APPENDIX 2

DETAILED CONDITION SURVEYS

BRIDGE CHECK CANADA

Your Bridge & Concrete Inspection Specialists

DETAILED CONDITION SURVEY REPORT

Structure ID 112, Macdonell Bridge, Guelph, ON

Prepared for: R.V. Anderson Association Limited

BCC Project No.: BCC21015
Report Date: March 25, 2025

Bridge Check Canada Ltd.
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STRUCTURE IDENTIFICATION SHEET

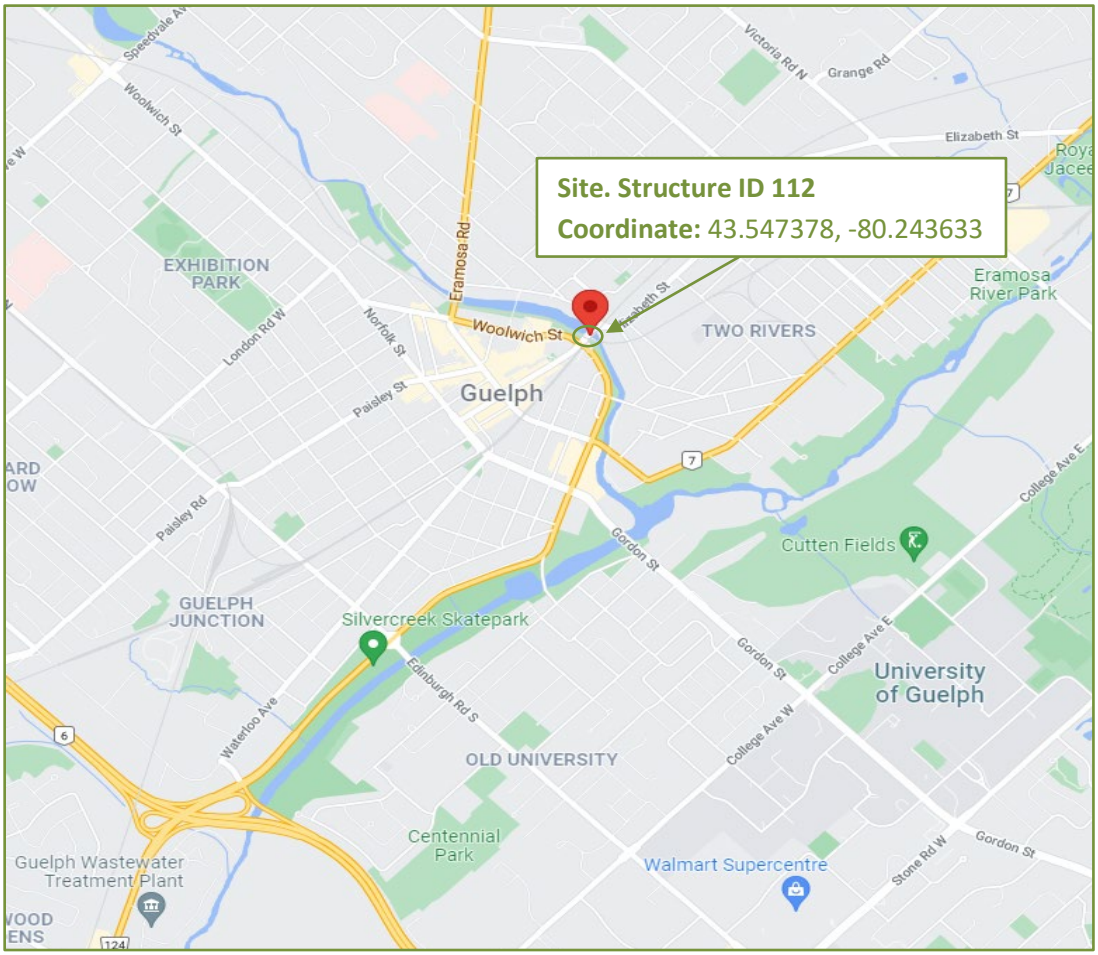
GENERAL INFORMATION			
STRUCTURE NAME	***Macdonell Bridge***		
SITE NUMBER	Structure ID 112	**DISTRICT NUMBER**	N/A
HIGHWAY	**above** Macdonell St.	**Below**	
TYPE OF STRUCTURE	Reinforced cast-in-place concrete slab		
NUMBER OF SPANS	2	**SPAN LENGTHS**	24.4, 18.60 m
ROADWAY WIDTH	14.60 m	**YEAR BUILT**	1963
DIRECTION OF STRUCTURE	East to West		
SEQUENCE NUMBER	N/A	**TOWNSHIP NUMBER**	N/A
LHRS NUMBER	N/A	**MUNICIPAL BRIDGE NUMBER**	N/A
LOCATION	60m E of Woolwich Street	**JURISDICTION**	City of Guelph
INSPECTOR'S NAME	Moe Abdollahi, P.Eng.		
PARTY MEMBERS	A.Rashid, P.Eng., J.Murray, P.Pandiyan, M.Azeem, V.Dave, V.Pandi		
DATE OF INSPECTION	27-Jul-21		
TEMPERATURE	24 °C	**WEATHER**	Rainy/Cloudy
MTO REGION	Southwestern	**AADT**	10000
DECK RIDING SURFACE	Asphalt		
YEAR LAST REHABILITATED	1988		

ENGINEER'S STAMP

Key Plan

KEY PLAN

Structure ID 112, Macdonell Bridge,
Guelph, ON



Summary of Significant Findings

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SUMMARY OF SIGNIFICANT FINDINGS

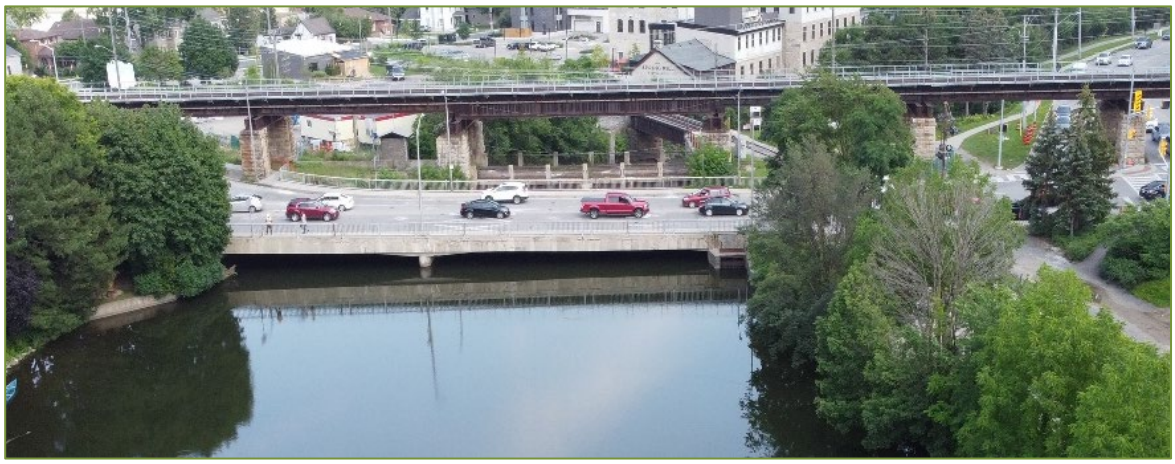
Site No. 112, Macdonell Bridge, Guelph, ON

1.0 INTRODUCTION

Bridge Check Canada Ltd. was retained by R.V. Anderson Associates Limited, under City of Guelph RFP# 20-156, to carry out detailed condition survey for three structures. This report presents *Bridge Check Canada's* findings, through the field investigations and laboratory testing, for Macdonell Bridge (Site No. 112) located on Macdonell Street, 60 m east of Woolwich Street in Guelph, Ontario. First time field investigations were carried out on July 27, 2021.

Site No. 112, constructed in 1963, is a two-span reinforced cast-in-place rigid frame concrete slab, overlain with an asphalt wearing surface and carries two traffic lanes per direction of Macdonell Street.

The total span length of the bridge is 43.00 m and the roadway width is 14.60 m. The structure has an east-to-west orientation. The outer limits of the structure contain concrete sidewalks and steel railing system. Photo P1 shows a view of the north elevation of the site. Photo P2 shows the south elevation.



North Elevation of Site No. 112, Macdonell Bridge

The bridge was rehabilitated in 1988 including concrete overlay and resurfacing, details of which were not available.

In 2018 OSIM Report the bridge Overall Comments were "Structure in overall fair to poor condition. Structure should be scheduled for replacement. A Municipal Class Environmental Assessment should be completed in conjunction with Structure 131 and Structure 320. Consideration could be given to only a superstructure replacement. Second inspection completed in October 2018 during low water levels." The BCI was 64.

2.0 METHODOLOGY

In general, the procedures followed to conduct the condition survey and delamination survey were those defined in Part 1 of the MTO Structure Rehabilitation Manual (2007). This assignment involved the

observation and recording of surface defects, delamination detection, grid layouts (1.5 m x 1.5 m), concrete cores (100 mm ø), sawn asphalt samples, corrosion potential survey, and physical testing of the concrete cores.

The delaminations in the concrete were detected by striking the surface with a heavy hammer and noting the type of sound being emitted. Note that, while this method is quite reliable, it may not detect delaminations at a depth greater than 100 mm. The hammer sounding method was used for all accessible vertical and overhead surfaces. The areas and locations of patches, spalls, delaminations, exposed reinforcement, honey-combing, wet areas, scaling and other observed defects were recorded.

A corrosion potential survey was conducted for the asphalt covered bridge deck and concrete sidewalks. The survey was performed in accordance with the requirements of ASTM C876 and the MTO Structure Rehabilitation Manual. A positive ground connection was made directly to the reinforcing steel, at the locations shown on the accompanying drawings.

Twenty two (22) cores (21 cores in deck and one core in the west approach) and 18 sawn asphalt samples were extracted from the structure, in compliance with the requirements for selecting cores and sawn asphalt samples from deteriorated and sound areas. The inside of the coreholes were examined carefully for cracks and the condition of the concrete. The exposed surface of the concrete at the sawn asphalt samples was carefully examined for evidence of deterioration. All the test holes were reinstated to their original condition using MTO-approved products.

Enclosed with this report are detailed condition survey summary sheets, survey equipment and calibration procedures, core photos/sketches, core logs, sawn asphalt sample photos, sawn asphalt sample logs, site photos, laboratory test results and drawings.

3.0 BRIDGE STRUCTURE

3.1 Asphalt Wearing Surface

The width of the asphalt covered bridge deck between abutments is 14.60 m, with a total surveyed area of 664.20 m^2. The condition of the asphalt wearing surface on the bridge deck was identified through visual field observations and review of cores and sawn asphalt samples. Drawing 1 shows the defects on the asphalt wearing surface as well as the location of the cores and sawn asphalt samples. The general pavement surface condition is shown in Photos P3 to P9. The asphalt wearing surface on the concrete deck was generally in fair-to-poor condition with unsealed transverse cracks (71.0 m), longitudinal cracks (119.0 m), random cracks (204.0 m); sealed random cracks (2.0 m); potholes/patches (9.70 m^2); alligator cracks (36.30 m^2); and rutting in the EB turning lane. The asphalt depth, measured in the drilled holes, coreholes, and sawn asphalt samples, varied from 35 mm to 95 mm with an average depth of 57 mm (refer to Drawing 2).

3.2 Waterproofing

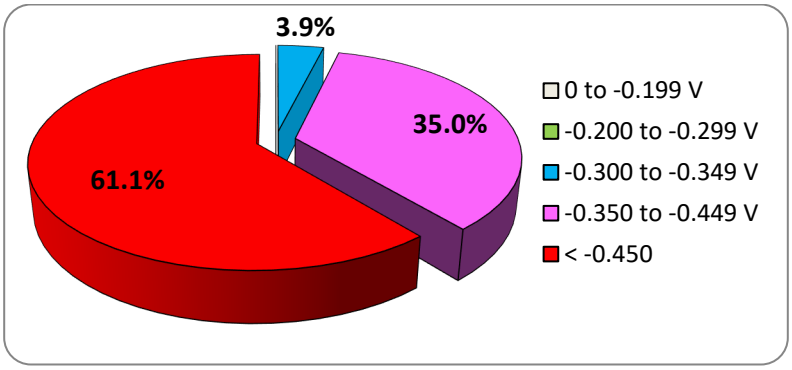
No evidence of a waterproofing system was detected over the concrete deck.

3.3 Concrete Deck

The concrete deck consists of a two-span cast-in-place rigid frame concrete slab, supported by abutments and a centre pier. The condition of the concrete deck was observed at 21 core locations and 18 sawn asphalt sample locations. The inside of the coreholes and the exposed concrete surface at the sawn asphalt samples were examined carefully for cracks and other defects. Photos P64 to P75 show the inside of the coreholes. A review of the concrete cores revealed debonding of the overlay in the majority of the cores. Medium-to-severe scaling was noted in cores C6, C7, C14, C16, C19, C21, C22. Visual review of the exposed concrete surface at the sawn asphalt samples revealed light-to-severe scaling in all sawn samples. Delamination of concrete surface was noted in SS2, SS7, SS9, SS16, SS18. Cracks were observed in SS10 and SS16. Refer to the core and sawn asphalt sample logs and photos.

The concrete overlay, encountered in the coreholes, varied in depth from 55 mm to 130 mm. The concrete cover on the upper rebar layer was found to range from 75 to 135 mm with an average cover of 111 mm. Light rusting of the reinforcement steel was found in core C20. Severe rusting of the reinforcement was noted in core C5.

Corrosion potential values obtained from the half-cell test carried out in the asphalt covered deck ranged from –0.303 V to –0.640 V with an average value of –0.434 V. The half-cell survey indicated uncertain low corrosion activity for 3.9% (0.0%+3.9%) of the deck area, with values ranging from -0.200 V to -0.349 V. Probable active corrosion was detected for 96.1% (35.0%+61.1%) of the deck area with corrosion potential values more negative than -0.350 V. Drawing 3 shows the corrosion potential readings in deck.



Corrosion potential distribution in deck

Core C19 was tested for compressive strength of the hardened concrete in accordance with CSA A23.2-14-14C. The compressive strength of the hardened concrete for this core was found to be 65.2 MPa.

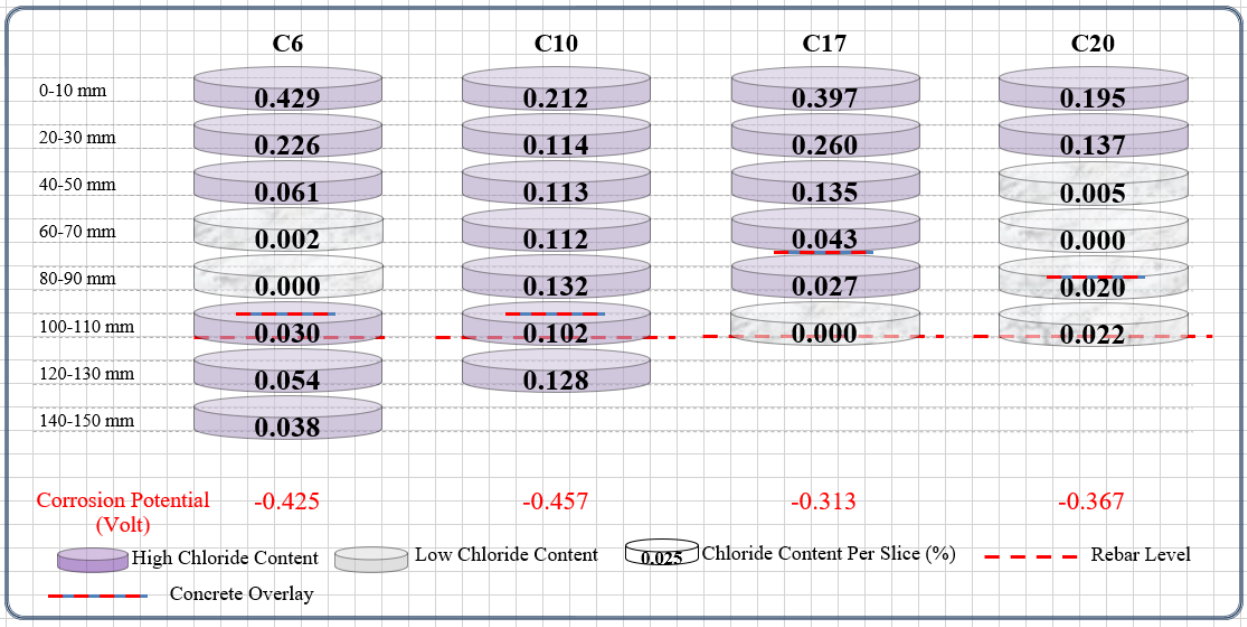
The chloride ion content was determined for four cores using MTO LS-417 “Method of Test for Determination of Total Chloride Ion in Concrete – Acid Soluble”. These core samples were located at areas prone to salt exposure (e.g. along construction joints, low points of the deck, asphalt cracks). In addition, samples from other moderately exposed areas were also taken. The chloride ion content values, at the average concrete cover or at rebar level are summarized below.

Core No.	C6 (Overlay)	C10 (Overlay)	C17 (Parent)	C20 (Parent)
Corrected Chloride Content (%)*	0.030	0.102	0.000	0.022
Corrosion Potential (V)	-0.425	-0.457	-0.313	-0.367

* Background chloride ion content was estimated to be 0.048% for parent concrete and 0.056% for overlay.

The chloride threshold value necessary to depassivate embedded steel and to allow the onset of corrosion (in the presence of oxygen and moisture) is generally taken as 0.025% by mass of concrete. The background chloride content is the lowest chloride content value for all of the cores tested for chloride content. The "background" chlorides do not contribute to corrosion, and thus the results are corrected for the background chloride content. The corrected chloride content, at the rebar level, was above the chloride threshold level of 0.025% in cores C6 and C10, both in the concrete overlay. The results indicate that chloride contamination has extended to the upper rebar level in the concrete overlay on deck.

The corrected chloride content (%) per slice for each tested core is summarized below:



Corrected Chloride Content (%) Per Slice for Each Tested Core

Core C3 was tested to determine the air void system of the hardened concrete in accordance with ASTM C457 using the Modified Point Count Method. Test results are summarized below:

Core No.	Air Content (%)	Specific Surface (mm^{-1})	Spacing Factor (mm)
C3	4.7	39.70	0.139

Concrete is normally considered to be properly air entrained if the air content exceeds 3.0%, the specific surface exceeds 24 mm^{-1}, and the average spacing factor is less than 0.200 mm. Therefore, the air void system for Core C3 is considered air entrained.

3.4 Deck Soffit and Fascia

A detailed visual inspection of deck soffit and fascia was carried out. The deterioration is shown on Drawing 4 and in Photos P10 to P25. Access to west side was limited due to the high-water level below the bridge at west abutment.

The bridge deck soffit and fascia, with a total surveyed area of 968.60 m^2, were in fair condition with clean/stained medium width cracks (155.0 m), clean wide width cracks (110.0 m), pattern cracks (19.70 m^2), delaminations (38.60 m^2), spalling (31.10 m^2), light scaling (108.00 m^2), and wet areas (46.60 m^2). The soffit deteriorations were mainly found along the deck centreline and surrounding deck drains. Wide cracks were located on the fascia.

3.5 Bridge Approaches

The asphalt wearing surface on the bridge approaches was generally in fair-to-poor condition with unsealed cracks and potholes. Photos P26 and P27 show the general pavement condition on the east and west approaches, respectively. Core C1 was taken from the west approach, where granular materials were encountered beneath 140 mm of asphalt. Photo P63 shows the inside of the corehole C1.

3.6 Deck Drainage

A total of eight steel drain pipes were located on bridge deck, each having a 100 mm diametre and a 350 mm length. The drain pipes need to be extended so that they do not discharge drain water on the soffit surface. Catch basins were found at all four quadrants outside structure limits (Photos P28 to P32).

3.7 Joints

Deck joints were found to be paved over and exhibiting multiple transverse cracks, potholes, and settlements (Photos P33 to P35).

3.8 Concrete Sidewalks

The concrete sidewalks, with a total surveyed area of 231.43 m^2, were in fair-to-poor condition with clean medium width cracks (221.0 m), clean wide width cracks (4.0 m), delaminations (11.30 m^2), spalls (1.50 m^2), patches (1.30 m^2), light scaling (10.10 m^2), medium scaling (92.80 m^2), and severe scaling (67.00 m^2). The surface deterioration is shown on Drawing 1 and in Photos P36 to P45.

Corrosion potential values obtained from the half-cell test carried out in the concrete sidewalks ranged from –0.451 V to –0.467 V with an average value of –0.460 V. The half-cell survey indicated probable active corrosion for 100.0% (0.0%+100.0%) of the sidewalk area with corrosion potential values more negative than -0.350 V. Drawing 3 shows the corrosion potential readings in the concrete sidewalk.

3.9 Steel Handrails

The steel handrails were in fair condition with light corrosion (Photos P36 to P45).

4.0 SUBSTRUCTURE COMPONENTS

The abutment walls, retaining walls, and piers were inspected and hammer sounded to check for delaminations, where accessible. Field measurements are presented in the field summary sheets.

4.1 Abutment Walls

The exposed surfaces of the abutment walls were inspected and sounded to check for delaminations, were accessible. The total surveyed area for the east and west abutments were 32.40 m^2 and 24.40 m^2, respectively. The deterioration is shown on Drawing 5. General views of the abutment walls are shown in Photos P46 to P51. Access to west abutment was limited due to the high-water level below the bridge at west abutment. The abutment walls were generally in fair condition. The field investigation of the east abutment wall revealed clean/stained medium width cracks (14.0 m), spalls (0.10 m^2), light scaling (1.10 m^2), medium scaling (2.30 m^2), and wet areas (0.91 m^2). The field investigation of the west abutment wall revealed clean medium width cracks (3.0 m) and light scaling (5.10 m^2).

4.2 Retaining Walls

The exposed surfaces of the retaining walls were inspected and sounded to check for delaminations, where accessible. The total surveyed area for the retaining walls was 44.30 m^2. The deterioration is shown on Drawing 5 and in Photos P52 to P56. The retaining walls were generally in fair-to-good condition with clean/stained medium width cracks (21.0 m), clean wide width cracks (1.0 m), delaminations (0.45 m^2), spalls (1.90 m^2), light scaling (35.40 m^2), medium scaling (0.54 m^2), and severe scaling (0.80 m^2). The wide cracks were found on the NE retaining wall.

4.3 Centre Pier

A detailed visual inspection of the centre pier was carried out. The deterioration is shown on Drawing 5 and in Photos P57 to P62.

The pier, with a total surveyed area of 47.20 m^2, was in fair-to-good condition with clean/stained medium width cracks (12.0 m), stained wide width cracks (1.0 m), light scaling (4.60 m^2), medium scaling (0.58 m^2), and severe scaling (0.10 m^2). The wide cracks were found on the east face of the pier.

Appendix A:

Detailed Condition Survey Summary Sheets

Asphalt Covered Deck, Exposed Concrete Components, Expansion Joint, Drainage

DETAILED CONDITION SURVEY SUMMARY SHEET
ASPHALT COVERED DECK
DECK RIDING SURFACE

Site No. 112

1. Dimensions and Area of Survey

Width between E abutment curbs	14.60 m	Width between W abutment curbs	14.60 m
Length between abutment joints	45.49 m	Area of deck riding surface	664.20 m²

Remarks

Deck dimensions were taken from the structural drawings

2. Asphalt Surface Cracks

Orientation	Unsealed	Sealed	
Transverse	71.0	0.0	**m**
Longitudinal	119.0	0.0	**m**
Random	204.0	2.0	**m**

* Asphalt potholes/patches = 9.70 m²
* Asphalt Alligator Cracks = 36.30 m²
* Asphalt Ravelling = 0.00 m²

3. Asphalt Depth

Remarks

Condition *	Depth			
	Min	Max	Avg	
F to P	35	95	57	**mm**

* G – Good, F – Fair, P – Poor, V - Variable Good to Poor

Remarks

4. Waterproofing

Type	Condition *	Conc. Bond *	Thickness (mm) **			
			Min	Max	Avg	
N/A	N/A	N/A	N/A	N/A	N/A	**mm**

* G – Good, F – Fair, P – Poor, V - Variable Good to Poor
** Report only thickness of waterproofing membrane but note presence of protection board

Site No. 112

5. Concrete Cover – Cores and Sawn Samples

Remarks

Minimum	Maximum	Average	
75	135	111	mm

Note: Only include covers for upper layer of rebars.

6. Corrosion Activity

Remarks

Minimum	Maximum	Average	
-0.303	-0.640	-0.434	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	V
0.0	0.0	25.9	232.5	405.8	m^2
0.0	0.0	3.9	35.0	61.1	%

Remarks

7. Defective Cores and Sawn Samples

Corrosion Activity (Volts)	Cores and Sawn Samples						
	Total in Each Area	Delaminated, Spalled, Severe Scaling and Disintegration *			Medium Scaling *		
		No.	m^2	%	No.	m^2	%
0 to -0.20	0	0	0.0	0.0	0	0.0	0.0
-0.20 to -0.30	0	0	0.0	0.0	0	0.0	0.0
-0.30 to -0.35	1	0	0.0	0.0	0	0.0	0.0
-0.35 to -0.45	15	13	201.5	30.3	0	0.0	0.0
<-0.45	23	17	299.9	45.2	0	0.0	0.0

* The percent calculation should be of the entire deck area investigated. The values obtained should be used with caution as large errors may occur when a small number of samples are used for the calculation or when the samples are not randomly distributed over the entire deck area.

Site No. 112

8. Adjusted Chloride Content Profile

*Background (original concrete) chloride content = 0.048
*Background (overlay concrete) chloride content = 0.056

Corrosion Activity at Core Location		0 to -0.20	-0.20 to -0.35	≤-0.35
Chloride Content*	0-10 mm	-	0.397	0.279
	20-30 mm	-	0.260	0.159
	40-50 mm	-	0.135	0.060
	60-70 mm	-	0.043	0.038
	80-90 mm	-	0.027	0.051
	100-110 mm	-	0.000	0.051
	120-130 mm	-	-	0.091
	140-150 mm	-	-	0.038

Remarks

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

9. Chloride Content at Rebar Level

Core No.	C6	C10	C7	C20			
Chloride Content*	0.030	0.102	0.000	0.022			
Corrosion Potential	-0.425	-0.457	-0.313	-0.367			
Core No.							
Chloride Content*							
Corrosion Potential							
Core No.							
Chloride Content*							
Corrosion Potential							

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

10. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

Remarks
Table # 10 is Not Applicable.

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No. 112

Remarks
Table # 11 is Not Applicable.

11. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

12. Concrete Air Entrainment

		Yes	No	Marginal
Concrete Air Entrained?	C3	X		

13. Compressive Strength

Average Compressive Strength **65.2 MPa**

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: **112**

Component Type & Location: Soffit and Fascia **OSIM Identifier: Decks**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 968.60 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Transverse	Longitudinal	Other	Total	
Medium Width	**Clean**	8.0	19.0	64.0	155.0	**m**
	Stained	2.0	48.0	14.0		
Wide Width	**Clean**	0.0	110.0	0.0	110.0	**m**
	Stained	0.0	0.0	0.0		

Pattern cracks= 19.70m²

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Minimum	Maximum	Average	
-	-	-	**mm**

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Remarks

Table # 4 is Not Applicable.

Site No: **112**

Component Type & Location: Soffit and Fascia **OSIM Identifier: Decks**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	38.60	31.10	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
69.70 m²	7.2 %	N/A	N/A

*Wet areas = 46.60 m²

7. Scaling

Remarks

Light	Medium	Severe to Very Severe	
108.00	0.00	0.00	m^2
11.2	0.0	0.0	%

8. Honeycombing

Total Area 0.00 m²

Site No: **112**

Component Type & Location: Soffit and Fascia **OSIM Identifier: Decks**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **112**

Component Type & Location: Soffit and Fascia **OSIM Identifier: Decks**

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: **112**

Component Type & Location: Sidewalks **OSIM Identifier: Sidewalks/curbs**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 231.43 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Transverse	Longitudinal	Other	Total	
Medium Width	**Clean**	30.0	29.0	162.0	221.0	**m**
	Stained	0.0	0.0	0.0		
Wide Width	**Clean**	2.0	0.0	2.0	4.0	**m**
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Remarks

Minimum	Maximum	Average	
51	118	93	**mm**

0 – 20 mm	0.0	**40 – 60 mm**	23.1	m^2
	0.0		10.0	%
20 – 40 mm	0.0	**over 60 mm**	208.3	m^2
	0.0		90.0	%

Site No: 112

Component Type & Location: Sidewalks **OSIM Identifier: Sidewalks/curbs**

Remarks

5. Corrosion Activity

Minimum	Maximum	Average	
-0.451	-0.467	-0.460	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	V
0.0	0.0	0.0	0.0	231.4	m^2
0.0	0.0	0.0	0.0	100.0	%

Remarks

6. Delaminations and Spalls

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	11.30	1.50	1.30

*Wet areas = 0.00 m²

Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
12.80 m²	5.5 %	12.8 m²	5.5 %

Remarks

7. Scaling

Light	Medium	Severe to Very Severe	
10.10	92.80	67.00	m^2
4.4	40.1	29.0	%

8. Honeycombing

Total Area 0.00 m²

Site No: **112**

Component Type & Location: Sidewalks **OSIM Identifier: Sidewalks/curbs**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **112**

Component Type & Location: Sidewalks

OSIM Identifier: Sidewalks/curbs

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: **112**

Component Type & Location: West Abutment Wall **OSIM Identifier: Abutments**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 24.40 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	**Clean**	1.0	0.0	2.0	3.0	**m**
	Stained	0.0	0.0	0.0		
Wide Width	**Clean**	0.0	0.0	0.0	0.0	**m**
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Remarks

Table # 4 is Not Applicable.

Minimum	Maximum	Average	
-	-	-	**mm**

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Site No: **112**

Component Type & Location: West Abutment Wall **OSIM Identifier: Abutments**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
					V
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.00	0.00	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
0.00 m²	0.0 %	N/A	N/A

*Wet areas = 0.00 m²

7. Scaling

Remarks

Light	Medium	Severe to Very Severe	
5.10	0.00	0.00	m^2
20.9	0.0	0.0	%

8. Honeycombing

Total Area 0.00 m²

Site No: **112**

Component Type & Location: West Abutment Wall **OSIM Identifier: Abutments**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **112**

Component Type & Location: West Abutment Wall **OSIM Identifier: Abutments**

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: 112

Component Type & Location: East Abutment Wall **OSIM Identifier: Abutments**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 32.40 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	**Clean**	3.0	6.0	4.0	14.0	**m**
	Stained	0.0	0.0	1.0		
Wide Width	**Clean**	0.0	0.0	0.0	0.0	**m**
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Remarks

Table # 4 is Not Applicable.

Minimum	Maximum	Average	
-	-	-	**mm**

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Site No: **112**

Component Type & Location: East Abutment Wall **OSIM Identifier: Abutments**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	V
-	-	-	-	-	m^2
-	-	-	-	-	%

Remarks

6. Delaminations and Spalls

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.00	0.10	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
0.10 m²	0.3 %	N/A	N/A

*Wet areas = 0.91 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe	
1.10	2.30	0.00	m^2
3.4	7.1	0.0	%

8. Honeycombing

Total Area 0.00 m²

Site No: **112**

Component Type & Location: East Abutment Wall **OSIM Identifier: Abutments**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **112**

Component Type & Location: East Abutment Wall **OSIM Identifier: Abutments**

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: 112

Component Type & Location: Retaining Walls **OSIM Identifier: Retaining Walls**

1. Dimensions and Area

Width	-	Length	-	Height	-
Diameter	-	Total Area Surveyed	44.30 m²		

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	**Clean**	3.0	6.0	11.0	21.0	**m**
	Stained	0.0	0.0	1.0		
Wide Width	**Clean**	0.0	0.0	1.0	1.0	**m**
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Remarks

Table # 4 is Not Applicable.

Minimum	Maximum	Average	
-	-	-	**mm**

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Site No: 112

Component Type & Location: Retaining Walls

OSIM Identifier: Retaining Walls

5. Corrosion Activity

Remarks

Table # 5 is Not Applicable.

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
					V
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.45	1.90	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
2.35 m²	5.3 %	N/A	N/A

*Wet areas = 0.00 m²

7. Scaling

Remarks

Light	Medium	Severe to Very Severe	
35.40	0.54	0.80	m^2
79.9	1.2	1.8	%

8. Honeycombing

Total Area 0.00 m²

Site No: 112

Component Type & Location: Retaining Walls

OSIM Identifier: Retaining Walls

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **112**

Component Type & Location: Retaining Walls

OSIM Identifier: Retaining Walls

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: **112**

Component Type & Location: Pier **OSIM Identifier: Piers**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 47.20 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	**Clean**	3.0	0.0	8.0	12.0	**m**
	Stained	1.0	0.0	0.0		
Wide Width	**Clean**	0.0	0.0	0.0	1.0	**m**
	Stained	1.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Minimum	Maximum	Average	
-	-	-	**mm**

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Remarks

Table # 4 is Not Applicable.

Site No: 112

Component Type & Location: Pier **OSIM Identifier: Piers**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	V
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.00	0.00	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
0.00 m²	0.0 %	N/A	N/A

*Wet areas = 0.00 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe	
4.60	0.58	0.10	m^2
9.7	1.2	0.2	%

8. Honeycombing

Total Area 0.00 m²

Site No: **112**

Component Type & Location: Pier **OSIM Identifier: Piers**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **112**

Component Type & Location: Pier

OSIM Identifier: Piers

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

DRAINAGE

Site No. 112

	Number	Type	Length	Angle	Depth *
Deck Drains	8	100mm Steel pipe	350 mm	N/A	20mm

* For asphalt covered decks, recess depth in mm between top of asphalt and top of drain.

Catch Basins	YES	N/E x 1, N/W x 2, S/E x 2, S/W x 1

* Identify location of catch basins as N/E, N/W, S/E etc. using the same direction of north as shown on the drawings.

Drainage Tubes	NO	**Void Drains**	NO

Typical Condition of Catch Basin @ Southeast

CONDITION SURVEY SUMMARY SHEET - EXPANSION JOINTS

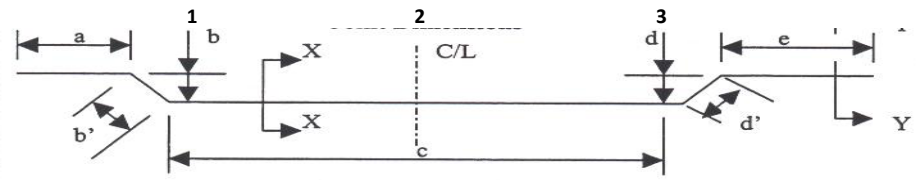
Site No. 112

Dimension	Abutments		Intermediate			
	Joint 1	Joint 2	Joint 3		Joint 4	
	E	W				
a (mm)	1900	1900	-		-	
b (mm)	220	250	-		-	
b' (mm)	230	260	-		-	
c (mm)	14600	14600	-		-	
d (mm)	250	220	-		-	
d' (mm)	260	230	-		-	
e (mm)	1900	1900	-		-	
Depth of Asphalt @ Deck Side			N/E	S/E	N/E	S/W
1 (mm)	35	60	-	-	-	-
2 (mm)	65	80	-	-	-	-
3 (mm)	55	55	-	-	-	-
Width: Top of Ballast Wall and End Dams						
	Ballast Wall	End Dam	Ballast Wall	End Dam	N/E	S/W	N/E	S/W
1 (mm)	-	-	-	-	-	-	-	-
2 (mm)	-	-	-	-	-	-	-	-
3 (mm)	-	-	-	-	-	-	-	-
Gap Dimensions								
1 (mm)	-		-		-		-	
2 (mm)	-		-		-		-	
3 (mm)	-		-		-		-	
Misc. Joint Details			Skew Angle		00° 00' 00"			
Exp	-		-		-		-	
Fixed	-		-		-		-	
Type	-						-	
Leaking	-		-		-		-	
Angle size	-		-		-		-	
Temp °C	Deck		24˚C		Ambient		24˚C	

Remarks

No expansion joints present in structure.

N — JOINT DIMENSIONS — S



Typical Sections at Joints:

Appendix B:

Survey Equipment and Calibration Procedures

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
www.bridgecheckcanada.com
Tel: 905-660-6608 Fax: 905-660-6609
info@bridgecheckcanada.com

SURVEY EQUIPMENT AND CALIBRATION PROCEDURES

Component Type: Asphalt Covered Bridge Deck **Site Number:** 112

1. Delaminations:

Weight of Chain: 2.2 **kg/m**
Other Equipment: Hammer

2. Concrete Cover:

Covermeter Make and Model: ELCOMETER Protovale 331

Battery Check:	**Reading at Start of Test:**	OK
	Reading at End of Test:	OK
Concrete Cover Check:	**Location of Check:**	@ 'SS1'
	Actual Depth and Rebar Diameter:	-
	Reading Before Test:	99 mm
	Readings Each 30 minutes During Test:	99 mm
	Reading at End of Test:	99 mm

3. Corrosion Activity:

Half Cell Make and Model: MC MILLER Electrode RE-3a (3" ø)
Multimeter Make and Model: Mastercraft Digital Multimeter 3R93
Length and Gauge of Lead Wires: 150 m of 18 gauge

Deck Temperature:	**Start of Test:**	24	°C	**End of Test:**	24	°C
Ambient Temperature:	**Start of Test:**	24	°C	**End of Test:**	24	°C

Battery Check: O.K.

Ground Check:	**Method of Connection:**	self-tapping screw		
	Ground Location:	@ Core C5	**Check Location:**	@ Core C7
	Lead Resistance:	1.8 - 1.9 Ω	**Voltage Drop (mV's):**	0.1
	Resistance [c]:	1.8 - 1.9 Ω	**Resistance Reversed:**	1.8 - 1.9 Ω

Grid Point Potential Readings Check – See Table Below

Location	Initial Reading	Check Reading [a]	Check Reading – Latex Concrete Overlay [b]
N1	-0.417	-0.416	-0.422
N2	-0.430	-0.431	-0.436
N3	-0.422	-0.423	-0.427
N4	-0.400	-0.402	-0.406
N5	-0.410	-0.411	-0.414

[a] Check at least five readings at beginning of test and each change in ground.
[b] On decks with latex modified concrete overlay, check at least five locations by drilling holes through the latex concrete overlay into the original concrete substrate.
[c] Resistance is the net resistance after deducting the lead resistance.

Appendix C:

Core Photographs and Sketches

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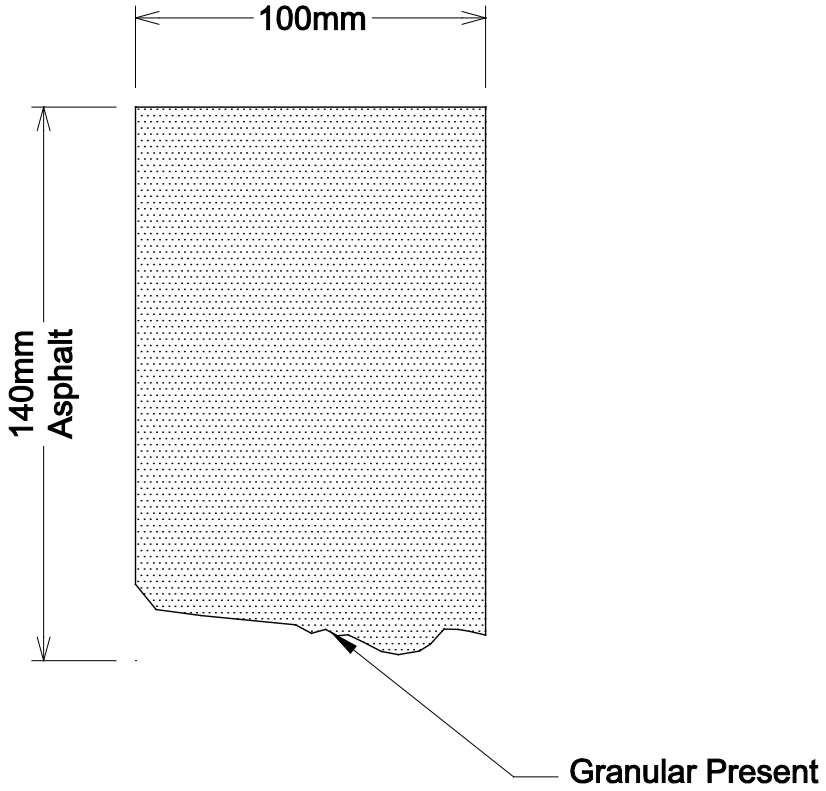
Core C1



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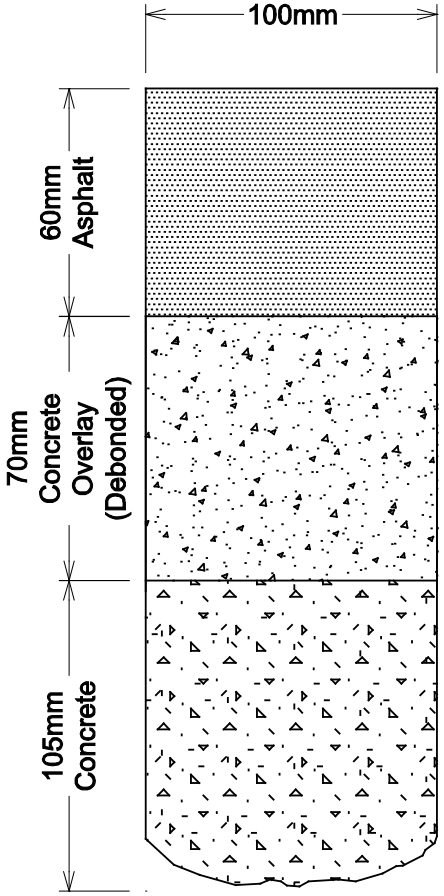
Core C2



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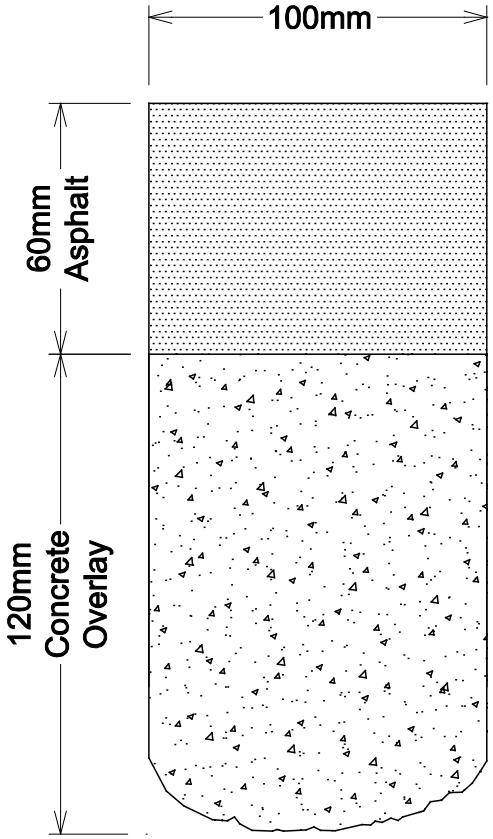
Core C3



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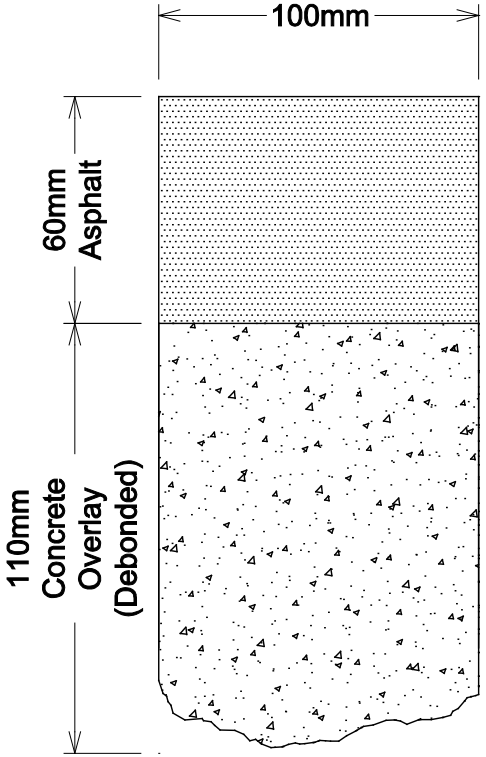
Core C4



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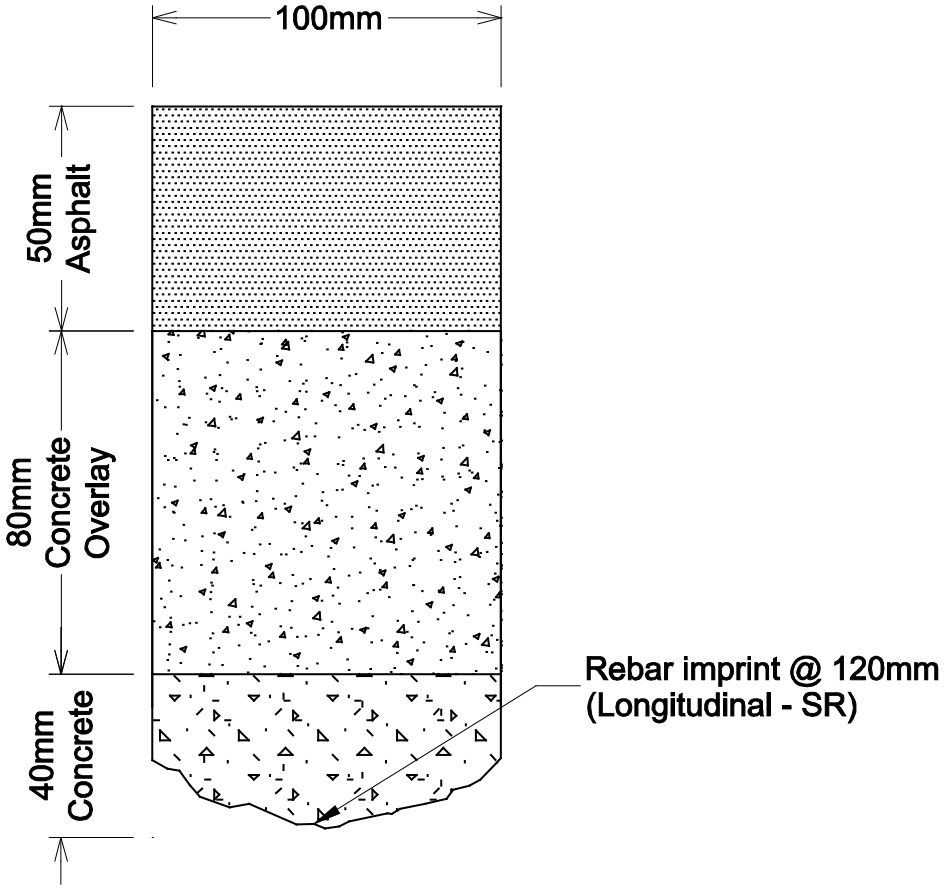
Core C5



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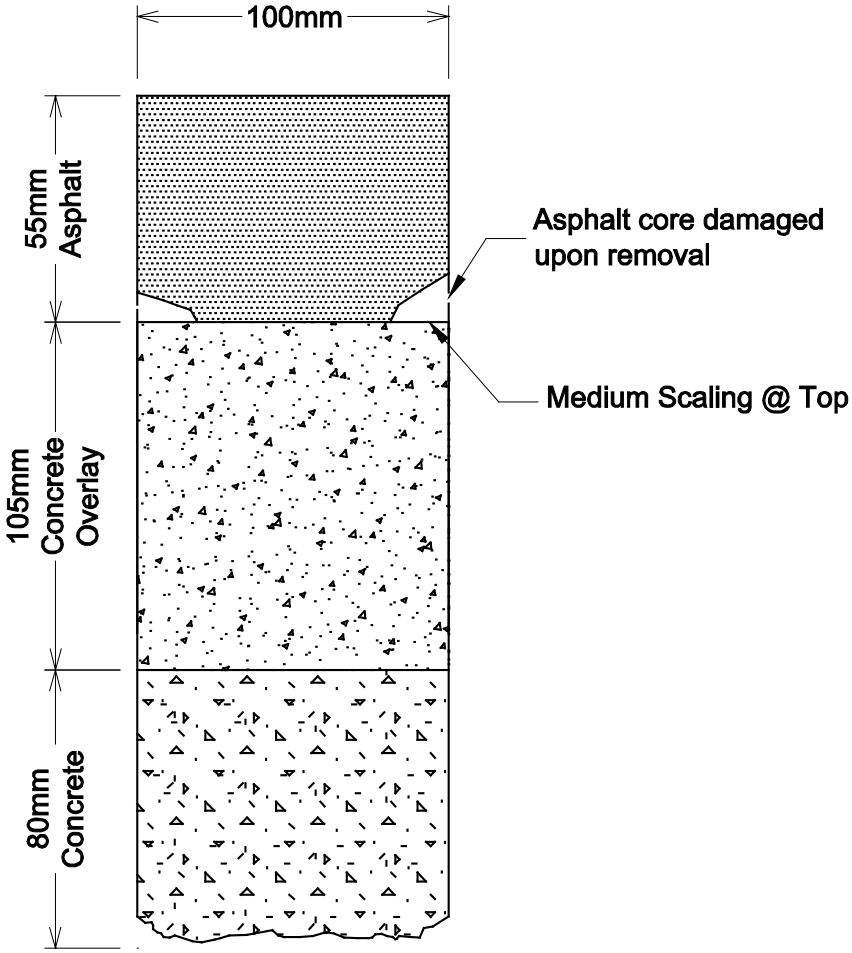
Core C6



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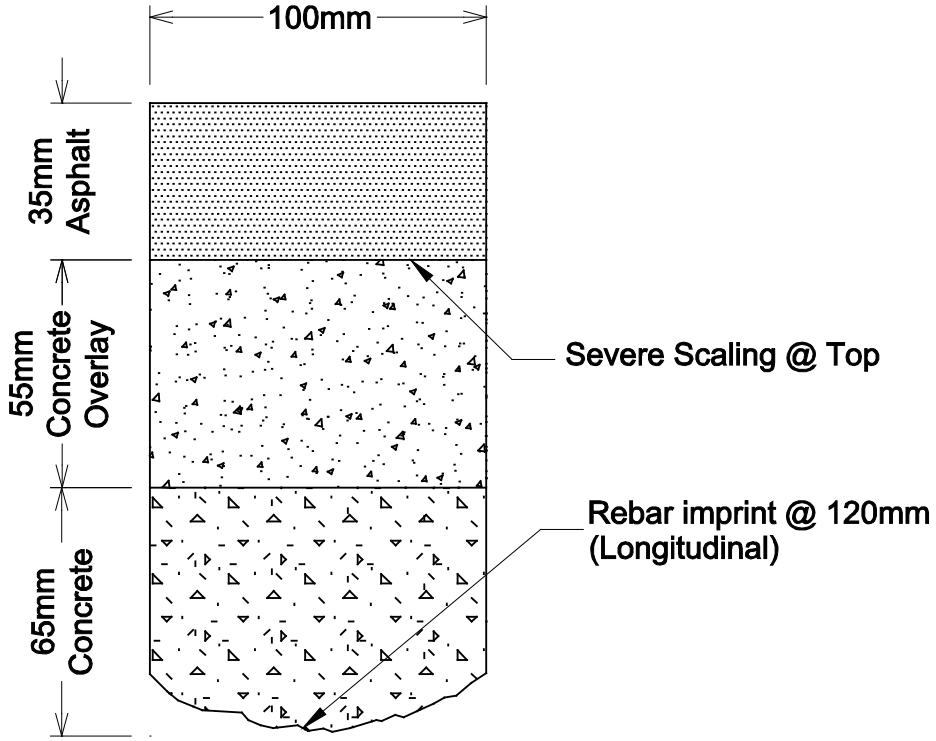
Core C7



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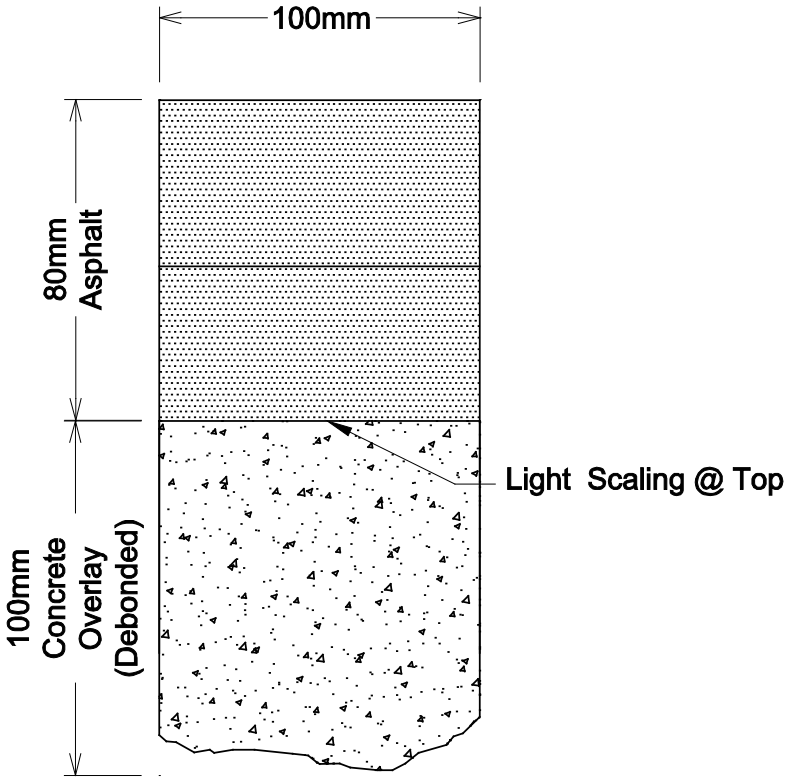
Core C8



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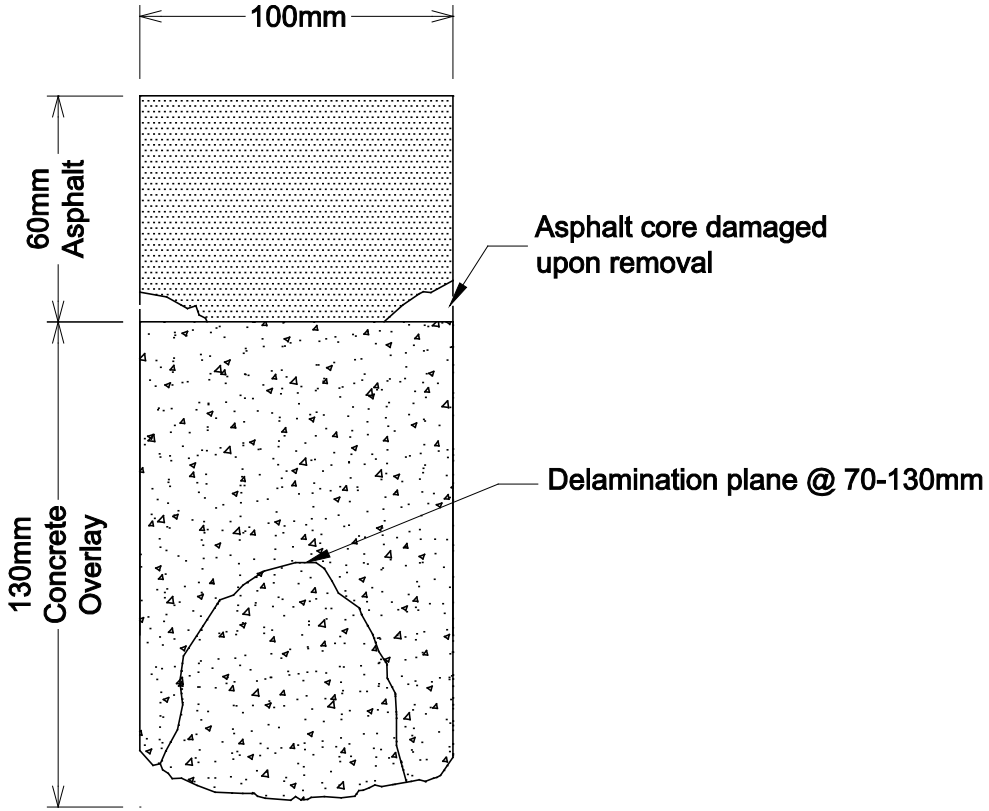
Core C9



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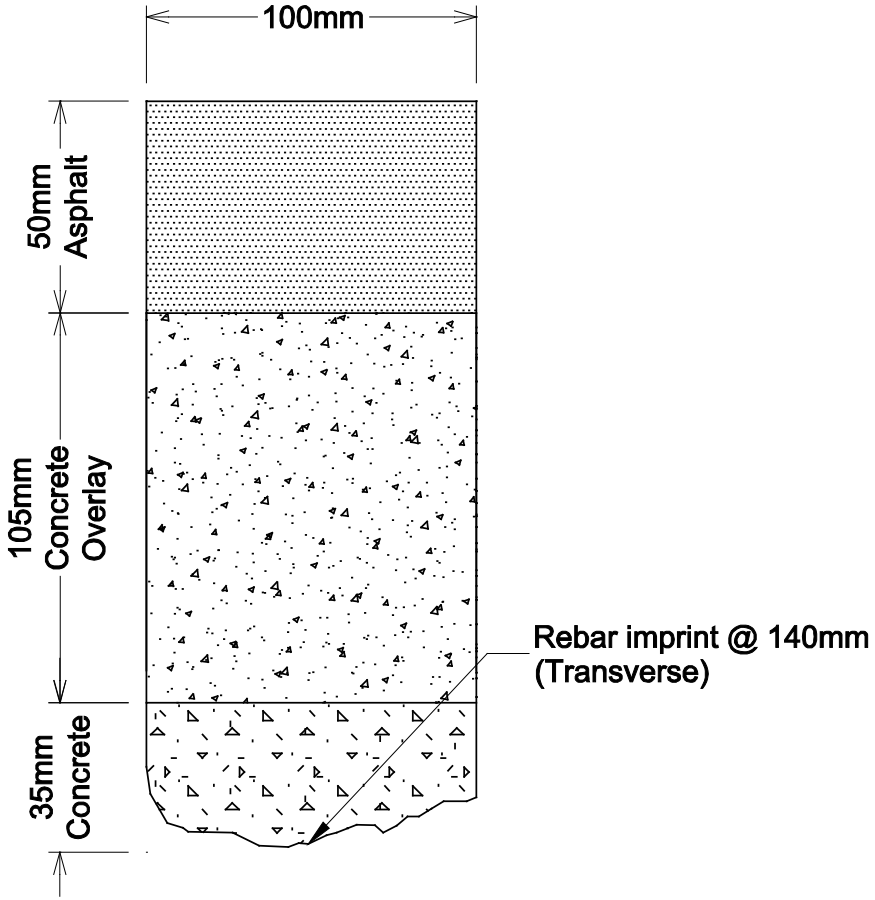
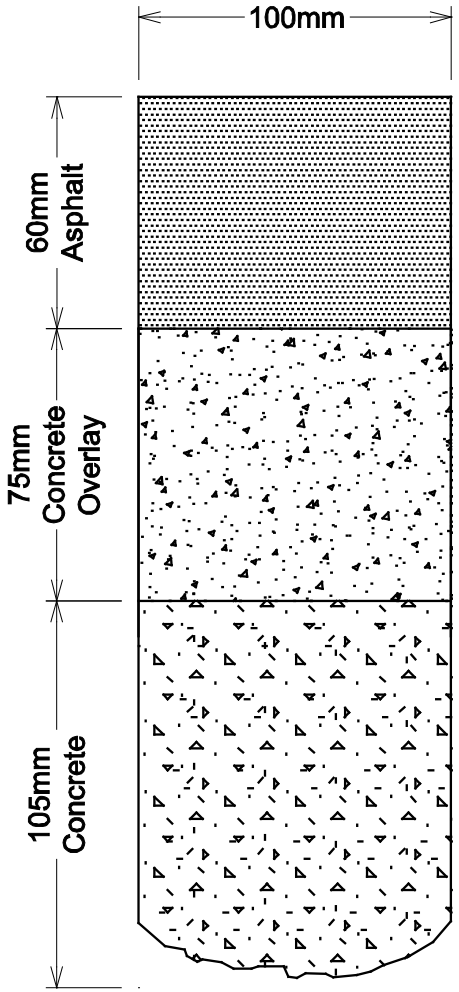
Core C10


100mm
50mm Asphalt
105mm Concrete Overlay
35mm Concrete
Rebar imprint @ 140mm (Transverse)

Core C11



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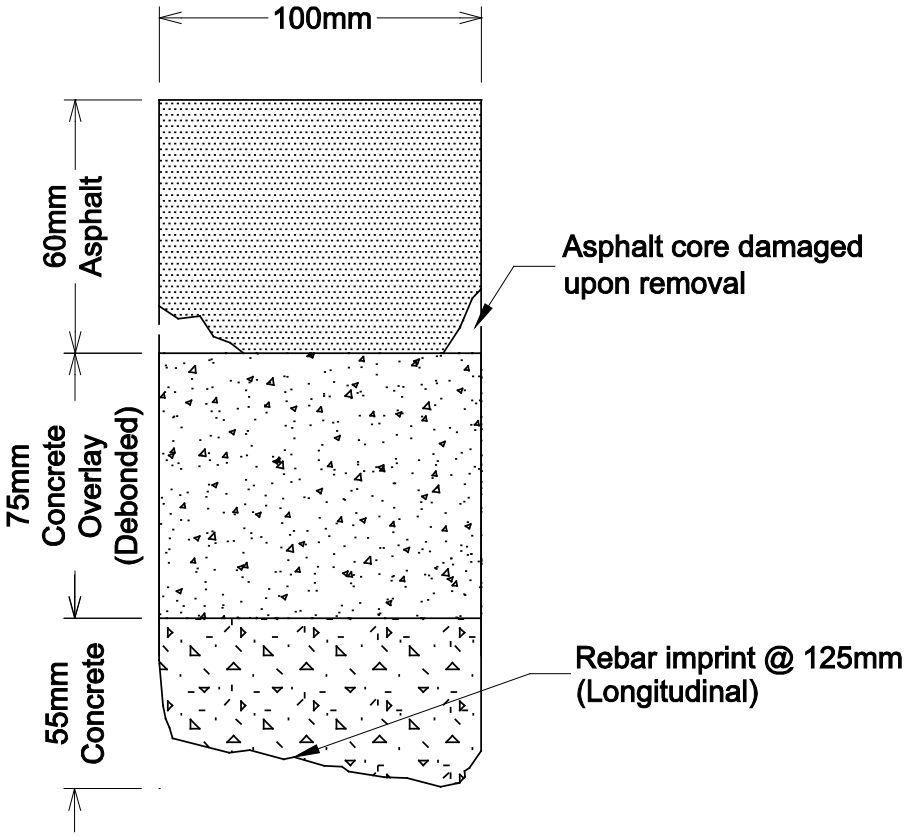
Core C12



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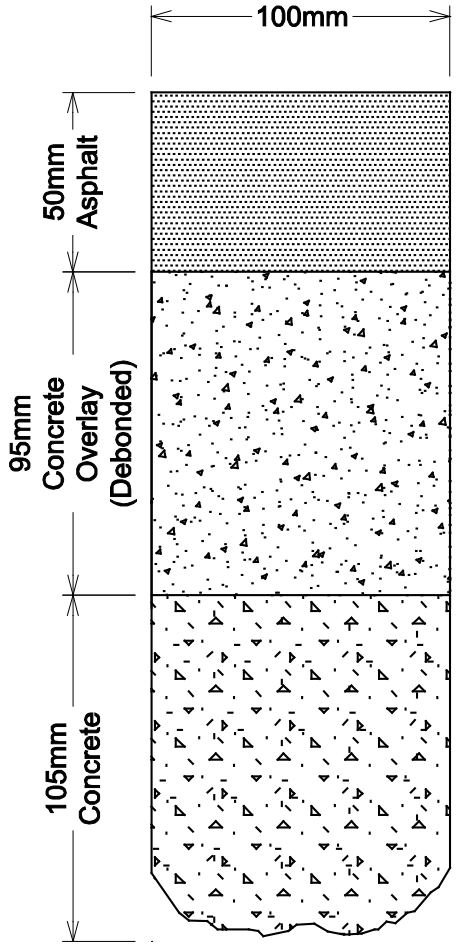
Core C13



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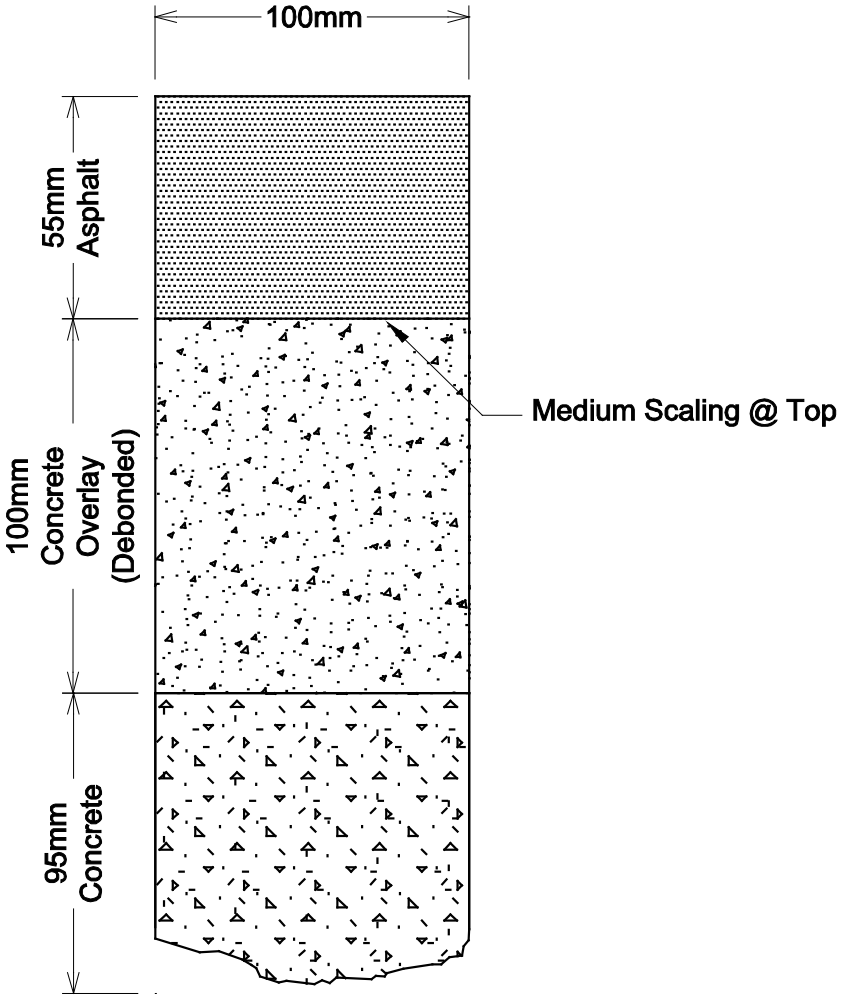
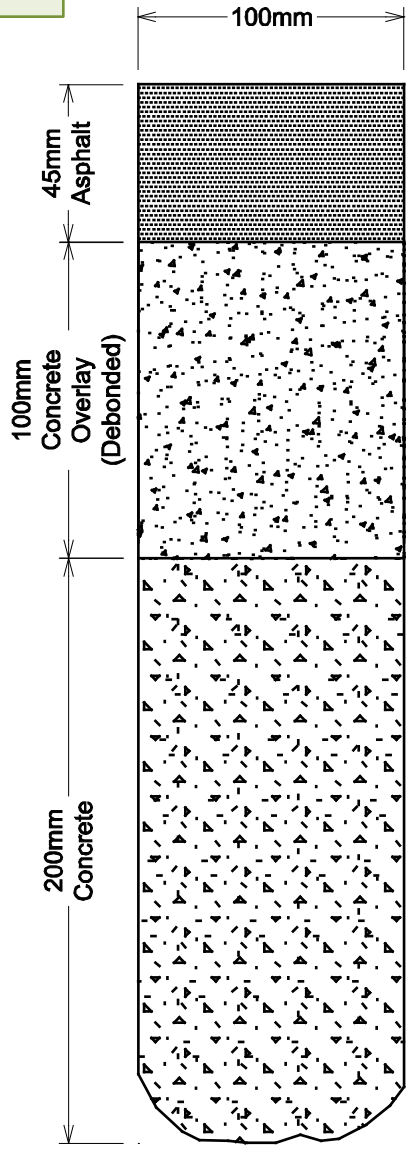
Core C14


100mm
55mm Asphalt
100mm Concrete Overlay (Debonded)
95mm Concrete
Medium Scaling @ Top

Core C15



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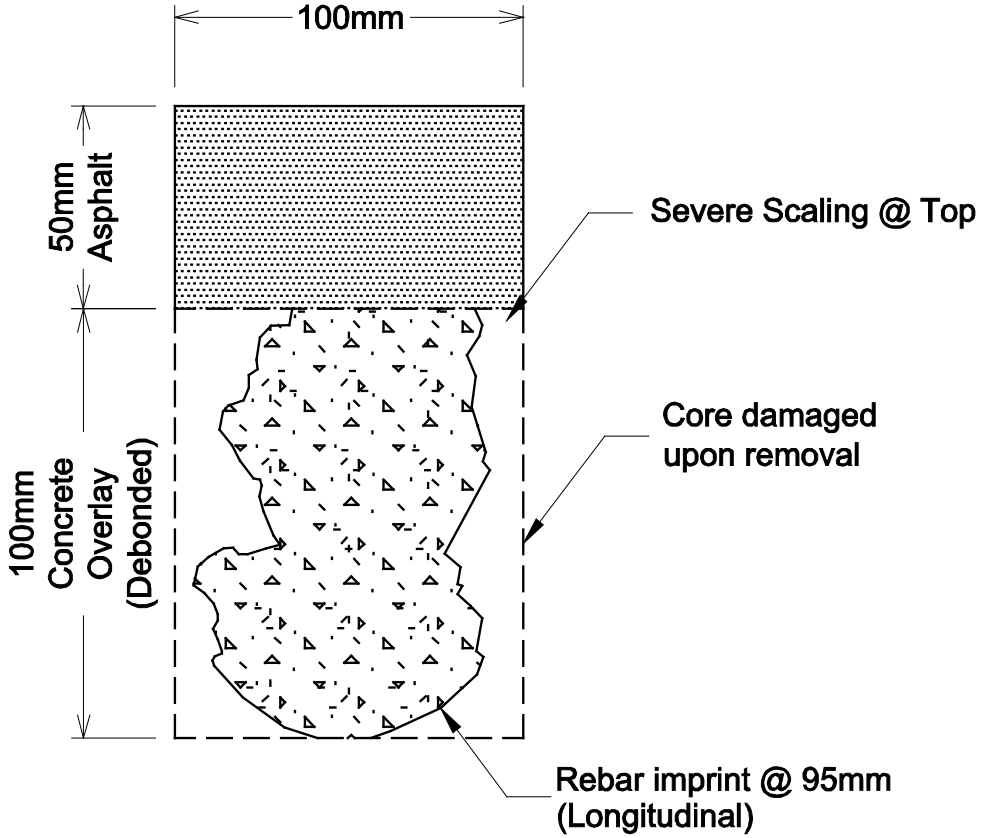
Core C16



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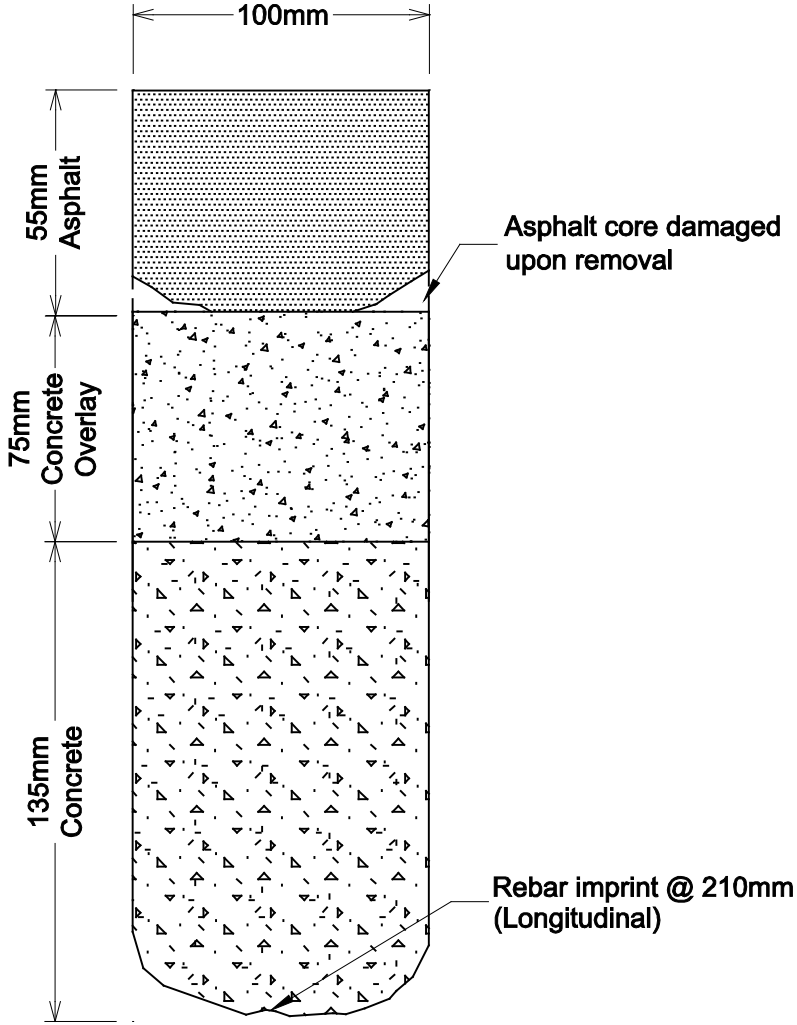
Core C17



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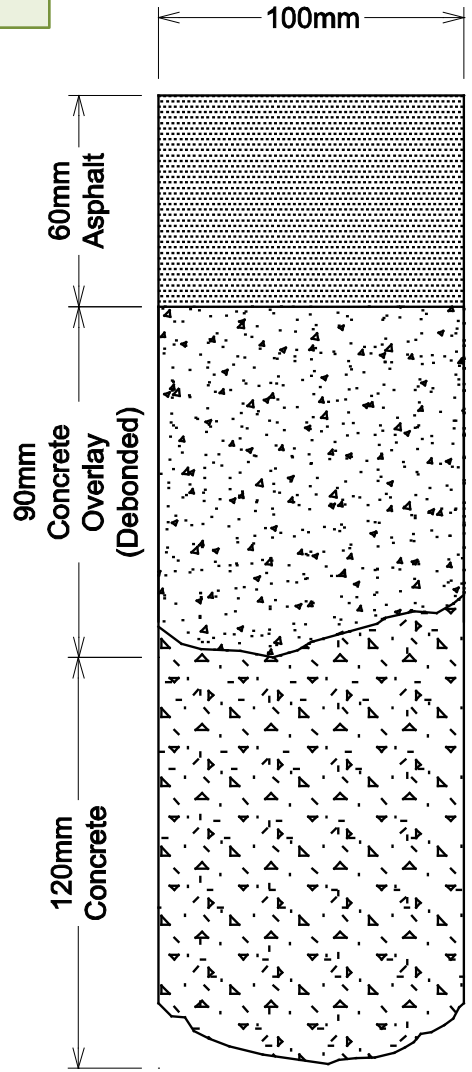
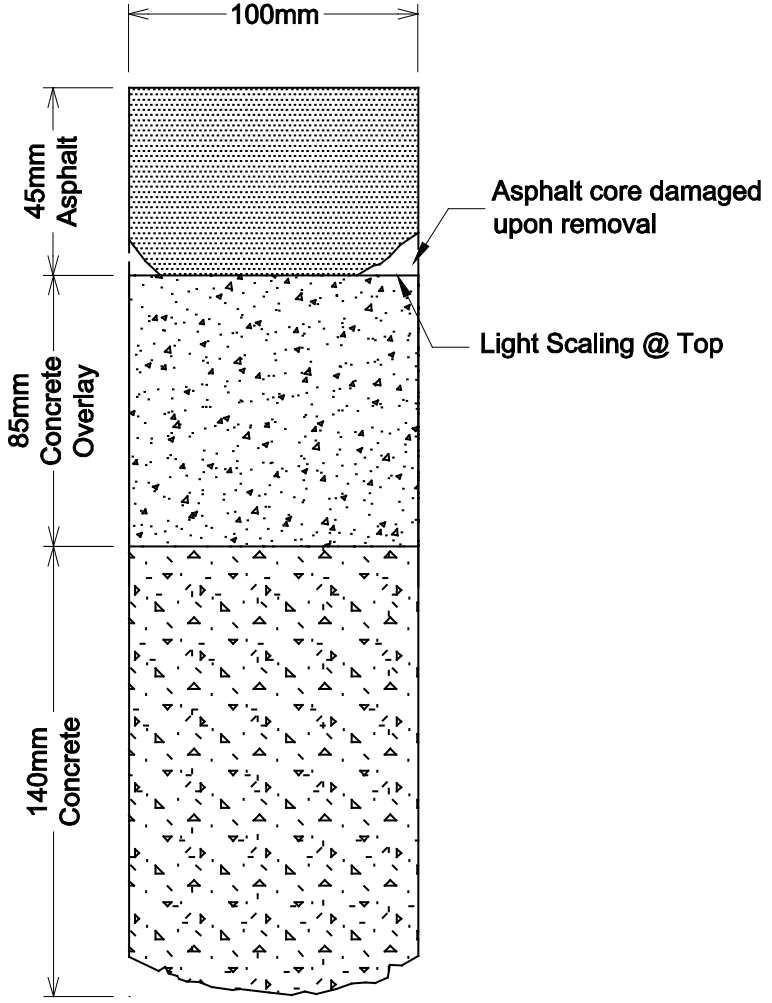
Core C18


100mm
60mm Asphalt
90mm Concrete Overlay (Debonded)
120mm Concrete

Core C19



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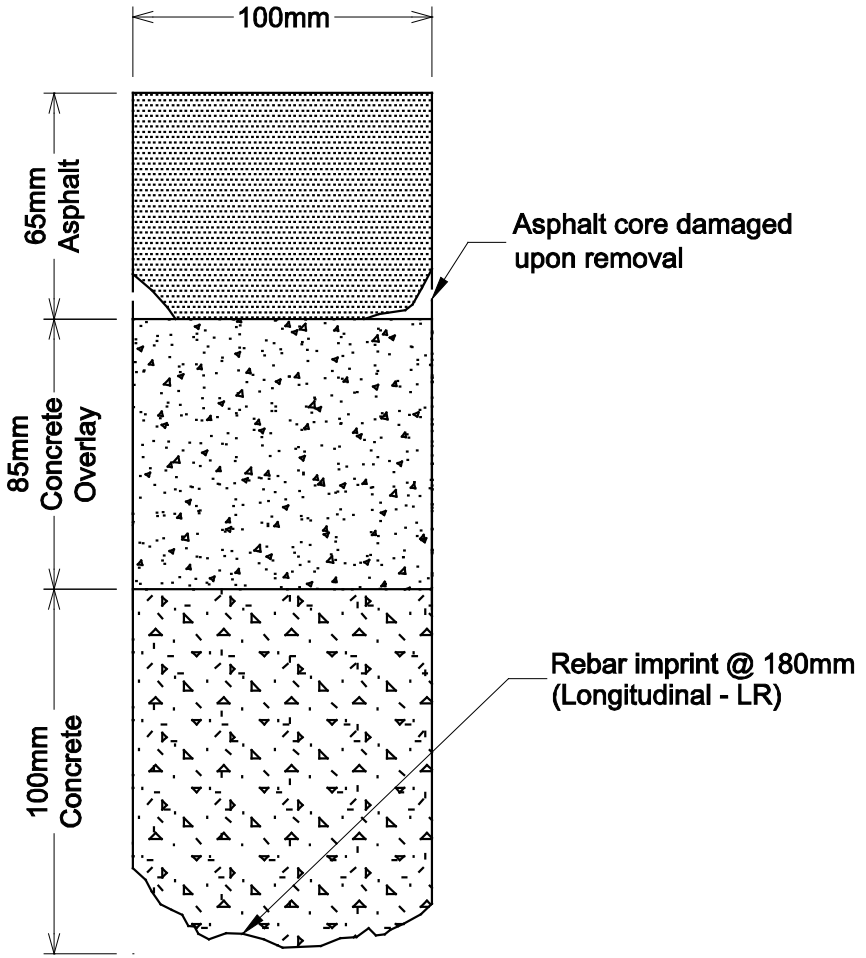
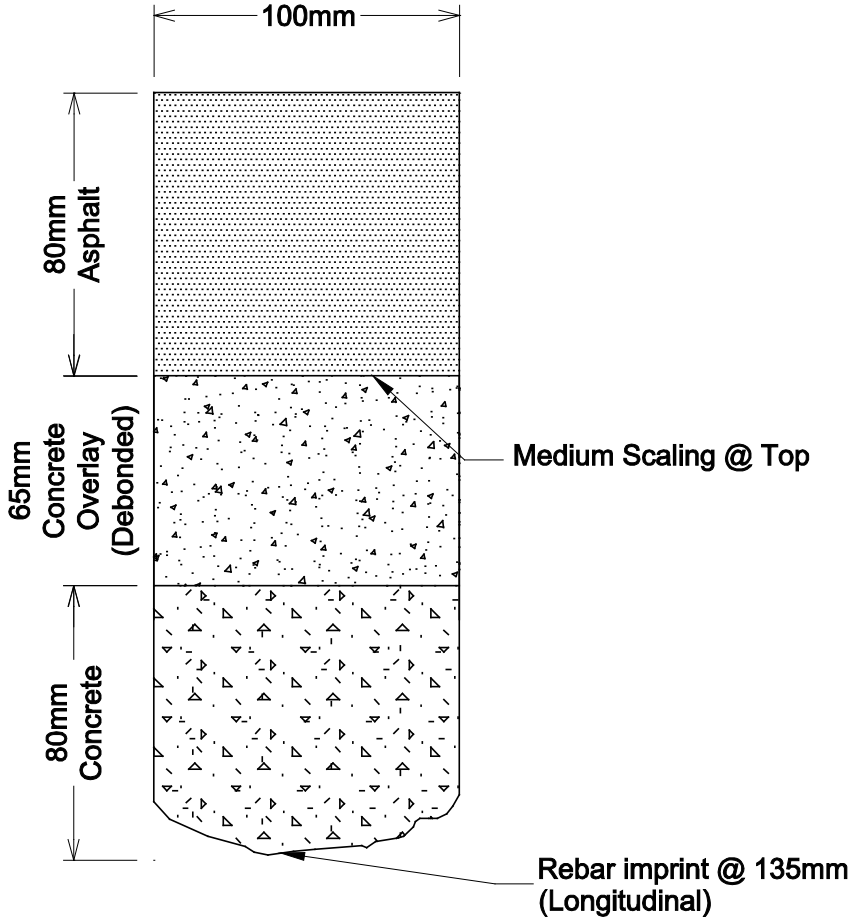
Core C20


100mm
65mm Asphalt
85mm Concrete Overlay
100mm Concrete
Asphalt core damaged upon removal
Rebar imprint @ 180mm (Longitudinal - LR)

Core C21



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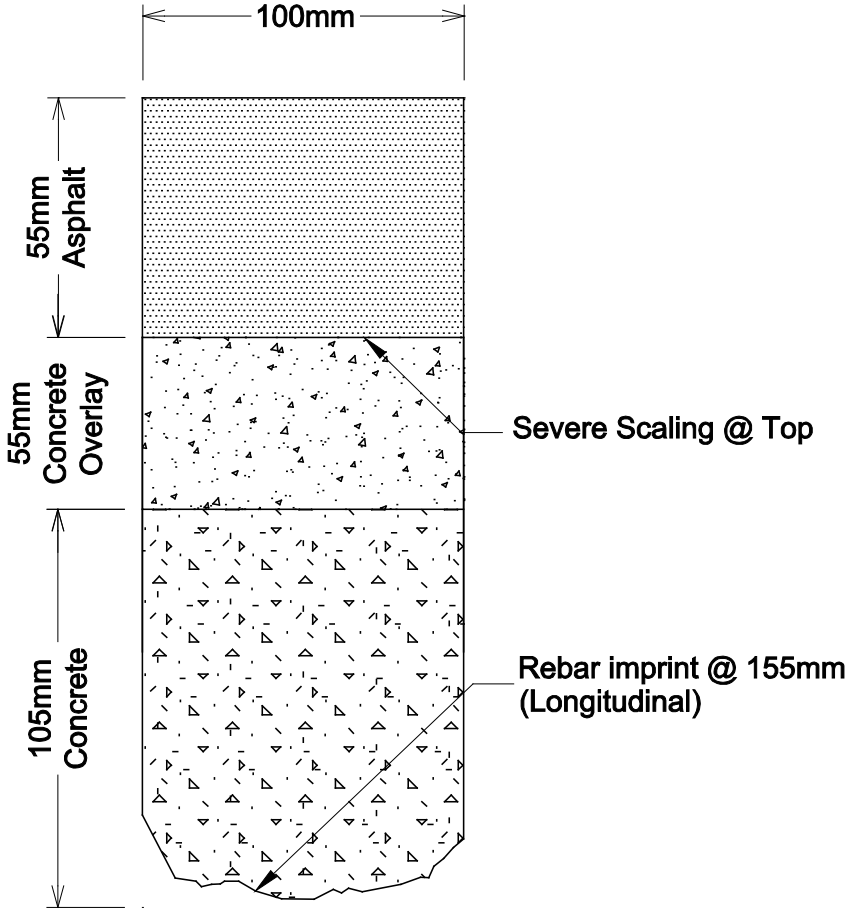
Core C22


100mm
55mm Asphalt
55mm Concrete Overlay
105mm Concrete
Severe Scaling @ Top
Rebar imprint @ 155mm (Longitudinal)

Appendix D:

Core Logs

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: **112**

Core No.		**C1**		**C2**		**C3**	
Location (between gridlines)		West Approach		'N' and '1'		'M' and '8'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		140.0		60.0		60.0	
Thickness of Asphalt @ Nearest Grid Point		N/A		60.0		60.0	
Thickness of Concrete, mm		*		175.0		120.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt [1]		F		F		F	
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P [1]		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		N/A		F		F	
Defects in Concrete [2]		-		D		-	
Condition of Rebar [3]		N/A		N/A		N/A	
Corrosion Potential				-0.421		-0.397	
Compressive Strength, MPa							
Chloride Content % Chloride by Weight of Concrete	**0-10 mm**	Total	Corrected	Total	Corrected	Total	Corrected
	20-30 mm						
	40-50 mm						
	60-70 mm						
	80-90 mm						
AIR VOIDS	**Air Content,%**					4.7	
	Spec. Surf.,mm^2/mm^3					39.7	
	Spacing Factor, mm					0.139	
TEST LABORATORY						BCC	
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**		*Granular present.		70mm concrete overlay (debonded).		120mm concrete overlay	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: **112**

Core No.		**C4**		**C5**		**C6**	
Location (between gridlines)		'M' and '13'		'N' and '16'		'L' and '23'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		60.0		50.0		55.0	
Thickness of Asphalt @ Nearest Grid Point		60.0		50.0		55.0	
Thickness of Concrete, mm		110.0		120.0		185.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt [1]		P		F			
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P [1]		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		F		F		F	
Defects in Concrete [2]		D		-		Sc	
Condition of Rebar [3]		N/A		SR		N/A	
Corrosion Potential		-0.463		-0.452		-0.425	
Compressive Strength, MPa							
		Total	Corrected	Total	Corrected	Total	Corrected
Chloride Content % Chloride by Weight of Concrete	**0-10 mm**					0.485	0.429
	20-30 mm					0.282	0.226
	40-50 mm					0.117	0.061
	60-70 mm					0.058	0.002
	80-90 mm					0.056	0.000
	100-110 mm					0.086	0.030
	120-130 mm					0.102	0.054
	140-150 mm					0.086	0.038
AIR VOIDS	**Air Content,%**						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY						BCC	
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**		110mm concrete overlay (debonded).		80mm concrete overlay (debonded). Rebar imprint @120mm (Longitudinal-SR).		105mm concrete overlay. Medium Scaling @ top. Asphalt core damaged upon removal.	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: **112**

Core No.		**C7**		**C8**		**C9**	
Location (between gridlines)		'N' and '28'		'K' and '3'		'H' and '7'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		35.0		80.0		60.0	
Thickness of Asphalt @ Nearest Grid Point		35.0		80.0		60.0	
Thickness of Concrete, mm		120.0		100.0		130.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt [1]		F to G		F		P	
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P [1]		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		P		F		F	
Defects in Concrete [2]		Sc		D		D	
Condition of Rebar [3]		G		N/A		N/A	
Corrosion Potential		-0.423		-0.465		-0.422	
Compressive Strength, MPa							
Chloride Content % Chloride by Weight of Concrete	**0-10 mm**	Total	Corrected	Total	Corrected	Total	Corrected
	20-30 mm						
	40-50 mm						
	60-70 mm						
	80-90 mm						
AIR VOIDS	**Air Content,%**						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY							
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**		55mm concrete overlay. Severe scaling @ top. Rebar imprint @120mm (Longitudinal).		100mm concrete overlay (debonded). Light scaling @top.		130mm concrete overlay. Delamination plane @ 70-130mm. Asphlat core damaged upon removal.	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: **112**

Core No.		**C10**		**C11**		**C12**	
Location (between gridlines)		'L' and '10'		'I' and '13'		'H' and '18'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		50.0		60.0		60.0	
Thickness of Asphalt @ Nearest Grid Point		50.0		60.0		60.0	
Thickness of Concrete, mm		140.0		180.0		130.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt (1)		F		F to G			
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P (1)		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		F		F		F	
Defects in Concrete (2)		-		-		D	
Condition of Rebar (3)		G		N/A		N/A	
Corrosion Potential		-0.457		-0.454		-0.455	
Compressive Strength, MPa							
		Total	Corrected	Total	Corrected	Total	Corrected
Chloride Content % Chloride by Weight of Concrete	**0-10 mm**	0.268	0.212				
	20-30 mm	0.170	0.114				
	40-50 mm	0.169	0.113				
	60-70 mm	0.168	0.112				
	80-90 mm	0.188	0.132				
	100-110 mm	0.158	0.102				
	120-130 mm	0.176	0.128				
AIR VOIDS	**Air Content,%**						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY		BCC					
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**		105mm concrete overlay. Rebar imprint @ 140mm (Transverse).		75mm concrete overlay.		75mm concrete overlay (debonded). Rebar imprint @ 125mm (Longitudinal). Asphlat core damaged upon removal.	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: **112**

Core No.		C13		C14		C15	
Location (between gridlines)		'K' and '19'		'H' and '23'		'J' and '27'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		50.0		55.0		45.0	
Thickness of Asphalt @ Nearest Grid Point		50.0		55.0		45.0	
Thickness of Concrete, mm		200.0		195.0		300.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt (1)		F		F to P		F	
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P (1)		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		F		F to P		F	
Defects in Concrete (2)		D		D		D	
Condition of Rebar (3)		N/A		N/A		N/A	
Corrosion Potential		-0.439		-0.451		-0.461	
Compressive Strength, MPa							
Chloride Content % Chloride by Weight of Concrete	0-10 mm	Total	Corrected	Total	Corrected	Total	Corrected
	20-30 mm						
	40-50 mm						
	60-70 mm						
	80-90 mm						
AIR VOIDS	Air Content,%						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY							
REMARKS - orientation of rebars and cover - presence of overlay, patch and thickness - other observed defects		95mm concrete overlay (debonded).		100mm concrete overlay (debonded). Medium scaling @ top. Asphalt core damaged upon removal.		100mm concrete overlay (debonded).	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: 112

Core No.		C16		C17		C18	
Location (between gridlines)		'K' and '28'		'A' and '2'		'F' and '6'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		50.0		55.0		60.0	
Thickness of Asphalt @ Nearest Grid Point		50.0		55.0		60.0	
Thickness of Concrete, mm		100.0		210.0		210.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt (1)		P		F		F to G	
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P (1)		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		P		F		F	
Defects in Concrete (2)		D		-		D	
Condition of Rebar (3)		G		G		N/A	
Corrosion Potential		-0.462		-0.313		-0.394	
Compressive Strength, MPa							
		Total	Corrected	Total	Corrected	Total	Corrected
Chloride Content % Chloride by Weight of Concrete	0-10 mm			0.453	0.397		
	20-30 mm			0.316	0.260		
	40-50 mm			0.191	0.135		
	60-70 mm			0.099	0.043		
	80-90 mm			0.075	0.027		
	100-110 mm			0.048	0.000		
AIR VOIDS	Air Content,%						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY				BCC			
REMARKS - orientation of rebars and cover - presence of overlay, patch and thickness - other observed defects		100mm concrete overlay (debonded). Severe Scaling @ top. Rebar imprint @ 95mm (Longitudinal). Core damaged upon removal.		75mm concrete overlay. Rebar imprint @ 210mm (Transverse). Asphalt core damaged upon removal.		90mm concrete overlay (debonded).	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: **112**

Core No.		**C19**		**C20**		**C21**	
Location (between gridlines)		'A' and '13'		'F' and '19'		'F' and '28'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		45.0		65.0		80.0	
Thickness of Asphalt @ Nearest Grid Point		45.0		65.0		80.0	
Thickness of Concrete, mm		225.0		185.0		145.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt [1]		F		F		F	
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P [1]		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		F		F			
Defects in Concrete [2]		Sc		-		D	
Condition of Rebar [3]		N/A		LR		G	
Corrosion Potential		-0.397		-0.367		-0.415	
Compressive Strength, MPa		65.2					
		Total	Corrected	Total	Corrected	Total	Corrected
Chloride Content % Chloride by Weight of Concrete	**0-10 mm**			0.251	0.195		
	20-30 mm			0.193	0.137		
	40-50 mm			0.061	0.005		
	60-70 mm			0.056	0.000		
	80-90 mm			0.068	0.020		
	100-110 mm			0.070	0.022		
AIR VOIDS	**Air Content,%**						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY		BCC		BCC			
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**		55mm concrete overlay. Light scaling @ top.		85mm concrete overlay. Rebar imprint@ 180mm (longitudinal-LR). Asphalt core damaged upon removal.		65mm concrete overlay (debonded). Medium scaling @ top. Rebar imprint@ 135mm (longitudinal).	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

 Site: 112

Core No.		**C22**				
Location (between gridlines)		'B' and '28'				
Diameter, mm		100.0				
Thickness of Asphalt, mm		55.0				
Thickness of Asphalt @ Nearest Grid Point		55.0				
Thickness of Concrete, mm		160				
Full Depth (yes/no)		No				
Condition of Asphalt [1]		F				
Waterproofing (W/P) Type		N/A				
Condition of W/P [1]		N/A				
W/P Thickness, mm		N/A				
Bond of Asphalt or W/P to Concrete		P				
Defects in Concrete [2]		Sc				
Condition of Rebar [3]		G				
Corrosion Potential		-0.401				
Compressive Strength, MPa						
Chloride Content % Chloride by Weight of Concrete	**0-10 mm** **20-30 mm** **40-50 mm** **60-70 mm** **80-90 mm**	Total	Corrected			
AIR VOIDS	**Air Content,%** **Spec. Surf.,mm^2/mm^3** **Spacing Factor, mm**					
TEST LABORATORY						
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**		55mm concrete overlay. Severe Scaling @ top. Rebar imprint @ 155mm (Longitudinal).				

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

Appendix E:

Sawn Asphalt Sample Photographs

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Photo S1 – Sawn Sample SS1 (medium scaling)

Photo S2 – Sawn Sample SS2 (delamination, and severe scaling)

Photo S3 – Sawn Sample SS3 (medium scaling)

Photo S4 – Sawn Sample SS4 (medium scaling)

Photo S5 – Sawn Sample SS5 (severe scaling)

Photo S6 – Sawn Sample SS6 (medium scaling)

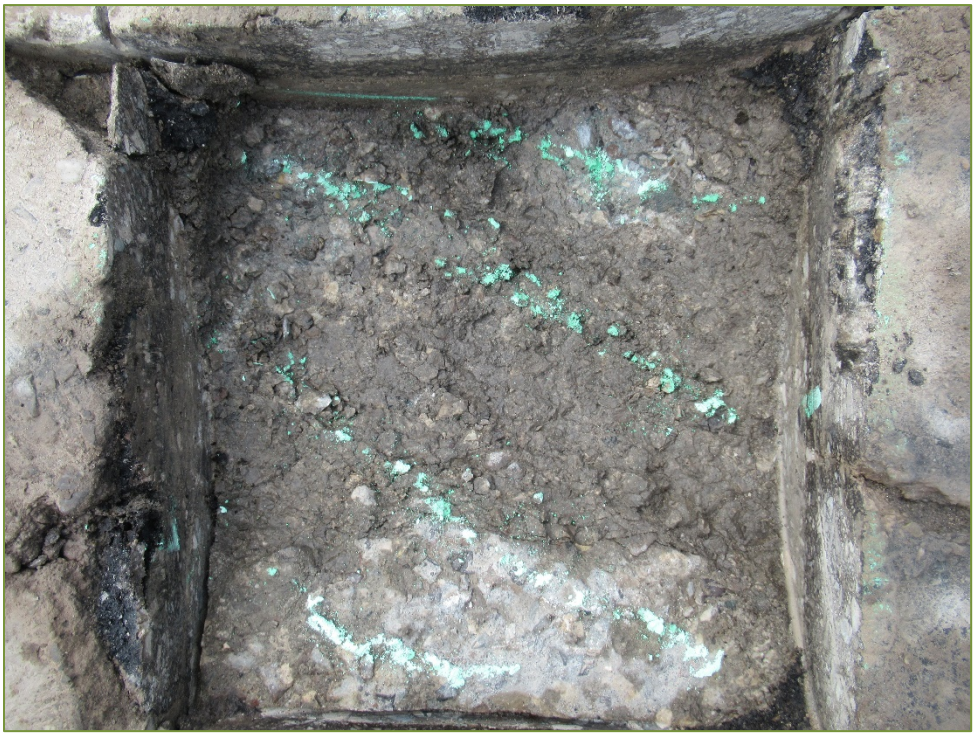

Photo S7 – Sawn Sample SS7 (delamination, and severe scaling)

Photo S8 – Sawn Sample SS8 (medium scaling)

Photo S9 – Sawn Sample SS9 (delamination, and severe scaling)

Photo S10 – Sawn Sample SS10 (crack, and medium scaling)

Photo S11 – Sawn Sample SS11 (light scaling)

Photo S12 – Sawn Sample SS12 (light scaling)

Photo S13 – Sawn Sample SS13 (severe scaling)

Photo S14 – Sawn Sample SS14 (severe scaling)

Photo S15 – Sawn Sample SS15 (light scaling)

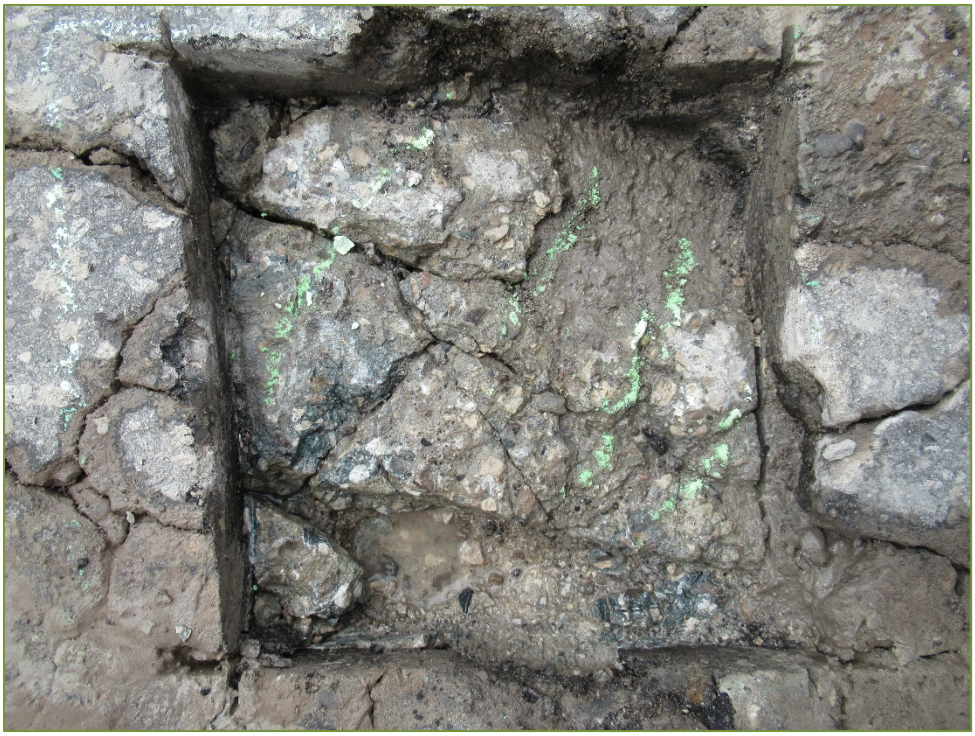

Photo S16 – Sawn Sample SS16 (cracks, delamination, and severe scaling)

Photo S17 – Sawn Sample SS17 (medium scaling)

Photo S18 – Sawn Sample SS18 (delamination, and severe scaling)

Appendix F:

Sawn Asphalt Sample Logs

SAWN ASPHALT SAMPLE LOG

 Site No: **112**

Sample No.	SS1	SS2	SS3
Location (between gridlines)	'M' and '27'	'N' and '22'	'L' and '18'
Size, mm X mm	310 x 260	360 x 260	300 x 310
Thickness of Asphalt, mm	65	95	55
Thickness of Asphalt @ Nearest Grid Point	65	95	55
Condition of Asphalt (1)	F	F to P	F to P
Waterproofing (W/P) Type	N/A	N/A	N/A
W/P Thickness, mm	N/A	N/A	N/A
Condition of W/P (1)	N/A	N/A	N/A
Bond of W/P to Asphalt	N/A	N/A	N/A
Bond of Asphalt or W/P to Concrete	F to P	F to P	F to P
Concrete Cover to Reinf., mm	99	101	115
Defects in Concrete Surface (2)	Sc	D	Sc
Corrosion Potential on Concrete Surface	-0.458	-0.462	-0.458
Remarks	Medium Scaling.	Delamination Plane and Severe Scaling.	Medium Scaling.

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

SAWN ASPHALT SAMPLE LOG

Site No: **112**

Sample No.	SS4	SS5	SS6
Location (between gridlines)	'N' and '11'	'L' and '5'	'H' and '28'
Size, mm X mm	300 x 290	350 x 270	280 x 270
Thickness of Asphalt, mm	70	50	65
Thickness of Asphalt @ Nearest Grid Point	70	50	65
Condition of Asphalt [1]	F to P	P	F to P
Waterproofing (W/P) Type	N/A	N/A	N/A
W/P Thickness, mm	N/A	N/A	N/A
Condition of W/P [1]	N/A	N/A	N/A
Bond of W/P to Asphalt	N/A	N/A	N/A
Bond of Asphalt or W/P to Concrete	F to P	F to P	F to P
Concrete Cover to Reinf., mm	75	98	112
Defects in Concrete Surface [2]	Sc	Sc	Sc
Corrosion Potential on Concrete Surface	-0.454	-0.456	-0.458
Remarks	Medium Scaling.	Severe Scaling.	Medium Scaling.

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

SAWN ASPHALT SAMPLE LOG

 Site No: **112**

Sample No.	SS7	SS8	SS9
Location (between gridlines)	'J' and '24'	'G' and '20'	'J' and '17'
Size, mm X mm	280 x 280	300 x 240	280 x 270
Thickness of Asphalt, mm	60	60	45
Thickness of Asphalt @ Nearest Grid Point	60	60	45
Condition of Asphalt (1)	P	F to P	P
Waterproofing (W/P) Type	N/A	N/A	N/A
W/P Thickness, mm	N/A	N/A	N/A
Condition of W/P (1)	N/A	N/A	N/A
Bond of W/P to Asphalt	N/A	N/A	N/A
Bond of Asphalt or W/P to Concrete	F to P	F to P	F to P
Concrete Cover to Reinf., mm	125	124	89
Defects in Concrete Surface (2)	D	Sc	D
Corrosion Potential on Concrete Surface	-0.463	-0.453	-0.455
Remarks	Delamination Plane, and Severe scaling.	Medium Scaling.	Delamination Plane, and Severe scaling.

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

SAWN ASPHALT SAMPLE LOG

Site No: **112**

Sample No.	SS10	SS11	SS12
Location (between gridlines)	'G' and '15'	'L' and '13'	'I' and '11'
Size, mm X mm	270 x 250	250 x 250	250 x 240
Thickness of Asphalt, mm	55	45	65
Thickness of Asphalt @ Nearest Grid Point	55	45	65
Condition of Asphalt (1)	P	F	F to P
Waterproofing (W/P) Type	N/A	N/A	N/A
W/P Thickness, mm	N/A	N/A	N/A
Condition of W/P (1)	N/A	N/A	N/A
Bond of W/P to Asphalt	N/A	N/A	N/A
Bond of Asphalt or W/P to Concrete	F to P	F	F
Concrete Cover to Reinf., mm	99	105	98
Defects in Concrete Surface (2)	C	-	-
Corrosion Potential on Concrete Surface	-0.452	-0.454	-0.457
Remarks	Crack, and medium scaling	Light scaling	Light scaling

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

SAWN ASPHALT SAMPLE LOG

 Site No: **112**

Sample No.	SS13	SS14	SS15
Location (between gridlines)	'K' and '7'	'A' and '4'	'G' and '10'
Size, mm X mm	260 x 270	320 x 270	290 x 280
Thickness of Asphalt, mm	55	70	60
Thickness of Asphalt @ Nearest Grid Point	55	70	60
Condition of Asphalt [1]	P		F to P
Waterproofing (W/P) Type	N/A	N/A	N/A
W/P Thickness, mm	N/A	N/A	N/A
Condition of W/P [1]	N/A	N/A	N/A
Bond of W/P to Asphalt	N/A	N/A	N/A
Bond of Asphalt or W/P to Concrete	F to P	F to P	F
Concrete Cover to Reinf., mm	125	124	125
Defects in Concrete Surface [2]	Sc	Sc	Sc
Corrosion Potential on Concrete Surface	-0.452	-0.372	-0.456
Remarks	Severe Scaling.	Severe Scaling.	Light Scaling.

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

SAWN ASPHALT SAMPLE LOG

 Site No: **112**

Sample No.	SS16	SS17	SS18
Location (between gridlines)	'F' and '18'	'E' and '26'	'E' and '29'
Size, mm X mm	290 x 280	400 x 350	300 x 290
Thickness of Asphalt, mm	45	35	55
Thickness of Asphalt @ Nearest Grid Point	45	35	55
Condition of Asphalt [(1)]	P	P	P
Waterproofing (W/P) Type	N/A	N/A	N/A
W/P Thickness, mm	N/A	N/A	N/A
Condition of W/P [(1)]	N/A	N/A	N/A
Bond of W/P to Asphalt	N/A	N/A	N/A
Bond of Asphalt or W/P to Concrete	P	F to P	F to P
Concrete Cover to Reinf., mm	123	121	93
Defects in Concrete Surface [(2)]	D	Sc	D
Corrosion Potential on Concrete Surface	-0.367	-0.402	-0.354
Remarks	Cracks, delamination plane, and severe scaling	Medium Scaling.	Delamination Plane, and Severe scaling.

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

Appendix G:

Site Photographs

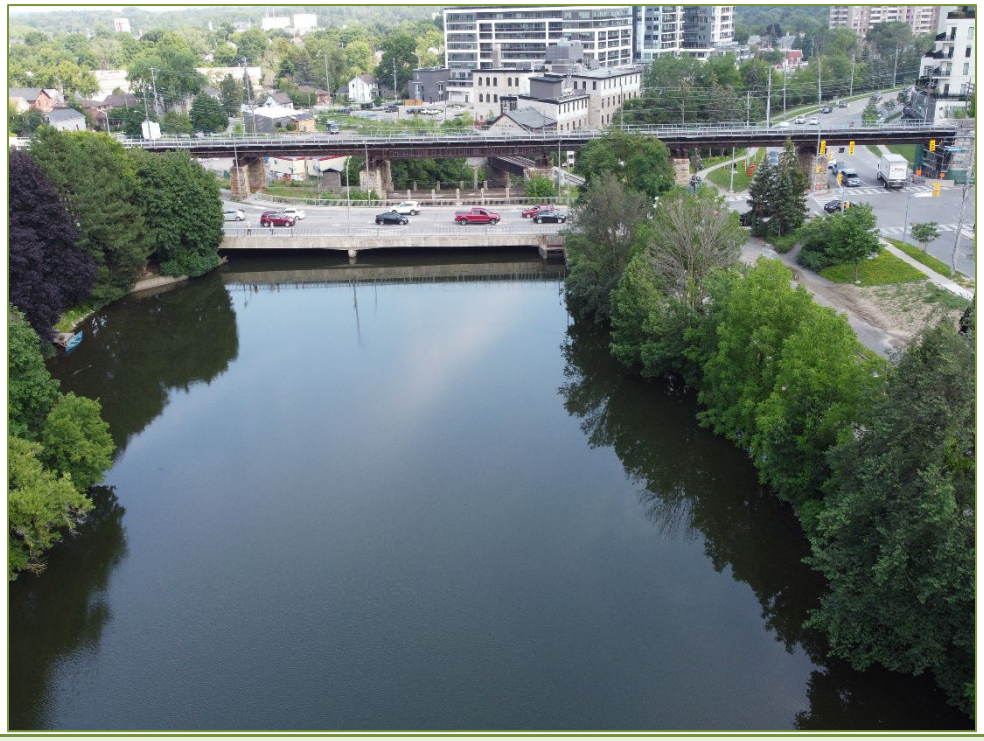

Photo P1 North Elevation

Photo P2 South Elevation

Photo P3 Deck General View, looking east

Photo P4 Deck General View, looking west

Photo P5 **Deck Wearing Surface** (fair to poor condition – unsealed cracks, alligator cracks, pot holes, ravelling and rutting)

Photo P6 **Deck Wearing Surface** (unsealed cracks)

Photo P7 **Deck Wearing Surface** (unsealed cracks, alligator cracks)

Photo P8 **Deck Wearing Surface** (unsealed cracks, alligator cracks and pot holes and rutting)

Photo P9 Deck Wearing Surface at East Abutment, south side (rutting)

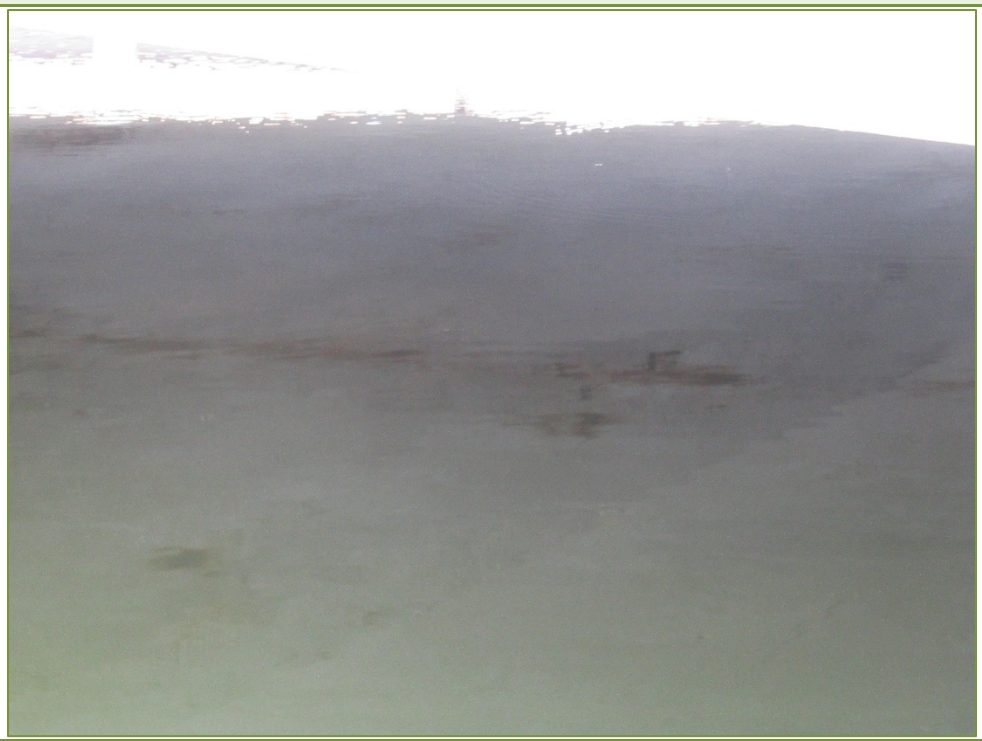

Photo P10 Soffit between West Abutment and Pier (fair condition - cracks, spall, delamination and wet area) note, Inaccessible

Photo P11 Soffit between East Abutment and Pier (fair condition – cracks, spall, delamination, light scaling, and wet area)

Photo P12 Soffit between East Abutment and Pier (cracks and light scaling)

Photo P13 Soffit between East Abutment and Pier (cracks, delamination, and wet area)

Photo P14 Soffit at Pier (cracks, spall, delamination, and wet area)

Photo P15 Soffit between East Abutment and Pier (cracks, spall, delamination, and wet area)

Photo P16 Soffit between East Abutment and Pier (cracks, spall, delamination, and wet area)

Photo P17 Soffit between East Abutment and Pier, south side (cracks, spall, delamination, and wet area) note, drain is discharging directly onto soffit

Photo P18 Soffit between East Abutment and Pier (cracks and wet area)

Photo P19 Soffit between East Abutment and Pier, south side (cracks)

Photo P20 Soffit at East Abutment (cracks, and spall)

Photo P21 Soffit at East Abutment (cracks, and spall)

Photo P22 North Elevation – Fascia (wide cracks, spall and delamination) note, exposed rebar

Photo P23 North Elevation – Fascia, east span (wide cracks, spall and delamination)

Photo P24 South Elevation – Fascia (wide cracks, spall and delamination)

Photo P25 South Elevation – Fascia (wide cracks and spall)

Photo P26 East Approach Wearing Surface (fair condition - unsealed cracks, and pot holes)

Photo P27 West Approach Wearing Surface (fair to poor condition - unsealed cracks, and pot holes)

Photo P28 Northeast Catch Basin

Photo P29 Northwest Catch Basin

Photo P30 Northwest Catch Basin

Photo P31 Southeast Catch Basin

Photo P32 Southwest Catch Basin

Photo P33 East Joint (settlement and water ponding)

Photo P34 East Joint (settlement)

Photo P35 West Joint (settlement)

Photo P36 North Sidewalk (fair to poor condition - cracks, spall, delamination, and light to severe scaling) **and Handrail** (fair condition - light corrosion)

Photo P37 North Sidewalk (cracks, delamination, and medium scaling) **and Handrail** (light corrosion)

Photo P38 North Sidewalk (cracks, spall, delamination, and severe scaling) **and Handrail** (light corrosion)

Photo P39 North Handrail (light corrosion)

Photo P40 North Sidewalk (cracks, spall, delamination, and severe scaling) **and Handrail** (light corrosion)

Photo P41 North Sidewalk (cracks, spall, delamination, and severe scaling) **and Handrail** (light corrosion)

Photo P42 South Sidewalk (fair condition – wide cracks and light to medium scaling) **and Handrail** (fair condition - light corrosion)

Photo P43 South Sidewalk (wide cracks and light to medium scaling) **and Handrail** (light corrosion)

Photo P44 South Sidewalk (cracks and light to medium scaling) **and Handrail** (light corrosion)

Photo P45 **South Sidewalk** (cracks and light to medium scaling) **and Handrail** (light corrosion)

Photo P46 **East Abutment** (fair condition – cracks, spall, light to medium scaling, and wet area)

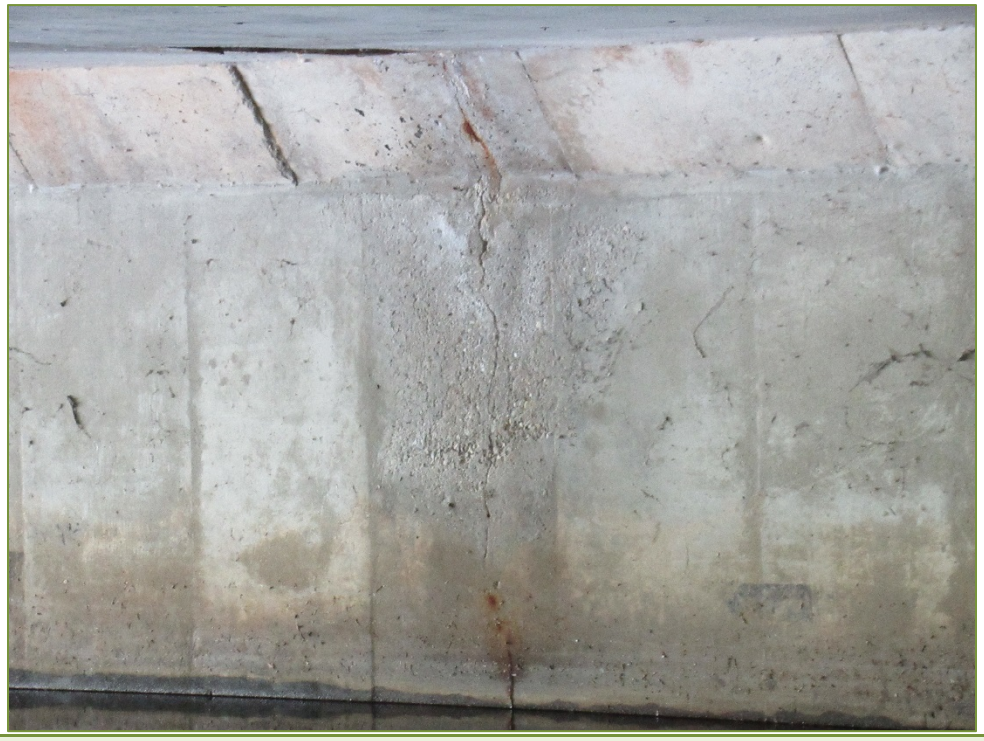

Photo P47 **East Abutment** (cracks, light to medium scaling, and wet area)

Photo P48 **East Abutment** (cracks, spall, light to medium scaling, and wet area)

Photo P49 **East Abutment** (cracks, and medium scaling) note, drain

Photo P50 **East Abutment, north side** (cracks)

Photo P51 **West Abutment** (cracks)

Photo P52 **Northeast Retaining Wall** (fair condition – wide cracks, spall, delamination, and light scaling)

Photo P53 **Northwest Retaining Wall** (fair condition – cracks, spall and light to severe scaling)

Photo P54 **Northwest Retaining Wall** (severe scaling)

Photo P55 **Southwest Retaining Wall** (good condition - cracks and light scaling)

Photo P56 **Southwest Retaining Wall** (cracks and light scaling)

Photo P57 **Pier - East Face** (fair to good condition - crack and light scaling)

Photo P58 **Pier - East Face** (light scaling)

Photo P59 **Pier - East Face** (cracks, spall, and wet area)

Photo P60 **Pier - West Face** (cracks, and light scaling)

Photo P61 **Pier - North Face** (crack)

Photo P62 **Pier - South Face** (medium scaling)

Photo P63 Typical Condition of Inside Core – C1 (west approach)

Photo P64 Typical Condition of Inside Core – C5

Photo P65 Typical Condition of Inside Core – C6

Photo P66 Typical Condition of Inside Core – C7

Photo P67 Typical Condition of Inside Core – C8

Photo P68 Typical Condition of Inside Core – C9

Photo P69 Typical Condition of Inside Core – C10

Photo P70 Typical Condition of Inside Core – C12

Photo P71 Typical Condition of Inside Core – C16

Photo P72 Typical Condition of Inside Core – C17

Photo P73 Typical Condition of Inside Core – C20

Photo P74 Typical Condition of Inside Core – C21

Photo P75 Typical Condition of Inside Core – C22

Photo P76 Upstream

Appendix H:

Laboratory Test Results

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AIR VOID TEST RESULTS

(Modified Point Count – ASTM C457, Procedure B)

Project No.:	BCC21015
Site No.:	ID 112
Location:	60 m East of Woolwich Street Macdonell Bridge.

Core ID	C3	-	-
Location on Structure	Deck	-	-
Lab No.	T21-2082	-	-
Air Content (%)	4.7	-	-
Specific Surface (mm^{-1})	39.7	-	-
Spacing Factor (mm)	0.139	-	-
Position of traversed Surface	-	-	-
Orientation of Traversed Surface	-	-	-
Length of Traverse (mm)	3819.2	-	-
Dimensions of Tested Sample	125mm x 90mm	-	-
Area Traversed (mm^2)	11075.68	-	-
Average Chord Length	0.101	-	-
Number of Stops	1364	-	-
No. of Voids per mm	0.465	-	-
Paste-Air Ratio	7.30	-	-
Paste Content (%)	34.2	-	-
Aggregate Content (%)	61.1	-	-

Note: Overlay.

Tested By: Brad Wiersma
Date Tested: Sep 7, 2021

Savio DeSouza, M.A.Sc., P.Eng.
Senior Principal Engineer

TOTAL CHLORIDE ION CONTENT

(Testing Method: MTO LS-417)

Project No.:	BCC21015
Site No.:	ID#112
Location:	60 m East of Woolwich Street Macdonell Bridge

Core ID	Lab No.	Horizon from the Top of the Core (mm)	Chloride Ion Content (%)	Chloride Ion Content Corrected for Background* (%)
C6	T21-2083	0-10(overlay) 20-30(overlay) 40-50(overlay) 60-70(overlay) 80-90(overlay) 100-110(overlay) 120-130 140-150	0.485 0.282 0.117 0.058 0.056 0.086 0.102 0.086	0.429 0.226 0.061 0.002 0.000 0.030 0.054 0.038
C10	T21-2084	0-10(overlay) 20-30(overlay) 40-50(overlay) 60-70(overlay) 80-90(overlay) 100-110(overlay) 120-130	0.268 0.170 0.169 0.168 0.188 0.158 0.176	0.212 0.114 0.113 0.112 0.132 0.102 0.128
C17	T21-2085	0-10(overlay) 20-30(overlay) 40-50(overlay) 60-70(overlay) 80-90 100-110	0.453 0.316 0.191 0.099 0.075 0.048	0.397 0.260 0.135 0.043 0.027 0.000
C20	T21-2087	0-10(overlay) 20-30(overlay) 40-50(overlay) 60-70(overlay) 80-90 100-110	0.251 0.193 0.061 0.056 0.068 0.070	0.195 0.137 0.005 0.000 0.020 0.022

**Background chloride (original) = 0.048%*
**Background chloride (overlay) = 0.056%*
***The threshold of chloride ion generally regarded to be able to initiate reinforcing bar corrosion is 0.025%.*

Tested By: Vafa Pe
Date Tested: Sep 10, 2021

Savio DeSouza, M.A.Sc., P.Eng.
Senior Principal Engineer

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info@bridgecheckcanada.com

COMPRESSIVE STRENGTH OF CONCRETE CORES

(CSA A23.2-14C)

Project No.:	**BCC21015**
Site No.:	.: **ID#112**
Location:	**60 m East of Woolwich Street Macdonell Bridge**

Core ID	**C19**
Location	Deck
Lab No.	T21-2086
Date Cast	-
Date Cored	July 24, 2021
Date Tested	Sep 14, 2021
Capped Height (mm)	115.0
Average Diameter (mm)	100.0
Density (kg/m^3)	2338
Corrected Compressive Strength (MPa)	65.2
*** Direction of Loading**	same
Moisture Contact at Time of Test	As-received
Remarks	

*Relative to the direction of original placement.

Savio DeSouza, M.A.Sc., P.Eng.
Senior Principal Engineer

Appendix I:

ACAD Drawings

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
www.bridgecheckcanada.com
Tel: 905-660-6608 Fax: 905-660-6609
info@bridgecheckcanada.com

CONSTRUCTION NORTH

W. ABUT. FACE

PIER ℄

E. ABUT. FACE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

SIDEWALK

SIDEWALK

N M L K J I H G F A

C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22

SS1 SS2 SS3 SS4 SS5 SS6 SS7 SS8 SS9 SS10 SS11 SS12 SS13 SS14 SS15 SS16 SS17 SS18

Macdonell St ℄

WEST APPROACH

EAST APPROACH

SC

1.50 TYP.

0.50

0.50

1.50 TYP.

SIDEWALK

SIDEWALK

DECK

LEGEND:

- Drain
- C1 Core Sample Location
- SS1 Sawn Sample Location
- Patched Spalls
- Delaminations
- Spalls
- Light Scaling
- Medium Scaling
- Severe Scaling
- Honeycombed Areas
- Wet Areas
- Concrete Pattern Cracks
- Ravelling
- Pot Hole/ Asphalt Patch
- Medium Concrete Cracks
- W Wide Concrete Cracks
- Medium Stained/ Efflorescence Cracks
- Unsealed Asphalt Cracks
- SC Sealed Asphalt Cracks
- Rutting
- Alligator Cracks

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

PROJECT:

60m East of Woolwich Streeet
Macdonell Bridge
Structure ID: 112
Guelph, ON

TITLE:

SURFACE DETERIORATION OF ASPHALT ON DECK AND CONCRETE SIDEWALKS

Drawing No.:	1
Project No.:	BCC21015
Date:	September 2021
Scale:	1:150
Drawn by:	MI
Checked by:	MA

CONSTRUCTION NORTH

W. ABUT. FACE

PIER

E. ABUT. FACE

SIDEWALK

SIDEWALK

Macdonell St

WEST APPROACH

EAST APPROACH

SIDEWALK

SIDEWALK

DECK

KEY PLAN

SITE

LEGEND:

- Drain
- C1 Core Sample Location
- SS1 Sawn Sample Location
- 80 Asphalt Thickness-mm
- 80 Concrete cover-mm
- Cover over 60mm
- Cover from 40mm to 60mm
- Cover from 20mm to 39mm
- Cover less than 20mm

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

PROJECT:

60m East of Woolwich Streeet
Macdonell Bridge
Structure ID: 112
Guelph, ON

TITLE:

THICKNESS OF ASPHALT ON DECK AND CONCRETE COVER OF SIDEWALKS

Drawing No.:	2
Project No.:	BCC21015
Date:	September 2021
Scale:	1:150
Drawn by:	MI
Checked by:	MA

CONSTRUCTION NORTH

W. ABUT. FACE

PIER ℄

E. ABUT. FACE

SIDEWALK

SIDEWALK

Macdonell St ℄

WEST APPROACH

EAST APPROACH

SIDEWALK

SIDEWALK

DECK

LEGEND:

- Ⓓ Drain
- C1 Core Sample Location
- SS1 Sawn Sample Location
- Ⓖ Ground Location
- ⊗ Ground Check Location
- 0.000 to -0.199 volts
- -0.200 to -0.299 volts
- -0.300 to -0.349 volts
- -0.350 to -0.449 volts
- more negative than -0.450 volts
- 460 Copper-Copper Sulphate Half-Cell Potential (negative volts x10^{-3})
- 20000 AC Test Result

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

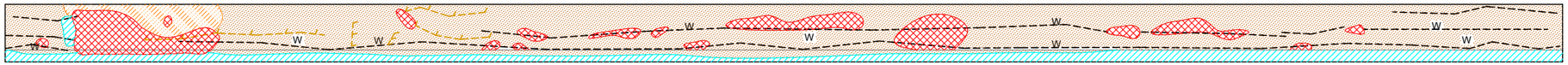
PROJECT:

60m East of Woolwich Streeet
Macdonell Bridge
Structure ID: 112
Guelph, ON

TITLE:

CORROSION POTENTIAL
ON DECK

Drawing No.:	3
Project No.:	BCC21015
Date:	September 2021
Scale:	1:150
Drawn by:	MI
Checked by:	MA

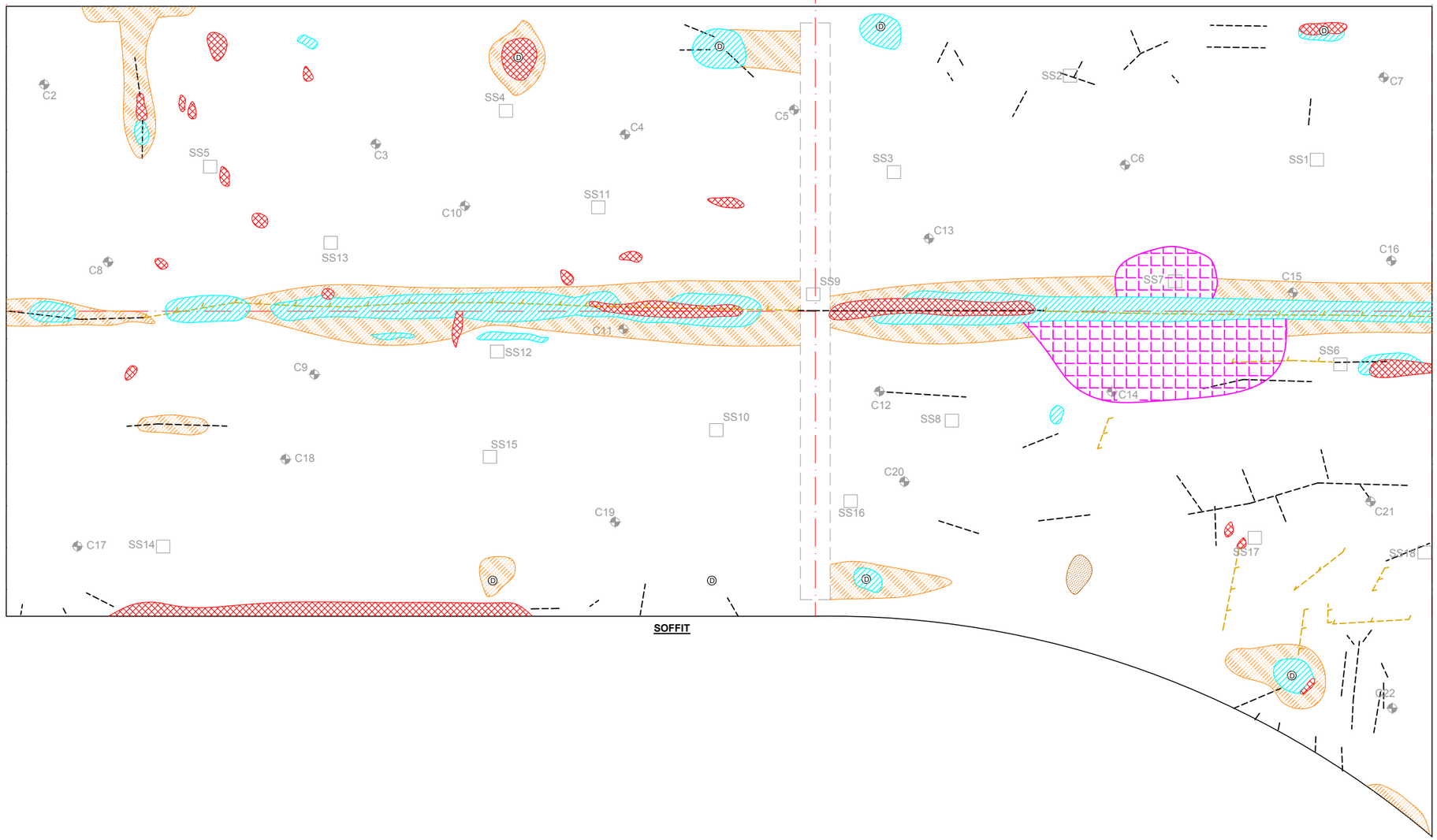


NORTH FASCIA

W. ABUT. FACE

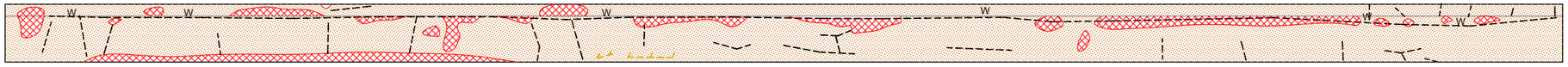
PIER ℄

E. ABUT. FACE



SOFFIT

NOTE, No access to west span



SOUTH FASCIA

LEGEND:

- Drain
- Core Sample Location (C1)
- Sawn Sample Location (SS1)
- Patched Spalls
- Delaminations
- Spalls
- Light Scaling
- Medium Scaling
- Severe Scaling
- Honeycombed Areas
- Wet Areas
- Concrete Pattern Cracks
- Medium Concrete Cracks
- Wide Concrete Cracks
- Medium Stained/ Efflorescence Cracks

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

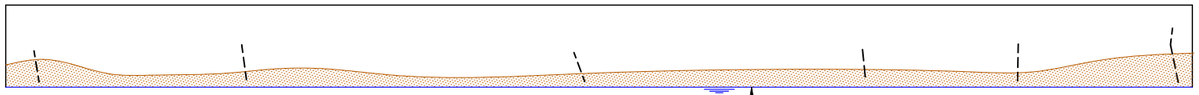
PROJECT:

60m East of Woolwich Streeet
Macdonell Bridge
Structure ID: 112
Guelph, ON

TITLE:

SURFACE DETERIORATION OF SOFFIT

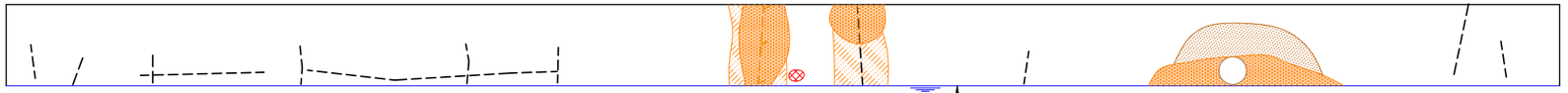
Drawing No.:	4
Project No.:	BCC21015
Date:	September 2021
Scale:	1:150
Drawn by:	MI
Checked by:	MA



NOTE, Limited access to west Abutment

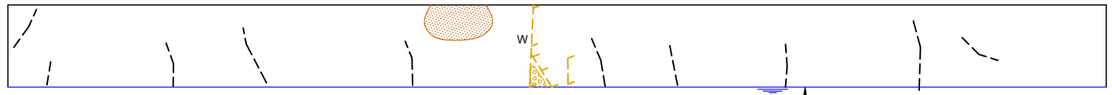
WEST ABUTMENT

Water Level



EAST ABUTMENT

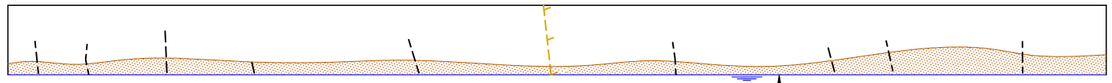
Water Level



PIER - EAST FACE

Water Level

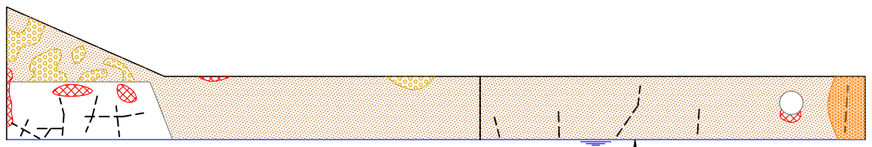
NORTH FACE



PIER - WEST FACE

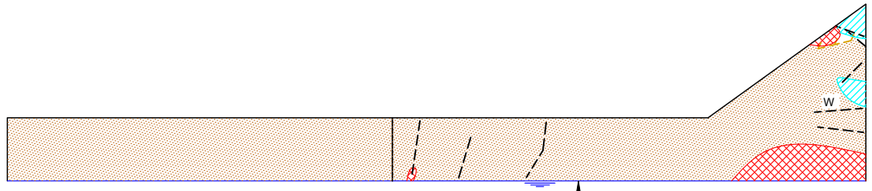
Water Level

SOUTH FACE



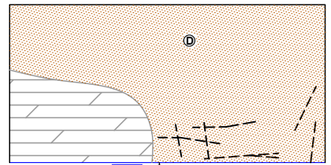
NW RETAINING WALL

Water Level



NE RETAINING WALL

Water Level



Water Level

SW RETAINING WALL

LEGEND:

- Drain
- Patched Spalls
- Delaminations
- Spalls
- Light Scaling
- Medium Scaling
- Severe Scaling
- Honeycombed Areas
- Wet Areas
- Concrete Pattern Cracks
- Masonary
- Medium Concrete Cracks
- Wide Concrete Cracks (W)
- Medium Stained/ Efflorescence Cracks

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

PROJECT:

60m East of Woolwich Streeet
Macdonell Bridge
Structure ID: 112
Guelph, ON

TITLE:

SURFACE DETERIORATION OF ABUTMENTS, PIER AND RETAINING WALLS

Drawing No.:	5
Project No.:	BCC21015
Date:	September 2021
Scale:	1:100
Drawn by:	MI
Checked by:	MA

DETAILED CONDITION SURVEY REPORT

Structure ID 131, Allan's Dam Bridge, Guelph, ON

Prepared for: R.V. Anderson Association Limited

BCC Project No.: BCC21015
Report Date: March 25, 2025

Bridge Check Canada Ltd.
200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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www.bridgecheckcanada.com

TABLE OF CONTENTS

Structure Identification Sheet

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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info@bridgecheckcanada.com

STRUCTURE IDENTIFICATION SHEET

GENERAL INFORMATION			
STRUCTURE NAME	Allan's Dam Bridge		
SITE NUMBER	131	**DISTRICT NUMBER**	N/A
HIGHWAY	**above** Allan's Dam	**Below**	Dam
TYPE OF STRUCTURE	Cast-in-place concrete slab over steel I girders		
NUMBER OF SPANS	2	**SPAN LENGTHS**	2 x 12.35 m
ROADWAY WIDTH	6.50 m	**YEAR BUILT**	1938
DIRECTION OF STRUCTURE	East to West		
SEQUENCE NUMBER	N/A	**TOWNSHIP NUMBER**	N/A
LHRS NUMBER	N/A	**MUNICIPAL BRIDGE NUMBER**	N/A
LOCATION	5m south of Macdonell Bridge	**JURISDICTION**	City of Guelph
INSPECTOR'S NAME	Moe Abdollahi, P.Eng.		
PARTY MEMBERS	A.Rashid, P.Eng., J.Murray, P.Pandiyan, M.Azeem, V.Dave		
DATE OF INSPECTION	27-Jul-21		
TEMPERATURE	24 °C	**WEATHER**	sunny
MTO REGION	Southwestern	**AADT**	
DECK RIDING SURFACE	Asphalt		
YEAR LAST REHABILITATED	N/A		

ENGINEER'S STAMP

Key Plan

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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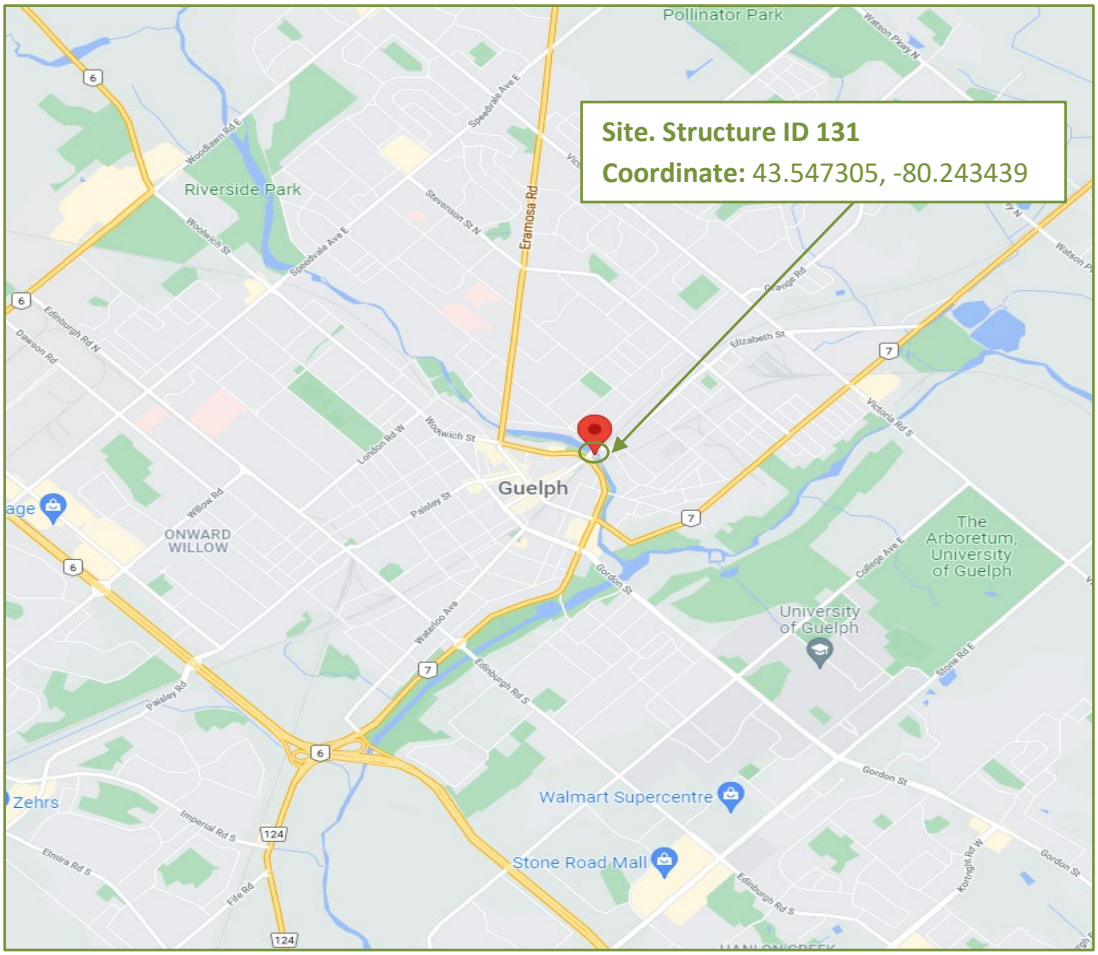
info@bridgecheckcanada.com

KEY PLAN

Structure ID 131, Allan's Dam Bridge,
Guelph, ON



Summary of Significant Findings

SUMMARY OF SIGNIFICANT FINDINGS

Site No. 131, Allan's Dam Bridge, Guelph, ON

1.0 INTRODUCTION

Bridge Check Canada Ltd. was retained by R.V. Anderson Associates Limited, under City of Guelph RFP# 20-156, to carry out detailed condition survey for three structures. This report presents *Bridge Check Canada's* findings, through the field investigations and laboratory testing, for Allan's Dam Bridge (Site No. 131) located on Allan's Dam, 5 m south of Macdonell Bridge in Guelph, Ontario. First time field investigations were carried out on July 27, 2021.

Site No. 131, constructed in 1938, is a two-span cast-in-place concrete slab over steel I girders, overlain with an asphalt wearing surface. The deck is currently closed to any vehicular and pedestrian traffic. The bridge spans over Allan's Dam. The deck cross-section consists of a total of six steel I girders. The Metrolinx Go Train Kitchener line is carried over the Speed River and the unused Allan Bridge on an elevated rail bridge.

The total span length of the bridge is 24.70 m and the roadway width is 6.50 m. The structure has an east-to-west orientation. The outer limits of the structure contain concrete curbs and steel railing with concrete posts. Photo P1 shows a view of the north elevation of the site. Photo P2 shows the south elevation.

South Elevation of Site No. 131, Allan's Dam Bridge

The rehabilitation history of the bridge was not available.

In 2018 OSIM Report the Overall Comments were "Overall structure in fair condition. Structure is currently closed. Structure should be removed. A Municipal Class Environmental Assessment should be completed in conjunction with Structure 112 and Structure 320. Additional investigations required. Maintenance work required." The BCI was 58.

2.0 METHODOLOGY

In general, the procedures followed to conduct the condition survey and delamination survey were those defined in Part 1 of the MTO Structure Rehabilitation Manual (2007). This assignment involved the observation and recording of surface defects, delamination detection, grid layouts (1.5 m x 1.5 m), concrete cores (100 mm ø), sawn asphalt samples, corrosion potential survey, and physical testing of the concrete cores.

The delaminations in the concrete were detected by striking the surface with a heavy hammer and noting the type of sound being emitted. Note that, while this method is quite reliable, it may not detect delaminations at a depth greater than 100 mm. The hammer sounding method was used for all accessible vertical and overhead surfaces. The areas and locations of patches, spalls, delaminations, exposed reinforcement, honey-combing, wet areas, scaling and other observed defects were recorded.

A corrosion potential survey was conducted for the asphalt covered bridge deck and concrete curbs. The survey was performed in accordance with the requirements of ASTM C876 and the MTO Structure Rehabilitation Manual. A positive ground connection was made directly to the reinforcing steel, at the locations shown on the accompanying drawings.

Seven (7) cores (six cores in deck and one core in the east approach) and six sawn asphalt samples were extracted from the structure, in compliance with the requirements for selecting cores and sawn asphalt samples from deteriorated and sound areas. The inside of the coreholes were examined carefully for cracks and the condition of the concrete. The exposed surface of the concrete at the sawn asphalt samples was carefully examined for evidence of deterioration. All the test holes were reinstated to their original condition using MTO-approved products.

Enclosed with this report are detailed condition survey summary sheets, survey equipment and calibration procedures, core photos/sketches, core logs, sawn asphalt sample photos, sawn asphalt sample logs, site photos, laboratory test results and drawings.

3.0 BRIDGE STRUCTURE

3.1 Asphalt Wearing Surface

The width of the asphalt covered bridge deck between abutments is 6.50 m, with a total surveyed area of 160.60 m^2. The condition of the asphalt wearing surface on the bridge deck was identified through visual field observations and review of cores and sawn asphalt samples. Drawing 1 shows the defects on the asphalt wearing surface as well as the location of the cores and sawn asphalt samples. The general pavement surface condition is shown in Photos P3 to P8. As evident from the photos and also identified on Drawing 1, large areas of deck were covered with debris and not visible for inspection. The asphalt wearing surface on the concrete deck was generally in poor condition with unsealed transverse cracks (14.0 m), longitudinal cracks (11.0 m), random cracks (58.0 m). The asphalt depth, measured in the drilled holes, coreholes, and sawn asphalt samples, varied from 30 mm to 50 mm with an average depth of 42 mm (refer to Drawing 2).

3.2 Waterproofing

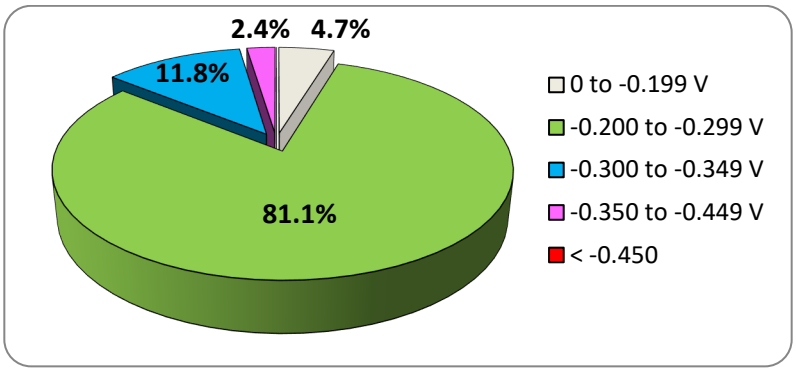
No evidence of a waterproofing system was detected over the concrete deck.

3.3 Concrete Deck

The concrete deck consists of a two-span cast-in-place concrete slab over steel I girders, supported by abutments and a centre pier. The condition of the concrete deck was observed at six core locations and six sawn asphalt sample locations. The inside of the coreholes and the exposed concrete surface at the sawn asphalt samples were examined carefully for cracks and other defects. Photos P80 to P83 show the inside of the coreholes. A review of the concrete cores did not reveal any defects. Visual review of the exposed concrete surface at the sawn asphalt samples revealed cracks and spalls in SS1. Rough concrete surface was observed in all sawn samples. Refer to the core and sawn asphalt sample logs and photos.

The concrete cover on the upper rebar layer was found to range from 45 to 130 mm with an average cover of 116 mm. Light rusting of the reinforcement steel (square rebar) was found in cores C1, C2, C5, C6.

Corrosion potential values obtained from the half-cell test carried out in the asphalt covered deck ranged from –0.189 V to –0.424 V with an average value of –0.255 V. The half-cell survey indicated that 4.7% of the deck area likely had no corrosion activity, with corrosion potential values between 0.000 V and -0.199 V. The half-cell survey indicated uncertain low corrosion activity for 92.9% (81.1%+11.8%) of the deck area, with values ranging from -0.200 V to -0.349 V. Probable active corrosion was detected for 2.4% (2.4%+0.0%) of the deck area with corrosion potential values more negative than -0.350 V. Drawing 2 shows the corrosion potential readings in deck.



Corrosion potential distribution in deck

Core C4 was tested for compressive strength of the hardened concrete in accordance with CSA A23.2-14-14C. The compressive strength of the hardened concrete for this core was found to be 63.7 MPa. This value is significantly higher than the minimum strength of 30 MPa specified in the GA drawing.

The chloride ion content was determined for two cores using MTO LS-417 “Method of Test for Determination of Total Chloride Ion in Concrete – Acid Soluble”. These core samples were located at areas prone to salt exposure (e.g. along construction joints, low points of the deck, asphalt cracks). In

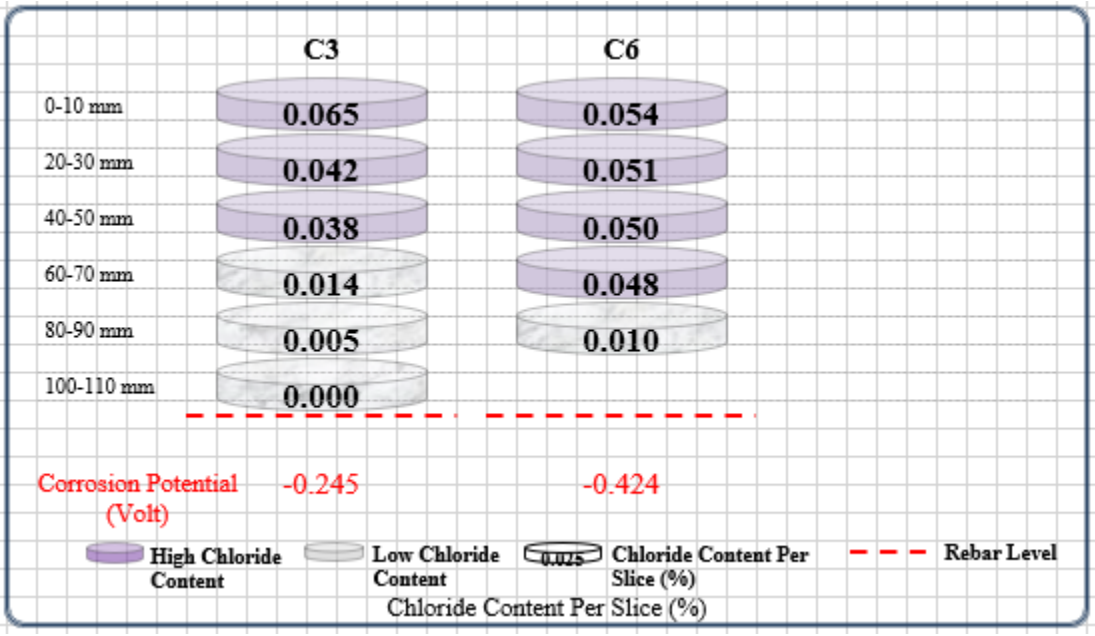
addition, samples from other moderately exposed areas were also taken. The chloride ion content values, at the average concrete cover or at rebar level are summarized below.

Core No.	C3	C6
Corrected Chloride Content (%)*	0.000	0.010
Corrosion Potential (V)	-0.245	-0.424

* Background chloride ion content was estimated to be 0.066% for the concrete.

The chloride threshold value necessary to depassivate embedded steel and to allow the onset of corrosion (in the presence of oxygen and moisture) is generally taken as 0.025% by mass of concrete. The background chloride content is the lowest chloride content value for all of the cores tested for chloride content. The "background" chlorides do not contribute to corrosion, and thus the results are corrected for the background chloride content. The corrected chloride content, at the rebar level, was below the chloride threshold level of 0.025% in both tested cores. The results indicate that chloride contamination has not yet extended to the upper rebar level in deck.

The corrected chloride content (%) per slice for each tested core is summarized below:



Corrected Chloride Content (%) Per Slice for Each Tested Core

Core C1 was tested to determine the air void system of the hardened concrete in accordance with ASTM C457 using the Modified Point Count Method. Test results are summarized below:

Core No.	Air Content (%)	Specific Surface (mm^{-1})	Spacing Factor (mm)
C1	2.5	46.10	0.150

Concrete is normally considered to be properly air entrained if the air content exceeds 3.0%, the specific surface exceeds 24 mm^{-1}, and the average spacing factor is less than 0.200 mm. Therefore, the air void system for Core C1 is considered non-air entrained.

3.4 Deck Soffit, Fascia, and Diaphragms

A detailed visual inspection of deck soffit, fascia, diaphragms was carried out. The deterioration is shown on Drawings 3 and 4 and in Photos P9 to P43.

The bridge deck soffit and fascia, with a total surveyed area of 242.40 m^2, were in fair condition with clean/stained medium width cracks (103.0 m), pattern cracks (0.48 m^2), delaminations (3.90 m^2), spalling (4.10 m^2), light scaling (32.50 m^2), medium scaling (6.10 m^2), honeycombing (1.80 m^2), and wet areas (0.66 m^2). The diaphragms with a total surveyed area of 18.80 m^2, were in fair condition with delaminations (0.10 m^2), spalling (2.20 m^2), honeycombing (0.45 m^2).

The steel girders were in fair to poor condition with light-to-severe corrosion as shown in the photographs.

3.5 Bridge Approaches

The asphalt wearing surface on the bridge approaches was generally in fair condition with unsealed cracks, ravelling, and vegetation growth. Photos P44 and P45 show the general pavement condition on the east and west approaches, respectively. Core C7 was taken from the east approach, where a concrete approach slab was encountered beneath 50 mm of asphalt. Photo P79 shows the inside of the corehole C7.

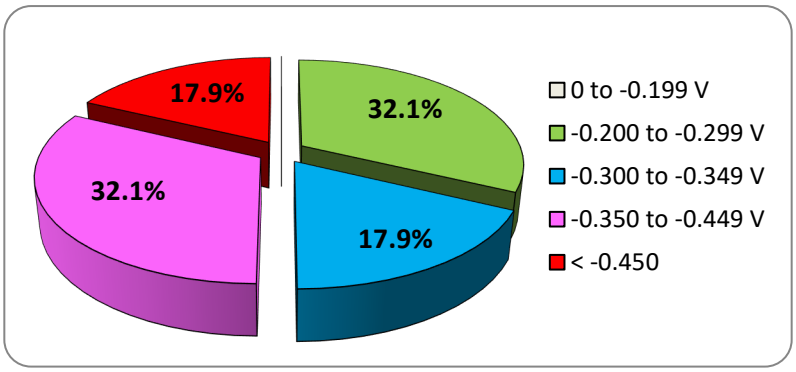
3.6 Deck Drainage

A total of eight drain pipes were located on deck, all of which were found to be blocked with debris. No catch basins were found in the vicinity of the structure.

3.7 Concrete Curbs

The concrete curbs, with a total surveyed area of 26.19 m^2, were in fair-to-poor condition with clean medium width cracks (2.0 m), delaminations (0.95 m^2), spalls (5.70 m^2), light scaling (17.00 m^2), and medium scaling (5.40 m^2). The surface deterioration is shown on Drawing 1 and in Photos P46 to P53.

Corrosion potential values obtained from the half-cell test carried out in the concrete curbs ranged from –0.202 V to –0.465 V with an average value of –0.343 V. The half-cell survey indicated uncertain low corrosion activity for 50.0% (32.1%+17.9%) of the curb area, with values ranging from -0.200 V to -0.349 V. Probable active corrosion was detected for 50.0% (32.1%+17.9%) of the curb area with corrosion potential values more negative than -0.350 V. Drawing 2 shows the corrosion potential readings in the concrete curbs. The active corrosion was more predominant in the south curb.



Corrosion potential distribution in the concrete curbs

3.8 Concrete Posts and Steel Handrails

The concrete posts, with a total surveyed area of 21.80 m^2, were in fair-to-poor condition with clean medium width cracks (8.0 m), delaminations (2.70 m^2), spalls (6.10 m^2), light scaling (13.80 m^2). The surface deterioration is shown on Drawing 1 and in Photos P46 to P53.

The steel handrails were in fair condition with light corrosion.

4.0 SUBSTRUCTURE COMPONENTS

The abutment walls, wingwalls, and piers were inspected and hammer sounded to check for delaminations, where accessible. Field measurements are presented in the field summary sheets.

4.1 Abutment Walls (Masonry Walls)

Photos P54 to P59 show the general condition of the masonry abutment walls, exhibiting cracks, spalls, and wet areas.

4.2 Wingwalls (Masonry Walls)

Photos P62 to P64 show the general condition of the masonry wingwalls.

4.3 Retaining Walls

The exposed surfaces of the retaining walls were inspected and sounded to check for delaminations, where accessible. The total surveyed area for the retaining walls was 118.00 m^2. The deterioration is shown on Drawing 4 and in Photos P65 to P69. The retaining walls were generally in fair-to-poor condition with clean/stained medium width cracks (15.0 m), clean wide width cracks (5.0 m), spalls (0.80 m^2), light scaling (52.50 m^2), medium scaling (0.10 m^2), and severe scaling (46.30 m^2). The wide cracks were found on the NE retaining wall.

4.4 Centre Pier

A detailed visual inspection of the centre pier was carried out. The deterioration is shown on Drawing 4 and in Photos P70 to P78.

The pier, with a total surveyed area of 40.00 m^2, was in fair-to-poor condition with clean/stained medium width cracks (37.0 m), clean wide width cracks (3.0 m), pattern cracks (0.45 m^2), delaminations (0.80 m^2), spalls (2.20 m^2), light scaling (39.10 m^2), medium scaling (2.10 m^2), and wet areas (8.30 m^2). The wide cracks were found on the east face of the pier.

Appendix A:

Detailed Condition Survey Summary Sheets

Asphalt Covered Deck, Exposed Concrete Components, Expansion Joint, Drainage

DETAILED CONDITION SURVEY SUMMARY SHEET
ASPHALT COVERED DECK
DECK RIDING SURFACE

Site No. 131

1. Dimensions and Area of Survey

Width between E abutment curbs	6.50 m	Width between W abutment curbs	6.50 m
Length between abutment joints	24.71 m	Area of deck riding surface	160.60 m²

Remarks

Deck dimensions were taken from the structural drawings

2. Asphalt Surface Cracks

Orientation	Unsealed	Sealed	
Transverse	14.0	0.0	**m**
Longitudinal	11.0	0.0	**m**
Random	58.0	0.0	**m**

* Asphalt potholes/patches = 0.00 m²
* Asphalt Alligator Cracks = 0.00 m²
* Asphalt Ravelling = 0.00 m²

3. Asphalt Depth

Remarks

Condition *	Depth			
	Min	Max	Avg	
F to P	30	50	42	**mm**

* G – Good, F – Fair, P – Poor, V - Variable Good to Poor

Remarks

4. Waterproofing

Type	Condition *	Conc. Bond *	Thickness (mm) **			
			Min	Max	Avg	
N/A	N/A	N/A	N/A	N/A	N/A	**mm**

* G – Good, F – Fair, P – Poor, V - Variable Good to Poor
** Report only thickness of waterproofing membrane but note presence of protection board

Site No. 131

5. Concrete Cover – Cores and Sawn Samples

Remarks

Minimum	Maximum	Average	
45	130	116	mm

Note: Only include covers for upper layer of rebars.

6. Corrosion Activity

Remarks

Minimum	Maximum	Average	
-0.189	-0.424	-0.255	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	V
7.5	130.2	19.0	3.9	0.0	m^2
4.7	81.1	11.8	2.4	0.0	%

Remarks

7. Defective Cores and Sawn Samples

Corrosion Activity (Volts)	Cores and Sawn Samples						
	Total in Each Area	Delaminated, Spalled, Severe Scaling and Disintegration *			Medium Scaling *		
		No.	m^2	%	No.	m^2	%
0 to -0.20	0	0	0.0	0.0	0	0.0	0.0
-0.20 to -0.30	9	0	0.0	0.0	0	0.0	0.0
-0.30 to -0.35	1	0	0.0	0.0	0	0.0	0.0
-0.35 to -0.45	2	1	2.0	1.2	0	0.0	0.0
<-0.45	0	0	0.0	0.0	0	0.0	0.0

* The percent calculation should be of the entire deck area investigated. The values obtained should be used with caution as large errors may occur when a small number of samples are used for the calculation or when the samples are not randomly distributed over the entire deck area.

Site No. 131

8. Adjusted Chloride Content Profile

*Background (original concrete) chloride content = 0.066

Remarks

Corrosion Activity at Core Location		0 to -0.20	-0.20 to -0.35	≤-0.35
Chloride Content*	0-10 mm	-	0.065	0.054
	20-30 mm	-	0.042	0.051
	40-50 mm	-	0.038	0.050
	60-70 mm	-	0.014	0.048
	80-90 mm	-	0.005	0.010
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

9. Chloride Content at Rebar Level

Core No.	C3	C6					
Chloride Content*	0.000	0.010					
Corrosion Potential	-0.245	-0.424					
Core No.							
Chloride Content*							
Corrosion Potential							
Core No.							
Chloride Content*							
Corrosion Potential							

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

10. AC Resistance Test Data of Epoxy Coated Rebar

Connection #1	Measured AC Resistance between Connection #1 and #2					Calculated AC Resistance *
	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

Remarks
Table # 10 is Not Applicable.

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No. 131

Remarks
Table # 11 is Not Applicable.

11. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

12. Concrete Air Entrainment

		Yes	No	Marginal
Concrete Air Entrained?				
	C1	X		

13. Compressive Strength

Average Compressive Strength **63.7 MPa**

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: **131**

Component Type & Location: Soffit and Fascia **OSIM Identifier: Decks**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 242.40 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Transverse	Longitudinal	Other	Total	
Medium Width	**Clean**	8.0	10.0	40.0	103.0	**m**
	Stained	4.0	27.0	14.0		
Wide Width	**Clean**	0.0	0.0	0.0	0.0	**m**
	Stained	0.0	0.0	0.0		

Pattern cracks= 0.48m²

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Minimum	Maximum	Average	
-	-	-	**mm**

Remarks

Table # 4 is Not Applicable.

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Site No: 131

Component Type & Location: Soffit and Fascia **OSIM Identifier: Decks**

5. Corrosion Activity

Remarks
Table # 5 is Not Applicable.

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	3.90	4.10	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
8.00 m²	3.3 %	N/A	N/A

*Wet areas = 0.66 m²

7. Scaling

Remarks

Light	Medium	Severe to Very Severe	
32.50	6.10	0.00	m^2
13.4	2.5	0.0	%

8. Honeycombing

Total Area 1.80 m²

Site No: **131**

Component Type & Location: Soffit and Fascia **OSIM Identifier: Decks**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **131**

Component Type & Location: Soffit and Fascia **OSIM Identifier: Decks**

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: 131

Component Type & Location: Diaphragms **OSIM Identifier: Beams**

1. Dimensions and Area

Width	-	Length	-	Height	-
Diameter	-	Total Area Surveyed	18.80 m²		

Remarks
Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	**Clean**	0.0	0.0	0.0	0.0	**m**
	Stained	0.0	0.0	0.0		
Wide Width	**Clean**	0.0	0.0	0.0	0.0	**m**
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Minimum	Maximum	Average	
-	-	-	**mm**

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Remarks
Table # 4 is Not Applicable.

Site No: **131**

Component Type & Location: Diaphragms **OSIM Identifier: Beams**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.10	2.20	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
2.30 m²	12.2 %	N/A	N/A

*Wet areas = 0.00 m²

7. Scaling

Remarks

Light	Medium	Severe to Very Severe	
0.00	0.00	0.00	m^2
0.0	0.0	0.0	%

8. Honeycombing

Total Area 0.45 m²

Site No: **131**

Component Type & Location: Diaphragms **OSIM Identifier: Beams**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **131**

Component Type & Location: Diaphragms **OSIM Identifier: Beams**

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: 131

Component Type & Location: Curbs

OSIM Identifier: Sidewalks/curbs

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 26.19 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Transverse	Longitudinal	Other	Total	
Medium Width	Clean	0.0	2.0	0.0	2.0	m
	Stained	0.0	0.0	0.0		
Wide Width	Clean	0.0	0.0	0.0	0.0	m
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Minimum	Maximum	Average	
-	-	-	mm

0 – 20 mm	-	40 – 60 mm	-	m^2
	-		-	%
20 – 40 mm	-	over 60 mm	-	m^2
	-		-	%

Remarks

Table # 4 is Not Applicable.

Site No: 131

Component Type & Location: Curbs

OSIM Identifier: Sidewalks/curbs

Remarks

5. Corrosion Activity

Minimum	Maximum	Average	
-0.202	-0.465	-0.343	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	V
0.0	8.4	4.7	8.4	4.7	m^2
0.0	32.1	17.9	32.1	17.9	%

Remarks

6. Delaminations and Spalls

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.95	5.70	0.00

*Wet areas = 0.00 m²

Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
6.65 m²	25.4 %	0.1 m²	0.4 %

Remarks

7. Scaling

Light	Medium	Severe to Very Severe	
17.00	5.40	0.00	m^2
64.9	20.6	0.0	%

8. Honeycombing

Total Area 0.00 m²

Site No: **131**

Component Type & Location: Curbs **OSIM Identifier: Sidewalks/curbs**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **131**

Component Type & Location: Curbs

OSIM Identifier: Sidewalks/curbs

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: **131**

Component Type & Location: Concrete Posts **OSIM Identifier: Barriers**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 21.80 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	**Clean**	2.0	1.0	5.0	8.0	**m**
	Stained	0.0	0.0	0.0		
Wide Width	**Clean**	0.0	0.0	0.0	0.0	**m**
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Minimum	Maximum	Average	
-	-	-	**mm**

Remarks

Table # 4 is Not Applicable.

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Site No: **131**

Component Type & Location: Concrete Posts **OSIM Identifier: Barriers**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
					V
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	2.70	6.10	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
8.80 m²	40.4 %	N/A	N/A

*Wet areas = 0.00 m²

7. Scaling

Remarks

Light	Medium	Severe to Very Severe	
13.80	0.00	0.00	m^2
63.3	0.0	0.0	%

8. Honeycombing

Total Area 0.00 m²

Site No: **131**

Component Type & Location: Concrete Posts **OSIM Identifier: Barriers**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **131**

Component Type & Location: Concrete Posts **OSIM Identifier: Barriers**

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: 131

Component Type & Location: Pier **OSIM Identifier: Piers**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 40.00 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	**Clean**	3.0	8.0	19.0	37.0	**m**
	Stained	1.0	0.0	6.0		
Wide Width	**Clean**	0.0	0.0	3.0	3.0	**m**
	Stained	0.0	0.0	0.0		

Pattern cracks= 0.45m²

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Minimum	Maximum	Average	
-	-	-	**mm**

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Remarks

Table # 4 is Not Applicable.

Site No: **131**

Component Type & Location: Pier **OSIM Identifier: Piers**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.80	2.20	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
3.00 m²	7.5 %	N/A	N/A

*Wet areas = 8.30 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe	
39.10	2.10	0.00	m^2
97.8	5.3	0.0	%

8. Honeycombing

Total Area 0.00 m²

Site No: **131**

Component Type & Location: Pier **OSIM Identifier: Piers**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **131**

Component Type & Location: Pier

OSIM Identifier: Piers

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: 131

Component Type & Location: Retaining Walls **OSIM Identifier: Retaining Walls**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 118.00 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	**Clean**	1.0	1.0	4.0	15.0	**m**
	Stained	1.0	2.0	6.0		
Wide Width	**Clean**	1.0	4.0	0.0	5.0	**m**
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Remarks

Table # 4 is Not Applicable.

Minimum	Maximum	Average	
-	-	-	**mm**

0 – 20 mm	-	**40 – 60 mm**	-	m^2
	-		-	%
20 – 40 mm	-	**over 60 mm**	-	m^2
	-		-	%

Site No: **131**

Component Type & Location: Retaining Walls **OSIM Identifier: Retaining Walls**

5. Corrosion Activity

Remarks

Table # 5 is Not Applicable.

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.00	0.80	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
0.80 m²	0.7 %	N/A	N/A

*Wet areas = 0.00 m²

7. Scaling

Remarks

Light	Medium	Severe to Very Severe	
52.50	0.10	46.30	m^2
44.5	0.1	39.2	%

8. Honeycombing

Total Area 0.00 m²

Site No: **131**

Component Type & Location: Retaining Walls **OSIM Identifier: Retaining Walls**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **131**

Component Type & Location: Retaining Walls

OSIM Identifier: Retaining Walls

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

DRAINAGE

Site No. 131

	Number	Type	Length	Angle	Depth *
Deck Drains	8 (blocked)	N/A	N/A	N/A	N/A

* For asphalt covered decks, recess depth in mm between top of asphalt and top of drain.

Catch Basins	NO	-

* Identify location of catch basins as N/E, N/W, S/E etc. using the same direction of north as shown on the drawings.

Drainage Tubes	NO	**Void Drains**	NO

Typical Condition of North Deck Drainage

CONDITION SURVEY SUMMARY SHEET - EXPANSION JOINTS

Site No. 131

Remarks

Dimension	Abutments		Intermediate	
	Joint 1	Joint 2	Joint 3	Joint 4
	E	W		
a (mm)	300	300	-	-
b (mm)	220	195	-	-
b' (mm)	240	200	-	-
c (mm)	6500	6500	-	-
d (mm)	210	230	-	-
d' (mm)	220	235	-	-
e (mm)	300	300	-	-

Depth of Asphalt @ Deck Side			N/E	S/E	N/E	S/W
1 (mm)	40	50	-	-	-	-
2 (mm)	50	40	-	-	-	-
3 (mm)	35	35	-	-	-	-

Width: Top of Ballast Wall and End Dams								
	Ballast Wall	End Dam	Ballast Wall	End Dam	N/E	S/W	N/E	S/W
1 (mm)	-	-	-	-	-	-	-	-
2 (mm)	-	-	-	-	-	-	-	-
3 (mm)	-	-	-	-	-	-	-	-

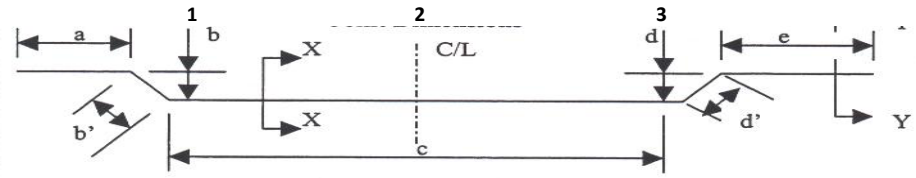
Gap Dimensions				
1 (mm)	-	-	-	-
2 (mm)	-	-	-	-
3 (mm)	-	-	-	-

Misc. Joint Details		Skew Angle	00° 00' 00"	
Exp	-	-	-	-
Fixed	-	-	-	-
Type	-			-
Leaking	-	-	-	-
Angle size	-	-	-	-
Temp °C	Deck	24˚C	Ambient	24˚C

N

JOINT DIMENSIONS

S



Typical Sections at Joints:

Appendix B:

Survey Equipment and Calibration Procedures

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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SURVEY EQUIPMENT AND CALIBRATION PROCEDURES

Component Type: Asphalt Covered Bridge Deck **Site Number:** 131

1. Delaminations:

Weight of Chain: 2.2 **kg/m**
Other Equipment: Hammer

2. Concrete Cover:

Covermeter Make and Model: ELCOMETER Protovale 331

Battery Check:	**Reading at Start of Test:**	OK
	Reading at End of Test:	OK
Concrete Cover Check:	**Location of Check:**	@ 'SS1'
	Actual Depth and Rebar Diameter:	-
	Reading Before Test:	125 mm
	Readings Each 30 minutes During Test:	125 mm
	Reading at End of Test:	125 mm

3. Corrosion Activity:

Half Cell Make and Model: MC MILLER Electrode RE-3a (3" ø)
Multimeter Make and Model: Mastercraft Digital Multimeter 3R93
Length and Gauge of Lead Wires: 150 m of 18 gauge

Deck Temperature:	**Start of Test:**	24	°C	**End of Test:**	24	°C
Ambient Temperature:	**Start of Test:**	24	°C	**End of Test:**	24	°C

Battery Check: O.K.

Ground Check:	**Method of Connection:**	self-tapping screw		
	Ground Location:	@ Core C2	**Check Location:**	@ Core C6
	Lead Resistance:	1.8 - 1.9 Ω	**Voltage Drop (mV's):**	0.1
	Resistance [c]:	1.8 - 1.9 Ω	**Resistance Reversed:**	1.8 - 1.9 Ω

Grid Point Potential Readings Check – See Table Below

Location	Initial Reading	Check Reading [a]	Check Reading – Latex Concrete Overlay [b]
C1	-0.201	-0.202	-
C2	-0.279	-0.277	-
C3	-0.305	-0.304	-
C4	-0.311	-0.312	-
C5	-0.245	-0.244	-

[a] Check at least five readings at beginning of test and each change in ground.
[b] On decks with latex modified concrete overlay, check at least five locations by drilling holes through the latex concrete overlay into the original concrete substrate.
[c] Resistance is the net resistance after deducting the lead resistance.

Appendix C:

Core Photographs and Sketches

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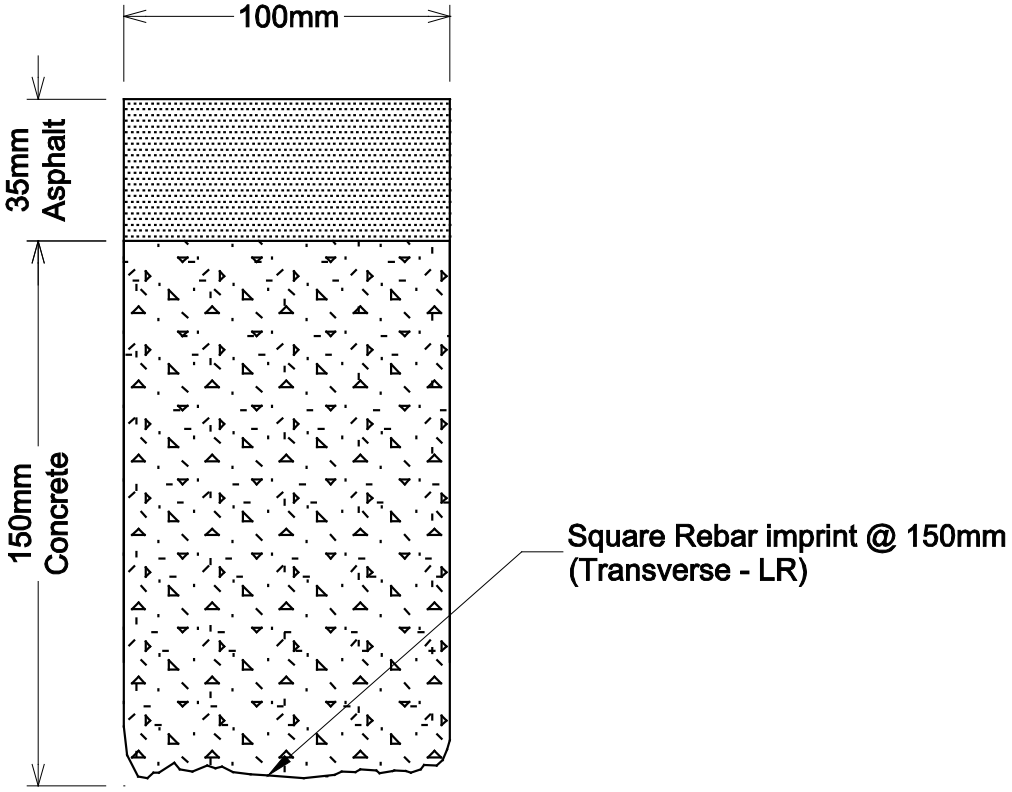
Core C1



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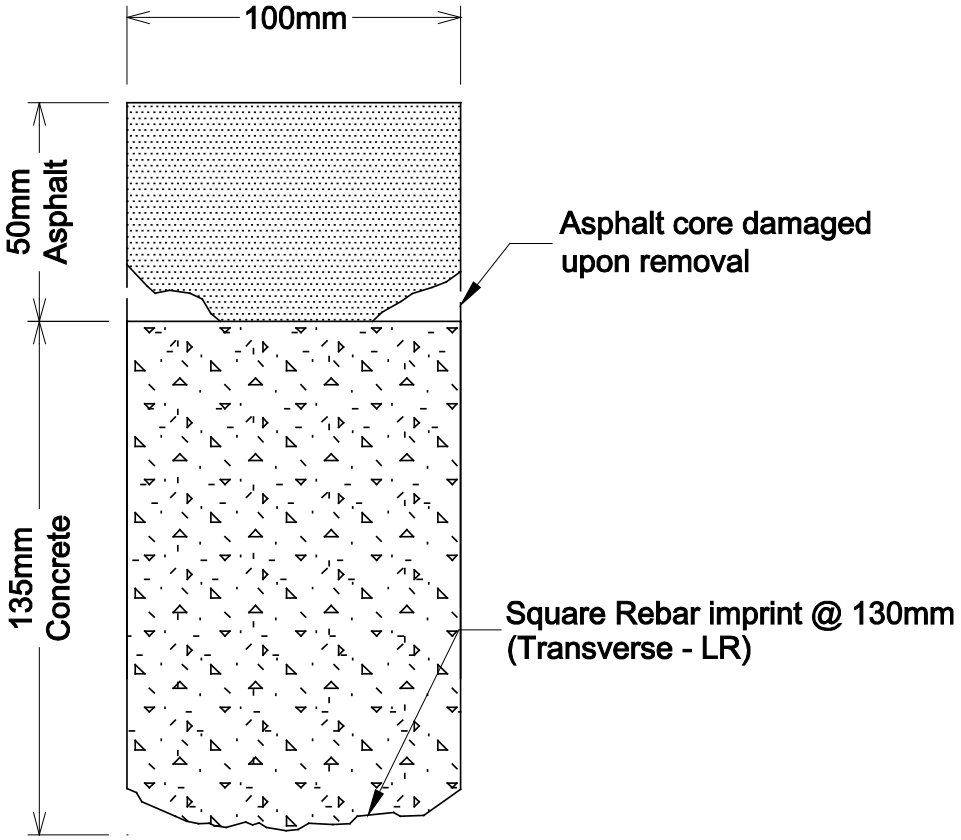
Core C2



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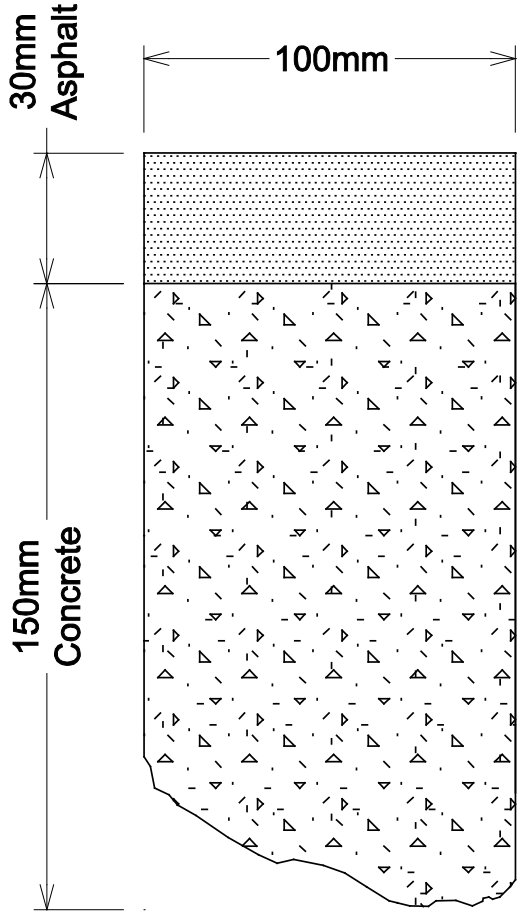
Core C3



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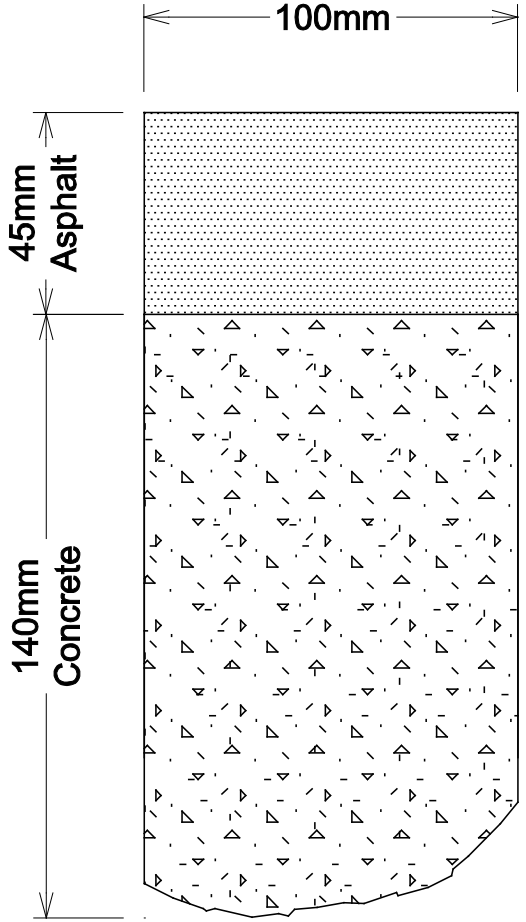
Core C4



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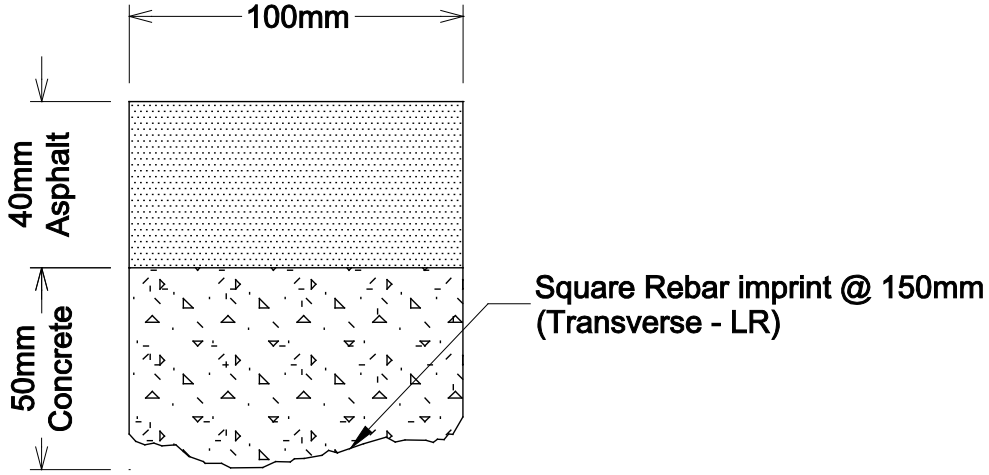
Core C5



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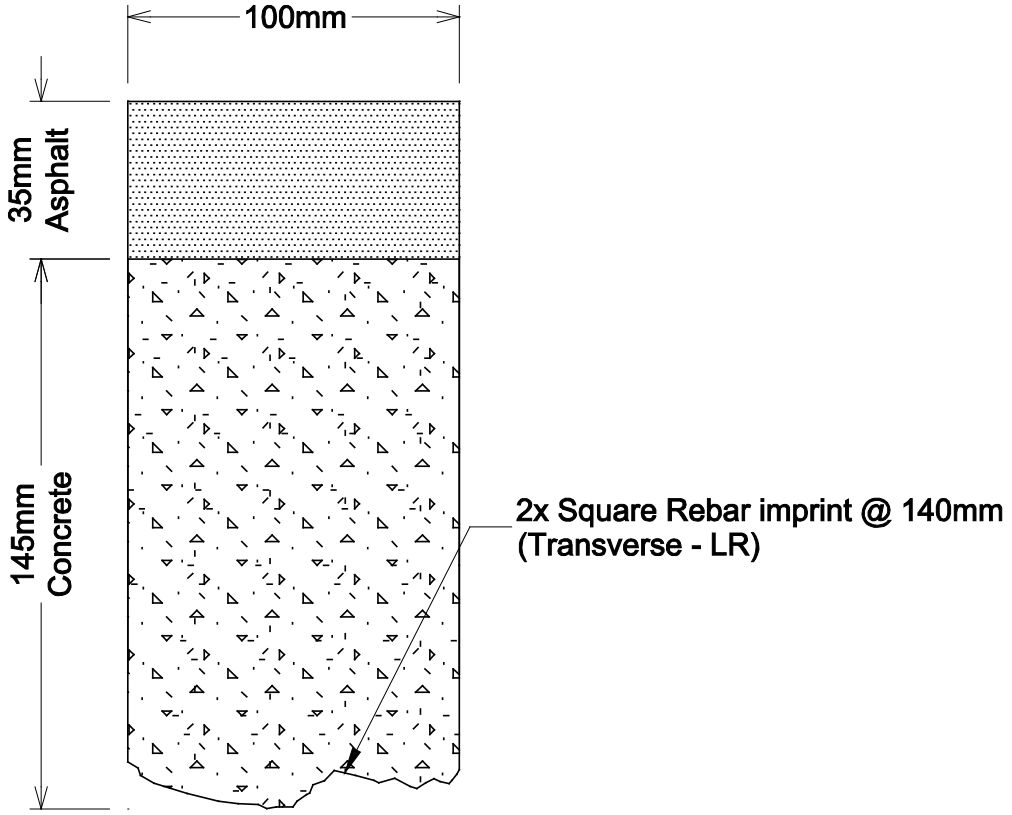
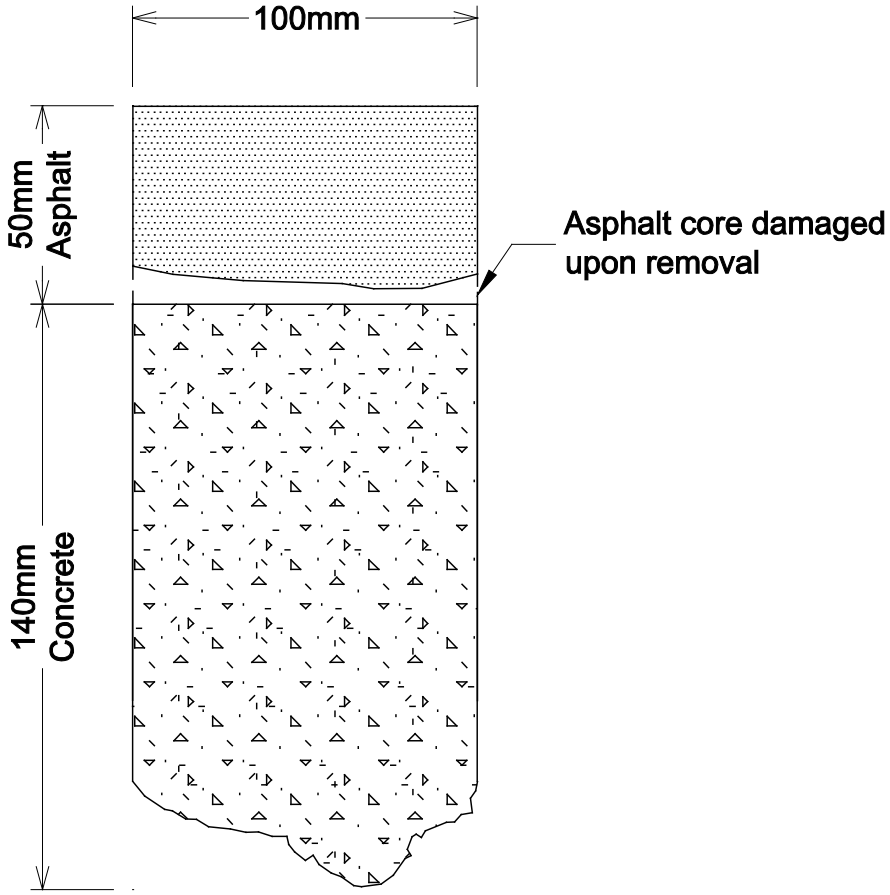
Core C6


100mm
35mm Asphalt
145mm Concrete
2x Square Rebar imprint @ 140mm
(Transverse - LR)

Core C7



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Appendix D:

Core Logs

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CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: 131

Core No.		C1		C2		C3	
Location (between gridlines)		'A' and '2'		'E' and '3'		'B' and '7'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		35.0		50.0		30.0	
Thickness of Asphalt @ Nearest Grid Point		35.0		50.0		30.0	
Thickness of Concrete, mm		150.0		135.0		150.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt (1)		F to G		F		F	
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P (1)		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		F		F		F to P	
Defects in Concrete (2)		-		-		-	
Condition of Rebar (3)		LR		LR		N/A	
Corrosion Potential		-0.319		-0.253		-0.245	
Compressive Strength, MPa							
		Total	Corrected	Total	Corrected	Total	Corrected
Chloride Content % Chloride by Weight of Concrete	0-10 mm					0.131	0.065
	20-30 mm					0.108	0.042
	40-50 mm					0.104	0.038
	60-70 mm					0.080	0.014
	80-90 mm					0.071	0.005
						0.066	0.000
AIR VOIDS	Air Content,%	2.5					
	Spec. Surf.,mm^2/mm^3	46.1					
	Spacing Factor, mm	0.150					
TEST LABORATORY		BCC				BCC	
REMARKS - orientation of rebars and cover - presence of overlay, patch and thickness - other observed defects		Square rebar imprint @150mm (Transverse-LR).		Square rebar imprint @130mm (Longitudinal-LR). Asphalt core damaged upon removal.			

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: 131

Core No.		C4		C5		C6	
Location (between gridlines)		'C' and '11'		'E' and '15'		'B' and '16'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		45.0		40.0		35.0	
Thickness of Asphalt @ Nearest Grid Point		45.0		40.0		35.0	
Thickness of Concrete, mm		140.0		50.0		145.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt (1)		F		F		F	
Waterproofing (W/P) Type		N/A		N/A		N/A	
Condition of W/P (1)		N/A		N/A		N/A	
W/P Thickness, mm		N/A		N/A		N/A	
Bond of Asphalt or W/P to Concrete		F to P		F		F	
Defects in Concrete (2)		-		-		-	
Condition of Rebar (3)		N/A		LR		LR	
Corrosion Potential		-0.225		-0.279		-0.424	
Compressive Strength, MPa		63.7					
		Total	Corrected	Total	Corrected	Total	Corrected
Chloride Content % Chloride by Weight of Concrete	0-10 mm					0.120	0.054
	20-30 mm					0.117	0.051
	40-50 mm					0.116	0.050
	60-70 mm					0.114	0.048
	80-90 mm					0.076	0.010
AIR VOIDS	Air Content,%						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY		BCC				BCC	
REMARKS - orientation of rebars and cover - presence of overlay, patch and thickness - other observed defects				Square rebar imprint @45mm (Transverse-LR).		2xSquare rebar imprint @140mm (Transverse-LR).	

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG ASPHALT COVERED BRIDGE DECKS

Site: **131**

Core No.		**C7**				
Location (between gridlines)		East Approach				
Diameter, mm		100.0				
Thickness of Asphalt, mm		50.0				
Thickness of Asphalt @ Nearest Grid Point		N/A				
Thickness of Concrete, mm		140.0				
Full Depth (yes/no)		No				
Condition of Asphalt [1]		F				
Waterproofing (W/P) Type		N/A				
Condition of W/P [1]		N/A				
W/P Thickness, mm		N/A				
Bond of Asphalt or W/P to Concrete		F				
Defects in Concrete [2]		-				
Condition of Rebar [3]		N/A				
Corrosion Potential						
Compressive Strength, MPa						
Chloride Content % Chloride by Weight of Concrete	**0-10 mm** **20-30 mm** **40-50 mm** **60-70 mm** **80-90 mm**	Total	Corrected			
AIR VOIDS	**Air Content,%** **Spec. Surf.,mm^2/mm^3** **Spacing Factor, mm**					
TEST LABORATORY						
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**		Asphalt core damaged upon removal.				

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
3. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

Appendix E:

Sawn Asphalt Sample Photographs

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Photo S1 – Sawn Sample SS1 (crack, spall, and rough surface)

Photo S2 – Sawn Sample SS2 (rough surface)

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info@bridgecheckcanada.com

Photo S3 – Sawn Sample SS3 (rough surface)

Photo S4 – Sawn Sample SS4 (rough surface)

Photo S5 – Sawn Sample SS5 (rough surface)

Photo S6 – Sawn Sample SS6 (rough surface)

Appendix F:

Sawn Asphalt Sample Logs

SAWN ASPHALT SAMPLE LOG

 Site No: **131**

Sample No.	SS1	SS2	SS3
Location (between gridlines)	'B' and '3'	'D' and '7'	'A' and '7'
Size, mm X mm	260 x 240	250 x 270	310 x 240
Thickness of Asphalt, mm	40	50	50
Thickness of Asphalt @ Nearest Grid Point	40	50	50
Condition of Asphalt (1)	F to P	F to P	F to P
Waterproofing (W/P) Type	N/A	N/A	N/A
W/P Thickness, mm	N/A	N/A	N/A
Condition of W/P (1)	N/A	N/A	N/A
Bond of W/P to Asphalt	N/A	N/A	N/A
Bond of Asphalt or W/P to Concrete	P	P	P
Concrete Cover to Reinf., mm	>125	>125	>125
Defects in Concrete Surface (2)	S	R	R
Corrosion Potential on Concrete Surface	-0.369	-0.244	-0.229
Remarks	Crack, spall, and rough surface.	Rough surface.	Rough surface.

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

SAWN ASPHALT SAMPLE LOG

Site No: **131**

Sample No.	SS4	SS5	SS6
Location (between gridlines)	'E' and '10'	'B' and '12'	'D' and '15'
Size, mm X mm	320 x 250	250 x 250	290 x 240
Thickness of Asphalt, mm	35	35	50
Thickness of Asphalt @ Nearest Grid Point	35	35	50
Condition of Asphalt [(1)]	F to P	F to P	F to P
Waterproofing (W/P) Type	N/A	N/A	N/A
W/P Thickness, mm	N/A	N/A	N/A
Condition of W/P [(1)]	N/A	N/A	N/A
Bond of W/P to Asphalt	N/A	N/A	N/A
Bond of Asphalt or W/P to Concrete	P	P	P
Concrete Cover to Reinf., mm	>125	>125	>125
Defects in Concrete Surface [(2)]	R	R	R
Corrosion Potential on Concrete Surface	-0.264	-0.244	-0.255
Remarks	Rough surface.	Rough surface.	Rough surface.

1. Condition - G = Good, F = Fair, P = Poor.
2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

Appendix G:

Site Photographs

Photo P1 North Elevation

Photo P2 South Elevation

Photo P3 Deck General View, looking east

Photo P4 Deck General View, looking west

Photo P5 **Deck Wearing Surface** (poor condition – unsealed cracks, and ravelling) note vegetation growth and debris

Photo P6 **Deck Wearing Surface** (unsealed cracks, and ravelling) note vegetation growth and debris

Photo P7 **Deck Wearing Surface** (unsealed cracks, and ravelling) note vegetation growth and debris

Photo P8 **Deck Wearing Surface** (unsealed cracks, and ravelling) note vegetation growth and debris

Photo P9 Soffit between West Abutment and Pier, looking east (fair condition – cracks, spall, delamination and light scaling) **and Girders** (fair condition – light to severe corrosion)

Photo P10 Soffit at West Abutment, south edge (spall, and delamination) note, light corrosion on utility duct

Photo P11 Soffit at West Abutment, south edge (spall, and delamination) **and Girder** (light corrosion)

Photo P12 Soffit at West Abutment (honeycombing) **and Girder** (light corrosion)

Photo P13 Soffit at West Abutment between 3rd and 4th Girder from North (cracks) **and Girders** (light corrosion)

Photo P14 Soffit at West Abutment between 2nd and 3rd Girder from North (cracks, honeycombing, and wet area)

Photo P15 Soffit at West Abutment, north edge (spall) **and Girder** (light corrosion)

Photo P16 Soffit between West Abutment and Pier between 4th and 5th Girder (crack, and honeycombing)

Photo P17 Soffit between West Abutment and Pier between 3rd and 4th Girder from North (cracks and light scaling) **and Girders** (light corrosion)

Photo P18 Soffit between West Abutment and Pier, north edge (cracks, and delamination) **and Girders** (light corrosion)

Photo P19 Soffit at Pier (cracks) **and Girders** (light corrosion)

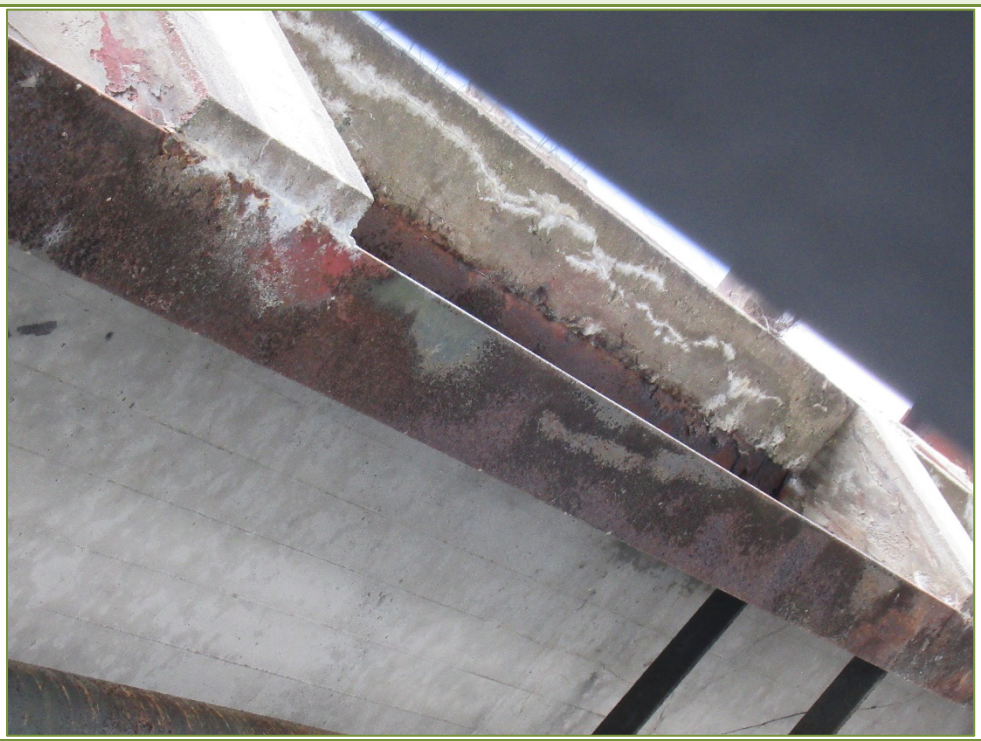

Photo P20 Soffit between West Abutment and Pier, south edge (cracks, and delamination) **and Girders** (light corrosion)

Photo P21 1st Girder from North at Pier (severe corrosion on flange)

Photo P22 6th Girder from North at Pier (severe corrosion, and section loss)

Photo P23 1st Girder from North at West Abutment (severe corrosion)

Photo P24 2nd Girder from North at West Abutment (severe corrosion)

Photo P25 **4th Girder from North at West Abutment** (severe corrosion)

Photo P26 **Soffit between Pier and East Abutment** (fair condition – cracks, spall, delamination and honeycombing) **and Girders** (fair condition – light to severe corrosion)

Photo P27 Soffit at Pier, south edge (spall)

Photo P28 Soffit at Pier, north edge (crack, spall, and delamination)

Photo P29 Soffit between Pier and East Abutment, south edge (crack, spall and delamination) **and Girders** (light corrosion)

Photo P30 Soffit between at East Abutment, south edge (cracks) **and Girders** (light corrosion)

Photo P31 Soffit between Pier and East Abutment between 1st and 2nd Girder from North (delamination) **and Girders** (light corrosion)

Photo P32 Soffit between Pier and East Abutment, north side (crack, spall, and delamination) **and Girders** (light corrosion)

Photo P33 Soffit between at East Abutment (crack, spall, and delamination) **and Girders** (light to medium corrosion)

Photo P34 Soffit between at East Abutment (crack and honeycombing)

Photo P35 1st Girder from North at East Abutment (severe corrosion on top flange)

Photo P36 1st Girder from North between Pier and East Abutment (severe corrosion on top flange)

Photo P37 1st Girder from North at Pier (severe corrosion on top flange)

Photo P38 Typical Diaphragm at Pier – East Face

Photo P39 Typical Diaphragm at Pier – West Face (spall and honeycombing)

Photo P40 North Elevation – Fascia (cracks, spall, delamination, and light scaling)

Photo P41 North Elevation – Fascia (cracks, spall, delamination, and light scaling)

Photo P42 South Elevation – Fascia (cracks, spall, delamination, and light scaling)

Photo P43 South Elevation – Fascia (cracks, spall, delamination, and light scaling)

Photo P44 East Approach Wearing Surface (fair condition – unsealed cracks, and ravelling) note, vegetation growth

Photo P45 West Approach Wearing Surface (fair condition – unsealed cracks, and ravelling) note, vegetation growth

Photo P46 North Curb (poor condition – cracks, spall, delamination, and medium to severe scaling) **Concrete Posts** (fair to poor condition – cracks, spall, delamination, and light scaling) **and Handrail** (fair condition – light corrosion)

Photo P47 North Curb (cracks, spall, delamination, and medium to severe scaling) **Concrete Posts** (cracks, spall, delamination, and light scaling) **and Handrail** (light corrosion)

Photo P48 North Curb (cracks, spall, delamination, and medium to severe scaling) **Concrete Posts** (cracks, spall, delamination, and light scaling) **and Handrail** (light corrosion)

Photo P49 North Curb (cracks, spall, delamination, and medium to severe scaling) **Concrete Posts** (cracks, spall, delamination, and light scaling) **and Handrail** (light corrosion)

Photo P50 South Curb (fair condition – cracks, spall, delamination, and medium scaling) **Concrete Posts** (fair to poor condition – cracks, spall, delamination, and light scaling) **and Handrail** (fair condition – light corrosion)

Photo P51 **South Curb** (medium scaling) **Concrete Posts** (cracks, spall, delamination, and light scaling) **and Handrail** (light corrosion)

Photo P52 **South Curb** (medium scaling) **Concrete Posts** (cracks, spall, delamination, and light scaling) **and Handrail** (light corrosion)

Photo P53 **South Curb** (medium scaling) **Concrete Posts** (cracks, spall, delamination, and light scaling) **and Handrail** (light corrosion)

Photo P54 **East Abutment – Masonry Wall** (cracks, spall and wet area)

Photo P55 **East Abutment – Masonry Wall**

Photo P56 **West Abutment – Masonry Wall** (cracks, and spall)

Photo P57 **West Abutment – Masonry Wall**

Photo P58 **West Abutment – Masonry Wall** (spall)

Photo P59 West Abutment – Masonry Wall (spall)

Photo P60 West Diaphragm, north side (spall, delamination, and light scaling)

Photo P61 West Diaphragm (spall)

Photo P62 Northwest Wingwall – Masonry Wall

Photo P63 Southeast Wingwall – Masonry Wall

Photo P64 Southeast Wingwall – Masonry Wall

Photo P65 Northeast Retaining Wall (fair to poor condition – wide cracks, spall, and light scaling)

Photo P66 Northeast Retaining Wall (wide cracks and spall)

Photo P67 Northwest Retaining Wall (fair to good condition – cracks, and light scaling)

Photo P68 Southwest Retaining Wall (spall and severe scaling)

Photo P69 Southwest Retaining Wall (spall and severe scaling)

Photo P70 Pier - East Face (fair to poor condition - cracks, spall, delamination, light to medium scaling, and wet area)

Photo P71 **Pier - East Face, north side** (cracks, spall, delamination, light to medium scaling, and wet area)

Photo P72 **Pier - East Face, north side** (cracks, spall, light to medium scaling, and wet area)

Photo P73 Pier – East Face, south side (cracks, spall, delamination, light to medium scaling, and wet area)

Photo P74 Pier - West Face (fair to poor condition - cracks, spall, delamination, light to medium scaling, and wet area)

Photo P75 **Pier - West Face, south side** (cracks)

Photo P76 **Pier - West Face, south side** (cracks, spall, and delamination)

Photo P77 **Pier - West Face, north side** (cracks, spall, and delamination) note, exposed rebar)

Photo P78 **Pier - South Face** (cracks, spall, and delamination)

Photo P79 Typical Condition of Inside Core – C7 (East Approach)

Photo P80 Typical Condition of Inside Core – C1

Photo P81 Typical Condition of Inside Core – C2

Photo P82 Typical Condition of Inside Core – C5

Photo P83 Typical Condition of Inside Core – C6

Photo P84 Upstream

Photo P85 Downstream

Appendix H:

Laboratory Test Results

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
www.bridgecheckcanada.com
Tel: 905-660-6608 Fax: 905-660-6609
info@bridgecheckcanada.com

AIR VOID TEST RESULTS

(Modified Point Count – ASTM C457, Procedure B)

Project No.:	BCC21015
Site No.:	ID 131
Location:	5m South of Macdonell Bridge Guelph, ON.

Core ID	C1	-	-
Location on Structure	Deck	-	-
Lab No.	T21-1860	-	-
Air Content (%)	2.5	-	-
Specific Surface (mm^{-1})	46.1	-	-
Spacing Factor (mm)	0.150	-	-
Position of traversed Surface	-	-	-
Orientation of Traversed Surface	-	-	-
Length of Traverse (mm)	3766.5	-	-
Dimensions of Tested Sample	125mm x 95mm	-	-
Area Traversed (mm^2)	10546.2	-	-
Average Chord Length	0.087	-	-
Number of Stops	1395	-	-
No. of Voids per mm	0.289	-	-
Paste-Air Ratio	12.14	-	-
Paste Content (%)	30.5	-	-
Aggregate Content (%)	67.0	-	-

Tested By: Brad Wiersma
Date Tested: Aug 19, 2021

Savio DeSouza, M.A.Sc., P.Eng.
Senior Principal Engineer

TOTAL CHLORIDE ION CONTENT

(Testing Method: MTO LS-417)

Project No.:	BCC21015
Site No.:	131
Location:	5m South of Macdonell Bridge Guelph, ON

Core ID	Lab No.	Horizon from the Top of the Core (mm)	Chloride Ion Content (%)	Chloride Ion Content Corrected for Background* (%)
C3	T21-1861	0-10 20-30 40-50 60-70 80-90 100-110	0.131 0.108 0.104 0.080 0.071 0.066	0.065 0.042 0.038 0.014 0.005 0.000
C6	T21-1863	0-10 20-30 40-50 60-70 80-90	0.120 0.117 0.116 0.114 0.076	0.054 0.051 0.050 0.048 0.010
-	-	-	-	-
-	-	-	-	-

**Background chloride = 0.066%*
***The threshold of chloride ion generally regarded to be able to initiate reinforcing bar corrosion is 0.025%.*

Tested By: Vafa Pe
Date Tested: September 10, 2021

Savio DeSouza, M.A.Sc., P.Eng.
Senior Principal Engineer

COMPRESSIVE STRENGTH OF CONCRETE CORES

(CSA A23.2-14C)

Project No.:	**BCC21015**
Site No.:	.: **ID 131**
Location:	**5m South of Macdonell Bridge Guelph, ON**

Core ID	**C4**
Location	Deck
Lab No.	T21-1862
Date Cast	-
Date Cored	July 27, 2021
Date Tested	Aug 22, 2021
Capped Height (mm)	108.0
Average Diameter (mm)	100.0
Density (kg/m^3)	2368
Corrected Compressive Strength (MPa)	63.7
*** Direction of Loading**	same
Moisture Contact at Time of Test	As-received
Remarks	

*Relative to the direction of original placement.

Savio DeSouza, M.A.Sc., P.Eng.
Senior Principal Engineer

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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Appendix I:

ACAD Drawings

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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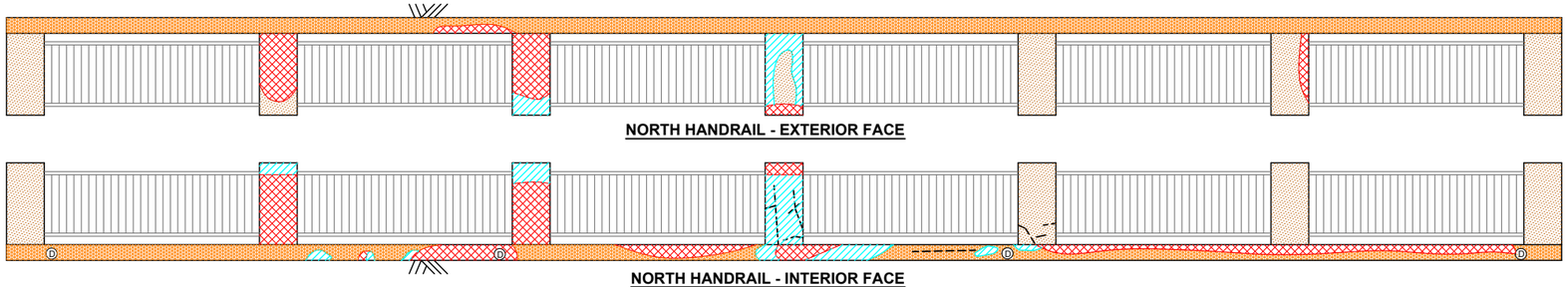
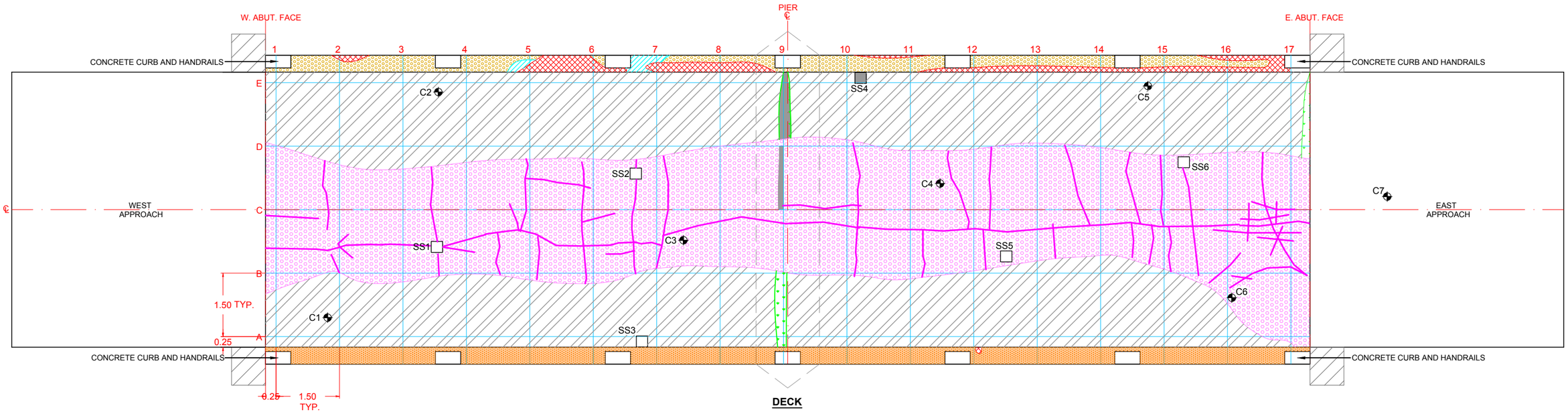
info@bridgecheckcanada.com

CONSTRUCTION NORTH

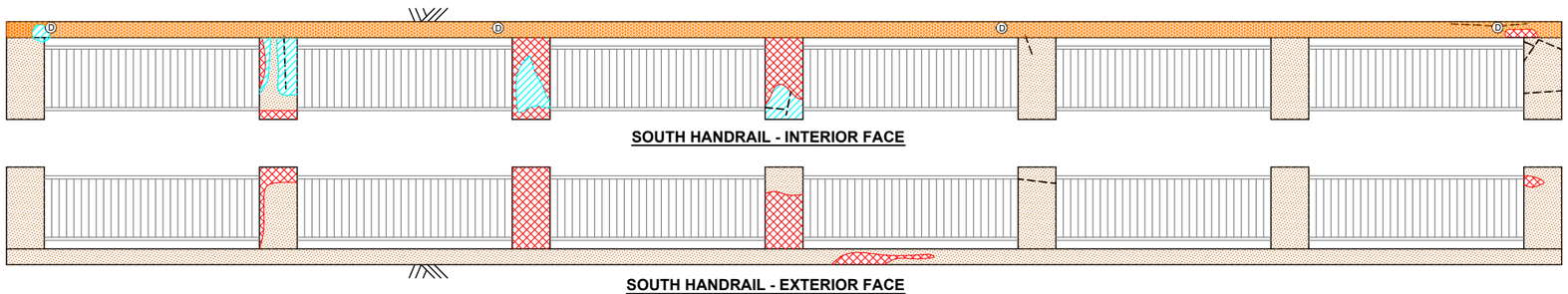


NORTH HANDRAIL - EXTERIOR FACE

NORTH HANDRAIL - INTERIOR FACE



DECK



SOUTH HANDRAIL - INTERIOR FACE

SOUTH HANDRAIL - EXTERIOR FACE

LEGEND:

- Drain
- C1 Core Sample Location
- SS1 Sawn Sample Location
- Patched Spalls
- Delaminations
- Spalls
- Light Scaling
- Medium Scaling
- Severe Scaling
- Honeycombed Areas
- Wet Areas
- Concrete Pattern Cracks
- Ravelling
- Pot Hole/ Asphalt Patch
- Medium Concrete Cracks
- W Wide Concrete Cracks
- Medium Stained/ Efflorescence Cracks
- Unsealed Asphalt Cracks
- SC Sealed Asphalt Cracks
- Rutting, Dirt, Grass

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

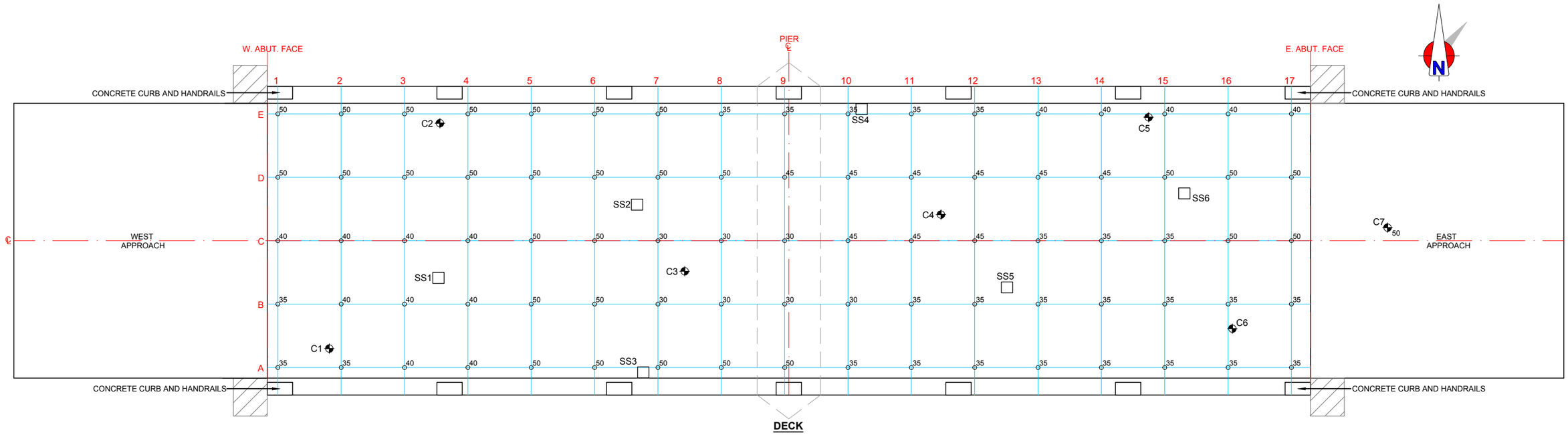
PROJECT:

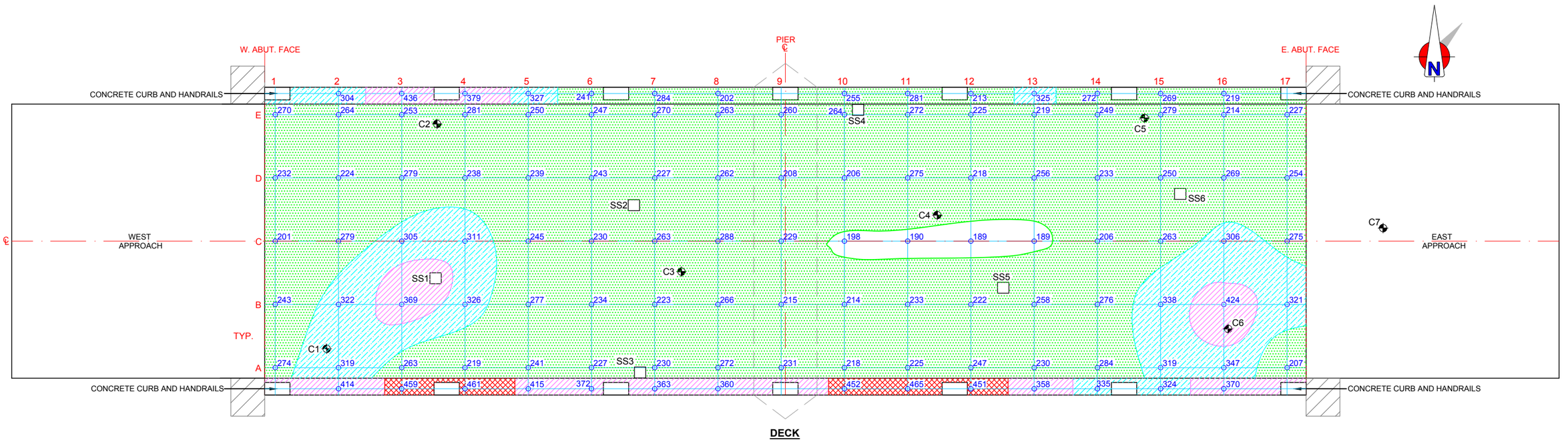
5m South of Macdonell Bridge
Structure ID: 131
Guelph, ON

TITLE:

SURFACE DETERIORATION OF ASPHALT ON DECK AND CONCRETE CURBS AND HANDRAILS

Drawing No.:	1
Project No.:	BCC21015
Date:	September 2021
Scale:	1:100
Drawn by:	MI
Checked by:	MA





LEGEND:

- Drain
- C1 Core Sample Location
- SS1 Sawn Sample Location
- 80 Asphalt Thickness-mm
- 80 Concrete cover-mm
- Cover over 60mm
- Cover from 40mm to 60mm
- Cover from 20mm to 39mm
- Cover less than 20mm
- Ground Location
- Ground Check Location
- 0.000 to -0.199 volts
- -0.200 to -0.299 volts
- -0.300 to -0.349 volts
- -0.350 to -0.449 volts
- more negative than -0.450 volts
- 460 Copper-Copper Sulphate Half-Cell Potential (negative volts x10^{-3})
- 20000 AC Test Result

BRIDGE CHECK CANADA
200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

PROJECT:

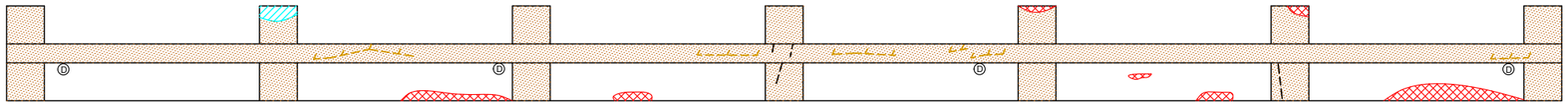
5m South of Macdonell Bridge
Structure ID: 131
Guelph, ON

TITLE:

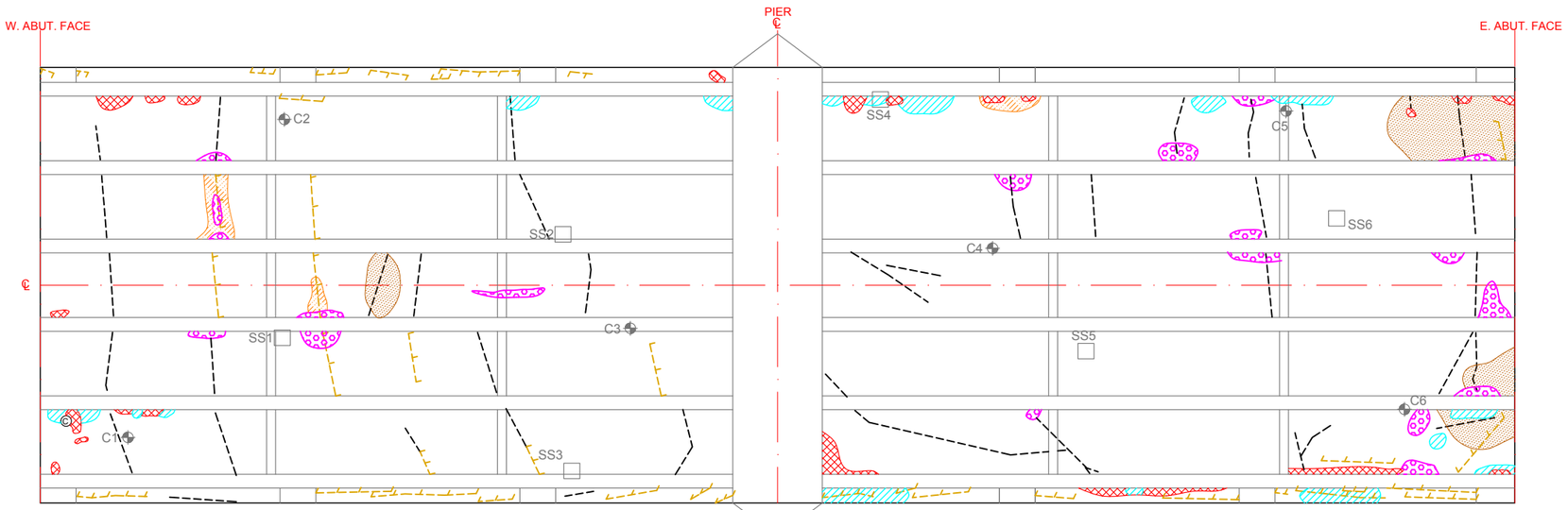
THICKNESS OF ASPHALT AND CORROSION POTENTIAL ON DECK

Drawing No.:	2
Project No.:	BCC21015
Date:	September 2021
Scale:	1:100
Drawn by:	MI
Checked by:	MA

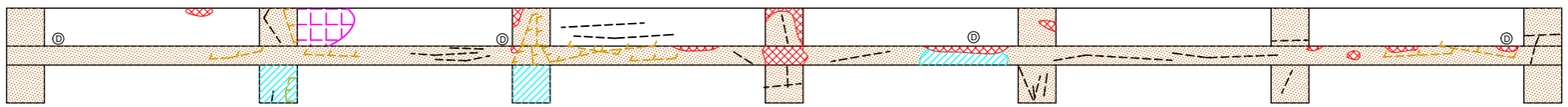
CONSTRUCTION NORTH



NORTH FASCIA



SOFFIT



SOUTH FASCIA

LEGEND:

- Ⓓ Drain Ⓒ Conduit
- C1 Core Sample Location
- SS1 Sawn Sample Location
- Patched Spalls
- Delaminations
- Spalls
- Light Scaling
- Medium Scaling
- Severe Scaling
- Honeycombed Areas
- Wet Areas
- Concrete Pattern Cracks
- Medium Concrete Cracks
- W Wide Concrete Cracks
- Medium Stained/ Efflorescence Cracks

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

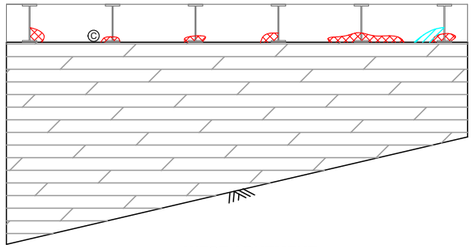
PROJECT:

5m South of Macdonell Bridge
Structure ID: 131
Guelph, ON

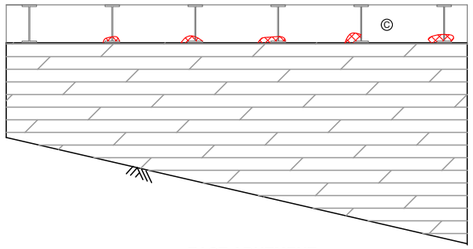
TITLE:

SURFACE DETERIORATION OF SOFFIT

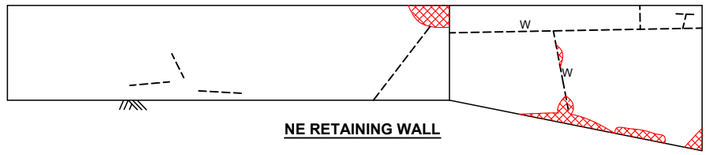
Drawing No.:	3
Project No.:	BCC21015
Date:	September 2021
Scale:	1:100
Drawn by:	MI
Checked by:	MA



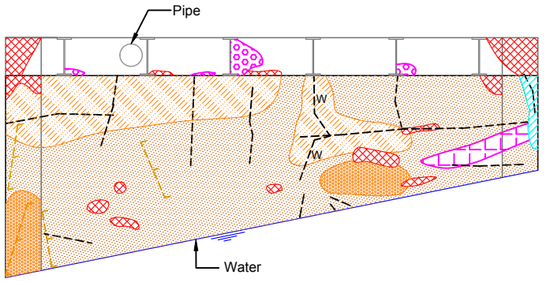
WEST ABUTMENT



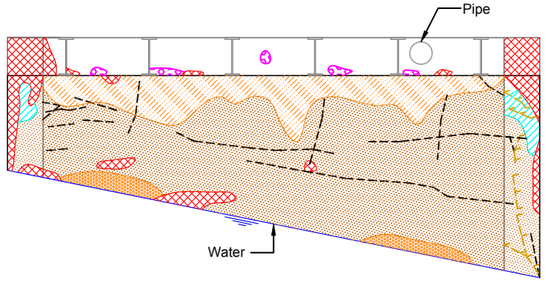
EAST ABUTMENT



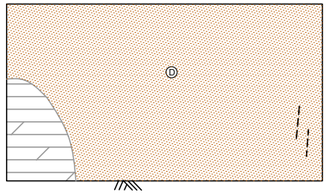
NE RETAINING WALL



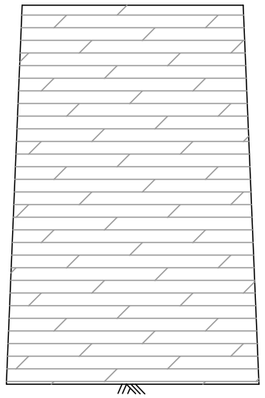
PIER - EAST FACE



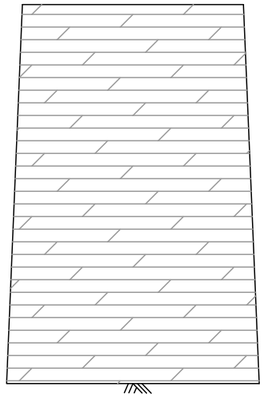
PIER - WEST FACE



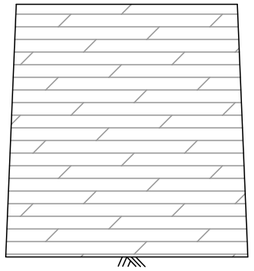
NW RETAINING WALL



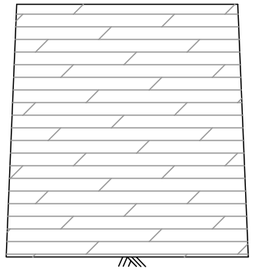
SE WINGWALL



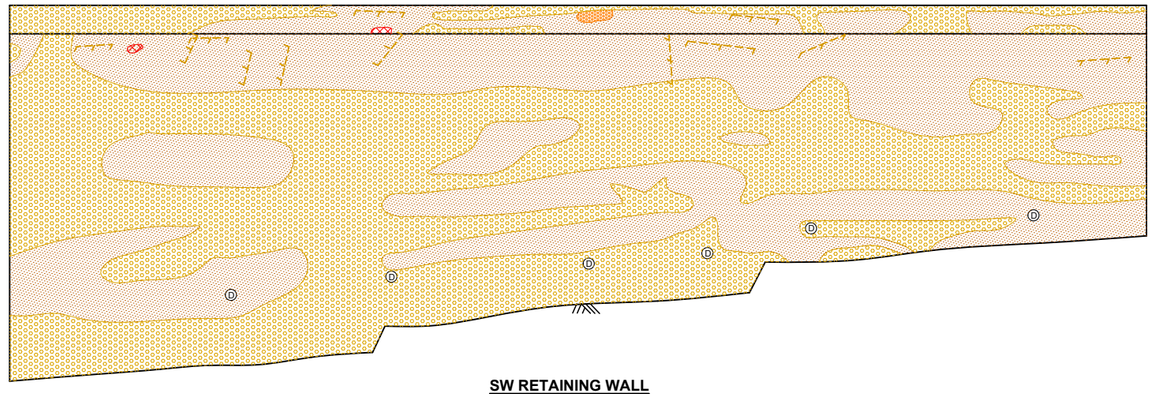
SW WINGWALL



NE WINGWALL



NW WINGWALL



SW RETAINING WALL

LEGEND:

- (D) Drain
- Patched Spalls
- Delaminations
- Spalls
- Light Scaling
- Medium Scaling
- Severe Scaling
- Honeycombed Areas
- Wet Areas
- Concrete Pattern Cracks
- Masonry
- Medium Concrete Cracks
- (W) Wide Concrete Cracks
- Medium Stained/ Efflorescence Cracks

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

PROJECT:

5m South of Macdonell Bridge
Structure ID: 131
Guelph, ON

TITLE:

SURFACE DETERIORATION OF ABUTMENTS, WINGWALLS, RETAINING WALLS AND PIER

Drawing No.:	4
Project No.:	BCC21015
Date:	September 2021
Scale:	1:100
Drawn by:	MI
Checked by:	MA

VISUAL INSPECTION REPORT

Structure ID 320, Allan's Dam Sluiceway, Guelph, ON

Prepared for: R.V. Anderson Association Limited

BCC Project No.: BCC21015
Report Date: March 25, 2025

Bridge Check Canada Ltd.
200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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www.bridgecheckcanada.com

TABLE OF CONTENTS

APPENDICES

Structure Identification Sheet

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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info@bridgecheckcanada.com

STRUCTURE IDENTIFICATION SHEET

GENERAL INFORMATION

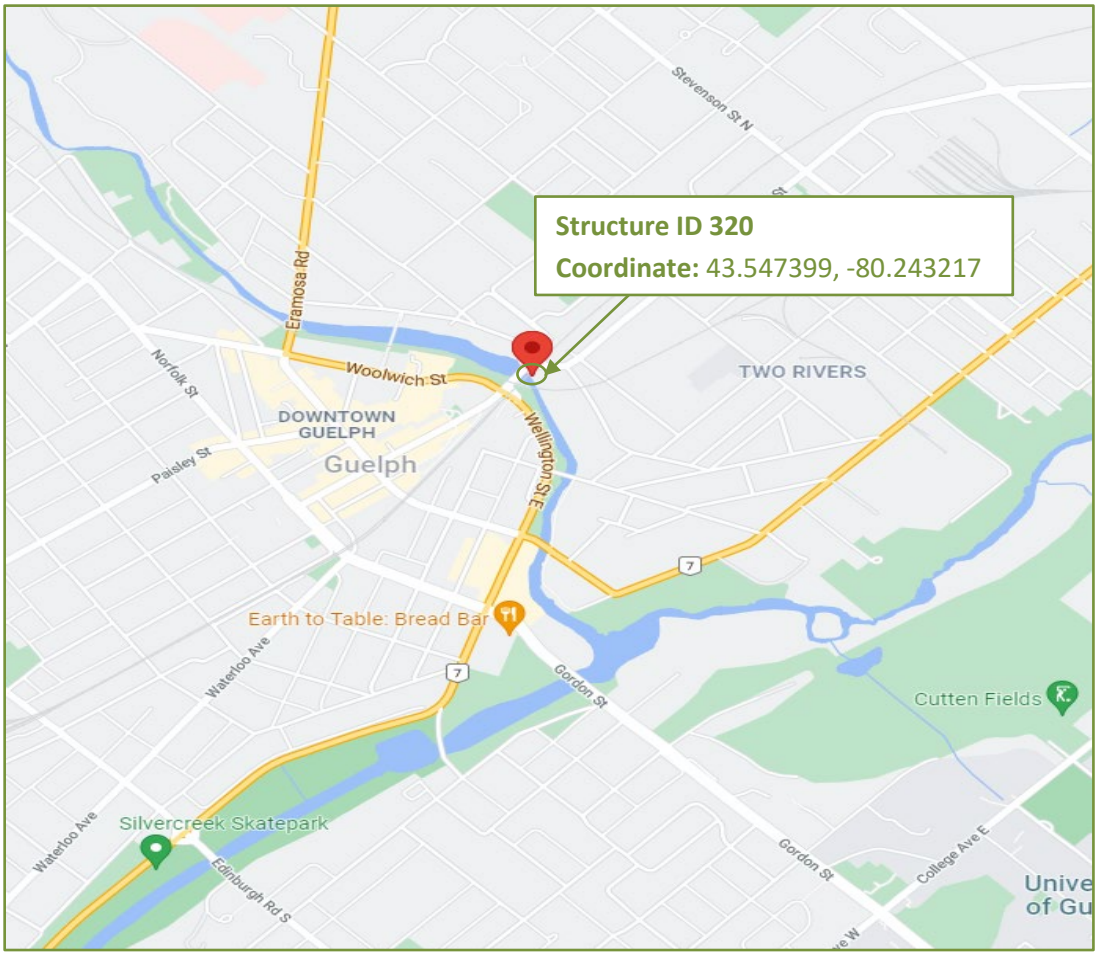
STRUCTURE NAME	***Allan's Dam Sluiceway***		
SITE NUMBER	320	**DISTRICT NUMBER**	N/A
HIGHWAY above	N/A	**Below**	N/A
TYPE OF STRUCTURE	Reinforced cast-in-place concrete slab and walls		
NUMBER OF SPANS	1	**SPAN LENGTHS**	N/A
ROADWAY WIDTH	N/A	**YEAR BUILT**	Unknown
DIRECTION OF STRUCTURE	Enorth to West		
SEQUENCE NUMBER	N/A	**TOWNSHIP NUMBER**	N/A
LHRS NUMBER	N/A	**MUNICIPAL BRIDGE NUMBER**	N/A
LOCATION	20m South of Macdonnel Street Bridge	**JURISDICTION**	City of Guelph
INSPECTOR'S NAME	Moe Abdollahi, P.Eng.		
PARTY MEMBERS	P.Pandiyan, V.Pandi		
DATE OF INSPECTION	28-Jul-21		
TEMPERATURE	27 °C	**WEATHER**	sunny
MTO REGION	Southwestern	**AADT**	
DECK RIDING SURFACE	Exposed concrete		
YEAR LAST REHABILITATED	N/A		

ENGINEER'S STAMP

Key Plan

KEY PLAN

Structure ID 320, Allan's Dam Sluiceway,
Guelph, ON



Summary of Significant Findings

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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info@bridgecheckcanada.com

SUMMARY OF SIGNIFICANT FINDINGS

Site No. 320, Allan's Dam Sluiceway, Guelph, Ontario

1.0 INTRODUCTION

Bridge Check Canada Ltd. was retained by R.V. Anderson Associates Limited, under City of Guelph RFP# 20-156, to carry out detailed condition survey for three structures. This report presents *Bridge Check Canada*'s findings, through the field investigations, for the Allan's Dam Sluiceway located 20 m south of Macdonell Street Bridge in the City of Guelph, Ontario. First time field investigations were carried out on July 28, 2021.

The site consists of reinforced cast-in-place concrete slab and walls. The Allan Spillway forms a weir that created headwaters for the removed Allan's Mill. The sluice gate was closed at the time of inspection and water level was high. Photo P1 shows a view of the inlet- north elevation. Photo P8 shows a view of the outlet-west elevation.

Inlet – North Elevation

Rehabilitation history of the structure was not available.

In 2018 OSIM Report the structure had following Overall Comments "Limited inspection of structure completed. Visible elements appear to be in fair to good condition. Minor rehabilitation recommended. A Municipal Class Environmental Assessment should be completed in conjunction with Structure 112

and Structure 131. Consideration should be given to completion of a Dam Safety Review under the Lakes and Rivers Improvement Act. Maintenance work required."

2.0 METHODOLOGY

In general, the procedures followed to conduct the condition survey and delamination survey were those defined in Part 1 of the MTO Structure Rehabilitation Manual (2007). This assignment involved the observation and recording of surface defects.

The delaminations in the concrete were detected by striking the surface with a heavy hammer and noting the type of sound being emitted. Note that, while this method is quite reliable, it may not detect delaminations at a depth greater than 100 mm. The hammer sounding method was used for all accessible vertical and overhead surfaces. The areas and locations of patches, spalls, delaminations, exposed reinforcement, honey-combing, wet areas, scaling and other observed defects were recorded.

Enclosed with this report are detailed condition survey summary sheets, survey equipment and calibration procedures, site photos, and drawings.

3.0 INLET COMPONENTS

The inlet components included the north elevation, west wall, and east wall. The deteriorations are shown on Drawing 1 and in Photos P1 to P7. The inlet components, with a total surveyed area of 13.30 m^2, were in fair condition with clean medium width cracks (2.0 m), clean wide width cracks (5.0 m), delaminations (0.95 m^2), spalls (0.85 m^2), light scaling (0.55 m^2), medium scaling (1.12 m^2), honeycombing (0.10 m^2), wet areas (0.45 m^2), and exposed reinforcement. The inlet was partially blocked with tree branches and debris.

4.0 OUTLET COMPONENTS

The outlet components included the north wall, south wall, top face, west elevation, and floor slab. The deteriorations are shown on Drawing 1 and in Photos P8 to P22. The outlet components, with a total surveyed area of 104.00 m^2, were in fair condition with clean/stained medium width cracks (46.0 m), delaminations (3.10 m^2), spalls (4.10 m^2), light scaling (46.70 m^2), medium scaling (14.10 m^2), severe scaling (8.50 m^2), wet areas (1.82 m^2), and exposed reinforcement in spalled areas. Photo P16 depicts a cavity behind the north wall-old structure at west end.

Appendix A:

Detailed Condition Survey Summary Sheets

Exposed Concrete Components

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: **320**

Component Type & Location: Inlet Components **OSIM Identifier:**

1. Dimensions and Area

Width	-	Length	-	Height	-
Diameter	-	Total Area Surveyed		13.30 m²	

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	Clean	0.0	0.0	2.0	2.0	m
	Stained	0.0	0.0	0.0		
Wide Width	Clean	0.0	2.0	3.0	5.0	m
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Minimum	Maximum	Average	
-	-	-	mm

0 – 20 mm	-	40 – 60 mm	-	m²
	-		-	%
20 – 40 mm	-	over 60 mm	-	m²
	-		-	%

Remarks

Table # 4 is Not Applicable.

Site No: **320**

Component Type & Location: Inlet Components **OSIM Identifier:**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	V
-	-	-	-	-	m^2
-	-	-	-	-	%

6. Delaminations and Spalls

Remarks

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	0.95	0.85	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
1.80 m^2	13.5 %	N/A	N/A

*Wet areas = 0.45 m^2

7. Scaling

Remarks

Light	Medium	Severe to Very Severe	
0.55	1.12	0.00	m^2
4.1	8.4	0.0	%

8. Honeycombing

Total Area 0.10 m^2

Site No: **320**

Component Type & Location: Inlet Components **OSIM Identifier:**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
Connection #1	Connection #2 G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **320**

Component Type & Location: Inlet Components **OSIM Identifier:**

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

EXPOSED CONCRETE COMPONENTS (Exposed Deck, Deck Soffit, Curbs, Medians, Sidewalks, Barrier/Parapet Walls, etc.): Use separate form for each component

Site No: **320**

Component Type & Location: Outlet Components **OSIM Identifier:**

1. Dimensions and Area

Width - Length - Height -

Diameter - Total Area Surveyed 104.00 m²

Remarks

Dimensions were taken from the structural drawings & site measurements

2. Cracks (medium and wide)

Type		Vertical	Horizontal	Diagonal	Total	
Medium Width	Clean	0.0	4.0	9.0	46.0	m
	Stained	5.0	12.0	16.0		
Wide Width	Clean	0.0	0.0	0.0	0.0	m
	Stained	0.0	0.0	0.0		

3. Alkali Aggregate Reaction

Area of component with severe to very severe aggregate reaction 0.0 m²

4. Concrete Cover

Remarks

Table # 4 is Not Applicable.

Minimum	Maximum	Average	
-	-	-	mm

0 – 20 mm	-	40 – 60 mm	-	m^2
	-		-	%
20 – 40 mm	-	over 60 mm	-	m^2
	-		-	%

Site No: **320**

Component Type & Location: Outlet Components **OSIM Identifier:**

Remarks
Table # 5 is Not Applicable.

5. Corrosion Activity

Minimum	Maximum	Average	
-	-	-	V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45	
-	-	-	-	-	V
-	-	-	-	-	m^2
-	-	-	-	-	%

Remarks

6. Delaminations and Spalls

Defect Type	Delaminations	Spalls	Patches
Area (m^2)	3.10	4.10	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
7.20 m²	6.9 %	N/A	N/A

*Wet areas = 1.82 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe	
46.70	14.10	8.50	m^2
44.9	13.6	8.2	%

8. Honeycombing

Total Area 0.00 m²

Site No: **320**

Component Type & Location: Outlet Components **OSIM Identifier:**

Remarks
Table # 9 and 10 are Not Applicable.

9. Adjusted Chloride Content Profile

Corrosion Activity at Core Location (volts)		0 to -0.20	-0.20 to -0.35	≤ -0.35
Chloride Content*	0-10 mm	-	-	-
	20-30 mm	-	-	-
	40-50 mm	-	-	-
	60-70 mm	-	-	-
	80-90 mm	-	-	-
	100-110 mm	-	-	-

* Average chloride content as % chloride by weight of concrete after deducting background chlorides for all cores taken in each range of corrosion potential.

10. Chloride Content at Rebar Level

Core No.	-	-	-	-	-	-
Chloride Content*	-	-	-	-	-	-

* Chloride content as % chloride by weight of concrete after deducting background chlorides.

Remarks
Table # 11 is Not Applicable.

11. AC Resistance Test Data of Epoxy Coated Rebar

Measured AC Resistance between Connection #1 and #2						Calculated AC Resistance *
	Connection #2					
Connection #1	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* See Appendix 1E for calculating AC resistance contributed by individual rebar.

Site No: **320**

Component Type & Location: Outlet Components **OSIM Identifier:**

Remarks
Table # 12 is Not Applicable.

12. IR Drop and True Half Cell Potential Measurements of Epoxy Coated Rebar

IR Drop Between Connection #1 and #2						True Half Cell Potential *
Connection #1 (positive)	Connection #2 (negative)					
	G1	G2	G3	G4	G5	
G1	N/A	-	-	-	-	-
G2	-	N/A	-	-	-	-
G3	-	-	N/A	-	-	-
G4	-	-	-	N/A	-	-
G5	-	-	-	-	N/A	-

* Half cell reading taken on the same rebar with the ground connection.

13. Concrete Air Entrainment

Concrete Air Entrained: not tested

14. Compressive Strength

Average Compressive Strength: not tested

Appendix B:

Site Photographs

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
www.bridgecheckcanada.com
Tel: 905-660-6608 Fax: 905-660-6609
info@bridgecheckcanada.com

Photo P1 Inlet - North Elevation

Photo P2 Inlet – North Elevation, East Wall (wide crack)

Photo P3 **Inlet – North Elevation, West Wall** (spall, and delamination) note, exposed rebar

Photo P4 **Inlet – Top Surface**

Photo P5 **Inlet – East Wall** (wide crack, spall, delamination, and light to medium scaling)

Photo P6 **Inlet- East Wall, North side** (wide crack, spall, delamination, and light to medium scaling)

Photo P7 **Inlet- West Wall** (wide crack, spall, delamination and medium scaling)

Photo P8 **Outlet – West Elevation**

Photo P9 Outlet – West Elevation

Photo P10 Outlet – West Elevation, South side (cracks, spall, and delamination)

Photo P11 Outlet – Top Surface (cracks, spall, and medium scaling)

Photo P12 Outlet – West Elevation, note, shutter

Photo P13 Outlet – North Wall, new structure (cracks, and light scaling)

Photo P14 Outlet – North Wall, old structure (crack, spall, delamination, and light scaling)

Photo P15 Outlet – North Wall, old structure (spall)

Photo P16 Outlet – North Wall, old structure note, void at the end of the wall

Photo P17 Outlet – South Wall (cracks, spall, delamination, light to medium scaling, and wet area)

Photo P18 Outlet – South Wall (cracks, spall, delamination and medium scaling)

Photo P19 Outlet – South Wall (cracks, spall, delamination, and medium scaling)

Photo P20 Outlet – South Wall (spall and delamination) note, exposed rebar

Photo P21 Outlet – Floor (cracks, and medium to severe scaling)

Photo P22 Outlet – Floor (cracks, and medium to severe scaling)

Photo P23 Southwest Gabion

Appendix C:

ACAD Drawings

200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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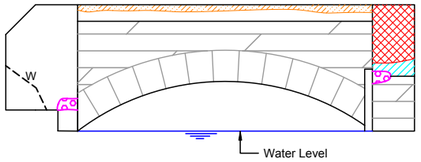
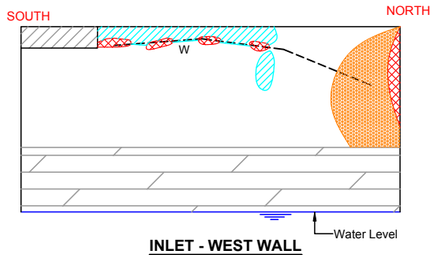
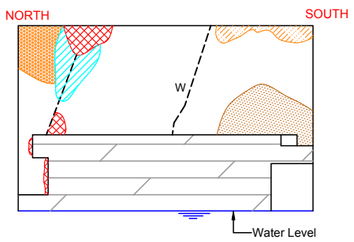
info@bridgecheckcanada.com



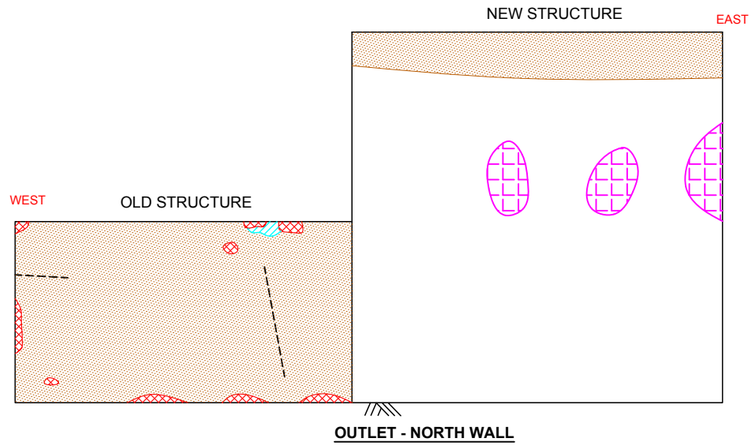
INLET - NORTH ELEVATION



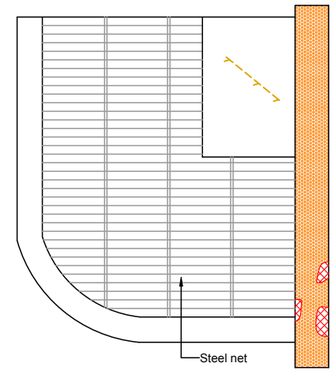
INLET - WEST WALL



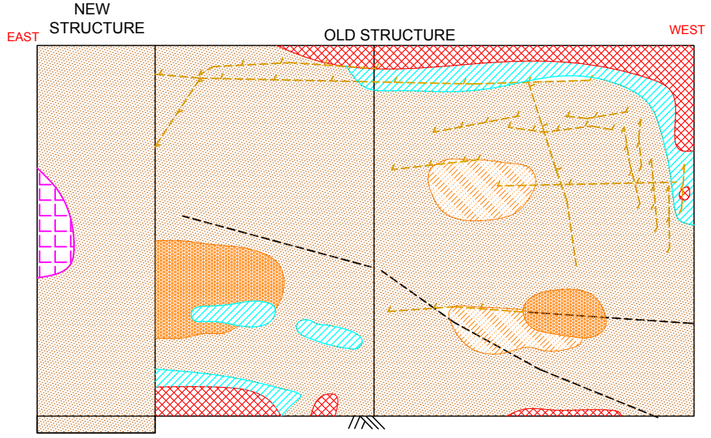
INLET - EAST WALL



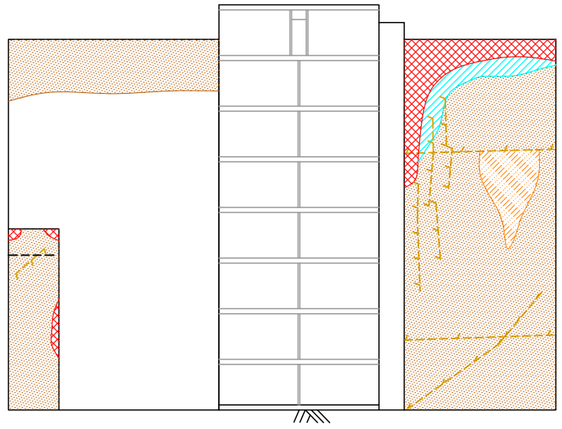
OUTLET - NORTH WALL



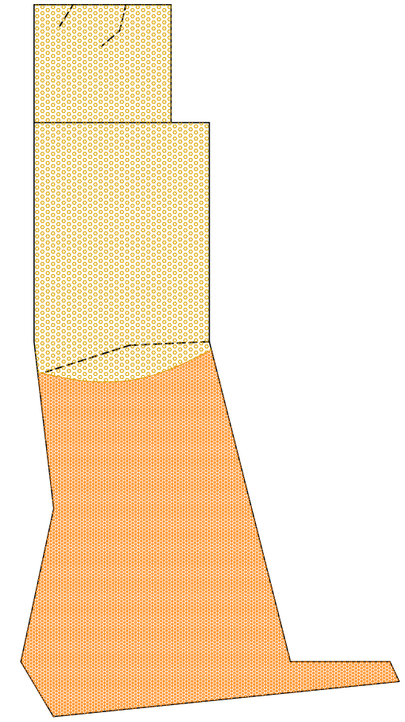
OUTLET - TOP FACE



OUTLET - SOUTH WALL



OUTLET - WEST ELEVATION



OUTLET - FLOOR SLAB

LEGEND:

- Drain
- Patched Spalls
- Delaminations
- Spalls
- Light Scaling
- Medium Scaling
- Severe Scaling
- Honeycombed Areas
- Wet Areas
- Concrete Pattern Cracks
- Masonry
- Medium Concrete Cracks
- Wide Concrete Cracks
- Medium Stained/ Efflorescence Cracks

BRIDGE CHECK CANADA

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PROJECT:

Allan's Dam Sluiceway
Guelph, ON

TITLE:

SURFACE DETERIORATION OF SLUICEWAY

Drawing No.:	1
Project No.:	BCC21015
Date:	September 2021
Scale:	1:75
Drawn by:	MI
Checked by:	MA