



RESPOND. RECLAIM. RENEW.

**HOW DO YOU DROWN A TREE?  
AND OTHER UNIQUE AND CHALLENGING CONSTRUCTION ASPECTS**

**PORT LANDS FLOOD PROTECTION  
AND ENABLING INFRASTRUCTURE PROJECT**

REMTECH 2023  
OCTOBER 12, 2023

# INTRODUCTION

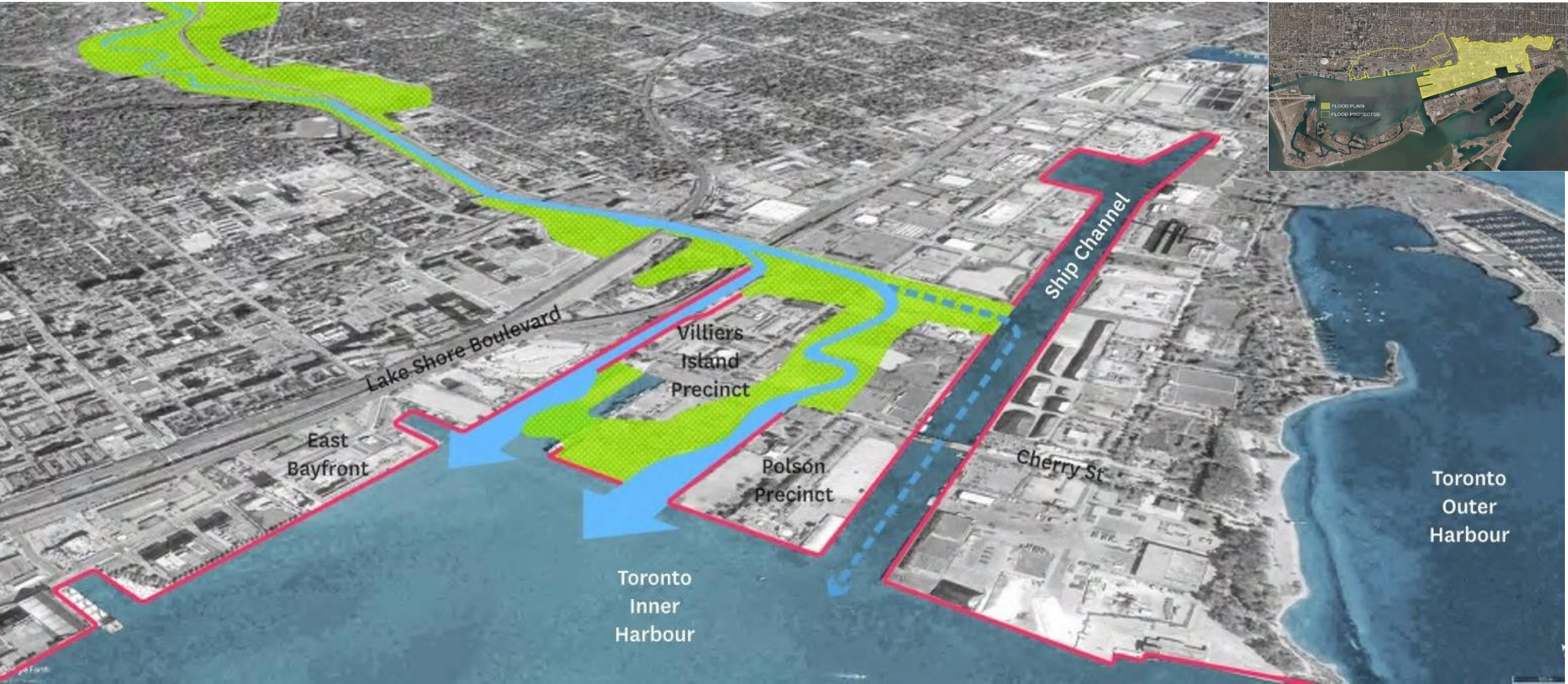
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- **Large scale infrastructure projects** are becoming **more complex and frequent**. They are almost all highly **multi-disciplinary** in terms of scope integration and execution.
- Their **frequency** in the future will become greater as the population of earth increases and that population grapples with climate change through **resiliency** infrastructure and the application of **natural based solutions**.
- Construction of these projects is considerably more challenging as their designs become more sophisticated and integrated. Pulling off these projects will **require innovation and creative thinking** from all stakeholders in the face of new, complex, and the logistically impossible.

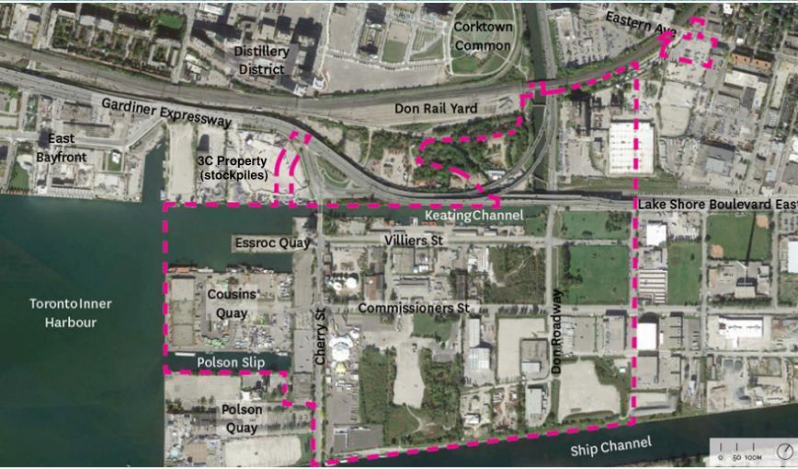
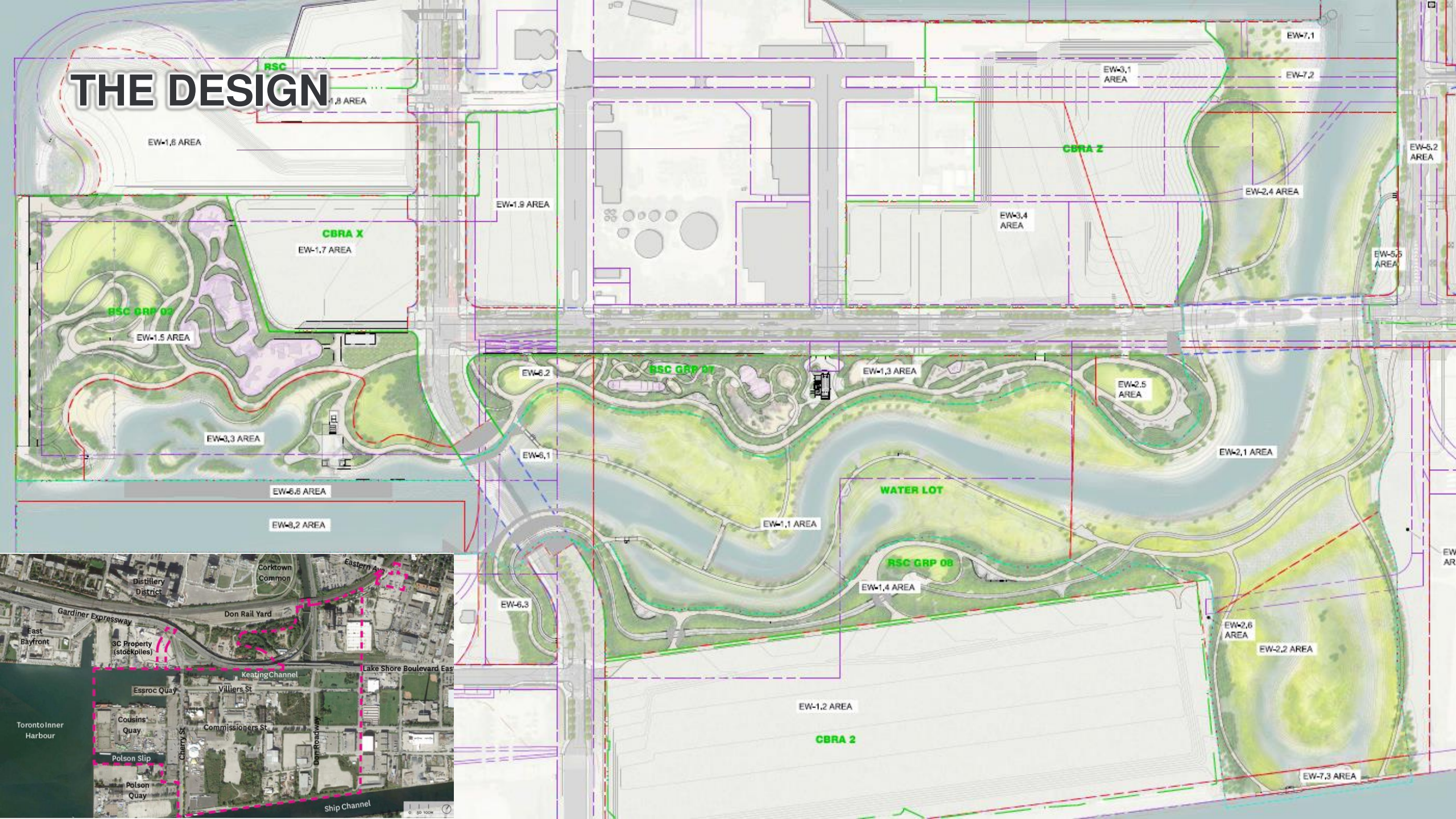
This presentation intends to give you a contractor's perspective on triumphs and lessons learned on delivering unique and complex elements of a large-scale multidisciplinary climate resiliency waterfront infrastructure project.

# PROJECT OBJECTIVES



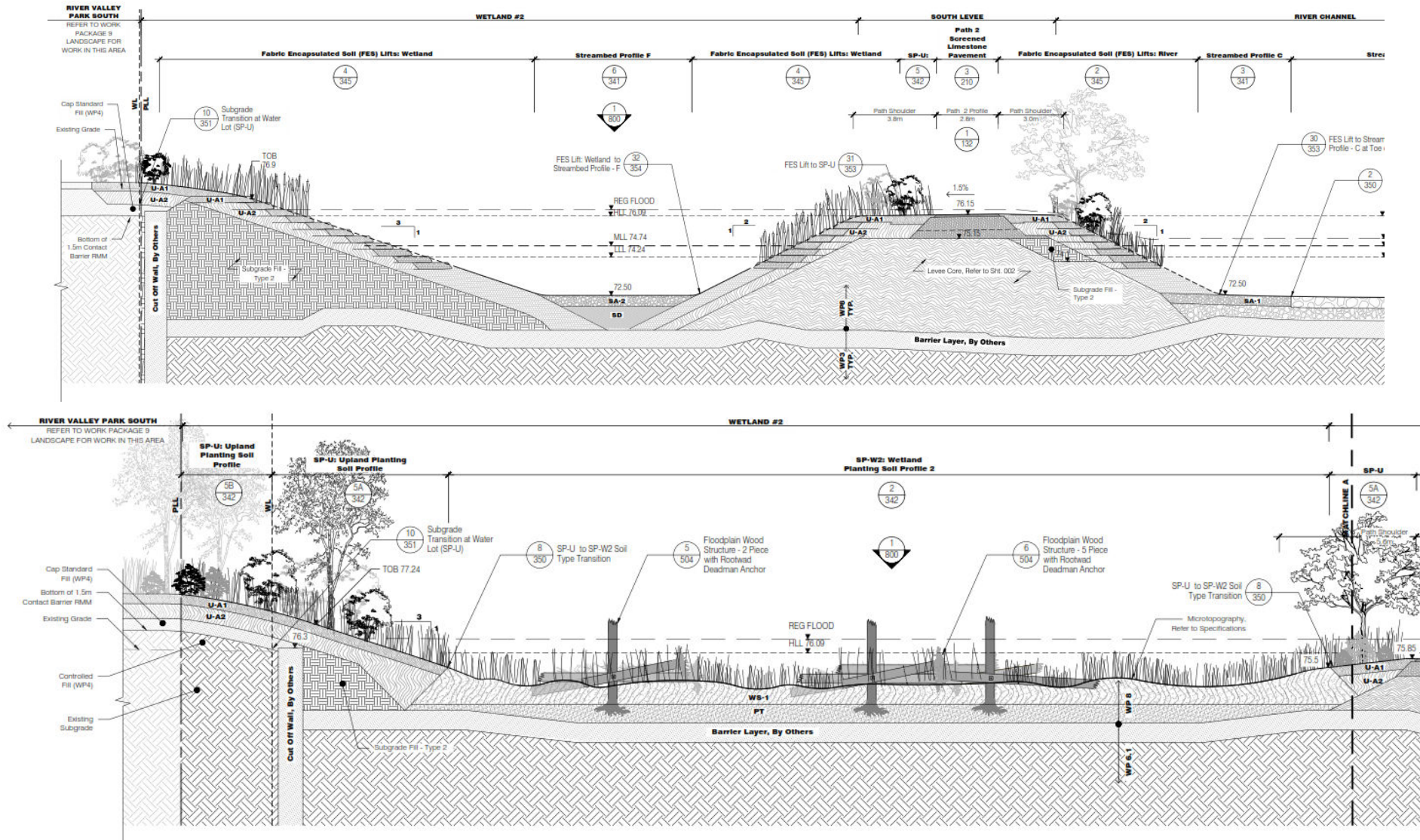


# THE DESIGN



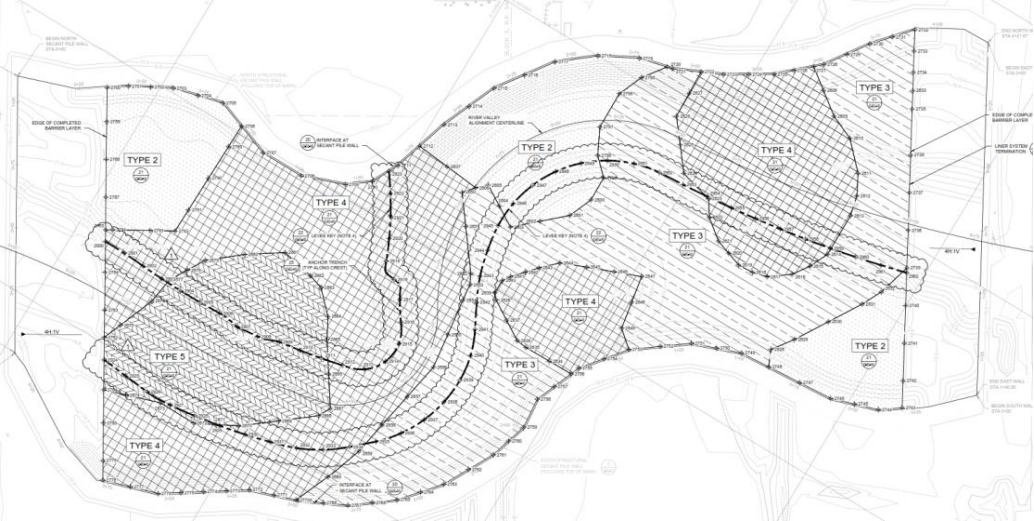
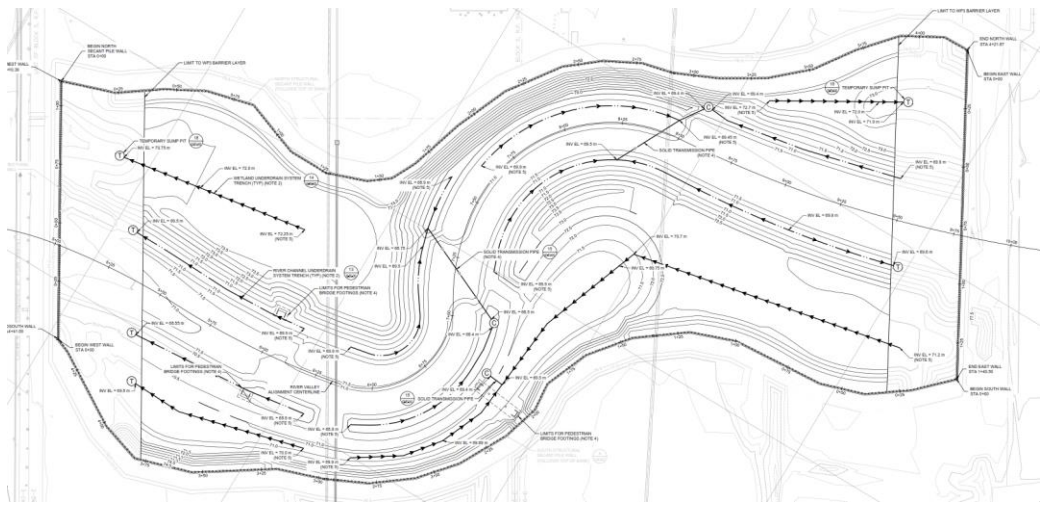
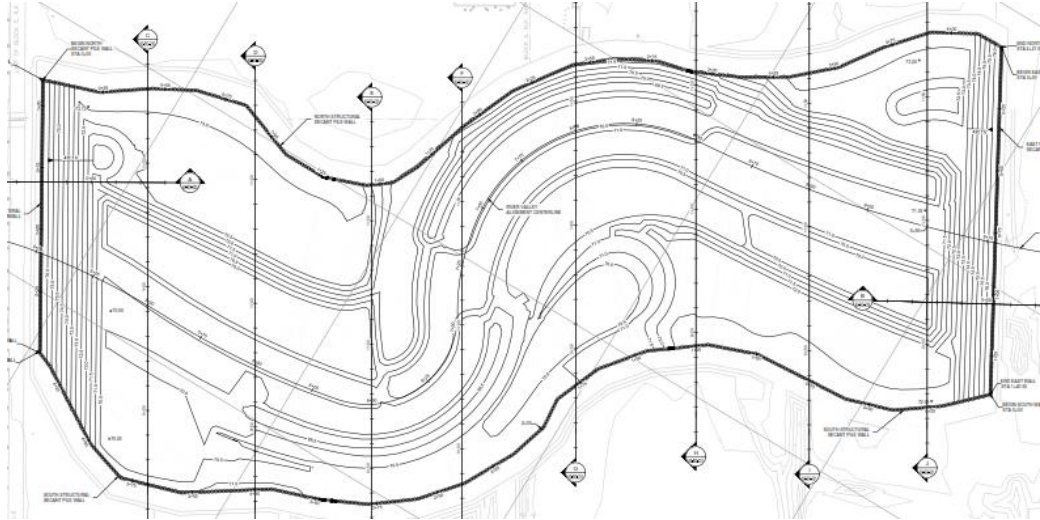


# CROSS SECTION OF DESIGN



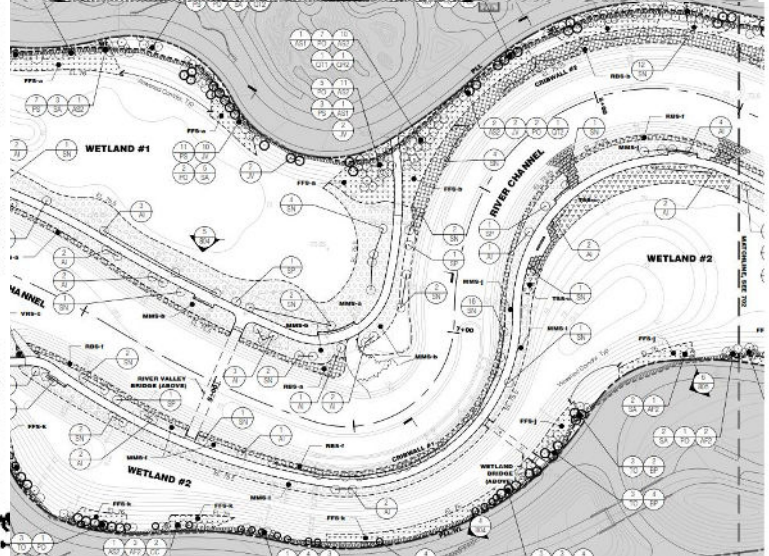
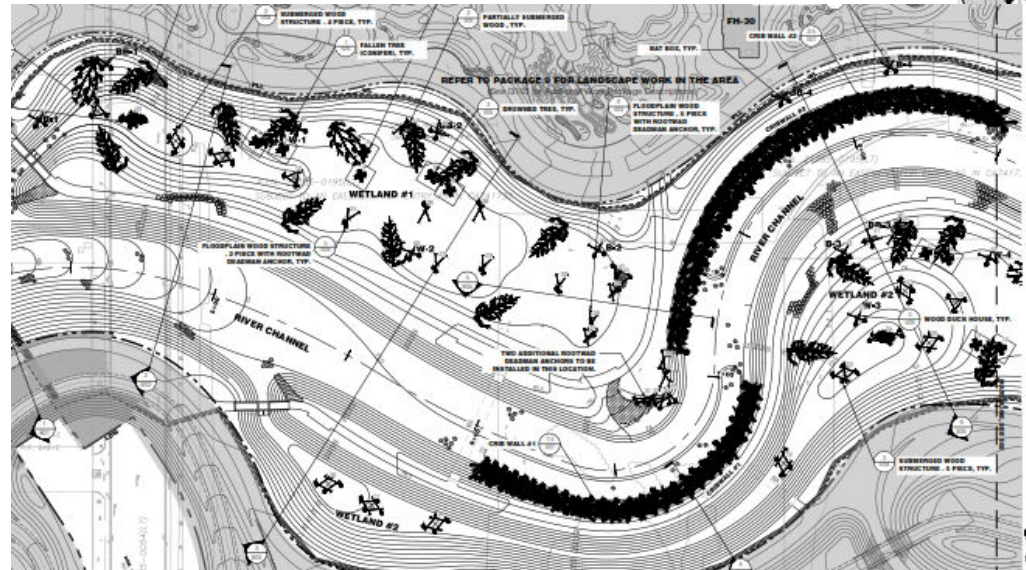
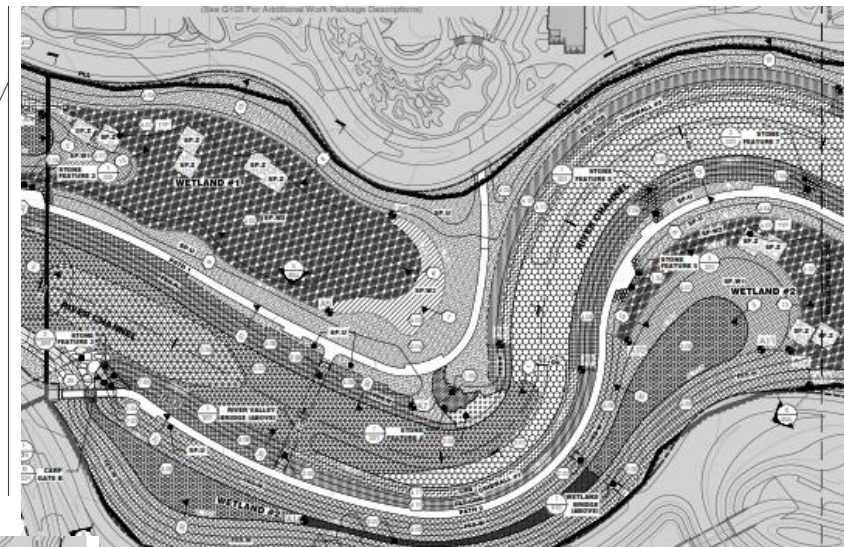
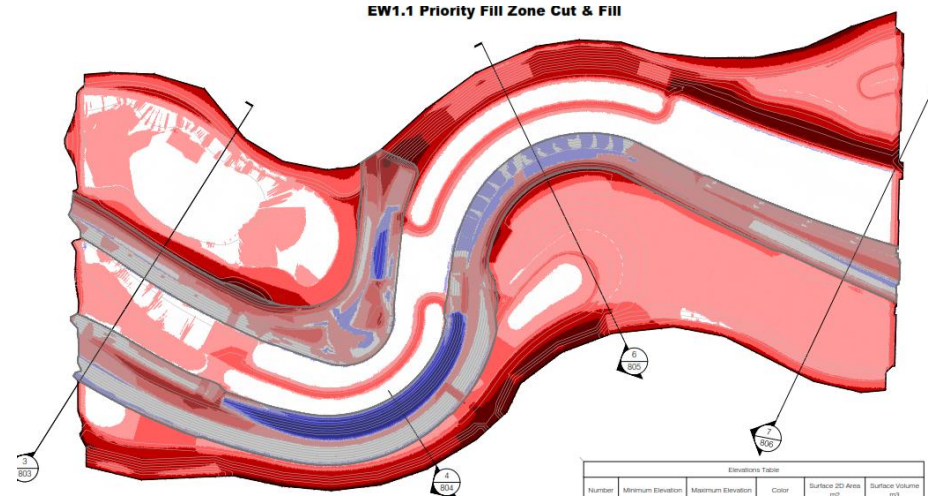


# LAYERS OF THE CAKE





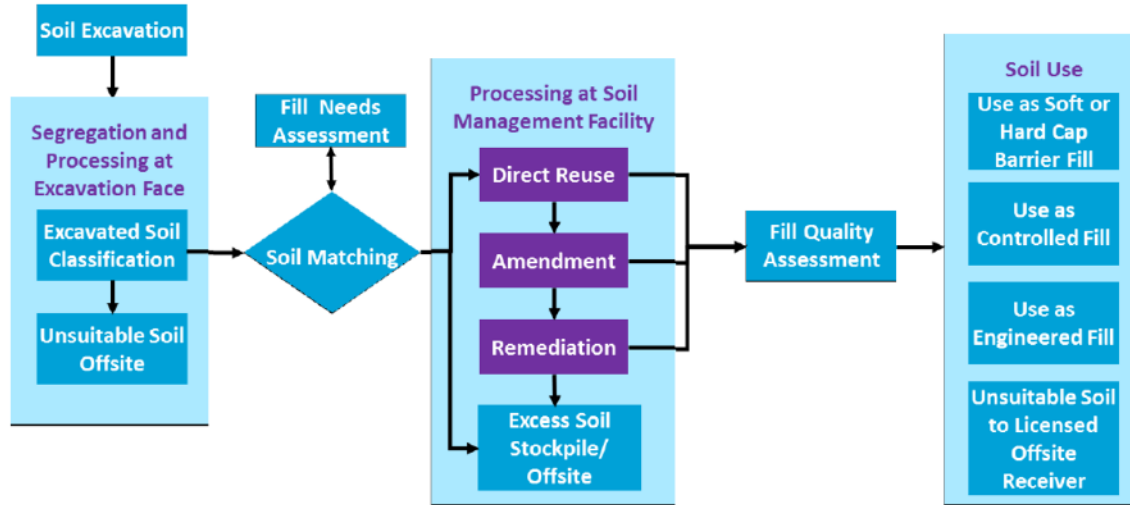
# LAYERS OF THE CAKE



Confidential



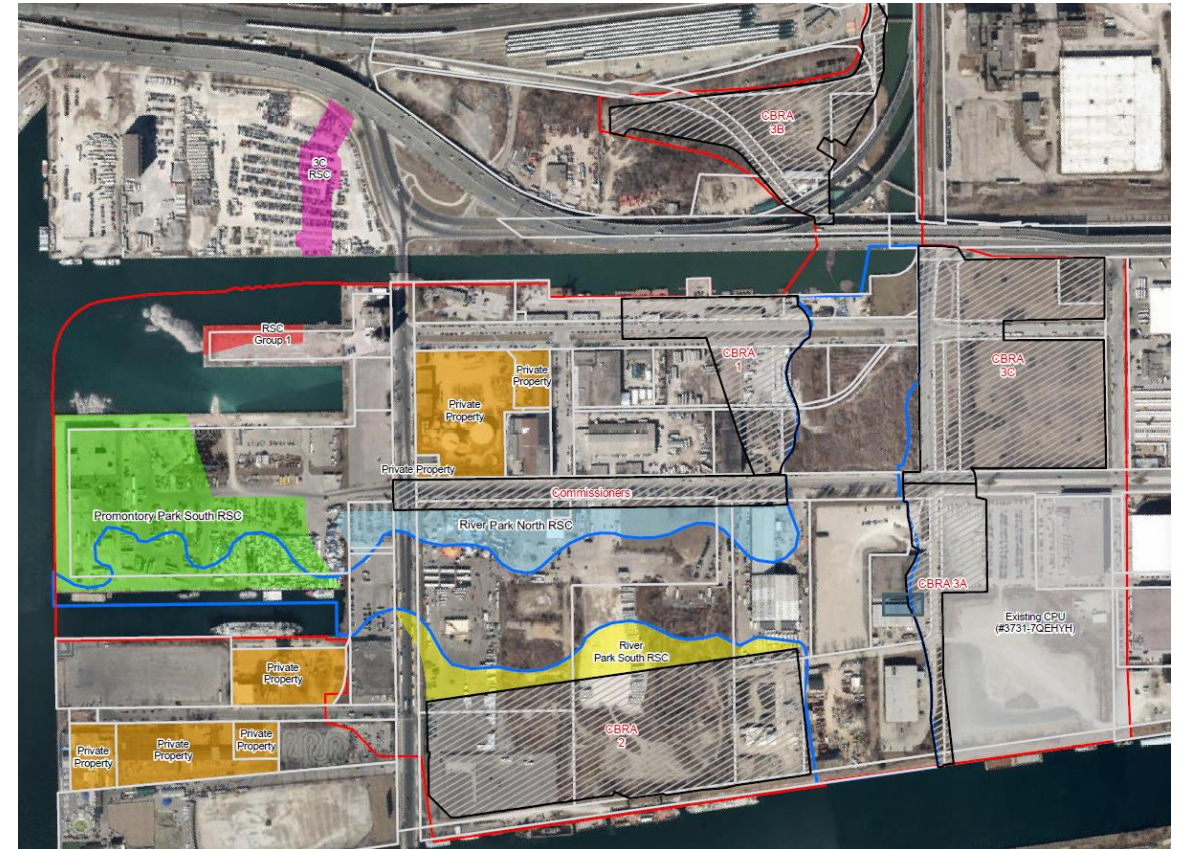
# SOIL REUSE CRITERIA & CBRAS



PLFPEI Soil Management Plan, Jacobs (2019)

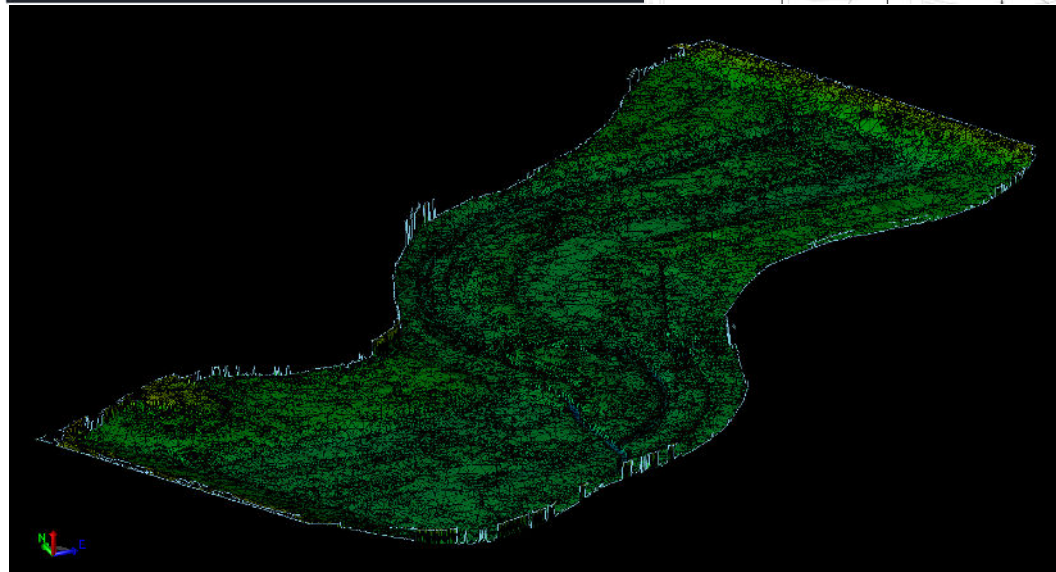
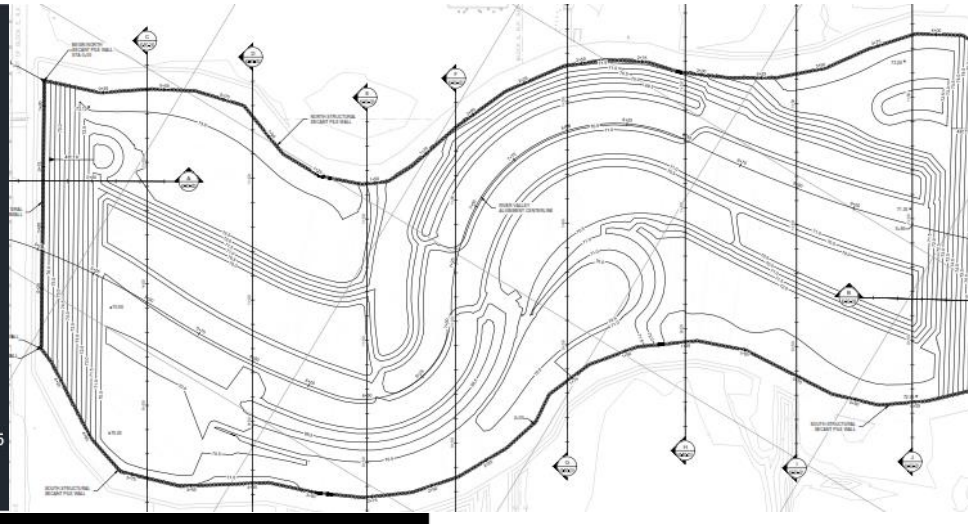
.2 Digital tracking will include, at a minimum, the following time-stamped criteria for each truck used to move soil or debris material from or within the excavation area shown in the drawings or otherwise identified, commencing with the excavation of source material from the excavation area, and/or the placement of material in a temporary stockpile:

- .1 Unique haul truck identification such as license plate number, registration number or Ministry approval number.
- .2 Load source location (GPS with submeter accuracy coordinates or origin identification), including depth and/or elevation range.
- .3 Load volume.
- .4 Qualitative assessment by Subcontractor of the moisture content (e.g., wet, dry, moist, etc.)
- .5 Load soil type (e.g., sand, fill, silt, etc.)
- .6 Load source soil excavation category as defined on Drawing 4-E-1
- .7 Drop location (spatial coordinates of fill placement) and approximate lift thickness and elevation.

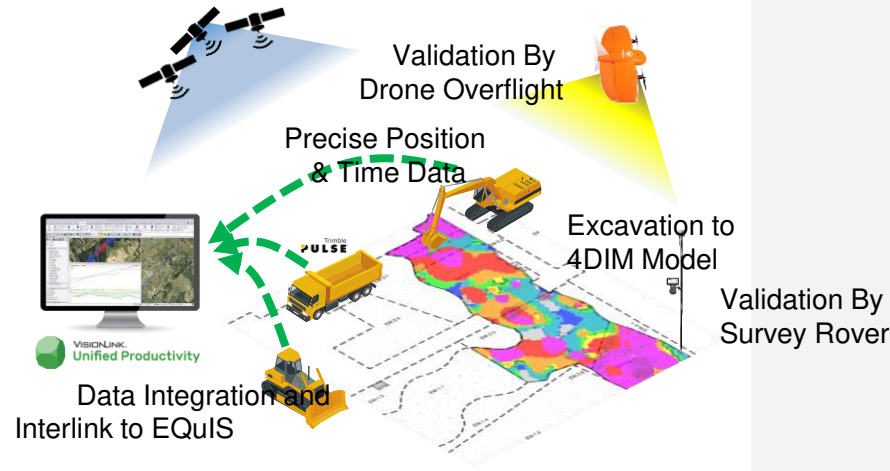
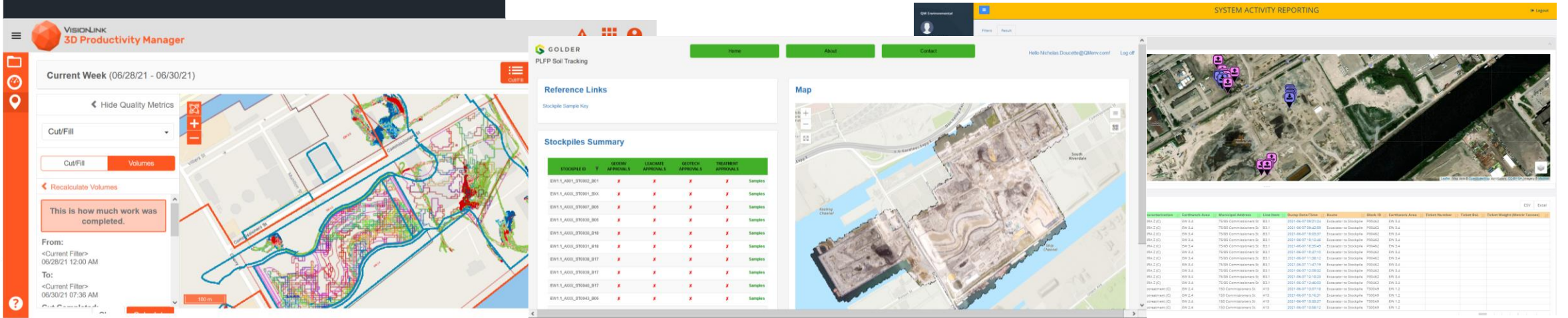




# 1. A "MODEL" EXCAVATION



# 2. TRACKING – FACE TO PLACE

**VISIONLINK 3D Productivity Manager**

Current Week (06/28/21 - 06/30/21)

Hide Quality Metrics

Cut/Fill

Recalculate Volumes

This is how much work was completed.

From: <Current Filler> 06/28/21 12:00 AM

To: <Current Filler> 06/30/21 07:36 AM

**GOLDER PLFP Soil Tracking**

Reference Links

Stockpile Summary

STOCKPILE ID	GENW APPROVALS	LEADW APPROVALS	GEOTECH APPROVALS	TREATMENT APPROVALS	
EW1_1_A001_37002_B01	X	X	X	X	Samples
EW1_1_A001_37001_B00	X	X	X	X	Samples
EW1_1_A001_37007_B06	X	X	X	X	Samples
EW1_1_A001_37003_B05	X	X	X	X	Samples
EW1_1_A001_37003_B19	X	X	X	X	Samples
EW1_1_A001_37001_B18	X	X	X	X	Samples
EW1_1_A001_37003_B17	X	X	X	X	Samples
EW1_1_A001_37003_B1	X	X	X	X	Samples
EW1_1_A001_37004_B17	X	X	X	X	Samples
EW1_1_A001_37004_B06	X	X	X	X	Samples

**SYSTEM ACTIVITY REPORTING**

Workstation	Earthwork Area	Municipal Address	Line Item	Empty State/Time	Phase	Block ID	Earthwork Area	Ticket Number	Ticket Sub	Ticket Weight (Metric Tons)
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 09:27:10	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 09:22:08	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 10:00:07	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 10:10:48	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 10:29:40	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 10:37:10	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 11:00:10	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 11:47:10	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 12:00:02	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 12:16:22	Excavation to Stockpile	PS0402	EW 3.4			
WA-2(C)	EW 3.4	7500 Commissioners St	851	2021-06-07 12:46:05	Excavation to Stockpile	PS0402	EW 3.4			
equipment (E)	EW 3.4	100 Commissioners St	410	2021-06-07 13:07:13	Excavation to Stockpile	T00049	EW 3.4			
equipment (E)	EW 3.4	100 Commissioners St	410	2021-06-07 13:16:29	Excavation to Stockpile	T00049	EW 3.4			
equipment (E)	EW 3.4	100 Commissioners St	410	2021-06-07 13:30:27	Excavation to Stockpile	T00049	EW 3.4			
equipment (E)	EW 3.4	100 Commissioners St	410	2021-06-07 13:58:72	Excavation to Stockpile	T00049	EW 3.4			



# 3. PREVENTING GCL HYDRATION

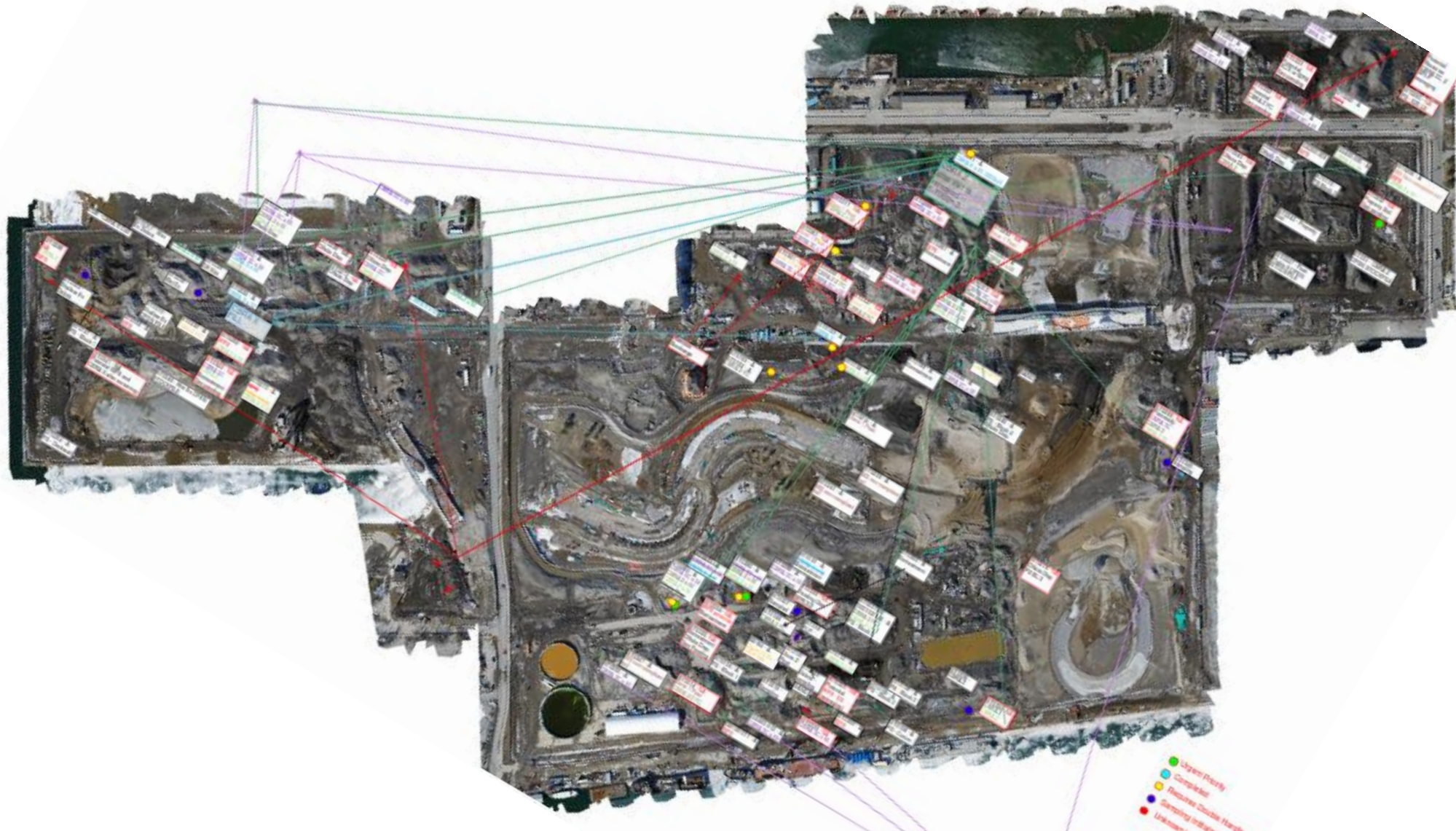






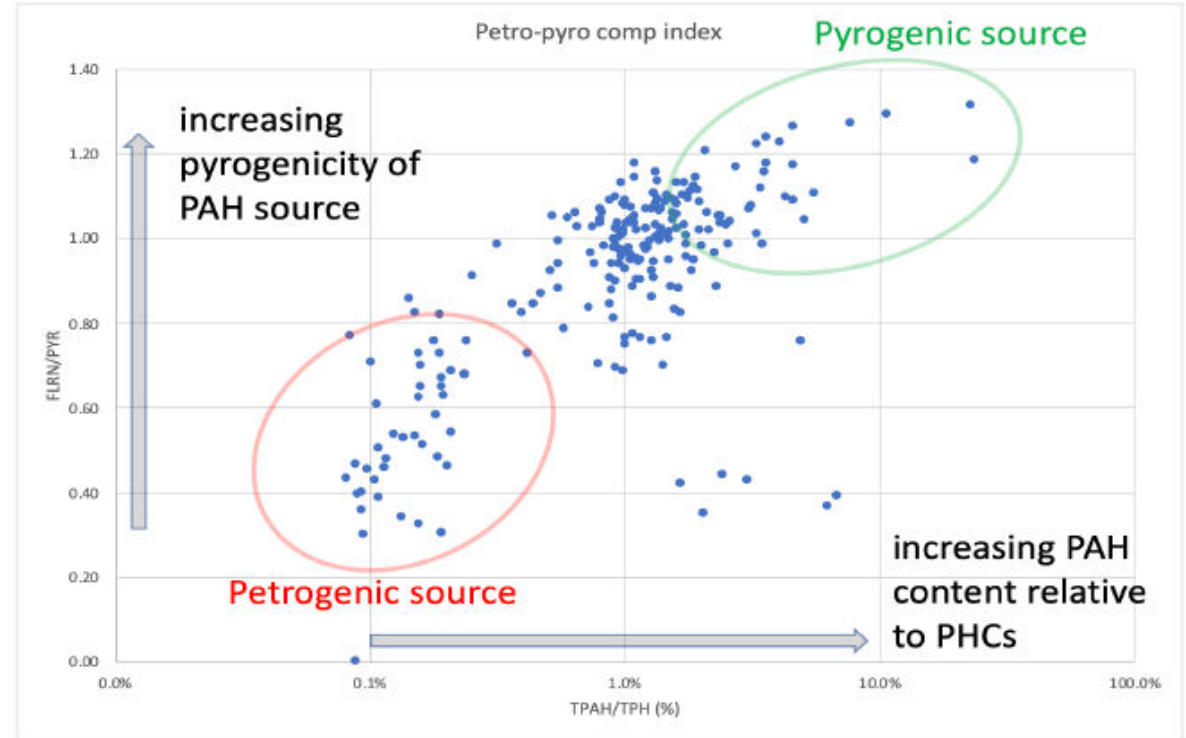


# 5. SEQUENCING PUZZLE





# 6. PAH VARIABILITY SLOT MACHINE





# 7. BALANCING THE MASS



QP Classification	Earthwork Area	Placed Survey Volume (m3) - Characterized Soil + Property Soil	Stockpiled in Placement EW To Be Placed (m3)	Characterized Used as Surcharge (m3)	Characterized - Awaiting Placement Volume (m3)	Waiting Approval Volume (m3)	Total Estimated Volume	Design Volume	Estimated Quantity Remaining/Needed
Package 8 Confined Fill	1.1/2.1/2.2/2.4	80,733		-	12,276	-	93,009	99,723	6,714
Package 8 Confined Fill	1.1	21,980	-	-	-	-	21,980	26,736	4,756
Package 8 Confined Fill	2.1	27,700	-	-	-	-	27,700	28,352	652
Package 8 Confined Fill	2.2	10,818	-	-	-	-	10,818	11,052	234
Package 8 Confined Fill	2.4	20,235	-	-	-	-	20,235	21,583	1,348
Package 8 Confined Fill (Plugs)	6.1	-	-	-	11,649	-	11,649	12,000	351
CBRA X	1.7/1.9	32,197	300	9,681	5,738	-	47,916	41,759	(6,157)
CBRA X	1.7	25,085	-	-	-	-	25,085	32,014	6,929
CBRA X	1.9	7,112	300	-	-	-	7,412	9,745	2,333
CBRA 3C	5.3/5.4	37,643	21,393	2,942	8,651	-	70,629	113,092	42,463
CBRA 3C + Property Block 625	5.3	22,019	400	-	-	-	22,419	28,217	5,798
CBRA 3C + Property Block 185	5.4	15,624	20,993	-	-	-	36,617	84,875	48,258
CBRA 2	1.2	47,111		11,559	11,262	305.00	70,237	193,150	122,913
CBRA Z	3.1/3.4	125,133	32,000	7,114	5,335	-	169,582	170,907	1,325
CBRA Z	3.1	56,574	32,000	-	-	-	88,574	88,183	(391)
CBRA Z	3.4	68,152	706	-	-	-	68,858	82,724	13,866
<b>Volume of Property Soil Excavated and Stockpiled - Characterized (Dispositioned and Directly Reused)</b>	<b>Earthwork Area</b>	<b>Placed Survey Volume (m3) - Characterized Soil + Property Soil</b>	<b>Stockpiled in Placement EW To Be Placed (m3)</b>	<b>Characterized Used as Surcharge (m3)</b>	<b>Characterized - Awaiting Placement Volume (m3)</b>	<b>Waiting Approval Volume (m3)</b>	<b>Total Estimated Volume</b>	<b>Design Volume</b>	<b>Estimated Quantity Remaining/Needed</b>
Property Soil Block 2	1.5	51,491.00	3,900	-	-	-	55,391	67,534	12,143
Property Soil Block 3	2.2/5.1	21,778.00	-	5,296	3,557	-	30,631	N/A	
Property Soil Block 4	2.1/2.5	6,326.60	-	-	1,400	-	7,727	N/A	
Property Soil Block 1	1.3/1.4	60,750.00	-	76,894	-	-	137,644	N/A	
Commissioners Property Soil	Commissioners St	-	-	-	-	-	0	N/A	
SDMA Property	SDMA	200.00	500	-	-	-	700	N/A	
Commissioners CFTC	Commissioners St	25,750.01	-	-	-	-	25,750	N/A	
Comm St IV SC	Commissioners St	4,983.10	-	-	-	-	4,983	N/A	
<b>Volume of Peat Excavated and Stockpiled - Characterized (Dispositioned and Directly Reused)</b>	<b>Earthwork Area</b>	<b>Placed Survey Volume (m3) - Characterized Soil + Property Soil</b>	<b>Stockpiled in Placement EW To Be Placed (m3)</b>	<b>Characterized Used as Surcharge (m3)</b>	<b>Characterized - Awaiting Placement Volume (m3)</b>	<b>Waiting Approval Volume (m3)</b>	<b>Total Estimated Volume</b>	<b>Design Volume</b>	<b>Estimated Quantity Remaining/Needed</b>
Zone 1	1.1	14,992.19	-	-	-	-	14,992.19	N/A	
Zone 2	1.1	-	-	-	-	-	-	N/A	
Zone 1 Peat	1.1/2.1/2.4	12,729.00			8,354		21,083.00	N/A	
CBRA X FC	1.7/1.9	-	-	15,151	-	-	15,151.45	N/A	
CBRA 3C FC	5.3	-	-	-	18,410	-	18,410.00	N/A	
CBRA 2 FC	1.2	-	-	-	14,404	-	14,404.47	N/A	
CBRA Z FC	3.1/3.4	-	-	-	13,777	-	13,777.47	N/A	

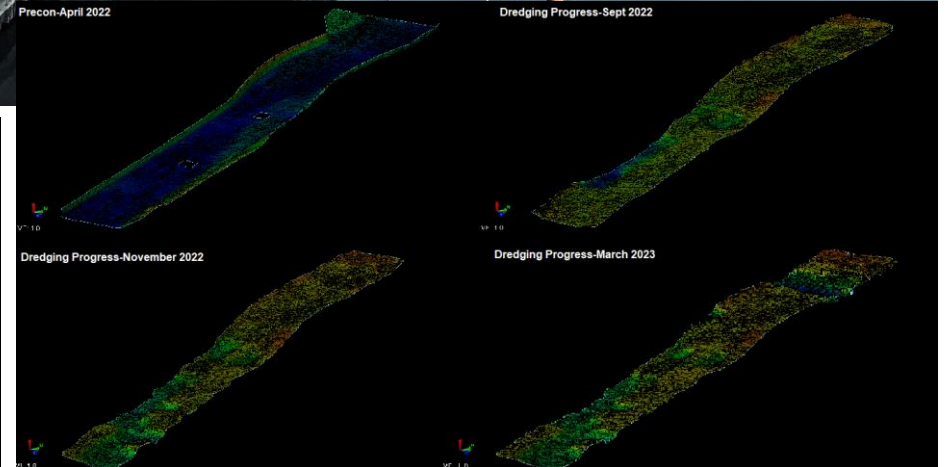
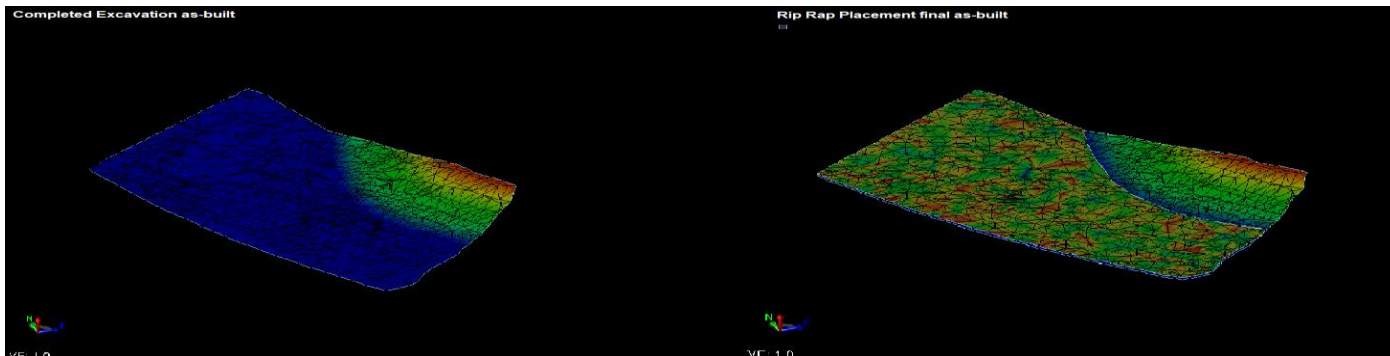


# 8. OBSTRUCTIONS



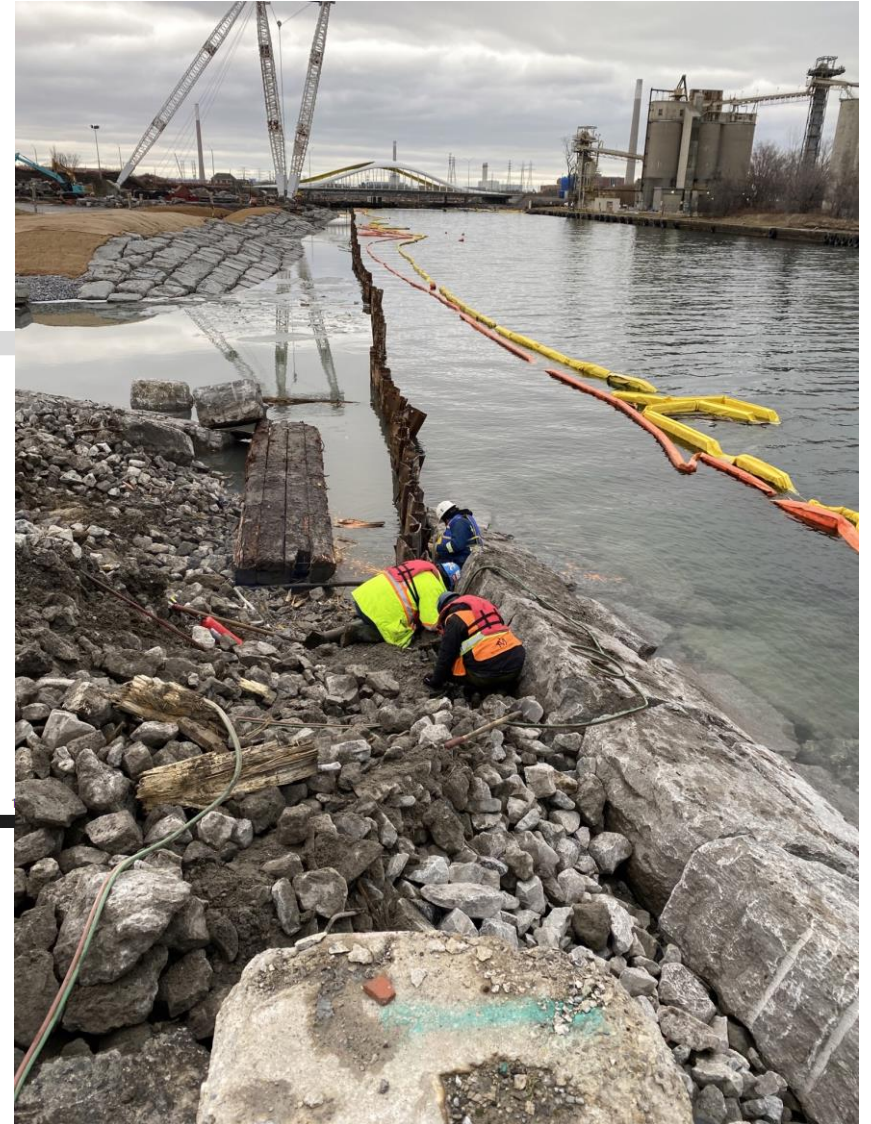
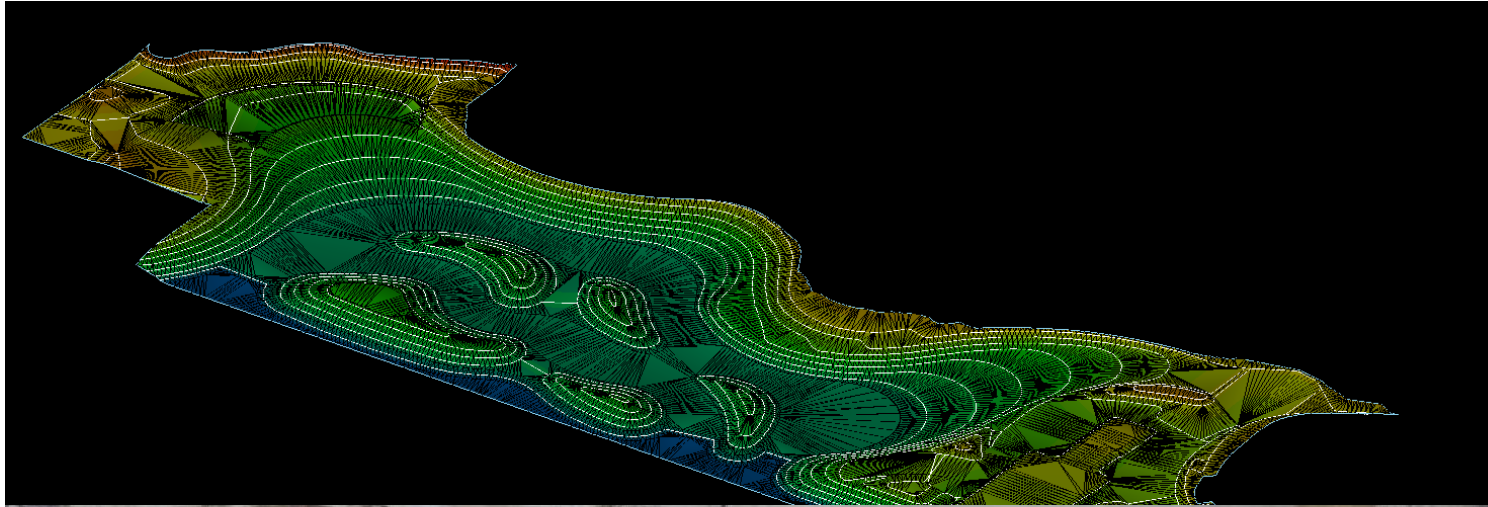


# 9. BLIND UNDER WATER





# 10. AQUATIC CURVES & TRANSITIONS





# 11. DROWNING TREES (UNKNOWN EFFORTS)



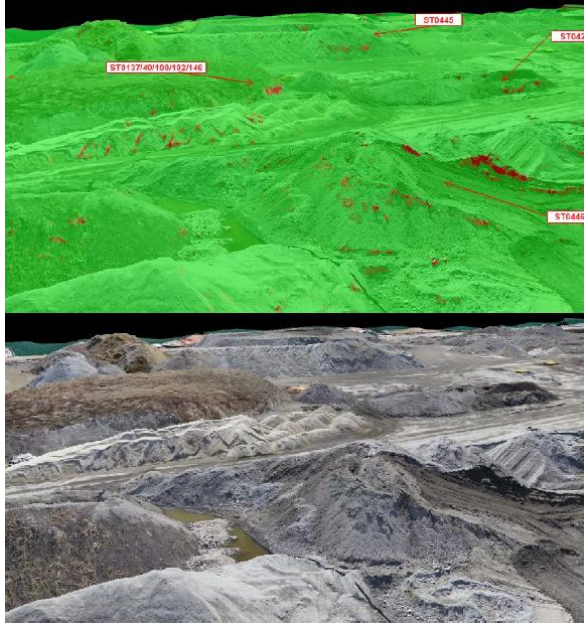


# 12. QUALITY STONE WORK





# 13. BIRDS, WEEDS, SLOPES, AND EROSION





# 14. WINTER HAD COME (A FEW TIMES)

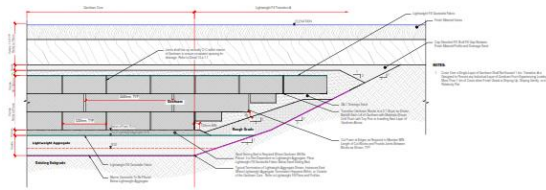




# 15. SCULPTING WITH FOAM

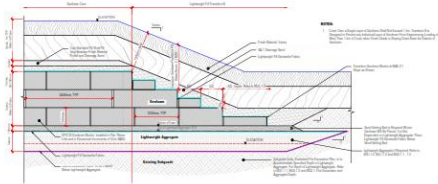


RESPOND. RECLAIM. RENEW.

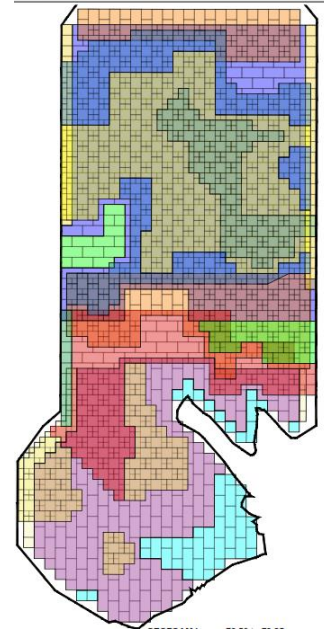
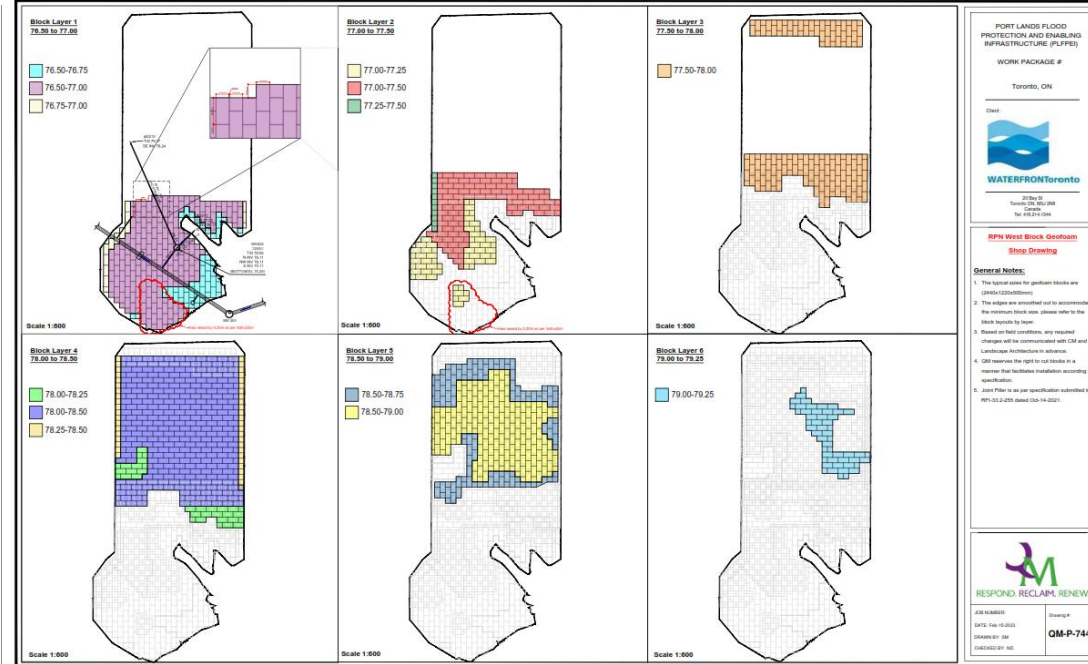
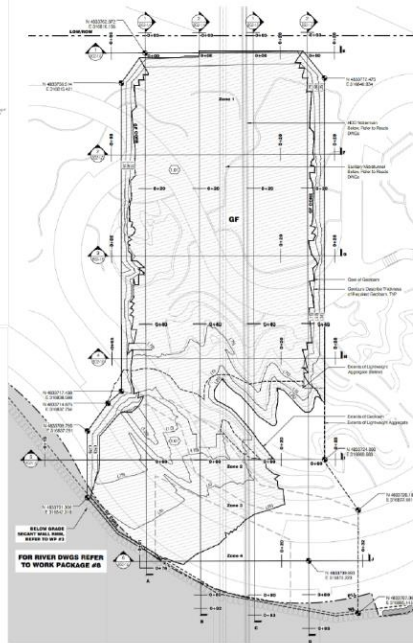


Typical: Lightweight Fill - Transition A  
1:7.5

Note: Transition A and B are typical transitions. The Block Layer Surfaces should be reviewed for actual transition details.

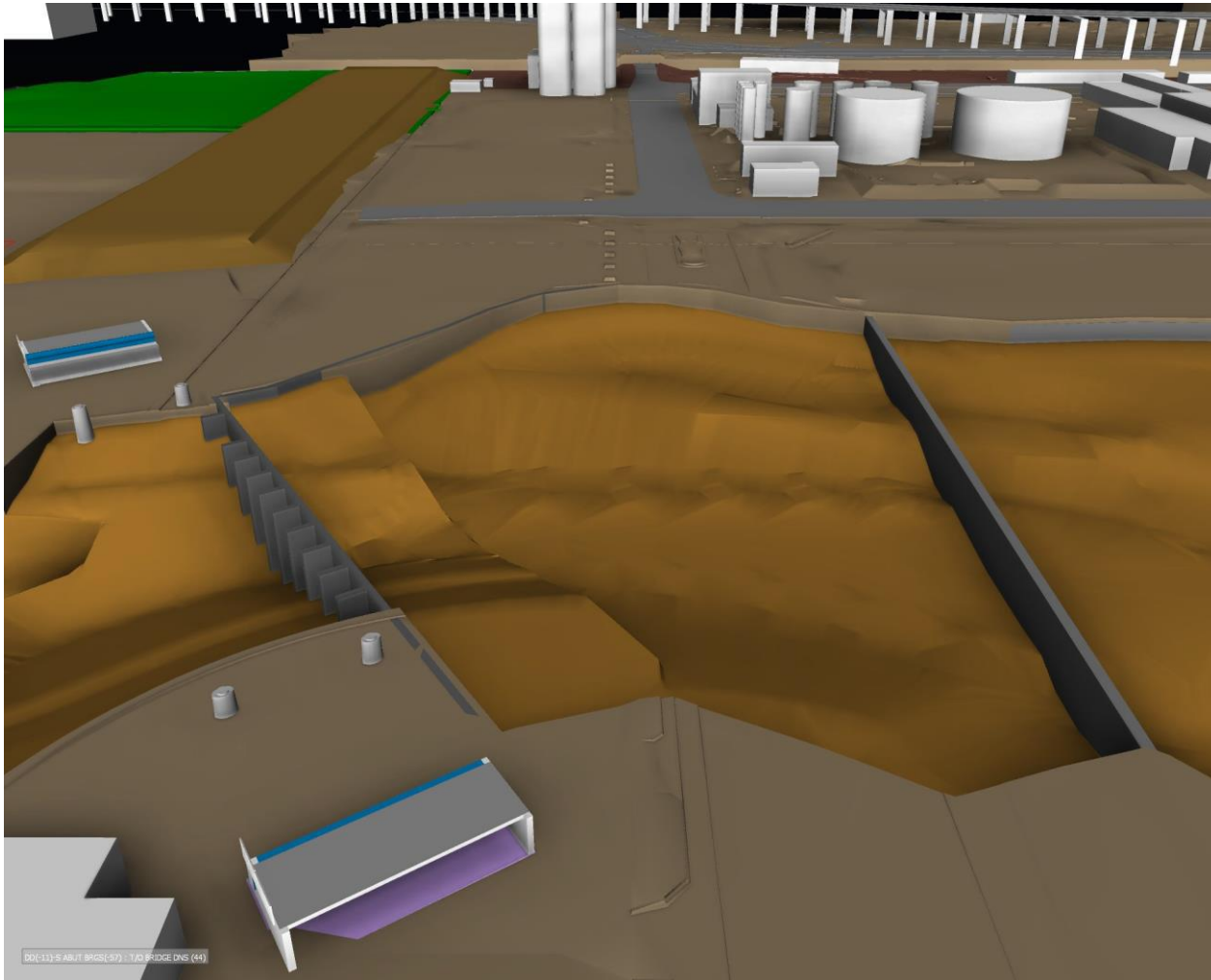


Typical: Lightweight Fill - Transition B  
1:7.5

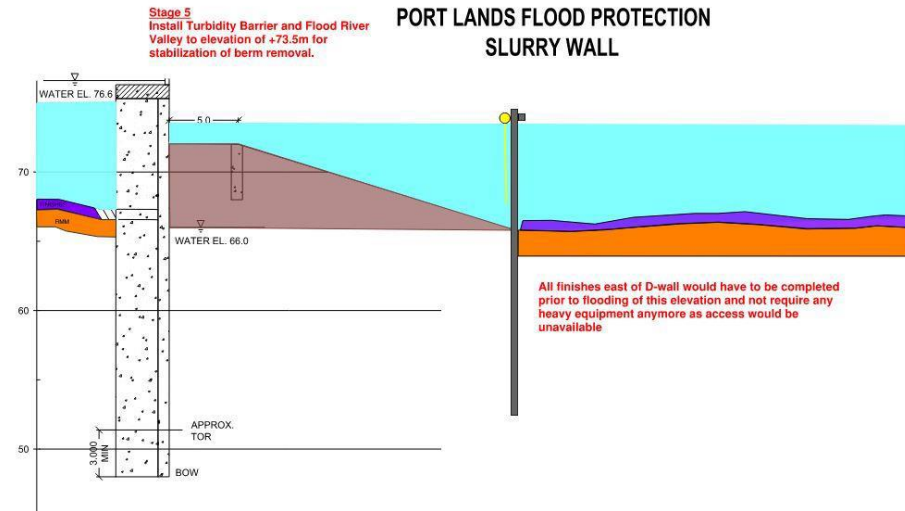
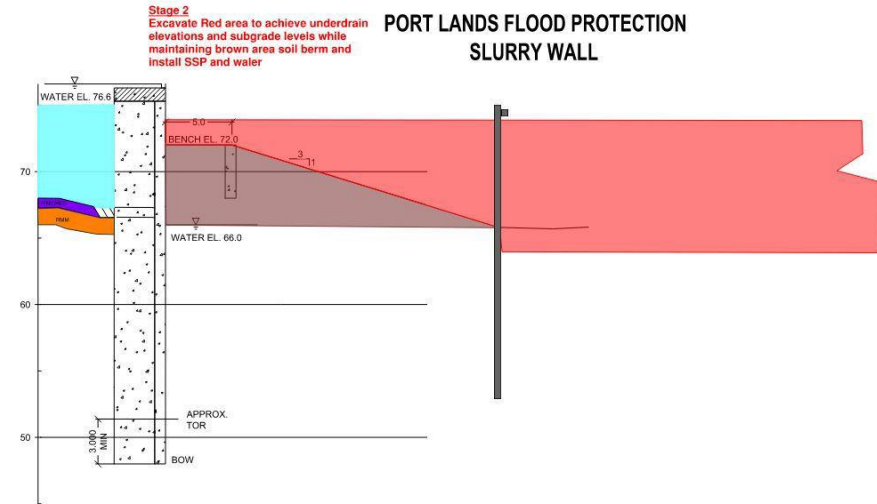




# WHAT'S NEXT? WEST PLUG SEQUENCE & DEMO

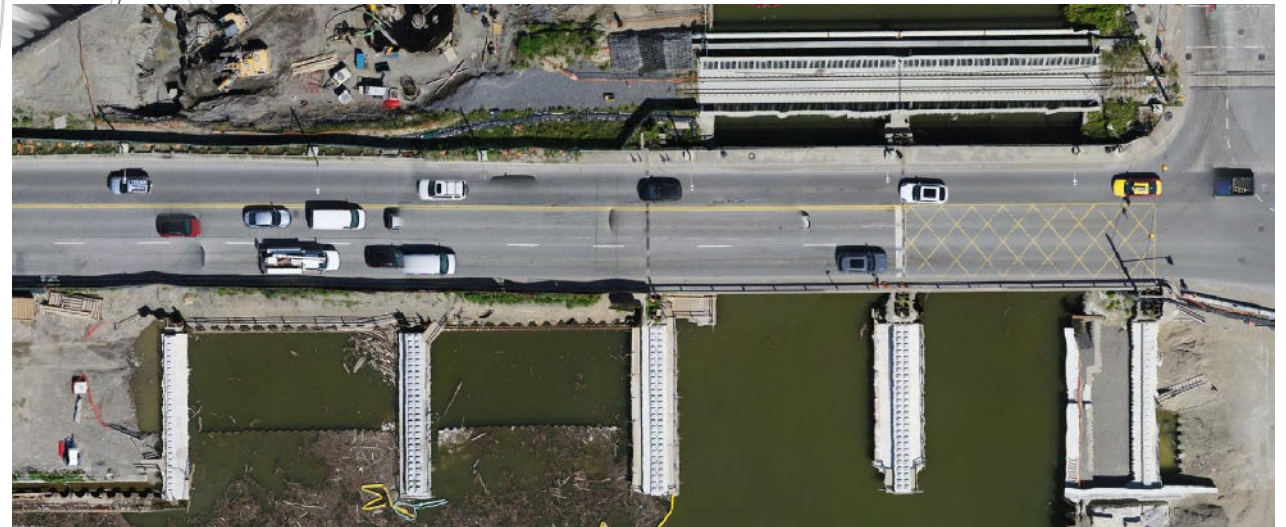
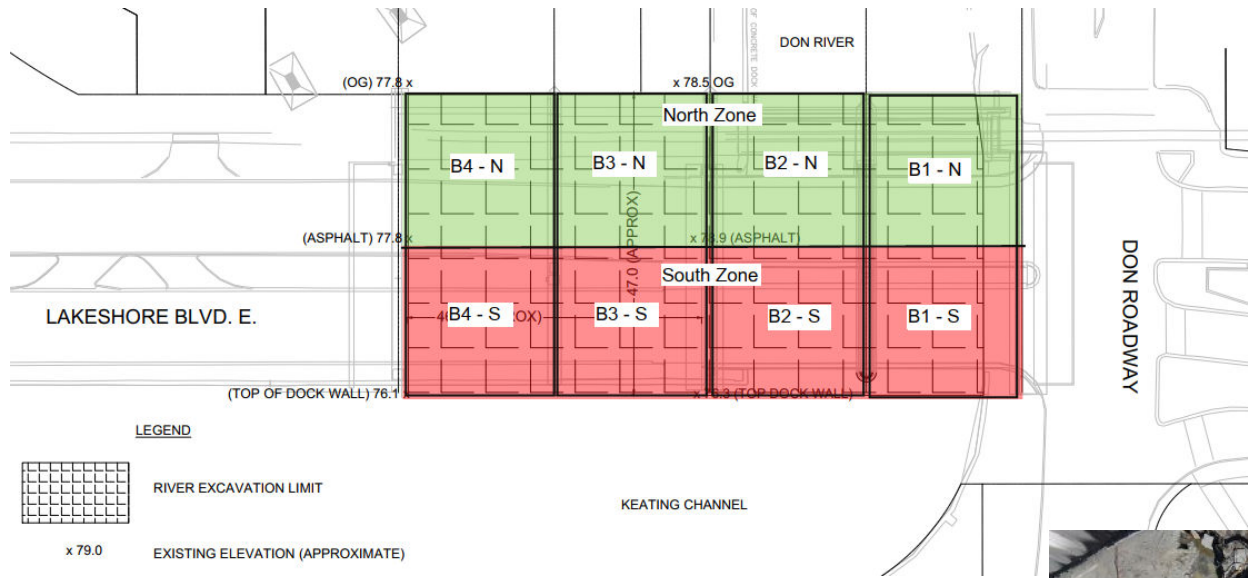


DD-11-5 ABUT BRGS(97) / TAD BRIDGE DNS (44)





# WHAT'S NEXT? LSBE SEQUENCE





# QUESTIONS?



## Acknowledgements



WATERFRONToronto



Geosyntec<sup>®</sup>  
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