

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 32 17 23 Pavement Markings.

1.02 MEASUREMENT AND PAYMENT

- .1 No measurement for payment will be made under this Section.

1.03 REFERENCES

- .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).

1.04 ACTION AND INFORMATIONAL SUBMITTALS

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

1.05 DELIVERY, STORAGE AND HANDLING

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

2 PRODUCTS

2.01 MATERIALS

- .1 Abrasives and solvents used for removal of paint, oil, grease, rubber deposits: proprietary products specially designed for pavement cleaning, subject to approval by Departmental Representative.

3 EXECUTION

3.01 REMOVING PAVEMENT MARKINGS

- .1 Remove rubber tire deposits and paint markings, in areas as directed by Departmental Representative, by water or shot blasting or other method approved in writing by Departmental Representative.
- .2 Exercise care to avoid dislodging of coarse aggregate particles, excessive removal of fines, damage to bituminous binder or damage

to joint and crack sealers.

3.02 PAVEMENT SURFACE CLEANING

- .1 Remove sealing compound which has protruded excessively, where directed by Departmental Representative.
 - .1 Dispose of removed material as directed by Departmental Representative.
- .2 Remove dust, contaminants, loose and foreign materials, oil and grease, in areas as directed by and by method approved in writing by Departmental Representative.
- .3 Use rotary power brooms, vacuum sweepers supplemented by hand brooming.

3.03 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 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

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 32 12 16 - Hot Mix Asphalt.
- .2 Section 02 41 13.14 - Selective Demolition

1.02 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- .1 Contractor will supply and apply:
 - .1 Asphalt tack coat material delivered to job site by tank truck in 205 L drums.

1.03 MEASUREMENT PROCEDURES

- .1 Asphalt tack coat will be measured in square metres at 15 degrees C of undiluted emulsified asphalt actually applied.
 - .1 Volume to be corrected to the volume at 15 degrees C to ASTM D 1250 for cutback asphalt, and ASTM D 633 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.

1.04 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 D 140/D 140M-09, Standard Practice for Sampling Bituminous Materials.
 - .2 ASTM D 633-11, Standard Volume Correction Table for Road Tar.
 - .3 ASTM D 1250-08, Standard Guide for Use of the Petroleum Measurement Tables.
- .3 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations (including Addendum 2007).
 - .2 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations 2009.
 - .3 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy

and Environmental Design): Green Building Rating System for Commercial Interiors.

- .4 LEED Canada-EB: O&M-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.05 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 or bottles made with plastic or plastic lined cans to Departmental Representative, at least 2 weeks prior to beginning Work.
 - .2 Sample asphalt tack coat material to: ASTM D 140.
 - .3 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work to ASTM D 140.

1.06 QUALITY ASSURANCE

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

1.07 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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 off ground 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 D 140.
- .5 Provide, maintain and restore asphalt storage area.

1.08 WASTE MANAGEMENT AND DISPOSAL

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

2 PRODUCTS

2.01 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.

2.02 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/m² with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m².
 - .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.

3 EXECUTION

3.01 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 Departmental Representative.
 - .2 Inform Departmental 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 Departmental Representative.

3.02 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 Departmental Representative.
- .3 Apply asphalt tack coat evenly to pavement surface at rate as directed by Consultant but not to exceed 0.7 L/m².
- .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 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 Departmental 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 Departmental Representative.
- .11 Permit asphalt tack coat to set break before placing asphalt pavement.
- .12 Submit summary report within 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 Departmental 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 Departmental Representative.
 - .2 Ensure tack coating performed using hand held devices is consistent in appearance with adjacent areas of machine applied material.

3.03 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 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 SECTION INCLUDES

- .1 Materials and installation for asphalt concrete paving for roads.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 02 41 23 - Selective Site Demolition
- .3 Section 31 05 17 - Aggregate Materials
- .4 Section 32 12 13.16 - Asphalt Tack Coats

1.3 MEASUREMENT PROCEDURES

- .1 Measure asphalt concrete paving in tonnes of asphalt concrete of each type indicated, actually incorporated into Work.
- .2 Asphalt padding required to create roadway crowns or similar will not be paid in tonnes acceptably incorporated into the work.
- .3 Asphalt required to reinstate existing asphalt driveways shall match the existing thickness and (40mm min and 70mm max) and will be measured for payment in tonnes of each type incorporated into the Work.
- .4 Asphalt concrete pavement for restoration of existing areas disturbed by construction and not shown for replacement under this Contract will not be included in this item and shall be considered incidental to the work.
- .5 Include all costs for transportation, liquid asphalt, admixtures, and incidentals.
- .6 Cutting of transverse joints will not be measured separately for payment and will be considered incidental to the work.
- .7 Payment adjustment will be made escalation in the price of liquid as per NBDOT Item 21.

1.4 REFERENCES

- .1 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 AASHTO M320-02, Standard Specification for Performance Graded Asphalt Binder.
 - .2 AASHTO R29-02, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.
 - .3 AASHTO T245-97(2001), Resistance to Plastic Flow of Bituminous Mixtures using Marshall Apparatus.
- .2 Asphalt Institute (AI)
 - .1 AI MS2-1994 Sixth Edition, Mix Design Methods for Asphalt Concrete and other Hot-Mix Types.

- .3 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C 88-99a, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate.
 - .2 ASTM C 117-95, Standard Test Method for Material Finer than 0.075mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C 123-98, Standard Test Method for Lightweight Particles in Aggregate.
 - .4 ASTM C 127-01, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
 - .5 ASTM C 128-01, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
 - .6 ASTM C 131-01, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .7 ASTM C 136-01, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .8 ASTM D 995-95b (2002), Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
 - .9 ASTM D 2419-02, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 - .10 ASTM D 3203-94(2000), Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
 - .11 ASTM D 4791-99, Standard Test Method for Flat and Elongated Particles or Flat And Elongated Particles in Coarse Aggregate.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.
 - .2 CAN/CGSB-16.3-M90, Asphalt Cements for Road Purposes.
- .5 New Brunswick Department of Transportation (NBDOT) Standard Specifications, January 2011 Edition including current revisions, Item 260, Asphalt Concrete and as noted.

1.5 PRODUCT DATA

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures
- .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 at least 4 weeks prior to Beginning of Work.
- .3 Submit manufacturer's test data and certification that asphalt cement meets Requirements of this Section.
- .4 Submit manufacturer's test data and certification that hydrated lime meets Requirements of this section.
- .5 Submit asphalt concrete mix design and trial mix test results to Departmental Representative for review at least 4 weeks prior to beginning of Work.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Inform Departmental Representative of proposed source of aggregates and provide Access for sampling at least 4 weeks prior to beginning of Work.
- .3 Submit samples of following materials proposed for use at least 4 weeks prior To beginning of Work.
 - .1 One 5 L container of asphalt cement.
- .4 Provide one asphalt cement sample per 3000 tonnes of asphalt mix production Taken in accordance with ASTM D140.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and stockpile aggregates in accordance with Section 31 05 17- Aggregate Materials. Stockpile minimum 50% of total amount of aggregate required Before beginning asphalt mixing operation.
- .2 When necessary to blend aggregates from one or more sources to produce Required gradation, do not blend in stockpiles.
- .3 Stockpile fine aggregate separately from coarse aggregate, although separate Stockpiles for more than two mix components are permitted.
- .4 Provide approved storage, heating tanks and pumping facilities for asphalt cement.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate Recycling facilities.
- .3 Collect and Separate for disposal paper plastic polystyrene corrugated cardboard Packaging material in appropriate on-site bins for recycling in accordance With Waste Management Plan.
- .4 Divert unused aggregate materials from landfill to facility for reuse as Approved by Departmental Representative.
- .5 Divert unused asphalt from landfill to facility capable of recycling materials.
- .6 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Asphalt cement: to NBDOT ITEM 260 For Asphalt Type "D" (use PG 58-28) and Asphalt Type "B".
- .2 Aggregates: in accordance with Section 31 05 17 - Aggregate Materials and Following requirements:
 - .1 Crushed Stone or Gravel.
 - .2 Gradations: within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2.
 - .3 Gradations:
 - .1 Coarse Aggregate to NBDOT 260.2.1.2 and Table 260-1.
 - .2 Fine Aggregate: to NBDOT 260.2.1.3 and Table 260-2.
 - .3 Blending Sand: to NBDOT 260.2.1.5 and Table 260-3.
 - .4 Coarse Aggregate: aggregate retained on 4.75mm sieve and fine aggregate Is aggregate passing 4.75mm sieve when tested to ASTM C 136.
 - .5 When dryer drum plant or plant without hot screening is used, process Fine aggregate through 4.75mm sieve and stockpile separately from Coarse aggregate.

2.2 EQUIPMENT

- .1 In general, provide equipment acceptable to the. Departmental Representative and in conformance with NBDOT 260.4.2 and as specified in this section.
- .2 Mixing plant and components: to NBDOT 240.4.2.
- .3 Placing Equipment: mechanical grade controlled Equipment capable of spreading mix within specified Tolerances, true to line, grade, and crown as indicated. Conform to NBDOT 240.2.12.
- .4 Compaction Equipment: sufficient number of type And weight to obtain specified density of compacted mix. Conform to NBDOT 260.4.2.13.
- .5 Vibratory Rollers:
 - .1 Minimum drum diameter: 1200mm.
 - .2 Maximum amplitude of vibration (machine Setting): 0.5mm for lifts less than 40mm thick.
- .6 Haul Trucks: sufficient number and of adequate size, Speed and condition to ensure orderly and continuous Operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely Cover and protect asphalt mix when truck is Fully loaded.
 - .3 In cool weather or for long hauls, insulate entire Contact area of each truck box.
 - .4 Use only trucks which can be weighed in single Operation on scales supplied.
- .7 Hand Tools:
 - .1 Lutes or rakes with covered teeth for spreading And finishing operations.

- .2 Tamping irons having mass not less than 12kg
And bearing area not exceeding 310cm² for
Compacting along structures inaccessible to
Roller. Mechanical compaction equipment, when
Approved by Departmental Representative, may be
Used instead of tamping irons.
- .3 Straight edges, 4.5m in length, to test finished
Surface.
- .8 Plant testing facility: provide laboratory space
At plant site for exclusive use of Departmental
Representative, for performing tests, keeping
Records and making reports.

2.3 MIX DESIGN

- .1 Mix design to be approved by Contractor and certified
By a Professional Departmental Engineer certified in the Province of New Brunswick.
Job mix formula to be approved by Departmental Representative.
- .2 Mix design to be developed by testing laboratory approved by Departmental
Representative.
- .3 Design of mix: by Superpave Method to NBDOT 260.3.2 and Requirements below:
 - .1 Mix physical requirements to NBDOT 260.2.3 and
Table 260-7.
 - .2 Do not change job-mix without prior approval
Of Departmental Representative. When change in
Material source proposed, new job-mix formula
To be approved by Departmental Representative.

PART 3 - EXECUTION

3.1 PLANT AND MIXING REQUIREMENTS

- .1 Batch and continuous mixing plants:
 - .1 Equipment to ASTM D995 and NBDOT 260.4.2.
 - .2 Production to NBDOT 260.4.3.
 - .3 Feed aggregates from individual stockpiles through separate bins to cold
elevator feeders. Do not load frozen materials into bins.
 - .4 Feed cold aggregates to plant in proportions to ensure continuous operations.
 - .5 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are
achieved.
 - .6 Before mixing, dry aggregates to moisture content not greater than 0.5% by mass
or to lesser moisture content if required to meet mix design requirements.
 - .7 Immediately after drying, screen aggregates into hot storage bins in sizes to
permit recombining into gradation meeting job-mix requirements.
 - .8 Store hot screened aggregates in manner to minimize segregation and temperature
loss.
 - .9 Heat asphalt cement and aggregates to mixing Temperature directed by
Departmental Representative. Do not heat asphalt cement above 160 degrees
Celsius.
 - .10 Make available current asphalt cement viscosity data at plant. With
information relative to viscosity of asphalt being used, Departmental

- Representative to review temperature of completed Mix at plant and at paver after considering Hauling and placing conditions.
- .11 Maintain temperature of materials within 5 Degrees Celsius of specified mix temperature during mixing.
 - .12 Mixing Time:
 - .1 In batch plants, batch dry and wet mixing Times as directed by Departmental Representative. Continue wet mixing as long as necessary to obtain thoroughly blended mix but not less than 35s or more than 75s.
 - .2 In continuous mixing plants, mixing time As directed by Departmental Representative but not less than 35s.
 - .3 Do not alter mixing time unless directed By Departmental Representative.
 - .2 Dryer Drum Mixing Plant:
 - .1 Equipment to ASTM D 995 and NBDOT 260.4.2.
 - .2 Production to NBDOT 240.4.3.
 - .3 Load aggregates from individual stockpiles to Separate cold feed bins. Do not load frozen materials into bins.
 - .4 Feed aggregates to burner end of dryer drum by Means of multi-bin cold feed unit and blend to Meet job-mix requirements by adjustments of Variable speed feed belts and gates on each Bin.
 - .5 Calibrate bin gate openings and conveyor speeds To ensure mix proportions are achieved. Calibrate Weigh bridge on charging conveyor by weighing Amount of aggregate passing over weigh bridge in set amount of time. Difference between this value and amount shown by plant computer system to differ by not more than $\pm 2\%$.
 - .6 Make provision for conveniently sampling full flow of materials from cold feed.
 - .7 Provide screens or other suitable devices to Reject oversize particles or lumps of aggregates from cold feed prior to entering drum.
 - .8 Provide system interlock stop on feed components If either asphalt or aggregate from bin stops flowing.
 - .9 Accomplish heating and mixing of asphalt mix in approved parallel flow dryer-mix in which aggregate enters drum at burner end and travels parallel to flame and exhaust gas stream. Control heating to prevent fracture of aggregate or excessive oxidation of asphalt. Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt mixture at discharge, with printing recorder that can be monitored by plant operator. Submit printed record of mix temperatures at end of each day.
 - .10 Mixing period and temperature to produce uniform Mixture in which particles are thoroughly coated, and Moisture content of material as it leaves mixer to be less than 0.15%.
 - .3 Temporary Storage of hot mix:
 - .1 Provide heated mix storage of sufficient capacity to permit continuous operation and designed to prevent Segregation and localized overheating.
 - .2 Do not store asphalt mix in storage bins in excess of 3 hours. Overnight storage is not permitted.
 - .4 While producing asphalt mix for this Project, do not Produce mix for other users unless separate storage and Pumping facilities are provided for materials supplied To this project.
 - .5 Mixing Tolerances:
 - .1 Permissible variation in physical requirements From job mix (percent of total mass) shall conform To NBDOT 260.4.3.2.
 - .2 Permissible variation of mix temperature at Discharge from plant: 5°C .

- .1 Minimum mixing temperature: 115°C.
- .2 Maximum mixing temperature: 165°C.

3.2 PREPARATION

- .1 When paving over existing asphalt surface, clean Pavement surface to satisfaction of Departmental Representative. When leveling course is not required, Patch and correct depressions and other irregularities To approval of Departmental Representative before Beginning paving operations.
- .2 Prior to laying mix, clean surfaces of loose and foreign material.
- .3 Fine grade granular surfaces to Departmental Representative's approval.
- .4 Contact faces of structures shall receive an application of tack coat before placing asphalt.

3.3 TRANSPORTATION OF MIX

- .1 Transport mix to job site in vehicles cleaned of Foreign material. Conform to NBDOT 260.4.3.6.
- .2 Paint or spray truck beds with limewater, soap or detergent solution, or non petroleum based commercial product, at least daily or as required. Elevate truck bed and thoroughly drain. No excess solution to remain in truck bed.
- .3 Schedule delivery of material for placing in daylight, unless Departmental Representative approves artificial light.
- .4 Deposit mix from surge or storage silo to trucks in multiple drops to reduce segregation. Do not dribble mix into trucks.
- .5 Deliver material to paver at uniform rate and in an amount within capacity of paving and compacting equipment.
- .6 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at temperature within range as directed by Departmental Representative, but not less than 135°C.

3.4 PLACING

- .1 Obtain Departmental Representative's approval of existing surface prior to placing asphalt.
- .2 Place asphalt concrete to thickness, grades and lines as indicated and directed by Departmental Representative. Conform to NBDOT 260.4.3.8.
- .3 Placing Conditions:
 - .1 Place asphalt mixtures only when surface temperature of material to be overlaid is above 5°C.
 - .2 When temperature of surface on which material is to be placed, falls below 10 °C, provide extra rollers as necessary to obtain required compaction before cooling.
 - .3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- .4 Place asphalt concrete in compacted lifts of thickness as follows:
 - .1 In layers of maximum 50mm each.
- .5 Where possible do tapering and leveling where required in lower lifts. Overlap joints by not less than 300mm.

- .6 Place individual strips no longer than 500m.
- .7 Spread and strike off mixture with self propelled mechanical finisher.
 - .1 Construct longitudinal joints and edges true to line markings. Contractor to establish lines for paver to follow parallel to centerline of proposed pavement. Position and operate paver to follow established line closely.
 - .2 When using pavers in echelon, have first paver follow marks or lines, and second paver follow edge of material placed by first paver. Work pavers as close together as possible and in no case permit them to be more than 30 m apart.
 - .3 Maintain constant head of mix in auger chamber of paver during placing.
 - .4 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.
 - .5 Correct irregularities in alignment left by paver by trimming directly behind machine.
 - .6 Correct irregularities in surface of pavement course directly behind paver. Remove shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.
- .7 Do not throw surplus material on freshly screened surfaces.
- .8 When hand spreading is used:
 - .1 Use approved wood or steel forms, rigidly supported to assure correct grade and cross section. Use measuring blocks and intermediate strips to aid in obtaining required cross-section.
 - .2 Distribute material uniformly. Do not broadcast material.
 - .3 During spreading operation, thoroughly loosen and uniformly distribute material by lutes or covered rakes. Reject material that has formed into lumps and does not break down readily.
 - .4 After placing and before rolling, check surface with templates and straightedges and correct irregularities.
 - .5 Provide heating equipment to keep hand tools free from asphalt. Control temperature to avoid burning material. Do not use tools at higher temperature than temperature of mix being placed.

3.5 COMPACTING

- .1 Do not change rolling pattern unless mix changes or lift thickness changes. Change rolling pattern only as directed by Departmental Representative.
- .2 Roll asphalt continuously to density not less than 92.5% of theoretical maximum relative density as determined in accordance with NBDOT 260.4.5.
- .3 General:
 - .1 Provide at least two rollers and as many additional rollers as necessary to achieve specified pavement density. When more than two rollers are required, one roller must be pneumatic tired type.
 - .2 Start rolling operations as soon as placed mix can bear weight of roller without excess displacement of material or cracking of surface.
 - .3 Operate roller slowly initially to avoid displacement of material. Do not exceed 5km/h for breakdown and intermediate rolling for static steel-wheeled and pneumatic tire rollers. Do not exceed 9km/h for finish rolling.
 - .4 Use static compaction for leveling coarse less than 25mm thick.
 - .5 For lifts 50mm thick and greater, adjust speed and vibration frequently of vibratory rollers to produce minimum of 25 impacts per metre of travel. For

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- lifts less than 50mm thick, impact spacing not to exceed compacted lift thickness.
- .6 Overlap successive passes of roller by minimum of 200mm and vary pass lengths.
 - .7 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.
 - .8 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.
 - .9 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.
 - .10 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side. Ensure that all points across width of pavement receive essentially equal numbers of passes of compactors.
 - .11 When paving in echelon, leave unrolled 50 to 75mm of edge which second paver is following and roll when joint between lanes is rolled.
 - .12 Where rolling causes displacement of material, loosed affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.
- .4 Breakdown Rolling:
- .1 Begin breakdown rolling immediately following rolling of transverse and longitudinal joint and edges.
 - .2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.
 - .3 Operate breakdown roller with drive roll or wheel nearest finishing machine. When working on steep slopes or super-elevated sections use operation approved by Departmental Representative.
 - .4 Use only experienced roller operators.
- .5 Intermediate Rolling:
- .1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.
 - .2 Rolling to be continuous after initial rolling until mix placed has been thoroughly compacted.
- .6 Finish Rolling:
- .1 Accomplish finish rolling with two-axle or three axle tandem steel wheeled rollers while material is still warm enough for removal of roller marks. If necessary to obtain desired surface finish, use pneumatic-tired rollers as directed by Departmental Representative.
 - .2 Conduct rolling operations in close sequence.

3.6 JOINTS

- .1 General:
- .1 Remove surplus material from surface of previously laid strip. Do Not deposit on surface of freshly laid strip.
 - .2 Construct joints between asphalt between asphalt concrete pavement And Portland Cement Concrete Pavement as indicated.
 - .3 Paint contact surfaces of existing structures such as manholes, curbs

Or gutters with bituminous material prior to placing adjacent pavement.

- .2 Transverse Joints:
 - .1 Offset transverse joint in succeeding lifts by at least 2000mm.
 - .2 Cut back to full depth vertical face and tack face with thin coat of hot asphalt prior to continuing paving.
 - .3 Compact transverse joints to provide smooth riding surface. Use methods to prevent rounding of compacted surface at joints.
- .3 Longitudinal Joints:
 - .1 Offset longitudinal joints in succeeding lifts by at least 150mm.
 - .2 Overlap previously laid strip with spreader by 25 to 50mm.
 - .3 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with lute or rake.
 - .4 Roll longitudinal joints directly behind paving operation.
 - .5 When rolling with static or vibratory rollers, have most of drum width Ride on newly placed lane with remaining 150mm extending onto Previously placed and compacted lane.
- .4 Construct feather joints so that thinner portion of joints contains fine Graded material obtained by changed mix design or by racking out coarse aggregate in mix. Place and compact joint so that joint is smooth and without visible breaks in grade.

3.7 FINISH TOLERANCES

- .1 Finished asphalt surface to conform with the requirements of NBDOT Item 260.4.5.2 and Bump/Dip Profile Requirements of NBDOT 260.4.5.2.3.
- .2 Finished asphalt surface shall have a uniform texture and be free of visible Signs of poor workmanship.

3.8 DEFECTIVE WORK

- .1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If Irregularities or defects remain after final compaction, remove Surface course promptly and lay new material to form true and even surface And compact immediately to specified density.
- .2 Determine surface defects in accordance with NBDOT Item 260.4.5.3.
- .3 Repair areas showing checking, rippling, segregation, insufficient binder Roller marks, cracking, tearing, improper joints, tire marks, improper patches, improper repair of sampling locations, contaminants, flushed areas, or other deficiencies to the satisfaction of the Departmental Representative.
- .4 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.9 HOURS OF WORK

- .1 Further to Section 01 11 00, unless specifically authorized by the Departmental Representative, all spreading of asphalt mix shall stop at least ½ hour before sunset and the paver shall be off the road by sunset.

3.10 POLLUTION CONTROL/SITE CLEAN-UP

- .1 Control emissions from equipment and plant to Provincial emission requirements.
- .2 Copies of the Contractor's current Provincial Asphalt Plant Approval Permit must be provided to PWGSC and the Environmental Protection Officer.

1 GENERAL

1.02 PRICE AND PAYMENT PROCEDURES

- .1 No payment will be made under this section, but will be considered incidental under this contract.

1.03 REFERENCES

- .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
- .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.

1.04 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 authorities having jurisdiction.

1.05 DELIVERY, STORAGE AND HANDLING

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

2 PRODUCTS

2.01 MATERIALS

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

3 EXECUTION

3.01 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.

3.02 APPLICATION

- .1 Apply water with distributors equipped with means of shut-off and with spray system to ensure uniform application.

3.03 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 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 Place materials defined as hazardous or toxic in designated containers.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures

1.02 MEASUREMENT FOR PAYMENT

- .1 Pavement marking including reflective glass beads, lines and symbols will be paid by lump sum.

1.03 REFERENCES

- .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
 - .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
- .2 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.
- .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
- .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.

1.04 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 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

- .3 Samples:
 - .1 Submit to Departmental Representative following material sample quantities at least 4 weeks prior to commencing work.
 - .1 Two 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.

1.05 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground 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: in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCTS

2.01 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 to GS-11.
 - .3 Colour: to MPI listed, yellow, white.
- .2 Thinner: to MPI listed manufacturer.
- .3 Glass reflective beads: type suitable for application to wet paint surface for light reflectance.

3 EXECUTION

3.01 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 Departmental 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.

3.02 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.
- .2 Distributor: capable of applying reflective glass beads as overlay on freshly applied paint.

3.03 TRAFFIC CONTROL

- .1 As per Section 01 35 00.06 - Special Procedures for Traffic Control.

3.04 APPLICATION

- .1 Pavement markings: laid out by the contractor.
- .2 Unless otherwise approved by Departmental Representative, apply paint only when air temperature is above 10 degrees C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours.
- .3 Apply traffic paint evenly at rate of 3 m² /L.
- .4 Do not thin paint unless approved by Departmental 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.
- .8 Apply glass beads at rate of 0.5kg/1 of painted area immediately after application of paint.

3.05 TOLERANCE

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

3.06 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: 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.

3.07 PROTECTION OF COMPLETED WORK

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

END OF SECTION

1 GENERAL

1.01 MEASUREMENT PROCEDURES

- .1 Measure supplying, placing and spreading topsoil will be included in measurement for payment under section 32 92 16.13.

1.02 PAYMENT

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

1.03 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 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
 - .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
- .4 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.

1.04 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.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 LEED Submittals:
 - .1 Submit erosion and sedimentation control plan for Credit SSp1 in accordance with LEED Canada-NC.

- .3 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.

1.06 WASTE MANAGEMENT AND DISPOSAL

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

2 PRODUCTS

2.01 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.

2.02 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, B 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.

2.03 SOURCE QUALITY CONTROL

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

3 EXECUTION

3.01 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, 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.

3.03 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Departmental Representative do not commence work until instructed by Departmental 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.

3.04 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

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

3.06 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 Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.07 ACCEPTANCE

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

3.08 SURPLUS MATERIAL

- .1 Dispose of materials except topsoil not required where directed by [Departmental Representative.

3.09 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

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 32 91 19.13 - Topsoil Placement and Grading.

1.02 MEASUREMENT AND PAYMENT

- .1 Measure and Payment for the supply and installation topsoil and hydraulic seeding will in lump sum payment to cover surface areas requiring hydroseed as indicated on drawings. Included will be:
 - .1 Grass mixture including fertilizer.
 - .2 Areas of blending into existing turf grass will not be measured for payment.

1.03 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 Agricultural Department.

1.04 REFERENCES

- .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
 - .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.

1.05 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.
- .3 Submit in writing five 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.

1.06 QUALITY ASSURANCE

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

1.07 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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 off ground, 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 in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.08 WARRANTY

- .1 For seeding, 12 months warranty period is extended to 24 months 1 full growing season.
- .2 Contractor hereby warrants that seeding will remain free of defects in accordance with General Conditions CCDC GC 12.3, but for 24 months 1 full growing season.
- .3 End-of-warranty inspection will be conducted by Departmental Representative.

2 PRODUCTS

2.01 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".
- .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%.
 - .2 Type II mulch:
 - .1 Made from newsprint, raw cotton fibre and straw, processed to produce fibre lengths of 15 mm minimum and 25 mm maximum. Greater proportions of ingredients to be straw.
- .3 Tackifier: water dilutable, liquid dispersion.
- .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.

3 EXECUTION

3.01 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 Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.02 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 Departmental Representative.

3.03 PREPARATION OF SURFACES

- .1 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.
- .2 Fine grade areas to be seeded free of humps and hollows.
 - .1 Ensure areas are free of deleterious and refuse materials.
- .3 Cultivated areas identified as requiring cultivation to depth of 25 mm.
- .4 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .5 Obtain Departmental Representative's approval of grade [and topsoil depth] before starting to seed.

3.04 PREPARATION OF SLURRY

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Departmental 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.

3.05 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.
 - .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .3 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.
- .4 Blend application 300 mm into adjacent grass areas to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.

3.06 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 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.

3.07 PROTECTION

- .1 Protect seeded areas from trespass until plants are established.
- .2 Remove protection devices as directed by Departmental Representative.

3.08 ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Seeded areas are free of rutted, eroded, bare or dead spots.
 - .2 Areas have been mown at least twice.
 - .3 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.

END OF SECTION

