



232-2010 ADDENDUM 2

**INKSTER BOULEVARD WIDENING AND REHABILITATION: PART 1 –
BROOKSIDE BOULEVARD TO KEEWATIN STREET, PART 2 – 430 M
WEST OF OAK POINT HIGHWAY TO BROOKSIDE BOULEVARD**

URGENT

**PLEASE FORWARD THIS DOCUMENT TO
WHOEVER IS IN POSSESSION OF THE BID
OPPORTUNITY**

ISSUED: May 6, 2010
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**THIS ADDENDUM SHALL BE INCORPORATED
INTO THE BID OPPORTUNITY AND SHALL
FORM A PART OF THE CONTRACT
DOCUMENTS**

Template Version: A20070419

Please note the following and attached changes, corrections, additions, deletions, information and/or instructions in connection with the Bid Opportunity, and be governed accordingly. Failure to acknowledge receipt of this Addendum in Paragraph 10 of Form A: Bid may render your Bid non-responsive.

PART E – SPECIFICATIONS

Replace: E38. Supply and Installation of Noise Barrier Walls with the attached specification.

APPENDIX A

Add: The attached test holes to Appendix A.

E38. SUPPLY AND INSTALLATION OF NOISE BARRIER WALLS

E38.1 Description

E38.1.1 General

- (a) This Specification covers the design, fabrication, and installation of precast concrete Noise Barrier Walls and associated pile foundations.
- (b) Prepare Detailed Design and Shop Drawings for the Noise Barrier Wall, including posts and panels, and piles. Detailed Design and Shop Drawings to be prepared and stamped by a Structural Engineer Registered in the Province of Manitoba.
- (c) Construct Noise Barrier Wall complete with cast-in-place piles and pre-cast posts and panels.
- (d) Salvage or demolish redundant backyard fences.
- (e) Construct short lengths of Infill Fences between existing fence lines and the Noise Barrier Wall, as required to maintain separation of yard spaces.
- (f) Restore damaged and undeveloped areas between the Noise Barrier Wall and right-of-way boundaries.
- (g) 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 thing necessary for and the incidental to the satisfactory performance and completion of all Works as hereinafter specified.

E38.1.2 Construction Drawings

- (a) Design and construction work shall be generally in accordance with the Construction Drawings for the Inkster Boulevard Noise Barrier Wall.

E38.1.3 Reference Standards

- (a) City of Winnipeg Standard Construction Specifications- latest revision.
- (b) Guide Specifications for Structural Design of Sound Barriers, 1989 included in Bridge Guide and Manual Interim Specifications – 1992, Published by the American Association of State Highway and Transportation Officials.
- (c) CAN/CSA-S6-06 Canadian Highway Bridge Design Code (for wind loading only).

E38.1.4 Schedule

- (a) Provide a bar chart Schedule of Work broken down to indicate the timing of the following components of the work:
 - (i) Completion of Detailed Design and Shop Drawings.
 - (ii) Removal of Existing Rear Yard/Side Yard Fences in areas affected by noise barrier wall construction, with immediate installation of Temporary Chain Link Fencing.
 - (iii) Construction of Piles and Supply and Installation of Pre-cast Posts.
 - (iv) Supply and Installation of Noise Barrier Wall Panels.
 - (v) Construction of Infill Fencing, including supply and installation of new material, as required, and removal of un-salvaged materials from existing rear yard fence.
 - (vi) Restoration of Rear Yards and Supply and installation of Topsoil and Sod, as required.

E38.2 Materials

E38.2.1 General

- (a) All materials supplied under this Specification shall be subject to inspection and approval by the Contract Administrator

- (b) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification

E38.2.2 Delivery Storage and Handling

- (a) Installer shall check all pre-cast noise barrier wall units upon delivery to ensure that proper material has been received.
- (b) Prevent excessive mud, concrete and similar materials from coming into contact with the pre-cast concrete units.
- (c) Protect materials from damage once on site: damaged materials including cracked, broken or chipped panels must not be used in the noise barrier wall.

E38.2.3 Pile and Pile Cap Concrete

- (a) General
 - (i) Concrete repair material shall be compatible with the concrete substrate.
- (b) The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this specification. Either ready mix concrete or proprietary repair mortars, where applicable, may be used having the following minimum properties in accordance with CSA A23.1-04:
 - (i) Class of Exposure: S-1
 - (ii) Compressive Strength @ 56 days = 35 MPa
 - (iii) Water / Cementing Materials Ratio = 0.4
 - (iv) Air Content: Category 2 per Table 4 of CSA A231-04 (4-7%)
- (c) Mix design for ready mix concrete shall be submitted to Contract Administrator at least two weeks prior to concrete placing operations.
- (d) The workability of each concrete mix shall be consistent with the Contractor's placement operations. Self compacting concrete may be used for pile foundations.
- (e) Any proposed proprietary repair mortar shall be subject to the approval of the Contract Administrator and must meet the properties of the ready mix concrete.
- (f) The temperature of all types of concrete shall be between 15°C and 25°C at discharge. Temperature requirements for concrete containing silica fume shall be between 10°C and 18°C at discharge unless otherwise approved by the Contract Administrator.
- (g) Concrete materials susceptible to frost damage shall be protected from freezing.

E38.2.4 Steel Reinforcement

- (a) All reinforcing bars shall be deformed billet steel conforming to CSA G30.18, Grade 400 W. Bars shall be branded by the manufacturer with bar size and grade of steel, and certified mill reports shall be submitted for record.
- (b) As per City of Winnipeg Standard Construction Specifications CW2160, latest revision.

E38.2.5 Pre-cast Concrete Posts

- (a) Height of posts above grade shall be as shown on the Construction Drawings. Patterns on posts shall match patterns on wall panels.
- (b) Pre-cast concrete post concrete shall: have minimum compressive strength of 35 MPa at 28 days, meet requirement for Class of Exposure C-1, meet air content Category 1, and have maximum aggregate size of 20 mm.
- (c) Supply 2 extra posts for typical wall panels and deliver them to the City Bridge Yard located at 849 Ravelston Avenue. Contact Mike Tereski, C.E.T. at 794-8510 to arrange suitable time and date. Provide timber blocking and equipment and personnel to offload onto the timber blocking at location directed by Mike Terleski.

- E38.2.6 Detailed Design and Shop Drawings
- (a) The profile on the Construction Drawings provides a guide to spacing and height of noise barrier wall posts.
- E38.2.7 Pre-cast Concrete Noise Barrier Wall Panels
- (a) Pre-cast concrete noise barrier wall panels shall be 686mm high. Thickness shall be determined by the Structural Engineer retained by the Contractor. Show cross-section of panels on Shop Drawings.
 - (b) Texture of panels to be as shown on the Construction Drawings. Colour of the panels and posts shall be Slate Grey or approved by the Contract Administrator. Orientate panels so that strongly textured faces are toward the roadway.
 - (c) Tables shown on Construction Drawing No. 1-55 provide guide for the number of noise barrier wall sections required. Each section requires at least 4 panels.
 - (d) Pre-cast concrete wall panel concrete shall: have minimum compressive strength of 35 MPa at 28 days, meet requirement for Class of Exposure C-1, meet air content Category 1, and have maximum aggregate size of 20 mm.
 - (e) Supply 8 extra wall panels for typical wall sections and deliver them to the City Bridge Yard located at 849 Ravelston Avenue. Contact Mike Tereski, C.E.T. at 794-8510 to arrange suitable time and date. Provide timber blocking and equipment and personnel to offload onto the timber blocking at location directed by Mike Terleski.
- E38.2.8 Shimming
- (a) Material used for shimming must be concrete which matches the concrete in the pile and/or pile cap.
- E38.2.9 Topsoil and Sod
- (a) As per City of Winnipeg Standard Construction Specification CW 3510.
- E38.2.10 Temporary Rear Yard Chain Link Fencing
- (a) Chain link fencing 1.8 metres high suitable to maintain yard security including preventing access by humans or animals.
- E38.2.11 Pile and Noise Barrier Wall Design
- (a) The Contractor shall be responsible for the detailed design of all elements on the Inkster Noise Barrier Wall, including size and depth of piles; cross-section of posts; thickness of stacking pre-cast concrete panels, and method of fastening. The piles shall extend a minimum of 6 metres into the ground and be reinforced full length to prevent frost jacking of the piles. Pre-cast concrete panels shall have a bearing length of at least 125 mm +/- 25 mm onto the top of the pile or pile cap. Pre-cast concrete panels shall be keyed into each other so no light can get through. Design calculations, stamped by a Professional Engineer registered in Manitoba, shall be submitted for review. The calculations shall clearly indicate all loadings used in the design and specify all materials to be used.
- E38.2.12 Shop Drawings
- (a) The Contractor shall submit Shop Drawings stamped by a Professional Engineer registered in Manitoba for all design elements to the Contract Administrator at least six weeks before start of noise barrier wall construction and/or pre-cast concrete element fabrication.
- E38.3 Construction
- E38.3.1 Noise Barrier Wall Pile Construction
- (a) Location and Alignment of Piles
 - (i) Contract Administrator will lay out the centreline of the noise barrier wall for its entire length. Contract Administrator will also provide vertical control to establish the top of pile elevation for each post.

- (ii) Pile construction shall not commence until the Contractor has obtained clearance from the appropriate Utility Authorities.
 - (iii) Piles shall be placed in the positions shown on the Drawings and the centre of piles must not be more than 75 mm off specified centre.
 - (iv) The deviation of the axis of any finished pile shall not differ by more than 1 percent from the vertical.
- (b) Buried Utilities
- (i) The Contractor shall exercise extreme caution when constructing the pile foundations in the vicinity of existing buried utilities and buildings. The Drawings show the approximate locations of existing buried utilities from the appropriate Utility Authorities prior to installing the piles.
 - (ii) The proposed locations of the pile foundations may be changed by the Contract Administrator if they interfere with the buried utilities.
 - (iii) The Contractor shall be responsible for all costs that may be incurred for repair/rectification of any damage caused to the existing buried utilities as a result of the Contractor's operations in constructing cast-in-place concrete piles, as determined by the Contract Administrator.
- (c) Excavation
- (i) The Contractor is responsible for determining the excavation method at each pile location.
 - (ii) Excavations for piles shall be made with equipment designed to remove a core of the diameter shown on the Design Drawing provided by the Contractor.
 - (iii) It may be necessary to hydro-jet excavate utilities adjacent to a pile location to adequately ascertain the location or provide enough "slack" in conduits to move them slightly to avoid interference with the pile locations. The contract Administrator may elect to alter the location of a pile if hydro-jet excavation shows that utilities cannot be avoided.
 - (iv) Upon reaching the required elevation, the bottom of the excavation shall be cleaned.
 - (v) All excavated material from the piles shall be promptly hauled away from the Site to an approved disposal area as located by the Contractor.
 - (vi) Upon completion of the cleaning out of the bottom to the satisfaction of the Contract Administrator, the reinforcement shall be set in place and the concrete poured immediately. Under no circumstances shall a hole be left to stand open after boring has been completed.
 - (vii) In locations where underground utilities have been exposed, the underground utilities shall be covered with clean sand to 300 mm above the utility.
- (d) Sleeving
- (i) Timber or steel sleeving shall be used to temporarily line the bore to prevent bulging or caving of the walls and to protect men at work in the bore.
 - (ii) The sleeving shall be designed by the Contractor and constructed to resist all forces that may tend to distort it.
 - (iii) The sleeving shall be withdrawn as the concrete is placed in the bore. The sleeving shall extend at least 1 m below the top of the freshly deposited concrete at all times.
 - (iv) The clearance between the face of the bore hole and the sleeving shall not exceed 75 mm.
- (e) Inspection of Bores
- (i) Concrete shall not be placed in a bore until the bore has been inspected and approved by the Contract Administrator.
 - (ii) The Contractor shall have available suitable light for the inspection of each bore throughout its entire length.

- (iii) All improperly set sleeving, bore, or bottom shall be corrected to the satisfaction of the Contract Administrator.
- (f) **Placing Reinforcing Steel**
 - (i) Reinforcement shall be:
 - Placed in accordance with the details shown on the Design Drawings provided by the Contractor;
 - Rigidly fastened together; and
 - Lowered into the bore intact before concrete is placed.
 - (ii) Spacers shall be utilized to properly locate the reinforcing steel cage in the bore.
- (g) **Forms**
 - (i) For bored piles, the top of the piles shall be formed with tubular forms (Sonotube) to a minimum depth of 1000 mm below final grade.
 - (ii) For “hydro-jet excavated” piles the top of the piles shall be formed with tubular forms (Sonotube) to a minimum depth of 1500 mm below final grade.
 - (iii) In locations of caving, the tubular form (Sonotube) should extend a minimum of 500 mm below where the shaft becomes uniform. The minimum depth of the tubular forms (Sonotube) shall be as specified by E38.3.1(g)(i) and E38.3.1(g)(ii).
 - (iv) The forms shall be sufficiently rigid to prevent lateral or vertical distortions from the loading environment to which they shall be subjected. Forms shall be set to the design grades, lines, and dimensions, as shown on the Drawings.
- (h) **Placing Concrete**
 - (i) Care shall be taken to ensure that precast posts are vertically aligned and are properly positioned prior to placement of concrete around the precast posts.
 - (ii) Concrete shall not have a free fall of more than 2.0 m and shall be placed so that the aggregates will not separate or segregate. The concrete shall be vibrated throughout the entire length of the pile.
 - (iii) Concrete shall be placed to the elevations as shown on the Drawings. The top surface of the pile shall be finished smooth and even with a hand float.
 - (iv) The shaft shall be free of water prior to placing of concrete. Concrete shall not be placed in or through water unless authorized by the contract Administrator. In the event that tremie concrete is allowed by the Contract Administrator, the concrete shall be placed as specified herein.
- (i) **Tremie Concrete**
 - (i) The shaft of the pile shall be pumped clear of water so that the bottom can be cleaned. Pumping shall then be stopped and water shall be allowed to come into the bore until a state of equilibrium is reached. Concrete shall then be placed by means of a tremie pipe. The tremie pipe shall have a suitable gate in the bottom to prevent water from entering the pipe. The bottom of the pipe shall be maintained below the surface of the freshly placed concrete. The pipe shall be capable of being raised or lowered quickly in order to control the flow of concrete.
 - (ii) Tremie concrete shall be poured up to a depth of 600 mm or as the Contract Administrator directs. Pumps shall then be lowered into the bore and the excess water pumped out. The laitance that forms on top of the tremie shall then be removed and the remainder of the concrete shall be placed in the dry bore.
- (j) **Protection of Newly Placed Concrete**
 - (i) Newly laid concrete threatened with damage by rain, snow, fog, or mist shall be protected with a tarpaulin or other approved means.

- (k) Curing Concrete
 - (i) The top of the freshly finished concrete piles shall be covered and kept moist by means of wet polyester blankets immediately following finishing operations and shall be maintained at above 10°C for at least seven (7) consecutive days thereafter.
 - (ii) After the finishing is completed, the surface shall be promptly covered with a minimum of a single layer of clean, damp polyester blanket.
 - (iii) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping or running water, vibration, and mechanical shock. Concrete shall be protected from freezing until at least twenty-four (24) hours after the end of the curing period.
 - (iv) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3°C in one hour or 20°C in twenty-four (24) hours.
- (l) Form Removal
 - (i) Forms shall not be removed for a period of at least twenty-four (24) hours after the concrete has been placed. Removal of forms shall be done in a manner to avoid damage to, or spalling of, the concrete.
 - (ii) The minimum strength of concrete in place for safe removal of forms shall be 20 MPa.
 - (iii) Field-cured test specimens, representative of the in-place concrete being stripped, will be tested to verify the concrete strength.
- (m) Patching of Formed Surfaces
 - (i) Immediately after forms around top of pile have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair of surface finishing started before this inspection may be rejected and required to be removed.
 - (ii) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back fifty (50) mm from the surface before patching.
 - (iii) Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, and voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement shall be well-brushed onto the area to be patched. When the slurry grout begins to lose the water sheen, the patching mortar shall be applied. It shall be struck-off slightly higher than the surface and left for one hour before final finishing to permit initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.
- (n) Cold Weather Concreting
 - (i) Protection of concrete shall be considered incidental to its placement. The temperature of the concrete shall be maintained at or above 10°C for a minimum of three (3) days or until the concrete has reach a minimum compressive strength of 20 MPa, by whatever means are necessary. Concrete damaged as a result of inadequate protection against weather conditions shall be removed and replaced by the Contractor at his own expense. Also, concrete allowed to freeze prior to the three (3) days will not be accepted for payment.

E38.3.2 Noise Barrier Wall Post and Panel Construction

- (a) Pre-cast posts shall be embedded in the cast-in-place piles and/or pile caps. Pre-cast posts shall be placed inside and be at least 25 mm clear of the reinforcing cage of the piles and pile caps. Length of post embedment shall be shown on the Shop Drawings.

- (b) Typically the top of the noise barrier wall will be 2.743 metres above finished grade.
- (c) The height of each post will typically be 50mm above the top of the top panel in each wall section. Where there is a downward slope the height of the post above the downward panels may be up to 180mm. In some cases, additional panels may be required to adjust for significant grade change.
- (d) For minor grade changes between posts (up to 180mm) set the bottom panel flush with the higher post finish grade elevation.
- (e) For major grade changes between posts (greater than 180mm) and particularly where an additional panel may be required to achieve a normal fence height (top of panels) of 2.743 metres, set the bottom panel flush with the lower post's finish grade elevation. Excavate between posts to accommodate the lower panel.
- (f) Shim panels as required to maintain true horizontal.
- (g) Guarantee
 - (i) Before final acceptance of the noise barrier walls by the Contract Administrator, the noise barrier wall supplier (fabricator) shall provide the City with a written guarantee stating that it will perform satisfactorily for a period of five (5) years from the issuance of Total Performance. A representative of the noise barrier wall supplier shall inspect the noise barrier wall installation on site to ensure that it has been properly installed. The supplier shall state that they have reviewed the installation procedures and find them in accordance with their recommendations. The supplier shall guarantee the replacement of the pre-cast concrete posts and pre-cast wall panels at his costs in the event the noise barrier wall pre-cast concrete posts and/or pre-cast wall panels do not perform satisfactorily. The Contractor shall ensure that the noise barrier wall is installed in such a manner that will not void the fabricator's guarantee.

E38.3.3 Side Yard Fence Infill Construction Including Salvage and Removal of Existing Rear Yard Fences

- (a) Remove rear yard fences located within 1.5 metres and parallel to the noise barrier wall. Remove/salvage material from rear yard fences and from any side yard fencing that impedes noise barrier wall construction, and use salvaged materials in the construction of infill fencing between the ends of the existing side yard fencing to remain and the noise barrier wall.
- (b) Attach/about infill fence sections to the noise wall as shown in typical detail in the Detailed Design and Shop Drawings.
- (c) Remove excess rear yard fence materials unless otherwise requested by the homeowner. Obtain written confirmation from the homeowner regarding the disposition of such materials if they are to remain.
- (d) Provide new fence posts and new boards as required to complete the infill fencing, matching the existing fencing. Do not reuse rotten or damaged fence components.
- (e) Paint or stain the new fence sections to match existing fencing as required.

E38.3.4 Temporary Rear Yard Chain Link Fence

- (a) Supply and install 1.8 m high temporary chain link fencing to complete enclosure of rear yards immediately following removal of existing rear yard fencing. For each yard the temporary chain link fencing shall remain in place until infill fencing has been completed so as to maintain rear yard enclosure.

E38.3.5 Rear Yard Restoration and Landscaping

- (a) Restore all rear yard areas damaged by noise barrier wall and related construction, including removal and restoration of rear yard/side yard fencing.
- (b) Adjust grades in areas being restored to create a gentle slope to the bottom of the noise barrier wall panels. No gaps between the finished grade and the bottom of the noise barrier wall will be allowed.

- (c) Restore damaged areas to condition equal to previous, including supply and installation of topsoil, sod, trees, shrubs, flowers or other landscape materials to replace materials removed or damaged, and fine grading . Where damage caused by noise barrier wall construction is light, prune damaged limbs or branches on trees and shrubs. Prune plants in accordance with City of Winnipeg Specifications for Tree and Shrub Plantings.

E38.4 Method of Measurement

E38.4.1 Noise Barrier Wall Posts and Panels Complete with Pile Foundations

- (a) Supply and installation of noise barrier wall including posts and panels, and cast-in-place pile foundations, will be measured on a lineal metre basis.

E38.4.2 Temporary and Infill Fence

- (a) Supply and installation of temporary chain link fence and infill fences, the latter using both salvaged and new components, will be included in the unit price per lineal metre for supply and installation of noise barrier wall complete with pile foundations, which price shall also include removal of demolished fence or cleanup of salvaged components as required.

E38.4.3 Additional Landscaping in Rear Yards

- (a) Restoration of rear yard areas, including supply and installation of all landscaping materials required to complete restoration equal to the prior condition, will be paid for on a lump sum basis and no measurement will be taken for this work.

E38.4.4 Sodding

- (a) As per CW 3510.

E38.5 Basis of Payment

E38.5.1 Noise Barrier Wall Posts and Panels Complete with Pile Foundations

- (a) Payment for "Noise Barrier Wall Posts and Panels Complete with Pile Foundations" will be based on the number of linear metres of noise barrier wall installed in accordance with this specification, as measured by the Contract Administrator.

E38.5.2 Temporary Chain Link Fence and Infill Fence

- (a) Temporary Chain Link Fence and Infill Fence, including salvaged or new infill fence, will be included in the unit price for "Noise Barrier Wall Posts and Panels Complete with Pile Foundations".

E38.5.3 Additional Landscaping in Rear Yards

- (a) Additional Landscaping in Rear Yards will be paid for at the Contract Lump Sum Price for "Additional Landscaping in Rear Yards", measured as specified herein, which price will be payment in full for performing all operations herein described and all other items incidental to the Work.

E38.5.4 Sodding

E38.5.5 As per CW 3510.