

REMEDIATION CONTRACTING IS DEAD

REMTECH EAST JUNE 2, 2022

INTRODUCTION



• SPEC ADDENDUM: Stand-alone remediation contracting for large-scale redevelopment projects is dead.

Why?

- Civil & Environmental are converging
- Risk Assessments permit leaving contamination in place
- Soil Reuse are becoming acceptable and in some cases preferred (Excess Soil Regs)
- Designs are being integrated and more complex
- Schedule compression requires overlapping of work and approvals process
- Tightening Regulations and Soil Tracking Requirements (already in ON / BC) -> Making Civil jobs Environmental

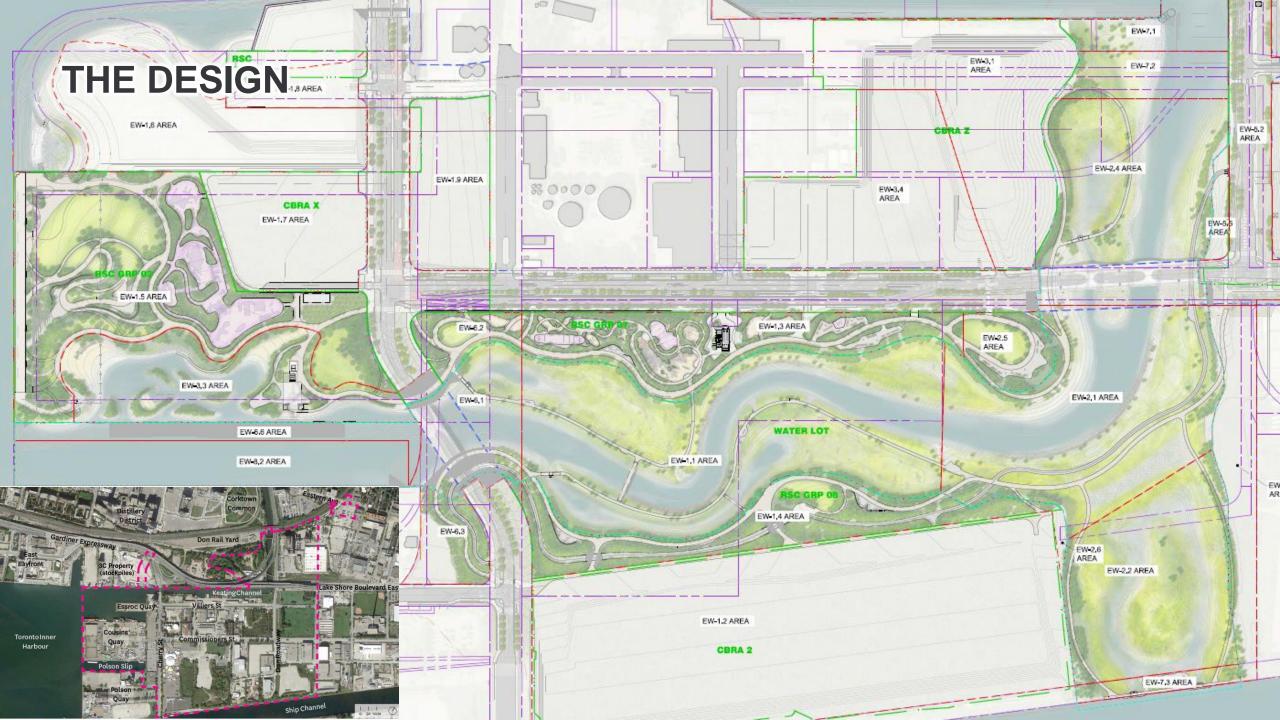
How can contractors respond:

- Multi-disciplinary competency with Integrated Service offering
- Technology
- Solution based approaches

PROJECT OBJECTIVES

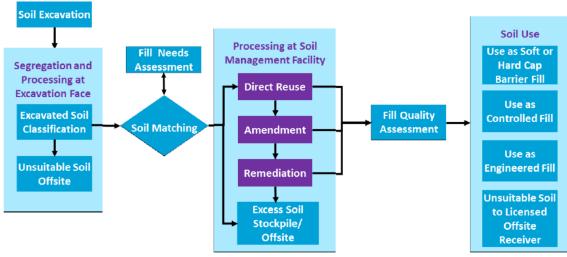






SOIL REUSE CRITERIA & CBRAS





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.)

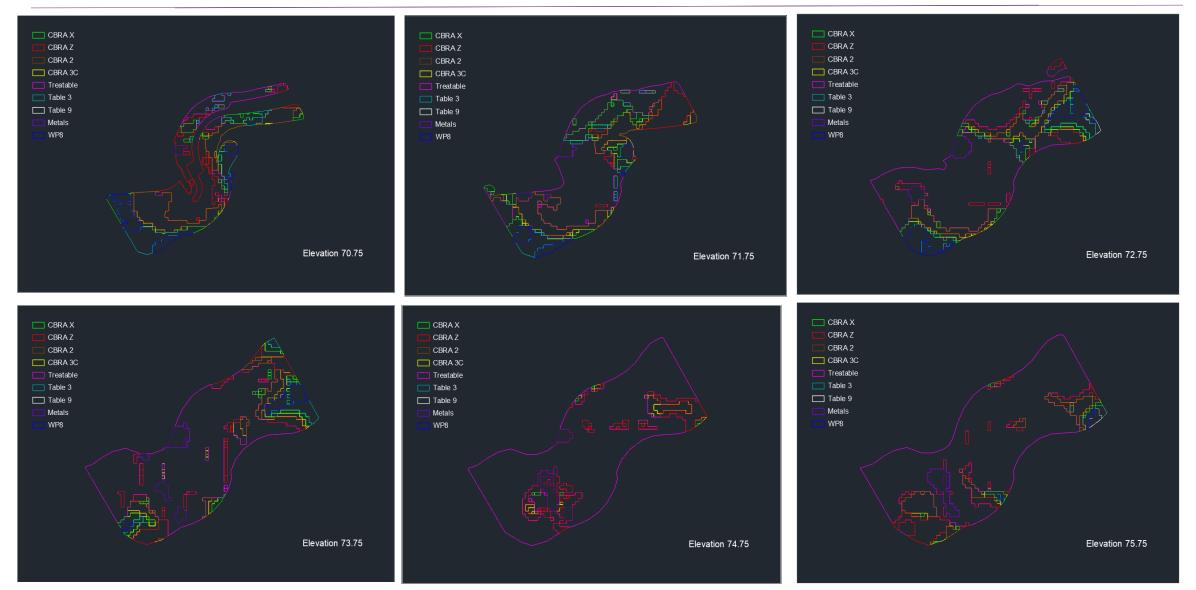
.6 Load source soil excavation category as defined on Drawing 4-E-1

.7 Drop location (spatial coordinates of fill placement) and approximate lift thickness and elevation.

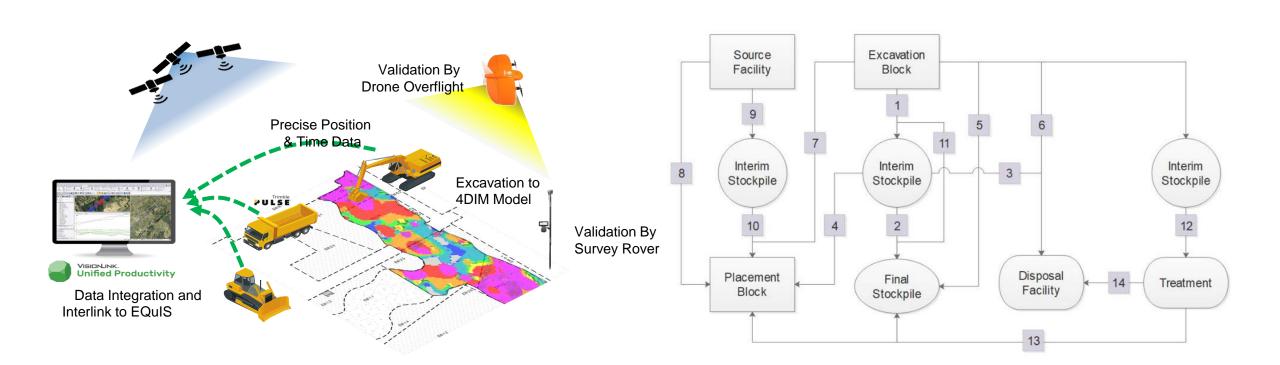


THE MODEL











THE THEORY OF AN APPROACH - STAKEHOLDER



Inputs:

- PLFP Topo Survey
- PLFP 33.2 Design Limits
- PLFP Geo-Env Model
- PLFP Geotech Model
- Field Observation Data (staining, odours, geotechnical classification) -(EQuIS[™] Collect)

Trimble Based System

- Uses PLFP design models to generate Excavation, Stockpile and Backfill x,y,z coordinates
- Generates unique source identifier ID (reuse & imported materials)
- Maintains unique source ID and adds stockpile identifier ID (soil, non-soil debris, peat, waste)
- Maintains unique source ID and stockpile ID and adds backfill identifier ID
- Generates Daily As-Built reports
 Date & Time stamped

EQuIS[™] Database

- Compares GeoEnv results to 14
 PLFP Bulk Reuse or Imported Soil
 Criteria and SPLP Leachate Criteria
- Compares Geotechnical results to
 4 PLFP soil type criteria
- Compares Horticultural results to PLFP horticultural criteria Retains unique stockpile identifier ID adds sample IDs
 - Includes Subcontractor QPESA approval recommendations to Consultant QPESA
 - Date & Time stamped

Lab EDD files for GeoEnv Reuse /Imported/Treated Soil Sample Results Golder Laboratory Geotech Reuse /

Imported/Treated Soil Sample Results

- Imported Soil Background Environ Reports/Data
- Horticultural Soil Quality Reports/Soil Sample Results
- Subcontractor QPESA Field Observations and Data (EQuIS[™] Collect)



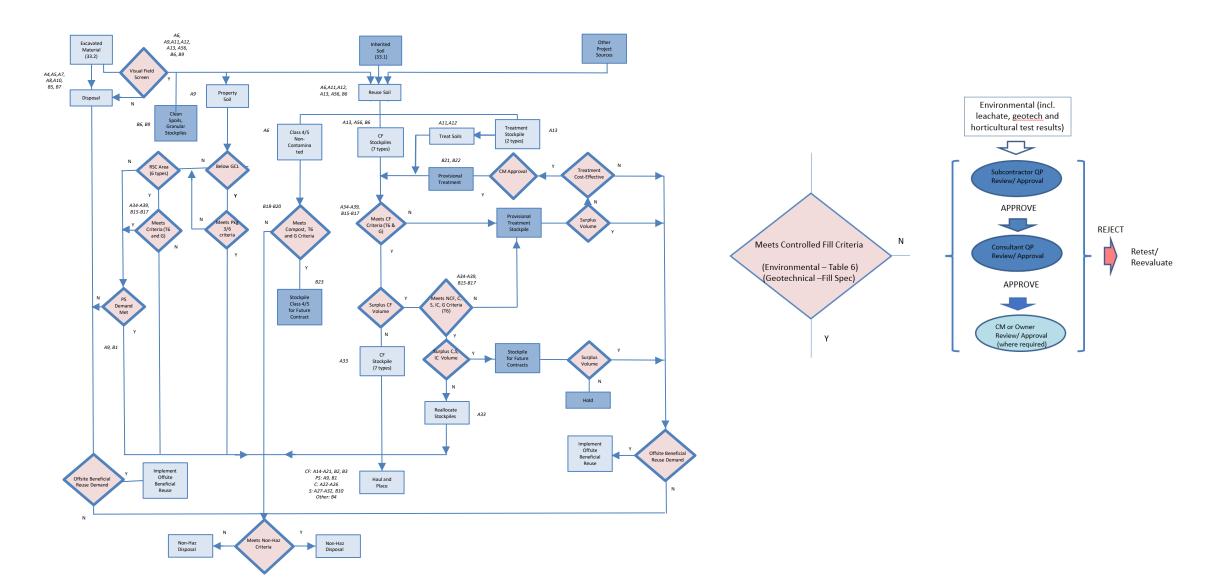


Stakeholder Accessibility Platform:

- Consultant QPESA (Final Approvals)
 - Consultant QPRA
 - Owner (Waterfront Toronto)
- Construction Manager (Ellis Don) QA results

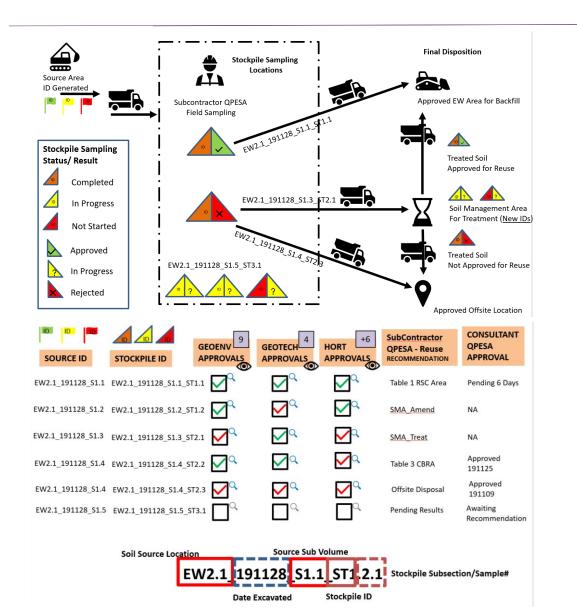
THE THEORY OF AN APPROACH - WORKFLOW





THE THEORY OF AN APPROACH – THE PLATFORM

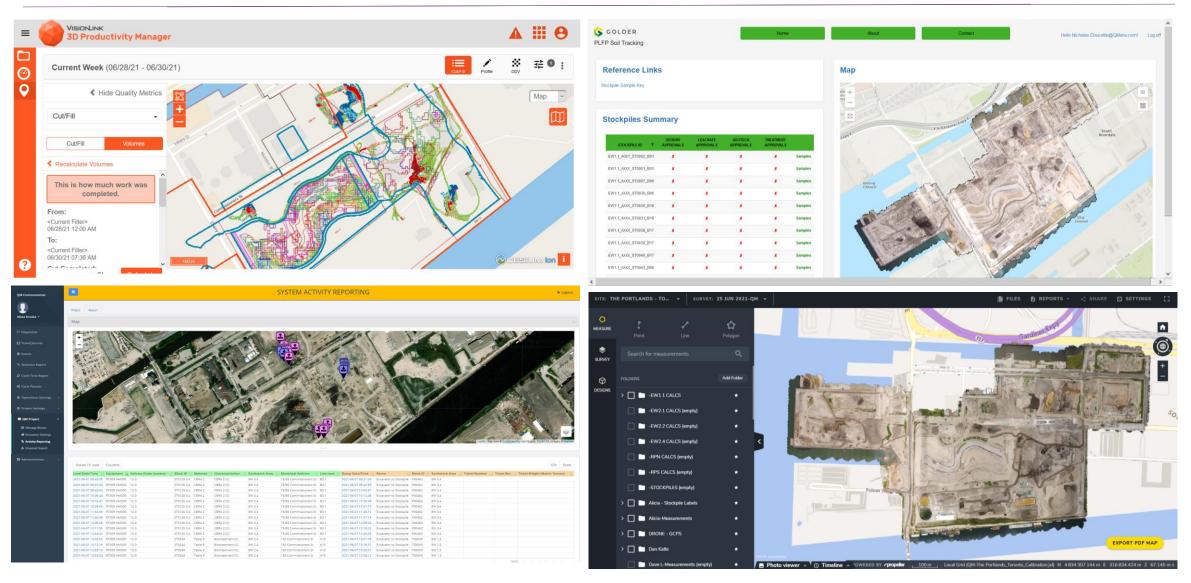






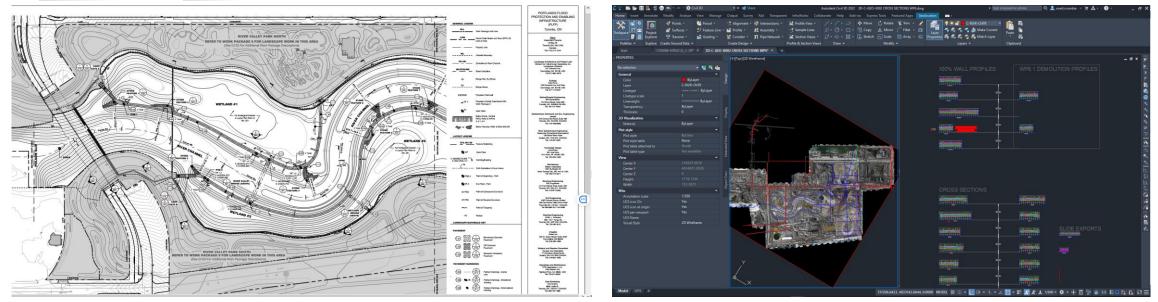
WHAT WE ACTUALLY BUILT

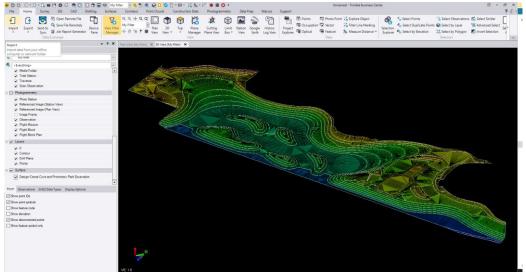




GEOMATICS DESIGN MANAGEMENT

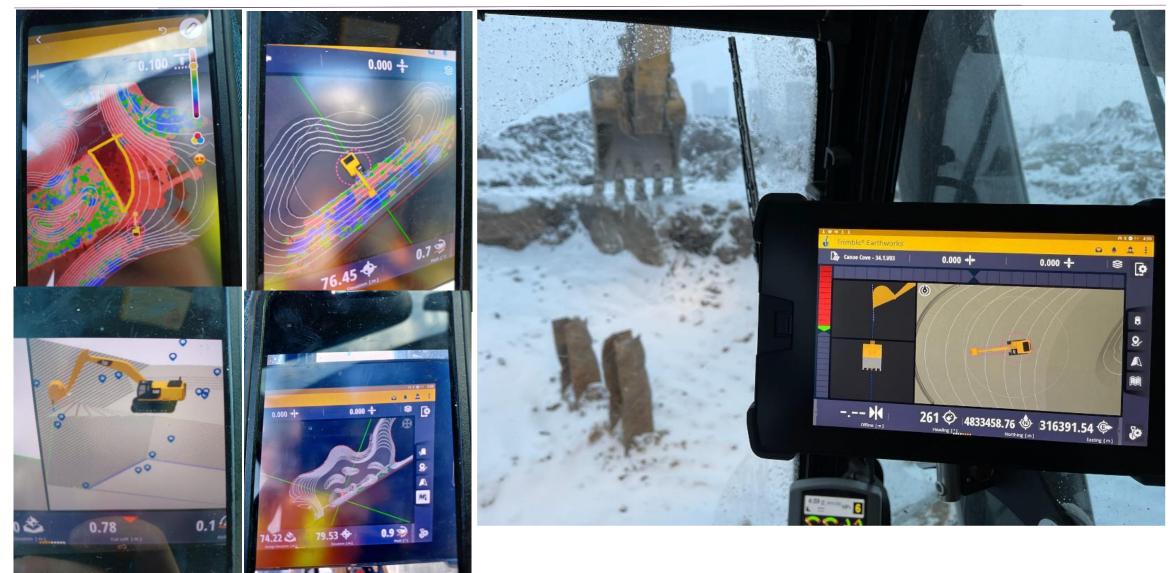






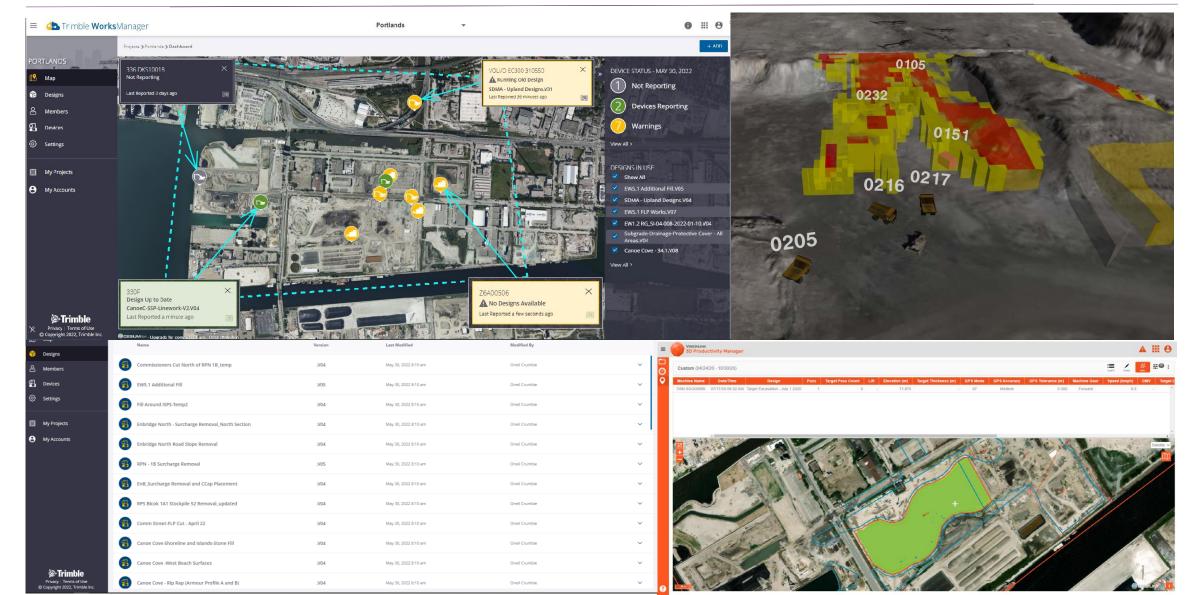
GRADE CONTROL - OPERATOR





GRADE CONTROL - MANAGER





RPS TRACKER



QM Environmental		DISPATCHER	🖼 Logout
Morgan Chambers +	Dispatcher		Updated 15:22:42 😋 19 🖬 Enable map autoupdate
降 Dispatcher	Select Projects/Routes +		
日 Travel Journal	Filter		
Events	Include hidden routes km		
ℜ Statistics Report	 Excavator to Stockpile ■ RT011 HM300 (Damian Hellyer) Damian Helly	Somal	
Cycle Time Report	RT012 HM300 (Damian Hellyer) Damian Helly C Stockpile to Disposal		
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RPS TRACKER



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Morgan Chambers +	Travel Journal		
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E Travel journal	2022-04-12 00:00		
Events	🛗 End time:	Route: Stockpile to Placement Started: April 12, 2022 6:36 am	
U tients	2022-04-13 00:00	Ended: April 12, 2022 4:16 pm	1000
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Cycle Time Report		Counts:	New Vo
	🕒 Journals	Dump: 25 Fuel: 0 Load: 25 Bulk: 0	Sec. 1
of Cycle Planner	Stockpile to Placement		1
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Project Settings ~	Stockpile to Placement		A PART
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		Dump 0	
II QM Project <	Stockpile to Placement RT189 CAT730 David Gray	April 12, 2022 7:20 am	
Administration			-
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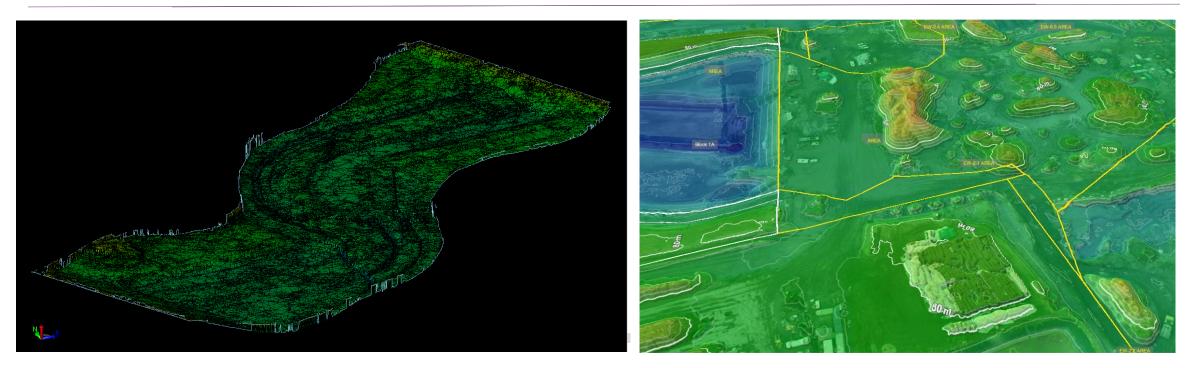
RPS TRACKER



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 □ Dispatcher □ Travel Journal ● Events ● Statistics Report Cycle Time Report 															August	Description	5
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AS-BUILT (SEMI-AUTOMATIC)







IS GOLDER

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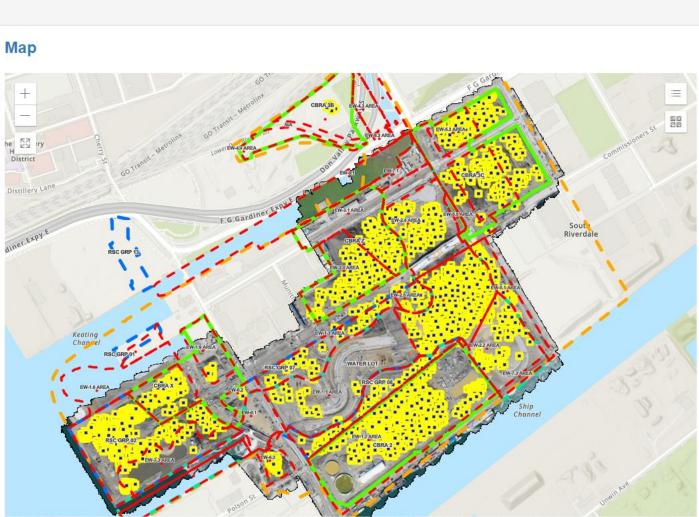
Reference Links

Stockpile Sample Key

Stockpiles Summary

1 2 3 ... 51 »

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



Contact

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5					Мар	
				Stockpile Summa		
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		
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 VIP4 Fill and Backfill – Interim Area, Revision # SI-04, dated June 22, 2021	Esri, NASA, NGA, USGS, FEMA Esri Communit	Maps Contributors, City of Toronto, Province of Ontario, Esri Can. Poweled by Esri
	Role	Role Decision	Role Decision Reassignment QPG R1-Reassign FD3.1 (CBRA1_Z), FD3.4 (CBRA1_Z)	Role Decision Reassignment Datetime QPG R1-Reassign FD3.1 (CBRA1_Z), 11/9/2021 9:34:01 AM	Role Decision Reassignment Datetime Comment QPG R1-Reassign FD3.1 (CBRA1_2), FD3.4 (CBRA1_2), FD3.4 (CBRA1_2) 11/9/2021 9:34:01 AM Bulk: Meets CBRA1_2 CFTCs based on the attached statistical analysis (NOTE: Lead, zinc, several Samples using single-point compliance. SPLP: Meets SPLP 3.19.1 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: 2320m3; Disposition as CBRA.Z Select, contouring and/or uncontrolled fill. Approved for disposition as CBRA.Z CFTC (EW3.4) and geotechnically based on the WP4 Fill and Backfill – Interim	Role Decision Reassignment Datetime Comment OPG R1-Reassign FD31 (CBRA1_Z) FD34 (CBRA1_Z) 11/9/2021 9:34:01 AM Bulk: Meets CBRA1_Z OFTCs based on the attached statistical analysis (NOTE: Lead, zinc, several PAHs and PHC F374 fail for several PAHs and PHC F374 fail for for pherometric PHC F374 fail for pherotechic for pherometric PHC F374 fail for pherotechic

EW2.1_AXXX_ST0270_B51_SA149

Controlled Fill (>1.5m)				CBRA Fill Areas	5			Parks			River/Waterlot			Roads			Generic			
	CBRA2 CF	C CBRA	3B 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 CF	C CBRA	X Roads CFTC	Table 1 RPIICC	Table 3 RPI	Table 3 ICC	Table 9 RPIICC	
Cap Standards (<1.5m)	3	8	4	8	7	1	10	11	11	4	7	5	1		6	23	9	6	21	
excess Soil Quality Standards																				
Excess Soil Quality Standards	Leac	ate		Treatment			Cont	trolled Fill Geote	chnical		Geotech Report	Type CF-1	Type Typ CF-2 CF-		Organic Content	Soil Texture	Geotech Obser	vation	Visual Observations	Olfactor Obervatio



NSP GOLDER				Hon	Exceedance Summary	Table		×	tact		Hello Alicia.Kruska	@QMenv.com!	Log off
Samples Assessment Attachments	s				Category: CBRA3B								
Sample Name					Sample Name	Chemical Name	Report Result Value	Action Level	1821		à		=
-	Role	Decision	Reassignment	Date	EW2.1_AXXX_ST0270_B51_SA149	Benzo [b,j] fluoranthene	2.0	0.78	and the second se				88
					EW2.1_AXXX_ST0270_B51_SA149	Benzo[a]anthracene	1.4	1.3	n Pan - n				
	QPG	R1-Reassign	FD3.1 (CBRA1_Z), FD3.4 (CBRA1_Z)	11/9/2021	EW2.1_AXXX_ST0270_B51_SA149	Benzo[a]pyrene	1.6	1	a the the				
			FD3.4 (CBRA1_Z)		EW2.1_AXXX_ST0270_B51_SA149	Fluoranthene	2.5	1.9		·			
	QM	Approve	N/A	11/9/2021	sample exceeds b/s. h fill typ Source: EW2.1; Mod 9:50:31 AM Volume: 22320m3; Di	oes. del: Multiple Model,				280	EVICIAREA	Ky V	
EW2.1_AXXX_ST0270_B51_SA149					select, contouring and Approved for dispositiv (EW3.1 and EW3.4) based on the WP4 Fill Area, Revision # SI-04, for placement in EW3.	d/or uncontrolled fill. on as CBRA-Z CFTC and geotechnically and Backfill – Interim dated June 22, 2021		Esri, NASA, NGA,	2TIAREA USGS, FEMA Esn Commun	nity Maps Contributors. City of T	oronto, Province of Onterio, E	Esri Can., Powered	t by Esri

EW2.1_AXXX_ST0270_B51_SA149

Controlled Fill (>1.5m)			CBRA Fill Area	8			Parks			River/Waterl	ot		Roads		Gen	eric		
	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	
ap Standards (<1.5m)	3	4	8	7	1	10	11	11	4	7	5	1	6	23	9	6	21	
xcess Soil Quality Standards																		
xcess Soil Quality Standards																		
ccess Soil Quality Standards	Leachate		Treatment			Contr	rolled Fill Geoted	chnical		Geotech Report			Type Organic CF-4 Content		Geotech Obse	rvation	Visual Observations	Olfact



Samples Assessment	Attachmer	nts					
						Stockpile Summ	<u>mary Export</u>
		Role	Decision	Reassignment	Datetime	Comment	•
		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	1
		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.	- 1
EW2.1_AXXX_ST0294_F	B60_SA066	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.	. 1
							*

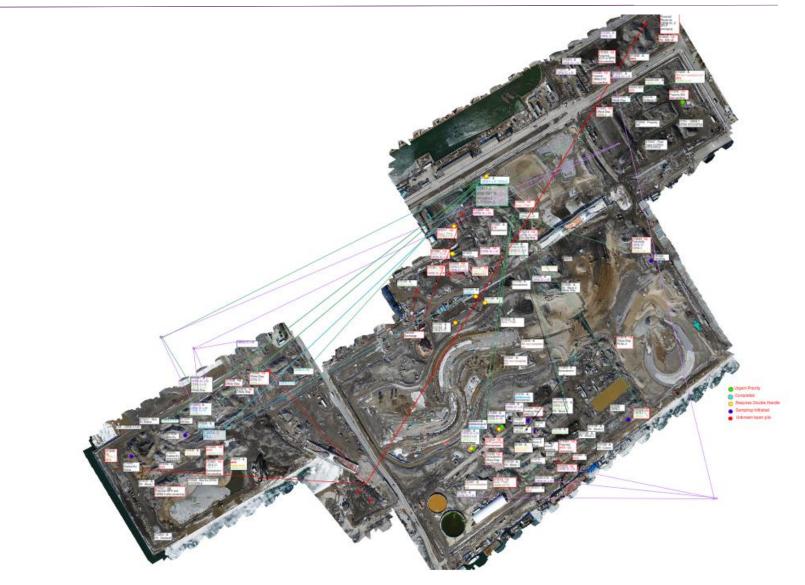
MANAGEMENT PLATFORM





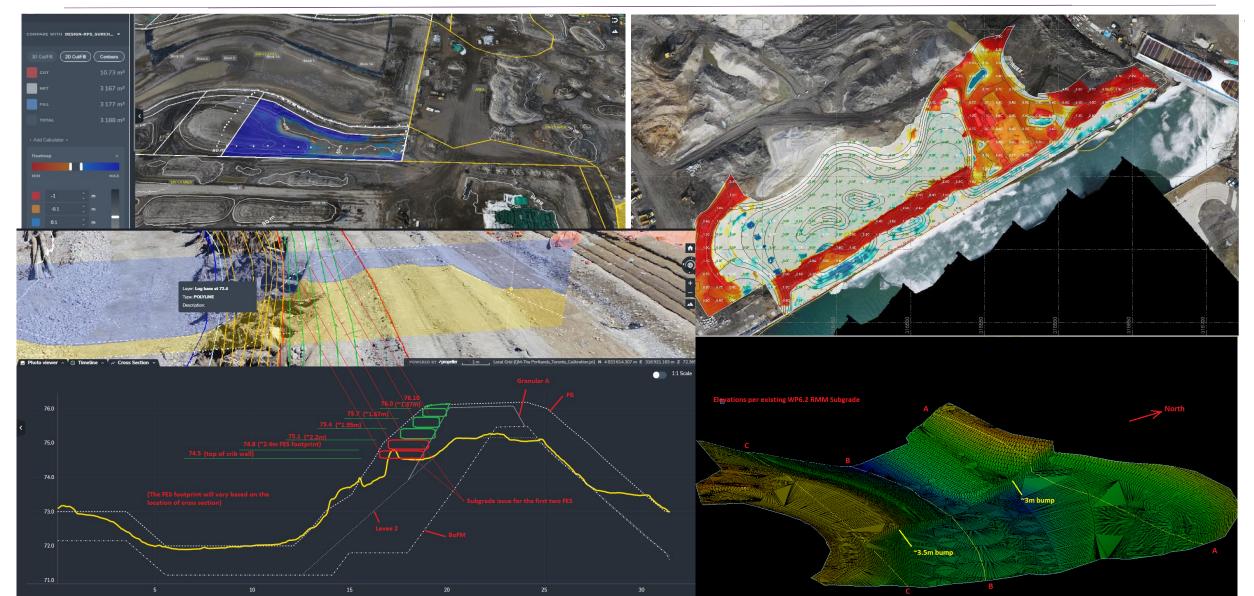
SEQUENCE THE PUZZLE





VISUALIZING THE TASK (OR THE PROBLEM)

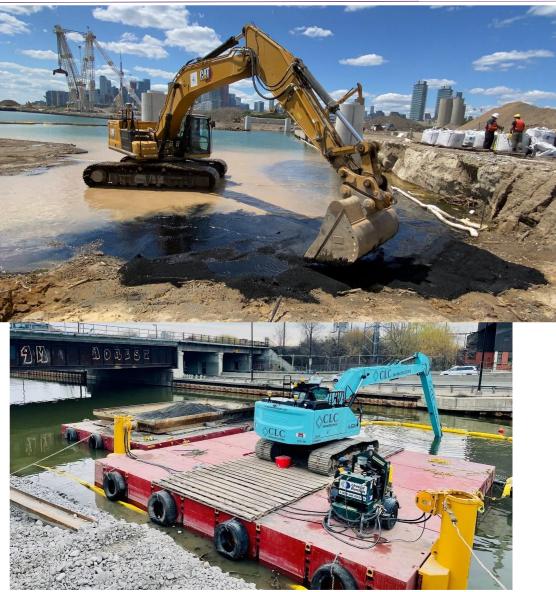




APPLICATION EXTENSIONS







THE FUTURE... OR SOONER











CLOSING / QUESTIONS



