

MEMORANDUM



To: Paul Kolp, Lower Columbia Estuary Partnership
From: Gardner Johnston, Josh Epstein, and Mike Rafferty (Inter-Fluve)
Date: February 8, 2024
Project: Ridgefield Pits Restoration
Re: Subsurface Investigations

INTRODUCTION

This memo describes the methods and results of subsurface investigations performed by Inter-Fluve and the Estuary Partnership at the Ridgefield Pits restoration project site in September 2022, April 2023, and September 2023. The purpose of these investigations was to characterize subsurface soil conditions in order to inform the grading plan for the project. The results support the design for habitat restoration actions at the site. Characterization of subsurface conditions was performed via excavation of test pits as well as from observations of bank exposures. The test pit locations provide a spatially distributed range of locations that characterize general site conditions where excavation for side-channel creation or gravel pit re-grading will occur as part of the project. Selection of test pit locations was also influenced by the ability to access areas with a backhoe or excavator (both were used). For the test pits, soil profiles and photos are included (Attachment 1). For the observations of bank exposures, notes and photos are included (Attachment 2). Where groundwater was encountered in the test pits, the depth to groundwater was recorded. In some cases, surface water elevation data were also collected in the EF Lewis River; these data were used to help understand patterns of surface and groundwater interaction at the site.

This work was performed in three parts. The first field effort occurred in September 2022 and included test pits in the West Floodplain area (as well as documentation of bank exposures in the core pits complex). This field investigation was completed in conjunction with geotechnical field work by Geotechnical Resources Incorporated (GRI), subcontractor to Inter-Fluve. GRI was performing geotechnical field investigations to inform design of future potential scour protection of the BPA powerline towers and design of footings for future potential access bridges over constructed side-channel habitat, elements that have since been removed from the restoration project designs. The results of the geotechnical investigations by GRI are included in a separate report by GRI. The second field effort occurred in April 2023 and included test pits in the core pits area and in the East Floodplain. The third field effort occurred in September 2023 and included additional test pits throughout the site, including in the West Floodplain, core Ridgefield Pits complex area, East Floodplain, Danger Park, and County Yard. A separate effort, to test for soil contamination, occurred in July 2023 and also included digging test pits and documenting subsurface conditions within the County Yard area and within the core Ridgefield Pits complex area. That work was led by Floyd-Snyder, Inc. and the results of that

investigation are summarized in a separate memo. The location of those pits and the basic subsurface information, however, are included in the summary map and table presented at the end of this memo.

METHODS

September 2022 (West Floodplain and Pits Bank Exposures)

Test pit field work was performed on September 23, 2022. The map in Figure 1 shows the test pit locations. The locations of the 2 test pits and 3 borings performed by GRI and areas of water surface elevation (WSE) measurements are included on the map. The work included excavating 6 machine-dug test pits using a Case 580 Super N wheeled backhoe (Dan J Fischer Excavating). The test pits were excavated to below static water level or to the maximum digging depth of the excavator (approximately 14 ft), whichever was shallower. The exception is Test Pit 7, which was a test dig into levee material and was only dug to 6.5 feet depth. Subsurface conditions in each pit were documented with a soil profile and photos. Bulk samples of the coarse gravel/cobble layers in Test Pits 4 and 5 were collected and subjected to sieve analysis by GRI. Additional samples of fine material layers in pits 3, 4, and 5 were collected and are stored for potential additional analysis if needed during the course of design.

Observations and documentation of bank exposures in the pits complex was performed on October 18, 2022. This was performed opportunistically in locations where bank erosion allowed for an observation of bank stratigraphy, primarily along the river-right bank of the mainstem at the upstream end of the pits complex where the river has been eroding into the high central area of the pits, which used to be the processing area during the mining operation. The bank on the opposite bank, at a smaller remnant area of high ground, was also documented.

WSEs were surveyed within the test pits (groundwater surface elevation), where groundwater was encountered, and also at select points along the margin of the EF Lewis River and within the pits complex. The locations of the WSE points are included in Figure 1.

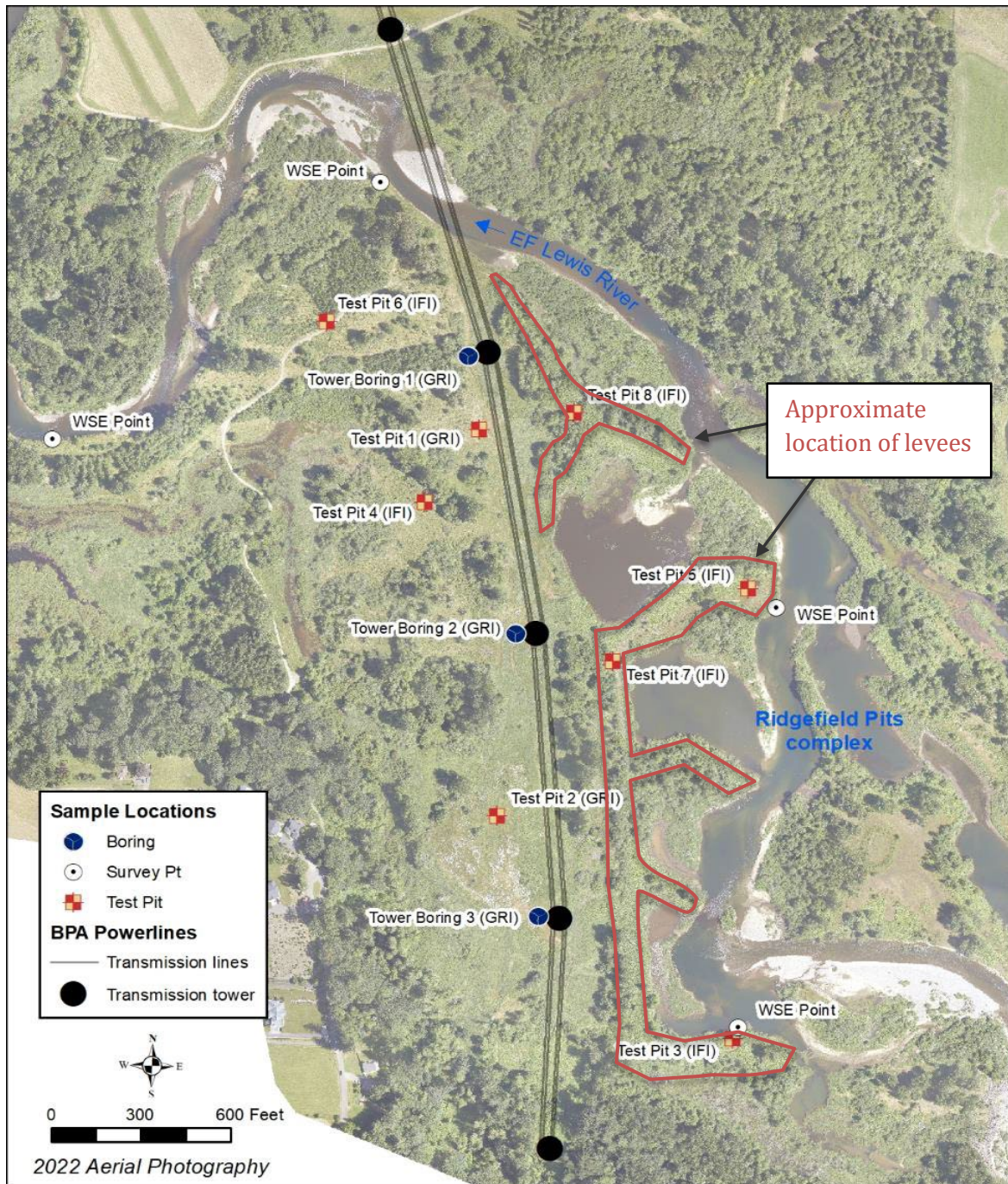


Figure 1. Map of “west” test pit, boring, and water surface elevation survey point locations in the West Floodplain area. Work performed in September 2022.

April 2023 (Core Pits Complex, East Floodplain)

The subsurface investigations of the East Floodplain were performed on April 18-19, 2023 by Inter-Fluve and EP staff. Kysar & Koistinen provided a tracked excavator (CAT 310C) and operator. Eight test pit locations were identified ahead of time, in addition to 5 dig locations to explore the materials used to construct existing berms and evaluate previously disturbed areas of the floodplain. Final test pit and dig

locations are shown in Figure 2. Test pit and dig locations were fine-tuned at each location to minimize impacts to existing vegetation and conform to observations at the site. At the test pit locations, surface substrate conditions were observed and a ground elevation was recorded using RTK-GPS. During the excavation, subsurface conditions in each pit were documented with a soil profile and photos. General subsurface conditions were observed with a focus on the depth to the gravel-cobble layer and depth to groundwater. Soil profiles are included in Attachment 1. Select cross-sections showing the elevations of the gravel-cobble layer and WSE are included at the end of this memo. Cross-section locations are displayed in Figure 2.

Before backfilling each test pit, a 4" PVC pipe was installed vertically to facilitate future monitoring of groundwater levels. Reference elevations on each of the groundwater monitoring stations were recorded using RTK-GPS.

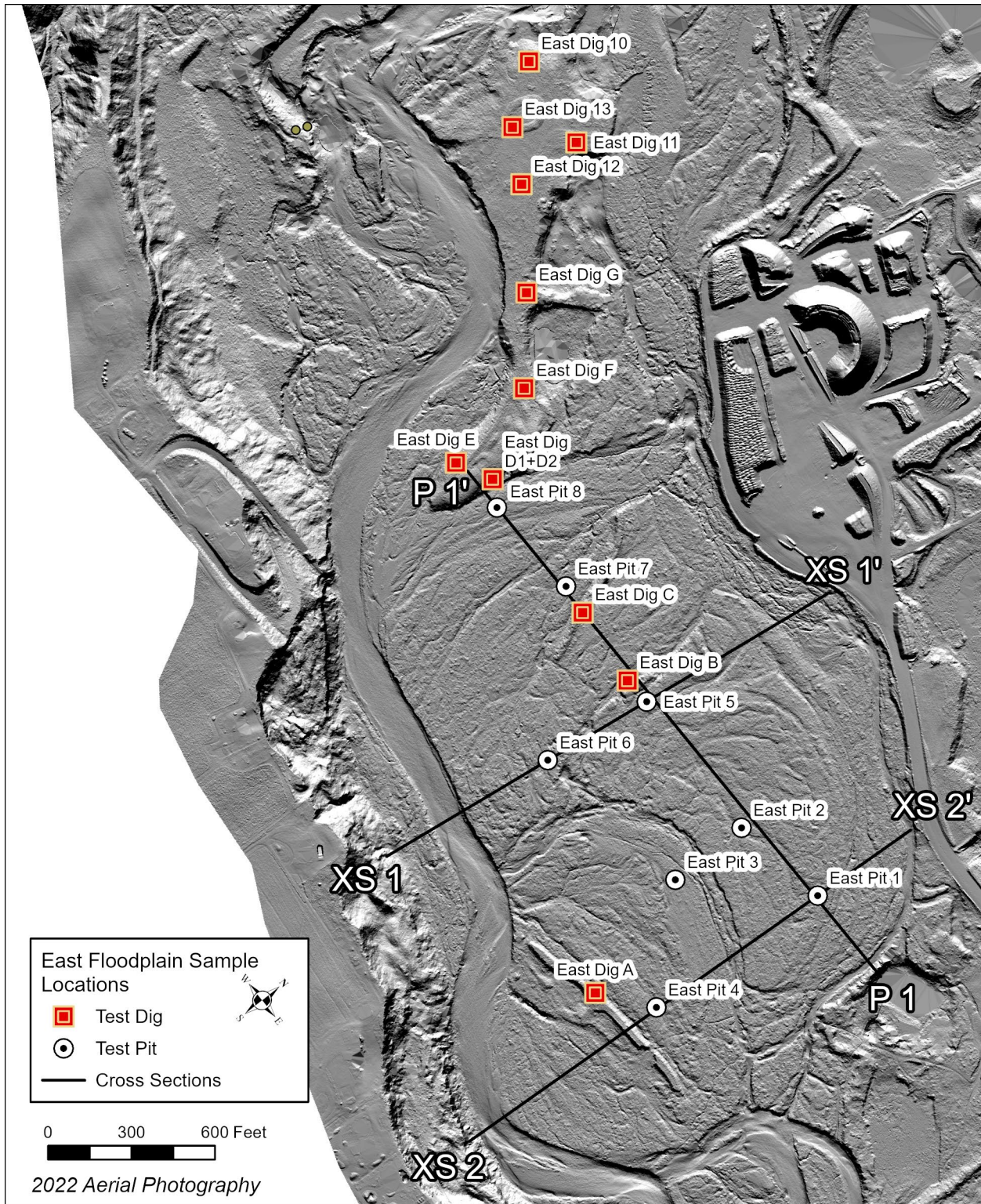


Figure 2. Map of subsurface investigation locations and cross sections in the Pits Complex and East Floodplain. Work performed in April 2023.

September 2023 (West Floodplain, Core Pits Complex, East Floodplain, Danger Park, County Yard)

Additional subsurface investigations were performed on September 25, 26, and 27, 2023. Inter-Fluve and EP staff observed test pit investigations on September 25 and EP staff observed test pits on September 26 and 27. Kysar & Koistinen, Inc. provided a tracked excavator and operator. This work was combined with timber pile drive testing, which is covered in a separate memo. A total of 28 test pits were dug over the three days of work. An additional single pit investigation was documented by GRI on September 25 in the West Floodplain area to investigate geotechnical soil conditions at the location of a potential bridge footing. This pit is included in the maps and tables, and the soil profile log is copied into Attachment 1; additional geotechnical information on the pit is included in a separate memo by GRI. The test pit locations for September 2023 are shown in Figure 3. Test pit locations were selected to provide additional spatial coverage in planned excavation areas, with a focus primarily on documenting the presence, depth, and elevation of the gravel-cobble layer to inform the grading plan and to help quantify the volume of coarse material available as fill within the core pits complex. Test pit locations were modified as needed in the field to minimize impacts to existing vegetation and to adjust to site access conditions. At the test pit locations, a ground elevation was recorded using RTK-GPS. During the excavation, subsurface conditions in each pit were documented with a soil profile and photos. General subsurface conditions were observed with a focus on the depth to the gravel-cobble layer and depth to groundwater. Soil profiles and photos are included in Attachment 1. For all of the pits except for 3 pits (2 by Inter-Fluve staff, 1 by GRI staff), the soil profiles were documented by Estuary Partnership staff.

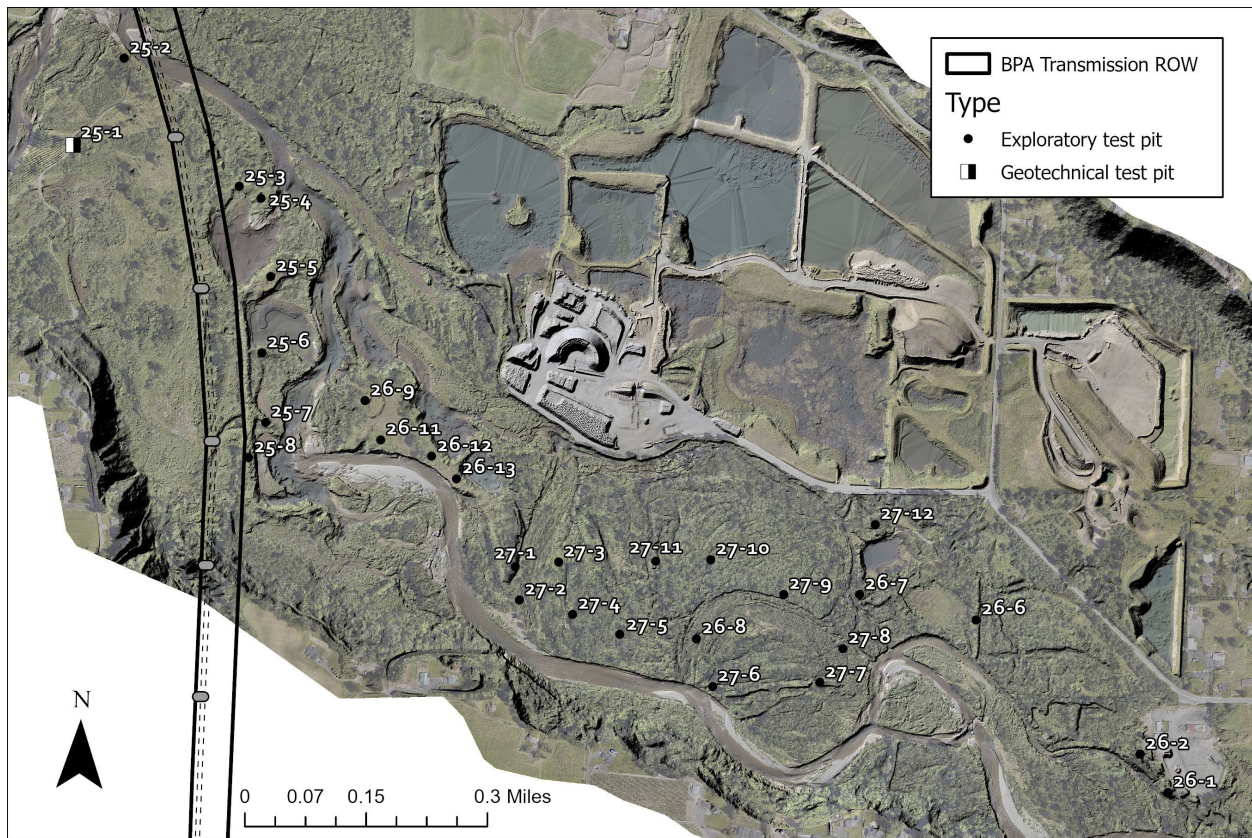


Figure 3. Locations of September 2023 test pits.

RESULTS

September 2022 (West Floodplain and Pits Bank Exposures)

Soil profiles and photos from the test pits investigated as part of this effort are included in Attachment 1 and tabular data is included in Table 1. The sieve analysis results for the gravel-cobble layer in test pits 4 and 5 are included in Attachment 1. A map of the areas where bank exposures were documented in the pits complex, and the corresponding photos, are provided in Attachment 2. Of particular interest for restoration design is the location of coarse (gravel-sized or larger) versus fine material that will be encountered as part of site grading. In order to aid in the understanding and visualization of this information, a series of cross-sections are provided of the study area that show the top of the gravel-cobble layer. Water surface elevations are also included on the cross-sections. A map of the cross-section locations is included in Figure 4. The cross-section figures are included at the end of this memo.

Areas sampled that are outside of the former Ridgefield Pits mining area exhibit natural floodplain stratigraphy. This includes all of the test pits, borings, and surveys of bank exposures that lie west of the levees that form the west boundary of the pit complex. From a total of 12 samples, the range of depths to the gravel-cobble layer is 2.1 to 7 feet, with an average of 4.5 feet below surface. The top layer(s) of fines is mostly comprised of a brown silty sand loam. In Test Pit 4, a 1.2-ft thick layer of buried silt or clay loam with organic material was observed between approximately 4 to 5 feet depth. The gravel layer is made up of sands, silts, gravels, and cobbles, with clasts up to approximately 10 inches median diameter. From the 7 sieve analysis results from this layer (4 from the borings and one each from test pits 1, 2, and 4), gravel size (4.75 mm [0.19 in]) or larger comprises between 55% and 90% of the material. The D_{50} ranges from 20-40mm (0.79-1.57 in) and the D_{84} ranges from 45-90mm (1.77-3.54 in). These numbers, however, are likely to be low since there were larger clasts (up to 10 inches or more) that are not represented in the sieve analysis results.

In contrast to the typical floodplain stratigraphy found in the undisturbed portions of the study area, the levees and bank exposures in the former gravel mining complex exhibit disturbed fill, with highly variable subsurface materials ranging from fines to large cobbles, but generally dominated by fines (Attachment 2). In a couple of areas, buried foreign debris was found up to approximately 3 feet from top of bank, including a bottle dated to circa 1957. These observations confirm the presence of fill and disturbance. Despite the mining history, coarse aggregates were nevertheless found in several of the upper layers of the levee test pits and bank exposures, but the material is poorly sorted and the presence and distribution of the coarse material is highly variable. The variability of material observed in the pits complex is consistent with the variability documented in previous bank stratigraphy assessments conducted by the EP and IFI in 2018. A few of the bank exposures, however, have more well-sorted material not far below top-of-bank, such as the bank exposures at Site K, and may represent former high ground areas between the gravel mining pits that were only disturbed in their uppermost layers by the mining, and which the river is now eroding into. Also, in most of the bank exposures, even those dominated by fines, a coarse alluvial layer is found at depth, 6 to 8 feet below top of bank.

A sieve analysis was performed of the material located at approximately 10 ft depth at Test Pit 5 on a levee. The material contained approximately 30% gravel or larger material. Based on this and other test pits and bank exposures in the pits complex, gravel or larger-size material appears to make up at least

15 to 25% of the material. However, additional investigations would be necessary to better document the presence of these coarse substrates.

Water surface elevations were generally at or somewhat below the elevation of the top of the gravel-cobble layer. There is some uncertainty with the groundwater levels recorded in the test pits and borings due to the unknown degree to which the water level was able to equilibrate with static groundwater by the time measurements were taken. Regardless, the water level pattern generally follows the expected down-valley gradient and is mostly aligned with the coarse material layer. The water levels recorded in Boring 3 and Test Pit 2 were slightly more elevated than would be expected from the down-valley gradient. This is possibly due to a local rise in the groundwater elevation due to the Dyer Creek tributary entering the valley bottom in this location.

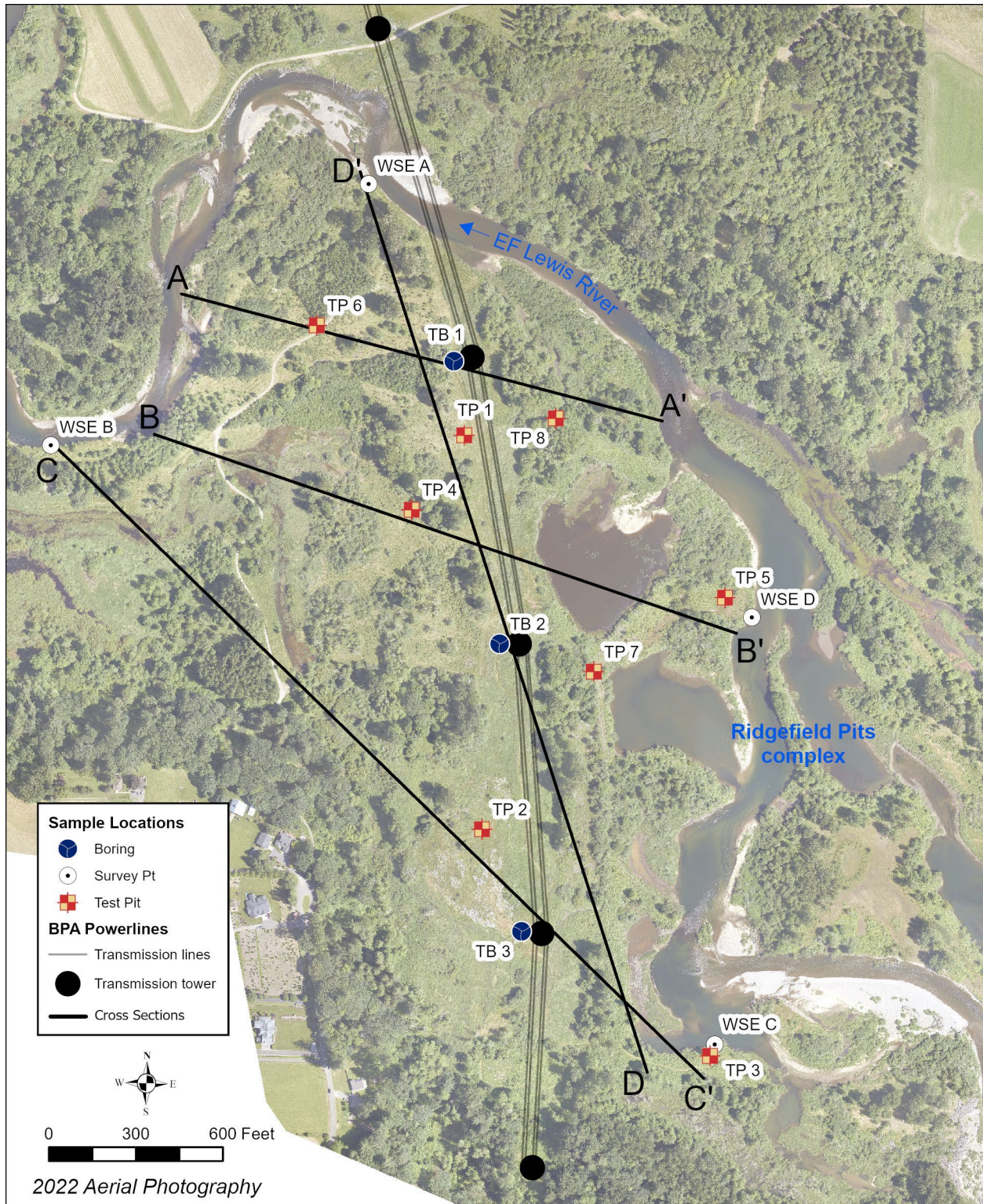


Figure 4. Location of cross-sections used for visualization of subsurface and WSE data for the West Floodplain area. East floodplain cross sections and profile are shown in Figure 2.

April 2023 (Pits Complex, East Floodplain)

Soil profiles and photos from the core pits complex and east floodplain subsurface investigation are included in Attachment 1, and tabular data is presented in Table 1. As with the West Floodplain data, a series of cross-sections are provided of the study area that show the top of the gravel-cobble layer. Water surface elevations are also included on the cross-sections. The cross-section locations are included in Figure 2. The cross-section figures are included at the end of this memo.

Generally, subsurface conditions can be categorized by these three dominant influences:

1. River Processes: These areas have been influenced by river processes, where a variable layer of soil and vegetation sits on top of layers of sand, gravel and cobble. This was the condition found in the East Floodplain test pits (Pits 1-8).
2. Berms / Levees: These are areas where previous berm or levee construction has left large rock (riprap, cobble) and pieces of concrete as surface armor, with native cobble, gravel, and sand underneath (i.e. East Dig A)
3. Disturbed / Graded: These are areas where the subsurface conditions have been affected by past gravel mining operations (mining, staging, processing). These conditions were found in the core Ridgefield Pits area (pits 10-13 and East E, F, and G). Conditions in these pits were variable.

In the areas of the east floodplain most influenced by river processes with typical alluvial stratigraphy, depth to substrate ranged from a few inches up to 3.5 ft, while the depth to groundwater varied from 1.5 to 6 feet. Soil logs and photos from each site can be found in Attachment 1. Groundwater connectivity appears to be variable, with elevations ranging from 35.6 – 44.1 ft in the east floodplain complex. The groundwater levels show the expected down-valley gradient as well as a cross-valley gradient with higher levels in the pits closer to the main river channel.

In the disturbed floodplain in the core pits area, subsurface conditions do not conform to natural alluvial floodplain deposits. Near the surface, compacted crushed rock (former mine processing/staging area?) was found on top of clay and silt. In pits 10, 12 and 13, coarse sand-gravel-cobble substrate was encountered at 11-12 ft, also coinciding with groundwater.

September 2023 (West Floodplain, Core Pits, East Floodplain, Danger Park, County Yard)

A total of 29 pits were dug as part of the September 25-27, 2023 effort. These were mostly concentrated in the core pits (11 test pits) and the East Floodplain (11 test pits), with 2 pits in the West Floodplain, 3 in Danger Park area, and 2 in the County Yard area. The overall pattern seen with these test pits is similar to the pattern described above for the April 2023 test pits. Subsurface conditions observed in the test pits in the East Floodplain generally matched previous explorations in this area, with relatively shallow depths until reaching the gravel-cobble layer. Depths to the gravel-cobble layer ranged from zero to 4.5 feet deep, for an average of 1.4 ft. The 2 test pits in the undisturbed floodplain deposits in the West Floodplain area showed depths of 5.8 ft and 1.5 ft, for a 3.8 ft average depth. As with previous investigations, the 11 test pits in the core pits area showed highly variable conditions, dominated by fines, without encountering the gravel-cobble layer at all, or only at significant depth (11-12 ft). There were layers and pockets of coarse material in many of these pits, but volumes of gravel or larger

material are less than 25%. Two of the test pits in Danger Park were in the berm surrounding Danger Park Pond. These showed fines throughout, which is to be expected as overburden from the gravel mining operation. The other test pit at Danger Park was in the push-up berm to the east (#26-6 in Figure 3). This berm had a mix of material, roughly half gravel-cobble but very poorly graded and variable. The two test pits at County Yard were in the berm to the west of the yard itself. These test pits showed overwhelmingly fine material, with some gravel-cobble at depth, but based on this investigation, they are assumed to be mostly fine overburden from past mining operations.

SUMMARY

Overall, there were a total of 74 test locations, including exploratory test pits led by the Estuary Partnership and Inter-Fluve; drilled borings and pits for geotechnical analysis; and pits used for soil contaminant sampling. The locations of all the sites are displayed in Figure 5. The data are included in Table 1. Soil profile logs for the sites, excluding the geotechnical borings and the logs from the soil contaminant testing, are provided in Attachment 1.

The study area can be divided into 5 areas: 1) West Floodplain – the floodplain to the west of the BPA powerline corridor; 2) Core Pits - the core gravel pit complex where the river avulsion occurred; 3) East Floodplain – the floodplain area to the east of the pits complex, which is largely undisturbed; 4) Danger Park – the County’s Danger Park area consisting of old County gravel pits; and 5) County Yard – the County’s “Daybreak Maintenance Yard” area, including the levee and old gravel pits to the west.

Subsurface conditions in the West Floodplain area exhibit largely undisturbed alluvial stratigraphy, with a coarse gravel-cobble layer overlain by a few to several feet of finer material dominated by sands and silts. The coarse alluvial layer was found at depths ranging from 1.5 to 7 feet, with an average of 4.8 feet. This coarse layer can be expected to contain greater than 60% and as much as 90% gravel or larger size material, and is likely to be suitable as channel bed substrate for constructed side channels or for use in other areas of the project where coarse material is desired.

Subsurface conditions in the East Floodplain area also exhibit undisturbed alluvial stratigraphy, except for the three push-up berms, which mostly contain coarse sand-gravel-cobble material assumed to be sourced from the surrounding floodplain. In contrast to the West Floodplain, the coarse alluvial layer was found at shallower depths in the East Floodplain area, ranging from the surface to 4.5 feet deep and averaging 1.7 feet deep (excludes pits on berms).

In contrast to the west and east floodplain areas, subsurface conditions in the central gravel pit complex (core pits) are mostly disturbed and highly variable. Project excavations in the core pits area can be expected to contain, on average, less than 25% gravel or larger sized material. Pockets and layers of coarser and finer material are likely to be encountered, and the material should be expected to be unevenly distributed. A few of the test pits did encounter a gravel-cobble layer at depth (11 or more feet deep), which is possibly the native coarse alluvial layer. There is also expected to be non-native buried material in this area based on what has been seen in some of the bank exposures and pits, including scrap metal, geotextile, concrete rubble, and other trash and debris. There is considerable uncertainty with respect to the amount of non-native material, as well as the total availability of native coarse material in the pits complex. Along the southern portion of the east boundary of the core pits area,

along the embankment edge of the central high ground (former gravel mine processing area), angular boulders, concrete rubble, and gravel bedding/liner material was observed in test digs and pits in this area. This is assumed to be the remnants of former bank armoring that lined the river-left (west) side of the former channel when it was located here prior to the 1996 avulsion. This area is indicated in Figure 5.

Similar to the core pits area, subsurface conditions in the Danger Park area exhibit disturbed and variable conditions. Based on a limited number of pits in this area, the berm surrounding the Danger Park Pond and remnant pond to the south should not be assumed to contain significant amounts of gravel-cobble material, as the test pits were dominated by fines. The berm to the east of the remnant south pond, however, may have a greater amount of gravel-cobble based on the one test pit on this berm that showed approximately 50% gravel-cobble. This berm may have been a push-up berm to protect the gravel mining operation or ponds from river erosion.

Subsurface conditions in the County Yard processing area contained more coarse alluvial material than what was expected from the history of gravel mining in this area. The depth to the coarse alluvial layer in the 4 test pits in the processing yard ranged from 1 to 4 ft, for an average of 1.25 ft. Less information is available for the levee to the west, due to only 2 test pits in this area. These 2 pits indicated variable subsurface conditions, dominated by fine material (sands and silts) with only occasional gravels and cobbles, mostly at depth.

The complete picture of the pattern of seasonal groundwater elevations and the relationship to surface water in the mainstem EF Lewis cannot be determined from these data due to collection in different seasons and many test pits that were not deep enough to encounter groundwater; nor was this the intent of these investigations. However, from the WSE data that were collected, it was observed that water surface elevations generally follow the expected down-valley slope pattern in the study area. In the east floodplain, during the April 2023 surveys, we also saw a drop in groundwater WSE with distance from the main channel, as would be expected during the spring freshet. The slightly higher groundwater observed in the vicinity of the Dyer Creek fan in the West Floodplain during the September 2022 surveys could have implications for future potential work in this area.

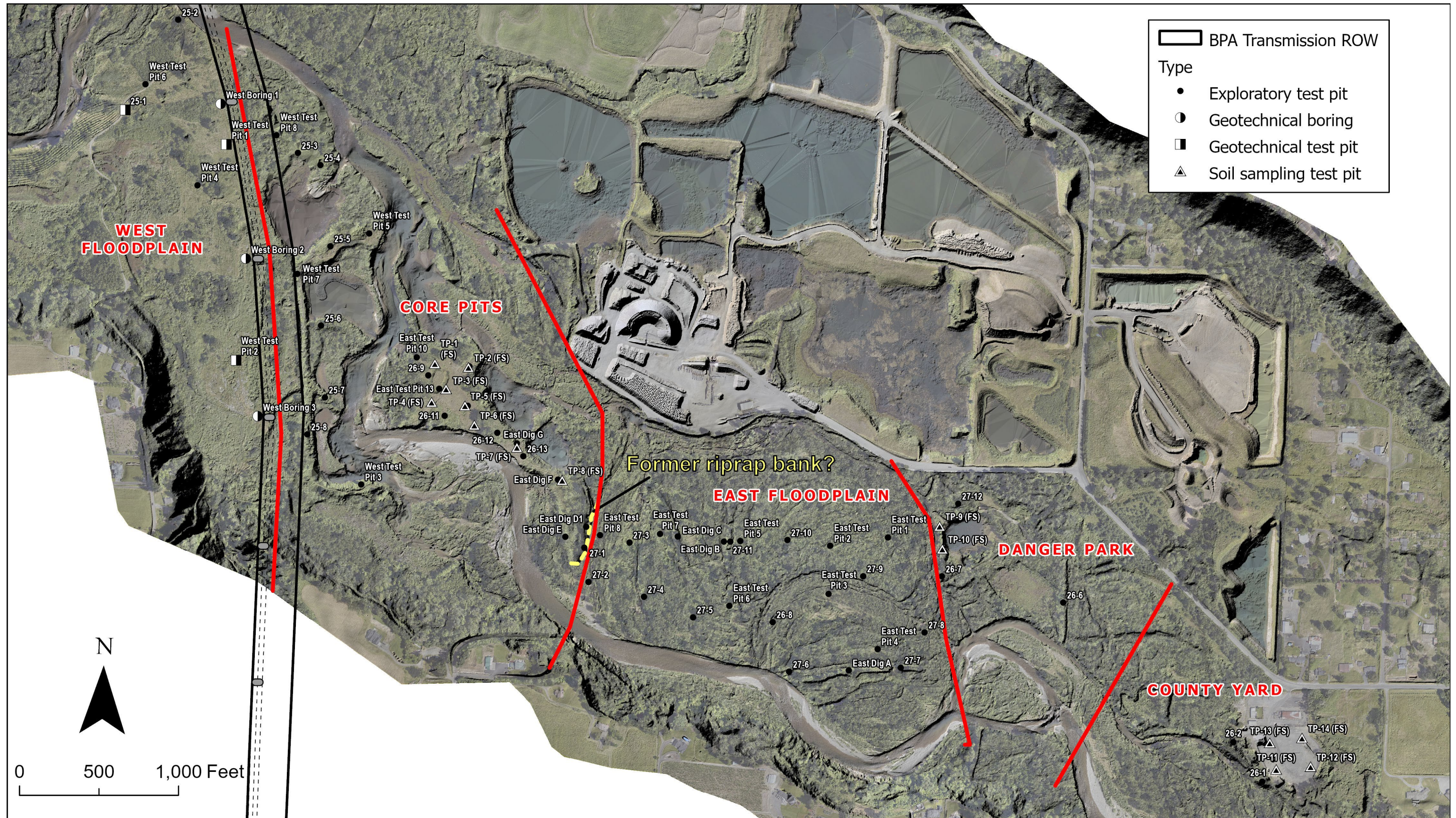


Figure 5. Overview of all subsurface investigation locations.

Table 1. All subsurface data. GRI = Geotechnical Resources Inc; IFI = Inter-Fluve, Inc; EP = Lower Columbia Estuary Partnership; FS = Floyd-Snider, Inc.

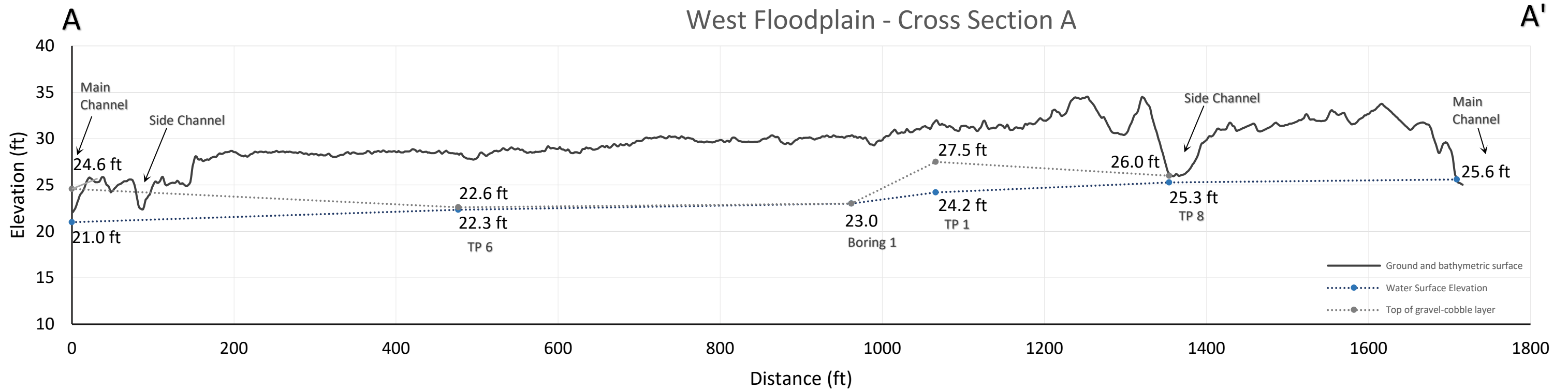
Name	Survey date	Survey Lead	Type	Coordinates (WA Stateplane South, NAD83, US Feet)		Elevations (ft, NAVD88)				Depths (ft)			PVC installed for monitoring? (Yes/No)	Notes
				Northing (ft)	Easting (ft)	Ground	Top of gravel- cobble layer	Water surface	Pit bottom	Pit depth	Depth to gravel- cobble layer	Depth to water surface		
West Boring 1	September 22, 2022	GRI	Geotechnical boring	186874.932	1097040.618	30	23.00	23.00	-31.50	61.50	7.00	7.00	N	
West Boring 2	September 22, 2022	GRI	Geotechnical boring	185901.932	1097198.833	30	25.00	22.50	-31.50	61.50	5.00	7.50	N	
West Boring 3	September 21, 2022	GRI	Geotechnical boring	184910.621	1097273.526	37	34.00	27.50	-24.50	61.50	3.00	9.50	N	
West Test Pit 1	September 23, 2022	GRI	Geotechnical test pit	186620.108	1097076.210	32	27.50	24.20	23.50	8.50	4.50	7.80	N	
West Test Pit 2	September 23, 2022	GRI	Geotechnical test pit	185262.532	1097137.283	35	29.50	27.57	26.00	9.00	5.50	7.43	N	
West Test Pit 3	September 23, 2022	IFI	Exploratory test pit	184481.428	1097923.861	41.1	NA	NA	26.60	14.50	NA	NA	N	Fill. variable coarse.
West Test Pit 4	September 23, 2022	IFI	Exploratory test pit	186363.575	1096894.983	28.7	23.50	22.70	20.70	8.00	5.20	6.00	N	
West Test Pit 5	September 23, 2022	IFI	Exploratory test pit	186060.802	1097974.992	34.5	NA	22.00	21.70	12.80	NA	12.50	N	~50% gravels below 3 inches, varies
West Test Pit 6	September 23, 2022	IFI	Exploratory test pit	186998.649	1096567.859	27.9	22.50	21.60	20.90	7.00	5.40	6.30	N	
West Test Pit 7	September 23, 2022	IFI	Exploratory test pit	185805.494	1097523.047	37.7	NA	NA	31.20	6.50	NA	NA	N	
West Test Pit 8	September 23, 2022	IFI	Exploratory test pit	186678.441	1097392.322	34	26	24	24	10.00	8.00	10.00	N	
East Test Pit 1	April 18, 2023	IFI	Exploratory test pit	184148.493	1101236.642	48.867	45.867	42.867	41.267	7.60	3.00	6.00	Y	
East Test Pit 2	April 18, 2023	IFI	Exploratory test pit	184095.601	1100874.000	47.132	44.132	44.132	40.332	6.80	3.00	3.00	Y	
East Test Pit 3	April 19, 2023	IFI	Exploratory test pit	183793.048	1100864.033	48.48	48.28	42.48	39.98	8.50	0.20	6.00	Y	
East Test Pit 4	April 19, 2023	IFI	Exploratory test pit	183446.247	1101171.589	48.03	47.83	44.03	40.53	7.50	0.20	4.00	Y	
East Test Pit 5	April 18, 2023	IFI	Exploratory test pit	184125.711	1100307.630	44.87	42.87	38.87	37.37	7.50	2.00	6.00	Y	
East Test Pit 6	April 19, 2023	IFI	Exploratory test pit	183718.151	1100239.979	44.3679	40.8679	40.8679	38.3679	6.00	3.50	3.50	Y	
East Test Pit 7	April 18, 2023	IFI	Exploratory test pit	184169.829	1099803.722	39.0768	37.5768	37.5768	34.5768	4.50	1.50	1.50	Y	
East Test Pit 8	April 18, 2023	IFI	Exploratory test pit	184161.606	1099427.049	38.611	36.611	35.611	31.611	7.00	2.00	3.00	Y	
East Dig A	April 19, 2023	IFI	Exploratory test pit	183311.612	1100990.300	52.939	49.939	-	44.939	8.00	3.00	NA	N	
East Dig B	April 18, 2023	IFI	Exploratory test pit	184121.560	1100205.200	41.7	41.7	-	34.2	7.50	0.00	NA	N	
East Dig C	April 18, 2023	IFI	Exploratory test pit	184155.014	1099914.258	47.4	47.4	-	41.4	6.00	0.00	NA	N	
East Dig D1	April 18, 2023	IFI	Exploratory test pit	184215.280	1099339.090	42.4	39.4	-	34.4	8.00	3.00	NA	N	
East Dig D2	April 18, 2023	IFI	Exploratory test pit	184215.280	1099339.090	41.8	39.8	-	33.8	8.00	2.00	NA	N	
East Dig E	April 18, 2023	IFI	Exploratory test pit	184152.390	1099209.000	46.5	44.5	-	39	7.50	2.00	NA	N	
East Dig F	April 18, 2023	IFI	Exploratory test pit	184511.860	1099161.380	46	NA	-	35.4	10.60	NA	NA	N	
East Dig G	April 18, 2023	IFI	Exploratory test pit	184739.450	1098903.670	41.5	NA	-	31.5	10.00	NA	NA	N	
East Test Pit 10	April 19, 2023	IFI	Exploratory test pit	185280.406	1098273.179	39.5278	28.5278	28.5278	28.5278	11.00	11.00	11.00	N	
East Test Pit 11	April 19, 2023	IFI	Exploratory test pit	185223.559	1098605.555	38.8144	-	-	25.8144	13.00	NA	NA	N	
East Test Pit 12	April 19, 2023	IFI	Exploratory test pit	184976.177	1098593.819	42.0245	30.0245	30.0245	30.0245	12.00	12.00	12.00	N	
East Test Pit 13	April 18, 2023	IFI	Exploratory test pit	185082.980	1098415.670	42.9	31.9	30.9	30.6	12.30	11.00	12.00	N	
TP-1 (FS)	July 18, 2023	FS	Soil sampling test pit	185242.102	1098387.555	40.04 ¹	NA	-	33.04	7.00	NA	NA	N	Mostly fill. Variable coarse.

¹ Ground elevation obtained from LiDAR surface elevation

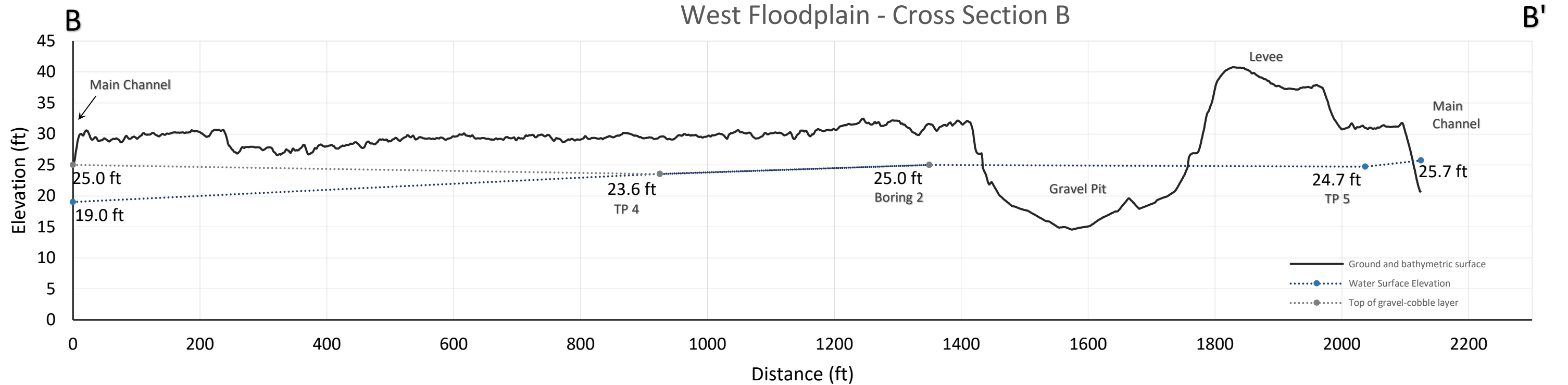
Name	Survey date	Survey Lead	Type	Coordinates (WA Stateplane South, NAD83, US Feet)		Elevations (ft, NAVD88)				Depths (ft)			PVC installed for monitoring? (Yes/No)	Notes
				Northing (ft)	Easting (ft)	Ground	Top of gravel- cobble layer	Water surface	Pit bottom	Pit depth	Depth to gravel- cobble layer	Depth to water surface		
TP-2 (FS)	July 18, 2023	FS	Soil sampling test pit	185218.970	1098598.528	38.6 ²	NA	-	30.1	8.50	NA	NA	N	Mostly fill. Variable coarse.
TP-3 (FS)	July 18, 2023	FS	Soil sampling test pit	185082.962	1098457.753	41.3 ²	NA	-	34.3	7.00	NA	NA	N	Mostly fill. Variable coarse.
TP-4 (FS)	July 18, 2023	FS	Soil sampling test pit	184999.727	1098366.772	40.98 ²	NA	-	35.48	5.50	NA	NA	N	Mostly fill. Variable coarse.
TP-5 (FS)	July 18, 2023	FS	Soil sampling test pit	184977.306	1098576.684	42.38 ²	NA	-	35.38	7.00	NA	NA	N	Mostly fill. Variable coarse.
TP-6 (FS)	July 18, 2023	FS	Soil sampling test pit	184855.829	1098635.595	42.62 ²	NA	-	37.62	5.00	NA	NA	N	Mostly fill. Variable coarse.
TP-7 (FS)	July 18, 2023	FS	Soil sampling test pit	184715.287	1098903.358	42.45 ²	NA	-	35.45	7.00	NA	NA	N	Mostly fill. Variable coarse.
TP-8 (FS)	July 18, 2023	FS	Soil sampling test pit	184508.678	1099188.190	45.73 ²	NA	-	38.73	7.00	NA	NA	N	Mostly fill. Variable coarse.
TP-9 (FS)	July 18, 2023	FS	Soil sampling test pit	184219.751	1101561.548	47.6 ²	43.1	-	38.6	9.00	4.50	NA	N	
TP-10 (FS)	July 18, 2023	FS	Soil sampling test pit	184076.458	1101578.639	55.73 ²	49.23	-	46.73	9.00	6.50	NA	N	
TP-11 (FS)	July 18, 2023	FS	Soil sampling test pit	182690.016	1103678.280	65.3 ²	62.8	-	60.3	5.00	2.50	NA	N	
TP-12 (FS)	July 18, 2023	FS	Soil sampling test pit	182707.426	1103894.632	64.88 ²	60.88	-	59.88	5.00	4.00	NA	N	
TP-13 (FS)	July 18, 2023	FS	Soil sampling test pit	182857.385	1103637.769	64.07 ²	62.57	-	59.07	5.00	1.50	NA	N	
TP-14 (FS)	July 18, 2023	FS	Soil sampling test pit	182887.825	1103840.568	64.34 ²	63.34	-	59.34	5.00	1.00	NA	N	
25-1	September 25, 2023	GRI	Geotechnical test pit	186836.625	1096440.376	27.914	26.414	21.914	19.914	8.00	1.50	6.00	N	GRI ("TP-3" in GRI report)
25-2	September 25, 2023	EP	Exploratory test pit	187403.298	1096773.435	29.45	23.62	23.37	22.7	6.75	5.83	6.08	N	Variable coarse above grvl layer
25-3	September 25, 2023	EP	Exploratory test pit	186565.806	1097526.326	35.156	23.656	23.156	23.156	12.00	11.50	12.00	N	Variable coarse
25-4	September 25, 2023	EP	Exploratory test pit	186489.412	1097668.494	33.786	26.786	-	24.786	9.00	7.00	NA	N	conglomerate w 7" cobbles below 7-9 ft
25-5	September 25, 2023	EP	Exploratory test pit	185979.378	1097731.305	39.922	NA	-	24.922	15.00	NA	NA	N	
25-6	September 25, 2023	EP	Exploratory test pit	185480.227	1097673.063	32.662	NA	-	25.662	7.00	NA	NA	N	Variable coarse
25-7	September 25, 2023	IFI	Exploratory test pit	185028.613	1097696.539	38.254	32.254	-	30.254	8.00	6.00	NA	N	
25-8	September 25, 2023	IFI	Exploratory test pit	184796.879	1097585.262	44.926	NA	-	32.926	12.00	NA	NA	N	Variable coarse. ~15% grvl/cbl btwn 4-6 ft depth
26-1	September 26, 2023	EP	Exploratory test pit	182612.632	1103590.144	73.133	NA	-	61.133	12.00	NA	NA	N	Variable coarse. Fill
26-2	September 26, 2023	EP	Exploratory test pit	182860.889	1103409.683	66.822	NA	-	44.322	22.50	NA	NA	N	Fill. Some small gravels
26-6	September 26, 2023	EP	Exploratory test pit	183738.978	1102338.648	58.674	55.674	-	50.674	8.00	3.00	NA	N	
26-7	September 26, 2023	EP	Exploratory test pit	183903.173	1101576.061	57.809	NA	-	48.809	9.00	NA	NA	N	
26-8	September 26, 2023	EP	Exploratory test pit	183615.637	1100512.370	47.123	47.123	-	40.123	7.00	0.00	NA	N	cobbles at surface
26-9	September 26, 2023	EP	Exploratory test pit	185168.130	1098345.817	40.482	NA	-	35.482	5.00	NA	NA	N	Fill. Some pea gravel and crushed rock
26-11	September 26, 2023	EP	Exploratory test pit	184913.636	1098448.923	39.78	NA	-	35.78	4.00	NA	NA	N	Variable coarse. Assumed mostly fill.
26-12	September 26, 2023	EP	Exploratory test pit	184806.226	1098779.778	42.238	NA	-	30.238	12.00	NA	NA	N	Variable coarse. Assumed mostly fill.
26-13	September 26, 2023	EP	Exploratory test pit	184659.554	1098944.556	42.671	NA	29.671	30.671	12.00	NA	13.00	N	Variable coarse. Assumed mostly fill.
27-1	September 27, 2023	EP	Exploratory test pit	184083.923	1099328.198	46.888	34.888	-	34.888	12.00	12.00	NA	N	Fill with boulders above grvl-cbl layer (old riprap?)
27-2	September 27, 2023	EP	Exploratory test pit	183868.475	1099353.871	40.682	39.682	-	38.182	2.50	1.00	NA	N	
27-3	September 27, 2023	EP	Exploratory test pit	184116.456	1099611.204	38.937	38.437	33.937	33.937	5.00	0.50	5.00	N	
27-4	September 27, 2023	EP	Exploratory test pit	183774.522	1099702.410	40.987	40.657	-	40.157	0.83	0.33	NA	N	

² Ground elevation obtained from LiDAR surface elevation

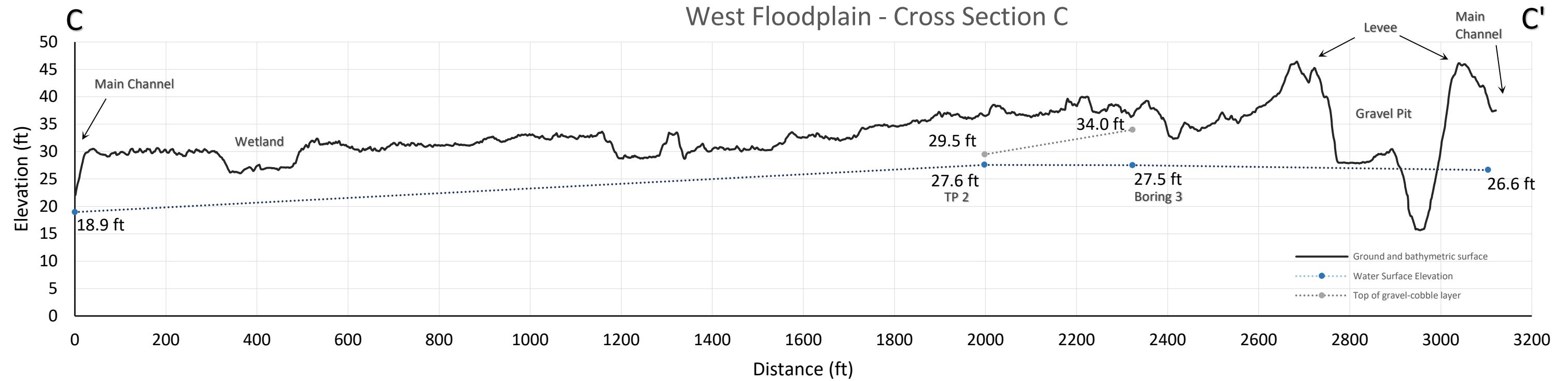
Name	Survey date	Survey Lead	Type	Coordinates (WA Stateplane South, NAD83, US Feet)		Elevations (ft, NAVD88)				Depths (ft)			PVC installed for monitoring? (Yes/No)	Notes
				Northing (ft)	Easting (ft)	Ground	Top of gravel- cobble layer	Water surface	Pit bottom	Pit depth	Depth to gravel- cobble layer	Depth to water surface		
27-5	September 27, 2023	EP	Exploratory test pit	183645.654	1100011.545	42.453	40.953	-	40.953	1.50	1.50	NA	N	
27-6	September 27, 2023	EP	Exploratory test pit	183303.681	1100615.525	44.609	43.109	39.609	39.609	5.00	1.50	5.00	N	
27-7	September 27, 2023	EP	Exploratory test pit	183329.120	1101317.905	55.446	55.446	-	47.446	8.00	0.00	NA	N	
27-8	September 27, 2023	EP	Exploratory test pit	183550.946	1101467.405	52.1	47.6	-	47.1	5.00	4.50	NA	N	
27-9	September 27, 2023	EP	Exploratory test pit	183904.405	1101081.300	50.318	45.818	-	45.318	5.00	4.50	NA	N	
27-10	September 27, 2023	EP	Exploratory test pit	184131.573	1100604.178	44.593	44.093	-	41.593	3.00	0.50	NA	N	
27-11	September 27, 2023	EP	Exploratory test pit	184121.115	1100246.715	46.197	45.367	-	42.197	4.00	0.83	NA	N	
27-12	September 27, 2023	EP	Exploratory test pit	184361.053	1101678.548	55.679	NA	-	46.679	9.00	NA	NA	N	~20% cobbles below 7 ft depth



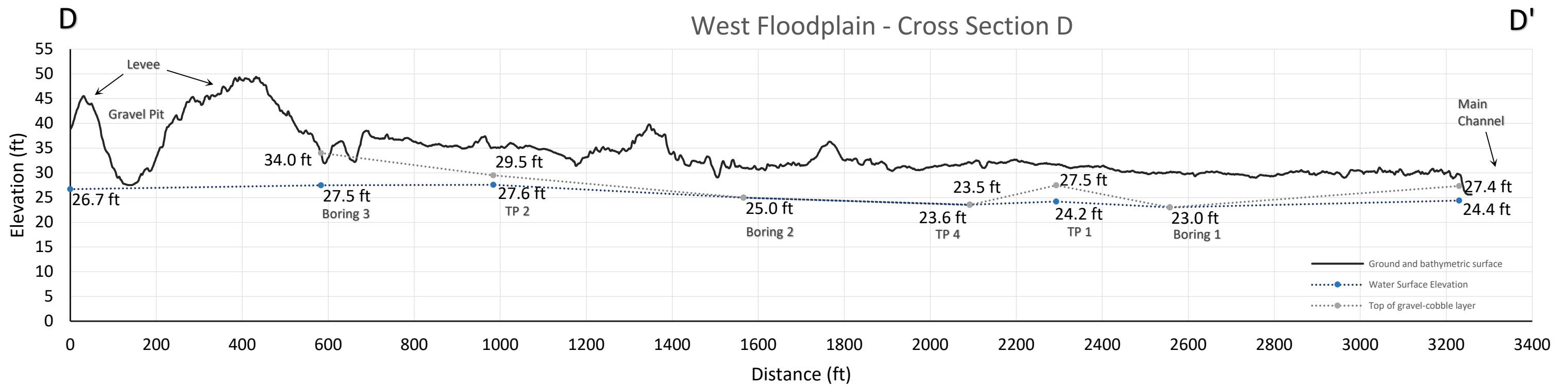
Note: Test Pit (TP) 1 is offset from the cross-section line by 218 feet; TP 8 is offset from the cross-section line by 89 feet.



Note: Test Pit (TP) 4 is offset from the cross-section line by 38 feet; Boring 2 is offset from the cross-section line by 298 feet; TP 5 is offset from the cross-section line by 108 feet



Note: Test Pit (TP) 2 is offset from the cross-section line by 66 feet; Boring 3 is offset from the cross-section line by 81 feet.

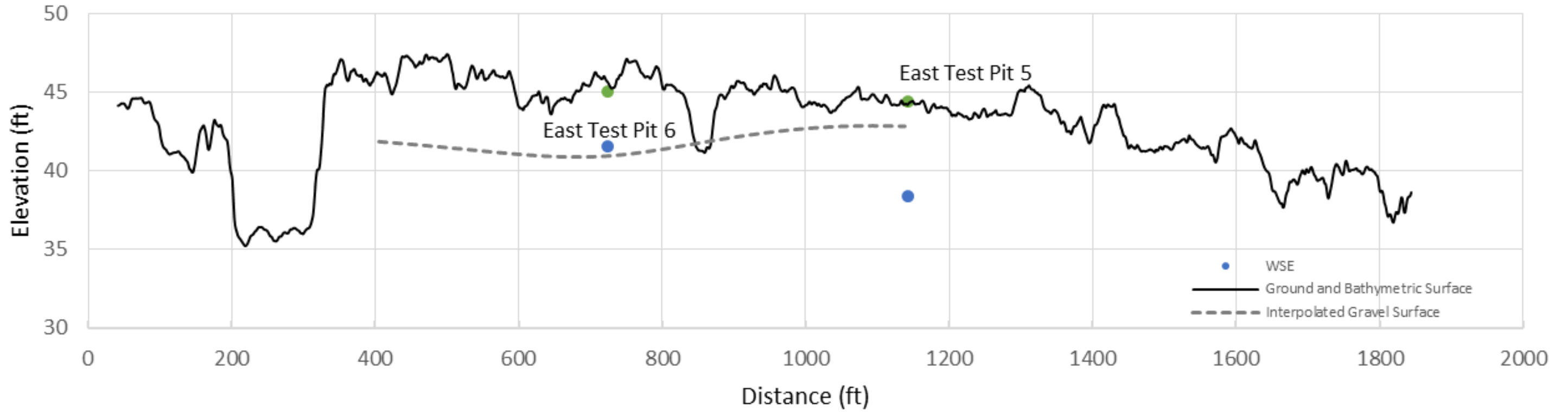


Note: Boring 3 is offset from the cross-section line by 274 feet; Test Pit (TP) 2 is offset from the cross-section line by 290 feet; Boring 2 is offset from the cross-section line by 40 feet; TP 4 is offset from the cross-section line by 187 feet; TP 1 is offset from the cross-section line by 65 feet; Boring 1 is offset from the cross-section line by 112 feet.

XS1

East Floodplain Cross Section 1

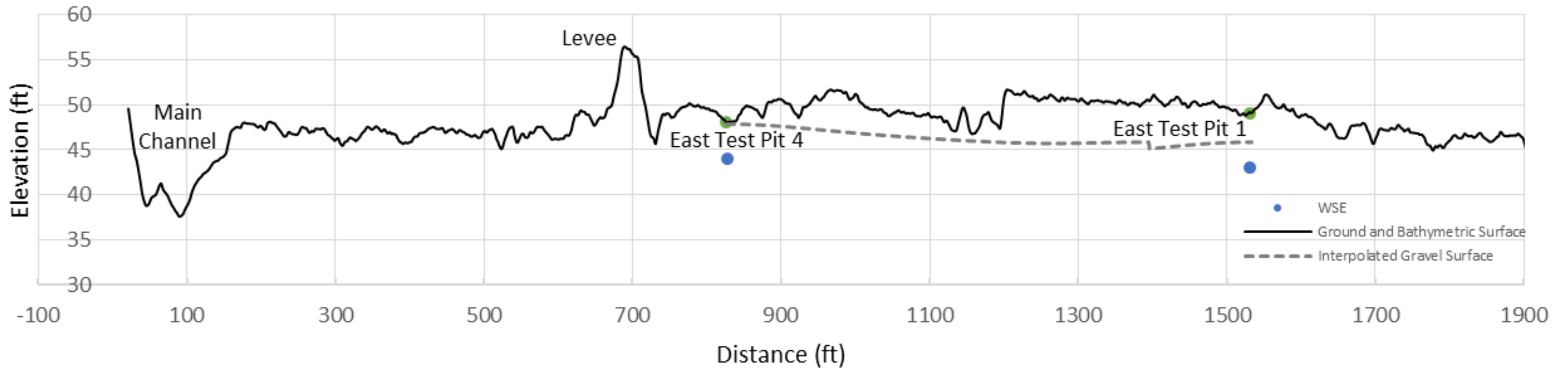
XS1'

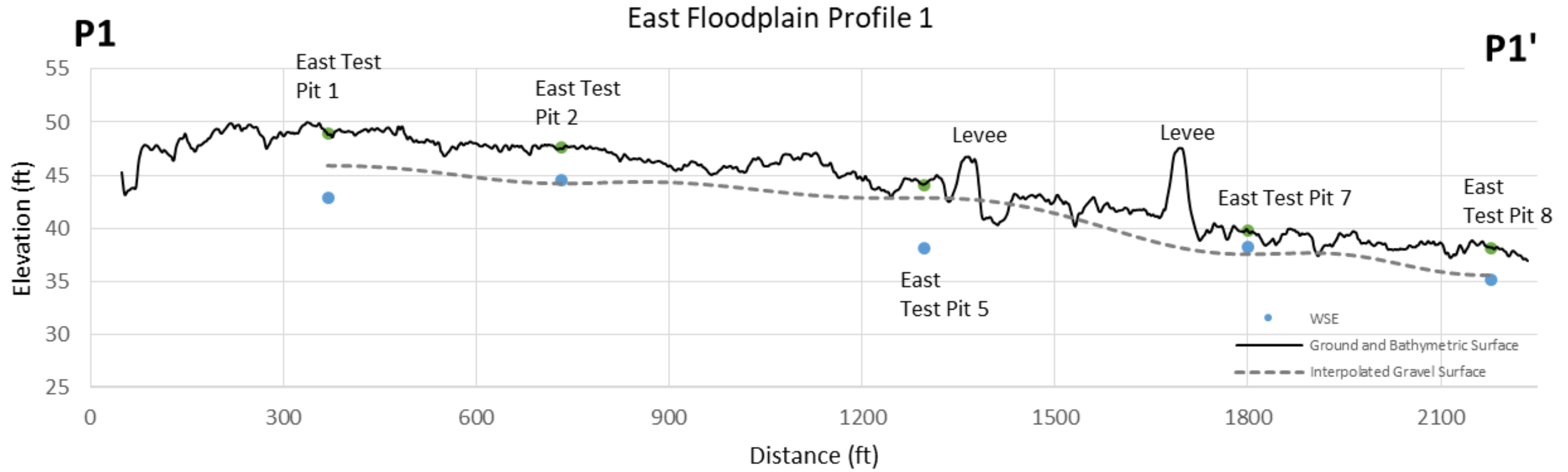


XS2

East Floodplain Cross Section 2

XS2'

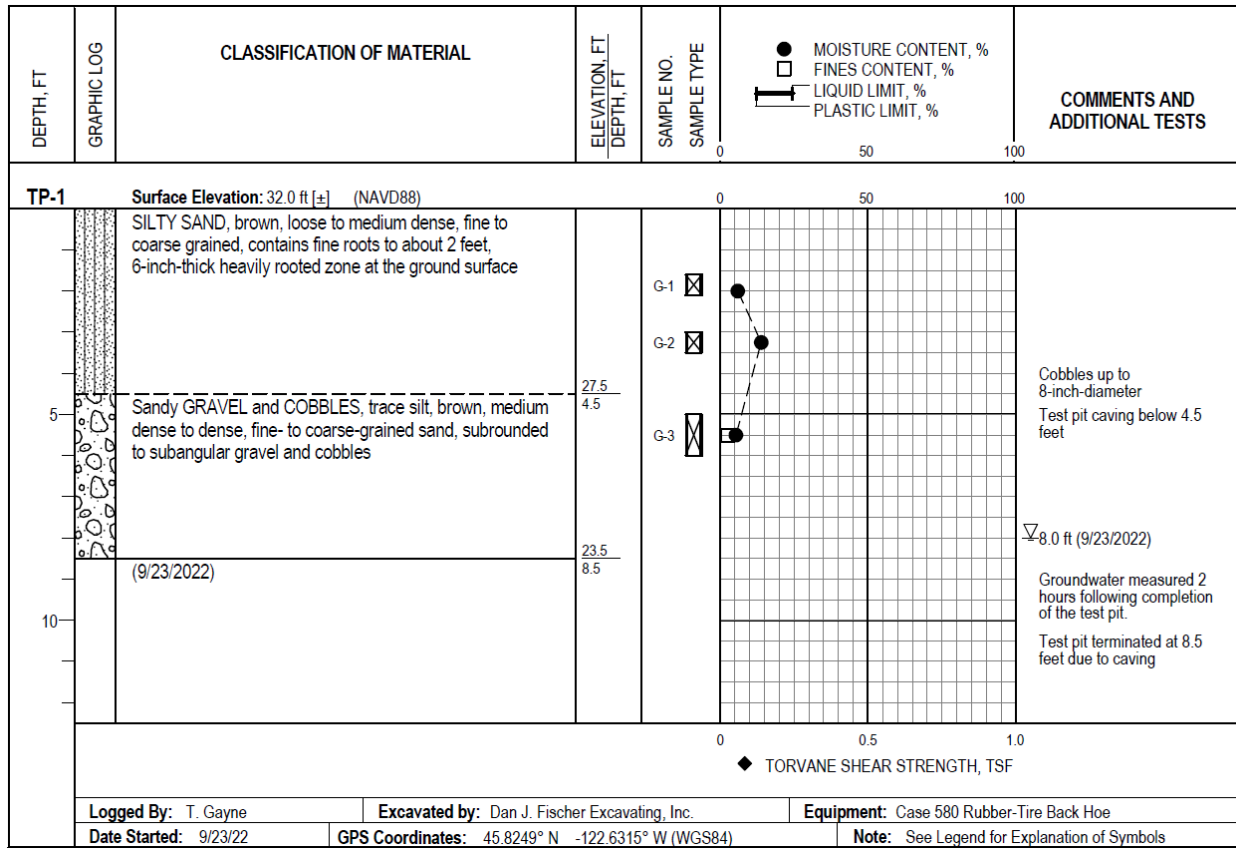




Note: Test Pit (TP) 2 is offset from the cross-section line by 50 ft; TP 5 is offset from the cross-section line by 25 ft; TP 7 is offset from the cross-section line by 12 ft

Attachment 1 – Soil Logs and Photos

West Test Pit 1



*Profile created by GRI and included here from the GRI Geotechnical Report

Attachment 1 – Soil Logs and Photos

West Test Pit 1 Photos



TEST PIT TP-1

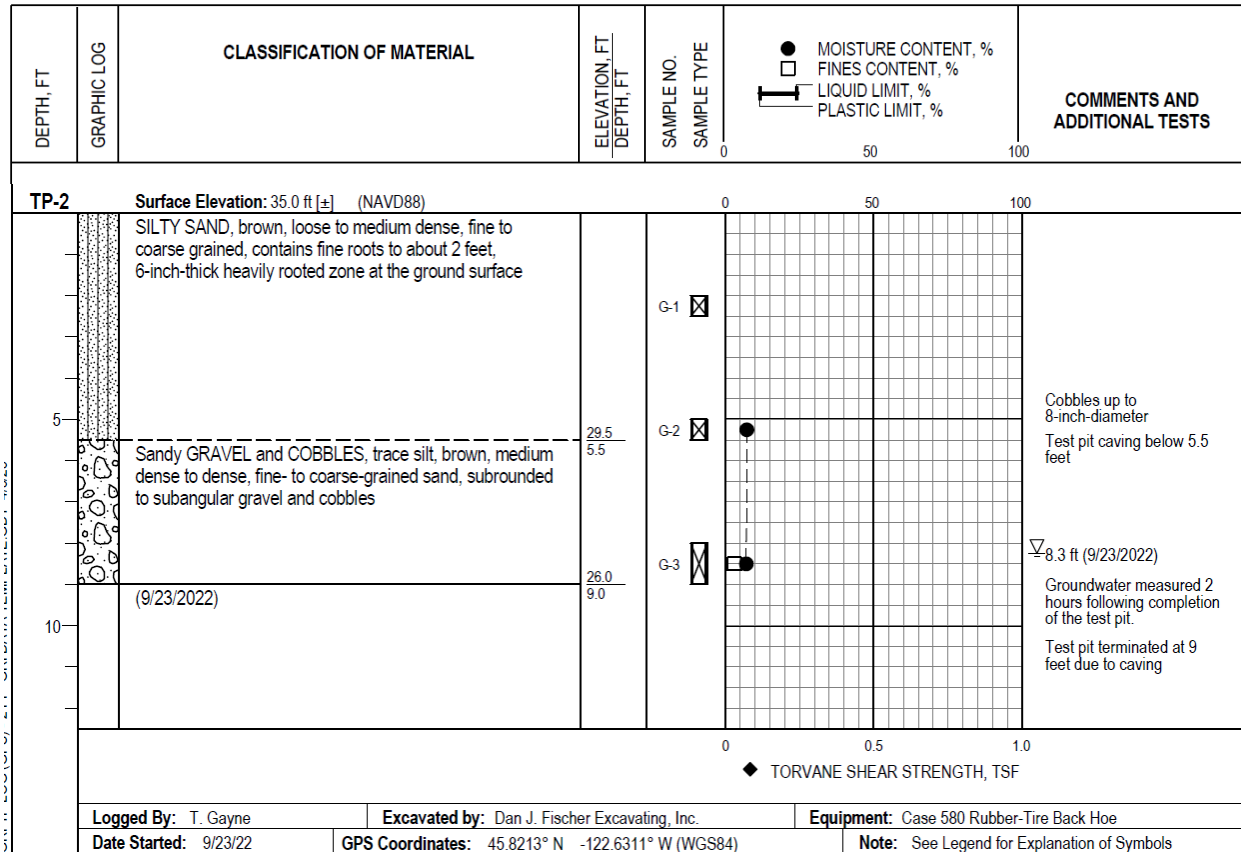


TEST PIT TP-1 SPOILS

*Photos by GRI and included here from the GRI Geotechnical Report

Attachment 1 – Soil Logs and Photos

West Test Pit 2



*Profile created by GRI and included here from the GRI Geotechnical Report

Attachment 1 – Soil Logs and Photos

West Test Pit 2 Photos



TEST PIT TP-2



TEST PIT TP-2 SPOILS

*Photos by GRI and included here from the GRI Geotechnical Report

Attachment 1 – Soil Logs and Photos

West Test Pit 3

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/23/2022	Site No. Test Pit 3
Address, City, State near La Center, WA	Coordinates	Machinery Contractor: Dan Fischer Excavation	Rig Type: Wheeled backhoe
Logged by: Gardner Johnston	Ground Elevation: 41.1 ft (NAVD 88)	Total Depth: 14.5 ft	Groundwater Depth: Did not encounter static GW

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class	USCS Soil Group	Additional Classification
0 - 1.6				Thin layer of grass, almost no surface organics 0 - 1.6 ft. Disturbed poorly graded sand to small, gray, subangular gravel (pea gravel).	Poorly graded sand with gravel, disturbed	SP	Fill
1.6 - 5.5	☒	TP3 1.6-5.5'		1.6 ft -5.5 ft - Very disturbed brown silty sand with subangular to rounded clasts up to 4-5 inches. Approximately 40% gravel or larger Wood debris, charcoal and some brick pieces present. Moist below 2 ft.	Silty sand with gravel, disturbed	SM	Fill
5.5 - 8.3				5.5 ft - 8.3 ft - Gray moist sandy silt with gravel up to 5 inches diameter. Approximately 25% gravel. Possibly redistributed / disturbed material	Silt loam, with gravel	ML	
8.3 - 14.5	☒	TP3 10'		8.3 ft -14.5 ft - Gray moist sandy loam or sandy clay loam. Less than 15% gravels up to 6 inches in diameter. Possibly redistributed / disturbed material No static water	Sandy loam or sandy clay loam	SC	

- ☒ Bulk/ Bag Sample
- Pebble Count
- ▼ Stabilized Ground water
- ▽ Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos




West Test Pit 3 Photos




Top left – disturbed fill layers in top 4 feet. Top right – Material below 5.5 feet depth comprised of sandy silt with gravels. Bottom – spoils pile mostly showing deeper sandy silt and clay loam layer, some gravels and cobbles up to 6 inches diameter.

Attachment 1 – Soil Logs and Photos

West Test Pit 4

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Date of Sample 9/23/2022	Site No. Test Pit 4		
Address, City, State near La Center, WA		Coordinates		Machinery Contractor: Dan Fischer Excavation	Rig Type: Wheeled backhoe		
Logged by: Gardner Johnston		Ground Elevation: 28.7 ft (NAVD 88)		Total Depth: 8 ft	Groundwater Depth: ~6 ft (initial)		
Notes: Surveyed groundwater WSE = 23.56 ft (NAVD 88)							
Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class	USCS Soil Group	Additional Classification
				0 - 3 in. - Silty sand with fine roots, dry, brown 3 in. - 4 ft - Brown sandy loam, moist below ~1.8'	Loam	SM	
	☒	TP4 2'					
	☒	TP4 4.5-5'		4 ft - 5.2 ft - dark brown silt or clay loam with organics and some clay, possibly buried topsoil, with woody debris	Clay loam	CL	
5	☒	TP4 Sieve		5.2 ft - 8 ft - Sandy gravel (~60% gravel, 30% sand, 10% fines). Cobbles to 4 inches. See sieve analysis results Attachment 2 Top of gravel layer approx 23.5 ft (NAVD 88) 6 ft - Static water		GW	

- ☒ Bulk/ Bag Sample
-  Pebble Count
- ▼ Stabilized Ground water
- ▽ Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

West Test Pit 4 Photos




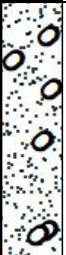


Top - coarse alluvial layer below 5 feet depth. Bottom – spoils pile showing primarily the coarse alluvial sandy gravel layer below 5 feet depth.




Attachment 1 – Soil Logs and Photos

West Test Pit 5

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/23/2022	Site No. Test Pit 5
Address, City, State near La Center, WA	Coordinates	Machinery Contractor: Dan Fischer Excavation	Rig Type: Wheeled backhoe
Logged by: Gardner Johnston	Ground Elevation: 34.5 ft (NAVD 88)	Total Depth 12.8 ft	Groundwater Depth: ~12.5 ft (initial)

Notes:
Surveyed groundwater WSE = 24.73 ft (NAVD 88). Water level in pit was gradually filling from seepage

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class	USCS Soil Group	Additional Classification
	<input checked="" type="checkbox"/>	TP5 3"-1.5'		0 - 3 in. - Coarse sand with fine roots 3 in. - 1.8 ft - Brown sand with gravel up to 6 in. diameter. Gravelly sand. Approximately 50% gravel (or larger) and 50% sand (or finer) Redistributed / disturbed material.	Sand	SW	
	<input checked="" type="checkbox"/>	TP5 2.7'		1.8 ft -7 ft - Gray gravelly silty sand with wood pieces. Some dark gray, sandy clay lenses are present. Cobbles up to 8 in. diameter. This layer is about 50% gravels, 50% sand and silt. Redistributed / disturbed material	Sandy loam, with gravels	GW	
	<input checked="" type="checkbox"/>	TP5 Sieve		7 ft - 12.8 ft - Silty sand, some gravel (~30%) with cobbles up to 9 in. diam See sieve analysis results Attachment 2 Possibly redistributed / disturbed material		SM	
				12.5' Static water (could be influenced by ponding from seepage)			

- Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

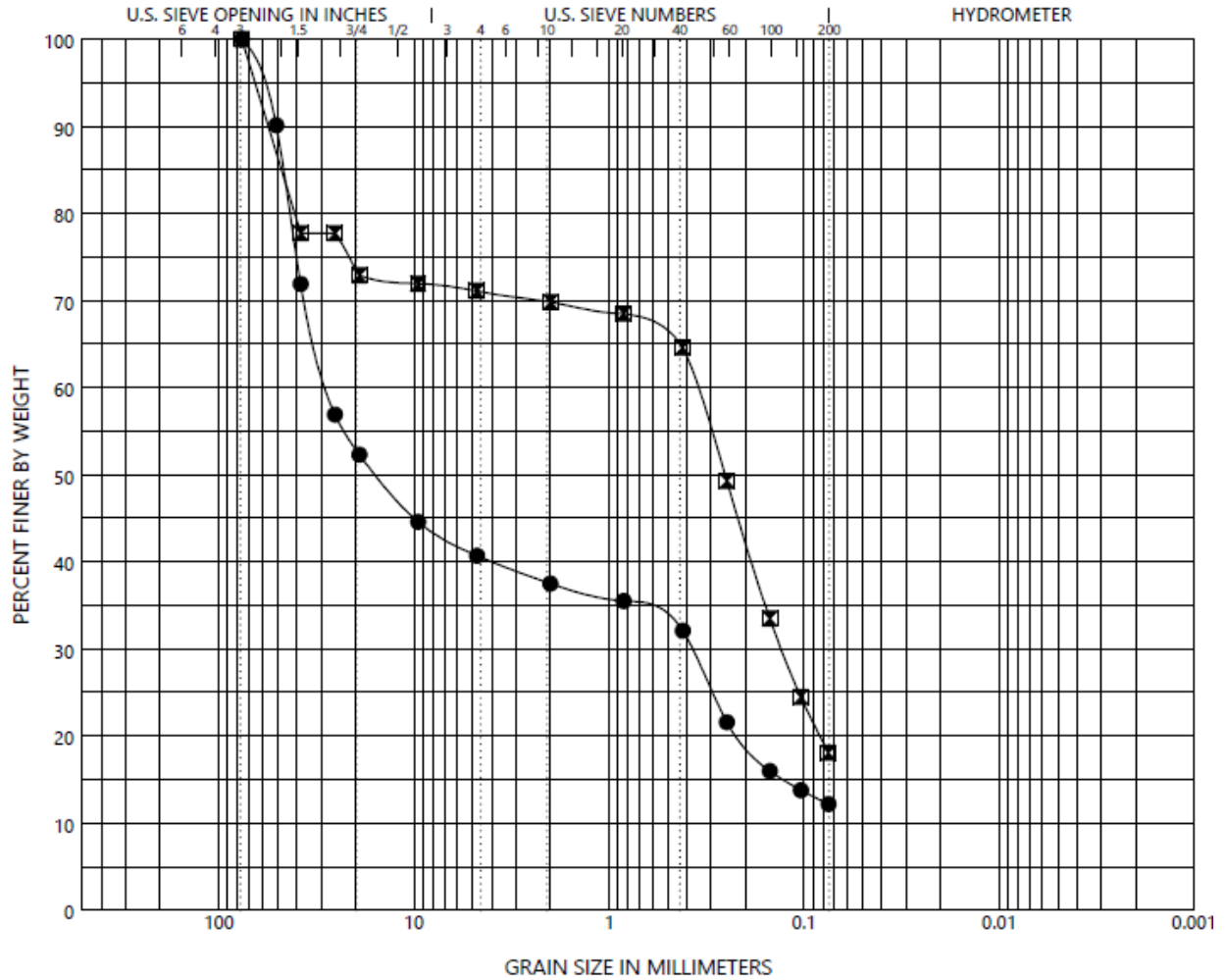
Attachment 1 – Soil Logs and Photos

West Test Pit 5 Photos



Top left – top disturbed layers (top 7 ft) with approximately 50% gravel or larger. Top right – material below 7 ft depth comprised of silty sand with approximately 30% gravel or larger. Bottom – spoils pile showing mainly the gray gravelly silt from 2 to 7 ft depth.

Attachment 1 – Soil Logs and Photos



COBBLES	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Location	Sample	Depth, ft	Classification	Gravel, %	Sand, %	Fines, %	
●	TP-4	G-1	5-8	Silty GRAVEL, some fine- to coarse-grained sand, contains cobbles	58.9	28.5	12.2
☒	TP-5	G-2	10	Silty SAND, some gravel, contains cobbles	28.4	53.0	18.1

Note: The samples contain particles larger than 3-inch diameter and up to 12-inch diameter that are not represented in the sieve results



GRAIN SIZE DISTRIBUTION

*Sieve analysis performed by GRI and included here from the GRI Geotechnical Report.

Attachment 1 – Soil Logs and Photos

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Attachment 1 – Soil Logs and Photos

West Test Pit 6

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Date of Sample 9/23/2022		Site No. Test Pit 6	
Address, City, State near La Center, WA		Coordinates		Machinery Contractor: Dan Fischer Excavation		Rig Type: Wheeled backhoe	
Logged by: Gardner Johnston		Ground Elevation: 27.9 ft (NAVD 88)		Total Depth: 7 ft		Groundwater Depth: ~6.3 ft (initial)	
Notes: Surveyed groundwater WSE = 22.33 ft (NAVD 88)							
Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class	USCS Soil Group	Additional Classification
5 ▽				0 - 0.7 ft - Brown silty sand with roots		SW	
				0.7 ft - 2.7 ft - Brown medium sand. No gravel.		SW	
				2.7 ft - 4.7 ft - Brown silty sand. No gravel.		SM	
				4.7 ft - 5.4 ft - Gray sandy silt with small gravel		ML	
				5.4 ft - 7 ft - Sandy gravel with cobbles up to 7 in. diameter 6.3 ft - Water, appears close to equalized. Top of gravel layer approx 22.6 ft (NAVD88)		GW	

- Bulk/ Bag Sample
- Pebble Count
- Stabilized Ground water
- Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

No photos available for West Test Pit 6

Attachment 1 – Soil Logs and Photos

West Test Pit 7

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/23/2022	Site No. Test Pit 7 (aka Test dig A)
Address, City, State near La Center, WA	Coordinates	Machinery Contractor: Dan Fischer Excavation	Rig Type: Wheeled backhoe
Logged by: Gardner Johnston	Ground Elevation: 37.7 ft (NAVD 88)	Total Depth: 6.5 ft	Groundwater Depth: No water encountered

Notes:
This was a sample dig to investigate levee material

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class	USCS Soil Group	Additional Classification
				0 - 3 in. - Grass and roots. Brown sand. Gravels up to 3 in. (<20% grvs)		SW	
				3 in - 3 ft - Brown and gray silty sand. <20% gravels up to 3 in. Redistributed / disturbed material		SM	
5				3' to 6.5' Brown sand. <10% gravels to 4" Redistributed / disturbed material Moist below 4 ft		SW	

- Bulk/ Bag Sample
- Pebble Count
- Stablized Ground water
- Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos



West Test Pit 7 Photo







Top 3 feet of Test Pit 7 (sand with approximately 20% gravel or larger)

Attachment 1 – Soil Logs and Photos

West Test Pit 8

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Date of Sample 9/23/2022	Site No. Test Pit 8 (aka Test dig B)		
Address, City, State near La Center, WA		Coordinates		Machinery Contractor: Dan Fischer Excavation	Rig Type: Wheeled backhoe		
Logged by: Gardner Johnston		Ground Elevation: ~34 ft (NAVD 88)		Total Depth: 10 ft	Groundwater Depth: ~10 ft		
Notes: Surveyed groundwater WSE = 24.4 ft (NAVD 88)							
Depth (feet)	Sample Type	Sample ID	Graphic Log	<u>Soil Description</u>	USDA Textural Class	USCS Soil Group	Additional Classification
5				Brown sand to 8 ft Redistributed / disturbed material at least in top 4-5 ft (levee)		SW	
10				Gray sandy gravel with gravels and cobbles up to 5 inches Static groundwater level approx 10 ft		GW	

-  Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

West Test Pit 8 Photos




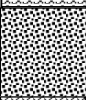


Top 8 ft (sand)



Below 8 ft deep (sandy gravels and cobbles up to 5 inches)

Attachment 1 – Soil Logs and Photos

East – Test Pit 1

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 1
Address, City, State near La Center, WA		Machinery Contractor: Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Mike Rafferty		Date	Completed: 4/18/2023	Potential Restoration Action: Side Channel
Water level monitoring pipe installed? Yes		Groundwater Depth: 6'		Elevation: 48.9'
				Total Depth of Boring: 7.6'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES
		0 - 1.25 ft - Silt, sand with organics		
		1.25 ft - 3 ft Mix sand, silt, coarse cobbles		
		3 ft - 7.6 ft Gravel Cobbles		
5				

Attachment 1 – Soil Logs and Photos

East – Test Pit 1 Photos

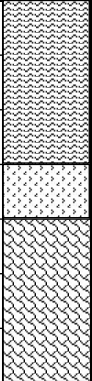


Top – Mixed fines and gravel 0-3 feet, gravel below 3 feet.

Below – Location of Piezometer, spoils piles show mixed gravel and cobbles from the bottom of the pit.

Attachment 1 – Soil Logs and Photos

East – Test Pit 2

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 2	
Address, City, State near La Center, WA			Machinery Contractor Kysar & Koistinen	Rig Type: CAT 310C	
Logged By: Mike Rafferty		Date	Completed: 4/18/2023	Potential Restoration Action: Side Channel	
Water level monitoring pipe installed? Yes		Groundwater Depth: 3'		Elevation: 47.1'	Total Depth of Boring: 6.8'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES	
0		0 - 3 ft - Sandy silt			
3		3 ft - 4 ft - Silty Gravel Cobble			
5		4 ft - 6.8 ft - Gravel Cobble			

Attachment 1 – Soil Logs and Photos

East – Test Pit 2 Photos



Top – Sandy silt soil above groundwater at 3 feet.

Bottom – Location of Piezometer; a few large, rounded cobbles in fine matrix.

Attachment 1 – Soil Logs and Photos

East – Test Pit 3

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 3	
Address, City, State near La Center, WA			Machinery Contractor Kysar & Koistinen	Rig Type: CAT 310C	
Logged By: Mike Rafferty		Date	Completed: 4/19/2023		Potential Restoration Action: Oxbow
Water level monitoring pipe installed? Yes		Groundwater Depth: 6'		Elevation: 48.5'	Total Depth of Boring: 8.5'
Depth (feet)	Graphic Log	<u>Soil Description</u>			NOTES
0		0 - 2" Soil			
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Attachment 1 – Soil Logs and Photos

East – Test Pit 3 Photos

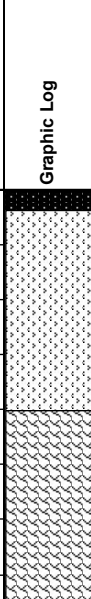


Left - Unconsolidated soils mixed with rounded gravel and cobbles

Right – Close up of poorly sorted gravel in a fine matrix

Attachment 1 – Soil Logs and Photos

East – Test Pit 4

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 4	
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Josh Epstein		Date	Completed: 4/19/2023		Potential Restoration Action: Side Channel
Water level monitoring pipe installed? Yes		Groundwater Depth: 4'		Elevation: 48'	Total Depth of Boring: 7.5'
		<u>Soil Description</u>			NOTES
		0"-3" Organic Soils			
		3" - 4 ft - Cobble			
4 ft - 7.5 ft - Cobble with gravel and sand					

Attachment 1 – Soil Logs and Photos

East – Test Pit 4 Photos




Right – Close up of poorly sorted gravel in a fine/sandy matrix.

Left- Location of Piezometer; spoils pile of rounded cobbles and gravel.

Attachment 1 – Soil Logs and Photos

East – Test Pit 5

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 5	
Address, City, State near La Center, WA			Machinery Contractor Kysar & Koistinen	Rig Type: CAT 310C	
Logged By: Mike Rafferty		Date	Completed: 4/18/2023	Potential Restoration Action: Oxbow	
Water level monitoring pipe installed? Yes		Groundwater Depth: 6'		Elevation: 44.9'	Total Depth of Boring: 7.5'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES	
		0 - 2 ft - Silty Sand with few organics			
		2 ft - 7.5 ft - Cobble gravel			

Attachment 1 – Soil Logs and Photos

East – Test Pit 5 Photos




Top – Gravel and cobbles in a fine matrix, groundwater at

Bottom – Large cobbles in spoils pile from bottom of pit.

Attachment 1 – Soil Logs and Photos

East – Test Pit 6

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 6	
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Josh Epstein		Date	Completed: 4/19/2023	Potential Restoration Action: Oxbow	
Water level monitoring pipe installed? Yes		Groundwater Depth: 3.5'		Elevation: 44.4'	Total Depth of Boring: 6'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES	
— — — — — 5		0 - 3.5 ft - Sandy soil coarsening downwards			
		3.5 ft - 6 ft - Cobble gravel			

Attachment 1 – Soil Logs and Photos

East – Test Pit 6 Photos



Left – Groundwater in pit, brown sandy soils.



Right – Close up of rounded gravel in sandy matrix.

Attachment 1 – Soil Logs and Photos

East – Test Pit 7

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 7	
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Mike Rafferty		Date	Completed: 4/18/2023		Potential Restoration Action: Side Channel
Water level monitoring pipe installed? Yes		Groundwater Depth: 1' 7"		Elevation: 39'	Total Depth of Boring: 4.5'
Depth (feet)	Graphic Log	<u>Soil Description</u>			NOTES
▼		0 - 1.5 ft - Sandy Silt			
—		1.5 ft - 4.5 ft - Sandt Gravel Cobble			
—					
4					

Attachment 1 – Soil Logs and Photos

East – Test Pit 7 Photos

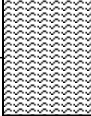
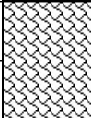
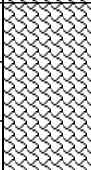


Top – Note shallow groundwater.

Bottom – Fines mixed with gravel/cobbles in pit.

Attachment 1 – Soil Logs and Photos

East – Test Pit 8

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 8	
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Mike Rafferty		Date	Completed: 4/18/2023	Potential Restoration Action: Side Channel	
Water level monitoring pipe installed? Yes		Groundwater Depth: 3'		Elevation: 38.6'	Total Depth of Boring: 7'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES	
—		0 - 2 ft Silty sand			
▼		2 ft - 4 ft Gravel Cobble			
5		4 ft - 7 ft Boulder/ Gravel Cobble			

Attachment 1 – Soil Logs and Photos

East – Test Pit 8 Photos



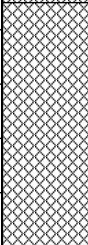
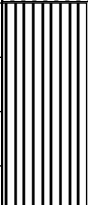




Top – Shallow groundwater.

Bottom – Poorly sorted cobbles and gravel in a fine matrix.

Attachment 1 – Soil Logs and Photos

East – Test Pit 10

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East Test Pit 10	
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Josh Epstein		Date	Completed: 4/19/2023		Potential Restoration Action: Floodplain
Water level monitoring pipe installed? No		Groundwater Depth: 11'		Elevation: 39.5'	Total Depth of Boring: 11'
Depth (feet)	Graphic Log	<u>Soil Description</u>			NOTES
		0 -1 ft Brown/organics and cobble/gravel			
		1 ft - 2.5 ft Sand/Gravel			
5		2.5 ft - 7 ft Hard Layer - clay/cobble			
		7 ft - 11 ft Softer layer, gray silt			
10		11 ft Cobble/gravel			
					

Attachment 1 – Soil Logs and Photos

East – Test Pit 10 Photos




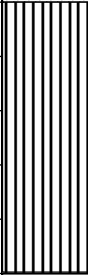




Left - Clear transition from brown fines to gray clay layer.

Right – Spoils piles show gravel and cobbles from the bottom of the pit.

Attachment 1 – Soil Logs and Photos

East – Test Pit 11

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 11
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen	Rig Type: CAT 310C
Logged By: Josh Epstein		Date	Completed: 4/19/2023	Potential Restoration Action: Floodplain
Water level monitoring pipe installed? No		Groundwater Depth:		Elevation: 38.8'
				Total Depth of Boring: 13'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES
		0 - 1.5 ft soil/sandy		
		1.5 ft - 2 ft Brown sand with gravel/cobble		
5		2 ft - 5.5 ft Gray silt/sand with cobbles		
10		5.5 ft - 9 ft Silt/clay		
		9 ft - 13 ft Clay		
		13 ft Mix of bricks, concrete and white rocks		

Attachment 1 – Soil Logs and Photos

East – Test Pit 11 Photos



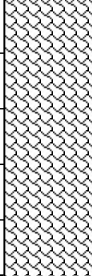



Left – Clear soil horizons, transitions from brown fines and silt to gray clay.

Right – Clay layer extends to the bottom of the 13 ft deep pit.

Attachment 1 – Soil Logs and Photos

East – Test Pit 12

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 12	
Address, City, State near La Center, WA			Machinery Contractor Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Josh Epstein		Date	Completed: 4/19/2023		Potential Restoration Action: Floodplain
Water level monitoring pipe installed? No		Groundwater Depth: 12'		Elevation: 42'	Total Depth of Boring: 12'
Depth (feet)	Graphic Log	<u>Soil Description</u>			NOTES
		0 - 2.5 ft Perfectly graded fill			
		2.5 ft 2" of organics			
5		2.5 ft - 7 ft Dark gray sandy clay, one 12" cobble			
10		7 ft - 12 ft Sandy gravel grading down to bigger cobbles			
					

Attachment 1 – Soil Logs and Photos

East – Test Pit 12 Photos




Left – Clear soil horizons; Brown silty soil above gray sand above gray clay.

Right – Close up of soil horizons

Attachment 1 – Soil Logs and Photos

East – Test Pit 13

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Pit 13	
Address, City, State near La Center, WA			Machinery Contractor Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Mike Rafferty		Date	Completed: 4/18/2023		Potential Restoration Action: Floodplain
Water level monitoring pipe installed? No		Groundwater Depth: 12'		Elevation: 42.9'	Total Depth of Boring: 12.3'
Depth (feet)	Graphic Log	<u>Soil Description</u>			NOTES
		<p>0 - 1.75 ft Silty Sand</p> <p>1.75 ft - 4 ft Compacted Gray Sand and Gravel</p> <p>4 ft - 11 ft Sandy Clay, Few Gravel/Cobbles</p> <p>11 ft - 12.3 ft Gravel Cobble</p>			

Attachment 1 – Soil Logs and Photos

East – Test Pit 13 Photos

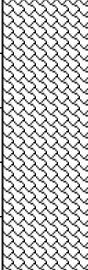



Left – Brown fines mix with some gravel above gray sand. Below gray sand is a layer of gray clay.

Right – Unconsolidated gray gravel on the bottom of the pit

Attachment 1 – Soil Logs and Photos

East – Test Dig A

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Dig A
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen	Rig Type: CAT 310C
Logged By: Josh Epstein		Date	Completed: 4/19/2023	Potential Restoration Action: Bern
Water level monitoring pipe installed? No		Groundwater Depth:		Elevation: 52.9 ft
				Total Depth of Boring: 8'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES
— — — — 5		0 - 5 ft Concrete chunks and big cobble		
— — — 5		5 ft - 8 ft Cobble		
		8 ft Packed gravel/cobble		

Attachment 1 – Soil Logs and Photos

East – Test Dig A Photos


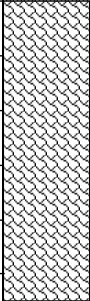


Left – Large chunks of concrete and cobbles in disturbed layer.

Right – Gravel in fine sandy matrix.

Attachment 1 – Soil Logs and Photos

East – Test Dig B

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. East - Test Dig B	
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Mike Rafferty		Date 4/18/2023	Completed:		Potential Restoration Action: Bern
Water level monitoring pipe installed? No		Groundwater Depth: -	Elevation: 41.7'		Total Depth of Boring: 7.5'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES	
		0 - 2 ft - Silty Sand with few organics			
5		2 ft - 6 ft - Sandy Cobble gravel			

Attachment 1 – Soil Logs and Photos

East – Test Dig B Photos

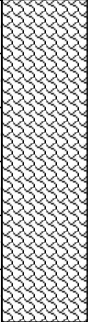


Top – Gravel mixing into loose fines.

Bottom – Large, rounded cobbles and gravel from the bottom of the pit.

Attachment 1 – Soil Logs and Photos

East – Test Dig C

Project:		Client:		Boring No.:	
Ridgefield Pits Project		Lower Columbia Estuary Partnership		Test Dig C	
Address, City, State			Machinery Contractor:		Rig Type:
near La Center, WA			Kysar & Koistinen		CAT 310C
Logged By:		Date	Completed:	Potential Restoration Action:	
Mike Rafferty			4/18/2023	Side Channel	
Water level monitoring pipe installed?		Groundwater Depth:		Elevation:	Total Depth of Boring:
No		-		47.4'	6'
Depth (feet)	Graphic Log	Soil Description		NOTES	
					
		0 - 6 ft - Sandy cobble/gravel			
5					

Attachment 1 – Soil Logs and Photos

East – Test Dig C Photos

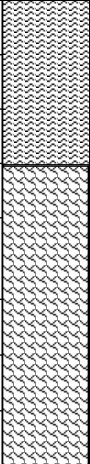


Left – Gravel and cobbles in an unconsolidated matrix of fines.

Right – Rounded cobbles on the ground surface.

Attachment 1 – Soil Logs and Photos

East – Test Dig D1

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. Test Dig D1
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen	Rig Type: CAT 310C
Logged By: Mike Rafferty	Date	Completed: 4/18/2023	Potential Restoration Action: High Bank	
Water level monitoring pipe installed? No	Groundwater Depth: -	Elevation: 42.4'	Total Depth of Boring: 8'	
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES
— — — — 5 — — —		0 - 3 ft - Silty Sand		
		3 ft - 8 ft Sandy Cobble		

Attachment 1 – Soil Logs and Photos

East – Test Dig D1 Photos

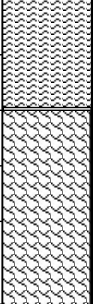


Left – Silty sand layer on top of fines and gravel.

Right – ~30 inch cobble from the pit.

Attachment 1 – Soil Logs and Photos

East – Test Dig D2

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. Test Dig D2	
Address, City, State near La Center, WA			Machinery Contractor Kysar & Koistinen		Rig Type: CAT 310C
Logged By: Mike Rafferty		Date	Completed: 4/18/2023		Potential Restoration Action: Low Bench
Water level monitoring pipe installed? No		Groundwater Depth: -		Elevation: 41.8'	Total Depth of Boring: 8'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES	
—		0 - 2 ft - Silty sand			
— — — — 5		2 ft - 5.5 ft Gravel cobble			

Attachment 1 – Soil Logs and Photos

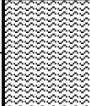
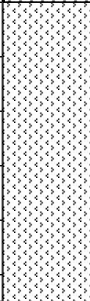
East – Test Dig D2 Photos



Top & bottom – Gravel and cobbles in fine matrix

Attachment 1 – Soil Logs and Photos

East – Test Dig E

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. Test Dig E
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen	Rig Type: CAT 310C
Logged By: Mike Rafferty		Date 4/18/2023	Completed: 4/18/2023	
Water level monitoring pipe installed? No		Groundwater Depth: -	Elevation: 46.5'	Potential Restoration Action: Floodplain
				Total Depth of Boring: 7.5'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES
—		0 - 2 ft - Silty Sand		
—		2 ft - 7.5 ft - Gravel Cobble with fines		
5				

Attachment 1 – Soil Logs and Photos

East – Test Dig E Photos



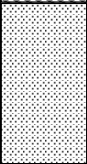



Left - Silty sand above gravel and cobbles layer. Note gray clay mixed into sand layer.

Right – Cobbles and gravel in a fine matrix from the bottom of the pit.

Attachment 1 – Soil Logs and Photos

East – Test Dig F

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. Test Dig F
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen	Rig Type: CAT 310C
Logged By: Mike Rafferty		Date -	Completed: 4/18/2023	Potential Restoration Action: Floodplain
Water level monitoring pipe installed? No		Groundwater Depth: -		Elevation: 46'
				Total Depth of Boring: 10.5'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES
0		0 - 2 ft - Silty Sand		
2		2 ft - 5 ft Cobble Gravel		
5		5 ft - 8 ft Gray Sand		
8		8 ft - 10.5 ft Cobble Gravel		
10				

Attachment 1 – Soil Logs and Photos

East – Test Dig F Photos


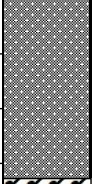

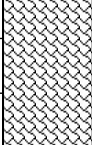


Left – Sand, silt, and cobbles interbedded with gray clay.

Right – Gray clay and cobbles from the bottom of the pit.

Attachment 1 – Soil Logs and Photos

East – Test Dig G

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Boring No. Test Dig G
Address, City, State near La Center, WA			Machinery Contractor: Kysar & Koistinen	Rig Type: CAT 310C
Logged By: Mike Rafferty		Date -	Completed: 4/18/2023	Potential Restoration Action: Floodplain
Water level monitoring pipe installed? No		Groundwater Depth: -		Elevation: 41.6'
				Total Depth of Boring: 10'
Depth (feet)	Graphic Log	<u>Soil Description</u>		NOTES
		0 - 1 ft - Silty sand		
		1 ft - 4.25 ft Dense gray sand with many gravel cobbles		
5		4.25 ft - 7.25 ft Clayey sand		
		7.25 ft - 10 ft Sandy Cobble		
10				

Attachment 1 – Soil Logs and Photos

East – Test Dig G Photos

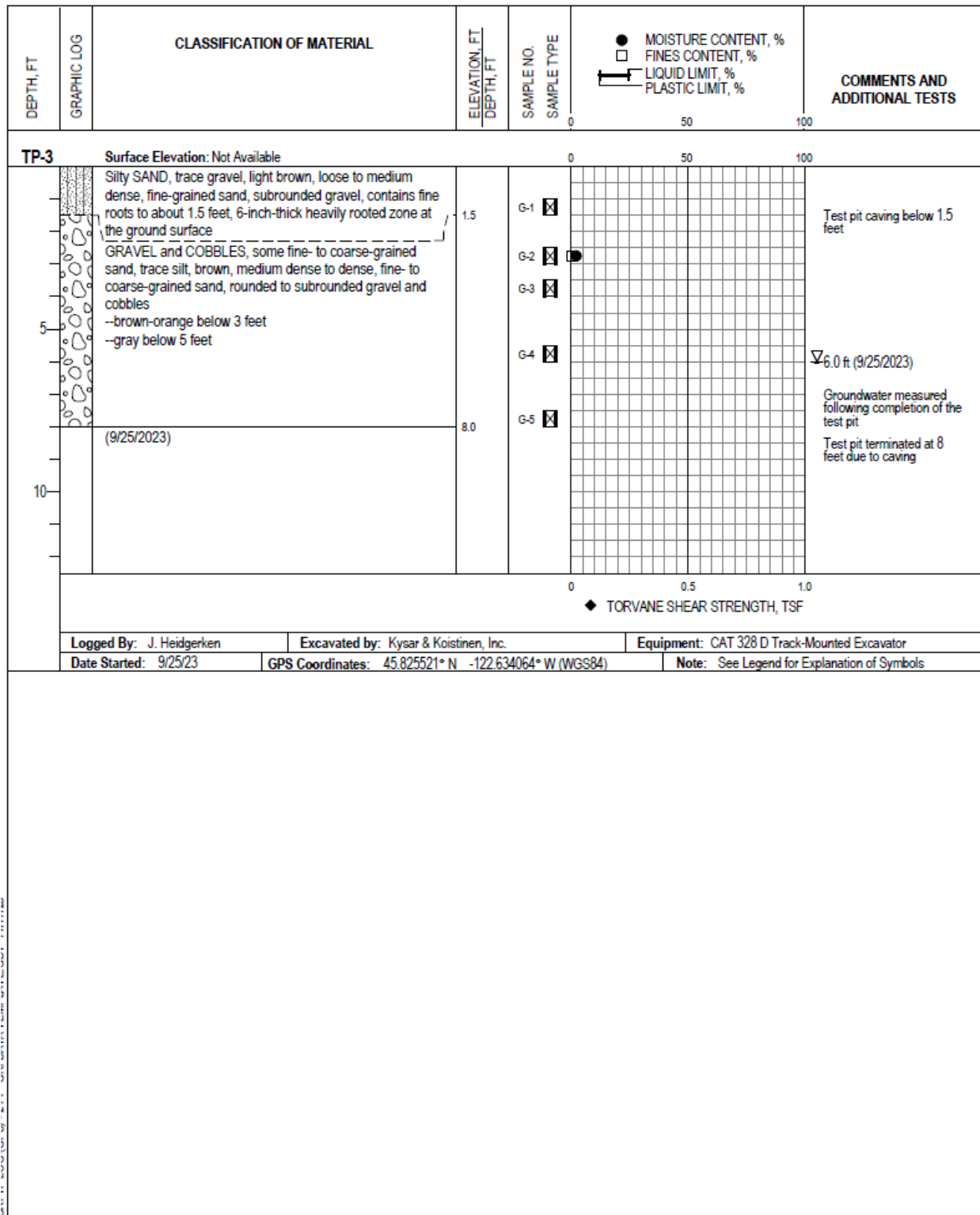


Top – Consolidated clay and sand layers mixed with cobbles.

Bottom – Gravel and cobbles mixed in fine matrix.

Attachment 1 – Soil Logs and Photos

25-1



Attachment 1 – Soil Logs and Photos

25-1 Photo












Attachment 1 – Soil Logs and Photos

25-2

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/25/2023	Site No. 25-2
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 6.75	Groundwater Depth: 6.08

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
				0 - 0.58 ft: Dark brown, think roots	Silty Loam	ML	
				0.58 - 5.83 ft: Brown, cobbles to 5 inches	Gravelly Cobbly Loam	CL	
5				5.83 - 6.08 ft: gray cobbly sand	Cobbly Sand	SP	
				6.08 ft: water table			
				6.08 - 6.75 ft.	Very Gravelly Cobbly Loam	GM	
10							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos


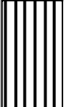


25-2 Photos







Top - test pit with water table at 73 inches; Bottom left - top with thick roots, cobbles and gravels start at 7 inches; Bottom right - >50% coarse materials

Attachment 1 – Soil Logs and Photos

25-3

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Date of Sample 9/25/2023	Site No. 25-3		
Address, City, State near La Center, WA		Coordinates (WA SP South, NAD83)		Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator		
Logged by: Kari Dupler, Estuary Partnership		Ground Elevation:		Total Depth: 12 ft	Groundwater Depth: 12.6 ft		
Notes:							
Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0				0 - 9.5 ft: brown loam	Loam	CL	
2				2 ft: wood debris / log			
5							
10				9.5 - 11.5 ft: grey	Cobbly Silty Loam	ML	
				11.5 - 12.6 ft: grey Water table at 12 ft	Gravelly Cobbly Sand	SP	

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos



25-3 Photos







Top - thick roots in top few inches, woody debris at 2 feet; Top right - gravels and cobbles with sand from bottom of pit; Bottom - grey silty loam with cobbles in bottom of pit.

Attachment 1 – Soil Logs and Photos

25-4

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Date of Sample 9/25/2023	Site No. 25-4		
Address, City, State near La Center, WA		Coordinates (WA SP South, NAD83)		Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator		
Logged by: Kari Dupler, Estuary Partnership		Ground Elevation:		Total Depth: 9 ft	Groundwater Depth: NA		
Notes:							
Depth (feet)	Sample Type	Sample ID	Graphic Log	<u>Soil Description</u>	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
5				0 - 7 ft: Brown	Loam	CL	
				7 - 7.8 ft: Brown	Cobbly Loam	CL	
				7.8 - 9 ft: Brown, with conglomerate, 7 inch cobbles	Cobbly Loam	GM	
10							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

25-4 Photos






Top left - thick tree roots at surface; Top right - Cobbles and gravels at 7 feet; Bottom - larger cobbles with conglomerate material at bottom of test pit





Attachment 1 – Soil Logs and Photos

25-5

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/25/2023	Site No. 25-5
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 15 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	<u>Soil Description</u>	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0-3				0-3 ft: Light brown sand. Trace gravels	Silty Sand	SP	
3-9				3 - 9 ft: Dark brown, 30% gravels, cobbles to 6 inches	Gravels Cobbles	GM	
9-15				9 - 15 ft: gray/blue sand with clay inclusions	Sandy Silt	SM	

-  Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

25-5 Photos






Above - Grey / blue sand with soft clay pockets





Attachment 1 – Soil Logs and Photos

25-6

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/25/2023	Site No. 25-6
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 7 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0 - 2				0 - 2 ft: Light brown silty sand	Silty Sand	SP	
2 - 3.5				2 - 3.5 ft: Gray silty sand, cobbles up to 6 inches	Silty Sand	SP	
3.5 - 7				3.5 - 7 ft: Dark brown sandy silt	Sandy Silt	SM	
5							
10							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

No photos for 25-6

Attachment 1 – Soil Logs and Photos

25-7

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/25/2023	Site No. 25-7
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83) Y: 185028.613; X: 1097696.539	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Gardner Johnston, Inter-Fluve	Ground Elevation:	Total Depth: 8 ft	Groundwater Depth: no water encountered

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0 - 5				0 - 6 ft: Light brown sand with some gravel-cobble (<25%)	Sandy Loam	SM	
6 - 8+				6 - 8+ ft: Native gravel-cobble layer. Clasts up to 6+ inches		GW	
10							

- Bulk/ Bag Sample
- Pebble Count
- Stablized Ground water
- Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

25-7 Photos





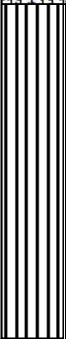
Top – coarse layer at 6 foot depth; Bottom – Close-up of coarse alluvial layer





Attachment 1 – Soil Logs and Photos

25-8

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/25/2023	Site No. 25-8
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83) Y: 184796.879; X: 1097585.262	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Gardner Johnston, Inter-Fluve	Ground Elevation:	Total Depth: 12 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0 - 4				0 - 4 ft: Light brown silty sand	Sandy Loam	SM	
4 - 6				4 - 6 ft: Medium brown loam with scattered gravel and cobble to 5 inches (<20%)	Sandy Loam	SM	
6 - 12				6 - 12 ft: Dark brown silty clay loam with areas of gray blue sand	Silt Loam	ML	

-  Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

25-8 Photos



Top – no gravel layer encountered. More cohesive at depth; Bottom – close-up showing blue-gray layer

Attachment 1 – Soil Logs and Photos

26-1

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/26/2023	Site No. 26-1
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 12 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0 - 9				0 - 9 ft: brown silty sand with fine gravels, some 10-12 inch cobbles; tree roots down to 9 ft	Silty Sand	SP	
9 - 12				9 - 12 ft: Dark gray sand hard material / Troutdale Fmn @ 9 ft old cable at 10 ft	Sandy	SP	
10-12				10-12 inch cobbles, 80% Sand, hard to dig	Cobbly Sand	SP	

- Bulk/ Bag Sample
- Pebble Count
- Stablized Ground water
- Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

26-1 Photos



Left - Brown silty sand with occasional 10-12 inch cobbles; Right -close up of dark grey material starting at 9 feet, with 10-12 inch cobbles




Attachment 1 – Soil Logs and Photos

26-2

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/26/2023	Site No. 26-2
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 22.5 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0				0 - 22.5 ft: Brown silty sand, some small gravels	Silty sand	SP	
22.5				At 22.5 ft": Dark gray, 20% cobbles	Cobbly sand	SP	

- Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

26-2 Photos



Top - Soil pit taken from side of berm, brown silty sand with small gravels on top of grey sandy material with large cobbles at 22.5 feet; Bottom - close up of materials from bottom of test pit

Attachment 1 – Soil Logs and Photos

26-6

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/26/2023	Site No. 26-6
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 8 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
5				0 - 3 ft: Light brown sandy silt, tree and plant roots	Sandy Silt	SM	
				3 - 3.5 ft: Light brown cobbly sand, 1-2 inch 60% cobbles	Cobbly Sand	SP	
				3.5 - 6 ft: Light brown silty sand with cobbles	Silty Sand with Cobbles	SM	
10				6 - 8 ft: Light brown sand with cobbles Mostly 3-4 inches, some 6-7 inches, 40% cobble	Sand with Cobbles	SP	

- Bulk/ Bag Sample
- Pebble Count
- Stablized Ground water
- Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

26-6 Photos



Top - thick tree roots at surface, sandy silt with some cobbles; Bottom - close up of cobble layer at 3 feet

Attachment 1 – Soil Logs and Photos

26-7

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Date of Sample 9/26/2023	Site No. 26-7		
Address, City, State near La Center, WA		Coordinates (WA SP South, NAD83)		Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator		
Logged by: Kari Dupler, Estuary Partnership		Ground Elevation:		Total Depth: 9 ft	Groundwater Depth: NA		
Notes:							
Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
5				0 - 0.8 ft: dark brown silty loam	Silty Loam	ML	
				0.8 - 8.5 ft: brown silty loam	Silty Loam	ML	
10				8.5-9 ft: brown, some wood debris & soils with redox, few cobbles 5-7"	Silty Clay Loam	CL	

- Bulk/ Bag Sample
- Pebble Count
- Stabilized Ground water
- Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos


26-7 Photos






Above - Pit taken in berm, silty loam for majority of pit, bottom of pit with woody debris and soils with redox

Attachment 1 – Soil Logs and Photos

26-8

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Date of Sample 9/26/2023	Site No. 26-8		
Address, City, State near La Center, WA		Coordinates (WA SP South, NAD83)		Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator		
Logged by: Kari Dupler, Estuary Partnership		Ground Elevation:		Total Depth: 7 ft	Groundwater Depth: NA		
Notes:							
Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
5				0 - 5 ft: brown, gravels and cobbles at surface, up to 4-5 inches, 40%	Very gravelly cobbly Silty Sand	SM	
				5 - 7 ft: brown, cobbles to 8-9 inches, 60% cobbles	Very Cobbly Silty Sand	SM	
10							

- Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

26-8 Photos



Above - Close up of gravels and cobbles in bottom of pit

Attachment 1 – Soil Logs and Photos

26-9 Photos







Left - Silty loam with crushed rock and pea gravel throughout pit; Right - close up of crushed rock layer at 1.25 feet




Attachment 1 – Soil Logs and Photos

26-11

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/26/2023	Site No. 26-11
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 4 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
				0 - 0.33 ft: brown	Sandy Loam	SM	
				0.33 - 0.58 ft: gray brown	Very Gravelly Cobbly Loam	GM	
				0.58 - 1.5 ft: brown	Cobbly Clay Loam	CL	
				1.5 - 4 ft: dark gray, 30% cobbles, 4-6 inches	Cobbly Silty Sand	SP	
5							
10							

- Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

26-11 Photos








Top - Brown sandy loam above grey sandy loam with gravels and small cobbles; Bottom - close up of grey silty sand with approximately 30% cobbles





Attachment 1 – Soil Logs and Photos

26-12

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/26/2023	Site No. 26-12
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 12 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
				0 - 0.5 ft: dark brown, with roots	Silty Sand	SP	
				0.5 - 1 ft: light brown	Sandy Loam	SM	
				1 - 1.25 ft: gray	Cobbly Sand	SP	
				1.25 - 11 ft: light brown, with some gravels	Sandy Loam	SM	
5							
				11 - 12 ft: dark brown, reddish / rusty brown concentrations prominent throughout; solid tree debris @ 12 ft, a few cobbles to 10 inches	Sandy Clay Loam	CL	
10							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos






No photos available for 26-12





Attachment 1 – Soil Logs and Photos

26-13

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/26/2023	Site No. 26-13
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 13 ft	Groundwater Depth: 12 ft

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0				0 - 3 ft: gray, Lots of wood debris and light odor, discontinuous layer	Sandy Clay	SC	
3				3 - 5 ft: brown, some small gravels	Sand	SP	
5				5 - 13 ft: brown, cobbles up to 7 inches	Cobbly Sand	SP	
12				groundwater at 12 ft			
13				caving in at 13 ft			

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos




No photos available for 26-13





Attachment 1 – Soil Logs and Photos

27-1

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-1
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 12+ ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;">5</div> <div style="margin-bottom: 20px;">10</div> </div>				0 - 0.8ft: dark brown, with roots	Loam	CL	
				0.8 - 12 ft: brown, drain rock and boulders, 2-5 ft	Rocky Silty Loam	ML	
				start of natural gravels and cobbles, caving in before 15'	Gravels / Cobbles	GM	

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-1 Photos




Top - pit taken in berm, 4 to 5-foot boulders in berm; Bottom - start of natural gravels at 12 feet, caving in before 15 foot target




Attachment 1 – Soil Logs and Photos

27-2

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-2
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 2.5 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	<u>Soil Description</u>	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0				0 - 2.5 ft: brown, to 4 inches and gravels	Cobbly Sand	SP	
5							
10							

- Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-2 Photos




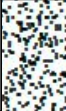
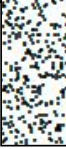
Above - Pit with brown sand with gravels and cobbles to 4 inches





Attachment 1 – Soil Logs and Photos

27-3

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-3
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 5 ft	Groundwater Depth: 5 ft

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
5		▽		0 - 0.5 ft: brown, roots	Sandy Loam	SM	
				0.5 - 2.5 ft: brown, to 4 inches and gravels	Cobbly	SP	
				2.5 - 5 ft: brown, to 8 inches	Cobbly Sand	SP	
				water table at 5 ft			
10							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos



27-3 Photos







Top - Top 6 inches with thick roots, brown sandy loam; Bottom - close up of gravels and cobbles at 5 feet

Attachment 1 – Soil Logs and Photos

27-4

Project: Ridgefield Pits Project		Client: Lower Columbia Estuary Partnership		Date of Sample 9/27/2023	Site No. 27-4	
Address, City, State near La Center, WA		Coordinates (WA SP South, NAD83)		Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator	
Logged by: Kari Dupler, Estuary Partnership		Ground Elevation:		Total Depth: 0.83 ft	Groundwater Depth: NA	
Notes:						
Depth (feet)	Sample Type	Sample ID	Graphic Log	<u>Soil Description</u>	USDA Textural Class (field estimate)	USCS Soil Group (estimated) Additional Classification
				0 - 0.33 ft: Brown	Loam	CL
				0.33 - 0.83 ft: Brown	Cobbly Sandy Loam	SM
5						
10						

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-4 Photos




Above - Shallow pit to 10 inches, cobbles start at 4 inches




Attachment 1 – Soil Logs and Photos

27-5

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-5
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 1.5 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0 - 1.5				0 - 1.5 ft: Dark brown	Silty Sand	SP	
				Brown. Cobbles and gravels to 4 inches	Cobbly Sand	SP	
5							
10							

- Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-5 Photos




Above - Cobbles and gravels start at 18 inches




Attachment 1 – Soil Logs and Photos

27-6

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-6
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 5 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0 1 2 3 4 5				0 - 1.5 ft: Light brown	Silty Sand	SP	
				1.5 - 3 ft: Brown	Gravelly Sand	SP	
				3 - 5 ft: Brown	Cobbly Sand	SP	
5 6 7 8 9 10				Caving in at 6 ft			

- Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-6 Photos




Left - Pit with thick roots at top, silty sand; Right - Close up of groundwater at approximately 6 feet, pit caving in at 6 feet




Attachment 1 – Soil Logs and Photos

27-7

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-7
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 8 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0				0 - 6.5 ft: Dark brown, with cobbles	Gravelly Cobbly Silty Sand	SP	
5				6.5 - 8 ft: Dark brown, larger cobbles 6-7 inches	Cobbly Silty Sand	SP	
10							

- Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-7 Photos




Top - Pit taken in berm, gravels and cobbles at surface, larger cobbles at 6-7 feet; Bottom - close up of cobbles and gravels from bottom of pit




Attachment 1 – Soil Logs and Photos

27-8

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnershi	Date of Sample 9/27/2023	Site No. 27-8
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 5 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	<u>Soil Description</u>	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
5				0 - 4.5 ft: Brown	Sand	SP	
				4.5 - 5 ft: Brown, cobbles to 8 inches	Cobbly Sand	SP	
10							

- Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-8 Photos







Above - Brown sand with a few cobbles at bottom of pit





Attachment 1 – Soil Logs and Photos

27-9

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-9
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 5 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
				0 - 0.83 ft: Dark brown	Sandy Loam	SM	
				0.83 - 2 ft: Brown, fine sand	Sand	SP	
				2 - 4.5 ft: Brown, coarse sand	Sand	SM	
5				4.5 - 5 ft: Brown, 60%, some boulders up to 12 inches	Very Cobbly Sand	SP	
10							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-9 Photos





Top - Thick roots at top of pit, mostly sand and sandy loam; Bottom - close up of sand with cobbles at bottom of pit, cobbles up to 12 inches





Attachment 1 – Soil Logs and Photos

27-10

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnershi	Date of Sample 9/27/2023	Site No. 27-10
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 3 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
				0 - 0.5 ft: Dark brown, with roots	Loam	CL	
				0.5 - 3 ft: Brown. >60% grv-cbl	Extremely Cobbly Silty	GM	
5							
10							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-10 Photos





Top - Sandy loam with thick roots at top of pit; Bottom - close up of cobbles at 3 feet





Attachment 1 – Soil Logs and Photos

27-11

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-11
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 4 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
				0 - 0.83 ft: Dark brown, with roots	Loam	CL	
				0.83 - 4 ft: Light brown, >60% grv-cbl	Extremely cobbly silty sand	GM	
5							
10							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stabilized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-11 Photos




Left - Pit in berm, dark brown loam with roots and plant material in top of pit, silty sand with 60% cobbles at 10 inches; Right - close up of well sorted material at bottom of pit





Attachment 1 – Soil Logs and Photos

27-12

Project: Ridgefield Pits Project	Client: Lower Columbia Estuary Partnership	Date of Sample 9/27/2023	Site No. 27-12
Address, City, State near La Center, WA	Coordinates (WA SP South, NAD83)	Machinery Contractor: Kysar & Koistenin	Rig Type: tracked excavator
Logged by: Kari Dupler, Estuary Partnership	Ground Elevation:	Total Depth: 9 ft	Groundwater Depth: NA

Notes:

Depth (feet)	Sample Type	Sample ID	Graphic Log	Soil Description	USDA Textural Class (field estimate)	USCS Soil Group (estimated)	Additional Classification
0 - 5				0 - 0.5 ft: Dark brown	Sandy Loam	SM	
				0.5 - 7 ft: Light brown	Fine Sand	SP	
5 - 7							
7 - 9				7 - 9 ft: Light brown, ~20% cobbles	Cobbly Sand	SP	
9 - 10							
10 - 11							

-  Bulk/ Bag Sample
-  Pebble Count
-  Stablized Ground water
-  Groundwater At time of Digging

Soil Log: Sheet 1 of 1

Attachment 1 – Soil Logs and Photos

27-12 Photos



Top - Pit in berm, sandy loam with cobbles at 7 feet; Bottom - close up of spils pile from bottom of pit

Attachment 2 - Bank Exposure Photos

Map of bank exposure photo locations



Attachment 2 - Bank Exposure Photos

Bank Exposure – Site A



Note: Rod is approximately 6 feet tall.



Bottle (dated approximately 1957) found buried a few feet below the surface near here.

Attachment 2 - Bank Exposure Photos

Bank Exposure – Site B



Note: Rod is approximately 6 feet tall.

Attachment 2 - Bank Exposure Photos

Bank Exposure – Site C



Note: Rod is approximately 6 feet tall

Attachment 2 - Bank Exposure Photos

Bank Exposure – Site D



Note: Rod is approximately 6 feet tall



Zoomed in photo of upper portion of bank

Attachment 2 - Bank Exposure Photos

Bank Exposure – Site E



Note: Rod is approximately 6 feet tall



Zoomed in photo of upper portion of bank

Attachment 2 - Bank Exposure Photos

Bank Exposure – Site F



Note: Rod is approximately 6 feet tall



Zoomed in photo of upper portion of bank showing buried foreign material located at approximately 2 feet depth.

Attachment 2 - Bank Exposure Photos
Bank Exposure – Site G



Note: Rod is approximately 6 feet tall

Attachment 2 - Bank Exposure Photos

Bank Exposure – Site H



Note: Rod is approximately 6 feet tall

Attachment 2 - Bank Exposure Photos

Bank Exposure – Site I



Note: Rod is approximately 6 feet tall

Attachment 2 - Bank Exposure Photos

Bank Exposure – Site J



Attachment 2 - Bank Exposure Photos

Bank Exposure – Site K



Note: Rod is approximately 6 feet tall

Attachment 2 - Bank Exposure Photos

View of bank just downstream of Site K

