

## **SPECIFICATIONS**

<b>Section 03 33 11</b>	<b>Concrete</b>
<b>Section 32 32 53.13</b>	<b>Armour Stone Retaining Wall</b>
<b>Section 32 91 19.13</b>	<b>Topsoil Placement and Grading</b>
<b>Section 32 92 23</b>	<b>Sodding and Topsoil</b>
<b>Section 32 93 00</b>	<b>Planting</b>

**PART I – GENERAL**

**1.1. Description**

- .1 The work covered by this section includes the furnishing of all labour, materials, equipment and incidentals for the inspection and construction of concrete paving and curbing as shown on the Construction Drawings and as described by the Contract Specifications.
- .2 Comply with the requirements of the Tender Document and General Conditions.

**1.3. Quality Assurance**

- .1 The contractor must have a minimum of 5 years experience in concrete work.
- .2 All materials must conform to CSA A23.1-94. A copy must be kept on site at all times during construction.
- .3 Furnish the Landscape Architect with a certificate prepared by the Ready-Mix concrete suppliers stating that all requirements regarding strength, slump, air entrainment, mix, materials and ratio have been met and maintained.
- .4 Prior to pouring concrete, obtain the approval of the Landscape Architect of all form work, placement of reinforcing steel, consolidation of subgrade and placement and consolidated of granular base.
- .5 When required by the Landscape Architect, have all concrete tested for compressive strength, slump and air content, in accordance with CSA A23.2-94. Submit test reports in duplicate and pay all costs incurred.
- .6 Ensure work complies with the Ontario Building Code and all pertinent local by-laws and regulations. These shall govern in case of conflict with the specification. Obtain and pay for all necessary permits before starting work.

**1.4. Product Delivery, Storage and Handling**

- .1 Store all materials in accordance with CSA A23.1-94 latest edition.
- .2 Store reinforcing steel on racks or skids. Protect from contamination by dirt or other materials.
- .3 Store forms off the ground and sufficiently supported to prevent warping or distortion. Protect from contaminations by oil, grease, water, earth, etc.
- .4 All concrete is to be ready mixed at plant and transported to the site by truck in accordance with CSA A23.1-94. Hand mixed concrete is not allowed unless approved in writing by the Landscape Architect prior to the start of work.
- .5 Convey concrete from the mixer to the place of final deposit as rapidly as possible, with as little rehandling as is practical. Avoid segregation and/or loss of material.
- .6 Place concrete in final position and at such a rate that it remains plastic at all times and flows readily between reinforcement, into all corners and crevices and around all embedded fixtures. Pour in a continuous operation between expansion joints.

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- .7 Thoroughly clean all equipment, used for mixing or transporting of concrete, of all hardened concrete and foreign material prior to placing concrete.
- .8 Do not allow concrete to be contaminated by foreign materials. Do not use retempered concrete unless approved in writing, by the Landscape Architect.
- .9 Obtain the approval of the Landscape Architect of the type, number and method of use of mechanical vibrators. Do not operate a vibrator for longer than 10 seconds in any one location.
- .10 Maintain constant control to ensure that finished concrete is dense, uniform, free of air holes or honeycombs and that no segregation of aggregates and cement paste occurs.

### **1.5. Job Conditions**

- .1 Protect all concrete surfaces from damage or harmful effects of weather, water, mechanical shock or trespassers until concrete is properly cured.
- .2 If temperature is expected to drop below 5°C, place and protect concrete in accordance with AC1.605.

### **1.5. Inspection**

- .1 Obtain the approval of the Landscape Architect of the layout, compacted sub-grade, compacted granular base, formwork and reinforcing before proceeding with subsequent work.

## **PART II – PRODUCTS**

### **2.1. Materials**

- .1 Granular A and Granular B: granular material conforming in all respects to OPSS 1010, latest edition.
- .2 Portland cement: standard grey portland cement, conforming to CAN/CSA-A5/A8/A362-93 type 10 normal.
- .3 Aggregates: nominal size as specified and conforming to CSA A23.1-94.
- .4 Water: clear and free of deleterious substances or efflorescing salts.
- .5 Air entraining admixtures: conforming to ASTM C 260-94 and of approved manufacturer.
- .6 Reinforcing steel: conforming to CSA G-30.12-M77 for bars, CSA G30.5-M83 for welded steel wire mesh and OPSS 1440.
- .7 Expansion joint filler: premoulded bituminous impregnated fibre board conforming to ASTM D1751-73 of thickness and depth specified.
- .8 Curing Compounds: clear liquid chlorinated rubber to ASTM C309 and OPSS 1315.
- .9 Formwork: conforming to CSA A23.1-94 and AC1- 347 and of sound wood, in good condition and equal or better than No. 2 grade construction spruce and/or 19mm Douglas

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Fir plywood, with the surface treated to produce a smooth concrete finish. Plywood to be CSA 0/2/.

### **2.2. Mixes**

- .1 Mix concrete materials in accordance with CSA CAN3-A23.1M-77, in the proper proportions and ratios to provide a finished product as specified. Concrete mix shall meet the following requirements: Compressive strength 32 MPa at 28 days; 100mm slump at point of deposit; air entrainment 6% (+ or - 1%). Unless noted otherwise on the drawings or details, all concrete is to be 32 MPa strength.
- .2 With the exception of air entraining agents, other mixtures may only be used with the written approval of the Landscape Architect. The use of agents to lower the freezing point of the mix will not be permitted.

## **PART III – EXECUTION**

### **3.1. Preparation**

- .1 Excavate to the minimum specified depths, after compaction, as shown on the drawings. Maintain sub-grade parallel to finished grade in all cases.
- .2 Fine grade subgrade eliminating uneven areas and filling low spots. Remove all debris. Excavate all soft and unstable areas in subgrade and backfill with Granular “B”.
- .3 Compact subgrade uniformly to minimum ninety-eight percent (98%) Standard Proctor Density. Arrange for testing of fill materials and compaction. When required and as directed by the Landscape Architect, the Contractor shall, at his own expense, sprinkle water to assist in compaction.
- .4 The Granular “B” base shall be applied in maximum 74mm (3 inches) layers, graded, rolled and compacted in accordance with OPSS Division 3.
- .5 In the event of delay between completion of subgrade and commencement of application of stone base, the Contractor shall re-grade and re-compact subgrade at his own expense if so ordered.
- .6 Keep materials clean and free of deleterious materials at all times.
- .7 Maintain final grade of granular base course parallel to finished grade.
- .8 Submit written test reports.
- .9 Contractor to ensure that all concrete columns are vibrated to eliminate all voids.

**3.2. Granular Base**

- .1 Spread the specified granular materials in horizontal layers not exceeding 100mm loose depth and compact to 95% Standard Proctor Dry Density. In areas where compaction by roller is not possible, compact with approved mechanical or hand tamping devices to the specified density.
- .2 Build up thickness of each material to the minimum compacted thickness as specified on the drawings.
- .3 Ensure that granular does not become contaminated by deleterious material.
- .4 Correct all irregularities or depressions resulting from rolling and compact until the granular surface is smooth, uniform and true to line and grade.
- .5 When required by the Landscape Architect, have the compaction of the granular materials tested by an approved, independent testing firm. Submit 2 copies of the test results to the Landscape Architect and obtain his approval prior to pouring concrete. Pay testing costs incurred.

**3.3. Form Work**

- .1 Erect forms in such a manner as to facilitate dismantling and removal without damaging concrete.
- .2 Erect forms true to line and level in accordance with the drawings, and sufficiently braced to maintain their form and alignment when concrete is placed.
- .3 Prior to each pouring operation, coat affected form surfaces with an approved form separating material.
- .4 Provide for all openings, sleeves, hangers, anchors and ties to be cast into the concrete.
- .5 Do not use treated plywood for exposed surfaces more than 5 times. Do not use plywood if surface is damaged.
- .6 Obtain the approval of the Landscape Architect of all form work before proceeding

**3.4. Reinforcement**

- .1 Before placing reinforcement, clean all loose scale, dirt and any other coating that would destroy or reduce bonding to concrete.
- .2 Place all reinforcement accurately in accordance with the drawings and/or approved shop drawings. Use approved chairs, spacers, hangers or ties to secure the reinforcing in position.
- .3 Unless directed otherwise, provide the following minimum concrete cover over reinforcing:
  - a) 75mm where concrete is deposited against soil.
  - b) 50mm for bars larger than 10m and 40mm for bars smaller than 10m where concrete is exposed to weather.
- .4 Obtain the approval of the Landscape Architect of all reinforcing before proceeding.

**3.5. Joints**

- .1 Locate expansion joints as shown on the drawings or at max. intervals of 6.0m, between new concrete and all new or existing rigid structures, and either side of all driveway sections. Joints must be cast in place.
- .2 Execute construction joints in accordance with AC1-301 and as detailed on the drawings. Thoroughly clean the joint surface of all laitance and wet thoroughly and slush with a coat of cement grout immediately before placing new concrete.
- .3 Except for expansion joints, continue reinforcing uninterrupted through joints, unless shown otherwise on the drawings or directed by the Landscape Architect.
- .4 Stop reinforcing on each side of expansion joints. Where dowels are indicated, cast one half into one side of the joints. The exposed half shall be machined smooth and heavily greased before placing adjoining sections.
- .5 Locate control joints as shown on the drawings or at a max. spacing of 2.0m. Ensure joints are to a minimum depth of 1/4 the thickness of the concrete. Make joints by one of the following methods:
  - a) Sawed joints
  - b) Hand formed and hand tooled
  - c) Inset joints placed in plastic concrete
- .6 No offsets will be allowed between adjacent sections of joint fillers and no plugs of concrete will be permitted anywhere within an expansion joint.
- .7 Apply joint sealant in accordance with the manufacturer's directions. Ensure joints are clean and free of any foreign substances before sealing. Clean any sealant spilled on concrete surface immediately.

**3.6. Placing of Concrete**

- .1 Place concrete by approved means and using approved equipment.
- .2 Do not place concrete until formwork and grades have been inspected by the Owner or Landscape Architect.
- .3 Transport concrete from mixer to point of deposit, and place in final position as quickly as possible to prevent separation and loss of materials.
- .4 While placing concrete, compact thoroughly and uniformly by approved means to ensure a dense homogeneous structure free of air pockets, and honeycombs and closely bonded with reinforcement.

**3.7. Finishing**

- .1 Treat and finish all surfaces as directed or specified and in accordance with CSA CAN3-A23-1-M77.

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- .2 Strike off and float all exposed paving surfaces as soon as possible after consolidation and in accordance with recommendations of the Portland Cement Association. Execute final finishing as specified on the drawings or as directed by the Landscape Architect.
- .3 Ensure finished surface is true to line and level as shown on the drawings. Walks are to be sloped as per grading plans.
- .4 All irregularities greater than 6mm under a 3000mm straight edge, operated parallel to the centre line, must be repaired.
- .5 Obtain the approval of the Landscape Architect of finished surfaces before starting curing operations.
- .6 Immediately after stripping formwork, obtain the approval of the Landscape Architect before commencing patching, finishing or curing operations.
- .7 The extent, method and type of mix for patching shall have the approval of the Landscape Architect before commencing work. Ensure patching mix contains an approved bonding and waterproofing agent and that it is installed in accordance with the manufacturer's specifications.

### **3.8. Curing**

- .1 Keep concrete moist for at least 3 days after placement, in accordance with CSA CAN-A231-M77.
- .2 Method of curing shall be as specified or by one of the following approved methods if not specified:
  - a) Moist curing
  - b) Waterproofing paper or white polyethylene sheeting
  - c) White liquid membrane compound
  - d) Combination of above methods
- .3 Moist curing: use burlap or approved equal. Ensure it is thoroughly wet when applied and kept continuously wet and in full contact with the surface during the curing period.
- .4 Waterproof paper or white polyethylene sheeting: ensure sheet is large enough to cover entire concrete surface. Secure to prevent displacement during curing period. Immediately repair any tears or holes.
- .5 White liquid membrane compound: apply at the rate of 1 litre per 5 square meters after final finishing and all free water has disappeared. Keep membrane compound agitated to prevent settling of compound. Apply membrane compound to edges immediately after formwork is removed. Ensure a continuous and unbroken membrane cover is applied.

### **3.9. Clean-up**

- .1 Clean and remove all concrete spills from the site and make good any disturbance.

**End of Section**

**PART I – GENERAL**

**1.1. Description**

- .1 This section specifies the supply and placement of Armour Stone for on site retaining walls and rock features.
- .2 Comply with all requirements of the General Requirements – Section 01 00 00.

**1.2. Site Examination**

- .1 The Contractor shall report to the Landscape Architect, in writing, of any conditions or defects encountered on the site during or before construction, upon which may adversely affect its performance.
- .2 Do not commence work until such conditions or defects have been investigated and corrected.

**1.3. Inspection and Certification**

- .1 Obtain approval of layout work for Armour Stone before proceeding with work.
- .2 Have all excavation for work inspected prior to installation of Armour Stone features.
- .3 The Landscape Architect shall approve the stake out provided by the Contractor or otherwise designate the extent of all areas requiring the placement of Armour Stone features. The quality of the Armour Stone placement shall be approved by the Landscape Architect.

**PART II – PRODUCTS**

**2.1. Delivery and Storage**

- .1 Delivery and storage of material shall be done in a neat and orderly fashion, all to the satisfaction of the Landscape Architect.
- .2 Stockpile existing topsoil or fill materials in locations designated by the Owner or Landscape Architect.
- .3 Obtain Armour Stone from approved supplier as stipulated by Landscape Architect.
- .4 Filter cloth : Terrafix “Terratract 240R” Filter cloth or approved equal.

**2.2. Maintenance and Guarantee**

- .1 Maintain all Armour Stone work from time of installation until acceptance.



- .2 During the guarantee period, the Contractor shall repair, replace or otherwise remedy, to the Landscape Architect's satisfaction, all defects due to faulty materials and/or workmanship. All work shall be carried out in full accordance with the drawings and specifications. Where there is substantial Armour Stone settlement, the Contract shall bring the settled area back to grade and replace and raise the Armour Stone as stipulated by the Landscape Architect.

**2.3. Materials**

- .1 Armour Stone retaining wall used will be free from deterioration by water action or weathering and will be as per dimensions on the drawings.
- .2 Existing armour stone is to be reused where suitable. The contractor shall carefully handle and reinstall the existing stones in accordance with the design. If the on-site stockpile is insufficient or stones are deemed unsuitable, additional armour stone of the required size and quality shall be supplied by the contractor from an approved source. A sample of any new stone must be submitted for approval prior to delivery.

**PART III – EXECUTION**

**3.1. Installation**

- .1 The Contractor shall excavate topsoil, fine grade and consolidate as required, to provide an even, firm foundation for the granular base and Armour Stone retaining wall and or rock features. Depressions shall be filled with granular and thoroughly compacted to 95 S.P.D.
- .2 A  $\frac{3}{4}$ " crusher-run limestone granular base shall be placed to the depth specified on the details and compacted to 95 S.P.D. or as per the details.
- .3 Stones shall be laid in close contact, and so as to break joints, and so that in the first layer, each stone is supported by the earth surface and not by adjacent stones. Spaces between larger stones is to be filled with topsoil securely rammed in place. The finished work shall present a natural rock edge to the surface @ 8:1 batter slope.
- .4 Terrafix filter cloth or approved alternate is to be provided with 150mm of 19mm crusher run throughout the length of the walls greater than 1 lift. Provide 100mm dia. Big "O" Drain in sock throughout backfill to catch basin.
- .5 Single lift Armour Stone retaining walls are to be placed directly on filter cloth with filter cloth coming up the back of the stone.
- .6 Armour Stone backfill is to be entirely inside the property line.

**3.2. Protection**

- .1 Take into account anticipated weather conditions and degree of exposure of site in setting requirements for protection in regards to erosion.
- .2 Carry out Armour Stone retaining wall construction so that each phase of work is not left exposed for an undue period of time. Follow schedule submitted to Landscape Architect.
- .3 Landscape Architect may order excavation to be stopped or placing final protective stone layers to be advanced depending on anticipated weather conditions.

**3.3. Clean-up**

- .1 Upon completion, remove all surplus excavated and graded materials from the site, and leave site clean and tidy. Make good all disturbance to approval of Landscape Architect.

**End of Section**

**PART I - GENERAL**

**1.1. Description**

- .1 This section specifies the supply and placing of topsoil as per drawings.
- .2 Comply with all requirements of the General Conditions.

**1.2. Quality Assurance**

- .1 Topsoil work to be carried out by experienced personnel under the direction of a skilled foreman and in strict accordance with all drawings.

**1.3. Product, Delivery, Storage and Handling**

- .1 In-situ topsoil: protect all areas of in-situ topsoil that are to remain in place from compaction by machinery and/or workers for the duration of the construction period.
- .2 Stockpiled site topsoil: Topsoil stripped from site to be stockpiled in a location as indicated on the drawings or in a location approved by the Landscape Architect. Shape and grade stockpile in a manner that will reduce erosion from rain and wind. If required by the Contract Administrator, provide additional sediment and erosion controls.
- .3 Imported topsoil: Topsoil imported on-site is to be stockpiled in a location as indicated on the drawings or in a location approved by the Landscape Architect. Shape and grade stockpile in a manner that will reduce erosion from rain and wind. If required by the Contract Administrator, provide additional sediment and erosion controls.

**1.4. Soil Testing**

- .1 If required by the Contract Administrator, the soil shall be tested for N, P, K and minor element values, soluble salt contents, organic matter content and pH value.
- .2 If required by the Contract Administrator, in-situ soil shall be tested for compaction levels with a soil compaction meter (penetrometer) in pounds-per-square-inch (psi).
- .3 Arrange for, and assume all costs for such testing. Testing shall be carried out by a reputable firm, approved by the Contract Administrator.
- .4 The contractor shall submit the soil analysis report to the Contract Administrator prior to the commencement of. When the source of such topsoil is exhausted, topsoil from a new source shall not be used until it is tested, and approved by the Contract Administrator.

**1.5. Inspection**

- .1 The Contractor shall verify that the final site grades are in accordance with the grading plan. Obtain the approval of the Contract Administrator of the finished topsoil surface.
- .2 The Contractor shall give timely notice, in writing, that all work has been completed and maintenance period is to begin.

**1.6. Guarantee**

- .1 Soil testing for N, P, K and minor element values, soluble salt contents, organic matter content, pH value and compaction shall be conducted after installation if deemed

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necessary by the Contract Administrator. Arrange for, and assume all costs for such testing. Testing shall be carried out by a reputable firm, approved by the Contract Administrator. Perform all remedial actions as recommended by the soil testing results and approved by the Contract Administrator.

### **PART II - PRODUCTS**

#### **2.1. Materials**

- .1 Topsoil: a fertile, friable, natural loam; containing not less than 4% organic matter for clay loams and not less than 4% organic matter for sandy loams to a maximum of 15%. Topsoil must be capable of sustaining vigorous plant growth, free of subsoil contamination, roots and stones over 25mm diameter, reasonably free of weeds (as determined by the Contract Administrator), and having a pH ranging from 6.0 to 7.5.

### **PART III - EXECUTION**

#### **3.1. Preparation**

- .1 Scarify the existing ground surface to a depth of 25mm before placing additional topsoil.

#### **3.2. Spreading of Topsoil**

- .1 Spread dry topsoil during dry weather over approved, dry, unfrozen subgrade where sod is to be installed.
- .2 Fine grade topsoil eliminating rough and low areas and to ensure positive drainage.
- .3 Roll topsoil with a 50 kg roller to compact and retain surface. Finished compacted depth of prepared topsoil to be minimum 150mm for sodded areas, 450mm for planting areas, or as indicated on the drawings and details. Do not over-compact soil.
- .4 Provide a finished topsoil surface that is smooth and firm against footprints with a fine, loose texture before sod or other plantings are placed. Topsoil compaction not to exceed 200 PSI.

#### **3.3. Protection after Completion**

- .1 Erect protective barriers and post signs where necessary and maintain same until performance acceptance.
- .2 Remedy all damages, wash-outs and eroded areas resulting from weather, improper protection, excessive compaction, or other causes.

#### **3.4. Clean Up**

- .1 The Contractor must leave the site in a neat and orderly condition upon completion of work on a daily basis, all to the satisfaction of the Contract Administrator.

**End of Section**

**0PART I - GENERAL**

**1.1. Description**

- .1 The work covered by this section includes the furnishing of all labour, materials, equipment and incidentals for inspection and placement of sod over topsoil as shown on the Construction Drawings and as described by the Contract Specifications.
- .2 Comply with all requirements of the General Requirements – Section 01 00 00.

**1.3. Quality Assurance**

- .1 The contractor must have 5 years experience in sodding work.

**1.4. Product, Delivery, Storage and Handling**

- .1 Deliver sod to site within 24 hours of being harvested and lay sod within 48 hours thereafter, depending on suitable weather conditions and in accordance with good horticultural practice.
- .2 Small irregular or broken pieces of sod will not be accepted.
- .3 Prevent sod from drying out on site.

**1.5. Sample**

- .1 Complete the installation of one sample panel of sod of a minimum 25 m<sup>2</sup> (one side minimum 2.0m) and have inspected and approved by the Contract Administrator prior to proceeding with the balance of sodding operations. All other work shall conform to this approved sample.

**1.6. Soil Testing**

- .1 If required by the Contract Administrator, the soil shall be tested for N, P, K and minor element values, soluble salt contents, organic matter content, and pH value.
- .2 If required by the Contract Administrator, in-situ soil shall be tested for compaction levels with a soil compaction meter (penetrometer) in pounds-per-square-inch (psi).
- .3 Arrange for, and assume all costs for such testing. Testing shall be carried out by a reputable firm, approved by the Contract Administrator.
- .4 The contractor shall submit the soil analysis report to the Contract Administrator prior to the commencement of the works. When the source of such topsoil is exhausted, topsoil from a new source shall not be used until it is tested, and approved by the Contract Administrator.

**1.7. Inspection**

- .1 The Contractor shall verify that the final site grades are in accordance with the grading plan. Obtain the approval of the Contract Administrator of the finished topsoil surface before proceeding with sodding.
- .2 The Contractor shall give timely notice, in writing, that all work has been completed and maintenance period is to begin.

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### **1.8. Acceptance**

- .1 Maintain sod in good condition until acceptance.
- .2 At the time of acceptance, the grass must not be more than 50mm high. Minimum acceptable cut height is 45mm. All sod must have a healthy and even stand of grass, free of thin, poor or burned-out patches.
- .3 Acceptance will be given when the sod is properly rooted, free of bare and dead spots and reasonably free of weeds in the opinion of the Contract Administrator.
- .4 Acceptance will not be given if the topsoil and/or sod layer are excessively compacted (compaction exceeding 200 PSI).
- .5 Replace any deteriorated sod with new sod at the direction of the Contract Administrator.
- .6 The Contractor is responsible for a minimum of one cut of grass or as many cuts as required until acceptance.

### **1.9. Guarantee**

- .1 During the guarantee period, the Contractor shall make monthly inspections and replace all sod which is dead, or is not in a healthy vigorous growing condition.
- .3 Soil testing for N, P, K and minor element values, soluble salt contents, organic matter content, pH value and compaction shall be conducted if issues with sod growth and/or health are widespread or persistent. Arrange for, and assume all costs for such testing. Testing shall be carried out by a reputable firm, approved by the Contract Administrator. Perform remedial actions as recommended by the soil testing results and approved by the Contract Administrator.

## **PART II - PRODUCTS**

### **2.1. Materials**

- .1 Grass sod: Certified No.1 grade cultivated turf grass sod with a composition of 50% Kentucky Blue Grass and 50% Blue Cultivar either "Fylking" or "Baron" or as specified on the drawings, grown and sold in accordance with NSGA classifications. At the time of sale it must have a strong, fibrous root system and be free of stones and burned or bare spots. Damaged and broken pieces shall not be laid and shall be removed from the site immediately.
- .2 Sod pegs: 25mm x 25mm x 230mm (minimum length). Ensure pegs are long enough to securely anchor sod.
- .3 Topsoil: a fertile, friable, natural loam; containing not less than 4% organic matter for clay loams and not less than 2% organic matter for sandy loams to a maximum of 15%. Topsoil must be capable of sustaining vigorous plant growth, free of subsoil contamination, roots and stones over 25mm diameter, reasonably free of weeds (as determined by the Contract Administrator), and having a pH ranging from 6.0 to 7.5.

## **PART III - EXECUTION**

### **3.1. Preparation**

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- .1 Rototill all areas that are to receive new sod. Cultivate to a minimum depth of 100mm. Remove all rocks, roots and grass or weed clumps from the surface.
- .2 Compact surface to 85% Standard Proctor Dry Density.
- .3 Scarify to a depth of 25mm before placing additional topsoil or sod.

### **3.2. Spreading of Topsoil**

- .1 Spread dry topsoil during dry weather over approved, dry, unfrozen subgrade where sod is to be installed.
- .2 Keep topsoil 25mm below finished grade for sodded areas.
- .3 Fine grade topsoil eliminating rough and low areas and to ensure positive drainage.
- .4 Roll topsoil with a 50 kg roller to compact and retain surface. Finished depth of prepared, compacted topsoil to be minimum 150mm. Do not overcompact soil.
- .4 Provide a finished topsoil surface that is smooth and firm against footprints with a fine, loose texture before sod is placed. Topsoil level shall not be compacted beyond 200 PSI.

### **3.3. Installation**

- .1 Lay sod with tight butt joints. Do not leave any open joints or overlap adjacent pieces of sod. Alternate joints on each row of sod.
- .2 Ensure finished sod surface is flush with adjoining grass areas, pavement or top surface of curbs.
- .3 On slopes steeper than 4:1, lay sod perpendicular to the slope and peg each row at intervals of not more than 600mm on each side of the sod strip. Drive pegs flush with surface of sod.
- .4 Immediately after installation, water the sod with sufficient quantity of water to penetrate the sod and the top 50mm of the underlying topsoil.
- .5 Apply 8-32-16 slow release commercial fertilizer at the rate of 22 kg per 1000 square metres.
- .6 When sod has dried sufficiently to prevent damage, roll all sodded areas to ensure a good bond between sod and topsoil. Imperfections in the surface should be corrected prior to the laying of the sod and not by rolling with a heavy roller.
- .7 Protect all newly sodded areas with warning signs or barricades.

### **3.4. Protection after Completion**

- .1 Assume full responsibility for protection of all sodded areas from all sources until performance acceptance.
- .2 Erect protective barriers and post signs where necessary and maintain same until performance acceptance.

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- .3 Remedy all damages, wash-outs and eroded areas resulting from weather, improper protection, excessive compaction, or other causes.

### **3.5. Clean Up**

- .1 The Contractor must leave the site in a neat and orderly condition upon completion of work on a daily basis, all to the satisfaction of the Contract Administrator.

**End of Section**



## SECTION 32 93 00 – PLANTING

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### PART I – GENERAL

#### **1.1. Description**

- .1 The work covered by this section includes the furnishing of all labour, materials, equipment and incidentals for the inspection, maintenance and planting of trees, shrubs, ground covers and perennials as shown on the Construction Drawings and as described by the Contract Specifications.
- .2 Comply with all requirements of the General Requirements – Section 01 00 00.

#### **1.2. Quality Assurance**

- .1 Planting work is to be carried out by experienced personnel under the direction of skilled foreman and in strict accordance with the Specifications and best horticultural practice.

#### **1.3. Product Delivery, Storage and Handling**

- .1 Supply manufactured items such as super phosphate, fertilizer tablets, mulch, etc., in standard containers, clearly indicating contents, weight, component analysis, and the name of the manufacturer.
- .2 Store manufactured materials, subject to deterioration, in a weatherproof place on site and in such a manner that their effectiveness is not impaired.
- .3 Supply plant materials as specified on the plant list. Confirm quantities as specified on the drawings, plant list and bid form. Report any discrepancies.
- .4 Dig materials specified “B.R.” (bare root) on the plant list, while in a dormant state and with the majority of the root system intact. Immediately after digging, wrap the roots in wet burlap and keep burlap wet during transport and storage.
- .5 Provide all material, specified “B. & B.” (balled and burlapped) on the plant list, with a solid, earth root ball, wrapped in burlap.
- .6 Provide all material, specified “WB” (wire basket) on the plant list, with a solid, earth root ball, bound by a wire basket.
- .7 Do NOT plant material with broken or abraded trunks or branches, or with broken or cracked root balls, or plants which are strongly desiccated, as they will be subject to rejection upon arrival on the project site.
- .8 Provide root balls of the following minimum sizes to meet the corresponding tree size. Ensure the root ball is large enough to accommodate at least 75% of the fibrous root system.

Deciduous Trees Caliper	Minimum Root Ball Diameter
50 mm	75 cm
60 mm	80 cm
70 mm	85 cm
80 mm	90 cm
90 mm	100 cm
1.00 m	60 cm
1.50 m	60 cm

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Coniferous Tree Height	Minimum Root Ball Diameter
1.75 m	65 cm
2.00 m	70 cm
2.25 m	75 cm
2.50 m	80 cm

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

### **1.4. Soil Testing**

- .1 If required by the Landscape Architect, the soil shall be tested for N, P, K and minor element values, soluble contents, organic matter and pH value.
- .2 Arrange for, and assume all costs for such testing. Testing shall be carried out by a reputable firm, approved by the Landscape Architect.
- .3 The Contractor shall submit the soil analysis report to the Consultant prior to the commencement of work. When the source of such topsoil is exhausted, topsoil from a new source shall not be used until it is tested, and approved by the Landscape Architect.

### **1.5. Job Conditions**

- .1 Proceed with planting operations during suitable weather conditions.

### **1.6. Substitutions**

- .1 Supply and install plant material as specified on the plant list. Substitutions with other plant material will only be allowed with the written approval of the Landscape Architect.
- .2 Give timely notice, in writing, to the Landscape Architect when applying for substitutions.

### **1.7. Inspections**

- .1 Make plant material available for inspection at source of supply and/or upon arrival on the site by the Landscape Architect. Notify Landscape Architect of delivery date and notify prior to shipment.

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- .2 Approval of plant material at source will not impair the right of the Owner or Landscape Architect to inspect plants upon arrival on the site or during the course of construction and to reject plants which have been damaged, or which, in any way, do not conform to the specifications.
  - .3 If partial acceptance is desired, give timely notice to the Landscape Architect in writing.
  - .4 Partial acceptance will be given when planting work has been delayed due to circumstances beyond the control of the contractor or where planting would be in conflict with good horticultural practices and would jeopardize the performance.
  - .5 Planting of materials, prior to inspection by the Landscape Architect will be the Contractor's responsibility.
  - .6 Remove all rejected materials from the site immediately.
  - .7 Furnish all inspection certificates as may be required by federal, provincial and other applicable regulations.
  - .8 Labels shall indicate variety, grade and size of each plant specimen or bundle. Do not remove any labels from plants until final or partial approval by the Landscape Architect, or as directed.
  - .9 Final inspection of all plant material will be made at the end of the specified guarantee period. All plants must be in a healthy growing condition at the time of this inspection.
  - .10 The contractor is to provide the Landscape Architect with a full scale marked plan showing any substitutions or changes in colour.

### **1.8. Maintenance**

- .1 Prepare and present to the Landscape Architect, two copies of a maintenance schedule prior to the beginning of the guarantee period.
- .2 All plant materials shall be maintained by the Contractor immediately after any planting has been installed and shall continue until the date of final acceptance.
- .3 Maintenance shall include all measures necessary to establish and maintain all plants in a vigorous and healthy growing condition, including but not limited to:
  - a. Weeding of planting beds and tree pits. Use herbicides in accordance with the manufacturer's directions. Make good any damage, resulting from herbicide use at no extra cost.
  - b. Watering when required and in sufficient quantities to saturate the root system.
  - c. Pruning, including the removal of dead or broken branches, and treatment of pruning wounds with approved dressing.
  - d. Disease and insect control when required. Use chemical methods in accordance with the manufacturer's directions. Make good any damage at no extra cost.
  - e. Keep all accessories in good condition and properly adjusted. Repair or replace accessories when required at no extra cost.

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- .4 The Contractor shall be responsible for making monthly inspections of all plantings during the guarantee period and submit a written report of each inspection to the Landscape Architect.
  - .5 The Contractor shall instruct the Landscape Architect in writing of any corrective or preventative measures necessary to ensure healthy plant growth. Any damage to plants shall be reported in writing to the Landscape Architect.
  - .6 At the time of acceptance, all material must be in a healthy vigorous growing condition. Beds and tree pits must be free of weeds, rubbish or debris.

### **1.9. Guarantee**

- .1 The guarantee period for approved “collected plants” shall extend for a period of one (1) year beyond the period specified under SECTION 01 78 36 - WARRANTIES.
- .2 During the guarantee period, the Contractor shall make monthly inspections and replace all plants which are dead, missing or which are not in a healthy vigorous growing condition.
- .3 Supply and plant all replacements in strict accordance with Contract Documents and guarantee replacement as specified.
- .4 Tag or mark, in a permanently visible manner, all replacement plant material and notify the Landscape Architect, in writing of the date on which replacements were planted. Include a sketch showing location of replaced plants.
- .5 Plant replacements at a time which is in accordance with good horticultural practice.
- .6 Remove all accessories and cut at grade, those trees which are to be replaced at a later date. Remove plants, which are to be replaced, when found, or when notified by the Landscape Architect.

## **PART II – PRODUCTS**

### **2.1. Plant Material**

- .1 All plant material must be nursery grown and meet the specifications set out in the latest Guide Specifications for Nursery Stock prepared by the Canadian Nursery Trade Association (CNTA) for quality and method of cultivation.
- .2 Nomenclature of specified plants shall conform to the International Code of Nomenclature for Cultivated Plants and the latest edition of Standardized Plant Names.
- .3 Any plant material not conforming to 2.1.1 above will be designated as collected plants.
- .4 Collected plants may only be used when approved in writing, by the Landscape Architect.
- .5 Plant Material: true to name and type, structurally sound, well branched; healthy and vigorous and free from disease, insect infestations, rodent damage, sun scald, frost cracks, and other abrasions to the bark and densely foliated with a healthy, well developed root system. Pruning wounds must show vigorous bark on all edges and all parts must show live and green cambium tissue when cut.

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- .6 All material must conform to the sizes shown on the plant list, except that larger material may be used when approved by the Landscape Architect. Use of larger plants will not increase the contract price.
  - .7 Plant material sizes must conform to the following standards:
    - a. caliper – diameter of the trunk measured 150 mm above the normal grade around the plant.
    - b. height – measured from the normal grade around the plant to the top of the main foliage mass.
    - c. spread – the diameter of the main foliage mass, at its widest point.

### **2.2. Other Material**

- .1 Topsoil: a fertile, friable, natural loam; mechanically screened, containing not less than 4% organic matter for clay loams and not less than 4% organic matter for sandy loams to a maximum of 15% and capable of sustaining vigorous plant growth, free of subsoil contamination, roots and stones over 25mm diameter, reasonably free of weeds (as determined by the Landscape Architect) and having a pH ranging from 6.0 to 7.5.
- .2 Peat moss: partially decomposed fibrous form of cellular stems and leaves of sphagnum moss, free of woody substance and harmful mineral matter, having a pH range of 4.5 to 6.0 and furnished in air dry state packed in standard bags of bales showing the name of the manufacturer.
- .3 Tree Wrap: 225 g burlap supplied in strips 150 mm minimum to 250 mm maximum width or heavy, waterproof crepe paper 100 mm to 150 mm wide.
- .4 Anchor stakes: metal 'T' bars: 51 x 51 x 5mm – 2500mm long, or  
Wood stakes: 50 x 50mm - 2130mm long (as specified)
- .6 Wire: #10 galvanized wire for trees 75mm caliper or larger and #11 gauge galvanized wire for smaller trees. Alternative: Use 19mm (3/4" ) Hemp Rope if specified.
- .7 Hose: two ply, reinforced, 20mm diameter, new, black rubber garden hose.
- .8 Mulch: as specified on details.
- .9 Rodent Guards: 300mm Big 'O' pipe, 200mm MIN Height.
- .10 Rodent Wrap Tree Protectors : spiral, plastic tree wrap.
- .11 Fertilizer Tablets: as per details.

### **2.3. Mixes**

- .1 Provide standard planting soil mix as follows: 6 parts dark loam topsoil, to 2 parts well-rotted cow manure and 1 part peat moss. (Mix thoroughly and provide sample prior to planting.)
- .2 Add bone meal at the rate of .58 kg per cubic metre and mix thoroughly for each tree or planting bed.
- .3 Be prepared to adjust the above rate in response to the soil analysis report.

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### **2.4 Planter Soil Mixes**

- .1 Provide soil mix equal as per drawings, or approved.

## **PART III – EXECUTION**

### **3.1. Preparation**

- .1 Obtain the approval of the Landscape Architect of all planting excavations
- .2 Apply topsoil to a depth of 450 mm for shrub and ground cover beds.

### **3.2. Installation of Plant Material**

- .1 Planting shall be done during periods suitable with respect to weather conditions and locally accepted practice and to the Landscape Architect's approval.
- .2 Ensure width of all planting excavations is 3 times the diameter of the root ball.
- .3 Place plant plumb in the centre of the planting pit with a minimum of 150mm of compacted planting soil mixture under the root ball. Face the plant to give the best appearance or relationship to adjacent structures. Cut away any ropes which might girdle the tree. Remove all rope, wire, and burlap from top 1/3 of the root ball.
- .4 Place bare root plants so that the roots lie in a natural position.
- .5 Backfill with planting soil in 150mm layers and firmly tamp each layer to ensure the plant remains plumb. Ensure no air pockets remain around the roots.
- .6 Water thoroughly when hole is 1/2 full of tamped soil mixture and again when the operation is complete.
- .7 Except for plants in planting beds, construct an earth saucer around each plant equal to the diameter of the rootball and 100mm minimum depth to retain water around the roots.

### **3.3. Installation of Planting Accessories**

- .1 Wrap all trees over 50mm caliper. Apply wrapping in a spiral manner from grade to above the second branch. Secure wrapping with suitable cord.
- .2 Stake or guy all trees as outlined in the drawings and detail.

### **3.4. Pruning**

- .1 Prune plants after planting to compensate for root loss and in such a manner that the natural shape and character are retained. Do not cut a leader. Use only clean and sharp tools, conforming to proper horticultural practice.

### **3.5. Mulching**

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- .1 Where a mulch is called for, place a minimum 100mm depth of shredded bark mulch over the planting area. Use only specified mulch. No other type of mulch is acceptable unless approved in writing by the Landscape Architect.
- .2 Cut and spread a 1200 x 1200 mm piece of approved landscape cloth around the base of each tree and shrub before mulch is spread.

### **3.6. Clean-up**

- .1 At the completion of planting operations, remove all surplus material from the site at no extra cost.
- .2 Make good all damage resulting from planting operations at no extra cost.
- .3 Maintain all areas neat and tidy at all times until final acceptance.

**End of Section**