



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 136-2005

**PROVINCE OF MANITOBA, CITY OF WINNIPEG, 2005 RESIDENTIAL STREET
RENEWAL PROGRAM: PART 1 – CLIFTON STREET AND HARRIS BOULEVARD
AND VARIOUS OTHER LOCATIONS, PART 2 – AGNES STREET AND INGLEWOOD
STREET**

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PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

- B1.1 PROVINCE OF MANITOBA, CITY OF WINNIPEG, 2005 RESIDENTIAL STREET RENEWAL PROGRAM: PART 1 – CLIFTON STREET AND HARRIS BOULEVARD AND VARIOUS OTHER LOCATIONS, PART 2 – AGNES STREET AND INGLEWOOD STREET

B2. SUBMISSION DEADLINE

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, May 13, 2005.

Bid Submissions determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.

- B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. ENQUIRIES

- B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

- B3.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

- B3.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.

- B3.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

- B3.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B4. ADDENDA

- B4.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.

- B4.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

- B4.2.1 Addenda will be available at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

- B4.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet website for addenda shortly before submitting his Bid.

- B4.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B5. SUBSTITUTES

- B5.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B5.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B5.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B5.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B5.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B5.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.
- B5.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.
- B5.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B5.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative shall base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B14.
- B5.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B6. BID SUBMISSION

- B6.1 The Bid Submission consists of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices, hard copy;
 - (c) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft;
- B6.2 All components of the Bid Submission shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely in ink, to constitute a responsive Bid.
- B6.3 The Bid Submission shall be submitted enclosed and sealed in an envelope. The envelope shall be clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B6.3.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid Submission.
- B6.3.2 A hard copy of Form B: Prices must be submitted with the Bid Submission. If there is any discrepancy between the Adobe PDF version of Form B: Prices and the Microsoft Excel version of Form B: Prices, the PDF version shall take precedence.
- B6.4 Bid Submissions submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B6.5 Bid Submissions shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Branch
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B7. BID

- B7.1 The Bidder shall complete Form A: Bid, making all required entries.
- B7.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B7.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B7.2.
- B7.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

- B7.4 Paragraph 12 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, shall be affixed;
 - (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B7.4.1 The name and official capacity of all individuals signing Form A: Bid shall be printed below such signatures.
- B7.4.2 All signatures shall be original and shall be witnessed except where a corporate seal has been affixed.
- B7.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid Submission and the Contract, when awarded, shall be both joint and several.

B8. PRICES

- B8.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B8.1.1 For the convenience of Bidders, and pursuant to B6.3.2 and B14.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Bid Opportunity on the Bid Opportunities page at the Materials Management Branch internet website at <http://www.winnipeg.ca/matmgt>.
- B8.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B8.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.
- B8.4 Form B: Prices is organized into Parts: Part 1 of the Work and Part 2 of the Work. Bidders shall provide a total price for each Part and, on the summary sheet, a Total Bid Price consisting of the sum of prices for Part 1 and Part 2.

B9. QUALIFICATION

- B9.1 The Bidder shall:
- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;
 - (b) be responsible and not be suspended, debarred or in default of any obligation to the City;
 - (c) be financially capable of carrying out the terms of the Contract;
 - (d) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract;
 - (e) have successfully carried out work, similar in nature, scope and value to the Work; and

- (f) employ only Subcontractors who:
 - (i) are responsible and not suspended, debarred or in default of any obligation to the City (a list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>); and
 - (ii) have successfully carried out work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of performing the Work required to be done in accordance with the terms of the Contract;
- (g) have a written workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba);

B9.2 Further to B9.1(g), the Bidder shall, within three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) a valid COR certification number under the Certificate of Recognition (COR) Program - Option 1 administered by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
- (b) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association; or
- (c) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.)

B9.3 The Bidder shall be prepared to submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B9.4 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B10. BID SECURITY

B10.1 The Bidder shall provide bid security in the form of:

- (a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or
- (b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or
- (c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

B10.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

B10.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B10.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B10.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B10.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B10.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

B10.4 The City will not pay interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B11. OPENING OF BIDS AND RELEASE OF INFORMATION

B11.1 Bid Submissions will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Branch, or in such other office as may be designated by the Manager of Materials.

B11.1.1 Bidders or their representatives may attend.

B11.1.2 Bid Submissions determined by the Manager of Materials, or his designate, to not include the bid security specified in B10 will not be read out.

B11.2 After the public opening, the names of the Bidders and their Total Bid Prices as read out (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B11.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B11.4 The Bidder is advised that any information contained in any Bid Submission may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B12. IRREVOCABLE BID

B12.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B12.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B13. WITHDRAWAL OF BIDS

- B13.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B13.1.1 Notwithstanding GC:23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B13.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B13.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials shall:
- (a) retain the Bid Submission until after the Submission Deadline has elapsed;
 - (b) open the Bid Submission to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B13.1.3(b), declare the Bid withdrawn.
- B13.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B12.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B14. EVALUATION OF BIDS

- B14.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B9 (pass/fail);
 - (c) Total Bid Price;
 - (d) economic analysis of any approved alternative pursuant to B5.
- B14.2 Further to B14.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements if the interests of the City so require.
- B14.2.1 Any bid with an apparent imbalance between the unit prices in Part 1 and Part 2 may be determined to be non-responsive and rejected by the Award Authority in its sole discretion, acting reasonably.
- B14.3 Further to B14.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid Submission or in other information required to be submitted, that he is responsible and qualified.
- B14.4 Further to B14.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.
- B14.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each

item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.

- B14.4.2 The electronic Form B: Prices and the formulas imbedded in that spreadsheet are only provided for the convenience of Bidders. The City makes no representations or warranties as to the correctness of the imbedded formulas. It is the Bidder's responsibility to ensure the extensions of the unit prices and the sum of Total Bid Price performed as a function of the formulas within the electronic Form B: Prices are correct.

B15. AWARD OF CONTRACT

- B15.1 The City will give notice of the award of the Contract by way of a letter of intent, or will give notice that no award will be made.
- B15.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.
- B15.2.1 Without limiting the generality of B15.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Bid is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B15.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid.
- B15.4 As noted in D2 and identified in Form B: Prices, the Work of Part 2 will be contingent upon the Province approving funding for the Work. If sufficient funding for Part 2 Work is not approved by the Province the City shall have the right to eliminate all or any portion of Part 2 Work in accordance with D2.
- B15.5 The City intends to award this Contract by June 6, 2005.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

- C1.1 The General Conditions for Construction Contracts (Revision 2000 11 09) are applicable to the Work of the Contract.
- C1.2 The *General Conditions for Construction Contracts* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

- D1.1 In addition to the General Conditions for Construction Contracts, these Supplemental Conditions are applicable to the Work of the Contract.
- D1.2 The General Conditions are amended by striking out "The City of Winnipeg Act" wherever it appears in the General Conditions and substituting "The City of Winnipeg Charter".
- D1.3 The General Conditions are amended by striking out "Tender Package" wherever it appears in the General Conditions and substituting "Bid Opportunity".
- D1.4 The General Conditions are amended by striking out "Tender Submission" wherever it appears in the General Conditions and substituting "Bid Submission".
- D1.5 The General Conditions are amended by deleting GC:6.16 and GC:6.17. The City of Winnipeg is now within the jurisdiction of the Manitoba Ombudsman pursuant to The Ombudsman Act.

D2. SCOPE OF WORK

- D2.1 The Work to be done under the Contract shall consist of two parts:

Part 1 – City Funded Work

- D2.2 Part 1 – City Funded Work shall consist of:
- (a) Pavement Reconstruction:
 - (i) Clifton Street: Ellice Avenue to Sargent Avenue (Concrete)
 - (ii) Harris Boulevard: Portage Avenue to Emo Avenue (Concrete)
 - (b) Pavement Rehabilitation:
 - (i) Clifton Street Bays: Ellice Avenue to Sargent Avenue
 - (c) Construction of 100 mm Concrete Sidewalk
 - (i) River Road: Parkville Drive to St. Vital Road
 - (d) Sewer Repairs:
 - (i) Agnes Street: - First Manhole South to Manhole at Ellice Avenue
- Second Manhole South of Ellice Avenue to Third Manhole South of Ellice Avenue
 - (ii) Harris Boulevard: - First Manhole North of Armour Crescent
- South Leg to Second Manhole North of Armour Crescent or South Leg
 - (iii) Inglewood Street: - Second Manhole South of Bruce Avenue to First Manhole South of Bruce Avenue

Part 2 – Provincially Funded Work

- D2.3 Part 2 – Provincially Funded Work shall consist of:
- (a) Pavement Rehabilitation:
 - (i) Agnes Street: Ellice Avenue to St. Matthews Avenue
 - (ii) Inglewood Street: Portage Avenue to Bruce Avenue

- D2.4 Bidders are advised that the City currently has no approved funding in the Capital Budget for Part 2 of the Work, but is anticipating receiving notification about funding from the Province of Manitoba by late May. Part 2 of the Work is contingent upon the Province approving sufficient funding.
- D2.4.1 Further to GC:7.1, if notice of sufficient funding is not received, the City shall have the right to eliminate all or any portion of Part 2, and the Contract Price will be reduced accordingly.
- D2.4.2 Further to GC:7.5, GC:7.5.1, and GC:7.6, a reduction in the Contract Price pursuant to D2.4.1 shall not be considered in calculating the aggregate reduction in the Contract Price for purposes of GC:7.5.
- D2.4.3 If all or any portion of Part 2 is eliminated pursuant to D2.4.1, the time periods stipulated in D19 for Substantial Performance of the Work and in D20 for Total Performance of the Work will be reduced proportionally by the Contract Administrator acting reasonably.
- D2.5 The major components of the Work are as follows:
- (a) Pavement Reconstruction
 - (i) Remove existing pavement
 - (ii) Excavation
 - (iii) Installation of subdrains
 - (iv) Compaction of existing sub-grade
 - (v) Installation of catchpits and connection pipe
 - (vi) Placement of separation/reinforcement fabric
 - (vii) Placement of sub-base and base course materials
 - (viii) Construct 150 mm concrete pavement (reinforced) (Clifton Street and Harris Boulevard)
 - (ix) Adjustment of existing manholes
 - (x) Construct 150 mm barrier curb (separate) (Clifton Street and Harris Boulevard), utilizing slip form paving equipment
 - (xi) Renewal of existing sidewalk (Clifton Street)
 - (xii) Boulevard restoration
 - (b) Pavement Rehabilitation
 - (i) Planing of existing asphalt pavement
 - (ii) Installation of catchbasins and catchpits
 - (iii) Complete pavement patching
 - (iv) Renewal of existing curb, 125 mm average height, utilizing slip-form paving equipment
 - (v) Complete curb renewal at intersections
 - (vi) Renewal of existing sidewalk
 - (vii) Adjustment of catchbasins and manholes
 - (viii) Placement of asphalt overlay (average thickness – 85 mm)
 - (ix) Boulevard restoration
 - (c) Construction of 100 mm Concrete Sidewalk
 - (i) Excavation
 - (ii) Construction of 100 mm Concrete Sidewalk
 - (iii) Miscellaneous Barrier Curb Renewal
 - (iv) Boulevard restoration

- (d) Sewer Repairs
 - (i) Repair of combined sewers by open trench methods at specified locations
 - (ii) Reconnection of sewer services within repair limits

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is Earth Tech (Canada) Inc., represented by:

Mr. Todd G. Smith, P. Eng.
Manager, Transportation
850 Pembina Highway, Winnipeg, Manitoba R3M 2M7
Telephone No. (204) 477-5381
Facsimile No. (204) 478-7856

D3.2 At the pre-construction meeting, Mr. Todd G. Smith, P. Eng. will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D4. CONTRACTOR'S SUPERVISOR

D4.1 At the pre-construction meeting, the Contractor shall identify his designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D4.2 At least two (2) business days prior to the commencement of any Work on the site, the Contractor shall provide the Contract Administrator with a phone number where the supervisor identified in D4.1 or an alternate can be contacted 24 hours a day to respond to an emergency.

D5. NOTICES

D5.1 Except as provided for in GC:23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

D5.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D5.3, D5.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D3.1.

D5.3 All notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg
Chief Administrative Officer Secretariat
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174

- D5.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:

The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1
Facsimile No.: (204) 947-9155

D6. FURNISHING OF DOCUMENTS

- D6.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him at cost.

SUBMISSIONS

D7. SAFE WORK PLAN

- D7.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.
- D7.2 The Safe Work Plan shall be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

D8. INSURANCE

- D8.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) all inclusive, with The City of Winnipeg being named as an additional insured, with a cross-liability clause, such liability policy to also contain a contractual liability, an unlicensed motor vehicle liability and a completed operations endorsement to remain in place at all times during the performance of the Work and throughout the warranty period;
 - (b) automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;
- D8.2 Deductibles shall be borne by the Contractor.
- D8.3 The Contractor shall provide the City Solicitor with a certified true copy or a certificate of insurance of each policy, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the GC:4.1 for the return of the executed Contract.
- D8.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

D9. PERFORMANCE SECURITY

- D9.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:
- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
 - (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
 - (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.
- D9.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.
- D9.2 If the bid security provided in his Bid Submission was not a certified cheque or draft pursuant to B10.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site and in no event later than the date specified in the GC:4.1 for the return of the executed Contract.

D10. SUBCONTRACTOR LIST

- D10.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at or prior to a pre-construction meeting, or at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the GC:4.1 for the return of the executed Contract.

D11. DETAILED WORK SCHEDULE

- D11.1 The Contractor shall provide the Contract Administrator with a detailed work schedule (Form L: Detailed Work Schedule) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract.
- D11.2 If, prior to submitting the Detailed Work Schedule, the Contractor does not receive notification pursuant to D13.4 that all or some portion of Part 2 of the Work may be commenced, he shall complete Form L: Detailed Work Schedule for only Part 1 of the Work assuming that, if all of Part 2 is eliminated, the time periods stipulated in D19 for Substantial Performance of the Work and in D20 for Total Performance of the Work will be reduced by fifteen (15) Working Days.
- D11.3 If, after submitting the Detailed Work Schedule, the Contractor receives notification that all or any portion of Part 2 of the Work may be commenced, he shall submit a revised Detailed Work Schedule no later than two (2) Business Days from receipt of the notification.

D12. SECURITY CLEARANCE

- D12.1 Each individual proposed to perform Work under the Contract shall be required to obtain a Criminal Record Search Certificate from the police service having jurisdiction at his place of residence.

- D12.2 Prior to the commencement of any Work, and during the term of the Contract if additional or replacement individuals are proposed to perform Work, the Contractor shall supply the Contract Administrator with a Criminal Record Search Certificate obtained not earlier than one (1) year prior to the Submission Deadline, or a certified true copy thereof, for each individual proposed to perform Work within City facilities or on private property.
- D12.3 Any individual for whom a Criminal Record Search Certificate is not provided, or for whom a Criminal Record Search Certificate indicates any convictions or pending charges related to property offences or crimes against another person, will not be permitted to perform any Work within City facilities or on private property.
- D12.4 Any Criminal Record Search Certificate obtained thereby will be deemed valid for the duration of the Contract subject to a repeated records search as hereinafter specified.
- D12.5 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated criminal records search. Any individual who fails to provide a satisfactory Criminal Record Search Certificate as a result of a repeated criminal records search will not be permitted to continue to perform Work under the Contract within City facilities or on private property.

SCHEDULE OF WORK

D13. COMMENCEMENT

- D13.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.
- D13.2 The Contractor shall not commence any Work on the Site until:
- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence that the Contractor is in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;
 - (ii) evidence of the workers compensation coverage specified in GC:6.14;
 - (iii) the twenty-four (24) hour emergency response phone number specified in D4.2.
 - (iv) evidence of the insurance specified in D8;
 - (v) the performance security specified in D9;
 - (vi) the subcontractor list specified in D10; and
 - (vii) the detailed work schedule specified in D11.
 - (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.
- D13.3 The Contractor shall not commence the Work on the Site before June 20, 2005, and shall commence the Work on Site no later than June 27, 2005, as directed by the Contract Administrator.
- D13.4 The Contractor shall not commence Part 2 of the Work as described in D2 and identified in Form B: Prices, unless prior to July 31, 2005, he has received notification from the Contract Administrator that the City has received notice of sufficient funding from the Province.

D14. WORKING DAYS

D14.1 Further to GC:1.1(gg);

D14.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record his assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he agrees with the Contract Administrator's determination of the Working Days assessed for the report period.

D14.1.2 Work done to restore the Site to a condition suitable for Work, shall not be considered "work" as defined in the definition of a Working Day.

D14.1.3 When the Work includes two or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types of Work in determining whether the Contractor was able to work in assessing Working Days.

D15. RESTRICTED WORK HOURS

D15.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission 48 hours in advance from the Contract Administrator for any work to be performed between 2000 hours and 0700 hours, or on Saturdays, Sundays, Statutory Holidays and or Civic Holidays.

D16. WORK BY OTHERS

D16.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) Manitoba Hydro – Lowering and/or rock wrapping of existing gas services due to inadequate cover or affected by the proposed works on Clifton Avenue and Harris Boulevard;
- (b) Manitoba Hydro – Replacement of street light cable on Clifton Street and Harris Boulevard;
- (c) City of Winnipeg, Traffic Signals Department – Installation of new traffic signals at the intersection of Clifton Street and Sargent Avenue.

D17. SEQUENCE OF WORK

D17.1 Further to GC 6.1, the sequence of work shall comply with the following:

D17.1.1 Providing that the Work on each street is completed in a similar order to the order that the Work was commenced in, the Contractor will be permitted to have a maximum of three (3) streets under construction at any one time. Completion of a street means that all of the necessary concrete, asphalt including approaches and landscaping Work is completed to the satisfaction of the Contract Administrator.

D17.1.2 Where the Contractor utilizes two (2) or more crews that work independently on the same major component of the Work as identified in D2, the Contract Administrator may approve an increase to the maximum number of streets under construction at any time.

D17.1.3 Placing the topsoil and finished grading of all boulevard and median areas shall be completed prior to commencing construction of asphaltic concrete overlays, including scratch courses.

D18. CRITICAL STAGES

D18.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

(a) Stage 1 Works

- (i) Pavement removal and excavation shall commence at the south limit and construction traffic shall be limited to Harris Boulevard. Upon completion of pavement removal, excavation, placement of base materials to Station 2+60, the underground works and the placement of 72 hour concrete pavement shall be placed including the approaches to Emo Street and Armour Crescent. This pavement removal, placement of base materials and placement of concrete pavement shall be scheduled to accommodate vehicular traffic on Harris Boulevard and the pickup of refuse and recycling disposal on Armour Crescent. Upon completion of the concrete pavement works, the concrete barrier curb and private approaches shall be completed and vehicular access shall be restored.

(b) Stage 2 Works

- (i) Pavement removal and excavation from Station 2+60 to the north limit will be permitted upon commencement of Stage 1 Concrete Works. The Contractor shall place and compact base materials immediately following pavement removal and excavation to accommodate traffic in accordance with Specification E6.1.1 (b). All construction traffic shall be limited to Harris Boulevard during Stage 2 Works.

D19. SUBSTANTIAL PERFORMANCE

D19.1 The Contractor shall achieve Substantial Performance within fifty (50) consecutive Working Days of the commencement of the Work as specified in D13.

D19.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D19.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D20. TOTAL PERFORMANCE

D20.1 The Contractor shall achieve Total Performance within fifty-five (55) consecutive Working Days of the commencement of the Work as specified in D13.

D20.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D20.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D21. LIQUIDATED DAMAGES

- D21.1 If the Contractor fails to achieve Substantial Performance in accordance with the Contract by the day fixed herein for Substantial Performance, the Contractor shall pay the City eighteen hundred dollars (\$1,800) per Working Day for each and every Working Day following the day fixed herein for Substantial Performance during which such failure continues.
- D21.2 The amount specified for liquidated damages in D21.1 is based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance by the day fixed herein for same.
- D21.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D22. SCHEDULED MAINTENANCE

- D22.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:
- (a) Reflection Crack Maintenance on Agnes Street, Inglewood Street and Clifton Bays during one year warranty period and two year warranty period on Clifton Street and Harris Boulevard as specified in CW 3250-R6;
 - (b) Maintenance of sodded areas as specified in CW 3510-R8.
- D22.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

CONTROL OF WORK

D23. JOB MEETINGS

- D23.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.
- D23.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D24. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

- D24.1 Further to GC:6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

WARRANTY

D25. WARRANTY

- D25.1 Notwithstanding GC:13.2, the warranty period shall begin on the date of Total Performance and shall expire one (1) year thereafter for asphalt resurfacing works and combined sewer repairs, and two (2) years thereafter for pavement reconstruction works, unless extended pursuant to GC:13.2.1 or GC:13.2.2, in which case it shall expire when provided for thereunder.

FORM H1: PERFORMANCE BOND
(See D9)

KNOW ALL MEN BY THESE PRESENTS THAT

_____ ,
(hereinafter called the "Principal"), and

_____ ,
(hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter
called the "Obligee"), in the sum of

_____ dollars (\$_____)

of lawful money of Canada to be paid to the Obligee, or its successors or assigns, for the payment of which
sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and
assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee dated the

_____ day of _____, 20____, for:

BID OPPORTUNITY NO. 136-2005

PROVINCE OF MANITOBA, CITY OF WINNIPEG, 2005 RESIDENTIAL STREET RENEWAL PROGRAM:
PART 1 – CLIFTON STREET AND HARRIS BOULEVARD AND VARIOUS OTHER LOCATIONS, PART 2
– AGNES STREET AND INGLEWOOD STREET

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall:

- (a) carry out and perform the Contract and every part thereof in the manner and within the times set forth in the Contract and in accordance with the terms and conditions specified in the Contract;
- (b) perform the Work in a good, proper, workmanlike manner;
- (c) make all the payments whether to the Obligee or to others as therein provided;
- (d) in every other respect comply with the conditions and perform the covenants contained in the Contract; and
- (e) indemnify and save harmless the Obligee against and from all loss, costs, damages, claims, and demands of every description as set forth in the Contract, and from all penalties, assessments, claims, actions for loss, damages or compensation whether arising under "The Workers Compensation Act", or any other Act or otherwise arising out of or in any way connected with the performance or non-performance of the Contract or any part thereof during the term of the Contract and the warranty period provided for therein;

THEN THIS OBLIGATION SHALL BE VOID, but otherwise shall remain in full force and effect. The Surety shall not, however, be liable for a greater sum than the sum specified above.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal, and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

IN WITNESS WHEREOF the Principal and Surety have signed and sealed this bond the

_____ day of _____, 20____ .

SIGNED AND SEALED
in the presence of:

(Witness)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

By: _____ (Seal)
(Attorney-in-Fact)

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)
(See D9)**

(Date)

The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

RE: PERFORMANCE SECURITY – BID OPPORTUNITY NO. 136-2005

PROVINCE OF MANITOBA, CITY OF WINNIPEG, 2005 RESIDENTIAL STREET RENEWAL PROGRAM:
PART 1 – CLIFTON STREET AND HARRIS BOULEVARD AND VARIOUS OTHER LOCATIONS, PART 2
– AGNES STREET AND INGLEWOOD STREET

Pursuant to the request of and for the account of our customer,

(Name of Contractor)

(Address of Contractor)

WE HEREBY ESTABLISH in your favour our irrevocable Standby Letter of Credit for a sum not exceeding
in the aggregate

Canadian dollars.

This Standby Letter of Credit may be drawn on by you at any time and from time to time upon written demand for payment made upon us by you. It is understood that we are obligated under this Standby Letter of Credit for the payment of monies only and we hereby agree that we shall honour your demand for payment without inquiring whether you have a right as between yourself and our customer to make such demand and without recognizing any claim of our customer or objection by the customer to payment by us.

The amount of this Standby Letter of Credit may be reduced from time to time only by amounts drawn upon it by you or by formal notice in writing given to us by you if you desire such reduction or are willing that it be made.

Partial drawings are permitted.

We engage with you that all demands for payment made within the terms and currency of this Standby Letter of Credit will be duly honoured if presented to us at:

(Address)

and we confirm and hereby undertake to ensure that all demands for payment will be duly honoured by us.

All demands for payment shall specifically state that they are drawn under this Standby Letter of Credit.

Subject to the condition hereinafter set forth, this Standby Letter of Credit will expire on

June 12, 2005

(Date)

It is a condition of this Standby Letter of Credit that it shall be deemed to be automatically extended from year to year without amendment from the present or any future expiry date, unless at least 30 days prior to the present or any future expiry date, we notify you in writing that we elect not to consider this Standby Letter of Credit to be renewable for any additional period.

This Standby Letter of Credit may not be revoked or amended without your prior written approval.

This credit is subject to the Uniform Customs and Practice for Documentary Credit (1993 Revision), International Chamber of Commerce Publication Number 500.

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
(See D10)

PROVINCE OF MANITOBA, CITY OF WINNIPEG, 2005 RESIDENTIAL STREET RENEWAL PROGRAM: PART 1 – CLIFTON STREET AND HARRIS BOULEVARD AND VARIOUS OTHER LOCATIONS, PART 2 – AGNES STREET AND INGLEWOOD STREET

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
SURFACE WORKS:		
<u>Supply of Materials:</u>		
Concrete		
Asphalt		
Base Course and Sub-Base		
Sod		
<u>Installation/Placement:</u>		
Concrete		
Asphalt		
Base		
Planing		
Pavement Removal		
Expansion		
Sod		
UNDERGROUND WORKS:		
<u>Supply of Materials:</u>		
Pipe		
Subdrains		
Catchbasins		
Catchpits		
Manholes		
Frames and Covers		
<u>Installation/Placement:</u>		
Pipe		
OTHERS:		

FORM L: DETAILED WORK SCHEDULE
 (See D11)

**PROVINCE OF MANITOBA, CITY OF WINNIPEG, 2005 RESIDENTIAL STREET RENEWAL
 PROGRAM: PART 1 – CLIFTON STREET AND HARRIS BOULEVARD AND VARIOUS OTHER
 LOCATIONS, PART 2 – AGNES STREET AND INGLEWOOD STREET**

For each item of Work, indicate the cumulative percentage proposed to be completed by the end of each time period until 100% completion is achieved.					
Items of Work	Time Period in Working Days				
	0 – 10	10 – 20	20 – 30	30 – 40	40 - 50
PART 1 – CITY FUNDED WORK					
a) Pavement Reconstruction:					
i) Clifton Street: Ellice Avenue to Sargent Avenue (Concrete)					
ii) Harris Boulevard: Portage Avenue to Emo Avenue (Concrete)					
b) Pavement Rehabilitation:					
i) Clifton Street Bays: Ellice Avenue to Sargent Avenue					
c) Construction of 100 mm Concrete Sidewalk					
i) River Road: Parkville Drive to St. Vital Road					
d) Sewer Repairs:					
i) Agnes Street					
ii) Harris Boulevard					
iii) Inglewood Street					
PART 2 – PROVINCIALY FUNDED WORK					
(a) Pavement Rehabilitation					
i) Agnes Street: Ellice Avenue to St. Matthews Avenue					
ii) Inglewood Street: Portage Avenue to Bruce Avenue					

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 on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch 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 Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
CT01	Pavement Reconstruction Plan/Profile – Ellice Avenue to Station 2+20	A1
CT02	Pavement Reconstruction Plan/Profile – Station 2+20 to Station 3+50	A1
CT03	Pavement Reconstruction Plan/Profile – Station 3+50 to Sargent Avenue	A1
CT04	Pavement Reconstruction Plan/Profile – Emo Avenue to Station 1+50	A1
CT05	Pavement Reconstruction Plan/Profile – Station 1+50 to Station 2+80	A1
CT06	Pavement Reconstruction Plan/Profile – Station 2+80 to Station 4+15	A1
CT07	Pavement Reconstruction Plan/Profile – Station 4+15 to Portage Avenue	A1
RT01	Clifton Street Bays Pavement Rehabilitation – Ellice Ave. to Sargent Ave.	A3
RT02	River Road Concrete Sidewalk – Parkville Dr. to St. Vital Rd.	A3
RT03	Agnes Street Pavement Rehabilitation – Ellice Ave. to St. Matthews Ave.	A3
RT04	Inglewood Street Pavement Rehabilitation – Portage Ave. to Bruce Ave.	A3
81010-U1	Combined Sewer Repairs Agnes Street 1 st MH S. of Ellice to MH at Ellice	A4
81010-U2	Combined Sewer Repairs Agnes Street 2 nd MH S. of Ellice to 3 rd MH S. of Ellice	A4
81010-U3	Combined Sewer Repairs Harris Boulevard 1 st MH N. of Armour Cr. S. Leg to 2 nd MH N. of Armour Cr. S. Leg	A4
81010-U4	Combined Sewer Repairs Inglewood Street 2 nd MH S. of Bruce Ave. to 1 st MH S. of Bruce Ave.	A4

E2. GEOTECHNICAL REPORT

- E2.1 Further to GC:3.1, the geotechnical report is provided to aid the Contractor's evaluation of the pavement structure and/or existing soil conditions. The geotechnical report is contained in Appendix 'A'.

E3. OFFICE FACILITIES

- E3.1 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, a height of 2.4 m 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°C or 24-25°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 12 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.
- E3.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.
- E3.3 The office facilities will be provided from the date of the commencement of the Work to the date of Substantial Performance.
- E3.4 On a one time basis, where directed by the Contract Administrator, the Contractor shall relocate the office facilities to a location more convenient for the remaining Work.

E4. PROTECTION OF EXISTING TREES

- E4.1 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 2400 mm 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.

E4.2 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.

E4.3 No separate measurement or payment will be made for the protection of trees.

E4.4 Elm trees cannot be trimmed between April 1 and July 31, inclusive.

E5. TRAFFIC CONTROL

E5.1 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.

E6. TRAFFIC MANAGEMENT

E6.1.1 The Contractor shall schedule construction activities to meet the following:

- (a) Clifton Street and Inglewood Street will be closed to all traffic. The Contractor shall sign the street "Road Closed" in accordance with the Manual of Temporary Traffic Control.
- (b) Harris Boulevard will be closed to through traffic. Local access will be maintained between 2000 hours and 0700 hours during the week and at all times on weekends. The Contractor will sign the street "Road Closed – Local Access Only" in accordance with the Manual of Temporary Traffic Control.
- (c) Agnes Street will be closed to through traffic. Local access traffic shall be maintained. The Contractor will sign the street "Road Closed – Local Access Only" in accordance with the Manual of Temporary Traffic Control.
- (d) River Road will remain open to traffic. The Contractor will be permitted to close the southbound gutter lane between the hours of 9:00 a.m. and 3:00 p.m. in order to complete his work. The lane adjacent to the construction area shall be reopened to traffic at the completion of each day's activities.

E6.1.2 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.

E6.1.3 Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

E7. REFUSE AND RECYCLING COLLECTION

E7.1 While access to refuse and/or recycling collection vehicles is restricted, on collection day(s) the Contractor shall move all of the affected property owners refuse and/or recycling materials to a nearby common area, prior to an established time, in accordance with E7.2 to permit the normal collection vehicles to collect the materials. Immediately following recycling collection the Contractor shall return recycling receptacles to the addresses marked on the receptacles.

E7.2 Collection Schedule:

- **Harris Boulevard: (West Side) Portage Avenue to Emo Avenue**

Collection Day(s): **3**

Collection Time: **7:00 a.m.**

Common Collection Area: **Emo Avenue**

E7.3 No measurement or payment will be made for the work associated with this specification.

E8. WATER USED BY CONTRACTOR

E8.1 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.

E9. SURFACE RESTORATIONS

E9.1 Further to clause 3.3 of CW 1130-R1, when Total Performance is not achieved in the year the Contract is commenced, the Contractor shall temporarily repair any Work commenced and not completed to the satisfaction of the Contract Administrator. The Contractor shall maintain the temporary repairs in a safe condition as determined by the Contract Administrator until permanent repairs are completed. The Contractor shall bear all costs associated with temporary repairs and their maintenance.

E10. INFRASTRUCTURE SIGNS

E10.1 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 performing all operations herein described and all other items incidental to the work described.

E11. SUPPLY AND INSTALLATION OF PAVEMENT REPAIR FABRIC

DESCRIPTION

E11.1 General

E11.1.1 This specification covers the supply and installation of pavement repair fabric.

- E11.1.2 Referenced Standard Construction
 - (a) CW 3130 – Supply and Installation of Geotextile Fabrics.

MATERIALS

- E11.2 Storage and Handling
 - E11.2.1 Store and handle material in accordance with Section 2 of CW 3130.
- E11.3 Pavement Repair Fabric
 - E11.3.1 Pavement repair fabric will be Glas Grid Road Reinforcement Mesh - Style 8501 or approved equal.

CONSTRUCTION METHODS

- E11.4 General
 - E11.4.1 Install pavement repair fabric at random locations as directed by the Contract Administrator.
 - E11.4.2 The extent of the placement limits and quantities required will be determined by the Contract Administrator and provided 48 hours prior to the placement of asphalt.
 - E11.4.3 Proceed with installation upon completion and acceptance of the asphalt levelling course.
 - E11.4.4 Install fabric in accordance with the manufacturer's specifications and recommendations.
 - E11.4.5 Only construction equipment required to place the final asphalt surface course will be allowed to travel on the exposed fabric.
 - E11.4.6 Replace damaged or improperly placed fabric.
 - E11.4.7 Ensure temperature of the asphalt material does not exceed the melting point of the fabric.

MEASUREMENT AND PAYMENT

- E11.5 Pavement Repair Fabric
 - E11.5.1 The supply and installation of the pavement repair fabric will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Pavement Repair Fabric". The area to be paid for will be the total number of square metres of pavement repair fabric supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E12. **SUPPLY AND INSTALLATION OF HIGH STRENGTH GEOTEXTILE FABRIC**

DESCRIPTION

- E12.1 General
 - E12.1.1 This specification covers the supply and installation of high strength geotextile fabric for bridging over unstable sub-grade conditions.
 - E12.1.2 Referenced Standard Construction Specifications
 - (a) CW 3130 - Supply and Installation of Geotextile Fabrics

MATERIALS

E12.2 Mill Certificate and Bill of Lading

E12.2.1 Provide mill certificate and bill of lading in accordance with Section 2 of CW 3130.

E12.3 High Strength Geotextile Fabric

E12.3.1 Separation/reinforcement fabric will be woven fabric and meet or exceed the following requirements:

PHYSICAL PROPERTY	REQUIREMENTS	TEST METHOD
Grab Tensile Strength	1750 N – minimum MD 1100 N – minimum CD	ASTM D4632
Puncture Strength	800 N – minimum	ASTM D4833
Trapezoidal Tear	800 N – minimum MD 490 N – minimum CD	ASTM D4533
Apparent Opening Size	0.600 mm – maximum	ASTM D4751
Permittivity	0.05 sec ⁻¹ - minimum	ASTM D4491
U.V. Resistance	70% per 500 hrs – minimum	ASTM D4355
Mullen Burst	5500 kPa – minimum	ASTM D3786

MD – Indicates property in machine direction or along the roll length.

CD – Indicates property in cross machine direction or across the roll width.

E12.3.2 All physical property requirements are MARV (Minimum Average Roll Values) determined in accordance with ASTM 4759.

E12.3.3 Acceptable products will be Armtec Geolon HP 370, or an approved equal.

CONSTRUCTION METHODS

E12.4 Install high strength geotextile fabric in accordance with Section 3.1 of CW 3130.

MEASUREMENT AND PAYMENT

E12.5 High Strength Geotextile Fabric

E12.5.1 Supply and installation of high strength geotextile fabric will be measured on an area basis and paid for at the Contract Unit Price per square metre for “High Strength Geotextile Fabric”. The area to be paid for will be the total number of square metres of high strength geotextile fabric, supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E12.5.2 Only material placed within the designated sub-grade limits will be included in the payment for “High Strength Geotextile Fabric”.

E12.5.3 No measurement or payment will be made for geotextile fabric removed and replaced due to improper installation or damaged materials.

E13. RECYCLED CONCRETE BASE COURSE MATERIAL

DESCRIPTION

E13.1 General

E13.1.1 Further to CW 3110, this specification covers supply and placement of recycled concrete base course material for Full-Depth Partial Slab Patches (Class A, B, C, and D), miscellaneous concrete slabs and sidewalks.

E13.2 Definitions

E13.2.1 Deleterious material – are materials such as vegetation, organic material, wood, glass, plastic, metal, reinforcing steel, building rubble, brick, salvaged asphalt materials, clay, shale, and friable particles.

E13.3 Referenced Standard Construction Specifications

- (a) CW 3110 – Sub-Grade. Sub-Base and Base Course Construction.
- (b) CW 3230 – Full-Depth Patching of Existing Pavement Slabs and Joints.
- (c) CW 3235 – Renewal of Existing Miscellaneous Concrete Slabs.
- (d) CW 3325 – Portland Cement Concrete Sidewalk.

MATERIALS

E13.4 Recycled Concrete Base Course Material

E13.4.1 Recycled concrete base course material when used for Full-Depth Partial Slab Patches (Class A, B, C, and D), miscellaneous concrete slabs and sidewalks will be considered equal to granular or limestone base course material specified in Section 2.2 of CW 3110.

E13.4.2 Recycled concrete base course material will be approved by the Contract Administrator.

E13.4.3 Recycled concrete base course material will consist of sound durable particles produced by crushing, screening, and grading of recovered concrete materials, free from soft material that would disintegrate through decay or weathering.

E13.4.4 The recycled concrete base course material will be well graded and conform to the following grading requirements:

Recycled Concrete Base Course Material Grading Requirements

CANADIAN METRIC SIEVE SIZE	PERCENT OF TOTAL DRY WEIGHT PASSING EACH SIEVE
20 000	100%
5 000	40% - 70%
2 500	25% - 60%
315	8% - 25%
80	6% - 17%

E13.4.5 Recycled concrete base course material when subjected to the abrasion test will have a loss of not more than 35% when tested in accordance with grading B of ASTM C131, Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

E13.4.6 The amount of deleterious material will be limited to a maximum of two percent of the total dry weight.

CONSTRUCTION METHODS

E13.5 Placement of Recycled Concrete Base Course Material

- E13.5.1 Place and compact recycled concrete base course material as a levelling course to a maximum thickness of 50 millimetres.
- E13.5.2 Spread materials uniformly to avoid segregation free of pockets of fine and coarse material.
- E13.5.3 Level and compact to the finished elevation. Compact to 100% Standard Proctor Density for Full-Depth Partial Slab Patches (Class A, B, C, and D) and 90% Standard Proctor Density for miscellaneous concrete slabs and sidewalks.
- E13.5.4 Maintain the finished material until the pavement or sidewalk is placed.

MEASUREMENT AND PAYMENT

E13.6 Recycled Concrete Base Course Material

- E13.6.1 The supplying, placing and compaction of recycled concrete base course material will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for the "Supplying and Placing Base Course Material" as specified in accordance with CW 3110.
- E13.6.2 No measurement or payment will be made for material placed as a levelling course under miscellaneous concrete slabs and sidewalks where the costs are included in accordance with CW 3235 and CW 3325.
- E13.6.3 No measurement or payment will be made for materials rejected by the Contract Administrator.

E14. RE-BENCHING EXISTING MANHOLES

- E14.1 Further to CW 2130-R9, the Contractor shall re-bench existing manholes as indicated on the construction drawings and as specified herein.
- E14.2 Remove loose and unsound material from inside surface of manhole wall and adjacent to pipe/manhole interface. Clean and prepare repair area as required and apply approved concrete patching compound in accordance with manufacturer's instructions. Entirely fill any voids beyond the manhole or pipe wall with grout. Reshape benching as specified in CW 2130, Clause 3.8.6.
- E14.3 Re-benching of existing manholes will be measured for payment on a unit basis and paid for at the Contract Unit Price for "Re-benching Manholes". The number of units to be paid for will be total number of manholes re-benched in accordance with this Specification, accepted and measured by the Contract Administrator.

APPENDIX 'A'

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

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The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.

APPENDIX 'A'

GEOTECHNICAL REPORT

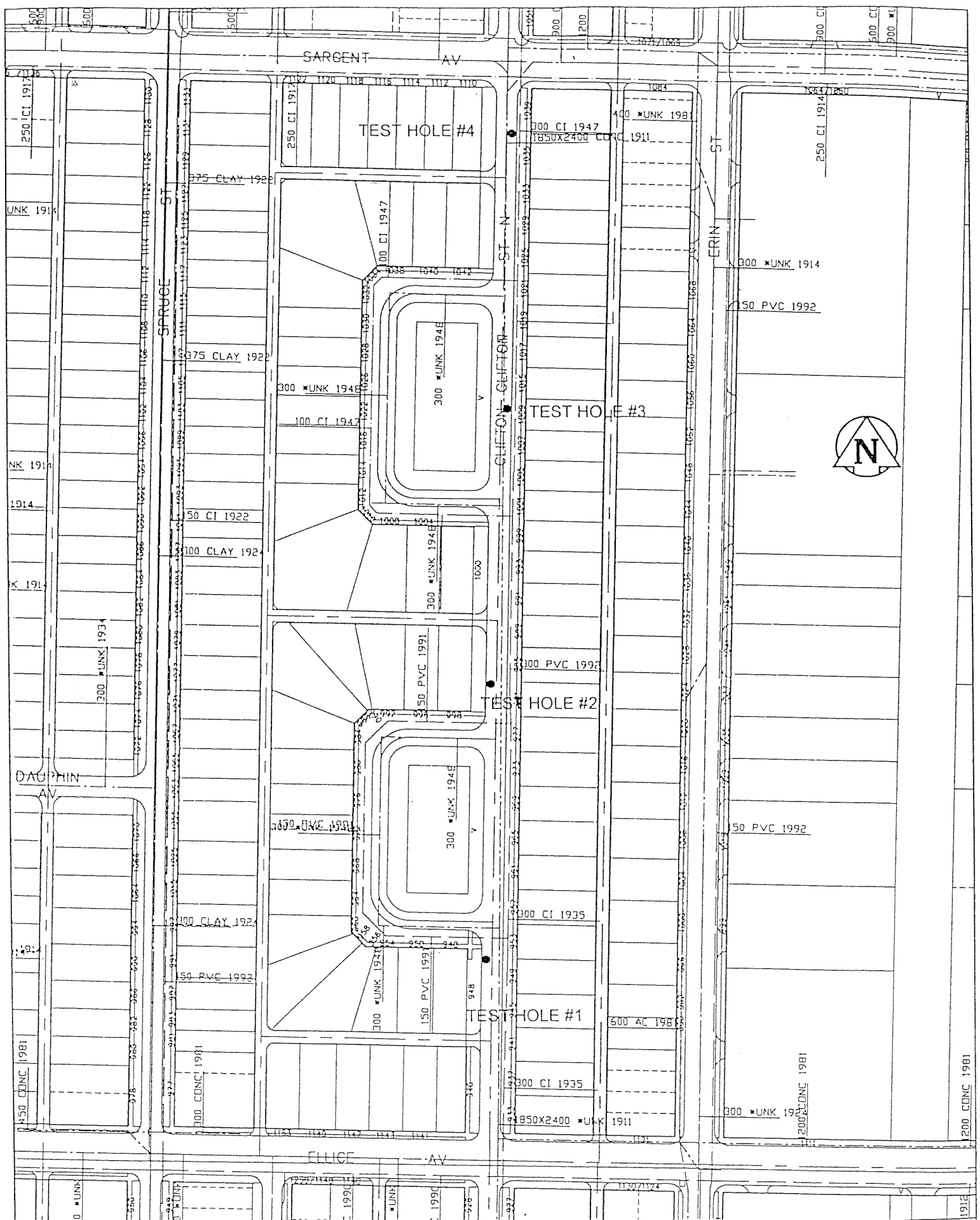
APPENDIX 'A' - GEOTECHNICAL REPORT

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CLIFTON STREET



SEWER ———
 WATER ———

2005 RESIDENTIAL STREET RENEWAL PROGRAM

TESTHOLE LOCATION SKETCH - CLIFFTON ST
 (CLIFF AV - SARGENT AV)



THE CITY OF WINNIPEG
 PUBLIC WORKS DEPARTMENT
 ENGINEERING DIVISION
 TECHNOLOGY SERVICES BRANCH
 106 - 1155 PACIFIC AVE

City of Winnipeg
 2005 Street Renewal Program
 Geotechnical Investigation
 Clifton Street

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Location	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
1	Clifton Street	Asphalt	22	--	--	--	--	--	--	--	--	--	--	--	--
1	Clifton Street	Concrete	153	--	--	--	--	--	--	--	--	--	--	--	--
2	Clifton Street	Asphalt	25	--	--	--	--	--	--	--	--	--	--	--	--
2	Clifton Street	Concrete	160	--	--	Silty Clay	1.07	26.4	11.9	37.5	50.6	54.4	22.4	32.0	
3	Clifton Street	Asphalt	77	--	--	--	--	--	--	--	--	--	--	--	--
3	Clifton Street	Concrete	200	--	--	Silt	1.22	25.0	3.8	78.6	17.6	26.5	18.8	7.7	
4	Clifton Street	Asphalt	48	--	--	--	--	--	--	--	--	--	--	--	--
4	Clifton Street	Concrete	162	--	--	Clayey Silt	0.46	21.5	0.3	61.3	28.0	31.0	18.1	12.9	

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Clifton St.

Location: 7.6 m S. of S. curb of S. bay, 0.5 m E. of W. curb

Test Hole #: TH1

File No: 04-217-04

Date Drilled: November 9, 2004

Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				GRAIN SIZE DISTRIBUTION %						
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm	Water Content (%)						
								PL	0	LL				
0		Ground Surface	100											
		Asphalt - 22 mm thick.												
		Concrete - 153 mm thick.												
		Clayey Silt (CI) - dark grey, damp, medium plastic, firm.		S1		100								
				S2		100								
				S3		100								
		- below 0.9 m, wet, with silt.												
1			99	S4		100								
				S5		100								
		Clay (CH) - grey, moist, high plastic, stiff, some silt.		S6		100								
2			98	S7		100								
		End of Test Hole - ended test hole at 2.2 m below grade. - backfilled test hole with auger cuttings. - filled core hole with cold patch.												

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by:

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

Drilled By: Paddock Drilling Ltd.

Drill Rig: Truck mounted Bratt

Auger Size: 125 mm solid stem

Completion Depth: 2.2 m

Completion Elevation: 97.8 m

Sheet: 1

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Clifton St.

Location: 9.0 m N. of N. curb of N. bay, 0.4 m E. of W. curb

Test Hole #: TH2

File No: 04-217-04

Date Drilled: November 12, 2004

Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				GRAIN SIZE DISTRIBUTION %							
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm	Water Content (%)							
								PL	0	LL					
0		Ground Surface	100												
		<i>Asphalt</i> - 25 mm thick.													
		<i>Concrete</i> - 160 mm thick.													
		<i>Clay Fill (CH)</i> - dark grey, moist, high plastic, firm, with silt, trace sand & gravel sizes. - below 0.5 m, some silt, trace organics. - below 0.8 m, some clay.		S1		100									
				S2		100									
				S3		100									
1		<i>Silty Clay (CH)</i> - dark grey & dark brown, moist, high plastic, firm to stiff, with silt, some sand sizes.	99	S4		100						0.0	11.9	37.5	50.6
				S5		100									
				S6		100									
2		<i>End of Test Hole</i> - ended test hole at 2.2 m below grade. - backfilled test hole with auger cuttings. - filled core hole with cold patch.	98	S7		100									

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by:

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

Drilled By: H.D.M. Enterprises

Drill Rig: Mounted Bobcat

Auger Size: 125 mm solid stem

Completion Depth: 2.2 m

Completion Elevation: 97.8 m

Sheet: 1

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Clifton St.

Location: 1.7 m S. of N. F.L. at 1009 Clifton St., 0.4 m W. of E. curb.

Test Hole #: TH3

File No: 04-217-04

Date Drilled: November 9, 2004

Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				GRAIN SIZE DISTRIBUTION %							
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm	Water Content (%)							
								PL	0	LL					
0		Ground Surface	100												
		<i>Asphalt</i> - 77 mm thick.													
		<i>Concrete</i> - 200 mm thick.													
		<i>Silty Clay (CI)</i> - grey, moist, medium plastic, soft, trace sand.		S1		100									
		<i>Clay (CH)</i> - black, moist, high plastic, soft, trace sand sizes.		S2		100									
		<i>Silt (ML)</i> - brown, wet, low plastic, soft, some clay, trace sand sizes.		S3		100									
1		<i>Silty Clay (CH)</i> - dark grey & dark brown, moist, high plastic, firm to stiff, with silt, some sand sizes.	99	S4		100						0.0	3.8	78.6	17.6
				S5		100									
				S6		100									
2			98	S7		100									
		<i>End of Test Hole</i> - ended test hole at 2.2 m below grade. - backfilled test hole with auger cuttings.													

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by:

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

Drilled By: Paddock Drilling Ltd.

Drill Rig: Truck mounted Bratt

Auger Size: 125 mm solid stem

Completion Depth: 2.2 m

Completion Elevation: 97.8 m

Sheet: 1

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Clifton St.

Location: 3.0 m S. of N. F.L. of 1035 Clifton St., 0.7 m W. of E. curb

Test Hole #: TH4

File No: 04-217-04

Date Drilled: November 09, 2004

Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				GRAIN SIZE DISTRIBUTION %						
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm	Water Content (%)						
								PL	0	LL				
								Gravel	Sand	Silt	Clay			
0		Ground Surface	100											
		<i>Asphalt</i> - 48 mm thick.												
		<i>Concrete</i> - 162 mm thick.												
		<i>Clay (Fill CH)</i> - dark grey, moist, high plastic, soft to firm, with silt, trace sand sizes.		S1		100								
		<i>Clayey Silt (CI)</i> - brown, moist, medium plastic, firm to stiff, and silt, some sand sizes, trace gravel.		S2		100					0.3	10.4	61.3	28.0
				S3		100								
1			99	S4		100								
		<i>Silty Clay (CH)</i> - dark grey & dark brown, moist, high plastic, firm to stiff, with silt, some sand sizes.		S5		100								
				S6		100								
2			98	S7		100								
		<i>End of Test Hole</i> - ended test hole at 2.2 m below grade. - backfilled test hole with auger cuttings. - filled core hole with cold patch.												

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by:

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

Drilled By: Paddock Drilling

Drill Rig: Truck mounted Bratt

Auger Size: 125 mm solid stem

Completion Depth: 2.2 m

Completion Elevation: 97.8 m

Sheet: 1

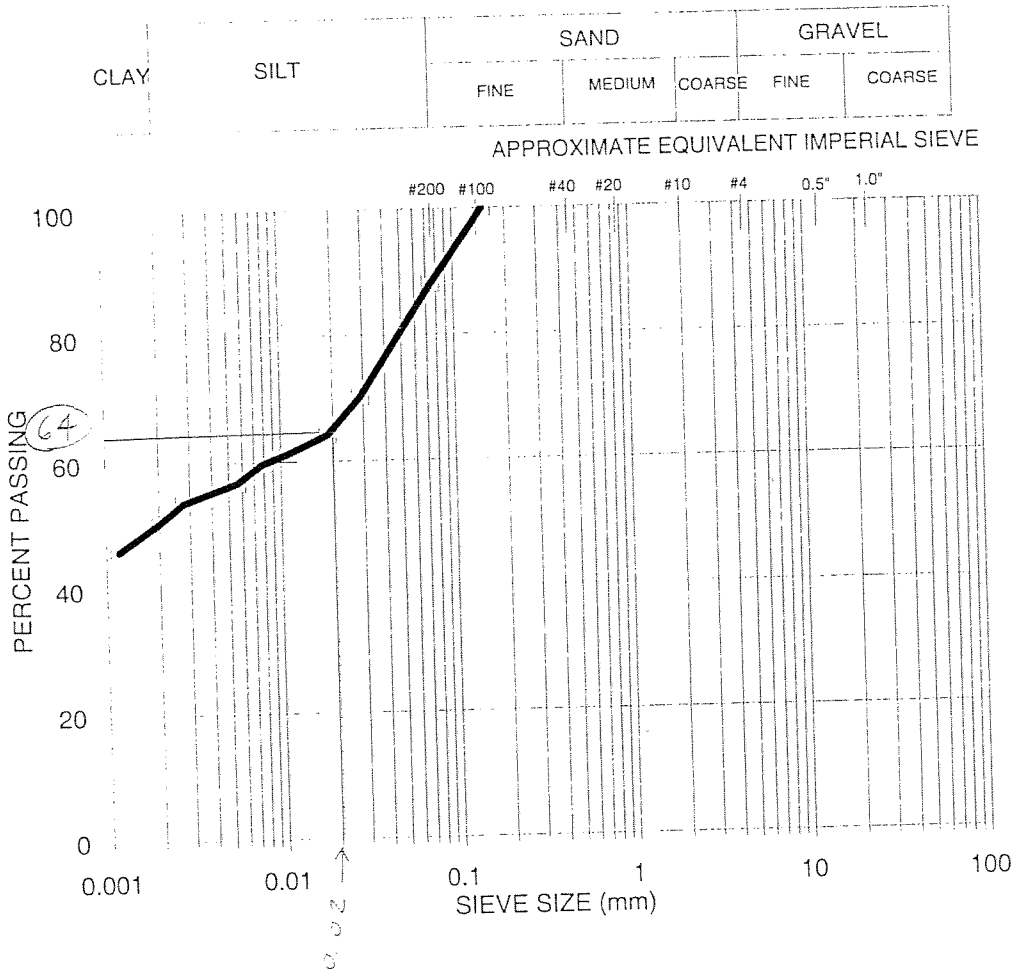
City of Winnipeg
 c/o UMA Engineering Ltd.
 1479 Buffalo Place
 Winnipeg, Manitoba
 R3T 1L7

File No.: 04-217-04
 Reference No.: 4-217-4-50

ATTENTION: Ron Bruce, P. Eng.

PROJECT: 2005 Street Renewal Program Geotechnical Investigation

Test Hole No. TH 2 Sample No. S4 Depth: 1.07m
 Sampled By: ENG-TECH Type of Sample: Bag Source: Clifton Street
 Date Sampled: Nov 12/04 Date Received: Nov 12/04 Date Tested: Nov 29/04



SIEVE SIZE (mm)	PERCENT PASSING
0.150	100.0
0.075	88.1
0.029	70.2
0.019	64.2
0.011	61.2
0.008	59.7
0.006	56.7
0.003	53.7
0.002	50.7
0.001	46.2

Percent of: GRAVEL (0.0%), SAND (11.9%), SILT (37.5%) and CLAY (50.6%)
 Sample Description: Silty Clay, high plastic, firm to stiff, moist, dark brown & dark grey, with silt, some sand sizes.

COMMENTS:

ENG-TECH Consulting Limited
 per Clark Hryhoruk
 Contact: Clark Hryhoruk, M. Sc., P. Eng.
 Ph: (204) 233-1694
 Fax: (204) 235-1579

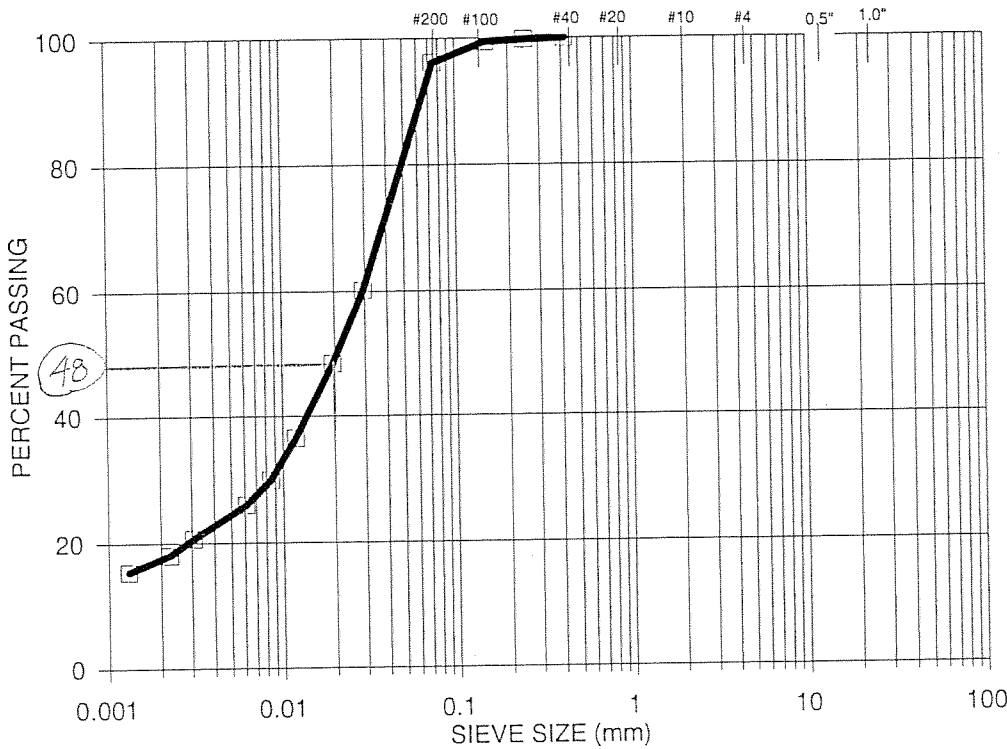
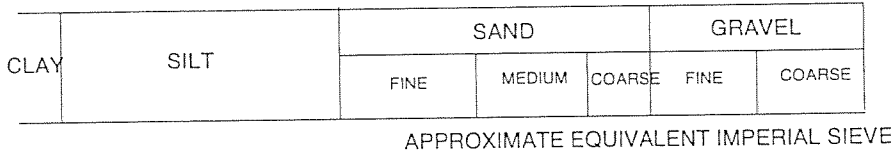
City of Winnipeg
 c/o UMA Engineering Ltd.
 1479 Buffalo Place
 Winnipeg, Manitoba
 R3T 1L7

File No.: 04-217-04
 Reference No.: 4-217-4-51

ATTENTION: Ron Bruce, P. Eng.

PROJECT: 2005 Street Renewal Program Geotechnical Investigation

Test Hole No. TH 3 Sample No. S4 Depth: 1.22m
 Sampled By: ENG-TECH Type of Sample: Bag Source: Clifton Street
 Date Sampled: Nov 9/04 Date Received: Nov 9/04 Date Tested: Nov 29/04



SIEVE SIZE (mm)	PERCENT PASSING
0.425	100.0
0.250	99.8
0.150	99.5
0.075	96.2
0.029	60.1
0.019	48.3
0.012	36.5
0.009	29.9
0.006	25.0
0.003	20.7
0.0022	18.1
0.0013	15.5

Percent of: GRAVEL (0.0%), SAND (3.8%), SILT (78.6%) and CLAY (17.6%)
 Sample Description: Silt, low plastic, soft, wet, brown, some clay, trace sand sizes.

COMMENTS:

ENG-TECH Consulting Limited
 per *Clark Hryhoruk*
 Contact: Clark Hryhoruk, M.Sc., P. Eng.
 Ph: (204) 233-1694
 Fax: (204) 235-1579

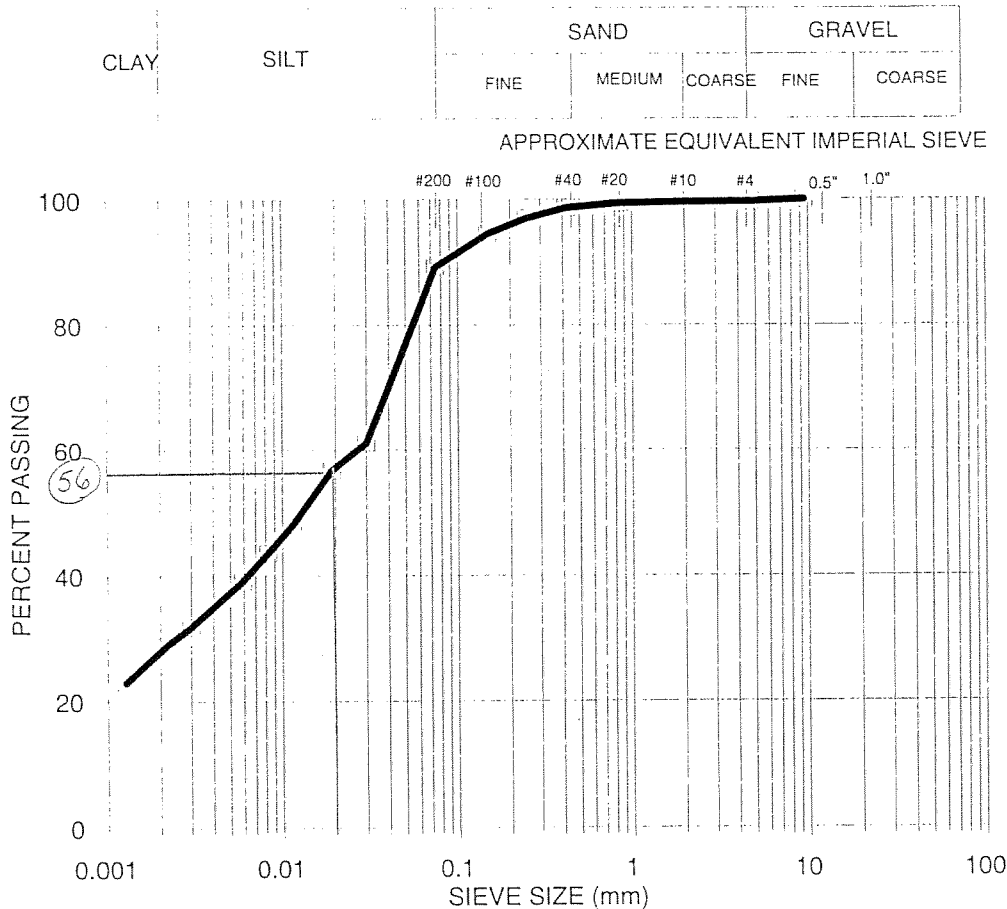
City of Winnipeg
 c/o UMA Engineering Ltd.
 1479 Buffalo Place
 Winnipeg, Manitoba
 R3T 1L7

File No.: 04-217-04
 Reference No.: 4-217-4-52

ATTENTION: Ron Bruce, P. Eng.

PROJECT: 2005 Street Renewal Program Geotechnical Investigation

Test Hole No. TH 4 Sample No. S2 Depth: 0.46m
 Sampled By: ENG-TECH Type of Sample: Bag Source: Clifton Street
 Date Sampled: Nov 9/04 Date Received: Nov 9/04 Date Tested: Nov 29/04



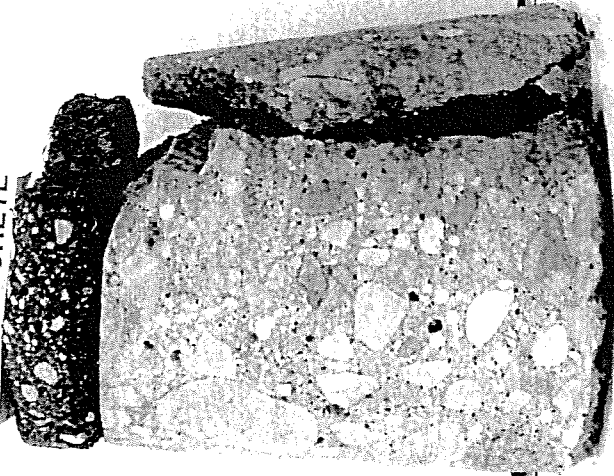
SIEVE SIZE (mm)	PERCENT PASSING
9.5	100.0
4.75	99.7
2.0	99.7
0.850	99.5
0.425	98.7
0.250	97.1
0.150	94.7
0.075	89.3
0.030	61.1
0.019	56.7
0.0115	48.0
0.0083	43.6
0.0059	39.2
0.0030	31.9
0.0022	29.0
0.0013	23.1

Percent of: GRAVEL (0.3%), SAND (10.4%), SILT (61.3%) and CLAY (28.0%)
 Sample Description: Clayey Silt, medium plastic, firm to stiff, moist, brown, and silt, some sand sizes, trace gravel.

COMMENTS:

ENG-TECH Consulting Limited
 per *Clark Hryhoruk*
 Contact: Clark Hryhoruk, M. Sc., P. Eng.
 Ph: (204) 233-1694
 Fax: (204) 235-1579

CLIFTON STREET
TH1
22 mm ASPHALT
153 mm CONCRETE



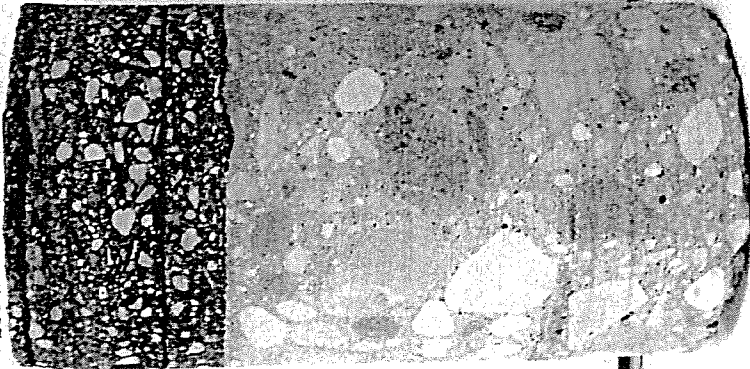
CLIFTON STREET
TH2
25 mm ASPHALT
160 mm CONCRETE



Clifton Street



CLIFTON STREET
TH3
77 mm ASPHALT
200 mm CONCRETE



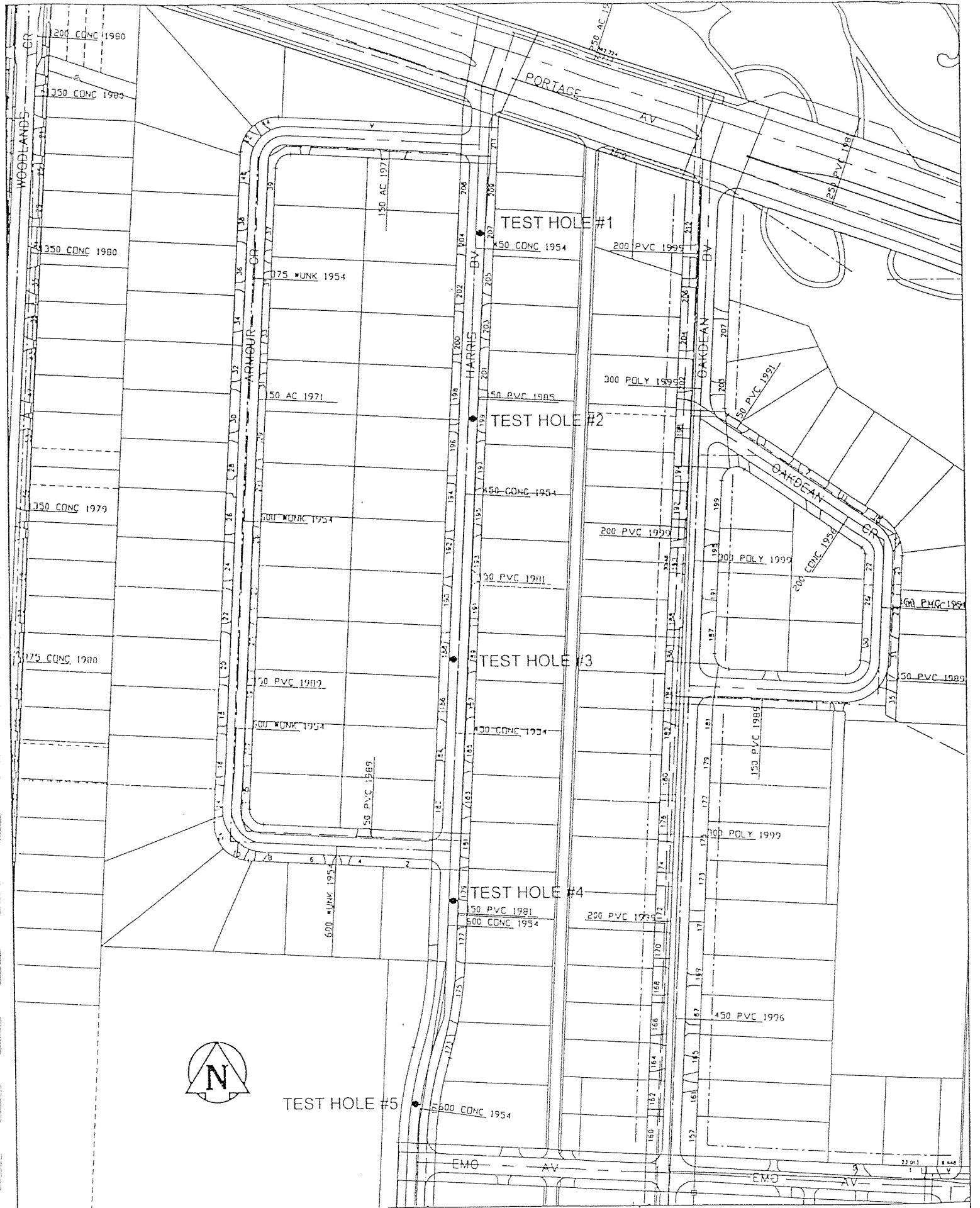
CLIFTON STREET
TH4
48 mm ASPHALT
162 mm CONCRETE

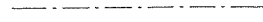



Clifton Street



HARRIS BOULEVARD



SEWER 
 WATER 

2005 RESIDENTIAL STREET RENEWAL PROGRAM
 TEST HOLE LOCATION SKETCH - HARRIS B.L.D.
 (PORTAGE AV - EMO AV)



THE CITY OF WINNIPEG
 PUBLIC WORKS DEPARTMENT
 ENGINEERING DIVISION
 TECHNOLOGY SERVICES BRANCH
 106 - 1155 PACIFIC AVE

City of Winnipeg
2005 Street Renewal Program
Geotechnical Investigation
Harris Boulevard

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Location	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
1	Harris Blvd.	Asphalt	63	--	--	--	--	--	--	--	--	--	--	--	--
1	Harris Blvd	Concrete	217	20 mm G	180	Sand	1.68	19.5	25.2	37.4	16.8	20.6	47.2	20.0	27.2
2	Harris Blvd	Asphalt	51	--	--	--	--	--	--	--	--	--	--	--	--
2	Harris Blvd	Concrete	188	20 mm G	61	Clay	0.76	42.7	--	--	23.2	76.8	84.3	37.2	47.1
3	Harris Blvd	Asphalt	56	--	--	--	--	--	--	--	--	--	--	--	--
3	Harris Blvd	Concrete	158	--	--	--	--	--	--	--	--	--	--	--	--
4	Harris Blvd	Asphalt	22	--	--	--	--	--	--	--	--	--	--	--	--
4	Harris Blvd	Concrete	148	--	--	Clayey Silt	0.76	26.6	--	10.5	61.7	27.8	34.1	17.9	16.2
5	Harris Blvd	Asphalt	26	--	--	--	--	--	--	--	--	--	--	--	--
5	Harris Blvd	Concrete	172	--	--	--	--	--	--	--	--	--	--	--	--

Notes: 20 mm G - 20 mm granular base

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Harris Blvd.

Location: 6.75 m N. of F.L. at 205/207 Harris Blvd., 0.8 m W. of E. curb

Test Hole #: TH1

File No: 04-217-04

Date Drilled: November 4, 2004

Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				GRAIN SIZE DISTRIBUTION %							
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm	Water Content (%)							
								PL	0	LL					
0		Ground Surface	100												
		Asphalt - 63 mm thick.													
		Concrete - 217 mm thick.													
		20 mm Granular Fill - 180 mm thick.		S1	Split Barrel	100									
		Clay Fill (CH) - dark grey, damp, high plastic, firm, with silt, trace sand sizes.		S2	Shelby Tube	100									
				S3	Shelby Tube	100									
1			99	S4	Shelby Tube	100									
				S5	Shelby Tube	100									
		Sand (SP) - grey, moist, poorly graded, loose, with gravel & clay, some silt.		S6	Shelby Tube	100						25.2	37.4	16.8	20.6
2			98	S7	Shelby Tube	100									
		End of Test Hole - ended test hole at 2.2 m below grade. - backfilled test hole with auger cuttings. - filled core hole with cold patch.													

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by: *CAS*

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

Drilled By: H.D.M. Enterprises

Drill Rig: Mounted Bobcat

Auger Size: 125 mm solid stem

Completion Depth: 2.2 m

Completion Elevation: 97.8 m

Sheet: 1

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Harris Blvd.

Location: 0.9 m S. of F.L. at 196/197 Harris Blvd., 1.4 m W. of E. curb








Test Hole #: TH2

File No: 04-217-04

Date Drilled: November 4, 2004


Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				GRAIN SIZE DISTRIBUTION %					
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm	Water Content (%)					
								PL	0	LL			
								Gravel	Sand	Silt	Clay		
0		Ground Surface	100										
		<i>Asphalt</i> - 51 mm thick.											
		<i>Concrete</i> - 188 mm thick.											
		<i>20 mm Granular Fill</i> - 61 mm thick.		S1		100							
		<i>Clay (CH)</i> - dark grey to black, moist, high plastic, stiff to very stiff, with silt inclusions, trace organics.		S2		100							
				S3		100							
1			99	S4		100							
				S5		100							
				S6		100							
2			98	S7		100							
		<i>End of Test Hole</i> - ended test hole at 2.2 m below grade. - backfilled test hole with auger cuttings. - filled core hole with cold patch.											
										0.0	0.0	23.2	76.8

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by: 

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

Drilled By: H.D.M. Enterprises

Drill Rig: Mounted Bobcat

Auger Size: 125 mm solid stem

Completion Depth: 2.2 m

Completion Elevation: 97.8 m

Sheet: 1

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Harris Blvd.

Location: 6.75 m N. of F.L. at 187/189 Harris Blvd., 1.75 m E. of W. curb

Test Hole #: TH3

File No: 04-217-04

Date Drilled: November 4, 2004

Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				GRAIN SIZE DISTRIBUTION %							
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm	Water Content (%)							
								PL	0	LL					
0		Ground Surface	100												
		Asphalt - 56 mm thick.													
		Concrete - 158 mm thick.													
		Clay (CI) - dark grey to black, moist, medium plastic, firm, friable, some silt, trace sand sizes.		S1		100									
				S2		100									
		Clay (CH) - dark grey to black, moist, high plastic, firm, with silt. - below 0.9 m, stiff.		S3		100									
1			99	S4		100									
				S5		100									
				S6		100									
2		Silt - light brown, moist, low plastic, soft, some clay & sand sizes.	98	S7		100									
		End of Test Hole - ended test hole at 2.2 m below grade. - backfilled test hole with auger cuttings.													

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by:

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

Drilled By: H.D.M. Enterprises

Drill Rig: Mounted Bobcat

Auger Size: 125 mm solid stem

Completion Depth: 2.2 m

Completion Elevation: 97.8 m

Sheet: 1

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Harris Blvd.

Location: 12.6 m S. of F.L. at 179/181 Harris Blvd., 1.1 m W. of E. curb

Test Hole #: TH4

File No: 04-217-04

Date Drilled: November 4, 2004

Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				GRAIN SIZE DISTRIBUTION %							
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm	Water Content (%)							
								PL	0	LL					
0		Ground Surface	100												
		Asphalt - 22 mm thick.													
		Concrete - 148 mm thick.													
		Clay (Cl) - dark grey to black, moist, medium plastic, firm, friable, some silt, trace sand sizes.		S1		100									
				S2		100									
		Clayey Silt (CI) - light brown, wet, medium plastic, soft, with clay, some sand sizes.		S3		100						0.0	10.5	61.7	27.8
1		- between 1.1 m to 1.2 m, silt lenses, wet, soft.	99	S4		100									
				S5		100									
		- between 1.4 m to 1.7 m, silt lenses, wet, soft.		S6		100									
		- between 1.7 m to 1.8 m, clay lense, firm to stiff, with silt inclusions.		S7		100									
2			98	S8		100									
		End of Test Hole - ended test hole at 2.4 m below grade. - backfilled test hole with auger cuttings. - filled core hole with cold patch. - water in test hole at 0.9 m below grade.													

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by:

Drilled By: H.D.M. Enterprioses

Drill Rig: Mounted Bobcat

Auger Size: 125 mm solid stem

Completion Depth: 2.4 m

Completion Elevation: 97.6 m

Sheet: 1

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

ENG-TECH CONSULTING LIMITED

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

Client: City of Winnipeg

Project: Geotechnical Investigation - 2005 Street Renewal Program

Site: Harris Blvd.

Location: 7.9 m S. of F.L. at 171/173 Harris Blvd., 1.1 m E. of W. curb

Test Hole #: TH5

File No: 04-217-04

Date Drilled: November 4, 2004

Grade Elevation: 100 m (local)

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				Water Content (%)	GRAIN SIZE DISTRIBUTION %			
Depth (m)	Soil Symbol	Description	Elevation (m)	Number	Sample Type	Recovery (%)	blows/300 mm		Gravel	Sand	Silt	Clay
0		Ground Surface	100									
		<i>Asphalt</i> - 26 mm thick.										
		<i>Concrete</i> - 172 mm thick.										
		<i>Clay Fill (CH)</i> - dark grey to black, damp, high plastic, firm to stiff, with silt inclusions, trace organics & rootlets. - below 0.4 m, moist.		S1		100						
				S2		100						
				S3		100						
1		<i>Clay (CH)</i> - grey, moist, high plastic, stiff, with silt, trace sand sizes.	99	S4		100						
				S5		100						
		- below 1.5 m, occasional sand & gravel sizes.		S6		100						
				S7		100						
2			98	S8		100						
		<i>End of Test Hole</i> - ended test hole at 2.2 m below grade. - backfilled test hole with auger cuttings. - filled core hole with cold patch.										

ENG-TECH Consulting Limited

Logged by: CW

Reviewed by:

Sample Type



Split Barrel



Shelby Tube



Auger Cuttings



Split Spoon

Drilled By: H.D.M. Enterprises

Drill Rig: Mounted Bobcat

Auger Size: 125 mm solid stem

Completion Depth: 2.2 m

Completion Elevation: 97.8 m

Sheet: 1

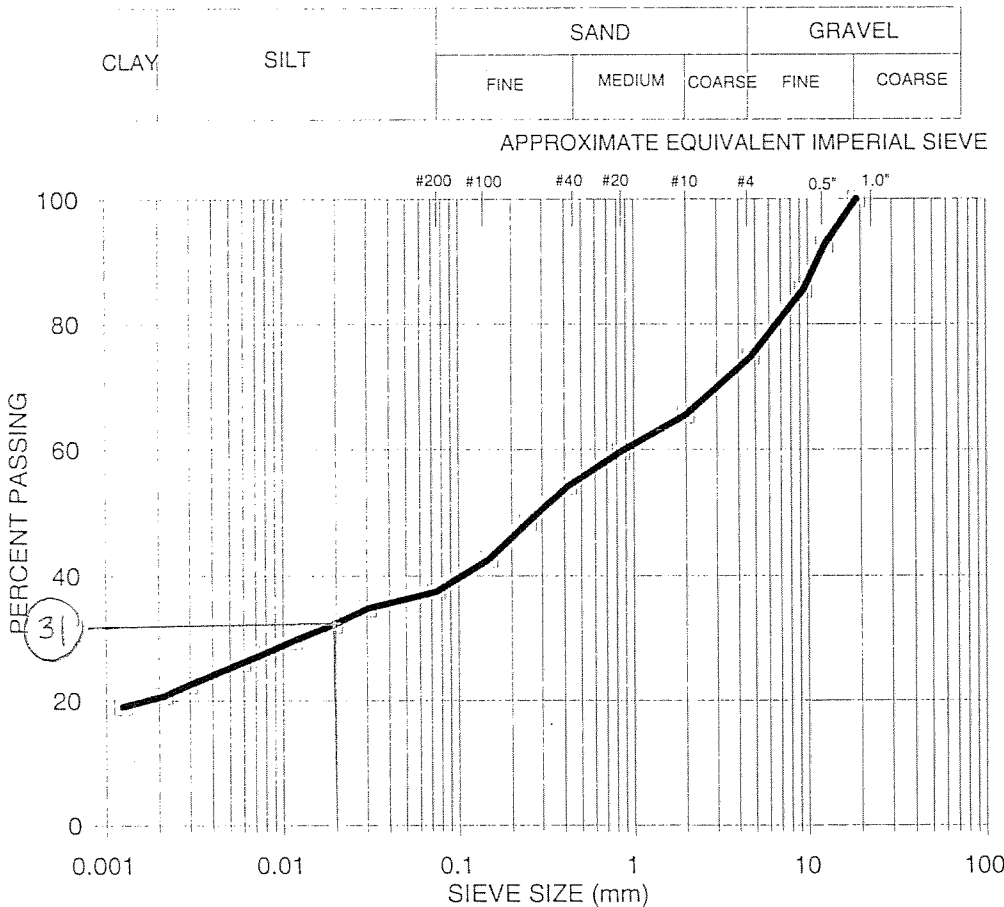
City of Winnipeg
 c/o UMA Engineering Ltd.
 1479 Buffalo Place
 Winnipeg, Manitoba
 R3T 1L7

File No.: 04-217-04
 Reference No.: 4-217-4-11

ATTENTION: Ron Bruce, P. Eng.

PROJECT: 2005 Street Renewal Program Geotechnical Investigation

Test Hole No. TH 1 Sample No. S6 Depth: 1.68m
 Sampled By: ENG-TECH Type of Sample: Bag Source: Harris Blvd.
 Date Sampled: Nov 4/04 Date Received: Nov 4/04 Date Tested: Nov 17/04



SIEVE SIZE (mm)	PERCENT PASSING
19.0	100.0
12.5	92.7
9.5	85.6
4.75	74.8
2.0	65.6
0.850	59.6
0.425	54.1
0.250	48.4
0.150	42.6
0.075	37.4
0.0305	34.8
0.0194	32.1
0.0115	29.5
0.0082	27.8
0.0059	26.0
0.0029	22.5
0.0021	20.8
0.0013	19.0

Percent of: GRAVEL (25.2%), SAND (37.4%), SILT (16.8%) and CLAY (20.6%)
 Sample Description: Sand, loose, moist, grey, with gravel sizes & clay, some silt.

COMMENTS:

ENG-TECH Consulting Limited
 per *Clark Hryhoruk*
 Contact: Clark Hryhoruk, M. Sc., P. Eng.
 Ph: (204) 233-1694
 Fax: (204) 235-1579

City of Winnipeg
 c/o UMA Engineering Ltd.
 1479 Buffalo Place
 Winnipeg, Manitoba
 R3T 1L7

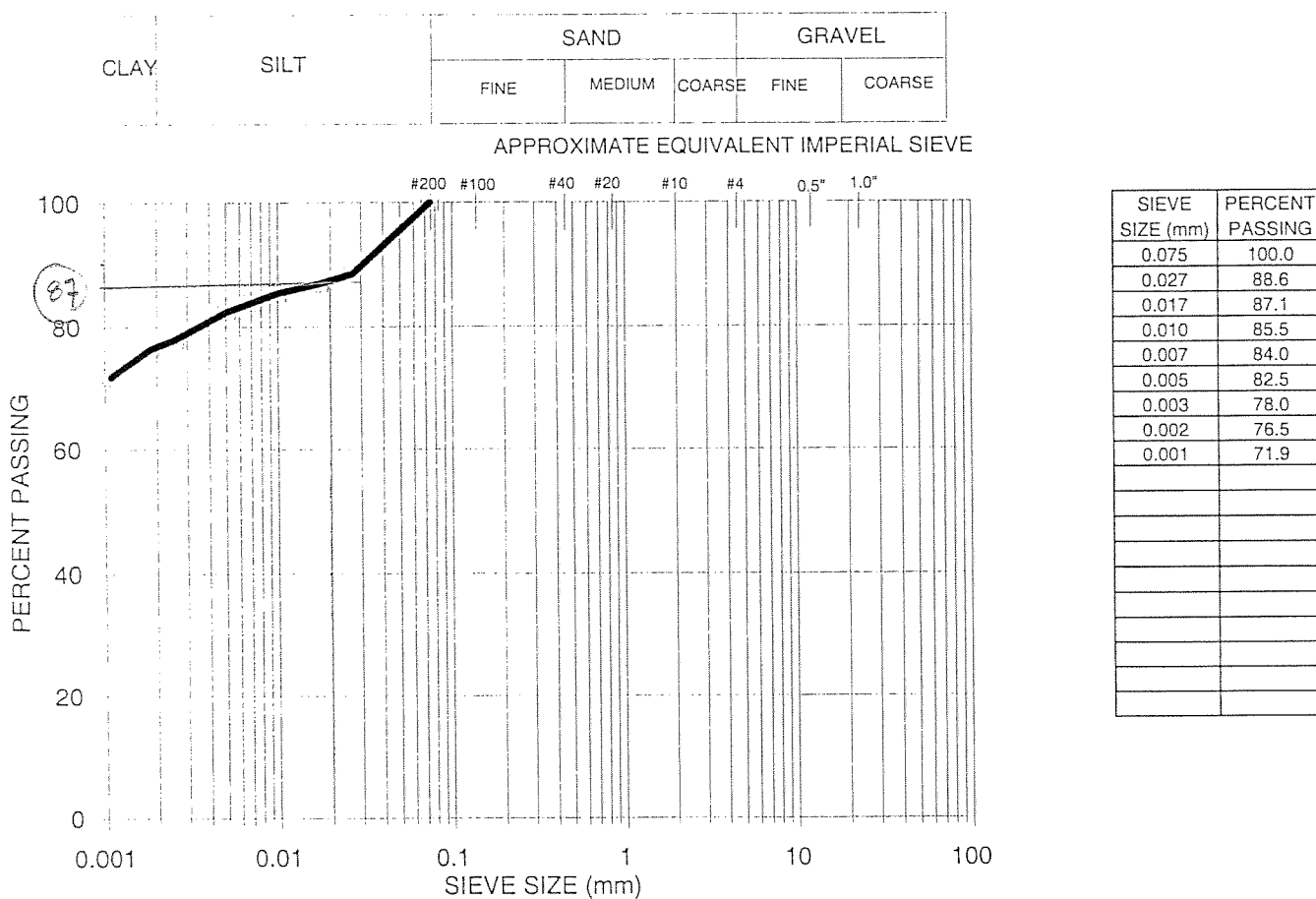
USE

File No.: 04-217-04
 Reference No.: 4-217-4-12

ATTENTION: Ron Bruce, P. Eng.

PROJECT: 2005 Street Renewal Program Geotechnical Investigation

Test Hole No. TH 2	Sample No. S3	Depth: 0.76m
Sampled By: ENG-TECH	Type of Sample: Bag	Source: Harris Blvd.
Date Sampled: Nov 4/04	Date Received: Nov 4/04	Date Tested: Nov 15/04



Percent of: GRAVEL (0.0%), SAND (0.0%), SILT (23.2%) and CLAY (76.8%)
 Sample Description: Clay, high plastic, stiff to very stiff, moist, dark grey to black, with silt.

COMMENTS:

ENG-TECH Consulting Limited
 per *Clark Hryhoruk*
 Contact: Clark Hryhoruk, M. Sc., P. Eng.
 Ph: (204) 233-1694
 Fax: (204) 235-1579

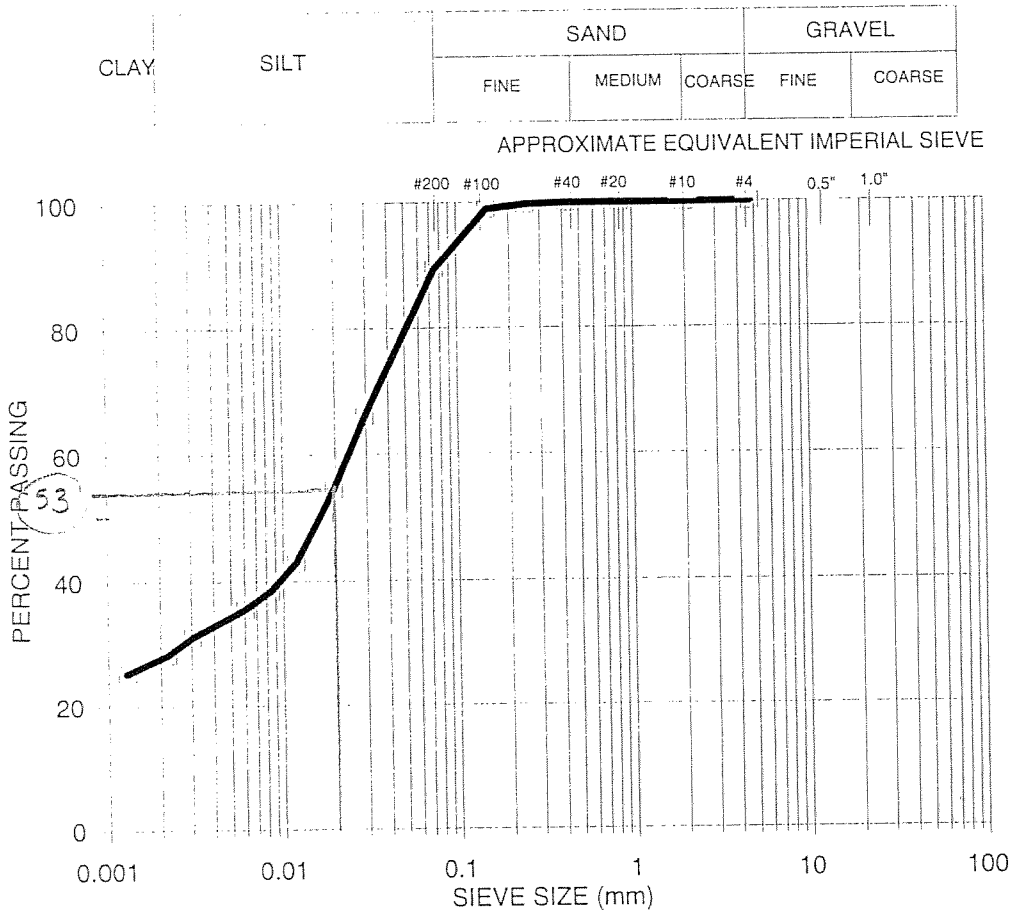
City of Winnipeg
 c/o UMA Engineering Ltd.
 1479 Buffalo Place
 Winnipeg, Manitoba
 R3T 1L7

File No.: 04-217-04
 Reference No.: 4-217-4-13

ATTENTION: Ron Bruce, P. Eng.

PROJECT: 2005 Street Renewal Program Geotechnical Investigation

Test Hole No. TH 4 Sample No. S3 Depth: 0.76m
 Sampled By: ENG-TECH Type of Sample: Bag Source: Harris Blvd.
 Date Sampled: Nov 4/04 Date Received: Nov 4/04 Date Tested: Nov 15/04



SIEVE SIZE (mm)	PERCENT PASSING
4.75	100.0
2.0	99.9
0.850	99.9
0.425	99.9
0.250	99.7
0.150	99.0
0.075	89.5
0.030	66.0
0.020	54.4
0.012	42.8
0.0085	38.5
0.0061	35.6
0.0030	31.2
0.0022	28.3
0.0013	25.4

Percent of: GRAVEL (0.0%), SAND (10.5%), SILT (61.7%) and CLAY (27.8%)
 Sample Description: Clayey Silt, medium plastic, soft, wet, light brown, with clay, some sand sizes.

COMMENTS:

ENG-TECH Consulting Limited

per *Clark Hryhoruk*
 Contact: Clark Hryhoruk, M.Sc., P. Eng.
 Ph: (204) 233-1694
 Fax: (204) 235-1579

HARRIS BLVD
TH1
63 mm ASPHALT
217 mm CONCRETE



HARRIS BLVD
TH2
51 mm ASPHALT
188 mm CONCRETE

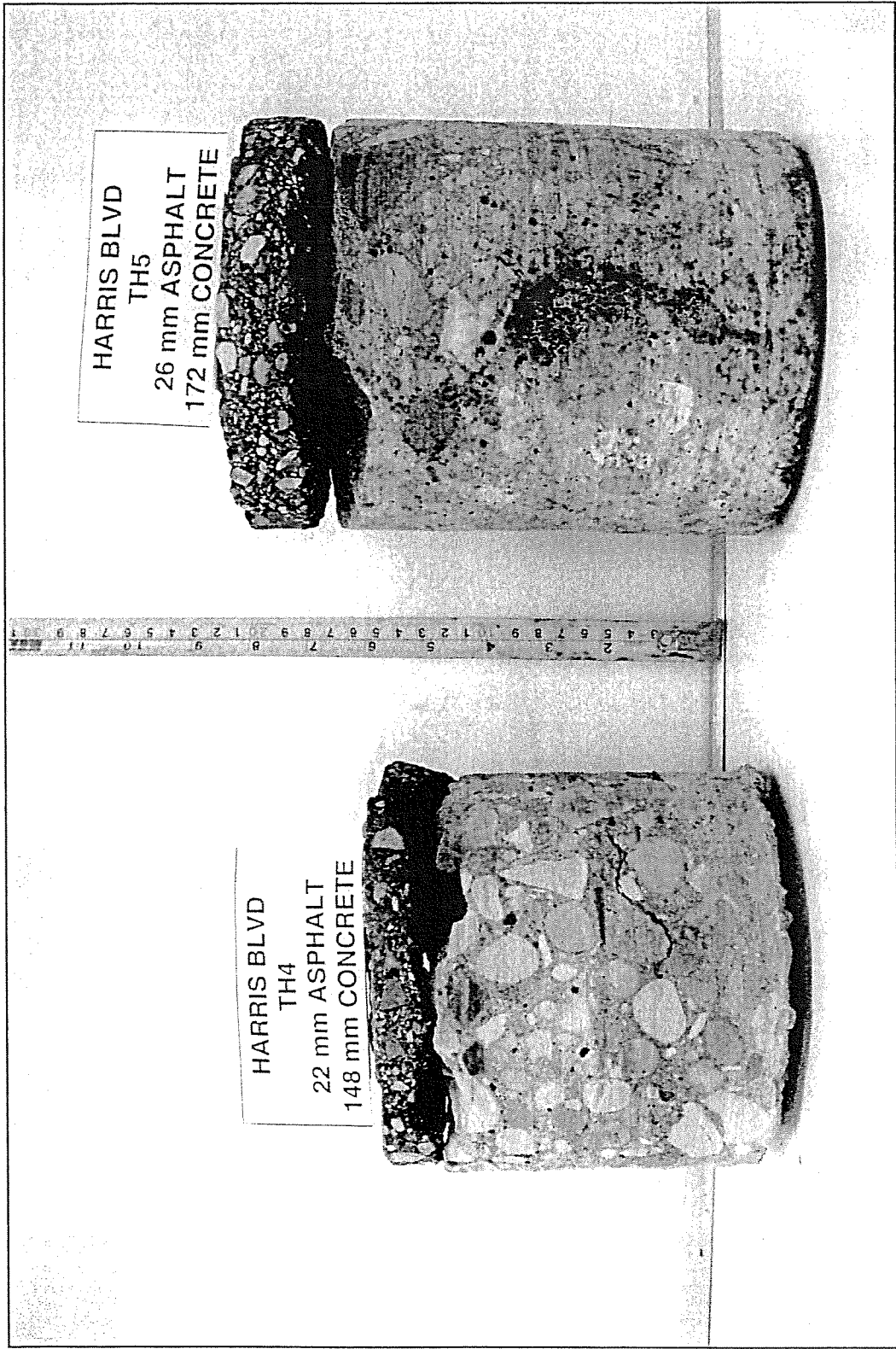


HARRIS BLVD
TH3
56 mm ASPHALT
158 mm CONCRETE



Harris Boulevard





HARRIS BLVD
TH5
26 mm ASPHALT
172 mm CONCRETE

HARRIS BLVD
TH4
22 mm ASPHALT
148 mm CONCRETE

Harris Boulevard

