APPENDIX 2

STORMWATER MANAGEMENT REPORT

Region of Peel
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STORMWATER MANAGEMENT REPORT

ENVIRONMENTAL ASSESSMENT (EA) AND PRELIMINARY DESIGN FOR DRAINAGE IMPROVEMENTS OF HIGHWAY 50 FROM MAYFIELD ROAD TO HEALEY ROAD

December 1, 2022

Prepared for:
Region of Peel
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arva

CANADA'S BEST MANAGED COMPANIES
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STORMWATER MANAGEMENT REPORT

ENVIRONMENTAL ASSESSMENT (EA) AND PRELIMINARY DESIGN FOR DRAINAGE IMPROVEMENTS OF HIGHWAY 50 FROM MAYFIELD ROAD TO HEALEY ROAD

Region of Peel

no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Highway 50 EA Stormwater Management Report

RVA 194615

December 1, 2022

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1.0 Introduction

1.1 Project Description

R.V. Anderson Associates Limited was retained by the Region of Peel (the Region) to undertake a Schedule “B” Municipal Class Environmental Assessment (EA) and preliminary design to assess low impact development (LID) and drainage infrastructure improvements required for the roadside drainage ditches and culvert crossings on Regional Road 50 (Highway 50) from Mayfield Road to Healey Road. The Region has identified several driveway culverts that are failing along Highway 50 from Mayfield Road to Healey Road (approximately 2.5 km) within the Town of Caledon.

As part of the Class EA study, preliminary recommendations to improve pedestrian and cyclist amenities (i.e., multi-use path (MUP) along the west side of Regional Road 50 from Mayfield Road to Healey Road and a new sidewalk between #12599 Regional Road (Highway) 50 and George Bolton Parkway have also been included to support the Region’s ‘Sustainable Transportation Strategy’ (STS).

Highway 50 and Mayfield Road are located at the northeast corner of the City of Brampton border. Highway 50 / Albion - Vaughan Road is the regional border division between the Region to the west and the Regional Municipality of York (York Region) to the east. It is also the municipal border division between the City of Brampton to the west and the City of Vaughan to the east. Mayfield Road is the municipal border division between the City of Brampton and the Town of Caledon.

This Stormwater Management (SWM) report was undertaken in support of the development of the alternatives and recommendations as identified through the Class EA study and outlines the proposed storm drainage system consisting of storm sewers, infiltration facilities, ditch inlets, oil grit separators, ditches, and culvert replacements for Highway 50 from Mayfield Road to Healey Road.

1.2 Project Background

The subject study area is shown below in **Figure 1.1** and is within the Humber River Watershed (Main Humber River primary subwatershed). It is also located within the Rainbow Creek subwatershed of the Humber River watershed. This watershed is managed by the Toronto and Region Conservation Authority (TRCA). The Rainbow Creek subwatershed is drained by two watercourses – Rainbow Creek and Robinson Creek. A Rainbow Creek tributary parallels the study area and Robinson Creek crosses -Highway 50 at George Bolton Parkway.

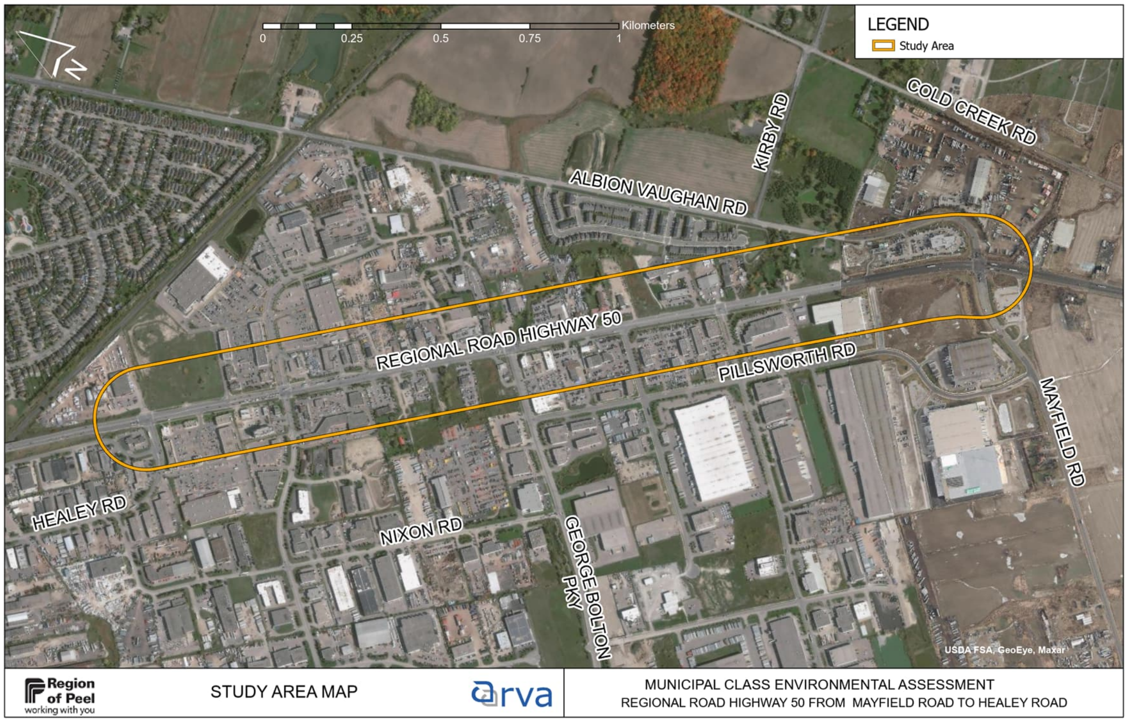


Figure 1.1: Study Area

In late 1996, the driveway culverts identified by the Region were transferred from the Ministry of Transportation (MTO) in "as is" condition. The Region is in the process of improving the existing SWM / drainage along -Highway 50 to cater to existing and future growth around the study area. Condition assessments were completed by the Region for seventeen subject culverts in 2017. Furthermore, the EA preferred alternative includes building a multi - use path (MUP) along the west side of -Highway 50 and sidewalk on the east side of the corridor north of George Bolton, to satisfy requirements for Active Transportation (AT).

The existing subcatchments on -Highway 50 were delineated based on the information provided by TRCA, localized survey information, and from previous studies as provided by the Region and the Town of Caledon. Current land uses in the study catchments are primarily industrial paved areas.

Potential permits and approvals necessary to complete the undertaking include TRCA, Ministry of Natural Resources (MNR), Ministry of Tourism, Culture, and Sport (MTCS), surrounding regional and municipal approvals, and utility approvals or relocations.

The following reports and models were utilized as the basis for the SWM design:

- Ontario Ministry of the Environment (MECP) Stormwater Management Planning and Design Manual, 2003
- LID Implementation Process for Regional Road Right - Of - Ways, 2014
- Development Standards, Policies & Guidelines, Town of Caledon, 2009
- Fluvial Geomorphology and Hydraulic Assessments, Highway 50 – Active Transportation and Drainage Improvements, Environmental Assessment, Matrix Solutions, 2021 (Draft)
- InfoWorks Model for Regional Road 50, Region of Peel, 2020
- Public Works Stormwater Design Criteria and Procedural Manual, Region of Peel, 2019
- Stormwater Management Implementation Report, Bolton Gateway Developments Inc., Town of Caledon, Region of Peel, C.F. Crozier & Associates Inc., 2015
- Natural Heritage Report – Existing Conditions, Schedule B Class Environmental Assessment (EA) and Preliminary Design for Drainage Improvements of Regional Road 50 From Mayfield Road to Healey, Town of Caledon, Region of Peel, LGL Limited, 2020

1.3 Purpose

The purpose of this report is to provide a SWM strategy that considers best management practices, supports climate change requirements and meets existing and future regulatory requirements in support of the Class EA. The SWM strategy will support the EA study requirements by:

- Identifying the recommended drainage infrastructure improvements required along Regional Road 50,

- Identifying and addressing impacts related to the EA recommended MUP along the west side of -Highway 50 and proposed sidewalk on the east side of -Highway 50, north of George Bolton Parkway,
- Incorporating concerns from stakeholders and regulatory agencies.

Under existing conditions -Highway 50 is a fully urbanized five lane road. Sidewalk exists intermittently along the west side of the road. Between Healey Road and Hopcroft Road there are sidewalks on both sides. In the west boulevard existing utilities including hydro poles, underground gas, bell, and watermains are present. An existing sanitary sewer runs along the west side of -Highway 50 until George Bolton Parkway, where it crosses and runs along the east boulevard. Surrounding land use is commercial and industrial with a high percentage of impervious cover. Road drainage is primarily conveyed by storm sewers along the east side of the road, while ditches on either side of the road convey predominantly external drainage. Existing sewers discharge directly to Robinson Creek at George Bolton Parkway and Simona Drive. No quantity or quality controls are provided for the existing road drainage.

Robinson Creek crosses -Highway 50 at George Bolton Parkway and flows east behind several industrial lots, before flowing west back towards -Highway 50, and flowing alongside the road in existing ditches for approximately 200 m. The existing culverts along this section of -Highway 50 show signs of deterioration and present a potential flood risk for surrounding properties. These culverts will need to be replaced due to safety concerns and to improve drainage flows. CCTV review of the existing sewers was not completed during the study as this was outside the scope of this EA.

As part of the EA study recommendations, a MUP is proposed along the west side of -Highway 50, which will widen and replace the existing sidewalk where it exists. The proposed MUP is not expected to increase peak flows, as the overall increase in impervious area is negligible compared to the existing roadway, surrounding commercial lots and industrial lots. Due to the proposed alignment of the MUP some existing ditches along the west side of -Highway 50 will be replaced by storm sewers with ditch inlet catchbasins. The EA study has also recommended a sidewalk on the east side of -Highway 50. The sidewalk ties in with the existing sidewalk at the front of property #12599 and runs south to the intersection of George Bolton Parkway and -Highway 50. This recommendation was undertaken to address public concerns and pedestrian safety considerations.

2.0 Existing Site Conditions Characterization

2.1 Tributary Areas, Outlets, and Drainage Patterns

Catchment boundaries for the entire project area were put together through information received from the Region, Town of Caledon, and existing hydraulic assessment models. For the Highway 50 right-of-way, these areas were confirmed through localized road survey.

2.2 Condition of Receiving Watercourses

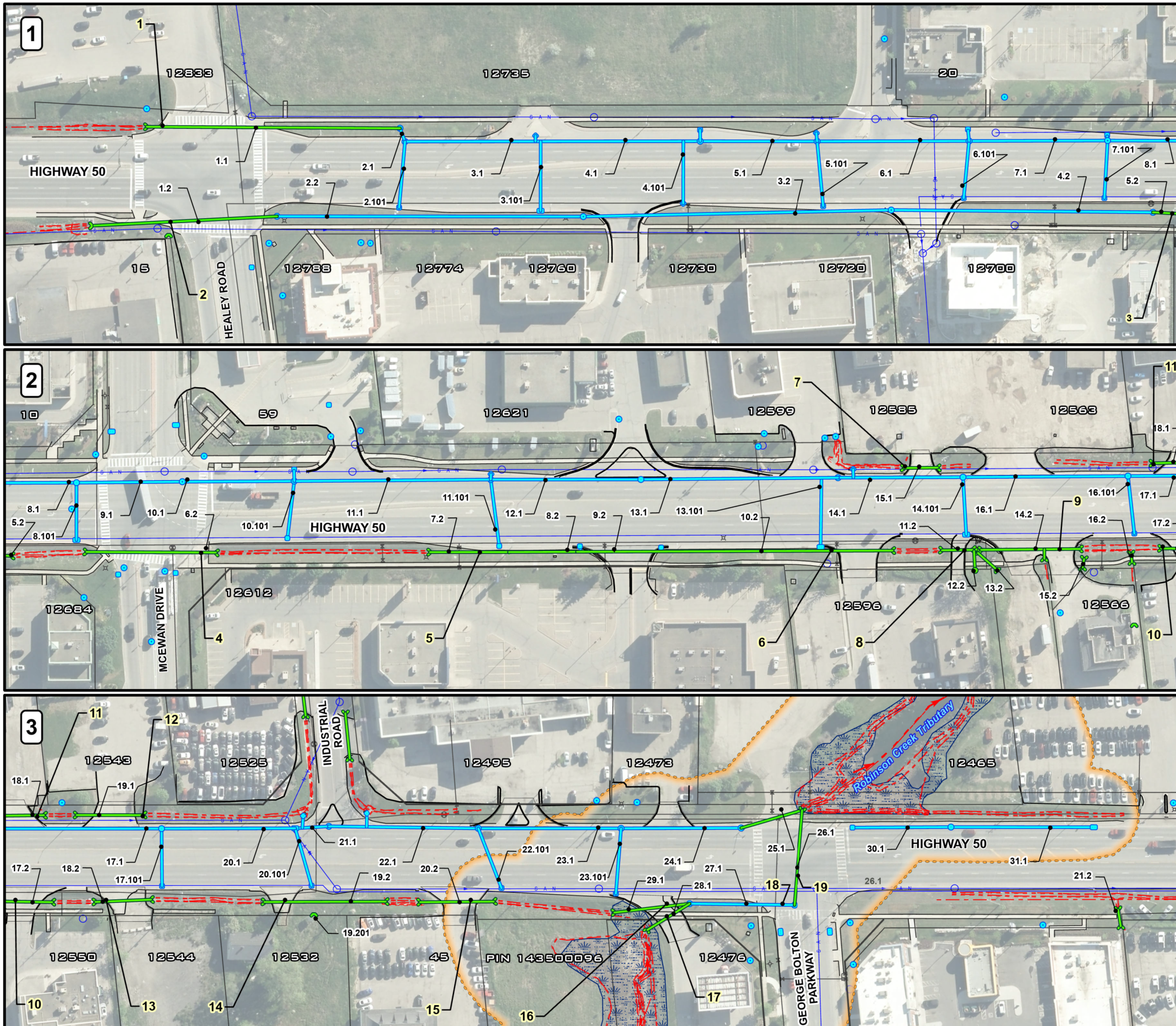
Existing watercourses receiving drainage from Highway 50, Healey Road, Mayfield Road and external areas within the project limits are located within the Humber River watershed, as well as the Rainbow Creek and Robinson Creek subwatersheds. These existing watercourses flow primarily across scattered woody riparian cover.

Rainbow Creek and Robinson Creek are intermittent watercourses regarded as warmwater habitat by the TRCA. However, the TRCA has indicated that all watercourses within the study area currently have a Redside Dace timing window (July 1st - September 15th).

2.3 Watercourse and Drainage Crossings

The existing storm drainage system of Highway 50 consists of roadside ditches and culverts as shown on drawings enclosed in Appendix B. As previously mentioned, the Region determined that a total of seventeen culverts require improvements. RVA inspected all culverts within the corridor and identified a total of twenty - one culverts that were deficient due to wear out of a total of thirty - four culverts evaluated within the project study area. RVA suggests that in total, twenty - three culverts may require improvements due to either wear or lack of hydraulic capacity, and additional three culverts will require replacement due to the proposed EA works. The existing information for the roadway culverts and reason for replacement are summarized in **Table 2.1** and **Table 2.2** below. Additional information regarding the existing culverts, include hydraulic capacity and existing hydraulic results as available.

Existing culverts provided with simple ID illustrated in **Map 1** and **Map 2**. Additional maps with sewer ID numbers provided in **Appendix D**.



ENVIRONMENTAL ASSESSMENT

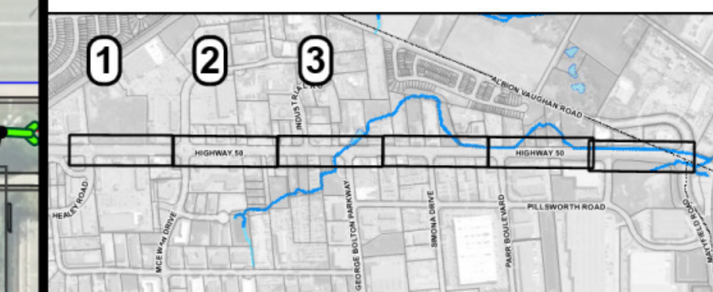
Map Group 1: Existing Storm Water Infrastructure Within North Section of the Highway 50 Project

DATA SOURCES

Contains public sector Information made available under The Regional Municipality of Peel's Open Data Licence - Version 1.0.

Contains information made available under the Toronto and Region Conservation Authority (TRCA)'s Open Data Licence v 1.0.

Map Credit:
Peel Region2020, TRCA



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LEGEND

- 123 PROPERTY INDEX NUMBER (PIN)
- TRCA O. REG. 166/06
- WETLAND
- CULVERT
- WATERCOURSE
- STORM SEWER
- CHANNEL
- MANHOLE
- SAN SANITARY SEWER
- CATCHBASIN
- WATERMAIN
- 12 REPLACEMENT ASSET ID #
- 12 ASSET ID #

Designed by	Approved by
rva	AM MAD

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10 0 10 20 30 40 m
HORIZONTAL SCALE

Region of Peel
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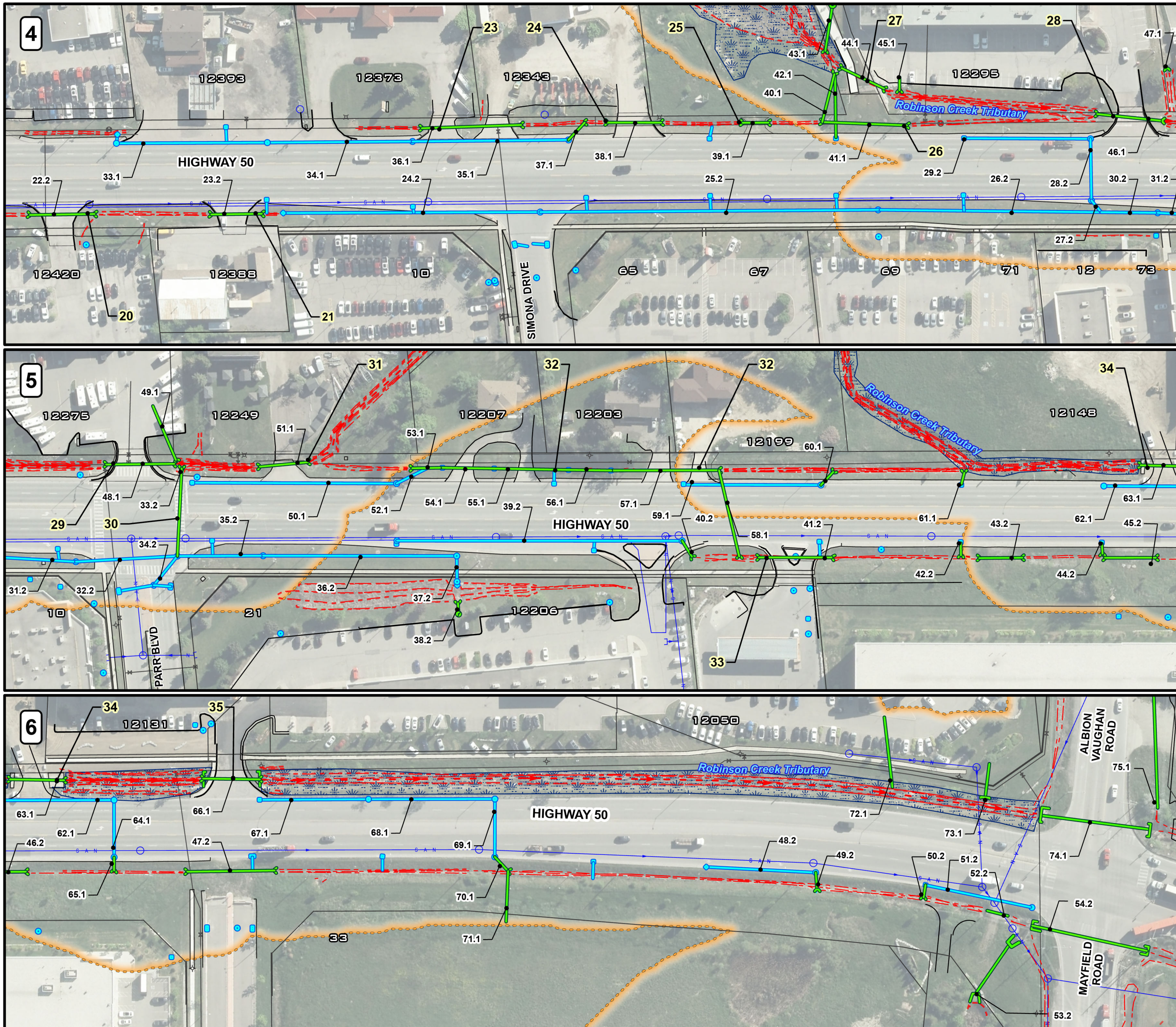
HIGHWAY 50 (QUEEN STREET)

FROM MAYFIELD ROAD TO HEALEY ROAD

EXISTING CULVERTS AND STORMWATER INFRASTRUCTURE - NORTH LIMIT

STORM WATER MANAGEMENT IMPROVEMENTS
STA. 14 + 300 +/- TO STA. 12 + 000 +/-

Page	1 of 2	Project No. (REGION OF PEEL) #18 - 4860
Drawn by	CER	
Date	11 / 2022	Project No. (rva) #194615



ENVIRONMENTAL ASSESSMENT

Map Group 2: Existing Storm Water Infrastructure Within South Section of the Highway 50 Project

DATA SOURCES

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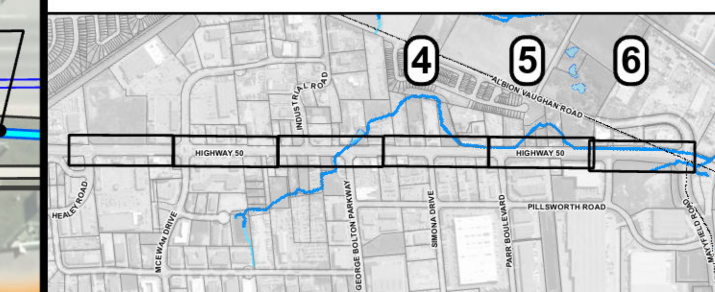
Map Credit:
Peel Region2020, TRCA



R.V. Anderson Associates Limited
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LEGEND

123 PROPERTY INDEX NUMBER (PIN)
TRCA O. REG. 166/06
WETLAND
CULVERT
WATERCOURSE
STORM SEWER
CHANNEL
MANHOLE
SANITARY SEWER
CATCHBASIN
WATERMAIN
12 REPLACEMENT ASSET ID #
12 ASSET ID #

Designed by	Approved by
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10 0 10 20 30 40 m
HORIZONTAL SCALE

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HIGHWAY 50 (QUEEN STREET)
FROM MAYFIELD ROAD TO HEALEY ROAD
EXISTING CULVERTS AND STORMWATER INFRASTRUCTURE - SOUTH LIMIT
STORM WATER MANAGEMENT IMPROVEMENTS
STA. 14 + 300 +/- TO STA. 12 + 000 +/-

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Drawn by	CER	Project No. (rva) #194615
Date	11 / 2022	

Table 2.1: Existing Roadway Culvert List

Culvert ID	Existing Material and Shape	Existing Diameter / Dimensions	Proposed Replacement	Proposed Size	Reason for Replacement		
					Wear	Lack of Capacity	Proposed MUP/Sidewalk
1	Circular CSP	500 mm	No Replacement Proposed				
2	Circular CSP	750 mm	Sewer	750mm DIA	X		
3	Circular CSP	750 mm	Sewer	900mm DIA	X	X	X
4	Circular CSP	900 mm	Sewer	900mm DIA			X
5	Circular CSP	750 mm	Sewer	900mm DIA	X		X
6	Circular CSP	900 mm	Sewer	900mm DIA			X
7	Circular HDPE	500 mm	Sewer	450mm DIA			X
8	Circular CSP	900 mm	Sewer	900mm DIA	X		X
9	Circular CSP	900 mm	Sewer	900mm DIA	X		X

Culvert ID	Existing Material and Shape	Existing Diameter / Dimensions	Proposed Replacement	Proposed Size	Reason for Replacement		
					Wear	Lack of Capacity	Proposed MUP/Sidewalk
10	Circular CSP	600 mm	Sewer	900mm DIA	X	X	X
11	Circular CSP	600 mm	Sewer	750mm DIA	X	X	X
12	Circular HDPE	825 mm	Sewer	750mm DIA	X		X
13	Circular CASP	900 mm	Sewer	900mm DIA	X		X
14	Circular CSP	900 mm	Sewer	900mm DIA	X		X
15	Circular CSP	750 mm	Sewer	900mm DIA	X		X
16	Circular CSP	900 mm	Sewer	900mm DIA			X
17	Circular HDPE	600 mm	Box Culvert	1.8m x 1.2m Box	X	X	
18	Circular CSP	900 mm	Box Culvert	1.8m x 1.2m Box		X	
19	Concrete Box	1800 mm x 1200 mm	No Replacement Proposed				

Culvert ID	Existing Material and Shape	Existing Diameter / Dimensions	Proposed Replacement	Proposed Size	Reason for Replacement		
					Wear	Lack of Capacity	Proposed MUP/Sidewalk
20	Circular CSP	600 mm	Sewer	450mm DIA	X		X
21	Circular CSP	500 mm	Sewer	450mm DIA	X		X
23	Steet Arch Plate	450 mm	New Culvert	450mm DIA	X		
24	Circular CSP	525 mm	New Culvert	525mm DIA	X		
25	Circular CSP	600 mm	New Culvert	600mm DIA	X		
26	Circular CSP	600 mm	No Replacement Proposed				
27	Steet Arch Plate	2900 mm x 1900 mm	No Replacement Proposed as this culvert is beyond Region ROW				
28	Steet Arch Plate	2260 mm x 1660 mm	Box Culvert	3.0m x 1.5m Box		X	
29	Steet Arch Plate	2060 mm x 1450 mm	Box Culvert	3.0m x 1.5m Box	X	X	
30	Concrete Box	975 mm x 600 mm	Box Culvert	0.9m x 0.6m Box	X		

Culvert ID	Existing Material and Shape	Existing Diameter / Dimensions	Proposed Replacement	Proposed Size	Reason for Replacement		
					Wear	Lack of Capacity	Proposed MUP/Sidewalk
31	Steet Arch Plate	2270 mm x 1600 mm	Box Culvert	3.0m x 1.5m Box	X	X	
32	Concrete Box	525 mm	Sewer	900mm DIA	X	X	
33	Circular CSP	450 mm	Sewer	375mm DIA	Replaced as part of Regional 50/Mayfield Road widening works		
34	Concrete Box	4500 mm x 1450 mm	No Replacement Proposed				
35	Concrete Box	4500 mm x 1700 mm	No Replacement Proposed				

Table 2.2: Existing Roadway Culvert Details

Culvert ID	U/S Invert	D/S Invert	Existing Length (m)	Existing Capacity (m^3/s)	Peak Flow (m^3/s) 10-year	Peak Flow (m^3/s) 100-year
1	246.068	244.622	90.4	0.478	0.2	0.208
2	244.853	244.72	65.5	0.502	0.486	0.779
3	244.31	244	92.6	0.644	0.486	0.787
4	243.022	242.887	47.2	0.969	0.486	0.789
5	242.399	241.796	27.7	1.644	0.482	0.788
6	241.668	240.816	111.9	1.58	0.483	0.789
7	239.03	238.781	44.2	1.077	Unavailable	
8	240.733	240.5	10.9	2.651	0.482	0.789
9	240.5	240.35	34.9	1.188	0.482	0.788
10	240.15	240.024	22.1	0.463	0.48	0.787
11	236.823	236.73	23.2	0.389	Unavailable	
12	238.469	238.336	72.4	0.615	Unavailable	
13	239.801	239.61	19.8	1.779	0.48	0.787
14	239.305	238.672	43.1	2.195	0.479	0.788
15	237.763	237.685	26.1	0.608	0.479	0.788
16	236.79	236.34	17.2	2.932	0.476	0.785

Culvert ID	U/S Invert	D/S Invert	Existing Length (m)	Existing Capacity (m^3/s)	Peak Flow (m^3/s) 10-year	100-year
17	236.763	236.688	15.1	0.47	1.83	7.9
18	236.008	235.825	36.6	1.387	1.8	1.8
19	235.825	235.654	34.2	5.948	1.8	1.8
20	236.823	236.73	23.2	0.389	0.046	0.076
21	236.566	236.505	17.9	0.22	0.077	0.126
23	235.65	235.19	35.2	0.326	Unavailable	
24	234.744	234.381	18.8	0.597	Unavailable	
25	234.112	233.966	9.1	0.78	Unavailable	
26	233.56	233.2	40.1	0.671	Unavailable	
27	231.178	231.142	16.7	5.052	5.47	5.47
28	230.408	230.2	23.5	6.393	5.47	5.47
29	230.15	230.06	24.1	3.02	5.47	5.47
30	230.223	230	30.4	1.254	0.453	0.758
31	229.3	229.26	17.2	3.093	5.84	5.84
32	229.745	228.708	103.3	0.4	0.404	0.404
33	228.659	228.328	25.6	0.324	0.073	0.109
34	226.7	226.52	19	24.208	5.84	9.03
35	226.29	226.13	19.8	38.336	5.84	9.03

2.4 Soil and Groundwater Conditions

Below the existing road surface, the general subsurface soils within the project area consist of fill material (sand and gravel, sand, gravelly sand, silty sand, sandy silt, silt, clayey silt, and silty clay). The fill layer extends to depths ranging from 0.6 m to 3.3 m below the ground surface.

Groundwater levels in the monitoring wells were measured by Thurber Engineering Ltd. between May 26, 2020, and August 24, 2020. The range of water level elevations in the monitoring wells were from 223.65 m to 243.67 m. The groundwater levels indicated that shallow groundwater flows follow local topography from northwest to southeast towards the tributary of Humber River. Hydraulic conductivity values were obtained through a series of slug tests carried out at some of the boreholes within the study area. The estimated hydraulic conductivity values range from 1.10 x 10 - 8 m / s to 9.80 x 10 - 10 m / s.

Guelph Permeameter testing was also carried out at nine locations along the grass boulevards on the west side of Highway 50. An infiltration rate was estimated by measuring the change in water level in the Guelph Permeameter reservoir once a steady state was reached. The infiltration rate was estimated to be in the range from 43 mm / hr to 101 mm / hr.

The subsurface information is described in detail within the hydrogeological report titled ‘Preliminary Design for Drainage Improvements Regional Road Highway 50 from Mayfield Road to Healey Road’ prepared by Thurber Engineering Ltd. dated October 2020.

2.5 Significant Natural Features

A Natural Heritage Report on existing conditions has been prepared by LGL Limited dated December 2020. The report indicated that the Land Information Ontario (LIO) and the Humber River Fisheries Management Plan has identified Robinson Creek as ‘Small Riverine Warmwater’ fish habitat. Brook Stickleback (*Culea inconstans*) and Creek Chuck (*Semotilus atromaculatus*) have been identified south of the study area. These two fish are a tolerant warmwater species.

The study area consists of naturalized vegetation communities of Dry - Moist Old Field Meadow (CUM1 - 1) and Mineral Shallow Marsh (MAS2 - 1 and MAS). These communities consist of high proportion of non - native and tolerant plant species. These plant species are well adopted to survive in areas that are regularly disturbed and subjected to high light conditions. During LGL's botanical investigation no plant species that are regulated under the Ontario Endangered Species Act (ESA) or the Canada Species at Risk Act were encountered.

The report also indicated that the wildlife species identified within the study area are tolerant of anthropogenic features and disturbance. During LGL's investigation, ten birds were recorded that are protected under the Migratory Birds Convention Act (MBCA) and a single bird species is protected under the Fish and Wildlife Conservation Act (FWCA). In total there were eighteen wildlife species recorded within the study area. However, none of the wildlife species are regulated under the Ontario Endangered Species Act, 2007 (ESA) or the federal Species at Risk Act (SARA). Furthermore, LGL reviewed the National Heritage Information Center database (MNRF 2020) for rare species records, but the study area contains no element occurrences for wildlife species at risk.

LGL limited is currently working on the second phase of the Natural Heritage Report which will indicate if the proposed condition impacts the natural heritage within the study area.

3.0 Stormwater Objectives

3.1 Water Quantity

The objective of the SWM report for drainage infrastructure improvements on - Highway 50 from Mayfield Road to Healey Road is to assess the EA recommended solutions that will address the following:

- Ensure no increased risk of flooding to downstream properties and / or infrastructure.
- Design any proposed sewer to convey 10 - year return period storm runoff.
- Where applicable, promote infiltration within the road right - of - way.

Best management practices (BMP) were utilized when evaluating the proposed LID measures. No road widening is proposed as part of this project and no significant increase in impervious area is proposed, relative to the contributing drainage area. No specific quantity control measures are proposed as no increase in peak flows is anticipated due to the proposed construction of sidewalk and MUP.

3.2 Water Quality, Erosion, and Sediment Control

The objective for water quality and erosion and sediment control for this project is to provide best efforts to treat stormwater runoff from Highway 50. A combination of different Low Impact Development (LID) techniques to provide a basic level treatment (60% Total Suspended Solids (TSS) removal) are proposed. To improve water quality in the postcondition Oil Grit Separators (OGS), bioretention facilities, and catch basin shields were included in the study recommendations. No significant increase in impervious area is proposed as part of the EA design and therefore no increase in peak flows is anticipated. Additionally, since the increase in imperviousness is negligible in the postcondition, the TSS loading is approximately the same as precondition. LID measures are proposed to provide an improvement over existing condition only.

The MECP is in the process of issuing a Stormwater CLI ECA to the Region of Peel. The Stormwater CLI ECA covers storm assets servicing regional roads, namely storm sewers, ditches, SWM facilities and LID, and Stormwater Pumping Stations. The Stormwater CLI ECA sets forth conditions for alterations to the stormwater system as well as ongoing operation of the system. The ECA comes with criteria for design of alterations to the Region's existing stormwater system.

At the time of completion of the EA study, the CLI ECA template and criteria were not available, therefore the EA recommendations do not guarantee compliance with the CLI ECA conditions and criteria. It is recommended that at the Detailed Design Stage, the Engineering Consultant re-assess the EA recommendations against the CLI ECA criteria and make the necessary adjustments and changes to the stormwater recommendations to comply

3.3 Water Balance

Water balance was not considered to be an objective for this project. Since no road widening is proposed along -Highway 50 from Mayfield Road to Healey Road, there is a negligible increase in the percent of impervious surface in the postcondition as compared to the precondition.

The Stormwater CLI ECA issued by MECP to the Region of Peel covers regional stormwater infrastructure and assets. Conditions set forth by the Stormwater CLI ECA establish design criteria for existing Region of Peel stormwater system alterations and operations. completed prior to availability of the CLI ECA template and criteria, the Highway 50 EA and preliminary design for drainage improvement recommendations require verification to ensure compliance requirements with criteria and conditions are satisfied. The Engineering Consultant awarded for the Detailed Design Stage is required to measure the recommendations provided from the Highway 50 Environmental Assessment preliminary design and based on provided guidelines from MECP determine if any updates are necessary for compliance.

4.0 Model Build Process – Hydraulic Modelling

An InfoWorks model was created to model the creek, ditches, culverts, and sewers to assess the existing drainage conditions of -Highway 50. The creek, ditch and culvert information were obtained from the TRCA's HEC - RAS model updated by Matrix Solutions Inc. The HEC - RAS model also included design flows for the creek. In addition, an InfoWorks model was also obtained from the Region. This InfoWorks model consisted of partial road subcatchment data as well as design storm and sewer information.

The InfoWorks model that was created by RVA combined the information obtained from the updated HEC - RAS and the existing InfoWorks models. Two scenarios were created in the RVA InfoWorks model for assessment: (1) the existing / precondition, and (2) the EA recommended condition. The following sections describe in detail how the RVA InfoWorks model was developed.

4.1 Design Storm

The design storm used in this project was obtained through the Region's InfoWorks Model. The design storm was developed using the Chicago Distribution storm for a duration of four hours using a five -minute time step. All sewers and roadside culverts were designed to convey the 10 - year design storm event. A 100 - year storm event was also modelled and run to understand the effect of flooding, if any, within the -Highway 50 right - of - way.

4.2 Existing Condition Scenario

The existing condition was built in InfoWorks using two main sources: HEC - RAS and InfoWorks models, from the TRCA and the Region, respectively. The profile data of the creek was imported into InfoWorks by using the cross - section data from HEC - RAS. The inverts of the channels were assigned based on the cross - section inverts of the HEC - RAS model. In general, the creek has several culverts that allow conveyance. The information for these culverts was also imported as per the HEC - RAS model.

The Region's InfoWorks model did not include open profile roadside diches. Instead, the existing roadside ditches were modelled in a simplified manner as 1000 mm diameter circular pipes running along Highway 50. To be able to accurately capture the drainage capacity RVA used topographic survey data to model all the roadside ditches with their respective open profiles

To the north of Healey Road there is a railway track that crosses Highway 50. The ditches along the railway track west of Highway 50 and the external drainage area draining to those ditches, were added to the Region's InfoWorks model since they contribute runoff and flows into the study area. Flows from these additional drainage areas contribute to the west side road ditch and enter the Robinson Creek culvert at George Bolton Parkway.

RVA performed an onsite investigation to determine the approximate external drainage areas that drain to these ditches and included them in the InfoWorks model. Since limited information about the outside drainage areas was available, runoff surface area parameters, such as imperviousness and runoff factors, were estimated. Flows from these areas were limited to a maximum runoff value into the west side ditch based on available rail crossing culvert capacity (750 mm diameter culvert, pfc = 1.08 m3 / s, restricted 1 - year flows to approximately 500 l / s peak flow). This estimate was made based on the assumption that the rail line should not flood for a 10 - year design storm. **Figure 4.1** below show the extent of the described external drainage area.

Figure 4.1: External Drainage Area That Contributes into Study Area

A large culvert crossing exists at the intersection of George Bolton Road and Highway 50. **Map 3 and Map 4** below show the drainage / culvert alignment. The flows from Robinson Creek enter a 600 mm diameter PVC storm sewer (EX

Culvert #17) and merge after 15 m with a 900 mm diameter CSP pipe (EX Culvert #18), that conveys additional flow from the west side of Highway 50 ditch drainage towards an 1800 mm x 1200 mm rectangular box culvert (EX Culvert #19) that crosses beneath Highway 50. The box culvert outlets into an online pond on the east side of Highway 50 and continues its flow path further as Robinson Creek.

A site investigation was also carried out to understand the online pond's drainage condition. The site investigation revealed that the inlet of the wet pond has a significant amount of silt and debris accumulated which causes a tail water condition and permanent submergence within the 1800 mm x 1200 mm rectangular box culvert (EX Culvert #19). The outlet of the pond was also observed to be approximately 0.5 m higher than the inlet of the wet pond which leads to the silt and debris built up and standing water in the culvert. RVA has added into the hydraulic model a storage node on the southwest corner (west of Esso Gas station) of George Bolton Parkway and Highway 50. This floodplain storage was added based on the observations made on the site to represent available floodplain storage flood volume that would be activated during the 100-year storm scenario. This storage would fill up and slowly raise the water elevation before reaching a level where Highway 50 would be overtopped. **Figure 4.2** below shows the described 1800 mm x 1200 mm rectangular box culvert alignment.

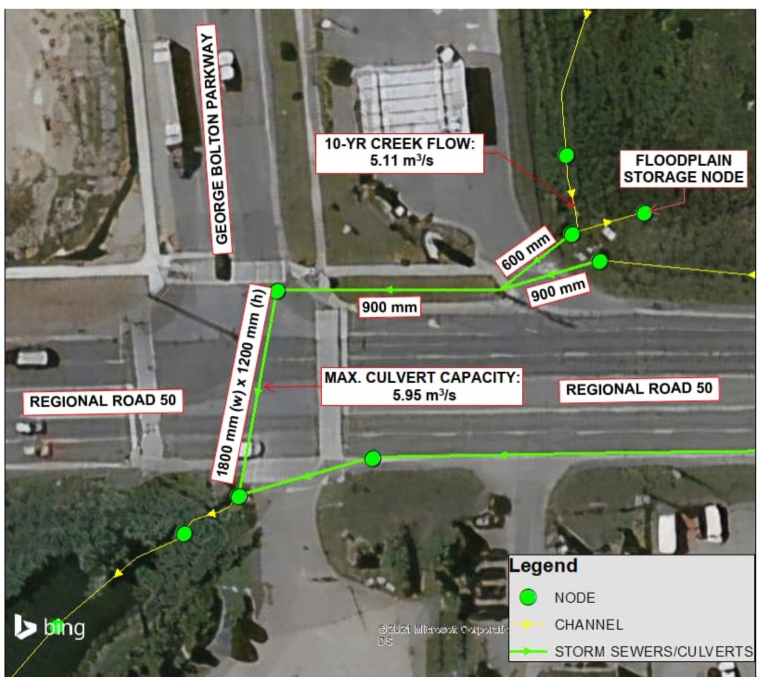


Figure 4. *2.* : Existing Drainage Configuration at George Bolton Parkway

The road overtopping is predicted in the existing scenario model due to the applied steady peak flows from Robinson Creek. Such an overtopping scenario has not been reported from historic observations and this would depend greatly on the duration of an experienced extreme storm event and the upstream associated catchment wetting and runoff parameters.

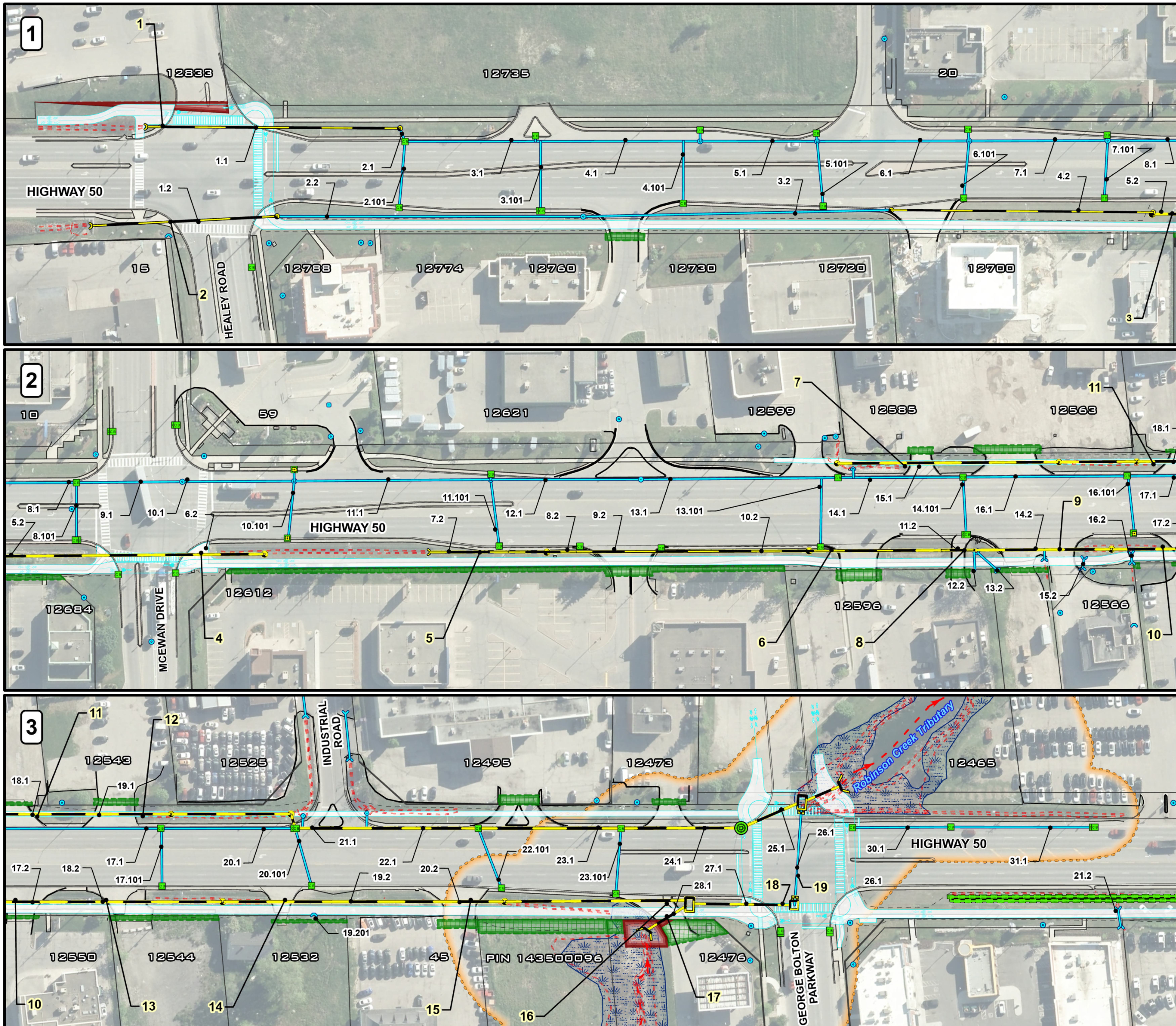
4.3 EA Recommendations / Proposed Condition Scenario

The preferred solution to address active transportation (AT) enhancements as identified through the EA study includes the implementation of a MUP along the west side of the corridor and a sidewalk along the east side of Highway 50 north of George Bolton Parkway. In support of the recommended AT amenities, the preferred drainage infrastructure improvements include infiltration trenches and bioretention facilities on the west side of Highway 50 and culvert upsizing where hydraulic restrictions exist along the east side the corridor. Proposed conditions are illustrated in **Map 3** and **Map 4.**

Bioretention facilities include bioswales and bioswale boxes. All three of these LID techniques were placed in locations, based on their implementation feasibility and hydrogeologic soil conditions. These features were modelled with infiltration rates that matched the test results taken from the locations considered.

Bioswales are proposed on the west side ditch section RR - WD - 27.1 to RR - WD - 28.1 and RR - WD - 29.1 to RR - WD - 30.1. Within the bioswales, check dams are recommended to create a cascading system for runoff to flow along. This effect will decrease the runoff velocity and utilize the storage volume of the bioswale to promote settling. The cascading system of check dams will ensure adequate infiltration within the proposed bioswales. A bioswale box is proposed south of the Simona Drive and Highway 50 intersection. This bioswale box is modelled with a depth of 1 m and a 201.60 m^2 surface area. An OGS is also proposed at the west side of Highway 50, north of and the Mayfield Road intersection.

Existing and proposed condition maps including sewer upgrades and new sewer ID numbers are included in **Appendix D.**



ENVIRONMENTAL ASSESSMENT

Map Group 3: Proposed Culverts and Storm Water Infrastructure Within North Section of the Highway

DATA SOURCES

Contains public sector Information made available under The Regional Municipality of Peel's Open Data Licence - Version 1.0.

Contains information made available under the Toronto and Region Conservation Authority (TRCA)'s Open Data Licence v 1.0.

Map Credit:
Peel Region2020, TRCA

arva R.V. Anderson Associates Limited
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LEGEND

- 123 PROPERTY INDEX NUMBER (PIN)
- WATERCOURSE
- CHANNEL
- WETLAND
- TRCA O. REG. 166/06
- BIORETENTION FACILITY
- INFILTRATION TRENCH
- OIL GRIT SEPARATOR
- CATCHBASIN SHIELD
- 1.2 REPLACEMENT ASSET ID #
- SIDEWALK / REST AREA / MULTI - USE PATH
- PROPOSED CULVERT / SEWER
- EXISTING CULVERT / SEWER
- MANHOLE
- CATCHBASIN
- MAYFIELD PROJECT CULVERT / SEWER
- PROPOSED FEE SIMPLE
- PROPOSED TEMPORARY EASEMENT
- GRADING LIMIT
- 1.2 ASSET ID #

Designed by	Approved by
rva	AM MAD

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10 0 10 20 30 40 m
HORIZONTAL SCALE

Region of Peel
working with you

HIGHWAY 50 (QUEEN STREET)
FROM MAYFIELD ROAD TO HEALEY ROAD

PROPOSED CULVERTS AND STORMWATER INFRASTRUCTURE - NORTH LIMIT

STORM WATER MANAGEMENT IMPROVEMENTS
STA. 14 + 300 +/- TO STA. 12 + 000 +/-

Page	1 of 2	Project No. (REGION OF PEEL) #18 - 4860
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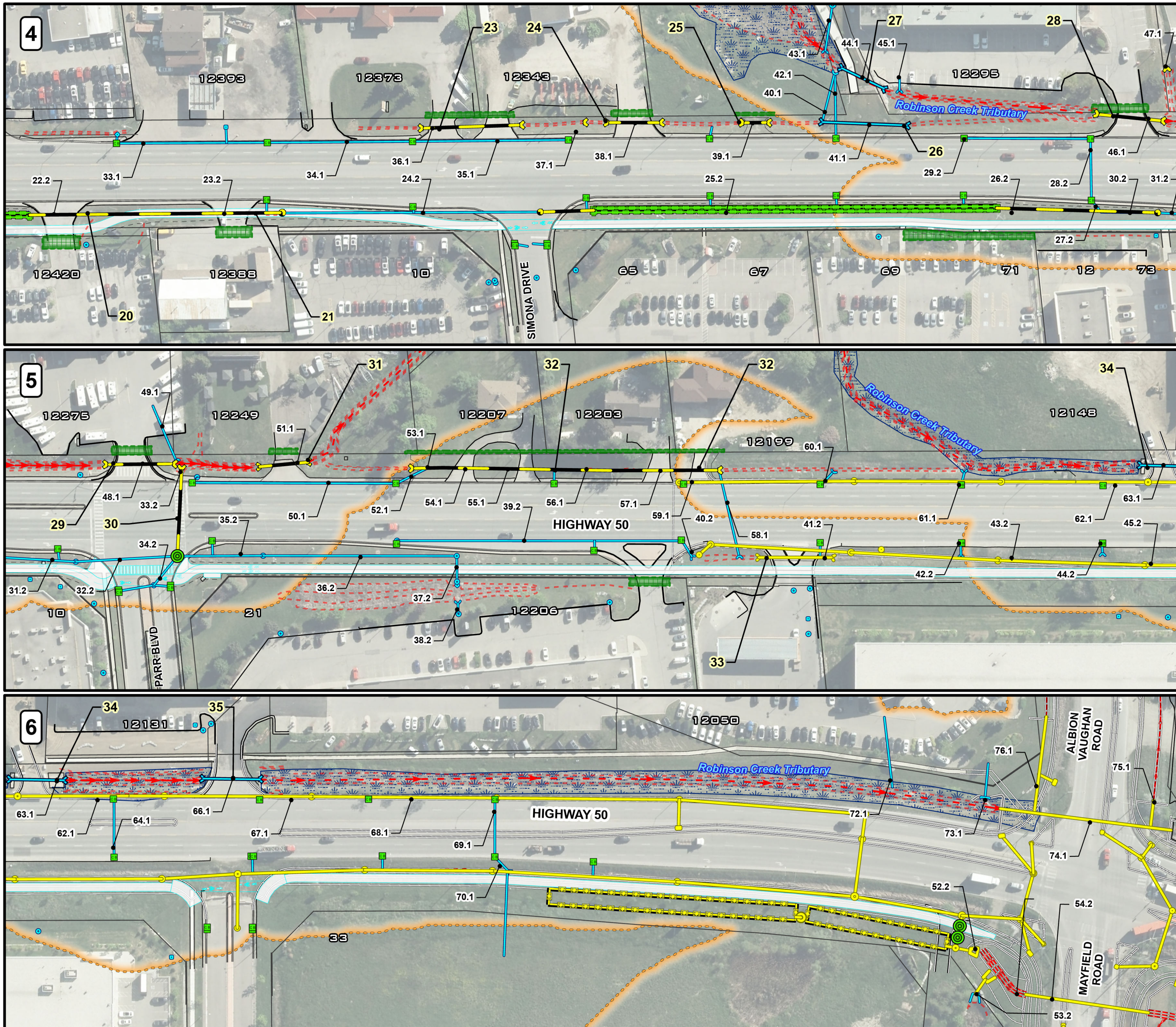
Date	11 / 2022	Project No. (rva) #194615



ENVIRONMENTAL ASSESSMENT

Map Group 4: Proposed Culverts and Storm Water Infrastructure Within South Section of the Highway

DATA SOURCES

Contains public sector Information made available under The Regional Municipality of Peel's Open Data Licence - Version 1.0.

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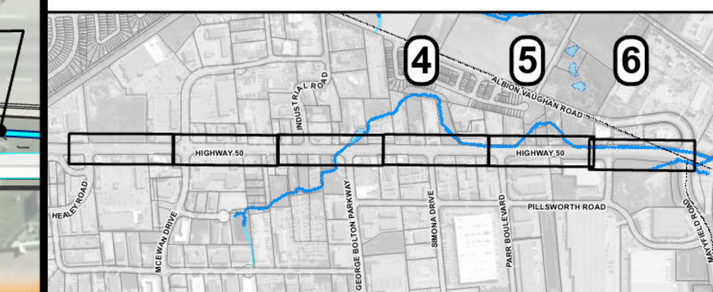
Map Credit:
Peel Region2020, TRCA



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LEGEND

- 123 PROPERTY INDEX NUMBER (PIN)
- WATERCOURSE
- CHANNEL
- WETLAND
- TRCA O. REG. 166/06
- BIORETENTION FACILITY
- INFILTRATION TRENCH
- OIL GRIT SEPARATOR
- CATCHBASIN SHIELD
- 12 REPLACEMENT ASSET ID #
- SIDEWALK / REST AREA / MULTI - USE PATH
- PROPOSED CULVERT / SEWER
- EXISTING CULVERT / SEWER
- MANHOLE
- CATCHBASIN
- MAYFIELD PROJECT CULVERT / SEWER
- PROPOSED FEE SIMPLE
- PROPOSED TEMPORARY EASEMENT
- GRADING LIMIT
- 12 ASSET ID #

Designed by	Approved by
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10 0 10 20 30 40 m
HORIZONTAL SCALE

Region of Peel
working with you

HIGHWAY 50 (QUEEN STREET)
FROM MAYFIELD ROAD TO HEALEY ROAD

PROPOSED CULVERTS AND STORMWATER INFRASTRUCTURE - SOUTH LIMIT

STORM WATER MANAGEMENT IMPROVEMENTS
STA. 14 + 300 +/- TO STA. 12 + 000 +/-

Page	2 of 2	Project No. (REGION OF PEEL) #18 - 4860
Drawn by	CER	Project No. (rva) #194615
Date	11 / 2022	

4.3.1 Recommended Sidewalk on East Side of -Highway 50 (North of -Highway 50 and George Bolton Parkway)

As part EA process, an approximately 400 m long sidewalk on the east side of Highway 50 is recommended. The sidewalk starts at the front of the property #12559 Highway 50 and ends at the intersection of Highway 50 and George Bolton Parkway. There are currently roadside ditches in place of the proposed sidewalk alignment. These ditches convey external drainage area flow into the Robinson Creek. Due to the sidewalk construction, the roadside ditches are proposed to be filled and a storm sewer system is proposed to convey the 10-year storm flow without surcharge and the 100-year storm flow without flooding. The design of the storm sewer system is subject to conditions of the forthcoming CLI ECA.

North of Highway 50 and George Bolton Parkway intersection there are multiple catch basins that capture 10-year road drainage flow from Highway 50 and convey these into the existing 825 mm diameter storm sewer system. The existing storm sewer system conveys the road drainage flows into the Robinson Creek, outletting at Highway 50 and George Bolton Parkway intersection into the online pond. It is important to note that the existing 825 mm diameter storm sewer system does currently not convey any external drainage area other than the road drainage.

As such, a parallel storm sewer system is recommended, ranging from 450 mm to 825 mm diameter to connect to the existing 825 mm diameter storm sewer system. From the connection point of the new storm sewer with the existing 825 mm diameter storm sewer, approximately 181 m of 825 mm diameter pipes need to be upgraded to 1050 mm to 1200 mm diameter to be able to convey the added flows without surcharge during a 10-year storm event into the pond. This pipe upgrade ensures that only one outfall into the pond will remain. All road catchbasins currently connected to the existing storm maintenance holes will be kept as per current drainage arrangement.

The extent of the external drainage area and the proposed and the existing storm sewer system are shown in **Figure 4.3.**

4.3.2 Culvert Crossing at -Highway 50 and George Bolton Parkway

Due to anticipated high peak flows in Robinson Creek, the existing 600 mm / 900 mm diameter inlet pipes are insufficient to convey the proposed flows and require upsizing. The existing box culvert #19 crossing (1800 mm x 1200 mm) has an available full pipe capacity of approximately 5.95 m^3 / s and can convey the 10-year design storm flow without flooding or overtopping the road. However, due to the upstream pipe capacity limitations, the current model scenario shows road overtopping.

Based on the available HEC - RAS flows, the road crossing is proposed to be enhanced with a consistent 1800 mm x 1200 mm box culvert crossing along the existing pipe alignment. **Figure 4.4** shows the proposed culverts at the George Bolton Parkway and -Highway 50 intersection.

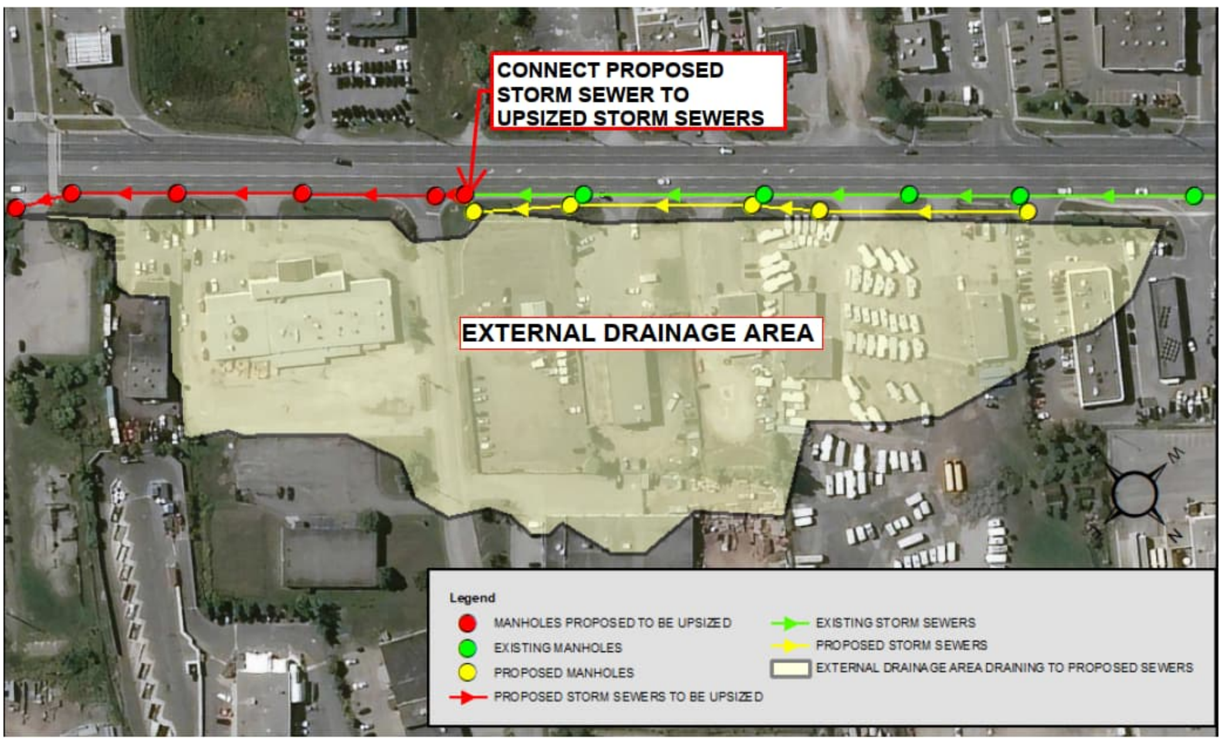

Figure 4.3 : External Drainage Area & Proposed Storm Sewer System (North of -Highway 50 & George Bolton intersection)

RVA carried out a site investigation to understand the hydraulic situation and condition of the online pond into which the existing 1800 mm x 1200 mm box culvert outlets. It is proposed to remove the debris and silt built up at the inlet of the online pond. To avoid future built up at the inlet again, it is also proposed to lower the outlet of the online pond by approximately 0.5 m. **Figure 4.5** shows the online wet pond and proposed maintenance required to mitigate tailwater condition at the existing 1800 mm x 1200 mm box culvert.

In order the validate the provided flows, RVA has analyzed flow monitoring and rain gauge data at the inlet of the online pond. The results and discussion of this analysis is provided in Section 8.0.

4.3.3 Flooding Complaints at # 12207 -Highway 50

During the study's public consultation period, a flooding complaint was received pertaining to property # 12207 -Highway 50. The problem was described as backyard property flooding due to high water levels in Robinson Creek. Robinson Creek turns away from the roadside and flows around the backyard of this property before realigning back to the east side of -Highway 50.

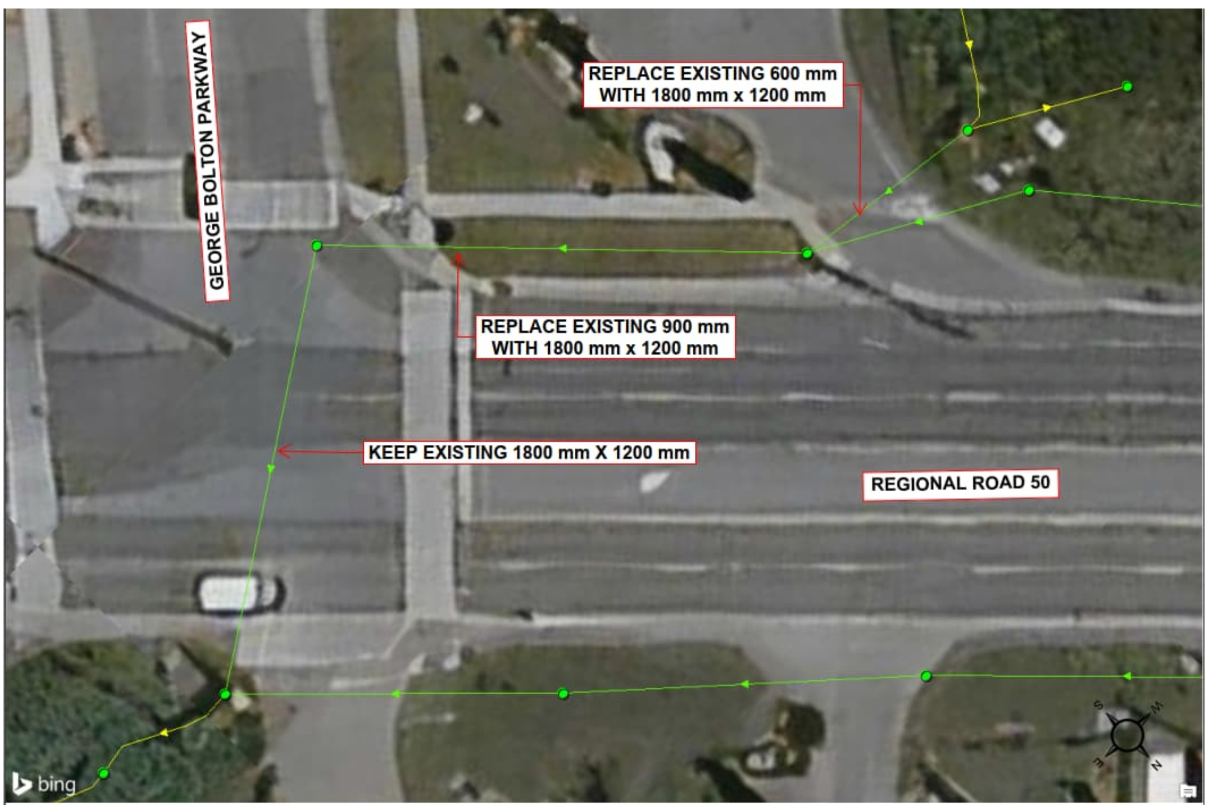

Figure 4.4 : Creek Bypass Enhancements at George Bolton and -Highway 50

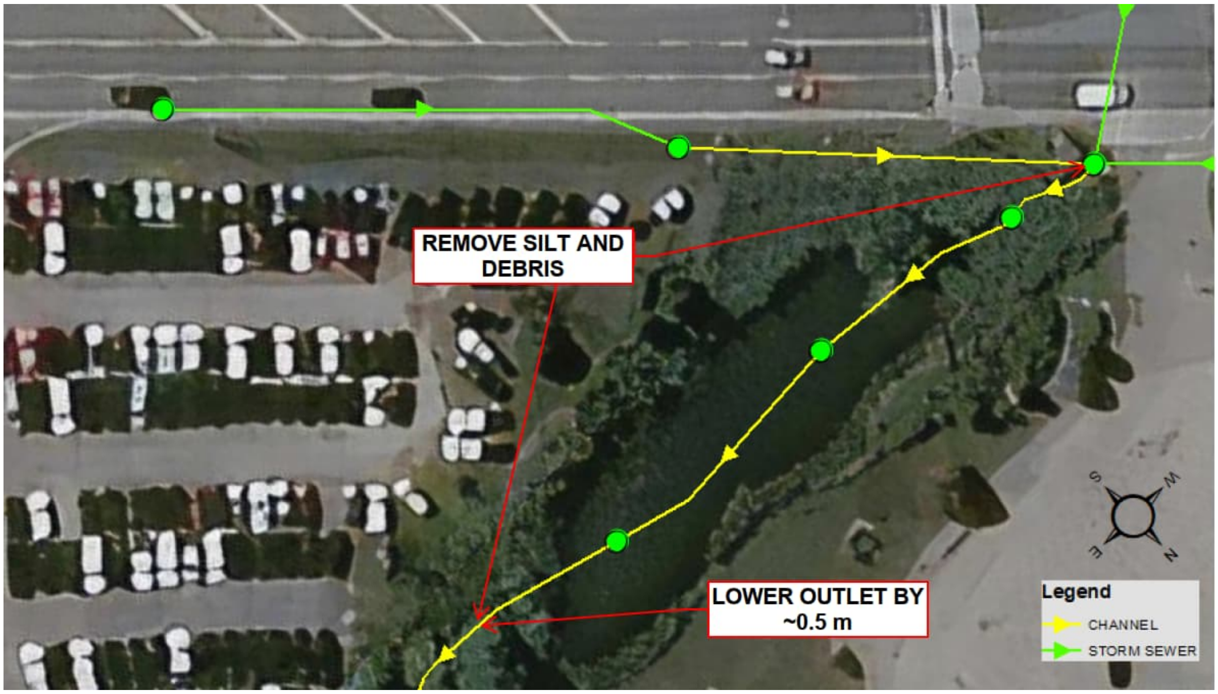

Figure 4.5 : Proposed Maintenance at online wet pond

In relation to the flooding report, the property owner mentioned a former roadside ditch to the front of his property had provided flood relief and a creek bypass, but this was replaced by the Region with a 525 mm diameter sewer (EX Culvert #32) to fill the ditch. In addition, directly opposite this flooding issue, a recent residential development was created with a Storm Water Management (SWM) pond with a controlled discharge point directly into the creek.

RVA undertook site investigation works to better understand the flooding mechanism and reviewed the SWM report and drawings of the pond to understand the discharge flow rate from the pond to the creek. The SWM pond is proposed to discharge at 0.18 m^3 / s and 0.34 m^3 / s for 10 - year and 100 - year, respectively. Compared to the HEC - RAS flows in the creek of 5.57 m^3 / s and 8.62 m^3 / s for 10 - year and 100 - year, respectively, the proposed SWM pond discharge rates are negligible. Excerpts from the SWM report have been attached in Appendix A. As such, it can be understood that the flooding at # 12207 -Highway 50 is not due to the discharge rate from the SWM pond. **Figure 4.6** illustrates Robinson Creek, the flood property, and the creek bypass channel.

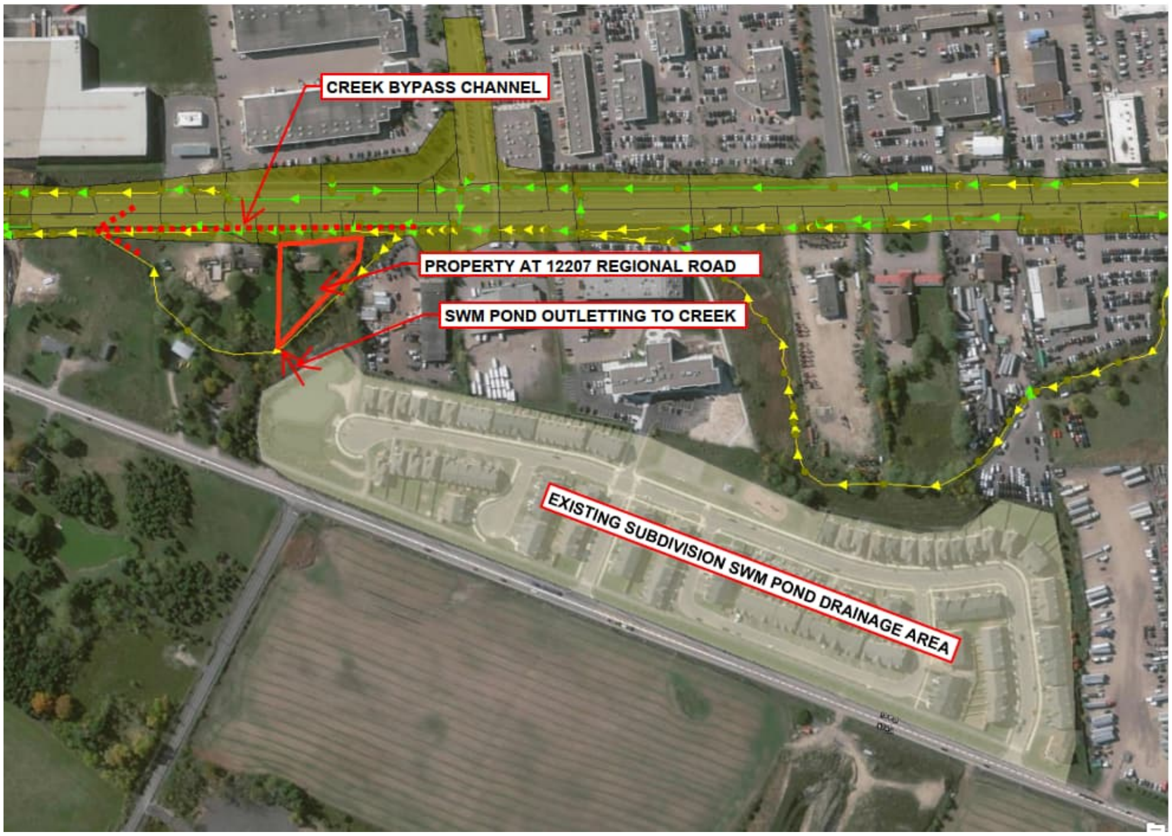

Figure 4.6 : Robinson Creek, Flood Property and Creek Bypass Channel

RVA has designed increased capacity for flooding relief of this property. The bypass level between the creek and the relief pipe was adjusted as well as the relief pipe being upsized from 525 mm diameter to 900 mm diameter.

4.3.4 Proposed Culvert Upgrades

The following in **Table 4.1** lists details of proposed culverts to be upgraded due to existing lack of capacity. Note that this list does not include existing culvert that are to be replaced by sewers due to the proposed MUP or sidewalk. Maps including sewer upgrades and new sewer ID numbers are included in **Appendix D.**

Table 4.1: Proposed Culvert Sizes and Shapes

Crossing Number	EX Culvert #	Existing Diameter / Dimensions	Proposed Material and Shape	Proposed Diameter / Dimensions
2223.44 - 2.1	17	600 mm Dia.	Concrete Box	1800 mm x 1200 mm
2223.44 - 3.1	18	900 mm Dia.	Concrete Box	1800 mm x 1200 mm
2223.25 - 2.1	28	2260 mm x 1660 mm	Concrete Box	3000 mm x 1500 mm
2223.22 - 2.1	29	2060 mm x 1450 mm	Concrete Box	3000 mm x 1500 mm
2223.19 - 2.1	31	2270 mm x 1600 mm	Concrete Box	3000 mm x 1500 mm
RR - ED - 38.1	32	525 mm Dia.	Concrete	900 mm
RR - ED - 39.1		525 mm Dia.	Concrete	900 mm
RR - ED - 40.1		525 mm Dia.	Concrete	900 mm
RR - ED - 41.1		525 mm Dia.	Concrete	900 mm

5.0 Model Results

5.1 Existing Condition Scenario Results

The existing condition scenario was tested for a 10 - year storm and a 100 - year storm event to analyze the effects of a design storm and a major storm on the culverts along Highway 50.

The results indicate that under a 10 - year storm the culverts under George Bolton Parkway and Highway 50 flood. The existing culverts at this intersection are a 600 mm diameter PVC pipe (EX Culvert #17), which is connected to a 900 mm diameter CSP culvert (EX Culvert #18). The 900 mm diameter pipe connects to an 1800 mm x 1200 mm concrete box culvert (EX Culvert #19) that crosses Highway 50 and outlets into the online pond. Robinson Creek flows through this pipe/culvert arrangement. Based on the existing conditions InfoWorks model results, there is overtopping of the road to a depth of 230 mm and 311 mm under 10-year and 100-year storm conditions respective. **Figure 5.1** represents the culverts under the George Bolton Parkway and Highway 50 intersection. Based on TRCA's HEC - RAS model, the 10 - year flow at the intersection is 5.10 m3 / s and the InfoWorks model predicts hydraulic restrictions due to the small culverts (600 mm and 900mm) under the intersection.

Figure 5. 1: George Bolton Parkway and -Highway 50 Intersection Culverts

At location further south near Parr Boulevard, a flooding complaint was received during the public consultation meeting. The complaint is related to property # 12207 Highway 50. Hydraulic details were added and analyzed in the existing model.

The hydraulic situation around this property can be explained as follows. Robinson Creek departs from the Highway 50 road alignment and runs around the property. Between the property and Highway 50, a former roadside ditch, that acted as flow relief to bypass high flows in Robinson Creek was filled and replaced with a 525 mm diameter sewer, (EX Culvert #32), of lesser conveyance capacity. Compared with the former drainage situation, the water level in the creek rises due to decreased relief capacity from the replaced ditch sections with 525 mm diameter storm sewers. The water level in the adjacent creek section ranges from 230.25 m to 229 m for the 10-year storm flows and 230.5 m to 229 m for the 100-year storm flows. Since the property elevation is within 230 m to 231 m, RVA can confirm that a flood risk currently exists at property # 12207 Highway 50. This flood risk might have been increased due to the filling of the ditch and replacement with a 525 mm diameter sewer which provides less flow capacity and flow relief than the previously existing ditch sections. In addition, the existing 525 mm storm sewers surcharge during a 10 - year storm event.

For a section of Robinson Creek that is located upstream of the above-described flood complaint property, the following hydraulic capacity restrictions exist. There are three culverts, (EX Culvert #28, #29, #31) that run along Highway 50 that show hydraulic restrictions to convey the 100 - year storm flows. All three culverts are steel arch plate with sizes 2060 mm x 1450 mm, 2260 mm x 1660 m and 2270 mm x 1600 mm respectively. **Figure 5.2** highlights the three culverts that show hydraulic restrictions in the existing condition.

The InfoWorks model output results are presented in Appendix B.

5.2 EA Recommended / Proposed Condition Scenario Results

The EA recommended condition scenario was set up to analyze the proposed drainage infrastructure improvements within the -Highway 50 corridor. LID design elements were also proposed and were integrated into the model to promote sustainable drainage features. The proposed condition model performs well under the established 10 - year design storm scenario and does not show any culvert capacity restrictions along the study area section for Robinson Creek and Rainbow Creek. The roadside drainage features that consist of ditches, pipes, swales, and infiltration trenches / chambers are all performing as expected and within their capacity limits.

Under the 10 - year design storm, all the proposed culverts under the George Bolton Parkway and -Highway 50 intersection convey the 10 - year flows without ponding or overtopping the intersection. Under the 100-year design storm the InfoWorks model predicts a ponding depth of 123 mm at the intersection. This represents a ponding depth reduction of approximately 100 mm from the existing condition. Since the predicted flow depth over the road depends on the width of the spill path and is difficult to properly quantify with a one-dimensional model, the result is an approximate value that is based on best available topographic data. Since no historic overtopping at the road was observed for the existing conditions and the proposed pipe upgrades show a significant improvement in drainage conditions, the likelihood of actual road overtopping to occur is very limited.

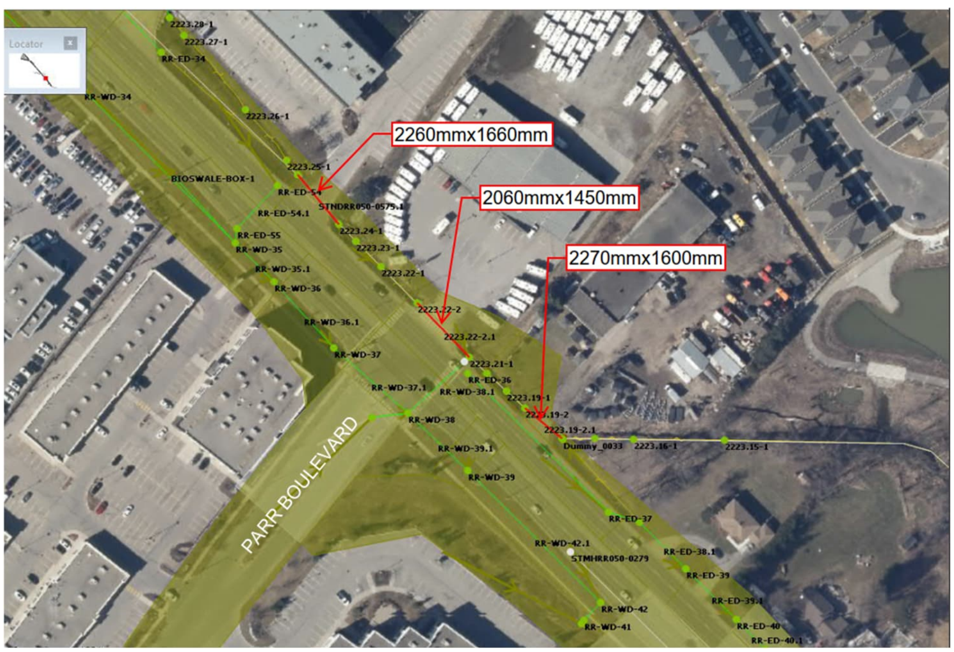

Figure 5.2 : Culverts on -Highway 50 and Parr Boulevard Showing Hydraulic Restrictions Under 100 - year flows

Further considerations are made with regards to peak flows in Robinson Creek under section 8 of this report. Several meetings were held with the TRCA on the peak flow prediction of Robinson Creek and the current presented peak flows represent already a reduction, compared with original supplied hydrologic data.

Further flow measurements during observed rainfall events in 2021 were undertaken to relate measured flows and try to upscale and compare them to the current predicted peak flows, since it is observed that the predicted peak flows might be excessive and overpredict current conditions.

The 525 mm CSP sewers at the front of property # 12207 Highway 50 are upsized to 900 mm concrete sewers in the proposed condition. The model predicts that since the sewer capacity has been increased, the flow in the creek decreases in the post condition compared to the precondition. The proposed 900 mm concrete sewers also do not surcharge during a 100 - year storm event. The **Table 5.1** below summarizes the pre and post flows of the creek at the back of # 12207 Highway 50.

Table 5.1: Creek Flow Comparison (at back of # 12207 -Highway 50)

Cross - Section Number	Existing (10 - Year) (m^3 / s)	Proposed (10 - Year) (m^3 / s)	Existing (100 - year) (m^3 / s)	Proposed (100 - year) (m^3 / s)
2223.16 - 1.1	5.57	4.72	8.63	7.68
2223.15 - 1.1	5.57	4.72	8.63	7.68
2223.14 - 1.1	5.57	4.72	8.63	7.68

The three culverts near Parr Boulevard and Highway 50 also show no hydraulic restriction or flooding during a 100 - year storm event. It is important to note that these proposed concrete box culverts of size 3000 mm x 1500 mm operate at 60-90% capacity during the 100 - year storm event.

The InfoWorks model output results for the proposed condition scenario are presented in **Appendix B**.

6.0 SWM and LID Features Plan and Design

6.1 Evaluation and Selection of Candidate Features

In support of the evaluation process that was undertaken as part of the Class EA study, the Region's *LID Implementation Process for Regional Road Right - of – Ways* was utilized in developing the most applicable Low Impact Development (LID) technique(s) for this project. Based on a thorough review of available information and evaluation against all relevant criteria during the EA process, it was determined that a combination of underground storage elements combined with infiltration elements and Oil and Grit Separator (OGS) units were feasible options for this study area.

Table 6.1 below indicates the opportunities and constraints for each of the applicable LID techniques relevant to Regional Roads within the Region.

Table 6.1: LID Practice Analysis

Project Type	LID Practice	Constraint / Opportunity
Regional Road Works (Urban)	**Stormwater Management (SWM) Pond**	**Constraint** - Space is not available within the road right - of - way. - The adjacent properties within the project area are either farmlands or developed sites. - To meet the Region's SWM initiative, multiple SWM ponds will be required at each existing culvert. - Buying a large amount of property to build SWM ponds is not an economical solution.
	Bioretention Facilities – Bioswales and Bioswale Box	**Opportunity** - Can be designed with overflow capacity and can provide surface conveyance for flows. - Water retention can be designed above the capacity for the filtration

Project Type	LID Practice	Constraint / Opportunity
Regional Road Works (Urban)	**Bioswales and Bioswale Box**	element to account for emergency overflows. - Higher costs for soil remediation and maintenance.
	Permeable Pavement	**Constraint** - Permeable surfaces can be provided along the MUP. - Runoff water from boulevard is relatively clean and from a small area. - If provided along the MUP, periodic cleaning is required to maintain drainage properties. - No costs associated with property requirements. - Higher maintenance costs to maintain permeability. - Will not meet the drainage requirements due to capacity restrictions.
	Oil / Grit Separator Units (OGS)	**Opportunity** - OGS units can be used due to their smaller footprint and treatment design flexibility for treatment area size. - OGS units need to be designed as part of a multi component approach to achieve water quality treatment targets.
	Superpipe Storage	**Constraint** - Shallow outlet points will not allow water to drain completely. Larger pipes will require the proposed road profile to be raised.

Project Type	LID Practice	Constraint / Opportunity
Regional Road Works (Urban)		- Does not provide the quality controls that the Region and other agencies are looking for.
	Infiltration Trenches	**Opportunity** - Underground storage / infiltration arches such as those manufactured by Terrafix, Stormtech or Cultec can be used to detain and infiltrate stormwater. - Can be used underneath pavement. - Clean out manholes provide the opportunity to clean out sediment without removal or any pavement.
	Enhanced Roadside Ditches	**Constraint** - Not compatible with adjacent land use. - Enhanced swale would require significant adjacent property. - Not practical within the -Highway 50 corridor due to constant water flows and large storm flows. - Significant property required to widen ditches for enhanced swales.
	Catchbasin Capture Devices / Catchbasin Shields	**Opportunity** - Does not impact existing flow capture and conveyance. - Provides some treatment benefits by removing larger TSS particles at catchbasin locations. - Compatible with adjacent land use. - No cost associated with property requirement. - Standard maintenance costs anticipated.

As indicated above, the selected feasible LID techniques that are recommended for incorporation in the SWM Design for -Highway 50 from Healey Road to Mayfield Rd are:

- Oil / Grit Separator Units (OGS)
- Bioretention Facilities
- Infiltration Trenches
- Catchbasin Capture Devices / Catchbasin Shields

7.0 Drainage Plan and Design

7.1 Minor System Design

The minor drainage system consists of storm sewers, roadside ditches, and driveway culverts. The systems were designed to convey the 10 - year storm event for the -Highway 50 subcatchments and external contributing drainage areas.

7.2 Major System Design

The major drainage system consists of the minor drainage system and the overland flow routes which convey excess runoff above the minor drainage system's capacity. The major drainage system was designed to convey the peak runoff flow from the 100 - year storm events.

7.3 Monitoring and Maintenance

To allow the stormwater maintenance facilities to function properly, the following monitoring and maintenance program is recommended by the MECP and TRCA guidelines.

The storm drainage systems should be maintained at regular intervals by inspecting and cleaning the sumps of catchbasins and maintenance holes as well as the OGS structures. In addition, infiltration trenches should be flushed out and any collected sediment should be removed via vacuum truck. The following sections describe the operations and maintenance requirement for each type of LID systems proposed within the study area.

7.3.1 Oil / Grit Separator (OGS)

With regards to monitoring and maintenance Imbrium System's OGS manual was reviewed. However, in the detailed design stage any OGS that is approved and equivalent to Imbrium System's OGS can be used. The manual by Imbrium System suggests that the inspection of the EFO® filter units should be carried out over the first year on a regular basis to inspect and assess sediment accumulation. Inspection in subsequent years should be based on the inspection schedule established based on the results on the first year. It is also important to note that the inspections should be performed immediately after oil, fuel or other chemical spills that take place within the area and drain to the OGS.

Task of inspection includes the removal of manhole covers, inspection of sediment buildup using a sediment probe with bulb valve or sludge judge, and an oil dipstick for oil inspection. The remaining tasks are primarily visual. Inspection and assessment of the unit performance can be logged using the sample maintenance logs provided in the EF Owner's manual. A copy of the owner's manual is attached in **Appendix C**.

7.3.2 Catchbasin Capture Devices / Catchbasin Shields

A Catchbasin Shield Operation manual was reviewed as part of this report. Inspecting a Catchbasin Shield should be done by opening the grate and then attaching a lifting rope to the top of the centered leg of the Catchbasin Shield insert. A Sludge Judge should be used to measure the sediment depth in four to six locations of the sump. The unit is recommended to be cleaned if the sediment depth is 300 mm – 600 mm. A copy of the owner's manual is attached in Appendix C.

7.3.3 Bioretention Facilities: Bioswales and Bioswale Box

Based on the 'Low Impact Development Stormwater Management Planning and Design Guide: Version 1.0,' developed by the Credit Valley Conservation (CVC) and TRCA, the proposed bioswales and bioswale box need to be maintained to ensure that the infiltration and water quality benefits are preserved. At the bioretention facility locations, routine roadside ditch maintenance practices to be avoided are scraping and regrading. In addition, vehicles should not be parked or driven on the bioswales and bioswale boxes. If routine mowing takes place, then it should be carried out using the lightest possible mowing equipment to prevent soil compaction.

After every major storm event (> 25 mm) and quarterly for the first two years the vegetation density needs to be inspected to ensure at least 80 % coverage exists, to observe if vegetation has been damaged due to foot or vehicular traffic, as well as, for channelization and accumulation of debris, waste, or sediment. After two years inspections are required twice annually. Monitoring wells should be installed within bioswale boxes to facilitate the inspection of water levels within the engineering soil layers and storage layers and confirm infiltration rates of the underlying soils.

At least twice annually during the first two years the proposed bioswales and bioswale box need to be regularly watered while vegetation is becoming established. The bioswales need to be mowed to ensure the height is between 75 mm to 150 mm.

Annually the proposed bioswales and bioswale box need to be inspected for dead vegetation, invasive growth, dethatching, thatching, and aerating. Dead vegetation needs to be replaced. Also, any erosion must be repaired. If the sediment within the bioretention facilities exceeds 25 mm depth, then it must be removed when dry.

7.3.4 Infiltration Trenches (Stormtech)

Maintenance hole inspections should be carried out to observe if trash, debris, or pipe blockages have occurred. Inspection ports should also be installed with infiltration trenches. Observations of sediment levels though the inspection ports should be completed as part of regular inspections. More thorough inspection should be conducted if vacuuming and removal of sediment or nondraining water are required. During the first two years of operation, inspections should be made after every significant storm event (> 25 mm) to ensure proper functioning. On an average about four inspections are required every year for the first two years.

After the first two years, the infiltration trenches should be inspected on a regular basis, typically twice per year, and maintained as required. The maintenance frequency should be based on site specific characteristics and driven by the amount of runoff and pollutant loading encountered by the system. Typically, maintenance intervals for the proposed infiltration trenches would be 5 years.

8.0 Flow Monitoring and Rain Gauge Data Analysis

Meetings were held with TRCA and Peel Region to discuss the perceived overprediction of the peak flows in Robinson Creek that are based on the TRCA's HEC-Ras model. The reason for this observation was, that flows at the road intersection of George Bolton Parkway and Highway 50 were predicted to overtop the road even in 5-year and 10-year storm events and the creek peak flows did exceed the available culvert conveyance capacity. No such observations were made in the past and no flood complaints exists for this road section or the creek.

TRCA agreed to reduce the duration of the design storm to lessen the peak design flows for the creek. In addition, it was agreed between Peel Region and RVA to conduct further flow monitoring to gain a better understanding of the creek flow response to rainfall events. The results of the flow monitoring were extrapolated to determine the accuracy of the predicted flows based on the hydrology analysis provided by TRCA and if further reduction in anticipated peak flows was warranted. For this purpose, Advanced Monitoring Group (AMG) Environmental installed a flow monitor and rain gauge at the Highway 50 and George Bolton Parkway intersection. The flow monitor and the rain gauge were installed at the outlet of the existing 1800 mm x 1200 mm rectangular box culvert on April 20, 2021. RVA has obtained and analyzed flow monitoring and rain gauge data between April 20, 2021, and July 31, 2021. The monitored data was measured under a 5-minute timestep.

The monitored data analysis revealed that there were four (4) significant rainfall events that happened during the monitored period. For this analysis, any flow recorded below 200 L/s was considered to be insignificant. The four (4) significant rainfall events occurred twice in July and once in September and October. The peak flow ranged from 200 L/s to 652 L/s. The most significant peak flow was observed in the month of July. The below graph, **Figure 8.1,** shows the recorded flow data and rainfall data between the period July 6, 2021, 20:50 to July 8, 2021, 16:00 (2 rain events).

During the period in July, two independent rainfall events occurred. The first rainfall event produced a volume of 10.16 mm with a peak intensity of30.48mm/hr. As there was no previous rainfall event, the flow monitor recorded approximately 150 L/s from the drainage area. However, the second rainfall of 21.34 mm of volume and a peak intensity of 45.72 mm/hr produced approximately 652 L/s of peak flow. The significantly increased peak flow of 652 L/s is due to the already saturated soil conditions because of the previous rainfall approximately 5 hours before. The saturated ground conditions resulted in increased runoff and reduced time to peak.

In October 2021, there was also a significant rainfall that was captured by the rain gauge**. Figure 8.2** illustrates the measured rainfall and the flow response from the drainage area. The graph shows that there was a 23.37 mm rainfall that occurred with an intensity of 36.58 mm/hr. The duration of the rain event was approximately 4 hours. The peak flow that was recorded during this event was approximately 460 L/s. Due to the leading dry period before this rainfall, the peak flows from this rainfall event are lower than the July event. The TRCA has revised the HEC-RAS flows, since RVA's previous SWM brief for this project, by changing the design storms from 6-Hour AES to 12-Hour AES. Email correspondence with TRCA is attached in Appendix A. The 12-Hour AES rainfall volume is approximately 42mm. The peak flow calculate by the TRCA model was 3.11 m3/s for this rainfall volume. Based on collected rainfall data an approximately equivalent 2-year storm event was recorded by RVA between September 22, 2021, 10:25 AM and September 22, 2021, 22:45 PM. During this period a total rainfall volume of 41.66 mm was recorded with a peak intensity of 42.67 mm/hr.

The resulting recorded peak flow for this rainfall event was only ~375 L/s, nearly 10% of the anticipated peak flow based on the TRCA model. **Figure 8.3** below shows the accumulated rainfall (total depth) and observed flow under an approximately 12-hour storm duration. Based on this observation and the flow results from the smaller storms described above the TRCA estimated peak flows are appeared to be over estimated. This over estimation of the peak flow is likely a result of the high-level, lumped catchment, model approach utilized in the TRCA hydrology model which is typical for a watershed level analysis. A more discretized model, with additional routing and surface and lot level storages accounted for would likely result in lower peak flows. Such an analysis is outside the scope of this project and at this time the revised TRCA flows have been used for analysis purposed with the understanding that they represent a very conservative approach.

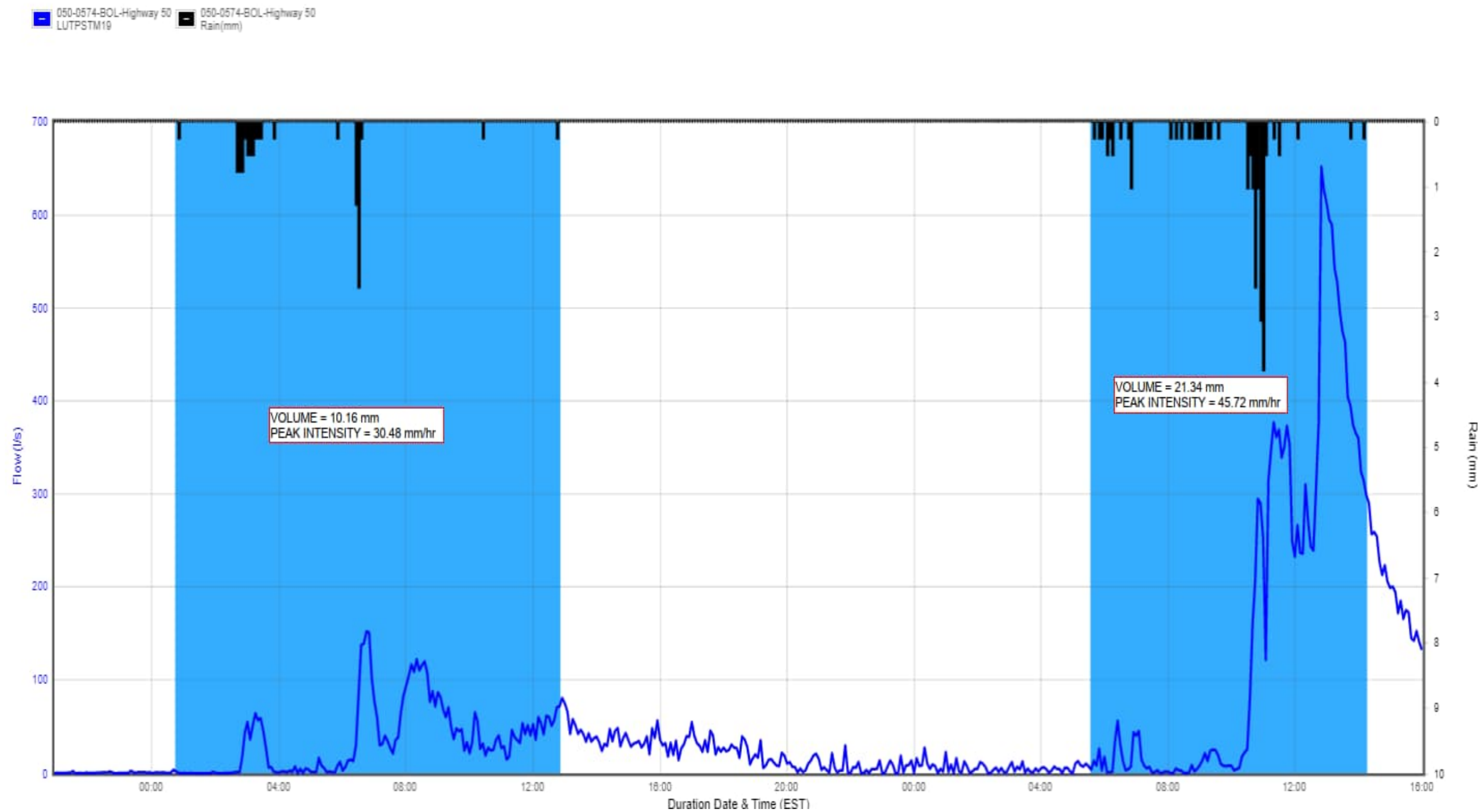

Figure 8.1: Measured Rainfall and Flow Data on July 6th – 8th

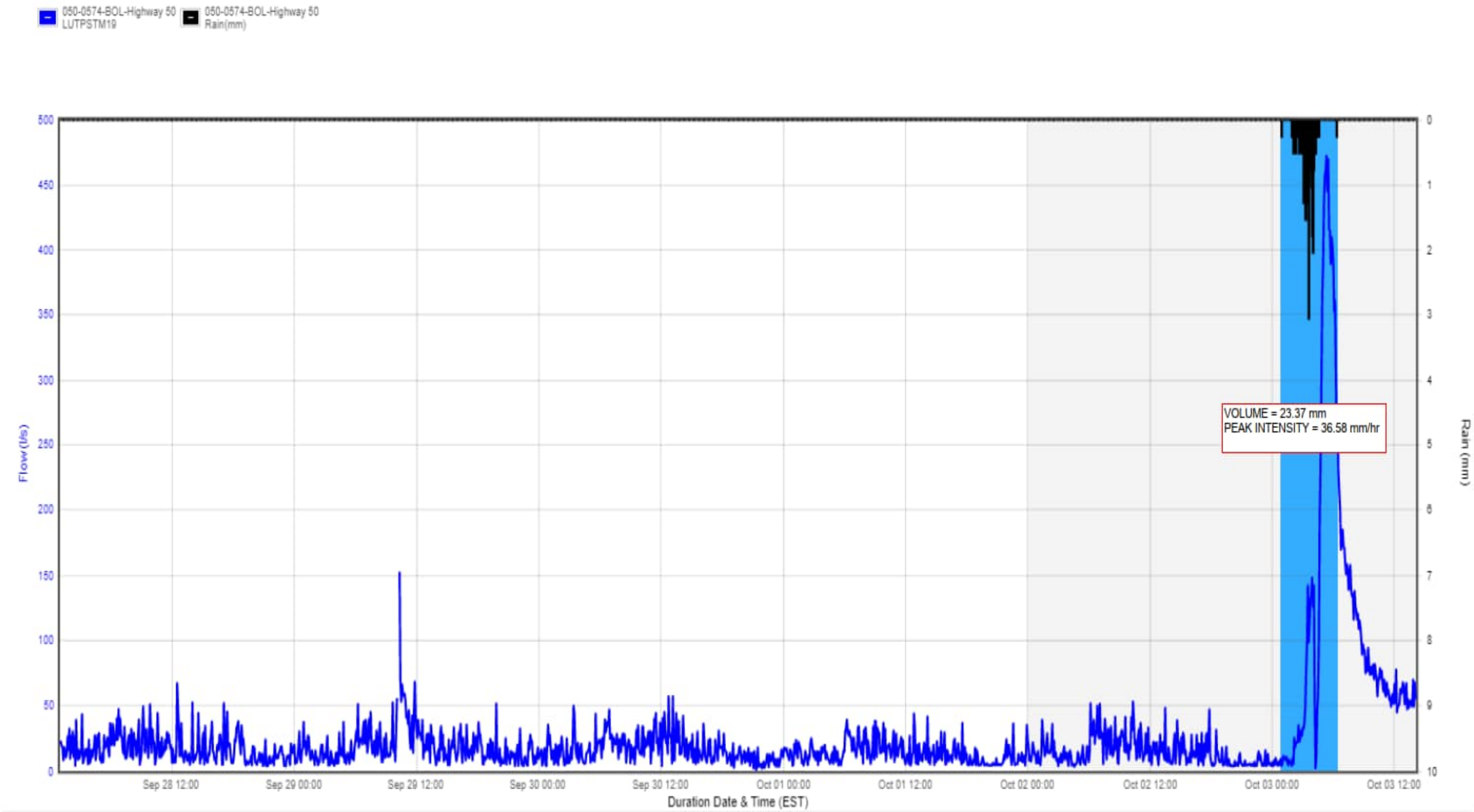

Figure 8.2: Measured Rainfall and Flow Data on October 3rd

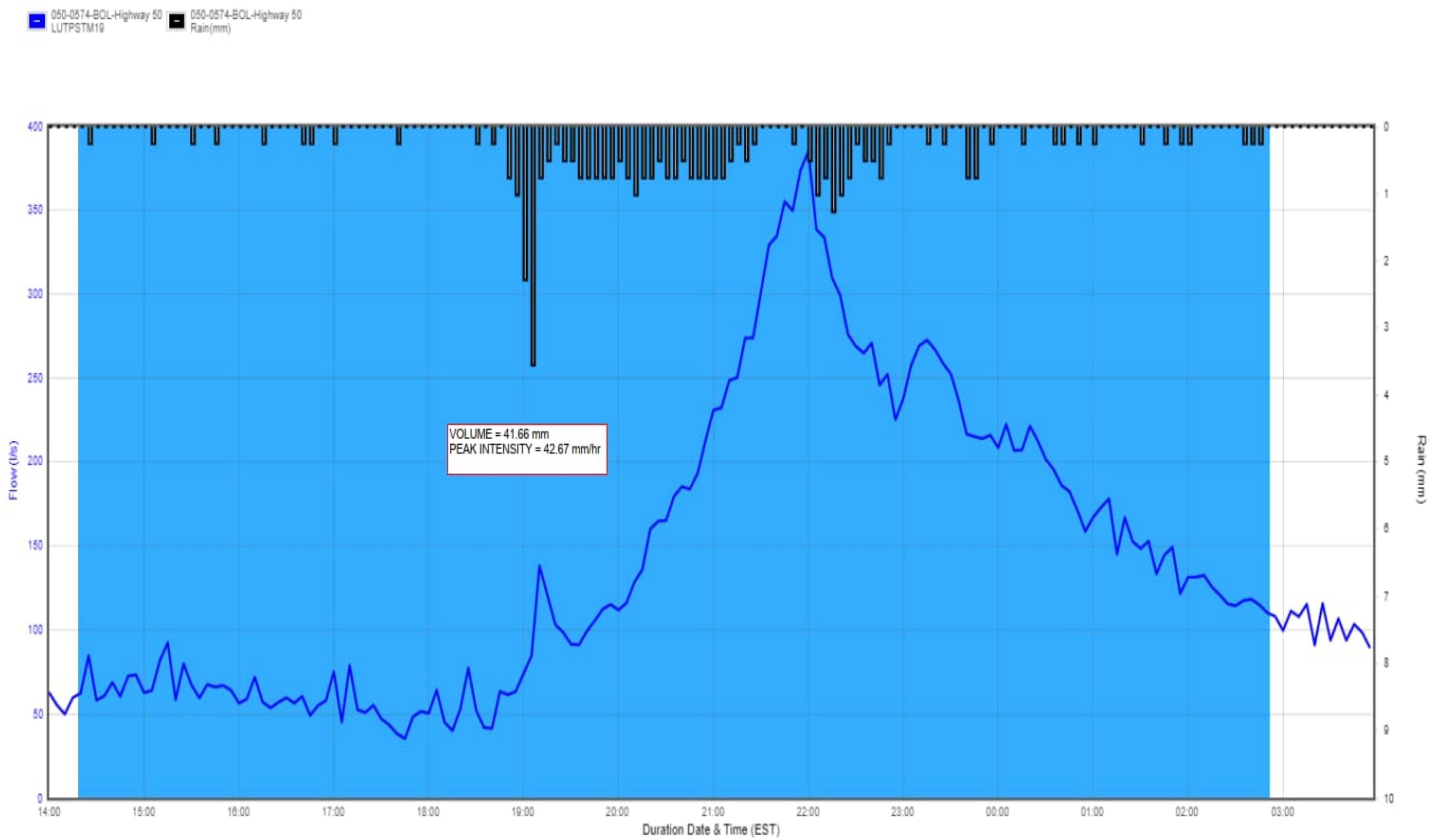

Figure 8.3: 12-Hour Rainfall and Measured Flow Data During September 22, 2021

9.0 Recommendations, Approval and Review Requirements

The proposed SWM measures outlined in this report have been developed in support of the recommendations developed though the Class EA planning and design process. The recommended infrastructure upgrades outlined in this document are expected to perform without flooding with the current TRCA's provided flows. Although it should be noted that based on the flow monitoring and rain gauge data analysis, RVA finds the flows provided by TRCA to be overestimated. However, the proposed culvert upgrades on -Highway 50 and George Bolton Parkway are sized adequately to perform under a 10-year without overtopping and during 100-year with an approximately 123 mm ponding with the TRCA provided flows.

The Stormwater Management (SWM) Report is subject to review and approval from the following regulatory agencies:

- The Region of Peel
- Toronto and Region Conservation Authority (TRCA)
- Town of Caledon
- Ministry of Environment, Conservation and Parks (MECP)
- Public interest groups and stakeholders

The implementation of the recommended storm drainage systems described within this report has been developed in support of the EA recommendations and will control the site's runoff in accordance with the Region and TRCA.

Report Prepared By:

R.V. Anderson Associates Limited

Sadman Soumik, MASc., EIT
Engineer-in-Training, Hydraulic Modeler

Oliver Olberg
Manager of Hydraulic Modelling

Appendix A

Background Information

Region of Peel
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STORMWATER MANAGEMENT IMPLEMENTATION REPORT

BOLTON GATEWAY DEVELOPMENTS INC.

TOWN OF CALEDON
REGION OF PEEL

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
2800 HIGH POINT DRIVE, SUITE 100
MILTON, ON L9T 6P4

SEPTEMBER 2014
REVISED MARCH 2015

CFCA FILE NO. 649-3357

CROZIER
& ASSOCIATES
Consulting Engineers

Table 4: Proposed Controlled Peak Flow Rates

Return Period (Years)	Maximum Allowable Release Rate (Per Table 1) (m^3/s)	PROPOSED SWM FACILITY		
		Proposed Discharge (m^3/s)	Active Storage Required (m^3)	Active Storage Provided* (m^3)
2	0.16	0.06	1660	5770
5	0.21	0.13	2200	
10	0.24	0.18	2570	
25	0.29	0.25	3050	
50	0.34	0.30	3420	
100	0.38	0.34	3790	
Regional	-	1.23	4720	

*Note: Active storage is measured from the permanent pool volume, elevation 229.1m, to the top of berm, elevation 230.60m

With the use of the proposed SWM facility, post development peak flows will respect the target flow rates for Robinson Creek for storms up to and including the 100 year event.

3.4 Stormwater Quality Control Requirements

As previously noted, the site drains to Robinson Creek and therefore is required to meet Enhanced level of protection (80% TSS removal) as defined by the MOE SWMPD Manual.

A wet pond has been selected as the preferred end of pipe treatment facility for the proposed development. Based on the MOE Stormwater Management Planning and Design Manual (2003), the following volumes are required for the contributing 8.1 ha site development area (65% composite imperviousness):

- Permanent Pool: 1404 m^3
- Extended Detention: 1098 m^3

A composite imperviousness of 65% imperviousness is based on the conservative value of 68% imperviousness for catchment 201, and an imperviousness of 20% for catchment 202. It is to be noted that the contributing area from the Pannia lands have been excluded from the water quality calculations given that it is not the responsibility of the proponent to provide water quality control for external lands. Refer to **Appendix D** for sizing calculations and **Section 4.1** for the provided storage volumes in the SWM facility.

Region of Peel
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Sadman Soumik

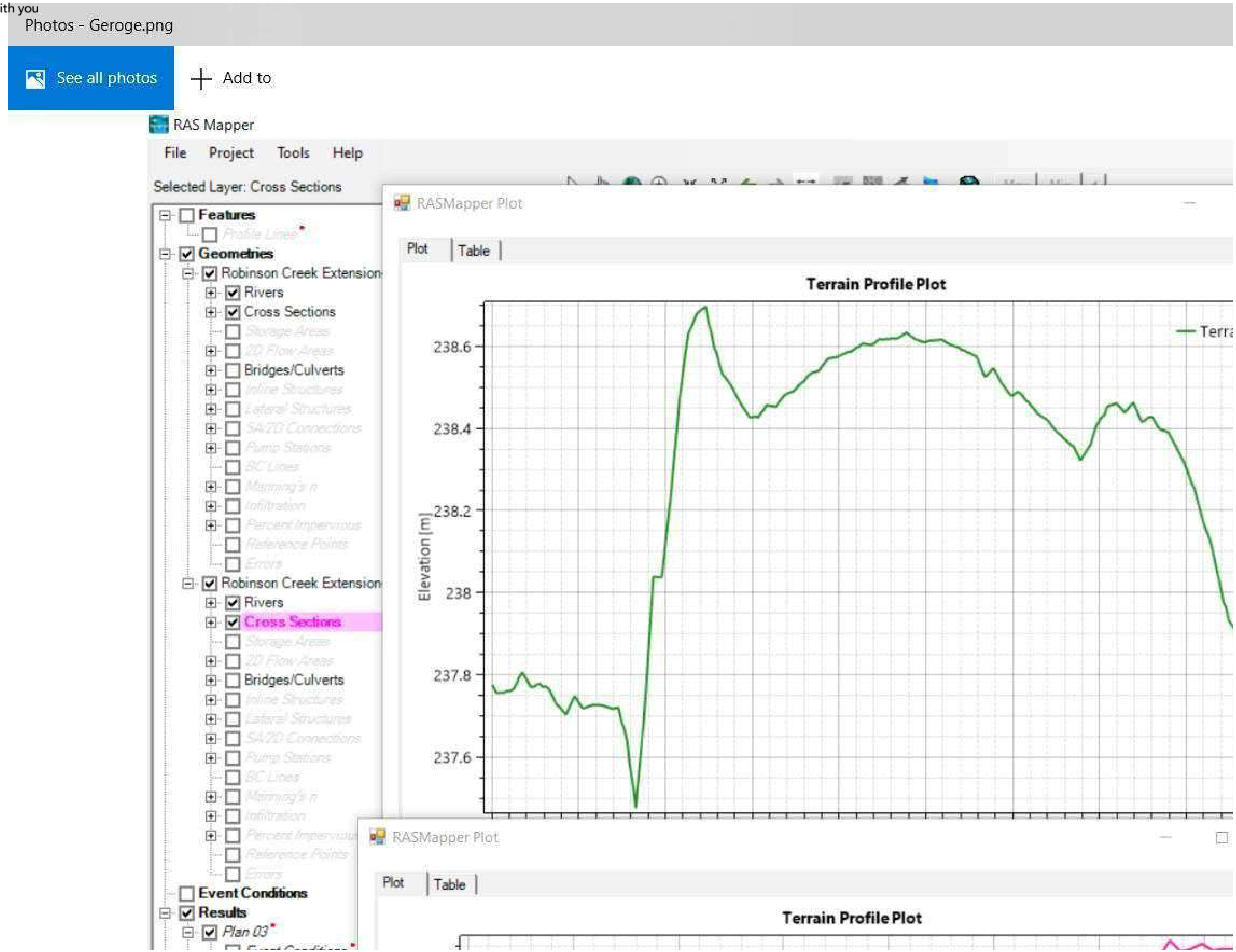
From: Jairo Morelli <Jairo.Morelli@trca.ca>
Sent: February 24, 2021 12:33 PM
To: Andrew McGregor; emma.benko@trca.ca
Cc: Banuri, Syeda; Oliver Olberg; Peter Cho; Matthew de Wit; Sadman Soumik; Dilnesaw Chekol
Subject: FW: Hwy 50 Drainage Improvements Class EA

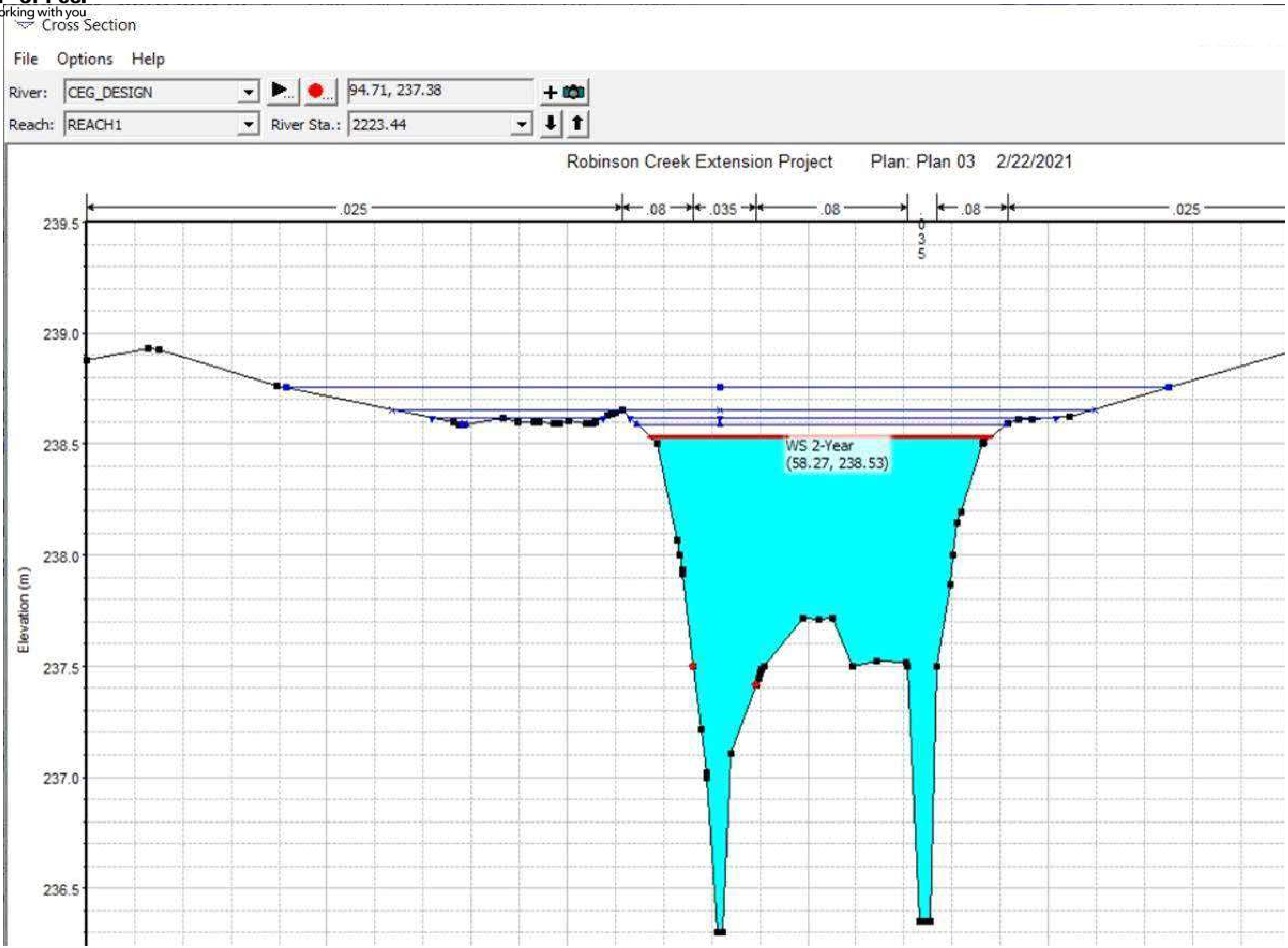
Hi Andrew

Staff had the opportunity to review the HEC RAS model and peak flows associated with the above-noted project. It appears that the flows resulting from the Humber River hydrology update are correct and consistent with those used in the hydraulic model.

We run a series of scenarios to simulate the conveyance of flow through the complex crossing at Geroge Bolton and Highway #50 and the analysis demonstrated that the rating curve used in the model is acceptable. The fact that flooding has not been frequently recorded within the intersection may be among others due to:

- The model is run in a steady-state assuming an unlimited supply of water to represent worst-case scenarios.
- The average ground elevations along the curb (parallel to the west side ditch =238.70m), appear to be a bit higher than the one assumed for the centreline of the road (238.50m). Please refer to the cross-sections shown below, which illustrate ground elevations across the intersection, cut from left to right looking north.


Photos - Geroge.png
See all photos
Add to
RAS Mapper
File
Project
Tools
Help
Selected Layer: Cross Sections
Features
Geometries
Robinson Creek Extension
Rivers
Cross Sections
Bridges/Culverts
Robinson Creek Extension
Rivers
Cross Sections
Bridges/Culverts
Event Conditions
Results
Plan 03
RASMapper Plot
Plot
Table
Terrain Profile Plot
Elevation (m)
238.6
238.4
238.2
238
237.8
237.6
RASMapper Plot
Plot
Table
Terrain Profile Plot


Cross Section
File Options Help
River: CEG_DESIGN
Reach: REACH1
River Sta.: 2223.44
94.71, 237.38
Robinson Creek Extension Project Plan: Plan 03 2/22/2021
.025
.08
.035
.08
.035
.08
.025
WS 2-Year
(58.27, 238.53)
Elevation (m)
239.5
239.0
238.5
238.0
237.5
237.0
236.5

TRCA staff run delineation using high-resolution LiDAR topography and the results show that generally, the drainage areas included in the hydrology model are more or less similar with this delineation except for some minor changes.

TRCA has no concerns, in case your team would like to take a closer look at the hydrology and/or hydraulic model. If that is the case, please let us know if your findings suggest further revisions to the models.

Due to staff and resource constraints, TRCA has a list of criteria to determine installations of stream gauges across its jurisdiction. The idea of installing a new stream gauge at the project site was discussed with the department that is responsible for the installation of stream gauges and the team indicated the site, does not satisfy the majority of the criteria. However, if the Region has an interest in installing and running it, the TRCA would be willing to provide advice.

Please contact me should you have any questions or concerns.

Regards

Jairo Morelli

Andrew McGregor <AMcGregor@rvanderson.com>; Emma Benko <emma.benko@trca.ca>

From: Andrew McGregor <AMcGregor@rvanderson.com>
Sent: Thursday, February 4, 2021 12:45 PM
To: Jairo Morelli <Jairo.Morelli@trca.ca>; Emma Benko <emma.benko@trca.ca>
Cc: Banuri, Syeda <syeda.banuri@peelregion.ca>; Oliver Olberg <OOlberg@rvanderson.com>; Peter Cho <pcho@rvanderson.com>; Matthew de Wit <MdeWit@rvanderson.com>; Sadman Soumik <ssoumik@rvanderson.com>
Subject: RE: Hwy 50 Drainage Improvements Class EA ~ Meeting Availability

Thanks Jairo,

The SWM report is attached. Let us know if you need anything else.

Kind regards,

Andrew McGregor, MCIP, RPP
Senior Planner, EA & Approvals

P: (905) 685-5049 ext. 4211
C: (905) 964-4056

R.V. Anderson Associates Limited
43 Church Street, Suite 104, St. Catharines, ON L2R 7E1

rvanderson.com

From: Jairo Morelli <Jairo.Morelli@trca.ca>
Sent: February 4, 2021 11:01 AM
To: Andrew McGregor <AMcGregor@rvanderson.com>; emma.benko@trca.ca
Cc: Banuri, Syeda <syeda.banuri@peelregion.ca>; Oliver Olberg <OOlberg@rvanderson.com>; Peter Cho <pcho@rvanderson.com>; Matthew de Wit <MdeWit@rvanderson.com>; Sadman Soumik <ssoumik@rvanderson.com>
Subject: RE: Hwy 50 Drainage Improvements Class EA ~ Meeting Availability

Hi Andrew

We will review the HEC RAS model and associated peak flows at the George Bolton Parkway/Hwy 50 intersection. You mentioned that you received the SWM report associated with the development site, discussed with regards to Figure 3. Would you mind providing us with that report?
I will bring the Region's proposal in regards to the monitoring of the Robinson creek into the discussion with my team next Tuesday. We aim to provide you with our suggestions/findings by the end of next week.

Regards

Jairo.

From: Andrew McGregor <AMcGregor@rvanderson.com>
Sent: Wednesday, February 3, 2021 5:21 PM
To: Jairo Morelli <Jairo.Morelli@trca.ca>; Emma Benko <emma.benko@trca.ca>
Cc: Banuri, Syeda <syeda.banuri@peelregion.ca>; Oliver Olberg <OOlberg@rvanderson.com>; Peter Cho <pcho@rvanderson.com>; Matthew de Wit

<MdeWit@rvanderson.com>; Sadman Soumik <ssoumik@rvanderson.com>
Subject: RE: Hwy 50 Drainage Improvements Class EA ~ Meeting Availability

Jairo and Emma,

Thanks for taking the time to meet earlier. Kindly review the attached notes from our meeting and note any errors or omissions. We would appreciate your follow up on the action items noted (eg. review of HEC-Ras model flows) at your earliest convenience. Any questions, please don't hesitate to ask.

Kind regards,

rva

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Andrew McGregor, MCIP, RPP
Senior Planner, EA & Approvals

P: (905) 685-5049 ext. 4211
C: (905) 964-4056

R.V. Anderson Associates Limited
43 Church Street, Suite 104, St. Catharines, ON L2R 7E1

rvanderson.com

From: Jairo Morelli <Jairo.Morelli@trca.ca>
Sent: January 29, 2021 11:39 AM
To: Andrew McGregor <AMcGregor@rvanderson.com>
Cc: Banuri, Syeda <syeda.banuri@peelregion.ca>; Oliver Olberg <OOlberg@rvanderson.com>; Peter Cho <pcho@rvanderson.com>; Matthew de Wit <MdeWit@rvanderson.com>; Sadman Soumik <ssoumik@rvanderson.com>; emma.benko@trca.ca
Subject: RE: Hwy 50 Drainage Improvements Class EA ~ Meeting Availability

[CAUTION EXTERNAL EMAIL] Make Sure that it is legitimate **before** Replying or Clicking on any links

Hi Andrew

Emma from our team will provide you with potential dates

In order to facilitate our meeting/discussion I would like to provide you with the following information:

Figure 1
We welcome the refinement or addition of drainage areas that were not part of the existing hydraulic model and may impact your study area. If feasible please provide us with the estimated flows and supporting calculations/assumptions before our meeting.

Figure 2
I will take a further look at this project next week. However, as far as I remember the description that you mentioned for the arrangement of the 900 and 600mm culverts that join to a large box under RR50 is correct.

We do not have any evidence of flooding on this intersection (Peel Region may know). However, we cannot predict it would not be flooded in the future. Due to the complex "hydraulics" of the three culverts that join at the George Bolton Parkway/RR50 intersection, the hydraulic update concluded that using a rating curve at the crossing will better simulate the existing conditions. You may refer to the COLE Hydraulic Report dated March 24, 2015, for further details.

The flows that were used in the HEC RAS model were derived from the hydrology study update we had at the time the HEC RAS was completed. We encourage your team to use these flows. However, if you would like to reassess them feel free to do so and provide us with the supporting calculations/modeling, hydrological parameters and relevant documentation.

We suggest the consultant investigate further opportunities to upgrade this crossing and reduce the existing flooding conditions as much as possible.

Figure 3
TRCA supports any measure that alleviates or enhance the existing flooding condition throughout the study area based on available BMP. Please go ahead and provide us with the rationale that supports your findings. We will take a look at TRCA database and provide you with details (if any) on the controlled flows from the mentioned new development.

Please contact me should you have further questions or concerns

Regards

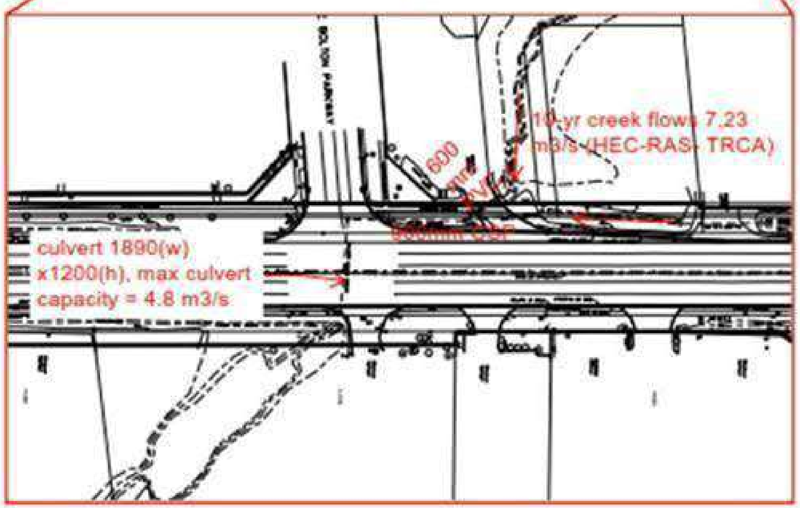
Jairo Morelli

From: Andrew McGregor <AMcGregor@rvanderson.com>
Sent: Thursday, January 28, 2021 12:24 PM
To: Jairo Morelli <Jairo.Morelli@trca.ca>
Cc: Banuri, Syeda <syeda.banuri@peelregion.ca>; Oliver Olberg <OOlberg@rvanderson.com>; Peter Cho <pcho@rvanderson.com>; Matthew de Wit <MdeWit@rvanderson.com>; Sadman Soumik <ssoumik@rvanderson.com>
Subject: Hwy 50 Drainage Improvements Class EA ~ Meeting Availability

Hello Jairo,

We'd like to arrange for a meeting with the TRCA to discuss HEC-Ras hydraulics and flows in Rainbow Creek. Specifically, why creek flows to the west side of RR50 are so high so that road flooding is predicted from a 2-year storm event onwards (see insert below and Figure 2 writeup attached). Kindly let us know your availability to meet (digitally)… hopefully some time next week. Feel free to include other staff as required.

Figure 2: Rainbow Creek crossing at George Bolton Intersection



Thanks and kind regards,

Region of Peel
working with you

arva

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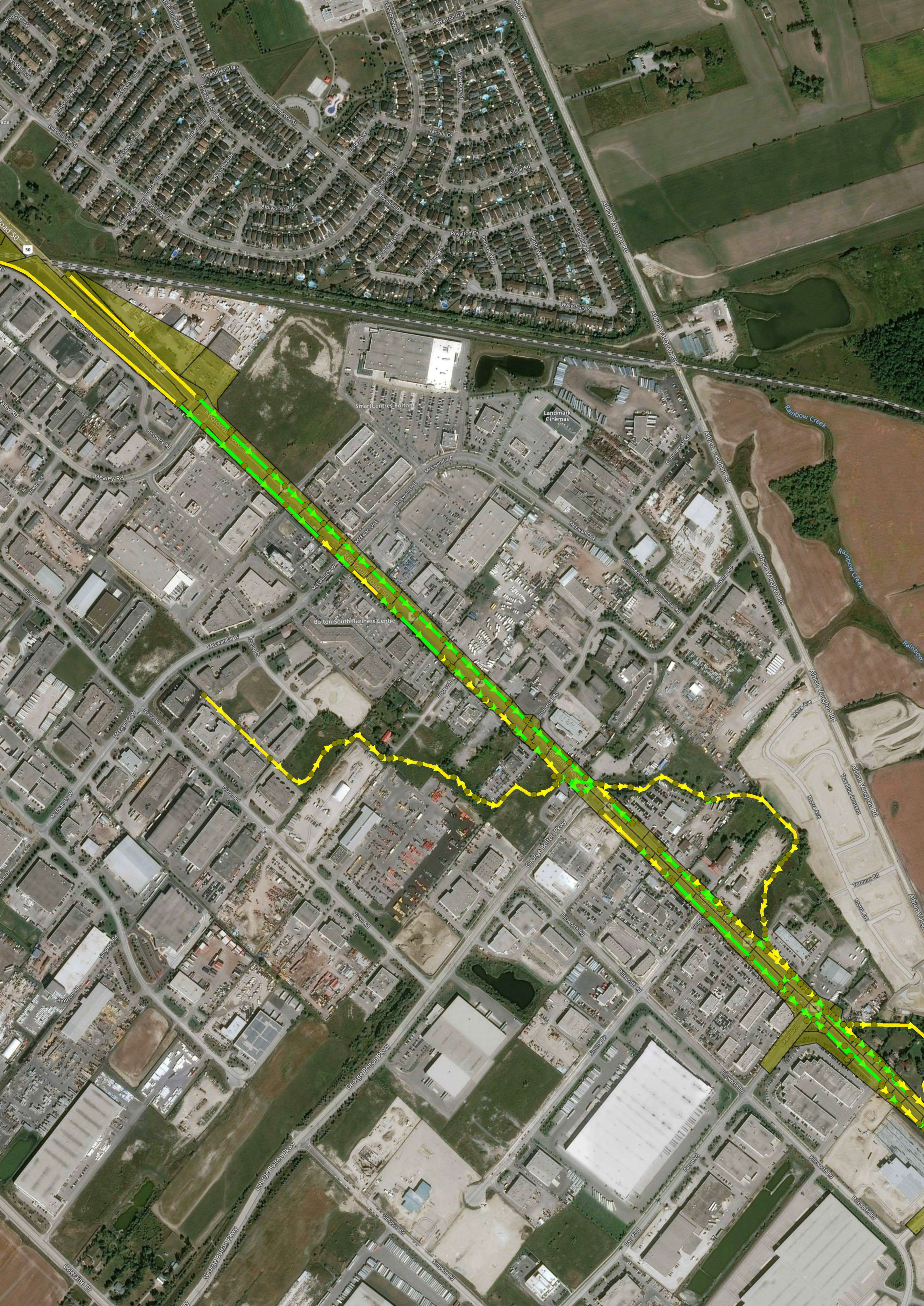
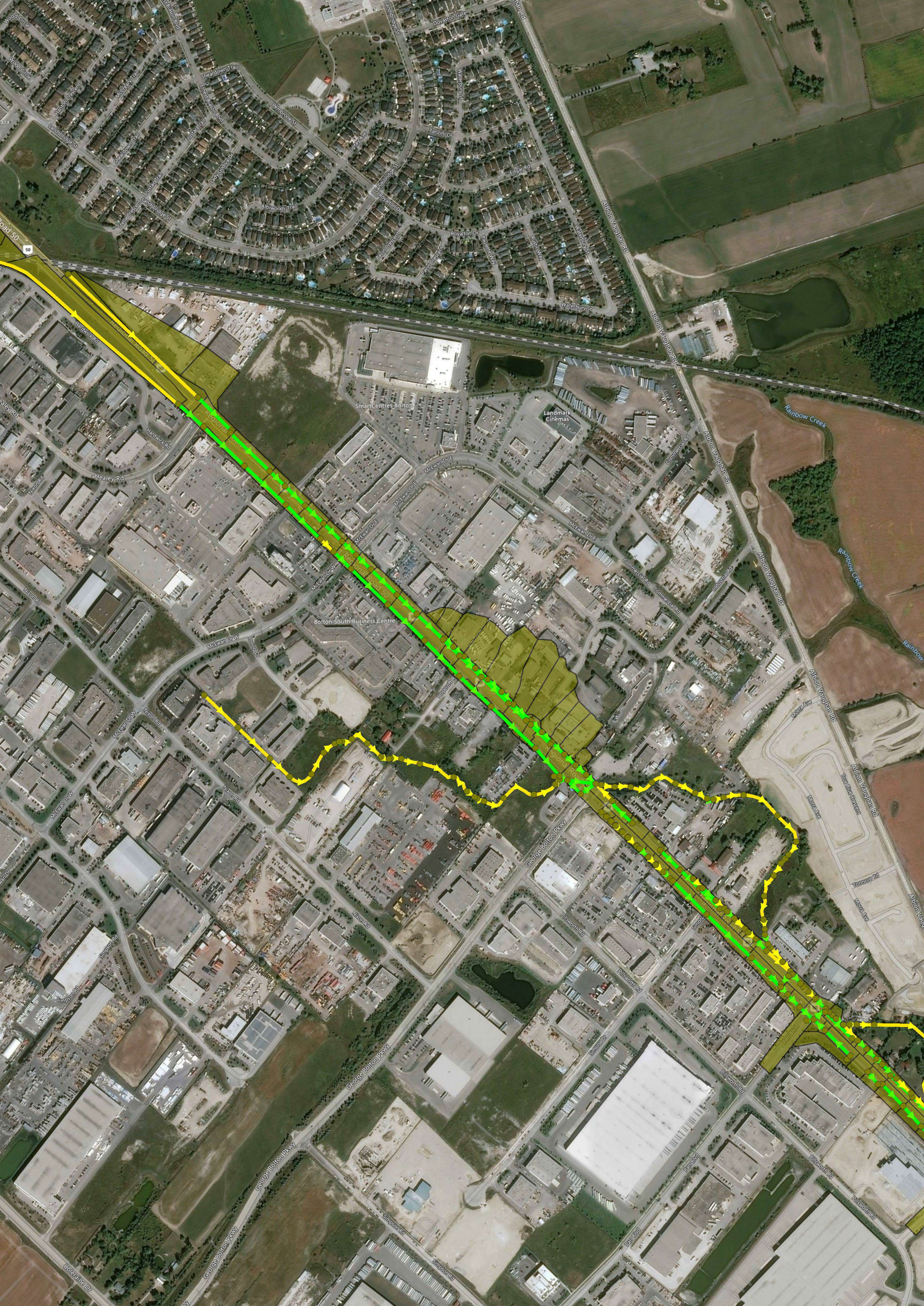


SmartCentres Bolton
Landmark Cinemas
Bolton South Business Centre
Rainbow Creek
Healey Rd
Albion Vaughan Rd
George Bolton Pkwy



SmartCentres Bolton
Landmark Cinemas
Healey Rd
Bolton South Business Centre
Rainbow Creek
Albion Vaughan Rd
George Bolton Pkwy

northwesterly, away from RR50, into the industrialized area bound by RR50, George Bolton Parkway, Nixon Road, and McEwan Drive West.

2 EXISTING CONDITIONS

2.1 Field Investigations and Background

A detailed topographic survey of the watercourse corridor was completed by the Project Team and provided to Matrix in May 2020. During the same time period, a request for historic record drawings was submitted. Applicable record drawings provided to the Matrix team are available in Appendix B. Also during this time period, a request for a historic record of operations/maintenance issues relative to Matrix's study focus was circulated to the Project Team and Owner. Of note, no response to this item was provided.

To ascertain the Matrix team of the current in-field conditions, Matrix Staff performed a site walk on September 9, 2020 with a focus to review and document the existing conditions of the watercourse, with a focus on the eight culvert structures identified, below. Detailed crossing sheets and photologs were prepared by Matrix for each structure to document the structure size, orientation, type, channel approach/departure characteristics etc. Matrix Structure Crossing Sheets and Photologs are available in Appendix C and D respectively. Of note, although Matrix fieldwork provides general commentary on structure condition, the intention of Matrix appraisals is focused on culvert and channel characteristics; not a detailed condition assessment of the culvert structures.

As a significant portion of the watercourse is within, or interacts with, private property, several Permissions to Enter were obtained prior to mobilization of the site reconnaissance. Also provided prior to the site reconnaissance was structure condition appraisals completed by Region of Peel Staff. Notably, not all culvert structures within this study were appraised. Condition appraisals are available in Appendix E.

2.2 Culvert 1

Culvert 1 is located in proximity to the intersection of RR50 and George Bolton Parkway, conveying watercourse flows under RR50 from west to east via a buried culvert/sewer network.

The upstream end is comprised of two protruding culvert barrels; one oriented westerly to convey approaching watercourse flows (Culvert 1) and one oriented northerly to convey approaching roadside ditch flows (Culvert 1A). Culvert 1 is a 600 mm dia. High Density Polyethylene (HDPE) pipe with vegetated embankments and no formalized end treatment (Figure 1). Culvert 1A is a 900 mm Corrugated Steel Pipe (CSP) with riprap stone embankments and no formalized end treatment (Figure 2).

FIGURE 1 Culvert 1 Upstream End

FIGURE 2 Culvert 1A Upstream End

The downstream end is a single span cast in place concrete box culvert. The culvert was significantly backwatered and silted-in at the time of the site visit, but it is presumed to be an open bottom structure with span of 1.88 m and rise of 1.05 m (Figure 3, Figure 4).

The adjacent vacant property upstream of Culvert 1/1A is situated in a low-lying orientation with little freeboard from the normal water levels of the upstream channel. Notably, at the time of the site visit it was visually evident that utility locates, and small tracked equipment had accessed the site (possibly for a geotechnical investigation) indicating planning for future improvements. The downstream end has riprap stone embankments and no formalized end treatments; discharging directly to a heavily vegetated online pond (see Section 2.9.1).

FIGURE 2 Culvert 1 Downstream End

FIGURE 3 Culvert 1 Downstream End

From a review of available record drawings, it is presumed the culvert system is comprised of a series of historic extensions/enclosures, likely to facilitate roadwork and adjacent private development. A perpendicular box culvert crossing of RR50 extends from the downstream end to a large maintenance hole structure located at the projection of the RR50 west curb-line at the centreline of George Bolton Parkway. Notably, this large maintenance hole structure is also a point of connection for urban stormwater from George Bolton Parkway. From this point the culvert system extends northerly in a single barrel piped system to a maintenance hole located immediately south of the Esso Entrance, behind the RR50 west curb-line. From this maintenance hole, the dual barrel arrangement extends north of the Esso Station Entrance to the open culvert upstream ends.

Notably the culvert system has minimal cover (less than 1.5 m) and is situated in proximity to several buried infrastructure/utilities and urban surface features. The culvert system is presumed to be situated within Region of Peel RR50 Right-of-Way, however the upstream end (Culvert 1) appears to extend west of the visible right-of-way features. Given the enclosed condition of the culvert system there are significant constraints to visibly assessing the condition/orientation and functionality which may benefit from further investigation (i.e., physical access, cleaning/CCTV, downstream pond maintenance etc.). Resultant of the enclosed condition the culvert system presents a barrier and disconnects the natural environment associated with the natural watercourse. Similarly, the enclosed condition presents less opportunity for larger watercourse flows to access floodplain.

Notably, this structure was not appraised as part of the Region of Peel condition assessments provided to Matrix, likely because of the enclosed condition.

It is recommended, at minimum, the upstream end be further understood by the EA team, as it pertains to ramifications of the assessed alternatives for improvement.

2.3 Culvert 2

Culvert 2 is located at the rear of a private lot which is currently under the operation of Enterprise Car Rental. The culvert conveys watercourse flows from north to south via a single barrel 1,500 mm CSP under a gravel parking lot connection road. The culvert is oriented perpendicular to the access road and has minimal cover (less than 1.5 m). The culvert structure is presumed to be situated within private property.

The upstream end is comprised of a protruding culvert barrel; oriented northerly to convey approaching watercourse flows with vegetated embankments and concrete block endwalls. The upstream end is partially obstructed by debris (both natural and “urban” debris), slumping slopes and overhanging vegetation (Figure 5). The downstream end is comprised of a protruding culvert barrel with vegetated embankments and no formalized end treatments (Figure 6).

Notably, this structure was not appraised as part of the Region of Peel condition assessments provided to Matrix, likely because of its location being situated on private property.

FIGURE 4 Culvert 2 Upstream End

FIGURE 5 Culvert 2 Downstream End

2.4 Culvert 3

Culvert 3 is located adjacent to RR50 to facilitate an elevated concrete pathway connection to a newly constructed multi-unit building situated behind (east of) the YMCA building. The culvert conveys watercourse flows from north to south via a single barrel, open bottom 2,900 mm span × 1,780mm rise multi-plate CSPA under a concrete pathway. The culvert is oriented at a skew to the pathway (and RR50) and has minimal cover (less than 1.5 m). The culvert structure is presumed to be situated within public property (RR5 50 Right-of-Way); however, the culvert appears to extend east of the visible right-of-way features.

The upstream end is comprised of an open culvert span; oriented northerly to convey approaching watercourse flows with armourstone wingwalls/headwall (Figure 7). The downstream end is comprised of an open culvert span with armourstone wingwalls/headwall (Figure 8).

The watercourse corridor upstream of Culvert 3 is currently under the process of being re-aligned by a private landowner (see Section 2.9.2). The adjacent private property downstream of Culvert 3 is situated in a low-lying orientation with little freeboard from the normal water levels of the downstream channel.

Notably, this structure was appraised as "Fair Condition" by the structure condition assessments completed by Region of Peel. The corresponding Region of Peel structure ID is: "FROM - RR050-0215 TO - RR050-0216"

FIGURE 6 Culvert 3 Upstream End

FIGURE 7 Culvert 3 Downstream End

2.5 Culvert 4

Culvert 4 is located adjacent to RR50 to facilitate an asphalt entrance to multi-unit commercial property, including YMCA facilities. The culvert conveys watercourse flows from north to south via a single barrel, closed bottom 2,250 mm span × 1,620 mm rise CSPA under the paved entrance. The culvert is oriented perpendicular to the entrance and has minimal cover (less than 1.5 m). The culvert structure is presumed to be situated within public property (RR5 50 Right-of-Way).

The upstream end is comprised of a protruding culvert barrel; oriented northerly to convey approaching watercourse flows with riprap stone/manicured grass embankments and no formalized end treatment (Figure 9). The downstream end is comprised of a protruding culvert barrel with manicured grass embankments and no formalized end treatment (Figure 10).

The adjacent private property upstream of Culvert 4 is situated in a low-lying orientation with little freeboard from the normal water levels of the upstream channel. Immediately downstream of Culvert 4 an open ditch stormwater drainage feature and a roadway light standard exist.

Notably, this structure was appraised as “Fair Condition” by the structure condition assessments completed by Region of Peel. The corresponding Region of Peel structure ID is: “FROM - RR050-0213 TO - RR050-0214”

FIGURE 8 Culvert 4 Upstream End

FIGURE 9 Culvert 4 Looking Downstream

2.6 Culvert 5

Culvert 5 is located adjacent to RR50 to facilitate an asphalt entrance to an RV Sales commercial property, which also forms the east leg of RR50/Parr Boulevard Signalized Intersection. The culvert conveys watercourse flows from north to south via a single barrel, closed bottom 2,080 mm span × 1,780mm rise CSPA under the paved entrance. The culvert is oriented perpendicular to the entrance and has minimal cover (less than 1.5 m). The culvert structure is presumed to be situated within public property (RR50 Right-of-Way).

The upstream end is comprised of a protruding culvert barrel; oriented northerly to convey approaching watercourse flows with riprap stone/manicured grass embankments and no formalized end treatment. The downstream end is comprised of a protruding culvert barrel with riprap stone/manicured grass embankments and no formalized end treatment (Figure 11, Figure 12).

Immediately downstream of Culvert 5 an open ditch stormwater drainage feature and piped urban stormwater outfall exist.

Notably, this structure was appraised as "Fair Condition" by the structure condition assessments completed by Region of Peel. The corresponding Region of Peel structure ID is: "FROM - RR050-0211 TO - RR050-0212"

FIGURE 10 Culvert 5 Downstream End

FIGURE 11 Culvert 5 Looking Downstream

2.7 Culvert 6

Culvert 6 is located adjacent to RR50 to facilitate a gravel entrance to a multi unit commercial property, including U-Haul. The culvert conveys watercourse flows from north to south via a single barrel, closed bottom 2,250 mm span × 1,620mm rise CSPA under the gravel entrance. The culvert is oriented perpendicular to the entrance and has minimal cover (less than 1.5 m). The culvert structure is presumed to be situated within public property (RR5 50 Right-of-Way).

The upstream end is comprised of a protruding culvert barrel; oriented northerly to convey approaching watercourse flows with riprap stone/vegetated embankments and no formalized end treatment. The downstream end is comprised of a protruding culvert barrel with riprap stone/vegetated embankments and no formalized end treatment (Figure 13).

Notably, this structure was appraised as “Fair Condition” by the structure condition assessments completed by Region of Peel. The corresponding Region of Peel structure ID is: “FROM - RR050-0209 TO - RR050-0210”

FIGURE 12 Culvert 6 Downstream End

2.8 Culvert 7

Culvert 7 is located adjacent to RR50 to facilitate a gravel entrance to a vacant lot which has visibly been recently altered (i.e., demolition, removals etc.). Notably the entrance has been temporarily closed – barricaded by concrete blocks. The culvert conveys watercourse flows from north to south via an open bottom, single span 4,550 mm × 1,500mm rise concrete box culvert under a gravel entrance. The culvert is oriented perpendicular to the entrance and has minimal cover (less than 1.5 m). The culvert structure is presumed to be situated within public property (RR5 50 Right-of-Way).

The upstream end is comprised of an open culvert span; oriented northerly to convey approaching watercourse flows with vegetated embankments and no formalized end treatment (Figure 14). The downstream end is comprised of an open culvert span with vegetated embankments and no formalized end treatment (Figure 15).

Notably, this structure was not appraised as part of the Region of Peel condition assessments provided to Matrix, likely because of its large size. Given its span, it is presumed this structure would be regularly (i.e., annually/biannually) inspected and appraised by the Region/Town as part of Ontario Structure Inspection Manual (OSIM) programs.

FIGURE 13 **Culvert 7 Upstream End**

FIGURE 14 **Culvert 7 Looking Downstream**

2.9 Culvert 8

Culvert 8 is located adjacent to RR50 to facilitate a paved entrance to a multi-tenant commercial plaza, including Storage Bolton, Bolton Kia, and Bolton Toyota Car dealerships. The culvert conveys watercourse flows from north to south via an open bottom, single span 4,550 mm × 1,620mm rise concrete box culvert under a paved entrance which is urbanized with curbs, sidewalk, and guiderails. The culvert is oriented perpendicular to the entrance and has minimal cover (less than 1.5 m). The culvert structure is presumed to be situated within public property (RR5 50 Right-of-Way).

The upstream end is comprised of an open culvert span; oriented northerly to convey approaching watercourse flows with riprap/vegetated embankments, a concrete headwall and armour stone wingwall along the roadside embankment (Figure 14). The downstream end is comprised of an open culvert span with riprap/vegetated embankments, a concrete headwall and armour stone wingwall along the roadside embankment (Figure 15).

Notably, this structure was not appraised as part of the Region of Peel condition assessments provided to Matrix, likely because of its large size. Given its span it is presumed this structure would be regularly (i.e., annually/biannually) inspected and appraised by the Region/Town as part of OSIM programs.

FIGURE 15 Culvert 8 Upstream End

FIGURE 16 Culvert 8 Looking Downstream

2.10 Specific Areas of Interest

2.10.1 Existing Pond

An online pond exists immediately downstream of Culvert 1. The pond appears to have no formalized inlet/outlet controls and appears largely unmaintained, with heavy siltation and overgrown invasive vegetation (**Figure 18**). Although the pond is not delineated by security fence along the RR50 boundary, the pond appears to be situated largely beyond the RR50 Right-of-Way. In addition to the upstream watercourse areas contributing to the pond, one small diameter inlet from the eastern side was located; presumed to provide some function of stormwater servicing to the adjacent private OPP property.

FIGURE 17 Existing Pond Looking Upstream

It is recommended that better understanding of the ownership/jurisdiction, form/function and maintenance/ operation of the pond be further understood by the EA Project Team, as it pertains to ramifications of the assessed alternatives for improvement. It is understood there is a future easterly extension of George Bolton Parkway which will require due consideration for Culvert 1 and the pond downstream.

2.10.2 Current Channel Re-Alignment

In consultation with the Project Team it has been identified that an approximate 200 m length of the watercourse upstream of Culvert 3 is currently under the process of being re-aligned by a private landowner (Figure 19).

It is recommended that the status of this re-alignment be further understood by the EA team, as it pertains to ramifications of the assessed alternatives for improvement.

2.10.3 Previous Channel Re-Alignment

In consultation with the Project Team it has been identified that an approximate 80 m length of the watercourse upstream of Culvert 7 has been historically re-aligned by a private landowner (Figure 20); for which TRCA is currently involved and pursuing restitution.

It is recommended that the status of this re-alignment be further understood by the EA team, as it pertains to ramifications of the assessed alternatives for improvement.

FIGURE 18 Current Channel Re-Alignment Looking Upstream

FIGURE 19 Previous Channel Re-Alignment Looking Upstream

2.10.4 Landowner Concerns

In consultation with the Project Team a private landowner located immediately downstream of Culvert 6 has raised concerns associated with recent stormwater/ditching revisions along the RR50 frontage of the subject property exacerbating/resulting in increased watercourse flows at the rear of the subject property

(Figure 21). Furthering landowner concern in this regard is the new establishment of a Stormwater Management Pond on the opposing side of the watercourse, particularly during periods of pond maintenance.

The nature of these issues are deemed beyond the scope of the current study by Matrix, and the EA Project Team. However, if jurisdictions having authority (i.e., Region of Peel/Town of Caledon/TRCA) opt to further investigate the issues sited by the landowner, below are a series of recommended initial steps:

- Site meet with landowner to understand issues.
- Review of historic changes along RR50 frontage, watercourse reach, subject property, SWM pond, and adjacent properties.
- Desktop and detailed field investigation, topo survey etc. of subject property and adjacent properties.
- Site-specific hydraulic analysis to review flood extents and frequency.

FIGURE 20 Looking Downstream from Culvert 6 (Subject Property on Right)

3 FLUVIAL GEOMORPHIC ASSESSMENT

3.1 Background and Context

In-field geomorphic crossing assessments of the eight existing stream crossings (Culverts 1 to 8) along RR50 between George Bolton Parkway and Mayfield Road were completed by Matrix Staff on September 9, 2020. The stream crossing assessment collects data specific to the channel and crossing structure within the vicinity of the road crossing and documents evidence of potential channel-related issues near the crossing (e.g., bank erosion, bed scour, debris trapping, and fish passage). Information regarding crossing type, material, shape, dimensions, and structural conditions are also recorded; this information is summarized in Section 2.

The reaches of West Robinson Creek within the study area are generally ephemeral, headwater-type streams with a relatively small drainage area (<2 km^2). In most locations, the creek is well vegetated with cattails or phragmites, and banks are poorly defined. As a result, it was difficult to accurately ascertain bankfull dimensions of the channel. For the purposes of this assessment, bankfull dimensions were determined as the flow that fills up the channel close to or to the top of bank. Several of the crossings have been historically straightened to serve as roadside drainage ditches along the eastern side of RR50. Crossing locations are illustrated in Appendix A. Seven of the eight crossings within the study area are located on the east side of RR50. As the proposed cycle track and/or multi-use path is to be constructed on the western side of RR50, West Robinson Creek is expected to have minimal interaction with the pathway, and geomorphic risk to the proposed active transportation measures is considered low. Existing geomorphic conditions of each culvert crossing are summarized below. All references to right or left banks are when looking in the downstream direction.

3.2 Culvert 1

Culvert 1 is located near the intersection of RR50 and George Bolton Parkway, conveying flows under RR50 from west to east. The upstream end consists of two culverts; one oriented westerly to convey approaching watercourse flows (Culvert 1) and one oriented northerly to convey approaching roadside ditch flows (Culvert 1A). Upstream of the crossing the main branch of West Robinson Creek lacks sinuosity and follows a very straight planform with sharp near-90 degree turns. The reach is also largely controlled by ponds both upstream and downstream of RR50. Upstream, the channel contains abundant instream vegetation (cattails) and flow at the time of the field assessment was minimal, and generally consisted of stagnant water. The channel is artificially confined along the right bank which borders the Esso Gas Station. Average bankfull channel dimensions are 3.2 m in width and 0.7 m in depth, with an absence of pool-riffle morphology. The channel is depositional in nature due to the abundance of instream vegetation and substrate dominantly consists of clay and silt. Riprap was previously placed overtop of Culvert 1 and has since slumped into the creek. Average bankfull channel dimensions of the ditch flowing into Culvert 1A are approximately 2.5 m in width, and 0.45 m in depth. Roadside banks are near-vertical and stagnant water was present. Similar to Culvert 1, riprap was previously placed overtop of Culvert 1A and has begun to slump into the ditch.

Downstream of RR50, the culvert end was extensively backwatered due to dense instream vegetation (phragmites) and siltation downstream, impeding flow. Backwatering has resulted in local widening of the channel at the culvert, with minor bank erosion noted. Channel banks are poorly defined, making it difficult to accurately determine bankfull dimensions. Locally, at the culvert end the channel width is larger than the width of the culvert, measuring 3.6 m in width with a maximum depth of 1 m. The channel is depositional in nature due to the abundance of instream vegetation and substrate dominantly consists of clay and silt. The watercourse subsequently discharges immediately into a heavily vegetated online pond downstream.

3.3 Culvert 2

Culvert 2 is located approximately 240 m downstream of Culvert 1 at the rear of a private lot and conveys flows from north to south via a single barrel 1500 mm CSP under a parking lot connection access road. Upstream, the channel follows a moderately sinuous planform and is confined on both banks. Due to the confined nature of the system, banks were near-vertical and toe/bank erosion was prevalent as evidenced by slumped bank material, fracture lines, and exposed tree roots. Immediately upstream of Culvert 2, a prominent meander exists which is promoting bank erosion and deposition. Exacerbating this issue is a woody debris jam which currently impeding flow and blocking the connection to the culvert at lower flows. Concrete blocks previously placed as bank protection around the culvert have also failed and begun slumping into the creek. Approximately 90 m upstream of the crossing, the channel is incising with steep bank heights and a suspended armour layer visible in the banks. A man-made weir structure constructed out of concrete has been placed in the channel at this location. Also visible at this location is bank erosion and several displaced small masonry bricks previously placed as bank protection and fill material.

Downstream of the crossing, the channel corridor has been straightened and contains virtually no floodplain as the channel is bordered by an industrial lot. Upstream and downstream, average bankfull channel dimensions were similar, measuring 2.5 m in width and 0.6 m in depth. Channel substrate dominantly consisted of clay and gravel; however, it is possible the gravel is not native and was sourced from the above parking lots during heavy rainfall events.

3.4 Culvert 3

Culvert 3 is located approximately 420 m downstream of Culvert 2 and is adjacent to the east side of RR50. Upstream of the crossing, approximately 200 m of channel is currently in the process of being re-aligned and is under construction, therefore geomorphic observations (i.e., bankfull dimensions, substrate, etc.) were not possible. Wetted channel dimensions at the time of the assessment were 2.95 m in width and 0.5 m in depth at the culvert upstream end. The current crossing appears stable, with the channel width equal to the opening width of the structure, and armourstone blocks placed around the culvert for added protection. The channel flows to the right as it enters the culvert, and a gravel point bar has formed toward the downstream end of the culvert. Culvert footings are partially exposed.

Downstream, the channel planform is straight, and the channel serves as a roadside ditch to convey flows parallel to RR50. The watercourse is confined on the right bank by the road embankment and unconfined on the left bank. As a result, at high flow events, flow would dissipate into the adjacent parking lot to the left. The channel is bordered by mowed, well-manicured grass, resulting in minor bank slumping due to the lack of root cohesion. Channel dimensions are much narrower than upstream, with an average bankfull width of 1.2 m and depth of 0.3 m. Rounded to sub-rounded cobble and pebbles were present throughout the reach, in addition to minor sand and clay/silt.

3.5 Culvert 4

Culvert 4 is located approximately 85 m downstream of Culvert 3 and is adjacent to the east side of RR50. Both upstream and downstream of the crossing, the channel serves as a roadside ditch to convey flows parallel to RR50 and is confined by the road embankment to the right, and a parking lot to the left. Approximately 10 m upstream of the crossing, the channel has been recently armoured with riprap and contains sparse cattails.

Downstream, the entire reach entire reach is filled with cattails. As a result, channel substrate mainly consists of fine sediment (clay and silt) due to the depositional nature of the reach. Average bankfull channel dimensions are approximately 5.5 m in width and 0.4 m in depth.

3.6 Culvert 5

Culvert 5 is located approximately 50 m downstream of Culvert 4 and is adjacent to the east side of RR50. Similar to Culvert 4, the channel serves as a roadside ditch to convey flows and is confined on the right by the road embankment. Immediately downstream of the culvert, there is a stormwater outfall on the right bank, that at the time of the assessment contained standing water. Upstream and downstream of the crossing, the ditch contains abundant cattails. Riprap has been placed over top and around the culvert for added protection. Average bankfull channel dimensions were approximately 3.5 m in width and 0.6 m in depth.

3.7 Culvert 6

Culvert 6 is located approximately 30 m downstream of Culvert 5 and is adjacent to the east side of RR50. Upstream of the crossing, the channel conveys flows as a roadside ditch along RR50, while downstream the channel regains sinuosity and flows easterly behind residential properties through a wooded area. Average bankfull channel dimensions were approximately 3 m in width and 0.4 m in depth.

Downstream of the crossing, most of the reach flows through a wooded area, where woody debris is common within the channel and on the banks. Within this area, the channel is stable with minimal bed and/or bank erosion noted. The channel lacks a sequence of well-defined pool-riffles, however, coarse substrate (gravel, pebbles, cobbles) was observed in the transitional areas. As the creek exits the wooded area and flows back toward RR50, the channel is actively incising, as evidenced by steep bank heights and suspended armour layer in the banks. It is understood that this part of the channel was historically re-aligned by a private landowner; for which TRCA is currently involved and pursuing restitution.

3.8 Culvert 7

Culvert 7 is located approximately 375 m downstream of Culvert 6 and is adjacent to the east side of RR50. Within the vicinity of the crossing, the channel conveys flows as a roadside ditch along RR50. The channel contains abundant instream vegetation such as cattails, tall grasses, and willow shrubs. At the culvert outlet, the presence of dense instream vegetation is impeding flows and has resulted in a buildup of fine sediment and minor debris. Channel substrate mainly consists of fine sediment (clay and silt) due to the depositional nature of the reach. Average bankfull channel dimensions were approximately 4 m in width and 0.6 m in depth.

3.9 Culvert 8

Culvert 8 is located approximately 50 m downstream of Culvert 7 and is adjacent to the east side of RR50. Similar to Culvert 7, the channel conveys flows as a roadside ditch parallel to RR50. Upstream and downstream of the crossing the channel is well vegetated with cattails and tall grasses and as a result, channel substrate dominantly consists of clay and silt. The channel is confined on the right by the road embankment where large armourstone blocks have been placed for added bank/culvert stability. Average bankfull channel dimensions were approximately 3 m in width and 0.7 m in depth.

3.10 Specific Areas of Interest

3.10.1 Culvert 1

The proposed cycle track and/or multi-use path and the resultant drainage improvements are planned on the west side of RR50 over Culvert 1. As such, this is the only location where the creek will have some interaction with the EA improvements, although geomorphic risk to the proposed active transportation measures is considered low. As the pathway is to cross over the Culvert 1, an erosion hazard assessment was not completed. The channel upstream of Culvert 1 is heavily modified (straightened and bermed in locations), and the delineation of the erosion hazard would extend into existing properties, therefore it was deemed not necessary for the purposes of the pathway planning. In this location, West Robinson Creek is an ephemeral, headwater-type feature with a small drainage area (~1km^2) and poorly defined banks and is not expected to migrate laterally. Additionally, there is no evidence of active erosion near the crossing as the channel is densely vegetated and depositional in nature.

Given the existing culvert system is anticipated to require modifications/extensions, it is recommended, at minimum, the upstream end be further understood by the EA team, as it pertains to ramifications of the assessed alternatives for improvement.

4 HYDRAULIC ASSESSMENT

A hydraulic assessment was completed to analyze the performance of West Robinson Creek including Culverts 1 to 8 during various design storm events and the regional event. An existing HEC-RAS hydraulic model was updated with latest topographic and collected hydraulic information so that the updated model can be assured appropriate for this study. For each culvert, the hydraulic model was used to verified whether the culvert is fully submerged and whether the road above the culvert is overtopped. For Culverts 1, and 3 to 8, which are adjacent to RR50, the hydraulic model was used to identify whether water is likely to spill on RR50 due to backwater impact from the culvert.

4.1 Model Development

TRCA provided the current approved HEC-RAS hydraulic model to use in this study. Matrix updated the TRCA model with the latest topography based on survey data and site reconnaissance within the study area. The following summarizes detailed model updates.

- Culvert 3: Matrix site reconnaissance and RVA topographic survey data showed that Culvert 3 is a corrugated steel arch with height approximately 1.8 metre. However, Culvert 3 in the TRCA model indicated a height of 1.4 metre. Matrix updated the Culvert 3 height to 1.8 m. In addition, a 0.5 m blockage of gravel/cobble was added to the model based on observations during the site reconnaissance.

- Culvert 4: Culvert 4 was not included in the provided TRCA model. Matrix added Culvert 4 based on field survey. This culvert is a corrugated steel arch culvert with a width and height approximately 2.26 m and 1.62 m, respectively. Upstream and downstream invert elevations were obtained from RVA topographic survey data.

- Following a detailed comparison of the modelled cross-sections to the topographic survey data provided by RVA, Matrix revised a number of cross-sections to ensure detailed representation of both the channel and overbank areas including the top of the road elevation. This update to precise cross-section data is important to yield accurate results. These revisions are documented within the model notes.

- In addition to cross-section data, the use of appropriate levee elevation and location in the cross-section is important to the assessment of overtopping conditions. Matrix added levees at appropriate locations and elevation in the cross-section profile. In particular, levees were added at the crown of RR50 as flow in Robinson Creek will not have access to the west ditch.

- Matrix found that cross-sections 2223.38 and 2223.15 were not properly geo-referenced. Matrix updated the cross-section cutline to an appropriate GIS location.

4.2 Design Flows

Design flows in the HEC-RAS model were confirmed with TRCA to be up to date. Design flows, ranging from 2- to 100-year events as well as the regional event were applied at 7 different cross-sections of the watercourse. Details are presented in Table 1 below.

TABLE 1 Design Flows

Cross-section	Description of Location	Flow Rate (m^3/s)						
		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	Regional
2224.08	Model upstream end near McEwan Dr. W	1.98	2.82	3.39	4.27	5.05	5.73	8.7
2223.56	70 m upstream of Hopcroft Rd	2.46	3.5	4.21	5.3	6.27	7.11	10.8
2223.45	20 m upstream of Culvert 1 (George Bolton Pkwy and RR50)	4.24	6.03	7.26	8.94	10.27	11.79	13.84
2223.37	Upstream face of Culvert 2 (Enterprise Car Rental)	4.59	6.53	7.85	9.68	11.11	12.75	14.97
2223.20	Upstream face of Culvert 6 (U-Haul)	5.24	7.45	8.96	11.04	12.68	14.55	17.09

Cross-section	Description of Location	Flow Rate (m³/s)						
		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	Regional
2223.04	220 m downstream of Culvert 8, 70 m upstream of Mayfield Rd	5.69	8.09	9.73	11.99	13.77	15.81	18.56
2219.56	100 m downstream of Mayfield Rd	6.08	8.72	10.49	12.98	14.95	17.19	38.3

4.3 Culvert 1

Due to its complex hydraulic situation (i.e., two inlet barrels and one outlet barrel), Culvert 1 and Culvert 1A were modelled using a custom rating curve which was provided by the existing TRCA model. The Cole Engineering Group Ltd. report (2015) indicated that the custom rating curve was derived with appropriate setup of dimension and flow values in FlowMaster. Matrix assumed the rating curve approach in the model is correct.

Table 2 presents the hydraulic results of Culvert 1 and Culvert 1A. The results indicate that both Culvert 1 and Culvert 1A experience full submergence during the 2-year event and greater. The road above Culvert 1, which serves as the northern entrance to the gas station, has a ground elevation of 238.5 m according to the RVA topographic survey data. The water level results from the model indicate that this road experiences overtopping during the 2-year event and greater. Figure 22 shows the water extent on cross-sections adjacent to Culvert 1 for the regional event. It is shown that water overtopping the entrance road will spill eastly toward RR50 and spill southerly through the gas station.

TABLE 2 Culvert 1 – HEC-RAS Results

Component	Value (m)						
C1 Upstream Invert Elevation	236.76						
C1 Upstream Obvert Elevation	237.36						
C1A Upstream Invert Elevation	236.79						
C1A Upstream Obvert Elevation	237.67						
Top of Road Elevation	238.5						
Return Period	**2-Year**	**5-Year**	**10-Year**	**25-Year**	**50-Year**	**100-Tear**	**Regional**
Flow (m³/s)	4.24	6.03	7.26	8.94	10.27	11.79	13.84
Water Surface Elevation (m)	238.53	238.59	238.62	238.66	238.69	238.72	238.76
Freeboard to Obvert Elevation on Culvert 1 (m)	-1.17	-1.23	-1.26	-1.3	-1.33	-1.36	-1.4
Culvert Submergence on Culvert 1	Y	Y	Y	Y	Y	Y	Y
Freeboard to Obvert Elevation on Culvert 1A (m)	-0.86	-0.92	-0.95	-0.99	-1.02	-1.05	-1.09
Culvert Submergence on Culvert 1A	Y	Y	Y	Y	Y	Y	Y
Freeboard to Top of Road Elevation (m)	-0.03	-0.09	-0.12	-0.16	-0.19	-0.22	-0.26
Road Overtopping	Y	Y	Y	Y	Y	Y	Y

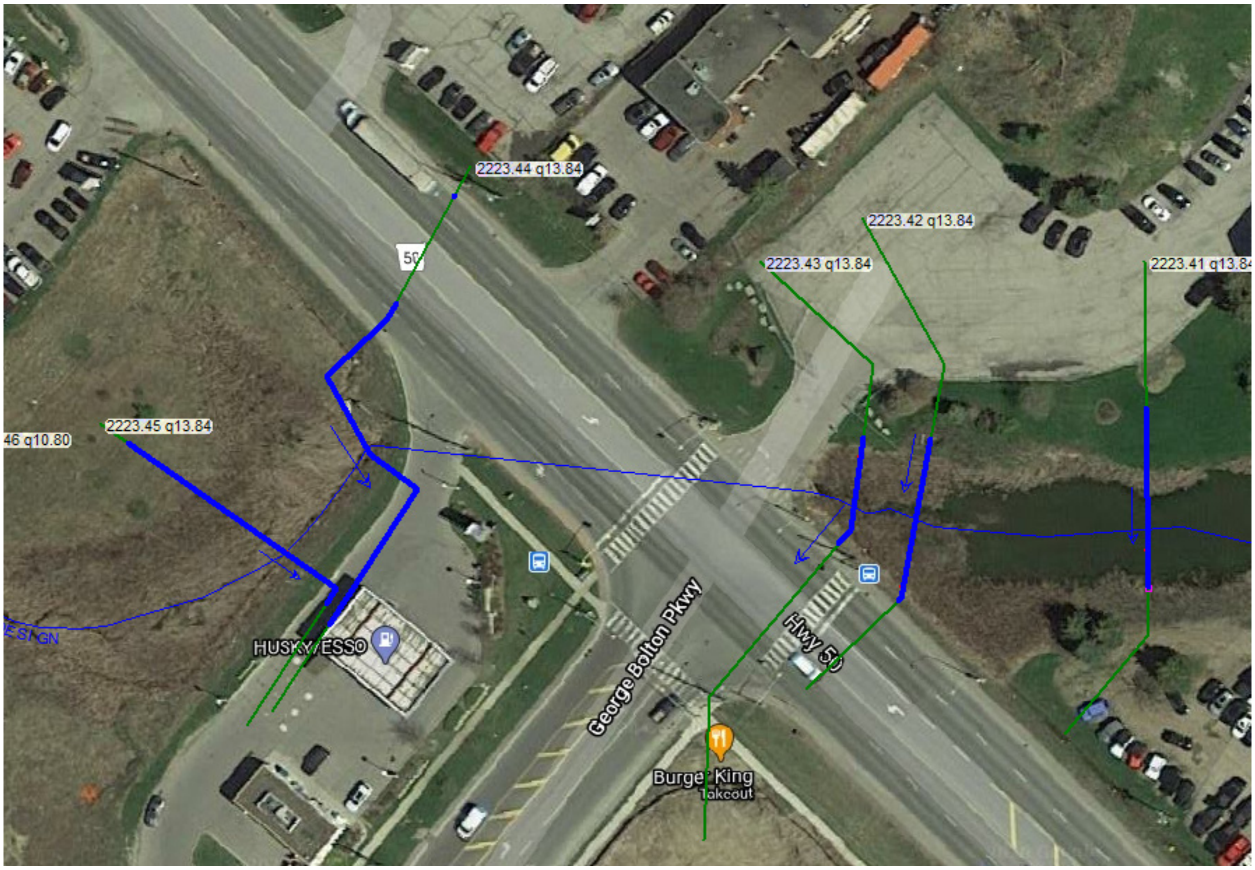


FIGURE 22 Culvert 1 – Water Extents on Cross-sections during the Regional Event

4.4 Culvert 2

Table 3 presents the hydraulic results of Culvert 2. The results indicate that Culvert 2 experiences full submergence and road overtopping during the 2-year event and greater. **Figure 23** plots water extents on cross-sections adjacent to Culvert 2 during the regional event. Water overtopping the culvert returns to the channel downstream of the culvert and does not spill toward the north and south directions. As Culvert 2 is located at the rear of a private lot and reasonably distant from RR50 (about 240 m downstream of RR50), backwater from Culvert 2 has no impact on RR50.

TABLE 3 Culvert 2 – HEC-RAS Results

Component	Value (m)						
Upstream Invert Elevation	233.38						
Upstream Obvert Elevation	234.93						
Top of Road Elevation	235.49						
Return Period	**2-Year**	**5-Year**	**10-Year**	**25-Year**	**50-Year**	**100-Tear**	**Regional**
Flow (m^3/s)	4.59	6.53	7.85	9.68	11.11	12.75	14.97
Water Surface Elevation (m)	235.59	235.87	235.97	236	236.02	236.05	236.05
Freeboard to Obvert Elevation (m)	-0.66	-0.94	-1.04	-1.07	-1.09	-1.12	-1.12
Culvert Submergence	Y	Y	Y	Y	Y	Y	Y
Freeboard to Top of Road Elevation (m)	-0.1	-0.38	-0.48	-0.51	-0.53	-0.56	-0.56
Road Overtopping	Y	Y	Y	Y	Y	Y	Y

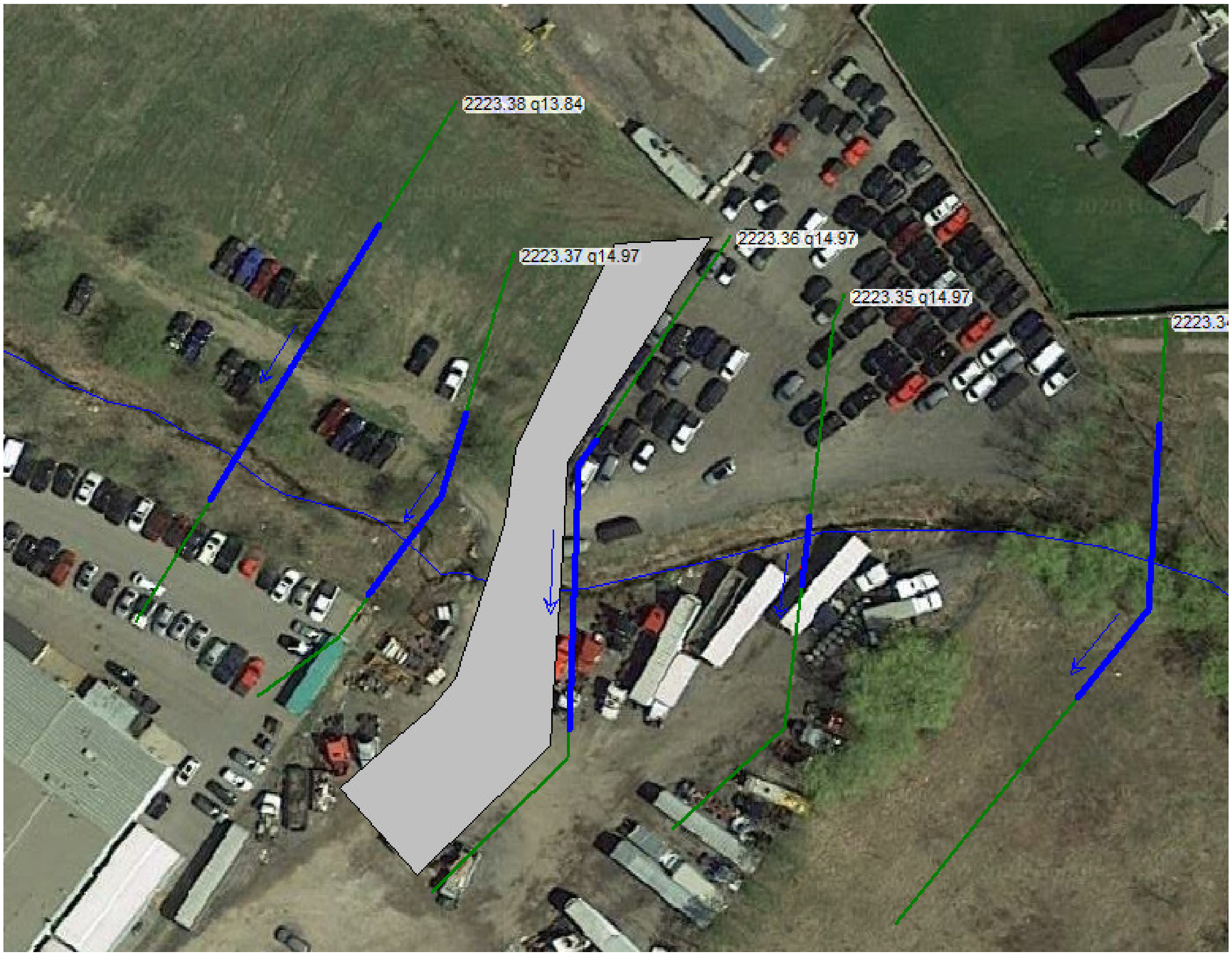


FIGURE 23 Culvert 2 – Water Extents on Cross-sections during the Regional Event

4.5 Culvert 3 and 4

Table 4 and 5 present the hydraulic results of Culvert 3 and Culvert 4, respectively. The results indicate that Culvert 3 experiences full submergence and road overtopping during the 5-year event and greater. Culvert 4 experiences full submergence during the 5-year event and greater. The road above Culvert 4 experiences overtopping during the 10-year event and greater.

Figure 24 plots water extents on cross-sections adjacent to Culvert 3 and 4 for the 2-year and regional events. The watercourse in this area experiences high water level during the 2-year through the regional event. The multi-unit commercial property and its parking lot, which is on the east bank of the watercourse, experience flooding during the 2-year event and greater. RR50, which is on the west bank of the watercourse, does not experience flow on the road, expect for the one cross-section upstream end of Culvert 4. During the 2-year event and greater, this cross-section indicates that water encroaches on RR50 but does not overtop the road crown or spill to other side of RR50.

TABLE 4 Culvert 3 – HEC-RAS Results

Component	Value (m)						
Upstream Invert Elevation	231.178						
Upstream Obvert Elevation	233.078						
Top of Road Elevation	233.3						
Return Period	**2-Year**	**5-Year**	**10-Year**	**25-Year**	**50-Year**	**100-Tear**	**Regional**
Flow (m^3/s)	4.59	6.53	7.85	9.68	11.11	12.75	14.97
Water Surface Elevation (m)	232.89	233.31	233.33	233.35	233.41	233.55	233.67
Freeboard to Obvert Elevation (m)	0.188	-0.232	-0.252	-0.272	-0.332	-0.472	-0.592
If Culvert Fully Submergence Occurs	N	Y	Y	Y	Y	Y	Y
Freeboard to Top of Road Elevation (m)	0.41	-0.01	-0.03	-0.05	-0.11	-0.25	-0.37
If Road Overtop Occurs	N	Y	Y	Y	Y	Y	Y

TABLE 5 Culvert 4 – HEC-RAS Results

Component	Value (m)						
Upstream Invert Elevation	230.408						
Upstream Obvert Elevation	232.028						
Top of Road Elevation	232.51						
Return Period	**2-Year**	**5-Year**	**10-Year**	**25-Year**	**50-Year**	**100-Tear**	**Regional**
Flow (m^3/s)	4.59	6.53	7.85	9.68	11.11	12.75	14.97
Water Surface Elevation (m)	231.87	232.42	232.75	232.89	232.95	233.01	233.06
Freeboard to Obvert Elevation (m)	0.158	-0.392	-0.722	-0.862	-0.922	-0.982	-1.032
If Culvert Fully Submergence Occurs	N	Y	Y	Y	Y	Y	Y
Freeboard to Top of Road Elevation (m)	0.64	0.09	-0.24	-0.38	-0.44	-0.5	-0.55
If Road Overtop Occurs	N	N	Y	Y	Y	Y	Y

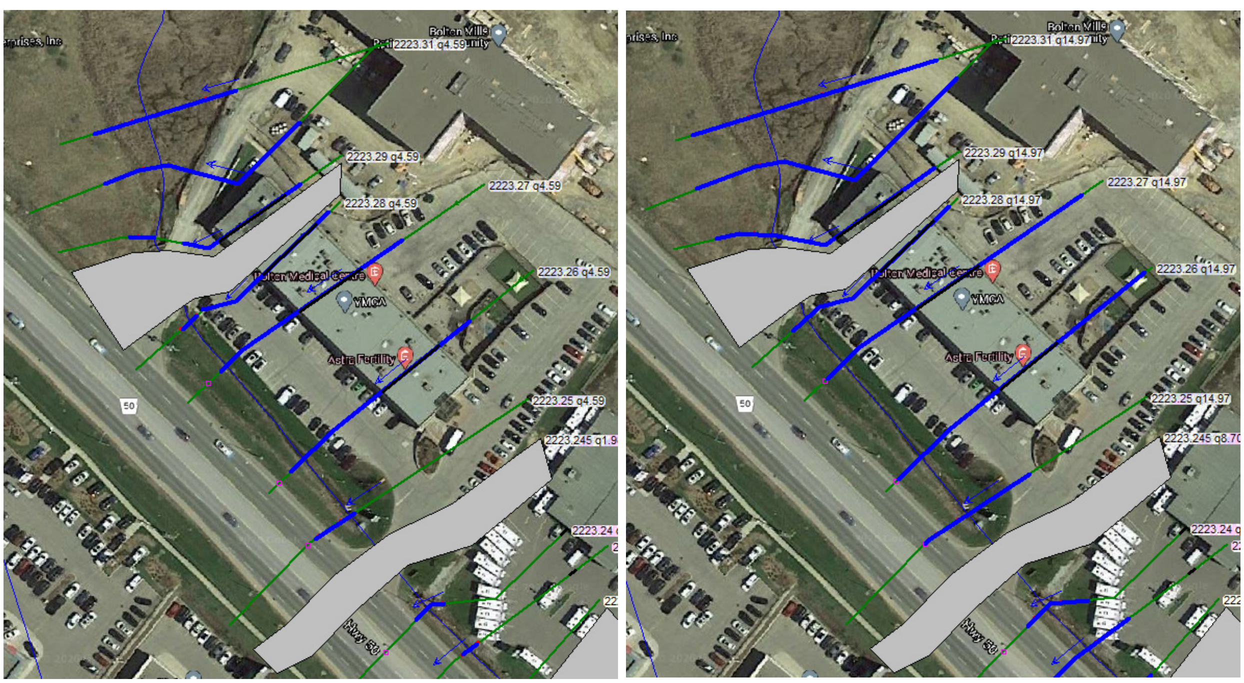


FIGURE 24 Culvert 3 and 4 – Water Extents on Cross-sections during the 2-Year (Left) and Regional Event (Right)

4.6 Culvert 5 and 6

Table 6 and 7 present the hydraulic results of Culvert 5 and Culvert 6, respectively. The results indicate that Culvert 5 experiences full submergence during the 10-year event and greater. The road above Culvert 5 experiences overtopping during the 25-year event and greater. Culvert 6 experiences full submergence and road overtopping during the 10-year event and greater.

Figure 25 plots water extents on cross-sections adjacent to Culvert 5 and 6 for the 5-year and 10-year event, and Figure 26 for the 25-year and the regional event. In this section of the watercourse, flooding is subject to the west bank spilling across RR50. During the 5-Year event, water is contained in the channel and does not encroach on RR50, expect for the cross-section in the middle between Culvert 5 and 6. This cross-section indicates that water encroaches on RR50 but not overtop the road crown or spill to other side of RR50. During the 10-year event, several cross-sections indicate water encroaches on west shoulder of RR50 but not overtop the road crown or spill to other side of RR50. During the 25-year event and greater, water spills across RR50 with overtopping of the road crown.

TABLE 6 Culvert 5 – HEC-RAS Results

Component	Value (m)						
Upstream Invert Elevation	**230.15**						
Upstream Obvert Elevation	231.6						
Top of Road Elevation	232						
Return Period	**2-Year**	**5-Year**	**10-Year**	**25-Year**	**50-Year**	**100-Tear**	**Regional**
Flow (m^3/s)	4.59	6.53	7.85	9.68	11.11	12.75	14.97
Water Surface Elevation (m)	231.01	231.22	231.68	232.06	232.27	232.29	232.32
Freeboard to Obvert Elevation (m)	0.59	0.38	-0.08	-0.46	-0.67	-0.69	-0.72
If Culvert Fully Submergence Occurs	N	N	Y	Y	Y	Y	Y
Freeboard to Top of Road Elevation (m)	0.99	0.78	0.32	-0.06	-0.27	-0.29	-0.32
If Road Overtop Occurs	N	N	N	Y	Y	Y	Y

TABLE 7 Culvert 6 – HEC-RAS Results

Component	Value (m)						
Upstream Invert Elevation	229.3						
Upstream Obvert Elevation	230.9						
Top of Road Elevation	231.28						
Return Period	**2-Year**	**5-Year**	**10-Year**	**25-Year**	**50-Year**	**100-Tear**	**Regional**
Flow (m^3/s)	5.24	7.45	8.96	11.04	12.68	14.55	17.09
Water Surface Elevation (m)	230.31	230.64	231.28	231.28	231.48	231.52	231.57
Freeboard to Obvert Elevation (m)	0.59	0.26	-0.38	-0.38	-0.58	-0.62	-0.67
If Culvert Fully Submergence Occurs	N	N	Y	Y	Y	Y	Y
Freeboard to Top of Road Elevation (m)	0.97	0.64	0	0	-0.2	-0.24	-0.29
If Road Overtop Occurs	N	N	Y	Y	Y	Y	Y

FIGURE 25 Culvert 5 and 6 – Water Extents on Cross-sections during the 5-Year (Left) and 10-Year Event (Right)

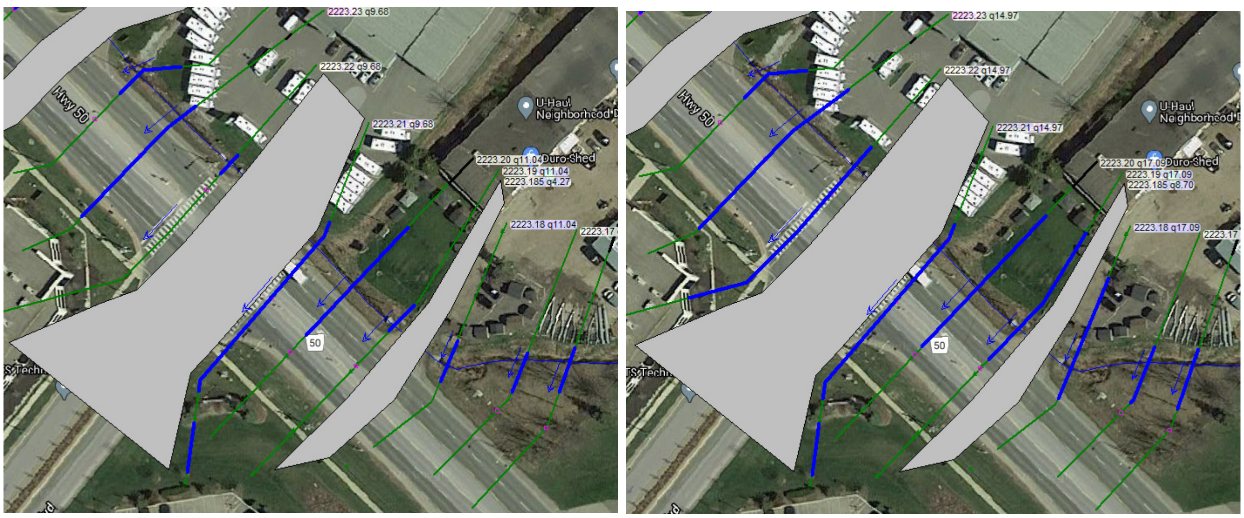


FIGURE 26 Culvert 5 and 6 – Water Extents on Cross-sections during the 25-Year (Left) and Regional Event (Right)

4.7 Culvert 7 and 8

Table 8 and 9 present the hydraulic results of Culvert 7 and Culvert 8, respectively. The results indicate that Culvert 7 experiences full submergence during the 5-year event and greater. The road above Culvert 7 experiences overtopping during the 100-year event and greater. Culvert 8 experiences full submergence and road overtopping during the regional event.

Figure 27 plots water extents on cross-sections adjacent to Culvert 7 and 8 for the 2-year and regional event. For the watercourse along RR50 (three cross-sections upstream of Culvert 7 to three cross-sections of Culvert 8, approximately 285 m), water is contained in the channel without spilling on RR50 during the 2-year to the regional event.

TABLE 8 Culvert 7 – HEC-RAS Results

Component	Value (m)						
Upstream Invert Elevation	226.7						
Upstream Obvert Elevation	228.15						
Top of Road Elevation	228.74						
Return Period	**2-Year**	**5-Year**	**10-Year**	**25-Year**	**50-Year**	**100-Tear**	**Regional**
Flow (m^3/s)	5.24	7.45	8.96	11.04	12.68	14.55	17.09
Water Surface Elevation (m)	228	228.19	228.31	228.46	228.57	228.74	228.74
Freeboard to Obvert Elevation (m)	0.15	-0.04	-0.16	-0.31	-0.42	-0.59	-0.59
If Culvert Fully Submergence Occurs	N	Y	Y	Y	Y	Y	Y
Freeboard to Top of Road Elevation (m)	0.74	0.55	0.43	0.28	0.17	0	0
If Road Overtop Occurs	N	N	N	N	N	Y	Y

TABLE 9 Culvert 8 – HEC-RAS Results

Component	Value (m)						
Upstream Invert Elevation	226.29						
Upstream Obvert Elevation	227.99						
Top of Road Elevation	228.25						
Return Period	**2-Year**	**5-Year**	**10-Year**	**25-Year**	**50-Year**	**100-Tear**	**Regional**
Flow (m^3/s)	5.24	7.45	8.96	11.04	12.68	14.55	17.09
Water Surface Elevation (m)	227.13	227.33	227.44	227.55	227.64	227.73	228.25
Freeboard to Obvert Elevation (m)	0.86	0.66	0.55	0.44	0.35	0.26	-0.26
If Culvert Fully Submergence Occurs	N	N	N	N	N	N	Y
Freeboard to Top of Road Elevation (m)	1.12	0.92	0.81	0.7	0.61	0.52	0
If Road Overtop Occurs	N	N	N	N	N	N	Y

FIGURE 27 Culvert 7 and 8 – Water Extents on Cross-sections during the 2-Year (Left) and Regional Event (Right)

4.8 Specific Areas of Interest

4.8.1 RR50

In general, Culverts 1 to 7 are under sized and incapable of conveying water during high flow events. Culvert 1, 5 and 6 cause flow to spill onto RR50 while Culvert 2, 3, 4, and 7 do not.

- Backwater from Culvert 1 is expected to spill on RR50 through the entrance road of the gas station during the 2-year event.
- As Culvert 2 is distant from RR50, backwater from Culvert 2 has no impact on RR50.
- Backwater from Culverts 3 and 4 generally do not cause flooding on RR50, but do cause flooding on the east bank where the multi-unit commercial property is located.
- Backwater from Culverts 5 and 6 contributes to flooding on RR50. Water is expected to spill over the road crown and to the other side of RR50 during the 25-year event and greater.
- Culverts 7 and 8 are generally capable of conveying water within the channel and not spill on RR50 during any of the modelled events.

4.8.2 Spilling Extent

For results of flood extents over entire watercourse along Culvert 1 to 8, **Appendix F** summarizes water extents on each HEC-RAS cross-section for storm events from 2-year through the regional event.

4.8.3 Sensitivity Analysis On Proposed Mayfield Rd Culvert

Matrix was informed by RVA that the Mayfield Road Culvert, which is located approximately 290 m downstream of Culvert 8, will be replaced with a new dimension during future construction. Matrix received a HEC-RAS model provided by RVA specific to this culvert. This model was used for the purpose of future culvert design including the proposed Mayfield Road Culvert and associated watercourses. To verify the proposed Mayfield Rd Culvert does not alter the general hydraulic performances of Culvert 8 and watercourse nearby, a sensitivity analysis was carried out to examine the hydraulic impact of proposed Mayfield Road Culvert. A rating curve, which represents the proposed hydraulic condition on the watercourse between Culvert 8 and Mayfield Rd, was derived from the RVA model and setup up in Matrix model in cross-section 2223.05. **Figure 28** shows the water level profiles for existing condition and the condition with proposed Mayfield Road Culvert. The figure shows water levels for three storm events including the 2-year, 25-year, and the regional events. The results show the proposed Mayfield Road Culvert has insignificant impact on water level from the 2-year through regional events. The maximum rise of water level is 13 cm difference on cross-section 2223.06 during the 25-year event. Overall, the proposed Mayfield Road Culvert does not alter the hydraulic performance of Culvert 8, and does not alter spill conditions on RR50 during any of the modelled events.

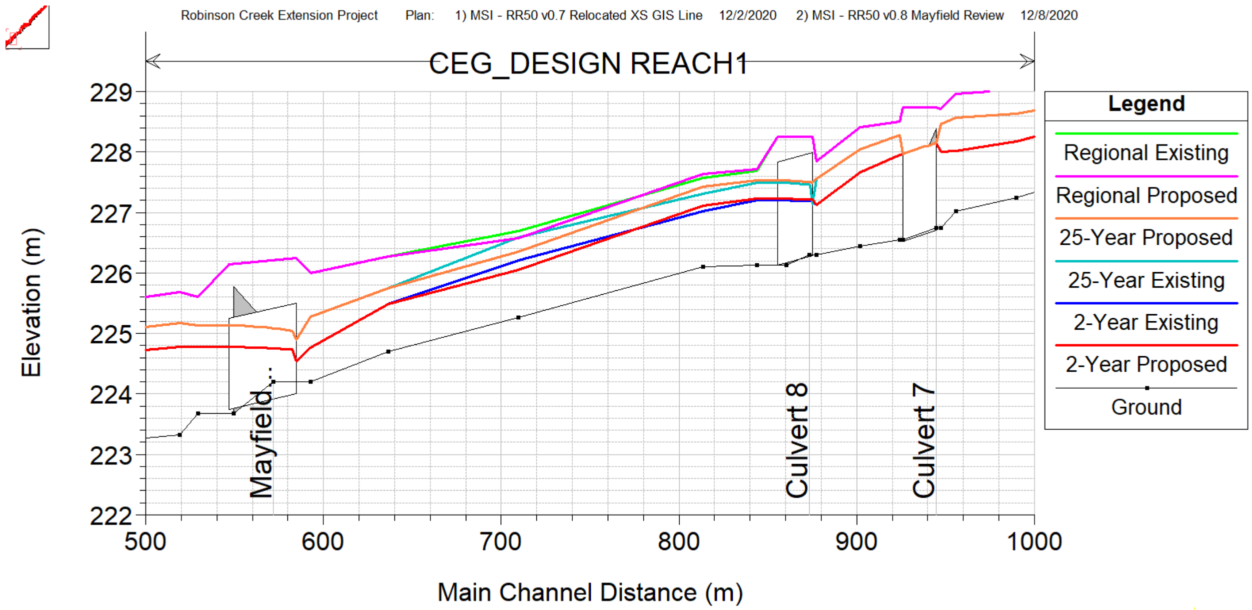
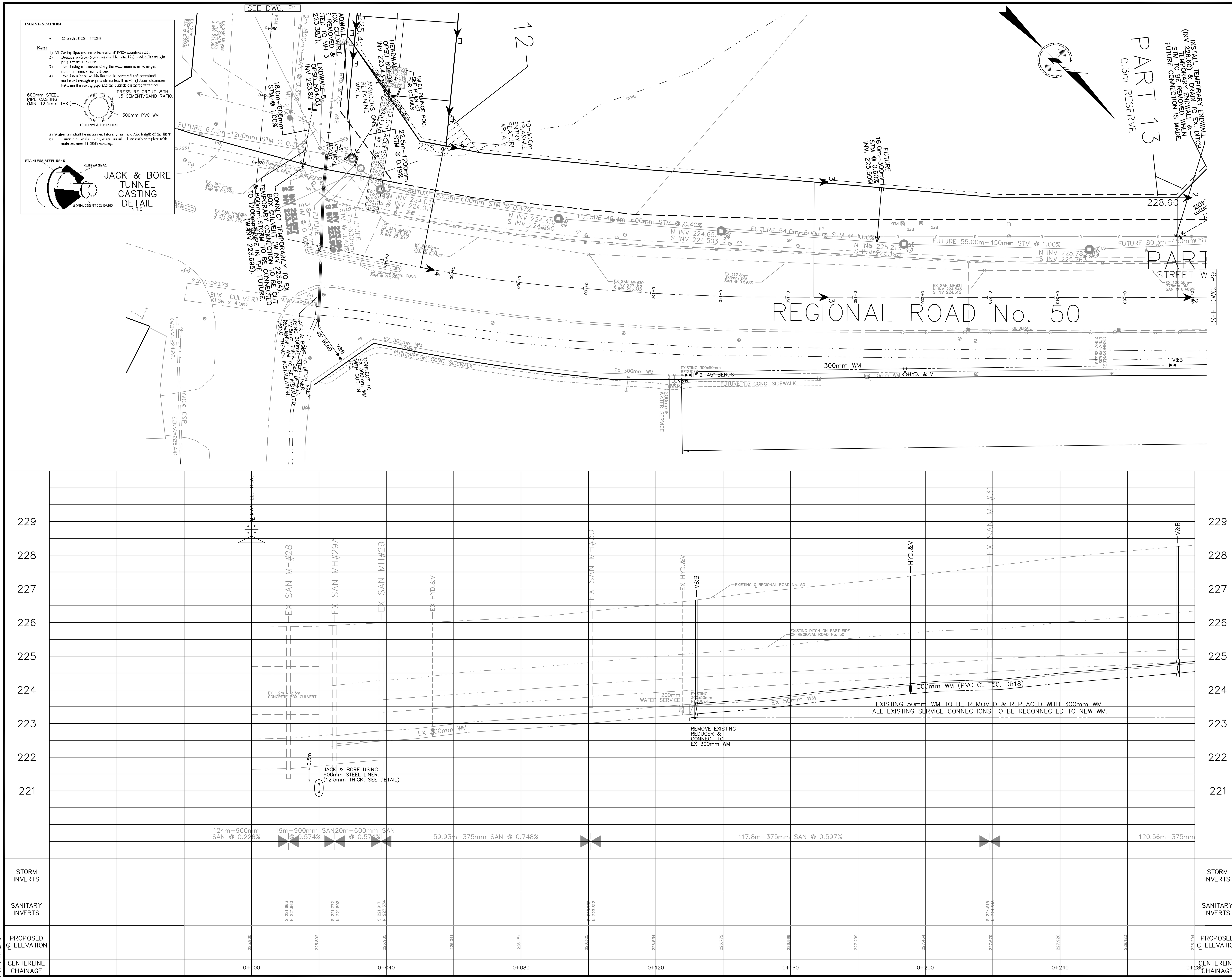


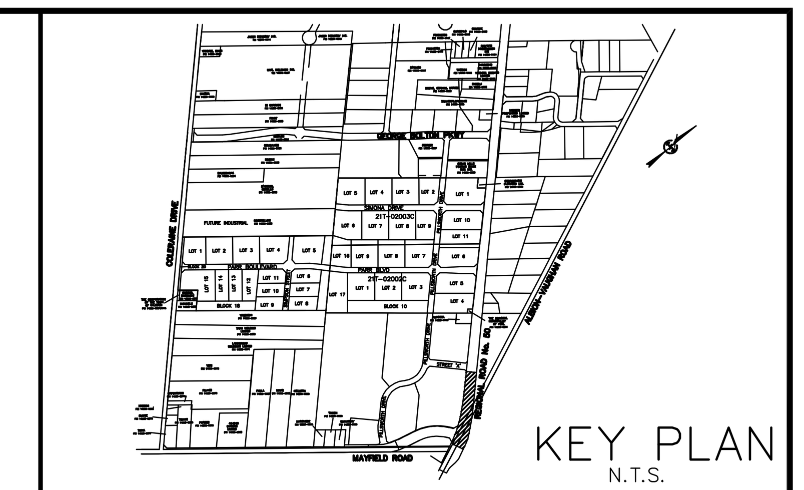
FIGURE 28 Water Level Profile for Existing Mayfield Rd Culvert and Proposed Mayfield Rd Culvert during the 2-year, 25-year, and the regional events.

5 REFERENCES

Cole Engineering Group Ltd. 2015. Floodplain Mapping Development: Assignment #2 EWR-14-03 Engineering Retainer – 2014 Floodplain Mapping. Markham, Ontario. March 2015.

APPENDIX B
Applicable Record Drawings





FOR GENERAL NOTES REFER TO DWG C3

LEGEND

- HYDRANT AND VALVE
- CATCHBASIN
- DOUBLE CATCHBASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- 236.00 PROPOSED ELEVATION
- 235.50 EXISTING ELEVATION
- VALVE AND BOX
- VALVE AND CHAMBER

TOWN OF CALEDON

APPROVED AS NOTED

THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.

THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.

DATE: ____________

APPROVED BY: ____________

C.A. CAMPBELL, C.E.T
DIRECTOR OF PUBLIC WORKS & ENGINEERING

CONTRACTOR TO BE RESPONSIBLE FOR VERIFYING THE LOCATIONS OF ALL EXISTING UNDERGROUND AND ABOVE UTILITIES AND SERVICES. THE CONTRACTOR SHALL ADVISE THE ENGINEER OF ANY DISCREPANCIES PROIR TO PROCEEDING WITH CONSTRUCTION. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCED NOTICE PRIOR TO ANY DIGGING, FOR STAKE OUT. A.M. CANDARAS ASSOCIATES INC. ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

PLAN OF SUBDIVISION OF
PART OF THE EAST HALF OF LOT 1,
CONCESSION 6,
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL

BENCH MARK

REGION OF PEEL #37 ELEV. 227.187m
ON THE NORTH FACE AT THE EAST CORNER OF A RED INSUL. BRICK HOUSE LOCATED ON THE SOUTH WEST CORNER OF SEVENTEENTH SIDEROAD (REGION ROAD #14) AND HIGHWAY #50

No.	Date	By	REVISIONS
7	08/28/08	M.F.S.	FINAL SUBMISSION, PHASE II FOR REGION
6	02/21/08	M.F.S.	4th SUBMISSION, PHASE II FOR TOWN
5	12/18/07	M.F.S.	3rd SUBMISSION, PHASE II FOR TOWN
4	07/18/07	M.F.S.	3rd SUBMISSION, PHASE II FOR REGION
3	06/28/07	M.F.S.	2nd SUBMISSION, PHASE II FOR TOWN
2	06/22/07	M.F.S.	2nd SUBMISSION, PHASE II FOR REGION
1	07/07/06	M.F.S.	1st SUBMISSION

a.m.candaras associates inc.
consulting engineers
8551 Weston rd., suite 203
Woodbridge ont. L4L 9R4
905–850–8020 Fax 905–850–8099
Email: civil@amcai.com

21T–06001Ca (PHASE II)

GIFFELS ENTERPRISES

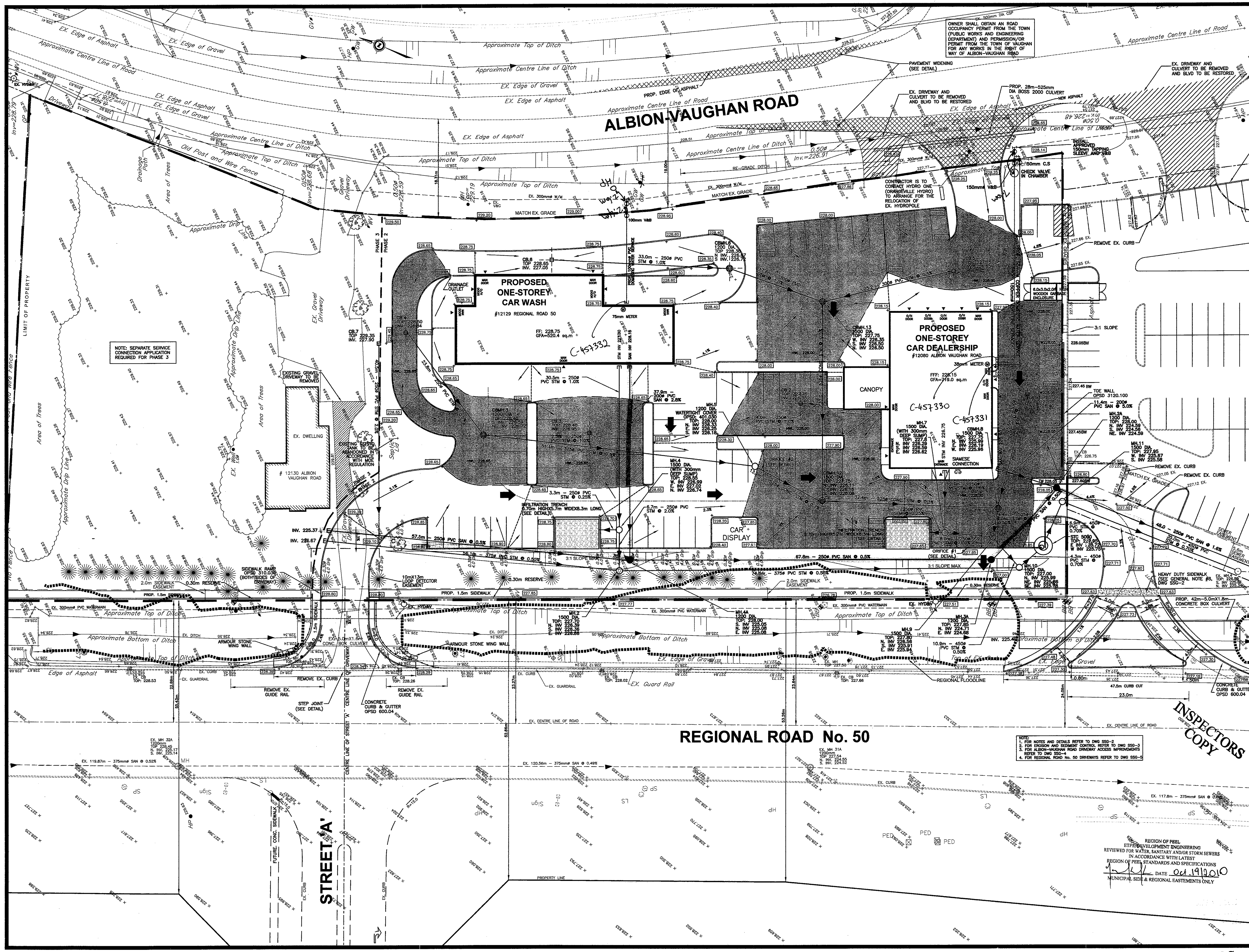
REGIONAL ROAD No. 50 & MAYFIELD ROAD DEVELOPMENT

TOWN OF CALEDON

REGIONAL ROAD No. 50

0+000.000 TO 0+280.000

SCALE: HORIZ 1:500 VERT 1:50	DATE: APRIL 2006	PROJ No. 0496
DRAWN: M.F.S.	CHK'D: A.M.C.	PLAN No. 56547-D
DESIGNED: M.F.S.	SHEET 8 OF 9	



LEGEND:

TW	TOP OF WALL
BW	BOTTOM OF WALL
227.05	EXISTING ELEVATION
188.5	EXISTING CONTOUR
2%	DRAINAGE FLOW DIRECTION AND SLOPE
228.00	PROPOSED ELEVATION
	STORM MANHOLE
	STORM CATCHBASIN MANHOLE
	STORM DOUBLE CATCHBASIN MANHOLE
	CATCHBASIN
	SANITARY MANHOLE
	VALVE AND BOX
M	WATER METER LOCATION
HYD&V	VALVED HYDRANT
	FIRE DEPARTMENT CONNECTION
	PROP. OVERLAND FLOW DIRECTION
FFE	FINISHED GROUND FLOOR ELEVATION
	EXTERIOR DOOR LOCATION
	ROAD RESTORATION (SEE DETAIL)
	SURFACE STORMWATER DETENTION AREA – 100 YEAR HWL
	SURFACE DRAINAGE DIVIDE LINE
	PROPERTY LINE
	PHASING LIMITS
RD	ROOF DRAIN
	REGIONAL FLOODLINE

BENCHMARK:

TOPOGRAPHIC SURVEY PREPARED BY YOUNG & YOUNG SURVEYING INC. OLS. PROJECT: 08-85874
ELEVATIONS ARE GEODETIC ARE REFERRED TO MTO BENCHMARK NO. 758056, ELEVATION = 251.263m.

NO.	DATE	REVISIONS	BY
8.	30/08/10	AS PER REGION COMMENTS	D.G.
7.	02/07/10	REDLINED BY TOWN	D.G.
6.	24/06/10	AS PER REVISED SITE PLAN	D.G.
5.	13/05/10	AS PER REVISED SITE PLAN	D.G.
4.	04/05/10	AS PER TOWN COMMENTS	D.G.
3.	26/04/10	DRIVEWAY DETAILS ADDED	D.G.
2.	07/04/10	RESUBMISSION OF SITE PLAN & H REMOVAL	D.G.
1.	25/03/10	TOWN, REGION & TRCA COMMENTS	D.G.

LICENSED PROFESSIONAL ENGINEER
D. A. GIUGOVAZ
AUG 30,2010
PROVINCE OF ONTARIO

Done By: T.E.R
Nov 15/10
RVR

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
661 CHRISLEA ROAD, SUITE 11, WOODBRIDGE, ONTARIO, L4L 8A3
TEL (905)264-0054, FAX (905)264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PROJECT

PROPOSED CAR DEALERSHIP

COFFEY PHASE 2

12129 REGIONAL ROAD 50 &
12080 ALBION VAUGHAN ROAD,
BOLTON, TOWN OF CALEDON
REGION FILE No. D-05011819E

SITE SERVICING & GRADING PLAN

SCALE	DATE OF DWG	PROJECT NO.
1:300	DEC. 1/2009	08140

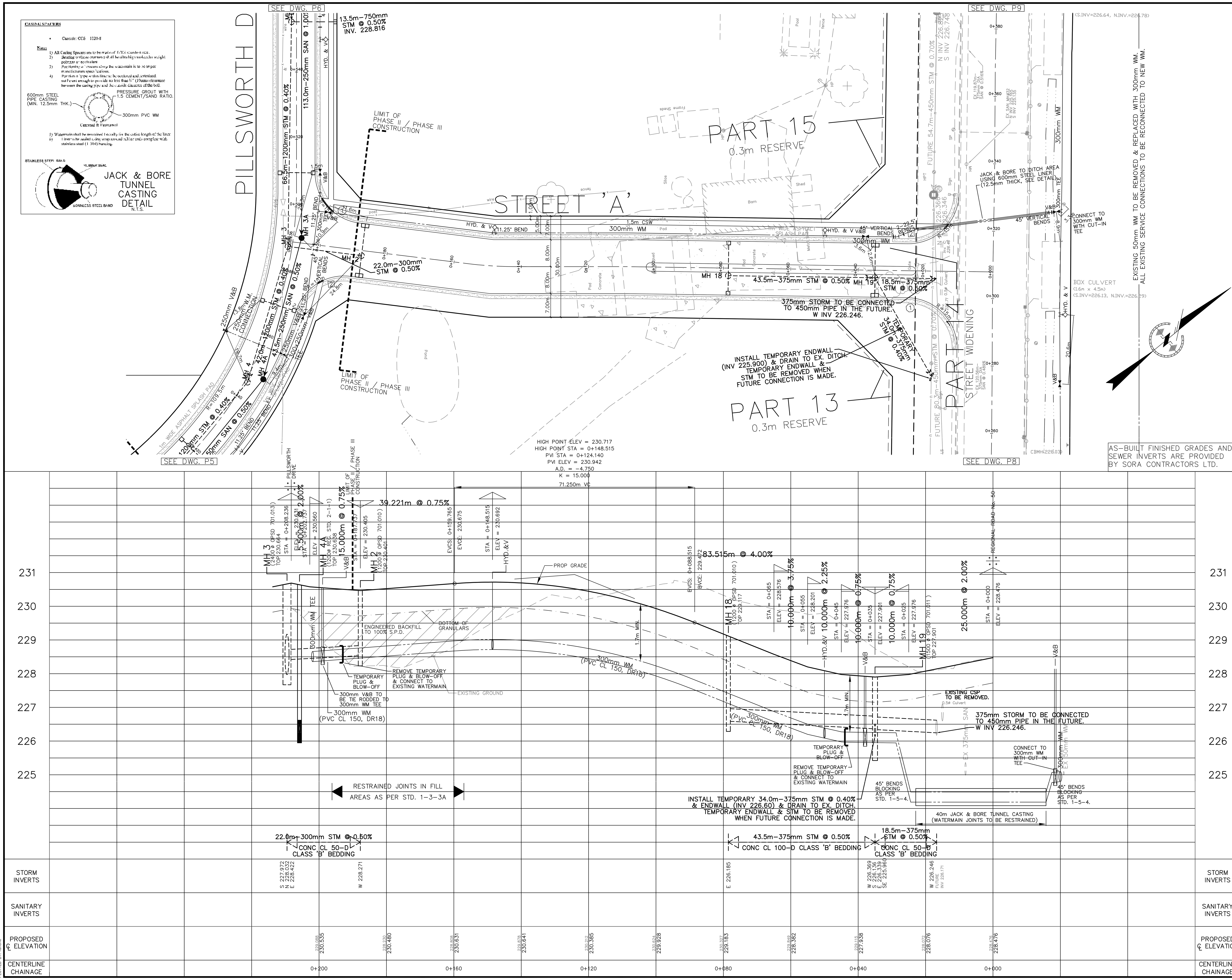
DRAWN BY	DRAWING NO.
P.C./L.S.	SSG-1
CHKD BY D.G.	

INSPECTORS COPY

INSPECTORS COPY

SUB #9

C-457330



KEY PLAN
N.T.S.

FOR GENERAL NOTES REFER TO DWG C3

LEGEND

- HYDRANT AND VALVE
- CATCHBASIN
- DOUBLE CATCHBASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- 236.00 PROPOSED ELEVATION
- 235.50 EXISTING ELEVATION
- VALVE AND BOX
- VALVE AND CHAMBER

TOWN OF CALEDON
APPROVED AS NOTED
THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.
THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.
DATE:
APPROVED BY:
C.A. CAMPBELL, C.E.T
DIRECTOR OF PUBLIC WORKS & ENGINEERING

CONTRACTOR TO BE RESPONSIBLE FOR VERIFYING THE LOCATIONS OF ALL EXISTING UNDERGROUND AND ABOVE UTILITIES AND SERVICES. THE CONTRACTOR SHALL ADVISE THE ENGINEER OF ANY DISCREPANCIES PROIR TO PROCEEDING WITH CONSTRUCTION. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCED NOTICE PRIOR TO ANY DIGGING, FOR STAKE OUT. A.M. CANDARAS ASSOCIATES INC. ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

PLAN OF SUBDIVISION OF PART OF THE EAST HALF OF LOT 1, CONCESSION 6, TOWN OF CALEDON REGIONAL MUNICIPALITY OF PEEL

BENCH MARK
REGION OF PEEL #37 ELEV. 227.187m
ON THE NORTH FACE AT THE EAST CORNER OF A RED INSUL. BRICK HOUSE LOCATED ON THE SOUTH WEST CORNER OF SEVENTEENTH SIDEROAD (REGION ROAD #14) AND HIGHWAY #50

No.	Date	By	REVISIONS
8	01/08/09	D.P.	AS-CONSTRUCTED
7	08/28/08	M.F.S.	FINAL SUBMISSION, PHASE II FOR REGION
6	02/21/08	M.F.S.	4th SUBMISSION, PHASE II FOR TOWN
5	12/18/07	M.F.S.	3rd SUBMISSION, PHASE II FOR TOWN
4	07/18/07	M.F.S.	3rd SUBMISSION, PHASE II FOR REGION
3	06/28/07	M.F.S.	2nd SUBMISSION, PHASE II FOR TOWN
2	06/22/07	M.F.S.	2nd SUBMISSION, PHASE II FOR REGION
1	07/07/06	M.F.S.	1st SUBMISSION

a.m.candaras associates inc.
consulting engineers
8551 Weston rd., suite 203
Woodbridge ont. L4L 9R4
905-850-8020 Fax 905-850-8099
Email: civil@amcai.com

21T-06001Ca (PHASE II)

GIFFELS ENTERPRISES

REGIONAL ROAD No. 50 & MAYFIELD ROAD DEVELOPMENT

TOWN OF CALEDON

AS-CONSTRUCTED

STREET 'A'

0+000.000 TO 0+208.236

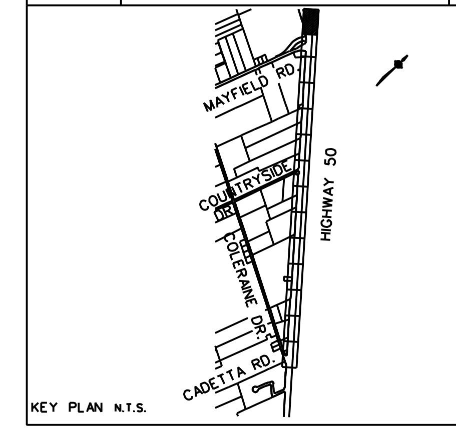
SCALE: HORIZ 1:500 VERT 1:50	DATE: APRIL 2006	PROJ No.	0496
DRAWN: M.F.S.	CHK'D: A.M.C.	PLAN No.	56546-D
DESIGNED: M.F.S.	SHEET 7 OF 9		

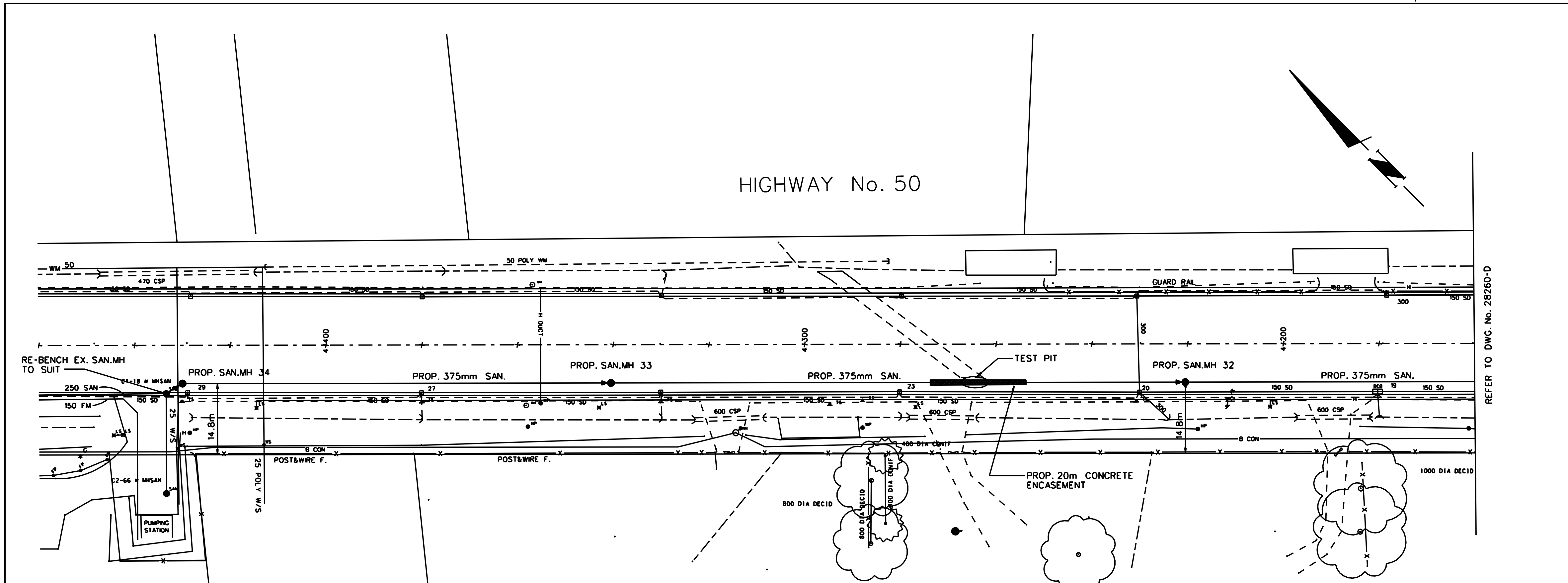
SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS	IX/24/01	J.P.
STORM SEWERS	IX/21/01	J.P.	BELL U/G CABLE	XI/22/01	J.P.
WATERMAINS			HYDRO U/G CABLE	X/22/01	J.P.
TRANSIT			ONT. HYDRO		
PARKS & REC.			CTV		
ONT. CLEAN WATER	IX/27/01	J.P.		X/16/01	J.P.

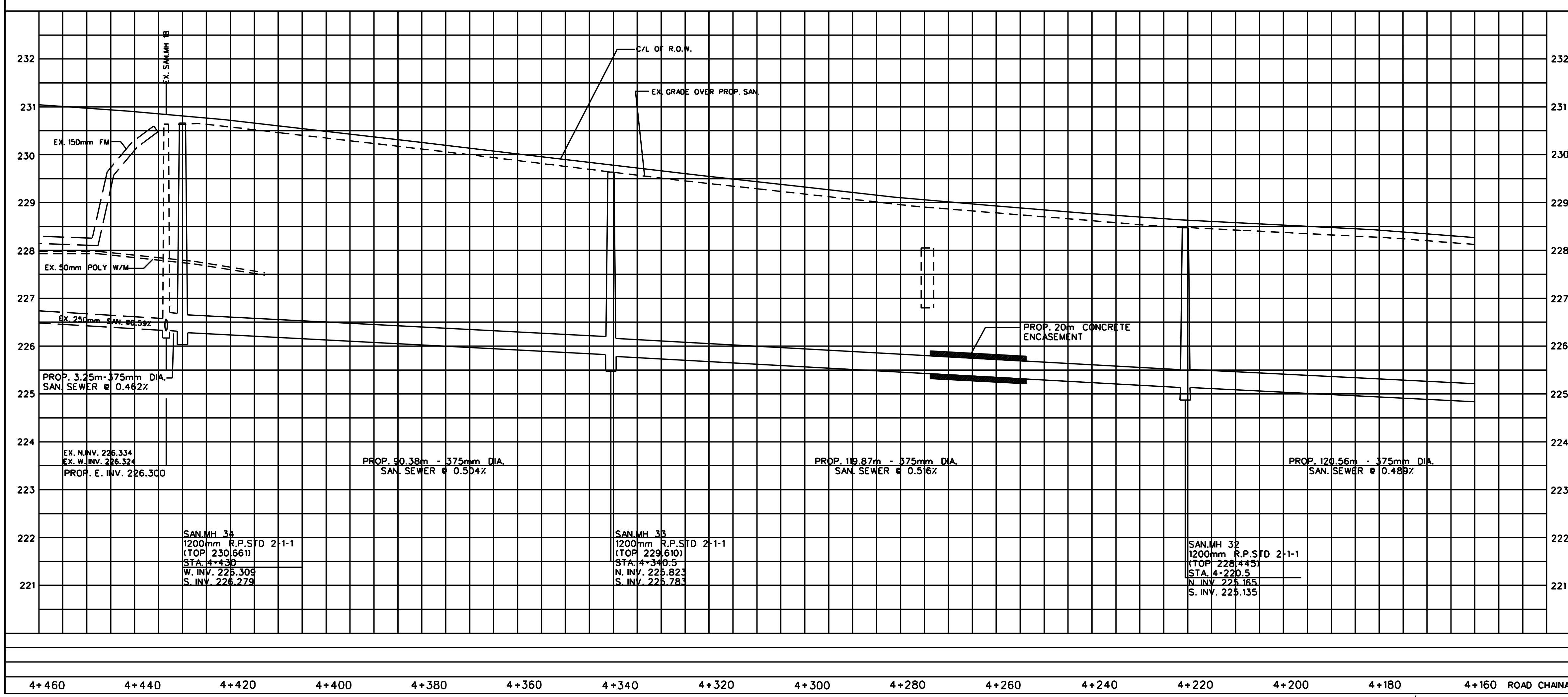
REVISIONS

DATE	DETAILS	INIT.
SEPT.02	AS CONSTRUCTED	J.P.





FOR GENERAL NOTES AND DETAILS SEE DWG. No. 28248-D & 28262-D



General Notes

- — ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- — ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN THE FIELD
- DENOTES BUILDING · NOT LOCATED
- DENOTES BUILDING LOCATED
- TYPE 'B' BEDDING UNLESS OTHERWISE NOTED (SAN)

B.M. NO. ELEV.

THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES PRIOR TO AND DURING CONSTRUCTION LOCATION OF EXISTING UTILITIES APPROXIMATE ONLY. TO BE VERIFIED IN FIELD BY CONTRACTOR.

DESIGNED BY

CHKD.

APPROVED BY

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
CABLE TELEVISION

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Public Works

BOLTON/BRAMPTON TRUNK SEWER

(FROM COLERAINE DR. TO MAYFIELD RD.)

PROP. 375mm SANITARY SEWER

Sta. 4+160 **To Sta.** 4+460

LOTS	AREA B-26/ C-2	PROJECT NO. 02-2140
CHECKED BY	DRAWN BY J.P.	PLAN NO. 28261-D
DATE MARCH,2002	SHEET 14 OF 14	

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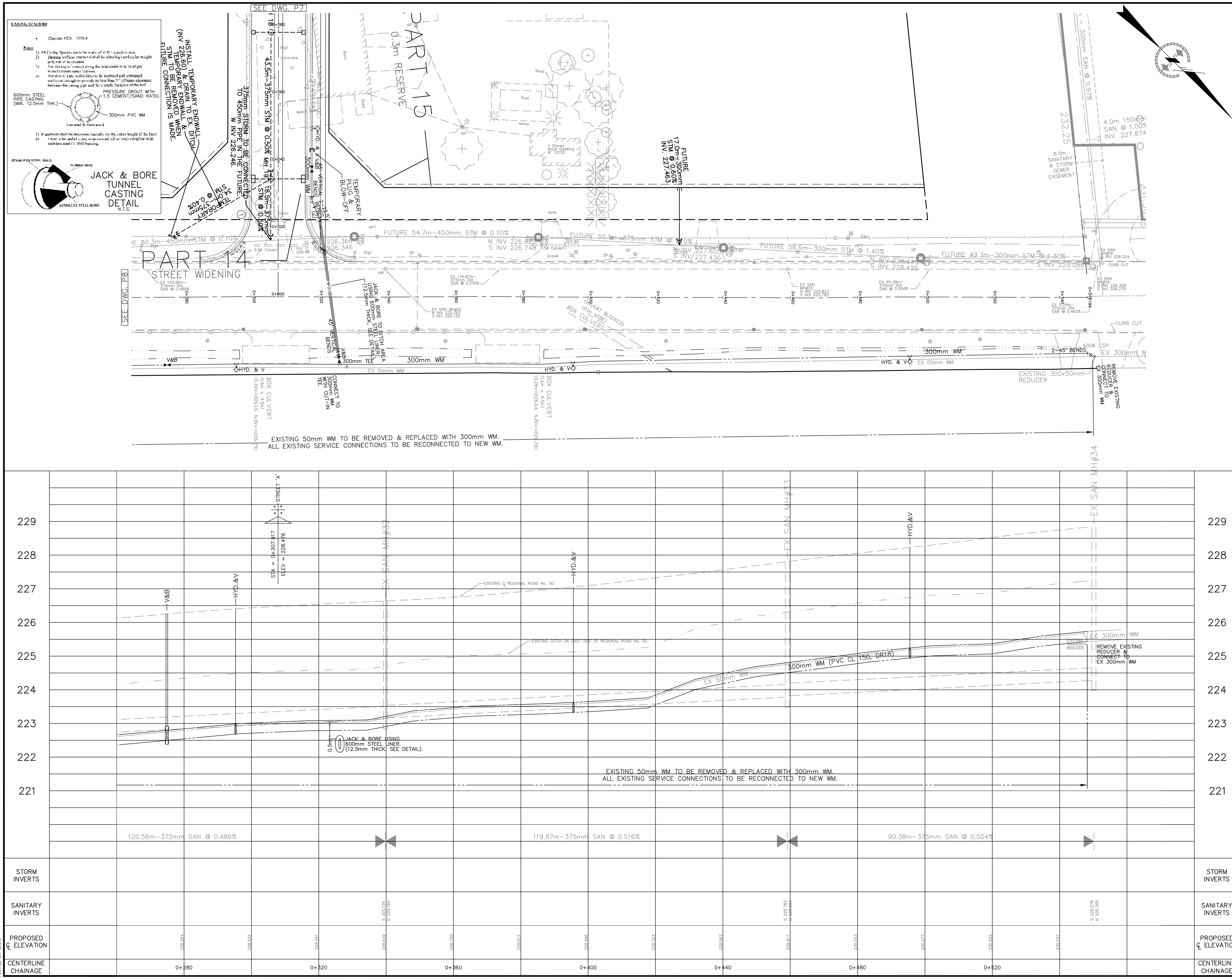


KEY PLAN N.T.S.

FOR GENERAL NOTES REFER TO DWG C3

LEGEND

- HYDRANT AND VALVE
- CATCHBASIN
- DOUBLE CATCHBASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- 236.00 PROPOSED ELEVATION
- 235.50 EXISTING ELEVATION
- VALVE AND BOX
- VALVE AND CHAMBER

TOWN OF CALEDON

APPROVED AS NOTED

THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.

THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.

DATE: ______

APPROVED BY: ______

C.A. CAMPBELL, C.E.T.
DIRECTOR OF PUBLIC WORKS & ENGINEERING

CONTRACTOR TO BE RESPONSIBLE FOR VERIFYING THE LOCATIONS OF ALL EXISTING UNDERGROUND AND ABOVE UTILITIES AND SERVICES. THE CONTRACTOR SHALL ADVISE THE ENGINEER OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCED NOTICE PRIOR TO ANY DIGGING, FOR STAKE OUT. A.M. CANDARAS ASSOCIATES INC. ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

PLAN OF SUBDIVISION OF
PART OF THE EAST HALF OF LOT 1,
CONCESSION 6,
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL

BENCH MARK

REGION OF PEEL #37 ELEV. 227.187m
ON THE NORTH FACE AT THE EAST CORNER OF A RED INSUL. BRICK HOUSE LOCATED ON THE SOUTH WEST CORNER OF SEVENTEENTH SIDEROAD (REGION ROAD #14) AND HIGHWAY #50

No.	Date	By	REVISIONS
7	08/28/08	M.F.S.	FINAL SUBMISSION, PHASE II FOR REGION
6	02/21/08	M.F.S.	4th SUBMISSION, PHASE II FOR TOWN
5	12/18/07	M.F.S.	3rd SUBMISSION, PHASE II FOR TOWN
4	07/18/07	M.F.S.	3rd SUBMISSION, PHASE II FOR REGION
3	06/28/07	M.F.S.	2nd SUBMISSION, PHASE II FOR TOWN
2	06/22/07	M.F.S.	2nd SUBMISSION, PHASE II FOR REGION
1	07/07/06	M.F.S.	1st SUBMISSION

a.m.candaras associates inc.
consulting engineers
8551 Weston rd., suite 203
Woodbridge ont. L4L 9R4
905–850–8020 Fax 905–850–8099
Email: civil@amcai.com

21T–06001Ca (PHASE II)

GIFFELS ENTERPRISES

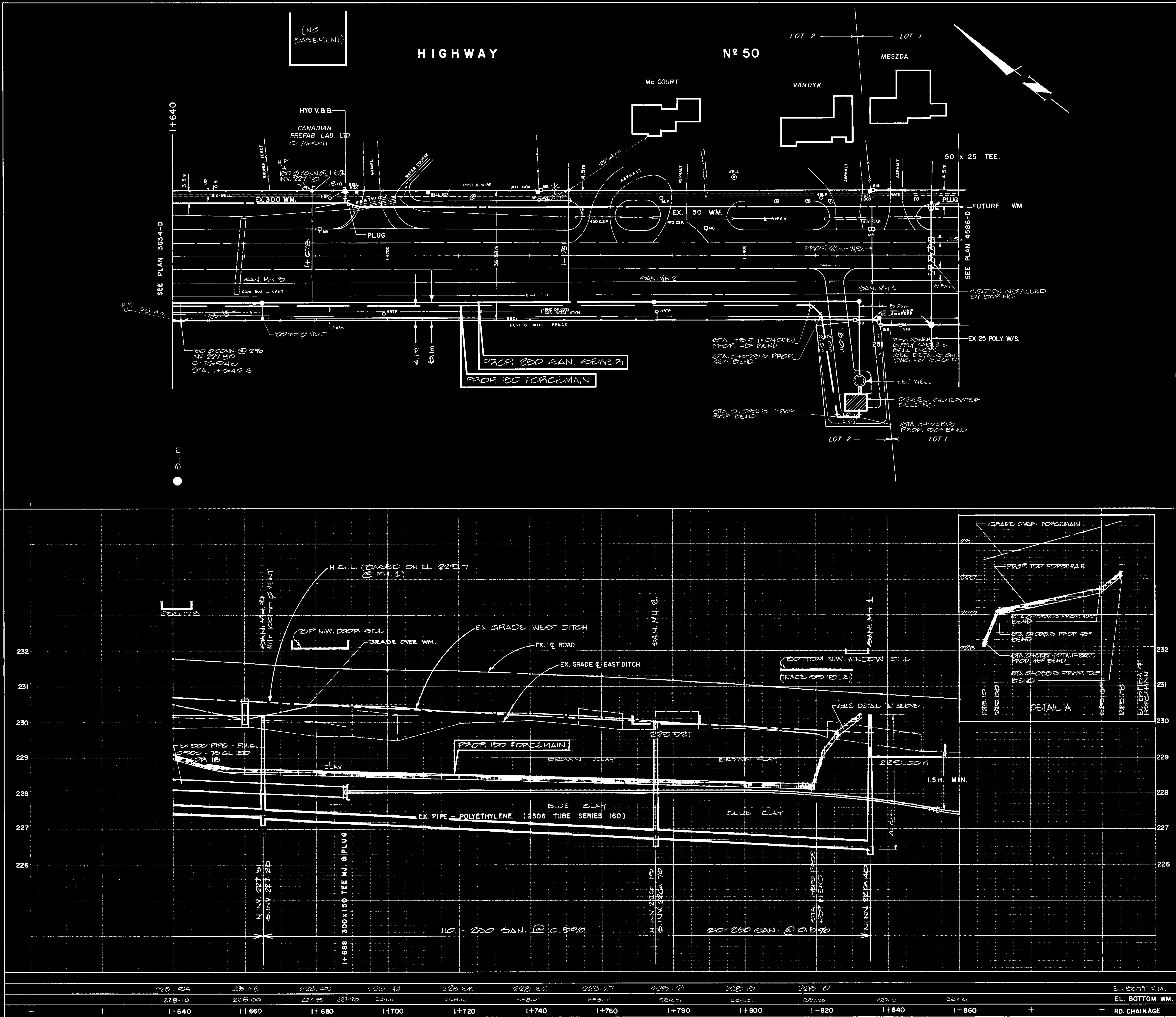
REGIONAL ROAD No. 50 & MAYFIELD ROAD DEVELOPMENT

TOWN OF CALEDON

REGIONAL ROAD No. 50

0+280.000 TO 0+548.194

SCALE: HORIZ 1:500 VERT 1:50	DATE: APRIL 2006	PROJ No. 0496
DRAWN: M.F.S.	CHK'D: A.M.C.	PLAN No. 56548-D
DESIGNED: M.F.S.	SHEET 9 OF 9	

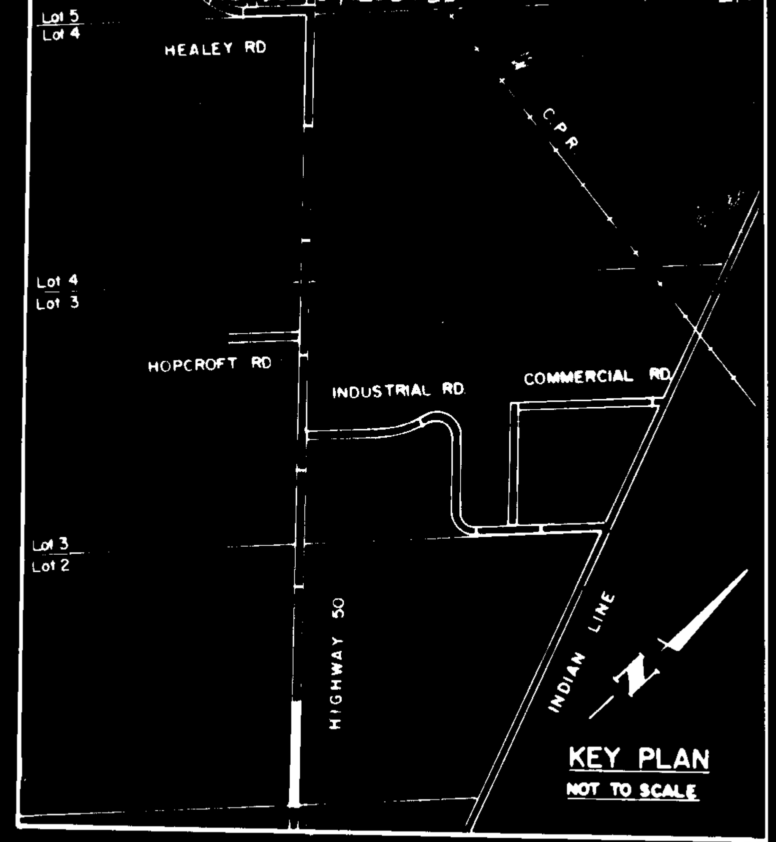


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN. SEWERS			GAS MAINS	80.09.10	G.F.
STORM SEWERS			BELL U/G CABLE	12th JULY 79	EWK.
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
4th NOV 79	GRADE OF WM. REVISED & GRADE OVER	EWK
	WM. ADDED	
23 APR. 80	AS CONSTRUCTED	EWK.
MAR '81	50mm ADDED	B.E.
MAR. '82	PROP. SAN. SEWER, FORCEMAIN & PUMP	
	STATION ADDED MAY 84 AS CONTR.	E.F.
	AS CONSTRUCTED	EF.



PROJ. No. 81-2134

Designed by — Chad — Approved by

General Notes

- — All Driveways Gravel Unless Otherwise Noted.
- — All Service Locations Are Approximate And Must Be Located Accurately In Field.
- ● Denotes Building - Not Located
- ▭ Denotes Building Located
- Type 'B' Bedding Unless Otherwise Noted (SAN.)

B.M. Nº Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

PROJ. No. 78-1101

Designed by — Chad — Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

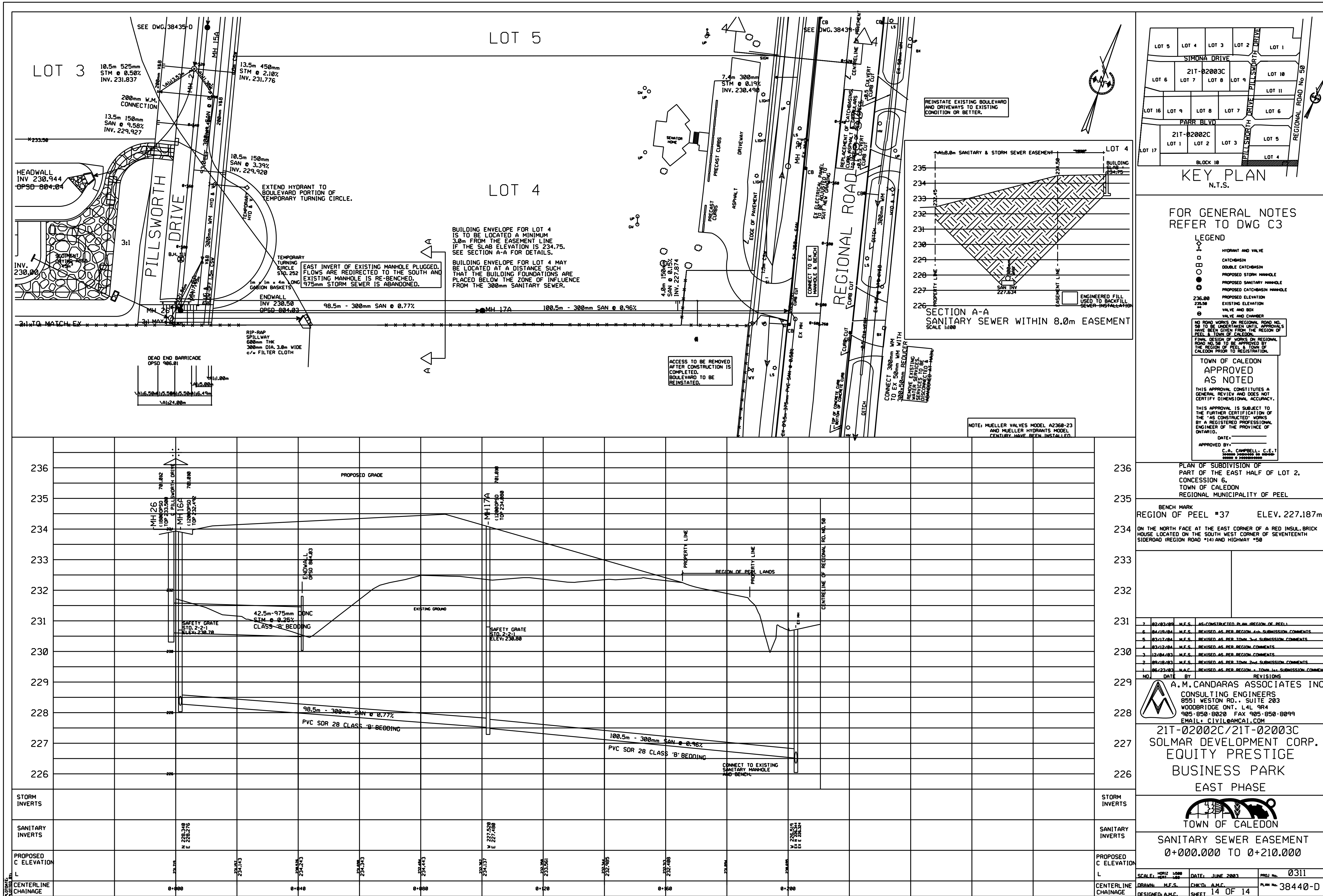
HIGHWAY 50

PROPOSED 250 SANITARY SEWER & 150 FORCEMAIN

Sta. 1+640 To Sta. 1+860

Lots 1-5	Area C-2	Project No. 81-2134
Scale Hor. 1:500 Ver. 1:50	Drawn by E.W.K.	Checked by RK.
Date MAY 79	Sheet 7 of 7	Plan No. 3635-D

3635-D



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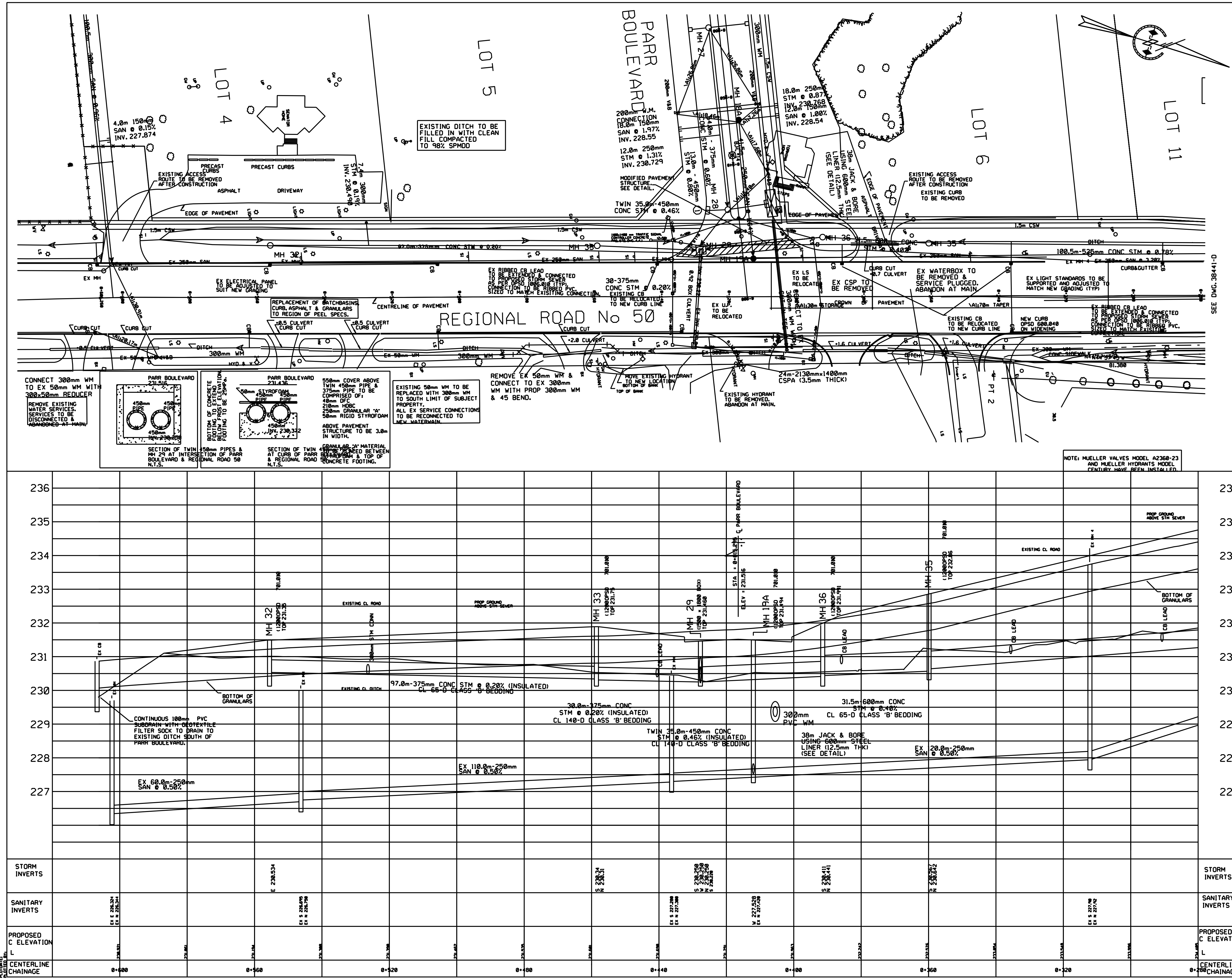
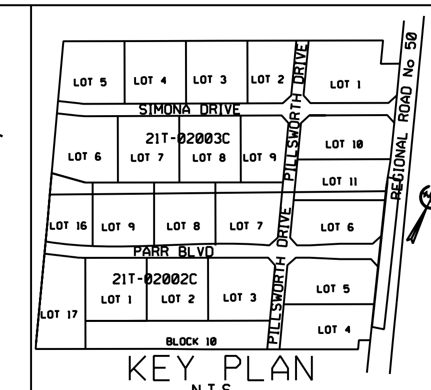




KEY PLAN
N.T.S.

FOR GENERAL NOTES REFER TO DWG C3

LEGEND

- HYDRANT AND VALVE
- CATCHBASIN
- DOUBLE CATCHBASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- 236.00 PROPOSED ELEVATION
- 235.50 EXISTING ELEVATION
- VALVE AND BOX
- VALVE AND CHAMBER

NO ROAD WORKS ON REGIONAL ROAD NO. 50 TO BE UNDERTAKEN UNTIL APPROVALS HAVE BEEN GIVEN FROM THE REGION OF PEEL & TOWN OF CALEDON.

SATISFACTORY CONSTRUCTION OF WORKS ON REGIONAL ROAD NO. 50 TO BE APPROVED BY THE REGION OF PEEL & TOWN OF CALEDON PRIOR TO REGISTRATION.

TOWN OF CALEDON
APPROVED AS NOTED

THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.

THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.

DATE:
APPROVED BY: C.A. CAMPBELL, C.E.T

PLAN OF SUBDIVISION OF PART OF THE EAST HALF OF LOT 2, CONCESSION 6, TOWN OF CALEDON REGIONAL MUNICIPALITY OF PEEL

BENCH MARK
REGION OF PEEL #37 ELEV. 227.187m
ON THE NORTH FACE AT THE EAST CORNER OF A RED INSUL. BRICK HOUSE LOCATED ON THE SOUTH WEST CORNER OF SEVENTEENTH SIDEROAD (REGION ROAD #14) AND HIGHWAY #50

NO.	DATE	BY	REVISIONS
7	02/03/09	M.F.S.	AS-CONSTRUCTED PLAN (REGION OF PEEL)
6	04/19/04	M.F.S.	REVISED AS PER REGION 4th SUBMISSION COMMENTS
5	03/17/04	M.F.S.	REVISED AS PER TOWN 3rd SUBMISSION COMMENTS
4	03/12/04	M.F.S.	REVISED AS PER REGION COMMENTS
3	12/04/03	M.F.S.	REVISED AS PER REGION COMMENTS
2	09/18/03	M.F.S.	REVISED AS PER TOWN 2nd SUBMISSION COMMENTS
1	06/23/03	N.A.C.	REVISED AS PER REGION & TOWN 1st SUBMISSION COMMENTS

A.M. CANDARAS ASSOCIATES INC.
CONSULTING ENGINEERS
8551 WESTON RD., SUITE 203
WOODBRIDGE ONT. L4L 9R4
905-850-8020 FAX 905-850-8099
EMAIL: CIVIL@AMCAI.COM

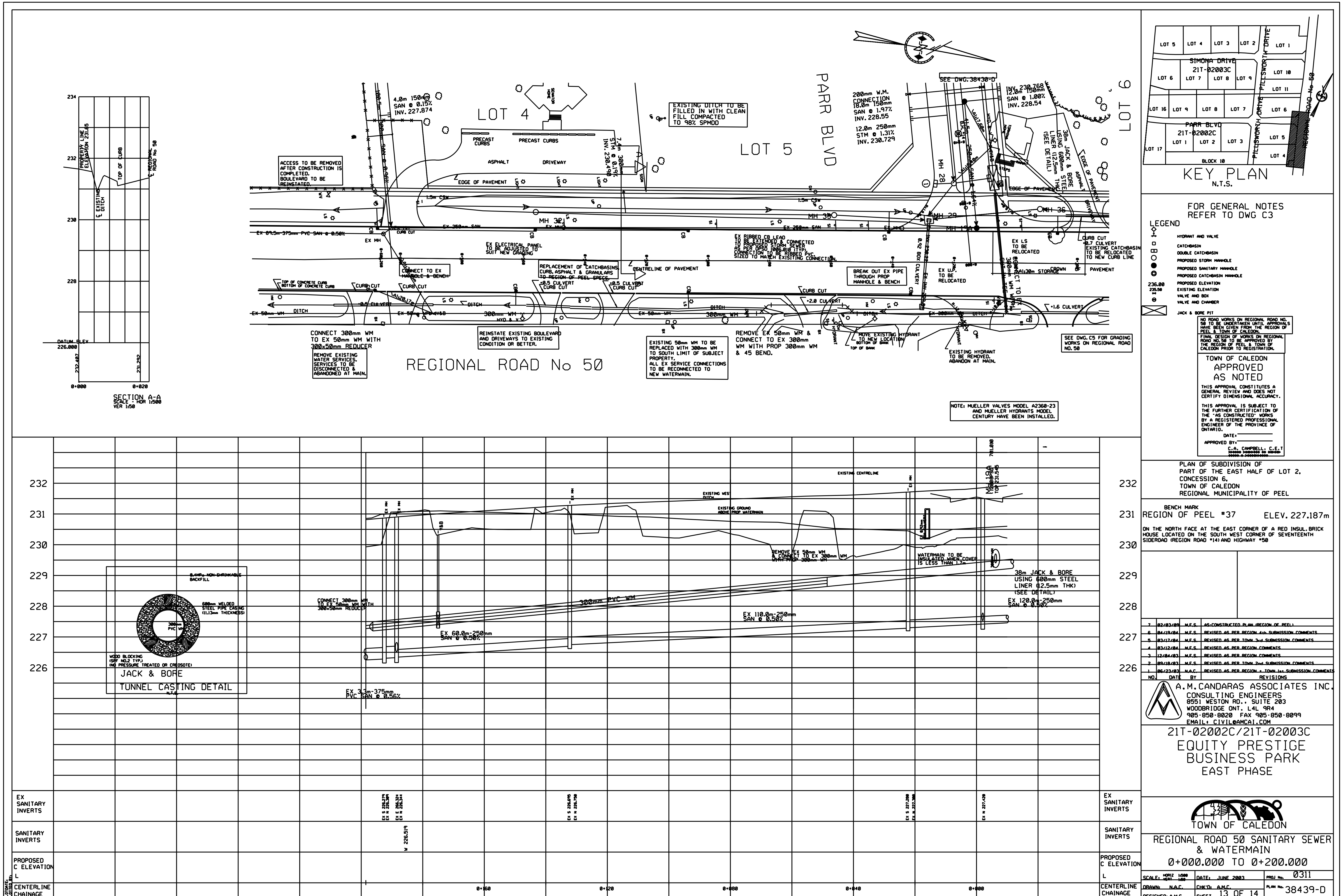
21T-02002C/21T-02003C
SOLMAR DEVELOPMENT CORP.
EQUITY PRESTIGE BUSINESS PARK
EAST PHASE

TOWN OF CALEDON

REGIONAL ROAD No. 50
0+320.000 TO 0+606.261

SCALE: HORIZ 1:500 VERT 1:50	DATE: MAY 2004	PROJ No. 0311	
DRAWN: F.P.	CHK'D: A.M.C.	PLAN No. 38442-D	
DESIGNED: A.M.C.	SHEET 16 OF 16		

38442-D.dgn 28/04/09 11:29:23 AM



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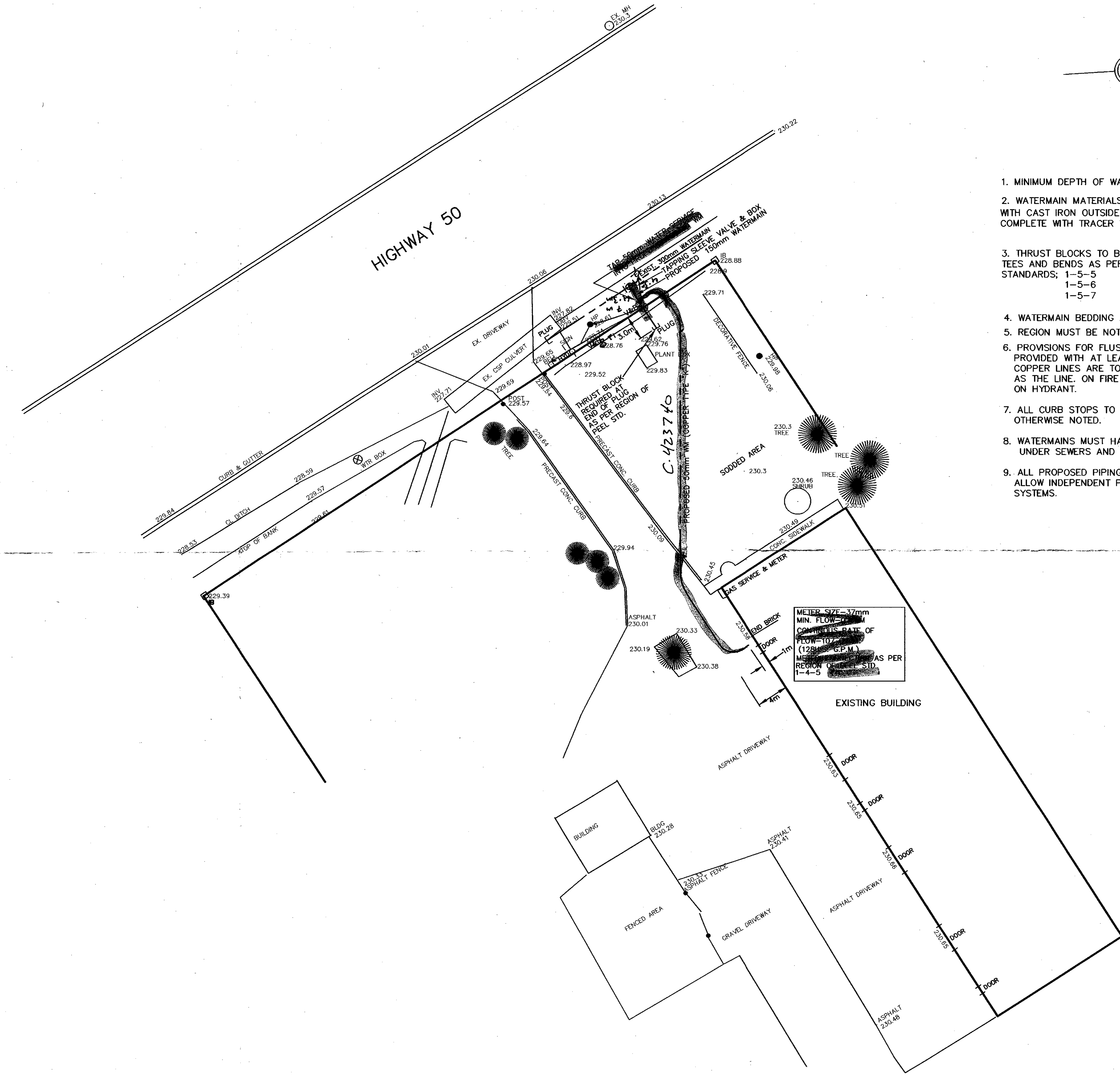
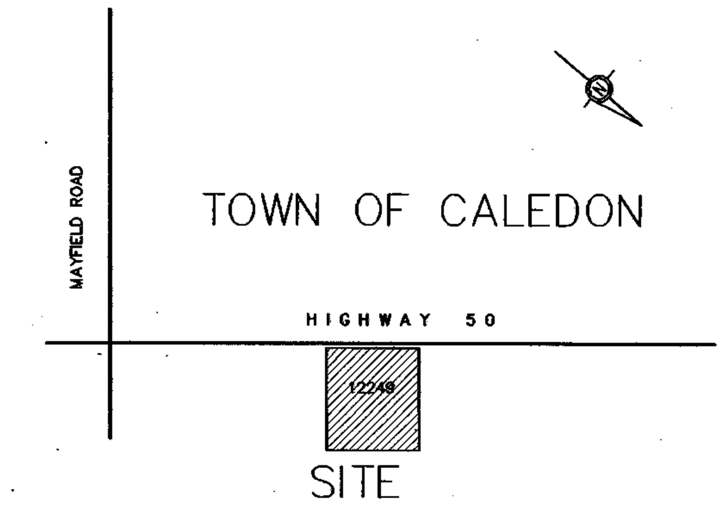


1. MINIMUM DEPTH OF WATERMAIN 1.7m
2. WATERMAIN MATERIALS TO BE PVC CLASS 150 WITH CAST IRON OUTSIDE DIAMETER (A.W.W.A C900 SPECIFICATION) COMPLETE WITH TRACER WIRE AS PER REGION OF PEEL SPECIFICATIONS
3. THRUST BLOCKS TO BE INSTALLED AT ALL TEES AND BENDS AS PER REGION OF PEEL STANDARDS; 1–5–5
   1–5–6
   1–5–7
4. WATERMAIN BEDDING AS PER REGION OF PEEL STD. 1–5–1
5. REGION MUST BE NOTIFIED 48 HOURS PRIOR TO START OF CONSTRUCTION.
6. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED WITH AT LEAST A 50mm(2") OUTLET ON 100mm(4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE THE END ,THE SAME SIZE AS THE LINE. ON FIRE LINES, FLUSHING OUTLET TO BE 100mm(4") DIA. MINIMUM ON HYDRANT.
7. ALL CURB STOPS TO BE 3.0m(10') OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
8. WATERMAINS MUST HAVE A MINIMUM CLEARANCE OF .15m(6") OVER/.3m(12") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
9. ALL PROPOSED PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.



GENERAL NOTES:

ALL DIMENSIONS ARE IN METERS, EXCEPT PIPE DIAMETERS WHICH ARE IN MILLIMETERS OTHERWISE SPECIFIED.

GENERAL:

1. ALL WORK SHALL BE IN ACCORDANCE WITH CURRENT REGION OF PEEL SPECIFICATIONS AND STANDARD DRAWINGS.
2. ALL UNDERGROUND SERVICES MATERIALS AND INSTALLATIONS TO BE IN ACCORDANCE WITH THE LATEST STANDARDS AND CODES.
3. ORDER OF PRECEDENCE OF STANDARD DRAWINGS IS FIRSTLY REGION OF PEEL STANDARD DRAWINGS, AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD)
4. LOCATION OF EXISTING SERVICES AND UTILITIES ARE NOT GUARANTEED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND MAINTAINING EXISTING UTILITIES. ANY CHANGES SHALL BE REPAIRED AT THE CONTRACTORS COST TO THE SATISFACTION OF THE APPROPRIATE UTILITY.
5. NATIVE AND GRANULAR MATERIAL, SUITABLE FOR BACKFILL, SHALL BE COMPACTED TO A MIN. 95% SPDD EXCEPT TOP 0.3m WHICH MUST BE COMPACTED TO 98% SPDD, OR AS RECOMMENDED BY A QUALIFIED SOILS CONSULTANT.
6. ALL AREAS DISRUPTED DUE TO INSTALLATION OF WATERMAIN TO BE RESTORED BACK TO ORGINAL CONDITION.

C-423740

12249 Highway 50, C

DATE Nov. 26/02

INSPECTORS COPY

No.	By	Date	Revison	Chk'd
1	DH	NOV. 25/02	PER REGION OF PEEL COMMENTS	B.W.
1	DH	NOV. 18/02	PER REGION OF PEEL COMMENTS	B.W.

Client: M & C LANDSCAPERS LTD.
Mr. LARRY MOZZOLA
416–888–7347

Municipality: THE CORPORATION OF THE TOWN OF CALEDON

LICENSED PROFESSIONAL ENGINEER
B. D. WORSLEY
02-11-26
PROVINCE OF ONTARIO

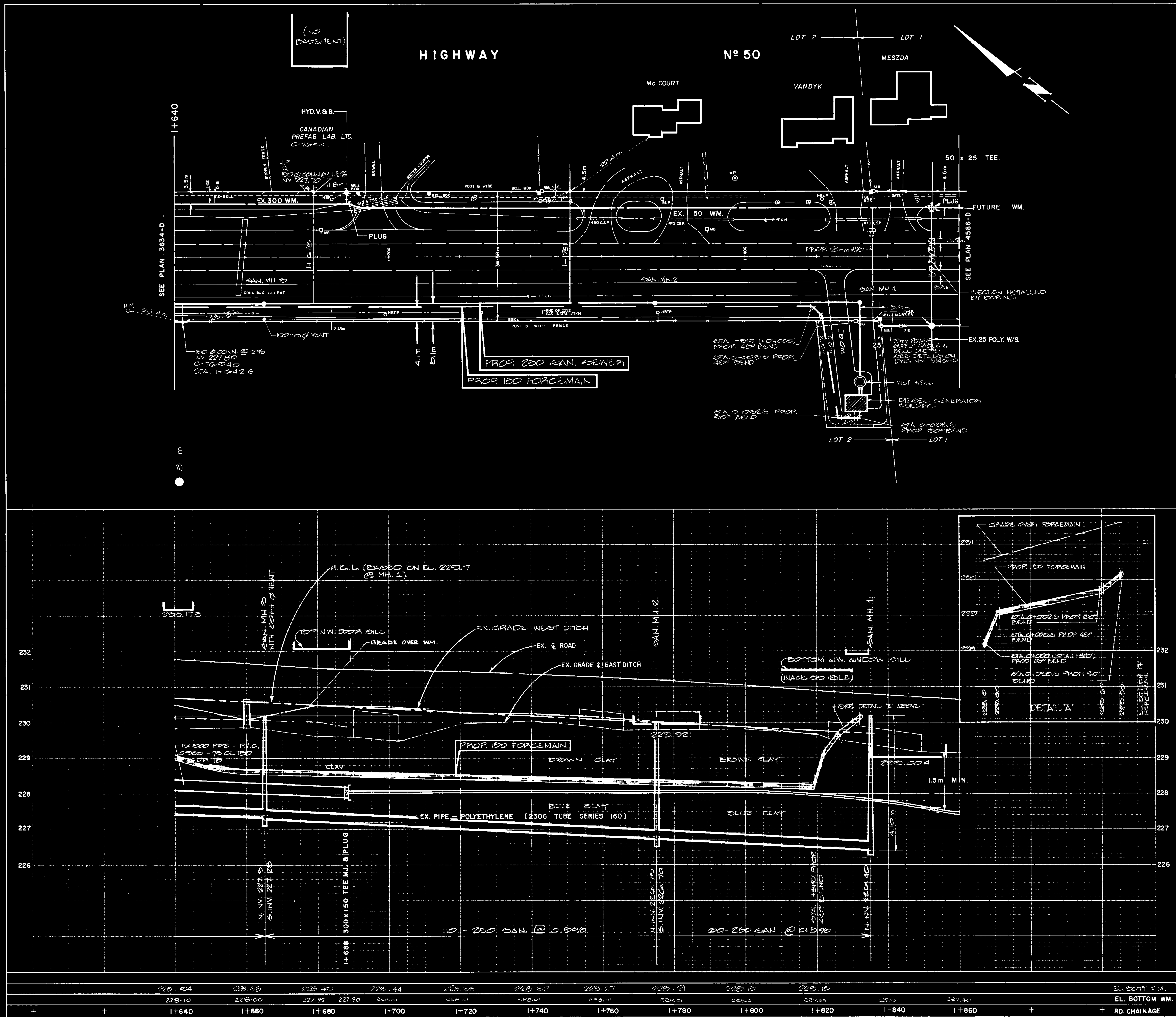
PART OF LOT 1
CONCESSION 7
GEOGRAPHIC TOWNSHIP OF ALBION
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL

AQUAFOR BEECH LIMITED
14 ABACUS ROAD
Brampton, Ontario
L6T 5B7
Tel (905) 794-2367 Fax (905) 794-2338 E-Mail brampton@aquaforbeech.com

WATER SERVICE CONNECTION
12249 HIGHWAY 50

Surveyed by:AQUAFOR BEECH LIMITED		*File:*
Drawn by: DH	*Chk'd by: R.J.W.*	*Drawing No.* 64134
Designed by: DH	*Chk'd by: RJW*	*Sheet No.* 1/1
Scale: 1 : 300	*Date NOV. 2002*	

Archived Box CT

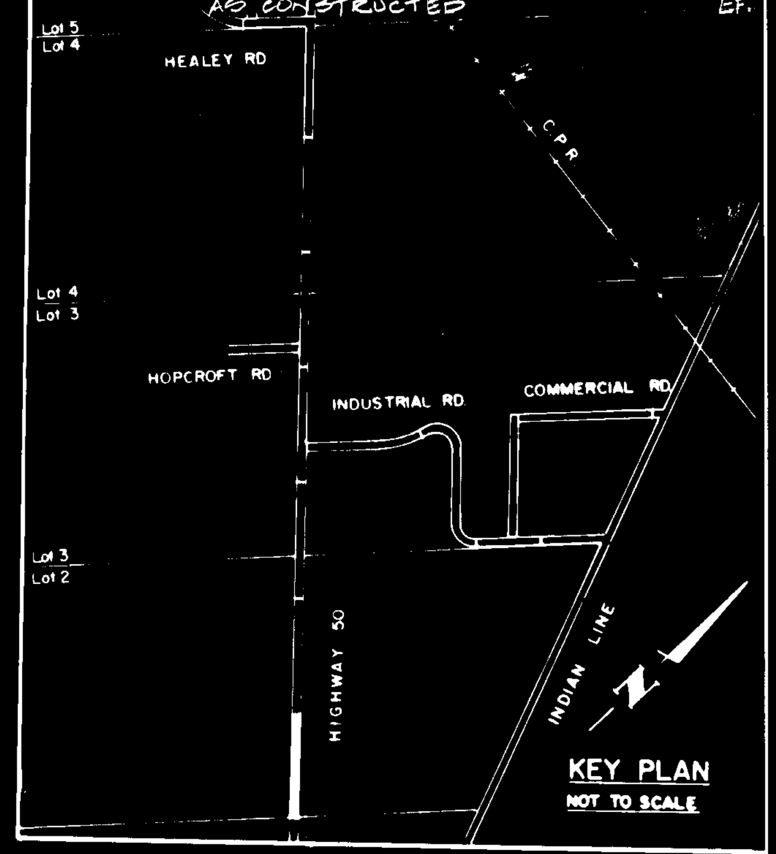


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN. SEWERS			GAS MAINS	00.09.10	G.F.
STORM SEWERS			BELL U/G CABLE	12th JULY 79	EWK
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
4th NOV 79	GRADE OF WM. REVISED & GRADE OVER WM. ADDED	EWK
23 APR. 80	AS CONSTRUCTED	EWK.
MAR '81	50mm ADDED	B.E.
MAR. '82	PROP. SAN. SEWER, FORCEMAIN & PUMP STATION ADDED MAY 84 AS CONTR.	E.F.
	AS CONSTRUCTED	EF.



PROJ. No. 81-2134

Designed by ____ Chkd. ____ Approved by ____

General Notes

- – All Driveways Gravel Unless Otherwise Noted.
- – All Service Locations Are Approximate And Must Be Located Accurately In Field.
- ● Denotes Building – Not Located
- ▭ Denotes Building Located
- Type 'B' Bedding Unless Otherwise Noted (SAN)

B.M. Nº Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

PROJ. No. 78-1101

Designed by ____ chkd. ____ Approved by ____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

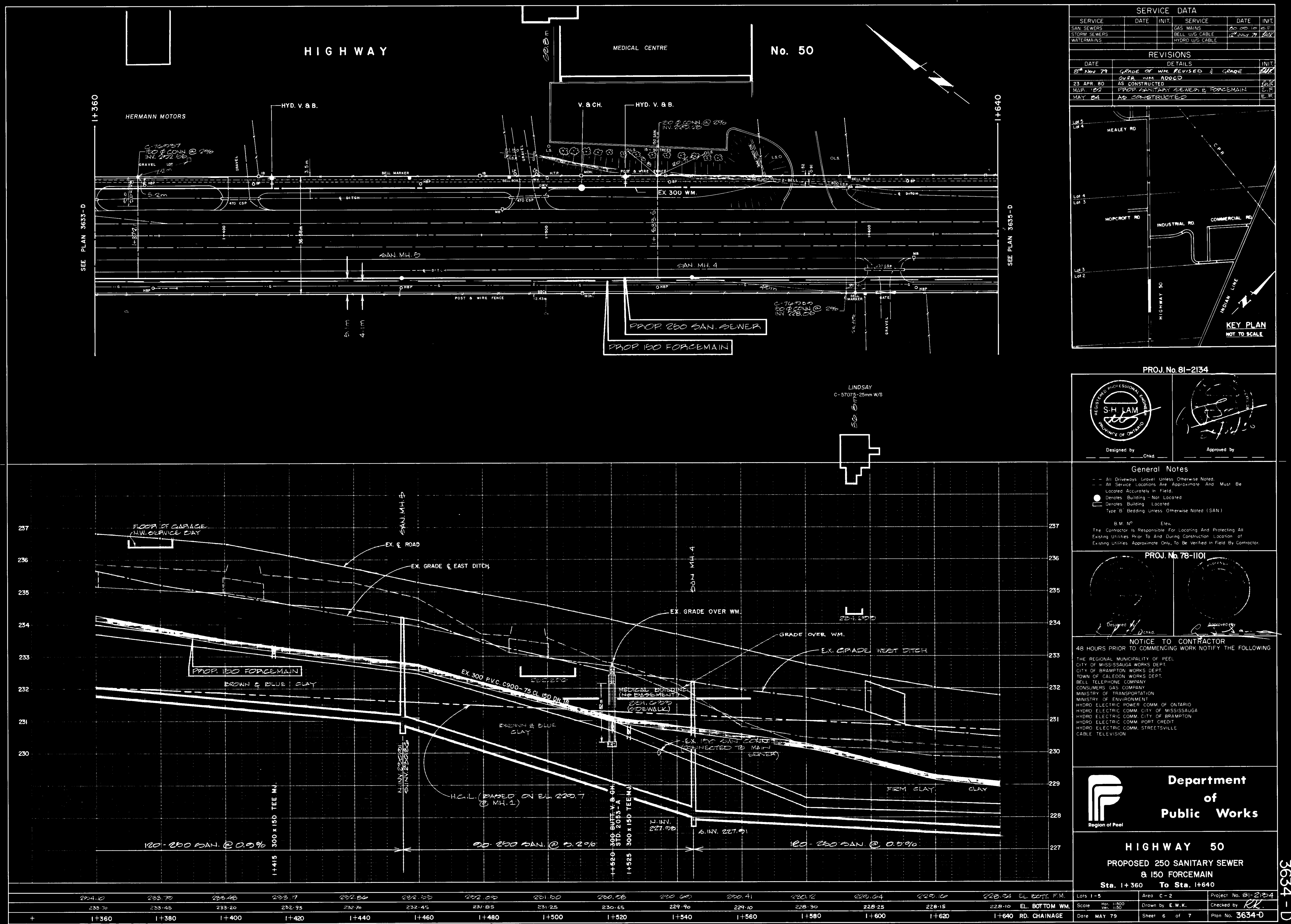
HIGHWAY 50

PROPOSED 250 SANITARY SEWER & 150 FORCEMAIN

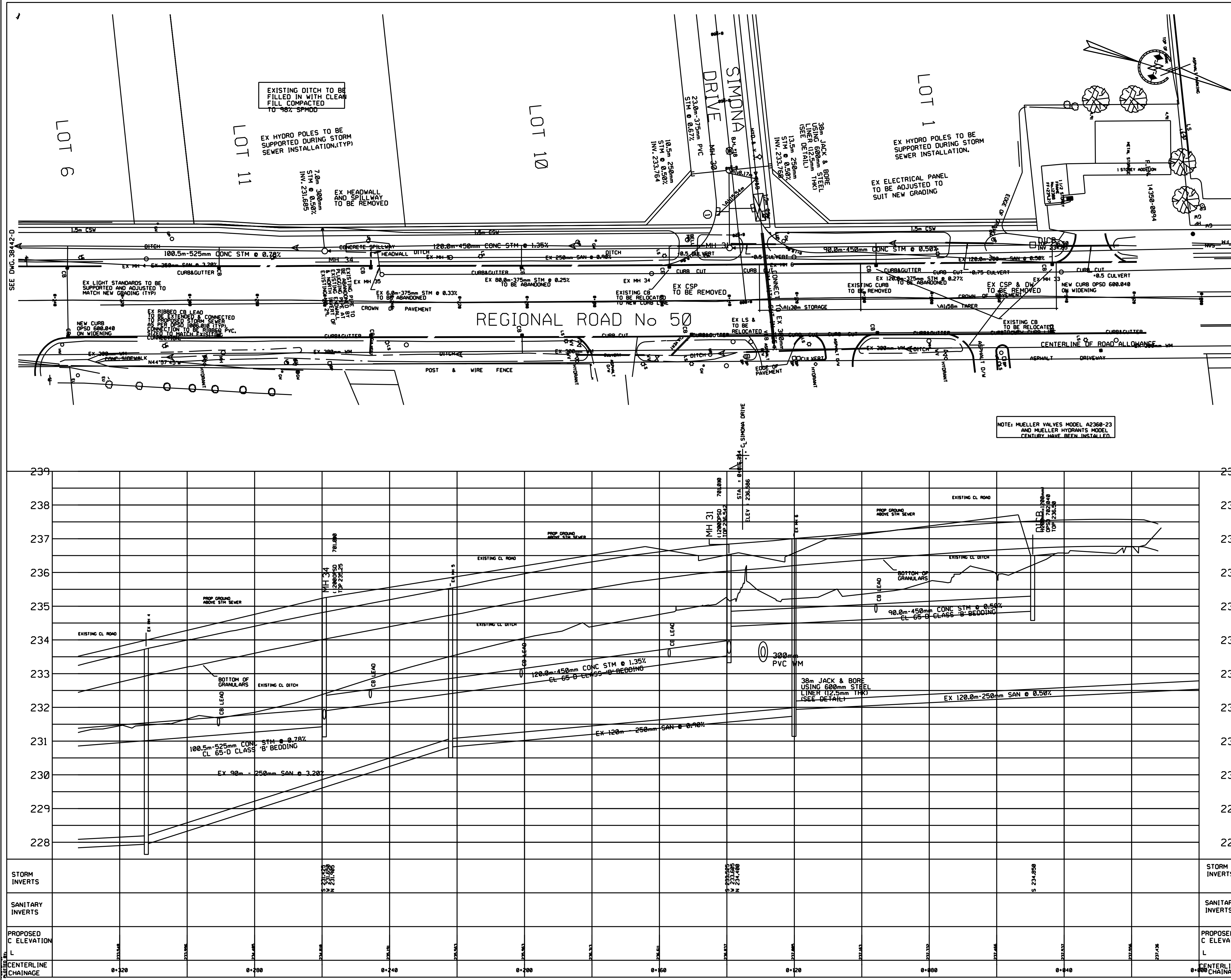
Sta. 1+640 To Sta. 1+860

Lots 1-5	Area C-2	Project No. 81-2134
Scale Hor. 1:500 Ver. 1:50	Drawn by E.W.K.	Checked by RK.
Date MAY 79	Sheet 7 of 7	Plan No. 3635-D

3635-D



SERVICE DATA
SAN. SEWERS
STORM SEWERS
WATERMAINS
GAS MAINS
BELL U/G CABLE
HYDRO U/G CABLE
REVISIONS
23 APR. 80 AS CONSTRUCTED
HIGHWAY No. 50
MEDICAL CENTRE
HERMANN MOTORS
HYD. V. & B.
V. & CH.
EX 300 WM.
SAN. MH. 5
SAN. MH. 4
POST & WIRE FENCE
PROP. 250 SAN. SEWER
PROP. 150 FORCEMAIN
SEE PLAN 3633-D
SEE PLAN 3635-D
HEALEY RD
HOPCROFT RD
INDUSTRIAL RD.
COMMERCIAL RD.
HIGHWAY 50
INDIAN LINE
C.P.R.
KEY PLAN
NOT TO SCALE
PROJ. No. 81-2134
S.H. LAM
LINDSAY
C-57075-25mm W/S
General Notes
All Driveways Gravel Unless Otherwise Noted.
All Service Locations Are Approximate And Must Be Located Accurately In Field.
Denotes Building - Not Located
Denotes Building Located
Type 'B' Bedding Unless Otherwise Noted (SAN.)
The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.
PROJ. No. 78-1101
NOTICE TO CONTRACTOR
48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING
THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION
Region of Peel
Department of Public Works
HIGHWAY 50
PROPOSED 250 SANITARY SEWER & 150 FORCEMAIN
Sta. 1+360 To Sta. 1+640
EX. ℄ ROAD
EX. GRADE ℄ EAST DITCH
EX. GRADE OVER WM.
GRADE OVER WM.
EX. GRADE WEST DITCH
PROP. 150 FORCEMAIN
BROWN & BLUE CLAY
EX 300 P.V.C. C900-75 CL 150 DR 18
FIRM CLAY
H.G.L. (BASED ON EL 220.7 @ MH.1)
300 x 150 TEE MJ.
300 BUTT. V. & CH. STD. 2053-A
120 - 250 SAN. @ 0.5%
90 - 250 SAN. @ 5.2%
160 - 250 SAN. @ 0.5%
EL. BOTT. F.M.
EL. BOTTOM WM.
RD. CHAINAGE
1+360 1+380 1+400 1+420 1+440 1+460 1+480 1+500 1+520 1+540 1+560 1+580 1+600 1+620 1+640
Lots 1-5
Area C-2
Project No. 81-2134
Scale Hor. 1:500 Ver. 1:50
Drawn by E.W.K.
Date MAY 79
Sheet 6 of 7
Plan No. 3634-D
3634-D



KEY PLAN
N.T.S.

FOR GENERAL NOTES REFER TO DWG C3

LEGEND

- HYDRANT AND VALVE
- CATCHBASIN
- DOUBLE CATCHBASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- 236.00 PROPOSED ELEVATION
- EXISTING ELEVATION
- VALVE AND BOX
- VALVE AND CHAMBER

NO ROAD WORKS ON REGIONAL ROAD NO. 50 TO BE UNDERTAKEN UNTIL APPROVALS HAVE BEEN GIVEN FROM THE REGION OF PEEL & TOWN OF CALEDON.

SATISFACTORY CONSTRUCTION OF WORKS ON REGIONAL ROAD NO. 50 TO BE APPROVED BY THE REGION OF PEEL & TOWN OF CALEDON PRIOR TO REGISTRATION.

TOWN OF CALEDON
APPROVED
AS NOTED

THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY.

THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO.

DATE:

APPROVED BY:
C.A. CAMPBELL, C.E.T

PLAN OF SUBDIVISION OF PART OF THE EAST HALF OF LOT 2, CONCESSION 6, TOWN OF CALEDON REGIONAL MUNICIPALITY OF PEEL

BENCH MARK
REGION OF PEEL #37 ELEV. 227.187m
ON THE NORTH FACE AT THE EAST CORNER OF A RED INSUL. BRICK HOUSE LOCATED ON THE SOUTH WEST CORNER OF SEVENTEENTH SIDEROAD (REGION ROAD #14) AND HIGHWAY #50

NO.	DATE	BY	REVISIONS
7	02/03/09	M.F.S.	AS-CONSTRUCTED PLAN (REGION OF PEEL)
6	04/19/04	M.F.S.	REVISED AS PER REGION 4th SUBMISSION COMMENTS
5	03/17/04	M.F.S.	REVISED AS PER TOWN 3rd SUBMISSION COMMENTS
4	03/12/04	M.F.S.	REVISED AS PER REGION COMMENTS
3	12/04/03	M.F.S.	REVISED AS PER REGION COMMENTS
2	09/18/03	M.F.S.	REVISED AS PER TOWN 2nd SUBMISSION COMMENTS
1	06/23/03	M.A.C.	REVISED AS PER REGION & TOWN 1st SUBMISSION COMMENTS

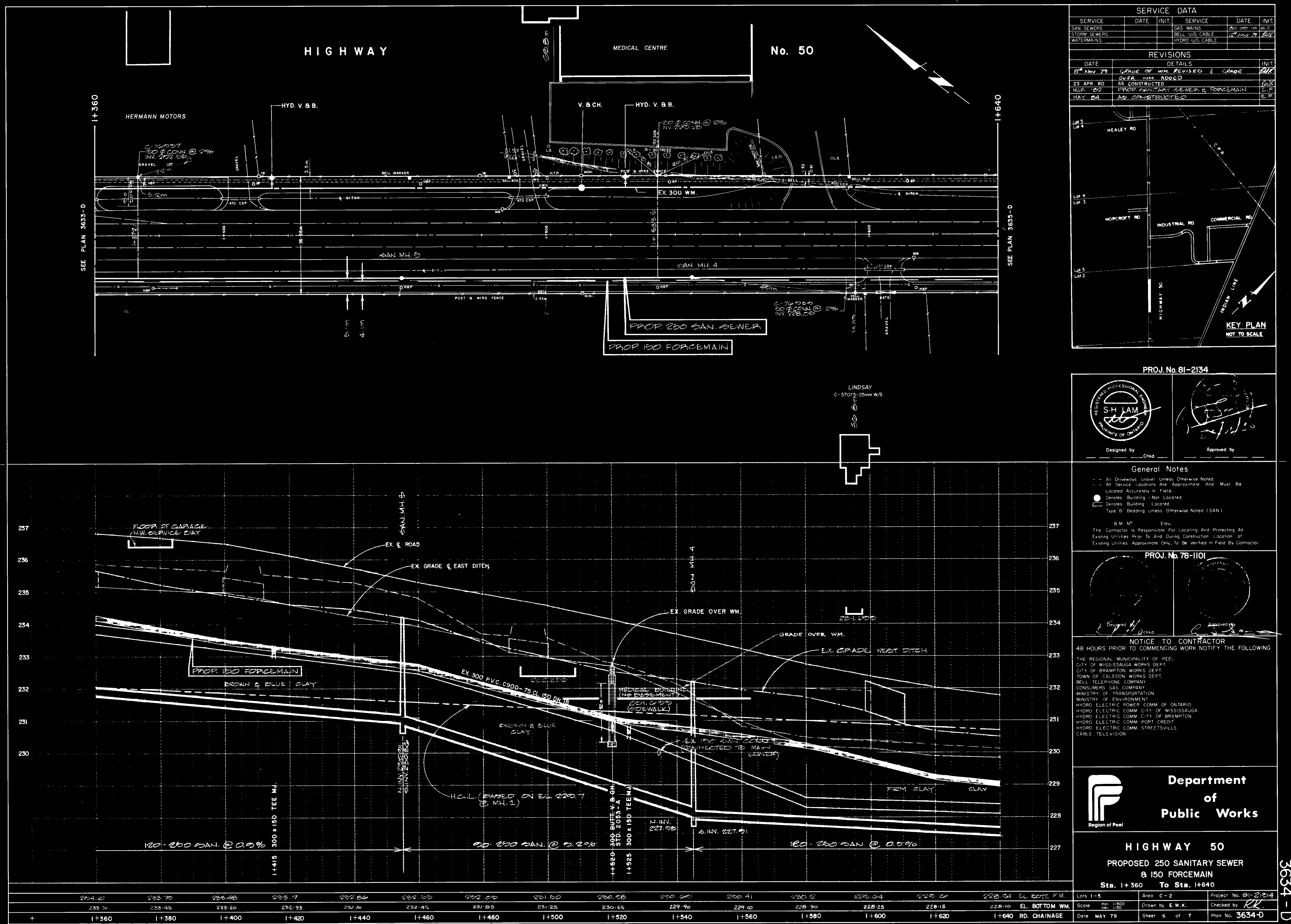
A.M. CANDARAS ASSOCIATES INC.
CONSULTING ENGINEERS
8551 WESTON RD., SUITE 203
WOODBRIDGE ONT. L4L 9R4
905-850-8020 FAX 905-850-8099
EMAIL: CIVIL@AMCAI.COM

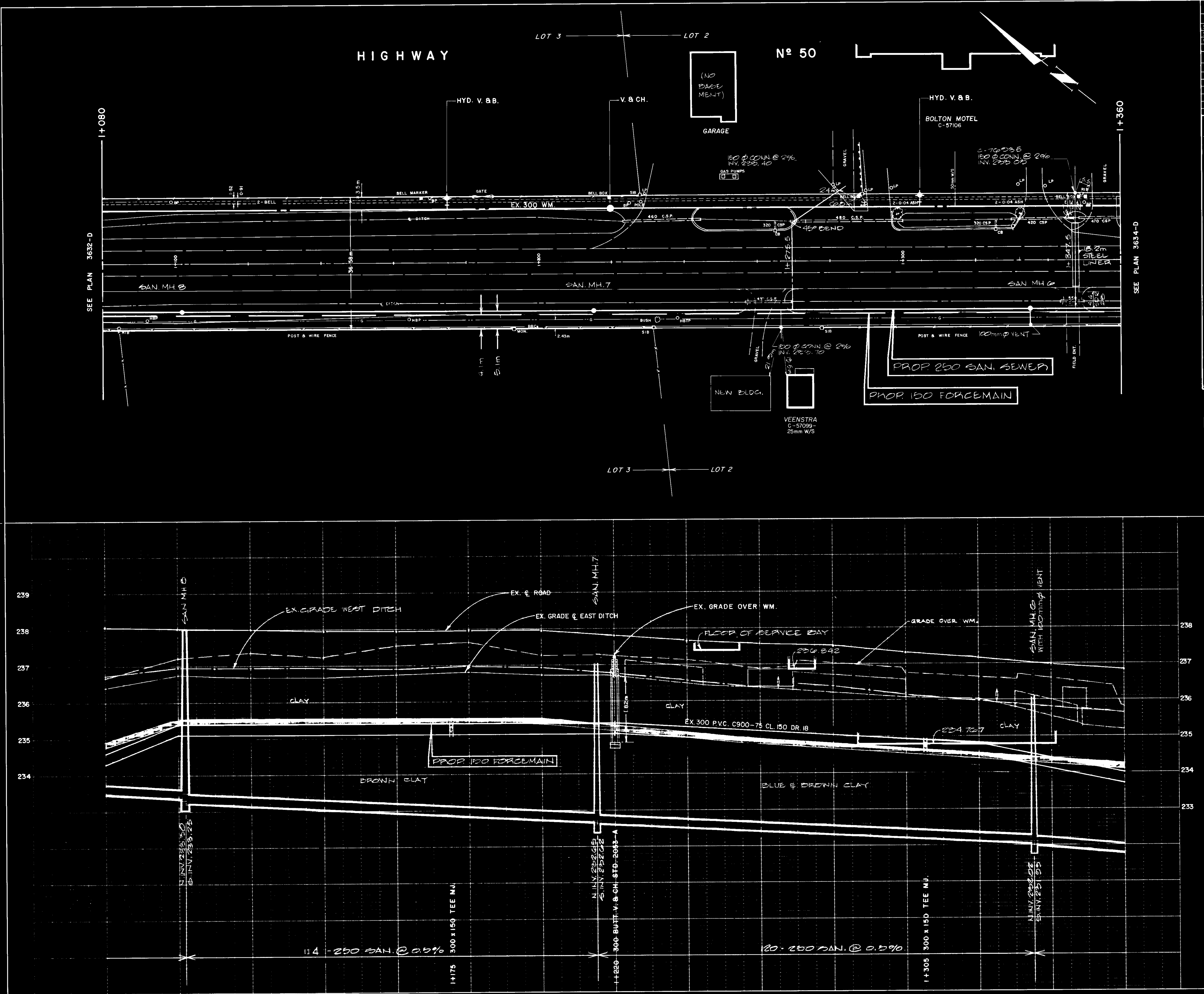
21T-02002C/21T-02003C
SOLMAR DEVELOPMENT CORP.
EQUITY PRESTIGE BUSINESS PARK
EAST PHASE

TOWN OF CALEDON

REGIONAL ROAD No. 50
0+000.000 TO 0+320.000

SCALE: HORIZ 1:500 VERT 1:50	DATE: MAY 2004	PROJ No. 0311	
DRAWN: F.P.	CHK'D: A.M.C.	PLAN No. 38441-D	
DESIGNED: A.M.C.	SHEET 15 OF 16		


HIGHWAY No. 50
MEDICAL CENTRE
HERMANN MOTORS
HYD. V. & B.
V. & CH.
EX 300 WM.
SAN. MH. 5
SAN. MH. 4
POST & WIRE FENCE
PROP. 250 SAN. SEWER
PROP. 150 FORCEMAIN
SEE PLAN 3633-D
SEE PLAN 3635-D
1+360
1+640
LINDSAY
SERVICE DATA
SERVICE | DATE | INIT. | SERVICE | DATE | INIT.
SAN. SEWERS
STORM SEWERS
WATERMAINS
GAS MAINS 80.09.10 E.F.
BELL U/G CABLE 12th JULY 79 EWK
HYDRO U/G CABLE
REVISIONS
DATE | DETAILS | INIT.
8th Nov 79 | GRADE OF WM. REVISED & GRADE OVER WM ADDED | EWK
23 APR. 80 | AS CONSTRUCTED | EWK
MAR. '82 | PROP. SANITARY SEWER & FORCEMAIN | E.F.
MAY 84 | AS CONSTRUCTED | E.F.
HEALEY RD
C.P.R.
HOPCROFT RD
INDUSTRIAL RD
COMMERCIAL RD
HIGHWAY 50
INDIAN LINE
KEY PLAN
NOT TO SCALE
PROJ. No. 81-2134
S.H. LAM
PROVINCE OF ONTARIO
Designed by
Chkd.
Approved by
General Notes
All Driveways Gravel Unless Otherwise Noted.
All Service Locations Are Approximate And Must Be Located Accurately In Field.
Denotes Building - Not Located
Denotes Building Located
Type 'B' Bedding Unless Otherwise Noted (SAN)
B.M. No Elev.
The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.
PROJ. No. 78-1101
NOTICE TO CONTRACTOR
48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING
THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION
Region of Peel
Department of Public Works
HIGHWAY 50
PROPOSED 250 SANITARY SEWER & 150 FORCEMAIN
Sta. 1+360 To Sta. 1+640
Lots 1-5
Area C-2
Project No. 81-2134
Scale Hor. 1:500 Ver. 1:50
Drawn by E.W.K.
Checked by RK.
Date MAY 79
Sheet 6 of 7
Plan No. 3634-D
3634-D
FLOOR OF GARAGE N.W. SERVICE DAY
EX. ℄ ROAD
EX. GRADE ℄ EAST DITCH
EX. GRADE OVER WM.
GRADE OVER WM.
EX. GRADE WEST DITCH
EX 300 P.V.C. C900-75 CL 150 DR 18
BROWN & BLUE CLAY
FIRM CLAY
MEDICAL BUILDING (NO BASEMENT)
EX. 150 SAN. CONN. CONNECTED TO MAIN SEWER
H.G.L. (BASED ON EL 229.7 @ MH. 1)
120 - 250 SAN. @ 0.5%
90 - 250 SAN. @ 5.2%
160 - 250 SAN. @ 0.5%
300 x 150 TEE MJ.
300 BUTT. V. & CH. STD. 2053-A
EL. BOTT. F.M.
EL. BOTTOM WM.
RD. CHAINAGE
1+360 1+380 1+400 1+420 1+440 1+460 1+480 1+500 1+520 1+540 1+560 1+580 1+600 1+620 1+640



234.75	235.30	235.37	235.35	235.36	235.30	235.28	235.15	234.98	234.84	234.69	234.54	234.40	234.25	234.10	EL. BOTT. F.M.
234.30	235.10	235.10	235.10	235.10	235.10	235.10	235.10	235.00	234.85	234.75	234.65	234.50	234.10	233.70	EL. BOTTOM WM.
1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	RD. CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN. SEWERS			GAS MAINS	81.09.10	E.F.
STORM SEWERS			BELL U/G CABLE	12 JULY 79	[illegible]
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
8th NOV 79	GRADE OF WM. REVISED & GRADE OVER WM ADDED	[illegible]
23 APR. 80	AS CONSTRUCTED	[illegible]
MAR. '82	PROP. SANITARY SEWER & FORCEMAIN	E.F.
MAY 84	AS CONSTRUCTED	E.F.

KEY PLAN
NOT TO SCALE

PROJ. No. 81-2134

Designed by ____ Chkd. ____ Approved by ____

General Notes

- All Driveways Gravel Unless Otherwise Noted.
- All Service Locations Are Approximate And Must Be Located Accurately In Field.
- Denotes Building - Not Located
- Denotes Building Located
- Type 'B' Bedding Unless Otherwise Noted (SAN.)

B.M. Nº Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

PROJ. No. 78-1101

Designed by chkd. Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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HYDRO ELECTRIC POWER COMM. OF ONTARIO
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HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

HIGHWAY 50

PROPOSED 250 SANITARY SEWER & 150 FORCEMAIN

Sta. 1+080 To Sta. 1+360

Lots 1-5	Area C-2	Project No. 81-2134
Scale Hor. 1:500 Ver. 1:50	Drawn by E.W.K.	Checked by RR.
Date MAY 79	Sheet 5 of 7	Plan No. 3633-D

3633-D

EXISTING UTILITIES:

THERE MAY BE VARIOUS UTILITIES WITHIN THE LIMITS OF THE CONTRACT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE LOCAL UTILITY AUTHORITIES AND THE LOCATE AGENCY TO DETERMINE THE EXACT LOCATION OF ALL UTILITIES, AND IF NECESSARY TO ENGAGE THE SERVICES OF A PRIVATE LOCATE COMPANY TO LOCATE SERVICES WITHIN THE VICINITY OF THE REQUIRED WORKS ALL AT THE CONTRACTOR'S COST.

NO RESPONSIBILITY WILL BE ASSUMED BY THE ENGINEER OR THE OWNER FOR THE CORRECTNESS OR COMPLETENESS OF ANY DRAWINGS WITH RESPECT TO EXISTING UTILITIES, PIPES, OR OTHER OBJECTS EITHER UNDERGROUND OR ON THE SURFACE AND NEITHER THE ENGINEER OR THE OWNER SHALL BE LIABLE FOR THE INCORRECTNESS OR INADEQUACY THEREOF. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE LOCATION OF ALL SUCH UTILITIES, PIPES OR OTHER OBJECTS.

ALL COSTS OF WORKING AROUND, SUPPORTING AND/OR PROTECTING ALL EXISTING UTILITIES AND SERVICES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

GENERAL NOTES

ALL WORKS, MATERIALS AND INSTALLATIONS MUST CORRESPOND TO THE CURRENT REGION OF PEEL AND TOWN OF CALEDON AND SPECIFICATIONS AND THE CURRENT ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS IN THE EVENT OF A DISCREPANCY BETWEEN THEM, THE REGION OF PEEL AND/OR THE TOWN OF CALEDON STANDARDS AND SPECIFICATIONS SHALL PREVAIL.

ALL CONSTRUCTION WORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.

1. ALL ELEVATIONS ARE IN METRES AND REFERENCED TO GEODETIC DATUM. ALL DIMENSIONS ARE IN METRIC UNITS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYOUT AND SURVEY CONTROL DURING CONSTRUCTION.
4. THE CONTRACTOR SHALL DELINEATE THE REQUIRED WORKING AREA ON-SITE PRIOR TO THE START OF WORK AND SHALL CONFINE OPERATIONS WITHIN THE DEFINED AREA.
5. WORKING AREAS, ACCESS REQUIREMENTS, AND TEMPORARY MATERIAL STORAGE AREAS TO BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR AT ALL TIMES. AREAS AFFECTED BY THE CONTRACTOR'S ACTIVITIES ARE TO BE REINSTATED TO THE EXISTING CONDITIONS OR BETTER.
6. ALL GENERAL BACKFILL TO BE OF APPROVED MATERIAL AND COMPACTED TO A MINIMUM 95% PROCTOR DENSITY UNLESS OTHERWISE STATED.
7. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL DEBRIS AND EXCESS MATERIAL OFF SITE.
8. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES ARE TO RESTORED TO A CONDITION EQUAL TO OR BETTER THAM ORIGINAL ALL TO THE SATISFACTION OF THE OWNER OF THE AFFECTED LANDS.

EROSION & SEDIMENT CONTROL

THE CONTRACTOR IS TO SUPPLY AND INSTALL EROSION AND SEDIMENTATION CONTROL MEASURES, SUCH AS SILT FENCING, CRUSHED STONE BERMS, AND OTHER BARRIERS AS MAY BE APPROPRIATE TO THE CONTRUCTION METHODS BEING EMPLOYEED BY THE CONTRACTOR TO STOP THE SILTATION OF ADJACENT LANDS AND/OR LOCAL STORM SEWER SYSTEM, DITCHES, ETC.

CONTRACTOR/BUILDER SHALL REGULARLY INSPECT, MAINTAIN AND REPAIR ALL EROSION SEDIMENT CONTROL FACILITIES AND TO ADD ADDITIONAL EROSION AND SEDIMENT CONTROL FACILITIES AT HIS COST DURING THE COURSE OF THE WORK, AS MAY BE NECESSARY BY VIRTUE OF HIS CONSTRUCTION PROCEDURES.

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL COSTS TO RECTIFY ANY AND ALL DAMAGE EXTERNAL THE WORK AREA RESULTING FROM THE WORK AND HIS CONSTRUCTION PROCEDURES.

THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE CONTROL OF DUST, MUD AND OTHER DEBRIS RESULTING FROM HIS WORKS. THIS COST AND THE COST OF ANY CLEANING FLUSHING, SWEEPING, SCRAPING OF EXISTING ROADS AND/OR DRIVEWAYS USED BY THE CONTRACTOR, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR

1. TEMPORARY EROSION AND SEDIMENT CONTROLS TO BE INSTALLED PRIOR TO THE START OF CONSTRUCTION AS IDENTIFIED ON OR IMPLIED BY THE PLANS AND SPECIFICATIONS.
2. ON-SITE EQUIPMENT REFUELING AND MAINTENANCE IS TO BE ONLY COMPLETED IN DESIGNATED AREAS.
3. SILTATION CONTROL FENCING TO BE INSTALLED ALONG THE DOWNSTREAM PERIMETER OF THE SITE LIMITS.
4. SILTATION CONTROLS TO BE INSPECTED AT LEAST WEEKLY AND AFTER EACH RAINFALL EVENT, ACCUMULATIONS OF SILT AND DEBRIS TO BE REMOVED BEFORE IT MAY CAUSE DAMAGE TO THE SILTATION CONTROL MEASURE IN PLACE.
5. DAMAGE TO SILTATION CONTROL MEASURES TO BE PROMPTLY CORRECTED AS MAY BE REQUIRED BY THE CONTRACTOR.
6. THE SILTATION CONTROL MEASURES INDICATED ON THE PLAN ARE CONSIDERED TO BE MINIMUM REQUIREMENTS, ADDITIONAL MEASURES ARE TO BE INSTALLED AS MAY BE REQUIRED TO SUIT CONSTRUCTION PROCEDURES AND CHANGES IN SITE CONDITIONS.
7. IT IS INTENDED THAT THE WORKS PROCEED IN A MANNER WHICH MINIMIZES ANY ADVERSE EFFECTS ON THE NATURAL ENVIRONMENT OF THE PROJECT AND THE LANDS DOWNSTREAM, ALL WORK IS TO BE CARRIED OUT IN A MANNER CONSISTENT WITH AVOIDING ENVIRONMENTAL DAMAGE.
8. TEMPORARY SEDIMENTATION CONTROLS ARE TO BE REMOVED FROM SITE FOLLOWING COMPLETION OF CONSTRUCTION AND WITH THE INSTALLATION OF FINISH SURFACE TREATMENTS (ie, paving, sodding, plantings, etc.)

NOTES: REGION OF PEEL GENERAL CONSTRUCTION STANDARDS

1. ALL WATERMAINS AND WATER SERVICE MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT REGION OF PEEL PUBLIC WORKS STANDARDS AND SPECIFICATIONS.
2. WATERMAINS AND/OR WATER SERVICE MATERIALS 100mm (4") AND LARGER MUST BE P.V.C. CLASS 150, MFG. TO A.W.W.A. SPEC. C900-75. SIZES 50mm (2") AND SMALLER, POLYETHYLENE PIPE TO BE 2306 TUBE SERIES 160 IN ACCORDANCE WITH C.S.A. B.137.1 -1970, A.W.W.A. SPEC. C901-78 IN SIZES 20 TO 50mm (1" TO 2")
3. WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7m (5'-6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2m (4'-0") FROM THEMSELVES AND ALL OTHER UTILITIES.
4. PROVISIONS FOR FLUSHING WATER LINES PRIOR TO TESTING MUST BE PROVIDED WITH AT LEAST A 50mm (2") OUTLET ON 100mm (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END AS SAME AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN INTO A PARKING LOT OR DOWN A DRAIN ON FIRE LINES, FLUSHING OUTLET TO BE 100mm (4") DIA. MINIMUM, OR A HYDRANT.
5. ALL CURB STOPS TO BE 3.0m (10') OFF THE FACE OF THE BUILDING UNLESS NOTED OTHERWISE.
6. HYDRANT AND VALVE SET TO REGION STANDARD 1-6-1. DIMENSIONS A AND B - .7m (2') AND .9m (3').
7. ALL HYDRANTS ARE TO HAVE PUMPER NOZZLE OUTLET.
8. WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED COPY OF GRADE SHEET WHICH MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK WHERE REQUESTED BY THE INSPECTOR. GRADE SHEET TO SPECIFY GRADE OF WATERMAIN, THE FINISHED GRADE OVER THE WATERMAIN AT INTERVALS OF AT LEAST 15 metres AND THE ELEVATIONS AT POINTS OF CROSSING OF THE WATERMAIN AND AND WATER SERVICES WITH OTHER UTILITIES AND DITCHES
9. WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF .15m (6") OVER AND .3m (12") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
10. ALL PROPOSED WATERMAIN PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING EXISTING SYSTEM.
11. NOTE: 50mm P.E. PIPE IS EQUIVALENT TO 50mm TYPE 'K' COPPER, METER SIZE IS TO BE ONE SIZE SMALLER THAN THE INCOMING WATER SERVICE.
12. WHERE POLYETHYLENE PIPE (OR OTHER NON METALLIC PIPE) IS USED IN PLACE OF COPPER, A 12 GAUGE TWU STRANDED COPPER LIGHT COLOURED PLASTIC COATED TRACER WIRE MUST BE INSTALLED PER REGION OF PEEL STANDARDS.

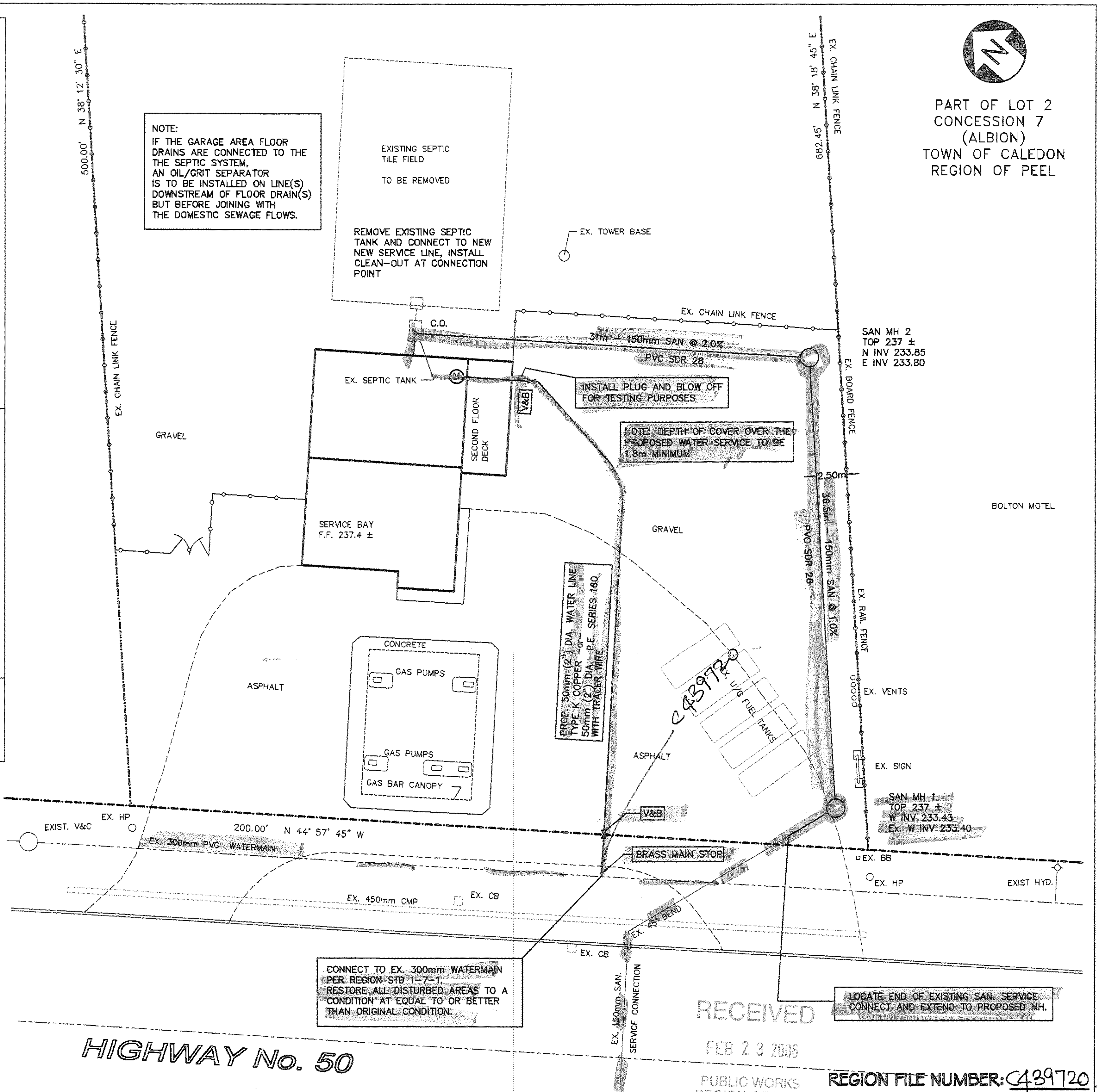
NOTES: SANITARY SEWER CONSTRUCTION

1. ALL SANITARY SEWERS AND SANITARY SERVICE MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT PEEL PUBLIC WORKS STANDARDS AND SPECIFICATIONS.
2. MAINLINE NON-PRESSURE PIPE SHALL BE POLYVINYL CHLORIDE (PVC) PIPE: 250 TO 375mm INCLUSIVE, TO BE MANUFACTURED TO LATEST EDITION OF C.S.A. STANDARD B182.2 (A.S.T.M. SPECIFICATION D 3034) WITH RUBBER GASKETTED BELL AND SPIGOT JOINTS. PIPE AND FITTINGS SHALL HAVE A MAXIMUM STANDARD DIMENSION RATIO OF 35 (SDR 35) AND A MINIMUM PIPE STIFFNESS OF 320 kPa, OR HIGHER STRENGTH AS MAY BE REQUIRED BY BY DESIGN.
3. SERVICE CONNECTIONS NON-PRESSURE PIPE OUTSIDE CONTROLLED SOLID WALL POLYVINYL CHLORIDE (PVC) PIPE; MANUFACTURED TO THE LATEST EDITION OF C.S.A. STANDARD B182.1 (A.S.T.M. SPECIFICATION D 3034). FITTINGS TO BE MANUFACTURED TO THE RUBBER GASKETTED BELL AND SPIGOT JOINTS. PIPE AND FITTINGS SHALL HAVE HAVE A MINIMUM OF PIPE PIPE STIFFNESS OF 630 kPa (SDR 28)
4. FITTINGS SUPPLIED TO A PROJECT SHALL BE COMPATIBLE WITH THE PIPE DELIVERED TO SITE: SHALL HAVE RUBBER GASKETTED BELL AND SPIGOT JOINTS. REFER TO REGION STANDARDS FITTING SPECIFICATIONS. REFER TO REGION OF PEEL MATERIAL SPECIFICATIONS FOR; MANHOLES, MANHOLE FITTINGS, BEDDING AND BACKFILL AND SERVICE CONNECTIONS.
5. UNLESS OTHERWISE NOTED:
   - MANHOLES SHALL BE 1200mm PRECAST PER STD DWG 2-1-1.
   - MANHOLE BENCHING PER STD DWG 2-1-4.
   - MANHOLE FRAME AND COVERS PER STD DWG 2-2-2.
   - PIPE BEDDING PER STD DWG 2-3-1, CLASS B, COVER MATERIAL GRANULAR C, BEDDING MATERIAL HL8 STONE.
   - FLEXIBLE SERVICE CONNECTION PIPE PER STD DWG 2-4-2.

NOTES: COMPACTION

- COMPACT FULL WIDTH OF TRENCH BOTTOM TO AT LEAST 95% S.P.D.
- BEDDING MATERIAL TO AT LEAST 98% S.P.D.
- COVER MATERIAL TO AT LEAST 98% S.P.D.
- TRENCH BACKFILL TO AT LEAST 95% S.P.D.
- GRANULAR SUB-BASE MATERIALS TO AT LEAST 100% S.P.D.
- HOT MIX ASPHALT TO AT LEAST 98% S.P.D.

METER PER REGION OF PEEL STD 1-4-5, 38mm ø DOMESTIC WATER METER, MIN. 0 GPM, MAX. CONT. RATE 80 GPM (M)



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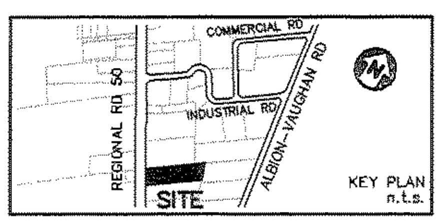
FEB 2 3 2006
PUBLIC WORKS
REGION OF PEEL

REGION FILE NUMBER: C439720



KEY PLAN
n.t.s.

No.	Revision/Issue	Date

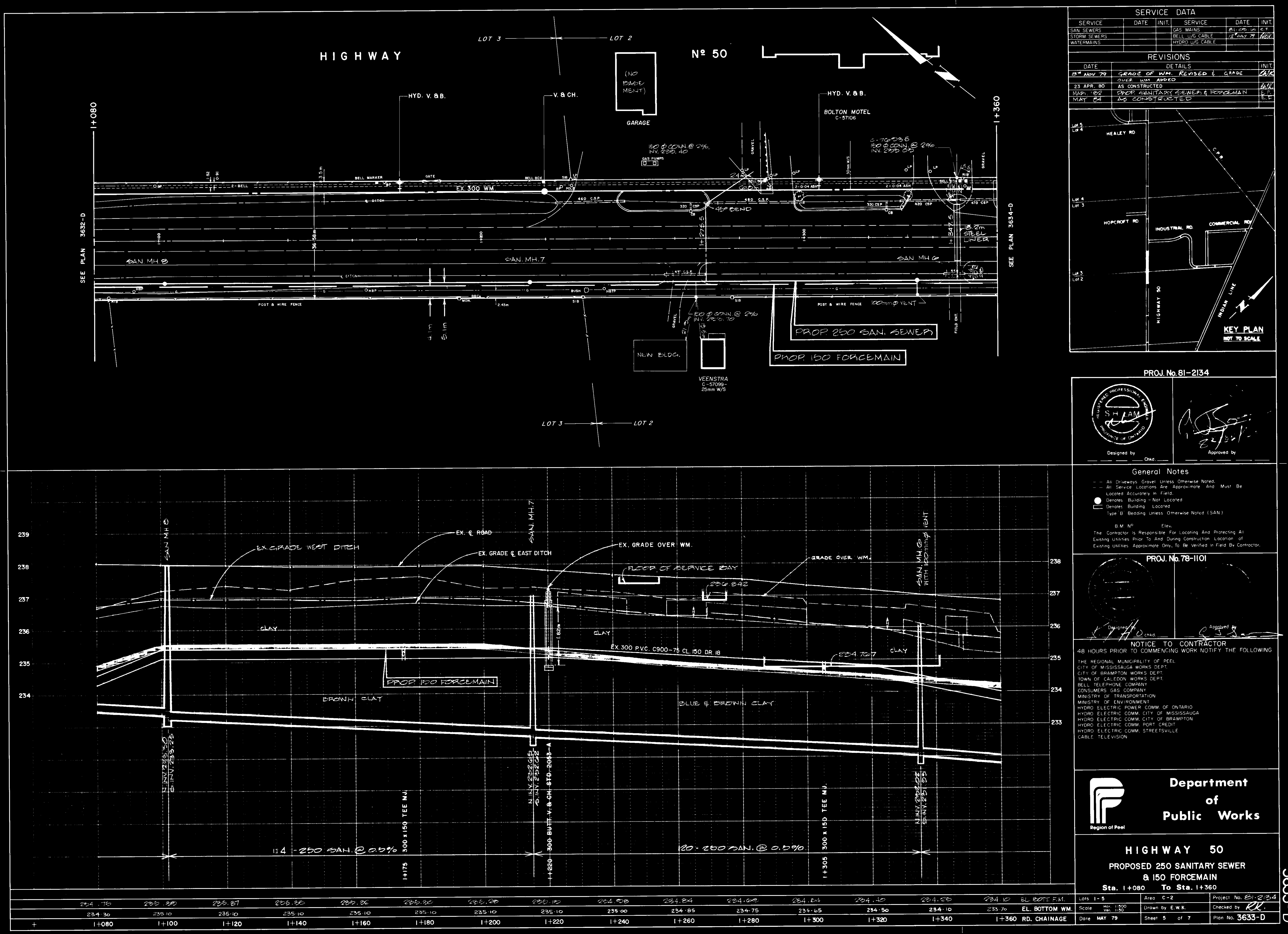
LICENSED PROFESSIONAL ENGINEER
B. B. BEECH
PROVINCE OF ONTARIO

Beech Engineering Limited
236 Longwood Drive
Bolton, Ontario L7E 4A1
Tel (905) 857-6658

Project Name & Address:
GREG PANNIA
(SHAMROCK GAS BAR)
12393 HIGHWAY 50
BOLTON
TOWN OF CALEDON

Title:
WATER & SANITARY SERVICE
SERVICE CONNECTIONS

Project No.
Date FEBRUARY 2006
Scale 1:250
Sheet S-1



HIGHWAY
Nº 50
LOT 3
LOT 2
1+080
1+360
SEE PLAN 3632-D
SEE PLAN 3634-D
HYD. V. & B.
V. & CH.
(NO BASEMENT)
GARAGE
BOLTON MOTEL C-57106
EX. 300 WM.
SAN. MH. 8
SAN. MH. 7
SAN. MH. 6
POST & WIRE FENCE
NEW BLDG.
VEENSTRA C-57099-25mm W/S
PROP. 250 SAN. SEWER
PROP. 150 FORCEMAIN
KEY PLAN
NOT TO SCALE
HEALEY RD
HOPCROFT RD
INDUSTRIAL RD
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HIGHWAY 50
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STORM SEWERS | | | BELL U/G CABLE | 12 JULY 79 |
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HYDRO ELECTRIC POWER COMM. OF ONTARIO
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HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION
EX. GRADE WEST DITCH
EX. ℄ ROAD
EX. GRADE ℄ EAST DITCH
EX. GRADE OVER WM.
FLOOR OF SERVICE BAY
GRADE OVER WM.
SAN. MH. 8
SAN. MH. 7
SAN. MH. 6 WITH 100mm VENT
CLAY
BROWN CLAY
BLUE & BROWN CLAY
EX. 300 P.V.C. C900-75 CL 150 DR 18
PROP. 150 FORCEMAIN
114 - 250 SAN. @ 0.5%
120 - 250 SAN. @ 0.5%
300 x 150 TEE MJ.
300 BUTT. V. & CH. STD-2053-A
EL. BOTT. F.M.
EL. BOTTOM WM.
RD. CHAINAGE
1+080 1+100 1+120 1+140 1+160 1+180 1+200 1+220 1+240 1+260 1+280 1+300 1+320 1+340 1+360
Region of Peel
Department of Public Works
HIGHWAY 50
PROPOSED 250 SANITARY SEWER & 150 FORCEMAIN
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Lots 1-5
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Drawn by E.W.K.
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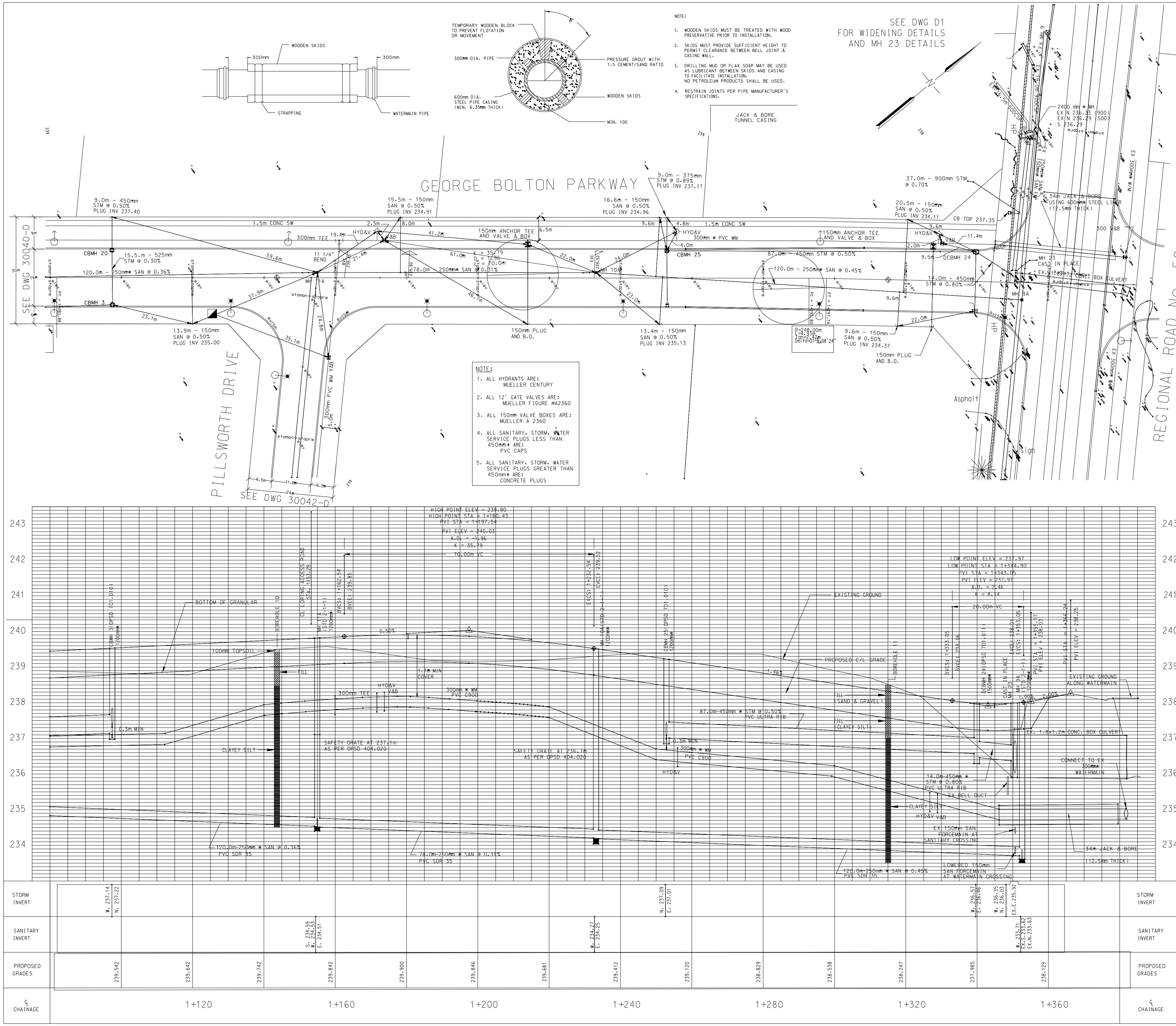
Sheet 5 of 7
Plan No. 3633-D
3633-D



KEY PLAN

GENERAL NOTES:

LEGEND

	CATCHBASIN
CBMH 21	CATCHBASIN MANHOLE
DCBMH 22	DOUBLE CATCHBASIN MANHOLE
MH 16	STORM MANHOLE
MH 19A	SANITARY MANHOLE
V&B	VALVE AND BOX
HYD&V	HYDRANT AND VALVE
BH 2	BOREHOLE LOCATION AND NUMBER
	HYDRO POLE WITH STREET LIGHT
	GUY WIRE
	50kVA PADMOUNTED SINGLE PHASE TRANSFORMER (SUPPLIED AND INSTALLED BY DEVELOPER)

No.	By	Date	Revision	Cons. Checked	Town Appr'd.
5.	B.K.	10/21/03	REVISED AS CONSTRUCTED		
4.	J.A.	JAN28/02	AS CONSTRUCTED		
3.	E.G.	AUG22/01	REVISED JACK AND BORE WATERMAIN SECTION		
2.	E.G.	JUL26/01	REVISED BOX CULVERT AT MH 23		
1.	E.G.	JUL6/01	REVISED JACK AND BORE WATERMAIN SECTION		

BENCHMARK

REGION OF PEEL #37 ELEV. 227.187m
ON THE NORTH FACE AT THE EAST CORNER OF A RED INSUL. BRICK HOUSE LOCATED ON THE SOUTH WEST CORNER OF SEVENTEENTH SIDEROAD (REGION ROAD #14) AND HIGHWAY #50.

CHKD.

BOLTON SOUTH BUSINESS PARK

PROJECT REGION OF PEEL FILE C02.303

BURNSIDE DEVELOPMENT SERVICES
A DIVISION OF R.J. BURNSIDE AND ASSOCIATES LIMITED
DEVELOPMENT ENGINEERING & MANAGEMENT,
STORMWATER MANAGEMENT & COMMUNAL SYSTEMS
8500 TORBRAM ROAD, SUITE 56, BRAMPTON, ONTARIO L6T 5C6
TELEPHONE: 905-793-9239 FAX: 905-793-5018

CONSULTANT

THE CORPORATION OF THE
TOWN OF CALEDON

GEORGE BOLTON PARKWAY
PLAN AND PROFILE
STN. 1+080 TO STN. 1+384.63

SCALE HORZ. 1:500 VERT. 1:50	APPROVED BY	DATE SEPT. 00
DRAWN BY R.A.	PROJECT No. PB00088	DRAWING No. 30041-D
CHECKED BY		

PB0088P5

XREF PB00088BASE.DWG PB00088DTM.DWG PB00088P5.DWG

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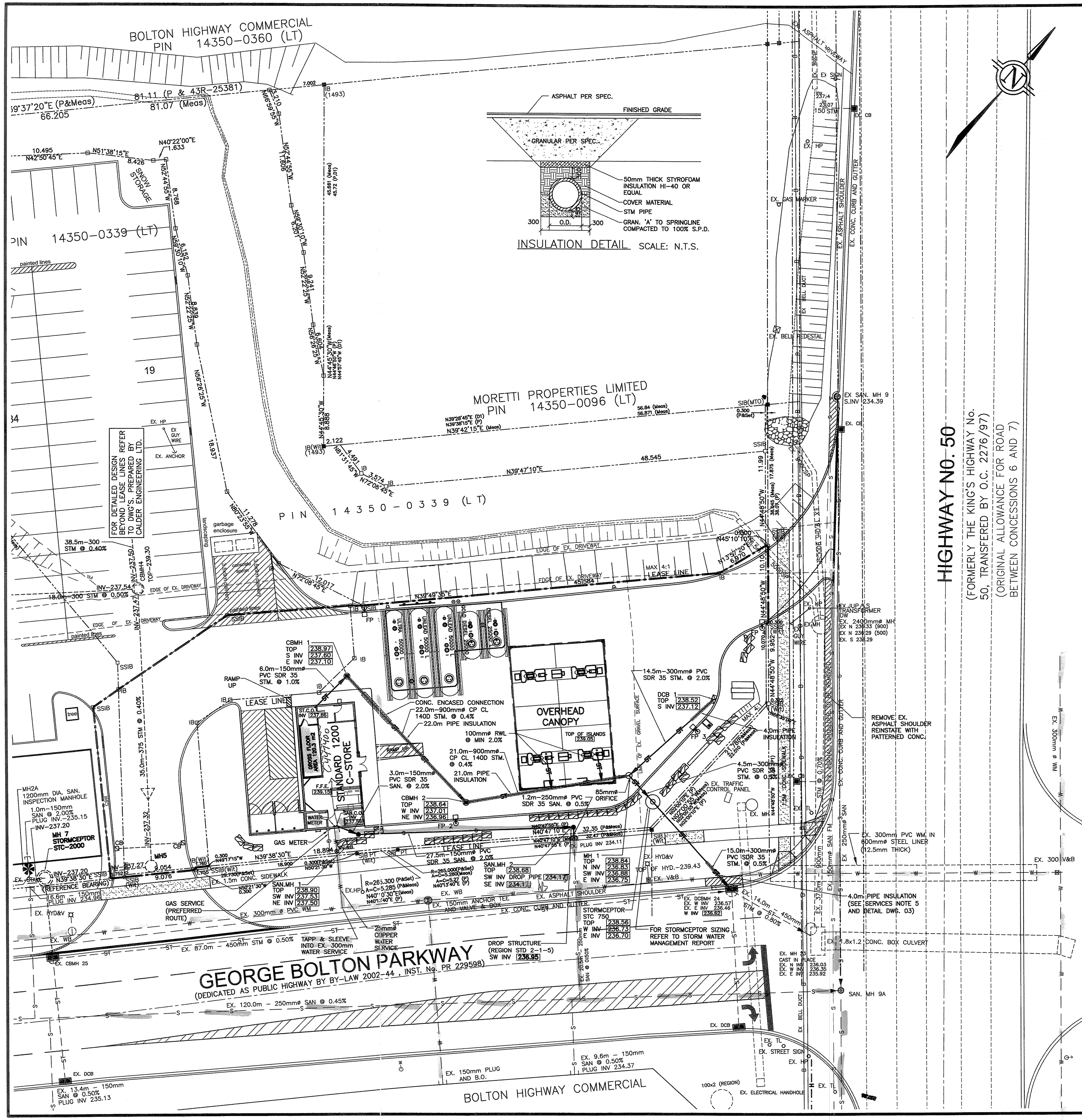


STORM DRAINAGE:

1. (A) ALL STORM WATER SHALL BE DIRECTED IN SUCH A MANNER THAT WATER WILL NOT ACCUMULATE AT OR NEAR A BUILDING INCLUDING FOUNDATION WALLS, WINDOWS, ENTRANCES AND WALKWAYS.
   (B) WHERE THE EXISTING GRADE IS ALTERED DUE TO GRADING, EXCAVATION, FILLING OR ANY OTHER RELATED WORK ALL SUCH WORK SHALL BE UNDERTAKEN AND COMPLETED IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE TO ENSURE STABLE CONDITIONS AND SO AS NOT TO ADVERSELY AFFECT OR DAMAGE PUBLIC OR PRIVATE PROPERTY.
   (C) STORM DRAINAGE SYSTEM TO CONFORM TO THE STORM WATER MANAGEMENT REPORT PREPARED BY TROW ASSOCIATES INC.
2. THE CONTRACTOR MUST PERFORM ALL NECESSARY WORKS TO ENSURE THAT NO SURFACE DRAINAGE PROBLEMS ARE CREATED ON OR ADJACENT TO PRIVATE OR PUBLIC LANDS BY REASON OF HIS DEVELOPMENT.

SITE SERVICES NOTES:

1. LEGAL INFORMATION TAKEN FROM DRAWINGS PREPARED BY YOUNG & YOUNG SURVEYING INC. (PROJECT No. 00-B3756).
2. GENERAL CONTRACTOR TO ENGAGE A HYDRO LOCATE COMPANY TO CONFIRM THE LOCATION OF HIGH VOLTAGE CABLES, PRIOR TO START OF CONSTRUCTION.
3. MANHOLES SHALL BE LOCATED A MINIMUM OF 1.5m AWAY FROM THE FACE OF CURB AND/OR ANY OTHER SERVICE.
4. WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE OBVERT OF THE INLET AND OUTLET PIPES EXCEED 0.9m, A DROP PIPE AS INDICATED ON REGION OF PEEL STANDARD DWG. 2-1-5 SHALL BE PLACED ON THE INLET PIPE.
5. THE DEPTH OF COVER OVER THE PROPOSED STORM & SANITARY SEWERS SHOULD BE CHECKED. WHEREVER THE COVER IS 1.2m OR LESS, IT IS TO BE INSULATED WITH 100mm THICK x 1.2m WIDE INSULATION PLACED INTO TWO (2) LAYERS WITH STAGGERED JOINTS, AND TO BE STYROFOAM BRAND H.I. TYPE IV.

STORM SEWERS:

1. ALL STORM SEWERS & CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH CURRENT MUNICIPAL SPECIFICATION.
2. STORM SEWERS AND CONNECTIONS 375mmø AND SMALLER TO BE PVC SDR 35.
3. STORM SEWERS 675mmø AND OVER SHALL BE CONCRETE AND EQUAL TO CSA SPECIFICATION A257.2 CLASS 500 OR LATEST AMENDMENT, UNLESS NOTED OTHERWISE.
4. ALL STORM SEWERS INCLUDING CATCH BASIN LEADS AND SERVICE CONNECTIONS TO BE FITTED WITH RUBBER GASKET JOINTS.
5. SEWER BEDDING TO BE IN ACCORDANCE WITH O.P.S.D. 802.03 FOR RIGID PIPE OR O.P.S.D. 802.04 FOR FLEXIBLE PIPE.
6. CBMH'S 1 & 2, MANHOLE 1 TO BE CONSTRUCTED IN ACCORDANCE WITH O.P.S.D. 701.012 (1800mmø). CBMH'S SHALL HAVE CAST IRON COVER & SQUARE FRAME O.P.S.D. 401.010 TYPE 'B' AND MANHOLE 1 SHALL HAVE CAST IRON COVER & SQUARE FRAME O.P.S.D. 401.010 TYPE 'A'.
7. CATCH BASINS TO BE IN ACCORDANCE WITH O.P.S.D. 705.01, TWIN INLET CATCH BASIN TO BE IN ACCORDANCE WITH O.P.S.D. 705.02 WITH FRAME AND GRATE AS PER O.P.S.D. 400.01, UNLESS NOTED OTHERWISE.
8. ALL CATCH BASINS AMD MANHOLES TO HAVE MINIMUM 300mm SUMP AND TOP AS PER MUNICIPAL STANDARDS.

SANITARY SEWERS:

1. PVC SEWER PIPE, UNLESS OTHERWISE NOTED MUST MEET THE REQUIREMENTS OF THE FOLLOWING STANDARDS.
   - CSA 182.1. ASTM D-2729 AND ASTM D-3034 OR LATEST AMENDMENT, CLASS SDR35.
   - CSA B183.4-M90 FOR RIBBED PVC SEWER PIPE. (NOTE THAT THE MANUFACTURES DIRECTIONS FOR INSTALLATION BEDDING AND BACK FILLING MUST BE FOLLOWED).
2. MANHOLES TO BE CONSTRUCTED IN ACCORDANCE WITH REGION OF PEEL STD. 2-1-1 (1200mmø) WITH RUBBER GASKET JOINTS.
3. ALL SANITARY SEWER AND SERVICE CONNECTIONS TO BE FITTED WITH CHEMICALLY RESISTANT JOINTS AS PER MUNICIPAL STANDARDS. SANITARY CONNECTIONS TO BE PER O.P.S.D. 1006.020.
4. SEWER BEDDING TO BE IN ACCORDANCE WITH O.P.S.D 1005. (UNLESS NOTED OTHERWISE).
5. SAFETY PLATFORMS TO BE IN ACCORDANCE WITH O.P.S.D. 404.02.
6. SANITARY MANHOLES TO HAVE FRAME AND GRATE AS PER O.P.S.D. 401.03.
7. MAINLINE AND STREETLINE MANHOLES TO BE IN ACCORDANCE WITH REGION OF PEEL STANDARDS.
8. MAX. DROP BETWEEN THE INLET AND OUTLET ELEVATIONS OF SANITARY MANHOLE IS 0.03m. MIN. DEPTH OF SANITARY MANHOLE IS 2.13m.

WATERMAINS:

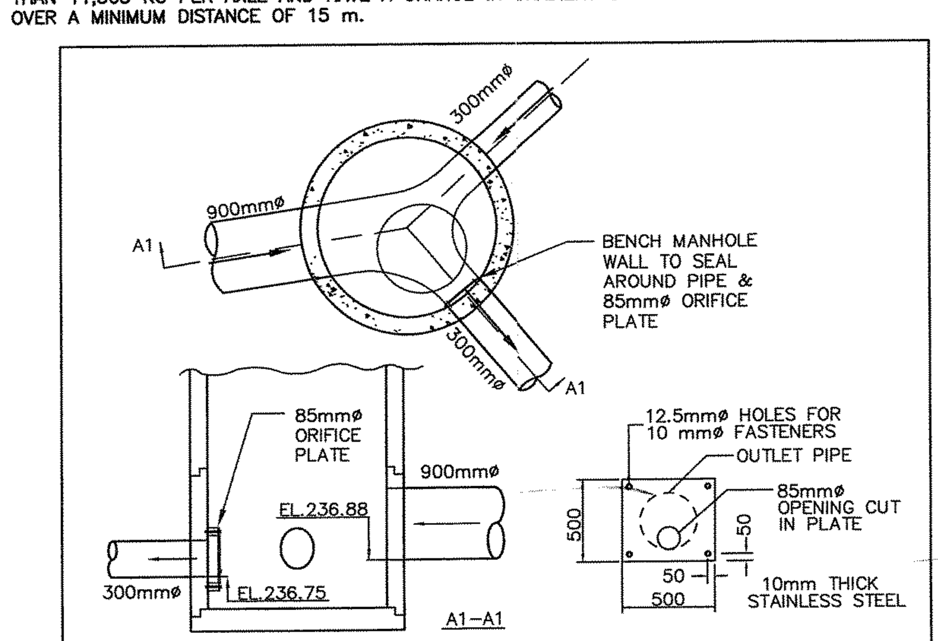
1. ALL MATERIAL AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT PEEL PUBLIC WORKS STANDARDS AND SPECIFICATIONS.
2. WATERMAIN AND/OR WATER SERVICE MATERIALS 100mmø AND LARGER MUST BE CLASS 150, A.W.W.A. C 900-75 P.V.C. PIPE. SIZE LARGER THAN 50ømm TO 100mmø TO BE P.V.C. 2306 TUBE SERIES 160 C.S.A. B.137.1 (A.W.W.A. C901). PIPE 50mmø AND SMALLER TO BE SOFT COPPER TYPE 'K'.
3. WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7m WITH A MINIMUM HORIZONTAL SPACING OF 1.2m FROM THEMSELVES AND ALL OTHER UTILITIES.
4. PROVISIONS FOR FLUSHING WATER LINES PRIOR TO TESTING, etc. MUST BE PROVIDED WITH AT LEAST A 50mmø OUTLET ON 100mm AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100mmø MINIMUM ON A HYDRANT.
5. ALL CURB STOPS TO BE 3.0m OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
6. HYDRANT AND VALVE SET TO REGION STANDARD 1-6-1 DIMENSION A AND B, 0.7m AND 0.9m AND TO HAVE PUMPER NOZZLE.
7. WATERMAINS TO BE INSTALLED TO GRADE AS SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
8. WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 0.3m OVER / 0.5m UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
9. ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
10. ALL LIVE TAPPING AND OPERATION OF REGION WATER VALVES SHALL BE ARRANGED TROUGH THE REGIONAL INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENANCE DIVISION.

TRAFFIC SAFETY AND CONTROL:

1. IT IS THE RESPONSIBILITY OF THE SITE DEVELOPER TO PROVIDE ALL TRAFFIC SAFETY AND CONTROL MEASURES IN ACCORDANCE WITH THE ONTARIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, TEMPORARY CONDITIONS. THE SITE DEVELOPER SHALL MAKE ARRANGEMENTS WITH THE MUNICIPALITY AT LEAST 30 DAYS PRIOR TO COMMENCING WORK ON ANY PUBLIC ROADS.

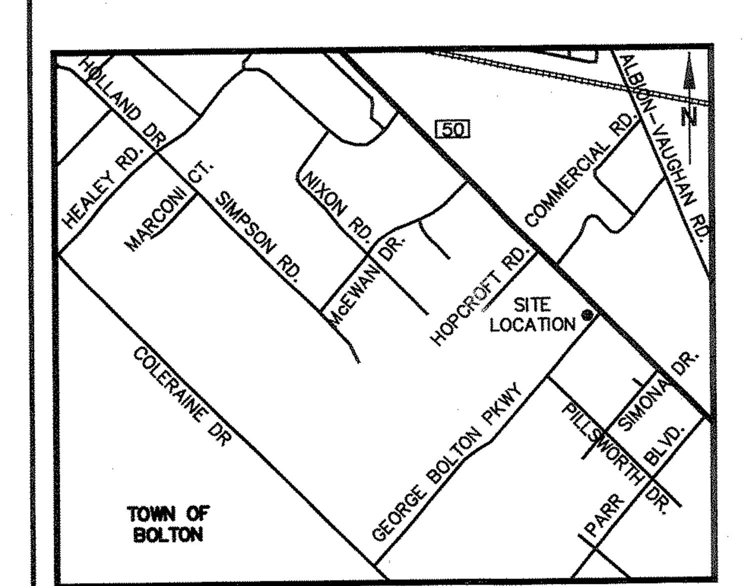
FIRE DEPARTMENT:

1. FIRE ROUTE WILL BE DESIGNATED AS PER MUNICIPAL BY-LAW.
2. THE FIRE DEPARTMENT ACCESS ROUTE SHALL BE DESIGNED TO SUPPORT A LOAD OF NOT LESS THAN 11,363 KG PER AXLE AND HAVE A CHANGE IN GRADIENT OF NOT MORE THAN 1 IN 12.5 OVER A MINIMUM DISTANCE OF 15 m.



ORIFICE PLATE AT MH 1 SCALE: NTS

NO.	REVISIONS	DATE	BY	APP.
E	SANITARY SERVICE, WATER SERVICE, SITE SERVICES NOTE 4, WATERMAIN NOTE 8 REVISED. WATERMAIN NOTE 10 AND SANITARY SEWER NOTE 8 ADDED. STORM SERVICE BEYOND LEASE LINE SHOWN.	OCT 17 2007	A.B.	
D	DWG UPDATED TO REFLECT SITE PLAN REV "E".	SEP 10 2007	A.B.	
C	DWG UPDATED TO REFLECT SITE PLAN REV "D".	SEP 05 2007	A.B.	
B	DWG UPDATED TO REFLECT SITE PLAN REV "C". STORM SERVICE REVISED. CITY FILE NUMBER ADDED.	JUL 05 2007	A.B.	
A	ISSUED FOR INFORMATION.	MAR 09 2007	A.B.	



KEY PLAN SCALE: N.T.S.

LEGEND:

IB	EX. IRON BAR	—ST—	EX. STORM SEWER
SIB	EX. STANDARD I.B.	—S—	EX. SANITARY SEWER
TL	EX. TRAFFIC LIGHT	—W—	EX. WATER MAINS
HP	EX. HYDRO POLE	—G—	EX. GAS MAINS
ICV	EX. IRRIGATION CONTROL VALVE	—H—	EX. OVERHEAD HYDRO
WV	EX. WATER VALVE	—UH—	EX. U/G HYDRO SERVICE
HYD	EX. FIRE HYDRANT	—B—	EX. U/G BELL SERVICE
C.O.	NEW CLEAN OUT	—F—	EX. FIBER OPTICS LINE
RWL	NEW DOWNSPOUT	—ST—	NEW STORM SEWER
BP	EX. BELL PEDESTAL	—S—	NEW SANITARY SEWER
	NEW FLOODPOLE	—W—	NEW WATER SERVICE
	EX. STORM M.H.	—G—	NEW GAS SERVICE
	NEW STORM M.H.	—H—	NEW HYDRO SERVICE
	EX. SANITARY M.H.	—B—	NEW BELL SERVICE
	NEW SANITARY M.H.		EX. CONC. CURB
	EX. CATCH BASIN		NEW CONC. CURB
	NEW CATCH BASIN		NEW DEPRESSED CURB
	NEW CATCH BASIN M.H.		NEW CURB CUT
2.0%	NEW SLOPE	+ (92.73)	EX. ELEVATION
	MAJOR OVERLAND FLOW DIRECTION	+ 92.53	EX. ELEVATION TO REMAIN
		+ 93.45	ELEVATION (PROPOSED)
		+ [92.73]	PROPOSED ELEVATION (BY OTHERS)

SCALE 1:250 METRES

0 5 10 15 20 25 METRES

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

LICENSED PROFESSIONAL ENGINEER D. TOTA 46772505 OCT 17 2007 PROVINCE OF ONTARIO

OWNER:

Farview Holdings

12599 Hwy. 50, Unit 7
Bolton, ON. L7E 1M4
Tel.: (416) 420-7709
Fax.: (905) 893-3100

APPLICANT/CLIENT:

SUNCOR ENERGY

SUNCOR ENERGY PRODUCTS INC. 36 YORK MILLS RD., TORONTO, ON. M2P 2C5
TEL: (416) 733-7224, FAX: (416) 733-2113

Trow Associates Inc.

1595 Clark Boulevard
Brampton, Ontario L6T 4V1
Tel.: (905) 793-9800
Fax: (905) 793-0641

LOCATION:

12476 REGIONAL ROAD 50
@ GEORGE BOLTON PKWY
TOWN OF CALEDON, ONTARIO

TITLE:

SITE SERVICES PLAN

SPA07-021

DESIGNED: A.B.	DRAWN: A.B.	S/S NO.:	I.D. No.:
CHECKED: B.H.	DATE: FEB. 2007		
SCALE: 1:250	PROJ. NO.:	DWG. NO.	
CAD FILE: 233513Asite0	brif00233513a	03	

REGION OF PEEL
PUBLIC WORKS/ENGINEERING & CONSTRUCTION DIVISION
APPROVED FOR WATER, SANITARY AND/OR STORM SEWERS IN ACCORDANCE WITH LATEST REGION OF PEEL STANDARDS AND SPECIFICATIONS
DATE Mar. 18/08
MUNICIPAL SIDE & REGIONAL EASEMENTS ONLY

RECEIVED
OCT 18 2007
PUBLIC WORKS
REGION OF PEEL

C447400

INSPECTORS COPY

APPENDIX C
Matrix Crossing Structure Sheets and Photolog

PARISH geomorphic

Stream Crossing Assessment Form

Date: Sept 9/20 **Stream:** Crossing 1 **Crew:** NC/PC
Road Name: Regional Road 50 **Recorder:** NC
Location: Caledon **Weather Description:** overcast, 20 degrees

black = upstream of crossing
red = downstream

Channel Dimensions (Measured/Estimated)

Bankfull Width (m) 3.2/3.6/0.5 (main channel d/s) Bankfull Depth (m) 0.75/1 m/ no bankfull downstream

Wetted Width (m) 2.5/2.5/1.5 Wetted Depth (m) 0.1/0.6/0.07

Gradient [X] Low [ ] Medium [ ] High Entrenchment [ ] Low [ ] Medium [ ] High

Sinuosity [X] Low [ ] Medium [ ] High Valley Setting unconfined

Riparian Vegetation Width (m) ~10 m Type cattails, grass

Channel Disturbance Hardened with riprap around culvert at road

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type
[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Cast-in-place Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Bridge
[X] Other HDPE, closed bottom

Material
[X] Concrete [ ] Bridge [ ] Aluminum [ ] Corrugated Steel [X] Other HDPE

Bridge Design
[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape
[X] Circular [X] Box [ ] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions
Width (m) 0.6 m/1.88 m Height (m) 0.6 m/1.05 Length (m) ______ Age HDP new
box 10+ years

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Stream:** **Crew:**
Road Name: **Recorder:**

Structure Condition

[X] Good [ ] Collapsed [ ] Mechanical Damage [ ] Rust [ ] Other ______
X

Evidence of Flow Restriction and Erosion Upstream of Crossing

[X] No Pooling [ ] Minor Pooling [ ] Major Pooling
[ ] No Erosion [X] Minor Erosion [ ] Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing

[ ] No Pooling [X] Minor Pooling [ ] Major Pooling
[ ] No Erosion [X] Minor Erosion [ ] Major Erosion

Relative Crossing Sizing

[ ] Channel Width < Opening [X] Channel Width = Opening [X] Channel Width > Opening
channel widened at culvert

Embankment Erosion Protection

[X] Riprap [ ] Vegetation [ ] Armour Stone
[ ] Slope Paving [ ] Retaining Wall [ ] Other ______

Debris Trapping

[X] No Debris [ ] Minor Debris [ ] Major Debris

Evidence of:

Patching or pavement built-up	[ ] yes	[X] X no
Cracks running parallel to the structure centerline	[ ] yes	[X] X no
Erosion or failure of the embankment slope over the structure	[X] yes	[ ] X no
Sink holes over the structure	[ ] yes	[X] X no

Substrate Present Through Crossing? [ ] yes [X] no Comment: cattails, depositional

Substrate Type [ ] Natural [ ] Constructed Comment: ______

Concerns Regarding Fish Passage? [ ] yes [X] no Comment: ______

Culvert Perched or Overhanging? [ ] yes [X] no Amount (m) ______

Comment on road alignment with respect to the valley and channel planform: part of culvert system

---

Does Light Penetrate Under Entire Crossing? [ ] yes [X] no Comment: ______

Noise Level at Time of Inspection [ ] High [X] Medium [ ] Low

Photos Taken of Structure? Upstream ______ Downstream ______

Comments: upstream channel choked with cattails, water flowing minimally
HDPE likely a culvert extension from box that is visible downstream
concrete box downstream, channel lined with dense phragmites, outlets to pond downstream

PARISH geomorphic

Stream Crossing Assessment Form

Date: Sept 9/20 **Stream:** Crossing 1a **Crew:** NC/PC
Road Name: Regional Road 50 **Recorder:** NC
Location: Caledon **Weather Description:** overcast, 20 degrees

black = upstream of crossing
red = downstream

Channel Dimensions (Measured/Estimated)

Bankfull Width (m) 2.5 m Bankfull Depth (m) 0.45 m

Wetted Width (m) 1.1 m Wetted Depth (m) 0.1

Gradient [X] Low [ ] Medium [ ] High Entrenchment [ ] Low [ ] Medium [ ] High

Sinuosity [X] Low [ ] Medium [ ] High Valley Setting Straightened ditch

Riparian Vegetation Width (m) ~20 m Type road on left, grass on right

Channel Disturbance Hardened with riprap around culvert at road

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type
[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Cast-in-place Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Bridge
[X] Other CSP, closed bottom

Material
[ ] Concrete [ ] Bridge [ ] Aluminum [X] Corrugated Steel [ ] Other ______

Bridge Design
[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape
[X] Circular [ ] Box [ ] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions
Width (m) 0.9 m Height (m) 0.9 m Length (m) ______ Age 10+ years

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Stream:** **Crew:**
Road Name: **Recorder:**

Structure Condition

invert rusted out

☐ Good ☐ Collapsed ☐ Mechanical Damage ☒ Rust ☐ Other ____________

Evidence of Flow Restriction and Erosion Upstream of Crossing

☒ No Pooling	☐ Minor Pooling	☐ Major Pooling
☐ No Erosion	☒ Minor Erosion	☐ Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing

☐ No Pooling	☐ Minor Pooling	☐ Major Pooling
☐ No Erosion	☐ Minor Erosion	☐ Major Erosion

Relative Crossing Sizing

☐ Channel Width < Opening ☒ Channel Width = Opening ☐ Channel Width > Opening

Embankment Erosion Protection

☒ Rip Rap	☐ Vegetation	☐ Armour Stone
☐ Slope Paving	☐ Retaining Wall	☐ Other riprap old and failing

Debris Trapping

☒ No Debris ☐ Minor Debris ☐ Major Debris

Evidence of:

Patching or pavement built-up	☐ yes	☒ no
Cracks running parallel to the structure centerline	☐ yes	☒ no
Erosion or failure of the embankment slope over the structure	☒ yes	☐ no
Sink holes over the structure	☐ yes	☒ no

Substrate Present Through Crossing? ☐ yes ☒ no Comment: ____________

Substrate Type ☐ Natural ☐ Constructed Comment: ____________

Concerns Regarding Fish Passage? ☐ yes ☒ no Comment: ____________

Culvert Perched or Overhanging? ☐ yes ☒ no Amount (m) ____________

Comment on road alignment with respect to the valley and channel planform: part of culvert system

Does Light Penetrate Under Entire Crossing? ☐ yes ☒ no Comment: ____________

Noise Level at Time of Inspection ☐ High ☒ Medium ☐ Low

Photos Taken of Structure? Upstream ____________ Downstream ____________

Comments: ditch along Highway 50, filled with cattails, banks near-vertical ~0.15 m high

PARISH geomorphic

Stream Crossing Assessment Form

Date: Sept 9/20 **Stream:** Crossing 2 **Crew:** NC/PC
Road Name: Regional Road 50 **Recorder:** NC
Location: Caledon **Weather Description:** overcast, 20 degrees

black = upstream of crossing
red = downstream

Channel Dimensions (Measured/Estimated)

Bankfull Width (m) 2.5 m Bankfull Depth (m) 0.6 m

Wetted Width (m) 1.1 m Wetted Depth (m) 0.03/0.15

Gradient [ ] Low [X] Medium [ ] High Entrenchment [ ] Low [ ] Medium [ ] High

Sinuosity [ ] Low [X] Medium [ ] High Valley Setting Partially confined

Riparian Vegetation Width (m) ~5 m Type Meadow, then gravel car lots beyond meadow

Channel Disturbance Old concrete blocks around culvert sides (failing)

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type
[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Cast-in-place Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Bridge
[X] Other CSP, closed bottom

Material
[ ] Concrete [ ] Bridge [ ] Aluminum [X] Corrugated Steel [ ] Other ______

Bridge Design
[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape
[X] Circular [ ] Box [ ] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions
Width (m) 1.55 m Height (m) 1.5 m Length (m) ______ Age 10+ years

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Stream:** **Crew:**
Road Name: **Recorder:**

Structure Condition

[X] Good [ ] Collapsed [ ] Mechanical Damage [ ] Rust [ ] Other ____________

Evidence of Flow Restriction and Erosion Upstream of Crossing

[ ] No Pooling [X] Minor Pooling [ ] Major Pooling
[ ] No Erosion [X] Minor Erosion [ ] Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing

[X] No Pooling [ ] Minor Pooling [ ] Major Pooling
[X] No Erosion [ ] Minor Erosion [ ] Major Erosion

Relative Crossing Sizing

[ ] Channel Width < Opening [X] X Channel Width = Opening [ ] Channel Width > Opening

Embankment Erosion Protection

[ ] Rip Rap [ ] Vegetation [ ] Armour Stone
[ ] Slope Paving [ ] Retaining Wall [X] Other concrete blocls
X None

Debris Trapping

[ ] No Debris [ ] Minor Debris [X] Major Debris

Evidence of:

Patching or pavement built-up	[ ] yes	[X] X no
Cracks running parallel to the structure centerline	[ ] yes	[X] X no
Erosion or failure of the embankment slope over the structure	[X] X yes	[ ] no
Sink holes over the structure	[ ] yes	[X] X no

Substrate Present Through Crossing? [ ] yes [X] no Comment: ____________

Substrate Type [ ] Natural [ ] Constructed Comment: ____________

Concerns Regarding Fish Passage? [X] yes [ ] no Comment: woody debris jam blocking upstream culvert connection

Culvert Perched or Overhanging? [ ] yes [X] no Amount (m) ____________

Comment on road alignment with respect to the valley and channel planform: Away from road N/A

Does Light Penetrate Under Entire Crossing? [ ] yes [X] no Comment: ____________

Noise Level at Time of Inspection [ ] High [ ] Medium [ ] Low

Photos Taken of Structure? Upstream ____________ Downstream ____________

Comments: sinuous upstream, bank erosion around meanders, channel substrate clay and fine gravel
gravel potentially sourced from parking lots above during rainfall

no erosion downstream, channels straight not sinuous, no floodplain channel is bordered by gravel lots
Channel substrate consists of clay and fine gravel

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Sept 9/20** ***Stream:*** **Crossing 3** ***Crew:*** NC/PC
Road Name: **Regional Road 50** ***Recorder:*** NC
Location: **Caledon** ***Weather Description:*** overcast, 20 degrees

black = upstream of crossing
red = downstream

Channel Dimensions (Measured/Estimated)

Bankfull Width (m): no bankfull upstream (design) / 1.2 m
Bankfull Depth (m): no bankfull upstream (design) / 0.3 m
Wetted Width (m): 2.95 at culvert / 0.6 m
Wetted Depth (m): 0.5 m in culvert / 0.15 m

Gradient: [X] Low [ ] Medium [ ] High
Entrenchment: [ ] Low [ ] Medium [ ] High
Sinuosity: [X] Low [ ] Medium [ ] High
Valley Setting: unconfined

Riparian Vegetation Width (m) ~10 m Type cattails, grass

Channel Disturbance Channel being realigned upstream (ongoing construction)

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type
[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Cast-in-place Culvert [X] Open Bottom [ ] Closed Bottom
[ ] Bridge
[X] Other CSP arch, open bottom

Material
[ ] Concrete [ ] Bridge [ ] Aluminum [X] Corrugated Steel [ ] Other ______

Bridge Design
[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape
[ ] Circular [ ] Box [X] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions
Width (m) 2.90 Height (m) 1.78 Length (m) ______ Age 10+ years

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Stream:** **Crew:**
Road Name: **Recorder:**

Structure Condition
[X] Good [ ] Collapsed [ ] Mechanical Damage [ ] Rust [ ] Other ______

Evidence of Flow Restriction and Erosion Upstream of Crossing
[X] No Pooling [ ] Minor Pooling [ ] Major Pooling
[X] No Erosion [ ] Minor Erosion [ ] Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing
[X] No Pooling [ ] Minor Pooling [ ] Major Pooling
[ ] No Erosion [X] Minor Erosion [ ] Major Erosion

Relative Crossing Sizing
[X] Channel Width < Opening [ ] Channel Width = Opening [ ] Channel Width > Opening
channel widened at culvert

Embankment Erosion Protection
X
[ ] Riprap [ ] Vegetation [X] Armour Stone around culvert
[ ] Slope Paving [ ] Retaining Wall [ ] Other ______

Debris Trapping
[X] No Debris [ ] Minor Debris [ ] Major Debris

Evidence of:

Patching or pavement built-up	[ ] yes	[X] X no
Cracks running parallel to the structure centerline	[ ] yes	[X] X no
Erosion or failure of the embankment slope over the structure	[ ] yes	[X] X no
Sink holes over the structure	[ ] yes	[X] X no

Substrate Present Through Crossing? [X] yes [ ] no Comment: gravel, cobbles (sourced from bank likely)

Substrate Type [X] Natural [ ] Constructed Comment: ______

Concerns Regarding Fish Passage? [ ] yes [X] no Comment: ______

Culvert Perched or Overhanging? [ ] yes [X] no Amount (m) ______

Comment on road alignment with respect to the valley and channel planform: skewed ~45 degrees to road

---

Does Light Penetrate Under Entire Crossing? [ ] yes [X] no Comment: ______

Noise Level at Time of Inspection [ ] High [X] Medium [ ] Low

Photos Taken of Structure? Upstream ______ Downstream ______

Comments: channel undergoing realignment, being shifted east
channel flows towards right of culvert, gravel bar has formed towards downstream end of culvert
can see culvert footings, minor bed erosion, outlets into ditch with mowed lawn on either side
cobbles on bed throughout ditch (possibly placed?)

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Sept 9/20** ***Stream:*** **Crossing 4** ***Crew:*** NC/PC
Road Name: **Regional Road 50** ***Recorder:*** NC
Location: **Caledon** ***Weather Description:*** overcast, 20 degrees

Channel Dimensions (Measured/Estimated)

black = upstream of crossing
red = downstream

Bankfull Width (m) 5.5 m   Bankfull Depth (m) 0.4 m

Wetted Width (m) 2.1 m   Wetted Depth (m) 0.1

Gradient [X] Low [ ] Medium [ ] High   Entrenchment [ ] Low [ ] Medium [ ] High

Sinuosity [X] Low [ ] Medium [ ] High   Valley Setting confined by road

Riparian Vegetation Width (m) ______ Type straightened ditch, mowed grass on either side

Channel Disturbance riprap at crossing on banks

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type
[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Cast-in-place Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Bridge
[X] Other CSP arch, closed bottom

Material
[ ] Concrete [ ] Bridge [ ] Aluminum [X] Corrugated Steel [ ] Other ______

Bridge Design
[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape
[ ] Circular [ ] Box [X] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions
Width (m) 2.25 m   Height (m) 1.62 m   Length (m) ______   Age 10+yrs

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Stream:** **Crew:**
Road Name: **Recorder:**

Structure Condition

[X] Good [ ] Collapsed [ ] Mechanical Damage [ ] Rust [ ] Other light rust marks

Evidence of Flow Restriction and Erosion Upstream of Crossing

[X] No Pooling	[ ] Minor Pooling	[ ] Major Pooling
[X] No Erosion	[ ] Minor Erosion	[ ] Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing

[ ] No Pooling	[X] Minor Pooling	[ ] Major Pooling
[X] No Erosion	[ ] Minor Erosion	[ ] Major Erosion

Relative Crossing Sizing

[ ] Channel Width < Opening [X] X Channel Width = Opening [ ] Channel Width > Opening

Embankment Erosion Protection

[X] Riprap X	[ ] Vegetation	[ ] Armour Stone
[ ] Slope Paving	[ ] Retaining Wall	[ ] Other

Debris Trapping

[X] No Debris [ ] Minor Debris [ ] Major Debris

Evidence of:

Patching or pavement built-up	[ ] yes	[X] X no
Cracks running parallel to the structure centerline	[ ] yes	[X] X no
Erosion or failure of the embankment slope over the structure	[ ] yes	[X] X no
Sink holes over the structure	[ ] yes	[X] X no

Substrate Present Through Crossing? [ ] yes [X] no Comment:

Substrate Type [ ] Natural [ ] Constructed Comment:

Concerns Regarding Fish Passage? [ ] yes [X] no Comment:

Culvert Perched or Overhanging? [ ] yes [X] no Amount (m)

Comment on road alignment with respect to the valley and channel planform: parallel to road

---

Does Light Penetrate Under Entire Crossing? [ ] yes [X] no Comment:

Noise Level at Time of Inspection [ ] High [X] Medium [ ] Low

Photos Taken of Structure? Upstream ________ Downstream ________

Comments: cattails ~10 m upstream of crossing, fine substrates, culvert protected by riprap

pooling downstream, remains ditched, channel choked with cattails

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Sept 9/20** ***Stream:*** **Crossing 5** ***Crew:*** NC/PC
Road Name: **Regional Road 50** ***Recorder:*** NC
Location: **Caledon** ***Weather Description:*** overcast, 20 degrees

black = upstream of crossing
red = downstream

Channel Dimensions (Measured/Estimated)

Bankfull Width (m) 3.5 m Bankfull Depth (m) 0.6 m

Wetted Width (m) 1.7 m Wetted Depth (m) 0.2

Gradient [X] Low [ ] Medium [ ] High Entrenchment [ ] Low [ ] Medium [ ] High

Sinuosity [X] Low [ ] Medium [ ] High Valley Setting confined by road

Riparian Vegetation Width (m) ______ Type straightened ditch, grass on either side

Channel Disturbance riprap at crossing on banks and road embankment

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type
[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Cast-in-place Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Bridge
[X] Other CSP arch, closed bottom

Material
[ ] Concrete [ ] Bridge [ ] Aluminum [X] Corrugated Steel [ ] Other ______

Bridge Design
[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape
[ ] Circular [ ] Box [X] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions
Width (m) 2.08 m Height (m) 1.45 m Length (m) ______ Age 10+yrs

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Stream:** **Crew:**
Road Name: **Recorder:**

Structure Condition

☐ Good ☐ Collapsed ☐ Mechanical Damage X ☒ Rust ☐ Other rusting through bottom

Evidence of Flow Restriction and Erosion Upstream of Crossing

☒	No Pooling	☐	Minor Pooling	☐	Major Pooling
☒	No Erosion	☐	Minor Erosion	☐	Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing

X	No Pooling	☐	Minor Pooling	☐	Major Pooling
X	No Erosion	☐	Minor Erosion	☐	Major Erosion

Relative Crossing Sizing

☐ Channel Width < Opening ☒ X Channel Width = Opening ☐ Channel Width > Opening

Embankment Erosion Protection

☒	Riprap X	☐	Vegetation	☐	Armour Stone
☐	Slope Paving	☐	Retaining Wall	☐	Other

Debris Trapping

☒ No Debris ☐ Minor Debris ☐ Major Debris

Evidence of:

Patching or pavement built-up	☐	yes	☒ X	no
Cracks running parallel to the structure centerline	☐	yes	☒ X	no
Erosion or failure of the embankment slope over the structure	☐	yes	☒ X	no
Sink holes over the structure	☐	yes	☒ X	no

Substrate Present Through Crossing? ☐ yes ☒ no Comment:

Substrate Type ☐ Natural ☐ Constructed Comment:

Concerns Regarding Fish Passage? ☐ yes ☒ no Comment:

Culvert Perched or Overhanging? ☐ yes ☒ no Amount (m)

Comment on road alignment with respect to the valley and channel planform: parallel to road

---

Does Light Penetrate Under Entire Crossing? ☐ yes ☒ no Comment:

Noise Level at Time of Inspection ☐ High ☒ Medium ☐ Low

Photos Taken of Structure? Upstream ________ Downstream ________

Comments: ditch lined with cattails upstream

0.9 m concrete box on right bank (likely storm sewer related)
ditch downstream lined with more cattails

PARISH geomorphic

Stream Crossing Assessment Form

Date: Sept 9/20 **Stream:** Crossing 6 **Crew:** NC/PC
Road Name: Regional Road 50 **Recorder:** NC
Location: Caledon **Weather Description:** overcast, 20 degrees

black = upstream of crossing
red = downstream

Channel Dimensions (Measured/Estimated)

Bankfull Width (m) 3 m Bankfull Depth (m) 0.4 m

Wetted Width (m) 1.6 m Wetted Depth (m) 0.06 m

Gradient [X] Low [ ] Medium [ ] High Entrenchment [ ] Low [ ] Medium [ ] High

Sinuosity [X] Low [ ] Medium [ ] High Valley Setting confined by road

Riparian Vegetation Width (m) ______ Type straightened ditch, road and parking lot on either side

Channel Disturbance none

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type

[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Cast-in-place Culvert [ ] Open Bottom [ ] Closed Bottom
[ ] Bridge
[X] Other CSP arch, closed bottom

Material

[ ] Concrete [ ] Bridge [ ] Aluminum [X] Corrugated Steel [ ] Other ______

Bridge Design

[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape

[ ] Circular [ ] Box [X] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions

Width (m) 2.25 m Height (m) 1.62 m Length (m) ______ Age 10+yrs

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Stream:** **Crew:**
Road Name: **Recorder:**

Structure Condition

[ ] Good [ ] Collapsed [ ] Mechanical Damage [X] Rust [ ] Other light rust marks

Evidence of Flow Restriction and Erosion Upstream of Crossing

[X] No Pooling	[ ] Minor Pooling	[ ] Major Pooling
[X] No Erosion	[ ] Minor Erosion	[ ] Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing

[X] No Pooling	[ ] Minor Pooling	[ ] Major Pooling
[X] No Erosion	[ ] Minor Erosion	[ ] Major Erosion

Relative Crossing Sizing

[ ] Channel Width < Opening [X] X Channel Width = Opening [ ] Channel Width > Opening

Embankment Erosion Protection

[ ] Riprap	[ ] Vegetation	[ ] Armour Stone
[ ] Slope Paving	[ ] Retaining Wall	[X] Other none

X

Debris Trapping

[X] No Debris [ ] Minor Debris [ ] Major Debris

Evidence of:

Patching or pavement built-up	[ ] yes	[X] X no
Cracks running parallel to the structure centerline	[ ] yes	[X] X no
Erosion or failure of the embankment slope over the structure	[ ] yes	[X] X no
Sink holes over the structure	[ ] yes	[X] X no

Substrate Present Through Crossing? [ ] yes [X] no Comment: ______

Substrate Type [ ] Natural [ ] Constructed Comment: ______

Concerns Regarding Fish Passage? [ ] yes [X] no Comment: ______

Culvert Perched or Overhanging? [ ] yes [X] no Amount (m) ______

Comment on road alignment with respect to the valley and channel planform: parallel to road

---

Does Light Penetrate Under Entire Crossing? [ ] yes [X] no Comment: ______

Noise Level at Time of Inspection [ ] High [X] Medium [ ] Low

Photos Taken of Structure? Upstream ______ Downstream ______

Comments: cattails upstream of culvert

downstream becomes sinuous as channel meanders through forested area

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Sept 9/20** ***Stream:*** **Crossing 7** ***Crew:*** NC/PC
Road Name: **Regional Road 50** ***Recorder:*** NC
Location: **Caledon** ***Weather Description:*** overcast, 20 degrees

black = upstream of crossing
red = downstream

Channel Dimensions (Measured/Estimated)

Bankfull Width (m) 4 m Bankfull Depth (m) 0.6 m

Wetted Width (m) 2.5 m Wetted Depth (m) 0.3 m at culvert, 0.15 m u/s

Gradient [X] Low [ ] Medium [ ] High Entrenchment [ ] Low [ ] Medium [ ] High

Sinuosity [X] Low [ ] Medium [ ] High Valley Setting confined by road

Riparian Vegetation Width (m) ______ Type straightened ditch, meadow on left

Channel Disturbance none

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type
[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[X] Cast-in-place Culvert [X] Open Bottom [ ] Closed Bottom
[ ] Bridge
[ ] Other ______

Material
[X] Concrete [ ] Bridge [ ] Aluminum [ ] Corrugated Steel [ ] Other ______

Bridge Design
[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape
[ ] Circular [X] Box [ ] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions
Width (m) 4.55 m Height (m) 1.5 m Length (m) ______ Age new

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Stream:** **Crew:**
Road Name: **Recorder:**

Structure Condition

[X] Good [ ] Collapsed [ ] Mechanical Damage [ ] Rust [ ] Other ____________

Evidence of Flow Restriction and Erosion Upstream of Crossing

[X] No Pooling [ ] Minor Pooling [ ] Major Pooling
[X] No Erosion [ ] Minor Erosion [ ] Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing

[X] No Pooling [ ] Minor Pooling [ ] Major Pooling
[X] No Erosion [ ] Minor Erosion [ ] Major Erosion

Relative Crossing Sizing

[X] Channel Width < Opening [ ] Channel Width = Opening [ ] Channel Width > Opening
X

Embankment Erosion Protection

[ ] Riprap [ ] Vegetation [ ] Armour Stone
[ ] Slope Paving [ ] Retaining Wall [X] Other none
X

Debris Trapping

[X] No Debris [ ] Minor Debris [ ] Major Debris

Evidence of:

Patching or pavement built-up	[ ] yes	[X] X no
Cracks running parallel to the structure centerline	[ ] yes	[X] X no
Erosion or failure of the embankment slope over the structure	[ ] yes	[X] X no
Sink holes over the structure	[ ] yes	[X] X no

Substrate Present Through Crossing? [ ] yes [X] no Comment: silt, small gravel,sediment buildup at downstream end

Substrate Type [X] Natural [ ] Constructed Comment: ____________

Concerns Regarding Fish Passage? [ ] yes [X] no Comment: ____________

Culvert Perched or Overhanging? [ ] yes [X] no Amount (m) ____________

Comment on road alignment with respect to the valley and channel planform: parallel to road

---

Does Light Penetrate Under Entire Crossing? [ ] yes [X] no Comment: ____________

Noise Level at Time of Inspection [ ] High [X] Medium [ ] Low

Photos Taken of Structure? Upstream ____________ Downstream ____________

Comments: ditch with cattails upstream, no erosion

sediment buildup at downstream culvert outlet, debris caught in cattails, ditch continues

PARISH geomorphic

Stream Crossing Assessment Form

Date: **Sept 9/20** ***Stream:*** **Crossing 8** ***Crew:*** NC/PC
Road Name: **Regional Road 50** ***Recorder:*** NC
Location: **Caledon** ***Weather Description:*** overcast, 20 degrees

black = upstream of crossing
red = downstream

Channel Dimensions (Measured/Estimated)

Bankfull Width (m) 3 m Bankfull Depth (m) 0.7 m

Wetted Width (m) 1.1 m Wetted Depth (m) 0.2 m

Gradient [X] Low [ ] Medium [ ] High Entrenchment [ ] Low [ ] Medium [ ] High

Sinuosity [X] Low [ ] Medium [ ] High Valley Setting confined by road

Riparian Vegetation Width (m) ______ Type straightened ditch, no floodplain

Channel Disturbance armourstone on bank against road

Cross-sectional Sketch:

Planform Sketch:

Road Type (Highway, Regional, Local) ______

Crossing Type
[ ] Pre-Cast Culvert [ ] Open Bottom [ ] Closed Bottom
[X] Cast-in-place Culvert [X] Open Bottom [ ] Closed Bottom
[ ] Bridge
[ ] Other ______

Material
[X] Concrete [ ] Bridge [ ] Aluminum [ ] Corrugated Steel [ ] Other ______

Bridge Design
[ ] Free Span [ ] Piers [ ] Abutments [ ] Number of Spans ______

Culvert Shape
[ ] Circular [X] Box [ ] Arch [ ] Elliptical [ ] Mulitple (# ____) [ ] Other ______

Dimensions
Width (m) 4.55 m Height (m) 1.62 m Length (m) ______ Age new

PARISH geomorphic

Stream Crossing Assessment Form

Date: ***Stream:*** ***Crew:***
Road Name: ***Recorder:***

Structure Condition
[X] Good [ ] Collapsed [ ] Mechanical Damage [ ] Rust [ ] Other ______

Evidence of Flow Restriction and Erosion Upstream of Crossing

[X] No Pooling	[ ] Minor Pooling	[ ] Major Pooling
[X] No Erosion	[ ] Minor Erosion	[ ] Major Erosion

Evidence of Scour Pool and Erosion Downstream of Crossing

[X] No Pooling	[ ] Minor Pooling	[ ] Major Pooling
[X] No Erosion	[ ] Minor Erosion	[ ] Major Erosion

Relative Crossing Sizing
[X] Channel Width < Opening [ ] Channel Width = Opening [ ] Channel Width > Opening
X

Embankment Erosion Protection

[ ] Riprap	[ ] Vegetation	X [X] Armour Stone
[ ] Slope Paving	[ ] Retaining Wall	[ ] Other ______

Debris Trapping
[X] No Debris [ ] Minor Debris [ ] Major Debris

Evidence of:

Patching or pavement built-up	[ ] yes	[X] X no
Cracks running parallel to the structure centerline	[ ] yes	[X] X no
Erosion or failure of the embankment slope over the structure	[ ] yes	[X] X no
Sink holes over the structure	[ ] yes	[X] X no

Substrate Present Through Crossing? [ ] yes [X] no Comment: silt, small gravel

Substrate Type [X] Natural [ ] Constructed Comment: ______

Concerns Regarding Fish Passage? [ ] yes [X] no Comment: ______

Culvert Perched or Overhanging? [ ] yes [X] no Amount (m) ______

Comment on road alignment with respect to the valley and channel planform: parallel to road

---

Does Light Penetrate Under Entire Crossing? [ ] yes [X] no Comment: ______

Noise Level at Time of Inspection [ ] High [X] Medium [ ] Low

Photos Taken of Structure? Upstream ______ Downstream ______

Comments: ditch with cattails upstream, no erosion

cattails at culvert outlet, armourstone against road, no erosion

APPENDIX D
Matrix Photolog

Matrix Solutions Inc. - September 9, 2020

1. Upstream of Culvert 1

Matrix Solutions Inc. - September 9, 2020

2. Upstream of Culvert 1

Matrix Solutions Inc. - September 9, 2020

3. Upstream of Culvert 1

Matrix Solutions Inc. - September 9, 2020

4. Upstream of Culvert 1

Matrix Solutions Inc. - September 9, 2020

5. Upstream of Culvert 1

Matrix Solutions Inc. - September 9, 2020

6. Culvert C1 (Inlet)

Matrix Solutions Inc. - September 9, 2020

7. Culvert C1 (Inlet)

Matrix Solutions Inc. - September 9, 2020

8. Culvert C1 (Inlet)

Matrix Solutions Inc. - September 9, 2020

9. Culvert C1a (Inlet)

Matrix Solutions Inc. - September 9, 2020

10. Culvert C1a (Inlet)

Matrix Solutions Inc. - September 9, 2020

11. Culvert C1a (Inlet)

Matrix Solutions Inc. - September 9, 2020

12. Culvert C1a (Inlet)

Matrix Solutions Inc. - September 9, 2020

13. Culvert C1a (Inlet)

Matrix Solutions Inc. - September 9, 2020

14. Culvert 1 Outlet

Matrix Solutions Inc. - September 9, 2020

15. Culvert 1 Outlet

Matrix Solutions Inc. - September 9, 2020

16. Culvert 1 Outlet

Matrix Solutions Inc. - September 9, 2020

17. Culvert 1 Outlet

Matrix Solutions Inc. - September 9, 2020

18. Culvert 1 Outlet

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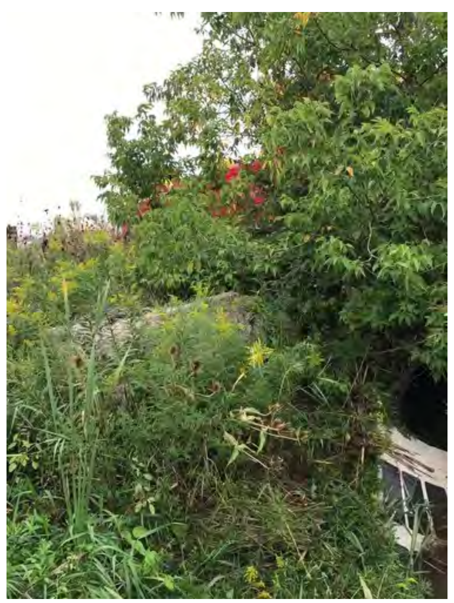
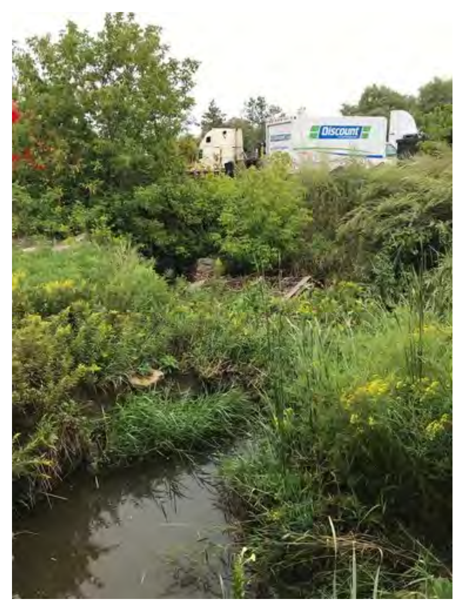


4.



5.

6.

RV ANDERSON ASSOCIATES LTD
REGIONAL ROAD 50
Channel Condition between Culvert 2 and 3

September 9, 2020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4.


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RV ANDERSON ASSOCIATES LTD
REGIONAL ROAD 50
Culvert 3

September 9, 2020


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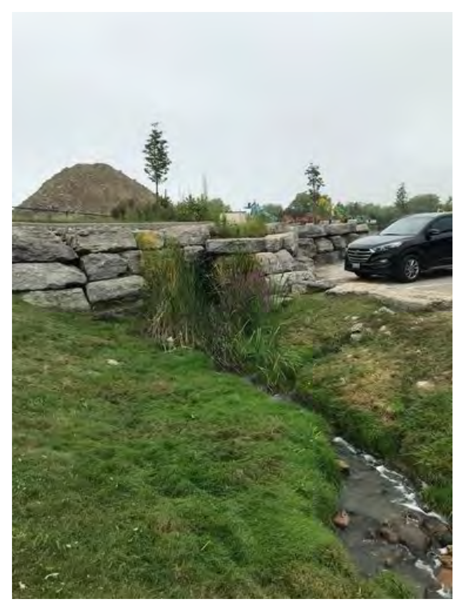
16.


17.

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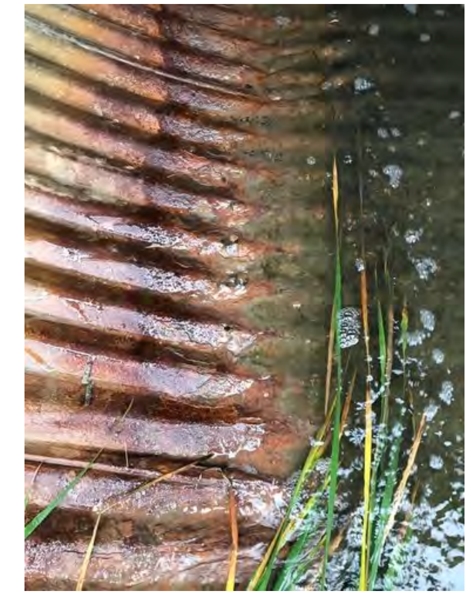

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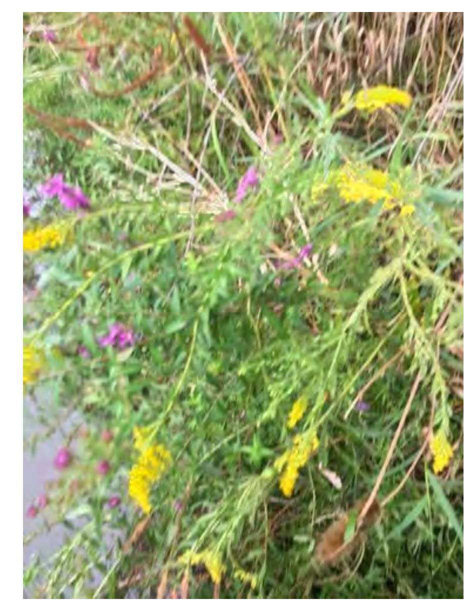
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RV ANDERSON ASSOCIATES LTD
REGIONAL ROAD 50
Culvert 8

September 9, 2020

Matrix Solutions Inc. - September 9, 2020

1. 177651

Matrix Solutions Inc. - September 9, 2020

2. 177651

Matrix Solutions Inc. - September 9, 2020

3. 177651

Matrix Solutions Inc. - September 9, 2020

4. 177651

Matrix Solutions Inc. - September 9, 2020

5. 177651

Matrix Solutions Inc. - September 9, 2020

6. 177651

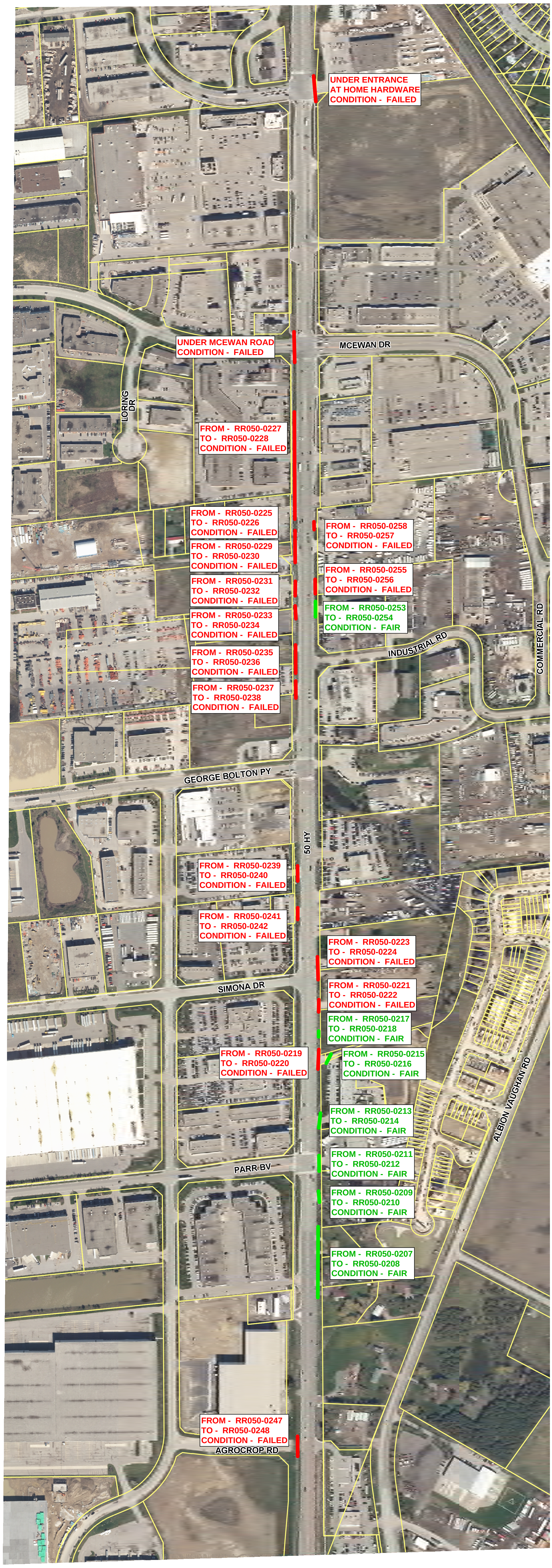
APPENDIX E
Region of Peel Structure Condition Appraisals

MINOR CULVERT CONDITION ASSESSMENT
HIGHWAY 50 - REGION OF PEEL

Appendix 7.4

SCALE 1:5,000

0 50 100 150 200 250
Meters



LEGEND

STORM CULVERT - FAIR CONDITION

STORM CULVERT - FAILED CONDITION

PROPERTY PARCEL

MAIN ST STREET NAME

Region of Peel
working with you

Map Created by: Information Management Group, Operations Support, Public Works
Map Number: PW_IMG_GDA_640 (Optimal Plot Size - 11"x17")
Date: December 12, 2017

ASSET # INLET	ASSET # OUTLET	ADDRESS	CONDITION	OPTION	LENGTH	SIZE -MM	GRANULAR	HL3	TOPSOIL	CONCRETE CURB REP	SAW CUTTING	RESTORATION/ M	SOIL DISPOSAL (GRANULAR X 1.25)	HRS TO REPAIR
NORTHBOUND FROM MAYFIELD RD														
RR050-0219	RR050-0220	12295 NORTH ENTRANCE AT ROAD	STARTING TO LOSE BOTTOM	LINER	30	600	67	23		$ 15,937.50	13	$ 1,200.00	$ 2,000.00	30
RR050-0221	RR050-0222	12343 SOUTH	BOTTOM FAILING	LINER	19	525	42	15		$ 10,093.75	8	$ 760.00	$ 1,266.67	19
RR050-0223	RR050-0224	12343 NORTH	BOTTOM FAILING	LINER	35	500	78	27		$ 18,593.75	16	$ 1,400.00	$ 2,333.33	35
RR050-0255	RR050-0256	1553	HOLE IN TOP IN OUTLET - HOLDING WATER		22	600	49	17		$ 11,687.50	10	$ 880.00	$ 1,466.67	22
RR050-0258	RR050-0257	12585	FULL OF DEBRIS - LOOKS TO BE FAILING		12	600	27	9		$ 6,375.00	5	$ 480.00	$ 800.00	12
		PIPE UNDER ENTRANCE AT HOME HARDWARE	PLUGGED, FAILING, UNKNOWN OUTLET		30	450	66.66666667	23		$ 15,937.50	13	$ 1,200.00	$ 2,000.00	30
SOUTHBOUND FROM HEALEY RD														
ASSET # INLET	**ASSET # OUTLET**	**ADDRESS**	**CONDITION**	**OPTION**	**LENGTH**	**SIZE - MM**								**HRS TO REPAIR**
		UNDER MCEWEN	UNABLE TO SEE DUE TO WATER; OUTLET HAS 2M EXTENSION AND CONCRETED OVER BOTH PIPES FOR COUPLER		24	900	53	19		$ 12,750.00	11	$ 960.00	$ 1,600.00	24
RR050-0227	RR050-0228	S/O MCEWEN	STORM/CULVERT FAILED BOTTOM		163.73	900	364	0	6000	$ 86,981.56	73	$ 6,549.20	$ 10,915.33	164
RR050-0225	RR050-0226	12596 - TIM'S DRIVETHROUGH	FAILED		10.86	900	24	8		$ 5,769.38	5	$ 434.40	$ 724.00	11
RR050-0229	RR050-0230	HOPCROFT	FAILED		34.85	900	77	27		$ 18,514.06	15	$ 1,394.00	$ 2,323.33	35
RR050-0231	RR050-0232	12550	FAILED		22.14	600	49	17		$ 11,761.88	10	$ 885.60	$ 1,476.00	22
RR050-0233	RR050-0234	12544	FAILED		19.68	900	44	15		$ 10,455.00	9	$ 787.20	$ 1,312.00	20
RR050-0235	RR050-0235	12532	FAILED		43.16	900	96	34		$ 22,928.75	19	$ 1,726.40	$ 2,877.33	43
RR050-0237	RR050-0238	12500	FAILED		26.02	700	58	20		$ 13,823.13	12	$ 1,040.80	$ 1,734.67	26
RR050-0239	RR050-0240	12420	FAILED		23.17	600	51	18		$ 12,309.06	10	$ 926.80	$ 1,544.67	23
RR050-0241	RR050-0242	12388	FAILING		17.93	600	40	14		$ 9,525.31	8	$ 717.20	$ 1,195.33	18
RR050-0247	RR050-0248	GREEN PVC AT NEW ROADWAY (AGROCROP RD??)	NEEDS PROPER CULVERT		30.811	400	68	24		$ 16,368.34	14	$ 1,232.44	$ 2,054.07	31
							1254	312	6000	$ 299,811.47	251	$ 22,574.04	$ 37,623.40	

TOPSOIL	**6000**
GRANULAR "A"	**1254.11**
HL3	**312**
C&G REPAIR	**299811**
SAW CUTTING	**251**
RESTORATION	**$ 22,574.04**
SOIL DISPOSAL	$ 37,623.40

* AVG HOURS FOR REPAIR IS 10 FOR EVERY 9 M

ASSET # INLET	ASSET # OUTLET	ADDRESS	CONDITION	OPTION	LENGTH	SIZE -MM	GRANULAR	HL3	TOPSOIL	HRS TO REPAIR
NORTHBOUND FROM MAYFIELD RD										
RR050-0207	RR050-0208	12207 KING ST (20)	FAIR		109	500				48
RR050-0209	RR050-0210	S/O PARR (21)	MULTIPLATE - FAIR		17	2300 STORM MAIN?				8
RR050-0211	RR050-0212	OPPOSITE PARR (22)(031)	FAIR		24	2100 STORM MAIN?				11
RR050-0213	RR050-0214	12295 N/O PARR (24)	MULTIPLATE - FAIR		23	2300 STORM MAIN?				10
RR050-0215	RR050-0216	12296 NORTH ENTRANCE IN FROM ROAD (Not Identified/Provided)			16	3000 STORM MAIN?				7
RR050-0217	RR050-0218	N/O 12295 (27)	FIELD ENTRANCE - GOOD		9	600				4
RR050-0253	RR050-0254	12543 (09)	FAIR		24	600				11

SOUTHBOUND FROM HEALEY RD														
ASSET # INLET	ASSET # OUTLET	ADDRESS	CONDITION	OPTION	LENGTH	SIZE - MM								HRS TO REPAIR
		UNDER MCEWEN (4-5)	*UNABLE TO SEE DUE TO WATER; OUTLET HAS 2M EXTENSION AND CONCRETED OVER BOTH PIPES FOR COUPLER*		*24*	*900*	*53*	*19*		*$ 12,750.00*	*11*	*$ 960.00*	*$ 1,600.00*	*24*
RR050-0227	RR050-0228	S/O MCEWEN (4)(5)	STORM/CULVERT FAILED BOTTOM		163.73	900	364	0	6000	$ 86,981.56	73	$ 6,549.20	$ 10,915.33	164
RR050-0225	RR050-0226	12596 - TIM'S DRIVETHROUGH (6)	FAILED		10.86	900	24	8		$ 5,769.38	5	$ 434.40	$ 724.00	11
RR050-0229	*RR050-0230*	*HOPCROFT (7)*	*FAILED*		*34.85*	*900*	*77*	*27*		*$ 18,514.06*	*15*	*$ 1,394.00*	*$ 2,323.33*	*35*
RR050-0231	*RR050-0232*	*12550 (8)*	*FAILED*		*22.14*	*600*	*49*	*17*		*$ 11,761.88*	*10*	*$ 885.60*	*$ 1,476.00*	*22*
RR050-0233	*RR050-0234*	*12544 (9)*	*FAILED*		*19.68*	*900*	*44*	*15*		*$ 10,455.00*	*9*	*$ 787.20*	*$ 1,312.00*	*20*
RR050-0235	*RR050-0235*	*12532 (10)*	*FAILED*		*43.16*	*900*	*96*	*34*		*$ 22,928.75*	*19*	*$ 1,726.40*	*$ 2,877.33*	*43*
RR050-0237	*RR050-0238*	*12500 (11)*	*FAILED*		*26.02*	*700*	*58*	*20*		*$ 13,823.13*	*12*	*$ 1,040.80*	*$ 1,734.67*	*26*
RR050-0239	*RR050-0240*	*12420 (14)*	*FAILED*		*23.17*	*600*	*51*	*18*		*$ 12,309.06*	*10*	*$ 926.80*	*$ 1,544.67*	*23*
RR050-0241	*RR050-0242*	*12388 (15)*	*FAILING*		*17.93*	*600*	*40*	*14*		*$ 9,525.31*	*8*	*$ 717.20*	*$ 1,195.33*	*18*
RR050-0247	RR050-0248	GREEN PVC AT NEW ROADWAY (AGROCROP RD??) (Not Included in Design)	NEEDS PROPER CULVERT		30.811	400	68	24		$ 16,368.34	14	$ 1,232.44	$ 2,054.07	31

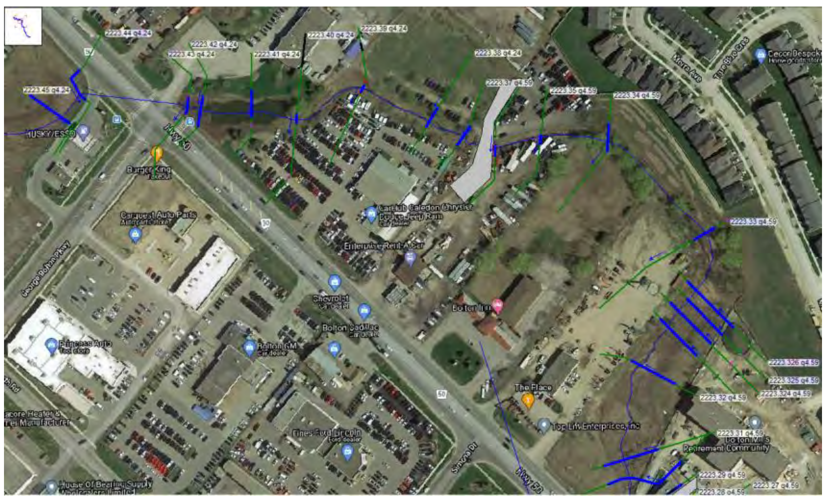
ASSET # INLET	ASSET # OUTLET	ADDRESS	CONDITION	OPTION	LENGTH	SIZE -MM	GRANULAR	HL3	TOPSOIL	CONCRETE CURB REP	SAW CUTTING	RESTORATION/ M	SOIL DISPOSAL (GRANULAR X 1.25)	HRS TO REPAIR
NORTHBOUND FROM MAYFIELD RD														
RR050-0219	RR050-0220	12295 NORTH ENTRANCE AT ROAD (26)	STARTING TO LOSE BOTTOM	LINER	30	600	67	23		$ 15,937.50	13	$ 1,200.00	$ 2,000.00	30
RR050-0221	RR050-0222	12343 SOUTH (28)	BOTTOM FAILING	LINER	19	525	42	15		$ 10,093.75	8	$ 760.00	$ 1,266.67	19
RR050-0223	RR050-0224	12343 NORTH (29)	BOTTOM FAILING	LINER	35	500	78	27		$ 18,593.75	16	$ 1,400.00	$ 2,333.33	35
RR050-0255	RR050-0256	1(2)553 (09)	HOLE IN TOP IN OUTLET - HOLDING WATER		22	600	49	17		$ 11,687.50	10	$ 880.00	$ 1,466.67	22
RR050-0258	RR050-0257	12585 (036)	FULL OF DEBRIS - LOOKS TO BE FAILING		12	600	27	9		$ 6,375.00	5	$ 480.00	$ 800.00	12
		PIPE UNDER ENTRANCE AT HOME HARDWARE (Not identified)	PLUGGED, FAILING, UNKNOWN OUTLET		30	450	66.66666667	23		$ 15,937.50	13	$ 1,200.00	$ 2,000.00	30
SOUTHBOUND FROM HEALEY RD														
ASSET # INLET	ASSET # OUTLET	ADDRESS	CONDITION	OPTION	LENGTH	SIZE - MM								HRS TO REPAIR
		UNDER MCEWEN (Not Identified)	UNABLE TO SEE DUE TO WATER; OUTLET HAS 2M EXTENSION AND CONCRETED OVER BOTH PIPES FOR COUPLER		24	900	53	19		$ 12,750.00	11	$ 960.00	$ 1,600.00	24
RR050-0227	RR050-0228	S/O MCEWEN (4)(5)	STORM/CULVERT FAILED BOTTOM		163.73	900	364	0	6000	$ 86,981.56	73	$ 6,549.20	$ 10,915.33	164
RR050-0225	RR050-0226	12596 - TIM'S DRIVETHROUGH (6)	FAILED		10.86	900	24	8		$ 5,769.38	5	$ 434.40	$ 724.00	11
RR050-0229	RR050-0230	HOPCROFT (7)	FAILED		34.85	900	77	27		$ 18,514.06	15	$ 1,394.00	$ 2,323.33	35
RR050-0231	RR050-0232	12550 (8)	FAILED		22.14	600	49	17		$ 11,761.88	10	$ 885.60	$ 1,476.00	22
RR050-0233	RR050-0234	12544 (9)	FAILED		19.68	900	44	15		$ 10,455.00	9	$ 787.20	$ 1,312.00	20
RR050-0235	RR050-0235	12532 (10)	FAILED		43.16	900	96	34		$ 22,928.75	19	$ 1,726.40	$ 2,877.33	43
RR050-0237	RR050-0238	12500 (11)	FAILED		26.02	700	58	20		$ 13,823.13	12	$ 1,040.80	$ 1,734.67	26
RR050-0239	RR050-0240	12420 (14)	FAILED		23.17	600	51	18		$ 12,309.06	10	$ 926.80	$ 1,544.67	23
RR050-0241	RR050-0242	12388 (15)	FAILING		17.93	600	40	14		$ 9,525.31	8	$ 717.20	$ 1,195.33	18
RR050-0247	RR050-0248	GREEN PVC AT NEW ROADWAY (AGROCROP RD??) (Not Included in Design)	NEEDS PROPER CULVERT		30.811	400	68	24		$ 16,368.34	14	$ 1,232.44	$ 2,054.07	31

APPENDIX F
HEC-RAS Output

APPENDIX F HEC-RAS OUTPUT

Item 1 – Spilling Extent on Cross-sections

2-Year

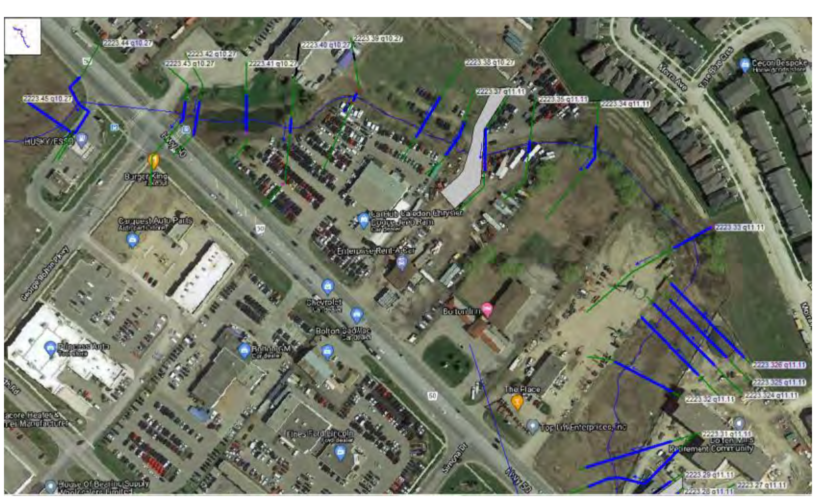


5-Year

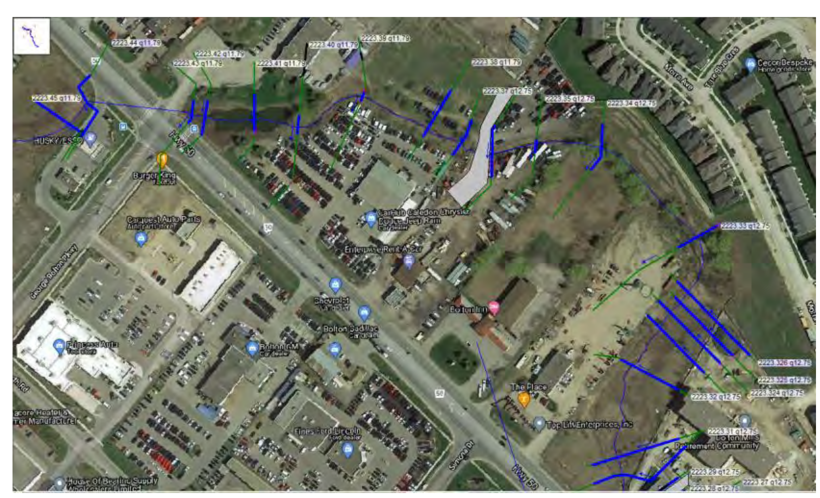
10-Year

25-Year

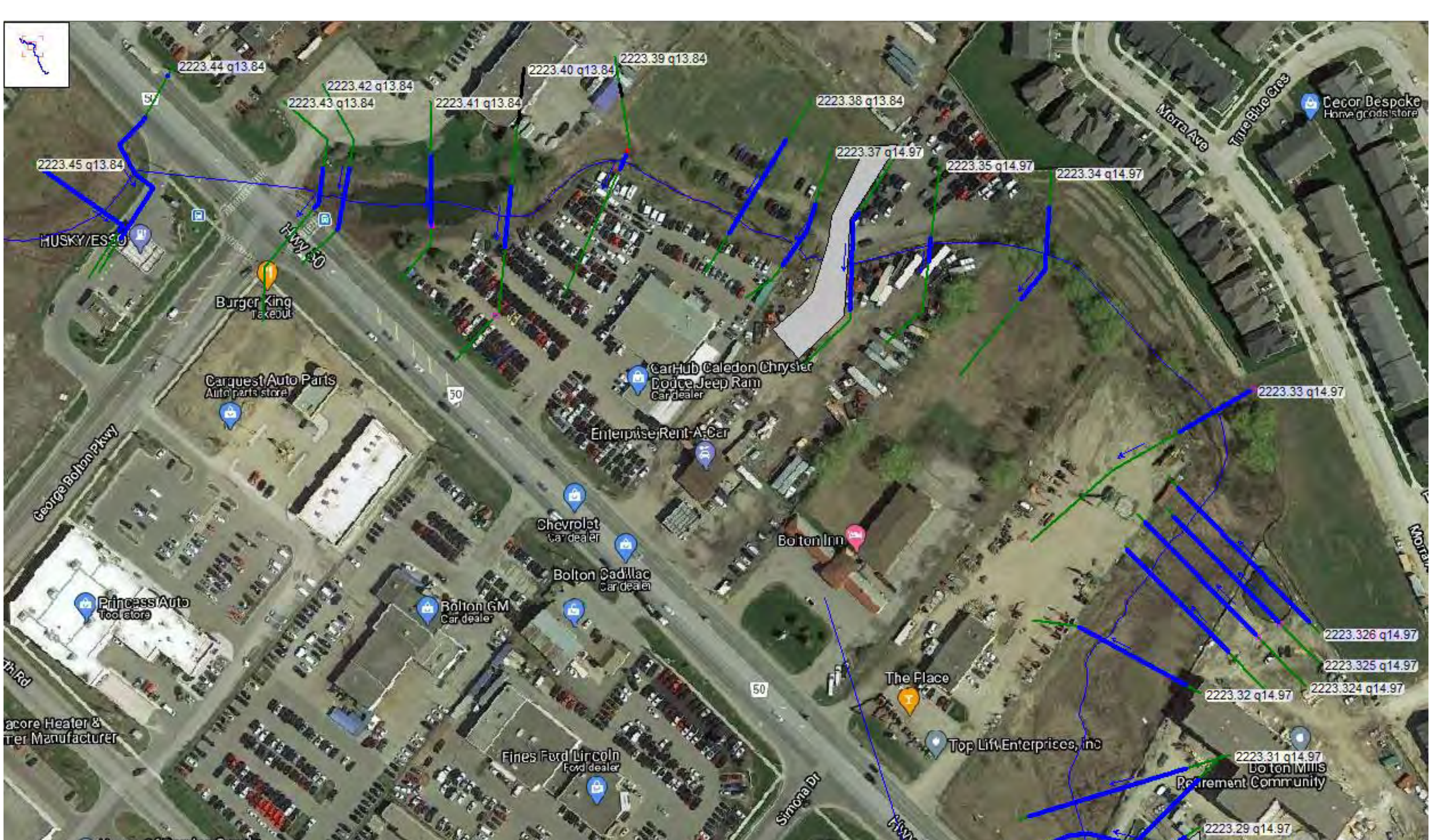
50-Year

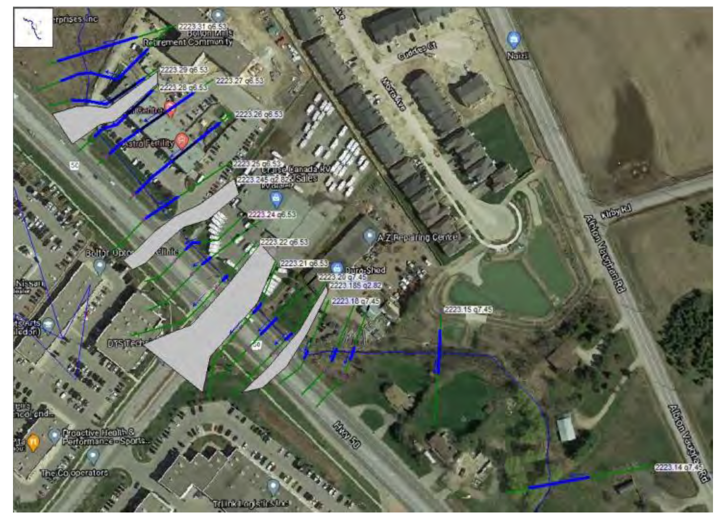
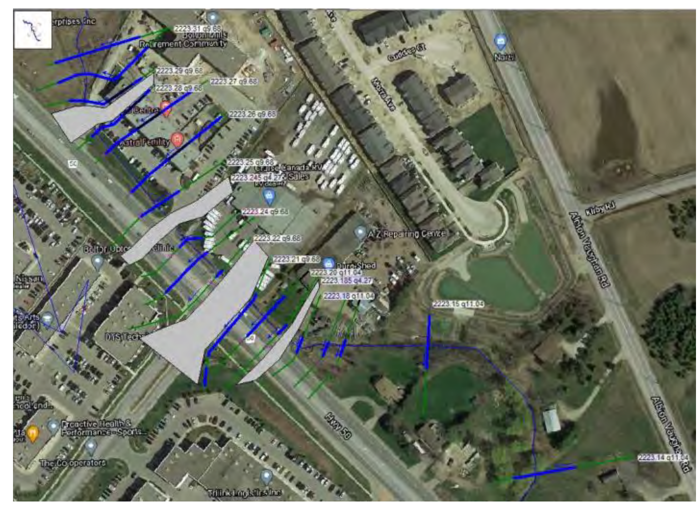


100-Year

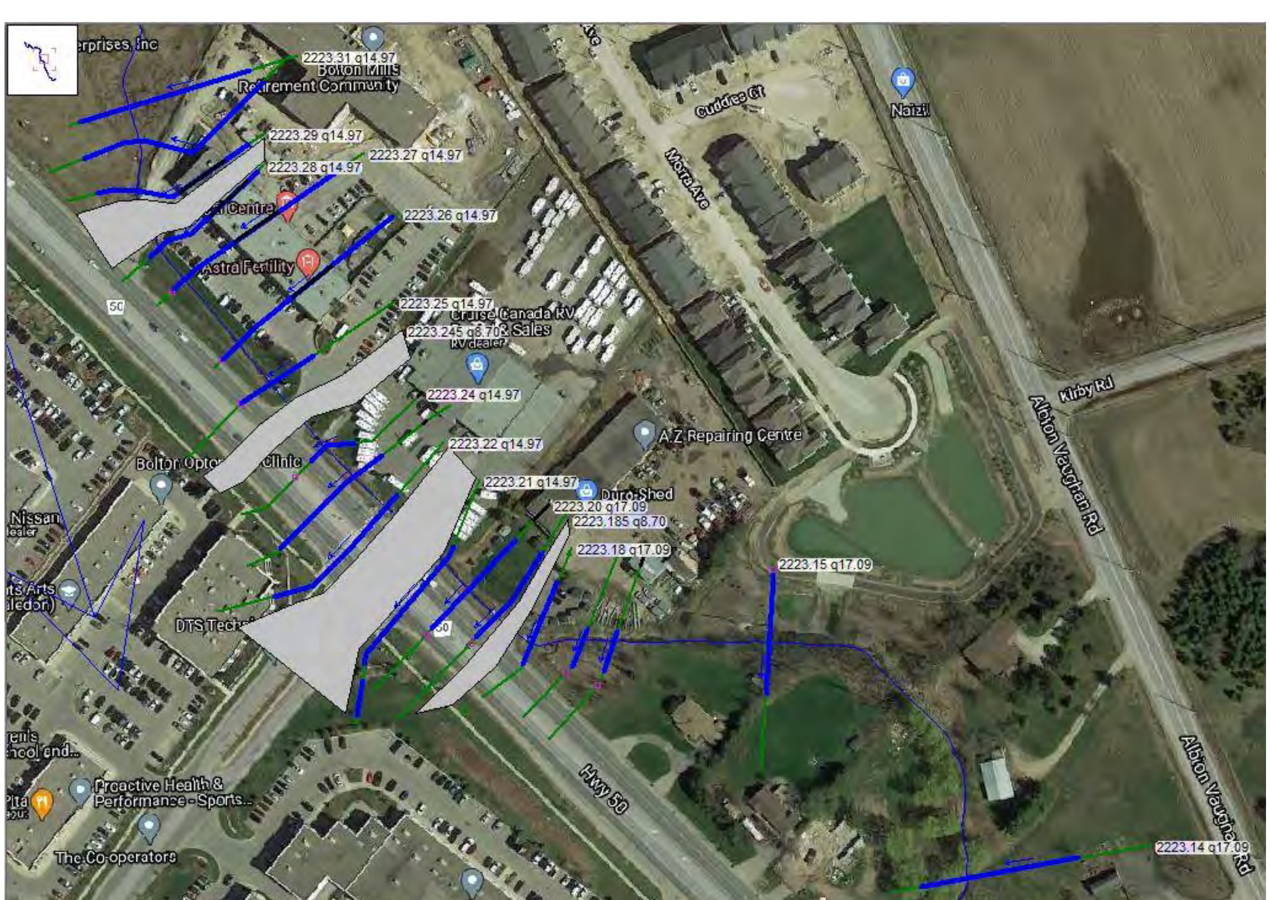


Regional



2-Year	5-Year
	
10-Year	**25-Year**
	
50-Year	**100-Year**
	

Regional

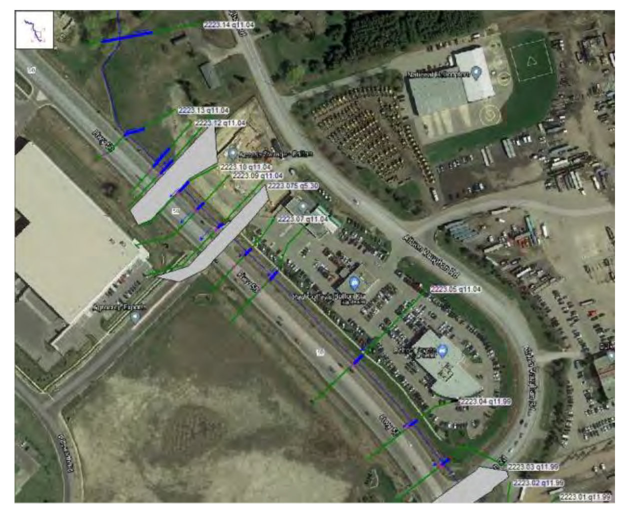


2-Year

5-Year

10-Year

25-Year



50-Year

100-Year

Regional

APPENDIX F HEC-RAS OUTPUT

Item 2 – Hydraulic Table of Cross-section

HEC-RAS Plan: Matrix - RR50 Dec08 2020 River: CEG_DESIGN Reach: REACH1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
REACH1	2224.08	2-Year	1.98	242.90	243.42	243.29	243.44	0.004498	0.88	2.93	18.18	0.49
REACH1	2224.08	5-Year	2.82	242.90	243.46		243.49	0.004513	0.95	3.78	18.29	0.50
REACH1	2224.08	10-Year	3.39	242.90	243.50		243.53	0.003958	0.93	4.45	18.37	0.48
REACH1	2224.08	25-Year	4.27	242.90	243.55		243.58	0.003331	0.93	5.45	19.68	0.45
REACH1	2224.08	50-Year	5.05	242.90	243.60		243.63	0.002866	0.92	6.37	20.78	0.42
REACH1	2224.08	100-Year	5.73	242.90	243.64		243.67	0.002455	0.90	7.29	22.70	0.40
REACH1	2224.08	Regional	8.70	242.90	243.67	243.56	243.73	0.004438	1.26	7.93	24.02	0.54
REACH1	2224.07	2-Year	1.98	241.78	242.27	242.25	242.42	0.011890	1.75	1.34	4.63	0.85
REACH1	2224.07	5-Year	2.82	241.78	242.39	242.35	242.54	0.009610	1.85	1.94	5.59	0.79
REACH1	2224.07	10-Year	3.39	241.78	242.43	242.41	242.61	0.010802	2.04	2.15	5.89	0.85
REACH1	2224.07	25-Year	4.27	241.78	242.47	242.47	242.71	0.012643	2.32	2.43	6.27	0.93
REACH1	2224.07	50-Year	5.05	241.78	242.51	242.49	242.79	0.014533	2.58	2.67	7.09	1.00
REACH1	2224.07	100-Year	5.73	241.78	242.53	242.49	242.88	0.016907	2.85	2.85	8.47	1.09
REACH1	2224.07	Regional	8.70	241.78	242.82	242.82	242.96	0.005979	2.13	7.93	27.28	0.69
REACH1	2224.06	2-Year	1.98	241.50	241.80	241.77	241.85	0.008355	1.04	2.20	14.08	0.66
REACH1	2224.06	5-Year	2.82	241.50	241.81	241.81	241.90	0.013974	1.38	2.36	14.59	0.86
REACH1	2224.06	10-Year	3.39	241.50	241.84	241.84	241.93	0.013434	1.44	2.74	15.73	0.86
REACH1	2224.06	25-Year	4.27	241.50	241.87	241.87	241.97	0.012895	1.52	3.29	17.25	0.86
REACH1	2224.06	50-Year	5.05	241.50	241.90	241.90	242.00	0.012625	1.58	3.75	18.43	0.86
REACH1	2224.06	100-Year	5.73	241.50	241.92	241.92	242.03	0.012263	1.62	4.16	19.41	0.85
REACH1	2224.06	Regional	8.70	241.50	242.00	242.00	242.12	0.011498	1.78	5.78	22.97	0.85
REACH1	2224.05	2-Year	1.98	241.00	241.54		241.57	0.003806	0.88	5.78	55.74	0.46
REACH1	2224.05	5-Year	2.82	241.00	241.65		241.65	0.001173	0.58	11.85	62.04	0.27
REACH1	2224.05	10-Year	3.39	241.00	241.67		241.68	0.001236	0.61	13.20	63.67	0.28
REACH1	2224.05	25-Year	4.27	241.00	241.70		241.71	0.001231	0.64	15.46	66.84	0.28
REACH1	2224.05	50-Year	5.05	241.00	241.73		241.74	0.001244	0.66	17.24	69.24	0.28
REACH1	2224.05	100-Year	5.73	241.00	241.75		241.76	0.001247	0.68	18.72	70.45	0.28
REACH1	2224.05	Regional	8.70	241.00	241.82		241.83	0.001403	0.77	23.58	74.12	0.31
REACH1	2224.04	2-Year	1.98	240.50	241.56		241.56	0.000003	0.04	52.52	116.35	0.01
REACH1	2224.04	5-Year	2.82	240.50	241.65		241.65	0.000004	0.05	64.00	125.07	0.02
REACH1	2224.04	10-Year	3.39	240.50	241.67		241.67	0.000005	0.06	66.73	127.06	0.02
REACH1	2224.04	25-Year	4.27	240.50	241.71		241.71	0.000007	0.07	71.15	130.21	0.02
REACH1	2224.04	50-Year	5.05	240.50	241.73		241.73	0.000008	0.08	74.56	132.59	0.03
REACH1	2224.04	100-Year	5.73	240.50	241.75		241.75	0.000010	0.09	77.36	134.51	0.03
REACH1	2224.04	Regional	8.70	240.50	241.82		241.82	0.000018	0.13	86.55	140.57	0.04
REACH1	2224.03	2-Year	1.98	240.50	241.56		241.56	0.000002	0.04	60.27	71.69	0.01
REACH1	2224.03	5-Year	2.82	240.50	241.65		241.65	0.000003	0.05	67.12	72.43	0.02
REACH1	2224.03	10-Year	3.39	240.50	241.67		241.67	0.000004	0.06	68.69	72.60	0.02
REACH1	2224.03	25-Year	4.27	240.50	241.71		241.71	0.000006	0.08	71.18	72.87	0.02
REACH1	2224.03	50-Year	5.05	240.50	241.73		241.73	0.000008	0.09	73.19	94.10	0.03
REACH1	2224.03	100-Year	5.73	240.50	241.75		241.75	0.000010	0.10	75.54	131.16	0.03
REACH1	2224.03	Regional	8.70	240.50	241.82		241.82	0.000019	0.14	86.71	182.90	0.04
REACH1	2224.02	2-Year	1.98	240.27	241.53	241.06	241.55	0.002733	0.72	5.02	37.72	0.39
REACH1	2224.02	5-Year	2.82	240.27	241.63	241.45	241.65	0.001557	0.65	9.24	43.57	0.31
REACH1	2224.02	10-Year	3.39	240.27	241.65	241.48	241.67	0.001876	0.73	10.00	44.55	0.34
REACH1	2224.02	25-Year	4.27	240.27	241.68	241.49	241.70	0.002236	0.83	11.30	46.17	0.38
REACH1	2224.02	50-Year	5.05	240.27	241.70	241.56	241.72	0.002573	0.92	12.27	47.33	0.41
REACH1	2224.02	100-Year	5.73	240.27	241.71	241.58	241.74	0.003444	1.07	12.64	55.71	0.47
REACH1	2224.02	Regional	8.70	240.27	241.71	241.65	241.79	0.007943	1.63	12.83	60.26	0.72
REACH1	2224.015		Culvert									
REACH1	2224.01	2-Year	1.98	239.91	240.78	240.78	241.17	0.013871	2.77	0.71	12.20	1.00
REACH1	2224.01	5-Year	2.82	239.91	240.99	240.99	241.48	0.012867	3.12	0.90	70.67	1.01
REACH1	2224.01	10-Year	3.39	239.91	241.23	241.23	241.28	0.010668	1.32	7.69	88.32	0.75
REACH1	2224.01	25-Year	4.27	239.91	241.26	241.26	241.30	0.009672	1.32	9.96	95.46	0.72
REACH1	2224.01	50-Year	5.05	239.91	241.27	241.27	241.32	0.012007	1.49	10.47	96.06	0.81
REACH1	2224.01	100-Year	5.73	239.91	241.27	241.27	241.33	0.012889	1.57	11.29	97.26	0.84
REACH1	2224.01	Regional	8.70	239.91	241.31	241.31	241.38	0.015252	1.82	14.68	101.37	0.93
REACH1	2223.56	2-Year	2.46	239.85	240.63	240.63	240.69	0.007054	1.31	5.93	60.54	0.62
REACH1	2223.56	5-Year	3.50	239.85	240.66	240.66	240.73	0.008519	1.50	7.93	70.32	0.68
REACH1	2223.56	10-Year	4.21	239.85	240.68	240.68	240.74	0.008975	1.57	9.17	71.70	0.71
REACH1	2223.56	25-Year	5.30	239.85	240.70	240.70	240.77	0.009588	1.68	10.87	73.55	0.74
REACH1	2223.56	50-Year	6.27	239.85	240.72	240.72	240.79	0.010353	1.78	12.10	74.87	0.77
REACH1	2223.56	100-Year	7.11	239.85	240.74	240.74	240.80	0.009930	1.78	13.57	75.78	0.76
REACH1	2223.56	Regional	10.80	239.85	240.78	240.78	240.86	0.012542	2.11	16.97	77.18	0.86
REACH1	2223.55	2-Year	2.46	239.56	240.53		240.53	0.000055	0.18	28.81	89.49	0.06
REACH1	2223.55	5-Year	3.50	239.56	240.55		240.55	0.000097	0.25	30.60	90.86	0.09
REACH1	2223.55	10-Year	4.21	239.56	240.56		240.56	0.000130	0.29	31.75	91.75	0.10
REACH1	2223.55	25-Year	5.30	239.56	240.58		240.59	0.000184	0.35	33.53	93.10	0.12
REACH1	2223.55	50-Year	6.27	239.56	240.60		240.60	0.000236	0.40	34.85	94.09	0.14

HEC-RAS Plan: Matrix - RR50 Dec08 2020 River: CEG_DESIGN Reach: REACH1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
REACH1	2223.55	100-Year	7.11	239.56	240.61		240.61	0.000284	0.44	35.95	94.91	0.15
REACH1	2223.55	Regional	10.80	239.56	240.65		240.66	0.000514	0.61	40.06	97.90	0.20
REACH1	2223.54	2-Year	2.46	239.55	240.52	240.44	240.53	0.002920	0.62	9.81	104.96	0.39
REACH1	2223.54	5-Year	3.50	239.55	240.53	240.46	240.54	0.003696	0.72	11.50	107.82	0.44
REACH1	2223.54	10-Year	4.21	239.55	240.54	240.48	240.55	0.003961	0.77	12.67	109.74	0.46
REACH1	2223.54	25-Year	5.30	239.55	240.56	240.51	240.57	0.003967	0.80	14.62	112.76	0.46
REACH1	2223.54	50-Year	6.27	239.55	240.57	240.52	240.59	0.004144	0.84	15.96	114.11	0.48
REACH1	2223.54	100-Year	7.11	239.55	240.58	240.53	240.60	0.004210	0.86	17.12	115.25	0.48
REACH1	2223.54	Regional	10.80	239.55	240.62	240.56	240.64	0.004748	0.98	21.21	119.76	0.52
REACH1	2223.535		Culvert									
REACH1	2223.53	2-Year	2.46	239.25	240.35	240.35	240.39	0.017492	1.23	4.77	51.87	0.88
REACH1	2223.53	5-Year	3.50	239.25	240.36	240.36	240.43	0.026762	1.58	5.33	52.65	1.10
REACH1	2223.53	10-Year	4.21	239.25	240.39	240.39	240.44	0.020302	1.49	6.84	55.19	0.98
REACH1	2223.53	25-Year	5.30	239.25	240.40	240.40	240.47	0.022731	1.65	7.83	57.60	1.05
REACH1	2223.53	50-Year	6.27	239.25	240.41	240.41	240.49	0.026366	1.83	8.38	58.20	1.13
REACH1	2223.53	100-Year	7.11	239.25	240.42	240.42	240.51	0.030906	2.00	8.67	58.50	1.23
REACH1	2223.53	Regional	10.80	239.25	240.49	240.49	240.58	0.026290	2.15	13.11	74.68	1.18
REACH1	2223.52	2-Year	2.46	239.15	239.84		239.89	0.007753	1.18	4.15	24.75	0.65
REACH1	2223.52	5-Year	3.50	239.15	239.89		239.95	0.008378	1.35	5.51	28.49	0.69
REACH1	2223.52	10-Year	4.21	239.15	239.96		240.01	0.005720	1.24	7.67	33.78	0.58
REACH1	2223.52	25-Year	5.30	239.15	240.03		240.08	0.004617	1.23	10.20	38.07	0.54
REACH1	2223.52	50-Year	6.27	239.15	240.09		240.13	0.003993	1.22	12.34	40.39	0.51
REACH1	2223.52	100-Year	7.11	239.15	240.14		240.17	0.003491	1.20	14.34	42.44	0.48
REACH1	2223.52	Regional	10.80	239.15	240.31		240.34	0.002624	1.22	22.11	49.67	0.43
REACH1	2223.51	2-Year	2.46	238.75	239.42		239.49	0.004474	1.24	2.60	8.95	0.54
REACH1	2223.51	5-Year	3.50	238.75	239.59		239.64	0.002809	1.17	4.35	12.17	0.45
REACH1	2223.51	10-Year	4.21	238.75	239.58		239.66	0.004353	1.44	4.22	11.98	0.55
REACH1	2223.51	25-Year	5.30	238.75	239.62		239.73	0.005087	1.63	4.83	12.83	0.60
REACH1	2223.51	50-Year	6.27	238.75	239.66		239.79	0.005785	1.79	5.29	13.44	0.65
REACH1	2223.51	100-Year	7.11	238.75	239.67	239.60	239.83	0.006932	1.99	5.45	13.65	0.71
REACH1	2223.51	Regional	10.80	238.75	239.77	239.76	240.01	0.009373	2.50	6.90	15.46	0.85
REACH1	2223.50	2-Year	2.46	238.52	239.44		239.44	0.000088	0.25	22.23	38.65	0.08
REACH1	2223.50	5-Year	3.50	238.52	239.60		239.60	0.000089	0.28	28.62	41.86	0.09
REACH1	2223.50	10-Year	4.21	238.52	239.59		239.60	0.000132	0.34	28.44	41.78	0.11
REACH1	2223.50	25-Year	5.30	238.52	239.65		239.65	0.000170	0.40	30.65	42.87	0.12
REACH1	2223.50	50-Year	6.27	238.52	239.68		239.69	0.000207	0.45	32.32	43.67	0.13
REACH1	2223.50	100-Year	7.11	238.52	239.70		239.71	0.000249	0.50	33.10	44.05	0.15
REACH1	2223.50	Regional	10.80	238.52	239.82		239.83	0.000391	0.66	38.22	46.40	0.19
REACH1	2223.49	2-Year	2.46	238.04	239.41	238.84	239.43	0.001205	0.76	9.00	38.47	0.29
REACH1	2223.49	5-Year	3.50	238.04	239.59	239.05	239.59	0.000617	0.63	15.88	42.52	0.22
REACH1	2223.49	10-Year	4.21	238.04	239.57	239.35	239.59	0.000966	0.78	15.40	42.23	0.27
REACH1	2223.49	25-Year	5.30	238.04	239.62	239.39	239.64	0.001099	0.86	17.53	43.50	0.29
REACH1	2223.49	50-Year	6.27	238.04	239.66	239.42	239.68	0.001230	0.94	19.10	44.42	0.31
REACH1	2223.49	100-Year	7.11	238.04	239.67	239.44	239.69	0.001462	1.03	19.68	44.75	0.34
REACH1	2223.49	Regional	10.80	238.04	239.78	239.51	239.81	0.001897	1.26	24.47	47.41	0.39
REACH1	2223.485		Culvert									
REACH1	2223.48	2-Year	2.46	237.92	238.84	238.84	239.25	0.014988	2.81	0.87	19.40	1.01
REACH1	2223.48	5-Year	3.50	237.92	239.05	239.05	239.56	0.013924	3.17	1.10	22.56	1.01
REACH1	2223.48	10-Year	4.21	237.92	239.29	239.29	239.38	0.009684	1.63	4.89	28.59	0.75
REACH1	2223.48	25-Year	5.30	237.92	239.32	239.32	239.42	0.010260	1.75	5.80	29.39	0.78
REACH1	2223.48	50-Year	6.27	237.92	239.36	239.36	239.45	0.009149	1.73	6.94	30.37	0.74
REACH1	2223.48	100-Year	7.11	237.92	239.36	239.36	239.48	0.010943	1.90	7.13	30.53	0.81
REACH1	2223.48	Regional	10.80	237.92	239.45	239.45	239.58	0.010451	2.05	9.88	32.75	0.81
REACH1	2223.47	2-Year	2.46	237.80	238.55		238.55	0.000166	0.20	12.43	31.47	0.10
REACH1	2223.47	5-Year	3.50	237.80	238.61		238.61	0.000209	0.24	14.39	31.75	0.12
REACH1	2223.47	10-Year	4.21	237.80	238.65		238.65	0.000236	0.27	15.54	31.92	0.12
REACH1	2223.47	25-Year	5.30	237.80	238.69		238.70	0.000278	0.31	17.02	32.13	0.14
REACH1	2223.47	50-Year	6.27	237.80	238.73		238.73	0.000314	0.34	18.21	32.29	0.15
REACH1	2223.47	100-Year	7.11	237.80	238.77		238.77	0.000328	0.37	19.42	32.47	0.15
REACH1	2223.47	Regional	10.80	237.80	238.83		238.84	0.000551	0.50	21.42	32.75	0.20
REACH1	2223.46	2-Year	2.46	237.57	238.54		238.54	0.000047	0.19	28.53	44.13	0.06
REACH1	2223.46	5-Year	3.50	237.57	238.60		238.60	0.000074	0.25	31.17	44.87	0.08
REACH1	2223.46	10-Year	4.21	237.57	238.64		238.64	0.000093	0.28	32.72	45.30	0.09
REACH1	2223.46	25-Year	5.30	237.57	238.68		238.68	0.000124	0.34	34.70	45.85	0.10
REACH1	2223.46	50-Year	6.27	237.57	238.71		238.72	0.000153	0.38	36.29	46.28	0.12
REACH1	2223.46	100-Year	7.11	237.57	238.75		238.75	0.000173	0.41	37.97	46.73	0.12
REACH1	2223.46	Regional	10.80	237.57	238.80		238.81	0.000338	0.60	40.19	47.32	0.17

HEC-RAS Plan: Matrix - RR50 Dec08 2020 River: CEG_DESIGN Reach: REACH1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
REACH1	2223.45	2-Year	4.24	237.00	238.54		238.54	0.000108	0.38	30.73	34.87	0.10
REACH1	2223.45	5-Year	6.03	237.00	238.59		238.59	0.000187	0.52	32.68	36.04	0.13
REACH1	2223.45	10-Year	7.26	237.00	238.62		238.63	0.000248	0.60	33.81	36.67	0.15
REACH1	2223.45	25-Year	8.94	237.00	238.66		238.67	0.000339	0.71	35.24	37.44	0.18
REACH1	2223.45	50-Year	10.27	237.00	238.69		238.70	0.000412	0.80	36.39	38.06	0.20
REACH1	2223.45	100-Year	11.79	237.00	238.72		238.73	0.000499	0.89	37.59	38.70	0.22
REACH1	2223.45	Regional	13.84	237.00	238.76		238.77	0.000618	1.00	39.20	43.37	0.24
REACH1	2223.44	2-Year	4.24	236.30	238.53		238.54	0.000052	0.25	27.43	27.51	0.06
REACH1	2223.44	5-Year	6.03	236.30	238.59		238.59	0.000092	0.34	28.96	29.43	0.09
REACH1	2223.44	10-Year	7.26	236.30	238.62		238.62	0.000124	0.40	30.11	44.21	0.10
REACH1	2223.44	25-Year	8.94	236.30	238.66		238.66	0.000170	0.48	31.88	50.26	0.12
REACH1	2223.44	50-Year	10.27	236.30	238.69		238.69	0.000206	0.53	33.43	53.40	0.13
REACH1	2223.44	100-Year	11.79	236.30	238.72		238.73	0.000249	0.59	35.12	57.50	0.14
REACH1	2223.44	Regional	13.84	236.30	238.76		238.77	0.000305	0.67	37.43	65.44	0.16
REACH1	2223.43 C1	2-Year	4.24	236.13	236.89		236.95	0.006458	1.07	3.96	12.18	0.60
REACH1	2223.43 C1	5-Year	6.03	236.13	237.03		237.09	0.004205	1.04	5.80	13.86	0.51
REACH1	2223.43 C1	10-Year	7.26	236.13	237.12		237.17	0.003393	1.04	7.01	14.57	0.47
REACH1	2223.43 C1	25-Year	8.94	236.13	237.22		237.28	0.002781	1.06	8.59	15.46	0.44
REACH1	2223.43 C1	50-Year	10.27	236.13	237.30		237.36	0.002461	1.08	9.80	16.14	0.42
REACH1	2223.43 C1	100-Year	11.79	236.13	237.38		237.44	0.002183	1.10	11.19	16.90	0.40
REACH1	2223.43 C1	Regional	13.84	236.13	237.47		237.54	0.002052	1.15	12.74	17.72	0.40
REACH1	2223.42	2-Year	4.24	236.07	236.91		236.91	0.000314	0.37	12.20	22.18	0.15
REACH1	2223.42	5-Year	6.03	236.07	237.05		237.05	0.000318	0.42	15.36	23.12	0.15
REACH1	2223.42	10-Year	7.26	236.07	237.13		237.14	0.000321	0.45	17.35	23.71	0.16
REACH1	2223.42	25-Year	8.94	236.07	237.24		237.25	0.000324	0.49	19.90	24.45	0.16
REACH1	2223.42	50-Year	10.27	236.07	237.31		237.33	0.000327	0.52	21.80	25.01	0.17
REACH1	2223.42	100-Year	11.79	236.07	237.40		237.41	0.000329	0.55	23.93	25.62	0.17
REACH1	2223.42	Regional	13.84	236.07	237.49		237.51	0.000346	0.60	26.30	26.52	0.17
REACH1	2223.41	2-Year	4.24	236.00	236.90	236.16	236.91	0.000071	0.22	19.79	24.36	0.07
REACH1	2223.41	5-Year	6.03	236.00	237.04	236.21	237.05	0.000087	0.26	23.31	26.35	0.08
REACH1	2223.41	10-Year	7.26	236.00	237.13	236.23	237.13	0.000096	0.29	25.61	28.06	0.09
REACH1	2223.41	25-Year	8.94	236.00	237.23	236.27	237.24	0.000106	0.33	28.71	30.25	0.10
REACH1	2223.41	50-Year	10.27	236.00	237.31	236.30	237.32	0.000112	0.35	31.10	31.83	0.10
REACH1	2223.41	100-Year	11.79	236.00	237.40	236.32	237.40	0.000118	0.38	33.86	33.55	0.10
REACH1	2223.41	Regional	13.84	236.00	237.49	236.36	237.50	0.000130	0.41	37.01	35.39	0.11
REACH1	2223.40	2-Year	4.24	236.00	236.71	236.71	236.88	0.017490	1.84	2.30	6.73	1.00
REACH1	2223.40	5-Year	6.03	236.00	236.80	236.80	237.02	0.016208	2.04	3.00	7.82	0.99
REACH1	2223.40	10-Year	7.26	236.00	236.87	236.87	237.10	0.014959	2.15	3.50	8.53	0.97
REACH1	2223.40	25-Year	8.94	236.00	236.94	236.94	237.20	0.014097	2.29	4.16	9.38	0.97
REACH1	2223.40	50-Year	10.27	236.00	237.00	237.00	237.28	0.013286	2.37	4.73	10.05	0.96
REACH1	2223.40	100-Year	11.79	236.00	237.06	237.06	237.36	0.012469	2.45	5.49	13.73	0.94
REACH1	2223.40	Regional	13.84	236.00	237.19	237.19	237.46	0.009353	2.37	7.83	25.56	0.84
REACH1	2223.39	2-Year	4.24	234.75	235.76		235.83	0.003169	1.20	3.54	4.86	0.45
REACH1	2223.39	5-Year	6.03	234.75	235.97		236.06	0.003074	1.30	4.63	5.42	0.45
REACH1	2223.39	10-Year	7.26	234.75	236.06		236.16	0.003385	1.42	5.13	5.67	0.48
REACH1	2223.39	25-Year	8.94	234.75	236.12		236.25	0.004364	1.64	5.45	5.84	0.54
REACH1	2223.39	50-Year	10.27	234.75	236.17		236.33	0.004988	1.78	5.76	6.01	0.58
REACH1	2223.39	100-Year	11.79	234.75	236.22		236.41	0.005768	1.93	6.11	6.32	0.63
REACH1	2223.39	Regional	13.84	234.75	236.28		236.51	0.006995	2.13	6.49	6.70	0.69
REACH1	2223.38	2-Year	4.24	234.50	235.67		235.71	0.001364	0.98	6.20	15.42	0.32
REACH1	2223.38	5-Year	6.03	234.50	235.91		235.95	0.001029	1.00	11.23	26.14	0.29
REACH1	2223.38	10-Year	7.26	234.50	236.01		236.05	0.001030	1.05	13.93	30.28	0.30
REACH1	2223.38	25-Year	8.94	234.50	236.05		236.11	0.001311	1.21	15.36	31.94	0.34
REACH1	2223.38	50-Year	10.27	234.50	236.11		236.17	0.001419	1.29	17.10	33.74	0.35
REACH1	2223.38	100-Year	11.79	234.50	236.15		236.23	0.001641	1.42	18.76	39.50	0.38
REACH1	2223.38	Regional	13.84	234.50	236.20		236.29	0.001931	1.58	20.88	45.35	0.41
REACH1	2223.37	2-Year	4.59	233.51	235.59	234.48	235.65	0.003161	1.17	4.98	16.45	0.45
REACH1	2223.37	5-Year	6.53	233.51	235.87	234.72	235.92	0.001509	1.02	10.17	19.57	0.33
REACH1	2223.37	10-Year	7.85	233.51	235.97	234.88	236.02	0.001478	1.07	12.08	20.72	0.33
REACH1	2223.37	25-Year	9.68	233.51	236.00	235.07	236.06	0.002022	1.27	12.66	21.14	0.39
REACH1	2223.37	50-Year	11.11	233.51	236.02	235.22	236.11	0.002640	1.47	13.22	27.45	0.44
REACH1	2223.37	100-Year	12.75	233.51	236.05	235.75	236.16	0.003111	1.63	14.08	29.45	0.48
REACH1	2223.37	Regional	14.97	233.51	236.05	235.82	236.20	0.004299	1.91	14.06	29.41	0.57
REACH1	2223.365 C2		Culvert									
REACH1	2223.36	2-Year	4.59	233.69	234.71	234.71	235.19	0.012764	3.09	1.49	7.84	1.01
REACH1	2223.36	5-Year	6.53	233.69	234.96	234.96	235.58	0.011777	3.47	1.88	9.07	1.01
REACH1	2223.36	10-Year	7.85	233.69	235.12	235.12	235.82	0.011296	3.69	2.13	11.86	1.01
REACH1	2223.36	25-Year	9.68	233.69	235.57	235.57	235.71	0.012163	1.79	6.27	27.22	0.85
REACH1	2223.36	50-Year	11.11	233.69	235.61	235.61	235.74	0.010738	1.78	7.37	30.97	0.81

HEC-RAS Plan: Matrix - RR50 Dec08 2020 River: CEG_DESIGN Reach: REACH1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
REACH1	2223.36	100-Year	12.75	233.69	235.65	235.65	235.77	0.008827	1.71	8.95	37.85	0.75
REACH1	2223.36	Regional	14.97	233.69	235.68	235.68	235.81	0.009478	1.83	9.94	41.35	0.78
REACH1	2223.35	2-Year	4.59	233.50	234.13	234.13	234.34	0.015947	2.06	2.27	5.86	0.99
REACH1	2223.35	5-Year	6.53	233.50	234.25	234.25	234.51	0.014396	2.30	3.02	6.67	0.98
REACH1	2223.35	10-Year	7.85	233.50	234.32	234.32	234.61	0.013613	2.42	3.53	7.17	0.97
REACH1	2223.35	25-Year	9.68	233.50	234.41	234.41	234.74	0.012799	2.58	4.23	7.80	0.96
REACH1	2223.35	50-Year	11.11	233.50	234.49	234.49	234.84	0.012186	2.67	4.80	8.28	0.95
REACH1	2223.35	100-Year	12.75	233.50	234.56	234.56	234.94	0.011801	2.79	5.41	8.73	0.95
REACH1	2223.35	Regional	14.97	233.50	234.65	234.65	235.06	0.011140	2.91	6.29	9.35	0.94
REACH1	2223.34	2-Year	4.59	233.00	233.62	233.52	233.71	0.006564	1.42	4.77	20.02	0.65
REACH1	2223.34	5-Year	6.53	233.00	233.63	233.63	233.80	0.012144	1.97	5.00	20.84	0.89
REACH1	2223.34	10-Year	7.85	233.00	233.69	233.69	233.87	0.011008	2.02	6.39	25.13	0.86
REACH1	2223.34	25-Year	9.68	233.00	233.76	233.76	233.94	0.010424	2.12	8.18	29.61	0.85
REACH1	2223.34	50-Year	11.11	233.00	233.80	233.80	233.99	0.010091	2.18	9.59	32.71	0.85
REACH1	2223.34	100-Year	12.75	233.00	233.85	233.85	234.04	0.010003	2.26	11.09	35.70	0.85
REACH1	2223.34	Regional	14.97	233.00	233.94	233.90	234.11	0.008001	2.19	14.56	41.93	0.78
REACH1	2223.33	2-Year	4.59	232.50	233.10		233.15	0.004926	1.04	4.78	17.22	0.54
REACH1	2223.33	5-Year	6.53	232.50	233.42		233.44	0.001093	0.74	11.55	25.06	0.28
REACH1	2223.33	10-Year	7.85	232.50	233.51		233.53	0.001004	0.77	13.91	27.04	0.28
REACH1	2223.33	25-Year	9.68	232.50	233.60		233.63	0.000998	0.82	16.52	29.26	0.28
REACH1	2223.33	50-Year	11.11	232.50	233.67		233.71	0.000963	0.85	18.74	31.03	0.28
REACH1	2223.33	100-Year	12.75	232.50	233.72		233.76	0.001041	0.92	20.32	32.22	0.29
REACH1	2223.33	Regional	14.97	232.50	233.80		233.84	0.001065	0.98	22.97	34.05	0.30
REACH1	2223.326	2-Year	4.59	232.03	233.00		233.00	0.000528	0.55	21.96	45.92	0.19
REACH1	2223.326	5-Year	6.53	232.03	233.39		233.39	0.000184	0.42	45.76	73.35	0.12
REACH1	2223.326	10-Year	7.85	232.03	233.49		233.49	0.000174	0.43	52.68	74.12	0.12
REACH1	2223.326	25-Year	9.68	232.03	233.58		233.58	0.000181	0.46	59.67	74.83	0.12
REACH1	2223.326	50-Year	11.11	232.03	233.65		233.66	0.000181	0.47	65.33	75.41	0.12
REACH1	2223.326	100-Year	12.75	232.03	233.70		233.71	0.000201	0.51	69.01	75.78	0.13
REACH1	2223.326	Regional	14.97	232.03	233.78		233.79	0.000217	0.55	75.10	77.45	0.14
REACH1	2223.325	2-Year	4.59	232.00	233.00	232.52	233.00	0.000238	0.36	24.32	39.85	0.13
REACH1	2223.325	5-Year	6.53	232.00	233.39	232.57	233.39	0.000095	0.30	48.18	62.20	0.09
REACH1	2223.325	10-Year	7.85	232.00	233.48	232.59	233.49	0.000098	0.32	54.02	62.61	0.09
REACH1	2223.325	25-Year	9.68	232.00	233.58	232.63	233.58	0.000109	0.36	59.89	63.02	0.10
REACH1	2223.325	50-Year	11.11	232.00	233.65	232.65	233.66	0.000115	0.38	64.68	64.59	0.10
REACH1	2223.325	100-Year	12.75	232.00	233.70	232.67	233.71	0.000132	0.42	67.83	65.76	0.11
REACH1	2223.325	Regional	14.97	232.00	233.78	232.71	233.79	0.000147	0.46	73.13	67.69	0.12
REACH1	2223.324	2-Year	4.59	231.99	232.99	232.52	233.00	0.000336	0.47	24.83	41.10	0.16
REACH1	2223.324	5-Year	6.53	231.99	233.39	232.57	233.39	0.000162	0.42	44.63	59.68	0.12
REACH1	2223.324	10-Year	7.85	231.99	233.48	232.59	233.49	0.000162	0.44	50.23	60.14	0.12
REACH1	2223.324	25-Year	9.68	231.99	233.58	232.63	233.58	0.000180	0.48	55.90	61.23	0.13
REACH1	2223.324	50-Year	11.11	231.99	233.65	232.65	233.65	0.000187	0.51	60.53	62.19	0.13
REACH1	2223.324	100-Year	12.75	231.99	233.70	232.68	233.70	0.000215	0.56	63.55	63.32	0.14
REACH1	2223.324	Regional	14.97	231.99	233.78	232.71	233.78	0.000238	0.60	68.64	65.19	0.15
REACH1	2223.323	2-Year	4.59	231.98	232.99		232.99	0.000292	0.45	21.86	38.50	0.15
REACH1	2223.323	5-Year	6.53	231.98	233.39		233.39	0.000127	0.38	38.90	47.78	0.11
REACH1	2223.323	10-Year	7.85	231.98	233.48		233.48	0.000137	0.42	43.60	53.17	0.11
REACH1	2223.323	25-Year	9.68	231.98	233.57		233.58	0.000160	0.47	48.80	59.25	0.12
REACH1	2223.323	50-Year	11.11	231.98	233.65		233.65	0.000187	0.52	53.29	61.65	0.13
REACH1	2223.323	100-Year	12.75	231.98	233.69		233.70	0.000213	0.57	56.23	62.20	0.14
REACH1	2223.323	Regional	14.97	231.98	233.77		233.78	0.000233	0.61	61.15	63.11	0.15
REACH1	2223.32	2-Year	4.59	231.67	232.98		232.98	0.000191	0.37	22.40	34.97	0.12
REACH1	2223.32	5-Year	6.53	231.67	233.38		233.39	0.000095	0.33	37.78	41.34	0.09
REACH1	2223.32	10-Year	7.85	231.67	233.48		233.48	0.000106	0.37	41.68	42.77	0.10
REACH1	2223.32	25-Year	9.68	231.67	233.57		233.57	0.000127	0.42	45.68	44.61	0.11
REACH1	2223.32	50-Year	11.11	231.67	233.64		233.65	0.000140	0.45	49.02	46.28	0.11
REACH1	2223.32	100-Year	12.75	231.67	233.69		233.69	0.000165	0.50	51.18	47.31	0.13
REACH1	2223.32	Regional	14.97	231.67	233.76		233.77	0.000192	0.56	54.91	49.95	0.14
REACH1	2223.31	2-Year	4.59	231.51	232.98		232.98	0.000021	0.15	39.39	39.96	0.04
REACH1	2223.31	5-Year	6.53	231.51	233.38		233.38	0.000016	0.16	57.46	57.25	0.04
REACH1	2223.31	10-Year	7.85	231.51	233.47		233.48	0.000018	0.18	62.88	59.79	0.04
REACH1	2223.31	25-Year	9.68	231.51	233.57		233.57	0.000023	0.20	68.48	62.72	0.05
REACH1	2223.31	50-Year	11.11	231.51	233.64		233.64	0.000025	0.22	73.18	65.01	0.05
REACH1	2223.31	100-Year	12.75	231.51	233.69		233.69	0.000030	0.24	76.23	66.33	0.06
REACH1	2223.31	Regional	14.97	231.51	233.76		233.77	0.000035	0.27	81.42	68.36	0.06
REACH1	2223.30	2-Year	4.59	231.50	232.98		232.98	0.000064	0.29	40.49	58.08	0.08
REACH1	2223.30	5-Year	6.53	231.50	233.38		233.38	0.000029	0.23	65.78	67.18	0.05
REACH1	2223.30	10-Year	7.85	231.50	233.47		233.48	0.000032	0.25	72.10	69.31	0.06
REACH1	2223.30	25-Year	9.68	231.50	233.57		233.57	0.000037	0.28	78.57	72.16	0.06

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Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
REACH1	2223.30	50-Year	11.11	231.50	233.64		233.64	0.000040	0.30	83.97	74.68	0.07
REACH1	2223.30	100-Year	12.75	231.50	233.69		233.69	0.000047	0.32	87.47	76.27	0.07
REACH1	2223.30	Regional	14.97	231.50	233.76		233.77	0.000053	0.35	93.46	78.91	0.08
REACH1	2223.29	2-Year	4.59	231.50	232.89	232.16	232.96	0.001186	1.15	3.99	21.48	0.32
REACH1	2223.29	5-Year	6.53	231.50	233.27	232.33	233.36	0.001038	1.27	5.13	33.79	0.31
REACH1	2223.29	10-Year	7.85	231.50	233.33	232.43	233.44	0.001354	1.48	5.29	34.52	0.35
REACH1	2223.29	25-Year	9.68	231.50	233.35	232.57	233.52	0.001982	1.81	5.35	34.80	0.43
REACH1	2223.29	50-Year	11.11	231.50	233.41	232.67	233.59	0.002919	1.90	7.48	35.63	0.50
REACH1	2223.29	100-Year	12.75	231.50	233.55	232.78	233.65	0.001844	1.60	12.65	38.47	0.40
REACH1	2223.29	Regional	14.97	231.50	233.67	232.92	233.74	0.001370	1.45	17.35	42.18	0.35
REACH1	2223.285 C3		Culvert									
REACH1	2223.28	2-Year	4.59	231.50	232.17	232.17	232.50	0.014783	2.52	1.82	29.05	1.01
REACH1	2223.28	5-Year	6.53	231.50	232.39	232.34	232.75	0.011226	2.67	2.44	31.85	0.92
REACH1	2223.28	10-Year	7.85	231.50	232.67		232.97	0.006261	2.42	3.25	33.12	0.72
REACH1	2223.28	25-Year	9.68	231.50	232.74	232.58	233.14	0.007959	2.82	3.43	33.42	0.82
REACH1	2223.28	50-Year	11.11	231.50	232.74	232.69	233.27	0.010380	3.23	3.44	33.44	0.94
REACH1	2223.28	100-Year	12.75	231.50	232.80	232.80	233.44	0.011764	3.54	3.60	33.70	1.01
REACH1	2223.28	Regional	14.97	231.50	232.94	232.94	233.65	0.011247	3.73	4.02	34.39	1.00
REACH1	2223.27	2-Year	4.59	231.10	232.02	231.75	232.03	0.000483	0.50	10.90	40.41	0.19
REACH1	2223.27	5-Year	6.53	231.10	232.57	231.80	232.57	0.000061	0.26	25.86	51.67	0.07
REACH1	2223.27	10-Year	7.85	231.10	232.82	231.84	232.82	0.000041	0.24	32.95	56.30	0.06
REACH1	2223.27	25-Year	9.68	231.10	232.94	231.87	232.94	0.000046	0.27	36.30	58.50	0.07
REACH1	2223.27	50-Year	11.11	231.10	233.00	231.89	233.01	0.000052	0.29	38.22	60.01	0.07
REACH1	2223.27	100-Year	12.75	231.10	233.06	231.91	233.07	0.000059	0.31	42.04	61.92	0.07
REACH1	2223.27	Regional	14.97	231.10	233.12	231.94	233.13	0.000069	0.35	45.75	63.70	0.08
REACH1	2223.26	2-Year	4.59	230.74	232.01	231.37	232.02	0.000151	0.34	16.98	44.21	0.11
REACH1	2223.26	5-Year	6.53	230.74	232.57	231.50	232.57	0.000030	0.20	35.85	57.36	0.05
REACH1	2223.26	10-Year	7.85	230.74	232.82	231.67	232.82	0.000022	0.19	44.75	62.28	0.05
REACH1	2223.26	25-Year	9.68	230.74	232.94	231.74	232.94	0.000025	0.21	48.97	64.26	0.05
REACH1	2223.26	50-Year	11.11	230.74	233.00	231.76	233.00	0.000028	0.23	51.40	65.26	0.05
REACH1	2223.26	100-Year	12.75	230.74	233.06	231.79	233.07	0.000032	0.25	55.50	66.59	0.06
REACH1	2223.26	Regional	14.97	230.74	233.12	231.82	233.13	0.000039	0.28	59.44	67.28	0.06
REACH1	2223.25	2-Year	4.59	230.50	231.87	231.25	231.98	0.001814	1.49	3.08	11.31	0.41
REACH1	2223.25	5-Year	6.53	230.50	232.42	231.45	232.53	0.001184	1.51	4.32	23.94	0.35
REACH1	2223.25	10-Year	7.85	230.50	232.75	231.57	232.80	0.001845	1.11	10.14	28.90	0.37
REACH1	2223.25	25-Year	9.68	230.50	232.89	231.73	232.93	0.001328	1.03	14.03	29.22	0.32
REACH1	2223.25	50-Year	11.11	230.50	232.95	231.85	232.99	0.001255	1.04	15.98	29.38	0.31
REACH1	2223.25	100-Year	12.75	230.50	233.01	231.98	233.05	0.001254	1.08	17.76	29.65	0.31
REACH1	2223.25	Regional	14.97	230.50	233.06	232.76	233.11	0.001406	1.17	19.28	30.29	0.34
REACH1	2223.245 C4		Culvert									
REACH1	2223.24	2-Year	4.59	230.20	231.47	230.96	231.60	0.002375	1.61	2.85	9.06	0.46
REACH1	2223.24	5-Year	6.53	230.20	231.75	231.16	231.93	0.002459	1.87	3.49	11.78	0.48
REACH1	2223.24	10-Year	7.85	230.20	232.00	231.28	232.19	0.002166	1.94	4.05	14.11	0.46
REACH1	2223.24	25-Year	9.68	230.20	232.17	231.44	232.41	0.002425	2.18	4.44	18.32	0.50
REACH1	2223.24	50-Year	11.11	230.20	232.25	231.56	232.55	0.002788	2.40	4.62	21.04	0.54
REACH1	2223.24	100-Year	12.75	230.20	232.24	231.69	232.63	0.003774	2.78	4.59	20.14	0.62
REACH1	2223.24	Regional	14.97	230.20	232.19	231.86	232.76	0.005631	3.34	4.48	18.66	0.76
REACH1	2223.23	2-Year	4.59	230.20	231.45	231.00	231.53	0.003472	1.23	3.72	4.91	0.45
REACH1	2223.23	5-Year	6.53	230.20	231.77	231.19	231.84	0.002170	1.21	5.68	7.80	0.38
REACH1	2223.23	10-Year	7.85	230.20	232.04	231.29	232.10	0.001332	1.11	8.19	13.11	0.31
REACH1	2223.23	25-Year	9.68	230.20	232.26	231.42	232.29	0.000732	0.91	16.14	41.34	0.23
REACH1	2223.23	50-Year	11.11	230.20	232.37	231.51	232.40	0.000528	0.81	21.13	45.42	0.20
REACH1	2223.23	100-Year	12.75	230.20	232.40	231.60	232.43	0.000603	0.88	22.46	49.86	0.22
REACH1	2223.23	Regional	14.97	230.20	232.44	231.71	232.47	0.000704	0.96	24.20	53.40	0.23
REACH1	2223.22	2-Year	4.59	230.20	231.01	231.01	231.42	0.006693	2.81	1.63	4.08	1.00
REACH1	2223.22	5-Year	6.53	230.20	231.22	231.22	231.74	0.006231	3.17	2.06	5.10	1.00
REACH1	2223.22	10-Year	7.85	230.20	231.68	231.35	232.04	0.002624	2.63	2.98	7.87	0.69
REACH1	2223.22	25-Year	9.68	230.20	231.54	231.53	232.20	0.005662	3.61	2.68	6.58	1.00
REACH1	2223.22	50-Year	11.11	230.20	232.27	232.27	232.37	0.001991	1.72	13.62	61.84	0.52
REACH1	2223.22	100-Year	12.75	230.20	232.29	232.29	232.40	0.002122	1.80	15.21	62.62	0.54
REACH1	2223.22	Regional	14.97	230.20	232.32	232.32	232.44	0.002258	1.89	17.25	63.62	0.56
REACH1	2223.215 C5		Culvert									
REACH1	2223.21	2-Year	4.59	230.00	230.79	230.79	231.20	0.006827	2.83	1.62	7.04	1.02
REACH1	2223.21	5-Year	6.53	230.00	231.02	231.02	231.52	0.006049	3.15	2.08	8.46	1.00
REACH1	2223.21	10-Year	7.85	230.00	231.15	231.15	231.72	0.005818	3.35	2.34	9.42	1.00
REACH1	2223.21	25-Year	9.68	230.00	231.81	231.81	231.91	0.002107	1.64	10.08	69.17	0.56
REACH1	2223.21	50-Year	11.11	230.00	231.83	231.83	231.94	0.002215	1.71	11.54	69.95	0.57

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Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
REACH1	2223.21	100-Year	12.75	230.00	231.86	231.86	231.97	0.002285	1.77	13.16	70.82	0.59
REACH1	2223.21	Regional	14.97	230.00	231.89	231.89	232.01	0.002449	1.88	14.91	71.74	0.61
REACH1	2223.20	2-Year	5.24	229.70	230.79	230.55	230.87	0.003665	1.27	4.38	8.84	0.50
REACH1	2223.20	5-Year	7.45	229.70	231.11	230.67	231.17	0.001771	1.15	7.89	14.25	0.37
REACH1	2223.20	10-Year	8.96	229.70	231.36	230.74	231.40	0.001032	1.02	12.22	21.00	0.30
REACH1	2223.20	25-Year	11.04	229.70	231.59	230.84	231.63	0.000687	0.94	18.60	35.01	0.25
REACH1	2223.20	50-Year	12.68	229.70	231.61	230.91	231.65	0.000848	1.05	19.23	36.49	0.28
REACH1	2223.20	100-Year	14.55	229.70	231.64	230.99	231.69	0.000988	1.15	20.44	39.52	0.30
REACH1	2223.20	Regional	17.09	229.70	231.68	231.05	231.74	0.001187	1.28	21.90	42.88	0.33
REACH1	2223.19	2-Year	5.24	229.45	230.31	230.31	230.73	0.024454	2.88	1.82	2.19	1.00
REACH1	2223.19	5-Year	7.45	229.45	230.64	230.54	231.08	0.017305	2.92	2.56	6.48	0.86
REACH1	2223.19	10-Year	8.96	229.45	230.94	230.68	231.34	0.011800	2.80	3.23	11.93	0.74
REACH1	2223.19	25-Year	11.04	229.45	230.86	230.86	231.54	0.021275	3.64	3.06	9.33	0.98
REACH1	2223.19	50-Year	12.68	229.45	231.48	231.48	231.62	0.004250	1.94	10.17	35.10	0.44
REACH1	2223.19	100-Year	14.55	229.45	231.52	231.52	231.66	0.004436	2.01	11.48	37.84	0.45
REACH1	2223.19	Regional	17.09	229.45	231.57	231.57	231.70	0.004472	2.05	13.40	41.85	0.46
REACH1	2223.185 C6		Culvert									
REACH1	2223.18	2-Year	5.24	229.37	230.19	230.17	230.58	0.012490	2.77	1.89	5.04	0.98
REACH1	2223.18	5-Year	7.45	229.37	230.38	230.38	230.90	0.012178	3.17	2.35	5.92	1.01
REACH1	2223.18	10-Year	8.96	229.37	230.52	230.52	231.10	0.011672	3.37	2.66	6.89	1.00
REACH1	2223.18	25-Year	11.04	229.37	230.69	230.69	231.35	0.011143	3.61	3.06	11.57	1.01
REACH1	2223.18	50-Year	12.68	229.37	230.82	230.82	231.55	0.010690	3.77	3.36	15.19	1.00
REACH1	2223.18	100-Year	14.55	229.37	231.26	231.26	231.43	0.004708	2.12	10.14	29.93	0.61
REACH1	2223.18	Regional	17.09	229.37	231.31	231.31	231.48	0.004560	2.15	11.97	34.21	0.60
REACH1	2223.17	2-Year	5.24	228.87	229.99	229.99	230.29	0.011640	2.52	2.84	6.86	0.86
REACH1	2223.17	5-Year	7.45	228.87	230.18	230.18	230.50	0.010121	2.69	4.40	8.95	0.83
REACH1	2223.17	10-Year	8.96	228.87	230.28	230.28	230.61	0.009836	2.82	5.36	9.89	0.83
REACH1	2223.17	25-Year	11.04	228.87	230.40	230.40	230.76	0.009663	2.98	6.62	11.00	0.84
REACH1	2223.17	50-Year	12.68	228.87	230.48	230.48	230.86	0.009741	3.11	7.53	11.74	0.85
REACH1	2223.17	100-Year	14.55	228.87	230.57	230.57	230.97	0.009842	3.26	8.59	13.32	0.86
REACH1	2223.17	Regional	17.09	228.87	230.68	230.68	231.10	0.009699	3.40	10.28	16.18	0.87
REACH1	2223.16	2-Year	5.24	228.57	229.61	229.61	229.84	0.016244	2.14	2.53	6.67	0.97
REACH1	2223.16	5-Year	7.45	228.57	229.75	229.75	230.01	0.013547	2.31	3.65	9.01	0.93
REACH1	2223.16	10-Year	8.96	228.57	229.83	229.83	230.12	0.012519	2.42	4.46	10.37	0.91
REACH1	2223.16	25-Year	11.04	228.57	229.93	229.93	230.24	0.011675	2.54	5.59	12.03	0.90
REACH1	2223.16	50-Year	12.68	228.57	230.00	230.00	230.33	0.011411	2.65	6.43	13.13	0.90
REACH1	2223.16	100-Year	14.55	228.57	230.08	230.08	230.42	0.010754	2.73	7.55	14.71	0.88
REACH1	2223.16	Regional	17.09	228.57	230.18	230.18	230.53	0.010157	2.82	9.07	16.61	0.87
REACH1	2223.15	2-Year	5.24	228.50	229.28	228.95	229.31	0.003035	0.67	8.91	23.99	0.28
REACH1	2223.15	5-Year	7.45	228.50	229.39	229.03	229.41	0.003444	0.78	11.61	29.31	0.30
REACH1	2223.15	10-Year	8.96	228.50	229.45	229.08	229.48	0.003578	0.84	13.57	33.52	0.31
REACH1	2223.15	25-Year	11.04	228.50	229.51	229.14	229.55	0.003888	0.92	15.94	38.16	0.32
REACH1	2223.15	50-Year	12.68	228.50	229.56	229.18	229.60	0.004076	0.97	17.75	40.69	0.33
REACH1	2223.15	100-Year	14.55	228.50	229.61	229.23	229.65	0.004212	1.01	19.78	43.15	0.34
REACH1	2223.15	Regional	17.09	228.50	229.66	229.29	229.71	0.004442	1.08	22.23	45.92	0.35
REACH1	2223.14	2-Year	5.24	227.98	228.86		228.91	0.002997	1.15	8.82	36.03	0.45
REACH1	2223.14	5-Year	7.45	227.98	228.95		228.99	0.003002	1.25	12.15	41.52	0.46
REACH1	2223.14	10-Year	8.96	227.98	228.98		229.04	0.003197	1.34	13.79	42.91	0.48
REACH1	2223.14	25-Year	11.04	227.98	229.04		229.09	0.003141	1.39	16.36	44.35	0.48
REACH1	2223.14	50-Year	12.68	227.98	229.10		229.15	0.003004	1.42	18.70	46.95	0.48
REACH1	2223.14	100-Year	14.55	227.98	229.16		229.21	0.002771	1.43	22.04	53.01	0.47
REACH1	2223.14	Regional	17.09	227.98	229.25		229.30	0.002402	1.41	27.18	61.53	0.44
REACH1	2223.13	2-Year	5.24	227.25	228.18	228.18	228.37	0.018126	1.92	2.73	7.23	1.00
REACH1	2223.13	5-Year	7.45	227.25	228.32	228.29	228.51	0.012971	1.93	3.99	10.27	0.88
REACH1	2223.13	10-Year	8.96	227.25	228.46	228.36	228.61	0.008154	1.76	5.52	12.48	0.72
REACH1	2223.13	25-Year	11.04	227.25	228.63	228.44	228.75	0.004878	1.61	8.16	18.21	0.58
REACH1	2223.13	50-Year	12.68	227.25	228.77	228.50	228.87	0.003343	1.48	11.02	23.48	0.50
REACH1	2223.13	100-Year	14.55	227.25	228.89	228.55	228.98	0.002563	1.41	14.20	28.20	0.44
REACH1	2223.13	Regional	17.09	227.25	229.03	228.64	229.10	0.002035	1.37	18.39	33.62	0.40
REACH1	2223.12	2-Year	5.24	227.02	228.02	227.73	228.10	0.002743	1.24	4.95	9.21	0.45
REACH1	2223.12	5-Year	7.45	227.02	228.24	227.85	228.32	0.002293	1.34	7.37	13.42	0.43
REACH1	2223.12	10-Year	8.96	227.02	228.38	227.93	228.47	0.001959	1.36	9.52	16.27	0.41
REACH1	2223.12	25-Year	11.04	227.02	228.57	228.01	228.65	0.001615	1.36	12.94	20.46	0.38
REACH1	2223.12	50-Year	12.68	227.02	228.71	228.10	228.79	0.001396	1.36	16.14	24.35	0.36
REACH1	2223.12	100-Year	14.55	227.02	228.84	228.19	228.91	0.001302	1.38	19.33	27.69	0.35
REACH1	2223.12	Regional	17.09	227.02	228.97	228.29	229.05	0.001266	1.44	23.18	31.45	0.35
REACH1	2223.11	2-Year	5.24	226.75	228.00	227.56	228.08	0.002000	1.21	4.33	7.90	0.39
REACH1	2223.11	5-Year	7.45	226.75	228.19	227.70	228.30	0.002243	1.44	5.17	9.80	0.43

HEC-RAS Plan: Matrix - RR50 Dec08 2020 River: CEG_DESIGN Reach: REACH1 (Continued)

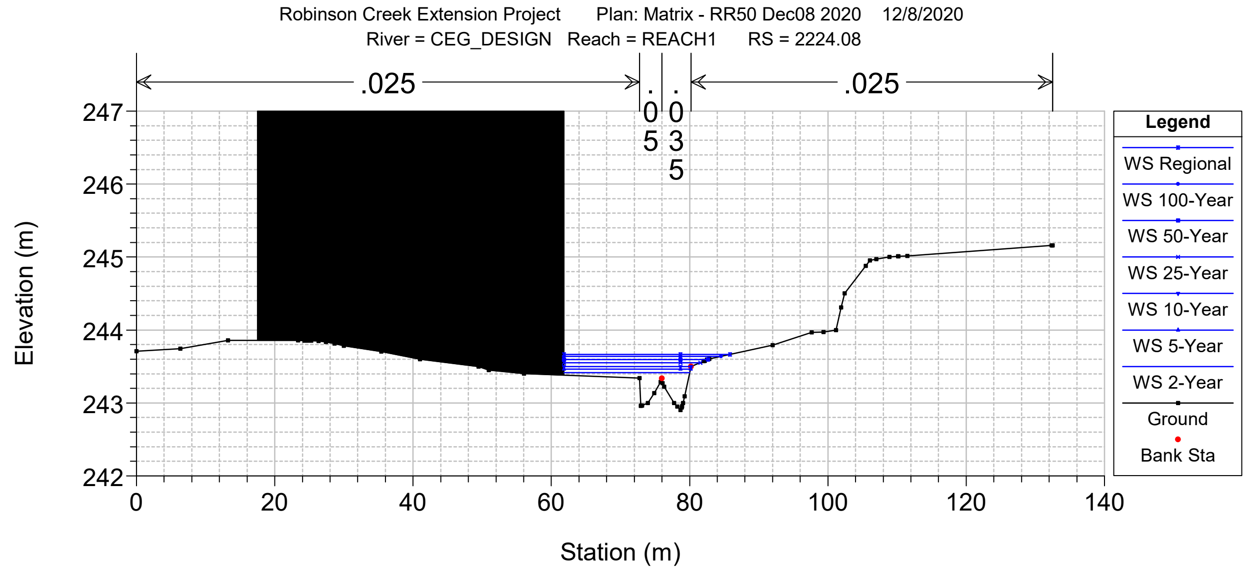
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
REACH1	2223.11	10-Year	8.96	226.75	228.31	227.78	228.44	0.002330	1.57	5.71	11.21	0.44
REACH1	2223.11	25-Year	11.04	226.75	228.46	227.89	228.61	0.002435	1.73	6.39	14.88	0.46
REACH1	2223.11	50-Year	12.68	226.75	228.57	227.97	228.75	0.002487	1.84	6.90	20.82	0.47
REACH1	2223.11	100-Year	14.55	226.75	228.66	228.06	228.86	0.002759	2.00	7.26	24.71	0.50
REACH1	2223.11	Regional	17.09	226.75	228.71	228.18	228.98	0.003388	2.27	7.52	27.23	0.56
REACH1	2223.105 C7		Culvert									
REACH1	2223.10	2-Year	5.24	226.55	227.96	227.58	228.04	0.002868	1.33	4.00	6.42	0.44
REACH1	2223.10	5-Year	7.45	226.55	228.11	227.72	228.24	0.003451	1.61	4.69	8.28	0.50
REACH1	2223.10	10-Year	8.96	226.55	228.19	227.81	228.36	0.003887	1.80	5.06	9.63	0.54
REACH1	2223.10	25-Year	11.04	226.55	228.27	227.92	228.49	0.004667	2.07	5.44	11.01	0.60
REACH1	2223.10	50-Year	12.68	226.55	228.32	228.00	228.58	0.005459	2.29	5.64	11.78	0.65
REACH1	2223.10	100-Year	14.55	226.55	228.39	228.10	228.70	0.005977	2.49	5.96	13.00	0.68
REACH1	2223.10	Regional	17.09	226.55	228.50	228.21	228.87	0.006298	2.69	6.47	14.88	0.71
REACH1	2223.09	2-Year	5.24	226.45	227.66	227.63	227.88	0.015756	2.07	2.53	4.97	0.93
REACH1	2223.09	5-Year	7.45	226.45	227.82	227.77	228.07	0.013360	2.19	3.42	6.05	0.88
REACH1	2223.09	10-Year	8.96	226.45	227.91	227.87	228.18	0.012649	2.29	3.98	6.40	0.88
REACH1	2223.09	25-Year	11.04	226.45	228.04	227.97	228.32	0.010980	2.35	4.83	7.27	0.84
REACH1	2223.09	50-Year	12.68	226.45	228.14	228.05	228.42	0.009737	2.38	5.58	8.48	0.80
REACH1	2223.09	100-Year	14.55	226.45	228.25	228.13	228.53	0.008300	2.38	6.63	9.94	0.76
REACH1	2223.09	Regional	17.09	226.45	228.41	228.23	228.67	0.006664	2.35	8.37	11.95	0.69
REACH1	2223.08	2-Year	5.24	226.30	227.13	227.13	227.45	0.019438	2.49	2.10	3.33	1.00
REACH1	2223.08	5-Year	7.45	226.30	227.33	227.33	227.68	0.018602	2.63	2.83	4.20	1.01
REACH1	2223.08	10-Year	8.96	226.30	227.44	227.44	227.81	0.017309	2.70	3.32	4.76	1.00
REACH1	2223.08	25-Year	11.04	226.30	227.55	227.55	227.98	0.016701	2.89	3.82	5.21	1.00
REACH1	2223.08	50-Year	12.68	226.30	227.64	227.64	228.10	0.016075	3.02	4.20	5.46	1.00
REACH1	2223.08	100-Year	14.55	226.30	227.73	227.73	228.24	0.015585	3.16	4.60	5.67	1.00
REACH1	2223.08	Regional	17.09	226.30	227.84	227.84	228.41	0.014983	3.33	5.13	5.92	1.00
REACH1	2223.075 C8		Culvert									
REACH1	2223.07	2-Year	5.24	226.13	227.20	226.67	227.26	0.001650	1.11	4.71	6.23	0.35
REACH1	2223.07	5-Year	7.45	226.13	227.33	226.81	227.43	0.002230	1.40	5.31	6.86	0.41
REACH1	2223.07	10-Year	8.96	226.13	227.41	226.89	227.54	0.002631	1.59	5.65	7.21	0.45
REACH1	2223.07	25-Year	11.04	226.13	227.49	227.01	227.66	0.003235	1.84	6.01	7.60	0.51
REACH1	2223.07	50-Year	12.68	226.13	227.55	227.09	227.75	0.003735	2.03	6.26	7.85	0.55
REACH1	2223.07	100-Year	14.55	226.13	227.61	227.17	227.86	0.004221	2.22	6.55	8.15	0.59
REACH1	2223.07	Regional	17.09	226.13	227.69	227.29	228.00	0.004900	2.48	6.90	8.50	0.64
REACH1	2223.06	2-Year	5.24	226.10	227.02	226.95	227.15	0.009937	1.60	3.28	7.54	0.78
REACH1	2223.06	5-Year	7.45	226.10	227.16	227.06	227.31	0.009098	1.73	4.31	8.26	0.76
REACH1	2223.06	10-Year	8.96	226.10	227.24	227.12	227.40	0.008677	1.79	4.99	8.70	0.76
REACH1	2223.06	25-Year	11.04	226.10	227.30	227.21	227.50	0.009519	1.97	5.60	9.07	0.80
REACH1	2223.06	50-Year	12.68	226.10	227.37	227.27	227.58	0.009453	2.05	6.19	9.43	0.81
REACH1	2223.06	100-Year	14.55	226.10	227.45	227.33	227.67	0.008796	2.08	7.01	9.89	0.79
REACH1	2223.06	Regional	17.09	226.10	227.57	227.41	227.79	0.007580	2.09	8.33	13.59	0.75
REACH1	2223.05	2-Year	5.24	225.27	226.21	226.04	226.32	0.006546	1.47	3.57	6.76	0.65
REACH1	2223.05	5-Year	7.45	225.27	226.35	226.17	226.48	0.006922	1.62	4.59	7.81	0.68
REACH1	2223.05	10-Year	8.96	225.27	226.43	226.25	226.58	0.007166	1.71	5.24	8.46	0.69
REACH1	2223.05	25-Year	11.04	225.27	226.59	226.35	226.73	0.005743	1.65	6.70	9.98	0.63
REACH1	2223.05	50-Year	12.68	225.27	226.65	226.42	226.80	0.005825	1.74	7.34	11.18	0.64
REACH1	2223.05	100-Year	14.55	225.27	226.68	226.49	226.87	0.006695	1.91	7.72	11.82	0.69
REACH1	2223.05	Regional	17.09	225.27	226.70	226.58	226.94	0.008707	2.20	7.89	12.04	0.79
REACH1	2223.04	2-Year	5.69	224.70	225.48	225.43	225.66	0.012270	1.90	3.00	6.22	0.87
REACH1	2223.04	5-Year	8.09	224.70	225.64	225.57	225.84	0.011000	2.01	4.02	7.01	0.85
REACH1	2223.04	10-Year	9.73	224.70	225.73	225.64	225.95	0.010141	2.05	4.74	7.52	0.83
REACH1	2223.04	25-Year	11.99	224.70	225.74	225.74	226.06	0.014802	2.50	4.80	7.56	1.00
REACH1	2223.04	50-Year	13.77	224.70	225.83	225.81	226.15	0.013679	2.52	5.47	8.00	0.97
REACH1	2223.04	100-Year	15.81	224.70	225.99	225.89	226.26	0.009993	2.31	6.83	8.94	0.85
REACH1	2223.04	Regional	18.56	224.70	226.27	225.99	226.47	0.004932	1.98	9.61	11.25	0.62
REACH1	2223.03	2-Year	5.69	224.20	224.76	224.76	225.04	0.015483	2.31	2.46	5.23	1.00
REACH1	2223.03	5-Year	8.09	224.20	224.91	224.91	225.25	0.014345	2.60	3.11	5.55	1.00
REACH1	2223.03	10-Year	9.73	224.20	225.00	225.00	225.39	0.013489	2.75	3.54	5.91	0.99
REACH1	2223.03	25-Year	11.99	224.20	225.28	225.12	225.60	0.007656	2.52	4.76	7.29	0.78
REACH1	2223.03	50-Year	13.77	224.20	225.43	225.20	225.75	0.006435	2.53	5.45	8.08	0.73
REACH1	2223.03	100-Year	15.81	224.20	225.59	225.30	225.92	0.005601	2.56	6.17	8.97	0.70
REACH1	2223.03	Regional	18.56	224.20	226.00	225.42	226.27	0.003245	2.32	8.01	17.89	0.56
REACH1	2223.025		Culvert									
REACH1	2223.02	2-Year	5.69	223.68	224.78	224.24	224.85	0.001517	1.16	4.89	7.93	0.36
REACH1	2223.02	5-Year	8.09	223.68	224.95	224.38	225.06	0.001874	1.43	5.66	8.91	0.41
REACH1	2223.02	10-Year	9.73	223.68	225.04	224.48	225.17	0.002142	1.60	6.08	9.43	0.44

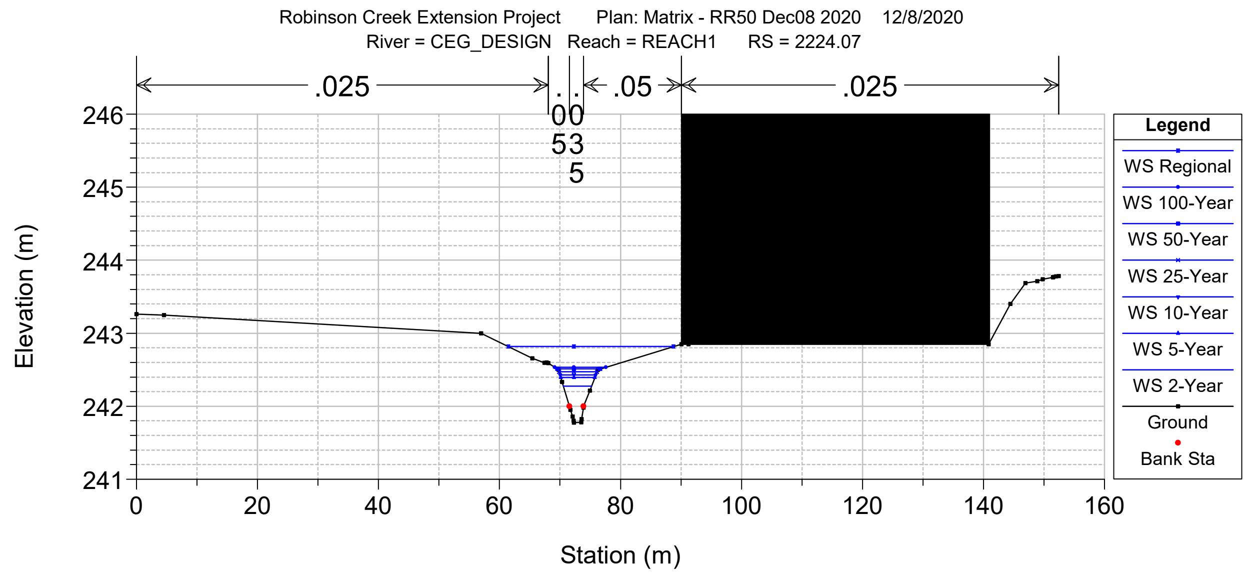
HEC-RAS Plan: Matrix - RR50 Dec08 2020 River: CEG_DESIGN Reach: REACH1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
REACH1	2223.02	25-Year	11.99	223.68	225.14	224.59	225.31	0.002597	1.84	6.50	9.97	0.49
REACH1	2223.02	50-Year	13.77	223.68	225.19	224.68	225.41	0.003028	2.04	6.75	10.28	0.53
REACH1	2223.02	100-Year	15.81	223.68	225.24	224.77	225.50	0.003604	2.27	6.96	10.55	0.58
REACH1	2223.02	Regional	18.56	223.68	225.61	224.90	225.84	0.002448	2.16	8.60	12.64	0.50
REACH1	2223.01	2-Year	5.69	223.33	224.78	224.20	224.82	0.001112	0.77	7.35	9.59	0.28
REACH1	2223.01	5-Year	8.09	223.33	224.97	224.34	225.01	0.001218	0.88	9.20	10.62	0.30
REACH1	2223.01	10-Year	9.73	223.33	225.07	224.41	225.11	0.001298	0.94	10.30	11.18	0.31
REACH1	2223.01	25-Year	11.99	223.33	225.18	224.51	225.23	0.001447	1.04	11.55	11.79	0.33
REACH1	2223.01	50-Year	13.77	223.33	225.24	224.58	225.31	0.001591	1.11	12.35	12.17	0.35
REACH1	2223.01	100-Year	15.81	223.33	225.31	224.65	225.38	0.001776	1.20	13.14	12.53	0.38
REACH1	2223.01	Regional	18.56	223.33	225.68	224.74	225.73	0.001016	1.02	18.20	14.62	0.29
REACH1	2219.56	2-Year	6.08	223.16	224.62	224.30	224.70	0.004223	1.26	4.84	7.82	0.51
REACH1	2219.56	5-Year	8.72	223.16	224.78	224.47	224.88	0.004558	1.41	6.20	9.03	0.54
REACH1	2219.56	10-Year	10.49	223.16	224.87	224.56	224.98	0.004802	1.50	7.03	15.67	0.56
REACH1	2219.56	25-Year	12.98	223.16	224.96	224.67	225.09	0.004875	1.61	9.57	33.53	0.58
REACH1	2219.56	50-Year	14.95	223.16	225.02	224.75	225.16	0.005003	1.70	11.68	43.36	0.59
REACH1	2219.56	100-Year	17.19	223.16	225.03	224.82	225.21	0.006068	1.89	12.44	45.59	0.65
REACH1	2219.56	Regional	38.30	223.16	225.47	225.34	225.61	0.003778	1.97	39.45	95.39	0.55
REACH1	2219.55	2-Year	6.08	222.82	223.49	223.49	223.68	0.017370	1.95	3.13	8.30	1.01
REACH1	2219.55	5-Year	8.72	222.82	223.61	223.61	223.83	0.016430	2.09	4.16	9.48	1.01
REACH1	2219.55	10-Year	10.49	222.82	223.68	223.68	223.92	0.015544	2.15	4.87	10.21	1.00
REACH1	2219.55	25-Year	12.98	222.82	223.77	223.77	224.02	0.015250	2.24	5.80	11.33	1.00
REACH1	2219.55	50-Year	14.95	222.82	223.84	223.83	224.09	0.014297	2.25	6.64	12.23	0.98
REACH1	2219.55	100-Year	17.19	222.82	223.97	223.89	224.18	0.010286	2.07	8.30	13.53	0.84
REACH1	2219.55	Regional	38.30	222.82	224.31	224.31	224.69	0.013501	2.74	13.99	18.41	1.00
REACH1	2219.54	2-Year	6.08	221.60	223.01		223.01	0.000307	0.54	30.36	53.22	0.16
REACH1	2219.54	5-Year	8.72	221.60	223.63		223.64	0.000071	0.35	70.91	74.26	0.08
REACH1	2219.54	10-Year	10.49	221.60	223.77		223.77	0.000071	0.36	81.42	78.02	0.08
REACH1	2219.54	25-Year	12.98	221.60	223.90		223.90	0.000081	0.40	91.21	81.27	0.09
REACH1	2219.54	50-Year	14.95	221.60	223.97		223.97	0.000090	0.44	97.20	83.19	0.10
REACH1	2219.54	100-Year	17.19	221.60	224.07		224.07	0.000096	0.47	105.59	86.51	0.10
REACH1	2219.54	Regional	38.30	221.60	224.23		224.24	0.000353	0.94	120.28	95.14	0.19
REACH1	2219.53	2-Year	6.08	220.75	222.79	221.91	222.93	0.004266	1.64	3.76	29.07	0.39
REACH1	2219.53	5-Year	8.72	220.75	223.52	222.19	223.60	0.004015	1.33	12.78	77.30	0.46
REACH1	2219.53	10-Year	10.49	220.75	223.74	222.36	223.76	0.001256	0.86	29.86	84.55	0.26
REACH1	2219.53	25-Year	12.98	220.75	223.87	222.59	223.88	0.000892	0.78	41.36	89.62	0.23
REACH1	2219.53	50-Year	14.95	220.75	223.94	222.76	223.96	0.000819	0.78	48.13	93.57	0.22
REACH1	2219.53	100-Year	17.19	220.75	224.04	222.93	224.06	0.000679	0.75	57.99	98.72	0.20
REACH1	2219.53	Regional	38.30	220.75	224.15	223.82	224.19	0.002147	1.40	68.99	103.55	0.36
REACH1	2219.525		Culvert									
REACH1	2219.52	2-Year	6.08	220.65	222.06	222.06	222.60	0.036106	3.26	1.86	1.74	1.01
REACH1	2219.52	5-Year	8.72	220.65	222.40	222.40	223.02	0.031508	3.50	2.51	28.84	0.99
REACH1	2219.52	10-Year	10.49	220.65	222.57	222.57	223.26	0.029531	3.69	2.89	43.58	0.97
REACH1	2219.52	25-Year	12.98	220.65	222.79	222.79	223.58	0.028379	3.96	3.36	51.32	0.98
REACH1	2219.52	50-Year	14.95	220.65	222.95	222.95	223.81	0.027241	4.13	3.73	58.99	0.97
REACH1	2219.52	100-Year	17.19	220.65	223.12	223.12	224.06	0.026424	4.32	4.11	65.41	0.97
REACH1	2219.52	Regional	38.30	220.65	223.73	223.73	223.93	0.010384	3.01	38.89	95.57	0.66
REACH1	2219.51	2-Year	6.08	220.50	222.03	221.82	222.04	0.003166	0.88	14.69	40.93	0.37
REACH1	2219.51	5-Year	8.72	220.50	222.11		222.13	0.003388	1.00	18.41	43.88	0.39
REACH1	2219.51	10-Year	10.49	220.50	222.18		222.20	0.003308	1.05	21.12	45.92	0.39
REACH1	2219.51	25-Year	12.98	220.50	222.25		222.27	0.003233	1.11	24.72	48.37	0.40
REACH1	2219.51	50-Year	14.95	220.50	222.31		222.33	0.003187	1.15	27.39	49.85	0.40
REACH1	2219.51	100-Year	17.19	220.50	222.36		222.39	0.003172	1.20	30.26	51.47	0.40
REACH1	2219.51	Regional	38.30	220.50	222.76		222.80	0.003201	1.53	53.54	63.73	0.43
REACH1	2219.50	2-Year	6.08	220.15	221.37	221.37	221.59	0.017409	2.11	2.98	7.56	1.00
REACH1	2219.50	5-Year	8.72	220.15	221.55	221.55	221.74	0.010478	2.03	6.04	23.95	0.82
REACH1	2219.50	10-Year	10.49	220.15	221.61	221.61	221.81	0.009838	2.11	7.76	27.46	0.80
REACH1	2219.50	25-Year	12.98	220.15	221.69	221.69	221.90	0.009545	2.22	9.96	31.10	0.81
REACH1	2219.50	50-Year	14.95	220.15	221.74	221.74	221.96	0.009391	2.30	11.66	33.62	0.81
REACH1	2219.50	100-Year	17.19	220.15	221.80	221.80	222.02	0.009170	2.38	13.61	36.31	0.81
REACH1	2219.50	Regional	38.30	220.15	222.14	222.14	222.42	0.009216	2.97	29.44	54.20	0.85

APPENDIX F HEC-RAS OUTPUT

Item 3 – Cross-section Profile


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.08
.025
.05
.035
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.07
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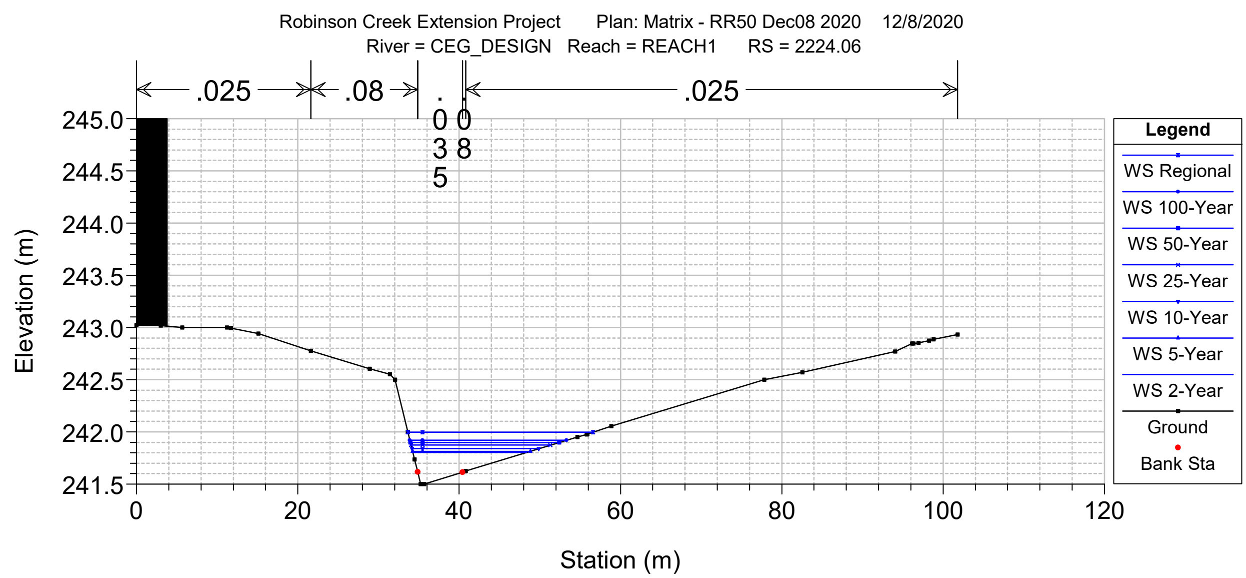
.05
.035
.05
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.06
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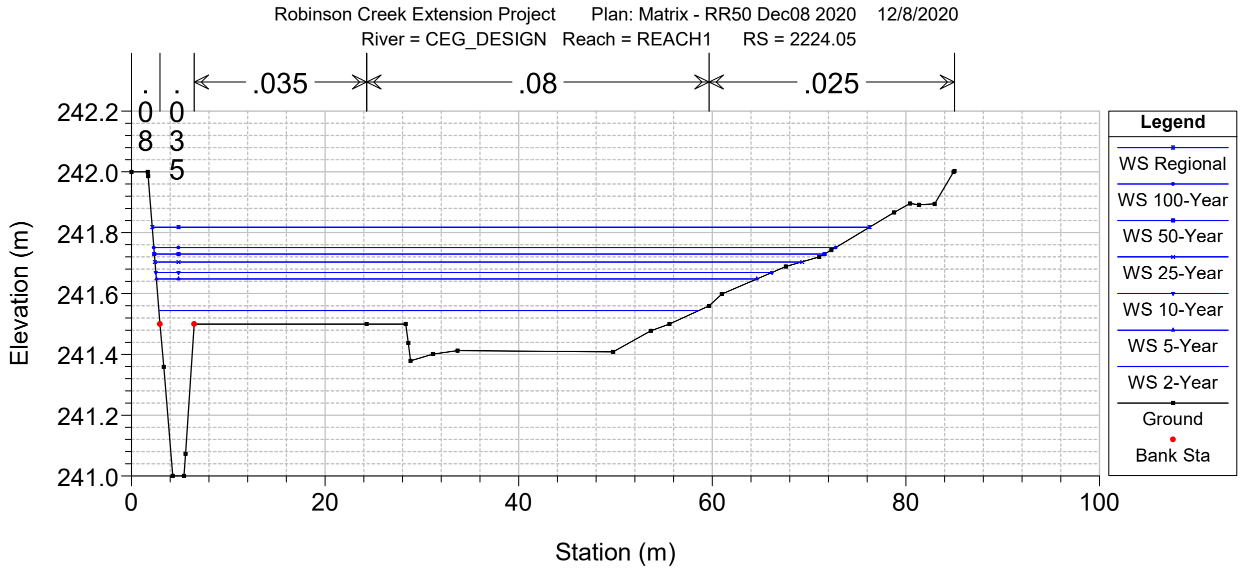
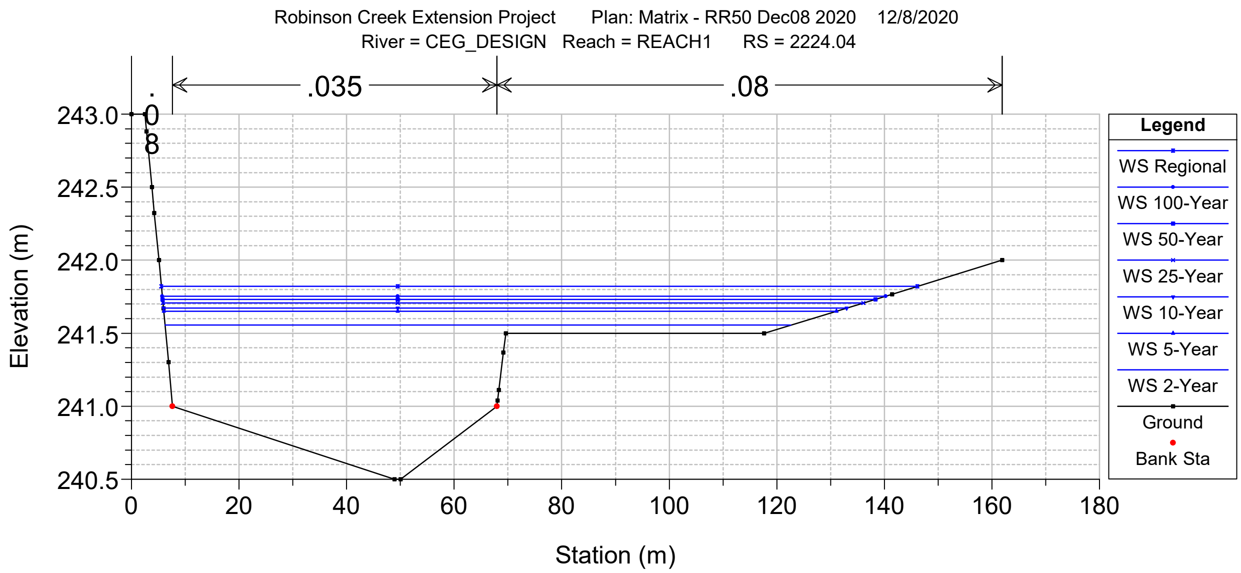
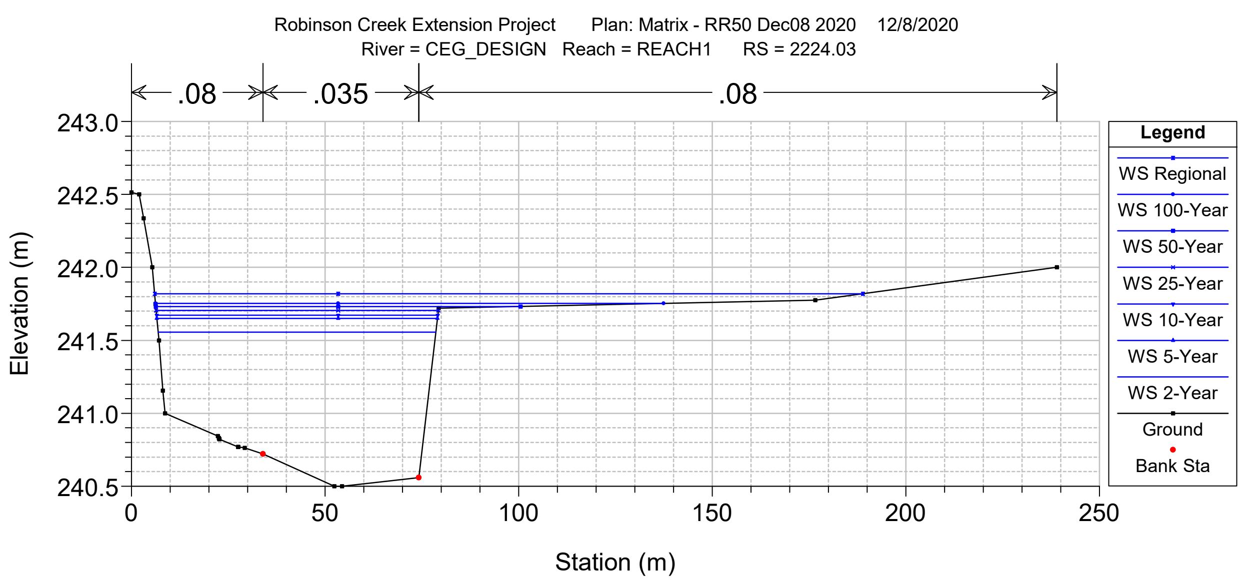
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



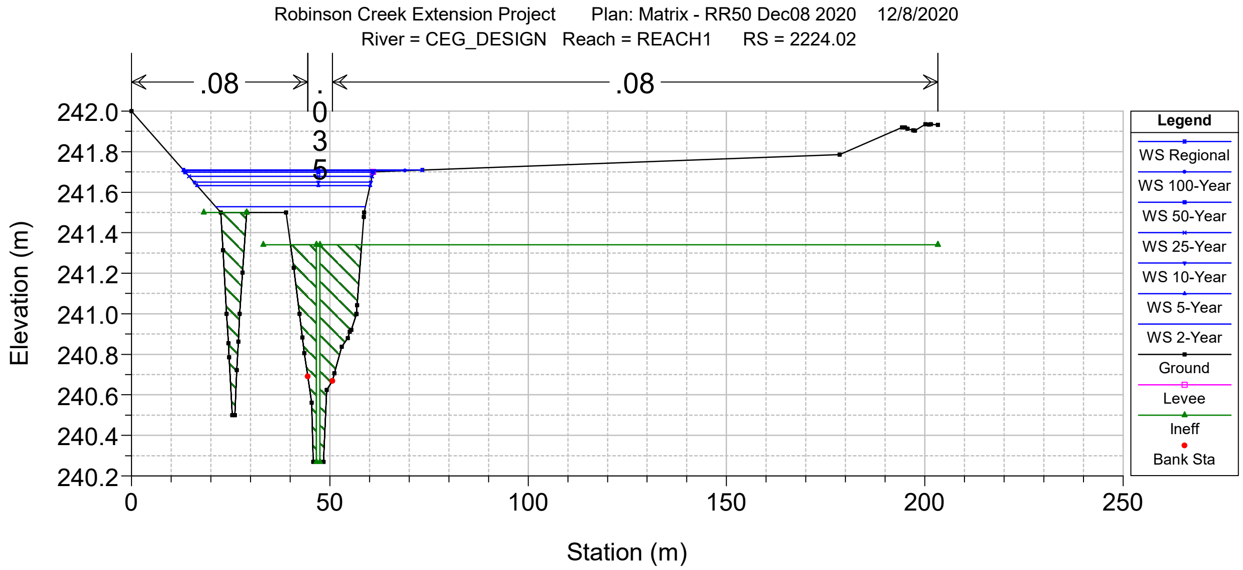
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.05
.08
.035
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



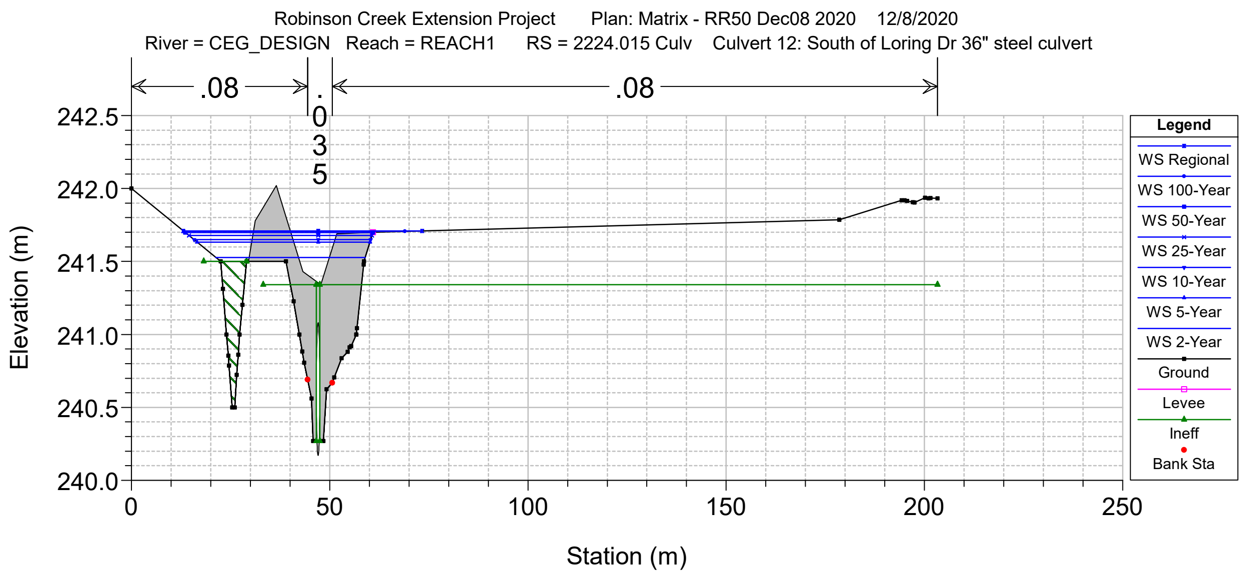
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.04
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



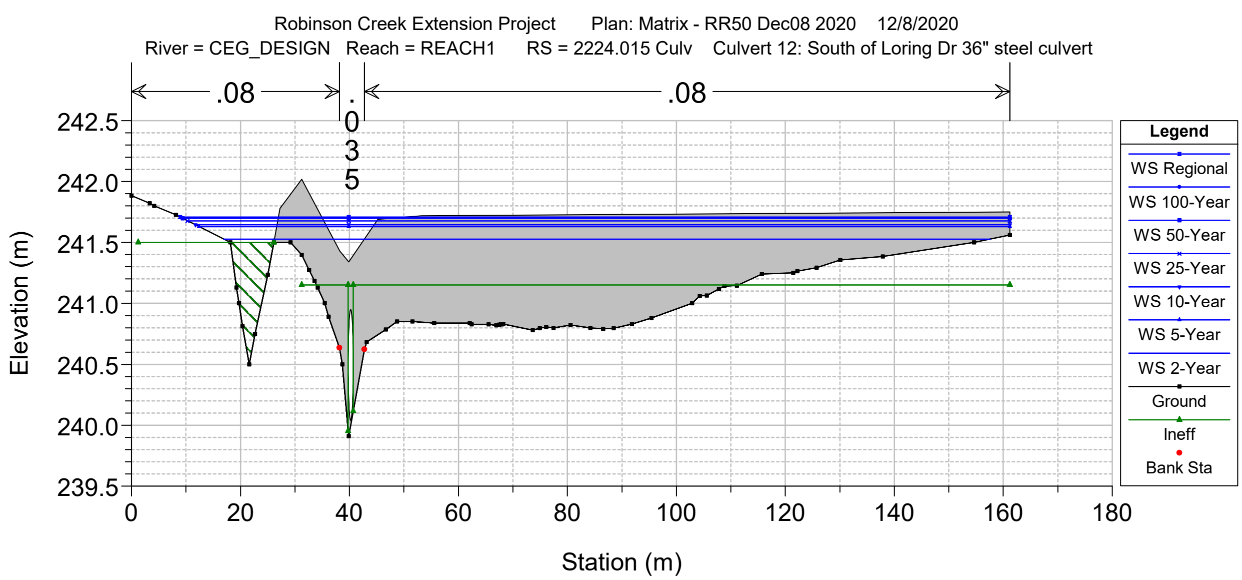
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.03
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



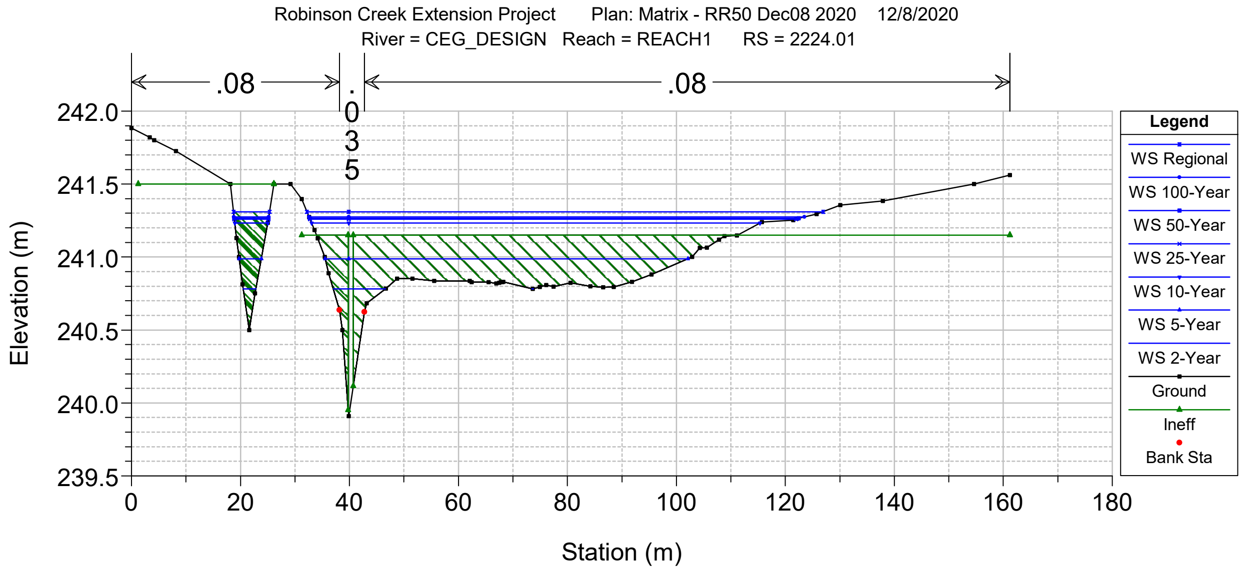
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.02
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

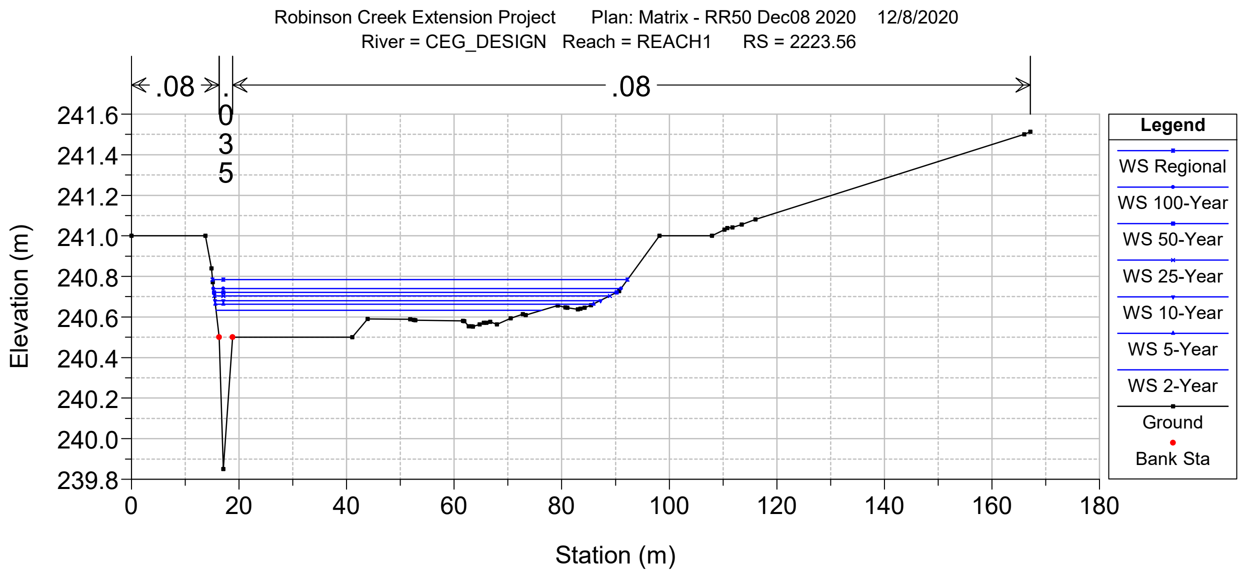


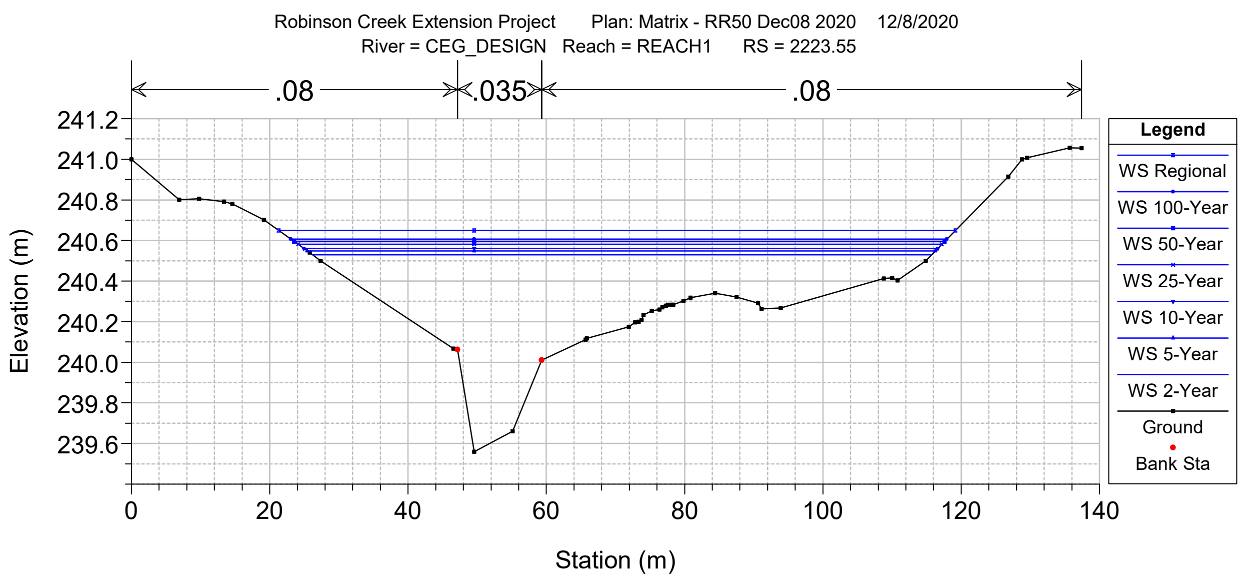
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.015 Culv Culvert 12: South of Loring Dr 36" steel culvert
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

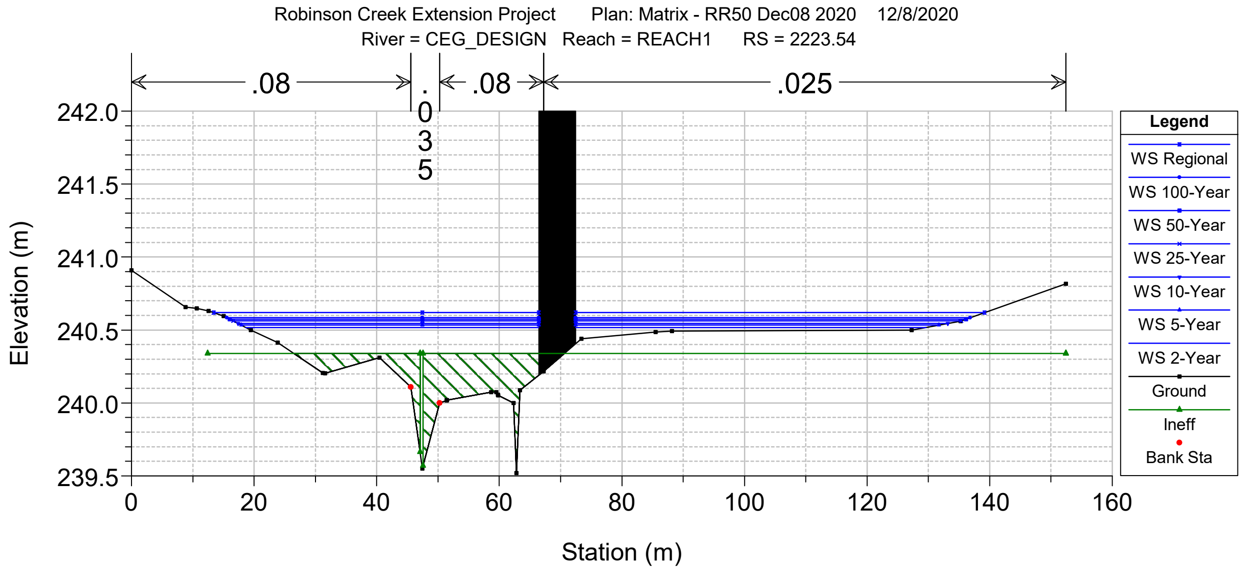


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.015 Culv Culvert 12: South of Loring Dr 36" steel culvert
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

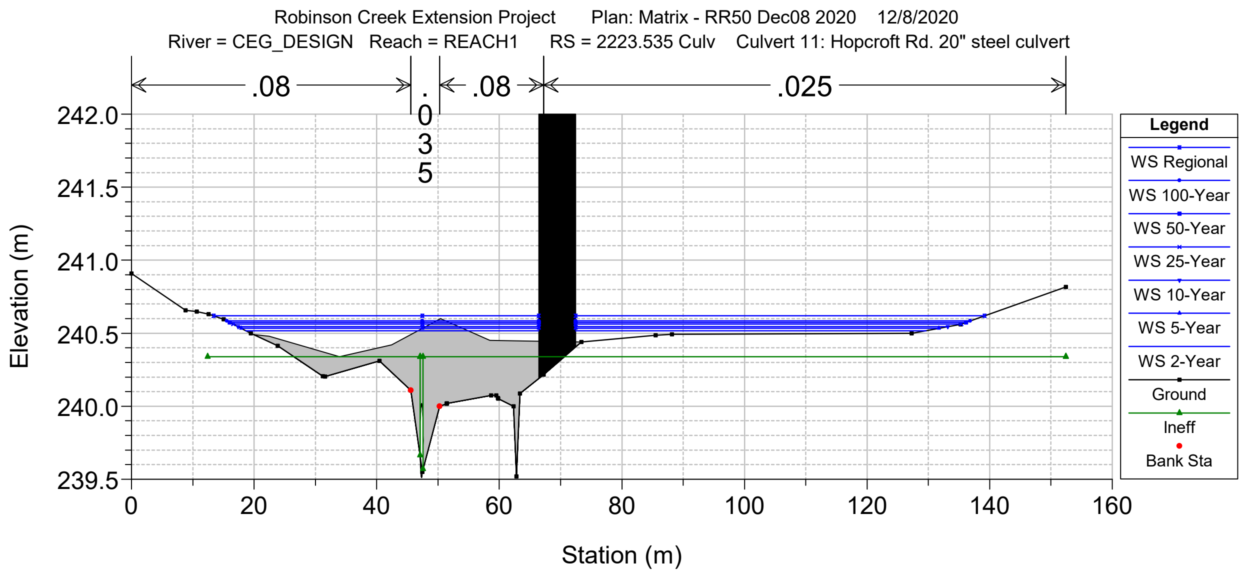

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2224.01
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.56
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

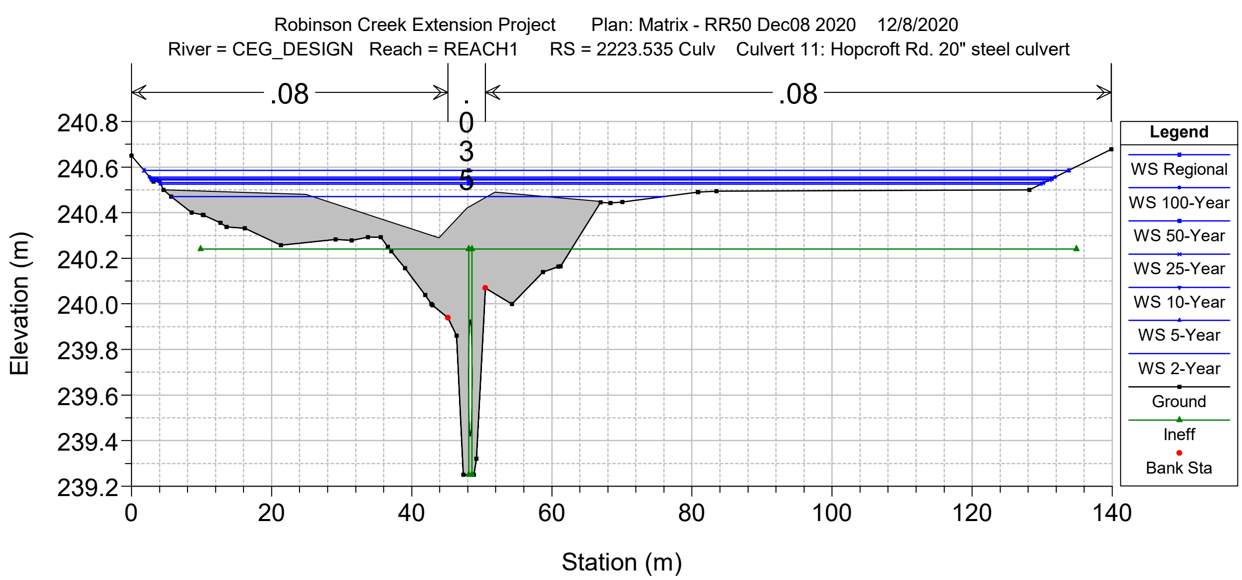

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.55
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



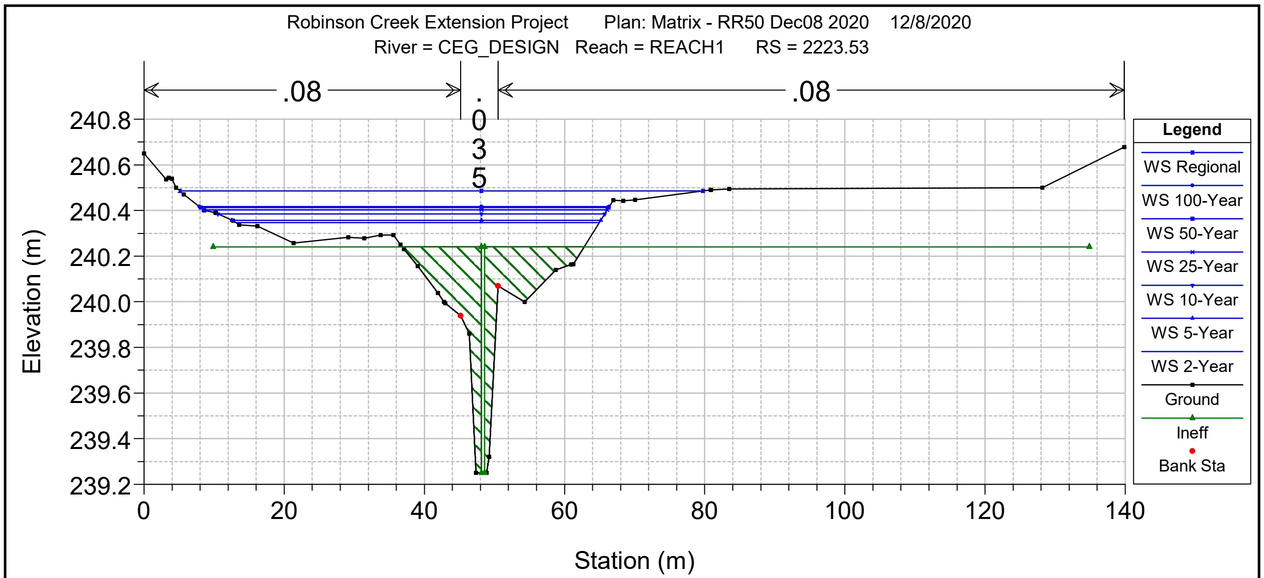
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.54
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

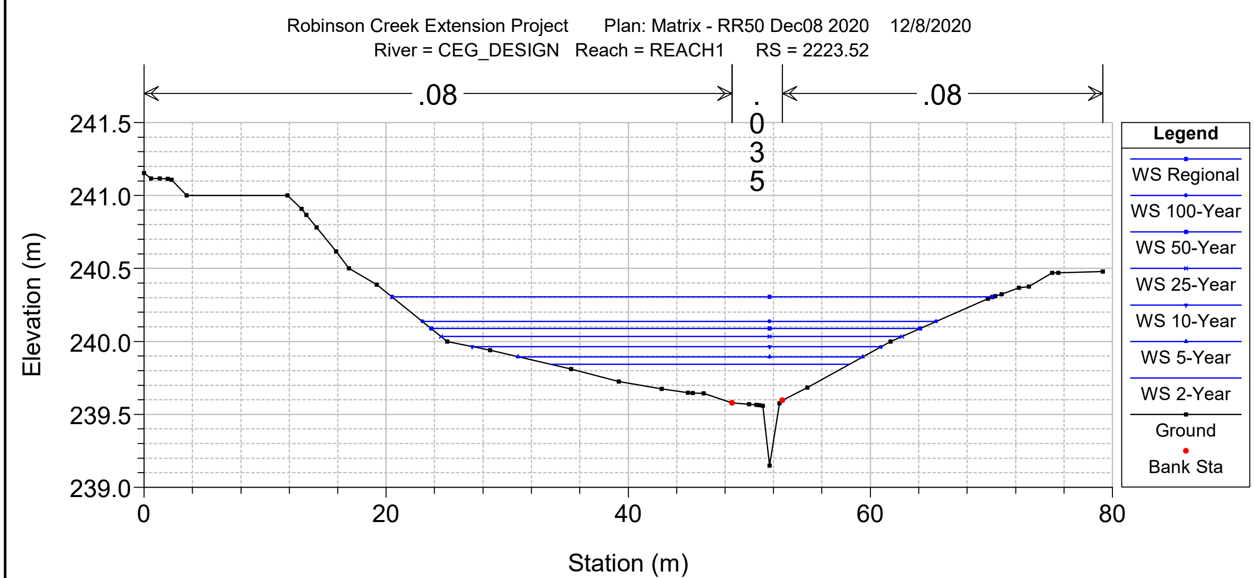


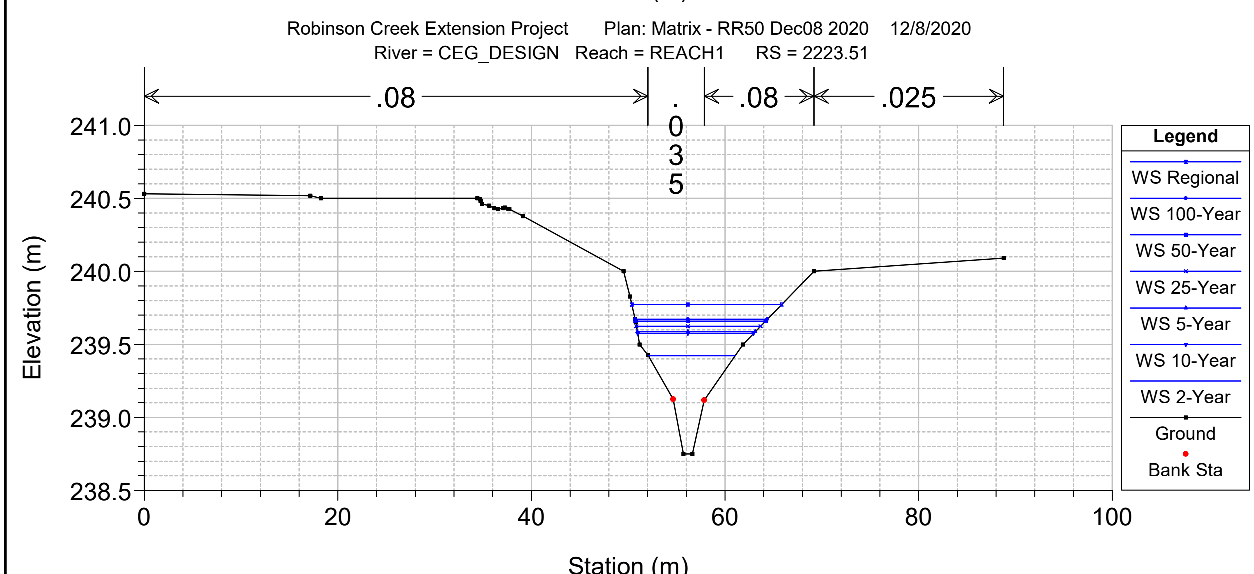
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.535 Culv Culvert 11: Hopcroft Rd. 20" steel culvert
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta



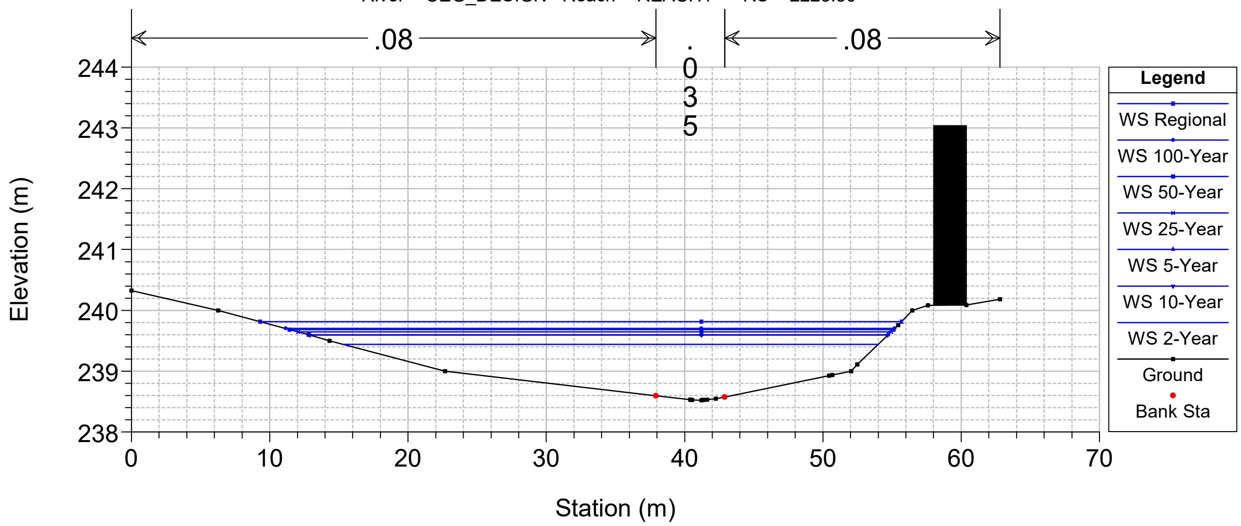
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.535 Culv Culvert 11: Hopcroft Rd. 20" steel culvert
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.53
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

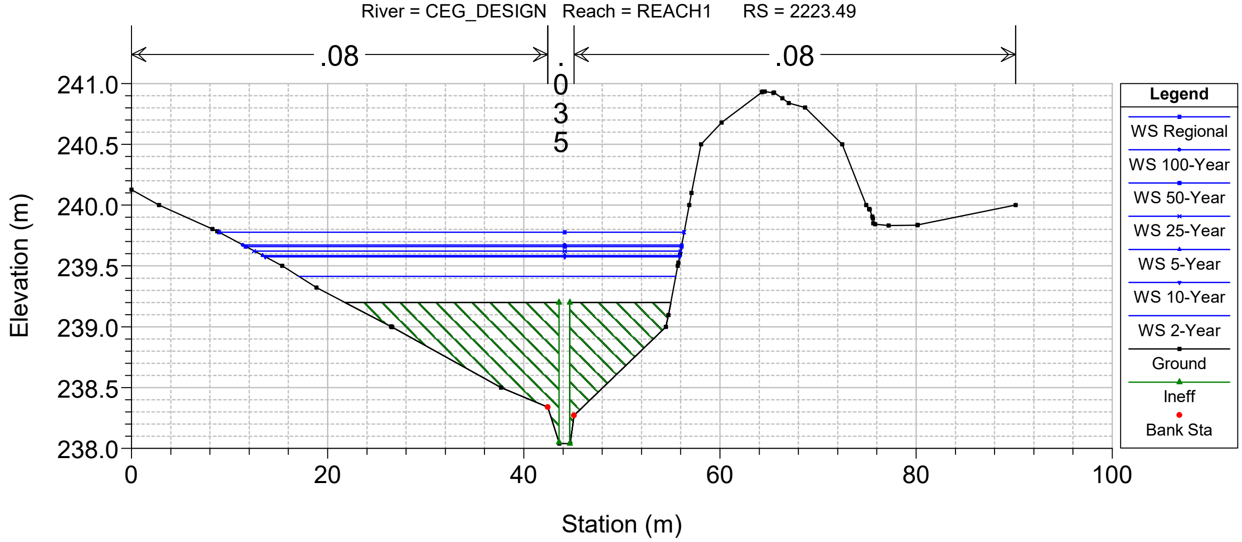

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.52
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.51
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 5-Year
WS 10-Year
WS 2-Year
Ground
Bank Sta

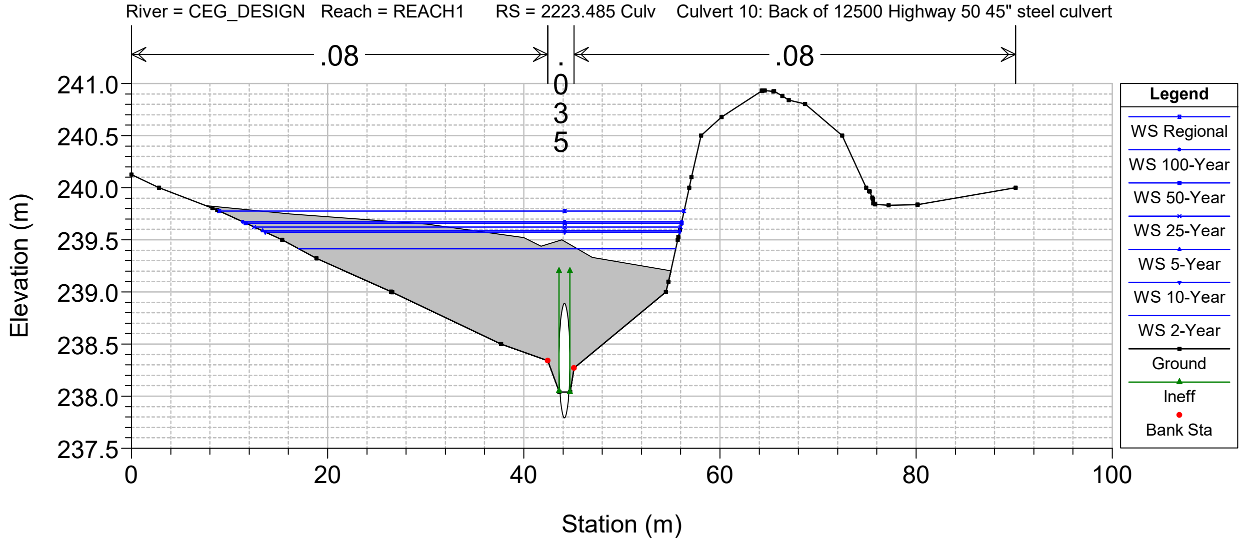
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.50

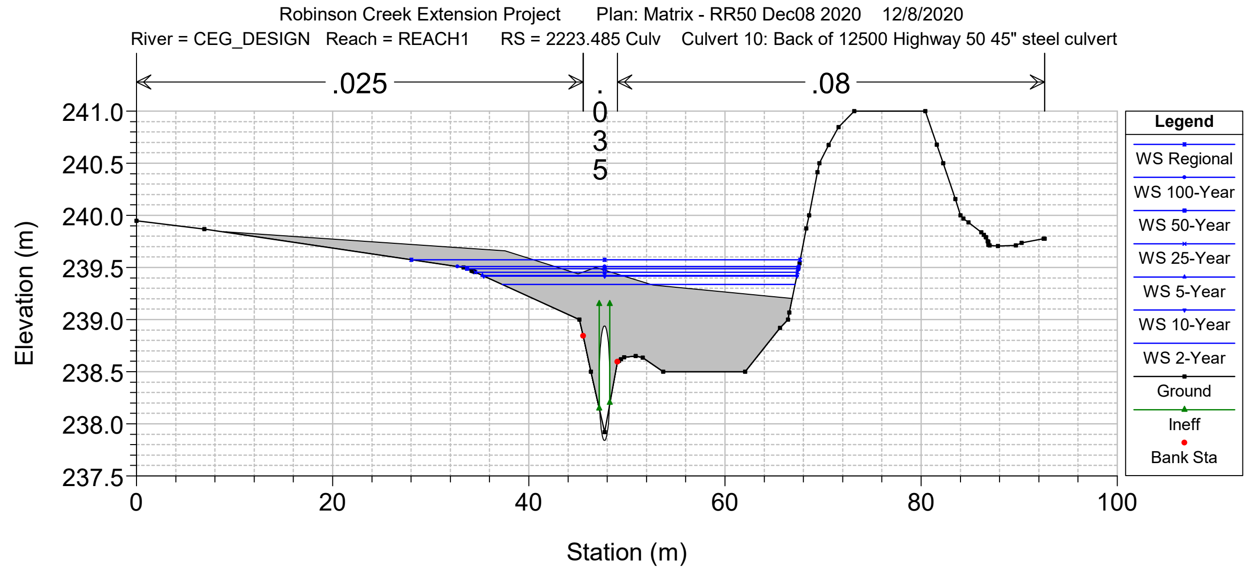


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.49

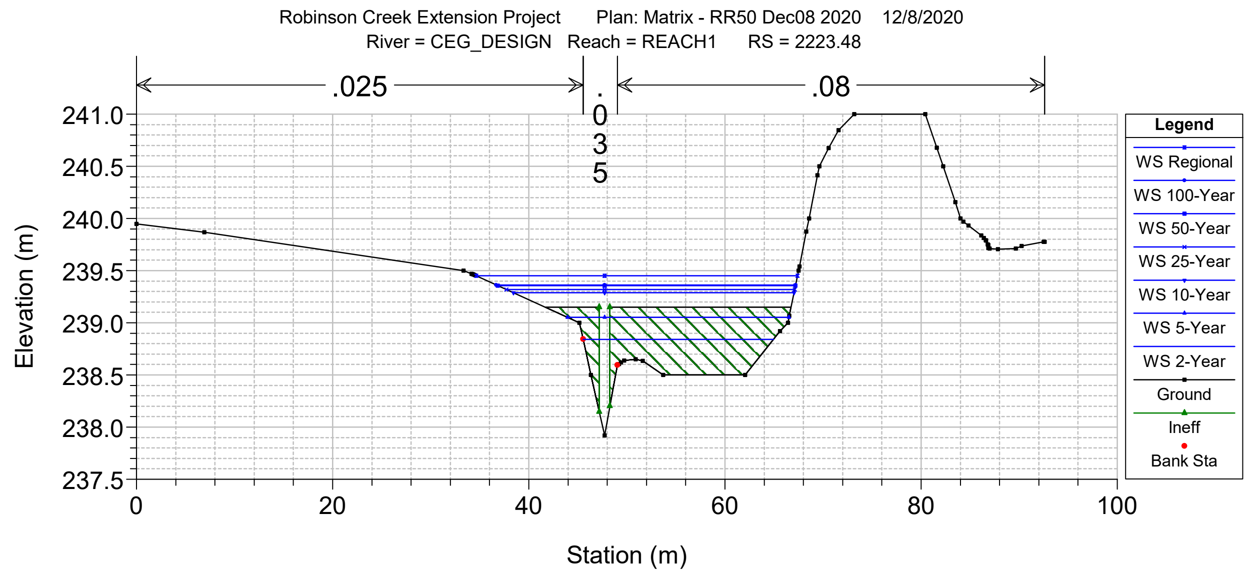


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.485 Culv Culvert 10: Back of 12500 Highway 50 45" steel culvert

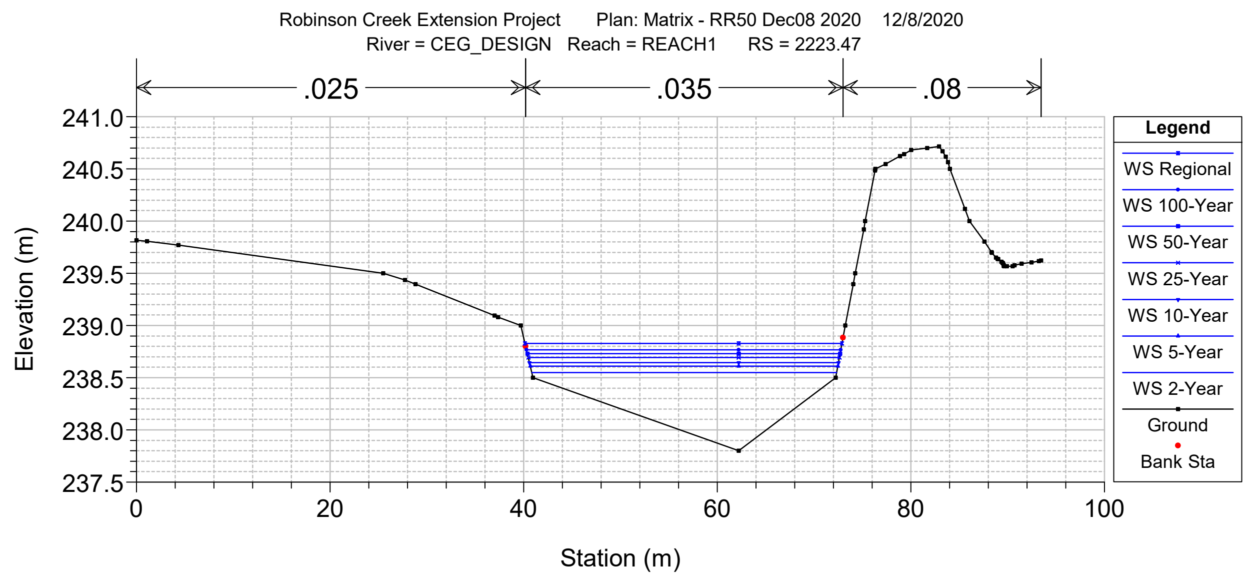




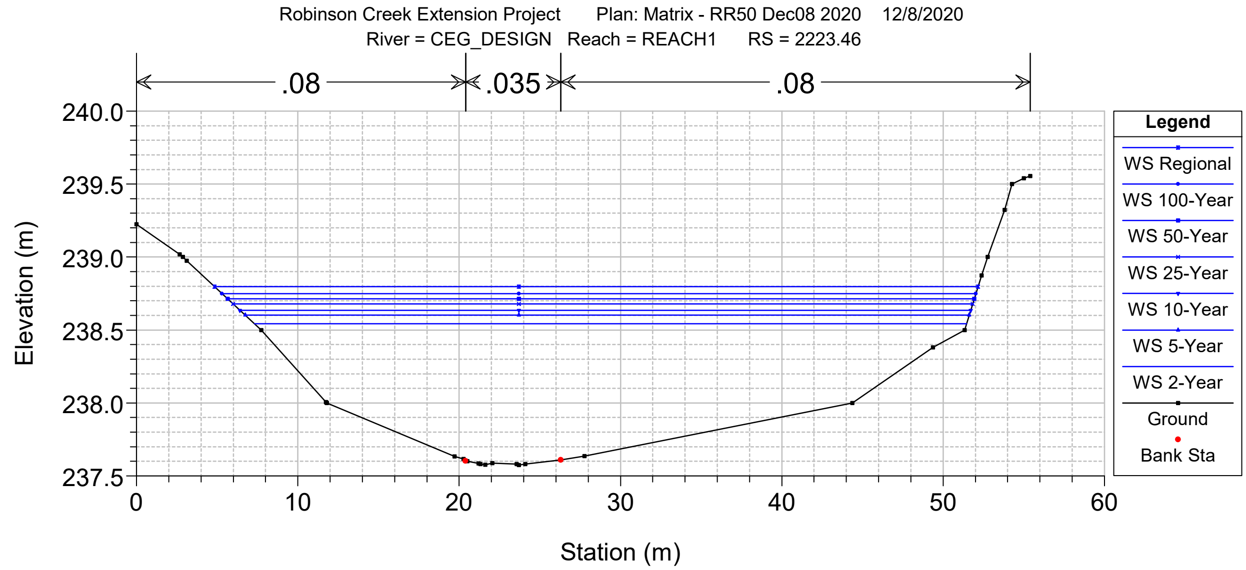
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.485 Culv Culvert 10: Back of 12500 Highway 50 45" steel culvert
.025
.035
.08
Elevation (m)
Station (m)
241.0
240.5
240.0
239.5
239.0
238.5
238.0
237.5
0
20
40
60
80
100
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 5-Year
WS 10-Year
WS 2-Year
Ground
Ineff
Bank Sta



Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.48
.025
.035
.08
Elevation (m)
Station (m)
241.0
240.5
240.0
239.5
239.0
238.5
238.0
237.5
0
20
40
60
80
100
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta



Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.47
.025
.035
.08
Elevation (m)
Station (m)
241.0
240.5
240.0
239.5
239.0
238.5
238.0
237.5
0
20
40
60
80
100
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.46
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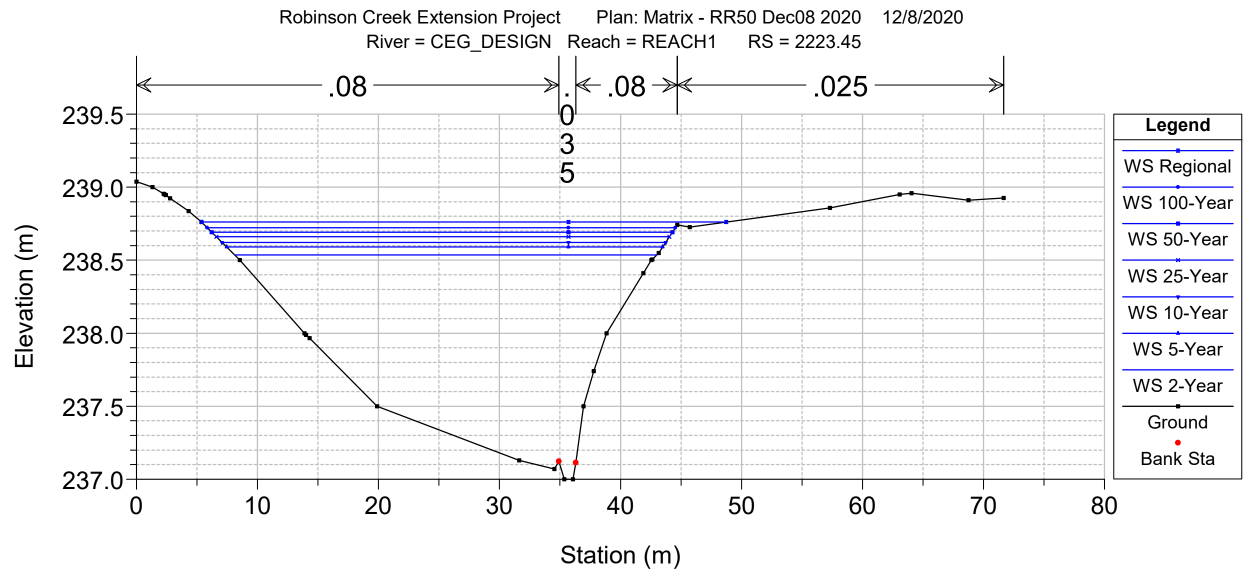
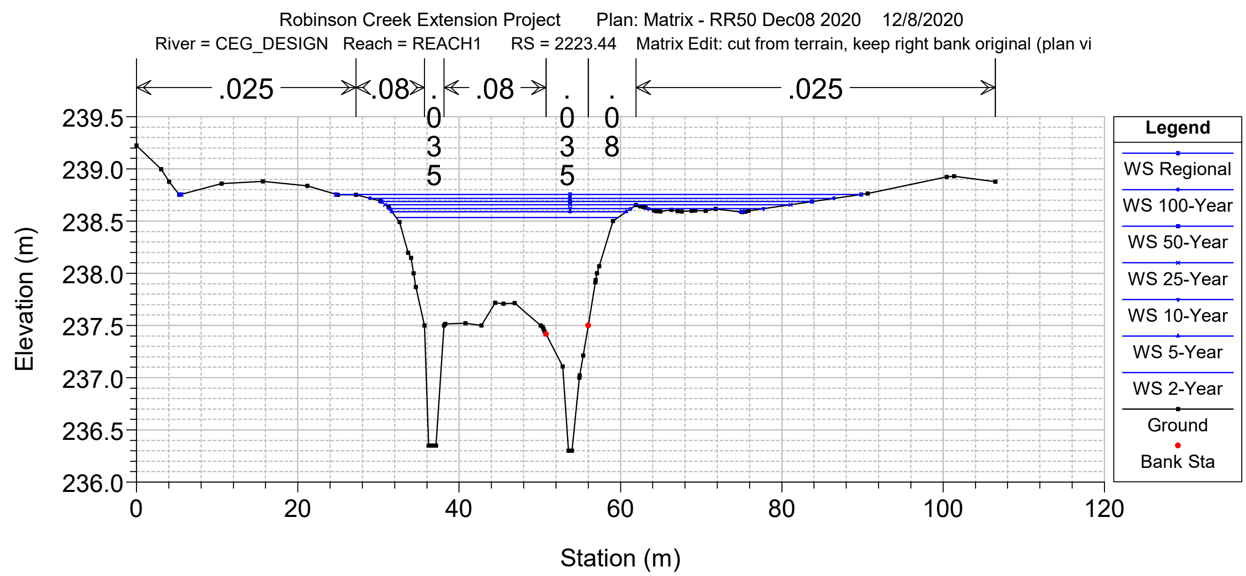
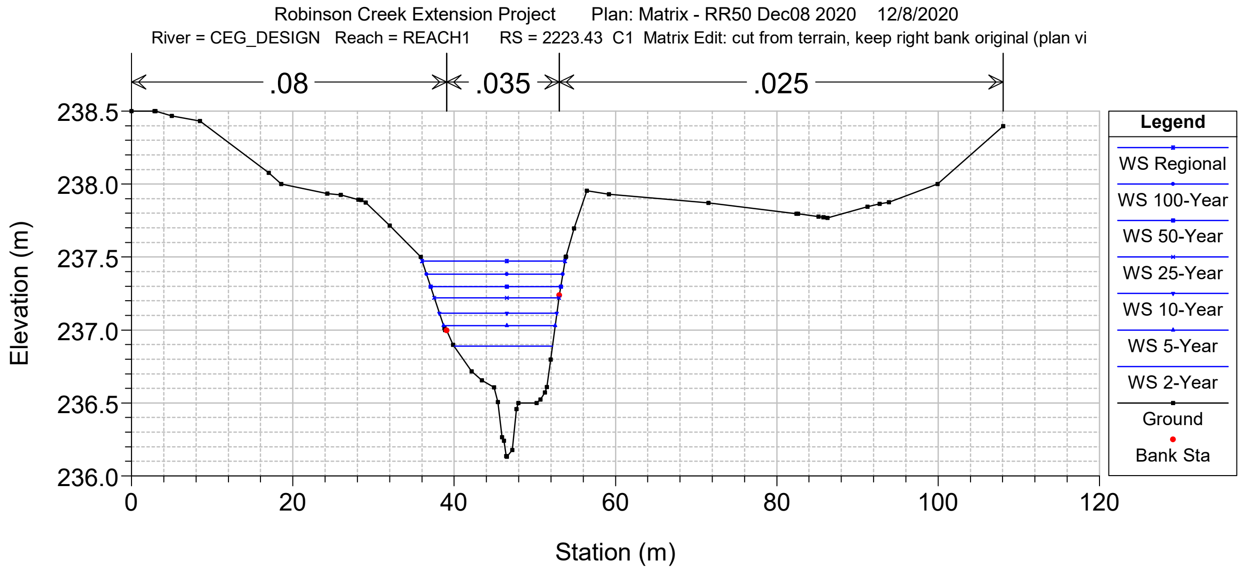
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

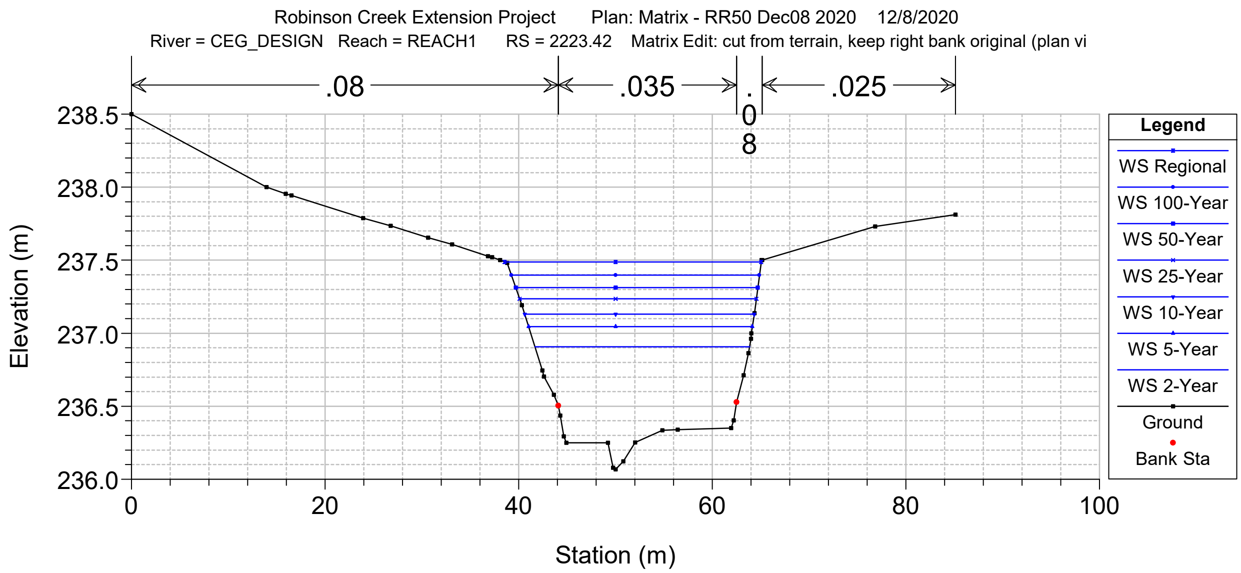


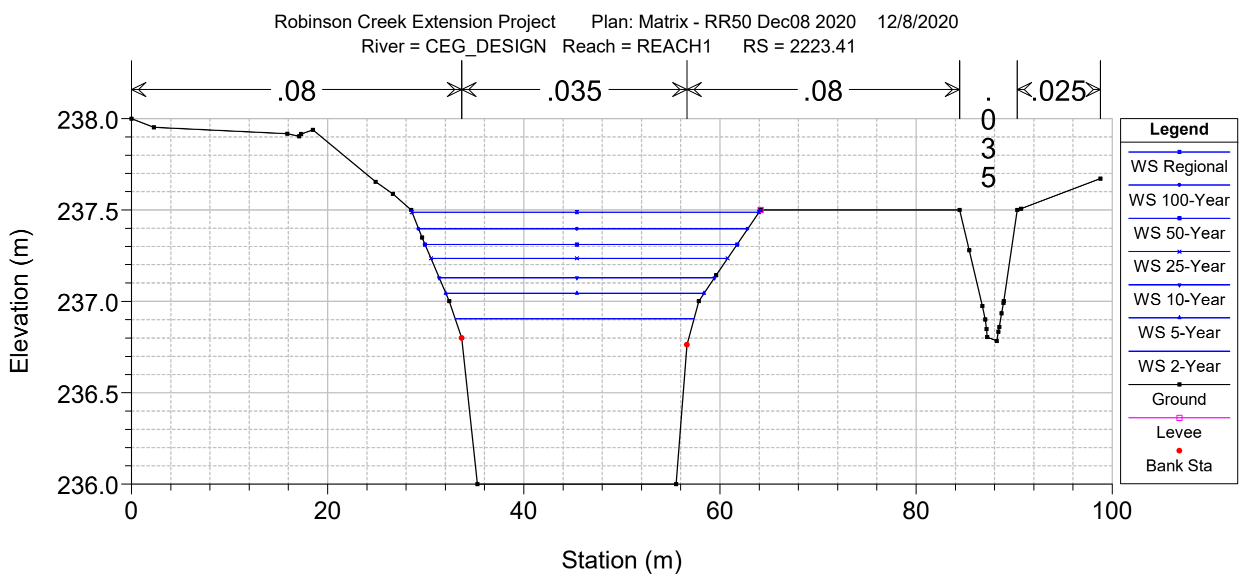
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.45
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

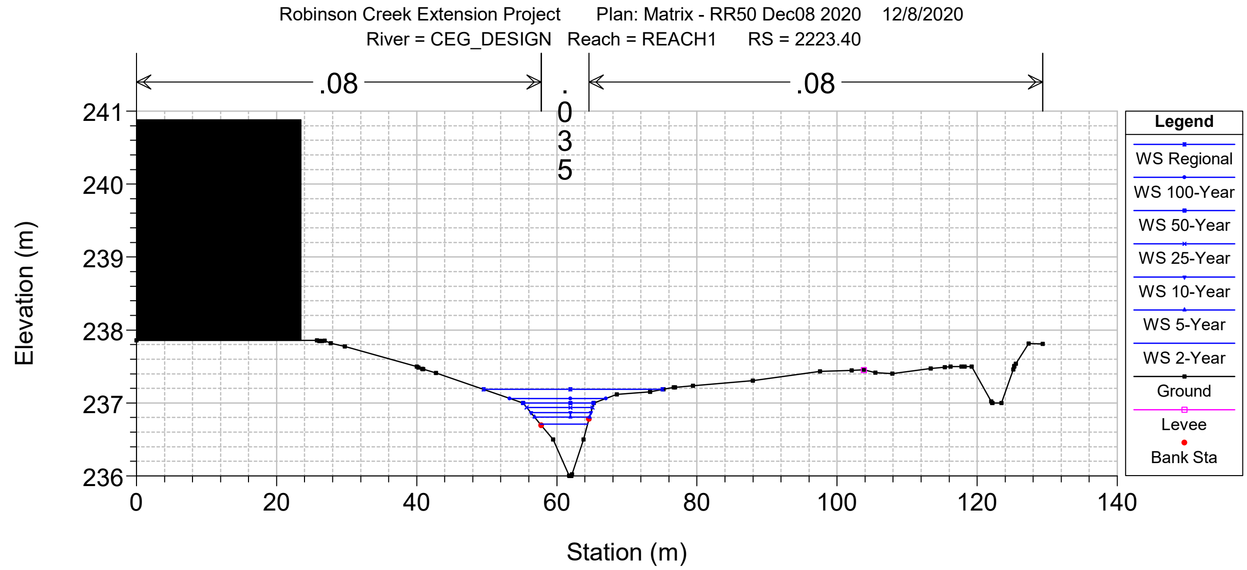


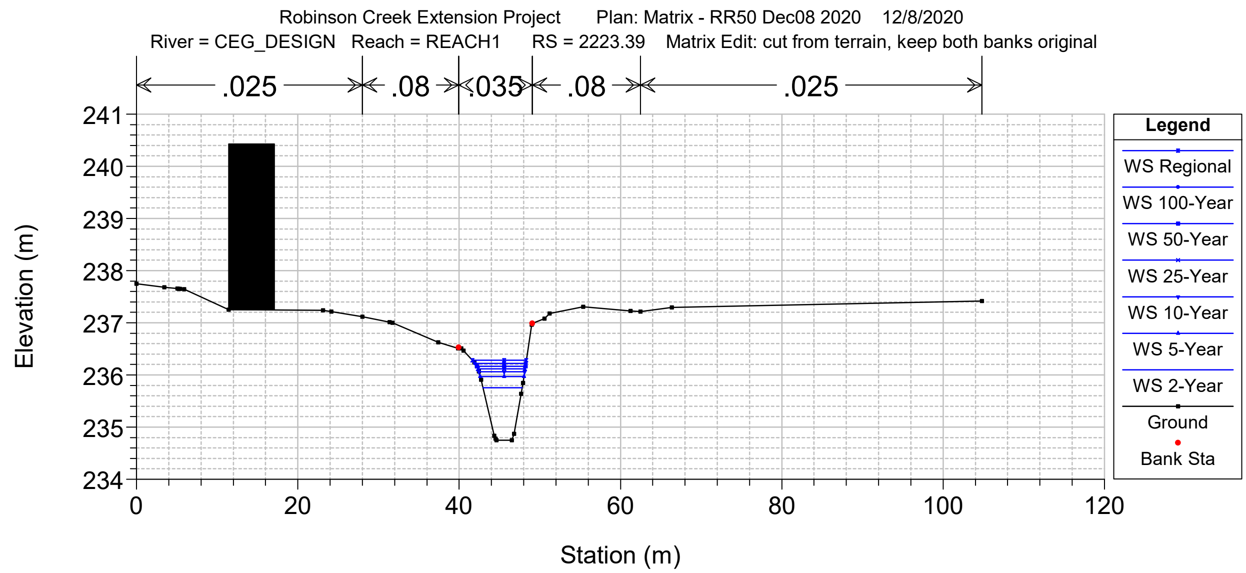
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.44 Matrix Edit: cut from terrain, keep right bank original (plan vi
.025
.08
.035
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

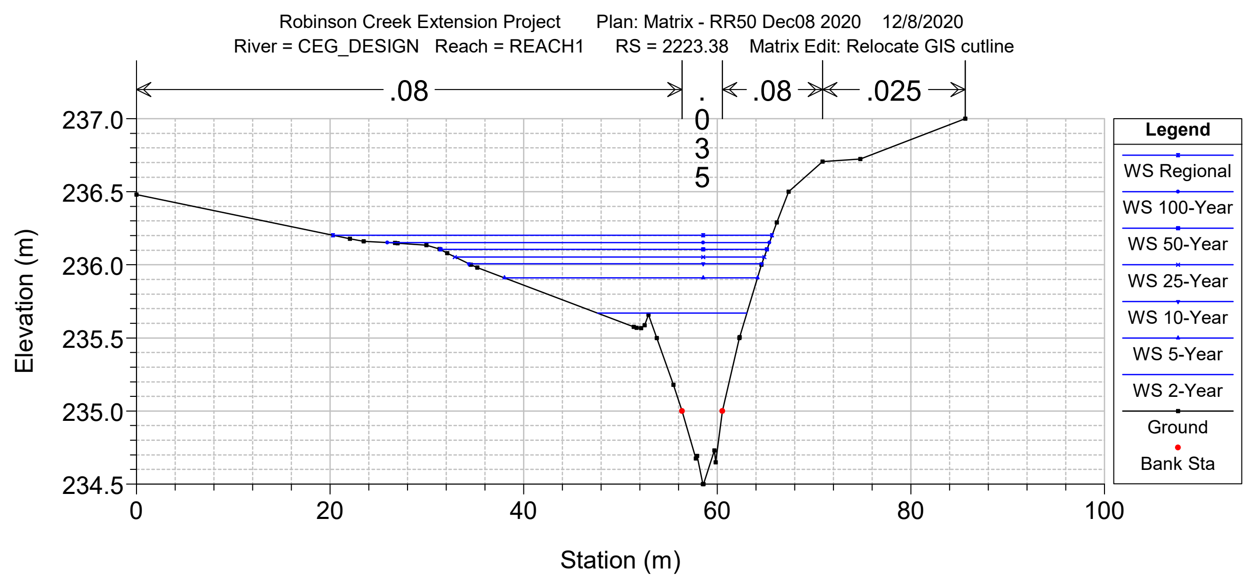

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.43 C1 Matrix Edit: cut from terrain, keep right bank original (plan vi
.08
.035
.025
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta
Elevation (m)
Station (m)

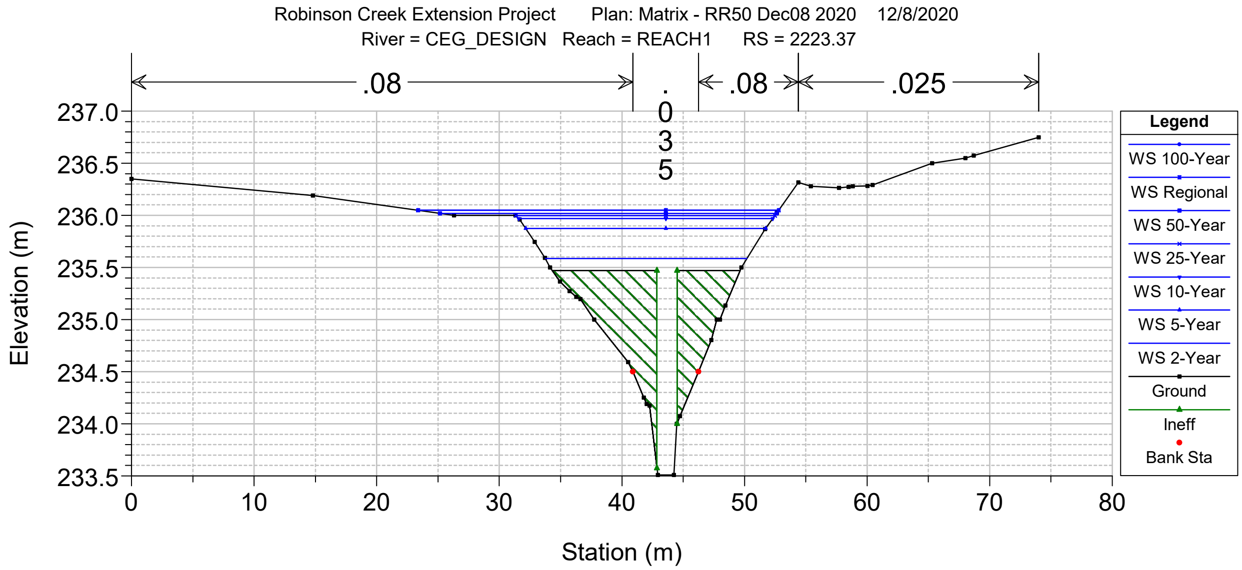

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.42 Matrix Edit: cut from terrain, keep right bank original (plan vi
.08
.035
.08
.025
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta
Elevation (m)
Station (m)

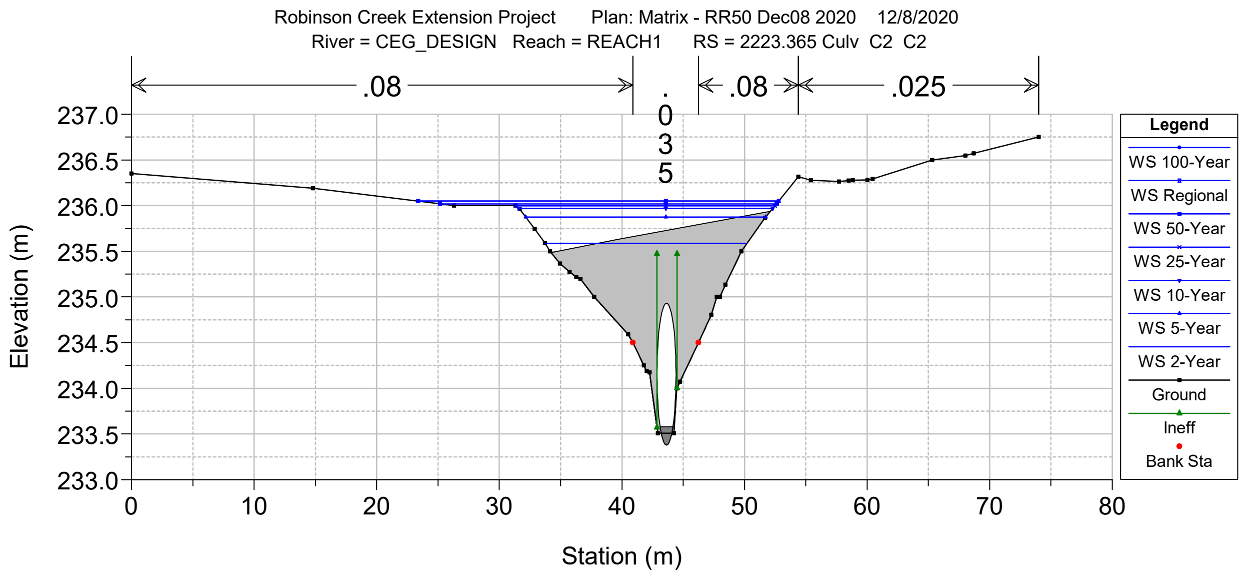

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.41
.08
.035
.08
.035
.025
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

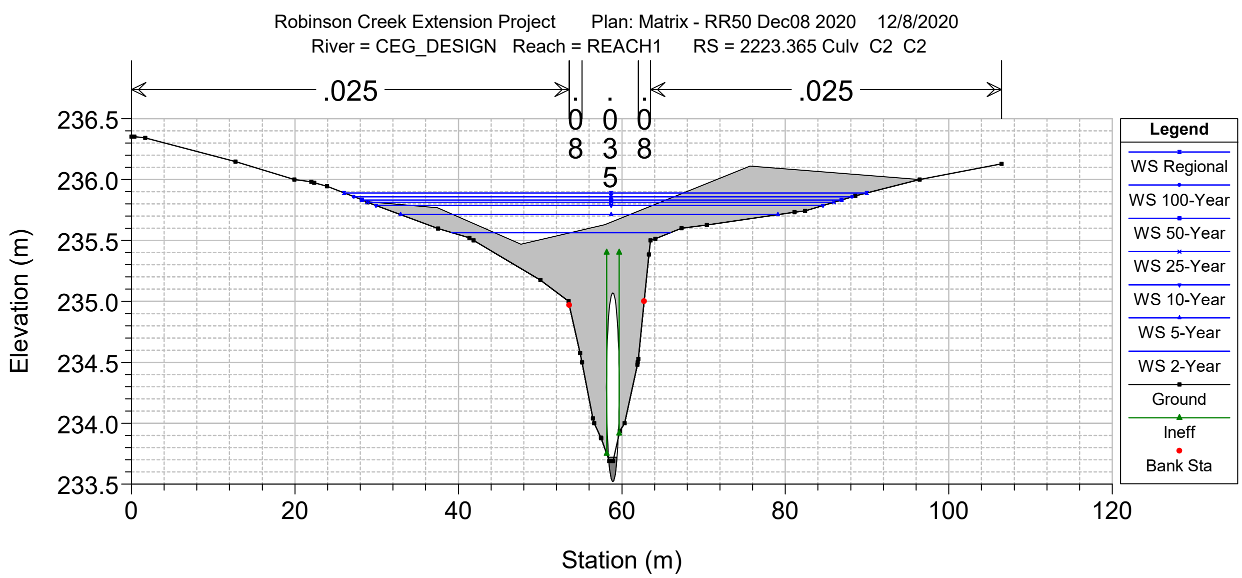

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.40
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Bank Sta

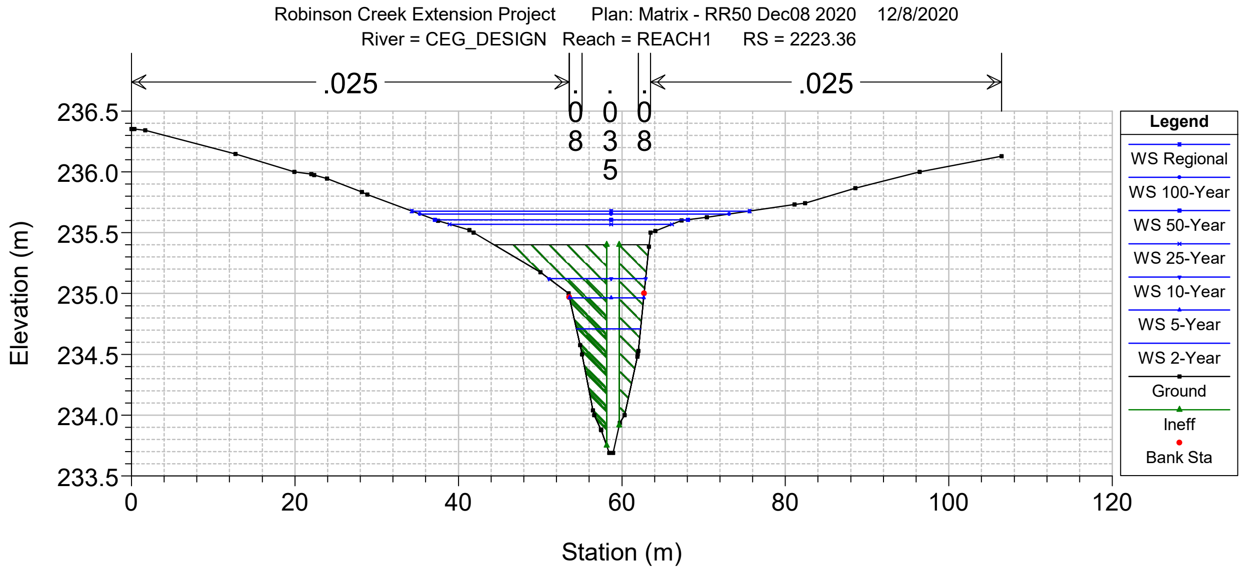

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.39 Matrix Edit: cut from terrain, keep both banks original
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

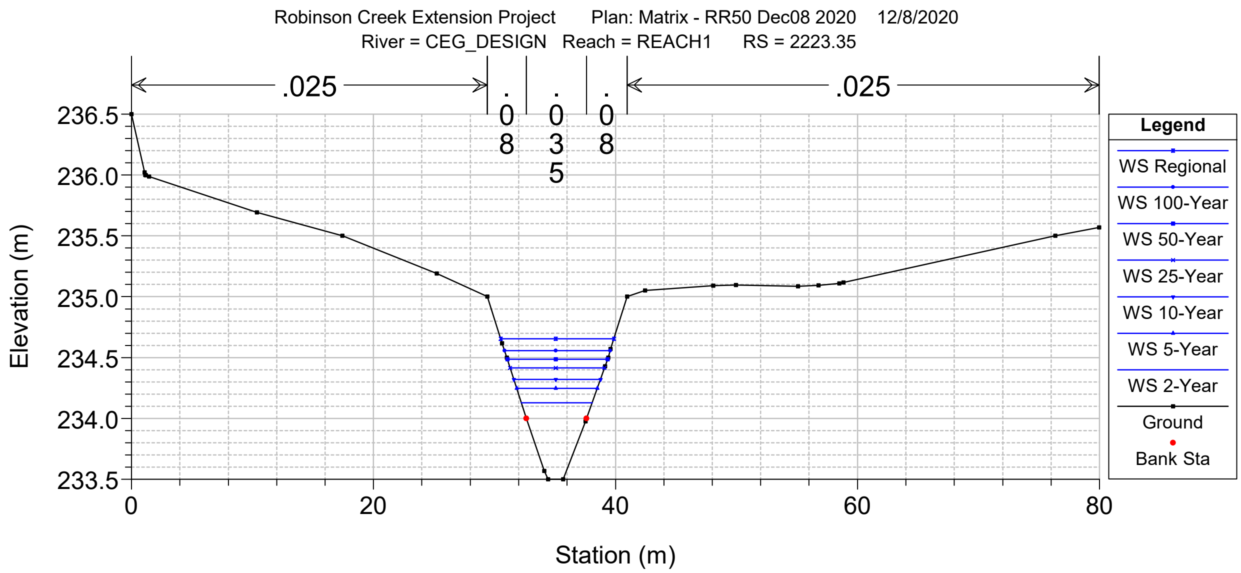

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.38 Matrix Edit: Relocate GIS cutline
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

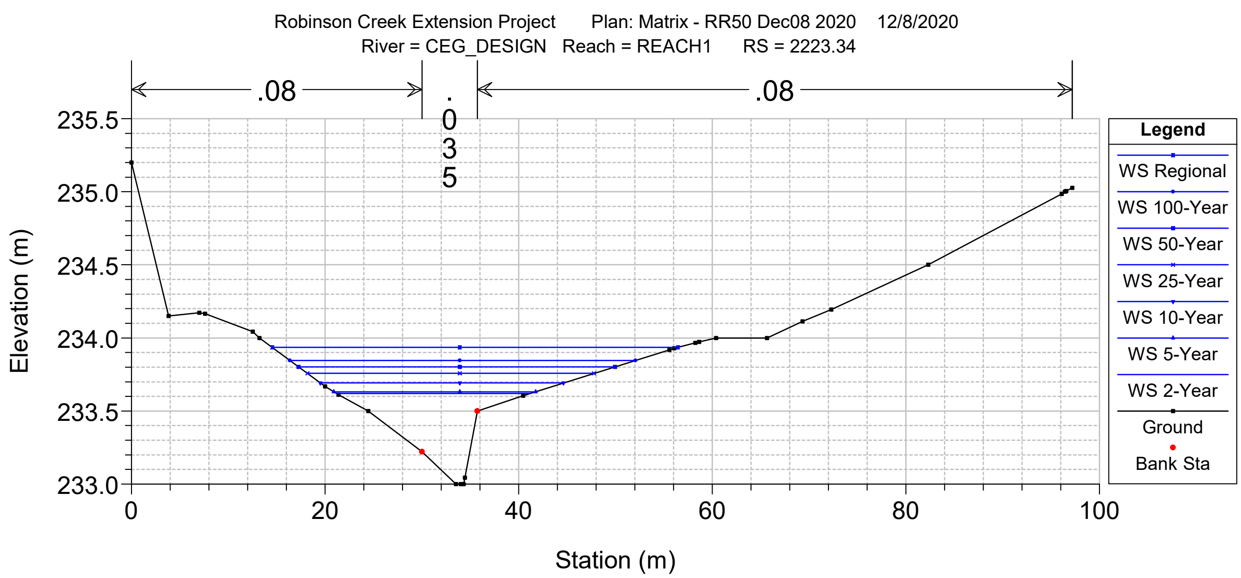

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.37
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS 100-Year
WS Regional
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

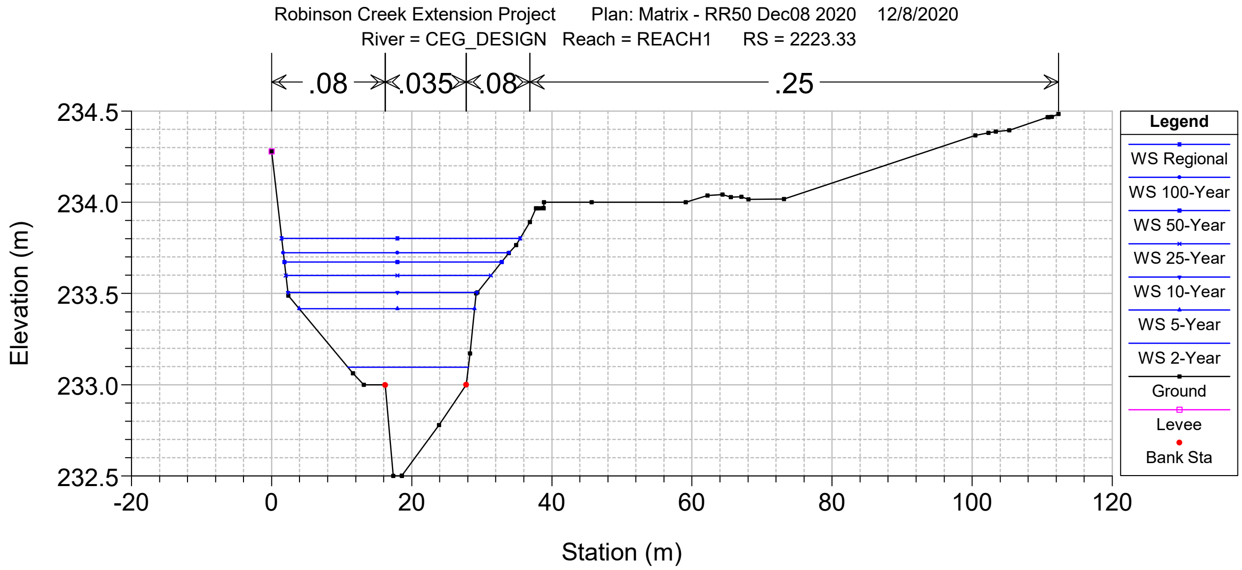

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.365 Culv C2 C2
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS 100-Year
WS Regional
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.365 Culv C2 C2
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

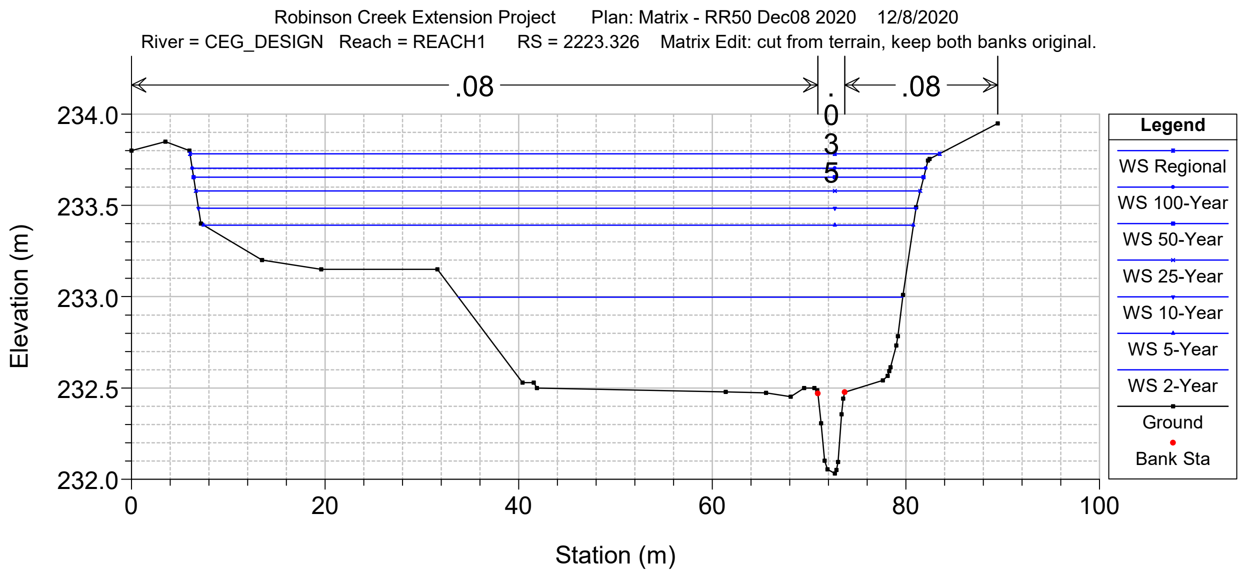

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.36
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.35
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

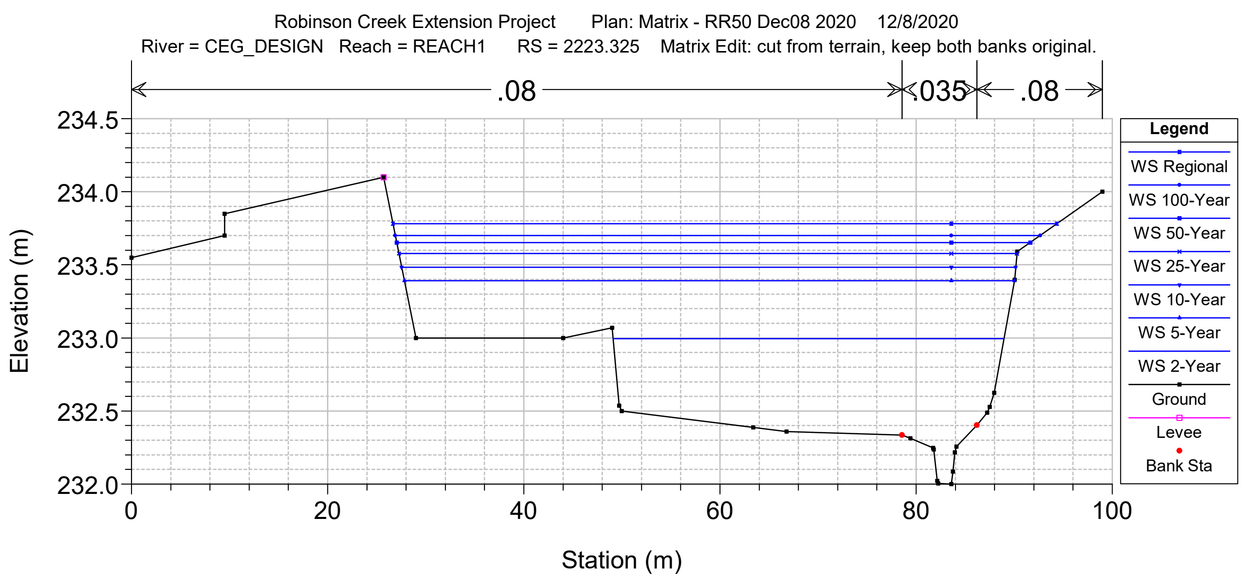

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.34
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



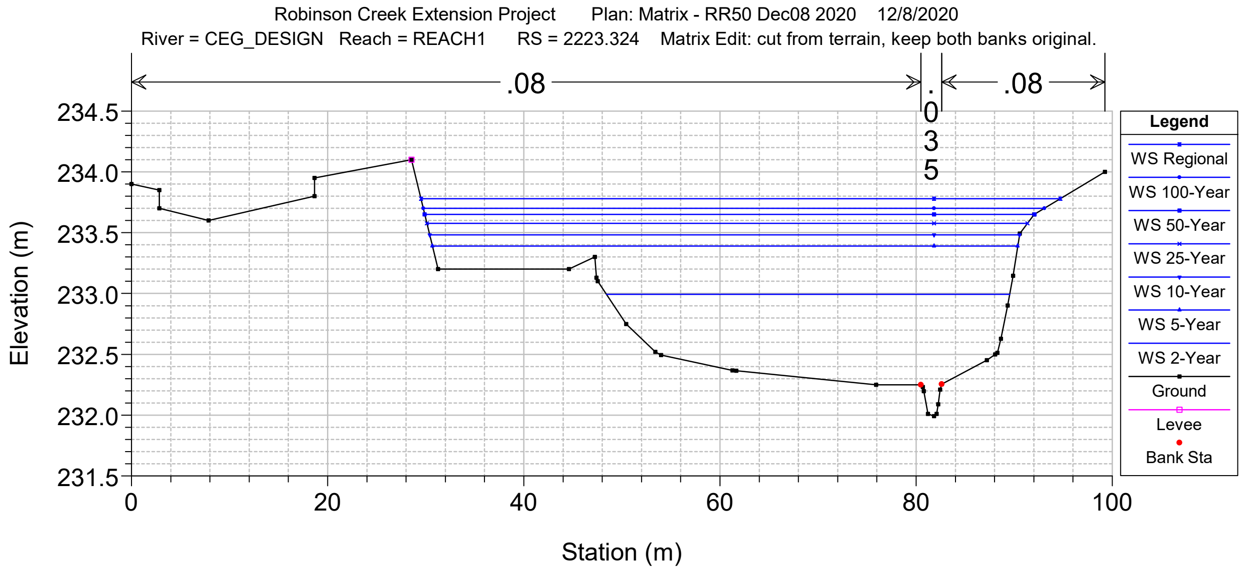
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.33
.08
.035
.08
.25
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Bank Sta



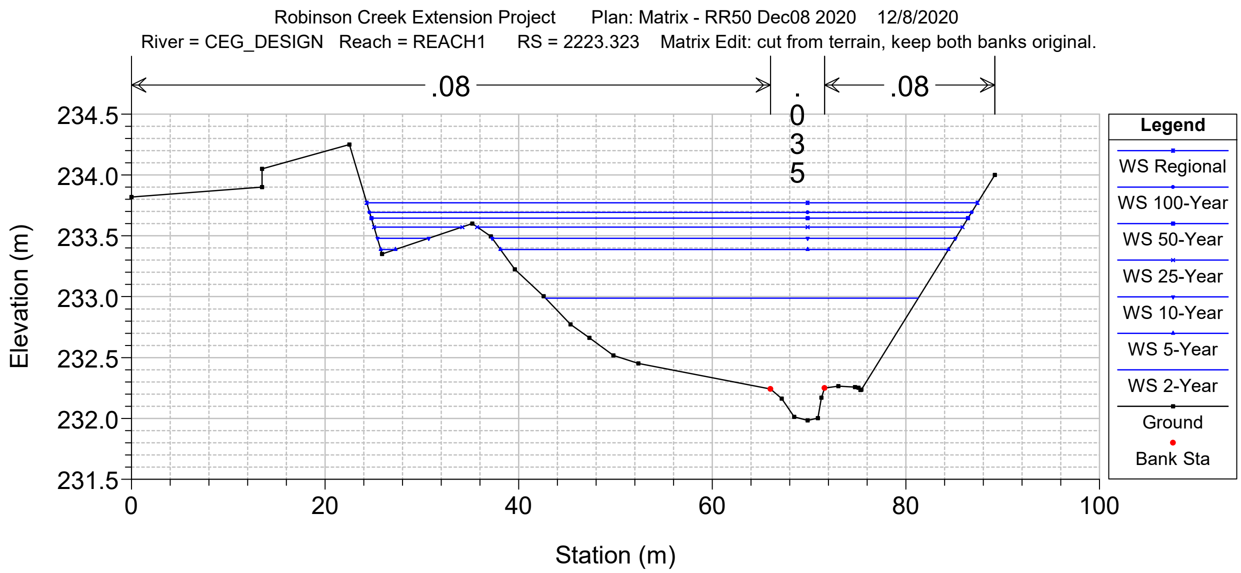
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.326 Matrix Edit: cut from terrain, keep both banks original.
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



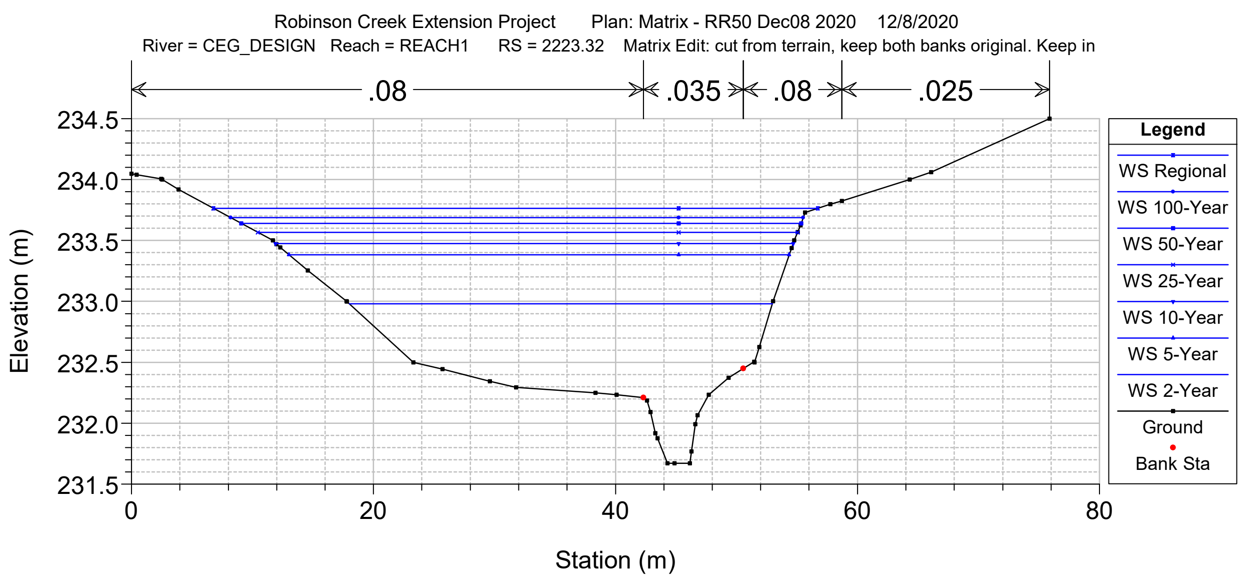
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.325 Matrix Edit: cut from terrain, keep both banks original.
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Bank Sta



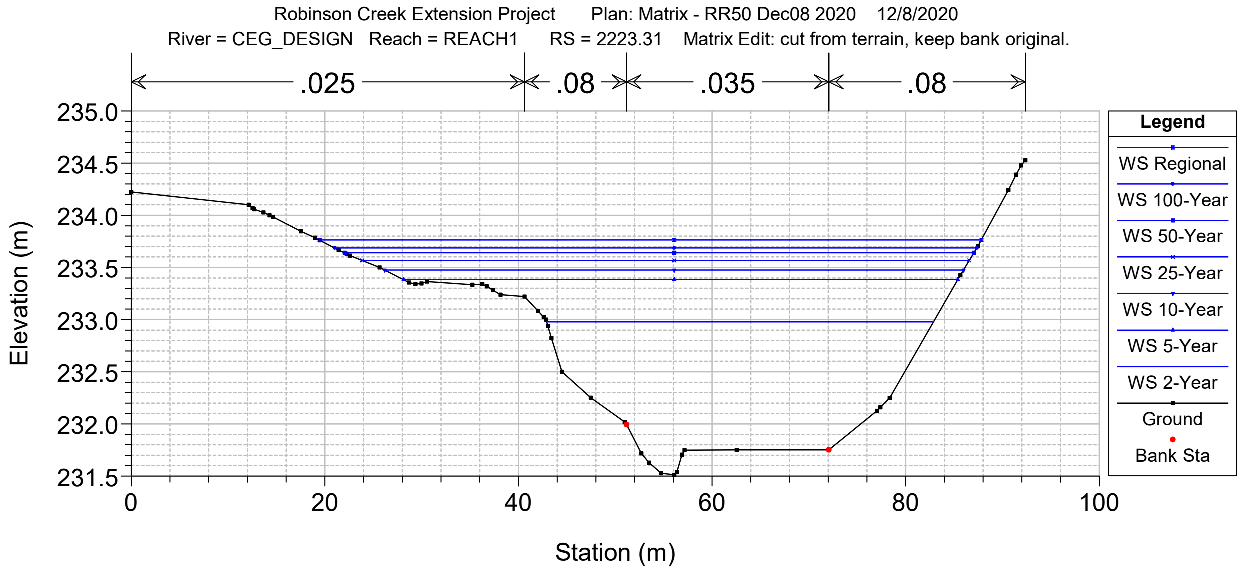
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.324 Matrix Edit: cut from terrain, keep both banks original.
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Bank Sta

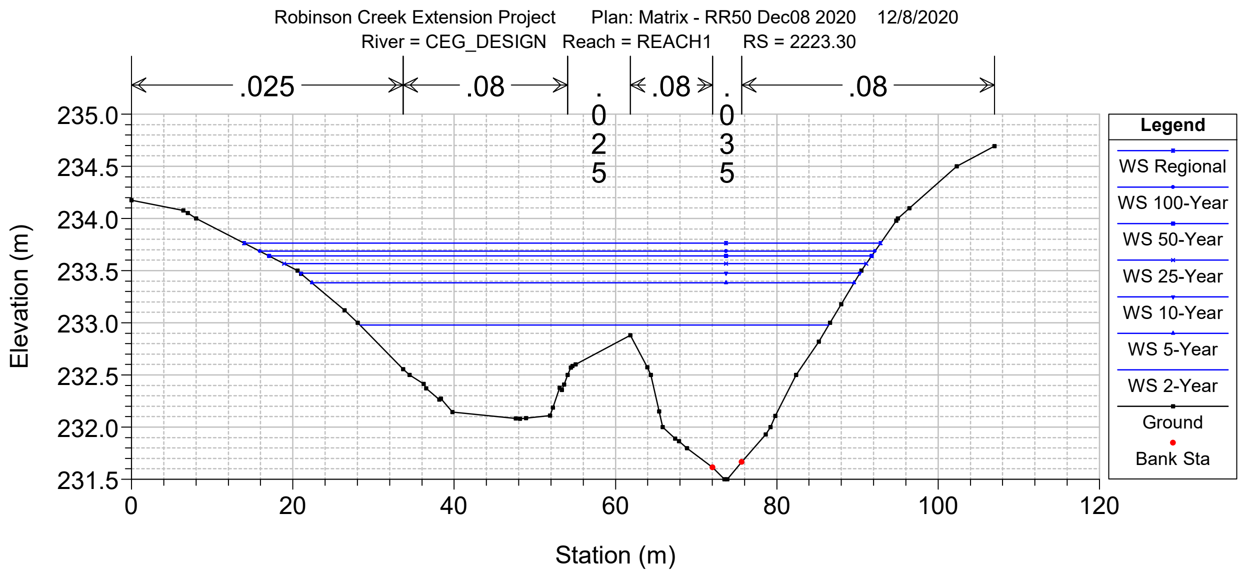


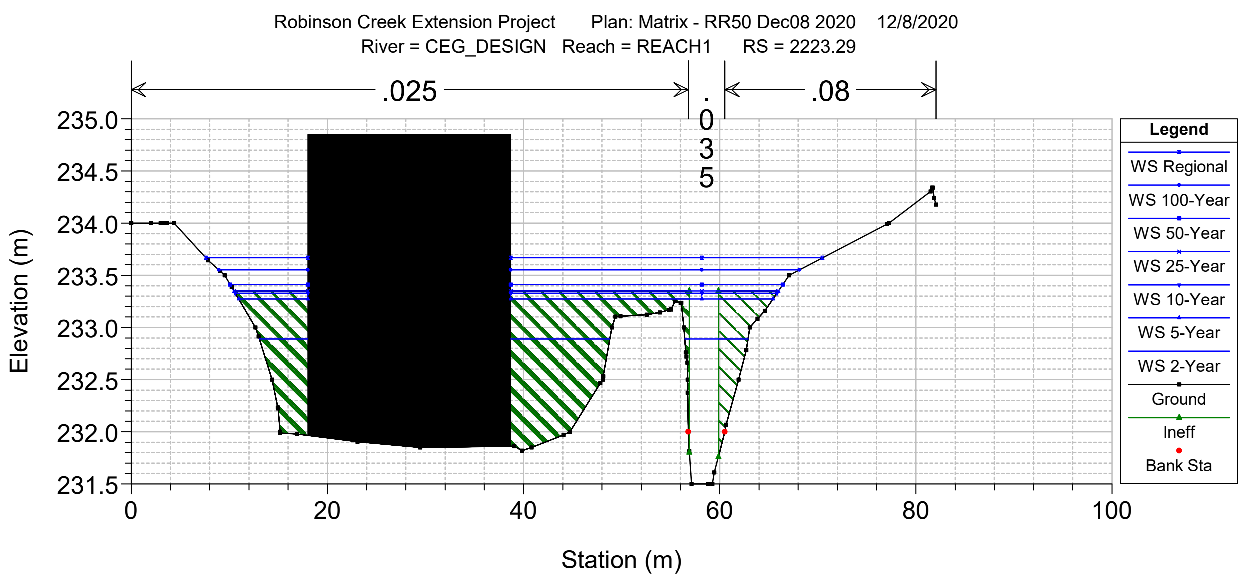
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.323 Matrix Edit: cut from terrain, keep both banks original.
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

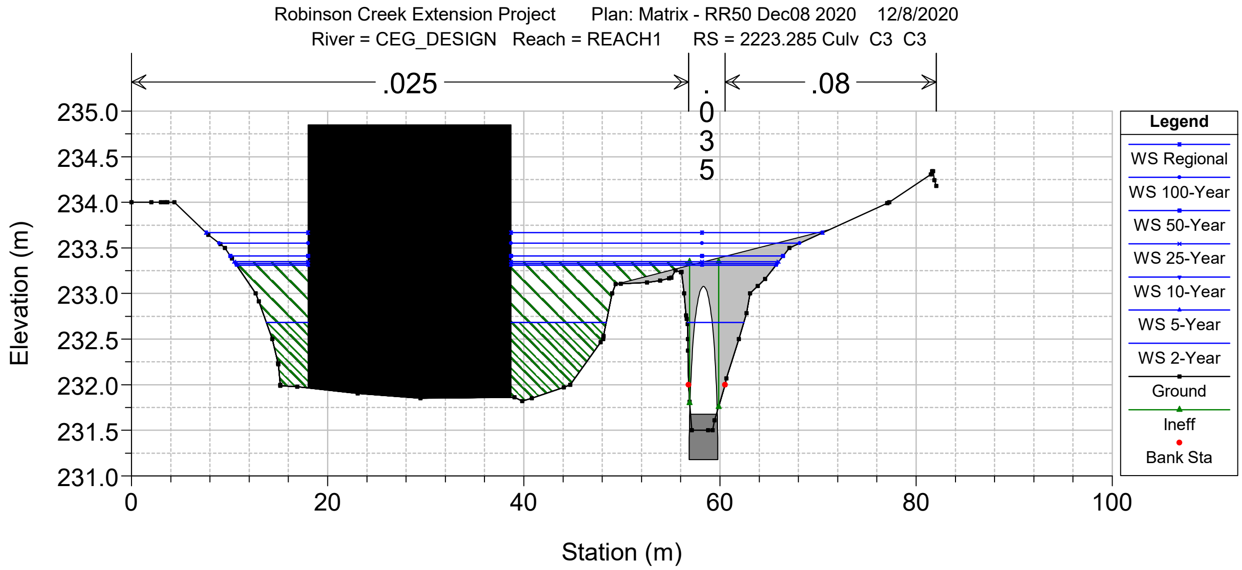


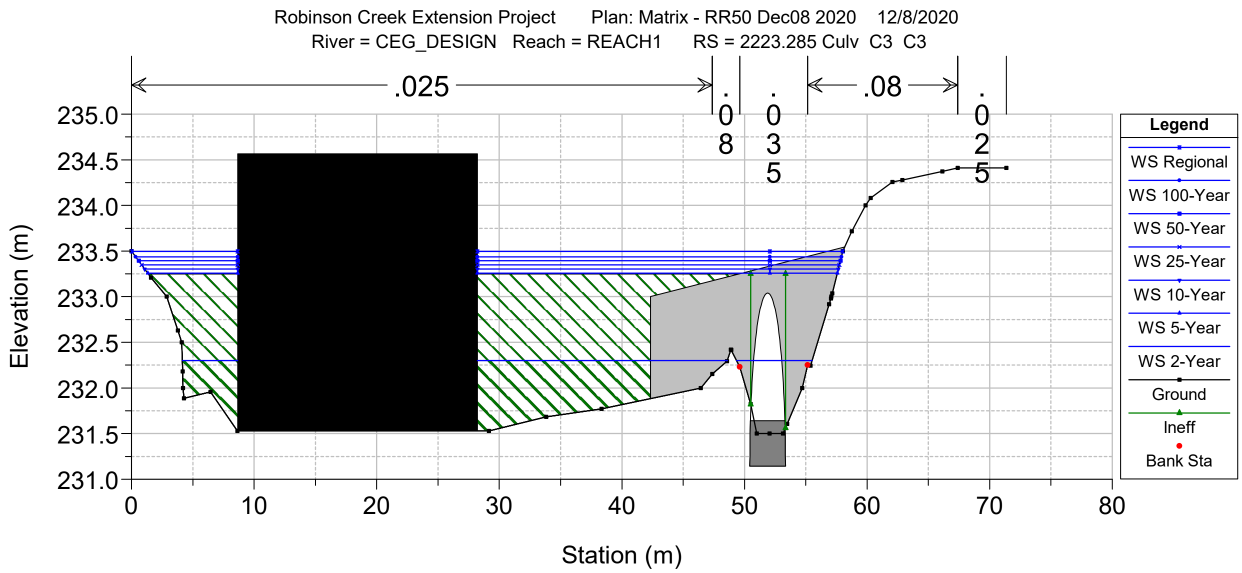
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.32 Matrix Edit: cut from terrain, keep both banks original. Keep in
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

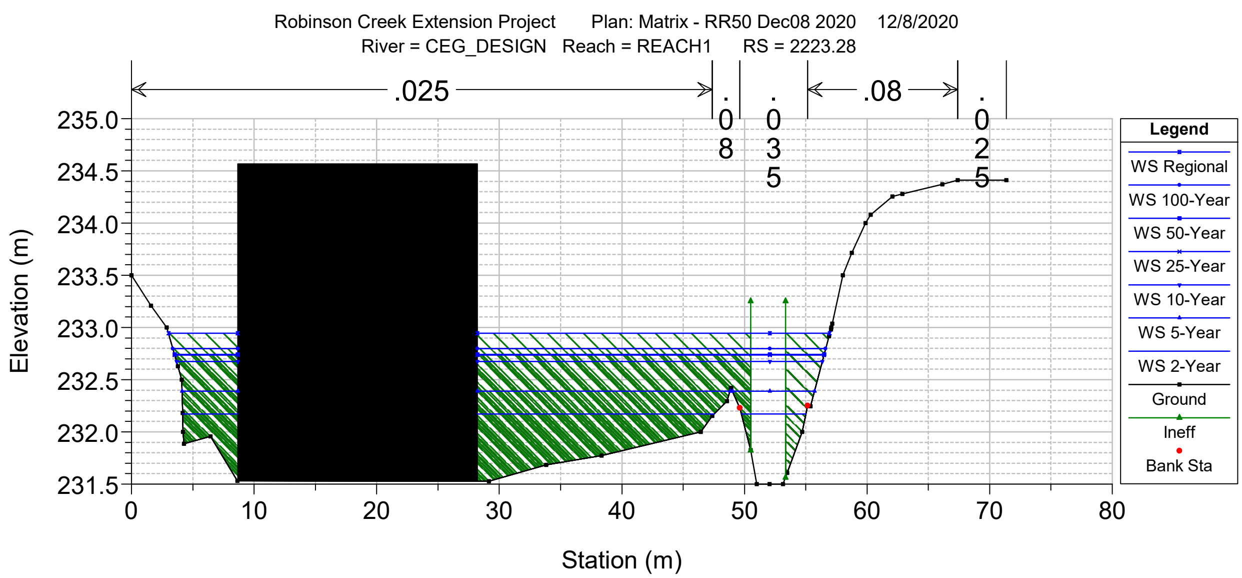

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.31 Matrix Edit: cut from terrain, keep bank original.
.025
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

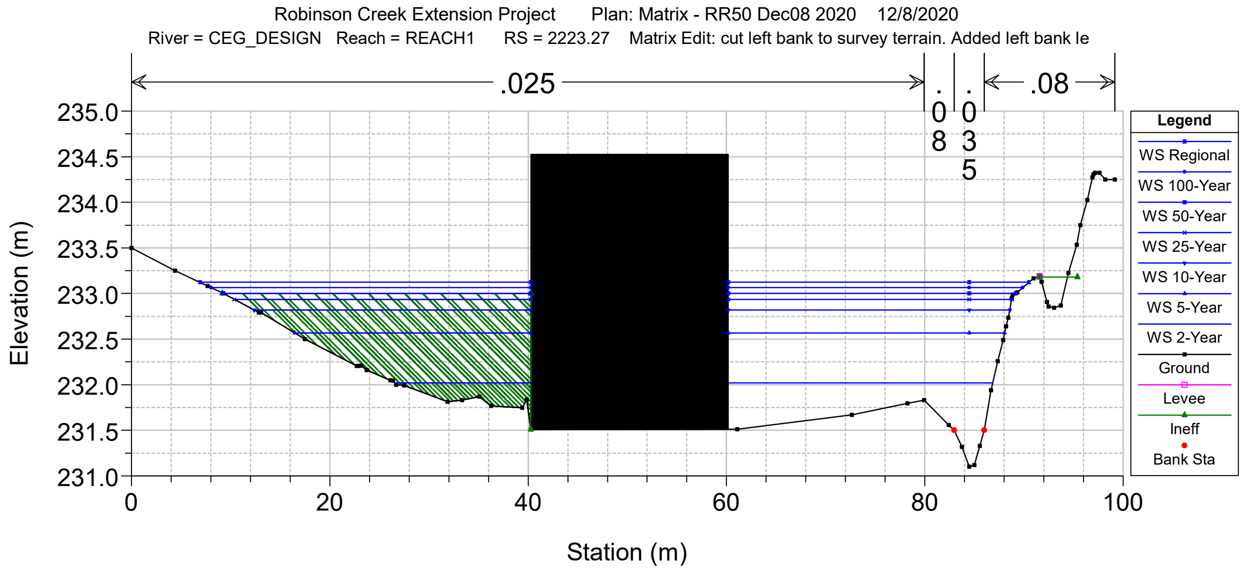

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.30
.025
.08
.025
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

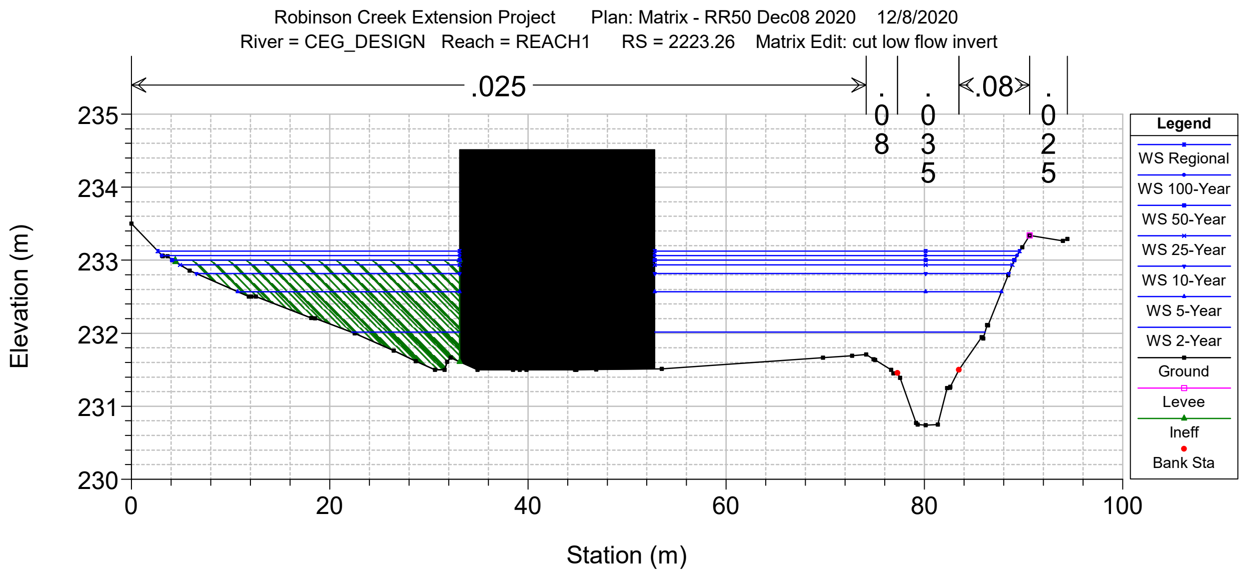

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.29
.025
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

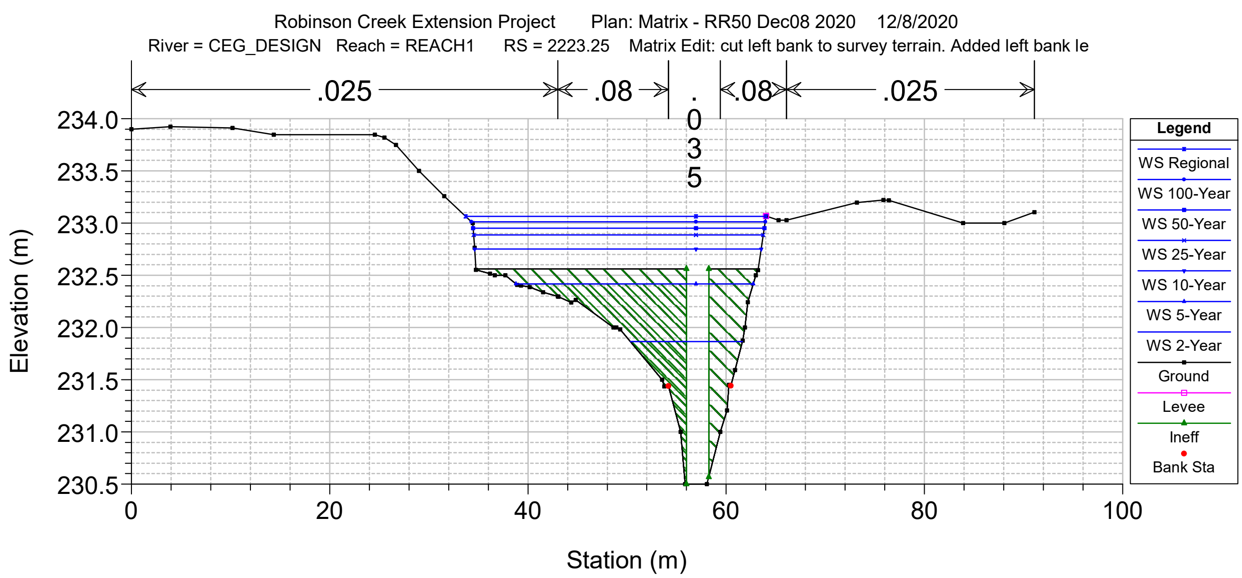

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.285 Culv C3 C3
.025
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

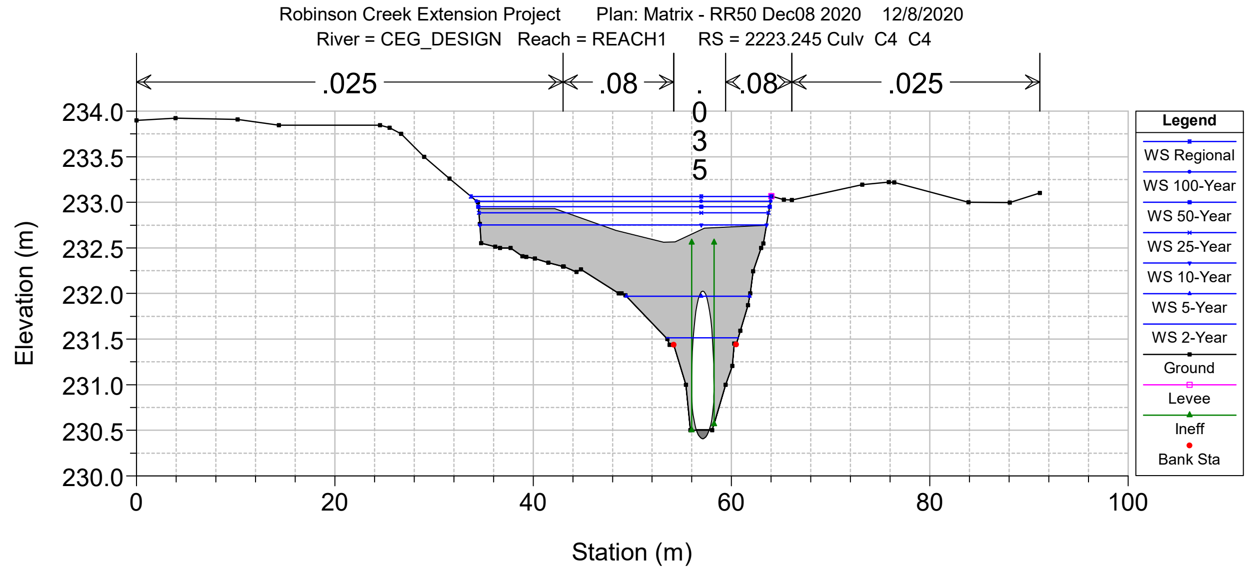

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.285 Culv C3 C3
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.28
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

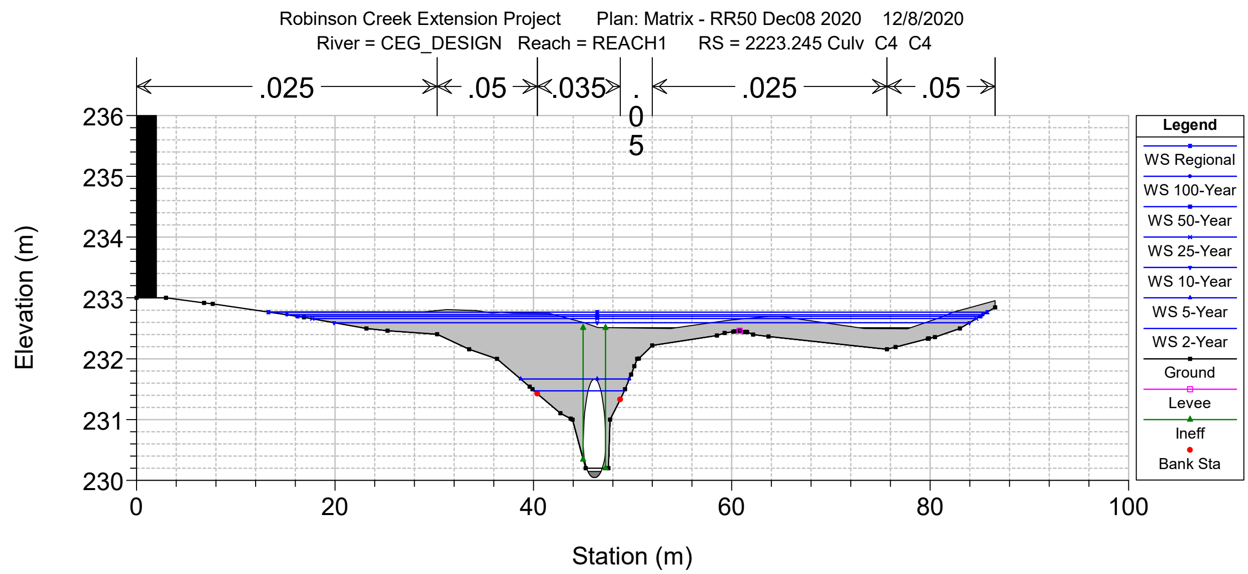

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.27 Matrix Edit: cut left bank to survey terrain. Added left bank le
.025
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.26 Matrix Edit: cut low flow invert
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

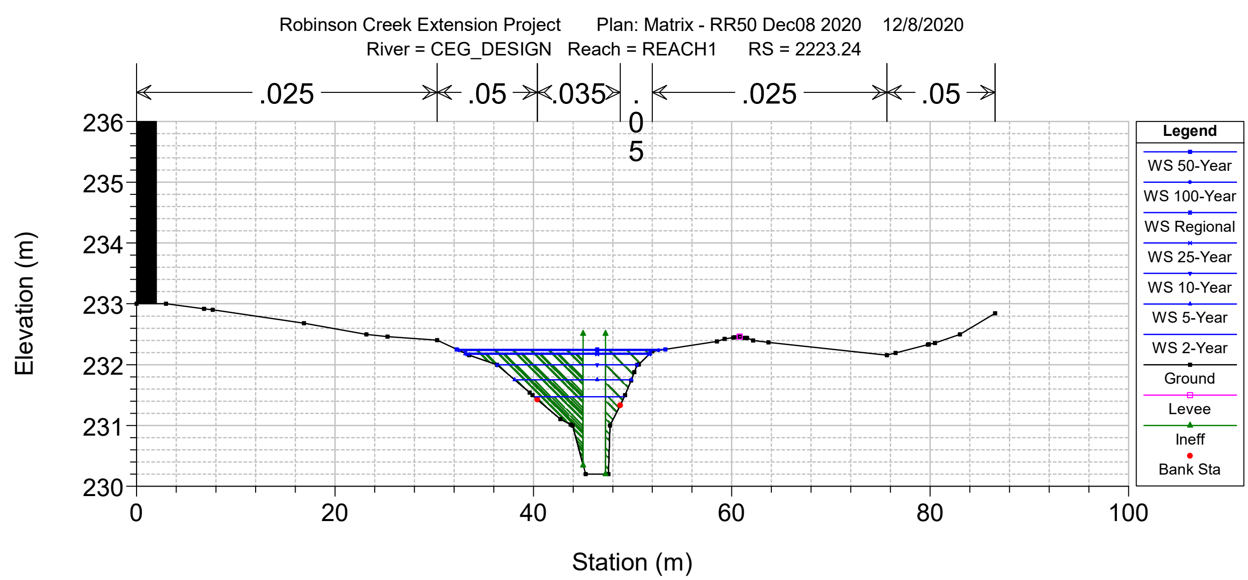

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.25 Matrix Edit: cut left bank to survey terrain. Added left bank le
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta



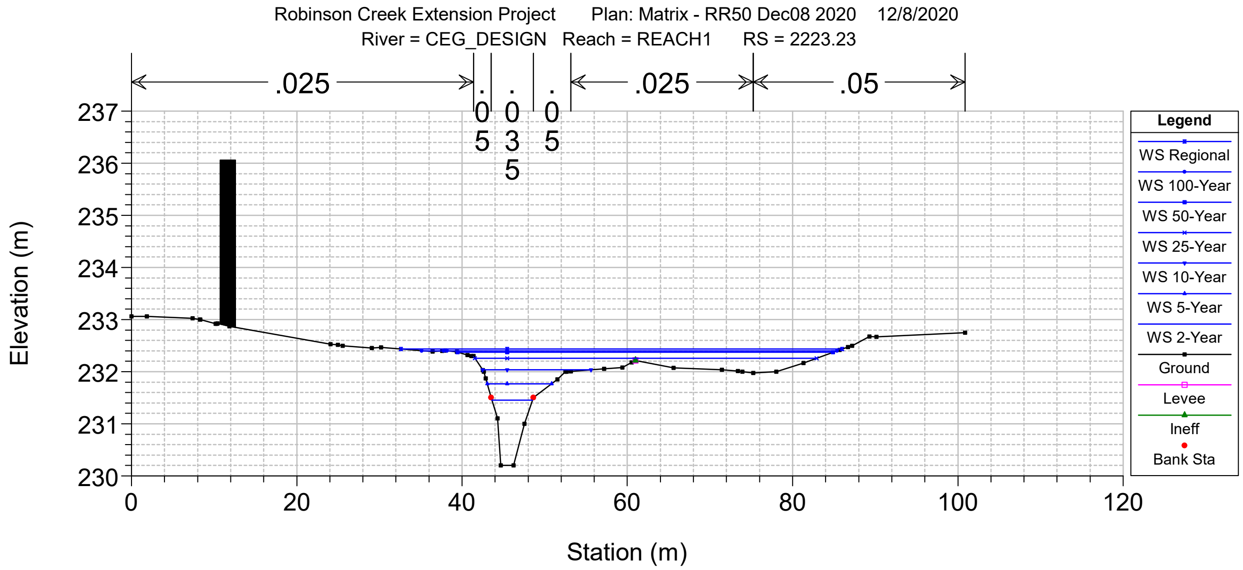
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.245 Culv C4 C4
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

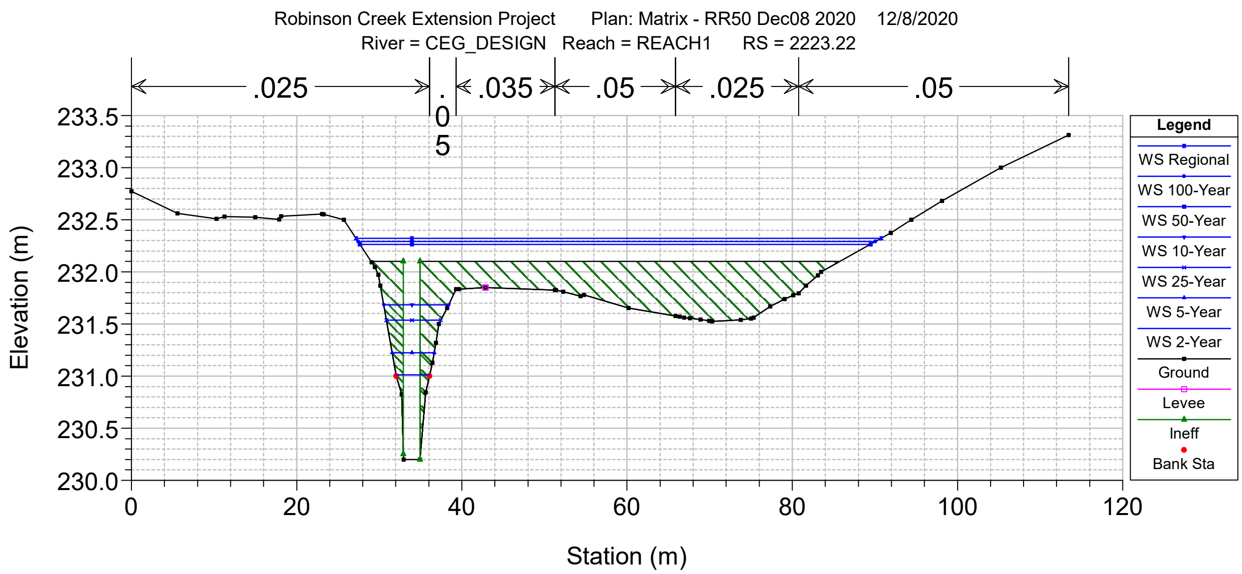


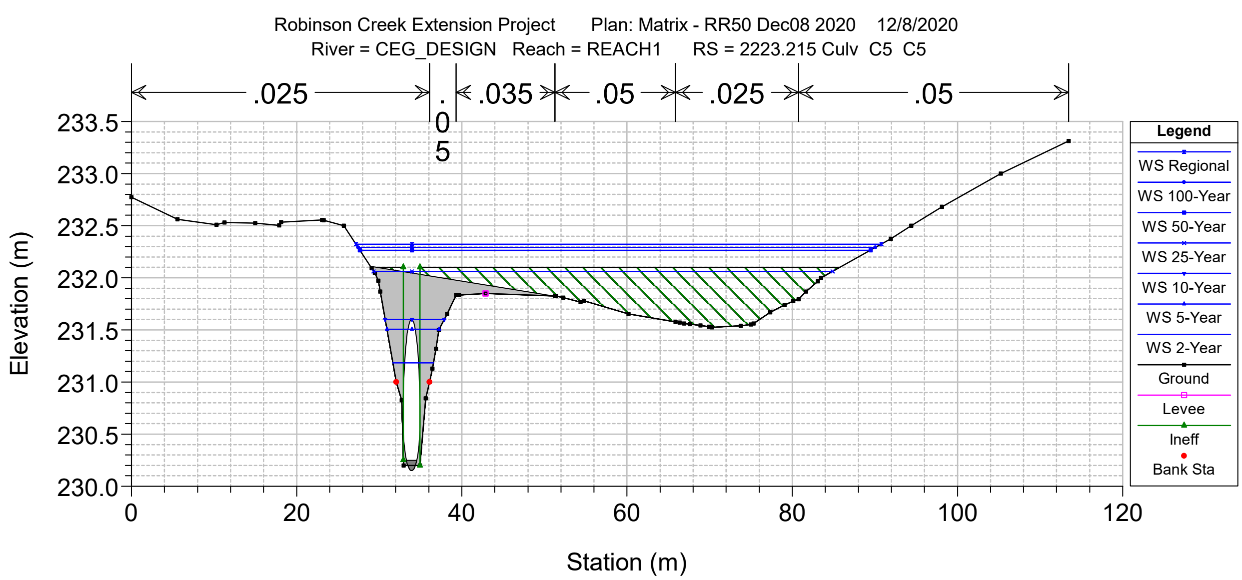
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.245 Culv C4 C4
.025
.05
.035
.05
.025
.05
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

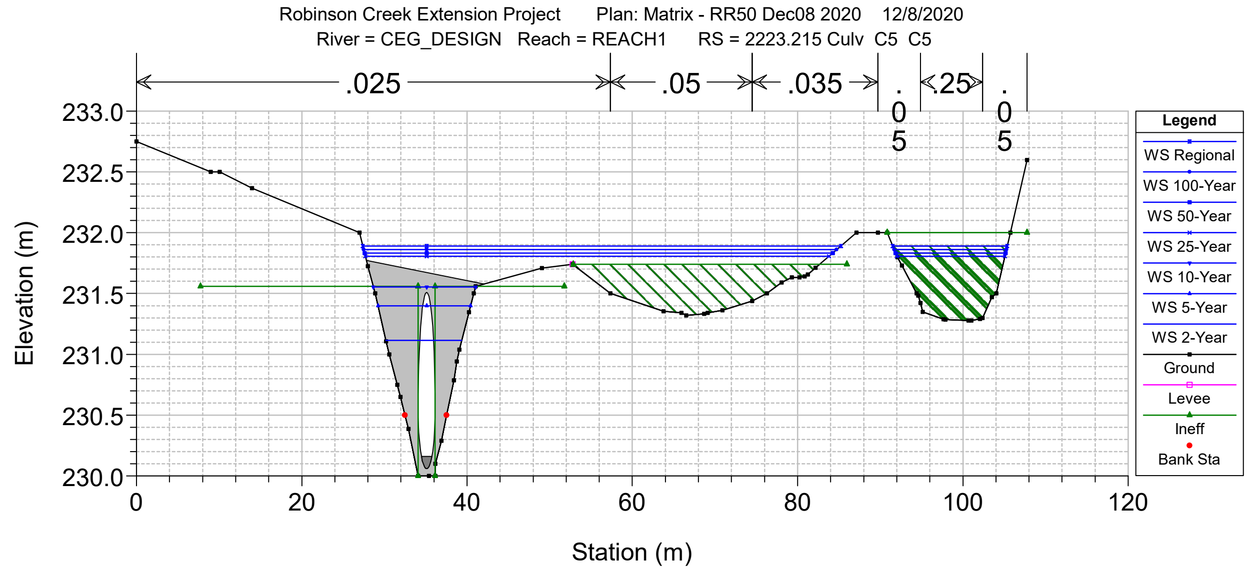


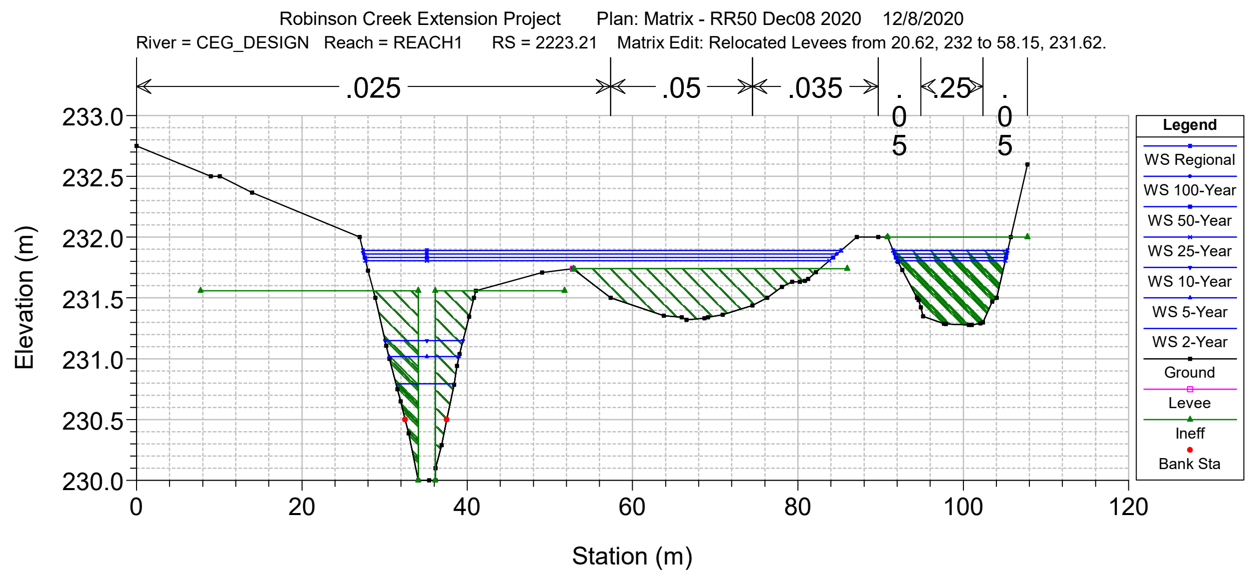
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.24
.025
.05
.035
.05
.025
.05
Elevation (m)
Station (m)
Legend
WS 50-Year
WS 100-Year
WS Regional
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

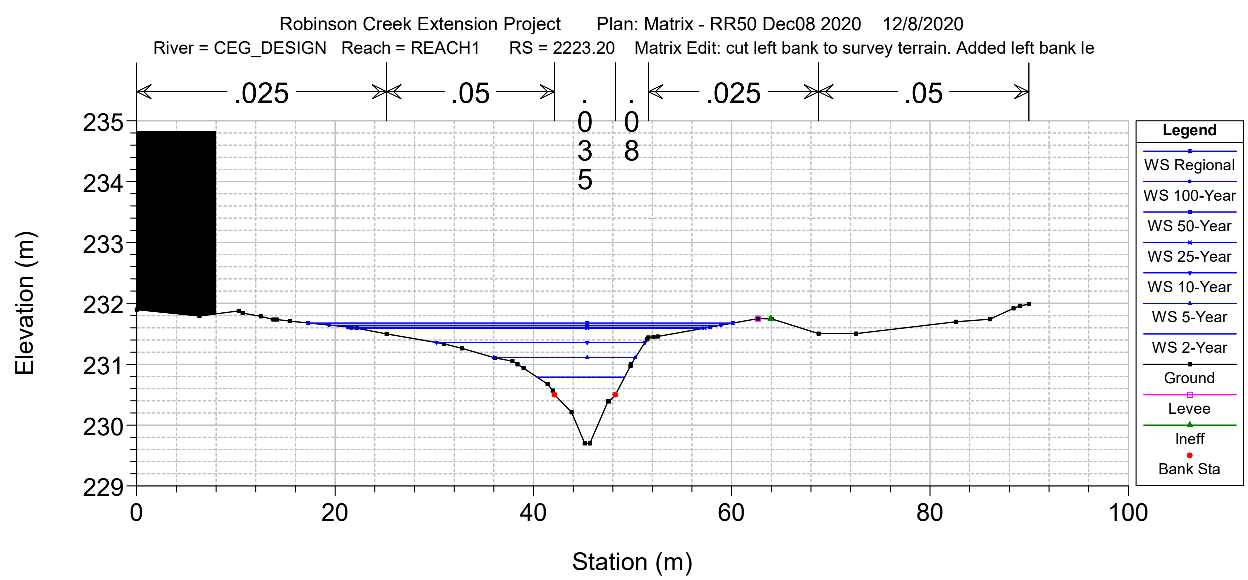

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.23
.025
.05
.035
.05
.025
.05
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

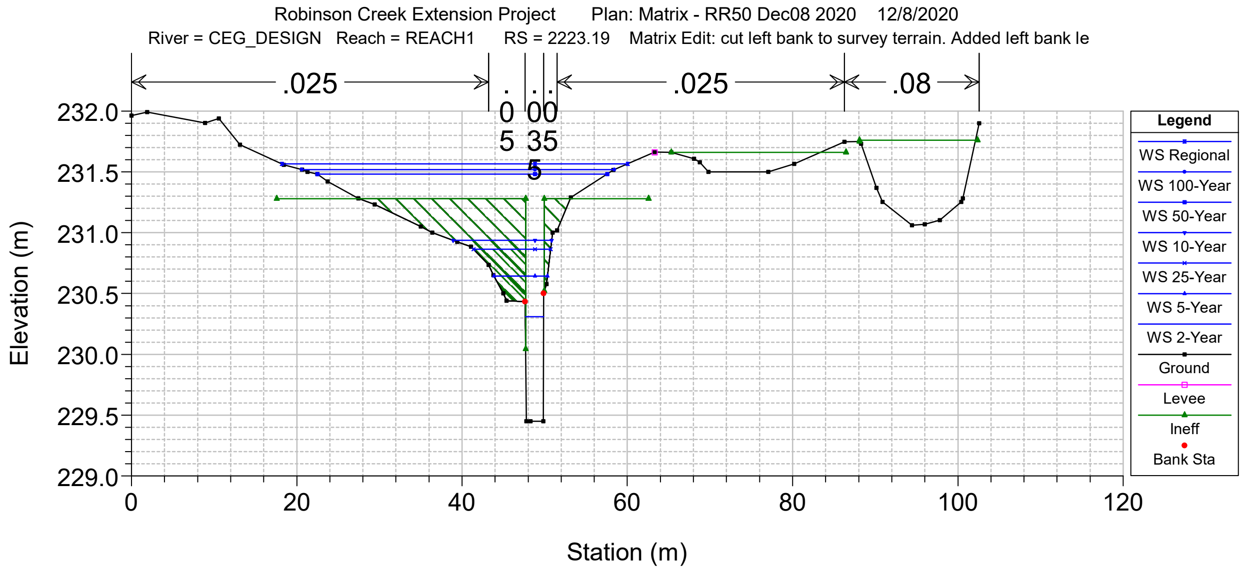

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.22
.025
.05
.035
.05
.025
.05
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 10-Year
WS 25-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

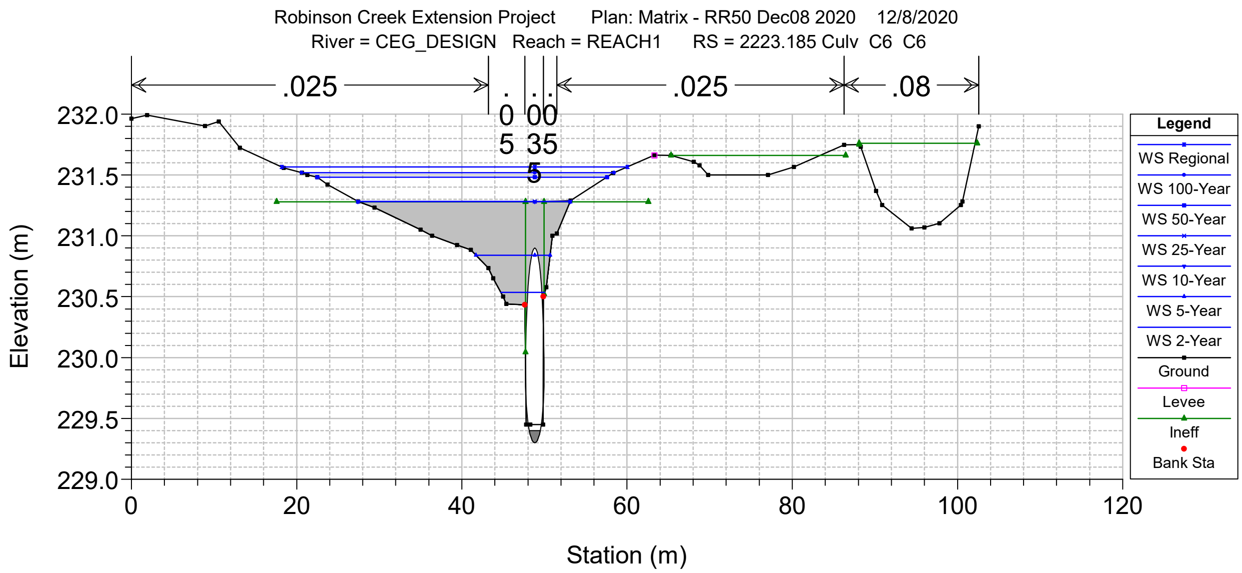

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.215 Culv C5 C5
.025
.05
.035
.05
.025
.05
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

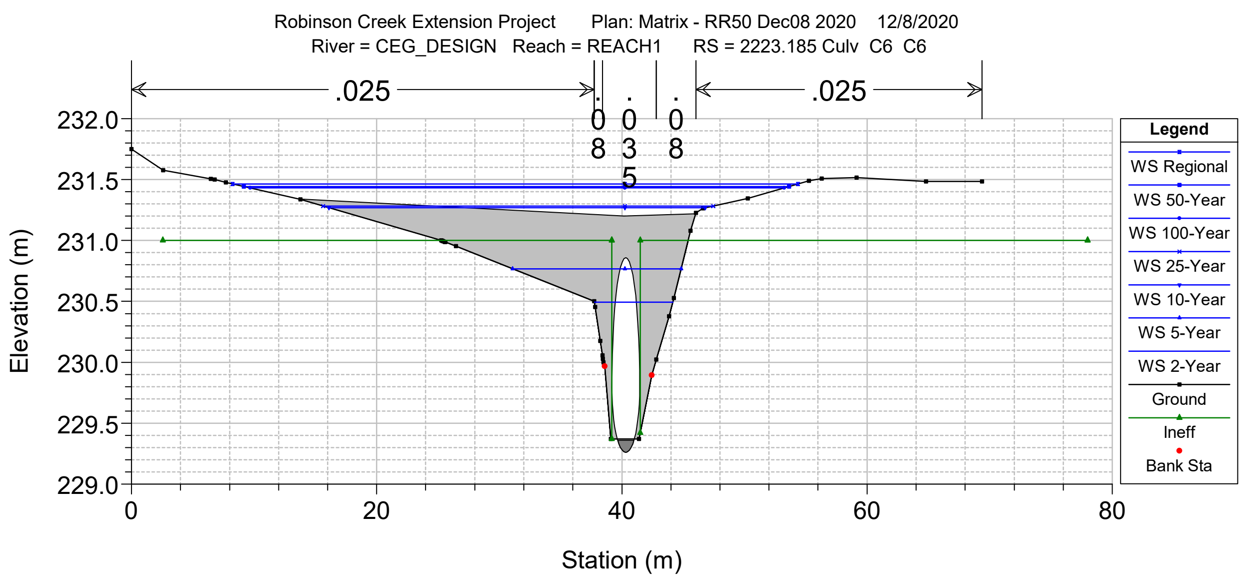

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.215 Culv C5 C5
.025
.05
.035
.05
.25
.05
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

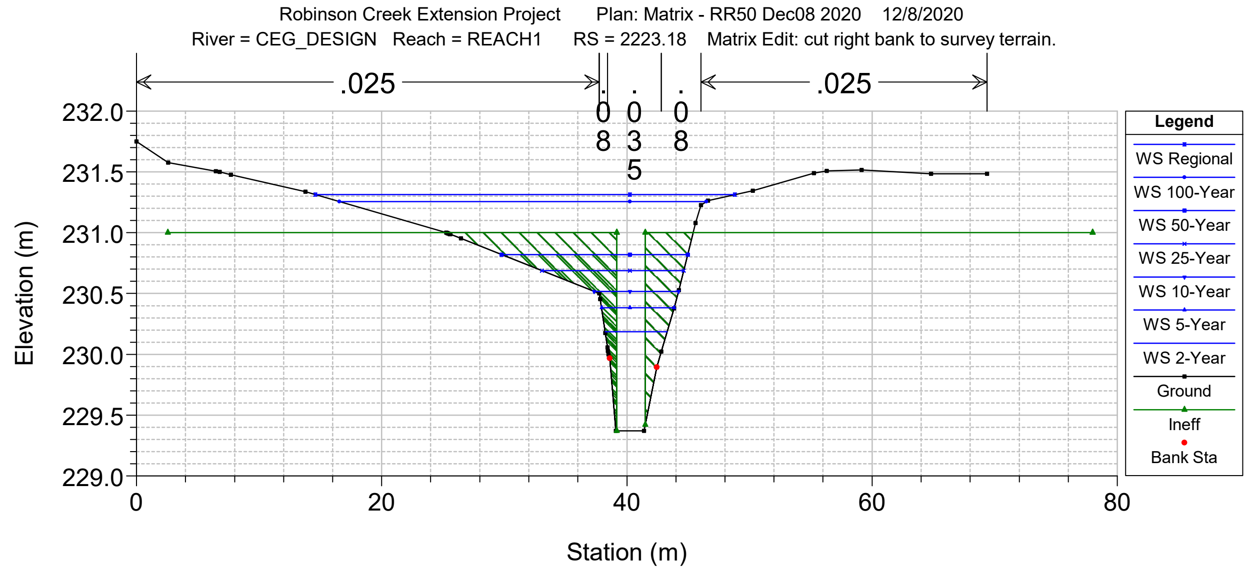

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.21 Matrix Edit: Relocated Levees from 20.62, 232 to 58.15, 231.62.
.025
.05
.035
.05
.25
.05
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

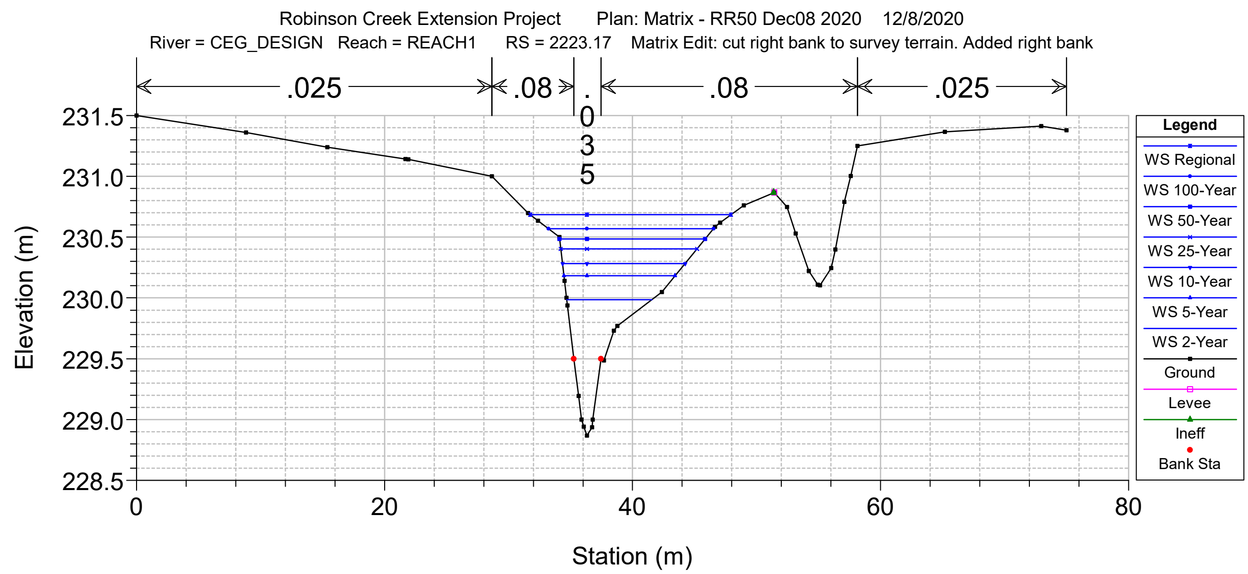

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.20 Matrix Edit: cut left bank to survey terrain. Added left bank le
.025
.05
.035
.08
.025
.05
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

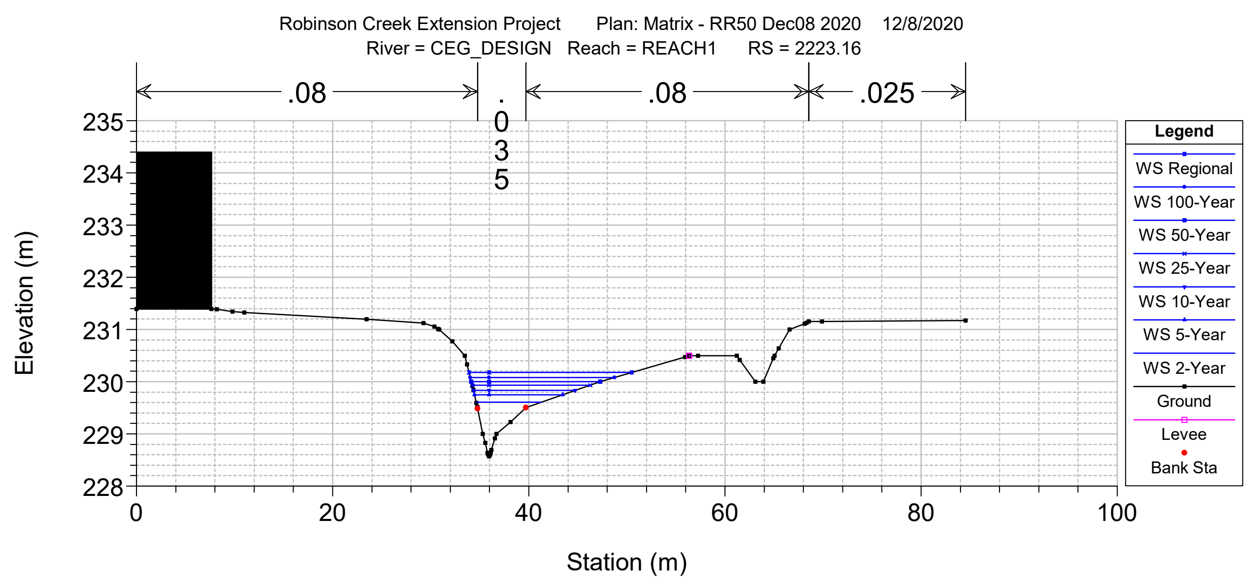

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.19 Matrix Edit: cut left bank to survey terrain. Added left bank le
.025
.025
.08
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 10-Year
WS 25-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)

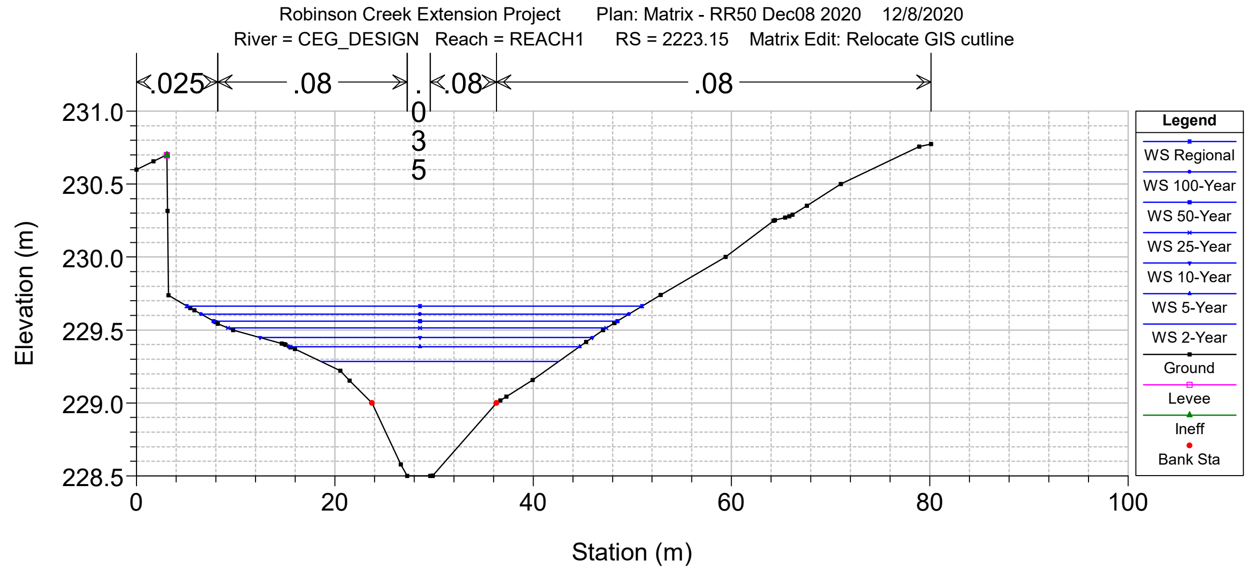

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.185 Culv C6 C6
.025
.025
.08
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.185 Culv C6 C6
.025
.025
Legend
WS Regional
WS 50-Year
WS 100-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

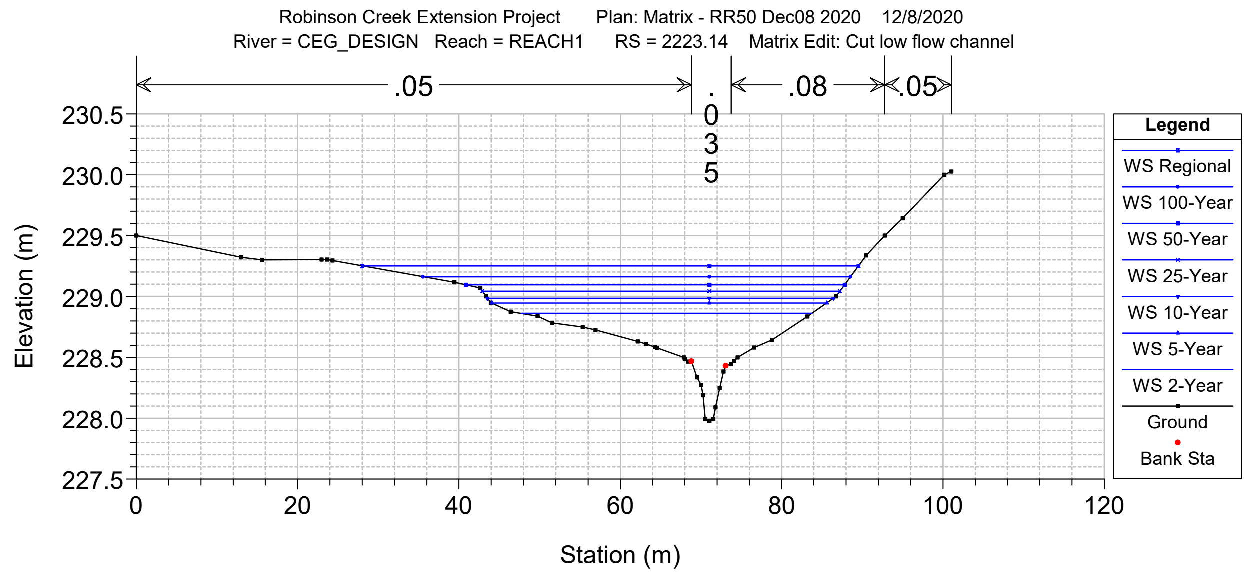

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.18 Matrix Edit: cut right bank to survey terrain.
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.17 Matrix Edit: cut right bank to survey terrain. Added right bank
.025
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

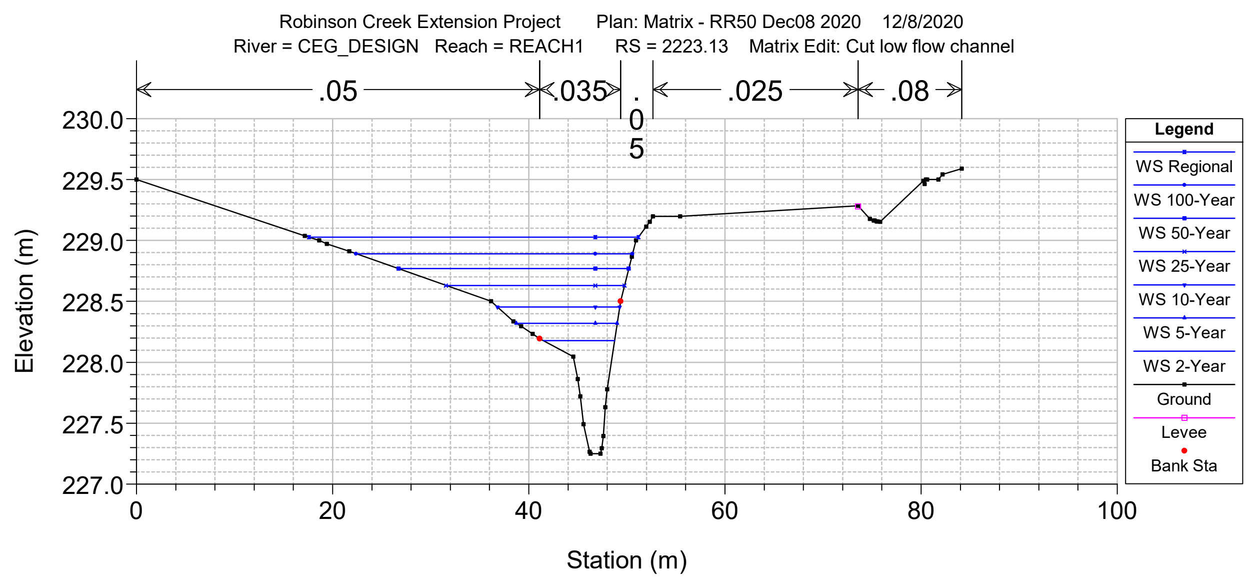

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.16
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Bank Sta



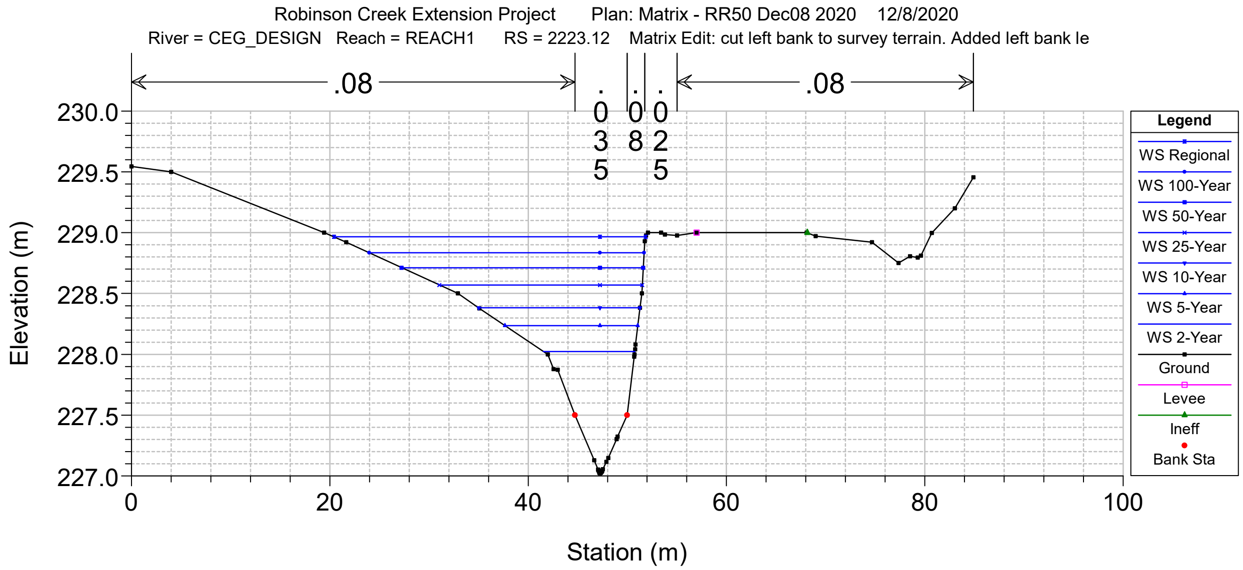
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.15 Matrix Edit: Relocate GIS cutline
.025
.08
.035
.08
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

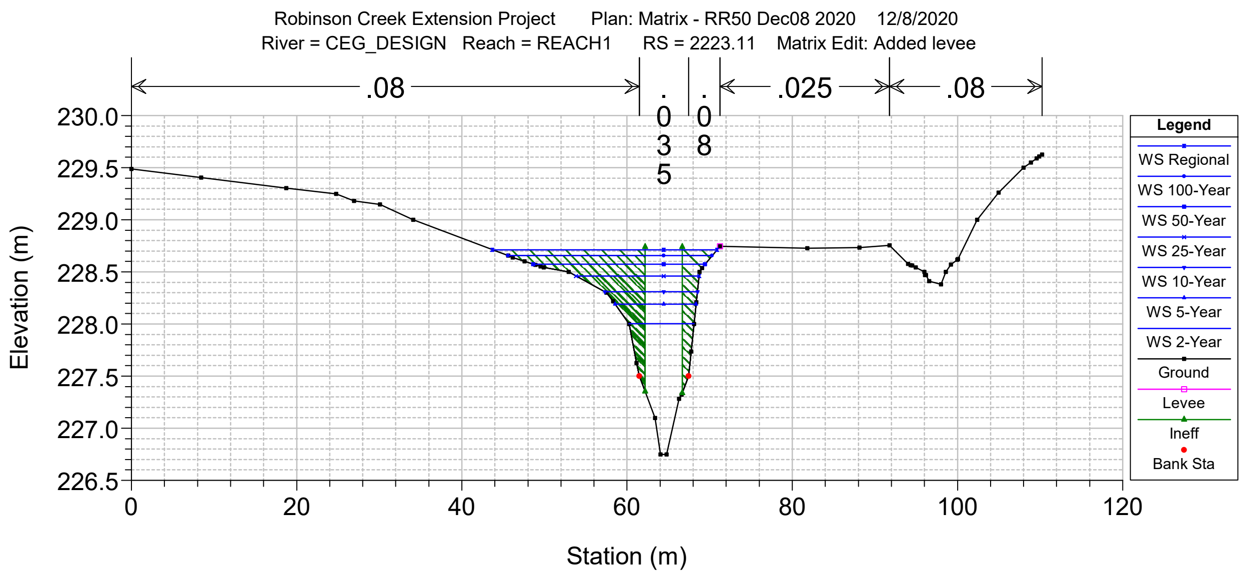


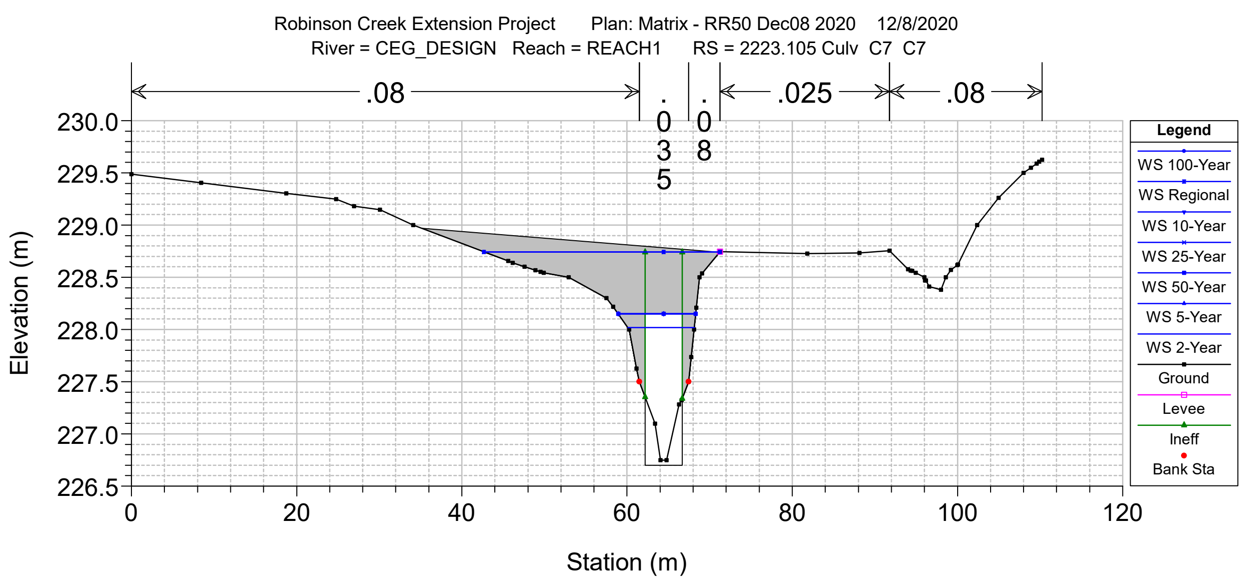
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.14 Matrix Edit: Cut low flow channel
.05
.035
.08
.05
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

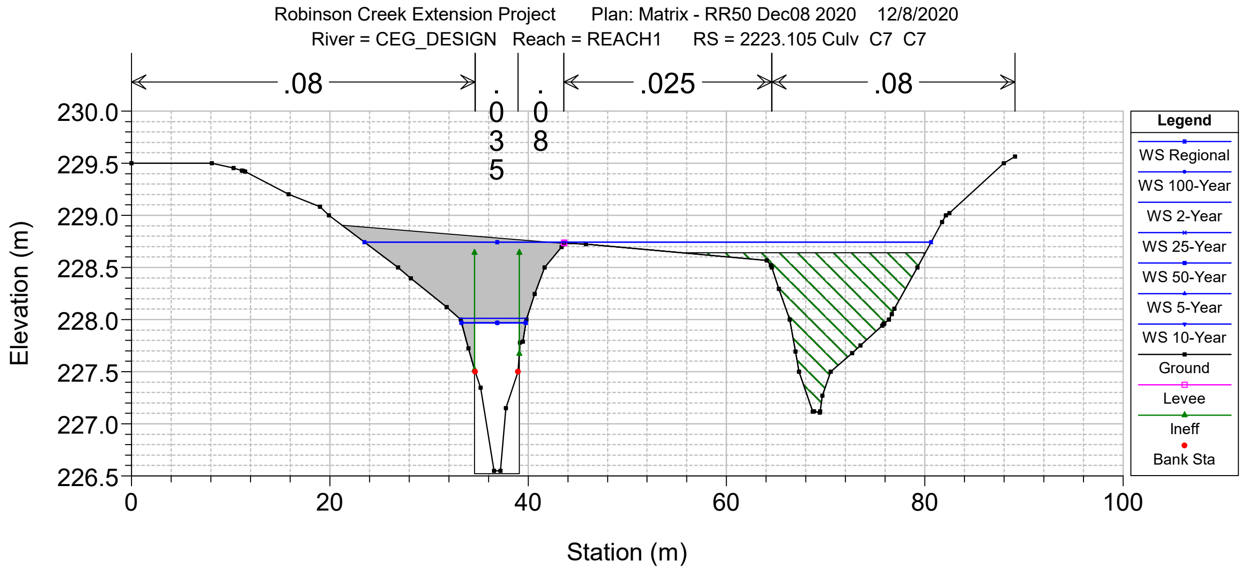


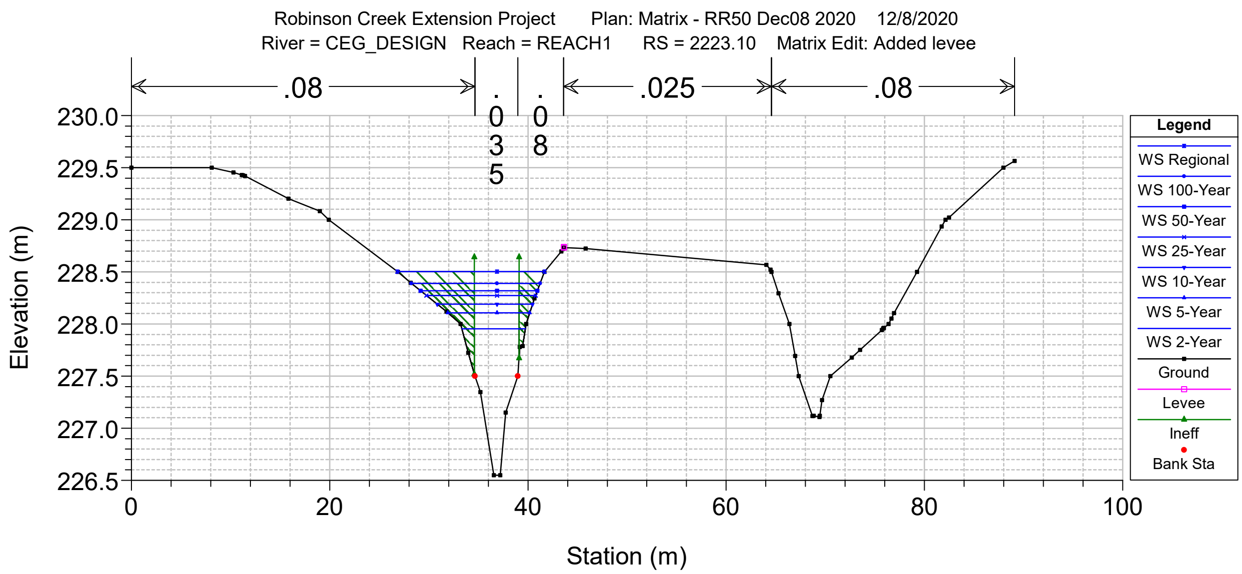
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.13 Matrix Edit: Cut low flow channel
.05
.035
.05
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Bank Sta

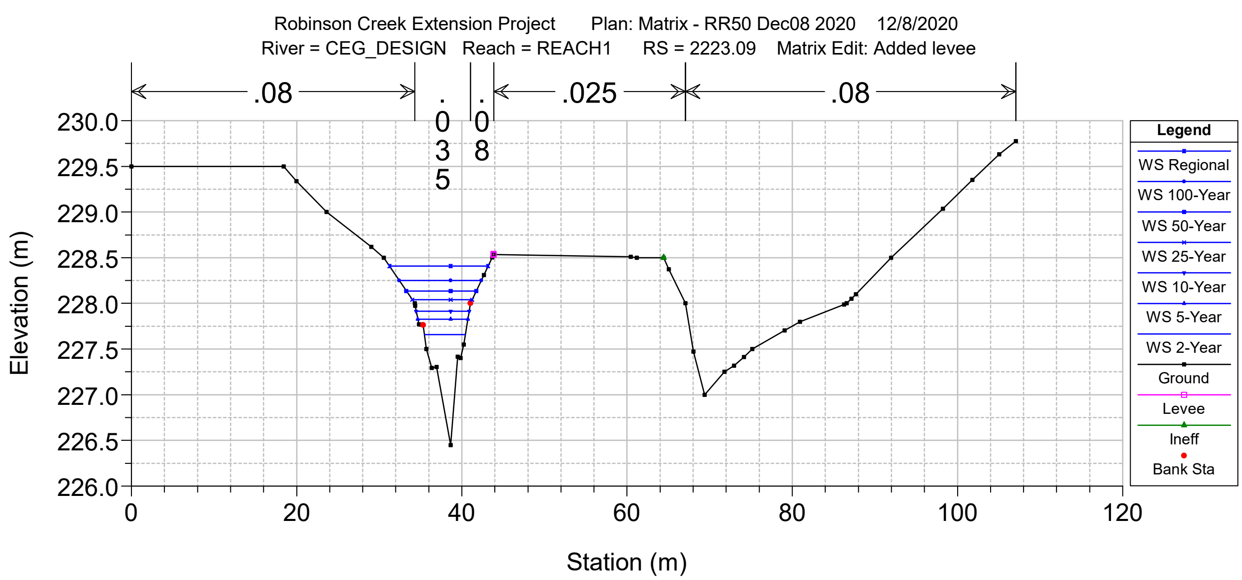

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.12 Matrix Edit: cut left bank to survey terrain. Added left bank le
.08
.035
.08
.025
.08
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
230.0
229.5
229.0
228.5
228.0
227.5
227.0
0
20
40
60
80
100

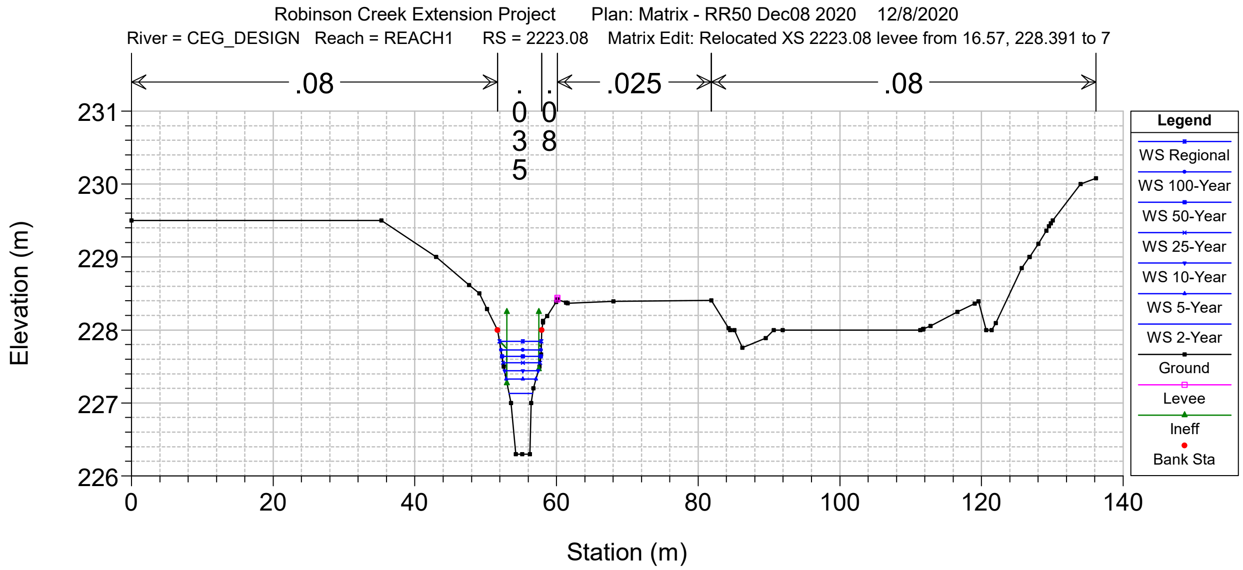

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.11 Matrix Edit: Added levee
.08
.035
.08
.025
.08
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
230.0
229.5
229.0
228.5
228.0
227.5
227.0
226.5
0
20
40
60
80
100
120

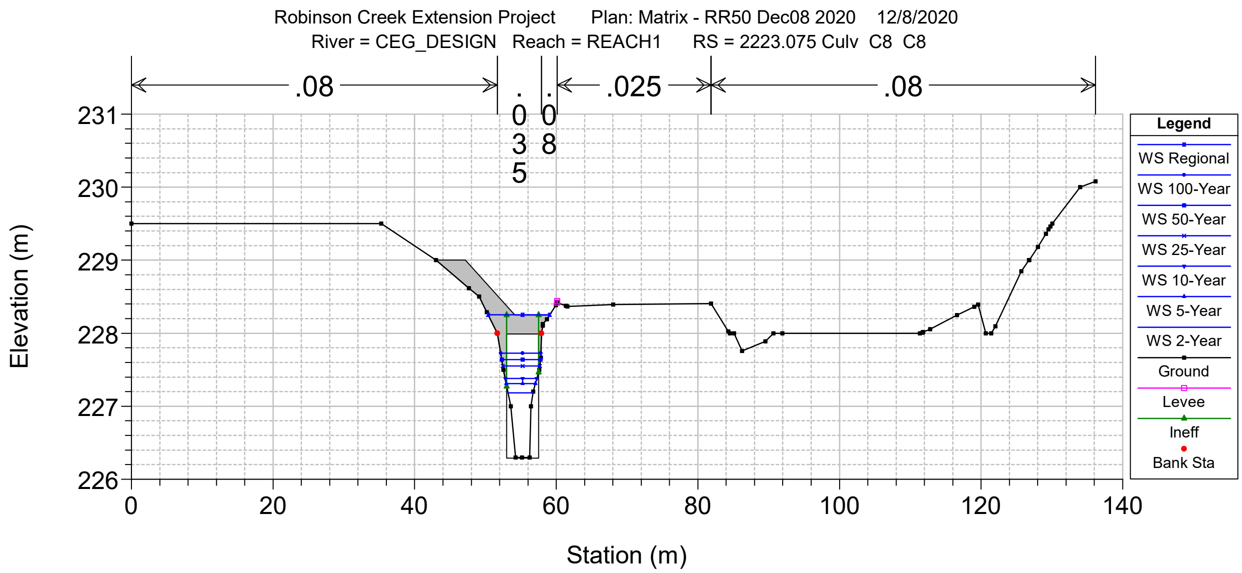

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.105 Culv C7 C7
.08
.035
.08
.025
.08
Legend
WS 100-Year
WS Regional
WS 10-Year
WS 25-Year
WS 50-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
230.0
229.5
229.0
228.5
228.0
227.5
227.0
226.5
0
20
40
60
80
100
120

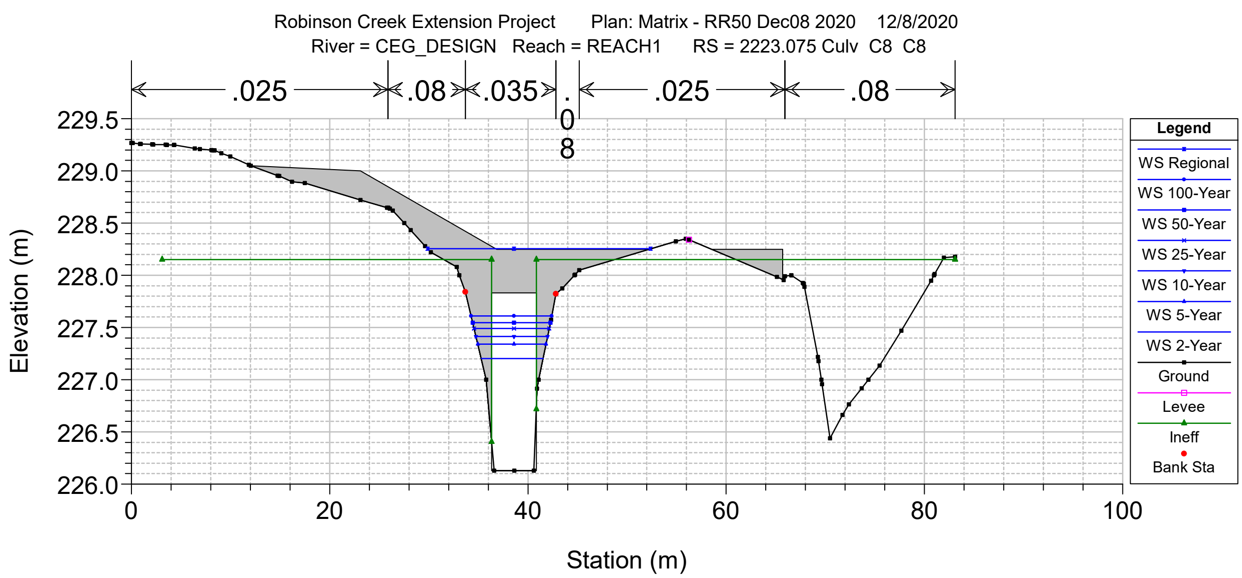

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.105 Culv C7 C7
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 2-Year
WS 25-Year
WS 50-Year
WS 5-Year
WS 10-Year
Ground
Levee
Ineff
Bank Sta

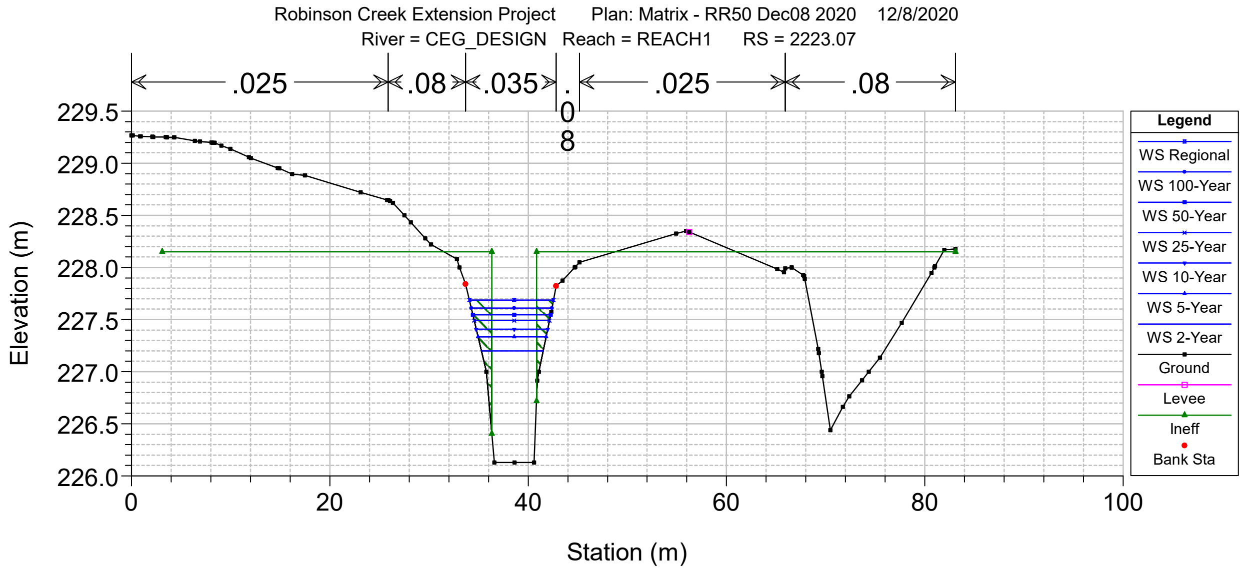

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.10 Matrix Edit: Added levee
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

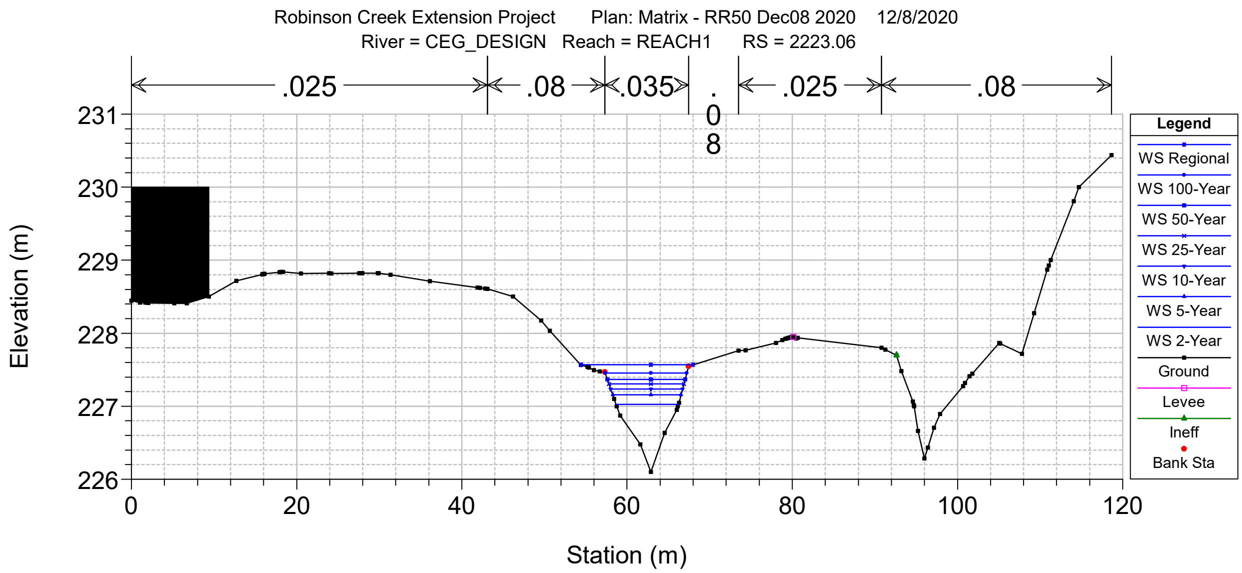

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.09 Matrix Edit: Added levee
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

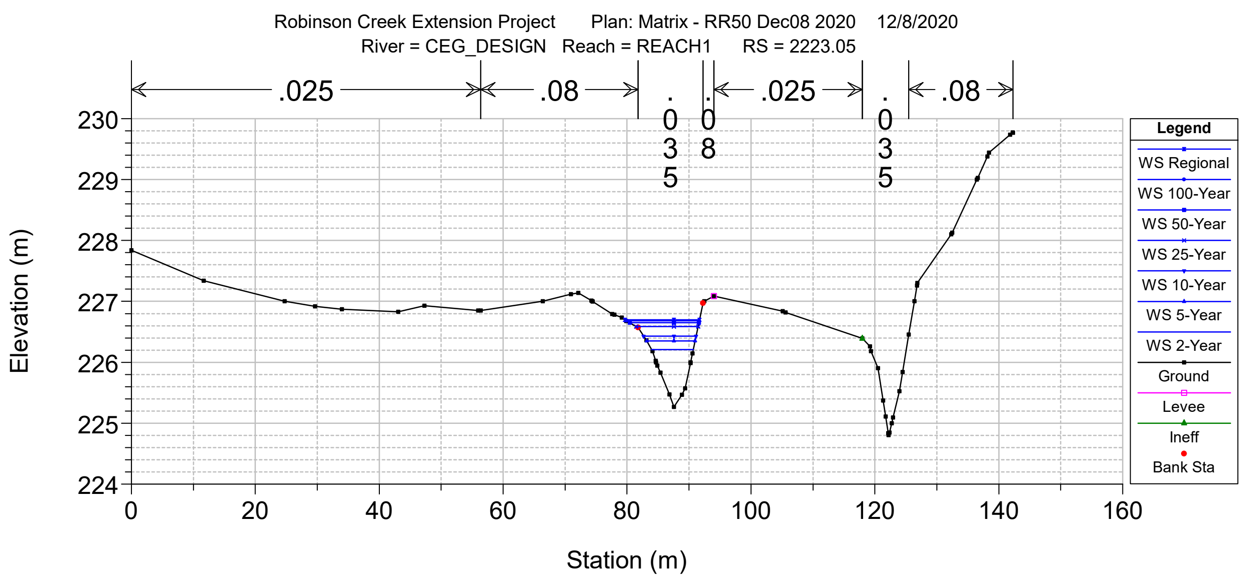

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.08 Matrix Edit: Relocated XS 2223.08 levee from 16.57, 228.391 to 7
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

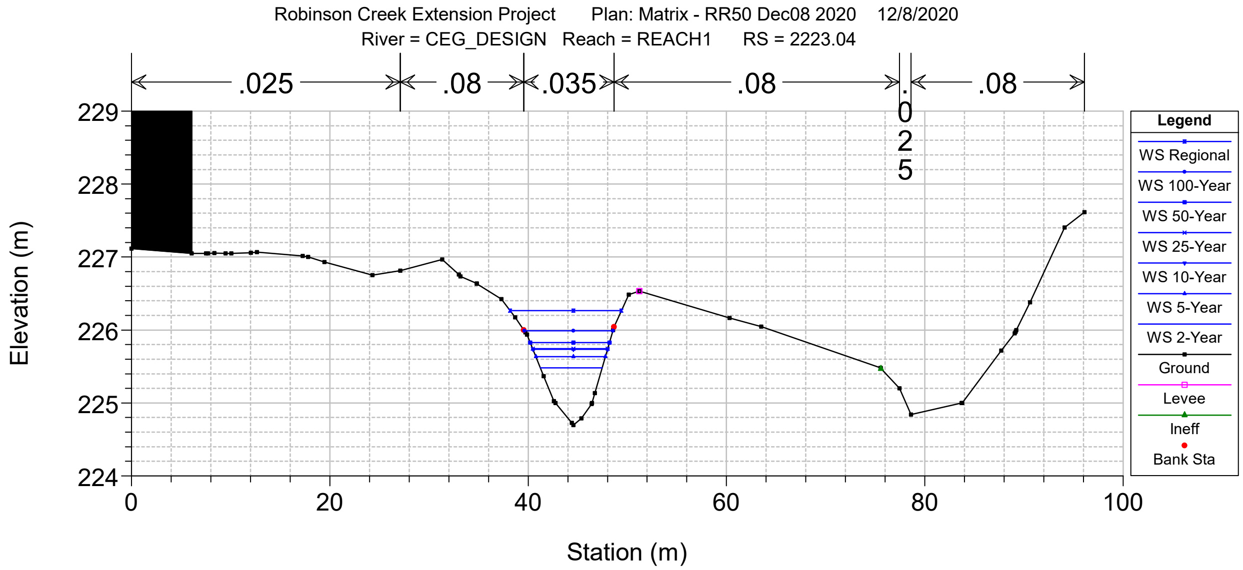

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.075 Culv C8 C8
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.075 Culv C8 C8
.025
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

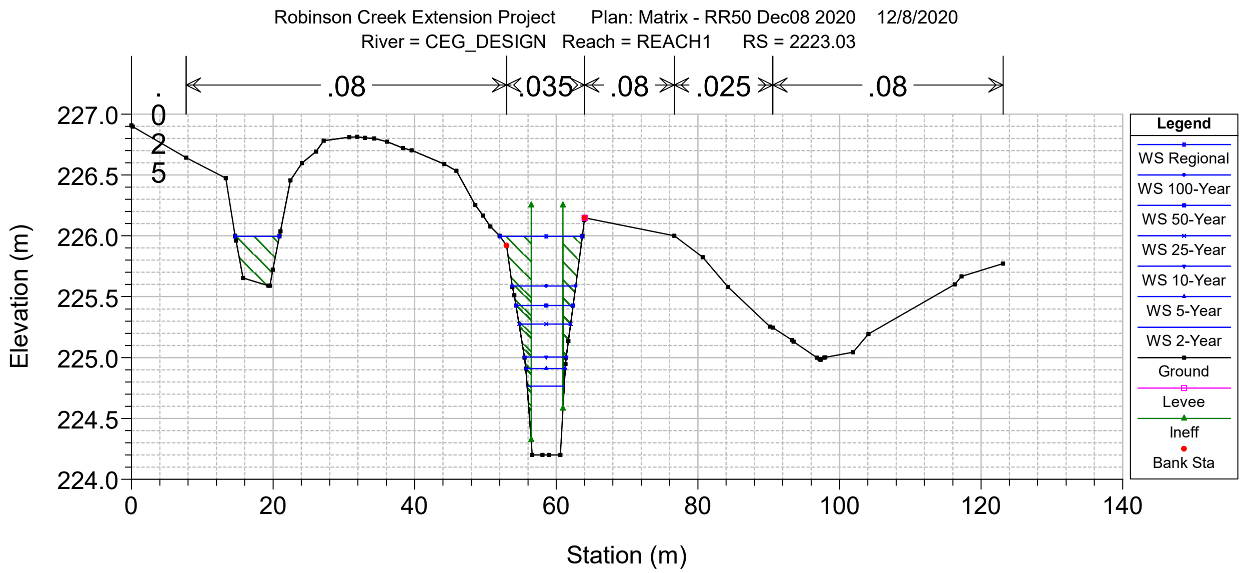

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.07
.025
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.06
.025
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

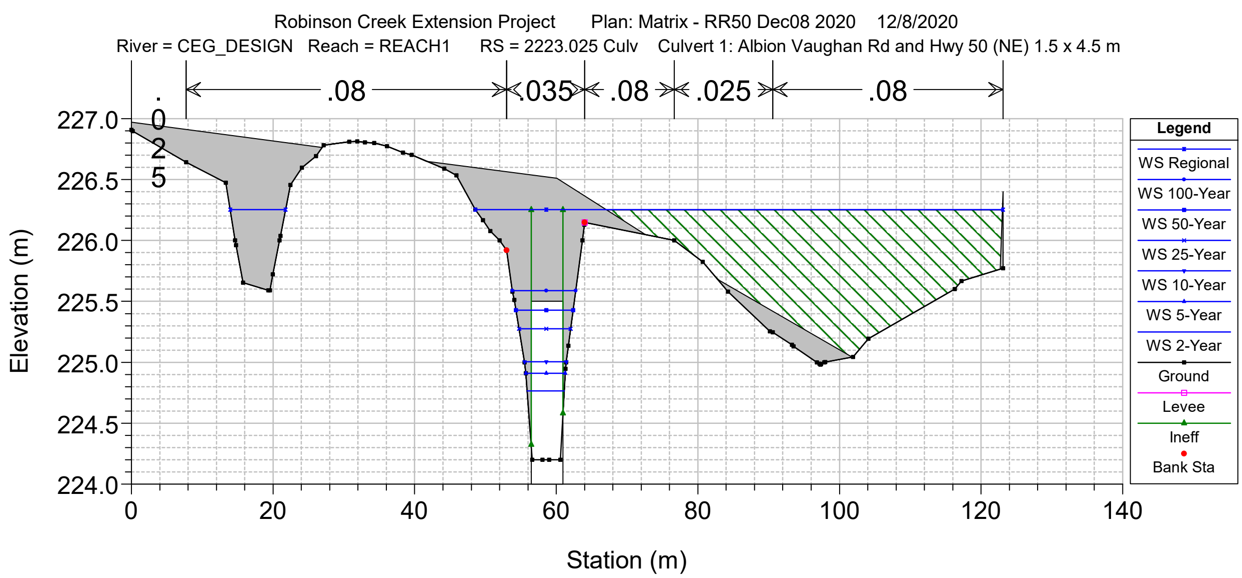

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.05
.025
.08
.035
.08
.025
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta



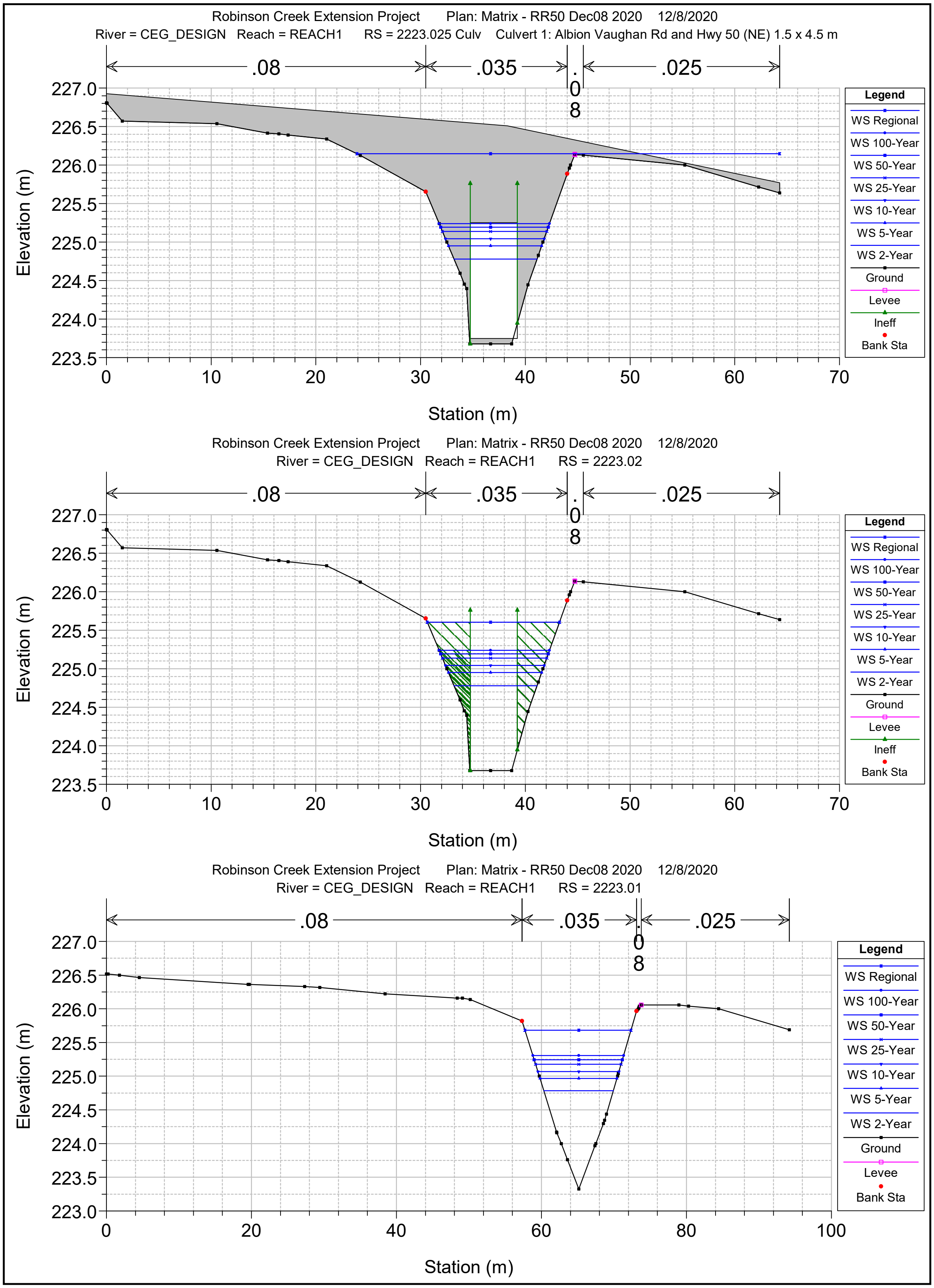
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.04
.025
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

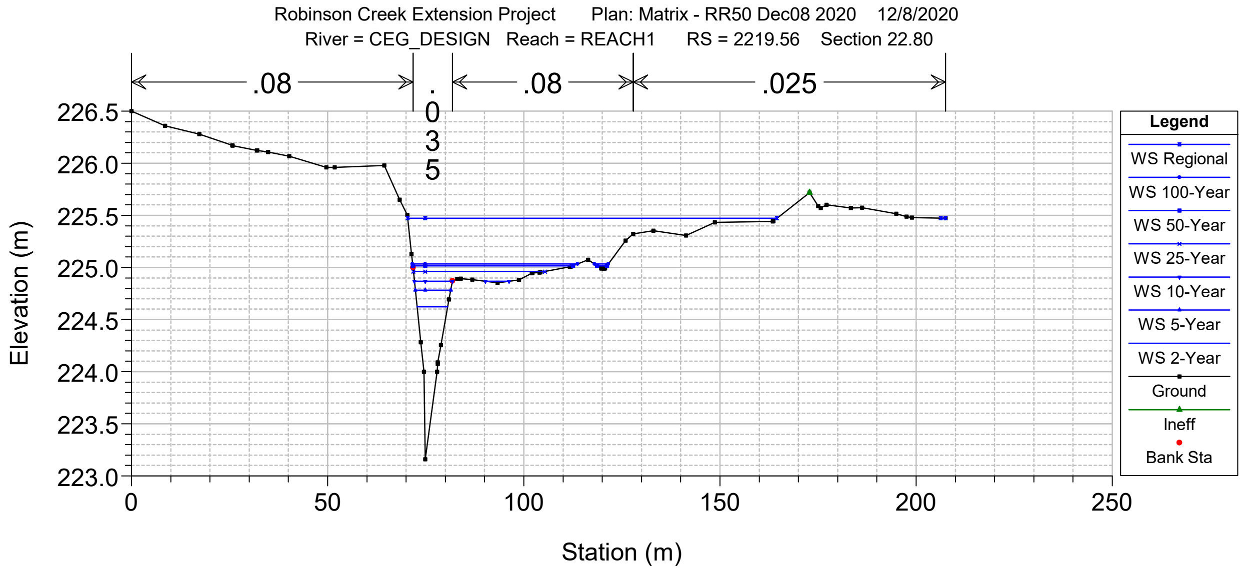


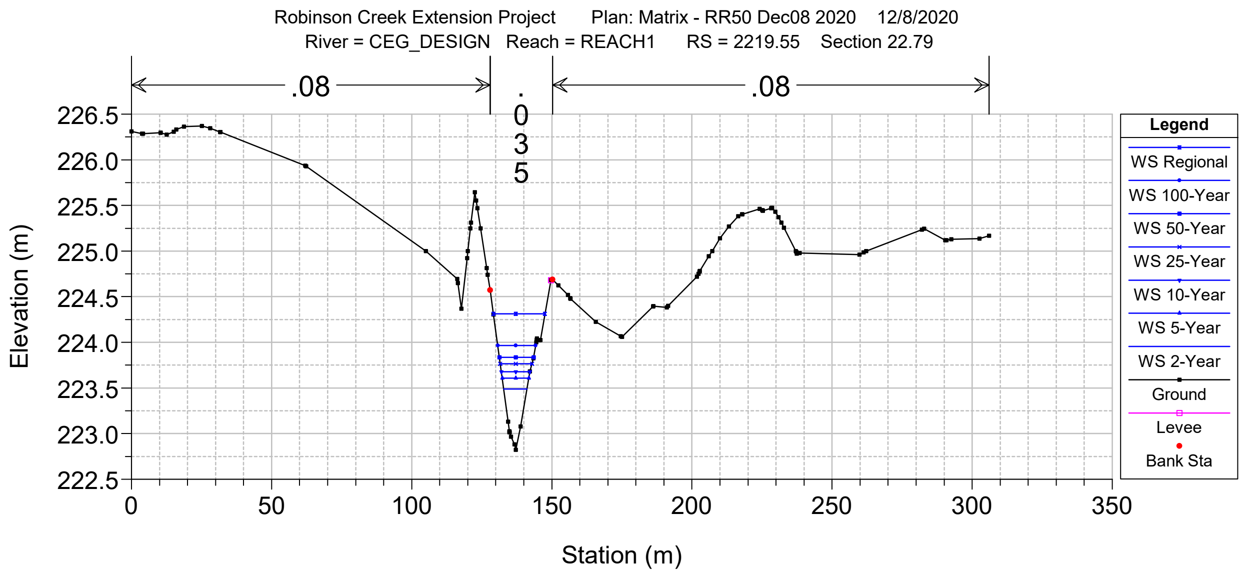
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.03
.025
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta

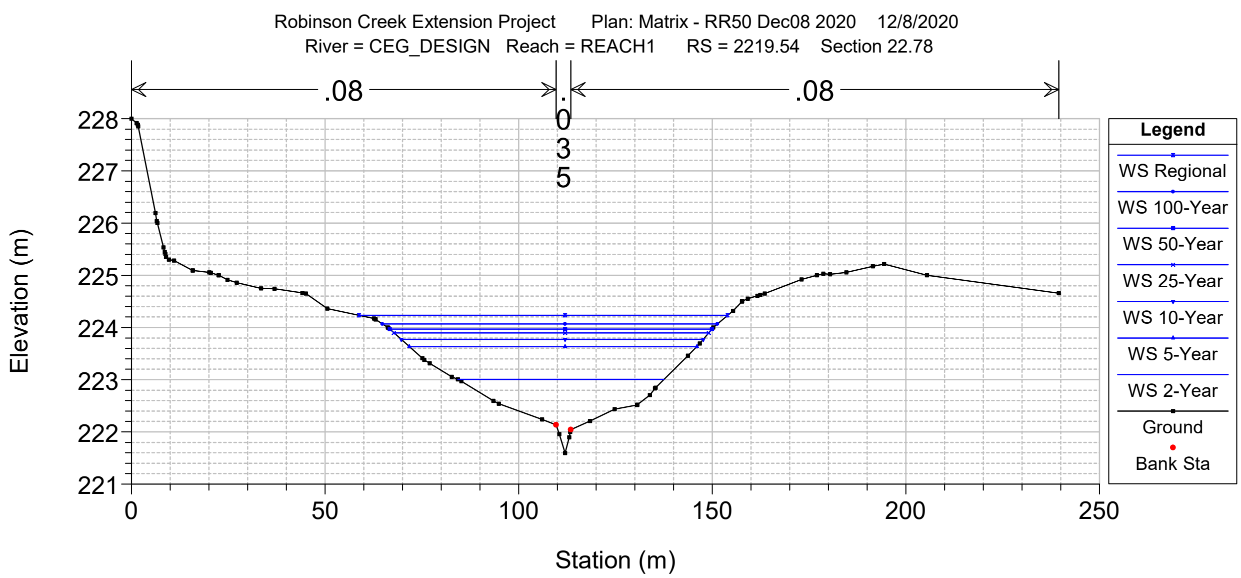


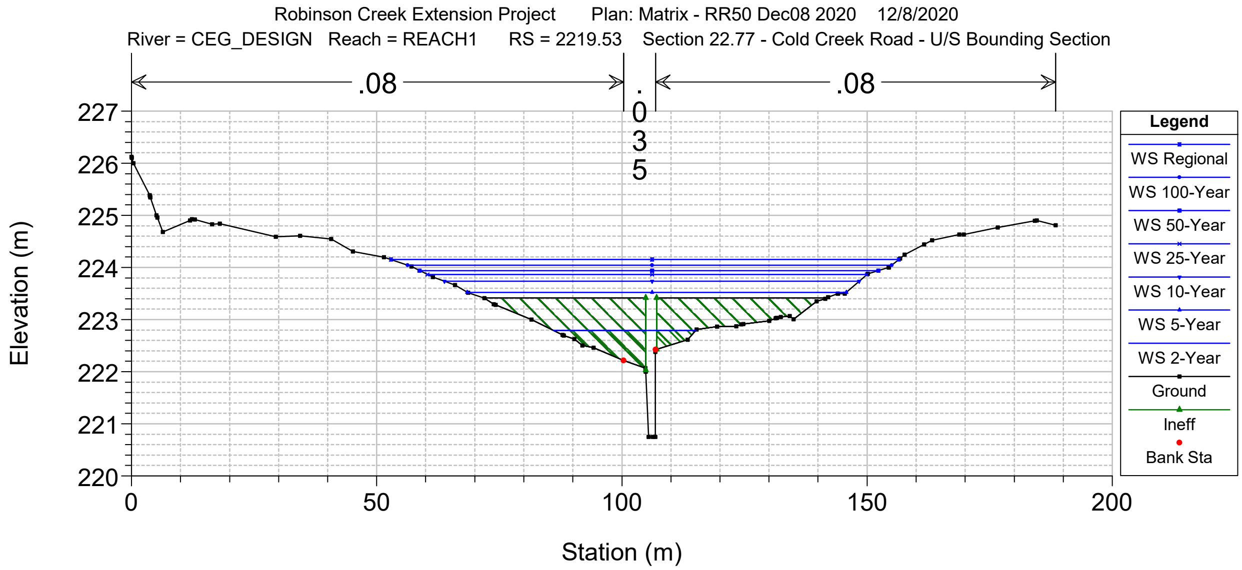
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.025 Culv Culvert 1: Albion Vaughan Rd and Hwy 50 (NE) 1.5 x 4.5 m
.025
.08
.035
.08
.025
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.025 Culv Culvert 1: Albion Vaughan Rd and Hwy 50 (NE) 1.5 x 4.5 m
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Ineff
Bank Sta
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.02
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2223.01

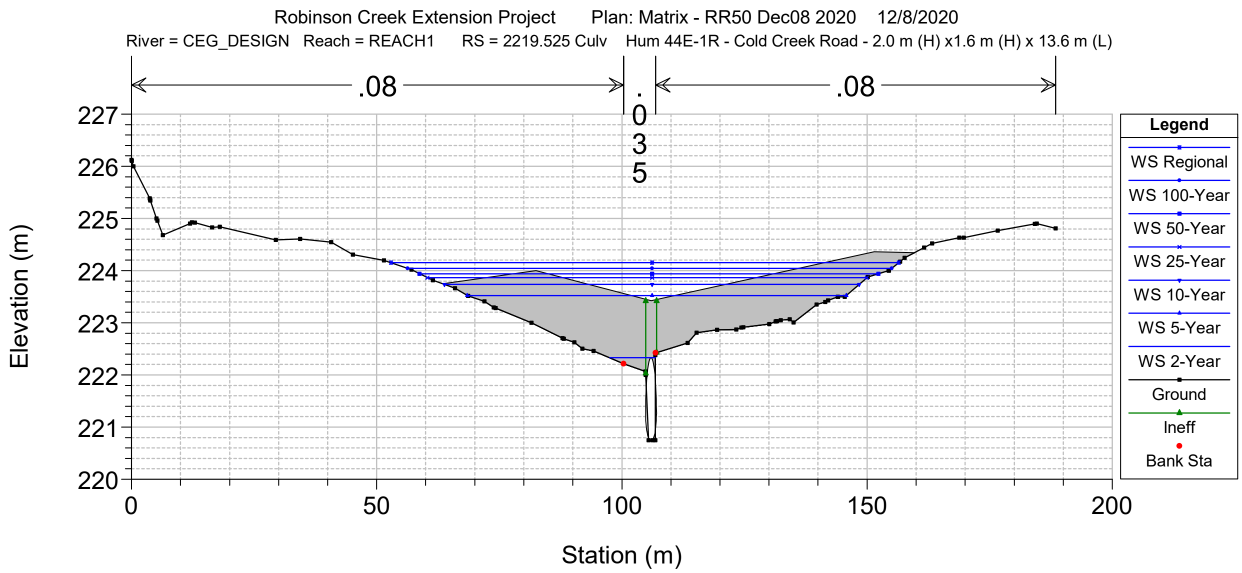

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.56 Section 22.80
.08
.035
.08
.025
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.55 Section 22.79
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Levee
Bank Sta

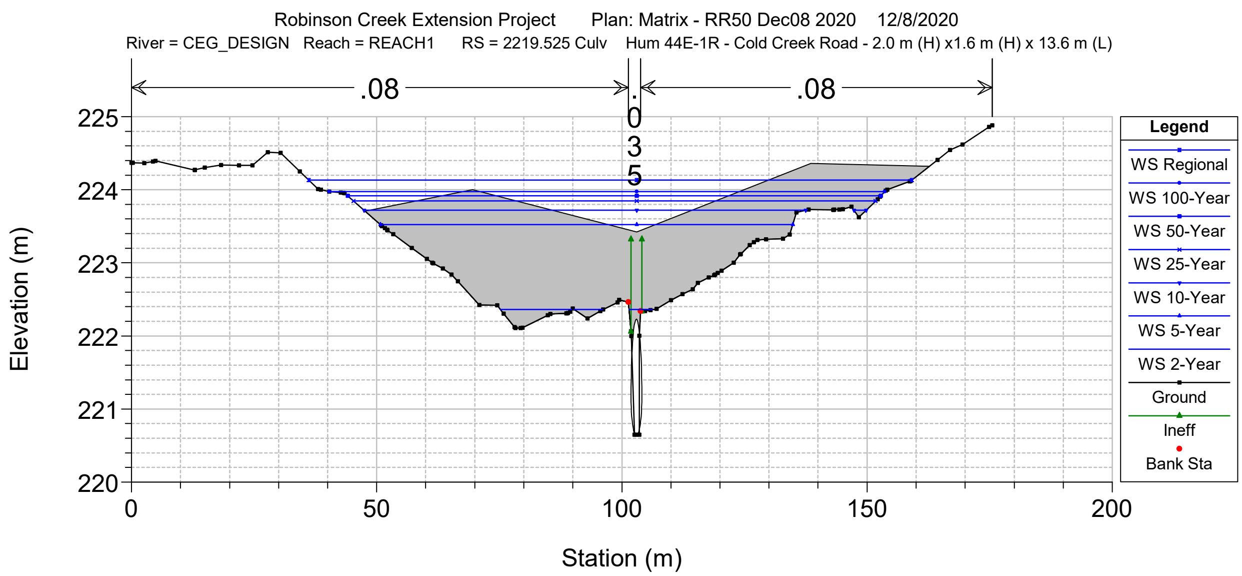

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.54 Section 22.78
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta



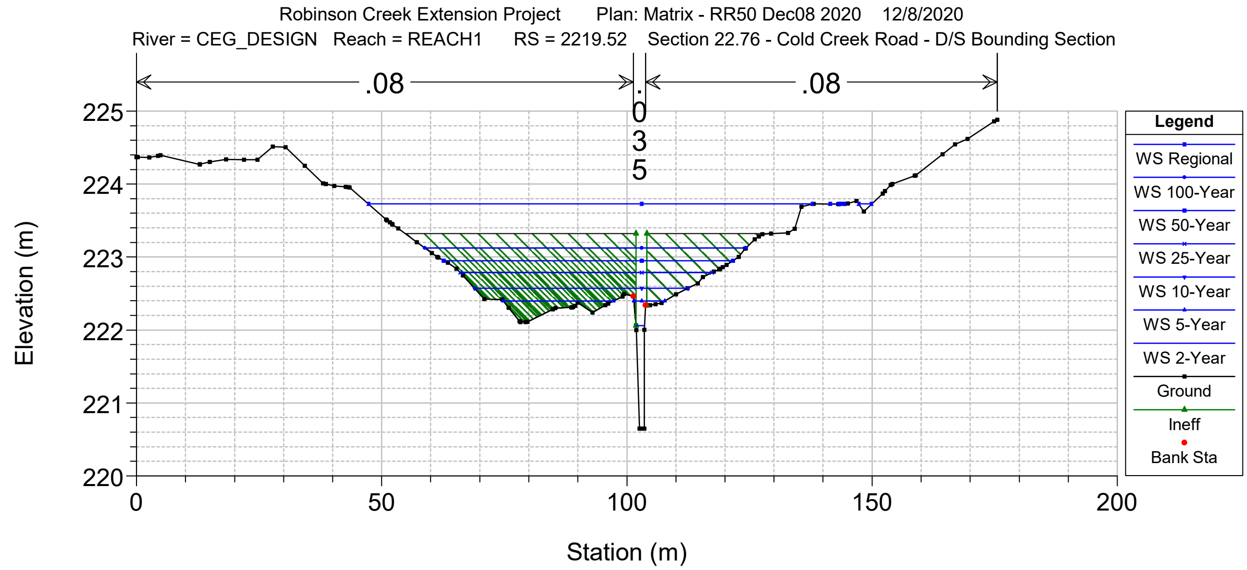
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.53 Section 22.77 - Cold Creek Road - U/S Bounding Section
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

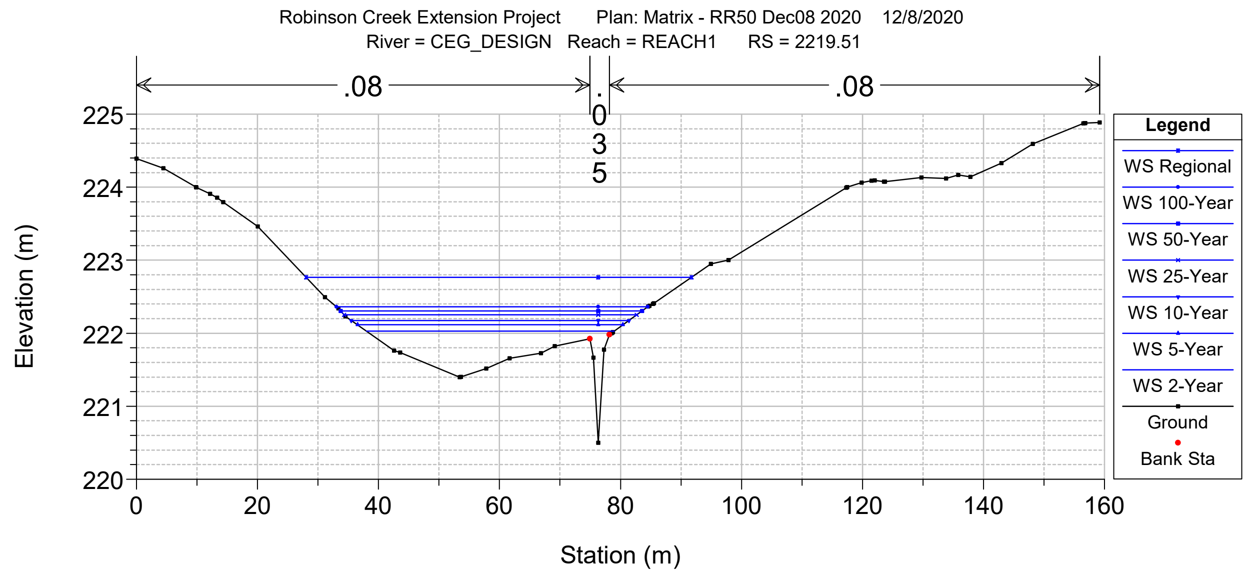


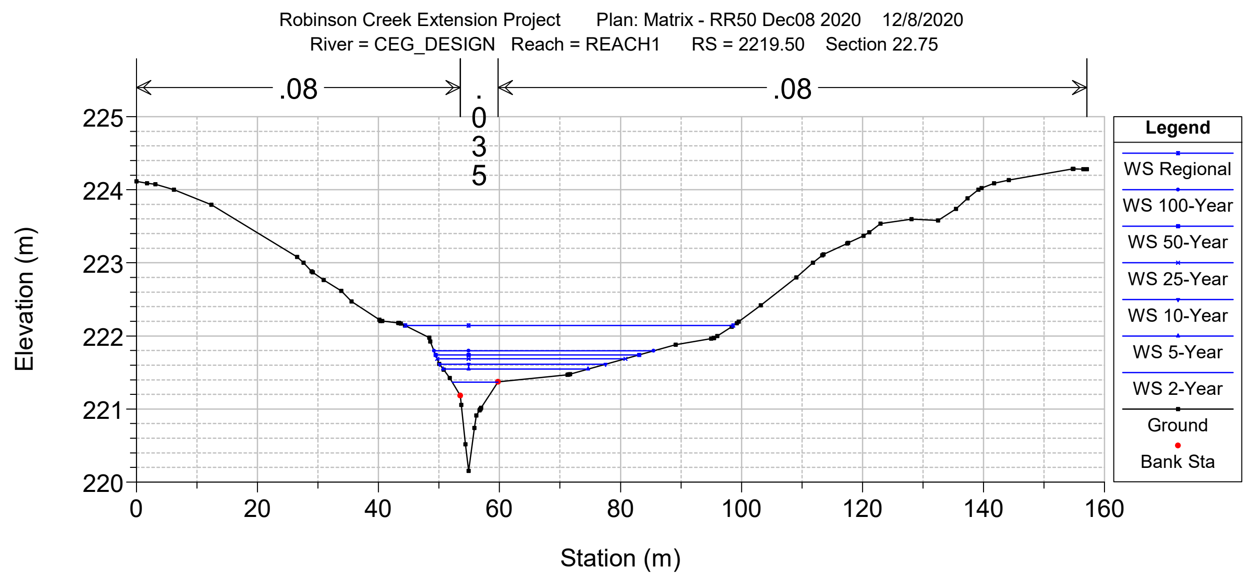
Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.525 Culv Hum 44E-1R - Cold Creek Road - 2.0 m (H) x1.6 m (H) x 13.6 m (L)
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta



Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.525 Culv Hum 44E-1R - Cold Creek Road - 2.0 m (H) x1.6 m (H) x 13.6 m (L)
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta

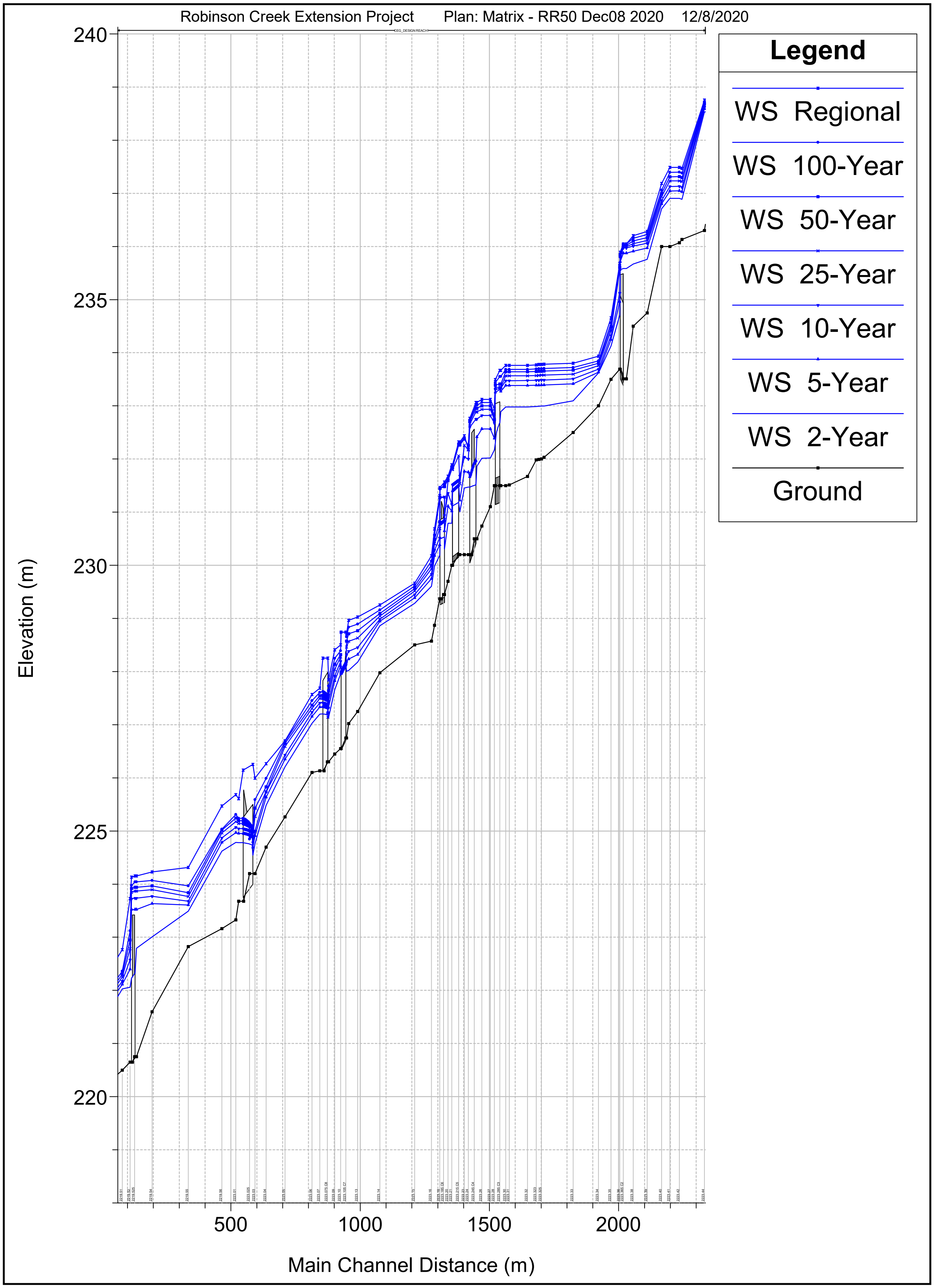

Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.52 Section 22.76 - Cold Creek Road - D/S Bounding Section
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Ineff
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.51
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta


Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
River = CEG_DESIGN Reach = REACH1 RS = 2219.50 Section 22.75
.08
.035
.08
Elevation (m)
Station (m)
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Bank Sta

APPENDIX F HEC-RAS OUTPUT

Item 4 – Water Surface Elevation Profile



Robinson Creek Extension Project Plan: Matrix - RR50 Dec08 2020 12/8/2020
Legend
WS Regional
WS 100-Year
WS 50-Year
WS 25-Year
WS 10-Year
WS 5-Year
WS 2-Year
Ground
Elevation (m)
Main Channel Distance (m)
240
235
230
225
220
500
1000
1500
2000

Appendix B

Hydraulic Modelling Outputs

WEST SIDE PLAN & PROFILE - INFOWORKS MODEL OUTPUT

DATA FLAGS

Name	Display Colour	Obsolete	Description
#A		☐	Asset Data
#D		☐	System Default
#G		☐	Data from GeoPlan
#I		☐	Model Import
#S		☐	System Calculated
#V		☐	CSV Import
AA		☐	Assumed Contributing Area
AC		☐	As Constructed Dwg
AD		☐	RVA-Assumed Data
AM		☐	Logical amendment made to GIS or survey data.
AS		☐	Assumed data
CA		☐	C of A
CALC		☐	Calculated Area Percentage (Google Earth) - RVA (SS)
CC		☐	Calculated based on set depth from cover level
CG		☐	Calculated on continuous gradient if no US invert
CPRV		☐	Calculated Parameter by RVA based on Matrix Data
CU		☐	Calculated by User
DC		☐	Based on Design Standards
DD		☐	Design Drawings
DE		☐	Developer Charges (DC)
DM		☐	Ground Level from DEM
DP		☐	Ground Level from Depth (+Min Invert)
DU		☐	DUMMY - data assumed for dummy or user-created nodes/link
EM		☐	Existing Model
FR		☐	Data supplied from Regional report or spreadsheet
GI		☐	GIS Import
IF		☐	Inferred
IT		☐	Interpolated
MD		☐	RVA - Data extracted from HEC-RAS model prepared by Matrix
MI		☐	Calculated Based on Minimum Slope
PD		☐	PROPOSED DESIGN
SD		☐	Survey Data
SDRV		☐	RVA-Survey Data
SI		☐	Calculated/Inferred Based on Survey/Site Data
TA		☐	TEMPORARY - Temporary assumption made pending survey or

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EXISTING CONDITION - 10 - YEAR - WEST SIDE PLAN 1			
RVA PROJECT NO. 194615	FIGURE NO. 1A	AUGUST 2021	arva

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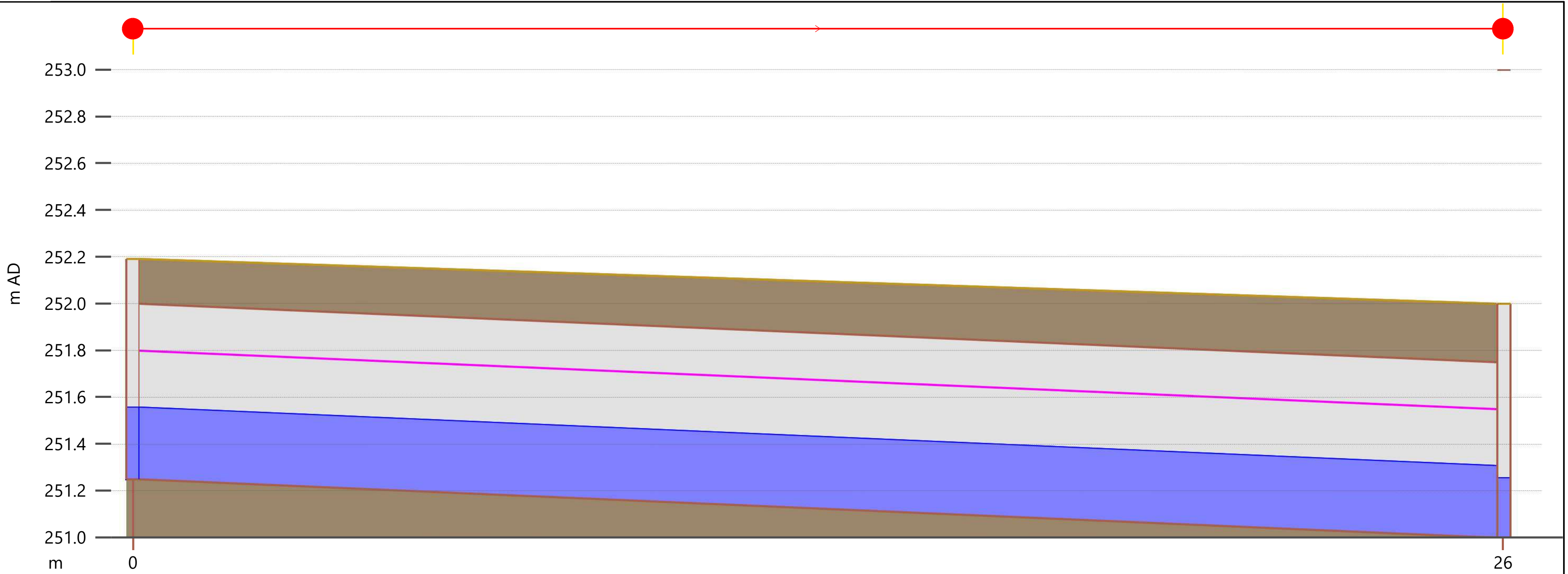

Link	RR-WD-1.1	
US node ID	RR-WD-1	
ds node	RR-WD-2	
numbarrels	1	
length (m)	26.3	
Shape ID	CIRC	
width (mm)	750	
height (mm)	750	
Rough type	N	
us inv (m AD)	251.250	
ds inv (m AD)	251.000	
grad (m/m)	0.00952	
r.pfc (m3/s)	1.086	
US depth (m)	0.307	
US flow (m3/s)	0.37046	
US velocity (m/s)	2.181	
Node	RR-WD-1	RR-WD-2
Node ID	RR-WD-1	RR-WD-2
ground (m AD)	252.191	252.000
level (m AD)	251.557	251.254
expr:Freeboard	0.634161	0.745789

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 1

RVA PROJECT NO. 194615 | FIGURE NO. 1B | AUGUST 2021

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PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 1			arva
RVA PROJECT NO. 194615	FIGURE NO. 1C	AUGUST 2021	

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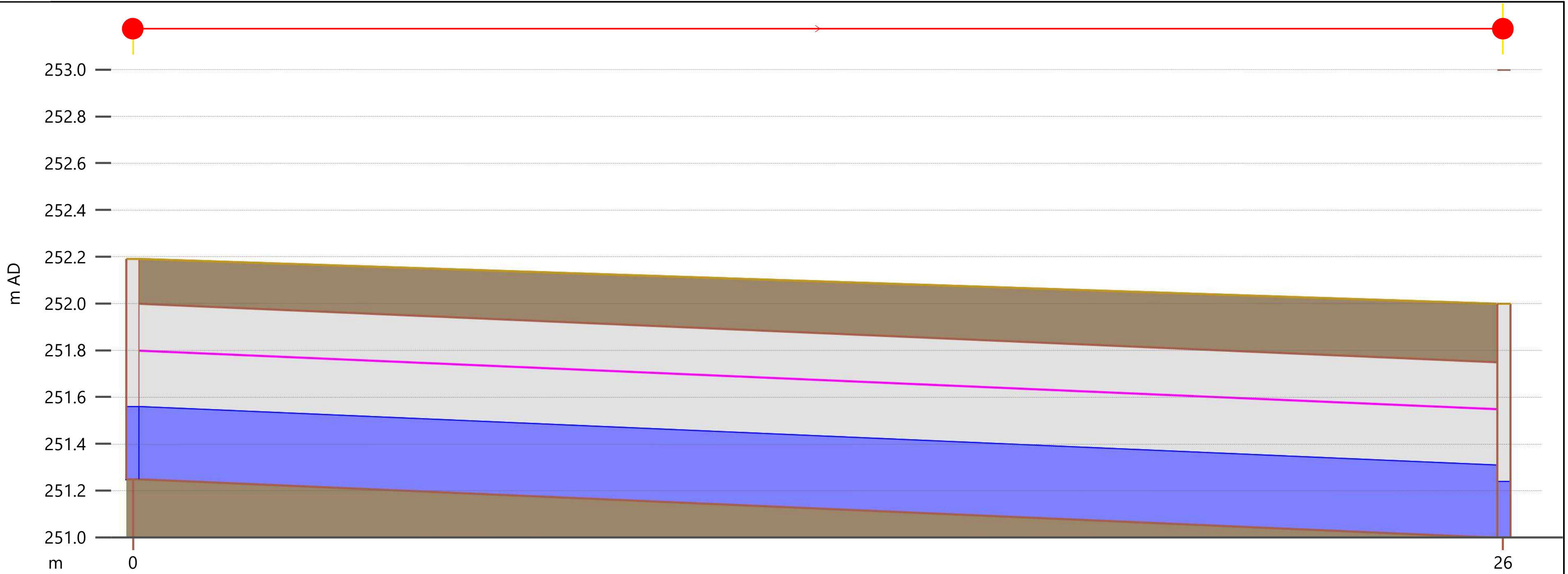

Link	RR-WD-1.1	
US node ID	RR-WD-1	
ds node	RR-WD-2	
numbarrels	1	
length (m)	26.3	
Shape ID	CIRC	
width (mm)	750	
height (mm)	750	
Rough type	N	
us inv (m AD)	251.250	
ds inv (m AD)	251.000	
grad (m/m)	0.00952	
r.pfc (m3/s)	1.086	
US depth (m)	0.307	
US flow (m3/s)	0.37129	
US velocity (m/s)	2.183	
Node	RR-WD-1	RR-WD-2
Node ID	RR-WD-1	RR-WD-2
ground (m AD)	252.191	252.000
level (m AD)	251.557	251.238
expr:Freeboard	0.633780	0.761581

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 1

RVA PROJECT NO. 194615	FIGURE NO. 1D	AUGUST 2021

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EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 1

RVA PROJECT NO. 194615	FIGURE NO. 1E	AUGUST 2021

arva

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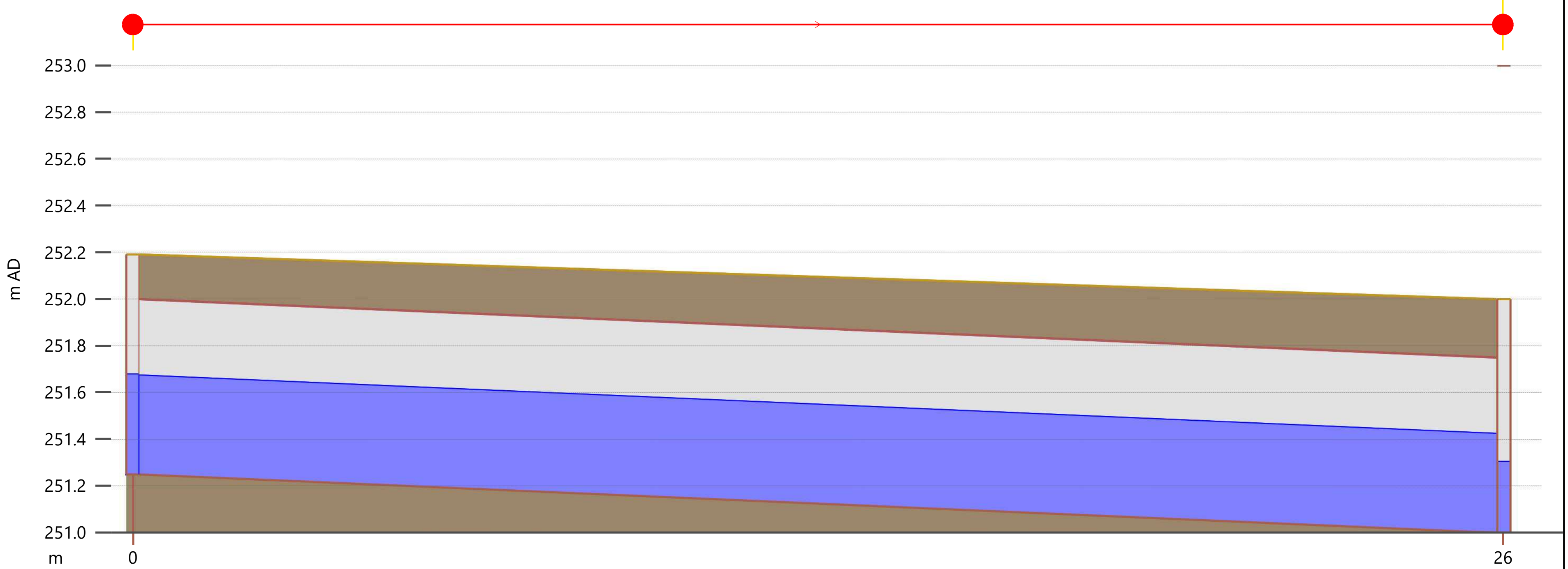

Link	RR-WD-1.1	
US node ID	RR-WD-1	
ds node	RR-WD-2	
numbarrels	1	
length (m)	26.3	
Shape ID	CIRC	
width (mm)	750	
height (mm)	750	
Rough type	N	
us inv (m AD)	251.250	
ds inv (m AD)	251.000	
grad (m/m)	0.00952	
r.pfc (m3/s)	1.086	
US depth (m)	0.422	
US flow (m3/s)	0.64887	
US velocity (m/s)	2.532	
Node	RR-WD-1	RR-WD-2
Node ID	RR-WD-1	RR-WD-2
ground (m AD)	252.191	252.000
level (m AD)	251.677	251.303
expr:Freeboard	0.513891	0.697281

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 1

RVA PROJECT NO. 194615	FIGURE NO. 1F	AUGUST 2021	arva

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PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 1

RVA PROJECT NO. 194615	FIGURE NO. 1G	AUGUST 2021

arva

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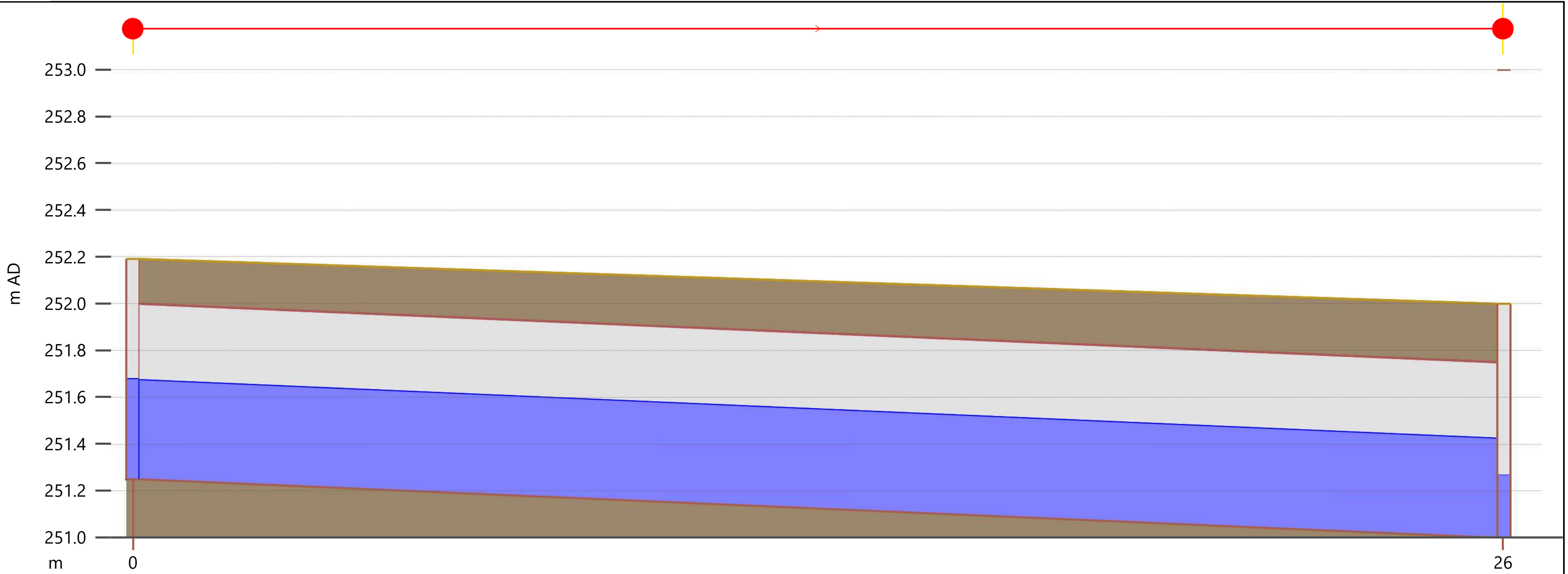

Link	RR-WD-1.1	
US node ID	RR-WD-1	
ds node	RR-WD-2	
numbarrels	1	
length (m)	26.3	
Shape ID	CIRC	
width (mm)	750	
height (mm)	750	
Rough type	N	
us inv (m AD)	251.250	
ds inv (m AD)	251.000	
grad (m/m)	0.00952	
r.pfc (m3/s)	1.086	
US depth (m)	0.423	
US flow (m3/s)	0.65001	
US velocity (m/s)	2.534	
Node	RR-WD-1	RR-WD-2
Node ID	RR-WD-1	RR-WD-2
ground (m AD)	252.191	252.000
level (m AD)	251.678	251.265
expr:Freeboard	0.513495	0.735275

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 1

RVA PROJECT NO. 194615	FIGURE NO. 1H	AUGUST 2021

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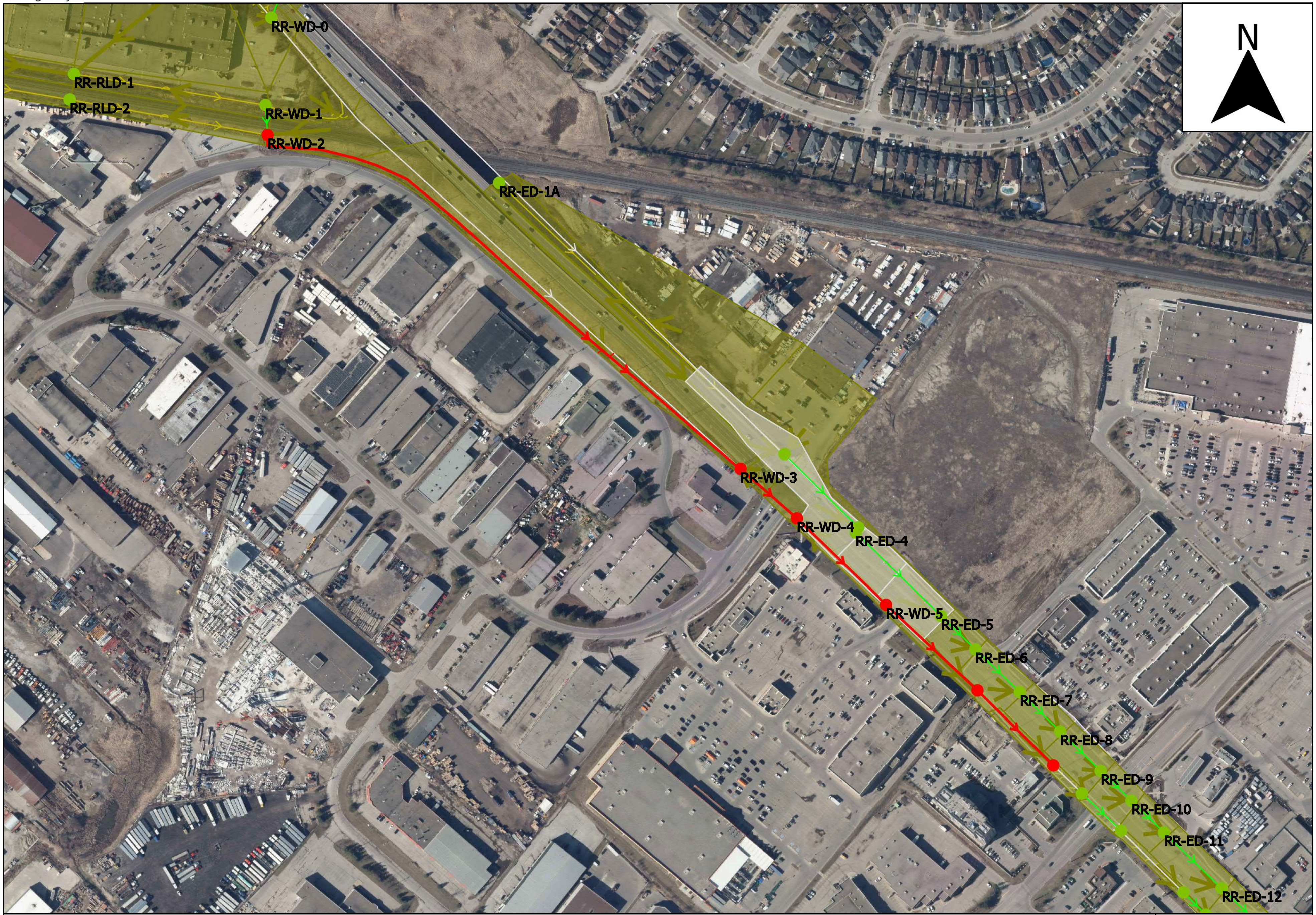

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 2

RVA PROJECT NO. 194615	FIGURE NO. 2A	AUGUST 2021

rva

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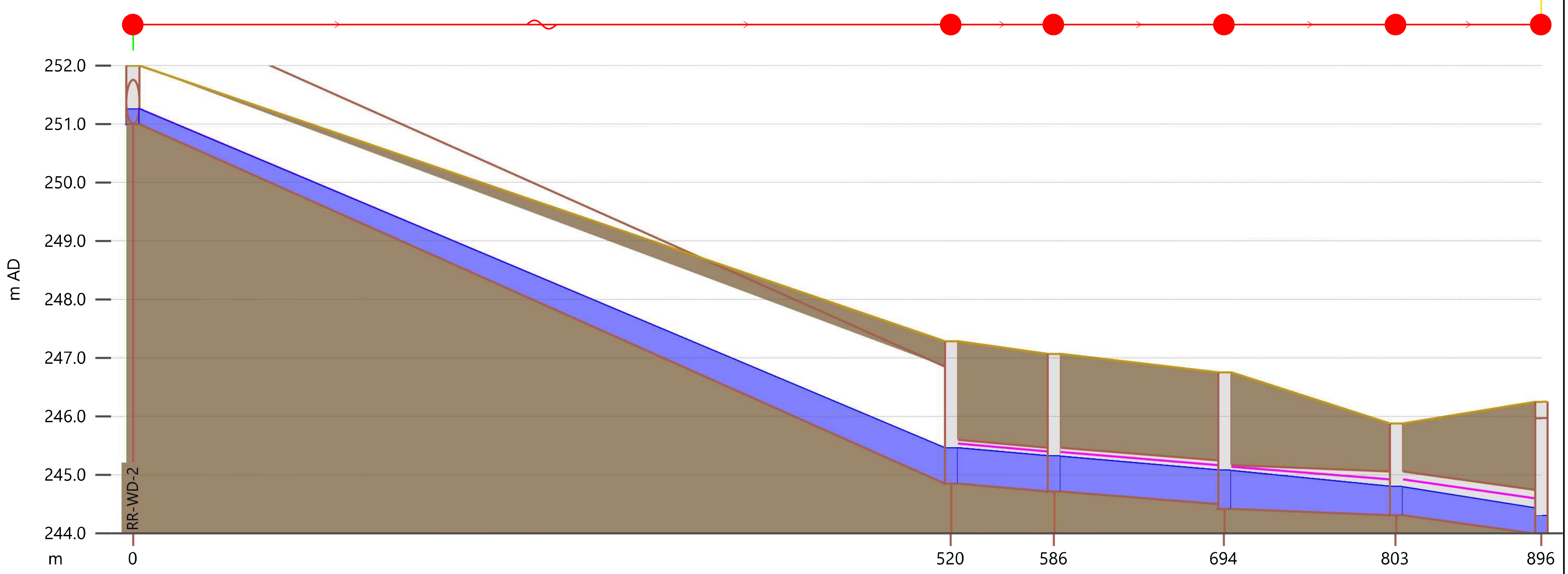

Link	RR-WD-2.1	RR-WD-3.1	RR-WD-4.1	RR-WD-5.1	RR-WD-6.1
US node ID	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6
ds node	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	RR-WD-7
numbarrels	1	1	1	1	1
length (m)		65.5	108.3	109.1	92.6
Shape ID	Channel (Assumption)	CIRC	CIRC	CIRC	CIRC
width (mm)		750	750	750	750
height (mm)		750	750	750	750
Rough type		N	N	N	N
us inv (m AD)	251.000	244.853	244.720	244.420	244.310
ds inv (m AD)	244.853	244.720	244.500	244.310	244.000
grad (m/m)		0.00203	0.00203	0.00101	0.00335
r.pfc (m3/s)	56.632	0.502	0.502	0.354	0.644
US depth (m)	0.254	0.601	0.592	0.653	0.482
US flow (m3/s)	0.52896	0.48954	0.48840	0.48626	0.48641
US velocity (m/s)	0.383	1.328	1.338	1.195	1.620

Node	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	-
Node ID	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	-
ground (m AD)	252.000	247.288	247.068	246.754	245.882	-
level (m AD)	251.254	245.460	245.318	245.079	244.797	-
expr:Freeboard	0.745789	1.828451	1.750114	1.674944	1.085648	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 2

RVA PROJECT NO. 194615	FIGURE NO. 2B	AUGUST 2021

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PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 2

RVA PROJECT NO. 194615	FIGURE NO. 2C	AUGUST 2021

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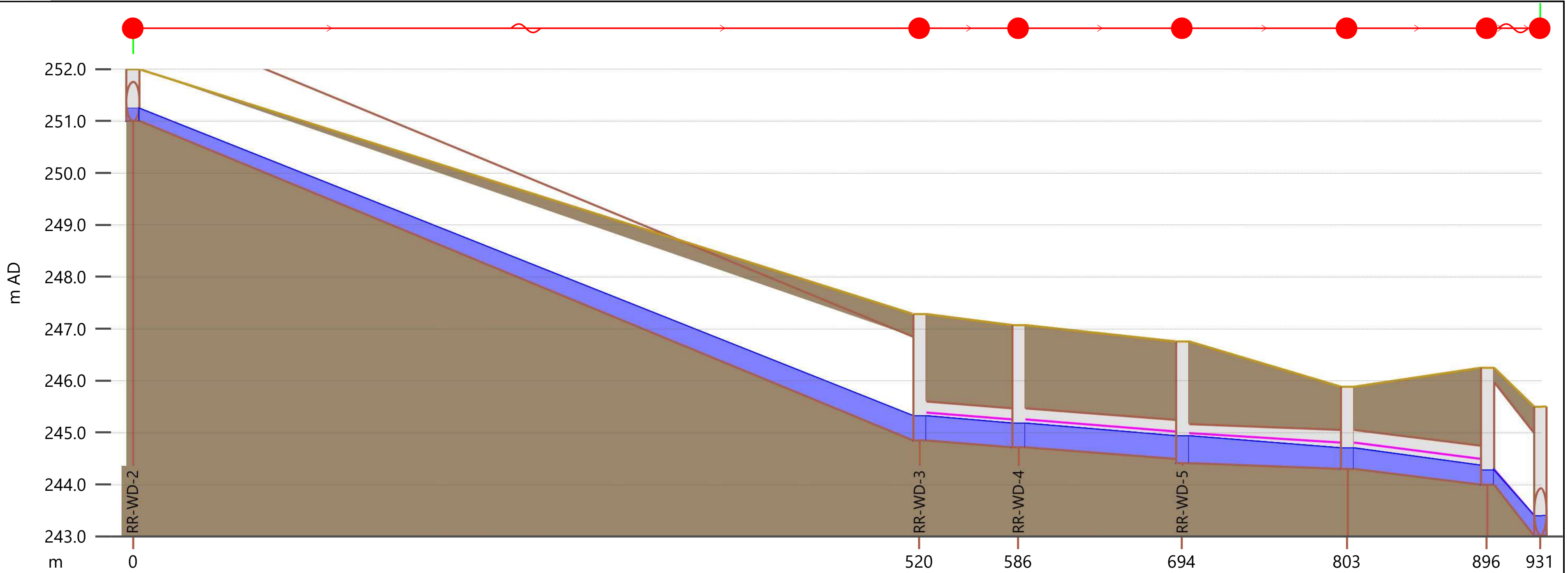

Link	RR-WD-2.1	RR-WD-3.1	RR-WD-4.1	RR-WD-5.1	RR-WD-6.1	-
US node ID	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	-
ds node	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	RR-WD-7	-
numbarrels	1	1	1	1	1	1
length (m)		65.5	108.3	109.1	92.6	
Shape ID	Channel (Assumption)	CIRC	CIRC	CIRC	CIRC	-
width (mm)		750	750	750	750	
height (mm)		750	750	750	750	
Rough type		N	N	N	N	
us inv (m AD)	251.000	244.853	244.720	244.420	244.310	-
ds inv (m AD)	244.853	244.720	244.500	244.310	244.000	-
grad (m/m)		0.00203	0.00203	0.00101	0.00335	
r.pfc (m3/s)	56.632	0.502	0.502	0.354	0.644	-
US depth (m)	0.238	0.463	0.457	0.514	0.390	0.272
US flow (m3/s)	0.36168	0.34999	0.34984	0.34776	0.34808	-
US velocity (m/s)	0.280	1.246	1.256	1.083	1.500	0.711

Node	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	RR-WD-7
Node ID	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	RR-WD-7
ground (m AD)	252.000	247.288	247.068	246.754	245.882	246.250
level (m AD)	251.238	245.318	245.179	244.936	244.701	244.272
expr:Freeboard	0.761581	1.970266	1.888572	1.817675	1.181824	1.978470

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 2

RVA PROJECT NO. 194615	FIGURE NO. 2D	AUGUST 2021

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EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 2		
RVA PROJECT NO. 194615	FIGURE NO. 2E	AUGUST 2021

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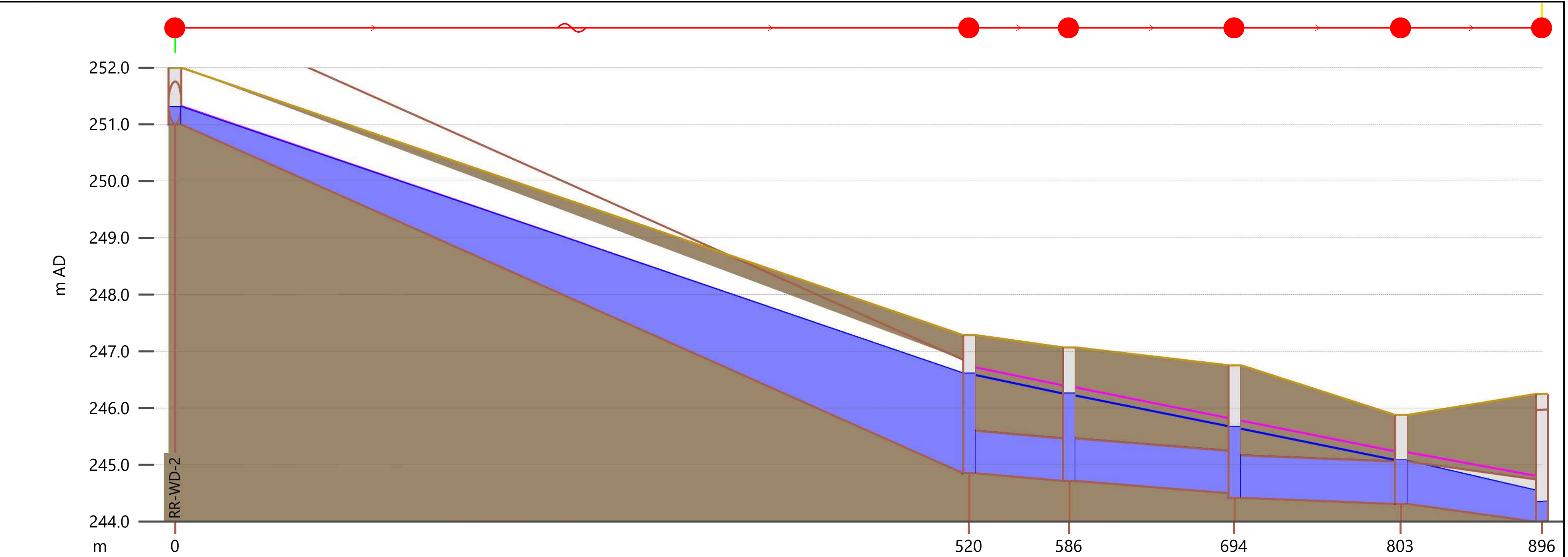

Link	RR-WD-2.1	RR-WD-3.1	RR-WD-4.1	RR-WD-5.1	RR-WD-6.1
US node ID	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6
ds node	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	RR-WD-7
numbarrels	1	1	1	1	1
length (m)		65.5	108.3	109.1	92.6
Shape ID	Channel (Assumption)	CIRC	CIRC	CIRC	CIRC
width (mm)		750	750	750	750
height (mm)		750	750	750	750
Rough type		N	N	N	N
us inv (m AD)	251.000	244.853	244.720	244.420	244.310
ds inv (m AD)	244.853	244.720	244.500	244.310	244.000
grad (m/m)		0.00203	0.00203	0.00101	0.00335
r.pfc (m3/s)	56.632	0.502	0.502	0.354	0.644
US depth (m)	0.303	1.731	1.504	1.220	0.758
US flow (m3/s)	1.09942	0.77860	0.78344	0.78342	0.78670
US velocity (m/s)	0.661	1.650	1.672	1.688	1.759

Node	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	-
Node ID	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	-
ground (m AD)	252.000	247.288	247.068	246.754	245.882	-
level (m AD)	251.303	246.606	246.257	245.678	245.088	-
expr:Freeboard	0.697281	0.681631	0.811179	1.076464	0.794662	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 2

RVA PROJECT NO. 194615 | FIGURE NO. 2F | AUGUST 2021

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PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 2			rva
RVA PROJECT NO. 194615	FIGURE NO. 2G	AUGUST 2021	

Region of Peel
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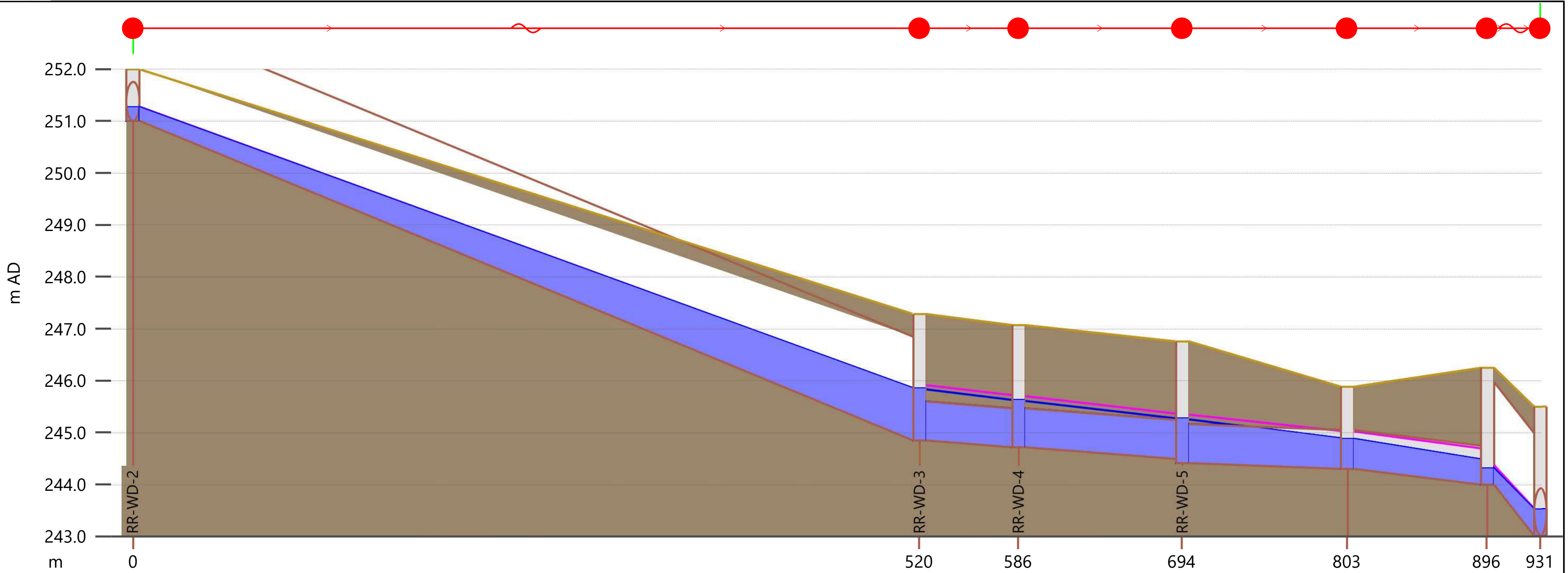

Link	RR-WD-2.1	RR-WD-3.1	RR-WD-4.1	RR-WD-5.1	RR-WD-6.1	-
US node ID	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	-
ds node	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	RR-WD-7	-
numbarrels	1	1	1	1	1	1
length (m)		65.5	108.3	109.1	92.6	
Shape ID	Channel (Assumption)	CIRC	CIRC	CIRC	CIRC	-
width (mm)		750	750	750	750	
height (mm)		750	750	750	750	
Rough type		N	N	N	N	
us inv (m AD)	251.000	244.853	244.720	244.420	244.310	-
ds inv (m AD)	244.853	244.720	244.500	244.310	244.000	-
grad (m/m)		0.00203	0.00203	0.00101	0.00335	
r.pfc (m3/s)	56.632	0.502	0.502	0.354	0.644	-
US depth (m)	0.265	0.979	0.893	0.842	0.569	0.316
US flow (m3/s)	0.63929	0.60675	0.61389	0.61373	0.61861	-
US velocity (m/s)	0.443	1.381	1.397	1.339	1.724	1.036

Node	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	RR-WD-7
Node ID	RR-WD-2	RR-WD-3	RR-WD-4	RR-WD-5	RR-WD-6	RR-WD-7
ground (m AD)	252.000	247.288	247.068	246.754	245.882	246.250
level (m AD)	251.265	245.853	245.634	245.278	244.887	244.316
expr:Freeboard	0.735275	1.434713	1.433952	1.476260	0.994995	1.933670

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 2

RVA PROJECT NO. 194615 | FIGURE NO. 2H | AUGUST 2021

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EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 3

RVA PROJECT NO. 194615	FIGURE NO. 3A	AUGUST 2021

arva

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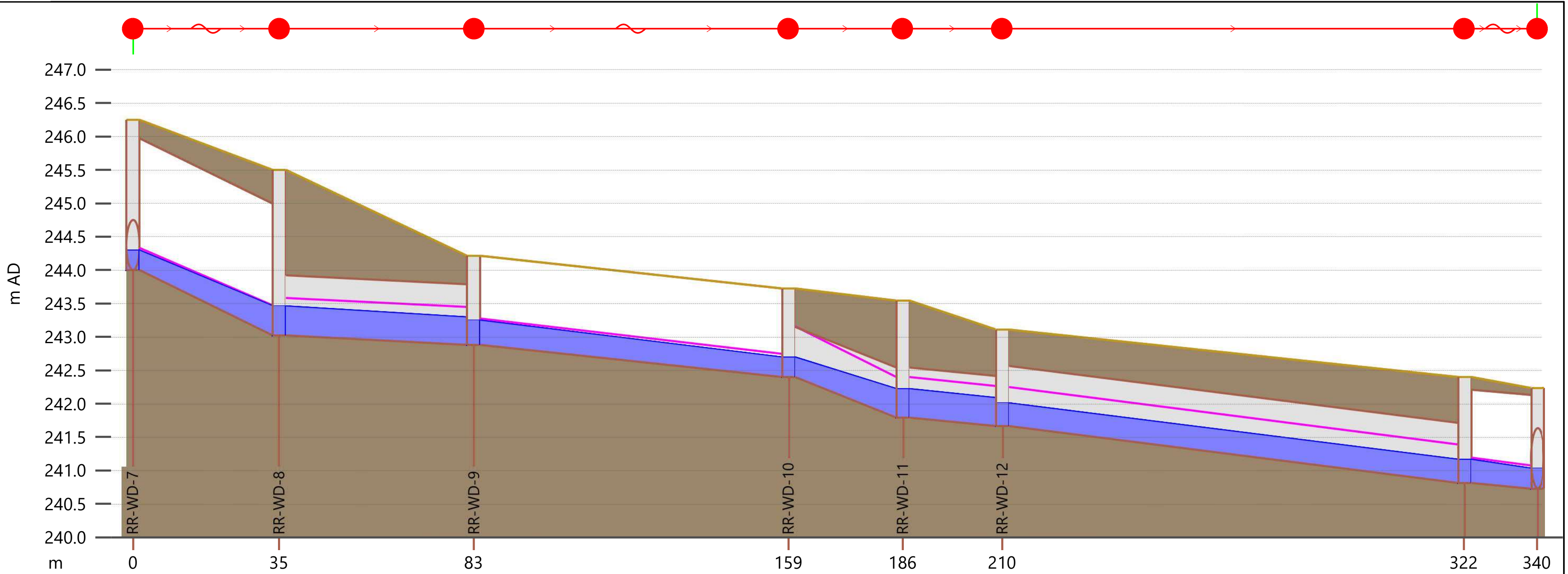

Link		RR-WD-7.1	RR-WD-8.1	RR-WD-9.1	RR-WD-10.1	-	RR-WD-12.1	-
US node ID		RR-WD-7	RR-WD-8	RR-WD-9	RR-WD-10	RR-WD-11	RR-WD-12	-
ds node		RR-WD-8	RR-WD-9	RR-WD-10	RR-WD-11	RR-WD-12	RR-WD-13	-
numbarrels		1	1	1	1	1	1	1
length (m)			47.2		27.7	24.1	111.9	
Shape ID		-	CIRC	-	CIRC	CIRC	CIRC	-
width (mm)			900		750	750	900	
height (mm)			900		750	750	900	
Rough type			N		N	N	N	
us inv (m AD)		244.000	243.022	242.887	242.399	241.796	241.668	240.816
ds inv (m AD)		243.022	242.887	242.399	241.796	241.668	240.816	240.733
grad (m/m)			0.00286		0.02180	0.00531	0.00762	
r.pfc (m3/s)		51.110	0.969	8.878	1.644	0.811	1.580	9.679
US depth (m)		0.293	0.440	0.358	0.292	0.421	0.343	0.351
US flow (m3/s)		0.48713	0.48554	0.48545	0.48226	0.48243	0.48260	0.48238
US velocity (m/s)		0.897	1.571	0.823	3.027	1.888	2.170	0.780

Node	-	RR-WD-8	RR-WD-9	RR-WD-10	RR-WD-11	RR-WD-12	RR-WD-13	-
Node ID	-	RR-WD-8	RR-WD-9	RR-WD-10	RR-WD-11	RR-WD-12	RR-WD-13	-
ground (m AD)	-	245.500	244.218	243.730	243.548	243.114	242.400	-
level (m AD)	-	243.462	243.245	242.692	242.220	242.011	241.167	-
expr:Freeboard	-	2.037827	0.972562	1.038258	1.327846	1.102983	1.232794	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 3

RVA PROJECT NO. 194615	FIGURE NO. 3B	AUGUST 2021

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PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 3

RVA PROJECT NO. 194615	FIGURE NO. 3C	AUGUST 2021	arva

Region of Peel
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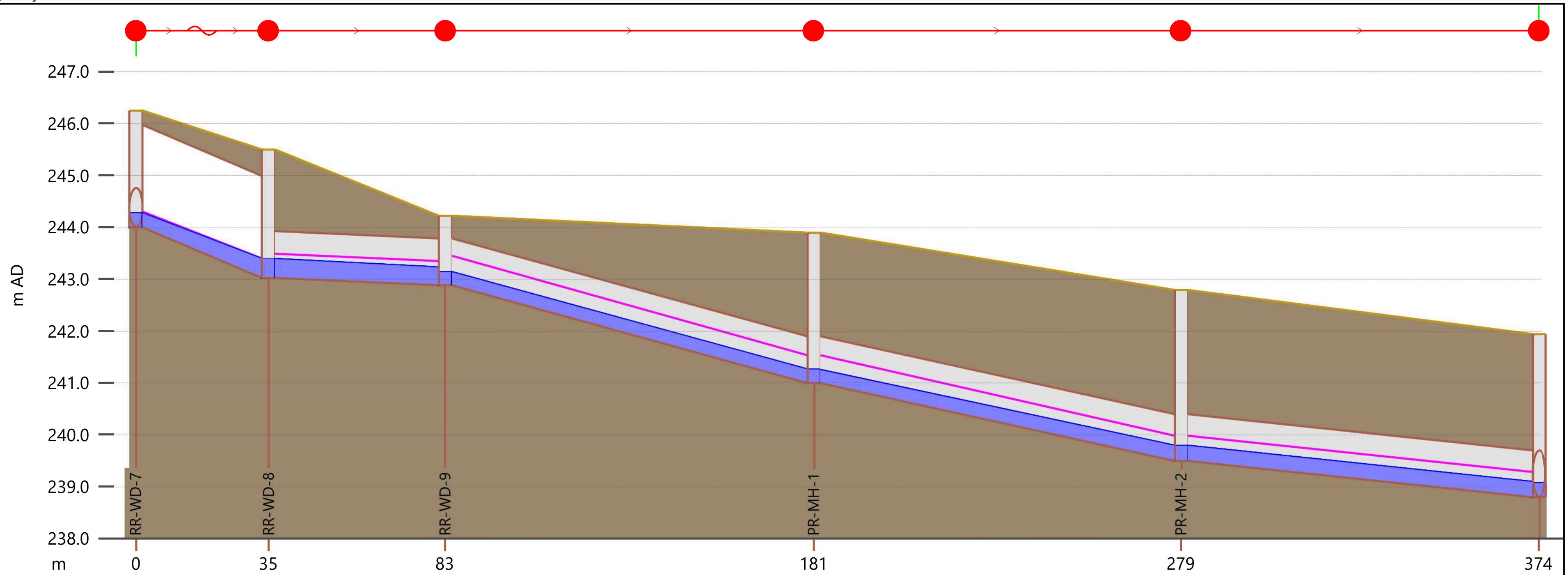

Link	RR-WD-7.1	RR-WD-8.1	RR-WD-9.1	PR-MH-1.1	PR-MH-2.1
US node ID	RR-WD-7	RR-WD-8	RR-WD-9	PR-MH-1	PR-MH-2
ds node	RR-WD-8	RR-WD-9	PR-MH-1	PR-MH-2	PR-MH-3
numbarrels	1	1	1	1	1
length (m)		47.2	98.3	98.0	95.6
Shape ID	-	CIRC	CIRC	CIRC	CIRC
width (mm)		900	900	900	900
height (mm)		900	900	900	900
Rough type		N	N	N	N
us inv (m AD)	244.000	243.022	242.887	241.000	239.500
ds inv (m AD)	243.022	242.887	241.000	239.500	238.800
grad (m/m)		0.00286	0.01919	0.01531	0.00733
r.pfc (m3/s)	51.110	0.969	2.508	2.240	1.550
US depth (m)	0.272	0.368	0.245	0.256	0.295
US flow (m3/s)	0.34897	0.34760	0.34861	0.34916	0.34887
US velocity (m/s)	0.711	1.419	2.484	2.341	1.924

Node	-	RR-WD-8	RR-WD-9	PR-MH-1	PR-MH-2	PR-MH-3
Node ID	-	RR-WD-8	RR-WD-9	PR-MH-1	PR-MH-2	PR-MH-3
ground (m AD)	-	245.500	244.218	243.900	242.788	241.937
level (m AD)	-	243.391	243.133	241.256	239.795	239.074
expr:Freeboard	-	2.109436	1.085462	2.643576	2.992849	2.863025

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 3

RVA PROJECT NO. 194615	FIGURE NO. 3D	AUGUST 2021

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Region of Peel
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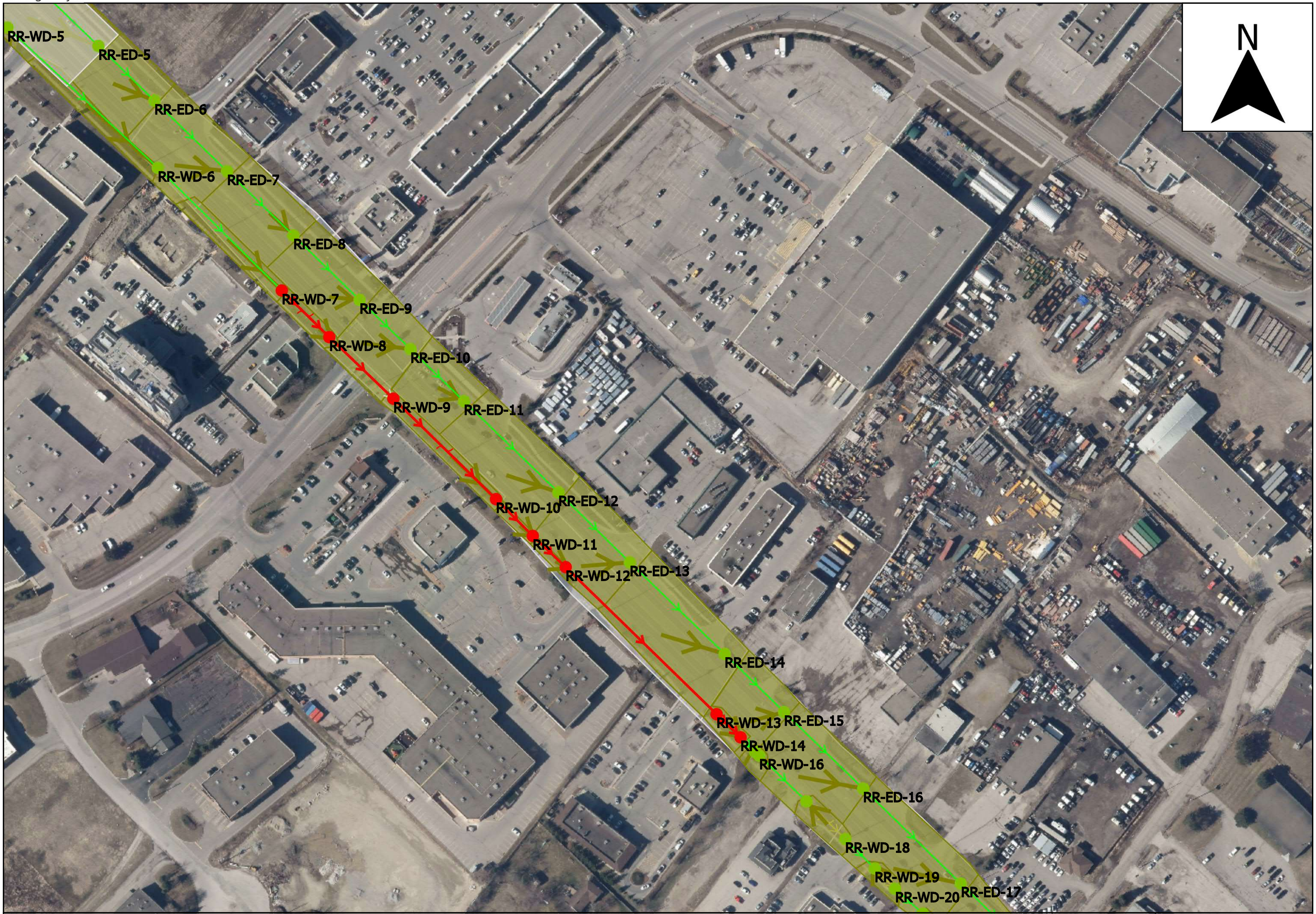
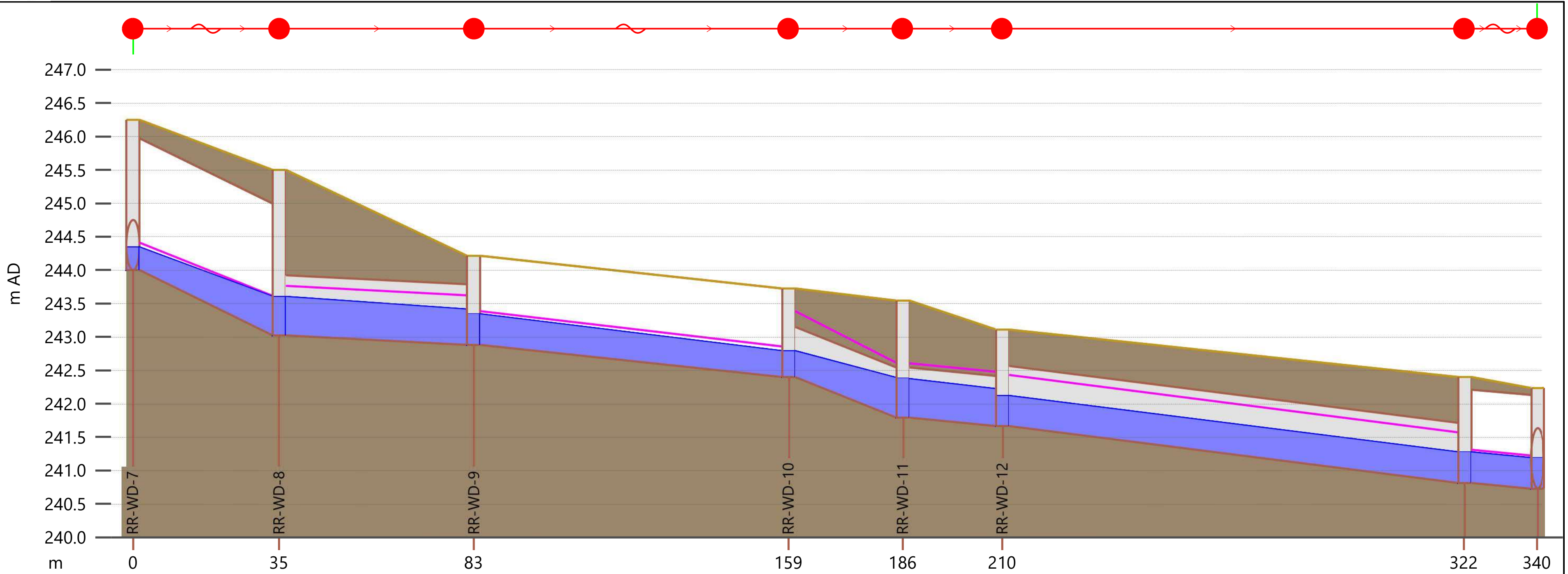


EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 3

RVA PROJECT NO. 194615	FIGURE NO. 3E	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-7.1	RR-WD-8.1	RR-WD-9.1	RR-WD-10.1	-	RR-WD-12.1	-
US node ID	RR-WD-7	RR-WD-8	RR-WD-9	RR-WD-10	RR-WD-11	RR-WD-12	-
ds node	RR-WD-8	RR-WD-9	RR-WD-10	RR-WD-11	RR-WD-12	RR-WD-13	-
numbarrels	1	1	1	1	1	1	1
length (m)		47.2		27.7	24.1	111.9	
Shape ID	-	CIRC	-	CIRC	CIRC	CIRC	-
width (mm)		900		750	750	900	
height (mm)		900		750	750	900	
Rough type		N		N	N	N	
us inv (m AD)	244.000	243.022	242.887	242.399	241.796	241.668	240.816
ds inv (m AD)	243.022	242.887	242.399	241.796	241.668	240.816	240.733
grad (m/m)		0.00286		0.02180	0.00531	0.00762	
r.pfc (m3/s)	51.110	0.969	8.878	1.644	0.811	1.580	9.679
US depth (m)	0.345	0.577	0.451	0.387	0.571	0.451	0.462
US flow (m3/s)	0.79021	0.78925	0.78925	0.78814	0.78857	0.78905	0.78883
US velocity (m/s)	1.165	1.831	0.950	3.431	2.185	2.471	0.870

Node	-	RR-WD-8	RR-WD-9	RR-WD-10	RR-WD-11	RR-WD-12	RR-WD-13	-
Node ID	-	RR-WD-8	RR-WD-9	RR-WD-10	RR-WD-11	RR-WD-12	RR-WD-13	-
ground (m AD)	-	245.500	244.218	243.730	243.548	243.114	242.400	-
level (m AD)	-	243.604	243.338	242.789	242.383	242.120	241.278	-
expr:Freeboard	-	1.895782	0.879789	0.941105	1.165493	0.994173	1.122153	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 3

RVA PROJECT NO. 194615 | FIGURE NO. 3F | AUGUST 2021

arva

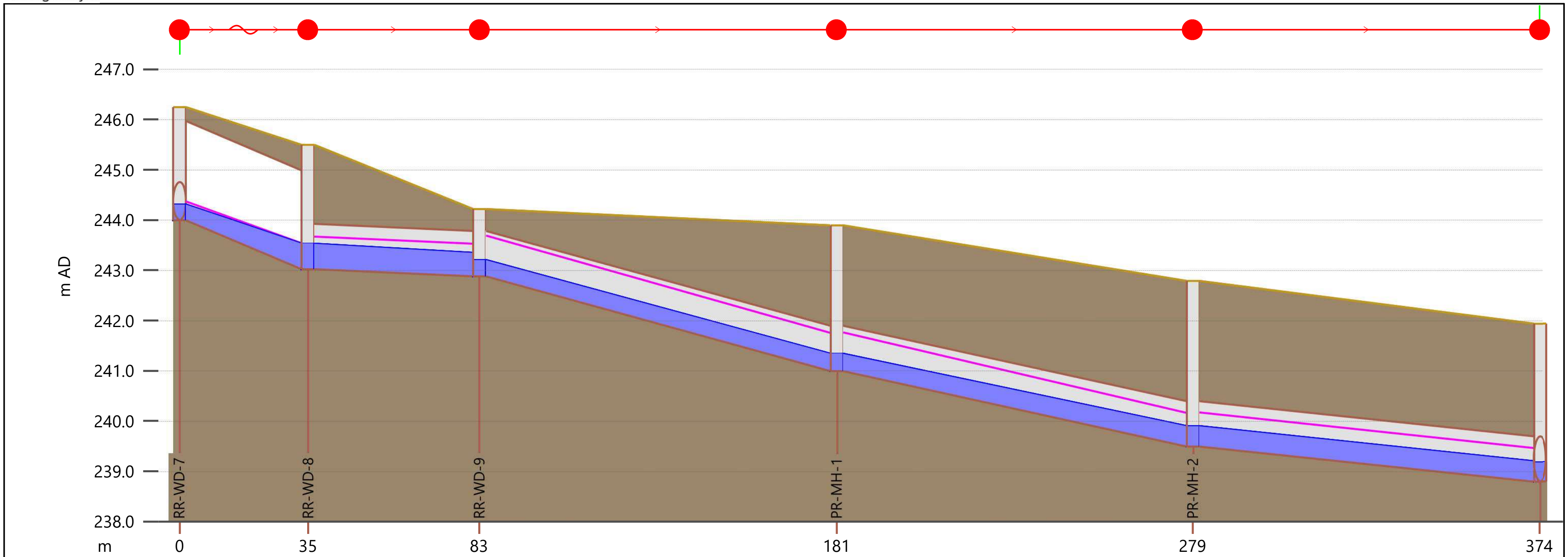
Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 3

RVA PROJECT NO. 194615	FIGURE NO. 3G	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-7.1	RR-WD-8.1	RR-WD-9.1	PR-MH-1.1	PR-MH-2.1
US node ID	RR-WD-7	RR-WD-8	RR-WD-9	PR-MH-1	PR-MH-2
ds node	RR-WD-8	RR-WD-9	PR-MH-1	PR-MH-2	PR-MH-3
numbarrels	1	1	1	1	1
length (m)		47.2	98.3	98.0	95.6
Shape ID	-	CIRC	CIRC	CIRC	CIRC
width (mm)		900	900	900	900
height (mm)		900	900	900	900
Rough type		N	N	N	N
us inv (m AD)	244.000	243.022	242.887	241.000	239.500
ds inv (m AD)	243.022	242.887	241.000	239.500	238.800
grad (m/m)		0.00286	0.01919	0.01531	0.00733
r.pfc (m3/s)	51.110	0.969	2.508	2.240	1.550
US depth (m)	0.316	0.505	0.321	0.337	0.400
US flow (m3/s)	0.62354	0.62375	0.62878	0.63056	0.63047
US velocity (m/s)	1.036	1.698	3.094	2.894	2.311

Node	-	RR-WD-8	RR-WD-9	PR-MH-1	PR-MH-2	PR-MH-3
Node ID	-	RR-WD-8	RR-WD-9	PR-MH-1	PR-MH-2	PR-MH-3
ground (m AD)	-	245.500	244.218	243.900	242.788	241.937
level (m AD)	-	243.529	243.208	241.338	239.900	239.179
expr:Freeboard	-	1.971252	1.009962	2.562109	2.888082	2.758030

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 3

RVA PROJECT NO. 194615	FIGURE NO. 3H	AUGUST 2021

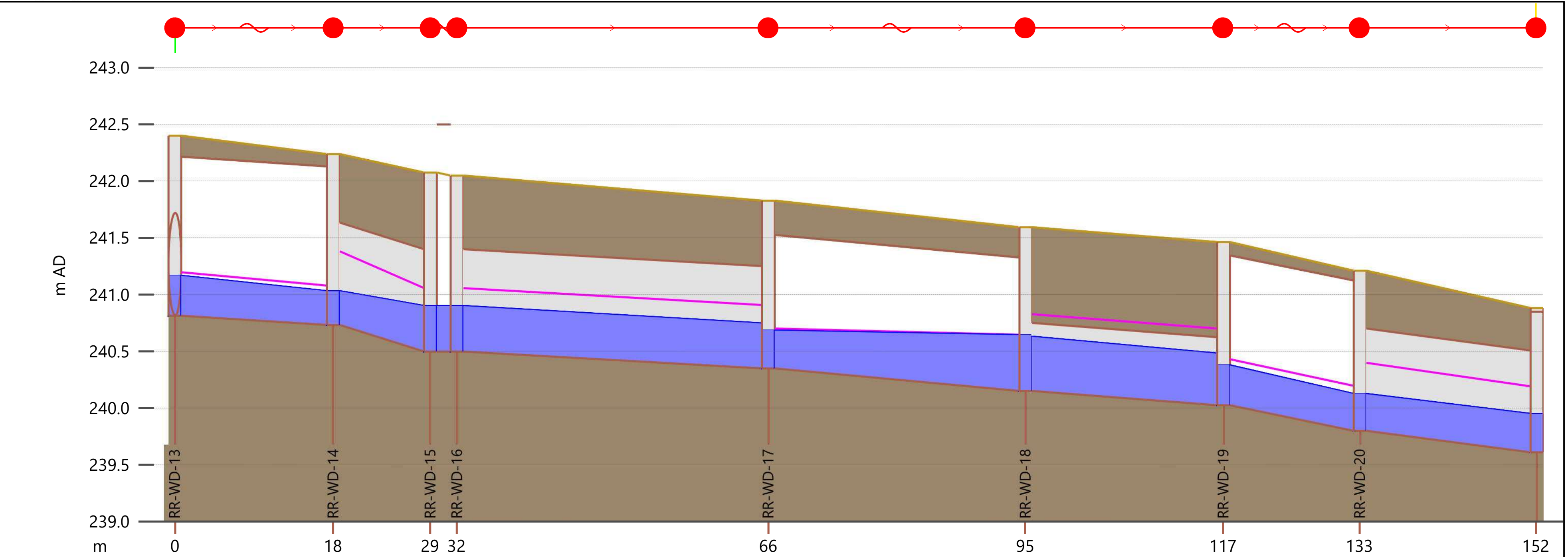
arva

Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 4		
RVA PROJECT NO. 194615	FIGURE NO. 4A	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-13.1	-	-	RR-WD-16.1	RR-WD-17.1	RR-WD-18.1	RR-WD-19.1	RR-WD-20.1
US node ID	RR-WD-13	RR-WD-14	-	RR-WD-16	RR-WD-17	RR-WD-18	RR-WD-19	RR-WD-20
ds node	RR-WD-14	RR-WD-15	-	RR-WD-17	RR-WD-18	RR-WD-19	RR-WD-20	RR-WD-21
numbarrels	1	1	1	1	1	1	1	1
length (m)		10.9		34.9		22.1		19.8
Shape ID	-	CIRC	-	CIRC	-	CIRC	-	CIRC
width (mm)		900		900		600		900
height (mm)		900		900		600		900
Rough type		N		N		N		N
us inv (m AD)	240.816	240.733	-	240.500	240.350	240.150	240.024	239.801
ds inv (m AD)	240.733	240.500	-	240.350	240.150	240.024	239.801	239.610
grad (m/m)		0.02144		0.00430		0.00569		0.00965
r.pfc (m3/s)	9.679	2.651	-	1.188	9.662	0.463	10.404	1.779
US depth (m)	0.351	0.297	-	0.399	0.334	0.480	0.352	0.324
US flow (m3/s)	0.48238	0.48209	-	0.48185	0.48232	0.48001	0.48033	0.47995
US velocity (m/s)	0.780	2.633	-	1.770	0.606	1.980	1.064	2.325

Node	-	RR-WD-14	-	RR-WD-16	RR-WD-17	RR-WD-18	RR-WD-19	RR-WD-20	-
Node ID	-	RR-WD-14	-	RR-WD-16	RR-WD-17	RR-WD-18	RR-WD-19	RR-WD-20	-
ground (m AD)	242.400	242.240	-	242.049	241.827	241.594	241.461	241.213	240.881
level (m AD)	241.167	241.030	-	240.899	240.684	240.643	240.376	240.126	239.950
expr:Freeboard	-	1.209589	-	1.149861	1.142781	0.951391	1.085496	1.087435	0.931049

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 4

RVA PROJECT NO. 194615	FIGURE NO. 4B	AUGUST 2021

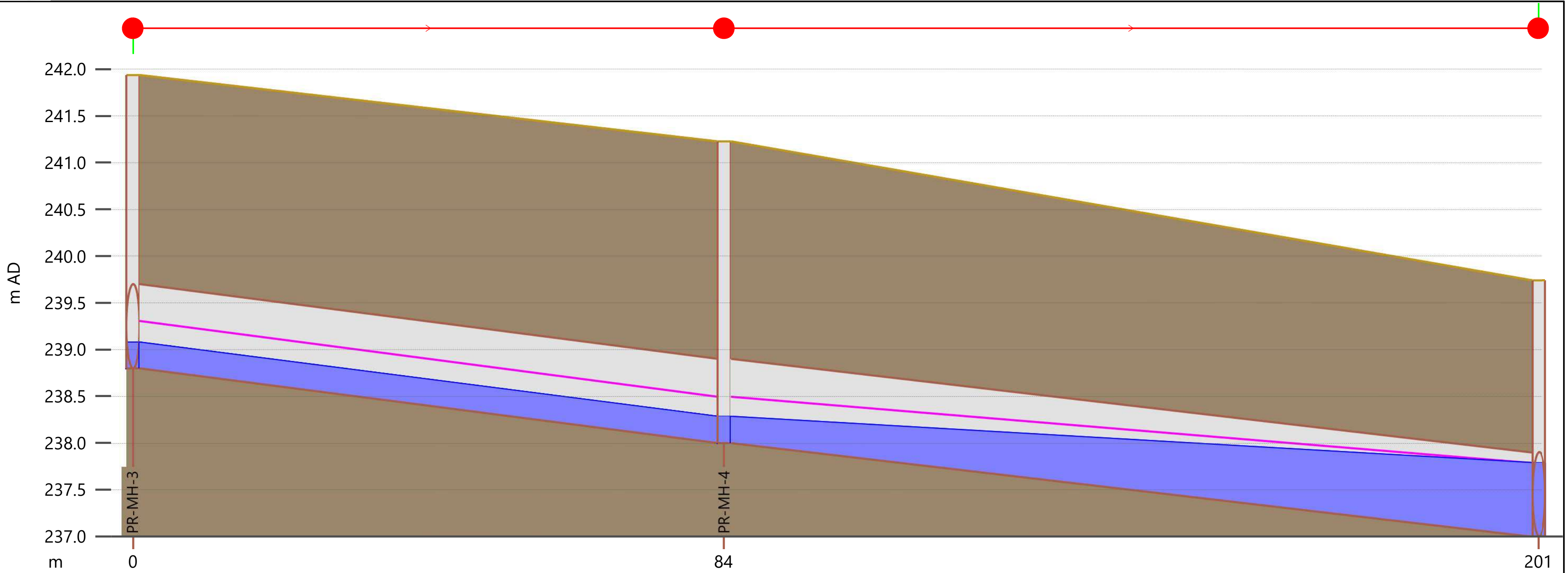
rva

Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 4

RVA PROJECT NO. 194615	FIGURE NO. 4C	AUGUST 2021

arva



Link	PR-MH-3.1	PR-MH-4.1
US node ID	PR-MH-3	PR-MH-4
ds node	PR-MH-4	PR-MH-5
numbarrels	1	1
length (m)	84.3	116.3
Shape ID	CIRC	CIRC
width (mm)	900	900
height (mm)	900	900
Rough type	N	N
us inv (m AD)	238.800	238.000
ds inv (m AD)	238.000	237.000
grad (m/m)	0.00948	0.00860
r.pfc (m3/s)	1.763	1.679
US depth (m)	0.274	0.282
US flow (m3/s)	0.35050	0.35158
US velocity (m/s)	2.142	2.059

Node	PR-MH-3	PR-MH-4	PR-MH-5
Node ID	PR-MH-3	PR-MH-4	PR-MH-5
ground (m AD)	241.937	241.227	239.743
level (m AD)	239.074	238.283	237.787
expr:Freeboard	2.863025	2.944407	1.956318

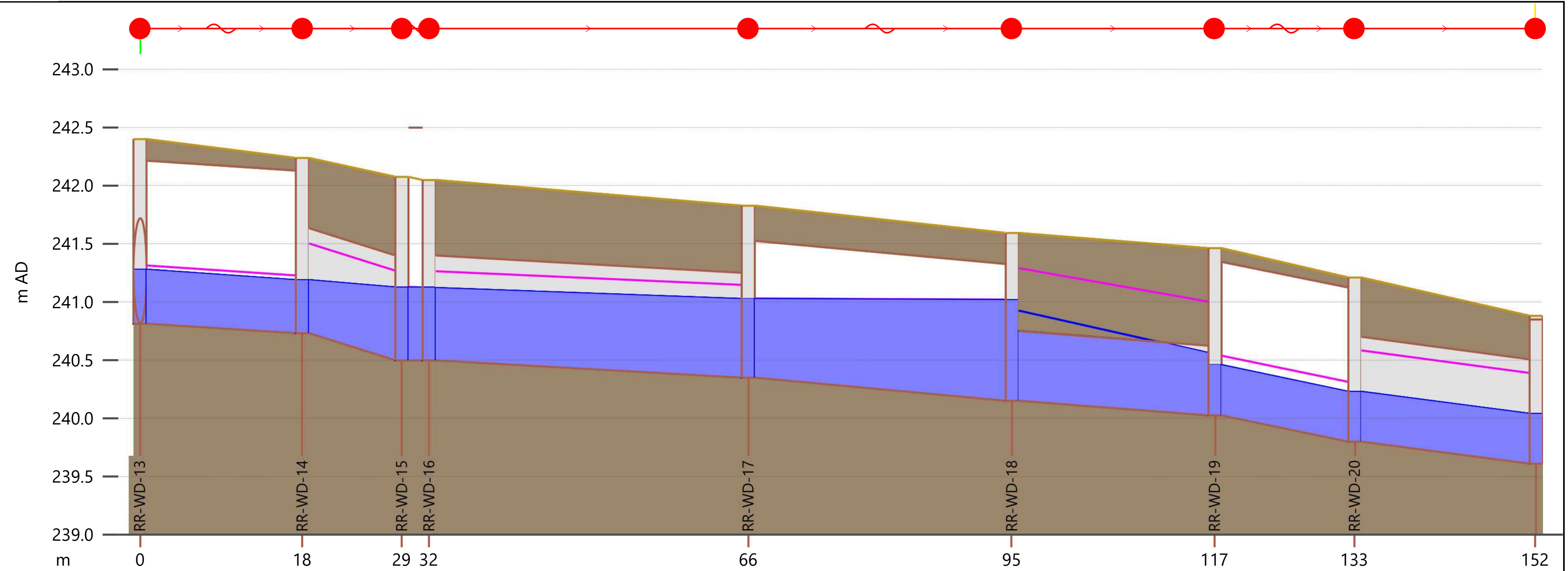
PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 4

RVA PROJECT NO. 194615	FIGURE NO. 4D	AUGUST 2021

Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 4			arva
RVA PROJECT NO. 194615	FIGURE NO. 4E	AUGUST 2021	

Region of Peel
working with you



Link	RR-WD-13.1	-	-	RR-WD-16.1	RR-WD-17.1	RR-WD-18.1	RR-WD-19.1	RR-WD-20.1
US node ID	RR-WD-13	RR-WD-14	-	RR-WD-16	RR-WD-17	RR-WD-18	RR-WD-19	RR-WD-20
ds node	RR-WD-14	RR-WD-15	-	RR-WD-17	RR-WD-18	RR-WD-19	RR-WD-20	RR-WD-21
numbarrels	1	1	1	1	1	1	1	1
length (m)		10.9		34.9		22.1		19.8
Shape ID	-	CIRC	-	CIRC	-	CIRC	-	CIRC
width (mm)		900		900		600		900
height (mm)		900		900		600		900
Rough type		N		N		N		N
us inv (m AD)	240.816	240.733	-	240.500	240.350	240.150	240.024	239.801
ds inv (m AD)	240.733	240.500	-	240.350	240.150	240.024	239.801	239.610
grad (m/m)		0.02144		0.00430		0.00569		0.00965
r.pfc (m3/s)	9.679	2.651	-	1.188	9.662	0.463	10.404	1.779
US depth (m)	0.462	0.456	-	0.619	0.676	0.779	0.435	0.426
US flow (m3/s)	0.78883	0.78851	-	0.78825	0.78970	0.78672	0.78776	0.78733
US velocity (m/s)	0.870	2.783	-	1.915	0.635	2.669	1.261	2.657

Node	-	RR-WD-14	-	RR-WD-16	RR-WD-17	RR-WD-18	RR-WD-19	RR-WD-20	-
Node ID	-	RR-WD-14	-	RR-WD-16	RR-WD-17	RR-WD-18	RR-WD-19	RR-WD-20	-
ground (m AD)	242.400	242.240	-	242.049	241.827	241.594	241.461	241.213	240.881
level (m AD)	241.278	241.190	-	241.125	241.026	241.019	240.459	240.227	240.040
expr:Freeboard	-	1.049738	-	0.924153	0.801304	0.574942	1.002122	0.985781	0.841327

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 4

RVA PROJECT NO. 194615	FIGURE NO. 4F	AUGUST 2021

rva

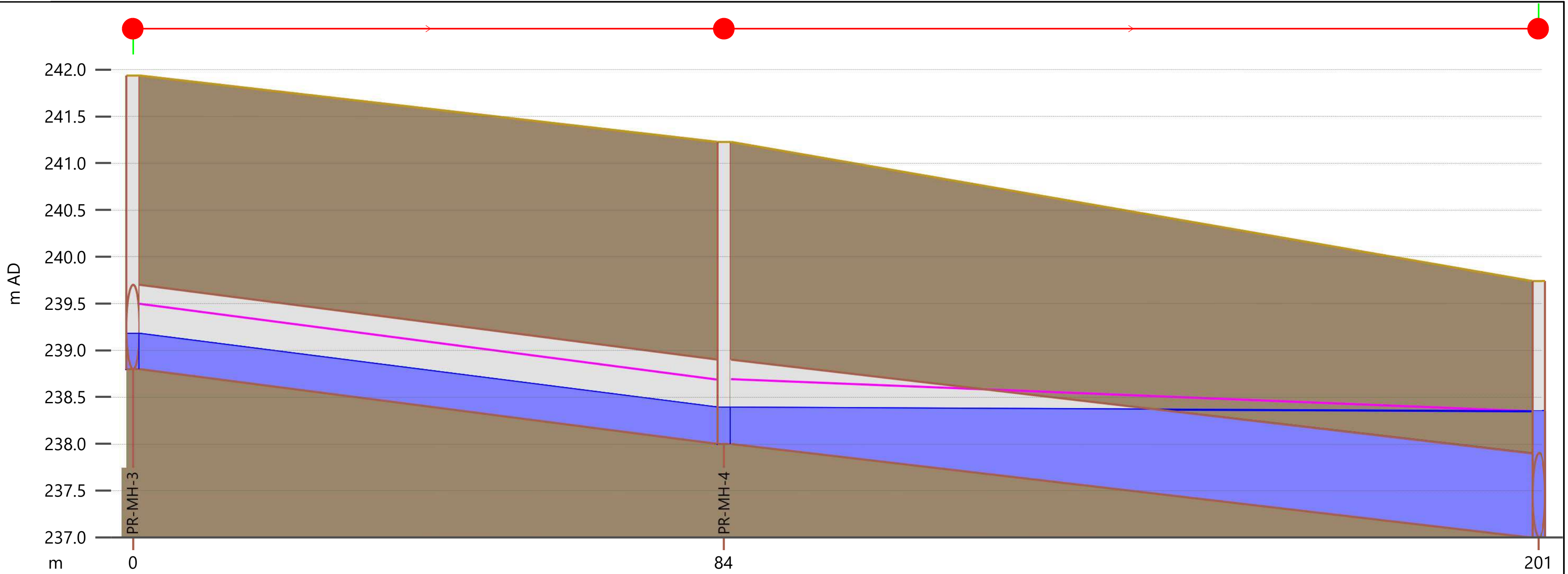
Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 4

RVA PROJECT NO. 194615	FIGURE NO. 4G	AUGUST 2021

arva

Region of Peel
working with you



Link	PR-MH-3.1	PR-MH-4.1
US node ID	PR-MH-3	PR-MH-4
ds node	PR-MH-4	PR-MH-5
numbarrels	1	1
length (m)	84.3	116.3
Shape ID	CIRC	CIRC
width (mm)	900	900
height (mm)	900	900
Rough type	N	N
us inv (m AD)	238.800	238.000
ds inv (m AD)	238.000	237.000
grad (m/m)	0.00948	0.00860
r.pfc (m3/s)	1.763	1.679
US depth (m)	0.379	0.388
US flow (m3/s)	0.63651	0.64099
US velocity (m/s)	2.505	2.444

Node	PR-MH-3	PR-MH-4	PR-MH-5
Node ID	PR-MH-3	PR-MH-4	PR-MH-5
ground (m AD)	241.937	241.227	239.743
level (m AD)	239.179	238.388	238.349
expr:Freeboard	2.758030	2.838923	1.393513

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 4

RVA PROJECT NO. 194615	FIGURE NO. 4H	AUGUST 2021

arva

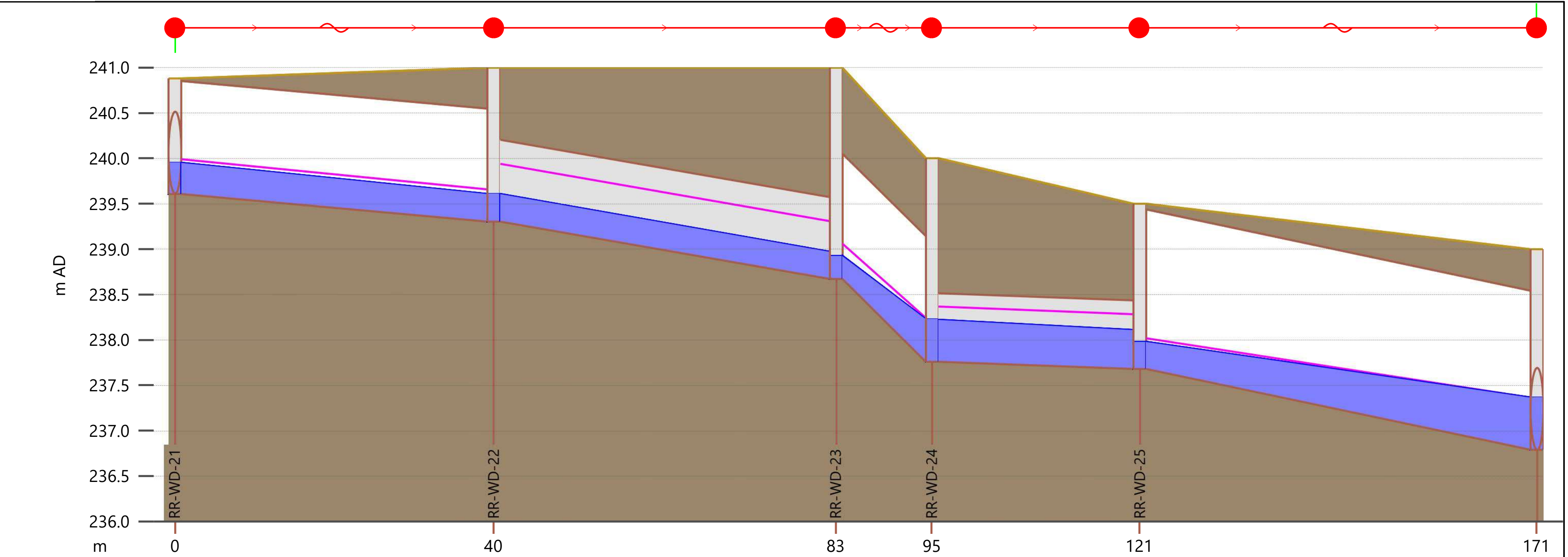
Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 5

RVA PROJECT NO. 194615	FIGURE NO. 5A	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-21.1	RR-WD-22.1	-	RR-WD-24.1	RR-WD-25.1
US node ID	RR-WD-21	RR-WD-22	RR-WD-23	RR-WD-24	RR-WD-25
ds node	RR-WD-22	RR-WD-23	RR-WD-24	RR-WD-25	RR-WD-26
numbarrels	1	1	1	1	1
length (m)		43.1		26.1	
Shape ID		CIRC	-	CIRC	-
width (mm)		900		750	
height (mm)		900		750	
Rough type		N		N	
us inv (m AD)	239.610	239.305	238.672	237.763	237.685
ds inv (m AD)	239.305	238.672	237.763	237.685	236.790
grad (m/m)		0.01470		0.00299	
r.pfc (m3/s)	8.561	2.195	34.185	0.608	29.699
US depth (m)	0.340	0.302	0.255	0.461	0.297
US flow (m3/s)	0.48042	0.47917	0.47915	0.47884	0.47882
US velocity (m/s)	0.871	2.559	1.616	1.683	0.838

Node	RR-WD-21	RR-WD-22	RR-WD-23	RR-WD-24	RR-WD-25	RR-WD-26
Node ID	RR-WD-21	RR-WD-22	RR-WD-23	RR-WD-24	RR-WD-25	RR-WD-26
ground (m AD)	240.881	241.000	241.000	240.000	239.500	239.000
level (m AD)	239.950	239.607	238.926	238.227	237.982	237.368
expr:Freeboard	0.931049	1.392761	2.073624	1.772873	1.518265	1.632263

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 5

RVA PROJECT NO. 194615	FIGURE NO. 5B	AUGUST 2021

arva

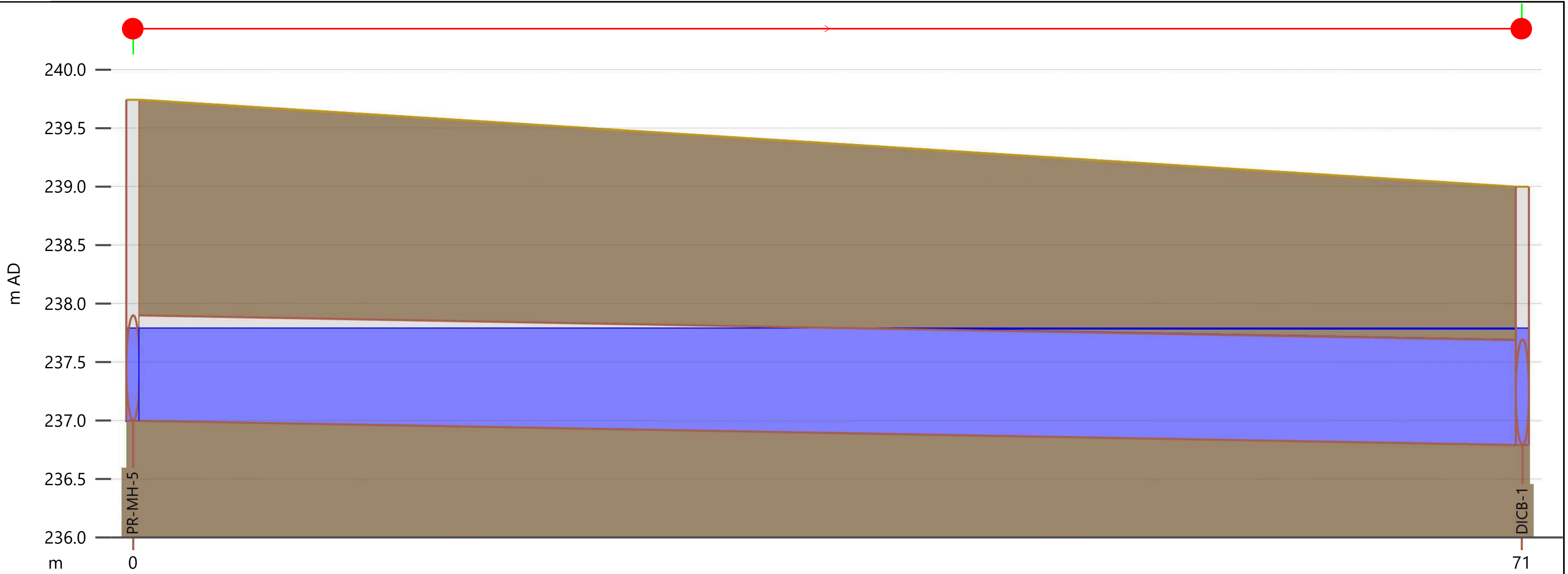
Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 5

RVA PROJECT NO. 194615	FIGURE NO. 5C	AUGUST 2021

arva

Region of Peel
working with you



Link	PR-MH-5.1		
US node ID	PR-MH-5		
ds node	DICB-1		
numbarrels	1		
length (m)	71.0		
Shape ID	CIRC		
width (mm)	900		
height (mm)	900		
Rough type	N		
us inv (m AD)	237.000		
ds inv (m AD)	236.790		
grad (m/m)	0.00296		
r.pfc (m3/s)	0.985		
US depth (m)	0.787		
US flow (m3/s)	0.35155		
US velocity (m/s)	1.417		
Node	PR-MH-5		DICB-1
Node ID	PR-MH-5		DICB-1
ground (m AD)	239.743		239.000
level (m AD)	237.787		237.787
expr:Freeboard	1.956318		1.213318

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 5

RVA PROJECT NO. 194615 | FIGURE NO. 5D | AUGUST 2021

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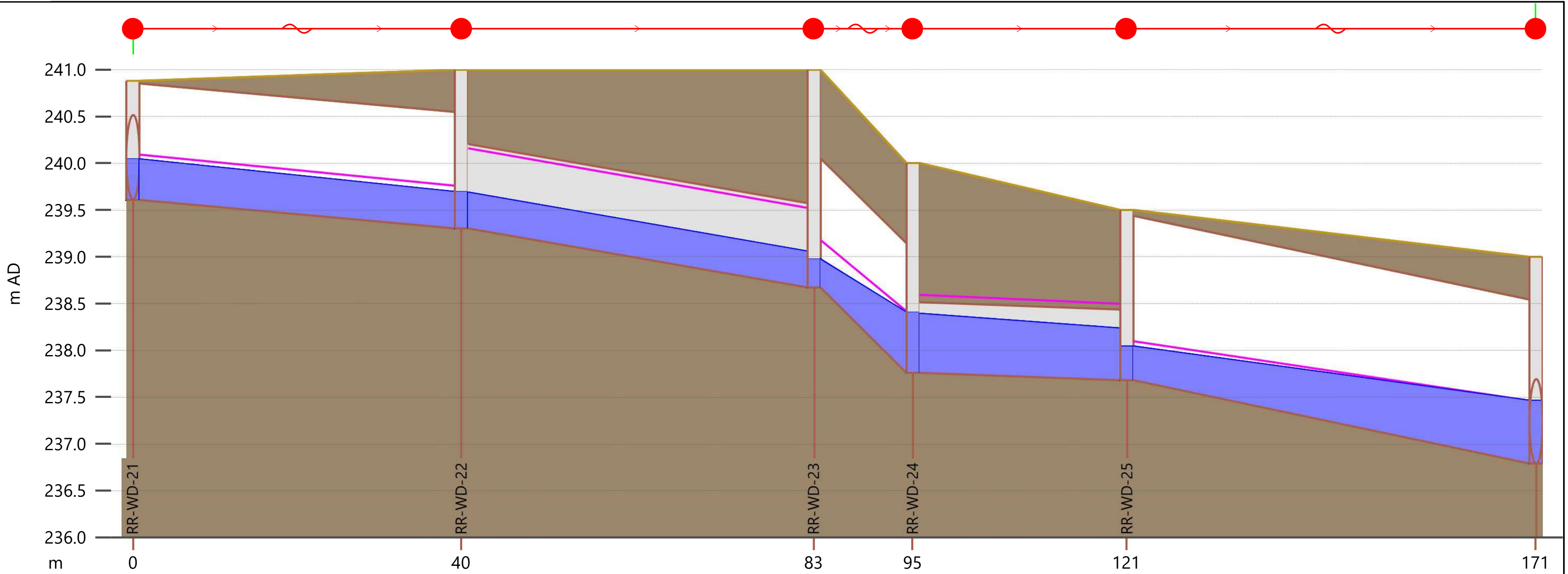
Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 5

RVA PROJECT NO. 194615	FIGURE NO. 5E	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-21.1	RR-WD-22.1	-	RR-WD-24.1	RR-WD-25.1
US node ID	RR-WD-21	RR-WD-22	RR-WD-23	RR-WD-24	RR-WD-25
ds node	RR-WD-22	RR-WD-23	RR-WD-24	RR-WD-25	RR-WD-26
numbarrels	1	1	1	1	1
length (m)		43.1		26.1	
Shape ID		CIRC	-	CIRC	-
width (mm)		900		750	
height (mm)		900		750	
Rough type		N		N	
us inv (m AD)	239.610	239.305	238.672	237.763	237.685
ds inv (m AD)	239.305	238.672	237.763	237.685	236.790
grad (m/m)		0.01470		0.00299	
r.pfc (m3/s)	8.561	2.195	34.185	0.608	29.699
US depth (m)	0.430	0.385	0.302	0.627	0.356
US flow (m3/s)	0.78904	0.78779	0.78778	0.78762	0.78761
US velocity (m/s)	1.011	3.035	2.020	1.995	1.060

Node	RR-WD-21	RR-WD-22	RR-WD-23	RR-WD-24	RR-WD-25	RR-WD-26
Node ID	RR-WD-21	RR-WD-22	RR-WD-23	RR-WD-24	RR-WD-25	RR-WD-26
ground (m AD)	240.881	241.000	241.000	240.000	239.500	239.000
level (m AD)	240.040	239.690	238.973	238.405	238.041	237.463
expr:Freeboard	0.841327	1.309784	2.026627	1.595108	1.458664	1.536545

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 5

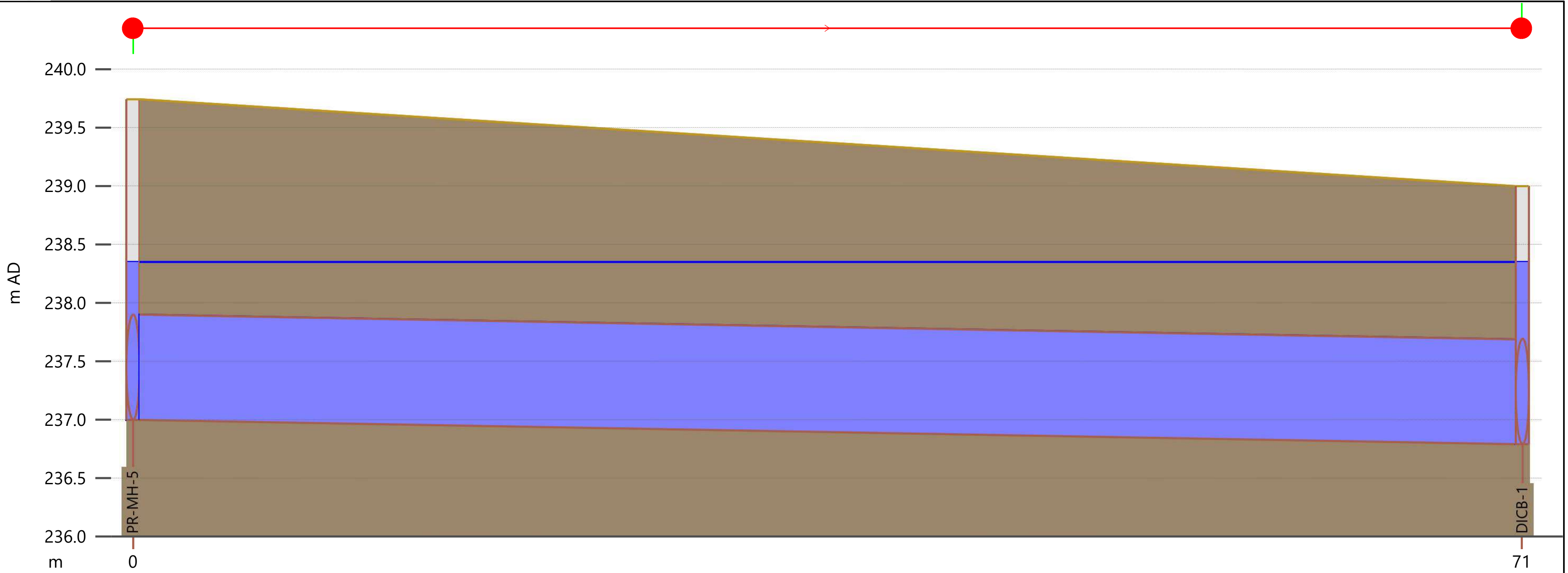
RVA PROJECT NO. 194615 | FIGURE NO. 5F | AUGUST 2021

rva

Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 5			arva
RVA PROJECT NO. 194615	FIGURE NO. 5G	AUGUST 2021	

Region of Peel
working with you



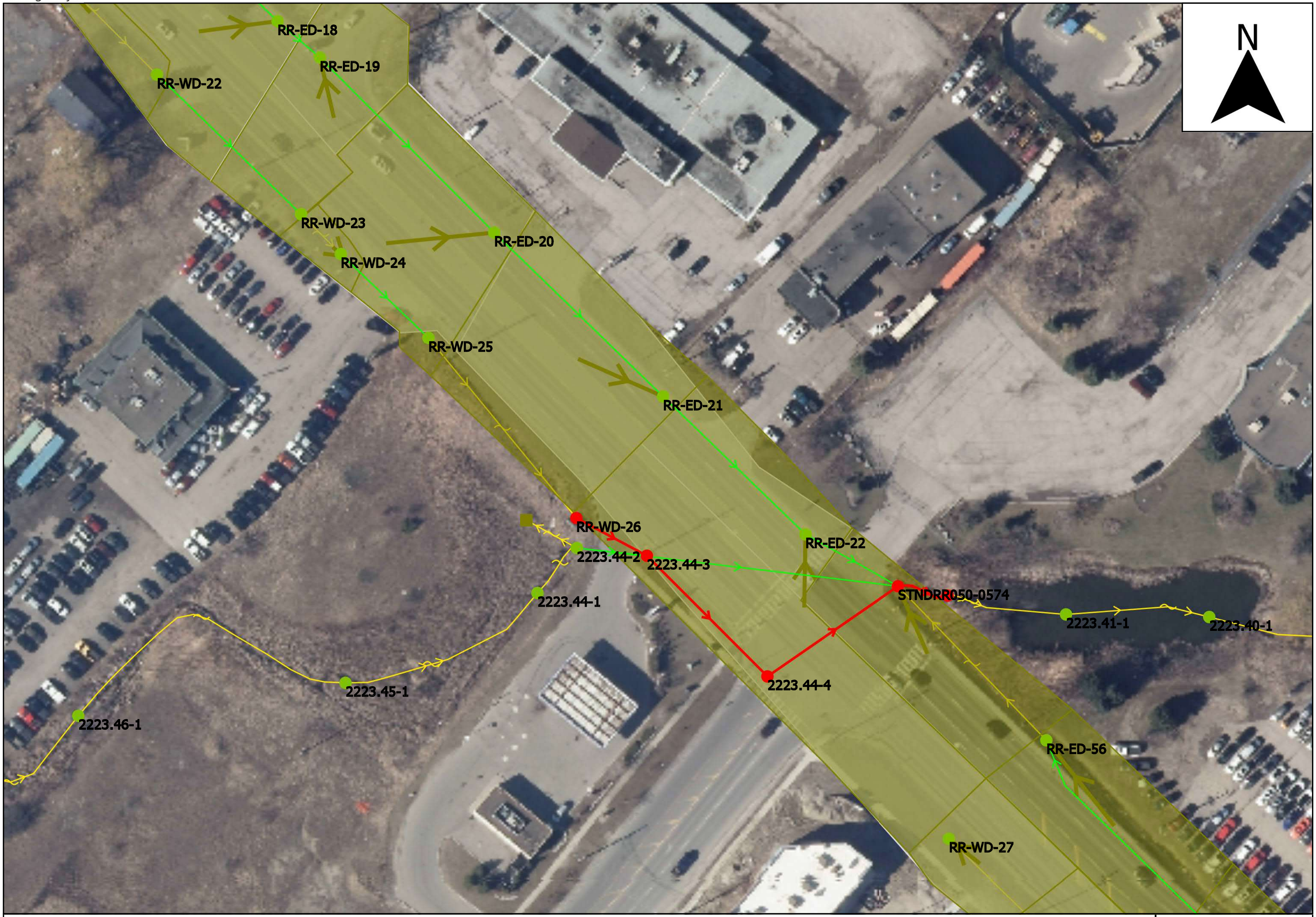
Link	PR-MH-5.1	
US node ID	PR-MH-5	
ds node	DICB-1	
numbarrels	1	
length (m)	71.0	
Shape ID	CIRC	
width (mm)	900	
height (mm)	900	
Rough type	N	
us inv (m AD)	237.000	
ds inv (m AD)	236.790	
grad (m/m)	0.00296	
r.pfc (m3/s)	0.985	
US depth (m)	1.349	
US flow (m3/s)	0.64181	
US velocity (m/s)	1.698	
Node	PR-MH-5	DICB-1
Node ID	PR-MH-5	DICB-1
ground (m AD)	239.743	239.000
level (m AD)	238.349	238.349
expr:Freeboard	1.393513	0.650513

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 5

RVA PROJECT NO. 194615 | FIGURE NO. 5H | AUGUST 2021

arva

Region of Peel
working with you

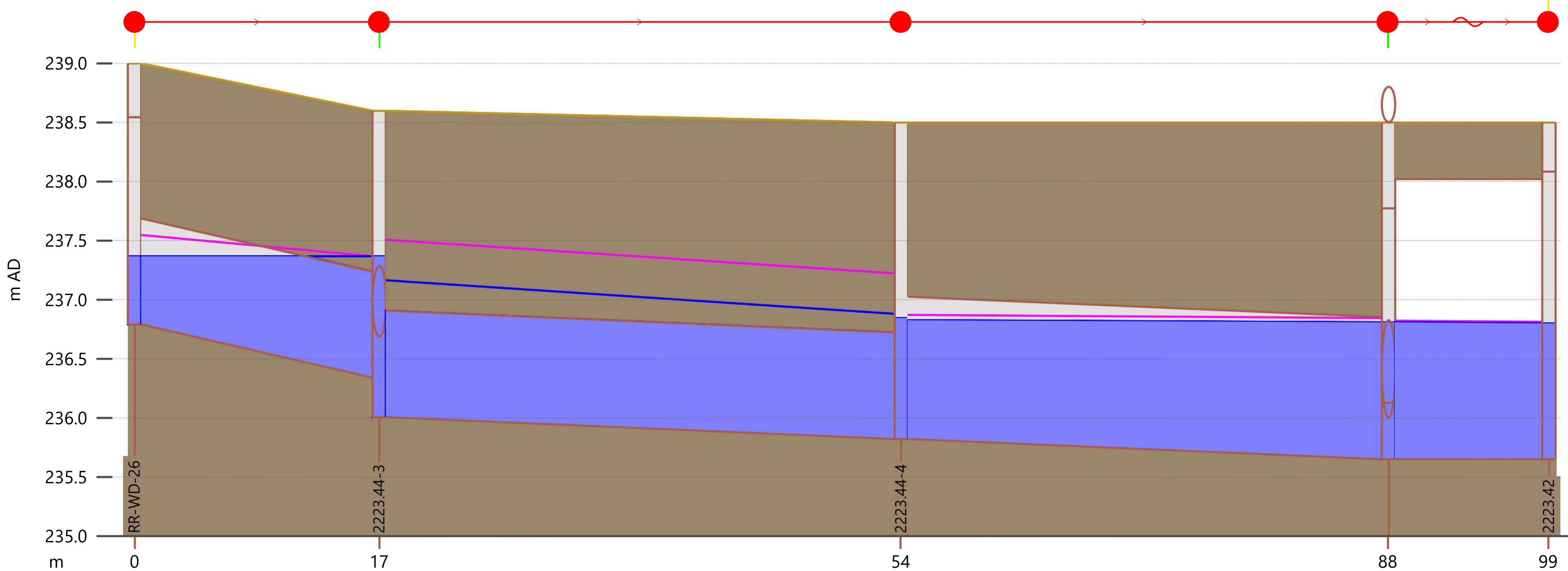


EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 6

RVA PROJECT NO. 194615	FIGURE NO. 6A	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-26.1	2223.44-3.1	2223.44-4.1	2223.43C1-1.1
US node ID	RR-WD-26	2223.44-3	2223.44-4	2223.43C1-1
ds node	2223.44-3	2223.44-4	2223.43C1-1	2223.42
numbarrels	1	1	1	1
length (m)	17.2	36.6	34.2	
Shape ID	CIRC	CIRC	RECT	Matrix-2223.43
width (mm)	900	900	1800	
height (mm)	900	900	1200	
Rough type	N	N	N	
us inv (m AD)	236.790	236.008	235.825	235.653
ds inv (m AD)	236.340	235.825	235.654	235.652
grad (m/m)	0.02623	0.00500	0.00500	
r.pfc (m3/s)	2.932	1.387	5.948	20.564
US depth (m)	0.578	1.156	1.001	1.156
US flow (m3/s)	0.47643	1.80088	1.79999	5.10639
US velocity (m/s)	3.128	2.727	1.265	0.530

Node	RR-WD-26	2223.44-3	2223.44-4	2223.43C1-1	2223.42
Node ID	RR-WD-26	2223.44-3	2223.44-4	2223.43C1-1	2223.42
ground (m AD)	239.000	238.599	238.500	238.500	238.500
level (m AD)	237.368	237.368	236.847	236.809	236.801
expr:Freeboard	1.632263	1.231477	1.652847	1.690994	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 6

RVA PROJECT NO. 194615	FIGURE NO. 6B	AUGUST 2021	rva

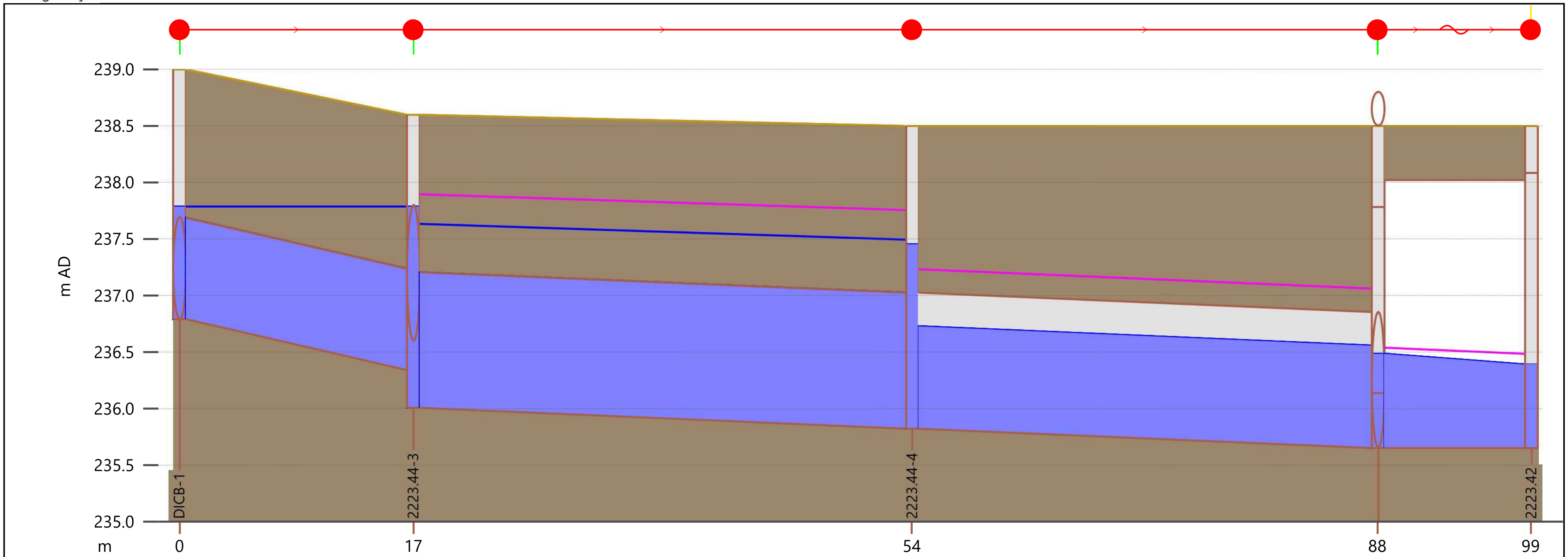
Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 6

RVA PROJECT NO. 194615	FIGURE NO. 6C	AUGUST 2021

arva

Region of Peel
working with you



Link	DICB-1.1	2223.44-3.1	2223.44-4.1	2223.43C1-1.1
US node ID	DICB-1	2223.44-3	2223.44-4	2223.43C1-1
ds node	2223.44-3	2223.44-4	2223.43C1-1	2223.42
numbarrels	1	1	1	1
length (m)	17.2	36.6	34.2	
Shape ID	CIRC	RECT	RECT	Matrix-2223.43
width (mm)	900	1800	1800	
height (mm)	900	1200	1200	
Rough type	N	N	N	
us inv (m AD)	236.790	236.008	235.825	235.653
ds inv (m AD)	236.340	235.825	235.654	235.652
grad (m/m)	0.02623	0.00500	0.00500	
r.pfc (m3/s)	2.932	5.946	5.948	20.564
US depth (m)	0.997	1.624	0.904	0.833
US flow (m3/s)	0.35134	5.11000	5.11000	5.10871
US velocity (m/s)	2.751	2.638	3.147	1.042

Node	DICB-1	2223.44-3	2223.44-4	2223.43C1-1	2223.42
Node ID	DICB-1	2223.44-3	2223.44-4	2223.43C1-1	2223.42
ground (m AD)	239.000	238.599	238.500	238.500	238.500
level (m AD)	237.787	237.786	237.455	236.486	236.390
expr:Freeboard	1.213318	0.812501	1.045303	2.014175	-

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 6

RVA PROJECT NO. 194615 | FIGURE NO. 6D | AUGUST 2021

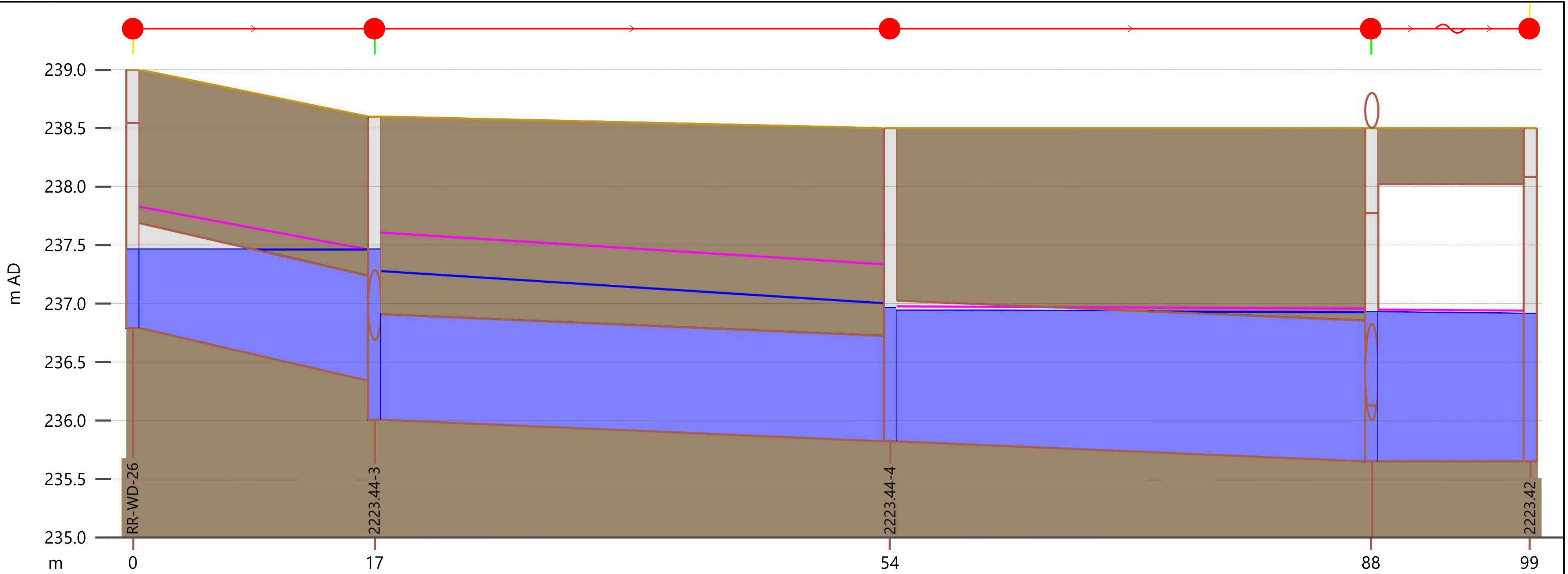
rva

Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 6

RVA PROJECT NO. 194615	FIGURE NO. 6E	AUGUST 2021	arva

Region of Peel
working with you



Link	RR-WD-26.1	2223.44-3.1	2223.44-4.1	2223.43C1-1.1
US node ID	RR-WD-26	2223.44-3	2223.44-4	2223.43C1-1
ds node	2223.44-3	2223.44-4	2223.43C1-1	2223.42
numbarrels	1	1	1	1
length (m)	17.2	36.6	34.2	
Shape ID	CIRC	CIRC	RECT	Matrix-2223.43
width (mm)	900	900	1800	
height (mm)	900	900	1200	
Rough type	N	N	N	
us inv (m AD)	236.790	236.008	235.825	235.653
ds inv (m AD)	236.340	235.825	235.654	235.652
grad (m/m)	0.02623	0.00500	0.00500	
r.pfc (m3/s)	2.932	1.387	5.948	20.564
US depth (m)	0.673	1.270	1.117	1.274
US flow (m3/s)	0.78511	1.81443	1.80692	7.89588
US velocity (m/s)	3.728	2.757	1.284	0.682

Node	RR-WD-26	2223.44-3	2223.44-4	2223.43C1-1	2223.42
Node ID	RR-WD-26	2223.44-3	2223.44-4	2223.43C1-1	2223.42
ground (m AD)	239.000	238.599	238.500	238.500	238.500
level (m AD)	237.463	237.463	236.963	236.927	236.915
expr:Freeboard	1.536545	1.135728	1.537094	1.573349	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 6

RVA PROJECT NO. 194615	FIGURE NO. 6F	AUGUST 2021

arva

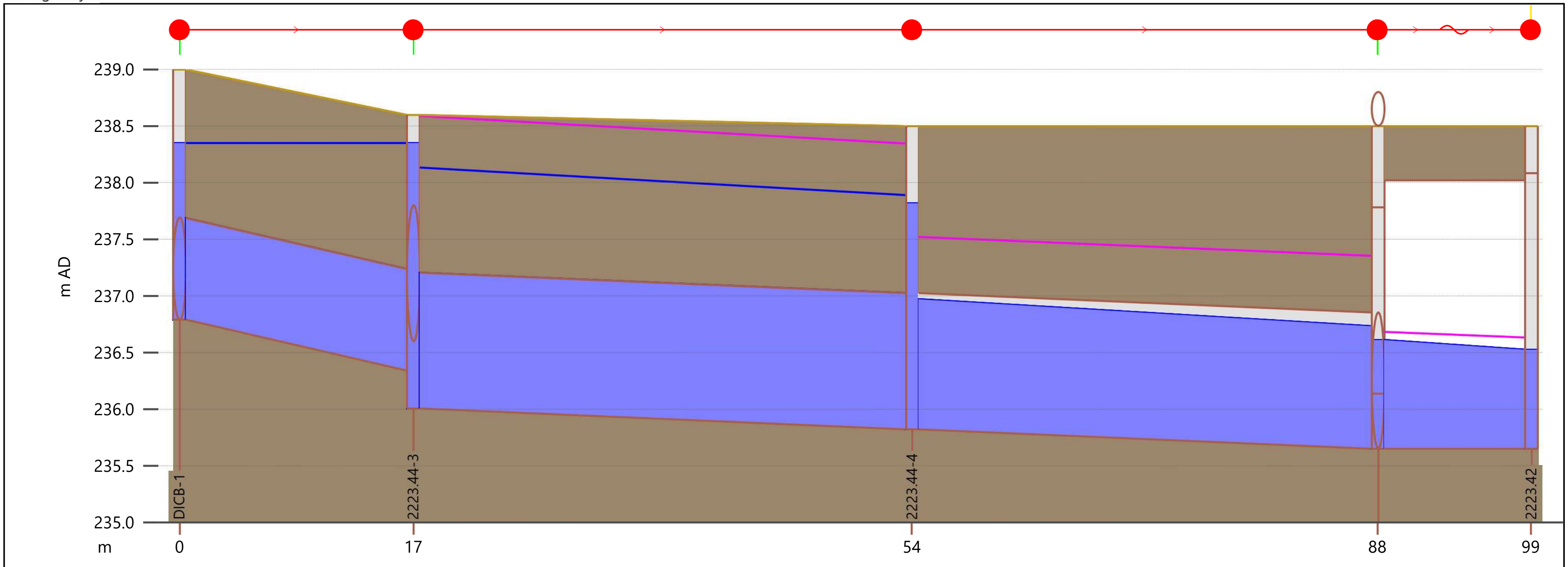
Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 6

RVA PROJECT NO. 194615	FIGURE NO. 6G	AUGUST 2021

arva

Region of Peel
working with you



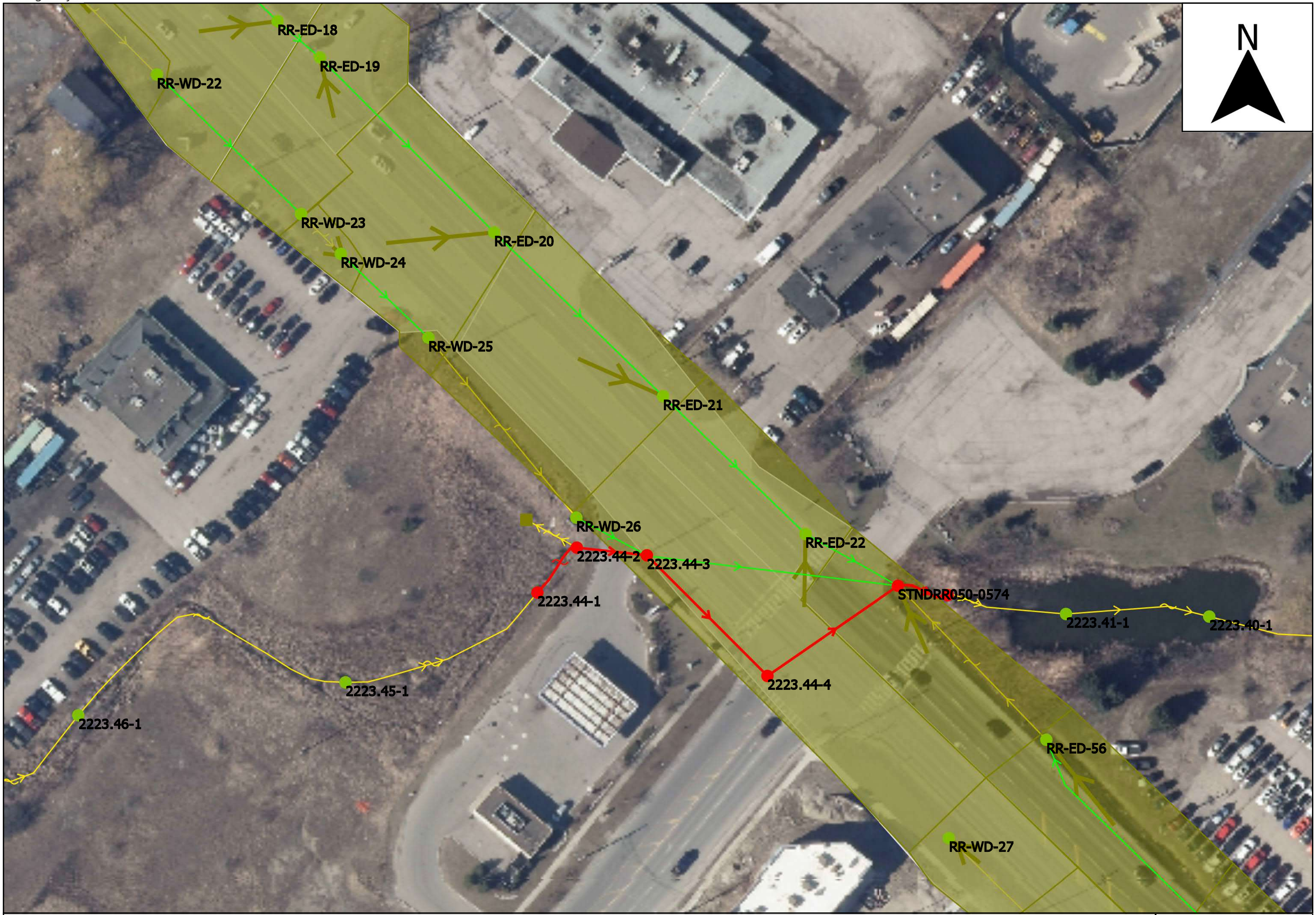
Link	DICB-1.1	2223.44-3.1	2223.44-4.1	2223.43C1-1.1
US node ID	DICB-1	2223.44-3	2223.44-4	2223.43C1-1
ds node	2223.44-3	2223.44-4	2223.43C1-1	2223.42
numbarrels	1	1	1	1
length (m)	17.2	36.6	34.2	
Shape ID	CIRC	RECT	RECT	Matrix-2223.43
width (mm)	900	1800	1800	
height (mm)	900	1200	1200	
Rough type	N	N	N	
us inv (m AD)	236.790	236.008	235.825	235.653
ds inv (m AD)	236.340	235.825	235.654	235.652
grad (m/m)	0.02623	0.00500	0.00500	
r.pfc (m3/s)	2.932	5.946	5.948	20.564
US depth (m)	1.559	2.126	1.147	0.957
US flow (m3/s)	0.64176	6.78191	6.78191	7.89915
US velocity (m/s)	3.421	2.989	3.290	1.195

Node	DICB-1	2223.44-3	2223.44-4	2223.43C1-1	2223.42
Node ID	DICB-1	2223.44-3	2223.44-4	2223.43C1-1	2223.42
ground (m AD)	239.000	238.599	238.500	238.500	238.500
level (m AD)	238.349	238.349	237.820	236.610	236.526
expr:Freeboard	0.650513	0.249696	0.680161	1.889725	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 6

RVA PROJECT NO. 194615	FIGURE NO. 6H	AUGUST 2021

rva

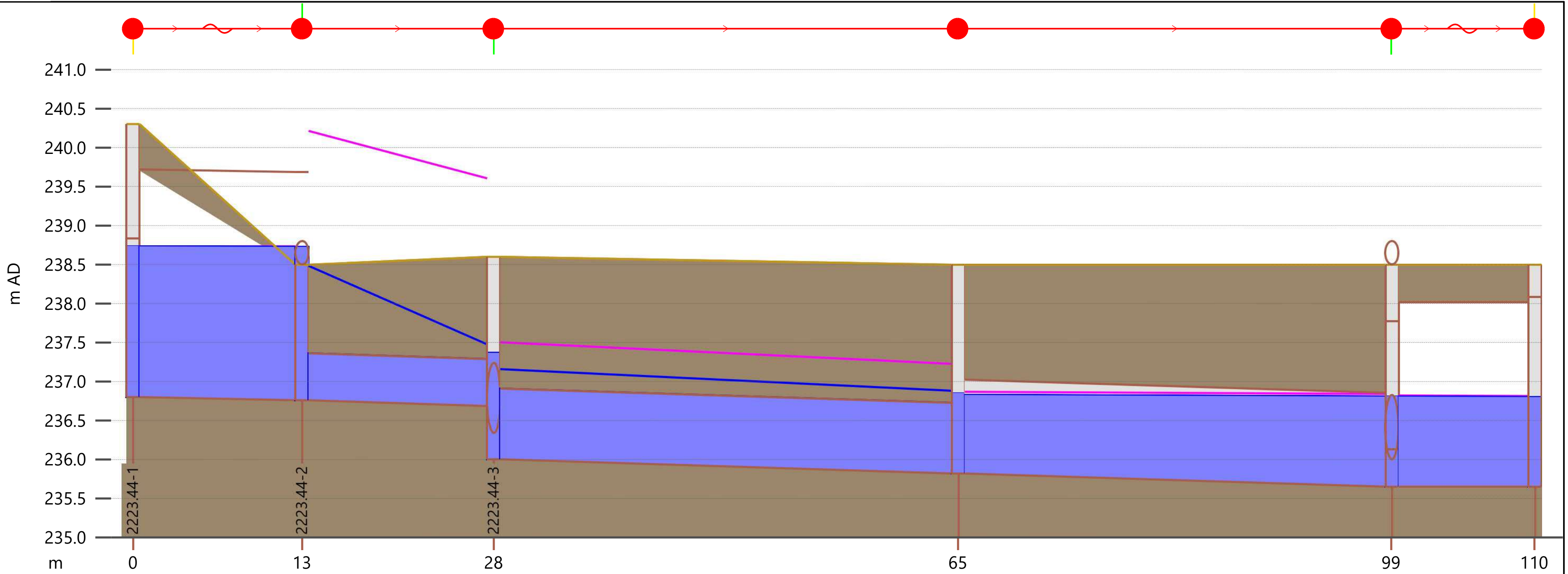


EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 7

RVA PROJECT NO. 194615	FIGURE NO. 7A	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.44-1.1	2223.44-2.1	2223.44-3.1	2223.44-4.1	2223.43C1-1.1
US node ID	2223.44-1	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1
ds node	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	2223.42
numbarrels	1	1	1	1	1
length (m)		15.1	36.6	34.2	
Shape ID	Matrix-2223.44	CIRC	CIRC	RECT	Matrix-2223.43
width (mm)		600	900	1800	
height (mm)		600	900	1200	
Rough type		N	N	N	
us inv (m AD)	236.800	236.763	236.008	235.825	235.653
ds inv (m AD)	236.763	236.688	235.825	235.654	235.652
grad (m/m)		0.00500	0.00500	0.00500	
r.pfc (m3/s)	106.361	0.470	1.387	5.948	20.564
US depth (m)	1.932	1.725	1.156	1.001	1.156
US flow (m3/s)	5.11000	1.83155	1.80088	1.79999	5.10639
US velocity (m/s)	0.551	6.010	2.727	1.265	0.530

Node	-	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	-
Node ID	-	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	-
ground (m AD)	240.300	238.500	238.599	238.500	238.500	-
level (m AD)	238.732	238.730	237.368	236.847	236.809	-
expr:Freeboard	-	-0.229935	1.231477	1.652847	1.690994	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 7

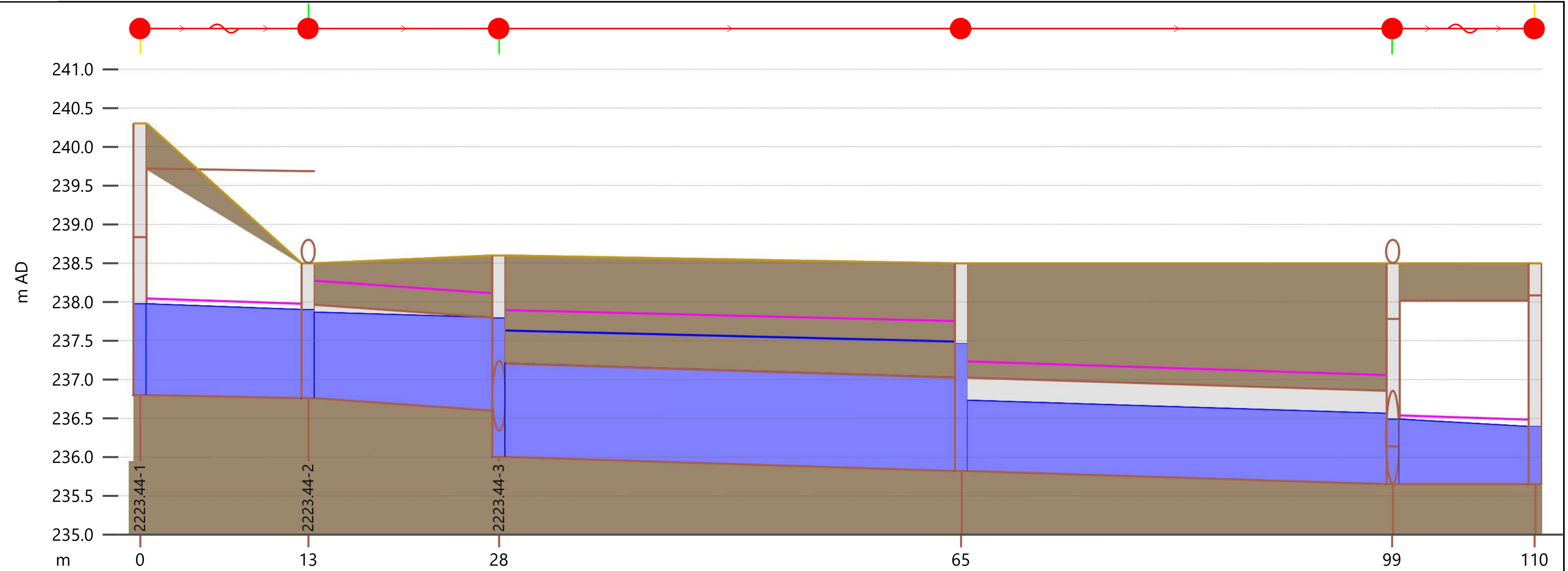
RVA PROJECT NO. 194615	FIGURE NO. 7B	AUGUST 2021

arva

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 7

RVA PROJECT NO. 194615	FIGURE NO. 7C	AUGUST 2021

Region of Peel
working with you



Link	2223.44-1.1	2223.44-2.1	2223.44-3.1	2223.44-4.1	2223.43C1-1.1
US node ID	2223.44-1	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1
ds node	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	2223.42
numbarrels	1	1	1	1	1
length (m)		15.1	36.6	34.2	
Shape ID	Matrix-2223.44	RECT	RECT	RECT	Matrix-2223.43
width (mm)		1800	1800	1800	
height (mm)		1200	1200	1200	
Rough type		N	N	N	
us inv (m AD)	236.800	236.763	236.008	235.825	235.653
ds inv (m AD)	236.763	236.600	235.825	235.654	235.652
grad (m/m)		0.01079	0.00500	0.00500	
r.pfc (m3/s)	106.361	8.734	5.946	5.948	20.564
US depth (m)	1.172	1.102	1.624	0.904	0.833
US flow (m3/s)	5.11000	5.11000	5.11000	5.11000	5.10871
US velocity (m/s)	1.563	4.010	2.638	3.147	1.042

Node	-	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	-
Node ID	-	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	-
ground (m AD)	240.300	238.500	238.599	238.500	238.500	-
level (m AD)	237.972	237.895	237.786	237.455	236.486	-
expr:Freeboard	-	0.605255	0.812501	1.045303	2.014175	-

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 7

RVA PROJECT NO. 194615	FIGURE NO. 7D	AUGUST 2021

arva

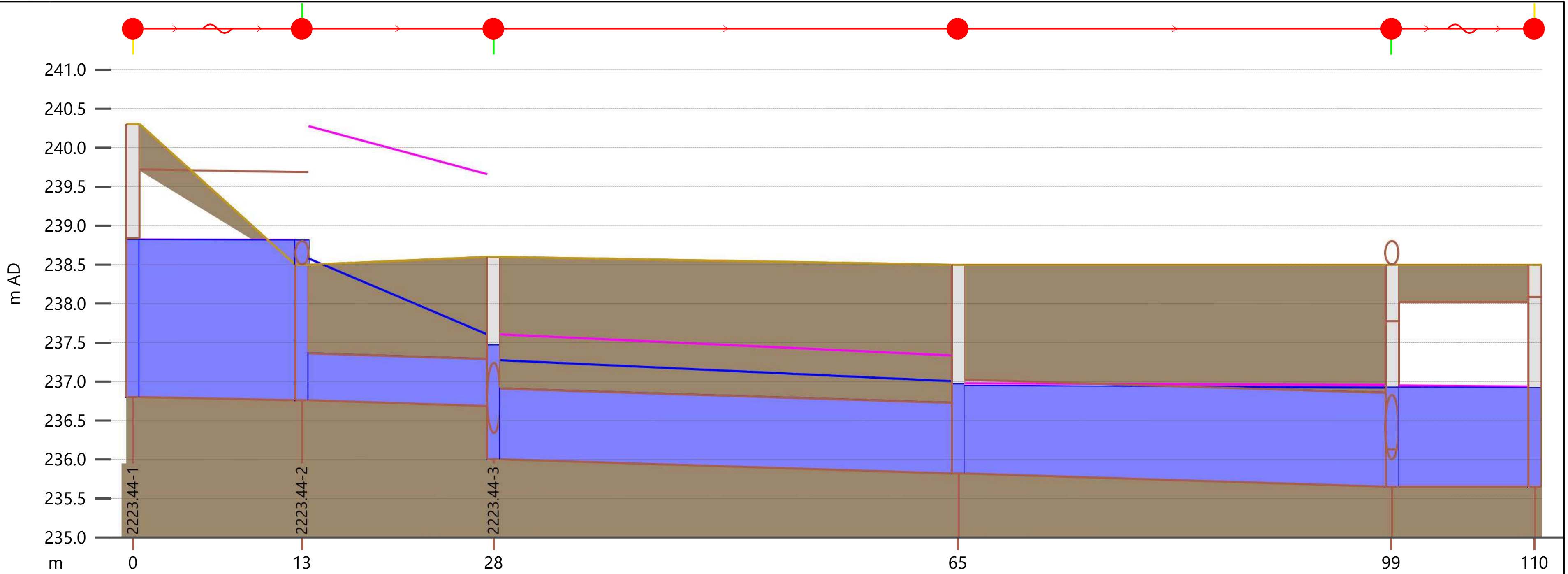
Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 7

RVA PROJECT NO. 194615	FIGURE NO. 7E	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.44-1.1	2223.44-2.1	2223.44-3.1	2223.44-4.1	2223.43C1-1.1
US node ID	2223.44-1	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1
ds node	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	2223.42
numbarrels	1	1	1	1	1
length (m)		15.1	36.6	34.2	
Shape ID	Matrix-2223.44	CIRC	CIRC	RECT	Matrix-2223.43
width (mm)		600	900	1800	
height (mm)		600	900	1200	
Rough type		N	N	N	
us inv (m AD)	236.800	236.763	236.008	235.825	235.653
ds inv (m AD)	236.763	236.688	235.825	235.654	235.652
grad (m/m)		0.00500	0.00500	0.00500	
r.pfc (m3/s)	106.361	0.470	1.387	5.948	20.564
US depth (m)	2.015	1.817	1.270	1.117	1.274
US flow (m3/s)	7.90000	1.85141	1.81443	1.80692	7.89588
US velocity (m/s)	0.540	6.069	2.757	1.284	0.682

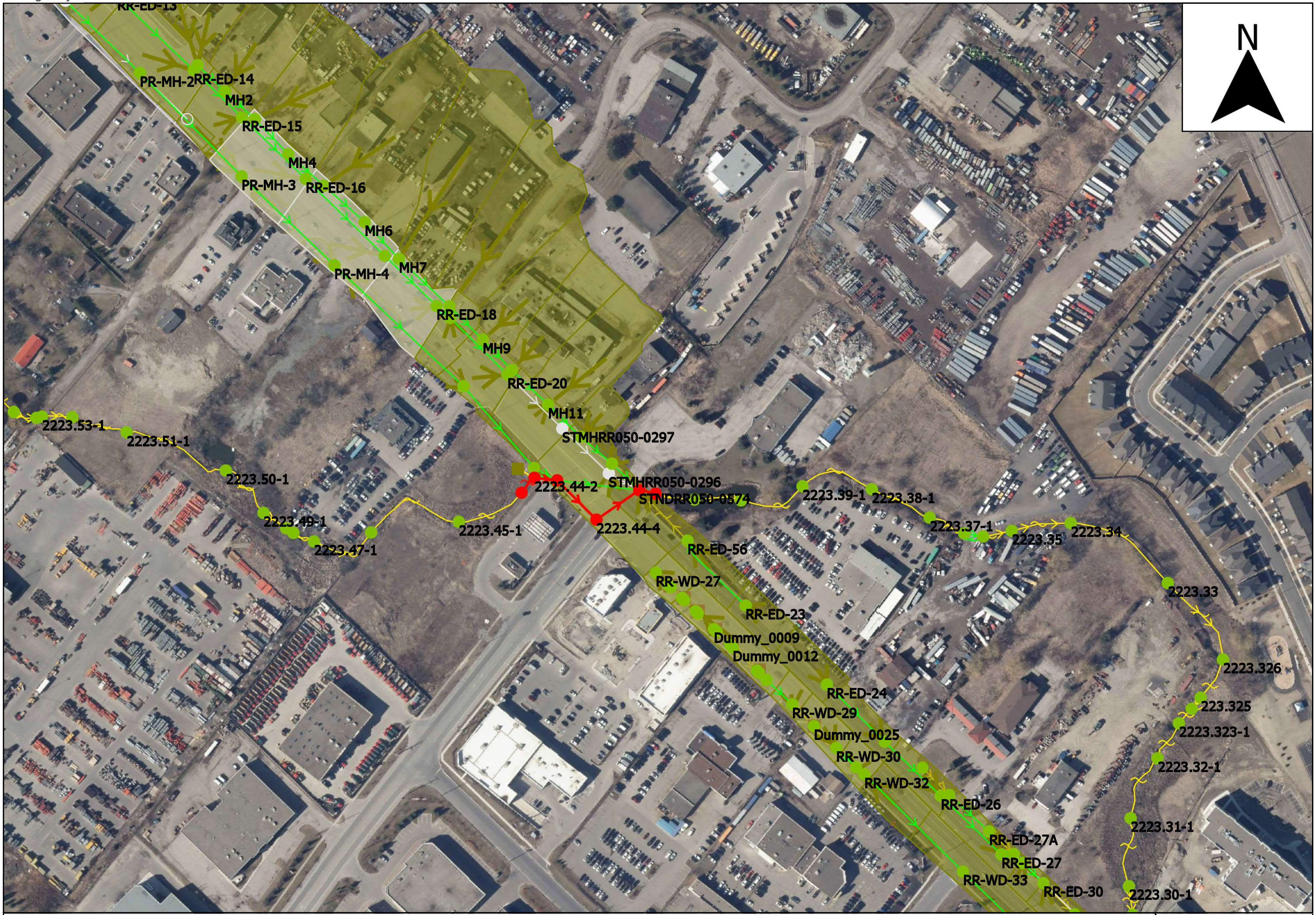
Node	-	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	-
Node ID	-	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	-
ground (m AD)	240.300	238.500	238.599	238.500	238.500	-
level (m AD)	238.815	238.811	237.463	236.963	236.927	-
expr:Freeboard	-	-0.310959	1.135728	1.537094	1.573349	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 7

RVA PROJECT NO. 194615	FIGURE NO. 7F	AUGUST 2021

rva

Region of Peel
working with you

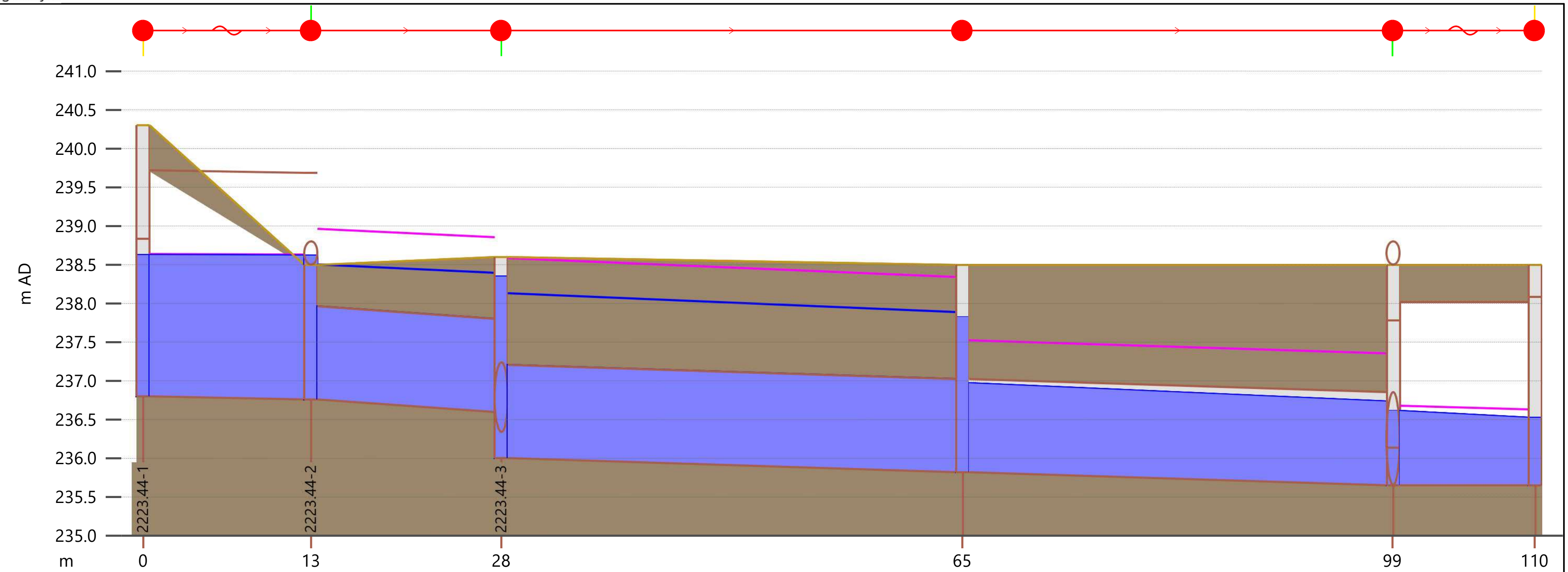


PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 7

RVA PROJECT NO. 194615	FIGURE NO. 7G	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.44-1.1	2223.44-2.1	2223.44-3.1	2223.44-4.1	2223.43C1-1.1
US node ID	2223.44-1	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1
ds node	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	2223.42
numbarrels	1	1	1	1	1
length (m)		15.1	36.6	34.2	
Shape ID	Matrix-2223.44	RECT	RECT	RECT	Matrix-2223.43
width (mm)		1800	1800	1800	
height (mm)		1200	1200	1200	
Rough type		N	N	N	
us inv (m AD)	236.800	236.763	236.008	235.825	235.653
ds inv (m AD)	236.763	236.600	235.825	235.654	235.652
grad (m/m)		0.01079	0.00500	0.00500	
r.pfc (m3/s)	106.361	8.734	5.946	5.948	20.564
US depth (m)	1.830	1.743	2.126	1.147	0.957
US flow (m3/s)	7.90000	6.78190	6.78191	6.78191	7.89915
US velocity (m/s)	1.588	4.066	2.989	3.290	1.195

Node	-	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	-
Node ID	-	2223.44-2	2223.44-3	2223.44-4	2223.43C1-1	-
ground (m AD)	240.300	238.500	238.599	238.500	238.500	-
level (m AD)	238.630	238.623	238.349	237.820	236.610	-
expr:Freeboard	-	-0.122910	0.249696	0.680161	1.889725	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 7

RVA PROJECT NO. 194615	FIGURE NO. 7H	AUGUST 2021

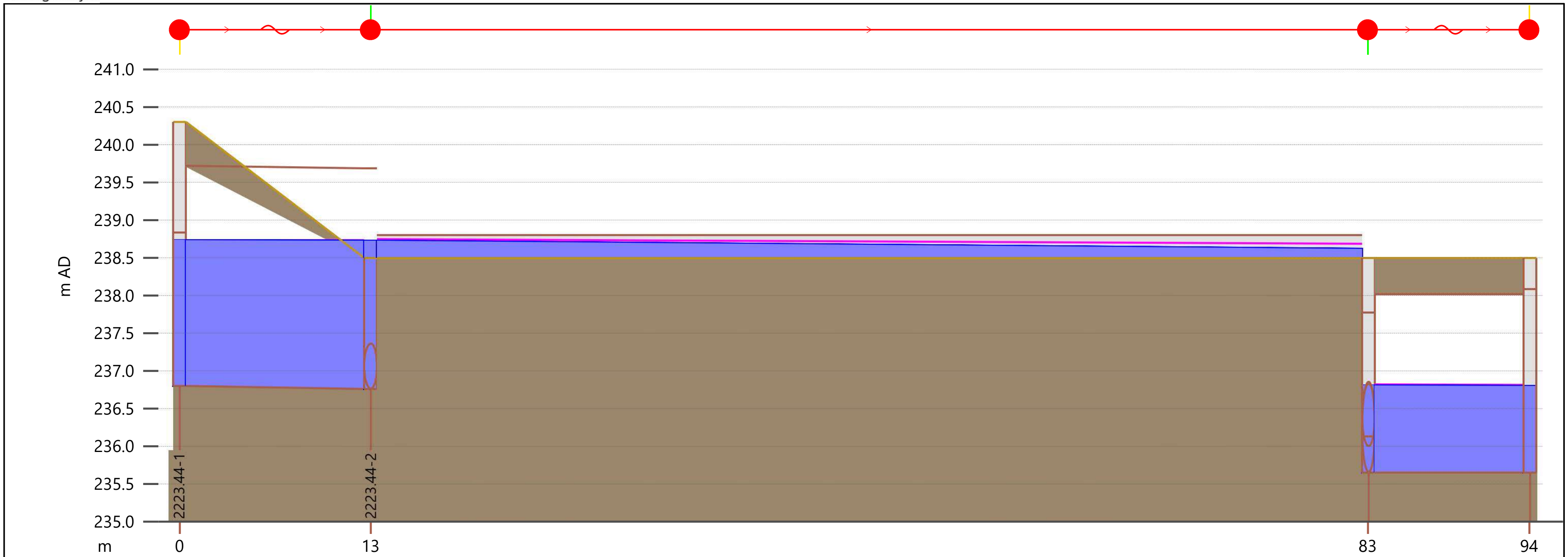
arva

Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 8		
RVA PROJECT NO. 194615	FIGURE NO. 8A	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.44-1.1	2223.44-2.2	2223.43C1-1.1
US node ID	2223.44-1	2223.44-2	2223.43C1-1
ds node	2223.44-2	2223.43C1-1	2223.42
numbarrels	1	1	1
length (m)		69.5	
Shape ID	Matrix-2223.44	OREC	Matrix-2223.43
width (mm)		25000	
height (mm)		300	
Rough type		N	
us inv (m AD)	236.800	238.500	235.653
ds inv (m AD)	236.763	238.500	235.652
grad (m/m)		0.00000	
r.pfc (m3/s)	106.361	0.000	20.564
US depth (m)	1.932	0.230	1.156
US flow (m3/s)	5.11000	3.38957	5.10639
US velocity (m/s)	0.551	0.590	0.530

Node	2223.44-1	2223.44-2	2223.43C1-1	2223.42
Node ID	2223.44-1	2223.44-2	2223.43C1-1	2223.42
ground (m AD)	240.300	238.500	238.500	238.500
level (m AD)	238.732	238.730	236.809	236.801
expr:Freeboard	1.568127	-0.229935	1.690994	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 8

RVA PROJECT NO. 194615 | FIGURE NO. 8B | AUGUST 2021

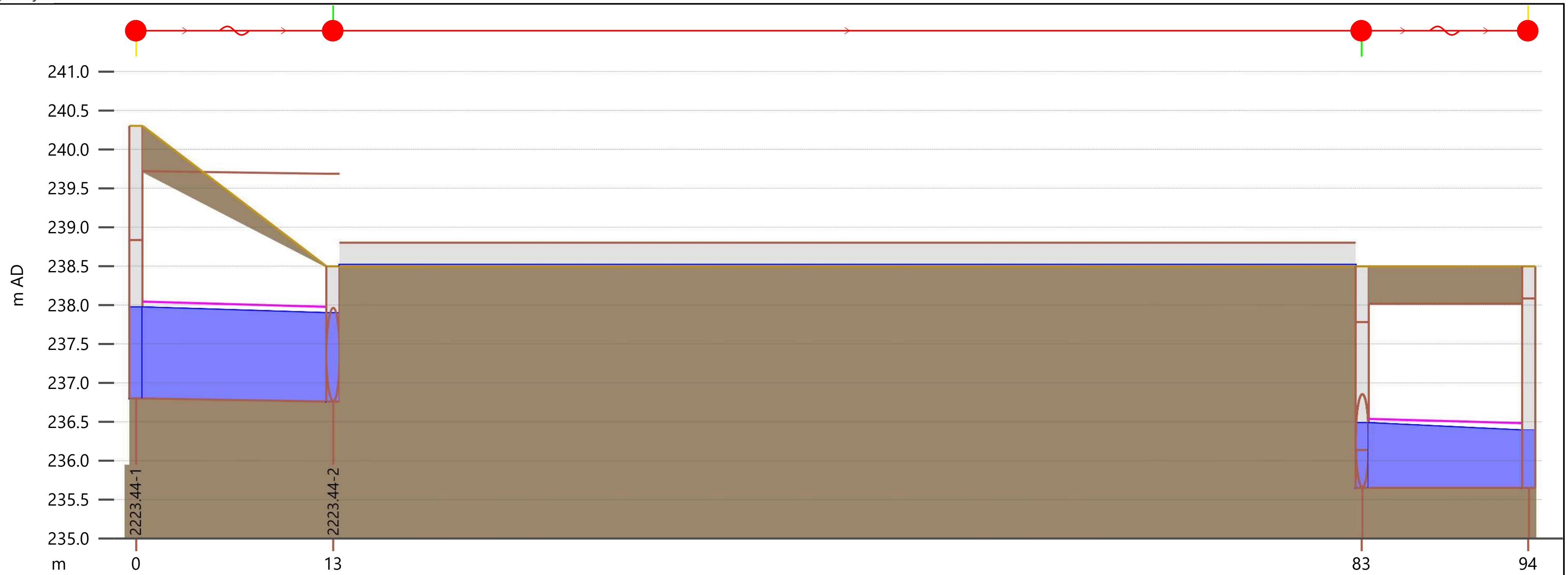
arva

Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 8

RVA PROJECT NO. 194615	FIGURE NO. 8C	AUGUST 2021	arva

Region of Peel
working with you



Link		2223.44-1.1	2223.44-2.2	2223.43C1-1.1
US node ID		2223.44-1	2223.44-2	2223.43C1-1
ds node		2223.44-2	2223.43C1-1	2223.42
numbarrels		1	1	1
length (m)			69.5	
Shape ID		Matrix-2223.44	OREC	Matrix-2223.43
width (mm)			25000	
height (mm)			300	
Rough type			N	
us inv (m AD)		236.800	238.500	235.653
ds inv (m AD)		236.763	238.500	235.652
grad (m/m)			0.00000	
r.pfc (m3/s)		106.361	0.000	20.564
US depth (m)		1.172	0.020	0.833
US flow (m3/s)		5.11000	0.00000	5.10871
US velocity (m/s)		1.563	0.000	1.042

Node	2223.44-1	2223.44-2	2223.43C1-1	2223.42
Node ID	2223.44-1	2223.44-2	2223.43C1-1	2223.42
ground (m AD)	240.300	238.500	238.500	238.500
level (m AD)	237.972	237.895	236.486	236.390
expr:Freeboard	2.327954	0.605255	2.014175	-

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 8

RVA PROJECT NO. 194615	FIGURE NO. 8D	AUGUST 2021

arva

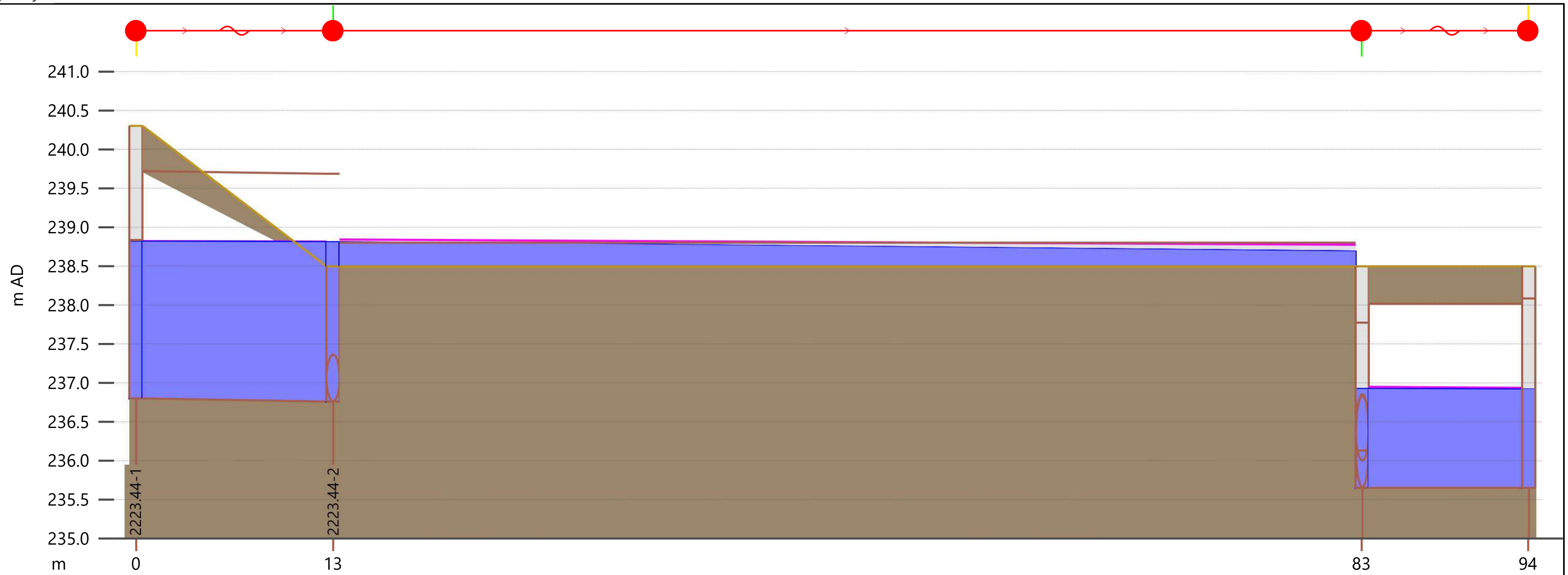
Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 8

RVA PROJECT NO. 194615	FIGURE NO. 8E	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.44-1.1	2223.44-2.2	2223.43C1-1.1
US node ID	2223.44-1	2223.44-2	2223.43C1-1
ds node	2223.44-2	2223.43C1-1	2223.42
numbarrels	1	1	1
length (m)		69.5	
Shape ID	Matrix-2223.44	OREC	Matrix-2223.43
width (mm)		25000	
height (mm)		300	
Rough type		N	
us inv (m AD)	236.800	238.500	235.653
ds inv (m AD)	236.763	238.500	235.652
grad (m/m)		0.00000	
r.pfc (m3/s)	106.361	0.000	20.564
US depth (m)	2.015	0.311	1.274
US flow (m3/s)	7.90000	6.21168	7.89588
US velocity (m/s)	0.540	0.799	0.682

Node	2223.44-1	2223.44-2	2223.43C1-1	2223.42
Node ID	2223.44-1	2223.44-2	2223.43C1-1	2223.42
ground (m AD)	240.300	238.500	238.500	238.500
level (m AD)	238.815	238.811	236.927	236.915
expr:Freeboard	1.485364	-0.310959	1.573349	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 8

RVA PROJECT NO. 194615 | FIGURE NO. 8F | AUGUST 2021

arva

Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 8		
RVA PROJECT NO. 194615	FIGURE NO. 8G	AUGUST 2021

arva

Region of Peel
working with you

Link		2223.44-1.1	2223.44-2.2	2223.43C1-1.1	
US node ID		2223.44-1	2223.44-2	2223.43C1-1	
ds node		2223.44-2	2223.43C1-1	2223.42	
numbarrels		1	1	1	
length (m)			69.5		
Shape ID		Matrix-2223.44	OREC	Matrix-2223.43	
width (mm)			25000		
height (mm)			300		
Rough type			N		
us inv (m AD)		236.800	238.500	235.653	
ds inv (m AD)		236.763	238.500	235.652	
grad (m/m)			0.00000		
r.pfc (m3/s)		106.361	0.000	20.564	
US depth (m)		1.830	0.123	0.957	
US flow (m3/s)		7.90000	1.11810	7.89915	
US velocity (m/s)		1.588	0.364	1.195	

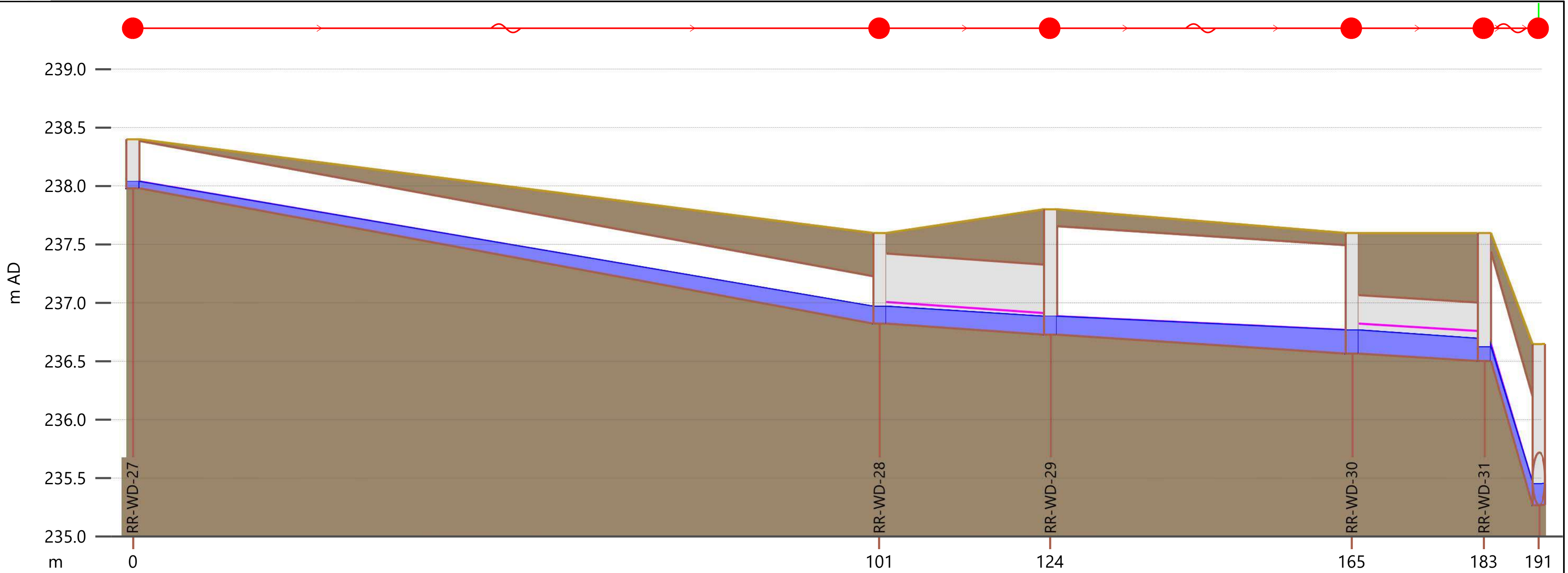
Node	2223.44-1	2223.44-2		2223.43C1-1	2223.42
Node ID	2223.44-1	2223.44-2		2223.43C1-1	2223.42
ground (m AD)	240.300	238.500		238.500	238.500
level (m AD)	238.630	238.623		236.610	236.526
expr:Freeboard	1.670392	-0.122910		1.889725	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 8			arva
RVA PROJECT NO. 194615	FIGURE NO. 8H	AUGUST 2021	

Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 9			arva
RVA PROJECT NO. 194615	FIGURE NO. 9A	AUGUST 2021	

Region of Peel
working with you



Link	RR-WD-27.1	RR-WD-28.1	RR-WD-29.1	RR-WD-30.1	-
US node ID	RR-WD-27	RR-WD-28	RR-WD-29	RR-WD-30	-
ds node	RR-WD-28	RR-WD-29	RR-WD-30	RR-WD-31	-
numbarrels	1	1	1	1	1
length (m)		23.2		17.9	
Shape ID	West Side Ditch-1 (Downstream of George Bolton Pkwy)	CIRC	-	CIRC	-
width (mm)		600		500	
height (mm)		600		500	
Rough type		N		N	
us inv (m AD)	237.980	236.823	236.730	236.566	-
ds inv (m AD)	236.823	236.730	236.566	236.505	-
grad (m/m)		0.00401		0.00340	
r.pfc (m3/s)	1.738	0.389	3.019	0.220	-
US depth (m)	0.057	0.142	0.151	0.200	0.117
US flow (m3/s)	0.01555	0.04596	0.05712	0.07692	-
US velocity (m/s)	0.186	0.896	0.373	1.052	0.726

Node	RR-WD-27	RR-WD-28	RR-WD-29	RR-WD-30	-
Node ID	RR-WD-27	RR-WD-28	RR-WD-29	RR-WD-30	-
ground (m AD)	238.400	237.600	237.800	237.600	237.600
level (m AD)	238.037	236.965	236.881	236.766	236.622
expr:Freeboard	0.362952	0.634500	0.918774	0.834085	0.978220

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 9

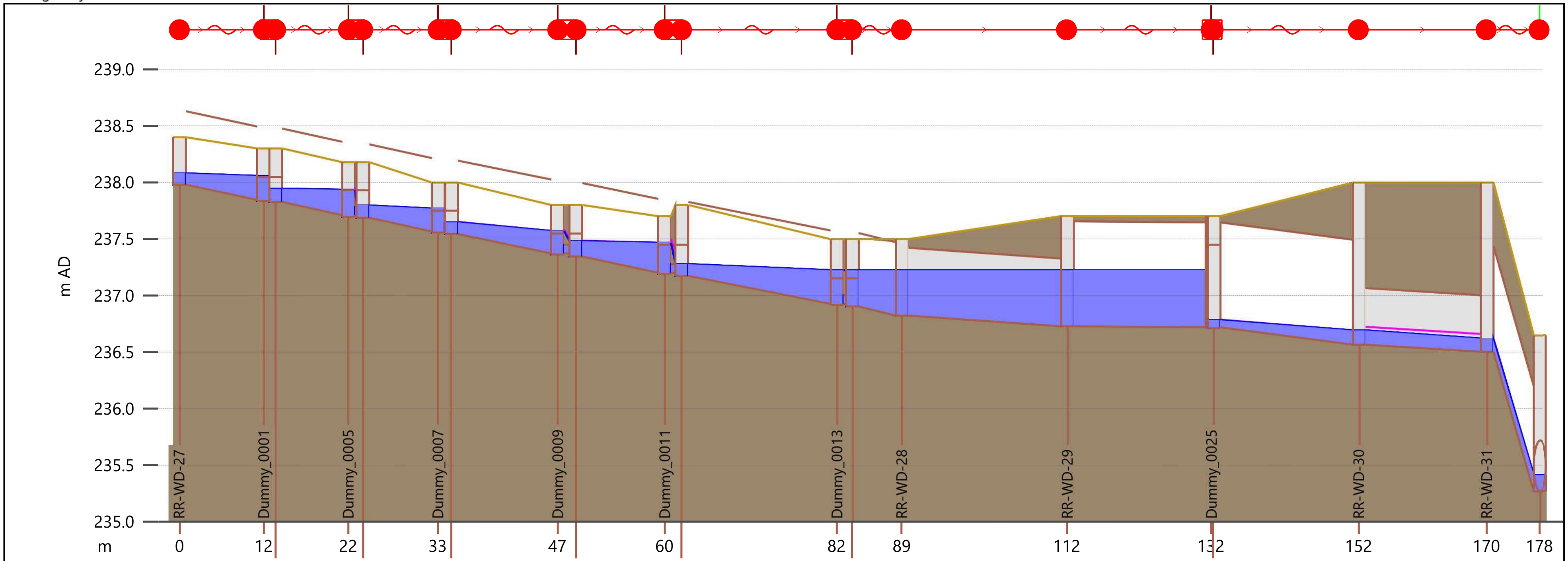
RVA PROJECT NO. 194615 | FIGURE NO. 9B | AUGUST 2021

arva

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 9

RVA PROJECT NO. 194615	FIGURE NO. 9C	AUGUST 2021

Region of Peel
working with you



Link	-	-	-	-	-	-	-	Dummy_0012.1	-	RR-WD-28.1	RR-WD-29.1	Dummy_0026.1	RR-WD-30.1	-
US node ID	-	-	-	-	-	-	-	Dummy_0012	-	RR-WD-28	RR-WD-29	Dummy_0026	RR-WD-30	-
ds node	-				-		-	Dummy_0013	-	RR-WD-29	Dummy_0025	RR-WD-30	RR-WD-31	-
numbarrels	1	1	1	1		1		1	1	1	1	1	1	1
length (m)										23.2			17.9	
Shape ID	-	-	-	-		-		-	-	CIRC	-	-	CIRC	-
width (mm)										600			500	
height (mm)										600			500	
Rough type										N			N	
us inv (m AD)	237.980	237.826	237.686	237.545		237.345		237.176	-	236.823	236.730	236.719	236.566	-
ds inv (m AD)	237.845	237.709	237.566	237.374		237.203		236.927	-	236.730	236.719	236.566	236.505	-
grad (m/m)										0.00401			0.00340	
r.pfc (m3/s)	3.756	3.756	3.756	3.756	-	3.756	-	3.756	3.756	0.389	1.091	4.129	0.220	-
US depth (m)	0.099	0.118	0.108	0.103	-	0.138	-	0.101	0.322	0.401	0.494	0.065	0.126	0.107
US flow (m3/s)	0.01571	0.01446	0.01088	0.04554	-	0.04444	-	0.04351	-	0.03631	0.03858	0.00918	0.03093	-
US velocity (m/s)	0.106	0.121	0.064	0.284	-	0.191	-	0.279	0.262	0.696	0.143	0.171	0.792	0.431

Node	-	-	-	-	-	-	-	-	-	-	-	-	-	RR-WD-28	RR-WD-29	-	-	RR-WD-30	-
Node ID	-	-	-	-	-	-	-	-	-	-	-	-	-	RR-WD-28	RR-WD-29	-	-	RR-WD-30	-
ground (m AD)	-	-	-	-	-	-	-	-	-	-	237.800	237.500	-	237.500	237.700	-	-	238.000	238.000
level (m AD)	-	-	-	-	-	-	-	-	-	-	237.276	237.225	-	237.225	237.224	-	-	236.693	236.612
expr:Freeboard	-	-	-	-	-	-	-	-	-	-	0.523557	-	-	0.275497	0.475558	-	-	1.307480	1.388245

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 9

RVA PROJECT NO. 194615	FIGURE NO. 9D	AUGUST 2021

arva

Region of Peel
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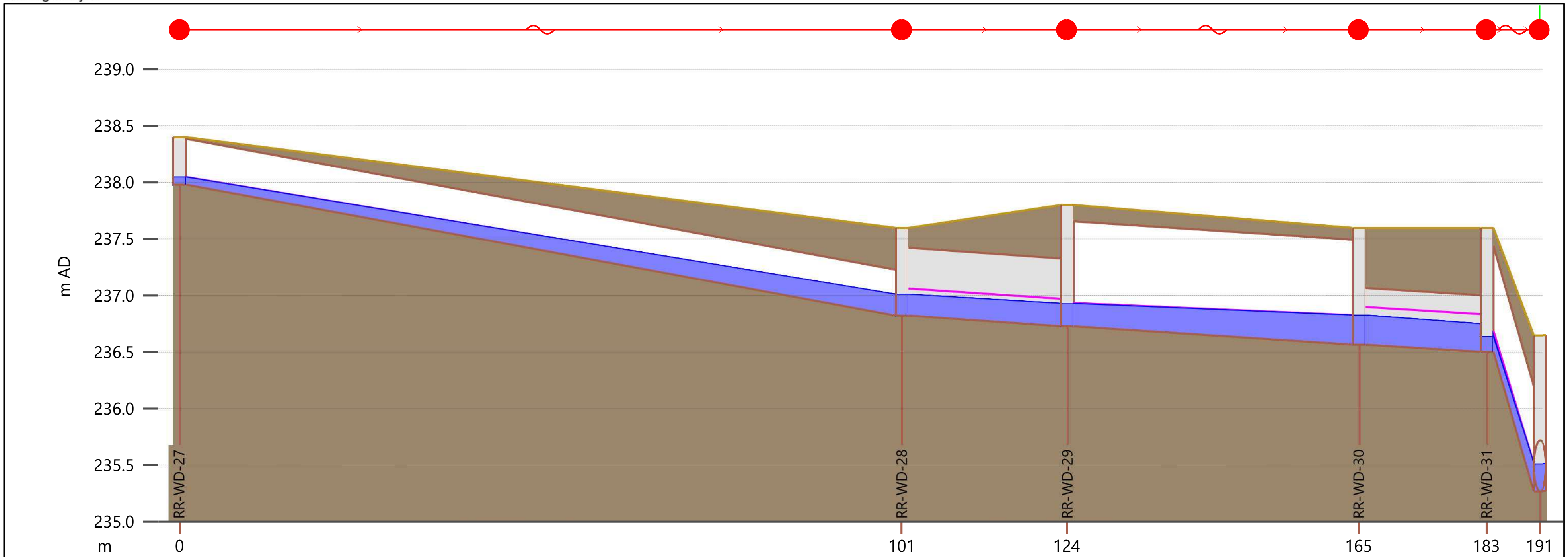
EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 9			arva
RVA PROJECT NO. 194615	FIGURE NO. 9E	AUGUST 2021	

Region of Peel
working with you



Link	RR-WD-27.1	RR-WD-28.1	RR-WD-29.1	RR-WD-30.1	-
US node ID	RR-WD-27	RR-WD-28	RR-WD-29	RR-WD-30	-
ds node	RR-WD-28	RR-WD-29	RR-WD-30	RR-WD-31	-
numbarrels	1	1	1	1	1
length (m)		23.2		17.9	
Shape ID	West Side Ditch-1 (Downstream of George Bolton Pkwy)	CIRC	-	CIRC	-
width (mm)		600		500	
height (mm)		600		500	
Rough type		N		N	
us inv (m AD)	237.980	236.823	236.730	236.566	-
ds inv (m AD)	236.823	236.730	236.566	236.505	-
grad (m/m)		0.00401		0.00340	
r.pfc (m3/s)	1.738	0.389	3.019	0.220	-
US depth (m)	0.064	0.183	0.196	0.259	0.128
US flow (m3/s)	0.02391	0.07558	0.09345	0.12629	-
US velocity (m/s)	0.246	1.038	0.426	1.232	1.058

Node	RR-WD-27	RR-WD-28	RR-WD-29	RR-WD-30	-
Node ID	RR-WD-27	RR-WD-28	RR-WD-29	RR-WD-30	-
ground (m AD)	238.400	237.600	237.800	237.600	237.600
level (m AD)	238.044	237.006	236.926	236.825	236.633
expr:Freeboard	0.355917	0.593729	0.874127	0.774942	0.966653

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 9

RVA PROJECT NO. 194615	FIGURE NO. 9F	AUGUST 2021

arva

Region of Peel
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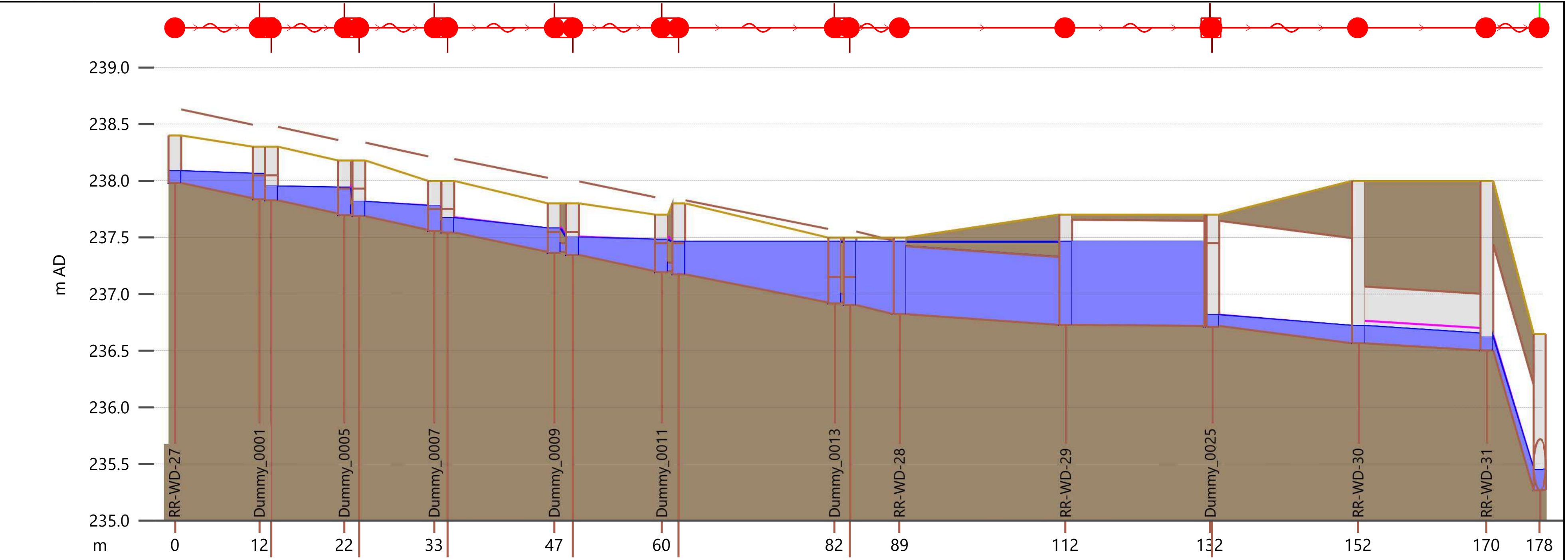
PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 9			arva
RVA PROJECT NO. 194615	FIGURE NO. 9G	AUGUST 2021	

Region of Peel
working with you



Link	-	-	-	-	-	-	-	Dummy_0012.1	-	RR-WD-28.1	RR-WD-29.1	Dummy_0026.1	RR-WD-30.1	-
US node ID	-	-	-	-	-	-	-	Dummy_0012	-	RR-WD-28	RR-WD-29	Dummy_0026	RR-WD-30	-
ds node	-	-	-	-	-	-	-	Dummy_0013	-	RR-WD-29	Dummy_0025	RR-WD-30	RR-WD-31	-
numbarrels	1	1	1	1		1		1	1	1	1	1	1	1
length (m)										23.2			17.9	
Shape ID	-	-	-	-		-		-	-	CIRC	-	-	CIRC	-
width (mm)										600			500	
height (mm)										600			500	
Rough type										N			N	
us inv (m AD)	237.980	237.826	237.686	237.545		237.345		237.176	-	236.823	236.730	236.719	236.566	-
ds inv (m AD)	237.845	237.709	237.566	237.374		237.203		236.927	-	236.730	236.719	236.566	236.505	-
grad (m/m)										0.00401			0.00340	
r.pfc (m3/s)	3.756	3.756	3.756	3.756	-	3.756	-	3.756	3.756	0.389	1.091	4.129	0.220	-
US depth (m)	0.105	0.125	0.127	0.127	-	0.156	-	0.289	0.561	0.641	0.733	0.096	0.156	0.113
US flow (m3/s)	0.02428	0.02313	0.02216	0.08643	-	0.08497	-	0.08410	-	0.05668	0.06077	0.02744	0.04790	-
US velocity (m/s)	0.148	0.146	0.105	0.413	-	0.309	-	0.408	0.294	0.735	0.177	0.313	0.918	0.620

Node	-	-	-	-	-	-	-	-	-	-	-	-	-	RR-WD-28	RR-WD-29	-	-	RR-WD-30	-
Node ID	-	-	-	-	-	-	-	-	-	-	-	-	-	RR-WD-28	RR-WD-29	-	-	RR-WD-30	-
ground (m AD)	-	-	-	-	-	-	-	-	-	-	237.800	237.500	-	237.500	237.700	-	-	238.000	238.000
level (m AD)	-	-	-	-	-	-	-	-	-	-	237.465	237.464	-	237.464	237.463	-	-	236.722	236.618
expr:Freeboard	-	-	-	-	-	-	-	-	-	-	0.335126	-	-	0.036255	0.236682	-	-	1.278244	1.381882

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 9

RVA PROJECT NO. 194615	FIGURE NO. 9H	AUGUST 2021

arva

Region of Peel
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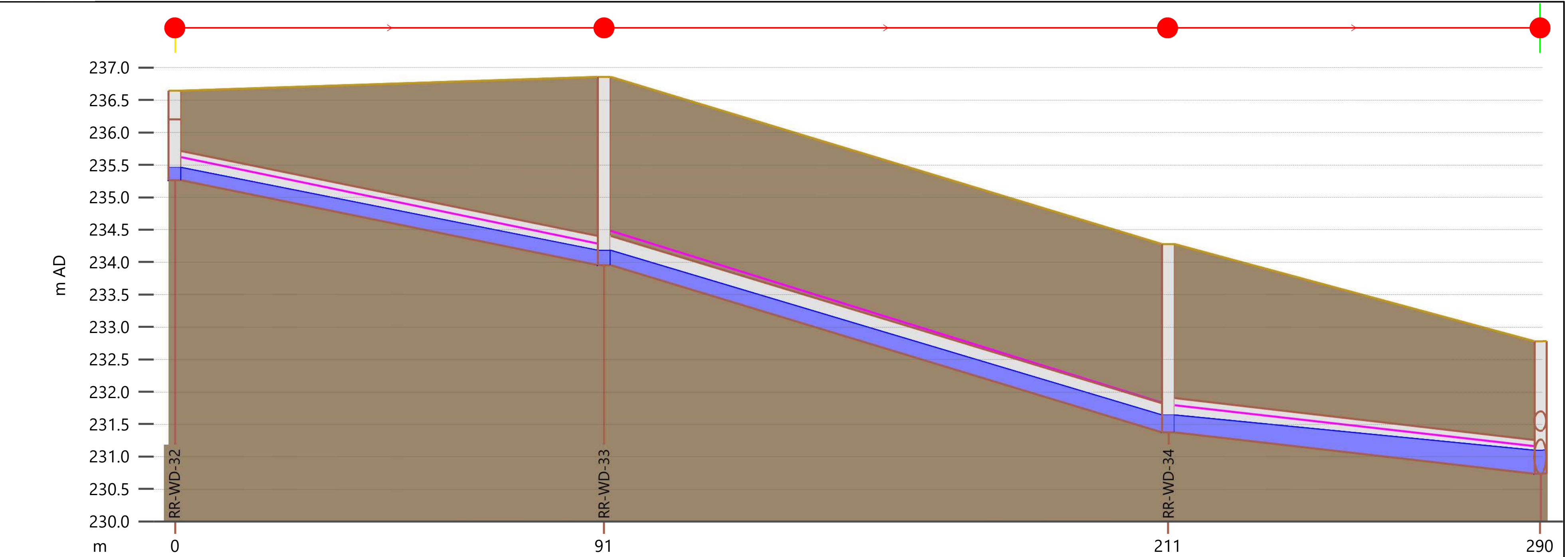
EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 10

RVA PROJECT NO. 194615	FIGURE NO. 10A	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-32.1	RR-WD-33.1	RR-WD-34.1
US node ID	RR-WD-32	RR-WD-33	RR-WD-34
ds node	RR-WD-33	RR-WD-34	RR-WD-35
numbarrels	1	1	1
length (m)	91.0	119.6	79.0
Shape ID	CIRC	CIRC	CIRC
width (mm)	450	450	525
height (mm)	450	450	525
Rough type	N	N	N
us inv (m AD)	235.267	233.958	231.377
ds inv (m AD)	233.958	231.377	230.737
grad (m/m)	0.01438	0.02157	0.00811
r.pfc (m3/s)	0.342	0.419	0.387
US depth (m)	0.184	0.219	0.260
US flow (m3/s)	0.11063	0.18958	0.18824
US velocity (m/s)	1.815	2.467	1.759

Node	RR-WD-32	RR-WD-33	RR-WD-34	RR-WD-35
Node ID	RR-WD-32	RR-WD-33	RR-WD-34	RR-WD-35
ground (m AD)	236.646	236.856	234.279	232.779
level (m AD)	235.451	234.177	231.637	231.096
expr:Freeboard	1.195389	2.678741	2.642136	1.683731

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 9

RVA PROJECT NO. 194615	FIGURE NO. 10B	AUGUST 2021

arva

Region of Peel
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PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 10			arva
RVA PROJECT NO. 194615	FIGURE NO. 10C	AUGUST 2021	

Region of Peel
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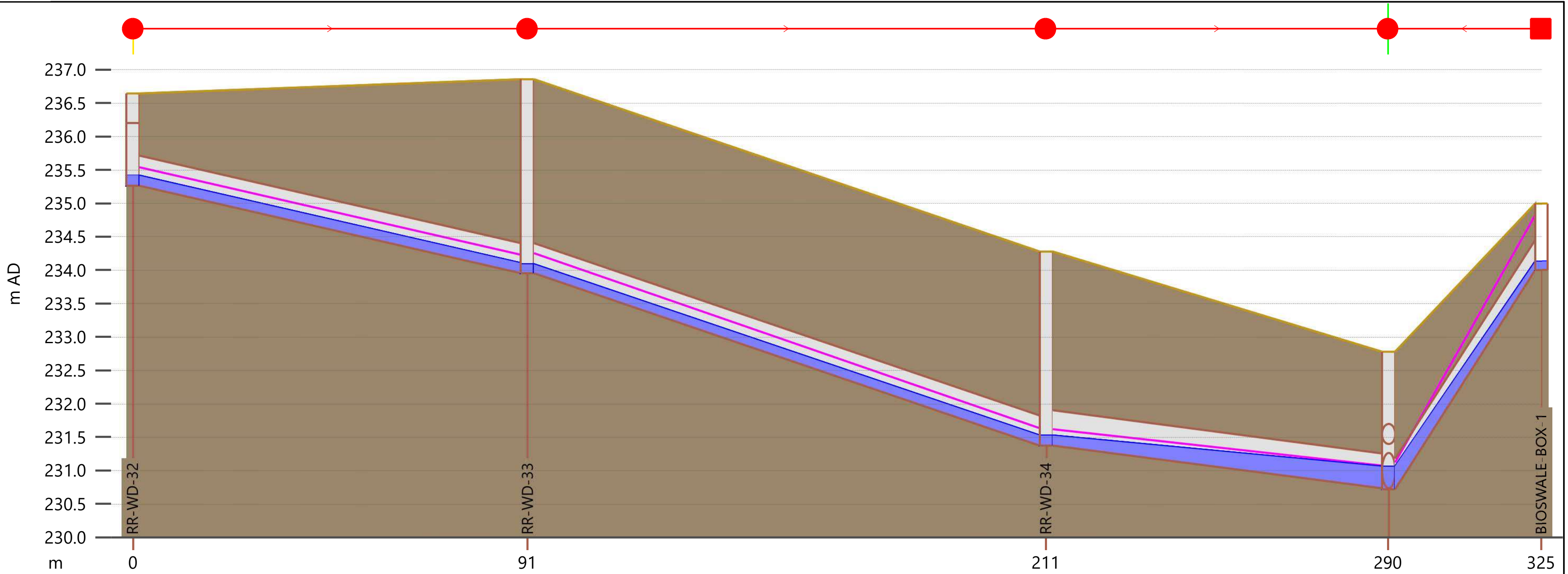

Link	RR-WD-32.1	RR-WD-33.1	RR-WD-34.1	-
US node ID	RR-WD-32	RR-WD-33	RR-WD-34	BIOSWALE-BOX-1
ds node	RR-WD-33	RR-WD-34	RR-WD-35	RR-WD-35
numbarrels	1	1	1	1
length (m)	91.0	119.6	79.0	35.3
Shape ID	CIRC	CIRC	CIRC	CIRC
width (mm)	450	450	525	450
height (mm)	450	450	525	450
Rough type	N	N	N	N
us inv (m AD)	235.267	233.958	231.377	234.000
ds inv (m AD)	233.958	231.377	230.737	230.727
grad (m/m)	0.01438	0.02157	0.00811	0.09259
r.pfc (m3/s)	0.342	0.419	0.387	0.868
US depth (m)	0.148	0.132	0.152	0.130
US flow (m3/s)	0.07240	0.07043	0.06918	0.13980
US velocity (m/s)	1.586	1.816	1.336	3.688

Node	RR-WD-32	RR-WD-33	RR-WD-34	RR-WD-35	-
Node ID	RR-WD-32	RR-WD-33	RR-WD-34	RR-WD-35	-
ground (m AD)	236.646	236.856	234.279	232.779	-
level (m AD)	235.415	234.090	231.529	231.065	-
expr:Freeboard	1.230789	2.766205	2.750626	1.714783	-

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 10			arva
RVA PROJECT NO. 194615	FIGURE NO. 10D	AUGUST 2021	

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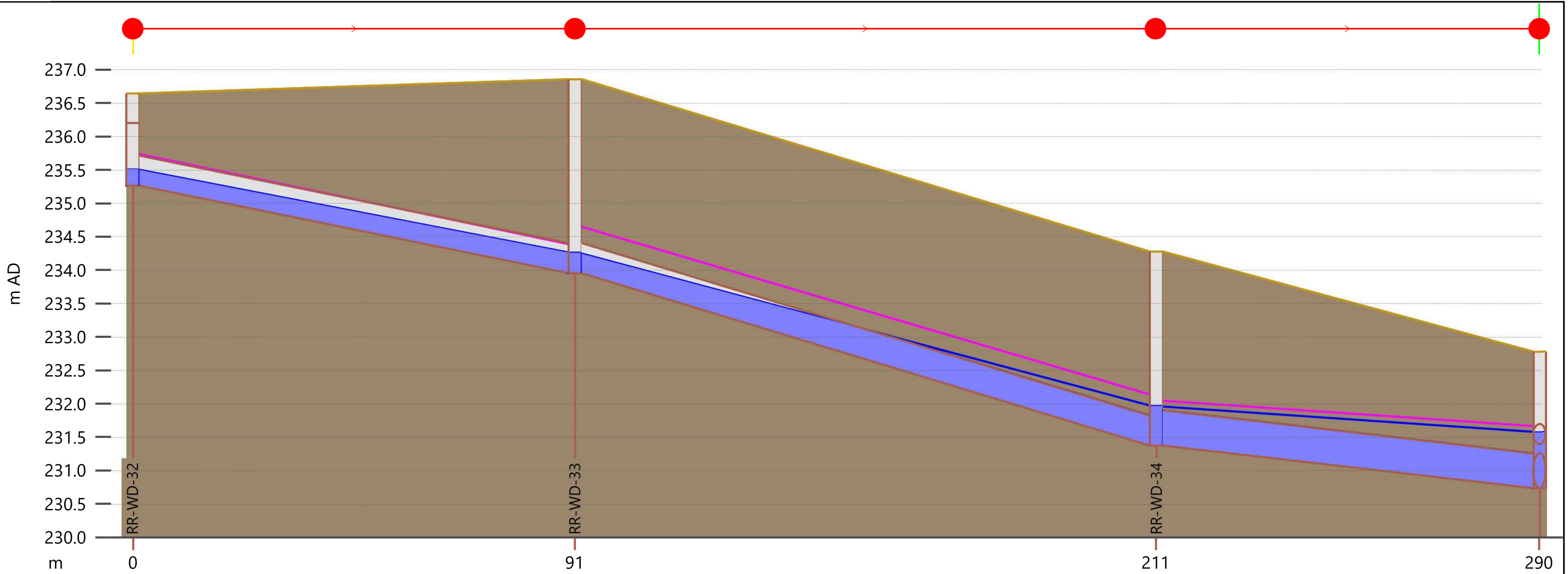
EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 10

RVA PROJECT NO. 194615	FIGURE NO. 10E	AUGUST 2021

rva



Link	RR-WD-32.1	RR-WD-33.1	RR-WD-34.1
US node ID	RR-WD-32	RR-WD-33	RR-WD-34
ds node	RR-WD-33	RR-WD-34	RR-WD-35
numbarrels	1	1	1
length (m)	91.0	119.6	79.0
Shape ID	CIRC	CIRC	CIRC
width (mm)	450	450	525
height (mm)	450	450	525
Rough type	N	N	N
us inv (m AD)	235.267	233.958	231.377
ds inv (m AD)	233.958	231.377	230.737
grad (m/m)	0.01438	0.02157	0.00811
r.pfc (m3/s)	0.342	0.419	0.387
US depth (m)	0.237	0.289	0.581
US flow (m3/s)	0.18076	0.30461	0.29912
US velocity (m/s)	2.126	2.818	1.955

Node	RR-WD-32	RR-WD-33	RR-WD-34	RR-WD-35
Node ID	RR-WD-32	RR-WD-33	RR-WD-34	RR-WD-35
ground (m AD)	236.646	236.856	234.279	232.779
level (m AD)	235.506	234.262	231.973	231.577
expr:Freeboard	1.140045	2.594254	2.306564	1.202011

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 10

RVA PROJECT NO. 194615 | FIGURE NO. 10F | AUGUST 2021

Region of Peel
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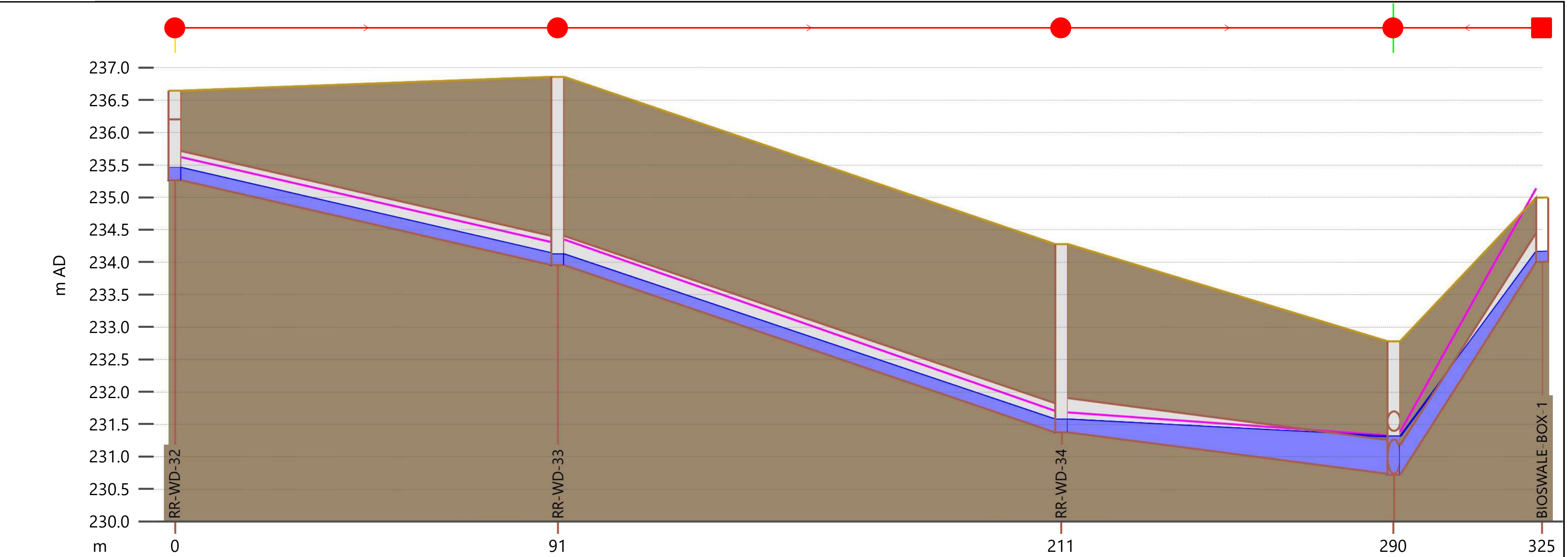
PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 10			
RVA PROJECT NO. 194615	FIGURE NO. 10G	AUGUST 2021	arva

Region of Peel
working with you



Link	RR-WD-32.1	RR-WD-33.1	RR-WD-34.1	-
US node ID	RR-WD-32	RR-WD-33	RR-WD-34	BIOSWALE-BOX-1
ds node	RR-WD-33	RR-WD-34	RR-WD-35	RR-WD-35
numbarrels	1	1	1	1
length (m)	91.0	119.6	79.0	35.3
Shape ID	CIRC	CIRC	CIRC	CIRC
width (mm)	450	450	525	450
height (mm)	450	450	525	450
Rough type	N	N	N	N
us inv (m AD)	235.267	233.958	231.377	234.000
ds inv (m AD)	233.958	231.377	230.737	230.727
grad (m/m)	0.01438	0.02157	0.00811	0.09259
r.pfc (m3/s)	0.342	0.419	0.387	0.868
US depth (m)	0.184	0.163	0.195	0.163
US flow (m3/s)	0.11202	0.10952	0.10764	0.22687
US velocity (m/s)	1.826	2.110	1.496	4.371

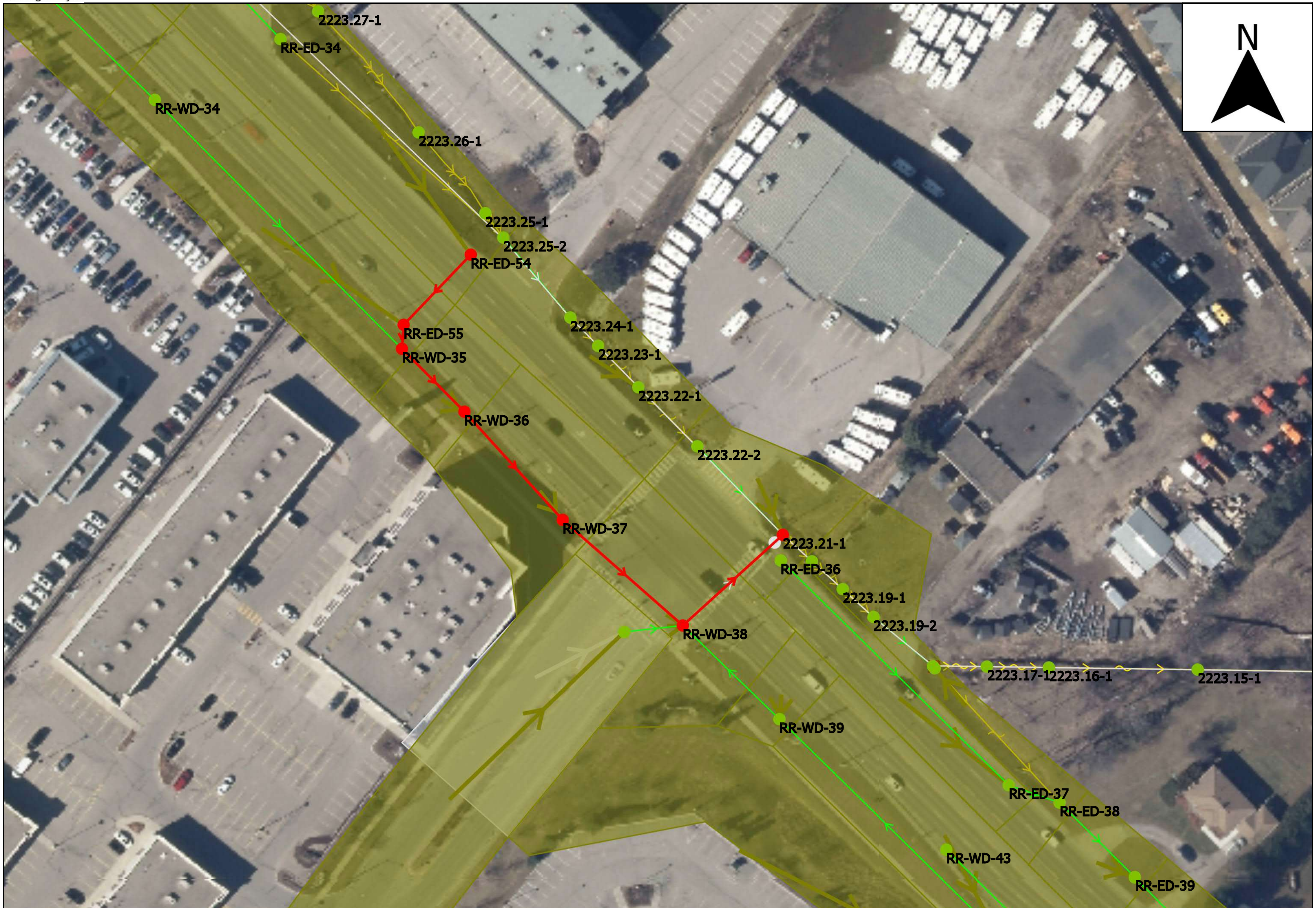
Node	RR-WD-32	RR-WD-33	RR-WD-34	RR-WD-35	-
Node ID	RR-WD-32	RR-WD-33	RR-WD-34	RR-WD-35	-
ground (m AD)	236.646	236.856	234.279	232.779	-
level (m AD)	235.452	234.121	231.572	231.315	-
expr:Freeboard	1.194565	2.735031	2.707413	1.464035	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 10

RVA PROJECT NO. 194615	FIGURE NO. 10H	AUGUST 2021

arva

Region of Peel
working with you

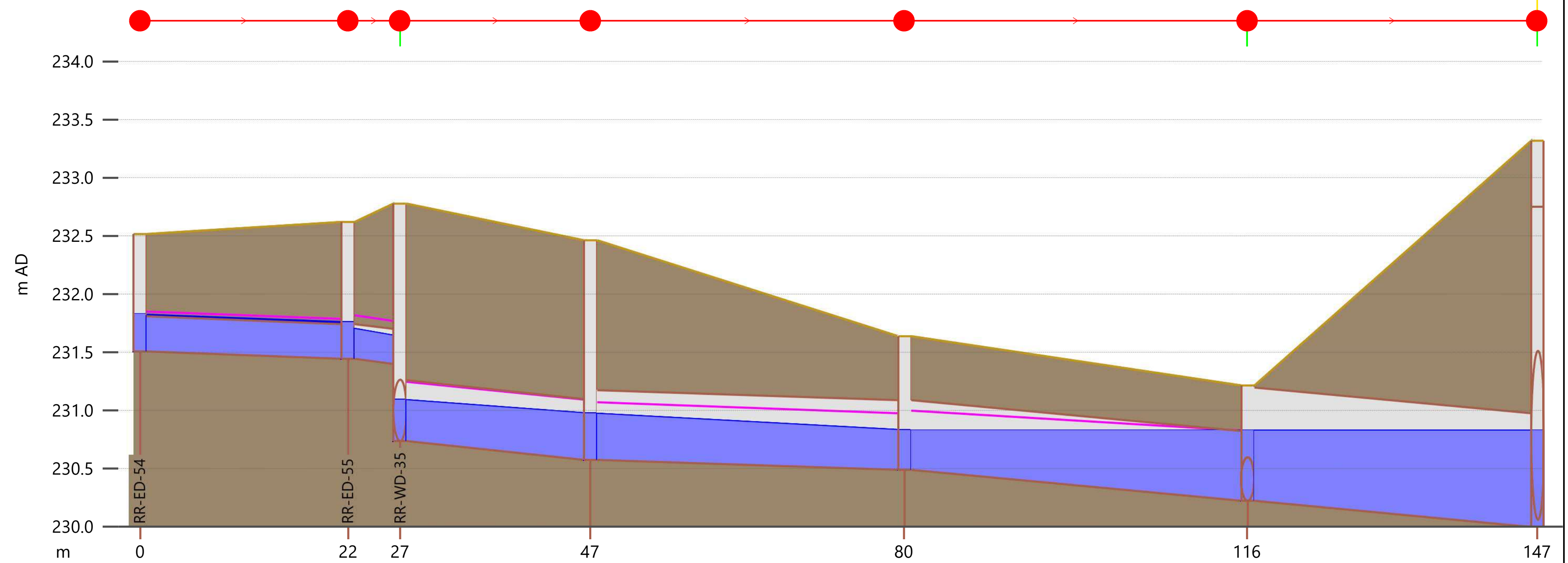


EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 11

RVA PROJECT NO. 194615	FIGURE NO. 11A	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-ED-54.1	-	RR-WD-35.1	RR-WD-36.1	RR-WD-37.1	RR-WD-38.1
US node ID	RR-ED-54	-	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38
ds node	RR-ED-55	-	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
numbarrels	1	1	1	1	1	1
length (m)	21.8	5.5	20.0	32.9	36.0	30.4
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	RECT
width (mm)	300	300	525	600	600	600
height (mm)	300	300	525	600	600	975
Rough type	N	N	N	N	N	N
us inv (m AD)	231.508	-	230.737	230.575	230.488	230.223
ds inv (m AD)	231.444	-	230.575	230.488	230.223	230.000
grad (m/m)	0.00293	-	0.00811	0.00264	0.00736	0.00733
r.pfc (m3/s)	0.052	0.087	0.387	0.316	0.527	1.254
US depth (m)	0.315	0.259	0.353	0.396	0.341	0.605
US flow (m3/s)	0.05144	-	0.27052	0.27983	0.30390	0.45262
US velocity (m/s)	0.766	1.507	1.755	1.422	1.837	1.946

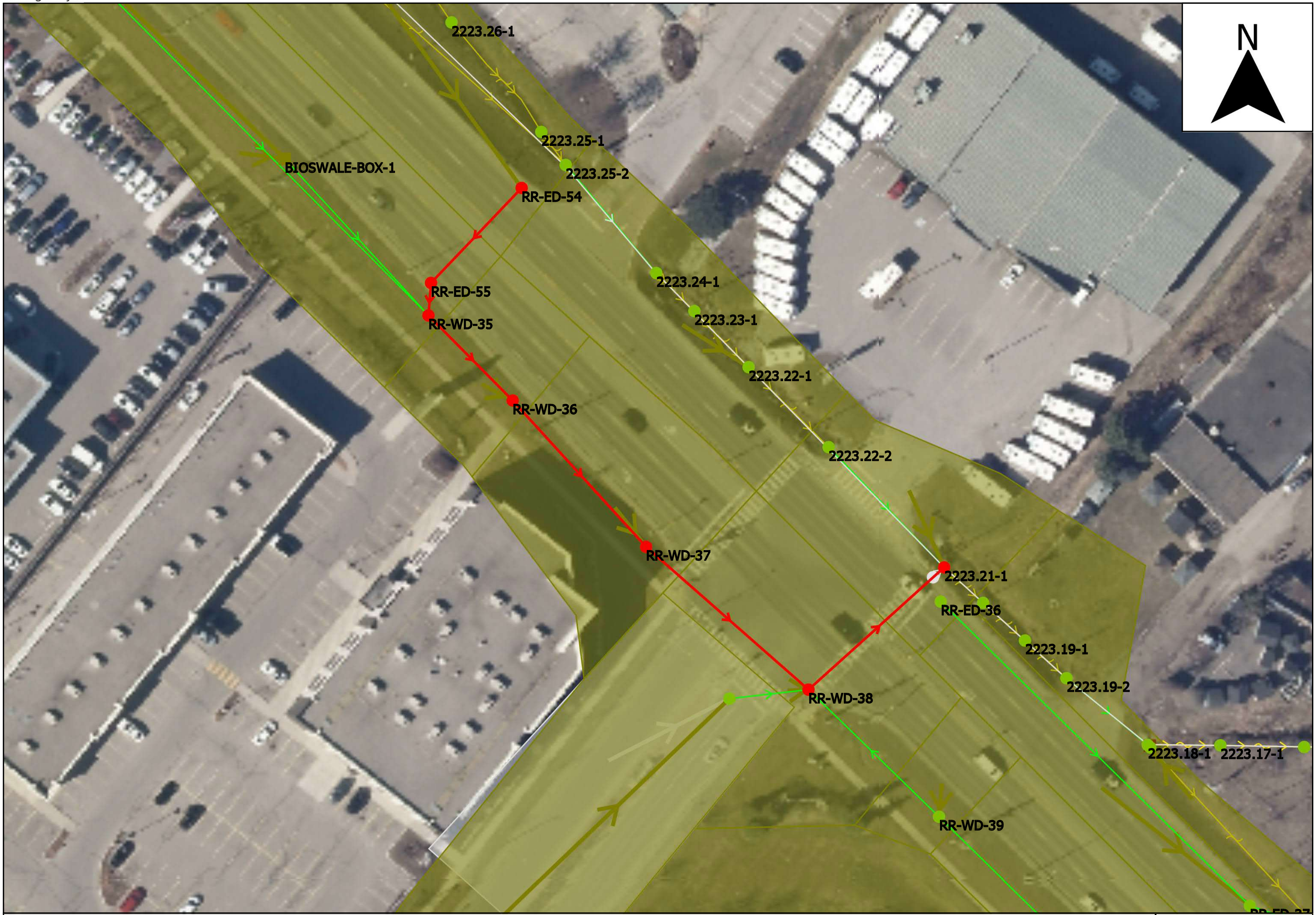
Node	RR-ED-54	RR-ED-55	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
Node ID	RR-ED-54	RR-ED-55	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
ground (m AD)	232.517	232.621	232.779	232.465	231.641	231.215	233.320
level (m AD)	231.826	231.760	231.096	230.975	230.833	230.828	230.827
expr:Freeboard	0.691620	0.861053	1.683731	1.489899	0.807510	0.387619	2.492592

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 11

RVA PROJECT NO. 194615 | FIGURE NO. 11B | AUGUST 2021

arva

Region of Peel
working with you

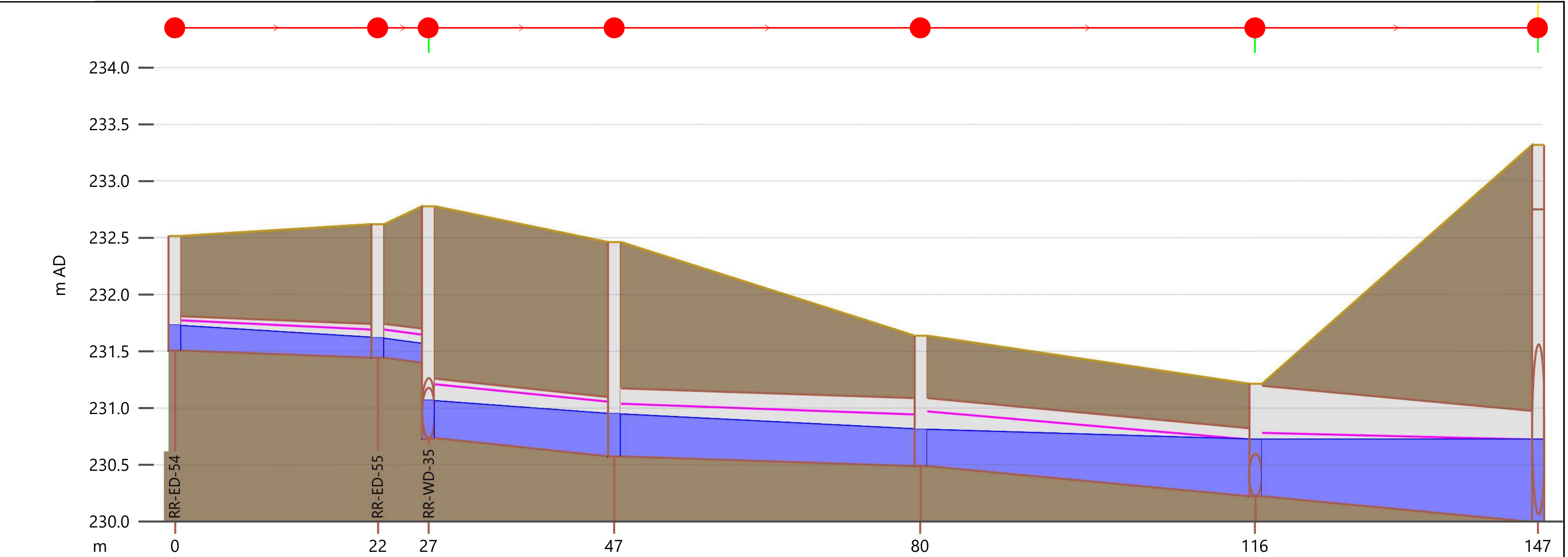


PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 11

RVA PROJECT NO. 194615	FIGURE NO. 11C	AUGUST 2021

arva

Region of Peel
working with you



Link		RR-ED-54.1	-	RR-WD-35.1	RR-WD-36.1	RR-WD-37.1	RR-WD-38.1
US node ID		RR-ED-54	-	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38
ds node		RR-ED-55	-	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
numbarrels		1	1	1	1	1	1
length (m)		21.8	5.5	20.0	32.9	36.0	30.4
Shape ID		CIRC	CIRC	CIRC	CIRC	CIRC	RECT
width (mm)		300	300	525	600	600	600
height (mm)		300	300	525	600	600	975
Rough type		N	N	N	N	N	N
us inv (m AD)		231.508	-	230.737	230.575	230.488	230.223
ds inv (m AD)		231.444	-	230.575	230.488	230.223	230.000
grad (m/m)		0.00293	-	0.00811	0.00264	0.00736	0.00733
r.pfc (m3/s)		0.052	0.087	0.387	0.316	0.527	1.254
US depth (m)		0.217	0.168	0.324	0.370	0.320	0.501
US flow (m3/s)		0.05254	-	0.24012	0.24950	0.27537	0.42999
US velocity (m/s)		0.958	1.257	1.719	1.379	1.818	1.938

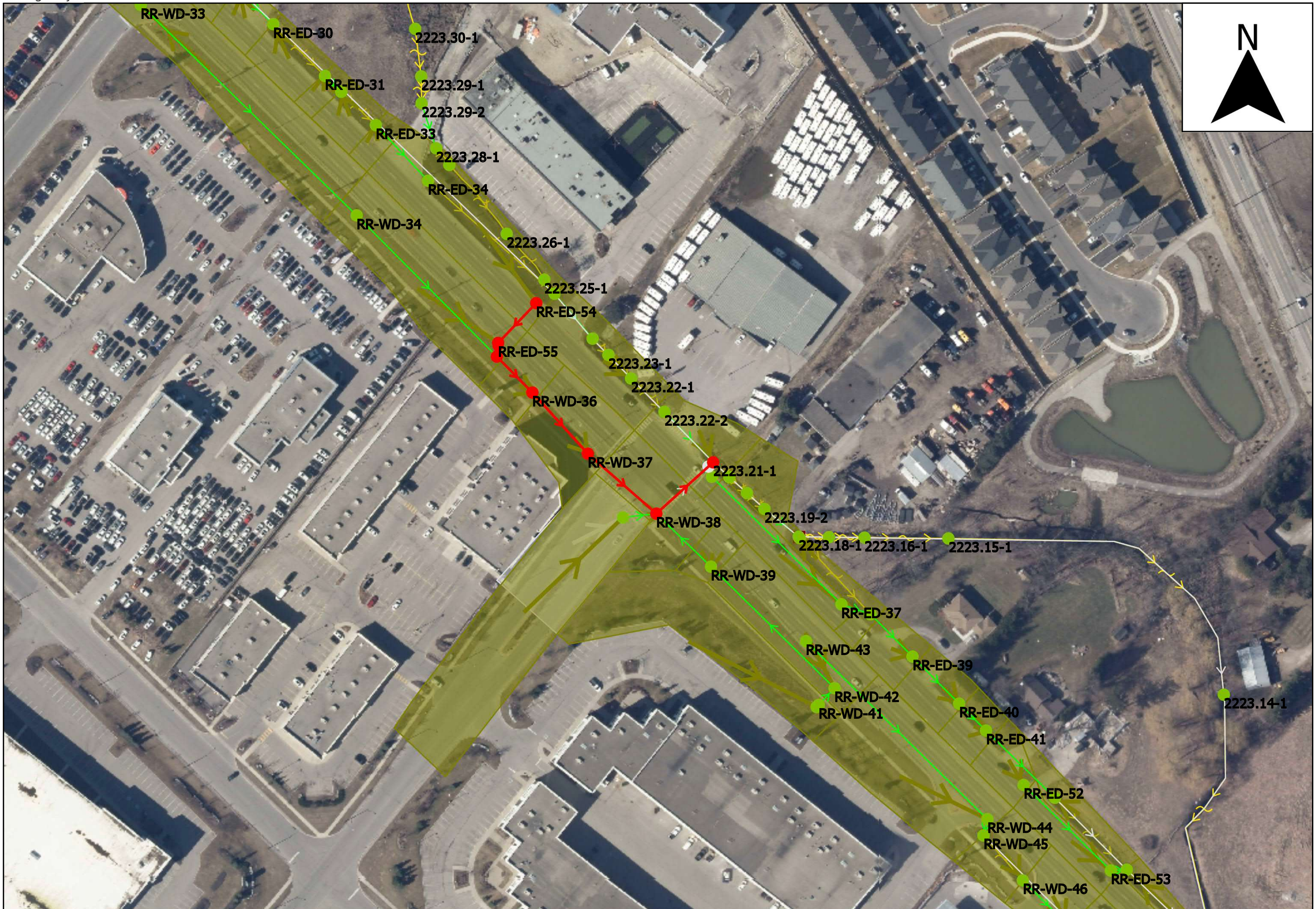
Node	RR-ED-54	RR-ED-55	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
Node ID	RR-ED-54	RR-ED-55	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
ground (m AD)	232.517	232.621	232.779	232.465	231.641	231.215	233.320
level (m AD)	231.728	231.617	231.065	230.948	230.811	230.724	230.724
expr:Freeboard	0.789703	1.004257	1.714783	1.516281	0.830276	0.490784	2.595818

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 11

RVA PROJECT NO. 194615	FIGURE NO. 11D	AUGUST 2021

rva

Region of Peel
working with you

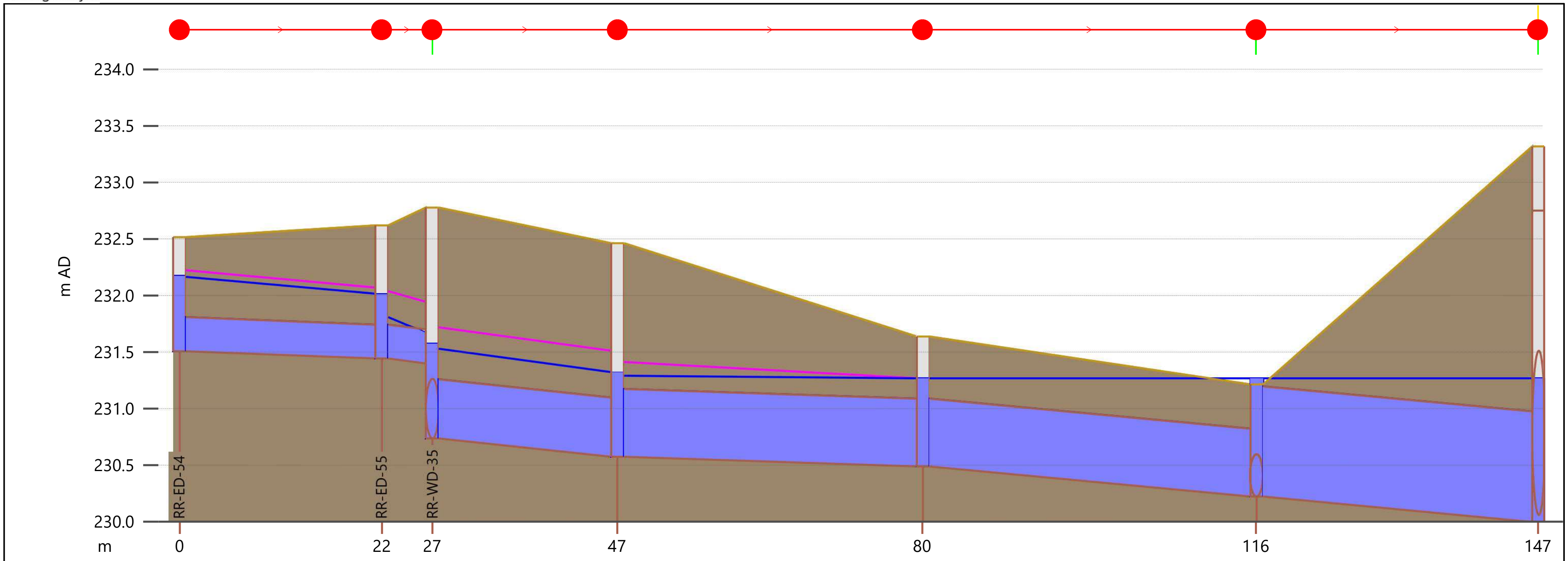


EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 11

RVA PROJECT NO. 194615	FIGURE NO. 11E	AUGUST 2021

rva

Region of Peel
working with you



Link	RR-ED-54.1	-	RR-WD-35.1	RR-WD-36.1	RR-WD-37.1	RR-WD-38.1
US node ID	RR-ED-54	-	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38
ds node	RR-ED-55	-	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
numbarrels	1	1	1	1	1	1
length (m)	21.8	5.5	20.0	32.9	36.0	30.4
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	RECT
width (mm)	300	300	525	600	600	600
height (mm)	300	300	525	600	600	975
Rough type	N	N	N	N	N	N
us inv (m AD)	231.508	-	230.737	230.575	230.488	230.223
ds inv (m AD)	231.444	-	230.575	230.488	230.223	230.000
grad (m/m)	0.00293	-	0.00811	0.00264	0.00736	0.00733
r.pfc (m3/s)	0.052	0.087	0.387	0.316	0.527	1.254
US depth (m)	0.659	0.368	0.794	0.716	0.782	1.047
US flow (m3/s)	0.07952	-	0.43483	0.45471	0.49572	0.75828
US velocity (m/s)	1.056	2.111	1.917	1.547	1.922	2.231

Node	RR-ED-54	RR-ED-55	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
Node ID	RR-ED-54	RR-ED-55	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
ground (m AD)	232.517	232.621	232.779	232.465	231.641	231.215	233.320
level (m AD)	232.176	232.011	231.577	231.320	231.270	231.270	231.270
expr:Freeboard	0.341217	0.610687	1.202011	1.144531	0.371262	-0.054428	2.050499

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 11

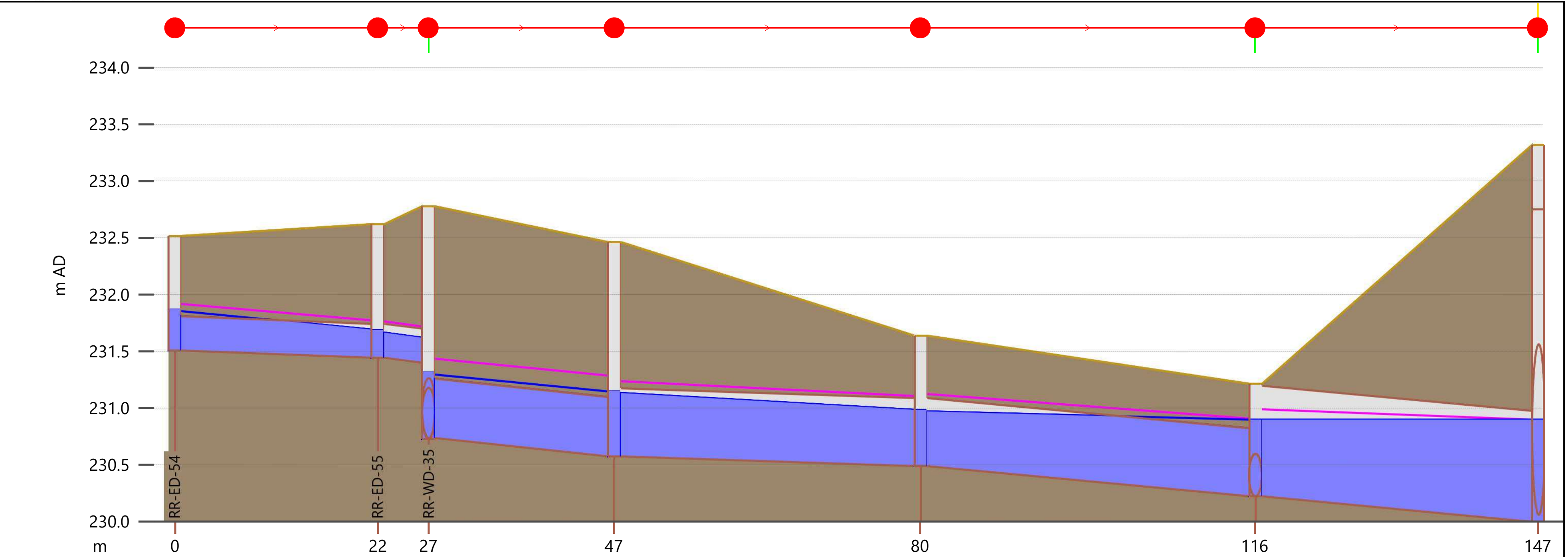
RVA PROJECT NO. 194615	FIGURE NO. 11F	AUGUST 2021

arva

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 11

RVA PROJECT NO. 194615	FIGURE NO. 11G	AUGUST 2021

Region of Peel
working with you



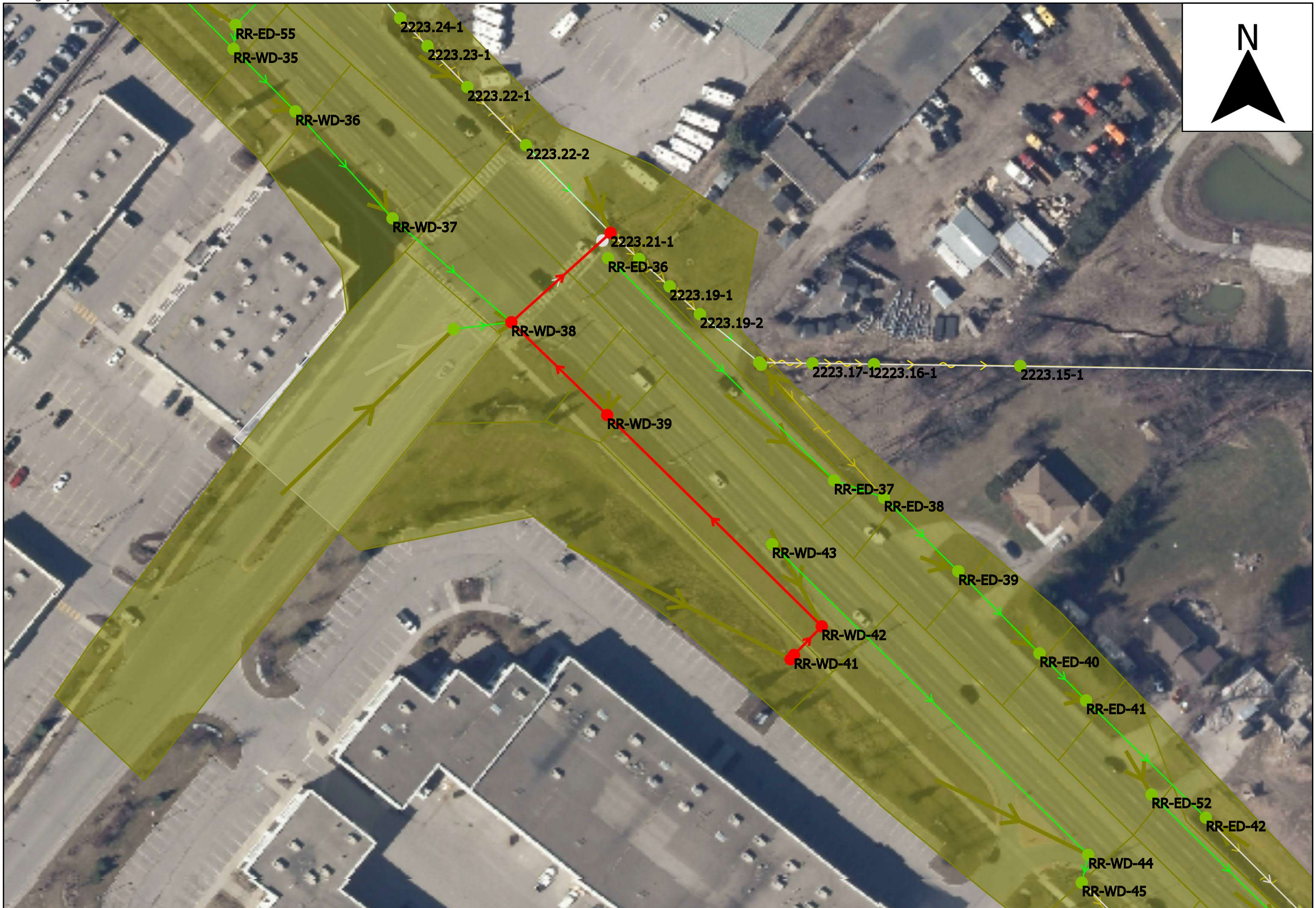
Link	RR-ED-54.1	-	RR-WD-35.1	RR-WD-36.1	RR-WD-37.1	RR-WD-38.1
US node ID	RR-ED-54	-	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38
ds node	RR-ED-55	-	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
numbarrels	1	1	1	1	1	1
length (m)	21.8	5.5	20.0	32.9	36.0	30.4
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	RECT
width (mm)	300	300	525	600	600	600
height (mm)	300	300	525	600	600	975
Rough type	N	N	N	N	N	N
us inv (m AD)	231.508	-	230.737	230.575	230.488	230.223
ds inv (m AD)	231.444	-	230.575	230.488	230.223	230.000
grad (m/m)	0.00293	-	0.00811	0.00264	0.00736	0.00733
r.pfc (m3/s)	0.052	0.087	0.387	0.316	0.527	1.254
US depth (m)	0.348	0.220	0.559	0.560	0.482	0.678
US flow (m3/s)	0.07983	-	0.37219	0.39057	0.42662	0.68592
US velocity (m/s)	1.087	1.408	1.793	1.502	1.892	2.164

Node	RR-ED-54	RR-ED-55	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
Node ID	RR-ED-54	RR-ED-55	RR-WD-35	RR-WD-36	RR-WD-37	RR-WD-38	2223.21-1
ground (m AD)	232.517	232.621	232.779	232.465	231.641	231.215	233.320
level (m AD)	231.867	231.690	231.315	231.146	230.985	230.901	230.901
expr:Freeboard	0.650635	0.930908	1.464035	1.318451	0.655350	0.313644	2.418587

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 11

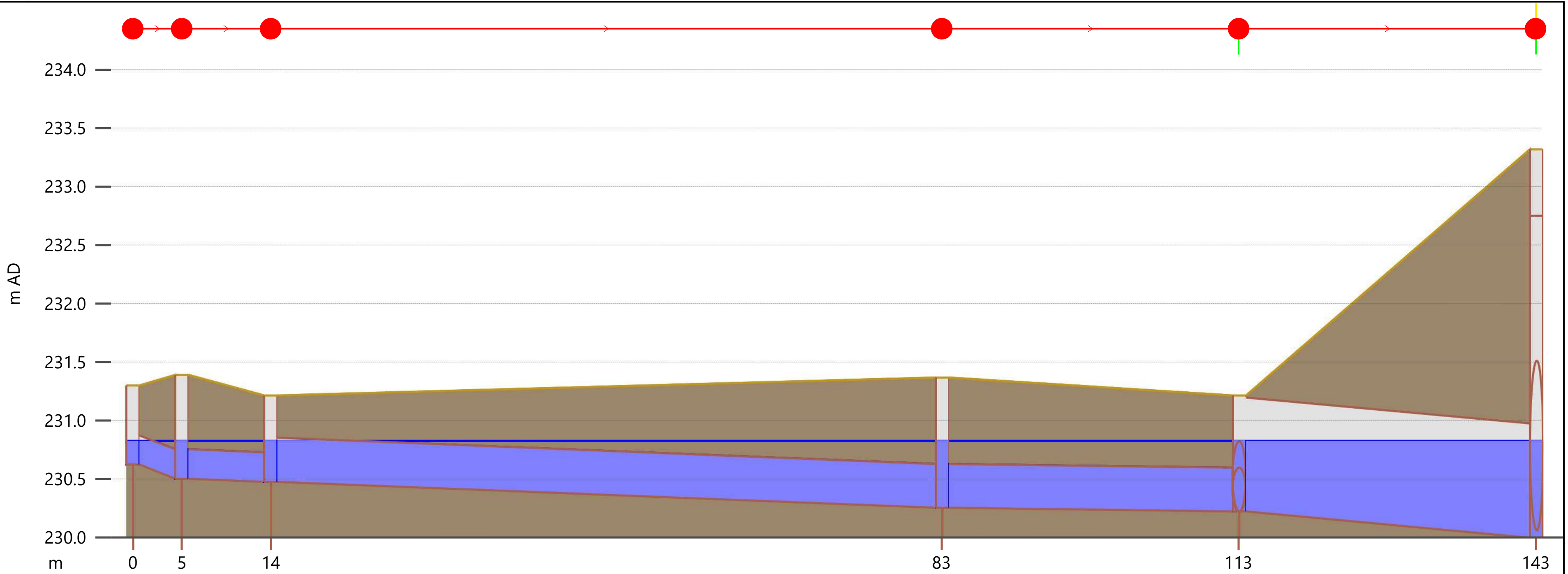
RVA PROJECT NO. 194615	FIGURE NO. 11H	AUGUST 2021	arva

Region of Peel
working with you



EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 12			arva
RVA PROJECT NO. 194615	FIGURE NO. 12A	AUGUST 2021	

Region of Peel
working with you



Link	-	-	RR-WD-42.1	RR-WD-39.1	RR-WD-38.1
US node ID	-	-	RR-WD-42	RR-WD-39	RR-WD-38
ds node	-	-	RR-WD-39	RR-WD-38	2223.21-1
numbarrels	1	1	1	1	1
length (m)	5.0	9.1	68.6	30.4	30.4
Shape ID	CIRC	CIRC	CIRC	CIRC	RECT
width (mm)	250	250	375	375	600
height (mm)	250	250	375	375	975
Rough type	N	N	N	N	N
us inv (m AD)	-	230.504	230.478	230.256	230.223
ds inv (m AD)	-	230.478	230.256	230.223	230.000
grad (m/m)	-	0.00285	0.00324	0.00109	0.00733
r.pfc (m3/s)	0.093	0.032	0.100	0.058	1.254
US depth (m)	0.203	0.324	0.350	0.572	0.605
US flow (m3/s)	-	0.00657	0.04079	0.04510	0.45262
US velocity (m/s)	0.826	0.344	0.828	0.417	1.946

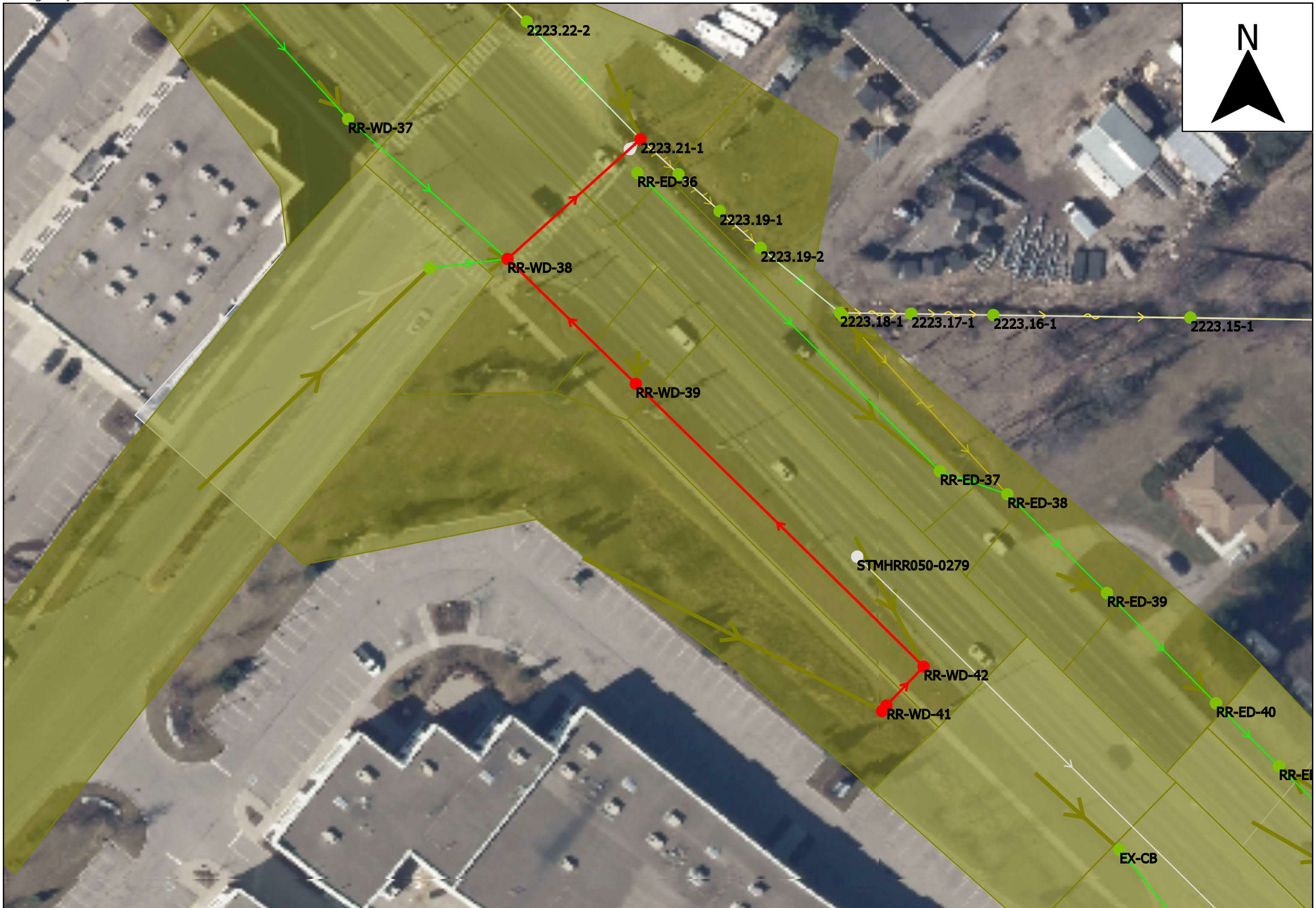
Node	-	RR-WD-42	RR-WD-39	RR-WD-38	2223.21-1
Node ID	-	RR-WD-42	RR-WD-39	RR-WD-38	2223.21-1
ground (m AD)	-	231.217	231.366	231.215	233.320
level (m AD)	-	230.828	230.828	230.828	230.827
expr:Freeboard	-	0.389389	0.538849	0.387619	2.492592

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 12

RVA PROJECT NO. 194615	FIGURE NO. 12B	AUGUST 2021

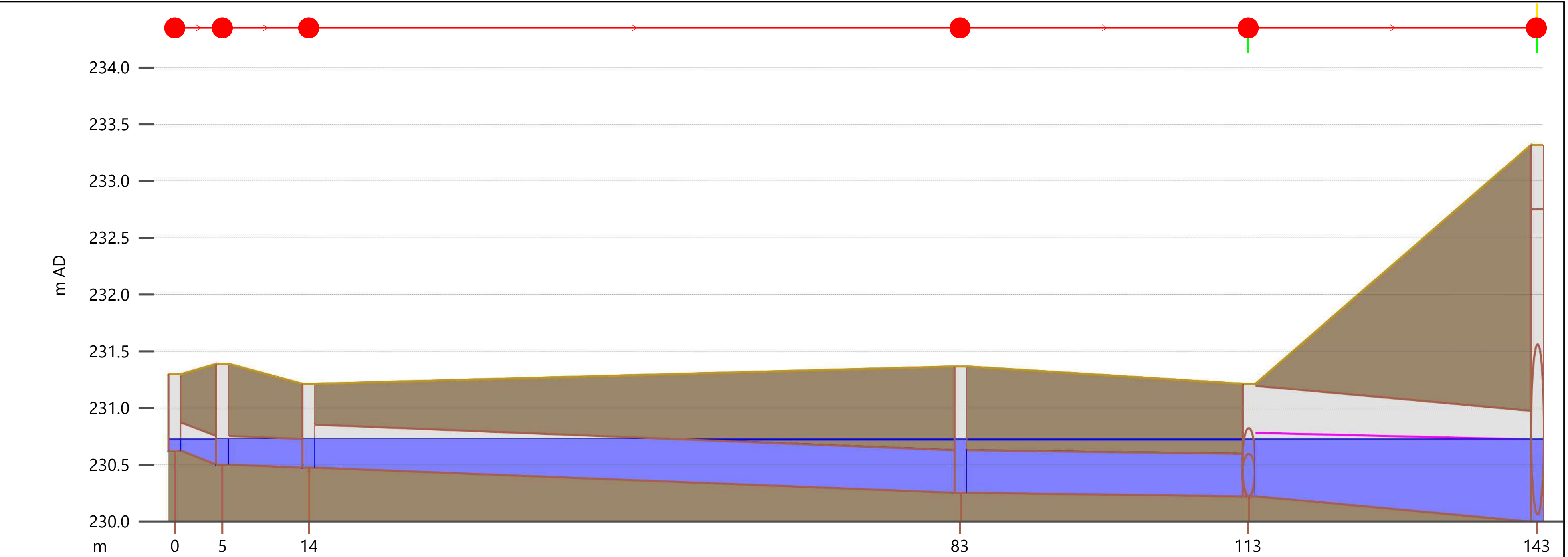
arva

Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 12			arva
RVA PROJECT NO. 194615	FIGURE NO. 12C	AUGUST 2021	

Region of Peel
working with you



Link	-	-	RR-WD-42.1	RR-WD-39.1	RR-WD-38.1
US node ID	-	-	RR-WD-42	RR-WD-39	RR-WD-38
ds node	-	-	RR-WD-39	RR-WD-38	2223.21-1
numbarrels	1	1	1	1	1
length (m)	5.0	9.1	68.6	30.4	30.4
Shape ID	CIRC	CIRC	CIRC	CIRC	RECT
width (mm)	250	250	375	375	600
height (mm)	250	250	375	375	975
Rough type	N	N	N	N	N
us inv (m AD)	-	230.504	230.478	230.256	230.223
ds inv (m AD)	-	230.478	230.256	230.223	230.000
grad (m/m)	-	0.00285	0.00324	0.00109	0.00733
r.pfc (m3/s)	0.093	0.032	0.100	0.058	1.254
US depth (m)	0.100	0.220	0.246	0.468	0.501
US flow (m3/s)	-	0.00666	0.04063	0.04611	0.42999
US velocity (m/s)	0.840	0.344	0.826	0.434	1.938

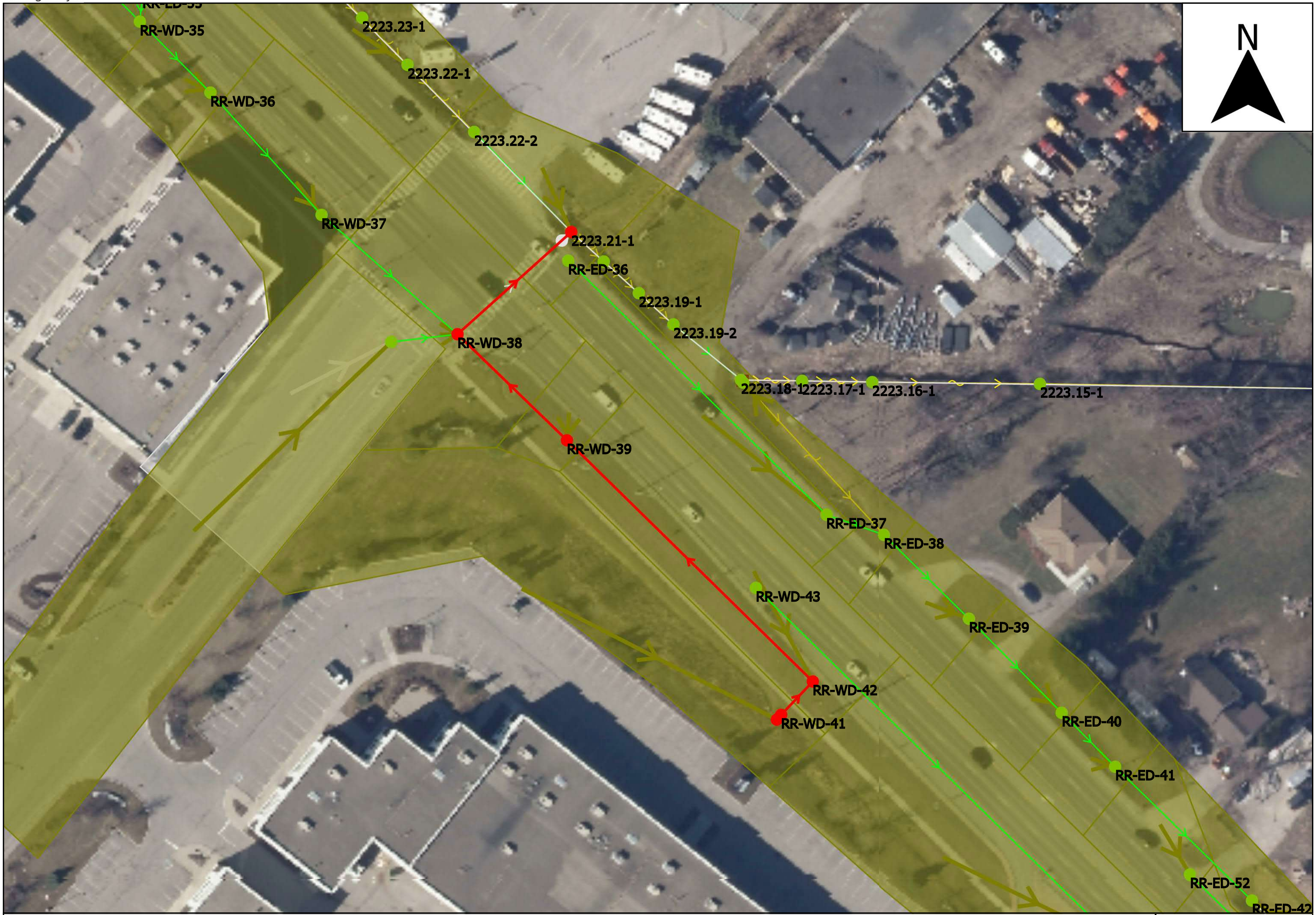
Node	-	RR-WD-42	RR-WD-39	RR-WD-38	2223.21-1
Node ID	-	RR-WD-42	RR-WD-39	RR-WD-38	2223.21-1
ground (m AD)	-	231.217	231.366	231.215	233.320
level (m AD)	-	230.724	230.724	230.724	230.724
expr:Freeboard	-	0.492569	0.642014	0.490784	2.595818

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 12

RVA PROJECT NO. 194615 | FIGURE NO. 12D | AUGUST 2021

arva

Region of Peel
working with you

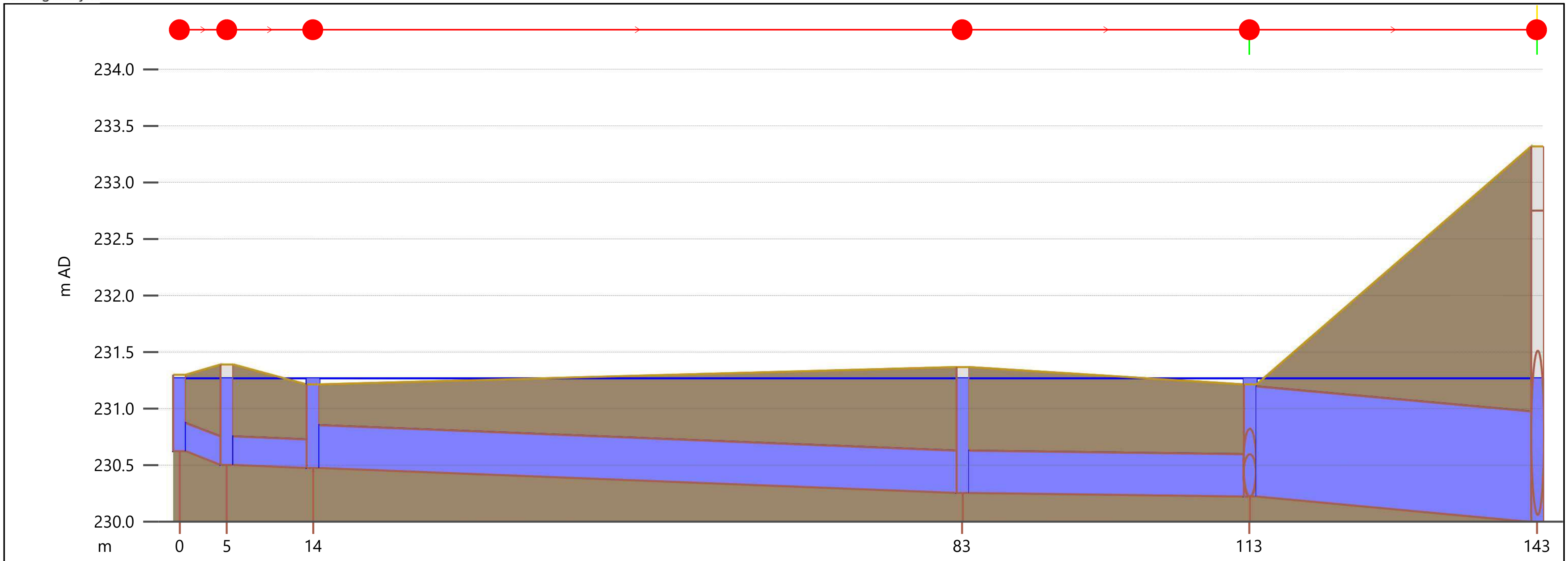


EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 12

RVA PROJECT NO. 194615	FIGURE NO. 12E	AUGUST 2021

arva

Region of Peel
working with you



Link	-	-	RR-WD-42.1	RR-WD-39.1	RR-WD-38.1
US node ID	-	-	RR-WD-42	RR-WD-39	RR-WD-38
ds node	-	-	RR-WD-39	RR-WD-38	2223.21-1
numbarrels	1	1	1	1	1
length (m)	5.0	9.1	68.6	30.4	30.4
Shape ID	CIRC	CIRC	CIRC	CIRC	RECT
width (mm)	250	250	375	375	600
height (mm)	250	250	375	375	975
Rough type	N	N	N	N	N
us inv (m AD)	-	230.504	230.478	230.256	230.223
ds inv (m AD)	-	230.478	230.256	230.223	230.000
grad (m/m)	-	0.00285	0.00324	0.00109	0.00733
r.pfc (m3/s)	0.093	0.032	0.100	0.058	1.254
US depth (m)	0.645	0.766	0.792	1.014	1.047
US flow (m3/s)	-	0.03133	0.07587	0.08651	0.75828
US velocity (m/s)	1.269	0.633	0.896	0.743	2.231

Node	-	RR-WD-42	RR-WD-39	RR-WD-38	2223.21-1
Node ID	-	RR-WD-42	RR-WD-39	RR-WD-38	2223.21-1
ground (m AD)	-	231.217	231.366	231.215	233.320
level (m AD)	-	231.270	231.270	231.270	231.270
expr:Freeboard	-	-0.052643	0.096802	-0.054428	2.050499

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 12

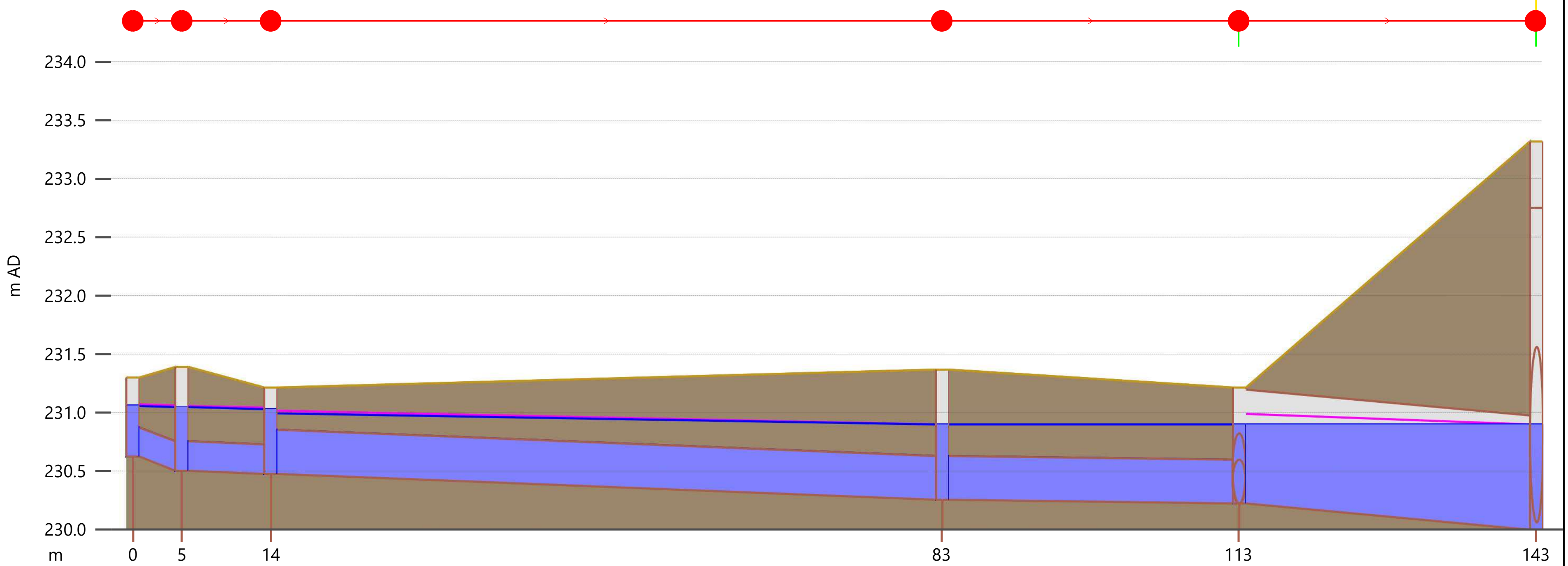
RVA PROJECT NO. 194615	FIGURE NO. 12F	AUGUST 2021	arva

Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 12		
RVA PROJECT NO. 194615	FIGURE NO. 12G	AUGUST 2021

rva

Region of Peel
working with you



Link	-	-	RR-WD-42.1	RR-WD-39.1	RR-WD-38.1
US node ID	-	-	RR-WD-42	RR-WD-39	RR-WD-38
ds node	-	-	RR-WD-39	RR-WD-38	2223.21-1
numbarrels	1	1	1	1	1
length (m)	5.0	9.1	68.6	30.4	30.4
Shape ID	CIRC	CIRC	CIRC	CIRC	RECT
width (mm)	250	250	375	375	600
height (mm)	250	250	375	375	975
Rough type	N	N	N	N	N
us inv (m AD)	-	230.504	230.478	230.256	230.223
ds inv (m AD)	-	230.478	230.256	230.223	230.000
grad (m/m)	-	0.00285	0.00324	0.00109	0.00733
r.pfc (m3/s)	0.093	0.032	0.100	0.058	1.254
US depth (m)	0.435	0.544	0.518	0.645	0.678
US flow (m3/s)	-	0.03255	0.07513	0.08572	0.68592
US velocity (m/s)	1.239	0.632	0.894	0.739	2.164

Node	-	RR-WD-42	RR-WD-39	RR-WD-38	2223.21-1
Node ID	-	RR-WD-42	RR-WD-39	RR-WD-38	2223.21-1
ground (m AD)	-	231.217	231.366	231.215	233.320
level (m AD)	-	231.032	230.901	230.901	230.901
expr:Freeboard	-	0.185364	0.464874	0.313644	2.418587

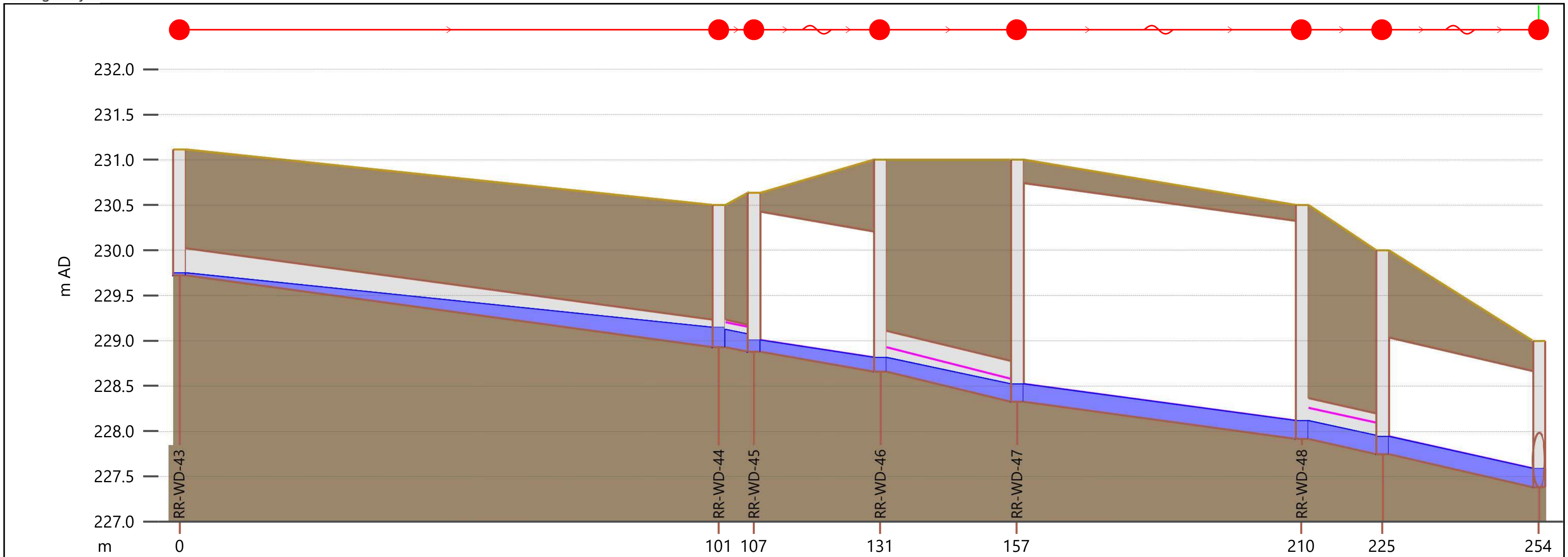
EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 12

RVA PROJECT NO. 194615 | FIGURE NO. 12H | AUGUST 2021

arva

Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 13			arva
RVA PROJECT NO. 194615	FIGURE NO. 13A	AUGUST 2021	



Link	RR-WD-43.1	-	RR-WD-45.1	RR-WD-46.1	RR-WD-47.1	-	RR-WD-49.1
US node ID	RR-WD-43	-	RR-WD-45	RR-WD-46	RR-WD-47	-	RR-WD-49
ds node	RR-WD-44	-	RR-WD-46	RR-WD-47	RR-WD-48	-	RR-WD-50
numbarrels	1	1	1	1	1	1	1
length (m)	100.9	6.6		25.6		15.1	
Shape ID	CIRC	-	-	CIRC	-	CIRC	-
width (mm)	300	300		450		450	
height (mm)	300	300		450		450	
Rough type	N	N		N		N	
us inv (m AD)	229.724	-	228.880	228.659	228.328	227.915	227.749
ds inv (m AD)	228.932	-	228.659	228.328	227.915	227.749	227.381
grad (m/m)	0.00785	-		0.01294		0.01101	
r.pfc (m3/s)	0.086	-	18.684	0.324	38.570	0.299	17.863
US depth (m)	0.020	-	0.121	0.153	0.189	0.199	0.188
US flow (m3/s)	0.00000	-	0.06074	0.07268	0.09432	0.11553	0.12549
US velocity (m/s)	-0.000	-	0.347	1.522	0.427	1.706	0.440

Node	RR-WD-43	RR-WD-44	-	RR-WD-46	RR-WD-47	RR-WD-48	RR-WD-49	-
Node ID	RR-WD-43	RR-WD-44	-	RR-WD-46	RR-WD-47	RR-WD-48	RR-WD-49	-
ground (m AD)	231.112	230.501	230.637	231.000	231.000	230.500	230.000	229.000
level (m AD)	229.744	229.142	229.001	228.812	228.517	228.114	227.937	227.585
expr:Freeboard	1.368454	1.359497	-	2.187744	2.483307	2.386185	2.062790	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 13

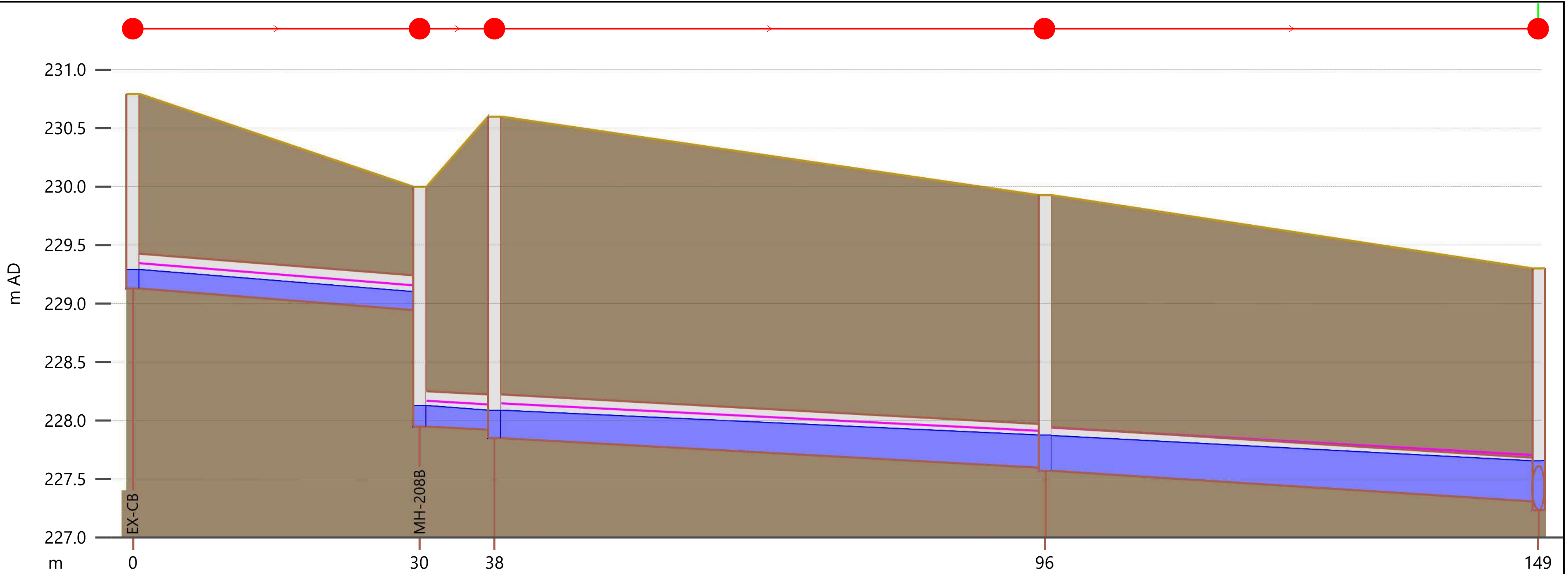
RVA PROJECT NO. 194615	FIGURE NO. 13B	AUGUST 2021

arva

Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 13			arva
RVA PROJECT NO. 194615	FIGURE NO. 13C	AUGUST 2021	

Region of Peel
working with you



Link	EX-CB.1	-	DCBMH-208A.1	DCBMH-208.1
US node ID	EX-CB	-	DCBMH-208A	DCBMH-208
ds node	MH-208B	-	DCBMH-208	DCBMH-209
numbarrels	1	1	1	1
length (m)	30.3	7.9	58.2	52.2
Shape ID	CIRC	CIRC	CIRC	CIRC
width (mm)	300	300	375	375
height (mm)	300	300	375	375
Rough type	N	N	N	N
us inv (m AD)	229.129	227.951	227.849	227.569
ds inv (m AD)	228.943	227.924	227.599	227.309
grad (m/m)	0.00613	0.00340	0.00429	0.00498
r.pfc (m3/s)	0.076	0.056	0.115	0.124
US depth (m)	0.157	0.173	0.235	0.298
US flow (m3/s)	0.04060	0.03980	0.08201	0.11680
US velocity (m/s)	1.088	0.951	1.134	1.289

Node	EX-CB	MH-208B	DCBMH-208A	DCBMH-208	DCBMH-209
Node ID	EX-CB	MH-208B	DCBMH-208A	DCBMH-208	DCBMH-209
ground (m AD)	230.790	230.000	230.600	229.925	229.299
level (m AD)	229.286	228.125	228.086	227.871	227.651
expr:Freeboard	1.504142	1.874847	2.514276	2.053891	1.648228

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 13

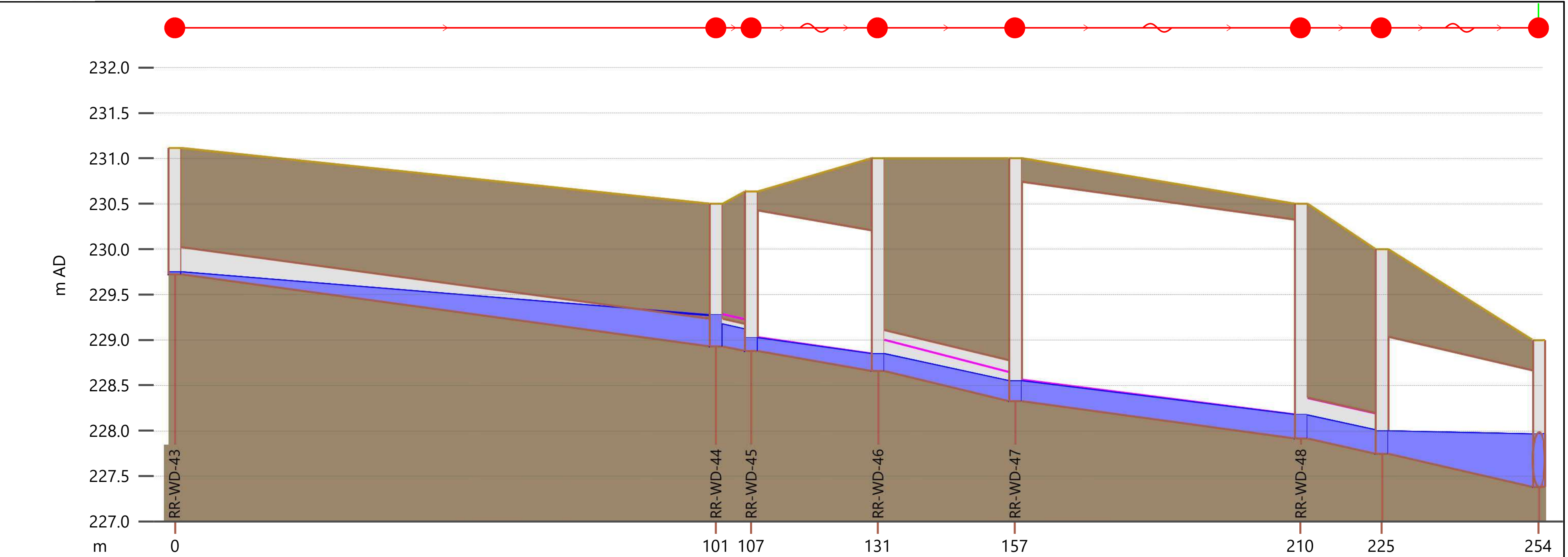
RVA PROJECT NO. 194615	FIGURE NO. 13D	AUGUST 2021

arva

Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 13			arva
RVA PROJECT NO. 194615	FIGURE NO. 13E	AUGUST 2021	

Region of Peel
working with you



Link	RR-WD-43.1	-	RR-WD-45.1	RR-WD-46.1	RR-WD-47.1	-	RR-WD-49.1
US node ID	RR-WD-43	-	RR-WD-45	RR-WD-46	RR-WD-47	-	RR-WD-49
ds node	RR-WD-44	-	RR-WD-46	RR-WD-47	RR-WD-48	-	RR-WD-50
numbarrels	1	1	1	1	1	1	1
length (m)	100.9	6.6		25.6		15.1	
Shape ID	CIRC	-	-	CIRC	-	CIRC	-
width (mm)	300	300		450		450	
height (mm)	300	300		450		450	
Rough type	N	N		N		N	
us inv (m AD)	229.724	-	228.880	228.659	228.328	227.915	227.749
ds inv (m AD)	228.932	-	228.659	228.328	227.915	227.749	227.381
grad (m/m)	0.00785	-		0.01294		0.01101	
r.pfc (m3/s)	0.086	-	18.684	0.324	38.570	0.299	17.863
US depth (m)	0.020	-	0.140	0.188	0.220	0.257	0.245
US flow (m3/s)	0.00000	-	0.08912	0.10936	0.14304	0.18015	0.19544
US velocity (m/s)	-0.000	-	0.426	1.739	0.523	1.917	0.561

Node	RR-WD-43	RR-WD-44	-	RR-WD-46	RR-WD-47	RR-WD-48	RR-WD-49	-
Node ID	RR-WD-43	RR-WD-44	-	RR-WD-46	RR-WD-47	RR-WD-48	RR-WD-49	-
ground (m AD)	231.112	230.501	230.637	231.000	231.000	230.500	230.000	229.000
level (m AD)	229.744	229.271	229.020	228.847	228.548	228.175	227.994	227.961
expr:Freeboard	1.368454	1.230347	-	2.152817	2.451813	2.324722	2.005768	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 13

RVA PROJECT NO. 194615	FIGURE NO. 13F	AUGUST 2021

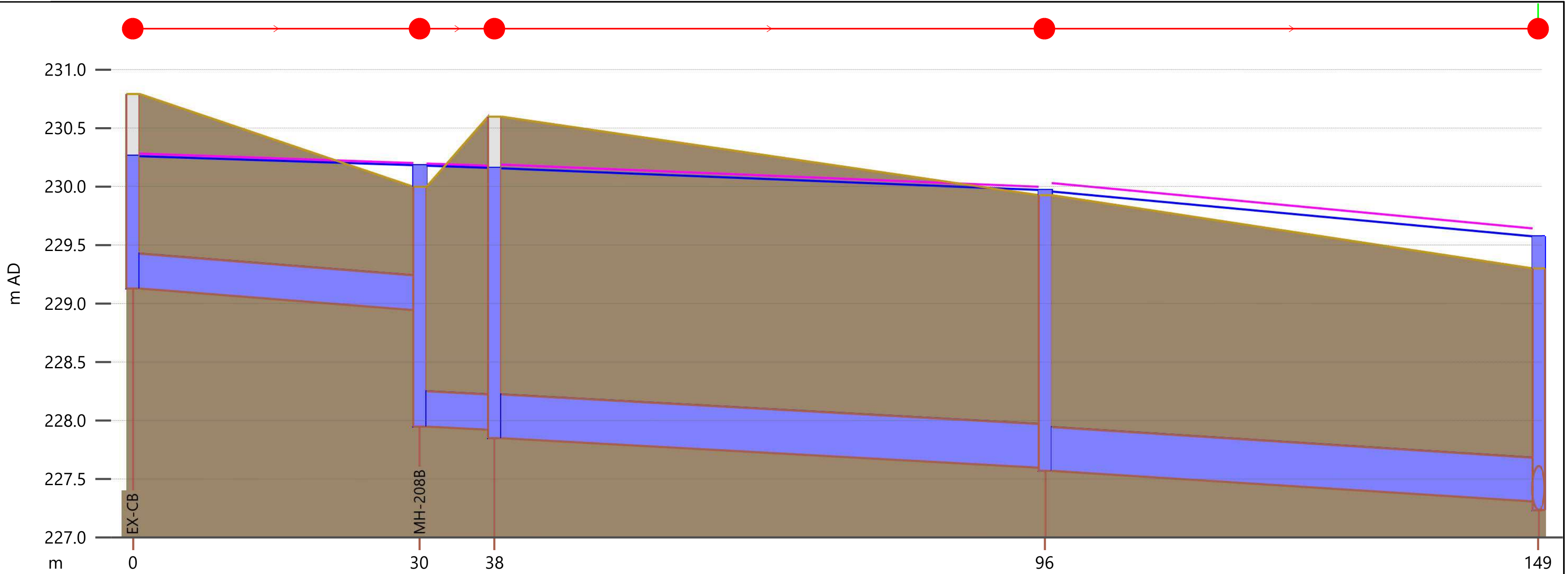
rva

Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 13		
RVA PROJECT NO. 194615	FIGURE NO. 13G	AUGUST 2021

rva

Region of Peel
working with you



Link	EX-CB.1	-	DCBMH-208A.1	DCBMH-208.1
US node ID	EX-CB	-	DCBMH-208A	DCBMH-208
ds node	MH-208B	-	DCBMH-208	DCBMH-209
numbarrels	1	1	1	1
length (m)	30.3	7.9	58.2	52.2
Shape ID	CIRC	CIRC	CIRC	CIRC
width (mm)	300	300	375	375
height (mm)	300	300	375	375
Rough type	N	N	N	N
us inv (m AD)	229.129	227.951	227.849	227.569
ds inv (m AD)	228.943	227.924	227.599	227.309
grad (m/m)	0.00613	0.00340	0.00429	0.00498
r.pfc (m3/s)	0.076	0.056	0.115	0.124
US depth (m)	1.133	2.230	2.307	2.391
US flow (m3/s)	0.06086	0.05996	0.10686	0.15087
US velocity (m/s)	1.201	0.971	1.214	1.353

Node	EX-CB	MH-208B	DCBMH-208A	DCBMH-208	DCBMH-209
Node ID	EX-CB	MH-208B	DCBMH-208A	DCBMH-208	DCBMH-209
ground (m AD)	230.790	230.000	230.600	229.925	229.299
level (m AD)	230.265	230.183	230.161	229.971	229.576
expr:Freeboard	0.524863	-0.183014	0.439142	-0.045825	-0.276760

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 13

RVA PROJECT NO. 194615	FIGURE NO. 13H	AUGUST 2021	arva

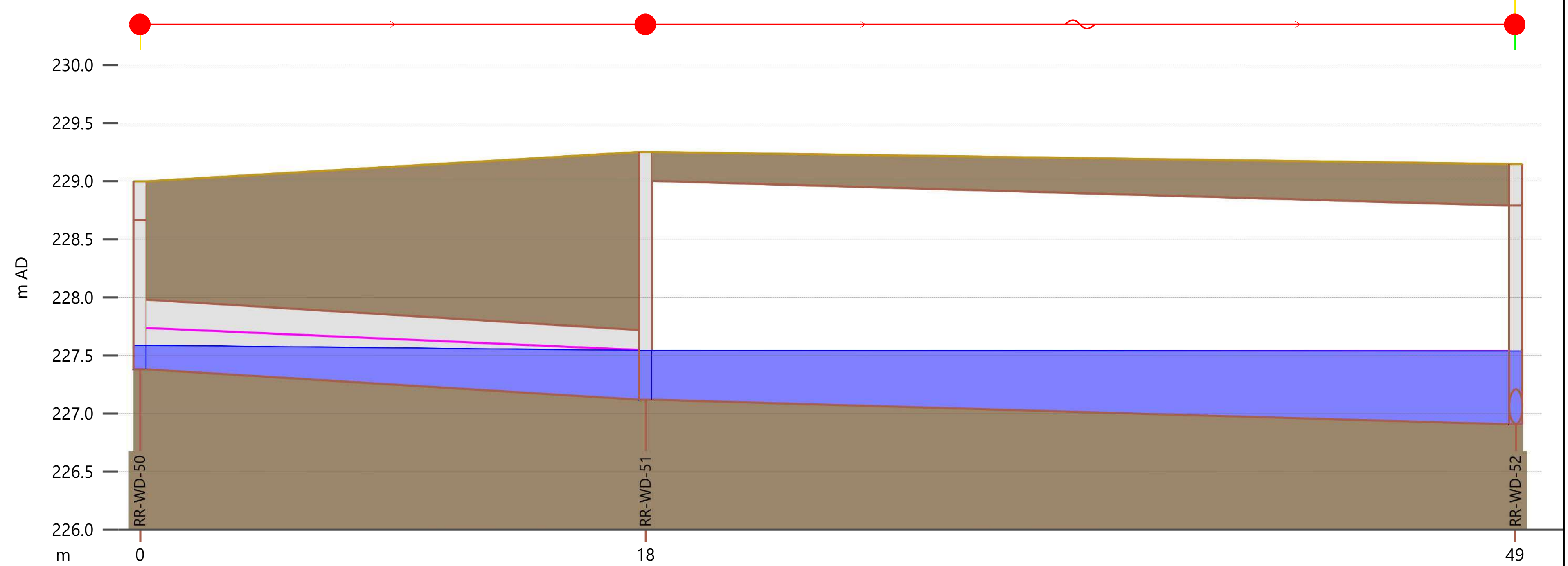
Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 14

RVA PROJECT NO. 194615	FIGURE NO. 14A	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-50.1	RR-WD-51.1
US node ID	RR-WD-50	RR-WD-51
ds node	RR-WD-51	RR-WD-52
numbarrels	1	1
length (m)	18.0	
Shape ID	CIRC	West Side Ditch-7 (Downstream of George Bolton Pkwy)
width (mm)	600	
height (mm)	600	
Rough type	N	
us inv (m AD)	227.381	227.121
ds inv (m AD)	227.121	226.910
grad (m/m)	0.01441	
r.pfc (m3/s)	0.737	15.132
US depth (m)	0.204	0.419
US flow (m3/s)	0.14187	0.15046
US velocity (m/s)	1.804	0.576

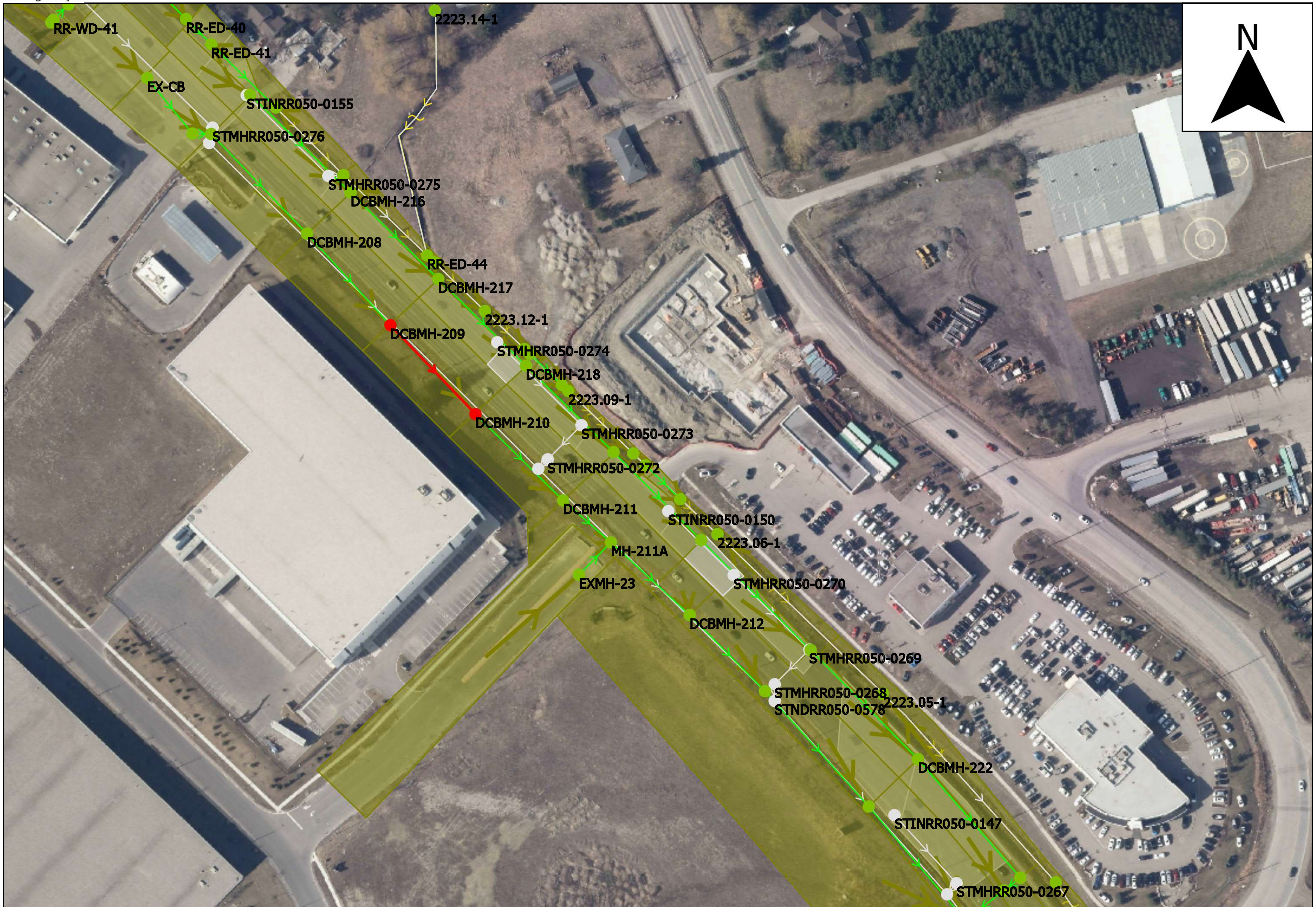
Node	RR-WD-50	RR-WD-51	RR-WD-52
Node ID	RR-WD-50	RR-WD-51	RR-WD-52
ground (m AD)	229.000	229.250	229.150
level (m AD)	227.585	227.540	227.537
expr:Freeboard	1.414673	1.709564	1.612891

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 14

RVA PROJECT NO. 194615	FIGURE NO. 14B	AUGUST 2021

arva

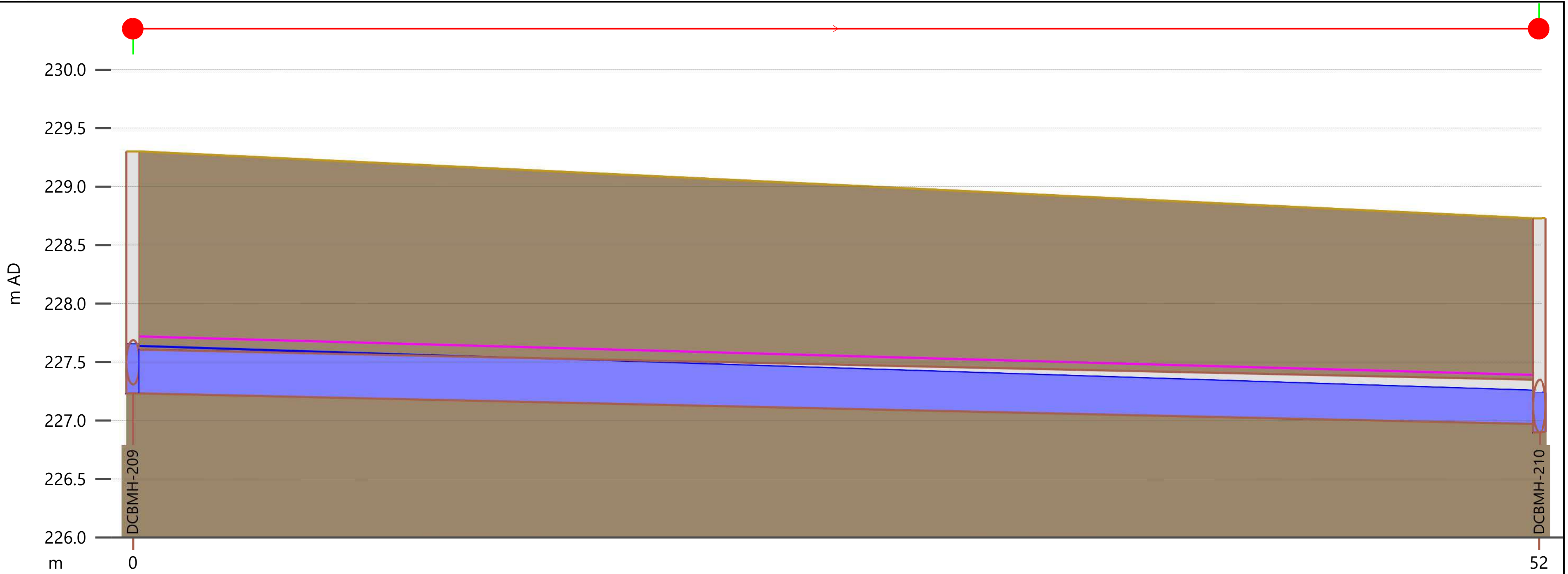
Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 14

RVA PROJECT NO. 194615	FIGURE NO. 14C	AUGUST 2021

rva

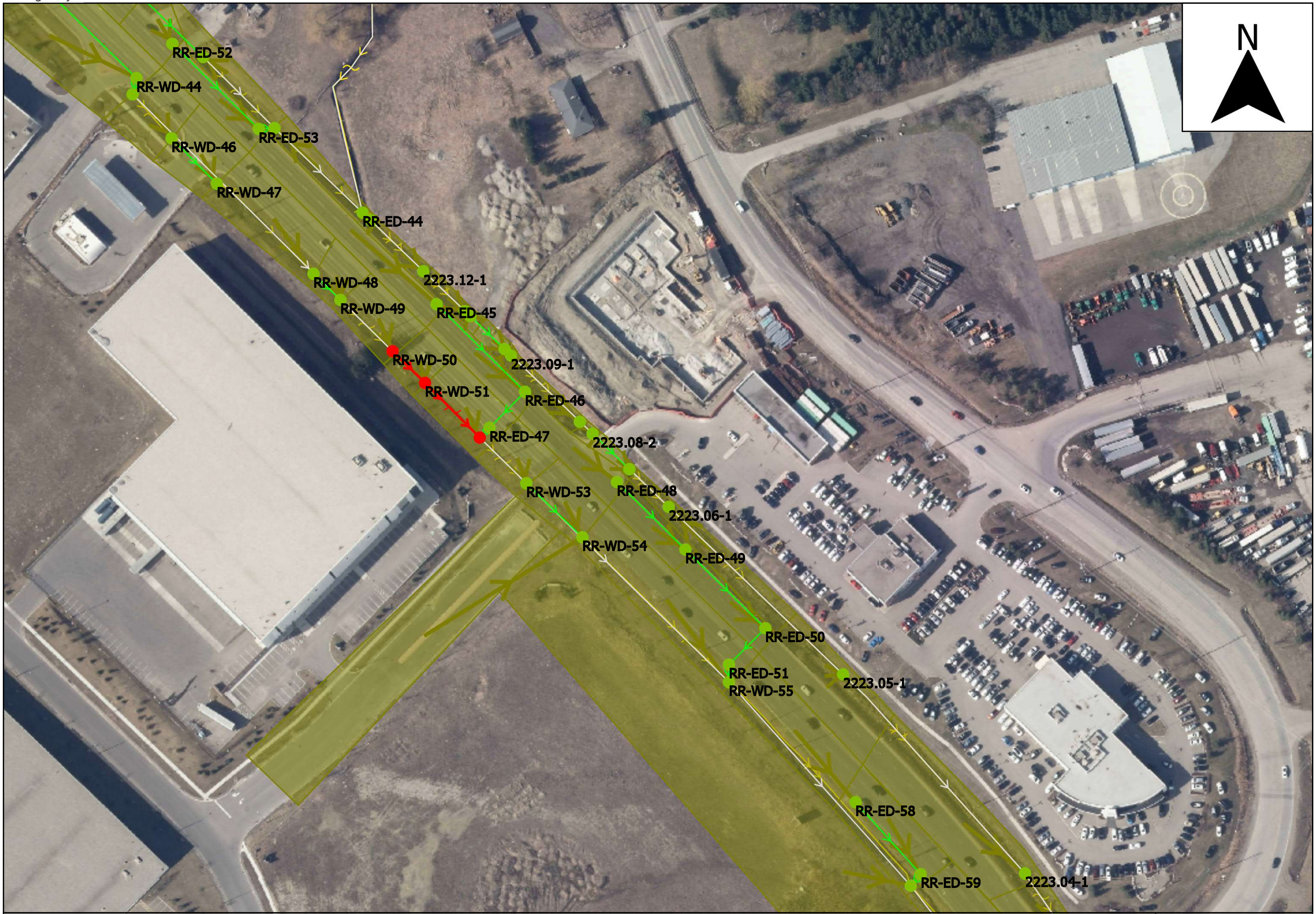


Link	DCBMH-209.1	
US node ID	DCBMH-209	
ds node	DCBMH-210	
numbarrels	1	
length (m)	51.9	
Shape ID	CIRC	
width (mm)	375	
height (mm)	375	
Rough type	N	
us inv (m AD)	227.234	
ds inv (m AD)	226.974	
grad (m/m)	0.00501	
r.pfc (m3/s)	0.124	
US depth (m)	0.405	
US flow (m3/s)	0.14718	
US velocity (m/s)	1.358	
Node	DCBMH-209	DCBMH-210
Node ID	DCBMH-209	DCBMH-210
ground (m AD)	229.299	228.728
level (m AD)	227.651	227.239
expr:Freeboard	1.648228	1.488880

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 14

RVA PROJECT NO. 194615	FIGURE NO. 14D	AUGUST 2021

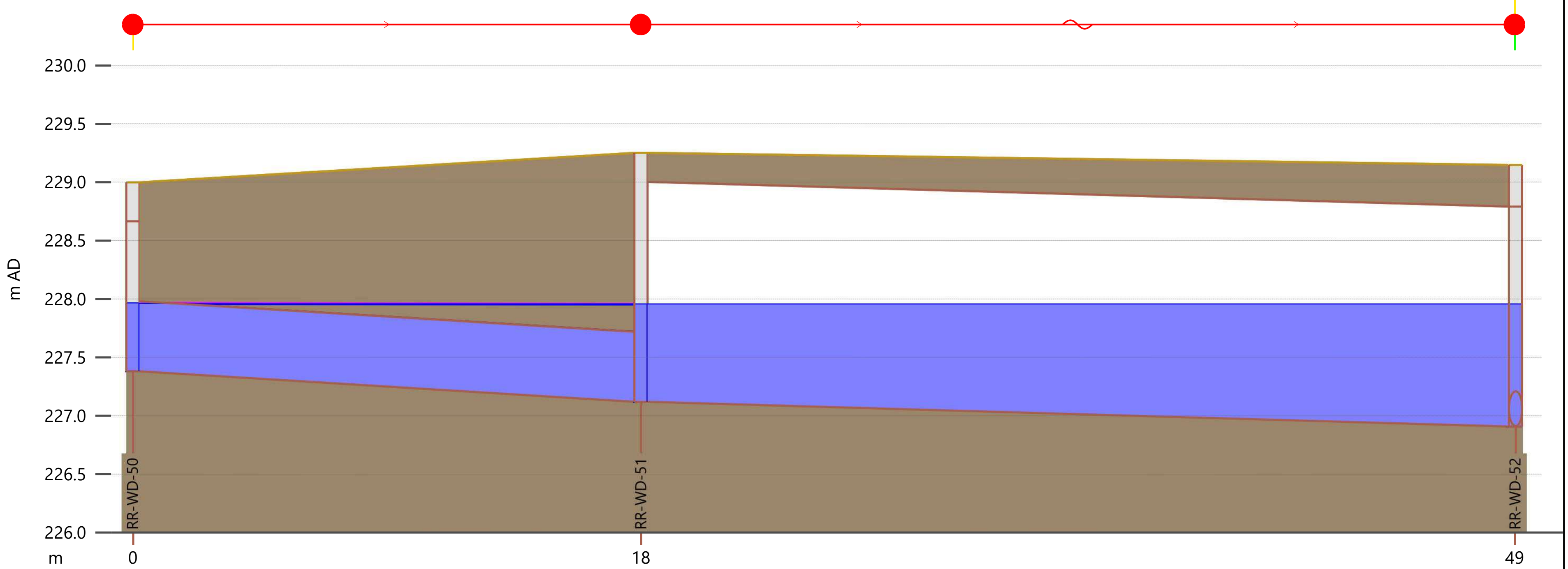
Region of Peel
working with you



EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 14		
RVA PROJECT NO. 194615	FIGURE NO. 14E	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-50.1	RR-WD-51.1
US node ID	RR-WD-50	RR-WD-51
ds node	RR-WD-51	RR-WD-52
numbarrels	1	1
length (m)	18.0	
Shape ID	CIRC	West Side Ditch-7 (Downstream of George Bolton Pkwy)
width (mm)	600	
height (mm)	600	
Rough type	N	
us inv (m AD)	227.381	227.121
ds inv (m AD)	227.121	226.910
grad (m/m)	0.01441	
r.pfc (m3/s)	0.737	15.132
US depth (m)	0.579	0.831
US flow (m3/s)	0.21152	0.21727
US velocity (m/s)	1.974	0.613

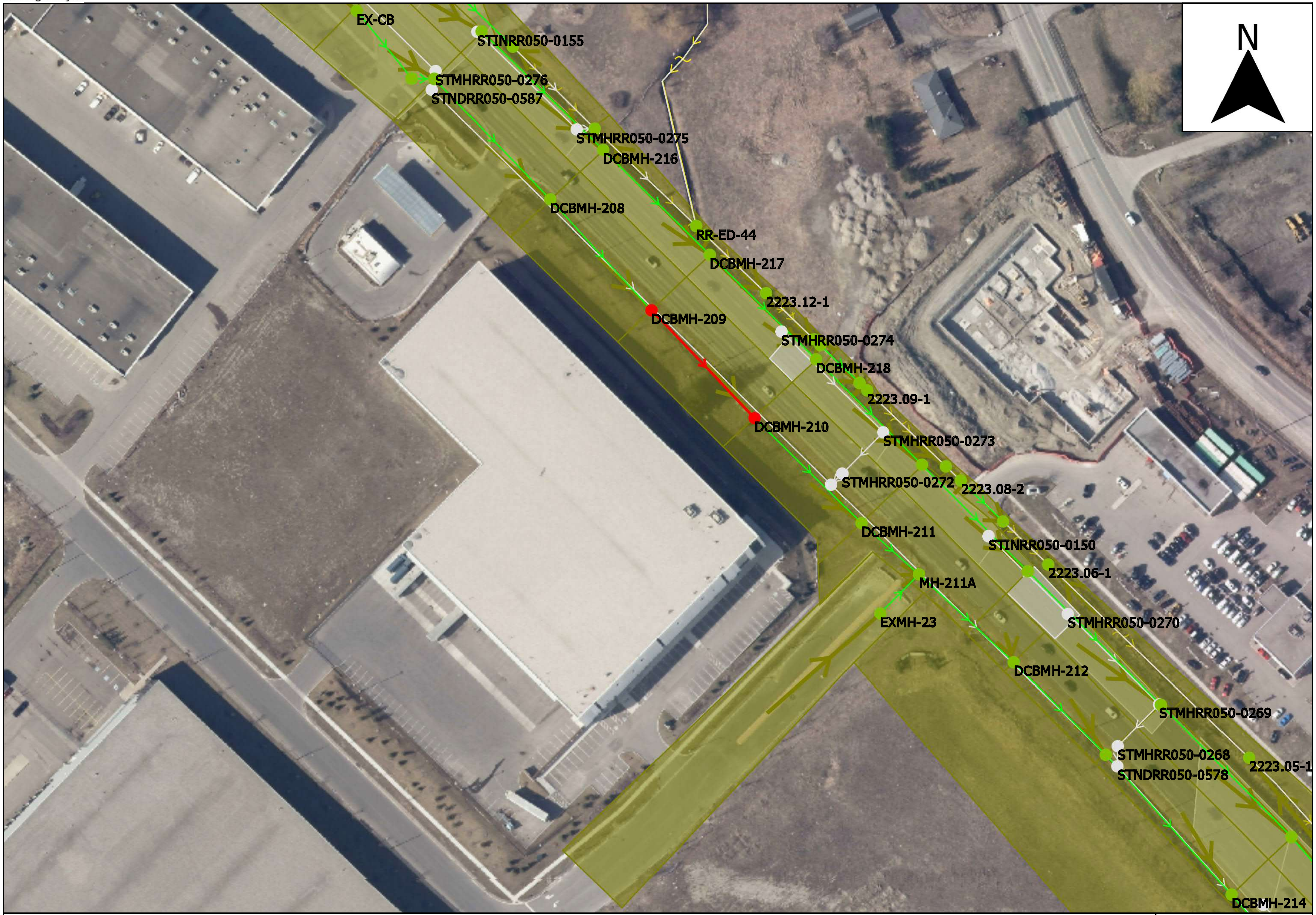
Node	RR-WD-50	RR-WD-51	RR-WD-52
Node ID	RR-WD-50	RR-WD-51	RR-WD-52
ground (m AD)	229.000	229.250	229.150
level (m AD)	227.961	227.952	227.952
expr:Freeboard	1.038696	1.297989	1.198203

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 14

RVA PROJECT NO. 194615	FIGURE NO. 14F	AUGUST 2021

arva

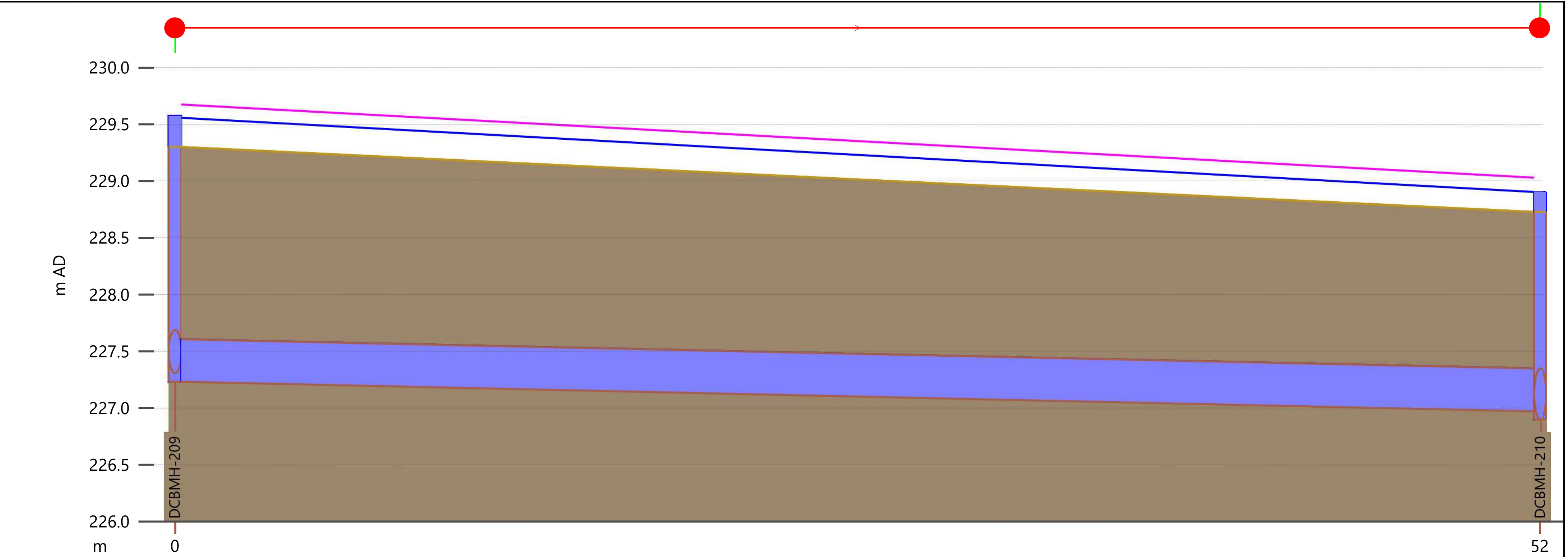
Region of Peel
working with you



PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 14		
RVA PROJECT NO. 194615	FIGURE NO. 14G	AUGUST 2021

arva

Region of Peel
working with you



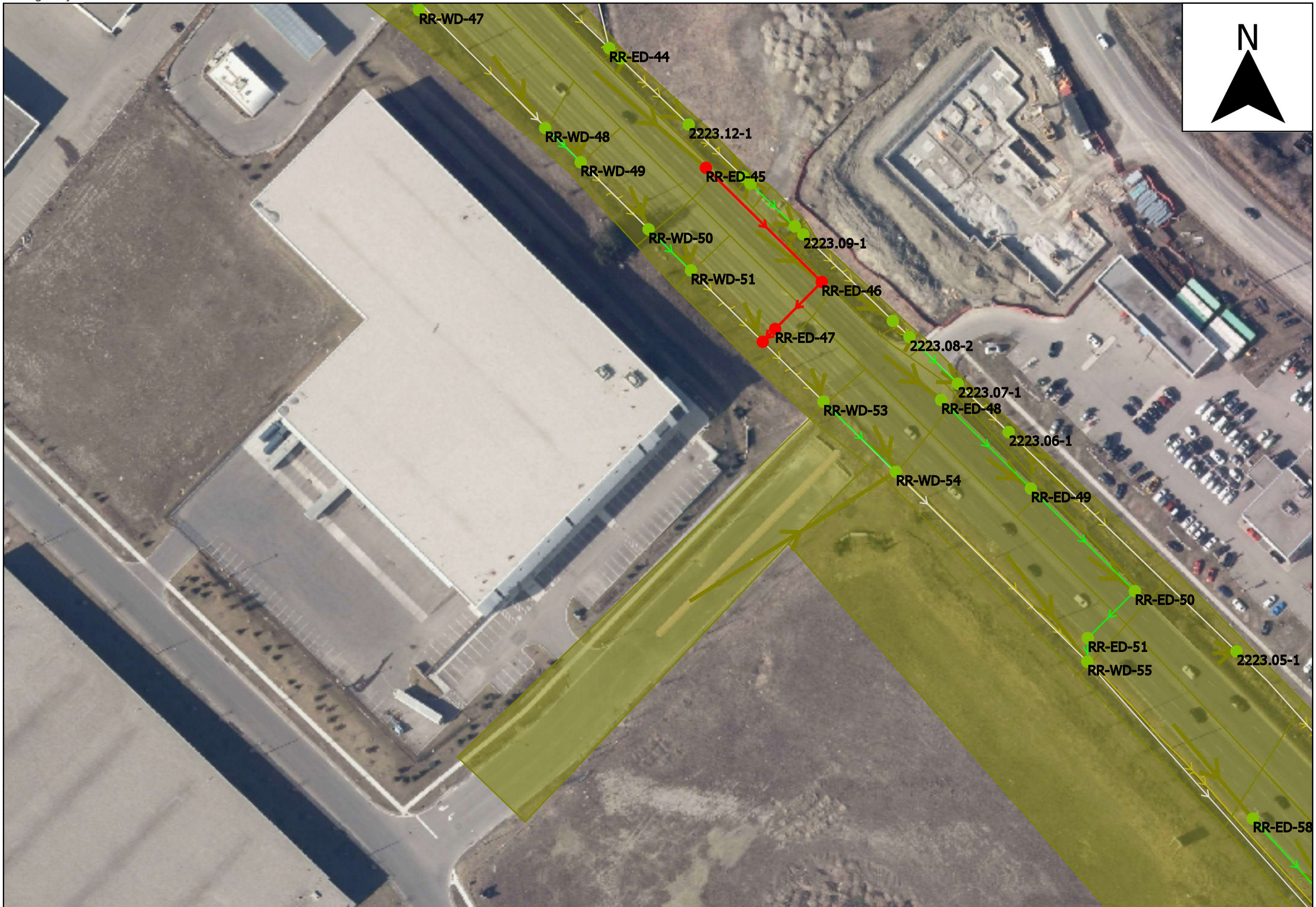
Link	DCBMH-209.1	
US node ID	DCBMH-209	
ds node	DCBMH-210	
numbarrels	1	
length (m)	51.9	
Shape ID	CIRC	
width (mm)	375	
height (mm)	375	
Rough type	N	
us inv (m AD)	227.234	
ds inv (m AD)	226.974	
grad (m/m)	0.00501	
r.pfc (m3/s)	0.124	
US depth (m)	2.324	
US flow (m3/s)	0.19580	
US velocity (m/s)	1.520	
Node	DCBMH-209	DCBMH-210
Node ID	DCBMH-209	DCBMH-210
ground (m AD)	229.299	228.728
level (m AD)	229.576	228.904
expr:Freeboard	-0.276760	-0.176312

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 14

RVA PROJECT NO. 194615 | FIGURE NO. 14H | AUGUST 2021

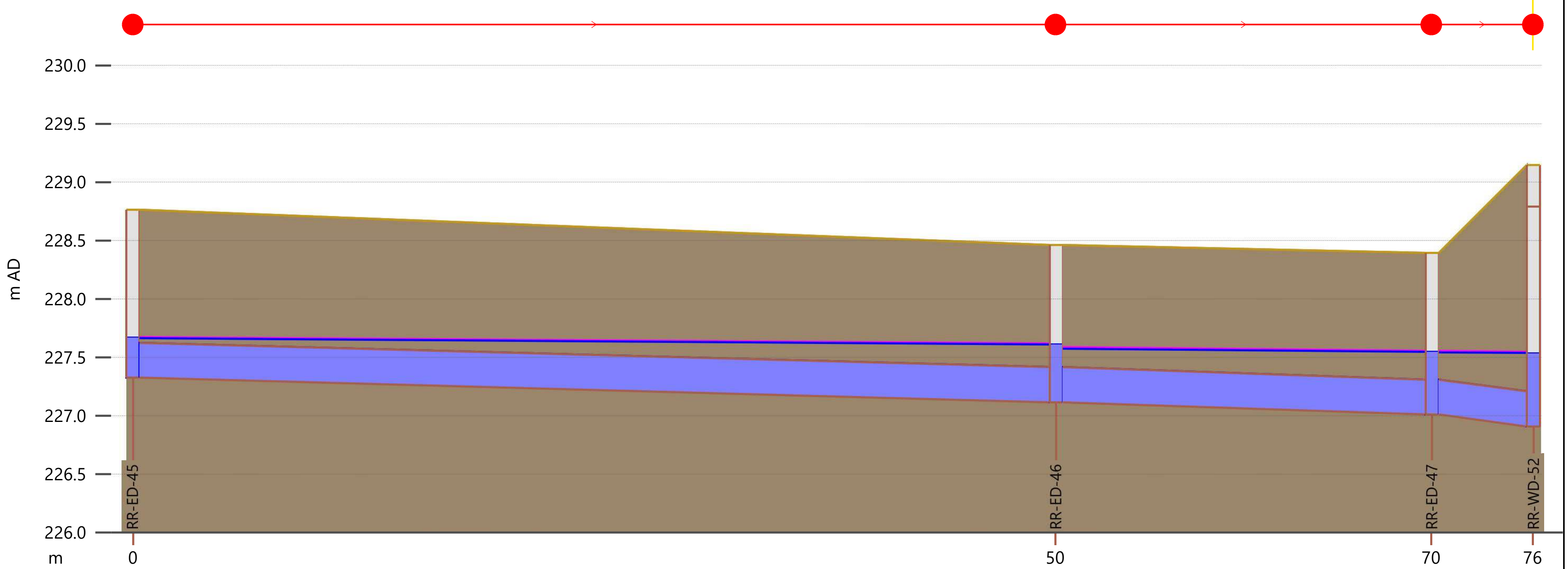
arva

Region of Peel
working with you



EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 15			arva
RVA PROJECT NO. 194615	FIGURE NO. 15A	AUGUST 2021	

Region of Peel
working with you



Link	RR-ED-45.1	RR-ED-46.1	RR-ED-47.1
US node ID	RR-ED-45	RR-ED-46	RR-ED-47
ds node	RR-ED-46	RR-ED-47	RR-WD-52
numbarrels	1	1	1
length (m)	49.8	20.3	5.5
Shape ID	CIRC	CIRC	CIRC
width (mm)	300	300	300
height (mm)	300	300	300
Rough type	N	N	N
us inv (m AD)	227.327	227.116	227.011
ds inv (m AD)	227.116	227.011	226.910
grad (m/m)	0.00424	0.00518	0.01844
r.pfc (m3/s)	0.063	0.070	0.131
US depth (m)	0.340	0.459	0.535
US flow (m3/s)	0.04222	0.05606	0.04937
US velocity (m/s)	0.942	1.077	1.006

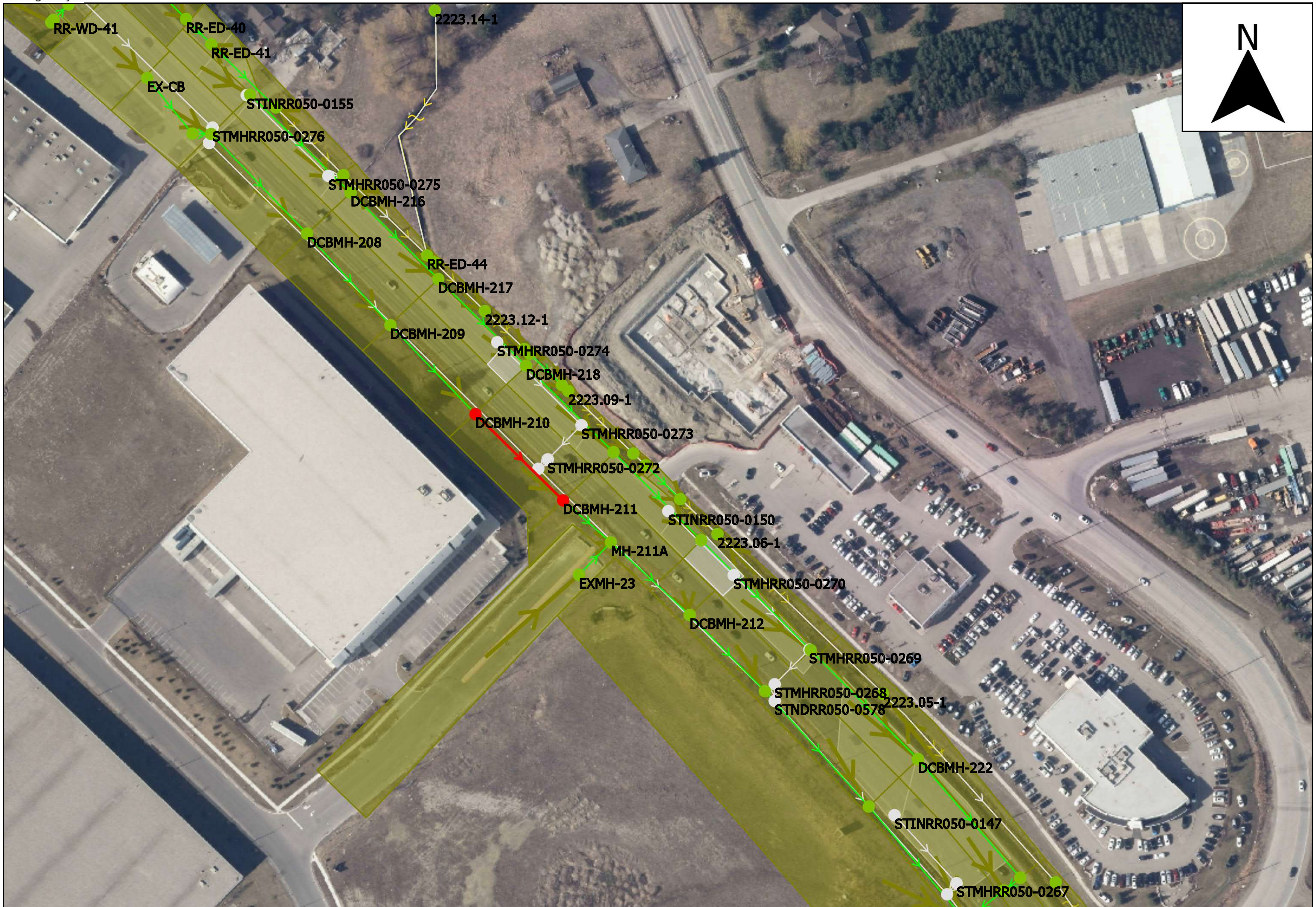
Node	RR-ED-45	RR-ED-46	RR-ED-47	-
Node ID	RR-ED-45	RR-ED-46	RR-ED-47	-
ground (m AD)	228.764	228.462	228.394	-
level (m AD)	227.668	227.610	227.549	-
expr:Freeboard	1.095627	0.852386	0.845779	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 15

RVA PROJECT NO. 194615	FIGURE NO. 15B	AUGUST 2021

arva

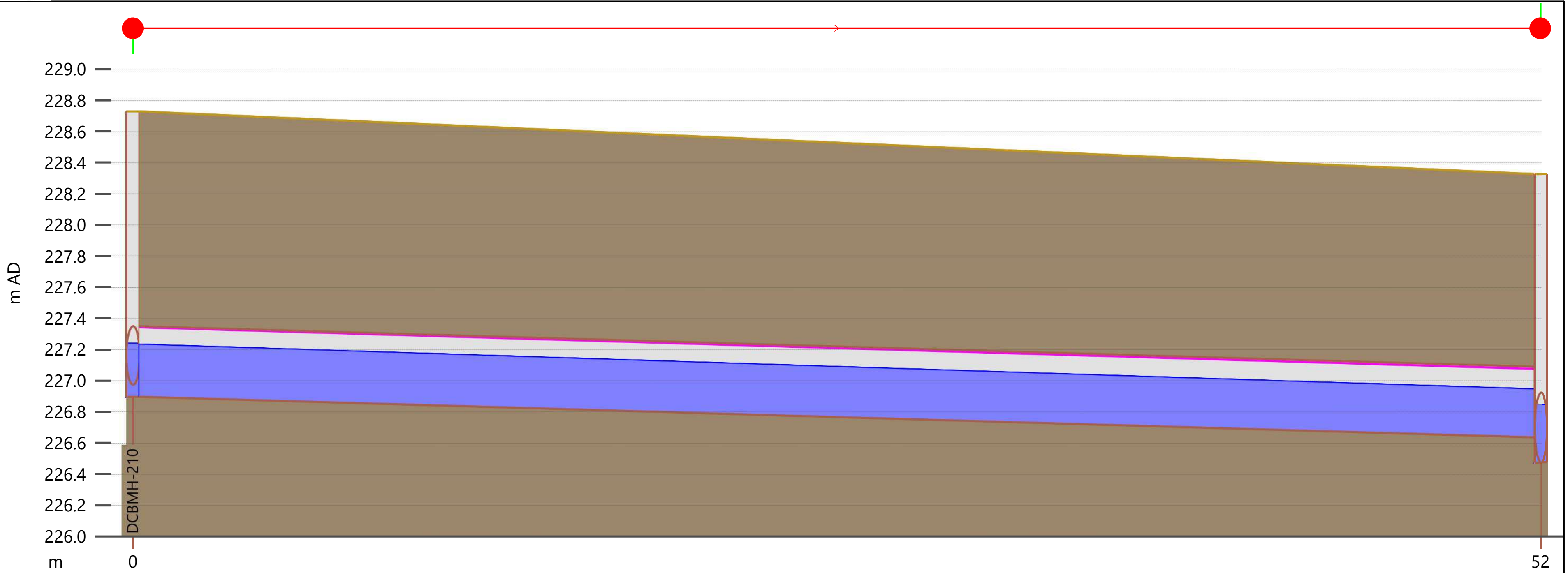
Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 15

RVA PROJECT NO. 194615	FIGURE NO. 15C	AUGUST 2021	rva

Region of Peel
working with you



Link	DCBMH-210.1
US node ID	DCBMH-210
ds node	DCBMH-211
numbarrels	1
length (m)	52.0
Shape ID	CIRC
width (mm)	450
height (mm)	450
Rough type	N
us inv (m AD)	226.899
ds inv (m AD)	226.639
grad (m/m)	0.00500
r.pfc (m3/s)	0.202
US depth (m)	0.335
US flow (m3/s)	0.18666
US velocity (m/s)	1.486

Node	DCBMH-210	DCBMH-211
Node ID	DCBMH-210	DCBMH-211
ground (m AD)	228.728	228.328
level (m AD)	227.239	226.841
expr:Freeboard	1.488880	1.487271

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 15

RVA PROJECT NO. 194615	FIGURE NO. 15D	AUGUST 2021	arva

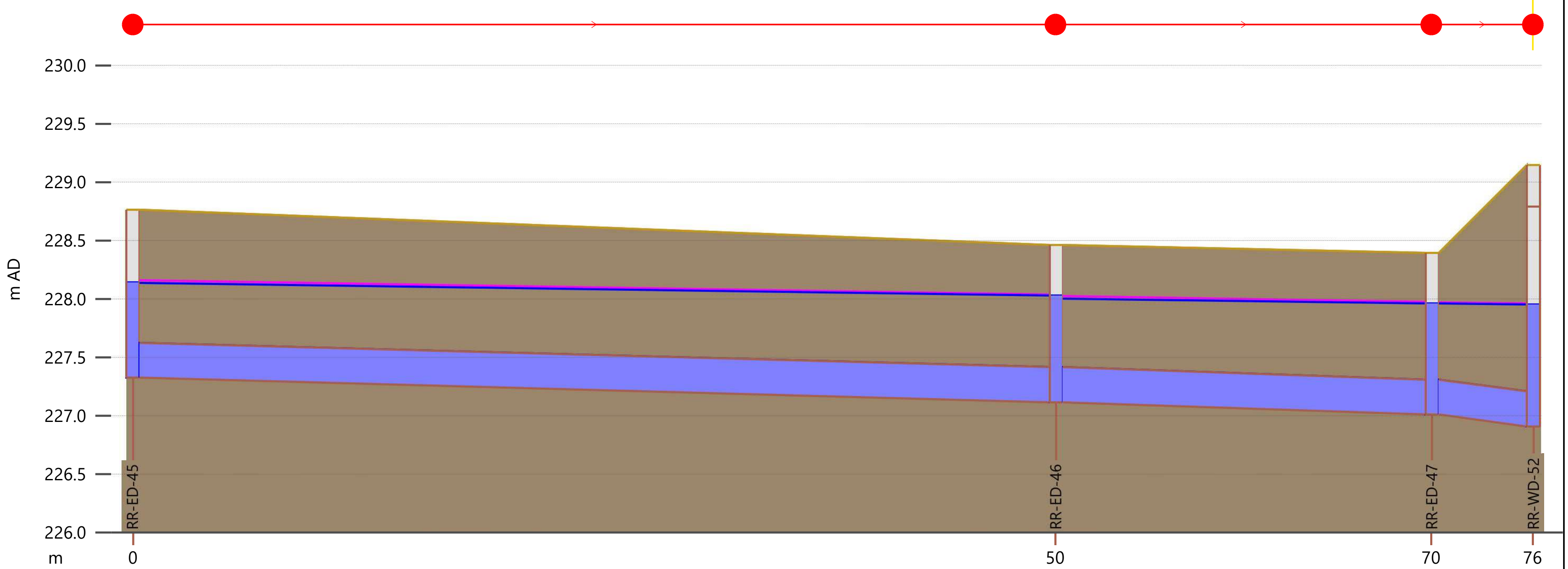
Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 15

RVA PROJECT NO. 194615	FIGURE NO. 15E	AUGUST 2021

rva

Region of Peel
working with you



Link		RR-ED-45.1	RR-ED-46.1	RR-ED-47.1
US node ID		RR-ED-45	RR-ED-46	RR-ED-47
ds node		RR-ED-46	RR-ED-47	RR-WD-52
numbarrels		1	1	1
length (m)		49.8	20.3	5.5
Shape ID		CIRC	CIRC	CIRC
width (mm)		300	300	300
height (mm)		300	300	300
Rough type		N	N	N
us inv (m AD)		227.327	227.116	227.011
ds inv (m AD)		227.116	227.011	226.910
grad (m/m)		0.00424	0.00518	0.01844
r.pfc (m3/s)		0.063	0.070	0.131
US depth (m)		0.813	0.886	0.950
US flow (m3/s)		0.06115	0.09108	0.08938
US velocity (m/s)		0.996	1.212	1.198

Node	RR-ED-45	RR-ED-46	RR-ED-47	-
Node ID	RR-ED-45	RR-ED-46	RR-ED-47	-
ground (m AD)	228.764	228.462	228.394	-
level (m AD)	228.143	228.030	227.963	-
expr:Freeboard	0.620392	0.432220	0.431183	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 15

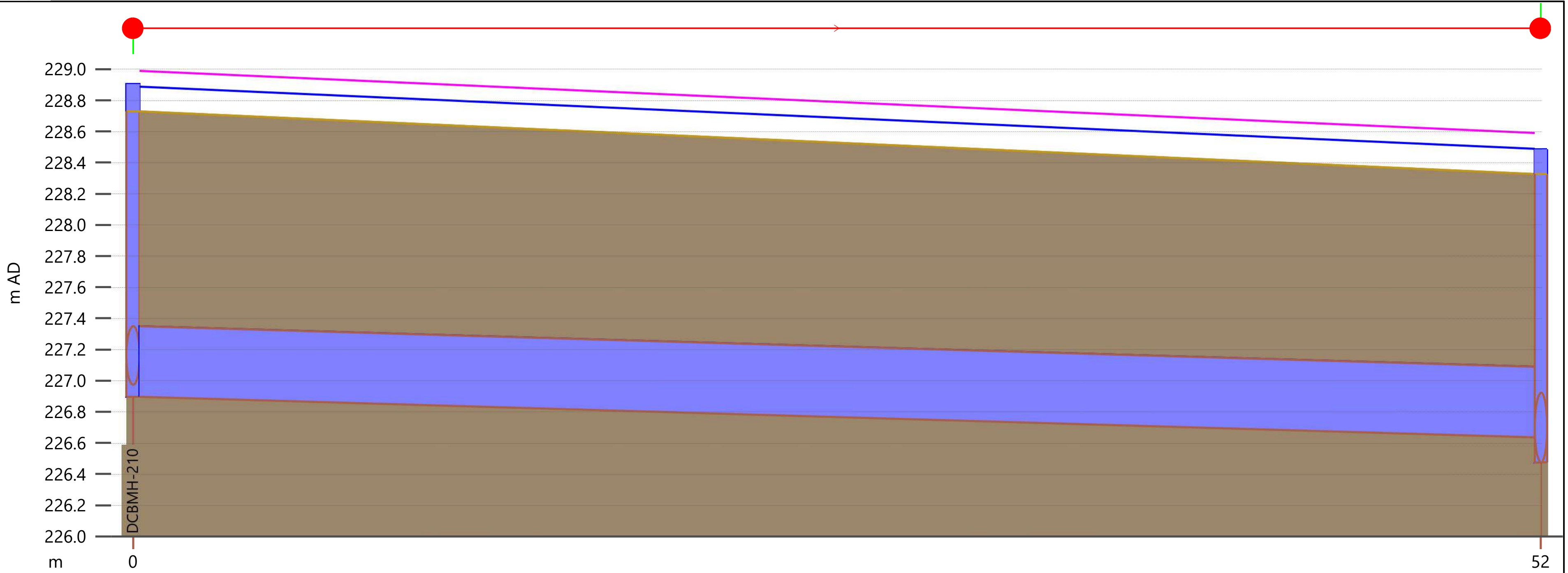
RVA PROJECT NO. 194615	FIGURE NO. 15F	AUGUST 2021

arva

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 15

RVA PROJECT NO. 194615	FIGURE NO. 15G	AUGUST 2021

Region of Peel
working with you



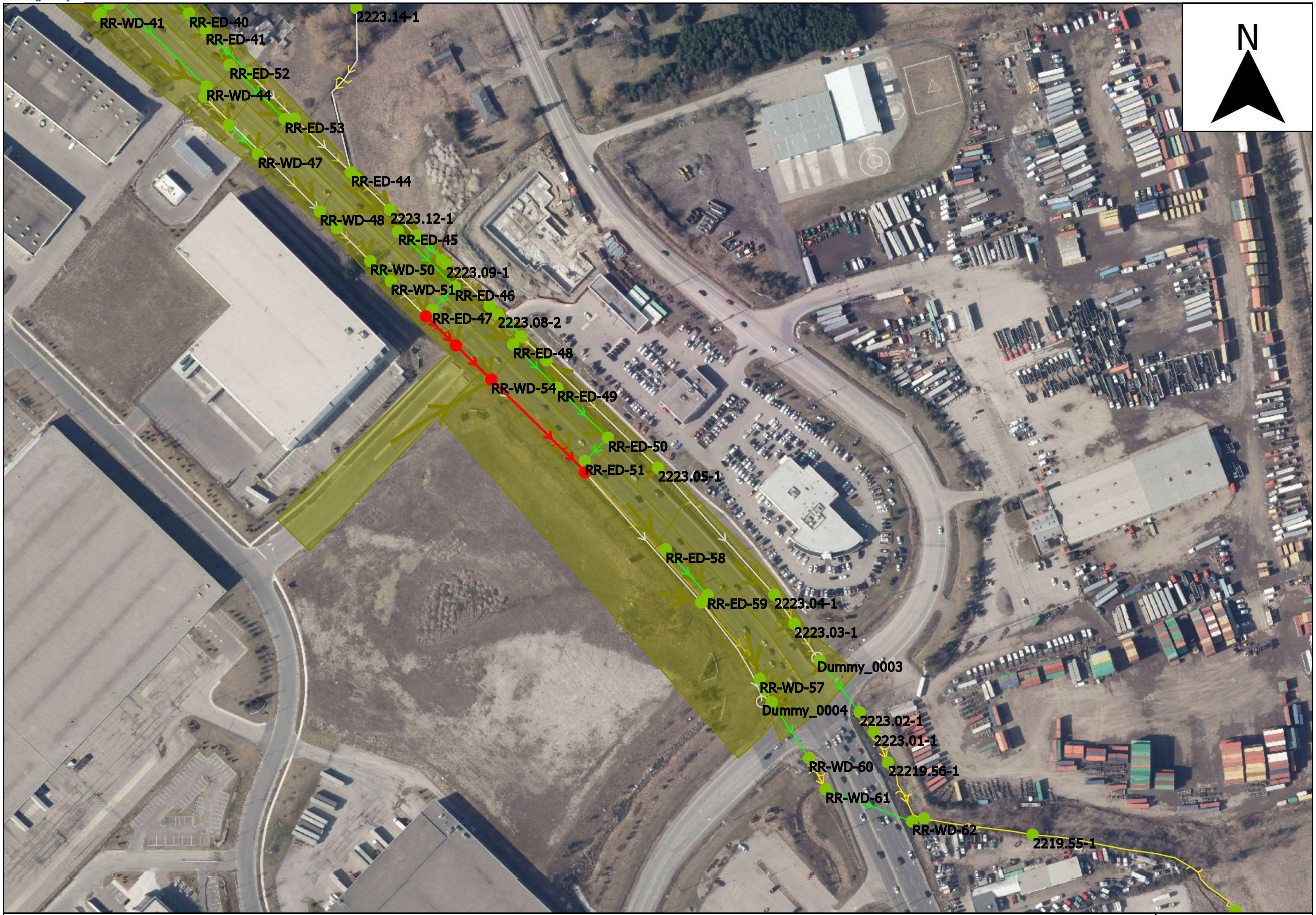
Link	DCBMH-210.1
US node ID	DCBMH-210
ds node	DCBMH-211
numbarrels	1
length (m)	52.0
Shape ID	CIRC
width (mm)	450
height (mm)	450
Rough type	N
us inv (m AD)	226.899
ds inv (m AD)	226.639
grad (m/m)	0.00500
r.pfc (m3/s)	0.202
US depth (m)	1.990
US flow (m3/s)	0.25036
US velocity (m/s)	1.526

Node	DCBMH-210	DCBMH-211
Node ID	DCBMH-210	DCBMH-211
ground (m AD)	228.728	228.328
level (m AD)	228.904	228.487
expr:Freeboard	-0.176312	-0.158694

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 15

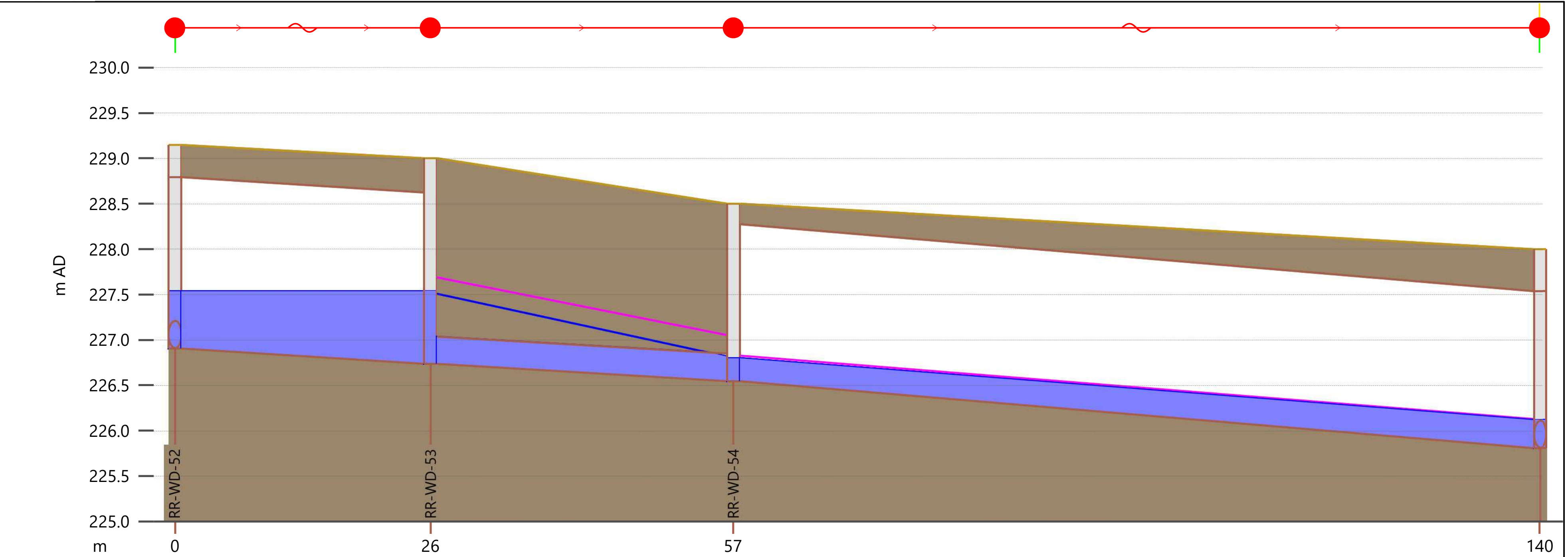
RVA PROJECT NO. 194615	FIGURE NO. 15H	AUGUST 2021	arva

Region of Peel
working with you



EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 16			arva
RVA PROJECT NO. 194615	FIGURE NO. 16A	AUGUST 2021	

Region of Peel
working with you



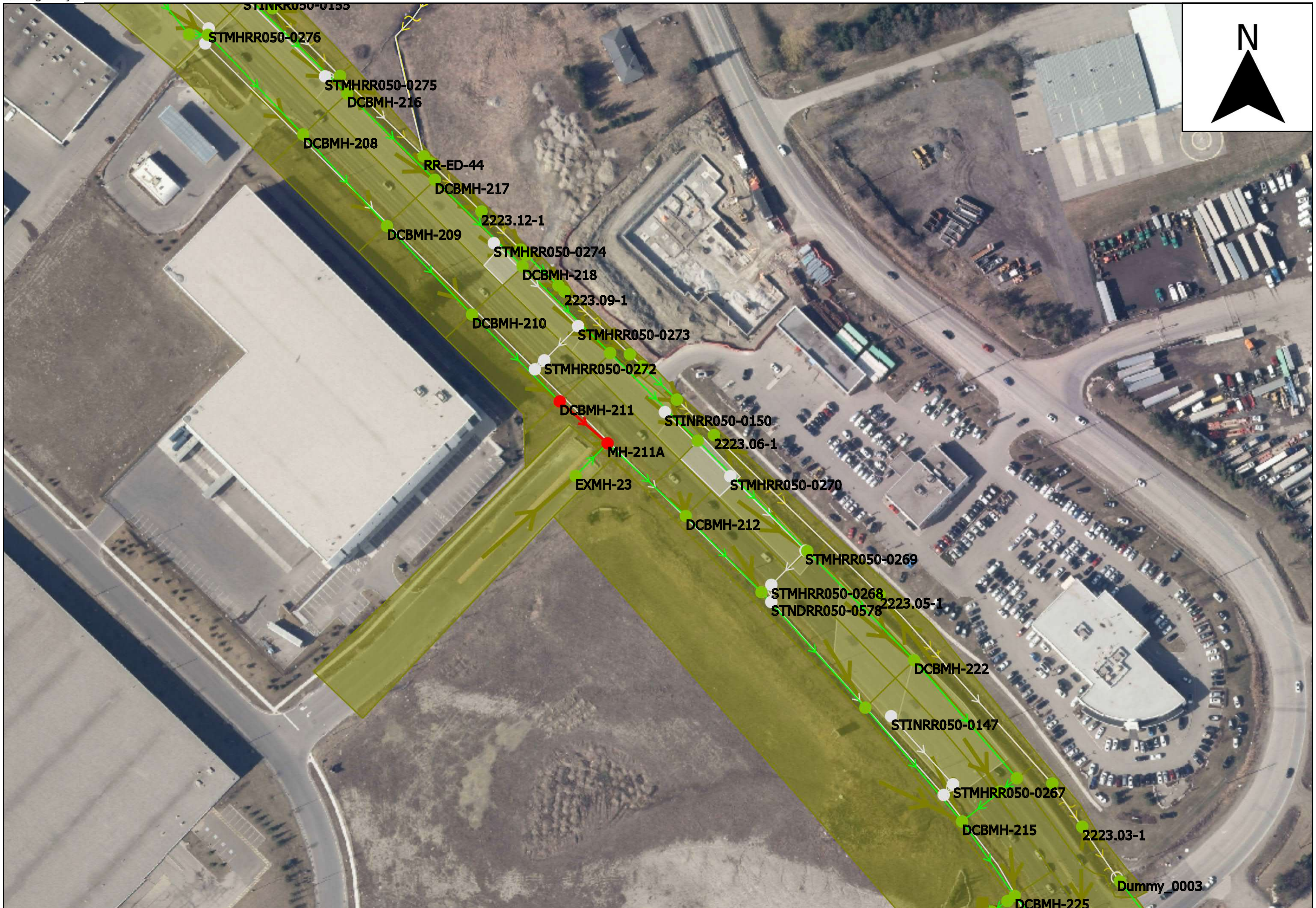
Link	RR-WD-52.1	RR-WD-53.1	RR-WD-54.1
US node ID	RR-WD-52	RR-WD-53	RR-WD-54
ds node	RR-WD-53	RR-WD-54	RR-WD-55
numbarrels	1	1	1
length (m)		31.0	
Shape ID	-	CIRC	West Side Ditch-8 (Downstream of George Bolton Pkwy)
width (mm)		300	
height (mm)		300	
Rough type		N	
us inv (m AD)	226.910	226.739	226.549
ds inv (m AD)	226.739	226.549	225.811
grad (m/m)		0.00613	
r.pfc (m3/s)	14.830	0.076	14.863
US depth (m)	0.627	0.770	0.253
US flow (m3/s)	0.17389	0.14359	0.23288
US velocity (m/s)	0.564	1.890	0.736

Node	RR-WD-52	RR-WD-53	RR-WD-54	RR-WD-55
Node ID	RR-WD-52	RR-WD-53	RR-WD-54	RR-WD-55
ground (m AD)	229.150	229.000	228.500	228.000
level (m AD)	227.537	227.536	226.802	226.118
expr:Freeboard	1.612891	1.463974	1.697891	1.881989

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 16

RVA PROJECT NO. 194615	FIGURE NO. 16B	AUGUST 2021	arva

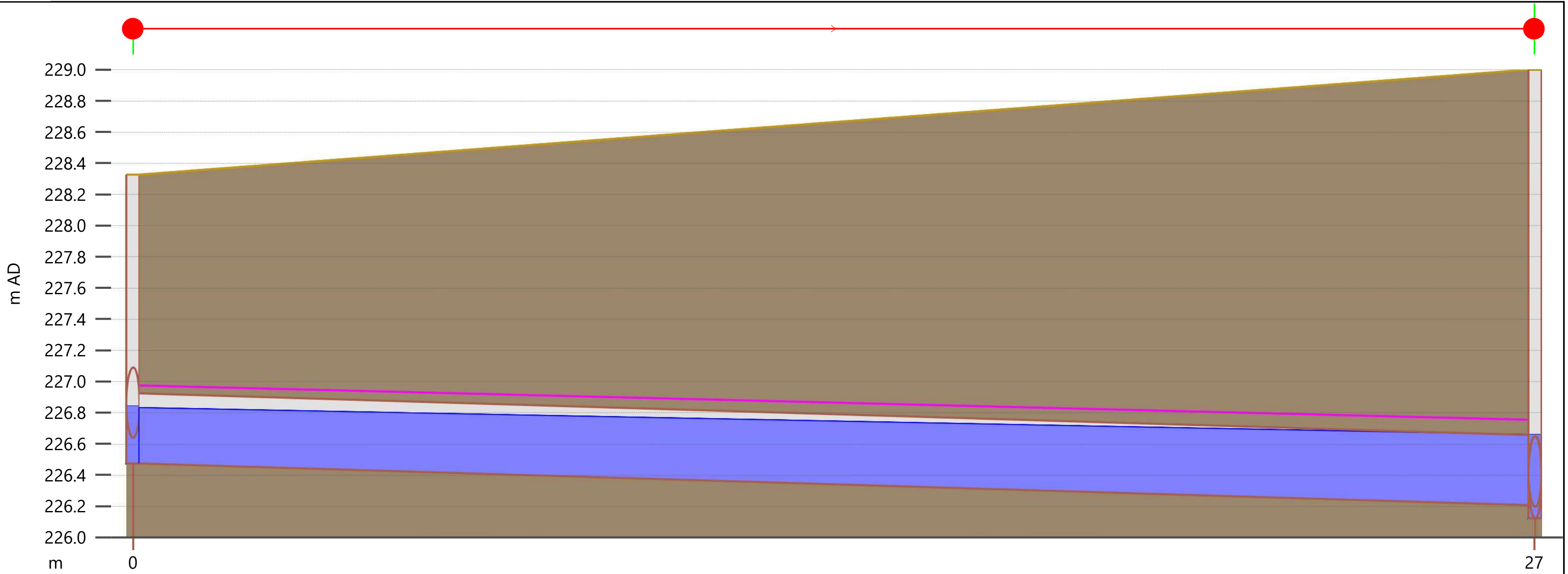
Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 16		
RVA PROJECT NO. 194615	FIGURE NO. 16C	AUGUST 2021

arva

Region of Peel
working with you



Link	DCBMH-211.1
US node ID	DCBMH-211
ds node	MH-211A
numbarrels	1
length (m)	26.9
Shape ID	CIRC
width (mm)	450
height (mm)	450
Rough type	N
us inv (m AD)	226.474
ds inv (m AD)	226.209
grad (m/m)	0.00986
r.pfc (m3/s)	0.283
US depth (m)	0.358
US flow (m3/s)	0.22690
US velocity (m/s)	1.896

Node	DCBMH-211	MH-211A
Node ID	DCBMH-211	MH-211A
ground (m AD)	228.328	229.000
level (m AD)	226.841	226.656
expr:Freeboard	1.487271	2.343567

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 16

RVA PROJECT NO. 194615	FIGURE NO. 16D	AUGUST 2021

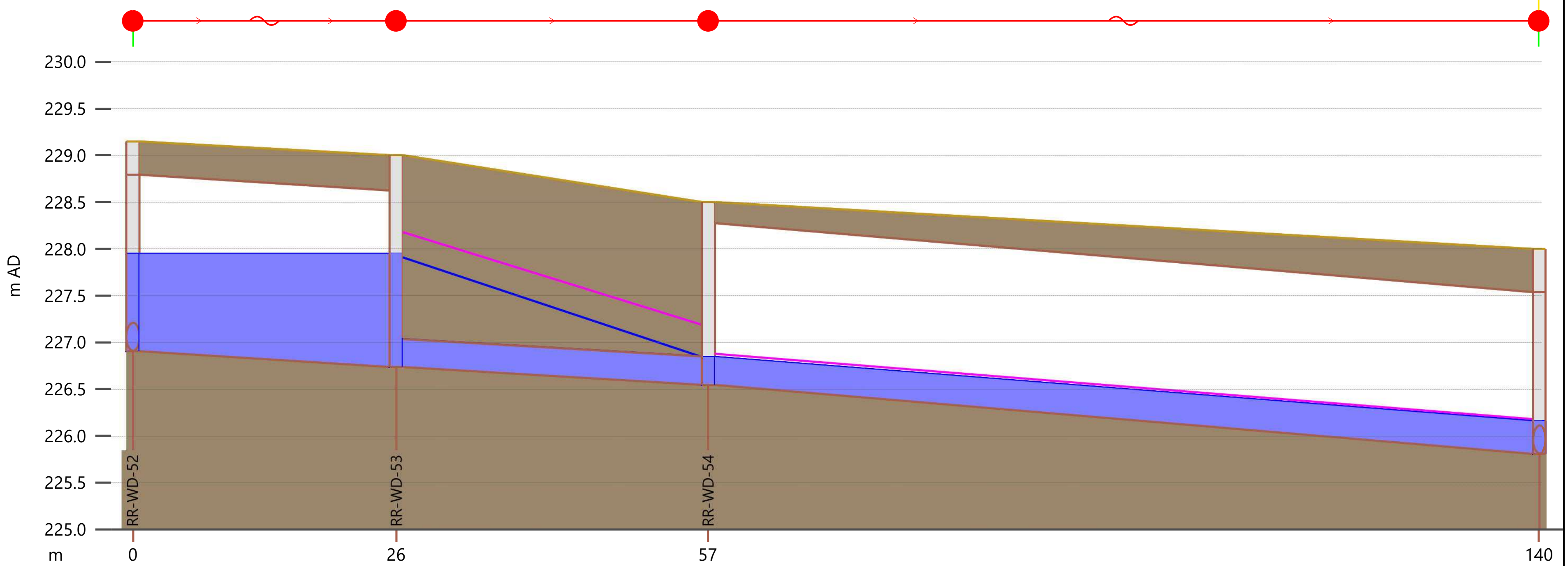
arva

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 16

RVA PROJECT NO. 194615	FIGURE NO. 16E	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-52.1	RR-WD-53.1	RR-WD-54.1
US node ID	RR-WD-52	RR-WD-53	RR-WD-54
ds node	RR-WD-53	RR-WD-54	RR-WD-55
numbarrels	1	1	1
length (m)		31.0	
Shape ID	-	CIRC	West Side Ditch-8 (Downstream of George Bolton Pkwy)
width (mm)		300	
height (mm)		300	
Rough type		N	
us inv (m AD)	226.910	226.739	226.549
ds inv (m AD)	226.739	226.549	225.811
grad (m/m)		0.00613	
r.pfc (m3/s)	14.830	0.076	14.863
US depth (m)	1.042	1.172	0.294
US flow (m3/s)	0.23029	0.18068	0.31887
US velocity (m/s)	0.514	2.305	0.816

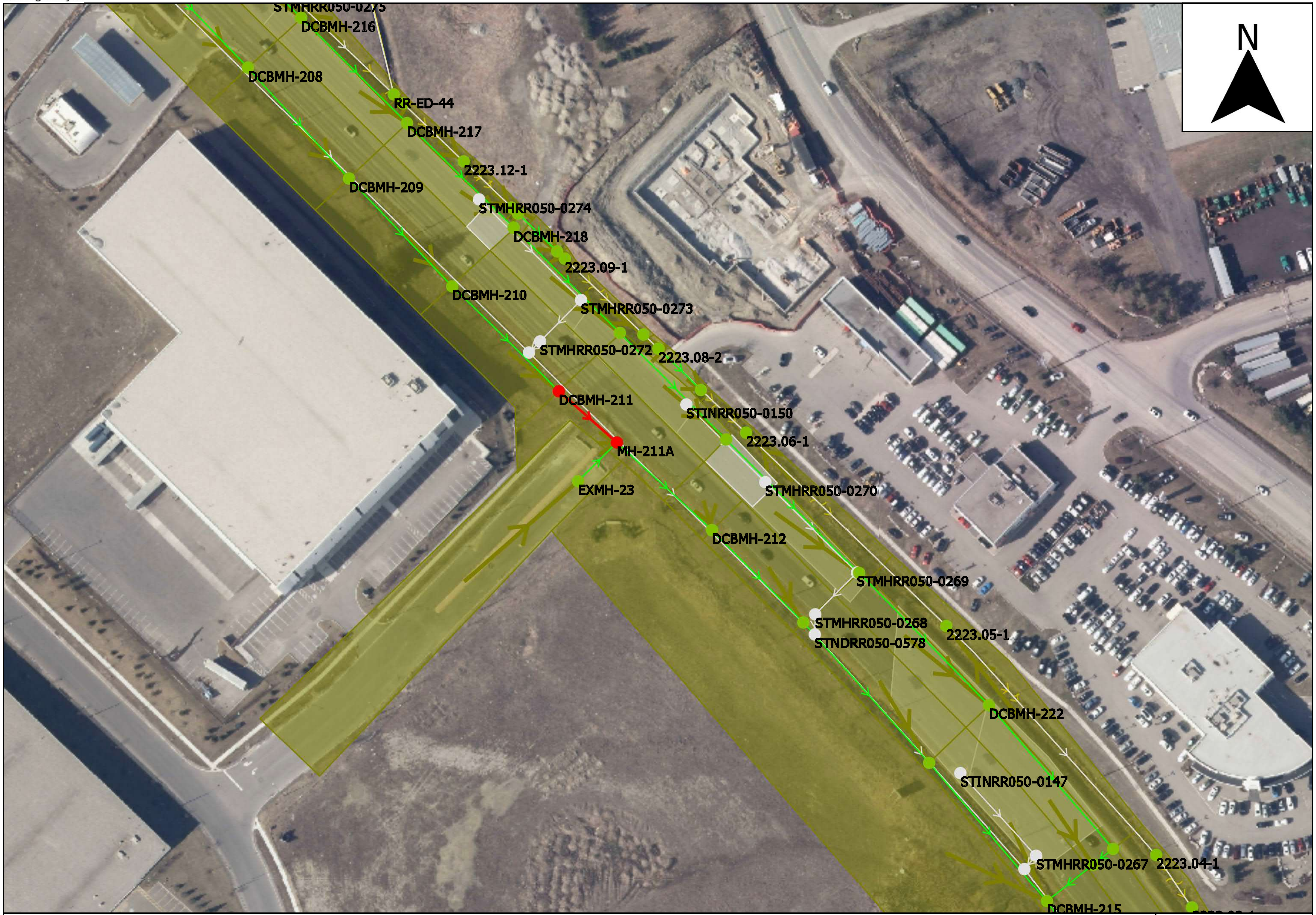
Node	RR-WD-52	RR-WD-53	RR-WD-54	RR-WD-55
Node ID	RR-WD-52	RR-WD-53	RR-WD-54	RR-WD-55
ground (m AD)	229.150	229.000	228.500	228.000
level (m AD)	227.952	227.952	226.843	226.161
expr:Freeboard	1.198203	1.048340	1.657074	1.839249

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 16

RVA PROJECT NO. 194615	FIGURE NO. 16F	AUGUST 2021

arva

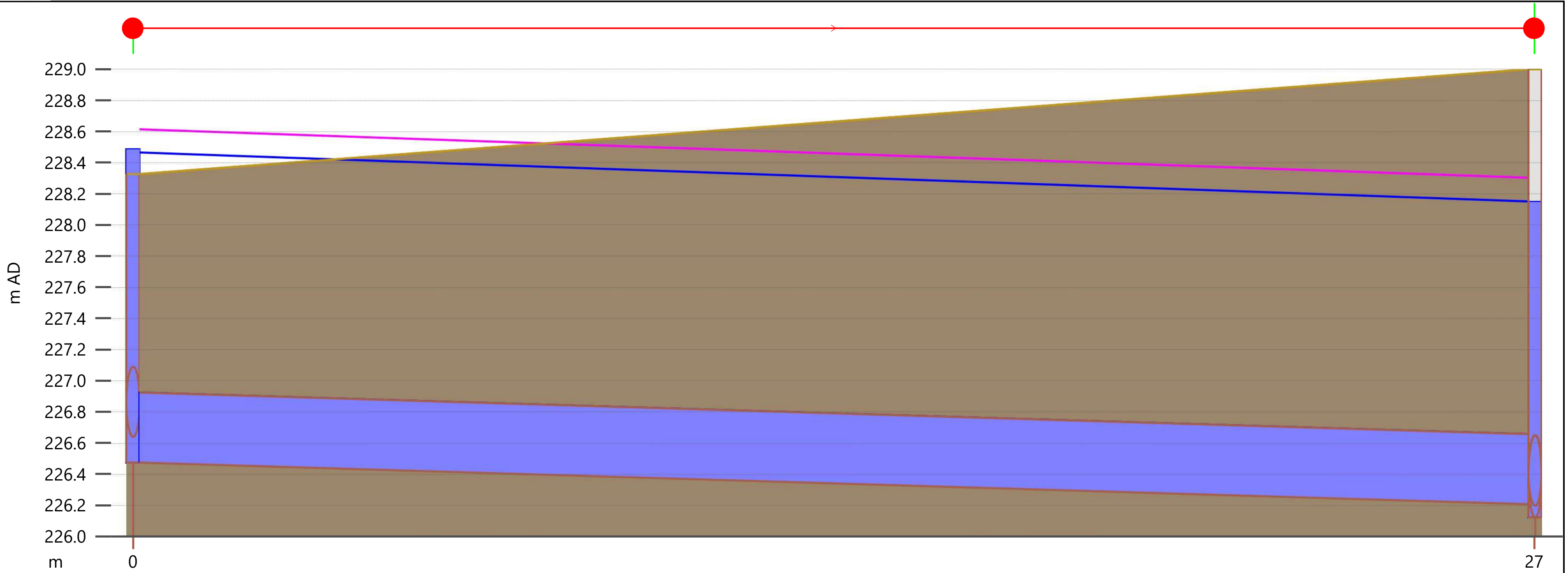
Region of Peel
working with you



PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 16		
RVA PROJECT NO. 194615	FIGURE NO. 16G	AUGUST 2021

arva

Region of Peel
working with you



Link	DCBMH-211.1
US node ID	DCBMH-211
ds node	MH-211A
numbarrels	1
length (m)	26.9
Shape ID	CIRC
width (mm)	450
height (mm)	450
Rough type	N
us inv (m AD)	226.474
ds inv (m AD)	226.209
grad (m/m)	0.00986
r.pfc (m3/s)	0.283
US depth (m)	1.990
US flow (m3/s)	0.30681
US velocity (m/s)	1.920

Node	DCBMH-211	MH-211A
Node ID	DCBMH-211	MH-211A
ground (m AD)	228.328	229.000
level (m AD)	228.487	228.150
expr:Freeboard	-0.158694	0.850433

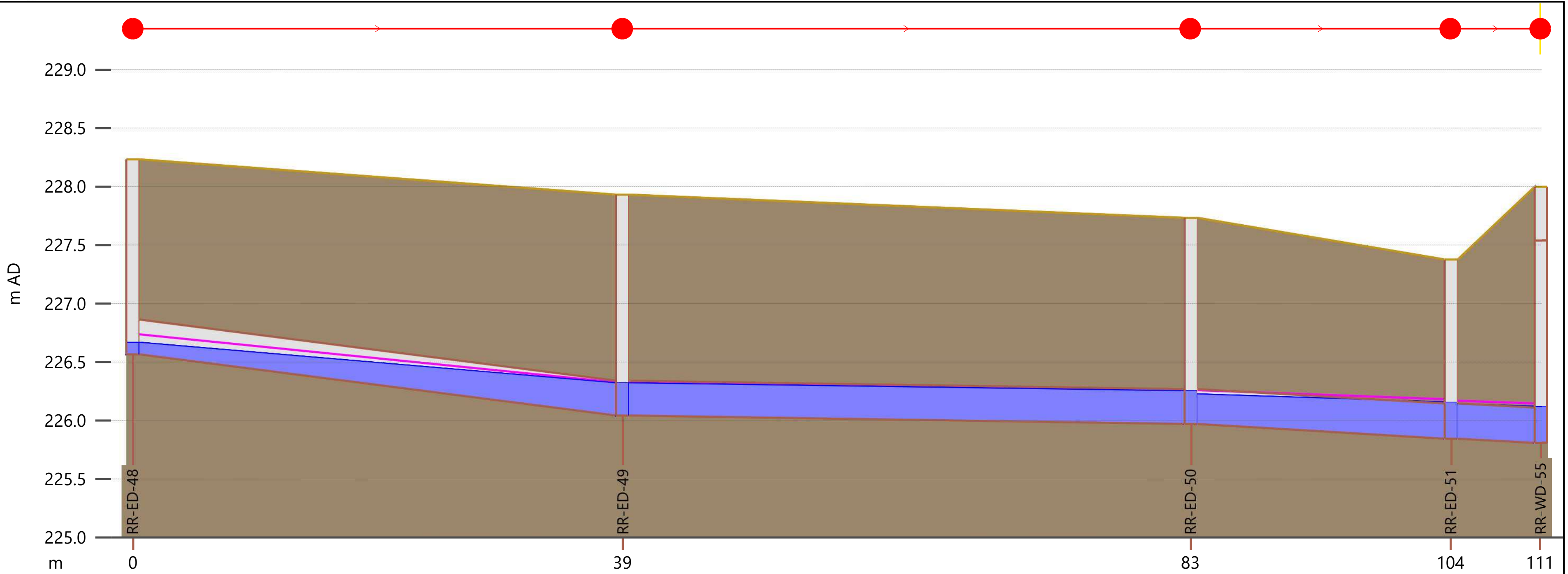
EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 16

RVA PROJECT NO. 194615	FIGURE NO. 16H	AUGUST 2021	rva

Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 17			arva
RVA PROJECT NO. 194615	FIGURE NO. 17A	AUGUST 2021	

Region of Peel
working with you



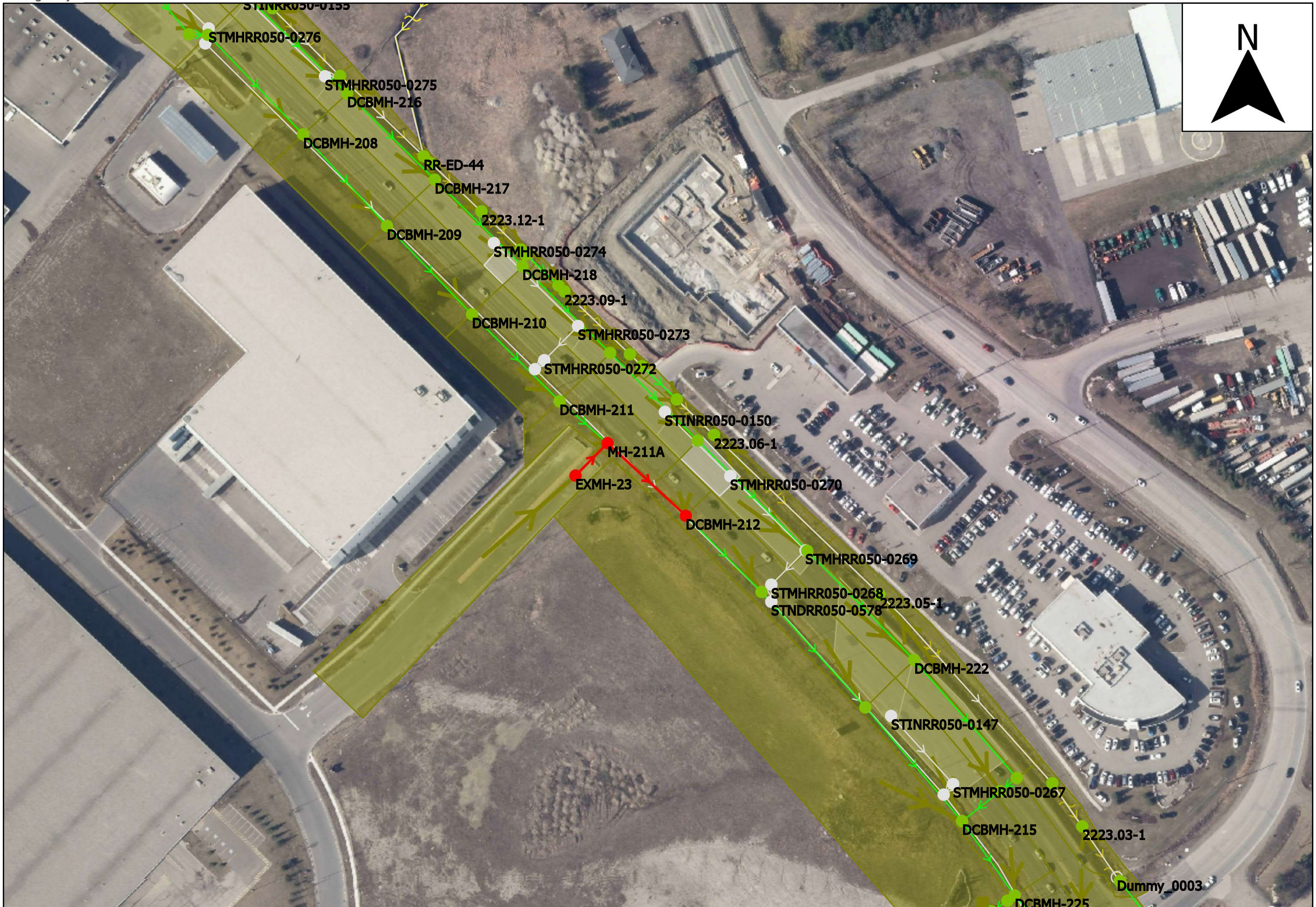
Link	RR-ED-48.1	RR-ED-49.1	RR-ED-50.1	-
US node ID	RR-ED-48	RR-ED-49	RR-ED-50	RR-ED-51
ds node	RR-ED-49	RR-ED-50	RR-ED-51	RR-WD-55
numbarrels	1	1	1	1
length (m)	38.6	44.8	20.5	7.1
Shape ID	CIRC	CIRC	CIRC	CIRC
width (mm)	300	300	300	300
height (mm)	300	300	300	300
Rough type	N	N	N	N
us inv (m AD)	226.565	226.042	225.970	225.848
ds inv (m AD)	226.042	225.970	225.848	225.811
grad (m/m)	0.01355	0.00161	0.00595	0.00522
r.pfc (m3/s)	0.113	0.039	0.075	0.070
US depth (m)	0.102	0.277	0.254	0.291
US flow (m3/s)	0.02502	0.03948	0.05584	0.05479
US velocity (m/s)	1.188	0.679	0.968	0.784

Node	RR-ED-48	RR-ED-49	RR-ED-50	RR-ED-51	-
Node ID	RR-ED-48	RR-ED-49	RR-ED-50	RR-ED-51	-
ground (m AD)	228.231	227.930	227.733	227.379	-
level (m AD)	226.667	226.321	226.250	226.154	-
expr:Freeboard	1.564758	1.609238	1.482635	1.225525	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 17

RVA PROJECT NO. 194615	FIGURE NO. 17B	AUGUST 2021	arva

Region of Peel
working with you

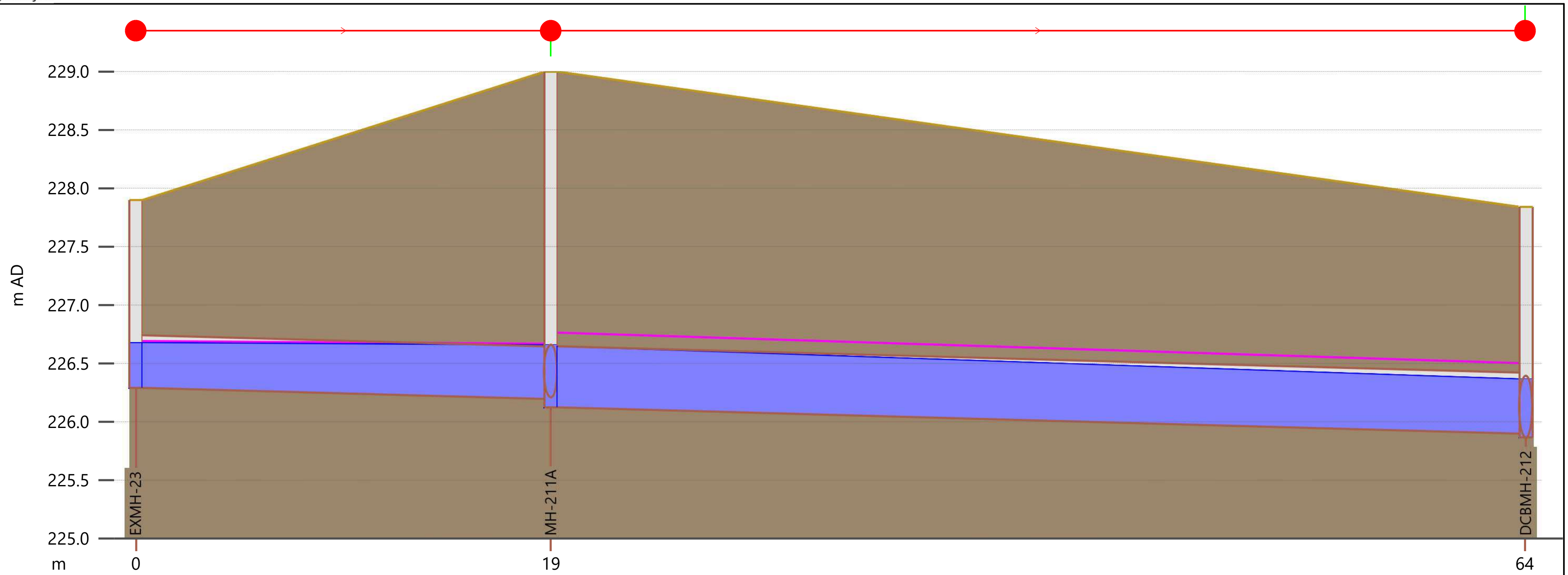


PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 17

RVA PROJECT NO. 194615	FIGURE NO. 17C	AUGUST 2021

arva

Region of Peel
working with you



Link	EXMH-23.1	MH-211A.1
US node ID	EXMH-23	MH-211A
ds node	MH-211A	DCBMH-212
numbarrels	1	1
length (m)	19.2	45.1
Shape ID	CIRC	CIRC
width (mm)	450	525
height (mm)	450	525
Rough type	N	N
us inv (m AD)	226.294	226.123
ds inv (m AD)	226.198	225.898
grad (m/m)	0.00500	0.00499
r.pfc (m3/s)	0.202	0.304
US depth (m)	0.380	0.521
US flow (m3/s)	0.09502	0.33715
US velocity (m/s)	1.036	1.680

Node	EXMH-23	MH-211A	DCBMH-212
Node ID	EXMH-23	MH-211A	DCBMH-212
ground (m AD)	227.898	229.000	227.843
level (m AD)	226.676	226.656	226.365
expr:Freeboard	1.222265	2.343567	1.478162

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 17

RVA PROJECT NO. 194615	FIGURE NO. 17D	AUGUST 2021

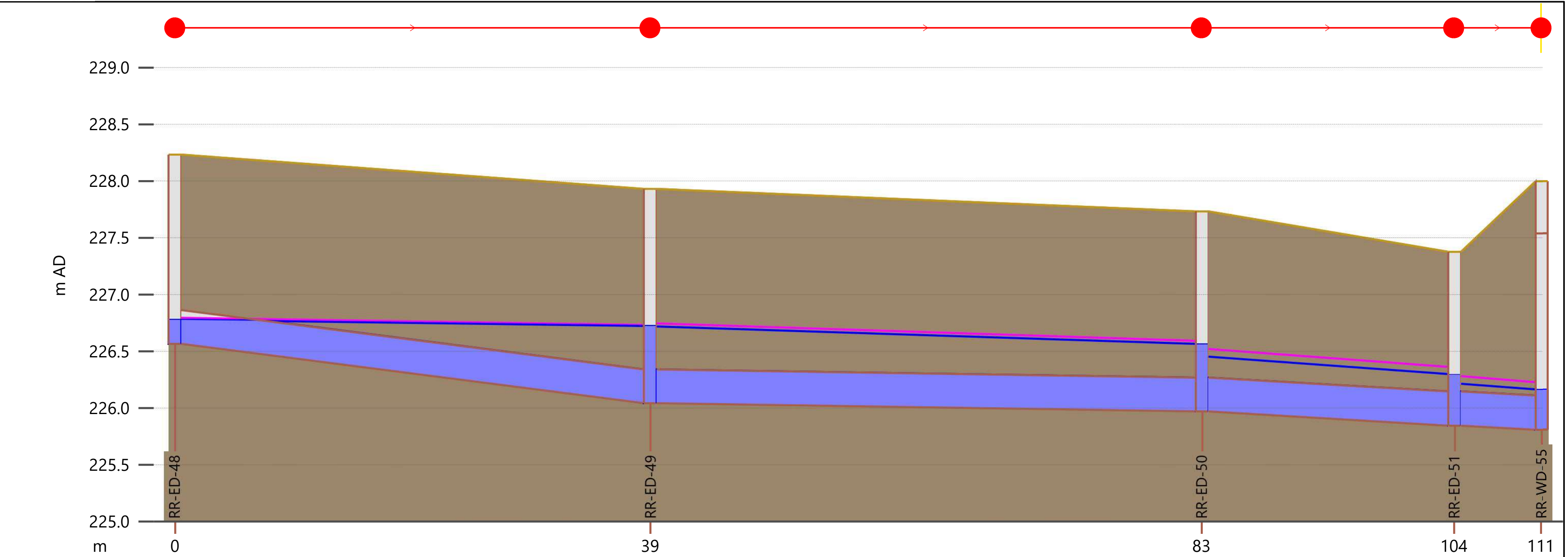
arva

Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 17		
RVA PROJECT NO. 194615	FIGURE NO. 17E	AUGUST 2021

arva

Region of Peel
working with you



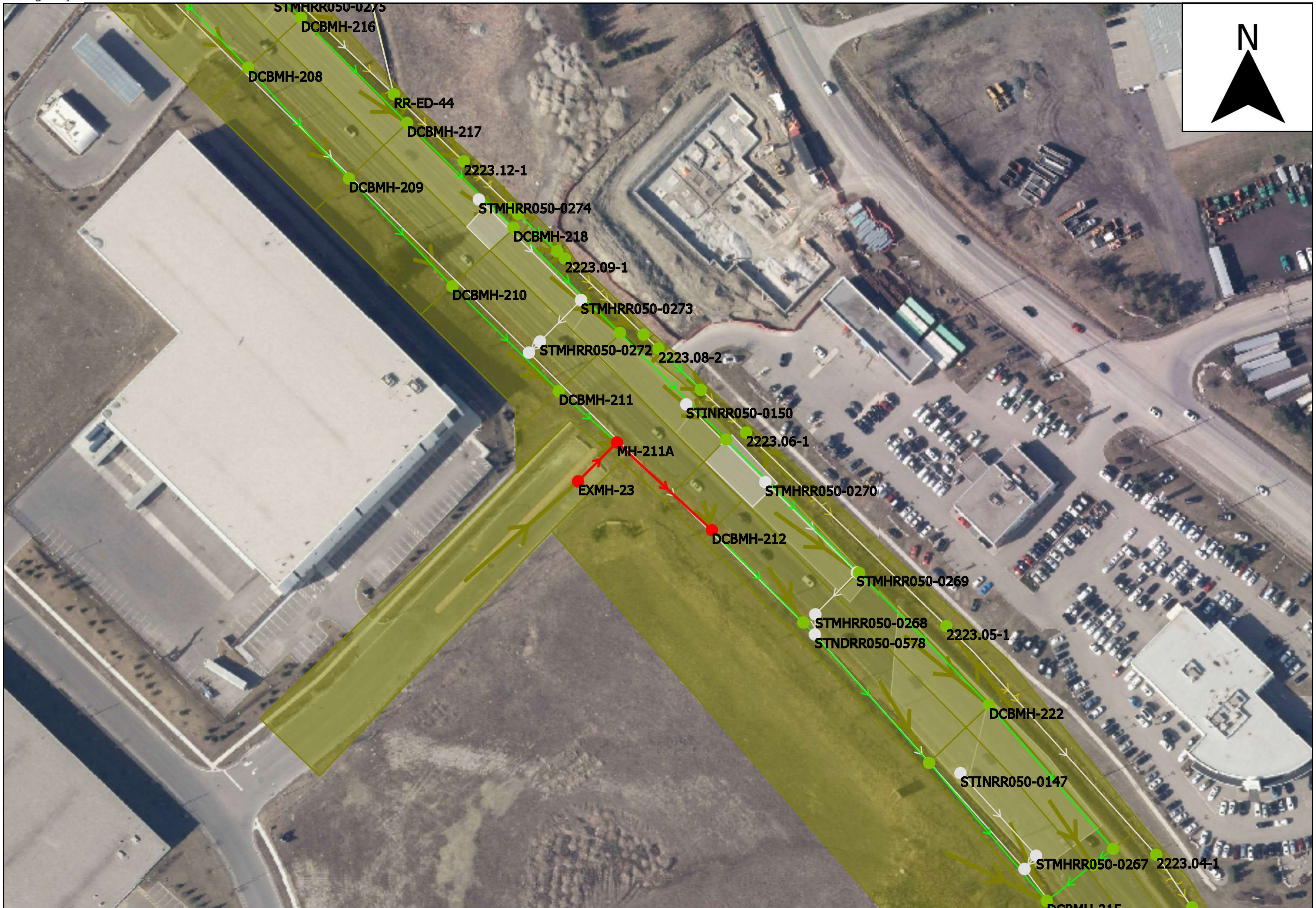
Link	RR-ED-48.1	RR-ED-49.1	RR-ED-50.1	-
US node ID	RR-ED-48	RR-ED-49	RR-ED-50	RR-ED-51
ds node	RR-ED-49	RR-ED-50	RR-ED-51	RR-WD-55
numbarrels	1	1	1	1
length (m)	38.6	44.8	20.5	7.1
Shape ID	CIRC	CIRC	CIRC	CIRC
width (mm)	300	300	300	300
height (mm)	300	300	300	300
Rough type	N	N	N	N
us inv (m AD)	226.565	226.042	225.970	225.848
ds inv (m AD)	226.042	225.970	225.848	225.811
grad (m/m)	0.01355	0.00161	0.00595	0.00522
r.pfc (m3/s)	0.113	0.039	0.075	0.070
US depth (m)	0.214	0.678	0.485	0.368
US flow (m3/s)	0.03501	0.05657	0.08482	0.08383
US velocity (m/s)	1.319	0.750	1.142	1.140

Node	RR-ED-48	RR-ED-49	RR-ED-50	RR-ED-51	-
Node ID	RR-ED-48	RR-ED-49	RR-ED-50	RR-ED-51	-
ground (m AD)	228.231	227.930	227.733	227.379	-
level (m AD)	226.779	226.724	226.563	226.292	-
expr:Freeboard	1.451920	1.205399	1.169632	1.087479	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 17

RVA PROJECT NO. 194615	FIGURE NO. 17F	AUGUST 2021	arva

Region of Peel
working with you

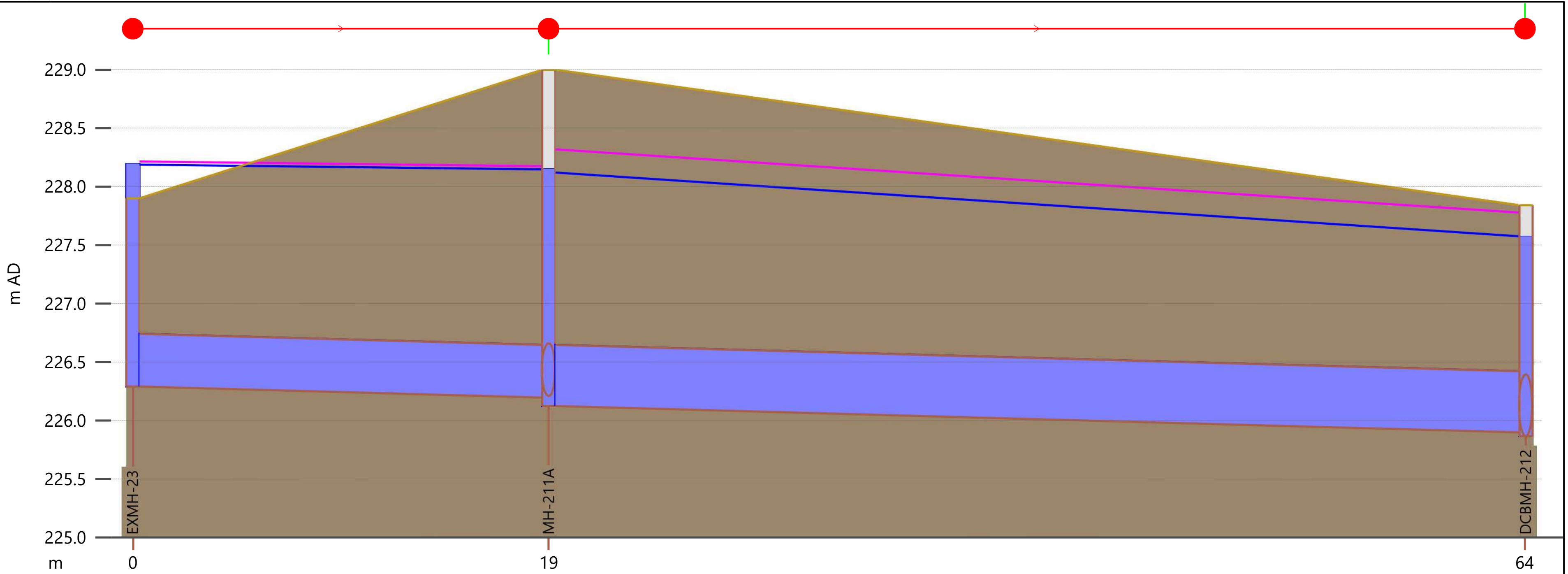


PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 17

RVA PROJECT NO. 194615	FIGURE NO. 17G	AUGUST 2021

arva

Region of Peel
working with you



Link	EXMH-23.1	MH-211A.1
US node ID	EXMH-23	MH-211A
ds node	MH-211A	DCBMH-212
numbarrels	1	1
length (m)	19.2	45.1
Shape ID	CIRC	CIRC
width (mm)	450	525
height (mm)	450	525
Rough type	N	N
us inv (m AD)	226.294	226.123
ds inv (m AD)	226.198	225.898
grad (m/m)	0.00500	0.00499
r.pfc (m3/s)	0.202	0.304
US depth (m)	1.894	1.997
US flow (m3/s)	0.14541	0.48341
US velocity (m/s)	1.055	2.024

Node	EXMH-23	MH-211A	DCBMH-212
Node ID	EXMH-23	MH-211A	DCBMH-212
ground (m AD)	227.898	229.000	227.843
level (m AD)	228.192	228.150	227.571
expr:Freeboard	-0.293528	0.850433	0.272077

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 17

RVA PROJECT NO. 194615 | FIGURE NO. 17H | AUGUST 2021

arva

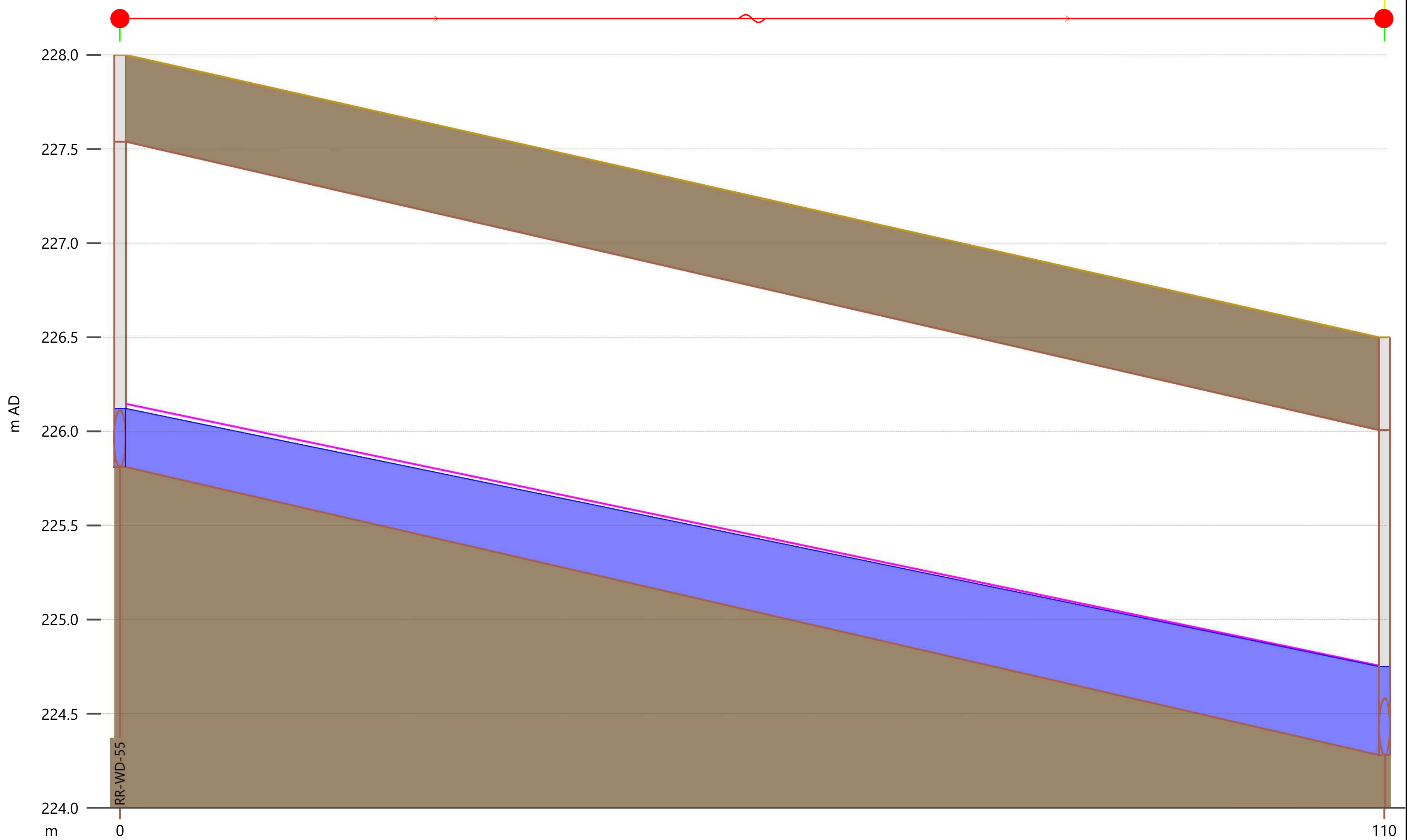
Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 18

RVA PROJECT NO. 194615	FIGURE NO. 18A	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-55.1	
Node	RR-WD-55	RR-WD-56
Node ID	RR-WD-55	RR-WD-56
ground (m AD)	228.000	226.500
level (m AD)	226.118	224.749
expr:Freeboard	1.881989	1.751068

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 18

RVA PROJECT NO. 194615 | FIGURE NO. 18B | AUGUST 2021

rva

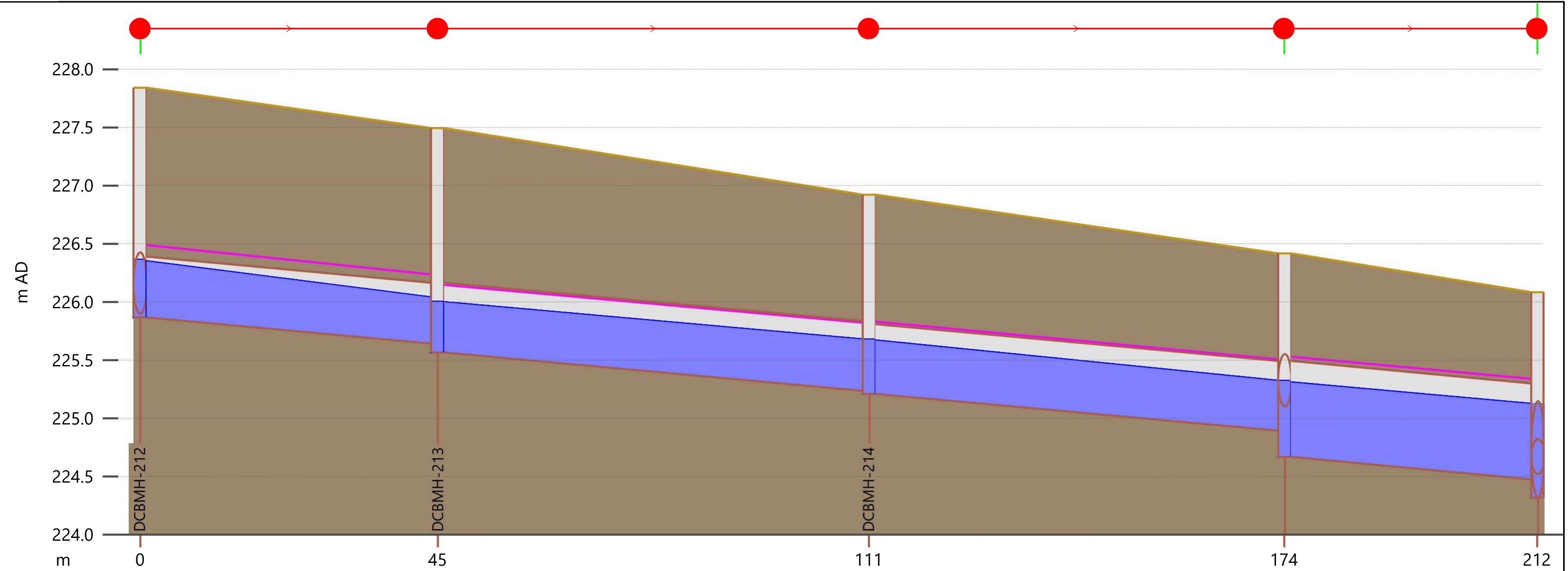
Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 18

RVA PROJECT NO. 194615	FIGURE NO. 18C	AUGUST 2021

arva

Region of Peel
working with you



Link	DCBMH-212.1	DCBMH-213.1	DCBMH-214.1	DCBMH-215.1
US node ID	DCBMH-212	DCBMH-213	DCBMH-214	DCBMH-215
ds node	DCBMH-213	DCBMH-214	DCBMH-215	DCBMH-225
numbarrels	1	1	1	1
length (m)	45.2	65.5	63.1	38.5
Shape ID	CIRC	CIRC	CIRC	CIRC
width (mm)	525	600	600	825
height (mm)	525	600	600	825
Rough type	N	N	N	N
us inv (m AD)	225.868	225.567	225.209	224.669
ds inv (m AD)	225.642	225.239	224.894	224.476
grad (m/m)	0.00499	0.00501	0.00499	0.00501
r.pfc (m3/s)	0.304	0.435	0.434	1.017
US depth (m)	0.484	0.431	0.462	0.639
US flow (m3/s)	0.34551	0.37451	0.41599	0.92973
US velocity (m/s)	1.689	1.744	1.795	2.144

Node	DCBMH-212	DCBMH-213	DCBMH-214	DCBMH-215	DCBMH-225
Node ID	DCBMH-212	DCBMH-213	DCBMH-214	DCBMH-215	DCBMH-225
ground (m AD)	227.843	227.493	226.924	226.418	226.085
level (m AD)	226.365	226.005	225.680	225.321	225.122
expr:Freeboard	1.478162	1.487949	1.243809	1.096833	0.963130

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 18

RVA PROJECT NO. 194615	FIGURE NO. 18D	AUGUST 2021

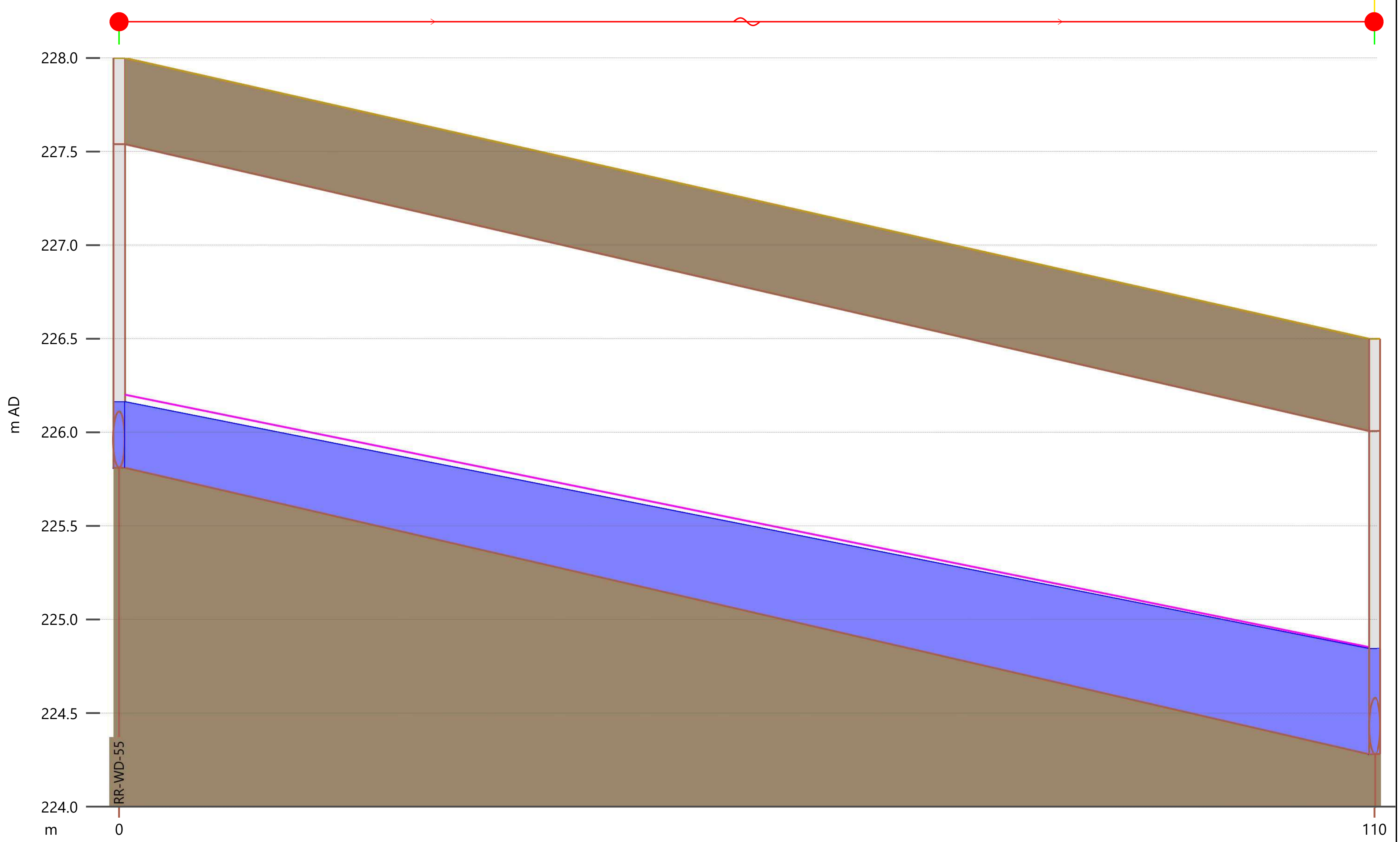
arva

Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 18		
RVA PROJECT NO. 194615	FIGURE NO. 18E	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-WD-55.1	
Node	RR-WD-55	RR-WD-56
Node ID	RR-WD-55	RR-WD-56
ground (m AD)	228.000	226.500
level (m AD)	226.161	224.843
expr:Freeboard	1.839249	1.657043

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 18

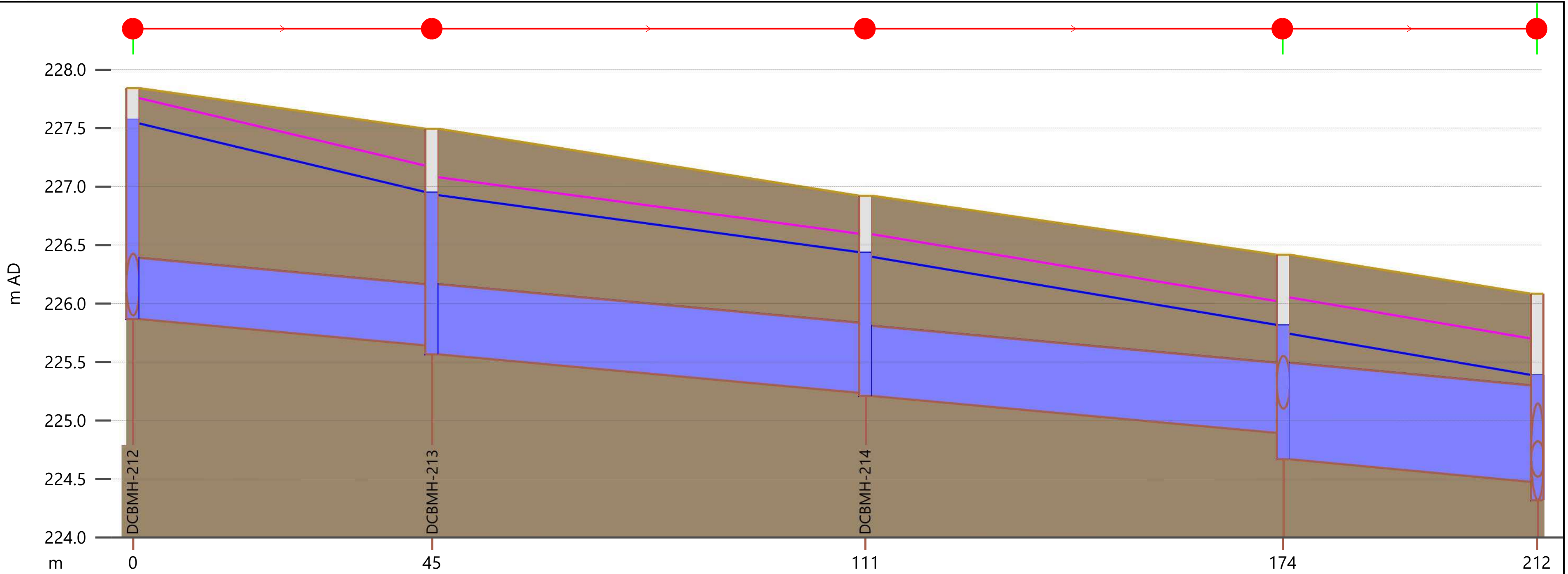
RVA PROJECT NO. 194615 | FIGURE NO. 18F | AUGUST 2021

rva

Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 18			arva
RVA PROJECT NO. 194615	FIGURE NO. 18G	AUGUST 2021	

Region of Peel
working with you



Link	DCBMH-212.1	DCBMH-213.1	DCBMH-214.1	DCBMH-215.1
US node ID	DCBMH-212	DCBMH-213	DCBMH-214	DCBMH-215
ds node	DCBMH-213	DCBMH-214	DCBMH-215	DCBMH-225
numbarrels	1	1	1	1
length (m)	45.2	65.5	63.1	38.5
Shape ID	CIRC	CIRC	CIRC	CIRC
width (mm)	525	600	600	825
height (mm)	525	600	600	825
Rough type	N	N	N	N
us inv (m AD)	225.868	225.567	225.209	224.669
ds inv (m AD)	225.642	225.239	224.894	224.476
grad (m/m)	0.00499	0.00501	0.00499	0.00501
r.pfc (m3/s)	0.304	0.435	0.434	1.017
US depth (m)	1.670	1.359	1.190	1.074
US flow (m3/s)	0.49755	0.53066	0.58580	1.37776
US velocity (m/s)	2.117	1.826	1.957	2.472

Node	DCBMH-212	DCBMH-213	DCBMH-214	DCBMH-215	DCBMH-225
Node ID	DCBMH-212	DCBMH-213	DCBMH-214	DCBMH-215	DCBMH-225
ground (m AD)	227.843	227.493	226.924	226.418	226.085
level (m AD)	227.571	226.949	226.436	225.816	225.385
expr:Freeboard	0.272077	0.543873	0.487812	0.602067	0.700373

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 18

RVA PROJECT NO. 194615	FIGURE NO. 18H	AUGUST 2021

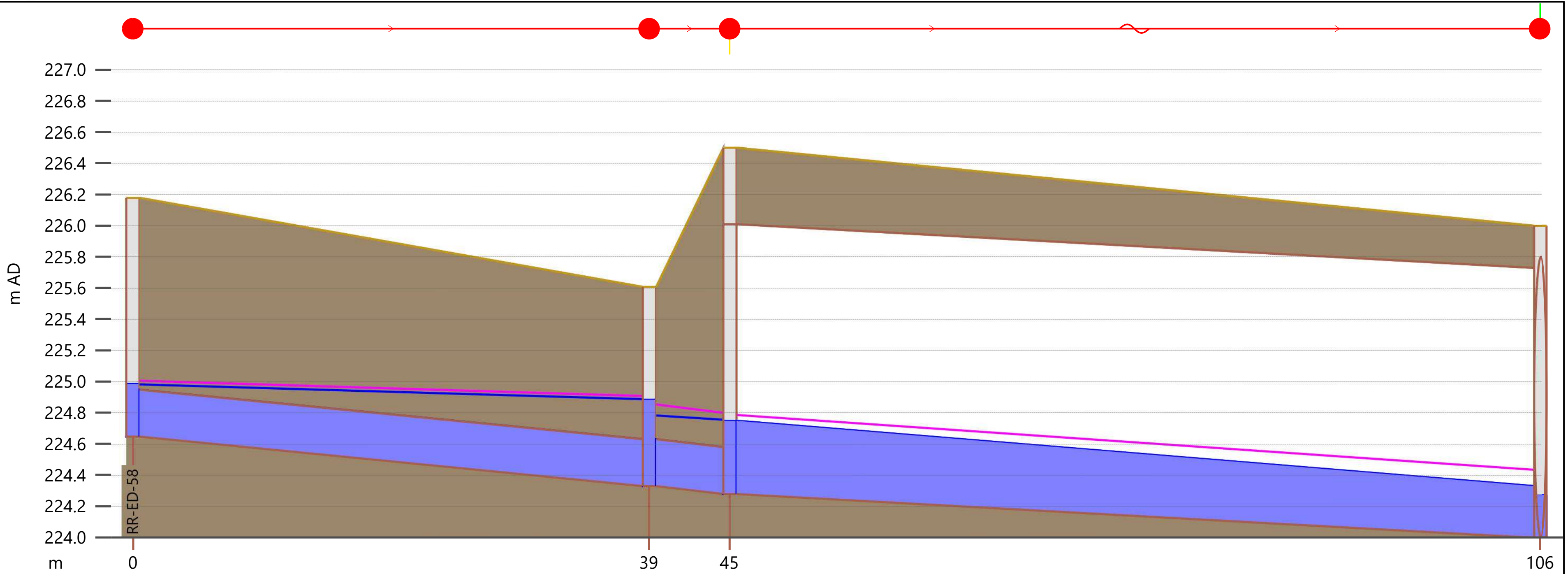
arva

Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 19

RVA PROJECT NO. 194615	FIGURE NO. 19A	AUGUST 2021	arva

Region of Peel
working with you



Link	RR-ED-58.1	-	RR-WD-56.1
US node ID	RR-ED-58	-	RR-WD-56
ds node	RR-ED-59	-	RR-WD-57
numbarrels	1	1	1
length (m)	38.9	6.1	
Shape ID	CIRC	CIRC	West Side Ditch-8 (Downstream of George Bolton Pkwy)
width (mm)	300	300	
height (mm)	300	300	
Rough type	N	N	
us inv (m AD)	224.648	224.330	224.280
ds inv (m AD)	224.330	224.280	224.000
grad (m/m)	0.00818	0.00818	
r.pfc (m3/s)	0.087	0.087	10.653
US depth (m)	0.336	0.452	0.469
US flow (m3/s)	0.04750	0.08912	0.66541
US velocity (m/s)	1.115	1.204	0.853

Node	RR-ED-58	RR-ED-59	RR-WD-56	RR-WD-57
Node ID	RR-ED-58	RR-ED-59	RR-WD-56	RR-WD-57
ground (m AD)	226.178	225.607	226.500	226.000
level (m AD)	224.987	224.884	224.749	224.269
expr:Freeboard	1.190598	0.722458	1.751068	1.730820

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 19

RVA PROJECT NO. 194615	FIGURE NO. 19B	AUGUST 2021

arva

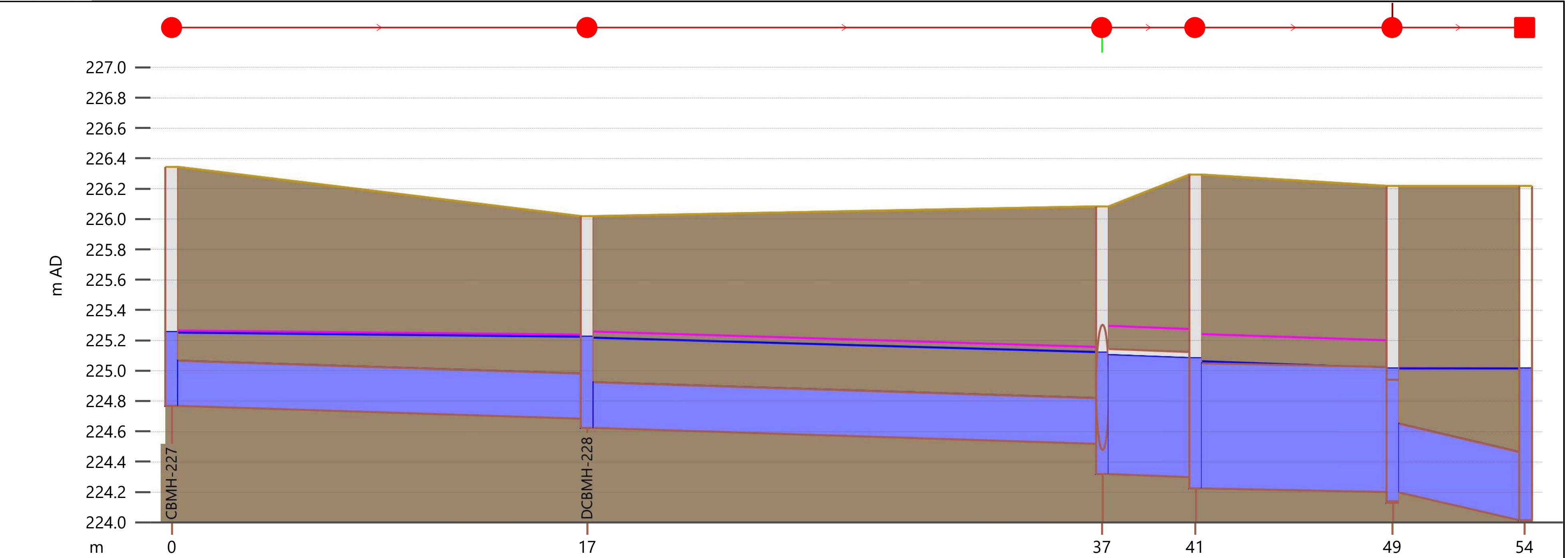
Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 19

RVA PROJECT NO. 194615	FIGURE NO. 19C	AUGUST 2021

arva

Region of Peel
working with you



Link	CBMH-227.1	DCBMH-228.1	-	OGS-20.1	MH-229.1
US node ID	CBMH-227	DCBMH-228	-	OGS-20	MH-229
ds node	DCBMH-228	DCBMH-225	OGS-20	MH-229	Chamber#19
numbarrels	1	1	1	1	1
length (m)	16.7	20.7	3.7	7.9	5.3
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC
width (mm)	300	300	825	825	450
height (mm)	300	300	825	825	450
Rough type	N	N	N	N	N
us inv (m AD)	224.768	224.624	224.320	224.224	224.200
ds inv (m AD)	224.684	224.520	224.299	224.202	224.017
grad (m/m)	0.00504	0.00503	0.00561	0.00278	0.03442
r.pfc (m3/s)	0.069	0.069	1.075	0.757	0.529
US depth (m)	0.485	0.595	0.784	0.838	0.817
US flow (m3/s)	0.03865	0.07307	1.02041	1.01905	0.18723
US velocity (m/s)	0.962	1.112	2.015	1.883	1.716

Node	CBMH-227	DCBMH-228	DCBMH-225	OGS-20	MH-229	-
Node ID	CBMH-227	DCBMH-228	DCBMH-225	OGS-20	MH-229	-
ground (m AD)	226.344	226.019	226.085	226.293	226.218	-
level (m AD)	225.256	225.227	225.122	225.083	225.017	-
expr:Freeboard	1.087942	0.792438	0.963130	1.210007	1.201200	-

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 19

RVA PROJECT NO. 194615 | FIGURE NO. 19D | AUGUST 2021

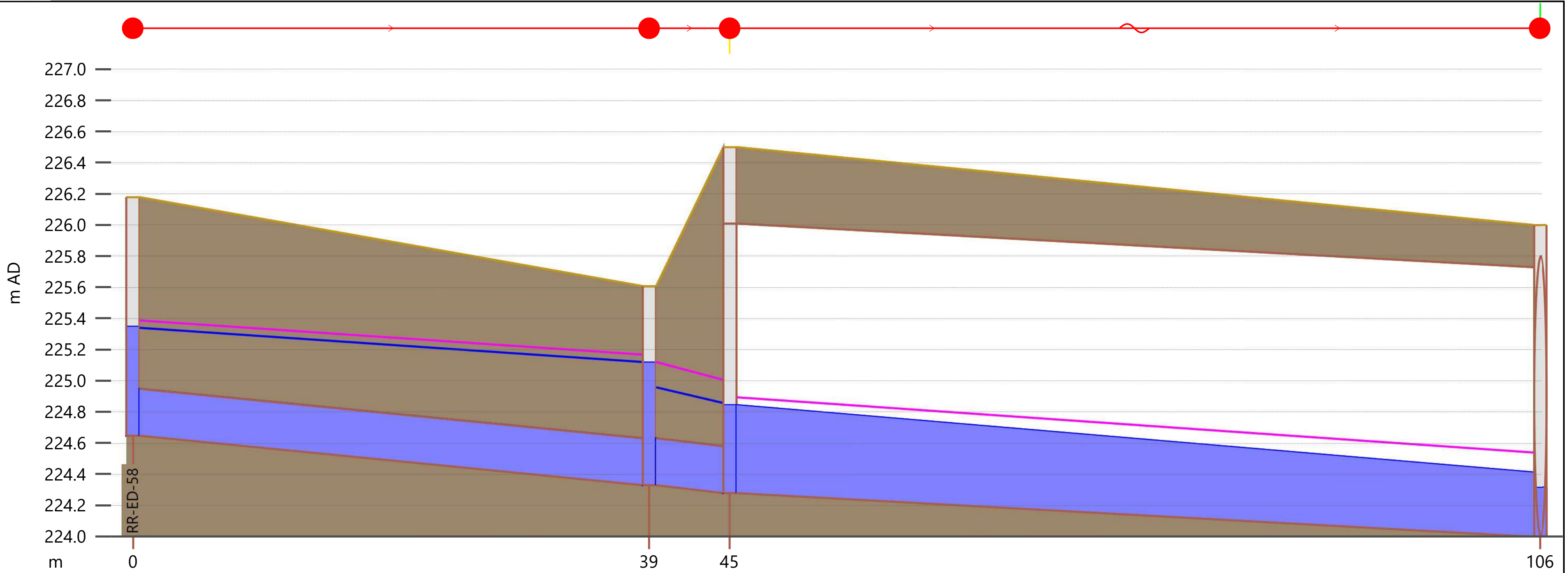
arva

Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 19		
RVA PROJECT NO. 194615	FIGURE NO. 19E	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-ED-58.1	-	RR-WD-56.1
US node ID	RR-ED-58	-	RR-WD-56
ds node	RR-ED-59	-	RR-WD-57
numbarrels	1	1	1
length (m)	38.9	6.1	
Shape ID	CIRC	CIRC	West Side Ditch-8 (Downstream of George Bolton Pkwy)
width (mm)	300	300	
height (mm)	300	300	
Rough type	N	N	
us inv (m AD)	224.648	224.330	224.280
ds inv (m AD)	224.330	224.280	224.000
grad (m/m)	0.00818	0.00818	
r.pfc (m3/s)	0.087	0.087	10.653
US depth (m)	0.694	0.629	0.563
US flow (m3/s)	0.07227	0.13442	1.02332
US velocity (m/s)	1.042	1.789	0.999

Node	RR-ED-58	RR-ED-59	RR-WD-56	RR-WD-57
Node ID	RR-ED-58	RR-ED-59	RR-WD-56	RR-WD-57
ground (m AD)	226.178	225.607	226.500	226.000
level (m AD)	225.349	225.117	224.843	224.313
expr:Freeboard	0.829056	0.489868	1.657042	1.686722

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 19

RVA PROJECT NO. 194615	FIGURE NO. 19F	AUGUST 2021

arva

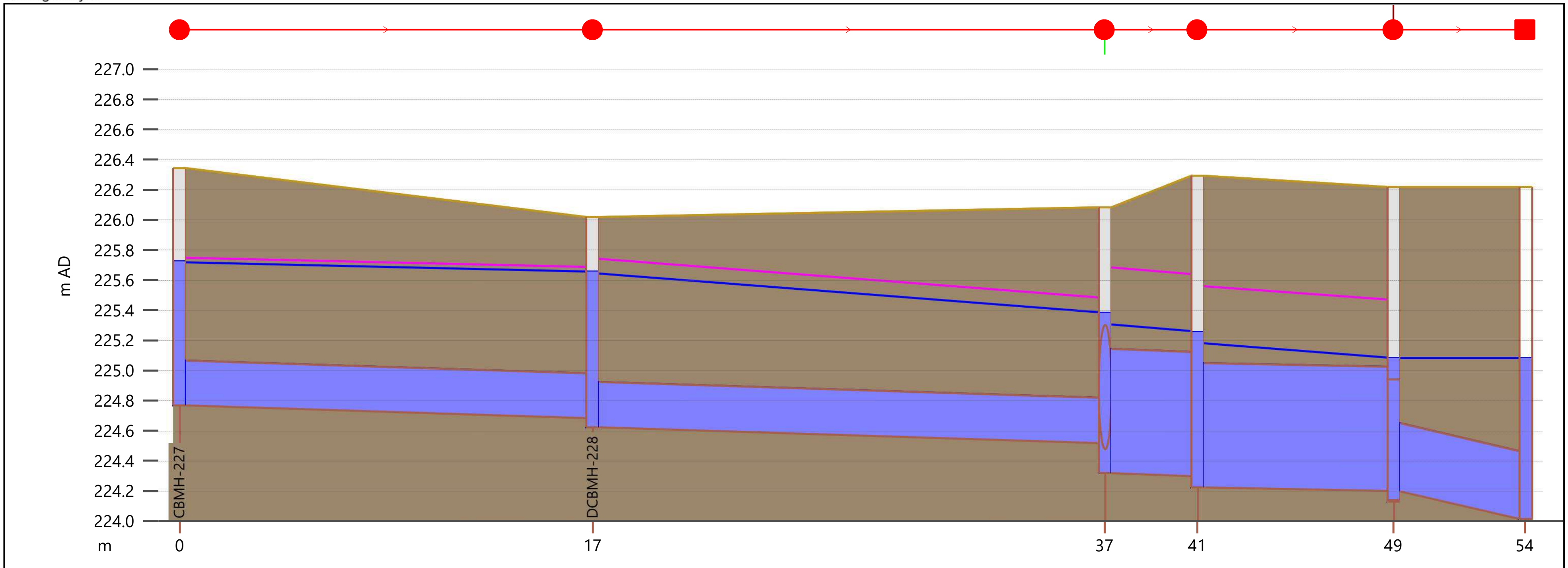
Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 19

RVA PROJECT NO. 194615	FIGURE NO. 19G	AUGUST 2021

arva

Region of Peel
working with you



Link	CBMH-227.1	DCBMH-228.1	-	OGS-20.1	MH-229.1
US node ID	CBMH-227	DCBMH-228	-	OGS-20	MH-229
ds node	DCBMH-228	DCBMH-225	OGS-20	MH-229	Chamber#19
numbarrels	1	1	1	1	1
length (m)	16.7	20.7	3.7	7.9	5.3
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC
width (mm)	300	300	825	825	450
height (mm)	300	300	825	825	450
Rough type	N	N	N	N	N
us inv (m AD)	224.768	224.624	224.320	224.224	224.200
ds inv (m AD)	224.684	224.520	224.299	224.202	224.017
grad (m/m)	0.00504	0.00503	0.00561	0.00278	0.03442
r.pfc (m3/s)	0.069	0.069	1.075	0.757	0.529
US depth (m)	0.952	1.019	0.986	0.958	0.883
US flow (m3/s)	0.06202	0.11367	1.51798	1.51702	0.17335
US velocity (m/s)	0.970	1.470	2.731	2.732	1.658

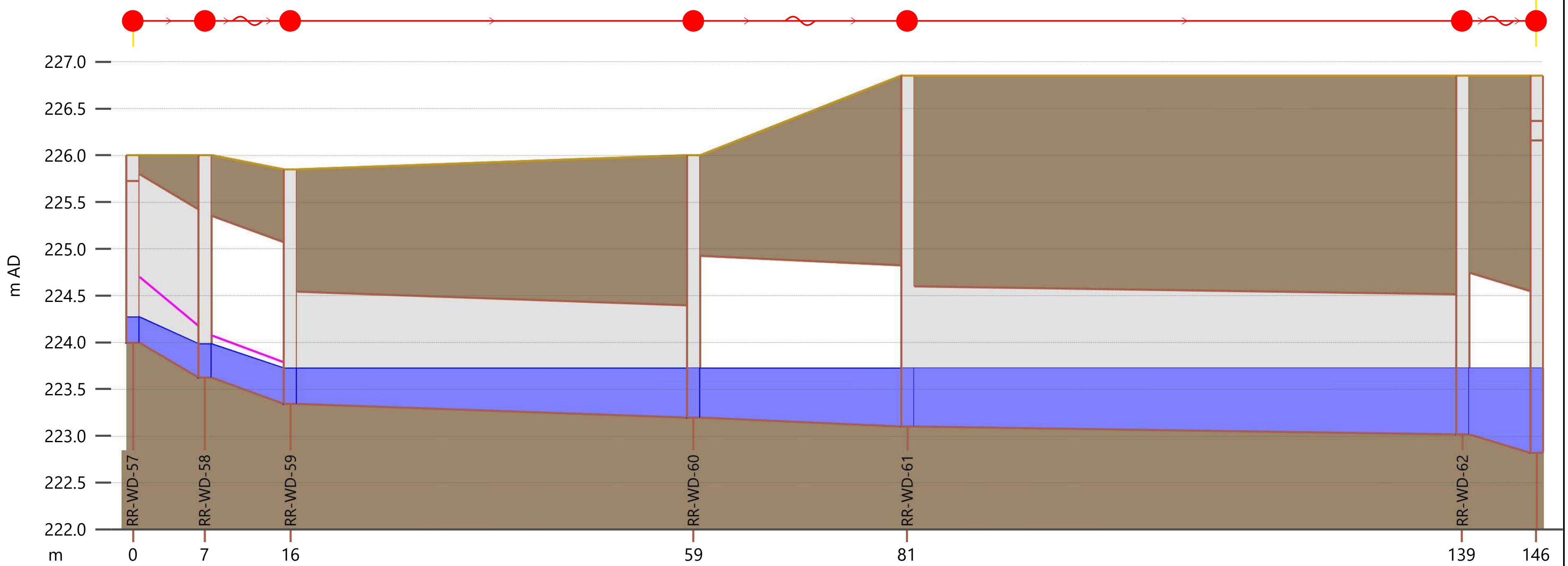
Node	CBMH-227	DCBMH-228	DCBMH-225	OGS-20	MH-229	-
Node ID	CBMH-227	DCBMH-228	DCBMH-225	OGS-20	MH-229	-
ground (m AD)	226.344	226.019	226.085	226.293	226.218	-
level (m AD)	225.724	225.658	225.385	225.258	225.083	-
expr:Freeboard	0.619879	0.361178	0.700373	1.035477	1.134519	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 19

RVA PROJECT NO. 194615	FIGURE NO. 19H	AUGUST 2021

rva

EXISTING CONDITION - 10-YEAR - WEST SIDE PLAN 20			arva
RVA PROJECT NO. 194615	FIGURE NO. 20A	AUGUST 2021	



Link	-	-	RR-WD-59.1	RR-WD-60.1	RR-WD-61.1	-
US node ID	-	-	RR-WD-59	RR-WD-60	RR-WD-61	-
ds node	-	-	RR-WD-60	RR-WD-61	RR-WD-62	-
numbarrels	1	1	1	1	1	1
length (m)	7.5		42.1		57.9	
Shape ID	CIRC	-	RECT	-	RECT	-
width (mm)	1800		2500		2500	
height (mm)	1800		1200		1500	
Rough type	N		N		N	
us inv (m AD)	224.000	223.625	223.343	223.199	223.100	223.016
ds inv (m AD)	223.625	223.343	223.199	223.100	223.016	222.822
grad (m/m)	0.05001		0.00342		0.00145	
r.pfc (m3/s)	25.709	27.903	7.396	10.477	6.629	24.879
US depth (m)	0.269	0.354	0.377	0.521	0.620	0.704
US flow (m3/s)	0.69418	0.69878	0.72091	0.71743	0.71436	0.71245
US velocity (m/s)	2.916	1.367	0.849	0.953	0.842	1.212

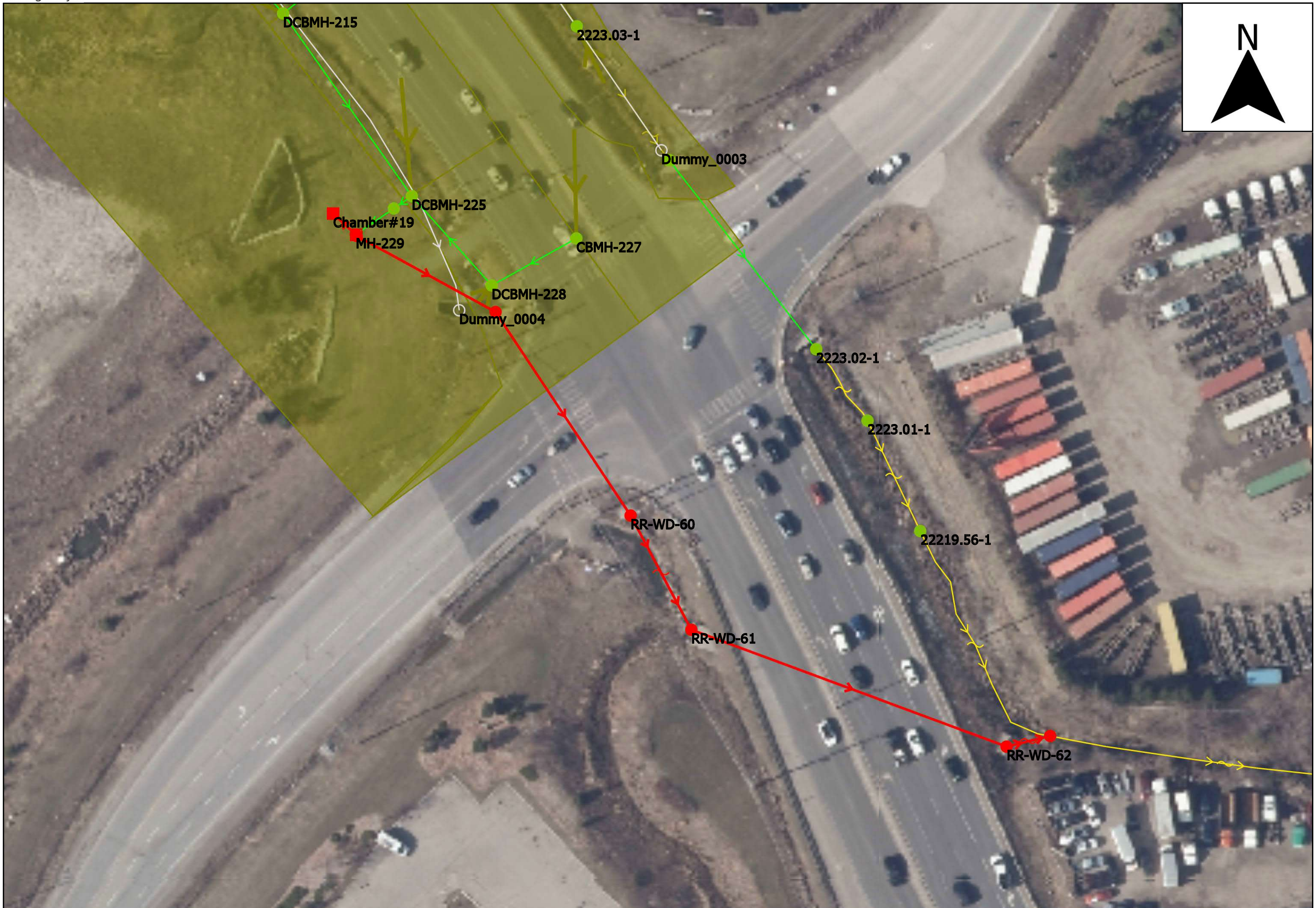
Node	-	-	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
Node ID	-	-	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
ground (m AD)	-	-	225.850	226.000	226.850	226.850	-
level (m AD)	-	-	223.720	223.720	223.720	223.720	-
expr:Freeboard	-	-	2.130029	2.280289	3.130334	3.130380	-

EXISTING CONDITION - 10-YEAR - WEST SIDE PROFILE 20

RVA PROJECT NO. 194615 | FIGURE NO. 20B | AUGUST 2021

rva

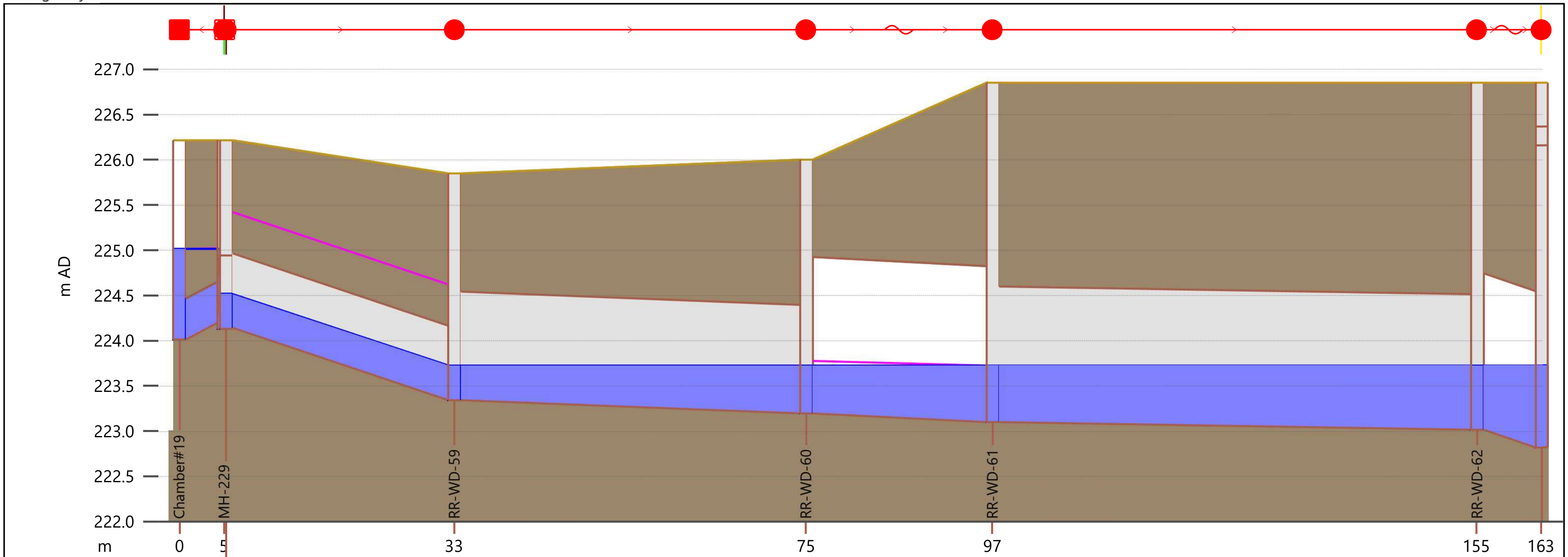
Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - WEST SIDE PLAN 20		
RVA PROJECT NO. 194615	FIGURE NO. 20C	AUGUST 2021

arva

Region of Peel
working with you



Link	-	MH-229_2.1	RR-WD-59.1	RR-WD-60.1	RR-WD-61.1	-
US node ID	-	MH-229_2	RR-WD-59	RR-WD-60	RR-WD-61	-
ds node	-	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
numbarrels	1	1	2	1	1	1
length (m)	5.3	27.3	42.1		57.9	
Shape ID	CIRC	CIRC	RECT	-	RECT	-
width (mm)	450	825	3500		2500	
height (mm)	450	825	1200		1500	
Rough type	N	N	N		N	
us inv (m AD)	-	224.142	223.343	223.199	223.100	-
ds inv (m AD)	-	223.343	223.199	223.100	223.016	-
grad (m/m)	-	0.02926	0.00342		0.00145	
r.pfc (m3/s)	-	2.456	11.048	10.477	6.629	24.879
US depth (m)	-	0.376	0.383	0.526	0.625	0.709
US flow (m3/s)	-	0.99917	0.99642	0.96917	0.96706	-
US velocity (m/s)	-	4.216	0.438	1.067	0.996	1.425

Node	MH-229_2	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
Node ID	MH-229_2	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
ground (m AD)	226.218	225.850	226.000	226.850	226.850	-
level (m AD)	224.519	223.726	223.725	223.725	223.725	-
expr:Freeboard	1.699079	2.124399	2.274643	3.124673	3.124734	-

PROPOSED CONDITION - 10-YEAR - WEST SIDE PROFILE 20

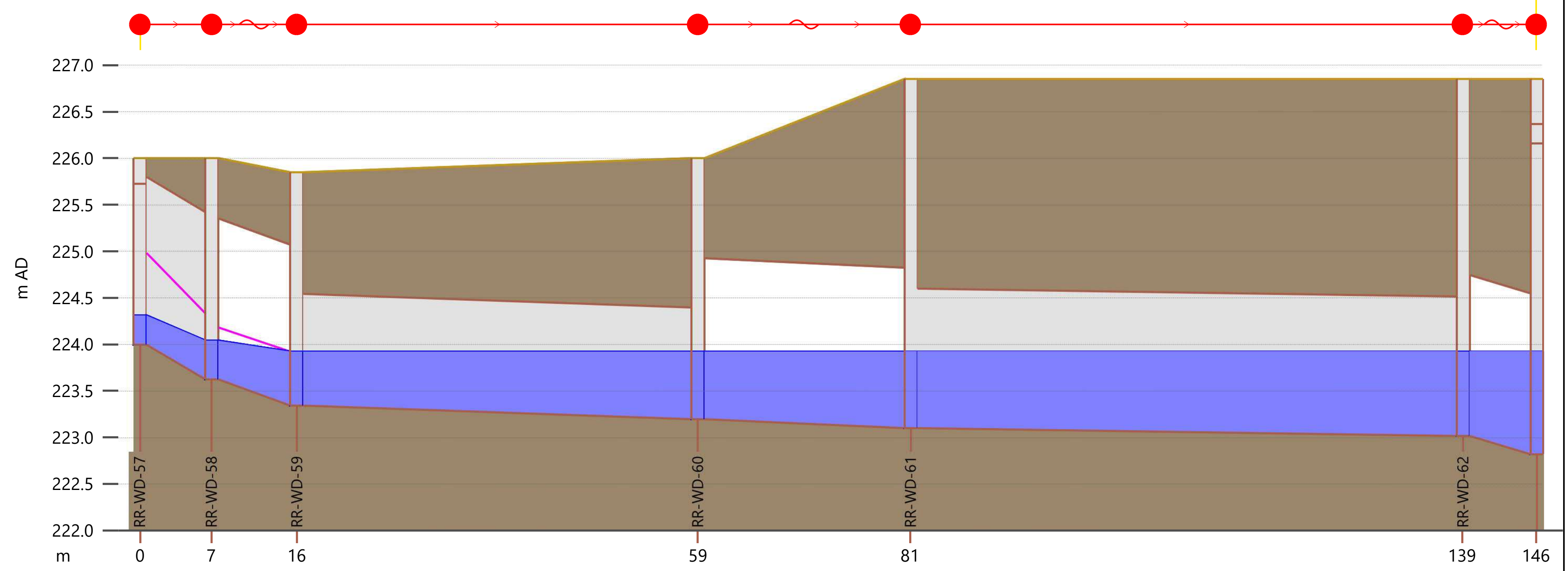
RVA PROJECT NO. 194615	FIGURE NO. 20D	AUGUST 2021

rva

Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - WEST SIDE PLAN 20			arva
RVA PROJECT NO. 194615	FIGURE NO. 20E	AUGUST 2021	

Region of Peel
working with you



Link	-	-	RR-WD-59.1	RR-WD-60.1	RR-WD-61.1	-
US node ID	-	-	RR-WD-59	RR-WD-60	RR-WD-61	-
ds node	-	-	RR-WD-60	RR-WD-61	RR-WD-62	-
numbarrels	1	1	1	1	1	1
length (m)	7.5		42.1		57.9	
Shape ID	CIRC	-	RECT	-	RECT	-
width (mm)	1800		2500		2500	
height (mm)	1800		1200		1500	
Rough type	N		N		N	
us inv (m AD)	224.000	223.625	223.343	223.199	223.100	223.016
ds inv (m AD)	223.625	223.343	223.199	223.100	223.016	222.822
grad (m/m)	0.05001		0.00342		0.00145	
r.pfc (m3/s)	25.709	27.903	7.396	10.477	6.629	24.879
US depth (m)	0.313	0.416	0.582	0.726	0.825	0.909
US flow (m3/s)	1.07331	1.08108	1.11756	1.11554	1.11323	1.10969
US velocity (m/s)	3.625	1.662	1.022	1.125	1.062	1.488

Node	-	-	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
Node ID	-	-	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
ground (m AD)	-	-	225.850	226.000	226.850	226.850	-
level (m AD)	-	-	223.925	223.925	223.925	223.925	-
expr:Freeboard	-	-	1.924692	2.074783	2.924783	2.924814	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 20

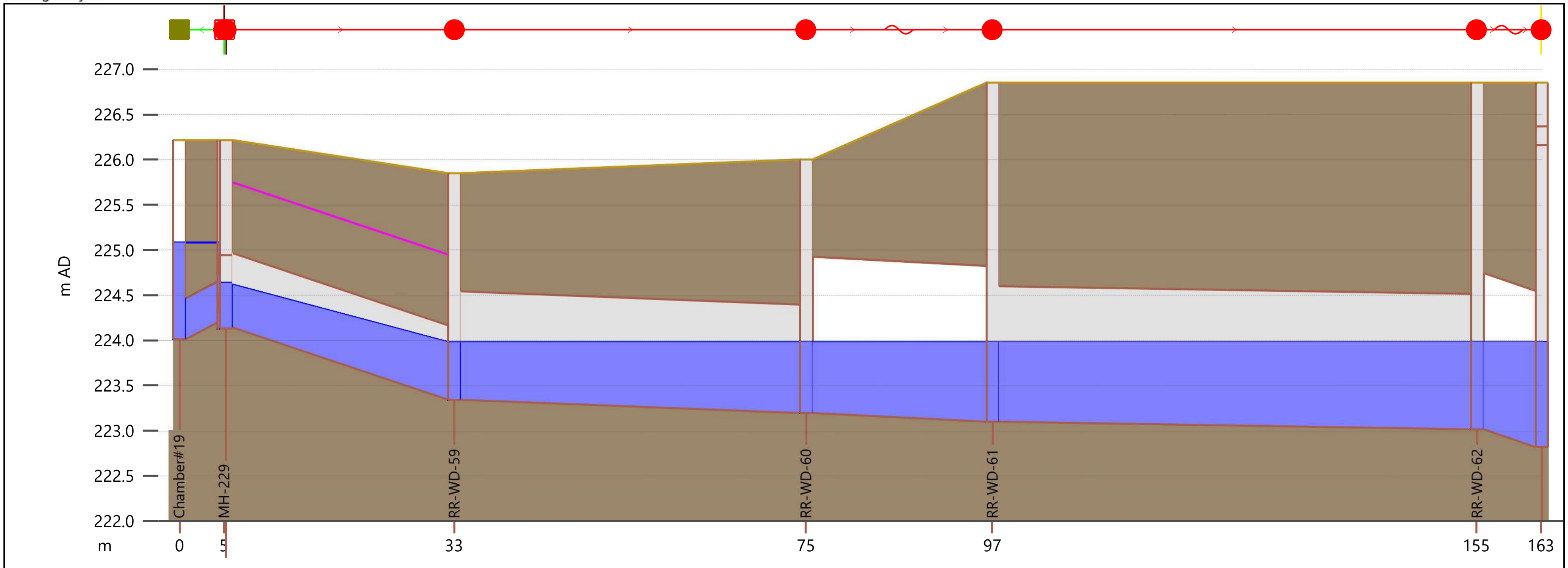
RVA PROJECT NO. 194615	FIGURE NO. 20F	AUGUST 2021	arva

Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - WEST SIDE PLAN 20		
RVA PROJECT NO. 194615	FIGURE NO. 20G	AUGUST 2021

arva

Region of Peel
working with you



Link	-	MH-229_2.1	RR-WD-59.1	RR-WD-60.1	RR-WD-61.1	-
US node ID	-	MH-229_2	RR-WD-59	RR-WD-60	RR-WD-61	-
ds node	-	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
numbarrels	1	1	2	1	1	1
length (m)	5.3	27.3	42.1		57.9	
Shape ID	CIRC	CIRC	RECT	-	RECT	-
width (mm)	450	825	3500		2500	
height (mm)	450	825	1200		1500	
Rough type	N	N	N		N	
us inv (m AD)	-	224.142	223.343	223.199	223.100	-
ds inv (m AD)	-	223.343	223.199	223.100	223.016	-
grad (m/m)	-	0.02926	0.00342		0.00145	
r.pfc (m3/s)	-	2.456	11.048	10.477	6.629	24.879
US depth (m)	-	0.474	0.638	0.782	0.881	0.965
US flow (m3/s)	-	1.49956	1.49705	1.48919	1.48718	-
US velocity (m/s)	-	4.718	0.485	1.254	1.251	1.750

Node		MH-229_2	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
Node ID		MH-229_2	RR-WD-59	RR-WD-60	RR-WD-61	RR-WD-62	-
ground (m AD)		226.218	225.850	226.000	226.850	226.850	-
level (m AD)		224.640	223.981	223.981	223.981	223.981	-
expr:Freeboard		1.577726	1.869226	2.019287	2.869287	2.869318	-

EXISTING CONDITION - 100-YEAR - WEST SIDE PROFILE 20

RVA PROJECT NO. 194615	FIGURE NO. 20H	AUGUST 2021

rva

EAST SIDE PLAN & PROFILE - INFOWORKS MODEL OUTPUT

DATA FLAGS

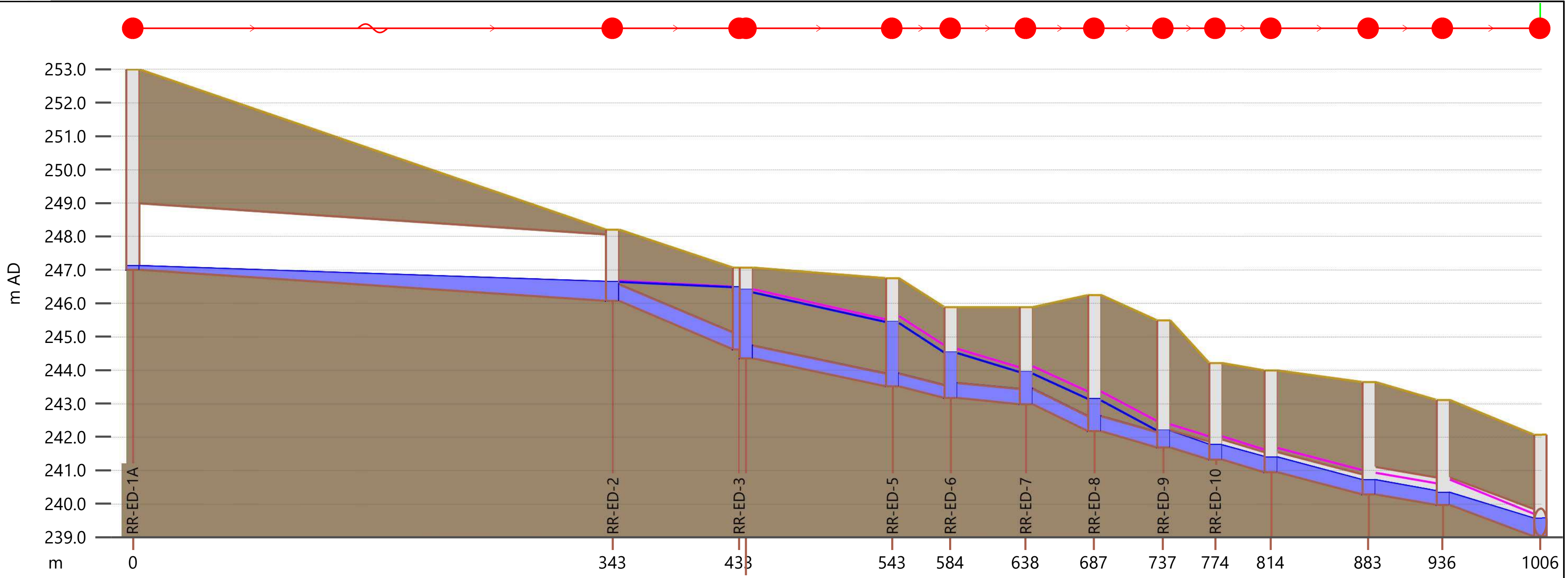
Name	Display Colour	Obsolete	Description
#A		☐	Asset Data
#D		☐	System Default
#G		☐	Data from GeoPlan
#I		☐	Model Import
#S		☐	System Calculated
#V		☐	CSV Import
AA		☐	Assumed Contributing Area
AC		☐	As Constructed Dwg
AD		☐	RVA-Assumed Data
AM		☐	Logical amendment made to GIS or survey data.
AS		☐	Assumed data
CA		☐	C of A
CALC		☐	Calculated Area Percentage (Google Earth) - RVA (SS)
CC		☐	Calculated based on set depth from cover level
CG		☐	Calculated on continuous gradient if no US invert
CPRV		☐	Calculated Parameter by RVA based on Matrix Data
CU		☐	Calculated by User
DC		☐	Based on Design Standards
DD		☐	Design Drawings
DE		☐	Developer Charges (DC)
DM		☐	Ground Level from DEM
DP		☐	Ground Level from Depth (+Min Invert)
DU		☐	DUMMY - data assumed for dummy or user-created nodes/link
EM		☐	Existing Model
FR		☐	Data supplied from Regional report or spreadsheet
GI		☐	GIS Import
IF		☐	Inferred
IT		☐	Interpolated
MD		☐	RVA - Data extracted from HEC-RAS model prepared by Matrix
MI		☐	Calculated Based on Minimum Slope
PD		☐	PROPOSED DESIGN
SD		☐	Survey Data
SDRV		☐	RVA-Survey Data
SI		☐	Calculated/Inferred Based on Survey/Site Data
TA		☐	TEMPORARY - Temporary assumption made pending survey or

Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 1		
RVA PROJECT NO. 194615	FIGURE NO. 21A	AUGUST 2021

rva

Region of Peel
working with you



Link	RR-ED-1A.1	RR-ED-2.1	RR-ED-4.1	-	-	-	-	-	-	RR-ED-11.1	-	RR-ED-13.1
US node ID	RR-ED-1A	RR-ED-2	RR-ED-4	-	RR-ED-6	-	-	-	-	RR-ED-11	-	RR-ED-13
ds node	RR-ED-2	RR-ED-3	RR-ED-5	-	RR-ED-7	-	-	-	-	RR-ED-12	-	RR-ED-14
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1
length (m)		90.4	104.4	41.5	53.8	49.0	49.3	37.5	39.6	69.7	53.1	69.9
Shape ID	East Side Ditch-1	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
width (mm)		500	375	375	450	450	450	525	600	600	825	825
height (mm)		500	375	375	450	450	450	525	600	600	825	825
Rough type		N	N	N	N	N	N	N	N	N	N	N
us inv (m AD)	247.000	246.068	244.358	-	243.173	242.988	242.176	-	-	240.956	240.291	239.970
ds inv (m AD)	246.068	244.622	243.521	-	242.988	242.176	241.695	-	-	240.291	239.970	239.030
grad (m/m)		0.01599	0.00801	-	0.00344	0.01656	0.00977	-	-	0.00954	0.00604	0.01345
r.pfc (m3/s)	16.699	0.478	0.157	0.161	0.167	0.367	0.282	0.421	0.601	0.600	1.116	1.665
US depth (m)	0.111	0.572	1.969	1.889	1.335	0.917	0.924	0.479	0.419	0.429	0.419	0.360
US flow (m3/s)	-0.00003	0.19957	0.20957	-	0.28792	0.34661	0.38606	-	-	0.51801	0.57414	0.62152
US velocity (m/s)	-0.000	2.218	1.686	2.088	1.675	2.459	2.286	2.202	2.347	2.392	2.105	2.777

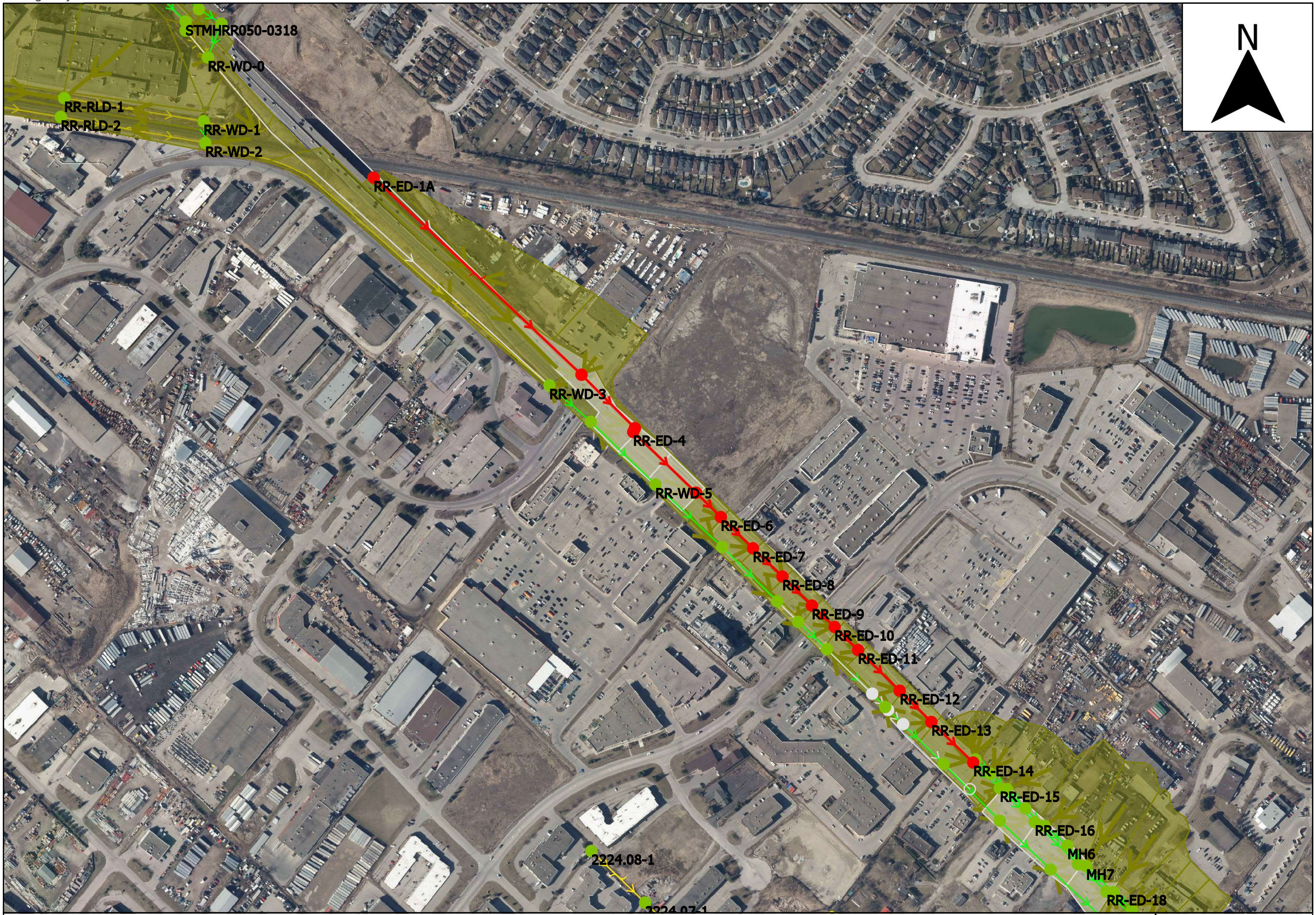
Node	RR-ED-1A	RR-ED-2	-	-	RR-ED-5	-	-	-	-	-	-	-	-	-
Node ID	RR-ED-1A	RR-ED-2	-	-	RR-ED-5	-	-	-	-	-	-	-	-	-
ground (m AD)	253.000	248.200	-	-	246.754	-	-	-	-	-	-	243.650	243.114	-
level (m AD)	247.111	246.646	-	-	245.441	-	-	-	-	-	-	240.711	240.330	-
expr:Freeboard	5.889252	1.554263	-	-	1.312655	-	-	-	-	-	-	-	-	-

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 1

RVA PROJECT NO. 194615	FIGURE NO. 21B	AUGUST 2021

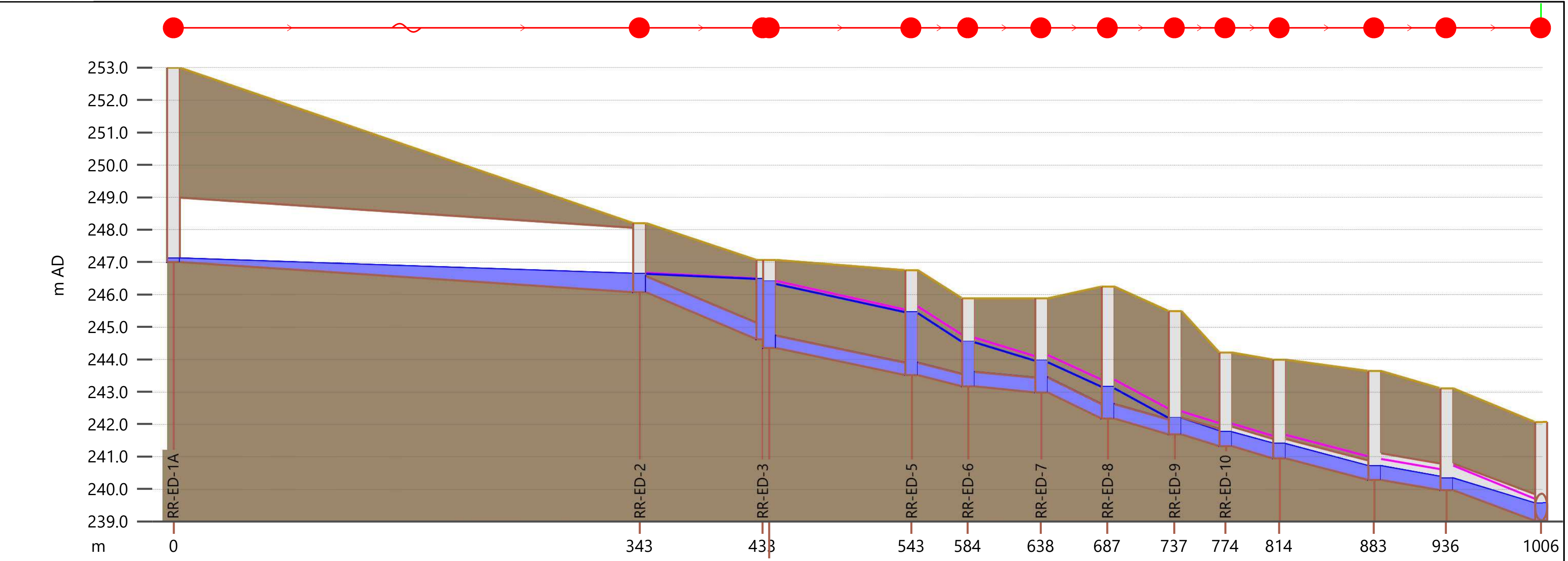
rva

Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 1			arva
RVA PROJECT NO. 194615	FIGURE NO. 21C	AUGUST 2021	

Region of Peel
working with you



Link	RR-ED-1A.1	RR-ED-2.1	RR-ED-4.1	-	-	-	-	-	-	RR-ED-11.1	-	RR-ED-13.1
US node ID	RR-ED-1A	RR-ED-2	RR-ED-4	-	RR-ED-6	-	-	-	-	RR-ED-11	-	RR-ED-13
ds node	RR-ED-2	RR-ED-3	RR-ED-5	-	RR-ED-7	-	-	-	-	RR-ED-12	-	RR-ED-14
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1
length (m)		90.4	104.4	41.5	53.8	49.0	49.3	37.5	39.6	69.7	53.1	69.9
Shape ID	East Side Ditch-1	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
width (mm)		500	375	375	450	450	450	525	600	600	825	825
height (mm)		500	375	375	450	450	450	525	600	600	825	825
Rough type		N	N	N	N	N	N	N	N	N	N	N
us inv (m AD)	247.000	246.068	244.358	-	243.173	242.988	242.176	-	-	240.956	240.291	239.970
ds inv (m AD)	246.068	244.622	243.521	-	242.988	242.176	241.695	-	-	240.291	239.970	239.030
grad (m/m)		0.01599	0.00801	-	0.00344	0.01656	0.00977	-	-	0.00954	0.00604	0.01345
r.pfc (m3/s)	16.699	0.478	0.157	0.161	0.167	0.367	0.282	0.421	0.601	0.600	1.116	1.665
US depth (m)	0.111	0.574	1.971	1.906	1.355	0.932	0.937	0.484	0.421	0.432	0.420	0.361
US flow (m3/s)	-0.00003	0.19937	0.20964	-	0.28793	0.34851	0.38772	-	-	0.52405	0.57648	0.62530
US velocity (m/s)	-0.000	2.229	1.686	2.088	1.675	2.459	2.295	2.200	2.343	2.406	2.109	2.782

Node	RR-ED-1A	RR-ED-2	-	-	RR-ED-5	-	-	-	-	-	-	-	-	-
Node ID	RR-ED-1A	RR-ED-2	-	-	RR-ED-5	-	-	-	-	-	-	-	-	-
ground (m AD)	253.000	248.200	-	-	246.754	-	-	-	-	-	-	243.650	243.114	-
level (m AD)	247.111	246.648	-	-	245.459	-	-	-	-	-	-	240.712	240.331	-
expr:Freeboard	5.889191	1.552371	-	-	1.295199	-	-	-	-	-	-	-	-	-

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 1

RVA PROJECT NO. 194615 | FIGURE NO. 21D | AUGUST 2021

rva

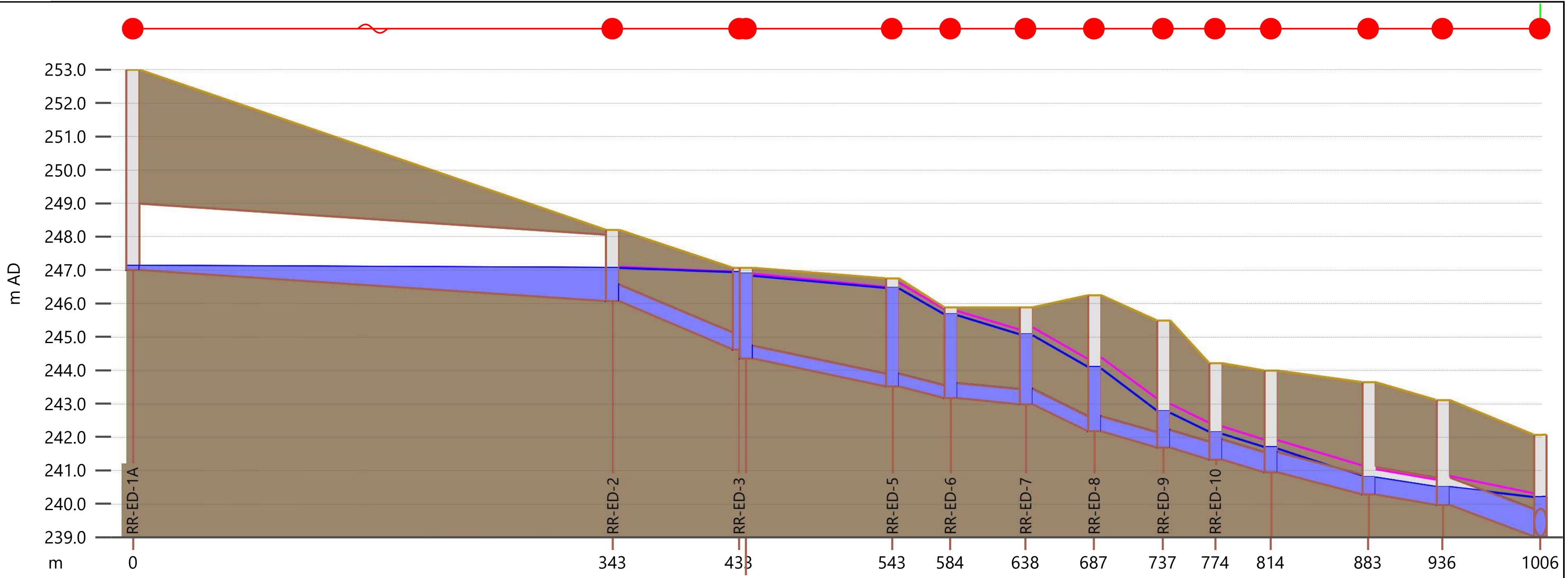
Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 1

RVA PROJECT NO. 194615	FIGURE NO. 21E	AUGUST 2021

rva

Region of Peel
working with you



Link	RR-ED-1A.1	RR-ED-2.1	RR-ED-4.1	-	-	-	-	-	-	RR-ED-11.1	-	RR-ED-13.1
US node ID	RR-ED-1A	RR-ED-2	RR-ED-4	-	RR-ED-6	-	-	-	-	RR-ED-11	-	RR-ED-13
ds node	RR-ED-2	RR-ED-3	RR-ED-5	-	RR-ED-7	-	-	-	-	RR-ED-12	-	RR-ED-14
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1
length (m)		90.4	104.4	41.5	53.8	49.0	49.3	37.5	39.6	69.7	53.1	69.9
Shape ID	East Side Ditch-1	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
width (mm)		500	375	375	450	450	450	525	600	600	825	825
height (mm)		500	375	375	450	450	450	525	600	600	825	825
Rough type		N	N	N	N	N	N	N	N	N	N	N
us inv (m AD)	247.000	246.068	244.358	-	243.173	242.988	242.176	-	-	240.956	240.291	239.970
ds inv (m AD)	246.068	244.622	243.521	-	242.988	242.176	241.695	-	-	240.291	239.970	239.030
grad (m/m)		0.01599	0.00801	-	0.00344	0.01656	0.00977	-	-	0.00954	0.00604	0.01345
r.pfc (m3/s)	16.699	0.478	0.157	0.161	0.167	0.367	0.282	0.421	0.601	0.600	1.116	1.665
US depth (m)	0.131	0.995	2.470	2.927	2.482	2.057	1.875	1.038	0.770	0.698	0.506	0.536
US flow (m3/s)	-0.00007	0.20793	0.22496	-	0.30730	0.38818	0.45608	-	-	0.67106	0.76581	0.84187
US velocity (m/s)	-0.000	2.266	1.775	2.153	1.742	2.467	2.576	2.326	2.410	2.467	2.271	2.973

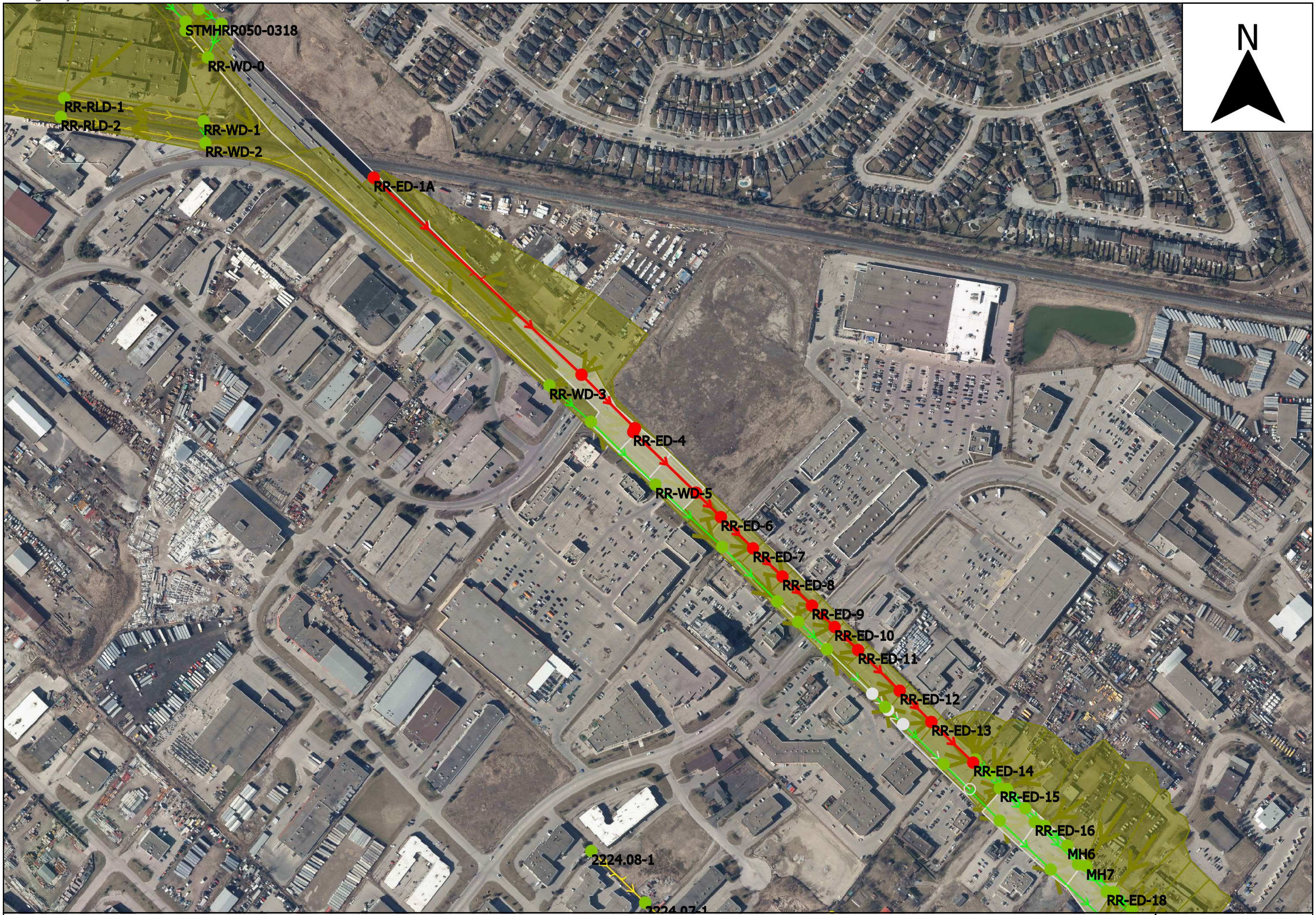
Node	RR-ED-1A	RR-ED-2	-	-	RR-ED-5	-	-	-	-	-	-	-	-	-
Node ID	RR-ED-1A	RR-ED-2	-	-	RR-ED-5	-	-	-	-	-	-	-	-	-
ground (m AD)	253.000	248.200	-	-	246.754	-	-	-	-	-	-	243.650	243.114	-
level (m AD)	247.131	247.069	-	-	246.475	-	-	-	-	-	-	240.802	240.514	-
expr:Freeboard	5.869446	1.130679	-	-	0.279055	-	-	-	-	-	-	-	-	-

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 1

RVA PROJECT NO. 194615	FIGURE NO. 21F	AUGUST 2021

rva

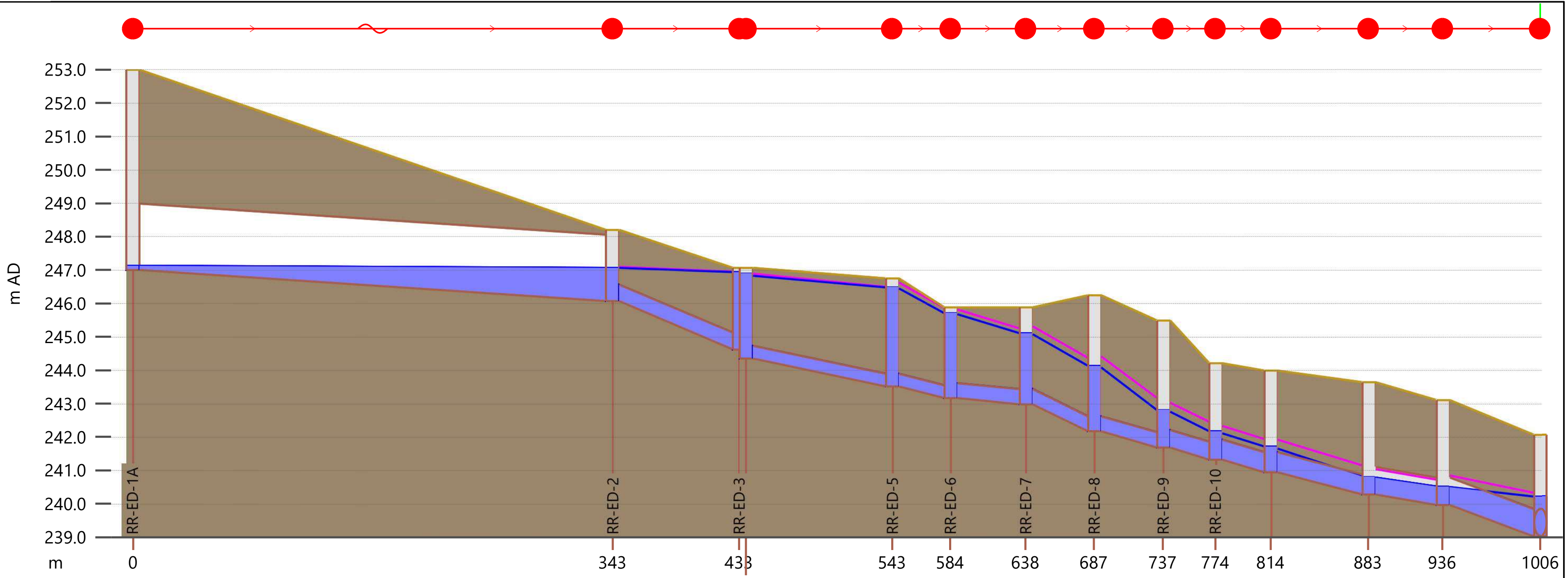
Region of Peel
working with you



PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 1		
RVA PROJECT NO. 194615	FIGURE NO. 21G	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-ED-1A.1	RR-ED-2.1	RR-ED-4.1	-	-	-	-	-	-	RR-ED-11.1	-	RR-ED-13.1
US node ID	RR-ED-1A	RR-ED-2	RR-ED-4	-	RR-ED-6	-	-	-	-	RR-ED-11	-	RR-ED-13
ds node	RR-ED-2	RR-ED-3	RR-ED-5	-	RR-ED-7	-	-	-	-	RR-ED-12	-	RR-ED-14
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1
length (m)		90.4	104.4	41.5	53.8	49.0	49.3	37.5	39.6	69.7	53.1	69.9
Shape ID	East Side Ditch-1	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
width (mm)		500	375	375	450	450	450	525	600	600	825	825
height (mm)		500	375	375	450	450	450	525	600	600	825	825
Rough type		N	N	N	N	N	N	N	N	N	N	N
us inv (m AD)	247.000	246.068	244.358	-	243.173	242.988	242.176	-	-	240.956	240.291	239.970
ds inv (m AD)	246.068	244.622	243.521	-	242.988	242.176	241.695	-	-	240.291	239.970	239.030
grad (m/m)		0.01599	0.00801	-	0.00344	0.01656	0.00977	-	-	0.00954	0.00604	0.01345
r.pfc (m3/s)	16.699	0.478	0.157	0.161	0.167	0.367	0.282	0.421	0.601	0.600	1.116	1.665
US depth (m)	0.131	0.996	2.471	2.940	2.515	2.091	1.907	1.066	0.785	0.708	0.509	0.539
US flow (m3/s)	-0.00006	0.20798	0.22499	-	0.30731	0.38811	0.45729	-	-	0.67827	0.77059	0.84922
US velocity (m/s)	-0.000	2.269	1.775	2.153	1.742	2.467	2.579	2.331	2.395	2.458	2.274	2.976

Node	RR-ED-1A	RR-ED-2	-	-	RR-ED-5	-	-	-	-	-	-	-	-	-
Node ID	RR-ED-1A	RR-ED-2	-	-	RR-ED-5	-	-	-	-	-	-	-	-	-
ground (m AD)	253.000	248.200	-	-	246.754	-	-	-	-	-	-	243.650	243.114	-
level (m AD)	247.131	247.070	-	-	246.485	-	-	-	-	-	-	240.807	240.518	-
expr:Freeboard	5.869125	1.129626	-	-	0.268633	-	-	-	-	-	-	-	-	-

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 1

RVA PROJECT NO. 194615 | FIGURE NO. 21H | AUGUST 2021

arva

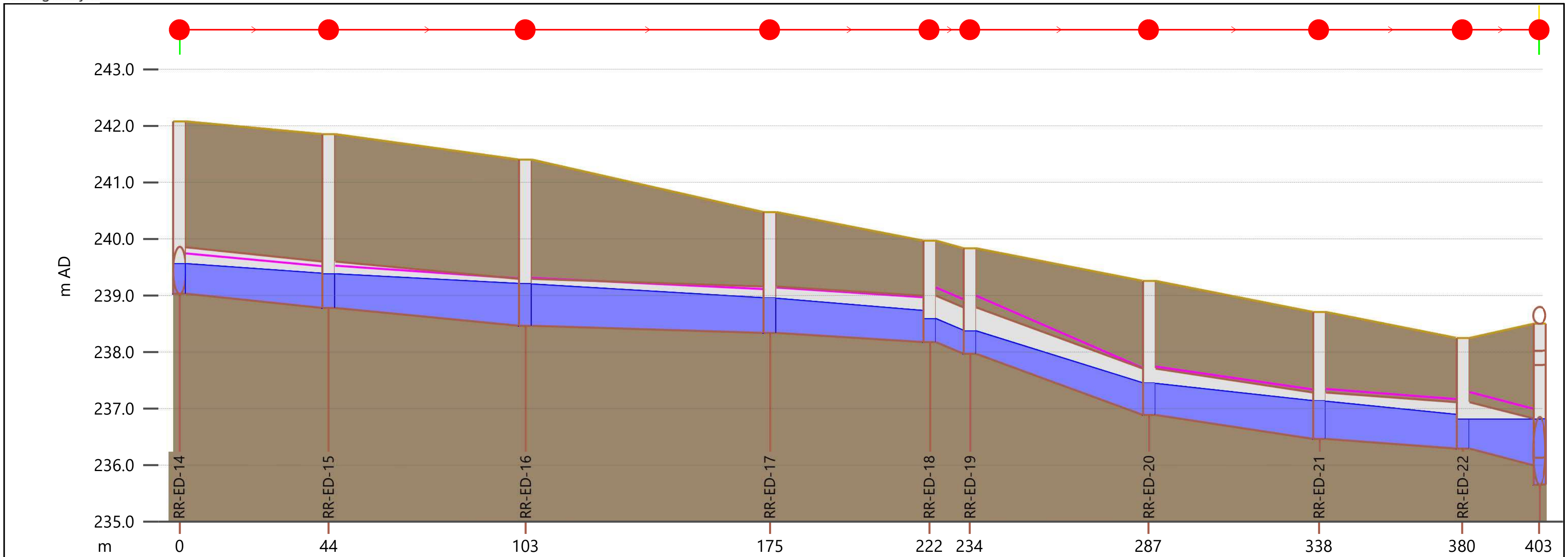
Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 2

RVA PROJECT NO. 194615	FIGURE NO. 22A	AUGUST 2021

rva

Region of Peel
working with you



Link	RR-ED-14.1	RR-ED-15.1	RR-ED-16.1	RR-ED-17.1	-	RR-ED-19.1	RR-ED-20.1	RR-ED-21.1	-
US node ID	RR-ED-14	RR-ED-15	RR-ED-16	RR-ED-17	-	RR-ED-19	RR-ED-20	RR-ED-21	-
ds node	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	-	RR-ED-20	RR-ED-21	RR-ED-22	-
numbarrels	1	1	1	1	1	1	1	1	1
length (m)	44.2	58.4	72.4	47.3	12.0	53.0	50.5	42.5	22.9
Shape ID	CIRC	CIRC	CIRC	CIRC	-	CIRC	CIRC	CIRC	CIRC
width (mm)	825	825	825	825	825	825	825	825	825
height (mm)	825	825	825	825	825	825	825	825	825
Rough type	N	N	N	N	N	N	N	N	N
us inv (m AD)	239.030	238.781	238.469	238.336	-	237.970	236.886	236.463	236.293
ds inv (m AD)	238.781	238.469	238.336	238.175	-	236.886	236.463	236.293	236.000
grad (m/m)	0.00563	0.00535	0.00184	0.00340	-	0.02044	0.00837	0.00400	0.01282
r.pfc (m3/s)	1.077	1.050	0.615	0.838	-	2.052	1.314	0.908	1.625
US depth (m)	0.522	0.592	0.726	0.609	-	0.396	0.549	0.657	0.516
US flow (m3/s)	0.69766	0.71717	0.75998	0.82651	-	0.89318	0.92671	0.97040	1.04332
US velocity (m/s)	2.028	1.888	1.563	1.955	-	3.526	2.472	2.125	3.174

Node	-	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	RR-ED-19	RR-ED-20	RR-ED-21	RR-ED-22	-
Node ID	-	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	RR-ED-19	RR-ED-20	RR-ED-21	RR-ED-22	-
ground (m AD)	-	241.856	241.407	240.476	239.970	239.836	239.262	238.713	238.252	-
level (m AD)	-	239.380	239.204	238.954	238.582	238.367	237.447	237.135	236.809	-
expr:Freeboard	-	2.475830	2.202118	1.521866	1.387787	1.469498	1.815109	1.578278	1.442688	-

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 2

RVA PROJECT NO. 194615 | FIGURE NO. 22B | AUGUST 2021

rva

Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 2			arva
RVA PROJECT NO. 194615	FIGURE NO. 22C	AUGUST 2021	

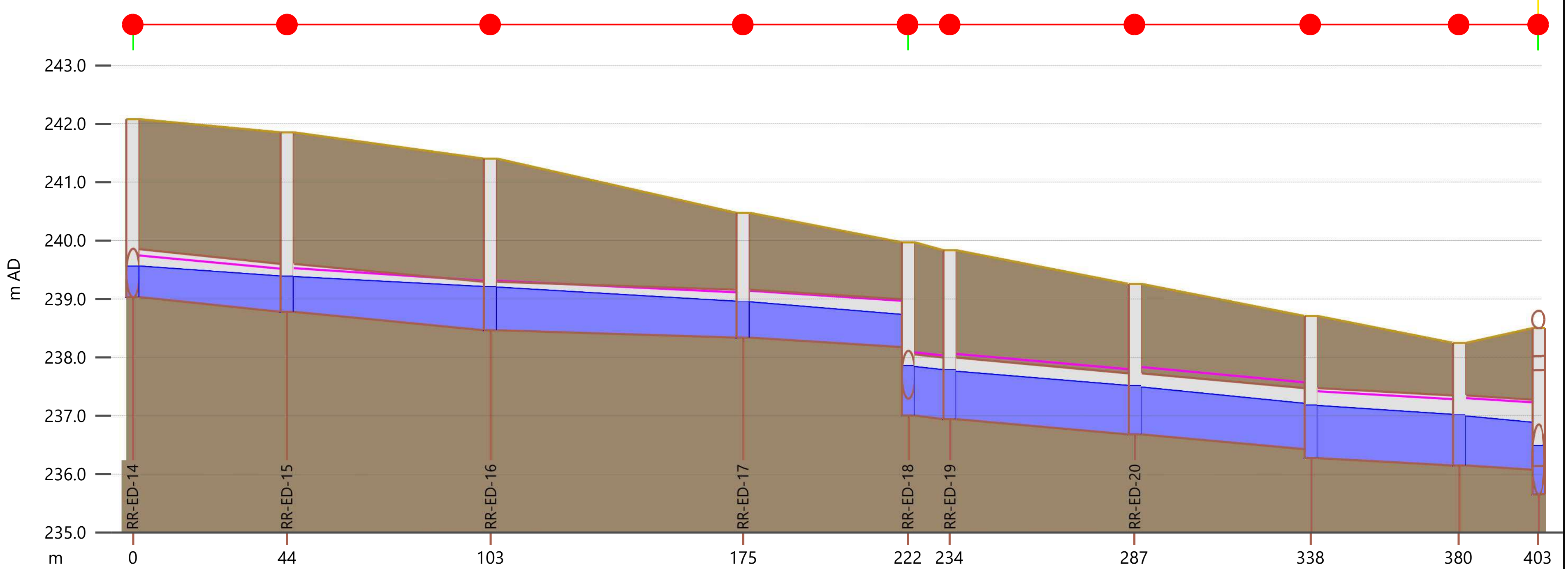
Region of Peel
working with you

PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 2-1
(PROPOSED STORM SEWERS UNDERNEATH THE PROPOSED SIDEWALK)

RVA PROJECT NO. 194615	FIGURE NO. 22C-1	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-ED-14.1	RR-ED-15.1	RR-ED-16.1	RR-ED-17.1	-	RR-ED-19.1	RR-ED-20.1	-	-
US node ID	RR-ED-14	RR-ED-15	RR-ED-16	RR-ED-17	-	RR-ED-19	RR-ED-20	-	-
ds node	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	-	RR-ED-20	STMHRR050-0297	-	-
numbarrels	1	1	1	1	1	1	1	1	1
length (m)	44.2	58.4	72.4	47.3	12.0	53.0	50.5	42.5	22.9
Shape ID	CIRC	CIRC	CIRC	CIRC	-	CIRC	CIRC	CIRC	CIRC
width (mm)	825	825	825	825	-	1050	1050	1200	1200
height (mm)	825	825	825	825	-	1050	1050	1200	1200
Rough type	N	N	N	N	N	N	N	N	N
us inv (m AD)	239.030	238.781	238.469	238.336	-	236.945	236.680	236.278	236.150
ds inv (m AD)	238.781	238.469	238.336	238.175	-	236.680	236.428	236.150	236.081
grad (m/m)	0.00563	0.00535	0.00184	0.00340	-	0.00500	0.00500	0.00300	0.00301
r.pfc (m3/s)	1.077	1.050	0.615	0.838	-	1.930	1.931	2.136	2.138
US depth (m)	0.525	0.595	0.729	0.610	-	0.814	0.808	0.889	0.836
US flow (m3/s)	0.70310	0.72099	0.76354	0.82912	-	1.75231	1.85792	2.02508	2.10251
US velocity (m/s)	2.035	1.888	1.565	1.956	-	2.451	2.605	2.258	2.499

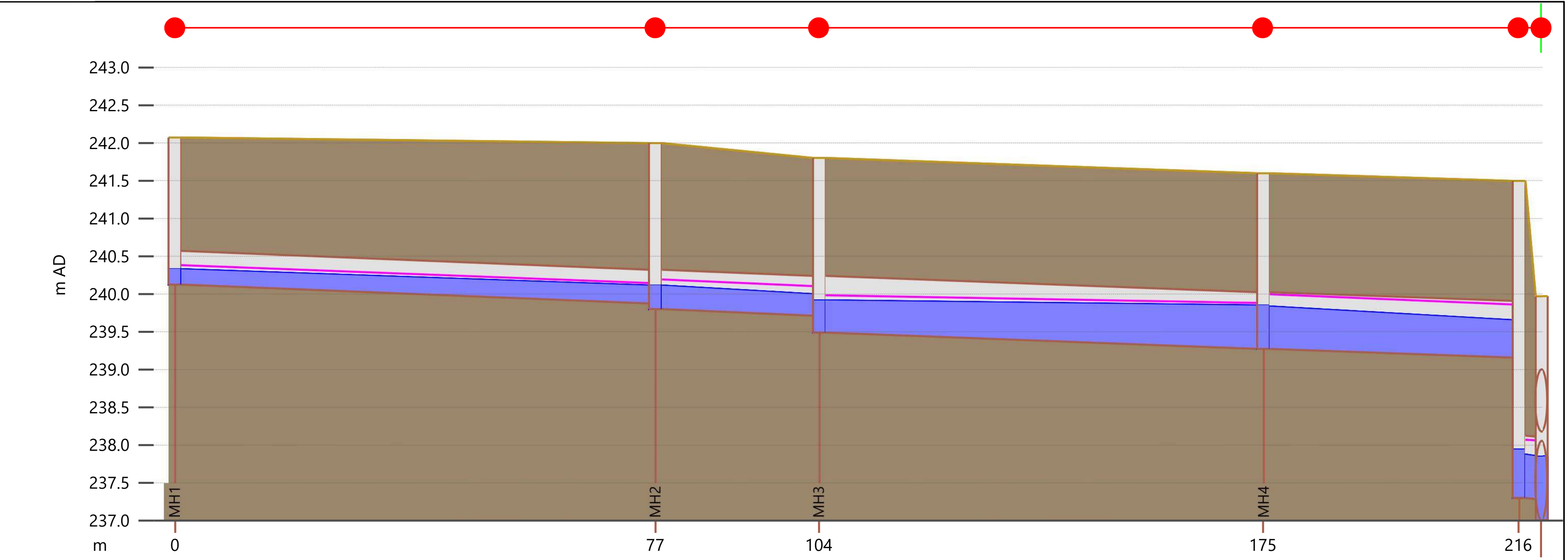
Node	-	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	RR-ED-19	RR-ED-20	STMHRR050-0297	-	-
Node ID	-	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	RR-ED-19	RR-ED-20	STMHRR050-0297	-	-
ground (m AD)	-	241.856	241.407	240.476	239.970	239.836	239.262	238.713	238.252	-
level (m AD)	-	239.383	239.207	238.956	237.852	237.782	237.509	237.180	237.016	-
expr:Freeboard	-	2.473404	2.199310	1.520294	2.118073	2.053696	1.752762	1.533129	1.235505	-

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 2

RVA PROJECT NO. 194615	FIGURE NO. 22D	AUGUST 2021

arva

Region of Peel
working with you



Link	MH1.1	MH2.1	MH3.1	MH4.1	-
US node ID	MH1	MH2	MH3	MH4	-
ds node	MH2	MH3	MH4	MH5	-
numbarrels	1	1	1	1	1
length (m)	77.3	26.3	71.5	41.1	-
Shape ID	CIRC	CIRC	CIRC	CIRC	-
width (mm)	450	525	750	750	-
height (mm)	450	525	750	750	-
Rough type	N	N	N	N	N
us inv (m AD)	240.125	239.800	239.493	239.275	-
ds inv (m AD)	239.875	239.718	239.275	239.159	-
grad (m/m)	0.00323	0.00314	0.00305	0.00283	-
r.pfc (m3/s)	0.162	0.241	0.615	0.592	-
US depth (m)	0.206	0.311	0.425	0.563	-
US flow (m3/s)	0.07100	0.17348	0.29497	0.63094	-
US velocity (m/s)	0.998	1.314	1.257	1.775	-

Node	MH1	MH2	MH3	MH4	MH5
Node ID	MH1	MH2	MH3	MH4	MH5
ground (m AD)	242.075	242.000	241.800	241.600	241.500
level (m AD)	240.331	240.113	239.919	239.850	237.942
expr:Freeboard	1.743594	1.886948	1.880811	1.750391	3.558243

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 2

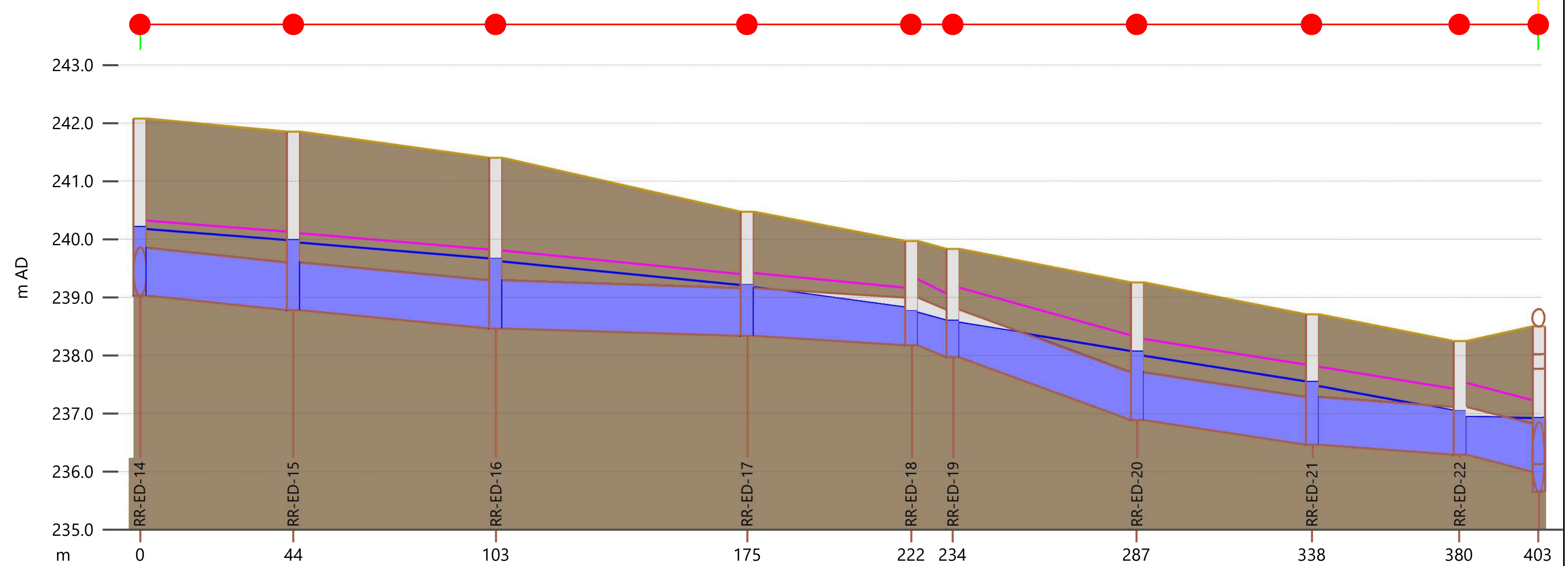
RVA PROJECT NO. 194615	FIGURE NO. 22D-1	AUGUST 2021

rva

Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 2			arva
RVA PROJECT NO. 194615	FIGURE NO. 22E	AUGUST 2021	

Region of Peel
working with you



Link	RR-ED-14.1	RR-ED-15.1	RR-ED-16.1	RR-ED-17.1	-	RR-ED-19.1	RR-ED-20.1	RR-ED-21.1	-
US node ID	RR-ED-14	RR-ED-15	RR-ED-16	RR-ED-17	-	RR-ED-19	RR-ED-20	RR-ED-21	-
ds node	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	-	RR-ED-20	RR-ED-21	RR-ED-22	-
numbarrels	1	1	1	1	1	1	1	1	1
length (m)	44.2	58.4	72.4	47.3	12.0	53.0	50.5	42.5	22.9
Shape ID	CIRC	CIRC	CIRC	CIRC	-	CIRC	CIRC	CIRC	CIRC
width (mm)	825	825	825	825	825	825	825	825	825
height (mm)	825	825	825	825	825	825	825	825	825
Rough type	N	N	N	N	N	N	N	N	N
us inv (m AD)	239.030	238.781	238.469	238.336	-	237.970	236.886	236.463	236.293
ds inv (m AD)	238.781	238.469	238.336	238.175	-	236.886	236.463	236.293	236.000
grad (m/m)	0.00563	0.00535	0.00184	0.00340	-	0.02044	0.00837	0.00400	0.01282
r.pfc (m3/s)	1.077	1.050	0.615	0.838	-	2.052	1.314	0.908	1.625
US depth (m)	1.149	1.166	1.153	0.846	-	0.597	1.111	1.015	0.649
US flow (m3/s)	0.93390	0.98049	1.06543	1.17392	-	1.28624	1.33600	1.40962	1.52962
US velocity (m/s)	2.097	1.933	1.907	2.157	-	3.784	2.550	2.534	3.388

Node	-	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	RR-ED-19	RR-ED-20	RR-ED-21	RR-ED-22	-
Node ID	-	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	RR-ED-19	RR-ED-20	RR-ED-21	RR-ED-22	-
ground (m AD)	-	241.856	241.407	240.476	239.970	239.836	239.262	238.713	238.252	-
level (m AD)	-	239.986	239.668	239.212	238.766	238.601	238.073	237.550	237.046	-
expr:Freeboard	-	1.869934	1.738785	1.264511	1.204330	1.234634	1.189056	1.163681	1.205948	-

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 2

RVA PROJECT NO. 194615	FIGURE NO. 22F	AUGUST 2021

arva

PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 2

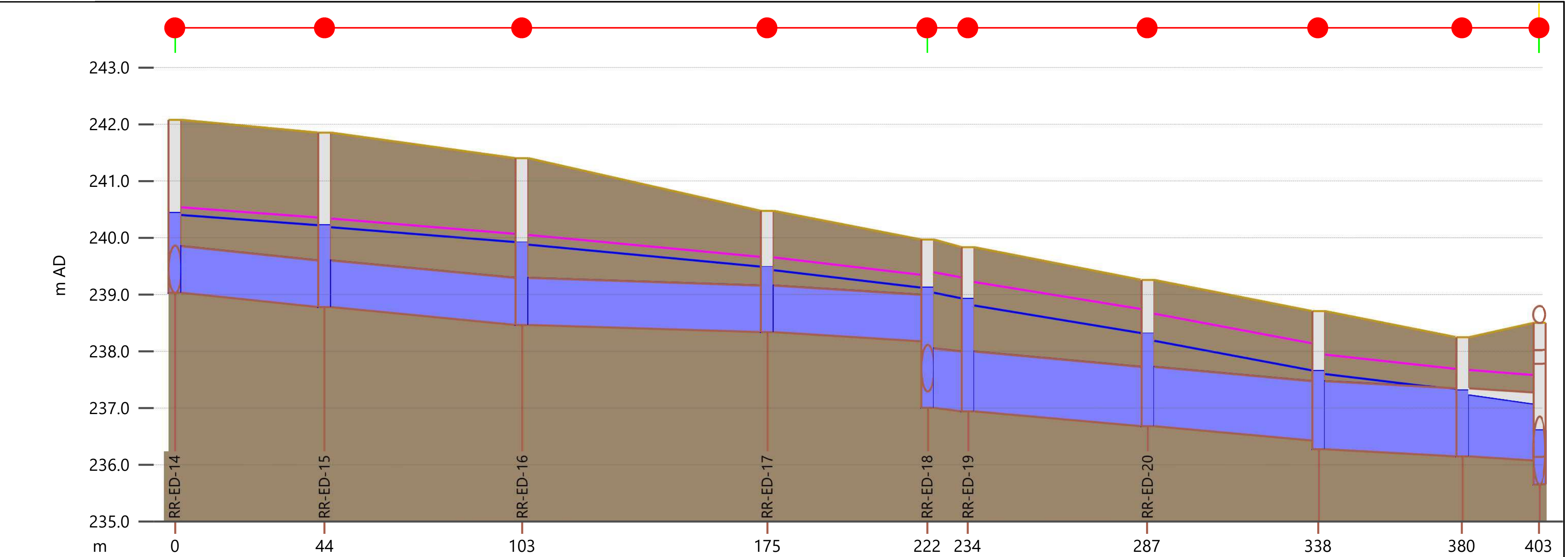
RVA PROJECT NO. 194615	FIGURE NO. 22G	AUGUST 2021

Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 2-1
(PROPOSED STORM SEWERS UNDERNEATH THE PROPOSED SIDEWALK)

RVA PROJECT NO. 194615	FIGURE NO. 22G-1	AUGUST 2021	arva

Region of Peel
working with you



Link	RR-ED-14.1	RR-ED-15.1	RR-ED-16.1	RR-ED-17.1	-	RR-ED-19.1	RR-ED-20.1	-	-
US node ID	RR-ED-14	RR-ED-15	RR-ED-16	RR-ED-17	-	RR-ED-19	RR-ED-20	-	-
ds node	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	-	RR-ED-20	STMHRR050-0297	-	-
numbarrels	1	1	1	1	1	1	1	1	1
length (m)	44.2	58.4	72.4	47.3	12.0	53.0	50.5	42.5	22.9
Shape ID	CIRC	CIRC	CIRC	CIRC	-	CIRC	CIRC	CIRC	CIRC
width (mm)	825	825	825	825	-	1050	1050	1200	1200
height (mm)	825	825	825	825	-	1050	1050	1200	1200
Rough type	N	N	N	N	N	N	N	N	N
us inv (m AD)	239.030	238.781	238.469	238.336	-	236.945	236.680	236.278	236.150
ds inv (m AD)	238.781	238.469	238.336	238.175	-	236.680	236.428	236.150	236.081
grad (m/m)	0.00563	0.00535	0.00184	0.00340	-	0.00500	0.00500	0.00300	0.00301
r.pfc (m3/s)	1.077	1.050	0.615	0.838	-	1.930	1.931	2.136	2.138
US depth (m)	1.377	1.407	1.411	1.099	-	1.863	1.503	1.321	1.077
US flow (m3/s)	0.94631	0.98974	1.06399	1.16673	-	2.60443	2.77007	3.03042	3.15791
US velocity (m/s)	2.097	1.939	1.902	2.105	-	2.852	3.059	2.587	2.951

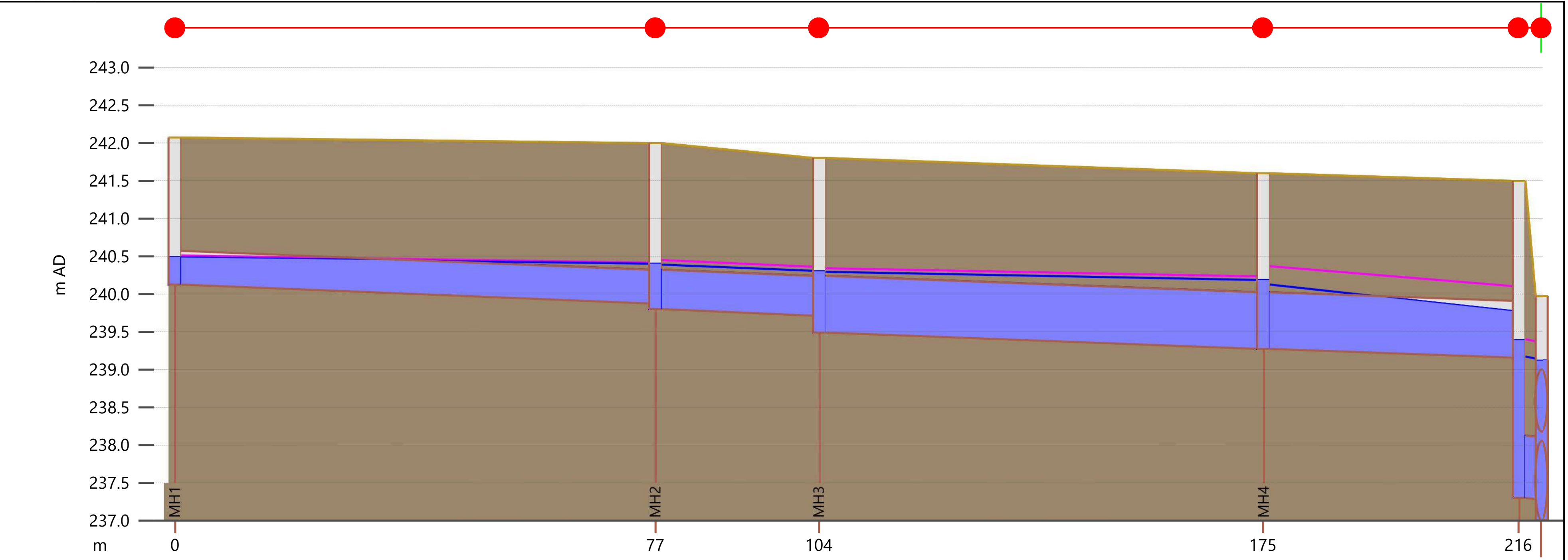
Node	-	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	RR-ED-19	RR-ED-20	STMHRR050-0297	-	-
Node ID	-	RR-ED-15	RR-ED-16	RR-ED-17	RR-ED-18	RR-ED-19	RR-ED-20	STMHRR050-0297	-	-
ground (m AD)	-	241.856	241.407	240.476	239.970	239.836	239.262	238.713	238.252	-
level (m AD)	-	240.222	239.920	239.486	239.122	238.925	238.312	237.654	237.317	-
expr:Freeboard	-	1.634048	1.486557	0.989929	0.848343	0.910767	0.950241	1.059283	0.934800	-

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 2

RVA PROJECT NO. 194615 | FIGURE NO. 22H | AUGUST 2021

arva

Region of Peel
working with you



Link	MH1.1	MH2.1	MH3.1	MH4.1	-
US node ID	MH1	MH2	MH3	MH4	-
ds node	MH2	MH3	MH4	MH5	-
numbarrels	1	1	1	1	1
length (m)	77.3	26.3	71.5	41.1	-
Shape ID	CIRC	CIRC	CIRC	CIRC	-
width (mm)	450	525	750	750	-
height (mm)	450	525	750	750	-
Rough type	N	N	N	N	N
us inv (m AD)	240.125	239.800	239.493	239.275	-
ds inv (m AD)	239.875	239.718	239.275	239.159	-
grad (m/m)	0.00323	0.00314	0.00305	0.00283	-
r.pfc (m3/s)	0.162	0.241	0.615	0.592	-
US depth (m)	0.362	0.590	0.805	0.855	-
US flow (m3/s)	0.11038	0.25868	0.43096	0.99206	-
US velocity (m/s)	1.103	1.467	1.315	2.163	-

Node	MH1	MH2	MH3	MH4	MH5
Node ID	MH1	MH2	MH3	MH4	MH5
ground (m AD)	242.075	242.000	241.800	241.600	241.500
level (m AD)	240.489	240.403	240.306	240.189	239.388
expr:Freeboard	1.586230	1.597244	1.494412	1.411050	2.111649

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 2
(PROPOSED STORM SEWER UNDERNEATH THE PROPOSED SIDEWALK)

RVA PROJECT NO. 194615 | FIGURE NO. 22H-1 | AUGUST 2021

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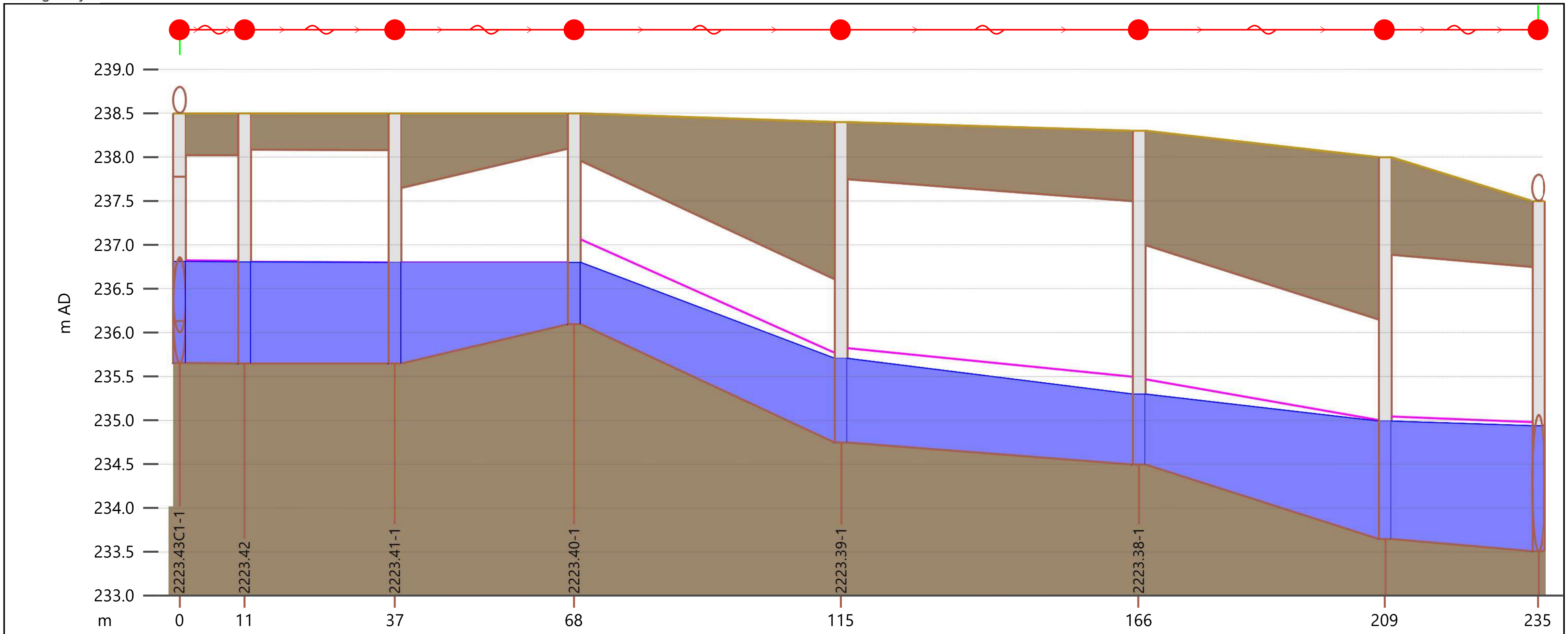
Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 3		
RVA PROJECT NO. 194615	FIGURE NO. 23A	AUGUST 2021

arva

Region of Peel
working with you



Link		-	2223.42.1	2223.41-1.1	2223.40-1.1	2223.39-1.1	2223.38-1.1	2223.37-1.1
US node ID		-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1
ds node		2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	2223.37-2
numbarrels		1	1	1	1	1	1	1
Length (m)		11.3	26.0	31.0	46.2	51.6	42.6	26.6
Shape ID		-	Matrix-2223.42	Matrix-2223.41	Matrix-2223.40	Matrix-2223.39	Matrix-2223.38	Matrix-2223.37
us inv (m AD)		235.653	235.652	235.651	236.100	234.750	234.500	233.650
ds inv (m AD)		235.652	235.651	236.100	234.750	234.500	233.650	233.510
grad (m/m)								
US depth (m)		1.156	1.149	1.147	0.698	0.951	0.798	1.337
US flow (m3/s)		5.10639	5.10639	5.10639	5.10639	5.10639	5.10639	5.47638
US velocity (m/s)		0.530	0.263	0.190	2.287	1.560	1.892	1.215
r.pfc (m3/s)		20.564	18.000	-285.884	121.664	112.156	176.862	97.931

Node	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	-
Node ID	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	-
ground (m AD)	-	238.500	238.500	238.500	238.400	238.300	238.000	237.500
level (m AD)	-	236.801	236.798	236.798	235.701	235.298	234.987	234.934
expr:Freeboard	-	1.698776	1.701767	1.701782	2.698630	3.001843	3.012772	-

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 3

RVA PROJECT NO. 194615	FIGURE NO. 23B	AUGUST 2021

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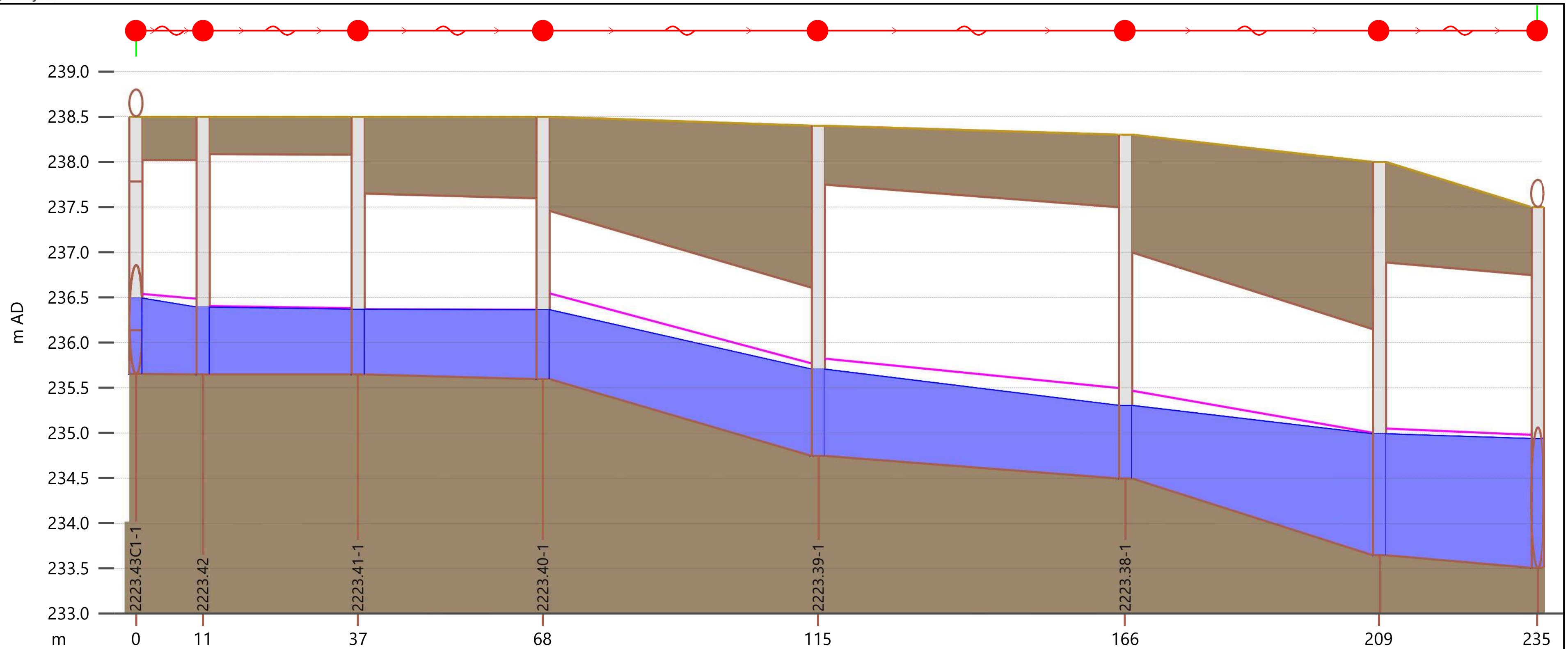
PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 3

RVA PROJECT NO. 194615	FIGURE NO. 23C	AUGUST 2021

Region of Peel
working with you



Link	-	2223.42.1	2223.41-1.1	2223.40-1.1	2223.39-1.1	2223.38-1.1	2223.37-1.1
US node ID	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1
ds node	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	2223.37-2
numbarrels	1	1	1	1	1	1	1
Length (m)	11.3	26.0	31.0	46.2	51.6	42.6	26.6
Shape ID	-	Matrix-2223.42	Matrix-2223.41	Matrix-2223.40	Matrix-2223.39	Matrix-2223.38	Matrix-2223.37
us inv (m AD)	235.653	235.652	235.651	235.600	234.750	234.500	233.650
ds inv (m AD)	235.652	235.651	235.600	234.750	234.500	233.650	233.510
grad (m/m)							
US depth (m)	0.833	0.738	0.715	0.759	0.952	0.798	1.338
US flow (m3/s)	5.10871	5.10871	5.10871	5.10871	5.10871	5.11123	5.47871
US velocity (m/s)	1.042	0.510	0.332	1.923	1.561	1.914	1.210
r.pfc (m3/s)	20.564	18.000	96.350	96.539	112.156	176.862	97.931

Node	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	-
Node ID	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	-
ground (m AD)	-	238.500	238.500	238.500	238.400	238.300	238.000	237.500
level (m AD)	-	236.390	236.366	236.359	235.702	235.298	234.988	234.934
expr:Freeboard	-	2.109528	2.133652	2.140930	2.698401	3.001614	3.012329	-

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 3

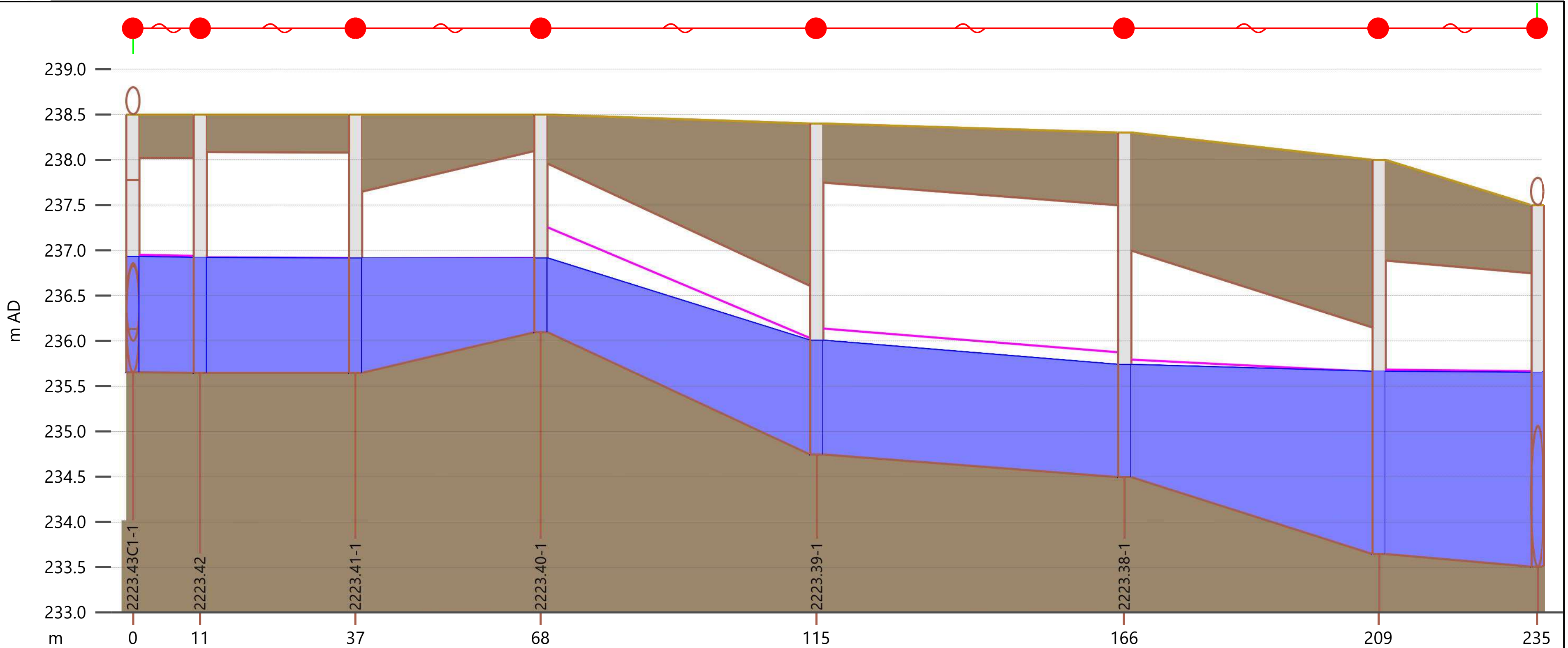
RVA PROJECT NO. 194615	FIGURE NO. 23D	AUGUST 2021

arva

EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 3

RVA PROJECT NO. 194615	FIGURE NO. 23E	AUGUST 2021	arva

Region of Peel
working with you



Link	-	2223.42.1	2223.41-1.1	2223.40-1.1	2223.39-1.1	2223.38-1.1	2223.37-1.1
US node ID	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1
ds node	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	2223.37-2
numbarrels	1	1	1	1	1	1	1
Length (m)	11.3	26.0	31.0	46.2	51.6	42.6	26.6
Shape ID	-	Matrix-2223.42	Matrix-2223.41	Matrix-2223.40	Matrix-2223.39	Matrix-2223.38	Matrix-2223.37
us inv (m AD)	235.653	235.652	235.651	236.100	234.750	234.500	233.650
ds inv (m AD)	235.652	235.651	236.100	234.750	234.500	233.650	233.510
grad (m/m)							
US depth (m)	1.274	1.263	1.260	0.810	1.255	1.238	2.012
US flow (m3/s)	7.89588	7.89588	7.89588	7.89588	7.89588	7.90018	8.48585
US velocity (m/s)	0.682	0.355	0.258	2.595	1.729	1.953	1.254
r.pfc (m3/s)	20.564	18.000	-285.884	121.664	112.156	176.862	97.931

Node	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	-
Node ID	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	-
ground (m AD)	-	238.500	238.500	238.500	238.400	238.300	238.000	237.500
level (m AD)	-	236.915	236.911	236.910	236.005	235.738	235.662	235.651
expr:Freeboard	-	1.584549	1.589371	1.590057	2.395361	2.562253	2.338242	-

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 3

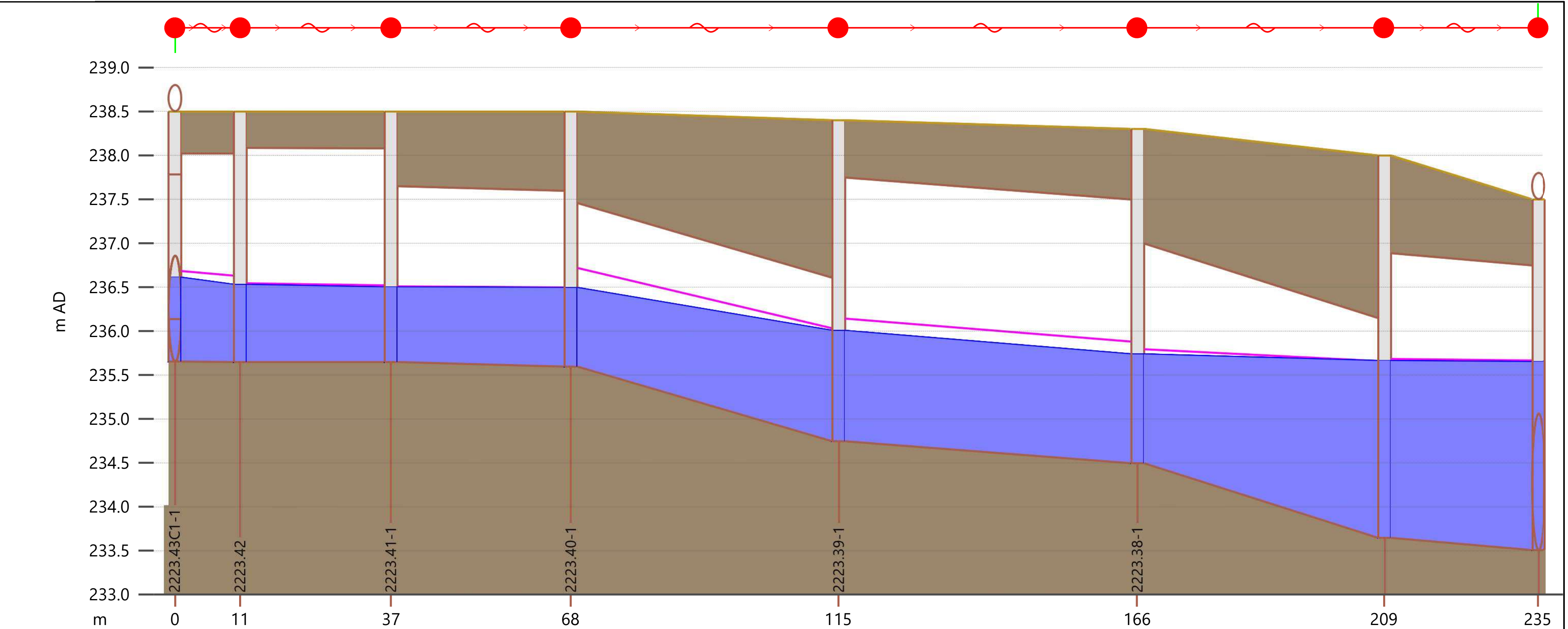
RVA PROJECT NO. 194615	FIGURE NO. 23F	AUGUST 2021

arva

Region of Peel
working with you

PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 3			arva
RVA PROJECT NO. 194615	FIGURE NO. 23G	AUGUST 2021	

Region of Peel
working with you



Link	-	2223.42.1	2223.41-1.1	2223.40-1.1	2223.39-1.1	2223.38-1.1	2223.37-1.1
US node ID	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1
ds node	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	2223.37-2
numbarrels	1	1	1	1	1	1	1
Length (m)	11.3	26.0	31.0	46.2	51.6	42.6	26.6
Shape ID	-	Matrix-2223.42	Matrix-2223.41	Matrix-2223.40	Matrix-2223.39	Matrix-2223.38	Matrix-2223.37
us inv (m AD)	235.653	235.652	235.651	235.600	234.750	234.500	233.650
ds inv (m AD)	235.652	235.651	235.600	234.750	234.500	233.650	233.510
grad (m/m)							
US depth (m)	0.957	0.874	0.849	0.890	1.255	1.238	2.012
US flow (m3/s)	7.89915	7.89915	7.89914	7.89912	7.89930	7.90986	8.48899
US velocity (m/s)	1.195	0.608	0.427	2.134	1.692	1.890	1.230
r.pfc (m3/s)	20.564	18.000	96.350	96.539	112.156	176.862	97.931

Node	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	-
Node ID	-	2223.42	2223.41-1	2223.40-1	2223.39-1	2223.38-1	2223.37-1	-
ground (m AD)	-	238.500	238.500	238.500	238.400	238.300	238.000	237.500
level (m AD)	-	236.526	236.500	236.490	236.005	235.738	235.662	235.651
expr:Freeboard	-	1.974167	2.000488	2.009644	2.395010	2.561703	2.337555	-

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 3

RVA PROJECT NO. 194615	FIGURE NO. 23H	AUGUST 2021

arva

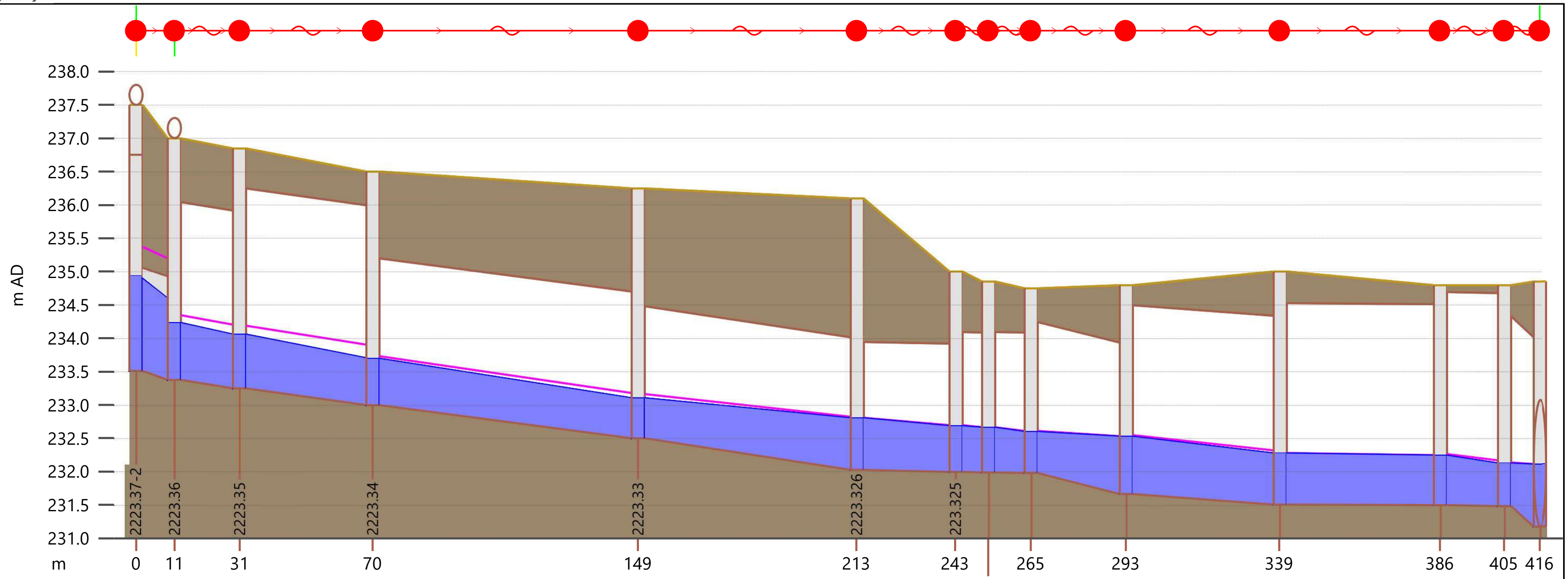
Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 4

RVA PROJECT NO. 194615	FIGURE NO. 24A	AUGUST 2021

arva

Region of Peel
working with you



Link	-	-	2223.35.1	2223.34.1	2223.33.1	2223.326.1	-	-	-	2223.32-1.1	2223.31-1.1	-	-
US node ID	-	-	2223.35	2223.34	2223.33	2223.326	-	-	2223.323-1	2223.32-1	2223.31-1	-	-
ds node	-	-	2223.34	2223.33	2223.326	223.325	-	-	2223.32-1	2223.31-1	2223.30-1	-	-
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	11.4												
Shape ID	-	-	Matrix-2223.35	Matrix-2223.34	Matrix-2223.33	-	-	-	-	Matrix-2223.32	Matrix-2223.31	-	-
width (mm)	-												
height (mm)	-												
Rough type	N												
us inv (m AD)	-	-	233.250	233.000	232.500	232.031	-	-	231.984	231.670	231.511	-	-
ds inv (m AD)	-	-	233.000	232.500	232.031	232.000	-	-	231.670	231.511	231.500	-	-
grad (m/m)	-												
r.pfc (m3/s)	-	-	353.527	169.587	107.007	45.047	-	-	186.614	143.820	82.012	-	-
US depth (m)	-	0.847	0.810	0.695	0.606	0.773	-	-	0.611	0.856	0.762	0.744	-
US flow (m3/s)	-	-	5.47638	5.47638	5.47638	5.47638	-	-	5.47637	5.47637	5.47637	-	-
US velocity (m/s)	-	1.567	1.589	0.921	1.108	0.561	-	-	0.669	0.823	0.405	0.683	-

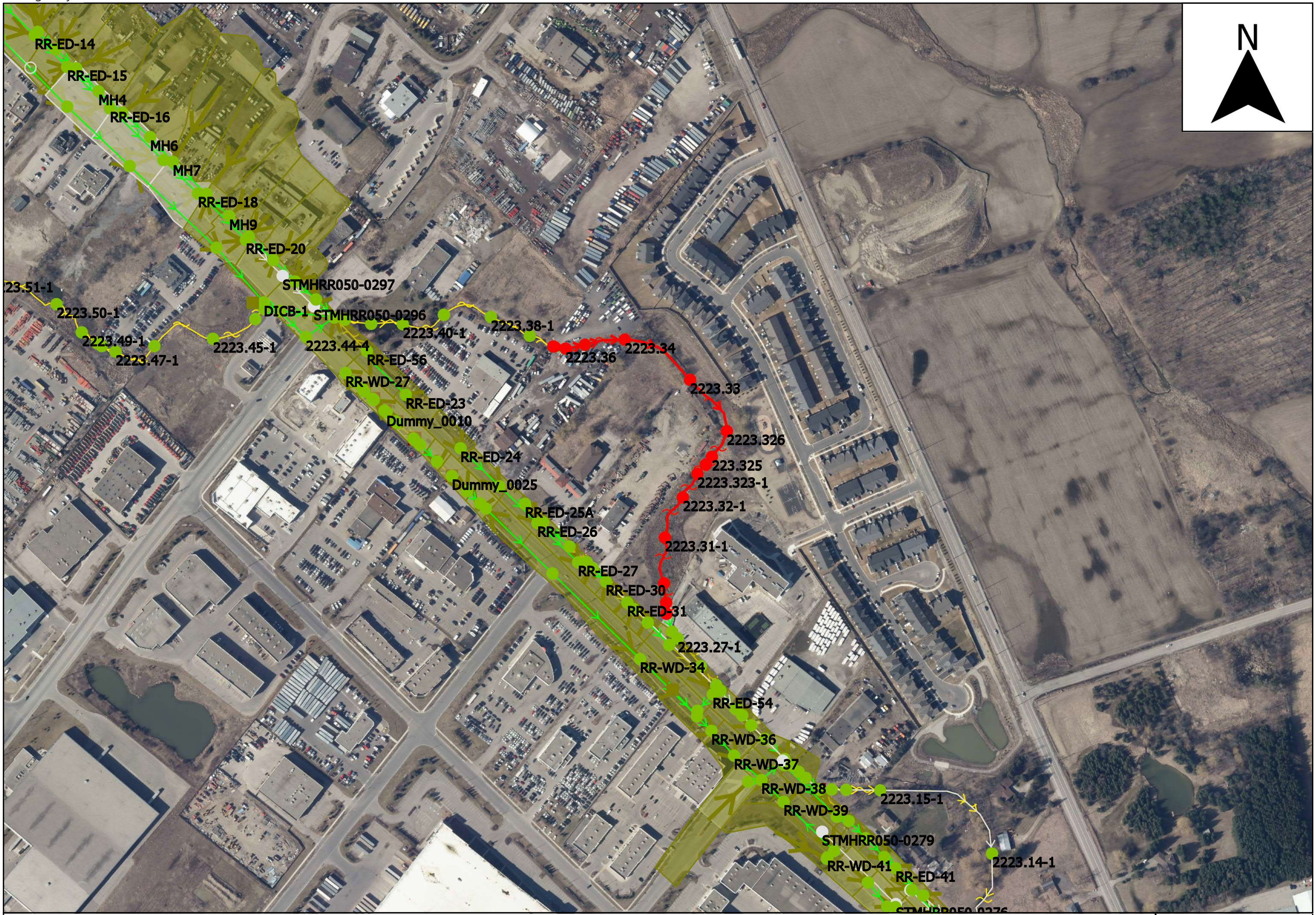
Node	-	2223.35	2223.34	2223.33	2223.326	-	-	-	2223.32-1	2223.31-1	2223.30-1	-
Node ID	-	2223.35	2223.34	2223.33	2223.326	-	-	-	2223.32-1	2223.31-1	2223.30-1	-
ground (m AD)	-	236.850	236.500	236.250	236.100	-	-	-	234.800	235.000	234.800	-
level (m AD)	-	234.060	233.695	233.106	232.804	-	-	-	232.526	232.273	232.244	-
expr:Freeboard	-	2.790430	2.804886	3.144180	3.296091	-	-	-	2.273755	2.726898	2.555920	-

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 4

RVA PROJECT NO. 194615 | FIGURE NO. 24B | AUGUST 2021

arva

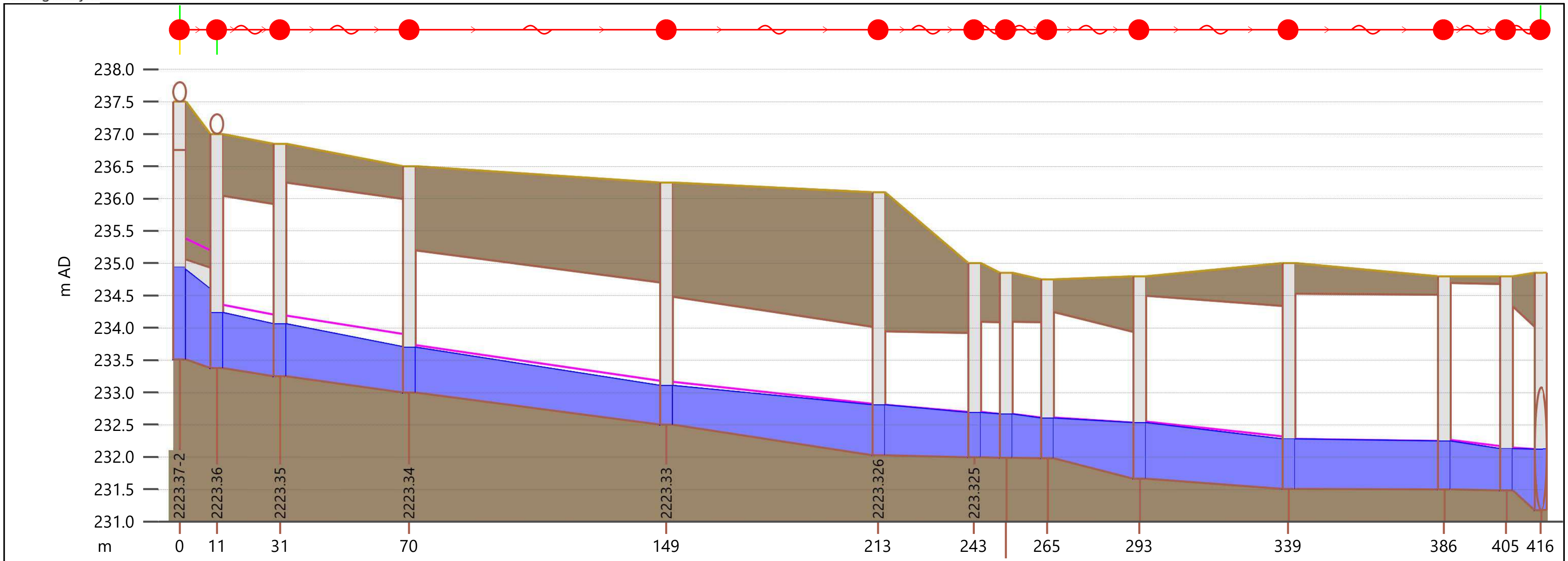
Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 4		
RVA PROJECT NO. 194615	FIGURE NO. 24C	AUGUST 2021

rva

Region of Peel
working with you



Link	-	-	2223.35.1	2223.34.1	2223.33.1	2223.326.1	-	-	-	2223.32-1.1	2223.31-1.1	-	-
US node ID	-	-	2223.35	2223.34	2223.33	2223.326	-	-	2223.323-1	2223.32-1	2223.31-1	-	-
ds node	-	-	2223.34	2223.33	2223.326	223.325	-	-	2223.32-1	2223.31-1	2223.30-1	-	-
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	11.4												
Shape ID	-	-	Matrix-2223.35	Matrix-2223.34	Matrix-2223.33	-	-	-	-	Matrix-2223.32	Matrix-2223.31	-	-
width (mm)	-												
height (mm)	-												
Rough type	N												
us inv (m AD)	-	-	233.250	233.000	232.500	232.031	-	-	231.984	231.670	231.511	-	-
ds inv (m AD)	-	-	233.000	232.500	232.031	232.000	-	-	231.670	231.511	231.500	-	-
grad (m/m)	-												
r.pfc (m3/s)	-	-	353.527	169.587	107.007	45.047	-	-	186.614	143.820	82.012	-	-
US depth (m)	-	0.847	0.810	0.695	0.606	0.773	-	-	0.611	0.857	0.764	0.746	-
US flow (m3/s)	-	-	5.47871	5.47871	5.47871	5.47871	-	-	5.47871	5.47871	5.47871	-	-
US velocity (m/s)	-	1.567	1.589	0.906	1.108	0.545	-	-	0.656	0.880	0.398	0.676	-

Node	-	2223.35	2223.34	2223.33	2223.326	-	-	-	2223.32-1	2223.31-1	2223.30-1	-
Node ID	-	2223.35	2223.34	2223.33	2223.326	-	-	-	2223.32-1	2223.31-1	2223.30-1	-
ground (m AD)	-	236.850	236.500	236.250	236.100	-	-	-	234.800	235.000	234.800	-
level (m AD)	-	234.060	233.695	233.106	232.804	-	-	-	232.527	232.275	232.246	-
expr:Freeboard	-	2.790292	2.804794	3.144073	3.295984	-	-	-	2.273450	2.725113	2.553815	-

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 4

RVA PROJECT NO. 194615 | FIGURE NO. 24D | AUGUST 2021

rva

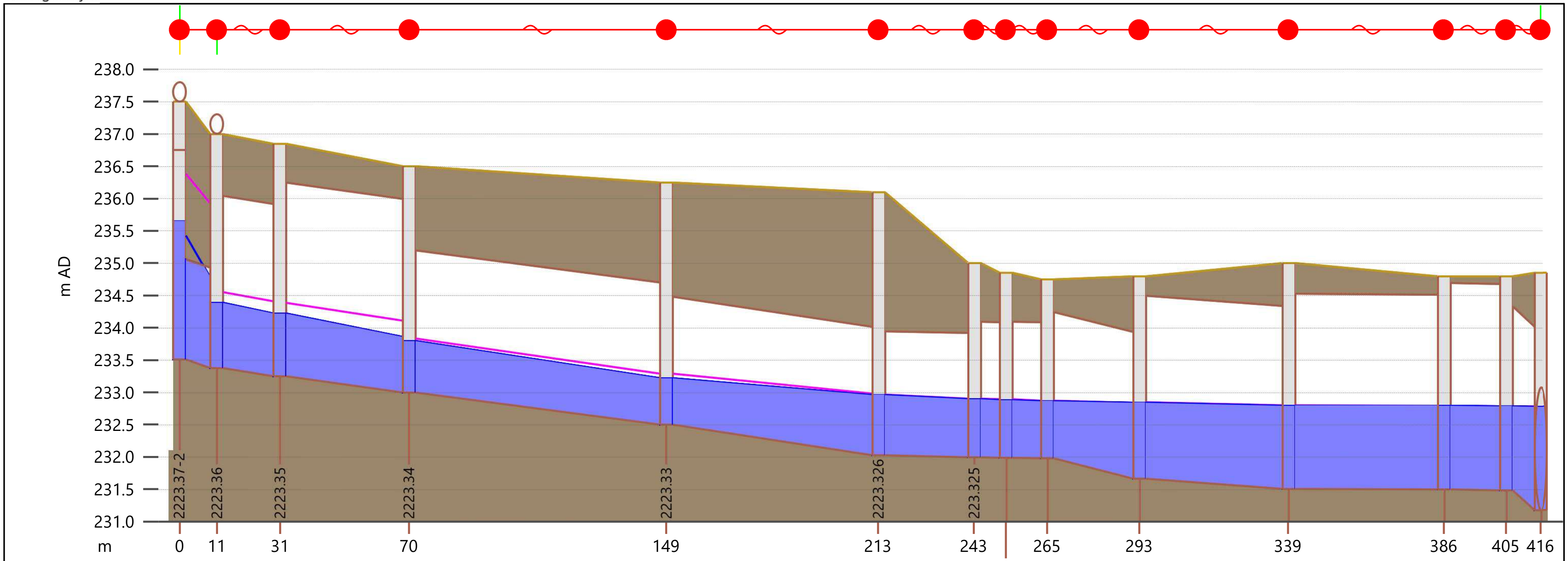
Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 4

RVA PROJECT NO. 194615	FIGURE NO. 24E	AUGUST 2021

arva

Region of Peel
working with you



Link	-	-	2223.35.1	2223.34.1	2223.33.1	2223.326.1	-	-	-	2223.32-1.1	2223.31-1.1	-	-
US node ID	-	-	2223.35	2223.34	2223.33	2223.326	-	-	2223.323-1	2223.32-1	2223.31-1	-	-
ds node	-	-	2223.34	2223.33	2223.326	223.325	-	-	2223.32-1	2223.31-1	2223.30-1	-	-
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	11.4												
Shape ID	-	-	Matrix-2223.35	Matrix-2223.34	Matrix-2223.33	-	-	-	-	Matrix-2223.32	Matrix-2223.31	-	-
width (mm)	-												
height (mm)	-												
Rough type	N												
us inv (m AD)	-	-	233.250	233.000	232.500	232.031	-	-	231.984	231.670	231.511	-	-
ds inv (m AD)	-	-	233.000	232.500	232.031	232.000	-	-	231.670	231.511	231.500	-	-
grad (m/m)	-												
r.pfc (m3/s)	-	-	353.527	169.587	107.007	45.047	-	-	186.614	143.820	82.012	-	-
US depth (m)	-	1.006	0.976	0.794	0.723	0.931	-	-	0.880	1.172	1.288	1.293	-
US flow (m3/s)	-	-	8.48585	8.48585	8.48561	8.48527	-	-	8.48405	8.48317	8.48173	-	-
US velocity (m/s)	-	1.816	1.799	0.926	1.214	0.569	-	-	0.706	0.838	0.449	0.702	-

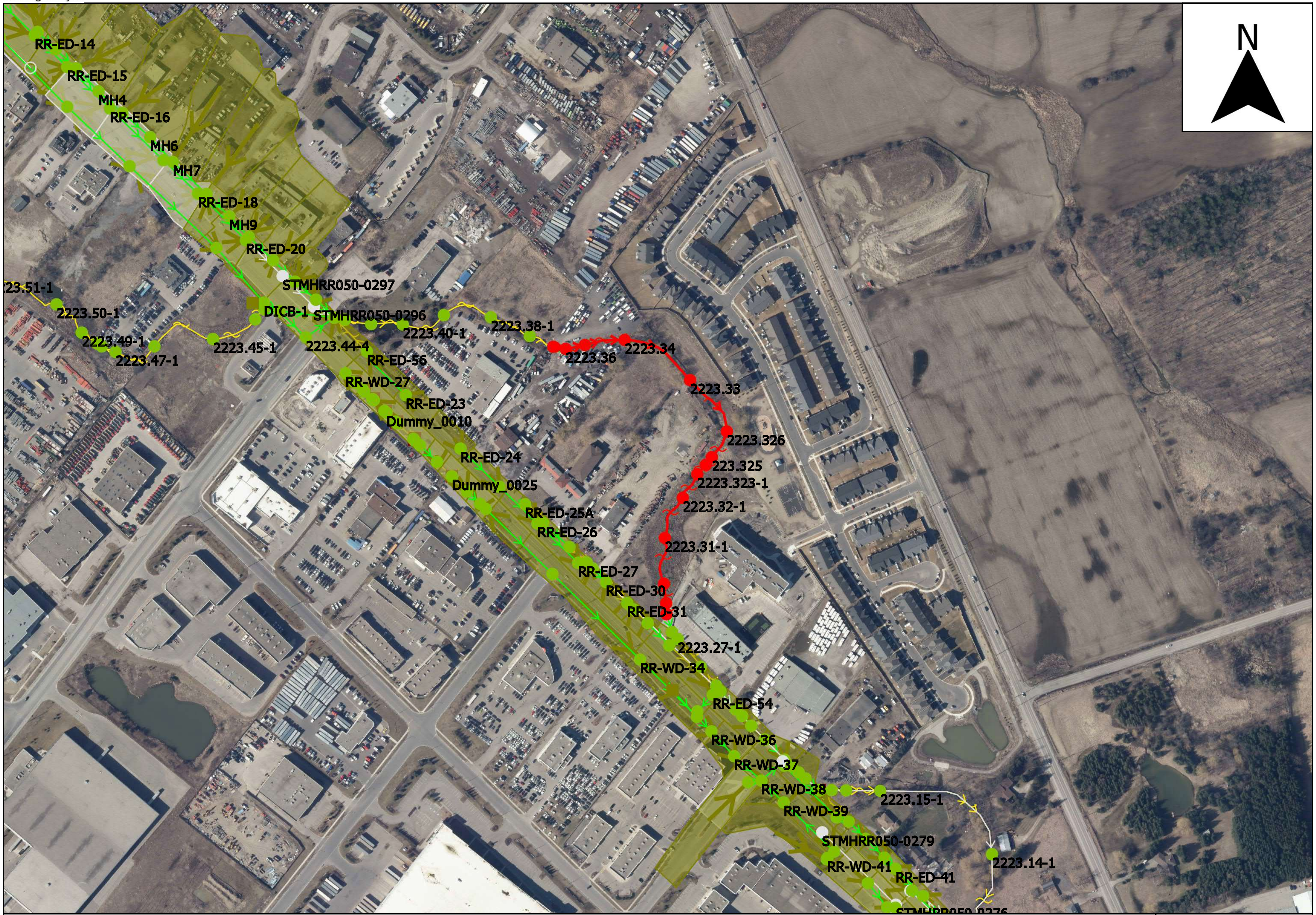
Node	-	2223.35	2223.34	2223.33	2223.326	-	-	-	2223.32-1	2223.31-1	2223.30-1	-
Node ID	-	2223.35	2223.34	2223.33	2223.326	-	-	-	2223.32-1	2223.31-1	2223.30-1	-
ground (m AD)	-	236.850	236.500	236.250	236.100	-	-	-	234.800	235.000	234.800	-
level (m AD)	-	234.226	233.794	233.223	232.962	-	-	-	232.842	232.799	232.793	-
expr:Freeboard	-	2.624338	2.706421	3.027313	3.138071	-	-	-	1.958127	2.200592	2.006512	-

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 4

RVA PROJECT NO. 194615 | FIGURE NO. 24F | AUGUST 2021

rva

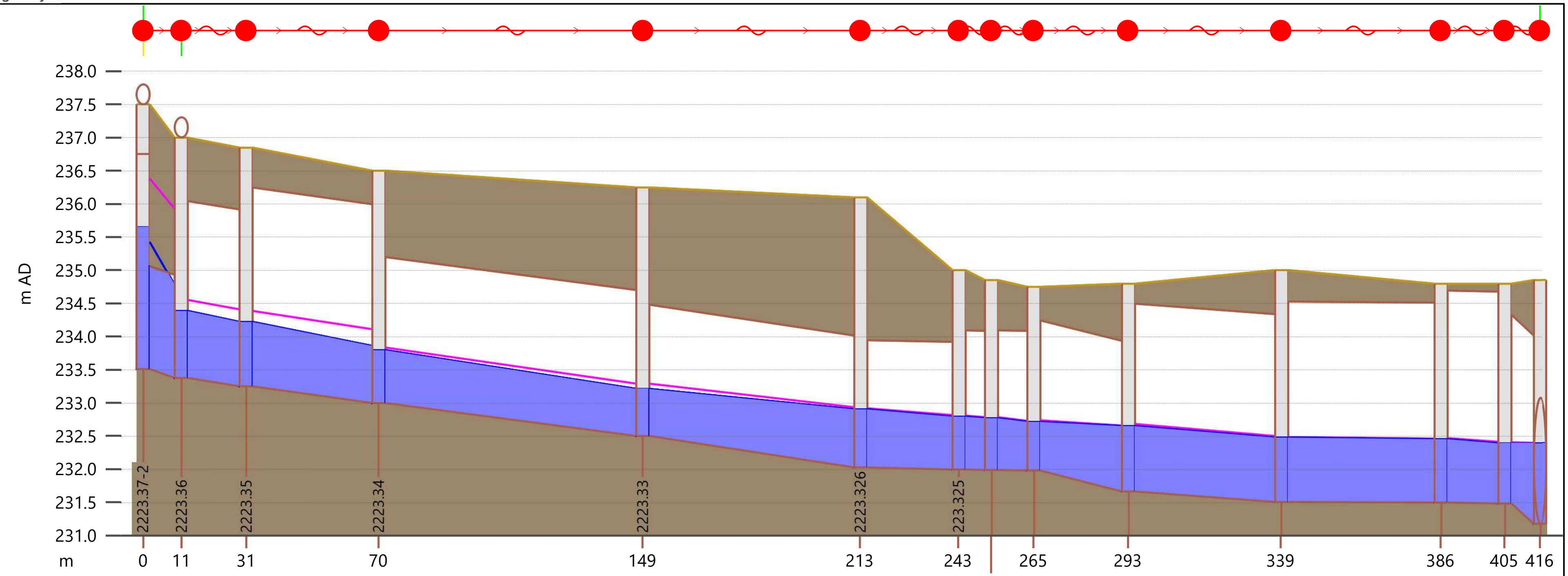
Region of Peel
working with you



PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 4		
RVA PROJECT NO. 194615	FIGURE NO. 24G	AUGUST 2021

arva

Region of Peel
working with you



Link	-	-	2223.35.1	2223.34.1	2223.33.1	2223.326.1	-	-	-	2223.32-1.1	2223.31-1.1	-	-
US node ID	-	-	2223.35	2223.34	2223.33	2223.326	-	-	2223.323-1	2223.32-1	2223.31-1	-	-
ds node	-	-	2223.34	2223.33	2223.326	223.325	-	-	2223.32-1	2223.31-1	2223.30-1	-	-
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	11.4												
Shape ID	-	-	Matrix-2223.35	Matrix-2223.34	Matrix-2223.33	-	-	-	-	Matrix-2223.32	Matrix-2223.31	-	-
width (mm)	-												
height (mm)	-												
Rough type	N												
us inv (m AD)	-	-	233.250	233.000	232.500	232.031	-	-	231.984	231.670	231.511	-	-
ds inv (m AD)	-	-	233.000	232.500	232.031	232.000	-	-	231.670	231.511	231.500	-	-
grad (m/m)	-												
r.pfc (m3/s)	-	-	353.527	169.587	107.007	45.047	-	-	186.614	143.820	82.012	-	-
US depth (m)	-	1.006	0.976	0.793	0.714	0.876	-	-	0.734	0.986	0.965	0.954	-
US flow (m3/s)	-	-	8.48899	8.48899	8.48899	8.48899	-	-	8.48898	8.48898	8.48897	-	-
US velocity (m/s)	-	1.817	1.799	0.950	1.215	0.574	-	-	0.700	0.905	0.423	0.688	-

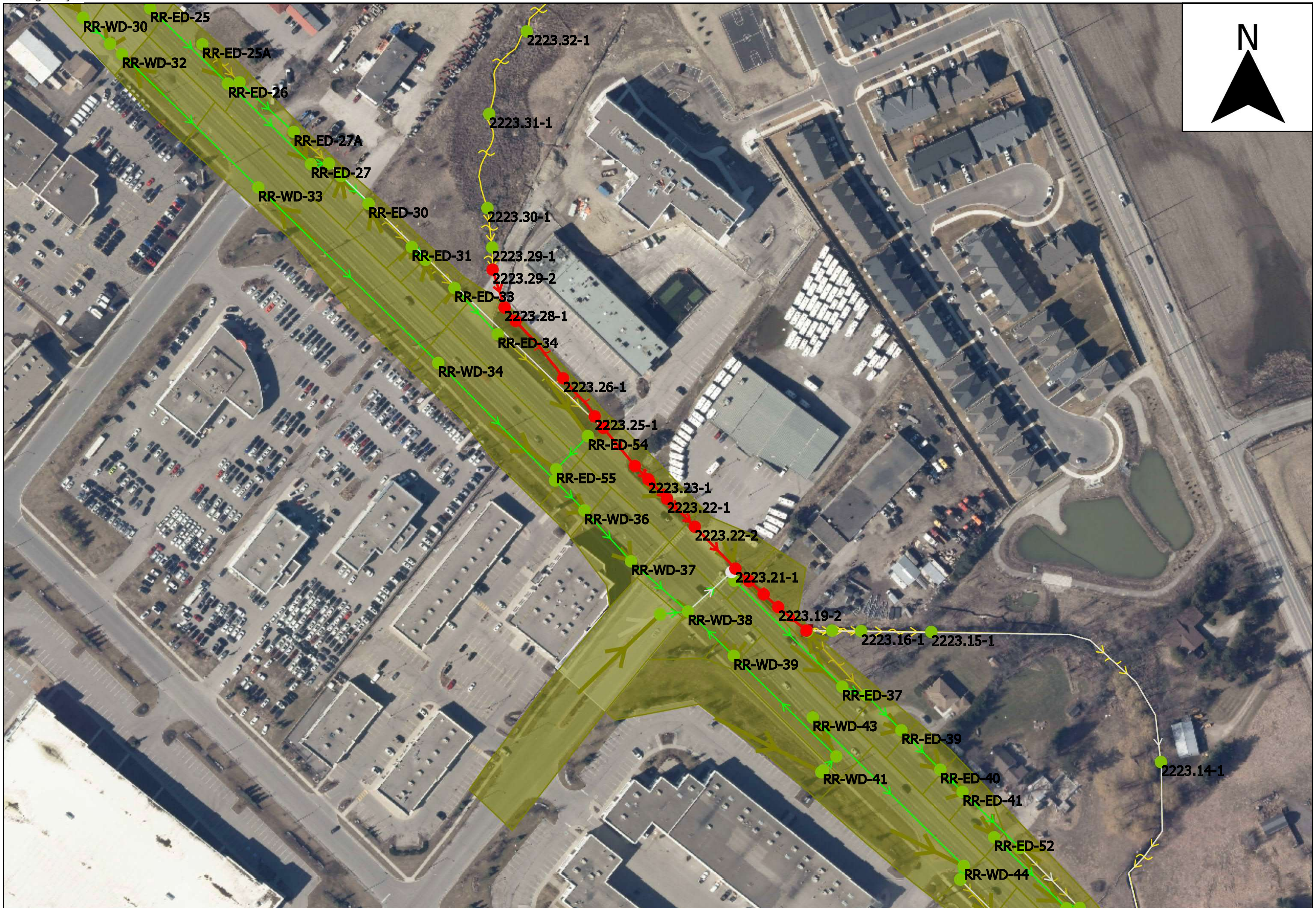
Node	-	2223.35	2223.34	2223.33	2223.326	-	-	-	2223.32-1	2223.31-1	2223.30-1	-
Node ID	-	2223.35	2223.34	2223.33	2223.326	-	-	-	2223.32-1	2223.31-1	2223.30-1	-
ground (m AD)	-	236.850	236.500	236.250	236.100	-	-	-	234.800	235.000	234.800	-
level (m AD)	-	234.226	233.793	233.214	232.907	-	-	-	232.656	232.476	232.454	-
expr:Freeboard	-	2.624185	2.706543	3.035660	3.192880	-	-	-	2.143826	2.523590	2.345822	-

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 4

RVA PROJECT NO. 194615	FIGURE NO. 24H	AUGUST 2021

arva

Region of Peel
working with you

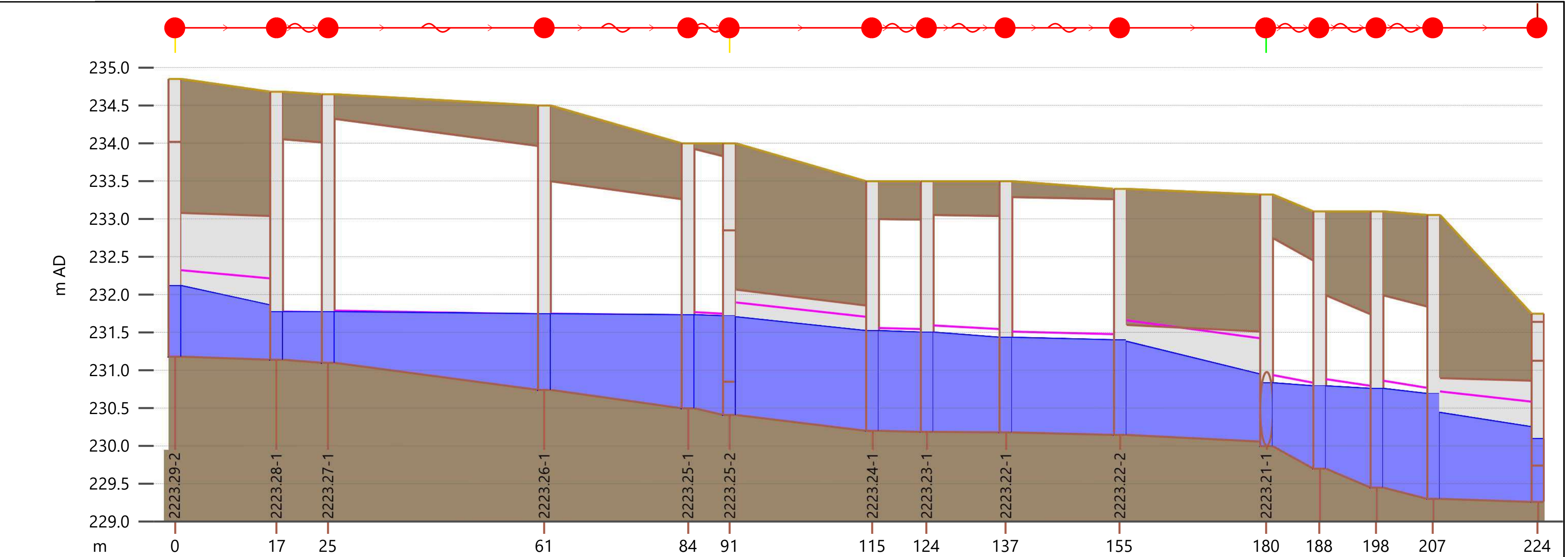


EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 5

RVA PROJECT NO. 194615	FIGURE NO. 25A	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.29-2.1	-	2223.27-1.1	2223.26-1.1	-	2223.25-2.1	-	-	2223.22-1.1	2223.22-2.1	-	-	-	2223.19-2.1
US node ID	2223.29-2	-	2223.27-1	2223.26-1	-	2223.25-2	-	-	2223.22-1	2223.22-2	-	-	-	2223.19-2
ds node	2223.28-1	-	2223.26-1	2223.25-1	-	2223.24-1	-	-	2223.22-2	2223.21-1	-	-	-	2223.18-1
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	16.7					23.5				24.1				17.2
Shape ID	ARCH	-	Matrix-2223.27	Matrix-2223.26	-	ARCH	-	-	-	ARCH	-	-	-	ARCH
width (mm)	2900					2260				2060				2270
height (mm)	1900					1660				1450				1600
Rough type	N					N				N				N
us inv (m AD)	231.178	-	231.102	230.740	-	230.408	-	230.190	230.180	230.150	-	-	-	229.300
ds inv (m AD)	231.142	-	230.740	230.500	-	230.200	-	230.180	230.150	230.060	-	-	-	229.260
grad (m/m)	0.00215					0.00886				0.00374				0.00233
r.pfc (m3/s)	5.052	-	1393.814	756.882	-	6.393	-	59.339	196.425	3.020	-	-	-	3.093
US depth (m)	0.934	0.628	0.667	0.999	-	1.294	1.318	1.309	1.253	1.229	0.827	1.091	1.308	1.138
US flow (m3/s)	5.47636	-	5.47625	5.47619	-	5.47401	-	5.47401	5.47401	5.47401	-	-	-	5.84407
US velocity (m/s)	2.041	0.271	0.810	1.204	-	1.967	0.958	1.369	1.267	2.339	1.611	1.529	1.588	2.349

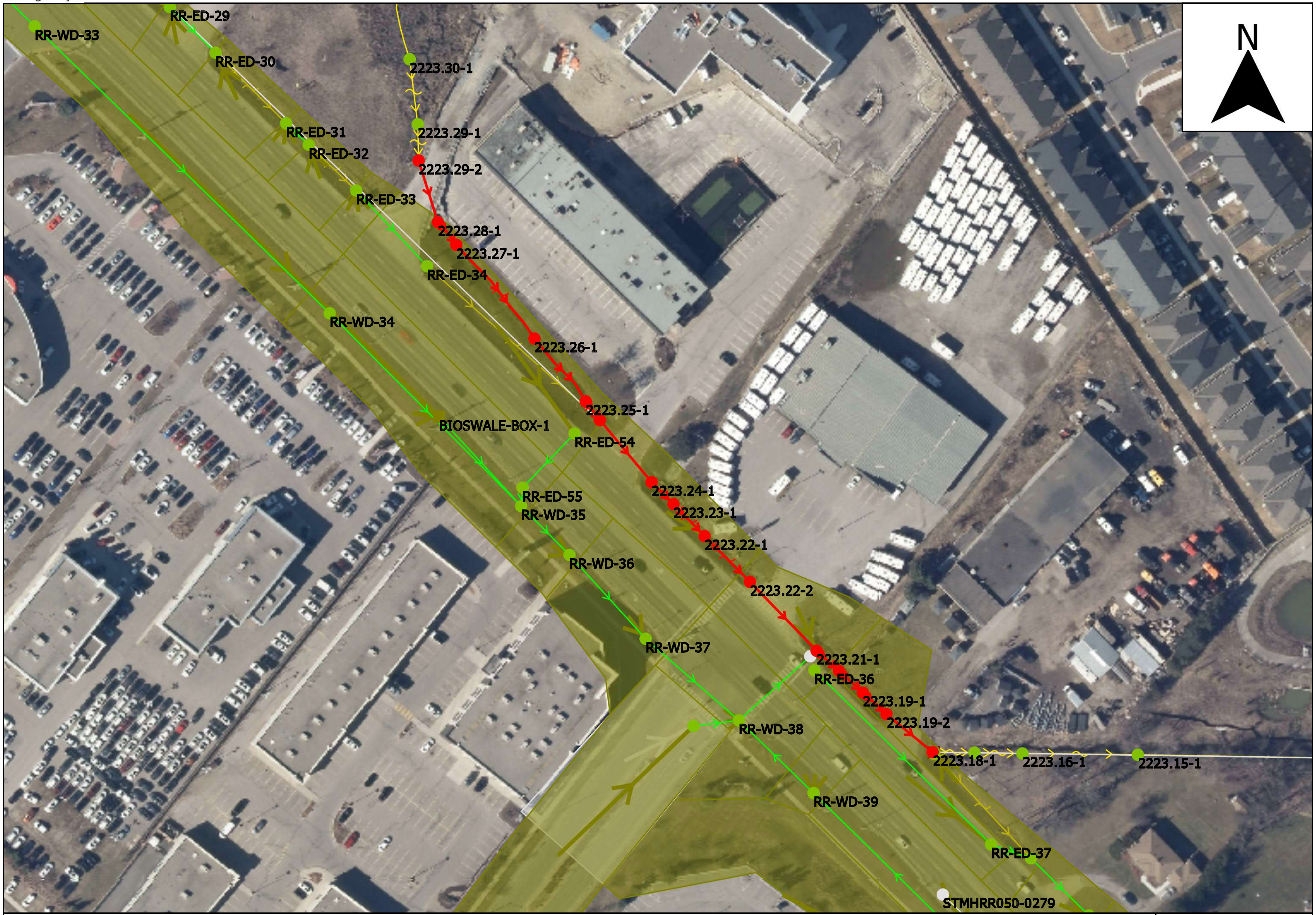
Node	-	-	2223.27-1	2223.26-1	-	-	2223.24-1	-	2223.22-1	2223.22-2	2223.21-1	-	-	-	-
Node ID	-	-	2223.27-1	2223.26-1	-	-	2223.24-1	-	2223.22-1	2223.22-2	2223.21-1	-	-	-	-
ground (m AD)	-	-	234.650	234.500	234.000	234.000	233.500	-	233.500	233.400	233.320	-	-	233.050	-
level (m AD)	-	-	231.769	231.739	231.728	231.714	231.518	-	231.433	231.400	230.827	-	-	230.691	-
expr:Freeboard	-	-	2.880591	2.760895	2.272049	2.286270	1.982422	-	2.067093	2.000342	2.492592	-	-	-	-

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 5

RVA PROJECT NO. 194615	FIGURE NO. 25B	AUGUST 2021

arva

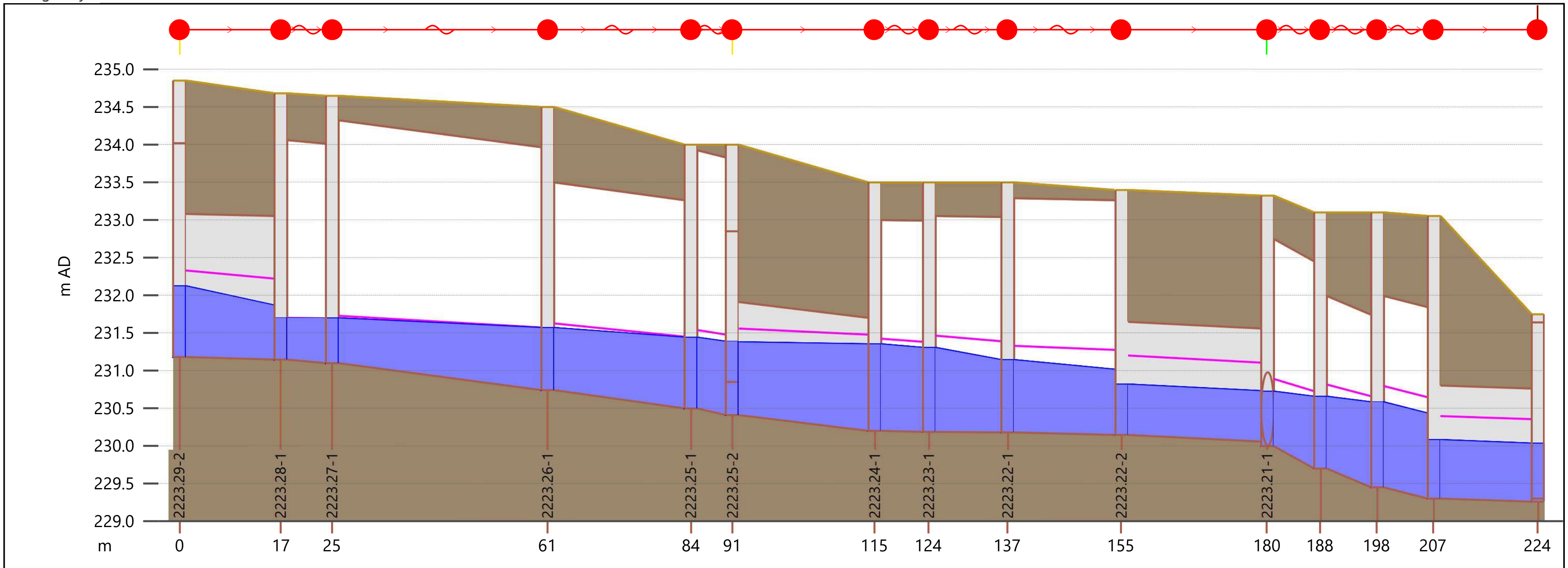
Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 5		
RVA PROJECT NO. 194615	FIGURE NO. 25C	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.29-2.1	-	2223.27-1.1	2223.26-1.1	-	2223.25-2.1	-	-	2223.22-1.1	2223.22-2.1	-	-	-	2223.19-2.1
US node ID	2223.29-2	-	2223.27-1	2223.26-1	-	2223.25-2	-	-	2223.22-1	2223.22-2		-	-	2223.19-2
ds node	2223.28-1	-	2223.26-1	2223.25-1	-	2223.24-1	-	-	2223.22-2	2223.21-1	-	-	-	2223.18-1
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	16.7					23.5				24.1				17.2
Shape ID	ARCH	-	Matrix-2223.27	Matrix-2223.26	-	RECT	-	-	-	RECT	-	-	-	RECT
width (mm)	2900					3000				3000				3000
height (mm)	1900					1500				1500				1500
Rough type	N					N				N				N
us inv (m AD)	231.178		231.102	230.740	-	230.408	-	230.190	230.180	230.150	-	-	-	229.300
ds inv (m AD)	231.150	-	230.740	230.500	-	230.200		230.180	230.150	230.060	-	-	-	229.260
grad (m/m)	0.00167					0.00886				0.00374				0.00233
r.pfc (m3/s)	4.455	-	1393.814	756.882	-	20.528	-	59.339	196.425	13.334	-	-	-	10.516
US depth (m)	0.940	0.545	0.591	0.826	-	0.971	1.152	1.112	0.963	0.666	0.724	0.957	1.132	0.780
US flow (m3/s)	5.47871	-	5.47871	5.47871	-	5.47713	-	5.47713	5.47713	5.47713	-	-	-	5.84713
US velocity (m/s)	2.030	0.302	0.852	1.391	-	1.880	1.203	1.785	1.912	2.740	1.928	1.949	2.388	2.498

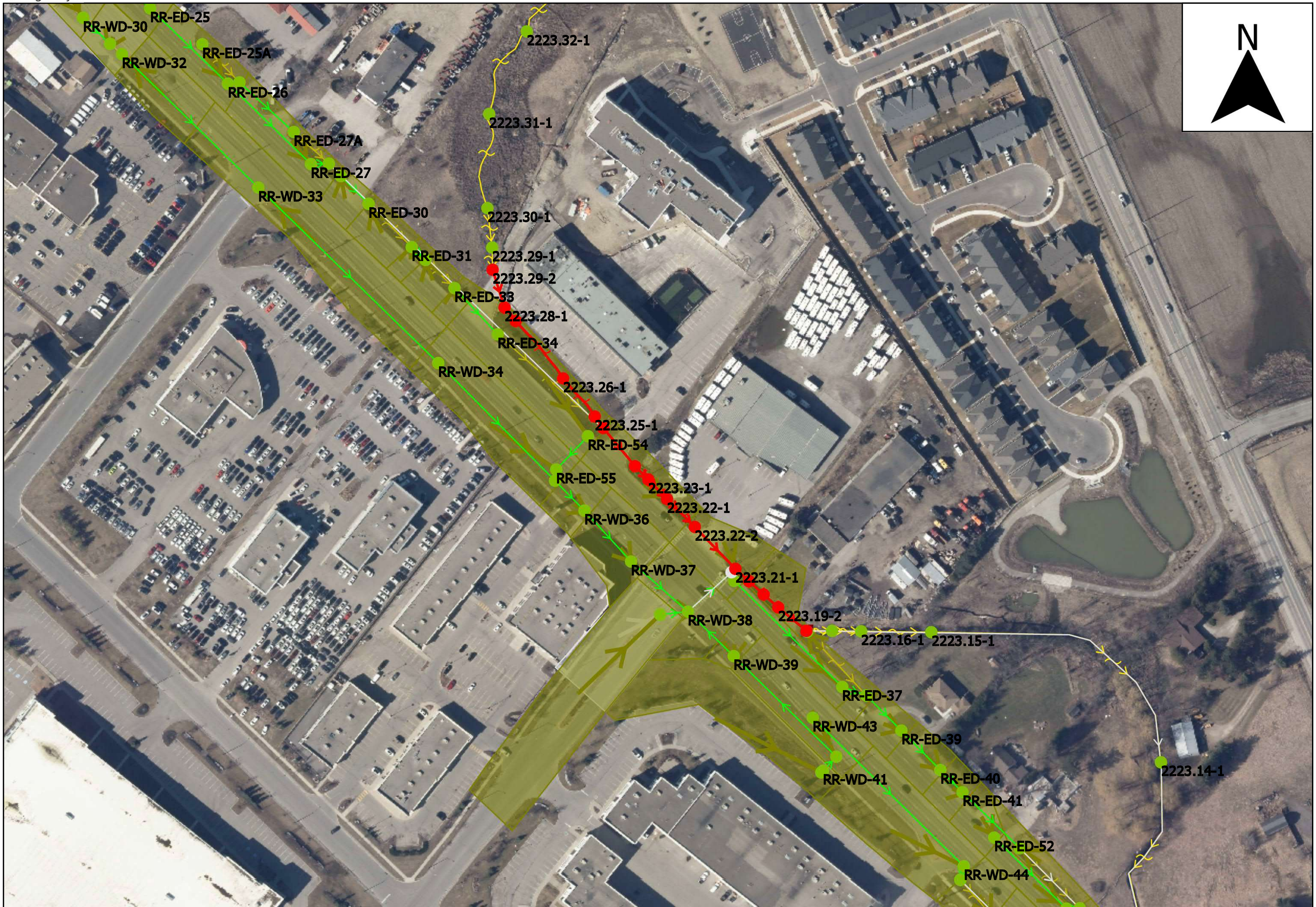
Node	-	-	2223.27-1	2223.26-1	-	-	2223.24-1	-	2223.22-1	2223.22-2	2223.21-1	-	-	-	-
Node ID	-	-	2223.27-1	2223.26-1	-	-	2223.24-1	-	2223.22-1	2223.22-2	2223.21-1	-	-	-	-
ground (m AD)			234.650	234.500	234.000	234.000	233.500	-	233.500	233.400	233.320	-	-	233.050	
level (m AD)	-	-	231.693	231.566	231.435	231.385	231.352	-	231.143	230.817	230.724	-	-	230.082	-
expr:Freeboard	-	-	2.957053	2.934174	2.564514	2.615494	2.147873	-	2.357025	2.583411	2.595818	-	-	-	-

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 5

RVA PROJECT NO. 194615 | FIGURE NO. 25D | AUGUST 2021

arva

Region of Peel
working with you

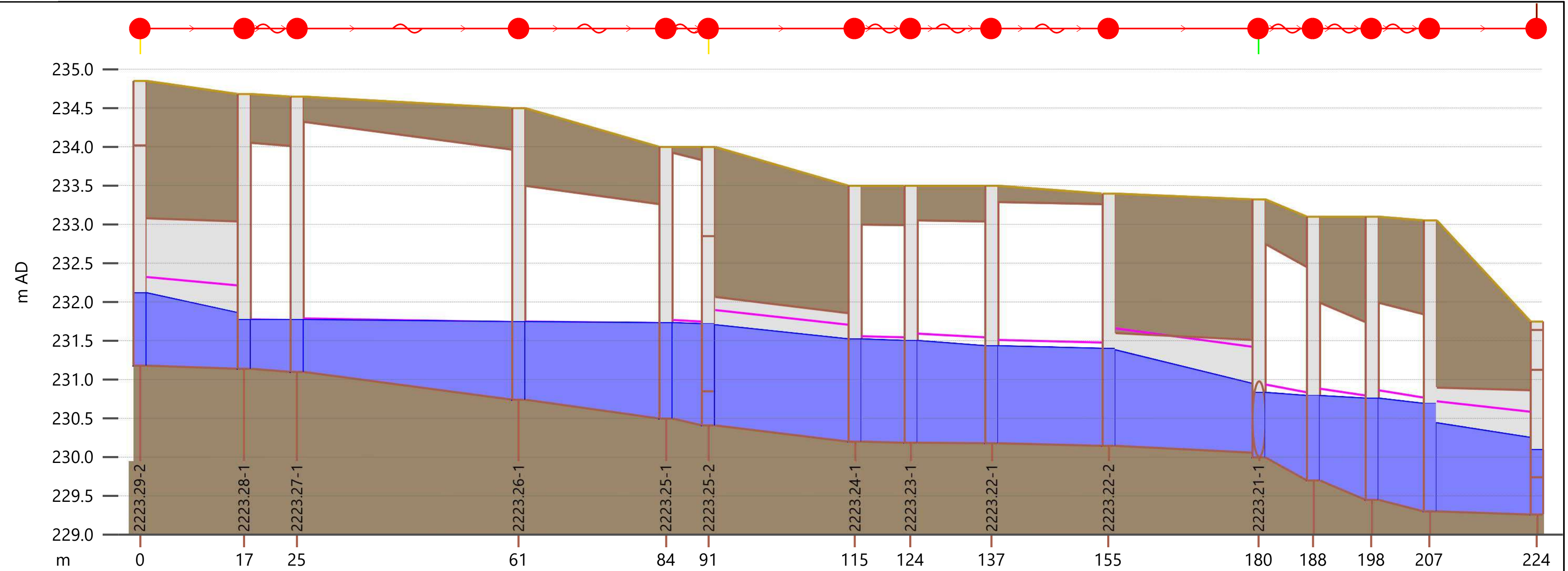


EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 5

RVA PROJECT NO. 194615	FIGURE NO. 25E	AUGUST 2021

arva

Region of Peel
working with you



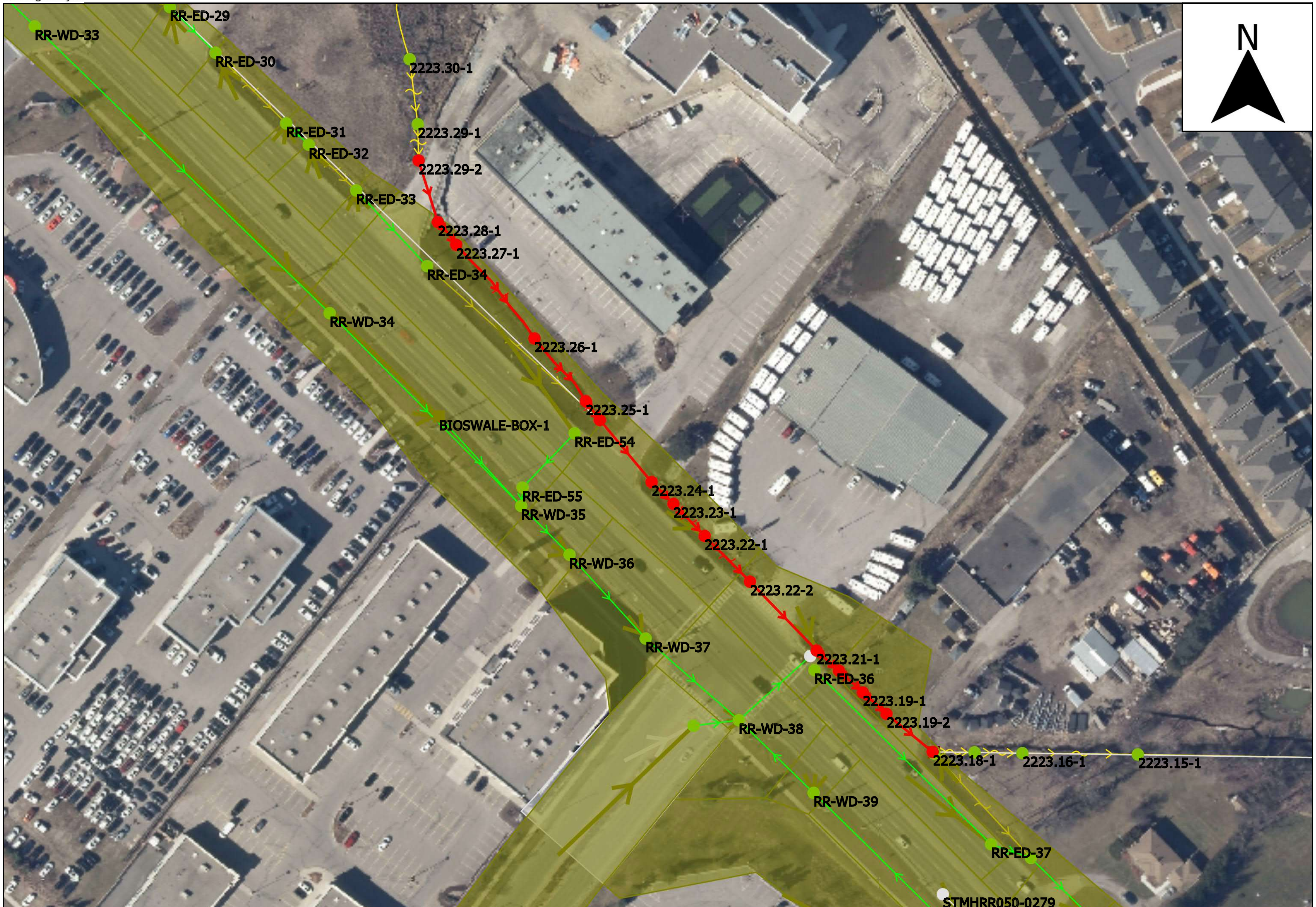
Link	2223.29-2.1	-	2223.27-1.1	2223.26-1.1	-	2223.25-2.1	-	-	2223.22-1.1	2223.22-2.1	-	-	-	2223.19-2.1
US node ID	2223.29-2	-	2223.27-1	2223.26-1	-	2223.25-2	-	-	2223.22-1	2223.22-2		-	-	2223.19-2
ds node	2223.28-1	-	2223.26-1	2223.25-1	-	2223.24-1	-	-	2223.22-2	2223.21-1	-	-	-	2223.18-1
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	16.7					23.5				24.1				17.2
Shape ID	ARCH	-	Matrix-2223.27	Matrix-2223.26	-	ARCH	-	-	-	ARCH	-	-	-	ARCH
width (mm)	2900					2260				2060				2270
height (mm)	1900					1660				1450				1600
Rough type	N					N				N				N
us inv (m AD)	231.178	-	231.102	230.740	-	230.408	-	230.190	230.180	230.150	-	-	-	229.300
ds inv (m AD)	231.142	-	230.740	230.500	-	230.200	-	230.180	230.150	230.060	-	-	-	229.260
grad (m/m)	0.00215					0.00886				0.00374				0.00233
r.pfc (m3/s)	5.052	-	1393.814	756.882	-	6.393	-	59.339	196.425	3.020	-	-	-	3.093
US depth (m)	0.934	0.628	0.667	0.999	-	1.294	1.318	1.309	1.253	1.229	0.827	1.091	1.308	1.138
US flow (m3/s)	5.47636	-	5.47625	5.47619	-	5.47401	-	5.47401	5.47401	5.47401	-	-	-	5.84407
US velocity (m/s)	2.041	0.271	0.810	1.204	-	1.967	0.958	1.369	1.267	2.339	1.611	1.529	1.588	2.349

Node	-	-	2223.27-1	2223.26-1	-	-	2223.24-1	-	2223.22-1	2223.22-2	2223.21-1	-	-	-	-
Node ID	-	-	2223.27-1	2223.26-1	-	-	2223.24-1	-	2223.22-1	2223.22-2	2223.21-1	-	-	-	-
ground (m AD)	-	-	234.650	234.500	234.000	234.000	233.500	-	233.500	233.400	233.320	-	-	233.050	-
level (m AD)	-	-	231.769	231.739	231.728	231.714	231.518	-	231.433	231.400	230.827	-	-	230.691	-
expr:Freeboard	-	-	2.880591	2.760895	2.272049	2.286270	1.982422	-	2.067093	2.000342	2.492592	-	-	-	-

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 5

RVA PROJECT NO. 194615 | FIGURE NO. 25F | AUGUST 2021

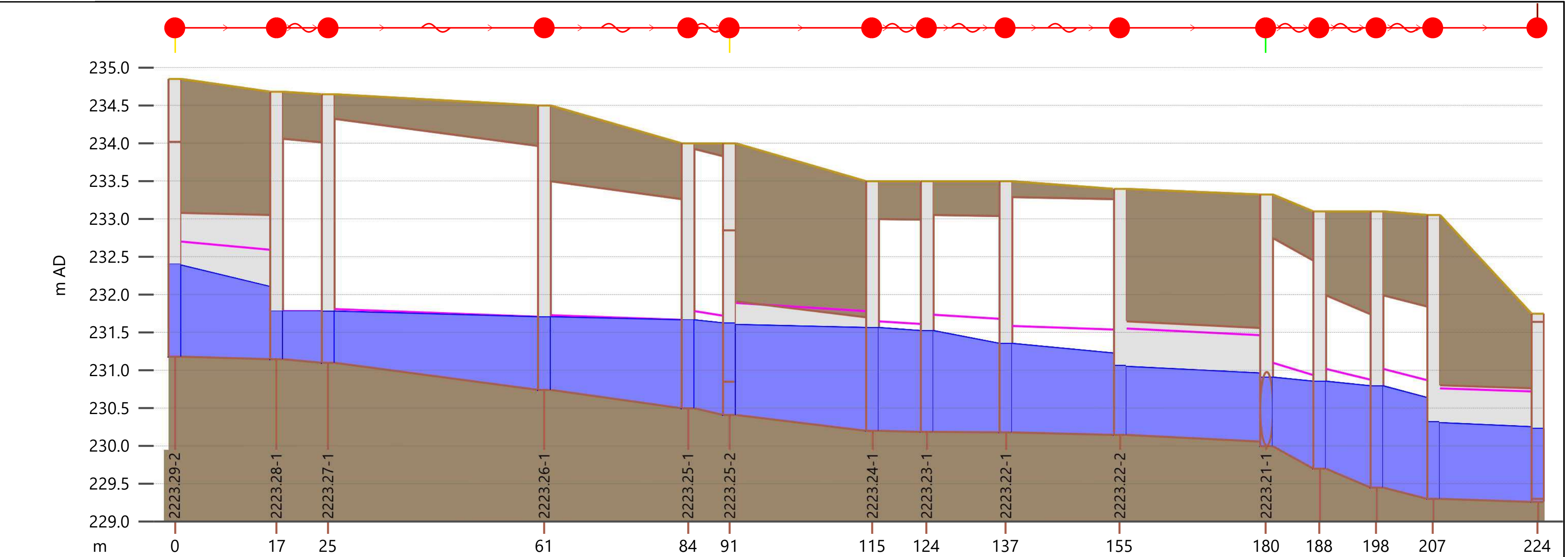
rva



PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 5

RVA PROJECT NO. 194615	FIGURE NO. 25G	AUGUST 2021

Region of Peel
working with you



Link	2223.29-2.1	-	2223.27-1.1	2223.26-1.1	-	2223.25-2.1	-	-	2223.22-1.1	2223.22-2.1	-	-	-	2223.19-2.1
US node ID	2223.29-2	-	2223.27-1	2223.26-1	-	2223.25-2	-	-	2223.22-1	2223.22-2		-	-	2223.19-2
ds node	2223.28-1	-	2223.26-1	2223.25-1	-	2223.24-1	-	-	2223.22-2	2223.21-1	-	-	-	2223.18-1
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	16.7					23.5				24.1				17.2
Shape ID	ARCH	-	Matrix-2223.27	Matrix-2223.26	-	RECT	-	-	-	RECT	-	-	-	RECT
width (mm)	2900					3000				3000				3000
height (mm)	1900					1500				1500				1500
Rough type	N					N				N				N
us inv (m AD)	231.178		231.102	230.740	-	230.408	-	230.190	230.180	230.150	-	-	-	229.300
ds inv (m AD)	231.150	-	230.740	230.500	-	230.200		230.180	230.150	230.060	-	-	-	229.260
grad (m/m)	0.00167					0.00886				0.00374				0.00233
r.pfc (m3/s)	4.455	-	1393.814	756.882	-	20.528	-	59.339	196.425	13.334	-	-	-	10.516
US depth (m)	1.207	0.627	0.672	0.961	-	1.195	1.360	1.327	1.171	0.899	0.901	1.149	1.338	1.000
US flow (m3/s)	8.48897	-	8.48897	8.48896	-	8.48700	-	8.48700	8.48700	8.48700	-	-	-	9.05705
US velocity (m/s)	2.500	0.384	0.884	1.404	-	2.368	1.324	2.068	2.160	3.148	2.070	1.953	2.387	3.019

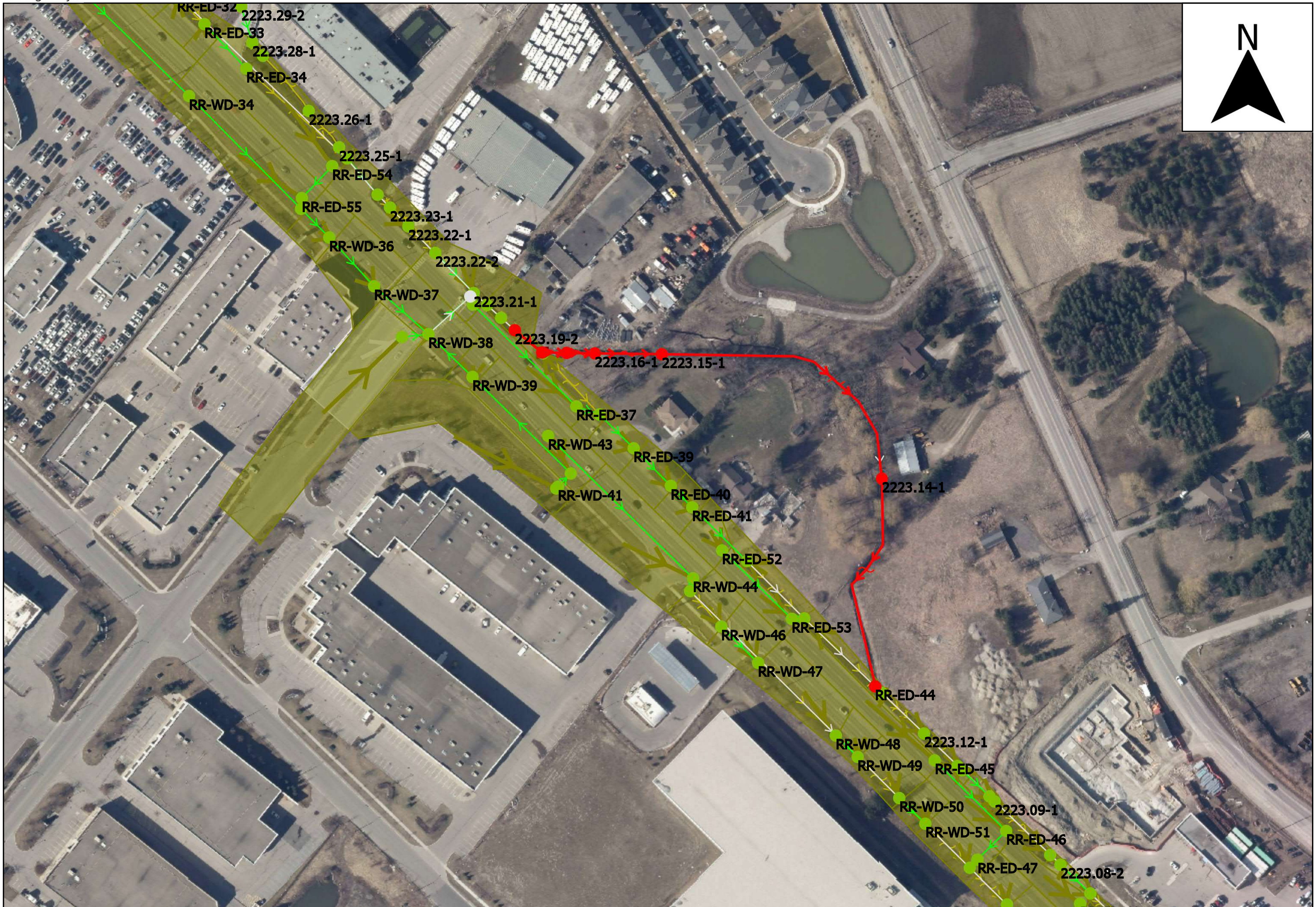
Node	-	-	2223.27-1	2223.26-1	-	-	2223.24-1	-	2223.22-1	2223.22-2	2223.21-1	-	-	-	-
Node ID	-	-	2223.27-1	2223.26-1	-	-	2223.24-1	-	2223.22-1	2223.22-2	2223.21-1	-	-	-	-
ground (m AD)	-	-	234.650	234.500	234.000	234.000	233.500	-	233.500	233.400	233.320	-	-	233.050	-
level (m AD)	-	-	231.774	231.701	231.660	231.620	231.560	-	231.351	231.060	230.901	-	-	230.315	-
expr:Freeboard	-	-	2.875525	2.798584	2.339676	2.379562	1.939941	-	2.149216	2.340262	2.418587	-	-	-	-

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 5

RVA PROJECT NO. 194615	FIGURE NO. 25H	AUGUST 2021

rva

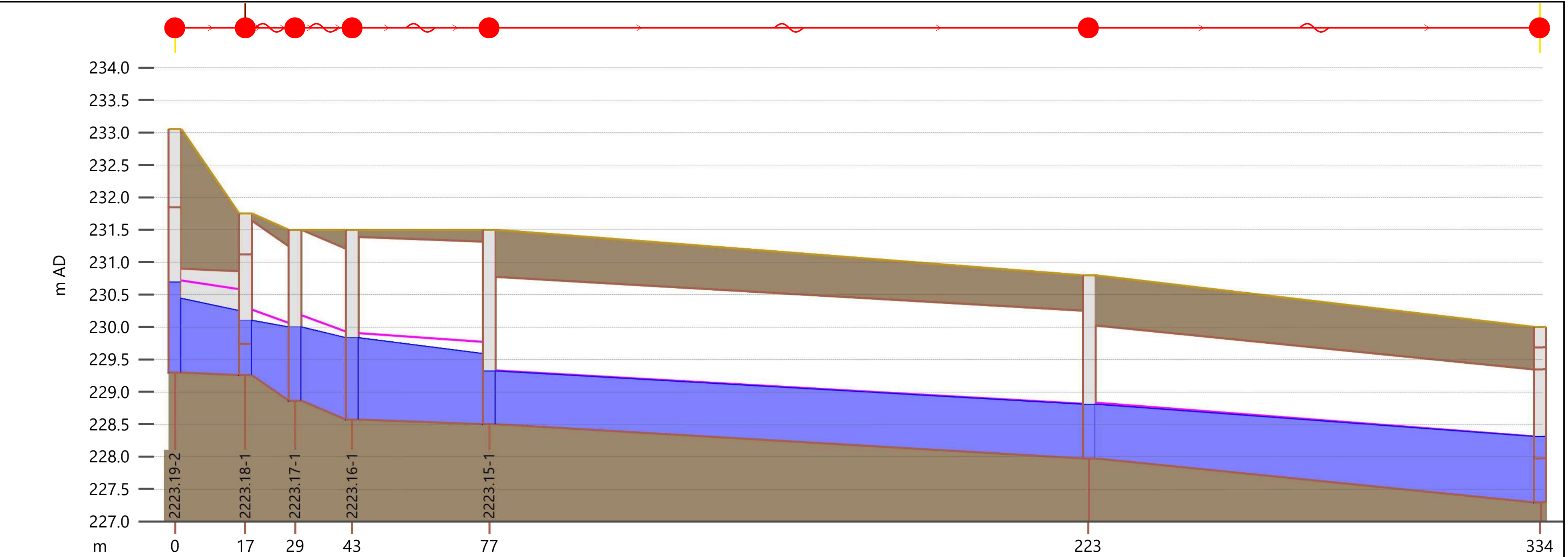
Region of Peel
working with you



EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 6

RVA PROJECT NO. 194615	FIGURE NO. 26A	AUGUST 2021

arva



Link	-	-	-	2223.16-1.1	2223.15-1.1	2223.14-1.1
US node ID	-	-	-	2223.16-1	2223.15-1	2223.14-1
ds node	-	-	-	2223.15-1	2223.14-1	RR-ED-44
numbarrels	1	1	1	1	1	1
length (m)	17.2					
Shape ID	ARCH	-	-	Matrix-2223.16	Matrix-2223.15	Matrix-2223.14
width (mm)	2270					
height (mm)	1600					
Rough type	N					
us inv (m AD)	229.300	-	-	228.573	228.500	227.977
ds inv (m AD)	229.260	-	-	228.500	227.977	227.300
grad (m/m)	0.00233					
r.pfc (m3/s)	3.093	-	-	49.589	93.206	151.870
US depth (m)	1.138	0.834	1.123	1.255	0.818	0.825
US flow (m3/s)	5.84407	-	-	5.57059	5.57059	5.57059
US velocity (m/s)	2.349	1.873	1.948	1.259	0.585	0.902

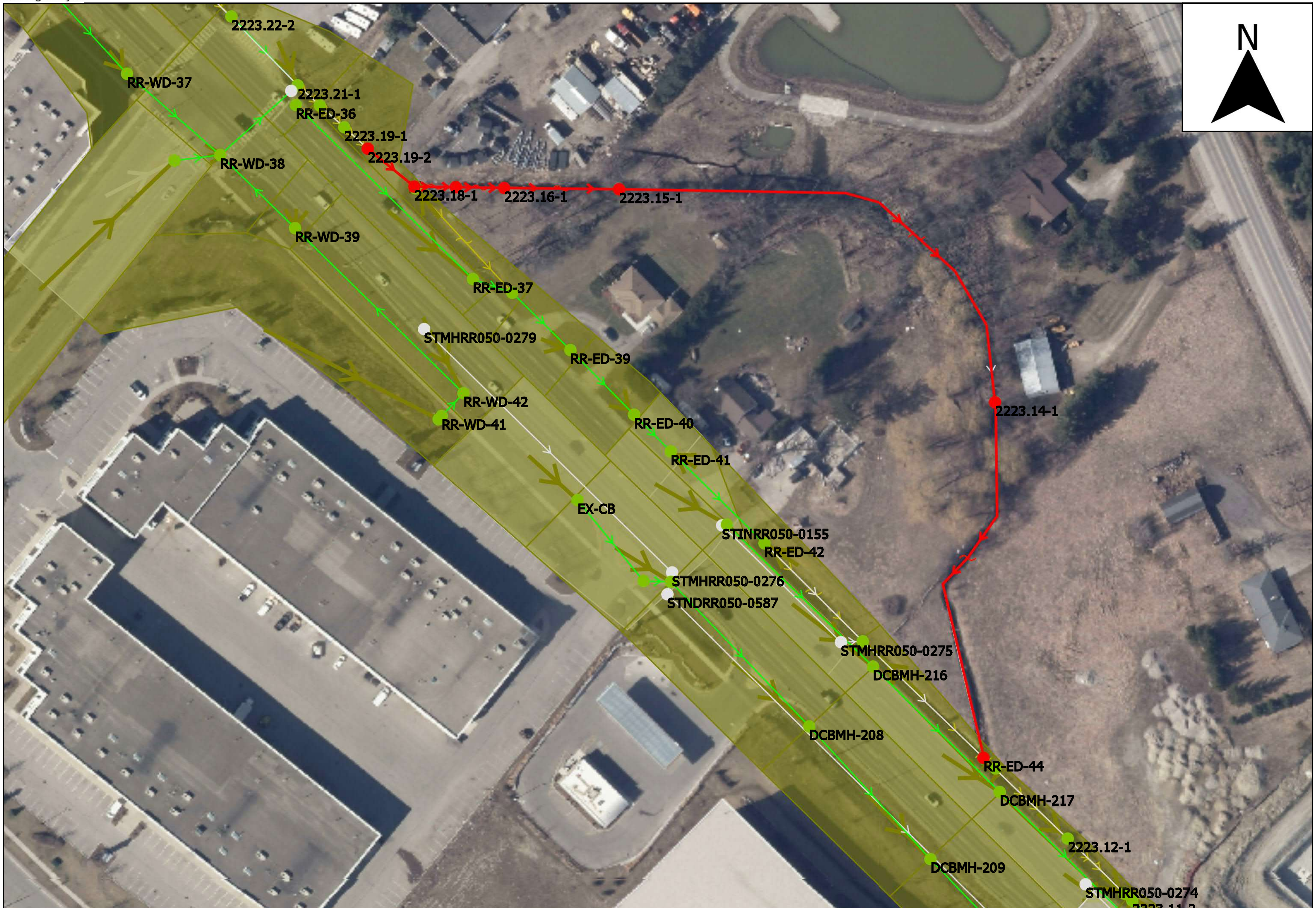
Node	-	-	-	2223.16-1	2223.15-1	2223.14-1	RR-ED-44
Node ID	-	-	-	2223.16-1	2223.15-1	2223.14-1	RR-ED-44
ground (m AD)	-	-	-	231.500	231.500	230.800	230.000
level (m AD)	-	-	-	229.828	229.318	228.802	228.310
expr:Freeboard	-	-	-	1.671570	2.181549	1.997998	1.690231

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 6

RVA PROJECT NO. 194615	FIGURE NO. 26B	AUGUST 2021

rva

Region of Peel
working with you

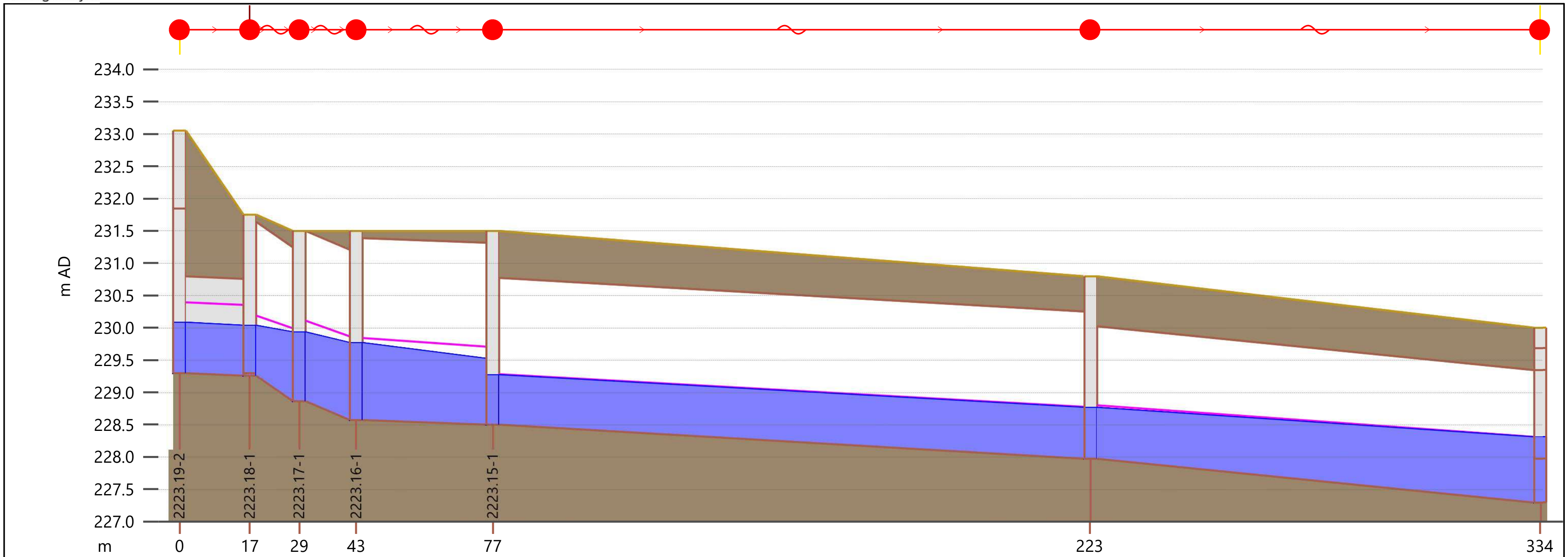


PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 6

RVA PROJECT NO. 194615	FIGURE NO. 26C	AUGUST 2021

rva

Region of Peel
working with you



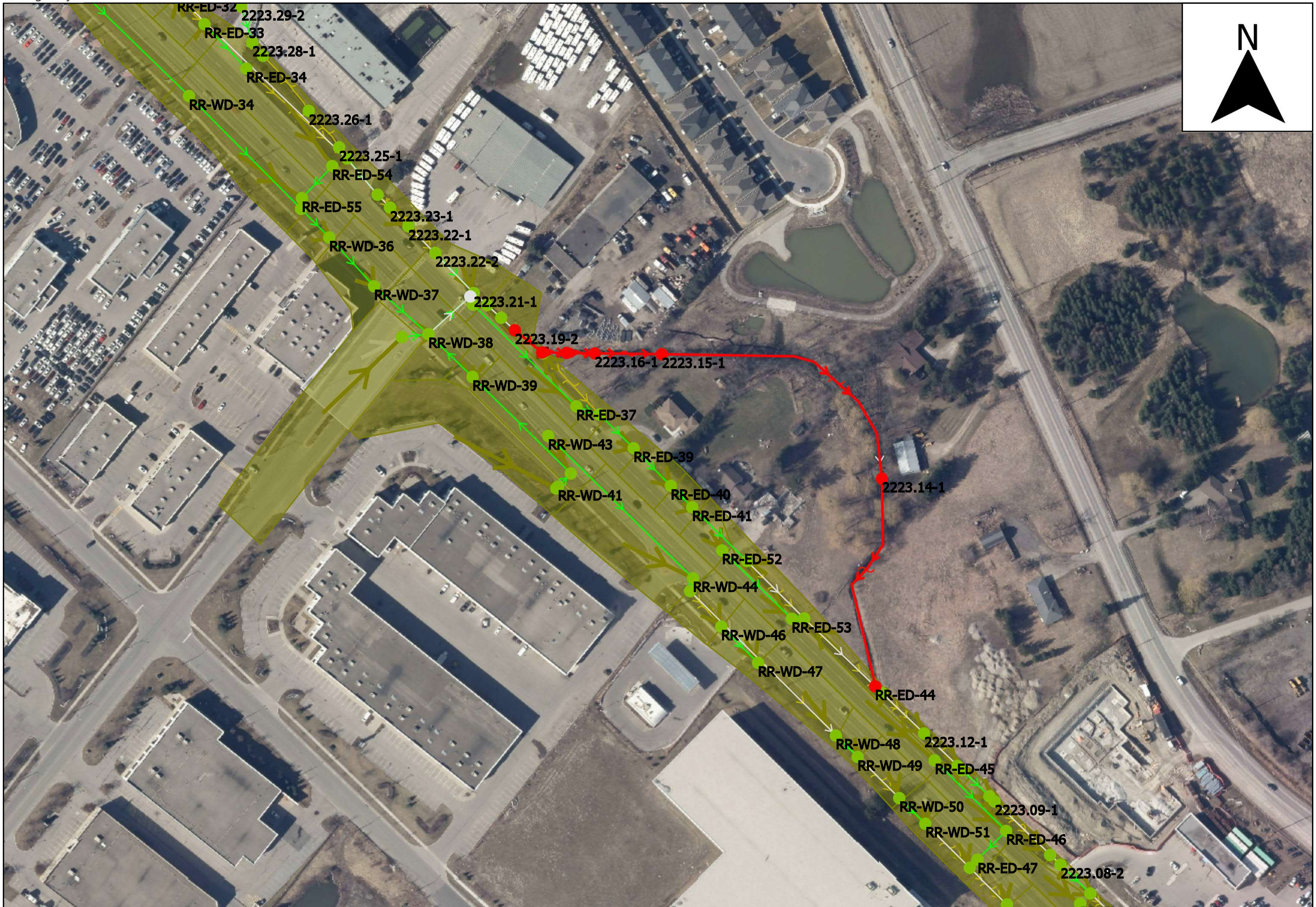
Link	-	-	-	2223.16-1.1	2223.15-1.1	2223.14-1.1
US node ID	-	-	-	2223.16-1	2223.15-1	2223.14-1
ds node	-	-	-	2223.15-1	2223.14-1	RR-ED-44
numbarrels	1	1	1	1	1	1
length (m)	17.2					
Shape ID	RECT	-	-	Matrix-2223.16	Matrix-2223.15	Matrix-2223.14
width (mm)	3000					
height (mm)	1500					
Rough type	N					
us inv (m AD)	229.300	-	-	228.573	228.500	227.977
ds inv (m AD)	229.260	-	-	228.500	227.977	227.300
grad (m/m)	0.00233					
r.pfc (m3/s)	10.516	-	-	49.589	93.206	151.870
US depth (m)	0.780	0.773	1.059	1.196	0.769	0.788
US flow (m3/s)	5.84713	-	-	4.71561	4.71561	4.71561
US velocity (m/s)	2.498	1.766	1.916	1.229	0.568	0.916

Node	-	-	-	2223.16-1	2223.15-1	2223.14-1	RR-ED-44
Node ID	-	-	-	2223.16-1	2223.15-1	2223.14-1	RR-ED-44
ground (m AD)	-	-	-	231.500	231.500	230.800	230.000
level (m AD)	-	-	-	229.769	229.269	228.765	228.310
expr:Freeboard	-	-	-	1.731186	2.231155	2.034711	1.690155

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 6

RVA PROJECT NO. 194615	FIGURE NO. 26D	AUGUST 2021	arva

Region of Peel
working with you

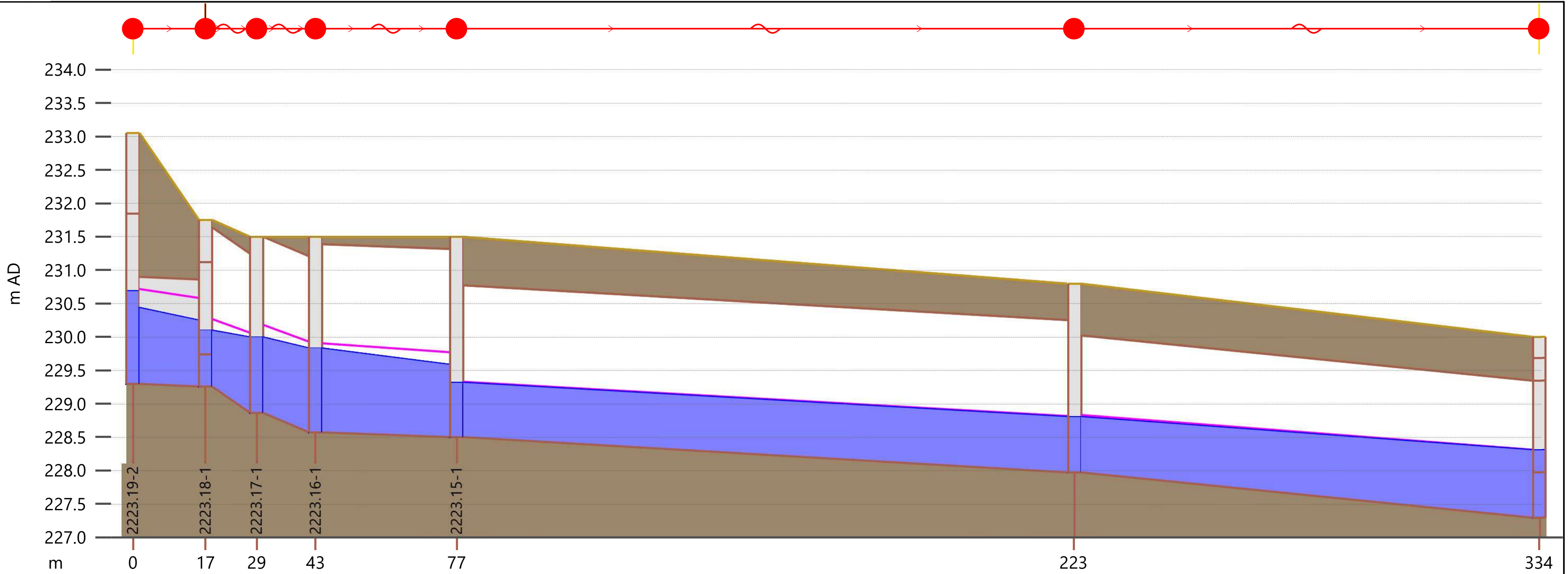


EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 6

RVA PROJECT NO. 194615	FIGURE NO. 26E	AUGUST 2021

arva

Region of Peel
working with you



Link	-	-	-	2223.16-1.1	2223.15-1.1	2223.14-1.1
US node ID	-	-	-	2223.16-1	2223.15-1	2223.14-1
ds node	-	-	-	2223.15-1	2223.14-1	RR-ED-44
numbarrels	1	1	1	1	1	1
length (m)	17.2					
Shape ID	ARCH	-	-	Matrix-2223.16	Matrix-2223.15	Matrix-2223.14
width (mm)	2270					
height (mm)	1600					
Rough type	N					
us inv (m AD)	229.300	-	-	228.573	228.500	227.977
ds inv (m AD)	229.260	-	-	228.500	227.977	227.300
grad (m/m)	0.00233					
r.pfc (m3/s)	3.093	-	-	49.589	93.206	151.870
US depth (m)	1.138	0.834	1.123	1.255	0.818	0.825
US flow (m3/s)	5.84407	-	-	5.57059	5.57059	5.57059
US velocity (m/s)	2.349	1.873	1.948	1.259	0.585	0.902

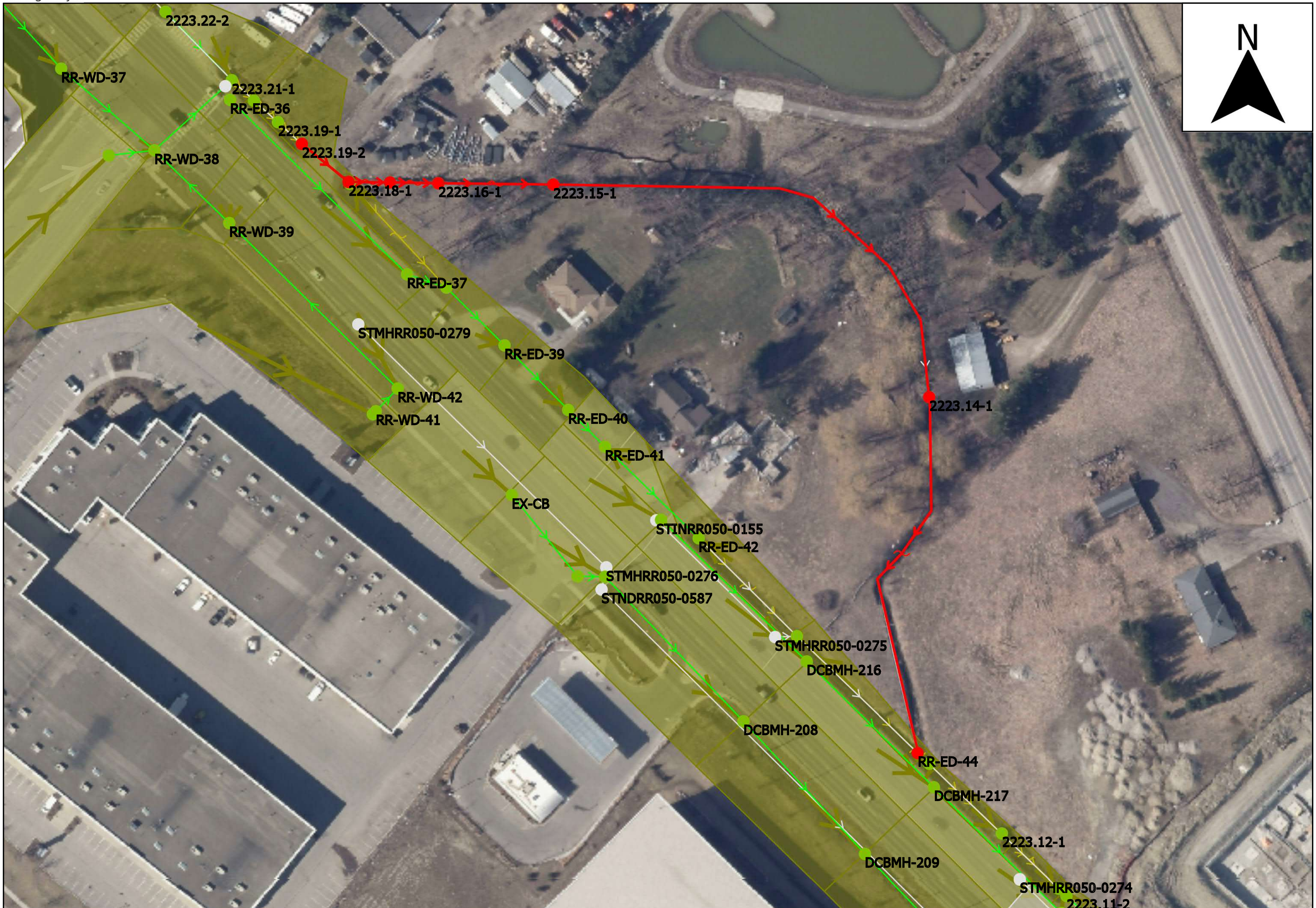
Node	-	-	-	2223.16-1	2223.15-1	2223.14-1	RR-ED-44
Node ID	-	-	-	2223.16-1	2223.15-1	2223.14-1	RR-ED-44
ground (m AD)	-	-	-	231.500	231.500	230.800	230.000
level (m AD)	-	-	-	229.828	229.318	228.802	228.310
expr:Freeboard	-	-	-	1.671570	2.181549	1.997998	1.690231

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 6

RVA PROJECT NO. 194615	FIGURE NO. 26F	AUGUST 2021

rva

Region of Peel
working with you

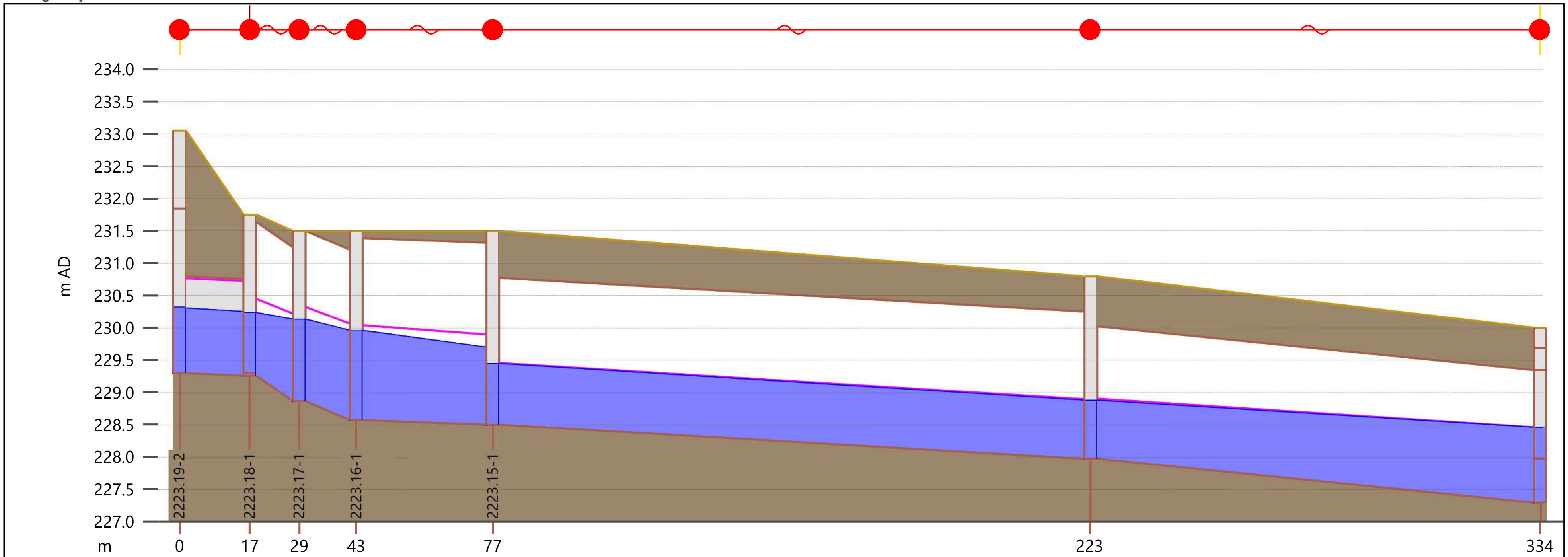


PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 6

RVA PROJECT NO. 194615	FIGURE NO. 26G	AUGUST 2021

arva

Region of Peel
working with you



Link	-	-	-	2223.16-1.1	2223.15-1.1	2223.14-1.1
US node ID	-	-	-	2223.16-1	2223.15-1	2223.14-1
ds node	-	-	-	2223.15-1	2223.14-1	RR-ED-44
numbarrels	1	1	1	1	1	1
length (m)	17.2					
Shape ID	RECT	-	-	Matrix-2223.16	Matrix-2223.15	Matrix-2223.14
width (mm)	3000					
height (mm)	1500					
Rough type	N					
us inv (m AD)	229.300	-	-	228.573	228.500	227.977
ds inv (m AD)	229.260	-	-	228.500	227.977	227.300
grad (m/m)	0.00233					
r.pfc (m3/s)	10.516	-	-	49.589	93.206	151.870
US depth (m)	1.000	0.968	1.260	1.380	0.939	0.898
US flow (m3/s)	9.05717	-	-	7.68312	7.68312	7.68312
US velocity (m/s)	3.019	2.077	1.947	1.317	0.586	0.923

Node	-	-	-	2223.16-1	2223.15-1	2223.14-1	RR-ED-44
Node ID	-	-	-	2223.16-1	2223.15-1	2223.14-1	RR-ED-44
ground (m AD)	-	-	-	231.500	231.500	230.800	230.000
level (m AD)	-	-	-	229.953	229.439	228.875	228.460
expr:Freeboard	-	-	-	1.547287	2.060944	1.924680	1.540054

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 6

RVA PROJECT NO. 194615	FIGURE NO. 26H	AUGUST 2021

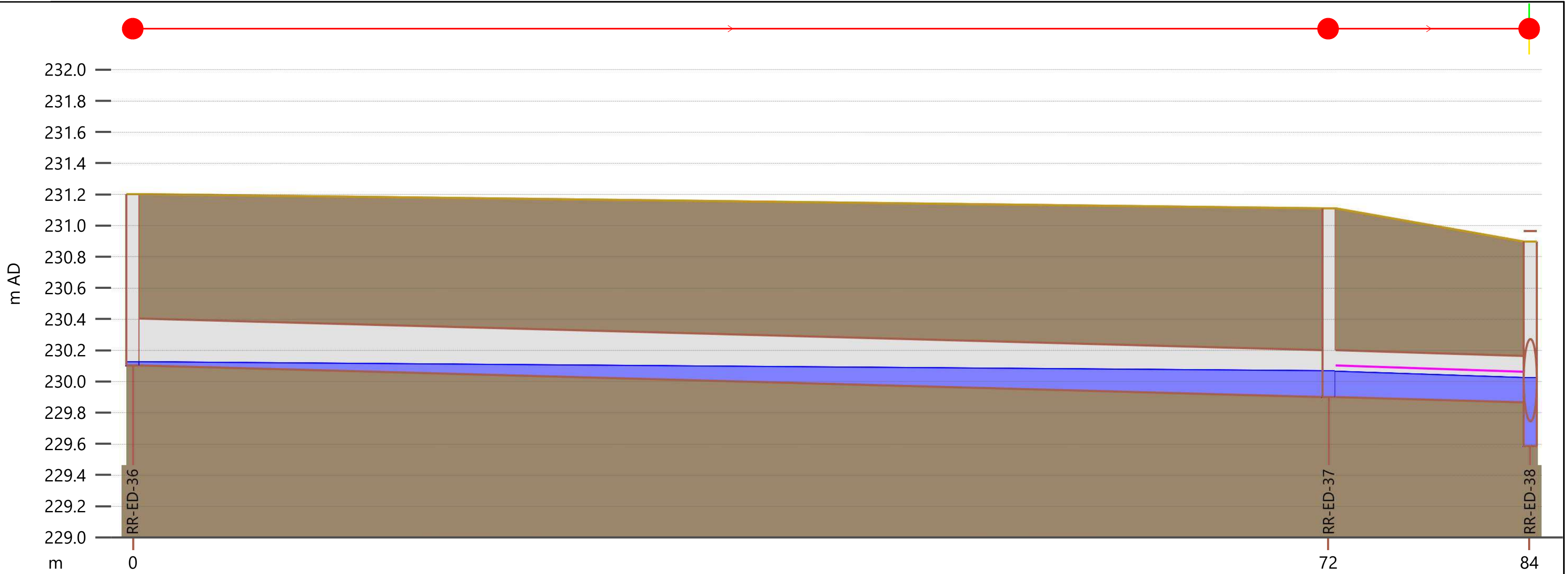
arva

Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 7

RVA PROJECT NO. 194615	FIGURE NO. 27A	AUGUST 2021

arva



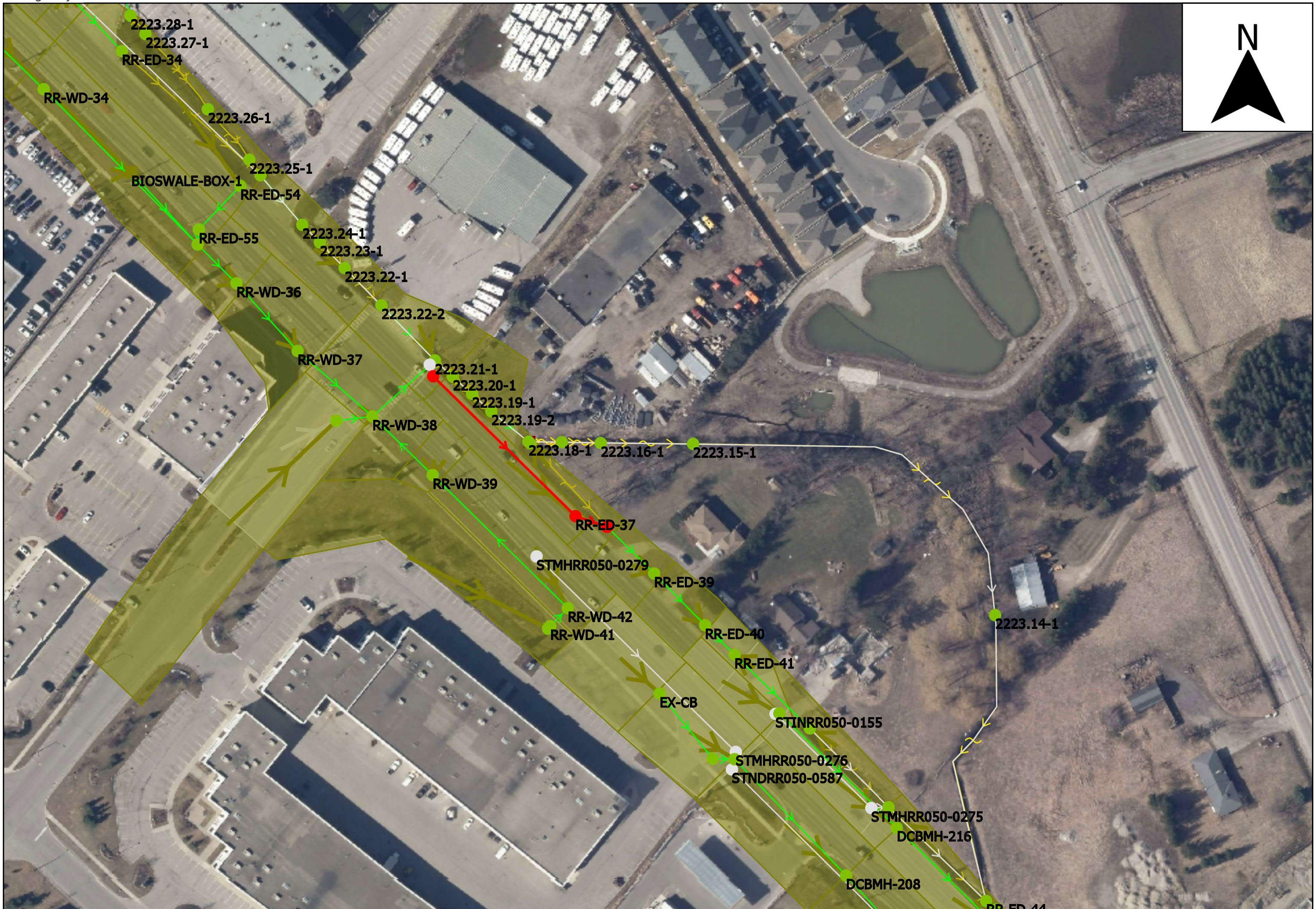
Link	RR-ED-36.1	RR-ED-37.1
US node ID	RR-ED-36	RR-ED-37
ds node	RR-ED-37	RR-ED-38
numbarrels	1	1
length (m)	72.2	12.1
Shape ID	CIRC	CIRC
width (mm)	300	300
height (mm)	300	300
Rough type	N	N
us inv (m AD)	230.105	229.900
ds inv (m AD)	229.900	229.866
grad (m/m)	0.00284	0.00284
r.pfc (m3/s)	0.052	0.052
US depth (m)	0.020	0.164
US flow (m3/s)	0.00000	0.03416
US velocity (m/s)	0.000	0.864

Node	RR-ED-36	RR-ED-37	RR-ED-38
Node ID	RR-ED-36	RR-ED-37	RR-ED-38
ground (m AD)	231.203	231.110	230.898
level (m AD)	230.125	230.066	230.024
expr:Freeboard	1.077820	1.044617	0.873474

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 7

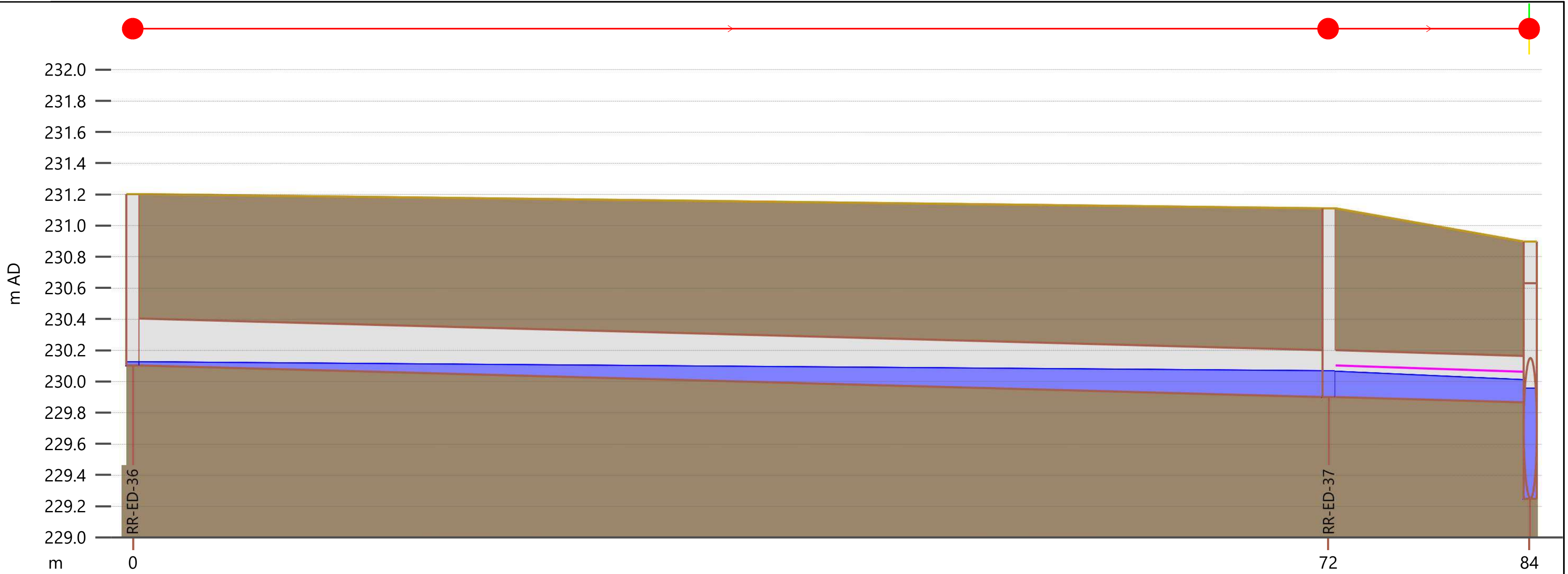
RVA PROJECT NO. 194615 | FIGURE NO. 27B | AUGUST 2021

Region of Peel
working with you



PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 7		
RVA PROJECT NO. 194615	FIGURE NO. 27C	AUGUST 2021

arva



Link	RR-ED-36.1	RR-ED-37.1
US node ID	RR-ED-36	RR-ED-37
ds node	RR-ED-37	RR-ED-38
numbarrels	1	1
length (m)	72.2	12.1
Shape ID	CIRC	CIRC
width (mm)	300	300
height (mm)	300	300
Rough type	N	N
us inv (m AD)	230.105	229.900
ds inv (m AD)	229.900	229.866
grad (m/m)	0.00284	0.00284
r.pfc (m3/s)	0.052	0.052
US depth (m)	0.020	0.165
US flow (m3/s)	0.00000	0.03445
US velocity (m/s)	-0.000	0.867

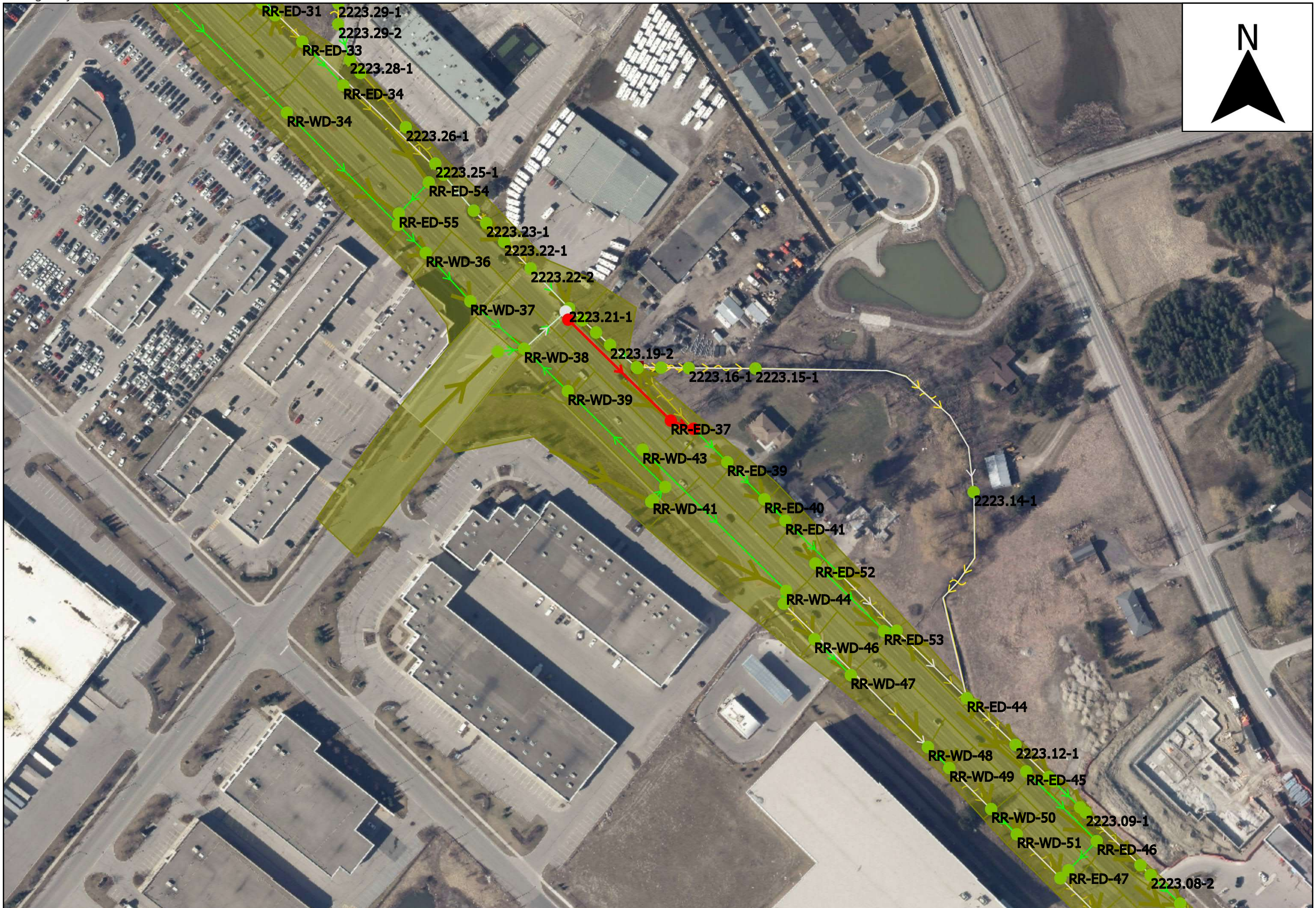
Node	RR-ED-36	RR-ED-37	RR-ED-38
Node ID	RR-ED-36	RR-ED-37	RR-ED-38
ground (m AD)	231.203	231.110	230.898
level (m AD)	230.125	230.066	229.957
expr:Freeboard	1.077820	1.043854	0.941193

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 7

RVA PROJECT NO. 194615	FIGURE NO. 27D	AUGUST 2021

rva

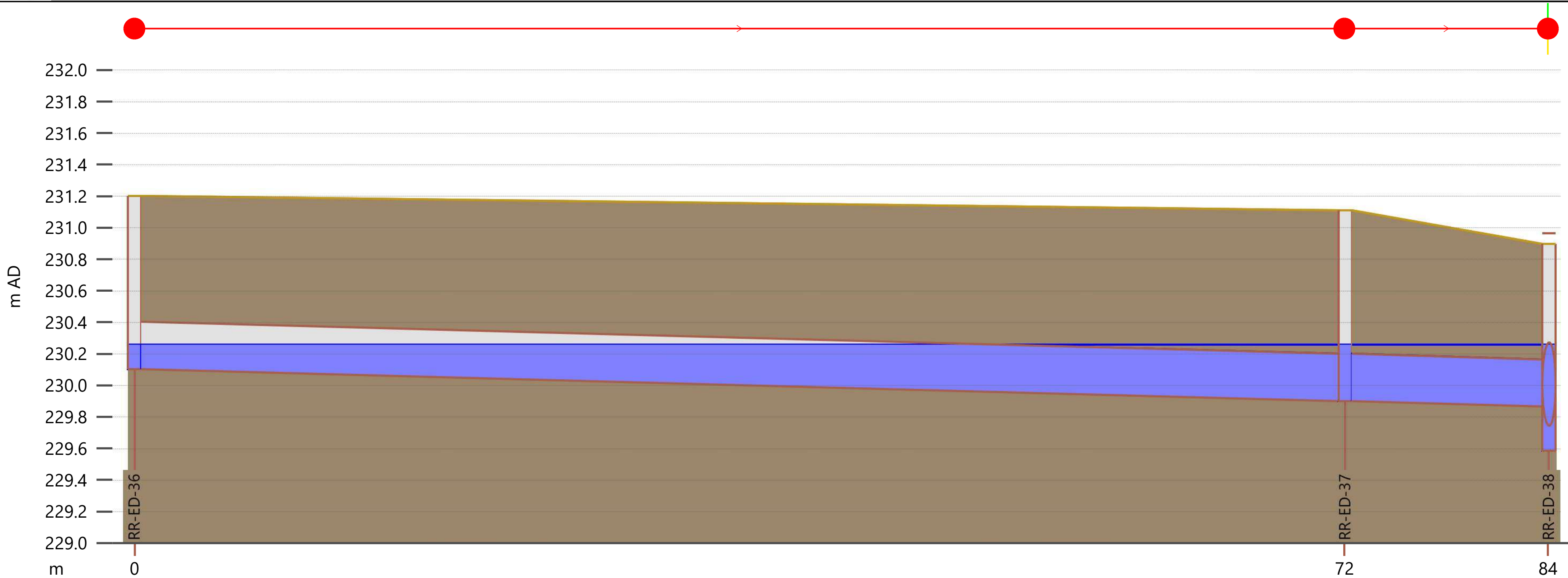
Region of Peel
working with you



EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 7

RVA PROJECT NO. 194615	FIGURE NO. 27E	AUGUST 2021	arva

Region of Peel
working with you



Link	RR-ED-36.1	RR-ED-37.1
US node ID	RR-ED-36	RR-ED-37
ds node	RR-ED-37	RR-ED-38
numbarrels	1	1
length (m)	72.2	12.1
Shape ID	CIRC	CIRC
width (mm)	300	300
height (mm)	300	300
Rough type	N	N
us inv (m AD)	230.105	229.900
ds inv (m AD)	229.900	229.866
grad (m/m)	0.00284	0.00284
r.pfc (m3/s)	0.052	0.052
US depth (m)	0.154	0.359
US flow (m3/s)	0.00011	0.05048
US velocity (m/s)	0.027	0.989

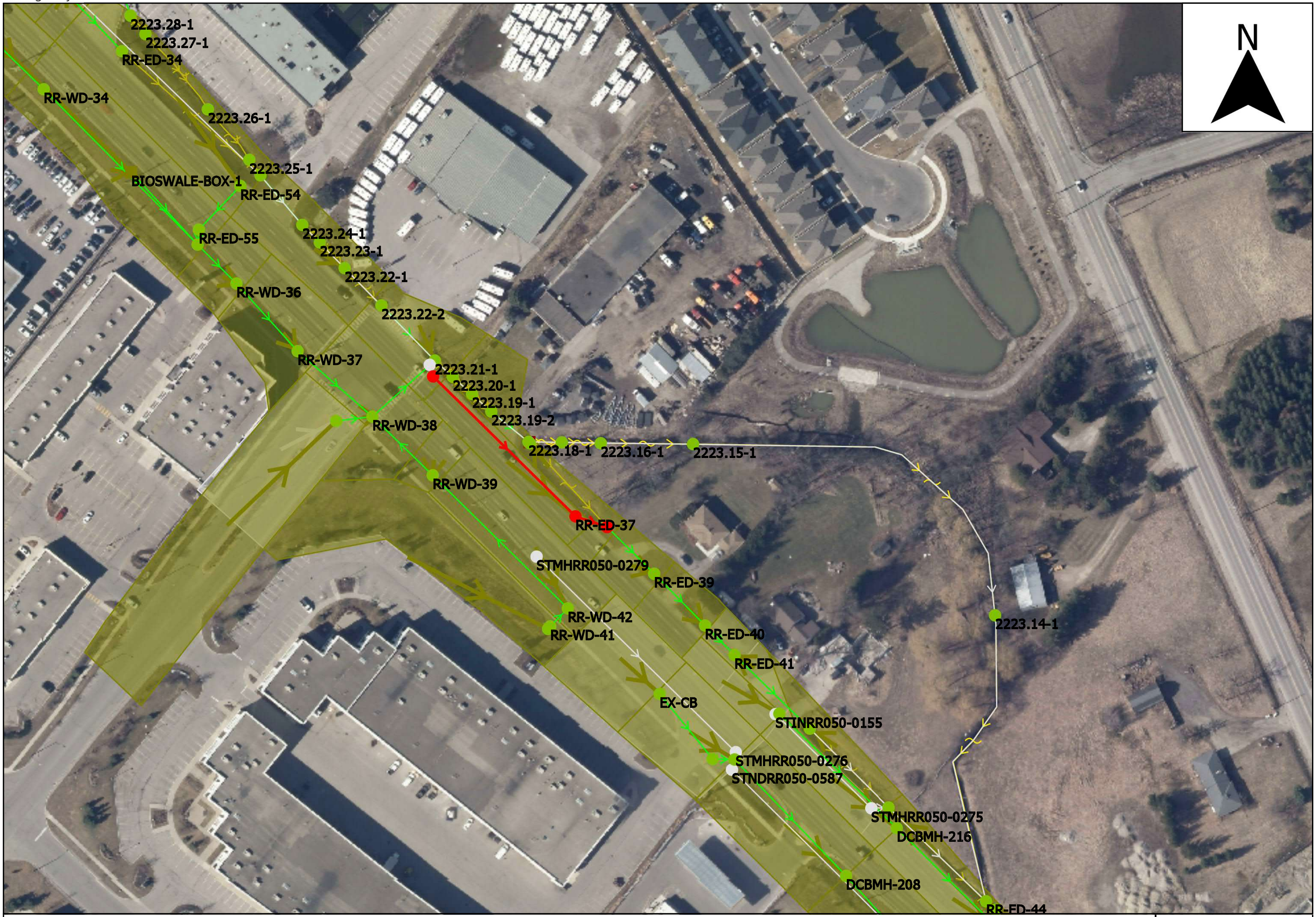
Node	RR-ED-36	RR-ED-37	RR-ED-38
Node ID	RR-ED-36	RR-ED-37	RR-ED-38
ground (m AD)	231.203	231.110	230.898
level (m AD)	230.259	230.259	230.259
expr:Freeboard	0.943680	0.851074	0.638840

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 7

RVA PROJECT NO. 194615 | FIGURE NO. 27F | AUGUST 2021

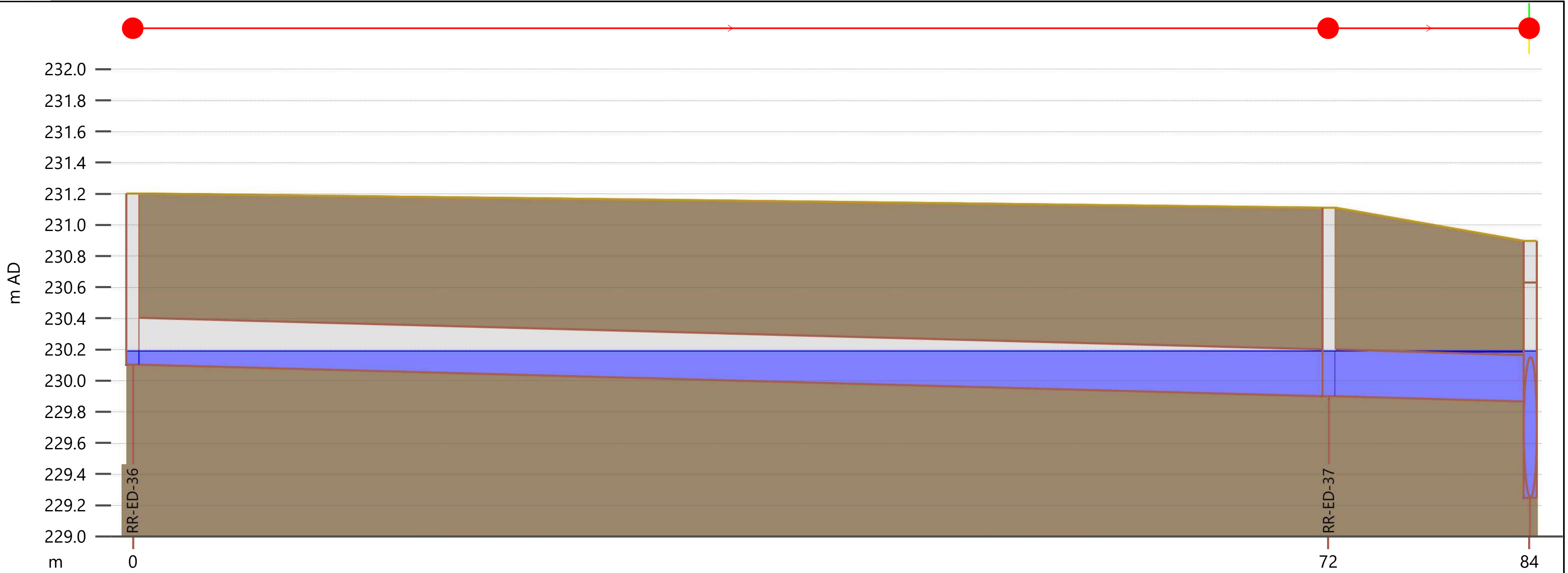
arva

Region of Peel
working with you



PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 7			arva
RVA PROJECT NO. 194615	FIGURE NO. 27G	AUGUST 2021	

Region of Peel
working with you



Link		RR-ED-36.1	RR-ED-37.1
US node ID		RR-ED-36	RR-ED-37
ds node		RR-ED-37	RR-ED-38
numbarrels		1	1
length (m)		72.2	12.1
Shape ID		CIRC	CIRC
width (mm)		300	300
height (mm)		300	300
Rough type		N	N
us inv (m AD)		230.105	229.900
ds inv (m AD)		229.900	229.866
grad (m/m)		0.00284	0.00284
r.pfc (m3/s)		0.052	0.052
US depth (m)		0.085	0.290
US flow (m3/s)		0.00036	0.05085
US velocity (m/s)		0.035	0.991

Node	RR-ED-36	RR-ED-37	RR-ED-38
Node ID	RR-ED-36	RR-ED-37	RR-ED-38
ground (m AD)	231.203	231.110	230.898
level (m AD)	230.190	230.190	230.190
expr:Freeboard	1.012817	0.920258	0.708023

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 7

RVA PROJECT NO. 194615	FIGURE NO. 27H	AUGUST 2021

arva

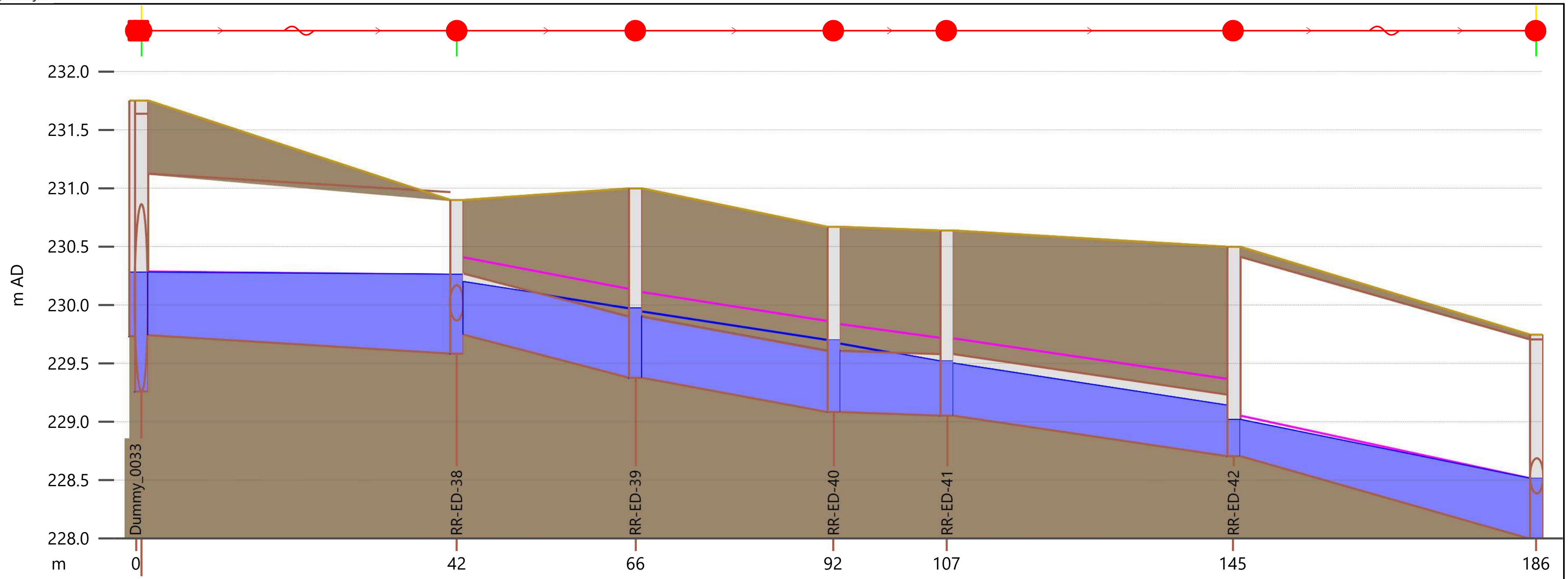
Region of Peel
working with you

EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 8

RVA PROJECT NO. 194615	FIGURE NO. 28A	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.18-1.2	RR-ED-38.1	RR-ED-39.1	RR-ED-40.1	RR-ED-41.1	RR-ED-42.1
US node ID	2223.18-1	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42
ds node	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43
numbarrels	1	1	1	1	1	1
length (m)		23.8	26.3	15.1	38.1	
Shape ID	East Side Ditch-8	CIRC	CIRC	CIRC	CIRC	East Side Ditch-9
width (mm)		525	525	525	525	
height (mm)		525	525	525	525	
Rough type		N	N	N	N	
us inv (m AD)	229.743	229.745	229.376	229.083	229.054	228.708
ds inv (m AD)	229.586	229.376	229.083	229.054	228.708	228.000
grad (m/m)		0.01551	0.01114	0.00192	0.00908	
r.pfc (m3/s)	8.402	0.536	0.454	0.189	0.410	29.255
US depth (m)	0.536	0.454	0.568	0.587	0.443	0.310
US flow (m3/s)	0.40712	0.40410	0.40409	0.40409	0.40409	0.40409
US velocity (m/s)	0.524	2.470	2.013	1.800	2.155	0.852

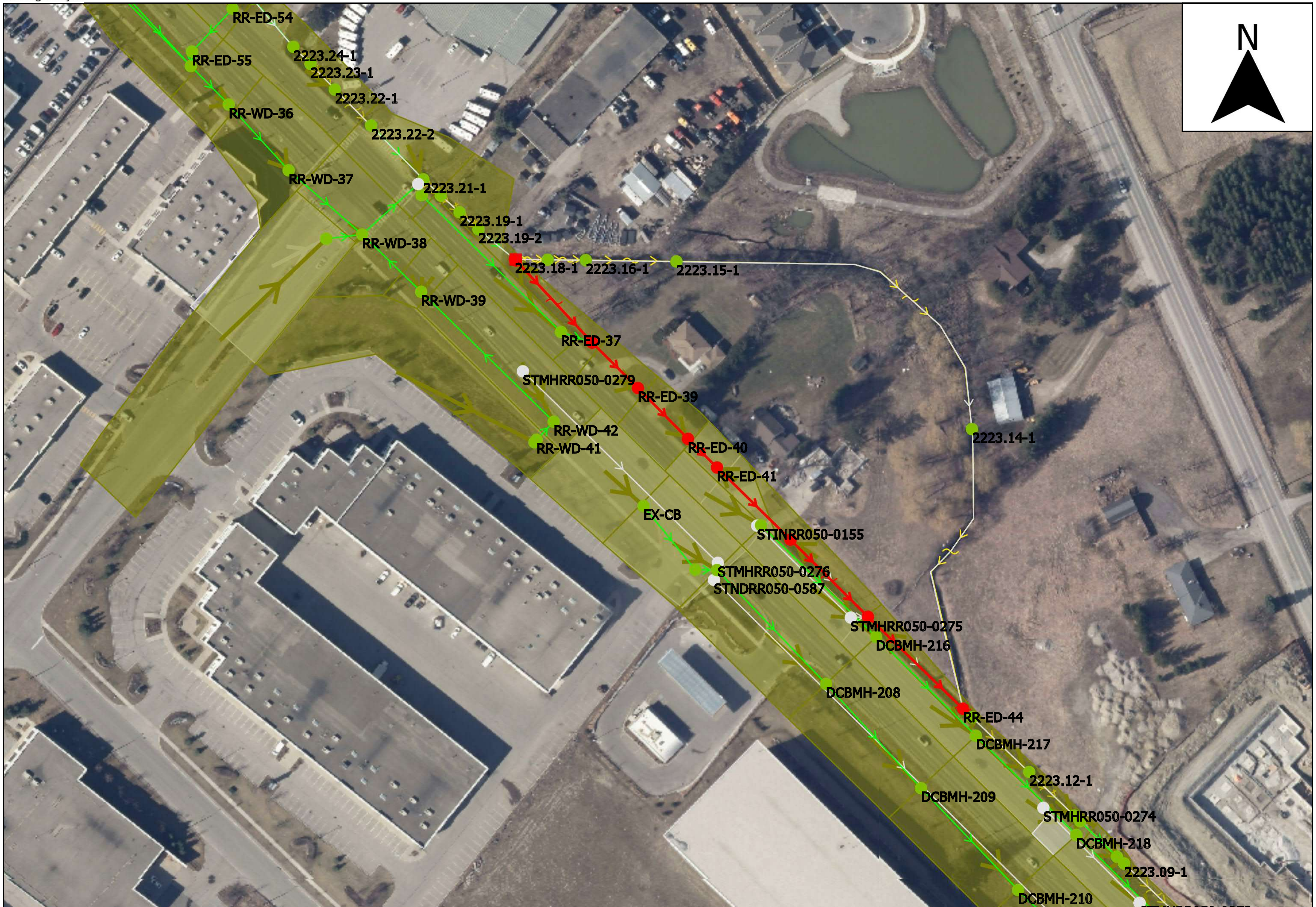
Node	2223.18-1	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43
Node ID	2223.18-1	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43
ground (m AD)	231.750	230.898	230.998	230.670	230.641	230.500	229.745
level (m AD)	230.279	230.259	229.971	229.698	229.515	229.018	228.511
expr:Freeboard	1.470764	0.638840	1.027542	0.971359	1.125885	1.481842	1.233770

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 8

RVA PROJECT NO. 194615	FIGURE NO. 28B	AUGUST 2021

arva

Region of Peel
working with you

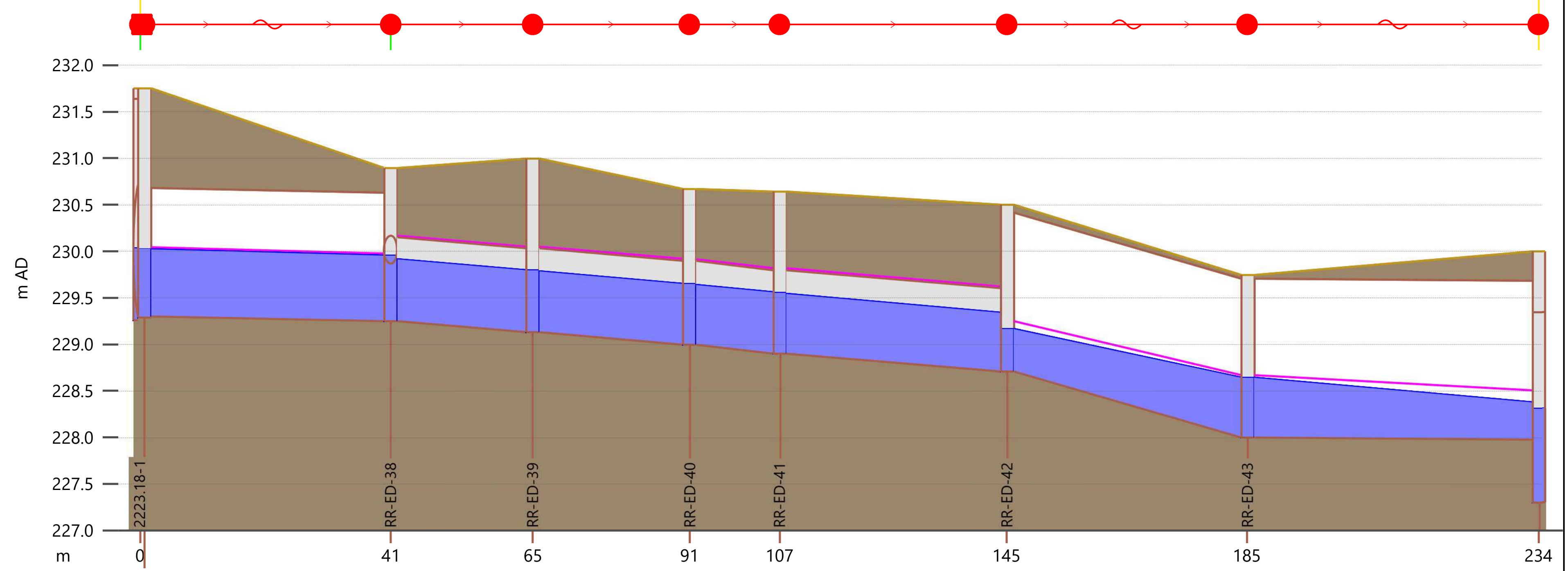


PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 8

RVA PROJECT NO. 194615	FIGURE NO. 28C	AUGUST 2021

arva

Region of Peel
working with you



Link	Dummy_0033.2	RR-ED-38.1	RR-ED-39.1	-	RR-ED-41.1	RR-ED-42.1	RR-ED-43.2
US node ID	Dummy_0033	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43
ds node	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43	RR-ED-44
numbarrels	1	1	1	1	1	1	1
length (m)		23.8	26.3	15.1	38.1		
Shape ID	East Side Ditch-8	CIRC	CIRC	CIRC	CIRC	East Side Ditch-9	East Side Ditch-9
width (mm)		900	900	900	900		
height (mm)		900	900	900	900		
Rough type		N	N	N	N		
us inv (m AD)	229.300	229.250	229.132	229.000	228.900	228.708	228.000
ds inv (m AD)	229.250	229.132	229.000	228.900	228.708	228.000	227.977
grad (m/m)		0.00496	0.00502	0.00663	0.00504		
r.pfc (m3/s)	4.778	1.275	1.282	1.474	1.285	29.255	4.789
US depth (m)	0.724	0.663	0.652	0.638	0.644	0.457	0.641
US flow (m3/s)	1.13152	1.12830	1.12830	1.12830	1.12830	1.12830	1.12571
US velocity (m/s)	0.651	2.245	2.286	2.339	2.314	1.313	0.761

Node	Dummy_0033	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43	RR-ED-44
Node ID	Dummy_0033	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43	RR-ED-44
ground (m AD)	231.750	230.898	230.998	230.670	230.641	230.500	229.745	230.000
level (m AD)	230.024	229.957	229.797	229.651	229.558	229.165	228.641	228.310
expr:Freeboard	1.726273	0.941193	1.201004	1.018631	1.082932	1.334610	1.104146	1.690155

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 8

RVA PROJECT NO. 194615	FIGURE NO. 28D	AUGUST 2021

arva

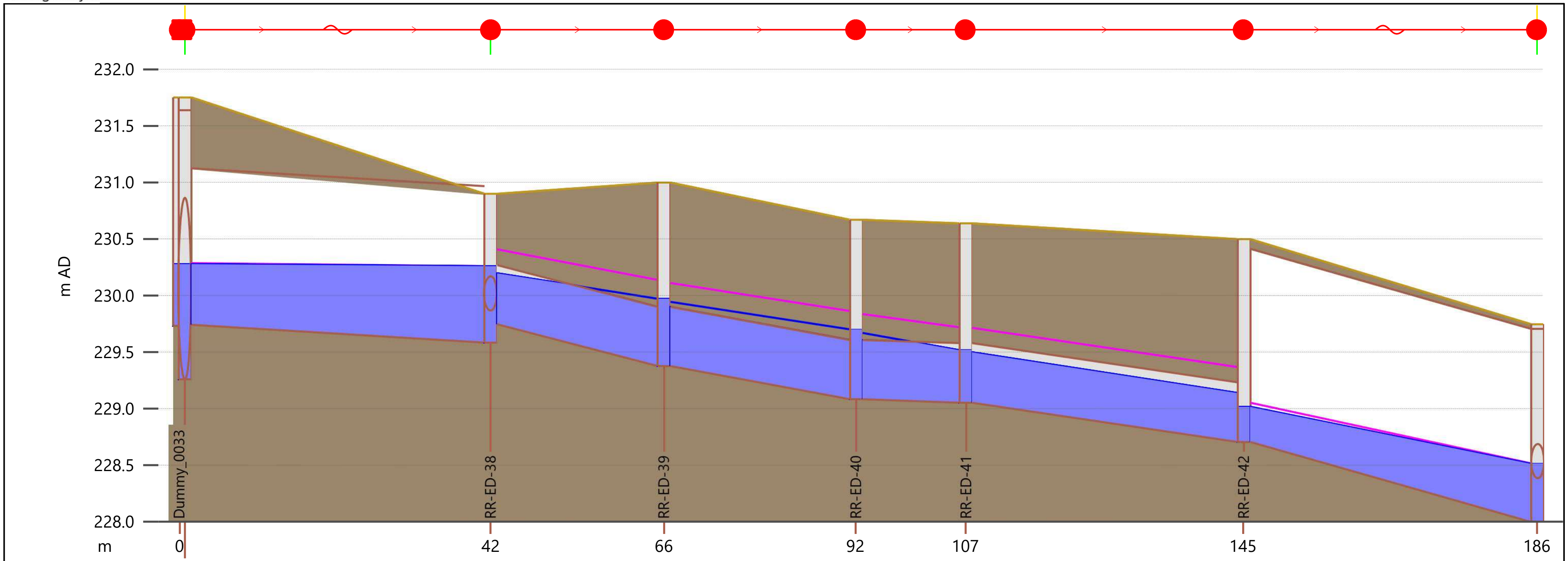
Region of Peel
working with you

EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 8

RVA PROJECT NO. 194615	FIGURE NO. 28E	AUGUST 2021

arva

Region of Peel
working with you



Link	2223.18-1.2	RR-ED-38.1	RR-ED-39.1	RR-ED-40.1	RR-ED-41.1	RR-ED-42.1
US node ID	2223.18-1	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42
ds node	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43
numbarrels	1	1	1	1	1	1
length (m)		23.8	26.3	15.1	38.1	
Shape ID	East Side Ditch-8	CIRC	CIRC	CIRC	CIRC	East Side Ditch-9
width (mm)		525	525	525	525	
height (mm)		525	525	525	525	
Rough type		N	N	N	N	
us inv (m AD)	229.743	229.745	229.376	229.083	229.054	228.708
ds inv (m AD)	229.586	229.376	229.083	229.054	228.708	228.000
grad (m/m)		0.01551	0.01114	0.00192	0.00908	
r.pfc (m3/s)	8.402	0.536	0.454	0.189	0.410	29.255
US depth (m)	0.536	0.454	0.568	0.587	0.443	0.310
US flow (m3/s)	0.40712	0.40410	0.40409	0.40409	0.40409	0.40409
US velocity (m/s)	0.524	2.470	2.013	1.800	2.155	0.852

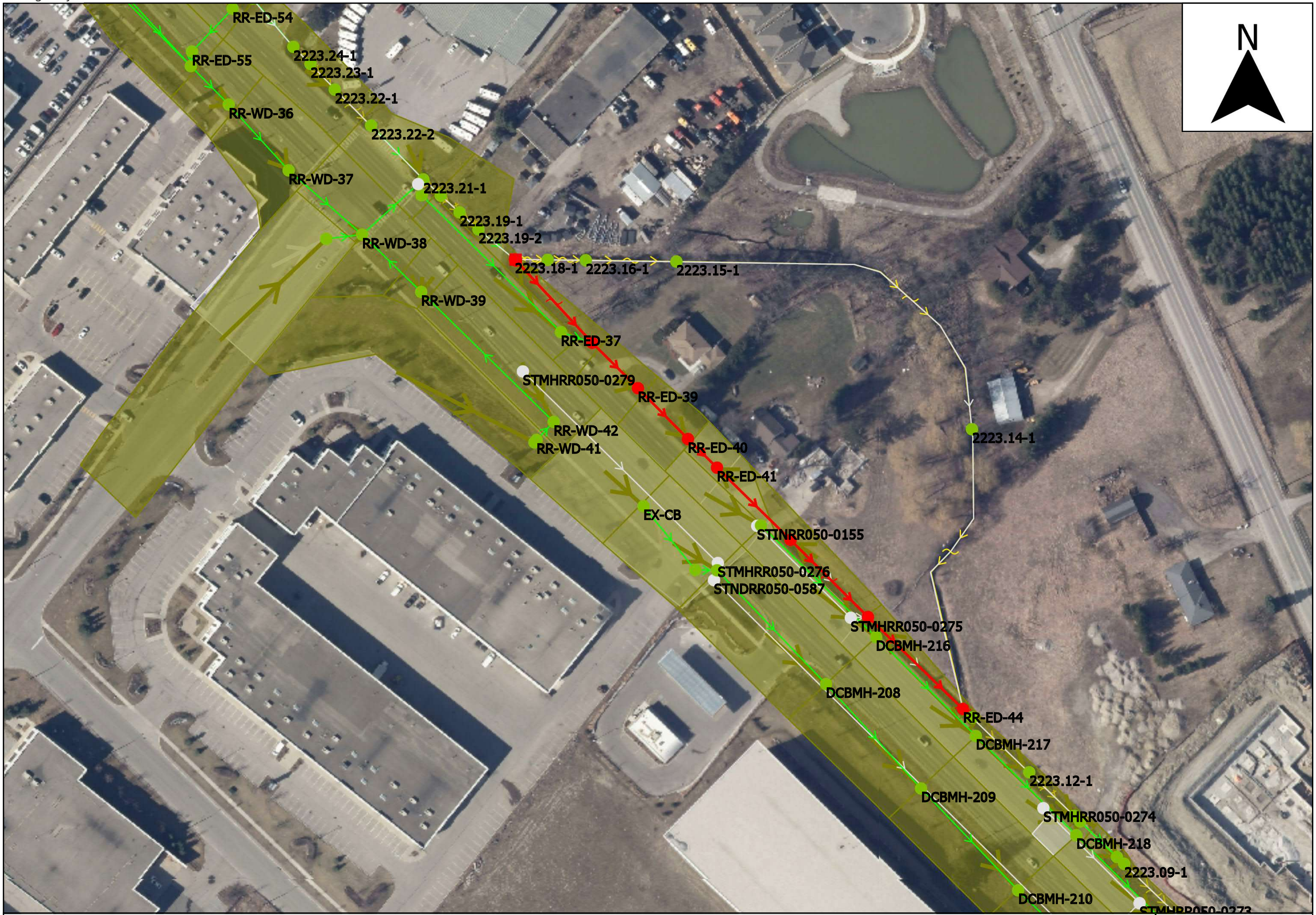
Node	2223.18-1	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43
Node ID	2223.18-1	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43
ground (m AD)	231.750	230.898	230.998	230.670	230.641	230.500	229.745
level (m AD)	230.279	230.259	229.971	229.698	229.515	229.018	228.511
expr:Freeboard	1.470764	0.638840	1.027542	0.971359	1.125885	1.481842	1.233770

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 8

RVA PROJECT NO. 194615 | FIGURE NO. 28F | AUGUST 2021

arva

Region of Peel
working with you

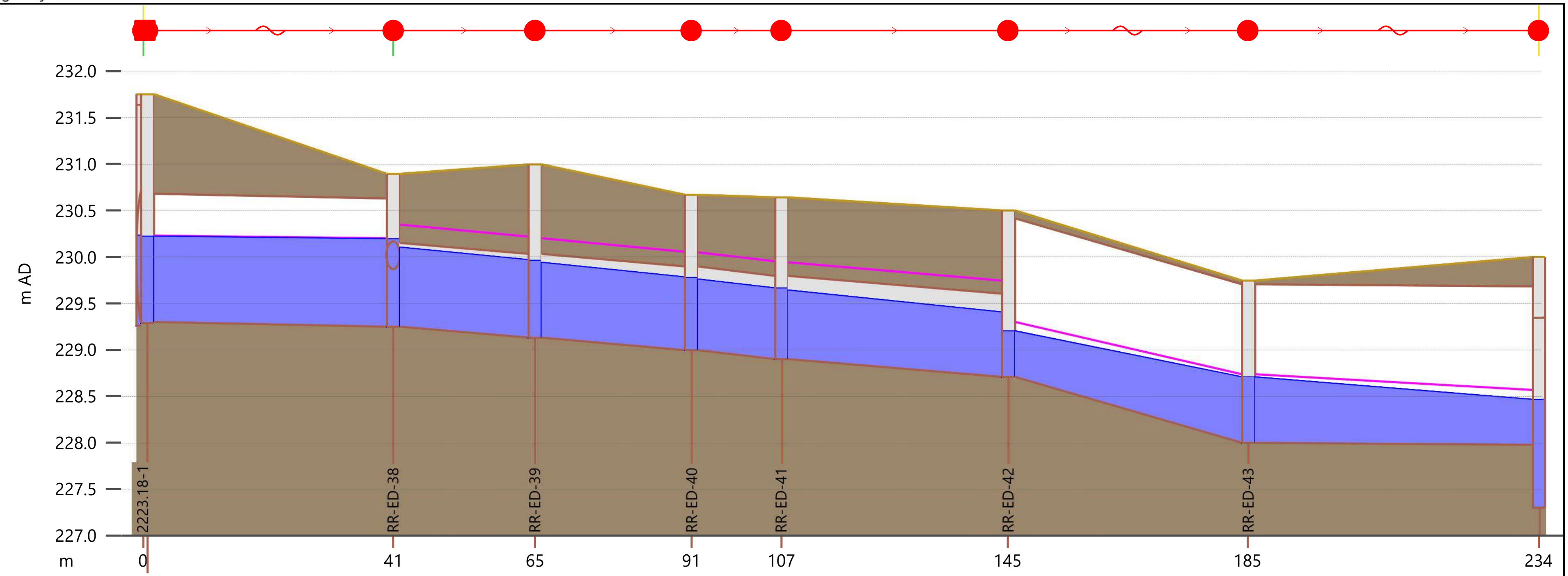


PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 8

RVA PROJECT NO. 194615	FIGURE NO. 28G	AUGUST 2021

arva

Region of Peel
working with you



Link	Dummy_0033.2	RR-ED-38.1	RR-ED-39.1	-	RR-ED-41.1	RR-ED-42.1	RR-ED-43.2
US node ID	Dummy_0033	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43
ds node	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43	RR-ED-44
numbarrels	1	1	1	1	1	1	1
length (m)		23.8	26.3	15.1	38.1		
Shape ID	East Side Ditch-8	CIRC	CIRC	CIRC	CIRC	East Side Ditch-9	East Side Ditch-9
width (mm)		900	900	900	900		
height (mm)		900	900	900	900		
Rough type		N	N	N	N		
us inv (m AD)	229.300	229.250	229.132	229.000	228.900	228.708	228.000
ds inv (m AD)	229.250	229.132	229.000	228.900	228.708	228.000	227.977
grad (m/m)		0.00496	0.00502	0.00663	0.00504		
r.pfc (m3/s)	4.778	1.275	1.282	1.474	1.285	29.255	4.789
US depth (m)	0.919	0.854	0.806	0.755	0.739	0.493	0.704
US flow (m3/s)	1.37405	1.37030	1.37030	1.37030	1.37030	1.37030	1.36761
US velocity (m/s)	0.658	2.252	2.307	2.406	2.453	1.419	0.807

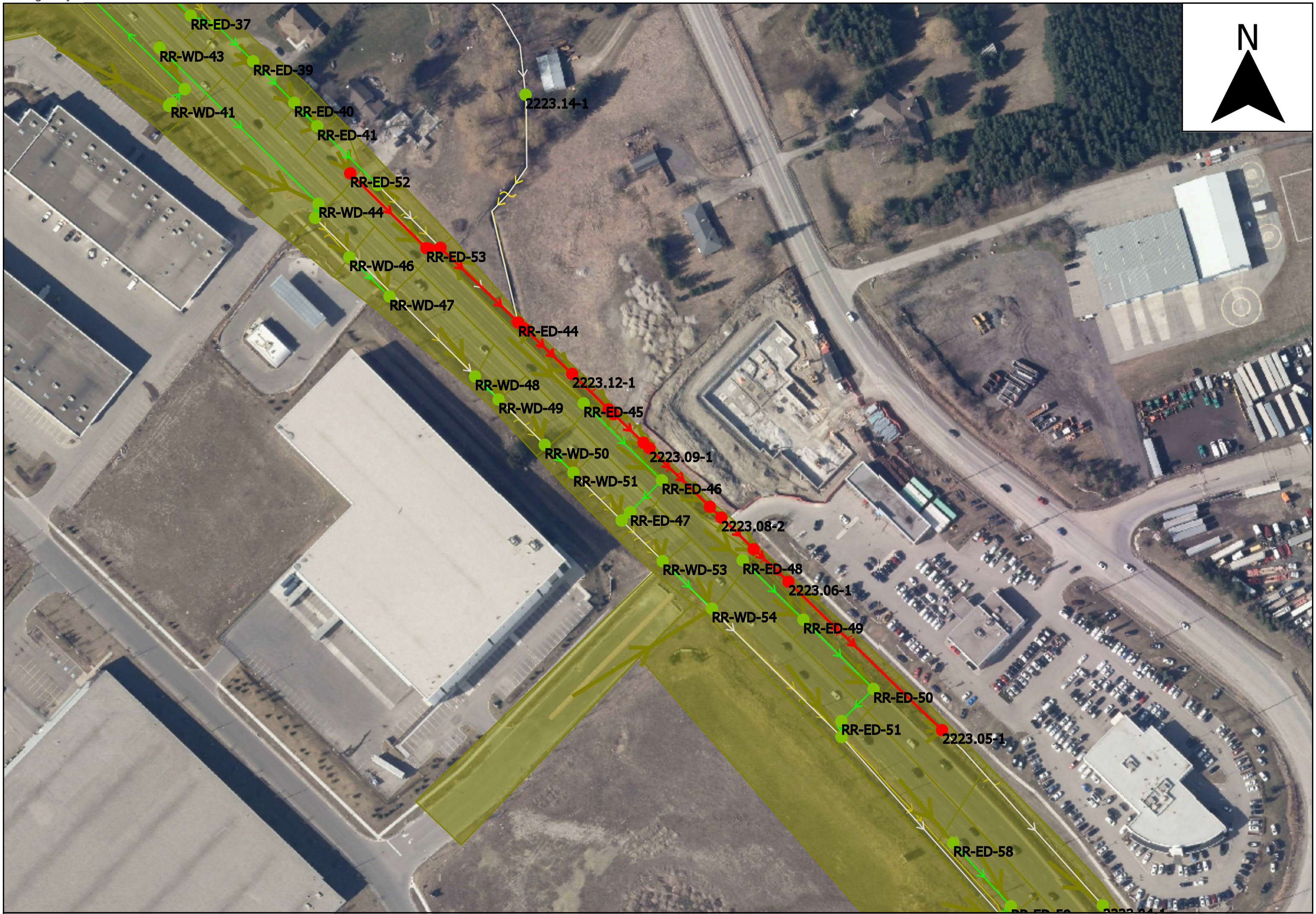
Node	Dummy_0033	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43	RR-ED-44
Node ID	Dummy_0033	RR-ED-38	RR-ED-39	RR-ED-40	RR-ED-41	RR-ED-42	RR-ED-43	RR-ED-44
ground (m AD)	231.750	230.898	230.998	230.670	230.641	230.500	229.745	230.000
level (m AD)	230.219	230.190	229.961	229.777	229.661	229.201	228.704	228.460
expr:Freeboard	1.531158	0.708023	1.036911	0.892380	0.979858	1.299438	1.040502	1.540070

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 8

RVA PROJECT NO. 194615 | FIGURE NO. 28H | AUGUST 2021

arva

Region of Peel
working with you

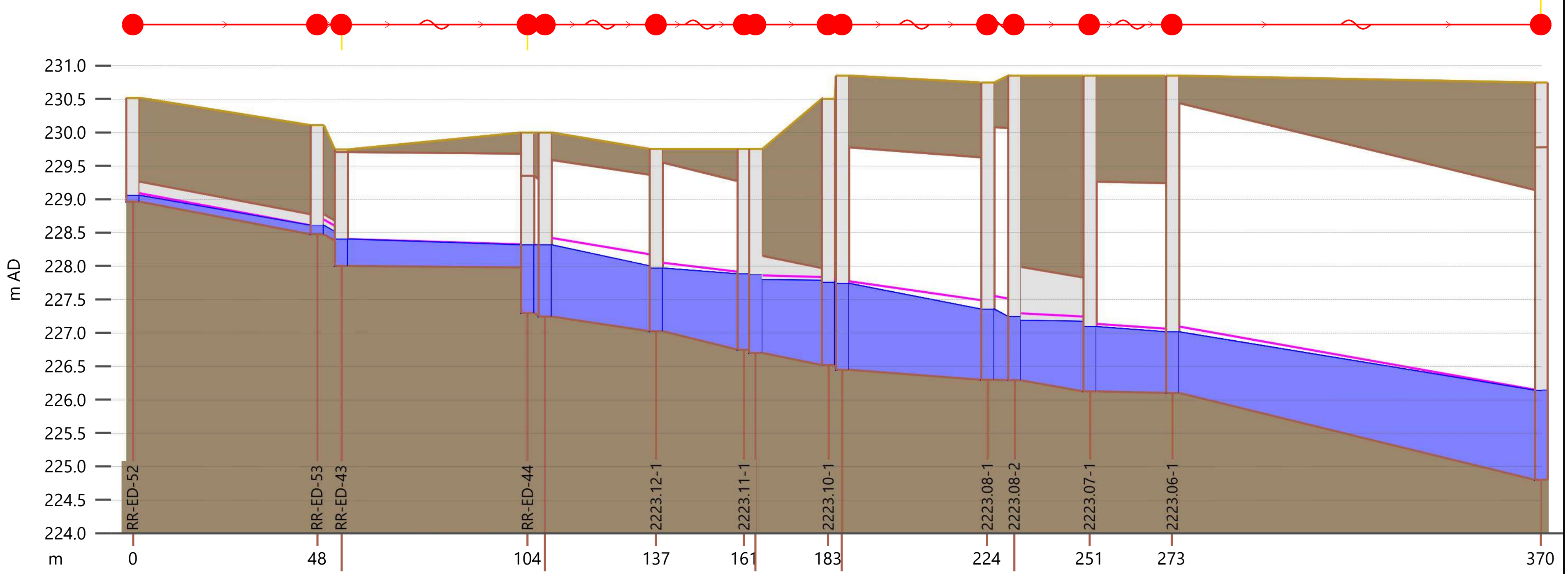


EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 9

RVA PROJECT NO. 194615	FIGURE NO. 29A	AUGUST 2021

arva

Region of Peel
working with you



Link	RR-ED-52.1	-	RR-ED-43.2	-	2223.13-1.1	-	-	2223.09-1.1	-	-	-	2223.06-1.1
US node ID	RR-ED-52	-	RR-ED-43	-	2223.13-1	2223.12-1	-	2223.09-1	-	-	-	2223.06-1
ds node	RR-ED-53	-	RR-ED-44	-	2223.12-1	2223.11-1	-	2223.08-1	-	-	-	2223.05-1
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	48.4	-					19.0			19.8		
Shape ID	CIRC	-	East Side Ditch-9	-	-	-	RECT	Matrix-2223.09	-	RECT	-	Matrix-2223.06
width (mm)	300	-					4500			4500		
height (mm)	300	-					1450			1700		
Rough type	N	N					N			N		
us inv (m AD)	228.968	-	228.000	-	227.250	227.022	226.700	226.450	-	226.290	226.130	226.100
ds inv (m AD)	228.478	-	227.977	-	227.022	226.750	226.520	226.300	-	226.130	226.100	224.803
grad (m/m)	0.01012	-					0.00947			0.00808		
r.pfc (m3/s)	0.097	-	4.789	-	103.563	123.244	24.208	216.006	-	38.336	108.743	1477.149
US depth (m)	0.083	-	0.394	-	1.057	0.938	1.092	1.288	-	0.892	0.959	0.911
US flow (m3/s)	0.01416	-	0.26894	-	5.83679	5.83679	5.83679	5.83679	-	5.83679	5.83679	5.83679
US velocity (m/s)	0.886	-	0.394	-	1.523	1.328	1.188	0.841	-	1.455	0.945	1.300

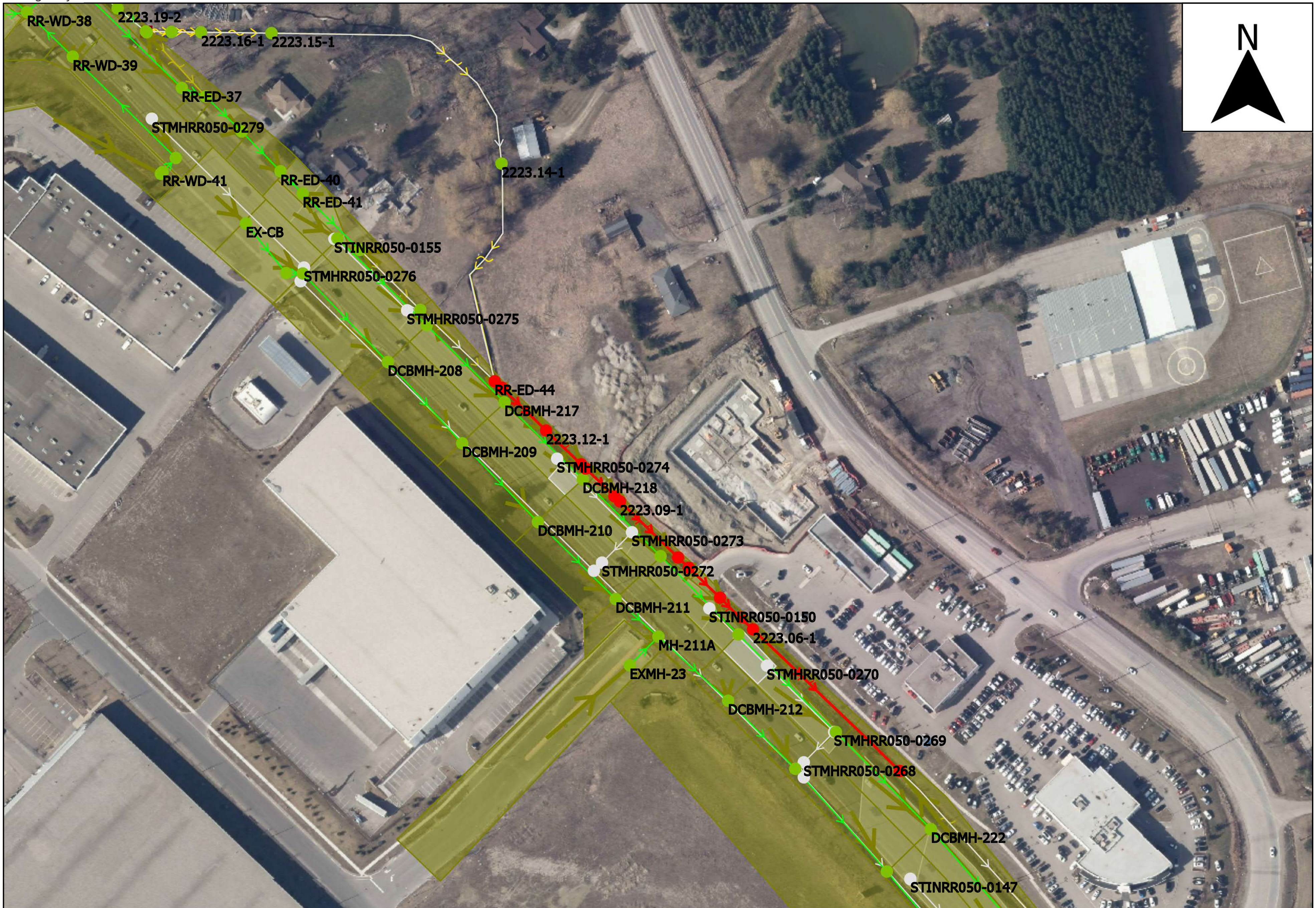
Node	-	RR-ED-53	RR-ED-43	RR-ED-44	-	2223.12-1	-	-	-	-	-	-	-	2223.06-1	2223.05-1
Node ID	-	RR-ED-53	RR-ED-43	RR-ED-44	-	2223.12-1	-	-	-	-	-	-	-	2223.06-1	2223.05-1
ground (m AD)	230.517	230.105	229.745	230.000	-	229.750	-	-	-	230.850	230.750	-	-	230.850	230.750
level (m AD)	229.051	228.600	228.394	228.310	-	227.960	-	-	-	227.738	227.349	-	-	227.011	226.135
expr:Freeboard	1.466248	1.504883	1.350530	1.690231	-	1.789978	-	-	-	-	-	-	-	3.839410	4.615448

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 9

RVA PROJECT NO. 194615	FIGURE NO. 29B	AUGUST 2021

rva

Region of Peel
working with you

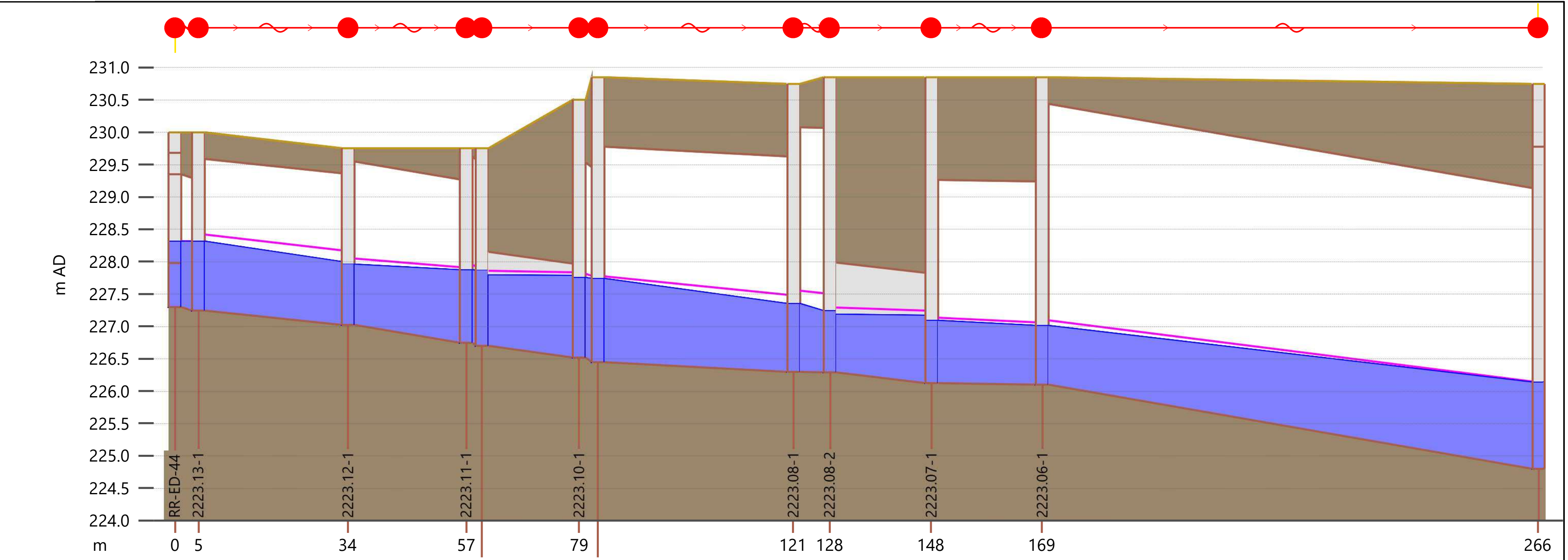


PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 9

RVA PROJECT NO. 194615	FIGURE NO. 29C	AUGUST 2021

arva

Region of Peel
working with you



Link	-	2223.13-1.1	2223.12-1.1	2223.11-2.1	-	2223.09-1.1	-	2223.08-2.1	2223.07-1.1	2223.06-1.1
US node ID	-	2223.13-1	2223.12-1	2223.11-2	-	2223.09-1	-	2223.08-2	2223.07-1	2223.06-1
ds node	-	2223.12-1	2223.11-1	2223.10-1	-	2223.08-1	-	2223.07-1	2223.06-1	2223.05-1
numbarrels	1	1	1	1	1	1	1	1	1	1
length (m)				19.0				19.8		
Shape ID	-	Matrix-2223.13	-	RECT	-	Matrix-2223.09	-	RECT	-	Matrix-2223.06
width (mm)				4500				4500		
height (mm)				1450				1700		
Rough type				N				N		
us inv (m AD)	-	227.250	227.022	226.700	-	226.450	-	226.290	226.130	226.100
ds inv (m AD)	-	227.022	226.750	226.520	-	226.300	-	226.130	226.100	224.803
grad (m/m)				0.00947				0.00808		
r.pfc (m3/s)	-	103.563	123.244	32.728	-	216.006	-	38.336	108.743	1477.149
US depth (m)	-	1.058	0.936	1.087	-	1.288	-	0.892	0.959	0.911
US flow (m3/s)	-	5.83809	5.83809	5.83809	-	5.83809	-	5.83809	5.83809	5.83809
US velocity (m/s)	-	1.524	1.334	1.193	-	0.841	-	1.455	0.945	1.300

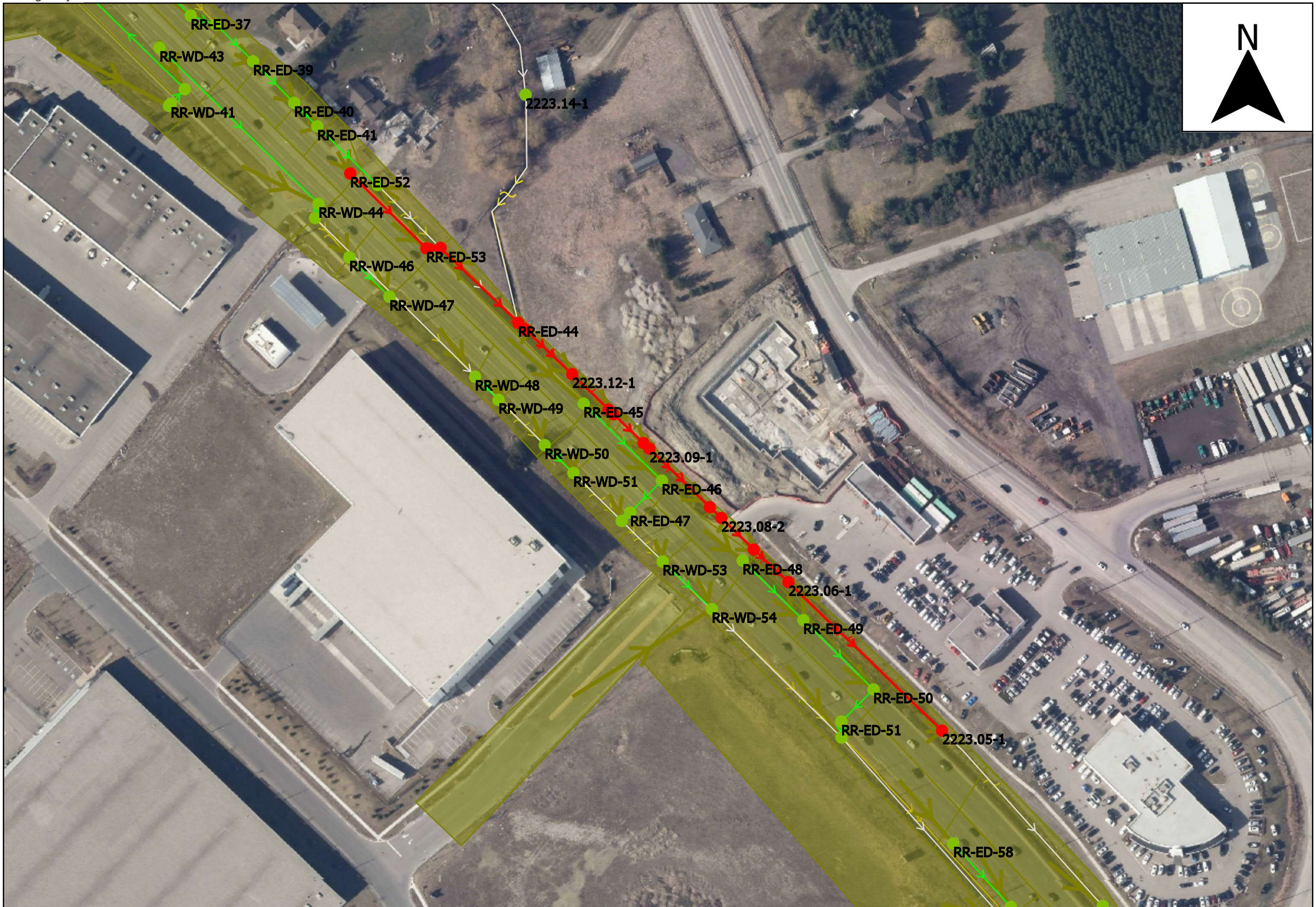
Node	-	2223.12-1	-	-	-	2223.09-1	2223.08-1	-	2223.07-1	2223.06-1	2223.05-1
Node ID	-	2223.12-1	-	-	-	2223.09-1	2223.08-1	-	2223.07-1	2223.06-1	2223.05-1
ground (m AD)	230.000	229.750	-	-	-	230.850	230.750	-	230.850	230.850	230.750
level (m AD)	228.307	227.958	-	-	-	227.738	227.349	-	227.089	227.011	226.135
expr:Freeboard	1.692505	1.792435	-	-	-	3.112131	3.400528	-	3.760614	3.839365	4.615356

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 9

RVA PROJECT NO. 194615 | FIGURE NO. 29D | AUGUST 2021

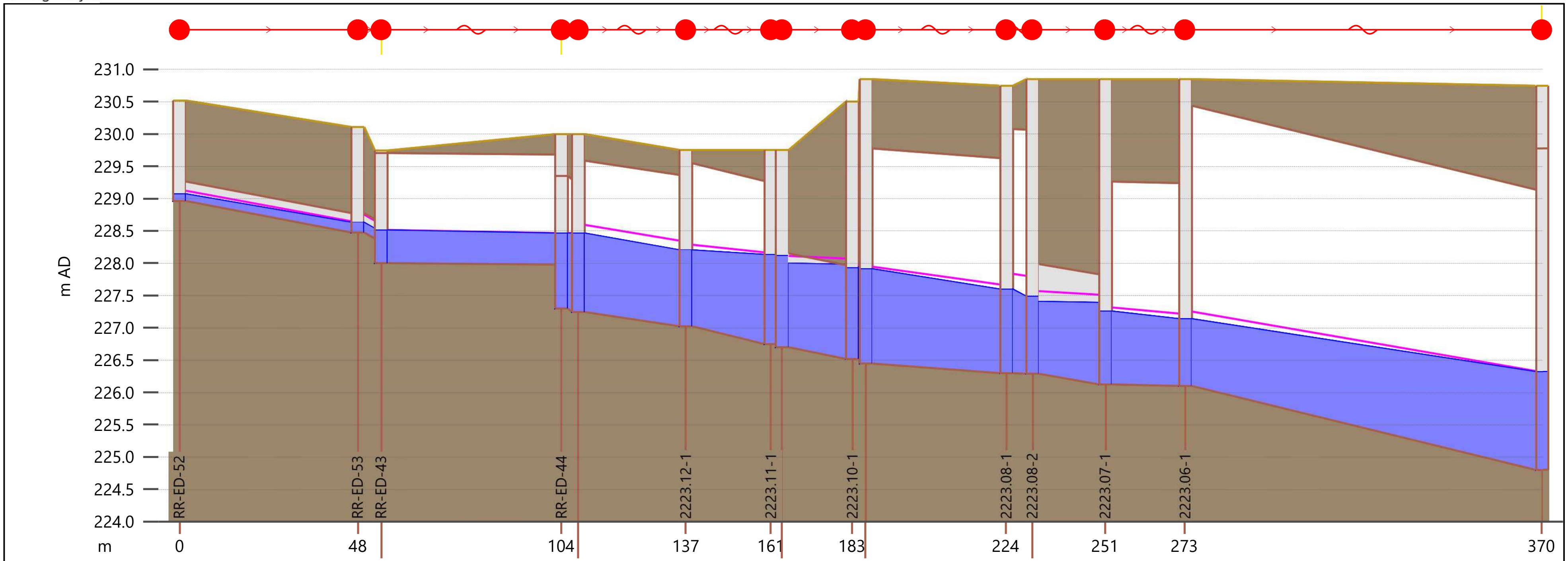
arva

Region of Peel
working with you



EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 9			arva
RVA PROJECT NO. 194615	FIGURE NO. 29E	AUGUST 2021	

Region of Peel
working with you



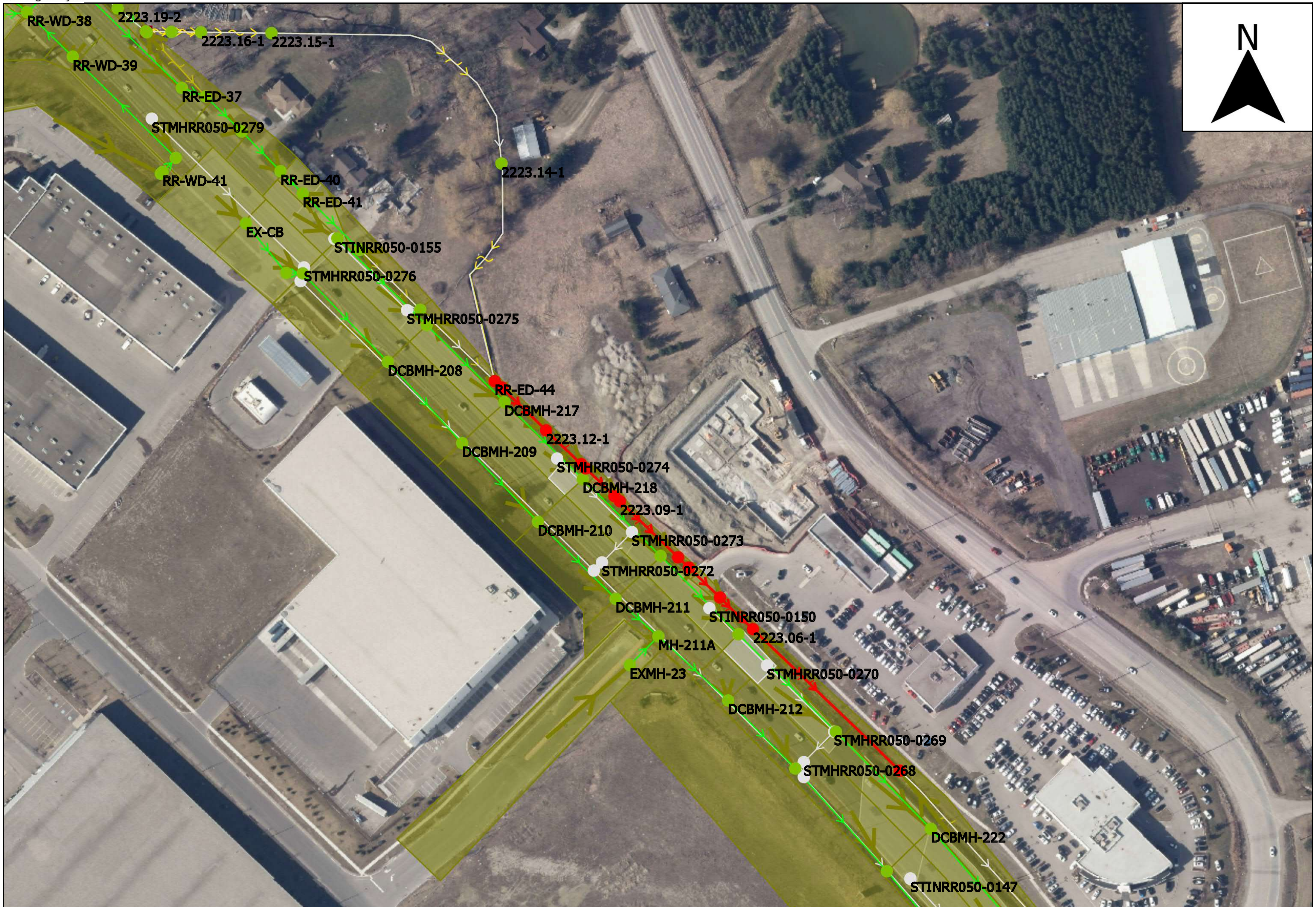
Link	RR-ED-52.1	-	RR-ED-43.2	-	2223.13-1.1	-	-	2223.09-1.1	-	-	-	2223.06-1.1
US node ID	RR-ED-52	-	RR-ED-43	-	2223.13-1	2223.12-1	-	2223.09-1	-	-	-	2223.06-1
ds node	RR-ED-53	-	RR-ED-44	-	2223.12-1	2223.11-1	-	2223.08-1	-	-	-	2223.05-1
numbarrels	1	1	1	1	1	1	1	1	1	1	1	1
length (m)	48.4	-					19.0			19.8		
Shape ID	CIRC	-	East Side Ditch-9	-	-	-	RECT	Matrix-2223.09	-	RECT	-	Matrix-2223.06
width (mm)	300	-					4500			4500		
height (mm)	300	-					1450			1700		
Rough type	N	N					N			N		
us inv (m AD)	228.968	-	228.000	-	227.250	227.022	226.700	226.450	-	226.290	226.130	226.100
ds inv (m AD)	228.478	-	227.977	-	227.022	226.750	226.520	226.300	-	226.130	226.100	224.803
grad (m/m)	0.01012	-					0.00947			0.00808		
r.pfc (m3/s)	0.097	-	4.789	-	103.563	123.244	24.208	216.006	-	38.336	108.743	1477.149
US depth (m)	0.102	-	0.511	-	1.207	1.175	1.294	1.462	-	1.111	1.125	1.038
US flow (m3/s)	0.02195	-	0.40184	-	9.02716	9.02712	9.02707	9.02706	-	9.02700	9.02701	9.02705
US velocity (m/s)	1.034	-	0.443	-	1.629	1.351	1.550	0.861	-	1.806	1.096	1.485

Node	-	RR-ED-53	RR-ED-43	RR-ED-44	-	2223.12-1	-	-	-	-	-	-	-	2223.06-1	2223.05-1
Node ID	-	RR-ED-53	RR-ED-43	RR-ED-44	-	2223.12-1	-	-	-	-	-	-	-	2223.06-1	2223.05-1
ground (m AD)	230.517	230.105	229.745	230.000	-	229.750	-	-	-	230.850	230.750	-	-	230.850	230.750
level (m AD)	229.070	228.628	228.511	228.459	-	228.197	-	-	-	227.912	227.590	-	-	227.138	226.314
expr:Freeboard	1.447281	1.477417	1.233770	1.540741	-	1.552765	-	-	-	-	-	-	-	3.712244	4.436066

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 9

RVA PROJECT NO. 194615 | FIGURE NO. 29F | AUGUST 2021

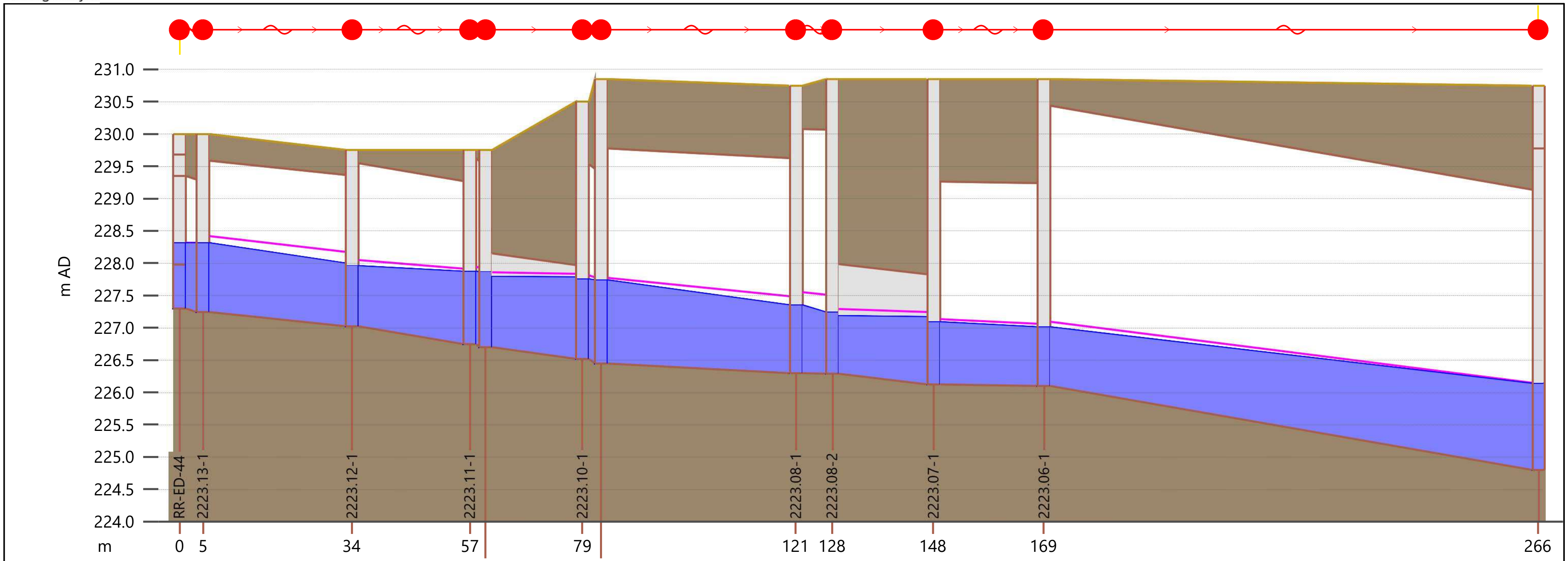
rva



PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 9

RVA PROJECT NO. 194615	FIGURE NO. 29G	AUGUST 2021

Region of Peel
working with you



Link	-	2223.13-1.1	2223.12-1.1	2223.11-2.1	-	2223.09-1.1	-	2223.08-2.1	2223.07-1.1	2223.06-1.1
US node ID	-	2223.13-1	2223.12-1	2223.11-2	-	2223.09-1	-	2223.08-2	2223.07-1	2223.06-1
ds node	-	2223.12-1	2223.11-1	2223.10-1	-	2223.08-1	-	2223.07-1	2223.06-1	2223.05-1
numbarrels	1	1	1	1	1	1	1	1	1	1
length (m)				19.0				19.8		
Shape ID	-	Matrix-2223.13	-	RECT	-	Matrix-2223.09	-	RECT	-	Matrix-2223.06
width (mm)				4500				4500		
height (mm)				1450				1700		
Rough type				N				N		
us inv (m AD)	-	227.250	227.022	226.700	-	226.450	-	226.290	226.130	226.100
ds inv (m AD)	-	227.022	226.750	226.520	-	226.300	-	226.130	226.100	224.803
grad (m/m)				0.00947				0.00808		
r.pfc (m3/s)	-	103.563	123.244	32.728	-	216.006	-	38.336	108.743	1477.149
US depth (m)	-	1.058	0.936	1.087	-	1.288	-	0.892	0.959	0.911
US flow (m3/s)	-	5.83809	5.83809	5.83809	-	5.83809	-	5.83809	5.83809	5.83809
US velocity (m/s)	-	1.524	1.334	1.193	-	0.841	-	1.455	0.945	1.300

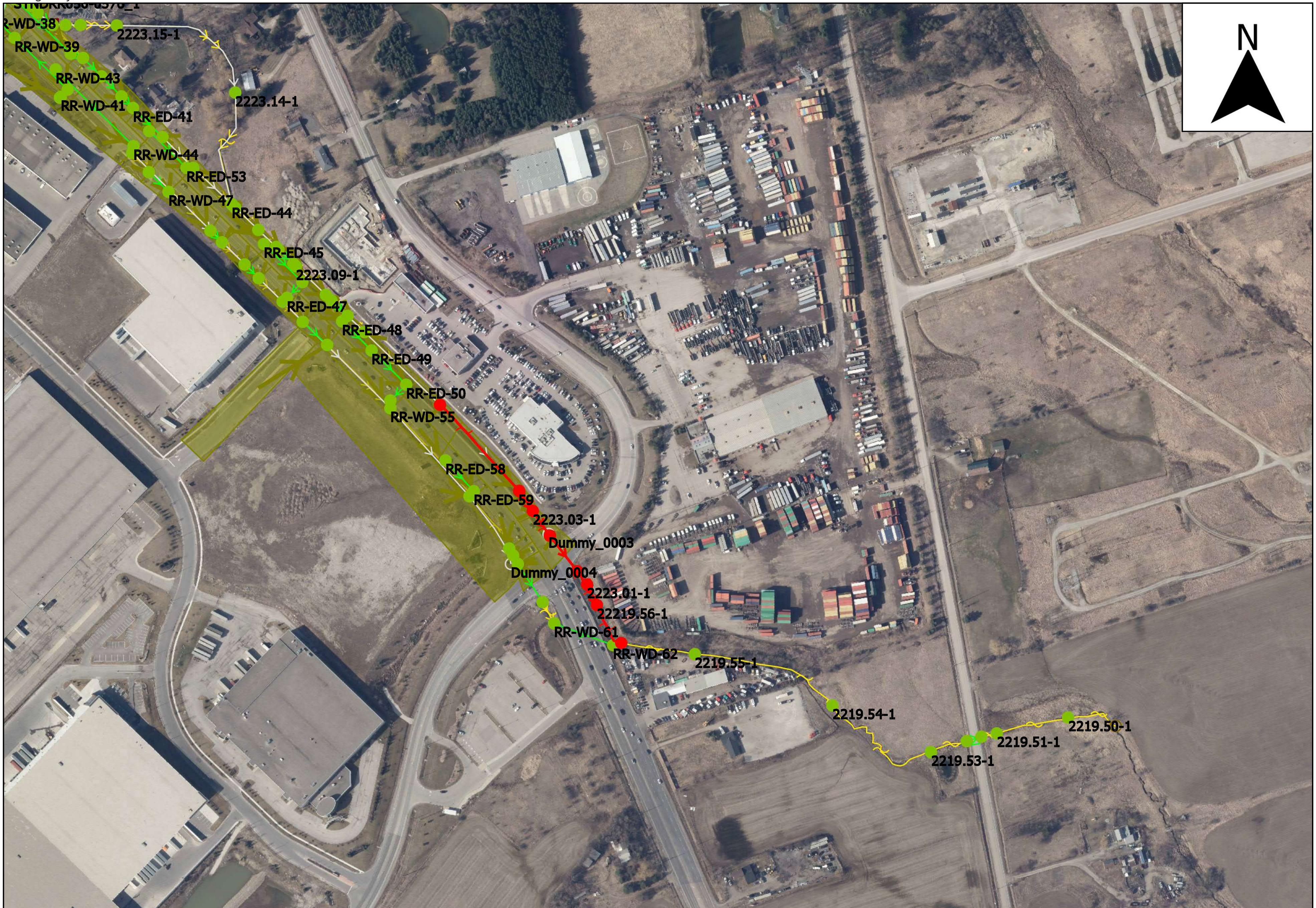
Node	-	2223.12-1	-	-	-	2223.09-1	2223.08-1	-	2223.07-1	2223.06-1	2223.05-1
Node ID	-	2223.12-1	-	-	-	2223.09-1	2223.08-1	-	2223.07-1	2223.06-1	2223.05-1
ground (m AD)	230.000	229.750	-	-	-	230.850	230.750	-	230.850	230.850	230.750
level (m AD)	228.307	227.958	-	-	-	227.738	227.349	-	227.089	227.011	226.135
expr:Freeboard	1.692505	1.792435	-	-	-	3.112131	3.400528	-	3.760614	3.839365	4.615356

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 9

RVA PROJECT NO. 194615 | FIGURE NO. 29H | AUGUST 2021

arva

Region of Peel
working with you

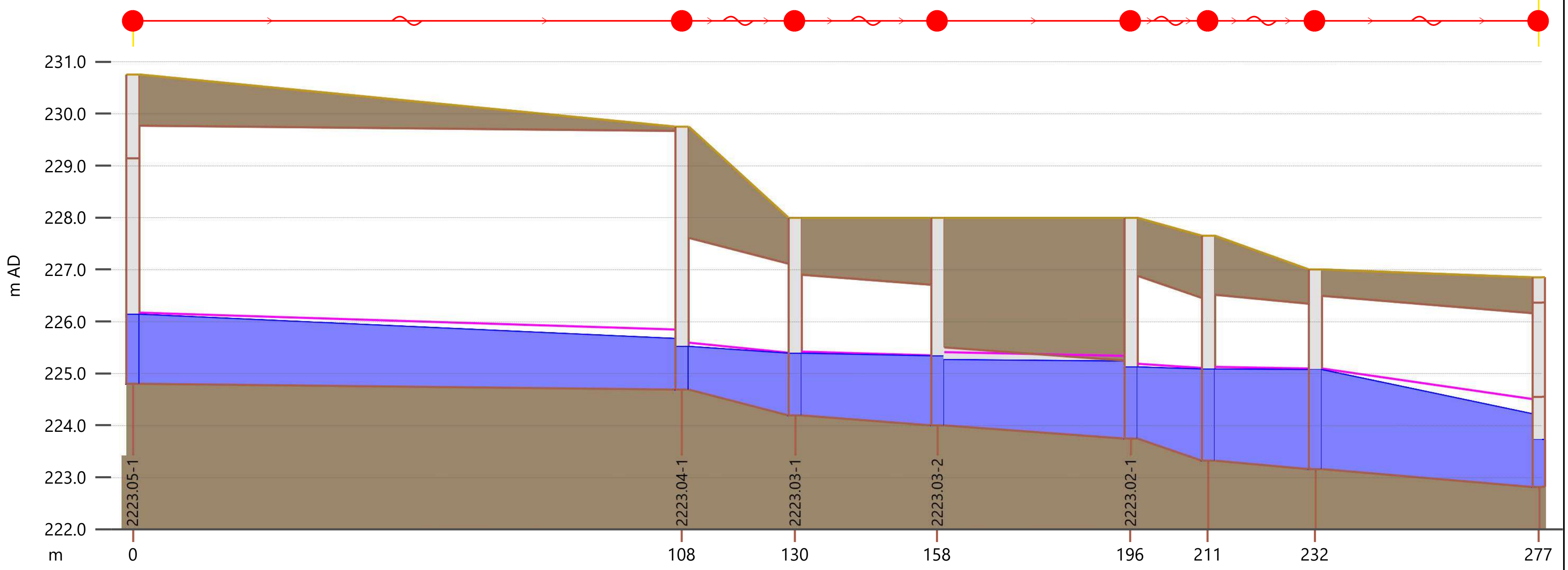


EXISTING CONDITION - 10-YEAR - EAST SIDE PLAN 10

RVA PROJECT NO. 194615	FIGURE NO. 30A	AUGUST 2021

rva

Region of Peel
working with you



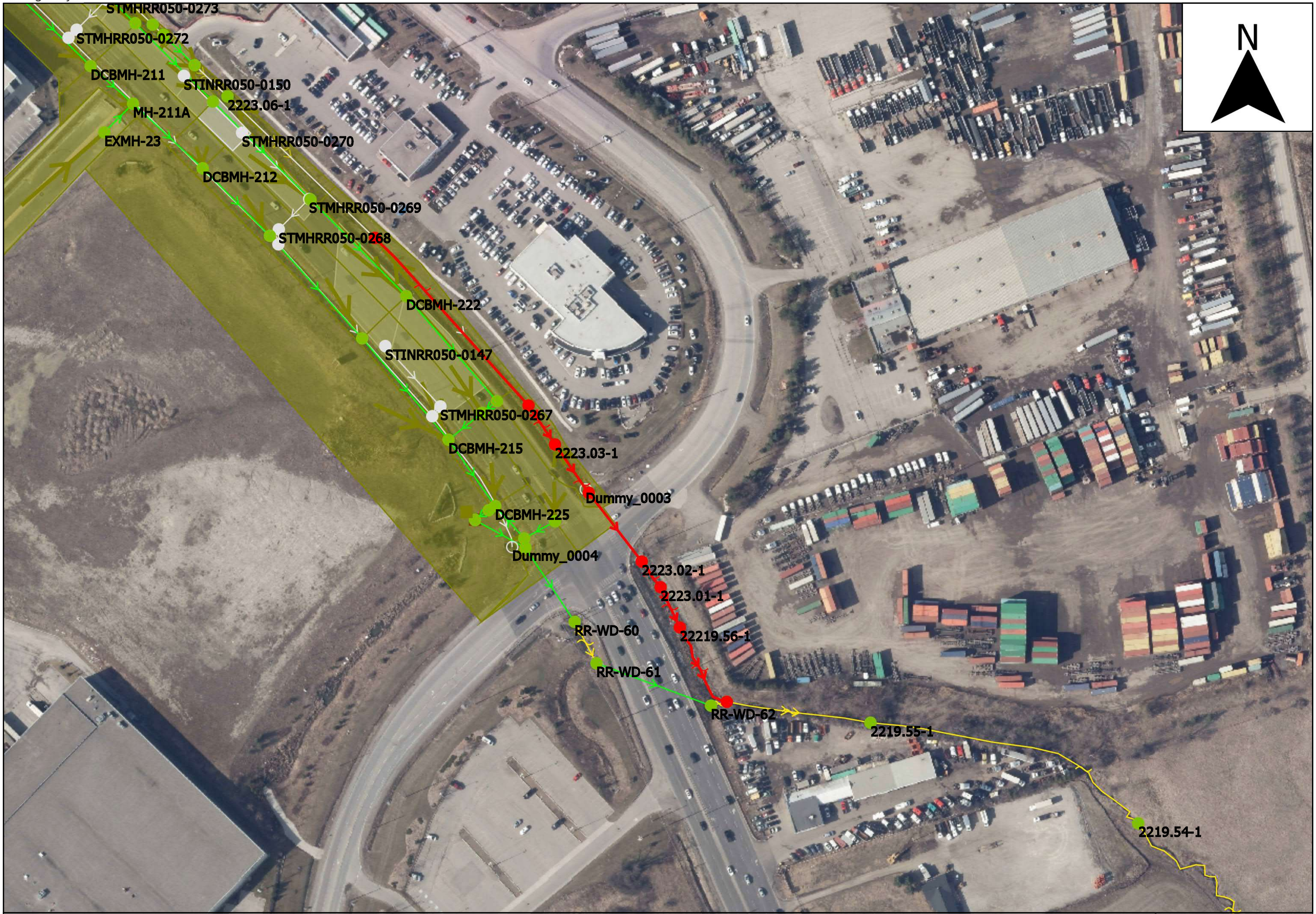
Link	2223.05-1.1	2223.04-1.1	2223.03-1.1	2223.03-2.1	-	2223.01-1.1	22219.56-1.1
US node ID	2223.05-1	2223.04-1	2223.03-1	2223.03-2	-	2223.01-1	22219.56-1
ds node	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
numbarrels	1	1	1	1	1	1	1
length (m)				38.0			
Shape ID	Matrix-2223.05	-	Matrix-2223.03	RECT	-	-	Matrix-2219.56
width (mm)				4500			
height (mm)				1500			
Rough type				N			
us inv (m AD)	224.803	224.696	224.200	224.000	223.750	223.326	223.160
ds inv (m AD)	224.696	224.200	224.000	223.750	223.326	223.160	222.822
grad (m/m)				0.00658			
r.pfc (m3/s)	775.159	486.695	249.889	28.698	357.148	154.934	418.526
US depth (m)	1.332	0.820	1.184	1.261	1.370	1.757	1.911
US flow (m3/s)	5.83679	9.71680	9.71680	9.71680	9.71680	9.71680	10.47680
US velocity (m/s)	0.889	1.255	1.386	1.712	1.150	0.929	0.987

Node	2223.05-1	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
Node ID	2223.05-1	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
ground (m AD)	230.750	229.750	228.000	228.000	228.000	227.650	227.000	226.850
level (m AD)	226.135	225.516	225.384	225.336	225.120	225.083	225.071	223.719
expr:Freeboard	4.615448	4.234421	2.616394	2.663925	2.880203	2.567175	1.928757	3.130807

EXISTING CONDITION - 10-YEAR - EAST SIDE PROFILE 10

RVA PROJECT NO. 194615	FIGURE NO. 30B	AUGUST 2021	rva

Region of Peel
working with you

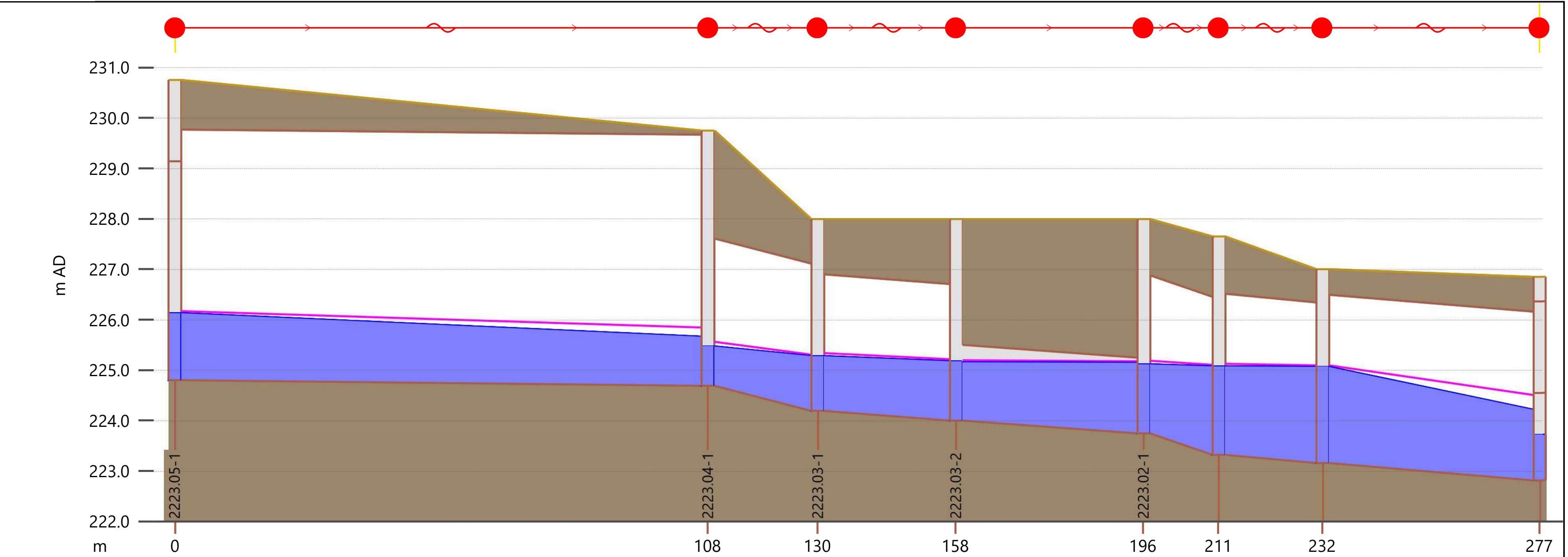


PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 10

RVA PROJECT NO. 194615	FIGURE NO. 30C	AUGUST 2021

arva

Region of Peel
working with you



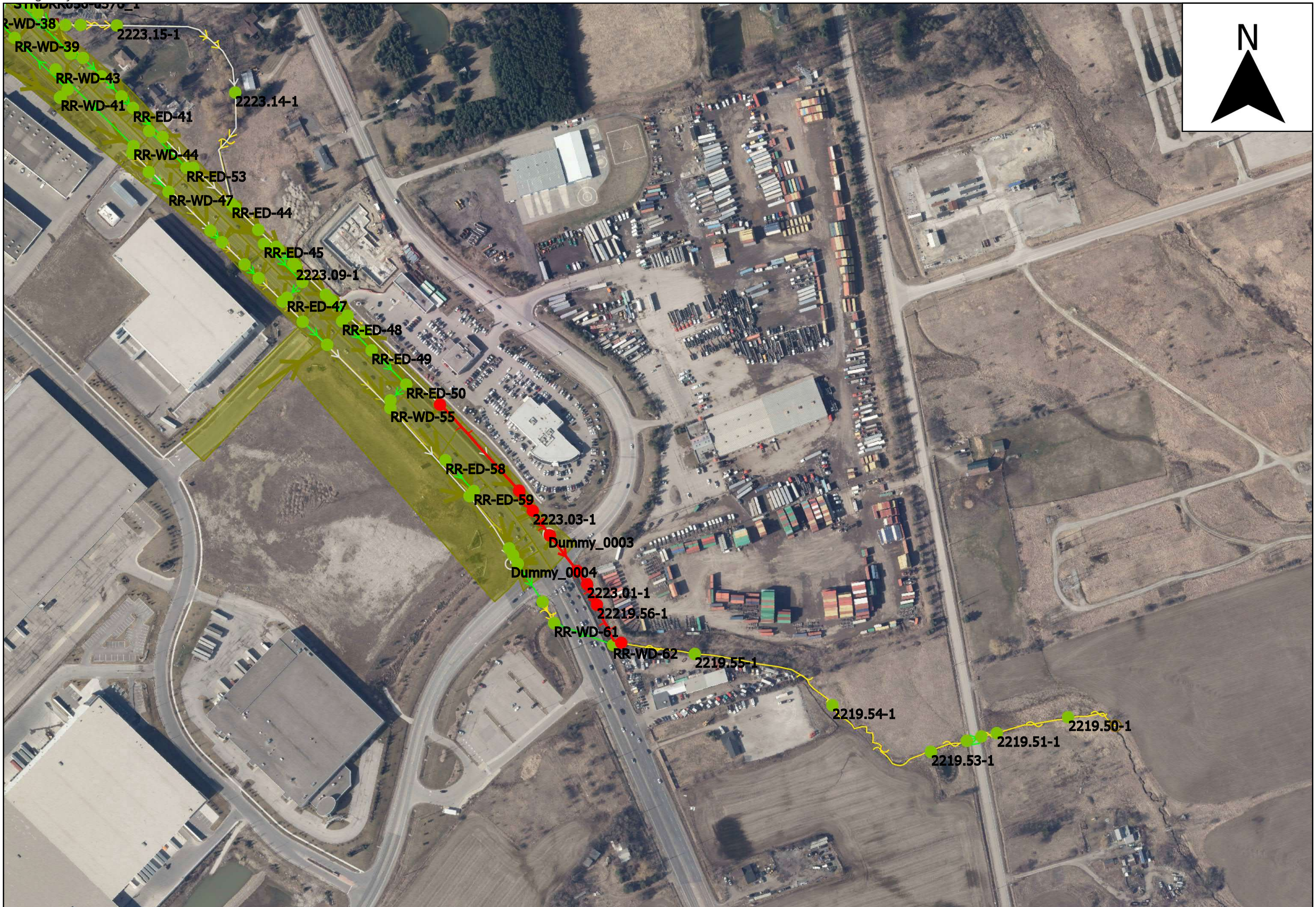
Link	2223.05-1.1	2223.04-1.1	2223.03-1.1	2223.03-2.1	-	2223.01-1.1	22219.56-1.1
US node ID	2223.05-1	2223.04-1	2223.03-1	2223.03-2	-	2223.01-1	22219.56-1
ds node	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
numbarrels	1	1	1	2	1	1	1
length (m)				38.0			
Shape ID	Matrix-2223.05	-	Matrix-2223.03	RECT	-	-	Matrix-2219.56
width (mm)				4500			
height (mm)				1500			
Rough type				N			
us inv (m AD)	224.803	224.696	224.200	224.000	223.750	223.326	223.160
ds inv (m AD)	224.696	224.200	224.000	223.750	223.326	223.160	222.822
grad (m/m)				0.00658			
r.pfc (m3/s)	775.159	486.695	249.889	28.698	357.148	154.934	418.526
US depth (m)	1.332	0.778	1.082	1.159	1.370	1.757	1.911
US flow (m3/s)	5.83809	9.71809	9.71809	9.71809	9.71809	9.71809	10.47809
US velocity (m/s)	0.889	1.350	1.452	0.932	1.150	0.929	0.989

Node	2223.05-1	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
Node ID	2223.05-1	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
ground (m AD)	230.750	229.750	228.000	228.000	228.000	227.650	227.000	226.850
level (m AD)	226.135	225.474	225.282	225.181	225.120	225.083	225.071	223.725
expr:Freeboard	4.615356	4.276352	2.717606	2.818970	2.880173	2.567145	1.928726	3.125146

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 10

RVA PROJECT NO. 194615	FIGURE NO. 30D	AUGUST 2021

rva

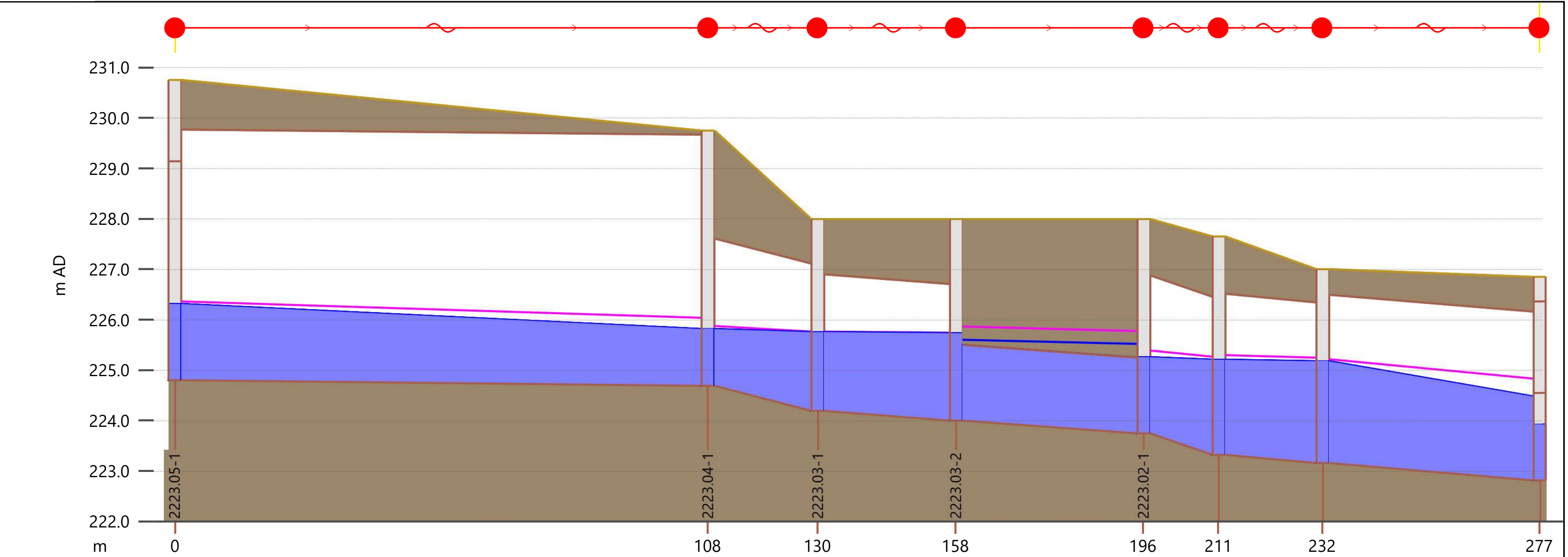


EXISTING CONDITION - 100-YEAR - EAST SIDE PLAN 10

RVA PROJECT NO. 194615	FIGURE NO. 30E	AUGUST 2021

rva

Region of Peel
working with you



Link	2223.05-1.1	2223.04-1.1	2223.03-1.1	2223.03-2.1	-	2223.01-1.1	22219.56-1.1
US node ID	2223.05-1	2223.04-1	2223.03-1	2223.03-2	-	2223.01-1	22219.56-1
ds node	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
numbarrels	1	1	1	1	1	1	1
length (m)				38.0			
Shape ID	Matrix-2223.05	-	Matrix-2223.03	RECT	-	-	Matrix-2219.56
width (mm)				4500			
height (mm)				1500			
Rough type				N			
us inv (m AD)	224.803	224.696	224.200	224.000	223.750	223.326	223.160
ds inv (m AD)	224.696	224.200	224.000	223.750	223.326	223.160	222.822
grad (m/m)				0.00658			
r.pfc (m3/s)	775.159	486.695	249.889	28.698	357.148	154.934	418.526
US depth (m)	1.511	1.125	1.555	1.602	1.515	1.882	2.024
US flow (m3/s)	9.04131	15.77637	15.77622	15.77589	15.77588	15.77587	17.15586
US velocity (m/s)	1.024	1.379	1.524	2.279	1.597	1.324	1.027

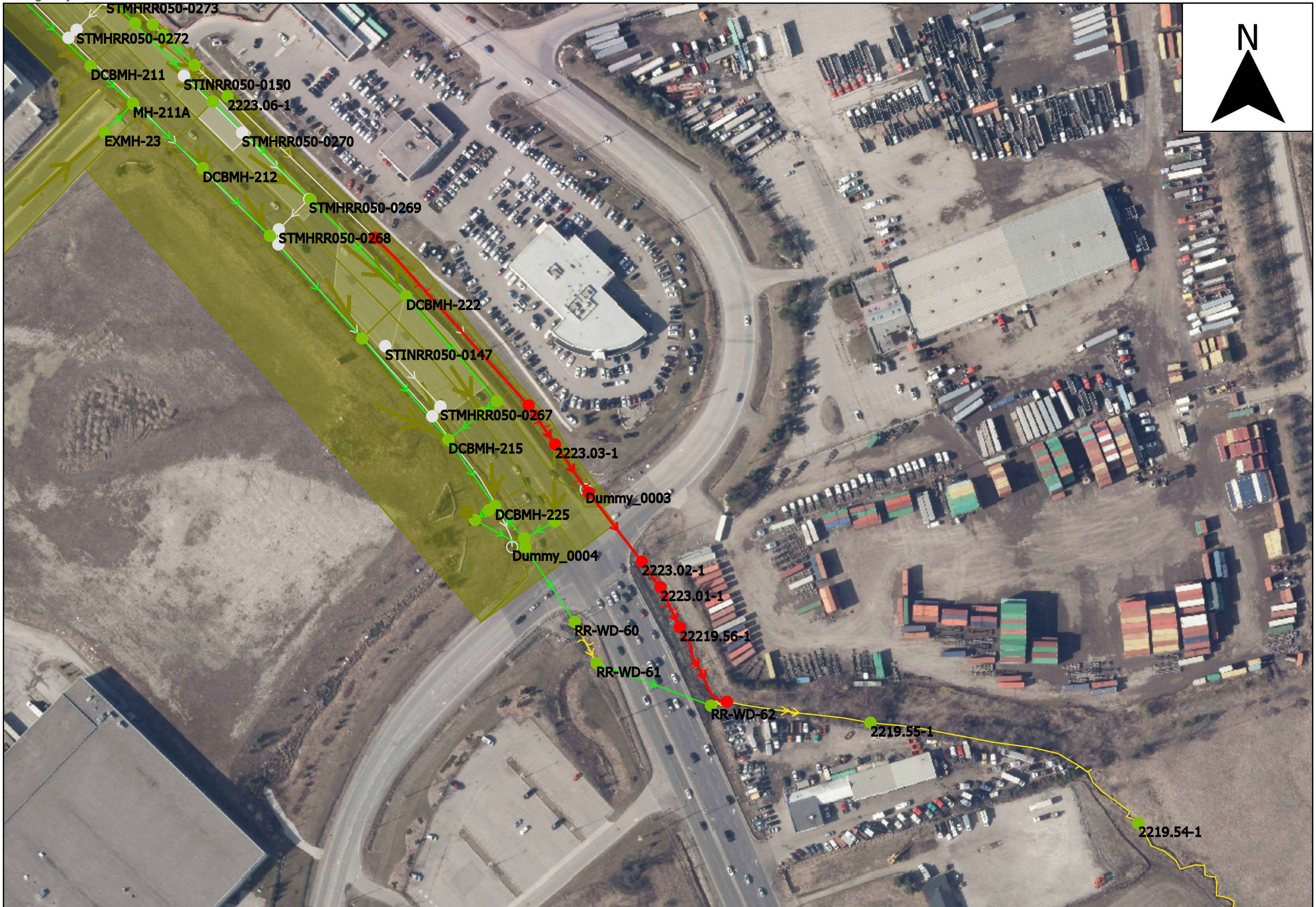
Node	2223.05-1	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
Node ID	2223.05-1	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
ground (m AD)	230.750	229.750	228.000	228.000	228.000	227.650	227.000	226.850
level (m AD)	226.314	225.821	225.755	225.735	225.265	225.208	225.184	223.925
expr:Freeboard	4.436066	3.929199	2.245102	2.265457	2.734970	2.441672	1.816269	2.924966

EXISTING CONDITION - 100-YEAR - EAST SIDE PROFILE 10

RVA PROJECT NO. 194615	FIGURE NO. 30F	AUGUST 2021

rva

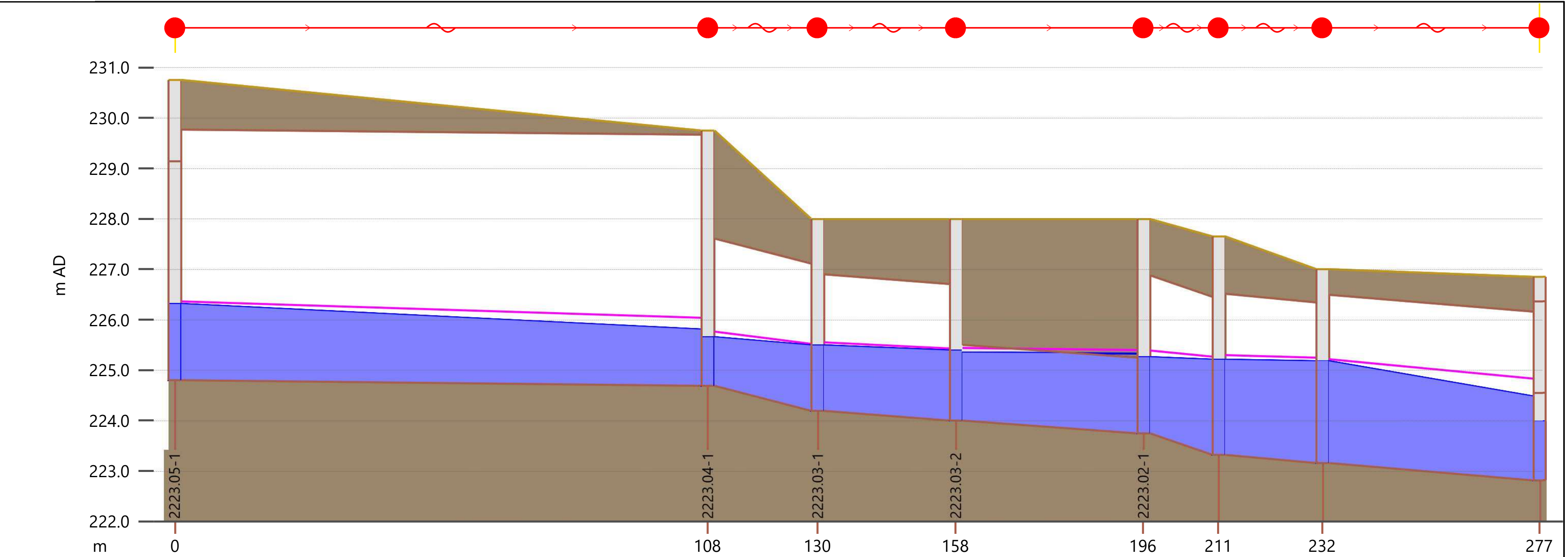
Region of Peel
working with you



PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 10

RVA PROJECT NO. 194615	FIGURE NO. 30G	AUGUST 2021	arva

Region of Peel
working with you



Link	2223.05-1.1	2223.04-1.1	2223.03-1.1	2223.03-2.1	-	2223.01-1.1	22219.56-1.1
US node ID	2223.05-1	2223.04-1	2223.03-1	2223.03-2	-	2223.01-1	22219.56-1
ds node	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
numbarrels	1	1	1	2	1	1	1
length (m)				38.0			
Shape ID	Matrix-2223.05	-	Matrix-2223.03	RECT	-	-	Matrix-2219.56
width (mm)				4500			
height (mm)				1500			
Rough type				N			
us inv (m AD)	224.803	224.696	224.200	224.000	223.750	223.326	223.160
ds inv (m AD)	224.696	224.200	224.000	223.750	223.326	223.160	222.822
grad (m/m)				0.00658			
r.pfc (m3/s)	775.159	486.695	249.889	28.698	357.148	154.934	418.526
US depth (m)	1.509	0.963	1.295	1.353	1.515	1.883	2.024
US flow (m3/s)	9.04717	15.79717	15.79717	15.79717	15.79717	15.79717	17.17717
US velocity (m/s)	1.025	1.450	1.681	1.297	1.598	1.326	1.026

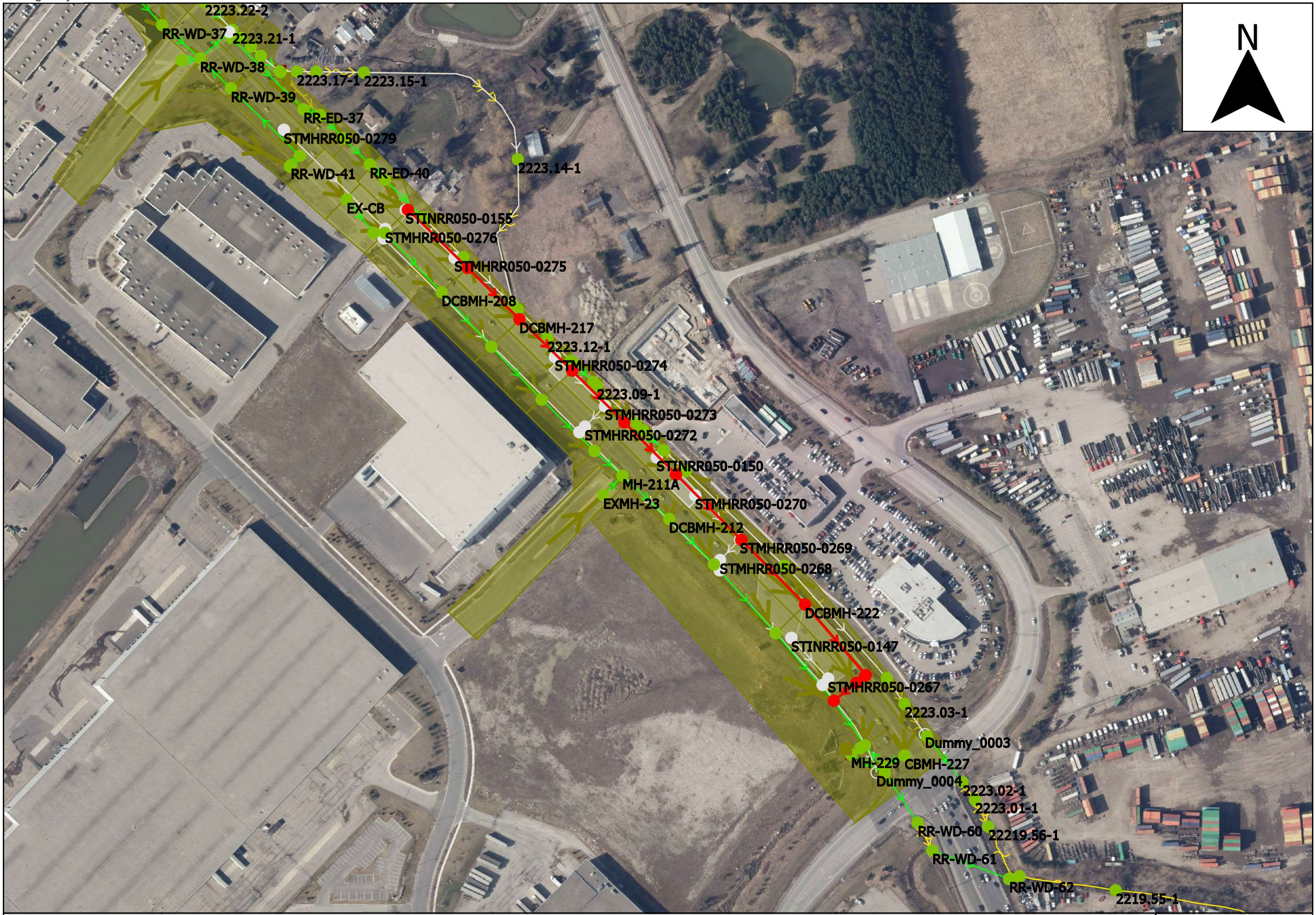
Node	2223.05-1	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
Node ID	2223.05-1	2223.04-1	2223.03-1	2223.03-2	2223.02-1	-	22219.56-1	RR-WD-63
ground (m AD)	230.750	229.750	228.000	228.000	228.000	227.650	227.000	226.850
level (m AD)	226.312	225.659	225.495	225.396	225.265	225.209	225.184	223.981
expr:Freeboard	4.438049	4.090561	2.504807	2.603760	2.734543	2.441321	1.815979	2.869440

PROPOSED CONDITION - 100-YEAR - EAST SIDE PROFILE 10

RVA PROJECT NO. 194615 | FIGURE NO. 30H | AUGUST 2021

arva

Region of Peel
working with you

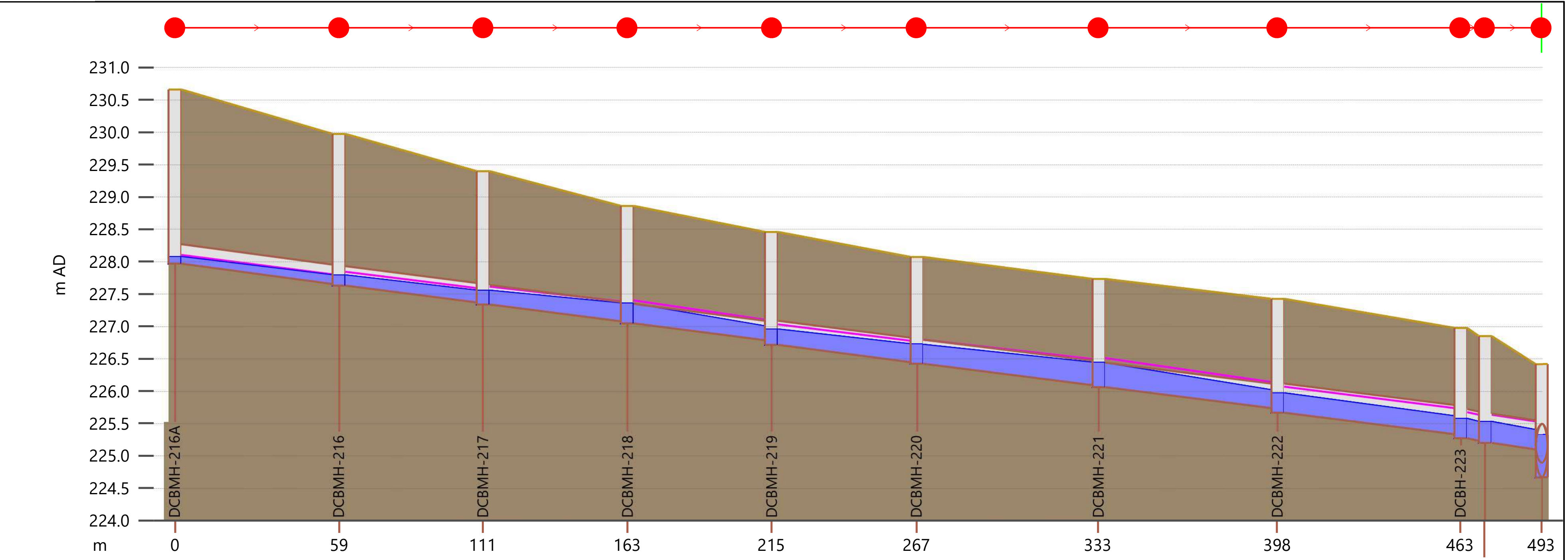


PROPOSED CONDITION - 10-YEAR - EAST SIDE PLAN 11

RVA PROJECT NO. 194615	FIGURE NO. 31A	AUGUST 2021

arva

Region of Peel
working with you



Link	DCBMH-216A.1	DCBMH-216.1	DCBMH-217.1	DCBMH-218.1	DCBMH-219.1	DCBMH-220.1	DCBMH-221.1	DCBMH-222.1	-	-
US node ID	DCBMH-216A	DCBMH-216	DCBMH-217	DCBMH-218	DCBMH-219	DCBMH-220	DCBMH-221	DCBMH-222	-	-
ds node	DCBMH-216	DCBMH-217	DCBMH-218	DCBMH-219	DCBMH-220	DCBMH-221	DCBMH-222	DCBH-223	-	-
numbarrels	1	1	1	1	1	1	1	1	1	1
length (m)	59.2	51.9	52.1	52.0	52.3	65.5	64.6	66.0	-	20.5
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	-	CIRC
width (mm)	300	300	300	300	375	375	375	450	-	450
height (mm)	300	300	300	300	375	375	375	450	-	450
Rough type	N	N	N	N	N	N	N	N	N	N
us inv (m AD)	227.969	227.629	227.339	227.049	226.714	226.423	226.066	225.667	-	-
ds inv (m AD)	227.659	227.369	227.079	226.789	226.453	226.096	225.742	225.337	-	-
grad (m/m)	0.00524	0.00501	0.00499	0.00500	0.00499	0.00499	0.00502	0.00500	-	-
r.pfc (m3/s)	0.070	0.068	0.068	0.068	0.124	0.124	0.124	0.202	-	0.202
US depth (m)	0.104	0.163	0.215	0.298	0.242	0.295	0.371	0.300	-	0.321
US flow (m3/s)	0.01721	0.03891	0.05880	0.07540	0.09170	0.11513	0.13645	0.15939	-	-
US velocity (m/s)	0.793	0.992	1.096	1.146	1.233	1.308	1.338	1.420	-	1.498

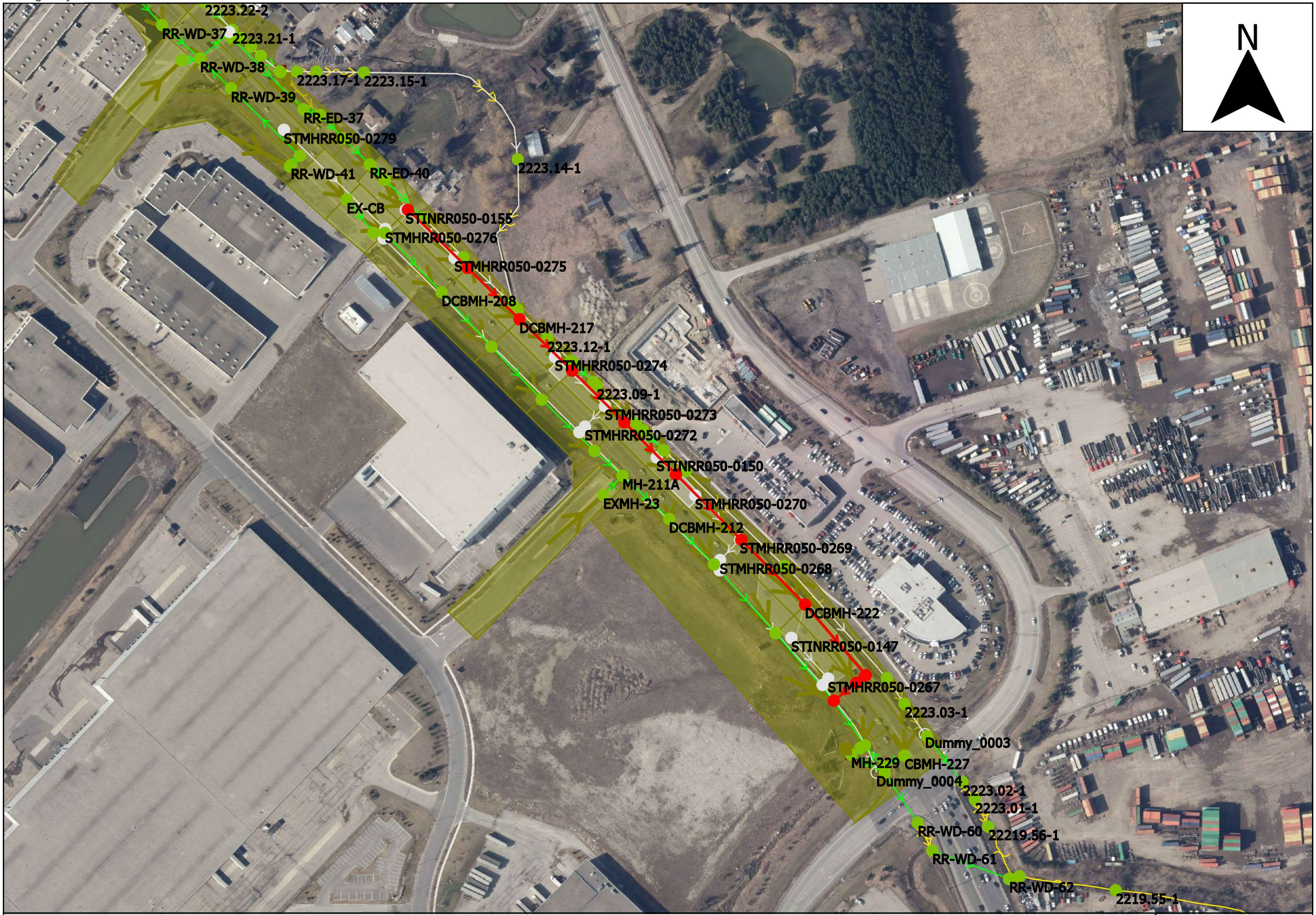
Node	-	DCBMH-216	DCBMH-217	DCBMH-218	DCBMH-219	DCBMH-220	DCBMH-221	DCBMH-222	DCBH-223	-
Node ID	-	DCBMH-216	DCBMH-217	DCBMH-218	DCBMH-219	DCBMH-220	DCBMH-221	DCBMH-222	DCBH-223	-
ground (m AD)	230.656	229.974	229.402	228.863	228.463	228.073	227.732	227.428	226.977	-
level (m AD)	228.073	227.792	227.557	227.354	226.958	226.723	226.445	225.971	225.579	-
expr:Freeboard	-	2.181504	1.845192	1.509500	1.504916	1.350298	1.286626	1.457465	1.398417	-

PROPOSED CONDITION - 10-YEAR - EAST SIDE PROFILE 11

RVA PROJECT NO. 194615 | FIGURE NO. 31B | AUGUST 2021

arva

Region of Peel
working with you



PROPOSED CONDITION - 100-YEAR - EAST SIDE PLAN 11			arva
RVA PROJECT NO. 194615	FIGURE NO. 31C	AUGUST 2021	

Appendix C

OGS & Catchbasin Shield Owner's Manual

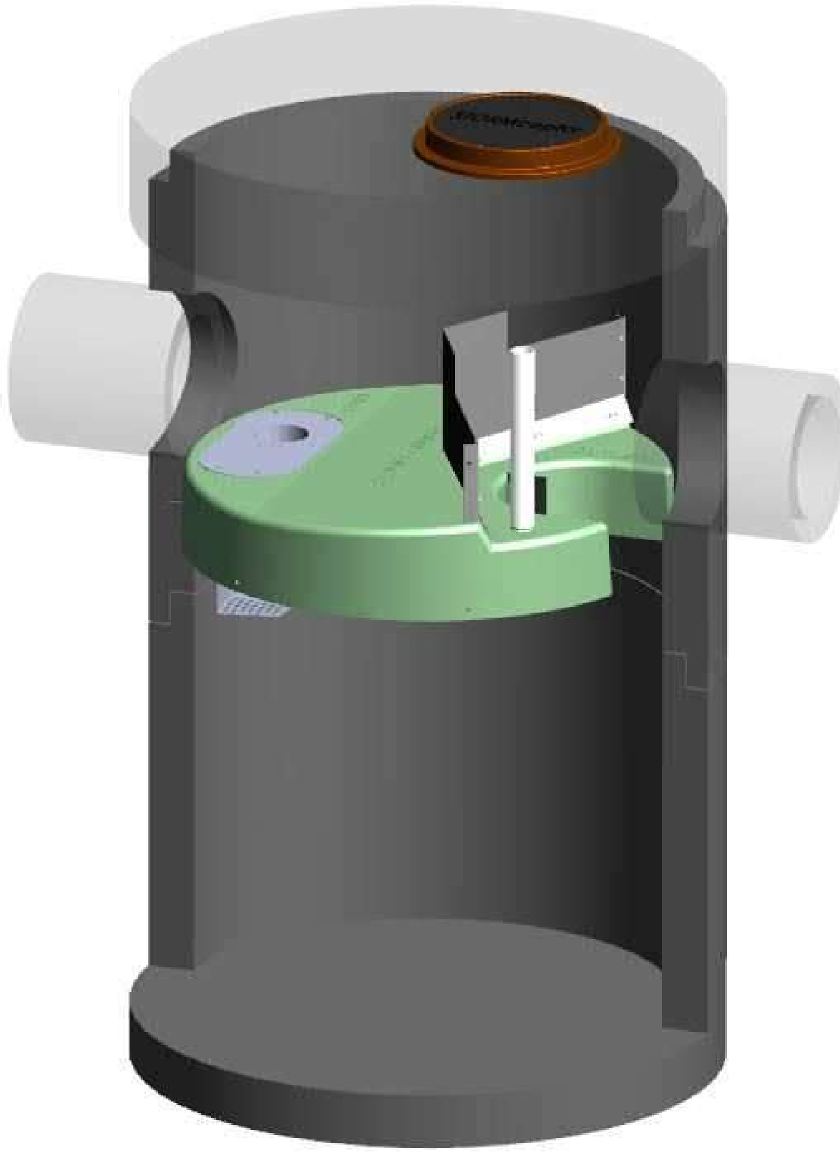
Region of Peel
working with you

Region of Peel
working with you

Region of Peel
working with you

Stormceptor® EF

Owner's Manual



Stormceptor is protected by one or more of the following patents:

Canadian Patent No. 2,137,942
Canadian Patent No. 2,180,305
Canadian Patent No. 2,327,768
Canadian Patent No. 2,694,159
Canadian Patent No. 2,697,287
U.S. Patent No. 6,068,765
U.S. Patent No. 6,371,690
U.S. Patent No. 7,582,216
U.S. Patent No. 7,666,303
Australia Patent No. 693.164
Australia Patent No. 729,096
Australia Patent No. 2008,279,378
Australia Patent No. 2008,288,900
Japanese Patent No. 5,997,750
Japanese Patent No. 5,555,160
Korean Patent No. 0519212
Korean Patent No. 1451593
New Zealand Patent No. 583,008
New Zealand Patent No. 583,583
South African Patent No. 2010/00682
South African Patent No. 2010/01796
Patent pending

Table of Contents:

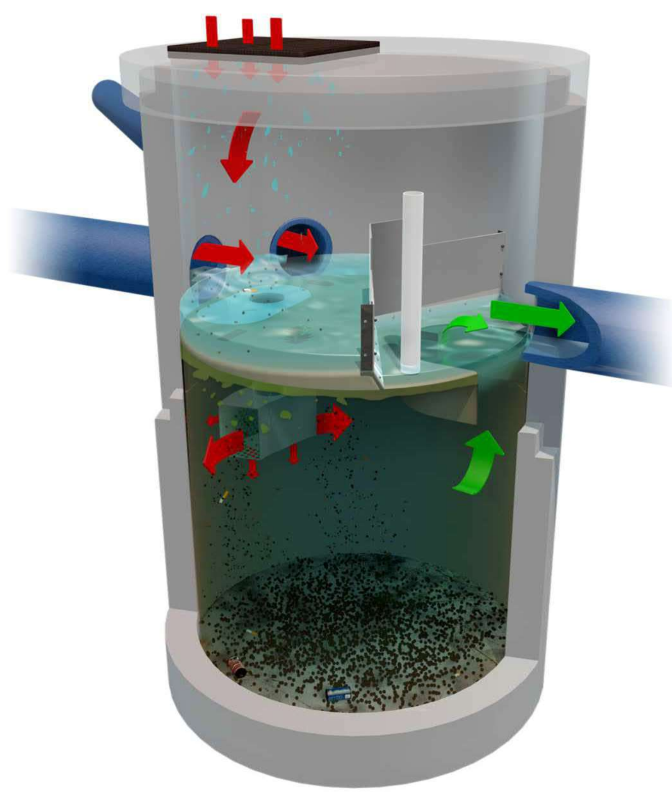
OVERVIEW

Stormceptor® EF is a continuation and evolution of the most globally recognized oil grit separator (OGS) stormwater treatment technology - ***Stormceptor®***. Also known as a hydrodynamic separator, the enhanced flow Stormceptor EF is a high performing oil grit separator that effectively removes a wide variety of pollutants from stormwater and snowmelt runoff at flow rates higher than the original Stormceptor. Stormceptor EF captures and retains sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's patent-pending treatment and scour prevention platform ensures sediment is retained during all rainfall events.

Stormceptor EF offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe, multiple inlet pipes, and/or from the surface through an inlet grate. Stormceptor EF can also serve as a junction structure, accommodate a 90-degree inlet to outlet bend angle, and be modified to ensure performance in submerged conditions. With its scour prevention and internal bypass, Stormceptor EF can be installed online, eliminating the need for costly additional bypass structures.

OPERATION

- Stormwater enters the Stormceptor upper chamber through the inlet pipe(s) or a surface inlet grate. A specially designed insert reduces the influent velocity by creating a pond upstream of the insert's weir. Sediment particles immediately begin to settle. Swirling flow sweeps water, sediment, and floatables across the sloped surface of the insert to the inlet opening of the drop pipe, where a strong vortex draws water, sediment, oil, and debris down the drop pipe cone.
- Influent exits the cone into the drop pipe duct. The duct has two large rectangular outlet openings as well as perforations in the backside and floor of the duct. Influent is diffused through these various opening in multiple directions and at low velocity into the lower chamber.
- Free oils and other floatables rise up within the channel surrounding the central riser pipe and are trapped beneath the insert, while sediment settles to the sump. Pollutants are retained for later removal during maintenance cleaning.
- Treated effluent enters the outlet riser, moves upward, and discharges to the top side of the insert downstream of the weir, where it flows out the outlet pipe.
- During intense storm events with very high influent flow rates, the pond height on the upstream side of the weir may exceed the height of the weir, and the excess flow passes over the top of the weir to the downstream side of the insert, and exits through the outlet pipe. This internal bypass feature allows for in-line installation, avoiding the cost of additional bypass structures. During bypass, the pond separates sediment from all incoming flows, while full treatment in the lower chamber continues at the maximum flow rate.
- Stormceptor EF's patent-pending enhanced flow and scour prevention technology ensures pollutants are captured and retained, allowing excess flows to bypass during infrequent, high intensity storms.



COMPONENTS

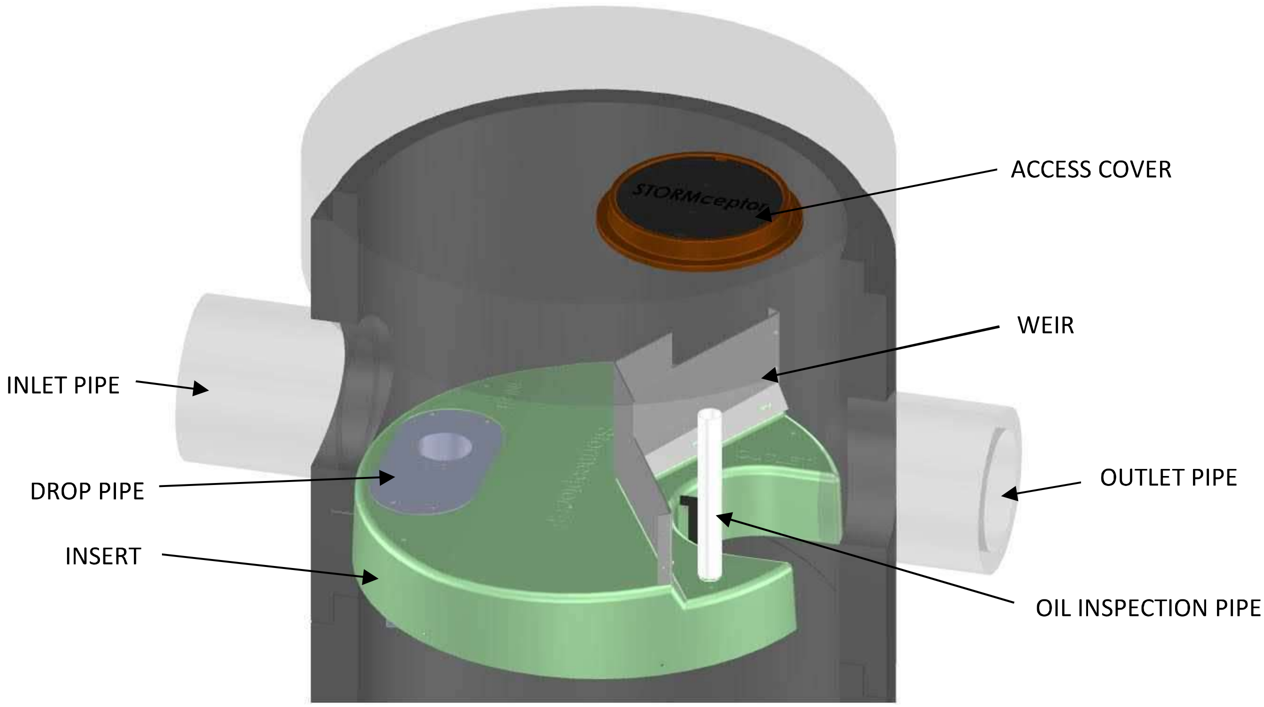


Figure 1

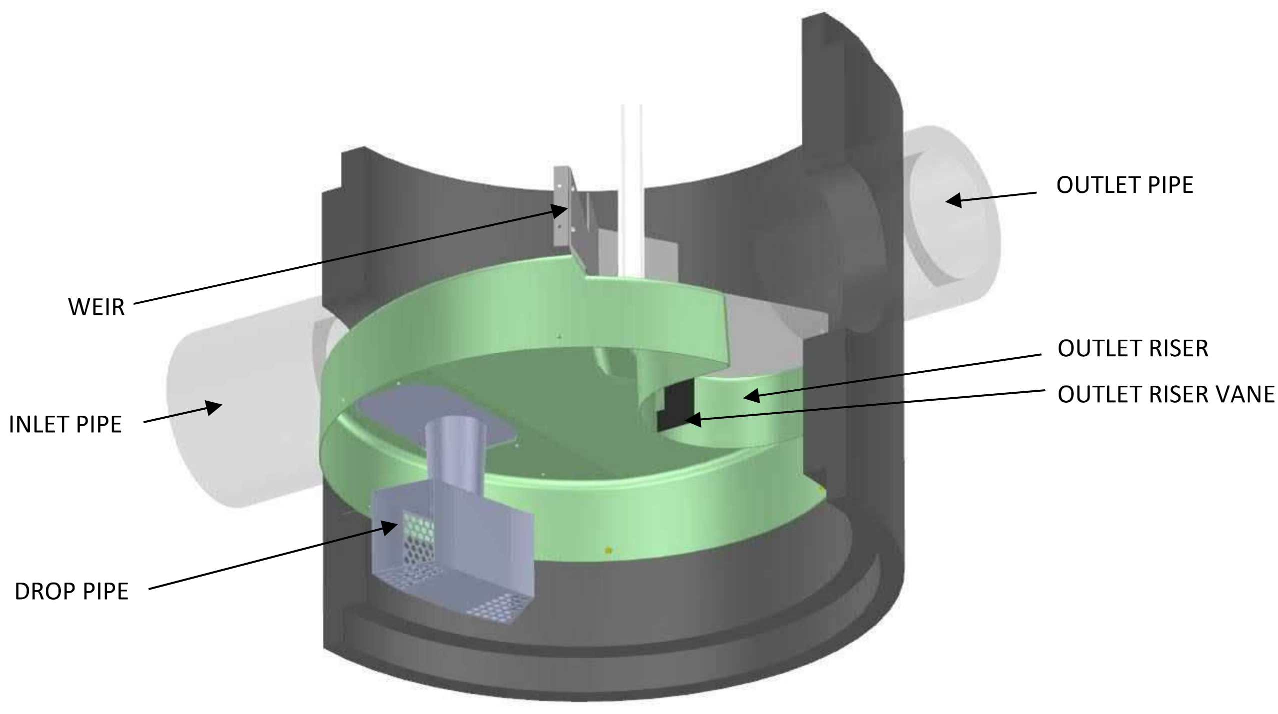


Figure 2

OUTLET PLATFORM (UP position)

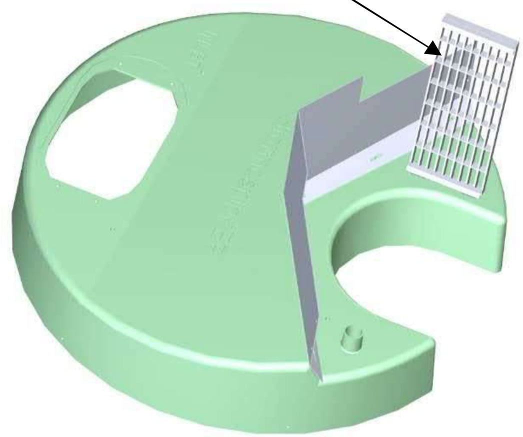


Figure 3A

OUTLET PLATFORM (DOWN position)

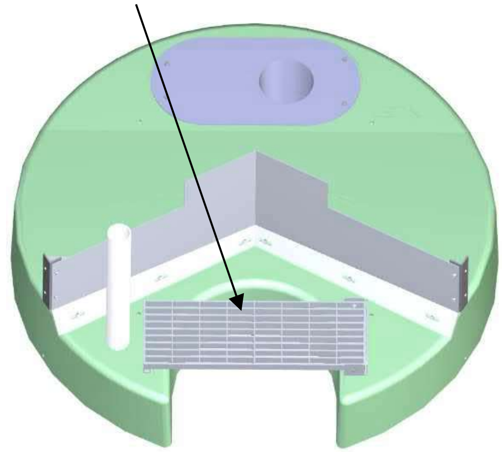


Figure 3B

- **Insert** – separates vessel into upper and lower chambers, and provides double-wall containment of hydrocarbons
- **Weir** – creates stormwater ponding and driving head on top side of insert
- **Drop pipe** – conveys stormwater and pollutants into the lower chamber
- **Outlet riser** – conveys treated stormwater from the lower chamber to the outlet pipe, and provides primary inspection and maintenance access into the lower chamber
- **Outlet riser vane** – prevents formation of a vortex in the outlet riser during high flow rate conditions
- **Outlet platform (optional)** – safety platform in the event of manned entry into the unit
- **Oil inspection pipe** – primary access for measuring oil depth

PRODUCT DETAILS

METRIC DIMENSIONS AND CAPACITIES

Table 1

Stormceptor Model	Inside Diameter (m)	Minimum Surface to Outlet Invert Depth (mm)	Depth Below Outlet Pipe Invert (mm)	Wet Volume (L)	Sediment Capacity [1] (m^3)	Hydrocarbon Storage Capacity [2] (L)	Maximum Flow Rate into Lower Chamber [3] (L/s)	Peak Conveyance Flow Rate [4] (L/s)
EF4 / EFO4	1.22	915	1524	1780	1.19	265	22.1 / 10.4	425
EF6 / EFO6	1.83	915	1930	5070	3.47	610	49.6 / 23.4	990
EF8 / EFO8	2.44	1219	2591	12090	8.78	1070	88.3 / 41.6	1700
EF10 / EFO10	3.05	1219	3251	23700	17.79	1670	138 / 65	2830
EF12 / EFO12	3.66	1524	3886	40800	31.22	2475	198.7 / 93.7	2830

[1] Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[2] Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[3] EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 1135 L/min/m^2.
EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 535 L/min/m^2.
[4] Peak Conveyance Flow Rate is limited by a maximum velocity of 1.5 m/s.

U.S. DIMENSIONS AND CAPACITIES

Table 2

Stormceptor Model	Inside Diameter (ft)	Minimum Surface to Outlet Invert Depth (in)	Depth Below Outlet Pipe Invert (in)	Wet Volume (gal)	Sediment Capacity [1] (ft^3)	Hydrocarbon Storage Capacity [2] (gal)	Maximum Flow Rate into Lower Chamber [3] (cfs)	Peak Conveyance Flow Rate [4] (cfs)
EF4 / EFO4	4	36	60	471	42	70	0.78 / 0.37	15
EF6 / EFO6	6	36	76	1339	123	160	1.75 / 0.83	35
EF8 / EFO8	8	48	102	3194	310	280	3.12 / 1.47	60
EF10 / EFO10	10	48	128	6261	628	440	4.87 / 2.30	100
EF12 / EFO12	12	60	153	10779	1103	655	7.02 / 3.31	100

[1] Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[2] Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[3] EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 27.9 gpm/ft^2.
EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 13.1 gpm/ft^2.
[4] Peak Conveyance Flow Rate is limited by a maximum velocity of 5 fps.

IDENTIFICATION

Each Stormceptor EF/EFO unit is easily identifiable by the trade name ***Stormceptor®*** embossed on the access cover at grade as shown in **Figure 3**. The tradename ***Stormceptor®*** is also embossed on the top of the insert upstream of the weir as shown in **Figure 3**.

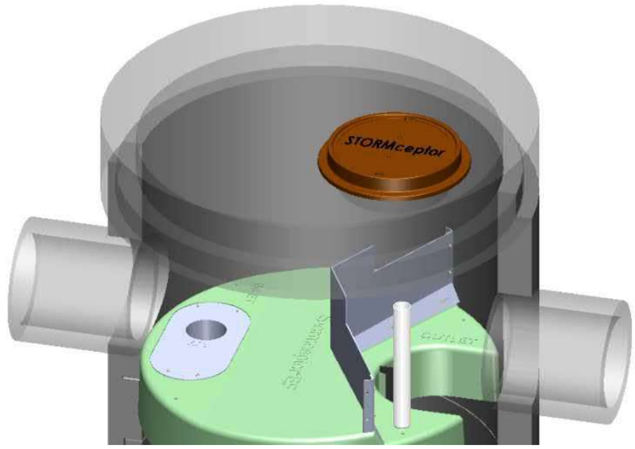


Figure 4

The specific Stormceptor EF/EFO model number is identified on the top of the aluminum Drop Pipe as shown in **Figure 4**. The unit serial number is identified on the top of the insert upstream of the weir as shown in **Figure 4**.

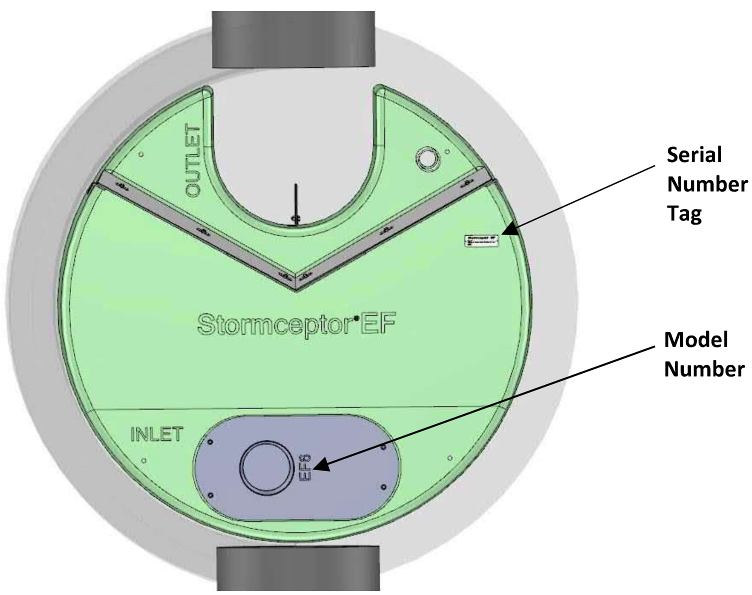


Figure 5

INSPECTION AND MAINTENANCE

It is very important to perform regular inspection and maintenance. Regular inspection and maintenance ensures maximum operation efficiency, keeps maintenance costs low, and provides continued of natural waterways.

Quick Reference

- Typical inspection and maintenance is performed from grade
- Remove manhole **cover(s)** or **inlet grate** to access insert and lower chamber
  NOTE: EF4/EFO4 requires the removal of a **flow deflector** beneath inlet grate
- Use Sludge Judge® or similar sediment probe to check sediment depth through the **outlet riser**
- Oil dipstick can be inserted through the **oil inspection pipe**
- Visually inspect the **insert** for debris, remove debris if present
- Visually inspect the **drop pipe** opening for blockage, remove blockage if present
- Visually inspect **insert** and **weir** for damage, schedule repair if needed
- Insert vacuum hose and jetting wand through the outlet riser and extract sediment and floatables
- Replace flow deflector (EF4/EFO4), inlet grate, and cover(s)
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess pollutant accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

When is maintenance cleaning needed?

- If the post-construction inspection indicates presence of construction sediment of a depth greater than a few inches, maintenance is recommended at that time.
- For optimum performance and normal operation the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, see **Table 3**.
- Maintain immediately after an oil, fuel, or other chemical spill.

Table 3

Recommended Sediment Depths for Maintenance Service*

MODEL	Sediment Depth (in/mm)
EF4 / EFO4	8 / 203
EF6 / EFO6	12 /305
EF8 / EFO8	24 / 610
EF10 / EFO10	24 / 610
EF12 / EFO12	24 / 610

* Based on a minimum distance of 40 inches (1,016 mm) from bottom of outlet riser to top of sediment bed

The frequency of inspection and maintenance may need to be adjusted based on site conditions to ensure the unit is operating and performing as intended. Maintenance costs will vary based on the size of the unit, site conditions, local requirements, disposal costs, and transportation distance.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required (adhere to all OSHA / CCOSH standards)

What conditions can compromise Stormceptor performance?

- Presence of construction sediment and debris in the unit prior to activation
- Excessive sediment depth beyond the recommended maintenance depth
- Oil spill in excess of the oil storage capacity
- Clogging or restriction of the drop pipe inlet opening with debris
- Downstream blockage that results in a backwater condition

Maintenance Procedures

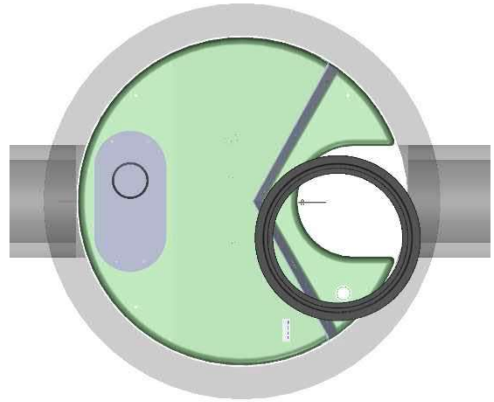
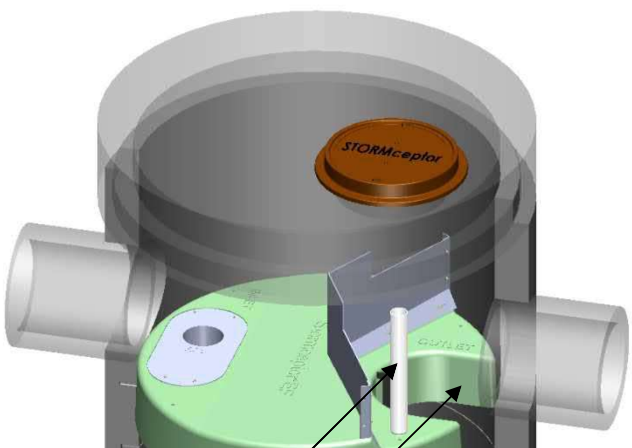


Figure 6

- Maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is maintained from grade through a standard surface manhole access cover or inlet grate.
- In the case of submerged or tailwater conditions, extra measures are likely required, such as plugging the inlet and outlet pipes prior to conducting maintenance.
- Inspection and maintenance of upstream catch basins and other stormwater conveyance structures is also recommended to extend the time between future maintenance cycles.
- Sediment depth inspections are performed through the **Outlet Riser** and oil presence can be determined through the **Oil Inspection Pipe**.
- Oil presence and sediment depth are determined by inserting a Sludge Judge® or measuring stick to quantify the pollutant depths.



Oil Inspection Pipe

Outlet Riser

Figure 7

Sludge Judge®

Figure 8

- Visually inspect the insert, weir, and drop pipe inlet opening to ensure there is no damage or blockage.
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

- When maintenance is required, a standard vacuum truck is used to remove the pollutants from the lower chamber of the unit through the **Outlet Riser**.

Figure 9

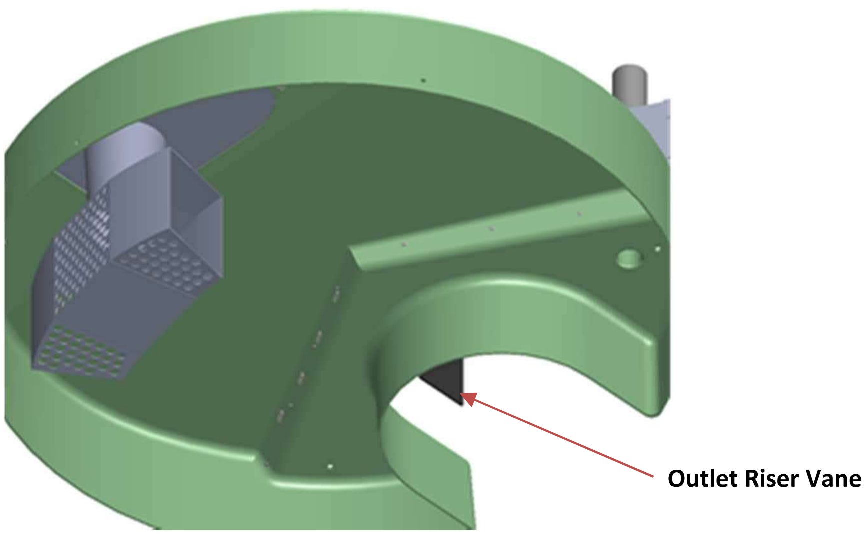


Figure 10

NOTE: The Outlet Riser Vane is durable and flexible and designed to allow maintenance activities with minimal, if any, interference.

Removable Flow Deflector

- Top grated inlets for the Stormceptor EF4/EFO4 model requires a removable flow deflector staged underneath a 24-inch x 24-inch (600 mm x 600 mm) square inlet grate to direct flow towards the inlet side of the insert, and avoid flow and pollutants from entering the outlet side of the insert from grade. The EF6/EFO6 and larger models do not require the flow deflector.

How to Remove:

1. Loosen anchor bolts
2. Pull up and out using the handle

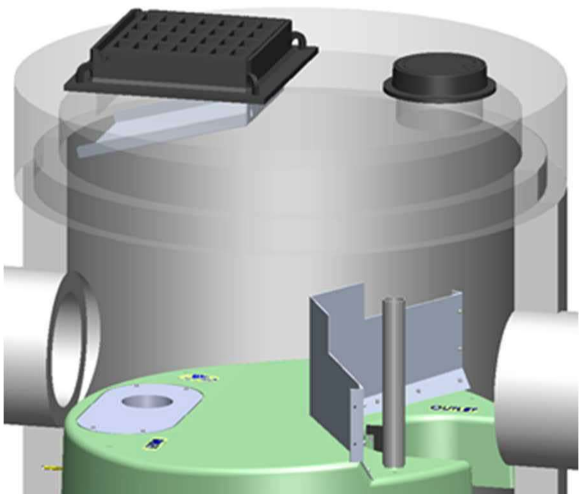
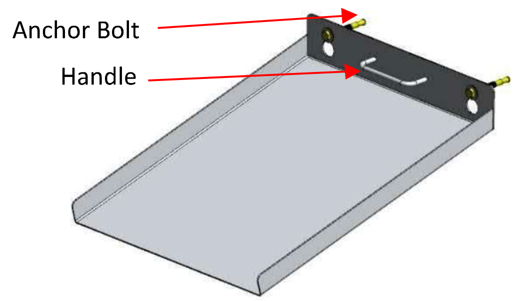


Figure 11



Removable Flow Deflector

Hydrocarbon Spills

Stormceptor is often installed on high pollutant load hotspot sites with vehicular traffic where hydrocarbon spill potential exists. Should a spill occur, or presence of oil be identified within a Stormceptor EF/EFO, it should be cleaned immediately by a licensed liquid waste hauler.

Disposal

Maintenance providers are to follow all federal, state/ provincial, and local requirements for disposal of material.

Oil Sheens

When oil is present in stormwater runoff, a sheen may be noticeable at the Stormceptor outlet. An oil rainbow or sheen can be noticeable at very low oil concentrations (< 10 mg/L). Despite the appearance of a sheen, Stormceptor EF/EFO may still be functioning as intended.

Oil Level Alarm

To mitigate spill liability with 24/7 detection, an electronic monitoring system can be employed to trigger a visual and audible alarm when a pre-set level of oil is captured within the lower chamber or when an oil spill occurs. The oil level alarm is available as an optional feature to include with Stormceptor EF/EFO as shown in **Figure 11**. For additional details about the Oil Level Alarm please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-systems.

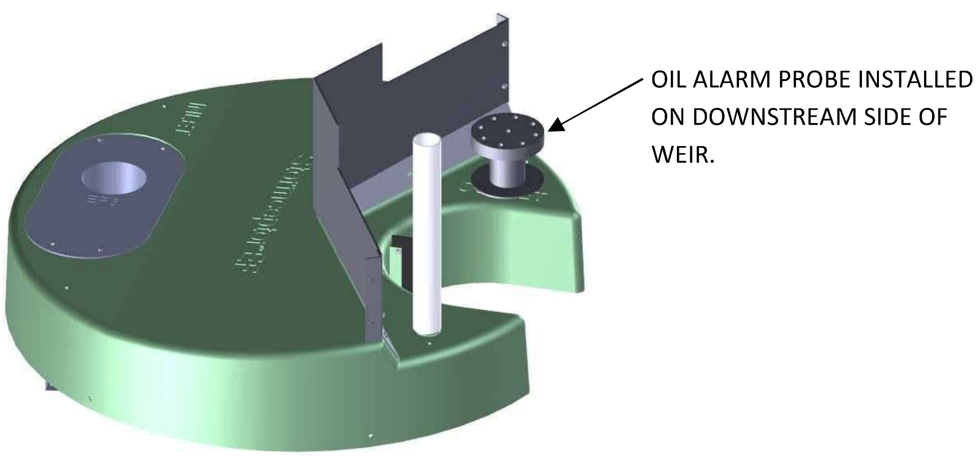


Figure 12

Replacement Parts

Stormceptor has no moving parts to wear out. Therefore inspection and maintenance activities are generally focused on pollutant removal. Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. However, if replacement parts are necessary, they may be purchased by contacting your local Stormceptor representative.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: ________________________

Serial Number: ________________________

Installation Date: ________________________

Location Description of Unit: ________________________

Recommended Sediment Maintenance Depth: ________________________

DATE	SEDIMENT DEPTH (inch or mm)	OIL DEPTH (inch or mm)	SERVICE REQUIRED (Yes / No)	MAINTENANCE PERFORMED	MAINTENANCE PROVIDER	COMMENTS

Other Comments:

Contact Information

Questions regarding Stormceptor EF/EFO can be addressed by contacting your local Stormceptor representative or by visiting our website at **www.stormceptor.com**.

Imbrium Systems Inc. & Imbrium Systems LLC

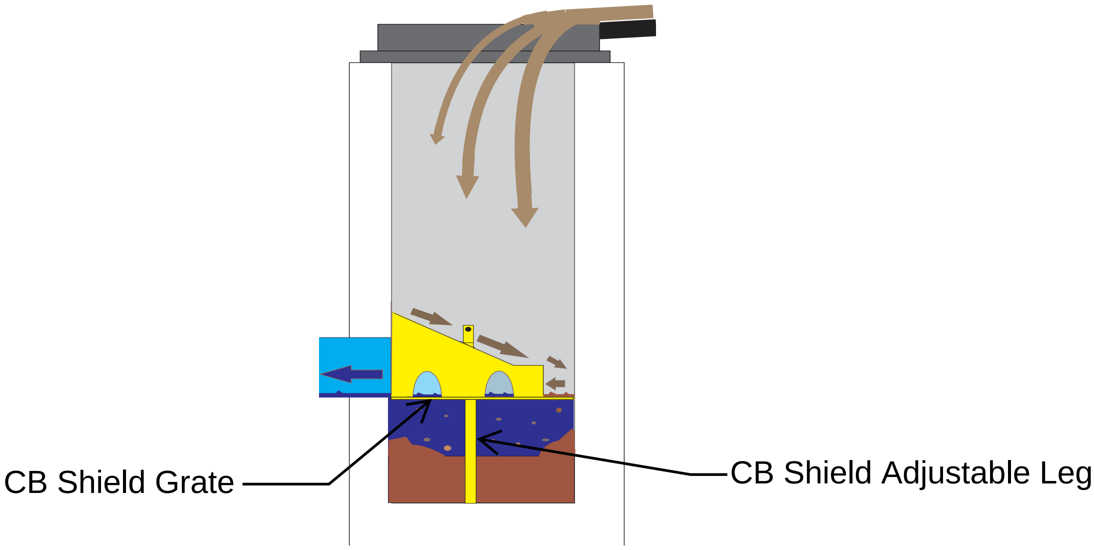
Canada	1-416-960-9900 / 1-800-565-4801
United States	1-301-279-8827 / 1-888-279-8826
International	+1-416-960-9900 / +1-301-279-8827

www.imbriumsystems.com
www.stormceptor.com
info@imbriumsystems.com

CB Shield Operations Manual

Installing CB Shield

It is important the catch basin frame and cover is aligned properly with the catch basin below
If it is misaligned it may be difficult to install the CB Shield insert
Determine the depth of the sump (i.e. the distance from the invert of the outlet pipe to the bottom of the catch basin). If the catch basin is in service the sump depth will be the depth of the water. The grate section of the CB Shield insert should be the same elevation as the water depth in the sump.



Adjust the leg of the CB Shield to achieve the appropriate elevation
The CB Shield is lowered into place with the rope attached to the top of the leg. The high side of the sloped plate should face the wall with the outlet pipe. (The incoming water should be directed to the wall furthest from the outlet)
The flexible plastic skirt around the outer edges of the CB Shield insert may interfere with some misaligned frame and grates. If so a slice can be cut into the skirt with a utility knife at the point of interference.
Make sure the grate is at the desired level or remove CB Shield and re-adjust the leg length.

Inspecting a CB Shield Enhanced Catch Basin

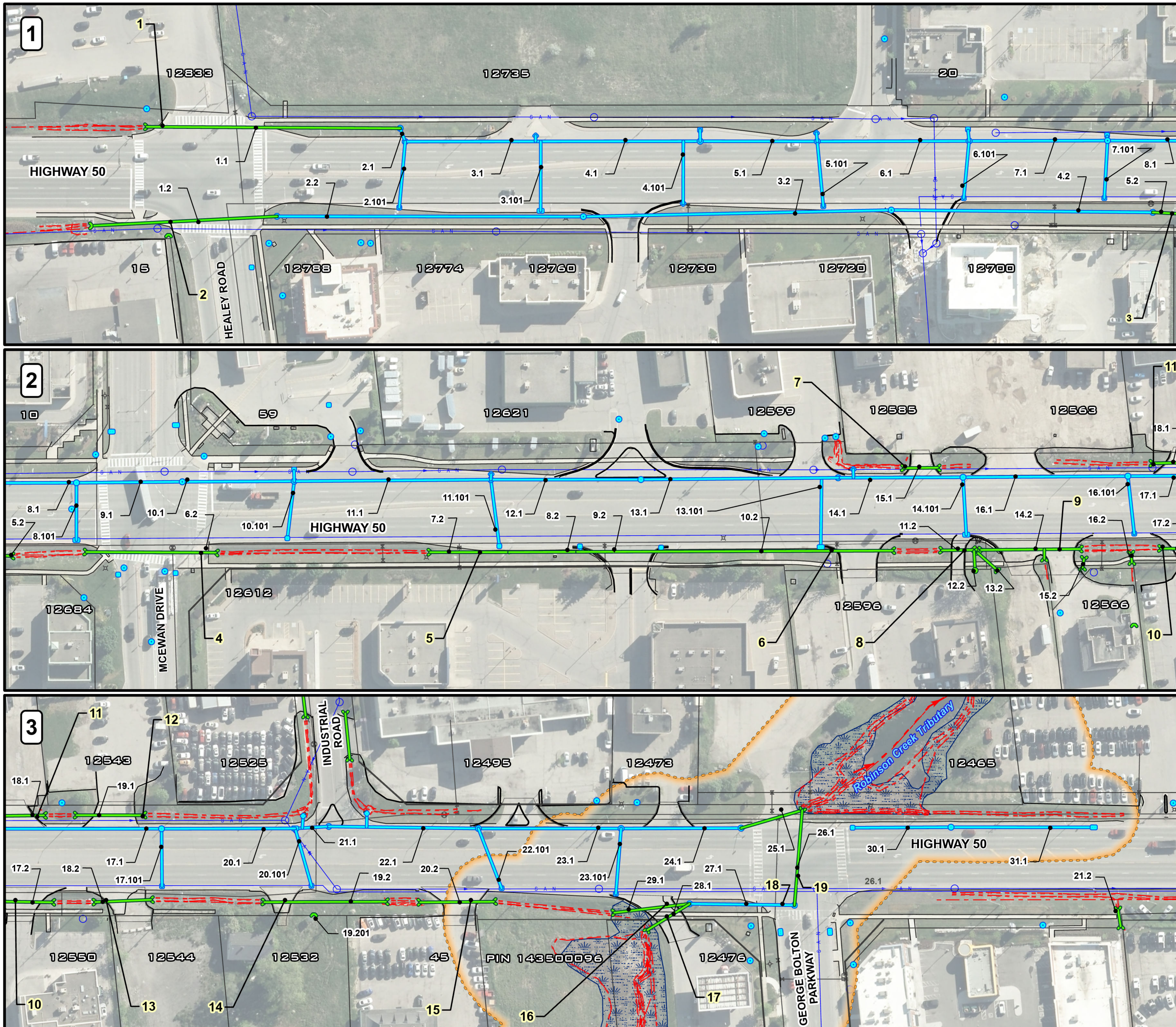
Open grate
A lifting rope is attached to the top of the centered leg of the CB Shield insert. Lift and remove the insert.
Inspect CB Shield for any possible damage. Quite often leaves will accumulate on the grate. This can actually improve the Shield's ability to capture sediment and assist in preventing leave litter from being washed down stream.
Use a Sludge Judge to measure the sediment depth in 4 - 6 locations of the sump.
If the sediment depth is 300mm – 600mm deep it is recommended that the unit be cleaned.

Cleaning a CB Shield Enhanced Catch Basin

Open grate and remove CB Shield with lift rope.
Clean catch basin as usual with a Vacuum truck.
Clean CB Shield (if needed) and re-install into catch basin.
If there is any significant damage to a CB Shield please send a picture and its location to CB Shield Inc. (info@cbshield.com).

Appendix D

Maps



ENVIRONMENTAL ASSESSMENT

Map Group 1: Existing Storm Water Infrastructure Within North Section of the Highway 50 Project

DATA SOURCES

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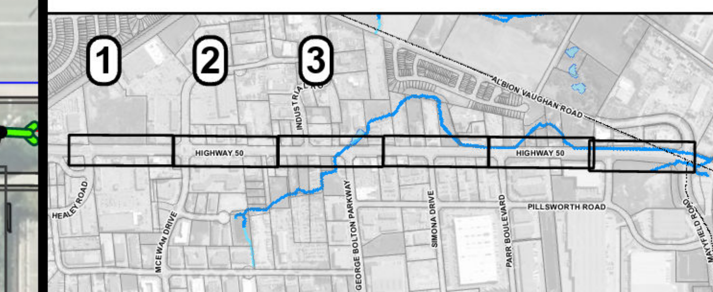
Map Credit:
Peel Region2020, TRCA



R.V. Anderson Associates Limited
engineering • environment • infrastructure

LEGEND

- 123 PROPERTY INDEX NUMBER (PIN)
- TRCA O. REG. 166/06
- WETLAND
- CULVERT
- WATERCOURSE
- STORM SEWER
- CHANNEL
- MANHOLE
- SAN SANITARY SEWER
- CATCHBASIN
- WATERMAIN
- 12 REPLACEMENT ASSET ID #
- 12 ASSET ID #

Designed by	Approved by
rva	AM MAD

NOTICE

NOT A PLAN OF SURVEY. The map is drawn 'as is' and The Regional Municipality of Peel excludes all representations, warranties, obligations and liabilities, in relation to the Information to the maximum extent permitted by law.

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10 0 10 20 30 40 m
HORIZONTAL SCALE

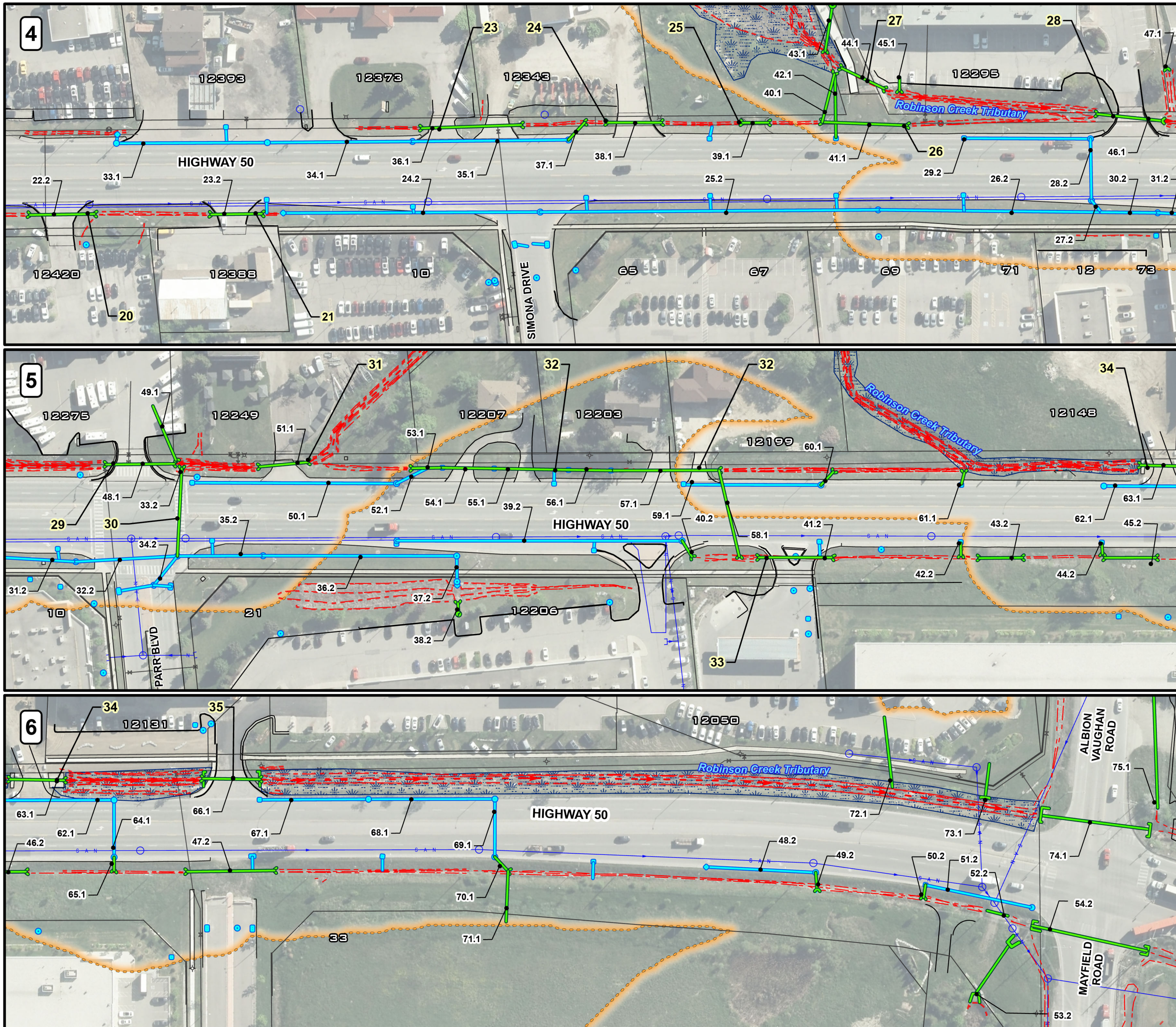
Region of Peel
working with you

HIGHWAY 50 (QUEEN STREET)
FROM MAYFIELD ROAD TO HEALEY ROAD

EXISTING CULVERTS AND STORMWATER INFRASTRUCTURE - NORTH LIMIT

STORM WATER MANAGEMENT IMPROVEMENTS
STA. 14 + 300 +/- TO STA. 12 + 000 +/-

Page	1 of 2	Project No. (REGION OF PEEL) #18 - 4860
Drawn by	CER	
Date	11 / 2022	Project No. (rva) #194615



ENVIRONMENTAL ASSESSMENT

Map Group 2: Existing Storm Water Infrastructure Within South Section of the Highway 50 Project

DATA SOURCES

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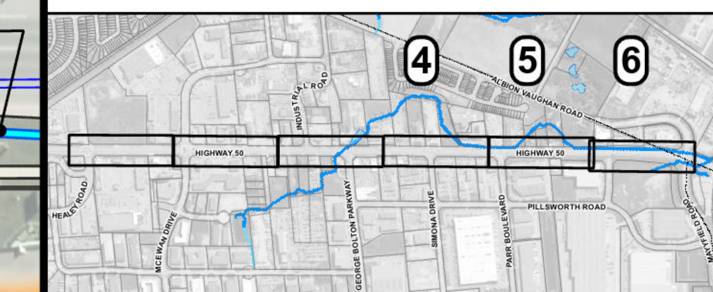
Map Credit:
Peel Region2020, TRCA



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LEGEND

123	PROPERTY INDEX NUMBER (PIN)		TRCA O. REG. 166/06
	WETLAND		CULVERT
	WATERCOURSE		STORM SEWER
	CHANNEL		MANHOLE
SAN	SANITARY SEWER		CATCHBASIN
	WATERMAIN		
12	REPLACEMENT ASSET ID #	12	ASSET ID #

Designed by rva

Approved by AM MAD

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10 0 10 20 30 40 m

HORIZONTAL SCALE

Region of Peel
working with you

HIGHWAY 50 (QUEEN STREET)

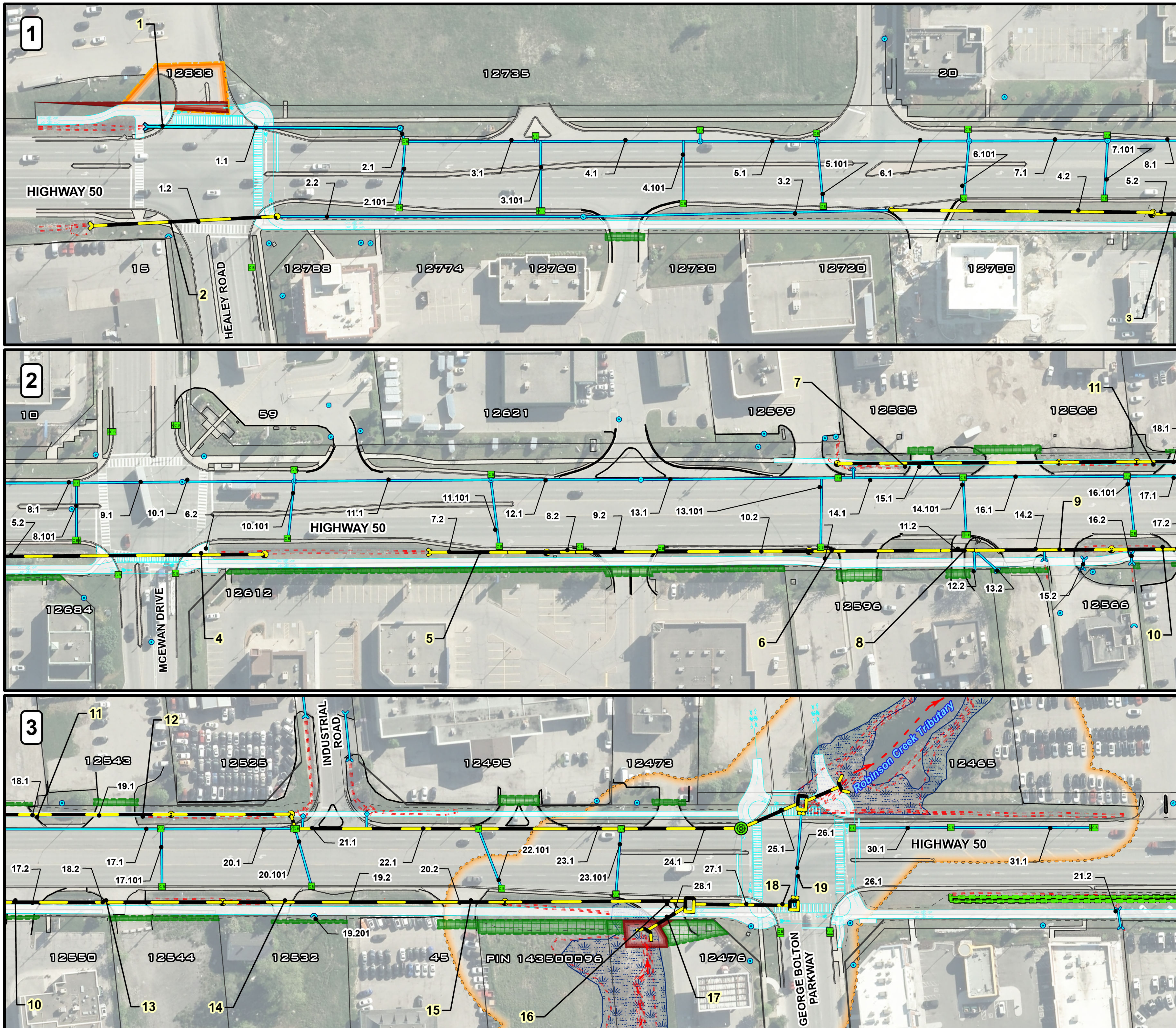
FROM MAYFIELD ROAD TO HEALEY ROAD

EXISTING CULVERTS AND STORMWATER INFRASTRUCTURE - SOUTH LIMIT

STORM WATER MANAGEMENT IMPROVEMENTS

STA. 14 + 300 +/- TO STA. 12 + 000 +/-

Page	2 of 2	Project No. (REGION OF PEEL)	#18 - 4860
Drawn by	CER	Project No. (rva)	#194615
Date	11 / 2022		



ENVIRONMENTAL ASSESSMENT

Map Group 3: Proposed Culverts and Storm Water Infrastructure Within North Section of the Highway

DATA SOURCES

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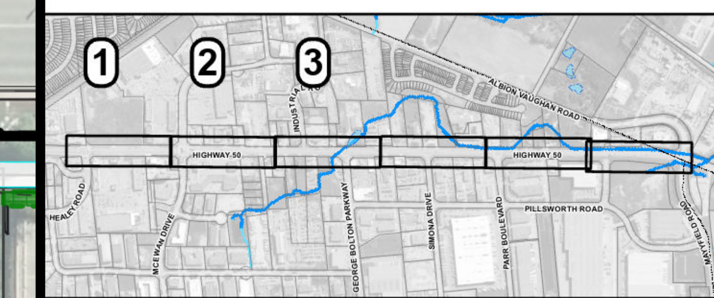
Map Credit:
Peel Region2020, TRCA



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LEGEND

- EXISTING PERMANENT EASEMENT
- PROPERTY INDEX NUMBER (PIN)
- WATERCOURSE
- CHANNEL
- WETLAND
- TRCA O. REG. 166/06
- BIORETENTION FACILITY
- INFILTRATION TRENCH
- OIL GRIT SEPARATOR
- CATCHBASIN SHIELD
- REPLACEMENT ASSET ID #
- SIDEWALK / REST AREA / MULTI - USE PATH
- PROPOSED CULVERT / SEWER
- EXISTING CULVERT / SEWER
- MANHOLE
- CATCHBASIN
- MAYFIELD PROJECT CULVERT / SEWER
- PROPOSED FEE SIMPLE
- PROPOSED TEMPORARY EASEMENT
- GRADING LIMIT
- ASSET ID #

Designed by	Approved by
rva	AM MAD

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10 0 10 20 30 40 m
HORIZONTAL SCALE

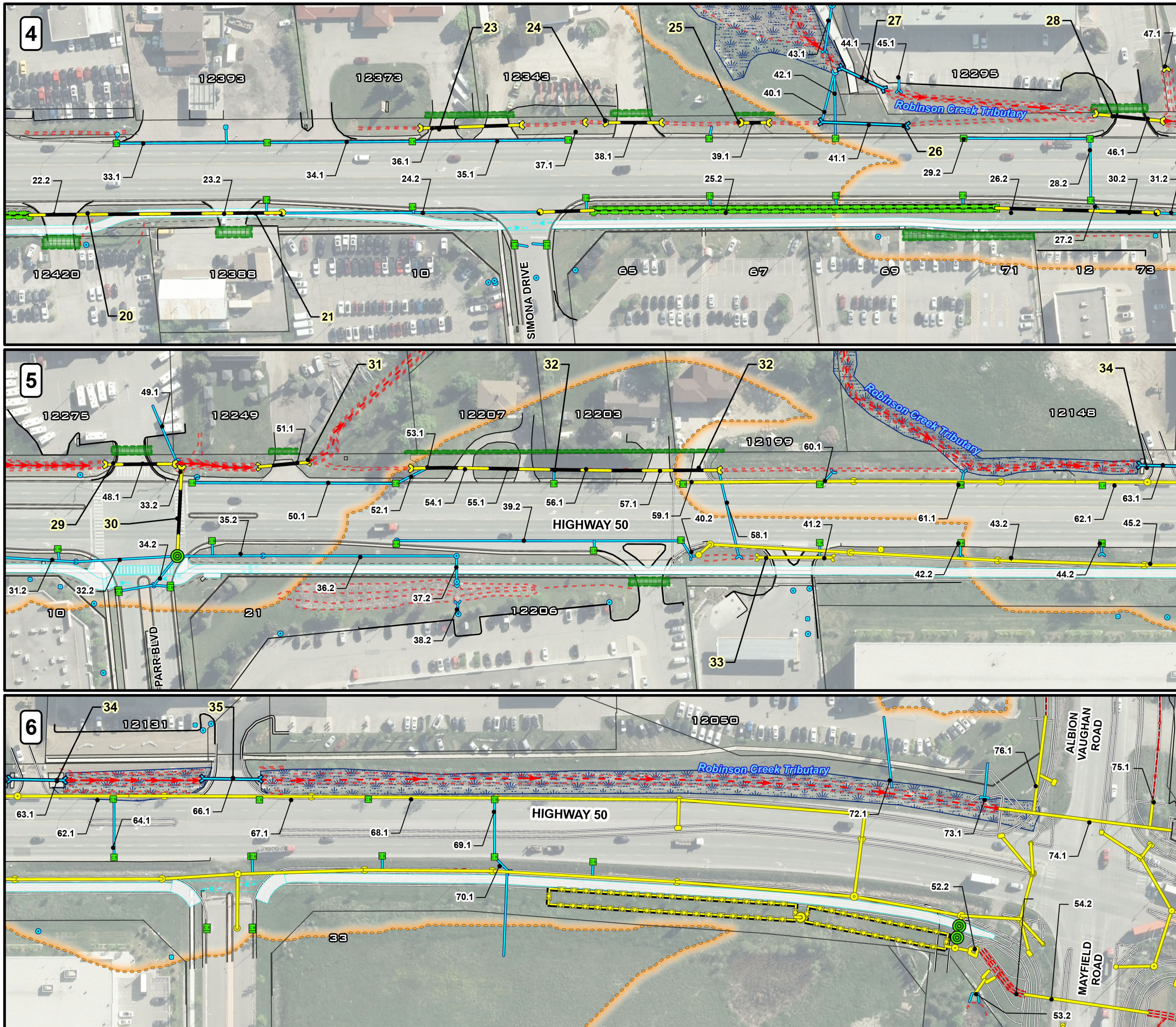
Region of Peel
working with you

HIGHWAY 50 (QUEEN STREET)
FROM MAYFIELD ROAD TO HEALEY ROAD

PROPOSED CULVERTS AND STORMWATER INFRASTRUCTURE - NORTH LIMIT

STORM WATER MANAGEMENT IMPROVEMENTS
STA. 14 + 300 +/- TO STA. 12 + 000 +/-

Page	1 of 2	Project No. (REGION OF PEEL)	#18 - 4860
Drawn by	CER	Project No. (rva)	#194615
Date	11 / 2022		



ENVIRONMENTAL ASSESSMENT

Map Group 4: Proposed Culverts and Storm Water Infrastructure Within South Section of the Highway

DATA SOURCES

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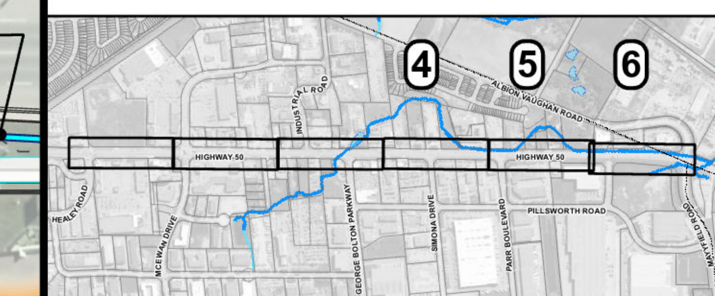
Map Credit:
Peel Region2020, TRCA



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LEGEND

- 123 PROPERTY INDEX NUMBER (PIN)
- WATERCOURSE
- CHANNEL
- WETLAND
- TRCA O. REG. 166/06
- BIORETENTION FACILITY
- INFILTRATION TRENCH
- OIL GRIT SEPARATOR
- CATCHBASIN SHIELD
- 12 REPLACEMENT ASSET ID #
- SIDEWALK / REST AREA / MULTI - USE PATH
- PROPOSED CULVERT / SEWER
- EXISTING CULVERT / SEWER
- MANHOLE
- CATCHBASIN
- MAYFIELD PROJECT CULVERT / SEWER
- PROPOSED FEE SIMPLE
- PROPOSED TEMPORARY EASEMENT
- GRADING LIMIT
- 12 ASSET ID #

Designed by	Approved by
rva	AM MAD

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10 0 10 20 30 40 m
HORIZONTAL SCALE

Region of Peel
working with you

HIGHWAY 50 (QUEEN STREET)

FROM MAYFIELD ROAD TO HEALEY ROAD

PROPOSED CULVERTS AND STORMWATER INFRASTRUCTURE - SOUTH LIMIT

STORM WATER MANAGEMENT IMPROVEMENTS

STA. 14 + 300 +/- TO STA. 12 + 000 +/-

Page	2 of 2	Project No. (REGION OF PEEL)	#18 - 4860
Drawn by	CER	Project No. (rva)	#194615
Date	11 / 2022		