DIVISION 32 EXTERIOR IMPROVEMENTS

Section 32 00 00 Exterior Improvements - General

1 Refer also to DC350, Part 1, Section 1, Item 4 Site Planning for related site improvements requirements for design and construction.

Section 32 10 00 Bases, Ballasts, and Paving

1 Asphalt Paving

1.1 Quality Assurance Requirements for Drawings and Specifications:

1.1.1 The materials, mixes, compacting and laying of pavement shall conform to the specifications set out by the DTIR Standard Specification Highway Construction & Maintenance, Division 4 - Pavements.

1.1.2 When requested, obtain and submit certificates from the asphalt supplier attesting that materials comply with specifications.

1.1.3 Submit affidavits that fill materials placed under Work of this Section have been compacted to specified density and approved by the Materials Testing or Geotechnical consultant.

1.1.4 Provide asphalt concrete inspection reports based on CSA standards and the Nova Scotia DTIR Standard Specification Highway Construction and Maintenance, latest edition.

1.1.5 Remove and replace all asphalt not conforming to the above requirement, at no cost to the Province.

1.2 Where Asphalt Paving is incorporated into the design:

1.2.1 Apply asphalt paving to all the parking areas, in addition to the access lanes and loading areas.

1.2.2 The surface of asphalt pavement shall be graded to meet the following:

1.2.2.1 In no case shall the cross slope or finish profile of the finished pavement be less than 2%. This slope is to discourage ponding or occurrence of surface icing.

1.2.2.2 The slope of driveways shall not exceed 6 % slope.

1.2.2.3 The slope of parking areas shall not exceed 5 % slope.

1.2.2.4 Barrier-free parking areas shall have a slope of 2%.

1.2.3 The thickness of the asphalt pavement shall be as recommended in the Geotechnical Report or if not specified shall be 63mm minimum in areas used by light traffic (vehicles of 1 ton or less) and 75mm minimum for areas used by vehicles heavier than 1 ton.

1.2.4 Surface Drainage

1.2.4.1 Slope surface of pavement to stormwater management devices unless a municipal storm drainage systems exist.

1.2.4.2 Where such municipal storm drainage system exists, receive approval from the owner of the storm sewer to connect to the system. Connect to that system using methods approved by the sewer system owner.

1.2.4.3 Storm water management of project sites is to comply with the more stringent of NSE guidelines or local Municipal storm water balancing requirements.

1.2.5 Line Painting

1.2.5.1 Two coats of line marking paint 100 mm wide are required for parking stall lines.

1.2.5.2 Crosswalk markings and barrier free symbols for designated parking stalls to be included in specifications and on design drawings.

Section 32 16 00 Curbs, Gutters, Sidewalks and Driveways

1 All walkways and curbs shall be Portland cement concrete or asphaltic concrete as required by DTIR, granular walkways are not permitted.

2 All walkways shall be barrier free. Slopes shall not exceed specifications provided in CSA B651-18 Barrier Free Design or Nova Scotia Building Code section on Barrier Free Design, whichever is more stringent.

3 Provide depressed curbs:

3.1 at driveways to allow vehicles to pass.

3.2 as required to provide barrier-free access.

4 Where curbs are adjacent to a sidewalk, they shall be monolithic or thickened edge design.

5 Expansion joints shall be built at right angles to the sidewalk.

6 The expansion joints shall be made of 12mm asphalt felt placed at intervals not to exceed 15.0 metres and at critical locations adjacent to other features such as utility poles, fire hydrants, walls and drains to prevent the uncontrolled cracking of the paved surface.

7 The surfaces of concrete sidewalks and curbs shall have a broom finish perpendicular to the edges. The surface shall be non-slip.

8 Sidewalks shall be constructed to ensure a transverse slope not less than 2.0%, but not more than is acceptable by CSA B651-18.

9 After finishing, polishing and clean-up of edges, cure in accordance with CSA A23.1-14/A23.2-14.

Section 32 17 00 Paving Specialties (Pavement Markings)

1 Provide for painted pavement markings to requirements of the Department of Transportation and Infrastructure Renewal and the local municipal authority. Identify and control traffic movement on site; including, but not limited to, sidewalks, bus entrances, car parking and service entrances.

Section 32 30 00 Site Improvements

1. Fences and Gates:

   1.1 Fences and gates are to be sized to accommodate the proposed use and shall include person gates, vehicle gates, height requirements and material based on the intended use.

   1.2 Fences and gates require submission of shop drawings and approval from DTIR prior to ordering of materials.

2. Retaining Walls:

   2.1. Design drawings are to include grades, elevations, length and width of proposed retaining walls. Proprietary walls are to be designed by the manufacturer and stamped design drawings are to be submitted for review.

Section 32 90 00 Planting

1 Planting Plan is to be prepared by landscape architect and submitted with the project design and tender documentation.

1.1 Where a specific list of approved plants is provided in the Project Program or other Contract Document, the use of alternate plant material shall only be considered when the Contractor has demonstrated that they have exhausted all possible sources. These alternatives must be approved by the landscape Architect Consultant on behalf of DTIR.

2 Plant trees, shrubs and ground covers in accordance with the Canadian Standards for Nursery Stock latest Edition of the Canadian Nursery Landscape Association.

3 Assure plant materials for landscape development are suitable for the locality, using native plant species material where practical.

4 Do not plant under building overhangs or within 900 mm of foundations.

5 The Contractor shall warrant that plant material will remain free of defects for 1 full growing season, following date of Acceptance.

6 The Contractor shall perform the following maintenance operations during the warranty period.

6.1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion. For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.

6.2 Remove weeds monthly.

6.3 Replace or re-spread damaged, missing or disturbed mulch.

6.4 For non-mulched areas, cultivate and remove weeds monthly.

6.5 Apply fertilizer in early spring at manufacturer's suggested rate.

6.6 Avoid use of pesticides. When required to control insects, fungus or disease, apply pesticides only with approval from DTIR and in accordance with Federal, Provincial and Municipal regulations.

6.7 Remove dead or broken branches from plant material.

6.8 Keep trunk protection and guy wires in proper repair and adjustment.

6.9 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

6.10 Remove trunk protection, tree supports and level watering saucers at end of first growing season.

Section 32 92 00 Turf and Grasses

1 Maintenance is to include but not to be limited to: watering, fertilizing, mowing, aerating.

2 Maintain seeded and sodded area from date of Acceptance until end of Warranty Period.

3 Deficiencies are defined as results from all operations during construction and/or maintenance that become apparent at any time before end of Warranty Period and do not conform with the required level of quality.

3.1 All deficiencies shall be corrected in a timely fashion.

4 Reference Standards

4.1 Canadian Nursery Trades Association; Canadian Standards for Nursery Stock, latest edition.

5 Samples

5.1 Inform Consultant of proposed source of sod to be supplied and provide access for sampling. Do not commence work prior to approval of sod. Submit samples in accordance with the requirements of this and related specifications and as directed by DTIR.

5.2 Provide product data for: Seed, fertilizer and soil amendments.

6 Quality Control

6.1 Obtain approval of sod from the Consultant prior to sod laying.

6.2 Obtain approval of sod roller from Consultant.

6.3 Inspection and testing of sod will be carried out by the Consultant.

6.4 Obtain approval of sod installation from the Consultant prior to starting maintenance period.

6.5 Obtain approval of watering operation from the Consultant during Maintenance Period.

7 Scheduling:

7.1 Seed between May 15 -June 15, or between August 15 and September 15.

7.2 Seeding is not to be undertaken outside of the periods specified above. Contractor must be prepared to irrigate to maintain moisture until seeded mixture is well established.

7.3 Sod may be laid any time from April until December. Sod should not be laid during hot/dry weather without irrigation or some other means of assuring the roots are in contact with moist soil

8 Warranty

8.1 Provide warranty for general field construction for a one-year maintenance period starting at date of Acceptance.

8.2 All lawns shall remain free of defects for 1 full growing season, commencing at date of Acceptance.

8.2.1 A growing season shall be from May 1 - Oct. 31.

8.3 All seeded and sodded areas shall be warrantied and maintained for a period of one year following the date of Acceptance.

8.4 Warranty shall be extended if development and growth is not sufficient to ensure future survival as determined by DTIR.

9 Materials:

9.1 Grass Seed

9.1.1 Canada “Certified” seed, in accordance with Government of Canada “Seeds Act” and “Seeds Regulations”.

9.1.2 Use seed mix approved for specific end use of area to be seeded.

9.1.2.1 “Canada No. 1 Lawn Grass Mixture” for lawns and other areas to consist of Creeping Red Fescue, Kentucky or Canada Bluegrass and Annual Rye in an approved mixture, or at the recommendations of a Turf Specialist approved by DTIR.

9.1.2.2 Canada No. 1 Grass seed mixture for sports field to contain 3 compatible varieties of Kentucky Bluegrass and this mixture is to be approved by DTIR.

9.1.2.3 For reclamation sites, the Nova Scotia Highway Seed Mix may be used, or other reclamation mixture recommended by a Reclamation Specialist.

9.1.2.4 In packages individually labeled in accordance with “Seeds Regulations” and indicating name and supplier and date bagged.

9.2 Sod:

9.2.1 Nursery Sod: quality and nursery source to comply with standards outlined in latest edition published by Canada Nursery Trades Association.

9.2.2 The sod shall be strongly rooted and free of noxious weeds, undesirable plants, roots, stones, and other foreign materials that will be detrimental or will hinder the proper development of the sod. It shall be cut from living, thickly matted turf and shall be mowed to a height not to exceed 50 - 70 mm and thoroughly watered before the sod is cut.

9.2.3 Sod for areas other than sports fields shall be field sod containing a biodiverse mixture of a minimum of five native and/or naturalized species containing grasses, wildflowers and other herbaceous plants known to thrive in the local area. Field sod must be free of diseased plants, pest infestations and noxious or invasive species as listed in the “Nova Scotia Weed Control Act” (e.g. Purple loosestrife, Japanese knotweed, sweet clover, coltsfoot, woundwort)

9.2.4 Sod for sports fields shall be 100% No. 1 Kentucky Bluegrass sod containing 3 compatible varieties. Cut and deliver in large rolls.

9.2.5 Sod shall be free of clover and weeds, with no surface soil visible when mowed to a height of 38 mm (1.5 inches). It must be well rooted, free from burnt or bare spots.

9.2.6 Soil portion shall be of uniform thickness, not to exceed 1.9 cm (0.8 in) thick, and to Section 17 of the Canadian Standards for Nursery Stock.

9.2.6.1 The use of sod in the following areas is an absolute requirement:

9.2.6.1.1 Areas which require immediate and permanent vegetation cover, such as:

9.2.6.1.1.1 waterways and channels carrying intermittent flow at acceptable velocities

9.2.6.1.1.2 areas around drop inlets when the drainage area has been stabilized,

9.2.6.1.1.3 steep critical areas,

9.2.6.1.1.4 under the face of buildings,

9.2.6.1.1.5 lawn areas as determined by DTIR.

9.2.7 Documentation of the source of the sod and verification of species used in the sod shall be submitted to DTIR.

9.2.8 Care shall be exercised at all times to retain soil on the sod roots during transportation, handling and planting. The sod shall be transported to the site within twenty-four (24) hours from the time it is cut, unless it can be stored to the satisfaction of the Project Engineer. During delivery and while in stacks or rolls, all sod shall be kept moist and protected from exposure to the wind, sun and freezing. All damaged or dry sod shall be rejected.

9.3 Water

9.3.1 Free of impurities that would inhibit germination and growth.

9.3.2 Supplied by Contractor.

9.4 Fertilizer

9.4.1 To Canada “Fertilizers Act” and “Fertilizers Regulations”.

9.4.2 Complete synthetic, slow release with 35% of nitrogen content in water insoluble form.

9.5 Organic Binder or Tackifier

9.5.1 Binder or Tackfier acts as an adhesive to bind soil, fiber and seed particles together and to temporarily control the effects of wind and water erosion during seed germination and plant establishment.

9.5.2 May be supplied in liquid or powder form and shall be applied at the Manufacturer’s recommended application rate. It shall not contain any toxic or growth inhibiting chemicals or compounds.

9.6 Hydraulic Mulch

9.6.1 Hydraulic mulch is specifically manufactured for use in hydraulic seeding equipment.

9.6.2 It shall be locally procured, non-toxic, water activated, green in colour, and free of germination and growth inhibiting factors. Requests to use products not locally produced shall be submitted to DTIR for approval before use.

9.7 Organic Amendments, including compose, to enhance germination or growth may be used at the discretion of DTIR.

9.8 Herbicide

9.8.1 No herbicide shall be used.

9.9 Accessories

9.9.1 Pegs: wood, 25mm x 25mm x 200mm nominal size, wood lathes or equivalent as approved by the Consultant.

10 Execution

10.1 Delivery and Storage of Sod:

10.1.1 Schedule deliveries of sod to coincide with end of topsoil installation and approval of Work to minimize storage at job site.

10.1.2 Deliver, unload and store sod on pallets.

10.1.3 Protect sod against damage during delivery and transportation.

10.1.4 Protect the sod when on site to prevent the drying of the sod or rain washout.

10.2 Workmanship

10.2.1 Work is not to be undertaken under adverse field conditions such as frozen soil, excessively wet or dry soil or soil covered with snow, ice or standing water.

10.3 Seed or Sod Bed Preparation

10.3.1 Verify that grades are correct. If discrepancies occur, notify Project Manager and do not commence work until instructed. For sports fields, provide a topographic survey to confirm finish elevations and depth of the installed topsoil.

10.3.2 Fine grade surface free of humps and hollows to smooth, even grade, to elevations indicated, to tolerance of plus or minus 15 mm, surface draining naturally.

10.3.3 Cultivate fine grade approved by Project Manager to 25 mm depth immediately prior to seeding.

10.3.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; at an approved site.

10.3.5 If seeding using a mechanical seeder or when sodding, work fertilizer and lime at rates recommended by the Soil Analysis Report, into the top few centimeters

of soil prior to seeding or laying sod.

10.4 Turf Establishment, Mechanical Seeding

10.4.1 Hydraulic seeding is permitted only in areas difficult to access and not intended for recreational use such as at the perimeter of a site, or slopes and areas that are not intended to be maintained. Permission for hydraulic seeding shall be approved by DTIR.

10.4.2 Use a single operation mechanical landscape seeder such as “Brillion” type which accurately places seed at specified depth and rate and rolls surface.

10.4.3 On cultivated surfaces, sow seed uniformly at rate of 1.0 kg/22.5 sq metres along with appropriate proportion of water and fertilizer.

10.4.4 Blend applications 150 mm into adjacent grass areas to form uniform surfaces.

10.4.5 Sow half of required amount of seed in one direction and remainder at right angles.

10.4.6 Embed seed into soil to depth of 10 mm. Not less than 85% of seed to be placed at specified depth and covered by soil.

10.4.7 Immediately after seeding, use agricultural, water ballast type roller, not less than 500 mm diameter with smooth steel drum and a width not less than the width of the landscape seeder to mechanically consolidate the seeded area if soil conditions warrant or if directed by DTIR.

10.4.8 Water with fine spray to avoid seed wash-out. Water to ensure penetration of minimum 50 mm.

10.4.9 Protect seeded areas against damage. Remove this protection after lawn areas have been accepted.

10.5 Turf Establishment, Hydraulic Seeding

10.5.1 Thoroughly mix the specified seed mixture, recommended fertilizer, lime if needed, hydraulic mulch and tackifier with water and apply with an approved hydraulic seeder.

10.5.2 Seed mix at rate of 100 kg/ha

10.5.3 Fertilizer at recommended formulation at rate of 625 kg/ha

10.5.4 Hydraulic mulch shall be mixed in a hydroseeding unit with the other ingredients, and sprayed evenly and uniformly over the designated areas at a rate of 2200 kg/ha +/- 10%.

10.5.5 Hydroseed during calm wind conditions. Re-apply where application is not uniform.

10.5.6 Remove slurry from areas not designated to be sprayed.

10.6 Turf Establishment, Sodding:

10.6.1 Sod delivered to the site shall not be dried out nor frozen. Sod shall not be dumped from vehicles nor shall it be handled with pitch forks.

10.6.2 Sod should be placed as soon as possible after the ground surface has been graded, to take advantage of the ground moisture.

10.6.3 Sod shall not be applied on frozen ground. The sod bed shall be moist prior to laying the sod. Lay sod as soon as possible after lifting to ensure proper establishment.

10.6.4 Roll or fold sod prior to lifting and handled in proper manner as to avoid stretching, tearing or breaking of sod and root mass.

10.6.5 Place sod in rows, perpendicular to slope, smooth and even with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps. Trim excess, irregular or thin sections with sharp knife, edger or equivalent. Do not tear sod.

10.6.6 Discard plastic mesh that support sod rolls; do not leave under sod as sod is laid on the field.

10.6.7 Replace any damaged sod by a well cut properly fitting piece of sod.

10.6.8 Throughout work, verify the quality of compaction of soil and correct according to field requirements before laying sod.

10.6.9 Roll sod with light weight roller immediately after placement of sod.

10.6.10 Water sods immediately after laying and rolling to obtain moisture penetration through sod into top 100mm (4 inches) of topsoil.

10.6.11 Obtain Substantial Performance of Work from Consultant prior to commencing Maintenance period.

10.7 Turf Establishment, Sodding

10.7.1 The sod shall be applied by hand in rows at right angles to the direction of slopes, starting at the base of the area to be sodded and working upward. The strips shall be laid together tightly so that no open joints are left between strips or between the ends of strips. The joints shall be staggered between the ends of strips. The edges of the sod at the top of the slopes shall be tucked slightly

under. A layer of soil shall be compacted over the edge to conduct surface water over and onto the top of the sod.

10.7.2 Sod shall be laid perpendicular to the flow of water on slopes and in ditches and waterways.

10.7.3 The sod shall be firmly tamped or rolled immediately after it is placed to eliminate all air pockets and to provide a smooth, even surface.

10.7.4 Immediately after rolling or tamping the sod, sufficient water will be applied to completely saturate the sod.

10.7.5 All excess earth, stones or other debris shall be removed by the Contractor when sodding is completed.

10.7.6 Sodding at face of building: Sod to a distance from the face of building minimum distance of 7 m with the balance of the site seeded, unless required otherwise by the program. Water run-off from the building will be directed away from any sodded areas around building perimeter.

10.8 Maintenance During Establishment Period: perform following operations from time of seed and sod application until acceptance by DTIR:

10.8.1 Water seeded and sodded areas with fine spray to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

10.8.2 At the Contractor's expense, any sod which shows signs of settlement shall be cut out and replaced.

10.8.3 Dead or bare spots shall be repaired and re-sodded or re-seeded, as approved by DTIR, to allow establishment of turf prior to acceptance.

10.8.4 For lawns and other manicured areas cut grass to 50 mm whenever it reaches height of 75 mm.

10.8.5 Fertilize seeded and sodded areas after first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water it well.

10.8.6 Eliminate weeds by means approved by DTIR.

10.9 Maintenance: General Requirements

10.9.1 Site Conditions:

10.9.1.1 Avoid maintenance operations after a heavy rain when soil is wet. Do

not mow when turf is wet.

10.9.2 Machinery:

10.9.2.1 All machinery will be equipped with turf tires and will be designed to specifically perform the intended operation.

10.9.2.2 Maintain mowing blades well sharpened and free of rust and abrasions.

10.9.3 Watering:

10.9.3.1 Water sodded areas throughout the maintenance period in sufficient quantity and at frequency required to maintain an appropriate level of moisture through sod into topsoil to a minimum penetration of 100mm.

10.9.3.2 Watering to be done between 7:00a.m. and 10:00a.m., and 4:00p.m. and 10:00p.m., and using best horticultural practice.

10.9.3.3 The Contractor shall notify the Consultant at least 12 hours before scheduled watering operation.

10.9.4 Mowing:

10.9.4.1 Mow sodded areas throughout the growing season, to maintain the turf between 70 mm to 90 mm (2.75 to 3.5 inches). Never mow any more than one third of the length of the leaf at one time.

10.9.4.2 Mowing operations will be done in cross mode.

10.9.4.3 Mowing shall be done with well maintained, sharp blades, free of rust and abrasions.

10.10 Fertilizing Program

10.10.1 Seeded areas:

10.10.1.1 To minimize environmental impact, the application of fertilizer is to be based on the soil chemistry as recommended in the soil analysis report. If no report exists (such as for smaller projects) apply a general fall lawn fertilizer in the fall of the year following the seeding of the lawn areas.

10.10.1.2 In the following spring, apply an application of 6-12-12 fertilizer at the recommended rate to all areas seeded the year before.

10.10.2 Sodded areas:

10.10.2.1 Fertilize sodded areas one month after finish sodding. Do three applications of nitrogen during the growing season, one in spring, one early summer and one in late summer, and starting one month after sod installation, at the rate of 0.25 lbs (0.007 kg) N/1000sq.ft per application.

10.10.2.2 When Maintenance Period starts at end of the growing season, postpone fertilization with high nitrogen content until the beginning of the next growing season and replace with a high potassium slow release fertilizer. Resume application of nitrogen fertilizer at the beginning of the next growing season.

10.10.2.3 Monitor the rate of fertilizer application and the ratio with Consultant for optimum growth.

10.10.3 Aeration:

10.10.3.1 Provide two aeration operations to non irrigated field during the maintenance period according to the following construction period:

10.10.3.1.1 Spring construction: Aerate the field once in early September and in accordance with the Consultant.

10.10.3.1.2 Autumn construction: Aerate the field in the following spring, one time as soon as the field moisture is at field capacity,

10.10.3.1.3 The second aeration operation will coincide with Final Acceptance of the Work.

10.10.3.1.4 Aeration operation will be done with slicer aerator equipped with 6 inch tines. Each operation shall consist of one time passing lengthwise and one time passing on the width of the field.

10.10.3.1.5 The 6 inch tines shall fully penetrate into the soil in all areas of the field for acceptance of the Work. Notify the Consultant 24 hours prior to aeration operation. Timing of field aeration will be coordinated with the Consultant.

10.10.4 Control of weeds, diseases and insect:

10.10.4.1 Maintain sodded areas weed, insect and disease free through proper cultural and maintenance practice including but not limited to aeration, watering, pH control, fertilization, proper mowing practice, over

seeding and control of grass coverage thickness.

10.10.4.2 Any application of pesticide will be performed in accordance with federal, provincial and municipal regulations as and when required to control insects, fungus and diseases and shall be approved by the Consultant.

10.10.5 Acceptance:

10.10.5.1 The Work will be accepted by the Consultant at the end of the Establishment Period provided that:

10.10.5.1.1 Root zone is properly established and penetrates into the topsoil layer to a depth sufficient to support a vigorous turf growth.

10.10.5.1.2 Turf is growing vigorously, without disease and insect infestation, areas are uniformly established and turf is healthy, dark green and free of rutted, eroded, bare or dead spots and free of weeds, with a thick carpet where when mowed at 6cm (2.5 inches) high, no soil is visible.

10.10.5.1.3 Surface is even and without depressions.

10.10.5.1.4 Gradients meet specifications.

10.10.5.1.5 That a 6 inch tine aerator will penetrate to its full depth into the soil and in all areas in the field, without adding extra weight to the aerator, and when soil is at field capacity.

10.10.5.1.6 Lawn areas have been cut at least twice.

10.10.5.1.7 All seeded and sodded areas have been fertilized.

10.11 Maintenance During Warranty Period. Perform following operations from date of Acceptance until end of Warranty Period.

10.11.1 Repair and re-sod / reseed dead or bare spots to satisfaction of DTIR.

10.11.2 Fertilize seeded areas in accordance with fertilizing program. On lawn areas, spread half of required amount of fertilizer in one direction and remainder at right angles and water it well.

10.11.3 Eliminate weeds by means approved by DTIR.

10.11.4 Regular cutting of the lawn areas is to be undertaken during the Warranty period.

10.11.5 Sodded sports fields are to be aerated at approved sequenced intervals during the warranty period.

END