



Your Bridge & Concrete Inspection Specialists

DETAILED CONDITION SURVEY REPORT

Site No. B26030042, Main Street, Alton
Caledon, ON

Prepared for: GHD Limited

BCC Project No.: BCC19012
Report Date: May 31, 2019

Bridge Check Canada Ltd.
200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
T 905-660-6608 F 905-660-6608
www.bridgecheckcanada.com





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Structure Identification Sheet

STRUCTURE IDENTIFICATION SHEET

GENERAL INFORMATION

STRUCTURE NAME	<u>Main Street, Alton</u>		
SITE NUMBER	<u>B26030042</u>	DISTRICT NUMBER	<u>N/A</u>
HIGHWAY	<u>above Main Street</u>	Below	<u></u>
TYPE OF STRUCTURE	<u>Reinforced cast-in-place concrete slab, rigid frame, vertical legs</u>		
NUMBER OF SPANS	<u>1</u>	SPAN LENGTHS	<u>9.30m</u>
ROADWAY WIDTH	<u>8.60m</u>	YEAR BUILT	<u>1969</u>
DIRECTION OF STRUCTURE	<u>North to South</u>		
SEQUENCE NUMBER	<u>N/A</u>	TOWNSHIP NUMBER	<u>N/A</u>
LHRS NUMBER	<u>N/A</u>	MUNICIPAL BRIDGE NUMBER	<u>N/A</u>
LOCATION	<u>0.02km north of Queen St</u>	JURISDICTION	<u>Town of Caledon</u>
INSPECTOR'S NAME	<u>Alireza Keramati, P.Eng.</u>		
PARTY MEMBERS	<u>Mohammad Abdollahi, P.Eng., Essam Elsayed, Jason Murray, Matthew Abedi</u>		
DATE OF INSPECTION	<u>17-Apr-19</u>		
TEMPERATURE	<u>14 °C</u>	WEATHER	<u>cloudy-clear</u>
MTO REGION	<u>Central</u>	AADT	<u>815</u>
DECK RIDING SURFACE	<u>Asphalt</u>		
YEAR LAST REHABILITATED	<u>N/A</u>		

ENGINEER'S STAMP



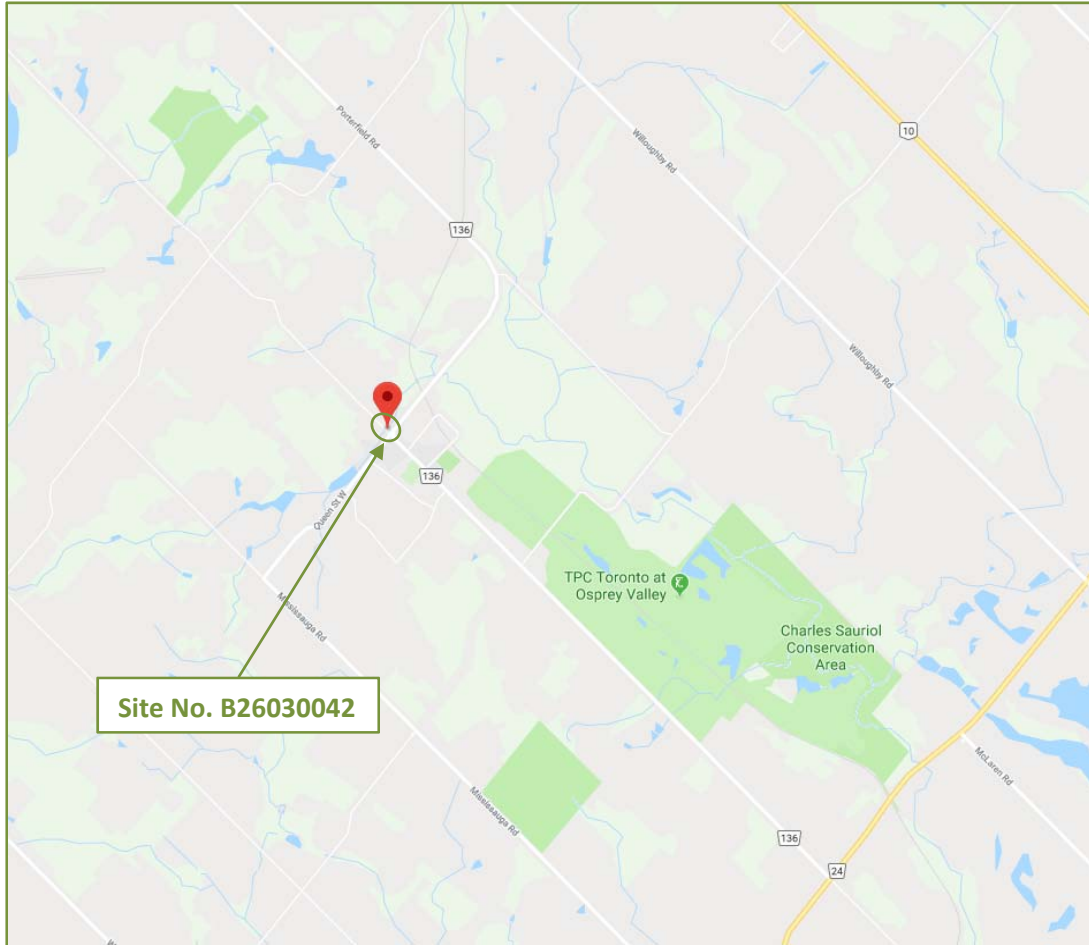


Key Plan



KEY PLAN

**Site No. B26030042, Main Street, Alton
Caledon, ON**





Summary of Significant Findings



SUMMARY OF SIGNIFICANT FINDINGS
Site B26030042, Main Street, Alton, Town of Caledon, ON

1.0 INTRODUCTION

Bridge Check Canada Ltd. was retained by GHD under Town of Caledon's RFP #2019-02 to carry out first time detailed bridge condition survey for Main Street, Alton (Site B26030042) located on Main Street, 0.02 km north of Queen Street in Caledon, Ontario. First time field investigations were carried out on April 17, 2019.

Site B26030042, constructed in 1969, is a single-span rigid frame reinforced cast-in-place concrete slab with vertical legs, overlain with an asphalt wearing surface and carries one traffic lane per direction of Main Street. The span length of the bridge is 9.30 m and the roadway width is 8.60 m. The structure has a north-to-south orientation. The outer limits of the structure contain concrete parapet wall and curb on the west side and concrete parapet wall and sidewalk on the east side. Photo P1 shows a view of the east elevation of the site. Photo P2 shows the west elevation.



East Elevation of Site B26030042, Main Street, Alton

The rehabilitation history of the bridge was not available.

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 \varnothing), 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, curb, sidewalk, and parapet walls. 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.

Nineteen (19) cores (11 cores in deck, one core in the north approach, five cores in the abutment walls, and two cores in the wingwalls) and eight sawn asphalt samples were extracted from the deck, 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 and length of the asphalt is 8.60 m and 10.50 m respectively, with a total surveyed area of 90.30 m². 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. The asphalt wearing surface on the concrete deck is generally in fair condition with unsealed transverse cracks (16.0 m), longitudinal cracks (27.0 m), and random cracks (42.0 m). The asphalt depth, measured in the drilled holes, coreholes, and sawn asphalt samples, varied from 60 mm to 110 mm with an average depth of 88 mm (refer to Drawing 2).

3.2 Waterproofing

No waterproofing system was encountered over the concrete on this bridge.

3.3 Concrete Deck

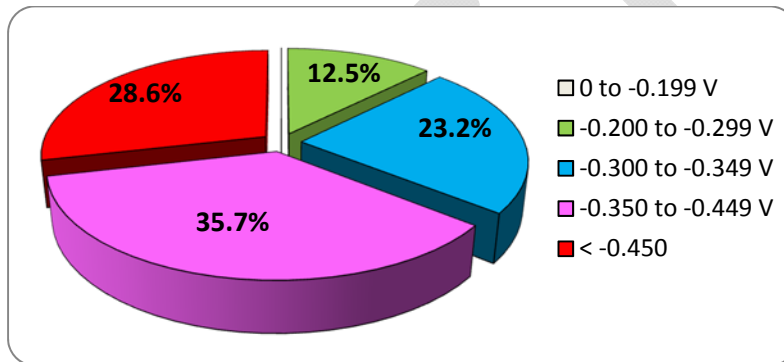
The concrete deck consists of a single-span rigid frame reinforced cast-in-place concrete slab with vertical legs, supported by abutments. The condition of the concrete deck was observed at 11 core locations and eight sawn asphalt sample locations. The inside of the coreholes and the exposed concrete surface at the sawn asphalt samples were examined carefully for cracks and other defects. Photos P62 to P70 show the inside of the coreholes. A review of the concrete cores revealed disintegrated concrete on top of cores C2, C5, C6, C7, C8, C9, C12. Visual review of the exposed concrete surface at the sawn



asphalt samples revealed disintegration, exposed and corroded reinforcement in SS5. Refer to the core and sawn asphalt sample logs and photos.

Concrete cover on the upper rebar layer was found to range from 100 to 125 mm with an average cover of 115 mm. Light rusting of the reinforcement steel was found in cores C3, C5, C6, C7, C8, C12. Severe rusting of the reinforcement was noted in core C9.

Corrosion potential values obtained from the half-cell test carried out in the asphalt covered deck ranged from -0.207 V to -0.468 V with an average value of -0.382 V . The half-cell survey indicated uncertain low corrosion activity for 35.7% (12.5%+23.2%) of the deck area, with values ranging from -0.200 V to -0.349 V . Probable active corrosion was detected for 64.3% (35.7%+28.6%) 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 C10 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 49.5 MPa. This value is significantly higher than the minimum strength of 21 MPa specified on the structural drawings.

The chloride ion content was determined for five 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.	C4	C5	C6	C7	C11
Corrected Chloride Content (%)*	0.000	0.187	0.057	0.084	0.088
Corrosion Potential (V)	-0.251	-0.422	-0.371	-0.423	-0.326

* Background chloride ion content was estimated to be 0.029% for parent 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 above the chloride threshold level of 0.025% in all cores except C4. The results indicate that chloride contamination has extended to the upper rebar level in large areas of deck.

Based on the concrete removal policy outlined in the Structure Rehabilitation Manual, the following comments can be made:

- Since greater than 10% of the deck area is more negative than -0.350 V, the average chloride content at the reinforcing level is calculated using only the cores with corrosion potential more negative than -0.350 V. Therefore, the average adjusted chloride content at the reinforcing steel level is 0.109%.
- Based on the above, since the average adjusted chloride content at the top reinforcement level is greater than 0.05% by mass of concrete, concrete deck removal is recommended to include delaminated areas as well as areas with corrosion potential more negative than -0.350 V.

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	21.00	0.218

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 marginal.

3.4 Deck Soffit and Fascia

A detailed visual inspection and hammer sounding of deck soffit and fascia were carried out. The deterioration is shown on Drawing 4 and in Photos P9 to P13. Access to the soffit was provided by means of small ladder, chest waders and delam 2000.

The bridge deck soffit and fascia, with a total surveyed area of 110.00 m², was in fair condition with clean/stained medium width cracks (26.0 m), delaminations (9.40 m²), and wet areas (19.60 m²). Medium corrosion was observed on the deck drain pipes.

3.5 Bridge Approaches

The asphalt wearing surface on the bridge approaches was generally in fair-to-good condition with unsealed cracks and settlements. Photos P14 to P16 show the general pavement condition on the approaches. Core C1 was taken from the north approach, where granular materials were encountered beneath 55 mm of asphalt.



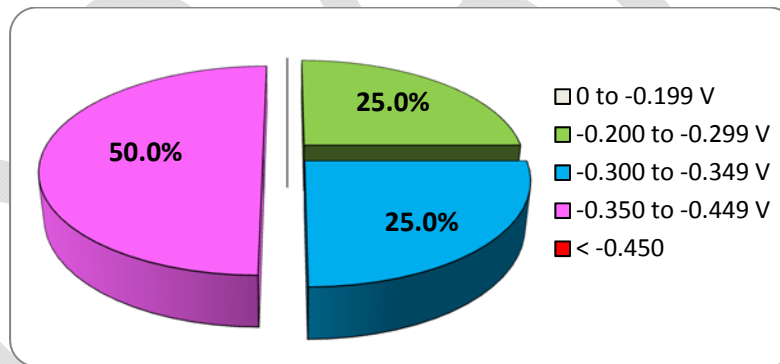
3.6 Deck Drainage

Four steel drain pipes were located on deck, each having a 150 mm diameter and a 720 mm length (Photos P17 to P20). Medium corrosion was observed on the deck drain pipes, as shown in Photo P10. Deck drains were partially covered with dirt and debris. Catch basins were detected all four quadrants outside structure limits (Photos P21 to P23).

3.7 Concrete Parapet Walls

The concrete parapet walls, with a total surveyed area of 41.14 m², were in fair-to-good condition with clean/stained medium width cracks (4.0 m), delaminations (0.31 m²), spalls (0.22 m²), light scaling (16.20 m²). The surface deterioration is shown on Drawing 1 and in Photos P24 to P35. The cracks were mainly vertical. The concrete cover ranged from 69 mm to 99 mm, with average cover of 84 mm, as shown on Drawing 2.

A corrosion potential survey was conducted for the parapet walls. The survey was not performed on the end posts as there is no continuity in the approach sides. Corrosion potential values obtained from the half-cell test carried out in the parapet walls ranged from -0.224 V to -0.440 V with an average value of -0.339 V. The half-cell survey indicated uncertain low corrosion activity for 50.0% (25.0%+25.0%) of the parapet wall area, with values ranging from -0.200 V to -0.349 V. Probable active corrosion was detected for 50.0% (50.0%+0.0%) of the parapet wall area with corrosion potential values more negative than -0.350 V. Drawing 3 shows the corrosion potential readings in the parapet walls.



Corrosion potential distribution in the parapet walls

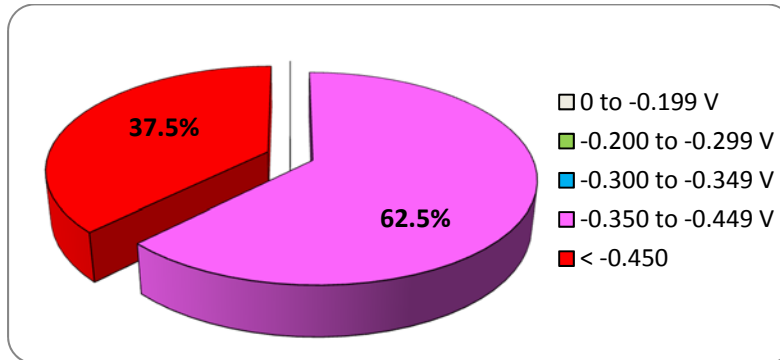
The steel handrails were generally in good condition with missing end caps at southeast and southwest corner and localized light surface rusting.

3.8 Concrete Sidewalk

The east sidewalk, with a total surveyed area of 38.75 m², was in fair condition with clean medium width cracks (1.0 m), clean wide width cracks (1.0 m), delaminations (0.29 m²), spalls (0.35 m²), light scaling (16.10 m²), medium scaling (3.40 m²). The surface deterioration is shown on Drawing 1 and in Photos P24 to P29. The concrete cover ranged from 95 mm to 119 mm, with average cover of 104 mm, as shown on Drawing 2.



Corrosion potential values obtained from the half-cell test carried out in the sidewalk ranged from -0.413 V to -0.461 V with an average value of -0.438 V. The half-cell survey indicated probable active corrosion for 100.0% (62.5%+37.5%) of the sidewalk area with corrosion potential values more negative than -0.350 V. Drawing 3 shows the corrosion potential readings in the east sidewalk.

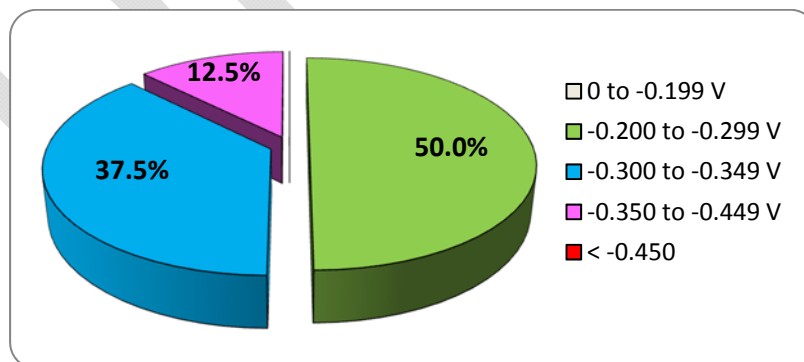


Corrosion potential distribution in the east sidewalk

3.9 Concrete Curb

The west concrete curb, with a total surveyed area of 21.77 m², was in fair-to-good condition medium scaling (2.50 m²). The surface deterioration is shown on Drawing 1 and in Photos P30 to P35. The concrete cover ranged from 96 mm to 119 mm, with average cover of 106 mm, as shown on Drawing 2.

Corrosion potential values obtained from the half-cell test carried out in the curb ranged from -0.220 V to -0.373 V with an average value of -0.305 V. The half-cell survey indicated uncertain low corrosion activity for 87.5% (50.0%+37.5%) of the curb area, with values ranging from -0.200 V to -0.349 V. Probable active corrosion was detected for 12.5% (12.5%+0.0%) of the curb area with corrosion potential values more negative than -0.350 V. Drawing 3 shows the corrosion potential readings in the west curb.



Corrosion potential distribution in the west curb

3.10 End Posts and Guiderails

The concrete end posts were in fair-to-good condition with light scaling (Photos P36 to P40). The steel beam guiderails were in good condition (Photo P41).



4.0 SUBSTRUCTURE COMPONENTS

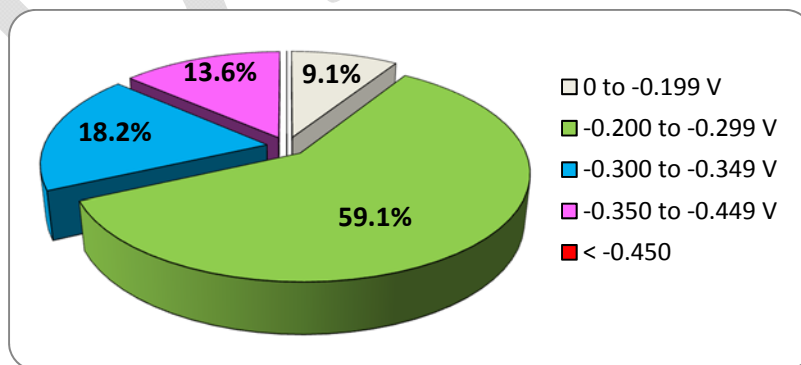
The abutment walls and wingwalls were inspected and hammer sounded to check for delaminations, where accessible. Field measurements are presented in the field summary sheets.

4.1 Abutment Walls

The exposed surfaces of the abutment walls were inspected and sounded to check for delaminations. The total surveyed area for the north and south abutments were 37.41 m² and 40.56 m², respectively. The deterioration is shown on Drawing 4. General views of the abutment walls are shown in Photos P42 to P46. The abutment walls were generally in fair-to-good condition. The field investigation of the north abutment wall revealed stained wide width cracks (4.0 m) and wet areas (1.21 m²). The field investigation of the south abutment wall revealed clean/stained medium width cracks (5.0 m). The cracks were mainly vertical.

The concrete cover for the north abutment wall ranged from 87 mm to 124 mm with an average cover of 102 mm, as shown on Drawing 6. The concrete cover for the south abutment wall ranged from 81 mm to 104 mm with an average cover of 92 mm, as shown on Drawing 6. Cores C13 to C17 were taken from the abutment walls at locations shown on Drawing 4. Photos P71 and P72 show the inside of the coreholes C13 and C15, respectively. No concrete defects were noted in the cores. Light rusting of the reinforcing steel was observed in cores C13, C15, C17. The corrected chloride content for cores C13 and C16 was found to be 0.000% and 0.011%, respectively, indicating no chloride contamination in these cores.

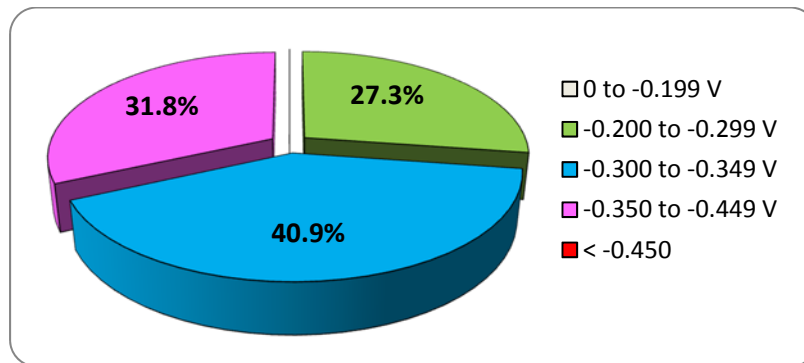
Corrosion potential values obtained from the half-cell test carried out in the north abutment wall ranged from -0.127 V to -0.412 V with an average value of -0.268 V. The half-cell survey indicated that 9.1% of the abutment area likely had no corrosion activity, with corrosion potential values between 0.000 V and -0.199 V. The half-cell survey indicated uncertain low corrosion activity for 77.3% (59.1%+18.2%) of the abutment wall area, with values ranging from -0.200 V to -0.349 V. Probable active corrosion was detected for 13.6% (13.6%+0.0%) of the abutment wall area with corrosion potential values more negative than -0.350 V. Drawing 6 shows the corrosion potential readings in the north abutment wall. Active corrosion was detected on the east side of the abutment wall.



Corrosion potential distribution in the north abutment wall



Corrosion potential values obtained from the half-cell test carried out in the south abutment wall ranged from -0.223 V to -0.423 V with an average value of -0.329 V. The half-cell survey indicated uncertain low corrosion activity for 68.2% (27.3%+40.9%) of the abutment wall area, with values ranging from -0.200 V to -0.349 V. Probable active corrosion was detected for 31.8% (31.8%+0.0%) of the abutment wall area with corrosion potential values more negative than -0.350 V. Drawing 6 shows the corrosion potential readings in the south abutment wall. Active corrosion was detected in the middle and west side of the abutment wall.



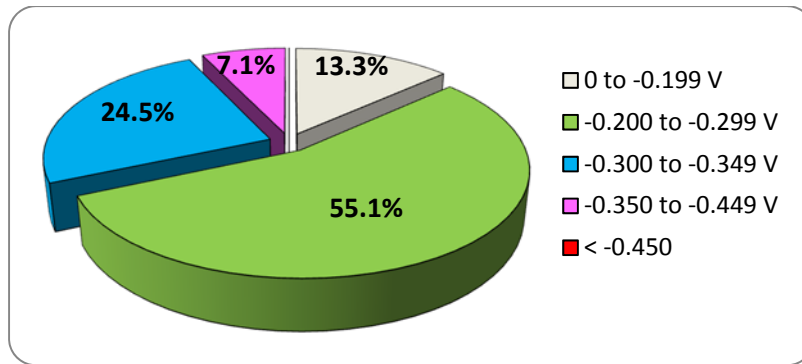
Corrosion potential distribution in the south abutment wall

4.2 Wingwalls

A detailed visual inspection and hammer sounding of the wingwalls were carried out. The deterioration is shown on Drawing 5 and in Photos P47 to P50.

The wingwalls, with a total surveyed area of 62.89 m², were in good condition with stained medium width cracks (1.0 m). The concrete cover for the wingwalls ranged from 67 mm to 125 mm with an average cover of 102 mm, as shown on Drawing 6. Cores C18 and C19 were taken from the wingwalls at locations shown on Drawing 5. Photo P73 shows the inside of the corehole C18. No defects were noted in the concrete cores. Reinforcing rebar, encountered in core C18, was found to be in good condition. A compressive strength of 47.1 MPa was obtained for core C18.

Corrosion potential values obtained from the half-cell test carried out in the wingwalls ranged from -0.119 V to -0.412 V with an average value of -0.265 V. The half-cell survey indicated that 13.3% of the wingwall 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 79.6% (55.1%+24.5%) of the wingwall area, with values ranging from -0.200 V to -0.349 V. Probable active corrosion was detected for 7.1% (7.1%+0.0%) of the wingwall area with corrosion potential values more negative than -0.350 V. Drawing 6 shows the corrosion potential readings in the wingwalls.



Corrosion potential distribution in the wingwalls

4.3 Gabion Walls and Slopes

The gabion walls were found to be in fair-to-good condition with bulging, tilting, and damaged baskets (Photos P51 to P56). A section of southeast gabion has collapsed/overtaken, as shown in Photo P54. The embankment slopes were in fair-to-good condition with evidence of minor soil erosion at bases, as shown in Photos P57 to P60.



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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. B26030042

1. Dimensions and Area of Survey

Width between N abutment curbs	8.60 m	Width between S abutment curbs	8.60 m
Length between abutment joints	10.50 m	Area of deck riding surface	90.30 m ²

Remarks

Deck dimensions were taken from the structural drawings

2. Asphalt Surface Cracks

Orientation	Unsealed	Sealed	
Transverse	16.0	0.0	* Asphalt potholes/patches = 0.00 m ² * Asphalt Alligator Cracks = 0.00 m ² * Asphalt Ravelling = 0.00 m ²
Longitudinal	27.0	0.0	
Random	42.0	0.0	

3. Asphalt Depth

Condition *	Depth			
	Min	Max	Avg	
F	60	110	88	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

Remarks

DETAILED CONDITION SURVEY SUMMARY SHEET
ASPHALT COVERED DECK
DECK RIDING SURFACE

Site No. B26030042

5. Concrete Cover – Cores and Sawn Samples

Remarks

Minimum	Maximum	Average
100	125	115

mm

Note: Only include covers for upper layer of rebars.

6. Corrosion Activity

Remarks

Minimum	Maximum	Average
-0.207	-0.468	-0.382

V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45
0.0	11.3	20.9	32.2	25.8
0.0	12.5	23.2	35.7	28.6

V
m²
%

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	1	0	0.0	0.0	0	0.0	0.0
-0.30 to -0.35	6	0	0.0	0.0	0	0.0	0.0
-0.35 to -0.45	5	0	0.0	0.0	0	0.0	0.0
<-0.45	7	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.

DETAILED CONDITION SURVEY SUMMARY SHEET
ASPHALT COVERED DECK
DECK RIDING SURFACE

Site No. **B26030042**

8. Adjusted Chloride Content Profile

*Background (original concrete) chloride content = 0.029

Remarks

Corrosion Activity at Core Location		0 to -0.20	-0.20 to -0.35	≤-0.35
Chloride Content*	0-10 mm	-	0.122	-
	20-30 mm	-	0.103	-
	40-50 mm	-	0.088	0.313
	60-70 mm	-	0.076	0.130
	80-90 mm	-	0.051	0.107
	100-110 mm	-	0.000	0.109
	120-130 mm	-	-	0.061
	140-150 mm	-	-	0.040

* 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.	C4	C5	C6	C7	C11		
Chloride Content*	0.000	0.187	0.057	0.084	0.088		
Corrosion Potential	-0.251	-0.422	-0.371	-0.423	-0.326		
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.

DETAILED CONDITION SURVEY SUMMARY SHEET
ASPHALT COVERED DECK
DECK RIDING SURFACE

Page 4 of 4

Site No. **B26030042**

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 49.5 MPa

DETAILED CONDITION SURVEY SUMMARY SHEET

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

Site No: **B26030042**

Component Type & Location: Soffit

OSIM Identifier: Decks

1. Dimensions and Area

Width 10.85 m Length 9.30 m Height 0.62 to 0.95 m
 Diameter - Total Area Surveyed 110.00 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	4.0	0.0	26.0	m
	Stained	0.0	9.0	13.0		
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.

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: Soffit

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
-	-	-	-	-
-	-	-	-	-

V

m²

%

6. Delaminations and Spalls

Defect Type	Delaminations	Spalls	Patches
Area (m ²)	9.40	0.00	0.00
Total Delaminations and Spalls	Total Delaminations and Spalls in Areas ≤-0.35 V		
9.40 m ²	8.5 %	N/A	N/A

*Wet areas = 19.60 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe
0.00	0.00	0.00
0.0	0.0	0.0

m²

%

Remarks

8. Honeycombing

Total Area 0.00 m²

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: Soffit

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.

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: Soffit

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

DETAILED CONDITION SURVEY SUMMARY SHEET

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

Site No: B26030042

Component Type & Location: East Sidewalk

OSIM Identifier: Sidewalks/curbs

1. Dimensions and Area

Width 1.37 m Length 23.92 m Height 0.25 m
 Diameter - Total Area Surveyed 38.75 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	0.0	1.0	1.0	m
	Stained	0.0	0.0	0.0		
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

Minimum	Maximum	Average	
95	119	104	mm

0 – 20 mm	0.0	40 – 60 mm	0.0	m ²
	0.0		0.0	%
20 – 40 mm	0.0	over 60 mm	38.8	m ²
	0.0		100.0	%

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: B26030042

Component Type & Location: East Sidewalk

OSIM Identifier: Sidewalks/curbs

Remarks

5. Corrosion Activity

Minimum	Maximum	Average
-0.413	-0.461	-0.438

V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45
0.0	0.0	0.0	24.2	14.5
0.0	0.0	0.0	62.5	37.5

V

m²

%

Remarks

6. Delaminations and Spalls

Defect Type	Delaminations	Spalls	Patches
Area (m ²)	0.29	0.35	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
0.64 m ²	1.7 %	N/A	N/A

*Wet areas = 0.00 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe
16.10	3.40	0.00
41.5	8.8	0.0

m²

%

8. Honeycombing

Total Area 0.00 m²

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: East Sidewalk

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.

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: East Sidewalk

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

DETAILED CONDITION SURVEY SUMMARY SHEET

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

Site No: **B26030042**

Component Type & Location: West Curb

OSIM Identifier: Sidewalks/curbs

1. Dimensions and Area

Width 0.66 m Length 23.92 m Height 0.25 m
 Diameter - Total Area Surveyed 21.77 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	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

Remarks

Minimum	Maximum	Average	
96	119	106	mm

0 – 20 mm	0.0	40 – 60 mm	0.0	m ²
	0.0		0.0	%
20 – 40 mm	0.0	over 60 mm	21.8	m ²
	0.0		100.0	%

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: B26030042

Component Type & Location: West Curb

OSIM Identifier: Sidewalks/curbs

Remarks

5. Corrosion Activity

Minimum	Maximum	Average
-0.220	-0.373	-0.305

V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45
0.0	10.9	8.2	2.7	0.0
0.0	50.0	37.5	12.5	0.0

V

m²

%

Remarks

6. Delaminations and Spalls

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 m ²	0.0 %	N/A	N/A

*Wet areas = 0.00 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe
0.00	2.50	0.00
0.0	11.5	0.0

m²

%

8. Honeycombing

Total Area 0.00 m²

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: West Curb

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.

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: West Curb

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

DETAILED CONDITION SURVEY SUMMARY SHEET

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

Site No: B26030042

Component Type & Location: East & West Parapet Walls

OSIM Identifier: Barriers

1. Dimensions and Area

Width 0.25 m Length 23.92 m Height 0.61 m
 Diameter - Total Area Surveyed 41.14 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	0.0	1.0	4.0	m
	Stained	1.0	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

Minimum	Maximum	Average	
69	99	84	mm

0 – 20 mm	0.0	40 – 60 mm	0.0	m ²
	0.0		0.0	%
20 – 40 mm	0.0	over 60 mm	41.1	m ²
	0.0		100.0	%

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: B26030042

Component Type & Location: East & West Parapet Walls

OSIM Identifier: Barriers

Remarks

5. Corrosion Activity

Minimum	Maximum	Average
-0.224	-0.440	-0.339

V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45
0.0	10.3	10.3	20.6	0.0
0.0	25.0	25.0	50.0	0.0

V

m²

%

6. Delaminations and Spalls

Defect Type	Delaminations	Spalls	Patches
Area (m ²)	0.31	0.22	0.00
Total Delaminations and Spalls		Total Delaminations and Spalls in Areas ≤-0.35 V	
0.53 m ²	1.3 %	N/A	N/A

*Wet areas = 0.00 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe
16.20	0.00	0.00
39.4	0.0	0.0

m²

%

Remarks

8. Honeycombing

Total Area 0.00 m²

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: East & West Parapet Walls

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.

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: East & West Parapet Walls

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

DETAILED CONDITION SURVEY SUMMARY SHEET

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

Site No: **B26030042**

Component Type & Location: North Abutment Wall

OSIM Identifier: Abutments

1. Dimensions and Area

Width 10.48 m Length - Height 3.57 m
 Diameter - Total Area Surveyed 37.41 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	4.0	m
	Stained	4.0	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	
87	124	102	mm

0 – 20 mm	0.0	40 – 60 mm	0.0	m ²
	0.0		0.0	%
20 – 40 mm	0.0	over 60 mm	37.4	m ²
	0.0		100.0	%

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: North Abutment Wall

OSIM Identifier: Abutments

Remarks

5. Corrosion Activity

Minimum	Maximum	Average
-0.127	-0.412	-0.268

V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45
3.4	22.1	6.8	5.1	0.0
9.1	59.1	18.2	13.6	0.0

V

m²

%

6. Delaminations and Spalls

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 m ²	0.0 %	N/A	N/A

*Wet areas = 1.21 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe
0.00	0.00	0.00
0.0	0.0	0.0

m²

%

Remarks

8. Honeycombing

Total Area 0.00 m²

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: North Abutment Wall

OSIM Identifier: Abutments

Remarks

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	-	0.028	-
	20-30 mm	-	0.028	-
	40-50 mm	-	0.024	-
	60-70 mm	-	0.010	-
	80-90 mm	-	0.000	-
	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.

*Background (substructure concrete) chloride content = 0.031

10. Chloride Content at Rebar Level

Core No.	C13	-	-	-	-	-
Chloride Content*	0.000	-	-	-	-	-

* 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.

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: North 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

DETAILED CONDITION SURVEY SUMMARY SHEET

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

Site No: B26030042

Component Type & Location: South Abutment Wall

OSIM Identifier: Abutments

1. Dimensions and Area

Width 10.48 m Length - Height 3.87 m
 Diameter - Total Area Surveyed 40.56 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	5.0	m
	Stained	1.0	1.0	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

Minimum	Maximum	Average	
81	104	92	mm

0 – 20 mm	0.0	40 – 60 mm	0.0	m ²
	0.0		0.0	%
20 – 40 mm	0.0	over 60 mm	40.6	m ²
	0.0		100.0	%

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: South Abutment Wall

OSIM Identifier: Abutments

Remarks

5. Corrosion Activity

Minimum	Maximum	Average
-0.223	-0.423	-0.329

V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45
0.0	11.1	16.6	12.9	0.0
0.0	27.3	40.9	31.8	0.0

V

m²

%

Remarks

6. Delaminations and Spalls

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 m ²	0.0 %	N/A	N/A

*Wet areas = 0.00 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe
0.00	0.00	0.00
0.0	0.0	0.0

m²

%

8. Honeycombing

Total Area 0.00 m²

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: South Abutment Wall

OSIM Identifier: Abutments

Remarks

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	-	-	0.031
	20-30 mm	-	-	0.018
	40-50 mm	-	-	0.014
	60-70 mm	-	-	0.011
	80-90 mm	-	-	0.011
	100-110 mm	-	-	0.010

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

*Background (substructure concrete) chloride content = 0.031

10. Chloride Content at Rebar Level

Core No.	C16	-	-	-	-	-
Chloride Content*	0.011	-	-	-	-	-

* 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.

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: South 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

DETAILED CONDITION SURVEY SUMMARY SHEET

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

Site No: B26030042

Component Type & Location: Wingwalls

OSIM Identifier: Abutments

1. Dimensions and Area

Width - _____ Length 7.31 m Height Avg. 2.15 m
 Diameter - _____ Total Area Surveyed 62.89 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	1.0	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

Minimum	Maximum	Average	
67	125	102	mm

0 – 20 mm	0.0	40 – 60 mm	0.0	m ²
	0.0		0.0	%
20 – 40 mm	0.0	over 60 mm	62.9	m ²
	0.0		100.0	%

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: Wingwalls

OSIM Identifier: Abutments

Remarks

5. Corrosion Activity

Minimum	Maximum	Average
-0.119	-0.412	-0.265

V

0 to -0.20	-0.20 to -0.30	-0.30 to -0.35	-0.35 to -0.45	< -0.45
8.4	34.7	15.4	4.5	0.0
13.3	55.1	24.5	7.1	0.0

V

m²

%

6. Delaminations and Spalls

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 m ²	0.0 %	N/A	N/A

*Wet areas = 0.00 m²

Remarks

7. Scaling

Light	Medium	Severe to Very Severe
0.00	0.00	0.00
0.0	0.0	0.0

m²

%

Remarks

8. Honeycombing

Total Area 0.00 m²

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: Wingwalls

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.

**DETAILED CONDITION SURVEY SUMMARY SHEET
EXPOSED CONCRETE COMPONENTS**

Site No: **B26030042**

Component Type & Location: Wingwalls

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: 47.1 MPa

CONDITION SURVEY SUMMARY SHEET - EXPANSION JOINTS

Site No. B26030042

Dimension	Abutments				Intermediate				Remarks
	Joint 1		Joint 2		Joint 3		Joint 4		
	N		S						
a (mm)	*254/1676		*254/1676		-		-		a = Top face of parapet wall / sidewalk width. e = Top face of parapet wall / curb width. No expansion joints present in structure.
b (mm)	240		240		-		-		
b' (mm)	250		250		-		-		
c (mm)	8600		8600		-		-		
d (mm)	240		240		-		-		
d' (mm)	250		250		-		-		
e (mm)	*254/991		*254/991		-		-		
Depth of Asphalt @ Deck Side					N/E	S/E	N/E	S/W	
1 (mm)	60		80		-	-	-	-	
2 (mm)	65		90		-	-	-	-	
3 (mm)	65		80		-	-	-	-	
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		10° 00' 00"				
Exp	-		-		-		-		
Fixed	-		-		-		-		
Type			-				-		
Leaking	-		-		-		-		
Angle size	-		-		-		-		
Temp °C	Deck		14°C		Ambient		14°C		
E JOINT DIMENSIONS W									
Typical Sections at Joints:									



DRAINAGE

Site No. B26030042

Deck Drains	Number	Type	Length	Angle	Depth *
	4	150mm steel pipe	720mm	N/A	20-30mm

* 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 1, S/E x 1, S/W x 1
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* 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
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Typical Condition of Deck Drain @ Northwest



Typical Condition of Catch Basin @ Southeast



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Appendix B:

Survey Equipment and Calibration Procedures



SURVEY EQUIPMENT AND CALIBRATION PROCEDURES

Component Type: Asphalt Covered Bridge Deck **Site Number:** B26030042

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: 118 mm
 Readings Each 30 minutes During Test: 118 mm
 Reading at End of Test: 118 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:** 14 °C **End of Test:** 14 °C
Ambient Temperature: **Start of Test:** 14 °C **End of Test:** 14 °C
Battery Check: O.K.
Ground Check: **Method of Connection:** self-tapping screw
 Ground Location: @ Core C6, C7 **Check Location:** @ Core C3, C11
 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
G1 / A1	-0.390/-0.468	-0.390/-0.468	-
G2 / A2	-0.368/-0.461	-0.368/-0.461	-
G3 / A3	-0.322/-0.394	-0.322/-0.394	-
G4 / A4	-0.327/-0.391	-0.327/-0.391	-
G5 / A5	-0.231/-0.378	-0.231/-0.378	-

^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.



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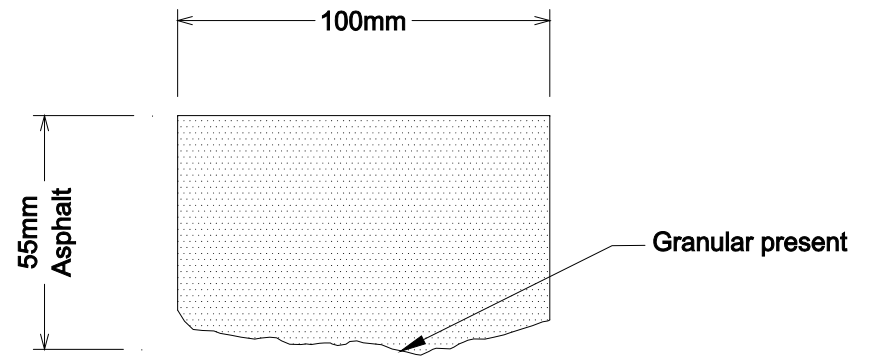
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Appendix C:

Core Photographs and Sketches

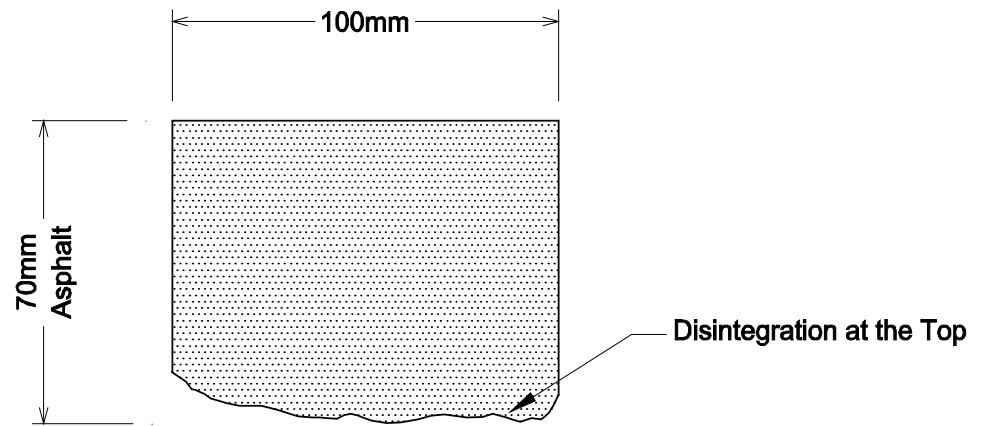
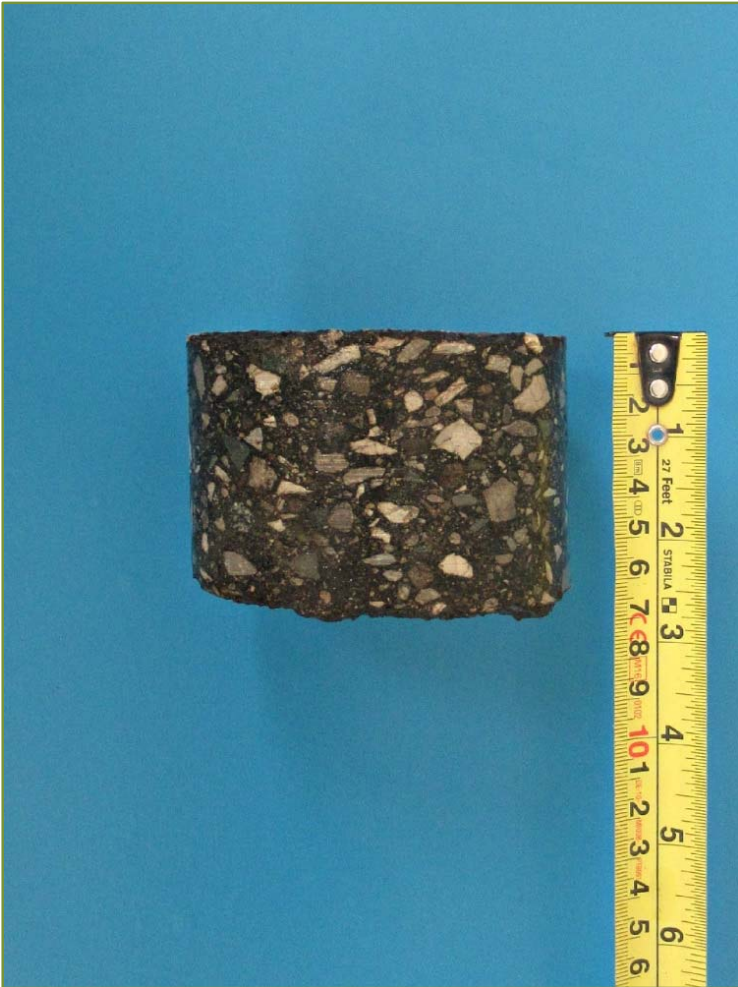


Core C1



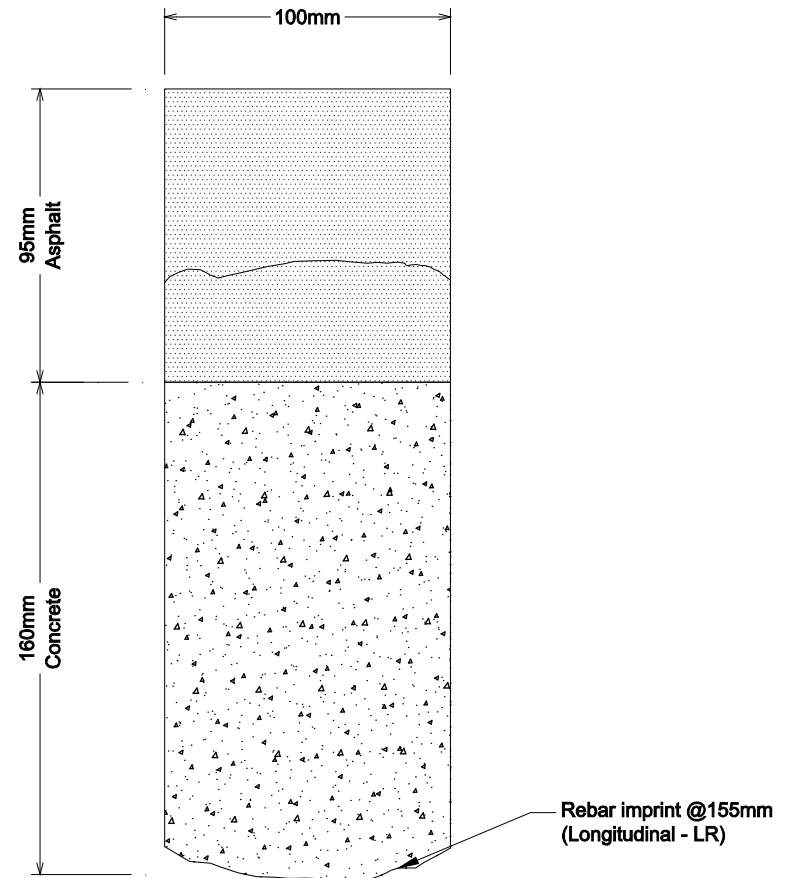


Core C2



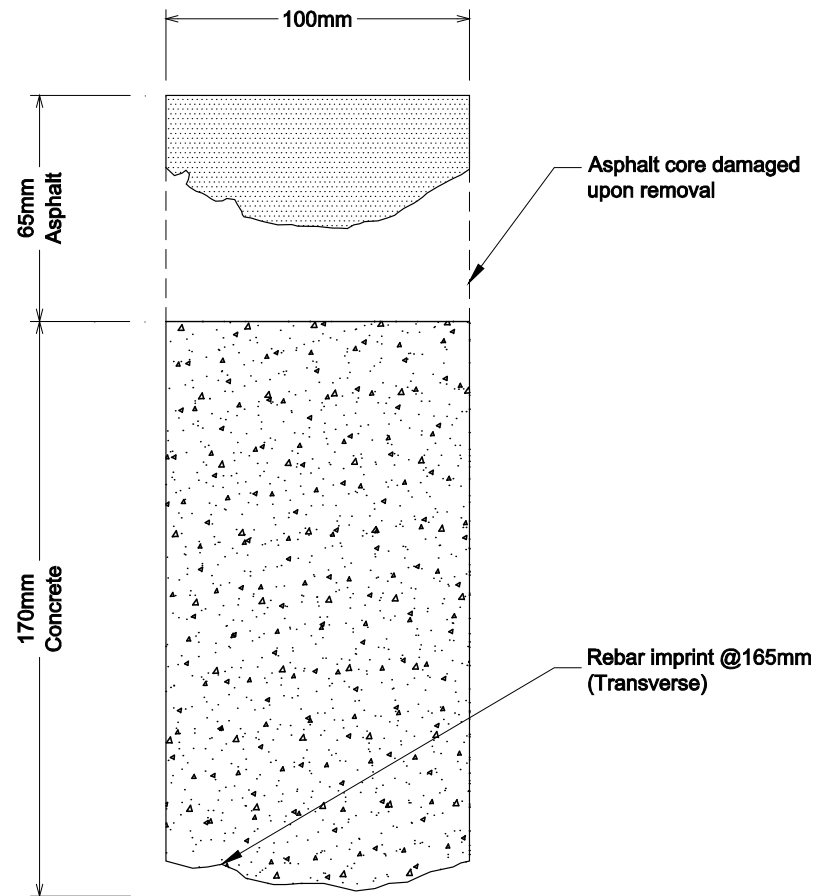


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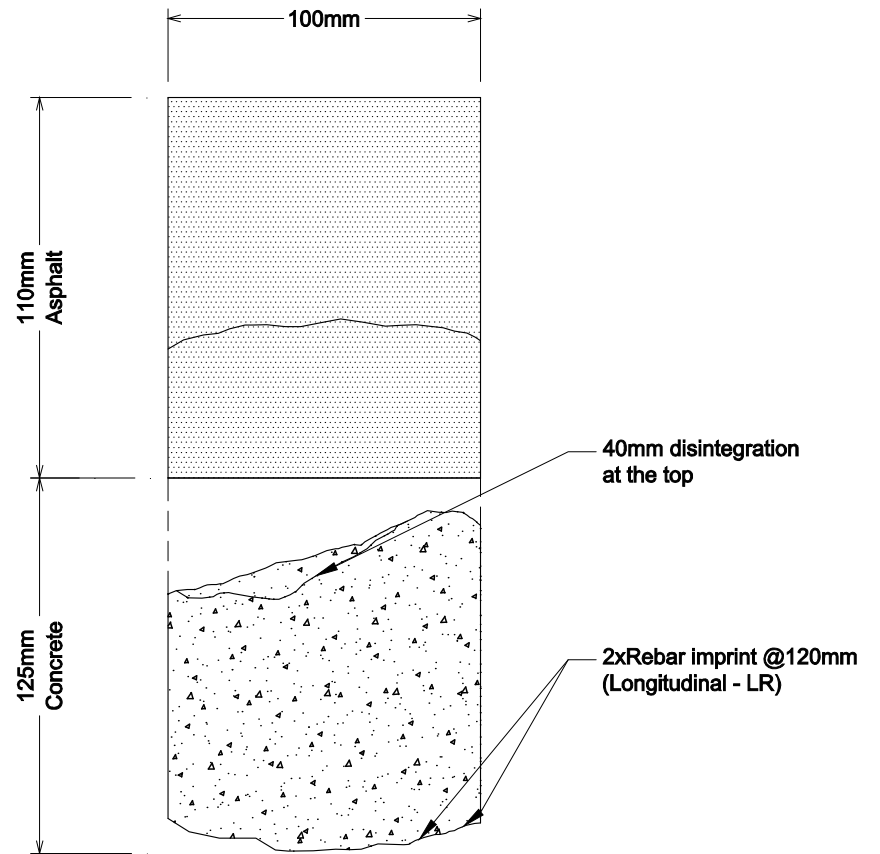


Core C4



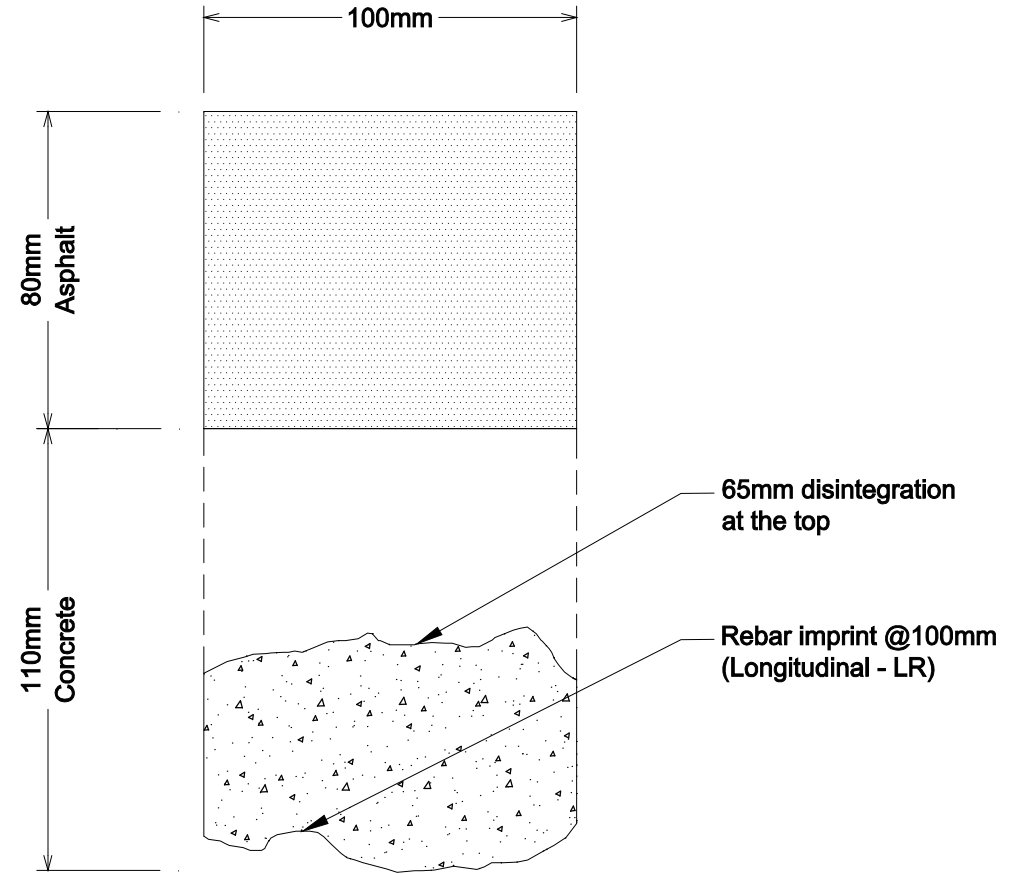


Core C5



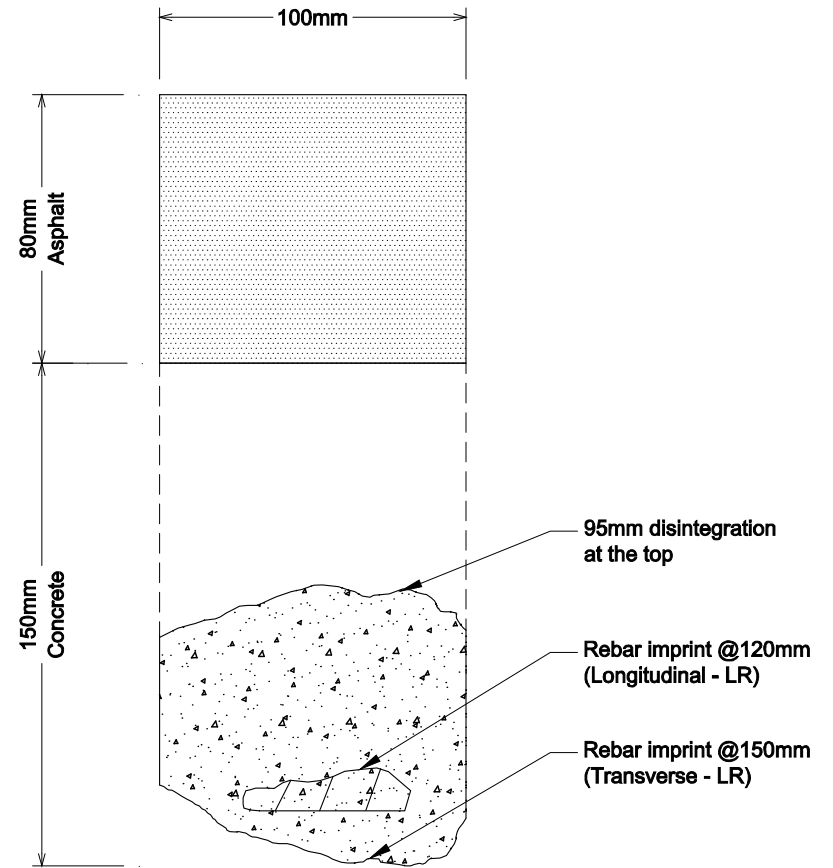


Core C6



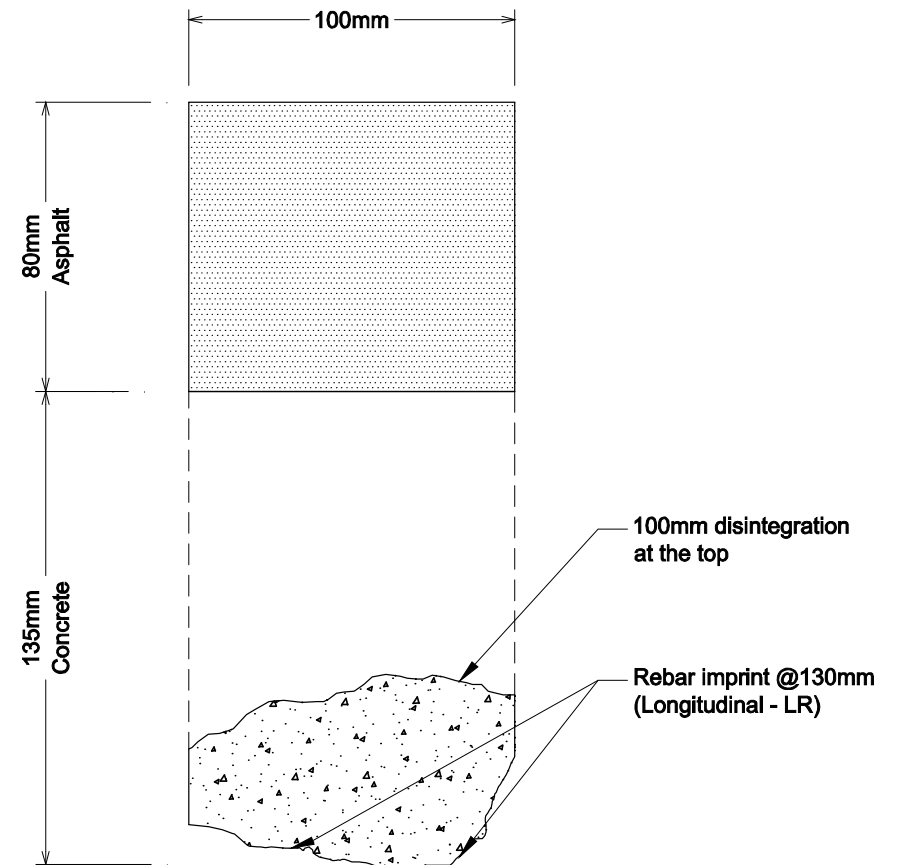


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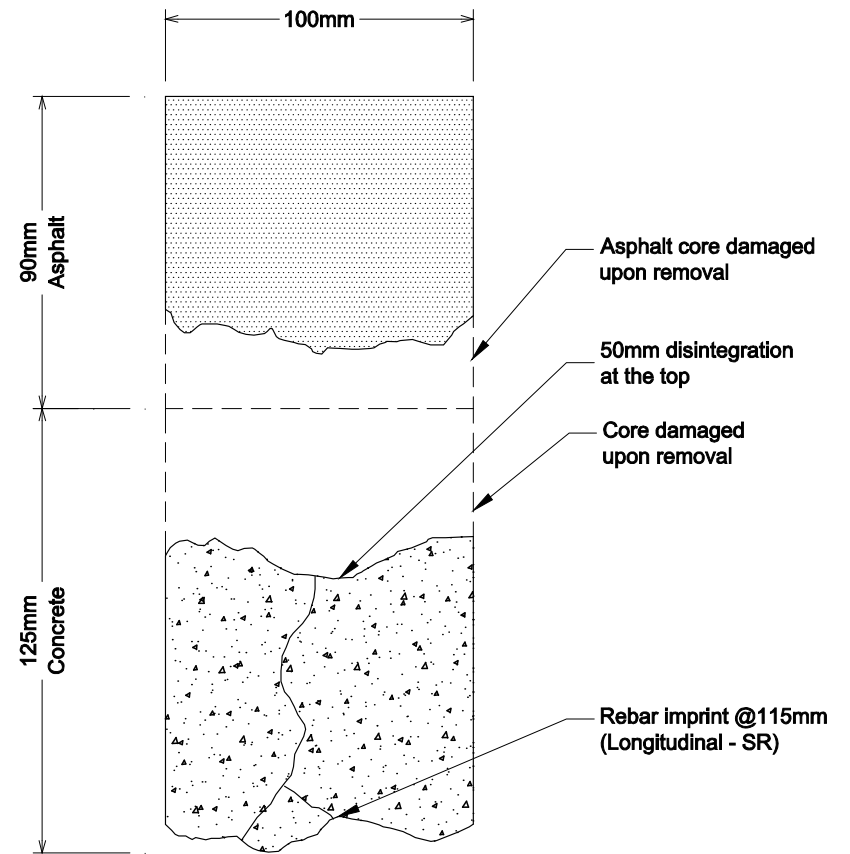


Core C8



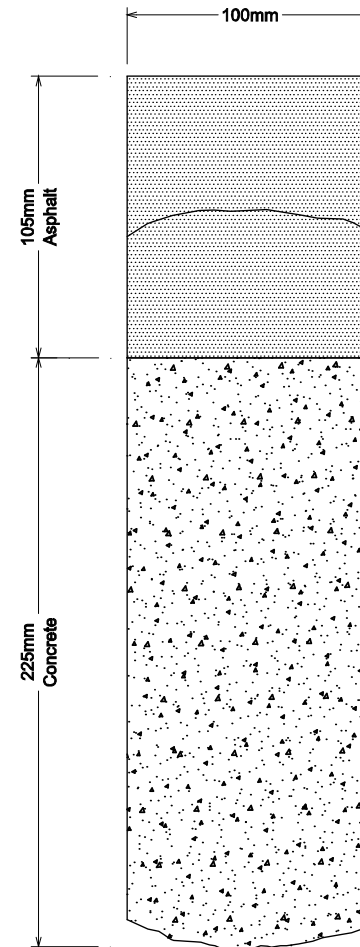


Core C9



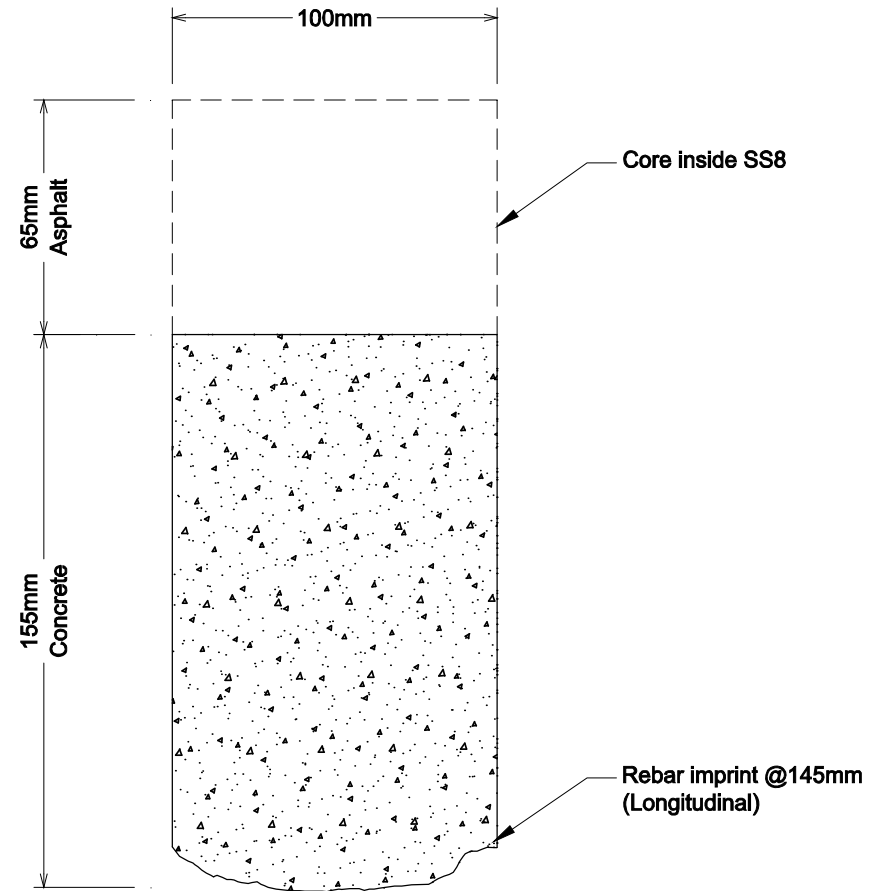


Core C10



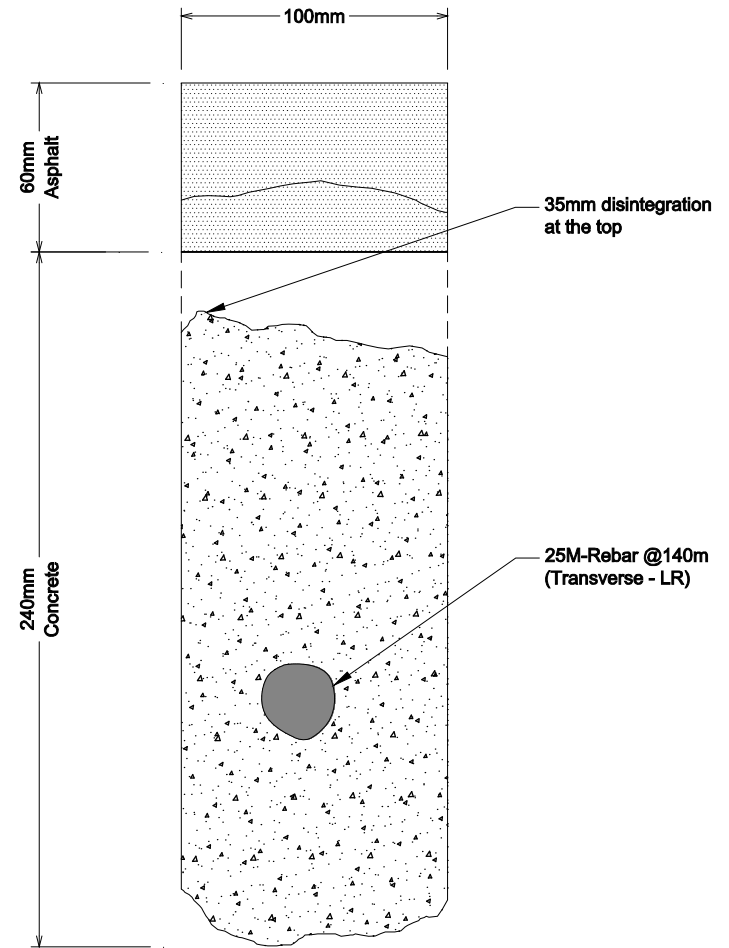


Core C11



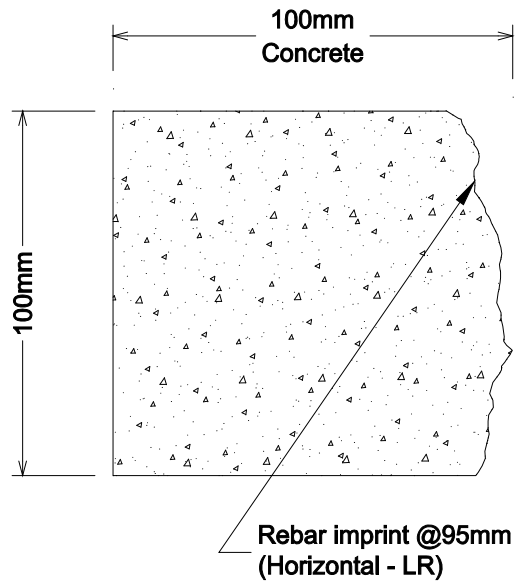


Core C12



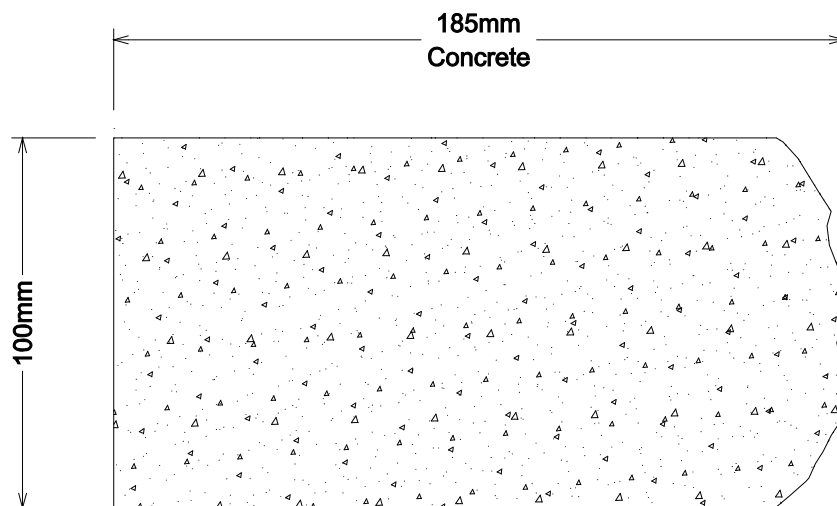


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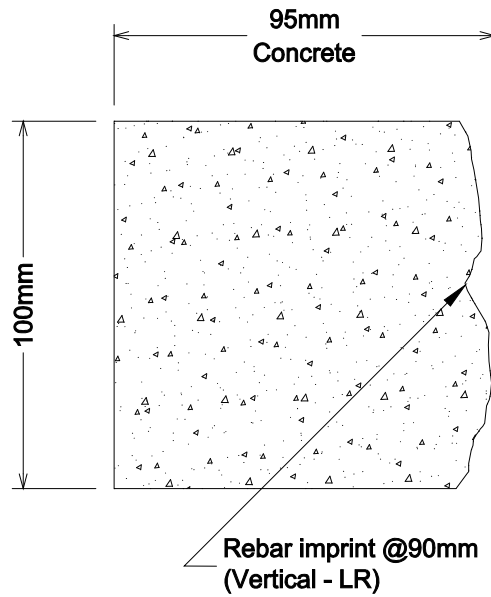


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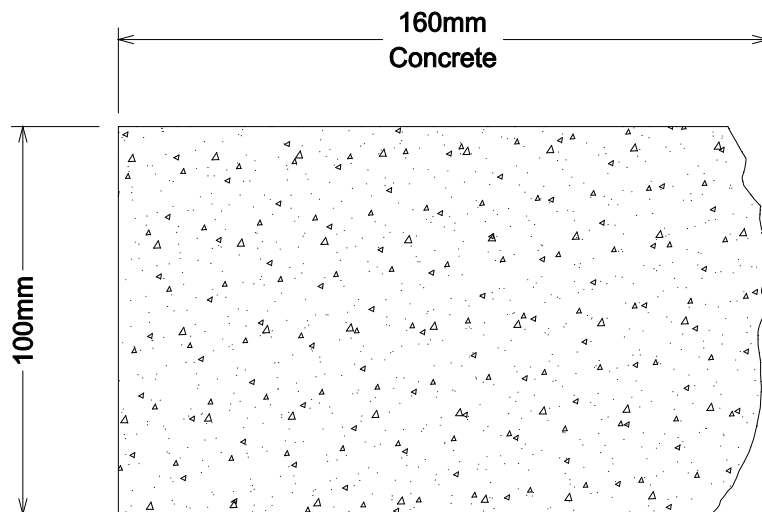


Core C15



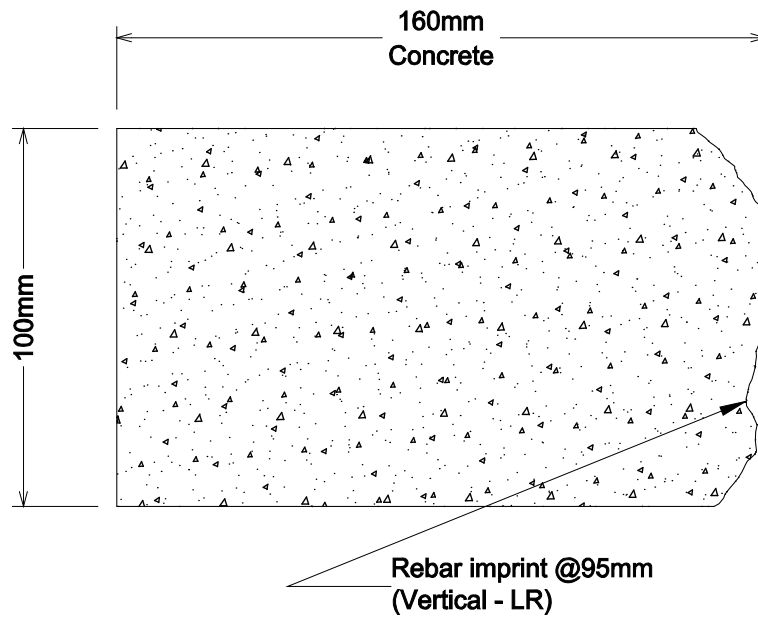


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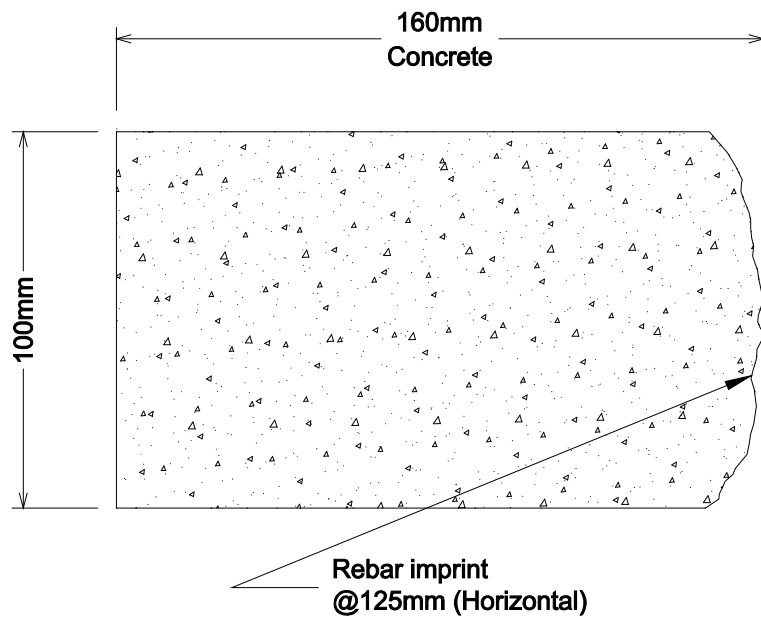


Core C17



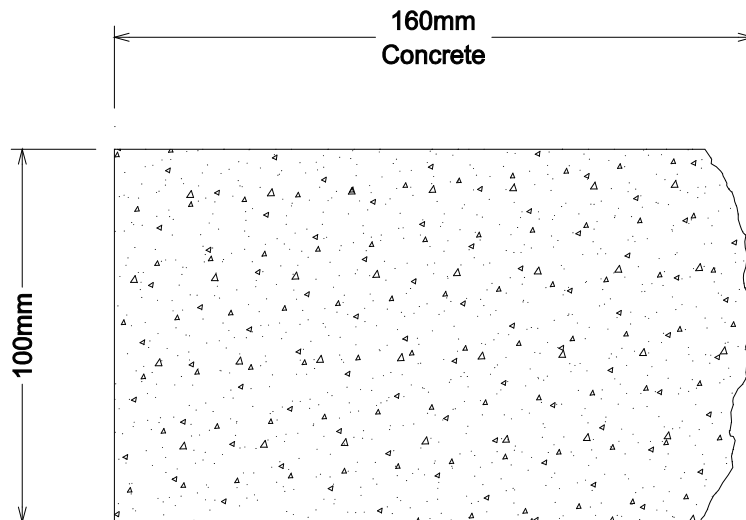


Core C18





Core C19





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Appendix D:

Core Logs

CORE LOG ASPHALT COVERED BRIDGE DECKS

Page 1 of 7

Site: **B26030042**

Core No.	C1	C2	C3
Location (between gridlines)	North Approach	'A' and '8'	'E' and '6'
Diameter, mm	100.0	100.0	100.0
Thickness of Asphalt, mm	55.0	70.0	95.0
Thickness of Asphalt @ Nearest Grid Point	N/A	70.0	95.0
Thickness of Concrete, mm	*N/A	*N/A	160.0
Full Depth (yes/no)	No	No	No
Condition of Asphalt ⁽¹⁾	G	G	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	P	F to G
Defects in Concrete ⁽²⁾	-	*	-
Condition of Rebar ⁽³⁾	N/A	N/A	LR
Corrosion Potential		-0.381	-0.461
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	Total	Corrected
TEST LABORATORY			BCC
REMARKS - orientation of rebars and cover - presence of overlay, patch and thickness - other observed defects	*Granular present.	*Disintegration at the top.	Rebar imprint @155mm (Longitudinal - 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

Core No.	C4		C5		C6		
Location (between gridlines)	'G' and '7'		'E' and '3'		'G' and '2'		
Diameter, mm	100.0		100.0		100.0		
Thickness of Asphalt, mm	65.0		110.0		80.0		
Thickness of Asphalt @ Nearest Grid Point	65.0		110.0		80.0		
Thickness of Concrete, mm	170.0		125.0		110.0		
Full Depth (yes/no)	No		No		No		
Condition of Asphalt ⁽¹⁾	P		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		P		
Defects in Concrete ⁽²⁾	-		*		*		
Condition of Rebar ⁽³⁾	G		LR		LR		
Corrosion Potential	-0.251		-0.422		-0.371		
Compressive Strength, MPa							
Chloride Content % Chloride by Weight of Concrete	0-10 mm	Total	Corrected	Total	Corrected	Total	Corrected
	20-30 mm	0.114	0.085				
	40-50 mm	0.087	0.058				
	60-70 mm	0.076	0.047	0.342	0.313		
	80-90 mm	0.068	0.039	0.223	0.194	0.141	0.112
	100-110 mm	0.043	0.014	0.210	0.181	0.107	0.078
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	Rebar imprint @165mm (Transverse). Asphalt core damaged upon removal.		*40mm Disintegration at the top. 2xRebar imprint @120mm (Longitudinal - LR).		*65mm Disintegration at the top. Rebar imprint @100mm (Longitudinal - 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

Core No.		C7		C8		C9	
Location (between gridlines)		'A' and '3'		'B' and '4'		'D' and '3'	
Diameter, mm		100.0		100.0		100.0	
Thickness of Asphalt, mm		80.0		80.0		90.0	
Thickness of Asphalt @ Nearest Grid Point		80.0		80.0		90.0	
Thickness of Concrete, mm		150.0		135.0		125.0	
Full Depth (yes/no)		No		No		No	
Condition of Asphalt ⁽¹⁾		P		P		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		P		P	
Defects in Concrete ⁽²⁾		*		*		*	
Condition of Rebar ⁽³⁾		LR		LR		SR	
Corrosion Potential		-0.423		-0.462		-0.455	
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						
	100-110 mm	0.113	0.084				
	120-130 mm	0.090	0.061				
	140-150 mm	0.069	0.040				
AIR VOIDS	Air Content,% Spec. Surf.,mm ² /mm ³ Spacing Factor, mm						
TEST LABORATORY							
REMARKS		*95mm Disintegration at the top. Rebar imprint @120mm (Longitudinal - LR). Rebar imprint @150mm (Transverse - LR).		*100mm Disintegration at the top. Rebar imprint @130mm (Longitudinal - LR).		*50mm Disintegration at the top. Rebar imprint @115mm (Longitudinal - SR). Core damaged upon removal. 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

Core No.		C10		C11		C12			
Location (between gridlines)		'B' and '6'		'B' and '7'		'A' and '7'			
Diameter, mm		100.0		100.0		100.0			
Thickness of Asphalt, mm		105.0		65.0		60.0			
Thickness of Asphalt @ Nearest Grid Point		105.0		65.0		60.0			
Thickness of Concrete, mm		225.0		155.0		240.0			
Full Depth (yes/no)		No		No		No			
Condition of Asphalt ⁽¹⁾		F		F to G		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		F		F to G		P			
Defects in Concrete ⁽²⁾		-		-		*			
Condition of Rebar ⁽³⁾		N/A		G		LR			
Corrosion Potential		-0.319		-0.326		-0.412			
Compressive Strength, MPa		49.5							
Chloride Content % Chloride by Weight of Concrete	0-10 mm	Total	Corrected	Total	Corrected	Total	Corrected		
	20-30 mm							0.188	0.159
	40-50 mm							0.177	0.148
	60-70 mm							0.158	0.129
	80-90 mm							0.141	0.112
				0.117	0.088				
AIR VOIDS	Air Content,% Spec. Surf.,mm ² /mm ³ Spacing Factor, mm								
TEST LABORATORY		BCC							
REMARKS				Rebar imprint @145mm (Longitudinal). Core inside SS8.		*35mm Disintegration at the top. 25M-Rebar @140m (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 FOR EXPOSED CONCRETE

Page 5 of 7

Site: **B26030042**

Core No.	C13	C14	C15
Location (between gridlines)	North Abutment	North Abutment	South Abutment
Diameter, mm	100.0	100.0	100.0
Length, mm	100.0	185.0	95.0
Full Depth (yes/no)	No	No	No
Defects in Concrete ⁽¹⁾	-	-	-
Condition of Rebar ⁽²⁾	LR	N/A	LR
Corrosion Potential	-0.270	-0.266	-0.423
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 0.059 0.059 0.055 0.041 0.031	Corrected 0.028 0.028 0.024 0.010 0.000
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	Rebar imprint @95mm (Horizontal - LR).		Rebar imprint @90mm (Vertical - LR).

1. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

2. 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 FOR EXPOSED CONCRETE

Page 6 of 7

Site: **B26030042**

Core No.	C16	C17	C18																																																												
Location (between gridlines)	South Abutment	South Abutment	NW Wingwall																																																												
Diameter, mm	100.0	100.0	100.0																																																												
Length, mm	160.0	160.0	160.0																																																												
Full Depth (yes/no)	No	No	No																																																												
Defects in Concrete ⁽¹⁾	-	-	-																																																												
Condition of Rebar ⁽²⁾	N/A	LR	G																																																												
Corrosion Potential	-0.423	-0.317	-0.286																																																												
Compressive Strength, MPa			47.1																																																												
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 10%;">Total</td> <td style="width: 10%;">Corrected</td> <td style="width: 10%;">Total</td> <td style="width: 10%;">Corrected</td> <td style="width: 10%;">Total</td> <td style="width: 10%;">Corrected</td> </tr> <tr> <td>Chloride</td> <td>0-10 mm</td> <td>0.062</td> <td>0.031</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Content %</td> <td>20-30 mm</td> <td>0.049</td> <td>0.018</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Chloride by</td> <td>40-50 mm</td> <td>0.045</td> <td>0.014</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Weight of</td> <td>60-70 mm</td> <td>0.042</td> <td>0.011</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Concrete</td> <td>80-90 mm</td> <td>0.042</td> <td>0.011</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>100-110 mm</td> <td>0.041</td> <td>0.010</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>			Total	Corrected	Total	Corrected	Total	Corrected	Chloride	0-10 mm	0.062	0.031					Content %	20-30 mm	0.049	0.018					Chloride by	40-50 mm	0.045	0.014					Weight of	60-70 mm	0.042	0.011					Concrete	80-90 mm	0.042	0.011						100-110 mm	0.041	0.010											
			Total	Corrected	Total	Corrected	Total	Corrected																																																							
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	Spec. Surf., mm ² /mm ³																																																														
	Spacing Factor, mm																																																														
TEST LABORATORY							BCC																																																								
REMARKS																																																															
<ul style="list-style-type: none"> - orientation of rebars and cover - presence of overlay, patch and thickness - other observed defects 					Rebar imprint @95mm (Vertical - LR).		Rebar imprint @125mm (Horizontal).																																																								

1. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

2. 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 FOR EXPOSED CONCRETE

Page 7 of 7

Site: **B26030042**

Core No.	C19					
Location (between gridlines)	SW Wingwall					
Diameter, mm	100.0					
Length, mm	160.0					
Full Depth (yes/no)	No					
Defects in Concrete ⁽¹⁾	-					
Condition of Rebar ⁽²⁾	N/A					
Corrosion Potential	-0.165					
Compressive Strength, MPa						
Chloride Content % Chloride by Weight of Concrete	0-10 mm	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						

1. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

2. 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



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Appendix E:

Sawn Asphalt Sample Photographs



Photo S1 – Sawn Sample SS1



Photo S2 – Sawn Sample SS2



Photo S3 – Sawn Sample SS3



Photo S4 – Sawn Sample SS4



Photo S5 – Sawn Sample SS5 (disintegration) note exposed and corroded rebar



Photo S6 – Sawn Sample SS5 (disintegration) note exposed and corroded rebar



Photo S7 – Sawn Sample SS6



Photo S8 – Sawn Sample SS7



Photo S9 – Sawn Sample SS8



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Appendix F:

Sawn Asphalt Sample Logs

SAWN ASPHALT SAMPLE LOG

Page 1 of 3

Site No: **B26030042**

Sample No.	SS1	SS2	SS3
Location (between gridlines)	'F' and '7'	'E' and '5'	'G' and '3'
Size, mm X mm	280x220	250x240	300x260
Thickness of Asphalt, mm	90	105	95
Thickness of Asphalt @ Nearest Grid Point	90	105	95
Condition of Asphalt ⁽¹⁾	F	F	F
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	F	F
Concrete Cover to Reinf., mm	118T	162T	89T
Defects in Concrete Surface ⁽²⁾	-	-	-
Corrosion Potential on Concrete Surface	-0.305	-0.331	-0.322
Remarks			

1. Condition - G = Good, F = Fair, P = Poor.

2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

SAWN ASPHALT SAMPLE LOG

Page 2 of 3

Site No: **B26030042**

Sample No.	SS4	SS5	SS6
Location (between gridlines)	'D' and '1'	'A' and '1'	'B' and '3'
Size, mm X mm	250x250	260x250	270x230
Thickness of Asphalt, mm	90	80	95
Thickness of Asphalt @ Nearest Grid Point	90	80	95
Condition of Asphalt ⁽¹⁾	F	P	F
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	P	F
Concrete Cover to Reinf., mm	105L	120T	118T
Defects in Concrete Surface ⁽²⁾	-	*	-
Corrosion Potential on Concrete Surface	-0.461	-0.465	-0.460
Remarks		*145mm disintegration at the top. Rebar imprint @120mm (Transverse - LR).	

1. Condition - G = Good, F = Fair, P = Poor.

2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling

SAWN ASPHALT SAMPLE LOG

Page 3 of 3

Site No: **B26030042**

Sample No.	SS7	SS8	
Location (between gridlines)	'C' and '5'	'B' and '7'	
Size, mm X mm	280x275	340x280	
Thickness of Asphalt, mm	100	65	
Thickness of Asphalt @ Nearest Grid Point	100	65	
Condition of Asphalt ⁽¹⁾	F to G	F to G	
Waterproofing (W/P) Type	N/A	N/A	
W/P Thickness, mm	N/A	N/A	
Condition of W/P ⁽¹⁾	N/A	N/A	
Bond of W/P to Asphalt	N/A	N/A	
Bond of Asphalt or W/P to Concrete	F	F	
Concrete Cover to Reinf., mm	125T	115L	
Defects in Concrete Surface ⁽²⁾	-	-	
Corrosion Potential on Concrete Surface	-0.464	-0.322	
Remarks			

1. Condition - G = Good, F = Fair, P = Poor.

2. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling



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Appendix G:

Site Photographs



Photo P1 – East Elevation



Photo P2 – West Elevation



Photo P3 – Deck General View, looking north



Photo P4 – Deck General View, looking south



Photo P5 – Deck Wearing Surface (fair condition – unsealed cracks)



Photo P6 – Deck Wearing Surface (unsealed cracks)



Photo P7 – Deck Wearing Surface (unsealed cracks)



Photo P8 – Deck Wearing Surface (unsealed cracks) note minor settlement



Photo P9 – Soffit (fair condition – cracks, delamination and wet area)



Photo P10 – Soffit at North Abutment, east edge (cracks, delamination and wet area) note medium corrosion on deck drain



Photo P11 – Soffit at North Abutment (cracks, delamination and wet area)



Photo P12 – Soffit (cracks, delamination and wet area)



Photo P13 – Soffit (crack and wet area)



Photo P14 – North Approach Wearing Surface (fair condition – unsealed cracks) note settlement



Photo P15 – North Approach Wearing Surface (unsealed cracks) note settlement



Photo P16 – South Approach Wearing Surface (fair to good condition – unsealed cracks)



Photo P17 – Northeast Deck Drainage



Photo P18 – Northwest Deck Drainage



Photo P19 – Southeast Deck Drainage



Photo P20 – Southwest Deck Drainage



Photo P21 – Northeast Catch Basin



Photo P22 – Northwest Catch Basin



Photo P23 – Southeast Catch Basin



Photo P24 – East Sidewalk (fair condition – wide crack, spall, delamination and light/medium scaling) and Parapet Wall (fair to good condition – cracks, delamination and light scaling)



Photo P25 – East Parapet Wall (crack and light scaling)



Photo P26 – East Sidewalk (medium scaling)



Photo P27 – East Sidewalk (light/medium scaling)



Photo P28 – East Sidewalk @ South Approach (spall, delamination and light/medium scaling)



Photo P29 – East Sidewalk @ South Approach (spall and light scaling)



Photo P30 – West Curb (fair to good condition – cracks and medium scaling) **and Parapet Wall** (fair condition – cracks, spall and delamination)



Photo P31 – West Parapet Wall (spall and delamination)



Photo P32 – West Parapet Wall (spall and delamination)



Photo P33 – West Parapet Wall (crack, spall and delamination)



Photo P34 – West Curb (crack and medium scaling)



Photo P35 – West Curb (crack and medium scaling)



Photo P36 – Northeast End Post (fair to good condition – light scaling)



Photo P37 – Northeast End Post (light scaling)



Photo P38 – Northwest End Post (good condition)



Photo P39 – Southeast End Post note missing handrail end cap



Photo P40 – Southwest End Post note missing handrail end cap



Photo P41 – Southeast Guiderail (good condition)



Photo P42 – North Abutment (fair to good condition – wide crack and wet area)



Photo P43 – North Abutment (wide crack and wet area)



Photo P44 – North Abutment (wide crack and wet area)



Photo P45 – South Abutment (good condition – cracks)



Photo P46 – South Abutment (cracks)



Photo P47 – Northeast Wingwall (good condition)



Photo P48 – Northwest Wingwall (good condition)



Photo P49 – Southeast Wingwall (good condition)



Photo P50 – Southwest Wingwall (good condition)



Photo P51 – Northeast Gabion Wall (good condition)



Photo P52 – Northwest Gabion Wall (fair to good condition – bulging)



Photo P53 – Northwest Gabion Wall (bulging)



Photo P54 – Southeast Gabion Wall (fair condition – overturning)



Photo P55 – Southwest Gabion Wall (fair condition – overturning and damaged gabion basket)



Photo P56 – Southwest Gabion Wall (overturning and damaged gabion basket)



Photo P57 – Northeast Embankment (fair to good condition – soil erosion)



Photo P58 – Northwest Embankment (fair to good condition – soil erosion)



Photo P59 – Southeast Embankment (fair to good condition – soil erosion)



Photo P60 – Southwest Embankment (fair to good condition – soil erosion)



Photo P61 – Typical Condition of Inside Core – C1 (north approach; granular)



Photo P62 – Typical Condition of Inside Core – C4



Photo P63 – Typical Condition of Inside Core – C6 (disintegration)



Photo P64 – Typical Condition of Inside Core – C6 (disintegration)



Photo P65 – Typical Condition of Inside Core – C8 (disintegration)



Photo P66 – Typical Condition of Inside Core – C8 (disintegration)



Photo P67 – Typical Condition of Inside Core – C9 (disintegration)



Photo P68 – Typical Condition of Inside Core – C9 (disintegration)



Photo P69 – Typical Condition of Inside Core – C11 (inside SS8)



Photo P70 – Typical Condition of Inside Core – C12 (disintegration)



Photo P71 – Typical Condition of Inside Core – C13 (north abutment)



Photo P72 – Typical Condition of Inside Core – C15 (south abutment)



Photo P73 – Typical Condition of Inside Core – C18 (Northwest wingwall)



Photo P74 – Upstream



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Photo P75 – Downstream



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Appendix H:

Laboratory Test Results



COMPRESSIVE STRENGTH OF CONCRETE CORES
(CSA A23.2-14C)

Project No.:	BCC19012
Site No.:	B26030042
Location:	Main Street, Alton, 0.02 km north of Queen Street

Core ID	C10	C18
Location	Deck	South Abutment
Lab No.	L19-0138	L19-0142
Date Cast	-	-
Date Cored	Apr 17, 2019	Apr 17, 2019
Date Tested	Apr 23, 2019	Apr 23, 2019
Capped Height (mm)	190.0	124.1
Average Diameter (mm)	100.0	100.0
Density (kg/m³)	2328	2331
Corrected Compressive Strength (MPa)	49.5	47.1
* Direction of Loading	Same as	Perpendicular
Moisture Content at Time of Test	Moist	Moist
Remarks		

*Relative to the direction of original placement.

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



TOTAL CHLORIDE ION CONTENT
(Testing Method: MTO LS – 417)

Project No.:	BCC19012
Site No.:	B26030042
Location:	Main Street, Alton , 0.02 km north of Queen Street

Core ID	Lab No.	Horizon from the Top of the Core (mm)	Chloride Ion Content (%)	Chloride Ion Content Corrected for Background* (%)
C4	L19-0134	0-10	0.114	0.085
		20-30	0.087	0.058
		40-50	0.076	0.047
		60-70	0.068	0.039
		80-90	0.043	0.014
		100-110	0.029	0.000
C5	L19-0135	40-50	0.342	0.313
		60-70	0.223	0.194
		80-90	0.210	0.181
		100-110	0.216	0.187
C6	L19-0136	60-70	0.141	0.112
		80-90	0.107	0.078
		100-110	0.086	0.057
C7	L19-0137	100-110	0.113	0.084
		120-130	0.090	0.061
		140-150	0.069	0.040
C11	L19-0139	0-10	0.188	0.159
		20-30	0.177	0.148
		40-50	0.158	0.129
		60-70	0.141	0.112
		80-90	0.117	0.088
C13	L19-0140	0-10	0.059	0.028
		20-30	0.059	0.028
		40-50	0.055	0.024
		60-70	0.041	0.010
		80-90	0.031	0.000
C16	L19-0141	0-10	0.062	0.031
		20-30	0.049	0.018
		40-50	0.045	0.014
		60-70	0.042	0.011
		80-90	0.042	0.011
		100-110	0.041	0.010

c* Background chloride (original concrete) = 0.029

*Background chloride (substructure concrete) = 0.031

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



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A handwritten signature in blue ink, appearing to read 'Savio DeSouza', is written over a horizontal line.

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

Tested By: Shervin M

Date Tested: May 6, 2019



AIR VOID TEST RESULTS
(Modified Point Count – ASTM C457, Procedure B)

Project No.:	BCC19012
Site No.:	B26030042
Location:	Main Street, Alton, 0.02 km north of Queen Street

Core ID	C3
Lab No.	L19-0133
Air Content (%)	4.7
Specific Surface (mm⁻¹)	21.00
Spacing Factor (mm)	0.218
Length of Traverse (mm)	3819.2
Area Traversed (mm²)	11075.68
Average Chord Length	0.190
Number of Stops	1364
No. of Voids per mm	0.246
Paste-Air Ratio	4.92
Paste Content (%)	23.09
Aggregate Content (%)	72.22

Tested By: Brad Wiersma
Date Tested: May 4, 2018

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

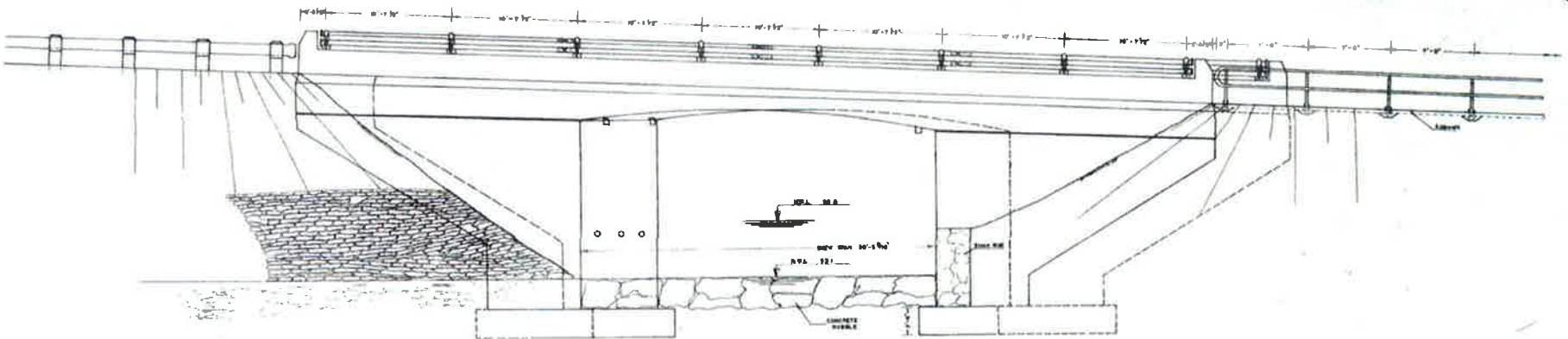


BRIDGE CHECK CANADA Ltd.

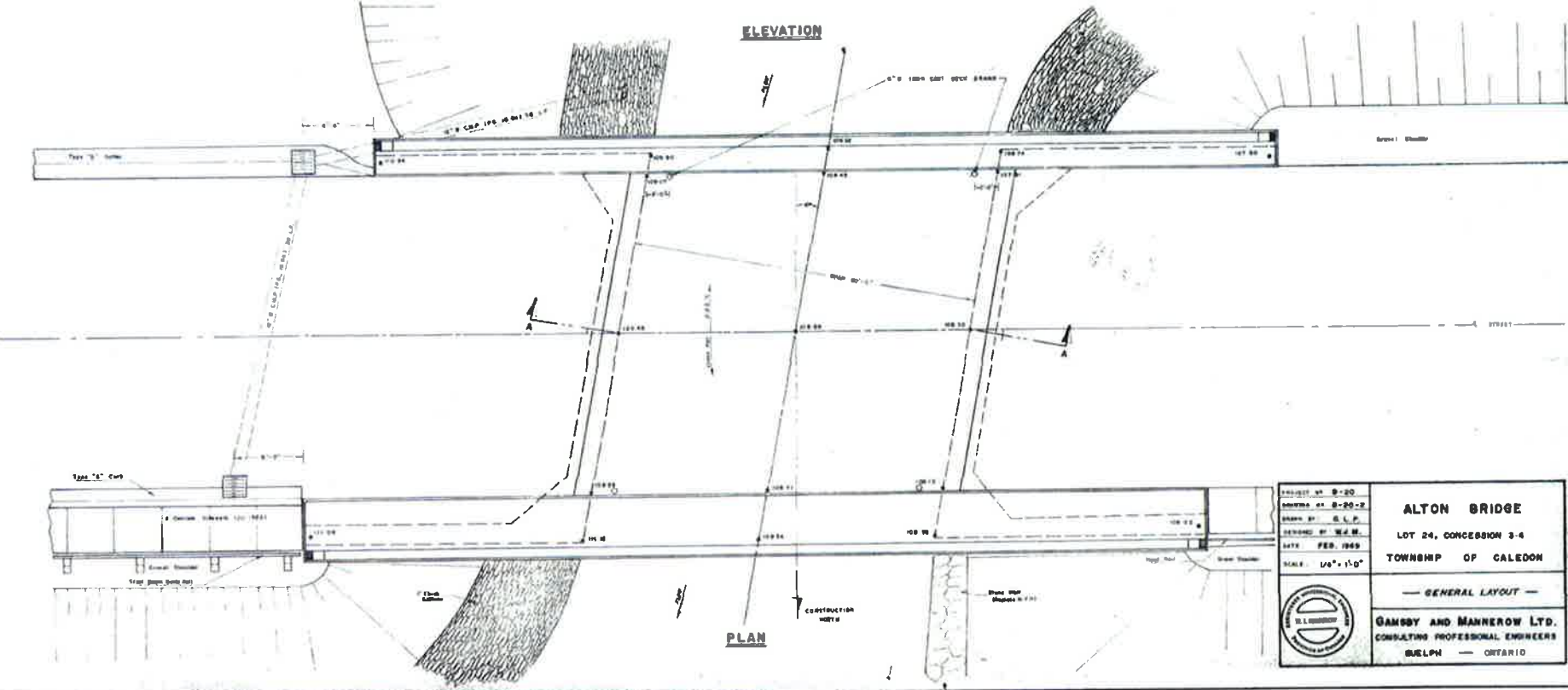
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Appendix I:

General Arrangement Drawing



ELEVATION



PLAN

PROJECT NO. B-20	<p>ALTON BRIDGE</p> <p>LOT 24, CONCESSION 3-4</p> <p>TOWNSHIP OF CALEDON</p> <p>— GENERAL LAYOUT —</p> <p>GAMBY AND MANNEROW LTD.</p> <p>CONSULTING PROFESSIONAL ENGINEERS</p> <p>MELPH — ONTARIO</p>
DRAWN BY S. L. P.	
DESIGNED BY W. E. M.	
DATE FEB. 1949	
SCALE 1/4" = 1'-0"	



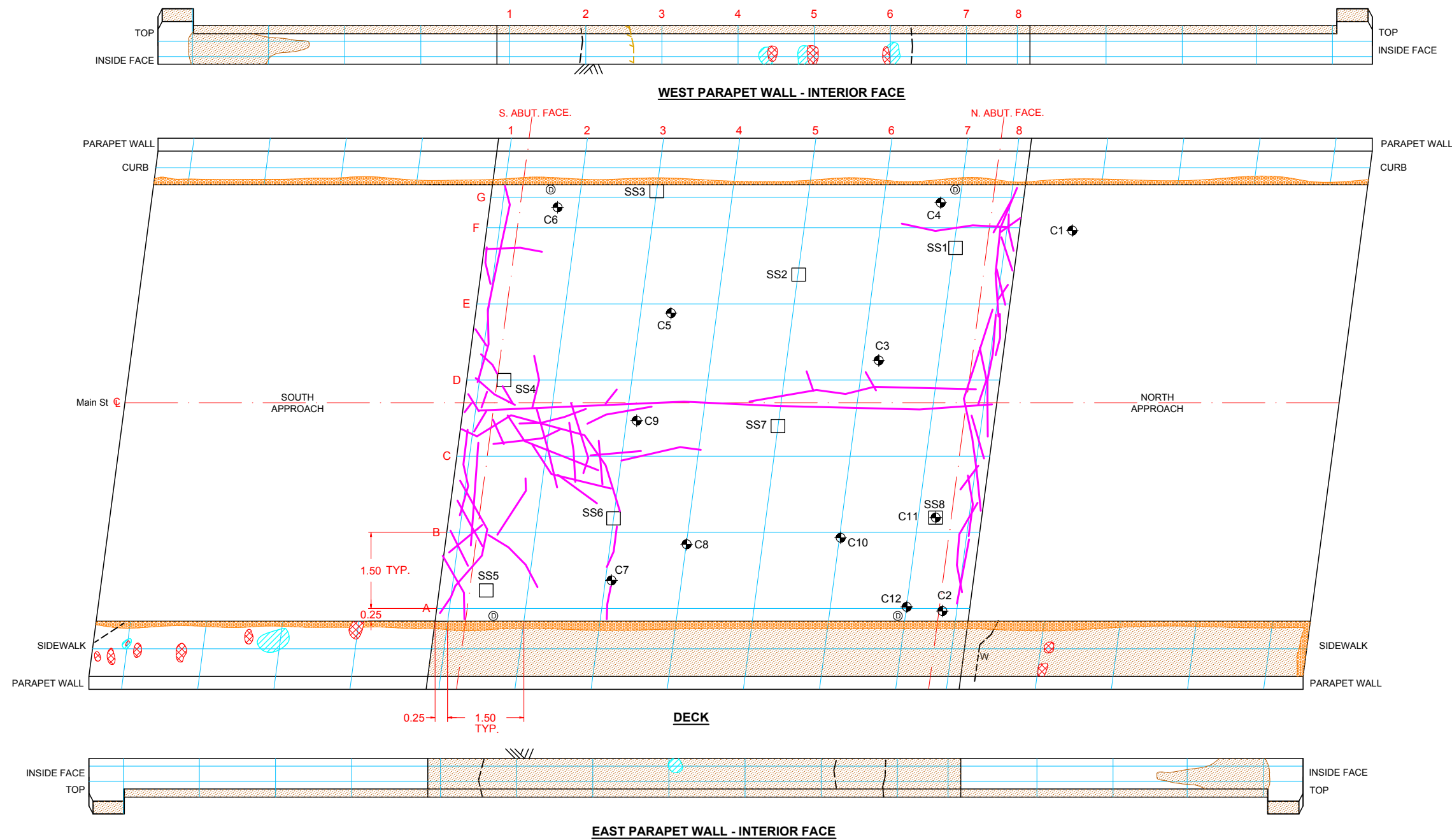
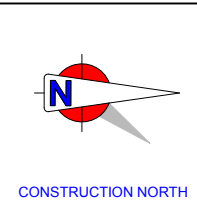


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Appendix J:

ACAD Drawings



LEGEND:

⊙	Drain		Medium Scaling		Medium Concrete Cracks
C1 ⊕	Core Sample Location		Severe Scaling		Wide Concrete Cracks
SS1 □	Sawn Sample Location		Honeycombed Areas		Medium Stained/ Efflorescence Cracks
	Patched Spalls		Wet Areas		Unsealed Asphalt Cracks
	Delaminations		Concrete Pattern Cracks		Sealed Asphalt Cracks
	Spalls		Raveling		Rutting
	Light Scaling		Pot Hole/ Asphalt Patch		

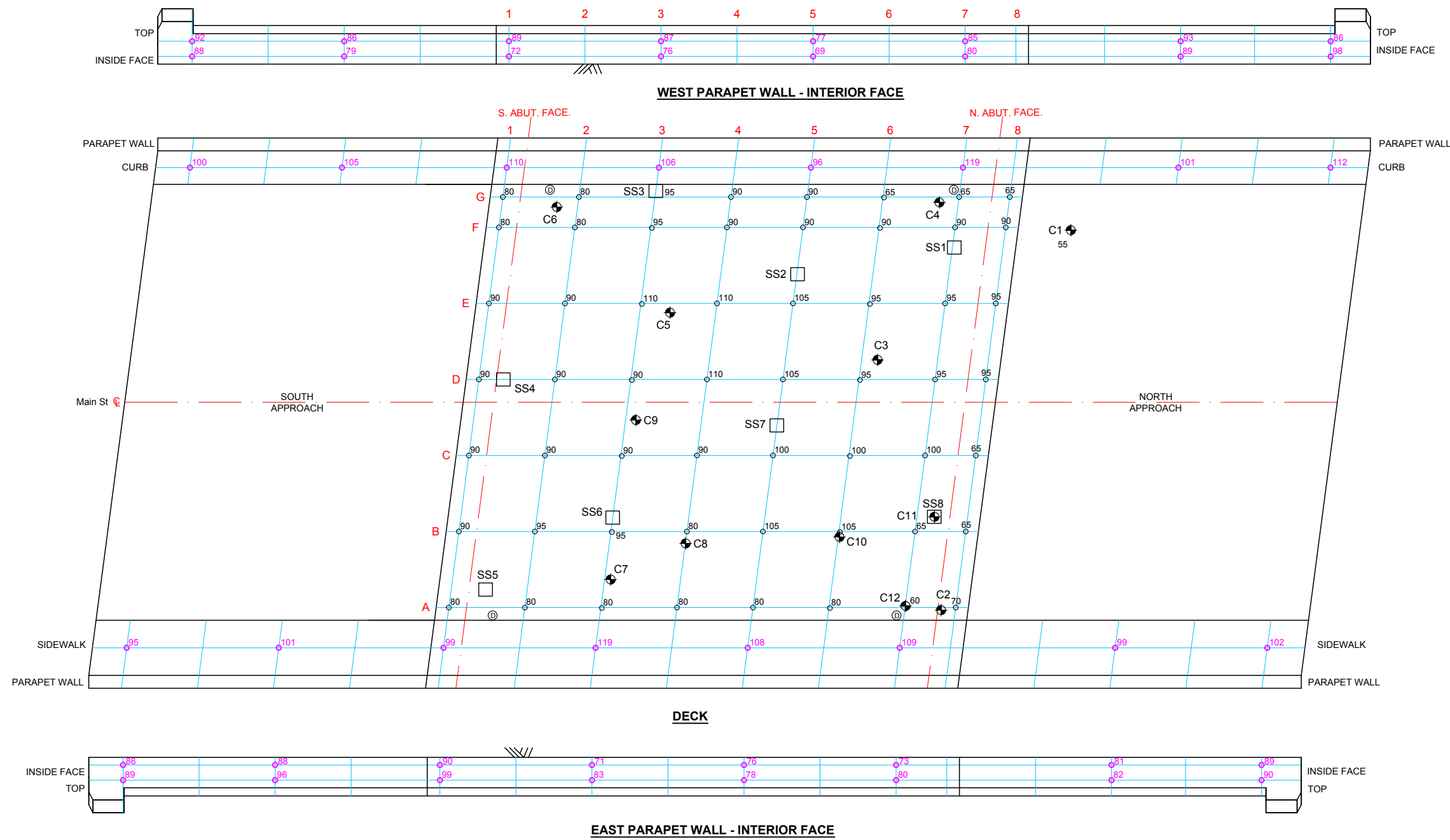
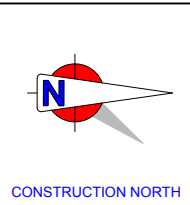
BRIDGE CHECK CANADA

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

PROJECT:
Main Street, Alton 0.02km North
of Queen Street
Site No. B26030042
Caledon, ON

TITLE:
SURFACE DETERIORATION OF
ASPHALT ON DECK, CONCRETE
SIDEWALK, CURB AND
PARAPET WALLS

Drawing No.:	1
Project No.:	BCC19012
Date:	May 2019
Scale:	1:100
Drawn by:	JL
Checked by:	MA



LEGEND:			
⊙	Drain		Cover from 20mm to 39mm
C1 ⊕	Core Sample Location		Cover less than 20mm
SS1 □	Sawn Sample Location	⊕	AC Resistance test Location
80	Asphalt Thickness-mm	⊙	Ground Location
80	Concrete cover-mm	⊗	Ground Check Location
	Cover over 60mm		-0.200 to -0.299 volts
	Cover from 40mm to 60mm		BWD-PARAPET wall dowel inspection
	Cover from 20mm to 39mm		-0.300 to -0.349 volts
	Cover less than 20mm		-0.350 to -0.449 volts
	AC Resistance test Location		more negative than -0.450 volts
	Ground Location		Copper-Copper Sulphate Half-Cell Potential (negative volts x10 ⁻³)
	Ground Check Location		AC Test Result

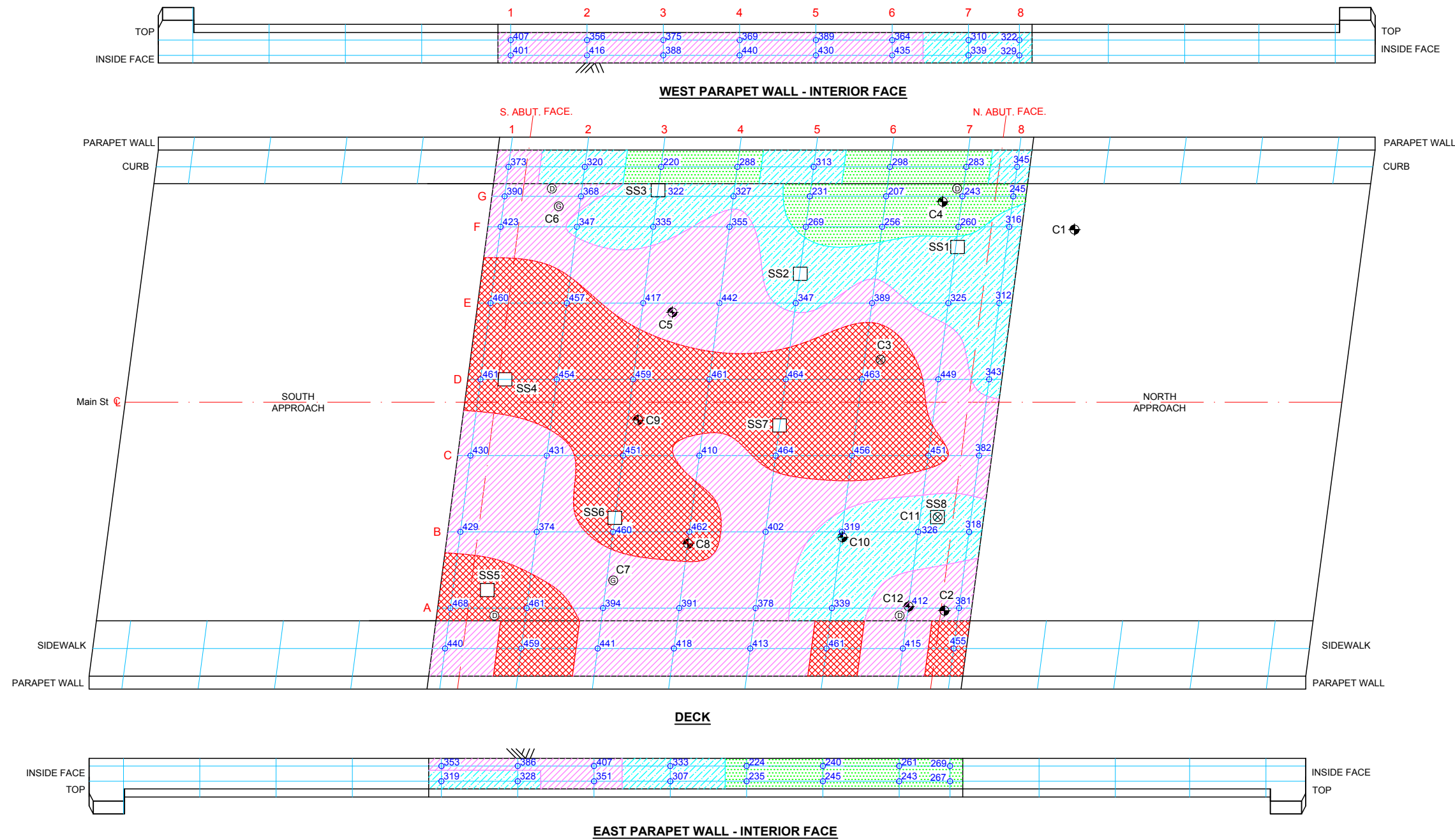
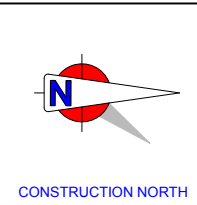
BRIDGE CHECK CANADA

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

PROJECT:
Main Street, Alton 0.02km North of Queen Street
Site No. B26030042
Caledon, ON

TITLE:
ASPHALT THICKNESS ON DECK, CONCRETE COVER OF SIDEWALK, CURB AND PARAPET WALLS

Drawing No.:	2
Project No.:	BCC19012
Date:	May 2019
Scale:	1:100
Drawn by:	JL
Checked by:	MA



LEGEND:			
⊙	Drain	▨ (diagonal lines)	Cover from 20mm to 39mm
C1 ⊕	Core Sample Location	▨ (cross-hatch)	Cover less than 20mm
SS1 □	Sawn Sample Location	⊕	AC Resistance test Location
80°	Asphalt Thickness-mm	⊙	Ground Location
80°	Concrete cover-mm	⊗	Ground Check Location
□	Cover over 60mm	⊕	BWD-PARAPET wall dowel inspection
▨ (dotted)	Cover from 40mm to 60mm	⊕	AC Test Result
		⊕	460
			Copper-Copper Sulphate Half-Cell Potential (negative volts x 10 ⁻³)
			0.000
			AC Test Result

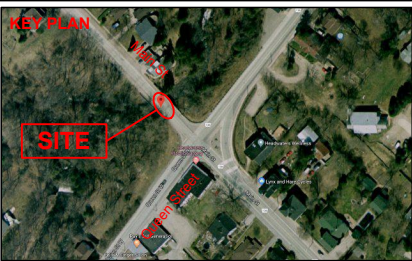
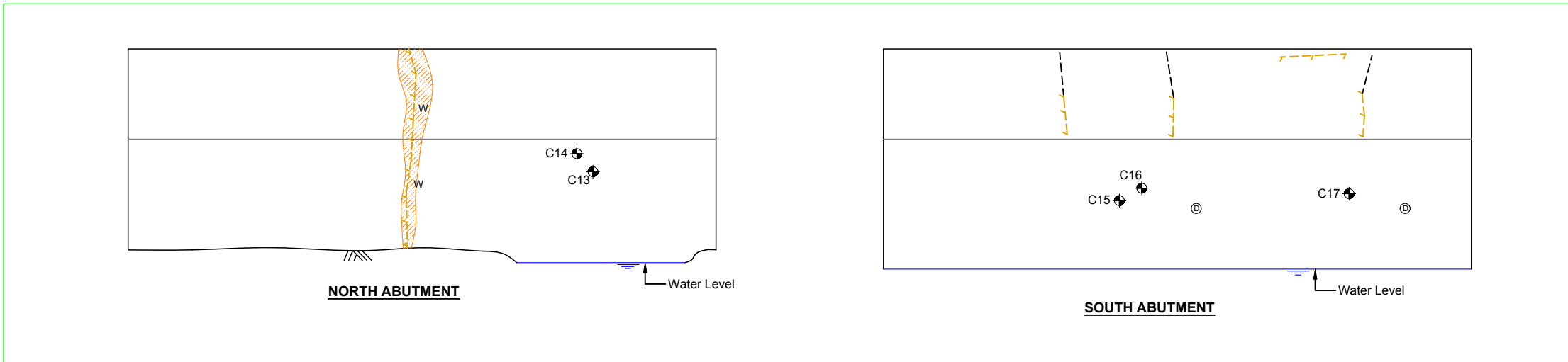
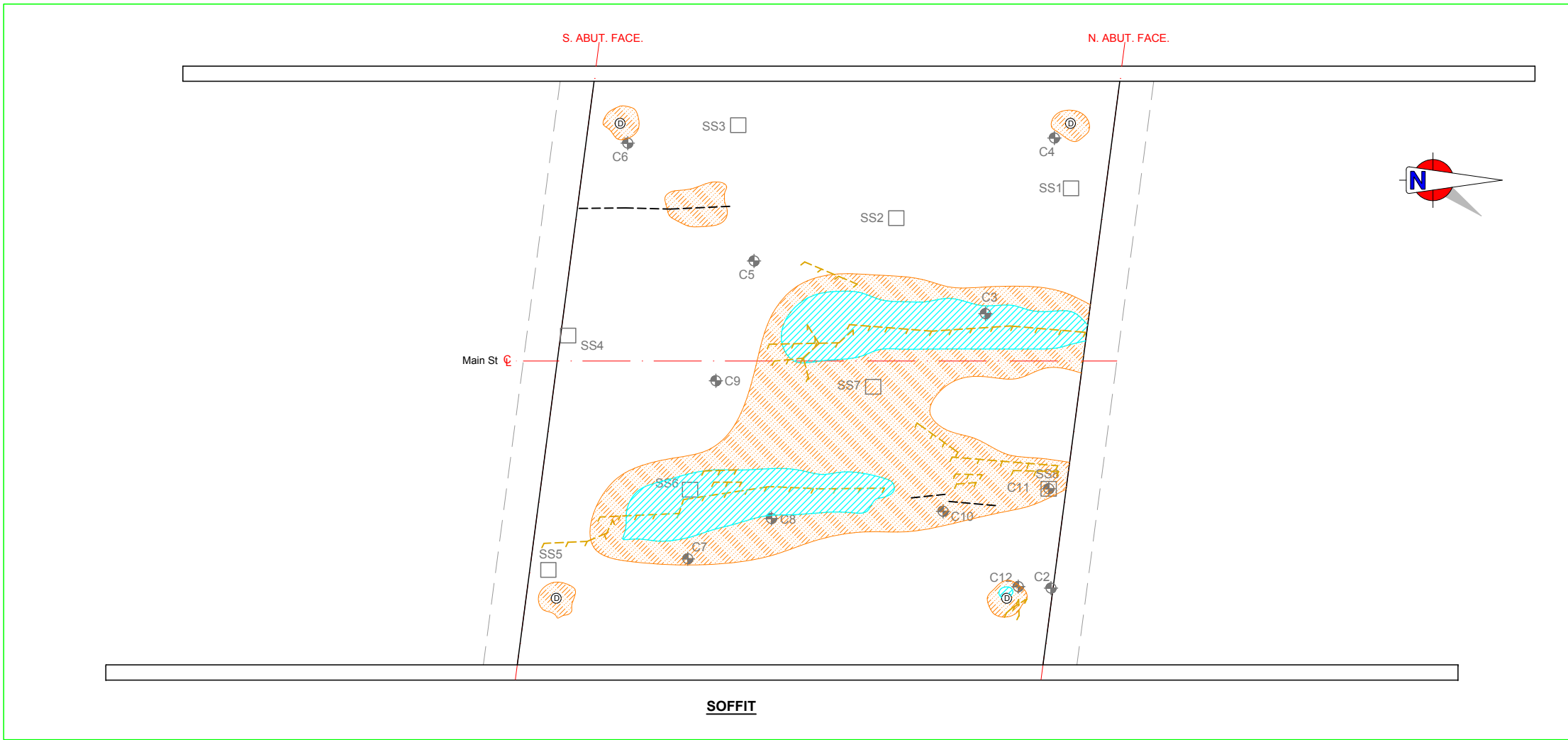
BRIDGE CHECK CANADA

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

PROJECT:
 Main Street, Alton 0.02km North of Queen Street
 Site No. B26030042
 Caledon, ON

TITLE:
 CORROSION POTENTIAL OF DECK, SIDEWALK, CURB AND PARAPET WALLS

Drawing No.:	3
Project No.:	BCC19012
Date:	May 2019
Scale:	1:100
Drawn by:	JL
Checked by:	MA



LEGEND:

⊙	Drain	▨	Medium Scaling	— — —	Medium Concrete Cracks
C1 ⊕	Core Sample Location	▩	Severe Scaling	— W —	Wide Concrete Cracks
SS1 □	Sawn Sample Location	⊞	Honeycombed Areas	— — —	Medium Stained/ Efflorescence Cracks
▤	Patched Spalls	▨	Wet Areas	— W —	Wide Stained/ Efflorescence Cracks
▨	Delaminations	▭	Concrete Pattern Cracks		
▩	Spalls				
▨	Light Scaling				

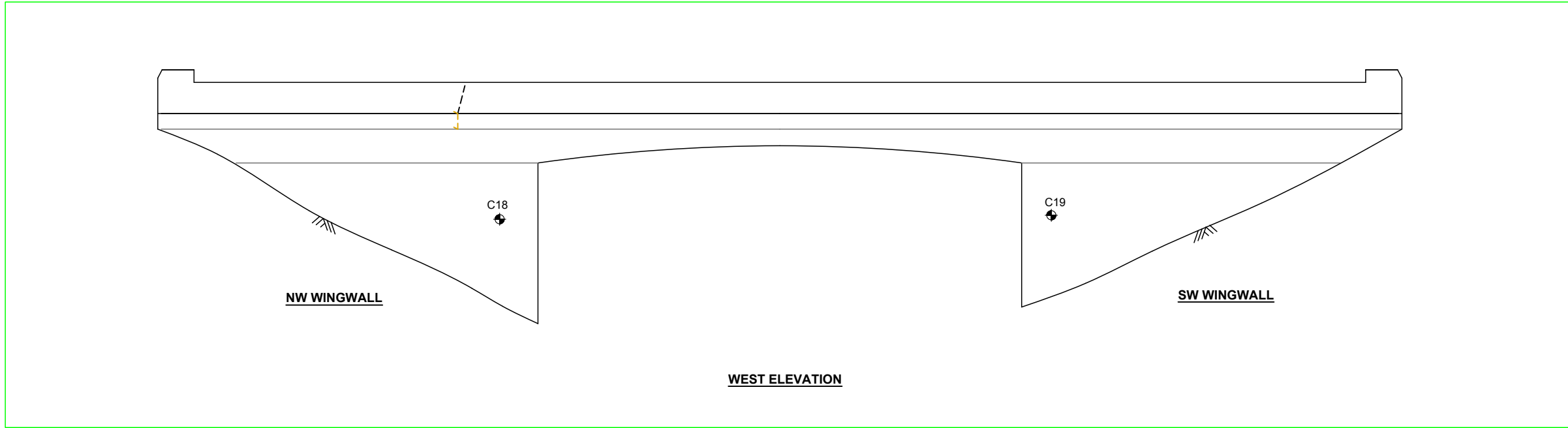
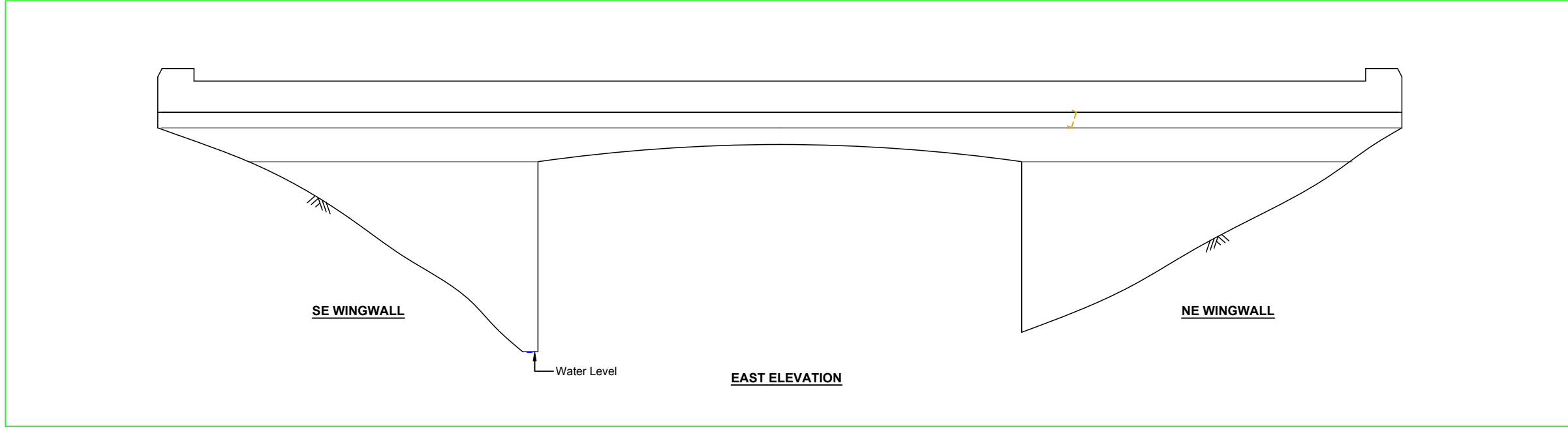
BRIDGE CHECK CANADA

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

PROJECT:
 Main Street, Alton 0.02km North
 of Queen Street
 Site No. B26030042
 Caledon, ON

TITLE:
 SURFACE DETERIORATION OF
 SOFFIT AND ABUTMENTS

Drawing No.:	4
Project No.:	BCC19012
Date:	May 2019
Scale:	1:100
Drawn by:	JL
Checked by:	MA



LEGEND:

⊙ Drain	Medium Scaling	— — — Medium Concrete Cracks
C1 ⊕ Core Sample Location	Severe Scaling	— W — Wide Concrete Cracks
▤ Patched Spalls	Honeycombed Areas	— — — Medium Stained/ Efflorescence Cracks
▨ Delaminations	Wet Areas	
▩ Spalls	Concrete Pattern Cracks	
▧ Light Scaling		

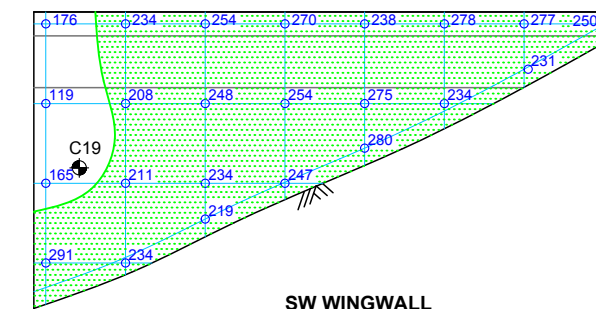
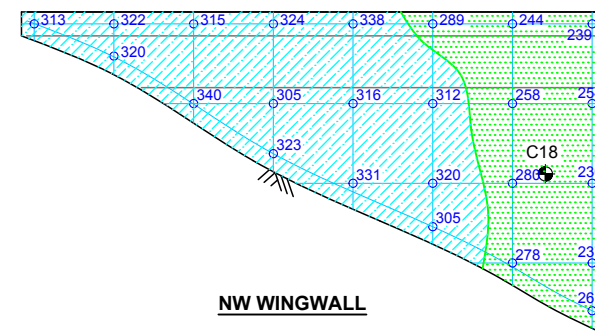
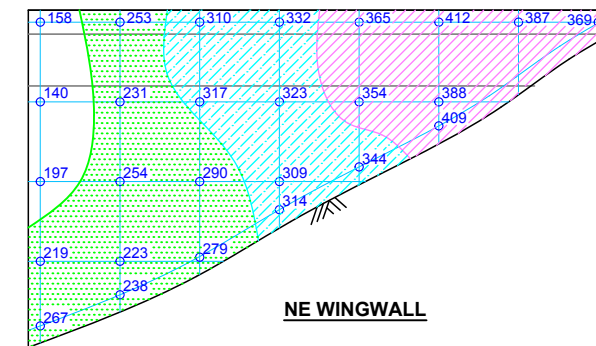
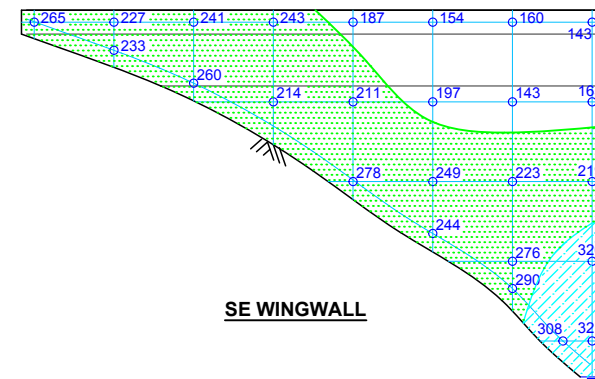
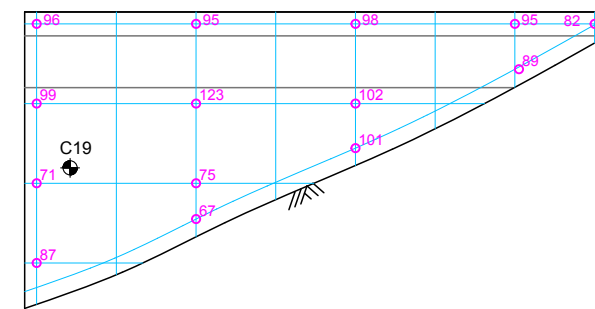
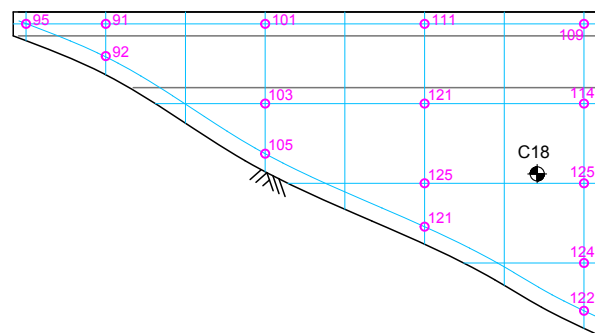
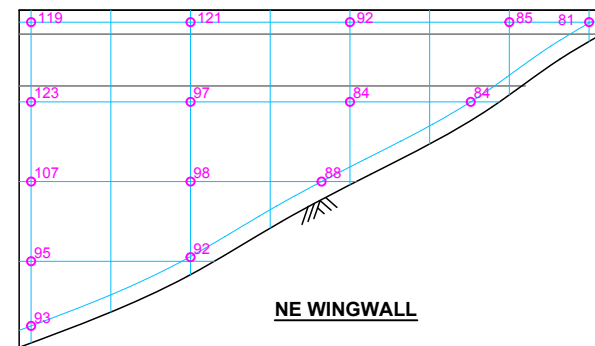
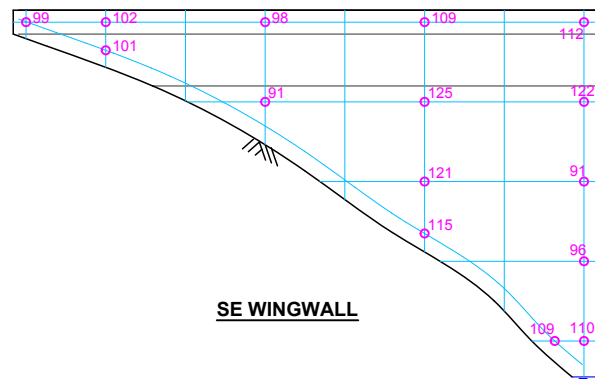
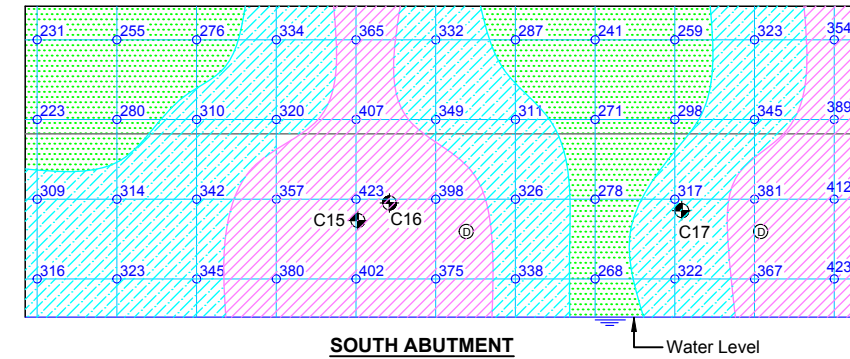
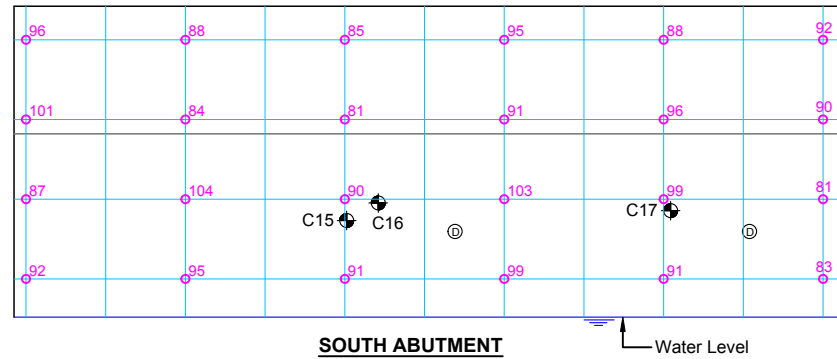
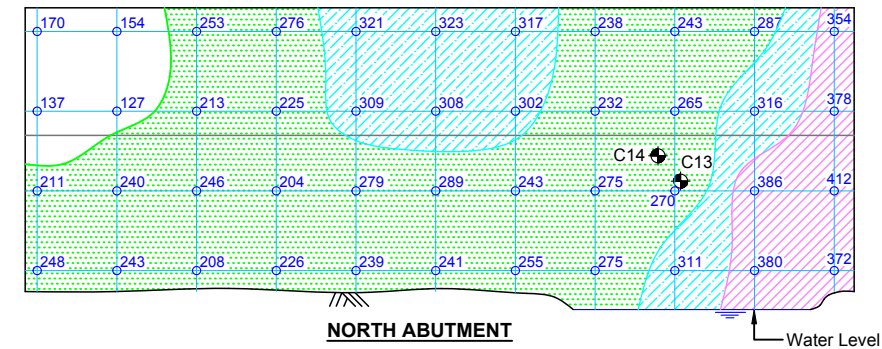
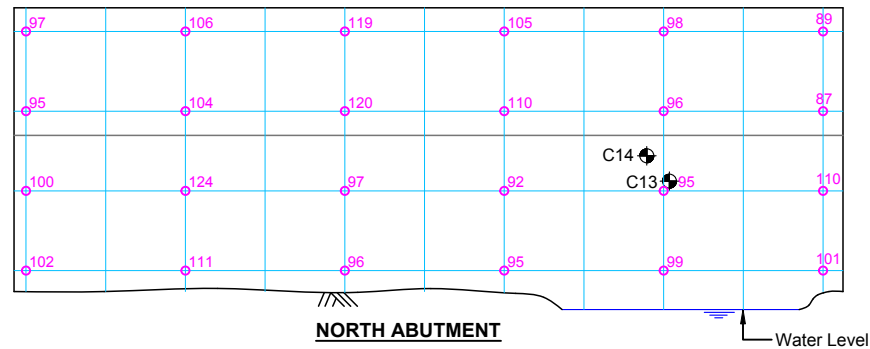
BRIDGE CHECK CANADA

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

PROJECT:
 Main Street, Alton 0.02km North
 of Queen Street
 Site No. B26030042
 Caledon, ON

TITLE:
 SURFACE DETERIORATION
 OF ELEVATIONS

Drawing No.:	5
Project No.:	BCC19012
Date:	May 2019
Scale:	1:100
Drawn by:	JL
Checked by:	MA



LEGEND:

⊙ Drain	▨ Cover from 20mm to 39mm	▨ -0.300 to -0.349 volts
C1 + Core Sample Location	▨ Cover less than 20mm	▨ -0.350 to -0.449 volts
80 Asphalt Thickness-mm	⊕ AC Resistance test Location	▨ more negative than -0.450 volts
80 Concrete cover-mm	⊕ Ground Location	460 Copper-Copper Sulphate Half-Cell Potential (negative volts x 10 ⁻³)
▨ Cover over 60mm	⊗ Ground Check Location	0.000 AC Test Result
▨ Cover from 40mm to 60mm	▨ -0.200 to -0.299 volts	
	▨ BWD-PARAPET wall dowel inspection	

BRIDGE CHECK CANADA

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

PROJECT:

Main Street, Alton 0.02km North of Queen Street
Site No. B26030042
Caledon, ON

TITLE:

CONCRETE COVER AND CORROSION POTENTIAL OF ABUTMENTS AND WINGWALLS

Drawing No.:	6
Project No.:	BCC19012
Date:	May 2019
Scale:	1:100
Drawn by:	JL
Checked by:	MA