



# Public Works and Government Services Canada

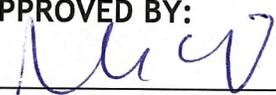
Requisition No.: EZ899-171601

DRAWINGS & SPECIFICATIONS  
for

The Gulf of Georgia Cannery National Historic Site  
Building Site Rehabilitation  
Richmond, B.C.

Project No.: R.060702.001

**APPROVED BY:**

  
\_\_\_\_\_  
Regional Manager, AES

2016-10-31  
Date

  
\_\_\_\_\_  
Construction Safety Coordinator

2016-10-24  
Date

**TENDER:**

  
\_\_\_\_\_  
Project Manager

12/11/01  
Date



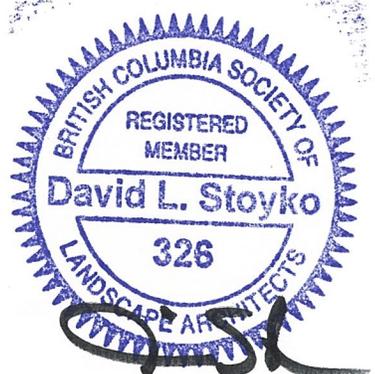
**PART 1 GENERAL**

**1.1 DRAWINGS**

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**1.3            APPENDICES**

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**PART 2            PRODUCTS**

**2.1            NOT USED**

.1            Not used.

**PART 3            EXECUTION**

**3.1            NOT USED**

.1            Not used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 14 00 – Work Restrictions
- .2 Section 01 33 00 – Submittal Procedures
- .3 Section 01 35 43 – Environmental Procedures
- .4 Section 01 41 00 – Regulatory Procedures
- .5 Section 01 56 00 – Temporary Barriers and Enclosures
- .6 Section 01 74 11 – Cleaning
- .7 Section 05 50 00 – Metal Fabrications
- .8 Section 06-20 00 – Finish Carpentry
- .9 Section 12 50 00 – Furnishings
- .10 Section 32 12 16 – Asphalt Paving
- .11 Section 32 13 13 – Concrete Paving
- .12 Section 32 14 13 – Precast Concrete Unit Paving

**1.2 WORK DESCRIBED BY CONTRACT DOCUMENTS**

- .1 The work of this contract comprises of the first phase of the Landscape upgrades at the Gulf of Georgia Cannery, located at 12138 Fourth Avenue, Richmond BC.
- .2 Work to be performed under this Contract includes, but is not limited to - the following items covered further in the Contract documents:
  - .1 Temporary hoarding: the Contractor shall determine the need for and provide temporary hoarding to protect existing site elements, ensure safety of the general public and comply with safety authority requirements.
  - .2 Review of testing reports provided with Contract documents.
  - .3 Contractor to remove, refinish and protect existing site elements per Sheet L0.1 Demolition and Site Protection Plan.
  - .4 Contractor to notify Departmental Representative should any hazardous materials are encountered on site (ie. lead paints) prior to proceeding with work.
  - .5 Landscape improvements as listed below and as noted on Materials Plan, Sheet L1.0. Site Grading will be a part of the upgrades per drawing L2.0. Since work is at the main entrance to the Cannery, access to the main entrance shall remain open for visitors and staff, refer to Section 01 56 00 Temporary Barriers and Enclosures.
    - .1 Locally excavate as required to install paving, curbs, and site furnishings.
    - .2 Paving – New paving to be completed at the east side of the building at the main entry to the Museum and to the south up to the border of the Parks Canada and Steveston Harbour Authority. See Sheets L5.0 - to L5.1.
      - .1 Cast-in-Place concrete paving with sawcut joints and sandblast finish. Part of the paving with have inset train tracks to mimic the historical significance of the railway.
      - .2 A Cast-in-Place concrete band will separate the concrete unit pavers from the Cast-in-Place concrete paving. Metal insets with Laserjet text will be set into the concrete bands between the Cast-in-Place concrete paving and the concrete unit pavers (Shop Drawings to be provided per L5.1 and Section 01 33 00 – Submittal Procedures).
      - .3 Concrete unit pavers to be installed at the front entry of the site. Pavers will be mortared in place over a concrete slab.
      - .4 Concrete curb edger and a gravel strip adjacent to building edge.

- .5 Concrete footing for metal railing posts, signage and furniture installation.
- .6 Repair work to existing asphalt path.
- .7 Concrete pads will be required for proposed historical artifacts. Engineered Shop Drawings to be provided.
- .8 Make good all adjacent hard surfaces including pavers, concrete and asphalt as indicated.
- .3 Metal Railing: Refer to details L5.4 – L5.6.
  - .1 Refer to the Materials Plan for heights and locations.
  - .2 Existing guardrails to be refurbished if in good condition and re-used on site.
  - .3 Existing woven wire mesh by Departmental Representatives to be incorporated into the guardrails, provided the sizes fit or can be altered to fit into the design.
  - .4 Structural shop drawings for review will be required for the fencing, guardrails, and gates.
- .4 Bridge/Ramp: Relocating the joists, beams, and utilities will be required under the wood deck. Refer to details on L5.6 and L5.7.
  - .1 New and re-used wood decking to be added to the new ramp.
  - .2 Structural shop drawings for review will be required for the new ramp.
- .5 Site Furnishings – To include work for new benches, bike racks, litter and recycling receptacles, planters, flag pole with custom bench, removable bollard, and relocated historical artifacts on site. Refer to details L5.2 and L5.3.
  - .1 Historical artifacts to be refinished as a part of this Contract (to match existing finish). Structural shop drawings for review will be noted on the drawings for the concrete pads.
  - .2 Existing flag pole to be refurbished and painted as part of the custom bench with Structural shop drawing provided.
- .6 New Planting - New planting to be a part of the upgrades, refer to Sheet L3.0 for location and plant types.
  - .1 Where existing lawn has been damaged, new sod will be required.
- .6 Contractor shall take possession of the project area and be contractually responsible for all construction activities. Cooperate with Parks Canada in scheduling operations to minimize conflict and to facilitate usage.

**1.3 TIME OF COMPLETION**

- .1 Commence work upon notification of acceptance and complete work within fifteen (15) weeks.

**1.4 MINIMUM STANDARDS**

- .1 Work to conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2015 (NBC) and applicable Provincial and Municipal codes. In the case of conflict or discrepancy, the most stringent requirement applies.
- .2 Work must be carried out in conformance to WorkSafe BC safety standards and requirements.
- .3 Meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

**1.5 TAXES**

- .1 Pay all taxes properly levied by law (including Federal, Provincial and Municipal).

**1.6 REGULATORY REQUIREMENTS**

- .1 Building Permit is not required. Obtain and pay for – Certificates, Licenses and other permits required by regulatory municipal, provincial or federal authorities to complete the work.
- .2 Provide inspection authorities with plans and information required for issue of acceptance certificates.
- .3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

**1.7 PROJECT MEETINGS**

- .1 Contractor will schedule a project start-up meeting following notice of acceptance.
- .2 Agenda to include lines of communication, contact information, scheduling and coordination.
- .3 Subsequent meetings will be called as required.

**1.8 CONTRACTOR'S USE OF SITE**

- .1 Use of site:
  - .1 The Gulf of Georgia Cannery will remain an active National Historic Site. Parks Canada Western Region has control over the site. All activities and security controls must remain operational at all times unless otherwise indicated. Coordinate with the Departmental Representative for all activities that impact on-going operations.
  - .2 Be responsible that neither paint nor construction debris of any does fall into the water below the Cannery.
  - .3 Work restrictions and security provisions will be enforced.
  - .4 Assume responsibility for assigned premises for laydown and storage areas as indicated and for performance of this work.
  - .5 Be responsible for coordination of all work activities for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.
- .2 Contractor is required to confirm the location of underground services and utilities prior to undertaking site works.
- .3 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.
- .4 Do not unreasonably encumber with with material and equipment.
- .5 Maintain scaffolding and hoarding throughout duration of work. Do not exceed areas indicated unless written approval by Departmental Representative is provided.
- .6 Execute work with least possible interference or disturbance to normal use. Make arrangements with Departmental Representative to facilitate work as stated.
- .7 Maintain existing services and provide for personnel, visitor and vehicle access.
- .8 Where security is reduced by work, provide temporary means to maintain security. Review measures with Departmental Representative before proceeding.

**1.9 SECURITY**

- .1 For Contractor access to building interior and for contractor access to exterior work after 17:30 hours, coordinate with and pay for the services of a commissionaire from the BC Commissionaires from the time of beginning work on site until substantial completion of the work. The contractor shall provide the Departmental Representative with an estimate of the total cost for that requirement after contract award at which time the Departmental Representative will then contract directly with Commissionaires BC for that work and pay for those costs directly accordingly since they will not work directly for the contractor. Upon completion of the contract work, a change order credit will be issued for the full cost of the Commissionaires so the contractor shall allow for that cost in their contract pricing. Contractor can refer to the following web site as a reference:  
<http://www.commissionaires.bc.ca>

- .2 Provide required service for any security to contractor's forces for further works to be done between substantial and final completion.

**1.10 NON SMOKING ENVIRONMENT**

- .1 Smoking is not permitted on site.

**1.11 WORK SCHEDULE**

- .1 Provide detailed project schedule (Gantt Bar Chart) within 5 working days of Award of Contract date showing activity sequencing, interdependencies and duration estimates. Include listed activities as follows:
  - .1 Shop drawings
  - .2 Samples.
  - .3 Approvals.
  - .4 Procurement.
  - .5 Construction.
  - .6 Installation.
  - .7 Site works.
  - .8 Testing.
  - .9 Acceptance.
- .2 Do not change approved schedule without notifying and receiving approval from Departmental Representative.
- .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.
- .4 Schedule Work in consultation with Departmental Representative to minimize impact on public use of facility during operating hours.

**1.12 SUBMITTALS**

- .1 Product Data: Manufacturers catalogue sheets, brochures, literature, performance charts and diagrams
  - .1 Submit electronic copies of documentation.
  - .2 Delete information not applicable to project.
  - .3 Cross-reference product data information to applicable portion of Contract Documents.
- .2 Samples: examples of materials, equipment, quality, finishes and workmanship.
  - .1 Provide two samples of each material as indicated in technical sections.
  - .2 Where colour, pattern or texture is criterion, submit full range of samples . Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.
- .3 Shop Drawings:
  - .1 Submit
    - .1 Date
    - .2 Project and Title number.
    - .3 Name and address of Subcontractor, Supplier and Manufacturer. Fabrication.
    - .4 Fabrication.
    - .5 Key plan and layout, showing dimensions, including identified field dimensions and clearances.
    - .6 Setting or erection details.
    - .7 Relationship to adjacent work.

- .8 Contractor's stamp signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .9 Revised shop drawing submissions Revised shop drawing submissions to be bubbled identifying revisions.
- .4 Submit drawings stamped and signed by professional engineer registered and licensed in the Province of British Columbia as indicated.

#### **1.13 COST BREAKDOWN**

- .1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregating Contract price.

#### **1.14 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Contract Specifications.
  - .3 Addenda to Contract Documents.
  - .4 Copy of approved work schedule.
  - .5 Environmental Protection Plan.
  - .6 Reviewed Shop Drawings.
  - .7 List of Outstanding Shop Drawings.
  - .8 Change Orders.
  - .9 Other Modifications to Contract.
  - .10 Field Test Reports.
  - .11 Reviewed and approved samples.
  - .12 Copy of Approved Work Schedule.
  - .13 Manufacturer's installation and application instructions.
  - .14 National Building Code 2010
  - .15 Health and Safety Plan and Other Safety Related Documents.
  - .16 Other documents as specified.

#### **1.15 HEALTH, SAFETY AND HAZARDOUS MATERIALS**

- .1 Comply with Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Comply with British Columbia Workers Compensation Act.
- .3 Perform duties in accordance with the British Columbia Occupational Health and Safety Regulation.
- .4 Submit copies of WCB Clearance Letter and WCB Contractor Rating. Submit copy of Final WCB Clearance Letter at completion of project
- .5 Submit letter stating that Contractor assumes the role of Prime Contractor for the purposes of site safety responsibility and the Workers Compensation Act
- .6 Submit copies of work site health and safety meeting minutes, inspection reports, reports or directions issued by Federal, Provincial or Municipal health and safety inspectors, incident and accident reports, and follow-up reports.
- .7 Work at site may involve contact with PCB and lead-containing paint. Take appropriate precautions.
- .8 Notify the Departmental Representative 48 hours for access to interior work and advise if work involves hazardous substances (Canada Labour Code, Part II, Section 10) or caulking.
- .9 Ensure fire code requirements are continued to be met during the course of construction. Ensure emergency exits from the building, exterior emergency egress paths, or access areas for emergency vehicles are not restricted.

**1.16 EXAMINATION**

- .1 Examine site and be familiar and conversant with existing conditions likely to affect work.
- .2 Provide photographs of surrounding objects and structures liable to be damaged or be the subject of subsequent claims (photographs not to include staff on duty).

**1.17 EXISTING SERVICES**

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.

**1.18 LOCATION OF EQUIPMENT AND FIXTURES**

- .1 Location of equipment indicated or specified are to be considered as approximate.
- .2 Locate equipment to provide minimum interference and maximum usable space, and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain his approval for actual location.
- .4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Departmental Representative and/or as specified.

**1.19 SETTING OUT OF WORK**

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.

**1.20 ACCEPTANCE OF SUBSTRATES**

- .1 Prime Contractor to examine surfaces prepared by others and job conditions which may affect his work, and shall report defects to the Contractor. Commencement of work shall imply acceptance of prepared work or substrate surfaces

**1.21 QUALITY OF WORK**

- .1 Remedial Work:
  - .1 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of work.
  - .2 Perform remedial work required to repair or replace part or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Ensure that quality workmanship is performed through use of skilled and experienced tradesmen, under supervision of qualified journeyman.
- .3 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code Construction Standards.
- .4 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative whose decision is final.

**1.22 WORKS COORDINATION**

- .1 Coordinate work of subtrades:
  - .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
- .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required

- .1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.
- .2 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.
  - .1 Pay particularly close attention to overhead work or near to building structural elements, including existing roof.
  - .2 Identify on coordination drawings, building elements and interface requirements.
  - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
  - .4 Publish minutes of each meeting.
  - .5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submit shop drawings and of rebuilt components only after coordination meeting for such items has taken place.
- .4 Work cooperation:
  - .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of interference.
  - .2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, patching and removal or replacement of completed work.
  - .3 Ensure disputes between subcontractors are resolved.
- .5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.
- .6 Maintain efficient and continuous supervision. Full-time site superintendent required throughout project

### 1.23 APPROVAL OF SHOP DRAWINGS

- .1 In accordance with Section 01 33 00 - Submittals Procedures, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.
- .2 Submit shop drawings for review to the Departmental Representative. Allow sufficient time for the following:
  - .1 Review of product data.
  - .2 Approval of shop drawings.
  - .3 Review of re-submission.
  - .4 Ordering of approved material and/or products - refer to technical sections.
- .3 The Departmental Representative's review of the shop drawings does not constitute approval of the design inherent in the shop drawings. This responsibility remains with the Prime Contractor.

### 1.24 TESTING AND INSPECTIONS

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative.
- .2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:
  - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
  - .2 Inspection and testing performed exclusively for Contractor's convenience.
    - .1 Mill tests and certificates of compliance.
    - .2 MPI Painting Inspections.
    - .3 Tests specified to be carried out by Contractor under the Departmental Representative's supervision
- .3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests

or inspections as the Departmental Representative may require to verify acceptability of corrected work.

- .4 Contractor shall furnish labour and facilities to:
  - .1 Notify Departmental Representative in advance of planned testing.
- .5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.
- .7 The Departmental Representative may require, and pay for, additional inspection and testing services.
- .8 Provide Departmental Representative with 2 copies of testing laboratory reports as soon as they are available.

**1.25 AS-BUILT DOCUMENTS**

- .1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, for "as-built" purposes.
- .2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

**1.26 CLEANING**

- .1 Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.
- .2 Ensure cleanup of the work areas each day after completion of work.
- .3 In preparation for interim and final inspections:
  - .1 Examine all sight-exposed exterior surfaced and concealed spaces.
  - .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed exterior finished surfaces, including glass.
- .4 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

**1.27 PROTECTION**

- .1 Existing Structure:
  - .1 The existing structures are part of this National Historic Site. The Contractor and sub trade personnel shall pay utmost attention to the preservation of all existing items on this site at all times during remediation work. Prior to the commencement of this project, the Contractor shall submit to the Departmental Representative a list of all proposed protection measures for approval. This list must identify procedures for the protection of adjacent building materials and elements to prevent accidental damage to this national historic site for the duration of the project.
  - .2 Provide temporary dust tight screens and/or partitions to localize dust generating activities, and for protection of workers, finished areas of work and public. Precautionary measure shall be taken for potential source of Lead and Arsenic dust within the complex. Refer to Appendix 1, Appendix 2 and Appendix 3.
  - .3 Protect work area with scaffolding structure for work with weather-tight polyethylene film during construction.
  - .4 Maintain and relocate protection until work is complete.

**1.28 PUBLIC WAY CONSTRUCTION**

- .1 Design, erect and maintain hoarding and covered pedestrian walkways to support all loads including windloads and provide protection, complete with signs and electrical lighting as required by authority having jurisdiction and Departmental Representative

**1.29 RELICS AND ANTIQUITIES**

- .1 Relics and antiquities and items of historical or scientific interest shall remain property of Department. Protect such articles and request directives from Departmental Representative.
- .2 Give immediate notice to Departmental Representative if evidence of historical or archeological finds are encountered during remediation work and await Departmental Representative's written instructions before proceeding with work in this area.

**1.30 ENVIRONMENTAL PROTECTION**

- .1 Contractor is responsible for environmental protection during all construction activities at all locations work is performed.

**1.31 MAINTENANCE MATERIALS, SPECIAL TOOLS AND SPARE PARTS**

- .1 Specific requirements for maintenance materials, tools and spare parts are specified in individual technical sections.

**1.32 ADDITIONAL DRAWINGS**

- .1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.
- .2 Upon request, Departmental Representative may furnish up to a maximum of 5 sets of Contract documents for use by the Contractor at no additional cost. Should more than 5 sets of documents be required the Departmental Representative will provide them at additional cost.

**1.33 SYSTEM OF MEASUREMENT**

- .1 The metric system of measurement (SI) will be employed on this Contract.

**1.34 APPROVAL LETTER**

- .1 See appendices for approval letter from Steveston Harbour Authority.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 01 44 00 – Regulatory Procedures
- .3 Section 01 56 00 – Temporary Barriers and Enclosures

**1.2 ACCESS AND EGRESS**

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

**1.3 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Where washroom facilities are available at the free-standing public washroom building located by main entry.
- .5 Elevators are not permitted for Contractor use.
- .6 Closures: protect work temporarily until permanent enclosures are completed.

**1.4 HOURS OF WORK**

- .1 Submit proposed hours-of-work to Departmental Representative for review and approval with Work in accordance with Section 01 11 00 General Instructions. The Cannery is operational from 8:30 to 17:30 for staff and from 10:00 to 17:00 for the public. Contractor may set his own schedule of work onsite, within restrictions specified.
- .2 Safe pedestrian access to vicinity and building is to be maintained.
- .3 Disruptive construction noise and operation to be executed before 11:00 daily.
- .4 Contractor must give Departmental Representative 48 hours notice of construction activity requiring access to the interior of the buildings. Workers must notify reception desk at time of entry and at time of departure of exterior work.
- .5 Gulf of Georgia Cannery Summer Schedule: Work is to minimize disturbance on Friday summer events at the "Courtyard"
- .6 Notify Departmental Representative and seek approval of all after hours work, including weekends and holidays.

**1.5 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING OR LANDSCAPE**

- .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises.
- .2 Maintain existing services and abide by regulations for personnel and vehicle access.
- .3 Closures: protect work temporarily, including where window sashes temporarily until project is complete.
- .4 Any work which impacts the operations onsite must have one (1) week notice and must be approved by Departmental Representative. Five (5) visitor parking passes, valid for duration of the work will be allocated to the Contractor for the visitor's parking lot. Work Additional parking will be

permitted where directed by Departmental Representative. Do not occupy any other parking areas without the approval of the Departmental Representative.

- .5 Construction crews are not permitted to use washrooms in the main building. Refer to Section 01 51 00 – Temporary Utilities.

#### 1.6 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give DCC Representative one (1) week of notice for permission. The maximum number of shut-down periods, is limited to four (4) for duration of the project.
- .3 Provide for personnel and pedestrian traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .5 Contractor will be held responsible for damages to facility equipment as the result of service shut-downs.
- .6 Contractor will be held responsible for unscheduled shut-downs of building utilities and services.
- .7 Contractor will not be allowed to connect to Departmental Representative's existing data and communication services for his own use.

#### 1.7 SPECIAL REQUIREMENTS

- .1 Security Cameras:
  - .1 Security cameras to remain operational. Cameras requiring temporary relocation to be serviced as directed by Departmental Representative.
- .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress. Respect properties adjacent to work site, providing continued access for public vehicular and pedestrian traffic.
- .4 Noise Generation:
  - .1 Means and procedures of controlling and isolating other excessive of disturbing noise and vibration affecting occupied areas shall be the responsibility of the Contractor and approved by the Departmental Representative.

#### 1.8 SECURITY

- .1 Be accountable for tools/equipment at all times. Do not leave tools unattended and /or within reach of the travelling public.
- .2 Act professionally at all times. No foul language or rude behaviour.
- .3 Do not interact with the public, unless authorized to do so where required.

#### 1.9 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

#### 1.10 ADDITIONAL REQUIREMENTS (PER NOTES L0.1)

- .1 Contractor is required to complete the work in two phases. The northern section is to be completed first, followed by the southern. Refer to drawing L1.0 for phase lines.
- .2 Provide Construction Logistic Plan to Departmental Representative for approval. Include the following information:
  - .1 Mobilization and Delivery Plans
  - .2 Traffic Management Plan

.3 Construction Fencing Plan

- .3 Ensure safe public access to the Gulf of Georgia Cannery Building is provided throughout the duration of construction to the satisfaction of the Departmental Representative.
- .4 Provide direction signage and/or temporary granular pathways to allow for safe bicycle and pedestrian circulation.
- .5 Provide flag person whenever construction vehicles or machinery move outside designated construction fence areas and wherever conflict with public occurs.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 ADMINISTRATIVE**

- .1 Contractor will arrange pre-construction project meeting.
- .2 Contractor to assume responsibility for setting meeting times, and recording and distributing meeting minutes. Contractor to attend project meetings throughout the progress of the work and at the call of Departmental Representative.
- .3 Contractor to provide physical space and make arrangements for progress meetings.
- .4 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

**1.2 PRECONSTRUCTION MEETING**

- .1 Contractor will:
  - .1 Within ten (10) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
  - .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
  - .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
  - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
  - .5 Provide agenda to include:
    - .1 Appointment of official representative of participants in the Work.
    - .2 Schedule of Work: in accordance with Section 01 11 00 – General Instructions - Bar (GANTT) Chart.
    - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
    - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
    - .5 Delivery schedule of specified equipment.
    - .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
    - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
    - .8 Departmental Representative provided products.
    - .9 Record drawings in accordance with Section 01 33 00 – Closeout Submittal Procedures.
    - .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
    - .11 Monthly progress claims, administrative procedures, photographs, hold backs.
    - .12 Appointment of inspection and testing agencies or firms.
    - .13 Insurances, transcript of policies.

**1.3 PROGRESS MEETINGS**

- .1 Contractor will:
  - .1 During course of Work and up to project completion, schedule progress meetings (weekly or bi-weekly depending on construction progress). Additional meetings will be scheduled to resolve extraordinary issues as required.

- .2 Contractor, major Subcontractors involved in Work, Consultant, and Departmental Representative are to be in attendance.
- .3 Notify parties minimum three (3) days prior to meetings.
- .4 Contractor will record minutes of meetings and circulate to attending parties and affected parties not in attendance.
- .5 Provide agenda. Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .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 affect on construction schedule and on completion date.
  - .12 Other business.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 05 50 00 – Metal Fabrications
- .2 Section 06-20 00 – Finish Carpentry
- .3 Section 12 50 00 – Furnishings
- .4 Section 32 12 16 – Asphalt Paving
- .5 Section 32 13 13 – Concrete Paving
- .6 Section 32 91 21 – Growing Medium and Finish Grading

**1.2 APPROVALS**

- .1 Approval of shop drawings: refer to section 01 11 00 – General Instructions.

**1.3 ADMINISTRATIVE**

- .1 This Section specifies the general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review. Additional specific requirements for submissions are specified in individual technical sections.
- .2 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .3 Where items or information is not produced in SI Metric units converted values are acceptable.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .5 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review unless Departmental Representative gives written acceptance of specific deviations.
- .7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative.
- .8 Notify Departmental Representative in writing when resubmitting, of any revisions other than those requested by Departmental Representative.
- .9 Do not proceed with work or order construction materials or products until relevant submissions are reviewed and approved by the Departmental Representative.
- .10 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. **Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.**
- .11 Verify field measurements and affected adjacent Work are co-ordinated.
- .12 Keep one reviewed copy of each submission on site.

**1.4 SUBMISSION REQUIREMENTS**

- .1 Coordinate each submission with the requirements of the work and the Contract Documents. Individual submissions will not be reviewed until all related information is available
- .2 Accompany submissions with transmittal letter, in duplicate containing:
  - .1 Date.



- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

**1.5 SHOP DRAWINGS AND PRODUCT DATA**

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data provided by Contractor to illustrate details of a portion of Work, which are specific to project requirements.
- .2 Submit electronic drawings stamped and signed by professional engineer registered in British Columbia, Canada as requested by Department Representative. Cross reference shop drawing information to applicable portions of the Contract 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. Provide cross references to design drawings and specifications.
- .4 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Submissions include:
    - .1 Date and revision dates.
    - .2 Project title and number.
    - .3 Name and address of:
      - .1 Subcontractor.
      - .2 Supplier.
      - .3 Manufacturer.
    - .4 Identification and quantity of each shop drawing, product date and sample.
    - .5 Other pertinent data.
  - .2 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents. **Submittals not stamped, signed, dated, and identified as to specific project will be returned without being examined and considered rejected**
  - .3 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.
    - .7 Operating weight.
    - .8 Relationship to adjacent work.
- .5 After Department Representative's review, distribute copies. Keep one reviewed copy of each submission on site.
- .6 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .7 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

- .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 3 years of date of contract award for project.
- .8 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .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.
- .9 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .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.
- .10 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .11 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .12 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .13 Delete information not applicable to project.
- .14 Supplement standard information to provide details applicable to project.
- .15 Shop Drawings include, but are not limited to the following items (refer to drawings for full Shop Drawing requirements):
  - .1 Inset metal plate with laserjet text (Detail 5,6 – L5.1)
  - .2 Salmon stencil (Detail 7 – L5.1)
  - .3 Interpretive sign blade (Detail 4 – L5.3)
  - .4 Removable bollard (Detail 5 – L5.3)
  - .5 Bike rack (Detail 2 – L5.2)
  - .6 Custom bollard sleeve (Detail 5 – L5.3)
- .16 Stamped Engineered Shop Drawings include, but are not limited to the following items (refer to drawings for full Shop Drawing requirements):
  - .1 Flag and custom bench (Detail 1,2,3 – L5.3)
  - .2 Metal railings (Details L5.4 – L5.5)
  - .3 Bridge/Ramp details (Details L5.6 – L5.7)
- .17 Submittals are required to include all concrete reinforcement details per Section 03 30 00 – Concrete Reinforcing, including:
  - .1 Vehicular paving and slab below pavers
  - .2 Footings for furnishings and artifacts
  - .3 Curbs, bands and post footings
  - .4 Proposed concrete paving and unit pavers

## **1.6 SHOP DRAWING REVIEW**

- .1 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
- .2 Allow seven (7) business days for Departmental Representative's review of each submission.

- .3 This review shall not mean that Departmental Representative approves the detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same.
- .4 This review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting requirements of the construction and Contract Documents.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect the value of Work, state such in writing to Departmental Representative prior to proceeding with ordering materials or Work.
- .6 Make changes in shop drawings Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested. All revisions to be clearly clouded.
- .7 Without restricting generality of foregoing, Contractor is responsible for:
  - .1 Dimensions to be confirmed and correlated at job site.
  - .2 Information that pertains solely to fabrication processes or to techniques of construction and installation.
  - .3 Co-ordination of the work and all sub-trades.
- .8 If upon review by Departmental Representative no errors or omissions are discovered or if only minor corrections are made, electronic copies will be returned and ordering, fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings with bubbled changes, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .9 Shop drawings to incorporate applicable key plan, plan, elevations and details for all work submitted. No materials to be ordered and no work to be fabricated shall be undertaken until shop drawings and other related submittals are reviewed.

#### 1.7 PRODUCT DATA

- .1 Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts, and diagrams, used to illustrate standard manufactured products or any other specified information.
- .2 Delete information not applicable to project.
- .3 Supplement standard information to provide details applicable to project.
- .4 Cross-reference product data information to applicable portions of Contract documents.
- .5 Submit electronic copies of product data.

#### 1.8 SAMPLES

- .1 Submit for review samples in duplicate as requested in individual technical specification Sections. Label samples with origin and intended use. One sample will be returned with Shop Drawing Review.
- .2 Deliver samples prepaid to the site office for review and approval by the Departmental Representative..
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to ordering materials or proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

**1.9 MOCK-UPS**

- .1 Erect mock-ups where directed by Departmental Representative in accordance with 01 45 00 - Quality Control. Upon acceptance by Departmental Representative, mock-up may remain.

**1.10 PROGRESS SCHEDULE**

- .1 Submit work schedule and cost breakdown in accordance with section 01 11 00 – General Instructions.

**1.11 INSPECTION REPORTS**

- .1 Submit electronic test results and inspection reports where indicated.

**1.12 PLAN DRAWING SUBMITTALS**

- .1 Contractor to provide the following plan drawings for approval by Departmental Representative:
  - .1 Construction logistic plan to include mobilization and delivery plans, traffic management plan, portable toilet location and extent of construction fencing/hoarding.

**1.13 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution monthly with progress statement and as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 4 locations.
  - .1 Viewpoints and their location as determined by Departmental Representative
- .4 Frequency of photographic documentation: as directed by Departmental Representative.
  - .1 Before concealment of Work as directed by Departmental Representative.

**1.14 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 REFERENCE STANDARDS**

- .1 Government of Canada
  - .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
  - .2 Canada Occupational Health and Safety Regulations
- .2 National Building Code of Canada (NBC) 2015
  - .1 Part 8 – Safety Measures at Construction and Demolition Sites.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .4 Province of British Columbia
  - .1 Workers Compensation Act Part 3 – Occupational Health and Safety, RSBC – Latest Edition.
- .5 Canadian Standards Association (CSA) as amended:
  - .1 CSA Z797-Latest Edition, Code of Practice for Access Scaffold.
  - .2 CSA S269.1-Latest Edition, Falsework for Construction Purposes
  - .3 CSA S350-M-Latest Edition, Code of Practice for Safety in Demolition of Structures.
- .6 American National Standards Institute (ANSI):
  - .1 ANSI A10.3 Operations – Safety Requirements for Powder-Actuated Fastening Systems.

**1.2 RELATED SECTIONS**

- .1 Section 01 11 00 – General Instructions
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 01 44 00 – Regulatory Requirements
- .4 Section 05 50 00 – Metal Fabrications
- .5 Section 06-20 00 – Finish Carpentry
- .6 Section 12 50 00 – Furnishings
- .7 Section 32 12 16 – Asphalt Paving
- .8 Section 32 13 13 – Concrete Paving

**1.3 WORKERS' COMPENSATION BOARD COVERAGE**

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the Work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

**1.4 COMPLIANCE WITH REGULATIONS**

- .1 It is the Contractor's responsibility to ensure that all workers are qualified, competent, and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

**1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit to Departmental Representative, submittals in accordance with Section 01 33 00 - Submittal Procedures
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Submit the following:
  - .1 Health and Safety Plan.
  - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
  - .3 Copies of incident and accident reports.
  - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
  - .5 Emergency Procedures.
- .4 The Departmental Representative will review Contractor's site-specific Health and Safety Plan and emergency procedures and provide comments to Contractor within seven (7) business days after receipt of plan. Revise plan as appropriate and resubmit to Departmental Representative.
- .5 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 Departmental Representative.
- .6 Submission and resubmission of the Health and Safety Plan to the Departmental Representative is for information and reference purposes only. It shall not:
  - .1 Be construed to imply approval by the Departmental Representative.
  - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
  - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.
- .7 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situation (the Provincial Emergency Program contact telephone is 1-800-663-3456).

**1.6 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.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with the site-specific Health and Safety Plan.

**1.7 HEALTH AND SAFETY CO-ORDINATOR**

- .1 The health and Safety Coordinator/Registered Occupational Hygenist/Certified Industrial Specified Hygienist must:
  - .1 Be responsible for completing all health and safety training sessions and ensuring that personnel not successfully completing required training are not permitted to enter site for perform Work.
  - .2 Be responsible for implementing, enforcing daily and monitoring site-specific Health and Safety Plan.
  - .3 Be on site during execution of Work.

**1.8 PROJECT/SITE CONDITIONS**

- .1 Work at site will involve:
  - .1 Lead containing paint abatement as indicated in Appendix 1, 2, and 3.

**1.9 REGULATORY REQUIREMENTS**

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site
- .2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

**1.10 WORK PERMITS**

- .1 Obtain and pay for specialty permits related to project before the start of work.

**1.11 FILING OF NOTICE**

- .1 The Contractor is to complete and submit a Notice of Project as required by provincial authorities.
- .2 Provide copies of all notices to the Departmental Representative.

**1.12 HEALTH AND SAFETY PLAN**

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including but not limited to, the following:
  - .1 Primary requirements:
    - .1 Contractor's safety policy.
    - .2 Identification of applicable compliance obligations.
    - .3 Definition of responsibilities for project safety/organization chart for project.
    - .4 General safety rules for project.
    - .5 Job-specific safe work, procedures.
    - .6 Inspection policy and procedures.
    - .7 Incident reporting and investigation policy and procedures.
    - .8 Occupational Health and Safety Committee/Representative procedures.
    - .9 Occupational Health and Safety meeting.
    - .10 Occupational Health and Safety communications and record keeping procedures.
  - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work,
  - .3 List hazardous materials to be brought on site as required by work.
  - .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
  - .5 Identify personal protective equipment (PPE) to be used by workers.
  - .6 Identify personnel and alternates responsible for site safety and health.
  - .7 Identify personnel training requirements and training plan, including site orientation for new works.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
- .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.

- .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of constructions and Contract documents.

#### 1.13 EMERGENCY PROCEDURES

- .1 List standard operating procedures and measures to be taken in emergency situations. Include on evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
  - .1 Designated personnel from own company.
  - .2 Regulatory agencies applicable to work and as per legislated regulations.
  - .3 Local emergency resources.
  - .4 Departmental Representative site staff.
- .2 Include the following provisions in the emergency procedures:
  - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
  - .2 Evacuate all workers safety.
  - .3 Check and confirm the safe evacuation of all workers.
  - .4 Notify the fire department or other emergency responders.
  - .5 Notify adjacent workplaces which may be affected if the risk extends beyond the workplace.
  - .6 Notify Departmental Representative site staff.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
  - .1 Work at high angles.
  - .2 Work with hazardous substances.
- .4 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

#### 1.14 HAZARDOUS PRODUCTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
  - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDA and WHMIS documents as per Section 01 33 00 – Submittal Procedures.
  - .2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.
  - .3 Provide adequate means of ventilation in accordance with Section 01 51 00 – Temporary Utilities.

#### 1.15 ELECTRICAL SAFETY REQUIREMENTS

- .1 Comply with authorities:
  - .1 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

#### 1.16 FIRE SAFETY REQUIREMENTS

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code.

**1.17 FIRE PROTECTION AND ALARM SYSTEM**

- .1 Fire protection and alarm systems shall not be:
  - .1 Obstructed.
  - .2 Shut off.
  - .3 Left inactive at the end of the working day or shift.
- .2 Do not use fire hydrants, standpipes, and hose systems for purposes other than firefighting.
- .3 Be responsible/liable for costs incurred from the fire department, Departmental Representative resulting from false alarms.
- .4 Repair any damage to existing fire protection and alarm system.

**1.18 UNFORSEEN HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety co-ordinator/Safety Officer, stop work and advise Departmental Representative verbally and in writing.

**1.19 POSTING OF DOCUMENTS**

- .1 Post legible versions of the following documents on site.
  - .1 Health and Safety Plan.
  - .2 Sequence of Work.
  - .3 Emergency procedures.
  - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
  - .5 Notice of Project.
  - .6 Site plans
  - .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
  - .8 Workplace Hazardous Materials Information System (WHMIS) documents.
  - .9 Material Safety Data Sheets (MSDS).
  - .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

**1.20 MEETINGS**

- .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

**1.21 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

- .3 Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 44 00 – Regulatory Procedures
- .2 Section 01 74 11 – Cleaning
- .3 Section 05 50 00 – Metal Fabrications
- .4 Section 06-20 00 – Finish Carpentry
- .5 Section 12 50 00 – Furnishings
- .6 Section 32 12 16 – Asphalt Paving
- .7 Section 32 13 13 – Concrete Paving
- .8 Section 32 14 13 – Precast Concrete Unit Paving
- .9 Section 32 22 13 – Rough Grading
- .10 Section 32 91 21 – Growing Medium and Finish Grading

**1.2 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 humans; 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.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Convene start-up meeting prior to beginning work with contractor's representative and Departmental Representative to:
  - .1 Verify Environmental Protection Plan and conformance requirements to municipal, provincial and federal regulations.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit 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 Departmental Representative.
- .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 All work to be restricted to above the high water line. All proposed work in and around the existing dike to be confirmed as acceptable by the responsible Authority prior to conducting work.
- .6 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 Drawings showing locations of proposed temporary scaffolding over water crossings, material storage areas, structures, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .6 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.
- .7 Pollution Control Plan:
  - .1 Including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
  - .2 Identifying potentially hazardous substances to be used on job 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.
  - .3 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
  - .4 Air pollution control plan detailing provisions to assure that dust, paint overspray, debris, materials, and trash, are contained on project site. Name of individual who will be responsible for implementing and supervising the spill containment and cleanup.
  - .5 Training requirements for Contractor's personnel and methods of accomplishing the training .
- .8 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

## 1.5

### ENVIRONMENTAL PROTECTION

- .1 Ensure removed paint, debris and paint overspray does not fall into the Fraser River under the Cannery Pier in accordance with applicable legislation.
- .2 Prevent extraneous materials from contaminating air beyond construction area, by providing temporary extensions to Mechanical intake louvres during work.
- .3 Environmental degradation arising from construction activities shall be prevented, abated, controlled and minimized by complying with all applicable federal, provincial and local laws and regulations concerning environmental pollution control and abatement.
- .4 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers. Construction methods shall be employed to ensure no fuels, oils, wood preservatives or other contaminants enter the Fraser River. As general mitigation measures for this project, it must be enforced and closely supervised and monitored as follows:
  - .1 All contractors and work crews must be briefed upon the importance of adhering to prescribed best practices or mitigation measures. Project meeting prior to commencement of the work shall indicate the above requirements have been fully explained to the contractor and staff.
  - .2 A copy of the mitigation measures shall be posted in a conspicuous location on site or readily accessible for reference.
  - .3 Conduct work in a manner which clearly separates visitors from the active construction area on-site to minimize potential accidents for public safety.
  - .4 Contractor and sub trade personnel must develop and maintain spill response and reporting procedures including containment methods. In the event of a spill, contact the Provincial Emergency Program at 1-800-663-3456.

- .5 The Contractor is to have personnel on site that are trained and ready to use spill containment kits. Ensure proper disposal procedures in accordance with all applicable provincial and municipal regulations. Fires and burning of rubbish on site is not permitted.
- .6 The Contractor must have all spill containment kits ready for immediate deployment, containing sufficient quantities of absorbent materials on site in close proximity to working machinery and equipment such as fuel portable generator, air compressors, hoist and tools.
- .7 Ensure all equipment used on site is clean and free from contaminants.
- .8 Ensure proper disposal procedures in accordance with all applicable provincial regulations.

**1.6 FIRES**

- .1 Fires and burning of rubbish on site is not permitted.

**1.7 DRAINAGE**

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided to Departmental Representative for review. Plan to include 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
- .2 Refer to EPA 832/R-92-005, Chapter 3 for guidelines.
- .3 Do not allow water containing suspended materials to into waterways, sewer or drainage systems.
- .4 As required, provide temporary drainage and pumping required to keep excavations and site free from water.
- .5 Ensure any pumped water diverted into sewer or drainage systems is free of suspended materials.
- .6 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

**1.8 SITE CLEARING AND PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties as indicated. Contractor to provide Protection Fencing/Hoarding Plan for Departmental Representative review.
- .2 Protect 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.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
  - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas as indicated by Departmental Representative.

**1.9 WORK ADJACENT TO WATERWAYS**

- .1 Construction equipment to be operated on land only.
- .2 Do not use waterway beds.
- .3 All Work limited to above High Water Line.
- .4 Waterways to be kept free of excavated fill, waste material and debris.
- .5 Design and construct temporary crossings to minimize erosion to waterways.
- .6 Do not skid logs or construction materials across waterways.

**1.10 POLLUTION CONTROL**

- .1 Contractor and sub trade personnel must develop and maintain spill response and reporting procedures including containment methods.
- .2 In the event of a spill, Contractor shall immediately contain and assess the spill, provide appropriate notifications and take the necessary steps to prevent further discharge. Notifications shall include contacting the Provincial Emergency Program at 1-800-663- 3456 and the Departmental Representative.
- .3 The Contractor must have spill containment kits ready for immediate deployment, containing sufficient quantities of absorbent materials on site in close proximity to work area including working machinery and equipment such as fuel portable generator, air compressors, hoist and tools.
- .4 The Contractor is to have personnel on site that are trained and ready to use spill containment kits. Ensure proper disposal procedures in accordance with all applicable provincial and municipal regulations. Fires and burning of rubbish on site is not permitted.
- .5 Contractor is responsible for immediate clean up of the spill and restoration of the area to the satisfaction of the Departmental Representative and other regulatory agencies, where involved.
- .6 Ensure all equipment used on site is clean and free from contaminants. Materials and equipment shall be regularly inspected, maintained, operated and stored in a manner that prevents deleterious substances (eg. Petroleum products, silt, etc.) from entering watercourse .
- .7 Ensure proper procedures in accordance with all applicable provincial regulations.
- .8 Ensure removed paint, debris and paint overspray does not fall into the Fraser River under the Cannery Pier in accordance with applicable legislation.
- .9 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
  - .1 Provide temporary enclosures around areas of work as directed by Departmental Representative.
- .10 Control emissions from equipment to local authorities' emission requirements.
- .11 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

**1.11 NOTIFICATION**

- .1 Departmental Representative 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.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
  - .1 Do not take action until after receipt of written approval by Departmental Representative
- .3 Departmental Representative 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.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Waste Management: separate waste materials and recycle or deposit at authority approved facilities.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 35 43 – Environmental Procedures

**1.2 REFERENCES AND CODES**

- .1 Perform Work in accordance with National Building Code of Canada (NBC), 2010 including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Perform Work in accordance with WorkSafe BC current requirements and standards.
- .3 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.
- .4 Perform Work in accordance with City of Richmond Guidelines and Provincial / Municipal diking Authority requirements.
- .5 No Work beyond Limit of Work Line without written approval. No work may be undertaken on City of Richmond Property.
- .6 No Work permitted below the High Water Line – all work at foreshore edge to Department of Fisheries and Oceans requirements.

**1.3 HAZARDOUS MATERIAL DISCOVERY**

- .1 Lead-containing Paint present. Take appropriate precautions in accordance with Government Standards and Regulations.
- .2 PCB: Polychlorinated Biphenyl: may be present. Take appropriate precautions.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative. Take appropriate precautions.

**1.4 BUILDING SMOKING ENVIRONMENT**

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

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 03 20 00 – Concrete Reinforcing
- .2 Section 05 50 00 – Metal Fabrications
- .3 Section 06 20 00 – Finish Carpentry
- .4 Section 31 22 13 – Rough Grading
- .5 Section 32 12 16 – Asphalt Paving
- .6 Section 32 13 13 – Concrete Paving
- .7 Section 32 14 13 – Precast Concrete Unit Paving
- .8 Section 32 15 40 – Crushed Stone Paving
- .9 Section 32 92 23 – Sodding
- .10 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting

**1.2 INSPECTION**

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

**1.3 INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Agencies will be engaged by General Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by General Contractor.
- .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 Documents.
- .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 Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

**1.4 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.

**1.5 PROCEDURES**

- .1 Notify appropriate agency Departmental Representative 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.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

**1.6 REJECTED WORK**

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

**1.7 REPORTS**

- .1 Submit two (2) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

**1.8 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 Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

**1.9 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Departmental Representative.
- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups 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.
- .5 Mock-ups to be kept at site trailer for comparisons.

**1.10 MILL TESTS**

- .1 Submit mill test certificates as requested.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 REFERENCE STANDARDS**

- .1 Canadian Standards Association (CSA) as amended:
  - .1 CAN/CSA Z321-96 (Latest Edition)-Signs and Symbols for the Occupational Environment.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3 INSTALLATION AND REMOVAL**

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

**1.4 STORAGE FACILITIES**

- .1 Storage space will be provided as directed by Departmental Representative.

**1.5 WATER SUPPLY**

- .1 Water supply is available at existing building and may be used for construction purposes at no cost.
  - .1 Hose bib locations for each building as directed by Departmental Representative.

**1.6 POWER**

- .1 Electrical power and lighting at existing buildings may be used for construction purposes at no extra cost, provided that warranties are not affected thereby and electrical components used for temporary power are replaced when damaged. Do not use emergency power or UPS panels for this purpose.
  - .1 Power located as directed by Departmental Representative.

**1.7 TEMPORARY HEATING AND VENTILATION**

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 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.
- .3 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
- .4 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.
  - .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.
  - .5 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.
  - .6 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.
- 1.8 TEMPORARY COMMUNICATION FACILITIES**
- .1 Provide and pay for temporary telephone, data hook up, lines and equipment necessary for own use and use of Departmental Representative.
- 1.9 SANITARY FACILITIES**
- .1 The Contractor is responsible for providing portable washroom facility for staff throughout the duration of construction.
- 1.10 SCAFFOLDING**
- .1 Construct and maintain scaffolding in rigid, secure and safe manner in accordance with Section 01 52 00 - Construction Facilities and WorkSafe BC requirements .
  - .2 Scaffolding to be erected independent of walls where possible. Remove promptly when no longer required. Remove fastenings from structure, if used and patch, sand and paint to match.
- 1.11 REMOVAL OF TEMPORARY FACILITIES**
- .1 Remove temporary facilities from site when directed by the Departmental Representative.
- 1.12 SIGNS AND NOTICES**
- .1 Signs and notices for safety and instruction are permitted and shall be in both official languages or graphic symbols conforming to CAN/CSA-Z321 .
  - .2 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or when directed by Departmental Representative.
- PART 2 PRODUCTS**
- 2.1 NOT USED**
- .1 Not Used.
- PART 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 municipal authorities having jurisdiction over sediment and erosion control plan, specific to site, that complies with regulations of EPA 832/R-92-005.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 REFERENCES**

- .1 Canadian Standards Association (CSA) as amended:
  - .1 CAN/CSA CAN/CSA-Z271-10, Safety Code for Suspended Platforms .
  - .2 CAN/CSA-Z321-96 (Latest Edition), Signs and Symbols for the Occupational Environment.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-(Latest Edition), Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-0121-(Latest Edition), Douglas Fir Plywood.
  - .3 CAN/CSA-S269.2-(Latest Edition), Access Scaffolding for Construction Purposes.
- .4 Guidelines of U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3 INSTALLATION AND REMOVAL**

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

**1.4 SCAFFOLDING**

- .1 Scaffolding in accordance with CAN/CSA CAN/CSA-Z271-10, Safety Code for Suspended Platforms and CAN/CSA-S269.2.
- .2 Provide and maintain platforms, scaffolding, ladders and ramps.

**1.5 BARRIERS AND ENCLOSURES**

- .1 In accordance with Section 01 56 00 - Temporary Barriers and Enclosures and WorkSafe BC requirements.

**1.6 ELEVATORS**

- .1 Existing elevators not to be used by construction personnel and transporting of materials.

**1.7 SITE STORAGE/LOADING**

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

**1.8 CONSTRUCTION PARKING**

- .1 Limited parking will be permitted on site as directed by Departmental Representative. Provide for additional parking off site. Refer to 01 14 00 - Work Restrictions.  
Provide and maintain adequate access to project site.

**1.9 SECURITY**

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

**1.10 OFFICES**

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.

**1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds 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.

**1.12 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

**1.13 OVERLOADING**

- .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation or damage to existing structure and finishes.

**1.14 FALSEWORK**

- .1 Design and construct falsework in accordance with CSA S269.1.

**1.15 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Refer to Section 01 14 00 - Work Restrictions.
- .2 Provide access and necessary to maintain traffic.
- .3 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .4 Provide measures for protection and diversion of traffic, 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
- .5 Protect travelling public from damage to person and property.
- .6 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .7 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .9 Dust control: adequate to ensure safe operation at all times.

- .10 Provide snow removal during period of Work when required.

**1.16 CLEAN-UP**

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

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 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 municipal authorities having jurisdiction over sediment and erosion control plan, specific to site, that meets guidelines within EPA 832/R-92-005.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED SECTIONS**

Section 01 14 00 – Work Restrictions

**1.2 REFERENCE STANDARDS**

- .1 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59-Latest Edition, Alkyd Exterior Gloss Enamel.
  - .2 CAN/CGSB 1.189-Latest Edition, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-O121-Latest Edition, Douglas Fir Plywood.

**1.3 GENERAL CONDITIONS**

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
  - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
  - .2 Secure site at night time as deemed necessary by Departmental Representative to protect site against entry.

**1.4 INSTALLATION AND REMOVAL**

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

**1.5 HOARDING**

- .1 Erect temporary site enclosures using 38 x 89mm construction grade lumber framing at 600 mm on centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121.
- .2 Apply plywood panels vertically flush and butt jointed.
- .3 Provide one (1) lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.
- .4 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
- .5 Paint public side of site enclosure in selected colours with one coat primer to CAN/CGSB 1.189 and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.
- .6 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide one lockable truck gate. Maintain fence in good repair.
- .7 Provide barriers around trees and plants designated to remain. Protect site from damage by equipment and construction procedures.

**1.6 GUARD RAILS AND BARRICADES**

- .1 Provide as required by governing authorities.

- 1.7 DUST TIGHT SCREENS**
  - .1 Provide dust tight screens or 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.
- 1.8 ACCESS TO SITE**
  - .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
- 1.9 PUBLIC TRAFFIC FLOW**
  - .1 Provide and maintain competent signal flag operators, barricades, or lights as required to perform Work and protect public.
- 1.10 FIRE ROUTES**
  - .1 Maintain access to property including overhead clearances for use by emergency response vehicles, including the area between west elevation of Cannery Building and adjacent building.
- 1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**
  - .1 Protect surrounding public property from damage during performance of Work.
  - .2 Be responsible for damage incurred.
- 1.12 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 Departmental Representative locations and installation schedule [3] days prior to installation.
  - .4 Be responsible for damage incurred due to lack of or improper protection.
- 1.13 WASTE MANAGEMENT AND DISPOSAL**
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- Part 2 Products**
  - 2.1 NOT USED**
    - .1 Not Used.
- Part 3 Execution**
  - 3.1 NOT USED**
    - .1 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 20 00 – Concrete Reinforcing
- .2 Section 05 50 00 – Metal Fabrications
- .3 Section 06 20 00 – Finish Carpentry
- .4 Section 31 22 13 – Rough Grading
- .5 Section 32 12 16 – Asphalt Paving
- .6 Section 32 13 13 – Concrete Paving
- .7 Section 32 14 13 – Precast Concrete Unit Paving
- .8 Section 32 15 40 – Crushed Stone Paving
- .9 Section 32 92 23 – Sodding
- .10 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting

**1.2 REFERENCE STANDARDS**

- .1 Conform to these 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, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .3 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

**1.3 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 Use products of one (1) manufacturer for material and equipment of the same type or classification unless otherwise specified.
- .3 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.
- .4 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.
- .5 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .6 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.
- .7 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .8 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.

**1.4 AVAILABILITY**

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

**1.5 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 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 Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

**1.6 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.

**1.7 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 Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

**1.8 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 Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative 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 Departmental Representative whose decision is final.

**1.9 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.

**1.10 REMEDIAL WORK**

- .1 Refer to Section 01 73 00 - Execution Requirements.
- .2 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.
- .3 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 Departmental Representative of conflicting installation. Install as directed.

**1.12 FASTENINGS**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .3 Prevent electrolytic action between dissimilar metals.
- .4 Bolts may not project more than one diameter beyond nuts.
- .5 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.
- .6 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .7 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in the details.
- .8 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .9 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
- .10 Store products in accordance with suppliers' instructions.
- .11 Touch up damaged factory finished surfaces according to manufacturer's recommendations and to Departmental Representative's satisfaction.
- .12 Use primer or enamel to match original.
- .13 Do not paint over nameplates.
- .14 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.
- .15 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .16 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.13 PROTECTION OF WORK IN PROGRESS**

- .1 Protect existing building components and finishes (including glazing, roof finishes, ramps, guardrails, stairways and areas not included in scope of work) from damage. Repair damaged

components and finishes according to Departmental Representative's specifications, to better condition.

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

**1.14 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, pedestrian and vehicular traffic, and/or building occupants.
- .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.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .3 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 03 20 00 – Concrete Reinforcing
- .2 Section 05 50 00 – Metal Fabrications
- .3 Section 06 20 00 – Finish Carpentry
- .4 Section 31 22 13 – Rough Grading
- .5 Section 32 12 16 – Asphalt Paving
- .6 Section 32 13 13 – Concrete Paving
- .7 Section 32 14 13 – Precast Concrete Unit Paving
- .8 Section 32 15 40 – Crushed Stone Paving
- .9 Section 32 92 23 – Sodding
- .10 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting

**1.2 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 Departmental Representative 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 Departmental Representative or separate contractor.
  - .7 Written permission of affected separate contractor.
  - .8 Date and time work will be executed.

**1.3 MATERIALS**

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

**1.4 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 and review existing conditions with Departmental Representative.
- .3 Beginning of cutting or patching means acceptance of existing conditions.

- .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.

**1.5 EXECUTION**

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Uncover Work to install ill-timed Work.
- .3 Remove and replace defective and non-conforming Work.
- .4 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .5 Restore work with new products in accordance with requirements of Contract Documents

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**PART 1 EXECUTION**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 20 00 – Concrete Reinforcing
- .2 Section 05 50 00 – Metal Fabrications
- .3 Section 06 20 00 – Finish Carpentry
- .4 Section 31 22 13 – Rough Grading
- .5 Section 32 12 16 – Asphalt Paving
- .6 Section 32 13 13 – Concrete Paving
- .7 Section 32 14 13 – Precast Concrete Unit Paving
- .8 Section 32 15 40 – Crushed Stone Paving
- .9 Section 32 92 23 – Sodding.
- .10 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting

**1.2 PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .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. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Dispose of waste materials and debris off site.
- .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.

**1.3 FINAL CLEANING**

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and wash clean paved areas.
- .11 Remove snow and ice from access to building.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling and reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .2 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .3 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Refer to technical sections for waste management and disposal.

**1.2 WASTE MANAGEMENT GOALS**

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PSPC's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and /or Demolition (CRD) waste to be project generated.
- .2 Protect environment and prevent environmental pollution damage.

**1.3 RELATED SECTIONS**

- .1 Section 03 20 00 – Concrete Reinforcing
- .2 Section 05 50 00 – Metal Fabrications
- .3 Section 06 20 00 – Finish Carpentry
- .4 Section 31 22 13 – Rough Grading
- .5 Section 32 12 16 – Asphalt Paving
- .6 Section 32 13 13 – Concrete Paving
- .7 Section 32 14 13 – Precast Concrete Unit Paving
- .8 Section 32 15 40 – Crushed Stone Paving
- .9 Section 32 92 23 – Sodding
- .10 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting

**1.4 DEFINITIONS**

- .1 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .2 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .3 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
  - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
  - .2 Returning reusable items including pallets or unused products to vendors.
- .4 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .5 Separate Condition: refers to waste sorted into individual types.
- .6 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.

**1.5 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Handle waste materials not re-used, salvaged or recycled in accordance with appropriate regulations and codes.

- .3 Materials in separated condition: collect, handle, store on site where directed and transport off-site to an approved and authorized recycling facility .
  - .4 Materials must immediately be separated into required categories for re-use or recycling.
  - .5 Unless specified otherwise, materials for removal become Contractor's property.
  - .6 Separate non-salvageable materials for recycling where applicable recycling facility exists. Transport and deliver non-salvageable items to licensed recycling and disposal facilities.
  - .7 Protect structural components not removed and salvaged materials from movement or damage.
  - .8 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
  - .9 Protect surface drainage, mechanical and electrical from damage and blockage.
  - .10 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
  - .11 Separate and store materials produced during project in designated areas.
  - .12 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
    - .1 On-site source separation is recommended.
    - .2 Remove co-mingled materials to off site processing facility for separation.
    - .3 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.
- 1.6 DISPOSAL OF WASTES**
- .1 Do not bury rubbish or waste materials.
  - .2 Do not dispose of mineral spirits, paint thinner, oil, volatile materials, and waste into waterways, storm, or sanitary sewers.
  - .3 Remove materials on-site as Work progresses.
- 1.7 SCHEDULING**
- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.
- PART 2 PRODUCTS**
- 2.1 NOT USED**
- .1 Not Used.
- PART 3 EXECUTION**
- 3.1 APPLICATION**
- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
- 3.2 CLEANING**
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

- .3 Source separate materials to be reused/recycled into specified sort areas.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 03 20 00 – Concrete Reinforcing
- .2 Section 05 50 00 – Metal Fabrications
- .3 Section 06 20 00 – Finish Carpentry
- .4 Section 31 22 13 – Rough Grading
- .5 Section 32 12 16 – Asphalt Paving
- .6 Section 32 13 13 – Concrete Paving
- .7 Section 32 14 13 – Precast Concrete Unit Paving
- .8 Section 32 15 40 – Crushed Stone Paving
- .9 Section 32 92 23 – Sodding
- .10 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting

**1.2 REFERENCE STANDARDS**

- .1 Canadian Environmental Protection Act (CEPA)
  - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
  - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2 Request Departmental Representative review.
  - .2 Departmental Representative Review:
    - .1 Departmental Representative 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 reviewed for compliance with Contract Documents.
    - .2 Defects: corrected and deficiencies completed.
    - .3 Work: complete and ready for final review.
  - .4 Final Review:
    - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
    - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-review.

**1.4 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 reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 05 50 00 – Metal Fabrications.
- .2 Section 06 10 00 - Rough Carpentry.
- .3 Section 06 14 00 – Treated Wood Foundations.
- .4 Section 06 15 00 – Wood Decking.
- .5 Section 06 20 00 – Finish Carpentry.
- .6 Section 09 91 00 – Painting.
- .7 Section 32 12 16.01 – Asphalt Paving – Short Form.
- .8 Section 32 13 13 – Concrete Paving.
- .9 Section 32 14 13 – Precast Concrete Unit Paving.
- .10 Section 32 91 19.13 – Topsoil Placement and Grading.
- .11 Section 32 92 23 – Sodding.
- .12 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting.

**1.2 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-warranty Meeting:
  - .1 Convene meeting [one] week prior to contract completion with Departmental Representative and contractor's representative, in accordance with Section 01 31 19 - Project Meetings to:
    - .1 Verify Project requirements.
    - .2 Review warranty requirements
  - .2 Departmental Representative 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.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Three (3) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, two (2) final hard copies and one electronic copy of operating and maintenance manuals. Substantial completion will not be considered until this submission is completed.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.
- .5 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

**1.4 FORMAT**

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 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 Section numbers and sequence of Table of Contents according to the contract documents 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 with drawing number and description visible.
- .9 Provide 1:1 scaled CAD files in dwg format on CD.

**1.5 CONTENTS - PROJECT RECORD DOCUMENTS**

- .1 Table of Contents for Each Volume: provide the following:
  - .1 Title of project;
  - .2 Date of submission;  
Names, addresses, and telephone numbers and email addresses of Departmental Representative, Contractor, and Sub-Contractors 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.
- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

**1.6 AS -BUILT DOCUMENTS AND SAMPLES**

- .1 Maintain, in addition to requirements in General Conditions, at site Departmental Representative one record copy of:
  - .1 Contract Drawings: legibly mark each item to record actual construction.
  - .2 Contract Specifications: legibly mark each item to record actual 'workmanship of construction', including:
    - .1 Manufacturer, trade name, and catalogue number of each 'ProductUMaterial' actually installed, particularly optional items and substitute items.
    - .2 Changes made by addenda and change orders .
  - .3 Addenda.
  - .4 Field changes of dimension and detail.

- .5 Changes made by change orders.
- .6 Details not on original Contract drawings.
- .7 Change Orders and other modifications to Contract.
- .8 Reviewed shop drawings and modifications, product data, and samples.
- .9 Field test records.
- .10 Inspection certificates.
- .11 Manufacturer's certificates.
- .2 As-built information:
  - .1 Record changes in red ink as work progresses.
  - .2 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final review, neatly transfer notations to second set.
  - .3 Provide 1 set of CDs in PDF file format with all as-built information included.
  - .4 Submit all sets to Departmental Representative.
- .3 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .4 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.
- .5 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .6 Keep record documents and samples available for inspection by Departmental Representative.
- 1.7 EQUIPMENT AND SYSTEMS**
  - .1 Include manufacturer's printed operation and maintenance instructions.
  - .2 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
  - .3 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
  - .4 Additional requirements: as specified in individual specification sections.
- 1.8 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.
- 1.9 MAINTENANCE MATERIALS**
  - .1 Spare Parts:
    - .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 location as directed; place and store.

- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Departmental Representative.
  - .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 location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .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 location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.

**1.10 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.
- .3 Store components subject to damage from weather in weatherproof enclosures.

**1.11 WARRANTIES**

- .1 Separate each Document 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 inspection reports executed in by subcontractors, suppliers, manufacturers and inspection agencies within 10 days after completion of applicable item of work.
- .4 Except for items put into use with the Departmental Representative's permission leave date of beginning of time of warranty until the date of substantial performance is determined.
- .5 Verify that documents are in proper form, contain full information and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal with Operating and Maintenance manual.
- .8 Conduct joint 12 month warranty inspection, measured from time of acceptance, by Departmental Representative.
- .9 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .10 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

**.11 COMPLETION**

- .1 Submit a written certificate that the following have been performed:
  - .1 Work has been completed and reviewed for compliance with the Contract documents .
  - .2 Defects have been corrected and deficiencies have been completed.

**PART 2 PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittals
- .2 Section 32 05 22 – Concrete Paving

### **1.2 SUBMITTALS**

- .1 Submit shop drawings, including placement of reinforcement, in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop drawings shall consist of bar bending details, bar schedules and placement drawings. Bar schedules shall detail each type of bar and provide a total weight, computed from the theoretical mass specified in CAN/CSA-G30.18.
- .3 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and splices, and mechanical splices if approved by Departmental Representative with identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with the Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .4 Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide Class B tension lap splices unless otherwise indicated.
- .1 Submittals are required to include all concrete reinforcement details, including:
  - .1 Vehicular paving and slab below pavers
  - .2 Footings for furnishings and artifacts
  - .3 Curbs, bands and post footings

### **1.3 REFERENCES**

- .1 Canadian Standards Association (CSA):
  - .1 CAN/CSA-A23.1 - Latest Edition, Concrete Materials and Methods of Concrete Construction Methods of Test and Standard Practices for Concrete.
  - .2 CSA-A23.3 – Latest Edition, Design of Concrete Structures.
  - .3 CAN/CSA-G30.18 – Latest Edition, Billet-Steel Bars for Concrete Reinforcement.
  - .4 CAN/CSA-G40.21 – Latest Edition, Structural Quality Steels.
  - .5 CAN/CSA-G164 – Latest Edition, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .6 CSA W186 – Latest Edition, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .2 Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada – Latest Edition.
- .3 American National Standards Institute/American Concrete Institute: ANSI/ACI 315, Details and Detailing of Concrete Reinforcement – Latest Edition.

### **1.4 MEASUREMENT FOR PAYMENT**

- .1 Payment for all Exterior Concrete Reinforcement will include supply and placing as listed in the Schedule of Quantities and Prices as shown in Drawings.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Contractor's Engineer.
- .2 Provide materials free of loose rust and mill scale or coating which may reduce concrete bond.
- .3 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .4 Weldable reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA-G30.18.
- .5 Plain round bars: to CAN/CSA-G40.21.
- .6 Cold-drawn annealed steel wire ties: to CSA-G30.3.
- .7 Deformed steel wire for concrete reinforcement: to CSA-G30.14.
- .8 Welded steel wire fabric: to CSA-G30.5. Provide in flat sheets only.
- .9 Welded deformed steel wire fabric: to CSA-G30.15. Provide in flat sheets only.
- .10 Chairs, bolsters, bar supports, spacers: acceptable non-metallic material in accordance with CAN/CSA-A23.1.
- .11 Tie wires: 16-gauge minimum, black annealed wire.
- .12 Mechanical splices: subject to approval of the Departmental Representative.

### 2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Reinforcement splices shall be located as detailed on the reviewed placing drawings. Obtain the Departmental Representative's approval for locations of reinforcement splices other than those shown on reviewed placing drawings.
- .3 Upon approval of the Departmental Representative, weld reinforcement in accordance with CSA-W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

### 2.2 SOURCE QUALITY CONTROL

- .1 All steel incorporated in the Work shall be identified by heat number.
- .2 Upon request, provide the Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, prior to fabrication.
- .3 Upon request, inform the Departmental Representative of proposed source of material to be supplied.

## PART 3 EXECUTION

### 3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by the Departmental Representative. When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .2 Replace bars which develop cracks or splits, or exhibit excessive surface contamination.

**3.2 HANDLING AND STORAGE**

- .1 Reinforcing steel shall be handled and stored at all times so that damage, surface contamination and loss of identification tags are avoided.

**3.3 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on reviewed shop drawings and in accordance with CAN/CSA-A23.1.
- .2 Prior to placing concrete, obtain the Departmental Representative's approval of reinforcing steel and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.
- .4 Deviation from placement, such as for construction access, to be noted and submitted to the Departmental Representative for review not less than fourteen (14) days prior to construction.

**3.4 FIELD TOUCH-UP AND REMEDIATION**

- .1 Where reinforcing bars project temporarily from concrete structures already cast, protect the exposed bar portions from corrosion until subsequent concrete is placed. Prior to placing concrete, clean off loose rust and mill scale or coating that may reduce concrete bond.

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 SECTION INCLUDES**

- .1 Metal Works (as indicated on Drawings) including but not limited to:
  - .1 Railings: including all guardrails, handrails, gates, railings, screens, bike barriers, mesh panels, and fasteners
  - .2 Decking: deck base frame and transition plate
  - .3 Inset: decorative plate and inset metal train tracks
  - .4 Furnishings: bike rack, sign base, custom bench, flag pole, fish stencil, metal collar at removable bollard
  - .5 Engineered Shop Drawings of all items must be submitted for approvals by Departmental Representative prior to fabrication.

### **1.2 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 06 20 00 – Finish Carpentry
- .3 Section 12 50 00 – Furnishings
- .4 Section 32 13 13 – Concrete Paving

### **1.3 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A53/A53M - Latest Edition, Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated Welded and Seamless.
  - .2 ASTM A269 - Latest Edition, Specification for Seamless and Welded Stainless Steel Tubing for General Service.
  - .3 ASTM A307 - Latest Edition, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.40 - Latest Edition, Anti-corrosive Structural Steel Alkyd Primer.
  - .2 CAN/CGSB-1.181 - Latest Edition, Ready-Mixed, Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-G40.20/G40.21 - Latest Edition, General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CAN/CSA-G164 - Latest Edition, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16.1 – Latest Edition, Limit States Design of Steel Structures.
  - .4 CSA W48 – Latest Edition, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .5 CSA W59 - Latest Edition, Welded Steel Construction Metal Arc Welding.
- .4 The Environmental Choice Program
  - .1 CCD-047a - Latest Edition, Paints, Surface Coatings.
  - .2 CCD-048 - Latest Edition, Surface Coatings - Recycled Water-borne.

### **1.4 SUBMITTALS**

- .1 Shop Drawings
  - .1 Submit Shop Drawings signed and sealed by an Engineer licensed to practice in BC for approval by Departmental Representative prior to fabrication.

- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

#### **1.5 MEASUREMENT FOR PAYMENT**

- .1 Payment for exterior metalwork will be by lump sum based on price bid. Payment shall be for all labour, equipment, materials and incidentals required for the specified work as shown on drawings and specified herein.

#### **1.6 SAMPLES**

- .1 Provide samples of metal items to be approved by the Departmental Representative prior to commencing fabrication work.

#### **1.7 PROTECTION**

- .1 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Departmental Representative at no extra cost to the Departmental Representative.

#### **1.8 QUALITY ASSURANCE**

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, installation instructions, and fabricators warranty requirements.

#### **1.9 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading: Deliver, store, handle and protect materials.
- .2 Storage and Protection:
  - .1 Cover exposed steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
  - .2 Leave protective covering in place until final cleaning of building and provide instructions for removal of protective covering.

#### **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials, remove from site and dispose of packaging materials at appropriate recycling facilities.

### **PART 2 PRODUCTS**

#### **2.1 MATERIALS**

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Seamless hollow structural sections, conforming to CAN3-G40.21, Grade 350W, Class C.
- .3 Steel pipe: to ASTM A53/A53M standard weight Grade B.
- .4 Welding materials: to CSA W59.
- .5 Bolts, anchor bolts, nuts and washers: to ASTM A307 or as indicated on Drawings.
- .6 Stainless steel tubing: to ASTM A269, Type 302 Seamless welded with AISI No. 4 satin finish.
- .7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

#### **2.2 FABRICATION**

- .1 Verify all dimensions on site prior to proceeding with shop fabrication.

- .2 Where possible, fit and shop assemble in largest practical sections for delivery to site.
- .3 Fabricate all work in accordance with details shown on Drawings and reviewed Shop Drawings. Work to be square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .4 Use self-tapping shake-proof oval-headed screws on items requiring assembly by screws or as indicated on Drawings.
- .5 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .6 Bolted work shall be carefully tightened with threads of bolts nicked to prevent subsequent loosening, unless work indicated is noted as demountable.
- .7 Drill or punch all holes required for the attachment of work of other trades and bolted connections.

### **2.3 ANCHORS, BOLTS AND SCREWS**

- .1 All fixing and anchorage for miscellaneous metal work shall be supplied as detailed and as required to suit installations and erection.
- .2 ACQ corrosion resistant screws/bolts for all pressure-treated wood applications.

### **2.4 ANGLES AND CLIPS**

- .1 Provide all the angles, clips, plates etc. required to support or fix items of work.

### **2.5 FINISHES**

- .1 Primed and refinished steel with galvanized finish as noted on Drawings:: hot dipped galvanizing with zinc coating [600] g/m<sup>2</sup> to CAN/CSA-G164.
  - .1 Shop coat primer: to CAN/CGSB-1.40.
  - .2 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .2 Railings: including all guardrails, handrails, gates, railings, screens, bike barriers, mesh panels, and fasteners
  - .1 Flat Bar, L-Bracket Frame, Plates: galvanized steel (thickness per details)
  - .2 Posts: galvanized HSS tube (100mm diameter)
  - .3 Gate Hardware: Heavy-duty, industrial locking gate latch and hinge hardware to support frame load
  - .4 Handrail: 42mm galvanized steel handrail welded to 25mm galvanized steel flat bar
  - .5 Bike Barrier Hardware: Heavy-duty, industrial locking gate pin and hinge hardware suitable to support gate load
  - .6 Mesh Panels: galvanized stainless steel mesh (25mm square grid for fall protection or 50mm square grid per drawings)
  - .7 Existing deck guardrails: to be refinished (free from scratches with dents repaired or touched-up) to satisfaction of Departmental Representative
  - .8 Note: all dimensions per Landscape Details
- .3 Decking: steel deck base frame and transition plate
  - .1 Decking and frame: galvanized steel structural support frame per drawing
  - .2 Transition plate: 13mm thick, stainless steel, one bar style checker plate
  - .3 Note: all dimensions per Landscape Details
- .4 Inset Metal: decorative plate and inset metal train track line
  - .1 Inset decorative metal plate: 10mm thick, hot rolled steel flat bar
  - .2 Inset train tracks: typical steel train rail track

- .5 Furnishings: bike rack, sign base, custom bench, flag pole, fish stencil, metal collar at removable bollard
  - .1 Bike rack: 25mm thick powdercoated (Regent Grey) galvanized steel plate (with 2mm radius on all exposed edges) and custom laserjet text stencil cut
  - .2 Sign Base: 12mm thick powdercoated (Regent Grey) galvanized steel plate (with 2mm radius on all exposed edges) and custom laserjet text stencil cut
  - .3 Custom Bench: hot rolled steel i-beam support
  - .4 Flag Pole: existing pole to be refinished (free from scratches with dents repaired or touched-up) and aluminum collar to be replaced
  - .5 Fish Stencil: to be made of re-usable steel product that can tolerate multiple sandblast applications
  - .6 Metal Collar at Removable Bollard: 5mm thick powdercoated (Regent Grey) galvanized steel sleeve
  - .7 Note: all dimensions per Landscape Details

## **2.6 ISOLATION COATING**

- .1 Isolate aluminum from following components, by means of bituminous paint:
  - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - .2 Concrete, mortar, masonry, and wood.

## **2.7 SHOP PAINTING**

- .1 If applicable, apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Paint colour to be approved by Departmental Representative. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

## **2.8 DUPLEX POWDERCOATING**

- .1 As indicated on drawings – galvanized steel custom bike rack and sign blade to be duplex powdercoated

## **2.9 ANGLE LINTELS**

- .1 Steel angles: galvanized, sizes indicated for openings. Provide 150 mm minimum bearing at ends.
- .2 Weld or bolt back-to-back angles to profiles as indicated on Shop Drawings.
- .3 Finish: galvanized, refer to Drawings.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Examine all details of the work as related to this section and other sections. Ensure that all conditions are suitable to provide a complete and satisfactory installation or be responsible for any additional costs involved.
- .2 Carefully inspect all surfaces and the work of other trades as it relates to the work of this section for defects and discrepancies and report same to the Departmental Representative.

**3.2 ERECTION**

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Execute all metalwork in a thorough and workmanlike manner according to best shop practices. Material cut from stock to the sheared or parted straight and all deburred. Where cuts are burned, grind off clean and true to line. Exposed welding or welding in fitted surfaces to be ground smooth or filleted as required. Fabricate all items accurately, true to line and dimension.
- .3 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .4 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .5 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .6 Provide components for building by other sections in accordance with shop drawings and schedule.
- .7 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .8 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .9 Touch up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .10 Touch up galvanized surfaces with zinc rich primer where burned by field welding.

**3.3 RAILINGS**

- .1 Install railings to concrete as indicated on Drawings. Anchor bolt base plate to concrete footing complete with non shrink cementitious grout to fill hole.

**3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- .1 Carpentry Works (as indicated on Drawings) including but not limited to:
  - .1 Timber screens
  - .2 Decking
  - .3 Railing caps
  - .4 Bench seating
  - .5 Removable bollard
  - .6 Low picket edge
  - .7 Hardware and fastenings including bolts, washers, rods, clips, and any other required accessories.

**1.2 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 05 50 00 – Metal Fabrication
- .3 Section 01 35 43 – Environmental Procedures

**1.3 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A123/A123M-Latest Edition, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM A653/A653M-Latest Edition, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated by the Hot-Dip Process.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA B111-Latest Edition, Wire Nails, Spikes and Staples.
  - .2 CAN/CSA-G164-Latest Edition, M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CSA O121-Latest Edition, Douglas Fir Plywood.
  - .4 CSA O141-Latest Edition, Softwood Lumber.
  - .5 CAN/CSA-O325.0-Latest Edition, Construction Sheathing.
- .3 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-Latest Edition, FSC Principle and Criteria for Forest Stewardship.
  - .2 FSC-STD-20-002-Latest Edition, Structure and Content of Forest Stewardship Standards V2-1.
  - .3 FSC Accredited Certified Bodies.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber-Latest Edition.
- .6 South Coast Air Quality Management District (SCAQMD)
  - .1 SCAQMD Rule 1113-Latest Edition, Architectural Coatings.
  - .2 SCAQMD Rule 1168-Latest Edition, Adhesives and Sealants Applications.

#### **1.4 SUBMITTALS**

- .1 Provide sample of wood for approval prior to installation.

#### **1.5 QUALITY ASSURANCE**

- .1 Lumber identification: by grade stamp certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

#### **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials, remove from site and dispose of packaging materials at appropriate recycling facilities.

#### **1.7 MEASUREMENT FOR PAYMENT**

- .1 Payment for Exterior Finish Carpentry will be by lump sum based on Price Bid. Payment shall be for all labour, equipment, materials and incidentals required for the specified work as shown on Drawings and Specified herein.

### **PART 2 PRODUCTS**

#### **2.1 LUMBER MATERIALS**

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
  - .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Structural lumber, not exposed to view, shall be construction grade pressure treated hem/fir with the following average maximum moisture contents:
  - .1 Lumber greater than 51mm in thickness 20%
  - .2 Lumber 51mm or less in thickness 15%
- .3 Timber decking: incised PT rough cut full dimension No. 1 Grade D-Fir, with average moisture content not exceeding 12% - dimensions to match existing. Re-use and refinish existing material where possible.
- .4 Timber railing at tank cradles and custom bench: S4S structural select No.1 Grade Yellow Cedar stained with wood preservative. Provide treated wood sample for approval (dimensions per details).
- .5 Timber screen at south boundary: Timber material and finish to match existing installation. No. 1 grade timber only.
- .6 Removable timber bollard: re-used standard size telephone pole or equivalent
- .7 Low picket edge: 100mm x 100mm (4x4) pressure treated round timber posts with bevelled top
- .8 All lumber shall be straight, sound, and free of splits, warps, cracks, large knots, and other defects.
- .9 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
  - .1 S2S is acceptable for all.
  - .2 Board sizes: "Standard" or better grade.
  - .3 Dimension sizes: "Standard" light framing or better grade.
  - .4 Post and timbers sizes: "Standard" or better grade.

## **2.2 REUSED AND RECYCLED WOOD**

- .1 Reused wood and recycled wood to be approved by Departmental Representative and Departmental Representative prior to installation. Minimum curing to be one year for milled logs or as determined by Departmental Representative.
- .2 Re-use and re-finish existing deck materials per L0.1 Demolition and Site Protection Plan.
- .3 Refer to Drawings for proposed wood dimensions. All wood reused to be lightly structurally sound, lightly sanded or planed, free of fasteners, nails, and sharp edges, dirt and debris.

## **2.3 ACCESSORIES**

- .1 Metal includes all metals and finishes required in the fabrication of wooden items.
- .2 Connectors, nails, spikes, bolts, lagscrews, nuts, and washers shall be galvanized or as indicated on Drawings.
- .3 ACQ corrosion resistant screws/bolts for all pressure-treated wood applications.
- .4 Nails, spikes and staples: to CSA B111.
- .5 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .6 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

## **2.4 FINISHES**

- .1 Galvanizing or as indicated on Drawings to CAN/CSA-G164

## **2.5 WOOD PRESERVATIVE**

- .1 Wood preservative to be used shall be copper wood preservative referred to as CCA-C50 by B.C. Clean Wood Preserving Ltd., or approved with vacuum pressure impregnation to manufacturer's specifications CSA-080-15 with absorption rates as follows:
  - .1 General - 6.4 kg/m
  - .2 SCAQMD Rule 1113 - Architectural Coatings.
  - .3 Maximum allowable VOC limit 350g/L.
- .2 Surface-applied wood preservative: clear, or copper naphthenate, or 5% pentachlorophenol solution, water repellent preservative (translucent finish). Provide treated wood sample for approval.
- .3 Pentachlorophenol use is restricted to building components that are in ground contact and subject to decay or insect attack only. Where used, pentachlorophenol-treated wood must be covered with two coats of an approved sealer.
- .4 Structures built with wood treated with pentachlorophenol and inorganic arsenicals must not be used for storing food nor should the wood come in contact with drinking water.
- .5 All lumber which has been pressure-treated shall bear the inspection and classification label of the Underwriter's Laboratories of Canada.
- .6 All treated lumber shall carry certificate from treatment company, certifying the treatment amount and moisture percentage after kiln drying.
- .7 Where at all possible, wood preservative treated wood shall be cut and machined prior to application of preservative. Where pre-cutting is not feasible then untreated surfaces exposed due to cutting or boring shall be thoroughly soaked with the same preservative used in the initial treatment.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- .1 Workmanship: due to high visibility of all timber components, very high quality workmanship will be expected. All decking planks to be square and evenly spaced. Contractor to work with Drawings and adjust to suit site conditions.
- .2 Curved wood to be installed using pre-approved steaming process to fit plank to radii indicated on Drawings. Wood preservation treatment to be carried out prior to steaming.
- .3 Treat surfaces of material with wood preservative, before installation.
- .4 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum three minute soak on lumber and one minute soak on plywood.
- .5 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .6 Treat material as follows:
  - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
  - .2 Wood furring for outside surface of exterior masonry and concrete walls.
  - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

### **3.2 INSTALLATION**

- .1 Install members to lines, levels and elevations indicated. Space members uniformly. Refer to Drawings.
- .2 Install required steel connectors; all to be galvanized, stainless steel or approved alternative as shown on Drawings.
- .3 Joints to be butt joints unless otherwise noted. All joints to have neat finished edges, square, plumb and true.
- .4 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .5 Countersink bolts where necessary to provide clearance for other work.
- .6 Remove all splinters, burrs, rough edges, and other hazards to users.
- .7 All exposed wood to be oriented for best side visible.
- .8 Install furring and blocking as required to space-out and support fascia, soffit, siding and other work as required. Align and plumb faces of furring and blocking.
- .9 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .10 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using stainless steel fasteners or approved alternative.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- .1 Catalogue Furnishing Works (as indicated on Drawings), including but not limited to:
  - .1 Waste containers
  - .2 Benches
- .2 Refer to Drawings for locations.
- .3 Refer to the following specifications for information relating to:
  - .1 Custom Benches / Removable Bollards
    - .1 Refer to Section 06 20 00 – Finish Carpentry
    - .2 Refer to Section 05 50 00 – Metal Fabrications
  - .2 Flag Pole / Sign Base /Bike Rack
    - .1 Refer to Section 05 50 00 – Metal Fabrications

**1.2 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .3 Section 01 78 00 - Closeout Submittals.
- .4 Section 06 20 00 – Finish Carpentry
- .5 Section 05 50 00 – Metal Fabrications

**1.3 SUBMITTALS**

- .1 All pre-manufactured products must be submitted with complete samples to Departmental Representative 120 days in advance of installation. Departmental Representative must approve sample and any relevant colours, finishes and sizes prior to Subcontractor placing final orders.
- .2 Indicate dimensions, sizes, assembly, anchorage and installation details for each furnishing specified. This approved sample will be the standard to be maintained throughout the Work.
- .3 Provide maintenance data for care and cleaning of site furnishings for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for disposal. Fold up metal banding, flatten and place in designated area for recycling.

**1.5 QUALITY ASSURANCE**

- .1 A manufacturer's warranty is required for all pre-manufactured site furnishings specified in this section.

**1.6 DELIVERY AND STORAGE**

- .1 All furnishings shall be stored at source until installation on Site and all delivery of site furnishings shall be coordinated by the Subcontractor with the supplier.

**1.7 MEASUREMENT FOR PAYMENT**

- .1 Payment for furnishing installation will be by lump sum based on Price Bid. Payment shall be for all labour, equipment, materials and incidentals required for the specified work as shown on Drawings and Specified herein.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Bench to be industrial character, powder-coated steel frame (min.19mm thickness) with heavy-duty hardwood panel boards (ie. ipe or tropical hardwood) in upright rows (min.50mm x 150mm). Typical lengths to be 5835mm (no backrest) and 2995mm (with and without backrest).
  - .1 Example Bench: BLOCQ by MMCITE (or approved alternate).
    - .1 Type 1: Double Bench (no backrest)
      - .1 Model LBQ120T
      - .2 5835mm long
    - .2 Type 2: Single Bench (with backrest)
      - .1 Model LBQ150T
      - .2 2995mm long
    - .3 Type 3: Single Bench (no backrest)
      - .1 Model LBQ210T
      - .2 2995mm long
    - .4 Mount: Surface mounted
    - .5 Contact: Pat Zelenak at PlayWorks and ParkWorks (780) 453-6903
    - .6 Finish: Jatoba wood panels (untreated) with galvanized steel frame powdercoated 'Corten'
  - .2 Trash Receptacle to be industrial character, powder-coated steel frame (min.19mm thickness) with hardwood panel boards (ie. ipe or tropical hardwood) on front and rear face (min.50mm x 25mm). Canopy cover, with 120L capacity and lockable door.
    - .1 Example Trash / Recycling Receptacle: PRAX by MMCITE (or approved alternate).
      - .1 Type: PRX-B315T
      - .2 Mount: Surface mounted
      - .3 Contact: Pat Zelenak at PlayWorks and ParkWorks (780) 453-6903
      - .4 Finish: Jatoba wood panels (untreated) with galvanized steel frame powdercoated 'Corten'
  - .3 Metal hardware shall be hot-dipped galvanized or an approved nonferrous type. All connecting steel shall be medium structural steel conforming to CSA-G40.4 unless otherwise indicated on Drawing. All connecting steel shall be hot-dipped galvanized after fabrication.

**PART 3 EXECUTION**

**3.1 GENERAL**

- .1 All Materials and/or components damaged or deteriorated during delivery and storage will be rejected and shall be removed from the site and replaced at no extra cost to the Owner.
- .2 The Contractor shall be responsible for protection and maintenance of all completed work and finishes from time of completion until acceptance of work and shall make good all damage to work caused during protection and maintenance period, at no extra cost to the Owner.

**3.2 INSTALLATION**

- .1 Assemble furnishings in accordance with manufacturer's instructions.
- .2 Install true, plumb, and anchored, as directed by Departmental Representative or as shown on Drawings.
- .3 Touch-up damaged and clean exposed finishes to approval of Departmental Representative.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 01 44 00 – Regulatory Requirements
- .3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .4 Section 31 23 33 – Excavating
- .5 Section 32 01 90 – Tree Preservation

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Payment for Clear and Grub will be fixed price per hectare unit price based on Price Bid. Payment shall be for all labour, equipment, materials and incidentals required for the specified work as shown on drawings and Specified herein.
  - .1 Clearing
  - .2 Grubbing
  - .3 Close cut clearing
  - .4 Underbrush clearing
  - .5 Invasive plant removal

**1.3 REFERENCES**

- .1 Environmental Protection Agency, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .2 Invasive Species Council of British Columbia.

**1.4 DEFINITIONS**

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
- .4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 51 mm trunk diameter and disposing of fallen timber and surface debris.
- .5 Grubbing consists of excavation and disposal of stumps and roots boulders to not less than specified depth below existing ground surface.

**1.5 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide Erosion and Sediment Control Plan for approval by Departmental Representative.
- .3 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties for approval prior to delivery of materials to project site for:
  - .1 Tree wound paint: one liter can with manufacturer's label.
  - .2 Herbicide: one liter can with manufacturer's label.

**1.6 QUALITY ASSURANCE**

- .1 Construction occupational health and safety in accordance with Section 01 45 00 Quality Control.
- .2 Safety Requirements: worker protection.
  - .1 Workers must wear gloves, respirators dust mask, long sleeved clothing, eye protection, protective clothing, when applying herbicide materials.
  - .2 Workers must not eat, drink or smoke while applying herbicide material.
  - .3 Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.

**1.7 STORAGE AND PROTECTION**

- .1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, utility lines, site appurtenances root systems of trees which are to remain.
  - .1 Repair damaged items to approval of Departmental Representative.
  - .2 Replace trees designated to remain, if damaged, as directed by Departmental Representative.

**1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20 Waste Management and Disposal.
- .2 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.
  - .1 Trim limbs and tops, and saw into saleable lengths for saw logs, for pulpwood, for poles, for ties, and for fuel wood.
  - .2 Stockpile adjacent to site, or as directed otherwise by Departmental Representative.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Bituminous based paint of standard manufacture specially formulated for tree wounds.
- .2 Herbicide: effective for killing annual and perennial weeds, and bamboo grass, by being absorbed through roots and foliage. Conform to local municipal regulations.
  - .1 Spray applied on non-crop land areas.
- .3 Soil Material for Fill:
  - .1 Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials. Remove and store soil material for reuse.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- .1 Verify existing conditions before starting work. Verify that survey bench mark and intended elevations for the Work are as indicated.
- .2 Locate, protect, stake and flag existing features which are to remain. If damaged, restore to original or better condition unless directed otherwise. Notify Departmental Representative immediately if damage occurs.

**3.2 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 Regional, Federal and Municipal requirements.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removals.

**3.3 PREPARATION**

- .1 Inspect site and verify with Departmental Representative items designated to remain.
- .2 Locate and protect utility lines
  - .1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
  - .2 Notify Departmental Representative in ample time to minimize interruption of service when utility lines to be removed are encountered within area of operations,
- .3 Notify utility authorities before starting clearing and grubbing. Keep roads and walks free of dirt and debris.

**3.4 APPLICATION**

- .1 Manufacturer's instructions: comply with manufacturers written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

**3.5 CLEARING**

- .1 Clearing includes felling, trimming, and cutting of trees and other vegetation designated for removal, into sections and satisfactory disposal including downed timber, snags, brush, and rubbish occurring within cleared areas.
- .2 Clear as indicated Departmental Representative by cutting at height of not more than 310mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1015mm above ground surface.
- .3 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.
- .4 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.
- .5 Apply herbicide in accordance with manufacturer's label to top surface of stumps designated not to be removed. Confirm with Site Superintendent products not to be used on site.

**3.6 CLOSE CUT CLEARING**

- .1 Perform close cut clearing to ground level by hand to avoid damage to surrounding vegetation or structures.
- .2 Cut down trees overhanging area cleared as directed by Departmental Representative.
- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

**3.7 ISOLATED TREES**

- .1 Cut off isolated trees as indicated by Departmental Representative at height of not more than 310mm above ground surface.
- .2 Grub out isolated tree stumps.
- .3 Prune individual trees as indicated.

- .4 Trim trees designated to be left standing within cleared areas of dead branches 4 cm or more in diameter; and trim branches to heights as indicated.
- .5 Cut limbs and branches to be trimmed close to bole of tree or main branches.
- .6 Paint cuts more than 30mm in diameter with approved tree wound paint.

**3.8 UNDERBRUSH CLEARING**

- .1 Clear underbrush from areas as indicated at ground level.

**3.9 GRUBBING**

- .1 Remove and dispose of roots larger than 75mm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 200mm below ground surface.
- .3 Grub out visible rock fragments and boulders, greater than 310mm in greatest dimension, but less than 0.25 m<sup>3</sup>.
- .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

**3.10 INVASIVE PLANT MATERIAL**

- .1 Invasive plant materials are listed by the Invasive Species Council of British Columbia.
- .2 Remove all invasive plants by mechanical means only within the foreshore areas as described on the Demolition and Site Protection Plan L0.1 (extents to be determined on-site).
- .3 Do not introduce debris or undertake any work below the High Water Line.
- .4 Monitor and remove invasive material throughout the 1-year warranty period to allow for establishment of proposed planting.
- .5 Dispose of invasive plant material per industry requirements (ie. bagged and deep burial at landfill or incineration at appropriate facility).

**3.11 REMOVAL AND DISPOSAL**

- .1 Cut timber greater than 125mm diameter and stockpile as indicated. Stockpiled timber becomes property of Departmental Representative.
- .2 Dispose of cleared and grubbed materials by burning and burying.
- .3 Burn only in area designated by Departmental Representative. Burn under constant care of competent watchmen, at such times and so that surrounding vegetation, adjacent property or anything to remain will not be jeopardized.
- .4 Bury to approval of Departmental Representative by:
  - .1 Consolidating.
  - .2 Covering with minimum 500mm of mineral soil.
  - .3 Finishing surface.
- .5 Chip, mulch and stockpile cleared and grubbed vegetative material on site as directed by Departmental Representative.
- .6 Remove diseased trees identified by Departmental Representative and dispose of this material to approval of Departmental Representative.

**3.12 FINISHED SURFACE**

- .1 Leave ground surface in condition suitable for immediate grading operations and stripping of topsoil to approval of Departmental Representative.

**3.13 CLEANING**

- .1 Proceed in accordance with Section 01 74 20 - Waste Management and Disposal.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 01 44 00 – Regulatory Requirements
- .3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .4 Section 31 11 00 – Clearing and Grubbing
- .5 Section 31 23 33 – Excavating
- .6 Section 32 01 90 – Tree Preservation

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Subsoil Fill measured in square metres area down to elevation shown on Drawing including excavating existing subsoil, supply, stockpiling, scarifying substrate, placing where required, and compacting.
- .3 Granular Fill measured in cubic metres including supply, stockpiling, scarifying substrate, placing where required, and compacting.

**1.3 REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
- .2 ASTM C136-06 – Method for Sieve Analysis of Fine and Coarse Aggregates, Latest Edition.
- .3 ASTM D698-07e1 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m<sup>3</sup>).
- .4 ASTM D1557-07 – Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/m<sup>3</sup>).

**1.4 SUBMITTALS FOR INFORMATION**

- .1 Refer to Division 1 - General Requirements.

**1.5 EXISTING CONDITIONS**

- .1 Soils and Geotechnical Report - request from Departmental Representative.

**1.6 CLOSEOUT SUBMITTALS**

- .1 Refer to Division 1 - General Requirements.
- .2 Record Documentation: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

**1.7 QUALITY ASSURANCE**

- .1 The Departmental Representative or the Departmental Representative's representative is to inspect and approve all stages of the work. Provide forty-eight (48) hours notice to the Departmental Representative when inspection is required. Rough grading condition to be approved by Departmental Representative.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Subsoil Fill: Type in accordance with of Dike Authority Requirements and specified compaction.
- .2 Structural Fill: Type in accordance with requirements for specified compaction.
- .3 Drainage Conduits: PVC.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- .1 Verify existing conditions before starting work. Verify that survey bench mark and intended elevations for the Work are as indicated.
- .2 Locate, protect, stake and flag existing features which are to remain. If damaged, restore to original or better condition unless directed otherwise. Notify Departmental Representative immediately if damage occurs.

**3.2 PREPARATION**

- .1 Identify required lines, levels, contours, and datum. Locate, protect, stake and flag existing natural features, bench marks, buildings, pavement, surface features and underground utility lines which are to remain. If damaged, restore to original or better condition unless directed otherwise. Notify Departmental Representative immediately if damage occurs.
- .2 Protect existing trees, landscaping to remain to satisfaction of City of Richmond Arborist and Departmental Representative.
- .3 Costs incurred by any disturbance of existing active utilities, service lines, and existing trees not called for in under the Contract Documents, shall be borne by the Contractor.
- .4 Maintain access roads to prevent accumulation of construction related debris on roads. Use all means necessary to control dust on and near the work caused by operations.
- .5 Notify Departmental Representative of useable boulders larger than 450mm in diameter to be re-used. Coordinate stockpile location with Departmental Representative.

**3.3 SUBSOIL EXCAVATION**

- .1 Do not excavate wet subsoil or handle soils while in wet or frozen condition or in any manner in which soil structure is adversely affected.
- .2 Commence rough grading works after area has been cleared and grubbed and material removed from site.
- .3 When excavating through roots, perform work by hand and cut roots with clean sharp tools.
- .4 Stockpile useable soils in locations as directed by Departmental Representative and protect from erosion. Stockpile height not to exceed 2 m. Remove unuseable subsoils from site as per site waste management and disposal procedures. Avoid mixing topsoils with subsoil.
- .5 Repair and re-establish rough grades in settled, eroded and rutted areas to specified tolerances.
- .6 Repair, make good, and clean up any damage and/or debris to roads streets caused by this operation. Obtain and pay for all permits required for use of road and streets.

**3.4 FILLING**

- .1 Uniformly rough grade within limits of Contract. Ensure smooth finished surface within specified tolerances, levels, profiles, and contours as indicated on Drawings.
- .2 Remove surplus material and material unsuitable for fill, grading or landscaping off site.
- .3 Place fill in continuous layers. Maintain optimum moisture content of fill materials to attain required compaction. Maximum dry density to ASTM D698:
  - .1 85% under landscaped areas.
  - .2 95% under paved and walk areas.
- .4 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .5 Slope rough grade away from building 1:50 minimum or as indicated on Drawings. Grade ditches, swales, and or infiltration areas to depth required for maximum runoff.

- .6 The site surface (cut and fill areas) must be contoured to direct precipitation and run-off to infiltration areas, drainage ditches, or slopes leading away from the work area. Surfaces must always be left graded smooth and rolled with a smooth drum roller to minimize infiltration of water and subsequent deterioration of material due to excessive moisture content. Surfaces must never be left with undrained depressions or with a rough texture.
- .7 Rainwater can be used more effectively by: using materials for walkways and parking areas which slow down run-off by allowing percolation into the soil; focusing the flow of water by grading the site; storing water on the site; and handling rainwater in visible surface channels integrated with the landscaping rather than in buried pipes.
- .8 Do not disturb soil within branch spread of trees or shrubs to remain, unless directed by Project Arborist and/or Landscape Architect.
- .9 Stockpile areas and job site to be left completely clean and raked. Remove surplus materials not required for backfill, grading or landscaping from site as directed by the Departmental Representative.

**3.5 TOLERANCES**

- .1 Rough grade to following subgrade depths below finish grades:
  - .1 300mm below grades as per Landscape Rough Grading Drawings.

**3.6 FIELD QUALITY CONTROL**

- .1 Refer to Section 01 45 00 - Quality Control.
- .2 Inspection and testing of soil compaction to be carried out by licensed testing laboratory. Costs of tests will be paid by Contractor and approved by Departmental Representative at no cost to the Departmental Representative.
- .3 Submit testing procedure, frequency of tests, testing laboratory or certified testing personnel to Departmental Representative for approval.
- .4 Testing / analysis of materials disposed of off site; submit to Departmental Representative.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 01 44 00 – Regulatory Requirements
- .3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .4 Section 31 11 00 – Clearing and Grubbing
- .5 Section 31 23 33 – Excavating
- .6 Section 32 01 90 – Tree Preservation
- .7 Section 32 93 10 – Trees, Shrubs, and Groundcover Planting

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Excavating Soil Materials per cubic metre. Payment to include all labour and materials for general excavating to required elevations, loading and placing materials in stockpile or removing from site. Payment will not be made for over excavated work nor for replacement materials.

**PART 2 PRODUCTS**

**2.1 NOT USED.**

- .1 Not Used.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- .1 Verify existing conditions before starting work. Verify that survey bench mark and intended elevations for the Work are as indicated.
- .2 Locate, protect, stake and flag existing features which are to remain. If damaged, restore to original or better condition unless directed otherwise. Notify Departmental Representative immediately if damage occurs.

**3.2 PREPARATION**

- .1 Identify required lines, levels, contours, and datum locations.
- .2 Locate, identify, and protect utilities that remain from damage.
- .3 Protect plant life, lawns and other features remaining as a portion of final landscaping.
- .4 Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- .5 Refer to L0.1 Demolition and Site Protection Plan for additional requirements.

**3.3 EXCAVATION**

- .1 Excavate subsoil to accommodate paving, planting, non-architectural structures (ie. stairs and walls).
- .2 Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity.
- .3 Slope banks with machine to angle of repose or less until shored.
- .4 Do not interfere with 45 degree bearing splay of foundations.

- .5 Grade top perimeter of excavating to prevent surface water from draining into excavation.
- .6 Hand trim excavation. Remove loose matter.
- .7 Remove lumped subsoil, boulders, and rock < 600mm in diameter. Rocks/boulders > 600mm to be stockpiled on site.
- .8 Notify Departmental Representative of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- .9 Correct areas over excavated in accordance with Section 31 22 13 - Rough Grading.
- .10 Stockpile excavated material in area designated on site as directed by Departmental Representative.
- .11 Remove excavated material from site as directed by Departmental Representative. Refer to Section 01 74 20 Waste Management and Disposal.

**3.4 FIELD QUALITY CONTROL**

- .1 Section 01 45 00: Quality Control
- .2 Provide for visual inspection of bearing surfaces.

**3.5 PROTECTION OF FINISHED WORK**

- .1 Section 01 52 00 - Construction Facilities.
- .2 Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- .3 Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 LANDSCAPE ESTABLISHMENT MAINTENANCE**

- .1 Labour, materials, equipment and operations to maintain all landscaped areas on site including the irrigation system for a period of (1) year following Substantial Completion, at which time maintenance will be turned over to the Departmental Representative.
- .2 The maintenance period begins at time of Final Completion or when Substantial deficiencies have been corrected to approval of Departmental Representative and continues to the end of the defined Maintenance Period, except as noted in this specification. The Landscape Establishment Maintenance is to be read in conjunction with Maintenance outlined in Section 32 93 10 - Trees, Shrubs, and Groundcover Planting.
- .3 The work includes, but not be limited to: maintenance of growing medium and monitoring the site for erosion; grass and meadow management including mowing, fertilization, liming, and watering; maintenance of site including plant replacement, tree support, pruning, fertilization and watering; weed control; control of insect pests and disease; and litter and landscape waste clean-up for the specified duration.
- .4 Contractor to examine the site conditions and Drawings carefully and be fully satisfied in understanding the nature of the work required to meet the maintenance standards specified herein.
- .5 Best practices are tailored to *provide* corrective measures that are most cost effective. Herbicides and pesticides are prohibited unless approved by Municipal and or Regional regulators.

**1.2 QUALIFICATIONS**

- .1 Maintenance for native, naturalized plantings, and meadow grass habitat is more sustainable than typical ornamental landscape industry standards. Maintenance crews must be skilled and equipped to recognize where innovative and improved sustainable practices are to be used.
- .2 All work of this Section shall be carried out by fully experienced and licensed Contractors who are members of the British Columbia Landscape And Nursery Association with at least 5 years written and proven experience. Provide all required permits and insurance.
- .3 Integrated Pest Management handling and application (if required) shall be done only by applicators holding current certification under the B.C. Pesticide Control Act.

**1.3 RELATED SECTIONS**

- .1 Section 31 12 13 – Clearing and Grubbing
- .2 Section 32 91 21 – Growing Medium and Finish Grading
- .3 Section 32 92 23 – Sodding
- .4 Section 32 93 10 – Trees, Shrubs, and Groundcover Planting

**1.4 MEASUREMENT FOR PAYMENT**

- .1 Landscape Maintenance will not be measured for payment. The Price Bid for Landscape Maintenance shall be considered full compensation for all labour, equipment, materials and incidentals required for the specified work.
- .2 Payment Schedule:
  - .1 Maintenance shall be itemized as a separate price in the Tendering and Contract Section, with progress payments for maintenance made on a monthly basis.
  - .2 Labour shall be designated separately from materials. All billing for materials, mulch, fertilizer, sand and others shall be submitted with receipts of purchase.
  - .3 The Contractor shall prepare a monthly summary of maintenance work and site conditions and submit it to the Departmental Representative at the end of each calendar month, for the duration of the maintenance period.

- .1 Regular inspections shall be conducted by the Departmental Representative prior to approval for payment.
- .2 The log shall document the development and condition of plant material, as well as, preventative and/or corrective measures required which are outside the Contractor's immediate responsibility. Failure to submit an updated logbook will result in delay in processing payment.

## 1.5 REFERENCES

- .1 BCSLA/BCLNA Landscape Maintenance Standard or as specified herein.
- .2 Refer to Level 3 Moderate in the Landscape Maintenance Standard.
- .3 Refer to the BC Landscape Standard (Latest Edition) for Appearance Standards that are desired for a facility.
- .4 Invasive Species Council of British Columbia.
- .5 The Canada Fertilizer Act and Fertilizer Regulations

## 1.6 PROTECTION

- .1 Take necessary precautions to protect persons and property including site plantings, paving, curbs, utilities, buildings, and other site elements. If damage occurs by the Contractor during maintenance operations, report it immediately to the Departmental Representative and repair damage, to the satisfaction of the Departmental Representative, at no extra cost.

## 1.7 SCHEDULING

- .1 Provide Scheduling and timing of all planned maintenance works planting works in advance for acceptance by Departmental Representative.

## 1.8 MAINTENANCE - WARRANTY PERIOD

- .1 Establishment Maintenance procedures applies to all areas of growing medium, soil amendments, and plantings including removals and re-installations.
- .2 Warranty Period is the one (1) year period of time commencing from the date of Substantial Completion of the Planting Works, with Planting Works defined by the General Conditions.
- .3 Maintenance operations shall be carried out during the Warranty Period provided all deficiencies are corrected. If all deficiencies are not corrected prior to the expiration of the Warranty Period, the Contractor shall remain responsible for maintenance until all deficiencies are corrected to satisfaction of Departmental Representative.

## PART 2 PRODUCTS

### 2.1 EQUIPMENT

- .1 The Contractor shall provide all materials, labour and equipment necessary to perform the operations as specified herein and as required to provide the optimum environment for the establishment of plant and landscape materials. Equipment shall be suited to the work at hand, safety devices in place and functioning to WorkSafe BC Requirements. Equipment shall be kept clean and disinfected to prevent the spread of plant diseases.
- .2 Consult local by-laws prior to using power tools for maintenance. Quieter electric-powered tools should be considered in place of gas-powered tools.

**PART 3 EXECUTION**

**3.1 GENERAL**

- .1 The Contractor shall maintain the project free from any defect resulting from work done or material supplied by the Contractor. The Contractor shall, to the satisfaction of the Departmental Representative, rectify any defect that exists within the Maintenance Period. The Contractor must warrant all growing medium, soil amendments and fertilizers used on this project.
- .2 The Contractor shall be responsible for regular examination of the site during the term of the Contract and shall adjust the work schedule to suit site conditions.
- .3 Begin Establishment Maintenance immediately after Substantial Completion until Final Acceptance.

**3.2 PLANT ESTABLISHMENT**

- .1 The Contractor shall be responsible for the maintenance of all plants. Maintenance shall include all measures necessary to maintain plants in a vigorous, healthy, normal growing condition, providing an appearance characteristic of their species and appropriate to their surroundings. Such maintenance shall include but not be limited to general cultivation; weed, pest and disease control, mulching, moisture conservation and watering, fertilizing, plant protection, pruning, and general clean up.
- .2 All plant material shall be alive and in a healthy growing condition at the end of the maintenance period. Plant material not in such a condition or has problems which, in the opinion of the Departmental Representative, are sufficient to detract from the function, character or form of the plant material, will be rejected, and shall be removed from the site and replaced.
- .3 Planted areas including base of all trees, shall be scarified 2-3 times per growing season or as required to prevent caking of surface or mulch.
- .4 Mulch for planted areas and tree saucers to be replaced yearly or when required by erosion, decay, cultivation or vandalism.
- .5 Soil fertility to be maintained through regular application of mulch, and soil amendment as required to maintain soil pH.
- .6 All trees shall be protected against wind and snow damage by adequate staking, guying, tying or wrapping as conditions require. Guys, wire ties and stakes shall be examined at frequent intervals, and adjustments or renewals made to prevent abrasions or other damage to plants. Remove tree supports and level watering saucers at the end of the Maintenance Period.

**3.3 WATERING**

- .1 Manual Irrigation:
  - .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
  - .2 In the event of watering restrictions, or LEED®, which discourage the use of automatic irrigation system, provide manual watering in quantities and at intervals required to promote healthy, vigorous plant growth. Planted areas shall be watered at frequencies required to replenish moisture at the root zone. Maintain watering saucers at the base of all trees.
  - .3 Soil moisture shall be monitored during the growing season, and watering shall be done more frequently when plants are reaching the permanent wilting point. Scheduled applications of water shall be missed only when natural rainfall, or use of grey water or cisterns has penetrated the soil fully as required.

**3.4 WEED CONTROL**

- .1 Weeds are defined as undesirable plants and will include all plant species not intentionally planted or seeded, unless mutually agreed upon by the Departmental Representative and Contractor. Weeds will include, but not be limited to such plants as annual bluegrass, barn yard grass, chickweed, groundsel, horsetail, mallow, prickly lettuce, mustards, oxalis, pigweed, pineapple weed, plantain, shepherds purse, smart weed, snap weed, sow thistle, storks bill, thistle and will also include invasive, non-native

species such as Scotch broom, Himalayan blackberry, purple loosestrife. Weeds will also be defined as any of the grass seedlings that germinate and develop in the mulched shrub bed areas that are caused by an over application in the seeding or hydroseeding operation.

- .2 The Contractor shall be responsible for the regular inspection and removal of weeds from all landscape portions of the project. Weeding shall be done manually at a bi-weekly interval during the maintenance period. Weeds identified shall be removed within 1 week of inspection not allowed to be greater than 50 mm in spread. Weeds should be removed in their entirety, including root systems or any other belowground parts.
- .3 The Contractor shall monitor the site for the presence of weeds growing in pathways, roadways, shoulders, rock work, and hard construction. All weeds in these areas shall be removed.
- .4 The type of weeds in an area shall determine the method of treatment. Weed control may consist of, but is not limited to the following:
  - .1 Hand pulling, digging, cultivation,
  - .2 Encouraging the growth of desired plants which can compete with weeds. Time the mowing of grass areas to correspond with the seeding cycle of weeds.
  - .3 In situations where there is doubt concerning the necessity or effectiveness of a weed control measure, the decision of the Departmental Representative shall be final.

**3.5 PEST AND DISEASE CONTROL**

- .1 All planting areas shall be inspected periodically for pests and disease infestations at least every two months during the growing season.
- .2 Report pests and disease infestations along with recommended control program to the Departmental Representative for approval prior to undertaking controls. The use of pesticides and herbicides are prohibited.
- .3 Obtain written approval from the Departmental Representative and public notification prior to use of any pesticides or herbicide application.

**3.6 INVASIVE PLANT MATERIAL**

- .1 Invasive plant materials are listed by the Invasive Species Council of British Columbia.
- .2 Remove all invasive plants by mechanical means only within the foreshore areas as described on the Demolition and Site Protection Plan L0.1 (extents to be determined on-site).
- .3 Do not introduce debris or undertake any work below the High Water Line.
- .4 Monitor and remove invasive material throughout the 1-year warranty period to allow for establishment of proposed planting.
- .5 Dispose of invasive plant material per industry requirements (ie. bagged and deep burial at landfill or incineration at appropriate facility).

**3.7 FERTILIZATION**

- .1 It shall be the responsibility of the Contractor to maintain an adequate level of soil fertility through the regular application of mulches, suitable fertilizers, and the control of soil acidity where required. Lime shall be applied to plant areas where acidity is excessive (i.e. below pH 4.5). No lime shall be applied where specific planting requires an acid condition such as Ericaceous shrubs, rhododendrons and other acid liking broadleaf evergreens.
- .2 The Contractor shall apply, at least twice during growing season, slow release organic fertilizers to plantings. Apply fertilizer to plants in early spring, after danger of frost has past, and again mid autumn, at manufacturers suggested rate or as required to promote health growth. Fertilizer shall be slow release, sulphur coated urea base, Agrico Evergro Total (23-3-23) or approved equal. The Contractor shall provide receipts for fertilizers along with the regular maintenance log book.
- .3 Meadow Habitat does not prefer high N fertilizers or manure.

**3.8 PRUNING**

- .1 No pruning of any plant material shall commence without prior approval of Departmental Representative and or Arborist.

**3.9 ESTABLISHMENT MAINTENANCE DURING WARRANTY PERIOD**

- .1 From time of Acceptance by Departmental Representative to end of Warranty Period, perform following maintenance operations:
  - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
  - .2 Reform damaged watering saucers.
  - .3 Remove weeds monthly.
  - .4 Replace or respread damaged, missing or disturbed mulch. For non-mulched areas, cultivate monthly to keep top layer of soil friable.
  - .5 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
  - .6 Apply fertilizer in early spring as indicated by soil test.
  - .7 Remove dead, broken or hazardous branches from plant material.
  - .8 Keep trunk protection and tree supports in proper repair and adjustment.
  - .9 Remove trunk protection, tree supports and level watering saucers at end of warranty period.
  - .10 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
  - .11 Submit monthly written reports to Departmental Representative identifying:
    - .1 Maintenance work carried out.
    - .2 Development and condition of plant material.
    - .3 Preventative or corrective measures required which are outside Contractor's responsibility.

**3.10 REPLACEMENTS**

- .1 Replace each defective or dead plant within 10 days hours after notification by the Departmental Representative and continue to replace each plant until it has established itself to the satisfaction of the Departmental Representative.
- .2 All required replacements shall be plants of the same size and species as specified on the plant list and shall be supplied and planted in accordance with the Drawings, Specifications and Change Orders thereto or as directed by Departmental Representative.
- .3 The cost of replacements resulting from theft, accidental damage, vandalism, carelessness, neglect on the part of others, shall be borne by the Landscape Contractor until the Final Acceptance.

**3.11 ACCEPTANCE**

- .1 Maintenance of Planted areas will be accepted by Departmental Representative at the end of Warranty Period provided that all deficiencies have been corrected to the satisfaction of the Departmental Representative. Plant material will be accepted by the Departmental Representative provided that plant material exhibits healthy growing condition and is free from disease, insects, and fungal organisms.
- .2 Plant material installed less than 4 days prior to frost will be accepted in following spring, thirty (30) days after start of growing season provided that acceptance conditions are fulfilled.

**3.12 CLEAN-UP**

- .1 Remove from the site all pots, cans, surplus materials, and other debris resulting from planting operations.
- .2 Ensure complete removal of planting tags, labels, strings, or other materials prior to Substantial Completion.
- .3 Neatly dress and finish all planting areas and flush all walks and paved areas clean to the satisfaction of the Departmental Representative.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- .1 Provide labour, materials, and equipment necessary for tree protection and to fertilize root systems of existing plant materials affected by changing grades, excavation, and building construction as specified herein, and as indicated on Drawings.
- .2 Sustainable requirements for construction and verification as directed by Departmental Representative.

**1.2 RELATED SECTIONS**

- .1 Section 01 56 00 – Temporary Barriers and Enclosures
- .2 Section 01 74 20 – Construction/Demolition and Waste Management Disposal
- .3 Section 31 22 13 - Rough Grading
- .4 Section 31 23 33 - Excavating
- .6 Section 31 11 00 - Clearing and Grubbing

**1.3 APPROVALS**

- .1 The intent of tree preservation measures is to minimize changes or damage to branching habit, the health, and root areas of these trees. A certified Arborist will be engaged to oversee all tree protection strategies and will provide on-site consultation during the initial stages of the construction work.
- .2 Do not remove any trees or branches from existing trees, or excavate around trees to be retained without prior approval by the Departmental Representative.
- .3 Layout of protective fencing to City of Richmond Tree Protection Standards.
- .4 Protection areas must be fenced at all times. Do not encroach, dispose waste materials, or store construction materials within designated tree protection areas unless directed by designated representative of the Owner, as approved by the Departmental Representative. Failure to comply shall infer the responsibility of the Contractor to damaging of retained existing trees.
- .5 Obtain approval from Departmental Representative of schedule indicating beginning of Work.

**1.4 REFERENCES**

- .1 BCSLA Landscape Standards Latest Edition
- .2 ISA Arboriculture Standards
- .3 The Canada Fertilizer Act and Fertilizer Regulations

**1.5 SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit monthly written reports on maintenance during Warranty Period, to Departmental Representative identifying:
  - .1 Maintenance work carried out.
  - .2 Development and condition of plant material.
  - .3 Preventative or corrective measures required which are outside Contractor's responsibility.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:

- .1 Separate waste materials for recycling in accordance with Section 01 74 20 Waste Management and Disposal. Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic in designated containers and dispose of unused fertilizer material at official hazardous material collections site. Do not dispose of unused fertilizer material into sewer system, into streams, lakes, onto ground or in any other location where they will pose health or environmental hazard.

**1.7 MAINTENANCE DURING WARRANTY PERIOD**

- .1 From time of acceptance by Departmental Representative to end of warranty period, perform following maintenance operations:
  - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
  - .2 Apply pesticides in accordance with Provincial and Municipal regulations as and when required to control insects, fungus and disease. Obtain product approval from Departmental Representative prior to application.
  - .3 Apply fertilizer in early spring at manufacturer's suggested rate.
  - .4 Remove dead, broken or hazardous branches from plant material. Dispose of debris through alternative disposal, composting or mulching.

**1.8 MEASUREMENT FOR PAYMENT**

- .1 Payment for Tree and Shrub Preservation will be by lump sum based on Price Bid. Payment shall be for all labour, equipment, materials and incidentals required for the specified work as shown on Drawings and Specified herein.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Fill:
  - .1 Sand: clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.
  - .2 Soil: pervious soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc). Excavated material must not affect soil pH levels and shall be approved by Departmental Representative before use as fill.
  - .3 Adding mycorrhiza during planting operation might improve better root system and provide stress relief in plant growth. It is important that new root growth be in contact with mycorrhiza. Use as recommended by the manufacturer.
- .2 Coarse washed stones: 35-75 mm diameter clean round hard stone.
- .3 Draintile: 100 mm diameter HDPE or approved alternative perforated piping complete with snap couplings. Fill vents with 20 mm clear stone.
- .4 Peatmoss:
  - .1 Derived from partially decomposed species of Sphagnum Mosses. Elastic and homogeneous, free of wood and deleterious material which could prohibit growth. Shredded minimum particle size: 5 mm.
- .5 Fertilizer:
  - .1 To Canada Fertilizer Act and Fertilizers Regulations.
  - .2 Complete, commercial, slow release with 35 % of nitrogen content in water - insoluble form.
- .6 Anti-desiccant: commercial, wax-like emulsion, to be approved by Departmental Representative.
- .7 Filter Cloth: 100 % non-woven or biodegradable burlap.

- .8 Recycled Wood posts or recycled composite plastic posts: 38 x 89 x 2400 mm length.
- .9 Welded wire fabric (WWF): 100 x 100 mm, MW x MW, to CSA G30.5.

### **PART 3 EXECUTION**

#### **3.1 IDENTIFICATION AND PROTECTION**

- .1 Construction Occupational Health and Safety in accordance with Section 01 35 33 - Health and Safety Requirements.
- .2 Identify plants and limits of root systems to be preserved as indicated on Drawings and approved by Departmental Representative.
- .3 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by Departmental Representative.
- .4 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an Arborist or Canadian Certified Horticultural Technician (CCHT) as approved by Departmental Representative.

#### **3.2 ROOT CURTAIN SYSTEM (IF APPLICABLE)**

- .1 Identify Extent of Disturbance limits for required construction excavation as indicated on Drawings and approved by Departmental Representative.
- .2 Prior to construction excavation, hand dig trench minimum 500 mm wide x 150 mm deep, along perimeter of excavation limits.
- .3 When depth of excavation for walls, foundations, and footings exceeds 1500mm, provide additional support for posts and curtain as required.
- .4 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.
- .5 Install wooden posts or recycled composite plastic posts and welded wire fabric against construction edge of trench.
- .6 Securely attach filter fabric on plant side of wire mesh.
- .7 Prepare homogeneous mixture of fertilizer, parent material and organic matter.
  - .1 Add organic matter to mixture to achieve 7-9% organic matter content by weight.
  - .2 Incorporate with mixture grade 2:12:8 ratio fertilizer (dry) at rate of 1.5 kg/m<sup>3</sup> or per manufacturer specifications.
- .8 Backfill with homogeneous mixture between curtain wall and plants to be preserved in layers not exceeding 150 mm in depth. Compact each layer to 85 % Standard Proctor Density.
- .9 Protect root curtain from damage during construction operations.
- .10 Water plants and root curtain sufficiently during construction to maintain optimum soil moisture condition until backfill operations are complete.
- .11 Protect root curtain during backfill operations. Ensure root curtain is cut down to 300 mm below finished grade and remove cut material.

#### **3.3 AIR LAYERING SYSTEM (RAISING GRADES)**

- .1 Using manual methods, carefully remove turf, plants, leaves and organic matter in area of root system, dispose of plant matter through compost site and slightly loosen topsoil surface. Avoid damage to root system.
- .2 Lay horizontal system of perforated drain pipe on surface of existing grade.
  - .1 Slope drain tile minimum 3% for drainage away from trunk of tree.
  - .2 Connect system with general site drainage system or drain to low point on site.

- .3 Install vent pipes vertically over joints in horizontal pipe system. Top of vent pipe to be 20 mm above finished grade of fill. Keep top of vent pipe covered during construction.
- .4 Cover joints with filter fabric and place coarse washed stone around joints and vertical pipes to secure their position.
- .5 Construct stone drywell around trunk of tree.
  - .1 Ensure open ends of vertical vent pipes are left exposed for air circulation to root system.
  - .2 Protect openings from blockage during construction.
  - .3 Install protective caps on exposed horizontal openings.
- .6 Place 200 mm depth of coarse washed stone on surface of original ground and horizontal pipe system to limits.
- .7 Place filter fabric over surface of granular layer.
- .8 Place washed stone mulch over filter fabric to required depth without disturbing or damaging drain pipe system. Avoid damage to filter fabric.
- .9 Complete topsoil and sodding or finished paving over area of sub-surface system within one week of placing fill.
- .10 Remove temporary protective covering from vent pipe openings. Install protective caps flush with finished grade.

#### 3.4 TRENCHING AND TUNNELING FOR UNDERGROUND SERVICES

- .1 Centre line location and limits of trench/tunnel excavation to be approved by Arborist / Departmental Representative prior to excavation. Tunnel excavation to extend 2000 mm from edge of trunk on either side.
- .2 Excavate manually within zone of root system. Do not sever roots greater than 40 mm diameter except at greater than 500 mm below existing grade. Protect roots, and cut roots cleanly with sharp disinfected tools.
- .3 Excavate tunnel under centre of tree trunk using methods and equipment approved by Arborist / Departmental Representative.
- .4 Minimum acceptable depth to top of tunnel: 1000 mm.
- .5 Backfill for tunnel and trench to 85 % Standard Proctor Density. Avoid damage to trunk and roots of tree.
- .6 Complete tunnelling and backfilling at tree within 2 weeks of beginning Work.

#### 3.5 LOWERING GRADE AROUND EXISTING TREE

- .1 Schedule work at time appropriate for plant species to be approved by Arborist.
- .2 Cut slope not less than 500 mm from tree trunk to new grade level or retaining wall.
- .3 Excavate to depths as indicated on Drawings. Protect from damage root zone which is to remain.
- .4 When severing roots at excavation level, cut roots with sharp tools.
- .5 Cultivate excavated surface manually to 15 mm depth.
- .6 Prepare homogeneous soil mixture consisting by volume of:
  - .1 60 % excavated soil cleaned of roots, plant matter, stones, debris.
  - .2 25 % coarse, clean sterile sand.
  - .3 15 % organic matter.
  - .4 Grade 2:12:8 fertilizer at rate of 1.5 kg/m<sup>3</sup>.
- .7 Place soil mixture over area of excavation to finished grade level. Compact to 85 % Standard Proctor Density.
- .8 Water entire root zone to optimum soil moisture level.

**3.6 PRUNING**

- .1 Prune crown to compensate for root loss while maintaining general form and character of plant. Dispose of debris through alternative disposal, composting, or mulching.
- .2 Prune in dormant season but not during heavy frost using clean sharp tools only.
- .3 Make cuts across the leading edge of the bark branch ridge to allow for a complete circle of callus to form around the cut. Do not make flush cuts and do not leave little stubs on trunks or main branches.
- .4 Remove dead and injured branches that rub together causing damage to bark. Sterilize tools before commencing pruning on each separate tree and shrub.
- .5 Thin out crown of trees and/or shrubs without changing their natural shape or habitat. Do not damage Lead branches. Remove smaller branches at juncture of limb from which they originate or cut at twig or bud pointing toward. Undercut larger branches to prevent tearing of bark.
- .6 Root pruning to be undertaken by designated Arborist under direction of Departmental Representative.
- .7 Where excavation is required, root prune during winter months one year in advance before excavation. Any exposed woody roots to be pruned cleanly.
- .8 Buffer area between new grade and protected root area to be backfilled with pumped river sand and composted manure as approved by Departmental Representative.

**3.7 ANTI-DESICCANT**

- .1 Apply anti-desiccant to foliage where applicable and as directed by Departmental Representative.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 32 13 13 – Concrete Paving

**1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM C117 – Latest Edition, Standard Test Method for Material Finer Than 0.075 (No. 200) mm Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C127 – Latest Edition, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
  - .3 ASTM C128 – Latest Edition, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
  - .4 ASTM C136 – Latest Edition, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .5 ASTM D995 – Latest Edition, Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
  - .6 ASTM D1559 – Latest Edition, Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations.
  - .2 Store and protect aggregate from damage.
  - .3 Replace defective or damaged materials with new.

**1.4 MEASUREMENT FOR PAYMENT**

- .1 Payment for all Exterior Asphalt will include supply and placing as listed in the Schedule of Quantities and Prices as shown in Drawings including grading associated with sub base and base preparation, filling and forming, compacting, reinforcing, backfilling and finishing; sealing of joints, saw cutting.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Soft, yielding materials or other portions of subgrade that will not compact to specification shall be removed and replaced with suitable material. Subgrade to be brought to a uniform and compacted 98% Standard Proctor dry density.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials. Dispose of surplus and unsuitable excavated material in approved location on site off site.
- .3 Place fill in maximum 150 mm layers and compact to at least 95% of maximum dry density to ASTM D698.
- .4 Asphalt concrete aggregates:

- .1 Coarse aggregate is aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm sieve when tested to ASTM C117.
- .2 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75 mm sieve and stockpile separately from coarse aggregate.
- .3 Separate stock piles for coarse and fine aggregate are not required for sheet asphalt.
- .4 Do not use aggregates having known polishing characteristics in mixes for surface courses.
- .5 Aggregate: material to Section 31 05 16 - Aggregate Materials

## **2.2 GRANULAR BASE**

- .1 Obtain Departmental Representative's approval of subgrade before placing granular base. Place granular base material to lines, widths, and depths as indicated.
- .2 Compact granular base in maximum 150 mm layers to at least 98% Standard Proctor dry density to ASTM D698.
- .3 Surface condition of base to be approved by Departmental Representative before placing concrete.

## **2.3 EQUIPMENT**

- .1 Pavers: mechanical self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
- .3 Vibratory rollers for parking lots and driveways:
  - .1 Minimum drum diameter: 750 mm.
  - .2 Maximum amplitude of vibration (machine setting): 0.5 mm for lifts less than 40 mm thick.
- .4 Haul trucks: of sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
  - .1 Boxes with tight metal bottoms.
  - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
  - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
- .5 Suitable hand tools.

## **2.4 MIX DESIGN**

- .1 Poured-in-place bituminous concrete paving 50mm depth placed in two 25mm lifts.
- .2 Mix design to be suitable for vehicular load, to be confirmed by Departmental Representative.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving installation in accordance with manufacturer's written instructions.
  - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied.

**3.2 SUBGRADE PREPARATION AND INSPECTION**

- .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 until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Verify grades of subgrade drains and other items set in paving area for conformity with elevations and sections before placing granular base and sub-base material.

**3.3 GRANULAR SUB-BASE AND GRANULAR BASE**

- .1 Place granular base and sub-base material on clean unfrozen surface, free from snow and ice.
- .2 Place granular base and sub-base to compacted thicknesses as indicated. Do not place frozen material.
- .3 Place in layers not exceeding 150 mm compacted thickness. Compact to density not less than 98% SPDD.
- .4 Finished base surface to be within 10 mm of specified grade, but not uniformly high or low.

**3.4 ASPHALT CONCRETE PAVING**

- .1 Place asphalt mix only when base or previous course is dry and air temperature is above 5 degrees C.
- .2 Place asphalt concrete in compacted layers not exceeding 50 mm.
- .3 Minimum 135 degrees C mix temperature required when spreading.
- .4 Maximum 160 degrees C mix temperature permitted at any time.
- .5 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
- .6 Compact parking lot and driveway asphalt concrete to density not less than 95 % of density obtained with Marshall. Roll until roller marks are eliminated.
- .7 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .8 Moisten roller wheels with water to prevent pick up of material.
- .9 Compact mix with hot tampers, in areas inaccessible to roller.
- .10 Finish surface to be within 10 mm of design elevation and with no irregularities greater than 10 mm in 4.5 m.
- .11 Repair areas showing checking, rippling or segregation as directed Departmental Representative.

**3.5 JOINTS**

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
- .2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
- .3 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.
- .4 For longitudinal joints, overlap previously laid strip with spreader by 50 mm.

**3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.7 PROTECTION**

- .1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38 degrees C.
  - .1 Do not permit stationary loads on pavement until 24 hours after placement.
- .2 Provide access to buildings as required.
  - .1 Arrange paving schedule so as not to interfere with normal use of premises.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 DOCUMENTS**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

**1.2 SECTION INCLUDES**

- .1 Supply all labour, materials, and equipment necessary to complete work as shown in Drawings including: grading associated with sub grade, preparation of granular base, filling and forming, compacting, reinforcing, dowels, backfilling and concrete finishing: construction joints undercrack control joints, sealing of joints, trowelling, formwork, saw cut control joints, and sandblasting. Items to include:
  - .1 Concrete Walks and Paving
  - .2 Concrete Curbing and Low Curb Walls for Post Railing Mount
  - .3 Concrete Edging and Banding
  - .4 Concrete Seatwall
  - .5 Concrete Sandblast Stencil

**1.3 RELATED SECTIONS**

- .1 Section 03 20 00 - Concrete Reinforcing
- .2 Section 01 33 00 – Submittal Procedures
- .3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .4 Section 32 14 13 - Precast Concrete Unit Paving

**1.4 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A23.1/A23.2-09 - Latest Edition, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
  - .2 Falsework in accordance with CSA S269.1 – Latest Edition, except where specified otherwise.
  - .3 CAN/CSA G30.18-M92 – Latest Edition, Billet-Steel Bars for Concrete Reinforcement.
  - .4 ASTM C666, ASTM C260, ASTM C171, ASTM D2628 – Latest Edition.
  - .5 CGSB 51-GP-51M – Latest Edition.

**1.5 MEASUREMENT FOR PAYMENT**

- .1 Payment for all Exterior Concrete Improvements will include supply and placing as listed in the Schedule of Quantities and Prices as shown in Drawings including grading associated with sub base and base preparation, filling and forming, compacting, reinforcing, backfilling and concrete finishing: sealing of joints, trowelling, formwork, saw cutting, sandblasting.

**1.6 SUBMITTALS**

- .1 Product Data:
  - .1 Submit following sampling and testing data:
    - .1 Sieve analysis for gradation of bedding and joint material.
    - .2 Proposed cement, fly ash, and supplementary cementing materials.

- .3 Cleaning and sealing compound.
- .2 At least twenty-eight (28) days before the start of each type of concrete work submit to the Departmental Representative for review, the following items:
  - .1 Source of concrete
  - .2 Source of cementitious material(s).
  - .3 Source of aggregates, including test report dated within one year demonstrating that aggregates meet the requirements of CAN/CSA-A23.1-M, including assessment of alkali-aggregate reactivity.
  - .4 Proposed admixtures and method of application.
  - .5 Mix design for each type of concrete, indicating material content of each component per m3.

**1.7 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Construct on-site samples (minimum 1200x1200mm) of proposed Landscape Architectural Concrete Finishes, for approval by Departmental Representative at least (2) two weeks prior to commencing work. Approved samples shall be used as the acceptable standard for all materials used on the project. Include:
  - .1 Forming materials, and architectural finishes including gaskets and ties, sealing materials, form jointing system (as applicable), form release agent, joints (expansion, control, isolation joints, sawcut, trowel)
  - .2 Construct additional samples as necessary until a sample is approved by the Departmental Representative. Samples may form part of the completed works provided they are hidden from view in the finished product. Concrete placed prior to sample approvals may be rejected.

**1.8 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installer: Company or person specializing in Portland cement and concrete paving with minimum PSPC policy experience requirement.
- .2 Certificates:
  - .1 Submit certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1. Provide product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements and performance standards.

**1.9 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, shipping, handling, and unloading: Unload cement and store in weathertight bins or silos that protect cement from dampness and contamination and provide easy access for inspection and identification of each shipment. Store admixtures, curing compounds and miscellaneous materials as recommended by manufacturer.

**1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Construction/Demolition Waste Management and Disposal Plan. Divert unused concrete materials from landfill to local facility approved by Departmental Representative.
- .2 Place materials defined as hazardous or toxic in designated containers. Ensure emptied containers are sealed and stored safely.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Portland Cement: Type 50 and to CAN/CSA-A3000.
- .2 Fly Ash: to CAN/CSA Class F or C
- .3 Aggregates: to CAN/CSA-A23.1 and tested in accordance with ASTM C666.
- .4 Supplementary cementing materials: to CAN/CSA-A3000.
- .5 Air entraining admixture: to ASTM C260.
- .6 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland Cement, water reducing and plasticizing agents of pouring consistency, capable of developing a compressive strength of 35MPa at 28 days.
- .7 Chemical admixtures: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .8 Curing compound: to ASTM C309, Type 1-D or 2.
- .9 Sheet material for curing: to ASTM C171, plastic sheets .
- .10 Burlap mats for curing: to ASTM C171.
- .11 Joint sealant, hot poured. Bond breaker to Departmental Representative's approval.
- .12 Joint seal, preformed polychloroprene elastomeric: to ASTM D2628.
- .13 Preformed expansion joint filler: to ASTM D1752.
- .14 Welded steel wire fabric: CSA G30.5
- .15 Dowels and tie-bars: to CSA G30.18.
  - .1 Dowels: clean, straight and free from flattened or burred ends, plain round bars of grade 300 or better conforming to CSA-G40.21 and be epoxy-coated to ASTM A775/A775M.
  - .2 Tie-Bars: deformed steel bars in compliance with CSA G30.18 and be epoxy-coated to ASTM A775/A775M.
- .16 Protective covers and insulation for cold weather concreting: to CAN/CSA-A23.1.
- .17 Dry pack grout: non-metallic aggregate, Type 10 Portland Cement and water capable of developing compression strength of 32MPa at 28 days.
- .18 Dovetail anchor slots: minimum 0.6mm thick galvanized steel with insulation filled slots.
- .19 Damproof membrane: Polyethylene film 0.15 mm: to CGSB 51-GP-51M.
- .20 Bonding adhesive: to be a two-part epoxy based adhesive as approved by the Departmental Representative.
- .21 Superplasticizer: to CAN3-A266.5-M "guidelines for the use of superplasticizing admixtures in Concrete".
- .22 Void form to be Styrafoam or approved alternative.
- .23 Clear penetrating silane/siloxane non-yellowing matte sealer.

**2.2 CONCRETE MIXES**

- .1 Submit concrete mix design to the Departmental Representative Materials Testing Agency for review prior to use. Job mix in accordance with CAN/CSA-A23.1, or as specified below.
  - .1 Sidewalks, curbs, gutters, slab-on-grade, stairs and precast:
    - .1 Minimum compressive strength at 28 days = 35 Mpa.
    - .2 Exposure Class = C2
    - .3 Air Content = 5-8%
    - .4 Maximum water to cement ratio of 0.40

- .5 Slump = 80mm +/- 20mm
- .2 Footings, walls, and columns:
  - .1 Minimum compressive strength at 28 days = 30 Mpa.
  - .2 Exposure Class = F2
  - .3 Air Content = 4-7%
  - .4 Maximum water to cement ratio of 0.50
  - .5 Slump = 80mm +/- 20mm
- .3 Use of chemical admixture will be approved only when specified mix requirements or workability cannot be achieved by proportioning of aggregates, water, cement and air entraining admixture.
- .4 Proposed changes in material source to be approved by Departmental Representative. New mix design to be approved by Departmental Representative.
- .5 Concrete mixes to be submitted for review by Departmental Representative.
- .7 Reinforcing Steel: in accordance with Section 03 20 00 - Concrete Reinforcing.
- .9 Granular Base and Fill Material: in accordance with 32 14 43 – Rocks, Gravels, Stone
- .10 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water-soluble soap.

### **PART 3 EXECUTION**

#### **3.1 WORKMANSHIP**

- .1 Order and schedule shipments to coincide with construction schedule. Obtain Departmental Representative's approval before placing concrete. Provide 24 hours notice, minimum, prior to placing concrete. Pumping of concrete is permitted only after approval of equipment and mix design.
- .2 Ensure reinforcement and inserts are not disturbed during concrete placement. Dowels shall be evenly placed, and aligned perpendicular to the joint and parallel to each other.
- .4 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .6 Concrete shall be deposited continuously, or in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or plains of weakness. If a section cannot be placed continuously, construction joints shall be located as permitted by the Departmental Representative. All pour and construction joints shall be formed with a straight-edge fixed to formwork. Placing shall be carried out at such a rate that concrete which is being integrated with fresh concrete is still plastic.
- .7 Compact concrete with high-frequency vibrators applied directly to concrete by experienced personnel. Do not over-vibrate.
- .8 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Attach steel dowels of deformed steel reinforcing bars with epoxy adhesive to the depths shown on the drawings or specified by the manufacturer.
- .9 Take every precaution to protect finished surfaces from stains and abrasions. Surfaces and edges likely to be damaged during the construction period shall be especially protected.
- .10 Do not place load upon new concrete until authorized by Departmental Representative.

#### **3.2 SUBGRADE**

- .1 Do grade preparation work in accordance with Section 31 23 16 - Excavating, Trenching and Backfilling.
- .2 Soft, yielding materials or other portions of subgrade that will not compact to specification shall be removed and replaced with suitable material. Subgrade to be brought to a uniform and compacted 98% Standard Proctor dry density.

- .3 Construct embankments using excavated material free from organic matter or other objectionable materials. Dispose of surplus and unsuitable excavated material in approved location on site off site.
- .4 Place fill in maximum 150 mm layers and compact to at least 95% of maximum dry density to ASTM D698.

### 3.3 GRANULAR BASE

- .1 Obtain Departmental Representative's approval of subgrade before placing granular base. Place granular base material to lines, widths, and depths as indicated.
- .2 Compact granular base in maximum 150 mm layers to at least 98% Standard Proctor dry density to ASTM D698.
- .3 Surface condition of base to be approved by Departmental Representative before placing concrete.
- .4 Refer to Section 32 15 40 – Crushed Stone Paving for granular base requirements.

### 3.4 FORMWORK

- .1 Verify lines, levels before proceeding and ensure dimensions agree with Drawings.
- .2 Prior to constructing formwork for all surfaces exposed to view, review all details and confirm joint locations and obtain written approval to proceed.
- .3 Construct forms to produce finished concrete conforming to shape, dimensions, locations, and levels indicated on Drawings. Keep form joints to a minimum and maintain leak free seal.
- .4 Reuse of plywood formwork and falsework subject to requirements of CAN/CSA-A23.1

### 3.5 CONCRETE PLACEMENT

- .1 Obtain Departmental Representative's approval of granular base and reinforcing steel prior to placing concrete.
- .2 Place concrete to lines, grades and depths as indicated. Use hand placing where machine spreading is not feasible.
- .3 Spread uniformly with approved equipment to thickness sufficient to allow for proper consolidation and finishing. Schedule concrete supply to minimize interruptions. When completing concrete placement for day, carry placement through to scheduled control joint location.
- .4 Do not place concrete on frozen surface or when raining. When rain appears imminent paving operation should cease. Protect freshly laid concrete from rain damage and adverse weather condition and in accordance with CAN/CSA A23.1. Extend protective coverings over edges of concrete and arrange so as not to bear on unprotected edges.
- .5 Immediately after floating, give walkway surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line or as indicated on Drawings.
- .6 Provide edging as indicated with 10 mm radius edging tool or as indicated on Drawings. Hand finish surfaces only when approved by Departmental Representative.

### 3.6 TOLERANCES

- .1 Tolerances shall not be cumulative. Deviations shall not exceed the following when checked with 4.5 m straight edge placed in any direction.
  - .1 Deviation from vertical line – 6mm in 3000mm, 9mm in 6000mm and 18mm in 12000mm or more.
  - .2 Deviation from flat surface (walls and paving) – 3mm in 3000mm.
  - .3 Deviation from horizontal – 6mm in 3000mm
  - .4 Deviation of relative position of columns and walls, thickness of slabs and walls in plan – 6mm.

### **3.7 EXPANSION AND CONTRACTION JOINTS**

- .1 General:
  - .1 Construct joints plumb, straight and square to details indicated.
  - .2 Transverse joints to coincide with those in adjacent pavement unless indicated or directed otherwise (maximum 3m).
  - .3 Install preformed joint filler at locations and to details indicated.
  - .5 Install expansion joints as indicated (maximum 9m). When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.
- .2 For Sawn Joints:
  - .1 Ensure joints are sawn straight. Mark joint alignment with chalk line or other suitable guide to approval of Departmental Representative.
  - .2 Saw joints using approved equipment and methods to produce joint dimensions indicated.
  - .3 Supply sufficient workers and equipment including standby equipment, to maintain satisfactory sawing schedule.
  - .4 Make initial saw cuts in progressive manner and as soon as concrete surface has hardened sufficiently to resist ravelling as cut is made and before shrinkage cracks occurs.
  - .5 If cracking occurs ahead of saw cut, stop sawing immediately. Move ahead several joints and cut one or more joints before returning to saw intermediate joints. Where cracking persists, make 3' (1 m) saw cut from one edge and complete sawing from opposite edge. Adjust sawing schedule accordingly.
  - .6 If uncontrolled cracking or other surface damage results from inadequate or improper sawing techniques suspend further concrete operations until situation is corrected and immediately remove and replace damaged slabs.
  - .7 Immediately on completion of sawing, flush joints with water to remove debris.

### **3.8 ISOLATION JOINTS**

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Seal isolation joints with sealant approved by Departmental Representative.

### **3.9 CURING**

- .1 Cure concrete by adding moisture continuously to exposed finished surfaces. During the curing period, no part of the concrete shall be permitted to become dry and prevent checking and cracking of the surface. Fresh concrete shall be protected from heavy rains, flowing water, and mechanical injury.
  - .1 Curing compound: If curing compound is used, apply evenly to form continuous film, in accordance with manufacturer's requirements.
  - .2 Burlap or cotton mats: place two pre-wetted layers on concrete surface and keep continuously wet during curing period.
  - .3 Sheet material: Cover slab with waterproof sheet material as soon as concrete has set sufficiently to bear weight without marking, sheet shall be in full contact with concrete surface during curing process.

### **3.10 FINISHING**

- .1 Submit a detailed description of the proposed paving construction methods, materials details, joint locations, and finishing methods, including marked-up drawings showing placing sequences to the Departmental Representative for review. No concrete paving shall be placed until the Departmental Representative is satisfied that the Contractor's proposed materials and methods will achieve a high quality product.

- .2 Finishing of formed surfaces exposed to view shall be free of bulges, fins, lips, and stains. All imperfections shall be removed by chipping or grinding and shall be patched and repaired as specified. Prevent dislodgement of coarse aggregate particles.
- .3 Formed surfaces: The finishes to be provided for the various formed surfaces shall be:
  - .1 Unexposed Finish:
    - .1 This finish shall apply to formed surfaces which are not exposed to view and where roughness is not objectionable. Plywood square edged and wood formwork materials to CAN/CSA Standards
    - .2 The surface, in general, shall not require any treatment after form removal, other than repair of defective concrete, snap-tie holes, and the removal of ridges and surface irregularities.
  - .2 Architectural Finish: Low Curb Walls
    - .1 Plywood or steel sheet finish - for all exposed surfaces unless otherwise specified. Overlay plywood shall be used as the finished form surface. Forms shall be constructed in accordance with Section 03 10 00.
    - .2 Clean 90 degree corners and edges. **No** chamfers unless indicated on Drawings.
    - .3 Form ties placed symmetrically in a uniform and consistent pattern. Form tie pattern to be illustrated in concrete shop drawings.
    - .4 Form release agents is to leave no residual staining on concrete. Form stripping agent to be colourless mineral oil, free of kerosene.
  - .5 Sandblast Finish: All Flat Works
    - .1 Light sandblast finish to exposed concrete as indicated on Drawings. Full sample mockup to be provided.
    - .2 Apply heavier shot blast finish to stencil as indicated on Drawings. Full sample mockup to be provided.
  - .6 Boardform Finish: CIP Concrete Bench
    - .1 75mm wide board pattern for all exposed surfaces as shown on Drawings unless otherwise specified.
    - .2 Clean 90 degree corners and edges. **No** chamfers unless indicated on Drawings.
    - .3 Form ties placed symmetrically in a uniform and consistent pattern. Form tie pattern to be illustrated in concrete shop drawings.
    - .4 Form release agents is to leave no residual staining on concrete. Form stripping agent to be colourless mineral oil, free of kerosene.

### 3.11 INSERTS

- .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where expressly detailed on structural drawings or approved by the Departmental Representative.
- .2 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of all modifications from the Departmental Representative before placing of concrete.

### 3.12 GROUT

- .1 Mix and place grout to manufacturers instructions.
- .2 Grout into place, bolts and other items of concrete hardware, stonework that are placed prior to pouring concrete.

**3.13 REPAIR AND PATCHING**

- .1 Repair of defective concrete work:
  - .1 Repairs shall match the surrounding area. Architectural concrete requiring repair is subject to rejection by the Departmental Representative and shall be removed and replaced. Removal and replacement of work shall be at no additional cost to the Departmental Representative.
  - .2 Where defective concrete is identified by Contractor during plastic condition, repair using methods approved by Departmental Representative. The Contractor shall demonstrate his repair techniques on a prototype sample panel.
  - .3 Repairs options to be approved include:
    - .1 Prepare the area to be repaired. This should include achieving the desired finish in the surrounding area. Remove loose particles and chip out part of the sound concrete to avoid feather edge repairs.
    - .2 Proportion the repair mix by weight according to the same proportions as used in the concrete mix but substituting a portion of white cement for grey cement. This should be based on tests to determine what is required to match the finished surface.
    - .3 Apply a coat of bonding material to the root of the areas to be repaired, being careful to avoid dripping on any surface to be exposed.
    - .4 Fill in the area to be repaired with mortar of the stiffest consistency that will permit placing. Consolidate in place and strike off so as to leave the repaired area slightly higher than the surrounding surface to permit initial shrinkage. The repair shall be left undisturbed for at least one hour before being textured.
    - .5 Cure the repaired area by keeping continuously damp for 7 days. Clean the repaired area to remove laitance and match the surrounding area. Grind off any high surface variations where directed by Departmental Representative.
- .2 Remove and replace defective concrete where directed by Departmental Representative.
  - .1 Remove minimum 3 m of pavement by sawing through concrete and replace with new concrete to this Specification.
  - .2 Construct contraction joint at boundary between sawn face of existing concrete and new concrete.
  - .3 Install new reinforcement, dowel bars and tie bars between old and new concrete as required and indicated by Departmental Representative.

**3.14 BACKFILLING**

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material approved by Departmental Representative. Compact and shape to required contours as indicated or as directed by Departmental Representative.

**3.15 PROTECTION**

- .1 Keep vehicular and pedestrian traffic off newly paved areas until paving has properly cured and joints have been sealed.

**3.16 CLEANING AND SEALING**

- .1 Surfaces shall be thoroughly cleaned and free of all foreign materials such as sand, chips, and dust from sandblasting and bush-hammering operations immediately prior to application of the sealer. Surfaces which are cleaned with a liquid cleaner shall be rinsed of all cleaning solution and allowed to dry before sealer application.
- .2 Apply two (2) coats of sealer to all exposed concrete surfaces (except paving) in strict accordance with manufacturer's instructions. The same method of application shall be used throughout the entire job. Use a clear penetrating silane/siloxane non-yellowing matte sealer. Do not apply sealer to concrete surfaces that receive additional finishes.

- .3 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**3.17 QUALITY CONTROL**

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Departmental Representative and paid by the General Contractor in accordance with CAN/CSA-A23.1-09. Non destructive Methods for Testing Concrete shall be in accordance with CAN/CSA A23.2-09.
- .2 Testing Laboratory will take additional test cylinders during cold weather concreting. Cure cylinders on job site under the same conditions as concrete which they represent.
- .3 If results of tests show concrete to be less than specified in quality or strength, the Departmental Representative shall have the right to have the mix designs altered for the remainder of the work at no cost to the Departmental Representative. Further testing and remedial measures required by CAN/CSA-A23.1 shall be done, the costs of this work paid for by the Contractor.
- .4 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve him of his contractual responsibilities.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal
- .4 Section 02 22 00 – Excavation, Backfill, and Grading
- .5 Section 31 22 13 – Rough Grading
- .6 Section 31 23 33 – Excavating

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Measurement and payment of precast unit paving will be by the square metre of unit paving supplied and installed. Tender price to include labour, equipment, materials and incidentals required for the supply and installation of unit paving as outlined in Section 1.2.

**1.3 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM) – Latest Edition.
  - .1 ASTM C 33, Specification for Concrete Aggregates.
  - .2 ASTM C 136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM C 140 - Sampling and Testing Concrete Masonry Units.
  - .4 ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
  - .5 ASTM C 936 – 08 – Solid Concrete Interlocking Paving Units
  - .6 ASTM C 979-05, Standard Specification for Pigments for Integrally Coloured Concrete.
  - .7 ASTM D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures using a 2.49 kg Rammer and 305 mm drop.
  - .8 ASTM D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures using a 4.54 kg Rammer and 457mm drop.
- .2 Canadian Standards Association (CSA International) – Latest Edition:
  - .1 CSA A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Method of Test for Concrete.
  - .2 CSA-A231.2-06, Precast Concrete Pavers.
  - .3 CSA-A23.2A Sieve Analysis of Fine and Coarse Aggregates.
  - .4 CSA A283-04, Qualification Code for Concrete Testing Laboratories.
  - .5 CAN/CSA-A82.56M-1976, Aggregate for Masonry Mortar.
- .3 Geotechnical Report – Upon request from Departmental Representative

**1.4 SUBMITTALS**

- .1 Product Data and Sampling:
  - .1 Submit Product and Installation Data: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

- .2 Submit Shop Drawings indicating layout, pattern and relationship of paving joints to fixtures, project edges, and where cut pavers will be required to suit detail and layout for Departmental Representative review and acceptance.
- .3 Submit (1) full size sample of each type, size, texture, and colour paver for Departmental Representative approval.
- .4 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties including:
  - .1 Sieve analysis for gradation of bedding and joint material
  - .2 Unit paver sampling and testing
  - .3 Evaluation of cleaning and sealing compound

#### **1.5 QUALITY ASSURANCE**

- .1 Qualifications: Installer, company or person specializing in precast concrete paver installations, permeable paving and vehicular rated paving, with minimum PSPC policy experience requirement.
- .2 Sample Mock-Ups:
  - .1 Construct Test mock-ups 2 x 2 m minimum area mock-up sample of each paving pattern, texture, colour, and or edge condition shown on Drawings for approval prior to paving works. Mock-up will be used to:
    - .1 Judge minimum acceptance standard for all paving workmanship, substrate preparation, operation of equipment and material application.
    - .2 To determine surcharge of bedding layer, joint sizes, lines, laying patterns, colours and texture for compliance with performance requirements. Final Compaction as approved by Departmental Representative.
    - .3 Approved mock-up may not remain as part of finished work.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .4 A manufacturer's warranty is required for the unit concrete pavers specified in this section.

#### **1.6 DELIVERY, STORAGE, & HANDLING**

- .1 Pavers shall be delivered to and stored at the work site on pallets, metal strapped, or wrapped in recyclable materials by the paver manufacturer.
- .2 Sand shall be protected against rain, snow, and standing water when stockpiled on site.
- .3 Protect all existing items to remain due to equipment and material storage. If damaged, restore to original condition unless specified otherwise at no cost to Departmental Representative. Notify the Departmental Representative immediately if any damage occurs.
- .4 Coordinate paving schedules to minimize interference with normal use of premises.

#### **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. Fold up metal banding, flatten and place in designated area for recycling.

## PART 2 PRODUCTS

### 2.1 CONCRETE PAVERS

- .1 Unit Pavers to be concrete with realistic wood texture patterns of various lengths (400mm – 1000mm) and equal width (250mm-300mm). Colour to be grey / charcoal. Minimum thickness of 51mm.
- .2 For example: Concrete Paving Type 1: Bridgewood Slab Paver manufactured by Barkman Concrete  
**Finish:** Standard  
**Color:** Weathered Grey  
**Size:** 890 x 250 x 51  
595 x 250 x 51  
440 x 250 x 51  
**Pattern:** Running Bond per Details  
**Install On:** Mortared Base on Concrete Slab.  
**Mortar Joints:** 3mm wide, with color to be approved by Departmental Representative prior to installation (color to match pavers).
- .3 Uniform in material colour, size, and from one manufacturer to CSA A231.1 Precast Concrete Paving delivered on site with palette and protective wrapping. Pigment in concrete pavers: to ASTM C979.

### 2.2 BEDDING SAND AND JOINT MATERIAL (NOT APPLICABLE)

- .1 Bedding Sand: clean, sharp, natural or manufactured from crushed rock or gravel, free from deleterious foreign matter or soluble salts. Do not use limestone screenings or stone dust.
- .2 Joint Sand filling shall be Polymeric Joint Sand, Techni-Seal HP Polymeric Sand or approved alternative. Joint sand must be free of soluble salts or contaminants that contribute to efflorescence.
- .3 Gradation: to CSA-A23.1, Table 4 - Grading Limits for Fine Aggregate, and CSA A179 as follows:

Sieve Designation	% Passing for Bedding Sand	% Passing Joint Sand
10 mm (No 2)		
5 mm (No 4)	95-100	100
2.5 mm (No 8)	80-100	95-100
1.25 mm (No 16)	50-85	70-100
0.630 mm (No 30)	25-60	40-75
0.315 mm (No 50)	10-30	10-35
0.160 mm (No 100)	2-10	2-15

### 2.3 SUB-BASE MATERIALS

- .1 Refer to Section 32 15 40 – Crushed Stone Paving for granular base requirements.

### 2.4 EDGE RESTRAINTS

- .1 All edges of unit paving shall be restrained. Type of edge restraint shall be approved and locations noted on Drawings. Pavers shall be restrained to withstand heavy vehicular traffic according to manufacturers' specification and as shown on Drawings.
- .2 Concrete curb: As indicated on Drawings

## 2.5 MORTAR AND GROUT

- .1 Thoroughly mix waterproof mortar ingredients in quantities needed for immediate use to ASTM C270.
  1. Add mortar colour and admixtures to requirements of mortar manufacturer's written instructions.
  2. Ensure uniformity of mix and colouration (review color with Departmental Representative)
  3. Take representative samples for testing consistency of strength and colour according to CSA A179.
  4. Use mortar within 2 hours after mixing at temperatures of 26 °C or 2½ hours at temperatures under 10 °C.
- .2 Remove chipped, cracked, and otherwise damaged units and replace with undamaged units.
- .3 Grouting: Grout masonry to CSA-A371 and CSA-A179 and as indicated, and in accordance with manufacturer's written recommendations.
- .4 Before placing mortar or grout obtain written approval of placement of connectors and reinforcement from Departmental Representative.
  - .1 Use rotating motion to press stone evenly into mortar and allow mortar to squeeze out freely beyond finished joint.
  - .2 Remove excess mortar from joints.
  - .3 After grout has set, remove packing for pointing.
- .5 Install continuous control joint fillers in control joints at locations indicated..
- .6 Set stones in full bed of mortar with vertical joints buttered and placed full, except where otherwise specified.
- .7 Embed only ends of lugged sills and steps in mortar.
  - .1 Leave balance of joint open for final pointing.
- .8 Place setting buttons or soft-wood wedges under stones to maintain joint thickness.
  - .1 Set heavy stones and projecting courses after mortar in courses below has hardened sufficiently to support weight.
- .9 Brace and anchor projecting stones until wall above is set.
- .10 Use soaked softwood wedges to support stone in proper alignment until mortar has set.
  - .1 Remove wedges when dry and without breaking them off, fill voids with pointing mortar.
- .11 Install through-wall flashing membranes at continuous shelf angles, steel lintels, ledges and similar obstructions to downward flow of water.
- .12 Tool joints only after initial set occurs.
- .13 Rake out joints and make ready for pointing.
  - .1 Sponge stone face along joints and remove droppings and splashed mortar immediately.

- .14 Set pavers with vertical joints unfilled.
- .15 Grouting: Wet ends of stone and pack exposed joints with joint filler. Fill joint with waterproof grouting mortar per drawings.
  - .1 Grout vertical joints of pavers.
  - .2 After grout has set, remove packing for pointing.
  - .3 Grout to be natural grey color, provide sample for Departmental Representative.
- .16 Pointing: Remove dirt and loose mortar from joints by using pressurized airstream.
  - .1 Wet joints for mortar pointing. Dry joints for sealant pointing.
  - .2 Point joints with pointing mortar in three stages. Rub smooth with appropriate tool

## **2.6 SEALING COMPOUND**

- .1 Apply clear urethane, exterior type, water based, specially formulated for application on precast concrete pavers.

## **PART 3 EXECUTION**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.2 STRUCTURAL BASE**

- .1 Verify that structural surfaces conform to levels and compaction required for installation of unit pavers. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative. Base Course shall be well drained and compacted to 98% Standard Proctor Density or as directed by Departmental Representative. Compaction testing to be conducted by qualified Testing Agency.
- .2 Verify that top of subgrade is uniform to within plus or minus 0.5% grade or within 5mm of desired grade and cross section.
- .3 Ensure that subgrade is not frozen or standing water is present during installation. Unsuitable material shall be removed and replaced with approved fill and or subbase material.
- .4 Sub-base shall not be less than 150mm in thickness for pedestrian areas unless otherwise shown on Drawings and shaped to a uniform surface within 9mm of desired grade and cross section.
- .5 Sub-base material shall be spread in layers not exceeding 150mm loose depths, brought to optimum moisture content and compacted to 98% Standard Proctor density as determined by compaction control tests conducted by a qualified Testing Agency.
- .6 Sub-base shall be inspected and have written approval by the Departmental Representative prior to sand and paver installation.

### **3.3 STRUCTURAL CURBS AND EDGE RESTRAINTS**

- .1 Install continuous edge restraint at edges of unit pavers. Verify that structural curbs and edge restraints conform to elevations and alignments required for installation of unit pavers. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

**3.4 PLACING OF BEDDING MATERIAL**

- .1 Ensure bedding material is not saturated or frozen at all times until installation is complete.
- .2 Spread and screed material on structural surface to achieve minimum 19mm to maximum 38mm compacted thickness after vibrating pavers in place. Do not use joint sand for bedding sand.
- .3 Do not disturb screeded material or use bedding material to fill depressions in structural surface.

**3.5 INSTALLATION OF CONCRETE PAVERS**

- .1 Lay pavers to patterns indicated on Drawings on mortar on concrete slab on approved compacted granular base course. Joints between pavers shall not exceed 3mm or as recommended by Manufacturer.
- .2 Paver to ensure radii, joint space standard, and to ensure ½ stagger pattern where possible and as determined in mock-up. Note: minimum ½ full size standard pieces at ends and edges.
- .3 Pavers shall be cut using an approved concrete saw to a straight even surface without cracks or chips. Guillotine cuts are not permitted. Fractured or broken pavers will not be accepted.
- .4 Place paver pallets and other materials without exceeding load bearing capacity, or otherwise detrimentally affecting installations.
- .5 Tamp and level pavers to their final level by 2 or 3 passes with low amplitude, high frequency plate compactor capable of at least 22 kN centrifugal compaction force. Use a minimum 19mm thick plywood or neoprene pad under plate compactor to vibrate pavers into bedding sand, to correct elevations and gradients. Do not tamp restrained edges.
- .6 Sweep jointing sand material over paver surface and vibrating pavers with plate compactor. Continue application of joint material and vibrating of pavers until joints are full. Do not vibrate within 1m of unrestrained edges of pavers. Leave a thin layer of sand on the pavers until occupancy.

**3.6 ALIGNMENT CONTROL**

- .1 Final surface elevations not to exceed plus or minus 6 mm under 4.8m long straightedge.
- .2 Surface elevation of pavers: 6mm above adjacent drainage inlets, concrete collars or channels. Ensure conformance of final elevations.

**3.7 CLEANUP**

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED WORK**

- .1 Section 31 22 13 - Rough Grading
- .2 Section 32 91 19 – Growing Medium And Finish Grading
- .3 Section 32 93 10 – Trees Shrubs and Groundcover Planting

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Stone finish will not be measured for payment. Payment will be for Lump Sum as Tendered to complete the work as indicated on Drawings. Refer to Schedule of Quantities.

**1.3 SAMPLES AND MOCKUP**

- .1 Submit samples of all stone materials (size, texture, and colour), weed control fabric, and edging specified for approval by Departmental Representative. Samples can be approved at source before delivery to the site. The approved sample will be the standard to be maintained throughout the Work.
- .2 Final placement and arrangements may vary from the Drawings. The Departmental Representative requests a full size mock-up field test section of material placement for approval of arrangement.

**1.4 QUALITY ASSURANCE**

- .1 Stonework shall be done by experienced tradesmen. Provide list or relevant projects and experience for approval prior to installation.

**1.5 PROTECTION**

- .1 Coordinate stone installation schedule to minimize interference with normal use of premises. Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property. Make good any damage at no cost to Departmental Representative.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 All rock shall be stored at source until on site installation. Notify the Departmental Representative minimum (10) working days prior to commencing placement of rock on site.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 General:
  - .1 Base Preparation: Crushed pit run, screened stone, gravel free from clay lumps, cementation, organic material, deleterious materials, or compacted subgrade.
  - .2 Stone shall be approved by Departmental Representative in writing prior to delivery to site. All stone shall be clean and free of fines, organic and deleterious material. Refer to Drawings for design intentions, placement, relative size and proportion.
- .2 Stone Types
  - .1 Gravels: clear washed gravel free of silts, sand, and clay
    - .1 50%: 40mm;
    - .2 50%: 20mm – 25mm;
  - .2 River Rock/River Stone
    - .1 Blend of: round, washed, smooth grey to black colour.
    - .2 Sizes: 25mm-75 mm diameter

- .3 Boulders:
  - .1 Onsite boulders can be used. Contractor to review boulders with Departmental Representative prior to installation to determine quantity for the purposes of determining imported boulders required for approvals prior to placement.
    - .1 Boulders collected from site shall be stockpiled and handled in a manner and location to prevent breakage.
- .3 Mortar: Type 10 Portland Cement mixed three parts coarse grained sand.
- .4 Drain Rock: 20mm – 25mm, clear washed gravel free of silts, sand, and clay.
- .5 Drain Pipe: PVC.
- .6 Edging: as indicated on Drawings.
- .7 Geotextile Filter Fabric: heat bonded, rot proof, woven polypropylene fabric. Nilex or approved alternate.

**PART 3 EXECUTION**

**3.1 SUBGRADE**

- .1 Ensure that subgrade preparation conforms to levels and compaction required to allow for installation of stone surface course. Compact to 95% maximum Dry Density or as directed by the Departmental Representative.
- .2 Ensure positive drainage. Subgrade is to be approved by Departmental Representative prior to placing surface course.

**3.2 GEOTEXTILE FILTER**

- .1 Install geotextile filter fabric as indicated on Drawings.

**3.3 STONE PLACEMENT**

- .1 All material shall be located true to grade, plumb, in location and layout as indicated on Drawings and under direction of Departmental Representative.
- .2 Place rockwork in depths, arrangement, on sand and sub-grade build-up as shown on Drawings prior to placement of growing medium. Ensure weed control fabric is not visible. On site inspection will be required for approval.
- .3 Dry mix concrete mortar may be used to stabilize material. No mortar may be visible upon completion. Mortar thickness for bedding stone minimum 25mm thick.
- .4 Boulders shall be placed to create a composition with similar orientation alignment. Set minimum 100mm below grade and placed by belts or chains. Boulders shall not be dumped or pushed in place.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED WORK**

- .1 Section 31 22 13 – Rough Grading
- .2 Section 31 23 33 – Excavating
- .3 Section 32 12 16 – Asphalt Paving
- .4 Section 32 13 13 – Concrete Paving
- .5 Section 32 14 13 – Precast Concrete Unit Paving

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Granular Sub-base, Base, and Topping will not be measured for payment. Payment will be for Lump Sum based on sq metre area as Tendered to complete the work as indicated on Drawings. Refer to Schedule of Quantities.

**1.3 REFERENCES**

- .1 American Society for Testing and Materials (ASTM) – Latest Edition.
  - .1 ASTM C 136, Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .2 ASTM C 117, Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .3 ASTM E 11, Specification for Wire - Cloth Sieves for Testing Purposes.
  - .4 ASTM D 4318, Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
  - .5 ASTM D 698, Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 2.49-kg Rammer and 304.8-mm Drop.
- .2 Canadian General Standards Board (CGSB) – Latest Edition.
  - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
  - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

**1.4 SAMPLES**

- .1 Submit samples of wearing course in accordance with Section 01 33 00– Submittals for approval by Departmental Representative. This approved sample will be the standard to be maintained throughout the Work. The Departmental Representative reserves the right to request a field test section of materials the Contractor proposes to use.

**1.5 QUALITY ASSURANCE**

- .1 The Contractor to ensure base course meets specified compaction requirements. Departmental Representative reserves the right to request test material and base compaction results.

**1.6 PROTECTION**

- .1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property. Make good any damage at no cost to Departmental Representative.
- .2 Provide access to building at all times. Coordinate paving schedule to minimize interference with normal use of premises.

**1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

**1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal, and with the Waste Reduction Workplan.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

.1 Granular Sub-base:

- .1 Crushed, pit run or screened stone, gravel or sand consisting of hard durable particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- .2 Gradations: within limits specified when tested to [ASTM C 136] and [ASTM C 117]. Sieve sizes to CAN/CGSB-8.1 rather than ASTM E 11. Refer to Table

**Table**

<b>Sieve Designation</b>	<b>% Passing</b>
75 mm	[100]
4.75 mm	[25-85]
0.425 mm	[5-30]
0.075 mm	[0-10]

.2 Granular Base

- .1 100mm depth (20mm) road mulch - crushed stone or gravel: hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials compacted to 98% Standard Proctor Density Maximum Dry or as directed by Engineer. Ensure complete compaction along all edge of all hard edges.
- .2 Gradations: within limits specified when tested to [ASTM C 136] and [ASTM C 117]. Sieve sizes to CAN/CGSB-8.1. Refer to Table

**Table**

<b>Sieve Designation</b>	<b>% Passing</b>
19 mm	[100]
12.5 mm	[70-100]
4.75 mm	[40-70]
2.00 mm	[23-50]
0.425 mm	[7-25]
0.075 mm	[3-8]

.3 Granular Topping

- .1 100mm depth well rolled crushed granite aggregate screenings: (9.5mm) diameter to dust free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- .2 Gradations: within limits specified when tested to [ASTM C 136] and [ASTM C 117].

**Table**

<b>Sieve Designation</b>	<b>% Passing</b>
9.5 mm	[100]
4.75 mm	[50-100]

Sieve Designation	% Passing
2.00 mm	[30-65]
0.425 mm	[10-30]
0.075 mm	[5-10]

- .4 Edging: Concrete curb as indicated on Drawings.
- .5 Geotextile filter: Polypropylene (for example: Nilex or approved alternate).

### **PART 3 EXECUTION**

#### **3.1 SUBGRADE**

- .1 Ensure that subgrade preparation conforms to levels and compaction required to allow for installation of granular base, sub-base and surface course.
- .2 Compact to 95% maximum Dry Density or as directed by the Departmental Representative.
- .3 Ensure positive drainage. Subgrade is to be approved by Departmental Representative prior to placing surface course. Excavate and replace any 'soft' areas in the subgrade prior to placing surface coat.

#### **3.2 GEOTEXTILE FILTER**

- .1 Install geotextile filter as indicated on Drawings.

#### **3.3 GRANULAR SUB-BASE**

- .1 Spread and compact granular sub base material in uniform layers not exceeding 150 mm compacted thickness or as indicated on Drawings.
- .2 Compact layer to 98% Standard Proctor Density in accordance with ASTM D 698 or as directed by Departmental Representative.

#### **3.4 GRANULAR BASE**

- .1 Spread and compact granular base material in uniform layers not exceeding 100 mm compacted thickness or as indicated on Drawings.
- .2 Compact to a density of not less than 98% Standard Proctor Density in accordance with ASTM D 698 or as directed by Departmental Representative.

#### **3.5 GRANULAR TOPPING**

- .1 Spread and compact granular topping material in uniform layers not exceeding 50 mm compacted thickness or as indicated on Drawings.
- .2 Granular topping to be placed at optimum moisture content (+/- 30%) and rolled with vibrating drum to refusal or as directed by Departmental Representative.

#### **3.6 EDGING**

- .1 Install edging true to grade, in location, layout as indicated on Drawings.

#### **3.7 FIELD QUALITY CONTROL**

- .1 Inspection and testing of crushed stone paving will be carried out by designated testing laboratory. With Contractor paying the costs.
- .2 Departmental Representative reserves the right to request a field test section of materials the Contractor proposes to use.

**3.8 ALIGNMENT & GRADE**

- .1 Layout on Drawings are for scope guidance only. The Departmental Representative is to approve horizontal pathway centre line alignment. Final alignment to be approved on site only.
- .2 Paving shall be installed in a manner such that there is positive drainage and no ponding of surface water.
- .3 Finish grades shall blend into adjacent topography.

**3.9 CLEANUP**

- .1 Rake smooth and blend into existing grades all disturbed areas.

**END OF SECTION**

**1.1 RELATED SECTIONS**

- .1 Section 31 22 13 - Rough Grading
- .2 Section 32 92 23 – Sodding
- .3 Section 32 01 21 – Landscape Establishment Maintenance
- .4 Section 32 93 10 - Trees, Shrubs, and Groundcover Planting

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Measurement for Payment for Growing Medium and Finish Grading will be made at the unit price per square meter tendered, and shall include imported topsoil, salvaged on site soils as approved by the Landscape Architect, amendments, preparation of existing grades, and finish grading, including settlement and consolidation as specified.

**1.3 DEFINITIONS**

- .1 For the purpose of this specification, the term 'Growing Medium' refers to 'Topsoil' which shall mean a mixture of mineral particulates, micro organisms and organic matter providing suitable medium for supporting intended plant growth.
- .2 Compost:
  - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner containing 40% or more organic matter.  
Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25:50), and contain no toxic or growth inhibiting contaminants.

**1.4 REFERENCES**

- .1 Latest Edition of British Columbia Landscape Standards (BCSLA) and British Columbia Landscape & Nursery Association (BCLNA).
- .2 Canadian system of Soil Classification

**1.5 SUBMITTALS**

- .1 Provide Soil Sample for approval of Departmental Representative complete with soil analysis.

**1.6 SOIL TESTING**

- .1 Advise Departmental Representative of sources of Growing Medium and manufactured topsoil to be utilized with sufficient lead time for testing (Minimum 7 days in advance).
- .2 Testing of Growing Medium and topsoil to be carried out by Pacific Soil Analysis (PH: 604.273.8226) or approved alternative. The Contractor is responsible for arrangement and payment for soil analysis and amendments as required. The recommendations of the soil laboratory will be the basis of requirements for soil acceptance and soil amendments.
- .3 Soil analysis shall include reasons for any rejection of submitted soil, required amendments such as sand, organic matter, fertilizers and lime to achieve adequate growing conditions. All submitted soil analysis results must be dated and include project name and submitted to Departmental Representative for approval prior to commencing work.
- .4 The Contractor shall guarantee that the Growing Medium submitted for laboratory analysis will be representative sample of the soil delivered to the site. The Contractor shall provide receipts (upon request) to the Departmental Representative. Failure to have the Growing Medium tested as indicated may result in the removal of substandard soils at Contractor's expense.

**1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert unused soil amendments from landfill to official hazardous material collections. Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Growing Medium: shall mean a mixture of mineral particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth. Soil texture is based on the Canadian system of Soil Classification.

**TABLE 1: GROWING MEDIUM FOR SEEDED AND PLANTED AREAS**

<b>TEXTURE: Particle Size Classes By The Canadian Soil Classification, And Other Parameters</b>	<b>PERCENT OF DRY WEIGHT OF MINERAL FRACTION (% UNO)</b>
GRAVEL greater than 2mm less than 25mm	0%
SAND greater than 0.05 less than 2mm	50 - -70%
SILT Greater than 0.002mm less than 0.05mm	10 – 30%
CLAY less than 0.002mm	0 – 20%
SAND FOR LAWNS	70-80%
FINES: SILT AND CLAY	12-25%
ORGANIC CONTENT percent of dry weight	12-20%
LAWNS	6-8%
ACIDITY PH	6 – 7 pH
DRAINAGE minimum saturated hydraulic conductivity (cm/hr)	2.0 (cm/hr)

**.2 SAND BASED GROWING MEDIUM FOR RIP-RAP EDGE**

- .1 Shall be a blend of free draining sand, select organic matter which is low-leaching and low in nutrients. It shall contain additional reactive components and mineral amendments to aid in the treatment of pollutants. An example of an acceptable product is the Cascade Ecomedia Level 2, Cascade Ecomedia Level 3, available through Cascade Envirotech, a division of Yardworks Supply Ltd. (604.625.7785). The media shall meet the following specifications in Table 2:

**TABLE: SAND-BASED GROWING MEDIUM**

<b>TEXTURE: Particle Size Classes By The Canadian Soil Classification, And Other Parameters</b>	<b>PERCENT OF DRY WEIGHT OF MINERAL FRACTION (% UNO)</b>
SAND	60-70%
FINES: SILT AND CLAY	10-25%
ORGANIC CONTENT percent of dry weight	15-20%
ACIDITY PH	6 – 7 pH
DRAINAGE minimum saturated hydraulic conductivity (cm/hr)	20 mm/hr)

- .2 The above chart(s) are a typical guide to growing medium composition. The Departmental Representative retains the right to approve or reject any growing medium based on the soil analysis. Nutrient Requirements and deficiencies shall be prepared from Compost Material, Sand and other Soil Amendments as required to meet the specifications herein.
- .3 Nutrient requirements shall meet the BCSLA/BCLNA Landscape Standard Growing Medium requirements for Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, sulfur and micronutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
- .4 Growing Medium shall not contain toxic substances or growth inhibiting materials. If unexplained plant loss occurs before the Warranty Period expires, soil will be tested for toxicity. If toxicity is determined, the Contractor will be responsible for replacement of affected plant material and soil, at no cost to the Departmental Representative.
- .5 Growing Medium shall be free from:
  - .1 Contamination by excessive weed seeds. The use of herbicides is not permitted. Weed control shall be carried out, as required to prevent competition with establishing plant material and to maintain the desired aesthetic. The presence of weeds in planted areas and seeded areas is limited to a maximum of 5% of surface area during the Warranty Period.
  - .2 Debris and stones over 50 mm diameter.
  - .3 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
- .6 Consistency: friable when moist.
- .7 Salinity: The electrical conductivity of the liquid taken from the soil pH evaluation shall not exceed 1.0 millimhos/cm before additions of fertilizers and/or liming agents.

## 2.2 GROWING MEDIUM AMENDMENTS

- .1 Peatmoss:
  - .1 Derived from partially decomposed species of Sphagnum Mosses. elastic and homogeneous, brown in colour, free of wood and deleterious material which could prohibit growth.
  - .2 pH value not less than 3.5 and not greater than 7, Moisture content at time of mixing shall be between 60 – 75%.
  - .3 Shredded particle minimum size: 5 mm.
- .2 Sand: clean imported pit sand or river pump sand, free of impurities, chemicals, horsetails, and other noxious weeds. Refer to Table 1. The saturation extract electrical conductivity of salinity shall not be greater than 2.0 millimhos/cm at 25 degrees C.
- .3 Lime: coarse ground dolomite lime containing minimum calcium carbonate and magnesium carbonate only as required by soil analysis report.
- .4 Fertilizer: Recommendations and application rate to be determined by soil test. If required:
  - .1 Slow release Certified Organic fertilizer products containing nitrogen, phosphorous, potassium and other micro-nutrients present in balanced ratios to support germination. An example of an acceptable product is provided by International Bio-Fert Manufacturing (Contact 604-530-1344, [www.biofert.net](http://www.biofert.net)) or approved alternative.
  - .2 Deliver in unopened containers with the manufacturer's guaranteed N-P-K analysis, type and trade name attached to each container.
- .5 Organic matter: compost or unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .6 Manure: If recommended by soil analysis: shall be free from salt or other harmful chemicals, such as any used to artificially hasten decomposition. The maximum saturation extract conductivity (salinity) shall be 3.0 mmhos/cm. at 25 degrees C. Screen the material to remove any woody particles longer than 25mm in any dimension, and all other non-organic material.

- .7 Bone meal: commercial raw bonemeal, finely ground with a minimum analysis of 4% nitrogen and 20% phosphoric acid.
- .8 Mulch:
  - .1 50mm min finishing mulch to all planted areas.
  - .2 Free of all soil, stones, roots or other extraneous matter, and free of weeds, seeds and spores.
  - .3 Place mulch over all growing medium except grass areas. Moisten uniformly and spread to a consistent settled depth of 50mm in tree and shrub planting areas, 25mm in ground cover areas.
  - .4 Mulch is to be composted sufficiently at high temperatures and for an extended time period so as to be free of extraneous matter, weeds, seeds, fungus and spores.
  - .5 Mulch is to be low odour (ie. not manure based).

### **PART 3 EXECUTION**

#### **3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 If required, provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties. Refer to sediment and erosion control plan, specific to site, and comply with local requirements.
  - .1 Erosion control mat (ie. example of approvable is the Enkamat). Install as per manufacturers specifications under Departmental Representative supervision.
  - .2 Mulch with tackifier (ie. example of approvable is the 50mm depth EcoBlanket mulch with tackifier by Denbow). Install as per manufacturers specifications under Departmental Representative supervision.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

#### **3.2 STRIPPING OF TOPSOIL (IF APPLICABLE)**

- .1 Begin topsoil stripping of areas after area has been cleared of brush weeds and grasses and removed from site.
- .2 Strip topsoil to 300mm or as determined by Departmental Representative and Soil Analysis.
  - .1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
  - .2 Amend subsoils as directed by soil testing analysis and recommendation.
- .3 Stockpile in locations as directed by the Contractor.
  - .1 Stockpile height not to exceed 2m.
  - .2 Protect stockpiles from contamination and compaction, wind blown soil particles, weed seeds and insects. Contamination of the ingredients may result in their rejection for use.
- .4 Dispose unused topsoil in an environmentally responsible manner but not used as landfill or as directed by Departmental Representative.

#### **3.3 PREPARATION OF SUBGRADE**

- .1 The Contractor shall examine the existing subgrade conditions and signify acceptance in writing to the Departmental Representative prior to commencement of work. Confirm the size and location of utilities and services prior to commencing work.
- .2 Repair any damage at no cost to Departmental Representative.

- .3 Grade the site, eliminating uneven areas and low spots, ensuring positive drainage. Verify that grades are correct. Any conditions which may adversely affect the performance of the landscape work shall be immediately brought to the attention of the Departmental Representative.
- .4 Remove debris, roots, branches, stones in excess of 50mm diameter and other deleterious materials at no additional cost to Departmental Representative.
  - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
  - .2 Remove debris which protrudes more than 25 mm above surface.
  - .1 Dispose of removed material off site.
- .5 Cultivate entire area which is to receive topsoil on existing grades to minimum depth of 300 mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

### 3.4 PLACING AND SPREADING OF GROWING MEDIUM / PLANTING SOIL

- .1 Commercial processing and mixing of soil components shall be done thoroughly by a mechanized screening process. No hand mixing shall occur unless approved by Departmental Representative.
- .2 Notify the Departmental Representative at least forty-eight (48) hours prior to Growing Medium placement for inspection. Place Growing Medium only after Departmental Representative has accepted subgrade.
- .3 Do not handle Growing Medium in a wet or frozen condition or in any manner in which structure may be adversely affected.
- .4 Spread topsoil in uniform layers not exceeding 150 mm (6 inches) over unfrozen subgrade free of standing water.
- .5 Spread topsoil / planting soil to following minimum depths after settlement and 80% compaction as shown on Drawings. Typically:
  - .1 Seeded Areas
    - .1 Seed/Sod Lawn 150mm
    - .2 Shrub / Groundcover Beds
      - .1 Typical 450 mm
    - .3 Planting at Rip-Rap Edge
      - .1 Plugs 300 mm
  - .6 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
  - .7 Increase sand content to 90% in the planting soil below lawns where heavy wear by pedestrians or maintenance equipment is anticipated. Increase sand content in a 1.5m wide strip at the bottom of swales, banks or other wet areas and as directed by the Departmental Representative. On steep south or west facing banks, reduce sand content in lawns and planting beds to 50 - 60% to improve moisture retention.
  - .8 During hauling and spreading, the paved roadway and other finished surfaces shall be kept clean and free of all Growing Medium, dust and debris.
  - .9 Test topsoil for NPK to determine fertilizer requirements and application rates.

### 3.5 SOIL AMENDMENTS

- .1 For planting beds: apply and thoroughly mix soil amendments into full specified depth of topsoil of existing soil at rates specified through soil analysis performed by qualified soil testing laboratory.

### 3.6 FINISH GRADING

- .1 Uniformly grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking. Consolidate topsoil to required bulk density using equipment approved Departmental Representative. Leave surfaces smooth, uniform and firm against deep footprinting.

- .2 Gradients shall be within the ranges shown in Table 1, except where shown on Drawings.

**TABLE 1**

<b>LOCATION</b>	<b>MINIMUM</b>	<b>MAXIMUM</b>
LAWN AND GRASS	50:1 (2%)	3:1
GRASS SWALES (without additional erosion protection) .1 Slope along invert .2 Side slopes	50:1 (2%) 6:1(preferred)	10:1 (10%) 3:1
UNMOWN AREAS	100:1 (1%)	2:1 *
PLANTED AREAS	50:1 (2%)	2:1 *

\* Note: Area may require erosion control prior to top soil and planting/seeding application for slope at 2:1 or steeper.

### 3.7 ACCEPTANCE

- .1 The Departmental Representative will review Growing Medium in place and determine acceptance of material, depth, and finish grading prior to plant installation. Approval of Growing Medium material subject to soil testing and analysis.
- .2 The Contractor shall be responsible for testing of soil, which will be carried out by testing laboratory approved by the Departmental Representative.
- .3 Dispose of materials not required off site. Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 31 22 13 – Rough Grading
- .2 Section 32 91 21 – Growing Medium and Finish Grading
- .3 Section 32 93 10 – Trees, Shrubs, and Groundcover Planting

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Supply, subgrade preparation, and placement of sodding will not be measured and will be by lump sum price based on metre squared area shown on Drawings.

**1.3 SUBMITTALS**

Samples: upon request submit Sod sample for each type specified and bio-degradable geotextile fabric if applicable.

**1.4 QUALITY ASSURANCE**

- .1 Supply upon request:
  - .1 Test Reports and certificates by supplier

**1.5 SCHEDULING**

- .1 Schedule sod laying to coincide with preparation of soil surface and other trades on site. Organize scheduling to ensure a minimum of on-site storage of sod, minimum movement and compaction of growing medium, and prompt watering operation.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Construction/Demolition Waste Management And Disposal. Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative. Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Nursery Sod: Quality and source to comply with standards outlined in 'Guide Specifications for Nursery Stock', BCLNA
  - .1 Turf Grass Nursery Sod types:
    - .1 Number 2 Standard Class 1 Lawn
  - .2 Sod Quality:
    - .1 Grown in a sand base with Soil portion of sod: 6 to 15 mm in thickness.
    - .2 Heavy clay based sod will not be accepted. Plastic webbing to hold sod together is not acceptable
    - .3 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.
    - .4 Density of sod sufficient so that no soil is visible
    - .5 Mowing height limit: 35 to 65 mm
- .2 Sod establishment support (as shown on Drawings)

- .1 Geotextile fabric: biodegradable, mm square mesh.
- .2 Wooden pegs: 17 x 8 x 200 mm.
- .3 Biodegradable starch pegs: 17 x 8 x 200 mm.
- .3 Water:
  - .1 Potable water supplied by Contractor at designated source.
- .4 Fertilizer:
  - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations". Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form.
- .5 Herbicide and Weed Control: IPM Best Practise and or direction from Departmental Representative.

### **PART 3 EXECUTION**

#### **3.1 PREPARATION**

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13 - Topsoil Placement and Grading. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, to tolerance of plus or minus 10 mm, for Turf Grass Nursery Sod to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site in location as directed by Departmental Representative.
- .5 Keep site well drained and clean up growing medium or debris spilled onto pavement.

#### **3.2 SOD PLACEMENT**

- .1 Obtain approval of subgrade and depth before starting sodding.
- .2 Lay sod during growing season. Sodding during dry summer period, at freezing temperatures or over frozen soil is not acceptable.
- .3 Water immediately after sod laying to obtain moisture penetration through sod into top 100 mm of topsoil.
- .4 Provide adequate protection of sodded areas against erosion and mechanical damage. Remove protection after lawn areas have been accepted.
- .5 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.
- .6 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .7 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.
- .8 Mow sod at height directed by Departmental Representative within 36 hours prior to lifting, and remove clippings.

#### **3.3 SOD PLACEMENT ON SLOPES AND PEGGING – FOR STEEP SLOPES ONLY**

- .1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.
- .2 Start laying sod at bottom of slopes.
- .3 Peg sod on slopes steeper than [3] horizontal to [1] vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:

- .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
- .2 Not less than [3-6] pegs per square metre.
- .3 Not less than [6-9] pegs per square metre in drainage structures. Adjust pattern as directed by Departmental Representative.
- .4 Drive pegs to [20 mm above soil surface of sod sections.

### 3.4 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods as recommended by type of turf. Number of applications will vary.

### 3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until Acceptance.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 100 mm.
- .3 Cut grass to 40 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas as directed by Departmental Representative. Apply herbicide when broad-leaf weeds start developing in competition with grass. When sod is top dressed and seeded apply herbicide only after new grass is well established and resistant to herbicide to IPM Best Practises..
- .4 Eliminate weeds by mechanical means to extent acceptable to Departmental Representative. If applicable, apply herbicide in accordance with manufacturer's instruction when winds are less than 10 km/h, when air temperature is above 10 degrees C.
  - .1 Do not apply herbicide unless directed by Departmental Representative.
- .5 Maintain sodded areas weed free 95%.
- .6 Fertilize sodded areas one month after sodding. Spread evenly and water in well. Postpone fertilizing until next spring if application falls within four week period prior to expected end of growth season in locality.

### 3.6 ACCEPTANCE

- .1 Turf Grass Nursery Sod areas will be accepted at Final Acceptance by Departmental Representative provided that:
  - .1 Sodded areas are properly established.
  - .2 Sod is free of bare and dead spots.
  - .3 No surface soil is visible when grass has been cut to height of 60mm.
  - .4 Sodded areas have been cut minimum 2 times prior to Acceptance.
  - .5 Lawns sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

### 3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- .1 Section 31 22 13 – Rough Grading
- .2 Section 32 01 21 – Landscape Establishment Maintenance
- .3 Section 32 91 21 – Growing Medium and Finish Grading
- .4 Section 32 92 23 – Sodding

**1.2 MEASUREMENT FOR PAYMENT**

- .1 Trees, Shrubs, and Planting will not be measured for payment. Trees, Shrubs, and Planting will be paid for the lump sum price tendered as shown on the Contract Drawings.
- .2 Payment includes all preparatory work, supply and planting, mulching, staking, and all related activities necessary to complete the work including Establishment Maintenance Section 32 01 90 to meet Conditions of Final Completion.
- .3 During Landscape Maintenance Periods, the Contractor shall submit monthly written log reports to Departmental Representative for approval prior to payment identifying Maintenance work carried out, development and condition of plant material and identifying preventative or corrective measures required which are outside Contractor's responsibility.

**1.3 REFERENCES**

- .1 BCLNA Guide Latest Edition Specifications for Nursery Stock and Specifications for Landscape Construction, and BCSLA Landscape Standards, Latest Edition.
- .2 Invasive Plant Council of BC
- .3 "Pruning Manual, Publication No. 1505," by Agriculture Canada.

**1.4 DEFINITIONS**

- .1 Mycorrhiza: association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.
- .2 Weeds: Any plant life not specified.
- .3 Landscape Maintenance: Refer to Section 32 01 90 - Landscape Maintenance

**1.5 QUALITY ASSURANCE**

- .1 Identification of the nursery (or nurseries) and any other sources of planting material for the site planting, including plugs, bulbs and seed. Nursery must have minimum (3) years documented experience specializing in growing and cultivating plants.
- .2 Installation Qualifications: Company must specialize in installation and planting with a minimum of (5) years documented experience. Contractor to consider all equipment required for planting including fueling procedures, frequency and emergency spill plans.
  - .1 Tree Pruning Qualifications: provide proof of Arborist Certification.
  - .2 Qualified Maintenance Services.
- .3 Health and Safety
  - .1 Submit inspection certificates for each shipment of plant material and fertilizers. Plants to be free of disease or hazardous insects.

**1.6 SUBSTITUTIONS**

- .1 Before substitutions of plant material are proposed, documented proof that materials are not available through search on the west coast of Canada and Western United States must be provided. Area of supply shall include but not be limited to the area as mentioned herein.

- .2 Contractor may be permitted to suggest substitutions with types and variations possessing the same characteristics. The Contractor must request in writing any substitutions of trees at least two (2) months and shrubs and groundcover at least two (2) months prior to planting. All substitutions must be approved by the Departmental Representative.

#### **1.7 DELIVERY STORAGE AND PROTECTION**

- .1 Protect plant material from frost, excessive heat, wind and sun damage during delivery. Replace, at no expense to the Owner, any plant material damaged as a result of the work of this section
  - .1 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in topsoil and watering to full depth of root zone.
  - .2 For pots and containers, maintain moisture level in containers. Heel-in fibre pots.
  - .3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.
- .2 Immediately store and protect plant material which will not be installed within 1 hour after arrival at site in storage location approved by Departmental Representative.
- .3 Deliver Store and manage hazardous materials in accordance with all applicable Laws and Regulations.
- .4 Plant material that has been located by the Departmental Representative and tagged for the project is to have the identification tags removed only after inspection and instruction by the Departmental Representative after delivery to the site.

#### **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling. Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations. Dispose of unused fertilizer and unused anti-desiccant at official hazardous material collection site.
- .2 Divert unused wood and mulch materials from landfill to composting facility.

#### **1.9 SCHEDULING**

- .1 Obtain approval from Departmental Representative of schedule 7 days in advance of shipment of plant material.
- .2 Provide Scheduling and timing of all planting works as specified and shown on Drawings, including confirmation of the lead time required prior to planting to obtain, grow, develop harvest, and/or transplant. These lead times shall be fully incorporated into the Contractor's Construction Schedule.
- .3 Schedule to include:
  - .1 Date for selection of representative sample at source by the Departmental Representative
  - .2 Quantity and type of plant material
  - .3 Shipping dates and arrival dates on site
  - .4 Planting Dates
- .4 Scheduling to be organized to ensure a minimum duration of on-site storage of plant material, minimum movement and compaction of growing medium, and prompt mulching and watering operations. Work schedule to be coordinated with other trades on-site.

#### **1.10 WARRANTY**

- .1 The Contractor hereby warrants that plant material as itemized on plant list will remain free of defects in accordance with General Conditions for (1) one full year from date of Substantial Completion to date of Final Acceptance, providing adequate maintenance has been provided.
- .2 End-of-warranty inspection will be conducted by Departmental Representative. The Departmental Representative reserves the right to extend Contractor's warranty responsibilities for an additional one

year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

**1.11 MAINTENANCE**

- .1 Specific maintenance requirements shall be as outlined in Section 32 01 21 – Landscape Establishment Maintenance. The maintenance period begins at time of Final Completion or when Substantial deficiencies have been corrected to approval of Owner and continues to the end of the defined Maintenance Period, except as noted in this specification. In cases where Landscape Maintenance Period is not required, maintenance shall continue for 45 days after Substantial Completion.
- .2 Maintenance includes necessary watering, cultivation, weeding, pruning, mowing, aerating, disease and insect control, protective spraying, replacement of unacceptable material, straightening plants which lean or sag, adjustment of plants which settle or are planted too low, and any other procedures consistent with good horticultural practice necessary to insure normal, vigorous and healthy growth of all work under this contract.
- .3 Maintain all accessories such as tree stakes, etc., in good condition including adjustment to keep tree stakes tight and repair or replace all such accessories when required.

**1.12 INSPECTION**

- .1 Make all planting available for inspection at one location at least one (1) month for inspection by the Departmental Representative prior to scheduled planting.
- .2 Notify the Departmental Representative at the completion of work for an Inspection for Substantial Performance.
- .3 All plants are subject to inspection and may be rejected for failure to comply with this specification at any time until Substantial Completion, and the end of the Warranty Period. Rejected material to be replaced and removed from the site at no cost to the Owner.
- .4 Final inspection of all planting will be made at the end of the specified Warranty Period. For release from the Contract, all plant materials supplied or transplanted must be alive and in a healthy, satisfactory growing condition at the time of inspection.
- .5 The Contractor shall be present during all required inspections as specified, or as required by the Departmental Representative.

**PART 2 PRODUCTS**

**2.1 SUSTAINABLE REQUIREMENTS**

- .1 Encourage the use of container products and plant production with recycled content or reduced resource efficiencies.

**2.2 PLANT MATERIAL**

- .1 Type of root preparation, sizing, grading and quality: comply with BCLNA and Canadian Standards for Nursery Stock.
- .2 Refer to Plant List on Drawings. Nursery stock shall be true to name, and of the size or grade stated and to the measurements specified in the plant list. Measurements specified are minimum size acceptable for each variety.
- .3 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system. Root balls shall be free from pernicious perennial weeds.
- .4 Plant material: Transplant or root-prune regularly, but not later than one growing season prior to arrival on site.
- .5 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.
- .6 Collected stock: maximum 40 mm in calliper, with well developed crowns and characteristically branched; no more than 40% of overall height may be free of branches.

- .7 Bulb Plantings if required as shown on Drawings.

### **2.3 SOIL AND AMENDMENT MATERIALS**

- .1 Growing Medium to depths as indicated on Drawings. Refer also to Section 32 91 21 - Growing Medium and Finish Grading. Soils collected from site for reuse to be tested and approved by Departmental Representative prior to installation.
- .2 Fertilizer, Peat Moss, Bone Meal, Lime and Mulch: refer to Section 32 91 19 – Growing Medium and Finish Grading.
- .3 Soils collected from site for reuse to be tested and approved by Departmental Representative prior to installation.
- .4 Water: Potable and free of impurities that would inhibit plant growth.

### **2.4 ACCESSORIES**

- .1 Wrapping Materials: Burlap and twine fastener.
- .2 Cable, Wire, Eye Bolts and Turnbuckles: Non corrosive of sufficient strength to withstand wind pressures and movement of plant life
- .3 Plant Protectors: wire, covered with black rubber to protect plant stems, trunks, and branches.
- .4 Mulch: 50mm – 150mm finishing mulch to all planted areas except Seeded areas using mulch per Section 32 91 21 Growing Medium and Finish Grading
- .5 Tree ties: no wire/hose ties are permitted. Flat woven Poly Propylene Material. 20 mm wide, 544kg Break Strength
- .6 Anti dessicant: horticulturally accepted non toxic, non hardening emulsion registered for use under Pest Control.
- .7 Adding mycorrhiza during planting operation might improve better root system and provide stress relief in plant growth. It is important that new root growth be in contact with mycorrhiza. Use as recommended by supplier.
- .8 Flagging tape: Fluorescent colour to be removed at Substantial Completion.

### **2.5 SOURCE QUALITY CONTROL**

- .1 Testing is not required if recent tests are available as per Section 32 91 21 – Growing Medium and Finish Grading.

## **PART 3 EXECUTION**

### **3.1 PRE-PLANTING PREPARATION**

- .1 Construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.
- .2 Verify that prepared subsoil is ready to receive planting.
- .3 Ensure plant material is acceptable to Departmental Representative and plant only during the season or seasons normal for such work determined by weather conditions and or as approved by Departmental Representative.
- .4 Remove damaged roots and branches from plant material.

### **3.2 EXCAVATION AND PREPARATION OF PLANTING BEDS**

- .1 Establishment of sub-grade for planting beds is specified in Section 31 22 13 - Rough Grading. Subgrade conditions must be approved by Departmental Representative prior to planting.
- .2 Preparation of planting beds, soil placement and finish grading is specified in Section 32 91 21 - Growing Medium Placement and Grading. For individual planting holes:

- .1 Stake out location and obtain approval from Departmental Representative prior to excavating. On-site adjustments may be necessary. Contractor to coordinate with Departmental Representative.
- .2 Excavate to depth and width as indicated. Remove subsoil, rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.
- .3 Scarify sides of planting hole and loosen bottom 150 – 300 mm . Contractor to ensure positive drainage at bottom of planting hole prior to installation – refer to Drawings. Remove ground water which enters excavations prior to planting. Notify Departmental Representative if water source, ground water is present.

**3.3 PLANTING**

- .1 For bare root stock, place 50 mm backfill soil in bottom of hole. Plant trees and shrubs with roots placed straight out in hole.
- .2 For jute burlapped root balls, loosen and cut away top one third of wrapping and wire basket without damaging root ball. Do not pull burlap or rope from under root ball. Non-biodegradable wrappings must be removed.
- .3 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.
- .4 Trees and Shrubs backfilling:
  - .1 Backfill soil in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.
  - .2 Form watering saucer as indicated. Water thoroughly and ensure saturation of root ball.
- .5 Ground Covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.
- .6 Bulbs: plant at a depth of two to three times bulb's width. Add handful of growing medium, compost, and bone meal to the planting hole. Plant up to 4-8 bulbs in random clumps for every square metre prior to seeding.
- .7 Plugs: pocket plant along rip-rap edge per drawings. Plant in groups of 5 or more.
- .8 Water plant material thoroughly. After soil settlement has occurred, fill with soil to finish grade.
- .9 Dispose of burlap, wire, tags and labels, and container material off site.
- .10 Water plants: (if applicable) shall be transplanted into perforated plastic planting baskets lined with filter fabric and mulched with pea gravel as detailed with materials specified.

**3.4 FERTILIZER APPLICATION**

- .1 Fertilize as per recommendations based on soil testing. Spread the tablets in each hole before planting trees. Place planting tablets at the following rates in prepared planting holes. Note: other sizes as per manufacturer's recommendations.

CONTAINER SIZE	TABLET SIZE	TABLETS PER PLANT
	21 g (0.75 oz)	1/25 calliper
#15 / 45 cm Tub	21 g (0.75 oz)	3
#7 / 35 cm Tub	21 g (0.75 oz)	3
#5 / 30 cm Pot	21 g (0.75 oz)	2
#3 / 27 cm Pot	21 g (0.75 oz)	2
#2 / 21 cm Pot	21 g (0.75 oz)	1
#1 / 15 cm Pot	21 g (0.75 oz)	1

**3.5 ACCESSORIES**

- .1 Install trunk protection prior to installation of tree supports when used.

**3.6 TREE SUPPORTS**

- .1 Install tree supports as indicated on Drawings. If staking is not specified, it becomes the option of the contractor with the Departmental Representative's approval and if staking is neither specified nor shown on the Drawings then it will be at the discretion of the Contractor.
- .2 Use double stake tree support for deciduous trees less than 3 m and evergreens less than 2 m.
  - .1 Place stake on prevailing wind side and 150 mm from trunk.
  - .2 Drive stake minimum 1200 mm below finish grade. Ensure stake is secure, vertical and unsplit. Do not penetrate root ball.
  - .3 Install guying collar approximately 1.2 m above grade.
  - .4 Thread Type 1 guying wire through guying collar tube. Twist wire to form collar and secure firmly to stake. Cut off excess wire.
- .3 Use 3 guy wires and anchors for deciduous trees greater than 3 m and evergreens greater than 2 m.
  - .1 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens and 1/2 height for deciduous trees. Collar mounting height not to exceed 2.5 m above grade.
  - .2 Guying collars to be of sufficient length to encircle tree plus 50 mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi-wraps; cut wire ends close to wrap. Spread lead wires equally proportioned about trunk at 120 degrees.
  - .3 Install anchors at equal intervals about tree and away from trunk so that guy wire will form 30 degree angle with ground. Install anchor at angle to achieve maximum resistance for guy wire.
  - .4 Attach guy wire to anchors Tension wire and secure by multi-wraps and installing clamps. Install wire tightener ensuring that guys are secure and leave room for slight movement of tree.
  - .5 After tree supports have been installed, install flagging tape to guys as indicated, remove broken branches with clean, sharp tools.

**3.7 MULCHING**

- .1 Ensure soil settlement has been corrected prior to mulching.
- .2 Mulch all trees, tree surrounds, shrub and groundcover planting areas to 50mm to 150mm depth. Ensure soil settlement has been corrected prior to mulching. Light rake to remove excess mulch away from stems and base of trunks and to eliminate low spots that could pond in rain events.

**3.8 PRUNING**

- .1 No pruning of any plant material shall commence without prior approval of Departmental Representative. Prune trees and shrubs according to accepted horticulture practises as outlined in the "Pruning Manual, Publication No. 1505," by Agriculture Canada.
- .2 Prune each tree and shrub planted to preserve the natural character of the plant and in a manner appropriate to its particular requirement in the landscape design. Pruning in general shall be heavier on collected than on nursery-grown plants. Remove all soft wood sucker growth and all broken or badly bruised branches with a clean cut.
- .3 Prune only with sharp tools. All pruning to be made to the bark branch ridge. No flush cutting or branch stubs to be left.

**3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD (UNTIL CERTIFICATE OF SUBSTANTIAL IS ISSUED)**

- .1 Perform following maintenance operations from time of planting to acceptance by Departmental Representative:

- .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
- .2 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
- .3 Remove weeds and invasive plants monthly.
- .4 Replace or respread damaged, missing or disturbed mulch.
- .5 For non-mulched areas, cultivate as required to keep top layer of soil friable.
- .6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
- .7 Remove dead or broken branches from plant material.
- .8 Keep trunk protection and guy wires in proper repair and adjustment.
- .9 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

### **3.10 MAINTENANCE DURING WARRANTY PERIOD**

- .1 From time of Final Completion (correction of all deficiencies) granted by Departmental Representative to end of Warranty Period, perform following maintenance operations:
  - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
  - .2 Reform damaged watering saucers.
  - .3 Remove weeds monthly.
  - .4 Replace or respread damaged, missing or disturbed mulch.
  - .5 For non-mulched areas, cultivate monthly to keep top layer of soil friable.
  - .6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
  - .7 Apply fertilizer in early spring as indicated by soil test.
  - .8 Remove dead, broken or hazardous branches from plant material.
  - .9 Keep trunk protection and tree supports in proper repair and adjustment.
  - .10 Remove trunk protection, tree supports and level watering saucers at end of warranty period.
  - .11 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
  - .12 Submit monthly written reports to Departmental Representative identifying:
    - .1 Maintenance work carried out.
    - .2 Development and condition of plant material.
    - .3 Preventative or corrective measures required which are outside Contractor's responsibility.

### **3.11 REPLACEMENTS**

- .1 Replace each defective or dead plant within 72 hours after notification by the Departmental Representative and continue to replace each plant until it has established itself to the satisfaction of the Departmental Representative.
- .2 All required replacements shall be plants of the same size and species as specified on the plant list and shall be supplied and planted in accordance with the Drawings, Specifications and Change Orders thereto or as directed by Departmental Representative.
- .3 The cost of replacements resulting from theft, accidental damage, vandalism, carelessness, neglect on the part of others, shall be borne by the Contractor until the certified date of Substantial Performance.
- .4 The cost of replacements resulting from theft, accidental damage, vandalism, carelessness or neglect on the part of others after the certified date of Substantial Performance shall be borne by the Owner.

**3.12 ACCEPTANCE**

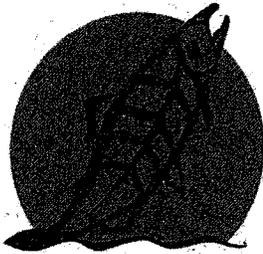
- .1 Planting will be accepted by Departmental Representative at the end of Maintenance Period provided that all deficiencies have been corrected to the satisfaction of the Departmental Representative. Plant material will be accepted by the Departmental Representative provided that plant material exhibits healthy growing condition and is free from disease, insects, and fungal organisms.
- .2 Plant material installed less than 4 days prior to frost will be accepted in following spring, 30 days after start of growing season provided that acceptance conditions are fulfilled.

**3.13 CLEAN-UP**

- .1 Remove from the site all pots, cans, surplus materials, and other debris resulting from planting operations. Ensure complete removal of planting tags, labels, strings, or other materials prior to Substantial Completion. Neatly dress and finish all planting areas and flush all walks and paved areas clean to the satisfaction of the Departmental Representative and Owner.

**END OF SECTION**

# APPENDICES



September 2, 2016

## STEVESTON HARBOUR AUTHORITY

12740 Trites Road, Richmond, B.C. V7E 3R8 604-272-5539 Fax 604-271-6142

Rebecca Clarke, Executive Director  
Gulf of Georgia Cannery Society  
[Rebecca.clarke@gogcannery.org](mailto:Rebecca.clarke@gogcannery.org)

Dear Rebecca:

**RE: GULF SITE LANDSCAPING- HEDGE & WASTE AREA**

This letter serves as Steveston Harbour Authority's approval for the Gulf of Georgia Cannery / Parks Canada to improve the landscaping around the 3<sup>rd</sup> Avenue Gulf Site hedge and waste area at your expense as discussed at our meeting on September 1, 2016.

Thank you for addressing my concerns regarding the barrier and signage in your email dated September 2, 2016.

Kindly keep me informed of the landscaping schedule.

Yours truly,

Bob Baziuk, General Manager  
Steveston Harbour Authority

CC: Jim Jones, Operations Manager, Steveston Harbour Authority

