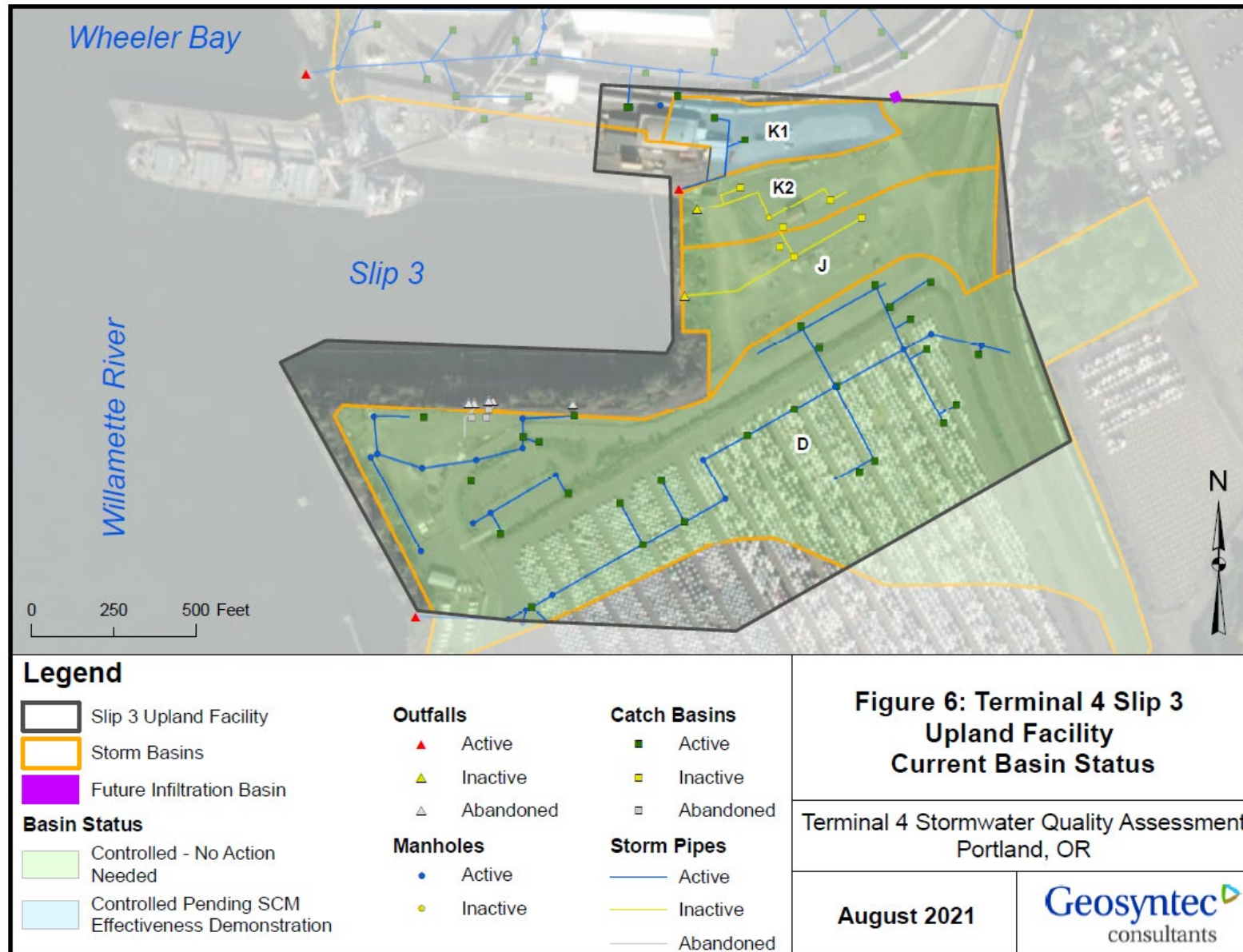

TERMINAL 4 STORMWATER UPDATE

Geosyntec Consultants
24 August 2023

Slip 3



Slip 3 Status

- Continue to confirm the inactive status of Basin J and K2 outfalls, and abandoned Basin D outfalls



Slip 3 BMPs

- Basin J
 - All but one catch basin verified as not existing in the field
 - The one catch basin still present (STSCB2654) was filled in May 2023
 - No discharge to outfall observed before or after CB filled



Slip 3 BMPs

- Basin K2

- CB found to be connected to Basin K1 was capped
- Enhanced disperse infiltration – scarification, wattles
- No discharge to K2 outfall observed before or after CB capping; no discharge from Basin K2 to K1 outfall observed after BMPs installed



Newly completed BMPs



BMPs after a >1" storm in November 2022

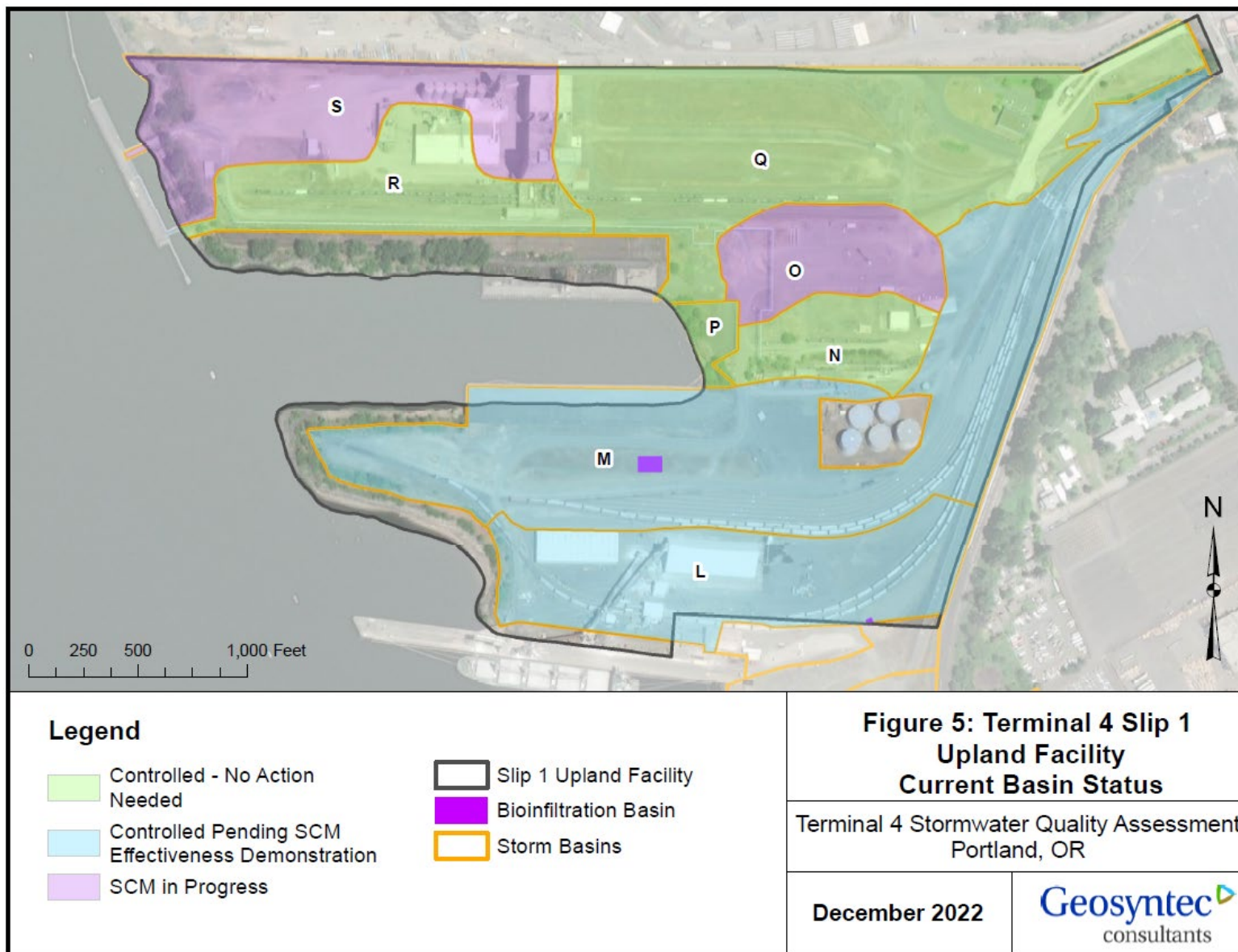


Slip 3 Summary

- BMPs and SCMs completed in Basin J and K2
- No further outstanding items identified
- Discussion
 - Given the SCMs and sufficiency assessment conclusions, sufficient information exists to move forward with a stormwater source control determination for Slip 3.



Slip 1

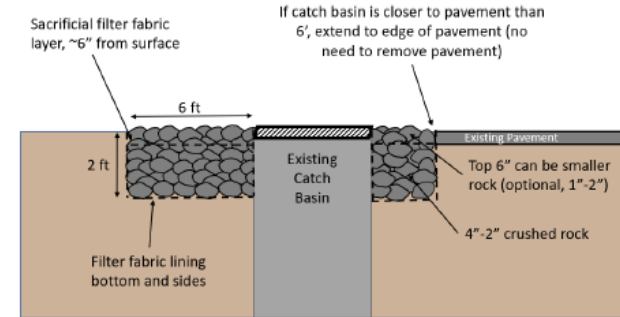
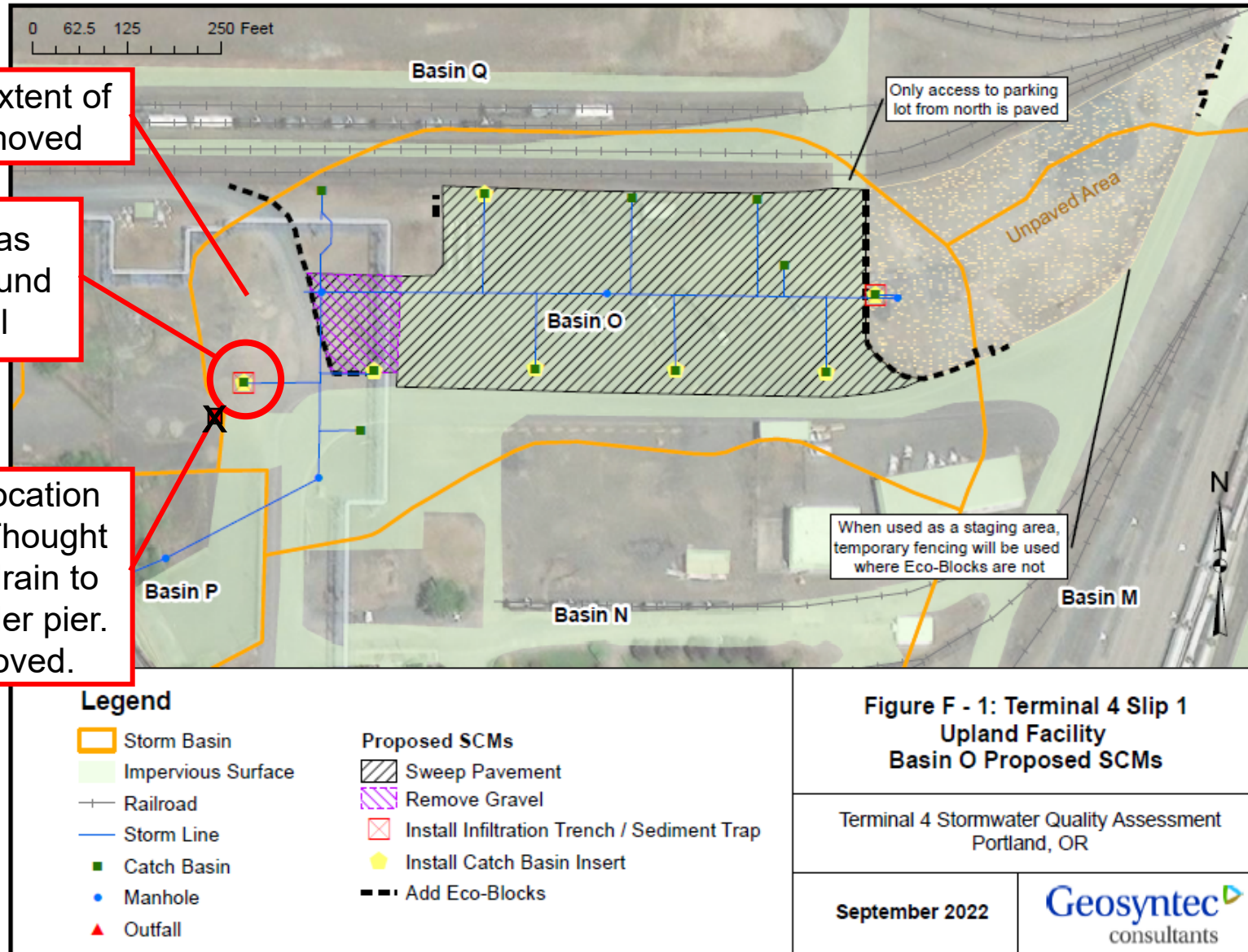


Work Plan for Slip 1

- **Basin O**
 - Install sediment management BMPs
 - Develop a solution for STSCB6065, which was near Basin O but found to not be connected to it
 - Time-weighted composite samples at last manhole (TSS, PAHs, D/F)
 - Grab samples for TSS only at all upstream manholes
- **Basin S**
 - Replace degraded pipe near manhole and outfall
 - Finish pipe cleanout
 - Time-weighted composite samples at last manhole (TSS, PCBs, D/F)
- **3-4 stormwater samples at all locations**



Basin O BMPs



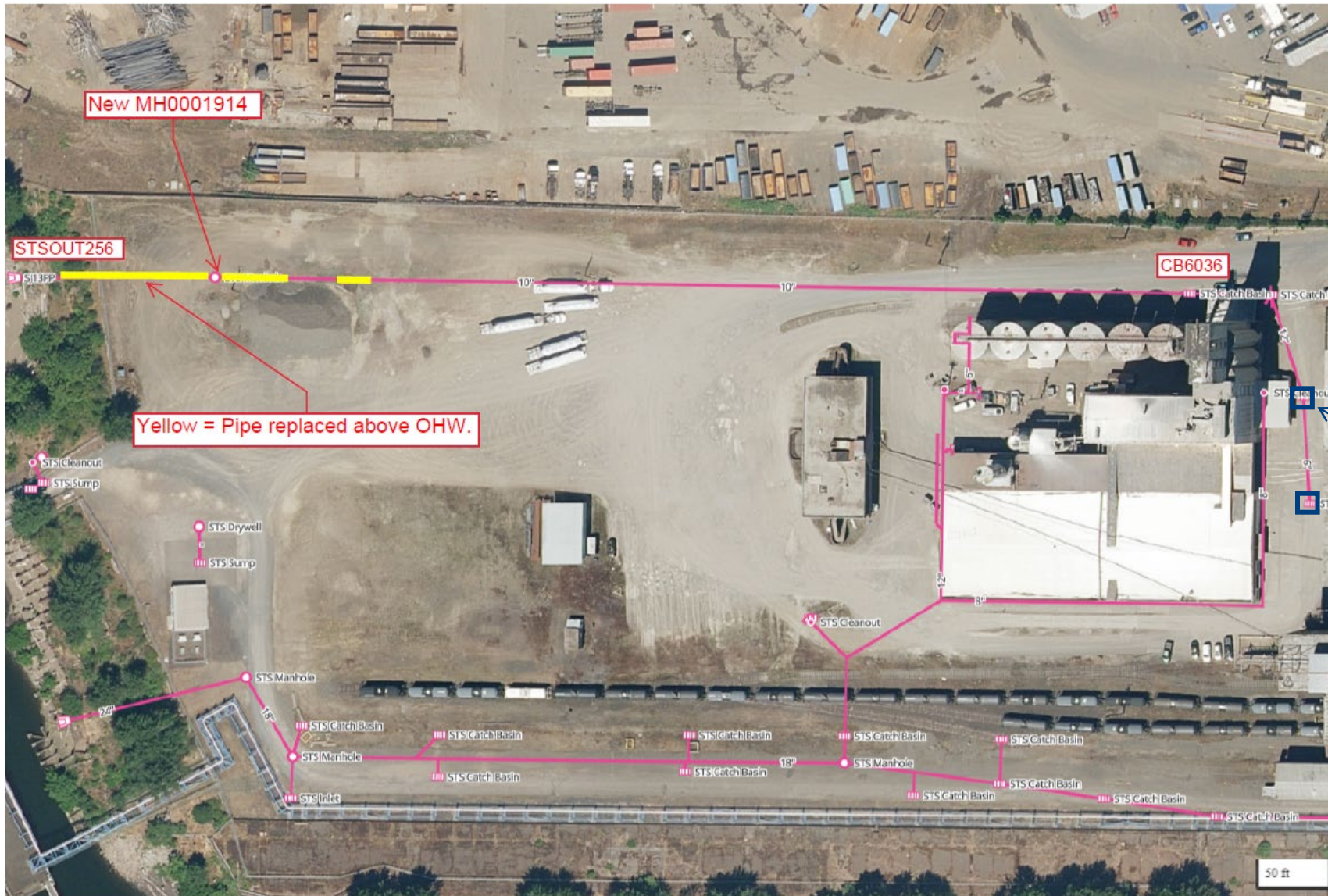
Work completed
December 2022
and January 2023



Basin O BMPs



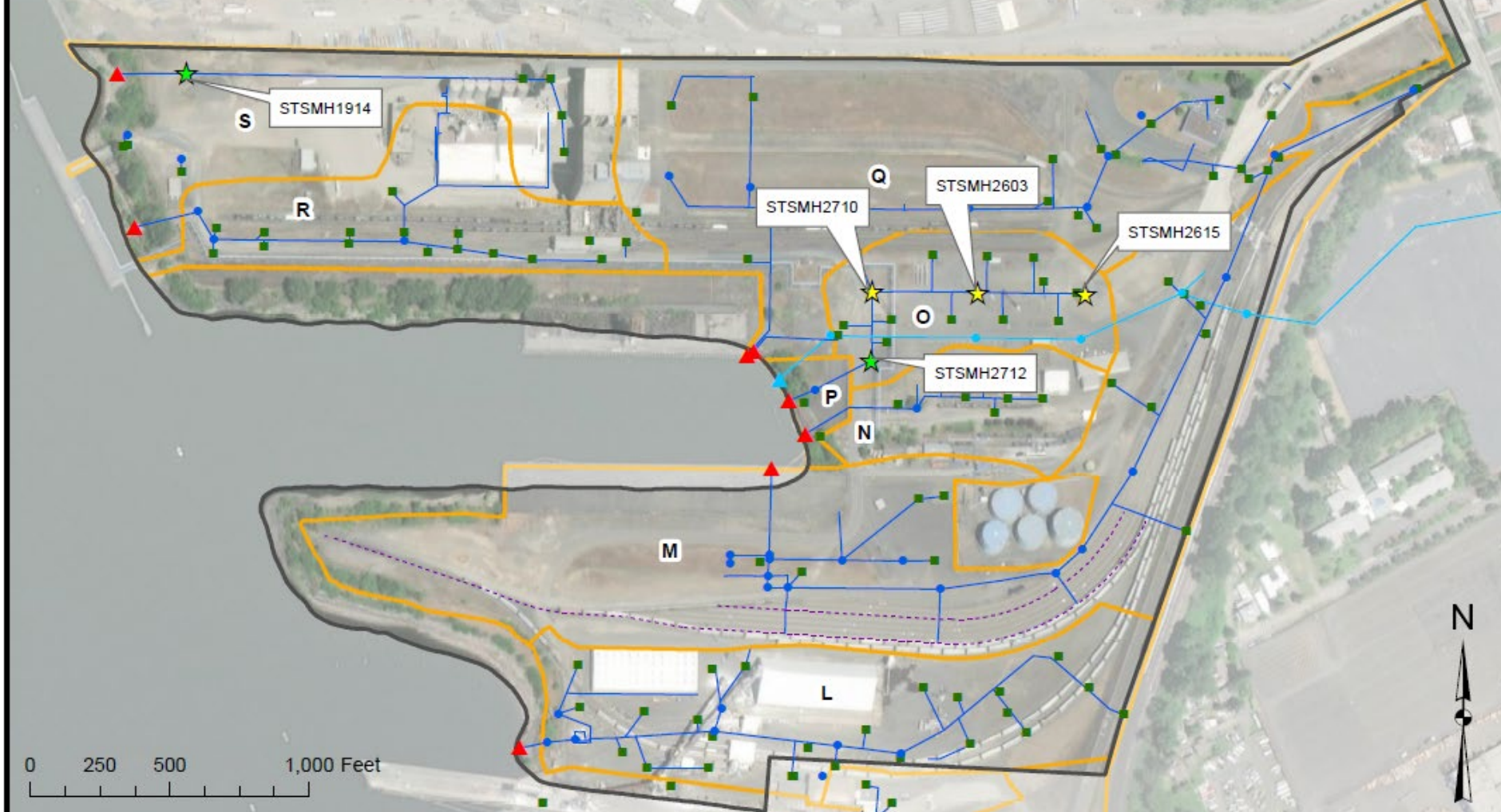
Basin S BMPs



Work completed
January 2023

Catch basin
inserts present





Legend

Sample Location

- ★ Time-weighted composite
- ★ Grab

Storm Pipes

- Port-owned
- - - Port Ballast Subdrain
- City-owned

- Catch Basin

Outfalls

- ▲ Port-owned
- ▲ City-owned

Manholes

- Port-owned
- City-owned

- Slip 1 Upland Facility
- Storm Basins

Figure F-1: Terminal 4 Slip 1 Upland Facility 2022-2023 Sampling Locations

Terminal 4 Stormwater Quality Assessment
Portland, OR

September 2022

Geosyntec
consultants

Post BMP Sampling Timeline

- January 19 – March 1: Only one qualifying event occurs; not selected for sampling due to unfavorable timing
- March 9: Unsuccessful sampling event
- March 19: Unsuccessful sampling event
- March 31 – April 1: Successful sampling event
- April 9 – 10: Successful sampling event, used last of MPTFE bag liners
- April 22: Last well-forecasted, qualifying event of the year occurs
- April 26: Backordered MPTFE bag liners arrive

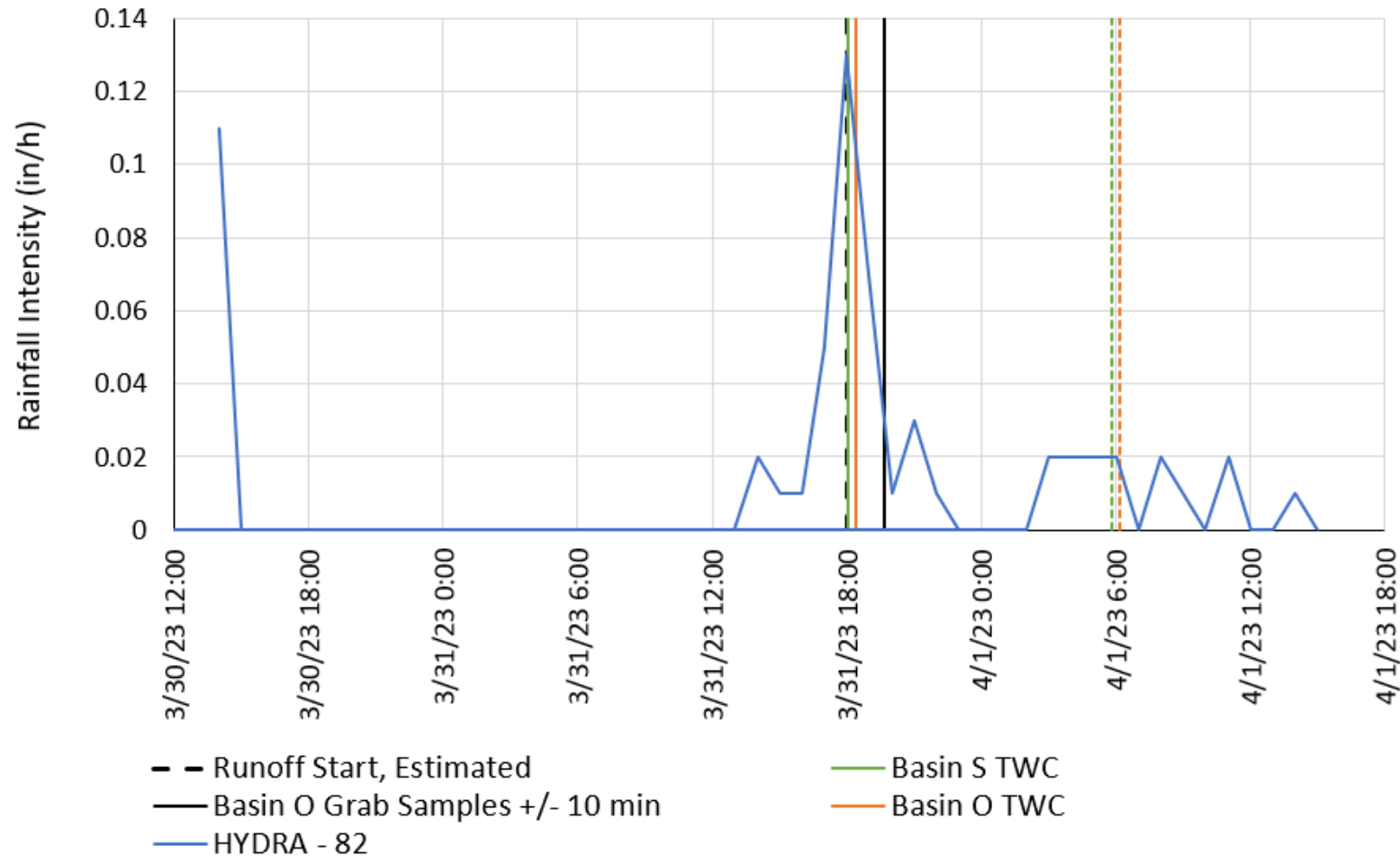


Spring Sampling Results

- Two sets of samples from each location successfully collected
 - One storm qualifies except antecedent 24 h rain was 0.11" rather than <0.10"
 - One storm fully qualifies
 - All parameters successfully sampled
- Data has been validated, shows no major issues
- Duplicate obtained during second storm



Storm Hyetograph – March 31 Storm

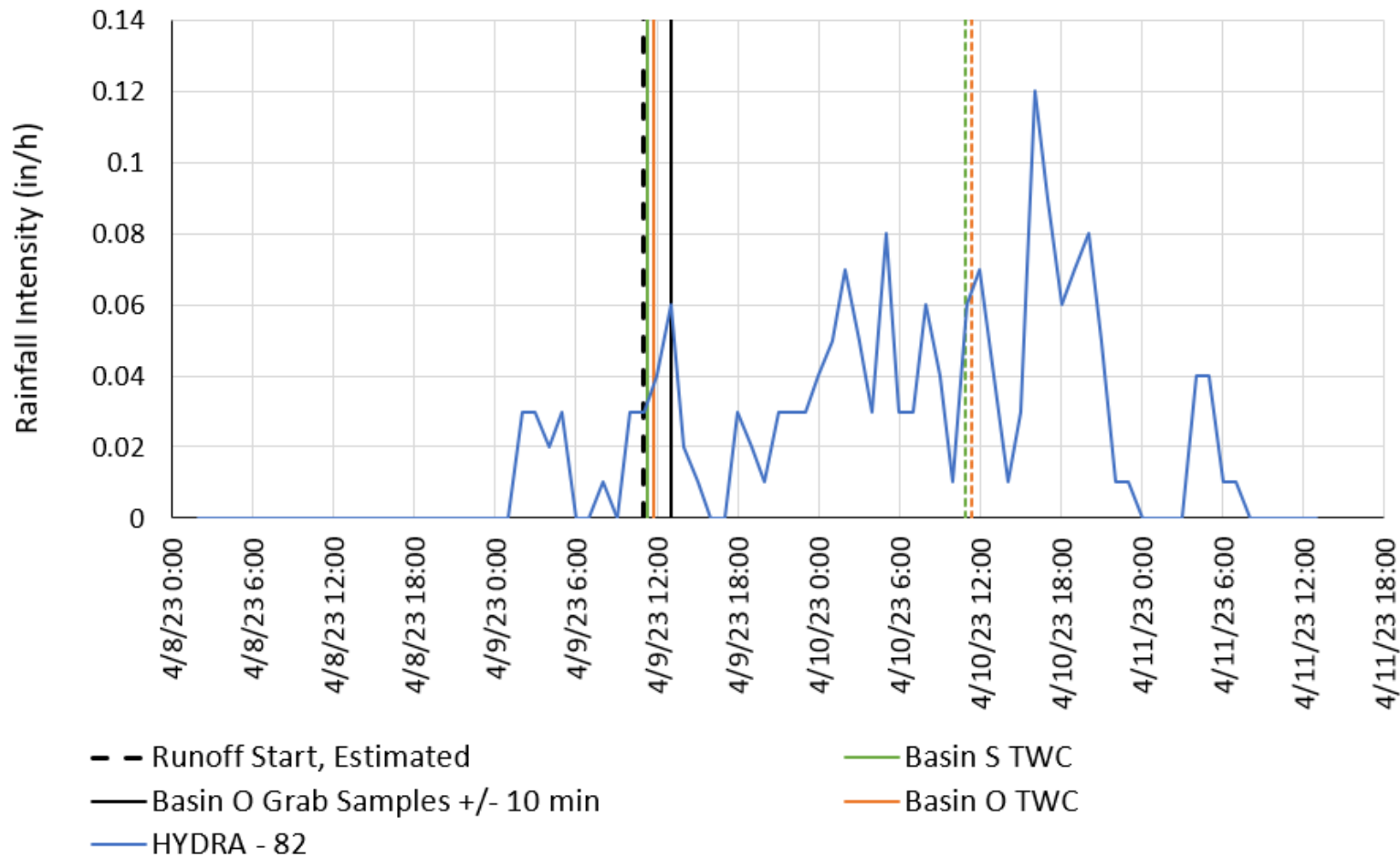


- Antecedent depth 0.11"
- Runoff duration estimated at 16 h
- Total storm depth 0.45"
- Samplers started within first 30 – 45 min of runoff
- Autosamplers covered 75% of storm

TWC: time-weighted composite



Storm Hyetograph – April 9 Storm

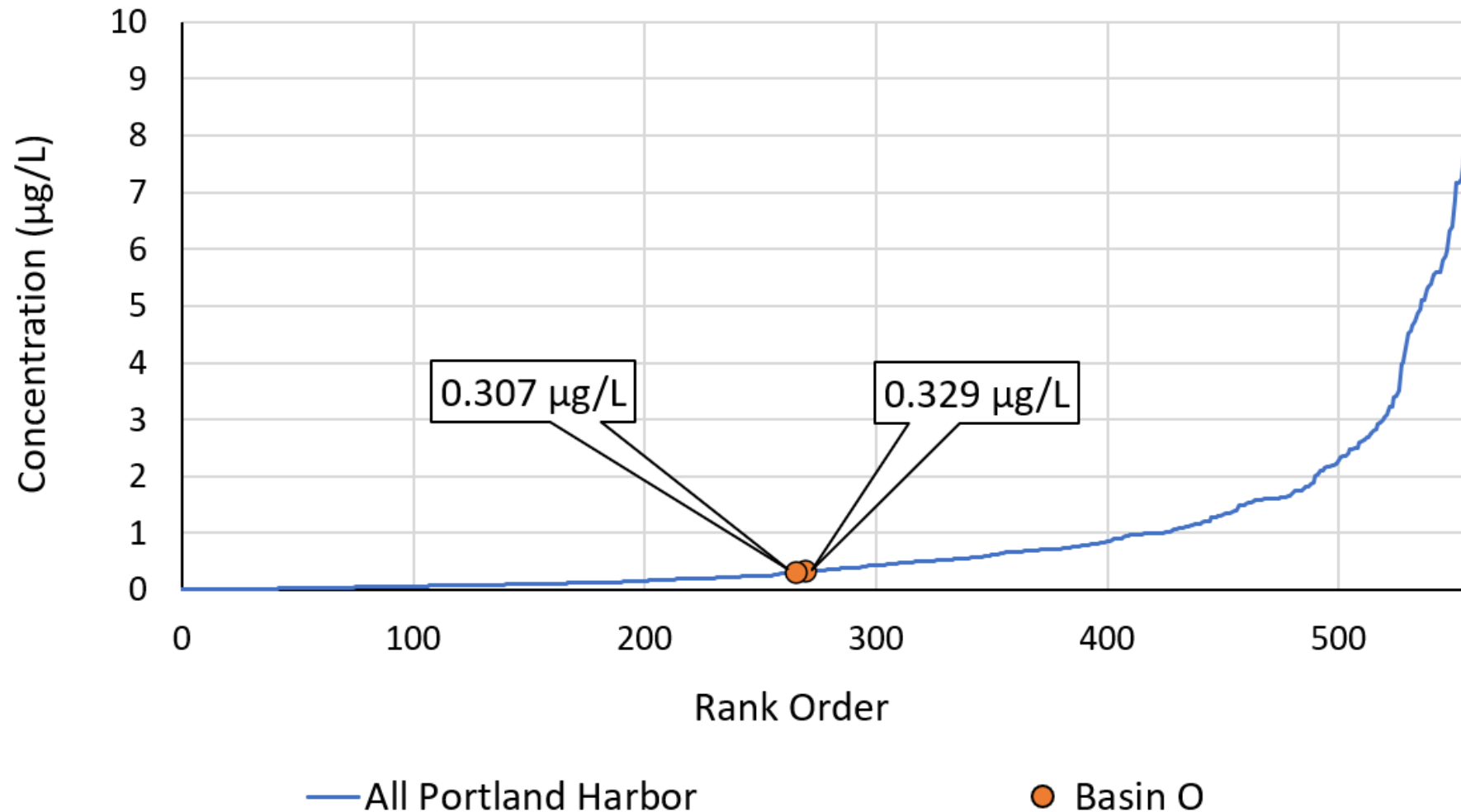


- Antecedent depth 0.00"
- Runoff duration > 24 h (estimated at 46 h)
- Total storm depth 1.75" (0.95" before samplers stopped)
- Samplers started within first 30 – 60 min of runoff
- Samplers ran for full 24 hours, per sampling plan when storms exceed 24 h in duration

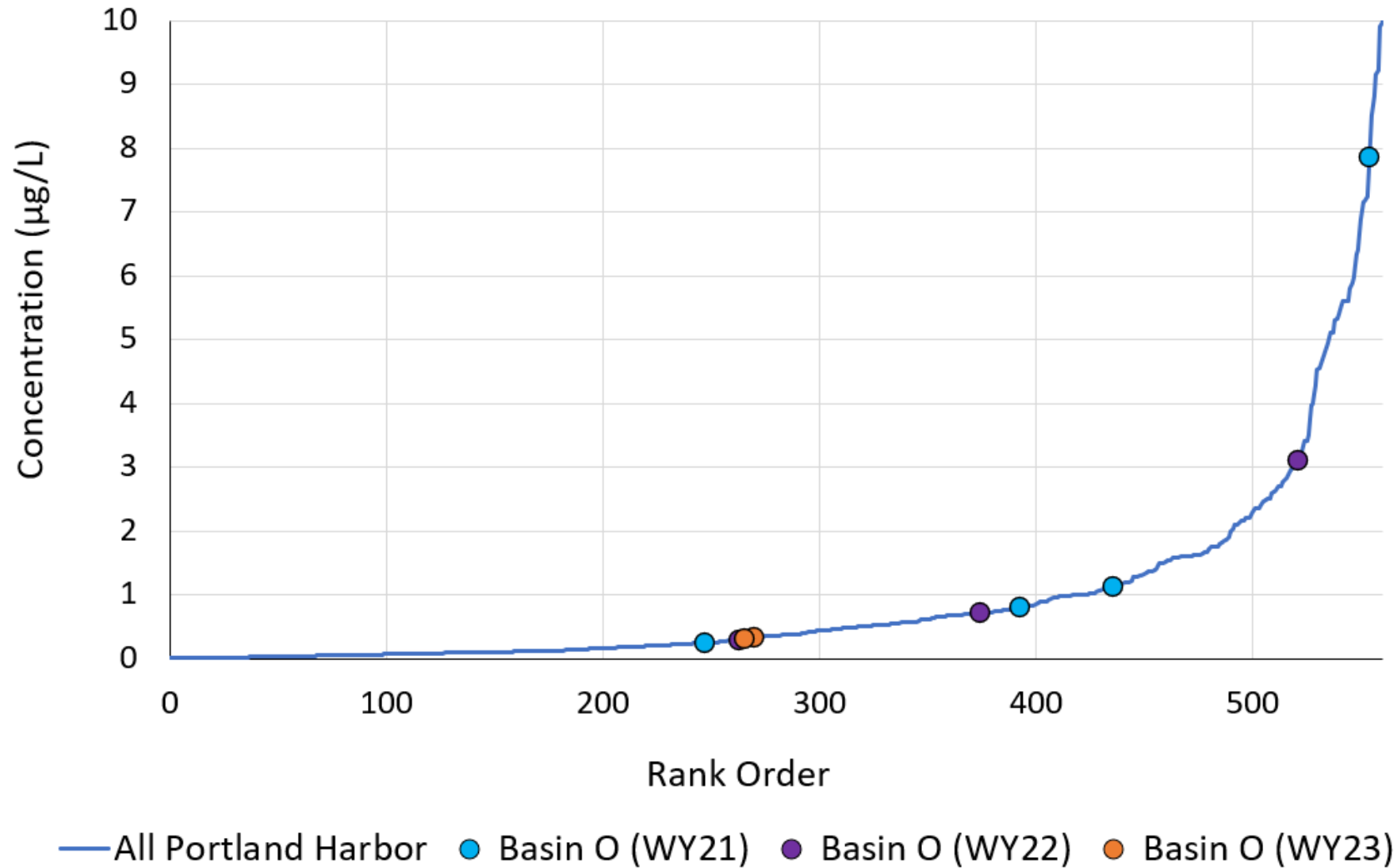
TWC: time-weighted composite



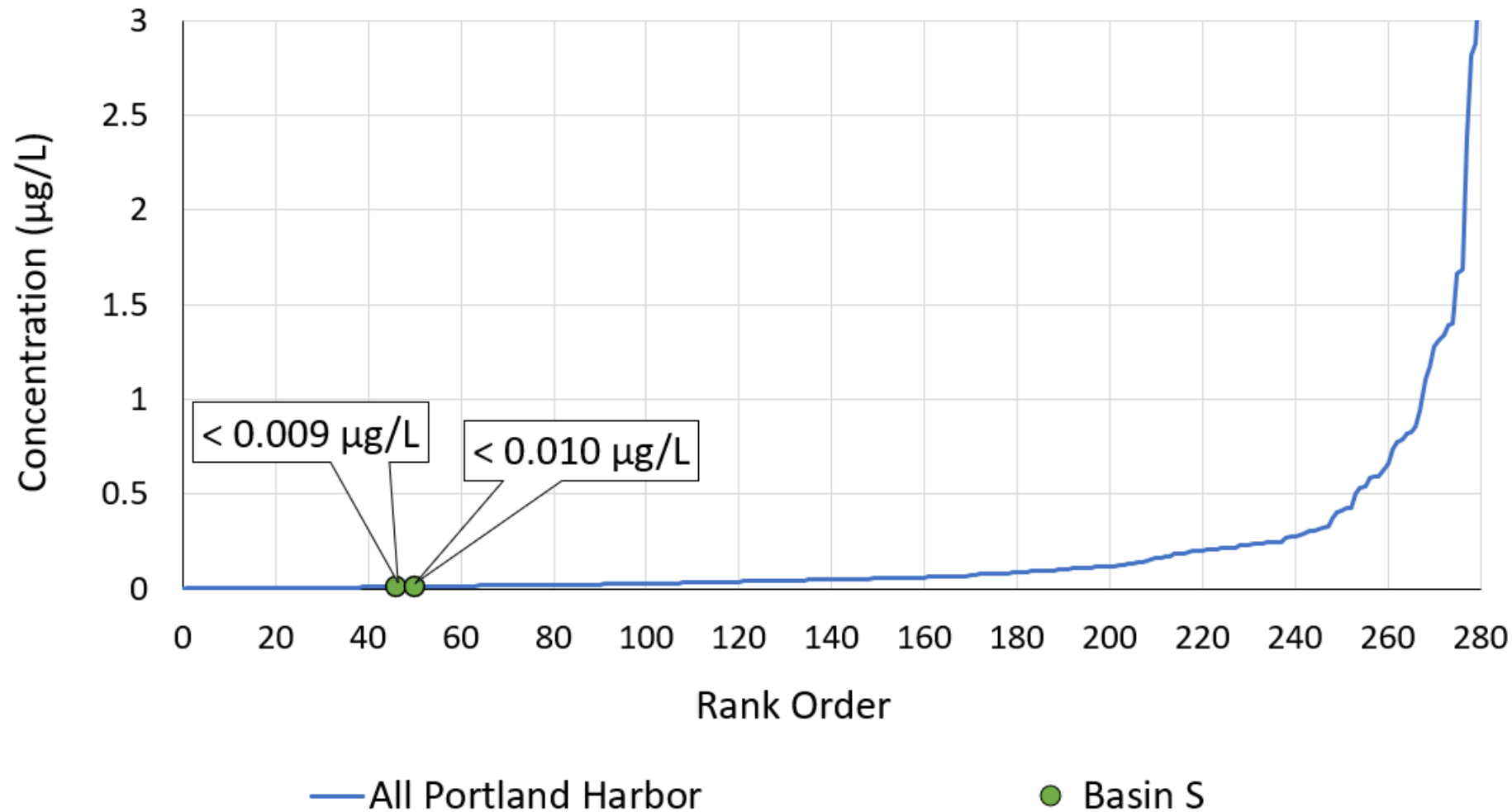
Rank Order - PAHs



Rank Order - PAHs



Rank Order - PCBs



Lines of Evidence – Dioxins and Furans

Property and Sample Name	Detected TCDD-TEQ Concentration in Stormwater (factor times SLV)		
Arkema, treated effluent	54 – 18,000		
Rhône-Poulenc	<1 – 24		
Vigor Industrial	350 – 13,000		
<i>Burgard Industrial Park¹</i>			
Felton Properties	29 – 2,900		
Portland Container	8		
Former Boydstun NE	200		
Pro Truck Lines / Romar	59		
RB Recycling	98 – 980		
Dunkin Bush	10 – 7,800		
<i>Terminal 4 Slip 1 Upland Facility</i>			
	<i>Pre-Cleanout (2020-2021)</i>	<i>Post-Cleanout (2021-2022)</i>	<i>Basin O – Post BMP Basin S Baseline (2023)</i>
Basin N	84 – 1,000	11 - 59	-
Basin O	57 – 1,600	130 – 1,600	150 - 430
Basin P	-	2 - 66	-
Basin S	-	-	200 - 360

¹The Burgard Industrial Park document cites these values as simply, “dioxin concentration.” It is assumed this refers to TCDD-TEQ concentration.



Spring Sampling Results

Date	Sample Name	Basin	Sample Type	TSS (mg/L)	Total PAHs (µg/L)	Total cPAHs (µg/L)	TCDD TEQ (pg/L)	Total PCB Aroclors (µg/L)
4/1/2023	STSMH1914	S	TWC	109	-	-	1.84	<0.00943
3/31/2023	STSMH2603	O	G	39	-	-	-	-
3/31/2023	STSMH2615	O	G	34	-	-	-	-
3/31/2023	STSMH2710	O	G	37	-	-	-	-
4/1/2023	STSMH2712	O	TWC	13	0.329	0.053	2.19	-
4/10/2023	STSMH1914	S	TWC	92	-	-	1.04	<0.0102
4/9/2023	STSMH2603	O	G	7	-	-	-	-
4/9/2023	STSMH2615	O	G	19	-	-	-	-
4/9/2023	STSMH2710	O	G	6	-	-	-	-
4/10/2023	STSMH2712	O	TWC	7	0.307	0.036	0.781	-
4/10/2023	STSMH2712-DUP	O	TWC	9	0.282	0.032	0.674	-
JSCS SLV				-	-	-	0.0051	0.000064
ROD CUL				-	-	0.00012	0.0005	0.0000064

TWC = time-weighted composite

G = grab



Summary for Slip 1

- BMPs and SCMs completed in Basins O and S
- Two sets of stormwater samples obtained
 - Basin O
 - No high TSS source area identified in upstream samples
 - PAHs well below “knee of curve”
 - D/F do not appear elevated compared to other sites in the area
 - Basin S
 - No PCBs detected
 - D/F do not appear elevated compared to other sites in the area
- Discussion
 - Given the recent results and sufficiency assessment conclusions, sufficient information exists to move forward with a stormwater source control determination for Slip 1.

