DURHAM – SCARBOROUGH

Bus Rapid Transit

Appendix L1 – Pavement Condition Survey and Design



Prepared for Metrolinx by IBI Group & Parsons



TECHNICAL MEMORANDUM

DATE December 24, 2021

TO Margaret Parkhill, P.Eng. Parsons

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Project No. 21473923

PAVEMENT CONDITION SURVEY AND PAVEMENT DESIGN RECOMMENDATIONS DURHAM-SCARBOROUGH BUS RAPID TRANSIT (DS BRT) SCARBOROUGH AND DURHAM, ONTARIO

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by IBI Group to carry out a desktop study and Pavement Condition Assessment (PCA) along Ellesmere Road from McCowan Road to Highway 2, and along Highway 2 from Ellesmere Road to Simcoe Street South in Toronto and the Regional Municipality of Durham (Durham), Ontario. IBI is carrying out the overall preliminary design for the "Metrolinx Durham-Scarborough Bus Rapid Transit (DS BRT) Project". This technical memorandum (memo) presents the results of the desktop review and PCA, and provides preliminary pavement rehabilitation and widening designs to assist Parsons in the overall costing of the DS BRT.

Metrolinx completed the DS BRT initial business case in 2018, which recommended a preferred BRT alignment along the project limits referenced above. The DS BRT is recognized as a crucial transportation corridor connecting people through the Regions of Scarborough and Durham. With rapid growth and the demand for travel along this corridor, the DS BRT is needed to link communities in Toronto and Durham.

2.0 DESKTOP STUDY

Golder completed a desktop study of historical documents available at the time of preparing this memo. The documents provided by IBI included relevant geotechnical/pavement engineering information along some sections of the proposed corridor of the DS BRT. Golder specifically reviewed the following documents listed in Table 1:

| Report | Title | Dated |
|--------|---|-------------------|
| 1 | Geotechnical Investigation, Watermain Replacement, Kingston Road BRT – Dixie Road to Liverpool Road (D2021-001) | May 6, 2020 |
| 2 | Geotechnical Investigation, Pine Creek Culver Extension, Kingston Road BRT – Dixie Road to Liverpool Road (D2021-001) | November 20, 2018 |
| 3 | Geotchnical Investigation, Highway 2 Bus Rapid Transit Proposed Retaining Walls Between About Sta. 19+850 and Sta. 20+350 | November 16, 2017 |

Table 1: Summary of Historical Documents

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| Report | Title | Dated |
|--------|---|----------------|
| 4 | Pavement Design Report, Preliminary/Detail Design – Highway 2 Bus Rapid Transit (BRT) Quick Win Project | June 20, 2013 |
| 5 | Pavement/Geotechnical Investigation for the Kingston Road Bus Rapid Transit, Kingston Road from Dixie Road to Liverpool Road (D2021-001) | March 19, 2020 |

2.1 Existing Pavement Structures and Subgrade Soils

Table 2 presents a summary of the existing pavement structures and subgrade soils, as described in the historical documents.

| Table 2. Summary of Existing Pavement Subclutes and Subgrade Sum | Table 2: Summary of | Existing | Pavement | Structures | and S | ubgrade | Soils |
|--|---------------------|----------|----------|------------|-------|---------|-------|
|--|---------------------|----------|----------|------------|-------|---------|-------|

| Report | Location | Pavement Structure | Subgrade Soil(s) |
|--------|---|---|--|
| 1 | Hwy 2 (Kingston Road) from Dixie Rd to Liverpool Rd (Pickering, ON) | 150 – 200 mm – HMA | |
| 2 | Hwy 2 from Dixie Rd to Liverpool Rd (Pickering, ON) | 490 – 1220 mm – Granular Base and Subbase | Siity Clay |
| 3 | Hwy 2 at Ritchie Ave (Ajax, ON) | 150 – 200 mm – HMA 460 – 1220 mm – Granular Base and Subbase | Silty Clay Silty Clay – Clayey Silt Silt and Sand Silty Sand Sand Sandy Silt |
| 4 | Hwy 2 from Steeple Hill Blvd to Wicks Dr (Pickering & Ajax, ON) | 70 – 290 mm – HMA 100 – 540 – Granular Base 150 – 1160 – Granular Subbase | Clayey Silt Silty Sand Silty Clay Sandy Silt |
| 5 | Hwy 2 from Dixie Rd to Liverpool Rd (Pickering, ON) | 110 – 170 – HMA 180 – 340 – Granular Base 750 – 1100 – Granular Subbase | Silty Clay Silty Sand |



3.0 PAVEMENT CONDITION ASSESSMENT

The PCA was carried out on August 24, 2021 to evaluate the condition of the existing pavements. The purpose of the visual assessment was to document the existing pavement surface distresses and the surface drainage characteristics. The PCA was carried out in accordance with the Ministry's *"Manual for Condition Rating for Flexible Pavements, SP-024"*.

Based on the results of the PCA, the proposed alignment of the DS BRT was split into 20 different sections. Table 3 describes the pavement condition along each section at the time of the survey (August 24, 2021).

| Table | 3: | Pavement | Condition | Survey | Results |
|-------|----|------------|------------|---------|------------|
| IUDIC | υ. | 1 avenient | Contaition | Our voj | / Itesuits |

| Section | Distresses |
|---|--|
| Section 1 Ellesmere Rd From McCowan Rd to Markham Rd ~1.7 km (Scarborough) This section consists of an urban cross section with four lanes (two per direction), an intermittent shared left turn lane, and regular bus inlets. | PCR = 85 and RCR = 8.5 Intermittent – slight flushing Intermittent – slight longitudinal cracking Intermittent – slight transverse cracking |
| Section 2 Ellesmere Rd From Markham Rd to Military Trail ~1.2 km (Scarborough) This section consists of an urban cross section with four lanes (two per direction), occasional left turn lanes, and regular bus inlets. | PCR = 65 and RCR = 6.5 Frequent – moderate ravelling Intermittent – slight flushing Intermittent – moderate potholes Intermittent – severe pavement edge breaks Extensive – slight wheel track rutting Intermittent – moderate utility trench deformation Frequent – severe longitudinal cracking Frequent – moderate to severe transverse cracking Intermittent – severe pavement edge cracking Intermittent – moderate alligator cracking Manual patching <20% |



| Section | Distresses |
|---|--|
| Section 3 Ellesmere Rd From Military Trail to Morningside Ave ~2.0 km (Scarborough) This section consists of an urban cross section with four lanes (two per direction), occasional left turn lanes, and regular bus inlets. | PCR = 85 and RCR = 8.5 Intermittent – slight flushing Intermittent – slight longitudinal cracking Intermittent – slight transverse cracking Machine patching <20% |
| Section 4 Ellesmere Rd From Morningside Ave to Kingston Rd (Extending along Kingston Rd to Hwy 401) ~3.5 km (Scarborough) This section consists of an urban cross section with four lanes (two per direction), occasional left turn lanes, and regular bus inlets. Ellesmere Road reduces from four to two lanes east of Meadowvale Road. | PCR = 60 and RCR = 6.0 Frequent – moderate ravelling Intermittent – slight flushing Intermittent – moderate potholes Intermittent – moderate pavement edge breaks Frequent – moderate wheel track rutting Intermittent – moderate utility trench deformation Extensive – moderate to severe longitudinal cracking Frequent – moderate to severe transverse cracking Intermittent – severe pavement edge cracking Frequent – moderate to severe alligator cracking Frequent – moderate to severe alligator cracking Manual patching <20% Machine patching between 20% to 50% Crack rout and seal <20% |
| Section 5 Kingston Rd (Hwy 2) From Hwy 401 to the CN Rail ~5.3 km (Scarborough / Pickering) This section consists of an urban cross section with four lanes (two per direction), and occasional left turn lanes. | PCR = 80 and RCR = 8.0 Intermittent - slight ravelling Intermittent - slight flushing Intermittent - severe potholes Intermittent - slight wheel track rutting Intermittent - slight utility trench deformation Intermittent - slight longitudinal cracking Intermittent - slight transverse cracking Intermittent - moderate pavement edge cracking Intermittent - slight map cracking Manual patching <20% Machine patching <20% Crack rout and seal <20% |



| Section | Distresses |
|---|---|
| Section 6 Kingston Rd (Hwy 2) From the CN Rail to Liverpool Rd ~1.0 km (Pickering) This section consists of an urban cross section with four lanes (two per direction), and an intermittent shared left turn lane. There is a small rural section east of Walnut Lane. | PCR = 75 and RCR = 7.5 Frequent – slight ravelling Extensive – slight flushing Intermittent – severe potholes Intermittent – moderate pavement edge breaks Frequent – slight wheel track rutting Frequent – slight to moderate longitudinal cracking Frequent – slight transverse cracking Intermittent – slight pavement edge cracking Intermittent – moderate map cracking Intermittent – slight to moderate alligator cracking Manual patching <20% Machine patching <20% Crack rout and seal between 20% and 50% |
| Section 7 Kingston Rd (Hwy 2) From Liverpool Rd to Glengrove Rd South ~1.0 km (Pickering) This section consists of an urban cross section with six lanes (three per direction) including two designated bus lane (one per direction), two bicycle lanes (one per direction), and occasional left turn lanes. | PCR = 85 and RCR = 8.5 Intermittent – slight ravelling Intermittent – slight flushing Intermittent – slight longitudinal cracking Intermittent – slight transverse cracking |
| Section 8 Kingston Rd (Hwy 2) From Glengrove Rd South to Royal Rd ~1.0 km (Pickering) This section consists of an urban cross section with four lanes (two per direction), and an intermittent shared left turn lane. There is a short rural section east of Valley Farm Road on the south side. | PCR = 75 and RCR = 7.5 Intermittent – slight ravelling Intermittent – slight flushing Intermittent – moderate potholes Intermittent – slight wheel track rutting Intermittent – moderate utility trench distortion Frequent – slight to moderate longitudinal cracking Intermittent – slight transverse cracking Intermittent – slight to moderate pavement edge cracking Manual patching <20% Machine patching <20% Crack rout and seal <20% |



| Section | Distresses |
|--|---|
| Section 9 Kingston Rd (Hwy 2) From Royal Rd to Southview Dr ~1.0 km (Pickering) This section consists of an urban cross section with six lanes (three per direction) including two designated bus lane (one per direction), two bicycle lanes (one per direction), and occasional left turn lanes. | PCR = 85 and RCR = 8.5 Intermittent – slight ravelling Intermittent – slight longitudinal cracking Intermittent – slight transverse cracking |
| Section 10 Kingston Rd (Hwy 2) From Southview Dr to Rotherglen Rd S ~1.9 km (Pickering / Ajax) This section consists of an urban cross section with four lanes (two per direction), and occasional left turn lanes. | PCR = 65 and RCR = 6.5 Intermittent – slight to moderate ravelling Frequent – slight flushing Frequent – slight to moderate wheel track rutting Intermittent – slight utility trench distortion Frequent – slight to moderate longitudinal cracking Intermittent – slight transverse cracking Intermittent – moderate alligator cracking Manual patching <20% Machine patching <20% Crack rout and seal >50% |
| Section 11 Kingston Rd (Hwy 2) From Rotherglen Rd S to Salem Rd ~2.6 km (Ajax) This section consists of an urban cross section with six lanes (three per direction) including two designated bus lane (one per direction), two bicycle lanes (one per direction), and occasional left turn lanes. | PCR = 80 and RCR = 8.0 Intermittent – slight flushing Intermittent – slight wheel track rutting Frequent – slight longitudinal cracking Intermittent – slight transverse cracking Intermittent – slight map cracking Intermittent – slight alligator cracking Manual patching <20% Machine patching <20% |



| Section | Distresses |
|---|--|
| Section 12 Kingston Rd (Hwy 2) From Salem Rd to Lakeridge Rd ~2.5 km (Ajax) This section consists of a rural cross section with four lanes (two per direction), and occasional left turn lanes. | PCR = 70 and RCR = 7.0 Intermittent – slight ravelling Intermittent – slight wheel track rutting Extensive – slight to moderate longitudinal cracking Extensive – slight transverse cracking Intermittent – slight pavement edge cracking Intermittent – slight map cracking Intermittent – slight to moderate alligator cracking Manual patching <20% Machine patching <20% Crack rout and seal >50% |
| Section 13 Dundas St E (Hwy 2) From Lakeridge Rd to Fothergill Ct ~1.6 km (Whitby) This section consists of an urban cross section with four lanes (two per direction), and occasional left turn lanes. | PCR = 85 and RCR = 8.5 Frequent – slight ravelling Intermittent – slight longitudinal cracking Intermittent – slight transverse cracking |
| Section 14 Dundas St E (Hwy 2) From Fothergill Ct to Jeffrey St ~0.5 km (Whitby) This section consists of an urban cross section with four lanes (two per direction), and occasional left turn lanes. | PCR = 70 and RCR = 7.0 Frequent – slight to moderate ravelling Frequent – slight flushing Frequent – slight wheel track rutting Extensive – slight longitudinal cracking Frequent – slight transverse cracking Frequent – slight map cracking Intermittent – moderate alligator cracking Manual patching <20% Machine patching <20% Crack rout and seal >50% |
| Section 15 Dundas St E (Hwy 2) From Jeffrey St to Annes St ~0.8 km (Whitby) This section consists of an urban cross section with four lanes (two per direction), and a shared left turn lane. | PCR = 85 and RCR = 8.5 Intermittent – slight longitudinal cracking Intermittent – slight transverse cracking |



| Section | Distresses |
|--|---|
| Section 16 Dundas St E (Hwy 2) From Annes St to Brock St ~0.8 km (Whitby) This section consists of an urban cross section with four lanes (two per direction), and occasional left turn lanes. | PCR = 65 and RCR = 6.5 Frequent – moderate ravelling Intermittent – slight flushing Intermittent – moderate potholes Intermittent – moderate pavement edge breaks Extensive – slight wheel track rutting Frequent – slight to moderate longitudinal cracking Frequent – slight to moderate transverse cracking Intermittent – slight map cracking Intermittent – moderate to severe alligator cracking Manual patching <20% Crack rout and seal between 20% and 50% |
| Section 17 Dundas St E (Hwy 2) From Brock St to Hickory St ~0.4 km (Whitby) This section consists of an urban cross section with four lanes (two per direction), and occasional left turn lanes. | PCR = 85 and RCR = 8.5 Intermittent – slight flushing Intermittent – slight transverse cracking |
| Section 18 Dundas St E (Hwy 2) From Hickory St to Garrard Rd ~2.9 km (Whitby) This section consists of an urban cross section with four lanes (two per direction), and a shared left turn lane. | PCR = 70 and RCR = 7.0 Intermittent – slight ravelling Intermittent – slight flushing Intermittent – severe rippling Extensive – slight wheel track rutting Intermittent – slight utility trench distortion Extensive – slight to moderate longitudinal cracking Extensive – slight to moderate transverse cracking Extensive – slight map cracking Intermittent – moderate alligator cracking Manual patching <20% Machine patching between 20% and 50% Crack rout and seal between 20% and 50% |



| Section | Distresses |
|---|---|
| Section 19 King St E (Eastbound Only) (Hwy 2) From Garrard Rd to Simcoe St ~3.3 km (Oshawa) This section consists of an urban cross section with four lanes (two per direction), and a shared left turn lane. King St E splits into a divided urban section east of Waverly St E. | PCR = 55 and RCR = 5.5 Intermittent – slight ravelling Intermittent – slight flushing Intermittent – moderate pavement edge breaks Extensive – slight to moderate wheel track rutting Intermittent – slight utility trench distortion Extensive – moderate to severe longitudinal cracking Extensive – moderate to severe transverse cracking Extensive – moderate to severe alligator cracking Frequent – moderate to severe alligator cracking Manual patching <20% Machine patching between 20% and 50% Crack rout and seal between 20% and 50% |
| Section 20 Bond St W (Westbound Only) (Hwy 2) From Simcoe St to Garrard St ~3.3 km (Oshawa) This section consists of a divided urban cross section with three westbound lanes. Bond St W transitions to King St E at the terminus of the divided section east of Waverly St E. West of the divided section, King St E consists of an urban cross section with four lanes (two per direction), and a shared left turn lane. | PCR = 55 and RCR = 5.5 Intermittent - slight ravelling Intermittent - moderate pavement edge breaks Extensive - slight to moderate wheel track rutting Intermittent - slight utility trench distortion Extensive - moderate to severe longitudinal cracking Extensive - moderate to severe transverse cracking Extensive - moderate to severe alligator cracking Frequent - moderate to severe alligator cracking Manual patching <20% Machine patching between 20% and 50% Crack rout and seal between 20% and 50% |

The observations listed above have also been summarized on the "Flexible Pavement Condition Evaluation Form" in Appendix A.

4.0 PAVEMENT DESIGN AND ANALYSIS

The design analyses for pavement widening were carried out using the "AASHTO Guide for Design of Pavement Structures 1993" and MTO's "Adaption and Verification of AASHTO Pavement Design Guide for Ontario Conditions, MI-183", dated March 2008.



4.1 Traffic Data

The data provided by IBI Group in an email dated August 24, 2021, were used to estimate the Equivalent Single Axle Loads (ESALs) and carry out the pavement design analyses. A summary of the traffic data is provided in Table 4 below.

| | Table | 4: | Traffic | Volumes | for | Ellesmere | Road | and | Highway | 2 |
|--|-------|----|---------|---------|-----|-----------|------|-----|---------|---|
|--|-------|----|---------|---------|-----|-----------|------|-----|---------|---|

| Section | AADT | Growth Rate (%) | Commercial (%) |
|--|---|--------------------|-------------------|
| Section 1 Ellesmere Rd – From McCowan Rd to Markham Rd | 32,288 (2019) 33,588 (2031) 34,488 (2041) | 0.3 0.3 | 4.8 |
| Section 2 Ellesmere Rd – From Markham Rd to Military Trail | 28,669 (2019) 30,369 (2031) 31,569 (2041) | 0.5 0.4 | 4.8 |
| Section 3 Ellesmere Rd – From Military Trail to Morningside Ave | 21,815 (2019) 23,515 (2031) 24,715 (2041) | 0.6 0.5 | 4.8 |
| Section 4 Ellesmere Rd – From Morningside Ave to Kingston Rd | 14,174 (2019) 16,274 (2031) 17,774 (2041) | 1.2 0.9 | 4.8 |
| Section 5 Kingston Rd – From Hwy 401 to the CN Rail | 41,445 (2019) 43,445 (2031) 44,945 (2041) | 0.4 0.3 | 6.0 |
| Section 6 Kingston Rd – From the CN Rail to Liverpool Rd | 32,651 (2019) 36,051 (2031) 37,851 (2041) | 0.8 0.5 | 2.3 |
| Section 7 Kingston Rd – From Liverpool Rd to Glengrove Rd | 33,230 (2018) 35,530 (2031) 36,830 (2041) | 0.5 0.4 | 3.6 |
| Section 8 Kingston Rd – From Glengrove Rd to Royal Rd | 33,230 (2018) 35,530 (2031) 36,830 (2041) | 0.5 0.4 | 3.6 |
| Section 9 Kingston Rd – From Royal Rd to Southview Dr | 32,806 (2018) 35,406 (2031) 36,806 (2041) | 0.6 0.4 | 2.9 |



| Section | AADT | Growth Rate (%) | Commercial (%) |
|--|---|--------------------|-------------------|
| Section 10 Kingston Rd – From Southview Dr to Rotherglen Rd S | 44,338 (2018) 46,238 (2031) 47,238 (2041) | 0.3 0.2 | 3.2 |
| Section 11 Kingston Rd – From Rotherglen Rd S to Salem Rd | 35,246 (2018) 36,346 (2031) 37,046 (2041) | 0.2 0.2 | 2.3 |
| Section 12 Kingston Rd – From Salem Rd to Lakeridge Rd | 35,246 (2018) 36,346 (2031) 37,046 (2041) | 0.2 0.2 | 2.3 |
| Section 13 Dundas St E – From Lakeridge Rd to Fothergill Ct | 27,849 (2018) 29,949 (2031) 31,749 (2041) | 0.6 0.6 | 2.8 |
| Section 14 Dundas St E – From Fothergill Ct to Jeffrey St | 27,849 (2018) 29,949 (2031) 31,749 (2041) | 0.6 0.6 | 2.8 |
| Section 15 Dundas St E – From Jeffrey St to Annes St | 27,849 (2018) 29,949 (2031) 31,749 (2041) | 0.6 0.6 | 2.6 |
| Section 16 Dundas St E – From Annes St to Brock St | 27,849 (2018) 28,649 (2031) 29,249 (2041) | 0.2 0.2 | 1.9 |
| Section 17 Dundas St E – From Brock St to Hickory St | 27,849 (2018) 28,649 (2031) 29,349 (2041) | 0.2 0.2 | 2.8 |
| Section 18 Dundas St E – From Hickory St to Garrard Rd | 20,872 (2018) 21,472 (2031) 21,972 (2041) | 0.2 0.2 | 2.3 |
| Sections 19 and 20 King St W – From Garrard St to Simcoe St | 20,608 (2018) 21,708 (2031) 22,708 (2041) | 0.4 0.5 | 3.4 2.9 |



4.2 ESAL Calculations

The flexible pavement designs for pavement widening were carried out for a service life of 19 years. The estimated Equivalent Single Axle Loads (ESALs) for the widening of the various road sections within the project limits are provided in Table 5 below.

Table 5: Equivalent Single Axle Loads

| Section | ESAL |
|--|------------------------------|
| Section 1: Ellesmere Rd – From McCowan Rd to Markham Rd | 6.0 x 10 ⁶ |
| Section 2: Ellesmere Rd – From Markham Rd to Military Trail | 5.5 x 10 ⁶ |
| Section 3: Ellesmere Rd – From Military Trail to Morningside Ave | 4.3 x 10 ⁶ |
| Section 4: Ellesmere Rd – From Morningside Ave to Kingston Rd | 3.1 x 10 ⁶ |
| Section 5: Kingston Rd – From Hwy 401 to the CN Rail | 9.7 x 10 ⁶ |
| Section 6: Kingston Rd – From the CN Rail to Liverpool Rd | 3.1 x 10 ⁶ |
| Section 7: Kingston Rd – From Liverpool Rd to Glengrove Rd | 4.8 x 10 ⁶ |
| Section 8: Kingston Rd – From Glengrove Rd to Royal Rd | 4.8 x 10 ⁶ |
| Section 9: Kingston Rd – From Royal Rd to Southview Dr | 3.9 x 10 ⁶ |
| Section 10: Kingston Rd – From Southview Dr to Rotherglen Rd S | 5.5 x 10 ⁶ |
| Section 11: Kingston Rd – From Rotherglen Rd S to Salem Rd | 2.7 x 10 ⁶ |
| Section 12: Kingston Rd – From Salem Rd to Lakeridge Rd | 4.1 x 10 ⁶ |
| Section 13: Dundas St E – From Lakeridge Rd to Fothergill Ct | 3.2 x 10 ⁶ |
| Section 14: Dundas St E – From Fothergill Ct to Jeffrey St | 3.2 x 10 ⁶ |
| Section 15: Dundas St E – From Jeffrey St to Annes St | 2.9 x 10 ⁶ |
| Section 16: Dundas St E – From Annes St to Brock St | 2.0 x 10 ⁶ |
| Section 17: Dundas St E – From Brock St to Hickory St | 3.0 x 10 ⁶ |
| Section 18: Dundas St E – From Hickory St to Garrard Rd | 1.8 x 10 ⁶ |
| Sections 19 and 20: King St W – From Garrard St to Simcoe St | 2.4 x 10 ⁶ |



4.3 Design Parameters

The flexible pavement design parameters selected for pavement rehabilitation/realignment are listed in Table 6.

| | Urban Minor Arterial | | | | | | |
|--|----------------------------|------------|--|--|--|--|--|
| | nitial Serviceability | 4.4 | | | | | |
| Τε | erminal Serviceability | 2.4 | | | | | |
| I | Reliability Level (%) | 90 | | | | | |
| Ove | rall Standard Deviation | 0.49 | | | | | |
| Subgrad | de Resilient Modulus (kPa) | 30,000 | | | | | |
| | New HMA | 0.42 / 1.0 | | | | | |
| Reliability Level (%) Overall Standard Deviation Subgrade Resilient Modulus Structural / Drainage Coefficients New Granu | New Granular A | 0.14 / 1.0 | | | | | |
| | New Granular B, Type II | 0.09 / 1.0 | | | | | |

5.0 PAVEMENT DESIGN RECOMMENDATIONS

5.1 Pavement Rehabilitation Designs

This section provides pavement rehabilitation recommendations for this assignment. It is important to note that the rehabilitation recommendations provided for the existing lanes in Table 7 below are based on the results of the PCA only, and does not consider the pavement structure layer thicknesses (As boreholes were not advanced as part of this study, the pavement structure information was not available). As such, the existing and required layer thicknesses should be confirmed during the detailed design of this project.

The pavement design recommendations for the rehabilitation of each section are provided in Table 7.

Table 7: Recommended Rehabilitation Strategies for the DS BRT

| Section | РСА | Recommendation | Lift Thicknesses | | | | |
|---|------------|------------------------------------|--|--|--|--|--|
| Sections 1, 3, 5, 6, 7, 8, 9, 11, 13, 15, 17 | >= 75 | Mill 50 mm / Pave 50 mm | 50 mm SP 12.5 FC2 | | | | |
| Sections 2, 10, 12, 14, 16, 18 | >=65 & <75 | Mill 100 mm / Pave 100 mm | 50 mm SP 12.5 FC2 50 mm SP 19.0 | | | | |
| Sections 4, 19, 20 | <65 | Mill/Excavate 150 mm / Pave 150 mm | 50 mm SP 12.5 FC2 2 x 50 mm SP 19.0 | | | | |



5.2 Pavement Widening Designs

The pavement design recommendations for the widening of each section are provided in Table 8.

Table 8: Recommended Widening Strategies for the DS BRT

| | Recommendatio | on | |
|--|---------------------------|-------------------|--|
| Section | Layer | Thickness (mm) | HMA Lift Thicknesses |
| | HMA | 160 | |
| Section 1: Ellesmere Rd – From McCowan Rd to Markham Rd | Granular A Base | 150 | SP 12.5 FC2 – 40 mm SP 19.0 – 2 x 60 mm |
| | Granular B Type I Subbase | 550 | |
| Section 2: Ellesmere Rd – From | НМА | 160 | |
| Markham Rd to Military Trail | Granular A Base | 150 | SP 12.5 FC2 – 40 mm SP 19.0 – 2 x 60 mm |
| | Granular B Type I Subbase | 550 | |
| Section 3: Ellesmere Rd – From | НМА | 150 | |
| Military Trail to Morningside Ave | Granular A Base | 150 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm |
| | Granular B Type I Subbase | 550 | |
| Section 4: Ellesmere Rd – From | НМА | 150 | |
| Morningside Ave to Kingston Rd | Granular A Base | 150 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm |
| | Granular B Type I Subbase | | |
| Section 5: Kingston Rd – From | НМА | 160 | |
| Hwy 401 to the CN Rail | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 60 mm + 70 mm |
| | Granular B Type I Subbase | 500 | |
| Section 6: Kingston Rd – From | НМА | 160 | |
| Section 6: Kingston Rd – From the CN Rail to Liverpool RdHMA160Granular A Base250 | | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm |
| | Granular B Type I Subbase | 300 | |
| Section 7: Kingston Rd – From | НМА | 160 | SP 12.5 FC2 – 40 mm |
| Liverpool Rd to Glengrove Rd | Granular A Base | 250 | SP 19.0 – 2 x 60 mm |



| | 'n | | | | | | | | |
|--------------------------------|------------------------------------|-------------------|--|--|--|--|--|--|--|
| Section | Layer | Thickness (mm) | HMA Lift Thicknesses | | | | | | |
| | Granular B Type I Subbase | 350 | | | | | | | |
| Section 8: Kingston Rd – From | НМА | 160 | | | | | | | |
| Glengrove Rd to Royal Rd | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 2 x 60 mm | | | | | | |
| | Granular B Type I Subbase | 350 | | | | | | | |
| Section 9: Kingston Rd – From | НМА | 160 | | | | | | | |
| Royal Rd to Southview Dr | to Southview Dr Granular A Base | | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm | | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | | |
| Section 10: Kingston Rd – From | НМА | 160 | | | | | | | |
| Southview Dr to Rotherglen Rd | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 2 x 60 mm | | | | | | |
| | Granular B Type I Subbase | 400 | | | | | | | |
| Section 11: Kingston Rd – From | НМА | 160 | | | | | | | |
| Rotherglen Rd S to Salem Rd | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm | | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | | |
| Section 12: Kingston Rd – From | НМА | 160 | | | | | | | |
| Salem Rd to Lakeridge Rd | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm | | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | | |
| Section 13: Dundas St E – From | НМА | 160 | | | | | | | |
| Lakeridge Rd to Fothergill Ct | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm | | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | | |
| Section 14: Dundas St E – From | НМА | 160 | | | | | | | |
| Fothergill Ct to Jeffrey St | Granular A Base | 250 | SP 12.5 FC2 – 40 mm | | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | | |



| | Recommendatio | | | | | | | |
|---------------------------------|---------------------------|----------------------|--|--|--|--|--|--|
| Section | Layer | HMA Lift Thicknesses | | | | | | |
| Section 15: Dundas St E – From | HMA | 160 | | | | | | |
| Jeffrey St to Annes St | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | |
| Section 16: Dundas St E – From | HMA | 160 | | | | | | |
| Annes St to Brock St | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 2 x 50 mm | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | |
| Section 17: Dundas St E – From | НМА | 160 | | | | | | |
| Brock St to Hickory St | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm | | | | | |
| | Granular B Type I Subbase | | | | | | | |
| Section 18: Dundas St E – From | НМА | 160 | | | | | | |
| Hickory St to Garrard Rd | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 2 x 50 mm | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | |
| Sections 19 and 20: King St W - | НМА | 160 | | | | | | |
| From Garrard St to Simcoe St | Granular A Base | 250 | SP 12.5 FC2 – 40 mm SP 19.0 – 50 mm + 60 mm | | | | | |
| | Granular B Type I Subbase | 300 | | | | | | |

The pavement designs provided in Table 8 for the widening have been checked against the City of Toronto's minimum requirement (150 mm HMA, 150 mm Granular A Base and 200 mm Granular B Type Subbase) for Sections 1 to 4 and against the Region of Durham's minimum requirements (160 mm HMA, and 250 mm Granular A Base) for Sections 5 to 20. The recommended pavement designs satisfy these minimum requirements.

Based on the anticipated ESALs, the Traffic Category for the sections along the DS BRT will be Category D or E. It is recommended that PG 64-28 asphalt cement be used for all mixes; however, it is recommended the surface course mixes (with the exception of the red asphalt) be increased to PG 70-28 in accordance with the applicable standards at the time of Tender preparation.



6.0 RED ASPHALT PAVEMENTS

Coloured pavements have been used to delineate dedicated lanes for bus rapid transit in the Region of York and a number of other municipalities in North America. There are a number of different methods to obtain coloured pavements including the following:

- 1. Epoxy based paints;
- 2. Thermoplastic Coatings;
- 3. Hot Mix Asphalt (HMA) with coloured pigments, conventional asphalt cement, and conventional aggregates or coloured aggregates;
- 4. HMA with synthetic asphalt cements with coloured aggregates.

We are not aware of a comprehensive study carried out to compare the field performance of the various methods used to achieve coloured pavement. However, anecdotal evidence indicates that paints and coatings are not as durable, especially when subjected to heavy traffic such as on Bus Rapid Transit (BRT) lanes. In addition, cold weather and repeated wetting and drying cycles can also reduce the durability of paints and thermoplastic coatings used to colour the BRT Lanes.

The Hot Mix Asphalt based methods listed in 3 and 4 above have performed satisfactorily, but the grade of the asphalt cement used in these mixes has to be selected with care as the pigment can react with the asphalt cement resulting in premature aging of the surface course HMA. Generally, synthetic asphalt cements are expensive and can add \$150 – \$200 to the cost of a tonne of conventional HMA. As such, HMA with synthetic asphalt cements is generally used on smaller projects to add aesthetic value. Due to the cost of pigments and special aggregates, coloured HMA mixes with conventional asphalt cements generally cost \$75 - \$100 more than conventional surface course HMA mixes.

Previous projects have incorporated granitic aggregates with 2.5 to 3.0% red pigment (ferric oxide) to produce a red-coloured asphalt. However, mineral fillers or other materials may be used and the contractor is encouraged to improve the brightness of the HMA by carrying out performance testing on the red asphalt mixes to evaluate the life cycle of the red asphalt mix compared to a conventional HMA. In addition, the contractor should also try different asphalt cement grades that will produce the best results during the performance testing. Previous projects have found that PG 70-34 performed satisfactorily with the materials used in the asphalt mix provided on those projects.

The red asphalt HMA should satisfy the material requirements of OPSS.MUNI 1151 and testing to evaluate the mix's resistance to rutting. This could be carried out by the Hamburg Wheel-track test in accordance with AASHTO T 324-19, or a similar test using an Asphalt Pavement Analyzer (APA) in accordance with AASHTO TP 63-09.

The colour of the red asphalt must be similar or better (brighter) than the red asphalt pavement placed on the VivaNext projects in York Region (see photo below). The brightness of the red asphalt is to clearly differenttiate between the bus lanes and the general purpose lanes. The Region and/or the City have the right to reject the Red Asphalt mix based on the brightness. The Design-Builder shall submit samples of the red asphalt for review and approval before carrying out any paving.





Photograph of Red Asphalt Mix produced on the VivaNext Bus Rapid Transit Project in York Region



Closure

We trust this memo is sufficient for your current needs. Should you have any questions or if clarifications are required, please do not hesitate to contact our office.

Yours truly,

Golder Associates Ltd.

DRAFT

DRAFT

Gordon Goode, B.A.Sc., EIT Pavement and Materials EIT

Andrew Balasundaram, P.Eng. Principal - Pavement and Materials Engineering

GBG/ACB/gbg;rl

Appendix A: Flexible Pavement Condition Evaluation Forms (Municipalities)

Appendix B: ESALs and AASHTO

https://golderassociates.sharepoint.com/sites/148821/project files/6 deliverables/pavements/21473923 mem draft revb 2021'12'24 pcs destop review pavement design - dbrt.docx



APPENDIX A

Flexible Pavement Condition Evaluation Forms



| Section Length 1.7 (KM) Survey Date August 24, 2021 Traffic | Direction B B: Both Directions, N: North Bound S: South Bound, E: East Bound, W: West Bound |
|--|---|
| Contract No Work Project No | Class A F: Freeway, C: Connecting Link, A: Major Artierial M: Minor Artierial, R: Residential |
| Pavement Condition Rating (PCR) 85 Riding Condition Rating (RCR) | 8.5 Evaluated by GBG |
| Riding Condition Rating (At Posted Speed) Density of Severity of Distress Density of Distress % Extent of Occurrence Shoulder Distress Manifestation | Severity of Distress % Extent of Occurrence |
| | Right Left Right Left |
| Excellent Good Fair Poor Very Poor + 8 9 9 5 6 2 Pominant Time Diat | Sli Mod Sev Sli Mod Sev <20 20-50 >50 <20 20-50 >50 |
| Smooth and Comfort- Pleasant able able able and Bumpy at Posted Speed Speed Sp | ess 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 |
| Pavement Distress Manifestation 1 2 3 < 20 20-50 > 50 Paved Full Paved Shoul | lge |
| Devalling 1 2 3 Separation | |
| Ravelling I Paved Partial Cracking | Curb and Cuttor |
| Surface Potholes 3 Breakup and | Potholes |
| Defects Pavement Edge Breaks 4 Surface Treated Distortion | |
| Manholes and Catchbasins 5 x x x | lae Curb |
| Rippling and Shoving 6 Primed Separation | |
| Surface Wheel Track Rutting 7 | |
| Deformation Distortion 8 | Maitenance Treatment |
| Utility Trenches 9 | Extent of Extent of |
| Longitudinal 10 X X | Occurrence % |
| Transverse 11 X X Pavement | Shoulder |
| Cracking Pavement Edge 12 | <20 20-50 >50 <20 20-50 >50 |
| Map 13 | 1 2 3 1 2 3 |
| Alligator 14 Manual Patching | Manual patching |
| Distress Comments (Items not covered above) | Manual Spray Patching |
| Manual Chin Seal | Crack Rout and Seal |
| Manual Chip Seal | |
| Fog Seal | |
| Recommendation by Evaluator Surface Treatment | |
| Manual Burn & Seal | |
| Crack Rout and Seal | |

| Road No. (Street) Ellesmere Road | | | | Location From | | | | | om | Markham Road | | | | То | o Military Trail | | | | | | | | | | | |
|--|--------------------------|------------------------|------------------|---------------|-----------------|---------|--|--------|-----------|-----------------------------------|----------------------|------------------|---------------|--|-------------------------|--------|---------|------|-----------|---|-------|--------|----------|----------|----------|--|
| Section Length 1.2 | | | - | (KM | KM) Survey Date | | | | e ct N | August 24, 2021 Traffic Direction | | | | B: Both Directions, N: North Bound S: South Bound, E: East Bound, W: West Bound F: Freeway, C: Connecting Link, A: Major Artierial | | | | | | | | | | | | |
| oonnuot no. | | | | | | | | 10]0 | | | | | Ľ | M: Minor Artierial, R: Residential | | | | | | | | | | | | |
| Pavement Cor | ndition Rating (PCR) | | 65 | | | Ric | ling | Con | ditic | on Rating (RCR) |) | 6.5 | _ | Eva | luat | ted | ру | | | GBG | | | | | | |
| Riding Condition Rating (At Posted Speed) | | | Severity of Dist | | | | Density of Distress % Extent of Occurrence | | | Shoulder Manife | r Dis estat | stress Se | ver | ity c | of Di | stres | s | | ļ | Density of Distress Extent of Occurrence | | | | | % ice | |
| ĨĨ | Í Í Í | Í | | 1 | I | | I | | | | | | F | Right | t | | Lef | t | + | ſ | Right | | | Left | | |
| Excellent | Good Fair Poor Very | Poor | ÷ | ate | e | teni | ant | ive | | Deminent Trace | | | Sli | Mod | Sev | Sli | Mod | I Se | ev | <20 | 20-50 | >50 | <20 | 20-50 | >50 | |
| Smooth and Co Pleasant | able able able Sp | gerous osted eed | Sligh | Moden | Sevel | ntermit | Freque | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | |
| | | | | | | _ | | | | Pavement Edge | | Pavement Edge | | | | | | | | | | | | hangela | \leq | |
| Pavement Distress Manifestation | | | 1 | 2 | 3 | < 20 | 20-50 |) > 50 | | Paved Full | | Paved Shoulder | | | | ļ | ļ | | | | | | | Ľ | | |
| | | | | | | 1 | 2 | 3 | | | | Separation | | | | | | | | | | \leq | ļ | ļ | | |
| | Ravelling | 1 | | X | | | Х | | | Paved Partial | | Cracking | | | | | <u></u> | | | | | | ļ | | <u> </u> | |
| Surface | Flushing | 2 | X | v | | X | - | | | | Breakup and Potholes | oles | | | Curp ar | | | | I G | ulle | r | ļ | + | <u> </u> | | |
| Defects | Politioles | 3 | | X | V | X | | | | Surface Treated | | Distantisu | | | | | / | | | | | | <u> </u> | | | |
| | Manhalas and Catabhasina | 4 | | v | × | X | | | | | | Distortion | | | | Ľ | | - | | | [l | | | | + | |
| | Rippling and Shoving | 5 | | × | - | × | | | | Primed Separation | | Separation | \rightarrow | | | | | | | | | | <u> </u> | | + | |
| Surface | Wheel Track Butting | oling and Snoving 6 | | | - | | | | | | | | | | | | | | | | | | | | | |
| Deformation | Distortion | el Track Rutting 7 | | | 1 | - | | | | Maitenanc | | | | nce Treatment | | | | | | | | | | | | |
| Deformation | Litility Trenches | 8 | | | | X | | | | Materia | | | | | | | | | | | | | | | | |
| | | ongitudinal 10 | | | X | É | X | | | | | Extent | ent of | | | | | | Extent of | | | | | | | |
| | Transverse | sverse 11 | | | X X | | | | | Pave | me | nt Occurrer | nce | % | | | Sho | ould | ler | | l | 00 | curr | ence | : % | |
| Cracking | Pavement Edge | 12 | | | X | X | <u> </u> | | | | | <20 20-50 | 20-50 | | | | | | | | ľ | <20 | 20 |)-50 | >50 | |
| Ŭ | Мар | 13 | | | | | | | | | | 1 2 | | 3 | | | | | | | ľ | 1 | | 2 | 3 | |
| | Alligator | 14 | | X | | Х | | | | Manual Patching | Х | | | Μ | Manual patching | | | | | | | | | | | |
| | | | | | | | Machine Patching | | | | | Manual Spray Pat | | | | | hing | | | | | | | | | |
| Distress Comments (Items not covered above) | | | | | | | Manual Spray patching | | | | | Manual Chip Seal | | | | | | _ | | | | 1 | | | | |
| | | | | | | | | | | Manual Chip Seal | I | | | | С | rack I | Rout | and | l Se | al | | | | | 1 | |
| | | | | | | | | | | Machine Chip Sea | al | | | | | | | | | | | | | _ | Γ | |
| | | | | | | | | | | Fog Seal | | | | | | | | | | | | ' | | | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt | | | | | | | | | | I | 1 ' | | | | |
| | | | | | | | | | | Manual Burn & Se | eal | | | | | | | | | | I | 1 ' | | | | |
| | | | | | | | | | | Crack Rout and S | Seal | Х | | | | | | | | | l | | | | | |

| Road No. (Stre | eet) Ellesme | ere Road | | | | Lo | catio | on Fi | rom | | Mi | litary Trail | | То | | | | Mor | ninç | gsid | e Av | enue | э | | |
|---------------------------|--|-------------------------|----------|---------------------------|------------|-------------------|-----------------|-------------------------|-------|-------------------|----------------|----------------------|------|---------|----------------|-------------------|------------------|---------------|-----------------|-----------------|-----------------|--------------|---------------|--------------|------------|
| Section Lengt | h2.0 | | _ | (KM | I) | Su | rvey | Dat | е | August 24, 2 | 2021 | Traffic Direction | | В | B: Bo S: So | oth Dir outh B | ectior ound | ns, N , E | l: No E: Ea | ⊮rth B ast B | ound ound | , W: | : Wes | st Bou | nd |
| Contract No. | | | | | | Wo | ork F | Proje | ect N | lo | | Clas | s | А | F: Fre M: M | eeway inor A | ν, C: rtieria | Conr I, R: | າectir : Reເ | ng Li siden | nk, . ntial | A: Ma | ijor Ar | tierial | |
| Pavement Cor | ndition Rating (PCR) | | 85 | | | Ric | ding | Con | ditio | on Rating (RCR) |) | 8.5 | | Eva | aluat | ted I | у | | | | (| GBG | j | | |
| Ri 10 8 | ding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | everit <u>;</u> Distre | y of ss | De Di Exter | ensity stres | y of s % currence |] | Shoulde Manife | r Dis estat | stress Se tion | ever | ity c | of Di | stres | s | | D |)ens Ex1 | sity tent | of D of C | istre)ccu | ess Irren | % ICe |
| ÍÍ | | | | | | | | | | | | | | Righ | t | | Left | t | 1 | F | ₹ight | | l | Left | |
| Excellent | Good Fair Poor Very | / Poor | Ŧ | ate | ē | ten | ent | sive | | Dominant Trac | | | Sli | Mod | Sev | Sli | Mod | Sev | v < | :20 2 | 20-50 | >50 | <20 | 20-50 | >50 |
| Smooth and Co Pleasant | able able able and Bumpy Spectrum Spect | gerous osted beed | Sligh | Moder | Seve | ntermit | Freque | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 3 | Τ | 1 | 2 | 3 | 1 | 2 | 3 |
| | | • | <u> </u> | | | < 20 | 20-50 |) > 50 | | Paved Full | | Pavement Edge | | ******* | | | | - | | | | | | | F |
| Pavem | ient Distress Manifestation | | 1 | 2 | 3 | 1 | 2 | 3 | | | | Separation | | | | | | | | | | \geq | | | |
| | Ravelling | 1 | 1 | | | | | | | Deved Dertial | | Cracking | | | | | 1 | | | フ | ~ | | | | 1 |
| 0 | Flushing | 2 | Х | | | Х | | | | Paved Partial | | Draskup and Datheles | | | | | Cur | bа | nd | Gι | utter | r | | | |
| Surface | Potholes | 3 | | | | | | | | Surface Treated | | Breakup and Potholes | | | | | | 1 | | | | | | | |
| Delects | Pavement Edge Breaks | 4 | | | | | | | | Surface Treated | | Distortion | | | | | | | | | | | | | |
| | Manholes and Catchbasins | 5 | Х | | | X | | | | Brimod | | Pavement Edge Curb | | / | | | | | | | | | | | |
| | Rippling and Shoving | 6 | | | | | | | | Filmed | | Separation | / | | | | | | | | | | | | |
| Surface | Wheel Track Rutting | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| Deformation | Distortion | 8 | | | | | | | | | | Maitena | nce | Tre | atm | ent | | | | | | | | | |
| | Utility Trenches | 9 | | | | | | | | | | Exten | t of | | | | | | | | | | Fyte | ant of | F |
| | Longitudinal | 10 | Х | | | X | | | | | | Occurre | nce | % | | | | | | | | Oc | curr | rence | 3 % |
| | Transverse | 11 | X | | | X | | | | Pave | eme | nt | | | | | Sho | ulde | ər | | ļ | | | | |
| Cracking | Pavement Edge | 12 | | | | 4 | | | | | | <20 20-50 | 0 | >50 | | | | | | | | <20 | 20 | -50 | >50 |
| | Мар | 13 | | <u> </u> | | | | - | | | | 1 2 | | 3 | | | | | | | $ \rightarrow $ | 1 | <u> </u> | 2 | 3 |
| | Alligator | 14 | | | | | | | | Manual Patching | | | | | M | anua | pato | ching | <u> </u> | | $ \rightarrow $ | | | | |
| Distross Com | monte (Itoma not covorad | abovo | | | | | | | | Machine Patching |) Jahin | X . | | | IVI: | anua | Spra | ay Pa | atch | ing | \rightarrow | | J | | |
| Distress Com | ments (items not covered | abuve) | | | _ | - | | | - | Manual Spray pat | .cninę | y | | | | anua | | o Sea | | | \rightarrow | | | | |
| | | | | | _ | - | | | - | Machina Chin Sea | ı ol | | | | | ACK | NUUL | anu | Sea | .1 | -+ | | <u> </u> | | + |
| | | | | | | | | | - | Fog Seal | al | | | | | | | | | | | | ł | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt | | | | | | | | | | | | ł | | |
| Recommentua | | | | | | | | | - | Manual Rurn & S | eal | | | | | | | | | | | | ł | | |
| | | _ | | - | | | | | - | Crack Rout and S | Seal | | | | | | | | | | | | ł | | 1 |
| | | | | | | | | | | | JCai | | | | 0 | | | | | | | | <u> </u> | | L |

| Road No. (Stre | eet) Ellesme | ere Road | | | | Loc | catio | on F | rom | Mc | ornin | gside Avenue | | То | Ki | ngsto | on F | Road | d (E | Exter | nding | i to ⊦ | lighv | vay 4 | 01) |
|-------------------------------|---|------------------------|---------|-----------------|------------|---------------------|-----------------|------------------------|-------------|--------------------|----------------|---------------------------------|---------|------------|---------------------------|----------------------------|------------------------|--------------------|--------------|---------------|------------------------|-------------------|-----------------|--------------------|----------|
| Section Lengt Contract No. | h <u>3.5</u> | | - | (KM |) | Sur Wo | vey rk P | Dat | te ect N | August 24, 2 | 2021 | Traffic Directio | n ss | B | B: Bo S: So F: Fr | oth Di outh E reeway | rectio Boun y, C | ons, d, : Co | N: N E: I | North East | Boun Bound Link, | d J, W A:Ma | ': We ajor A | st Bou rtierial | nd |
| Pavement Cor | ndition Rating (PCR) | | 60 | | | Rid | ling | Cor | nditio | on Rating (RCR) | | 6.0 | | Eva | l ^{M: M} alua | ted | by | ial, | R: R | | ential | GBG | 6 | | |
| Ri | iding Condition Rating (At Posted Speed) | 0 | Se D | verit Vistre | y of ss | De Dis Extent | ensity stres | y of s % urrence | | Shoulder Manife | r Dis estat | stress tion S | Seve | rity o | of Di | stre | SS | | | Der E: | nsity xten | of D t of (|)istro Dccu | ess urren | % ice |
| ĨĨ | ĨĨĨ | ľ | | | | | I | | | | | | | Righ | t | I | Le | ft | - | | Righ | t | | Left | |
| Excellent | Good Fair Poor Very | Poor | ÷ | ate | e | tent | ant | ive. | | | | | Sli | Mod | Sev | Sli | Мо | d S | Sev | <20 | 20-50 | >50 | <20 | 20-50 |) >50 |
| Smooth and Co Pleasant | able able able Sc | jerous osted eed | Sligh | Modera | Sever | ntermit | Freque | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Pavem | nent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 |) > 50 | | Paved Full | | Pavement Edge Paved Shoulder | | | | | | | | ******** | | | | | |
| | Povelling | 1 | | v | | 1 | 2 | 3 | | | | Separation | | | | | | | | | | <u> </u> | | | |
| | Flushing | 2 | v | ^ | | v | ^ | | - | Paved Partial | | Gracking | | + | + | + | _ | rh | on | 4 6 | utto | r | | + | + |
| Surface | Potholes | 2 | ^ | v | | ^ V | | | | | - | Breakup and Potholes | | | 1 | + | Cu | | and | uG | ulle | | | + | + |
| Defects | Pavement Edge Breaks | 4 | - | × | | Ň | | | | Surface Treated | | Distortion | | | | \vdash | \leftarrow | | | ******** | | | | | |
| | Manholes and Catchbasins | - | - | × | | X | | \vdash | | | | Pavement Edge Curb | | | | 1 | | | | | | | | | |
| | Rippling and Shoving | 6 | | | | Â | | | | Primed | | Separation | | - | 1 | + | + | | | | 1 | | | + | + |
| Surface | Wheel Track Rutting | 7 | | X | | | х | | | | | | / | 1 | i. | 1 | | 5 | | | 1 | | 1 | 1 | |
| Deformation | Distortion | 8 | | | - | | | | | | | Maiten | anc | e Tre | atm | ent | | | | | | | | | |
| | Utility Trenches | 9 | | X | | Х | | | | | | | | | Π | | | | | | | Γ | | | |
| | Longitudinal | 10 | | X | X | | | Х | | | | Exte | nt of | | | | | | | | | | Exte | ent of | . 0/ |
| | Transverse | 11 | | Х | X | | Х | | | Pave | eme | nt | ence | * % | | | Sh | oulo | der | , | | 0 | ccur | rence | ÷ % |
| Cracking | Pavement Edge | 12 | | | Х | X | | | | | | <20 20 | -50 | >50 | 1 | | | | | | | <20 | 2 | 0-50 | >50 |
| | Мар | 13 | | Х | | | X | | | | | 1 | 2 | 3 | 1 | | | | | | | 1 | | 2 | 3 |
| | Alligator | 14 | | X | X | | X | | | Manual Patching | | Х | | | M | anua | l pat | tchir | ١g | | | | | | |
| | | | | | | | | | | Machine Patching |) | | X | | M | lanua | ıl Sp | ray l | Pato | ching | ļ | | | | |
| Distress Com | ments (Items not covered | above) | | | | | | | _ | Manual Spray pat | ching | g | | | M | lanua | l Ch | ip S | eal | | | | | | |
| | | | | | | _ | | | _ | Manual Chip Seal | | | | | С | rack | Rou | t and | d Se | eal | | | | | |
| | | | | | | | | | _ | Machine Chip Sea | al | | | | | | | | | | | | | | |
| _ . | | | | | | | | | | Fog Seal | | | | | | | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | _ | Surface Treatmen | nt | | | | 1 | | | | | | | | | | |
| | | | | | | | | | - | Manual Burn & Se | eal | | | | 4 | | | | | | | | | | |
| | | | | | | | | | | Crack Rout and S | Seal | Х | | | | | | | | | | | | | |

| Road No. (Stre | eet) Kingsto | on Road | | | | Loc | catio | on Fi | rom | | Hig | hway 401 | | | То | | | | | CN | Ra | il 📃 | | | |
|------------------------|--|------------------------|----------|----------------|------------|--------------------|-----------------|-------------|-------|-------------------|----------------|-----------------------------|--------|----------|---------|----------------|-------------------|------------------|---------------------|---------------|---------------|--------------------|------------------|--------------|----------|
| Section Lengt | h 5.3 | | - | (KM | I) | Su | rvey | Dat | e | August 24, 2 | 2021 | Traffic D | irec | tion | В | B: Bo S: So | oth Dir outh B | rection ound, | is, N: E Conn | North East | Bou Bour | nd id, V A·N | V: We laior 4 | st Bou | nd |
| Contract No. | - | | | | | _Wo | ork F | roje | ect N | 0. | | - | _(| Class | A | M: M | linor A | , o. rtieria | l, R: | Resid | entia | 1 | ajor / | | |
| Pavement Cor | ndition Rating (PCR) | | 80 | | | Rid | ling | Con | ditio | on Rating (RCR) |) | 8.0 |) | | _Eva | aluat | ted I | by | | | | GB | 3 | | |
| Ri 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | verit istre | y of ss | De Dis Exten | ensity stres | y of s % |] | Shoulde Manife | r Dis estat | stress tion | | Seve | erity o | of Di | stres | 6S | | De E | nsity xter | / of I nt of |)istr Occi | ess urrer | % nce |
| | | | | | | Ŧ | | | | | | | | | Righ | t | | Left | | | Rig | nt | | Left | |
| Excellent | Good Fair Poor Very | Poor | Ħ | rate | ere | tten | lent | sive | | Dominant Type | | Distress | - | Sli | Mod | Sev | Sli | Mod | Sev | <20 | 20-5 | 0 >50 | <20 | 20-50 |) >50 |
| Smooth and Pleasant | able able able Sp | jerous osted eed | Slig | Mode | Seve | ntermi | Frequ | Exten | | Dominant Type | one | | - | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| | | | | | | - | | | | | | Pavement Edge | | DOLOUR D | | | | | | | | | | | |
| Pavem | nent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 |) > 50 | | Paved Full | | Paved Shoulder | | | | | | ļ | | | | | | 1 | |
| | David line a | 4 | v | | | 1 | 2 | 3 | | | | Separation | | | | | | | | | | | | | |
| | Ravelling | 1 | X | | | X | | | - | Paved Partial | | Cracking | | | | | | <u></u> | | | ť." | | | | |
| Surface | Potholes | 2 | × | | v | × | | | - | | | Breakup and Pot | tholes | | | | | Cur | o ai | | วนแ | - | | | |
| Defects | Politicies | 3 | | | ^ | ^ | | <u> </u> | - | Surface Treated | | Distartion | | | | | | <u> </u> | | | | | | | |
| | Manholes and Catchhasins | 4 | v | | | × | | | - | | | Distortion Payement Edge | Curb | | - | | 1 | + | | | | | | | |
| | Rippling and Shoving | 6 | ^ | | - | | | ł | | Primed | | Separation | Curb | | | | | | | | + | | | | |
| Surface | Wheel Track Butting | ° 7 | x | | | X | | | | | | Coparation | | / | 1 | : | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | : |
| Deformation | Distortion | 8 | F | \vdash | | ~ | | | | | | | Mai | tenanc | e Tre | atm | ent | | | | | | | | |
| | Utility Trenches | 9 | x | | | X | - | | | | | | mar | contanto | • | I | 0.110 | | | | | Τ_ | | | |
| | Longitudinal | 10 | X | | | X | | | | | | | E | Extent o | f | | | | | | | | Ext | ent o | í |
| | Transverse | 11 | X | | | X | 1 | | | Pave | eme | nt | Occ | urrenc | e % | | | Sho | ulde | r | | 0 | ccur | rence | % و |
| Cracking | Pavement Edge | 12 | | X | | X | | | | | | - | <20 | 20-50 | >50 | 1 | | | | | | <20 | 2 | 0-50 | >50 |
| | Мар | 13 | X | | | X | | | | | | F | 1 | 2 | 3 | 1 | | | | | | 1 | | 2 | 3 |
| | Alligator | 14 | | | | 1 | | | | Manual Patching | | | х | | | M | anua | l patc | hing | | | | | | |
| | | | | | · · · · | | | | | Machine Patching | g | | Х | | | M | anua | I Spra | ay Pa | tching | g | | | | |
| Distress Com | ments (Items not covered | above) | | Sho | rt rura | al sec | tion e | east | | Manual Spray pat | tching | g | | | | M | anua | I Chip | Sea | I | | | | | |
| of Rosebank Road | with pavement edge cracking. S | Small 0.5 k | m see | ction | at De | lta Bo | ouleva | ard in | - | Manual Chip Sea | | | | | | С | rack I | Rout | and S | Seal | | L | | | |
| slightly worse cond | lition. | | | | | | | | _ | Machine Chip Se | al | | | | | | | | | | | | | | |
| | | | | | | | | | - | Fog Seal | | | | | |] | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | _ | Surface Treatmer | nt | | | | |] | | | | | | | | | |
| | | | | | | | | | _ | Manual Burn & S | eal | | | | |][| | | | | | | | | 1 |
| | | | | | | | | | - | Crack Rout and S | Seal | | Х | | | | | | | | | | | | |

| Road No. (Stre | eet) Kingsto | on Road | | | | Loc | catio | on Fr | om | | (| CN Rail | | То | | : | 300 | m w | ves | t of l | Liver | pool | Roa | ıd | |
|---------------------------|--|------------------------|---------|------------------|------------|--------------------|-----------------|------------------------|-------|--------------------|----------------|---------------------------------|-------|-------|---------------|-------------------|-------------------|--------------|--------------|-------------------|----------------|--------------|---------------|--------------|----------|
| Section Lengt | h <u>1.0</u> | | - | (KM | I) | Su | rvey | Date | e | August 24, 2 | 2021 | Traffic Directio | n | В | B: B S: S | oth Di outh E | rectio Bound | ns, 1 I, | N: N E: E | lorth I East E | Bound Bound | d I, W | : Wes | st Bou | ind |
| Contract No. | - | | | | | Wo | ork F | roje | ct N | o | | Cla | ss | А | F: Fi M: N | reeway 1inor A | /, Ca Artieria | Con al, F | nect R: R | ting L eside | ₋ink, ntial | A: Ma | ijor Ar | rtierial | I |
| Pavement Cor | ndition Rating (PCR) | | 75 | | | Rid | ling | Cond | ditic | on Rating (RCR) |) | 7.5 | | Eva | alua | ted | by | | | | | GBG | ; | | |
| R i 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | everit Distre | y of ss | De Dis Exten | ensity stres | y of s % urrence | | Shoulder Manife | r Dis estat | stress stion s | eve | rity | of Di | stre | SS | | ſ | Den Ex | sity teni | of D of C | istre Dccu | ess Irrer | % 1Ce |
| | | 1 | | | | t L | | | | | | | | Righ | t | | Let | ť | | | Right | | | Left | t |
| Excellent | Good Fair Poor Very | Poor | ŧ | ate | ē | ten | ent | sive | | Dominant Turna | | Distracs | Sli | Mod | Sev | Sli | Мо | l Se | əv | <20 | 20-50 | >50 | <20 | 20-50 |) >50 |
| Smooth and Co Pleasant | able able able Sp Sp | gerous osted eed | Sligh | Moder | Seve | ntermit | Freque | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Paver | nent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 | > 50 | | Paved Full | | Pavement Edge Paved Shoulder | | | | | | | | | | | | / | |
| | | | | | - | 1 | 2 | 3 | | | | Separation | | ļ | ļ | | | | | | | | ļ | ļ | |
| | Ravelling | 1 | Х | | | | Х | | | Paved Partial | | Cracking | | ļ | ļ | | Ļ | | | | | | | | |
| Surface | Flushing | 2 | Х | | | | | Х | | | | Breakup and Potholes | | ļ | | | Cu | rb a | anc | ן G | utte | r | ļ | ļ | |
| Defects | Potholes | 3 | | | Х | X | | _ | | Surface Treated | | | | ļ | | | / | 1 | | | | | | | |
| | Pavement Edge Breaks | 4 | | Х | | X | | | | | | Distortion | | ļ | | | | | | | | | ļ | Ļ | |
| | Mannoles and Catchbasins | 5 | Х | | | X | | | | Primed | | Pavement Edge Curb | | | 1 | | | | | | | | | | |
| Curfees | Rippling and Shoving | 0 | v | | - | | v | | | | | Separation | / | | | | | | | | | | | | |
| Deformation | | / 0 | - | + | 1 | | L^ | | | | | Maiton | anci | Tre | atm | ont | | | | | | | | | |
| Deformation | Litility Trenches | 9 | | \leftarrow | | | - | | | | | Waten | anico | 5 110 | | ent | | | | | | | | | |
| | | 10 | x | x | \vdash | | X | | | | | Exte | nt of | F | | | | | | | | | Exte | ent o | F |
| | Transverse | 11 | X | ~ | t | | X | | | Pave | emei | nt Occurr | ence | 9% | | | Sho | buld | ler | | | 0 | curr | rence | э% |
| Cracking | Pavement Edge | 12 | X | | | X | <u> </u> | | | | | <20 20 | -50 | >50 | | | | | | | | <20 | 20 |)-50 | >50 |
| Ū | Мар | 13 | | X | | X | | | | | | 1 | 2 | 3 | | | | | | | | 1 | | 2 | 3 |
| | Alligator | 14 | Х | X | | Х | | | | Manual Patching | | Х | | | N | lanua | l pat | ching | g | | | | | | |
| | | | | | | | | | | Machine Patching | 3 | Х | | | N | lanua | l Spr | ay P | atc | hing | | | | | |
| Distress Com | ments (Items not covered | above) | | Rura | al sec | tion e | east o | f | | Manual Spray pat | ching | g | | | N | lanua | l Ch | p Se | al | | | | | | 1 |
| Walnut Lane with | pavement edge cracking. | | | | | | | | | Manual Chip Seal | | | | | С | rack | Rout | and | Se | al | | | | | |
| | | | | | | | | | | Machine Chip Sea | al | | | | | | | | | | | | | | |
| | | | | | | | | | | Fog Seal | | | | | | | | | | | | | 1 | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt | | | | | | | | | | | | Í | | |
| | | | | | | | | | | Manual Burn & Se | eal | | | |] | | | | | | | | Í | | |
| | | | | | | | | | | Crack Rout and S | Seal | ; | < | | | | | | | | | | | | |

| Road No. (Stre | eet) Kingsto | on Road | | | | Lo | catio | on Fr | om | 300 m v | west | of Liverpool Road | | То | | | | Gl | leng | rov | e Ro | bad | | | |
|---------------------|--|------------------------|---------|--------|------------|-------------------|-----------------|------------------------|-------|-------------------|----------------|----------------------|--------|-----------|----------------|-------------------|-------------------|--------------|-----------------|---------------|----------------|---------------|---------------|--|----------|
| Section Lengt | h <u>1.0</u> | | - | (KM |) | Su | rvey | Date | e | August 24, 2 | 2021 | Traffic Directio | on | В | B: Bo S: So | oth Dii outh B | rection lound | ns, N , E | l: Nor E: Ea | th B st B | ound ound | . W: | Wes | t Bour | nd |
| Contract No. | | | | | | Wo | ork P | Proje | ct N | lo | | Cla | iss | А | F: Fr M: M | eeway linor A | ν, C: .rtieria | Conr I, R | iectin : Res | ig Li iden | nk, . itial | A: Maj | jor Arl | tierial | |
| Pavement Cor | ndition Rating (PCR) | | 85 | | | Ric | ling | Con | ditic | on Rating (RCR) |) | 8.5 | | Eva | aluat | ted I | by | | | | (| GBG | | | |
| R i 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | verity | y of ss | De Di Exter | ensity stres | y of s % urrence | | Shoulde Manife | r Dis estat | stress tion | Seve | rity o | of Di | stres | s | | D | ens Ext | ity ent | of Di of C | istre Iccu | ss rren | % ce |
| | | | | | | _ | Ι | | | | | | | Righ | t | | Lef | t | | F | light | | | Left | |
| Excellent | Good Fair Poor Very | Poor | ц. | ate | e | teni | ant | ive | | | | | Sli | Mod | Sev | Sli | Mod | Sev | v <2 | 20 2 | 20-50 | >50 | <20 | 20-50 | >50 |
| Smooth and Pleasant | able able able Sc | gerous osted eed | Sligh | Modera | Sever | ntermit | Freque | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 1 | 2 | 3 | 1 | 2 | 3 |
| | | | | | | - 20 | 20.50 | > 50 | | Payod Full | | Pavement Edge | | | | | | | | | | | | an a | |
| Paver | nent Distress Manifestation | | 1 | 2 | 3 | 1 | 20-30 | 2 30 | | Faveu Full | | Paved Shoulder | | | | 1 | + | | | | | | , | | |
| | Bayelling | 1 | × | | | I Y | 2 | 3 | | | | Crocking | | + | | 1 | + | | | - | \rightarrow | | | | |
| | Flushing | 2 | X | | | × | | | | Paved Partial | | Clacking | | | | | Cur | ha | nd | G | itto | | | | |
| Surface | Potholes | 3 | ~ | | | ~ | | | | | | Breakup and Potholes | | + | | 1 | | v a | nu | Ju | nici | | | | |
| Defects | Pavement Edge Breaks | 4 | | | | | | | | Surface Treated | | Distortion | | | | \sim | <u> </u> | | | - | | | | | |
| | Manholes and Catchbasins | 5 | х | | | X | | | | | | Pavement Edge Curb | | | / | 1 | + | + | | | | | | | |
| | Rippling and Shoving | 6 | | | | <u> </u> | | | | Primed | | Separation | / | 1 | | - | 1 | 1 | | - | | | | | |
| Surface | Wheel Track Rutting | 7 | | | | | | | | | | | 1 | | | | | 1 | - | | | | | | 1 |
| Deformation | Distortion | 8 | | | | | | | | | | Maiter | nance | e Tre | atm | ent | | | | | | | | | |
| | Utility Trenches | 9 | | | | | | | | | | / | | | Ι | | | | | | | | | | |
| | Longitudinal | 10 | Х | | | X | | | | | | Exte | ent of | [. 0/ | | | | | | | | 0 | Exte | nt of | 0/ |
| | Transverse | 11 | Х | | | X | | | | Pave | me | nt | rence | \$ 70 | | | Sho | ulde | er | | | 00 | cum | ence | 70 |
| Cracking | Pavement Edge | 12 | | | | | | | | | | <20 20 | 0-50 | >50 | | | | | | | ſ | <20 | 20 | -50 | >50 |
| | Мар | 13 | | | | | | | | | | 1 | 2 | 3 | | | | | | | | 1 | 2 | 2 | 3 |
| | Alligator | 14 | | | | | | | | Manual Patching | | | | | M | anua | l pato | ching | J | | | | | | |
| | | | | | | | | | | Machine Patching | 3 | | | | M | anua | I Spr | ay Pa | atchi | ng | | | | | |
| Distress Com | ments (Items not covered | above) | | | | | | | | Manual Spray pat | ching | g | | | M | anua | l Chi | o Sea | al | | | | | | |
| | | | | | | _ | | | | Manual Chip Sea | | | | | C | rack l | Rout | and | Seal | | | | | | L |
| | | | | | | | | | | Machine Chip Sea | al | | | | | | | | | | | | | | ĺ |
| _ . | | | | | | | | | | Fog Seal | | | | | | | | | | | | | | | ĺ |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt . | | | <u> </u> | | | | | | | | | | | ĺ |
| | | | | | | | | | | Manual Burn & Se | eal | | | - | | | | | | | | | | | ĺ |
| | | | | | | | | | | Crack Rout and S | ieal | | | 1 | | | | | | | | | | | i |

| Road No. (Str | eet) Kingsto | on Road | | | | Loc | atic | on Fr | om | | Glen | grove Road | | | _ 1 | Го | | | | F | Roya | l Ro | ad | | | |
|------------------------|--|-----------------------|--------|------------------|--------------|--------------------|-----------------|------------------------|-----------|--------------------|----------------|----------------|---------|--------|--------|-------|--------------|----------------------|--------------------------|----------------------|---------------|-----------------------|--------------------|--------------|---------------------|------------|
| Section Lengt | h <u>1.0</u> | | _ | (KN | 1) | Su | vey | Date | e ct N | August 24, 2 | 2021 | Traffic | Direc | tion | | B B: | Both Sout | Dire h Bc way, | ection: ound, C: (| s, N: E: Conne | North East | Bour Boun Link, | ıd d, M A: M | /: We | st Bou artierial | nd |
| Contract No. | - | | | | | - **0 | | roje | CUN | | | - | _ | Class | Ľ | АМ | Minc | or Ar | tierial, | R: | Reside | ential | | | | |
| Pavement Co | ndition Rating (PCR) | | 75 | | | Rid | ling | Con | ditic | on Rating (RCR) | | 7 | .5 | | _E | valu | ate | d b | У | | | | GBC | } | | |
| R 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se | everit Distre | ty of ess | De Dis Exten | ensity stres | y of s % urrence | | Shoulder Manife | r Dis estat | stress tion | | Sev | verity | y of | Disti | res | s | | Dei E | nsity xten | of C |)istr Occ | ess urren | % ICe |
| | | | | | | Ħ | | 0 | | | | | | | Ri | ght | | | Left | | | Righ | ıt | | Left | |
| Excellent | Good Fair Poor Very | Poor | Ħ | rate | ere | itter | lent | sive | | Dominant Type | ۵ | Distres | s | S | li M | lod S | ev | Sli | Mod | Sev | <20 | 20-5 |) >50 | <20 | 20-50 | >50 |
| Smooth and Pleasant | able able able able Sp | erous osted eed | Slig | Mode | Seve | nterm | Fregu | Exten | | | чo | | | 1 | | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| | | | | | | _ | | | | | | Pavement Edge | e | | | | | | | | | | | | | |
| Paven | ent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 | > 50 | | Paved Full | | Paved Shoulde | r | | | | | | | | | | | \downarrow | 1 | + |
| | Ravelling | 1 | × | | | 1 X | 2 | 3 | | | | Separation | | | | | | | | | | \vdash | - | + | + | + |
| | Flushing | 2 | X | | | X | | | | Paved Partial | | Clacking | | | | | | 6 | Curk |) ar | d C | litte | - - | + | + | + |
| Surface | Potholes | 3 | | Х | | X | | | | | | Breakup and Po | otholes | s | | | | | | <u> </u> | | | 1 | + | 1 | + |
| Defects | Pavement Edge Breaks | 4 | | | | | | | | Surface Treated | | Distortion | | | | | | \geq | | | | | - | 1 | | 1 |
| | Manholes and Catchbasins | 5 | Х | | | X | | | | Driver | | Pavement Edge | e Curb |) | | X | | | | | | 1 | - | 1 | 1 | 1 |
| | Rippling and Shoving | 6 | | | | 1 | | | | Primed | | Separation | | / | 1 | | | | | | | | | 1 | 1 | 1 |
| Surface | Wheel Track Rutting | 7 | Х | | | Х | | | | | | | | | | | | | | | | | | | | |
| Deformation | Distortion | 8 | | | | | | | | | | | Mai | itenan | ce T | reat | men | nt | | | | | | | | |
| | Utility Trenches | 9 | | X | | Х | | | | | | | | Extont | of | | | | | | | | | Evt | ont of | F |
| | Longitudinal | 10 | Х | X | | | X | | | | | | 00 | curren | ce % | | | | | | | | | CCUR | rence | <u>،</u> % |
| | Transverse | 11 | X | | | X | | | | Pave | eme | nt | | ourron | | , | | 9 | Shou | ulde | r | | Ľ | | | |
| Cracking | Pavement Edge | 12 | Х | X | | X | | | | | | | <20 | 20-50 | > | ·50 | | | | | | | <20 | 2 | 0-50 | >50 |
| | Мар | 13 | | | | | | | | | | | 1 | 2 | | 3 | | | | | | | 1 | ┢ | 2 | 3 |
| | Alligator | 14 | | | | | | | | Manual Patching | | | Х | | | | Man | ual | patch | ning | | | \bot | ┢ | | |
| D : () | | | | | | | | | | Machine Patching | 9 | | Х | | | | Man | ual | Spra | y Pat | ching | 9 | \vdash | ⊢ | | |
| Distress Com | ments (Items not covered | above) | | Incr | ease | l pave | emen | t | | Manual Spray pat | ching | g | | | | | Man | ual | Chip | Sea | | | \vdash | ⊢ | | |
| edge cracking and | general distresses at new develo | pment - 1 | 550 k | Kings | ton R | oad. | | | | Manual Chip Seal | | | | | _ | | Crac | к R | out a | ind S | eal | | ╄ | — | | — |
| Pavement betweer | Liverpool Rd and Glengrove Rd | in excelle | nt cor | nditio | n. | | | | | Machine Chip Sea | al | | | | _ | _ | | | | | | | | | | |
| Decembrasis | tion by Evolution | | | | | | | | | ⊢og Seal | | | | | _ | _ | | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt ' | | | | _ | _ | | | | | | | | | | |
| | | | | | | | | | | Manual Burn & Se | eal | | | | _ | _ | | | | | | | | | | |
| | | | | | | | | | | Crack Rout and S | eal | | Х | | | | | | | | | | | | | |

| Road No. (Stre | eet) Kingsto | on Road | | | | Loc | catio | on Fr | om | | Ro | oyal Road | | _ Тс |) | | | S | out | hvie | w D | rive | | | |
|------------------------|---|-----------------------|---------|--------|------------|--------------------|-----------------|------------------------|-------|-------------------|----------------|----------------------|----------|-------|---------------|----------------------------|-------------------|---------------|---------------|-----------------|----------------|--------------|---------------|------------|----------|
| Section Lengt | h <u>1.0</u> | | | (KM |) | Su | rvey | Date | е | August 24, 2 | 2021 | Traffic Direc | ction | В | B: B S: S | oth Di Jouth E | rectio 3ounc | ns, 1 1, | N: No E: E | orth E ast E | 3ounc Jound | 1 , W: | Wes | t Bour | ıd |
| Contract No. | | | | | | Wo | ork F | Proje | ct N | 0. | | (| Class | А | F: Fi M: N | reewa <u>y</u> /linor A | y, C: Artieria | :Con al, F | nect ≀: Re | ing L eside | ink, ntial | A: Ma | jor Arl | ierial | |
| Pavement Cor | ndition Rating (PCR) | | 85 | | | Rid | ling | Con | ditic | on Rating (RCR) |) | 8.5 | | _Ev | alua | ted | by | | | | (| GBG | | | |
| Ri | ding Condition Rating (At Posted Speed) | 0 | Se D | verity | y of ss | De Dis Exten | ensity stres | y of s % urrence | | Shoulde Manife | r Dis estat | stress tion | Sev | erity | of Di | istre | SS | | ſ | Den Ex | sity tent | of D of C | istre Iccu | ss rren | % ce |
| Î | Î Î Î | ľ | | | | | | | | | | | | Righ | nt | | Lef | ft | - | | Right | | | Left | |
| Excellent | Good Fair Poor Verv | Poor | t | ate | e | tent | ant | ive | | | | | SI | i Mod | I Sev | Sli | Mod | d Se | ev · | <20 | 20-50 | >50 | <20 | 20-50 | >50 |
| Smooth and Pleasant | mfort-Uncomfort-Very Rough Dang able able and Bumpy at P | erous osted eed | Sligh | Modera | Sever | ntermitt | Freque | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| | | | | | | = | | | | | | Pavement Edge | | | | | | | | | | | | | < |
| Pavem | ent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 | > 50 | | Paved Full | | Paved Shoulder | | | | | | | | | | | | \leq | |
| 1 4761 | | | | - | Ŭ | 1 | 2 | 3 | | | | Separation | | | | | | | | | | \leq | | | |
| | Ravelling | 1 | Х | | | Х | | | | Paved Partial | | Cracking | | | | | | | | | \leq | | | | |
| Surface | Flushing | 2 | | | | | | | | | | Breakup and Potholes | s | | | | Cu | rb a | and | G | utte | r | | | |
| Defects | Potholes | 3 | | | | | | | | Surface Treated | | | | | | | | 1 | | | | | | | |
| | Pavement Edge Breaks | 4 | | | | | | | | | | Distortion | | | | / | | | | | | ļ | | | |
| | Manholes and Catchbasins | 5 | Х | | | X | | | | Primed | | Pavement Edge Curb |) | | 1 | | | | | | | | | | |
| | Rippling and Shoving | 6 | | | | | | | | | | Separation | / | | | | | | | | | | | | |
| Surface | Wheel Track Rutting | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| Deformation | Distortion | 8 | | | _ | | | | | | | Mai | itenano | ce Tr | eatm | nent | | | | | | | | | |
| | Utility Trenches | 9 | | | | | | | | | | | Extent o | of | | | | | | | | l | Exte | nt of | |
| | Longitudinal | 10 | Х | | | X | | | | | | Oco | currend | e % | | | | | | | | Oc | curr | ence | % |
| | Transverse | 11 | Х | | | Х | | | | Pave | eme | nt | | | | | Sho | buld | er | | | ļ | | | |
| Cracking | Pavement Edge | 12 | | | | | | | | | | <20 | 20-50 | >50 | | | | | | | | <20 | 20- | -50 | >50 |
| | Мар | 13 | | | | | | | | | | 1 | 2 | 3 | | | | | | | | 1 | 2 | 2 | 3 |
| | Alligator | 14 | | | | | | | | Manual Patching | | | | | N | lanua | al pat | ching | g | | | | | | |
| | | | | | | | | | | Machine Patching | g | | | | N | lanua | al Spr | ay P | 'atch | ning | | | | | I |
| Distress Com | ments (Items not covered | above) | | | | _ | | | - | Manual Spray pat | tchin | g | | | N | lanua | l Chi | ip Se | al | | | | | | j |
| | | | | | | _ | | | | Manual Chip Sea | | | | _ | C | rack | Rout | and | Sea | al | | | | | į |
| | | | | | | | | | | Machine Chip Sea | al | | | _ | -11 | | | | | | | , I | | | ł |
| D | the sector of the sector of | | | | | | | | | Fog Seal | | | | _ | 4 | | | | | | | | | | ł |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmer | nt | | | _ | 4 | | | | | | | , I | | | ł |
| | | | | | | | | | | Manual Burn & Se | eal | | | _ | -11 | | | | | | | , I | | | l |
| | | | | | | | | | | Crack Rout and S | Seal | | | | 1 | | | | | | | | | | i |

| Road No. (Stre | eet) Kingsto | on Road | | | | Lo | catio | on Fr | om | S | Sout | hview Drive | | | То | | | | Rot | herç | glen | Roa | id Sc | outh | | |
|---------------------------|--|-----------------------|---------|-----------------|------------|-------------------|-----------------|-------------------------|-------|--------------------|----------------|---|--------|-----------------|-------|---------------|------------------|----------------|----------------|--------------|-------------------|-----------------|----------------|---------------|--------------|----------|
| Section Lengt | h 1.9 | | - | (KM | 1) | Su | rvey | Date | • | August 24, 2 | 2021 | Traffic Dire | ction | [| В | B: B S: S | oth Di outh E | recti Boun | ions, 1d, | N: 1 E: | North East | Bour Boun | ıd d, V | ∕:We | st Bou | ind |
| Contract No. | | | | | | Wo | ork F | Proje | ct N | 0. | | - | Clas | s | Α | F: Fr M: N | eewa linor A | y, C Artier | C: Co rial, | nneo R: F | cting l Reside | Link, ential | A: M | ajor A | rtieria | |
| Pavement Cor | ndition Rating (PCR) | | 65 | | | Ric | ling | Cond | ditic | on Rating (RCR) | | 6.5 | | | Eva | alua | ted | by | _ | | | | GB(| 3 | | |
| Ri 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | verit)istre | y of ss | De Di Exter | ensity stres | y of s % surrence | | Shoulder Manife | r Dis estat | stress tion | Se | ver | ity c | of Di | stre | SS | | | Der E: | nsity kten | of [t of | Distr Occi | ess urrer | % nce |
| | | | | | | Ť | | | | | | | | ŀ | Right | t | | Le | eft | | | Righ | ıt | | Lef | ĩ |
| Excellent | Good Fair Poor Very | Poor | Ħ | rate | e | tten | ent | sive | | Dominant Type | | Distross | | Sli | Mod | Sev | Sli | Mo | od | Sev | <20 | 20-50 |) >50 | <20 | 20-5 |) >50 |
| Smooth and Co Pleasant | able able able able Sp | erous osted eed | Slig | Mode | Seve | ntermi | Frequ | Exten | | Dominant Type | one | Distress | | 1 | 2 | 3 | 1 | 2 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Pavem | nent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 |) > 50 | | Paved Full | | Pavement Edge Paved Shoulder Separation | | | | | | | | | | | | | / | |
| | Ravelling | 1 | х | х | 1 | X | - | Ŭ | | | | Cracking | | | | | 1 | | | | , | | + | + | 1 | |
| | Flushing | 2 | X | | | | х | | | Paved Partial | | Crucking | | | | | 1 | Cι | ırb | an | d G | utte | ər | + | 1 | + |
| Surface | Potholes | 3 | 1 | 1 | | | | | | | | Breakup and Pothole | es | | | 1 | 1 | | 7 | | | | 1 | 1 | Ì | |
| Defects | Pavement Edge Breaks | 4 | | | | | | | | Surface Treated | | Distortion | 011 | | | | \square | | | | | | | | 1 | |
| | Manholes and Catchbasins | 5 | Х | | | X | | | | Drimod | | Pavement Edge Cur | b. | | / | | 1 | | | | | | | 1 | 1 | |
| | Rippling and Shoving | 6 | | | | | | | | Prineu | | Separation | _ | \triangleleft | | |] | | | | | | | | 1 | |
| Surface | Wheel Track Rutting | 7 | Х | X | | | Х | | | | | | | | | | | | | | | | | | | |
| Deformation | Distortion | 8 | | | | | | | | | | Ma | aitena | nce | Tre | atm | ent | | | | | | | | | |
| | Utility Trenches | 9 | Х | | | Х | | | | | | | Exten | t of | | | | | | | | | | Fxt | ent o | f |
| | Longitudinal | 10 | Х | Х | | | X | | | | | . 0 | ccurre | nce | % | | | | | | | | c | ccur | rence | э % |
| | Transverse | 11 | X | | | X | | | | Pave | eme | nt | 1 | | | | | Sh | oul | der | | | | | | |
| Cracking | Pavement Edge | 12 | | | _ | | | | | | | <20 | 20-50 | 0 | >50 | | | | | | | | <20 | 2 | 0-50 | >50 |
| | | 13 | | X | <u> </u> | | | | | Manual Data! | | 1 | 2 | | 3 | | | 1 | 4 - 1- 1 | | | | + ¹ | ╂── | 2 | 3 |
| | Alligator | 14 | | X | | Х | | | | Manual Patching | | X | | | | M | anua | al pa | tchi | ng | - 1- 1 | | — | — | | — |
| Distross Com | monte (Itams not covered | above) | | Alia | otor o | rooki | | | | Machine Patching |) ohin/ | X | | _ | | | anua | | oray | Pate | cning | | — | ╂── | | — |
| depending wheel | aths | abuve) | | Alig | ator c | acki | ng | | | Manual Opray pat | CHIN | 9 | | | | | rack | | iip c it an | d S | <u></u> | | – | + | | |
| generally in wheelp | auis. | | | | _ | - | | | | Machine Chin Sea | al | | | | | \vdash | | 1.00 | il ail | u ot | Jai | | + | + | | + |
| | | _ | | | | | | | | For Seal | 51 | | | | | | | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt | | | | | | | | | | | | | | | |
| | | | | _ | _ | | | | | Manual Burn & Se | eal | | | | | | | | | | | | | | | |
| | | | - | | | | | | | Crack Rout and S | Seal | | | | х | | | | | | | | | | | |
| | | | | | | | | | | | | 4 | 1 | | | | | | | | | | | <u> </u> | | 1 |

| Road No. (Stre | eet) Kingsto | on Road | | | | Lo | catio | on Fi | rom | Roth | nergl | len Road South | | То | | | | East | t of | Sal | em | Road | b | | |
|---------------------------|---|------------------------|---------|------------------|------------|-------------------|-----------------|------------------------|-------|-------------------|----------------|---------------------------------|-------|--------|----------------|-------------------|------------|---------------|-------------------|-----------------|--------------|--------------|---------------|-------------|----------|
| Section Lengt | h 2.6 | | - | (KM | I) | Su | rvey | Dat | e | August 24, 2 | 2021 | Traffic Direction | n | В | B: Bo S: So | oth Dii outh B | | ns, Ni , E | : No E: Ea | rth B ast Br | Bound | , W: | Wes | t Boui | nd |
| Contract No. | - | | | | | Wo | ork F | Proje | ect N | lo | | - Clas | ss | А | н: н М: М | linor A | rtieria | l, R: | Res | siden | ntial | A: IVIa | jor Ar | lienai | |
| Pavement Cor | ndition Rating (PCR) | | 80 | | | Ric | ling | Con | ditio | on Rating (RCR) |) | 8.0 | | Eva | aluat | ted I | by | | | | (| GBG | | | |
| Ri 10 8 | iding Condition Rating (At Posted Speed) | 0 | Se D | everit Distre | y of ss | De Di Exter | ensity stres | y of s % urrence | | Shoulde Manife | r Dis estat | stress S | eve | rity o | of Di | stres | s | | D | ens Ext | sity tent | of D of C | istre)ccu | ess rren | % ce |
| ĨĨ | ÎÎ | Í | | | | Ţ | | | | | | | | Righ | t | 1 | Left | t | | F | Right | | | Left | |
| Excellent | Good Fair Poor Very | Poor | ¥ | ate | ē | tten | ent | sive | | Dominant Type | | Distross | Sli | Mod | Sev | Sli | Mod | Sev | / < | 20 2 | 20-50 | >50 | <20 | 20-50 | >50 |
| Smooth and Co Pleasant | able able able Sp | gerous osted eed | Sligh | Moder | Seve | ntermi | Frequ | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 3 | | 1 | 2 | 3 | 1 | 2 | 3 |
| D | | | | | | < 20 | 20-50 |) > 50 | - | Paved Full | | Pavement Edge Paved Shoulder | | | | | | | | | | | | | |
| Paverr | ient Distress Manifestation | | 1 | 2 | 3 | 1 | 2 | 3 | | | | Separation | | | | | 1 | | | | | / | | | |
| | Ravelling | 1 | | | | | | | | Payod Partial | | Cracking | | | | | | | | X | \geq | | | | |
| Surface | Flushing | 2 | Х | | | Х | | | | Faveu Fartial | | Breakup and Potholes | | | | | Cur | b ai | nd | Gι | uttei | r | | | |
| Defects | Potholes | 3 | | | | | | | | Surface Treated | | Breakup and Fourioics | | | | | \geq | 1 | | | | | | | |
| Dereets | Pavement Edge Breaks | 4 | | | | | | | | ounace meated | | Distortion | | | | \mid | | | | | | | | | |
| | Manholes and Catchbasins | 5 | Х | | | X | | | | Primed | | Pavement Edge Curb | | / | | | | | | | | | | | |
| | Rippling and Shoving | 6 | | | | | | | | T THICK | | Separation | / | Ĩ | | | | | | | | | | | |
| Surface | Wheel Track Rutting | 7 | Х | | | Х | | | | | | | | | | | | | | | | | | | |
| Deformation | Distortion | 8 | | | | | | | | | | Maitena | ance | e Tre | atm | ent | | | | | | | | | |
| | Utility Trenches | 9 | | | | | | | | | | Exte | nt of | | | | | | | | | | Exte | nt of | 1 |
| | Longitudinal | 10 | Х | | | | X | | | | | Occurre | ence | % | | | . . | | | | | Oc | curr | ence | : % |
| | Iransverse | 11 | X | - | | X | | | | Pave | emei | nt | | - | | | Sho | ulde | ər | | | | | | |
| Cracking | Pavement Edge | 12 | | | | \mathbf{h} | | | - | | | <20 20- | .50 | >50 | 4 | | | | | | ŀ | <20 | 20 | -50 | >50 |
| | | 13 | X | | | X | | <u> </u> | | M | | 1 2 | 2 | 3 | | | | | | | | 1 | | 2 | 3 |
| | Alligator | 14 | X | | | Х | | |] | Manual Patching | | X | | | IVI | anua | i pato | ning | - 4 - I- 3 | | | | | | <u> </u> |
| Distress Com | ments (Items not covered | ahove) | | Mon | orac | king | oroco | nt | | Machine Patching | J tobing | ~ × | | | | anua | I Spra | ay Pa | | ing | | | | | |
| at intersections | ments (items not covered | abovej | | wap | Clac | king | prese | III | - | Manual Chin Sea | | 9 | | | | rack l | | and 9 | ai Sool | 1 | | | | | |
| ละ แก้เอารอบแบกร. | | | | | _ | - | | | - | Machine Chin Sea | ı əl | | | | | IAUNI | vout | anu c | JEd | 1 | | | | | ├ |
| | | _ | | | - | | | | - | For Seal | al | | | | 1 | | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt | | | | 1 | | | | | | | | | | |
| | | | | | _ | | | | - | Manual Burn & S | eal | | | | 1 | | | | | | | | | | |
| | | _ | _ | | | | | | - | Crack Rout and S | Seal | | | | 1 | | | | | | | | | | |
| | | | | | | | | | | | .5u | | | 1 | | | | | | | | | | | L |

| Road No. (Stre | eet) Kingsto | on Road | | | | Lo | catio | on Fi | rom | Ea | ast of | Salem Road | | | То | | | Ea | ast o | f La | keri | dge | Roa | ad | | |
|---------------------------|---|---------------|---------|-----------------|-------------|-------------------|-----------------|-------------|-------|-------------------------------------|----------------|-------------------|---------|--------|--------|-------------------------|----------------------------|-------------------|---------------------|------------------|-------------------------|-----------------------------|----------------|-------------|-------------------|----------|
| Section Lengt | h 2.5 | | - | (KM | 1) | Su | rvey | Dat | e | August 24, 2 | 2021 | Traffic Dire | ection | 1 | В | B: Bo S: So F: Fr | oth Dir outh B eeway | rectior lound, | ns, N: E Conn | : Nortl : Eas | h Boi t Boi g Lin | und und, ık, <i>F</i> | W: A: Maj | West | t Boui tierial | nd |
| Contract No. | - | | | | | - 900 | ork F | roje | | lo | | - | - Clas | S | А | M: M | inor A | rtieria | l, R: | Resid | denti | al | , | | | |
| Pavement Cor | ndition Rating (PCR) | | 70 | | | Ric | ling | Con | ditio | on Rating (RCR) |) | 7.0 | | | Eva | alua | ted I | by | | | | G | BG | | | |
| Ri 10 8 | ding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | verit Vistre | y of ess | De Di Exter | ensity stres | y of s % |] | Shoulde Manife | r Dis estat | stress ion | Se | evei | rity o | of Di | stres | S S | | De E | ensi Exte | ity c ent (| of Di of O | stre ccu | ss rren | % ce |
| | | | | | | Ħ | | 0 | | | | | | | Righ | t | | Left | | | Ri | ght | | | Left | |
| Excellent (| Good Fair Poor Very | / Poor | Ħ | rate | ere | itter | lent | sive | | Dominant Type | U U | Distress | | Sli | Mod | Sev | Sli | Mod | Sev | <20 |) 20 | -50 | >50 | <20 | 20-50 | >50 |
| Smooth and Co Pleasant | able able able Sg | osted beed | Slig | Mode | Seve | nterm | Fregu | Exten | | | one | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | : | 2 | 3 | 1 | 2 | 3 |
| | | | | | | _ | | | | | | Pavement Edge | | DINIKI | | | | | | | | | | | magla | |
| Pavem | ent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 |) > 50 | | Paved Full | | Paved Shoulder | | | | ļ | | | | | | | | $ \leq $ | <u> </u> | |
| | Rayelling | 1 | v | - | + | 1 | 2 | 3 | - | | | Separation | | | | <u> </u> | | | | | + | - | $ \rightarrow$ | | | |
| | Flushing | 2 | ^ | | - | ^ | | | | Paved Partial | | Cracking | | | | + | | Cur | h ai | ad (| - Sut | ter | | | | |
| Surface | Potholes | 3 | | | | | | | | | | Breakup and Potho | les - | | | † | | | | | - | | | | | |
| Defects | Pavement Edge Breaks | 4 | | | | | - | | | Surface Treated | | Distortion | | | | - | | | | | | | | | | |
| | Manholes and Catchbasins | 5 | Х | | | X | | | | Defense of | | Pavement Edge Cu | rb | | | 1 | 1 | | 1 | T | | | | | | |
| | Rippling and Shoving | 6 | | | | | | | | Primed | | Separation | _ | / | | | | | | | | | | | | |
| Surface | Wheel Track Rutting | 7 | Х | | | Х | | |] | | | | | | | | | | | | | | | | | |
| Deformation | Distortion | 8 | | | | | | | | | | М | laitena | nce | e Tre | eatm | ent | | | | | | | | | |
| | Utility Trenches | 9 | | | | | | | | | | | Exten | t of | | | | | | | | | , | Exte | nt of | ; |
| | Longitudinal | 10 | Х | Х | | | | Х | | | | . 0 |)ccurre | nce | % | | | | | | | | Oc | curr | ence | % |
| | Transverse | 11 | X | | | | | Х | | Pave | emei | nt | | | | 4 | | Sho | ulde | r | | ⊢ | <u> </u> | | | |
| Cracking | Pavement Edge | 12 | X | | _ | X | | | - | | | <20 | 20-5 | 60 | >50 | - | | | | | | - | <20 | | .50 | >50 |
| | Alligator | 13 | X | V | <u> </u> | X | | \vdash | | Manual Databian | | 1 | 2 | | 3 | | | Inata | la ina ar | | — | \rightarrow | | | <u> </u> | 3 |
| | Alligator | 14 | ^ | ~ | <u> </u> | ^ | | | J | Manual Patching Machine Patching | 2 | × | | | | | anua | l pato | ning w Pa | tchin | | + | \rightarrow | | | <u> </u> |
| Distress Com | ments (Items not covered | above) | | Roa | dwav | has | exces | sive | | Manual Spray pat | y tching | ^r | | | | M | anua | l Chir | sy i a Sea | l | y | + | \rightarrow | | | |
| cracking, however. | most cracks are slight severity. | Many crac | cks ha | ave b | een ro | outed | and | | - | Manual Chip Sea | | 9 | | | | C | rack F | Rout | and S | Seal | | + | - | | | |
| sealed. Rural cros | s section. | | | | | | | | - | Machine Chip Se | al | | 1 | | | ╟─ | | | | | | + | \dashv | | | <u> </u> |
| | | | | | | | | | - | Fog Seal | | | | | | 1 | | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmer | nt | | 1 | | | 11 | | | | | | | | | | 1 |
| | | | | | | | | | - | Manual Burn & S | eal | | | | | 11 | | | | | | | | | | |
| | | | | | | | | | - | Crack Rout and S | Seal | | | | Х | 1 | | | | | | | | | | |

| Road No. (Stre | eet) Dundas S | Street East | t | | | Lo | catio | on F | rom | East | t of L | _akeridge Road | | То | | | ٧ | Nes | st of | f Fo | therg | ill Cc | ourt | | |
|---------------------------|--|------------------------|---------|-----------------|------------|-------------------|-----------------|------------------------|--------|-------------------|----------------|---------------------------------|------|-------------|---------------|-------------------|-----------------|------------|--------------|----------------|-----------------|----------------|----------------|--------------|----------|
| Section Lengt | h 1.6 | | | (KM |) | Su | rvey | Dat | te | August 24, 2 | 2021 | Traffic Directio | n | В | B: B S: S | oth Di outh E | rectio Bound | ons, d, | N: N E: I | √orth East | Boun Boun | d 1, W | ': We | st Bou | ind |
| Contract No. | - | | | | | Wo | ork F | Proje | ect N | lo | | Cla | ss | А | F: Fi M: N | reeway 1inor A | /, C Artieri | ial, | nneo R: F | ting ≀esid∉ | Link, ential | A: Ma | ajor A | rtierial | |
| Pavement Cor | ndition Rating (PCR) | | 85 | | | Ric | ding | Cor | nditio | on Rating (RCR) |) | 8.5 | | Ev | alua | ted | by | | | | | GBG | } | | |
| Ri 10 8 | ding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | verit)istre | y of ss | Di Di Exter | ensity stres | y of s % urrence | | Shoulde Manife | r Dis estat | stress S | eve | rity | of Di | stre | ss | | | Der E | nsity xten | of D t of (|)istre Dccı | ess Arrer | % nce |
| | | | | | | t | | | 1 | | | | | Righ | nt | | Le | ft | | | Righ | t | 1 | Left | |
| Excellent | Good Fair Poor Very | Poor | ¥ | rate | e | tten | ent | sive | | Dominant Type | | Distross | Sli | Mod | Sev | Sli | Мо | od S | sev | <20 | 20-50 | >50 | <20 | 20-50 |) >50 |
| Smooth and Co Pleasant | able able able able Sp | jerous osted eed | Sligh | Moder | Seve | ntermi | Frequ | Exten | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Pavem | ent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 |) > 50 |) | Paved Full | | Pavement Edge Paved Shoulder | | | | | | | | | | | | | |
| | Povelling | 1 | v | | | 1 | 2 | 3 | - | | | Separation | | | | | | | | | | \leq | | | |
| | Ravelling | 2 | X | | | | × | | - | Paved Partial | | Сгаскіпд | | | | | | irh i | 20 | <u> </u> | utte | | | | |
| Surface | Potholes | 2 | | | | | | | - | | | Breakup and Potholes | | | | | <u>u</u> | | arr | 10 | ulle | | | | |
| Defects | Pavement Edge Breaks | 4 | | | | | \vdash | | - | Surface Treated | | Distortion | | | | \vdash | K | | | | | | | + | |
| | Manholes and Catchbasins | 5 | х | | | X | | | | | | Pavement Edge Curb | | | | 1 | | | | | | | | | |
| | Rippling and Shoving | 6 | ~ | | | | | | | Primed | | Separation | | - | | + | 1 | | - | | | | | | + |
| Surface | Wheel Track Rutting | 7 | | | | | 1 | | | | | | / | | | | , | | | | | 1 | | | |
| Deformation | Distortion | 8 | | | | | | | | | | Maiten | ance | e Tre | eatm | ent | | | | | | | | | |
| | Utility Trenches | 9 | | | | | | | | | | Este | | | 1 | | | | | | | | E.t. | | |
| | Longitudinal | 10 | Х | | | X | | | | | | Exte | | r 5 % | | | | | | | | 6 | EXTE | | í • % |
| | Transverse | 11 | Х | | | Х | | | | Pave | eme | nt | ence | ; /0 | | | Sh | oulo | der | | | | scuri | ence | ; /0 |
| Cracking | Pavement Edge | 12 | | | | | | | | | | <20 20 | -50 | >50 | | | | | | | | <20 | 20 |)-50 | >50 |
| | Мар | 13 | | | | | | | | | | 1 2 | 2 | 3 | | | | | | | | 1 | | 2 | 3 |
| | Alligator | 14 | | | | | | | | Manual Patching | | | | | M | lanua | l pat | tchin | ١g | | | | | | |
| | | | | | | | | | | Machine Patching | g | | | | N | lanua | l Sp | ray F | Pato | ching | ļ | | | | _ |
| Distress Com | ments (Items not covered | above) | | | | | | | _ | Manual Spray pat | tchin | g | | | M | lanua | l Ch | nip S | eal | | | | ⊢ | | |
| | | | | | | _ | | | _ | Manual Chip Sea | | | | | C | rack | Rou | t and | d Se | eal | | ⊢ | ⊢ | | <u> </u> |
| | | | | | | | | | _ | Machine Chip Se | al | | | <u> </u> | 4 | | | | | | | | 1 | | 1 |
| D | the sector and the sector sect | | | | | | | | | Fog Seal | | | | <u> </u> | 4 | | | | | | | | 1 | | 1 |
| Recommenda | tion by Evaluator | | _ | _ | | | | | _ | Surface Treatmer | nt | | | - | 4 | | | | | | | | 1 | | 1 |
| | | | | | | | | | _ | Manual Burn & S | eal | | | | ╢ | | | | | | | | | | |
| | | | | | | | | | | Crack Rout and S | seal | | | | 1 | | | | | | | L | L | | |

| Road No. (Stre | eet) Dundas S | street Eas | st | | | Loc | catio | on Fr | om | Wes | st of | Fothergill Court | | | То | | | | | Jeff | frey | Stre | et | | | |
|---------------------------|--|-----------------------|---------|-----------------|------------|--------------------|-----------------|------------------------|-------|--------------------|----------------|---------------------------------|--------|-------|---------------|--------------------------------------|-------------------|----------------|-------------------|----------------|------------------|-----------------------|------------------|---------------|------------|----------|
| Section Lengt | h 0.5 | | - | (KM |) | Su | rvey | Dat | e | August 24, 2 | 2021 | Traffic Direc | ction | | В | B: Bo S: So F [:] Fre | oth Dir outh B | ection ound | ns, N , Con | N: No E: Ea | orth E last E | Bound Bound ink | I , W A⁺Ma | : Wes | t Bou | nd |
| Contract No. | - | | | | | Wo | ork P | roje | ct N | 0. | | - | Class | • | A | M: Mi | inor A | rtieria | al, R | ł: Re | side | ntial | 7. WC | | licitai | |
| Pavement Cor | ndition Rating (PCR) | | 70 | | | Rid | ling | Con | ditic | on Rating (RCR) |) | 7.0 | | - | ∃va | luat | ed I | у | | | | | GBG | 1 | | |
| Ri 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | verit)istre | y of ss | De Dis Exten | ensity stres | / of s % urrence | | Shoulder Manife | r Dis estat | stress tion | Sev | /erit | ty o | f Dis | stres | s | | C | Den Ex | sity tent | of D of C | istre)ccu | ss rren | % ce |
| | | 1 | | | | t. | | | | | | | | R | light | | | Lef | t | | ŀ | Right | | | Left | |
| Excellent | Good Fair Poor Very | Poor | ¥ | ate | ē | ten | ent | sive | | Dominant Type | | Distroop | S | Sli M | Mod | Sev | Sli | Mod | Se | ، ۷ | <20 | 20-50 | >50 | <20 | 20-50 | >50 |
| Smooth and Co Pleasant | able able able able Sp | erous osted eed | Sligh | Moder | Seve | ntermit | Freque | Extens | | Dominant Type | one | Distress | | 1 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Payor | ont Distross Manifestation | | 1 | 2 | 3 | < 20 | 20-50 | > 50 | | Paved Full | | Pavement Edge Paved Shoulder | | | | | | | - | | | | | | | |
| i aven | lent Distress Mannestation | | ' | 2 | Ŭ | 1 | 2 | 3 | | | | Separation | | | | | | | | | | | \square | | Ĺ | |
| | Ravelling | 1 | Х | Х | | | Х | | | Paved Partial | | Cracking | | | | | | | | | | | | | L | |
| Surface | Flushing | 2 | Х | | | | Х | | | | | Breakup and Pothole | s | | | | | Cur | b a | and | G | utte | r |] | L | |
| Defects | Potholes | 3 | | | | | | _ | | Surface Treated | | | | | | | | \geq | 1 | | | | J | ļ | ļ | |
| | Pavement Edge Breaks | 4 | | | | | | | | | | Distortion | | | | | \leq | | | - | | | لــــــا | ļ | L | |
| | Manholes and Catchbasins | 5 | | Х | | X | | | | Primed | | Pavement Edge Curk | > | | \leq | | | | | | | | l |] | ļ | |
| | Rippling and Shoving | 6 | | | 4 | | | | | | | Separation | / | | | | | | | | | | | | - | |
| Surface | Wheel Track Rutting | / | X | \leftarrow | ſ | | X | | | | | Ma | | | T | - 4 | | | | | | | | | | |
| Deformation | Distortion | 8 | | | <u> </u> | | | | | | | IVIA | itenan | ce | Trea | atme | ent | | | | | 1 | | | | |
| | | 9 | v | | | \vdash | | V | | | | | Extent | of | | | | | | | | | l | Exte | nt of | (|
| | Transverse | 10 | × | | | | × | ~ | | Pave | mo | oc Oc | curren | ce % | 6 | | | She | hlu | or | | | Oc | curr | ence | , % |
| Cracking | Pavement Edge | 12 | Ĥ | | | | L^ | | | 1 4 4 | | <20 | 20.50 | | >50 | | | one | Juiu | 01 | | | <20 | 20 | 50 | >50 |
| orability | Map | 13 | X | | | | X | | | | | 1 | 20-00 | | 3 | | | | | | | | 1 | 20 | 2 | 3 |
| | Alligator | 14 | ~ | X | | х | | | | Manual Patching | | X | _ | | | Ma | anua | pato | chind | a | | | <u> </u> | | | |
| | | | | | | | | | I | Machine Patching | a | X | | Ī | | Ma | anua | Spr | av P | , atch | nina | | | | | |
| Distress Com | ments (Items not covered | above) | | | | | | | | Manual Spray pat | tching | q | | | | Ma | anua | l Chi | , p Se | al | | | | | | <u> </u> |
| | | , | | | | _ | | | • | Manual Chip Seal | | <u> </u> | | | | Cr | ack I | Rout | and | Sea | al | | | | | |
| | | | | | 7 | | | | | Machine Chip Sea | al | | | | | | | | | | | | | | | |
| | | | | | | | | | | Fog Seal | | | | | | | | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmer | nt | | | | | | | | | | | | | | | |
| | ~ | | | | | | | | | Manual Burn & Se | eal | | | | | | | | | | | | | | | |
| | | | | | | | | | | Crack Rout and S | Seal | | | | Х | | | | | | | | | | | |

| Road No. (Street) Dundas Street Ea | | | st | | | Location From | | | rom | Jeffrey Street | | | | То | | | | A | nnes | s Stre | et | | | | |
|---|--------------------------|-----------------------|-------------------------|----------|-----------------------|--|-------|----------|-----------------------------------|------------------------------------|------------------|----------------------|----------------------|------------------------------------|--|-----------|--------|----------|---|-------------------------|-------|----------|---|--------|----------|
| Section Length 0.8 | | | _ (KM) | | Survey Date | | | te | August 24, 2021 Traffic Direction | | | | on | В | B B: Both Directions, N: North Bound S: South Bound, E: East Bound, W: West Bound F: Freeway, C: Connecting Link, A: Maior Artierial | | | | | | | | | | |
| Contract No | | | | | work Project No Class | | | | | | | | | M: Minor Artierial, R: Residential | | | | | | | | | | | |
| Pavement Condition Rating (PCR) 85 | | | | | | | | Cor | nditio | on Rating (RCR) |) | 8.5 | Evaluated by GBG | | | | | | | | | | | | |
| Riding Condition Rating (At Posted Speed)1086420 | | | Severity of Distress | | | Density of Distress % Extent of Occurrence | | | | Shoulder Distress Manifestation | | | Severity of Distress | | | | | | Density of Distress % Extent of Occurrence | | | | | | |
| | | | | | | ÷ | | | | | | | | Righ | | Left | | | | Righ | t | Left | | | |
| Excellent | ood Fair Poor Very | / Poor | ¥ | Moderate | ē | tten | ent | sive | | Dominant Type | one | Distress | | Sli | Mod | Sev | Sli | Mod | Sev | <20 | 20-50 | >50 | <20 | 20-50 | >50 |
| Smooth and Pleasant | able able able able Sp | erous osted eed | Sligh | | Seve | ntermi | Frequ | Exten | | | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| | | | | | | _ | | | | Paved Full | | Pavement Edge | | | | | | | | | | | | angela | \leq |
| Pavement Distress Manifestation | | | 1 | 2 | 3 | < 20 | 20-50 | > 50 | 2 | | | Paved Shoulder | | | | | ļ | | | | | | | | |
| | | | | | 1 | 2 | 3 | | | | Separation | | | | | | | | | \leq | | | ļ | | |
| Surface Defects | Ravelling | 1 | | | | | | | _ | Paved Partial | | Cracking | | | | | | Cur | | | Nutte | | | | ļ |
| | Potholes | 2 | | | | | | | _ | | | Breakup and Potholes | | | | | | Cur | v a | | Julle | | | | |
| | Pavement Edge Breaks | 4 | | | | | | | - | Surface Treated | Distortion | | | | | | | <u> </u> | | | + | | | | |
| | Manholes and Catchbasins | 5 | | | | | | \vdash | | | Pavement Edge Cu | ırb | | | | 1 | | | | + | + | | | | |
| Surface Deformation | Rippling and Shoving | 6 | | | | 1 | | | - | Primed Separation | | | | | | | | 1 | + | | | + | | | |
| | Wheel Track Rutting | 7 | | | | | | | 7 | | | / | | | | 8 | | | | | | | <u>, </u> | | |
| | Distortion | 8 | | | | | | | | Maitenan | | | | | | Treatment | | | | | | | | | |
| | Utility Trenches | 9 | | | | | | | | | | | | | | | | | | | | | | | |
| Cracking | Longitudinal | 10 | Х | | | X | | | | | EXte | Extent of | | | | | | | | Extent of Occurrence | | | | | |
| | Transverse | 11 | Х | | | X | | | | Pavement | | | | | 3 /0 | Shoulder | | | | | | | | | |
| | Pavement Edge | 12 | | | | | | | | | 2 | 0-50 | >50 | | | | | | <20 | 20 | -50 | >50 | | | |
| | Мар | 13 | | | | | | | | | 1 | | 2 | 3 | | | | | | | 1 | : | 2 | 3 | |
| | Alligator | 14 | | | | | | | | Manual Patching | | | | | M | anua | pato | hing | | | | | | | |
| Distress Comments (Items not covered above) | | | | | | | | | | Machine Patching | | | | | | M | anua | Spra | ay Pa | tchin | g | | | | |
| | | | | | | | | | _ | Manual Spray patching | | | | | | M | anua | Chip |) Sea | | | ┢ | ┢ | | |
| | | | | | | | | | _ | Manual Chip Seal | | | | | | C | rack l | Rout | and S | Seal | | \vdash | ⊢ | | <u> </u> |
| | | | | | | | | | _ | Machine Chip Se | al | | | | | 4 | | | | | | | | | 1 |
| Decommondation by Evaluator | | | | | | | | | | Fog Seal | | | | | | 4 | | | | | | | | | 1 |
| Recommendation by Evaluator | | | | | | | | | _ | Surface Treatment | | | | | | 4 | | | | | | | | | 1 |
| | | | | | | | | | | Manual Burn & Seal | | | | | ┨── | 4 | | | | | | | 1 | | 1 |
| | | | | | | | | | | Crack Rout and S | seal | | | | | | | | | | | ⊢ | L | | 1 |
| Section Length 0.8 (KM) Survey Date August 24, 2021 Traffic Direction B< | Road No. (Stre | eet) Dundas S | Street Eas | st | | | Lo | catio | on Fi | rom | | Anı | nes Street | | То | | | | E | Broc | < Str | eet | | | |
|--|---------------------|--|------------------------|---------|------------------|--------------|-------------------|-----------------|-------------------------|-------|--------------------|---------------|----------------------------------|-------|--------|----------------|-------------------|-----------------|---------------|-------------------|-----------------|---------------|--------------|--------------|----------|
| Contract No. | Section Lengt | h 0.8 | | _ | (KN | 1) | Su | rvey | v Dat | e | August 24, 2 | 2021 | Traffic Direction | ı | В | B: Bo S: So | oth Dir outh B | ectior ound | ns, N E | : North :: Eas | ו Bou Bour | nd nd, \ | V: We | est Bou | nd |
| Pavement Condition Rating (PCR) 6 Riding Condition Rating (NCR) 6.5 Evaluated by GBC Riding Condition Rating (At Posted Speed) 10 1 1 2 1 1 1 1 1 1 1 1 1 1 2 1 1 2 3 1 2 <t< td=""><td>Contract No.</td><td>-</td><td></td><td></td><td></td><td></td><td>Wo</td><td>ork F</td><td>Proje</td><td>ect N</td><td>lo</td><td></td><td>- Clas</td><td>ss</td><td>А</td><td>F: Fr M: M</td><td>eeway linor A</td><td>, C: rtieria</td><td>Conn I, R:</td><td>Resid</td><td>LINK, Jentia</td><td>A: N</td><td>lajor A</td><td>Artieria</td><td></td></t<> | Contract No. | - | | | | | Wo | ork F | Proje | ect N | lo | | - Clas | ss | А | F: Fr M: M | eeway linor A | , C: rtieria | Conn I, R: | Resid | LINK, Jentia | A: N | lajor A | Artieria | |
| Riding Condition Rating (At Posted Speed) Severity of Distress % Distress % Density of Distress % Density of Distress % Density of Distress %< | Pavement Cor | ndition Rating (PCR) | | 65 | | | Ric | ding | Con | ditio | on Rating (RCR) |) | 6.5 | | Eva | aluat | ted I | ру | | | | GB | G | | |
| Excellent Brouth and biordet. Poor Length and biordet. Very Poor able The Big Big Big Big Big Big Big Big Big Big | R i 10 8 | iding Condition Rating (At Posted Speed) | 0 | Se D | everit Distre | ty of ess | De Di Exter | ensity stres | y of s % currence |] | Shoulder Manife | r Dis stat | stress St | evei | rity o | of Di | stres | s | | De E | nsit xtei | y of nt of | Distr Occ | ess urrer | % nce |
| Eachert Broch and Oradie Eachert Broch and Surface Far box alligator Var Poor alligator Var Poor allicor Var Poor alligator < | ĨĨ | Í Í Ī | Ĩ | | 1 | | | 1 | | | | | | | Righ | t | 1 | Left | | | Rig | nt | Т | Lef | |
| Surface Deformation Distress Manual participant Total and participant Total and participant Distress Distres Distress Distres Distress Distress Distres | Excellent | Good Fair Poor Very | Poor | Ŧ | ate | ē | teni | ent | ive | | Dominant Trma | | Distance | Sli | Mod | Sev | Sli | Mod | Sev | / <20 | 20-5 | 0 >50 | <20 | 20-50 |) >50 |
| Pavement Distress Manifestation 1 2 3 4 2 3 1 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 3 4 3 4 4 3 4 4 3 4 4 3 4 <t< th=""><th>Smooth and Pleasant</th><th>omfort- Uncomfort- Very Rough Dang able able and Bumpy at P Sp</th><th>gerous osted eed</th><th>Sligh</th><th>Moder</th><th>Seve</th><th>ntermit</th><th>Freque</th><th>Extens</th><th></th><th>Dominant Type</th><th>one</th><th>Distress</th><th>1</th><th>2</th><th>3</th><th>1</th><th>2</th><th>3</th><th>1</th><th>2</th><th>3</th><th>1</th><th>2</th><th>3</th></t<> | Smooth and Pleasant | omfort- Uncomfort- Very Rough Dang able able and Bumpy at P Sp | gerous osted eed | Sligh | Moder | Seve | ntermit | Freque | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Bavelling 1 2 3 Surface Defects Flushing 2 X X X Patholes 3 X X X X X Payement Edge Braks 4 X | Paver | nent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 | 0 > 50 | | Paved Full | | Pavement Edge Paved Shoulder | | | | | | | | | | | | |
| Surface Defects Flushing 2 X X Payment Edge Breaks 3 X X Breakup and Potholes Curb and Gutter Manholes and Catchasins 5 X X X Distortion Breakup and Potholes Distortion Breakup and Potholes Surface Wheel Track Rutting 7 X X X Distortion Breakup and Potholes Distortion Distortion <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td>1</td> <td>2</td> <td>3</td> <td></td> <td></td> <td></td> <td>Separation</td> <td></td> <td></td> <td>ļ</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>,</td> <td></td> <td></td> <td></td> | | | | | | _ | 1 | 2 | 3 | | | | Separation | | | ļ | | | | | | , | | | |
| Surface Defects Pitusting 2 X X X Partenet Edge Breaks 4 X X X X Manholes and Catchbasins 5 X X X X Manholes and Catchbasins 5 X X X X Beformation 0 X X X X X Deformation 8 X X X X X X Cracking Pavement Edge 12 X X X X X X X Alligator 11 X | | Ravelling | 1 | | X | | × | X | _ | | Paved Partial | | Cracking | | | | | _ | L | 181 | <u></u> | _ | | | |
| Defects Polluties 3 A A A Parement Edge Breaks 4 x | Surface | Patholog | 2 | X | v | | X | - | - | | | | Breakup and Potholes | | | + | | Cur | o ai | na c | วนแ | er | | | + |
| Partnent Cuge Dreaks 4 X X Manholes and Catchbasins 5 X X Surface Deformation Wheel Track Rutting 7 X X Utility Tranches 9 X X X Longitudinal 10 X X X Transverse 11 X X X Alligator 14 X X X Alligator 14 X X X Manholes and Catchbasins in poor Catchbasins in poor Manual Patching X X Recommendation by Evaluator Crack Rout and Seal I I I I | Defects | Politoles | 3 | - | X | | X | | - | | Surface Treated | | Distortion | | | | | <u> </u> | | | | | - | | |
| Image: Notified and Columnation in the stand calculation is and calculation in the stand calculation is and calculation in the stand calculation is and calculation is anot calculated ato a lo | | Manholes and Catchbasins | 4 | | | V | | T v | | | | | Distortion Devomont Edge Curb | | | | 1 | | | | | | | | |
| Surface Deformation Mphell Track Rutting 7 X X X Deformation 8 2 1 X X X Utility Trenches 9 3 X X X X Longitudinal 10 X X X X X X Pavement Edge 12 X X X X X X X Alligator 14 X <td></td> <td>Rippling and Shoving</td> <td>6</td> <td>-</td> <td></td> <td></td> <td>1</td> <td>^</td> <td>-</td> <td></td> <td>Primed</td> <td></td> <td>Separation</td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>+</td> | | Rippling and Shoving | 6 | - | | | 1 | ^ | - | | Primed | | Separation | | | 1 | | | | + | | | | | + |
| Outroot And that reading A <td>Surface</td> <td>Wheel Track Butting</td> <td>7</td> <td>X</td> <td></td> <td>+-</td> <td></td> <td>1</td> <td>X</td> <td></td> <td></td> <td></td> <td>Copulation</td> <td></td> <td></td> <td>5</td> <td>1</td> <td>1</td> <td>1</td> <td></td> <td>1</td> <td>1</td> <td></td> <td>1</td> <td>1</td> | Surface | Wheel Track Butting | 7 | X | | +- | | 1 | X | | | | Copulation | | | 5 | 1 | 1 | 1 | | 1 | 1 | | 1 | 1 |
| Distress Commentation by Evaluator Catchbasins in poor Catchbasins in poor Recommendation by Evaluator Catchbasins in poor | Deformation | Distortion | 8 | Ê | + | | | | | | | | Maitena | ance | | atm | ent | | | | | | | | |
| Image: construction of the final 10 x | Derermation | Utility Trenches | 9 | | | | | | | | | | | 11100 | / 110 | | | | | | | | | | |
| Pavement Edge 11 X | | Longitudinal | 10 | x | x | + | | X | | | | | Exter | nt of | | | | | | | | | Ext | ent o | i |
| Cracking Pavement Edge 12 Image: constraint of the state of | | Transverse | 11 | X | X | | | X | | | Pave | eme | nt Occurre | ence | % | | | Sho | ulde | ər | | | ccui | rence | ¥% |
| Map 13 X | Cracking | Pavement Edge | 12 | | | | | | | | | | <20 20- | 50 | >50 | 1 | | | | | | <20 | ; | 20-50 | >50 |
| Alligator 14 X X X Distress Comments (Items not covered above) Catchbasins in poor Catchbasins in poor Manual Patching Manual Spray patching Manual Spray patching Manual Chip Seal Manual Chip Seal Fog Seal Surface Treatment Manual Burn & Seal Crack Rout and Seal | 0 | Map | 13 | X | | | x | | | | | | 1 2 | | 3 | 1 | | | | | | 1 | - | 2 | 3 |
| Distress Comments (Items not covered above) Catchbasins in poor Condition. Machine Patching Manual Spray Patching Manual Spray patching Manual Chip Seal Manual Chip Seal Machine Chip Seal Crack Rout and Seal Manual Spray Patching Surface Treatment Manual Burn & Seal Manual Burn & Seal Crack Rout and Seal Crack Rout and Seal Manual Burn & Seal | | Alligator | 14 | | X | X | Х | | | | Manual Patching | | Х | | | М | anua | pato | hing | | | | | | |
| Distress Comments (Items not covered above) Catchbasins in poor condition. Manual Spray patching Manual Chip Seal Recommendation by Evaluator Manual Chip Seal Crack Rout and Seal Surface Treatment Manual Burn & Seal Crack Rout and Seal Crack Rout and Seal Crack Rout and Seal Crack Rout and Seal | | | | | | | | - | | | Machine Patching | 1 | | | | M | anua | I Spra | ay Pa | atchin | g | | | | |
| condition. Manual Chip Seal Crack Rout and Seal Image: Condition Seal Recommendation by Evaluator Manual Chip Seal Image: Condition Seal Image: Conditio | Distress Com | ments (Items not covered | above) | | Cate | chbas | ins ir | n poor | r | | Manual Spray pat | ching | g | | | M | anua | I Chip | Sea | al | <u> </u> | | | | |
| Recommendation by Evaluator Machine Chip Seal I Surface Treatment I Manual Burn & Seal I Crack Rout and Seal X | condition. | | , | | | | | | | - | Manual Chip Seal | | - | | | С | rack F | Rout | and S | Seal | | | | | |
| Recommendation by Evaluator Fog Seal I Surface Treatment I Manual Burn & Seal I Crack Rout and Seal X | | | | | | | | | | - | Machine Chip Sea | al | | | | | | | | | | | | | |
| Surface Treatment Image: Constraint of the second | | | | | | | | | | - | Fog Seal | | | | | 1 | | | | | | | | | |
| Manual Burn & Seal Crack Rout and Seal X | Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmer | nt | | | | 11 | | | | | | | | | |
| Crack Rout and Seal X | | | | | | | | | | - | Manual Burn & Se | eal | | | | 11 | | | | | | | | | |
| | | | | | | | | | | - | Crack Rout and S | Seal | X | | | 1 | | | | | | | | | |

| Road No. (Stre | eet) Dundas S | Street Eas | st | | | Lo | catio | on Fr | om | | Bro | ock Street | | То | | | | F | lickc | ory S | stree | ət | | | |
|------------------------|---|------------------------|---------|------------------|------------|-------------------|-----------------|------------------------|-------|--------------------|---------------|---------------------------------|-------|---------|----------------|-------------------|------------------------------|---------------|------------------|------------------|---------------|---------------|-------------|------------|---------|
| Section Lengt | h 0.4 | | - | (KM |) | Su | rvey | Date | e | August 24, 2 | 021 | Traffic Direction | • [| В | B: Bo S: So | oth Dir outh B | ectior ound | ns, N , E | : Norf E: Eas | :h Boi st Boi | und und, | W: | West | Bour | nd |
| Contract No. | | | | | | Wo | ork P | Proje | ct N | 0. | | - Clas | s | А | F: Fre M: M | eeway inor A | [/] , C: rtieria | Conr I, R: | iectine Resi | g Linl denti | k, A al | ∖: Maj | or Arl | ierial | |
| Pavement Cor | ndition Rating (PCR) | | 85 | | | Ric | ling | Con | ditic | on Rating (RCR) | | 8.5 | | Eva | aluat | ed I | ру | | | | G | BG | | | |
| Ri | iding Condition Rating (At Posted Speed) | 0 | Se D | verity Distre | y of ss | De Di Exter | ensity stres | y of s % urrence | | Shoulder Manife | r Dis stat | stress Se | ever | ity c | of Dis | stres | s | | De | ensi Exte | ty c ent (| of Di of O | stre ccu | ss rren | % ce |
| Î Î | ĨĪĪ | Ĩ | | | I | | Ι | | | | | | | Right | t | | Left | | + | Rie | ght | | | Left | |
| Excellent | Good Fair Poor Verv | Poor | t t | ate | e | tent | ant | ive | | | | | Sli | Mod | Sev | Sli | Mod | Sev | v <2 | 0 20 | -50 | >50 | <20 | 20-50 | >50 |
| Smooth and Pleasant | able able able Sp | jerous osted eed | Sligh | Modera | Sever | ntermitt | Freque | Extensi | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 3 | 1 | : | 2 | 3 | 1 | 2 | 3 |
| Pavem | nent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 | > 50 | | Paved Full | | Pavement Edge Paved Shoulder | | | | | | | | | | | | | / |
| | D | | | | | 1 | 2 | 3 | | | | Separation | | | | | | | | | \rightarrow | \leq | | | |
| | Ravelling | 1 | | | | | | | | Paved Partial | | Cracking | | | | | <u></u> | | - 1 | 4 | | | | | |
| Surface | Flushing | 2 | X | | | Х | | | | | | Breakup and Potholes | | | | | Cur | ра | na | JUL | ter | | | | |
| Defects | Politioles | 3 | | | | | | - | | Surface Treated | | Distantian | | ******* | | | \leq | | | _ | | | | | |
| | Manholos and Catchhasins | 4 | - | | | | | | | | | Distortion | | | | <u> </u> | | | | | | | | | |
| | Rippling and Shoving | 6 | | | | <u> </u> | | | | Primed | | Separation | | ,, | | | | | | | | | | | |
| Surface | Wheel Track Rutting | 7 | | | | | | | | | | Coparation | | | 1 | | | | | | | | | | |
| Deformation | Distortion | 8 | | | | | | | | | | Maitena | nce | Tre | atm | ent | | | | | — | | | | |
| | Utility Trenches | 9 | | | | | - | | | | | | | | | | | | | | Т | | | | |
| | Longitudinal | 10 | | | | | | | | | | Exten | it of | | | | | | | | | - | Exte | nt of | • |
| | Transverse | 11 | х | | | X | 1 | | | Pave | me | nt Occurre | nce | % | | | Sho | ulde | ər | | | Oc | curre | ence | % |
| Cracking | Pavement Edge | 12 | | | | | | | | | | <20 20-5 | 50 | >50 | | | | | | | | <20 | 20- | 50 | >50 |
| _ | Мар | 13 | | | | | | | | | | 1 2 | | 3 | | | | | | | | 1 | 2 | 2 | 3 |
| | Alligator | 14 | | | | | | | | Manual Patching | | | | | M | anual | l pato | hing | i | | | | | | |
| | | | | | | | _ | | • | Machine Patching | J | | | | M | anual | l Spra | ay Pa | atchir | ۱g | | | | | |
| Distress Com | ments (Items not covered | above) | | | | | | | | Manual Spray pat | chin | g | | | M | anual | l Chip | o Sea | al | | | | | | |
| | | | | | | | | | | Manual Chip Seal | | | | | Cı | ack F | Rout | and | Seal | | | | | | |
| | | | | | | | | | | Machine Chip Sea | al | | | | | | | | | | | | | | |
| _ | | | | | | | | | | Fog Seal | | | | | | | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt | | | | | | | | | | | | | | |
| | | | | | | | | | | Manual Burn & Se | eal | | | | | | | | | | | | | | |
| | | | | | | | | | | Crack Rout and S | eal | | | | | | | | | | | | | | |

| Road No. (Stre | eet) Dundas S | Street Ea | st | | | Lo | catio | on Fi | rom | | Hick | ory Street | | | _ т | o | | | Ģ | Sarra | rd R | oad | | | |
|--------------------------------------|--|-----------------------|----------|------------------|--------------|-------------------|-----------------|---------------------------|------------|--------------------|---------------|-----------------|---------|--------|-------|---------------|------------------------------|---------------------------|----------------------|-------------------------------|-----------------------|----------------------|------------------|----------------------|----------------------|
| Section Lengt | h <u>2.9</u> | | _ | (KN | 1) | Su | rvey ork F | [,] Dat Proie | e ect N | August 24, 2 | 021 | Traffic D |)irec | ction | E | B: E S: S | Both Di Bouth E Treewa | rection Bound y, C: | ns, N , E Conn | : North :: East iecting | ו Bou Bou: Link | nd nd, V , A:N | V: W∉ 1ajor / | est Bou Artierial | nd |
| Pavement Cor | ndition Rating (PCR) | | 70 | | | Ric | ling | Con | ditio | on Rating (RCR) | | 7.0 |) | | E | valua | Minor A | Artieria by | I, R: | Resid | entia | GB | G | | |
| R i 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | everit Distre | ty of ess | De Di Exter | ensity stres | y of s % | | Shoulder Manife | r Dis stat | tress ion | | Sev | erity | of D | istre | SS | | De E | nsit :xte | y of I nt of | Distr Occ | ress urrer | % ICe |
| ÍÍ | Í I I | | | | | + | | | | | | | | | Rig | ht | | Lef | t | | Rig | ht | Т | Left | |
| Excellent | Good Fair Poor Very | Poor | ¥ | ate | ē | tten | ent | sive | | Dominant Type | | Distros | - | S | li Mo | d Sev | / Sli | Mod | Sev | / <20 | 20- | i0 >50 | <20 | 20-50 |) >50 |
| Smooth and ^{Co} Pleasant | able able able able Sp | erous osted eed | Sligh | Moder | Seve | ntermi | Frequ | Exten | | Dominant Type | one | Distress | 5 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| | | _ | - | - | - | | 20-50 |) > 50 | | Paved Full | | Pavement Edge | | | | | | | | | | | | | |
| Paver | ent Distress Manifestation | | 1 | 2 | 3 | 1 | 2 | 3 | | | | Separation | | | | | | | + | | | 17 | 1 | | 1 |
| | Ravelling | 1 | Х | | | Х | | | | Deved Destial | | Cracking | | | | -i | | - | 1 | 1 | \mathbf{r} | - | 1 | 1 | 1 |
| Surface | Flushing | 2 | Х | | | Х | | | | Paved Partial | | Brookup and Pot | tholog | | | | | Cur | bа | nd (| Jutt | er | 1 | | |
| Defects | Potholes | 3 | | | | | | | | Surface Treated | | Breakup and Po | linoles | 5 | | | | | 1 | | | | | | |
| Delects | Pavement Edge Breaks | 4 | | | | | | | | Sullace Heated | | Distortion | | | | | \swarrow | | | | | | | | |
| | Manholes and Catchbasins | 5 | | | | | | | | Primod | | Pavement Edge | Curb |) | | \mathcal{I} | | | | | | | | | |
| | Rippling and Shoving | 6 | | | X | Х | | | | THINGU | | Separation | | / | 1 | | | | | | | | | | Constant of Constant |
| Surface | Wheel Track Rutting | 7 | Х | | | | | Х | | | | | | | | | | | | | | | | | |
| Deformation | Distortion | 8 | | | | | | | | | | | Mai | itenan | ce T | reatn | nent | | | | | | | | |
| | Utility Trenches | 9 | Х | | | Х | | | | | | | F | Extent | of | | | | | | | | Ext | ent of | F |
| | Longitudinal | 10 | Х | Х | | | | Х | | | | | Oce | curren | ce % | | | | | | | l c | | rrence | ∍% |
| | Transverse | 11 | X | Х | | | | Х | | Pave | emei | nt | | | | | | Sho | ulde | ۶r | | | | | |
| Cracking | Pavement Edge | 12 | | | | 4 | | - | | | | | <20 | 20-50 | >5 | 0 | | | | | | <20 | 2 | 20-50 | >50 |
| | Мар | 13 | Х | - | | | | X | | | | | 1 | 2 | 3 | | | | | | | 1 | ╄ | 2 | 3 |
| | Alligator | 14 | | X | | Х | | | | Manual Patching | | | Х | V | _ | N | /lanua | al pato | hing | | | +- | ╇ | | |
| Distrass Com | mante (Itoma not acurad | abova) | | <u> </u> | | | | | | Machine Patching |) - In in | | | Х | | | /lanua | al Spr | ay Pa | itchin | g | + | ╇ | | — |
| Distress Com | ments (items not covered | above) | . | Sev | ere ri | ppling |) at | | - | Manual Spray pat | ching | 9 | | | _ | N | /lanua | al Chi | o Sea | 1 | | +- | ╇ | | |
| I NICKSON ROAD INTO | ersection. Small section west of (| Gien Hill L | Jrive | n siiç | gntly k | etter | cond | ition. | - | Mashina Chip Seal | | | | | | - | rack | Rout | and | seal | | — | ┿ | | — |
| | | _ | | | | | | | - | Fag Seel | al | | | | | -11 | | | | | | | | | 1 |
| Decommondo | tion by Evaluator | | | | | | | | | | | | | | | -11 | | | | | | | | | 1 |
| Recommenda | | | | _ | | | | | - | Surrace Treatmen | il Dol | | _ | | _ | -1 | | | | | | 1 | | | |
| | | | | - | | | | | - | Crock Pout and S | -ai | | -+ | v | _ | -11 | | | | | | | | | 1 |
| | | | | | | | | | | Crack Rout and S | ear | | | ^ | | | | | | | | | | | |

| Road No. (Stre | eet) Dundas Street East / | King Stre | eet W | /est | (EB) | Loc | catio | on Fr | om | | Gar | rrard Road | | То | | | | | Si | mco | e Str | eet | | | |
|--------------------------------------|--|-------------------------|---------|------------------|--------------|--------------------|-----------------|------------------------|-------|-------------------|----------------|---|---------|----------|--------------|--------------------|---------------|----------------|--------------|----------------|-----------------|-----------|----------------|--------------|-----------|
| Section Lengt | h <u>3.3</u> | | _ | (KN | 1) | Su | vey | Dat | е | August 24, 2 | 2021 | Traffic Direct | tion | В | B: B S: S | oth Di outh I | irect Boui | tions nd, | , N: E: | North East | Bour Boun | d d, N | /: We | st Bou | ind |
| Contract No. | | | | | | Wo | rk P | Proje | ct N | lo | | <u> </u> | lass | А | F: F M: N | reewa ⁄linor / | y, Artie | C: C erial, | onne R: I | cting Resid | Link, ential | A: M | ajor A | .rtierial | |
| Pavement Cor | ndition Rating (PCR) | | 55 | | | Rid | ling | Con | ditio | on Rating (RCR) |) | 5.5 | | Eva | alua | ted | by | - | | | | GBC | } | | |
| Ri 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | everit Distre | ty of ess | De Dis Exten | ensity stres | y of s % urrence | | Shoulde Manife | r Dis estat | stress tion | Seve | rity | of Di | istre | SS | | | Dei E | nsity xten | of E |)istro Dccı | ess urren | % 1Ce |
| ÍÍ | | | | | | Ŧ | | | | | | | | Righ | nt | | L | eft | | | Righ | t | Π | Left | i |
| Excellent | Good Fair Poor Very | / Poor | Ŧ | ate | ē | ten | ent | sive | | Dominant Type | | Distrass | Sli | Mod | Sev | Sli | Ν | lod | Sev | <20 | 20-50 | >50 | <20 | 20-50 |) >50 |
| Smooth and ^{Co} Pleasant | able able able and Bumpy Springer Sprin | gerous osted oeed | Sligh | Moder | Seve | ntermit | Freque | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Paver | ent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 |) > 50 | | Paved Full | | Pavement Edge Paved Shoulder Separation | | | | | | | | | | | | | |
| | Bayelling | 1 | x | | - | X | 2 | 5 | | | | Cracking | | | + | | | | | | | F- | + | | + |
| | Flushing | 2 | X | | | X | | | | Paved Partial | | Oracking | | | 1 | | C | urh | an | d C | utte | ۲ | + | | + |
| Surface | Potholes | 3 | | | | - A | | | | | | Breakup and Potholes | | | 1 | + | Ť | | , di | | | 1 | + | + | + |
| Defects | Pavement Edge Breaks | 4 | | х | | X | | | 1 | Surface Treated | | Distortion | | | | \bigtriangledown | - | | | | | | | ****** | |
| | Manholes and Catchbasins | 5 | | | X | | X | | | | | Pavement Edge Curb | | | / | 1 | | | | | | 1 | + | + | 1 |
| | Rippling and Shoving | 6 | 1 | | | 1 | | İ. | | Primed | | Separation | / | - | 1 | | 1 | | | | | | | | 1 |
| Surface | Wheel Track Rutting | 7 | Х | X | | | | X | | | | | | | | | | | | | 2 | - | | <u> </u> | - |
| Deformation | Distortion | 8 | | | | | | | | | | Mait | enanc | e Tre | eatm | ent | | | | | | | | | |
| | Utility Trenches | 9 | Х | | | Х | | | | | | - | | | I | | | | | | | 1 | F 4 | | |
| | Longitudinal | 10 | | x | Х | | | Х | | | | E | xtent o | T 0 % | | | | | | | | | EXte | ent of | í • 9/ |
| | Transverse | 11 | | Х | X | | | Х | 1 | Pave | eme | nt | unenco | 8 /0 | | | Sł | hou | Ide | r | | | ccun | rence | ; /0 |
| Cracking | Pavement Edge | 12 | | | | | | | | | | <20 | 20-50 | >50 | | | | | | | | <20 | 20 | 0-50 | >50 |
| | Мар | 13 | | Х | | | | Х | | | | 1 | 2 | 3 | | | | | | | | 1 | | 2 | 3 |
| | Alligator | 14 | | X | X | | X | | | Manual Patching | | Х | | | N | lanua | al pa | atch | ing | | | | | | |
| | | | | | | | | | | Machine Patching | 9 | | Х | | N | lanua | al S | pray | / Pat | ching | ļ | | | | |
| Distress Com | ments (Items not covered | above) | | | | | | | - | Manual Spray pat | ching | g | | | N | lanua | al C | hip | Seal | I | | | | | |
| | | | | | | _ | | | - | Manual Chip Sea | I | | | | C | rack | Ro | ut a | nd S | eal | | ┢ | L | | _ |
| | | | | | | | | | - | Machine Chip Sea | al | | | | 1 | | | | | | | | 1 | | |
| - - | · · - · · | | | | | | | | | Fog Seal | | | | 1 | 4 | | | | | | | | 1 | | |
| Recommenda | tion by Evaluator | | | | | | | | - | Surface Treatmer | nt | | | _ | 4 | | | | | | | | | | |
| | | | | | | | | | - | Manual Burn & Se | eal | | | _ | 4 | | | | | | | | | | |
| | | | | | | | | | | Crack Rout and S | Seal | | Х | | l | | | | | | | ⊢ | ∟ | | |

| Road No. (Stre | eet) Bond Street West / Du | undas Stre | eet E | East (| (WB) | Loc | atio | n Fro | om _ | | Sim | coe Street | | То | | | | | Ga | irrarc | l Str | eet | | | |
|---------------------------|--|-------------------------|---------|-----------------|------------|---------------------|------------------|----------------------|-------|--------------------|---------------|---|---------|-----------|----------------|-------------------|----------------|----------------|--------------|-------------------|----------------|----------------|---------------|--------------|-----------|
| Section Lengt | h <u>3.3</u> | | _ | (KM | I) | Sur | vey | Date | _ | August 24, 2 | 021 | Traffic Directi | ion | В | B: Bo S: So | oth Dir outh E | recti Boun | ons, id, | N: I E: | North East I | Boun Bound | d I, W | : Wes | st Bou | nd |
| Contract No. | | | | | | Wo | rk P | rojec | t No | 0 | | <u> </u> | lass | А | F: Fr M: M | eeway linor A | y, C Artier | C: Co rial, | nneo R: F | cting L Reside | ₋ink, ntial | A: Ma | ajor Ar | tierial | |
| Pavement Cor | ndition Rating (PCR) | | 55 | | | Rid | ing | Cond | litio | n Rating (RCR) | | 5.5 | | Eva | aluat | ted | by | | | | | GBG | i | | |
| Ri 10 8 | iding Condition Rating (At Posted Speed) 6 4 2 | 0 | Se D | verit)istre | y of ss | De Dis Extent | ensity stres: | vof s% urrence | | Shoulder Manife | r Dis stat | tress ion | Seve | rity o | of Di | stres | ss | | | Den E> | sity | of D t of C | istre Occu | ess Irren | % nce |
| | | | | | | t t | | | Γ | | | | | Righ | t | | Le | eft | | | Right | t | | Left | |
| Excellent | Good Fair Poor Very | Poor | ¥ | ate | Ð | tten | ent | sive | | Dominant Type | | Distross | Sli | Mod | Sev | Sli | Mo | bd S | Sev | <20 | 20-50 | >50 | <20 | 20-50 |) >50 |
| Smooth and Co Pleasant | able able able Bumpy Sr | gerous osted jeed | Sligh | Moder | Seve | Intermi | Frequ | Extens | | Dominant Type | one | Distress | 1 | 2 | 3 | 1 | 2 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Pavem | ent Distress Manifestation | | 1 | 2 | 3 | < 20 | 20-50 | > 50 | | Paved Full | | Pavement Edge Paved Shoulder Separation | | | | | | | | | | | | / | |
| | Ravelling | 1 | X | | | Y | 2 | 3 | - H | | | Gracking | | + | 1 | | | | | | | | | | + |
| | Flushing | 2 | X | | | X | | | | Paved Partial | | Cracking | | + | 1 | | C | irh | an | d G | utte | r | | | + |
| Surface | Potholes | 3 | ~ | | | ~ | | | F | | | Breakup and Potholes | | 1 | 1 | | | | un | u O | ullo | • | | | |
| Defects | Pavement Edge Breaks | 4 | | х | | X | | | | Surface Treated | | Distortion | | | | \sim | | | | | | | | | |
| | Manholes and Catchbasins | 5 | | | X | | x | | F | | | Pavement Edge Curb | | 1 | | | + | | | | | | | 1 | + |
| | Rippling and Shoving | 6 | | | | 1 | | | | Primed | | Separation | | 1 | 1 | | | | | | | | | | |
| Surface | Wheel Track Rutting | 7 | Х | X | | | | X | - | | | | £ | | | | | 8 | | | | | | | |
| Deformation | Distortion | 8 | | | | | | | - [| | | Maite | enanc | e Tre | atm | ent | | | | | | | | | |
| | Utility Trenches | 9 | Х | | | Х | | | | | | _ | | | Π | | | | | | | | | | |
| | Longitudinal | 10 | | x | Х | | | Х | | | | EX | tent of | [. 0/ | | | | | | | | | Exte | ent of | i • 0/ |
| | Transverse | 11 | | Х | X | | | Х | | Pave | mei | nt | mence | \$ 70 | | | Sh | oul | der | , | | | curr | ence | ; 70 |
| Cracking | Pavement Edge | 12 | | | | | | | | | | <20 | 20-50 | >50 | 1 | | | | | | | <20 | 20 | -50 | >50 |
| | Мар | 13 | | Х | | | | Х | | | | 1 | 2 | 3 | | | | | | | | 1 | | 2 | 3 |
| | Alligator | 14 | | X | X | | X | | | Manual Patching | | Х | | | M | anua | ıl pa | itchii | ng | | | | | | |
| | | | | | | | | | | Machine Patching | | | Х | | M | anua | ıl Sp | oray | Pate | ching | | | | | |
| Distress Com | ments (Items not covered | above) | | | | | | | | Manual Spray pate | ching | 9 | | | M | anua | ıl Cł | nip S | Seal | | | | | | |
| | | | | | | | | | | Manual Chip Seal | | | | | C | rack l | Rou | ıt an | id Se | eal | | | | | |
| | | | | | | | | | | Machine Chip Sea | al | | | | | | | | | | | | | | |
| _ | | | | | | | | | | Fog Seal | | | | | | | | | | | | | | | |
| Recommenda | tion by Evaluator | | | | | | | | | Surface Treatmen | nt | | | | 1 | | | | | | | | | | 1 |
| | | | | | | | | | | Manual Burn & Se | eal | | | | | | | | | | | | | | |
| | | | | | | | | | | Crack Rout and S | eal | | Х | | | | | | | | | | | | |

APPENDIX B

ESALs and AASHTO



Table B1 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Ellesmere Road Section 1 - McCowan Road to Markham Road

| 1) Traffic Analysis | | | | | |
|---|-----------|----------------|-----------|--------------------|-----------|
| Traffic Data Year | | 2019 | | 2031 | 2041 |
| Design Year | | <u>2031</u> | | | |
| Traffic Analysis Period | | | 12 | | 10 |
| Average Annual Daily Traffic (AADT) | | 32,288 | | 33,588 | 34,488 |
| Average Rate of Increase in Traffic (%) | | | 0.33 | C |).26 |
| Truck Fraction of Total Traffic (%) | | 4.84 | | 4.84 | 4.84 |
| Average Rate of Increase in Truck Frac | ction (%) | | 0.00 | C | 0.00 |
| Number of Lanes in One Direction | | 2 | | 2 | 2 |
| Directional Factor | | 0.5 | | 0.5 | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | 0.8 |
| Daily Truck Volume | | 650 | | 650 | 667 |
| 2) Daily ESALs Analysis | | | | | |
| Road Classification | | | Urban Mir | or Arterial | |
| Traffic Analysis Base Year | | 2031 | | 2031 | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | |
| | Class 2 | 5 | | | |
| | Class 3 | 20 | | | |
| | Class 4 | 10 | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 422 | | 422 | 434 |
| | Class 2 | 32 | | 32 | 33 |
| | Class 3 | 130 | | 130 | 133 |
| | Class 4 | 65 | | 65 | 67 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | |
| | Class 2 | 2.3 | | | |
| | Class 3 | 1.6 | | | |
| | Class 4 | 5.5 | | | |
| Weighted Average Truck Factor | r | | | 1.310 | |
| Daily ESALs per Truck Class | Class 1 | 211 | | 211 | 217 |
| | Class 2 | 75 | | 75 | 77 |
| | Class 3 | 208 | | 208 | 214 |
| | Class 4 | 357 | | 357 | 367 |
| Total Daily ESALs in Design Lane | 9 | 851 | | 851 | 874 |
| 3) Total ESALs for Base Year | | | | | |
| Base Year | | 2031 | | 2031 | 2041 |
| Number of Days of Truck Traffic | _ | 365 | | 365 | 365 |
| Total ESALS for Base Year | r | 310,777 | | 310,606 | 319,022 |
| 4) Cumulative ESALs for the Design Period | bd | | | | |
| Design Period (Years) | | | <u>19</u> | <u>9</u> | |
| Span of Design Periods | | <u>2031 to</u> | 2031 | <u>2031 to 205</u> | <u>50</u> |
| Average Rate of Increase in Truck Volu | ume (%) | | | 0.27 | |
| Years of Design Periods | | 0 | | 19 | |
| Growth Factor | | 0.0 | 0 | 19.46 | |
| ESALs for the Design Periods | | 0 | | 6,044,000 | |
| Cumulative ESALs for the Design Period | 1 | | 6.044 | .283 | |

Table B2 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Ellesmere Road

Section 2 - Markham Road to Military Trail

| 1) Traffic Analysis | | | | | | |
|--|-----------|-------------|----------|--------------|-------|---------|
| Traffic Data Year | | 2019 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | | |
| Traffic Analysis Period | | | 12 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 28,669 | | 30,369 | | 31,569 |
| Average Rate of Increase in Traffic (%) | | | 0.48 | | 0.39 | |
| Truck Fraction of Total Traffic (%) | | 4.82 | | 4.83 | | 4.82 |
| Average Rate of Increase in Truck Frac | ction (%) | | 0.01 | | -0.01 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 586 | | 586 | | 609 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 381 | | 381 | | 396 |
| | Class 2 | 29 | | 29 | | 30 |
| | Class 3 | 117 | | 117 | | 122 |
| | Class 4 | 59 | | 59 | | 61 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Factor | r | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 190 | | 191 | | 198 |
| | Class 2 | 67 | | 67 | | 70 |
| | Class 3 | 187 | | 188 | | 195 |
| | Class 4 | 322 | | 323 | | 335 |
| Total Daily ESALs in Design Lane | 9 | 767 | | 768 | | 798 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Yea | r | 279,995 | | 280,387 | | 291,098 |
| 4) Cumulative ESALs for the Desian Perio | bd | | | | | |
| Design Period (Years) | | | 1 | 9 | | |
| Span of Design Periods | | 2031 to | 2031 | | 2050 | |
| Average Rate of Increase in Truck Volu | ume (%) | ~~ | <u> </u> | 0.3 | 8 | |
| Years of Design Periods | × / | 0 | | 19 |) | |
| Growth Factor | | 0.0 | 0 | 19.6 | 38 | |
| ESALs for the Design Periods | | 0 | | 5.518 | ,000 | |
| Cumulative ESALs for the Design Period | 1 | - | 5,51 | 7,684 | | |

Table B3 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Ellesmere Road

| Section 3 - Military | y Trail to | Morningside | Avenue |
|----------------------|------------|-------------|--------|
| | | | |

| 1) Traffic Analysis | | | | | |
|--|----------|-------------|-----------|-------------|---------|
| Traffic Data Year | | 2019 | | 2031 | 2041 |
| Design Year | | <u>2031</u> | | | |
| Traffic Analysis Period | | | 12 | | 10 |
| Average Annual Daily Traffic (AADT) | | 21,815 | | 23,515 | 24,715 |
| Average Rate of Increase in Traffic (%) | | | 0.63 | | 0.50 |
| Truck Fraction of Total Traffic (%) | | 4.82 | | 4.82 | 4.83 |
| Average Rate of Increase in Truck Frac | tion (%) | | 0.00 | | 0.01 |
| Number of Lanes in One Direction | | 2 | | 2 | 2 |
| Directional Factor | | 0.5 | | 0.5 | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | 0.8 |
| Daily Truck Volume | | 454 | | 454 | 477 |
| 2) Daily FSAI s Analysis | | | | | |
| Road Classification | | L | Irban Min | or Arterial | |
| Traffic Analysis Base Year | | 2031 | | 2031 | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | |
| | Class 2 | 5 | | | |
| | Class 3 | 20 | | | |
| | Class 4 | 10 | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 295 | | 295 | 310 |
| | Class 2 | 23 | | 23 | 24 |
| | Class 3 | 91 | | 91 | 95 |
| | Class 4 | 45 | | 45 | 48 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | |
| | Class 2 | 2.3 | | | |
| | Class 3 | 1.6 | | | |
| | Class 4 | 5.5 | | | |
| Weighted Average Truck Factor | | | | 1.310 | |
| Daily ESALs per Truck Class | Class 1 | 147 | | 147 | 155 |
| | Class 2 | 52 | | 52 | 55 |
| | Class 3 | 145 | | 145 | 153 |
| | Class 4 | 249 | | 249 | 262 |
| Total Daily ESALs in Design Lane |) | 594 | | 594 | 625 |
| 3) Total ESALs for Base Year | | | | | |
| Base Year | | 2031 | | 2031 | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | 365 |
| Total ESALs for Base Year | | 216,885 | | 216,889 | 228,173 |
| 4) Cumulative ESALs for the Design Perio | d | | | | |
| Design Period (Years) | | | 19 | | |
| Span of Design Periods | | 2031 to 2 | 2031 | 2031 to 20 | 050 |
| Average Rate of Increase in Truck Volu | me (%) | | <u></u> | 0.51 | |
| Years of Design Periods | \ -/ | 0 | | 19 | |
| Growth Factor | | 0.00 | | 19.88 | |
| ESALs for the Design Periods | | 0 | | 4.311.00 | 00 |
| Cumulative ESALs for the Design Period | 1 | - | 4,311, | 280 | |

Table B4 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT)

Ellesmere Road and short section o Kingston Road

Section 4 - Morningside Avenue to Kingston Road and Kingston Road from Ellesmere Road to Highway 401

| 1) Traffic Analysis | | | | | |
|--|-----------|-------------|---------------|--------------|---------|
| Traffic Data Year | | 2019 | 2 | 031 | 2041 |
| Design Year | | <u>2031</u> | | | |
| Traffic Analysis Period | | | 12 | 10 | |
| Average Annual Daily Traffic (AADT) | | 14,174 | 16 | 6,274 | 17,774 |
| Average Rate of Increase in Traffic (%) |) | | 1.16 | 0.89 | |
| Truck Fraction of Total Traffic (%) | | 4.83 | L | 1.83 | 4.83 |
| Average Rate of Increase in Truck Frac | ction (%) | | 0.01 | -0.01 | |
| Number of Lanes in One Direction | | 2 | | 2 | 2 |
| Directional Factor | | 0.5 | | 0.5 | 0.5 |
| Lane Distribution Factor | | 0.9 | | 0.8 | 0.8 |
| Daily Truck Volume | | 353 | : | 314 | 343 |
| 2) Daily FSAI s Analysis | | | | | |
| Road Classification | | U | Irban Minor A | rterial | |
| Traffic Analysis Base Year | | 2031 | 2 | 031 | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | |
| | Class 2 | 5 | | | |
| | Class 3 | 20 | | | |
| | Class 4 | 10 | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 230 | | 204 | 223 |
| · | Class 2 | 18 | | 16 | 17 |
| | Class 3 | 71 | ~ | 63 | 69 |
| | Class 4 | 35 | | 31 | 34 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | |
| | Class 2 | 2.3 | | | |
| | Class 3 | 1.6 | | | |
| | Class 4 | 5.5 | | | |
| Weighted Average Truck Factor | r | | 1 | .310 | |
| Daily ESALs per Truck Class | Class 1 | 115 | | 102 | 112 |
| | Class 2 | 41 | | 36 | 39 |
| | Class 3 | 113 | | 101 | 110 |
| | Class 4 | 194 | | 173 | 189 |
| Total Daily ESALs in Design Lane | 9 | 463 | • | 412 | 450 |
| 3) Total ESALs for Base Year | | | | | |
| Base Year | | 2031 | 2 | 031 | 2041 |
| Number of Days of Truck Traffic | | 365 | : | 365 | 365 |
| Total ESALs for Base Year | r | 168,980 | 15 | 0,330 | 164,101 |
| 4) Cumulative ESALs for the Design Perio | bd | | | | |
| Design Period (Years) | ' | | 19 | | |
| Span of Design Periods | | 2031 to 2 | 2031 | 2031 to 2050 | |
| Average Rate of Increase in Truck Volu | ume (%) | <u></u> | | 0.88 | |
| Years of Design Periods | - (-) | 0 | | 19 | |
| Growth Factor | | 0.00 | | 20.59 | |
| ESALs for the Design Periods | | 0 | | 3.096.000 | |
| Cumulative ESALs for the Design Period | 1 | 5 | 3,095.768 | -,,••• | |

Table B5 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road

| Section 5 - Highway 401 to the CN Rail | |
|--|--|
|--|--|

| 1) Traffic Analysis | | | | | | |
|--|----------|-------------|---------------|---------------|------|---------|
| Traffic Data Year | | 2019 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | | |
| Traffic Analysis Period | | | 12 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 41,445 | | 43,445 | | 44,945 |
| Average Rate of Increase in Traffic (%) | | | 0.39 | | 0.34 | |
| Truck Fraction of Total Traffic (%) | | 5.98 | | 5.99 | | 6.00 |
| Average Rate of Increase in Truck Frac | tion (%) | | 0.01 | | 0.02 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 1,039 | | 1,040 | | 1,078 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 675 | | 676 | | 701 |
| | Class 2 | 52 | | 52 | | 54 |
| | Class 3 | 208 | | 208 | | 216 |
| | Class 4 | 104 | | 104 | | 108 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Factor | , | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 338 | | 338 | | 350 |
| | Class 2 | 119 | | 120 | | 124 |
| | Class 3 | 332 | | 333 | | 345 |
| | Class 4 | 571 | | 572 | | 593 |
| Total Daily ESALs in Design Lane |) | 1,361 | | 1,363 | | 1,412 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Year | • | 496,613 | | 497,467 | | 515,446 |
| 4) Cumulative ESALs for the Design Perio | d | | | | | |
| Design Period (Years) | | | 1 | 9 | | |
| Span of Design Periods | | 2031 to | 2031 | | 2050 | |
| Average Rate of Increase in Truck Volu | ıme (%) | | | 0.3 | 6 | |
| Years of Design Periods | . / | 0 | | 19 |) | |
| Growth Factor | | 0.0 | 0 | 19.5 | 59 | |
| ESALs for the Design Periods | | 0 | | 9,747, | ,000 | |
| Cumulative ESALs for the Design Period | 1 | | <u>9,74</u> 6 | 6 <u>,767</u> | | |

Table B6 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 6 - The CN Rail to Liverpool Road

| 1) Traffic Analysis | | | | | | |
|--|-----------|------------------|-----------|----------------|------|---------|
| Traffic Data Year | | 2019 | | 2031 | | 2041 |
| Design Year | | 2031 | | | | |
| Traffic Analysis Period | | | 12 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 32,651 | | 36,051 | | 37,851 |
| Average Rate of Increase in Traffic (%) |) | | 0.83 | | 0.49 | |
| Truck Fraction of Total Traffic (%) | | 2.24 | | 2.25 | | 2.26 |
| Average Rate of Increase in Truck Frac | ction (%) | | 0.05 | | 0.04 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 322 | | 324 | | 342 |
| 2) Daily ESAL & Analysis | | | | | | |
| Road Classification | | U | Irban Min | or Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 210 | | 211 | | 222 |
| | Class 2 | 16 | | 16 | | 17 |
| | Class 3 | 64 | | 65 | | 68 |
| | Class 4 | 32 | | 32 | | 34 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Facto | r | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 105 | | 105 | | 111 |
| | Class 2 | 37 | | 37 | | 39 |
| | Class 3 | 103 | | 104 | | 109 |
| | Class 4 | 177 | | 178 | | 188 |
| Total Daily ESALs in Design Lane | 9 | 422 | | 425 | | 448 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Yea | r | 154,159 | | 155,112 | | 163,527 |
| 4) Cumulative ESALs for the Design Perio | bd | | | | | |
| Design Period (Years) | | | <u>19</u> | <u>)</u> | | |
| Span of Design Periods | | <u>2031 to 2</u> | 2031 | <u>2031 to</u> | 2050 | |
| Average Rate of Increase in Truck Volu | ume (%) | | | 0.5 | 3 | |
| Years of Design Periods | | 0 | | 19 |) | |
| Growth Factor | | 0.00 | | 19.8 | 36 | |
| ESALs for the Design Periods | | 0 | | 3,080, | ,000 | |
| Cumulative ESALs for the Design Period | d | | 3,080 | ,330 | | |

Table B7 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 7 - Liverpool Road to Glengrove Road

| 1) Traffic Analysis | | | | | | |
|--|----------|----------------|--------------|------------------|-------------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | 2031 | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 33,230 | | 35,530 | | 36,830 |
| Average Rate of Increase in Traffic (%) | | | 0.52 | | 0.36 | |
| Truck Fraction of Total Traffic (%) | | 3.61 | | 3.61 | | 3.61 |
| Average Rate of Increase in Truck Frac | tion (%) | | -0.01 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 513 | | 513 | | 532 |
| 2) Doily ESAL o Analysia | | | | | | |
| 2) Daily ESALS Analysis Road Classification | | | Urban Mir | or Arterial | | |
| Traffic Analysis Base Year | | 2031 | or ball line | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | 2001 | | 2011 |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 334 | | 333 | | 346 |
| Dully Huck Volumes for 4 Oldsses | Class 2 | 26 | | 26 | | 27 |
| | Class 3 | 103 | | 103 | | 106 |
| | Class 4 | 51 | | 51 | | 53 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | 01 | | |
| | Class 2 | 2.3 | | | | |
| | Class 2 | 1.6 | | | | |
| | Class J | 5.5 | | | | |
| Weighted Average Truck Factor | 01035 4 | 0.0 | | 1 310 | | |
| Daily ESALs per Truck Class | Class 1 | 167 | | 167 | | 173 |
| Daily EOAES per Truck Olass | Class 7 | 59 | | 59 | | 61 |
| | Class 2 | 164 | | 164 | | 170 |
| | Class 4 | 282 | | 282 | | 292 |
| Total Daily ESALs in Design Lane | | 672 | | 672 | | 696 |
| | | •••= | | •••= | | |
| 3) Total ESALS for Base Year | | 2021 | | 2021 | | 2041 |
| Number of Dave of Truck Traffic | | 2031 | | 2031 | | 2041 |
| Total FSALs for Base Year | | 245.398 | | 245.195 | | 254.185 |
| | | , | | , | | , |
| 4) Cumulative ESALs for the Design Perio | d | | | | | |
| Design Period (Years) | | | <u>19</u> | <u>9</u> | | |
| Span of Design Periods | | <u>2031 to</u> | 2031 | <u>2031 to 2</u> | <u>2050</u> | |
| Average Rate of Increase in Truck Volu | ıme (%) | | | 0.36 | j | |
| Years of Design Periods | | 0 | | 19 | | |
| Growth Factor | | 0.0 | 0 | 19.6 | 3 | |
| ESALs for the Design Periods | | 0 | | 4,813,0 | 000 | |
| Cumulative ESALs for the Design Period | 1 | | <u>4,812</u> | ,777 | | |

Table B8 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road

Section 8 - Glengrove Road to Royal Road

| 1) Traffic Analysis | | | | | | |
|--|----------|-----------------|-----------|--------------------|------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | 2031 | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 33,230 | | 35,530 | | 36,830 |
| Average Rate of Increase in Traffic (%) | | | 0.52 | | 0.36 | |
| Truck Fraction of Total Traffic (%) | | 3.61 | | 3.61 | | 3.61 |
| Average Rate of Increase in Truck Frac | tion (%) | | -0.01 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 513 | | 513 | | 532 |
| 2) Daily FSAI s Analysis | | | | | | |
| Road Classification | | | Urban Mir | or Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 334 | | 333 | | 346 |
| | Class 2 | 26 | | 26 | | 27 |
| | Class 3 | 103 | | 103 | | 106 |
| | Class 4 | 51 | | 51 | | 53 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Factor | | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 167 | | 167 | | 173 |
| | Class 2 | 59 | | 59 | | 61 |
| | Class 3 | 164 | | 164 | | 170 |
| | Class 4 | 282 | | 282 | | 292 |
| Total Daily ESALs in Design Lane | | 672 | | 672 | | 696 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Year | | 245,398 | | 245,195 | | 254,185 |
| 4) Cumulative ESALs for the Design Perio | d | | | | | |
| Design Period (Years) | | | 19 | <u>)</u> | | |
| Span of Design Periods | | <u>2</u> 031 to | 2031 | <u>20</u> 31 to 20 | 050 | |
| Average Rate of Increase in Truck Volu | me (%) | | | 0.36 | | |
| Years of Design Periods | . , | 0 | | 19 | | |
| Growth Factor | | 0.0 | 0 | 19.63 | | |
| ESALs for the Design Periods | | 0 | | 4,813,00 | 00 | |
| Cumulative ESALs for the Design Period | 1 | | 4,812 | ,777 | | |

Table B9 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road

Section 9 - Royal Road to Southview Drive

| 1) Traffic Analysis | | | | | | |
|--|----------|-------------|----------|--------------|-------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 32,806 | | 35,406 | | 36,806 |
| Average Rate of Increase in Traffic (%) | | | 0.59 | | 0.39 | |
| Truck Fraction of Total Traffic (%) | | 2.90 | | 2.90 | | 2.90 |
| Average Rate of Increase in Truck Frac | tion (%) | | 0.00 | | -0.01 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 411 | | 411 | | 427 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 267 | | 267 | | 277 |
| | Class 2 | 21 | | 21 | | 21 |
| | Class 3 | 82 | | 82 | | 85 |
| | Class 4 | 41 | | 41 | | 43 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Factor | | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 133 | | 134 | | 139 |
| | Class 2 | 47 | | 47 | | 49 |
| | Class 3 | 131 | | 131 | | 137 |
| | Class 4 | 226 | | 226 | | 235 |
| Total Daily ESALs in Design Lane | | 538 | | 538 | | 559 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Year | | 196,304 | | 196,424 | | 204,074 |
| 4) Cumulative ESALs for the Design Perio | d | | | | | |
| Design Period (Years) | | | 1 | 9 | | |
| Span of Design Periods | | 2031 to | 2031 | | 2050 | |
| Average Rate of Increase in Truck Volu | me (%) | | | 0.3 | 8 | |
| Years of Design Periods | · / | 0 | | 19 |) | |
| Growth Factor | | 0.0 | 0 | 19.6 | 68 | |
| ESALs for the Design Periods | | 0 | - | 3.865 | .000 | |
| Cumulative ESALs for the Design Period | 1 | C C | 3.86 | 5.483 | , | |

Table B10 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road

Section 10 - Southview Drive to Rotherglen Road South

| | 2018 | | 2031 | | 2041 |
|----------|---|---|--|---|---|
| | 2031 | | | | |
| | | 13 | | 10 | |
| | 44,338 | | 46,238 | | 47,238 |
| | | 0.32 | | 0.21 | |
| | 3.20 | | 3.21 | | 3.21 |
| tion (%) | | 0.01 | | 0.00 | |
| . , | 2 | | 2 | | 2 |
| | 0.5 | | 0.5 | | 0.5 |
| | 0.8 | | 0.8 | | 0.8 |
| | 593 | | 593 | | 606 |
| | | | | | |
| | | | | | |
| | 0004 | Urban Min | or Arterial | | |
| | 2031 | | 2031 | | 2041 |
| Class 1 | 65 | | | | |
| Class 2 | 5 | | | | |
| Class 3 | 20 | | | | |
| Class 4 | 10 | | | | |
| Class 1 | 385 | | 386 | | 394 |
| Class 2 | 30 | | 30 | | 30 |
| Class 3 | 119 | | 119 | | 121 |
| Class 4 | 59 | | 59 | | 61 |
| Class 1 | 0.5 | | | | |
| Class 2 | 2.3 | | | | |
| Class 3 | 1.6 | | | | |
| Class 4 | 5.5 | | | | |
| | | | 1.310 | | |
| Class 1 | 193 | | 193 | | 197 |
| Class 2 | 68 | | 68 | | 70 |
| Class 3 | 190 | | 190 | | 194 |
| Class 4 | 326 | | 326 | | 333 |
| | 777 | | 777 | | 794 |
| | | | | | |
| | 2031 | | 2031 | | 2041 |
| | 365 | | 365 | | 365 |
| | 283,427 | | 283,639 | | 289,759 |
| ч | | | | | |
| и | | 10 | | | |
| | 2031 to | 2031 | 2031 to | 2050 | |
| me (%) | 200110 | 2001 | <u>2001 10</u> 0 2 | 1 | |
| | 0 | | 10.2 |)) | |
| | 0 | 0 | 10 1 | , 37 | |
| | 0.0 | 0 | 5 /0/ | 000 | |
| | 0 | 5 401 | 295 | ,000 | |
| | tion (%) Class 1 Class 2 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 3 Class 4 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 1 Class 2 Class 3 Class 4 Class 4 Clas 4 Class 4 Class 4 Clas 4 Cla | $\begin{array}{c} 2018 \\ \hline 2031 \\ 44,338 \\ 3.20 \\ \text{ion (\%)} \\ 2 \\ 0.5 \\ 0.8 \\ 593 \\ \hline \\ \hline \\ \hline \\ 2031 \\ \hline \\ \hline \\ \hline \\ 2031 \\ \hline \\ $ | $\begin{array}{c c} 2018 \\ \hline 2031 \\ 13 \\ 44,338 \\ 0.32 \\ 3.20 \\ \hline 0.01 \\ 2 \\ 0.5 \\ 0.8 \\ \hline 593 \\ \hline \\ $ | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | $\begin{array}{c c c c c c c c c } & 2018 & 2031 \\ \hline 2031 & 13 & 46,238 & 0.21 \\ \hline 3.20 & 3.21 & 0.00 & 2 & 0.21 \\ \hline 3.20 & 0.01 & 0.00 & 2 & 0.5 & 0.5 \\ \hline 0.5 & 0.5 & 0.5 & 0.8 & 0.8 & 0.8 \\ \hline 593 & 593 & 593 & \hline & & & & & \\ \hline & & & & & & & & & & \\ \hline & & & &$ |

Table B11 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road

Section 11 - Rotherglen Road South to Salem Road

| 1) Traffic Analysis | | | | | | |
|--|-----------|----------------|----------|----------------|------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 35,246 | | 36,346 | | 37,046 |
| Average Rate of Increase in Traffic (%) |) | | 0.24 | | 0.19 | |
| Truck Fraction of Total Traffic (%) | | 2.30 | | 2.30 | | 2.30 |
| Average Rate of Increase in Truck Fra- | ction (%) | | 0.00 | | 0.00 | |
| Number of Lanes in One Direction | | 3 | | 3 | | 3 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.7 | | 0.7 | | 0.7 |
| Daily Truck Volume | | 292 | | 292 | | 298 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 190 | | 190 | | 194 |
| | Class 2 | 15 | | 15 | | 15 |
| | Class 3 | 58 | | 58 | | 60 |
| | Class 4 | 29 | | 29 | | 30 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Facto | r | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 95 | | 95 | | 97 |
| | Class 2 | 34 | | 34 | | 34 |
| | Class 3 | 94 | | 94 | | 95 |
| | Class 4 | 161 | | 161 | | 164 |
| Total Daily ESALs in Design Land | e | 383 | | 383 | | 390 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Yea | r | 139,786 | | 139,739 | | 142,417 |
| 4) Cumulative ESALs for the Design Perio | od | | | | | |
| Design Period (Years) | | | 1 | 9 | | |
| Span of Design Periods | | <u>2031 to</u> | 2031 | <u>2031 to</u> | 2050 | |
| Average Rate of Increase in Truck Vol | ume (%) | | - | 0.1 | 9 | |
| Years of Design Periods | | 0 | 1 | 19 |) | |
| Growth Factor | | 0.0 | 00 | 19.3 | 33 | |
| ESALs for the Design Periods | | 0 | I | 2,701 | ,000 | |
| Cumulative ESALs for the Design Period | d | | 2.70 | 1.172 | | |

Table B12 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road

Section 12 - Salem Road to Lakeridge Road

| 1) Traffic Analysis | | | | | | |
|---|-----------|----------------|----------|----------------|------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 35,246 | | 36,346 | | 37,046 |
| Average Rate of Increase in Traffic (%) |) | | 0.24 | | 0.19 | |
| Truck Fraction of Total Traffic (%) | | 2.30 | | 2.30 | | 2.30 |
| Average Rate of Increase in Truck Frace | ction (%) | | 0.00 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 334 | | 334 | | 340 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Rural Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 45 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 35 | | | | |
| | Class 4 | 15 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 150 | | 150 | | 153 |
| | Class 2 | 17 | | 17 | | 17 |
| | Class 3 | 117 | | 117 | | 119 |
| | Class 4 | 50 | | 50 | | 51 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Facto | r | | | 1.725 | | |
| Daily ESALs per Truck Class | Class 1 | 75 | | 75 | | 77 |
| | Class 2 | 38 | | 38 | | 39 |
| | Class 3 | 187 | | 187 | | 191 |
| | Class 4 | 276 | | 276 | | 281 |
| Total Daily ESALs in Design Lane | 9 | 576 | | 576 | | 587 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Yea | r | 210,365 | | 210,295 | | 214,324 |
| 4) Cumulative ESALs for the Design Period | bd | | | | | |
| Design Period (Years) | | | 1 | 9 | | |
| Span of Design Periods | | <u>2031 to</u> | 2031 | <u>2031 to</u> | 2050 | |
| Average Rate of Increase in Truck Volu | ume (%) | | | 0.1 | 9 | |
| Years of Design Periods | | 0 | | 19 |) | |
| Growth Factor | | 0.0 | 0 | 19.3 | 33 | |
| ESALs for the Design Periods | | 0 | | 4,065 | ,000 | |
| Cumulative ESALs for the Design Period | d | | 4.06 | 5.013 | | |

Table B13 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East

Section 13 - Lakeridge Road to Fothergill Court

| 1) Traffic Analysis | | | | | | |
|---|-----------|----------------|----------|----------------|------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 27,849 | | 29,949 | | 31,749 |
| Average Rate of Increase in Traffic (% |) | | 0.56 | | 0.59 | |
| Truck Fraction of Total Traffic (%) | | 2.80 | | 2.80 | | 2.80 |
| Average Rate of Increase in Truck Fra | ction (%) | | 0.00 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 336 | | 336 | | 356 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 218 | | 218 | | 231 |
| | Class 2 | 17 | | 17 | | 18 |
| | Class 3 | 67 | | 67 | | 71 |
| | Class 4 | 34 | | 34 | | 36 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Facto | or | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 109 | | 109 | | 116 |
| | Class 2 | 39 | | 39 | | 41 |
| | Class 3 | 107 | | 107 | | 114 |
| | Class 4 | 185 | | 185 | | 196 |
| Total Daily ESALs in Design Lan | е | 440 | | 440 | | 466 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Yea | r | 160,432 | | 160,467 | | 170,030 |
| 4) Cumulative ESALs for the Design Period | od | | | | | |
| Design Period (Years) | | | <u>1</u> | 9 | | |
| Span of Design Periods | | <u>2031 to</u> | 2031 | <u>2031 to</u> | 2050 | |
| Average Rate of Increase in Truck Vol | ume (%) | | | 0.5 | 8 | |
| Years of Design Periods | | 0 | | 19 |) | |
| Growth Factor | | 0.0 | 0 | 20.0 |)3 | |
| ESALs for the Design Periods | | 0 | | 3,215, | ,000 | |
| Cumulative ESALs for the Design Perio | d | | 3.214 | 4.952 | | |

Table B14 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East

Section 14 - Fothergill Court to Jeffrey Street

| 1) Traffic Analysis | | | | 0001 | | |
|--|-------------|-------------|----------|--------------|---------|-----------------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | • • • • | |
| I raffic Analysis Period | | 07.040 | 13 | 00.040 | 10 | o 4 - 40 |
| Average Annual Daily Traffic (AADT) | | 27,849 | | 29,949 | | 31,749 |
| Average Rate of Increase in Traffic (%) | | | 0.56 | | 0.59 | |
| Truck Fraction of Total Traffic (%) | | 2.80 | | 2.80 | | 2.80 |
| Average Rate of Increase in Truck Frac | tion (%) | | 0.00 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 336 | | 336 | | 356 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 218 | | 218 | | 231 |
| | Class 2 | 17 | | 17 | | 18 |
| | Class 3 | 67 | | 67 | | 71 |
| | Class 4 | 34 | | 34 | | 36 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Factor | | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 109 | | 109 | | 116 |
| | Class 2 | 39 | | 39 | | 41 |
| | Class 3 | 107 | | 107 | | 114 |
| | Class 4 | 185 | | 185 | | 196 |
| Total Daily ESALs in Design Lane |) | 440 | | 440 | | 466 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Year | | 160,432 | | 160,467 | | 170,030 |
| 4) Cumulative ESALs for the Design Perio | d | | | | | |
| Design Period (Years) | | | 1 | 9 | | |
| Span of Design Periods | | 2031 to | 2031 | 2031 to | 2050 | |
| Average Rate of Increase in Truck Volu | me (%) | | <u> </u> | 0.5 | 8 | |
| Years of Design Periods | <u>\</u> -/ | 0 | | 19 |) | |
| Growth Factor | | 0.0 | 0 | 20 (| 03 | |
| ESALs for the Design Periods | | 0.0 | - | 3.215 | .000 | |
| Cumulative ESALs for the Design Period | 1 | Ũ | 3.214 | 4.952 | , | |

Table B15 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East

Section 15 - Jeffrey Street to Annes Street

| 1) Traffic Analysis | | | | | | |
|---|-----------|-------------|----------|--------------|------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 27,849 | | 29,949 | | 31,749 |
| Average Rate of Increase in Traffic (% |) | | 0.56 | | 0.59 | |
| Truck Fraction of Total Traffic (%) | | 2.55 | | 2.55 | | 2.55 |
| Average Rate of Increase in Truck Fra | ction (%) | | 0.02 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 305 | | 306 | | 324 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 198 | | 199 | | 211 |
| | Class 2 | 15 | | 15 | | 16 |
| | Class 3 | 61 | | 61 | | 65 |
| | Class 4 | 30 | | 31 | | 32 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Facto | or | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 99 | | 99 | | 105 |
| | Class 2 | 35 | | 35 | | 37 |
| | Class 3 | 98 | | 98 | | 104 |
| | Class 4 | 168 | | 168 | | 178 |
| Total Daily ESALs in Design Lan | е | 400 | | 400 | | 424 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Yea | nr | 145,829 | | 146,123 | | 154,921 |
| 4) Cumulative ESALs for the Design Peri | od | | | | | |
| Design Period (Years) | | | 1 | 9 | | |
| Span of Design Periods | | 2031 to | 2031 | | 2050 | |
| Average Rate of Increase in Truck Vol | ume (%) | | <u> </u> | 0.5 | 9 | |
| Years of Design Periods | × / | 0 | | 19 |) | |
| Growth Factor | | 0.0 | 0 | 20.0 |)3 | |
| ESALs for the Design Periods | | 0 | | 2.928 | ,000 | |
| Cumulative ESALs for the Design Perio | d | - | 2.92 | 7.561 | | |

Table B16 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East

Section 16 - Annes Street to Brock Street

| 1) Traffic Analysis | | | | | | |
|--|-----------|----------------|------------|----------------|------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | 2031 | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 27,849 | | 28,649 | | 29,249 |
| Average Rate of Increase in Traffic (%) |) | | 0.22 | | 0.21 | |
| Truck Fraction of Total Traffic (%) | | 1.84 | | 1.85 | | 1.85 |
| Average Rate of Increase in Truck Frac | ction (%) | | 0.02 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 211 | | 212 | | 216 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mir | or Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 137 | | 138 | | 140 |
| | Class 2 | 11 | | 11 | | 11 |
| | Class 3 | 42 | | 42 | | 43 |
| | Class 4 | 21 | | 21 | | 22 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Factor | r | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 69 | | 69 | | 70 |
| | Class 2 | 24 | | 24 | | 25 |
| | Class 3 | 68 | | 68 | | 69 |
| | Class 4 | 116 | | 116 | | 119 |
| Total Daily ESALs in Design Lane | 9 | 277 | | 277 | | 283 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Year | r | 100,935 | | 101,177 | | 103,280 |
| 4) Cumulative ESALs for the Design Perio | bd | | | | | |
| Design Period (Years) | | | <u>1</u> 9 | 9 | | |
| Span of Design Periods | | <u>2031 to</u> | 2031 | <u>2031 to</u> | 2050 | |
| Average Rate of Increase in Truck Volu | ume (%) | | | 0.2 | 1 | |
| Years of Design Periods | . , | 0 | | 19 | | |
| Growth Factor | | 0.0 | C | 19.3 | 6 | |
| ESALs for the Design Periods | | 0 | | 1,959, | 000 | |
| Cumulative ESALs for the Design Period | 1 | | 1,958 | 677 | | |

Table B17 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East

Section 17 - Brock Street to Hickory Street

| 1) Traffic Analysis | | | | | | |
|---|-----------|----------------|----------|--------------|------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | <u>2031</u> | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 27,849 | | 28,649 | | 29,349 |
| Average Rate of Increase in Traffic (% |) | | 0.22 | | 0.24 | |
| Truck Fraction of Total Traffic (%) | | 2.80 | | 2.80 | | 2.80 |
| Average Rate of Increase in Truck Fra | ction (%) | | -0.01 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 321 | | 321 | | 329 |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mi | nor Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 209 | | 209 | | 214 |
| | Class 2 | 16 | | 16 | | 16 |
| | Class 3 | 64 | | 64 | | 66 |
| | Class 4 | 32 | | 32 | | 33 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Facto | or | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 104 | | 104 | | 107 |
| | Class 2 | 37 | | 37 | | 38 |
| | Class 3 | 103 | | 103 | | 105 |
| | Class 4 | 177 | | 176 | | 181 |
| Total Daily ESALs in Design Lan | е | 421 | | 420 | | 431 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Yea | r | 153,665 | | 153,391 | | 157,216 |
| 4) Cumulative ESALs for the Design Peri | od | | | | | |
| Design Period (Years) | | | <u>1</u> | 9 | | |
| Span of Design Periods | | <u>2031 to</u> | 2031 | 2031 to | 2050 | |
| Average Rate of Increase in Truck Vol | ume (%) | | | 0.2 | .5 | |
| Years of Design Periods | | 0 | | 19 |) | |
| Growth Factor | | 0.0 | 0 | 19.4 | 42 | |
| ESALs for the Design Periods | | 0 | | 2,979 | ,000 | |
| Cumulative ESALs for the Design Perio | d | | 2,97 | 8,692 | | |

Table B18 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East

Section 18 - Hickory Street to Garrard Street

| 1) Traffic Analvsis | | | | | | |
|---|----------|----------------|------------|------------------|------------|---|
| Traffic Data Year | | 2018 | | 2031 | 2041 | |
| Design Year | | <u>2031</u> | | | | - |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 20,872 | | 21,472 | 21,972 | |
| Average Rate of Increase in Traffic (%) | | | 0.22 | | 0.23 | |
| Truck Fraction of Total Traffic (%) | | 2.25 | | 2.25 | 2.25 | |
| Average Rate of Increase in Truck Frac | tion (%) | | 0.01 | | -0.01 | |
| Number of Lanes in One Direction | | 2 | | 2 | 2 | |
| Directional Factor | | 0.5 | | 0.5 | 0.5 | |
| Lane Distribution Factor | | 0.8 | | 0.8 | 0.8 | |
| Daily Truck Volume | | 193 | | 194 | 198 | |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | | Urban Mir | or Arterial | | |
| Traffic Analysis Base Year | | 2031 | | 2031 | 2041 | _ |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | - |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 126 | | 126 | 129 | |
| | Class 2 | 10 | | 10 | 10 | |
| | Class 3 | 39 | | 39 | 40 | |
| | Class 4 | 19 | | 19 | 20 | |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | _ |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Factor | r | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 63 | | 63 | 64 | |
| | Class 2 | 22 | | 22 | 23 | |
| | Class 3 | 62 | | 62 | 63 | |
| | Class 4 | 106 | | 106 | 109 | |
| Total Daily ESALs in Design Lane | 9 | 253 | | 254 | 259 | |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | 2041 | |
| Number of Days of Truck Traffic | | 365 | | 365 | 365 | |
| Total ESALs for Base Year | • | 92,476 | | 92,570 | 94,674 | |
| 4) Cumulative ESALs for the Design Period | d | | | | | |
| Design Period (Years) | | | <u>1</u> 9 | <u>9</u> | | |
| Span of Design Periods | | <u>2031 to</u> | 2031 | <u>2031 to 2</u> | <u>050</u> | |
| Average Rate of Increase in Truck Volu | ıme (%) | | | 0.22 | | |
| Years of Design Periods | | 0 | | 19 | | |
| Growth Factor | | 0.0 | 0 | 19.40 | | |
| ESALs for the Design Periods | | 0 | | 1,796,00 | 00 | |
| Cumulative ESALs for the Design Period | 1 | | 1,795 | ,788 | | |

Table B19 EQUIVALENT SINGLE AXLE LOAD CALCULATION

Durham-Scarborough Bus Rapid Transit (DS BRT) King Street West

Sections 19 and 20 - Garrard Street to Simcoe Street

| 1) Traffic Analysis | | | | | | |
|--|----------|---------|-----------|-------------|------|---------|
| Traffic Data Year | | 2018 | | 2031 | | 2041 |
| Design Year | | 2031 | | | | |
| Traffic Analysis Period | | | 13 | | 10 | |
| Average Annual Daily Traffic (AADT) | | 20,608 | | 21,708 | | 22,708 |
| Average Rate of Increase in Traffic (%) | | | 0.40 | | 0.45 | |
| Truck Fraction of Total Traffic (%) | | 3.38 | | 2.90 | | 2.90 |
| Average Rate of Increase in Truck Frac | tion (%) | | -1.17 | | 0.00 | |
| Number of Lanes in One Direction | | 2 | | 2 | | 2 |
| Directional Factor | | 0.5 | | 0.5 | | 0.5 |
| Lane Distribution Factor | | 0.8 | | 0.8 | | 0.8 |
| Daily Truck Volume | | 294 | | 252 | | 264 |
| | | | | | | |
| 2) Daily ESALs Analysis | | | | | | |
| Road Classification | | 0001 | Urban Mir | or Arterial | | 0044 |
| | | 2031 | | 2031 | | 2041 |
| Breakdown of Truck Proportions (%) | Class 1 | 65 | | | | |
| | Class 2 | 5 | | | | |
| | Class 3 | 20 | | | | |
| | Class 4 | 10 | | 101 | | |
| Daily Truck Volumes for 4 Classes | Class 1 | 191 | | 164 | | 1/1 |
| | Class 2 | 15 | | 13 | | 13 |
| | Class 3 | 59 | | 50 | | 53 |
| | Class 4 | 29 | | 25 | | 26 |
| Truck Factors for 4 Classes of Truck | Class 1 | 0.5 | | | | |
| | Class 2 | 2.3 | | | | |
| | Class 3 | 1.6 | | | | |
| | Class 4 | 5.5 | | | | |
| Weighted Average Truck Factor | • | | | 1.310 | | |
| Daily ESALs per Truck Class | Class 1 | 95 | | 82 | | 86 |
| | Class 2 | 34 | | 29 | | 30 |
| | Class 3 | 94 | | 81 | | 84 |
| | Class 4 | 162 | | 139 | | 145 |
| Total Daily ESALs in Design Lane | | 385 | | 330 | | 345 |
| 3) Total ESALs for Base Year | | | | | | |
| Base Year | | 2031 | | 2031 | | 2041 |
| Number of Days of Truck Traffic | | 365 | | 365 | | 365 |
| Total ESALs for Base Year | • | 140,424 | | 120,494 | | 126,040 |
| 4) Cumulative ESALs for the Design Perio | bd | | | | | |
| Design Period (Years) | - | | 19 | 9 | | |
| Span of Design Periods | | 2031 to | 2031 | 2031 to | 2050 | |
| Average Rate of Increase in Truck Volu | me (%) | <u></u> | | 0.4 | 5 | |
| Years of Design Periods | (,,) | 0 | | 19 | - | |
| Growth Factor | | 0.0 | 0 | 19 7 | 79 | |
| ESALs for the Design Periods | | 0.0 | - | 2.385 | .000 | |
| Cumulative ESALs for the Design Period | 1 | Ū | 2.384 | .809 | | |

Table B20 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Ellesmere Road Section 1 - McCowan Road to Markham Road

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 6,044,283 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| Calculated Design Structural Number | 136 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 150 | 150 | 21 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 550 | 550 | 50 |
| Total | - | - | - | 860 | 860 | 138 |

Layered Thickness Design

| Thickness precision | Actual | | | | | |
|----------------------------|-------------|-------------|--------------------------|-----------------|-------------|----------------|
| | Struct | Drain | Spec Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThicknes | s Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)(Di) (mm</u> | <u>ı) (kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | | 2,750,000 | 155 | 65 |
| 2 New Granular A Base | 0.14 | 1.00 | | 250,000 | 96 | 13 |
| 3 New Granular B, Type I | 0.09 | 1.00 | | 150,000 | 635 | 57 |
| Total - | - | - | | - | 887 | 135 |

Table B21 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Ellesmere Road Section 2 - Markham Road to Military Trail

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 5,517,684 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| | |
| Calculated Design Structural Number | 134 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 150 | 150 | 21 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 550 | 550 | 50 |
| Total | - | - | - | 860 | 860 | 138 |

Layered Thickness Design

| Thickne | ess precision | Actual | | | | | | |
|---------|-----------------------|-------------|-------------|--------------------|-----------------|--------------|-------------|----------------|
| | | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | | Coef. | Coef. | ThicknessT | hickness | Modulus | Thickness | Calculated |
| Layer N | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (</u> | <u>Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 N | lew Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 153 | 64 |
| 2 N | lew Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 95 | 13 |
| 3 N | lew Granular B,Type I | 0.09 | 1.00 | - | - | 150,000 | 629 | 57 |
| Total - | | - | - | - | - | - | 877 | 134 |

Table B22 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Ellesmere Road Section 3 - Military Trail toMorningside Avenue

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 4,311,280 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| | |
| Calculated Design Structural Number | 130 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 150 | 150 | 63 |
| 2 | New Granular A Base | 0.14 | 1.00 | 150 | 150 | 21 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 550 | 550 | 50 |
| Total | - | - | - | 850 | 850 | 134 |

Layered Thickness Design

| Thickness precision | Actual | | | | | |
|----------------------------|-------------|-------------|--------------------------|-----------------|-------------|----------------|
| | Struct | Drain | Spec Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThicknes | s Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)(Di) (mm</u> | <u>ı) (kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | | 2,750,000 | 147 | 62 |
| 2 New Granular A Base | 0.14 | 1.00 | | 250,000 | 91 | 13 |
| 3 New Granular B, Type I | 0.09 | 1.00 | | 150,000 | 613 | 55 |
| Total - | - | - | | - | 852 | 130 |

Table B23 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Ellesmere Road and short section o Kingston Road Section 4 - Morningside Avenue to Kingston Road and Kingston Road from Ellesmere Road to Highway 401

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 3,095,768 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| Calculated Design Structural Number | 124 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 150 | 150 | 63 |
| 2 | New Granular A Base | 0.14 | 1.00 | 150 | 150 | 21 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 450 | 450 | 41 |
| Total | - | - | - | 750 | 750 | 125 |

Layered Thickness Design

| Thickness precision | Actual | | | | | |
|----------------------------|-------------|-------------|--------------------------|-----------------|-------------|----------------|
| | Struct | Drain | Spec Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThicknes | s Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)(Di) (mm</u> | <u>n) (kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | | 2,750,000 | 139 | 59 |
| 2 New Granular A Base | 0.14 | 1.00 | | 250,000 | 87 | 12 |
| 3 New Granular B, Type I | 0.09 | 1.00 | | 150,000 | 591 | 53 |
| Total - | - | - | | - | 818 | 124 |

Table B24 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Ellesmere Road Section 5 - Highway 401 to CN Rail

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 9,746,767 | |
|---|------------|--|
| Initial Serviceability | 4.4 | |
| Terminal Serviceability | 2.4 | |
| Reliability Level (%) | 90 | |
| Overall Standard Deviation | 0.49 | |
| Roadbed Soil Resilient Modulus | 30,000 kPa | |
| Stage Construction | 1.0 | |
| Calculated Design Structural Number | 145 | |
| | 140 | |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 500 | 500 | 45 |
| Total | - | - | - | 910 | 910 | 147 |

Layered Thickness Design

| Thickness precision | | Actual | | | | | |
|----------------------------|-------------|-------------|--------------------|------------------|--------------|-------------|----------------|
| | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessT | hickness | Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (</u> | <u>(Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 168 | 70 |
| 2 New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 102 | 14 |
| 3 New Granular B, Type I | 0.09 | 1.00 | - | - | 150,000 | 667 | 60 |
| Total - | - | - | - | - | - | 937 | 144 |

Table B25 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 6 - The CN Rail to Liverpool Road

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 3,080,330 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| | |
| Calculated Design Structural Number | 124 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thickness precision | Actual | | | | | |
|----------------------------|-------------|-------------|---------------------------|-----------------|-------------|----------------|
| | Struct | Drain | Spec Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThickne | ss Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (Di) (mr</u> | <u>n) (kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | | 2,750,000 | 139 | 59 |
| 2 New Granular A Base | 0.14 | 1.00 | | 250,000 | 87 | 12 |
| 3 New Granular B, Type I | 0.09 | 1.00 | | 150,000 | 591 | 53 |
| Total - | - | - | | - | 817 | 124 |

Table B26 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 7 - Liverpool Road to Glengrove Road

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 4,812,777 | |
|---|------------|--|
| Initial Serviceability | 4.4 | |
| Terminal Serviceability | 2.4 | |
| Reliability Level (%) | 90 | |
| Overall Standard Deviation | 0.49 | |
| Roadbed Soil Resilient Modulus | 30,000 kPa | |
| Stage Construction | 1.0 | |
| Calculated Design Structural Number | 132 | |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 350 | 350 | 32 |
| Total | - | - | - | 760 | 760 | 134 |

Layered Thickness Design

| Thickness precision | | Actual | | | | | |
|----------------------------|-------------|-------------|---------------------|-----------------|--------------|-------------|----------------|
| | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessTh | ickness | Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (D</u> | <u>)i) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 150 | 63 |
| 2 New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 93 | 13 |
| 3 New Granular B, Type I | 0.09 | 1.00 | - | - | 150,000 | 620 | 56 |
| Total - | - | - | - | - | - | 863 | 132 |

Table B27 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 8 - Glengrove Road to Royal Road

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 4,812,777 | |
|---|------------|--|
| Initial Serviceability | 4.4 | |
| Terminal Serviceability | 2.4 | |
| Reliability Level (%) | 90 | |
| Overall Standard Deviation | 0.49 | |
| Roadbed Soil Resilient Modulus | 30,000 kPa | |
| Stage Construction | 1.0 | |
| Calculated Design Structural Number | 132 | |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 350 | 350 | 32 |
| Total | - | - | - | 760 | 760 | 134 |

Layered Thickness Design

| Thickness precision | | Actual | | | | | |
|----------------------------|-------------|-------------|----------------------|---------------|--------------|-------------|----------------|
| | Struct | Drain | Spec I | Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThic | ckness | Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (Di</u> | <u>) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 150 | 63 |
| 2 New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 93 | 13 |
| 3 New Granular B, Type I | 0.09 | 1.00 | - | - | 150,000 | 620 | 56 |
| Total - | - | - | - | - | - | 863 | 132 |

Table B28 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 9 - Royal Road to Southview Drive

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 3,865,483 | |
|---|------------|--|
| Initial Serviceability | 4.4 | |
| Terminal Serviceability | 2.4 | |
| Reliability Level (%) | 90 | |
| Overall Standard Deviation | 0.49 | |
| Roadbed Soil Resilient Modulus | 30,000 kPa | |
| Stage Construction | 1.0 | |
| | | |
| Calculated Design Structural Number | 128 | |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thick | ness precision | Actual | | | | | | |
|-------|-----------------------|-------------|-------------|--------------------|-----------------|--------------|-------------|----------------|
| | | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | | Coef. | Coef. | ThicknessT | hickness | Modulus | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (</u> | <u>Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 145 | 61 |
| 2 | New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 90 | 13 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | - | - | 150,000 | 606 | 55 |
| Total | - | - | - | - | - | - | 840 | 129 |

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Table B29 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 10 - Southview Drive to Rotherglen Road South

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 5,494,295 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| | |
| Calculated Design Structural Number | 134 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 400 | 400 | 36 |
| Total | - | - | - | 810 | 810 | 138 |

Layered Thickness Design

| Thickness precision | Actual | | | | | |
|----------------------------|-------------|-------------|---------------------------|----------------|-------------|----------------|
| | Struct | Drain | Spec Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThicknes | s Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (Di) (mm</u> | <u>) (kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | | 2,750,000 | 153 | 64 |
| 2 New Granular A Base | 0.14 | 1.00 | | 250,000 | 95 | 13 |
| 3 New Granular B,Type I | 0.09 | 1.00 | | 150,000 | 629 | 57 |
| Total - | - | - | | - | 877 | 134 |

Table B30 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 11 - Rotherglen Road South to Salem Road

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 2,701,172 | |
|---|------------|--|
| Initial Serviceability | 4.4 | |
| Terminal Serviceability | 2.4 | |
| Reliability Level (%) | 90 | |
| Overall Standard Deviation | 0.49 | |
| Roadbed Soil Resilient Modulus | 30,000 kPa | |
| Stage Construction | 1.0 | |
| | | |
| Calculated Design Structural Number | 122 | |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thick | ness precision | Actual | | | | | | |
|-------|-----------------------|-------------|-------------|--------------------|-----------------|--------------|-------------|----------------|
| | | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | | Coef. | Coef. | ThicknessT | hickness | Modulus | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (</u> | <u>Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 136 | 57 |
| 2 | New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 86 | 12 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | - | - | 150,000 | 582 | 52 |
| Total | - | - | - | - | - | - | 804 | 121 |
Table B31 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 12 - Salem Road to Lakeridge Road

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 4,065,013 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| | |
| Calculated Design Structural Number | 129 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thick | ness precision | Actual | | | | | | |
|-------|-----------------------|-------------|-------------|---------------------|-----------------|--------------|-------------|----------------|
| | | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | | Coef. | Coef. | ThicknessTl | hickness | Modulus | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (I</u> | <u>Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 146 | 61 |
| 2 | New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 91 | 13 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | - | - | 150,000 | 609 | 55 |
| Total | - | - | - | - | - | - | 846 | 129 |

Table B32 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Kingston Road Section 13 - Lakeridge Road to Fothergill Court

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 3,214,952 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| Calculated Design Structural Number | 125 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thickness precision | Actual | | | | | |
|----------------------------|-------------|-------------|----------------------------|----------------|-------------|----------------|
| | Struct | Drain | Spec Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThickness | s Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (Di) (mm)</u> | <u>) (kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | | 2,750,000 | 140 | 59 |
| 2 New Granular A Base | 0.14 | 1.00 | | 250,000 | 88 | 12 |
| 3 New Granular B, Type I | 0.09 | 1.00 | | 150,000 | 594 | 53 |
| Total - | - | - | | - | 822 | 124 |

Table B33 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East Section 14 - Fothergill Court to Jeffrey Street

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 3,214,952 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| Calculated Design Structural Number | 125 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thickness precision | Actual | | | | | |
|----------------------------|-------------|-------------|----------------------------|----------------|-------------|----------------|
| | Struct | Drain | Spec Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThickness | s Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (Di) (mm)</u> | <u>) (kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | | 2,750,000 | 140 | 59 |
| 2 New Granular A Base | 0.14 | 1.00 | | 250,000 | 88 | 12 |
| 3 New Granular B, Type I | 0.09 | 1.00 | | 150,000 | 594 | 53 |
| Total - | - | - | | - | 822 | 124 |

Table B34 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East Section 15 - Jeffrey Street to Annes Street

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 2,927,561 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| Calculated Design Structural Number | 123 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thick | ness precision | Actual | | | | | | |
|-------|-----------------------|-------------|-------------|--------------------|-----------------|--------------|-------------|----------------|
| | | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | | Coef. | Coef. | ThicknessT | hickness | Modulus | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (</u> | <u>Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 138 | 58 |
| 2 | New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 87 | 12 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | - | - | 150,000 | 587 | 53 |
| Total | - | - | - | - | - | - | 812 | 123 |

Table B35 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East Section 16 - Annes Street to Brock Street

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 1,958,677 | |
|---|------------|--|
| Initial Serviceability | 4.4 | |
| Terminal Serviceability | 2.4 | |
| Reliability Level (%) | 90 | |
| Overall Standard Deviation | 0.49 | |
| Roadbed Soil Resilient Modulus | 30,000 kPa | |
| Stage Construction | 1.0 | |
| Coloulated Design Structural Number | 116 | |
| | 110 | |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thick | ness precision | Actual | | | | | | |
|-------|-----------------------|-------------|-------------|--------------------|------------------|--------------|-------------|----------------|
| | | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | | Coef. | Coef. | ThicknessT | hickness | Modulus | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (</u> | <u>(Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 129 | 54 |
| 2 | New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 82 | 11 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | - | - | 150,000 | 561 | 50 |
| Total | - | - | - | - | - | - | 772 | 115 |

Table B36 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East Section 17 - Brock Street to Hickory Street

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 2,978,692 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| Calculated Design Structural Number | 123 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thick | ness precision | Actual | | | | | | |
|-------|-----------------------|-------------|-------------|--------------------|-----------------|--------------|-------------|----------------|
| | | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | | Coef. | Coef. | ThicknessT | hickness | Modulus | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (</u> | <u>Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 139 | 58 |
| 2 | New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 87 | 12 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | - | - | 150,000 | 588 | 53 |
| Total | - | - | - | - | - | - | 814 | 123 |

Table B37 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East Section 18 - Hickory Street to Garrard Street

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 1,795,788 | |
|---|------------|--|
| Initial Serviceability | 4.4 | |
| Terminal Serviceability | 2.4 | |
| Reliability Level (%) | 90 | |
| Overall Standard Deviation | 0.49 | |
| Roadbed Soil Resilient Modulus | 30,000 kPa | |
| Stage Construction | 1.0 | |
| Calculated Design Structural Number | 115 | |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thick | ness precision | Actual | | | | | | |
|-------|-----------------------|-------------|-------------|--------------------|-----------------|--------------|-------------|----------------|
| | | Struct | Drain | Spec | Min | Elastic | Calculated | |
| | | Coef. | Coef. | ThicknessT | hickness | Modulus | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (</u> | <u>Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | - | - | 2,750,000 | 128 | 54 |
| 2 | New Granular A Base | 0.14 | 1.00 | - | - | 250,000 | 81 | 11 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | - | - | 150,000 | 555 | 50 |
| Total | - | - | - | - | - | - | 763 | 115 |

Table B38 PAVEMENT DESIGN AND ANALYSIS - FLEXIBLE STRUCTURAL DESIGN MODULE

Durham-Scarborough Bus Rapid Transit (DS BRT) Dundas Street East Sections 19 and 20 - Garrard Street to Simcoe Street

Flexible Structural Design

| 80-kN ESALs Over Initial Performance Period | 2,384,809 |
|---|------------|
| Initial Serviceability | 4.4 |
| Terminal Serviceability | 2.4 |
| Reliability Level (%) | 90 |
| Overall Standard Deviation | 0.49 |
| Roadbed Soil Resilient Modulus | 30,000 kPa |
| Stage Construction | 1.0 |
| Calculated Design Structural Number | 119 |

Specified Layer Design

| | | | | | Required | |
|-------|-----------------------|--------------|-------------|------------------|-------------|----------------|
| | | Struct Coef. | Drain Coef. | Thickness | Thickness | Calculated |
| Layer | Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 | New Hot Mix Asphalt | 0.42 | 1.00 | 160 | 160 | 67 |
| 2 | New Granular A Base | 0.14 | 1.00 | 250 | 250 | 35 |
| 3 | New Granular B,Type I | 0.09 | 1.00 | 300 | 300 | 27 |
| Total | - | - | - | 710 | 710 | 129 |

Layered Thickness Design

| Thickness precision | Actual | | | | | |
|----------------------------|-------------|-------------|----------------------------|--------------|-------------|----------------|
| | Struct | Drain | Spec Min | Elastic | Calculated | |
| | Coef. | Coef. | ThicknessThickness | Modulus | Thickness | Calculated |
| Layer Material Description | <u>(Ai)</u> | <u>(Mi)</u> | <u>(Di) (mm) (Di) (mm)</u> | <u>(kPa)</u> | <u>(mm)</u> | <u>SN (mm)</u> |
| 1 New Hot Mix Asphalt | 0.42 | 1.00 | | 2,750,000 | 134 | 56 |
| 2 New Granular A Base | 0.14 | 1.00 | | 250,000 | 84 | 12 |
| 3 New Granular B, Type I | 0.09 | 1.00 | | 150,000 | 574 | 52 |
| Total - | - | - | | - | 792 | 120 |