The City of Winnipeg Tender No. 166-2025

APPENDIX 'A'

GEOTECHNICAL REPORT



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"Engineering and Testing Solutions That Work for You"

| Date: | January 15, 2024 | File No.: | 23-035-03 |
|---------------------|---|------------|-----------|
| Client: Address: | WSP Canada Inc. 1600 Buffalo Place Winnipeg, Manitoba R3T 6B8 | | |
| Attention: | Scott Suderman, P.Eng. | | |
| Project: | Bishop Grandin Boulevard (Abinojii Mikanah) Pavement R Manitoba Canada | enewals, W | /innipeg, |

Introduction

ENG-TECH Consulting Limited (ENG-TECH) was retained by WSP Canada Inc. (WSP) to complete a geotechnical investigation inclusive of test holes and pavement cores for a future rehabilitation project along sections of Bishop Grandin Boulevard (Abinojii Mikanah) in Winnipeg, Manitoba, Canada.

Scope of Work

The scope of work for the project entailed drilling a total of 12 test holes and recovering a total of thirty-four (34) cores through the existing pavement structure, documenting findings in accordance with Appendix B – Site Investigation Requirements for Public Works Street Projects and providing a report outlining the work conducted, including photographs and pavement core summary tables showing the pavement core thicknesses and locations using UTM coordinates.

The sections of road covered in the investigation were as follows:

- Eastbound Bishop Grandin Blvd (Abinojii Mikanah) (River Road to St Anne's Road) 12 Test Holes, 17 cores
- Westbound Bishop Grandin Blvd (Abinojii Mikanah) (Dakota Street to River Road) 17 cores

Field Program

ENG-TECH conducted the coring and drilling program between December 4th and 13th, 2023 across the site locations previously stated. The cores were obtained by ENG-TECH at locations determined by WSP using 100mm and 150mm diameter diamond end core barrels. The test holes were drilled using a Lone Star T1A+ drill rig equipped with 100 mm diameter solid stem continuous flight augers owned and operated by ENG-TECH. The test holes were advanced to 2.5 m below the pavement structure on Eastbound Bishop Grandin Boulevard (Abinojii Mikanah) at the locations as shown on Coring and Drilling Location Plan Figures 1 to7. Soil samples were collected off the auger flights, as measured from the bottom of the pavement structure, at depth intervals of 0.6, 0.9, 1.2, 1.6, 2.0, and 2.5 m as specified in the Site Investigation Requirements for Public Works Street Projects. After sample collection the test holes were backfilled with soil auger cuttings and granular fill. ENG-TECH repaired the core apertures with a City of Winnipeg approved material (cold mix asphalt) that has been accepted on previous street renewal projects.





Laboratory Program

The soil samples collected were retained for testing in ENG-TECH'S laboratory. The moisture content of each sample depth collected was determined and select samples were tested for particle size and Atterberg Limits. The moisture content, particle size and Atterberg Limit test results are summarized on Table 3 and in the attached test hole logs. The Particle Size Analysis and Liquid Limit, Plastic Limit and Plasticity Index of Soils results with ASTM D2487 and D3282 classifications are shown on Table 3 and separate reports enclosed.

Two standard proctors (moisture-density relationships) and California Bearing Ratios (CBR) were determined on composite samples of Test Holes (TH#) 1 to 7 and TH#'s 8 to 12 to represent the 2 sections of the eastbound lanes. The results are shown on the enclosed Moisture-Density Relationship and California Bearing Ratio Reports.

The pavement core thicknesses were measured and photographed. Photographs of each core are shown in the attached Photographs 1 to 34. Select concrete pavement cores were tested for compressive strength and the results are shown on the enclosed Obtaining and Testing Drilled Cores report.

Soil Stratigraphy Summary

The pavement structure ranged from 0.25m to 0.36m. As measured from the bottom of the pavement structure, there was typically 0.9m to 1.4m of high plastic (fat) clay underlain by another layer of predominately high plastic clay with minor irregular sections of slight silty clay to 2.5m depth explored.

Closure

ENG-TECH trusts this is all the information required. If you have any questions, please contact the undersigned.

Sincerely, ENG-TECH Consulting Limited Darci Babisky, C.E.T. **Operations Manager - Laboratory** Email: WSP Canada Inc. Contact Group Enclosures: Table 1 – Summary of Pavement Core Structure – EB Bishop Grandin Boulevard St Mary's Road to St Anne's Road Table 2 - Summary of Pavement Core Structure - WB Bishop Grandin Boulevard Dakota Street to River Road Table 3 - Summary of Pavement Structure - EB Bishop Grandin Boulevard River Road to St Annes's Road Figures 1 to 7 - Coring and Drilling Location Plan Specimen Photographs (34 pages) Test Hole Logs (12 pages) Obtaining and Testing Drilled Cores Report Ref. No. 23-35-3-2 Atterberg Limits, Plastic Index and Plasticity Index of Soil Reports Ref. No.'s 23-35-3-4, 5 and 9 Particle Size Analysis Reports Ref. No.'s 23-35-3-6, 7 and 10 Moisture-Density Relationship Report Ref. No. 23-35-3-11 and 13 California Bearing Ratio Report Ref. No. 23-35-3-12 and 14

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| | Table 1 - Summary of Pavement Core Structure Eastbound Bishop Grandin Boulevard St Mary's Road to St Anne's Road | | | | | | | | | | | | |
|-------------|--|-----------|------------|------------------|--------------------|----------------|--|--|--|--|--|--|--|
| Core | Long | Test Hole | e Location | Pavement Surface | | | | | | | | | |
| No. | Lane | UTM (N) | 14U (E) | Туре | Core Diameter (mm) | Thickness (mm) | | | | | | | |
| 504 | NA J | 5504500 | 025042 | Asphalt | 150 | 90 | | | | | | | |
| PC1 | Median | 5521533 | 635642 | Concrete | 150 | 190 | | | | | | | |
| | A | 5504000 | 005000 | Asphalt | 100 | 105 | | | | | | | |
| PC2 | Acceleration | 5521630 | 635830 | Concrete | 100 | 195 | | | | | | | |
| D 00 | 2 | 5504050 | 005050 | Asphalt | 150 | 145 | | | | | | | |
| PC3 | Curb | 5521650 | 635856 | Concrete | 150 | 180 | | | | | | | |
| 504 | NA | 5504044 | 000100 | Asphalt | 100 | 100 | | | | | | | |
| PC4 | Median | 5521811 | 636133 | Concrete | 100 | 200 | | | | | | | |
| DOC | Marilian | 5504007 | 626267 | Asphalt | 150 | 140 | | | | | | | |
| PC5 | Median | 5521887 | 636267 | Concrete | 150 | 210 | | | | | | | |

| Table 2 - Summary of Pavement Core Structure Westbound Bishop Grandin Boulevard Dakota Street to River Road | | | | | | | | | | | |
|---|--------------------|-----------|----------|------------------|--------------------|----------------|--|--|--|--|--|
| Core | Tana | Test Hole | Location | Pavement Surface | | | | | | | |
| No. | Lane – | UTM (N) | 14U (E) | Туре | Core Diameter (mm) | Thickness (mm) | | | | | |
| | Longitudinal Joint | 5500700 | 00.44.00 | Asphalt | 150 | 90 | | | | | |
| PC6 | between Lanes | 5520783 | 634163 | Concrete | 150 | 180 | | | | | |
| | | 5500700 | 004404 | Asphalt | 100 | 75 | | | | | |
| PC7 | Median | 5520783 | 634164 | Concrete | 100 | 175 | | | | | |
| 1927 IZ 13 | | | 00.4400 | Asphalt | 150 | 68 | | | | | |
| PC8 | Median | 5520784 | 634169 | Concrete | 150 | 205 | | | | | |
| | | | 004400 | Asphalt | 150 | 70 | | | | | |
| PC9 | Middle | 5520967 | 634483 | Concrete | 150 | 185 | | | | | |
| 5010 | | 5500000 | 004404 | Asphalt | 100 | 85 | | | | | |
| PC10 | Middle | 5520968 | 634484 | Concrete | 100 | 190 | | | | | |



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| File No. 23-035-03 | |



| | | Westbo | Table 2 - Summary of I und Bishop Grandin Boul | Pavement Core Structure evard Dakota Street to Riv | ver Road | | | | |
|-------------|---------------------|-----------|---|---|--------------------|----------------|--|--|--|
| Core | Laws | Test Hole | Location | Pavement Surface | | | | | |
| No. | Lane | UTM (N) | 14U (E) | Туре | Core Diameter (mm) | Thickness (mm) | | | |
| 5011 | | 5504000 | 004000 | Asphalt | 150 | 80 | | | |
| PC11 | Curb | 5521066 | 634662 | Concrete | 150 | 210 | | | |
| 5040 | 0 | 5504005 | 004000 | Asphalt | 150 | 90 | | | |
| PC12 | Curb | 5521065 | 634662 | Concrete | 150 | 210 | | | |
| DOID | | 5504007 | 624662 | Asphalt | 100 | 90 | | | |
| PC13 | Curb | 5521067 | 634662 | Concrete | 100 | 190 | | | |
| D011 | N.A I' | 5504450 | 624924 | Asphalt | 150 | 120 | | | |
| PC14 | Median | 5521152 | 634824 | Concrete | 150 | 230 | | | |
| DOIL | Marilian. | 5504044 | 625100 | Asphalt | 150 | 110 | | | |
| PC15 | Median | 5521311 | 635199 | Concrete | 150 | 220 | | | |
| | | 5504040 | 025400 | Asphalt | 150 | 130 | | | |
| PC16 | Median | 5521310 | 635199 | Concrete | 150 | 210 | | | |
| D017 | NA I' | 5504040 | 635200 | Asphalt | 100 | 110 | | | |
| PC17 | Median | 5521310 | 635200 | Concrete | 100 | 190 | | | |
| 5040 | | 5504004 | 635779 | Asphalt | 100 | 110 | | | |
| PC18 | Curb | 5521634 | 635779 | Concrete | 100 | 160 | | | |
| 2010 | | 5504700 | 025042 | Asphalt | 150 | 100 | | | |
| PC19 | Curb | 5521709 | 635912 | Concrete | 150 | 155 | | | |
| DODO | Qual | EE01709 | 635910 | Asphalt | 100 | 100 | | | |
| PC20 | Curb | 5521708 | 033910 | Concrete | 100 | 190 | | | |
| DO01 | Quit | 5524700 | 625012 | Asphalt | 150 | 100 | | | |
| PC21 | Curb | 5521709 | 635912 | Concrete | 150 | 190 | | | |
| | A Annual Property C | 5504500 | 025040 | Asphalt | 100 | 110 | | | |
| PC22 | Median | 5521533 | 635640 | Concrete | 100 | 200 | | | |



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| | | | | | Eastbound I | | Table nary of Paven din Boulevard | nent Struct | ure Id to St Annes | 's Road | | | | | | | | |
|------|---------|------------|----------|---------------|-------------|------------------------|---|--------------|-----------------------|---------------------|-------------|-------------|-------------|------------------|------------------|---------------------|---|---|
| Test | GPS Co | oordinates | Paveme | nt Surface | | nt Structure terial | Subgrade | Sample | Moisture | Hydrometer Analysis | | | sis | Atterberg Limits | | | | |
| Hole | UTM (N) | 14U (E) | Туре | Depth (mm) | Туре | Depth (mm) | Description | Depth (m) | Content (%) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) | Liquid Limit | Plastic Limit | Plasticity Index | | |
| | | | | | | | | 0.6 | 31.0 | - | - | - | - | - | - | - | | |
| | | | Asphalt | 190 | | | Fat Clay | 0.9 | 30.5 | 0.9 | 6.3 | 30.0 | 62.7 | 75 | 19 | 56 | | |
| TH1 | | | | | | | | 1.2 | 31.8 | - | - | - | - | - | - | - | | |
| | 5520738 | 634189 | | | Clay | 2500 | | 1.6 | 40.3 | - | - | | - | - | 2 | - 1 | | |
| | | | Concrete | 155 | | | | 2.0 | 39.5 | - | - | - | - | - | - | - | | |
| | | | | | | | | 2.5 | 44.1 | - | - | - | - | - | | - | | |
| | | | | | | | | | | 0.6 | 31.7 | - | - | ÷ | - | - | - | - |
| | | | Asphalt | 140 | Clay | 2500 | | 0.9 | 33.0 | | - | - | = | | | - | | |
| TH2 | 5520855 | 634403 | | | | | | 1.2 | 39.1 | - | | - | - | - | 2- | - | | |
| THZ | 5520655 | 034403 | | | Clay | 2500 | | 1.6 | 41.5 | - | - | - | - | - | - | - | | |
| | | | Concrete | 150 | | | | 2.0 | 28.6 | Ξ. | - | - | - | - | 12 | - | | |
| | | | | | | | | 2.5 | 48.6 | e n | - | - | - | - | - | - | | |
| | | | | sphalt 100 | | | | 0.6 | 27.6 | 3- | - | - | - | | 87 | - | | |
| | | | Asphalt | | | | | 0.9 | 29.1 | - | - | - | - | - | - | - | | |
| TH3 | 5520939 | 634553 | | | Clay | 2500 | Fat Clay | 1.2 | 34.0 | 2.7 | 4.0 | 17.7 | 75.6 | 80 | 27 | 53 | | |
| 1115 | 3320333 | 004000 | | | Oldy | 2000 | | 1.6 | 28.7 | - | - | - | | - | - | - | | |
| | | | Concrete | 180 | | | | 2.0 | 25.2 | | - | = | - | - | - | - | | |
| | | | | | | | | 2.5 | 32.3 | - | - | - | - | - | | - | | |
| | | | | | | | | 0.6 | 34.7 | - | - | - | - | | | - | | |
| | | | Asphalt | 85 | | | | 0.9 | 33.5 |) | - | - | - | - | - | - | | |
| TH4 | 5521041 | 634728 | | | Clay | 2700 | | 1.2 | 34.6 | - | - | - | - | - | - | - | | |
| | 0021011 | 00.120 | Concrete | 200 | Clay | 2100 | | 1.6 | 29.6 | - | - | - | - | - | - | - | | |
| | | | | | | | | 2.0 | 27.9 | - | - | - | - | 4 | - | - | | |
| | | | | | | | | 2.5 | 21.3 | = | - | - | - | E | - | - | | |

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| File No. 23-035-03 | |



| | Table 3 Summary of Pavement Structure Eastbound Bishop Grandin Boulevard Road River to St Anne's Road | | | | | | | | | | | | | | | |
|------|---|-----------|----------|---------------|-----------------|----------------------|-------------|--------------|-------------|---------------------|-------------|-------------|-------------|------------------|------------------|---------------------|
| Test | GPS Coo | ordinates | Pavemen | t Surface | Pavement Mat | t Structure erial | Subgrade | Sample | Moisture | Hydrometer Analysis | | | | Atterberg Limits | | |
| Hole | UTM (N) | 14U (E) | Туре | Depth (mm) | Туре | Depth (mm) | Description | Depth (m) | Content (%) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) | Liquid Limit | Plastic Limit | Plasticity Index |
| | | | | | | | | 0.6 | 40.1 | - | - | - | - | - | - | - |
| | | | Asphalt | 135 | | | | 0.9 | 28.8 | - | - | - | - | - | - | - |
| | | | | | | 0700 | | 1.2 | 33.1 | - | - | - | - | H. | - | - |
| TH5 | 5521147 | 634954 | | | Clay | 2700 | | 1.6 | 34.8 | - | - | - | - | | - | - |
| | | | Concrete | 150 | | | | 2.0 | 36.4 | - | - | - | - | - | - | - |
| | | | | | | | | 2.5 | 43.7 | - | - | - | - | - | - | - |
| | 5521213 | | Asphalt | | | | | 0.6 | 32.0 | - | - | - | - | - | - | - |
| | | | | 110 | - Clay | 2500 | | 0.9 | 24.4 | - | - | - | - | - | - | - |
| TUC | | 635083 | | | | | | 1.2 | 22.9 | - | - | - | - | | | - |
| TH6 | | 635063 | | | | | | 1.6 | 35.4 | - | - | - | - | - | - | - |
| | | | Concrete | 200 | | | | 2.0 | 38.3 | - | - | - | - | - | - | - |
| | | | | | | | | 2.5 | 44.2 | - | - | - | - | - | - | - |
| | | | | | | | | 0.6 | 39.3 | - | - | | - | - | - | - |
| | | | Asphalt | 75 | | | | 0.9 | 38.6 | - | - | - | - | - | - | - |
| TH7 | 5521313 | 635083 | | | Clay | 2700 | | 1.2 | 34.8 | - | - | - | - | - | - | - |
| | 5521515 | 035005 | | | Ciay | 2700 | | 1.6 | 29.6 | - | - | - | - | | - | - |
| | | | Concrete | 200 | | | | 2.0 | 25.0 | - | - | - | - | - | - | - |
| | | | | | | | | 2.5 | 21.9 | - | - | - | - | | - | - |
| | | | | | | | | 0.6 | 29.2 | - | - | - | - | - | - | - |
| | | | Asphalt | 170 | | | | 0.9 | 29.6 | - | - | - | - | | - | - |
| TH8 | 5521567 | 636401 | | | Clay | 2500 | | 1.2 | 29.9 | - | - | - | - | - | - | - |
| 100 | 3521507 | 000401 | Concrete | | Oldy | 2000 | | 1.6 | 23.3 | - | - | - | - | - | - | - |
| | | | | 195 | | | | 2.0 | 22.5 | - | - | - | - | - | - | - |
| | | | | | | | | 2.5 | 32.5 | - | - | - | - | - | - | - |



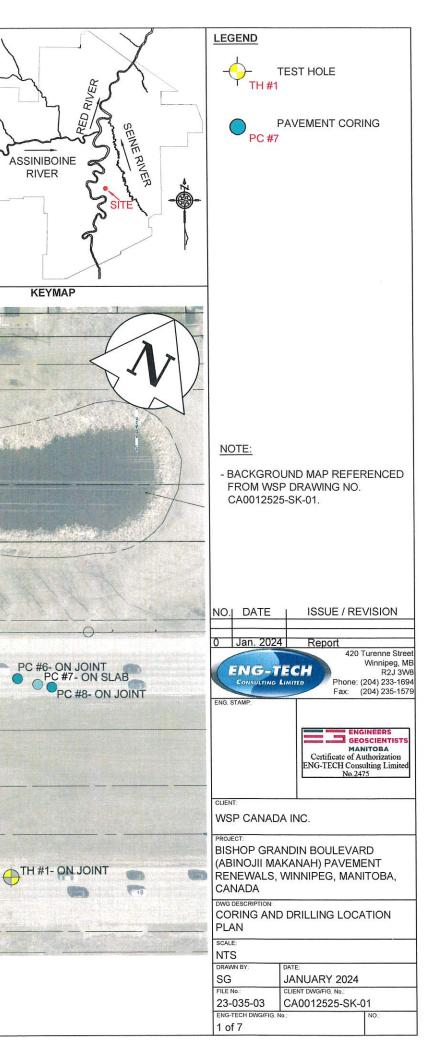
| WSP Canada Inc. |
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| Bishop Grandin Boulevard (Abinojii Mikanah) Pavement Renewals, Winnipeg, Manitoba Canada |
| File No. 23-035-03 |



| | Table 3 Summary of Pavement Structure Eastbound Bishop Grandin Boulevard River Road to St Anne's Road | | | | | | | | | | | | | | | | | |
|-------------|---|-----------|------------|---------------|-----------------|----------------------|-------------|--------------|-------------|---------------------|---------------|-------------|-------------|------------------|------------------|---------------------|---|---|
| Test | GPS Coo | ordinates | Pavemen | t Surface | Pavement Mat | t Structure erial | Subgrade | Sample | Moisture | Hydrometer Analysis | | | is | Atterberg Limits | | | | |
| Hole | UTM | 14U | Туре | Depth (mm) | Туре | Depth (mm) | Description | Depth (m) | Content (%) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) | Liquid Limit | Plastic Limit | Plasticity Index | | |
| | | | | | | | | 0.6 | 32.7 | - | - | - | - | - | - | - | | |
| | | | Asphalt | 110 | | | | 0.9 | 32.9* | - | - | - | - | | - | - | | |
| TH9 5522044 | | | | | | | | 1.2 | 33.7 | - | - | - | - | - | - | - | | |
| | 5522044 | 636534 | | | Clay | 2500 | | 1.6 | 40.6 | - | - | - | - | - | - | - | | |
| | | | Concrete | 140 | | | | 2.0 | 39.4 | - | - | - | - | - | - | - | | |
| | | | | | | | | 2.5 | 45.8 | - | - | - | - | - | - | - | | |
| | | | | | | | | | | 0.6 | 37.3 | | - | - | - | - | - | - |
| | | | Asphalt 10 | 105 | | | Fat Clay | 0.9 | 32.2 | 0.2 | 6.0 | 19.6 | 74.2 | 88 | 31 | 57 | | |
| THE | 5522130 | 000000 | 22 | | - Clay | 0500 | | 1.2 | 35.5 | - | - | - | - | - | - | - | | |
| TH10 | | 636686 | | | | 2500 | | 1.6 | 35.6 | - | - | - | - | - | - | - | | |
| | | | Concrete | 200 | | | | 2.0 | 36.1 | - | - | - | - | - | - | - | | |
| | | | | | | | | 2.5 | 36.3 | | - | - | - | - | - | - | | |
| | | | | | | | | 0.6 | 31.1 | - | . | . – | - | | - | - | | |
| | | | Asphalt | 90 | | | | 0.9 | 31.0 | - | - | - | - | - | - | - 2 | | |
| TH11 | 5522187 | 636788 | | | Clay | 2500 | | 1.2 | 34.3 | - | - | - | - | - | - | - | | |
| | 5522107 | 030700 | | | Ciay | 2000 | | 1.6 | 24.6 | - | - | - | - | - | - | - | | |
| | | | Concrete | 200 | | | | 2.0 | 33.8 | - | - | - | - | - | - | - | | |
| | | | | | | | | 2.5 | 40.0 | - | - | - | - | - | - | - | | |
| | | | | | | | | 0.6 | 29.2 | ~ | - | - | - | - | - | | | |
| | | | Asphalt | 95 | | | | 0.9 | 33.4 | - | - | - | - | - | - | - | | |
| TH12 | 5522267 | 636929 | | | Clay | 2500 | | 1.2 | 32.8 | - | . | - | - | - | - | - | | |
| 11112 | JULLEUT | 000020 | Concrete | | , | | | 1.6 | 32.0 | - | - | - | - | - | - | - | | |
| | | | | te 200 | | | | 2.0 | 29.3 | - | - | - | - | - | - | - | | |
| | | | | | | | | 2.5 | 27.3 | - | - | - | - | - | - | - | | |

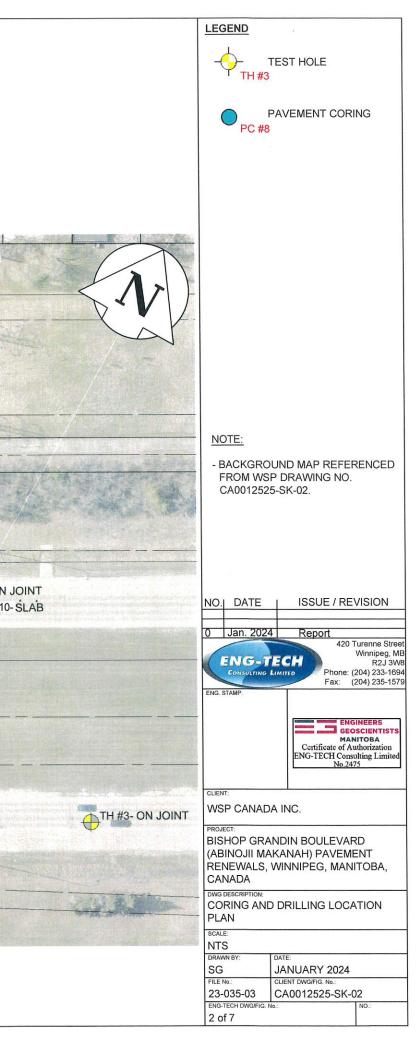


| | and the second sec | | CORE LOCATION TABLE | | |
|----------------------|--|--|--|--|--|
| HOLE | CORING COM DECEMBER 4, 5 | APLETED ON 6 AND 7 2023 | | | |
| NUMBER | UTM COO | | LOCATION DESCRIPTIONS | | |
| | UTM | 14U | - | | |
| TH #1 | 5520738 | 634189 | EB LANE, MEDIAN LANE, ON € OF LANE | | and a |
| PC #6 | 5520783 | 634163 | WB LANE, ON € BETWEEN MEDIAN AND MIDDLE LAN | JE | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |
| PC #7 | 5520783 | 634164 | WB MEDIAN LANE, ON &LANE | | |
| PC #8 | 5520784 | 634169 | WB MEDIAN LANE, ON & OF LANE | | |
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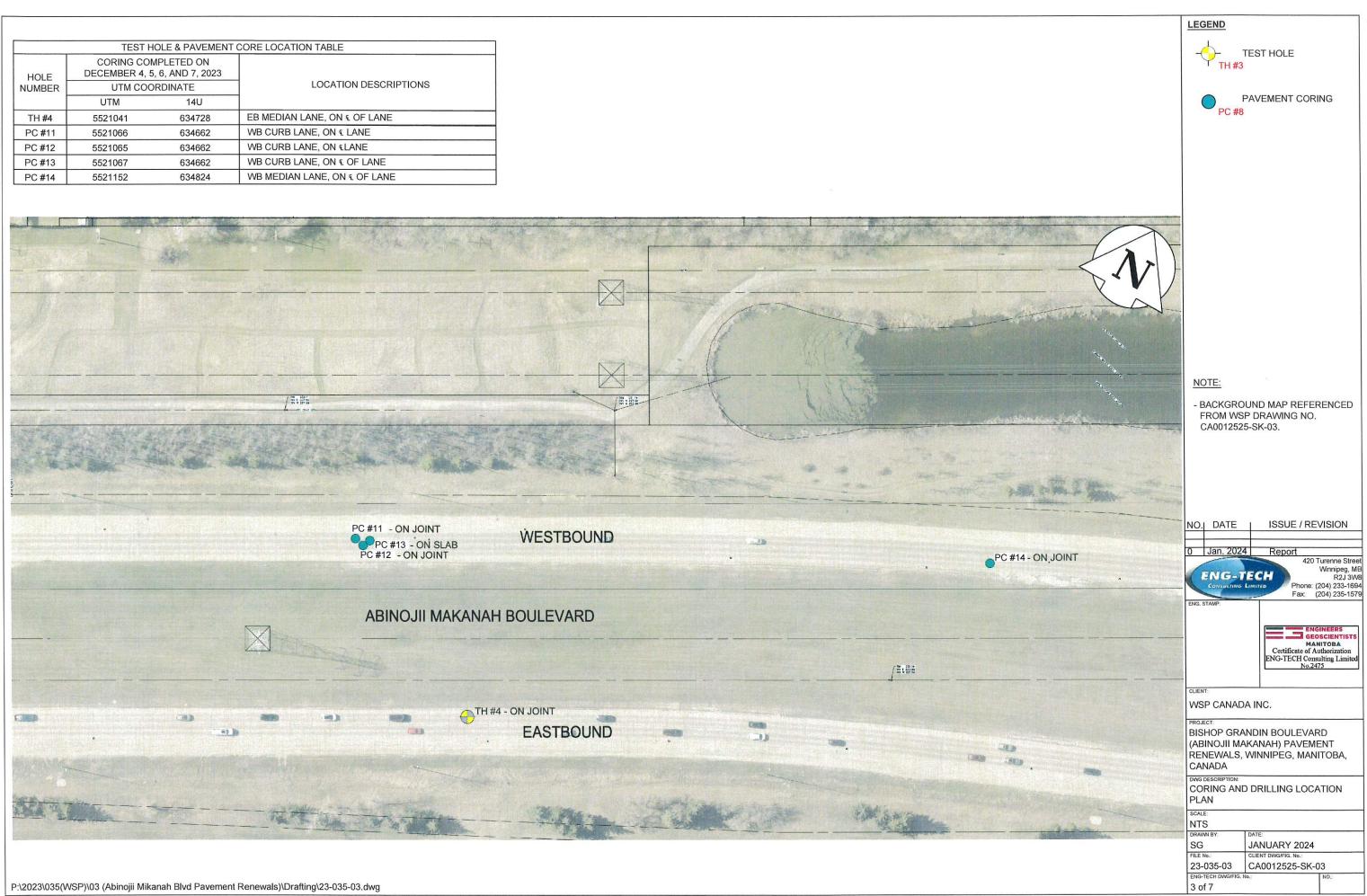


| IST HOLE & PAVEMENT CORE LOCATION TABLE HOLE UTIM LOCATION DESCRIPTIONS UTIM 14U LOCATION DESCRIPTIONS TH #2 5520855 534403 EB CURB LANE, ON & OF LANE PC #8 5520855 634453 EB CURB LANE, ON & LANE PC #9 5520865 634454 WB MIDDLE LANE, ON & LANE PC #10 5520865 634454 WB MIDDLE LANE, ON & LANE PC #10 5520865 634454 WB MIDDLE LANE, ON & LANE PC #10 5520867 634454 WB MIDDLE LANE, ON & LANE VESTBOUND VESTBOUND WESTBOUND | |
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| NUMBER UTM COORDINATE LOCATION DESCRIPTIONS 11 H#2 5520855 634403 EB CURB LANE, ON & OF LANE TH #3 5520986 634403 WB MIDDLE LANE, ON & OF LANE PC #10 5520986 634404 WB MIDDLE LANE, ON & OF LANE | |
| NUMBER UTM 144 LOCATION DESCRIPTIONS TH #2 5520855 634403 EB CURB LANE, ON & OF LANE TH #3 5520967 634483 WB MIDDLE LANE, ON & LANE PC #3 5520968 634484 WB MIDDLE LANE, ON & OF LANE PC #10 5520968 634484 WB MIDDLE LANE, ON & OF LANE | |
| TH #2 5520855 634403 EB CURB LANE, ON & OF LANE TH #3 5520893 634553 TE CUBB LANE, ON & LANE PC #0 5520967 634483 WB MIDDLE LANE, ON & LANE PC #10 5520988 634484 WB MIDDLE LANE, ON & LANE | |
| TH #3 5520939 634553 EB CURB LANE, ON & LANE PC #9 5520967 634483 WB MIDDLE LANE, ON & OF LANE PC #10 5520968 634484 WB MIDDLE LANE, ON & OF LANE | |
| PC #9 5520967 634483 WB MIDDLE LANE, ON & OF LANE PC #10 5520968 634484 WB MIDDLE LANE, ON & OF LANE | |
| PC #10 5520968 634484 WB MIDDLE LANE, ON % OF LANE | |
| EINE WESTBOUND ABINOJII MAKANAH BOULEVARD | |
| ABINOJII MAKANAH BOULEVARD | |
| | PC #9 - ON J |
| | |
| EASTBOUND OTH #2- ON JOINT | |
| | 0 |

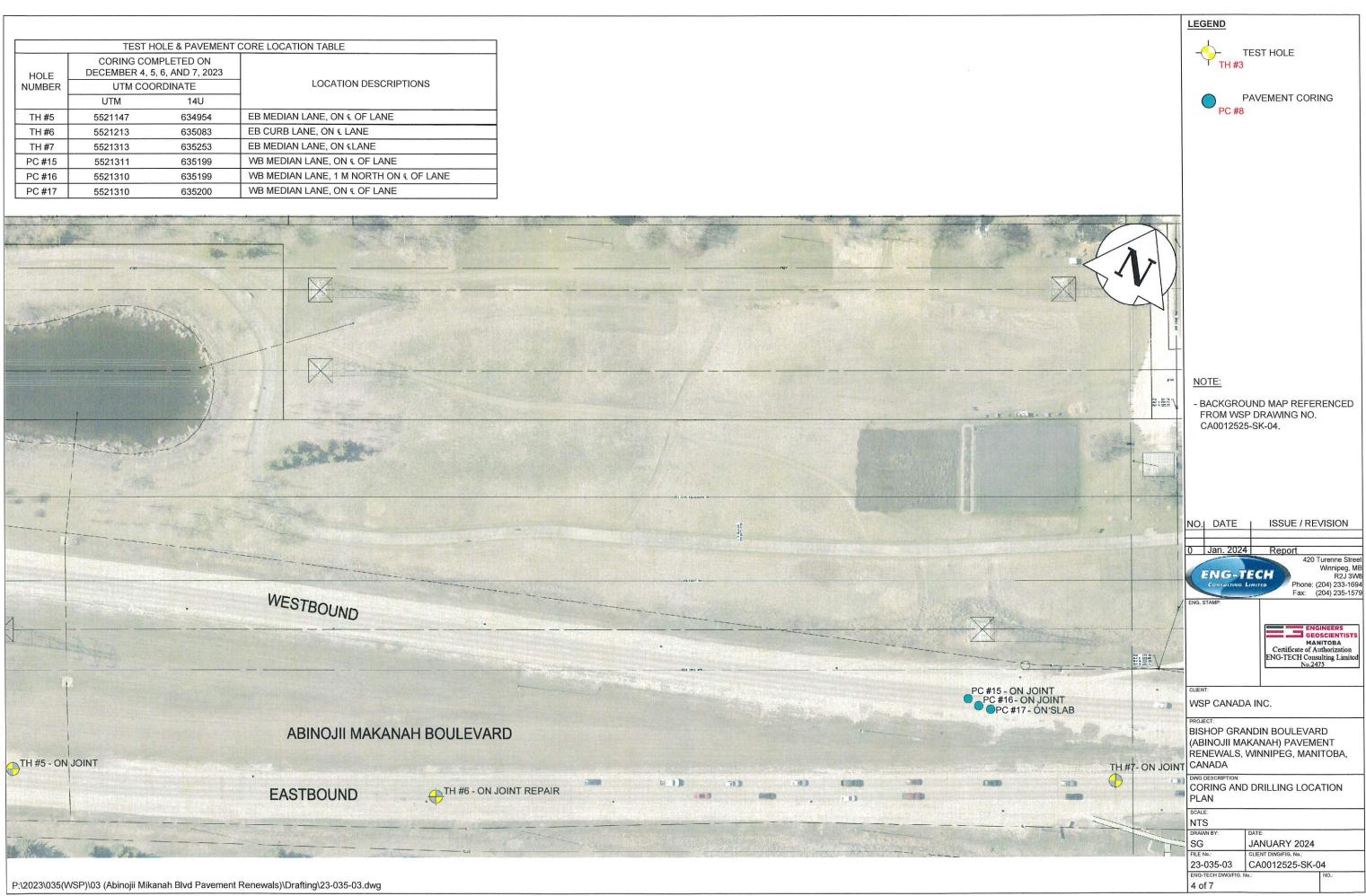
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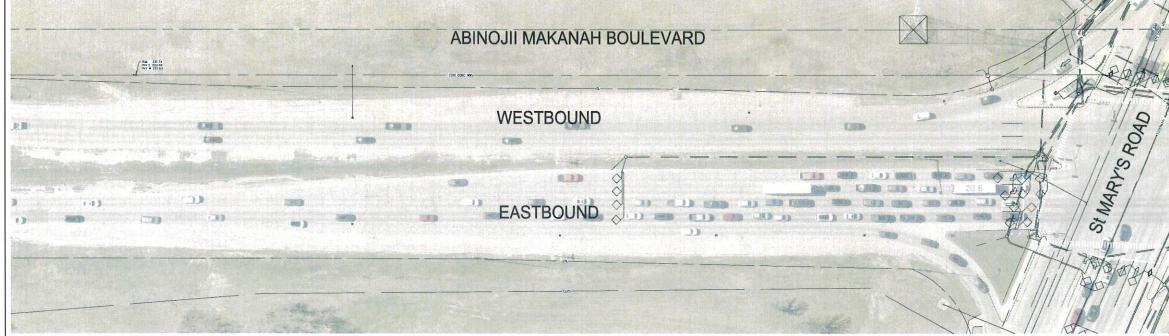
| | TEST H | OLE & PAVEMENT | CORE LOCATION TABLE |
|--|----------------|----------------|------------------------------|
| HOLE CORING COMPLETED ON DECEMBER 4, 5, 6, AND 7, 2023 NUMBER UTM COORDINATE | | | |
| | | RDINATE | LOCATION DESCRIPTIONS |
| | UTM | 14U | |
| TH #4 | 5521041 | 634728 | EB MEDIAN LANE, ON € OF LANE |
| PC #11 | 5521066 | 634662 | WB CURB LANE, ON € LANE |
| PC #12 | 5521065 | 634662 | WB CURB LANE, ON €LANE |
| PC #13 | 5521067 634662 | | WB CURB LANE, ON € OF LANE |
| PC #14 | 5521152 634824 | | WB MEDIAN LANE, ON € OF LANE |

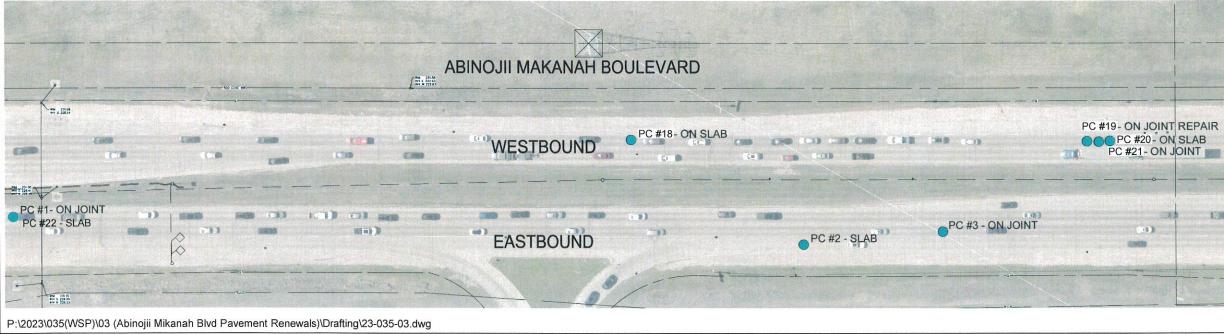


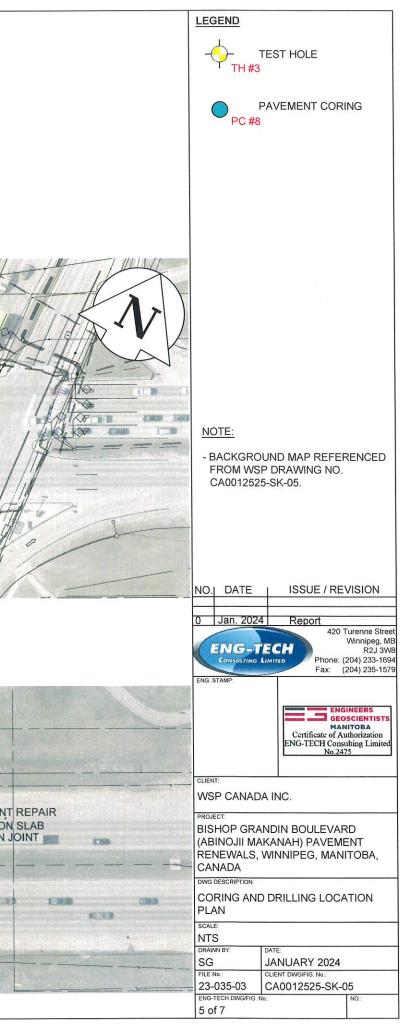
| | IPLETED ON | | |
|--|---|---------|--------|
| | HOLE DECEMBER 4, 5, 6, AND 7, 2023 NUMBER UTM COORDINATE | | |
| LOCATION DESCRIPTIONS | | | |
| | 14U | UTM | |
| EB MEDIAN LANE, ON € OF LANE | 634954 | 5521147 | TH #5 |
| EB CURB LANE, ON € LANE | 635083 | 5521213 | TH #6 |
| EB MEDIAN LANE, ON €LANE | 635253 | 5521313 | TH #7 |
| WB MEDIAN LANE, ON € OF LANE | 635199 | 5521311 | PC #15 |
| WB MEDIAN LANE, 1 M NORTH ON € OF LANE | 5521310 635199 | | PC #16 |
| WB MEDIAN LANE, ON € OF LANE | 635200 | 5521310 | PC #17 |



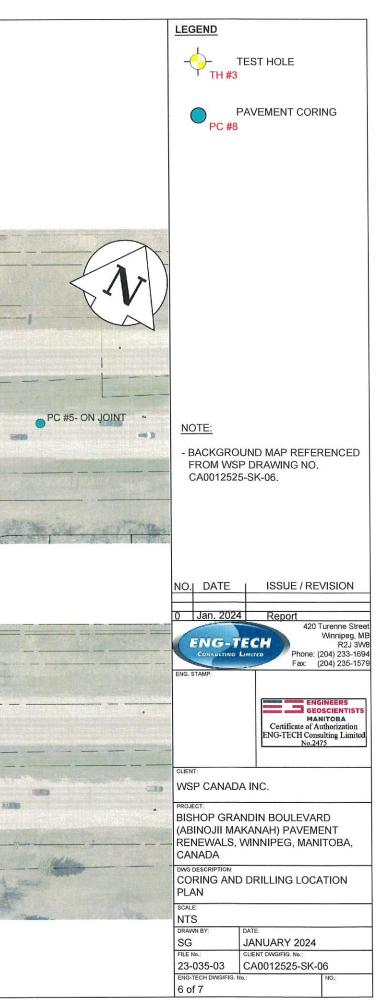
| | TEST F | IOLE & PAVEMENT | CORE LOCATION TABLE | |
|--------|---------|-----------------|--|--|
| HOLE | | | | |
| NUMBER | | | LOCATION DESCRIPTIONS | |
| | UTM 14U | | | |
| PC #1 | 5521533 | 635642 | EB MEDIAN LANE, 0.8 M NORTH OF € OF LANE | |
| PC #2 | 5521630 | 635830 | EB ACCELERATION LANE, ON € LANE | |
| PC #3 | 5521650 | 635856 | EB CURB LANE, ON & LANE | |
| PC #18 | 5521634 | 635779 | WB CURB LANE, ON € OF LANE | |
| PC #19 | 5521709 | 635912 | WB CURB LANE, ON € OF LANE | |
| PC #20 | 5521708 | 635910 | WB CURB LANE, ON € OF LANE | |
| PC #21 | 5521709 | 635912 | WB CURB LANE, ON € OF LANE | |
| PC #22 | 5521533 | 635642 | EB MEDIAN LANE, 0.8 M NORTH OF & OF LANE | |



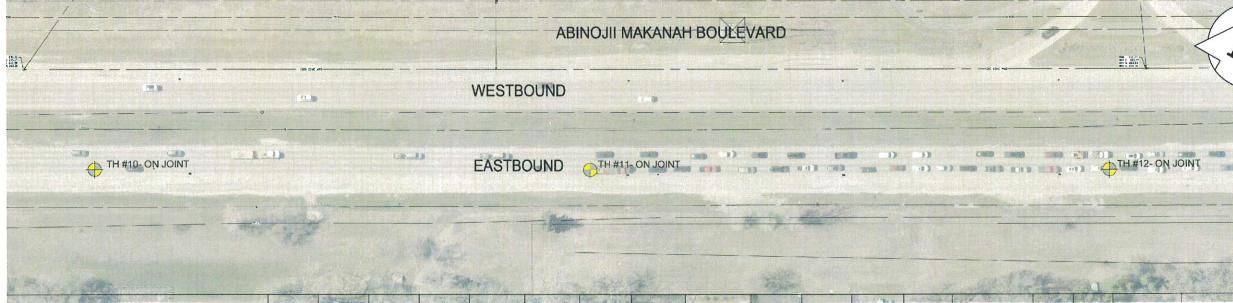


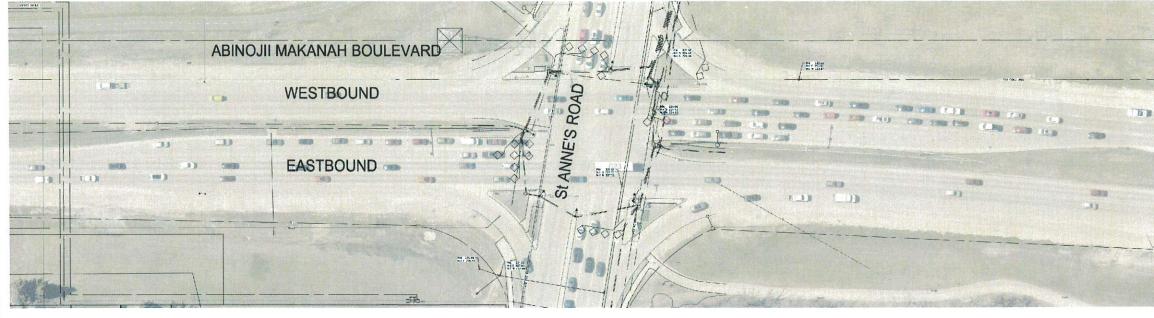


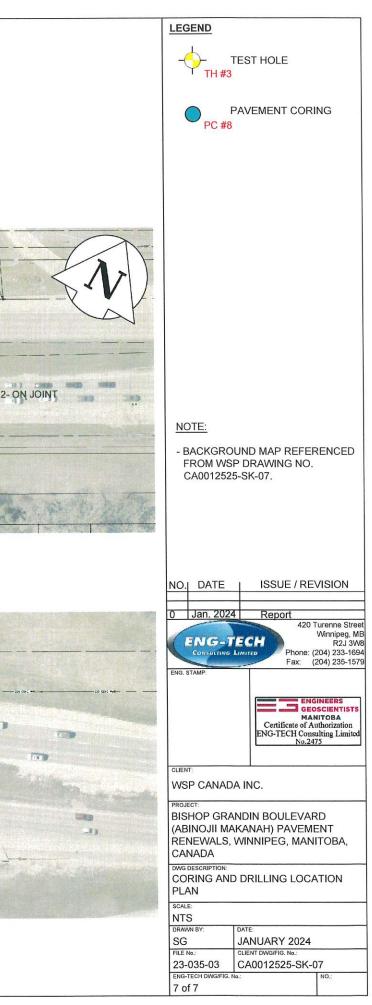
| | TEST H | OLE & PAVEMENT | CORE LOCATION TAB | LE | | | | | | |
|-------------------|--|--|-------------------|----------------------------------|--------------------|-----------------|------------------------|----------------|--------------|---|
| IOLE - IMBER | CORING COM DECEMBER 4, 5, UTM COOI | 6, AND 7, 2023 | LOCA | TION DESCRIPTIONS | | | | | | |
| | UTM | 14U | - | | | | | | | |
| -H #8 | 5521567 | 636401 | EB MEDIAN LANE, 0 | .8 M NORTH OF € OF LANE | | | | | | |
| ⁻ H #9 | 5522044 | 636534 | EB CURB LANE, 0.5 | M NORTH OF & LANE | | | | | | |
| PC #4 | 5521811 | 636133 | EB MEDIAN LANE, C | N €LANE | | | | | | |
| PC #5 | 5521887 | 636267 | WB MEDIAN LANE, | ON € OF LANE | | | | | | |
| | DAKOTA STREET | a state of the sta | | | | PC #4 - ON SLAB | JII MAKANA WESTBOUI | | | |
| ~~~ | | | ===== | | | | | | | |
| | | | | | | | Hele | | | |
| | A THE | | | ABINOJ | II MAKANAH BOULEVA | ARD | | A | Z | 2 |
| | | • | | | /ESTBOUND | | | | | • |
| | | | | | | | | | | |
| -0 | 0 | -1) (200 | 1 ed | ⊕ ^{TH #8- ON JOINT} , E | ASTBOUND | | | . Ф тна | #9- ON JOINT | |
| | D. | | | ➡ ^{TH #8- ON JOINT} | ASTBOUND | | | ⊕ ™ | #9- ON JOINT | |



| [| TEST H | OLE & PAVEMENT | CORE LOCATION TABLE | | | |
|--------|----------------|--------------------------------|----------------------------|--|--|--|
| | | /PLETED ON , 6, AND 7, 2023 | | | | |
| NUMBER | UTM COC | RDINATE | LOCATION DESCRIPTIONS | | | |
| | UTM | 14U | | | | |
| TH #10 | 5522130 | 636686 | EB CURB LANE, ON € OF LANE | | | |
| TH #11 | 5522187 636788 | | EB CURB LANE, ON € LANE | | | |
| PC #12 | 5522267 | 636929 | EB CURB LANE, ON €LANE | | | |

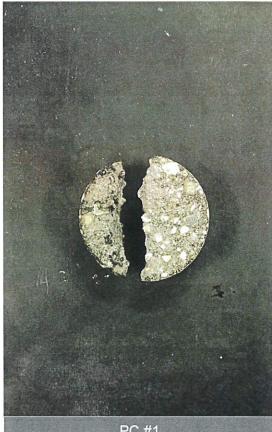






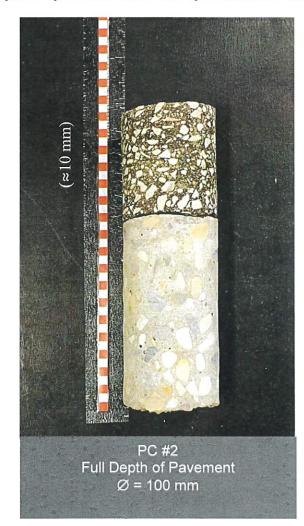
Photograph 1: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane



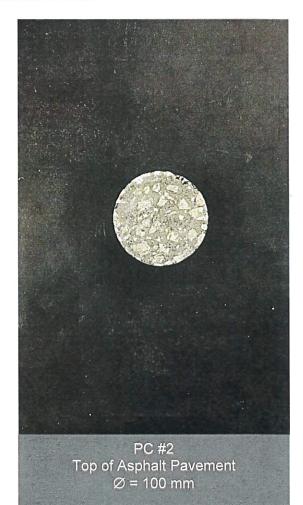


PC #1 Top of Asphalt Pavement Ø = 150 mm

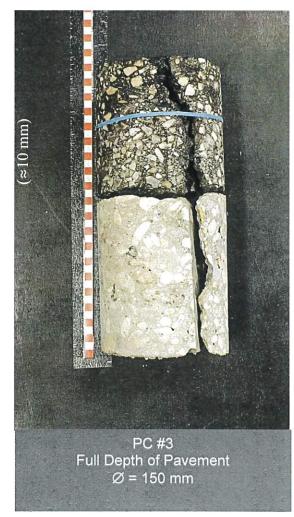




Photograph 2: Specimen from Bishop Grandin Boulevard, Eastbound Acceleration Lane



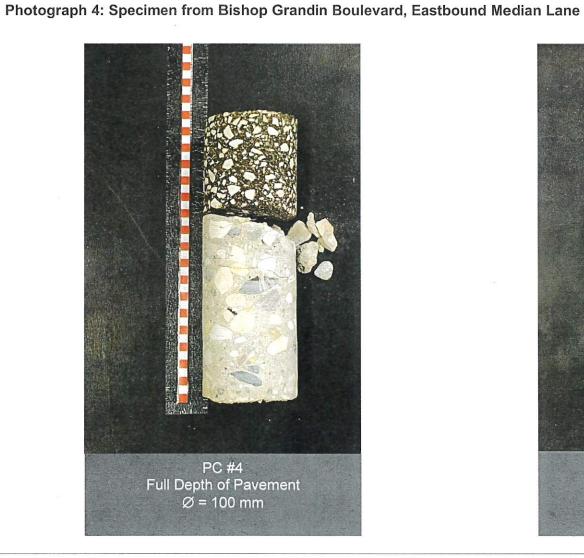








Photograph 3: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane





Top of Asphalt Pavement $\emptyset = 100 \text{ mm}$



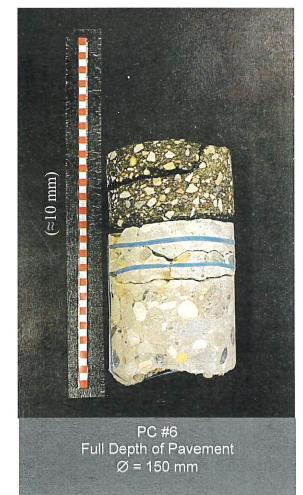


Photograph 5: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane











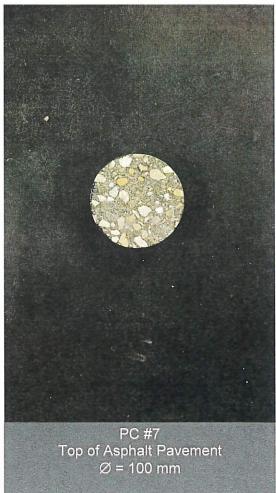


Photograph 6: Specimen from Bishop Grandin Boulevard, Westbound Lane Longitudinal Joint between Lanes

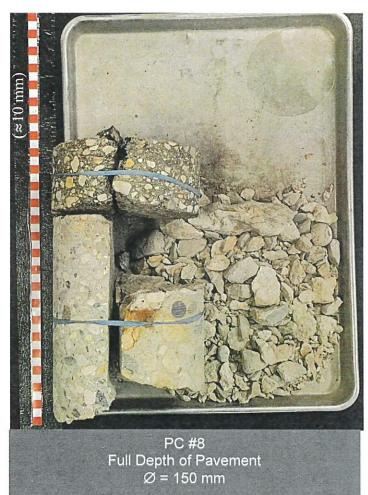
Photograph 7: Specimen from Bishop Grandin Boulevard, Westbound Median Lane

File No.: 23-035-03 Page 7

PC #7 Full Depth of Pavement \emptyset = 100 mm





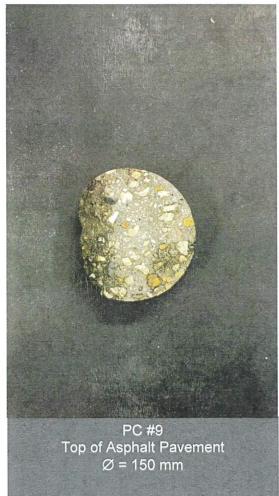






Photograph 8: Specimen from Bishop Grandin Boulevard, Westbound Median Lane

PC #9 Full Depth of Pavement Ø = 150 mm

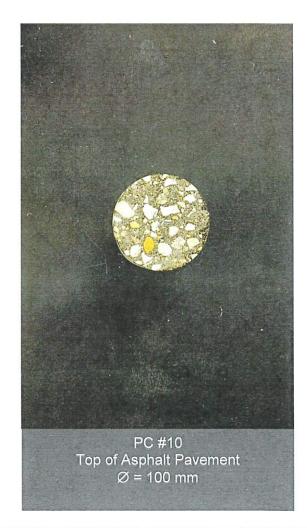




Photograph 9: Specimen from Bishop Grandin Boulevard, Westbound Middle Lane

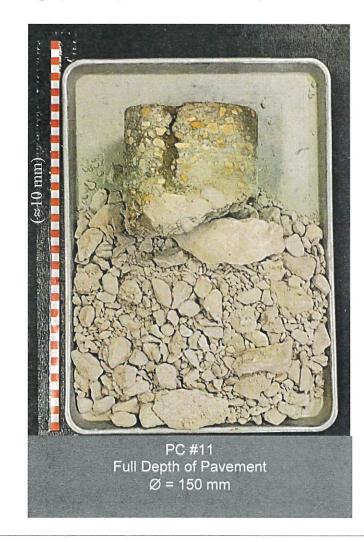
Photograph 10: Specimen from Bishop Grandin Boulevard, Westbound Middle Lane







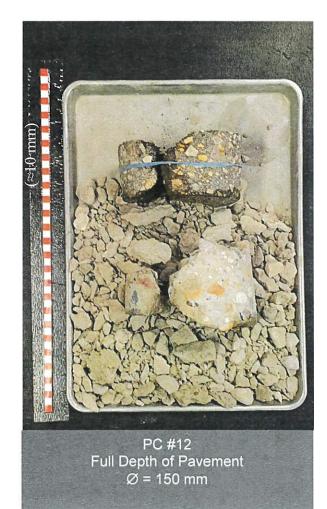
Photograph 11: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane







Photograph 12: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane







Photograph 13: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane



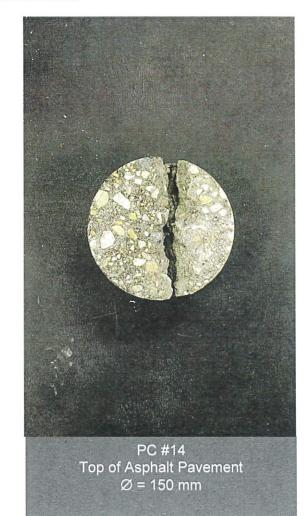
PC #13 Top of Asphalt Pavement

 $\emptyset = 100 \text{ mm}$

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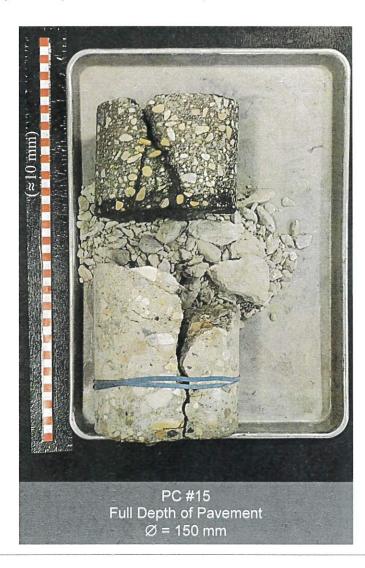
PC #14 Full Depth of Pavement $\varnothing = 150 \text{ mm}$





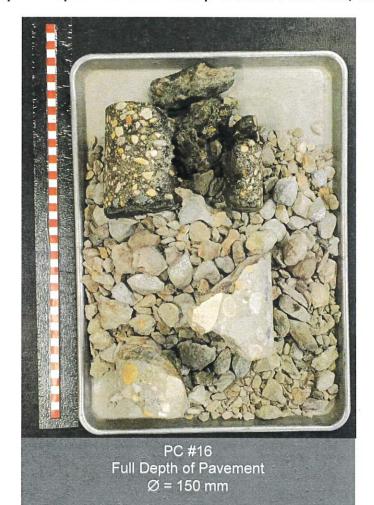
Photograph 14: Specimen from Bishop Grandin Boulevard, Westbound Median Lane

Photograph 15: Specimen from Bishop Grandin Boulevar, Westbound Median Lane













Photograph 16: Specimen from Bishop Grandin Boulevard, Westbound Median Lane

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Photograph 17: Specimen from Bishop Grandin Boulevard, Westbound Median Lane



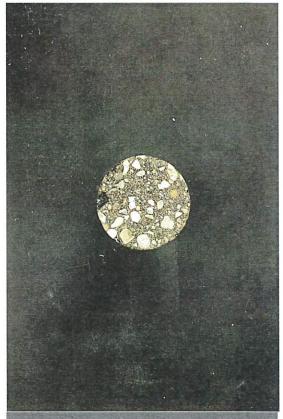


PC #17 Top of Asphalt Pavement Ø = 100 mm



Photograph 18: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane



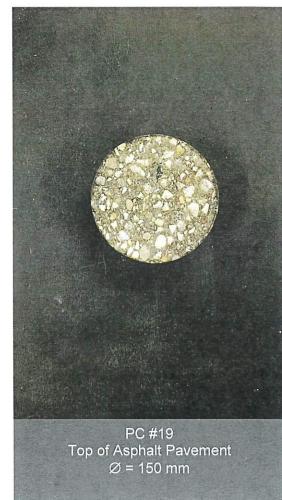


PC #18 Top of Asphalt Pavement Ø = 100 mm



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Photograph 19: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane

Photograph 20: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane



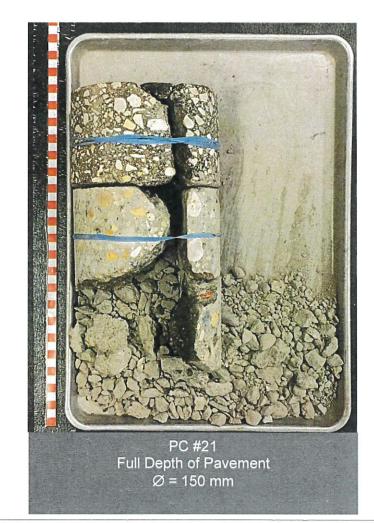




Page 21

File No.: 23-035-03

Photograph 21: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane



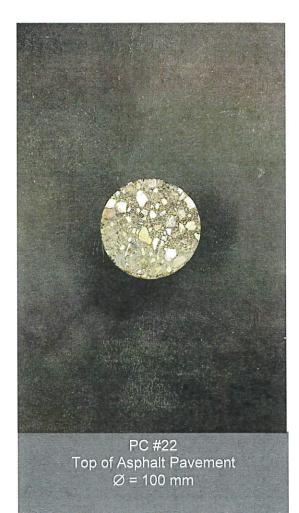




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Photograph 22: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane



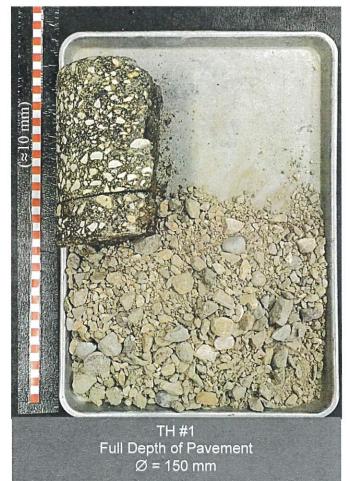


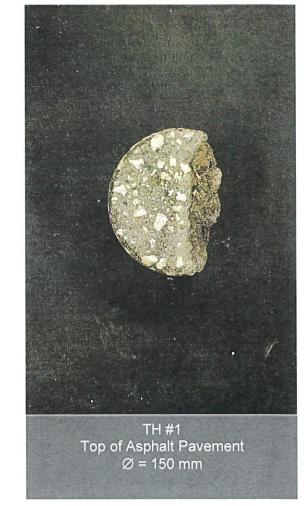


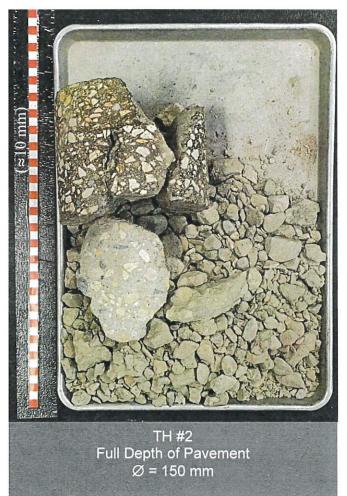
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Photograph 23: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane

File No.: 23-035-03 Page 23











Photograph 24: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane

Photograph 25: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane

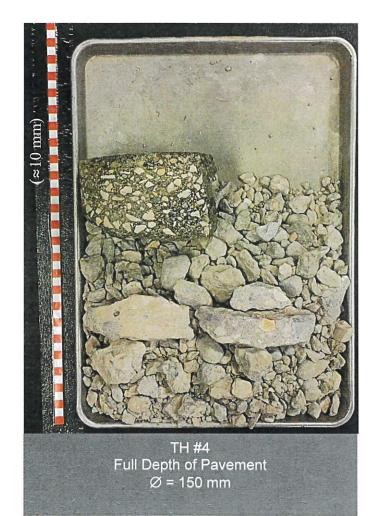
TH #3 Full Depth of Pavement Ø = 150 mm

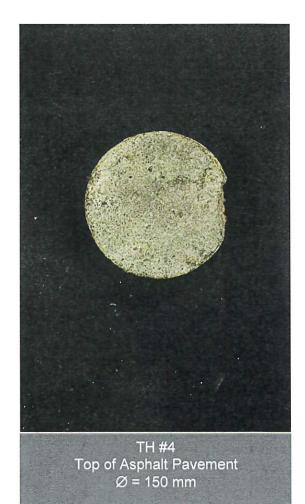




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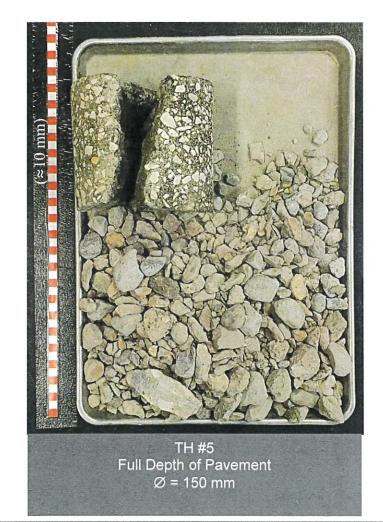
Photograph 26: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane







Photograph 27: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane







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Photograph 28: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane



TH #6 Full Depth of Pavement \emptyset = 150 mm





Photograph 29: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane



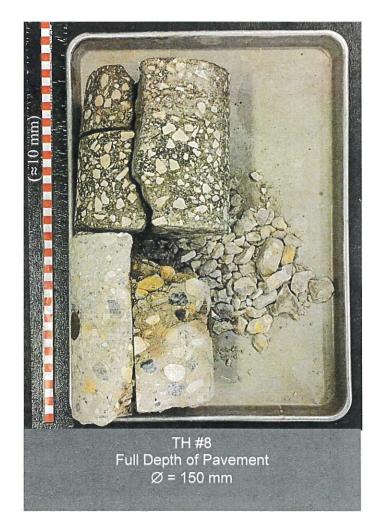
Full Depth of Pavement $\emptyset = 150 \text{ mm}$



Top of Asphalt Pavement $\emptyset = 150 \text{ mm}$



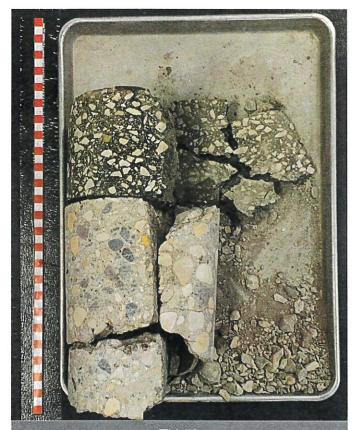
Photograph 30: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane







Photograph 31: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane

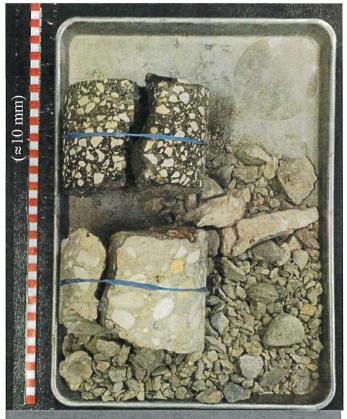


TH #9 Full Depth of Pavement Ø = 150 mm





Photograph 32: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane



TH #10 Full Depth of Pavement Ø = 150 mm



Top of Asphalt Pavement $\emptyset = 150 \text{ mm}$



Photograph 33: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane



Ø = 150 mm



Top of Asphalt Pavement Ø = 150 mm



Photograph 34: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane



Ø = 150 mm



Top of Asphalt Pavement $\emptyset = 150 \text{ mm}$



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Location: See Figure 1

Client: WSP Canada Inc.

Site: EB Abinojii Mikanah Blvd, Winnipeg, MB

File No.: 23-035-03

Water Elevation: --

Date Drilled: December 4, 2023

Grade Elevation: 100.0 m

Engineering And TestingLocation: See Figure 1water Elevation: --Solutions That Work For YouProject: Bishop Grandin Boulevard (Abinojii Mikanah) Pavement Renewals

| | | SUBSURFACE PROFILE | | S | AMPL | E DAT | A | _ | | SHEAR ENGTH | |
|-----------|---|---|---------------|------------|-------------|----------------------|--------------|---|--------|----------------|----|
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | P. Pen | Torvane | nc |
| 0.0- | | Ground Surface Asphalt (190 mm) | 100.0 | | | | | | - | | |
| - | | Concrete (155 mm) | | | | | | | | | |
| - | | <i>Fat Clay</i> - dark brown, moist, stiff, high plastic, trace silt, trace sand, trace gravel. | - | S1 | 1 | 31.0 | | • | | | |
| - 1.0- | - | | 99.0- | S2 | 1 | 30.5 | | | | | |
| - | | | - | S 3 | 1 | 31.8 | 1 | | | | |
| - | | - below 1.5 m medium brown, stiff, trace silt. | _ | S4 | \$ | 40.3 | | • | | | |
| 2.0- | | <i>Clay</i> - light brown, moist, very stiff, high plastic. - below 2.2 m medium brown, stiff. | 98.0- | S5 | \$ | 39.5 | | | | | |
| - | | | _ | S6 | | 44.1 | | | | | |
| 3.0- | - | End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling. | 97.0- | | | - | | | - | | |
| 4.0- | | | 96.0- | | | | | | - | | |
| - | - | | - | | | | | | | | |
| 5.0- | | | 95.0- | | | | | | - | | |
| Lo | ogge | CH Consulting Limited Drilled By ed by: DO Drill Rig: wed by: ① Auger Siz | Lone Sta | ar T1, | A+ | | | nited Completion Dep Completion Ele Sheet: 1 of 1 | | | m |
| SA | AMPLE TYPE SPLIT BARREL SHELBY TUBE SAUGER CUTTINGS SPLIT SPOON | | | | | | | | | | |



Client: WSP Canada Inc.

Location: See Figure 3

File No.: 23-035-03

Date Drilled: December 4, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba

Grade Elevation: 100.0 m Water Elevation: --

Engineering And Testing

| | | SUBSURFACE PROFILE | | S | AMPL | E DAT | A | _ | | SHEAR | |
|-----------|---|---|-----------------------|------------|-------------|----------------------|--------------|--|-------------|---------|-------|
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | STRE Leu | Torvane | (kPa) |
| 0.0- | | Ground Surface | 100.0 | _ | | | | | - | | |
| - | | Asphalt (85 mm) Concrete (200 mm) | 1 - | _ | | | | | | | |
| - | - | <i>Fat Clay</i> - dark brown, moist, stiff, high plastic, silt, trace sand, trace gravel. | - | - S1 | \$ | 34.7 | | • | | | |
| - 1.0- | | | 99.0- | S2 | 1 | 33.5 | | • | | | |
| 1.0 | | | 99.0 | - S3 | 1 | 34.6 | | • | - | | |
| - | | | - | | | | | | | | |
| - | | | | S 4 | • | 29.6 | | | | | |
| - | | Clay - medium brown, moist, firm, high plastic, | | | | | | | | | |
| 2.0- | | silty. - below 2.1 m light brown. | 98.0- | S5 | | 27.9 | | | | | |
| _ | 11 | bolow 2.1 might brown. | | S 6 | | 21.3 | | | | | |
| - | 11 | | | _ | | | | | | | |
| - 3.0- | - | End of Test Hole - end of test hole at 2.7 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and | 97.0- | - | | | | | - | | |
| - | | gravel and patched with cold mix asphalt upon completion of drilling. | | | | | | | | | |
| | | | | | | | | | | | |
| 4.0- | | | 96.0- | - | | | | | _ | | |
| - | | | 8 | - | | | | | | | |
| - | | | | - | | | | | | | |
| - | | | | - | | | | | | | |
| 5.0- | | | 95.0- | | | | | | | | |
| | TEC | CH Consulting Limited | | | 0 | | | | 4.0- | , | |
| Lo | ogge | by: P7 | By: ENG- : Lone St | | | sultir | ig Lir | nited Completion Dep Completion Elev | | | n |
| Re | evie | | | | | Stem | | Sheet: 1 of 1 | | | |
| SA | Auger Size: 100 mm Solid Stem Sheet: 1 of 1 AMPLE TYPE SPLIT BARREL SHELBY TUBE AUGER CUTTINGS SPLIT SPOON | | | | | | | | | | |



Client: WSP Canada Inc.

Location: See Figure 4

File No.: 23-035-03

Date Drilled: December 4, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Water Elevation: --

Engineering And TestingLocation: See Figure 4water Elevation: --Solutions That Work For YouProject: Bishop Grandin Boulevard (Abinojii Mikanah) Pavement Renewals

| | | SUBSURFACE PROFILE | | S | AMPL | e dat | Ά | | | SHEAR | 2 |
|----------------|--|---|---------------|------------|-------------|----------------------|--------------|--|--------|---------|-------|
| | | | | | | (9 | | | STRE | INGTH | (kPa) |
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | P. Pen | Torvane | nc |
| 0.0- | | Ground Surface | 100.0 | | | | | ······ | | | |
| _ | 3515 | Asphalt (136 mm) | _ | - | | | | | | | |
| - | | Concrete (150 mm) Fat Clay - dark brown, moist, firm, high plastic, silt, trace sand, trace gravel, trace mica. - below 0.8 m stiff, trace gravel. | - | S1 | \$ | 40.1 | | • | | | |
| 1.0- | | - below 0.0 m still, trace gravel. | 99.0- | S2 | 5 | 28.8 | | • | | | |
| _ | | | _ | S 3 | | 33.1 | | • | | | |
| _ | * | 01-11 | | - | | | | | | | |
| _ | 1 | <i>Clay</i> - medium brown, moist, firm, high plastic, | - | | | - | | | | | |
| - | | silty. | - | S4 | 1 | 34.8 | | • | | | |
| 2.0- | 1 | | 98.0- | S5 | 1 | 36.4 | | | | | |
| - | 1 | | - | | | | | | | | |
| _ | | | 1 <u>-</u> | S6 | 1 | 43.7 | | • | | | |
| - | 1 | | - | | | - | | | | | |
| - 3.0- - | | End of Test Hole - end of test hole at 2.7 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling. | 97.0- | - | | | | | | | |
| | | | - | - | | | | | | | |
| 4.0- | | | 96.0- | | | | | | | | |
| 4.0 | | | 90.0- | | | | | | | | |
| | | | | | | | | | | | |
| - | | | - | | | | | | | | |
| _ | | | - | | | | | | | | |
| 5.0- | | | 95.0- | | | | | | | | |
| ENG- | TEC | CH Consulting Limited | | FOU | 0 | ou dat | | mitod Completion D | the or | 7 | I |
| Lo | gge | ed by: DO Drilled By | | | | suitir | ig Lin | mited Completion Dep Completion Elev | | | n |
| Re | evie | | | | | Stem | | Sheet: 1 of 1 | | 01.01 | |
| SA | Auger Size: 100 mm Solid Stem Sheet: 1 of 1 MPLE TYPE SPLIT BARREL SHELBY TUBE SHELBY CUTTINGS SPLIT SPOON | | | | | | | | | | |



Client: WSP Canada Inc.

Location: See Figure 4

File No.: 23-035-03

Water Elevation: --

Date Drilled: December 4, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Engineering And Testing

| | | SUBSURFACE PROFILE | | S/ | AMPL | E DAT | A | - | | SHEAF | |
|----------------|-------------|---|-----------------|------------|-------------|----------------------|--------------|--|--------|---------|----|
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | P. Pen | Torvane | nc |
| 0.0- | | Ground Surface | 100.0 | | | | | | - | | |
| _ | | Asphalt (110 mm) Concrete (200 mm) | - | | | | | | | | |
| _ | | Fat Clay | _ | | | | | | | | |
| _ | | - dark brown, moist, stiff, high plastic, silt, trace sand, trace gravel, trace mica. | - | S1 | 1 | 32.0 | | , | | | |
| - 1.0- | | - below 0.9 m very stiff, trace silt. | 99.0- | S2 | 1 | 24.4 | | • | _ | | |
| _ | | | - | S3 | \$ | 22.9 | | † | | | |
| | | 0 km | - | S4 | \$ | 35.4 | | - | | | |
| 2.0- | | <i>Clay</i> - medium brown, stiff, moist, high plastic. | 98.0- | S5 | 1 | 38.3 | | · · · · · · · · · · · · · · · · · · · | - | | |
| _ | | | _ | S6 | 1 | 44.2 | | • | | | |
| - 3.0— - | | End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling. | - 97.0- - | | | | | | - | | |
| | | | - | | | | | | | | |
| 4.0- | | | 96.0- | | | | | | | | |
| 4.0- | | | 96.0- | | | | | | 1 | | |
| | | | 2 | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 5.0- | | | 95.0- | | | | | iiiiii | 1 | | |
| Lo | gge | H Consulting Limited Drilled By d by: DO Drill Rig: I wed by: 00 Auger Siz | Lone Sta | ar T1/ | 4+ | | g Lin | nited Completion Dep Completion Elev Sheet: 1 of 1 | | | m |
| SAMPLE TYPE | | | | | | | | | | | |



Client: WSP Canada Inc.

Location: See Figure 4

File No.: 23-035-03

Date Drilled: December 5, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Water Elevation: --

Engineering And Testing

| | | SUBSURFACE PROFILE | | S | AMPL | E DAT | A | | | SHEAR | |
|----------------|---|---|---------------|------------|-------------|----------------------|--------------|--|--------|---------|-------|
| | | | | | | (9) | | | STRE | ENGTH | (kPa) |
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | P. Pen | Torvane | nc |
| 0.0- | | Ground Surface | 100.0 | - | | | | | - | | |
| - | | Asphalt (75 mm) Concrete (200 mm) Fat Clay - dark brown, moist, firm, high plastic, silt, trace sand, trace gravel. | - | S1 | 1 | 39.3 | | • | | | |
| - | | | - | | | 20.0 | | | | | |
| 1.0- | | | 99.0- | S2 | | 38.6 | | | - | | |
| _ | | | - | S3 | \$ | 34.8 | | , f | | | |
| | | | | S4 | 5 | 29.6 | | • | | | |
| 2.0- | | <i>Clay</i> - medium grey, moist, firm, high plastic, silty. | 98.0- | S 5 | \$ | 25.0 | | | - | | |
| - | | -below 2.1 m, brown, firm | - | S6 | 1 | 21.9 | | | | | |
| - 3.0— - | | End of Test Hole - end of test hole at 2.7 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling. | 97.0 - | | | | | | | | |
| | | | | | | | | | | | |
| 4.0- | | | 96.0- | | | | | | | | |
| - | | | - | - | | | | | | | |
| - | | | - | _ | | | | | | | |
| - | | | - | | | | | | | | |
| _ | | | - | | | | | | | | |
| 5.0- | | H Consulting Limited | 95.0 | 1 | | | | iiiiii | - | | |
| Lo | gge | d by: DO Drilled By: DO Drill Rig: L | one Sta | ar T1/ | 4+ | | g Lin | nited Completion Dep Completion Elev Sheet: 1 of 1 | | | n |
| SAI | Auger Size: 100 mm Solid Stem Sheet: 1 of 1 MPLE TYPE SPLIT BARREL SHELBY TUBE AUGER CUTTINGS SPLIT SPOON | | | | | | | | | | |



Client: WSP Canada Inc.

File No.: 23-035-03

Date Drilled: December 7, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m Location: See Figure 6

Water Elevation: --

Engineering And TestingLocation: See Figure 6water Elevation: --Solutions That Work For YouProject: Bishop Grandin Boulevard (Abinojii Mikianah) Pavement Renewals

| | | SUBSURFACE PROFILE | | SA | AMPL | E DAT | A | - | | SHEAF | |
|-------------|--|---|--------------------------|------------|-------------|----------------------|--------------|---|--------|---------|----|
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | P. Pen | Torvane | nc |
| 0.0- | | Ground Surface Asphalt (169 mm) | 100.0 | | | | | | | | |
| - | | Concrete (195 mm) | _ | | | | | | | | |
| _ | | Fat Clay - black, moist, stiff, high plastic, silt, trace gravel. | - | S1 | \$ | 29.6 | | • | | | |
| 1.0- | | | - 99.0 | S2 | 1 | 29.6 | | • | _ | | |
| - | | | - | S 3 | 1 | 29.6 | | • | | | |
| | | <i>Clay</i> - light brown, moist, stiff, high plastic, silty. | - | | | | | | | | |
| - | | - below 1.8 m, soft. | - | S4 | 1 | 23.3 | | • | | | |
| 2.0- | | | 98.0- | S5 | 1 | 22.5 | | | - | | |
| | | - below 2.3 m, stiff. | - | S6 | 1 | 32.5 | | | | | |
| 3.0- | | End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling. | - - 97.0 - | | | - | | | | | |
| 4.0 | - | | - - 96.0 - - | - | | | | | | | |
| 5.0- | | | - - 95.0 – | | | | | | | | |
| Lo | gge | H Consulting Limited Drilled By: ed by: PZ Drill Rig: L wed by: 0 | one Sta | ar T1/ | 4+ | | | nited Completion Dep Completion Ele Sheet: 1 of 1 | | | m |
| SAI | SAMPLE TYPE SPLIT BARREL SHELBY TUBE SAUGER CUTTINGS SPLIT SPOON | | | | | | | | | | |



Client: WSP Canada Inc.

Location: See Figure 6

File No.: 23-035-03

Date Drilled: December 7, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Water Elevation: --

Engineering And Testing

| | P | SUBSURFACE PROFILE | | SA | MPL | E DAT | A | | | SHEAR | |
|-------------|-------------|---|---------------------------|-----------------|--------------|----------------------|--------------|----------------------------------|--------|---------|------------|
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) | STRE | Torvane | (kPa) O |
| 0.0- | | Ground Surface | 100.0 | | | | | | | | |
| _ | | Asphalt (107 mm) Concrete (142 mm) | - | | | | | | | | |
| - | | Fat Clay - dark brown, moist, very stiff, high plastic, silt, trace sand, trace gravel. | - | S1 | \$ | 32.7 | | • | | | |
| 1.0- | | | 99.0- | S2 | 5 | 32.7 | | • | | | |
| _ | | | - | S3 | \$ | 33.7 | | | | | |
| - | | <i>Clay</i> - light brown, moist, stiff, silty. | | S4 | \$ | 40.6 | | | | | |
| 2.0- | | | 98.0- | S 5 | 5 | 39.9 | | •••••• | 1 | | |
| 3- | | | - | S6 | \$ | 45.8 | | | | | |
| 3.0 | | End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling. | - - 97.0- - - | | | | | | - | | |
| - | | | - | - | | | | | | | |
| 4.0- | | | 96.0- | | | | | | _ | | |
| - | | | - | - | | | | | | | |
| | | | - | | | | | | | | |
| - | | | | | | | | | | | |
| 5.0- | | | 95.0- | | | | | | - | | |
| Lo | gge | H Consulting Limited Drilled By: d by: PZ Drill Rig: I ved by: Auger Siz | one Sta e: 100 r | ar T1/ mm Se | ۹+ olid s | Stem | g Lin | Completion Elev Sheet: 1 of 1 | ation: | 97.5 r | |
| SAI | MPL | E TYPE SPUT BARREL | S | HELB | ΥT | JBE | 1 | AUGER CUTTINGS | SPLIT | SPO | ON |



Location: See Figure 7

Client: WSP Canada Inc.

File No.: 23-035-03

Date Drilled: December 7, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Water Elevation: --

Engineering And Testing

| | | SUBSURFACE PROFILE | | SA | MPL | e dat | A | | | SHEAR | |
|--------------|---|---|----------------------|------------|-------------|----------------------|--------------|--|--------|---------|-------|
| | | | | | | (% | | | STRE | NGTH | (kPa) |
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | P. Pen | Torvane | UC |
| 0.0- | | Ground Surface | 100.0 | | | | | | | | |
| - | | Asphalt (105 mm) Concrete (200 mm) | - | | | | | | | | |
| - | | Fat Clay - medium brown, moist, stiff, high plastic, silt, trace sand, trace mica. - below 0.7 m very stiff. | - | S1 | \$ | 37.3 | | • | | | |
| 1.0- | *** | | 99.0- | S2 | 5 | 32.2 | | i | | | |
| - | * | | | S 3 | | 35.5 | | | | | |
| r- 1 | | <i>Clay</i> - light brown, moist, very stiff, high plastic. | | | | | | | | | |
| 33- | 1 | | - | S4 | Ъ | 35.6 | | 1 | | | |
| 2.0- | | | 98.0- | S5 | \$ | 36.1 | | • | | | |
| - | 1 | | - | S6 | | 36.3 | | • | | | |
| 3.0 | ~~ | End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling. | - 97.0- - - | | | | | | | | |
| | | | - | | | | | | | | |
| 4.0- | | | 96.0- | | | | | | | | |
| | | | - | | | | | | | | |
| | | | | | | | | | | | |
| 5.0- | | | 95.0- | | | | | | | | |
| Constanting? | TEC | H Consulting Limited | | | | | | | 1 | | |
| Lo | gge | d by: PZ Drilled By: Drill Rig: I | one Sta | ar T1/ | + | | g Lin | nited Completion Dep Completion Elev Sheet: 1 of 1 | | | n |
| | eviewed by: Auger Size: 100 mm Solid Stem Sheet: 1 of 1 MPLE TYPE SPLIT BARREL SHELBY TUBE AUGER CUTTINGS SPLIT SPOON | | | | | | | | | | |



Location: See Figure 7

Client: WSP Canada Inc.

File No.: 23-035-03

Date Drilled: December 7, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba

Water Elevation: --

Grade Elevation: 100.0 m

Engineering And Testing

| | | SUBSURFACE PROFILE | | S | AMPL | E DAT | A | | | SHEAF | |
|--------------------|-------------|---|---|------------|-------------|----------------------|--------------|--|--------|---------|----|
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | P. Pen | Torvane | UC |
| <mark>0.0</mark> - | | Ground Surface Asphalt (90 mm) | 100.0 | | | | | | - | | |
| - | **** | Concrete (200 mm) | - | | | | | | | | |
| | | <i>Fat Clay</i> - medium brown, moist, stiff, silt, trace sand, trace gravel. | - | S1 | 1 | 31.1 | | • | | | |
| - 1.0- | | - below 1.0 m black, very stiff. | - 99.0 | S2 | 1 | 31.0 | | | | | |
| _ | | - below 1.0 m black, very sun. | = | S 3 | \$ | 34.3 | | | | | |
| - | | <i>Clay</i> - light brown, moist, stiff, silty. | - | | | 24.0 | | | | | |
| - 2.0 - | | - below 1.8 m medium brown. | - 98.0 <i>—</i> | S4 | | 24.6 33.8 | | | | | |
| - | | | - | | | - | | | | | |
| | | End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling. | 97.0 - - - 96.0 - - - - | S6 | • | 40 | | | - | | |
| 5.0- | TEC | H Consulting Limited | 95.0 - | | | | | iiiiii | - | | |
| Lo | gge | H Consulting Limited Drilled By: d by: PZ Drill Rig: L wed by: 10 Auger Siz | one Sta | ar T1/ | 4+ | | g Lin | nited Completion Dep Completion Elev Sheet: 1 of 1 | | | n |
| SAN | AMPLE TYPE | | | | | | | | | | |



Client: WSP Canada Inc.

File No.: 23-035-03

Date Drilled: December 7, 2023

Engineering And Testing Loca

Location: See Figure 7 Water Elevation: --

Solutions That Work For You Project: Bishop Grandin Boulevard (Abinojii Mikanah) Pavement Renewals

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

| | | SUBSURFACE PROFILE | | | SAMF | PLE D | | | | | SHEAR ENGTH | |
|----------------|---------------------------------------|--|---|--------------|-------------|----------------------|----|--------------|--|--------|----------------|----|
| Depth (m) | Soil Symbol | Description | Elevation (m) | Sample No. | Sample Type | Moisture Content (%) | | Blows/300 mm | Moisture Content (%) PL IXI LL 20 40 60 80 | P. Pen | Torvane | UC |
| 0.0- | | Ground Surface | 100. | C | | | | | | - | | |
| and the | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Asphalt (95 mm) | | | | | | | | | | |
| | *** | Concrete (200 mm) | | 1 | | | | | | | | |
| _ | | <i>Fat Clay</i> - dark brown, moist, stiff, high plastic, trace sand, trace gravel, trace mica. | , <mark>silt</mark> , | - - S1 | 1 | 29 | .2 | | • | | | |
| - | * | | | S2 | 1 | 33 | .4 | | | | | |
| 1.0- | | - below 1.0 m very stiff. | 99. | - S3 | | 32 | 8 | | | | | |
| _ | * | | | | | | | | | | | |
| - | | below 1.5 m black, firm, trace sand, gravel. | trace | - | - | | | | | | | |
| - | | | | S4 | | 32 | .0 | | f | | | |
| 2.0- | * | | 98. | 0- <u>S5</u> | 1 | 29 | .3 | | | - | | |
| _ | | | | - - S6 | | 29 | .3 | | | | | |
| 3.0- | | End of Test Hole - end of test hole at 2.5 m below grad - no seepage or sloughing encounterd during drilling. - test hole backfilled with auger cuttin gravel and patched with cold mix asp upon completion of drilling. | ed gs and 97.1 | - | | | | | | | | |
| - - 4.0- | | | 96. | - - 0 | | | | | | | | |
| - | | | | - | | | | | | | | |
| 5.0- | | | 95. | 0- | | | | | | | | |
| ENG- Lo | gge | D | rilled By: ENG rill Rig: Lone uger Size: 10 | G-TECI | 1A+ | | | Lim | nited Completion Dep Completion Elev Sheet: 1 of 1 | | | m |
| | AMPLE TYPE | | | | | | | | | | | |



420 Turenne Street Winnipeg, Manitoba R2J 3W8 engtech@mymts.net www.eng-tech.ca

OBTAINING AND TESTING DRILLED CORES

Test Method: CSA A23.2-14C, 9C



| WSP Canada 1600 Buffalo F Winnipeg, Ma R3T 6B8 | Place | | | File No.: Ref. No.: | 23-035-03 23-35-3-2 |
|---|------------------------------|-----------------|-------------------------|------------------------|------------------------|
| Attention: | Scott Suderman, | C.E.T., P. Eng. | | | |
| Project: | BISHOP GRAND MANITOBA CAN | | D (ABINOJII MIKANAH) PA | VEMENT RENEWA | ALS, WINNIPEG, |
| Date Cored: | Dec 6 to 13/23 | Cored By: | ENG-TECH (Kyle Zebiere) | Page: | 1 of 2 |
| Date Received | : Dec 6 to13/23 | Received By: | ENG-TECH (Kyle Zebiere) | Structure: | Road pavement |
| Age of Concret | e: - | Concrete Des | ign Strength: - | Direction of Load: | Parallel |

Core Conditioning: As per CSA A23.2-14C Clause 7.3.1 (moist)

Strength Specification: Minimum 85% of design strength on an average of 3 cores - no single core less than 75% as per CSA A23.1 Clause 4.4.2.2.2.2

| Core No. | Location on Structure | Ler Cored (mm) | gth Tested (mm) | Average Diameter (mm) | Date Tested (m/d/y) | Compressive Strength (MPa) | Type of Fracture | Tested By ENG-TECH |
|-------------|---|----------------------|-----------------------|-----------------------------|------------------------|-------------------------------|---------------------|-----------------------|
| PC #2 | Eastbound acceleration lane, Northing: 5521630 Easting: 635830 Centerline of lane | 195 | 184 | 100 | Jan 17/24 | 46.53* | 1 | Rey Batac |
| PC #4 | Eastbound median lane, Northing: 5521811 Easting: 636133 Centerline of lane | 200 | 121 | 100 | Jan 17/24 | 50.33* | 1 | Rey Batac |
| PC #7 | Westbound median lane, Northing: 5520783 Easting: 634164 Centerline of lane | 175 | 113 | 100 | Jan 17/24 | 58.22* | 1 | Rey Batac |
| PC #10 | Westbound middle lane, Northing: 5520968 Easting: 634484 Centerline of lane | 190 | 187 | 100 | Jan 17/24 | 52.65* | 1 | Rey Batac |
| PC #13 | Westbound curb lane, Northing: 5521067 Easting: 634662 Centerline of lane | 190 | 188 | 100 | Jan 17/24 | 63.21* | 1 | Rey Batac |

Reporting of these results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. *Denotes corrected strength for Length/Diameter ratio less than 2.0 to 1.0. Type of fracture indicated when cylinder fails to meet 85% of design strength or if different than CSA A23.2-19-9C Table 3 Type 1.

Deviations from test procedure: None

Email: WSP Canada Inc. Contact Group

ENG-TECH Consulting Limited

Per





420 Turenne Street Winnipeg, Manitoba R2J 3W8 engtech@mymts.net www.eng-tech.ca

OBTAINING AND TESTING DRILLED CORES



"Engineering and Testing Solutions That Work for You"

Project:

BISHOP GRANDIN BOULEVARD (ABINOJII MIKANAH) PAVEMENT RENEWALS, WINNIPEG, MANITOBA CANADA 23-035-03 File No .: 23-35-3-2 Ref. No.: Date Cored: Dec 6/23 Page: 2 of 2

| | A CONTRACTOR OF A CONTRACTOR | | | | | | | |
|-------------|---|----------------------|------------------------|-----------------------------|------------------------|-------------------------------|---------------------|-----------------------|
| Core No. | Location on Structure | Len Cored (mm) | ngth Tested (mm) | Average Diameter (mm) | Date Tested (m/d/y) | Compressive Strength (MPa) | Type of Fracture | Tested By ENG-TECH |
| PC #17 | Westbound median lane, Northing: 5521310 Easting: 635200 Centerline of lane | 190 | 191 | 100 | Jan 17/24 | 57.91* | 1 | Rey Batac |
| PC #18 | Westbound curb lane, Northing: 5521634 Easting: 635779 Centerline of lane | 160 | 147 | 100 | Jan 17/24 | 66.65* | 1 | Rey Batac |
| PC #20 | Westbound middle lane, Northing: 5521708 Easting: 635910 Centerline of lane | 190 | 183 | 100 | Jan 17/24 | 58.44* | 1 | Rey Batac |
| PC #22 | Eastbound median lane, Northing: 5521533 Easting: 635640 0.5 meters North of centerline of lane | 200 | 165 | 100 | Jan 17/24 | 63.79* | 1 | Rey Batac |

Comments: All core ends were trimmed prior to compressive strength testing and were end prepared using a high strength capping compound.

Deviations from test procedure: none

Email: WSP Canada Inc. Contact Group

ENG-TECH Consulting Limited

Per





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LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS



WSP Canada Inc. File No.: 23-035-03 1600 Buffalo Place Winnipeg, Manitoba Ref. No.: 23-35-3-4 **R3T 6B8** Attention: Scott Suderman, C.E.T., P. Eng. BISHOP GRANDIN BOULEVARD (ABINOJII MIKANAH) PAVEMENT RENEWALS, WINNIPEG, Project: MANITOBA, CANADA Source: Eastbound Bishop Grandin Boulevard (Abinojii Mikinah) River Road to St. Mary's Road Material Description: Clay Test Hole No.: 1 Date Sampled: Dec 4/23 Date Received: Dec 4/23 **ENG-TECH** Sample No.: 2 Sampled By: Date Tested: Dec 20/23 Depth: 0.9 m (Denys Ostrovskyi) Tested By: ENG-TECH (Jessica Bauer) Test Method: ASTM D4318 - A (Multipoint) Sampling Method: Auger Specimen Preparation Procedure: 2 (Dry) Drying Method: Air Liquid Limit Device: Manual Grooving Tool: Metal Plastic Limit Rolling Procedure: 1 (Hand Rolled) 100 90 80 1.5 70 Plasticity Index (%) 60 50 CH or OH 40 30 20 or OL CL MH or OH 10 ML or OL 0 0 10 20 30 40 50 60 70 80 90 100 110 Liquid Limit (%) Group Symbol Liquid Limit (%): 75 Plastic Limit (%): 19 Plasticity Index (%): 56 Percentage of sand particles retained on 0.425mm sieve: 6.0

Classification: ASTM D2487, CH, fat clay ASTM D3282: A-7-6 (57)

As Received Moisture Content (%): 30.5 Comments:

Email: WSP Canada Inc. Contact Group

may apply.





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LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS



WSP Canada Inc. File No.: 23-035-03 1600 Buffalo Place Winnipeg, Manitoba Ref. No.: 23-35-3-5 **R3T 6B8** Attention: Scott Suderman, C.E.T., P. Eng. BISHOP GRANDIN BOULEVARD (ABINOJII MIKANAH) PAVEMENT RENEWALS, WINNIPEG, **Project:** MANITOBA, CANADA Eastbound Bishop Grandin Boulevard (Abinojii Mikinah) River Road to St. Mary's Road Source: Material Description: Clay Date Sampled: Date Received: Test Hole No.: 3 Dec 4/23 Dec 4/23 Sample No.: 3 Sampled By: **ENG-TECH** Date Tested: Dec 20/23 (Denys Ostrovskyi) Depth: 1.2 m Tested By: ENG-TECH (Jessica Bauer) Test Method: ASTM D4318 - A (Multipoint) Sampling Method: Auger Specimen Preparation Procedure: 2 (Dry) Drying Method: Air Liquid Limit Device: Manual Grooving Tool: Metal Plastic Limit Rolling Procedure: 1 (Hand Rolled) 100 90 80 20 70 Plasticity Index (%) 60 50 CH or OH 40 30 20 CL or OL MH or OH ML or OL 10 0 0 10 20 30 40 50 60 70 80 90 100 110 Liquid Limit (%) Group Symbol 80 Plastic Limit (%): 27 Plasticity Index (%): 53 Liquid Limit (%): Percentage of sand particles retained on 0.425mm sieve: 6.0 Classification: ASTM D2487, CH, fat clay ASTM D3282: A-7-6 (57)

As Received Moisture Content (%): 34.0 Comments:

Email: WSP Canada Inc. Contact Group



ENG-TECH Consulting Limited



WSP Canada Inc.

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LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS



File No.: 23-035-03 Ref. No.: 23-35-3-9

1600 Buffalo Place Winnipeg, Manitoba **R3T 6B8** Attention: Scott Suderman, C.E.T., P. Eng. BISHOP GRANDIN BOULEVARD (ABINOJII MIKANAH) PAVEMENT RENEWALS, WINNIPEG, **Project:** MANITOBA, CANADA Eastbound Bishop Grandin Boulevard (Abinojii Mikinah) Dakota Street To St. Anne's Road Source: Material Description: Clay Test Hole No.: 10 Date Sampled: Dec 4/23 Date Received: Dec 4/23 Sample No.: 2 Sampled By: **ENG-TECH** Date Tested: Dec 20/23 (Denys Ostrovskyi) Depth: 0.9 m Tested By: ENG-TECH (Jessica Bauer) Test Method: ASTM D4318 - A (Multipoint) Sampling Method: Auger Specimen Preparation Procedure: 2 (Dry) Drying Method: Air Liquid Limit Device: Manual Grooving Tool: Metal Plastic Limit Rolling Procedure: 1 (Hand Rolled) 100 90 80 70 Plasticity Index (%) 60 50 CH or OH 40 30 20 -01 or MH or OH VIL or OL 10 0 0 10 20 30 40 50 60 70 80 90 100 110 Liquid Limit (%) Group Symbol 88 Plastic Limit (%): Plasticity Index (%): Liquid Limit (%): 31 57 Percentage of sand particles retained on 0.425mm sieve: 4.0 Classification: ASTM D2487, CH, fat clay ASTM D3282: A-7-5 (64)

As Received Moisture Content (%): 32.2 Comments:

Email: WSP Canada Inc. Contact Group



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Darci Babisky, C.E.T. **Operations Manager - Laboratory** Ph: (204) 233-1694 Fx: (204) 235-1579

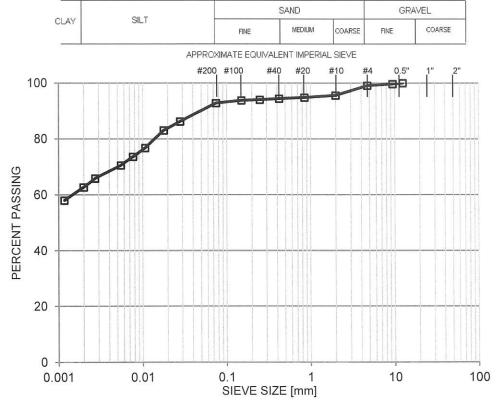


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PARTICLE SIZE ANALYSIS

| "Engineering and Testing Solutions That Wo | rk for You" | | | | |
|--|-------------------------|---|---|--|--|
| WSP Canada Inc. | | | File No.: 23-035-03 | | |
| 1600 Buffalo Place | | | Ref. No.: 23-35-3-6 | | |
| Winnipeg, Manitoba R3T 6B8 | | | | | |
| KJI OBO | | | | | |
| Attention: Scott Suderman, C.E | .T., P. Eng. | | | | |
| Project: BISHOP GRANDIN E | OULEVARD (ABINO | JII MIKANAH) PAVE | EMENT RENEWALS, WINNIPEG, | | |
| MANITOBA, CANAD | | ••••••••••••••••••••••••••••••••••••••• | , | | |
| | Grandin Boulevard (Abi | noiii Mikinah) River Ro | pad to St. Marv's Road | | |
| | Chanan Boalovara (Abh | | | | |
| Material Description: Clay | | | | | |
| Test Hole No.: 1 | Date Sampled: | Dec 4/23 | Sampled By: ENG-TECH (Denys Ostrovskyi) | | |
| Sample No.: 2 | Date Received: | Dec 4/23 | Sample Type: Auger cutting | | |
| Depth: 0.9 m | Date Tested: | Dec 20/23 | Tested By: ENG-TECH (Tim Christensen) | | |
| Test Method: ASTM D7928 | Drying Method: | Air | Specific Gravity: Estimated 2.7 | | |
| Method Used: - | Dispersion Proce | ess: Stirrer / Tipping | Separating Sieve Size (mm): 2.0 | | |
| Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer Dispersion Time (min.): 3 | | | | | |
| | | | | | |



SIEVE PERCENT SIZE (mm) PASSING 12.5 100 9.5 100 4.75 99 2.0 96 0.850 95 0.425 94 0.250 94 0.150 93.8 0.075 93 0.028 86 0.018 83 0.011 77 0.008 74 0.005 71 0.003 66 0.002 63 0.001 58

 Percent of:
 GRAVEL (0.9 %), SAND (6.3 %), SILT (30.0 %), CLAY (62.7 %)

 Classification:
 ASTM D2487, CH, fat clay

 ASTM D3282: A-7-6 (57)

As Received Moisture Content (%): 30.5 Comments:

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Supplementary information may be provided upon request. Restrictions and additional fees may apply.

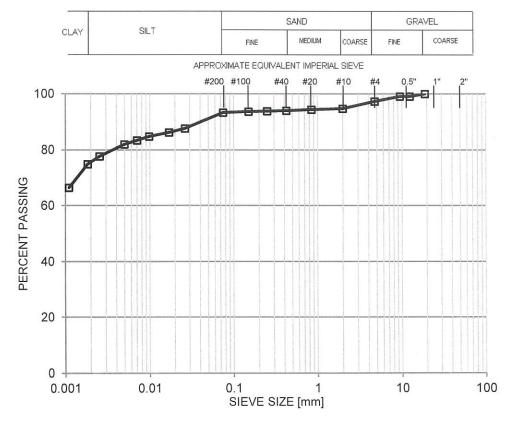
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PARTICLE SIZE ANALYSIS

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| WSP Canada I | nc. | | | File No.: 23-035-03 |
| 1600 Buffalo Pl | | | | Ref. No.: 23-35-3-7 |
| Winnipeg, Man R3T 6B8 | itoba | | | |
| N31 0B0 | | | | |
| Attention: Sco | ott Suderman, C.E.T., | P. Eng. | | |
| Project: BIS | HOP GRANDIN BOU | LEVARD (ABINC | JII MIKANAH) PAVE | EMENT RENEWALS, WINNIPEG, |
| MA | NITOBA, CANADA | 1.75 | 178-4 | 81 U.S |
| Source: | Eastbound Bishop Gran | ndin Boulevard (Ab | inojii Mikinah) River Ro | oad to St. Mary's Road |
| Material Descrip | otion: Clay | | | |
| Test Hole No.: | 3 | Date Sampled: | Dec 4/23 | Sampled By: ENG-TECH (Denys Ostrovskyi) |
| Sample No.: | 3 | Date Received: | Dec 4/23 | Sample Type: Auger cutting |
| Depth: | 1.2 m | Date Tested: | Dec 20/23 | Tested By: ENG-TECH (Tim Christensen) |
| Test Method: | ASTM D6913 & D7928 | Drying Method: | Air | Specific Gravity: Estimated 2.7 |
| Method Used: | А | Dispersion Proc | ess: Stirrer / Tipping | Separating Sieve Size (mm): 2.0 |
| Dispersion Devi | ce: Apparatus A: Hu | mboldt Mechanical | Analysis Stirrer | Dispersion Time (min.): 3 |
| | | | | and an and the second |



| SIEVE SIZE (mm) | PERCENT PASSING | | |
|--------------------|--------------------|--|--|
| 19.0 | 100 | | |
| 12.5 | 99 | | |
| 9.5 | 99 | | |
| 4.75 | 97 | | |
| 2.0 | 94.7 | | |
| 0.850 | 94 | | |
| 0.425 | 94 | | |
| 0.250 | 94 | | |
| 0.150 | 94 | | |
| 0.075 | 93.3 | | |
| 0.026 | 88 | | |
| 0.017 | 86 | | |
| 0.010 | 85 | | |
| 0.007 | 83 | | |
| 0.005 | 82 | | |
| 0.003 | 78 | | |
| 0.002 | 75 | | |
| 0.001 | 66 | | |

 Percent of:
 GRAVEL (2.7 %), SAND (4.0 %), SILT (17.7 %), CLAY (75.6 %)

 Classification:
 ASTM D2487, CH, fat clay

 ASTM D3282: A-7-6 (57)
 As Descined Moisture Content (%):

As Received Moisture Content (%): 34.0 Comments:

Email: WSP Canada Inc. Contact Group

Supplementary information may be provided upon request. Restrictions and additional fees may apply.



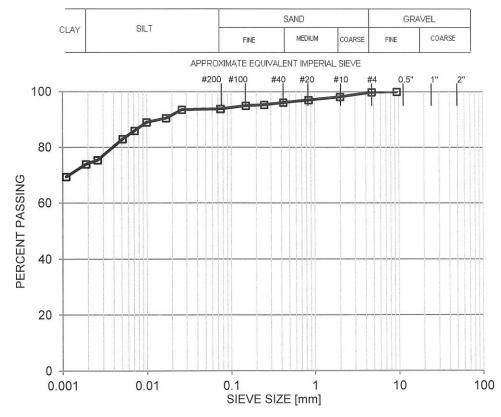
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PARTICLE SIZE ANALYSIS

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|-----------------------|-----------------------|------------------------|------------------------|---|
| WSP Canada I | | | | File No.: 23-035-03 |
| 1600 Buffalo Pl | | | Ref. No.: 23-35-3-10 | |
| Winnipeg, Man | itoba | | | |
| R3T 6B8 | | | | |
| Attention: Sco | ott Suderman, C.E.T., | P. Eng. | | |
| Project: BIS | SHOP GRANDIN BOU | LEVARD (ABINC |) JII MIKANAH) PAVI | EMENT RENEWALS, WINNIPEG, |
| MA | NITOBA, CANADA | , | | |
| Source: | Eastbound Bishop Grai | ndin Boulevard (Ab | inojii Mikinah) Dakota | Street To St. Anne's Road |
| Material Descrip | otion: Clay | | | |
| Test Hole No.: | 10 | Date Sampled: | Dec 4/23 | Sampled By: ENG-TECH (Denys Ostrovskyi) |
| Sample No.: | 2 | Date Received: | Dec 4/23 | Sample Type: Auger cutting |
| Depth: | 0.9 m | Date Tested: | Dec 20/23 | Tested By: ENG-TECH (Tim Christensen) |
| Test Method: | ASTM D7928 | Drying Method: | Air | Specific Gravity: Estimated 2.7 |
| Method Used: | | Dispersion Proc | ess: Stirrer / Tipping | Separating Sieve Size (mm): 2.0 |
| Dispersion Dev | ice: Apparatus A: Hu | mboldt Mechanica | Analysis Stirrer | Dispersion Time (min.): 3 |
| | | | | |



| SIEVE SIZE (mm) | PERCENT PASSING | | | |
|--------------------|--------------------|--|--|--|
| | | | | |
| 9.5 | 100 | | | |
| 4.75 | 100 | | | |
| 2.0 | 98 | | | |
| 0.850 | 97 | | | |
| 0.425 | 96 | | | |
| 0.250 | 95 | | | |
| 0.150 | 95 | | | |
| 0.075 | 93.8 | | | |
| 0.026 | 94 | | | |
| 0.017 | 90 | | | |
| 0.010 | 89 | | | |
| 0.007 | 86 | | | |
| 0.005 | 83 | | | |
| 0.003 | 75 | | | |
| 0.002 | 74 | | | |
| 0.001 | 69 | | | |
| | | | | |
| | | | | |
| | | | | |

 Percent of:
 GRAVEL (0.2 %), SAND (6.0 %), SILT (19.6 %), CLAY (74.2 %)

 Classification:
 ASTM D2487, CH, fat clay

 ASTM D3282: A-7-5 (64)
 ASTM D3282: A-7-5 (64)

As Received Moisture Content (%): 32.2 Comments:

Email: WSP Canada Inc. Contact Group

Supplementary information may be provided upon request. Restrictions and additional fees may apply.



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|--|---|--|--|
| "Engineering and Testing Solutions That Work for You | n | | an Council of Independent Laboratories crific tests as listed on www.ccil.com |
| WSP Canada Inc. | | File No.: | 23-035-03 |
| 1600 Buffalo Place Winnipeg, Manitoba R3T 6B8 | | Ref. No.: | 23-35-3-11 |
| Attention: Scott Suderman, C.E.T., P | . Eng. | | |
| Project: BISHOP GRANDIN BOUL MANITOBA, CANADA | EVARD (ABINOJII MIKANAH) F | PAVEMENT RENEWALS | , WINNIPEG, |
| from TH1, S3,1.2m; TH2, S | Boulevard (Abinojii Mikinah) River R 2, 0.9m; TH 2, S3, 1.2m; TH3, S2, 0. S2, 0.9m; TH6, S3, 1.2m; TH7, S2, 0 | 9m; TH4, S2, 0.9m; TH4, S3, | |
| Material Type: Subgrade | | Description: CH, clay | |
| Date Sampled: Dec 4 to 6/23 | Date Received: Dec 12/23 | Date Tested: Dec 27/23 | |
| Sampled By: ENG-TECH (Denys Ostrovs | skyi) TM D698 ASTM D1557 | Tested By: ENG-TECH | (Rey Betac) |
| | TM D698ASTM D1557 TM D4718 | | |
| | mpaction Method: Manual | Test Compaction Method: | А |
| | | Material Oversize: 4.75 mm: 1.2 19.0 mm: - | % % |
| 1440 | 1000% Sa | Dry Density (kg/m³) Moist | ure Content (%) |
| | Satura | 1412 | 28.3 |
| | 1 ag | 1438 1436 | 30.1 32.3 |
| ີ ເພິ່ງ 1430 | ation Est. Q | 1409 | 34.0 |
| 1420 | | Maximum Dry Density (MI Optimum Moisture (C | |
| 1410 | | MDD Correc OM Correc | |
| | | Received Moisture Cont | tent: - % |
| 1400 + 27 29 31 27 29 31 MOISTURE CONTEN | 33 35 IT (PERCENT) | | |
| Comments: | | | |

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| ENG-TECH CONSULTING LIMITED | 420 Turenne Street Winnipeg, Manitoba R2J 3W8 engtech@mymts.net www.eng-tech.ca | MOISTURE-DENSITY RELATIONSHIP |
|--|---|---|
| "Engineering and Testing Solutions That Work for Y | ou" | Canadan Council of Independent Laboratories For specific tests as listed on www.ccil.com |
| WSP Canada Inc. 1600 Buffalo Place Winnipeg, Manitoba R3T 6B8 | | File No.:23-035-03Ref. No.:23-35-3-13 |
| Attention: Scott Suderman, C.E.T., | P. Eng. | |
| Project: BISHOP GRANDIN BOU MANITOBA, CANADA | JLEVARD (ABINOJII MIKANAH) P | AVEMENT RENEWALS, WINNIPEG, |
| from TH8, S2, 0.9m; TH8 | | Street to St. Anne's Road. Composite sample 2m; TH10, S3, 1.2m; TH10, S4, 1.6m; TH11, |
| Material Type: Subgrade Date Sampled: Dec 6 to 8/23 Sampled By: ENG-TECH (Denys Ostro | Date Received: Dec 12/23 | Description: CH, clay Date Tested: Dec 28/23 Tested By: ENG-TECH (Rey Betac) |
| | STM D4718 | |
| Preparation Method: Moist C | Compaction Method: Manual | Test Compaction Method: A Material Oversize: 4.75 mm: 0.4 % 19.0 mm: - % |
| 1400 | 100 | Dry Density (kg/m³) Moisture Content (%) |
| (function of the second | ho Saturation Est. G | 1361 30.3 1391 32.1 1382 33.8 1340 35.7 |
| | ³ "i, i, i | Maximum Dry Density (MDD): 1393 kg/m ³ Optimum Moisture (OM): 32.6 % |
| 1340 | | MDD Corrected: - kg/m ³ OM Corrected: - % |
| 1320 28 30 32 | 34 36 38 | Received Moisture Content: - % |
| MOISTURE CONTE | ENT (PERCENT) | |
| Comments: | | |

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Operations Manager – Laboratory Ph: (204) 233-1694 Fx: (204) 235-1579

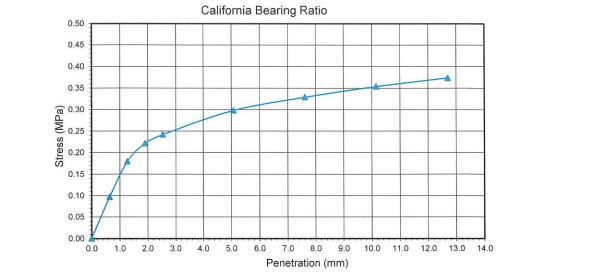




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|--|----------|---------------------------|---------------|------------|-------------|---|------------------------|------------------|
| Attention: | Scott S | Suderman, C.E | .T., P. Er | ng. | | | | |
| Project: | | P GRANDIN E OBA CANADA | | ARD (ABI | NOJII MIKA | ANAH) PAVEMEN | T RENEWA | LS, WINNIPEG, |
| Source: | from Th | -11, S3,1.2m; TH | 2, S2, 0.9 | m; TH 2, S | 3, 1.2m; TH | River Road to St. M 3, S2, 0.9m; TH4, S 1; TH7, S2, 0.9m an | 2, 0.9m; TH4 | , S3, 1.2m; TH5, |
| Material Type: | | Subgrade | | | | Date Sampled: | Dec 4 to | 6/24 |
| Material Desci | ription: | CH, clay | | | | Date Received: | Dec 12/2 | 4 |
| Sampled By: | | ENG-TECH (D | enys Ostr | ovskyi) | | Date Tested: | Jan 3/24 | |
| Immersion Period: 94.5 hours Tested By: | | | | Tested By: | ENG-TEC | CH (Rey Betac) | | |
| Compactive Effort (Density) Required: 95% Actual: 94.3% Test | | | Test Methods: | ASTM De | 598, D1883 | | | |
| | | | | | | | | |



| | | | Test Data | a | | | | | | |
|--------------------|----------|---------------------|------------------|-------------------|------|----|---------|-------------------|------|-----|
| | | | Soaked | | | Ur | soaked | | | |
| Dry Density: As Co | ompacted | d; | 1366 | kg/m ³ | 5 | | - | kg/m ³ | | |
| Moisture Content: | As Com | pacted; | 31.4 | % | | | - | % | | |
| Moisture Content: | Top 25 r | nm; | 34.8 | % | | | - | % | | |
| CBR Values: 2.54 | mm (0.1i | n); | 3.5 | % | | | - | % | | |
| CBR Values: 5.08 | mm (0.2i | n); | 2.9 | % | | | - | % | | |
| Swell: | 1.7 | % of Initial Height | Oversize Correct | tion: | 1.2 | % | Surchar | ge Mass: | 4.54 | kg |
| Maximum Load: | 719.3 | Ν | Penetration Dep | th: | 12.7 | mm | | | | 125 |
| Comments: | | | | | | | | | | |

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| WSP Canada | a Inc. | | | Fi | ile No.: | 23-035-03 |
| 1600 Buffalo | | | | R | ef. No.: | 23-35-3-14 |
| Winnipeg, Ma R3T 6B8 | anitoba | | | | | 20 00 0 11 |
| Attention: | Scott Suderman, C.E.T., P. Er | ıg. | | | | |
| Project: | BISHOP GRANDIN BOULEVA MANITOBA CANADA | | | , | | |
| Source: | Eastbound Bishop Grandin Boule sample from TH8, S2, 0.9m; TH8 1.6m; TH11, S2, 0.9m; T11, S3, 1 | , S3, 1.2m; TH9, | S2, 0.9m; | TH9, S3, 1.2m; T | | |
| Material Type: | | ,,, | | Date Sampled: | Dec 6 to 8 | 3/24 |
| Material Desc | | | [| Date Received: | Dec 12/24 | 1 |
| Sampled By: | ENG-TECH (Denys Ostro | ovskyi) | [| Date Tested: | Jan 2/24 | |
| Immersion Pe | riod: 95.5 hours | | 10 | Tested By: | ENG-TEC | H (Rey Betac) |
| Compactive E | ffort (Density) Required: 95% | Actual 94.89 | % - | Test Methods: | ASTM D6 | 98, D1883 |
| | 0.20 0.18 0.16 0.14 (re 0.12 0.10 0.00 0.10 0.00 0. | California Bearir | ng Ratio | | | |
| | 0.04 0.02 0.00 0.0 1.0 2.0 3.0 | | | .0 10.0 11.0 12.0 | 0 13.0 14.0 | |
| | | Pen | etration (mm | ו) | | |
| | | Test Dat | а | | | |
| | | Soaked | | Unsoaked | | |
| Dry Density: | As Compacted; | 1321 | kg/m³ | - | kg/m ³ | |
| the second | itent: As Compacted; | 32.4 | % | - | % | |
| 1 | ntent: Top 25 mm; | 47.5 | % | - | % | |
| 2 5 4 5 4 5 6 6 6 7 6 7 6 6 6 7 6 6 6 7 6 6 6 7 6 6 6 6 7 6 6 6 6 7 6 6 6 7 6 7 6 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6 | 2.54mm (0.1in); | 1.6 | % | - | % | |
| | 5.08mm (0.2in); | 1.4 | % | - | % | |
| Swell: | | Oversize Correc | tion: (| 0.4 % Surcha | rge Mass: | 4.54 kg |

Penetration Depth:

12.7 mm

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Maximum Load: Comments: 314.9 N

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