

**NATIONAL CAPITAL COMMISSION**

**GATINEAU PARKWAY PAVEMENT REPAIRS  
DUNLOP ROAD AND GATINEAU PARKWAY (PINK LAKE)  
ADDITION OF ASPHALT APRON AND DITCHING WORK**

**DC3085-08**

**ENGINEERING DRAWINGS AND SPECIFICATIONS – ISSUED FOR TENDER  
AUGUST 11, 2015**



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**NOTICE TO READERS:**

*This document was prepared by Stantec Consulting Ltd.*

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**C. OTHER DOCUMENTS**

***(That the Bidders Must Purchase At Their Own Cost)***

- 1. *Ministère des Transports du Québec (MTQ) – applicable Tômes.*
- 2. *Cahier des charges et devis généraux (CCDG) – Infrastructures routières – Construction et réparation, édition 2009 (published by the MTQ).*

**D. OTHER DOCUMENTS**

***(Provided in the Tender Documents)***

- 1. *Technical Note (Geotechnical Report): Dunlop Road and Pink Lake – Addition of Asphalt Apron and Ditching Works on the Gatineau Parkway (NCC), file number: 038-B-0010310-1-GE-0001-00, prepared by LVM, dated September 29, 2014.*

**NOTE: FOR THE PURPOSE OF THESE SPECIFICATIONS AND DRAWINGS, THE TERM “ENGINEER” IS INTERCHANGEABLE WITH “NCC REPRESENTATIVE” OR THEIR DELEGATE.**



Gaëtan Beauchesne, Eng.  
Civil Infrastructures

END OF SECTION

## DIVISION 01

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**Part 1        General**

**1.1        REFERENCES**

- .1 BNQ 1809-300/2004 (R2007), published by the Bureau de normalisation du Québec, to the Cahier des charges et devis généraux (CCDG), 2011 edition, published by the Ministère des Transports du Québec (MTQ) and to the norms and regulations in effect.

**1.2        CODES**

- .1 Perform work in accordance with BNQ 1809-300/2004 (R2007), published by the Bureau de normalisation du Québec, to the Cahier des charges et devis généraux (CCDG), 2011 edition, published by the Ministère des Transports du Québec (MTQ) and to the norms and regulations in effect.
- .2 Meet or exceed requirements of:
  - .1 contract documents,
  - .2 specified standards, codes and referenced documents.

**1.3        DOCUMENTS REQUIRED**

- .1 Maintain at job site, all relevant documentation, including at least one copy each of following:
  - .1 Contract drawings
  - .2 Specifications
  - .3 Addenda
  - .4 Reviewed shop drawings if required
  - .5 Change orders
  - .6 Other modifications to Contract
  - .7 Approved work schedule
  - .8 Instructions for the supply and installation of items provided by Suppliers
  - .9 All relevant construction and environmental permits
  - .10 NCC Land Access Permit
  - .11 Emergency contact information, and
  - .12 Environmental Protection Plan.



#### **1.4 WORK SCHEDULE**

- .1 Provide within 10 working days after Contract award, schedule showing anticipated progress stages and final completion of work within time period required by Contract documents.
- .2 Construction works shall be done from 7h00 to 17h30 during weekdays. Work shall be at a minimum during weekend to avoid tourist disruption and shall be approved by the NCC Representative.
- .3 Provide in form acceptable to the NCC Representative, within 10 working days after Contract award, a detailed schedule showing activities and dates for:
  - .1 Submission of shop drawings, material lists and samples.
  - .2 Delivery of equipment and materials
  - .3 Final completion date within time period required by Contract documents.
- .4 Interim reviews of work progress based on work schedule will be conducted as decided by the NCC Representative and schedule updated by Contractor in conjunction with and to approval of the NCC Representative.

#### **1.5 COST BREAKDOWN**

- .1 Before submitting first progress claim submit breakdown of contract price in detail as directed by the NCC Representative and aggregating contract price. After approval by the NCC Representative, cost breakdown will be used as basis for progress payment.

#### **1.6 CONTRACTOR'S USE OF SITE**

- .1 Use of site: as specified in contract documents and as per the NCC Representative's instructions.
- .2 Contractor shall be responsible for all damages, dirt and oil on site and shall remove them.

#### **1.7 PROJECT MEETINGS**

- .1 Hold project meetings at times and locations approved by the NCC Representative.
- .2 Notify participants of date and time of meetings.
- .3 Record minutes of meetings, and distribute to participants within 7 days of meeting.

#### **1.8 SETTING OUT OF WORK**

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

- .3 Supply such devices as straight edges and templates required to facilitate the NCC Representative's inspection work.

#### **1.9 CUTTING AND PATCHING**

- .1 Obtain's approval before cutting or boring in areas not indicating on drawings.
- .2 Cut and patch as required to make work fit.
- .3 Make cuts with clean, true, smooth edges.
- .4 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

#### **1.10 EXISTING SERVICES**

- .1 Contractor is responsible for underground service locates prior to construction.
- .2 Where unknown services are encountered, immediately advise the NCC Representative and confirm findings in writing.

#### **1.11 ADDITIONAL DRAWINGS**

- .1 NCC Representative may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract documents.

**END OF SECTION**

**Part 1            General**

**1.1            WORK COVERED BY CONTRACT DOCUMENTS**

- .1      Work of this Contract comprises general construction of an asphalt apron and ditching work, located at Dunlop Road and the Gatineau Parkway (near Pink Lake).

**1.2            CONTRACT METHOD**

- .1      Construct Work under lump sum contract.

**1.3            WORK SEQUENCE**

- .1      Construct Work in stages to accommodate Owner's continued use of premises during construction.
- .2      Co-ordinate Progress Schedule and co-ordinate with Owner during construction.
- .3      Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .4      Maintain fire access/control.

**1.4            CONTRACTOR USE OF PREMISES**

- .1      Unrestricted use of site until Substantial Performance.
- .2      Limited use of designated areas in or adjoining site for Work, for storage, for access, to allow:
  - .1      Public usage.
- .3      Co-ordinate use of premises under direction of the NCC Representative.
- .4      Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5      Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6      Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by the NCC Representative.
- .7      At completion of operations condition of existing work: equal to or better than that which existed before new work started.
- .8      Contractor will provide adequate sanitary facilities for workers at or near site. Keep facilities clean.

## **1.5 EXISTING SERVICES**

- .1 Notify the NCC Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give the NCC Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to cyclist, pedestrian, and vehicular traffic.
- .3 Provide traffic control measures at sites and, provide signage indicating alternative routes for pedestrian, cyclist, and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify the NCC Representative of findings.
- .5 Submit schedule to and obtain approval from the NCC Representative for any shut-down or closure of active service including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Where unknown services are encountered, immediately advise the NCC Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .8 Record locations of maintained, re-routed and abandoned service lines.

## **1.6 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 List of Outstanding Shop Drawings.
  - .6 Change Orders.
  - .7 Other Modifications to Contract.
  - .8 Field Test Reports.
  - .9 Copy of Approved Work Schedule.
  - .10 Health and Safety Plan and Other Safety Related Documents.
  - .11 Other documents as specified.

**Part 2            Products**

**2.1                NOT USED**

.1            Not used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not used.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1      Section 01 52 00 – Construction Facilities.

**1.2            USE OF SITE AND FACILITIES**

- .1      Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with the NCC Representative to facilitate work as stated.
- .2      Provide for personnel and vehicle access.

**1.3            EXISTING SERVICES**

- .1      Notify NCC Representative and utility companies of intended interruption of services and obtain required permission.
- .2      Where Work involves breaking into or connecting to existing services, give the NCC Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3      Provide for personnel for cyclist, pedestrian and vehicular traffic.

**1.4            SPECIAL REQUIREMENTS**

- .1      The days of construction are Monday through Thursday 07:00 to 21:00h and Friday from 07:00 until 12:00 only. No noise producing work or heavy equipment operations are permitted outside of these hours on weekdays nor on Saturdays, Sundays and public holidays (unless special permission is granted by the NCC).
- .2      Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3      Keep within limits of work and avenues of ingress and egress.
- .4      Permissible routes to and from the sites, and between approved storage and work areas, will be identified by the NCC Representative. These routes must be used by the Contractor and by their suppliers for anything larger than single axle vehicles.

**1.5            SMOKING ENVIRONMENT**

- .1      Comply with smoking restrictions in accordance with the NCC regulations. Smoking is not permitted.

**Part 2            Products**

**2.1                NOT USED**

.1            Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1        General**

**1.1           CASH ALLOWANCES**

- .1        Include in Contract Price specified cash allowances.
- .2        Cash allowances for quality control of materials testing of a certified laboratory for the following tests (1 to 2% of the construction cost estimate):
  - .1        Compaction tests; \$250
  - .2        Sieve analysis for aggregate materials used under this contract: \$500
  - .3        Asphalt testing: \$250
- .3        Cash allowance for pre-blast survey: \$2,000.

**Part 2        Products**

**2.1           NOT USED**

- .1        Not Used.

**Part 3        Execution**

**3.1           NOT USED**

- .1        Not Used.

**END OF SECTION**



**Part 1 General**

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by the NCC Representative are specified under sections as follows:

**1.2 APPOINTMENT AND PAYMENT**

- .1 The NCC Representative will appoint and pay for services of testing laboratory except follows:
  - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
  - .2 Inspection and testing performed exclusively for the Contractor's convenience.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by the NCC Representative to verify acceptability of corrected work.

**1.3 CONTRACTOR'S RESPONSIBILITIES**

- .1 Provide labour, equipment and facilities to:
  - .1 Provide access to Work for inspection and testing.
  - .2 Facilitate inspections and tests.
  - .3 Make good Work disturbed by inspection and test.
  - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify the NCC Representative forty-eight (48) hours minimum in advance of operations requiring testing to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by the NCC Representative.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3          Execution**

**3.1            NOT USED**

.1          Not Used.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED REQUIREMENTS**

- .1      Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart
- .2      Section 01 33 00 – Submittal Procedures
- .3      Section 01 52 00 – Construction Facilities

**1.2               ADMINISTRATIVE**

- .1      Schedule and administer project meetings at the call of the NCC Representative.
- .2      Prepare agenda for meetings.
- .3      Distribute written notice of each meeting four days in advance of meeting date to the NCC Representative.
- .4      Provide physical space and make arrangements for meetings.
- .5      Preside at meetings.
- .6      Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7      Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants.
- .8      Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

**1.3               PRECONSTRUCTION MEETING**

- .1      Within ten (10) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2      NCC Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3      Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4      Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5      Agenda to include:
  - .1      Appointment of official representative of participants in the Work.
  - .2      Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
  - .3      Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .6 Owner provided products.
- .7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .8 Monthly progress claims, administrative procedures, photographs, hold backs.
- .9 Appointment of inspection and testing agencies or firms.
- .10 Insurances, transcript of policies.

#### **1.4 PROGRESS MEETINGS**

- .1 During course of Work, schedule progress meetings weekly.
- .2 Contractor, major Subcontractors involved in Work are to be in attendance.
- .3 Notify parties minimum three (3) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for affect on construction schedule and on completion date.
  - .12 Other business.

#### **Part 2 Products**

##### **2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1      Section 01 14 00 - Work Restrictions
- .2      Section 01 33 00 - Submittal Procedures

**1.2            DEFINITIONS**

- .1      Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2      Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3      Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4      Construction Work Week: Monday to Friday, in accordance with Section 01 14 00 – Work Restrictions. This work week shall be incorporated into the schedule as working days as part of Bar (GANTT) Chart submission.
- .5      Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6      Master Plan: summary-level schedule that identifies major activities.
- .7      Project Schedule: planned dates for performing activities. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .8      Project Planning, Monitoring and Control System: overall system operated by the NCC Representative to enable monitoring of project work.

**1.3            REQUIREMENTS**

- .1      Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2      Plan to complete Work in accordance with prescribed time frame.
- .3      Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.

- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

#### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

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

#### **1.5 PROJECT DURATION**

- .1 Project duration shall be 20 working days from the date of the Award of Contract.

#### **1.6 MASTER PLAN**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 The NCC Representative will review and return revised schedules within five (5) working days.
- .3 Revise impractical schedule and resubmit within five (5) working days.
- .4 Accepted revised schedule will become the Master Plan and be used as baseline for updates.

#### **1.7 PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Excavation.
  - .6 Backfill.
  - .7 Building footings.
  - .8 Slab on grade.
  - .9 Structural Steel.
  - .10 Siding and Roofing.
  - .11 Interior Architecture (Walls, Floors and Ceiling).
  - .12 Plumbing.
  - .13 Lighting.
  - .14 Electrical.
  - .15 Piping.
  - .16 Controls.
  - .17 Heating, Ventilating, and Air Conditioning.

- .18 Millwork.
- .19 Fire Systems.
- .20 Testing and Commissioning.
- .21 Supplied equipment long delivery items.
- .22 Engineer supplied equipment required dates.

## **1.8 PROJECT SCHEDULE REPORTING**

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

## **1.9 PROJECT MEETINGS**

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not used.

## **Part 3 Execution**

### **3.1 NOT USED**

- .1 Not used.

**END OF SECTION**



**Part 1            General**

**1.1            ADMINISTRATIVE**

- .1      Submit to NCC 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.
- .2      Do not proceed with Work affected by submittal until review is complete.
- .3      Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4      Where items or information is not produced in SI Metric units converted values are acceptable.
- .5      Review submittals prior to submission to NCC Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6      Notify NCC Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7      Verify field measurements and affected adjacent Work is co-ordinated.
- .8      Contractor's responsibility for errors and omissions in submission is not relieved by NCC Representative's review of submittals.
- .9      Keep one reviewed copy of each submission on site.

**1.2            SHOP DRAWINGS AND PRODUCT DATA**

- .1      The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2      Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec, Canada.
- .3      Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4      Allow five (5) days for the NCC Representative's review of each submission.

- .5 Adjustments made on shop drawings by the NCC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the NCC Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as the NCC Representative may require, consistent with Contract Documents. When resubmitting, notify NCC Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .8 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .9 After the NCC Representative's review, distribute copies.
- .10 Submit one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as the NCC Representative may reasonably request.

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

- .21 The review of shop drawings by the NCC Representative is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that the NCC Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

### **1.3 SAMPLES**

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

### **1.4 PHOTOGRAPHIC DOCUMENTATION**

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

**Part 2            Products**

**2.1                NOT USED**

.1            Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 01 00 5E – General Instructions

**1.2            REFERENCES**

- .1        Manual of Uniform Traffic Control Devices (UTCD) for Streets and Highways, 2002.

**1.3            PROTECTION OF PUBLIC TRAFFIC**

- .1        Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2        When working on travelled way:
  - .1        Place equipment in position to minimize interference and hazard to travelling public.
  - .2        Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
  - .3        Do not leave equipment on travelled way overnight.
- .3        Do not close any lanes of road without approval from the NCC Representative.
  - .1        Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in the Manual of Uniform Traffic Control Devices for Streets and Highways (UTCD).
- .4        Keep travelled way graded and of sufficient width for required number of lanes of traffic.
  - .1        One (1) lane to remain open at all times for traffic throughout. Users to be rerouted along the lane opposite the work area during the construction period, with flagmen present at all times.

**1.4            INFORMATIONAL AND WARNING DEVICES**

- .1        Provide, install, and maintain signs, and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2        Supply and erect signs, delineators, barricades and miscellaneous warning devices to the Manual of Uniform Traffic Control Devices for Streets and Highways (UTCD).
- .3        Place signs and other devices in locations recommended in the Manual of Uniform Traffic Control Devices for Streets and Highways (UTCD).

- .4 Meet with the NCC Representative prior to commencement of Work to prepare list of signs and other devices required for project. If the situation on site changes, revise list to approval of the NCC Representative.
- .5 Continually maintain traffic control devices in use:
  - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Remove or cover signs which do not apply to conditions existing from day to day.

## **1.5 CONTROL OF PUBLIC TRAFFIC**

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped to the Manual of Uniform Traffic Control Devices for Streets and Highways for situations as follows:
  - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
  - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
  - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
  - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .5 For emergency protection when other traffic control devices are not readily available.
  - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
  - .7 Delays to public traffic due to contractor's operators: 15 minutes maximum.
- .2 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system.
  - .1 Adjust, as necessary, and regularly maintain system during period of restriction.
  - .2 Ensure signal system meets requirements of the Manual of Uniform Traffic Control Devices for Streets and Highways (UTCD).

## **1.6 OPERATIONAL REQUIREMENTS**

- .1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by the NCC Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:
  - .1 As per NCC regulations.

- .2 Maintain existing conditions for traffic crossing right-of-way.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1      Section 01 33 00 – Submittal Procedures.
- .2      Section 01 41 00 - Regulatory Requirements.

**1.2            REFERENCES**

- .1      Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2      Workplace Hazardous Materials Information System (WHMIS)
  - .1      Material Safety Data Sheets (MSDS).
- .3      Province of Quebec
  - .1      An Act Respecting Occupational Health and Safety, R.S.Q., c.S-2.1 (current edition)
  - .2      Safety Code for the Construction Industry, R.R.Q. 1981, c. S 2-1, r.6 (current edition).

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Submit site-specific Health and Safety Plan: Within five working days (5) days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1      Results of site specific safety hazard assessment.
  - .2      Results of safety and health risk or hazard analysis for site tasks and operation and procedure for managing hazards.
  - .3      All applicable Material Safety Data Sheets (MSDS).
- .3      Submit one (1) copy of Contractor's authorized representative's work site health and safety inspection reports to the NCC Representative and to the authority having jurisdiction on a weekly basis.
- .4      Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .5      Submit copies of incident and accident reports.
- .6      Submit WHMIS MSDS - Material Safety Data Sheets.
- .7      Other safe-work procedures such as: communication plan, contact numbers, emergency procedures, public protections, supervisor and employee names, proof (copy) of all worker Trades Qualifications, Apprentice Certificates and mandatory training certificates for all workers on the project.

- .8 The NCC Representative will review the Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to the NCC Representative within five (5) days after receipt of comments from the NCC Representative.
- .9 The NCC Representative's 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.
- .10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the NCC Representative.
- .11 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

#### **1.4 FILING OF NOTICE**

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.
- .2 Contractor shall be responsible and assume the Principal Contractor role for each work zone location and not the entire complex. Contractor shall provide a written acknowledgement of this as per instructions issued by the NCC Procurement. Contractor to submit written acknowledgement to CSST along with Ouverture de Chantier Notice. File Notice of Project (Ouverture de chantier) with provincial authorities (i.e. Commission de la Santé et Sécurité au Travail – CSST) prior to beginning of Work.
- .3 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

#### **1.5 SAFETY ASSESSMENT**

- .1 Perform site specific safety hazard assessment related to the Work.

#### **1.6 MEETINGS**

- .1 Schedule and administer Health and Safety meeting with the NCC Representative prior to commencement of Work.

#### **1.7 REGULATORY REQUIREMENTS**

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

#### **1.8 PROJECT/SITE CONDITIONS**

- .1 Work at site will involve contact with:
  - .1 Excavation of materials on slope
  - .2 Work carried out on a curved section of the roadway
  - .3 Presence of trees/branch fallings, potential hazardous plants, animals

- .4 Use of fertilizers.

## **1.9 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 The NCC Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

## **1.10 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 Contractor shall be the "Principal Contractor" as described in the Quebec Act respecting health and safety code for the Construction for only their scope and areas of work as defined and described this project specification.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal and provincial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.11 COMPLIANCE REQUIREMENTS**

- .1 Comply with the Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .2 Comply with all applicable Occupational Health and Safety Acts, Safety Codes and Regulations of the province having jurisdiction (Quebec).

## **1.12 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 the Province having jurisdiction and advise the NCC Representative verbally and in writing.

## **1.13 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of the Province having jurisdiction, and in consultation with the NCC Representative.

**1.14 HEALTH AND SAFETY COORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have minimum two (2) years site-related working experience specific to activities associated with the Work.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on site during execution of Work.

**1.15 CORRECTION OF NON-COMPLIANCE**

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

**1.16 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Coordinator to stop or start Work when, at Health and Safety Coordinator's discretion, it is necessary to advisable for reasons of health or safety. The NCC Representative may also stop Work for health and safety considerations.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not used.

**END OF SECTION**

**Part 1            General**

**1.1            DESCRIPTION**

- .1        This section describes the requirements relative to environmental protection. The Contractor must comply with the requirements in this document.

**1.2            RELATED REQUIREMENTS**

- .1        Section 01 33 00 – Submittal Procedures
- .2        Section 01 35 29.06 – Health and Safety Requirements
- .3        Section 01 74 11 – Cleaning
- .4        Section 01 74 21 – Construction/Demolition Waste Management and Disposal
- .5        Section 31 24 13 – Roadway Embankments
- .6        Section 32 01 90.33 – Tree and Shrub Preservation
- .7        Section 32 15 60 – Roadway Dust Control

**1.3            REFERENCES**

- .1        Definitions:
  - .1        Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
  - .2        Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .2        Reference Standards:
  - .1        U.S. Environmental Protection Agency (EPA)/Office of Water
    - .1        EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
  - .2        *Ministère du Développement durable, de l'Environnement et de la lutte contre les changements climatiques (MDDELCC).*

**1.4            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by NCC Representative.
- .3        Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 Include in Environmental Protection Plan:
  - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
  - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
  - .3 Names and qualifications of persons responsible for training site personnel.
  - .4 Descriptions of environmental protection personnel training program.
  - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
  - .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
  - .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
    - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
  - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
    - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
  - .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
  - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
  - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
  - .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
  - .13 Waste Water Management Plan identifying methods and procedures for management, discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

- .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
- .15 Pesticide treatment plan to be included and updated, as required.

## **1.5 FIRES**

- .1 Fires and burning of rubbish on site is not permitted.
- .2 Where fires or burning is permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved.
  - .1 Restore, clean and return to new condition stained or damaged work.
- .3 Provide supervision, attendance and fire protection measures as directed.

## **1.6 DRAINAGE**

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

## **1.7 SITE CLEARING AND PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
  - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated and designated by the NCC Representative.



## **1.8 SOIL AND SURFACE WATER PROTECTION**

### **.1 Keeping the Site Clean:**

- .1 The Contractor shall provide all the necessary equipment (portable toilets, garbage cans, tubs, etc.) to prevent the spreading of waste into the surrounding environment.
- .2 Materials and waste must be disposed of outside Park boundaries, at a site authorized by the Ministry of Sustainable Development, Environment and Parks.
- .3 Any debris which falls into the Creek must be recovered immediately.

### **.2 Machinery Traffic:**

- .1 The Contractor must use equipment suitable for the bearing capacity of the soil.
- .2 The movement of machinery must be restricted to existing roads.
- .3 The movement of machinery on the shore of the creek must be limited to the minimum requirement for the replacement of the culvert.
- .4 Machinery shall be operated so as to avoid or minimize disturbances to the stream bank.

### **.3 Refuelling and Mechanical Maintenance:**

- .1 Refuelling, mechanical inspection, the cleaning of (rolling) vehicles, as well as handling and storage of hydrocarbons must be carried out in places where there is no risk of contamination to the water environment and at a minimum distance of 60 meters from a lake, a stream or a wetland.
- .2 The Contractor shall provide in each supply area: absorbent materials, as well as airtight containers for recovering petroleum products and waste. The containers containing petroleum products must be clearly identified.

### **.4 Oil Spills:**

The Contractor must comply with the following conditions to prevent oil spills or contain them if necessary:

- .1 The Contractor shall ensure that the equipment is clean and free of leaks upon arrival at the site and continue to maintain that standard by conducting regular inspections, maintenance and repairs thereafter;
- .2 No machinery or gas-powered equipment should remain on a bulkhead or within 60 meters of a stream, lake or wetland during off-hours construction. The inability to meet this requirement will result in the implementation of environmental protection measures (monitoring or other);
- .3 An emergency kit for recovering petroleum products must be permanently available on site. The kit must include at least 30 meters of absorbent materials, a floating boom with a length of at least 30 meters, one box of absorbent pads, shovels, an empty 45 gallon barrel, rope and absorbent

- in solid form (powder or granules). The kit should be stored near the work and machinery and be easily accessible at all times for rapid response;
- .4 Recovery bins should be placed under all stationary equipment that leak or require refuelling, including generators. The accumulated water in these tanks must be emptied regularly and disposed of in accordance with the standards of the Ministry of Sustainable Development, the Environment and Parks;
- .5 During an accidental release of contaminants, the affected site must be cleaned immediately. The construction Supervisor, the Emergency Service department of the NCC (613-239-5353), the NCC project manager and the Province of Quebec's Environmental Emergency department (1-866-694-5454) must be notified directly;
- .6 A list of resource personnel and organizations to contact in case of emergency must be posted in a visible place on site throughout the construction period.
- .5 Materials:
  - .1 The Contractor must use clean and non-contaminated materials.
  - .2 The quality of the soil brought to the site must be equal to or greater than the quality of the soil already on the site.
  - .3 The wood in contact with the surface water, used as part of the work, must be untreated. Similarly, the stones in contact with surface water must be clean.
  - .4 All temporary structures must be constructed of materials free of fine particles and contaminants.
- .6 Management and Storage of Materials, Debris and Waste

The Contractor shall observe the following as part of the management and storage of materials, debris and waste on site:

  - .1 All temporary storage sites must be located in an area closed to traffic in the parking lot at a minimum of 40 m from the work area, on the main road;
  - .2 All snow removed from the work area must be stockpiled at least 60 m from any stream, ditch or wetland;
  - .3 It is prohibited to store, even temporarily, hazardous materials or contaminants (oil, paint, solvents, etc) near a ditch and within 60m of a stream, ditch or wetland;
  - .4 A management plan for different types of residual materials should be developed by the Contractor and approved by the construction Supervisor;
  - .5 The Contractor must create separate piles for materials, soils and wastes based on whether they are hazardous, contaminated or not;

- .6 The Contractor shall implement the 3R1s principle in the management of waste, scrap and surplus excavated material - disposal should be the last option;
- .7 The surplus excavated materials and waste, if disposed, must be disposed of in a site that meets the requirements of the Ministry of Sustainable Development, Environment and Parks;
- .8 The dumping of waste or garbage in a stream, a wetland or on their banks is strictly prohibited;
- .9 No natural material can be dumped on site without permission from the NCC;
- .10 Wood debris should be reused<sup>2</sup>, recovered, or disposed off site at a site authorized by the Ministry of Sustainable Development, Environment and Parks and the construction Supervisor;
- .11 No waste can be left on site. The Contractor is responsible for collecting garbage in proper containers;
- .12 Storage and disposal sites provided by the Contractor are subject to approval by the Supervisor prior to work beginning, to ensure compliance with the standards and requirements in effect.

#### **1.9 WORK ADJACENT TO WATERWAYS**

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

#### **1.10 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
  - .1 Provide temporary enclosures where indicated and directed by the NCC Representative.

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<sup>1</sup> Reduce, Reuse and Recycle.

For details please consult [www.recyc-quebec.gouv.qc.ca/Client/fr/gerer/travail/dechet-boulot/3rv.html](http://www.recyc-quebec.gouv.qc.ca/Client/fr/gerer/travail/dechet-boulot/3rv.html)

<sup>2</sup> They are reusable in shredded form only.

- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

#### **1.11 HISTORICAL/ARCHAEOLOGICAL CONTROL**

- .1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.
- .2 The Contractor must cease work immediately upon the discovery of archaeological remains. The site must then be examined by a qualified archaeologist. The Contractor must notify the region office of the Outaouais Ministry of Culture, Communications and the Status of Women (819-772-3992) and also the archaeologist (Heritage Program) at the NCC (613-239-5751).
- .3 The Contractor must cease work immediately upon the discovery of human remains. The Contractor must notify the Senior Capital Planner (613-239-5462).

#### **1.12 MIGRATORY BIRD PROTECTION**

- .1 All clearing and deforestation should occur between August 16 and March 31 to avoid the breeding and nesting season of migratory birds.
- .2 Should work be required outside this period the Contractor must obtain approval and recommendations from the NCC prior to clearing and deforestation.

#### **1.13 VEGETATION PROTECTION**

- .1 Prior to the cutting of any vegetation, the project Supervisor must first outline the perimeter of the work area. Once approved, the perimeter must be lined by temporary fencing.
- .2 The Contractor must keep the cutting of vegetation to a strict minimum, including vegetation which interferes with the the project itself. The cutting must be performed prior to the starting of earthwork and excavation. No trees or other debris should fall into stream. Should debris fall into stream or wetland areas, the debris must be removed immediately by the least intrusive method available.
- .3 It is prohibited to cut vegetation to create storage sites for materials, waste, machinery or equipment.
- .4 The Contractor shall avoid uprooting vegetation. It must focus on pruning and topping.

#### **1.14 EROSION AND SEDIMENT CONTROL**

- .1 During all construction activities, sediment and erosion control measures shall be carried out as per the following:
  - .1 Re-vegetate all exposed areas as soon as possible.

- .2 A visual inspection shall be completed daily on sediment control barriers and any damage repaired immediately. Care will be taken to prevent damage during construction operations.
- .3 In some cases, some barriers may be removed temporarily to accommodate the construction operations. The affected barriers will be reinstated at night when construction is completed.
- .4 The sediment control devices will be cleaned of accumulated silt as required. The deposits will be disposed of as per the Environmental Protection Agency (EPA) regulations or as directed by the NCC.
- .5 During the course of construction, if the NCC Representative believes that the additional prevention methods are required to control erosion and sedimentation, the Contractor will install additional silt fences or other devices required to the satisfaction of the NCC Representative.
- .6 Provide sediment traps if dewatering required, as per EPA regulations.
- .7 Establish material stockpiles away from watercourses.
- .8 Construction and maintenance requirements for erosion and sediment controls to comply with EPA regulations.

#### **1.15 SEDIMENT BARRIERS**

- .1 The installation of sediment barriers should include the following steps:
  - .1 Dig a trench between 100-150mm deep and 150 wide in the proposed barrier
  - .2 Push the poles next to the trench (the side of the stream or wetland), with the exception of the last post;
  - .3 Unroll the membrane along the fence line;
  - .4 Expand the base of the membrane in the trench to a width of 150mm;
  - .5 Hang the membrane, making sure the bottom of the membrane is placed well into the trench;
  - .6 Attach the membrane between posts;
  - .7 Attach the last post to the membrane;
  - .8 Cover the bottom of the membrane with compacted soil.
- .2 Sediment barriers must be removed and recovered only when reworked surfaces are permanently stabilized, including re-vegetation.

#### **1.16 NOISE PROTECTION**

- .1 The noise level emitted by all equipment and machinery must be in compliance with the regulations of the NCC.
- .2 Work Week: Monday to Friday, restricted per Section 01 14 00, Article 1.4.
- .3 The Contractor must maintain good working equipment and heavy machinery (silencers, regular maintenance, etc.), to keep the noise level as low as possible.
- .4 Noise filtering equipment, if available, must be used (for example: close the side panels of compressors etc.).

- .5 The Contractor must shut off any powered equipment when not in use on site.

#### **1.17 AIR QUALITY**

- .1 The Contractor must use equipment with functioning exhaust systems.
- .2 All machinery must be stopped when not in use.
- .3 Soil excavation should be carried out so that it produces the least dust possible.
- .4 Construction related-activities have the potential to release airborne particles, should be avoided during periods of prolonged drought and high winds.
- .5 The Contractor will take steps to limit the release of dust particles into the air. However, only water is permitted as a stabilizing product within a protected area of 30m measured horizontally, from a stream, wetland and a source of drinking water.

#### **1.18 SAFETY**

- .1 Prior to starting work, the Contractor must mark the location of all underground utility lines.
- .2 During the construction period, traffic signs should be put in place where required and the Contractor must clearly identify areas of work.
- .3 Heavy machinery must have reverse (back-up) alarms.
- .4 The Contractor must inform his employees of procedures in case of an accident.
- .5 Any complaints related to culvert replacements should be directed to the NCC, who will coordinate public relations.

#### **1.19 RESTORATION**

- .1 Vegetation

The restoration of vegetation must be performed as early as possible, at a proper time for the re-growth of the vegetation.

The Contractor shall replace the herbaceous plants and shrubs cut or damaged by construction. To do this he must:

- .1 Cover the disturbed soil with clean topsoil (from off-site);
- .2 Cover topsoil with roll-on turf. This turf must be installed without overlap or gaps, and be pinned to the ground where slopes exceed 30%;
- .3 Shrubs replaced must be endemic to the area and non-invasive. The Contractor shall produce a planting plan. This plan must be approved by the NCC prior to re-planting. The plan must show shrubs species used, location of the plants and the distance between them.
- .4 The Contractor must replace trees with a diameter of 10cm or more at breast height that were cut or damaged during construction. These trees must be replaced with tree species native to the Park area at a ratio of 2:1 or 2 trees planted per 1 tree lost or damaged. The Contractor shall produce a planting plan to address tree replacement. This plan must be

approved by the NCC prior to planting. The plan must show tree species used and diameter, location of the trees and the distance between each specimen.

- .5 In the case where it is too late in the growing season to restore the vegetation, the Contractor will stabilize the disturbed soil with an erosion control mat to limit the amount of fine material intake to streams. The mat should be dismantled only at the restoration stage.

- .6 Warranty Period:

- .1 The Contractor will offer a two year warranty on roll-on turf, shrubs and trees.
- .2 All vegetation in poor condition the following year must be replaced at the expense of the Contractor. It is the same after the second year.

- .2 Ditches

Ditches which damaged by machinery during construction must be reinstated to their original state (slope, width, etc.).

## **1.20 NOTIFICATION**

- .1 The NCC Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform the NCC Representative of proposed corrective action and take such action for approval by the NCC Representative.
  - .1 Take action only after receipt of written approval by the NCC Representative.
- .3 The NCC Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

## **1.21 PENALTIES**

- .1 The failure to comply with any provision in this quote may result in fines being levied by Federal, Provincial, or Municipal Authorities.
- .2 Any expense related to environmental damage is incurred at the expense of the Contractor. In the case of non-performance by the Contractor, the NCC makes the correction and is paid by the Contractor the cost of such work and delays through the withholding of payments.

**Part 2            Products**

**2.1                NOT USED**

- .1        Not Used.

**Part 3            Execution**

**3.1                CLEANING**

- .1        Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1        Leave Work area clean at end of each day.
- .2        Bury rubbish and waste materials on site where directed after receipt of written approval from the NCC Representative.
- .3        Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4        Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .5        Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1        Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**



**Part 1            General**

**1.1                REFERENCES AND CODES**

- .1        Perform Work in accordance with the NCC regulations including amendments up to tender closing date and other codes of federal, provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2        Meet or exceed requirements of:
  - .1            Contract documents.
  - .2            Specified standards, codes and referenced documents.

**1.2                SMOKING ENVIRONMENT**

- .1        Comply with smoking restrictions in accordance with the NCC regulations. Smoking is not permitted.

**1.3                NATIONAL PARKS ACT**

- .1        Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.

**Part 2            Products**

**2.1                NOT USED**

- .1        Not Used.

**Part 3            Execution**

**3.1                NOT USED**

- .1        Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 01 00 5E – General Instructions.

**1.2            INSPECTION**

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

**1.3            INDEPENDENT INSPECTION AGENCIES**

- .1        Independent Inspection/Testing Agencies will be engaged by the NCC Representative for purpose of inspecting and/or testing portions of Work. The cost of such services will be borne by the NCC Representative.
- .2        Allocated costs: to Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .3        Provide equipment required for executing inspection and testing by appointed agencies.
- .4        Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

**1.4            ACCESS TO WORK**

- .1        Allow inspection/testing agencies access to Work.

**1.5            PROCEDURES**

- .1        Notify appropriate agency and the NCC Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2        Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

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

## **1.6 REJECTED WORK**

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the NCC Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If, in the opinion of the NCC Representative, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the NCC 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 the NCC Representative.

## **1.7 REPORTS**

- .1 Submit one (1) hardcopy and one (1) electronic copy of inspection and test reports to the NCC Representative.
- .2 Provide copies to of these reports to sub-contractors responsible for inspected or tested work.

## **1.8 TESTS AND MIX DESIGNS**

- .1 Supply test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by law of Place of Work will be appraised by the NCC Representative and may be authorized as recoverable.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1      Section 01 14 00 – Work Restrictions
- .2      Section 01 35 00.06 – Special Procedures for Traffic Control
- .3      Section 01 35 43 – Environmental Procedures
- .4      Section 32 15 60 – Roadway Dust Control

**1.2            REFERENCES**

- .1      U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1      EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
- .2      Ministère du Développement durable, de l'Environnement et de la lutte contre les changements climatiques (MDDELCC).

**1.3            ACCESS**

- .1      Provide and maintain adequate access to site project.
- .2      If authorized to use existing roads for access to project site, maintain such roads for duration of Contract.
- .3      Pink Lake site access via Alexandre-Taché Boulevard or Boulevard des Allumettières. Turn in at first Pink Lake parking lot and exit the same way. Site access via Chelsea road is prohibited.

**1.4            ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.5            INSTALLATION AND REMOVAL**

- .1      Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2      Staging area for stockpiling of material: access via the Pink Lake Dam Service Road located approximately 150m from the work site.
- .3      Provide construction facilities in order to execute work expeditiously.
- .4      Backfill of material to be carried out immediately after excavation so as to reduce the risk of erosion and sedimentation.

**1.6 SITE STORAGE/LOADING**

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

**1.7 CONSTRUCTION PARKING**

- .1 Parking will not be permitted on site.
- .2 Provide and maintain adequate access to project site.

**1.8 OFFICES**

- .1 Provide office if required for Contractor use.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

**1.9 SANITARY FACILITIES**

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

**1.10 CONSTRUCTION SIGNAGE**

- .1 NCC may provide and erect the project sign prior to work commencement.
- .2 No other signs or advertisements, other than warning signs, are permitted on site.

**1.11 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Provide access as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by the NCC Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs, as per Section 01 35 00.06 – Special Procedures for Traffic Control.
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

- .6 Verify adequacy of existing roads and allowable load limit on these roads.  
Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .8 Dust control: adequate to ensure safe operation at all times, in accordance with Section 32 15 60 – Roadway Dust Control.

**1.12 CLEAN-UP**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Temporary erosion and sedimentation control measures: in accordance with Section 01 35 43 – Environmental Procedures.

**END OF SECTION**

**Part 1            General**

**1.1            REFERENCES**

- .1      Owner's identification of existing survey control points and property limits.

**1.2            QUALIFICATIONS OF SURVEYOR**

- .1      Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to the NCC Representative.

**1.3            SURVEY REFERENCE POINTS**

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

**1.4            SURVEY REQUIREMENTS**

- .1      Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2      Establish lines and levels, locate and lay out, by instrumentation.
- .3      Stake for grading, fill and topsoil placement and landscaping features.
- .4      Stake slopes.

**1.5            EXISTING SERVICES**

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

**1.6            RECORDS**

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

- .3 Record locations of maintained, re-routed and abandoned service lines.

**1.7 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.8 SUBSURFACE CONDITIONS**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



**Part 1        General**

**1.1           RELATED REQUIREMENTS**

- .1        Section 01 33 00 – Submittal Procedures

**1.2           ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3           MATERIALS**

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

**1.4           PREPARATION**

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

**1.5 EXECUTION**

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Restore work with new products in accordance with requirements of Contract Documents.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 00 5E – General Instructions

**1.2 SITE CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the NCC Representative. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .5 Dispose of waste materials and debris at designated dumping areas off site.
- .6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .7 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .8 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

**1.3 FINAL CLEANING**

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by the NCC Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Sweep and wash clean paved areas.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            WASTE MANAGEMENT GOALS**

- .1      Prior to start of Work conduct meeting with the NCC Representative to review and discuss the waste management goal and the Contractor's proposed Waste Reduction Workplan for Construction and /or Demolition (CRD) waste to be project generated.
- .2      Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.
- .3      Protect environment and prevent environmental pollution damage.

**1.2            RELATED REQUIREMENTS**

- .1      Section 01 74 11 - Cleaning

**1.3            REFERENCES**

- .1      Definitions:
  - .1      Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the NCC Representative.
  - .2      Class III: non-hazardous waste - construction renovation and demolition waste.
  - .3      Inert Fill: inert waste - exclusively asphalt and concrete.
  - .4      Waste Source Separation Program (WSSP): implementation and co-ordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
  - .5      Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
  - .6      Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
  - .7      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.
  - .8      Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

- .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
- .2 Returning reusable items including pallets or unused products to vendors.
- .9 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .10 Separate Condition: refers to waste sorted into individual types.
- .11 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.

#### **1.4 WASTE PROCESSING SITES**

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

#### **1.5 QUALITY ASSURANCE**

- .1 After award of Contract, a mandatory site examination will be held for this Project for the Contractor and/or sub-contractors responsible for construction, renovation demolition/deconstruction waste management.
  - .1 Date, time and location will be arranged by the NCC Representative.

#### **1.6 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by the NCC Representative.
- .2 Unless specified otherwise, materials for removal do not become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed and salvaged materials from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify the NCC Representative.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .9 Separate and store materials produced during project in designated areas.

- .10 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
  - .1 On-site source separation is recommended.
  - .2 Remove co-mingled materials to off-site processing facility for separation.
  - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
  - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

## **1.7 DISPOSAL OF WASTES**

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
  - .1 Number and size of bins.
  - .2 Waste type of each bin.
  - .3 Total tonnage generated.
  - .4 Tonnage reused or recycled.
  - .5 Reused or recycled waste destination.
- .4 Remove materials on-site as Work progresses.

## **1.8 SCHEDULING**

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 APPLICATION**

- .1 Do Work in compliance with WSSP.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

### **3.2 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with this section
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
  - .2 Source separate materials to be reused/recycled into specified sort areas.

### **3.3 DIVERSION OF MATERIALS**

- .1 Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by the NCC Representative, and consistent with applicable fire regulations.
  - .1 Mark containers or stockpile areas.
  - .2 Provide instruction on disposal practices.
- .2 On-site sale of salvaged, recovered, reusable, and recyclable materials is not permitted.

**END OF SECTION**



## DIVISION 31

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**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 33 00 – Submittal Procedures
- .2    Section 01 74 11 – Cleaning
- .3    Section 32 11 16.01 – Granular Sub-Base
- .4    Section 32 11 23 – Aggregate Base Course

**1.2            REFERENCES**

- .1    ASTM International
  - .1    ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- .2    U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1    EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .3    *Cahier des charges et devis généraux du Québec (CCDG) – Infrastructures routières, Construction et réparation (édition 2013).*

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .3    Samples:
  - .1    Provide the NCC Representative with access to source and processed material for sampling.
  - .2    Supply new or clean sample bags or containers according appropriate to aggregate materials.
  - .3    Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
  - .4    Provide water, electric power and propane to the NCC Representative laboratory trailer at production site.

**1.4            DELIVERY, STORAGE AND HANDLING**

- .1    Deliver, store and handle materials in accordance with manufacturer's written instructions.

- .2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.
- .3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
  - .1 Greatest dimension to exceed 5 times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
  - .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
  - .1 Crushed rock.
  - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
  - .3 Light weight aggregate, including slag and expanded shale.

### **2.2 SOURCE QUALITY CONTROL**

- .1 Inform the NCC Representative of proposed source of aggregates and provide access for sampling 2 weeks minimum before starting production.
- .2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.
- .3 Advise the NCC Representative 2 weeks minimum 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**

**3.1                EXAMINATION**

- .1    Verification of Conditions: verify that conditions are acceptable for topsoil stripping.
  - .1    Visually inspect substrate in presence of the NCC Representative.
  - .2    Inform NCC Representative of unacceptable conditions immediately upon discovery.
  - .3    Proceed with topsoil stripping only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the NCC Representative.

**3.2                PREPARATION**

- .1    Removal:
  - .1    Stockpile in locations as indicated and directed by the NCC Representative. Stockpile height not to exceed 2 m.
  - .2    Dispose of topsoil to location off site as directed by the NCC Representative.
- .2    Processing:
  - .1    Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
  - .2    Blend aggregates, as required, including reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
    - .1    Use methods and equipment approved in writing by the NCC Representative.
- .3    When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
- .4    Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.
  - .1    Use only equipment approved in writing by the NCC Representative.
- .5    Stockpiling:
  - .1    Stockpile aggregates on site in locations as indicated unless directed otherwise by the NCC Representative. Do not stockpile on completed pavement surfaces.
  - .2    Stockpile aggregates in sufficient quantities to meet project schedules.
  - .3    Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate the 300 mm sand base into Work.
- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by the NCC Representative within 48 hours of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
  - .1 Maximum 1.5 m for coarse aggregate and base course materials.
  - .2 Maximum 1.5 m for fine aggregate and sub-base materials.
  - .3 Maximum 1.5 m for other materials.
- .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .9 Do not cone piles or spill material over edges of piles.
- .10 Do not use conveying stackers.
- .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Remove any unused aggregates or relocate as directed by the NCC Representative. Restore stockpile location to original state.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to the NCC Representative.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 33 00 - Submittal Procedures.
- .2    Section 01 74 11 - Cleaning.
- .3    Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4    Section 32 91 19.13 - Topsoil Placement and Grading.

**1.2            MEASUREMENT PROCEDURES**

- .1    Stripping: measure in cubic metres calculated from cross sections taken by the NCC Representative in areas of excavation.
  - .1    The NCC Representative will take initial cross sections after clearing and grubbing completed.
  - .2    Stripping unit price to include cost of placing material on slopes upon completion of excavation and embankment.
- .2    Common Excavation: measure in cubic metres calculated from cross sections taken by the NCC Representative in areas of excavation.
  - .1    The NCC Representative will take initial cross sections after clearing, grubbing and stripping completed and immediately prior to excavation of material to be incorporated into work.
- .3    Borrow: measure in cubic metres calculated from cross sections taken by the NCC Representative in areas of excavation.
  - .1    The NCC Representative will take initial cross sections after clearing, grubbing and stripping completed and immediately prior to excavation of material to be incorporated into work.
- .4    Unclassified excavation:
  - .1    Measure in cubic metres calculated from cross sections taken by the NCC Representative in areas of excavation.
  - .2    NCC Representative will take initial cross sections after clearing, grubbing and stripping completed and immediately prior to excavation of material to be incorporated into work.
- .5    Measure overhaul in cubic metre-kilometres and computed by "Mass Diagram Method". Overhaul as designated by the NCC Representative.

- .6 No separate payment for:
  - .1 Excavating unnecessarily beyond lines established by NCC Representative, with exception of unavoidable slide material. Do not measure slide material, when such slides are attributable to negligence.
  - .2 Ripping and/or drilling and blasting of material.
  - .3 Scarifying or benching existing slopes or existing road surfaces.
  - .4 Removing and disposing of roots, stumps and other materials excavated during waste operation.
  - .5 Burying existing culverts from old road.
  - .6 Removing unsuitable material from embankment attributable to negligence.
  - .7 Shattering rock to 300 mm below subgrade elevation.
  - .8 Scaling and removing loose rock from rock face.
  - .9 Watering, drying and compacting.
  - .10 Finishing.

### **1.3 REFERENCES**

- .1 Definitions:
  - .1 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.
  - .2 Unclassified Excavation: excavation of whatever character other than stripping encountered in the Work.
  - .3 Free Haul: distance that excavated material is hauled without compensation. Free haul distance to be 5 km or less.
  - .4 Stripping: excavation of organic material covering original ground.
  - .5 Over Haul: authorized hauling in excess of free haul distance that excavated material is moved.
  - .6 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.
  - .7 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.
  - .8 Borrow Material: material obtained from areas outside right-of-way and required for construction of embankments or for other portions of work.
  - .9 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Reference Standards:

.1 ASTM International

- .1 ASTM D698-07ea1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).

.2 American Association of State Highway and Transportation Officials (AASHTO)

- .1 AASHTO T99-10, Standard Method of test for Moisture-Density Relations of Soils Using a 2.5 kg (5.5lb) Rammer and 305 mm (12 in) Drop.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.5 QUALITY ASSURANCE**

.1 Regulatory Requirements:

- .1 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Embankment materials require approval by NCC Representative.
- .2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.
- .3 Borrow material:
- .1 Obtain from sources such as quarry, or borrow pit as approved or as designated by NCC Representative.
- .1 Earth Embankment materials to consist of acceptable earth material and processed rock material free from objectionable quantities of organic matter, frozen soil, stumps, trees, moss, and other unsuitable materials.
- .2 Rock Embankment material to consist of fragmented rock produced by drilling and blasting operations, and boulders which cannot be placed in layers as specified for Earth Embankments.

- .1 Rock Embankment to conform to gradation as follows:



Sieve Designation	Percent Passing by Weight
150 mm	100
100 mm	85 - 100
75 mm	10 - 50
No. 200	* 0 - 3

- .2 \* Gradation is determined by that portion passing 75 mm screen.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that condition of substrate is acceptable for roadway embankment Work:
- .1 Visually inspect substrate in presence of NCC Representative.
  - .2 Inform NCC Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NCC Representative.

#### **3.2 COMPACTION EQUIPMENT**

- .1 Compaction equipment: vibratory rollers or vibrating plate compactors capable of obtaining required density in materials on project.
- .1 Demonstrate compaction equipment effectiveness on specified material and lift thickness by documented performance of test-strip before start of Work.
  - .2 Replace or supplement equipment that does not achieve specified densities.
- .2 Operate compaction equipment continuously in each embankment when placing material.

#### **3.3 WATER DISTRIBUTORS**

- .1 Apply water with equipment capable of uniform distribution.

#### **3.4 STRIPPING OF TOPSOIL**

- .1 Place top soil and finish grading in accordance with Section 32 91 19.13 - Topsoil Placement and Grading.
- .2 Commence topsoil stripping of areas as directed by NCC Representative after grasses have been removed from these areas.

- .3 Strip topsoil to depths as directed by the NCC Representative. Do not mix topsoil with subsoil.
- .4 Stockpile in locations as directed by the NCC Representative.
  - .1 Stockpile height: not to exceed 2 m.
- .5 Dispose of unused topsoil to location off site as directed by the NCC Representative.
- .6 Remove clearing and grubbing debris from stripping.
- .7 Spread organic stripping, on completion of excavation and embankment construction, on slopes and trim or remove from site if quantity exceeds ability to grade on site.

### **3.5 EXCAVATING**

- .1 General:
  - .1 Notify NCC Representative when waste materials are encountered and remove to depth and extent directed.
  - .2 Sub-excavate as indicated.
    - .1 Compact top 150 mm below sub-excavate to minimum 95% maximum dry density, to ASTM D698.
    - .2 Replace with approved embankment material and compact to specified embankment density.
  - .3 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points as directed by NCC Representative.
  - .4 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points as indicated or as directed NCC Representative.
- .2 Drainage:
  - .1 Maintain profiles, crowns and cross slopes to provide good surface drainage.
  - .2 Provide ditches as work progresses to provide drainage.
  - .3 Construct interceptor ditches as indicated or as directed before excavating or placing embankment in adjacent area.
- .3 Borrow Excavation:
  - .1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.
  - .2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas.
    - .1 NCC Representative to designate extent of borrow areas and allowable depth of excavation.

- .2 Remove waste and stripping material from borrow pits to designated locations.
- .3 Slope edges of borrow areas to minimum 2:1 and provide drainage as directed.
- .4 Trim and leave borrow pits in condition to permit accurate measurement of material removed.

### **3.6 EMBANKMENTS**

- .1 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces.
  - .1 Method used to be to be pre-approved in writing by NCC Representative.
- .2 Break up or scarify existing road surface prior to placing embankment material.
- .3 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized by NCC Representative.
- .4 Maintain crowned surface during construction to ensure ready run-off of surface water.
- .5 Drain low areas before placing materials.
  - .1 Place and compact to full width in layers not exceeding 200 mm loose thickness. NCC Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.
- .6 Where material consists of rock:
  - .1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 1 m.
  - .2 Distribute rock material to fill voids with smaller fragments to form compact mass.
  - .3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.
  - .4 Do not place boulders and rock fragments with dimensions exceeding 150 mm within 300 mm of pavement subgrade elevation.
- .7 Deductions from excavation will be made for overbuild of embankments.

### **3.7 COMPACTION**

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.
- .2 Deposit, spread, and level, embankment material in layers 200 mm maximum thickness before compaction.
  - .1 Compact each layer of embankment until compaction equipment achieves no further significant consolidation.

- .2 Ensure required compaction for each layer before placing any material for next layer.
- .3 Use specialized compaction equipment supplemented by routing, hauling, and leveling equipment over each layer of fill.
- .4 Obtain written approval from NCC Representative before using specialized compaction equipment such as tamping rollers, vibratory rollers, or other alternate compaction equipment that produces the required results
  - .1 For tamping rollers, use equipment that exerts 1000 kPa minimum of pressure on tamping surface of each tamping foot in transverse row.
- .5 Compact each layer to minimum 95% maximum dry density: ASTM D698 except top 150 mm of subgrade.
  - .1 Compact top 150 mm to 100% maximum dry density.
- .6 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

### **3.8 FINISHING**

- .1 Shape entire roadbed to within 25 mm of design elevations.
- .2 Finish slopes, ditch bottoms and borrow pits true to lines, grades and drawings where applicable. Scale slope by removing loose fragments, for cut slopes in bedrock steeper than 1:1.
- .3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.
- .4 Hand finish slopes that cannot be finished satisfactorily by machine.
- .5 Round top of backslope 1.5 m both sides of top of slope.
- .6 Run tractor tracks over slopes exceeding 3 m in height to leave tracks parallel to centreline of highway.
- .7 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

### **3.9 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.10 PROTECTION**

- .1 Maintain finished surfaces in condition conforming to this section until acceptance by NCC Representative.
- .2 Provide silt fences and erosion protection as required to mitigate and prevent impacts to adjacent properties.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 33 00 - Submittal Procedures.
- .2    Section 01 74 11 - Cleaning.
- .3    Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4    Section 31 24 13 - Roadway Embankments.

**1.2            MEASUREMENT AND PAYMENT**

- .1    Measure geotextiles in square metres of surface covered by material. No allowance will be made for seams and overlaps.

**1.3            REFERENCES**

- .1    ASTM International
  - .1    ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2    ASTM D4491-99a(2009), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  - .3    ASTM D4595-09, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
  - .4    ASTM D4716-08, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
  - .5    ASTM D4751-04, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-4.2 No. 11.2-2004, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
  - .2    CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
    - .1    No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
    - .2    No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
    - .3    No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
    - .4    No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.

- .5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

- .3 CSA International

- .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

#### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
  - .1 Submit following samples two (2) weeks prior to beginning Work.
    - .1 Minimum length of one (1) m of roll width of geotextile.
    - .2 Methods of joining.
- .4 Test and Evaluation Reports:
  - .1 Submit copies of mill test data and certificate at least four (4) weeks prior to start of Work.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect geotextiles from direct sunlight and UV rays.
  - .3 Replace defective or damaged materials with new.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### **Part 2 Products**

#### **2.1 MATERIAL**

- .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.
  - .1 Width: 3.5 m minimum.
  - .2 Length: 100 m minimum.

- .3 Composed of: minimum 85% by mass of polypropylene with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 20 days.
- .2 Physical properties:
  - .1 Thickness: to CAN/CGSB-148.1, No.3, minimum 2 mm.
  - .2 Mass per unit area: to CAN/CGSB-148.1, No.2, minimum 330 g/m<sup>2</sup>.
  - .3 Tensile strength and elongation (in any principal direction): to ASTM D4595.
    - .1 Tensile strength: minimum 1050 N, wet condition.
    - .2 Elongation at break: 68 to 96%.
    - .3 Seam strength: equal to or greater than tensile strength of fabric, minimum 1050 N.
  - .4 Grab tensile strength and elongation: to CAN/CGSB-148.1, No.7.3.
    - .1 Breaking force: minimum 1110 N, wet condition.
    - .2 Elongation at future: 50%.
  - .5 Ball burst strength: to CAN/CGSB-4.2, No.11.2, minimum 710 N, wet condition.
  - .6 Bursting strength: to CAN/CGSB-148.1, No.6.1 3500 kPa, wet condition.
- .3 Hydraulic properties:
  - .1 Apparent opening size (AOS): to ASTM D4751, 0.150 mm.
  - .2 Filtration opening size (FOS): to CAN/CGSB-148.1 No.10.
  - .3 Water flow rate: to ASTM D4491, minimum 3250 L/min/m<sup>2</sup>.
  - .4 Permittivity: to ASTM D4491, 1.2 per second.
- .4 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m<sup>2</sup> to ASTM A123/A123M.
- .5 Factory seams: sewn in accordance with manufacturer's recommendations.
- .6 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of NCC Representative.
  - .2 Inform NCC Representative of unacceptable conditions immediately upon discovery.



- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NCC Representative.

### **3.2 INSTALLATION**

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with securing pins.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .5 Join successive strips of geotextile by 600 mm overlapping.
- .6 Pin successive strips of geotextile with securing pins at 1500 mm interval at mid-point of lap.
- .7 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .8 After installation, cover with overlying layer within four (4) hours of placement.
- .9 Replace damaged or deteriorated geotextile to approval of NCC Representative.
- .10 Place and compact soil layers in accordance with Section 31 24 13 - Roadway Embankments.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.4 PROTECTION**

- .1 Vehicular traffic not permitted directly on geotextile.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1      Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2      Section 31 32 19.01 - Geotextiles.

**1.2            MEASUREMENT PROCEDURES**

- .1      Measure rip-rap without cement mortar in cubic metres of material placed.

**1.3            REFERENCES**

- .1      American Society for Testing and Materials (ASTM)
  - .1      ASTM C144-99, Standard Specification for Aggregate for Masonry Mortar.
  - .2      ASTM C618-00, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- .2      Canadian Standards Association (CSA)
  - .1      CAN/CSA-A23.1-00, Concrete Materials and Methods of Concrete Construction.
  - .2      CAN/CSA-A3000-98, Cementitious Materials Compendium.

**Part 2           Products**

**2.1           STONE**

- .1      Hard, dense with relative density (formally specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended:
  - .1      Armour rip-rap:
    - .1      Not more than 10% of total volume of stones with individual volume less than 30 dm<sup>3</sup>.
    - .2      Not less than 50% of total volume of stones with individual volume of 225 dm<sup>3</sup> or more.
    - .3      Remaining percentage of total volume to have uniform distribution of stones between 30 and 225 dm<sup>3</sup> size.
  - .2      Heavy rip-rap:
    - .1      Not more than 10% of total volume of stones with individual volume less than 30 dm<sup>3</sup>.
    - .2      Not less than 50% of total volume of stones with individual volume of 140 dm<sup>3</sup> or more.

- .3 Remaining percentage of total volume to have uniform distribution of stones between 30 and 140 dm<sup>3</sup> size.
- .3 Random rip-rap:
  - .1 Not more than 10% of total volume of stones with individual volume less than 15 dm<sup>3</sup>.
  - .2 Not less than 50% of total volume of stones with individual volume of 85 dm<sup>3</sup> or more.
  - .3 Remaining percentage of total volume to have uniform distribution of stones between 15 and 85 dm<sup>3</sup> size.
- .4 Hand placed rip-rap:
  - .1 Minimum size of individual stones 10 dm<sup>3</sup>.
  - .2 Not less than 75% of total volume of stones with individual volume of 25 dm<sup>3</sup> or more.
  - .3 Supply rock spalls or cobbles to fill open joints.

## **2.2 GEOTEXTILE FILTER**

- .1 Geotextile: in accordance with Section 31 32 19.01 - Geotextiles.

## **Part 3 Execution**

### **3.1 PLACING**

- .1 Where rip-rap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place geotextile on prepared surface in accordance with Section 31 32 19.01- Geotextiles and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.
- .4 Place rip-rap to thickness and details as indicated.
- .5 Place stones in manner approved by NCC Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.
- .6 Hand placing:
  - .1 Use larger stones for lower courses and as headers for subsequent courses.
  - .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
  - .3 Finish surface evenly, free of large openings and neat in appearance.

**END OF SECTION**

## DIVISION 32

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**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 33 00 - Submittal Procedures
- .2    Section 01 35 29.06 - Health and Safety Requirements
- .3    Section 01 74 21 - Construction/Demolition Waste Management and Disposal
- .4    Section 32 92 21 - Hydraulic Seeding
- .5    Section 32 93 43.01 - Tree Pruning

**1.2            REFERENCES**

- .1    Canadian Standards Association (CSA International).
  - .1    CSA G30.5-M1983(R1998), Welded Steel Wire Fabric for Concrete Reinforcement.
- .2    Department of Justice Canada (Jus).
  - .1    Canadian Environmental Protection Act (CEPA), 1999, c. 33.
  - .2    Fertilizers Act (R.S. 1985, c. F-10).
  - .3    Fertilizers Regulations (C.R.C., c. 666).
  - .4    Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .3    Health Canada - Pest Management Regulatory Agency (PMRA).
  - .1    National Standard for Pesticide Education, Training and Certification in Canada (1995).
- .4    Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1    Material Safety Data Sheets (MSDS).

**1.3            DEFINITIONS**

- .1    Mycorrhiza : association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.

**1.4            ACTION AND INFORMATIONAL SUBMITTALS**

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

- .3 Submit WHMIS MSDS.

## **1.5 QUALITY ASSURANCE**

- .1 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Not used.

## **1.7 SCHEDULING**

- .1 Obtain approval from NCC Representative of schedule indicating beginning of Work.

## **1.8 MAINTENANCE DURING WARRANTY PERIOD**

- .1 From time of acceptance by NCC Representative to end of warranty period, perform following maintenance operations.
  - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
  - .2 Remove dead, broken or hazardous branches from plant material. Dispose of debris through composting and/or mulching.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Fill:
  - .1 Type (A): clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.
  - .2 Type (B): excavated soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc). Excavated material shall be approved by NCC Representative before use as fill.
- .2 Coarse washed stones: 35-75 mm diameter clean round hard stone.
- .3 Drintile: 100 mm diameter corrugated plastic perforated tubing complete with snap couplings. Fill vents with 20 mm clear stone.
- .4 Peatmoss:
  - .1 Derived from partially decomposed species of Sphagnum Mosses.
  - .2 Elastic and homogeneous.
  - .3 Free of wood and deleterious material which could prohibit growth.

- .4 Shredded minimum particle size: 5 mm.
- .5 Fertilizer:
  - .1 To Canada Fertilizer Act and Fertilizers Regulations.
  - .2 Complete, commercial, slow release with 35 % of nitrogen content in water-insoluble form.
- .6 Anti-desiccant: commercial, wax-like emulsion.
- .7 Filter Cloth:
  - .1 Type 1: 100 % non-woven needle punched polyester, 2.75 mm thick, 240 g/m<sup>2</sup> mass.
  - .2 Type 2: biodegradable burlap.
- .8 Wood posts: 38 x 89 x 2400 mm length, untreated wood.
- .9 Welded wire fabric (WWF): 100 x 100 mm, MW 4.75 mm x MW 4.75 mm, to CSA G30.5.

### **Part 3 Execution**

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

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Identify plants and limits of root systems to be preserved as approved by NCC Representative.
- .3 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by NCC Representative.
- .4 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an arborist or Canadian Certified Horticultural Technician (CCHT) as approved by NCC Representative.

#### **3.2 ROOT CURTAIN SYSTEM**

- .1 Identify limits for required construction excavation as approved by NCC Representative.
- .2 Prior to construction excavation, dig trench minimum 500 mm wide x 1500 mm deep, along perimeter of excavation limits.
- .3 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.
- .4 Install wooden posts and welded wire fabric against construction edge of trench.
- .5 Securely attach Type 2 filter fabric on plant side of wire mesh.
- .6 Prepare homogeneous mixture of fertilizer, parent material and organic matter.

- .1 Add organic matter to mixture to achieve 7-9% organic matter content by weight.
- .2 Incorporate with mixture grade 2:12:8 ratio fertilizer (dry) at rate of 1.5 kg/m<sup>3</sup>.
- .7 Backfill with homogeneous mixture between curtain wall and plants to be preserved in layers not exceeding 150 mm in depth. Compact each layer to 85% Standard Proctor Density.
- .8 Protect root curtain from damage during construction operations.
- .9 Water plants and root curtain sufficiently during construction to maintain optimum soil moisture condition until backfill operations are complete.
- .10 Protect root curtain before and during backfill operations. Ensure root curtain is cut down to 300 mm below finished grade and remove cut material.

### **3.3 AIR LAYERING SYSTEM**

- .1 Using manual methods, carefully remove turf, plants, leaves and organic matter in area of root system, dispose of plant matter through compost site and slightly loosen topsoil surface. Avoid damage to root system.
- .2 Lay horizontal system of perforated recycled content drain pipe on surface of existing grade.
  - .1 Slope drain tile minimum 3% for drainage away from trunk of tree.
  - .2 Connect system with general site drainage system or drain to low point on site.
- .3 Install plastic "vent" pipes vertically over joints in horizontal pipe system or where indicated. Top of vent pipe to be 20 mm above finished grade of fill. Keep top of vent pipe covered during construction.
- .4 Cover joints with Type 1 filter fabric and place coarse washed stone around joints and vertical pipes to secure their position.
- .5 Construct drywell around trunk of tree.
  - .1 Ensure open ends of vertical vent pipes are left exposed for air circulation to root system.
  - .2 Protect openings from blockage during construction.
  - .3 Install protective caps on exposed horizontal openings.
- .6 Place 200 mm depth of coarse washed stone on surface of original ground and horizontal pipe system to limits.
- .7 Place Type 1 filter fabric over surface of granular layer.
- .8 Place Type A fill over filter fabric to required depth without disturbing or damaging drain pipe system. Avoid damage to filter fabric.
- .9 Complete topsoil and hydraulic seeding over area of sub-surface system within one week of placing fill.



- .10 Remove temporary protective covering from vent pipe openings. Install protective caps flush with finished grade.

### **3.4 LOWERING GRADE AROUND EXISTING TREE**

- .1 Begin Work in accordance with schedule approved by NCC Representative.
- .2 Cut slope not less than 500 mm from tree trunk to new grade level.
- .3 Excavate to depths as indicated. Protect from damage root zone which is to remain.
- .4 When severing roots at excavation level, cut roots with sharp tools.
- .5 Cultivate excavated surface manually to 15 mm depth.
- .6 Prepare homogeneous soil mixture consisting by volume of:
  - .1 60 % excavated soil cleaned of roots, plant matter, stones, debris.
  - .2 25 % coarse, clean sterile sand.
  - .3 15 % organic matter.
  - .4 Grade 2:12:8 fertilizer at rate of 1.5 kg/m<sup>3</sup>.
- .7 Place soil mixture over area of excavation to finished grade level. Compact to 85% Standard Proctor Density.
- .8 Water entire root zone to optimum soil moisture level.
- .9 Install surface cover of seeding in accordance with Section 32 92 21 - Hydraulic Seeding.

### **3.5 PRUNING**

- .1 Prune in accordance with Section 32 93 45 - Tree Pruning.
- .2 Prune crown to compensate for root loss while maintaining general form and character of plant. Dispose of debris through composting and/or mulching.

### **3.6 ANTI-DESICCANT**

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

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 33 00 - Submittal Procedures.
- .2    Section 01 74 11 - Cleaning.
- .3    Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4    Section 31 05 16 - Aggregate Materials.

**1.2            REFERENCES**

- .1    ASTM International
  - .1    ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
  - .2    ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3    ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4    ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.
  - .5    ASTM D698-07e1, 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>).
  - .6    ASTM D1557-09, Standard 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>).
  - .7    ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - .8    ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3    U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1    EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Sustainable Design Submittals:

- .1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with EPA 832/R-92-2005 and authorities having jurisdiction.
- .2 Construction Waste Management:
  - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations and the erosion and sedimentation control plan.
  - .2 Replace defective or damaged materials with new.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
  - .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1:

Sieve Designation	% Passing per Sieve Designation			
100 mm	-	-	-	-
75 mm	100	100	100	-
50 mm	-	-	-	100
37.5 mm	-	-	-	-
25 mm	55-100	-	-	60-100
19 mm	-	-	-	-
12.5 mm	-	-	-	38-70
9.5 mm	-	-	-	-
4.75 mm	25-100	25-85	-	22-55
2.00 mm	15-80	-	-	13-42
0.425 mm	4-50	5-30	0-30	5-28
0.180 mm	-	-	-	-
0.075 mm	0-8	0-10	0-8	2-10

- .3 Other properties as follows:
  - .1 Liquid Limit: to ASTM D4318, Maximum 25.
  - .2 Plasticity Index: to ASTM D4318, Maximum 6.
  - .3 Los Angeles degradation: to ASTM C131.

- .1 Maximum loss by mass: 50 %.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular sub-base installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of NCC Representative.
  - .2 Inform NCC Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from NCC Representative.

#### **3.2 PREPARATION**

- .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, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
  - .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.

#### **3.3 PLACING**

- .1 Place granular sub-base after subgrade is inspected and approved by NCC Representative.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice.
- .5 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.

- .1 NCC Representative may authorize thicker lifts if specified compaction can be achieved.
- .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .8 Remove and replace portion of layer in which material has become segregated during spreading.
- 3.4 COMPACTION**
  - .1 Compaction equipment to be capable of obtaining required material densities.
  - .2 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 NCC Representative before use.
- 3.5 CLEANING**
  - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
    - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- 3.6 SITE TOLERANCES**
  - .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.
- 3.7 PROTECTION**
  - .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by NCC Representative.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 - Cleaning.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 31 05 16 - Aggregate Materials.

**1.2 MEASUREMENT AND PAYMENT**

- .1 Measure granular base in tonnes of material incorporated into Work and accepted in writing by NCC Representative.

**1.3 REFERENCES**

- .1 ASTM International
  - .1 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4 ASTM D698-07e1, 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>).
  - .5 ASTM D1557-09, 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>).
  - .6 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - .7 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Sustainable Design Submittals:
  - .1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with EPA 832/R-92-2005 and authorities having jurisdiction.
  - .2 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 31 05 16 - Aggregate Materials.
- .2 Storage and Handling Requirements:
  - .1 Stockpile minimum 50% of total aggregate required prior to beginning operation.
  - .2 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .3 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
  - .1 Crushed stone or gravel.
  - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
    - .1 Gradation Method #2 to:

Sieve Designation	% Passing		
	(1)	(2)	(3)
100 mm	-	-	-
75 mm	-	-	-
50 mm	100	-	-
37.5 mm	70-100	-	-
25 mm	-	100	-
19 mm	50-75	-	100
12.5 mm	-	65-100	70-100
9.5 mm	40-65	-	-
4.75 mm	30-50	35-60	40-70
2.00 mm	-	22-45	23-50
0.425 mm	10-30	10-25	7-25
0.180 mm	-	-	-
0.075 mm	3-8	3-8	3-8

- .2 Liquid limit: to ASTM D4318, maximum 25
- .3 Plasticity index: to ASTM D4318, maximum 6.
- .4 Los Angeles degradation: to ASTM C131. Max. % loss by weight: 45
- .5 Crushed particles: at least 60% of particles by mass within each of following sieve designation ranges to have at least one (1) freshly fractured face. Material to be divided into ranges using methods of ASTM C136.

Passing		Retained on
50 mm	to	25 mm
25 mm	to	19.0 mm
19.0 mm	to	4.75 mm

### **Part 3 Execution**

#### **3.1 PREPARATION**

- .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, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
  - .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.

#### **3.2 PLACEMENT AND INSTALLATION**

- .1 Place granular base after sub-base surface is inspected and approved in writing by NCC Representative.
- .2 Placing:
  - .1 Construct granular base to depth and grade in areas indicated.
  - .2 Ensure no frozen material is placed.
  - .3 Place material only on clean unfrozen surface, free from snow and ice.
  - .4 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
  - .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.



- .1 NCC Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
- .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
  - .1 Ensure compaction equipment is capable of obtaining required material densities.
  - .2 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 NCC Representative before use.
- .4 Compacting:
  - .1 Compact to density not less than 98% maximum dry density to ASTM D698 and to ASTM D1557.
  - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
  - .3 Apply water as necessary during compacting to obtain specified density.
  - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by NCC Representative.
  - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

### **3.3 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.

### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
  - .2 Divert unused granular material from landfill to local quarry approved by NCC Representative.

**3.5 PROTECTION**

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

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 33 00 - Submittal Procedures.
- .2    Section 01 35 00.06 - Special procedures for Traffic control.
- .3    Section 01 74 11 - Cleaning.
- .4    Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.2            MEASUREMENT PROCEDURES**

- .1    Asphalt tack coat will be measured in square metres at 15 degrees Celcius of undiluted emulsified asphalt actually applied.
  - .1    Volume to be corrected to the volume at 15 degrees Celcius to ASTM D1250 for cutback asphalt, and ASTM D633 for tar, and Table IV-3 of the Asphalt Institute's Manual MS-6 for emulsified asphalt.
  - .2    Water added to emulsified asphalt will not be measured for payment.

**1.3            REFERENCES**

- .1    American Association of State Highway and Transportation Officials (AASHTO)
  - .1    AASHTO M081-92-UL-04, Standard Specification for Cutback Asphalt (Rapid-Curing Type).
- .2    ASTM International
  - .1    ASTM D140/D140M-09, Standard Practice for Sampling Bituminous Materials.
  - .2    ASTM D633-11, Standard Volume Correction Table for Road Tar.
  - .3    ASTM D1250-08, Standard Guide for Use of the Petroleum Measurement Tables.
- .3    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

**1.4            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's instructions, printed product literature and data sheets for asphalt tack coat and include product characteristics, performance criteria, physical size, finish and limitations.

- .3 Samples:
  - .1 Submit two - 4 L samples of asphalt tack coat material proposed for use in new, clean, airtight, sealed, wide mouth jars to NCC Representative, at least two (2) weeks prior to beginning Work.
  - .2 Sample asphalt tack coat material to: ASTM D140.
  - .3 Provide access on tank truck for NCC Representative to sample asphalt material to be incorporated into Work to ASTM D140.
- .4 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

## **1.5 QUALITY ASSURANCE**

- .1 Upon request from NCC Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

## **1.6 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:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect asphalt tack coats from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Deliver, store and handle materials in accordance with ASTM D140.
- .5 Provide, maintain and restore asphalt storage area.
- .6 Develop Waste Management Plan related to Work of this Section.
- .7 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

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

**Part 2 Products**

**2.1 MATERIALS**

- .1 Anionic emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.
- .2 Cut-back asphalt; to AASHTO M081-92-UL, grade RC-70 or RC-250.
- .3 Water: clean, potable, free from foreign matter.

**2.2 EQUIPMENT**

- .1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for duration of Work.
- .2 Pressure distributor:
  - .1 Designed, equipped, maintained and operated so that asphalt material can be:
    - .1 Maintained at even temperature.
    - .2 Applied uniformly on variable widths of surface up to 5 m.
    - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m<sup>2</sup> with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m<sup>2</sup>.
    - .4 Distribute in uniform spray without atomization at temperature required.
  - .2 Equipped with meter, registering travel in metres per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
  - .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
  - .4 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
    - .1 Measure temperature to closest whole number.
  - .5 Equipped with accurate volume measuring device or calibrated tank.
  - .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
  - .7 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 metres and capable of being raised or lowered.
  - .8 Cleaned if previously used with incompatible asphalt material.

**Part 3            Execution**

**3.1                EXAMINATION**

- .1      Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt tack coat installation in accordance with manufacturer's written instructions.
  - .1      Visually inspect substrate in presence of NCC Representative.
  - .2      Inform NCC Representative of unacceptable conditions immediately upon discovery.
  - .3      Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from NCC Representative.

**3.2                APPLICATION**

- .1      Apply asphalt tack coat only on clean and dry surface.
- .2      Dilute asphalt emulsion with water at 1:1 ratio for application.
  - .1      Mix thoroughly by pumping or other method approved by NCC Representative.
- .3      Apply asphalt tack coat evenly to pavement surface at rate as directed by NCC Representative, between 0.5 and 1.0 L/m<sup>2</sup> but not to exceed 0.7 L/m<sup>2</sup>.
- .4      Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.
- .5      Apply asphalt tack coat only when air temperature greater than 10 degrees C and when rain is not forecast within two (2) hours minimum of application.
- .6      Apply asphalt tack coat only on unfrozen surface.
- .7      Evenly distribute localized excessive deposits of tack coat by brooming as directed by NCC Representative.
- .8      Where traffic is to be maintained, treat no more than one half of width of surface in one application.
  - .1      Control traffic in accordance with Section 01 35 00.06 - Special procedures for Traffic control.
- .9      Keep traffic off tacked areas until asphalt tack coat has set.
- .10     Re-tack contaminated or disturbed areas as directed by NCC Representative.
- .11     Permit asphalt tack coat to set before placing asphalt pavement.
- .12     Submit summary report within seven (7) days minimum of date of application and include information as follows:
  - .1      Total area tack coated.
  - .2      Quantity of tack coat used.

- .3 Mean application rate.
- .4 Actual product quantity used when using equipment on pressure distributors.
- .5 Dipstick measurements or electronic printouts are acceptable.
- .13 Carry out measurements in presence of NCC Representative upon request.
- .14 Inspect tack coat application to ensure uniformity.
  - .1 Re-spray areas of insufficient or non-uniform tack coat coverage as directed by NCC Representative.
  - .2 Ensure tack coating performed using hand held devices is consistent in appearance with adjacent areas of machine applied material.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 74 11 - Cleaning
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal
- .4 Section 32 17 23 - Pavement Markings

**1.2 MEASUREMENT AND PAYMENT**

- .1 Measure asphalt paving in tonnes of asphalt concrete actually incorporated into Work.

**1.3 REFERENCES**

- .1 American Association of State Highway and Transportation Officials (AASHTO)
  - .1 AASHTO M320-10, Standard Specification for Performance Graded Asphalt Binder.
  - .2 AASHTO R29-08, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.
  - .3 AASHTO T245-97(2008), Standard Method of Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
- .2 Asphalt Institute (AI)
  - .1 AI MS-2-1994, Mix Design Methods for Asphalt Concrete and Other Hot-Mixes.
- .3 ASTM International
  - .1 ASTM C88-05, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
  - .2 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- .4 Government of Québec, Transport Québec
  - .1 Cahier des charges et devis généraux (CCDG) - Infrastructure routières - Construction et réparation, édition 2013.
- .5 U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.



## **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for asphalt mixes and aggregate and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit viscosity-temperature chart for asphalt cement to be supplied showing either Saybolt Furol viscosity in seconds or Kinematic Viscosity in centistokes, temperature range 105 to 175 degrees Celcius, four (4) weeks prior to beginning Work.
- .3 Samples:
  - .1 Inform NCC Representative of proposed source of aggregates and provide access for sampling four (4) weeks prior to beginning Work.
- .4 Sustainable Design Submittals:
  - .1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with EPA 832/R-92-2005 and authorities having jurisdiction.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Aggregates: to CCDG.
  - .1 Crushed Granular 20-0 mm (MG 20).
  - .2 Natural Gravel 80-0 mm.
  - .3 Gravel and sand.
- .2 Prime coat: RC-30 to CCDG.
- .3 Tack coat: SS-1 to CCDG.
- .4 Asphalt: EC-10, PG 58-34.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of NCC Representative.

- .2 Inform NCC Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NCC Representative.

### **3.2 FOUNDATIONS**

- .1 Foundations for roadways and asphalt apron comprise:
  - .1 300 mm compacted thickness of granular subbase 112-0 mm (MG-112).
  - .2 150 mm compacted thickness of granular base 20-0 mm (MG-20).
- .2 Construction of granular foundations: CCDG.
- .3 Compaction: compact each lift of granular material to 98% maximum density to ASTM D698. Maximum lift thickness: 150 mm.

### **3.3 PAVEMENT THICKNESS**

- .1 Pavements for roadway (Dunlop):
  - .1 Base course: 30 mm EC-10 PG 58-34.
  - .2 Wear course: 30 mm EC-10 PG 58-34.
- .2 Pavements for roadway (Gatineau Parkway – Pink Lake):
  - .1 Wear course (swale): 50 mm EC-10 PG 58-34.

### **3.4 PAVEMENT CONSTRUCTION**

- .1 Surface preparation: CCDG.
- .2 Application of prime coat and tack coat: CCDG.
- .3 Construction of asphalt: CCDG.

### **3.5 TRAFFIC MARKINGS**

- .1 Pavement markings: in accordance with Section - 32 17 23 Pavement Markings.

### **3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 - Cleaning.

**1.2 PRICE AND PAYMENT PROCEDURES**

- .1 Measurement and Payment:
  - .1 Measure Supply and application of water for dust control in litres.
  - .2 No extra compensation will be paid for water ordered and applied on Saturdays, Sundays or holidays.

**1.3 REFERENCES**

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Sustainable Design Submittals:
  - .1 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with EPA 832/R92-005 and authorities having jurisdiction.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Water: in accordance with NCC Representative's approval.

**Part 3 Execution**

**3.1 PREPARATION**

- .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 specific to site, that complies with EPA

832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

**3.2 APPLICATION**

- .1 Apply water with equipment approved by NCC Representative at rate of 5 L/m<sup>2</sup> for liquid when directed by NCC Representative.
- .2 Apply water with distributors equipped with means of shut-off and with spray system to ensure uniform application.

**3.3 CLEANING**

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

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 33 00 - Submittal Procedures
- .2    Section 01 35 00.06 – Special Procedures for Traffic Control
- .3    Section 01 35 29.06 - Health and Safety Requirements
- .4    Section 01 35 43 - Environmental Procedures
- .5    Section 01 74 11 - Cleaning
- .6    Section 01 74 21 - Construction/Demolition Waste Management and Disposal

**1.2            MEASUREMENT FOR PAYMENT**

- .1    Pavement marking: measured in metres of solid lines or painted length of dash lines.
- .2    Symbols and letters: measured in units.

**1.3            REFERENCES**

- .1    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-1.5-99, Low Flash Petroleum Spirits Thinner.
  - .2    CAN/CGSB 1.74-01, Alkyde Traffic Paint.
- .2    Green Seal Environmental Standards (GS)
  - .1    GS-11-2008, 2nd Edition, Paints and Coatings.
- .3    Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1    Material Safety Data Sheets (MSDS).
- .4    The Master Painters Institute (MPI)
  - .1    Architectural Painting Specification Manual - latest edition.
- .5    South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1    SCAQMD Rule 1113-A2007, Architectural Coatings.

**1.4            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
- .3 Samples:
  - .1 Submit to NCC Representative following material sample quantities at least four (4) weeks prior to commencing work.
    - .1 One (1) L samples of each type of paint.
    - .2 One (1) kg sample of glass beads.
    - .3 Sampling to MPI Painting Manual.
  - .2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, MPI specification number and formulation number and batch number.
- .4 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
  - .2 Low-Emitting Materials: submit listing of paints and coatings to comply with VOC and chemical component limits or restrictions requirements.

## **1.5 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:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Paint:
  - .1 To MPI -EXT 2.1B, Alkyd zone/traffic marking.
  - .2 Paints: in accordance with MPI recommendation for surface conditions.

- .1 Paints: maximum VOC limit 100 g/L to SCAQMD Rule 1113 and to GS-11.
- .3 Colour: to MPI listed, yellow or white.
- .4 Upon request, NCC Representative will supply qualified product list of paints applicable to work. Qualified paints may be used but NCC Representative reserves right to perform further tests.
- .2 Thinner: to MPI listed manufacturer.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation in accordance with MPI instructions prior to pavement markings installation.
  - .1 Visually inspect substrate in presence of NCC Representative.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions have been rectified.

#### **3.2 EQUIPMENT REQUIREMENTS**

- .1 Paint applicator: approved pressure type mobile with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.

#### **3.3 TRAFFIC CONTROL**

- .1 Traffic control: in accordance with Section 01 35 00.06 – Special Procedures for Traffic Control.

#### **3.4 APPLICATION**

- .1 Pavement markings: lay out determined by NCC Representative.
- .2 markings. Unless otherwise approved by NCC Representative, apply paint only when air temperature is above 10 degrees C, wind speed is less than 50 km/h and no rain is forecast within next four (4) hours.
- .3 Apply traffic paint evenly at rate of three (3) m<sup>2</sup>/L.
- .4 Do not thin paint unless approved by NCC Representative.
- .5 Symbols and letters to dimensions indicated.
- .6 Paint lines: of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.



**3.5 TOLERANCE**

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.

**3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.7 PROTECTION OF COMPLETED WORK**

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
- .3 Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
- .4 Section 01 74 11 - Cleaning.
- .5 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.2 MEASUREMENT PROCEDURES**

- .1 Preparation of sub-grade for placing of topsoil will be measured in square metres of area prepared.
- .2 Topsoil stripping will be measured by NCC Representative in cubic metres of stockpiled topsoil and volume will be determined by average end area method.
- .3 Measure placing of topsoil in cubic metres removed from stockpile.
  - .1 Stockpiles will be measured by NCC Representative and volume of topsoil removed calculated by average end area method.
- .4 Measure supply and application of soil amendments, including fertilizer, in as determined by NCC Representative.
  - .1 Measure soil amendment including fertilizer applied to 1.5 in kilograms per cubic metres of area treated.
- .5 Measure supplying, placing and spreading topsoil in cubic metres determined by truck box measurement as loaded.
  - .1 Truck box capacity determined by NCC Representative.
- .6 Measure supplying, placing and spreading topsoil in cubic metres as determined from actual surface area covered and depth of topsoil specified.
  - .1 Specified depth of topsoil: measured and approved by NCC Representative after settlement and consolidation as specified.
- .7 Measure finish grading in square metres from actual surface measurements as determined by NCC Representative.

**1.3 PAYMENT**

- .1 Testing of topsoil: NCC Representative will pay for cost of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

**1.4 REFERENCES**

- .1 Agriculture and Agri-Food Canada

- .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
  - .1 PN1340-2005, Guidelines for Compost Quality.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

## **1.5 DEFINITIONS**

- .1 Compost:
  - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
  - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
  - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C : N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminants.
  - .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

## **1.6 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality control submittals :
  - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
  - .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

## **1.7 QUALITY ASSURANCE**

- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

## **1.8 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.
- .2 Divert unused soil amendments from landfill to official hazardous material collections site approved by NCC Representative.

- .3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

## **Part 2 Products**

### **2.1 TOPSOIL**

- .1 Topsoil for seeded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
  - .1 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.
  - .2 Contain no toxic elements or growth inhibiting materials.
  - .3 Finished surface free from:
    - .1 Debris and stones over 50 mm diameter.
    - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
  - .4 Consistence: friable when moist.

### **2.2 SOIL AMENDMENTS**

- .1 Fertilizer:
  - .1 Fertility: major soil nutrients present in following amounts:
  - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
  - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
  - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
  - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
  - .6 Ph value: 6.5 to 8.0.
- .2 Peatmoss:
  - .1 Derived from partially decomposed species of Sphagnum Mosses.
  - .2 Elastic and homogeneous, brown in colour.
  - .3 Free of wood and deleterious material which could prohibit growth.
  - .4 Shredded particle minimum size: 5 mm.
- .3 Sand: washed coarse silica sand, medium to course textured.
- .4 Organic matter: compost Category A in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .5 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.

- .6 Limestone:
  - .1 Ground agricultural limestone.
  - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .7 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

### **2.3 SOURCE QUALITY CONTROL**

- .1 Advise NCC Representative of sources of 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 NCC Representative.
  - .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

## **Part 3 Execution**

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

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent].
- .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.

### **3.2 STRIPPING OF TOPSOIL**

- .1 Begin topsoil stripping of areas as directed by NCC Representative after area has been cleared of grasses and removed from site.
- .2 Strip topsoil to depths as directed by NCC Representative.
  - .1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .3 Stockpile in locations as directed by NCC Representative.
  - .1 Stockpile height not to exceed 2 m.

- .4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill as directed by NCC Representative.
- .5 Protect stockpiles from contamination and compaction.

### **3.3 PREPARATION OF EXISTING GRADE**

- .1 Verify that grades are correct.
  - .1 If discrepancies occur, notify NCC Representative and do not commence work until instructed by NCC Representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
  - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
  - .2 Remove debris which protrudes more than 75 mm above surface.
  - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
  - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

### **3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL**

- .1 Place topsoil after NCC Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil as indicated to following minimum depths after settlement.
  - .1 150 mm for seeded areas.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

### **3.5 FINISH GRADING**

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

### **3.6 ACCEPTANCE**

- .1 NCC Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

**3.7 SURPLUS MATERIAL**

- .1 Dispose of materials except topsoil not required off site where directed by NCC Representative.

**3.8 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**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 31 19 - Project Meetings.
- .2    Section 01 33 00 - Submittal Procedures.
- .3    Section 01 35 29.06 - Health and Safety Requirements.
- .4    Section 01 35 43 - Environmental Procedures.
- .5    Section 01 74 11 – Cleaning.
- .6    Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.2            MEASUREMENT AND PAYMENT**

- .1    Measure hydraulic seeding square metres of actual surface area for:
  - .1    Grass mixture including fertilizer.
  - .2    Areas of blending into existing turf grass will not be measured for payment.
- .2    Measure maintenance during warranty period of areas seeded in square metres.
- .3    Payment for seeding made at unit price bid of actual area surface measurements taken and computed by NCC Representative.

**1.3            ADMINISTRATIVE REQUIREMENTS**

- .1    Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 31 19 - Project Meetings.
- .2    Scheduling:
  - .1    Schedule hydraulic seeding to coincide with preparation of soil surface.
  - .2    Schedule hydraulic seeding using grass mixtures and mixtures containing Crownvetch or Trefoil between dates recommended by Provincial and Regional Agricultural Department.

**1.4            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's instructions, printed product literature and data sheets for seed, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.



- .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
- .3 Submit in writing seven (7) days prior to commencing work:
  - .1 Volume capacity of hydraulic seeder in litres.
  - .2 Amount of material to be used per tank based on volume.
  - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.
- .4 Samples:
  - .1 Submit 0.5 kg container of each type of fertilizer used.
- .5 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .6 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

## **1.5 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Landscape Contractor: to be a Member in Good Standing of the Horticultural Trades Association.
  - .2 Landscape Maintenance Supervisor: Landscape Industry Certified Technician with Turf Maintenance designation.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
  - .2 Inoculant containers to be tagged with expiry date.
- .3 Storage and Handling Requirements:
  - .1 Store fertilizer in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Workplan related to Work of this Section and in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Waste Reduction

Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **1.7 WARRANTY**

- .1 For seeding, 12 months warranty period is extended to 24 months.
- .2 End-of-warranty inspection will be conducted by NCC Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
  - .1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
    - .1 Mixture composition:
      - .1 50% Phleum pratense.
      - .2 25% Poa trivalis.
      - .3 10% Agrosti alba.
      - .4 7% Medicago lupulina.
      - .5 8% Trioflum repens.
  - .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
    - .1 Type I mulch:
      - .1 Made from wood cellulose fibre.
      - .2 Organic matter content: 95% plus or minus 0.5%.
      - .3 Value of pH: 6.0.
      - .4 Potential water absorption: 900%.
  - .3 Tackifier: water dilutable, liquid dispersion or water soluble vegetable carbohydrate powder.
  - .4 Water: free of impurities that would inhibit germination and growth.
  - .5 Fertilizer:
    - .1 To Canada "Fertilizers Act" and Regulations.
    - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
  - .6 Inoculants: inoculant containers to be tagged with expiry date.

- .7 Liquid Soil Amendment and Micronutrients: in accordance with manufacturer's instructions.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

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

#### **3.2 INSTALLERS**

- .1 Use installers members in Good Standing of the Horticultural Trades Association.

#### **3.3 PROTECTION OF EXISTING CONDITIONS**

- .1 Protect structures, signs, guide rails, fences, plant material, utilities and other surfaces not intended for spray.
- .2 Immediately remove any material sprayed where not intended as directed by NCC Representative.

#### **3.4 PREPARATION OF SURFACES**

- .1 Do not perform work under adverse field conditions such as wind speeds over ten (10) km/h, frozen ground or ground covered with snow, ice or standing water.
- .2 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .3 Obtain NCC Representative's approval of grade and topsoil depth before starting to seed.

#### **3.5 PREPARATION OF SLURRY**

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to NCC Representative. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After materials are in seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

### **3.6 SLURRY APPLICATION**

- .1 Ensure seed is placed under supervision of certified Landscape Planting Supervisor.
- .2 Hydraulic seeding equipment:
  - .1 Slurry tank.
  - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
  - .3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
- .3 Slurry mixture applied per hectare.
  - .1 Seed: grass mixture 270 kg.
  - .2 Mulch: Type I kg to be used as per the manufacturer's instructions.
  - .3 Tackifier: kg to be used as per the manufacturer's instructions.
  - .4 Water: Minimum 30,000 L.
  - .5 Fertilizer: kg and ratio to be used as per the manufacturer's instructions.
  - .6 Liquid Soil Amendment/Micronutrients: kg and ratio to be used as per the manufacturer's instructions.
- .4 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
  - .1 Using correct nozzle for application.
  - .2 Using hoses for surfaces difficult to reach and to control application.
- .5 Blend application 300 mm into adjacent grass areas to form uniform surfaces.
- .6 Re-apply where application is not uniform.
- .7 Remove slurry from items and areas not designated to be sprayed.

### **3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Clean and reinstate areas affected by Work.
- .3 Waste Management: separate waste materials for reuse, recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .2 Divert unused fertilizer from landfill to official hazardous material collections site approved by NCC Representative.

**3.8 PROTECTION**

- .1 Protect seeded areas from trespass until plants are established using survey ribbon and pickets.
- .2 Remove protection devices as directed by NCC Representative.

**3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD**

- .1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
- .2 Perform following operations from time of seed application until acceptance by NCC Representative.
- .3 Grass Mixture:
  - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
  - .2 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

**3.10 ACCEPTANCE**

- .1 Seeded areas will be accepted by NCC Representative provided that:
  - .1 Seeded areas are free of rutted, eroded, bare or dead spots.
  - .2 Areas have been fertilized.
- .2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

**3.11 MAINTENANCE DURING WARRANTY PERIOD**

- .1 Perform following operations from time of acceptance until end of warranty period:
  - .1 Repair and reseed dead or bare spots to satisfaction of NCC Representative.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1      Section 01 74 11 – Cleaning.
- .2      Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .3      Section 01 35 29.06 – Health and Safety Requirements.

**1.2            REFERENCES**

- .1      American National Standard Institute (ANSI)
  - .1      ANSI A300 (Part 1)-2001, Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices (revision and re-designation of ANSI A300-1995) (includes supplements).
  - .2      ANSI A300 (Part 2)-1998, Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices - Part 2 - Fertilization.
  - .3      ANSI A300 (Part 3)-2000, Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance: Standard Practices - Part 3 - Tree Support Systems (a. Cabling, Bracing, and Guying) (supplement to ANSI A300-1995).
- .2      Canadian Nursery Landscape Association (CNLA)
- .3      International Society of Arboriculture (ISA)
- .4      Ontario Ministry of Agriculture, Food and Rural Affairs
  - .1      Publication 483-2004, Pruning Ornamentals.

**1.3            DEFINITIONS**

- .1      Crown Cleaning: consists of selective removal of one or more of following items: dead, dying or diseased branches, weak branches and water sprouts.
- .2      Crown Thinning: consists of selective removal of branches to increase light penetration, air movement and reduce weight.
- .3      Crown Raising: consists of removal of lower tree branches to provide clearance.
- .4      Crown Reduction or Crown Shaping: decreases tree height and/or spread.
- .5      Vista Pruning: is selective thinning of framework limbs or specific crown areas to improve views.
- .6      Crown Restoration: improves structure, form and appearance of trees that have been severely headed or vandalized.

**1.4            QUALITY ASSURANCE**

- .1      Certification: provide Canadian Nursery Landscape Association certification.

- .2 Regulatory requirements: provide safety certificate as approved by local hydro utility.
- .3 Field Samples: do sample pruning in manner to enable NCC Representative to identify:
  - .1 Knowledge of target areas including branch bark ridge and branch collars.
  - .2 Technique for selection process and pruning used to establish desired form and shape for each species.
- .4 Acceptance of Work will be determined by NCC Representative from field sample.
- .5 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

## **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse, recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Dispose of unused disinfectant at official hazardous material collections site approved by NCC Representative.
- .4 Ensure emptied containers are sealed and stored safely.
- .5 Divert wood materials from landfill to facility for recycling and composting as directed by NCC Representative.

## **1.6 TOOL MAINTENANCE**

- .1 Ensure that tools are clean and sharp throughout pruning operation: do not use tools that crush or tear bark.
- .2 Disinfect tools before each tree is pruned.
- .3 On diseased plant material disinfect tools before each cut.

## **Part 2 Products**

### **2.1 DISINFECTANT**

- .1 20% solution of sodium hypochlorite or 70% solution of ethyl alcohol.

**Part 3            Execution**

**3.1                APPLICATION**

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

**3.2                GENERAL**

- .1      Prune in accordance with Pruning Ornamentals, ANSI A300, and as directed by NCC Representative. Where discrepancies occur between standard and specifications, specifications govern.
- .2      Notify immediately NCC Representative conditions detrimental to health of plant material or operations.
- .3      Prune during plant dormant period or after leaves have matured. Avoid pruning during leaf formation, at time of leaf fall, or when seasonal temperature drops below minus 10 degrees C.
- .4      Prune each species when in full leaf.
- .5      Retain natural form and shape of plant species.
- .6      Do not:
  - .1      Flush cut branches.
  - .2      Crush or tear bark.
  - .3      Cut behind branch bark ridge.
  - .4      Damage branch collars.
  - .5      Damage branches to remain.

**3.3                PRUNING**

- .1      Remove dead, dying, diseased and weak growth from plant material to provide crown cleaning, crown thinning, crown raising, crown reduction, vista pruning, crown restoration, or as directed by NCC Representative in order to promote healthy growth.
- .2      Remove live branches that:
  - .1      Interfere with healthy development and structural strength including branches crossed or rubbing more important branches.
  - .2      Are of weak structure including narrow crotches.
  - .3      Obstruct development of more important branches.
  - .4      Are broken.
- .3      Remove live branches to re-establish natural species form including:
  - .1      One or more developing leaders.
  - .2      Multiple growth due to previous topping.



- .3 Branches extending outward from natural form.
- .4 Undesirable sucker growth.
- .4 Remove loose branches, twigs and other debris lodged in tree.
- .5 Remove vines.
- .6 For branches under 50 mm in diameter:
  - .1 Locate branch bark ridge and make cuts smooth and flush with outer edge of branch collar to ensure retention of branch collar. Cut target area to bottom of branch collar at angle equal to that formed by line opposite to branch bark ridge.
  - .2 Make cuts on dead branches smooth and flush with swollen callus collar. Do not injure or remove callus collar.
  - .3 Do not cut lead branches unless directed by NCC Representative.
- .7 For branches greater than 50 mm in diameter:
  - .1 Make first cut on lower side of branch 300 mm from trunk, one third diameter of branch.
  - .2 Make second cut on upper side of branch 500 mm from trunk until branch falls off.
  - .3 Make final cut adjacent to and outside branch collar.
- .8 Ensure that trunk bark and branch collar are not damaged or torn during limb removal.
  - .1 Repair areas which are damaged, or remove damaged area back to next branch collar.
- .9 Remove additional growth designated by NCC Representative.

### **3.4 ROOT GIRDLING**

- .1 For girdling roots one-quarter size of trunk diameter or larger, V-cut girdling root one-half way through at point where root is crossing.
- .2 Remove exposed portion of girdling root as directed by NCC Representative after cleanly cutting root flush with grade on each side of parent root. Do not injure bark or parent root.

### **3.5 CARE OF WOUNDS**

- .1 Shape bark around wound to oblong configuration ensuring minimal increase in wound size. Retain peninsulas of existing live bark.

### **3.6 CLEAN-UP**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Collect and dispose of compost/recycle whenever applicable, prune material daily and remove from site.

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

**END OF SECTION**

# TECHNICAL NOTE (GEOTECHNICAL REPORT)

038-B-0010310-1-GE-0001-00

PREPARED BY: LVM

DATED: SEPTEMBER 29, 2014

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September 29<sup>th</sup>, 2014

**Ms. Sara Mashaie**

Dessau

900, boulevard de la Carrière, Suite 100

Gatineau (Québec) J8Y 6T5

**Subject:** Technical Note

**Dunlop Road and Pink Lake – Addition of Asphalt Apron and Ditching Works on the  
Gatineau Parkway (NCC)**

Our ref.: 033-B-0010310-1-GE-0001-00

Ms. Mashaie,

Following our site visit of May 30, 2014, at the mentioned site above, please find herein our recommendations regarding the pavement structure for the projected asphalt apron and ditching works.

We understand that the project consists in the construction of two (2) new asphalt aprons on Dunlop road and Pink Lake. Some ditching work will also be done to protect them against erosion.

LVM has not performed any fieldwork for this mandate, and all the information used for the recommendation of this technical note are based on information received by the NCC and Dessau as well observations done during the site visit of May 30, 2014.

## **1 SITE PREPARATION**

The topsoil, the fill and eventual soft and/or improper material shall be removed and disposed outside of the work areas.

The temporary excavation slopes must be uniform. In the presence of any sign of instability, the slopes should be immediately reduced.

The exposed surfaces and/or the bottom of excavations shall be horizontal, uniform, stable and compacted properly. They shall be inspected and approved by a geotechnical engineer to detect and correct improper conditions. Remoulded, unstable and soft materials shall be replaced with granular class "A" or "B" material placed as indicated in the following paragraph.

Excavated materials exempt of organic matters, clayey material and/or improper materials and particles larger than 100 mm in size shall be stockpiled on the site for further reuse as class "B" material during backfilling operations if their water content allows easy compaction at the time of placement.

Throughout the entire duration of the work, surface water run-off must be evacuated using a method adapted to the project and to the stratigraphy, in a manner that the bottom of the excavation remains dry and enables proper construction. Groundwater as well as water coming from precipitations shall be drained correctly.

## 2 PAVEMENT STRUCTURE

A pavement design life of 20-year was used for this design. Also, although this asphalt apron will be mainly used by cyclists and pedestrians, a 10 Annual Average Daily Traffic (AADT) without heavy traffic was assumed for the pavement design. The pavement design was based on the American Association of State Highway and Transportation Officials (AASHTO, 1993 edition) design method.

The following structure is proposed for the asphalt aprons:

Table 1 : Proposed Structure

Structure Item <sup>2</sup>	Type of Material	Thickness (mm)	Compaction (%)
Asphalt	Asphalt Mix Type EC-10 PG 58-34	2 x 30	93-98 % (LC 26-040/045)
Granular Base	MG 20 crushed stone	300	Compacted to at least 98 % modified Proctor
Total :		360	
<b>Notices:</b> 1: A hydrocarbon binder should be applied between each bitumen course to a residual rate of 0.20 l/m². 2: The native soil assumed for this design is a granular material of type SM, with less than 30% of fine particle passing the 0.08 mm. If a different native soil is encountered during the construction, this design should be reviewed.			

All materials shall comply with the requirements of the "Ministère des Transports du Québec".

The base materials shall be compacted to at least 98 % modified Proctor. The asphalt shall be compaction to 93% to 98% of maximum density (LC 26-040/045).

## **2.1 PROTECTION OF THE DITCHES**

The ditches could be protected by use of riprap or with hydraulic seeding. The type of riprap recommended for these ditches will be a 100-200 mm with a d50 of 150 mm and shall comply with the requirements of the "Ministère des Transports du Québec". The recommended thickness of riprap protection is 300 mm (if the maximum water flow is 2,3 m/s). Also, this riprap must have sharp edges to increase friction and relative density must be greater than 2.6.

If hydraulic seeding is used, it will be important that a proper channel is installed along the edge of the asphalt apron, to diverge the water coming from the road away from the ditch slope.

## **2.2 CONSTRUCTION METHODS FOR RIPRAP**

- ▶ The surface must be clean from any debris ;
- ▶ Slope must be equal or lower than 2 H : 1 V;
- ▶ Geotextile type V (Tome VII- 13101) must cover the surface before the riprap is placed ;
- ▶ Geotextile type V must be carefully installed and approved by an engineer. The height of material falling on it must be lower than 0.50 m ;
- ▶ To avoid disturbances of the ditch surface, material must be placed (drop directly material must be avoid) from the bottom of the slope to the top ;

## **3 GENERAL RECOMMENDATIONS**

### **3.1 SENSITIVITY OF SOILS TO REMOULDING**

The deposit underlying the site could be sensitive to remoulding caused by weather (rain, frost and snow melt) or by the movement of workers and machinery during the construction activities. An excessive remoulding of the exposed surfaces can cause loss of soil strength and subsequent settlements exceeding the expected range.

### **3.2 WINTER CONDITIONS**

Frost penetration can cause problems to the structure. In order to minimize these effects, the following recommendations are presented:

- ▶ During winter construction, exposed surfaces to support foundations or paved areas must be protected against frost penetration by means of isolating materials such as straw, polystyrene, heating, etc;
- ▶ In order to minimize frost related differential heaving between the granular backfill which is relatively non-frost susceptible and the generally more frost-susceptible natural soil, it is

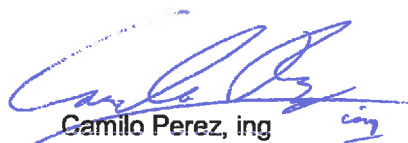
**Subject :** Dunlop Road and Pink Lake – Addition of Asphalt Apron and Ditching  
Works on the Gatineau Parkway (NCC)

**2014-09-29**

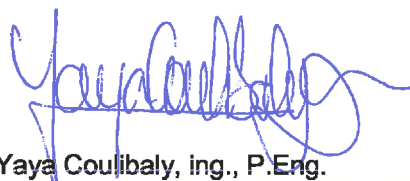
recommended that the trenches be excavated with appropriate transition slopes within the freezing depth.

We trust the enclosed to your satisfaction. If, however, additional information should be required, please communicate with the undersigned.

Best regards,

A handwritten signature in blue ink, appearing to read 'Camilo Perez', with a stylized flourish at the end.

Camilo Perez, ing  
Project Manager

A handwritten signature in blue ink, appearing to read 'Yaya Coulibaly', with a stylized flourish at the end.

Yaya Coulibaly, ing., P.Eng.  
Discipline Manager