

## PROJECT MEETINGS

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### 1. GENERAL

#### 1.1 Administrative

- .1 Participate in scheduled meetings in the Winnipeg area, on a minimum monthly basis throughout the progress of the work. Coordinate location with the Contract Administrator.
- .2 Participate in scheduled meetings, at the Shoal Lake site at scheduled construction inspection dates determined by the Contract Administrator. A minimum of six such visits are anticipated during the construction and testing phases.
- .3 Submit any agenda items for meetings.
- .4 Coordinate with the City for use of physical space and make arrangements for meetings held at Site.
- .5 Contract Administrator will preside at meetings.
- .6 Contract Administrator will record the meeting minutes, and include significant proceedings and decisions, and identify actions by parties.
- .7 Contract Administrator will reproduce and distribute electronic copies of minutes within five (5) Business Days after meetings and transmit to meeting participants and, affected parties not in attendance, electronically.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- .9 Contractor will be responsible to provide above services at any additional meetings where Contract Administrator has not been requested to participate by the City.

#### 1.2 Preconstruction Meeting

- .1 Within fifteen (15) Business Days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Contract Administrator, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location, in Winnipeg area, of meeting and notify parties concerned minimum five (5) Business Days before meeting.
- .4 Agenda to include:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work presented as Microsoft Project or similar Gantt chart format.
  - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

## PROJECT MEETINGS

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- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences.
- .5 Delivery schedule and logistics for specified equipment in accordance with E5 – Use of GWWD Railway.
- .6 Site travel, meals and accommodations arrangements, in accordance with E4 – Staffhouse Accommodations.
- .7 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures, and Part F – Security Clearances.
- .8 Procedures for proposed changes, change orders, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements in accordance with the General Conditions.
- .9 City provided products.
- .10 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .11 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .12 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals, the General Conditions, and the Supplemental Conditions.
- .13 Monthly progress claims, administrative procedures, photographs, hold backs in accordance with the General Conditions, and the Supplemental Conditions.
- .14 Appointment of inspection and testing agencies or firms.
- .15 Insurances, transcript of policies, in accordance with the Supplemental Conditions.

### 1.3 Progress Meetings

- .1 During course of Work participate in monthly progress meetings scheduled by Contract Administrator. Meeting frequency may be adjusted based on schedule progress and general construction requirements.
- .2 Contractor, major Subcontractors involved in Work and Contract Administrator and City are to be in attendance.
- .3 For Contractor originated meetings, notify parties minimum three (3) Business Days prior to any such meetings.
- .4 For Contractor originated meetings, record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) Business Days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.

**PROJECT MEETINGS**

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- .3 Field observations, problems, conflicts.
- .4 Problems which impede construction schedule.
- .5 Review of off-site fabrication delivery schedules.
- .6 Corrective measures and procedures to regain projected schedule.
- .7 Revision to construction schedule.
- .8 Progress schedule, during succeeding work period.
- .9 Review submittal schedules: expedite as required.
- .10 Maintenance of quality standards.
- .11 Review proposed changes for effect on construction schedule and on completion date.
- .12 Other business.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## **CONSTRUCTION PROGRESS SCHEDULE - BAR (GANTT) CHART**

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### **1. GENERAL**

#### **1.1 Definitions**

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by the Contract Administrator to enable monitoring of project work in relation to established milestones.

#### **1.2 Requirements**

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 7 Calendar Days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

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**CONSTRUCTION PROGRESS SCHEDULE - BAR (GANTT) CHART**

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**1.3 Submittals**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Contract Administrator within 7 Business Days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Contract Administrator within 5 Business Days of receipt of acceptance of Master Plan.

**1.4 Project Milestones**

- .1 Project milestones form interim targets for Project Schedule.
  - .1 Project Award.
  - .2 Mobilization to Site.
  - .3 Concrete works completed.
  - .4 Pre-assembly and testing of systems in Winnipeg complete.
  - .5 Shipping of tanks and components to Site from Winnipeg.
  - .6 Tanks installed.
  - .7 Piping systems installed.
  - .8 Electrical and Lighting installed.
  - .9 System controls installed.
  - .10 Testing and demonstration of systems.
  - .11 Substantial Performance.
  - .12 Fuel transferred from existing to new tanks.
  - .13 Decommissioning of existing fuel systems.
  - .14 Total performance.

**1.5 Master Plan**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT), on Microsoft Project, Excel, or similar format.
- .2 Contract Administrator will review and return revised schedules within 5 Business Days.
- .3 Revise impractical schedule and resubmit within 5 Business Days.

**CONSTRUCTION PROGRESS SCHEDULE - BAR (GANTT) CHART**

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- .4 Accepted revised schedule will become the Master Plan and be used as baseline for updates.

**1.6 Project Schedule**

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization to Site.
  - .5 Site excavations, impermeable liner and drainage piping in place.
  - .6 Cast in place forming and reinforcing steel in place.
  - .7 Concrete works completed.
  - .8 Pre-assembly and testing of systems in Winnipeg complete.
  - .9 Shipping of tanks and components to Site from Winnipeg.
  - .10 External tanks placed.
  - .11 Internal tanks placed.
  - .12 Fuel unloading piping systems installed.
  - .13 Fuel transfer piping system completed.
  - .14 Dispensing systems completed.
  - .15 Electrical and Lighting installed.
  - .16 System controls installed.
  - .17 Testing and demonstration of systems.
  - .18 Substantial Performance.
  - .19 Fuel transferred from existing to new tanks.
  - .20 Decommissioning of existing fuel systems.
  - .21 Total performance.

**CONSTRUCTION PROGRESS SCHEDULE - BAR (GANTT) CHART**

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.22 Warranty Inspection.

**1.7 Project Schedule Reporting**

- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

**1.8 Project Meetings**

- .1 Discuss Project Schedule at the regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## **SUBMITTAL PROCEDURES**

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### **1. GENERAL**

#### **1.1 Administrative**

- .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.
- .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. 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, identifying deviations from requirements of Contract 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 is not relieved by Contract Administrator review.
- .10 Keep one (1) 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 Submit Drawings stamped and signed by Professional Engineer registered or licensed in the Province of Manitoba where required by provincial requirements or those of the Authority Having Jurisdiction, or specified by these documents.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

### **SUBMITTAL PROCEDURES**

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- .4 Allow five (5) Business Days for Contract Administrator's review of each submission.
- .5 Adjustments made on Shop Drawings by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.
- .6 Make changes in Shop Drawings as Contract Administrator may require, consistent with Contract. When resubmitting, notify Contract Administrator in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
  - .1 Date.
  - .2 Project title and Bid Opportunity number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each Shop Drawing, product data and sample.
  - .5 Other pertinent data.
- .8 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and Bid Opportunity number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.

### **SUBMITTAL PROCEDURES**

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- .7 Operating weight.
- .8 Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .9 After Contract Administrator's review, distribute copies.
- .10 Submit one (1) electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Contract Administrator where Shop Drawings will not be prepared due to standardized manufacture of product.
- .11 Submit one (1) electronic copy of test reports for requirements requested in specification Sections and as requested by Contract Administrator.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within three (3) years of date of contract award for project.
- .12 Submit one (1) electronic copy of certificates for requirements requested in Specification Sections and as requested by Contract Administrator.
  - .1 Statements printed on Manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit one (1) electronic copy of Manufacturer's instructions for requirements requested in Specification Sections and as requested by Contract Administrator.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit one (1) electronic copy of Manufacturer's Field Reports for requirements requested in Specification Sections and as requested by Contract Administrator.
- .15 Documentation of the testing and verification actions taken by Manufacturer's Representative to confirm compliance with Manufacturer's standards or instructions.
- .16 Submit one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Contract Administrator.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.

## **SUBMITTAL PROCEDURES**

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- .19 Shop Drawings will be reviewed by the Contract Administrator and returned with one of the following comment:
  - .1 Reviewed No Comment: the information presented appears consistent with the requirements.
  - .2 Reviewed as Noted: Notes have been added to represent the reviewer's understanding, assumptions or information to be included in the closeout submissions.
  - .3 Revise and Resubmit: resubmission of corrected Shop Drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

### **1.3 Samples**

- .1 Submit for review samples in duplicate as requested in respective Specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Contract Administrator's business address.
- .3 Notify Contract Administrator in writing, at time of submission of any deviations, and reasons for same, in samples from requirements of Contract.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.
- .6 Make changes in samples which Contract Administrator may require, consistent with Contract.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

### **1.4 Mock-Ups**

- .1 Not Used.

### **1.5 Photographic Documentation**

- .1 The City security requirements must be met prior to taking and use of any photos. All proposed photos will be discussed with site personnel and reviewed by the City prior to photos being taken, leaving site or being made available for use in any of the Contractor's documentation.
- .2 Submit one (1) electronic copy of colour digital photography in jpg format, standard resolution as directed by Contract Administrator. Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints:

### **SUBMITTAL PROCEDURES**

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- .1 Viewpoints and their location as determined by Contract Administrator.
- .4 Frequency of photographic documentation: as directed by Contract Administrator.
  - .1 Upon completion of: excavation, foundation, framing and services before concealment, of Work, and as directed by Contract Administrator.

#### **1.6 Certificates and Transcripts**

- .1 The Contractor shall not commence any Work on the Site until the Contract Administrator has confirmed receipt and approval of:
  - .1 Evidence that the Contractor is in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;
  - .2 Evidence of the workers compensation coverage specified in C6.15;
  - .3 The Safe Work Plan specified in D9;
  - .4 Evidence of the insurance specified in D10;
  - .5 The performance security specified in D11;
  - .6 The Subcontractor list specified in D12;
  - .7 The security clearances specified in Part F – Security Clearances for each individual proposed to perform Work under the Contract; and
  - .8 Completed Form N: Licensed Petroleum Technician List specified in D13.

#### **2. PRODUCTS (NOT USED)**

#### **3. EXECUTION (NOT USED)**

**END OF SECTION**

## HEALTH AND SAFETY REQUIREMENTS

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### 1. GENERAL

#### 1.1 References

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Manitoba
  - .1 The Workers Compensation Act C., C.S.M. c.W200.
- .4 City of Winnipeg – Materials Management web site – Workplace Safety and Health Program for Contractors

#### 1.2 Action and Informational Submittals

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within at least five (5) Business Days prior to the commencement of any Work on Site but in no event later than the time specified in the General Conditions for the return of the executed Contract. Health and Safety Plan must include:
  - .1 Results of site specific safety hazard assessment.
  - .2 Results of safety and health risk or hazard analysis for site tasks and operation, found in work plan.
- .3 Submit one (1) electronic copy of Contractor's authorized representative's work site health and safety inspection reports to Contract Administrator and to authority having jurisdiction, weekly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and City health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets.
- .7 The Contract Administrator will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 calendar days after receipt of plan. Revise plan as appropriate and resubmit plan to Contract Administrator within 7 calendar days after receipt of comments from Contract Administrator.
- .8 Contract Administrator review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

## HEALTH AND SAFETY REQUIREMENTS

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- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Contract Administrator.
- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
  - .1 Emergency evacuation of personnel from Site.

### 1.3 Filing of Notice

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

### 1.4 Safety Assessment

- .1 Perform site specific safety hazard assessment related to project.

### 1.5 Meetings

- .1 Schedule and administer Health and Safety meeting with Contract Administrator prior to commencement of Work.

### 1.6 Regulatory Requirements

- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

### 1.7 Project/Site Conditions

- .1 Work at Site may involve contact with:
  - .1 Wildlife
  - .2 Chlorine gas stored on site and in use during the warmer temperatures.
  - .3 As identified in the site briefings provided by the City.

### 1.8 General Requirements

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning Work and continue to implement, maintain, and enforce plan until final demobilization from Site. Health and Safety Plan must address project specifications.
- .2 Contract Administrator may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

### 1.9 Responsibility

- .1 Be responsible for health and safety of persons on Site, safety of property on Site and for protection of persons adjacent to Site and environment to extent that they may be affected by conduct of Work.

## HEALTH AND SAFETY REQUIREMENTS

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- .2 Comply with and enforce compliance by employees with safety requirements of Contract, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

### 1.10 Compliance Requirements

- .1 Comply with The Workers Compensation Act, and The Workplace Safety and Health Act., Manitoba Reg.

### 1.11 Unforeseen Hazards

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Contract Administrator verbally and in writing.

### 1.12 Health and Safety Co-Ordinator

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have site-related working experience specific to activities associated with petroleum works in environmentally sensitive areas.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter Site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on Site during execution of Work, and report directly to and be under direction of site supervisor.

### 1.13 Posting of Documents

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Contract Administrator.

### 1.14 Correction of Non-Compliance

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Contract Administrator.
- .2 Provide Contract Administrator with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Contract Administrator may stop Work if non-compliance of health and safety regulations is not corrected.

**HEALTH AND SAFETY REQUIREMENTS**

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**1.15 Powder Actuated Devices**

- .1 Use powder actuated devices only after receipt of written permission from Contract Administrator.

**1.16 Work Stoppage**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## ENVIRONMENTAL PROCEDURES

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### 1. GENERAL

#### 1.1 References

##### .1 Definitions:

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

#### 1.2 Action and Informational Submittals

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to Site, provide Environmental Protection Plan for review and approval by Contract Administrator.
- .3 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 Include in Environmental Protection Plan:
  - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
  - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from Site.
  - .3 Names and qualifications of persons responsible for training site personnel.
  - .4 Descriptions of environmental protection personnel training program.
  - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3 requirements.
  - .6 Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and

## ENVIRONMENTAL PROCEDURES

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stockpiles of excess or spoil materials including methods to control runoff and to contain materials on Site.

- .7 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .8 Spill Control Plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .9 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .10 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on Site.
- .11 Contaminant Prevention Plan identifying potentially hazardous substances to be used on Site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .12 Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

### 1.3 Fires

- .1 Fires and burning of rubbish on Site are not permitted.

### 1.4 Drainage

- .1 Provide Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .2 Provide temporary drainage and pumping required to keep excavations and Site free from water.
- .3 Ensure water pumped into waterways, sewer or drainage systems is free of suspended materials.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

### 1.5 Site Clearing and Plant Protection

- .1 Protect trees and plants on Site and adjacent properties as indicated.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.

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- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Contract Administrator.

### 1.6 Work Adjacent To Waterways

- .1 Construction equipment to be operated on land only.
- .2 Do not use waterway beds for borrow material.
- .3 Waterways to be free of excavated fill, waste material and debris.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

### 1.7 Pollution Control

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
  - .1 Provide temporary enclosures where indicated by Contract Administrator.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

### 1.8 Historical/Archaeological Control

- .1 Provide historical, archaeological, cultural resources biological resources plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, known to be on Site: and/or identifies procedures to be followed if historical archaeological, or cultural resources not previously known to be on Site or in area are discovered during construction.
- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and the Contract Administrator.

### 1.9 Notification

- .1 Contract Administrator will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

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- .2 Contractor: after receipt of such notice, inform Contract Administrator of proposed corrective action and take such action for approval by Contract Administrator.
  - .1 Do not take action until after receipt of written approval by Contract Administrator.
- .3 Contract Administrator will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

### **2. PRODUCTS (NOT USED)**

### **3. EXECUTION**

#### **3.1 Cleaning**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

**END OF SECTION**

## REGULATORY REQUIREMENTS

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### 1. GENERAL

#### 1.1 References and Codes

- .1 Perform Work in accordance with most current versions of:
  - .1 Manitoba Building Code.
  - .2 Manitoba Fire Code.
  - .3 Manitoba Plumbing Code.
  - .4 CSA B139 Series 15 Installation Code for Oil Burning Equipment.
  - .5 The Dangerous Goods Handling and Transportation Act C.C.S.M. c.D12, as amended by Manitoba Regulation 188/2001.
  - .6 The Workplace Safety and Health Act, C.C.S.M. c W210.
- .2 Meet or exceed requirements of:
  - .1 Specified standards, codes and referenced documents, and those included by the above documents.

#### 1.2 Hazardous Material Discovery

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Contract Administrator.
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Contract Administrator.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Contract Administrator.

#### 1.3 Building and Site Smoking Environment

- .1 Comply with smoking restrictions and municipal by-laws.

### 2. PRODUCTS (NOT USED)

### 3. EXECUTION (NOT USED)

END OF SECTION

## QUALITY CONTROL

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### 1. GENERAL

#### 1.1 Inspection

- .1 Allow Contract Administrator access to Work. If part of Work is in preparation at locations other than Site, 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 Site.
- .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 Contract Administrator will order part of Work to be examined if Work is suspected to be not in accordance with Contract. If, upon examination such work is found not in accordance with Contract, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract, Contract Administrator shall pay cost of examination and replacement.

#### 1.2 Independent Inspection Agencies

- .1 Independent Inspection/Testing Agencies will be engaged by City for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the City.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract.
- .4 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 Contract Administrator at no cost to City or Contract Administrator. Pay costs for retesting and reinspection.

#### 1.3 Access to Work

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

#### 1.4 Procedures

- .1 Notify appropriate agency and Contract Administrator in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 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.

## QUALITY CONTROL

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- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

### 1.5 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 Contract Administrator as failing to conform to Contract. Replace or re-execute in accordance with Contract.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with Contract, The City will deduct from Contract Price difference in value between Work performed and that called for by Contract, amount of which will be determined by Contract Administrator.

### 1.6 Reports

- .1 Submit one (1) electronic copy of inspection and test reports to Contract Administrator.
- .2 Provide copies to subcontractor of work being inspected or tested.

### 1.7 Tests and Mix Designs

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract or beyond those required by law of Site will be appraised by Contract Administrator and may be authorized as recoverable.

### 1.8 Mill Tests

- .1 Submit mill test certificates as requested or required of specification Sections.

### 1.9 Equipment and Systems

- .1 Submit adjustment and balancing reports for mechanical and electrical systems.
- .2 Refer to each Section for definitive requirements.

## 2. PRODUCTS (NOT USED)

## 3. EXECUTION (NOT USED)

END OF SECTION

## TEMPORARY UTILITIES

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### 1. GENERAL

#### 1.1 Action and Informational Submittals

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

#### 1.2 Installation and Removal

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from Site all such work after use.

#### 1.3 Dewatering

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

#### 1.4 Water Supply

- .1 The City will provide continuous supply of water for construction use.

#### 1.5 Temporary Heating and Ventilation

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
  - .1 Facilitate progress of Work.
  - .2 Protect Work and products against dampness and cold.
  - .3 Prevent moisture condensation on surfaces.
  - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10°C in areas where construction is in progress.
- .5 Ventilating:
  - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
  - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

## TEMPORARY UTILITIES

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- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Permanent heating system of building may be used when available and approved by the Contract Administrator. Be responsible for damage to heating system if use is permitted.
- .7 On completion of Work for which permanent heating system is used, replace filters.
- .8 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
  - .1 Conform with applicable codes and standards.
  - .2 Enforce safe practices.
  - .3 Prevent abuse of services.
  - .4 Prevent damage to finishes.
  - .5 Vent direct-fired combustion units to outside.
- .9 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

### 1.6 Temporary Power and Light

- .1 Contractor will be allowed to connect to a restricted amount of site electrical power for temporary lighting and operating of power tools, but must confirm requirements and obtain site approval from Contract Administrator personnel prior to mobilization.
- .2 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.
- .3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Contract Administrator provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than three (3) months.

### 1.7 Temporary Communication Facilities

- .1 The Contractors shall provide and pay for any temporary equipment necessary for own use and intermittent use of Contract Administrator. Access to Systems is typically via satellite only.

## **TEMPORARY UTILITIES**

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### **1.8 Fire Protection**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and by-laws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

### **2. PRODUCTS (NOT USED)**

### **3. EXECUTION**

#### **3.1 Temporary Erosion and Sedimentation Control**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**END OF SECTION**

## CONSTRUCTION FACILITIES

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### 1. GENERAL

#### 1.1 Related Requirements

- .1 Not used.

#### 1.2 References

- .1 Canadian Standards Association (CSA)
  - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CSA-O121, Douglas Fir Plywood.

#### 1.3 Action and Informational Submittals

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

#### 1.4 Scaffolding

- .1 Scaffolding in accordance with The Workplace Safety and Health Act, Part 28.
- .2 Provide and maintain scaffolding, ramps, ladders, platforms, temporary stairs, and all similar systems required for the work and inspections in progress.

#### 1.5 Hoisting

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Confirm availability and conditions of use of site equipment for these works.
- .3 Hoists and cranes to be operated by qualified operator.

#### 1.6 Site Storage/Loading

- .1 Confine work and operations of employees by Contract. Do not unreasonably encumber premises with products.
- .2 Confirm availability and conditions of use of Site for storage and general operations during the works.
- .3 Do not load or permit to load any part of Work with weight or force that will endanger Work.
- .4 Provide and maintain adequate access to Site.

#### 1.7 Offices

- .1 Heated office space will be provided by the City.

## CONSTRUCTION FACILITIES

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- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Contract Administrator's Site office.
  - .1 Not required provided pre-arranged intermittent access to Contractor's site office is allowed for periods not exceeding approximately eight (8) continuous hours.

### 1.8 Equipment, Tool and Materials Storage

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds or job boxes for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on Site in manner to cause least interference with work activities.

### 1.9 Sanitary Facilities

- .1 Site sanitary facilities may be used by employees. Facilities are to be maintained clean as instructed by the Contract Administrator and City site supervisory personnel.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

### 1.10 Construction Signage

- .1 No other signs or advertisements, other than warning signs, are permitted on Site.
- .2 Maintain approved signs and notices in good condition for duration of project, and dispose of off-Site on completion of project or earlier if directed by Contract Administrator.

### 1.11 Protection and Maintenance of Traffic

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Contract Administrator.
- .3 Provide measures for protection and diversion of local traffic as required by Site management, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.
- .4 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .5 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .6 Provide snow removal within construction zone during period of Work.

**CONSTRUCTION FACILITIES**

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**1.12 Clean-Up**

- .1 Remove construction debris, waste materials, packaging material from Site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## **TEMPORARY BARRIERS AND ENCLOSURES**

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### **1. GENERAL**

#### **1.1 Related Requirements**

- .1 Not Used.

#### **1.2 References**

- .1 Not Used.

#### **1.3 Installation and Removal**

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from Site all such work after use.

### **2. HOARDING**

- .1 Coordinate any hoarding with site personnel.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

#### **2.2 Guard Rails and Barricades**

- .1 Provide secure, flexible fencing attached to steel supports around all excavations deeper than 1m.
- .2 Provide as required by governing authorities and as indicated.

#### **2.3 Weather Enclosures**

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings.
- .3 Design enclosures to withstand wind pressure and snow loading.

#### **2.4 Dust Tight Screens**

- .1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

#### **2.5 Access to Site**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

**TEMPORARY BARRIERS AND ENCLOSURES**

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**2.6 Local Traffic Flow**

- .1 Provide and maintain barricades, lights, or lanterns as required to perform Work and protect site personnel.

**2.7 Protection of Building Finishes**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Contract Administrator locations and installation schedule three (3) Business Days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

**2.8 Waste Management and Disposal**

- .1 Separate waste materials for reuse and recycling.

**3. PRODUCTS (NOT USED)**

**4. EXECUTION (NOT USED)**

**END OF SECTION**

## COMMON PRODUCT REQUIREMENTS

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### 1. GENERAL

#### 1.1 References

- .1 Conform to the reference standards, in whole or in part as specifically requested in Specifications.
- .2 If there is question as to whether products or systems are in conformance with applicable standards, Contract Administrator reserves right to have such products or systems tested to prove or disprove conformance.
- .3 Cost for such testing will be borne by Contractor in event of conformance with Contract or by Contractor in event of non-conformance.

#### 1.2 Quality

- .1 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.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 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.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Contract Administrator based upon requirements of Contract.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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.

#### 1.3 Availability

- .1 Immediately upon award of Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Contract Administrator of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Contract Administrator at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Contract Administrator reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

## COMMON PRODUCT REQUIREMENTS

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### 1.4 Storage, Handling and Protection

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with Manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with Manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber, etc. on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Contract Administrator.
- .9 Touch-up damaged factory finished surfaces to Contract Administrator's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

### 1.5 Transportation

- .1 Except as specified in 1.5.2, the Contractor shall deliver / receive products to/from the City of Winnipeg, Water and Waste Department's GWWD Railroad at the location identified in the Bid Opportunity documents.
- .2 Products supplied by the City will be delivered to the Contractor at the above location.
- .3 The Contractor shall load and secure all products onto the GWWD designated rail vehicles. The City will transport the products from/to the identified location to/from the Shoal Lake Aqueduct Inlet site. The Contractor shall load/unload all products at the Site.

### 1.6 Manufacturer's Instructions

- .1 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.
- .2 Notify Contract Administrator in writing, of conflicts between Specifications and Manufacturer's instructions, so that Contract Administrator will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Contract Administrator to require removal and re-installation at no increase in Contract Price or Contract Time.

## COMMON PRODUCT REQUIREMENTS

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### 1.7 Quality of Work

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Contract Administrator if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Contract Administrator reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Contract Administrator, whose decision is final.

### 1.8 Co-ordination

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

### 1.9 Concealment

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Contract Administrator if there is interference. Install as directed by Contract Administrator.

### 1.10 Remedial Work

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

### 1.11 Location of Fixtures

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Contract Administrator of conflicting installation. Install as directed.

### 1.12 Fastenings

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

### **COMMON PRODUCT REQUIREMENTS**

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- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

#### **1.13 Fastenings - Equipment**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

#### **1.14 Protection of Work in Progress**

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Contract Administrator.

#### **1.15 Existing Utilities**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

#### **2. PRODUCTS (NOT USED)**

#### **3. EXECUTION (NOT USED)**

**END OF SECTION**

## **EQUIPMENT INSTALLATION**

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### **1. GENERAL**

#### **1.1 Summary**

- .1 This Section describes general requirements for all equipment supplied under the Contract relating to factory inspections, equipment delivery, equipment installation training, equipment installation, equipment performance testing, and process performance testing.
- .2 Equipment to be delivered to the City of Winnipeg, Water and Waste Department's GWWD Railroad train as indicated in the Bid Opportunity documents, loaded and secured onto the GWWD designated rail vehicles. The City will transport the equipment from this site to the Shoal Lake Aqueduct Inlet site.
- .3 The Contractor shall be responsible for the loading and securing the equipment onto the train, and for offloading from the train.
- .4 Form 100 - Certificate of Equipment Delivery in Appendix C of the Bid Opportunity shall be completed accordingly.

#### **1.2 Related Requirements**

- .1 Section 01 91 13 – General Facility Operational Review.

#### **1.3 References**

- .1 Conform to the reference standards, in whole or in part as specifically requested in Specifications.
- .2 If there is question as to whether products or systems are in conformance with applicable standards, Contract Administrator reserves right to have such products or systems tested to prove or disprove conformance.
- .3 Cost for such testing will be borne by Contractor in event of conformance with Contract or by Contractor in event of non-conformance.

#### **1.4 Definitions**

- .1 **Manufacturer's Representative:** A Manufacturer's Representative is a trained serviceman empowered by the Contractor to provide:
  - .1 Installation training.
  - .2 Witnessing of equipment installation.
  - .3 Assistance in equipment performance testing.
  - .4 Assistance in process performance testing.
  - .5 Participation in the guaranteed performance testing.

## **EQUIPMENT INSTALLATION**

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### **1.5 Expertise and Responsibility**

- .1 The Contract Administrator recognizes the expertise of the Contractor.
- .2 Should the Contract Administrator issue a Notice of Proposed Change, Field Order or Change Order to change the Work which would, in the opinion of the Contractor, compromise the success or safety of the Work, then it shall be incumbent on the Contractor to notify in writing the Contract Administrator to this effect within two (2) days upon receipt

### **1.6 Inspection at Factory**

- .1 The City and/or Contract Administration may, before or after selection of equipment has been made, inspect or have an authorized representative inspect the manufacturing, assembling and testing facilities at the Contractor's or Subcontractor equipment factory, to satisfy themselves of the capability of the Contractor or Subcontractor to supply the specified equipment.
- .2 The City and/or the Contract Administrator may inspect or have an authorized inspector inspect the equipment factory or the process of manufacture or testing of the equipment at the Contractor's or Subcontractor's equipment factory at any reasonable time. The City and/or the Contract Administrator or the inspector may notify the Contractor or Subcontractor at any time of unsatisfactory materials, workmanship or processes.
- .3 The Contractor or Subcontractor, as the case may be, shall provide every reasonable facility, access and co-operation to assist the City and/or the Contract Administrator or an authorized inspector in carrying out inspection or testing at the equipment factory or plant.
- .4 Inspection or testing carried out by the City and/or the Contract Administrator or an authorized inspector shall not relieve the Contractor of the responsibility for supplying equipment in accordance with the Request for Proposal Documents and good engineering practice.

### **1.7 Equipment Delivery**

- .1 The delivery of all material and equipment shall be coordinated with the City, the Contractor and the Contract Administrator to optimize the amount of trips and the requirement for the material and equipment on site or removed from site.
- .2 The Contractor shall deliver all material and equipment required under this Contract to the City of Winnipeg, Water and Waste Department's GWWD designated site as indicated in the Bid Opportunity documents from which the equipment will be transported to the Shoal Lake Aqueduct Inlet site by the City.
- .3 The Contractor shall deliver the equipment on or before the specified delivery date. The Contractor shall include a schedule within 15 Calendar Days after notification of acceptance of Shop Drawings.
- .4 No delivery to the Site shall occur until Reviewed Shop Drawings are received by the Contractor.
- .5 The Contractor shall off-load and place into storage all equipment at the Shoal Lake Intake Facility at the location agreed with the Contract Administrator. The Contractor shall provide

## EQUIPMENT INSTALLATION

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off-loading requirements and procedures to the Contract Administrator well in advance of the arrival of the equipment.

- .6 The Contractor will be responsible for storing the equipment, appurtenances and materials and for protection against weather, loss, damage or theft. The Contractor shall provide the Contract Administrator with a copy of all instructions in writing of all precautions to be observed in connection with the storing and protection of the equipment.
- .7 The Contractor shall clearly mark each item to be shipped and identify and reference it to the packing lists and to bills of materials on the shop drawings. The lists will be used by the Contractor and the Contract Administrator to check the contents of each delivery. No shipments will be off-loaded until itemized packing lists have been received by the parties mentioned herein.
- .8 The Contractor shall adequately pack and crate each component to provide protection during transport, handling and storage. Equipment suitable for outside storage will be stored to the satisfaction of the Contractor and the Contract Administrator. The Contractor shall identify each component with durable labels or tags securely attached to each piece of equipment, crate or container.
- .9 No item shall be shipped loose or in such a way as to be adversely affected by weather conditions, pilferage, normal transit hazards or other reasonably anticipated shipping hazards.

### 1.8 Storage

- .1 Where the equipment is to be stored on site for any period of time exceeding one week, the Contractor shall ensure there is no uneven wear or distortion of equipment component parts.
- .2 The Contractor shall protect painted, polished and machined metal surfaces from corrosion and damage during shipment and storage and shall carefully pack and crate the equipment for shipment. The Contractor shall protect threaded connections with threaded plugs or caps and shall protect open plain end pipes with caps. He shall especially pack electrical equipment and control panels to prevent scratching, access by dirt, moisture or dust or damage to insulation, and shall cover equipment having exposed bearings and glands to exclude foreign matter. All openings in the equipment shall be covered before shipment. Sufficient lifting hooks shall be supplied for handling all crates or boxes and heavy pieces.
- .3 The equipment may have to be stored on the site for an extended period of time before installation and equipment performance testing. Accordingly, the Contractor shall provide any special packaging and protective coatings, lubricants, etc. which the Contractor deems necessary to protect the equipment during the protracted storage and prior to equipment performance testing. The Contractor will be responsible for removing any protective coatings prior to installation and equipment performance testing in accordance with the manufacturer's written instructions.

### 1.9 Installation Assistance

- .1 Where stated in the specifications, the Contractor shall provide a Manufacturer's Representative who, in conjunction with the Contract Administrator or his agent, shall give instructions regarding the installation of the equipment.

## EQUIPMENT INSTALLATION

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- .2 Before commencing installation of equipment, the Contractor will arrange for the attendance of the Manufacturer's Representative to provide instructions in the methods, techniques, precautions, and any other information relevant to the successful installation of the equipment.
- .3 The Contractor will inform the Contract Administrator, in writing, of the attendance at the Site of the Manufacturer's Representative for installation training at least fourteen (14) Calendar Days prior to arrival.
- .4 The Contractor shall instruct the Installation Contractor in the proper installation of the equipment and shall provide all necessary installation instructions to the Installation Contractor in writing.
- .5 The Contractor shall provide advice and instructions to the Installation Contractor on the installation of the equipment but shall not be responsible for the detailed supervision of the installation of the equipment or of the workers installing it. The Contractor shall notify the Contract Administrator in writing immediately in the event of any disputes with the Installation Contractor concerning installation of the equipment.
- .6 The Manufacturer's Representative shall complete **Form 101**, attached in Appendix C, when satisfied that the Contractor has received adequate instruction in the installation of the Contractor's equipment. The completed **Form 101** must be submitted to the Contract Administrator prior to the commencement of equipment installation. Such certification shall be provided to the Contract Administrator before the Manufacturer's Representative leaves the Site.
- .7 Installation of the equipment will not commence until the Contract Administrator has advised that completed **Form 101** has been accepted.

## 2. PRODUCTS (NOT USED)

## 3. EXECUTION

### 3.1 Installation

- .1 If it is found necessary, or if so directed by the Contract Administrator, the Contractor will arrange for the Manufacturer's Representative to visit the site to provide assistance during installation, all at no cost to the City.
- .2 Prior to completing installation, the Contractor will inform the Contract Administrator and arrange for the attendance at the Site of the Manufacturer's Representative to verify successful installation.
- .3 The Manufacturer's Representative shall conduct a detailed inspection of the installation including alignment, attached pipe work, wiring and motor starters, electrical connections, controls and instrumentation, rotation direction, running clearances, lubrication, workmanship, satisfactory noise and vibration requirements and all other items as required to ensure successful operation of the equipment.
- .4 The Manufacturer's Representative shall identify any outstanding deficiencies in the installation and shall provide a written report to the Contract Administrator and Contractor describing such deficiencies.

## EQUIPMENT INSTALLATION

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- .5 The deficiencies shall be rectified by the Contractor and the Manufacturer's Representative will be required to re-inspect the installation, at no cost to the City.
- .6 The Manufacturer's Representative shall complete **Form 102**, attached in Appendix C, following installation of the equipment. The completed **Form 102** must be submitted to the Contract Administrator prior to the commencement of functional testing.
- .7 Deliver the completed **Form 102** to the Contract Administrator prior to departure of the Manufacturer's Representative from the site.
- .8 Tag the equipment with a 100 mm by 200 mm card stating "Equipment Checked. Do Not Run." stenciled in large black letters. Sign and date each card.

### 3.2 Equipment and Performance Verification

- .1 Equipment will be subjected to the demonstrations and test indicated in Section 01 79 00 - Demonstration and Section 01 91 13 - General Facility Operational Review.
- .2 The Contractor will inform the Contract Administrator at least fourteen (14) days in advance of conducting the tests and arrange for the attendance of the Manufacturer's Representative as specified in various sections. The tests may be concurrent with the inspection of satisfactory installation if mutually agreed by the Contractor and the Contract Administrator.
- .3 Where specified, the Manufacturer's Representative shall conduct all necessary checks to the equipment and if necessary, advise the Contractor of any further work needed prior to confirming the equipment is ready to run.

### 3.3 Summary Requirements

- .1 All chemicals, temporary power, heating, or any other ancillary services required to complete the initial demonstration, running test and equipment performance tests are the responsibility of the Contractor. Diesel Fuel and Gasoline will be supplied by the City.
- .2 Should the initial demonstration, running test or equipment performance tests reveal any defects, then those defects shall be promptly rectified and the demonstration, running tests, and / or performance tests will be repeated to the satisfaction of the Contract Administrator. Additional costs incurred by the Contract Administrator, or the City, due to repeat demonstration, running tests, and/or performance tests shall be the responsibility of the Contractor.
- .3 On successful completion of the demonstration, running tests, and performance tests, the "**Certificate of Satisfactory Equipment Performance**" (**Form 103**) attached to this specification will be signed by the Manufacturer's Representative, the Contractor, the Contract Administrator and the City.
- .4 Process performance testing (Section 01670) can commence as soon as the "**Certificate of Satisfactory Equipment Performance**" (**Form 203**) is completed.

**END OF SECTION**

## EXAMINATION AND PREPARATION

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### 1. GENERAL

#### 1.1 Qualifications of Surveyor

- .1 Qualified Construction Surveyor.
- .2 Submit work experience resume for review and approval by the Contract Administrator.

#### 1.2 Survey Reference Points

- .1 Existing base horizontal and vertical control points are designated on Drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to the Contract Administrator.
- .4 Report to the Contract Administrator when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

#### 1.3 Survey Requirements

- .1 Establish lines and levels, locate and lay out, by instrumentation.
- .2 Stake for grading, fill and landscaping features.
- .3 Stake slopes and berms.
- .4 Establish pipe invert elevations.
- .5 Stake batter boards for foundations.
- .6 Establish foundation column locations and slab elevations.
- .7 Establish lines and levels for mechanical and electrical work.

#### 1.4 Existing Services

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify the Contract Administrator of findings.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by the Contract Administrator.

#### 1.5 Location of Equipment and Fixtures

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

## **EXAMINATION AND PREPARATION**

---

- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform the Contract Administrator of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by the Contract Administrator.

### **1.6 Records**

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

### **1.7 Action and Informational Submittals**

- .1 Submit name and address of surveyor to the Contract Administrator.
- .2 On request of the Contract Administrator, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract.

### **1.8 Subsurface Conditions**

- .1 Promptly notify Contract Administrator in writing if subsurface conditions at Site differ materially from those indicated in Contract, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Contract Administrator determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

## **2. PRODUCTS (NOT USED)**

## **3. EXECUTION (NOT USED)**

**END OF SECTION**

## EXECUTION

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### 1. GENERAL

#### 1.1 Action and Informational Submittals

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
  - .1 Structural integrity of elements of project.
  - .2 Integrity of weather-exposed or moisture-resistant elements.
  - .3 Efficiency, maintenance, or safety of operational elements.
  - .4 Visual qualities of sight-exposed elements.
  - .5 Work of City or separate contractor.
- .3 Include in request:
  - .1 Identification of project.
  - .2 Location and description of affected Work.
  - .3 Statement on necessity for cutting or alteration.
  - .4 Description of proposed Work, and products to be used.
  - .5 Alternatives to cutting and patching.
  - .6 Effect on Work of City or separate contractor.
  - .7 Written permission of affected separate contractor.
  - .8 Date and time work will be executed.

#### 1.2 Materials

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

#### 1.3 Preparation

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.

## EXECUTION

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- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

### 1.4 Execution

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract.
- .10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

### 1.5 Waste Management and Disposal

- .1 Separate waste materials for reuse and recycling.

### 2. PRODUCTS (NOT USED)

### 3. EXECUTION (NOT USED)

END OF SECTION

## CLEANING

---

### 1. GENERAL

#### 1.1 Project Cleanliness

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by the City or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Contract Administrator. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from Authorities Having Jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

#### 1.2 Final Cleaning

- .1 Surfaces of all installed components shall be cleaned of any traces of soiling resulting from the handling, installation, or testing prior to turning over to the City, including but not limited to:
  - .1 Tanks.
  - .2 Pumps and ancillary devices.
  - .3 Piping and supports.
  - .4 Dispensers.
  - .5 Concrete surfaces.
  - .6 Electrical panels and control panels.

**CLEANING**

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**1.3 Waste Management and Disposal**

- .1 Separate waste materials for recycling and disposal.

**2. PRODUCTS**

**2.1 Cleaning Products**

- .1 Cleaning products used must be controlled with the chemical or discharge of product including soaps for washing not contaminate waters in or around the Aqueduct or source water supply.
- .2 Only food grade cleaning solutions and products are to be used.
- .3 Prior to the use of any cleaning products submit to the Contract Administrator the MSDS and any other applicable supporting information of the proposed products for review by the City.

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## CLOSEOUT PROCEDURES

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### 1. GENERAL

#### 1.1 Administrative Requirements

- .1 Acceptance of Work Procedures:
  - .1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract.
    - .1 Notify Contract Administrator in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2 Request Contract Administrator's inspection.
  - .2 Contract Administrator's Inspection:
    - .1 Contract Administrator and Contractor to inspect Work and identify defects and deficiencies.
    - .2 Contractor to correct Work as directed.
  - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
    - .1 Work: completed and inspected for compliance with Contract.
    - .2 Defects: corrected and deficiencies completed.
    - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
    - .4 Certificates required by Fire Commissioner, and Utility companies: submitted.
    - .5 Operation of systems: demonstrated to the City's personnel.
    - .6 Commissioning of systems completed:
      - .1 Mechanical.
      - .2 Electrical.
      - .3 Controls and Instrumentation.
    - .7 O&M Manuals and all other support documents provided to satisfaction of the City and the Contract Administrator.
- .4 Declaration of Substantial Performance: when Contract Administrator considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

**CLOSEOUT PROCEDURES**

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**1.2 Final Cleaning**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
  - .2 Waste Management: separate waste materials for recycling and disposal.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## CLOSEOUT SUBMITTALS

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### 1. GENERAL

#### 1.1 Related Requirements

- .1 Not Used.

#### 1.2 References

- .1 Not Used.

#### 1.3 Administrative Requirements

- .1 Pre-warranty Meeting:
  - .1 Convene meeting one (1) week prior to Substantial Completion with Contractor's Representative and Contract Administrator, in accordance with Section 01 31 19 - Project Meetings to:
    - .1 Verify Project requirements.
    - .2 Review Manufacturer's installation instructions and warranty requirements.
  - .2 Contract Administrator to establish communication procedures for:
    - .1 Notifying construction warranty defects.
    - .2 Determine priorities for type of defects.
    - .3 Determine reasonable response time.
  - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
  - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

#### 1.4 Action and Informational Submittals

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Contract Administrator, one (1) draft hard copy of operating and maintenance manuals in English.
- .3 Upon review by Contract Administrator, make any required revisions, and provide four (4) final hard copies in heavy duty D ring type binders, and one copy on electronic media (CD or DVD).
- .4 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

## CLOSEOUT SUBMITTALS

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- .5 Provide evidence, if requested, for type, source and quality of products supplied.

### 1.5 Format

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, heavy duty, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
  - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, process flow, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dxf and dwg format on CD or DVD.

### 1.6 Contents - Project Record Documents

- .1 Table of Contents for Each Volume: provide title of project:
  - .1 Date of submission; names.
  - .2 Addresses and telephone numbers of Contract Administrator and Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

## CLOSEOUT SUBMITTALS

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- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating Manufacturer's instructions.
- .6 Training: refer to Section 01 79 00 - Demonstration and Training.

### 1.7 As-Built Documents and Samples

- .1 Maintain, in addition to requirements in General Conditions, at site for Contract Administrator and the City one (1) record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed Shop Drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store Record Documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .3 Label Record Documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Contract Administrator.

### 1.8 Recording Information on Project Record Documents

- .1 Record information on set of black line opaque drawings and in copy of Project Manual, provided by Contract Administrator.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

### CLOSEOUT SUBMITTALS

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- .3 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and Shop Drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations/depth of burial and inverts of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related Shop Drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain Manufacturer's certifications, inspection certifications, and field test records, required by individual Specifications Sections.
- .7 Provide digital photos, if requested, for site records. Photos will require pre-approval and review by the City for security reasons.

#### **1.9 Equipment and Systems**

- .1 For each item of equipment and each system include description of unit or system, and component parts.
  - .1 Give function, normal operation characteristics and limiting conditions.
  - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.

### **CLOSEOUT SUBMITTALS**

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- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
  - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
  - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include Manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original Manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .12 Provide list of original Manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .13 Include test and balancing reports as specified in Section 01 91 13 - General Facility Operational Review.
- .14 Additional requirements: as specified in individual Specification Sections.

#### **1.10 Materials and Finishes**

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
  - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions 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 Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual Specifications Sections.

#### **1.11 Maintenance Materials**

- .1 Spare Parts:

### CLOSEOUT SUBMITTALS

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- .1 Provide spare parts, in quantities specified in individual Specification Sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site agreed transfer location; place and store once on site.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Contract Administrator.
  - .2 Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
  - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Contract Administrator.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools:
  - .1 Provide special tools, in quantities specified in individual specification section.
  - .2 Provide items with tags identifying their associated function and equipment.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Contract Administrator.
    - .2 Include approved listings in Maintenance Manual.

#### **1.12 Delivery, Storage and Handling**

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with Manufacturer's seal and labels intact.

### CLOSEOUT SUBMITTALS

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- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Contract Administrator.

#### **1.13 Warranties and Bonds**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, thirty (30) calendar days before planned pre-warranty conference, to Contract Administrator approval.
- .3 Warranty management plan to include required actions and documents to assure that Contract Administrator receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Contract Administrator for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) working days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with the City's permission, leave date of beginning of time of warranty until time indicated in D24 - Warranty.
- .8 Conduct joint 11th month warranty inspections, measured from time of Total Performance.
- .9 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

**CLOSEOUT SUBMITTALS**

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- .2 Listing and status of delivery of Certificates of Warranty for extended warranty items and commissioned systems.
- .3 Provide list for each warranted equipment, item, feature of construction or system indicating the following.
  - .1 Name of item.
  - .2 Model and serial numbers.
  - .3 Location where installed.
  - .4 Name and phone numbers of manufacturers or suppliers.
  - .5 Names, addresses and telephone numbers of sources of spare parts.
  - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
  - .7 Cross-reference to warranty certificates as applicable.
  - .8 Starting point and duration of warranty period.
  - .9 Summary of maintenance procedures required to continue warranty in force.
  - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
  - .11 Organization, names and phone numbers of persons to call for warranty service.
  - .12 Typical response time and repair time expected for various warranted equipment.
- .4 Contractor's plans for attendance at post-construction warranty inspections.
- .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Contract Administrator to proceed with action against Contractor.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## **DEMONSTRATION AND TRAINING**

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### **1. GENERAL**

#### **1.1 Administrative Requirements**

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to the City's personnel two (2) weeks prior to date of final inspection.
- .2 The City: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3 Preparation:
  - .1 Verify conditions for demonstration and instructions comply with requirements.
  - .2 Verify designated personnel are present.
  - .3 Ensure equipment has been inspected and put into operation in accordance with applicable sections.
  - .4 Ensure testing, adjusting, and balancing has been performed and equipment and systems are fully operational.
- .4 Demonstration and Instructions:
  - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon time.
  - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
  - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
  - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

#### **1.2 Action and Informational Submittals**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system two (2) weeks prior to designated dates, for Contract Administrator's approval.
- .3 Submit reports within one (1) week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Give time and date of each demonstration, with list of persons present.
- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

**DEMONSTRATION AND TRAINING**

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- .6 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:
  - .1 Unloading Systems: two hours.
  - .2 Fuel Transfer and Day Tank Systems: two hours.
  - .3 Dispensing Systems: one hour.
  - .4 Containment Monitoring and Miscellaneous two hours of instruction.

**1.3 Quality Assurance**

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
  - .1 Instruct the City's personnel.
  - .2 Provide written report that demonstration and instructions have been completed.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## GENERAL FACILITY OPERATIONAL REVIEW

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### 1. GENERAL

#### 1.1 Summary

- .1 Section Includes:
  - .1 General requirements relating to facility start-up and confirmation that all systems are operating according to design.
- .2 Related Requirements
  - .1 Section 01 61 10 Equipment Installation.
- .3 Acronyms:
  - .1 O&M - Operation and Maintenance.
  - .2 TAB - Testing, Adjusting and Balancing.

#### 1.2 General

- .1 The Contractor will demonstrate to the City the suitable operation of the following main systems according to Manufacturer's ratings and recommendations, site performance requirements, and control sequences:
  - .1 Pumps.
  - .2 All valves and controls for above.
  - .3 Electrical distribution and lighting.
  - .4 Drainage.
- .2 Contractor will operate equipment and systems, troubleshooting and making adjustments as required.
  - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be operated interactively with each other as intended in accordance with Contract and design criteria.
  - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
- .3 Design Criteria: To meet Project functional and operational requirements.

#### 1.3 Overview

- .1 This will ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Activities include transfer of training of facility operational personnel.

## GENERAL FACILITY OPERATIONAL REVIEW

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- .2 The City will issue acceptance documentation in accordance with Section 01 61 10 Equipment Installation.

### 1.4 Non-Conformance to Performance Verification Requirements

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during testing, correct deficiencies, re-verify equipment and components within the non-functional system, including related systems as deemed required by the Contract Administrator, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

### 1.5 Contractor Responsibilities

- .1 Responsibilities include:

Before Construction:

- .1 Review Contract and confirm:

- .1 Adequacy of provisions for testing.
- .2 Aspects of design and installation pertinent to success of testing.

During Construction:

- .3 Co-ordinate provision, location and installation of provisions for testing.

- .2 Before Start of Operational Review:

- .1 Ensure installation of related components, equipment, sub-systems, is complete.
- .2 Fully understand start-up and operating requirements and procedures.
- .3 Have all checklists and documentation ready.
- .4 Understand completely design criteria and intent and special features.
- .5 Submit complete start-up documentation to Contract Administrator.
- .6 Ensure systems have been cleaned thoroughly.
- .7 Complete TAB procedures on systems, submit TAB reports to Contract Administrator for review and approval.
- .8 Ensure "As-Built" system schematics are available.

- .3 Inform Contract Administrator in writing of discrepancies and deficiencies on finished works.

## GENERAL FACILITY OPERATIONAL REVIEW

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### 1.6 Conflicts

- .1 Report conflicts between requirements of this section and other sections to Contract Administrator before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

### 1.7 Action and Informational Submittals

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit no later than eight (8) weeks after award of Contract:
    - .1 Draft documentation consisting of key equipment manufacturer's start-up, and Contractors checklists for the equipment including:
      - .1 Pumps.
      - .2 Filters.
      - .3 Strainers.
      - .4 Tank Level Alarm Systems.
      - .5 Flexible unloading and dispensing hoses.
      - .6 Hose Reels.
      - .7 Hose Nozzles.
      - .8 Electrical distribution and switchgear.
    - .2 Request in writing to Contract Administrator for changes to submittals and obtain written approval at least eight (8) weeks prior to start of operational review.
    - .3 Provide additional documentation relating to operational review process required by Contract Administrator.

### 1.8 Documentation

- .1 Manufacturer's start-up and operating checklists.
- .2 Contractor supplied or trade supplied start-up checklists.
- .3 Contract Administrator supplied Control Sequence Review checklist (included in this Section).
- .4 Contract Administrator to review and approve documentation.
- .5 Provide completed and approved documentation to Contract Administrator.

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### 1.9 Operational Review Schedule

- .1 Provide schedule as part of construction schedule, identifying the key systems listed in this section.
- .2 Provide adequate time for operational review activities including:
  - .1 Approval of reports.
  - .2 Verification of reported start-up and TAB results.
  - .3 Repairs, retesting, re-verification.
  - .4 Training.

### 1.10 Starting and Testing

- .1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

### 1.11 Witnessing of Starting and Testing

- .1 Provide two (2) weeks' notice prior to commencement.
- .2 Contract Administrator may witness start-up and initial testing.
- .3 Contractor to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

### 1.12 Manufacturer's Involvement

- .1 Integrity of warranties:
  - .1 Use Manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
  - .2 Verify with Manufacturer that testing as specified will not void warranties.
- .2 Qualifications of Manufacturer's personnel:
  - .1 Experienced in design, installation and operation of equipment and systems.
  - .2 Ability to interpret test results accurately.
  - .3 To report results in clear, concise, logical manner.

### 1.13 Procedures

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Operational Review.
- .2 Conduct start-up and testing in following distinct phases:

## GENERAL FACILITY OPERATIONAL REVIEW

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- .1 Included in delivery and installation:
  - .1 Verification of conformity to specification, approved Shop Drawings.
  - .2 Visual inspection of quality of installation.
- .2 Start-up: follow accepted start-up procedures.
- .3 Correct deficiencies and obtain approval from Contract Administrator after distinct phases have been completed and before commencing next phase.
- .4 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Contract Administrator. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
  - .1 Minor equipment/systems: implement corrective measures approved by Contract Administrator.
  - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Contract Administrator.
  - .3 If evaluation report concludes that major damage has occurred, Contract Administrator shall reject equipment.
    - .1 Rejected equipment to be removed from site and replaced with new.
    - .2 Subject new equipment/systems to specified start-up procedures.

### 1.14 Start-Up Documentation

- .1 Assemble start-up documentation and submit to Contract Administrator for approval before commencement of operational review.
- .2 Start-up documentation to include:
  - .1 Factory and on-site test certificates for specified equipment.
  - .2 Pre-start-up inspection reports.
  - .3 Signed installation/start-up check lists and reports,
  - .4 Step-by-step description of complete start-up procedures, to permit Contract Administrator to repeat start-up at any time.

### 1.15 Operation and Maintenance of Equipment and Systems

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer develop written maintenance program and submit Contract Administrator for approval before implementation.

## **GENERAL FACILITY OPERATIONAL REVIEW**

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- .3 Operate and maintain systems for length of time required for operational review to be completed.
- .4 After completion of review, operate and maintain systems until issuance of certificate of interim acceptance.

### **1.16 Test Results**

- .1 If start-up or operational review produces unacceptable results, repair, replace or repeat specified starting procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-operational review.

### **1.17 Start of Operational review**

- .1 Notify Contract Administrator at least two (2) weeks prior to start of Operational Review.
- .2 Start Operational Review after elements of building affecting start-up and performance verification of systems have been completed.

### **1.18 Instruments / Equipment**

- .1 Submit to Contract Administrator for review and approval:
  - .1 Complete list of instruments proposed to be used.
  - .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
- .2 Provide
  - .1 Equipment as required to complete work.

### **1.19 Operational Review**

- .1 Carry out Operational Review:
  - .1 Under actual conditions to confirm equipment operating:
    - .1 As per Manufacturer's ratings and recommendations;
    - .2 As specified and required by site conditions; and
    - .3 According to control and operating sequences.
  - .2 Operational Review procedures to be repeatable and reported results are to be verifiable.
  - .3 Follow equipment Manufacturer's operating instructions.

### **1.20 Witnessing Operational Review**

- .1 Contract Administrator to witness activities and verify results.

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### **1.21 Authorities Having Jurisdiction**

- .1 Where specified start-up, testing or operational review procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to Contract Administrator within five (5) working days of test and with Operational Review report.

### **1.22 Sundry Checks and Adjustments**

- .1 Make adjustments and changes which become apparent as Operational Review proceeds.
- .2 Perform static and operational checks as applicable and as required.

### **1.23 Deficiencies, Faults, Defects**

- .1 Correct deficiencies found during start-up and Operational Review to satisfaction Contract Administrator.
- .2 Report problems, faults or defects affecting Operational Review to Contract Administrator in writing. Stop Operational Review until problems are rectified. Proceed with written approval from Contract Administrator.

### **1.24 Completion of Operational review**

- .1 Upon completion of Operational Review leave systems in normal operating mode or as requested by Client.
- .2 Except for warranty and seasonal verification activities specified in Operational Review specifications, complete Operational Review prior to issuance of Interim Certificate of Completion.
- .3 Operational Review to be considered complete when contract Operational Review deliverables have been submitted and accepted by Contract Administrator.

### **1.25 Activities Upon Completion of Operational Review**

- .1 When changes are made to baseline components or system settings established during Operational Review process, provide updated Operational Review form for affected item.

### **1.26 Training**

- .1 In accordance with Section 01 79 00 - Demonstration and Training.

### **1.27 Maintenance Materials, Spare Parts, Special Tools**

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in Contract.

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**1.28 Installed Instrumentation**

- .1 Use instruments installed under Contract for TAB if:
  - .1 Accuracy complies with these specifications.
  - .2 Calibration certificates have been deposited with Contract Administrator.

**1.29 Review Tolerances**

- .1 Application tolerances:
  - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.
- .2 Instrument accuracy tolerances:
  - .1 To be of higher order of magnitude than equipment or system being tested.
- .3 Measurement tolerances during verification:
  - .1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.

**1.30 City's Performance Testing**

- .1 Performance testing of equipment or system by the City or its Contract Administrator will not relieve Contractor from compliance with specified start-up and testing procedures.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION – CHECKLISTS FOLLOW**

**GENERAL FACILITY OPERATIONAL REVIEW**

**CONTROL SEQUENCE CHECKLISTS (13 PAGES – ITEMS 4 THROUGH 10.9)**

4. DIESEL 25,000 LITRE TANK SYSTEMS	OK Y or N	Comments
.1 No remote operation of unloading will be possible directly from the basic PLC HMI screen graphics.		
.2 Password protected PLC direct operation only.		
.3 Local OFF / FUEL UNLOAD switch box at hose reel enclosure location.		
.4 Fuel unloading operation:		
.5 All pumps on AUTO.		
.6 Fuel unloading hose on hose reel is extended and manually connected to the locomotive tank connection.		
.7 Manual unloading valves are opened.		
.8 Manual flow totalizer meter reset to zero.		
.9 Unload" process		
.10 OFF / UNLOAD selector switch to "UNLOAD" position enables PLC to operate the lead/lag pumping system to unload fuel from train into tank.		
.11 Designated lead pump starts up and operates for timed period.		
.12 Adjustable 0-90 minutes in PLC. (Initial 40 minutes)		
.13 Pumps will alternate after each pump use.		
.14 Main panel indicator light shows active pump. "RUN" signal.		
.15 If no fuel flow detected at flow switch after 5 seconds (adjustable 0-20 seconds at PLC):		
.16 Pump will turn off and pump alarm will indicate.		

**GENERAL FACILITY OPERATIONAL REVIEW**

4. DIESEL 25,000 LITRE TANK SYSTEMS	OK Y or N	Comments
.17 Pump no flow will remain on until manually reset from PLC.		
.18 Lag pump will be signalled on.		
.19 If no lag pump fuel flow detected at flow switch after 5 seconds (adjustable 0-20 seconds at PLC):		
.20 Pump will turn off and pump alarm will indicate.		
.21 Pump no flow alarm will remain until manually reset from PLC.		
.22 Storage tank mechanical overfill limiter stops flow:		
.23 Fuel flow detection will cause pump shutdown, based on no flow.		
Fuel unloading timer stops unloading operation.		
.24 OFF / UNLOAD selector switch to "UNLOAD" position.		
.25 Above process repeats.		
Fuel unloading complete:		
.26 Turn OFF / UNLOAD selector switch to OFF position.		
.27 Pump turns off.		
.28 Manual valves closed		
.29 Hose disconnected from locomotive fuel tank.		
.30 Fuel transfer from 5,000 litre tank to 25,000 litre tank.		
.31 If large tank required fuel, and train is not available, fuel may be transferred from the smaller diesel tank to the larger tank, as follows.		

**GENERAL FACILITY OPERATIONAL REVIEW**

<b>4. DIESEL 25,000 LITRE TANK SYSTEMS</b>	<b>OK Y or N</b>	<b>Comments</b>
.32 25,000 litre tank fuel unloading hose can be connected to dry coupling on 5,000 litre tank pumping circuit.		
.33 Operation is otherwise as for unloading from locomotive supply to 25,000 litre tank.		

**GENERAL FACILITY OPERATIONAL REVIEW**

5. AUTOMATIC DAY TANK FILL OPERATION:	OK Y or N	Comments
.1 Day Tank Autofill enabled by PLC.		
.2 All commands and indications on HMI graphics.		
.3 Each day tank is equipped with a 4 level float switch system, with four discrete adjustable levels of control.		
.4 Low level set at 33% of tank volume for low-level alarm		
.5 Start level set at 45% of tank volume for pump start		
.6 Stop level set at 90% of tank volume for pump stop		
.7 High level to be set at 95% of tank volume for pump shut down and alarming.		
.8 PLC monitors status of transfer pump.		
.9 Alarm indicator if any transfer pump not on auto.		
.10 Fuel level at low level in any or all of the three tanks:		
.11 Sequence as per start pump level.		
.12 Alarm at HMI indicating tank low level alarm.		
.13 Alarm maintained even if tank refills. Manual reset only.		
.14 Fuel level at start pump level in any or all of the three tanks:		
.15 Signal to open the corresponding fuel valve(s) at the requesting tank(s).		

**GENERAL FACILITY OPERATIONAL REVIEW**

5. AUTOMATIC DAY TANK FILL OPERATION:	OK Y or N	Comments
.16 Designated lead pump starts up.		
.17 Indicator shows active pump. "RUN" signal.		
.18 Lead pump will be signalled on.		
.19 If no fuel flow detected at flow switch after 5 seconds (adjustable 0-20 seconds at PLC):		
.20 Pump will turn off and pump alarm will indicate.		
.21 Pump no flow will remain on until manually reset from PLC.		
.22 Lag pump will be signalled on.		
.23 If no lag pump fuel flow detected at flow switch after 5 seconds (adjustable 0-20 seconds at PLC):		
.24 Lag pump will turn off and pump alarm will indicate.		
.25 Pump no flow alarm will remain until manually reset from PLC.		
.26 Fuel at pump stop level		
.27 Fill valve for tank shut off		
.28 Pump turns off if no other tank being filled.		
.29 Indication of "full" status for that tank		
.30 Fuel at high-high level:		
.31 Pump shutdown.		
.32 Solenoid fill valve for that tank closes and will not operate		

**GENERAL FACILITY OPERATIONAL REVIEW**

5. <b>AUTOMATIC DAY TANK FILL OPERATION:</b>	<b>OK Y or N</b>	<b>Comments</b>
.33 Indication of high level status for that tank on HMI.		
.34 Storage tank mechanical overfill limiter stops flow:		
.35 Fuel flow detection will cause pump shutdown, based on no flow.		
.36 When a pump is already operating, and a second or subsequent tank calls for fuel, then the operation of the pump that is running will be extended until both or all of the tanks have been filled and their pump stop high level switches are all actuated .		
.37 If at any time the motor of a pump is energized and the flow switch does not detect flow in the piping, an alarm circuit is energized and the lag pump will be started.		
.38 Emergency stop on panel shuts down all pumping operations.		

**GENERAL FACILITY OPERATIONAL REVIEW**

6. LEAKAGE MONITORING - DAY TANK INTERSTITIAL SPACES, CONTAINMENT SUMP.	OK Y or N	Comments
.1 Normally OK green indication on HMI screen for each location.		
.2 Liquid detected in space:		
.3 Detection sends signal to PLC		
.4 Alarm on HMI indicates location.		
.5 Tank fuel fill valve closes or remains closed until alarm is cleared.		
.6 If no other tank being filled, transfer pump shuts down, otherwise continue to run as long as there is demand from other tank(s).		
.7 Leaking tank fuel fill valve locked out until alarm cleared by manual reset in PLC.		
.8 Leakage Monitoring - Fire Pump Engine Supply Piping Containment Sump		
.9 Normally OK green indication on HMI screen for location.		
.10 Liquid detected in space:		
.11 Detection sends signal to PLC and alarm on HMI indicates location.		
.12 All transfer pumping activity to the Fire Pump Day tanks stops and is prevented until manual reset of PLC alarm.		

**GENERAL FACILITY OPERATIONAL REVIEW**

7. <b>COMBINED TANK - DIESEL 5,000 LITRE TANK SYSTEMS</b>	<b>OK Y or N</b>	<b>Comments</b>
.1 No remote operation of unloading will be possible directly from the basic PLC HMI screen graphics. Password protected PLC direct operation only.		
.2 Local OFF / FUEL UNLOAD switch box at hose reel enclosure location.		
.3 Fuel unloading operation:		
.4 Pump on AUTO.		
.5 Fuel unloading hose on hose reel is extended and manually connected to the locomotive tank connection.		
.6 Manual unloading valves are opened.		
.7 Manual flow totalizer meter reset to zero.		
.8 "Unload" process		
.9 OFF / UNLOAD selector switch to "UNLOAD" position.		
.10 Pump starts up and operates for timed period.		
.11 Adjustable 0-60 minutes		
.12 Initial setting 40 minutes.		
.13 Main panel indicator light shows active pump. "RUN" signal.		
.14 If no fuel flow detected at flow switch after 5 seconds (adjustable at PLC 0-20 seconds), pump will turn off and pump NO FLOW alarm will indicate.		

**GENERAL FACILITY OPERATIONAL REVIEW**

7. <b>COMBINED TANK - DIESEL 5,000 LITRE TANK SYSTEMS</b>	<b>OK Y or N</b>	<b>Comments</b>
.15 "NO-FLOW" alarm will maintain for the pump in question, until manual reset from panel button.		
.16 Storage tank mechanical overfill limiter stops flow:		
.17 Fuel flow detection will cause pump shutdown, based on no flow.		
.18 Fuel unloading times out		
.19 OFF / UNLOAD selector switch to "UNLOAD" position.		
.20 Above process repeats.		
.21 Fuel unloading complete:		
.22 Turn OFF / UNLOAD selector switch to OFF position.		
.23 Pump turns off.		
.24 Manual valves closed		
.25 Hose disconnected from locomotive fuel tank.		

**GENERAL FACILITY OPERATIONAL REVIEW**

8. DIESEL DISPENSING:	OK Y or N	Comments
.1 Manual unmonitored operation:		
.2 Remove hose from remote dispensing head.		
.3 Rotate dispensing head switch to turns on pump after hose removed from holder		
.4 Fuel hose inserted into tank to be filled		
.5 Normal fill operation by holding nozzle		
.6 Auto shut-off will stop flow of fuel		
.7 Hose holder rotated to off position, shuts pump off		
.8 Hose replaced.		
.9 Emergency shut off Red Mushroom Head buttons mounted remote from dispensing location shuts off power to both diesel and gasoline dispensing pumps.		

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9. <b>COMBINED TANK - GASOLINE UNLOADING SYSTEM</b>	<b>OK Y or N</b>	<b>Comments</b>
.1 No remote operation of unloading will be possible directly from the basic PLC HMI screen graphics. Password protected PLC direct operation only.		
.2 Local OFF / FUEL UNLOAD switch box at hose reel enclosure location.		
.3 Fuel unloading operation:		
.4 Pump on AUTO.		
.5 Grounding static reel cable is connected to supply tank.		
.6 Fuel unloading hose on hose reel is extended and manually connected to the supply tank connection.		
.7 Manual unloading valves are opened.		
.8 Manual flow totalizer meter reset to zero.		
.9 "Unload" process		
.10 OFF / UNLOAD selector switch to "UNLOAD" position.		
.11 Pump starts up and operates for timed period.		
.12 Adjustable 0-60 minutes		
.13 Initial setting 40 minutes.		
.14 Main panel indicator light shows active pump. "RUN" signal.		
.15 If no fuel flow detected at flow switch after 5 seconds (adjustable at PLC 0-20 seconds), pump will turn off and pump NO FLOW alarm will indicate.		

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9. <b>COMBINED TANK - GASOLINE UNLOADING SYSTEM</b>	<b>OK Y or N</b>	<b>Comments</b>
.16 "NO-FLOW" alarm will maintain for the pump in question, until manual reset from panel button.		
.17 Storage tank mechanical overfill limiter stops flow:		
.18 Fuel flow detection will cause pump shutdown, based on no flow.		
.19 Fuel unloading times out		
.20 OFF / UNLOAD selector switch to "UNLOAD" position.		
.21 Above process repeats.		
.22 Fuel unloading complete:		
.23 Turn OFF / UNLOAD selector switch to OFF position.		
.24 Pump turns off.		
.25 Manual valves closed		
.26 Hose disconnected from locomotive fuel tank.		
.27 Static grounding cable disconnected.		

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10. GASOLINE DISPENSING:	OK Y or N	Comments
.1 Manual unmonitored operation:		
.2 Remove hose from remote dispensing head.		
.3 Rotate dispensing head switch to turns on pump after hose removed from holder		
.4 Fuel hose inserted into tank to be filled		
.5 Normal fill operation by holding nozzle		
.6 Auto shut-off will stop flow of fuel		
.7 Hose holder rotated to off position, shuts pump off		
.8 Hose replaced.		
.9 Emergency shut off Red Mushroom Head buttons mounted remote from dispensing location shuts off power to both diesel and gasoline dispensing pumps.		