

**Solicitation No. 5P201-20-0106**  
**Bob to Boyles Trail**  
**Rouge National Urban Park**  
**Parks Canada**

# **SPECIFICATION DOCUMENTS**

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Fall 2020

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**1. OWNER:**

Parks Canada  
10725 Reesor Road,  
Markham, ON., L6B 1A8

**2. PROJECT:**

**Bob to Boyles Trails Project**  
Rouge Urban National Park  
Markham, Ontario, L6B 1A8

**3. PROFESSIONAL SEALS AND SIGNATURES**

1. Professional seals and signatures are provided as required by the Ontario Building Code (latest edition), Ontario Regulation 403/97 **(350/06)**, Subsection 2.3.1 **Division C, Part 1, Subsection 1.2.2)** and all amendments thereto, for the Project stated above and apply only to those documents and specifications prepared by the respective Landscape Architect. The Professional seals and signatures stated above are as follows:

**LANDSCAPE ARCHITECT OF RECORD**

**WSP CANADA GROUP LIMITED**

Address: 100 Commerce Valley Drive W  
Thornhill, ON., L3T 0A1



**Connor Blaikie**

Landscape Architect of Record

**November 17, 2020**

Date

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----- END OF SECTION -----

## **SPECIAL CONDITIONS**

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### **ARTICLE SC1 Acceptance of Site**

The Contractor shall accept the site as it exists at the time of the tender call.

The successful Bidder must make careful examination of existing site surface conditions and topography and advise the PCA Representative of unsatisfactory site surface conditions and topography prior to commencement of construction. Commencement of construction will mean that the successful Bidder has accepted the existing site surface conditions and topography and no allowance will be made later for any expenses incurred through failure to note unsatisfactory existing site surface conditions and topography.

### **ARTICLE SC2 Limit of the Working Area**

On the PCA Representative's land, the Contractor shall limit his operations to the trail corridor and limits of work indicated on drawings for proposed trails, limit of the material staging areas, the parking area, fencing, boardwalk and associated silt and tree protection as indicated on the drawings, unless otherwise approved by the PCA Representative.

The Contractor must obtain all necessary permits for the Work.

The Contractor must notify the PCA Representative three (3) days prior to the start of construction activity.

### **ARTICLE SC3 Existing Utilities and Services**

The Contractor shall be responsible for locating and adequately protecting all existing utilities and services and for permanently supporting utilities which cross over the services to be constructed under this Contract.

The utility companies require that their own forces are employed to repair any damages to these utilities. The Contractor shall reimburse the utility companies for any cost associated with these repairs.

### **ARTICLE SC4 Work Schedule**

Within 7 days of Contract Award or receipt of a "letter of intent", the Contractor shall provide the PCA Representative with a detailed work schedule. It shall contain sufficient detail for the PCA Representative to monitor progress of the work. The schedule must also include the total number of working days required to complete the project.

The PCA Representative reserves the right to adjust the schedule to delay the start dates until all approvals are obtained. Any delay in the commencement of the project caused by the PCA Representative, will result in the contract schedule being extended by an equivalent period of time.

Delays in the completion of work due to additional work requested or inclement weather will result in the contract schedule being extended by a period of time agreed upon by all parties through signed change orders. The Contractor is responsible to report delays, provide time estimates, and request change orders through the PCA Representative.

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The Contractor shall commence work and carry it on at whatever location or locations the PCA Representative may direct. No work shall be undertaken without the PCA Representative's approval and no work shall be suspended without his written permission except as described in the Contract Documents.

### **ARTICLE SC5 Warranty Periods**

Notwithstanding the General Conditions, the following warranty periods apply to this contract:

Overall, the Warranty period for Works is one year, and is scheduled to commence on the date of Substantial Performance of the Work as accepted by the PCA Representative. Partial Substantial Performance Certificates will be issued upon request from of the contractor in writing and agreement of the PCA Representative for the following reasons:

- The Contractor completes a scheduled phase of construction;
- The PCA Representative requests the Contractor to stop work for a period of greater than two weeks.

Partially substantial completion for release of hold back shall not in anyway imply acceptance of any part of the work and the warranty period shall begin as noted above.

The Contractor guarantees and warrants that the Works shall, for the warranty period, remain in such a condition as will meet with the approval of the PCA Representative and make good in a manner satisfactory to the PCA Representative any imperfections therein due to materials used in the construction thereof or due to faulty workmanship.

The decision of the PCA Representative as to the nature, extent and cause of such imperfections and the necessity for remedying the same shall be final. Should the Contractor fail to comply with the direction of the PCA Representative may, after giving the Contractor seven (7) days' written notice, perform the necessary work, provided that in the event of an emergency, of which the PCA Representative shall be the sole judge, the PCA Representative may forthwith, without notice, perform the necessary work and the cost of such work in either event may be deducted or collected from the Contractor by the PCA Representative.

If the PCA Representative has notified the Contractor in writing of imperfections prior to the termination of the warranty period, the Contractor shall make good the imperfections as specified above notwithstanding that the work of making good may commence after or extend beyond the end of the warranty period. In such case, the warranty period shall expire on the date of final acceptance of the Work by the PCA Representative, on which date all known deficiencies and imperfections shall have been corrected. Inspection must be arranged by the Contractor with 72 hours written notification to all parties.

The warranty will not expire if the Contractor fails to notify the PCA Representative for a Final Acceptance meeting within the specified time limit.

### **ARTICLE SC6 Independent Testing**

The Contractor will retain independent specialized testing companies to provide material quality control services. Contractor to provide a Testing Plan prior to the commencement of work. The Testing must outline the Contractor's approach, timing and frequency of testing in conformance with the OPSS 501, OPSS 1010 and in accordance with applicable specifications.

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### a) Gradation Tests

Provide gradation tests for granular or stone aggregates, backfill material and granular or stone base material as required to verify conformance with the applicable specifications.

### **ARTICLE SC7 - Substantial Performance**

Upon written application by the Contractor, the PCA Representative will determine Substantial Performance in accordance with the Construction Lien Act.

When the Contractor considers that the Work is substantially performed, or if permitted by the lien legislation applicable to the Place of the Work a designated portion thereof which the PCA Representative agrees to accept separately is substantially performed, the Contractor shall prepare and submit to the PCA Representative comprehensive list of items to be completed or corrected and apply for a review by the PCA Representative to establish Substantial Performance of the Work or substantial performance of the designated portion of the Work. Failure to include an item on the list does not alter the responsibility of the Contractor Bidder to complete the Contract.

No later than ten (10) days after receipt of the Contractor list and application, the PCA Representative will review the Work to verify the validity of the application, and no later than seven (7) days after completing the review, will notify the successful Bidder whether the work or the designated portion of the work is substantially performed.

### **ARTICLE SC8 – Regular Meetings**

The Contractor shall be required to attend regular meetings on site to review the progress of the Work with the PCA Representative.

### **ARTICLE SC9 – Licenses, Permits, Locates and Approvals**

The Contractor shall comply with all applicable statutes, laws, by-laws, regulations, ordinances, notices and orders whether Federal, Provincial, Municipal or otherwise, at any time in effect during the execution of this contract, and all rules and requirements of the Police and Fire departments, or other governmental authorities, and procure all C.S.A. approvals, as required. The successful bidder shall obtain and pay for all necessary permits and licenses, and shall not do or suffer to be done anything in violation of any such laws, ordinances, rules or requirements. If the attention of the Contractor is called to any such violation on the part of the Contractor or of any person employed or engaged by the Contractor, the Contractor shall immediately desist from and correct such violation.

### **ARTICLE SC10 – Geotechnical Investigation**

No soils investigation was carried out for this section of trail. The Contractor remains fully responsible for assessment of soil and site conditions and shall take any additional steps necessary to assure themselves of any such circumstances.

### **ARTICLE SC11 Existing Property Limits**

The Contractor shall be responsible for locating and adequately marking all existing property limits, including adjacent roads right-of-way for work to be constructed under this Contract.

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The utility companies require that their own forces are employed to repair any damages to these utilities. The Contractor shall reimburse the utility companies for any cost associated with these repairs.

**ARTICLE SC12 – Clean Equipment Protocol – Appendix A**

All work shall conform to Ontario Invasive Plants – Clean Equipment Protocol for Industry 2016 - See Appendix A

----- END OF SECTION -----

## SUMMARY OF WORK

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### PART 1 - GENERAL

1. RELATED REQUIREMENTS
  2. WORK COVERED BY CONTRACT DOCUMENTS
  3. CONTRACT METHOD
  4. CONTRACTOR USE OF PREMISES
  5. PCA REPRESENTATIVE FURNISHED ITEMS
1. Section 01 56 00 - Temporary Barriers and Enclosures.
  1. Work of this Contract comprises general construction of limestone aggregate trails, a parking area, tree planting, seeding, tree removal and pruning, fencing and boardwalks on lands owned by Parks Canada in the northern part of Rouge National Urban Park, (Markham, ON. for work in this Contract)
  2. The items as noted above may vary based upon portion of contract awarded to contractor.
  1. Construct Work under single, stipulated price contract.
  1. Use of project site area until Substantial Performance is restricted to the limits of work, trail corridor footprint (4.2 to 6m width) area of proposed observation platforms and boardwalks, the parking area and designated staging areas.
  1. PCA Representative Responsibilities:
    - a. Review shop drawings, product data, samples, and other submittals.
  2. Contractor Responsibilities:
    - a. Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions, and certificates to the PCA Representative.
    - b. Deliver supplier's bill of materials to the PCA Representative.
    - c. Arrange and pay for delivery to site in accordance with Progress Schedule.
    - d. Designate submittals and delivery date for each product in progress schedule.
    - e. Review shop drawings, product data, samples, and other submittals. Submit to PCA Representative notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
    - f. Receive and unload products at site.
    - g. Inspect deliveries; record shortages, and damaged or defective items.
    - h. Handle products at site, including uncrating and storage.

## SUMMARY OF WORK

- 
- i. Protect products from damage.
  - j. Assemble, install, connect, adjust, and finish products.
  - k. Provide installation inspections required by public authorities.
  - l. Repair or replace items damaged by Contractor or subcontractor on site (under Contractor's control).
  - m. Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties to the PCA Representative.
6. EXISTING SERVICES
- 1. Notify PCA Representative and utility companies of intended interruption of services and obtain required permission.
  - 2. Provide alternative routes for pedestrian and vehicular traffic where necessary.
  - 3. Provide signage and /or flag person in order to ensure safety of existing trail users, road users and site.
  - 4. Establish location and extent of service lines in area of work before starting Work. Notify PCA Representative of findings.
  - 5. Submit schedule to and obtain approval from PCA Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
  - 6. Where unknown services are encountered, immediately advise PCA Representative and confirm findings in writing.
  - 7. Protect, relocate or maintain existing active services.
  - 8. Record locations of maintained, re-routed and abandoned service lines.
  - 9. Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

**SUMMARY OF WORK**

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7. DOCUMENTS  
REQUIRED

1. Maintain at job site, one copy of each document as follows:
  - a. Contract Drawings.
  - b. Specifications.
  - c. Addenda.
  - d. Reviewed Shop Drawings.
  - e. List of Outstanding Shop Drawings.
  - f. Change Orders.
  - g. Other Modifications to Contract.
  - h. Field Test Reports.
  - i. Copy of Approved Work Schedule.
  - j. Health and Safety Plan and Other Safety Related Documents.
  - k. Other documents as specified.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

----- END OF SECTION -----

## WORK RESTRICTIONS

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### PART 1 - GENERAL

- |                               |  |
|-------------------------------|--|
| 1. RELATED REQUIREMENTS       | 1. Section 01 56 00 - Temporary Barriers and Enclosures.   |
| 2. ACCESS AND EGRESS          | 1. Design, construct and maintain temporary "access to" and "egress from" work areas in accordance with relevant municipal, provincial and other regulations.  |
| 3. USE OF SITE AND FACILITIES | 1. Execute work with least possible interference or disturbance to normal use of the adjacent roadways. Make arrangements with PCA Representative to facilitate work as stated.<br><br>2. Accept liability for damage, safety of equipment and overloading of existing equipment.<br><br>3. Use of project site area until Substantial Performance is restricted to the trail corridor footprint (4.2 to 6m width) area of proposed parking lot and designated staging areas.  |
| 4. EXISTING SERVICES          | 1. Notify PCA Representative and utility companies of intended interruption of services and obtain required permission.<br><br>2. Where Work involves breaking into or connecting to existing services, give PCA Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.<br><br>3. Provide for personnel, pedestrian and vehicular traffic.<br><br>4. Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures. |
| 5. SPECIAL REQUIREMENTS       | 1. Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.<br><br>2. Keep within limits of work and avenues of ingress and egress.  |

PART 2 – PRODUCTS – not used

PART 3 – EXECUTION – not used

----- END OF SECTION -----

**PAYMENT PROCEDURES**

PART 1 - GENERAL

- |                                      |   |
|--------------------------------------|---|
| 1. REFERENCES                        | 1. PCA/Contractor Agreement and Special Conditions 00 82 00   |
| 2. APPLICATIONS FOR PROGRESS PAYMENT | 1. Refer to PCA/Contractor Agreement and Special Conditions 00 82 00<br>2. Make applications for payment on account as provided in Agreement as Work progresses.<br>3. Date applications for payment last day of agreed payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of Work at that date.<br>4. Submit to PCA Representative at least 14 days before first application for payment. Schedule of values for parts of Work, aggregating total amount of Contract Price, to facilitate evaluation of applications for payment. |
| 3. SCHEDULE OF VALUES                | 1. Refer to PCA/Contractor Agreement<br>2. Provide schedule of values supported by evidence as PCA Representative may reasonably direct and when accepted by PCA Representative to be used as basis for applications for payment.<br>3. Include statement based on schedule of values with each application for payment.<br>4. Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as PCA Representative may reasonably require to establish value and delivery of products.   |
| 4. PROGRESS PAYMENT AND HOLDBACK     | 1. Refer to PCA/Contractor Agreement and Special Conditions 00 82 00, and R2850D GC5 Terms of Payment   |

PART 2 – PRODUCTS  
NOT USED

PART 3 - EXECUTION

NOT USED

----- END OF SECTION -----

**PROJECT MEETINGS**

PART 1 - GENERAL

- |                         |   |
|-------------------------|---|
| 1. RELATED REQUIREMENTS | 1. Section 01 33 00 - Submittal Procedures<br>2. Section 01 56 00 - Temporary Barriers and Enclosures<br>3. Section 01 78 00 - Closeout Submittals  |
| 2. ADMINISTRATIVE       | 1. Schedule project meetings throughout the progress of the work at the call of PCA Representative.<br><br>2. Preside at meetings.<br><br>3. Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents. |

PART 2 – PRODUCTS – Not used

PART 3 – EXECUTION – Not used

----- END OF SECTION -----

## SUBMITTAL PROCEDURES

### PART 1 - GENERAL

- |                         |  |
|-------------------------|--|
| 1. RELATED REQUIREMENTS | 1. Section 01 45 00 – Quality Control.   |
| 2. REFERENCES           | 1. Refer to PCA/Contractor Agreement   |
| 3. ADMINISTRATIVE       | <ol style="list-style-type: none"><li>1. Submit to PCA Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.</li><li>2. Do not proceed with Work affected by submittal until review is complete.</li><li>3. Present shop drawings, product data, samples and mock-ups in SI Metric units.</li><li>4. Where items or information is not produced in SI Metric units converted values are acceptable.</li><li>5. Review submittals prior to submission to PCA Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated 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.</li><li>6. Notify PCA Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.</li><li>7. Verify field measurements and that affected adjacent work is coordinated.</li><li>8. Contractor's responsibility for errors and omissions in submission is not relieved by PCA Representative's review of submittals.</li><li>9. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by PCA Representative's review.</li><li>10. Keep one reviewed copy of each submission on site.</li></ol> |

## SUBMITTAL PROCEDURES

### 4. SHOP DRAWINGS AND PRODUCT DATA

1. Refer to PCA/Contractor Agreement
2. The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
3. Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario.
4. 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
5. Allow 5 days for PCA Representative's review of each submission.
6. Adjustments made on shop drawings by PCA Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to PCA Representative prior to proceeding with Work.
7. Make changes in shop drawings as PCA Representative may require, consistent with Contract Documents. When resubmitting, notify PCA Representative in writing of revisions other than those requested.
8. Accompany submissions with transmittal letter, in duplicate, containing:
  - a. Date.
  - b. Project title and number.
  - c. Contractor's name and address.
  - d. Identification and quantity of each shop drawing, product data and sample.
  - e. Other pertinent data.
9. Submissions include:
  - a. Date and revision dates.
  - b. Project title and number.
  - c. Name and address of:
    - i. Subcontractor.
    - ii. Supplier.
    - iii. Manufacturer.
  - d. Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - e. Details of appropriate portions of Work as applicable:
    - i. Fabrication.
    - ii. Layout, showing dimensions, including identified field dimensions, and clearances.

## SUBMITTAL PROCEDURES

- iii. Setting or erection details.
  - iv. Performance characteristics.
  - v. Standards.
  - vi. Single line and schematic diagrams.
  - vii. Relationship to adjacent work.
10. After PCA Representative's review, distribute copies.
11. Submit electronic copy of required project documents including but not necessarily limited to:
  - a. Work Schedule
  - b. Testing Plan
  - c. Health and Safety Plan
12. Submit electronic copy of shop drawings for each requirement requested in specification Sections and as PCA Representative may reasonably request, including but not necessarily limited to:
  - a. Helical Pile Layout for 3 boardwalk sections and lookouts
  - b. Structural members
  - c. Pergola Structures
13. Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by PCA Representative where shop drawings will not be prepared due to standardized manufacture of product, including but not necessarily limited to:
  - a. P-Gates
  - b. Bollards
14. Submit electronic copies of test reports for requirements requested in specification Sections and as requested by PCA Representative.
  - a. 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.
15. Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
16. Supplement standard information to provide details applicable to project.
17. If upon review by PCA Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

**SUBMITTAL PROCEDURES**

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PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

----- END OF SECTION -----

## HEALTH AND SAFETY REQUIREMENTS

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### PART 1 - GENERAL

- |  |  |
|--|--|
| 1. RELATED REQUIREMENTS                | 1. Section 01 33 00 – Submittal Procedures.  |
| 2. REFERENCES                          | <ol style="list-style-type: none"><li>1. Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations</li><li>2. Health Canada/Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).</li><li>3. Province of Ontario Occupational Health and Safety Act, R.S.O. 1990 Updated 2005.</li></ol>  |
| 3. ACTION AND INFORMATIONAL SUBMITTALS | <ol style="list-style-type: none"><li>1. Make submittals in accordance with Section 01 33 00 - Submittal Procedures.</li><li>2. Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:<ol style="list-style-type: none"><li>a. Results of site specific safety hazard assessment.</li><li>b. Results of safety and health risk or hazard analysis for site tasks and operation found in work plan</li></ol></li><li>3. Submit electronic copy of Contractor's authorized representative's work site health and safety inspection reports to PCA Representative.</li><li>4. Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.</li><li>5. Submit copies of incident and accident reports.</li><li>6. Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 – Submittal Procedures.</li><li>7. PCA Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to PCA Representative within 7 days after receipt of comments from PCA Representative.</li><li>8. PCA Representative review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.</li><li>9. On-site Contingency and Emergency Response Plan: address</li></ol> |

## HEALTH AND SAFETY REQUIREMENTS

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- standard operating procedures to be implemented during emergency situations.
4. FILING OF NOTICE
    1. File Notice of Project with Provincial authorities prior to beginning of Work.
  5. SAFETY ASSESSMENT
    1. Perform site specific safety hazard assessment related to project.
  6. MEETINGS
    1. Schedule and administer Health and Safety meeting with PCA Representative prior to commencement of Work.
  7. GENERAL REQUIREMENTS
    1. Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
    2. PCA Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
  8. 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 site-specific Health and Safety Plan.
  9. COMPLIANCE REQUIREMENTS
    1. Comply with Ontario Health and Safety Act, R.S.O.
  10. UNFORSEEN HAZARDS
    1. When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise PCA Representative verbally and in writing.
  11. HEALTH AND SAFETY CO-ORDINATOR
    1. Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
      - a. Have site-related working experience specific to activities associated with this project.
      - b. Have working knowledge of occupational safety and health regulations.
      - c. Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not

## HEALTH AND SAFETY REQUIREMENTS

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successfully completing required training are not permitted to enter site to perform Work.

- d. Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- e. Be on site during execution of Work and report directly to and be under direction of site supervisor.

### 12. POSTING OF DOCUMENTS

1. Ensure applicable items, articles, notices and orders are posted in conspicuous locations on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with PCA Representative. Post at seven(7) access points to construction site.

### 13. CORRECTION OF NON-COMPLIANCE

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

### 14. WORK STOPPAGE

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

## PART 2 - PRODUCTS

NOT USED

## PART 3 - EXECUTION

NOT USED

----- END OF SECTION -----

## QUALITY CONTROL

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### PART 1 - GENERAL

- |                                    |   |
|------------------------------------|---|
| 1. RELATED REQUIREMENTS            | 1. Not applicable   |
| 2. REFERENCES                      | 1. Refer to PCA/Contractor Agreement  |
| 3. INSPECTION                      | 1. PCA 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.   |
| 4. INDEPENDENT INSPECTION AGENCIES | <ol style="list-style-type: none"><li>1. Independent Inspection/Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work.</li><li>2. Allocated costs: Paid by Contractor</li><li>3. Provide equipment required for executing inspection and testing by appointed agencies.</li><li>4. Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.</li><li>5. 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 PCA Representative at no cost to PCA. Pay costs for retesting and re-inspection.</li></ol> |
| 5. ACCESS TO WORK                  | <ol style="list-style-type: none"><li>1. Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.</li><li>2. Co-operate to provide reasonable facilities for such access.</li></ol>   |
| 6. PROCEDURES                      | <ol style="list-style-type: none"><li>1. Notify appropriate agency and PCA Representative in advance of requirement for tests, in order that attendance arrangements can be made.</li><li>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.</li><li>3. Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples where applicable.</li></ol>   |
| 7. REJECTED WORK                   | 1. Refer to PCA/Contractor Agreement  |

**QUALITY CONTROL**

2. 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 PCA Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
3. Make good other Contractor's work damaged by such removals or replacements promptly.
4. If in opinion of PCA Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, PCA Representative 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 PCA Representative.

8. REPORTS

1. Submit digital copy of inspection and test reports to PCA Representative.
2. Provide copies to subcontractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

9. TESTS

1. Furnish test results as requested.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

----- END OF SECTION -----

## CONSTRUCTION FACILITIES

Rouge National Urban Park Trails Phase 3  
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### PART 1 - GENERAL

- |  |  |
|--|--|
| 1. RELATED REQUIREMENTS                  | 1. Submittal Procedures  |
| 2. REFERENCES                            | <ol style="list-style-type: none"><li>1. Refer to PCA/Contractor Agreement</li><li>2. Canadian General Standards Board (CGSB)<ol style="list-style-type: none"><li>a. CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.</li><li>b. CGSB 1.59-97, Alkyd Exterior Gloss Enamel.</li></ol></li><li>3. Canadian Standards Association (CSA International)<ol style="list-style-type: none"><li>a. CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.</li></ol></li></ol> |
| 3. ACTION AND INFORMATIONAL SUBMITTALS   | <ol style="list-style-type: none"><li>1. Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.</li></ol>  |
| 4. INSTALLATION AND REMOVAL              | <ol style="list-style-type: none"><li>1. Prepare site including staging areas, parking areas, trails etc. indicating proposed location and dimensions of area to be fenced and used by Contractor, avenues of ingress/egress to fenced area and details of fence installation.</li><li>2. Provide construction facilities in order to execute work expeditiously.</li><li>3. Remove from site all such work after use.</li></ol>   |
| 5. SITE STORAGE/LOADING                  | <ol style="list-style-type: none"><li>1. Special Conditions 00 82 00 Article SC2</li><li>2. Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.</li><li>3. Do not load or permit to load any part of Work with weight or force that will endanger Work.</li></ol>   |
| 6. CONSTRUCTION PARKING                  | <ol style="list-style-type: none"><li>1. Parking will be permitted on site provided it does not disrupt performance of Work.</li><li>2. Provide and maintain adequate access to project site.</li></ol>  |
| 7. EQUIPMENT, TOOL AND MATERIALS STORAGE | <ol style="list-style-type: none"><li>1. Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials</li><li>2. Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.</li></ol>   |

## CONSTRUCTION FACILITIES

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- 
- |                         |   |
|-------------------------|---|
| 8. SANITARY FACILITIES  | <ol style="list-style-type: none"><li>1. Provide sanitary facilities for work force in accordance with governing regulations and ordinances.</li><li>2. Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary conditions</li></ol>  |
| 9. CONSTRUCTION SIGNAGE | <ol style="list-style-type: none"><li>1. Provide and erect project signs as well as Health &amp; Safety signage at each staging area, within three weeks of signing Contract, in locations designated by PCA Representative.</li><li>2. Indicate on sign, PCA, name of Contractor and Subcontractor.</li><li>3. No other signs or advertisements, other than warning signs, are permitted on site.</li><li>4. Locate project identification signs as directed by PCA Representative and construct as follows:<ol style="list-style-type: none"><li>a. Build a secure foundation/buried posts, erect framework, and attach signboard to framing.</li></ol></li><li>5. Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.</li><li>6. Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed PCA Representative.</li></ol> |
| 10. CLEAN-UP            | <ol style="list-style-type: none"><li>1. Remove construction debris, waste materials, packaging material from work site daily.</li><li>2. Clean dirt or mud tracked onto paved or surfaced roadways.</li><li>3. Store materials resulting from demolition activities that are salvageable.</li><li>4. Stack stored new or salvaged material not in construction facilities.</li><li>5. Remove and restore construction facilities site upon completion of work to equal or better condition than prior to construction.</li></ol>   |

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

## CONSTRUCTION FACILITIES

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 watercourses and properties.
2. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
3. Remove erosion and sedimentation controls other than Filtrexx Siltsoxx and restore and stabilize areas disturbed during removal.

----- END OF SECTION -----

## TEMPORARY BARRIERS AND ENCLOSURES

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### PART 1 - GENERAL

- |  |   |
|--|---|
| 1. RELATED REQUIREMENTS                        | 1. Section 01 74 21 – Construction/Demolitions Waste Management and Disposal.   |
| 2. INSTALLATION AND REMOVAL                    | 1. Provide temporary controls in order to execute Work expeditiously.<br>2. Remove from site all such work after use.   |
| 3. HOARDING                                    | 1. Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.   |
| 4. GUARD RAILS AND BARRICADES                  | 1. Provide secure, rigid guard rails and barricades around deep excavations.  |
| 5. ACCESS TO SITE                              | 1. Provide and maintain access roads as may be required for access to Work.   |
| 6. PUBLIC TRAFFIC FLOW                         | 1. Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.  |
| 7. PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY | 1. Protect surrounding private and public property from damage during performance of Work.<br>2. Be responsible for damage incurred.  |
| 8. PROTECTION OF FINISHES                      | 1. Provide protection for finished and partially finished construction finishes and equipment during performance of Work.<br>2. Provide necessary screens, covers, and hoardings.<br>3. Confirm with PCA Representative locations and installation schedule 3 days prior to installation.<br>4. Be responsible for damage incurred due to lack of or improper protection. |
| 9. 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 – Not used

PART 3 – EXECUTION – Not used

----- END OF SECTION -----

## EXECUTION

### PART 1 - GENERAL

1. RELATED REQUIREMENTS
  1. Section 01 33 00 – Submittal Procedures
  2. Section 01 74 21 – Construction/Demolition Waste Management and Disposal
  
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:
    - a. Structural integrity of elements of project.
    - b. Efficiency, maintenance, or safety of operational elements.
    - c. Visual qualities of sight-exposed elements.
    - d. Other Work of PCA.
  3. Include in request:
    - a. Identification of project.
    - b. Location and description of affected Work.
    - c. Statement on necessity for cutting or alteration.
    - d. Description of proposed Work, and products to be used.
    - e. Alternatives to cutting and patching.
    - f. Effect on other Work of PCA.
    - g. Date and time work will be executed.
  
3. MATERIALS
  1. Required for original installation.
  2. Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.
  
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.
  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; maintain excavations free of water.
  
5. EXECUTION
  1. Execute cutting, fitting, and patching including excavation and fill, to complete Work.
  2. Fit several parts together, to integrate with other Work.

**EXECUTION**

3. Uncover Work to install ill-timed Work.
  4. Remove and replace defective and non-conforming Work.
  5. Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
  6. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
  7. Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- 
6. 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

NOT USED

PART 3 - EXECUTION

NOT USED

----- END OF SECTION -----

## CLEANING

### PART 1 - GENERAL

- |                         |   |
|-------------------------|---|
| 1. RELATED REQUIREMENTS | 1. Section 01 74 21 - Construction/Demolition Waste Management and Disposal   |
| 2. REFERENCES           | 1. Refer to PCA/Contractor Agreement and Special Conditions 00 82 00  |
| 3. PROJECT CLEANLINESS  | <ol style="list-style-type: none"><li>1. Maintain Work in tidy condition, free from accumulation of waste products and debris caused by Contractor.</li><li>2. Remove waste materials from site at regularly scheduled times or dispose of as directed by PCA Representative. Do not burn waste materials on site.</li><li>3. Clear snow and ice from access to site, bank/pile snow in designated areas only or remove from site.</li><li>4. Remove non-organic waste and debris within 10m either side of proposed trails corridors that is encountered during construction. This includes but is not limited to isolated pieces of metal, pieces of wire fence, glass and plastics.</li><li>5. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.</li><li>6. Provide on-site containers for collection of waste materials and debris.</li><li>7. Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.</li><li>8. Dispose of waste materials and debris at designated dumping areas off-site.</li><li>9. Store any volatile waste in covered metal containers, and remove from premises at end of each working day.</li></ol> |
| 4. FINAL CLEANING       | <ol style="list-style-type: none"><li>1. Refer to PCA/Contractor Agreement and Special Conditions 00 82 00</li><li>2. When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.</li><li>3. Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.</li></ol>  |

**CLEANING**

4. Prior to final review remove surplus products, tools, construction machinery and equipment.
5. Remove waste products caused by Contractor.
6. Remove waste materials from site at regularly scheduled times or dispose of as directed by PCA Representative. Do not burn waste materials on site.
7. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
8. Remove stains, spots, marks and dirt from decorative work.
9. Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
10. Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
11. Remove dirt and other disfiguration from exterior surfaces.
12. Sweep and wash clean paved areas.
13. Clean drainage systems.
14. Sweep with metal detector to pick up loose metals.

5. 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

NOT USED

PART 3 - EXECUTION

NOT USED

----- END OF SECTION -----

## CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL

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### PART 1 - GENERAL

- |  |   |
|--|---|
| 1. WASTE MANAGEMENT GOALS              | <ol style="list-style-type: none"><li>1. Accomplish maximum control of solid construction waste.</li><li>2. Preserve environment and prevent pollution and environment damage.</li></ol>  |
| 2. RELATED REQUIREMENTS                | <ol style="list-style-type: none"><li>1. Section 01 33 00 – Submittal Procedures</li></ol>  |
| 3. DEFINITIONS                         | <ol style="list-style-type: none"><li>1. Class III: non-hazardous waste - construction and demolition waste.</li><li>2. Inert Fill: inert waste - exclusively asphalt and concrete.</li><li>3. Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.</li><li>4. Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.</li><li>5. 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.</li><li>6. Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:<ol style="list-style-type: none"><li>a. Returning reusable items including pallets or unused products to vendors.</li></ol></li><li>7. Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.</li><li>8. Separate Condition: refers to waste sorted into individual types.</li><li>9. Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.</li></ol> |
| 4. ACTION AND INFORMATIONAL SUBMITTALS | <ol style="list-style-type: none"><li>1. Submittals in accordance with Section 01 33 00 - Submittal Procedures.</li></ol>   |
| 5. STORAGE, HANDLING AND PROTECTION    | <ol style="list-style-type: none"><li>1. Store, materials to be reused, recycled and salvaged in locations as directed by PCA Representative.</li><li>2. Unless specified otherwise, materials for removal do not become</li></ol>  |

## CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL

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Contractor's property.

3. Protect, stockpile and store salvaged items.
  4. Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
  5. Protect surface drainage, mechanical and electrical from damage and blockage.
  6. Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
    - a. On-site source separation is recommended.
    - b. Remove co-mingled materials to off-site processing facility for separation.
    - c. Provide waybills for separated materials.
6. DISPOSAL OF WASTES
1. Do not bury rubbish or waste materials.
  2. Do not dispose of waste, volatile materials, mineral spirits, oil, or paint thinner into waterways, storm, or sanitary sewers.
  3. Remove materials from deconstruction as deconstruction/disassembly Work progresses.
7. USE OF SITE AND FACILITIES
1. Execute work with least possible interference or disturbance to normal use of premises.
8. SCHEDULING
1. Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

### PART 2 - PRODUCTS

NOT USED

### PART 3 - EXECUTION

1. APPLICATION
  1. Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
2. CLEANING
  1. Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
  2. Clean-up work area as work progresses.

**CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL**

3. DIVERSION OF MATERIALS
  1. Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by PCA Representative, and consistent with applicable fire regulations.
    - a. Mark containers or stockpile areas.
    - b. Provide instruction on disposal practices.
  2. On-site sale of salvaged materials is not permitted.
3. Source separate materials to be reused/recycled into specified sort areas.

----- END OF SECTION -----

## CLOSEOUT PROCEDURES

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### PART 1 - GENERAL

- |                                |   |
|--------------------------------|---|
| 1. RELATED REQUIREMENTS        | 1. Section 01 74 11 – Cleaning<br>2. Section 01 74 21 – Construction/Demolition Waste Management and Disposal   |
| 2. REFERENCES                  | 1. PCA/Contractor Agreement and Special Conditions 00 82 00   |
| 3. ADMINISTRATIVE REQUIREMENTS | 1. Acceptance of Work Procedures: <ul style="list-style-type: none"><li>a. Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.<ul style="list-style-type: none"><li>i. Notify PCA Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.</li><li>ii. Request PCA Representative inspection.</li></ul></li><li>b. PCA Representative's Inspection:<ul style="list-style-type: none"><li>i. PCA Representative and Contractor to inspect Work and identify defects and deficiencies.</li><li>ii. Contractor to correct Work as directed.</li></ul></li></ul> |
| 4. FINAL CLEANING              | 1. Clean in accordance with Section 01 74 11 - Cleaning. <ul style="list-style-type: none"><li>a. Remove surplus materials, excess materials, rubbish, tools and equipment.</li></ul><br>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

NOT USED

### PART 3 - EXECUTION

NOT USED

----- END OF SECTION -----

## CLOSEOUT SUBMITTALS

### PART 1 - GENERAL

- |  |   |
|--|---|
| 1. RELATED REQUIREMENTS                              | 1. Section 01 31 19 - Project Meetings<br>2. Section 01 33 00 - Submittal Procedures<br>3. Section 01 45 00 - Quality Control   |
| 2. REFERENCES  | 1. Canadian Environmental Protection Act (CEPA)<br>a. SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.  |
| 3. ADMINISTRATIVE REQUIREMENTS                       | 1. Pre-warranty Meeting:<br><br>a. Convene meeting one week prior to contract completion with Contractor's representative and PCA Representative in accordance with Section 01 31 19 - Project Meetings to:<br>i. Verify Project requirements.<br>ii. Review manufacturer's installation instructions and warranty requirements.<br>b. PCA Representative to establish communication procedures for:<br>i. Notifying construction warranty defects.<br>ii. Determine priorities for type of defects.<br>iii. Determine reasonable response time.<br>c. 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.<br>d. Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action. |
| 4. ACTION AND INFORMATIONAL SUBMITTALS               | 1. Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.   |
| 5. RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS | 1. Record information neatly on set of black line opaque drawings, provided by PCA Representative.<br><br>2. Record information concurrently with construction progress.<br>a. Do not conceal Work until required information is recorded.<br><br>3. Contract Drawings and shop drawings: mark each item to record actual construction, including:<br>a. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.   |

**CLOSEOUT SUBMITTALS**

- b. Field changes of dimension and detail.
    - c. Changes made by change orders.
    - d. Details not on original Contract Drawings.
    - e. References to related shop drawings and modifications.
  - 4. Specifications: mark each item to record actual construction, including:
    - a. Manufacturer, trade name, and catalogue number of each product actually installed.
    - b. Changes made by Addenda and change orders.
  - 5. Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
  - 6. Provide digital photos, if requested, for site records.
- 6. WARRANTIES AND BONDS
  - 1. Conduct 11-month warranty inspection, measured from time of acceptance, by PCA Representative.
  - 2. Include information contained in warranty management plan as follows:
    - a. Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
    - b. Contractor's plans for attendance at 11-month post-construction warranty inspections.
  - 3. Respond in timely manner to oral or written notification of required construction warranty repair work.
  - 4. Written verification to follow oral instructions. Failure to respond will be cause for the PCA Representative to proceed with action against Contractor.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

----- END OF SECTION -----

## PART 1 - GENERAL

## 1. REFERENCES

1. ASTM International
  - a. ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - b. ASTM D 1761-06, Standard Test Methods for Mechanical Fasteners in Wood.
  - c. ASTM F 1941, Standard Specification for Zinc Plated Steel Fasteners.
2. CSA International
  - a. CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - b. CSA O141-05(R2009), Softwood Lumber.
3. Forest Stewardship Council (FSC)
  - a. FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
  - b. FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1
  - c. FSC Accredited Certified Bodies.
4. National Lumber Grades Authority (NLGA)
  - a. Standard Grading Rules for Canadian Lumber 2007.

## 2. QUALITY ASSURANCE

1. Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

## 3. DELIVERY, STORAGE AND HANDLING

1. Deliver, store and handle materials in accordance with manufacturer's written instructions.
2. Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
3. Storage and Handling Requirements:
  - a. Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - b. Replace defective or damaged materials with new.

## PART 2 - PRODUCTS

## 1. FRAMING, DECKING AND FENCE BOARDS

1. Lumber: Rough sawn Ontario White Cedar for all visible components/surfaces except the pergola members. Rough

sawn Douglas Fir for all pergola members. Contractor to provide cedar samples to PCA Representative for approval prior ordering and delivery to site:

- a. CSA O141.
- b. NLGA Standard Grading Rules for Canadian Lumber.

2. Framing and board lumber: in accordance with NBC.

## 2. ACCESSORIES

1. Nails, spikes and staples: to CSA B111.
  - a. 75mm (3") galvanized spikes
  - b. 100mm (4") galvanized spikes
2. Bolts: galvanized 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
3. Screws:
  - a. 75mm (3") coated deck screws
4. Fastener Finishes:
  - a. Galvanizing: to ASTM A 123/A 123M, use galvanized fasteners

## PART 3 - EXECUTION

### 1. EXAMINATION

1. Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
  - a. Visually inspect substrate in presence of PCA Representative.
  - b. Inform PCA Representative of unacceptable conditions immediately upon discovery.
  - c. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from PCA Representative.

### 2. INSTALLATION

1. Install members true to line, levels and elevations, square and plumb.
2. Construct continuous members from pieces of longest practical length.
3. Install spanning members with "crown-edge" up.
4. Select exposed framing for appearance. Install lumber so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
5. Install wood cants, fascia backing, nailers, curbs and other

## CARPENTRY

wood supports as required and secure using galvanized steel fasteners.

6. Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
7. Apply end cut preservative to all cut ends of pressure treated framing materials.
8. Sanding: Top of railings to be lightly sanded to remove any splinters. Provide sanded sample area of a 600mm long section of railing top for approval by PCA Representative.
9. Predrill holes for all applications where large screws are utilized to prevent splitting.

### 3. CLEANING

1. Progress Cleaning: clean in accordance with contract requirements.
  - a. Leave Work area clean at end of each day.
2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with contract requirements.
3. Waste Management: separate waste materials for reuse and recycling in accordance with contract requirements.

### 4. PROTECTION

1. Protect installed products and components from damage during construction.
2. Repair damage to adjacent materials caused by carpentry installation.

----- END OF SECTION -----

PART 1 - GENERAL

1. REFERENCES

The publications listed below (latest revision applicable) form a part of this specification to the extent referenced herein. The publications are referred to within the text by the designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS  
(ASTM) Test  
Methods:

ASTM D-638-Tensile Properties of Plastics

ASTM D-790-Flexural Properties of Unreinforced and  
Reinforced Plastics

ASTM D-2344-Apparent Interlaminar Shear Strength of  
Parallel Fiber Composites by Short Beam Method

ASTM D-696-Coefficient of Linear Thermal Expansion  
for Plastics

ASTM E-84-Surface Burning Characteristics of Building  
Materials

NSF/ANSI STANDARD 61

2. CONTRACTOR  
SUBMITTALS

1. The CONTRACTOR shall furnish shop drawings of all fabricated structural systems and accessories in accordance with the provisions of this Section.
2. The CONTRACTOR shall furnish manufacturer's shop drawings clearly showing material sizes, types, styles, part or catalog numbers, complete details for the fabrication of and erection of components including, but not limited to, location, lengths, type and sizes of fasteners, clip angles, member sizes, and connection details sealed by a Professional Engineer.
3. The CONTRACTOR shall submit the manufacturer's published literature including structural design data, structural properties data, corrosion resistance tables, certificates of compliance, test reports as applicable, and design calculations for systems not sized or designed in the contract documents, sealed by a Professional Engineer.
4. The CONTRACTOR may be requested to submit sample pieces of each item specified herein for acceptance by the ENGINEER as to quality and color. Sample pieces shall be manufactured by the method to be used in the WORK.

## PULTRUDED FIBERGLASS STRUCTURAL SHAPES

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### 3. QUALITY ASSURANCE

1. All items to be provided under this Section shall be furnished only by manufacturers having a minimum of ten (10) years experience in the design and manufacture of similar products and systems. Additionally, if requested, a record of at least five (5) previous, separate, similar successful installations in the last five (5) years shall be provided.
2. Manufacturer shall offer a 3 year limited warranty on all FRP products against defects in materials and workmanship.
3. Manufacturer shall be certified to the ISO 9001-2008 standard.
4. Manufacturer shall provide proof of certification from at least two other quality assurance programs for its facilities or products (DNV, ABS, USCG, AARR).
5. Manufacturer shall provide proof, via independent testing, that materials proposed as a solution do not contain heavy metals in amounts greater than that allowed by current EPA requirements.

### 4. PRODUCT DELIVERY AND STORAGE

1. Delivery of Materials: Manufactured materials shall be delivered in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturer. Adhesives, resins and their catalysts and hardeners shall be crated or boxed separately and noted as such to facilitate their movement to a dry indoor storage facility.
2. Storage of Products: All materials shall be carefully handled to prevent them from abrasion, cracking, chipping, twisting, and other types of damage. Store adhesives, resins and their catalysts and hardeners in dry indoor storage facilities between 70 and 85 degrees Fahrenheit (21 to 29 degrees Celsius) until they are required.

## PART 2 - MATERIALS

### 1. MANUFACTURER

1. Structural shapes shall be similar to those components indicated on the structural drawings as manufactured by:

**Fibergate Composite Structures Inc.**  
5151 Belt Line Road, Suite 1212  
1000 Thornton Road South, Unit E  
Oshawa, ON L1J 7E2  
(877)771-7764

## PULTRUDED FIBERGLASS STRUCTURAL SHAPES

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Website: [www.fibergrate.com](http://www.fibergrate.com)

E-mail: [info@fibergrate.com](mailto:info@fibergrate.com)

2. Contractor may propose alternative manufacturer to the Engineer for approval. The products shall have similar size and equal or better strength than those fabricated by Fibergrate.
  3. The resin of fiberglass components shall have dark color.
2. GENERAL
1. All structural shapes are to be manufactured by the pultrusion process with a glass content minimum of 45%, maximum of 55% by weight. The structural shapes shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions as specified in the Contract Documents.
  2. Fiberglass reinforcement shall be a combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application and/or physical properties required.
  3. Resins shall be ISOFR, fire retardant isophthalic polyester or VEFR, fire retardant vinyl ester, with chemical formulation necessary to provide the corrosion resistance, strength and other physical properties as required.
  4. All finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.
  5. All pultruded structural shapes shall be further protected from ultraviolet (UV) attack with 1) integral UV inhibitors in the resin and 2) a synthetic surfacing veil to produce a resin rich surface.
  6. All fire retardant FRP products shall have a tested flame spread rating of 25 or less per ASTM E-84 Tunnel Test.

## PULTRUDED FIBERGLASS STRUCTURAL SHAPES

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2.3 Pultruded structural shapes are to have the minimum longitudinal mechanical properties listed below:

Property	ASTM Method	Value	Units
Tensile Strength	D-638	30,000 (206)	psi (MPa)
Tensile Modulus	D-638	$2.5 \times 10^6$ (17.2)	psi (GPa)
Flexural Strength	D-790	30,000 (206)	psi (MPa)
Flexural Modulus	D-790	$1.8 \times 10^6$ (12.4)	psi (GPa)
Flexural Modulus (Full Section)	N/A	$2.8 \times 10^6$ (19.3)	psi (GPa)
Short Beam Shear (Transverse)	D-2344	4,500 (31)	psi (MPa)
Shear Modulus (Transverse)	N/A	$4.5 \times 10^5$ (3.1)	psi (GPa)
Coefficient of Thermal Expansion	D-696	$4.4 \times 10^{-6}$ ( $8.0 \times 10^{-6}$ )	in/in/°F (cm/cm/°C)
Flame Spread	E-84	25 or less	N/A

### PART 3 - EXECUTION

#### 1. FABRICATION

1. Measurements: Structural Shapes supplied shall meet the minimum dimensional requirements as shown or specified. The Contractor shall provide and/or verify measurements in field for work fabricated to fit field conditions as required by manufacturer to complete the work. Determine correct size and locations of required holes or coping from field dimensions before structural shape fabrication.
2. Sealing: All shop fabricated cuts or drilling shall be coated with vinyl ester resin to provide maximum corrosion resistance. All field fabricated cuts or drilling shall be coated similarly by the contractor in accordance with the manufacturer's instructions.
3. Hardware: Type 316 stainless steel bolts shall be provided.

#### 2. INSPECTION

1. Shop inspection is authorized as required by the Owner and shall be at Owner's expense. The fabricator shall give ample notice to Contractor prior to the beginning of any fabrication work so that inspection may be provided. The structural shapes shall be as free, as commercially possible, from visual defects such as foreign inclusions, delamination, blisters, resin burns, air bubbles and pits.

----- END OF SECTION -----

## EARTHWORK FOR MINOR WORKS

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### PART 1 - GENERAL

1. RELATED REQUIREMENTS
  2. REFERENCES
  3. ACTION AND INFORMATIONAL SUBMITTALS
1. Section 32 11 23 - Aggregate Base Courses
  1. ASTM International
    - a. ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
  2. Ontario Provincial Standard Specifications (OPSS)
    - a. OPSS 1004-[05], Material Specification for Aggregates-Miscellaneous.
    - b. OPSS SP 110F13-03, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
  1. Submit in accordance with Section 01 33 00 - Submittal Procedures.

### PART 2 - PRODUCTS

1. MATERIALS
1. Select Subgrade to OPSS SP 1010F13. Sand to OPSS 1004.

### PART 3 - EXECUTION

1. EXAMINATION
1. Verification of Conditions:
    - a. Before commencing work verify locations of buried services on and adjacent to site.
  2. Evaluation and Assessment:
    - a. Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.
    - b. Testing of materials and compaction of backfill and fill will be carried out by testing laboratory approved by PCA Representative.
    - c. Not later than 48 hours before backfilling or filling with approved material, notify PCA Representative so that compaction tests can be carried out by designated testing agency.
    - d. Before commencing work, conduct, with PCA

Representative, condition survey of existing structures, trees and plants, lawns, fencing, service poles, wires, and paving, survey bench marks and monuments which may be affected by work.

## 2. PREPARATION

### 1. Temporary Erosion and Sedimentation Control:

- a. Use 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, in accordance with sediment and erosion control plan.
- b. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- c. Remove erosion and sedimentation controls other than Filtrexx Siltsoxx and restore and stabilize areas disturbed during removal.

### 2. Protection of in-place conditions:

- a. Protect excavations from freezing.
- b. Keep excavations clean, free of standing water, and loose soil.
- c. Where soil is subject to significant volume change due to change in moisture content, cover and protect to PCA Representative's approval.
- d. Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- e. Protect buried services that are to remain undisturbed.

### 3. Removal:

- a. Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- b. Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
- c. Carefully remove soil around roots of trees to remain.

## 3. EXCAVATION

### 1. Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial and Municipal regulations.

### 2. Topsoil stripping:

- a. Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
- b. Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.
- c. Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering

topsoil.

3. Excavate as required to carry out work

4. BACKFILLING

1. Start backfilling only after inspection and receipt of written approval of fill material and spaces to be filled from PCA Representative.
2. Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
3. Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
4. Compaction of subgrade: compact existing subgrade under trails to same compaction as specified for fill. Fill excavated areas with selected subgrade material compacted as specified for fill.
5. Placing:
  - a. Place backfill, fill and basecourse material in 150 mm lifts. Add water as required to achieve specified density.
6. Under seeded areas: use site excavated material.

5. GRADING

1. Grade to ensure that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by PCA Representative. Grade to be gradual between finished spot elevations as indicated.

6. CLEANING

1. Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - a. Dispose of cleared and grubbed material daily.
2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
3. Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

----- END OF SECTION -----

## AGGREGATE MATERIALS

### PART 1 - GENERAL

- |                                  |   |
|----------------------------------|---|
| 1. RELATED REQUIREMENTS          | 1. Section 32 11 23 – Aggregate Base Courses  |
| 2. REFERENCES                    | 1. American Society for Testing and Materials (ASTM)<br>a. ASTM D 4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate. |
| 3. SAMPLES                       | 1. Submit samples in accordance with Section 01 33 00 - Submittal Procedures.<br>2. Provide PCA Representative with access to source and processed material for sampling.                     |
| 4. WASTE MANAGEMENT AND DISPOSAL | 1. Divert unused granular materials from landfill to local quarry facility as approved by PCA Representative.   |

### PART 2 - PRODUCTS

- |                   |   |                   |           |        |       |         |          |         |         |          |         |          |        |
|-------------------|---|-------------------|-----------|--------|-------|---------|----------|---------|---------|----------|---------|----------|--------|
| 1. MATERIALS      | 1. Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, invasive plants, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.<br>2. Flat and elongated particles of coarse aggregate: to ASTM D 4791.<br>a. Greatest dimension to exceed five times least dimension.<br>3. Fine aggregates (Limestone Screenings) satisfying requirements of applicable section to be the following:<br>a. Gradations: within limits specified when tested to ASTM C 136 and ASTM C 117.<br><table border="0" style="margin-left: 40px;"><tr><td style="padding-right: 20px;">Sieve Designation</td><td>% Passing</td></tr><tr><td>9.5 mm</td><td>[100]</td></tr><tr><td>4.75 mm</td><td>[50-100]</td></tr><tr><td>2.00 mm</td><td>[30-65]</td></tr><tr><td>0.425 mm</td><td>[10-30]</td></tr><tr><td>0.075 mm</td><td>[5-10]</td></tr></table><br>4. Coarse aggregates (Granular A & Granular B Type II) satisfying requirements of applicable section to be one of or blend of following:<br>a. Crushed rock. | Sieve Designation | % Passing | 9.5 mm | [100] | 4.75 mm | [50-100] | 2.00 mm | [30-65] | 0.425 mm | [10-30] | 0.075 mm | [5-10] |
| Sieve Designation | % Passing   |                   |           |        |       |         |          |         |         |          |         |          |        |
| 9.5 mm            | [100]   |                   |           |        |       |         |          |         |         |          |         |          |        |
| 4.75 mm           | [50-100]  |                   |           |        |       |         |          |         |         |          |         |          |        |
| 2.00 mm           | [30-65]   |                   |           |        |       |         |          |         |         |          |         |          |        |
| 0.425 mm          | [10-30]   |                   |           |        |       |         |          |         |         |          |         |          |        |
| 0.075 mm          | [5-10]  |                   |           |        |       |         |          |         |         |          |         |          |        |

## AGGREGATE MATERIALS

- b. Gravel and crushed gravel composed of naturally formed particles of stone.
  - c. Granular A and Granular B Type II to: OPSS.MUNI 1010
- 2. SOURCE QUALITY CONTROL
  - 1. Inform PCA Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
  - 2. If, in opinion of PCA Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
  - 3. Advise PCA Representative 1 week in advance of proposed change of material source.
  - 4. Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

## PART 3 - EXECUTION

- 1. PREPARATION
  - 1. Topsoil and vegetation stripping
    - a. Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
    - b. Supply and install flags every 10 metres along one side of clear zone prior to commencing clearing and stripping of vegetation. Remove flags only at completion of entire trail aggregate installation.
    - c. Begin topsoil stripping of areas as indicated after area has been cleared of weeds and grasses and these have been removed from trail corridor.
    - d. Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.
    - e. Stockpile topsoil in locations indicated on site for reuse. Stockpile height not to exceed 2 m.
    - f. Strip grasses, forbs, weeds, shrub and tree vegetation as indicated. Remove trees including their trunks, stumps and roots from clear zone. Remove stoloniferous shrub roots from clear zone prior to placing of geogrid and geofabric.
  - 2. Processing
    - a. Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
    - b. Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment

## AGGREGATE MATERIALS

approved by PCA Representative.

- c. Wash aggregates, if required to meet specifications. Use only equipment approved by PCA Representative.

3. Handling

- a. Handle and transport aggregates to avoid segregation, contamination and degradation.

4. Stockpiling

- a. Stockpiled aggregate is to be moved from staging areas within 48 hours maximum.

2. CLEANING

1. It will be Contractor's responsibility to remove any unused aggregate onsite.

----- END OF SECTION -----

## AGGREGATE BASE COURSES

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### PART 1 - GENERAL

- |                                    |  |
|------------------------------------|--|
| 1. RELATED REQUIREMENTS            | 1. Section 31 05 16 Aggregate Materials.   |
| 2. REFERENCES                      | <ol style="list-style-type: none"><li>1. American Society for Testing and Materials (ASTM)<ol style="list-style-type: none"><li>a. ASTM C 117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.</li><li>b. ASTM C 131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.</li><li>c. ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.</li><li>d. ASTM D 698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).</li><li>e. ASTM D 1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).</li><li>f. ASTM D 4318-[00], Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.</li></ol></li><li>2. Canadian General Standards Board (CGSB)<ol style="list-style-type: none"><li>a. CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.</li><li>b. CAN/CGSB-8.2-M8, Sieves, Testing, Woven Wire, Metric.</li></ol></li></ol> |
| 3. DELIVERY, STORAGE, AND HANDLING | 1. Deliver and stockpile aggregates in accordance with Section 31 05 16 – Aggregate Materials  |
| 4. WASTE MANAGEMENT AND DISPOSAL   | 2. Separate and recycle waste materials accordance with contract requirements.   |

### PART 2 - PRODUCTS

- |              |   |
|--------------|---|
| 1. MATERIALS | <ol style="list-style-type: none"><li>1. Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and following requirements:<ol style="list-style-type: none"><li>a. Crushed stone or gravel.</li><li>b. Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.</li></ol></li></ol> |
|--------------|---|

## AGGREGATE BASE COURSES

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### PART 3 - EXECUTION

#### 1. SEQUENCE OF OPERATION

1. Place granular base after trail offset flags have been installed every 10 metres along entire length of trail clear zone by Contractor and accepted by Consultant and PCA representative.
2. Place granular base after subgrade surface is inspected and accepted by Consultant.

#### 3. Placing

- a. Construct granular base to depth and grade in areas indicated.
- b. Ensure no frozen material is placed.
- c. Place material only on clean surface, free from snow and ice.
- d. Begin spreading base material on crown line or on high side of one-way slope.
- e. Place material using methods which do not lead to segregation or degradation of aggregate.
- f. Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
- g. Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- h. Remove and replace that portion of layer in which material becomes segregated during spreading.

#### 4. Compaction Equipment

- a. Compaction equipment to be capable of obtaining required material densities.
- b. Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from PCA Representative before use.
- c. Equipped with device that records hours of actual work, not motor running hours.

#### 5. Compacting

- a. Shape and compact alternately to obtain smooth, even and uniformly compacted base.
- b. Apply water as necessary during compacting to obtain specified density.
- c. Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

#### 2. SITE TOLERANCES

1. Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

**AGGREGATE BASE COURSES**

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3. PROTECTION

1. Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by PCA Representative.

----- END OF SECTION -----

## WIRE FENCE

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### PART 1 - GENERAL

1. RELATED REQUIREMENTS
  1. Section 01.33.00 Submittals
  2. Section 01.45.00 Quality Control
  3. Section 01.73.00 Execution
  
2. MEASUREMENT AND PAYMENT
  1. Measure supply and erection of wire fence in metres erected
  
3. REFERENCES
  1. American Society for Testing and Materials International, (ASTM).
    - a. ASTM A 121, Specification for Zinc-Coated (Galvanized) Steel Wire.
  2. Canadian Standards Association (CSA International).
    - a. CSA G42- Galvanized (Zinc-Coated) Steel Farm-Field Wire Fencing.
  
4. INFORMATIONAL SUBMITTALS
  1. Product Data:
    - a. Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  
5. QUALITY ASSURANCE
  1. Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
  2. Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
  
6. WASTE MANAGEMENT AND DISPOSAL
  1. Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
  2. Remove from site and dispose of packaging materials at appropriate recycling facilities.
  3. Collect and separate for disposal any packaging material for recycling.
  4. Divert unused metal materials from landfill to approved metal recycling facility.

## WIRE FENCE

### PART 2 - PRODUCTS

#### 1. MATERIALS

1. Wire fence:
  - a. Farm-field type: to CSA G42, standard.
2. Timber posts:
  - a. Sound, seasoned wood peeled cedar with ends cut square or on a slant as indicated.
  - b. Intermediate posts: 2.5 m long and minimum 125 mm diameter at small end.
  - c. Corner, end, and anchor posts: 2.5 m long and minimum 200 mm diameter at small end
  - d. Braces for end and corner and gate posts: 89 x 89 mm 3 m long.

### PART 3 - EXECUTION

#### 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.

#### 2. GRADING

1. Level ground along fence line in order that bottom wire of fence between posts can be maintained at not more than 300mm above ground.

#### 3. ERECTION OF FENCE

1. Erect fence along lines as indicated and directed by PCA Representative.
  - a. Slant of post tops to be perpendicular to fence line and facing outward.
  - b. Install cleats for anchoring at corner, gate, end and anchor posts as indicated.
  - c. Erect wires and stretch to have uniform tension. Splice wires with standard wire splices.
  - d. Attach top wires to posts with minimum two staples. Fasten other wires to posts and cross braces with at least two staples. Staple wires securely at end, anchor and gate posts.
  - e. Do not excavate for post installation. Posts to be pounded securely into place.

#### 4. CLEANING

1. Perform cleaning as soon as possible after installation.
2. Clean and trim areas disturbed by operations. Dispose of surplus as directed by PCA Representative.
3. Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

----- END OF SECTION -----

## EXTERIOR SITE FURNISHINGS

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### PART 1 - GENERAL

- |  |   |
|--|---|
| 1. RELATED REQUIREMENTS                | 1. Section 03 30 00      Cast-in-Place Concrete   |
| 2. ACTION AND INFORMATIONAL SUBMITTALS | <ol style="list-style-type: none"><li>1. Submit product data in accordance with contract requirements.</li><li>2. Submit shop drawings in accordance with contract requirements.</li><li>3. Submit colour sample in accordance with contract requirements.</li><li>4. Indicate dimensions, sizes, assembly, anchorage and installation details for each furnishing specified.</li><li>5. Provide maintenance data for care and cleaning of site furnishings for incorporation into manual.</li></ol>  |
| 3. WASTE MANAGEMENT AND DISPOSAL       | <ol style="list-style-type: none"><li>1. Separate waste materials for reuse and recycling in accordance with contract requirements.</li><li>2. Remove from site and dispose of packaging materials at appropriate recycling facilities.</li><li>3. Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.</li><li>4. Separate for reuse and recycling and place in designated containers Steel, Metal and Plastic waste in accordance with Waste Management Plan.</li><li>5. Fold up metal banding, flatten and place in designated area for recycling.</li></ol> |

### PART 2 - PRODUCTS

- |             |  |
|-------------|--|
| 1. BOLLARDS | <ol style="list-style-type: none"><li>1. Maglin – 650 Series Bollard<ol style="list-style-type: none"><li>a. Manufacturer: Maglin (phone: 1-800-716-5506 x 1102) or approved equal;</li><li>b. Model: MTB650-B4;</li><li>c. Material: H.S. steel tube capped with cast aluminum parts;</li><li>d. Custom Colour: Pantone Heritage Green Pantone 556</li><li>e. Installation as per manufacturer's instructions;</li><li>f. Contractor to provide product data and shop</li></ol></li></ol> |
|-------------|--|

## EXTERIOR SITE FURNISHINGS

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drawings.

### 2. P-GATES

#### 1. P-Gates

- a. P Offset Walkway Gate by Maglin (1-800-716-5506 x 1102), or approved equal.
- b. All pipe weights to be schedule 40.
- c. Contractor to padlock gate immediately following installation. Keys shall be provided to PCA upon award of Substantial Completion.
- d. Custom Colour: Pantone Heritage Green Pantone 556
- e. Installation as per manufacturer's instructions;
- f. Contractor to provide product data and shop

## PART 3 - EXECUTION

### 1. INSTALLATION

1. Assemble furnishings in accordance with manufacturer's instructions.
2. Install furnishings true, plumb, anchored and firmly supported, as directed by Contract Administrator.
3. Touch-up or replace damaged finishes to approval of Contract Administrator.

----- END OF SECTION -----

## TOPSOIL PLACEMENT AND GRADING

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### PART 1 - GENERAL

1. RELATED REQUIREMENTS
  2. REFERENCES
  3. DEFINITIONS
  4. ACTION AND INFORMATIONAL SUBMITTALS
  5. WASTE MANAGEMENT AND DISPOSAL
1. Section 32 19 .13 – Mechanical Seeding
  1. Agriculture and Agri-Food Canada
    - a. The Canadian System of Soil Classification, Third Edition, 1998.
  2. Canadian Council of Ministers of the Environment
    - a. PN1340-2005, Guidelines for Compost Quality.
  3. U.S. Environmental Protection Agency (EPA)/Office of Water
    - a. EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
  1. Topsoil:
    - a. Mixture of soil and decomposing organic matter excavated on site for trail preparation, seeding and tree/vegetation planting
    - b. Imported mixture of soil is permitted only at the parking area south of Major MacKenzie and in the quantity needed to achieve grading indicated on drawings. This imported soil shall be heat-treated prior to arrival on site in order to be weed seed free. It shall be composed of sand, silt, clay and decomposing organic matter, suitable as a growing medium for native species and free from toxic or growth inhibiting contaminants.
  1. Provide submittals for any imported topsoil in accordance with Section 01 33 00 - Submittal Procedures.
  2. Quality control submittals:
    - a. Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties
  1. Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### PART 2 - PRODUCTS

1. TOPSOIL
1. Topsoil for seeding: contractor to use existing materials

## TOPSOIL PLACEMENT AND GRADING

stripped and stockpiled from the site prior to grading works. No amendments are required. Contractor is required to ensure the soil is free of non-organic debris.

2. Imported topsoil: heat-treated mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.
  - a. Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, minimum 7% clay, and contain 2 to 10 % organic matter by weight.
  - b. Contain no toxic elements or growth inhibiting materials.
  - c. Finished surface free from:
    - i. Debris and stones over 50 mm diameter.
    - ii. Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
  - d. Consistency: friable when moist.

### 2. SOIL AMENDMENTS

1. Applies only to imported topsoil should any be required.
2. Sand: washed coarse sand, medium to course textured.
3. Organic matter: compost Category in accordance with CCME PN1340, unprocessed organic matter, such as rotted cow manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
4. Limestone:
  - a. Ground agricultural limestone.
  - b. Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- 5.

### 3. SOURCE QUALITY CONTROL

1. Advise PCA Representative of sources for imported topsoil to be utilized with sufficient lead time for testing.
2. Contractor is responsible for amendments to supply topsoil as specified.
3. Soil testing by recognized testing facility for PH, P and K, and organic matter.
4. Testing of topsoil will be carried out by testing laboratory designated by PCA Representative.
  - a. Soil sampling, testing and analysis to be in accordance with Provincial standards.

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### PART 3 - EXECUTION

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 and sediment and erosion control drawings.
  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. STRIPPING OF TOPSOIL
  1. Begin topsoil stripping of areas after area has been cleared of trees, brush and tall herbaceous plants.
  2. Strip topsoil to depths as indicated.
    - a. Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
  3. Stockpile in locations as directed by PCA Representative.
    - a. Stockpile height not to exceed 2 m.
    - b. Protect stockpiles from contamination and compaction.
3. PREPARATION OF EXISTING GRADE
  1. Verify that grades are correct.
    - a. If discrepancies occur, notify PCA Representative and do not commence work until instructed by PCA Representative.
  2. Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
4. PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL
  1. Place topsoil after PCA Representative has accepted subgrade.
  2. Spread topsoil in uniform layers not exceeding 150 mm.
  3. Spread topsoil to following minimum depths after settlement.
    - a. As indicated on drawings.
  4. Manually spread topsoil/planting soil around trees, shrubs and obstacles.
5. FINISH GRADING
  1. Grade to eliminate rough spots and low areas and ensure positive drainage.
    - a. Prepare loose friable bed by means of cultivation

**TOPSOIL PLACEMENT AND GRADING**

and subsequent raking.

2. Consolidate topsoil to required bulk density using equipment approved by PCA Representative.
  - a. Leave surfaces smooth, uniform and firm against deep footprinting.
  
6. ACCEPTANCE
  1. PCA Representative will review topsoil in place and determine acceptance of material, depth of topsoil and finish grading.
  
7. SURPLUS MATERIAL
  1. Dispose of materials except topsoil not required where directed by PCA Representative.
  
8. CLEANING
  1. Proceed in accordance with Section 01 74 11 - Cleaning.
  
  2. Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

----- END OF SECTION -----

## MECHANICAL SEEDING

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### PART 1 - GENERAL

1. RELATED REQUIREMENTS
  1. Section 32 91 19.13 Topsoil Placement and Grading.
2. ACTION AND INFORMATIONAL SUBMITTALS
  1. Product Data:
    - a. Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
    - b. Provide product data for:
      - i. Seed.
3. QUALITY ASSURANCE
  1. Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
  2. Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
4. WASTE MANAGEMENT AND DISPOSAL
  1. Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  2. Divert unused fertilizer from landfill to official hazardous material collections site approved by PCA Representative

### PART 2 - PRODUCTS

1. SEED
  1. Canada certified seed in accordance with Government of Canada Seeds Act and Seeds Regulations.
    - a. Mixture compositions as indicated on drawings.
  2. In packages individually labelled in accordance with Seeds Regulations and indicating name of supplier, product name and composition.
2. WATER
  1. Free of impurities that would inhibit germination and growth.
  2. Supplied by contractor at designated source.

## MECHANICAL SEEDING

### PART 3 - EXECUTION

1. QUALITY OF WORK
  1. Do not perform work under adverse field conditions as determined by PCA Representative.
  2. Remove and dispose of non-organic materials in topsoil and other deleterious materials; off site.
2. SEED BED PREPARATION
  1. Verify that grades are correct. If discrepancies occur, notify PCA Representative and do not commence work until instructed by PCA Representative.
  2. Fine grade surface free of humps and hollows to smooth, even grade, to tolerance of plus or minus 25 mm, surface draining naturally.
  3. Cultivate fine grade approved by PCA Representative to 25mm depth immediately prior to seeding.
3. SEED PLACEMENT
  1. For manual seeding:
    - a. Use "Cyclone" type manually operated seeder.
  2. Refer to drawings for seed sowing rate.
  3. Blend applications into adjacent grass/meadow/wetland/woodland areas to form uniform surfaces.
  4. Sow half of required amount of seed in one direction and remainder at right angles as applicable.
  5. Incorporate seed by light raking in cross directions.
4. MAINTENANCE DURING ESTABLISHMENT PERIOD
  1. Perform following operations from time of seed application until acceptance by PCA Representative:
    - a. Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
5. FINAL ACCEPTANCE
  1. Seeded areas will be accepted by PCA Representative provided that:
    - a. Areas are uniformly established and free of rutted, eroded, bare or dead spots.
6. MAINTENANCE DURING WARRANTY PERIOD
  1. Perform following operations from time of acceptance until end of warranty period.
    - a. Repair and reseed dead or bare spots to satisfaction of PCA Representative.

**MECHANICAL SEEDING**

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7. CLEANING

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

----- END OF SECTION -----

PART 1 - GENERAL

1. RELATED  
REQUIREMENTS

1. Section 32 91 19\_13 – Topsoil Placement and Grading

2. REFERENCES

1. Agriculture and Agri-Food Canada (AAFC).
  - a. Plant Hardiness Zones in Canada-2000.
2. Canadian Nursery Landscape Association (CNLA).
  - a. Canadian Standards for Nursery Stock-2001.
3. Department of Justice Canada (Jus).
  - a. Canadian Environmental Protection Act (CEPA), 1999, c. 33.
  - b. Transportation of Dangerous Goods Act (TDGA), 1992, c.34.
4. Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - a. Material Safety Data Sheets (MSDS).

3. DESCRIPTION

1. The work covered in this specification shall include the supply of all labour, materials, consumables and equipment necessary to install the required plant material.
2. Supply of and payment for work covered by this section will assume spring and summer planting conditions.

4. QUALITY ASSURANCE

1. Planting work is to be carried out by experienced personnel under the direction of a skilled foreman.
2. Obtain approval from Consultant of plant material source(s) prior to placing orders.
3. Canadian Nursery Trades Association Sixth Edition of Canadian Standards for Nursery Stock shall be the minimum standard for plant material unless this specification is superior, in which case, this specification shall apply.

5. SCHEDULING

1. Confirm availability of all plant material within 30 days of award of contract. If any plant material specified is not available, provide written notice, detailing the deficiencies within 30 days of contract

award. Obtain approval from Consultant of schedule 7 days in advance of shipment of plant material.

2. Schedule to include:
  - a) Date plant material representative sample will be available for review, at work site, by Consultant.
  - b) Quantity and type of plant material.
  - c) All shipping dates.
  - d) All arrival dates on site.
  - e) All planting dates.

**6. PRODUCT, DELIVERY,  
STORAGE AND HANDLING**

1. Refer to Contract Drawings for locations and accurate plant lists and quantities of all material.
2. Supply manufactured items such as fertilizer, bonemeal, mulch etc., in standard containers, clearly indicating contents, weight, component analysis, and the name of the manufacturer.
3. Store manufactured materials, subject to deterioration, in a weatherproof place on site and in such a manner that their effectiveness is not impaired.
4. Supply plant material as specified on the plant list on each drawing and in accordance with sizes specified. Undersized material will not be accepted in this contract.
5. Provide all "B & B" (balled and burlapped) material on the plant list, with a solid, earth rootball, wrapped in burlap, and all potted material, as specified.

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- 6. Do not use plant material on which the rootball has been cracked or broken preparatory to, or during the planting process.
- 7. Provide rootballs of the following minimum sizes to meet the corresponding tree size. Ensure the rootball is large enough to accommodate at least 75% of the fibrous root section.

<b>Deciduous Trees Caliper</b>	<b>Minimum Rootball Diameter</b>
45 - 60 mm	70 cm
70 - 80 mm	90 cm

- 8. Wrap rootballs according to the following schedule:

<b>Rootball Diameter</b>	<b>Wrapping Schedule</b>
over 60 cm	double wrap 142 g hessian burlap and drum laced with 6 mm rope at 20 cm spacing

- 9. Cut all roots cleanly when digging plants. Split roots are not acceptable. Cut roots even with the edges of the rootball.
- 10. Protect all plant material from damage and breakage. Protect all parts of the plant material from drying out from the time of digging until they are installed.
- 11. Do not transport plant material in an open truck unless it is adequately protected, to the satisfaction of the Consultant, from sun and wind.
- 12. Carefully tie in all branches before transporting.
- 13. Pad all points of contact between plant material and equipment.
- 14. Heel in any plant material that cannot be planted during the current day's operations.

## TREE AND SHRUB PRESERVATION

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- a. Bare rooted stock to be heeled-in and kept moist throughout the planting process.
    - b. For balled and burlapped root balls, and wire basket and potted plants, place to protect branches from damage. Maintain moisture level in root zones.
  15. Keep all roots and rootballs moist prior to planting.
  16. Planting beds are to be cleared and grubbed prior to planting.
7. JOB CONDITIONS
  1. Proceed with planting operations only during suitable weather conditions.
8. SUBSTITUTIONS
  1. Supply and install plant material as specified on the plant list. Do not anticipate substitutions of size, or with other plant material will be acceptable. If substitutions are requested, they will only be allowed with the written approval of the Consultant.
9. INSPECTIONS
  1. Make plant material available for inspection at source by the Consultant.
  2. Ensure plants are labelled true to species upon arrival at job site.
  3. Approval of plant material at source will not impair the right of the Consultant to inspect plants upon arrival on the site or during the course of construction and to reject plants which have been damaged, or which in any way, do not conform to the specifications.
  4. If partial acceptance is desired, give notice to the Consultant in writing.
  5. Partial acceptance may be given at the sole discretion of the Consultant, when planting work has been delayed due to circumstances beyond the control of the Contractor or where planting would be in discordance with good horticultural practices and would jeopardize the performance of the work and plants.

6. Final inspection of all plant material will be made at the end of the specified guarantee period. All plants must be in a healthy growing condition at the time of this inspection.
10. MAINTENANCE
1. Maintain all plants and planting areas immediately after installation, throughout construction and until ten (10) calendar days after all project work has been inspected, approved and accepted by the Consultant.
  2. Maintenance shall include all measures necessary to establish and maintain all plants in a vigorous and healthy growing condition, including, but not limited to:
    - a. Cultivating and weeding of planting pits and tree pits. Use herbicides in accordance with the manufacturer's directions. Make good any damage resulting from herbicides used at no extra cost.
    - b. Watering when required and in sufficient quantities to saturate the root system.
    - c. Pruning, including the removal of dead or broken branches, and treatment of pruning wounds with approved dressing. Refer to appropriate section.
    - d. Disease and insect control when required. Use chemical methods in accordance with the manufacturer's directions. Make good any damage at no extra cost.
    - e. Keep all accessories in good condition and properly adjusted. Repair or replace accessories when required at no extra cost.
    - f. Provide adequate winter protection in the form of burlap fence, burlap wrapping or the application of antidessicant or all the above as required to maintain plant material in healthy growing condition.
  3. At the time of acceptance, all material must be in a healthy vigorous growing condition. Beds and tree

pits must be freshly cultivated and free of weeds, rubbish and debris.

**11. GUARANTEE**

1. All plant material to be guaranteed against defects for a period of two (2) years from the date of Certificated of Substantial Completion.
2. Guarantee that all plant material shall remain free of defect, pests and diseases for the full duration of the guarantee period.
3. All plants shall be inspected at the end of the guarantee period(s). Plants which, at that time, are not in a healthy vigorous growing condition, to the sole discretion of the Consultant, shall be replaced within 30 days, by the Contractor ,at no extra charge to the Client.
4. Replacements shall be supplied and planted in strict accordance with drawings, plant list, and the specifications and shall be subject to the specified guarantee periods.
5. Replacements shall be planted as soon as possible, but during the proper planting season, in accordance with accepted horticultural practice.
6. All replacement trees shall be clearly marked in a visible manner.
7. Notify Consultant in writing, when replacements are to be planted.
8. Maintain shrub beds during the warranty period including the removal of weeds.

**PART 2 - PRODUCTS**

**1. PLANT MATERIAL**

1. All plant material must be nursery grown and meet the specifications set out in the latest Guide Specifications for Nursery Stock prepared by the Canadian Nursery Trades Association (C.N.T.A.) for size, height, spread, grading, quality and method of cultivation.
2. Nomenclature of specified plants shall conform to the International Code of Nomenclature of

Cultivated Plants and the latest edition of Standardized Plant Names.

3. Any plant materials not conforming to above will be designated as collected plants.
4. Plant Material: True to name and type, structurally sound, well branched; healthy and vigorous and free from disease, insect infestations, rodent damage, sun scald, frost cracks, and other abrasions to the bark; and densely foliated with a healthy, well developed root system. Pruning wounds must show vigorous bark on all edges and all parts must show live and green cambium tissue when cut. Bare root material shall exhibit a strong fibrous root system.
5. All material must conform to the sizes shown on the plant list, except that larger material may be used when approved by the Consultant. Use of larger plants will not increase the contract price. Undersized material will be rejected.
6. Plant material sizes must conform to the following standards:
  - a. Calliper diameter of the trunk measured 150 mm above the normal grade around the plant.
  - b. Height measured from the normal grade around the plant to the top of the main foliage mass.
  - c. Spread the diameter of the main foliage mass, at its widest point.

**2. OTHER MATERIAL**

1. Planting Soil / Topsoil:
  - a. As per Section 32 91 19 13 Topsoil Placement and Grading
  - b. Contractor to provide a minimum of three (3) samples of planting soil / topsoil to a qualified soil testing lab (i.e. SGS Agrifood Laboratories) for analysis.

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- c. Planting soil is not to be imported but is to be taken from adjacent areas of native soil, with the exception of soil required at the parking area south of Major MacKenzie Drive. Imported planting soil / topsoil at the parking area south of Major MacKenzie is restricted in volume to that required to achieve required grades and shall meet the following criteria:

Description	Typical Guidelines
pH	5.5 – 7.0
Organic Matter (%)	4 – 15
Total Salts	<1.5
Phosphorus (ppm)	10 - 60
Potassium (ppm)	80 - 250
Calcium (ppm)	1000 – 4000
Magnesium (ppm)	100 - 300
Chloride (ppm)	<100
Sodium (ppm)	<200
Sodium Adsorption Ratio	<15
Sand Fraction (%)	20 – 75
Silt Fraction (%)	5 – 50
Clay Fraction (%)	5 - 30
Texture	Loam / Sandy Loam

d. Contractor to make all required planting soil / topsoil amendments to meet the above-mentioned criteria.

4. Bonemeal: as required is to be finely ground commercial bonemeal with a minimum analysis of 4% nitrogen and 20% phosphoric acid.
5. Tree wrap: to be 225 g burlap supplied in strips 150 mm minimum to 250 mm maximum width or heavy, waterproof crepe paper 100 mm to 150 mm wide.
6. Stakes: to be 80mm diameter, rounded, bark removed, pine or cedar wood stakes drilled to receive guy wire.
7. Guy Material: to be flat, flexible woven nylon webbing in green or brown.
9. Mulch Material: shall be Shredded Pine Bark mulch by Gro-Treated Farms or approved equal, varying from 25 to 75 mm in length and 5 to 20 mm thick, free of small branches, leaves, and chemicals as approved by Consultant. Approval of substitutions must be requested in writing prior to commencement of work under this contract. Place mulch to a depth of 70 mm.
10. Water: to be potable and free of toxins, minerals, and impurities that would inhibit plant growth.
11. Anti desiccant: to be a wax like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.

3. PLANTING SOIL MIX

1. Planting soil to be friable, soil, free of atrazine, taken from adjacent farm land. Contractor to test for atrazine as described in testing section of specifications.
2. Planting soil is to be thoroughly mixed in to excavation to eliminate air pockets and prevent settlement.

**PART 3 - EXECUTION**

**1. PREPARATION**

1. Obtain the approval of the Consultant of all planting excavations as outlined or indicated on the drawings.

**2. PRE-PLANTING OPERATIONS**

1. For individual planting holes and planting beds:
  - a. Stake out planting location and obtain acceptance of the staking from Consultant prior to excavating.
  - b. Excavate to depth and width as indicated on detail drawings. For shrub beds, excavate to depth of 600 mm.
  - c. Remove 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 off site.
  - d. Remove water which enters excavations prior to planting. Notify Consultant if water source is ground water.

**3. PLANTING**

1. For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball. Do not pull burlap or rope from under root ball.
2. For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.
3. Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to roads and walkways.
4. For trees and shrubs:
  - a. Place plant plumb in the centre of the planting pit with a minimum of 200 mm of compacted planting soil mixture under the rootball of trees; and 150 mm of compacted planting soil mixture under the rootball of shrubs. Face the plant to give the best

appearance or relationship to proposed pedestrian/vehicular traffic. Cut away any ropes which might girdle the tree.

- b. Backfill with planting soil in 150 mm layers and firmly tamp each layer to ensure the plant retains its orientation. Ensure no air pockets remain around the roots.
- c. Water thoroughly when two thirds of the depth of planting pit has been backfilled; fill remaining space with water. After water has penetrated soil, backfill to finish grade. Water again when the operation is complete.
- d. For trees and shrubs, construct an earth saucer around each plant equal to the diameter of the tree pit to retain water around the roots.
- e. Correct soil settlement as it occurs during the guarantee period.

5. For perennials:

- .i Refer to contract drawings for specific notes applicable to perennial planting.
- .ii Ensure container is removed prior to planting.

4. TRUNK PROTECTION

- 1. Install trunk protection on deciduous trees prior to installation of tree supports.

5. TREE SUPPORTS

- 1. Install wooden tree supports for deciduous and coniferous trees.
  - a. Place one stake 150 mm away from trunk on side of prevailing wind. Fasten trunk to stake with woven webbing guying collars. Various patterns of fastening tree trunk to webbing may be acceptable if no damage to bark of tree will occur.

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- b. Drive stake outside the root ball, minimum 150 mm into undisturbed soil beneath roots. Ensure stake is secure, vertical and un-split.
- 6. MULCHING
  - 1. Ensure soil settlement has been corrected prior to mulching.
  - 32 For continuous / mass planting beds (ie: shrubs, perennial, grasses), mulch to be spread throughout bed to form continuous mat.
- 7. CLEAN UP
  - 1. At the completion of planting operations, remove all surplus material from the site at no extra cost.
  - 2. Make good all damage resulting from planting operations at no extra cost.
- 8. MAINTENANCE DURING ESTABLISHMENT PERIOD
  - 1. Perform following maintenance operations from time of planting to acceptance by Consultant.
    - a. Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
      - .1 For coniferous plant material, water thoroughly in late fall prior to freeze up to saturate soil around root system.
    - b. Replace or re-spread damaged, missing or disturbed mulch.
    - c. For non-mulched areas, cultivate as required to keep top layer of soil friable.
    - d. Remove dead or broken branches from plant material.
    - e. Keep trunk protection and guy collars in proper repair and adjustment.
    - f. Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

- g. Apply Rodent Protection between October 1st and 30th.

9. ACCEPTANCE

- 1. Plant material will be reviewed by Consultant 60 days after planting operation is completed, provided that plant material exhibits healthy growing conditions and is free from disease, insects and fungal organisms.
- 2. Plant material installed less than 90 days prior to frost will be reviewed the following spring, 30 days after start of growing season.

10 MAINTENANCE DURING  
WARRANTY PERIOD

- 1. From time of acceptance by Consultant to end of two year warranty period, perform following maintenance operations.
  - a. Water fall and spring seasons to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
  - b. Replace or respread damaged, missing or disturbed mulch.
  - c. For non-mulched areas, cultivate late fall and early spring to keep top layer of soil friable.
  - d. Remove dead, broken or hazardous branches from plant material.
  - e. Keep trunk protection and tree supports in proper repair and adjustment where required for newly planted stock.
  - f. Remove trunk protection, tree supports and level watering saucers at end of warranty period.
  - g. Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

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- h. Install burlap wrap or apply antidessicant as required to overwinter plant material.
- i. Submit seasonal written reports to Consultant identifying:
  - .i Maintenance work carried out.
  - .ii Development and condition of plant material.
  - .iii Preventative or corrective measures required which are outside Contractor's responsibility.

END OF SECTION

## HELICAL PILE FOUNDATION SPECIFICATIONS

This document is intended to provide a comprehensive list of considerations and specifications for the provision of a certified and successful helical pile foundation for any given project.

### **1. DESIGN OF HELICAL PILE FOUNDATIONS**

- 1.1 The geotechnical design of helical pile foundations shall conform to the latest editions of the National Building Code, Canadian Foundation Engineering Manual (CFEM) and any local applicable building codes.
- 1.2 The structural design of helical piles and pile caps shall conform to the latest editions of CSA-S16 for the design of steel structures and CSA-A23.3 for the design of concrete as well as any applicable local, national, or international codes and standards.
- 1.3 Helical pile design shall take into consideration the following, if provided:

Loading Information	<ul style="list-style-type: none"> <li>• Foundation design loads – SLS (Serviceability Limit State)</li> <li>• Foundation design loads – ULS (Ultimate Limit State)</li> </ul>
Geotechnical Resistance Factor (GRF)	<ul style="list-style-type: none"> <li>• Unless specified otherwise, based on the Canadian Foundation Engineering Manual 2006 (CFEM), Section 8.6, the following GRF are recommended for helical pile foundation design:            GRF for compression is 0.4 (without static pile load testing)            GRF for compression is 0.6 (with static pile load testing)            GRF for uplift/tension is 0.3 (without static pile load testing)            GRF for uplift/tension is 0.4 (with static pile load testing)</li> </ul>

- 1.4 A helical pile design engineer should have adequate foundation design experience and geotechnical engineering knowledge.
- 1.5 The helical pile foundation design should be based on clearly specified methodology and design process. All calculation formulas and details, including assumptions, shall be made available upon request for review.

Note: Helical pile design shall be in accordance with fundamental engineering principles and shall not be dependent of the sole use of empirical torque factor ( $K_T$ ) unless supported by CCMC documentation.

### **2. SUBMITTALS**

- 2.1 Project specific drawings for initial review (IFR) shall be submitted to the Client.
- 2.2 Project specific construction drawings (IFC) sealed by a registered engineer in the province of Ontario shall be submitted to the Client. These drawings shall include:
  - a. Quantity, type and layout of piles
  - b. Pile design loads
  - c. Size of shafts and helices, and configuration of these elements
  - d. Materials and procedures to be used in fabrication
  - e. Minimum and maximum anticipated torques during installation
  - f. Pile cap configuration, materials and connection details
  - g. Weld sizes and standards
  - h. Acceptable installation tolerances

- j) Load testing and inspection plan
- k) Design summary

**3. HELICAL PILE MATERIALS**

- 3.1 Only new materials shall be used for the fabrication of helical piles.
- 3.2 Minimum requirements for steel pipe used for helical piles are as follows unless noted otherwise.

All helical piles shall be fabricated with welded or seamless steel pipe that conforms to any of the following specifications or an equivalent.

Pipe Grade	Yield Strength	Tensile Strength
ASTM A252 – Grade 2	(35 ksi) 240MPa	(60 ksi) 414MPa
ASTM A252 – Grade 3	(45 ksi) 310MPa	(66 ksi) 455MPa
ASTM A500 – Grade B	(42 ksi) 290MPa	(58 ksi) 400MPa
ASTM A500 – Grade C	(46 ksi) 317MPa	(62 ksi) 428MPa
API 5L – X46	(46 ksi) 317MPa	(63 ksi) 434MPa

Commonly available pipe sizes used for helical piles are shown below. Additional pipe diameters and wall thicknesses are also available and may be selected based on project requirements.

Pipe Diameter inches (mm)	Standard Wall Thickness inches (mm)
2.375" (60)	0.217" (5.51)
2.875" (73)	0.217" (5.51)
3.500" (89)	0.250" (6.35)
4.500" (114)	0.250" (6.35)
5.500" (140)	0.304" (7.72)
6.625" (168)	0.280" (7.11)
7.000" (179)	0.317" (8.05)
8.625" (219)	0.322" (8.18)
10.750" (273)	0.365" (9.27)
12.750" (324)	0.375" (9.53)
16.000" (406)	0.375" (9.53)
20.000" (508)	0.375" (9.53)

- Note: Square shaft sections are not recommended unless soil voiding during installation can confidently be remediated by pressure grouting.
- Note: Gravity fed grout placement is not recommended.

- 3.4 Steel Plate for Helix and Pile Cap Material: Material grades shall conform to CSA-G40.21 “Structural Quality Steels” or per Client specifications. Examples of common yield and tensile strengths are listed below and shall be selected to meet the structural design requirements.

Grade	Yield Strength	Tensile Strength
ASTM A36	(36 ksi) 250MPa	(60 ksi) 414MPa
CSA 44W	(44 ksi) 300MPa	(60 ksi) 414MPa
CSA 50W & 50WT	(50 ksi) 350MPa	(65 ksi) 450MPa

3.5 All helical pile shaft and helices shall be hot-dipped galvanized.

#### 4. WELDING

4.1 The latest revisions of the following standard specifications (or equivalents) shall apply for the welding and fabrication of helical piles for structural applications:

- a. CSA W47.1 Certification of Companies for Fusion Welding of Steel
- b. CSA W59 Welded Steel Construction (Metal Arc Welding)
- c. CSA W48 Filler Metals and Allied Materials for Metal Arc welding

4.2 All welding procedure specifications (WPS), quality and inspection requirements shall conform to CSA W59. All WPS used shall be approved by the Canadian Welding Bureau (or equivalent certifying organization).

4.3 All inspection and testing reports and non-conformance reports shall be maintained by the fabricator and may be made available to the Client upon request.

4.4 Electrode Ultimate Tensile Strength = 485 MPa (70 ksi) or higher.

4.5 Non-destructive Evaluation (NDE) may be requested by the Client/Owner and shall be specified in the contract terms.

#### 5. HELICAL PILE FABRICATION

5.1 All helical pile fabrication shall be performed by a facility that complies with ISO 9001 requirements.

5.2 Helical pile manufacturer shall hold a current Evaluation Report completed by Canadian Construction Materials Center (CCMC)

5.3 Helix shall be welded to the pipe section using a continuous fillet weld on both sides of the helix to pipe connection.

5.4 Welding procedures and welder qualifications shall conform to CSA W47.1 and CSA W59. Welding electrodes (for either stick welding or wire feed welding) shall conform to CSA W48.

5.5 Helical plate should have a minimum thickness of 9.5mm (3/8”).

5.6 Unless otherwise specified, all piles shall be open ended and the pile tip shall be cut at 45°.

5.7 The leading edge of the first helix shall be sharpened to minimize soil disturbance during installation.

5.8 Helices shall be mechanically formed by suitable means to ensure “True-Pitch” shape is formed. The helix must be formed such that the surface of the helix remains perpendicular to the pipe shaft (within  $\pm 2^\circ$ ) along the entire distance around the pipe shaft. This is critical to ensure the helix cuts cleanly through the soil with minimal soil disturbance and to provide representative torque measurements to achieve the specified pile capacities.

5.9 When multiple helices are welded on a pile, the spacing of helices shall be such that the distance from the lead of the lower helix to the lead of the upper helix is a whole number multiple of the helix pitch. This is critical to ensure that the upper helices follow exactly in the path of the first helix in the soil, again to minimize soil disturbance and to obtain

acceptable correlation between torque measurement and pile capacities.

- 5.10 All edges on piles shall be ground and clear of slag, burrs, or sharp edges.
- 5.11 Hot-Dipped Galvanizing shall be completed by a qualified supplier complying with the latest ASTM A123 standard. The pile shall be galvanized inside and out and free from any galvanizing slag.
- 5.12 Any pipe splice welding shall be full strength complete penetration groove welds.

## **6. HELICAL PILE INSTALLATION**

6.1 Prior to helical pile installation, all site-specific permits must be obtained. All underground utilities must be located, marked and identified by the proper authorities. Responsibility for permits and locates will be determined by contract terms.

6.2 The installation of helical piles shall be performed by experienced and well-trained installation personnel with a minimum 5 years helical pile installation experience of similar size and scope. Supporting documentation of such experience shall be provided.

6.3 Unless otherwise specified by the Design Engineer:

- a. All piles shall be installed to design embedment depths as specified in the pile schedule drawings or specifications,
- b. The piles shall be installed achieving the design torque values as specified in the pile schedule drawings or specifications.
- c. All piles shall be installed to ensure the uppermost helix is below the maximum frost penetration depth as per the design drawings or specifications.

6.4 Installation Equipment

- a. Suitable installation equipment should be selected to provide sufficient reach, lifting and torque capacities for helical pile installation. Recommended torque capacity should exceed design torque by 20 percent.
- b. The installation equipment should be well maintained with applicable certifications performed on a regular basis.
- c. Provide torque monitoring device as part of the installation unit or as a separate in-line device capable of recording torque or drive head hydraulic operating pressure. In the case of drive head hydraulic pressure being used for torque monitoring, the conversion factors for the specific drive head shall be provided.
- d. Annual calibration certificates for torque monitoring devices and/or hydraulic pressure transducers shall be provided by the contractor prior to start of installation to ensure accurate correlation between hydraulic pressure and applied torque.
- e. Torque shall be monitored continuously during the entire installation.

6.5 Helical Pile Placement

- a. If required, survey professionals shall mark the location for the center of the pile using a flagged pin or nail as per specified locations in the installation IFC drawings.
- b. Position helical pile as indicated on drawings. Place the center of the pile on the pinned location. Establish the proper angular alignment at start of installation.
- c. Install helical piles in a smooth and continuous manner. Apply downward pressure to aid in the advancement of the pile into the ground.
- d. Unless noted otherwise, vertical pile cut-off tolerance should be within  $\pm 6$  mm of cut-off elevation specified by the client.
- e. The placement of helical piles shall be considered satisfactory providing the following conditions have been met:

- i. At the cut-off elevation of the pile, the horizontal location of the center of the pile (northing and easting) is located within +/-50mm of the position specified on the drawing.
- ii. Piles are within +/-2 degrees inclination from the vertical or their intended batter angle.
- iii. The piles, as placed, have not been structurally damaged.
- iv. Structural changes or repairs to the installed pile due to improper placement of piles shall be made only as directed by the Design Engineer.

6.6 Helical Pile Extensions

- a. A pile extension may be required when design torque cannot be achieved with a single length of pile.
- b. Field Welded Extension: Design Engineer shall specify the field weld requirements and an approved Weld Procedure Specification shall be utilized for the welded connection of the extension to the lead pile in the ground. The welding procedures shall conform to W47.1 and W59.
- c. Field Bolted Extension Connection: A bolted connection may be used if the design has been analyzed from both structural and geotechnical engineering to meet the loading requirements for the pile. Considerations must include the ability to withstand both the installation torque and the service loads; analysis of the “slack” in the bolted connection that may result in movement of the joint in uplift or lateral forces and confirmation that performance specifications will be met.

**7. LOAD TESTING**

7.1 If pre-production and/or production load testing of piles is required, testing shall be according to the following ASTM Standards:

Compression:	ASTM D1143
Tension:	ASTM D3689
Lateral:	ASTM D3966

**8. HELICAL PILE ENGINEERING APPROVAL**

8.1 Pile design embedment depth and design torque may be revised when unexpected soil conditions are encountered as follows:

- a. At pile locations where harder soil conditions (higher than expected installation torque) are encountered at shallow depths, the design embedment may be reduced based on design engineer approval.
- b. At pile locations where weaker soil conditions (lower than expected installation torque) are encountered, the design embedment may be increased based on design engineer approval.

8.2 Complete pile installation records shall be submitted to the Design Engineer for review and approval at each pile location. The pile record should include, but not limited to, the following aspects:

- a. Installation date and time
- b. Installation personnel
- c. Installation equipment Identification Number
- d. Pile location
- e. Pile Identification Number
- f. Pile extension (if any) Identification Number
- g. Installed pile length
- h. Installed pile embedment depth
- i. Installed pile final torque

- j. Installed pile batter angle
  - k. Installed pile inclination
  - l. Cut-off elevation
  - m. Distance from top of pile to ground surface
  - n. Relevant field notes and observations
- 8.3 The installation torque shall be recorded continuously during installation with specific attention given to the last 1500mm of the pile installation and the final installed depth. These torque profiles will be used by the Design Engineer to approve each pile installation per design requirements.
- 8.4 Any deviation from the installation specifications shall be reported to the Design Engineer immediately for evaluation, design revision, and approval. These deviations could be listed as following:
- a. Field observations indicating discrepancies between the design soil profile and the actual in-situ conditions
  - b. Lack of pile advancement or obstructions
  - c. Sudden changes in installation torque
- 8.5 The installed pile horizontal location (northing and easting) and the pile cut-off elevation of each pile should be reviewed and approved by the Design Engineer. For out-of-tolerance piles, specific repair solution should be directed by the Design Engineer and approved by the Client's engineer prior to construction.

## **9. HELICAL PILE RECORDS**

- 9.1 Fabrication records shall be completed for each pile and stored for both manufacturing and Quality Control and Assurance purposes. The pile fabrication record should include, but not limited to, the following aspects:
- a. Pile Shop drawings
  - b. Pile Identification Number
  - c. Pile part number
  - d. Pipe heat number
  - e. Helices heat numbers
  - f. Welding personnel
  - g. Manufacturing date and time
  - h. CWB inspection date and time
  - i. Inspector Identification Number
  - j. Welding inspection procedure
- 9.2 During installation, the following information shall be recorded for each helical pile installation: pile identification number (serial number), pile geometric description, installation location, final torque and final embedment depth. This information will be recorded in a pile installation summary report.
- 9.3 A helical pile installation summary report for all piles installed shall be provided by the installation contractor to the Client/Owner at the completion of the project. This report shall be reviewed, approved and stamped by the Design Engineer.
- 9.4 If required, final as-built survey locations shall be recorded by survey professionals and then reviewed and approved by the Design Engineer to confirm all piles have been installed within specified location tolerances per the installation IFC drawings and/or any approved changes.