

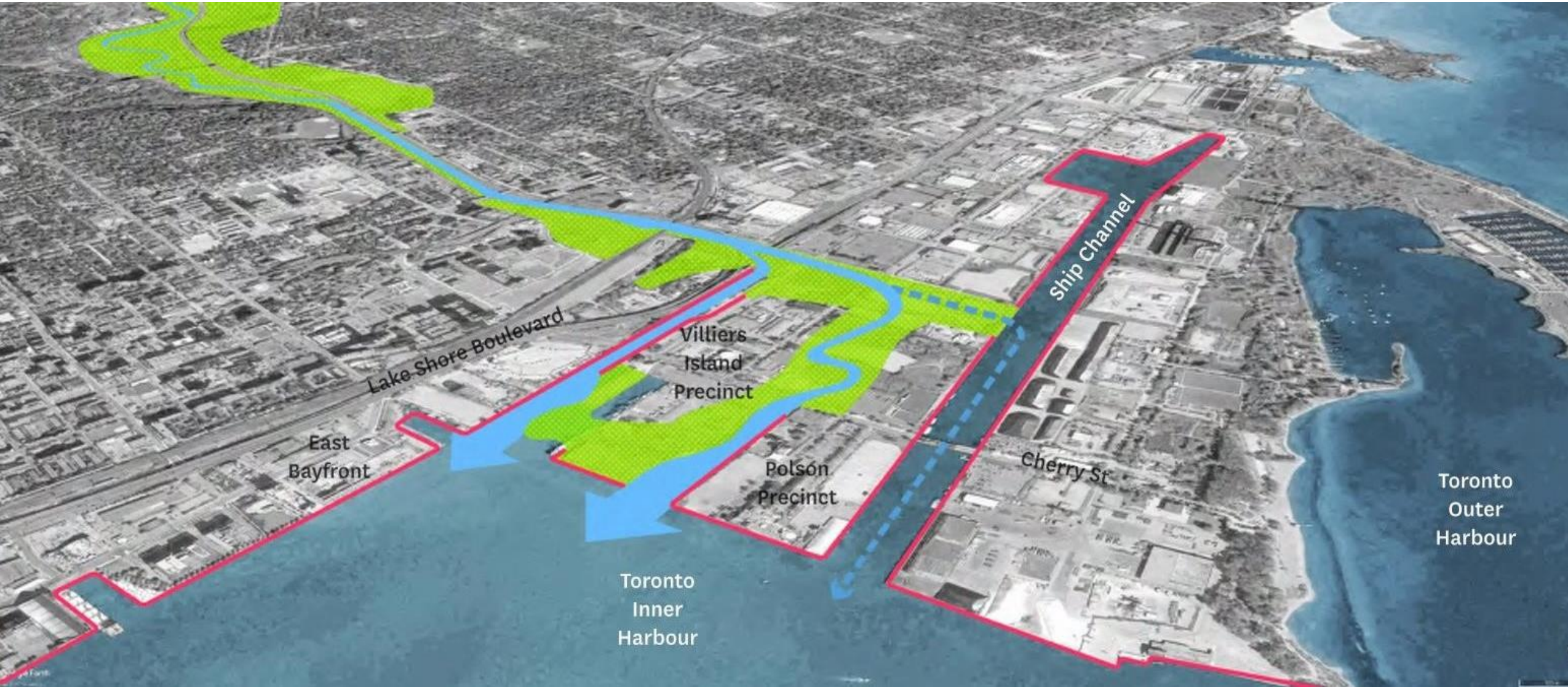


RESPOND. RECLAIM. RENEW.

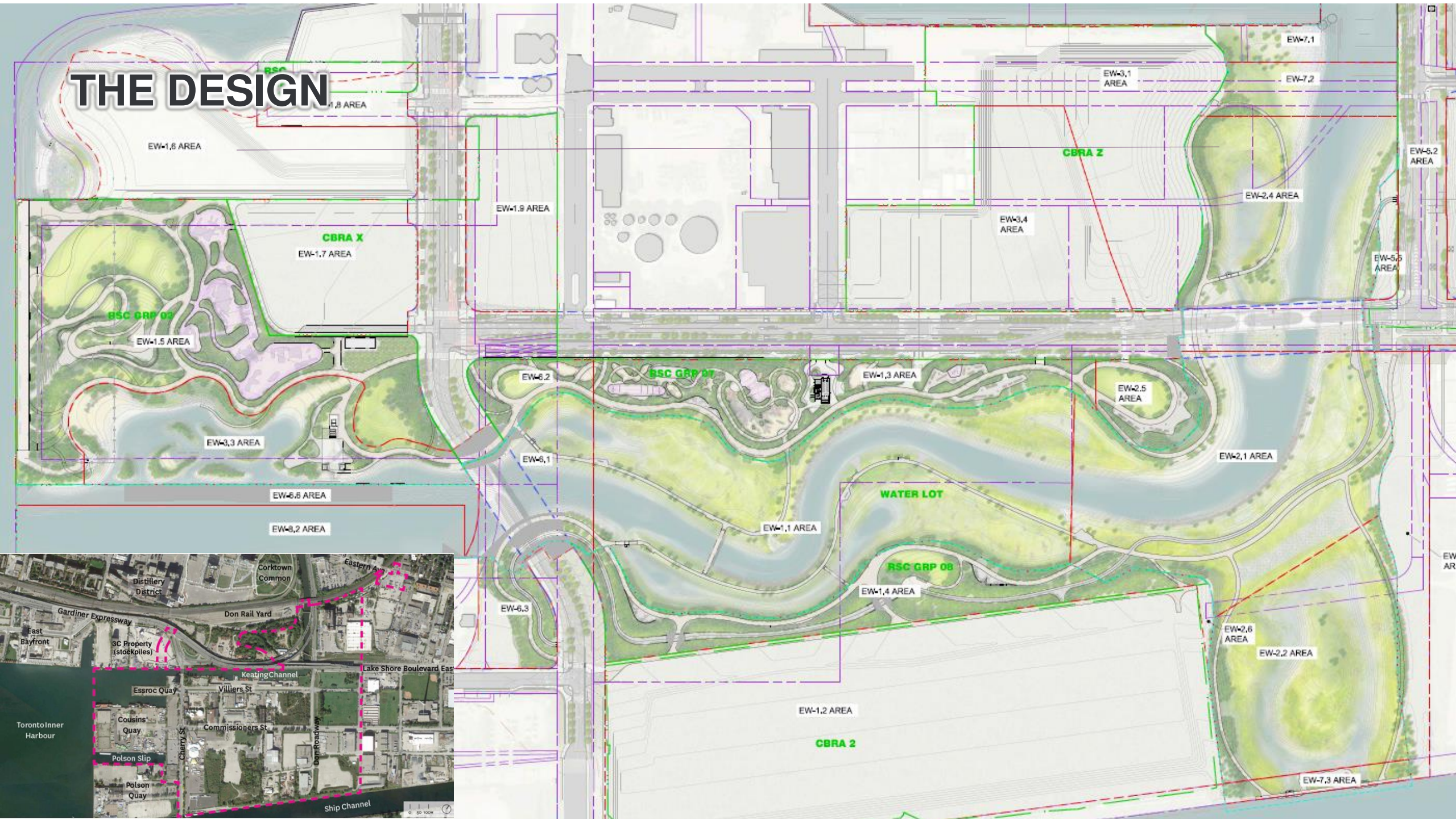
**EXCESS SOIL MANAGEMENT TECHNOLOGY
AT THE
TORONTO PORT LANDS
AND
LESSONS LEARNED**

REMTECH EAST
MAY 31, 2023

PORT LANDS FLOOD PROTECTION ENABLING INFRASTRUCTURE PROJECT OBJECTIVES



THE DESIGN

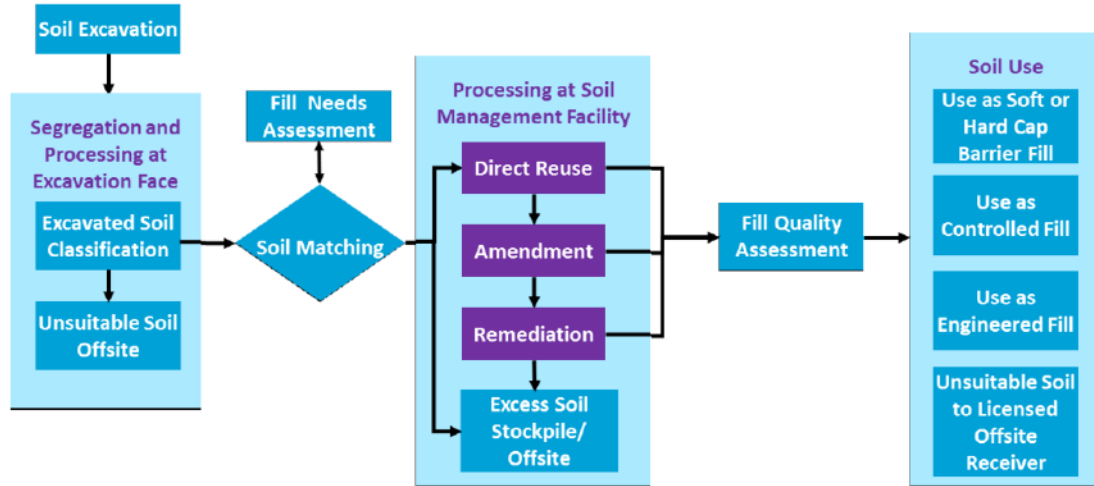


SOIL REUSE OBJECTIVES



- O.Reg. 406/19 promotes the 'beneficial reuse of soil' and diversion from landfill.
- Toronto Port Lands soil reuse target of 85% - 850,000m³.
- So far reused ~ 600,000 m³ on-site and ~200,000 m³ stockpiled for reuse.
- Out of ~1,000,000 m³ excavated, ~150,000m³ have been taken offsite.
- Benefit of 800,000 m³ of soil saved/reused = 80,000 round trips to landfill = 400,000km = 10 trips around the earth!

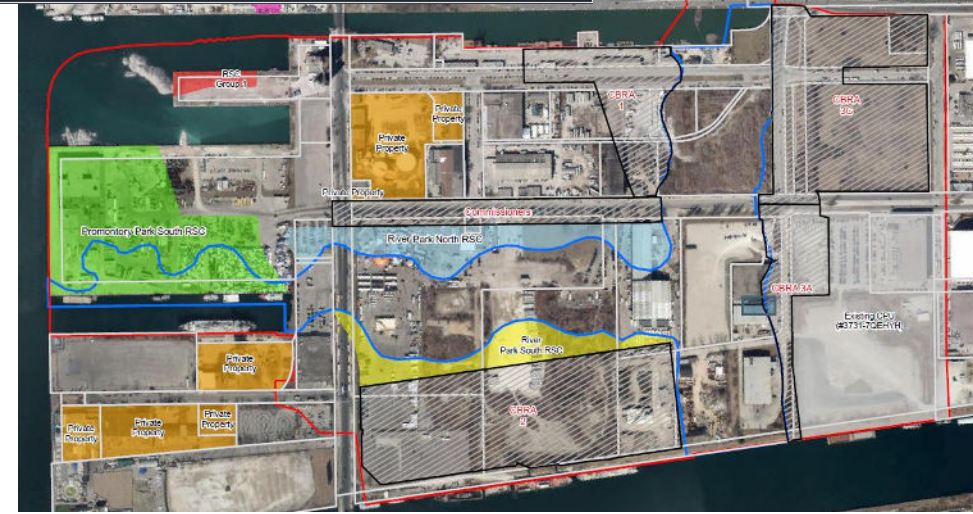
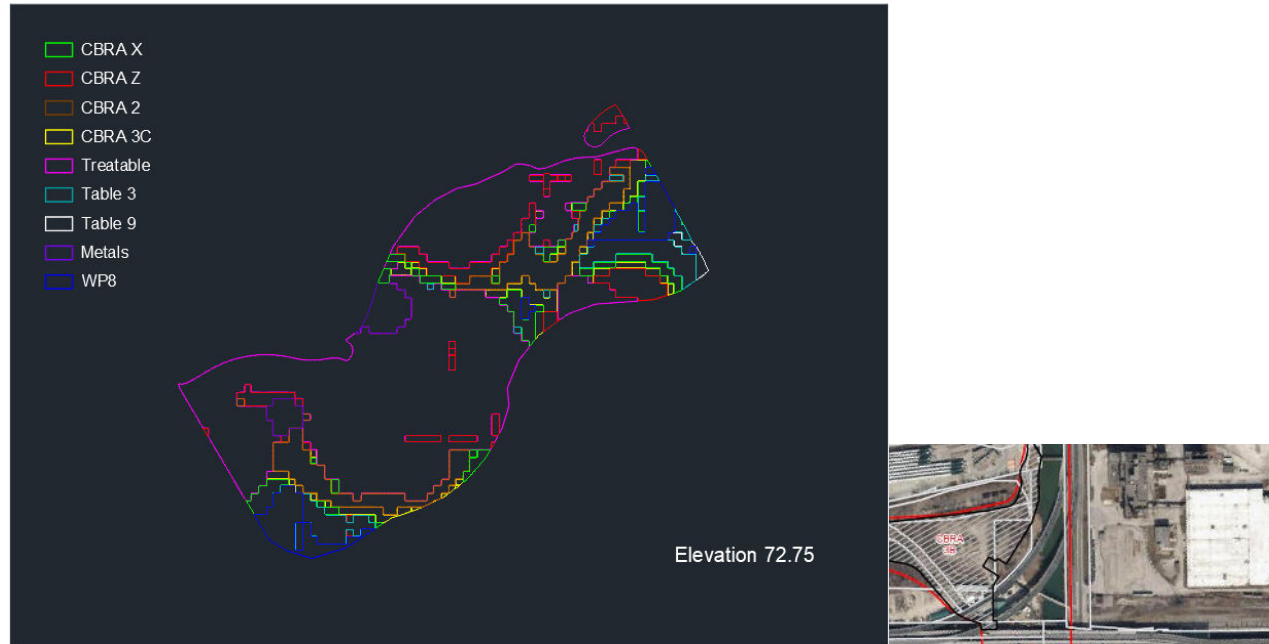
SOIL REUSE CRITERIA & REUSE AREAS



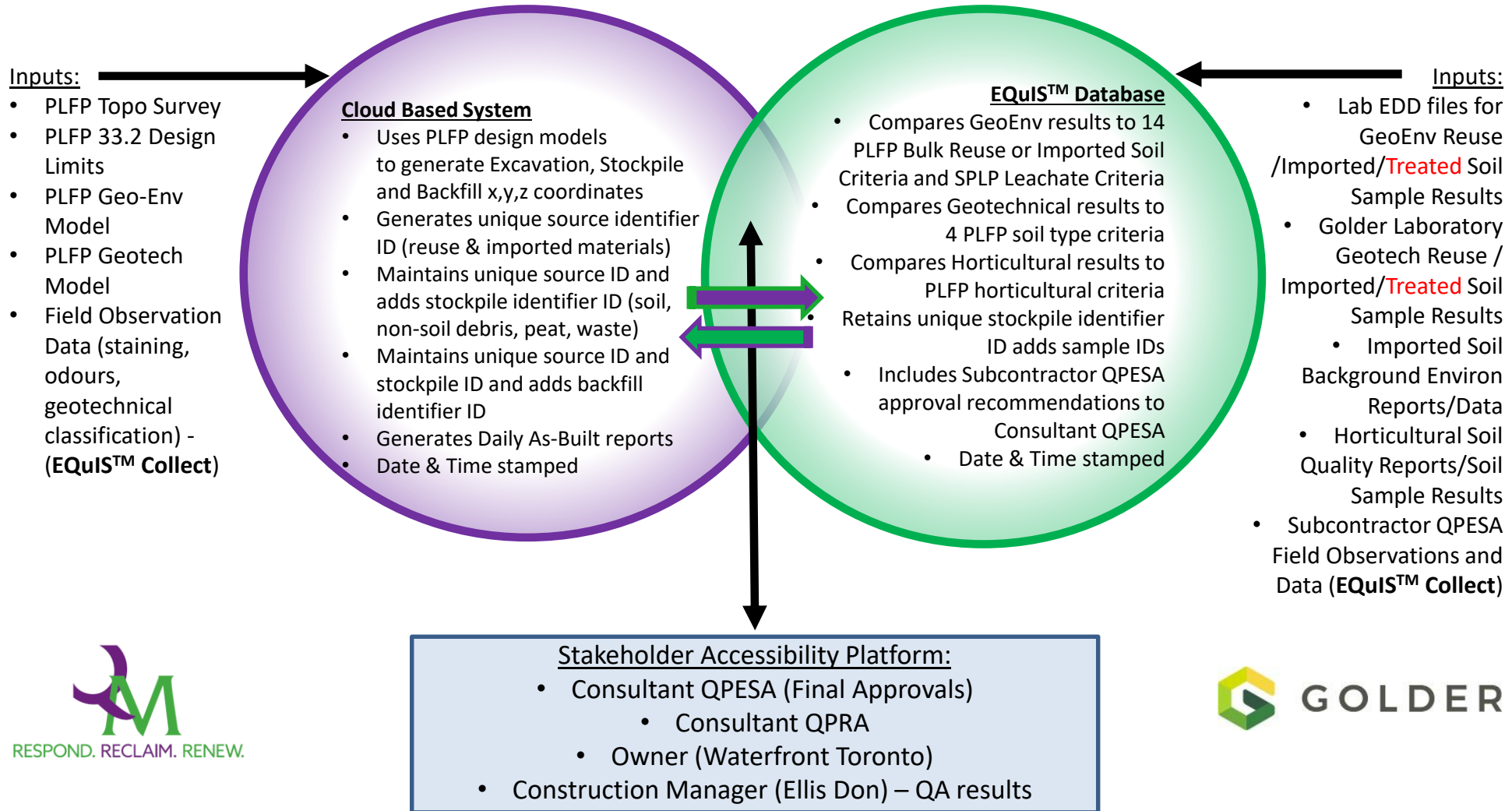
PLFPEI Soil Management Plan, Jacobs (2019)

.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:

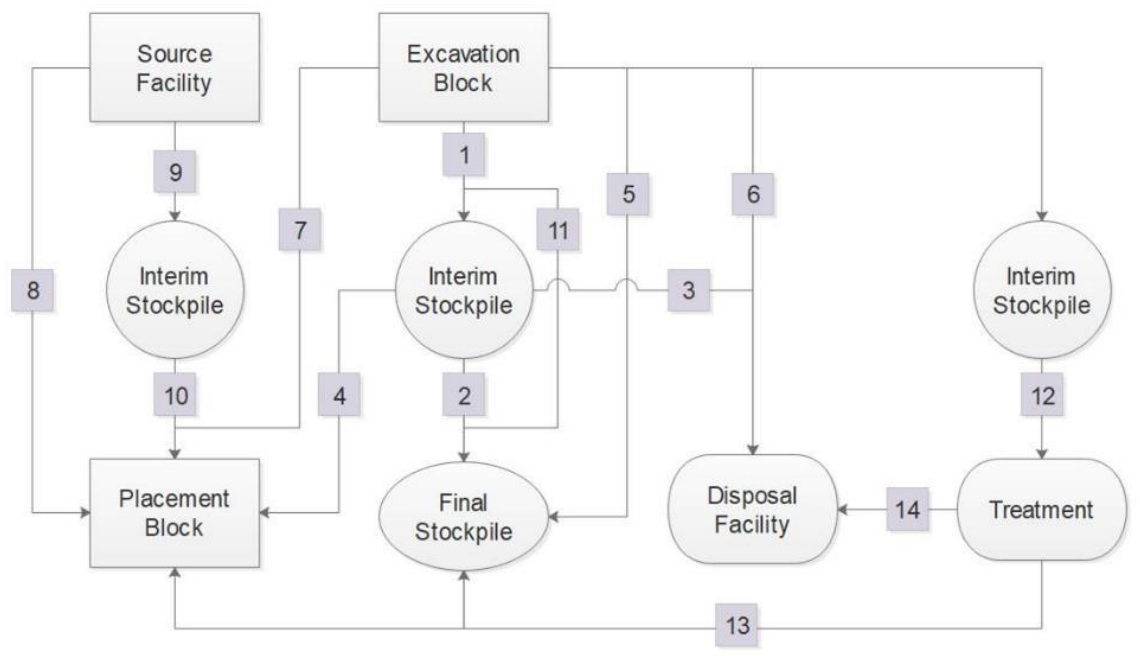
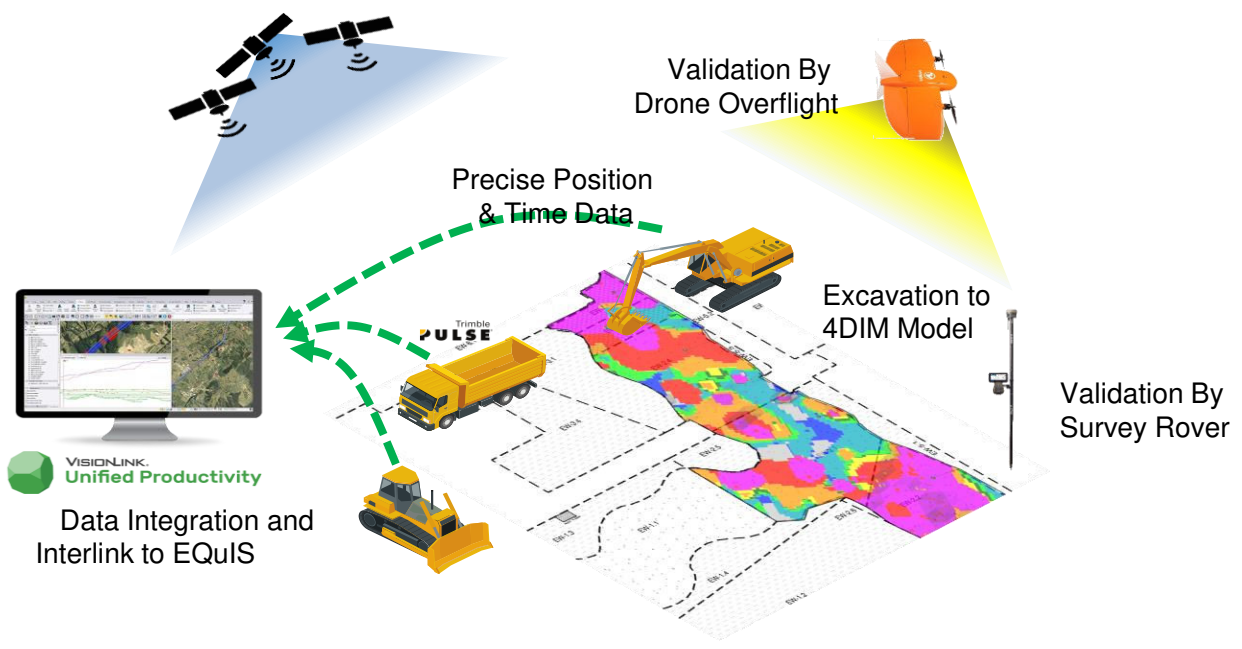
- .1 Unique haul truck identification such as license plate number, registration number or Ministry approval number.
- .2 Load source location (GPS with submeter accuracy coordinates or origin identification), including depth and/or elevation range.
- .3 Load volume.
- .4 Qualitative assessment by Subcontractor 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.



APPROACH – ENVIRO. AND GEOTECH STEWARDSHIP



APPROACH – FACE TO PLACE



WHAT WE BUILT



VISIONLINK 3D Productivity Manager

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

Hide Quality Metrics

Cut/Fill

Cut/Fill Volumes

Recalculate Volumes

This is how much work was completed.

From: <Current Filter> 06/28/21 12:00 AM
To: <Current Filter> 06/30/21 07:36 AM

GOLDER
PLFP Soil Tracking

Home About Contact

Hello Nicholas.Doucette@Golder.com! Log off

Reference Links

Stockpile Sample Key

Stockpiles Summary

STOCKPILE ID	GEOTECH APPROVALS	LEACHATE APPROVALS	GLITCH APPROVALS	TREATMENT APPROVALS	
EW1_1_A001_ST0002_B01	X	X	X	X	Samples
EW1_1_A000_ST0001_B0X	X	X	X	X	Samples
EW1_1_A000_ST0007_B06	X	X	X	X	Samples
EW1_1_A000_ST0030_B06	X	X	X	X	Samples
EW1_1_A000_ST0030_B19	X	X	X	X	Samples
EW1_1_A000_ST0031_B19	X	X	X	X	Samples
EW1_1_A000_ST0038_B17	X	X	X	X	Samples
EW1_1_A000_ST0039_B17	X	X	X	X	Samples
EW1_1_A000_ST0048_B17	X	X	X	X	Samples
EW1_1_A000_ST0043_B06	X	X	X	X	Samples

SYSTEM ACTIVITY REPORTING

Filters Result

Lead Data/Time	Equipment	Volume (Cubic meters)	Block ID	Material	Characteristics	Earthwork Area	Municipal Address	Line Item	Start Date/Time	Route	Block ID	Earthwork Area	Ticket Number	Ticket Box	Ticket Weight (Refer to Ticket)
2021-06-07 08:45:08	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 09:21:24	Excavator to Stockpile	P00463	EW 3.A				
2021-06-07 08:47:44	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 09:42:59	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 09:48:04	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 10:03:57	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 10:06:44	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 10:13:46	Excavator to Stockpile	P00463	EW 3.A				
2021-06-07 10:16:47	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 10:39:49	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 10:39:49	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 10:47:10	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 11:32:26	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 11:38:12	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 11:40:49	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 11:47:19	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 12:05:28	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 12:09:32	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 12:11:08	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 12:18:28	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 12:34:24	RT309 HW300	12.0	37025 3.A	CBRA 2	CBRA 2 (C)	EW 3.A	7635 Commissioners St. B3.1	2021-06-07 12:40:02	Excavator to Stockpile	P00462	EW 3.A				
2021-06-07 13:05:02	RT309 HW300	12.0	370234	Table 9	Reinforcement (C)	EW 2.4	150 Commissioners St. A13	2021-06-07 13:07:18	Excavator to Stockpile	T30049	EW 12				
2021-06-07 13:12:18	RT309 HW300	12.0	370234	Table 9	Reinforcement (C)	EW 2.4	150 Commissioners St. A13	2021-06-07 13:18:51	Excavator to Stockpile	T30049	EW 12				
2021-06-07 13:39:14	RT309 HW300	12.0	370234	Table 9	Reinforcement (C)	EW 2.4	150 Commissioners St. A13	2021-06-07 13:39:57	Excavator to Stockpile	T30049	EW 12				
2021-06-07 13:53:34	RT309 HW300	12.0	370234	Table 9	Reinforcement (C)	EW 2.4	150 Commissioners St. A13	2021-06-07 13:58:12	Excavator to Stockpile	T30049	EW 12				

SITE: THE PORTLANDS - TO... SURVEY: 25 JUN 2021-QM

FILES REPORTS SHARE SETTINGS

MEASURE Point Line Polygon

Search for measurements

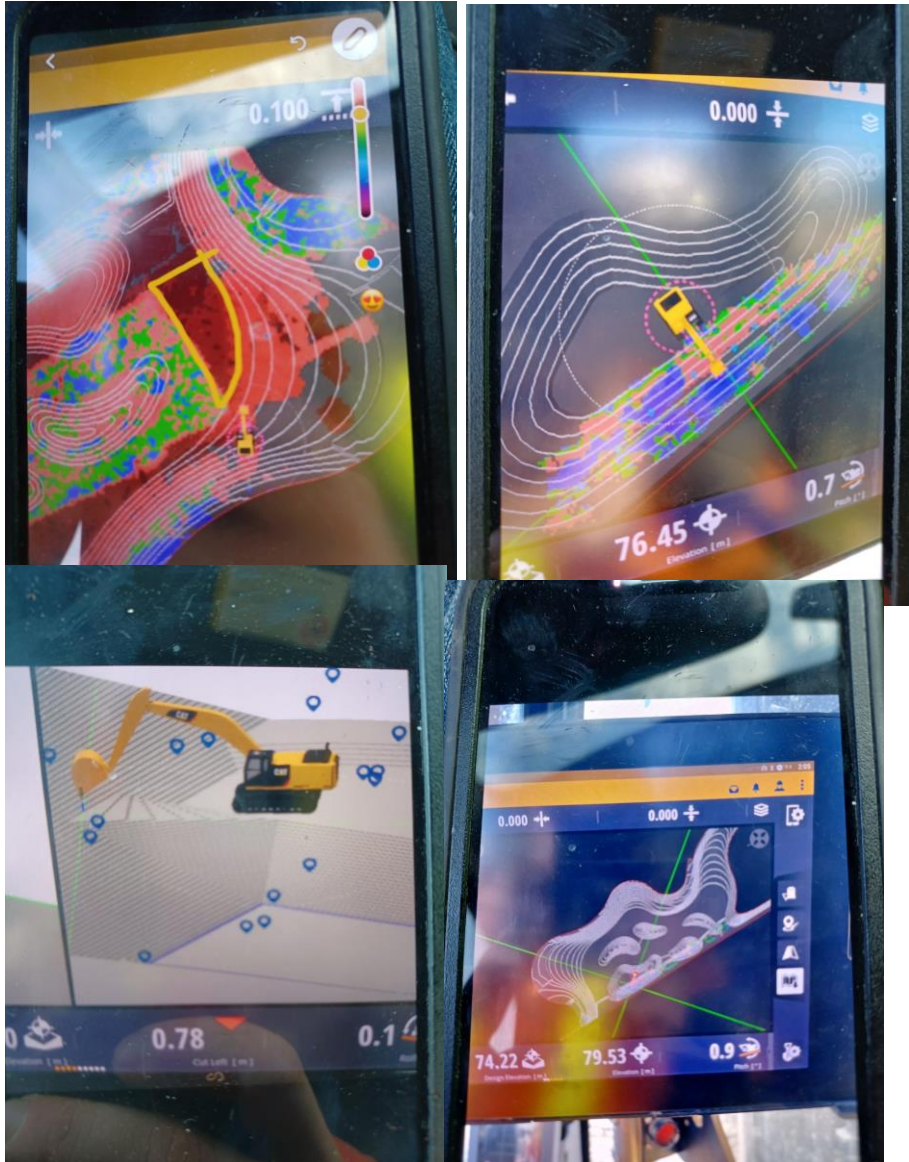
FOLDERS Add Folder

- EW1.1 CALCS
- EW2.1 CALCS (empty)
- EW2.2 CALCS (empty)
- EW2.4 CALCS (empty)
- RPN CALCS (empty)
- RPS CALCS (empty)
- STOCKPILES (empty)
- Alicia - Stockpile Labels
- Alicia - Measurements
- DRONE - GCPs
- Dan Kalle
- Dave L- Measurements (empty)

EXPORT PDF MAP

Photo viewer Timeline POWERED BY: propler 100m Local Grid (QM-The Portlands_Toronto_Calibration).jd N 4 834 307 144 m E 316 834 424 m Z 67 145 m

GRADE CONTROL - OPERATOR



RPS TRACKER



Dispatcher

Updated 12:05:45

Select Projects/Routes

Filter...

Include hidden routes

- Excavator to Stockpile
 - RT003 CAT730 (Philip Pereira) Phil...
 - RT1818 CAT730 (Ran Segroneur) Ran...
 - RT1819 CAT730 (Abenika Panyan) A...
 - RT1820 CAT730 (Justin James) Justin J...
 - RT184 - CAT730 (Juan Cedeno) Juan...
 - RT186 CAT730 (Julio Bosa) Julio Rosa...
 - RT189 CAT730 (Andre Manning) An...
 - RT1900 CAT730 (Kevin Barrow) Kevl...
- Stockpile to Disposal
 - AM-12 (Unassigned) Unassigned
 - AM-16 (Unassigned) Unassigned
 - AM-30 (Unassigned) Unassigned
 - AM-38 (Unassigned) Unassigned
 - Somal 102 (Unassigned) Unassigned
 - Somal 409 (Unassigned) Unassigned
 - Somal 410 (Unassigned) Unassigned
 - Somal 415 (Unassigned) Unassigned
 - Somal 819 (Unassigned) Unassigned
 - Somal 820 (Unassigned) Unassigned
 - Somal 823 (Unassigned) Unassigned
 - Somal 824 (Unassigned) Unassigned
- Stockpile to Placement
 - AM-52 (Unassigned) Unassigned
 - AM-54 (Unassigned) Unassigned
 - AM-58 (Unassigned) Unassigned
 - AM-70 (Unassigned) Unassigned

Materials

Material	Tested from Stockpile	Destination Location
Aggregate	<input type="checkbox"/>	
Armour Stone	<input type="checkbox"/>	
Asphalt	<input type="checkbox"/>	
Bioretment (C)	<input checked="" type="checkbox"/>	
Block 1B (Geofoam)	<input type="checkbox"/>	
Bridge Spoils	<input type="checkbox"/>	
CBRA 2	<input type="checkbox"/>	
CBRA 2 (C)	<input checked="" type="checkbox"/>	
CBRA 2 FC (C)	<input checked="" type="checkbox"/>	
CBRA 3C	<input type="checkbox"/>	
CBRA 3C (C)	<input checked="" type="checkbox"/>	
CBRA 3C FC (C)	<input checked="" type="checkbox"/>	
CBRA X	<input type="checkbox"/>	
CBRA X (C)	<input checked="" type="checkbox"/>	
CBRA X FC (C)	<input checked="" type="checkbox"/>	

Edit Haul Category: Rock Truck

Logout

Save Delete

Show audit panel

Haul Categories +

- +No Haul Profile*
- Excavator
- Rock Truck**
- SSM Trailer
- Tri-axle

Haul Category Information

Title:

Track Engine Hours:

Haul Profile	Cubic meters m³	Icon for Maps Click to change
CAT730	12	
CAT725	12	
HM300	12	
Volvo40	16	
SDMA	10	

RPS TRACKER



QM Environmental Logout

Morgan Chambers

Travel Journal

Travel Journal

Time range: 2023-05-29 00:00 to 2023-05-30 00:00

Journal Summary: May 29, 2023 6:35 am, Somal 824 - Unassigned, Route: Stockpile to Disposal, Started: May 29, 2023 6:35 am, Ended: May 29, 2023 2:41 pm, Engine Accumulated: 3.0h, Driven: 85 km, Counts: Dump: 12, Fuel: 0, Load: 12, Bulk: 0

RT189 CAT730 Andre Manning

Stockpile to Disposal: Somal 815 Unassigned

Stockpile to Disposal: Somal 824 Unassigned

Excavator to Stockpile: RT1900 CAT730 Kevin Barrow

Stockpile to Disposal: AM-30 Unassigned

Excavator to Stockpile

QM Environmental Logout

Morgan Chambers

Travel Journal

Travel Journal

Time range: 2023-05-29 00:00 to 2023-05-30 00:00

Journal Summary: May 29, 2023 6:35 am, Somal 824 - Unassigned, Route: Stockpile to Disposal, Started: May 29, 2023 6:35 am, Ended: May 29, 2023 2:46 pm, Engine Accumulated: 3.0h, Driven: 85 km, Counts: Dump: 12, Fuel: 0, Load: 12, Bulk: 0

AM-38 Unassigned

Excavator to Stockpile: RT186 CAT730 Julio Rosa

Stockpile to Disposal: AM-16 Unassigned

Stockpile to Disposal: Somal 819 Unassigned

Stockpile to Placement: AM-70 Unassigned

Stockpile to Disposal: Somal 824 Unassigned

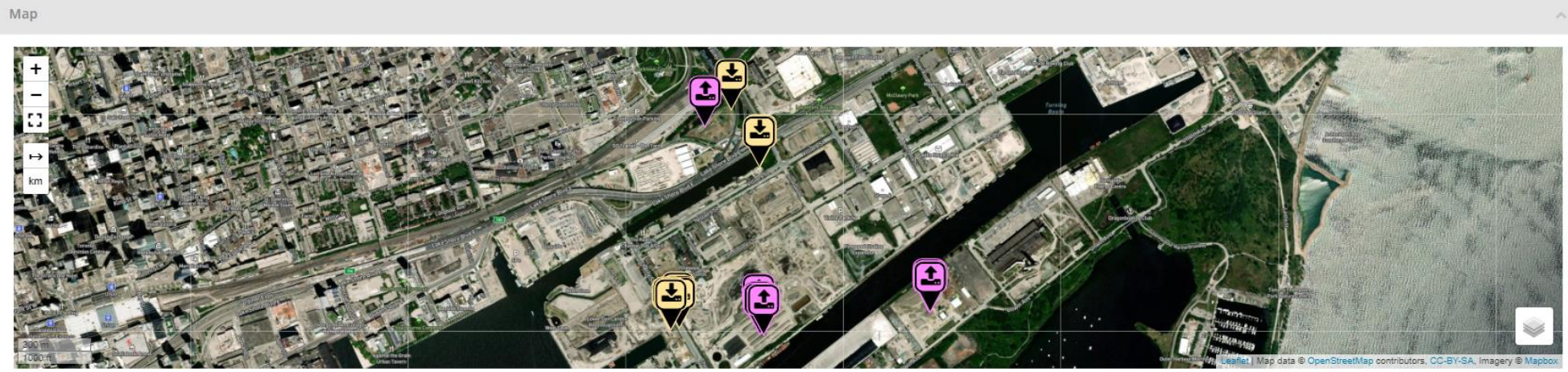
RPS TRACKER



- QM Environmental
- Morgan Chambers ▾
- Dispatcher
- Travel Journal
- Events
- Statistics Report
- Cycle Time Report
- Equipment Snapshot
- Deep Location Analysis
- Dashboards <
- Cycle Planner
- Operations Settings <
- Project Settings <
- QM Project ▾
 - Manage Blocks
 - Excavator Settings
 - Activity Reporting**
 - Disposal Import
 - Total Excavation Report
- Administration <

System Activity Reporting Logout

Filters Result



Shows 15 rows Columns Bulk Edit CSV Excel

Load Date/Time	Equipment	Volume (Cubic meters)	Block ID	Material	Characterization	Earthwork Area	Municipal Address	Line Item	Dump Date/Time	Route	Block ID	Earthwork Area	Ticket Number	Ticket BoL	Ticket Weight (Metric Tonnes)
2023-04-04 08:11:46	RT184 - CAT730	12.0	E90019	Impacted Soil		EW 6.1	225 Cherry St	C5	2023-04-04 08:19:40	Excavator to Stockpile	ST0447	EW 1.2			
2023-04-04 08:13:41	Somal 824	11.0	ST0454	Dredging	Waste (C)	EW 8.1	Keating Channel	K2	2023-04-04 08:26:06	Stockpile to Disposal	GFL Unwin		252113	051457	20.05
2023-04-04 08:14:06	RT1835 CAT730	12.0	E90017	Property Soil		EW 6.1	225 Cherry St	C5	2023-04-04 08:19:41	Excavator to Stockpile	ST0445	EW 1.2			
2023-04-04 08:14:50	RT1819 CAT730	10.0	E70002	Dredging		EW 4.2	SDMA	A37	2023-04-04 08:28:24	Excavator to Stockpile	ST0435	EW 4.1			
2023-04-04 08:20:39	Somal 821	11.0	ST0454	Dredging	Waste (C)	EW 8.1	Keating Channel	K2	2023-04-04 08:35:52	Stockpile to Disposal	GFL Unwin		252116	043120	20.73
2023-04-04 08:23:00	RT1900 CAT730	12.0	E90017	Property Soil		EW 6.1	225 Cherry St	C5	2023-04-04 08:28:06	Excavator to Stockpile	ST0445	EW 1.2			
2023-04-04 08:24:12	RT184 - CAT730	12.0	E90019	Impacted Soil		EW 6.1	225 Cherry St	C5	2023-04-04 08:38:21	Excavator to Stockpile	ST0447	EW 1.2			
2023-04-04 08:26:01	RT1835 CAT730	12.0	E90017	Property Soil		EW 6.1	225 Cherry St	C5	2023-04-04 08:31:22	Excavator to Stockpile	ST0445	EW 1.2			

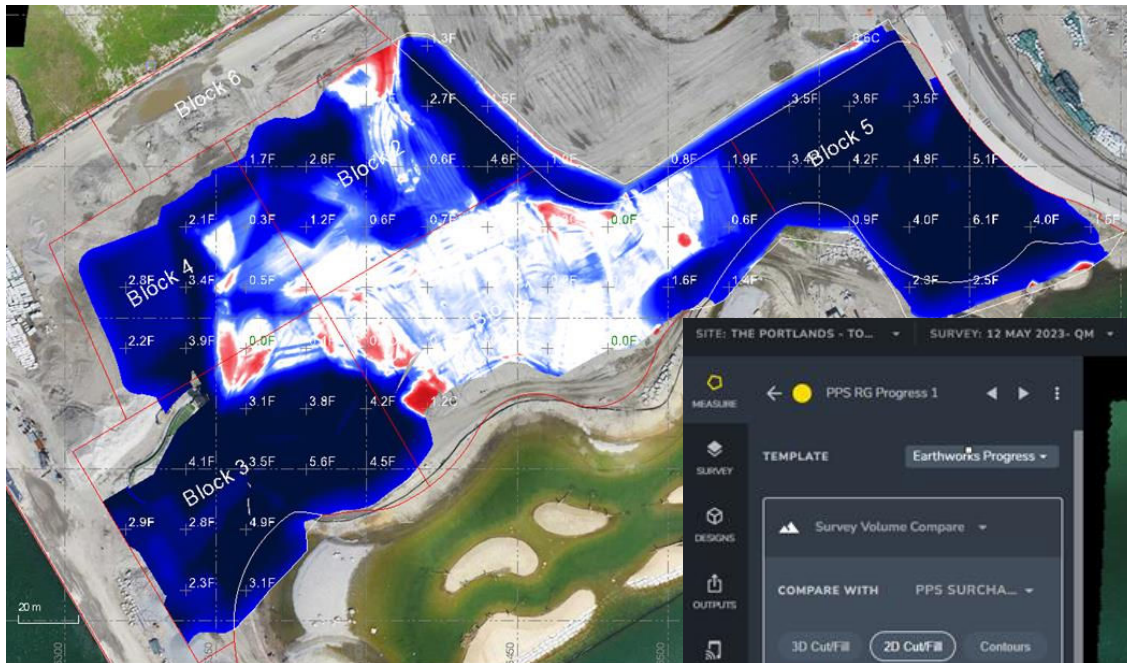
SOIL MANAGEMENT BY DRONE - OVERVIEW



SOIL MANAGEMENT BY DRONE - VOLUMES



SOIL MANAGEMENT BY DRONE - PROGRESS SURVEYS



SITE: THE PORTLANDS - TO... SURVEY: 12 MAY 2023 - QM

MEASURE
SURVEY
DESIGNS
OUTPUTS
CREW

← ● PPS RG Progress 1

TEMPLATE Earthworks Progress

▲ Survey Volume Compare

COMPARE WITH PPS SURCHA...

3D Cut/Fill	2D Cut/Fill	Contours
CUT	337 m ³	
NET	15 601 m ³	
FILL	15 938 m ³	
TOTAL	16 275 m ³	

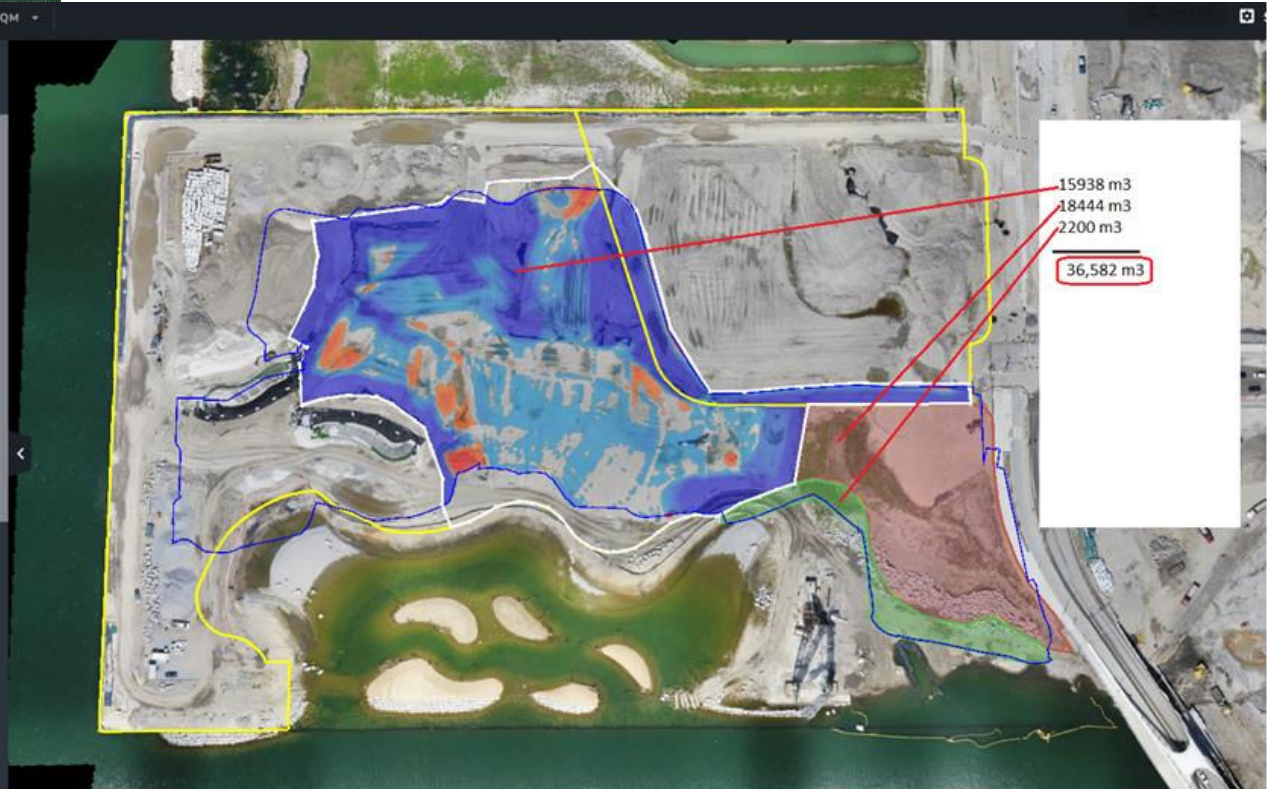
+ Add Calculator

Heatmap ×

Smooth Colors RESET

MIN MAX

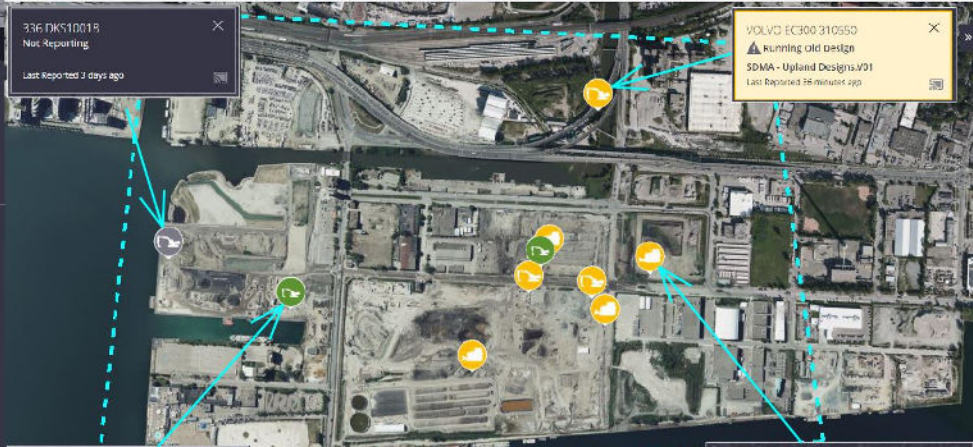
Use deadband in calculations



SOIL MANAGEMENT BY GRADE CONTROL

Trimble WorksManager Portlands

Project > Portlands > Dashboard



PORTLANDS

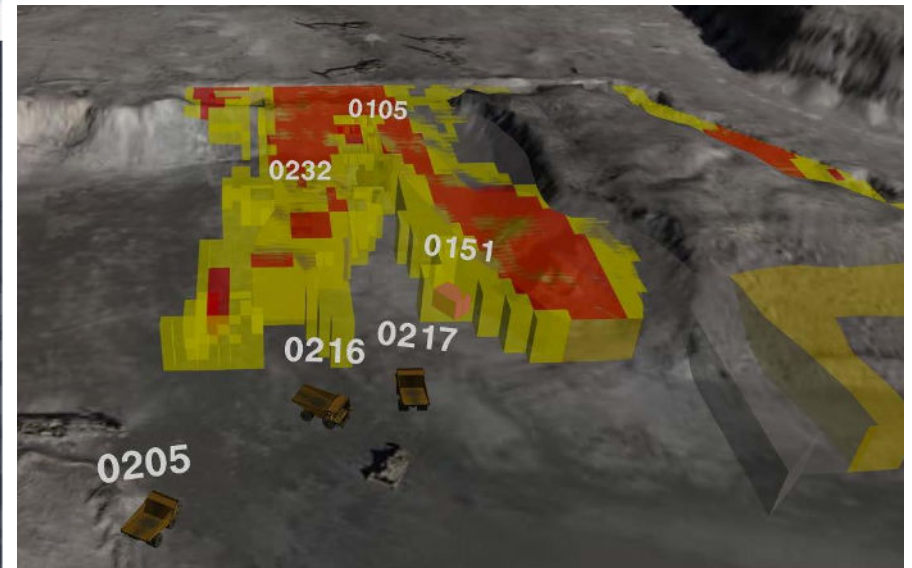
- Map
- Designs
- Members
- Devices
- Settings
- My Projects
- My Accounts

DEVICES STATUS - MAY 30, 2022

- 1 Not Reporting
- 2 Devices Reporting
- 7 Warnings

DESIGNS IN USE

- Show All
- EWS.1 Additional Fill.V05
- SDMA - Upland Designs.V04
- FWS.1 FLP Works.V07
- FW1.2 RG_SI-04-008-2022-01-10.V04
- Subgrade-Drainage-Protective Cover - All Areas.V04
- Canoe Cove - 34.1.V08



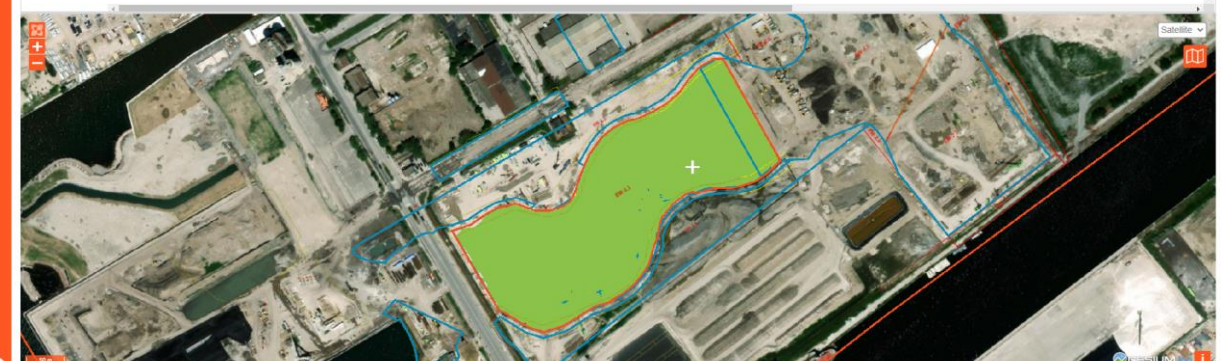
Project > Portlands > Designs

Active Designs

Name	Version	Last Modified	Modified By
Commissioners Cut North of RPN 1B_temp	.V04	May 30, 2022 8:10 am	Oneil Crumble
EWS.1 Additional Fill	.V05	May 30, 2022 8:10 am	Oneil Crumble
Fill Around ISPS-Temp2	.V04	May 30, 2022 8:10 am	Oneil Crumble
Enbridge North - Surcharge Removal_North Section	.V04	May 30, 2022 8:10 am	Oneil Crumble
Enbridge North Road Slope Removal	.V04	May 30, 2022 8:10 am	Oneil Crumble
RPN - 1B Surcharge Removal	.V05	May 30, 2022 8:10 am	Oneil Crumble
EnB_Surcharge Removal and Ccap Placement	.V04	May 30, 2022 8:10 am	Oneil Crumble
RPS Block 1A1 Stockpile 52 Removal_updated	.V04	May 30, 2022 8:10 am	Oneil Crumble
Comm Street-FLP Cut - April 22	.V04	May 30, 2022 8:10 am	Oneil Crumble
Canoe Cove-Shoreline and Islands-Stone Fill	.V04	May 30, 2022 8:10 am	Oneil Crumble
Canoe Cove -West Beach Surfaces	.V04	May 30, 2022 8:10 am	Oneil Crumble
Canoe Cove - Rip Rap (Armour Profile A and B)	.V04	May 30, 2022 8:10 am	Oneil Crumble

Custom (04/24/20 - 10/30/20)

Machine Name	Date/Time	Design	Pass	Target Pass Count	LIR	Elevation (m)	Target Thickness (m)	GPS Mode	GPS Accuracy	GPS Tolerance (m)	Machine Gear	Speed (kmph)	CMV	Target C
DGN SGG00906	07/17/20 06:52 AM	Target Excavation - July 1 2020	1	0	-	71.875	-	67	Medium	0.050	Forward	6.5	-	-



STAKEHOLDER DATABASE



Reference Links

Stockpile Sample Key

Stockpiles Summary

STOCKPILE ID	GEOENV APPROVALS	LEACHATE APPROVALS	GEOTECH APPROVALS	TREATMENT APPROVALS	
EW1.1_A001_ST0002_B01	X	X	X	X	Samples
EW1.1_AXXX_ST0001_B01	X	X	X	X	Samples
EW1.1_AXXX_ST0007_B06	X	X	X	X	Samples
EW1.1_AXXX_ST0030_B06	X	X	X	X	Samples
EW1.1_AXXX_ST0030_B18	X	X	X	X	Samples
EW1.1_AXXX_ST0031_B18	X	X	X	X	Samples
EW1.1_AXXX_ST0038_B17	X	X	X	X	Samples
EW1.1_AXXX_ST0039_B17	X	X	X	X	Samples
EW1.1_AXXX_ST0040_B17	X	X	X	X	Samples
EW1.1_AXXX_ST0043_B06	X	X	X	X	Samples
EW1.1_AXXX_ST0044_B17	X	X	X	X	Samples

Map



STAKEHOLDER DATABASE



Samples Assessment Attachments

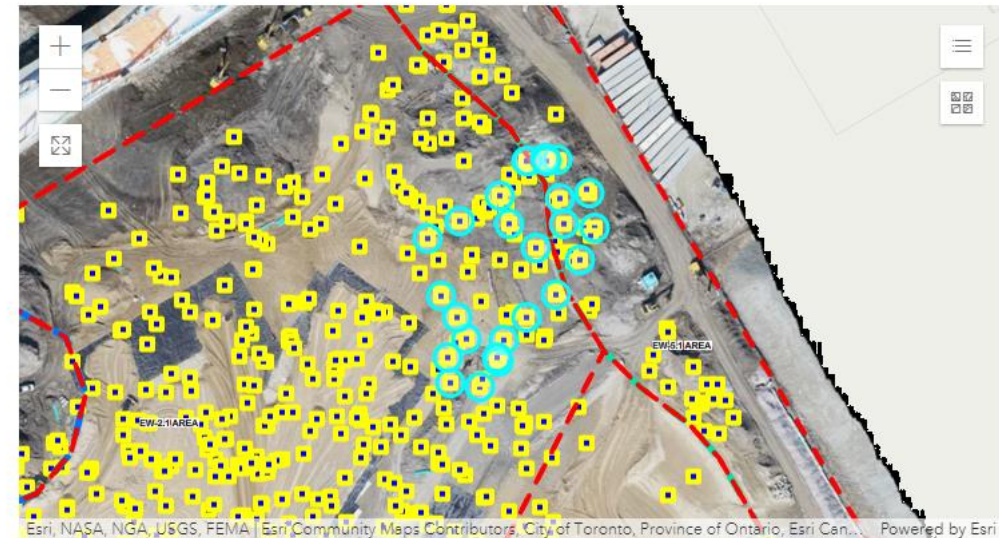
[Stockpile Summary Export](#)

Sample Name

Role	Decision	Reassignment	Datetime	Comment
QPG	R1-Reassign	FD3.1 (CBRA1_Z), FD3.4 (CBRA1_Z)	11/9/2021 9:34:01 AM	Bulk: Meets CBRA1_Z CFTCs based on the attached statistical analysis (NOTE: Lead, zinc, several PAHs and PHC F3/F4 fail for several samples using single-point compliance. SPLP: Meets SPLP 3.1/9.1 Geotech: Meets Interim Fill criteria for all interim fill types noting that organic content is met on average for Type 1 but one sample exceeds 6%. Meets all other interim fill types.
QM	Approve	N/A	11/9/2021 9:50:31 AM	Source: EW2.1; Model: Multiple Model; Volume: 22320m3; Disposition as CBRA Z select, contouring and/or uncontrolled fill. Approved for disposition as CBRA-Z CFTC (EW3.1 and EW3.4) and geotechnically based on the WP4 Fill and Backfill – Interim Area, Revision # SI-04, dated June 22, 2021 for placement in EW3.1 as Select Fill and in

EW2.1_AXXX_ST0270_B51_SA149

Map



EW2.1_AXXX_ST0270_B51_SA149

Controlled Fill (>1.5m)

Cap Standards (<1.5m)

Excess Soil Quality Standards

CBRA Fill Areas					Parks			River/Waterlot		Roads		Generic				
CBRA2 CFTC	CBRA3B CFTC	CBRA3C CFTC	CBRAX CFTC	CBRA1_Z CFTC	RSC_PPS CFTC	RSC_RPS CFTC	RSC_RPN CFTC	WP8 CF	Class 1 WL	Class 2 WL	Comm St CFTC	CBRAX Roads CFTC	Table 1 RPIICC	Table 3 RPI	Table 3 ICC	Table 9 RPIICC
3	4	8	7	✓	10	11	11	4	7	5	1	6	23	9	6	21

Leachate Controlled Fill

Leachate Excess Soil

Leachate		Treatment		
SPLP 3.1	SPLP 9.1	BioPile	StarX WP8 CF	StarX T3 RPI
1	1	11	4	4

Controlled Fill Geotechnical

WP8 Geotechnical

Geotech Report	Type CF-1	Type CF-2	Type CF-3	Type CF-4	Organic Content	Soil Texture	Geotech Observation	Visual Observations	Olfactory Observations
View	X	X	X	X	3.7	SM	Debris, Foreign Objects, Large Rock Fragments, Organics	NO	NO

STAKEHOLDER DATABASE



wsp GOLDER

Hello Alicia.Kruska@QMenv.com! Log off

Samples Assessment Attachments

Sample Name

Role Decision Reassignment Date

QPG R1-Reassign FD3.1 (CBRA1_Z), FD3.4 (CBRA1_Z) 11/9/2021

QM Approve N/A 11/9/2021 9:50:31 AM

EW2.1_AXXX_ST0270_B51_SA149

Exceedance Summary Table

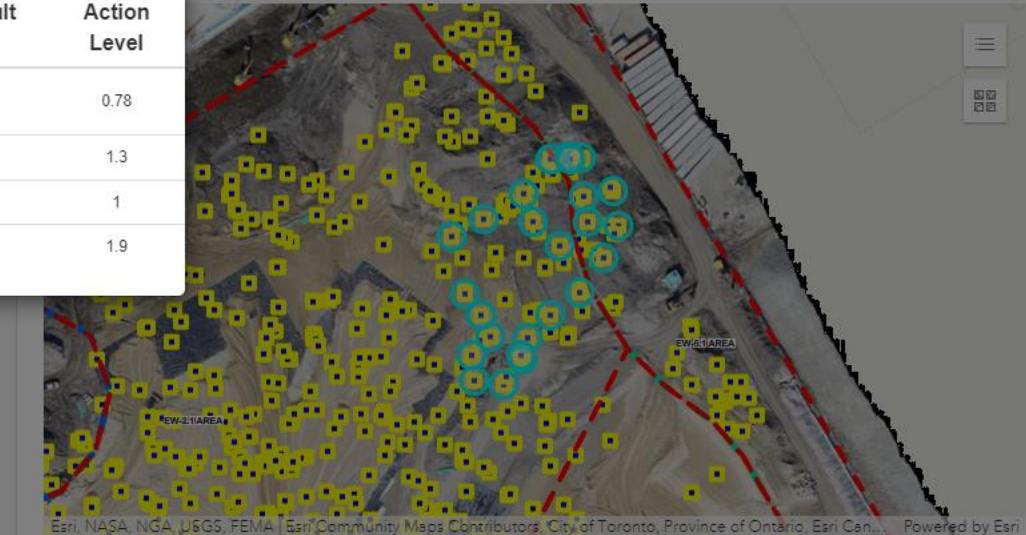
Category: CBRA3B

Sample Name	Chemical Name	Report Result Value	Action Level
EW2.1_AXXX_ST0270_B51_SA149	Benzo [b,j] fluoranthene	2.0	0.78
EW2.1_AXXX_ST0270_B51_SA149	Benzo[a]anthracene	1.4	1.3
EW2.1_AXXX_ST0270_B51_SA149	Benzo[a]pyrene	1.6	1
EW2.1_AXXX_ST0270_B51_SA149	Fluoranthene	2.5	1.9

sample exceeds 6%. Meets all other interim fill types.

Source: EW2.1; Model: Multiple Model; Volume: 22320m3; Disposition as CBRA Z select, contouring and/or uncontrolled fill.

Approved for disposition as CBRA-Z CFTC (EW3.1 and EW3.4) and geotechnically based on the WP4 Fill and Backfill – Interim Area, Revision # SI-04, dated June 22, 2021 for placement in EW3.1 as Select Fill and in



EW2.1_AXXX_ST0270_B51_SA149

Controlled Fill (>1.5m)

Cap Standards (<1.5m)

Excess Soil Quality Standards

Leachate Controlled Fill

CBRA Fill Areas					Parks			River/Waterlot		Roads		Generic				
CBRA2 CFTC	CBRA3B CFTC	CBRA3C CFTC	CBRAX CFTC	CBRA1_Z CFTC	RSC_PPS CFTC	RSC_RPS CFTC	RSC_RPN CFTC	WP8 CF	Class 1 WL	Class 2 WL	Comm St CFTC	CBRAX Roads CFTC	Table 1 RPIICC	Table 3 RPI	Table 3 ICC	Table 9 RPIICC
3	4	8	7	✓	10	11	11	4	7	5	1	6	23	9	6	21

Leachate		Treatment		
SPLP 3.1	SPLP 9.1	BioPile	StarX WP8 CF	StarX T3 RPI

Controlled Fill Geotechnical

Geotech Report	Type CF-1	Type CF-2	Type CF-3	Type CF-4	Organic Content	Soil Texture	Geotech Observation	Visual Observations	Olfactory Observations
							Debris, Foreign Objects, Large		

STAKEHOLDER DATABASE



Samples Assessment

[Attachments](#)

[Stockpile Summary Export](#)

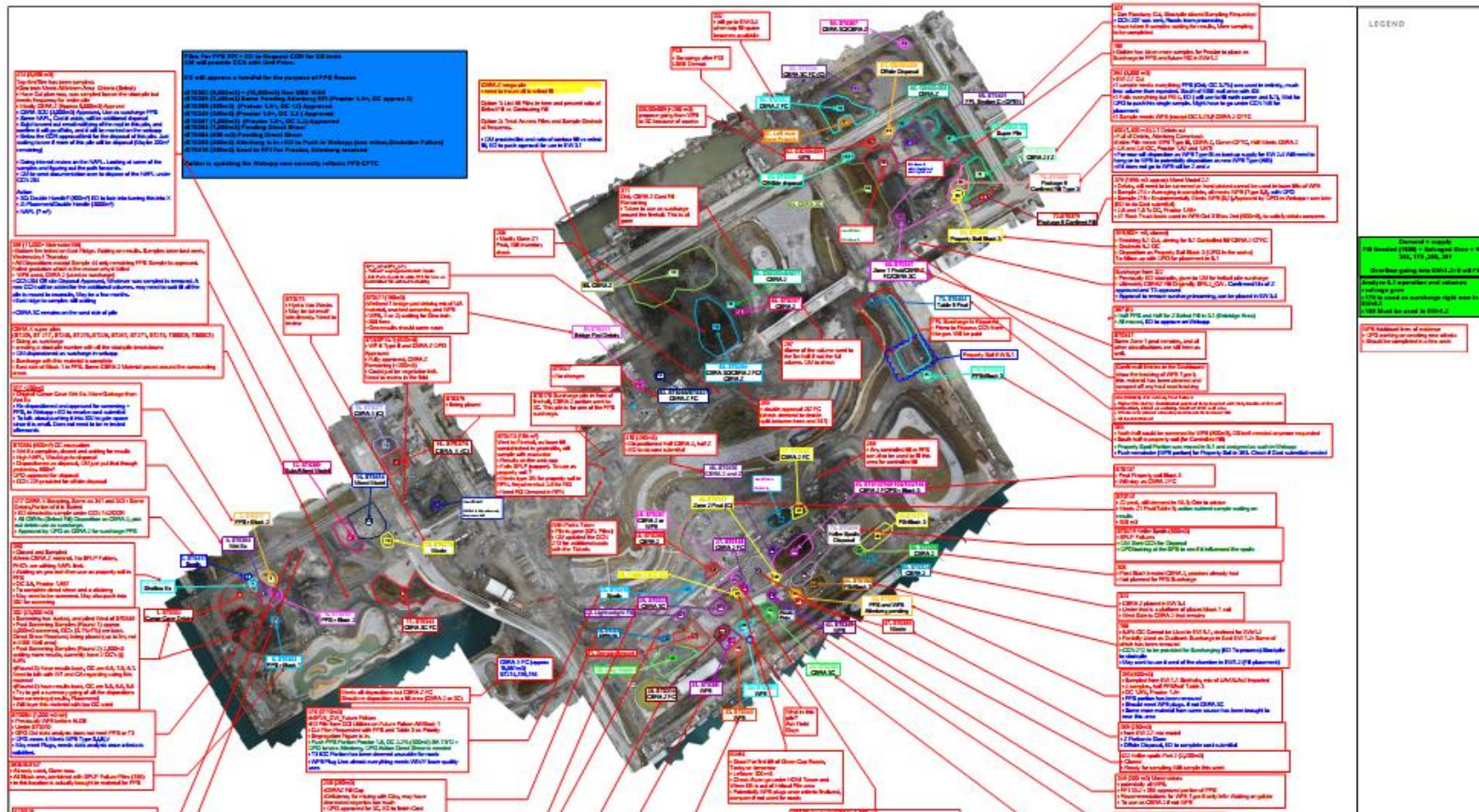
	Role	Decision	Reassignment	Datetime	Comment
EW2.1_AXXX_ST0294_B60_SA066	QPG	R1-Reassign	FD5.2 (CBRA3C), FD5.3 (CBRA3C), FD5.4 (CBRA3C)	1/11/2022 5:31:35 AM	Environmental: Stockpile meets CBRA 3C CFTCs Leachate: Meets SPLP 3.1/9.1 Geotech: Meets Interim Fill excluding Select Fill. Stockpile contains significant debris (see attached photos) which may require removal during placement
	QM	Approve	N/A	1/17/2022 9:45:44 AM	Source: EW2.1; Model: Table 3; Volume: 300m3; Disposition as CBRA 3C contouring or uncontrolled fill.
	QPO	Approve	N/A	1/20/2022 3:46:49 AM	Approved for dispositioned as CBRA-3C and geotechnically based on the WP4 Fill and Backfill - Interim Area, Revision #SI-04- 009 specification, dated January 6, 2022 for placement in EW5.3 and EW5.4 as Contouring Fill and Uncontrolled Fill.
	ED	Approve	N/A	2/2/2022 4:33:06 AM	Approved for CBRA3c placement based on QPO's comment and submission 033.2-31 23 23-280.



LESSONS AND PROGRESS

LESSONS AND PROGRESS

- Incorporating visual planning tools to reference stockpile locations, volumes, future reuse potential and progress through approvals.



LESSONS AND PROGRESS

- Allowance for additional information that track exceptions, specification changes, irregular soil movements on the webapp.

The screenshot displays a web application interface for 'wsp GOLDER'. The top navigation bar includes 'Home', 'About', and 'Contact' buttons, along with a user greeting 'Hello Sajid.Alimohamed@QMenv.com!' and a 'Log off' link. Below the navigation, there are two tabs: 'Samples Assessment' and 'Attachments'. The 'Attachments' tab is active, showing a table of documents. To the right of the table is a 'Map' section displaying an aerial view of a site with numerous yellow and cyan markers overlaid on it. The map includes a scale bar and a legend.

Attachment Name	Date	Sender
19130936-4500 REP 2023*01*05 EWX_X_AXXX_ST0302_B42_SA081 (retest).pdf	23/01/2023	RAndrews@golder.com
19130936-4500 REP 2023*01*05 EWX_X_AXXX_ST0302_B42_SA082 (retest).pdf	23/01/2023	RAndrews@golder.com
19130936-4500 REP 2023*01*05 EWX_X_AXXX_ST0302_B42_SA083 (retest).pdf	23/01/2023	RAndrews@golder.com
19130936-4500 REP 2023*01*05 EWX_X_AXXX_ST0302_B42_SA090.pdf	23/01/2023	RAndrews@golder.com
19130936-4500 REP 2023*01*05 EWX_X_AXXX_ST0302_B42_SA091.pdf	23/01/2023	RAndrews@golder.com
19130936-4500 REP 2023*01*05 EWX_X_AXXX_ST0302_B42_SA092.pdf	23/01/2023	RAndrews@golder.com
RFI 033.2-379.1_Response.pdf	23/01/2023	RAndrews@golder.com
RE_ ST0302 OC and Direct Shear Test Results of Screened Material.msg	23/01/2023	RAndrews@golder.com

Map

The map shows an aerial view of a site with a red dashed boundary. Numerous yellow and cyan markers are overlaid on the map, indicating specific locations or data points. Labels on the map include 'RSC GRP 02' and 'EW-15 AREA'.

LESSONS AND PROGRESS

Soil Truck Tracking Volume based on truck counts:
6,300m³ – wet volume

Load Date/Time	Equipment	Volume (Cubic meters)	Block ID	Material	Characterization	Earthwork Area	Municipal Address	Line Item	Dump Date/Time	Route	Block ID	Earthwork Area	Ticket Number	Ticket BOL	Ticket Weight (Metric Tonnes)
2022-05-09 07:08:53	RT003 CAT730	12.0	ST0346	Debris	CBRA 3C (C)	EW 2.1	75/85 Commissioners St	CCN-147	2022-05-09 07:16:22	Stockpile to Stockpile	C-ST0346	EW 5.4			
2022-05-09 07:24:00	RT003 CAT730	12.0	ST0346	Debris	CBRA 3C (C)	EW 2.1	75/85 Commissioners St	CCN-147	2022-05-09 07:31:36	Stockpile to Stockpile	C-ST0346	EW 5.4			
2022-05-09 07:34:52	RT003 CAT730	12.0	ST0346	Debris	CBRA 3C (C)	EW 2.1	75/85 Commissioners St	CCN-147	2022-05-09 07:40:21	Stockpile to Stockpile	C-ST0346	EW 5.4			
2022-05-09 07:43:54	RT003 CAT730	12.0	ST0346	Debris	CBRA 3C (C)	EW 2.1	75/85 Commissioners St	CCN-147	2022-05-09 07:48:11	Stockpile to Stockpile	C-ST0346	EW 5.4			
2022-05-09 07:50:02	RT003 CAT730	12.0	ST0346	Debris	CBRA 3C (C)	EW 2.1	75/85 Commissioners St	CCN-147	2022-05-09 07:57:00	Stockpile to Stockpile	C-ST0346	EW 5.4			
2022-05-09 08:06:23	RT003 CAT730	12.0	ST0346	Debris	CBRA 3C (C)	EW 2.1	75/85 Commissioners St	CCN-147	2022-05-09 08:32:21	Stockpile to Stockpile	C-ST0346	EW 5.4			
2022-05-09 08:35:50	RT003 CAT730	12.0	ST0346	Debris	CBRA 3C (C)	EW 2.1	75/85 Commissioners St	CCN-147	2022-05-09 08:43:16	Stockpile to Stockpile	C-ST0346	EW 5.4			

Measuring Volume by Drone Imagery:

- 5,350m³ – dry volume after dewatering

Trimble Stratus

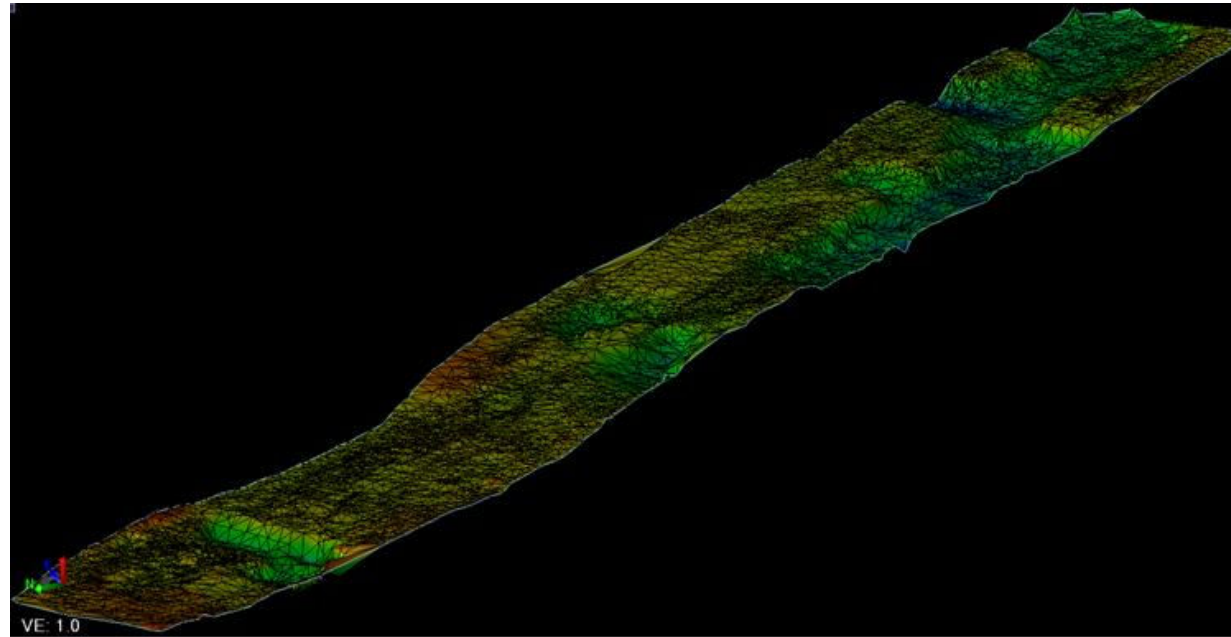
MEASURE

REFERENCE ELEVATION LEVEL

79.00

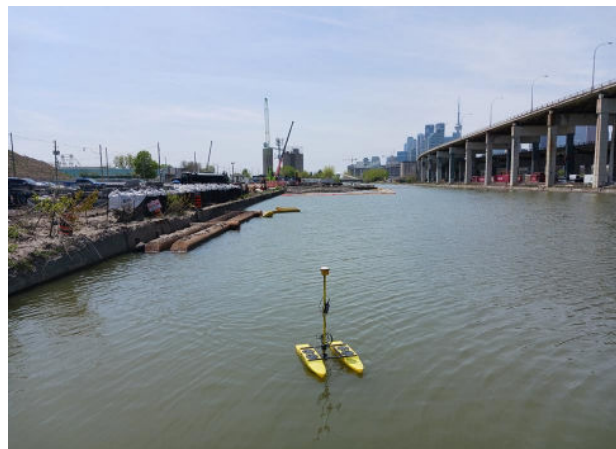
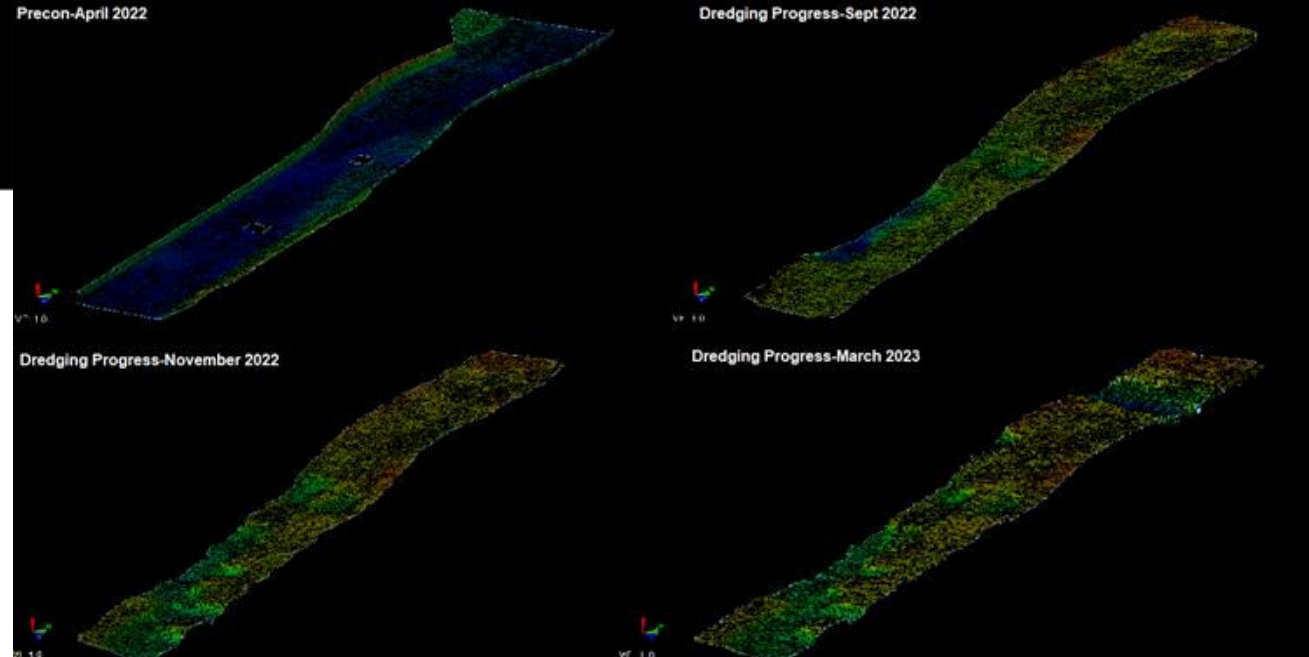
CUT	5,352 m ³
NET	-5,352 m ³
FILL	0 m ³
TOTAL	5,352 m ³

LESSONS AND PROGRESS



Bathymetric Survey
*300mx35m section contains
15000-18000 survey points!*

Visual of Dredging Progress



LESSONS & PROGRESS

Journal Summary
 May 26, 2023 12:00 am
 777-07 - Driver 777-07

Route: Chimney Hollow Reservoir
 Started: May 26, 2023 12:00 am
 Ended: May 26, 2023 11:59 pm
 Engine Accumulated: 14.8h
 Driven: 156 mi
 Counts:
 Dump: 79 Fuel: 0
 Load: 79 Bulk: 0

Exit Location: Quarry
 May 26, 2023 8:21 am

Enter Location: MD Upstream
 May 26, 2023 8:27 am

Dump
 May 26, 2023 8:28 am

Exit Location: MD Upstream
 May 26, 2023 8:38 am

Enter Location: Quarry
 May 26, 2023 8:38 am

Load
 May 26, 2023 8:41 am

Journal Summary
 May 26, 2023 12:00 am
 777-07 - Driver 777-07

Route: Chimney Hollow Reservoir
 Started: May 26, 2023 12:00 am
 Ended: May 26, 2023 11:59 pm
 Engine Accumulated: 14.8h
 Driven: 156 mi
 Counts:
 Dump: 79 Fuel: 0
 Load: 79 Bulk: 0

Exit Location: Quarry
 May 26, 2023 8:21 am

Enter Location: MD Upstream
 May 26, 2023 8:27 am

Dump
 May 26, 2023 8:28 am

Exit Location: MD Upstream
 May 26, 2023 8:38 am

Enter Location: Quarry
 May 26, 2023 8:38 am

Load
 May 26, 2023 8:41 am

Journal Summary
 May 26, 2023 12:00 am
 777-07 - Driver 777-07

Route: Chimney Hollow Reservoir
 Started: May 26, 2023 12:00 am
 Ended: May 26, 2023 11:59 pm
 Engine Accumulated: 14.8h
 Driven: 156 mi
 Counts:
 Dump: 79 Fuel: 0
 Load: 79 Bulk: 0

Exit Location: Quarry
 May 26, 2023 8:21 am

Enter Location: MD Upstream
 May 26, 2023 8:27 am

Dump
 May 26, 2023 8:28 am

Exit Location: MD Upstream
 May 26, 2023 8:38 am

Enter Location: Quarry
 May 26, 2023 8:38 am

Load
 May 26, 2023 8:41 am

Journal Summary
 May 26, 2023 12:00 am
 777-07 - Driver 777-07

Route: Chimney Hollow Reservoir
 Started: May 26, 2023 12:00 am
 Ended: May 26, 2023 11:59 pm
 Engine Accumulated: 14.8h
 Driven: 156 mi
 Counts:
 Dump: 79 Fuel: 0
 Load: 79 Bulk: 0

Exit Location: Quarry
 May 26, 2023 8:21 am

Enter Location: MD Upstream
 May 26, 2023 8:27 am

Dump
 May 26, 2023 8:28 am

Exit Location: MD Upstream
 May 26, 2023 8:38 am

Enter Location: Quarry
 May 26, 2023 8:38 am

Load
 May 26, 2023 8:41 am

Journal Summary
 May 26, 2023 12:00 am
 777-07 - Driver 777-07

Route: Chimney Hollow Reservoir
 Started: May 26, 2023 12:00 am
 Ended: May 26, 2023 11:59 pm
 Engine Accumulated: 14.8h
 Driven: 156 mi
 Counts:
 Dump: 79 Fuel: 0
 Load: 79 Bulk: 0

Exit Location: Quarry
 May 26, 2023 8:21 am

Enter Location: MD Upstream
 May 26, 2023 8:27 am

Dump
 May 26, 2023 8:28 am

Exit Location: MD Upstream
 May 26, 2023 8:38 am

Enter Location: Quarry
 May 26, 2023 8:38 am

Load
 May 26, 2023 8:41 am

Journal Summary
 May 26, 2023 12:00 am
 785-24 - Colin Cecil-Whearty

Route: Pipestem Spillway
 Started: May 26, 2023 12:00 am
 Ended: May 26, 2023 11:59 pm
 Engine Accumulated: 5.0h
 Driven: 85 mi
 Counts:
 Dump: 76 Fuel: 0
 Load: 76 Bulk: 0

Dump
 May 26, 2023 11:30 am

Load
 May 26, 2023 11:35 am

Dump
 May 26, 2023 11:38 am

Load
 May 26, 2023 11:45 am

Dump
 May 26, 2023 11:57 am

Load
 May 26, 2023 12:05 pm

Dump
 May 26, 2023 12:44 pm

Load
 May 26, 2023 12:50 pm

Default project

Map

MAP WORK ORDERS

Default project

Work Orders

MAP WORK ORDERS

EW-0000005 Design and Progress

Cut/Fill Summary

Selected Surfaces

- Target Surface
- Surveys
- Starting Surface

Apply

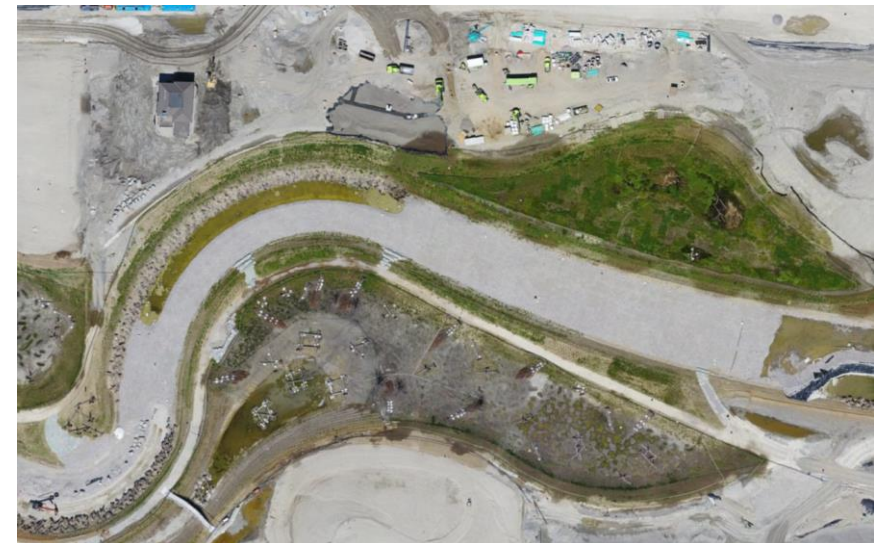
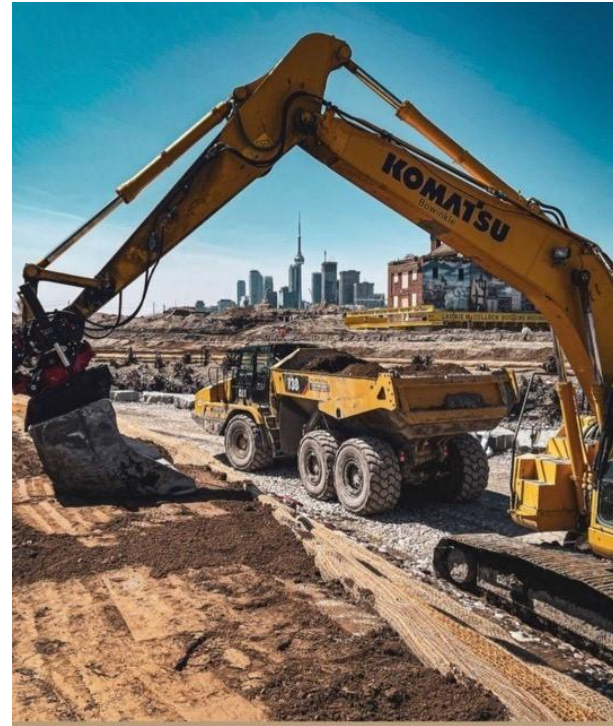
Cut/Fill Elevation Slope

Elevation: 69 ft

Remaining	Completed	Target (Tolerance)
Cut: 0.0 yd ³	0.0 yd ³	0% (2%)
Fill: 207,224,985.5 yd ³	0.0 yd ³	0% (2%)
Total: 207,224,985.5 yd ³	0.0 yd ³	0% (2%)

Cut: 0 ft, 24 ft, 48 ft, 73 ft, 97 ft
 Fill: -45 ft, -64 ft, -43 ft, -21 ft, 0 ft

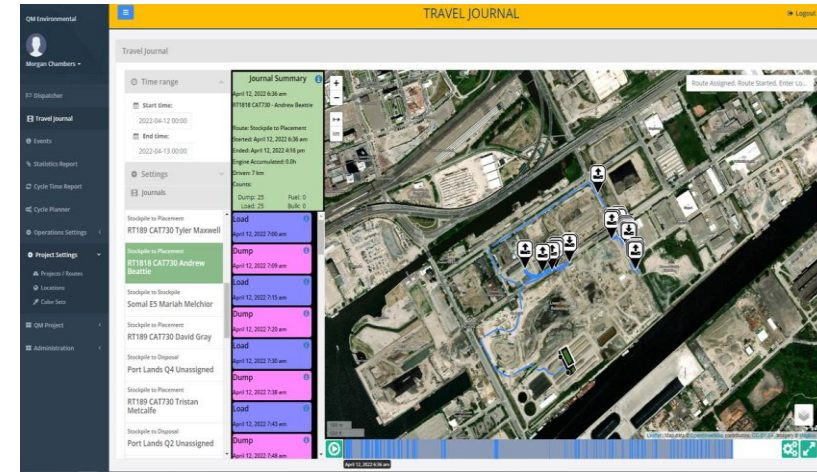
LESSONS & PROGRESS



Incorporating our soil re-use technologies for ecological recovery



TECHNOLOGICAL RELIANCE – PRODUCTIVE?



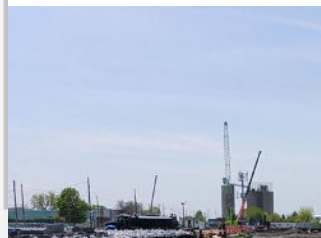
WPI GOLDR

Reference Links

Stockpile Summary

STOCKPILE #	OPERATION	PLACEMENT	DISPOSAL	REMOVAL	STATUS
EM11_2025_07001_01					Stockpile
EM11_2025_07001_02					Stockpile
EM11_2025_07001_03					Stockpile
EM11_2025_07001_04					Stockpile
EM11_2025_07001_05					Stockpile
EM11_2025_07001_06					Stockpile
EM11_2025_07001_07					Stockpile
EM11_2025_07001_08					Stockpile
EM11_2025_07001_09					Stockpile
EM11_2025_07001_10					Stockpile

Map



Reference Level Volume

REFERENCE ELEVATION LEVEL: 78.00

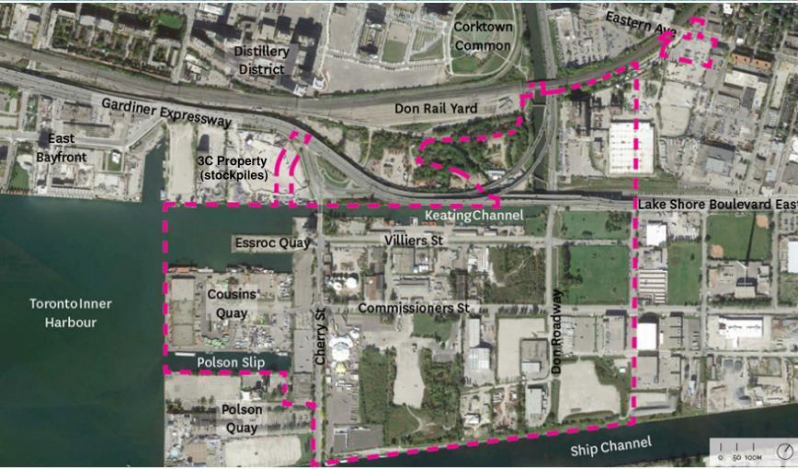
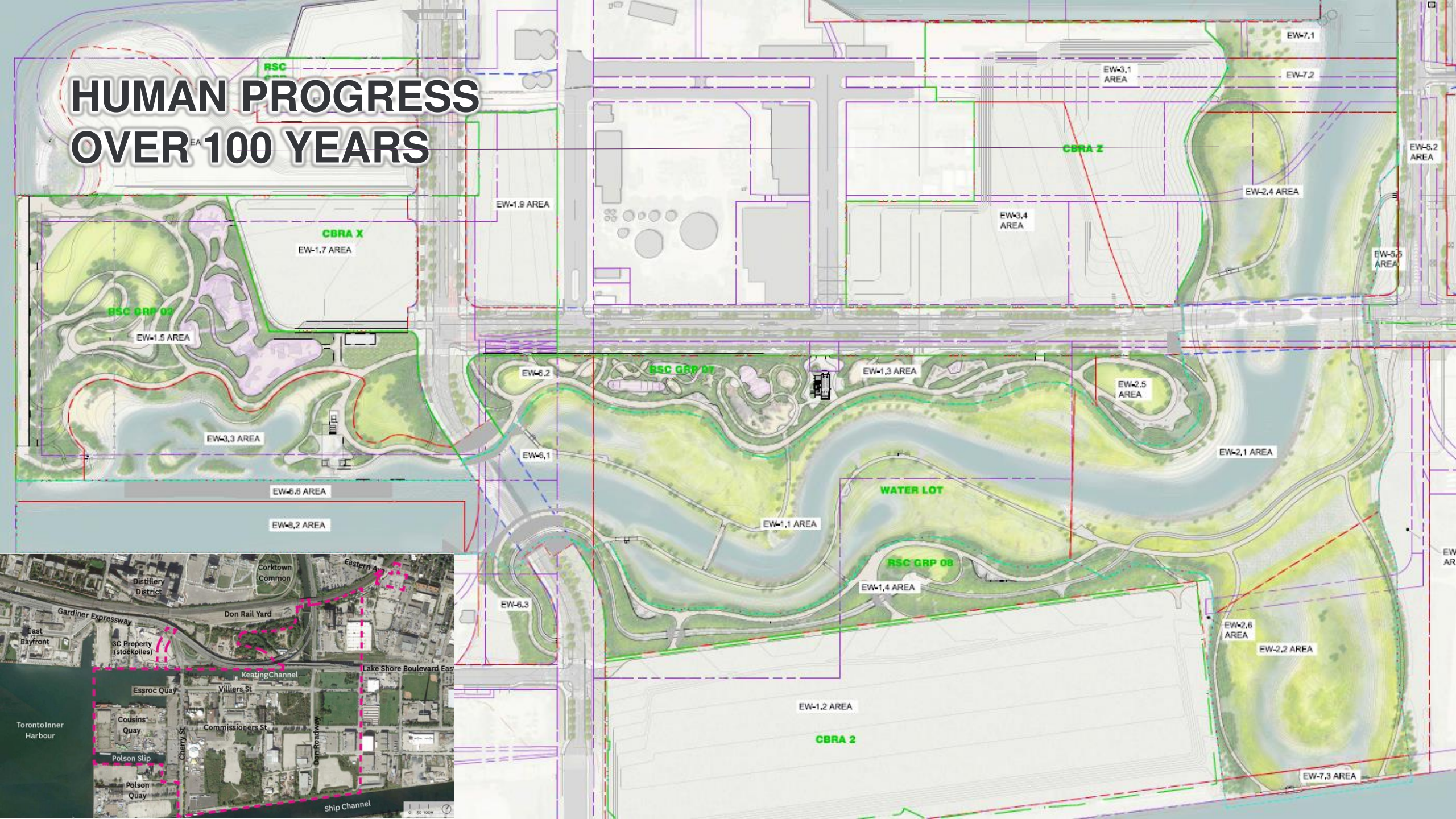
3D CUT: 5 352 m³

3D FILL: -5 352 m³

TOTAL: 5 352 m³



HUMAN PROGRESS OVER 100 YEARS



THANK YOU!



RESPOND. RECLAIM. RENEW.



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