

.3 The index shall be generated using Microsoft Excel software. A copy of the electronic file shall be furnished to the City.

.4 The Contractor shall remove the Architect/Engineer seal from all documents.

.5 The Contractor shall provide a set of Project Record Documents on a USB drive in an electronic format compatible with the plant USB drive record standards. All drawings are to be provided electronically on USB drive in both AutoCAD (latest version) and Adobe Acrobat PDF (latest version). Also provide a set of USB drives containing the software implemented on this project, including standard software and custom application software. Also provide a set of USB drives containing the various programming tools and files necessary for maintenance, editing, backing up and restoring programmable equipment implemented on this project.

1.10 Equipment Inventory Spreadsheet

.1 As part of the City's asset management program, the Contractor shall complete all fields for the equipment inventory file for each piece of equipment and device provided under this Contract, as a requirement for Substantial Performance. An electronic format of the equipment inventory spreadsheet will be provided on a CD or USB drive to the successful General Contractor.

1.11 Equipment Preventative Maintenance Spreadsheet

.1 As part of the City's asset management program, the Contractor shall complete all fields for each piece of equipment and device provided under this Contract, as a requirement for Substantial Completion. The Contractor shall transfer all of the manufacturer's recommended preventative maintenance tasks and frequencies into the spreadsheet. An electronic format of the equipment inventory spreadsheet will be provided on a CD or USB drive to the successful General Contractor

1.12 Protecting Installed Construction

.1 Protect installed Work and provide special protection where specified in individual Specification Sections.

.2 Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

.3 Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

.4 Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

.5 Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

.6 Prohibit traffic from landscaped areas.

1.13 Spare Parts and Maintenance Products

.1 Furnish spare parts, maintenance, and extra products in quantities as specified within Division 26 and Division 40 within thirty (30) days of substantial performance

.2 Deliver to Project site and place in location as directed by the City; obtain receipt prior to final payment.

.3 Coat parts to protect from moisture.

.4 Crate in containers designed for prolonged storage suitable for handling with hoisting equipment containers: palletized.

.5 Create a list with all spare parts that are in the container with the part numbers, descriptions, and quantities included.

.6 Stencil on containers:

.1 Manufacturer/supplier name.

.2 Unit name.

.3 Spare part name.

.4 Manufacturer catalogue number.

.5 Other identifying information.

.6 Precautionary information.

1.14 Final Completion Procedures

.1 Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

.1 Submit a final Application for Payment according to Section D.

.2 Certified List of Incomplete Items: Submit certified copy of Contract Administrator's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Contract Administrator. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

.3 Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

.2 Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Contract Administrator will either proceed with inspection or notify Contractor of unfulfilled requirements. Contract Administrator will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

.1 Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.15 List of Incomplete Items (Punch List)

.1 Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

.1 Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.

.2 Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

.3 Include the following information at the top of each page:

.1 Project name.

.2 Date.

.3 Name of Contractor.

.4 Page number.

.4 Submit list of incomplete items in the following format:

.1 MS Excel electronic file. Contract Administrator will return annotated file.

.2 PDF electronic file. Contract Administrator will return annotated file.

2. PRODUCTS

2.1 Materials

.1 Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

.1 Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

3. EXECUTION

3.1 Final Cleaning

.1 General: Perform final cleaning .

.2 Dispose of Construction Waste.

3.2 Repair of The Work

.1 Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

.2 Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

.1 Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

.2 Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

.1 Do not paint over "CSA" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

.3 Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

.4 Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.3 Adjusting

.1 Adjust operating products and equipment to ensure smooth and unhindered operation.

END OF SECTION

OPERATION AND MAINTENANCE DATA

1. GENERAL

1.1 Description

.1 This Section includes procedural requirements for providing, compiling and submitting operation and maintenance data required for this project.

1.2 Summary:

.1 This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

.1 General contents of data.

.2 Specific data for each equipment and system.

.3 Manual for materials and finishes.

.4 Assembly.

1.3 Definitions

.1 System: An organized collection of parts, equipment, or subsystems united by regular interaction.

.2 Subsystem: A portion of a system with characteristics similar to a system.

1.4 Submittals

.1 O&M Manual Content: Operations and maintenance manual submittal requirements are specified in individual Specification Sections for the Products for which they must be supplied. Submit reviewed manual content formatted and organized by this Section and as defined in Section 01 33 00.

.1 Provide separate O&M Manuals and As-built drawings for each process area as defined in Appendix A the Migration Plan.

.1 O&M Manuals and As-built drawings submissions are a requirement of the migration stages in Appendix A the Migration Plan. Each migration stage will not be complete until the O&M Manual and As-built drawings are submitted. Work on subsequent stages will not be permitted until the current migration stage is complete.

.2 Contract Administrator and City will comment on whether content of operations and maintenance submittals are acceptable.

.3 Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

.2 Initial O&M Manuals: Submit draft copy of each manual as defined in Section 01 33 00. Contract Administrator and City will comment on whether general scope and content of manual are acceptable.

.3 After acceptance, deliver electronic copies to the Contract Administrator and City. Provide the City with one (1) hardcopy and the Contract Administrator with one (1) hardcopy.

1.5 Arrangement

.1 The O&M Manual shall be arranged into the following tabbed sections:

.1 Tab A: Contractor and Sub-contractor Information

.2 Tab B: Warranty

.3 Tab C: Equipment List, Datasheets and Approved Shop Drawings

.4 Tab D: Record Drawings

.5 Tab E: Spare Parts & Tools

.6 Tab F: Certified FAT Test Checklists

.7 Tab G: Certified SAT and SIT Test Checklists

.8 Tab H: PLC Software Code

.9 Tab I: Sequence of Operation

.10 Tab J: Maintenance Activities

.11 Tab K: Training Presentations

.12 Tab L: Lessons Learned and Challenges

.13 Tab M - P: (Spare Tabs)

.2 The General Construction Contractor shall provide additional formatted O&M sections based on their work. Allow for and include these sections in a comprehensive O&M manual with appropriate ordering, formatting, tabs, and electronic hyperlinks.

1.6 Format (Hardcopy)

.1 Prepare data in the form of an O&M instructional manual.

.2 Binders: Commercial quality, 8-1/2 x 11-inch three-hole post type binders with hardback, 3-inch maximum binder size. When multiple binders are used, correlate data into related consistent groupings. Three ring binders are not acceptable.

.3 Arrange contents by Specification Section numbers and sequence of Table of Contents of this Project Manual.

.4 Provide tabbed fly leaf for each separate product and system, with printed description of product and major component parts of equipment. Insert type tab labels must be secured or bonded to prevent the labels from falling out.

.5 Text: Manufacturer's printed data, or typewritten data on twenty (20) pound paper.

.6 Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages and insert into clear plastic envelopes that can be secured into the three-hole post binders.

1.7 Format (Electronic Documentation)

.1 The Contractor must provide Operation and Maintenance Manual information specific to the configuration of the project in electronic form. Documents should be formatted like a web site complete with index page and Table of Contents. The electronic format must be such that the City is able to load the files onto a server to provide online access via any standard web browser. The Contractor shall make use of HTML (for text based documents) and PDF (for CAD type drawings) file formats. The complete document shall be provided on a USB drive.

.2 The electronic O&M data must be organized in a logical manner to aid operation in troubleshooting and information retrieval.

.3 All PDF documents must be searchable.

1.8 Quality Assurance

.1 Preparation of data shall be performed by personnel:

.1 Trained and experienced in O&M of described equipment.

.2 Familiar with requirements of this Section.

.3 Skilled as technical writers to the extent required to communicate the essential data to the Reader.

.4 Skilled as drafters competent to prepare any required drawings.

2. PRODUCTS (NOT USED)

3. EXECUTION

3.1 General Contents of Data

.1 Title Sheet: First page in data listing following:

.1 Title: "OPERATION AND MAINTENANCE INSTRUCTIONS".

.2 Title of Project: As shown on Contract Documents.

.3 Name(s) of applicable building(s) or structure(s) in which equipment is located.

.4 Name of equipment as described in Contract Documents.

.5 Contractor's name, address, and telephone number.

.6 Subcontractor's name, address, and telephone number if equipment is provided by Subcontractor.

.7 Contractor's or Subcontractor's purchase order number, manufacturer's shop order number or other such numbers required for parts and service ordering.

.8 Manufacturer's name, address, and telephone number.

.9 Name, address, and telephone number for local source of supply for parts and service.

.2 Equipment List: Immediately following title sheet containing the following:

.1 Table of Contents: Immediately following equipment list. Arrange in logical, systematic order and shall include as minimum each tabbed divider. Each page shall be numbered.

.2 Tabbed Dividers: Insert tabbed section dividers between each major section

.1 Provide title of section on each tab.

.2 Provide table of contents for each tabbed section, arranged in systematic order.

.3 Equipment Data Sheets: Provide catalog sheets showing configuration, manufacturer's specifications, models, options, and styles of equipment and major components being provided. Product data sheets will show project specific information with inapplicable information deleted by crossing out or removal. Include in tabbed section(s).

.4 Text:

.1 Include only those sheets applicable to Project.

.2 Each sheet shall:

.1 Identify specific equipment or part installed.

.2 Identify text applicable to equipment or part installed.

.3 Do not include inapplicable information or neatly strike it out.

.5 Drawings:

.1 Include As-built field wiring loop detailed drawings. Red lines for field wiring loop drawings will be produced by others within two (2) weeks after completion of field wiring loop installation.

.2 Supplement text with drawings to clearly illustrate following:

.1 Equipment and components.

.2 Relations of component parts of equipment and systems.

.3 Control and flow diagrams.

.3 Actual drawings of equipment from manufacturer. “Typical” drawings are not acceptable.

.6 Specially written information, as required to supplement text for particular installation.

.1 Provide explanation of interrelationships of equipment and components, and effects one component has on another or entire system.

.2 Provide overall instructions and procedures for equipment tying in instructions and procedures for separate components into unified instructional package.

.3 Provide glossary of any special terms used by the manufacturer if applicable.

.4 Organize in consistent format under separate headings for different O&M procedures.

.5 Provide logical sequence of instructions in order of O&M action required for each procedure.

3.2 Specific Data for Each Item of Equipment and/or System

.1 For each item of equipment and system include:

.1 Description of equipment and component parts:

.1 Function.

.2 Normal operating characteristics.

.3 Limiting conditions.

.4 Performance curves.

.5 Engineering data.

.6 Test as applicable.

.7 Complete nomenclature and model number of replaceable parts including keyed labeled exploded diagram.

.8 Complete nameplate data.

.9 City’s tag (or asset) numbers for equipment as indicated on the Contract Drawings.

.2 Operating Procedures:

.1 Startup and break-in.

.2 Normal operating instructions.

.3 Regulation and control.

.4 Stopping and shutdown.

.5 Emergency instructions.

.3 Maintenance Procedures:

.1 Routine maintenance operations.

.2 Guide to troubleshooting.

.3 Disassembly, repair, and reassembly instructions.

.4 Manufacturer's printed instructions regarding safety precautions for both (a) protection of personnel operating equipment and systems and (b) prevention of damage to equipment and systems.

.5 Assembly drawings and diagrams required for maintenance.

.6 Manufacturer's parts list and illustrations

.1 Predicted life of parts subject to wear.

.2 Items recommended to be stocked by the City as spare parts and quantities of same.

.7 Accepted control diagrams such as ladder diagrams, instrumentation loop diagrams, and electrical schematics.

.8 Bill of material.

.9 Other data as required under applicable Specification sections.

.2 Each system shall include:

.1 Description of System and Component Parts:

.1 Function.

.2 Normal operating characteristics.

.3 Limiting conditions.

.4 Performance curves.

.5 Engineering data.

.6 Rating tables.

.7 Tests, as applicable.

.8 Complete nomenclature and model number of replaceable parts.

.9 Complete nameplate data.

.10 City's Tag (asset) numbers for equipment as indicated on the Contract Drawings.

.2 Circuit Directories of Panel Boards:

.1 Electrical service.

.2 Controls.

.3 Communications.

.3 Maintenance Procedures:

.1 Guide to troubleshooting.

.2 Disassembly, repair, and reassembly instructions.

.3 Adjustment and checking instructions.

.4 Manufacturer's printed instructions regarding safety precautions for both:

.1 Protection of personnel operating equipment and systems.

.2 Prevention of damage to equipment and systems.

.5 List of original all of the manufacturer's components, spare parts with diagram, and recommended quantities to be maintained in storage by the City.

.6 Other data as required under pertinent sections of Specifications.

.3 Prepare and include additional data when need for such data becomes apparent during instruction of City's personnel. Differences between the equipment O&M manual and the manufacturers training session shall result in the training and/or O&M Manual being corrected.

3.3 Manual For Materials and Finishes

.1 Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

.4 Additional Requirements: As specified in individual product specification sections.

.5 Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.4 Assembly

.1 Assemble in two (2) sets.

.2 Remove bindings of individual manuals.

.3 Insert index tabs labeled with the respective piece of equipment to separate individual manuals.

.4 Provide a Table of Contents at the front of each volume showing the equipment items in the order in which they appear in the volume. Each equipment items shall include the functional name, applicable specifications section, and the plan listing, if any.

.5 The preventive maintenance schedule shall be bound in the front of each section immediately following the index tab sheet. The schedule shall be identified with respect to the piece of equipment it is referring to.

.6 Sheet Size: 8-1/2 x 11 sheets.

.7 Drawings may be on 11 x 17-inch sheets folded to 8-1/2 x 11 inches.

.8 Engrave on covers and end of binder, title OPERATIONS AND MAINTENANCE INSTRUCTIONS, name of Project, City's project number, date of Contract, and volume number with subject matter of contents, and the Contract Administrator's name.

FORM 01 78 23-2 Page 1 of 4 **EQUIPMENT DATA FORM**				
PROJECT NAME				
CONTRACT NO.				
CONTRACTOR				
EQUIPMENT NO.			ASSET NO.*	
DESCRIPTION			MAINT. NO.*	
LOCATION				
MANUFACTURER				
PURCHASED FROM				
VENDOR ORDER NO.			PURCHASE $	
DATE OF PURCHASE				
LOCAL SUPPLIER				
ADDRESS				
PHONE NO.				
MODEL NO.				
NO. OF UNITS		SERIAL NOS.		
*By City				

END OF SECTION