Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
- .2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .4 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft3) (600kN-m/m3).
- .5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft3) (2,700kN-m/m3).
- .6 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .7 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 .Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.3 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Metric.

.4 City of Winnipeg (CW)

- .1 City of Winnipeg Standard Construction Specifications.

1.2 DELIVERY, STORAGE AND HANDLING

.1 Deliver and stockpile aggregates in locations that are accessible to construction, but will not damage existing structures or landscape designated to remain. Stockpile minimum 50% of total aggregate required prior to beginning operations.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate metal, plastic, wood and corrugated cardboard packing and place in designated areas for disposal or recycling in accordance with Section 01 74 00 – Cleaning and Waste Management.

Part 2 Products

2.1 GRANULAR BASE MATERIAL

.1 Class ‘A’ and Class ‘B’ aggregate in accordance with The City of Winnipeg Standard Construction Specifications CW 3110.

Part 3 Execution

3.1 PLACING

.1 Place granular base after subgrade is inspected and approved by the Contract Administrator.

.2 Construct granular base to depth and grade in areas indicated on drawings.

.3 Ensure no frozen material is placed.

.4 Place material only on clean, unfrozen surface, free from snow and ice.

.5 Place granular 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 screens which will place material in uniform layers of required thickness.

.7 Place material to full width in uniform layers not exceeding 150mm compacted thickness.

.8 Contract Administrator may authorize thicker lifts (layers) if specified compaction can be achieved.

.9 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.10 Remove and replace that portion of layer in which material becomes segregated during spreading.

3.2 COMPACTION

.1 Compact to density of not less than 98% corrected maximum dry density.

.2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.3 Apply water as necessary during compacting to obtain specified density.

.4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Contract Administrator.

.5 Compaction along building edges, curb faces, and around utilities to be completed with vibratory rammer (jumping jack).

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 SITE TOLERANCES

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

3.4 CLEANING

.1 Perform cleaning after aggregate base course installation to remove construction and accumulated environmental dirt. Remove surplus materials, excess materials, rubbish, tools and equipment.

3.5 ACCEPTANCE

.1 Obtain final approval of aggregate base courses via site inspection with the Contract Administrator.

3.6 PROTECTION

.1 Maintain finished base in condition conforming to this section until succeeding base is constructed, or until granular base is accepted by the Contract Administrator.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation BarriersCompliance Board's "Americans With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.

.2 City of Winnipeg 2015 Accessibility Design Standards

.3 City of Winnipeg Standard Construction Specification CW 3326 – Detectable Tactile Warning Surfaces.

.4 ASTM International (American Society for Testing and Materials):

.1 ASTM B 117: Standard Practice for Operating Salt Spray (Fog) Apparatus.

.2 ASTM C 501: Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.

.3 ASTM C 1028: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.

.4 ASTM D 570: Standard Test Method for Water Absorption of Plastics.

.5 ASTM D 638: Standard Test Method for Tensile Properties of Plastics.

.6 ASTM D 695: Standard Test Method Compressive Properties of Rigid Plastics.

.7 ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.8 ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.

.9 ASTM G 26: Standard Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.

.10 ASTM G 155: Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

1.2 SUBMITTALS

.1 Product Data:

.1 In accordance with Section 01 33 00 – Submittal Procedures.

.2 For each type of product indicated. Include technical data and tested physical and performance properties.

.2 Shop Drawings: Show layout and placement of tactile warning surface panel joints and fasteners.

.3 Samples for Initial Selection: Manufacturer's full range of colors and patterns for tactile warning surfaces, for selection by Contract Administrator.

.1 Minimum Number of Colors for Selection: Four.

.4 Samples for Verification: 6 inch by 6 inch sample, for each color and type of tactile warning surface.

.5 Maintenance Data:

.1 Submit copies of manufacturer's specified installation and maintenance practices for each type of Detectable Warning Tile and accessories as required.

.2 In accordance with Section 01 78 00 – Closeout Submittals.

1.3 QUALITY ASSURANCE

.1 Installer Qualifications: A qualified installer who employs Workers for this Project that are trained and approved by manufacturer.

.2 Fire-Test-Response Characteristics: Provide products identical to those tested for fire-exposure behavior per test method indicated by testing and inspecting agency acceptable to Authorities Having Jurisdiction.

.3 Regulatory Requirements: Comply with requirements for tactile warning surfaces as per the following:

.1 2010 National Building Code of Canada inclusive of Province of Manitoba amendments.

.2 2010 City of Winnipeg Accessibility Design Standards

.3 City of Winnipeg Standard Construction Specification CW 3326 – Detectable Tactile Warning Surfaces.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Surface Applied Detectable/Tactile Warning Surface Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings and tile type shall be identified by part number.

.2 Surface Applied Detectable/Tactile Warning Surface Tiles shall be delivered to location at building Site for storage prior to installation.

.3 Store panels on flat surfaces.

1.5 SITE CONDITIONS

.1 Environmental Conditions and Protection: Maintain minimum temperature of 4.4°C (40°F) in spaces to receive Surface Applied Detectable/Tactile Warning Surface Tiles for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.

.2 The use of water for Work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the general public. Provide barricades or screens to protect the general public.

1.6 COORDINATION

.1 Coordinate installation of cast-in-place tactile warning surface panels with placement of Site concrete as specified in Section 03 30 01 – Site Works CIP Concrete

.2 Verify concrete slump range is within limits as recommended in writing by manufacturer of tactile warning surface cast-in-place panels.

1.7 EXTRA STOCK

.1 Deliver extra stock to storage area designated by Contract Administrator. Furnish new materials from same manufactured lot as materials installed and enclose in protective

packaging with appropriate identification for cast-in-place tactile panels. Furnish not less than two (2)% of the supplied materials for each type, color and pattern installed.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away for public.

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

1.9 WARRANTY

.1 Surface Applied Detectable/Tactile Warning Surface Tiles shall be guaranteed in writing for a period of five (5) years from date of final completion. The guarantee includes defective Work, breakage, deformation, fading and loosening of tiles.

Part 2 Products

2.1 TACTILE WARNING SURFACES – GENERAL

.1 General: Manufacturer's detectable warning system consisting of prefabricated panels with raised truncated dome pattern and non-slip surface field area to provide warning and directional assistance to visually impaired pedestrians.

.2 Truncated Dome Profile Dimensions:

.1 Base Diameter: 0.9 inch.
.2 Diameter at Top of Truncated Dome: 0.45 inch.
.3 Dome Height: 0.2 inch.
.4 Dome Pattern: In-line square pattern.
.5 Dome Spacing: 1.67 inches center to center, both ways.

2.2 TACTILE WARNING SURFACES - CAST-IN-PLACE PANELS

.1 General: Manufacturer's prefabricated polymer or glass and carbon-reinforced composite panels with raised truncated dome pattern; designed for installation by casting embedment flanges with mechanical keyways on backside of panel into wet (e.g. uncured) concrete substrate; homogeneous color and pattern throughout thickness of material; waterproof and nonabsorbent; ultraviolet light-stable

.2 Panel Dimensions:

.1 610 x 1220mm (2'x 4') Cast in Place
.2 300 x 300mm (1'x1') Cast in Place

.3 Face Thickness: 1/8 to 3/16 inches.

.4 Panel Depth (Including Embedment Flanges): 1-3/8 to 1-1/2 inches.

.5 Colour: Federal Yellow (USA) or Safety Yellow (Canada). Colour shall be homogeneous throughout the tile.

.6 Physical Properties:

.1 Detectable Warning Surface Tile (SMC) shall be made of glass and carbon reinforced polyester based Sheet Moulded Compound.

.1 Compressive Strength: Not less than 25,000 psi, per ASTM D 695.

.2 Slip Resistance: Not less than 0.80 static coefficient of friction for wet surfaces, per ASTM C 1028.

.3 Tensile Strength: Not less than 10,000 psi, per ASTM D 638.

.4 Flexural Strength: Not less than 25,000 psi, per ASTM D 790.

.5 Abrasion Resistance: 300 minimum, per ASTM C501.

.6 Water Absorption: 0.13 percent maximum, per ASTM D 570.

.7 Accelerated Weathering: $\Delta E<5.0$ at 2,000 hrs. No fading, per ASTM G155.

.8 Flame Spread: 15 or less, per ASTM E 84.

.9 Salt and Spray Performance: No deterioration or other effects after 200 hours of exposure, per ASTM B 117.

.2 Detectable Warning Surface Tile (VPC) shall be made of vitrified polymer compoSite.

.1 Compressive Strength: Not less than 28,000 psi, per ASTM D 695.

.2 Slip Resistance: Not less than 0.80 static coefficient of friction for wet surfaces, per ASTM C 1028.

.3 Tensile Strength: Not less than 19,000 psi, per ASTM D 638.

.4 Flexural Strength: Not less than 25,000 psi, per ASTM D 790.

.5 Abrasion Resistance: 500 minimum, per ASTM C501.

.6 Accelerated Weathering: $\Delta E<4.5$ at 3,000 hrs. No fading, per ASTM G155.

.7 Salt and Spray Performance: No deterioration or other effects after 100 hours of exposure, per ASTM B 117.

.8 Freeze/Thaw: No deterioration or other effects after 200 hours of exposure, per ASTM D 1037.

2.3 ACCEPTABLE MANUFACTURERS AND PRODUCTS

.1 Manufacturer

.1 Engineering Plastics, Inc. 300 International Drive Suite 100 Williamsville, NY 14221 Phone: 1-800-682-2525 (or approved equal in accordance with B7).

.2 Products

.1 Armor-Tile (or approved equal in accordance with B7).

2.4 SUBSTITUTIONS

.1 In accordance with B7.

Part 3 Execution

3.1 EXAMINATION

.1 Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content and other conditions affecting performance.

.2 Do not begin installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Prepare substrates according to manufacturer's written recommendations to ensure adhesion of tactile warning surface panels.

.2 At areas to receive surface-applied tactile warning panels, verify that substrates are dry and free of curing compounds, sealers, loose material, dust, oils, grease, and other foreign materials that might impair adhesive bond.

.3 Prior to installation, clean backside of surface-applied tactile

3.3 INSTALLATION, GENERAL

.1 General: Install tactile warning surface in accordance with manufacturer's written instructions and the City of Winnipeg Standard Construction Specification CW 3326 – Detectable Tactile Warning Surfaces.

.2 Lay out tactile warning surface panels in accordance with the City of Winnipeg Standard Construction Specification CW 3326 – Detectable Tactile Warning Surfaces.

.3 If not indicated otherwise, lay out panels from center marks established at end points, so panels at opposite ends of run are of equal width. Adjust as necessary to avoid using cut widths equal to less than one-half of a panel width at ends.

.4 Maintain correct orientation of each panel, so as to maintain correct alignment of truncated domes from panel to panel.

.5 Set panels true and square to adjacent curbs, ramps and paving edges.

.6 Install adjacent panels in accordance with manufacturer's written instructions to maintain correct spacing and alignment of truncated domes from panel to panel.

.7 Where cut widths are necessary, cut and fit panels along a clean, straight line.

.8 Where occurring adjacent to vertical

3.4 INSTALLATION - CAST-IN-PLACE TACTILE WARNING SURFACE PANELS

.1 Refer to Section 03 30 01 – Site Works CIP Concrete for placement and finishing of concrete paved substrate at areas to receive cast-in-place tactile warning surfaces.

.2 Upon placement and finishing of concrete substrates, verify proper lines and levels have been achieved.

.3 Protect finished face of tactile warning surface panel from wet concrete with manufacturer's plastic sheeting or other means of protection.

.4 Place cast-in-place tactile warning surface panels into fresh concrete and tamp into place as required to eliminate all air voids below each panel and fully encase all embedment flanges and keyway holes with concrete.

.1 Surface of panel field (e.g. base of truncated dome) is to be flush with adjacent paving surface.

.2 Maintain flush alignment of panel field surface of adjacent panels.

.3 Place weights on panels as recommended in writing by manufacturer to maintain solid embedment of panels in concrete with no air voids.

.4 Finish adjacent concrete as specified in Section 03 30 01 – Site Works CIP Concrete

3.5 PROTECTION

.1 Do not allow traffic on tactile warning panels until the following conditions have been met:

.1 Surface-Applied Panels: Sufficient time has been allowed for adhesive to set as per written instructions of manufacturer.

.2 Cast-in-Place Panels: Underlying concrete has fully cured.

.2 Once conditions have been met for allowing traffic over tactile warning panels, do not move heavy or sharp objects directly over surfaces. Place plywood or hardboard sheets over tactile warning surfaces and under objects while objects are being moved. Slide or roll objects over protective sheets without moving sheets.

3.6 CLEANING

.1 Remove adhesive and other surface blemishes using cleaner recommended by tactile surface manufacturer.

.2 Clean tactile warning surfaces in accordance with manufacturer’s written instructions.

END OF SECTION

Part 1 General

1.1 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.

1.2 SOURCE QUALITY CONTROL

.1 Advise Contract Administrator of sources of topsoil to be utilized 7 days in advance of stating time.

.2 Contractor is responsible for soil analysis and requirements for amendments to supply topsoil as specified.

.3 Soil testing by recognized testing facility for PH, P and K, and organic matter.

Part 2 Products

2.1 TOPSOIL

.1 All topsoil required shall consist of a screened clay-textured or loam-textured dark topsoil, a fertile, friable material neither of heavy clay nor of very light sandy nature containing by volume, a minimum of four (4%) percent for clay loams and two (2%) percent for sandy loams to a maximum twenty-five (25%) percent organic matter (peat, rotted manure or composted material) and capable of sustaining vigorous plant growth.

.2 Topsoil shall be free of subsoil contamination, roots, stones over 25mm in diameter, baler twine or subsoil clay lumps over 25mm in diameter and other extraneous matter.

.3 Topsoil shall not contain quackgrass rhizomes, Canada thistle roots or other noxious weeds.

.4 Upon delivery or thirty (30) days following delivery, salinity rating shall be less than 4.0mm hos/cm on a saturated paste basis. The pH range shall be between 6.0 - 8.0.

.5 Topsoil may be either on-site topsoil or imported topsoil.

.6 On-site topsoil which has been stockpiled, can be reused providing that it is shredded or screened prior to being re-spread and that it meets the requirements specified above for topsoil.

.7 Topsoil shall not be blow-in dirt taken from wind erosion sites and topsoil shall not be taken from fields abandoned to corn production where such soil may contain soil incorporated herbicides, such as eradicane and atrazine with lasting residual effects.

.8 The Contractor shall inform the Contract Administrator of proposed source of topsoil to be supplied. The Contract Administrator reserves the right to reject topsoil not conforming to the requirements of this Specification.

2.2 FERTILIZER

.1 Chemical fertilizer with an N-P-K analysis of 1-2-1 ratio at a rate to provide 48 kg actual Nitrogen, 96 kg actual Phosphate and 48 kg actual Potassium per hectare.

.2 Fertilizer shall be standard commercial brands meeting the requirements of the Canada Fertilizer Act and the Canadian Fertilizer Quality Assurance Program.

.3 All fertilizers shall be granular, pelletized or pill form, and shall be dry and free flowing.

Part 3 Execution

3.1 SITE SAFETY AND TRAFFIC CONTROL

.1 Where work is to be done in boulevard and median areas adjacent to roadways, the Contractor shall maintain traffic and ensure that protection is afforded to the road user and that the Contractor's operations in no way interfere with the safe operation of traffic.

.2 The Contractor shall supply, erect and maintain all applicable traffic control devices in accordance with the provisions of the latest edition of the Manual of Temporary Traffic Control in Work Areas on City Streets issued by the Public Works Department of the City of Winnipeg.

3.2 PREPARATION OF EXISTING GRADE

.1 Subsoil shall be graded in accordance with Specification CW 3110 to eliminate uneven areas and low spots, ensuring positive drainage. Any soil contaminated by toxic materials shall be removed and disposed off site.

.2 All surface debris, roots, vegetation, branches and stones in excess of 25mm shall be removed.

.3 Grades on the area to receive topsoil that have been previously established in conformance with the

.4 Construction Drawings and/or other applicable specifications shall be maintained in a true and even grade.

.5 Prior to placing topsoil, all sub-grade areas within athletic fields and all athletic field "run out" areas as Identified on the construction drawings shall be scarified to a minimum depth of 75mm.

.6 Topsoil shall be manually spread around trees, shrubs and other obstacles.

.7 The Contractor shall ensure that topsoil does not come in contact with new asphaltic concrete pavement that is less than 2 weeks old.

3.3 APPLICATION OF FERTILIZER

.1 The Contractor shall provide the Contract Administrator with a report for each work site indicating the fertilizer formulation used, the rate of application and the date of application.

.2 Fertilizer shall be spread uniformly over the entire area of topsoil at a rate to provide 48 kg actual Nitrogen, 96 kg actual Phosphate and 48 kg actual Potassium per hectare.

3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after Contract Administrator has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm, over unfrozen subgrade free of standing water.

.3 For sodded areas keep topsoil 50/100 mm below finished grade.

.4 Spread topsoil as indicated to following minimum depths after settlement and 80% compaction:

.1 150 mm for seeded areas.
.2 135 mm for sodded areas.
.3 300 mm for flower beds.
.4 500 mm for shrub beds.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 FINISH GRADING AND ROLLING

.1 The area shall be fine graded and the topsoil loosened. Eliminate rough spots and low areas to ensure positive drainage. Prepare a loose friable bed by means of cultivation and subsequent raking.

.2 Topsoil shall be rolled with a mechanical roller of a minimum weight of 220kg, minimum width of 760mm roller, to consolidate it in areas to be seeded or sodded, leaving the surface smooth, uniform and firm against deep foot printing and to the satisfaction of the Contract Administrator.

3.6 ACCEPTANCE

.1 Contract Administrator will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading. Approval of topsoil material subject to soil testing and anaylsis.

.2 Testing of topsoil will be carried out by testing laboratory designated by Contract Administrator. Soil sampling, testing and analysis to be in accordance with Provincial regulations and standards. Contract Administrator will pay for cost of tests as specified in Section 01 45 00 – Quality Control.

3.7 RESTORATION OF STOCKPILE SITES

.1 Restore stockpile sites acceptable to Contract Administrator.

3.8 SURPLUS MATERIAL

.1 Dispose of materials not required where directed by Contract Administrator.

3.9 CLEANING

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

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 In accordance with Section 01 33 00 – Submittal Procedures.

.2 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.

.3 Obtain approval of samples by Contract Administrator.

1.2 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.

1.3 SCHEDULING

.1 Schedule sod installation when frost has left ground and Before June 15 or between August 15 and September 30.

.2 Schedule sod laying to coincide with preparation of soil surface.

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.

.1 Number one Named Cultivars: Nursery Sod grown from certified seed.

.2 The Contractor shall supply turf grass sod with a mineral soil layer containing a minimum of seventy (70%) percent inorganic soil. Upon delivery or thirty (30) days following delivery, the salinity rating shall be less than 4.0 mm hos/cm on a saturated paste basis. The pH range shall be between 6.0 – 8.0. Sod supplied shall have been sown in nursery fields with Canada Certified No. 1 or Canada

.3 Certified No. 2 grass seed and mixed by percentage (%) of weight to meet the following certified seed blends or mixtures:

.4 Turf Grass Nursery Sod Quality:

.1 Shall not contain more than ten (10) broadleaf weeds per fifty (50) square metres

.2 Shall have been mowed to a height of 50 mm prior to delivery and be of sufficient density that no surface soil will be visible

.3 Shall have a uniform inorganic soil layer thickness of not less than 12 mm and not greater than 19 mm and shall be consistent throughout all loads delivered to the work site

.4 Shall have the organic thatch layer within the sod not exceed an uncompressed thickness of 12 mm and in all cases, the final rolled and compacted topsoil/sod growing medium shall be maintained at not less than 100 mm in depth.

.2 Sod establishment support:

.1 Geotextile fabric: biodegradable, 25 mm square mesh.

.2 Wooden pegs: 17 x 8 x 250 mm.

.3 Water:

.1 Supplied by Contract Administrator at designated source.

.2 Potable, free of impurities.

.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 Contract Administrator of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization.

Part 3 Execution

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 32 91 19 - Topsoil Placement and Grading. If discrepancies occur, notify Contract Administrator.

.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, to contours and elevations indicated, to tolerance of plus or minus 8 mm, for Turfgrass Nursery Sod, and plus or minus 15 mm for commercial grade turfgrass nursery, 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 in location as directed by Contract Administrator.

.5 Cultivate fine grade approved by Contract Administrator to 25mm depth immediately prior to sodding.

3.2 SOD PLACEMENT

.1 The sod shall be placed evenly and closely packed together, leaving no open joints and no overlap on adjacent pieces of sod. Joints in adjacent rows shall be staggered, as shown in City of Winnipeg Standard Detail SD-243. A full row of

sod, not less than 450 mm in width shall be placed along the perimeter of the sodded area, parallel to planting or walkway areas.

.2 Where big roll sod is to be placed, the Contractor shall ensure that any reinforcement netting that may be used to assist with the harvesting and/or placement of the sod roll is removed before final placement of the sod.

.3 On embankments, sod shall be placed lengthwise across the face of the slope. On slopes of 1 vertical to 3 horizontal (18 degrees) or steeper, in every second row on the slope and at the foot of the slope, each piece of sod shall be pegged with two minimum 250 mm long wooden pegs driven into the soil layer of the sod.

.4 For slopes of 1 vertical to 2 horizontal (26 degrees) or steeper, each piece of sod in every row shall be pegged as indicated above.

.5 Small, broken or irregular pieces of sod will be rejected.

.6 All visible joints, low, bare or dead spots shall be repaired to the satisfaction of the Contract Administrator prior to the commencement of the Thirty (30) Day Maintenance Period

.7 Sodding operations shall be completed within two working days after placing the sod. This shall be deemed to include watering, rolling, and repairing any visible joints and low, bare or dead spots within the sodded area.

.8 Sod shall not be placed in a frozen state, or when any other conditions unfavourable to the successful transplanting of sod exist.

.9 The Contractor shall not place sod after September 15 unless the Contract Administrator gives written approval to proceed.

.10 Should the Contract Administrator provide written approval to, or direct the Contractor to place sod after September 15, and termination of the sod maintenance period is not achieved in that same year, the Contractor will not be held responsible for sod damage over the winter due to winter-kill, ice damage, sand/salt applications on adjacent streets or from snow removal or spring clean-up equipment. When the Contract Administrator provides written approval, or direction to the Contractor to place the sod after September 15, the City will assume all costs related to the spring replacement of sod damaged over the winter provided that the layover was due only to the late season start and not defective sod or maintenance not conforming to this Specification.

.11 Where the Contractor places sod prior to September 15, and termination of the sod maintenance period is not achieved in that same year, the Contractor shall be responsible for replacement of any sod damaged over the winter due to winter-kill, ice damage, sand/salt applications on adjacent streets, or from snow removal or spring clean-up equipment.

3.3 WATERING AND ROLLING

.1 Immediately after placement of sod, the Contractor shall water the area in sufficient quantities and frequencies required to obtain root development and sod growth. All costs to provide water for sodded areas shall be borne by the Contractor. These costs may include hydrant permit and meter rental fees.

.2 After the sod and topsoil has dried sufficiently to prevent damage, the areas shall be rolled (the edges pounded if necessary) with a mechanical roller minimum weight of 220kg and minimum width of 760mm to form a uniform even surface and level with adjoining existing grades, sidewalks and curbs.

.3 Heavy rolling to correct irregularities in grade will not be permitted. Sodded areas near existing fixtures that are unable to be rolled shall be thoroughly tamped to ensure a good bond between topsoil and sod.

3.4 COMMENCEMENT OF MAINTENANCE PERIOD

.1 Immediately after the sod has been placed to the satisfaction of the Contract Administrator, the Contractor shall provide and pay for continuous maintenance of the sodded area until the criteria specified for termination of the maintenance period has been met.

.2 The Contract Administrator will not allow the Thirty (30) Day Maintenance Period to commence until the following requirements are met:

.1 Written approval has been granted by the Contract Administrator to place sod if after September 15.

.2 The nursery sod supplied meets the seed mixture requirement specified above.

.3 The sod is free of bare and dead spots.

.4 The nursery sod does not contain more than 10 broadleaf weeds per 50 square metres.

.5 Sodded area has been rolled to form a firm, uniform even surface.

.6 The sod has sufficient shoot density that no surface soil is visible within sod.

.7 The height of the top growth of the sod is between 50 - 60 mm.

.8 The sodded area is free of any visual obstructions such as leaves.

.9 Sodded area is free of any turf damaging insects.

.3 Any deficient, damaged or vandalized areas shall be re-sodded by the Contractor within three working days after receiving notification from the Contract Administrator and the area so re-sodded, shall be further maintained until it meets the criteria specified below.

.4 In situations where the start of the Thirty (30) Day Maintenance Period is not granted by the Contract Administrator before the end of a growing season, the Thirty (30) Day Maintenance Period will commence on May 15 of the following year or such date as is mutually agreed upon by all parties, at which time all sodded areas must meet the requirements listed above.

3.5 MAINTENANCE OF SODDED AREA

.1 The Contractor shall mow the turf area at regular intervals to a height of between 50 - 60 mm. Do not cut more than thirty (30%) percent of the grass height at any one mowing. Remove clippings that will smother grassed areas.

.2 The Contractor shall water sodded areas in sufficient quantities and frequencies required to maintain sod growth. All costs to provide water for sodded areas shall be borne by the Contractor. These costs may include hydrant permit and meter rental fees.

.3 The Contractor shall clean and remove all dead vegetation, leaves, debris and snowmold from turf areas to encourage healthy and uniform grass growth.

.4 Given the need for weed control, the Contractor shall have in his possession a Pesticide Applicator’s License and a Pesticide Use Permit for pesticide applications related to this Specification.

.5 The Contractor shall apply herbicide when broadleaf weeds start developing in competition with grass. Apply herbicide in accordance with the City of Winnipeg Weed Control Standards and Procedures, manufacturer’s instructions and the Manitoba Agriculture Guide to Crop Protection and Herbicide Recommendations for Landscape Applicators, latest editions and the following criteria:

.6 The Contractor shall mow the turf area at regular intervals to a height of between 50 - 60 mm. Do not cut more than thirty (30%) percent of the grass height at any one mowing. Remove clippings that will smother grassed areas.

.7 The Contractor shall water sodded areas in sufficient quantities and frequencies required to maintain sod growth. All costs to provide water for sodded areas shall

be borne by the Contractor. These costs may include hydrant permit and meter rental fees.

.8 The Contractor shall clean and remove all dead vegetation, leaves, debris and snowmold from turf areas to encourage healthy and uniform grass growth.

.9 Given the need for weed control, the Contractor shall have in his possession a Pesticide Applicator's License and a Pesticide Use Permit for pesticide applications related to this Specification.

.10 The Contractor shall apply herbicide when broadleaf weeds start developing in competition with grass. Apply herbicide in accordance with the City of Winnipeg Weed Control Standards and Procedures, manufacturer's instructions and the Manitoba Agriculture Guide to Crop Protection and Herbicide Recommendations for Landscape Applicators, latest editions and the following criteria:

.1 Use 2,4-D Amine or MCPA Amine herbicide for susceptible broadleaf weeds.

.2 ii. Use a mixture containing 2,4-D Amine or MCPA Amine, Mecoprop and Dicamba for 2,4-D resistant plants.

.3 Do not apply to newly seeded turf until after the second or third mowing.

.4 Do not water within 24 hours after application.

.5 Apply when winds are less than 20 km/h and air temperature is above 10° (degrees) Celsius.

.6 Avoid use of pure Dicamba solutions near trees and shrubs.

.11 Given the need for insect control, the Contractor shall have in his possession a Pesticide Applicator's License and a Pesticide Use Permit for pesticide applications related to this Specification. Use standard commercial products in accordance with the manufacturer's instructions and the Manitoba Agriculture Guide to Crop Protection (latest edition) for the particular insect/insects involved.

.12 Copies of the Pesticide Applicator's License and the Pesticide Use Permit must be submitted to the Contract Administrator prior to commencement of pesticide application.

.13 All persons handling pesticides shall be fully aware of toxicological rules and regulations governing their use.

.14 The Contractor shall inform the Contract Administrator immediately of any dangerous occurrence.

3.6 SPRING CLEANUP

.1 Where termination of the sod maintenance period has not been achieved prior to the end of a growing season, the Contractor shall complete all operations related to the clean-up of the work area in the following spring. This shall include the cleaning and removal of all dead vegetation, leaves, debris, snowmold and any sand or gravel resulting from winter sanding/deicing operations from turf areas to encourage healthy and uniform grass growth.

.2 All costs for spring clean-up operations shall be borne by the Contractor if in the previous year, the termination of the sod maintenance period was not achieved in that same year or where the damage was due to defective sod or maintenance not conforming to this Specification.

3.7 TERMINATION OF MAINTENANCE PERIOD

.1 The Contract Administrator will terminate the sod maintenance period after the following criteria has been met:

.1 The work site is clean and the sodded area is free of any visual obstructions such as leaves.

.2 The sod is free of bare and dead spots and without more than 10 broadleaf weeds per 50 square metres.

.3 Grass roots are well anchored into the underlying topsoil and the sodded area has established into a healthy, vigorously growing condition.

.4 Sodded areas are free of visible joints.

.5 The sod has sufficient shoot density that no surface soil is visible when the grass has been cut to a height of 50 – 60 mm.

.6 Sodded area has been cut to a height of 50 – 60 mm within two working days before the final inspection.

.7 Sodded area is free of any turf damaging insects.

.2 If the sodded area does not meet the above criteria, the deficient area shall be resodded within three working days after receiving notification from the Contract Administrator and maintained by and at the expense of the Contractor.

.3 In situations where the termination of the maintenance period is not granted by the Contract Administrator before the end of a growing season, the maintenance period will commence as described above.

3.8 CLEANING

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

END OF SECTION