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 - 12 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))

.5 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-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 City of Winnipeg Standard Construction Specification CW 3110 – Sub-grade, Sub-base and Base Course Construction.

1.2 DELIVERY, STORAGE AND HANDLING

.1 Deliver and stockpile aggregates. Stockpile minimum 50% of total aggregate required prior to beginning operation.

.2 Store cement in weather-tight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment.

Part 2 Products

2.1 MATERIALS

.1 Granular base: material in accordance with the following requirements:

.1 Crushed stone or gravel.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.1 Gradation to:

Sieve Designation	% Passing
25 mm	100
12.5 mm	65-100
4.75 mm	35-60
2.00 mm	22-45
0.425 mm	10-25

0.075 mm	3-8

.2 Liquid limit: to ASTM D4318, maximum 25.

.3 Plasticity index: to ASTM D4318. maximum 6

.4 Los Angeles degradation: to ASTM C131. Max % loss by weight: 45.

.5 Crushed particles: at least 60^ of particles by mass within each of the following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C136.

Passing		Retained on
25 mm	to	19.0 mm
19.0 mm	to	4.75 mm

Part 3 Execution

3.1 SEQUENCE OF OPERATION

.1 Place granular base after sub-base surface is inspected and approved by Contract Administrator.

.2 Placing:

.1 Construct granular base to depth and grade in areas indicated.

.2 Ensure no frozen material is placed.

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

.4 Begin spreading base material on crown line or on high side of one-way slope.

.5 Place material using methods which do not lead to segregation or degradation of aggregate.

.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. Contract Administrator 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.

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

.3 Compaction Equipment:

.1 Compaction equipment to be capable of obtaining required material densities.

.4 Compacting:

.1 Compact to density not less than 100% standard maximum dry density ASTM D698.

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

.5 Proof Rolling

.1 For proof rolling use standard roller of 45,400 kg gross mass with four pneumatic tires each carrying 11,350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.

.2 Obtain approval from Contract Administrator to use non-standard proof rolling equipment.

.3 Proof roll at level in granular base as indicated. If use of non-standard proof rolling equipment is approved, Contract Administrator to determine level of proof rolling.

.4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.

.5 Where proof rolling reveals areas of defective subgrade:

.1 Remove base, sub-base and subgrade material to depth and extent as directed by Contract Administrator.

.2 Backfill excavated subgrade with sub-base material and compact in accordance with Section 31 23 10 – Excavation, Trenching & Backfilling.

.3 Replace sub-base material and compact in accordance with Section 31 23 10 – Excavation, Trenching & Backfilling.

.4 Replace base material and compact in accordance with this Section.

.6 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Contract Administrator and replace with new materials in accordance with 31 23 10 – Excavation, Trenching & Backfilling and this section at no extra cost.

3.2 SITE TOLERANCES

.1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION

.1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Contract Administrator.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 74 00 – Cleaning and Waste Management.

.3 Section 32 11 23 – Aggregate Base Courses.

1.2 REFERENCES

.1 American Association of State Highway and Transportation Officials (AASHTO)

- .1 AASHTO M320-02, Standard Specification for Performance Graded Asphalt Binder.
- .2 AASHTO R29-02, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.
- .3 AASHTO T245-97(2001), Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

.2 Asphalt Institute (AI)

- .1 AI MS2-1994, Mix Design Methods for Asphalt Concrete

.3 American Society for Testing and Materials International (ASTM)

- .1 ASTM C88-99a, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
- .2 ASTM C117-95, Standard Test Method for Material Finer Than 0.075mm (no.200) Sieve in Mineral Aggregates by Washing.
- .3 ASTM C123-98, Standard Test Method for Lightweight Particles in Aggregate.
- .4 ASTM C127-01, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- .5 ASTM C128-01, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
- .6 ASTM C131-01, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .7 ASTM C136-01, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- .8 ASTM C207-91 (1997), Standard Specification for Hydrated Lime for Masonry Purposes.
- .9 ASTM D995-95 (2002), Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- .10 ASTM D2419-02, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-2.1(88), Sieves Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.

.3 CAN/CGSB-16.3(M90), Asphalt Cements for Road Purposes.

.5 City of Winnipeg Standard Construction Specification CW 3410 – Asphaltic Concrete Paving Works.

1.3 PRODUCT DATA

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

.2 Submit asphalt concrete mix design and trial mix test results to Contract Administrator for review at least 4 weeks prior to beginning work.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver and stockpile aggregates in accordance with Section 32 11 23 – Aggregate Base Course. Stockpile minimum 50% of total amount of aggregate required before beginning asphalt mixing operation.

.2 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.

.3 Stockpile fine aggregate separately from coarse aggregate, although separate stockpiles for more than two mix components are permitted.

.4 Provide approved storage, heating tanks and pumping facilities for asphalt cement.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugate cardboard packaging material for recycling in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxin in designated containers.

.5 Divert unused aggregate materials from landfill to facility for reuse as approved by Contract Administrator.

.6 Dispose of unused paint and paint thinner materials at official hazardous material collections site as approved by Contract Administrator.

.7 Fold up metal banding, flatten and place in designated area for recycling.

.8 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.

.9 Divert unused asphalt from landfill to facility capable of recycling materials.

Part 2 Products

2.1 MATERIALS

.1 Asphalt cement to CAN/CGSB-16.3, according to chart of Absolute viscosity versus penetration.

.2 Performance graded asphalt cement to AASHTO M320, Grade (PG58-280 when tested to AASHTO R29.

.3 Aggregates to:

.1 Granular Base Course: Section 32 11 23 (Aggregate Base Course).

.2 Granular sub-base: Section 32 11 23 (Aggregate Base Course).

.3 Table

Sieve Designation	%Passing	Surface	Sheet
200mm	-	-	-
75 mm	-	-	-
50 mm	-	-	-
38.1mm	-	-	-
25 mm	[100]	-	-
19 mm	-	-	-
12.5 mm	[70-85]	[100]	-
9.5 mm	-	-	[100]
4.75 mm	[40-65]	[55-75]	[85-100]
2.00 mm	[30-50]	[35-55]	[80-95]
0.425 mm	[15-30]	[15-30]	[40-70]
1.180 mm	[5-20]	[5-20]	[10-35]
0.075 mm	[3-8]	[3-8]	[4-14]

.4 Coarse aggregate: aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm sieve when tested to ASTM C136.

.5 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75mm sieve and stockpile separately from coarse aggregate.

.6 Separate stockpiles for coarse and fine aggregates are not required for sheet asphalt.

.7 Do not use aggregates having known polishing characteristics in mixes for surface courses.

.8 Sand equivalent: ASTM D2419. Min: 50.

.9 Magnesium Sulphate soundness: to ASTM C88. Max% loss by mass:

.1 Coarse aggregate surface course 12%.

.2 Coarse aggregate lower course: 12%.

.3 Fine aggregate, surface course: 16%.

.4 Fine aggregate, lower course: 16%.

.10 Los Angles degradation; Grading B, to ASTM C131. Max % loss by mass:

.1 Coarse aggregate, surface course: 25%.

.2 Coarse aggregate, lower course: 35%.

.11 Absorption to ASTM C127. Max % by mass:

.1 Coarse aggregate, surface course: 1.75%.

.2 Coarse aggregate, lower course: 2.00%.

.12 Loss by washing: to ASTM C117. Max % passing 0.075 mm sieve:

.1 Coarse aggregate, surface course: 1.5%.

.13 Coarse aggregate, lower course: 35%.

.14 Lightweight particles to ASTM C123. Max % by mass less than 1.95 relative density:

.1 Surface course: 1.5%.

.2 Lower course: 3.0%.

.15 Flat and elongated particles: to ASTM D4791, with length to thickness ratio greater than 5. Max % by mass:

.1 Coarse aggregate, surface course: 15%.

.2 Coarse aggregate, lower course: 15%.

.16 Crushed fragments: at least 60% of particles by mass within each of the following sieve designation ranges, to have at least 1 freshly fractured face. Material to be divided into ranges, using methods of ASTM C136.

Passing		Retained on
25 mm	to	12.5mm
12.5 mm	to	0 mm

.17 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.

.4 Mineral filler:

.1 Finely ground particles of limestone, hydrated lime, Portland cement or other approved non-plastic mineral matter, thoroughly dry and free from lumps.

.2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed to improve mix properties.

.3 Mineral filler to be dry and free flowing when added to aggregate.

.5 Anti-stripping agent: hydrated lime to ASTM C207 type N. Add lime at rate of approximately 2-3% of dry weight aggregate.

.6 Water: potable.

2.2 EQUIPMENT:

.1 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

.2 Rollers: minimum of three pavers of type and weight to obtain specified density of compacted mix.

.3 Vibratory rollers:

.1 Minimum drum diameter: 1200 mm

.2 Maximum amplitude of vibration (machine setting): 0.5 mm for lifts less than 40 mm thick.

.4 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:

.1 Boxes with tight metal bottoms.

.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.

.3 In cool weather or for long hauls, insulate entire contact area of each truck box.

.4 Use only trucks which can be weighed in single operation on scales supplied.

.5 Hand tools:

.1 Lutes or rakes with covered teeth for spreading and finishing operations.

.2 Tamping irons having mass not less than 12 kg and bearing area not exceeding 310 cm^2 for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Contract Administrator, may be used instead of tamping irons.

.3 Straight edges, 4.5 m in length, to test finished surface.

2.3 MIX DESIGN

.1 Mix design to be approved by Contract Administrator.

.1 Mix design to be developed by testing laboratory approved by Contract Administrator.

.2 Design of mix: by Marshall Method to requirements below.

.1 Compaction blows

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for sand-set unit paving without mortared joints for pedestrian or light vehicular traffic.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 31 23 10 – Excavation, Trenching and Backfilling.

.3 Section 32 11 23 – Aggregate Base Courses.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117, Standard Test Method for Material Finer Than 0.075 (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM E11, Standard Specification for Wire-Cloth Sieves for Testing Purposes.

.2 Canadian General Standards Board (CGSB)

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

.2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA)

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Construction/Methods of Test for Concrete.

.2 CSA A179, Mortar and Grout for Unit Masonry.

.3 CSA-A231.1, Precast Concrete Paving Slabs.

.4 City of Winnipeg Standard Construction Specification CW 3330 – Installation of Interlocking Paving Stones

.5 City of Winnipeg Standard Construction Specification CW 3110 – Sub-grade, Sub-base and Base Course Construction.

1.4 SUBMITTALS

.1 Submit following product test data:

.1 Sieve analysis for granulation of bedding and joint material.

.2 Unit paver test data.

.2 Submit full size samples of each type of paving unit.

.3 Indicate layout, pattern and relationship of paving joints to fixtures and project formed details.

1.5 DELIVERY, STORAGE AND HANDLING

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

1.6 QUALITY CONTROL

.1 All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified work.

.2 The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

Part 2 Products

2.1 MATERIALS

.1 Interlocking Paving Stones

.1 Interlocking paving stones: to be Barkman Concrete Ltd. Boardwalk Series.

.1 Size: 3 1/2” x 12 11/16” x 3 1/8”

.2 Colour: Colour as selected by Contract Administrator from manufacturer's standard range.

.3 Provide in locations as shown.

.2 Contact for paving stone:

Barkman Concrete
909 Gateway Road
Winnipeg. MB R2K 3L1
Telephone No. (204) 667-3310

.3 Paving stones shall conform to the requirements of CAN3-A231.2, Precast Concrete Pavers.

.4 Further to CAN3-A231.2.6.1.1, where concrete pavers are shipped for installation before the pavers are 28 days old, the average compressive strength of these pavers at the time of delivery to the work site shall be not less than 40 MPa.

.2 Crushed Limestone:

.1 Crushed limestone shall conform to the requirements of Section 5 of Specification CW3110 and Section 32 11 23 - Aggregate Base Courses.

.3 Bedding Sand

.1 Bedding sand shall be fine aggregate as specified in Section 5.3.1 of Specification CW 3310 and Section 32 11 23 - Aggregate Base Courses, with the exception that the sand shall conform to the following grading requirements:

Canadian Metric Sieve Size	% of Total Dry Weight Passing Each Sieve
10 000	100
5 000	95 -100

2 500	80 -100
1 250	50 - 85
630	25 - 60
315	10 - 35
160	5 - 15
80	0 - 10

.4 Filler Sand

Filler sand shall have a maximum aggregate size of 2.5 mm.

.5 Plastic Edge Support

.1 Plastic edge support shall be made of High Density Polyethylene (HDPE) material.

.2 Acceptable product: Plastic edge support by “Snap Edge” as manufactured by Snapedge Canada Ltd. Or Snap Edge Corporation.

Part 3 Execution

3.1 PROTECTION

.1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property. Make good any damage.

.2 Provide access to building at all times. Coordinate paving schedule to minimize interference with normal use of premises.

3.2 PREPARATION OF SUB-GRADE, SUB-BASE AND SAND-BASE

.1 The construction of sub-grade and crushed limestone sub-base shall be completed in accordance with Specification CW 3110, Section 32 11 23 - Aggregate Base Courses and the Drawings

.2 Ensure that subgrade preparation conforms to levels and compaction required to allow for installation of granular base, and has been inspected and approved by Contract Administrator.

.3 A layer of compacted crushed limestone shall be placed as shown in the appropriate detail on the compacted sub-grade. On top of this a 30 mm layer of bedding sand shall be placed.

.4 The bedding sand layer shall be spread and levelled so that the paving stones when installed are 10 mm higher than the finished grade. No more sand shall be spread than can be covered in one day by paving stones. The bedding sand layer shall not be compacted prior to laying the paving stones.

.5 Supply and placing of bedding sand shall be incidental to the installation of the paving stones.

3.3 SURFACE COURSE

.1 The installation of paving stones shall be completed in accordance with Specification CW3330.

.2 Where edge support is required, precast concrete curbs shall be installed at locations determined by the Contract Administrator. Supply and installation of precast concrete curbs shall be incidental to the installation of the paving stones.

.3 Plastic edge support may be installed as a paving stone edging for residential approaches. All installation shall be in accordance with the manufacturer's instructions. Supply and installation of plastic edge support shall be incidental to the installation of the paving stones.

.4 The paving stones shall be installed such that spaces between joints do not exceed 5 mm, unless otherwise approved by the Contract Administrator. Spaces between paving stones shall be uniform and consistent while maintaining straight and true patterns.

.5 Work shall commence with edge stones along the longest straight section of curb or property line and work towards the opposite edge. Edge stones shall be used around any structure within the sidewalk limits and along the limits of the sidewalk.

.6 If cutting of paving stones is required, the sawn or sheared edges shall be true, even and undamaged.

.7 Coloured mortar shall be used to fill small voids between blocks and curbs or other structures.

.8 Paving stones shall be compacted into the sand layer using approved vibratory compactors until they are at the proper grade, uniformly level and free of any movement. Filler sand shall be swept into the joints until full.

.9 Supply and placing of filler sand shall be incidental to installation of the paving stones.

3.4 CORRECTIVE ACTION

.1 The Contractor shall, at his/her own expense, correct such work or replace such materials found to be defective under this Specification in an approved manner to the satisfaction of the Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 74 00 – Cleaning and Waste Management.

.2 Section 31 23 10 – Excavation, Trenching and Backfilling

.3 Section 32 12 16 – Asphalt Paving

.4 Section 03 30 00 – Cast-in-Place Concrete

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D698-00(a), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3)

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.2[98], Boiled Linseed Oil.

.2 CAN/CGSB-3.3[99], Kerosene.

.3 Canadian Standards Association (CSA)

.4 CAN/CSA-A23.1/A23.2-[94], Concrete Materials and Methods of Concrete Construction/Methods of Testing for Concrete.

1.3 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.

Part 2 Products

2.1 MATERIALS

.1 Concrete mixes and materials: to Section 03 30 00 - Cast-in-Place Concrete.

.2 Reinforcing steel: to City of Winnipeg Standard Specifications.

.3 Joint Filler/Curing Compound: to Section 03 30 00 - Cast-in-Place Concrete.

.4 Granular base: to Section 31 23 10 – Excavation, Trenching and Backfilling.

.5 Non-staining mineral type form release agent: Chemically active release agents containing compounds that react with free lime to provide water soluble soap.

.6 Fill material: to Section 31 23 10 – Excavation, Trenching and Backfilling.

.7 Boiled linseed oil: to CAN/CGSB-1.2.

.8 Kerosene: to CAN/CGSB-3.3.

Part 3 Execution

3.1 GRADE PREPARATION

.1 Do grade preparation work in accordance with Section 31 23 10 – Excavation, Trenching and Backfilling.

.2 Construct embankments using excavated material free from organic matter or other objectionable materials. Dispose of surplus and unsuitable excavated materials in approved location on site and off site.

.3 Place fill in maximum 150mm layers and compact to at least 95% of maximum density to ASTM D698.

3.2 GRANULAR BASE

.1 Obtain Contract Administrator's approval of subgrade before placing granular base.

.2 Place granular base materials to lines, widths and depths as indicated.

.3 Compact granular base to at least 98% of maximum standard density to ASTM D698 00{a).

3.3 CONCRETE

.1 Obtain Contract Administrator'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 2mm deep, by drawing broom in direction normal to centre line.

.4 Provide edging as indicated with 10mm radius edging tool.

.5 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Contract Administrator can be demonstrated. Hand finish surfaces when directed by Contract Administrator.

3.4 TOLERANCES

.1 Finish surfaces to within 3mm in 3m as measured with 3m straight edge 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 intervals specified by the Contract Administrator. Install expansion joints ad indicated, as directed by Contract Administrator.

.2 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.

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 Contract Administrator.

3.7 CURING

.1 Cure concrete by adding moisture continuously in accordance with CAN/CSA 23.1 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound approved by Contract Administrator

.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 BACKFILL

.1 Allow concrete to cure for 7 days prior to backfilling.

.2 Backfill to designated elevations with material approved by Contract Administrator. Compact and shape to required contours as indicated or as directed by 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 2010 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 – Concrete Paving.

.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 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: ΔE<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: ΔE<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

.2 Products

.1 Armor-Tile

2.4 SUBSTITUTIONS:

.1 Refer to Section 01 33 00 – Submittal Procedure, subsection 2.2.

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 00 – Cast-in-Place 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 00 – Cast-in-Place 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 REFERENCES

.1 American Society for Testing and Materials (ASTM).

- .1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A90/A90M, Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
- .3 ASTM A121, Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
- .4 A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-138.1, Fabric for Chain Link Fence.
- .2 CAN/CGSB-138.2, Steel Framework for Chain Link Fence.
- .3 CAN/CGSB-138.3, Installation of Chain Link Fence.
- .4 CAN/CGSB-138.4,Gates for Chain Link Fence.
- .5 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA).

- .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA-A3000, Cementitious Materials Compendium. Includes:
  - .1 CAN/CSA-A23.5, Supplementary Cementing Materials.

.4 City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing

.5 City of Winnipeg Standard Construction Specification CW 2160 – Concrete Underground Structures and Works.

1.2 SUBMITTALS

.1 Submit WHMIS MSDS – Material Safety Data Sheets.

.2 Submit manufacturer's data sheets including:

- .1 Fence fabric gauge and finish.
- .2 Post and rail dimension and finish.
- .3 Gate frame dimension and finish.
- .4 Required fittings and hardware.

Part 2 Products

2.1 MATERIALS

.1 In accordance with City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing.

.2 Concrete mixes and materials: in accordance with Section 03 30 00- Cast-in-Place Concrete and City of Winnipeg Standard Construction Specification CW 2160 – Concrete Underground Structures and Works..

.1 Where concrete piles are specified for post installation, the concrete shall conform to CW 2160 and be sulphate resistant type 50, minimum compressive strength of 25 MPa at 28 days, air content of 4% - 7%, maximum slump of 80 mm and a maximum size of course aggregate of 40 mm.

.3 Chain-link fence fabric: All materials shall conform to this Specification and the Canadian General Standards Board (CGSB) Specifications CAN/CGSB-138.1, CAN/CGSB-138.2 and CAN/CGSB-138.4. Where any contradictions occur, Specification CW 3550 shall take precedence over CGSB Specifications.

.1 Type 1, Class A, medium style.

.2 Height of fabric: as indicated.

.4 Terminal Posts:

.1 Terminal posts, comprising of end, gate, corner and straining posts shall be standard seamless, continuous weld, schedule 40 hot dip galvanized steel pipe weighing 11.28 kg per lineal metre. Posts shall be supplied with weatherproof caps. Tubing, conduit or open seam material will not be accepted.

.2 End, gate, corner and straining posts shall be of the lengths and dimensions shown in following Table 1 in CW3550.

.5 Line Posts:

.1 Line posts shall be standard seamless, continuous weld, schedule 40 hot dip galvanized steel pipe weighing 5.43 kg per lineal metre. Line posts for fence fabric that is to be 3660 mm and higher shall weigh 8.63 kg per lineal metre. Tubing, conduit or open seam pipe will not be accepted.

.2 Line posts shall be supplied with weatherproof eye top caps to accommodate continuous horizontal top rail and shall be of the lengths and dimensions shown in the following Table 2 in CW3550.

.6 Top and bottom rails:

.1 Top and bottom rail sleeve couplings shall be schedule 40, hot dip galvanized steel pipe, 171 mm long and 45 mm inside diameter to accommodate a 43 mm outside diameter top rail and manufactured specifically as a top/bottom rail sleeve coupling for chain link fencing.

.7 Fabric:

.1 Fabric shall be No. 9 gauge steel wire woven into a uniform 50 mm (2") diamond pattern mesh or as specified. Size of mesh shall be determined by measuring the minimum clear distance between the wires forming the parallel sides of the mesh. Permissible variation in size of mesh shall be 3 mm (1/8"). Diameter of wire shall be no less than 3.68 mm (0.145"). The top and bottom selvage shall be knuckled.

.2 Fabric shall be zinc coated before weaving by the hot dip process to an average mass per unit area of not less than 490 g/m2.

.3 Mesh fabric shall not be excessively rough, or have blisters, sal ammoniac spots, bruises or flaking.

.4 Chain link fabric shall have a minimum tensile strength of 415 MPa.

.8 Bottom tension wire:

.1 Bottom tension wire shall be No. 6 gauge single strand galvanized steel wire.

.9 Turnbuckles

.1 Where turnbuckles are specified, they shall be drop forged steel and be hot dip galvanized. The average overall length shall be approximately 300 mm, with ends in the closed position. Bolt diameter shall be 10 mm and shall be capable of taking up a minimum of 150 mm slack.

.10 Braces

.1 Braces, shall be schedule 40 hot dip galvanized steel pipe, not less than 43 mm outside diameter and weigh 3.38 kg per lineal metre.

.11 Fittings and Accessories

.1 Tension bars shall be 5 x 19 mm galvanized flat steel and not less than 50 mm shorter than the height of the fabric with which they are to be used.

.2 Tension bands shall be 3 x 19 mm galvanized flat steel c/w 8 x 32 mm galvanized carriage bolts and nuts.

.3 Brace bands shall be 3 x 19 mm galvanized flat steel c/w 8 x 32 mm galvanized carriage bolts and nuts to fasten top rail receptacles to terminal posts.

.4 Cut ends of tension bars shall be ground smooth to remove all sharp edges and burrs. Fabric clips shall be No. 9 gauge aluminum alloy wire.

.5 Weatherproof post tops/caps, receptacles, and fittings shall be of adequate strength and may be of aluminum alloy, malleable steel or pressed steel. All ferrous metals shall be hot dip galvanized.

.6 Tie wire fasteners: to CAN/CGSB-138.1, Table 2 (steel wire), single strand, galvanized steel wire confirming to requirements of fence fabric, 5 mm diameter.

.12 Gates: to CAN/CGSB-138.4.

.13 Gate frames: to ASTM A53/A53M, galvanized steel pipe, standard weight 45 mm outside diameter pipe for outside frame, 35mm outside diameter pipe for interior bracing.

.1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding.

.2 Fasten fence fabric to gate with twisted selvage at top.

.3 Furnish gates with galvanized malleable iron hinges, latch and latch catch with provision for padlock which can be attached and operated from either side of installed gate.

.4 Furnish double gates with chain hook to hold gates open and centre rest with drop bolt for closed position.

.14 Organic zinc rich coating: to CAN/CGSB-1.181.

.15 Grounding rod: 16 mm diameter copper well rod, 3 m long.

2.2 FINISHES

.1 Galvanizing:

.1 For chain link fabric: to CAN/CGSB-138.1, Grade2.

.2 For pipe: 550 g/m^2 minimum to ASTM A90.

.3 For other fittings: to CAN/CSA-G164.

Part 3 Execution

3.1 GENERAL REQUIREMENTS

.1 The Contractor shall install chain link fence in accordance with Clauses 9.2 to 9.9 herein and the Canadian General Standards Board Specification CAN/CGSB-138.3. Where any contradictions occur, Specification CW 3550 shall take precedence over CGSB Specifications.

.2 Survey bars and control monuments must be protected during construction.

3.2 GRADING

.1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.

.1 Provide clearance between bottom of fence and ground surface of 30 mm to 50 mm.

3.3 INSTALLATION OF POSTS

.1 In accordance with City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing.

.2 Terminal and line posts, except where otherwise specified, shall be installed to a depth equal to the difference between the proposed fence height and the specified pipe length shown as described above. Use hydraulic equipment to push or pound posts into the existing ground.

.3 Where concrete piles are specified for post installation, they shall be of the lengths and dimensions as described above. Posts shall be set in the centre of the concrete pile. Tops of concrete piles shall be crowned or domed to shed water and be installed 100mm below the finished grade. Concrete piles shall be constructed in accordance with Section 03 30 00- Cast-in-Place Concrete and CW 2160.

.4 Posts shall be plumbed and set to give correct alignment. Bending of posts to give correct alignment is not acceptable.

.5 Weatherproof post tops/caps shall be securely attached to eliminate removal by hand. Eye top caps shall allow for the insertion of a top rail in a horizontal position.

.6 Maximum spacing between centerline of posts shall not exceed 3050 mm.

.7 Straining posts shall be installed at all sharp changes in grade and where directed by the Contract Administrator.

3.4 INSTALLATION OF FABRIC

.1 In accordance with City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing.

.2 Fabric shall be stretched taut to the correct tension as specified by the manufacturer and to the Contract Administrator's satisfaction. Where posts have been installed in concrete piles, fence fabric shall not be installed until piles have cured for a period of not less than five (5) days. Fabric shall be installed on the outside of the fence unless requirement for installation on the inside of the fence is specified.

.3 Clearance between bottom of fabric mesh and ground surface shall be no less than 40 mm or more than 50 mm unless otherwise indicated on the drawing or approved by the Contract Administrator.

.4 Fabric clips shall be used to fasten the fabric to the top rail at 450 mm spacing and to line posts at 380 mm maximum spacing. Wires ties on the top rail and bottom rail or tension wire shall have a minimum of two twists around mesh.

.5 Tension bars, bands and bolts shall be used to fasten the fabric to terminal posts. Maximum spacing for tension bands and bolts shall be 380 mm. Top of tension bars shall not protrude above the bottom of the top rail.

.6 The bottom tension wire shall be stretched taut along the bottom of the fabric and securely attached to all terminal and line posts and attached to the bottom edge of the fabric at 450 mm maximum spacing using hog rings.

3.5 INSTALLATION OF TURNBUCKLES

.1 In accordance with City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing.

.2 Where turnbuckles are specified for installation, they shall be used to stretch the bottom tension wire taut and be able to take up a minimum of 150 mm slack.

3.6 INSTALLATION OF BRACES

.1 In accordance with City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing.

.2 Braces, where specified only, shall be placed either horizontally or diagonally from the terminal post to the first adjacent line post. Braces shall be secured to posts in accordance with construction drawing details and/or to the satisfaction of the Contract Administrator.

.3 Corner and straining posts shall have braces on both sides.

3.7 INSTALLATION OF MID RAILS

.1 In accordance with City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing.

.2 Mid rails for 4880 mm high fences shall be installed at a height of 2440 mm above the finished grade in accordance with construction drawing details and/or to the satisfaction of the Contract Administrator.

3.8 INSTALLATION OF GATES

.1 In accordance with City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing.

.2 Gate frames shall be made from schedule 40 hot dip galvanized steel pipe; not less than 43 mm outside diameter, electrically welded at all joints with ample bracing to provide a rigid frame free from sag or twist.

.3 Gate height shall match the height of the fence unless otherwise specified.

.4 No. 9 gauge chain link fabric as specified in Clause 5.6 herein shall be attached to gate panels as described above. Top and bottom fabric selvage shall be knuckled.

.5 Gates shall be supplied and installed complete with hot dip galvanized malleable iron hinges, latches, chain holdbacks, and a gate latch suitable for padlock, which is accessible from either side. Gates 3000 mm or more in width shall have three hinges per section.

.6 Hinges shall permit the gate to swing back 180° degrees in line with the fence and shall be installed so as not to permit easy removal of the gate.

.7 If requested by the Contract Administrator, the Contractor shall supply shop drawings of all gates to be supplied prior to manufacture for the Contract Administrator's approval.

3.9 ZINC COATING REPAIRS

.1 In accordance with City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing.

.2 All abraded and damaged galvanized surfaces shall be cleaned and painted. Damaged surface areas shall be thoroughly grinded or wire brushed and all loose and cracked zinc coating removed, after which the cleaned area shall be painted with two coats of a zinc pigmented paint approved by the Contract Administrator for these purpose.

3.10 CLEANING

.1 Clean and trim areas disturbed by operations. Dispose of surplus material as directed by Contract Administrator.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This specification shall cover the supply, installation and final contouring of planting medium for all shrub and perennial planting beds.

1.2 REFERENCES

.1 Agriculture and Agri-Food Canada
  .1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the environment (CCME) Guidelines.

.3 The City of Winnipeg Standard Construction Specifications
  .1 CW 3540 – Topsoil and Finished Grading for Established Turf Areas.

1.3 SUBMITTALS

.1 Submit 0.5kg sample of topsoil to National Testing Laboratory, or approved alternate, and indicate present use and intended use. Prepare and ship sample in accordance with Provincial regulations and testing laboratory requirements.

.2 Submit two (2) copies of soil analysis and recommendations for corrections to Contract Administrator.

1.4 QUALITY ASSURANCE

.1 This project shall use local produced imported topsoil amended as required. Inform Contract Administrator of proposed topsoil source.

.2 Testing of topsoil to be carried out and paid for by Contractor. Prepare and ship topsoil samples to approved laboratory in accordance with Provincial regulations and laboratory requirements, and CSA A283. Indicating intended use on each sample.

.3 Test topsoil for nutrients N, P, K, micronutrients, soluble salt content, pH value and OM (organic matter).

.4 Submit copy of topsoil analysis and recommendations for corrections to Contract Administrator.

.5 Acceptance of topsoil is subject to inspection of material and confirmation of test results. Do not commence work until Contract Administrator has accepted planting medium.

1.5 DELIVERY STORAGE AND HANDLING

.1 Store materials in a dry area, protected from freezing, sedimentation and contamination.

.2 Deliver and store fertilizer in waterproof bags labelled with weight, analysis and name of manufacturer.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate metal, plastic, wood and corrugated cardboard packing and place in designated areas for disposal or recycling.

Part 2 Products

2.1 PLANTING MEDIUM

.1 In accordance with CW 3540 for topsoil except organic matter to be in the range of 5-10%.

2.2 PEATMOSS

.1 Derived from partially decomposed fibrous or cellular stems and leaves of species of sphagnum mosses. Elastic and homogeneous, brown in colour. Free of wood and deleterious material that could prohibit growth. Shredded particle minimum size: 5 mm.

2.3 SAND

.1 Coarse Sand: Clean, hard fine silica sand, well washed and free of impurities, chemical or organic matter. Coarse texture, and to the following gradation:

Particle Size (mm)	% Passing through Screen
2.0	100%
1.0	95 to 100%
0.5	80 to 100%
0.25	0 to 30%
0.15	0 to 8%
0.075	0 to 1%

2.4 FERTILIER

.1 Synthetic start-up slow release fertilizer with a N-P-K analysis of 12-36-15 ratio at a rate of 4 kg per 100 m2 which is 8 pounds per 100 sq ft.

Part 3 Execution

3.1 EXCAVATION OF PLANTING BEDS

.1 Excavate planting beds by hand unless otherwise directed by Contract Administrator. Dispose of all rock, clay soils and other deleterious materials off Site.

.2 Protect bottom of excavations against freezing.

.3 Remove water that enters excavations and planters prior to planting. Ensure source of water is not groundwater.

.4 Scarify bottom and sides of tree planting pits to depth of 150 mm.

.5 Cover bottom of each tree pit with bone meal fertilizer.

.6 Verify and obtain approval by Contract Administrator of planting beds complete filter fabric prior to compacted soil mound and planting medium placement.

3.2 PLANTING MEDIUM PLACEMENT

.1 Place planting medium in uniform layers over approved, unfrozen sub-grade, to the depth indicated on the Drawings.

.2 Eliminate rough spots and low areas, prepare a loose, friable bed, boot firm and level.

3.3 SOIL AMENDMENTS

.1 Apply lime, sulpher or other soil amendment at a rate determined and recommended from planting medium sample test.

.2 Mix soil amendment well into full depth topsoil prior to application of fertilizer.

3.4 FINISHED GRADING

.1 As per CW 3540.

.2 Fine grade entire planting medium area to elevations as indicated on the Drawings. Eliminate rough spots and low areas Leave surfaces smooth, uniform and firm against foot printing with a fine loose texture.

3.5 SURPLUS MATERIAL

.1 Dispose of unused planting medium off Site to a topsoil supply facility within 25 km of the site.

3.6 CLEANING

.1 Upon completion of installation, perform cleaning to remove accumulated environmental dirt from all paved surfaces of building faces. Remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Standard Construction Specification CW 3540 – Topsoil and Finish Grading for the Establishment of Turf Areas.

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 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 In accordance with City of Winnipeg Standard Construction Specification CW 3540 – Topsoil and Finish Grading for the Establishment of Turf Areas.

.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 In accordance with City of Winnipeg Standard Construction Specification CW 3540 – Topsoil and Finish Grading for the Establishment of Turf Areas.

.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 In accordance with City of Winnipeg Standard Construction Specification CW 3540 – Topsoil and Finish Grading for the Establishment of Turf Areas.

.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 In accordance with City of Winnipeg Standard Construction Specification CW 3540 – Topsoil and Finish Grading for the Establishment of Turf Areas.

.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 In accordance with City of Winnipeg Standard Construction Specification CW 3540 – Topsoil and Finish Grading for the Establishment of Turf Areas.

.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,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 REFERENCES

.1 City of Winnipeg Standard Construction Specification CW 3510 – Sodding.

1.2 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.

1.3 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 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 In accordance with City of Winnipeg Standard Construction Specification CW 3510 – Sodding.

.2 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.

.3 Sod establishment support:

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

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

.4 Water:

.1 Supplied by Contract Administrator at designated source.

.2 Potable, free of impurities.

.5 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 19.13 - 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 In accordance with City of Winnipeg Standard Construction Specification CW 3510 – Sodding.

.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 of1 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 In accordance with City of Winnipeg Standard Construction Specification CW 3510 – Sodding.

.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 In accordance with City of Winnipeg Standard Construction Specification CW 3510 – Sodding.

.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 In accordance with City of Winnipeg Standard Construction Specification CW 3510 – Sodding.

.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 In accordance with City of Winnipeg Standard Construction Specification CW 3510 – Sodding.

.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 In accordance with City of Winnipeg Standard Construction Specification CW 3510 – Sodding.

.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

Part 1 General

1.1 DESCRIPTION

.1 This specification shall cover the supply and installation of shrub and perennial plant material.

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).

.5 The City of Winnipeg Standard Construction Specifications
  .1 CW 1120 – Existing Services, Utilities and Structures

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit product data for:
  .1 Fertilizer.
  .2 Wood chip mulch.

.3 Submit samples for:
  .1 Wood Chip Mulch.

1.4 SOURCE QUALITY CONTROL

.1 Obtain approval of plant material at source.

.2 Notify Contract Administrator of source of material at least seven (7) days in advance of shipment. No work under this Section is to proceed without approval.

.3 Acceptance of plant material at source does not prevent rejection on site prior to or after planting operations.

.4 Plant material imported from other nations will not be accepted on this project.

.5 Bare root plant material will not be accepted for this project.

1.5 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 four (4) hours after arrival at site in storage location approved by Contract Administrator.

.3 Protect plant material from damage during transportation:
.1 When delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.
.2 When delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.

.4 Protect stored plant material from frost, wind and sun and as follows:
.1 For pots and containers, maintain moisture level in containers.

1.6 SCHEDULING

.1 Obtain approval of species alternatives from Contract Administrator prior to ordering plant material. All species must native or adaptive species suited to the region.

.2 Order plant material as soon as possible after award of contract to ensure plant availability. Plants should be ordered at least one full growing season prior to anticipated planting date.

.3 Provide Contract Administrator a written schedule fourteen (14) days in advance of shipment of plant material. Schedule to include: quantity and type of plant material, shipping dates, arrival dates on Site, and planting dates.

1.7 WARRANTY OF NURSERY STOCK

.1 An eighteen (18) month warranty period is required for all plant material.

.2 During the warranty period, upon written notification from the Contract Administrator, the Contractor warrants to replace and replant any nursery stock found dead and/or in poor condition as soon as possible thereafter, without cost to The City. "Poor Condition" shall be interpreted as meaning nursery stock on which branches are dead or dying, or have not shown satisfactory growth in leaves. Exempted is nursery stock damaged by accidental causes or vandalism, which stock shall be replaced at the cost of The City.

.3 End-of-Warranty inspection will be conducted by Contract Administrator.

.4 Contract Administrator reserves the right to extend Contractor's warranty responsibilities for an additional one (1) year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

1.8 REPLACEMENTS

.1 During warranty period, remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator.

.2 Extend warranty on replacement plant material for a period equal to the original warranty period.

.3 All required replacements shall be by plants of at least the same size and species as specified, and shall be supplied and planted in accordance with the original Drawings and Specifications.

.4 Should the replaced plant material not survive, the Contractor will be responsible to replace it a third time and guarantee it for a period equal to the original warranty period unless it is determined that unique Site conditions or inadequate maintenance causes the death of plants.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate metal, plastic, wood and corrugated cardboard packing and place in designated areas for disposal or recycling.

Part 2 Products

2.1 PLANT MATERIAL

.1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock.
- .1 Source of plant material: grown in Zone 3 in accordance with Plant Hardiness Zones in Canada.
- .2 Plant material must be planted in zone indicated as appropriate for its species.

.2 Plant Material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.

.3 Plant species, cultivars and sizes as indicated on the Drawings.

.4 Container grown stock: acceptable if containers are large enough for root development. Plant material must have grown in container for minimum of two growing seasons. Root system must be able to "hold" soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.

.5 Substitutions to plant material as indicated on planting plan are not permitted unless written approval has been obtained as to type, variety and size from Contract Administrator. Plant substitutions must be of similar species and of equal size as those originally specified.

.6 Refer to Drawings for species, size and quality of plant materials

2.2 PLANTING MEDIUM

.1 As specified in Section 32 91 19 - Planting Medium and Finish Grading.

2.3 WATER

.1 Water free of impurities that would hinder plant growth. The Contractor shall provide water, so that all costs to provide water for the watering operation and all associated costs shall be borne by the Contractor. These costs may include hydrant permit and meter rental fees.

.2 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs associated with obtaining water in accordance with the Waterworks By-law. Sewer charges will not be assessed for water obtained from a hydrant.

2.4 WOOD CHIP MULCH

.1 Wood Chip Mulch, varying in size from 50 mm to 75 mm and 5 to 20 mm thick, free of bark. Wood chip shall be mulched locally within 100km of the Site.

2.5 FERTILIZER

.1 Synthetic start-up slow release fertilizer with a N-P-K analysis of 12-36-15 ratio at a rate of 4 kg per 100 m2 which is 8 pounds per 100 sq ft.

Part 3 Execution

3.1 PRE-PLANTING PREPARATION

.1 Obtain approval from Contract Administrator of finish grading, and planting medium installation prior to commencing work in this section.

.2 Ensure plant material is acceptable to the Contract Administrator.

.2 Remove damaged roots and branches from plant material with sharp clean equipment treating wounds as necessary to maintain plant health.

3.2 PLANT MATERIAL LAYOUT

.1 Prepare planting beds per Section 32 91 19 - Planting Medium & Finish Grading.

.2 Lay out plants in pots on beds for Contract Administrator approval prior to installation and make any necessary adjustments on site.

.3 Lay out plants per drawings carefully ensuring spacing specified on the drawings.

.4 Remove water which enters excavations or shrub beds prior to planting. Notify Contract Administrator if water source is groundwater.

3.3 PLANTING

.1 Cover bottom of each excavation with bonemeal in amount recommended by manufacturer.

.2 For shrubs: Backfill planting medium in 150mm (6”) 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 planting medium, backfill to finish grade. Form watering saucer as indicated on the Drawings.

.5 For perennials: backfill planting medium evenly to finish grade and tamp to eliminate air pockets.

.6 Water plant material thoroughly. Report extreme ponding in planters indicative of malfunctioning drains to the Contract Administrator immediately.

.7 After soil settlement has occurred, fill with planting medium to finish grade.

.8 Dispose of burlap, wire and container material off Site.

3.4 MULCHING

.1 Wood Chip Mulch:
- .1 Obtain approval of planting from Contract Administrator before mulching material is applied.
- .2 Ensure soil settlement has been corrected prior to mulching with wood chip mulch.
- .3 Spread wood chip mulch as indicated on all shrub and perennial beds.
- .4 Loosen planting medium in planting beds and remove debris and weeds. Spread mulch to minimum thickness of 75 mm. Mulch material susceptible to blowing must be moistened and mixed with topsoil before applying. When mulching is placed in fall, place immediately after planting. When mulch is placed in spring, wait until soil has warmed up.

3.5 MAINTENANCE

.1 Maintain plant material from date of planting to the end of the warranty period. Refer to section 32 93 11 - Landscape Maintenance.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This specification shall cover the maintenance of planting beds, shrubs and perennials following acceptance of the plant material to start warranty.

.2 In general, work shall include:

- .1 Spring cleaning
- .2 Fertilizing
- .3 Watering
- .4 Weed control
- .5 Pest and disease control
- .6 Mulching
- .7 Pruning
- .8 Winter preparation

.3 Maintenance shall be performed on an as required basis.

1.2 MAINTENANCE PERIOD

.1 Maintenance shall occur between the date of installation and up to a period of two (2) years from date landscaped areas are accepted to start warranty. The warranty period for plant materials will be coincidental to the maintenance period.

.2 Thirty (30) days after the planting installation has been completed, the Contract Administrator shall perform an inspection of the plant material to determine if the plant material is acceptable to start warranty.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate metal, plastic, wood and corrugated cardboard packing and place in designated areas for disposal or recycling.

Part 2 Products

2.1 GENERAL

.1 Provide watering service within 24 hours, weeding services within 48 hours of the request by the Contract Administrator. Monitor the Site and advise the Contract Administrator of conditions that might void the Contractor’s warranty responsibilities.

.2 The Contractor shall maintain a log noting times, dates, equipment used, and quantity of materials used and areas treated for each maintenance application. Forms shall be provided by Contract Administrator. Submit log to Contract Administrator upon request. Contractor shall notify Contract Administrator of the exact time Contractor proposes to commence each application.

.3 Schedule operations in accordance with growth, health, weather conditions, and use of Site.

.4 Perform each operation continuously and completely within a reasonable time period.

.5 Store equipment and materials off Site.

.6 Collect and dispose of debris or excess material on the day the maintenance is undertaken.

Part 3 Execution

3.1 SPRING CLEANING

.1 Planting Beds: clean shrub beds and planters of debris and dead plant material. Trim grass edges around planting beds neatly in lines as in original layout.

3.2 MAINTENANCE OF SHRUBS AND PERENNIALS

.1 Fertilizing: Apply fertilizer only at frequency, ratio and rates as recommended by manufacturer. Water immediately after fertilizing. Apply fertilizer no later than May 30th of each maintenance year.

.2 Watering: Apply water as required to supplement rainfall and to maintain optimum growing conditions. In general, water once a week to achieve rates as indicated. Allow soil to adequately dry between watering to prevent over saturation without creating water stress. Subject to the above-noted requirements, the Contractor must water at least once a week between May 1st and October 15th inclusive. A complete record is to be kept of each series of waterings for all plant material noting location and date of watering. This record is to be given to the Contract Administrator when requested.

.3 Weed Control: Inspect and undertake weed control weekly during the first year of maintenance and monthly during the second year. By hand, remove all weeds with their roots from planting beds and dispose of off Site. When weeding operation is complete, replace and rake displaced mulch to its original condition.

.4 Pest and Diseases: Obtain written approval of Contract Administrator prior to using any pesticide. Control pests and disease through pruning or application of pesticides. Use species specific pesticides where possible. Use only pesticides of low mammalian toxicity. Strictly follow manufacturer’s written instructions,

.5 Pruning: The Contractor shall provide a person with a Manitoba Arborists Certificate for each work crew or Work Site. Prune shrubs as required to remove dead, broken or damaged limbs. Prune back to healthy growth while maintaining a balanced shape. Employ clean sharp tools. Make cuts smooth and flush with outer edge of branch collar near the main stem or branch. Cuts must be smooth and sloping to prevent accumulation of water on cut. Do not leave little stumps (“horns”) on trunks or main branches. Prune shrubs according to accepted horticultural practices as outline in “The Pruning Manual”, Publication No. 1505-1977 by Agriculture Canada.

.6 Mulching: Add mulch as required to maintain original thickness. Contractor is to provide replacement mulch material.

.7 Winter Preparation: Ensure adequate moisture in plant material root zones prior to freeze-up. Clean out planting beds. Remove debris from site. Ensure adequate moisture in root zones of plant material prior to freeze-up.

END OF SECTION