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.

E1.1.6 *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.

E1.1.7 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:

Drawing Title	***Drawing No.***	***File Name***	***Size***
Manitoba Ave. – Sinclair St. to Arlington St. – Sta 0+93 to Sta 2+50 – Plan and Profile	C0001	120-2004-Dwg-C0001-R0.pdf	594 mm x 841 mm
Manitoba Ave. – Sinclair St. to Arlington St. – Sta 2+50 to Sta 2+84.5 – Plan, Profile, and Details	C0002	120-2004-Dwg-C0002-R0.pdf	594 mm x 841 mm
Quelch St. – Roy Ave. to Pacific Ave. – Sta 0+57 to Sta 0+82 – Plan, Profile, and Details	C0003	120-2004-Dwg-C0003-R0.pdf	594 mm x 841 mm
Alfred Ave. – Manhole at Sgt Tommy Prince St. (EPL) to 1st Manhole east of Sgt Tommy Prince St.	SKT-C8001 (City 05371)	120-2004-Dwg-SKT-C8001-R0.pdf	279 mm x 432 mm
Alfred Ave. – 1st Manhole east of Sgt Tommy Prince St. to 2nd Manhole east of Sgt Tommy Prince St.	SKT-C8002 (City 05372)	120-2004-Dwg-SKT-C8002-R0.pdf	279 mm x 432 mm
Alfred Ave. – 2nd Manhole west of Sgt Tommy Prince St. to 1st Manhole west of Sgt Tommy Prince St.	SKT-C8005 (City 05373)	120-2004-Dwg-SKT-C8005-R0.pdf	279 mm x 432 mm
Alfred Ave. – 1st Manhole west of Sgt Tommy Prince St. to Manhole at Sgt Tommy Prince St.	SKT-C8006 (City 05374)	120-2004-Dwg-SKT-C8006-R0.pdf	279 mm x 432 mm

E2. OFFICE FACILITIES

E2.1 The Contractor shall supply office facilities meeting the following requirements:

(a) The field office shall be for the exclusive use of the Contract Administrator.

(b) The building shall be conveniently located near the site of the Work.

(c) The building shall have a minimum floor area of 20 square metres, with two windows for cross ventilation and a door entrance with a suitable lock.

(d) The building shall be suitable for all weather use. It shall be equipped with an electric heater and air conditioner so that the room temperature can be maintained between either 16-18^{o}C or 24-25 ^{o}C.

(e) The building shall be adequately lighted with fluorescent fixtures and have a minimum of three wall outlets.

(f) The building shall be furnished with two desks, one drafting table, table 3 m x 1.2 m, one stool, one four-drawer legal-size filing cabinet, and a minimum of eight chairs.

(g) A portable toilet shall be located near the field office building. The toilet shall have a locking door and be for the exclusive use of the Contract Administrator and other personnel from the City.

(h) The field office building and the portable toilet shall be cleaned on a weekly basis immediately prior to each site meeting. The Contract Administrator may request additional cleaning when he deems it necessary.

E2.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.

E2.3 The office facilities will be provided from the date of the commencement of the Work to the date of Substantial Performance.

E3. PROTECTION OF EXISTING TREES

E3.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing boulevard trees within the limits of the construction area:

a) The Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.

b) Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400mm wood planks, or suitably protected as approved by the Contract Administrator.

c) Excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of 1.5 times the diameter (measured in inches), with the outcome read in feet, from the closest edge of the trunk. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation.

d) Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.

e) Work on-site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to branches does occur, they shall be neatly pruned.

E3.2 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his designate.

E3.3 No separate measurement or payment will be made for the protection of trees.

E3.4 Elm trees cannot be trimmed between April 1 and July 31, inclusive.

E4. TRAFFIC CONTROL

E4.1 Further to clauses 3.6 and 3.7 of CW 1130-R1:

(a) Where directed, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. No measurement for payment will be made for this work.

(b) In accordance with the Manual of Temporary Traffic Control, the Contractor ("Agency" in the manual) shall make arrangements with the Traffic Services Section of the City of Winnipeg to place all temporary regulatory signs. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by the Traffic Services Section of the City of Winnipeg in connection with the works undertaken by the Contractor.

E5. TRAFFIC MANAGEMENT

E5.1 Further to clause 3.7 of CW 1130:

E5.1.1 The Contractor shall schedule construction activities to meet the following:

(a) Major rehabilitation streets will be closed to through traffic. Local access and/or bus traffic shall be maintained. The Contractor shall sign the street "Road Closed Local Access Only" in accordance with the Manual of Temporary Traffic Control.

(b) Reconstruction and crack and seating streets will be closed to all traffic. The Contractor shall sign the street "Road Closed" in accordance with the Manual of Temporary Traffic Control.

(c) Private approach access on all streets shall be maintained at all times.

E5.1.2 Should the Contractor be unable to maintain an existing access to a residence or business, he shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours' notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E5.1.3 Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

E6. PEDESTRIAN SAFETY

E6.1 During the project, as required and directed by the Contract Administrator, a temporary snow fence shall be installed for the safety of pedestrians. The Contractor shall be responsible for maintaining the snow fence in a proper working condition. No measurement for payment shall be made for this work.

E7. WATER USED BY CONTRACTOR

E7.1 Further to clause 3.7 of CW 1120-R1, the Contractor shall pay for all costs associated with obtaining water in accordance with the Waterworks By-law. Sewer charges will not be assessed for water obtained from a hydrant.

E8. INFRASTRUCTURE SIGNS

E8.1 The Contractor shall obtain infrastructure signs from the traffic Services Sign Shop at 421 Osborne Street. The Contractor shall mount each sign securely to a rigid backing material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain one sign at each street as directed by the Contract Administrator. When the Contract Administrator considers the Work on the street complete, the Contractor shall remove and dispose of the signs and supports. No measurement for payment will be made for the performing all operations herein described and all other items incidental to the work described.

E9. CRACK AND SEATING OF EXISTING CONCRETE PAVEMENT

DESCRIPTION

E9.1 General

E9.1.1 This specification covers the crack and seating of existing concrete pavements.

E9.2 Definitions

E9.2.1 Proof Rolling – applying of a dynamic load to a concrete pavement with the intent of cracking and embedding the cracked concrete into the existing sub-base.

E9.3 Referenced Standard Construction Specifications

(a) CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.

(b) CW 3310 – Portland Cement Concrete Pavement Works

CONSTRUCTION METHODS

E9.4 Saw-Cutting for Curb and Gutter Removal

E9.4.1 Saw-cut the existing concrete pavement full-depth longitudinally at the locations as shown on the Drawings to allow for installation of the curb and gutter section.

E9.4.2 Remove existing concrete pavement in accordance with Section 3.1 of CW 3110.

E9.4.3 Install curb and gutter in accordance with CW 3310.

E9.5 Crack and Seating

E9.5.1 The equipment for the crack and seating will be a roller having a single axle, unless approved otherwise by the Contract Administrator.

E9.5.2 The single axle roller will have a maximum of four (4) pneumatic tire wheels and the wheels will be evenly spaced in one line across the width of the roller so that each wheel will carry an approximate equal load when operated over an uneven surface. The centre-to-centre spacing between adjacent wheels will not exceed 800 millimetres. The roller equipment will have a suitable body for ballast loading with a minimum capacity of 40 tonnes and the ability to add additional ballast to a maximum capacity of 60 tonnes.

E9.5.3 Complete initial proof rolling of the concrete pavement with the equipment specified in accordance with clauses E9.5.1 and E9.5.2 of this specification.

E9.5.4 Complete passes as necessary to ensure that the equipment has contacted the entire pavement surface.

E9.5.5 Undertake second proof rolling as directed by the Contract Administrator.

E9.5.6 Loading requirements for each proof rolling will be identified by the Contract Administrator.

E9.5.7 Alter methods to avoid areas of instability. One rolling cycle will consist of two complete proof rolling applications to the pavement surface.

E9.5.8 Complete partial depth saw-cuts at 2/3 the depth of the existing concrete pavement at locations as directed by the Contract Administrator.

E9.5.9 Complete additional rolling cycles and partial depth saw-cuts until the existing concrete pavement has been cracked to a minimum of 300 millimetres to a maximum of 600 millimetres pieces and the pavement has been seated 10 millimetres to 20 millimetres into the sub-base, as directed by the Contract Administrator.

MEASUREMENT AND PAYMENT

E9.6 Crack and Seating

E9.6.1 Crack and seating of existing concrete pavement will be measured on an area basis and paid for at the Contract Unit Price per square metre for “Crack and Seating Pavement”. The area to be paid for will be the total number of square metres of existing concrete pavement cracked and seated in accordance with this specification, accepted and measured by the Contract Administrator.

E9.6.2 Additional rolling cycles will be measured and paid in accordance with this specification.

E9.6.3 Saw-cutting of the existing concrete pavement for curb and gutter installation will be included in the payment for “Crack and Seating Pavement”.

E9.7 Partial Depth Saw-Cutting

E9.7.1 Partial depth saw-cutting will be measured on a length basis and paid for at the Contract Unit Price per metre for “Partial Depth Saw-Cutting”. The length to be paid for will be the total number of metres of existing concrete pavement saw-cut in accordance with this specification, accepted and measured by the Contract Administrator.

E10. SUPPLY AND INSTALLATION OF MOISTURE BARRIER/STRESS ABSORPTION GEOTEXTILE FABRIC

DESCRIPTION

E10.1 General

E10.1.1 This specification covers the supply and installation of Moisture Barrier/Stress Absorption Geotextile.

E10.1.2 Referenced Standard Construction Specifications
.1 CW 3130 – Supply and Installation of Geotextile Fabrics.
.2 CW 3410 – Asphaltic Concrete Pavement Works.

MATERIALS

E10.2 Mill Certificate and Bill of Lading

E10.2.1 Provide mill certificate and bill of lading in accordance with Section 2 of CW 3130.

E10.3 Storage and Handling

E10.3.1 Store and handle material in accordance with Section 2 of CW 3130.

E10.4 Moisture Barrier/Stress Absorption Geotextile Fabric

E10.4.1 Geotextile fabric will be non-woven.

E10.4.2 All physical property requirements are minimum average roll values determined in accordance with ASTM 4759. The moisture barrier/stress absorption geotextile fabric will meet or exceed the standards as follows:

PROPERTY	**STANDARD**	**TEST METHOD**
GrabTensile Strength	0.40 kN	ASTM D4632
Grab Elongation	50%	ASTM D4632
Mullen Burst	1240 Kpa	ASTM D3786

E10.4.3 Acceptable products will be Amoco-petromat 4599, ARMTEC PF1, NILEX-9W99 or an approved equal.

E10.5 Tack Coat

E10.5.1 Tack coat will be 150 – 200 asphalt cement supplied in accordance with Clause 5.4.2 of CW 3410.

CONSTRUCTION METHODS

E10.6 General

E10.6.1 Install moisture barrier/stress absorption geotextile fabric at the locations as shown on the Drawings or as directed by the Contract Administrator.

E10.6.2 Proceed with installation upon completion and acceptance of the asphalt levelling course.

E10.6.3 Ensure pavement surface is clean and free of all dirt, water, oil or foreign materials.

E10.6.4 Apply tack coat with a distribution truck in accordance with manufacturer's specifications and recommendations. Ensure uniform coverage of entire pavement surface.

E10.6.5 Install geotextile fabric in accordance with the manufacturer's specifications and recommendations.

E10.6.6 Only construction equipment required to place the final asphalt surface course will be allowed to travel on the exposed geotextile fabric.

E10.6.7 Replace damaged or improperly placed geotextile fabric.

E10.6.8 All fabric installed must be covered with asphalt the same day.

E10.6.9 Commence placement of asphalt material after the fabric has been placed over the full width of the pavement surface and accepted by the Contract Administrator.

E10.6.10 Ensure temperature of asphalt material does not exceed the melting point of the fabric.

MEASUREMENT AND PAYMENT

E10.7 Moisture Barrier/Stress Absorption Geotextile Fabric

E10.7.1 Supply and installation of Moisture Barrier/Stress Absorption Geotextile Fabric will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Moisture Barrier/Stress Absorption Geotextile Fabric". The area to be paid for will be the total number of square metres of geotextile fabric supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E10.7.2 The supply and application of the tack coat will be included in the payment for "Moisture Barrier/Stress Absorption Geotextile Fabric".

E11. PATCHING OF EXISTING PAVEMENT

DESCRIPTION

E11.1 General

E11.1.1 This specification covers patching of existing concrete pavement in preparation for an asphalt overlay.

E11.1.2 Referenced Standard Construction Specifications

(a) CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.

(b) CW 3130 – Supply and Installation of Geotextile Fabrics.

(c) CW 3410 – Asphaltic Concrete Pavement Works.

MATERIALS

E11.2 Crushed Sub-Base Material

E11.2.1 Crushed Sub-base material will have a maximum aggregate size of 50 millimetre and be supplied in accordance with Section 2.1 of CW 3110.

E11.3 Geotextile Fabric

E11.3.1 Geotextile fabric will be supplied in accordance with Section 2 of CW 3130.

E11.4 Asphalt Material

E11.4.1 Asphalt material will be Type 1A and will be supplied in accordance with Sections 5 and 6 of CW 3410.

CONSTRUCTION METHODS

E11.5 General

E11.5.1 Remove existing concrete pavement to a minimum width of 1.5 metres at locations as shown on the Drawings or as directed by the Contract Administrator in accordance with Section 3.1 of Specification CW 3110.

E11.5.2 Excavate to a depth of 350 millimetres below the top of the existing pavement.

E11.5.3 Compact existing sub-grade to a minimum of 95% Standard Proctor Density.

E11.5.4 Place separation/reinforcement geotextile fabric in accordance with Specification CW 3130.

E11.5.5 Place and compact crushed sub-base material in accordance with CW 3110 to a 300 millimetres compacted depth. Compact to a minimum of 100% Standard Proctor Density.

E11.5.6 Place and compact asphalt material to a 50 millimetres compacted depth matching the top of the existing concrete pavement. Compact to an average of 95% percent of the 75 Blow Marshall Density of the paving mixture with no individual test being less than 90% percent.

E11.5.7 Each layer must be levelled and accepted by the Contract Administrator before the succeeding layer may be placed.

E11.5.8 Additional excavation and placement of sub-base material beyond the identified pavement structure will be completed in accordance with CW 3110 as directed by the Contract Administrator.

MEASUREMENT AND PAYMENT

E11.6 Pavement Patching

E11.6.1 Pavement patching will be measured on an area basis and paid for at the Contract Unit Price per square metre for “Pavement Patching”. The area to be paid for will be the total number of square metres of pavement patched in accordance with this specification, accepted and measured by the Contract Administrator.

E12. SUPPLY AND INSTALLATION OF GEOGRID

DESCRIPTION

E12.1 General

E12.1.1 This specification covers the supply and installation of geogrid relating to surface works construction.

E12.1.2 Referenced Standard Construction Specifications

(a) CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.

(b) CW 3130 – Supply and Installation of Geotextile Fabrics.

MATERIALS

E12.2 Material Identification

E12.2.1 Geogrid is to be labelled in accordance with ASTM D4873, and must clearly show the manufacturer's product style number and unique roll number.

E12.3 Storage and Handling

E12.3.1 Protect geogrid at all times from contamination of dirt, dust, or any other deleterious materials.

E12.3.2 Protective coating is to remain on the geotextile fabric until installation.

E12.3.3 Store and handle in accordance with manufacturer's and/or supplier's recommendations.

E12.3.4 Protect geogrid from exposure to ultraviolet light during storage.

E12.4 Mill Certificate and Bill of Lading Data

E12.4.1 Provide Mill Certificate and Bill of Lading Data upon request by the Contract Administrator.

E12.5 Geogrid

E12.5.1 Geogrid will meet or exceed the following requirements:

Minimum Biaxial Geogrid Specification Requirements		
Geogrid Property	*ASTM Test Method*	*Minimum Requirement*
Mass per Unit Area (oz/yd^2)	D 5261	9.0
Aperture Size – Machine Direction (in.)	Direct Measure	1.0
Aperture Size – Cross-Machine Direction (in.)	Direct Measure	1.3
Wide Width Strip Tensile Strength (lb/ft)/%:		
• Strength at 5% Strain – Machine Direction		700
• Strength at 5% Strain – Cross-Machine Direction	D 6637	1,200
• Ultimate Strength – Machine Direction		1,200
• Ultimate Strength – Cross-Machine Direction		2,096
Manufacturing Process	----	Punched and Drawn

CONSTRUCTION METHODS

E12.6 Geogrid Installation

E12.6.1 Commence installation of geogrid after material has been approved by the Contract Administrator and the geotextile fabric has been placed in accordance with CW 3130.

E12.6.2 Geogrid shall be laid at the proper elevation and orientation as shown on the construction drawings or as directed by the Contract Administrator.

E12.6.3 Correct orientation (roll direction) of the geogrid shall be verified by the Contractor.

E12.6.4 Geogrid may be secured in place with staples, pins, sandbags, or backfill as required by fill properties, fill placement procedures, or weather conditions, or as directed by the Contract Administrator.

E12.6.5 Biaxial geogrid shall be overlapped a minimum of 150 mm along edges parallel to the direction of the reinforcement (parallel to roadway).

E12.6.6 Biaxial geogrid shall be overlapped a minimum of 450 mm along edges perpendicular to the direction of reinforcement (perpendicular to roadway), or as directed by the Contract Administrator.

E12.6.7 Backfill material shall be placed in accordance with CW 3110.

E12.6.8 Tracked construction equipment shall not be operated directly upon the geogrid. A minimum fill thickness of 150 mm is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

MEASUREMENT AND PAYMENT

E12.7 Geogrid

E12.7.1 Supply and installation of geogrid will be measured on an area basis and paid for at the Contract Unit Price per square metre for “Supply and Installation of Geogrid.” The area to be paid for will be the total number of square metres supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E12.7.2 Only material placed within the designated sub-grade limits will be included in the payment for “Supply and Installation of Geogrid.”

E12.7.3 No measurement or payment will be made for geotextile fabric removed and replaced due to improper installation or damaged materials.