Part 1 General

1.1 RELATED SECTIONS

.1 Section CW 3110 – Sub grade

.2 Section CW 2030 – Excavation, Bedding and Backfilling

.3 City of Winnipeg Tree Planting Specification E4

1.2 SUBMITTALS

.1 Product Data: Including stone type and quantity.

.2 The following shall be submitted 10 days, minimum, prior to beginning work under this Section.

.1 List of materials and sources for products to be installed under this section. Include a description of the components of the material.

.2 A half cubic foot of 19 (3/4”) down clean black granite

.3 A 1’x1’ sample of compacted 6 (1/4”) down black granite

1.3 QUALITY ASSURANCE

.1 Sources: The crushed stone surfacing shall be obtained from a single source and be of the same type material to assure uniformity of quality and appearance. Deliver all project stone materials to an approved holding area prior to commencement of Work for review by the Contract Administrator.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials to the Site only when the work area is ready and surfacing can begin.

.2 Store and handle gravel and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, or other causes.

.3 Store cementitious materials off the ground, under cover, and in a dry location.

.4 Store aggregates, covered and in a dry location, where grading and other required characteristics can be maintained and contamination avoided.

.5 Handling:

1. Handle materials in a safe and professional manner. Use tools, equipment and methods designed and suitable for the task being performed.

2. Comply with all applicable safety standards, requirements, and practices, including those for using safety glasses or goggles.

1.5 SUBSTITUTIONS

.1 Materials substitutions are not permitted without written approval of the Contract Administrator.

1.6 LAYOUT

.1 Verify the location of all elements prior to installation with Contract Administrator.

Part 2 PRODUCTS

2.1 CRUSHED STONE SURFACING BASE AGGREGATE

.1 19mm (3/4”) down Crushed Limestone as described in CW3110.

2.2 GEOTEXTILE WEED BARRIER

.1 Weed barrier shall be non-woven, ‘Geotex 401’ weed barrier by Propex.

2.3 CRUSHED STONE SURFACING TOP COURSE

.1 6mm (1/4") down crushed Black Granite

.2 19mm (3/4”) down crushed clean Black Granite

Part 3 EXECUTION

3.1 EXAMINATION

.1 Verify the following:

.1 Support substrates and site conditions are ready to receive Work of this Section.

.2 Items in other Sections are properly located and sized.

3.2 PREPARATION

.1 Do not work in frozen soils.

.2 Protect soils from excessive moisture.

.3 Apply supplemental moisture to overly dry soils.

3.3 GRADING

.1 Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Contract Administrator is not authorized. Unauthorized excavation, as well as remedial work directed by the Contract Administrator shall be at the Contractor's expense.

.2 Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified areas. Compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades. Finish surfaces free from irregular surface changes.

.3 Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

.4 Locate and retain soil materials away from edge of excavations and drip lines of trees to remain.

.5 Dispose of excess soil material and waste materials as herein specified.

3.4 COMPACTION

.1 General: Control soil compaction during construction providing minimum percentage of density specified for area classification. Do not allow equipment traffic to overly compact areas beyond specified percentages. Remediate over compaction as directed by the Contract Administrator including ripping, regrading and re-compaction or over-excavation and in-kind replacement per plan.

.2 Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages for maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D1557; and not less than the following percentages of relative density; determined in accordance with ASTM 2049, for soils which will not exhibit a well-defined moisture density relationship (cohesion-less soils).

.1 Import aggregate base material for Crushed Stone Surface- 95%.

.2 Crushed Stone Surface Top Courses - 95%

.3 Moisture Control:

.1 Where sub-grade or lift of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

.2 Before compaction, moisten or aerate each layer as necessary to provide optimum content. Compact each layer to required percentages of maximum dry density or relative dry density for each area classification.

.3 Do not perform compaction operations on excessively wetted soils.

3.5 CRUSHED STONE SURFACING BASE BACKFILL

.1 Provide a minimum 100mm (4”) compacted lift of specified Crushed Stone Surfacing Base Aggregate, true to the elevations either described or implied in the Contract Drawings, or as required to match adjacent existing pavements, and a minimum of 150mm (6”) beyond the horizontal layout lines of pavement as indicated on the Contract Drawings.

3.6 GEOTEXTILE WEED BARRIER

.1 Lay a continuous layer of geotextile weed barrier, evenly and smoothly, between granular base course and granular top course typically. Overlap all joints as recommended by manufacturer.

3.7 CRUSHED STONE SURFACING TOP COURSE

.1 Provide a minimum 100mm (4”) compacted lift of specified Crushed Stone Surfacing Top Course, true to the elevations either described or implied by the Contract Drawings.

.2 Shape the crushed stone area to the desired grades and shape surfaces so as to provide natural run-off and drainage.

3.8 INSPECTION

.1 All workmanship and materials of the Work will be systematically reviewed by the Contract Administrator, from selection and production of materials through to final acceptance of the Work. The Contract Administrator reserves the right to reject any materials or installation, which are not in accordance with the requirements of this Section.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 33 - Excavating, Trenching and Backfilling

.2 Section 03 10 00 - Concrete Forming

.3 Section 03 20 00 - Concrete Reinforcing

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

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM), latest edition

.1 ASTM D698, 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), latest edition

.1 CAN/CGSB-1.2, Boiled Linseed Oil

.2 CAN/CGSB-3.3, Kerosene

.3 Canadian Standards Association (CSA), latest edition

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

.4 City of Winnipeg Standard Construction Specifications, latest edition.

1.3 MEASUREMENT PROCEDURES

.1 Concrete walks: will be measured in square metres.

.2 Concrete curbs and gutters: will be measured in linear metres.

.3 Borrow material: will be measured in cubic metres compacted in place.

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

.5 Ensure emptied containers are sealed and stored safely.

Part 2 PRODUCTS

2.1 MATERIALS

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

.2 Reinforcing steel: to Section 03 20 00 - Concrete Reinforcing.

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

.4 Granular base: to Section 31 23 33 - Excavating, 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 33 - Excavating, Trenching and Backfilling.

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

.8 Kerosene: to CAN/CGSB-3.3 or latest.

.9 Aggregates: to CAN/CSA-A23.1 or latest. Coarse aggregates to be high density.

.1 Exposed aggregates (at exterior sidewalk/slab areas and where indicated on drawings): Aggregate shall be 10 (3/8") round maximum, with the following sieve graduation:

Size	% Passing
3/8"	70-100
#4	40-70
#8	0-40

.2 All exposed aggregate to be purchased from one place at one time.

2.2 DETECTABLE WARNING AREA AT EXTERIOR ENTRY STAIR

.1 Exterior Sidewalk Detectable Warning Area: Vitrified Polymer Composite (VPC) cast-in-place detectable guidance tile strips with a non-slip UV-stabilized surface coating of aluminium oxide particles in two rows of finely raised ribs. Acceptable Products: “Armor-tile Guidance Tile” by Engineered Plastics Inc [as dist. by Alsip’s (204) 791-2760]. Size: 102 x 610mm (4” x 24”). Set surface of these tiles flush with adjacent concrete with gaps between; refer to drawings for layout. Locations: At exterior entry stair top landing, as indicated on drawings. Warning area width to match that of stair x 900 (36”) minimum deep. Colour: “Black”, unless otherwise noted.

.2 SAFETY TREAD NOSINGS AT EXTERIOR ENTRY STAIR

Heat-treated, corrosion resistant, 6 (1/4”) high extruded aluminium base in a satin/lacquered finish, with 76 (3”) tread width of abrasive, non-slip, aluminium oxide coloured filler strips. Rated for heavy pedestrian traffic and exterior use. Acceptable product: Supergrit by Wooster Products Inc. (dist. by Erv Parent, Tel: 204.981.7227). Where concrete is the tread finish: Type #231 BF at cast concrete stairs, set into concrete so top of aluminium is flush with the concrete tread and riser. Locations: At each nosing of exterior entry stairs and where indicated on drawings. Colour: “Black”, unless otherwise noted.

Part 3 EXECUTION

3.1 GRADE PREPARATION

.1 Do grade preparation work in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling.

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

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

3.2 GRANULAR BASE

.1 Obtain Contract Adminstrator’s approval of subgrade before placing granular base.

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

.3 Compact granular base to at least 95% of maximum density to ASTM D698.

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 and City of Winnipeg Standard Construction Specifications.

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

3.4 FINISHING

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

.2 Unless other finishes are noted, give sidewalk surface a uniform broom finish immediately after floating. Produce regular corrugations not exceeding 2 mm deep, by drawing broom in one continuous movement, perpendicular to sidewalk edges. Unless otherwise noted, edge all sidewalks/slabs with a 10mm radius edging tool.

.2 Where exposed aggregate finish is noted, proceed as soon as surface grout can be removed by simultaneously brushing and flushing surface with water, without overexposing or dislodging the aggregate. High pressure water may be used, if desired finish is more easily achieved without harm to the concrete. Use a consistent method of exposure throughout, either with or without retarder.

3.5 EXPANSION AND CONTRACTION JOINTS

.1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 1500mm or as per drawings. Install expansion joints as indicated at intervals of 6000mm.

.2 When sidewalk is adjacent to curb, make joints at curbs, gutters, and sidewalks 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.

.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-A23.1 or latest 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 pre-wetted 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.

3.9 LINSEED OIL TREATMENT

.1 After concrete has cured for specified curing time and when surface of concrete is clean and dry, apply two coats of linseed oil mixture uniformly to surfaces of curbs, walks and gutters.

.2 Linseed oil mixture to consist of 50% boiled linseed oil and 50% mineral spirits by volume.

.3 Apply treatment when air temperature above 10EC.

.4 Apply first coat at 135 mL/m^2.

.5 Apply second coat at 90 mL/$m^2$when first coat has dried.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Supply and install wire fencing posts, panels, gate, and all related accessories where indicated on the drawings and to the lines, grades, angles, heights, and details indicated on the drawings.

1.2 RELATED WORK

.1 Section 03 30 00 – Cast-in-Place Concrete
.2 Section 05 50 00 – Metal Fabrications
.3 Section 31 23 33 – Excavation, Trenching, and Backfilling
.4 Section 31 22 00 – Site Grading

1.3 REFERENCES (latest editions)

.1 ASTM
  .1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  .2 ASTM D5116, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.2 CSA
  .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  .2 CSA G42-Galvanized (Zinc-Coated) Steel Farm-Field Wire Fencing.

.3 The Master Painters Institute (MPI)
  .1 Architectural Painting Specification Manual

1.4 SUBMITTALS

.1 Submit in accordance with Section 01 33 00.
.2 Submit manufacturer's instructions, printed product literature/ data sheets, and shop drawings for fences, gates, posts, paint finish, and include characteristics, components, performance criteria, physical size, dimensions, layout, hardware, and finishes.
.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.5 QUALITY ASSURANCE

.1 Qualified manufacturers shall have a minimum 5 years proven experience in manufacturing the type of fencing system specified.

.2 Qualified installers shall have a minimum of 5 years proven experience in installing the type of fencing system specified.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Store products in strict accordance with Section 01 60 00, in manufacturer's unopened packaging, until ready for installation.
.2 Store products on edge or lay flat on a smooth, level surface. Protect all finished faces, edges, and corners from damage. Store product under cover and keep dry prior to installing. If material should become wet, allow to dry thoroughly before installing.
.3 Immediately report and replace any damaged pieces.

.4 Separate and recycle waste materials in accordance with Section 01 74 21. Recycle any packaging materials as much as possible.

1.7 WARRANTY

.1 Provide a one (1) year written warranty for Work of this Section against all defects in materials, fabrication, installation, and workmanship, from the Date of Substantial Performance.

PART 2 PRODUCTS

2.1 FENCING SYSTEM

.1 Concrete design mix and materials: refer to Section 03 30 00.

.2 Galvanized bolts/anchor bolts: refer to Section 05 50 00.

.3 Welded steel wire mesh panels: standard length 2510mm with anti-climb mesh pattern, 50 x 200mm (2" x 8") vertical. 5mm (3/16") dia. vertical wire and 6mm (1/4") double horizontal wires ('Pallas Economy'). Panel sizes to suit layout and shape as indicated on the drawings. Where possible, use two 1830 (6') high x 2440 (8') long panels stacked, to achieve the 3660 (12') height overall.

.4 Posts, rails, bracing, and gate frame: 60x40x2mm steel HSS, with peaked PVC cover cap at post tops, 160x160x4mm steel baseplates, and shearing nuts.

.5 Universal connectors: steel RVS U-brackets with stainless steel straps and nylon spacers.

.6 Gate: include rigid steel perimeter frame and wire mesh panel of matching materials and finish, and all hardware such as 180 deg. hinges (3 per gate) and a latch plate. Refer to drawings for gate size and location.

.7 Acceptable products: 'Pallas' welded mesh fencing system as manufactured by Heras Fencing Systems (dist. by Wallace + Wallace fences, tel. 204.452.2700).

2.2 FINISHES

.1 All steel components to be hot dipped galvanized to NEN-EN-ISO 14561.

.2 Final finish: electrostatically-applied powder coating, RAL 9005 'Deep Black' typical. Include touch-up kit.

2.3 CONCRETE

.1 Unless detailed otherwise on drawings, provide concrete piles for post installation, 300 (12") diameter x 1200mm (48") deep, with 150mm (6') thick Type 1 base granular at bottom of pile, compacted to 98% SPDMM. Concrete shall conform to CW 2160 and be sulphate resistant type 50 with a 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, unless otherwise noted.

PART 3 EXECUTION

3.1 GRADING

.1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts. Provide clearance between bottom of fence panel and ground of 50mm (2").

3.2 ERECTION OF FENCE

.1 Excavate post holes to 1400mm deep x 300mm ø. Bulb the bottom of holes for corner, end and gate posts and for intermediate posts at every 60m of fence length minimum. Place concrete into post holes, shaping top of the pile to suit baseplate size, with a slight slope away from baseplate to pile edges. Let cure for a minimum of 7 days.

.2 Erect fence plumb, level, and along lines indicated on drawings and in accordance with written manufacturer's instruction. Mesh panels to be on outside face of posts typical.

.3 Install corner posts at fence corners and at end terminations, as well as at both sides of gate openings.

.4 Space line posts in between as indicated on the drawings. Install additional bracing members to reinforce panel joints, at angle changes, and where necessary to stiffen panels.

.5 Install bracing at end posts, corner posts, and at gate posts, to nearest line post.

.6 Install top and bottom rails between posts and fasten securely. Secure waterproof caps to top of posts.

.7 Lay out wire mesh panels and securely fasten to posts and bracing at intervals with connectors as recommended by manufacturer.

.8 Remove all manufacturer's/supplier's tags from fencing system.

3.3 INSTALLATION OF GATE

.1 Install one swing gate in location indicated on the drawings.

.2 Level ground between gate posts and set gate bottom approximately 50mm (2") above the finished ground surface.

.3 Coordinate gate for additional panic bar hardware in Sections 08 06 00 and 08 06 71.

.4 Adjust hardware until gate swings and operates smoothly.

3.4 TOUCH UP

.1 Take care not to scratch or damage the factory finish on any components. Should site damage occur, repair or replace any damaged surface finishes. If damage is minor, clean surfaces thoroughly, removing any loose and cracked coatings. Pre-treat damaged surfaces according to manufacturers' written instructions. Touch up with same paint from manufacturer to match colour and sheen.

.2 Touch up anchor bolts/nuts with same paint from manufacturer to match colour/sheen.

3.5 CLEANING

.1 Clean all areas disturbed by this Work. Dispose of surplus excavated material as directed.

END OF SECTION

Part 1 GENERAL

1.1 SECTION INCLUDES

.1 Supply and installation of manufactured exterior site furnishings where indicated on the drawings, including bike racks and waste/recycle containers.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 01 74 21 - Construction/Demolition Waste Management

.3 Section 01 78 00 - Closeout Submittals

.4 City of Winnipeg Standard Construction Specifications, latest edition.

1.3 SUBMITTALS

.1 Submit all product data and shop drawings in accordance with Section 01 33 00.

.2 Shop drawings shall indicate dimensions, sizes, assembly, finishes, colours, and anchorage/installation instructions for each item.

.3 Provide maintenance data for care and cleaning of site furnishings for incorporation into manual specified in Section 01 78 00.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for recycling and place in designated containers for Steel, other Metals and Plastic waste in accordance with Waste Management Plan. Fold up metal banding, flatten and place in designated area for recycling.

Part 2 PRODUCTS

2.1 BICYCLE RACKS

.1 Acceptable Product: 'Ring' bike rack by landscapeforms or approved equal in accordance with B7. 38 (1.5") O.D. x 0.120" thick wall stainless steel tubing. Contact: Martin Petersen, Western Canada Sales Representative. Phone: 604 -987-7461, Fax: 604-987-7924, martinp@landscapeforms.com

.1 Frame: 1.5" (38mm) x 0.12" wall tubing (3mm)

.2 Dimensions:

.1 Width: 25" (635mm)

.2 Height: 27" (686mm)

.3 Finish: #4 satin finish on stainless steel.

.4 Quantity & Anchorage: 6 total, embedded into 200 (8”) dia. x 460 (18”) deep concrete piles-top of pile flush to top of sidewalk; see drawings for locations.

2.2 WASTE / RECYCLE RECEPTACLES

.1 Acceptable Products: ‘Select’ Series by landscapeforms or approved equal in accordance with B7; heavy steel construction with solid top, solid front, and perforated sides/back on a cast iron base, in a triple-unit combination. Each combination to have cast aluminium trim rings and signage plates labelled, “Waste” (multi-use opening), “Newspapers” (slot opening), and “Bottles” (round opening). Include molded polyethylene 25-gallon liner, concealed stainless steel hinges, cam locks, and levelling glides. Contact: Martin Petersen, Western Canada Sales Representative. Phone: 604 -987-7461, Fax: 604-987-7924, martinp@landscapeforms.com.

.1 Dimensions:

.1 Height: 42” (1070mm)

.2 Depth: 17” (431mm)

.3 Length: 51” (1296mm)

.2 Factory powder coated finish: Top, sides, and back to be metallic silver colour, front face to be in accent colour (allow for 3 to be selected by Contract Administrator from range available).

.3 Quantity: 1 - triple unit total; refer to drawings for locations

Part 3 EXECUTION

3.1 INSTALLATION

.1 Assemble furnishings in accordance with manufacturer's written instructions.

.2 Install furnishings true, plumb, fully anchored and firmly supported.

.3 Touch-up any damaged finishes to the approval of the Contract Administrator.

.4 Turn over extra or replacement parts, instruction manuals and warranty information to the City, in accordance with Section 01 78 00.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 Work of this Section shall conform to industry standards and to local construction and trade associations.

.2 City of Winnipeg Standard Construction Specifications, latest edition.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Weeping Tile: corrugated, high-density polyethylene resin tubing to meet Type III, Category 4 or 5, Grade P33 or P34, Class C, as per ASTM D1248. Non-perforated type OR perforated type with sock filter, where indicated and required for sub-drainage applications, including all required fittings and couplers. Sock filter to be of seamless, knitted polyester, to prevent blockage or clogging in fine, sandy, or silty soils. Size: 100 (4”) or 150 (6”) inside diameter, and at locations indicated on the drawings. Acceptable material: Big “0” or approved equal in accordance with B7.

.2 Course Filter Aggregate: clean, uncontaminated pea gravel, 10mm (3/8”) minus

Part 3 EXECUTION

3.1 INSTALLATION

.1 Trench for perimeter foundation and underslab drainage system as indicated on the drawings. Install weeping tile with filter sock typically around the foundation perimeter, at under slab/crawlspace areas, and where indicated on the drawings.

.2 Hand trim bottom of trenches to required elevations and to provide a minimum 1:100 slope to allow weeping tile to naturally drain to low points, where they will connect to non-perforated piping to sump pits typically. Do not overexcavate. Remove large stones or other hard matter, which could damage drainage tile.

.3 Place down a bottom bedding layer of 150mm (6”) thickness minimum of course filter aggregate and fine tune the slope of the tile to the low points.

.4 Carefully lay down the drainage tile level, with maximum variations of 3mm in 3000mm (1/8” in 10 feet) and ensure non-perforated lengths are draining to sump pit locations intended.

.5 Plug open ends of tile during installation to prevent the entry of foreign matter. Remove the plugs as connections are made.

.6 Ensure all connections are secure and complete to the storm sewer system, sump pits, or exterior pump chambers, with lengths of non-perforated pipe sloped to 1:100 minimum. Use purpose-made connectors and glue all joints to be watertight, as recommended by the manufacturer. Also use non-perforated sections where there is a risk of tree or other roots infringing upon the weeping tile.

.7 Prior to placing any backfill over tile, take photos of installed drainage tile system and request visual inspection by Contract Administrator, at least 48 hours prior to backfill.

.8 Upon Contract Administrator review, carefully place course filter aggregate over weeping tile for full coverage on all sides and top, in maximum 150mm (6”) lifts, to a total thickness of 300mm (12”). Backfill carefully, so as not to crush the weeping tile and do not displace or damage drainage tile.

.9 If vehicle traffic is expected over weeping tile areas, place an additional 300 (12”) thickness of Type 1, Class ‘A’ granular base, in maximum 150mm (6”) lifts and compact carefully. Do not displace or damage drainage tile when compacting.

END OF SECTION

Part 1 GENERAL

1.1 WORK INCLUDED

.1 Furnish all labour, materials, equipment, and services required to install all poured-in-place granular rubber surfacing, where scheduled and as indicated on drawings and details.

1.2 REFERENCES

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

.2 Section 09 30 13 – Ceramic Tile

.3 Section 11 68 16 – Aquatic Play Structures

.4 Canadian Playground Safety Institute (CPSI)

.5 CAN/CSA Z614, Children's Playspaces and Equipment, latest edition.

1.3 SUBMITTALS

.1 All submittals to be in accordance with Section 01 33 00. Submit product data, MSDS confirming recycled content percentage, regional material data, full colour range available for Contract Administrator's selection, and a detailed contour plan shop drawing, showing the various safety surface thicknesses, to comply with all requirements.

1.4 DELIVERY AND STORAGE

.1 Deliver materials in original manufacturer's packaging, clearly labelled, and unopened.
.2 Store and handle in a manner, which will prevent intrusion of foreign matter and will assure protection from weather.
.3 All resins and solvents shall be stored at a minimum temperature of 0 degrees C.
.4 Ambient air temperatures shall be 5 degrees C minimum, during the day and night, prior to, during, and after the installation for at least 24 hours.
.4 Co-ordinate delivery of materials with the scheduled time of installation to ensure minimum storage time at the Site.

1.5 QUALITY ASSURANCE/WARRANTY

.1 The installer must be a dealer authorized by the manufacturer, and shall have at least 25 applications of similar size installations, with a minimum of three (3) years of proven experience in the poured-in-place rubber safety surface industry.
.2 The installer shall provide a written commercial warranty for any defects in materials, labour, and workmanship, for up to (5) five years from the Date of Substantial Performance.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Granules: Pure vulcanized, UV stable, high quality EPDM rubber chips (German produced only) ranging in size from 0.5 to 1.5mm minimum to 1 to 4mm maximum.
.2 Binder: Resin (from aromatic or aliphatic isocyanate chemical family), 100% polyurethane with no: TDI, halogen, CFC's, plasticizers, chlorine, cadmium, mercury, lead, zinc, and asbestos. Accelerators may be used with aliphatic binders (only for indoor applications where UV exposure or where light coloured rubber granuals are selected).
.3 Primer: aromatic or aliphatic resin thinned with solvent-free primer (mandatory for indoor applications).
.4 Matrix: resin mixed with a thickening agent, used as a base coat to allow application of rubber on vertical surfaces.
.5 Finished floor properties:
  .1 Surface to withstand 600-psi tensile stress

.2 Surface to be slip-resistant when wet or dry
.3 Surface to be non-porous, fungus and bacteria resistant
.4 Surface to be chemical resistant (treated surface immersed for 24 hours) so that there is no effect from oil, lye, hydrochloric acid, animal fat, grease, acetone, toluidine, alcohol, blood, chlorine, urine, detergents, and insect spray.
.5 Surface granules to achieve a tight, compact pattern.

.6 Splash Pad Floor Area (over concrete substrate):
.1 Non-porous type required for Spray/Splash Pads; impact absorbing and cushioning
.2 Rubber safety surfacing thickness varies from 10mm minimum to 165mm maximum; coordinate thickness relative to fall protection requirements, maximum play structure height and 'use zones' (Section 11 68 16), layout, and to meet CAN/CSA Z614.
.4 Before general use, spray pads to be left to cure for 5 days minimum.

.7 Acceptable products: Rubber Safety Surfacing by Rubber FX.

2.2 TESTING REQUIREMENTS
.1 Hardness: ASTM D-2444 94% recovery
.2 Water Absorption: ASTM D-530 +6.5%
.3 Ultraviolet Resistance: ASTM D-3137
.4 Fungal Resistance: no growth
.5 Bacteria Resistance: no growth
.6 Spread of Flame Resistance: ANSI/UL 790 (ULC-S107) Class A
.7 Accelerated: weathering no change after 2000 hours
.8 Freeze/Thaw: no change after 30 days at minus 50 in 24-hour period
.9 Complies with ASTM F1292 Standard, to accommodate fall heights to 12'

Part 3 EXECUTION

3.1 PREPARATION

.1 Inspect all substrates prior to application and report any discrepancies to the Contractor and Contract Administrator. Installation shall not proceed until any problems are rectified to the satisfaction of the The City and Contract Administrator.
.2 Clean substrate with broom or shop-vac as required. Use a pressure washer if substrate is extremely dirty but allow for sufficient time to dry thoroughly.
.3 Install retaining edging or forms as required.

3.2 MIXING/APPLICATION

.1 Use a short nap roller, roll onto substrate surface one coat of primer at approx. 50 s.f. per liter (priming not required for two tier system over gravel).
.2 Coat the selected EPDM topcoat granules with aromatic or aliphatic resin in a non-porous container at a rise to granule ratio of 80% rubber to 20% urethane resin by weight. Topcoat to be between 6mm and 12mm thickness. Mix topcoat with an electric vertical shaft mortar mixer to ensure consistency and to assure complete coverage of each granule.
.3 Apply resin to rubber once rubber is initially working within the mixer, and mix for approx. 1 to 3 minutes.

3.3 HEALTH AND SAFETY

.1 When using resin or solvent products, follow all safety regulations as recommended by the manufacturer. Keep all MSDS data sheets on-site during installation.
.2 Immediately wash off any resin or solvent in contact with skin.
.3 Erect barricades, caution tape, and signage as required around work areas and around finished surfaces and maintain for at least 48 hours after installation.
.4 Upon completion of the Work, remove all tools, equipment, unused materials, and debris from the Site; broom clean immediate area.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section CW3170 – Earthwork and Grading

.2 Section CW3510 – Sodding

.3 Section CW 3540 – Topsoil for Turf

Part 2 PRODUCTS

2.1 MATERIALS

.1 Planting Soil: black top soil, a fertile friable natural loam containing by volume not less than 4% and no more than 25% of organic matter for clay loams, and not less than 2% and no more than 25% for sandy loams, with an acidity value ranging from pH 6.0 to 8.0 and capable of sustaining vigorous plant growth. Topsoil is to be free of any mixture of subsoil, clay lumps and free of stones and other extraneous matter. It is not to contain couch or crab grass rhizomes.

.2 Mulch: locally available mulch, free of soil, stones or other deleterious material, smallest chips to be no less than 1” in any one dimension. Colour: dark brown or black. Red, gold, or orange mulch shall not be accepted. Or stone mulch as shown in Drawings.

.3 Water: potable and free of minerals which may be detrimental to plant growth.

.4 Fertilizer: complete synthetic slow release fertilizer with maximum 35% water-soluble nitrogen.

Part 3 EXECUTION

3.1 PLANTING BED PREPARATION

.1 All planting bed areas shall match to shapes as shown on the drawings. Beds shall be excavated to the finished depth (including mulch) shown on drawings.

.2 Excavation shall be filled with soil mixture. After filling, excavation of top of bed shall be level with surrounding grade. Soil should be lightly compacted and indicated soil depths shall be depths after light compaction.

.3 All areas and locations provided for planting shall be staked according to layout shown on the drawings. Excavation shall not proceed until the layout has been inspected and approved by the Contract Administrator. Excavation shall not be undertaken until all underground utilities have been located and protected.

.4 The Contractor shall provide a planting bed with a crisp spade edge (where appropriate), complete with topsoil and bark mulch as indicated on the Drawings.

3.2 INSTALLATION OF MULCH

.1 Mulch shall be spread to a consistent depth over entire planting bed area, taking care not to damage the plants.

3.3 COORDINATION OF INSTALLATION

.1 Topsoil and mulch installation shall be coordinated to allow for sufficient time for planting of tree, shrubs, and groundcover.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 32 91 13 - Topsoil and Finish Grading

.2 Section 32 93 00 - Trees, Shrubs, and Ground Cover Plantings

.3 Section 32 93 45 – Landscape Maintenance

.4 City of Winnipeg Standard Construction Specifications, latest edition.

1.2 SUBMITTALS

.1 Upon request, submit samples for review, in accordance with Section 01 33 00:

.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.

1.3 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.4 SCHEDULING

.1 Schedule sod laying to follow immediately after completion of topsoil and finish grading.

.2 Schedule sod installation when frost is not present in ground.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused fertilizer from landfill to official hazardous material collections locations.

.2 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

1.6 WARRANTY

.1 The Contractor shall warranty sod work of this Section for a period of one (1) year with a full growing season after the Date of Substantial Performance. The Contractor shall replace dead sod material or that in “poor condition” within two weeks after being notified during this guarantee period, without cost to The City. "Poor Condition” means sod that has yellowed or died out. The Contractor shall repair sod areas that are not in a satisfactory state of growth at the end of the warranty period to the satisfaction of, and without cost to, The City.

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.2 The Contractor will not be responsible for sod destroyed by vandalism.

.3 Sod replacement shall be of the same quality as originally specified, and shall be supplied and planted in accordance with the drawings and specifications. Such replacement material shall also be subject to a full one-year warranty period.

Part 2 PRODUCTS

2.1 MATERIALS

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

.1 Turf Grass Nursery Sod types:

.1 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivar[s].

.2 Turf Grass Nursery Sod quality:

.1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.

.2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.

.3 Mowing height limit: 35 to 65 mm.

.4 Soil portion of sod: 6 to 15 mm in thickness.

.2 Commercial Grade Turf Grass Nursery: sod that has not been grown as Turf Grass Nursery Sod crop.

.1 Mow sod at height directed by Contract Administrator within 36 hours prior to lifting, and remove clippings.

.3 Sod establishment support:

.1 Geotextile fabric: biodegradable, square mesh.

.4 Water:

.1 Coordinate water supply with The City at designated source.

.5 Fertilizer:

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Type recommended for sod, with 50% of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil. Complete, slow release with 65 % of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

.1 Obtain approval from Contract Administrator of sod quality at source.

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

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Part 3 EXECUTION

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 32 91 13 - Topsoil Placement and Grading. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by 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 elevations indicated on drawings, and to tolerance of plus or minus 8 mm for Turf Grass Nursery Sod and plus or minus 15 mm for Commercial Grade Turf Grass Nursery; surface to drain naturally.

.4 Remove and dispose of weeds, debris, and stones 50mm in diameter and larger. Soil contaminated by oil, gasoline and other deleterious materials shall be removed off-site.

3.2 SOD PLACEMENT

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

.2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.3 Roll sod as directed by Contract Contract Administrator. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

.1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.

.2 Start laying sod at bottom of slopes.

.3 Peg sod on slopes steeper than 3 horizontal to 1vertical, within 1m of catch basins and within 1m of drainage channels and ditches to following pattern:

.1 100mm below top edge at 200 mm on centre for first sod sections along contours of slopes.

.2 Not less than 3-6 pegs per square metre.

.3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by Contract Contract Administrator.

.4 Drive pegs to 20mm above soil surface of sod sections.

3.4 FERTILIZING PROGRAM

.1 Fertilize during establishment and warranty periods and provide written records.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until acceptance.

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.2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100mm.

.3 Cut grass to 50mm height. Remove clippings which will smother grassed areas.

.4 Maintain sodded areas weed free 95%.

.5 Fertilize areas in accordance with a fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.6 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted provided that:

.1 Sodded areas are properly established.

.2 Sod is free of bare and dead spots.

.3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.

.4 Sodded areas have been cut minimum 2 times prior to acceptance.

.2 Commercial Grade Turf Grass Nursery Sod areas will be accepted provided that:

.1 Sodded areas are properly established.

.2 Extent of surface soil visible when grass has been cut to height of 60 mm is acceptable.

.3 Sod is free of bare or dead spots and extent of weeds apparent in grass is acceptable.

.4 Sodded areas have been cut a minimum of 2 times prior to acceptance.

.5 Fertilizing has been done at least once in accordance with fertilizer program.

.3 Areas sodded in the fall will be reviewed in the following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.7 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Water sodded areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100mm.

.2 Repair and resod dead or bare spots to satisfaction of Contract Contract Administrator.

.3 Cut grass and remove clippings that will smother grass.

.1 Turf Grass Nursery Sod: 50mm during normal growing conditions.

.2 Commercial Grade Turf Grass Nursery Sod: 60 mm during normal growing conditions.

.3 Cut grass at 2-week intervals and at intervals so that approximately one third of growth is removed in single cut.

.4 Fertilization: spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

.5 Eliminate weeds by non-chemical means to extent acceptable to The City.

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3.8 CLEANING

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

END OF SECTION

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Part 1 GENERAL

1.1 SECTION INCLUDES

.1 Installation of trees, shrubs, and groundcovers.

1.2 RELATED SECTIONS

.1 CW3540 – Topsoil and Grading

.2 Section 32 93 45 – Landscape Maintenance

1.3 QUALITY CONTROL

.1 All plant material shall be randomly inspected at the source upon request of the Contract Administrator.

.2 Trees and shrubs are to be grown in nurseries under proper cultural practices as recommended by the Canadian Nursery Trades Association.

.3 Only those trees will be accepted which have been grown for at least the four (4) previous years in local Manitoba nurseries located in an Agriculture Canada Plant Hardiness Zone designation of 2(a or b) or 3(a or b) and within a 250 kilometre radius of Winnipeg. Trees that have grown in plant hardiness zones 1 and 4 or greater will be rejected.

1.4 MAINTENANCE

.1 The Contractor shall be responsible for the maintenance of the planted material for a period of two (2) years from Date of Total Performance. Any areas planted after Sept. 15th, the maintenance period will commence on May 15th of the following year or such date as mutually agreed upon by all parties. Defective plants shall be replaced within three (3) days of notification to the Contractor.

1.5 WARRANTY

.1 Further to the General Conditions, the Contractor shall, at his/her expense, maintain the Work against any and all defects or deficiencies resulting from insect infestation, disease and mechanical damage due to improper handling, installation or maintenance, for a period of two (2) years from the date of Total Performance. Nursery stock damaged by vandalism or reasons beyond the control of the Contractor, so far is reasonable or practicable, shall be replaced by the City.

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

.3 The Contract Administrator reserves the right to request material replacement or extend the Contractor's Maintenance responsibilities for an additional one (1) year if, at the end of the Warranty Period, leaf development and growth are not sufficient to ensure future survival of the plant.

1.6 REPLACEMENTS

.1 During the Maintenance Period, the Contractor shall remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator and replace as per Specifications within a maximum ten (10) day period from notification.

.2 The Contractor shall extend Maintenance and Warranty on replacement plants for a period equal to the original Maintenance and Warranty Periods.

.3 The Contractor shall continue such replacement, Maintenance and Warranty until plant material is acceptable.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Water: potable and free of minerals which may be detrimental to plant growth.

.2 Planting Soil: as per CW2540 - Topsoil and Grading

.3 Root Ball Burlap: 150 g Hessian burlap, biodegradable.

.4 Anti-desiccant: wax-like emulsion to provide film over tree leaf surfaces reducing evaporation but permeable enough to permit transpiration.

.5 Wound Dressing: horticulturally accepted non-toxic, non-hardening emulsion.

.6 Wire Baskets: horticulturally accepted product designed to carry the weight and to contain a burlap-covered root ball. Minimum diameter basket size is to conform to the same minimum diameter of the tree root ball for the respective minimum tree caliper sizes.

.7 Fertilizer: slow release formulation of low nitrogen and high phosphorus e.g. 10-50-12. Apply quantities at rates stated by product manufacturer.

2.2 PLANT MATERIALS

.1 Nomenclature of specified trees and shrubs is to conform to the International Code of Nomenclature for Cultivated Plants and is to be in accordance with the approved scientific names given in the latest edition of the Standardized Plant Names.

.2 Plants are to be characteristically developed for their species and structurally sound, well branched, healthy and vigorous and densely foliated when in leaf. The plant is to have a healthy, well developed, fibrous root system which may be verified through a testing procedure that destructively samples one or more randomly selected root balls.

.3 Trees are to have been root pruned regularly, but not later than one growing season prior to arrival on the Site. The Contractor may be required to furnish documentation to the client on their root-pruning program. Trees in excess of 75 mm caliper are to have been half root pruned during each of two successive growing seasons, the latter at least, one growing season prior to arrival on Site.

.4 All parts of the trees, especially the lower branches, are to be moist and show live, green cambium tissue when cut.

.5 Trees are to have only one, sturdy, reasonably straight and vertical trunk, and a well-balanced crown with fully developed leader.

.6 Plants are to be free of disease, insect infestation, rodent damage, sun scald, frost cracks, abrasions, unhealed scars, scars exceeding 5 cm in diameter, major forks or crooks in tree trunks, broken branches, or angled leaders. Plants having the above defects will not be accepted by the Contract Administrator.

.7 Trees having a leader which has developed at a sharp angle to the trunk as a result of pruning or trunk damage will not be accepted.

.8 Trees exhibiting suppressed, weakly developed branches due to competition from other closely spaced trees in the nursery will not be accepted. Trees exhibiting dead branches will not be accepted.

.9 Any tree that has come out of dormant stage and is too far advanced will not be accepted unless prior approval obtained. Approval is required for any tree which has been held in cold storage.

.10 Balled and burlapped trees in excess of a 3 m height must have been dug with large firm ball. Roots in root balls must be comprised of 75% fibrous and feeder root systems. Secure root balls with burlap, heavy twine and rope. For trees 75 mm or more in caliper, wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.

.11 Tree spade dug trees are to be dug with mechanized digging equipment with hydraulic spade. Lift root ball from hole, place in wire basket designed for purpose and lined with burlap. Tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.

.12 Use of collected or native trees and shrubs is not permitted.

2.3 QUANTITY AND SIZE

.1 Trees and shrubs are to be planted at the quantities and calipers listed on the Plant List. Any variations to species, size or caliper of specified plants will require a request for approval from the Contract Administrator.

.2 Any changes in planting locations will be determined on-site by the Contract Administrator.

.3 Plants shall conform to the measurements specified in the Plant List, except those larger than specified, may be used if approved by the Contract Administrator, at no extra cost to The City.

.4 Trees are to be measured when the branches are in their normal position. Height dimensions specified are to refer to the main body of the tree and not from branch tip to root base. Where trees have been measured by caliper or diameter, reference is to be made to the diameter of the trunk measured 15 cm above the ground as the tree stands in the nursery prior to lifting. Caliper of tree shall be appropriately designed on a permanently fixed tag on one of the branches.

2.4 SHIPMENT AND PRE-PLANTING CARE

.1 Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.

.2 Tie branches of trees securely, and protect trees against abrasion, exposure and extreme temperature change during transit. Avoid binding of trees with rope or wire which would damage bark, break branches or destroy natural shape of tree. Give full support to root ball of trees during lifting.

.3 Cover tree foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.

.4 Remove broken and damaged roots with sharp pruning shears. Make clean cuts, and cover cuts over 10 mm diameter with a tree wound dressing.

.5 Keep roots moist and protected from sun and wind. Heel-in trees which cannot be planted immediately in shaded areas and water well.

Part 3 EXECUTION

3.1 WORKMANSHIP

.1 Plant locations will be staked out or painted on-site by the Contractor. Locations shall be approved by the Contract Administrator prior to installation.

.2 Apply anti-desiccant in accordance with material manufacturer's instructions with prior approval of the Contract Administrator, on an as needed basis only.

.3 Coordinate operations. Keep the Site clean and planting holes drained. Immediately remove soil or debris spilled onto street pavement, grass or sidewalk.

3.2 PLANTING TIME

.1 Plant deciduous trees during dormant period before buds have broken. Trees noted for spring planting only, must be planted in dormant period.

.2 When permission has been obtained from the Contract Administrator to plant deciduous trees after buds have broken, spray plants with anti-desiccant to slow down transpiration prior to transplanting.

.3 Plant only under conditions that are conducive to health and physical conditions of trees.

.4 Provide planting schedule to Contract Administrator. Extending planting operations over long period using limited crew will not be accepted.

.5 The Contractor must obtain all above and below ground clearances from all the utilities as well as the appropriate District Operations Branch in a timely manner so as not to jeopardize the schedule of the complete tree planting Contract.

3.3 EXCAVATION

.1 Excavate planting pits as indicated by stakes or paint marks.

.2 Protect bottom of excavations against freezing.

.3 Remove water which enters excavations prior to planting. Ensure source of water is not ground water or from broken City water main pipe.

3.4 INSTALLATION

.1 Planting shall be done during periods of suitable weather conditions and in accordance with locally accepted practice.

.2 Trees are to be planted within forty-eight (48) hours of excavation from the nursery.

.3 No tree pit is to be left open at the end of the Contractor's Work Day. Planting program is to be planned to ensure that all approved trees delivered to the Site at designated planting locations are installed and thoroughly watered the same day as delivery.

.4 Loosen bottom of planting hole to depth of 100 - 150 mm. Cover bottom of each excavation with minimum of 150 mm topsoil mixture, incorporate with subgrade material.

.5 Plant trees and shrubs vertically. Orient trees to give best appearance in relation to structure, roads and sidewalks.

.6 Place trees to depth equal to depth they were originally growing in nursery.

.7 With balled and burlapped root balls and root balls in wire baskets, loosen burlap and cut away the top 1/3 without disturbing root ball. Do not pull burlap or rope from under root ball. Non-biodegradable wrapping must be removed.

.8 Tamp planting soil around root system in layers of 150 mm eliminating air voids. Frozen or saturated planting soil is unacceptable. When 2/3 of planting soil has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling.

.9 Stake trees and install wire tree protection as shown on Drawings and as directed by Contract Administrator.

3.5 FERTILIZING

.1 When planting is completed, give surface of planting saucer dressing of fertilizer meeting the requirements of Specification. Mix fertilizer thoroughly with top layer of planting soil and water in well.

3.6 PRUNING

.1 The Contractor shall provide a Manitoba Certified Arborist for the Site.

.2 Prune trees and shrubs after planting to compensate for loss of roots suffered during transplanting. Postpone pruning of those trees where heavy bleeding may occur, until in full leaf. Employ clean sharp tools and make cuts flush with main and secondary branch collars, smooth and sloping as to prevent accumulation of water.

.3 Remove projecting stumps on trunks or main branches. Remove dead and injured branches and branches that rub causing damage to bark. Trim out crown of trees without changing their natural shape. Do not damage lead branches or remove smaller twigs along main branches.

.4 Treat cuts in excess of 20 mm diameter and damaged parts with application of industry approved tree wound dressing.

3.7 WATERING

.1 Trees and shrubs are to be watered during the planting procedure as described previously, and once a week thereafter, or more frequently if required, during the growing season.

.2 A complete record is to be kept of each series of waterings for all planted trees and shrubs noting: 1) location, and 2) date of watering. This record shall be sent bi-weekly to the Contract Administrator.

.3 Apply 40 litres of water per 25 mm caliper per application using deep root feeder or low/pressure nozzle and hose. The water stream must not gouge out a hole in the soil and mulch.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Maintenance of all plantings from the time of installation and for a period of two (2) years from Date of Total Performance. The Contractor shall furnish all labour, materials, equipment and services necessary to perform the Work, according to the drawings and specifications. In general, work shall include:

- .1 Spring cleaning
- .2 Fertilizing
- .3 Watering
- .4 Weed Control
- .5 Pest and disease control
- .6 Tree support repair and adjustment
- .7 Tree pruning
- .8 Winter preparation

1.2 PROTECTION

.1 Prevent damage to fencing, other trees, landscaping, benches, buildings, pavement, surface and underground utility facilities.

1.3 MAINTENANCE SCHEDULE

.1 The Contractor shall provide a complete written Maintenance schedule to the Contract Administrator prior to the issuing of the Certificate of Substantial Performance.

.2 All maintenance of trees and shrubs to be supervised by a Manitoba Certified Arborist.

1.4 DOCUMENTATION AND REPORTING

.1 All maintenance personnel they shall record in a logbook the operations carried out and any conditions that require attention or monitoring. The arborist shall submit a summary of the information as a Monthly Report to the Contract Administrator. Conditions requiring attention should be brought to the Contract Administrator's attention immediately.

.2 The Contractor shall review the site regularly and adjust maintenance operations to suit observed conditions. A Site Maintenance Inspection Form (supplied by the Contract Administrator) should be used to record each site visit. Copies of these forms shall be sent to the Contract Administrator biweekly.

.3 Report in writing any major maintenance procedures intended, minimum one week in advance.

.4 If any damage, dangerous or potentially dangerous situations are observed the Contractor shall notify the Contract Administrator immediately.

1.5 FAILURE TO DOCUMENT AND DOCUMENT

.1 If the Contractor fails to submit a monthly report it shall be assumed the work was not performed for that time period. Payment for Landscape Maintenance shall be reduced by $1/6^{th}$ for every month a report is not submitted.

1.6 QUALIFICATIONS

.1 All landscape maintenance personnel shall be skilled in the tasks assigned to them.

1.7 CERTIFICATE OF ACCEPTANCE

.1 The Certificate of Acceptance will be issued upon completion of the two (2) year Maintenance Period, provided that trees are well established and rooted, properly pruned and showing vigorous growth satisfactory to the Contract Administrator.

.2 Unacceptable trees or shrubs shall be removed and replaced according to the required specifications. Maintenance of replacement items shall be extended for a period equal to the original Maintenance Period as specified herein. The Contract Administrator shall make further inspection after the additional Maintenance Period.

.3 Replacement and maintenance requirements shall continue until the material is accepted.

PART 2 PRODUCTS

2.1 GENERAL

.1 Materials are to conform to the requirements of related Specification sections.

2.2 FERTILIZER

.1 Fertilizer shall be complete synthetic slow release fertilizer with maximum 35% water-soluble nitrogen.

2.3 CONDITION OF EQUIPMENT

.1 The Contractor shall provide all necessary equipment for the Work, in good operating condition to achieve the requirements of the Specifications.

.2 The supply of replacement equipment of equal or larger size, if regular units are under repair, will be the responsibility of the Contractor.

PART 3 EXECUTION

3.1 GENERAL

.1 Program timing of operations to growth, weather conditions and use of Site.

.2 Each operation shall be done continuously and complete within reasonable time period.

.3 Store equipment and materials off site.

.4 Collect and dispose of debris or excess material on daily basis.

3.2 SPRING CLEANING

.1 Any dead vegetation, leaves and debris shall be removed. Heavy raking shall be done with a flexible grass rake on areas with "snow mold". Roll lightly areas where grass plants have lifted due to frost action.

3.3 FERTILIZING

.1 Soil testing shall be carried out by a recognized testing facility prior to fertilizer application to ensure a properly formulated program as required by contract administrator at no extra cost to the client.

.2 Fertilizer shall be spread evenly at frequency, ratio and rates as recommended by Manufacturer. Use approved mechanical spreading equipment. Check calibration to ensure specified rate is spread evenly. Water immediately after fertilizing. Rectify uneven spreading as soon as it becomes apparent.

3.4 WATERING - GENERAL

.1 Water shall be applied 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.

.2 Water shall be applied in a soft spray to avoid packing of soil.

.3 Use of the installed irrigation system is prohibited unless approved by the Contract Administrator.

.4 Do not impede use of sidewalk and other paved areas.

3.5 WATERING OF TREES

.1 Water every third day for first and second month after planting. Thereafter, water once per week between May 1 and October 15.

.2 A complete record is to be kept of each series of watering for all planted trees noting: 1) location, and 2) date of watering. This record is to be given to the Contract Administrator when requested.

.3 Apply 40 litres of water per 25mm calliper per application using deep root feeder or low-pressure open flow nozzle and hose. The water stream must not gouge out a hole in the soil and mulch.

3.6 WEED CONTROL OF TREES

.1 Surface of tree planters shall be maintained free of weeds. Do not allow weeds to establish for a period longer than one (1 week).

.2 Obtain written approval of Contract Administrator prior to using any herbicides.

.3 Do not use dicamba and picloram solutions near trees.

3.7 PESTS AND DISEASE CONTROL

.1 Obtain written approval of Contract Administrator prior to using any pesticide.

.2 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.

3.8 CULTIVATING PLANTING BEDS

.1 Cultivate whenever required to keep top layer of soil, loose, friable and free from weeds. Any operation must be continuous without interruption.

.2 Cultivate surface of planting bed, and soil areas around trees.

.3 Remove weeds including their roots.

.4 Take care not to damage roots of shrubs or flowers. Use small hand tools for areas of closely planted shrubs and/or perennials.

.5 Collect and dispose of paper and refuse. Remove dead plants, leaves, branches, dead flowers and seed pods.

.6 Clean, by hand, areas that are covered with mulch. Loosen top layer of mulch without mixing it with soil underneath.

.7 Add mulch as required to maintain specified thickness.

3.9 TREE AND SHRUB PRUNING

.1 The Contractor shall provide a person with a valid Manitoba Arborist's License for each Work crew or Work Site.

.2 Prune trees as required to remove dead, broken or damaged limbs. Prune back to healthy growth while maintaining balanced crown shape.

.3 Employ clean sharp tools. Make cuts co-incident with the 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.

3.10 WINTER PREPARATION

.1 Rake and assemble leaves after they have been shed by trees. Remove from site.

.2 Protect trees from rodent damage using fine wire mesh or approved plastic protector beyond snow line or by applying rodent repellent sprays.

.3 Ensure adequate moisture in root zones of trees material prior to freeze-up.

.4 Apply anti-desiccant to evergreen trees susceptible to winter desiccation.

END OF SECTION