

**PART E**  
**SPECIFICATIONS**

## PART E - SPECIFICATIONS

### GENERAL

#### E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

- E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available in Adobe Acrobat (.pdf) format on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>.
- E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing</u>
L1	Casino Park and Ride Stops
L2	Vaughan Street Pedestrian Remediation
L3	Details
L4	BRT Parkette Main Street and St.Mary Avenue
E1	Electrical Plan for Club Regent
S1	MTS Centre Transit Shelter
Figure 6	Park and Ride Information Kiosk
Figure 18	Sign Dimensions and Composition: Illuminated Transit Sign
Figure 21	Sign Dimensions and Composition: Park and Ride Information Kiosk

#### E2. SOILS INVESTIGATION REPORT

- E2.1 Further to GC:3.1, no soil inspection has been done. Contractor to supply soils investigation report if site conditions warrant.

#### E3. TRUCK WEIGHT LIMITS

- E3.1 The City shall not pay for any portion of Material which results in the vehicle exceeding the maximum gross vehicle weight allowed under *The City of Winnipeg Traffic By-Law*, unless such vehicle is operating under special permit.

#### E4. PRE-CONSTRUCTION MEETING

- E4.1 The Contractor shall not begin the Work under this Contract until a pre-construction meeting has been held between representatives of the Contractor, the City of Winnipeg and the Contract Administrator.

#### E5. ACCESS

- E5.1 Further to GC5.02 of the General Conditions, the Contractor shall provide adequate safety protection for pedestrians and vehicular traffic exposed to the Work environment under this Contract.
- E5.2 All access is to be on City Streets and as directed by Contract Administrator.

- E5.3 Access to the Site as required by the Contractor shall be provided, maintained and restored (to as good as or better than existing condition) by the Contractor at his own expense and approved by the Contract Administrator.
- E5.4 The Contractor's operations shall be limited to the minimum area necessary for undertaking the Work and he shall be responsible for all damage resulting from his work on private property. The Contractor shall take such measures as are necessary to ensure safe and convenient pedestrian ingress and egress is maintained to private properties while he is working near them. Any damage caused by the negligence of the Contractor or his Sub-Contractors to the adjacent works or properties, shall be promptly repaired by him at his own expense, to the satisfaction of the Contract Administrator.
- E5.5 All necessary precautions shall be exercised by the Contractor so as not to remove, disturb, or damage any existing trees, shrubs, sod, pavements, streets, roads, boulevards, poles, hydrants, water pipes, gas pipes, electrical wires, cables, conduits, sewers or other existing facilities and equipment at the Site of the Work. For all damage incurred in the performance of the Work (either directly or indirectly), the Contractor shall either replace and repair such damage, whichever may be deemed necessary in the opinion of, and acceptable to, the City and the owners, and the cost of which shall be borne entirely by the Contractor. The Contractor shall also indemnify and save harmless the City from all claims made directly or indirectly against it in respect to any such damage.

## **E6. SAFETY PRECAUTIONS**

- E6.1 Further to Section GC 5.02 of the General Conditions, the Contractor shall provide adequate safety protection for pedestrians and vehicular traffic exposed to the Work environment under this Contract.
- E6.2 The Contractor must maintain safe pedestrian access to the Site at all times during construction.
- E6.3 The Contractor must restrict vehicular access to the access lanes indicated on the plans and as directed on Site by the Contract Administrator.

## **E7. SITE CONDITIONS**

- E7.1 The Contractor and all sub-contractors shall examine the Site and make themselves familiar with the existing conditions (both above and below grade) and nature of Work to be done.
- E7.2 Surface and sub-surface conditions shown on the Drawings and included herein are provided for general information and variations there from shall not affect the terms of the Contract.
- E7.3 The Contractor shall set all necessary control lines, benchmarks, survey, elevation stakes and layout in accordance with the individual site conditions and in consultation with the Contract Administrator.

## **E8. EXISTING UNDERGROUND STRUCTURES**

- E8.1 The Contractor's attention is drawn to the existing underground lines or services that may be located in the area of the Work.
- E8.2 The Contractor shall take all necessary precautions when performing the Work to ensure that no damage is done to these existing services.
- E8.3 No responsibility will be assumed by the City for correctness or completeness of the Drawings, when provided, with respect to the existing utilities, pipes or other objects either underground or

on the surface; the Owner shall not be liable for the incorrectness and inadequacy thereof. It shall be the responsibility of the Contractor to determine the location of all such utilities, pipes and other objects and to make good any damage done to them.

- E8.4 All costs in connection with this item including location of the existing service, repairs to any existing services damaged by the construction operation, etc. shall be included in the unit prices bid for supply and installation of the items included under this Contract.
- E8.5 The Contractor will be required to make his own arrangements in connection with the temporary use of lighting, power, gas, sewer, water or other utilities, and pay all costs in connection therewith.
- E8.6 All necessary permits, fees and other like expenses as well as the cost of temporary connections to existing facilities shall be arranged and paid for by the Contractor.

## **E9. PRODUCT APPROVALS**

- E9.1 The Contractor shall, following award, prepare a complete list of all material to be used on the project and submit the list to the Contract Administrator 72 hours prior to start of construction.
- E9.2 The Contractor shall only use material which has been approved by Specification CW3710-R1 or by the Contract Administrator. The list shall give the product, the manufacturer and the supplier.
- E9.3 Other than required to be done by the Contractor under the Work of this contract, all necessary precautions shall be exercised by the Contractor so as not to remove, disturb, or damage any existing plant material, pavements, streets, roads, boulevard, poles, hydrants, water pipes, gas pipes, electrical wires, cables, conduits, sewers or other existing facilities and equipment at the Site of the Work. For all damage incurred thereto in the performance of the Work, the Contractor shall upon instructions from the Contractor Administrator and to the satisfaction of the City and the owners thereof, either replace and repair such damage, whichever may be deemed necessary in the opinion of, and acceptable to, the City and the owners thereof and the costs of which shall be borne entirely by the Contractor. The Contractor shall also indemnify and safe harmless the City from all claims made directly or indirectly against it in respect to any such damage.
- E9.4 All workmanship and materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator. The Contract Administrator reserves the right to reject any materials or Works which are not in accordance with the requirements of the Specifications.
- E9.5 The Contractor shall wholly be responsible for the supply, safe storage, and handling of all materials set forth in this specification, and the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given.

## **E10. DAMAGE TO STREETS AND STRUCTURES**

- E10.1 The Contractor's attention is drawn to the following existing Site features to be retained and protected to the City of Winnipeg Standards:

- |                  |                   |  |
|------------------|-------------------|--|
| a) trees, shrubs | e) light standard | i) hydro towers and poles                                |
| b) curbs         | f) fire hydrants  | j) catch basins  |
| c) sidewalk      | g) street signs   | k) curb inlets   |
| d) sod           | h) signal poles   | m) underground services including<br>land drainage sewer |

## **E11. PERMITS, NOTICES, LICENCES, CERTIFICATIONS, LAWS AND RULES**

- E11.1 The Contractor shall give all necessary notices, obtain all necessary permits and pay all fees in order that the Work may be carried out. The Contractor shall submit all plans required by any inspection authority and obtain approval of same before proceeding with the Work, and pay any cost attached to the inspection of such plans.
- E11.2 The Contractor shall comply with all laws, ordinances, rules, and regulations that would relate to the Works.

## **E12. REMOVALS**

- E12.1 Further to Specification CW 3110 and due to the extent and nature of underground services in the street right-of-way, the Contractor shall be permitted to use only backhoe type equipment when excavating sub-grade material.
- E12.2 Further to Specifications CW 3230 and CW 3235, the Contractor shall sawcut and remove existing concrete sidewalk paving as shown on the Drawings and as directed by the Contract Administrator. The removal shall include all existing concrete and base course where applicable.

### **Description**

- E12.3 This Specification shall cover the removal of existing concrete sidewalk, unit paving, and tree wells.
- E12.4 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

### **Equipment**

- E12.5 All equipment shall be of a type approved by the Contract Administrator and shall be kept in good working order.

### **Construction Methods**

- E12.6 The Contractor shall restrict his activities strictly to within the limits of the Works, unless receiving prior written approval from the Contract Administrator.
- E12.7 The Contractor shall sawcut, remove and dispose of existing concrete sidewalk as indicated on the drawings.
- E12.8 The Contractor shall remove and deliver to 421 Osborne existing concrete tree grates that are in good condition as indicated on the drawings. Any broken tree grates to be disposed of off Site.
- E12.9 The Contractor shall remove and stockpile existing unit paver on site for reinstallation. Disposal of sand setting bed is incidental to the Work.
- E12.10 The Contractor shall sawcut, remove and disposed of existing tree wells as indicated on the drawings including removal of base material and reinforcing as required.
- E12.11 The Contractor shall breakout, remove and dispose of existing C.I.P. shelter base as indicated on the drawings.
- E12.12 The Contractor shall load and haul all removed material from the Site and dispose of these materials at a dump located by the Contractor and approved by the Contract Administrator. Any materials dropped or spilled on any streets during the hauling operations shall be promptly cleaned up at the expense of the Contractor, to the satisfaction of the Contract Administrator.

E12.13 The Contractor shall ensure that upon completion of the removal operations, the Site shall be left free of any hazardous depressions and in a neat condition.

#### **Method of Measurement**

E12.14 Removal of concrete sidewalk paving will be measured on an area basis for Work completed in accordance with this Specification as determined by the Contract Administrator.

E12.15 Removal and delivery of existing tree wells will be incidental to the unit price bid for removal of tree wells.

E12.16 Removal of stockpile of existing unit paver will be measured on an area basis for Work completed in accordance with this Specification as determined by the Contract Administrator.

E12.17 Removal of tree wells will be measured on a per unit basis for Work completed in accordance with this Specification as determined by the Contract Administrator.

E12.18 Removal and delivery of existing shelter base will be measured on a lump sum basis for Work completed in accordance with this Specification as determined by the Contract Administrator.

#### **Basis of Payment**

E12.19 Removal of Concrete sidewalk paving will be paid for at the contract square metre price for "Sawcut, Remove and Dispose of Concrete Sidewalk", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

E12.20 Removal and stockpile of existing unit paver will be paid for at the contract per square metre price "Remove and Stockpile Existing Unit Paver", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification

E12.21 Removal of existing tree wells will be paid for at the contract per item price "Remove and Dispose of Existing Tree Wells", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

### **E13. EXCAVATION AND REMOVAL OF EXISTING SOD**

#### **Scope of Work**

E13.1 The Work of this section comprises the furnishing of all labour, equipment and materials required to complete the excavation and removal of the existing sod and related Work including, but not necessarily confined to, the following:

- a) Excavation and Grading of the existing sodded area as shown on the drawings, to the design elevations indicated, less the surface finish allowance for concrete sidewalk and concrete shelter base.

#### **Removals**

E13.2 The Contractor shall restrict his activities strictly to within the limits of the Works, unless receiving prior written approval from the Contract Administrator. The Contractor shall take all precautions to prevent damage to traffic structures, pole lines, adjacent property and he shall be liable for any damages occurring in the performance of this Work.

**E13.3** The Contractor shall load and haul all rubbish and all other surface litter from the Site and dispose of these materials at dumps located by the Contractor and approved by the Contract

Administrator. Any materials dropped or spilled on any streets during the hauling operations shall be promptly cleaned up by and at the expense of the Contractor, to the satisfaction of the Contract Administrator.

- E13.4 The Contractor shall ensure that upon completion of the removal operations, the Site is left in a neat condition free from debris, etc.
- E13.5 Any unsuitable materials related to the removal, excavation and grading operations shall be removed and legally disposed of off Site.
- E13.6 The Contractor is advised that all Work under this section is incidental to the unit prices bid under this contract.

## **E14. EXCAVATION AND SITE GRADING**

### **General**

- E14.1 The "General Conditions and Supplemental Conditions" of this Specification and all documents listed in the Tender shall apply to and govern all phases of the Work hereinafter specified and/or shown on the Drawings.

### **Scope of Work**

#### **Work Included**

- E14.2 The Work of this section comprises the furnishing of all labour, equipment and materials required to complete the Site grading and related Work including, but not necessarily confined to, the following:
  - (a) Excavation and Grading of the existing Site to the design requirements noted on the Drawings, approved on Site by the Contract Administrator, less the appropriate surface finish allowance.

#### **Work Not Included**

- a) Excavation for Electrical Installation.

### **Protection**

- E14.3 Prevent damage to surface or underground utility lines, sods, existing trees to remain, etc. which are to remain. The Contractor shall take special care to protect the existing trees, including root systems and trunks. Make good any damage.

### **Removals**

- E14.4 The Contractor shall restrict his activities strictly to within the limits of the Works, unless receiving prior written approval from the Contract Administrator. The Contractor shall take all precautions to prevent damage to traffic structures, pole lines, adjacent property and he shall be liable for any damages occurring in the performance of this Work.
- E14.5 The Contractor shall load and haul all rubbish and all other surface litter from the Site and dispose of these materials at dumps located by the Contractor and approved by the Contract Administrator. Any materials dropped or spilled on any streets during the hauling operations shall be promptly cleaned up by and at the expense of the Contractor, to the satisfaction of the Contract Administrator.
- E14.6 The Contractor shall ensure that upon completion of the removal operations, the Site is left in a neat condition free from debris, etc.

## Materials

E14.7 Excavated or graded material to be approved before use as fill for grading work. Protect such approved material from contamination.

## Earthwork and Grading

E14.8 The Contractor shall construct the Site within the limits indicated to the design elevations and gradients noted on the Drawings, less the appropriate surface treatment depths specified and shall excavate, remove and dispose of all unsuitable materials of whatever nature encountered.

E14.9 The Contractor shall construct all subgrades in accordance with Specification CW 3110-R5. This shall include the use of sheep's foot or other suitable compaction equipment as approved by the Contract Administrator to achieve a minimum compaction of 98% Standard Proctor Density below concrete sidewalk, and 95% Standard Proctor Density in all other areas disturbed under this Contract.

E14.10 The Contractor is advised that there may be a surplus of fill on the Site after the design subgrade level has been achieved. All surplus material will be disposed of as previously stated. No direct payment will be made for disposing of surplus fill as all costs for this Work shall be included in the lump sum price for Excavation and Grading.

E14.11 Following earth moving, rough grading and compaction, the Work areas shall be fine graded to provide a maximum deviation of 50mm in 10m from the design grade with no low areas that hold water. The finished surface of all disturbed areas shall be dragged and smoothed in such a manner that there are no loose soil particles greater than 50mm in maximum dimensions.

E14.12 The Contractor shall construct the subgrade surface to the following depths below the design grades shown on the Drawings for each area:

1.	Shrub bed	550mm
2.	Concrete Sidewalk	150mm
3.	Limestone Paving	250mm
4.	C.I.P. Transit Shelter Base	300mm-450mm(perimeter)
5.	Concrete Sidewalk with Unit Paving	223mm

E14.13 The Contractor is advised that all Work under this section is incidental to the unit prices bid under this contract.

## E15. CAST-IN-PLACE CONCRETE

### General

E15.1 The "General Conditions and Supplemental Conditions" of this Specification and all documents listed in the Quotation shall apply to and govern all phases of the Work hereinafter specified and/or shown on the Drawings.

### Scope of Work

#### Work Included

E15.2 The Work of this section comprises the furnishing of all labour, equipment and materials required to complete the supply and installation of cast-in-place concrete slabs and footings as shown on the drawings and as hereinafter specified, including, but not necessarily confined to the following:

- (a) Excavation.
- (b) Granular Fill work as required.



- (c) Supply, erection and removal of all formwork as required.
- (d) Design of concrete mixes.
- (e) Supply, placing and curing of concrete for one Illuminated Signage Pile and Pile Cap as shown on the drawings. Co-ordinate manufacturer of sign structure as required.
- (f) Supply, placing and curing of concrete for one Transit Shelter Base as shown on the Drawings. Co-ordinate with Winnipeg Transit (who will supply and install shelter) as required.
- (g) Supply, placing and curing of reinforced concrete planter wall.
- (h) Supply, placing and curing of concrete base for power pedestal. Co-ordinate manufacturer of pedestal.
- (i) Co-ordination of the installation of all electrical and other items to be installed in the concrete works by other trades.
- (j) Detailing, supply and placing of reinforcing.
- (k) Clean-up.

### Work Not Included

E15.3 The following items of Work are specified under other sections of the specifications and are not included in this section:

- (a) Supply of miscellaneous metal anchors, bolts, inserts, etc.

### Materials

E15.4 Concrete for cast-in-place power pedestal, Transit Shelter base and planter wall as follows:

Cement: Type 50  
Max. Coarse Aggregate: 20mm  
Min Compressive Strength at 28 days +35Mpa  
Min. Cement Content: 310 kg/cu.m  
Max. Water Cement Ratio: 0.45  
Class of Exposure: C-2  
Max. Slump: 90mm ± 20mm  
Air Content: 5 to 8%  
Flyash content: Max. 15% of Cementitious Material

Concrete for cast-in-place friction pile as follows:

Cement: Type 50  
Max. Coarse Aggregate: 40mm  
Min Compressive Strength at 28 days = 30  
Min. Cement Content: 310 kg/cu.m  
Max. Water Cement Ratio: 0.45  
Class of Exposure: S-2  
Max. Slump: 90mm ± 20mm  
Air Content: 4 to 7%  
Flyash content: Max. 15% of Cementitious Material

E15.5 Fine aggregate shall consist of natural sand or manufactured sand and shall conform to all requirements of CAN3.A23.1.

E15.6 Coarse aggregate shall consist of hard, strong, uncoated durable particles of crushed stone, gravel or approved combination thereof and shall be free from an excess of thin, elongated or soft pieces, frozen lumps, vegetable matter or other deleterious matter, and shall conform with all the requirements of CAN3-A23.1. Maximum size of coarse aggregate shall be 20 mm.

- E15.7 Water for concrete shall be clean and free from injurious amounts of oil, acid, alkali, salts, silt, organic matter or other deleterious matter. The quality of the water shall be equal to or better than that of potable water.
- E15.8 A non-detergent type of air-entraining admixture, supplied in liquid form, shall be metered into the mix. The total air in the placed concrete shall be 5% - 8%.
1. Reinforcing steel shall be grade 300 deformed bars. Detailing of reinforcing steel shall be in accordance with ACI 315. All bars, which require bending, shall be bent in shops.
- E15.9 All reinforcing steel shall be straight, clean and free from paint oil, mill scale, excess rust and any injurious defects, which may affect its strength or bond.:
- E15.10 Ends of reinforcing steel intended for bonding that are to be left exposed for some time shall be protected from injury, oils or moisture.
- E15.11 The City may engage a fully qualified Inspecting Engineer and Testing Laboratory to:
- (a) Inspect the pile excavations to determine that they have been augured to the specified depth, are of the specified size, are clean and level, and meet the design criteria.
  - (b) Take test cylinders during concrete placing and carry out compression tests to determine whether concrete produced complies with these Specifications.
  - (c) Take compaction tests of compacted granular subbase and subgrade material.
  - (d) Submit reports to the Contract Administrator of all materials, concrete, and caisson tests and inspections.
- E15.12 Three concrete test cylinders to be taken for pile cast. One cylinder from each group shall be tested at 7 days, one at 14 days and the remainder at 28 days. Sampling and testing procedures shall be according to CAN3-A23.1 latest edition.

### **Excavation for Piling**

- E15.13 Excavation for the pile shall be done by auguring to the sizes shown on the Drawings. Water jetting methods of excavation will not be permitted. The bearing surface shall be inspected and any loose material shall be cleaned out prior to casting concrete.
- E15.14 If, in the opinion of the Contract Administrator, casing is required to prevent the sides of the augured hole from sloughing in the casing shall be supplied and installed, at no cost to the City. Sleeving will not be allowed for piles less than 600 mm diameter. The diameter of casing supplied shall be equal to the specified diameter of the foundation being constructed. If required, overboring shall be carried out to allow the installation of the casing, if so approved by the Contract Administrator. No additional payment will be made for overboring. The casing shall be designed to withstand installation, withdrawal and earth pressure forces. The casing shall be withdrawn as the concrete is poured ensuring that the casing is at least 1 metre below the top of the freshly placed concrete until all concrete in the foundation is placed.
- E15.15 The pile excavation shall be kept dry at all times. The Contractor shall have on hand sufficient pumps to satisfy this requirement.
- E15.16 Rocks or boulders hindering the continuation of drilling shall be removed in whole or part, using approved methods.
- E15.17 If the excavation for the pile varies from the location shown on the drawing by more than 75 mm (3"), the excavation shall be enlarged so that the centreline of the reinforcing cage is within 75 mm (3") of its specified location and 75 mm (3") of concrete cover to the reinforcing steel is maintained.

### **Pile Concrete Work**

- E15.18 The pile concrete shall be cast no later than 24 hours after the excavation has been completed.
- E15.19 The reinforcing cage shall be placed in the pile excavation prior to starting the concreting. Spacers shall be provided to keep the reinforcing cage in its correct location.
- E15.20 Reinforcement shall be clean, and free from all coatings, including ice, loose rust, dried concrete, which tend to reduce bond.
- E15.21 Reinforcement shall be formed accurately and secured in pile shaft and to required ties and spacers with annealed wire ties or suitable clips so that position and concrete cover, as called for on drawings is assured.
- E15.22 Vertical or bent bars shall extend above the top of pile shaft as shown to provide anchorage for the grade beam.
- E15.23 Reinforcing bars kinked, twisted, bent past a right angle, or reduced in cross section, will be rejected.
- E15.24 Concrete consistency shall be such that concrete works readily into corners and around reinforcement without segregation of materials or the collection of free water on the surface.
- E15.25 Do not place concrete until piles, shafts, and/or bells have been inspected.
- E15.26 Place concrete using "elephant trunk" or special chutes which will prevent segregation of materials, ensure a practically continuous flow of concrete at the delivery end, and limit the vertical height of free fall of the concrete to 3 metres.
- E15.27 Concrete placing shall be continuous from bottom to top of pile or caisson, and puddling or rodding carried on constantly to bring air bubbles to the surface and produce a uniform, homogeneous structure.
- E15.28 Mechanical vibration shall be carried out continuously during placing of concrete in piles.
- E15.29 Work concrete completely around reinforcement by rodding, spading and mechanical vibration. Vibrators shall vibrate at not less than 5000 impulses per minute and shall be operated by personnel experienced and qualified in their use.
- E15.30 Finish exposed pile tops smooth and level at elevations shown on Drawings. Form top of pile or shaft as required.
- E15.31 Concrete shall be kept moist for at least the first 7 days after placing and the temperature of the concrete maintained above 10°C during this time.
- E15.32 If upper soil stratum is dry and there is danger of the concrete losing moisture thereto, water shall be added to the soil by forming a depression around the pile top and ponding continuously for a period of 7 days.
- E15.33 Whenever the temperature of the surrounding air is below or is likely to fall below 5°C during the 4 day period immediately following concrete placing, artificial heating, housing and/or protective covering shall be provided for the pile tops to maintain concrete temperature at or above 10°C.
- E15.34 No dependence shall be placed on salt or other chemicals for the prevention of freezing.

#### **Placing of Concrete for Slab**

- E15.35 Placing of concrete shall be in accordance with CAN3-A23.1

- E15.36 No concrete shall be placed until formwork, insulation, reinforcing steel, sleeves, hangers, anchors, inserts, etc., required to be built into the concrete have been inspected by the Contract Administrator.
- E15.37 Before placing concrete on bearing strata, notify the Contract Administrator so that she may make an inspection of the exposed bearing surface.
- E15.38 No concrete shall be placed in water or upon frozen surfaces.
- E15.39 Before placing any concrete, all debris shall be removed, forms shall be thoroughly oiled except where form oil will be detrimental to the finished surface. Equipment shall be cleaned or of hardened concrete and foreign material.
- E15.40 All concrete shall be thoroughly vibrated during pouring. Precautions shall be taken to prevent separation or loss of ingredients while transporting the concrete. At no time shall concrete be allowed to a free fall of more than 1.5 m.
- E15.41 Conveying equipment shall be on temporary runways built over the floor system and runway supports shall not bear upon the fresh concrete.
- E15.42 Placement of concrete shall be carried out as a continuous operation until the placing of an individual section is completed. Concrete shall be carefully worked around reinforcement and embedded fixtures, along surfaces and into corners of forms. Vibrators shall be used, and operated under experienced supervision; forms must be constructed to withstand their action.
- E15.43 The Contractor is advised that no joints will be allowed in the slab except as directed on Site in conjunction with the Contract Administrator.

### **Cold Weather Concreting**

- E15.44 The protection of concrete and concreting operations during cold weather shall be in accordance with CSA A23.1
- E15.45 Equipment for heating concrete after placement must be in operation before pouring is commenced. Provide sufficient thermometers to be placed in accordance with the Contract Administrator's instructions. Tarpaulins shall not be placed directly on the surface of slabs. Indirect light units only shall be used.

### **Finishing of Slabs**

- E15.46 All slabs shall be finished by a speciality concrete finishing Contractor.
- E15.47 The size of finishing crews shall be planned with due regard for the effects of concrete temperatures and atmospheric conditions on the rate of hardening of the concrete.
- E15.48 The shelter floor slab shall be power floated. The elevation of the finished floor slab shall not vary more than 4mm +/- from the design elevation. The minimum amount of steel trowelling shall be done.
- E15.49 The slab finish shall match concrete sidewalk finish as per CW 3325.

### **Clean Up and Damage**

- E15.50 Immediately on completion of pile, shelter base, planter walls and slab, Contractor shall remove from Site all equipment, timbers, shores, excavated material, unused concrete, rubbish, etc., caused by his operations, and leave the Site clean.

E15.51 The Contractor shall be responsible for making good all areas damaged by his operations in connection with this Contract regardless of the limits of the Contract as shown on the Drawings.

### **Method of Measurement**

#### **Concrete Works**

E15.52 The following items will be measured on a per item basis:

- (a) Supply and Installation of Reinforced C.I.P. Concrete Shelter Base.
- (b) Supply and Installation of Illuminated Transit Signage Concrete Piles and Pile Caps.
- (c) Supply and Installation of C.I.P. Concrete Base for Power Pedestal

E15.53 The number of units to be paid for shall be the total number of units supplied in accordance with the Specifications and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E15.54 No adjustments in price will be made should actual pile lengths in place be lesser or greater than anticipated by the Contractor or indicated on the Drawings.

E15.55 Supply and Installation of C.I.P. Concrete Wall be measured on a lineal basis.

### **Basis of Payment**

#### **Concrete Works**

E15.56 The following items will be paid for at the Contract per item Price per items basis as follows:

- (a) Supply and Installation of Reinforced C.I.P. Concrete Base for Transit Shelter.
- (b) Supply and Installation of Illuminated Transit Signage Concrete Piles and Pile Caps.
- (c) Supply and Installation of C.I.P. Concrete Base for Power Pedestal.

measured, as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

E15.57 Supply and Installation of C.I.P. Concrete Planter Wall will be paid for at the Contract lineal metre price measured, as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

## **E16. CONCRETE SIDEWALK**

### **Description**

E16.1 All Work in this section shall be to City of Winnipeg Specification CW 3325 for Supply and Installation of Concrete Sidewalk.

E16.2 Blockouts for all paving bands in sidewalk to be constructed as per detail. All forming is incidental to the unit price bid for concrete sidewalk.

### **Method of Measurement**

E16.3 Supply and Installation of 100 mm Concrete Sidewalk will be measured on an area basis. The surface area to be paid for shall be the total number of square metres supplied in accordance with the specifications and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

## Basis of Payment

- E16.4 Supply and Installation of Concrete Sidewalk will be paid for at the contract square metre price for "Supply and Installation of Concrete Sidewalk", measured as specified herein, which price shall be payment in full for supplying all materials including compacted base course as required and performing all operations herein described and all other items incidental to the Work included in this specification.

## E17. INTERLOCKING PAVING STONE

### Description

- E17.1 Further to CW 3335 this Specification shall cover the supply and installation of new paving stones and sand setting bed.
- E17.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary or and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

### Materials

- E17.3 Paving stones shall be Barkman Interlocking Concrete Pavers as supplied by Winnipeg Transit as Shown on the Construction Drawings and as follows:
- (a) Half-Natural 105x210x60
  - (b) Stockpiled Holland Pavers
- E17.4 Sand:
- (a) Clean brick sand as joint filler.
  - (b) Clean brick sand as 13mm depth setting bed

### Construction Methods

- E17.5 Paving Stones shall be installed block out in concrete sidewalk.

### Installation

- E17.6 Contractor to verify the exact dimensions of Interlocking Paving Stones prior to construction of block outs in concrete sidewalk.
- (a) Install concrete sidewalk as specified on Drawings.
  - (b) Install sand bed to 13mm depth as specified on Drawings
  - (c) Do not compact setting bed prior to installation of pavers.
  - (d) Spread only sufficient area which can be covered with pavers same day.
  - (e) Lay pavers on sand bed hand tight.
  - (f) Remove adjacent pavers in bands as required to ensure that bricks do not require cutting on straight bands.
  - (g) Where paving pattern is interrupted by vertical structural elements pavers must be sawcut and fit true and hand tight.
  - (h) Vertical Structural Elements are to be installed prior to installation of Pavers.
  - (i) Commence installation of stones against edge to obtain straightest possible course for installation.

- (j) Pavers shall be cut with a saw only, to obtain true even undamaged edges. Chipped pavers are unacceptable.
- (k) Crews shall Work on installed paving stone, not on sand layer.
- (l) Spread and fine grade brick sand over paving surface and sweep into joints, in several directions. Sand is incidental to the price for supply and installation of paving stone.
- (m) Compact paving stones with vibratory plate compactor having mass of at least 113kg. Compaction is incidental to the price for supply and installation of paving stone.
- (n) Sweep remaining sand over all paving areas and remove from Site.
- (o) Replace at no extra cost all whole or cut stones marked as unacceptable.
- (p) Remove cracked, chipped, broken or otherwise damaged paving materials from Site immediately.
- (q) Upon completion, clean in accordance with manufacturer's recommendations.

#### **Method of Measurement**

E17.7 Reinstallation of stockpiled unit pavers will be measured on a surface area basis. The surface area to be paid for shall be the total number of square metres installed in accordance with the Drawings and Specifications and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

#### **Basis of Payment**

E17.8 Reinstallation of stockpiled unit pavers will be paid for at the Contract Unit Price per square metre for "Reinstall Stockpiled Unit Pavers" measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

#### **E18. ASPHALT CHIP PAVING**

E18.1 This specification shall cover all work and materials required for the supply and installation of Asphalt Chip Paving.

#### **Materials**

E18.2 Asphalt chips as supplied by Winnipeg Transit.

#### **Construction Methods**

E18.3 The contractor shall deliver to site, spread and compact asphalt chip paving following site grading operations.

E18.4 Asphalt Chips to be installed to a 100mm compacted depth. Compaction to 95% SPD.

E18.5 Ensure smooth grades without bumps or dips over area of asphalt chip.

E18.6 Clean and remove from site all excess asphalt chips.

#### **Method of Measurement**

E18.7 Delivery and Installation of Asphalt Chip Paving will be measured on a surface area basis. The surface area to be paid for shall be the total number of square metres supplied in accordance with the specifications and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

#### **Basis of Payment**

E18.8 Delivery and Installation of Asphalt Chip Paving will be paid for at the contract square metre price for "Delivery and Installation of Asphalt Chip Paving", measured as specified herein, which price shall be payment in full for supplying all materials including compacted base course as required and performing all operation herein described and all other items incidental to the Work included in this specification.

## **E19. LIMESTONE PAVING**

### **E19.1 Description**

E19.1.1 Further to CW 3410 and CW 3110 the work of this section comprises the furnishing of all labour, equipment and materials incidental and required to complete the construction of limestone pathway as shown on the drawings and as hereinafter specified, including but not necessarily confined to:

- (a) Construction of Crushed Limestone Paving, including supply and installation of base courses as shown on the Drawings.

### **E19.2 Related Work**

E19.2.1 Excavation, Removals and Site Grading

### **E19.3 Materials**

E19.3.1 Crushed granular material to the following requirements:

- (a) All Materials supplied under this Specification shall be of a type approved by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator;
- (b) Crushed limestone consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- (c) Gradations to be within limits specified below when tested to ASTM C136-83 and have a smooth curve without sharp breaks when plotted on semi-log grading chart;

<u>ASTM Sieve Designation</u>	<u>% Passing</u>
19mm (3/4")	100
12.5mm (1/2")	50-75
9.5mm	30-50
6.0mm	10-20
0.425	0-5
0.18	nil
0.075	nil

- (d) Crushed Limestone Fines –1/4" (6mm) down.

E19.3.2 If materials have been tested by an independent testing laboratory within previous 2 months and have successfully passed tests equal to requirements of this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

### **E19.4 Subgrade Inspection**

- (a) Verify grades of compacted subgrade (to 100% SPD) for conformity with elevations and sections before placing granular material.
- (b) Proof roll graded subgrade to check for unstable areas, obtain approval of subgrade by Contract Administrator before placing granular base.



- (c) Remove and dispose of unsuitable sub base material as directed by Contract Administrator.

**E19.5 Placement and Compaction of Granular and Crushed Limestone**

- (a) Place 50mm crushed granular material to a minimum compacted thickness of 150mm. Compact to 100% standard proctor density.
- (b) Place 19mm crushed granular material to a minimum compacted thickness of 50mm. Compact to 100% standard proctor density.
- (c) Crushed Limestone fines to a minimum compacted thickness of 50mm as finishing course. Compact to 98% standard proctor density.
- (d) Add crushed granular material as required to replace unsuitable subgrade material. Place in layers not exceeding 200mm thickness and compact to 98% standard proctor.
- (e) Compact subgrade to min. 98% standard proctor density.
- (f) Finished surface to be within 12mm of specified grade, but not uniformly high or low. Ensure positive drainage on paved areas and in adjacent sodded areas.

**E19.6 Field Quality Control**

- E19.6.1 Inspection and testing of crushed stone paving will be carried out by designated testing laboratory, cost of testing to be paid for by cash allowance as directed by the Contract Administrator.

**E19.7 Acceptance**

- E19.7.1 Any work not satisfactory as specified herein and as determined by the Contract Administrator shall be rectified by the Contractor. This process of inspection and correction shall continue until the Contract Administrator is satisfied that the work is 100% complete and as per the construction drawings and specifications.

**E19.8 Method of Measurement**

- E19.8.1 Crushed Limestone Pathway shall be measured on an area basis. The area to be paid for shall be the total number of square metres of Stone Chip / Crushed Limestone Pathway placed in accordance with this Specification and the Construction Drawings, as determined by the Contract Administrator.

**E19.9 Basis of Payment**

- E19.9.1 Stone Chip / Crushed Limestone Pathway will be paid for at the contract unit price per square metre for "Supply and Install Crushed Limestone Pathway" measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification including supply and install topsoil and sod in areas disturbed by construction.

**E20. FENCING**

**E20.1 Description**

- E20.1.1 Supply and Installation of Wood Bumper Fencing.

**E20.2 Materials**

- (a) 140mm x 140mm posts
- (b) 140mm x 38mm rails
- (c) Hardware as per details.

### E20.3 Installation

E20.3.1 Measure length of fencing to be installed prior to construction. Install posts as per detail and space to provide consistent length between posts.

E20.3.2 Construct fence as per detail.

### E30.1 Method of Measurement

E20.3.3 Wood Bumper Fencing shall be measured on a linear metre basis. The numbers to be paid shall be the total number of lineal metres constructed in accordance with the Drawings and Specifications and as measure and accepted by the Contract Administrator.

### E20.4 Basis of Payment

E20.4.1 Supply and install wood bumper fence will be paid for at the contract unit price per lineal metre for "Supply and install 1.2m height Wood Bumper Fence" measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

## E21. SITE FURNITURE

### Description

E21.1 The following list generally describes the scope of this section:

- (a) Supply and installation of:
  - (i) Stackable Concrete Planters
  - (ii) Rectangular Concrete End Pieces
  - (iii) Specialty frangible planter panels
  - (iv) Precast Concrete Base for Park and Ride Information Boards
  - (v) Recycled Plastic Benches
  - (vi) Metal Guard Rail
  - (vii) Metal Park and Ride Sign Frame

### General

### Delivery and Storage

E21.2 Store units in a protected location, immediately upon arrival on the Site.

E21.3 Remove from Site any units which have been damaged during transportation and replace.

### Products

E21.4 Stackable Concrete Planters to be 1.2m x 1.2m charcoal exposed aggregate finish as supplied by:

Barkman Concrete Ltd.  
909 Gateway Road  
Winnipeg, Manitoba, R3K 3L1  
Contact: Wayne Wiebe  
T (204) 667-3310

E21.5 Rectangular Bench Ends to be charcoal exposed aggregate finish with mounts for bench to be supplied by:

Barkman Concrete Ltd.  
909 Gateway Road  
Winnipeg, Manitoba, R3K 3L1  
Contact: Wayne Wiebe  
T (204) 667-3310

E21.5.1 Rectangular concrete Bench Ends are incidental to the unit prices bid for supply and installation of benches.

E21.6 Specialty frangible planter panels to be smooth finish with charcoal accent as supplied by:

Barkman Concrete Ltd.  
909 Gateway Road  
Winnipeg, Manitoba, R3K 3L1  
Contact: Wayne Wiebe  
T (204) 667-3310

E21.6.1 Specialty frangible planter panels are incidental to the unit prices bid for supply and installation of specialty planters.

E21.7 Recycled Plastic Benches to be dark grey 1.8m long mounted on metal angle to fit mounting points on bench ends. Contractor to submit shop drawings for approval prior to manufacture of mounting structure. Recycled Plastic Benches available through:

GAT Home Company Ltd.  
289 King Street  
Winnipeg, Manitoba, R3B 1J8  
Contact: Neil Buller  
T (204) 946-0729  
F (204) 941-3800

E21.7.1 Recycled plastic benches are incidental to the unit price bid for supply and installation of benches.

E21.8 Metal Guard Rail as per Drawings to be supplied by:

Hi Tec Industries Inc.  
Box 1127, 1000 6<sup>th</sup> Avenue N.E.  
Portage La Prairie, MB R1N 3C5  
Contact: Percy Phillips  
T (204) 239-4270  
F (204) 239-4271  
E percy@hitecindustries.ca

E21.9 Precast Concrete Base for Park and Ride sign to be exposed aggregate charcoal finish as supplied by:

Barkman Concrete Ltd.  
909 Gateway Road  
Winnipeg, MB, R3K 3L1  
Contact: Wayne Wiebe  
T (204) 667-3310

E21.9.1 Precast concrete base for Park and Ride sign is incidental to the unit price bid for supply and installation of Park and Ride Signs.

E21.10 Metal Park and Ride sign frame to be as per detail, galvanized, painted black as supplied by:

Hi Tec Industries Inc.  
Box 1127, 1000 6<sup>th</sup> Avenue N.E.  
Portage La Prairie, MB R1N 3C5  
Contact: Percy Phillips  
T (204) 239-4270  
F (204) 239-4271  
E [percy@hitecindustries.ca](mailto:percy@hitecindustries.ca)

- E21.10.1 Metal Park and Ride sign frame is incidental to the unit prices bid for supply and installation of Park and Ride Signs.

### **Installation of Site Furniture**

- E21.11 Site Furniture shall be installed in locations indicated on the Construction Drawings.

- E21.12 All Site Furniture shall be set level.

### **Protection after Completion**

- E21.13 Protect and maintain site furnishings, including accessories, until acceptance of project Work.

- E21.14 Immediately remove from Site, damaged furnishing and accessories. Replace, repair, re-finish, or otherwise make good to approval of Contract Administrator.

### **Method of Measurement**

- E21.15 Site Furniture will be measured on a unit basis. The number of each item to be paid for will be the total number placed in accordance with this Specification and accepted by the Contract Administrator, as computed by the Contract Administrator.

### **Basis of Payment**

- E21.16 Site Furniture will be paid for at the Contract Unit Price for each item, which price shall be payment in full for supply of all materials and performing all operations herein described and for all other items incidental to the Work included in this Specification.

## **E22. ILLUMINATED TRANSIT SIGN STRUCTURE**

### **Description**

- E22.1 The following list generally describes the scope of this section:
- (a) Supply and installation of Illuminated Transit Structure as per Winnipeg Transit Department specification or approved equal as per manufacturer's Engineer's stamped drawing.

### **Design / Shop Drawings**

- E22.2 The Contractor shall submit stamped engineer's drawings for review before commencing fabrication. Engineer's drawings shall show all details of construction and fastenings for erections and shall be as specified or approved.

### **General**

### **Quality and Workmanship**

- E22.3 A prototype has been manufactured by Winnipeg Transit for the sign structure. The Contractor must meet or exceed the standards of the prototype. The prototype shall be the minimum acceptable standard for all materials, workmanship and finishes. Drawings are available for review in the offices of McGowan Russell Group Inc.

## Delivery and Storage

- E22.4 Store units in a protected location, immediately upon arrival on the Site.
- E22.5 Remove from Site any units which have been damaged during transportation and replace.

## Products

- E22.6 The Illuminated Transit Structure to be supplied by:

Hi Tec Industries Inc.  
Box 1127, 1000 6<sup>th</sup> Avenue N.E.  
Portage La Prairie, MB R1N 3C5  
Contact: Percy Phillips  
T (204) 239-4270  
F (204) 239-4271  
E percy@hitecindustries.ca

## Installation and Co-ordination with Others

- E22.7 The Contractor is advised of the following:
- (a) Concrete pile and pile cap to be constructed by Site works contractor. Sign manufacturer to supply anchor bolts and template.
  - (b) Contractor to make final electrical connection to electrical source at sign base.
  - (c) The Contract Administrator will notify Winnipeg Transit of installation date with a minimum of three (3) working days.
  - (d) Any damage to the illuminated structure, incurred during fabrication, delivery, installation etc., is to be repaired to the satisfaction of the Contract Administrator within three (3) working days of installation.

## Method of Measurement

- E22.8 Supply and Installation of Illuminated signage structure shall be measured on a per item basis as specified herein and as measured and accepted by the contract administrator.

## Basis of Payment

**E22.9** Supply and Installation of Illuminated signage structure will be paid for at the contract unit price for 'supply and install illuminated signage structure' measured and specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this specification.

## E23. ILLUMINATED TRANSIT SIGNAGE

### Scope of Work

### Work Included

- E23.1 The Work of this specification comprises the furnishing of all labour, equipment and materials required to complete the supply, fabrication and erection of the illuminated signage and related Work as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:
- (a) Supply, fabrication and installation of five (2) two-sided illuminated station stop identification displays 403 x 1318 mm with 228 mm channels.

### Source

E23.2 Illuminated Transit Signage to be supplied by Neon Products or approved equal.

Pattison Sign Group.  
1695 Sargent Avenue  
Winnipeg, MB, R3H 0C4  
Contact Greg Drummond  
T (204) 788-4353  
F (204) 774-0689

### **Materials**

- E23.3 Materials shall be free from defects impairing strength, durability or appearance, and be of best commercial quality for use intended.
- E23.4 Materials and methods used to assemble Work of this section shall be of such properties and construction to safely sustain the loads normally imposed thereon, as would be required of this type of installation.
- E23.5 All exposed fastenings shall be of the same material, colour and finish as the metals to which these are supplied, unless otherwise specified or called for on the Drawings.
- E23.6 All metal shall be free from scale, buckles, pits and other defects.
- E23.7 Sign components and construction shall be as shown on the Drawings and as approved by the Contract Administrator.
- E23.8 Station Stop Identification signs to be constructed of 20 ga. sheet metal with 12.5 mm F-Section vinyl retainers. Cabinet to be painted to match sign stand. General Paint - Match Pantone Colour #286 Blue
- E23.9 Lamps to be Led light system to fit to lettering and image. Number of lights varies with size of sign.
- E23.10 Lexan face to be 4.6 mm (3/16") clear lexan.
- E23.11 Background to be 3M 3630 - 22 black vinyl.
- E23.12 Logo to be 3M 3630 - 167 bright blue vinyl.
- E23.13 Copy to be 50 - 100 mm high Frutiger Bold as follows:
- (a) 'MCPHILLIPS STREET STATION PARK AND RIDE' (with logo) on all four faces. (to be approved by Contract Administrator prior to manufacture)
  - (b) 'CLUB REGENT PARK AND RIDE' on all four faces. (to be approved by Contract Administrator prior to manufacture)

### **Design / Shop Drawings**

- E23.14 The Contractor shall submit design and shop drawings for review before commencing fabrication. Design drawings shall show layout of copy/logo on sign face, colours and shall be signed by Contract Administrator prior to manufacture. Shop drawings shall show all details of construction and fastenings for erections and shall be as specified or approved.

### **Workmanship**

- E23.15 Proportion items to meet the National Building Code. Items shall support loads recommended by the Code unless specific loads are indicated on the Drawings.

- E23.16 Fabricate work to shape and size with sharp lines, angles and smooth surfaces. Connections shall be securely welded, bolted or riveted. Welds shall be dressed smooth on exposed surfaces. Rabbets, lugs and brackets shall be provided so that the Work can be assembled in a neat substantial manner. Thickness of metal and design of assembly and support shall give ample strength and stiffness.
- E23.17 Exposed ends and edges of metal shall be smooth. Joints exposed to the weather shall be formed to exclude water or to drain.
- E23.18 Insofar as possible, fit and shop assemble Work and deliver to the Site in largest practical sections.
- E23.19 Prior to makings drawings or proceeding with shop fabrication, take all necessary field measurements to verify dimensions or calculations from Drawings.
- E23.20 Fabricate Work in strict accordance with shop drawings, and in general to details, sizes, materials shown on drawings and specified herein.
- E23.21 Assembly: Material intended for use in the various assemblies shall be straight, clean, sharply defined profiles, assembled in such a way that no disfigurements will show in the finished work, or impair the strength.
- E23.22 Welding: All welding shall conform to the requirements of the current CSA Standard W.59 and the fabricator shall be fully approved by the Canadian Welding Bureau, in conformance with the requirements of the current CSA Standard W.47. Welding shall be done by currently licensed welders only.
- E23.23 Welding splatter and other fabrication burrs where exposed shall be ground or filed smooth and left ready for subsequent operations.
- E23.24 Finish: Fabricated material Work shall be delivered with shop coat primer paint or galvanizing, or other finish as specified.
- E23.25 Following installation, apply a touch up coat of shop primer or galvanizing to match finish to all surface where finish has been removed and to installation devices such as bolts, screws, welds and the like.

### **Quality Control**

- E23.26 All workmanship and all material furnished and supplied under this Section 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 Work. 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 which are not in accordance with the requirements of this Section.

### **Fabrication**

#### **General**

- E23.27 Fabrication shall be carried out in accordance with these Specifications and Drawings which form a part of this Contract.
- E23.28 Vinyl graphics to be applied to second surface of Lexan background.
- E23.29 The workmanship shall meet established practice in modern shops.

E23.30 If damage occurs during fabrication, the Contract Administrator shall be notified to facilitate the implementation of remedial measures. Remedial repair measures will be subject to the approval of the Contract Administrator. Their cost will be paid by the Contractor.

E23.31 Dimensions and fabrication which control the field matching of parts shall receive careful attention in order to avoid field adjustments.

### **Clean Material**

E23.32 The material shall be clean, free from rust, mill scale, and other foreign matter before being worked in the shop.

### **Finish**

E23.33 All portions of the Work shall be neatly finished. Shearing, cutting, chipping and machining shall be done neatly and accurately. Finished members shall be true to line, free from twists, bends open joints, sharp corners and edges.

### **Painting**

E23.34 Clean all metal thoroughly and apply recommended primer.

E23.35 Apply all materials under adequate illumination, spread evenly and flow on smoothly without runs or sags.

E23.36 All coats must be thoroughly dry before applying succeeding coats.

E23.37 All Work where a coat of material has been applied, must be inspected and approved by the Contract Administrator before the application of the succeeding specified coat, otherwise no credit for the coat applied will be given, and the Contractor shall then assume the responsibility and recoat the Work in question. Report each coat applied to the Contract Administrator when completed for inspection and approved to comply with the above.

### **Installation**

E23.38 The Contractor is advised of the following:

- (a) Contractor to make final electrical connection to electrical source at sign base.
- (b) The Contract Administrator will notify Winnipeg Transit of installation date with a minimum of three (3) working days.
- (c) Any damage to the illuminated signage and incurred during fabrication, delivery, installation etc., is to be repaired to the satisfaction of the Contract Administrator within three (3) working days of installation.

### **Method of Measurement**

E23.39 Supply and Installation of Illuminated Signage will be measured on a set basis. (1 set equals 2 double sided station stop identification displays). The number of sets to be paid for shall be the number of units supplied in accordance with the Specifications and accepted by the Contract Administrator.

### **Basis of Payment**

E23.40 Supply and Installation of Illuminated Signage will be paid at the Contract Unit Price per Set for "Supply and Installation of Illuminated Signage", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification



## **E24. PARK AND RIDE KIOSK SIGNAGE**

### **Scope of Work**

#### **Work Included**

E24.1 The Work of this specification comprises the furnishing of all labour, equipment and materials required to complete the supply, fabrication and erection of the Park and Ride Information Signs and related Work as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:

- (a) Supply, fabrication and installation of Park and Ride information signs for kiosk.

#### **Source**

E24.2 Site Signage to be supplied by Neon Products or approved equal.

Belle Fosh Signs  
60 Park Lane  
Winnipeg, MB, R2R 0K2  
Contact: Rona Jackson  
Ph: (204) 633-0738 Fax: (204) 694-5594

#### **Materials**

E24.3 Signs to be manufactured from H32 3mm (.125") Aluminium. Metals shall be free from defaults impairing strength, durability or appearance.

- (a) Finish: The surfaces of the aluminium signs shall be free of visible oil, grease, dirt, mill scale, rust scale, oxides and other foreign matter leaving only shadows and/or streaks caused by rust stain and mill scale oxide.
- (b) Surfaces contaminated with grease, oil or chemicals, or mill scale, must be cleaned prior to painting.
- (c) Clean aluminium with zylol or an equivalent reducer/dry carefully while removing any residue or foreign material.
- (d) Apply an acid wash to the items and dry carefully again. The acid wash should be applied within 2 hours of washing with reducers.
- (e) Apply Sikkens (or approved equal) 2-part primer to the item after the acid wash has set. (Approximately 20 minutes). If the primer cannot be applied within 6 hours of the acid wash, the item must be acid washed again.
- (f) Apply a top coat of paint as per manufacturer's specifications 30 minutes after applying primer and no later than 5 hours after applying the primer. If this cannot be done, the item must be scuff sanded and reprimed again.
- (g) The topcoat for signs shall be one coat of powder coated white colour.

E24.4 All signs shall be guaranteed for a period of one year.

E24.5 Contract Administrator to supply digital sign design to manufacturer upon contract award.

E24.6 Any damage to paint incurred prior to or during installation shall be repaired within three (3) days of installation. Sign components and construction shall be as shown on the Drawings and as approved by the Contract Administrator.

E24.7 All sign components as per City of Winnipeg Transit Signage Manual Figures 6 and 21 included in this document

## **Design / Shop Drawings**

- E24.8 The Contractor shall submit design and shop drawings for review before commencing fabrication. Design drawings shall show layout of copy/logo on sign face, colours and shall be signed by Contract Administrator prior to manufacture. Shop drawings shall show all details of construction and fastenings for erections and shall be as specified or approved.

## **Workmanship**

- E24.9 Proportion items to meet the National Building Code. Items shall support loads recommended by the Code unless specific loads are indicated on the Drawings.
- E24.10 Fabricate Work to shape and size with sharp lines, angles and smooth surfaces. Connections shall be securely welded, bolted or riveted. Welds shall be dressed smooth on exposed surfaces. Rabbets, lugs and brackets shall be provided so that the Work can be assembled in a neat substantial manner. Thickness of metal and design of assembly and support shall give ample strength and stiffness.
- E24.11 Exposed ends and edges of metal shall be smooth. Joints exposed to the weather shall be formed to exclude water or to drain.
- E24.12 Insofar as possible, fit and shop assemble Work and deliver to the Site in largest practical sections.
- E24.13 Welding splatter and other fabrication burrs where exposed shall be ground or filed smooth and left ready for subsequent operations.
- E24.14 Finish: Fabricated material Work shall be delivered with shop coat primer paint or galvanizing, or other finish as specified.
- E24.15 Following installation, apply a touch up coat of shop primer or galvanizing to match finish to all surface where finish has been removed and to installation devices such as bolts, screws, welds and the like.

## **Quality Control**

- E24.16 All workmanship and all material furnished and supplied under this Section 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 Work. 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 which are not in accordance with the requirements of this Section.

## **Fabrication**

### **General**

- E24.17 Fabrication shall be carried out in accordance with these Specifications and Drawings which form a part of this Contract.
- E24.18 The workmanship shall meet established practice in modern shops.
- E24.19 The manufacturer's identification marks on signs will not be allowed unless authorized in writing by the Contract Administrator.
- E24.20 If damage occurs to the aluminium during fabrication, the Contract Administrator shall be notified to facilitate the implementation of remedial measures. Remedial repair measures will be subject to the approval of the Contract Administrator.

E24.21 Dimensions and fabrication which control the field matching of parts shall receive careful attention in order to avoid field adjustments.

### **Clean Material**

E24.22 The material shall be clean, free from rust, mill scale, and other foreign matter before being worked in the shop.

### **Finish**

E24.23 All portions of the Work shall be neatly finished. Shearing, cutting, chipping and machining shall be done neatly and accurately. Finished members shall be true to line, free from twists, bends open joints, sharp corners and edges.

### **Painting**

E24.24 Clean all metal thoroughly and apply recommended primer.

E24.25 Apply all materials under adequate illumination, spread evenly and flow on smoothly without runs or sags.

E24.26 All coats must be thoroughly dry before applying succeeding coats.

E24.27 All Work where a coat of material has been applied must be inspected and approved by the Contract Administrator before the application of the succeeding specified coat, otherwise no credit for the coat applied will be given, and the Contractor shall then assume the responsibility and recoat the Work in question. Report each coat applied to the Contract Administrator when completed for inspection and approved to comply with the above.

### **Installation**

E24.28 The Contractor is advised of the following:

- (a) Concrete base to be constructed by Contractor. Contractor to supply structural drawings stamped by and Engineer licensed in the Province of Manitoba prior to construction.
- (b) Contractor to supply and install structural support including all fasteners and anchors. Contractor to supply structural drawings stamped by and Engineer licensed in the Province of Manitoba prior to construction.
- (c) The Contract Administrator will notify Winnipeg Transit of installation date with a minimum of three (3) working days.
- (d) Any damage to the signage and incurred during fabrication, delivery, installation etc., is to be repaired to the satisfaction of the Contract Administrator within three (3) working days of installation.

### **Method of Measurement**

E24.29 Supply and Installation of Site Signage will be measured on a per unit basis. The number of units to be paid for shall be the number of units supplied in accordance with the Specifications and accepted by the Contract Administrator.

### **Basis of Payment**

E24.30 Supply and Installation of Site Signage will be paid at the Contract Unit Price per item for "Supply and Installation of Site Signage, measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification

## **E25. SHRUB BEDS AND PLANTER PREPARATION**

### **Description**

#### **Scope of Work**

- E25.1 The following list generally describes the scope of this Section:
- (a) Cultivate subsoil
  - (b) Supply and install planting soil mixture in shrub beds and planters
  - (c) Supply and Install Filter Cloth
  - (d) Supply and install Wood Chip Mulch
  - (e) Supply and Install drainage course
  - (f) Supply and Install Rock Mulch

#### **Samples**

- E25.2 Submit to the Contract Administrator samples of the following materials:
- (a) Planting Soil Mixture: 1kg
  - (b) Wood Chip Mulch: 400g
  - (c) Rock Mulch: 400g
  - (d) Filter Cloth: 1sq.m

#### **Delivery and Storage**

- E25.3 Deliver and store fertilizer in waterproof bags showing weight, analysis and name of manufacturer.

#### **Materials**

- E25.4 Imported topsoil: natural, fertile, agricultural soil typical of locality, capable of sustaining vigorous plant growth, from well drained site that is free of flooding, not in frozen or muddy condition, not less than 6% organic matter to a maximum 25% organic matter by volume, and pH value of 5.9 to 7.0. Free from subsoil, slag or clay, stones, lumps, live plants and their roots, sticks, crabgrass, couchgrass, noxious weeds and foreign matter.
- E25.5 Peatmoss: horticultural grade Class "A" decomposed plant material, fairly elastic and homogeneous. Free of decomposed colloidal residue, weed, sulphur and iron. To have pH value of 5.9 to 7.0, 60% organic matter by weight, moisture content not exceeding 15% and water absorption capacity of not less than 300% by weight on oven dry basis.
- E25.6 Sand: hard, granular natural beach sand, washed free of impurities, chemical or organic matter.
- E25.7 Fertilizer: commercial type with 50% of the elements derived from organic sources.
- E25.8 Bonemeal: shall be raw bonemeal, finely ground with a minimum analysis of 3% nitrogen and 20% phosphoric acid.
- E25.9 Planting Soil: For planting of shrubs and ground covers, mix topsoil with 20% peatmoss loose by volume.
- E25.10 Incorporate bonemeal into planting soil at rate of 5 lbs /cu.yd. of soil mixture.
- E25.11 Filter fabric to be UV resistant, black, woven cloth.
- E25.12 Wood Chip mulch to be local grade free of twigs, leaves and particles over 50mm in length.

E25.13 Drainage Course to be 25mm clean washed rock.

E25.14 Rock mulch to be 19mm clean washed rock mulch.

### **Construction Methods**

#### **Preparation**

E25.15 Grade subgrade, eliminating uneven areas and low spots, ensuring positive drainage with minimal disturbance of existing relocated trees. Remove debris, broken roots, branches, stones in excess of 50mm diameter and other deleterious materials. Remove subsoil that has been contaminated with oil, gasoline or calcium chloride. Dispose of removed materials as directed.

E25.16 Cultivate entire area which is to receive topsoil or planting soil to depth of 100mm.

E25.17 Excavate shrub pits to a depth of 550mm.

E25.18 Construct planters as per details. Install drainage course at bottom and cover with filter fabric.

#### **Spreading Soil Mixture**

E25.19 Do not spread planting soil mixture until Contract Administrator has inspected subgrade.

E25.20 Spread soil mixture with adequate moisture in uniform layers during dry weather over approved, dry, unfrozen subgrade, where planting is indicated.

E25.21 Bring soil mixture up to 100 mm finished grade and 100mm below edge of planter or as indicated on details.

E25.22 Remove stones, roots, grass, weeds, construction materials, debris and foreign non-organic objects from soil mixture.

#### **Application of Fertilizer**

E25.23 Spread fertilizer at manufacturer's recommended rate of application.

E25.24 Mix fertilizer thoroughly into upper 50mm of planting soil.

#### **Finish Grading**

E25.25 Fine grade entire planting soil area to 100mm below level of Concrete Curb or sidewalk. Eliminate rough spots.

E25.26 Compact planting soil to leave surface smooth, uniform, firm against deep foot printing, with a fine, loose texture.

E25.27 Tolerance: plus or minus 15mm of design grade.

E25.28 Supply and install filter fabric. Secure with staples every 600mm on centre.

E25.29 Supply and install 100mm Wood Chip Mulch in shrub bed and 75mm depth rock mulch in planters.

#### **Method of Measurement**

E25.30 Supply and Installation of Planting bed shall be measured on a square metre basis.

E25.31 Planter Preparation shall be measured on a per unit basis for:

- (a) 560mm ht stackable planters

- (b) 280mm ht stackable planters
- (c) 560mm ht specialty planter
- (d) 280mm ht specialty planter
- (e) C.I.P. Concrete Planter

### **Basis of Payment**

E25.32 Supply and Installation of Planting Bed will be made at the Contract Unit Price per square metre for supply and install, shrub bed which price shall be payment in full for supply of all materials and performing all operations herein described and for all other items incidental to the Work included in this Specification.

E25.33 Supply and Installation of planter preparation will be made at the contract unit price per item for:

- (a) 560mm ht stackable planters
- (b) 280mm ht stackable planters
- (c) 560mm ht specialty planter
- (d) 280mm ht specialty planter
- (e) C.I.P. Concrete Planter

## **E26. PLANT MATERIAL**

### **Description**

E26.1 The following list generally describes the scope of this section:

- (a) Supply and installation of trees including preparation, digging, transport and planting.
- (b) Maintenance to date of substantial performance.
- (c) Warranty for two full years.

### **General**

E26.2 Obtain approval of plant material at source.

E26.3 Notify Contract Administrator of source of material at least 7 days in advance of shipment. No Work under this Section is to proceed without approval.

E26.4 Acceptance of plant material at source does not prevent rejection at Site prior to or after planting operations.

E26.5 Source of all plant material to be from an area within the same hardiness zone and soil conditions as Winnipeg.

### **Shipment and Pre-Planting Care**

E26.6 Co-ordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting. Tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire which would damage bark, break branches or destroy natural shape of plant. Give full support to root ball of large trees during lifting.

- E26.7 Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peatmoss, sawdust or other acceptable material to prevent loss of moisture during transit and storage.
- E26.8 Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over 50 mm diameter with wound dressing.
- E26.9 Keep roots moist and protected from sun and wind. Heel-in shrubs, which cannot be planted immediately, in shaded areas, and water well.

### **Materials**

#### **Water**

- E26.10 Water should be potable and free of minerals, which may be detrimental to plant growth.

#### **Anti-Desiccant**

- E26.11 Anti-desiccant should be wax-like emulsion to provide film over plant surface reducing evaporation but permeable enough to permit transpiration.

#### **Wound Dressing**

- E26.12 Wound dressing should be horticulturally accepted non-toxic, non-hardening emulsion.

#### **Plant Material**

- E26.13 Quality and Source: Comply with Guide Specification for Nursery Stock, 1982 Edition of Canadian Nursery Trades Association, referring to size and development of plant material and root ball. All plant material to be approved by City and Contract Administrator at source.
- E26.14 Measure plants when branches are in their natural position. Height and spread dimensions refer to main body of plant and not from branch tip to branch tip. Use trees of No. 1 grade.
- E26.15 Additional plant material qualifications:
- (a) Use shrubs with strong fibrous root system free of disease, insects, defects or injuries and structurally sound. Plant must have been root pruned regularly, but not later than one growing season prior to arrival on Site.

#### **Cold Storage**

- E26.16 Approval required for plant material, which has been held in cold storage.

#### **Container – Grown Stock**

- E26.17 Acceptable if containers large enough for root development. Shrubs must have grown in container for minimum of one growing season but not longer than two. 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.

#### **Substitutions**

- E26.18 Substitutions to plant material as indicated on plantings plan are not permitted unless written approval has been obtained as to type, variety and size prior to award of Contract. Plant substitutions must be similar species and of equal size to those originally specified.

#### **Root balls**

- E26.19 Deciduous trees in excess of 3 m height must have been dug with large firm ball. Root balls must include 75% of fibrous and feeder root system. This excludes use of native trees grown in light sandy or rocky soil. Secure root balls with burlap, heavy twine and wire basket. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.
- E26.20 Tree spade material shall not be accepted. Unless dug in field and secured as above.
- E26.21 Lift root ball from hole, place in wire basket designed for purpose and line with burlap. Place root ball and tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.

### **Construction Methods**

#### **Workmanship**

- E26.22 Stake out location of trees and shrubs as per the Construction Drawings. Obtain approval by City and Contract Administrator prior to excavating.
- E26.23 Apply anti-desiccant in accordance with material manufacturer's instructions only as required.
- E26.24 Co-ordinate operations. Keep Site clean and planting holes drained. Immediately remove soil or debris spilled onto pavement.

#### **Planting Time**

- E26.25 Plant deciduous plant material during dormant period before buds have broken. Plant material noted for spring planting only, must be planted in dormant period.
- E26.26 When permission has been obtained to plant materials after buds have broken, spray plants with anti-desiccant to slow down transpiration prior to transplanting.
- E26.27 When permission has been obtained, shrubs and perennials growing in containers may be planted throughout growing season.
- E26.28 Plant only under conditions that are conducive to health and physical conditions of plants.
- E26.29 Provide planting schedule. Executing planting operations over long period using limited crew will not be accepted.

#### **Excavations**

- E26.30 Prepare planting pits to City of Winnipeg and Canadian Nursery Trades Association standards.
- E26.31 Provide drainage for planting holes in heavy soil if natural drainage does not exist. Have method approved.
- E26.32 Protect bottom of excavations against freezing.
- E26.33 Remove water, which enters excavations prior to planting. Ensure source of water is not ground water.

#### **Planting**

- E26.34 Loosen bottom of planting hole to depth of 150 to 200 mm. Cover bottom of each excavation with minimum of 150 mm of topsoil mixture.
- E26.35 Plant trees and shrubs vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to structure, roads and walks.



- E26.36 Place plant material to depth equal to depth they were originally growing in nursery.
- E26.37 With balled and burlapped roots balls, loosen burlap and cut away minimum top 1/2 without disturbing root ball. Cut vertical slits in remaining burlap around root ball at 250mm intervals. Remove all rope, string, or other ties from around trunk. Do not pull burlap or rope from under root ball. With container stock, remove entire container without disturbing root ball. Non bio-degradable wrappings must be removed including wire baskets.
- E26.38** Tamp planting soil around root system in layers of 150mm 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.
- E26.39** Build 100 mm deep saucer around outer edge of hole to assist with maintenance watering. Install 100mm depth wood chip mulch in saucer as shown on drawings.
- E26.40 When planting is completed, give surface of planting saucer dressing of organic 10-6-4 fertilizer at rate of 12 kg/100 m for shrub beds or 40 to 50 g/mm of calliper for trees. Mix fertilizer thoroughly with top layer of planting soil and water in well.

### **Pruning**

- E26.41 Prune trees and shrubs after planting only as required to remove broken diseased or dead branches. Employ clean sharp tools and make cuts flush with main branch, smooth and sloping as to prevent accumulation of water.

### **Maintenance**

- E26.42 After completion of planting operation to the satisfaction of the Contract Administrator and City of Winnipeg, the Contractor shall be responsible for the maintenance of the plant material until date of Substantial Performance and commencement of two year warranty.
- E26.43 Replace any dead or damaged plant material during the maintenance period, including replacement of vandalized material.
- E26.44 Water sufficiently to maintain optimum growing conditions. Ensure adequate moisture in root zone at freeze-up.
- E26.45 The Contractor shall provide all necessary equipment, including: tractors, mowers, hand mowers, trimmers, fertilizer spreaders, pruning tools, hoses, water meters, and any other items necessary for the maintenance of the plant material indicated in this Specification.

### **Personnel**

- E26.46 The Contractor shall provide all necessary personnel for the ongoing maintenance operations.
- E26.47 Personnel should have at least one year of experience in landscape maintenance and should be under the direction of a foreman, in all cases, with not less than five years of experience with similar maintenance operations.

### **Maintenance Methods**

#### **Maintenance of Shrub Beds**

#### **Watering**

- E26.48 Shrub beds shall be watered bi-weekly, or during the summer, if temperatures are fairly high and there has been no rainfall, water approximately once a week.

E26.49 To determine the need for watering, make a soil test weekly with a one-inch auger. Take a test sample from both the planting soil and from the root ball by drilling to a minimum depth of 600 mm. The soil shall contain enough moisture to hold together when compressed in the hand, but not be muddy.

### **Fertilizing Shrub Beds**

E26.50 Because of the specialized nature of such operations, fertilizing is to be done by a qualified local arborist.

E26.51 Fertilize in the fall over the surface of the ground surrounding the plants, then soak the area thoroughly, use 10-6-4 analysis fertilizer spreading a maximum of 0.13 kg per square metre.

### **Spraying**

E26.52 Spray trees to control insect pests and diseases. Use horticulturally recommended compounds specific for the problem to be contained.

### **Insects and Diseases**

E26.53 Spray plants to combat pests and diseases. Do not use DDT or sprays prohibited by Agriculture Canada.

### **Method of Measurement**

E26.54 Supply and Installation of Plant Material will be measured on a unit basis. The number of units to be paid shall be the total number of each type and size of units supplied and installed in accordance with the Drawings and Specifications and as measured and accepted by the Contract Administrator.

### **Basis of Payment**

E26.55 Supply and Installation of Plant Material will be paid for at the Contract Unit Price per unit type and size specified for "Supply and Installation of Plant Material", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification.

## **E27. EXTENDED MAINTENANCE**

E27.1 Description

E27.1.1 This Specification shall deal with the maintenance of the trees, shrubs, and perennials for Two (2) calendar years after the date of the Substantial Performance

E27.1.2 The following generally describes the scope of this Specification:

(a) Maintenance of trees and perennials.

E27.2 Materials and Personnel

E27.2.1 The Contractor shall provide all necessary equipment, including: tractors, trimmers, fertilizer spreaders, pruning tools, water trucks, hoses, water meters, and any other items necessary for the maintenance of the area indicated in this Specification.

E27.2.2 The Contractor shall provide all necessary personnel for the ongoing maintenance operations

E27.3 Work Included

E27.3.1 The following areas shall be part of the maintenance jurisdiction:

- (a) The trees and shrubs as indicated on the Construction Drawings
- (b) All sod indicated on the Construction Drawings

#### E27.4 Maintenance of Trees, Shrubs and Perennials

##### E27.4.1 Watering Trees and shrubs

- (i) All plant material shall be watered bi-weekly, or during the summer, if temperatures are fairly high and there has been no rainfall, water approximately once a week. Where irrigation is not available this should be executed by leaving a hose, with a gentle rate of flow, running into the saucer of the root ball for about one hour
- (ii) To determine the need for watering, make a soil test weekly with a one-inch auger. Take a test sample from both the planting soil and from the root ball by drilling to a minimum depth of 600 mm. The soil shall contain enough moisture to hold together when compressed in the hand, but shall not be muddy.
- (iii) Fertilizing, Pruning and Spraying Deciduous Trees and Shrubs. Because of the specialized nature of such operations, this should be done by a qualified local arborist
- (iv) Fertilize in the fall over the surface of the ground surrounding the plants, then soak the area thoroughly. Use 10-6-4 analysis fertilizer spreading a maximum of 0.13 kg per square meter.
- (v) Spray trees and shrubs to control insect pests and diseases. Use horticulturally recommended compounds specific for the problem to be contained.
- (vi) Tighten, or remove, turnbuckles or guy wires for trees as required or directed by the Contract Administrator.
- (vii) Straighten trees as required and directed by the Contract Administrator.

E27.4.2 The Contractor shall agree and guarantee to replace and replant any nursery stock found dead or in poor condition during and at the completion of the maintenance period. All plant material to be replaced and maintained for a minimum of 30 days prior to end of maintenance period. "Poor Condition" shall be interpreted as meaning nursery stock in which branches are dead or dying, or have not shown satisfactory growth of leaves. All replacements shall be of same size and species, as specified.

E27.4.3 Upon the end of the required maintenance period, a site inspection shall be held. If at this time, all material and Works is satisfactory the Contract for maintenance and warranty shall be terminated. If materials and Works are found unacceptable the warranty shall be extended by 30 days for a follow up inspection. Extension of warranty will continue in 30 day increments for inspection until all work and material are satisfactory.

##### E27.5 Method of Measurement

E27.6 Extended Maintenance will be measured on a per year lump sum basis and paid for in accordance with this Specification and accepted by the Contract Administrator.

##### E27.7 Basis of Payment

E27.7.1 Extended Maintenance will be paid for each year at the Contract per Year Lump Sum Price for "Extended Two Year Maintenance"; which price shall be payment in full for supply of all materials and performing all operations herein described and for all other items incidental to the work included in this Specification.

## **E28. ELECTRICAL**

### E28.1 General Provisions

- E28.1.1 Furnish all labour, new material, equipment and services for the complete installation of the electrical Work as shown on the plans and specified.
- E28.1.2 Conform to all Codes and pay all Fees. Upon completion, present a "Certificate of Approval" for electrical Work from the Inspection Department.
- E28.1.3 Examine the Site and local conditions affecting the Work under this contract.
- E28.1.4 Refer to associated drawings and specifications for electrical Work in connection therewith.
- E28.1.5 Install all Work promptly and in advance of concrete pouring and/or construction.
- E28.1.6 The Electrical Trade shall be responsible to make good all "Cutting and Patching" required by his section of the Contract. Include all trenching and backfilling.
- E28.1.7 All Work shall be executed in a first class and workmanlike manner. All supports, hangers, and securing devices shall be solid and substantial. All Work shall be laid out neatly in its mechanical appearance. It shall be logically arranged for simplicity of installation and accessibility.
- E28.1.8 Provide corrected "as-built" drawings on completion of the project. All underground services shall be indicated on as-builts and dimensioned. Provide shop drawings for approval of all major electrical items. Provide three (3) copies of manufacturers maintenance instructions bound in hard covered book for each piece of major electrical equipment.
- E28.1.9 Identify circuits/equipment with lamacoid nameplates.
- E28.1.10 "Temporary Lighting and Power" shall be provided by the General Contractor.
- E28.1.11 All electrical apparatus shall be properly grounded according to the latest edition of the "Canadian Electrical Code"
- E28.1.12** All equipment, wiring, conduit, grounding, seals, etc., shall be in compliance with the "Canadian Electrical" and local "Codes". Wiring in finished grade shall be in rigid PVC conduits, complete with ground conductor.
- E28.1.13 Wiring shall be copper, RWU-90, insulated, minimum #12 AWG.
- E28.1.14 Wire and connect to sign where indicted. Provide lockable, weatherproof disconnect switches for each sign. Locate as directed on Site.
- E28.1.15 Co-ordinate installation with Manitoba Hydro. Installation to conform with all requirements.
- E28.1.16 The base for the pedestal and sign will be provided under another section E17. Contractor to co-ordinate location of sleeves.
- E28.1.17 Provide ground rod and grounding connections to suit Manitoba Hydro and City of Winnipeg Inspection Department.

## Responsibilities

### General

- E28.2 Electrical Work will be performed by various parties. The description of the Work and responsibility for same is described below.

### LIST OF FIRMS/UTILITIES

C	-	Contractor
CR	-	Club Regent
MH	-	Manitoba Hydro
WT	-	Winnipeg Transit

### E28.3 Specific Items & Responsibility

1. Trenching  
Street Crossover & Electrical Services - C
2. Backfilling and Surface Restoration - C
3. Signs  
Base by GC - GC  
Wired by EC - EC
4. Services  
Conduit by - EC  
Wiring by - EC  
"EC" to co-ordinate with "WT"

### Method of Measurement / Basis of Payment

- E28.4 Electrical Work for each location will be measured and paid on a lump sum basis which price shall be payment in full for completing all operations herein described and all other items incidental to the Work included in this Specification.

### E29. SITE CLEAN UP

- E29.1 The Contractor shall upon the completion of Work each day, load and dispose of all excess asphalt cuttings, spoiled concrete, reinforcing steel, granular and other material associated with the Works from the Work Site.
- E29.2 The Contractor shall secure or remove all of his machinery and equipment at the end of each day from the immediate Work Site.
- E29.3 The Contractor will not be permitted to store machinery, equipment, or materials on public roads overnight.
- E29.4 Any costs in connection with the above mentioned Works are incidental to the unit prices bid on this project.