

TREE AND SHRUB PRESERVATION**PART 1 GENERAL****1.1 RELATED SECTIONS**

- .1 Section 32 93 10 – Trees, Shrubs and Ground Cover Planting.

1.2 REFERENCES

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

1.3 DEFINITION

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

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE AND HANDLING

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

1.7 SCHEDULING

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

1.8 MAINTENANCE DURING WARRANTY PERIOD

- .1 From time of acceptance by Departmental Representative to end of warranty period, perform following maintenance operations.
- .2 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
- .3 Apply pesticides in accordance with National Standard for Pesticide Education, Training and Certification in Canada, Federal, Provincial and Municipal regulations as and when required to control insects, fungus and disease. Obtain product approval from Departmental Representative prior to application.
- .4 Apply fertilizer in early spring at rate of 0.025 kg of nitrogen/m².
- .5 Remove dead, broken or hazardous branches from plant material. Dispose of debris through alternative disposal.

PART 2 PRODUCTS**2.1 MATERIALS**

- .1 Fill:
 - .1 Type (A): clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.
 - .2 Type (B): excavated pervious soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc). Excavated material shall be approved by Departmental Representative before use as fill.
- .2 Coarse washed stones: 35-75mm diameter clean round hard stone.
- .3 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded minimum particle size: 5mm.
- .4 Fertilizer:
 - .1 To Canada Fertilizer Act and Fertilizers Regulations.
 - .2 Complete, commercial, slow release with 35% of nitrogen content in water-

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insoluble form.

- .5 Anti-desiccant: commercial, wax-like emulsion.
- .6 Filter Cloth:
 - .1 Type 1: 100 % non-woven needle punched polyester, 2.75 mm thick, 240 g/m² mass.
 - .2 Type 2: biodegradable burlap.
- .7 Wood posts: 38 x 89 x 2400mm length, untreated wood.
- .8 Welded wire fabric (WWF): 100 x 100mm, MW 15 x MW 15, to CSA G30.5.

PART 3 EXECUTION**3.1 IDENTIFICATION AND PROTECTION**

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

3.2 TREE PROTECTION FENCING

- .1 Erect tree protection fencing as indicated on landscape drawings.

3.3 SOIL AND ROOT ZONE PROTECTION

- .1 Where equipment and pedestrian access within the dripline is unavoidable, protect critical root zone from compaction as indicated on landscape details.

3.4 ROOT PRUNING TECHNIQUE

- .1 Where trenching and excavation within the dripline / critical root zone is unavoidable, pruning roots as indicated on landscape details.
- .2 Backfill trench / excavation immediately after root pruning and associated work are complete to avoid desiccation.
- .3 If trench / excavation are to be left exposed for a period of time exceeding 24hrs, cover the exposed wall with 2 layers of burlap. Maintain burlap in moist condition to the satisfaction of the Departmental Representative.

END OF SECTION

GRANULAR SUB-BASE**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .2 Section 32 16 15 – Concrete Walks and Curbs

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117-17, Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131 / C131M – 14. Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136 / C136M – 14. Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698 - 12e2. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³)).
 - .5 ASTM D1557 - 12e1. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - .6 ASTM D1883 – 16. Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.
 - .7 ASTM D4318 - 17e1. Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.3 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products**2.1 MATERIALS**

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended meeting the requirements of OPSS 1004 and OPSS 1010. Aggregates derived from slag are not permitted.
- .2 Granular A to be used as base and bedding material, Granular B Type II for sub-base, Select Subgrade Material for trench backfill, including backfill against foundations and structures.
- .3 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed five times least dimension.

GRANULAR SUB-BASE

- .4 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel.
- .5 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate. Slag and expanded shale are not permitted.

2.2 SOURCE QUALITY CONTROL

- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
- .2 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .3 Advise Departmental Representative 4 weeks in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution**3.1 PLACING**

- .1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Place material only on clean unfrozen surface, free from snow or ice.
- .4 Begin spreading sub-base material on crown line or high side of one-way slope.
- .5 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

GRANULAR SUB-BASE

- .9 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 100% maximum dry density in accordance with ASTM D1557.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 PROOF ROLLING

- .1 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm maximum.
- .2 Obtain approval from Departmental Representative to use non standard proof rolling equipment.
- .3 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
- .4 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

3.4 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.5 PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative.

END OF SECTION

ASPHALT PAVING – SHORT FORM**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 32 11 19 – Granular Sub-Base.

1.2 REFERENCES

- .1 It is the Contractors responsibility to obtain the required standard specification documents.
- .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 310-17. Hot Mix Asphalt.
 - .2 OPSS 1103-16, Emulsified Asphalt.
 - .3 OPSS 1150-16, Hot Mix Asphalt.

1.3 PROTECTION

- .1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38 degrees C. Do not permit stationary loads on pavement until 24 h after placement.
- .2 Where applicable provide access to buildings as required. Arrange paving schedule so as not to interfere with normal use of premises.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Divert unused aggregate materials from landfill to facility for reuse as approved by Departmental Representative.
- .5 Dispose of unused paint and paint thinner materials at official hazardous material collections site as approved by Departmental Representative.
- .6 Fold up metal banding, flatten and place in designated area for recycling.
- .7 Do not dispose of unused paint and paint thinner material into sewer system, into streams, lakes, onto ground or in other location where it will pose health environmental hazard.
- .8 Divert unused asphalt from landfill to facility capable of recycling materials.

Part 2 Products

ASPHALT PAVING – SHORT FORM**2.1 MATERIALS**

- .1 All materials and dimensions shall be as described in OPSS 310 and 1150, and associated specifications.
- .2 Granular bases: material to Ontario Provincial Standard Specification MUNI 1010, for Granular 'A, B and SSM'.
- .3 Asphaltic concrete: approved plant hot-mixes, hot laid to Ontario Provincial Standard Specification OPSS 1150.
- .4 Traffic Paint: yellow traffic paint to CAN/CGSB-174.

Part 3 Execution**3.1 GENERAL**

- .1 Construction of asphalt pavement shall be as described in OPSS 310 and 1150.

3.2 PLANT AND MIXING REQUIREMENTS

- .1 To Ontario Provincial Standard Specification OPSS 310 and 1150.

3.3 EQUIPMENT

- .1 Pavers: mechanical self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Rollers, general: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
- .3 Vibratory rollers:
 - .1 Minimum drum diameter: 1500 mm.
 - .2 Maximum amplitude of vibration (machine setting): 0.5 mm for lifts less than 40 mm thick.
- .4 Haul trucks: of adequate size, speed and condition to ensure orderly and continuous operation.
- .5 Suitable hand tools.

3.4 PAVEMENT THICKNESS

- .1 Pavements for parking lots and pathways:
 - .1 Wear course: 50mm HL3
 - .2 Base course: 50mm HL8

3.5 ASPHALT CONCRETE PAVING

ASPHALT PAVING – SHORT FORM

- .1 Obtain approval of base from Departmental Representative before placing asphalt mix for asphalt walks and surfaces.
- .2 Adjust catch basins, manholes and other iron work encountered in accordance with Ontario Provincial Standards, to match finish grades.
- .3 Place asphalt mix only when base or previous course is dry and air temperature is above 5 degrees Celsius.
- .4 Place asphalt concrete in compacted layers not exceeding 50 mm.
- .5 Minimum 120 degrees Celsius mix temperature required when spreading.
- .6 Maximum 160 degrees Celsius mix temperature permitted at any time.
- .7 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
- .8 Roll until roller marks are eliminated. Compact to density not less than 95% of density obtained with Marshall specimens prepared in accordance with ASTM D1559 from samples of mix being used.
- .9 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .10 Moisten roller wheels with water to prevent mix adhesion.
- .11 Compact mix with hot tampers or other equipment approved by Departmental Representative, in areas inaccessible to roller.
- .12 Tamp all edges as per drawings.
- .13 Finish surface smooth, true to grade to within 10 mm and with no irregularities greater than 10 mm in 4.5 m.
- .14 Paint traffic markings as indicated on the site plan.

3.6 JOINTS

- .1 Cut bituminous course to full depth in neat lines to provide full cross section against which new paving may be laid. Remove loose material.
- .2 Paint exposed vertical edge of asphaltic joints, edges of manholes and catch basin frames, curbs and similar items with hot asphalt cement or liquid cut back asphalt prior to placing of fresh mix.
- .3 Overlap previously laid strip with spreader by 150 mm.
- .4 Carefully place and compact hot asphaltic material against joints.

3.7 DEFECTIVE WORK

ASPHALT PAVING – SHORT FORM

- .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 a true and even surface and compact immediately to specified density.
- .2 Repair areas showing checking or rippling.
- .3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.8 TRAFFIC MARKINGS

- .1 Paint parking space divisions and other pavement markings in accordance with Manufacturer's recommendations and as indicated.
- .2 Use paint thinner in accordance with manufacturer's requirements.

END OF SECTION

CONCRETE WALKS AND CURBS**Part 1 General****1.1 RELATED REQUIREMENTS**

1. Section 03 10 00 – Concrete Formwork.
2. Section 03 20 00 – Concrete Reinforcement.
3. Section 03 30 00 – Cast-in-Place Concrete.
4. Section 03 23 33.01 – Excavation, Trenching and Backfilling.
5. Section 32 11 19 – Granular Sub-Base.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 698-12e1(2012), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely

Part 2 Products**2.1 MATERIALS**

- .1 Concrete mixes and materials: to Section 03 30 00 - Cast-in-Place Concrete.
- .2 Reinforcing steel: to Section 03 20 00 - Concrete Reinforcing.
- .3 Concrete Formwork: to Section 03 10 00 – Concrete Formwork.
- .4 Joint filler: to Section 03 30 00 - Cast-in-Place Concrete.
- .5 Granular base: to Section 32 11 19 – Granular Sub-Base.
- .6 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.
- .7 Boiled linseed oil: to CAN/CGSB-1.2.
- .8 Kerosene: to CAN/CGSB-3.3.

CONCRETE WALKS AND CURBS**Part 3 Execution****3.1 GRADE PREPARATION**

- .1 Do grade preparation work in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials. Dispose of surplus and unsuitable excavated material off site.
- .3 Place fill in maximum 150 mm layers and compact to at least 95% of maximum density to ASTM D 698.

3.2 GRANULAR BASE

- .1 Obtain Departmental Representative's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular base to at least 95% of maximum density to ASTM D 698.

3.3 CONCRETE

- .1 Obtain Departmental Representative's approval of granular base and reinforcing steel prior to placing concrete.
- .2 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centreline.
- .4 Provide edging as indicated with 10 mm radius edging tool.

3.4 TOLERANCES

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

3.5 EXPANSION AND CONTRACTION JOINTS

- .1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at interval spacing as indicated on drawing.
- .2 Install expansion joints as directed by Departmental Representative at minimum intervals of 6 m or to match existing.
- .3 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.

CONCRETE WALKS AND CURBS**3.6 ISOLATION JOINTS**

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Seal isolation joints with sealant approved by Departmental Representative.

3.7 CURING

- .1 Cure concrete by adding moisture continuously in accordance with CAN/CSA-A23.1 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound approved by Departmental Representative.
- .2 Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
- .3 Apply curing compound evenly to form continuous film. In accordance with manufacturer's requirements.

3.8 BACKFILLING

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material approved by Departmental Representative. Compact and shape to required contours as indicated or as directed by Departmental Representative.

3.9 LINSEED OIL TREATMENT

- .1 After concrete has cured for specified curing time and when surface of concrete is clean and dry, apply two coats of linseed oil mixture uniformly to surfaces of curbs, walks and gutters.
- .2 Linseed oil mixture to consist of 50% boiled linseed oil and 50% mineral spirits by volume.
- .3 Apply treatment when air temperature above 10°C.
- .4 Apply first coat at 135 mL/m².
- .5 Apply second coat at 90 mL/m² when first coat has dried.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 31 23 13 – Rough Grading
- .2 Section 32 92 20 – Mechanical Seeding
- .3 Section 32 93 10 – Trees, shrubs and groundcover planting

1.2 DEFINITIONS

- .1 **COMPOST:** A mixture of soil and decomposing organic matter used as a fertilizer, mulch, or soil conditioner. Compost is processed organic matter containing 40% or more organic matter as determined by the Walkley-Black or LOI test. 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. Composed bio-solids must meet the requirements of the Guidelines for Compost Quality, Category (A) (B) produced by the Canadian Council of the Ministers of the Environment (CCME), January 1996.

1.3 QUALITY ASSURANCE

- .1 **Test Reports:** certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 **Certificates:** product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 **Pre-Installation Meetings:** conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance to Section 01 74 21 – Construction / Deconstruction Waste Management. Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.
- .2 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products**2.1 TOPSOIL**

- .1 Topsoil for sodded and seeded areas and planting beds: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.

TOPSOIL PLACEMENT AND GRADING

- .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, 7-20 % clay, and contain 5 to 10 % organic matter by weight.
- .2 Contain no toxic elements or growth inhibiting materials.
- .3 Finished surface free from:
 - .1 Debris and stones.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
- .4 Consistence: friable when moist.

2.2 SOIL AMMENDMENTS

- .1 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 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, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .5 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

2.3 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. Soil sampling, testing and analysis to be in accordance with Provincial standards. Departmental Representative will pay for cost of tests.

TOPSOIL PLACEMENT AND GRADING**Part 3 Execution****3.1 PREPARATION OF EXISTING GRADE**

- .1 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and 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 and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.2 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 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil to following minimum depths after settlement.
 - .1 135 mm for sodded areas.
 - .2 150 mm for seeded areas.
 - .3 400 mm for flower and shrub beds.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.3 FINISH GRADING

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

3.4 ACCEPTANCE

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

3.5 SURPLUS MATERIAL

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

TOPSOIL PLACEMENT AND GRADING

3.6 CLEANING

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

END OF SECTION

MECHANICAL SEEDING**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 32 91 21 – Topsoil Placement and Grading.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Provide product data for:
 - .1 Seed.
 - .2 Fertilizer.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.4 SCHEDULING

- .1 Schedule completion of work after frost has left ground and before June 15, or between August 25 and September 30.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management.
- .2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.
- .3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products**2.1 SEED**

MECHANICAL SEEDING

- .1 Canada "Certified" seed, "Canada No. 1, germination and purity in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
 - .1 Non-Invasive, native grass and wildflower seed mixture.
 - .2 TYPE 1 Seed Mix (Turfgrass / Lawn – as per plan)
50% Kentucky Bluegrass (equal blend of 3 varieties)
20% Creeping Fescue
15% Tall Fescue (turf type)
15% Perennial Ryegrass

Application rate: 2.5kg per 100m²
 - .3 TYPE 2 Seed Mix (Naturalized areas – as per plan)
30% Meadow Foxtail (*Alpocurus pratensis*)
15% Fox Sedge (*Carex vulpinoidea*)
30% Virginia Wild Rye (*Elymus virginicus*)
25% Fowl Meadowgrass (*Poa palustris*)

Application rate: 2.5 per 100m²
 - .4 Nurse / Cover Crop: Add annual rye grass to the mixtures if the seeding is to be done during any time other than between August 25 and September 30.
Include at 0.5kg/100m²
- .2 In packages individually labeled in accordance with "Seeds Regulations" and indicating name of supplier.

2.2 WATER

- .1 Free of impurities that would inhibit germination and growth.

2.3 FERTILIZER

- .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
- .2 Complete synthetic fertilizer with guaranteed minimum analysis as specified.

Part 3 Execution**3.1 QUALITY OF WORK**

- .1 Do not perform work under adverse field conditions as determined by Departmental Representative.
- .2 Remove and dispose of weeds, debris, stones, soil contaminated by oil, gasoline and other deleterious materials; off site.

MECHANICAL SEEDING**3.2 SEED BED PREPARATION**

- .1 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated to tolerance of plus or minus 15 mm, surface draining naturally.
- .3 Cultivate fine grade approved by Departmental Representative to 25 mm depth immediately prior to seeding.

3.3 SEED PLACEMENT

- .1 For mechanical seeding:
 - .1 Use "Brillion" type mechanical landscape seeder which accurately places seed at specified depth and rate and rolls in single operation.
 - .2 Use equipment and method acceptable to Departmental Representative.
- .2 For manual seeding:
 - .1 Use "Cyclone" type manually operated seeder.
 - .2 Use manually operated, water ballast, landscaping type, smooth steel drum roller. Ballast as directed by Departmental Representative.
 - .3 Use equipment and method acceptable to Departmental Representative.
- .3 On cultivated surfaces, sow seed uniformly at indicated rates.
- .4 Blend applications 300 mm into adjacent grass areas and previous applications to form uniform surfaces.
- .5 Sow half of required amount of seed in one direction and remainder at right angles as applicable.
- .6 Incorporate seed by light raking in cross directions.
- .7 Consolidate mechanically seeded areas by rolling area if soil conditions warrant or if directed by Departmental Representative with equipment approved by Departmental Representative immediately after seeding.
- .8 Install measures to demarcate naturalized areas as indicated on drawings.

3.4 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods to a program approved by Departmental Representative. Program shall be based on results of laboratory analysis of in-place topsoil. Cost of testing is the responsibility of the Contractor.

MECHANICAL SEEDING**3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD**

- .1 Perform following operations from time of seed application until acceptance by Departmental Representative:
 - .1 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .3 Do not mow or trim vegetation during the first season of growth. Consideration will be given to allow this exercise only as a means to control an infestation of undesirable plants.
 - .4 Fertilize seeded areas in accordance with approved fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .5 Control weeds by mechanical or cultural means utilizing acceptable integrated pest management practices.

3.6 FINAL ACCEPTANCE

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

3.7 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period.
 - .1 Water seeded area to maintain optimum soil moisture level for continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.
 - .3 Do not mow or trim vegetation during the first season of growth. Consideration will be given to allow this exercise only as a means to control an infestation of undesirable plants.
 - .4 Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .5 Control weeds by mechanical or cultural means utilizing acceptable integrated pest management practices.

3.8 CLEANING

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

MECHANICAL SEEDING

END OF SECTION

SODDING**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 32 92 21 – Topsoil Placement and Grading.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Samples.
 - .1 Submit:
 - .1 Sod for each type specified.
 - .1 Install approved samples in one square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.
 - .2 Bio-degradable geotextile fabric.
- .2 Obtain approval of samples by Departmental Representative.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.4 SCHEDULING

- .1 Schedule sod laying to coincide with preparation of soil surface.
- .2 Schedule sod installation when frost is not present in ground.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.
- .3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products**2.1 MATERIALS**

- .1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

SODDING

- .1 Turf Grass Nursery Sod type:
 - .1 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivars.
- .2 Turf Grass Nursery Sod quality:
 - .1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.
 - .2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.
 - .3 Mowing height limit: 35 to 65 mm.
 - .4 Soil portion of sod: 6 to 15 mm in thickness.
- .2 Sod establishment support:
 - .1 Geotextile fabric: biodegradable, square mesh.
 - .2 Biodegradable starch pegs: 17 x 8 x 200 mm.
- .3 Water:
 - .1 Free of impurities that would inhibit plant growth.
- .4 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain approval from Departmental Representative of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

Part 3 Execution**3.1 PREPARATION**

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 21 - Topsoil Placement and Grading. If discrepancies occur, notify Departmental Representative and do not commence work until instructed.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, elevations indicated, to tolerance of plus or minus 8 mm, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site as directed by Departmental Representative.

3.2 SOD PLACEMENT

- .1 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.

SODDING

- .2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .3 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

- .1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.
- .2 Start laying sod at bottom of slopes.
- .3 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
 - .2 Not less than 3 pegs per square metre.
 - .3 Not less than 6 pegs per square metre in drainage structures. Adjust pattern as directed by Departmental Representative.
 - .4 Drive pegs to 20 mm above soil surface of sod sections..

3.4 FERTILIZING PROGRAM

- .1 Fertilize during establishment period as directed by Departmental Representative.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
- .3 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas as directed by Departmental Representative.
- .4 Maintain sodded areas weed free 95%.
- .5 Fertilize areas in as directed by Departmental Representative. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.6 ACCEPTANCE

- .1 Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum 2 times prior to acceptance.

SODDING

- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.7 CLEANING

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

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 32 91 21 – Topsoil Placement and Grading.

1.2 REFERENCES

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

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data for:
 - .1 Fertilizer.
 - .2 Mycorrhiza.
 - .3 Anti-desiccant.
 - .4 Guying assembly including clamps, collar, guying wire, anchors and wire tightener.
 - .5 Mulch.
- .3 Submit WHMIS MSDS for hazardous materials.
- .4 Submit samples for:
 - .1 Mulch.
 - .2 Mycorrhiza.

1.5 QUALITY ASSURANCE

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

01 35 29.06 - Health and Safety Requirements.

1.6 STORAGE AND PROTECTION

- .1 Protect plant material from frost, excessive heat, wind and sun during delivery.
- .2 Immediately store and protect plant material which will not be installed within 1 hour after arrival at site in storage location approved by Departmental Representative.
- .3 Protect stored plant material from frost, wind and sun and as follows:
 - .1 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in sand, topsoil or mulch and watering to full depth of root zone.
 - .2 For pots and containers, maintain moisture level in containers. Heel-in fibre pots.
 - .3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.
- .4 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Handle and dispose of hazardous materials in accordance with Municipal regulations.
 - .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
 - .5 Dispose of unused fertilizer at official hazardous material collection site approved by Departmental Representative.
 - .6 Divert unused wood and mulch materials from landfill to composting facility approved by Departmental Representative.

1.7 SCHEDULING

- .1 Obtain approval from Departmental Representative of schedule 7 days in advance of shipment of plant material.
 - .1 Schedule to include:
 - .2 Quantity and type of plant material.
 - .3 Shipping dates.
 - .4 Arrival dates on site.
 - .5 Planting Dates.

1.8 WARRANTY

- .1 Provide warranty that plant material (as itemized on plant list) will remain free of defects for 1 full growing season.
- .2 End-of-warranty inspection will be conducted by Departmental Representative.

Part 2 Products**2.1 PLANT MATERIAL**

- .1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock.
- .2 Source of plant material: grown in Zone 5 in accordance with Plant Hardiness Zones in Canada.
- .3 Plant material must be planted in zone indicated as appropriate for its species.
- .4 Plant material in location appropriate for its species.
- .5 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- .6 Trees: with straight trunks, well and characteristically branched for species except where specified otherwise.
- .7 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.

2.2 WATER

- .1 Free of impurities that would inhibit plant growth.

2.3 STAKES

- .1 T-bar, steel, 40 x 40 x 5 x 2440 mm.

2.4 WIRE TIGHTENER

- .1 Turnbuckle, galvanized steel, 9.5 mm diameter with 270 mm open length.

2.5 GUYING WIRE

- .1 Steel, 3 mm wire.

2.6 GUYING COLLAR

- .1 Tube: plastic, 13 mm diameter, nylon reinforced.

2.7 TRUNK PROTECTION

- .1 Wire mesh: galvanized, electrically welded 1.4 mm wire with 25 x 25 mm mesh and fastener.

2.8 WEED CONTROL

- .1 Mulch - Shredded wood: varying in size from 25 to 75 mm in length, from coniferous trees.

2.9 FERTILIZER

- .1 Synthetic commercial type as recommended by soil test report and approved by Departmental Representative.

2.10 ANTI-DESICCANT

- .1 Wax-like emulsion.

2.11 FLAGGING TAPE

- .1 Fluorescent, yellow colour.

2.12 TRUNK / RODENT PROTECTION

- .1 Physical barriers, as indicated.

2.13 SOURCE QUALITY CONTROL

- .1 Obtain approval from Departmental Representative of plant material prior to planting.
- .2 Imported plant material must be accompanied with necessary permits and import licenses. Conform to Federal, Provincial or Territorial regulations.

Part 3 Execution**3.1 PRE-PLANTING PREPARATION**

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Ensure plant material acceptable to Departmental Representative.
- .3 Remove damaged roots and branches from plant material.
- .4 Apply anti-desiccant to conifers and deciduous trees in leaf in accordance with manufacturer's instructions.

3.2 EXCAVATION AND PREPARATION OF PLANTING BEDS

- .1 Prepare planting beds as specified in Section 32 91 21 -Topsoil Placement &

Grading.

- .2 For individual planting holes:
 - .1 Stake out location and obtain approval from Departmental Representative prior to excavating.
 - .2 Excavate to depth and width as indicated.
 - .3 Remove subsoil rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.
 - .4 Scarify sides of planting hole.
 - .5 Remove water which enters excavations prior to planting. Notify Departmental Representative if water source is ground water.

3.3 PLANTING

- .1 For bare root stock, place 50 mm backfill soil in bottom of hole. Plant trees and shrubs with roots placed straight out in hole.
- .2 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball. Do not pull burlap or rope from under root ball.
- .3 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.
- .4 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.
- .5 For trees and shrubs:
 - .1 Backfill soil in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.
 - .2 Form watering saucer as indicated.
- .6 For ground covers, backfill soil evenly to finish grade & tamp to eliminate air pockets.
- .7 Water plant material thoroughly.
- .8 After soil settlement has occurred, fill with soil to finish grade.
- .9 Dispose of burlap, wire and container material off site.

3.4 TRUNK / RODENT PROTECTION

- .1 Install trunk / rodent protection on deciduous trees as indicated.
- .2 Install trunk / rodent protection prior to installation of tree supports when used.

3.5 TREE SUPPORTS

- .1 Install tree supports as indicated.

3.6 MULCHING

- .1 Ensure soil settlement has been corrected prior to mulching.
- .2 Spread mulch as indicated.

3.7 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following maintenance operations from time of planting to acceptance by Departmental Representative.
 - .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
 - .1 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
 - .2 Remove weeds monthly.
 - .3 Replace or respread damaged, missing or disturbed mulch.
 - .4 Cultivate non-mulched areas to keep top layer of soil friable.
 - .5 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
 - .6 Remove dead or broken branches from plant material.
 - .7 Keep trunk protection and guy wires in proper repair and adjustment.
 - .8 Remove and replace dead plants and plants not in healthy growing condition. Make replacements as specified for original plantings.

3.8 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform the following maintenance operations from the date of Substantial Performance to the end of the warranty period.
 - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
 - .2 Reform damaged watering saucers.
 - .3 Remove weeds monthly.
 - .4 Replace or respread damaged, missing or disturbed mulch.
 - .5 For non-mulched areas, cultivate monthly to keep top layer of soil friable.
 - .6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative prior to application.
 - .7 Apply fertilizer in early spring as indicated by soil test.
 - .8 Remove dead, broken or hazardous branches from plant material.
 - .9 Keep trunk protection and tree supports in proper repair and adjustment.
 - .10 Remove trunk protection, tree supports and level watering saucers at end of warranty period.
 - .11 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

END OF SECTION