FLOYD | SNIDER
strategy ▪ science ▪ engineering

Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101
tel: 206.292.2078 fax: 206.682.7867

Memorandum

To: Sunny Becker, Washington State Department of Ecology

Cc: Nduta Mbuthia, City of Bothell

From: Mark Jusayan, Emily Jones, and Megan King, PE, Floyd|Snider

Date: September 30, 2020

Project No: COB-Ultra Task 3.3

Re: **Data Gaps Investigation Technical Memorandum**

OVERVIEW

Background

In fall 2019 the City of Bothell (City) conducted a data gaps investigation (DGI) at the Ultra Custom Care Cleaners Site (Site) located in Bothell, Washington. This work is a requirement of the existing Agreed Order (AO) No. DE9704 with the Washington State Department of Ecology (Ecology), Deliverable No. 4 (refer to Attachment 1), which requires the City to further delineate and define the site boundary of a chlorinated volatile organic compound (cVOC) plume associated with former dry-cleaning operations at the Site. A secondary goal of the investigation was to characterize soil and groundwater concentrations of other chemicals of potential concern (COPCs) for the Site, including arsenic, total petroleum hydrocarbons (TPH), and select volatile organic compounds (VOCs) associated with petroleum hydrocarbons. Figure 1 shows the Project Area, the inferred boundaries of the groundwater plume originating from the source property, and the surrounding areas of potential concern where the groundwater plume boundary required further delineation.

The DGI occurred in two phases. The first phase began in 2019 with an initial review of existing environmental reports and data to identify potential data gaps. The second phase began in January 2020 and included obtaining access agreements for three private properties within the project area, followed by the field investigation to address the data gaps identified in the first phase. The field investigation was performed consistent with the DGI Work Plan (Floyd|Snider 2020) and supplements prior investigation work completed by others. The intent of this work is to allow for the development of an agency-approved remedial investigation/feasibility study (RI/FS) as required by the AO that the City and Ecology entered in April 2013. This technical memorandum was prepared by Floyd|Snider on behalf of the City to document the results of the data gaps field investigation.

Data Gaps Investigation Event Summary

The data gaps field investigation included five mobilizations. The mobilizations and their objectives are as follows:

1. *Well Reconnaissance and Synoptic Water Level Event:* An inventory and status check of previously installed wells at the site along with water level measurements to confirm groundwater flow direction.
2. *Groundwater Monitoring at Previously Installed Wells:* A groundwater monitoring well sampling event. Samples were collected at select wells to evaluate current conditions and concentrations of COPCs for the Site.
3. *Membrane Interface Probe Investigation:* A subsurface investigation that advanced a membrane interface probe (MIP) into the ground with a direct push drill rig. Real-time data of relative VOC concentrations were collected to locate contaminant mass and inform the placement of new permanent monitoring wells delineating the lateral and vertical plume extent.
4. *Soil and Groundwater Monitoring at Newly Installed Wells:* A monitoring well installation and soil sampling event. This event included installation of additional groundwater monitoring wells and collection of soil samples to evaluate collocated soil and groundwater concentrations.
5. *Elevation Survey:* A groundwater sampling event and water level measurement event. Groundwater sampling was conducted at newly installed wells to evaluate COPC concentrations and delineate plume boundaries. Water level measurement was conducted at all previously and newly installed wells to confirm groundwater flow direction.

Preliminary findings were reviewed following completion of each event and were used to inform the data collection and sampling schema of the subsequent event. Following completion of all events, a survey was completed to generate coordinate and elevation data for all new locations and previously installed well locations lacking surveyed elevation information.

ANALYSIS PERFORMED DURING EACH DATA GAPS INVESTIGATION EVENT

The text that follows describes the sampling dates, sampling methods, sample types, and analyses performed during each of the five DGI mobilizations.

Well Reconnaissance and Synoptic Water Level Event

On January 9, 2020, all previously installed monitoring wells shown on Figure 2 were located and inspected. The condition of each monitoring well (e.g., presence and condition of cap, monument, and bolts) was documented. If present, the unique Ecology identification tag numbers were recorded. During this time, all available wells were also gauged with a water level meter to measure depths to groundwater and total depth of each well. The water level meter

was decontaminated between measurements. From among the 62 wells installed during previous environmental investigations, 45 wells were located and found to be usable. A list of all previously installed wells and their condition are presented in Table 1. Wells that were no longer present are shown on Figure 2 as abandoned or missing.

Groundwater Monitoring at Previously Installed Wells

Groundwater samples were collected at 15 previously installed monitoring wells from March 9 through March 11, 2020.

Monitoring wells sampled during this event are identified on Figure 3. Sample collection was performed in general accordance with Floyd|Snider Standard Guidelines. Groundwater sampling occurred using low-flow purge and sampling techniques with new dedicated tubing. Water quality parameters consisting of pH, specific conductivity, dissolved oxygen, temperature, turbidity, and oxidation-reduction potential (ORP) were measured and recorded at regular intervals until parameters stabilized to within 10% for three consecutive readings or when at least 30 minutes of purging had elapsed.

All samples were analyzed for VOCs by U.S. Environmental Protection Agency (USEPA) Method 8260D-SIM, arsenic by USEPA Method 200.8, and dissolved gases (methane, ethene, and ethane) via RSK 175. Groundwater samples collected from six wells in the vicinity of, or downgradient of, Speedy Glass were also analyzed for the presence of petroleum hydrocarbons by NWTPH-HCID. The six monitoring wells analyzed for TPH were BB-2, BLMW-10, UCCMW-8, UCCMW-9, UCCMW-10, and UCCMW-27. Diesel-range TPH was affirmatively identified in the samples collected from locations UCCMW-8 and UCCMW-27; these samples were subsequently analyzed for TPH by NWTPH-Dx.

All groundwater analytical data were subject to Compliance Screening (Stages 1 & 2A) data quality review. Analytical data were determined to be of acceptable quality for use as reported by the laboratory. Data validation summaries and laboratory reports for this event are included in Attachment 2.

Membrane Interface Probe Investigation

To further delineate the cVOC plume in soil and groundwater, a MIP was used in conjunction with a direct push technology drill rig to drive the MIP through the subsurface and measure the presence of VOC vapor. A total of 16 MIP borings (MIP-01 through MIP-16) were advanced from March 12 through March 18, 2020, up to a target depth of 50 feet below ground surface (bgs). Total depths for the MIP borings ranged from approximately 29 to 50 feet bgs with the majority of the borings encountering refusal at depths shallower than 50 feet.

A MIP is a semiquantitative field-screening tool that can detect VOCs in soil and groundwater. The MIP consists of a heated probe with a semipermeable membrane (permeable to gas but impermeable to liquid). As the heated probe advances, VOCs in the subsurface diffuse across the

membrane and are transported up a trunk line via an inert carrier gas to a gas chromatograph equipped with several sensors at the surface. These sensors included a low-level halogen-specific detector (XSD™) appropriate for chlorinated solvents at plume boundaries and a high-level XSD™ detector for locations with suspected higher contaminant mass. The MIP boring locations and their associated XSD™ detector types are shown on Figure 3.

The six locations in closest proximity to the source property (MIP-07 through MIP-12) were advanced using the high-level XSD™ detector. The locations of these borings were selected to provide information about the maximum depth of the cVOC contamination near the source property, where few deep groundwater samples had been collected in previous investigations. The remaining borings (MIP-01 through MIP-06 and MIP-13 through MIP-16) used the low-level detector. These locations are outside the previously established plume boundaries or far downgradient of the source property. These locations were selected to delineate the plume boundary and identify locations appropriate for installation of new groundwater monitoring wells.

In addition to the XSD™ detector, the MIP includes a photoionization detector (PID) and flame ionization detector (FID) that measure total VOC chromatographic response in soil gas; a detector that measures electrical conductivity (EC) of soil; and a hydraulic profiling tool (HPT) that logs the pressure decay to establish a measurement of hydraulic conductivity for a given depth. The EC detector provides qualitative lithologic logging. In general, finer grained soils (silts, clays) exhibit higher EC values than more permeable soils (sand, gravel). The MIP instrumentation continuously logs data from the probe at the surface, providing information about changes in geology and relative contaminant response as measured by each of the detectors.

Following completion of this event, the MIP specialty contractor (Columbia Technologies, LLC) prepared a report detailing results of the MIP investigation. This High-Resolution Site Assessment report is included as Attachment 3 and includes individual data logs for each boring location.

Soil and Groundwater Monitoring at Newly Installed Wells

Eleven groundwater monitoring wells were installed as part of this event. A hollow-stem auger drill rig was used to advance borings into the subsurface at each new monitoring well location shown on Figure 3. Standard penetration tests were performed at regular intervals (approximately every 5 feet) where a split spoon sampler was driven by a 140-pound pneumatic hammer to collect undisturbed samples of soil. Soil quality was logged at each location and screened for evidence of contamination using a PID and by geologist observations of staining, odor, and the presence of sheen. One or more soil samples were collected from each of the drilling locations. Each location was completed as a monitoring well and subsequently developed, then sampled for groundwater. Monitoring well locations sampled for soil and groundwater during this event are identified on Figure 3. Boring logs for each location are provided in Attachment 4.

A total of 20 soil samples were collected from the 11 locations between June 23 and July 1, 2020. In general, soil samples were collected at depth intervals where nearby MIP borings had indicated

moderate to high responses on the XSD™ detector or where field screening indicated evidence of contamination. Soil sample collection was performed in general accordance with Floyd|Snider Standard Guidelines.

All soil samples were analyzed for VOCs by USEPA 8260D-SIM/8270E. All soil samples except for those collected at UCCMW-34D at the southern extent of the investigation area were analyzed for the presence of TPH by NWTPH-HCID. TPH was affirmatively identified in one soil sample collected at location UCCMW-36D from a depth of 2 to 3 feet bgs; this sample was subsequently analyzed for TPH by NWTPH-Gx/Dx. Additionally, all soil samples collected below 3 feet bgs were analyzed for fractional organic carbon by ASTM D2974-87.

Groundwater samples were collected at the 11 newly installed monitoring wells between July 13 and August 4, 2020. Groundwater sample collection was performed in general accordance with Floyd|Snider Standard Guidelines. Groundwater sampling occurred using low-flow purge and sampling techniques with new dedicated tubing. Water quality parameters consisting of pH, specific conductivity, dissolved oxygen, temperature, turbidity, and ORP were measured and recorded at regular intervals until parameters stabilized to within 10% for three consecutive readings or when at least 30 minutes of purging had elapsed.

All 12 samples were analyzed for VOCs by USEPA Method 8260D-SIM, arsenic by USEPA Method 200.8, and dissolved gases (methane, ethene, and ethane) via RSK 175. Groundwater samples collected from wells in the vicinity of, or downgradient of, Speedy Glass were analyzed for the presence of petroleum hydrocarbons by NWTPH-HCID.

All soil and groundwater analytical data were subject to Compliance Screening (Stages 1 & 2A) data quality review. Analytical data were determined to be of acceptable quality for use as reported by the laboratory. Data validation summaries and laboratory reports for this event are included in Attachment 2.

Elevation Survey

A comprehensive elevation survey was conducted following completion of the DGI events detailed in the previous sections. All newly installed monitoring wells and MIP investigation locations were surveyed during this mobilization. Additionally, 28 of the previously installed monitoring wells that did not already have survey data available were surveyed. Locations included in the comprehensive elevation survey are shown on Figure 4.

RESULTS

Geology and Hydrogeology

Boring logs for deeper soil borings completed during prior investigations and as part of this DGI were reviewed to better understand deeper geology. These prior investigations provide limited

data on the deeper geology at the Site. To fill this data gap, 9 of the 11 newly installed wells were completed at depths deeper than 30 feet bgs (Attachment 4). Recessional outwash deposits including sands interbedded with silts are present across a majority of the Site just below ground surface or beneath fill. Underlying glacial till was encountered at depths of approximately 40 feet bgs (0 to 8 feet North American Vertical Datum of 1988 [NAVD 88]). Figure 4 shows the location of representative cross-section A-A' running from northeast to southwest along the Site. The subsurface cross-section A-A' is shown on Figure 5.

Survey information and results of the water level measurement results were used to develop groundwater contours and estimated flow direction. This information is presented in Figure 6. Groundwater flow direction is to the south-southeast. Groundwater was encountered at the Site at depths between 2.45 and 16.64 feet bgs (elevation of 29.74 to 39.15 feet NAVD 88).

Analytical Results

Groundwater and soil results discussed in this section are compared to screening levels developed in the DGI Work Plan (Floyd|Snider 2020). Groundwater screening levels include consideration of MTCA Method A/B groundwater criteria and MTCA Method B vapor intrusion screening levels. Soil screening levels include MTCA Method A/B unrestricted criteria and terrestrial ecological criteria presented in WAC Table 749-2.

cVOCs in Shallow Groundwater

Prior to completion of this investigation, 14 previously installed monitoring wells were screened in the shallow aquifer zone. The shallow aquifer zone is defined as approximately 15 to 25 feet bgs. Based on MIP data and previous monitoring well results, only two additional monitoring wells were required in the shallow aquifer zone to delineate plume boundaries. The left panel of Figure 7 presents groundwater data representing current concentrations of cVOCs in the shallow aquifer zone. Results that exceed screening levels are listed on the figure, and each location is colored according to the magnitude of the maximum result measured at that location during the most recent monitoring event. Additionally, Figure 7 shows the revised groundwater cVOC plume boundary in the shallow aquifer zone, interpreted MIP responses, and historical direct-push probe sample results used to bound the extent of cVOC contamination in shallow groundwater.

Table 2 presents cVOC groundwater data at all monitoring well locations sampled during this DGI compared to their screening levels. From among the 14 previously installed monitoring wells, results at seven locations (BB-2, BI-3, UCCMW-7, UCCMW-17, UCCMW-18, UCCMW-21, and UCCMW-25) exceeded the groundwater screening level for one or more cVOCs. The greatest cVOC concentrations were measured at wells due south of the Source Property at locations UCCMW-18 and BB-2. Tetrachloroethene (PCE) concentrations measured in UCCMW-18 and

BB-2 were 130 micrograms per liter (µg/L) and 80 µg/L, respectively (26 and 18 times greater than the screening level, respectively).

In the shallow aquifer zone, MIP field screening responses agree with collocated well data and can be used to delineate the lateral extent of cVOC contamination. The largest response from the high-level XSD™ detector was at MIP-08 (collocated with BI-3) in the central portion of the plume. The response at MIP-08 peaked at a depth of approximately 18 feet bgs in the shallow aquifer zone. Vinyl chloride is the only cVOC that exceeds its screening level at this location, with a measured concentration of 0.52 µg/L (2.6 times greater than the screening level).

Shallow well UCCMW-29 was installed collocated with MIP-07, where a moderate response was observed, to delineate groundwater quality along the eastern plume boundary and correlate the moderate MIP response with analytical results. The PCE result at UCCMW-29 was measured at 9.2 µg/L (1.8 times the screening level). All other cVOC results were measured at concentrations less than their screening levels at UCCMW-29. Locations MIP-14 and MIP-15 were advanced at the western and eastern boundaries of the central portion of the plume to bound the lateral extent of contamination in this area. The observed response was low in MIP-14 and displayed no peaks; this response profile is presumed clean. MIP-15 had a small response on the low-level XSD™ detector in the shallow aquifer zone and was also presumed clean. These interpretations of MIP responses were verified by review of collocated MIP and groundwater monitoring well results in the deep aquifer zone.

All five of the low-level XSD™ detector MIP locations installed along the southern transect/southern plume boundary (i.e., MIP-01 through MIP-04 and MIP-06) exhibited a response profile consistent with presumed clean groundwater quality. MIP-05, located near the intersection of Main Street and Bothell Way NE, displayed a large response in the shallow aquifer zone. A shallow well (UCCMW-32) was installed slightly downgradient of this location. The PCE result at UCCMW-32 was measured at 8.6 µg/L (1.7 times the screening level). All other cVOC results were measured at concentrations less than their screening levels.

The revised plume boundary shown in Figure 7 considers historical groundwater samples collected with direct push probes; MIP probe responses; and monitoring well results measured in 2020.

cVOCs in Deep Groundwater

Prior to completion of this DGI, only one previously installed monitoring well (UCCMW-4) was screened in the deep aquifer zone, which is defined as approximately 25 to 40 feet bgs. Nine additional monitoring wells were installed in the deep aquifer zone to delineate the extent of deep cVOC contamination in the subsurface. One or more cVOCs were detected at concentrations exceeding their screening levels at three of these deep aquifer zone locations south-southeast of the Source Property: UCCMW-36D, UCCMW-31D, and UCCMW-34D. The

maximum detected PCE result of 25 µg/L (5 times the screening level) was measured at location UCCMW-31D. Table 2 presents cVOC groundwater data at all locations sampled during this DGI.

The right panel of Figure 7 presents groundwater data representing current concentrations of cVOCs in the deep aquifer zone. Results that exceed screening levels are listed on the figure, and each location is colored according to the maximum exceedance factor for all cVOC results measured at that location during the most recent monitoring event. Figure 7 also shows the revised groundwater cVOC plume boundary in the deep aquifer zone along with interpreted MIP responses and historical direct-push probe sample results used to confirm the extent of the cVOC plume in the deep aquifer zone.

In the deep aquifer zone, MIP field screening supplements groundwater data collected during the DGI. Collocated groundwater wells were installed at six low-level XSD™ detector MIP locations: MIP-16 (UCCMW-30D); MIP-13 (UCCMW-31D); MIP-01 (UCCMW-33D); MIP-05 (UCCMW-32D) and MIP-02/MIP-03 (UCCMW-34D). These paired results provide evidence that a moderate response in a low-level XSD™ detector MIP location generally corresponds to groundwater cVOC concentrations 2 to 5 times the screening level; and a small or presumed clean response with the low-level XSD™ detector corresponds to groundwater cVOC concentrations in compliance with the screening level.

Similarly, MIP data from the high-level XSD™ detector MIP locations can be used to estimate the depth and the lateral extent of contamination in the deep aquifer zone. One high-level XSD™ detector MIP probe location (MIP-08) exhibited a small response in the deep aquifer zone at a depth of approximately 36 feet bgs. Nearby MIP locations MIP-07, MIP-09, MIP-10, MIP-11, and MIP-12 exhibited a response profile consistent with presumed clean groundwater quality (no peaks in XSD™ response). Concentrations of cVOCs in groundwater at UCCMW-29D (collocated with MIP-07) and UCCMW-28D (east of MIP-09) are in compliance with their screening levels, correlating baseline MIP response with groundwater concentrations less than screening levels. These results support the expectation that groundwater is also in compliance with screening levels in the deep aquifer zone between the Source Property and the Ranch Drive In, based on similar MIP response profiles at locations MIP-07 and MIP-10 in the deeper zone.

In the central and southern portion of the investigation area, small-to-moderate responses were detected in 7 of the 10 MIP locations advanced with the low-level XSD™ detector. The remaining three locations (MIP-04, MIP-06, and MIP-14) on the southwestern and western plume boundary exhibited a response profile consistent with presumed clean groundwater quality.

The revised deep aquifer zone plume boundary shown on Figure 7 considers historical groundwater samples collected with direct push probes; MIP probe responses; and monitoring well results measured in 2020.

Other COPCs in Groundwater

Groundwater results for cVOCs; arsenic; TPH; and benzene, toluene, ethylbenzene, and xylenes (BTEX) are included in Table 2. Field parameter data and laboratory analytical results for all chemicals, including the full suite of VOCs and dissolved gases, are tabulated in Attachment 5.

Arsenic was detected in groundwater at concentrations greater than its screening level at 10 out of the 25 monitoring wells sampled during the DGI. The maximum detected concentration of arsenic was 17 µg/L at location UCCMW-25. The average arsenic result across the Site is 5.1 µg/L and the median result is 3.3 µg/L. Arsenic concentrations measured at the Site do not display a clear pattern with respect to depth or spatial location. There is no known source of arsenic at the Site as a result of former operations at the Source Property. Arsenic concentrations may be influenced by sampling artifacts like elevated turbidity and by geochemically reducing conditions (e.g., elevated pH) caused by the presence of certain contaminants, like TPH. The influence of these factors on measured arsenic concentrations will be evaluated in the RI/FS process.

TPH and its associated VOC components are in compliance with their screening levels in all groundwater samples collected during the DGI.

Soil

Soil results for cVOCs and other COPCs with detections in either soil or groundwater (i.e., arsenic, TPH, and BTEX) are included in Table 3. Laboratory analytical results for all chemicals, including the full suite of VOCs and fractional organic carbon, are tabulated in Attachment 5.

Concentrations of cVOCs measured in all soil samples were in compliance with soil screening levels developed for the Site (Floyd|Snider 2020).

TPH and two associated component VOCs were detected at concentrations exceeding the soil screening level in shallow soil at one location (UCCMW-36D) located on the Speedy Glass property. Results measured in this sample, which was collected from a depth of 2 to 3 feet bgs, exceeded screening levels for oil- and gasoline-range organics; benzene; and ethylbenzene. UCCMW-36D is located in the vicinity of known historical TPH contamination (PSI 1998). The groundwater table at this location was encountered during drilling at 10 feet bgs, and the sample collected from 10.5 to 11.5 feet bgs at this location was in compliance with screening levels for all chemicals, including those associated with TPH.

CONCLUSION AND RECOMMENDATIONS

Results of the DGI supplement existing Site data. Following completion of the DGI, Site data are sufficient to bound the lateral and vertical extent of cVOCs in groundwater originating from the Source Property in both the shallow and deep aquifer zones. Results collected during the DGI are sufficient to proceed with completion of the RI/FS.

Arsenic exceedances in groundwater will be evaluated in the RI/FS and are assumed to be associated with geochemical conditions associated with degradation of cVOCs in the subsurface. No other COPCs were detected in groundwater at concentrations exceeding screening levels.

The only exceedance of screening levels encountered in soil was TPH and its associated components at UCCMW-36D. This detection was encountered above the water table and does not result in impacts to groundwater. This contamination is not associated with historical releases from the Site and is not commingled with cVOC in groundwater originating from the Site.

REFERENCES

Floyd|Snider. 2020. *Ultra Care Custom Cleaners Site Data Gaps Investigation Work Plan.* Prepared for the City of Bothell. March.

Professional Services, Inc. (PSI). 1998. *Contaminated Soil and Water Removal, and Sampling and Analysis Results Storm Sewer Installation Immediately West of Speedy Auto Glass Facility.* 4 September.

LIST OF ATTACHMENTS

Table 1	Previously Installed Wells and Their Condition
Table 2	Groundwater Data for Select Chemicals of Potential Concern (µg/L)
Table 3	Soil Data for Select Chemicals of Potential Concern (mg/kg)
Figure 1	Areas of Potential Concern Requiring Further Delineation at the Ultra Custom Care Cleaners Site
Figure 2	Previously Installed Monitoring and Injection Well Locations
Figure 3	Soil, Groundwater, and Membrane Interface Probe Sampling Locations
Figure 4	Locations Surveyed During Data Gaps Investigation Event and Location of Geologic Transect
Figure 5	Geologic Cross-Section A-A’
Figure 6	Groundwater Elevation(s) and Estimated Flow Direction
Figure 7	Current Groundwater Quality: cVOCs
Attachment 1	Exhibit C from Agreed Order No. DE9704
Attachment 2	Data Validation Memorandum and Laboratory Reports
Attachment 3	Columbia Technologies, LLC, Membrane Interface Probe Report
Attachment 4	Well Construction Logs
Attachment 5	Soil and Groundwater Analytical and Field Parameter Data

Tables

Table 1
Previously Installed Wells and Their Condition

Well ID	Date of Measurement	Time of Measurement	Depth to Water (ft BTOC)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Total Depth (ft BTOC)	Total Depth (ft bgs)	TOC to Ground Surface (ft)	Casing Diameter (inches)	Damaged Monument?	Bolts Missing?	Flooded Monument?	Well Plug Missing?	Ecology Well ID	Comments
BB-2	1/9/20	9:49	4.39	9	19	18.74	19.1	0.36	2	No	2/2	No	No	BAR 280	South of expected location. In driveway to Main St. Soft bottom.
BB-3	1/9/20			10	20										Not found.
BC-5	1/9/20	8:17	7.02	14	20	16.14	16.5	0.36	2	See comment	1/2	No	No	Missing	No Ecology tag. No concrete in monument around PVC (just sand).
BI-3	1/9/20	12:41	2.12	5	10	6.8	8.6	1.8	2	No	No	Yes	No	Missing	Well monument labeled as UCCMW-23 but much closer to BI-3 map location, slip cap near bottom of monument, soft bottom.
BLMW-1	1/9/20	NM		5	15										Not found. Possibly in large stormwater puddle/pond.
BLMW-3	1/9/20			5	15										Not found. New street/fresh asphalt.
BLMW-4	1/9/20			5	15										Not found. New street and planters in area.
BLMW-5	1/9/20			5	10										Not found. New concrete where well is supposed to be.
BLMW-5R	1/9/20			5	15										Not found. New concrete where well is supposed to be.
BLMW-6	1/9/20			5	15										Not part of area of concern/Site. Could not locate; new planter area where well is supposed to be.
BLMW-6R	1/9/20	NM		5	15										Well exists, but not part of area of concern/Site.
BLMW-7	1/9/20			5	10										Not found. New asphalt where well is supposed to be.
BLMW-9	1/9/20			5	15										Not found. 10-inch-diameter sewer monument within 15 feet.
BLMW-10	1/9/20	8:45	4.78	5	10	14.61	14.75	0.14	2	No	No	Yes	No	BHZ 442	Well buried under 3-4" of gravel.
INJ-1	1/9/20	10:27	7.7			22.29			4	No	No	No	No	BJA 503	
INJ-2	1/9/20	10:41	8.43	8	23	21.9	22.2	0.3	4	No	No	No	No	BJA 504	Some sediment on probe tip upon retrieval.
Unknown	1/9/20	14:35	9.58	8	13	12.29	12.5	0.21	1	No	All	Yes	No	BJA 560	No ID on well or monument. Located on source property.
INJ-?	1/9/20	14:27	9.34	8	13	12.07	12.4	0.33	1	No	No	Yes	No	BJA 561	ID not legible on monument lid (looks like INJ-13 or INJ-18). Monument full of soapy water and thick/hard film covering everything (almost rusty looking).
INJ-4	1/9/20	14:46	9.47			23.03	23.4	0.37	4	No	No	No	No	BJA 506	
INJ-5	1/9/20	NM	NM								2/3				Cross-threaded bolt stuck. Unable to open monument lid.
INJ-6	1/9/20	15:04	9.71			23.01	23.3	0.29	4	No	No	No	No	BJA 508	
INJ-7	1/9/20	10:22	7.63			12.62			1	No	No	Yes	No	BJA 551	
INJ-8	1/9/20	10:39	8.07			12.59			1	No	1	Yes	No	BJA 552	Soft bottom.
INJ-9	1/9/20	10:21	8.35	8	23	12.85	13.1	0.25	1	No	No	Yes	No	BJA 553	Soft bottom.
INJ-10	1/9/20	11:06	8.58			12.77			1	No	No	Yes	No	BJA 554	
INJ-11	1/9/20	11:14	8.73			12.35			1	No	1/3	Yes	No	BJA 555	
INJ-12	1/9/20	11:23	8.94			11.25			3/4	No	No	Yes	No	BJA 556	
INJ-13	1/9/20	14:26	9.34			12.53	12.8	0.27	1	No	3/3	Yes	No	BJA 557	Torque cap does not fit (glued in?) but screw top acts as retrofitted slip
INJ-14	1/9/20	14:55	9.51			12.55	12.9	0.35	1	No	No	Yes	No	BJA 558	
INJ-15	1/9/20	15:00	9.46			12.4	12.75	0.35	1	No	No	No	No	BJA 559	
RMW-4	1/9/20			15	25										Not found. Nearby asphalt patch in concrete; possibly from well being decommissioned.
RMW-11D	1/9/20			22	32										Not found. Cleanout nearby; new concrete and landscaping in area.
UCCMW-1	1/9/20	11:27	9.14	4.5	14.5	14.55	14.8	0.25	2	No	2/3	No	No	Missing	Monument dirty; rusty, no Ecology tag.
UCCMW-2	1/9/20	11:29	7.71	3	13.5	13.38	13.55	0.17		Yes	3/3	No	No	Missing	Threaded cap; all bolts missing, but flanges are all stripped/too big.
UCCMW-3R	1/9/20	13:45	8.83	3.5	13.5	15.9	14.9	-1	2	Yes	All	No	No	BHZ 439	Monument is fully exposed above ground surface (including PVC riser). Monument lid read "MW-3R." Updated ID in table from UCCMW-3 to UCCMW-3R.
UCCMW-4D	1/9/20	10:10	8.2	35	40	39.57	39.8	0.23	2	No	No	Yes	No	BHZ 404	
UCCMW-5	1/9/20	10:04	10.01	10	20	19.19	19.4	0.21		No	No	Yes	No	BHZ 436	Has threaded cap.
UCCMW-6	1/9/20	12:30	4.33	5	15	13.2	14.25	1.05	2	No	No	No	No	BHZ 402	Well casing is sitting below base of monument.
UCCMW-7	1/9/20	9:40	4.84	8	18	17.99	18.5	0.51		Yes	1/3	No	No	BHZ 438	Soft bottom; missing flange where bolt is missing; partially cemented lid took considerable effort to open.
UCCMW-8	1/9/20	9:12	4.4	5	15	14.33	14.6	0.27	2	No	1/3	No	No	BHZ 441	Soft bottom.
UCCMW-9	1/9/20	12:52	3.8	5	15	10.77	12.35	1.58	2	No	No	No	No	BHZ 403	Monument has been raised (sitting on cinder blocks) so well casing is below base of monument.
UCCMW-10	1/9/20	13:17	4.36	5	15	10.6	10.8	0.2	2	Yes	No	No	No	BHZ 437	Monument in left turn lane (west bound) of Main St. Bolts were cemented in; required significant effort to open. Soft bottom.

Table 1
Previously Installed Wells and Their Condition

Well ID	Date of Measurement	Time of Measurement	Depth to Water (ft BTOC)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Total Depth (ft BTOC)	Total Depth (ft bgs)	TOC to Ground Surface (ft)	Casing Diameter (inches)	Damaged Monument?	Bolts Missing?	Flooded Monument?	Well Plug Missing?	Ecology Well ID	Comments
UCCMW-11S	1/9/20	13:57	7.89	8	18	17.64	17.95	0.31	2	No	1/2	Yes	No		Threaded cap.
UCCMW-11	1/9/20	13:47	8.00	18	23	22.35	22.5	0.15	1	Yes	No	Yes	No	BIE 899	Threaded cap; one flange broken so bolt is not functional; skirt is cracked; soft bottom.
UCCMW-12S	1/9/20	14:14	8.86	8	18	17.42	17.6	0.18	1	Yes	All	No	No	Missing or	Well monument full of dirt and thorned plant; threaded cap; no lid.
UCCMW-12D	1/9/20	14:20	8.81	25	30	29.36	29.5	0.14	2	Yes	2/2	No	No	BIE 861	Threaded cap, hole in lid. Location on map is 12S; needs to be switched.
UCCMW-13S	1/9/20	14:00	8.74	9	19	18.4	18.9	0.5	1	No	All	No	Yes	BIE 816	1-inch PVC inside of a 2-inch PVC casing. Torque cap on 2-inch casing creates seal, however, 2-inch PVC does not have a slip cap. Standing water was observed in annular space between 1-inch and 2-inch PVC. Soft bottom.
UCCMW-13D	1/9/20	NM	NM	19	24						All				Well exists, but cannot open because the lid is partially covered by an ecology block.
UCCMW-14S	1/9/20			10	20										Not found. Possibly buried/overgrown by grass or gone.
UCCMW-14D	1/9/20			21	26										Not found. Possibly buried/overgrown by grass or gone.
UCCMW-15	1/9/20	14:17	9.06			18.14	18.6	0.46	1	No	No	Yes	No	BIE 817	Screw cap.
UCCMW-16	1/9/20	10:58	7.01	9	19	18.78	19	0.22	1	No	No	Yes	No	BIE 812	Threaded cap.
UCCMW-17	1/9/20	11:08	8.69	10	20	19.55	19.85	0.3	1	Yes	1/2	No	No	BIE 811	Threaded cap; broken flange where bolt is missing; other flange is stripped so bolt is not functional.
UCCMW-18	1/9/20	10:58	8.76	10	20	19.56	19.9	0.34	1	No	No	Yes	No	BIE 813	
UCCMW-19	1/9/20	10:05	8.18	10	20	19.44	19.65	0.21	1	No	No	No	No	BIE 819	
UCCMW-20	1/9/20	12:14	7.88	8	18	16.1	16.6	0.5	1	Yes	2	No	No	Illegible	Threaded cap. Ecology tag present, but cannot read.
UCCMW-21	1/9/20	12:07	12.24	12	22	20.93	21.4	0.47	2	No	1/2	Yes	No	Illegible	Ecology tag present, but cannot read.
UCCMW-23	1/9/20	13:30	3.47	8	18	15.2	16.8	1.6	1	No	No	Yes	No	BIE 862	Slip cap.
UCCMW-24	1/9/20	9:36	4.5	8	18	16.82	16.9	0.08	1	No	No	No	No	BIE 863	1-inch SCH80 PVC inside of 2-inch SCH40 PVC. Slip cap over 2-inch casing. Both PVC casings cut at high angles. Water level measured from North high point. Soft bottom.
UCCMW-25	1/9/20	9:25	4.32	8	18	17.04	17.1	0.06	1	No	No	No	No	BIE 975	Slip cap.
UCCMW-26	1/9/20			5	15										Not found. Possibly buried/overgrown by grass or gone.
UCCMW-27	1/9/20	8:57	4.53	5	15	14.3	14.7	0.4	2	No	No	Yes	No	BJA 501	Well located under ~3 inches of gravel. Soft bottom. Hydrocarbon-like odor observed during water level measurement.

Abbreviations:

bgs	Below ground surface
BTOC	Below top of casing
ft	Feet
NAVD 88	North American Vertical Datum of 1988
NM	Not measured
PVC	Polyvinyl chloride
TOC	Top of casing

Table 2

Groundwater Data for Select Chemicals of Potential Concern (µg/L) [1]

					Primary COPCs					Secondary COPCs								
Analyte Class					cVOCs					Dissolved Metals [2]	Total Metals	TPHs			BTEX			
Analyte					PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC	Arsenic	Arsenic	Diesel Range	Gasoline Range	Oil Range	Benzene	Ethylbenzene	Toluene	Total Xylenes
CAS No.					127-18-4	79-01-6	156-59-2	156-60-5	75-01-4	7440-38-2	7440-38-2	DRO	GRO	ORO	71-43-2	100-41-4	108-88-3	1330-20-7
MTCA Method A/B Groundwater Criterion [3]					5.0	5.0	16	160	0.20	5.0	5.0	500	800	500	5.0	700	1,000	1,000
MTCA Method B Vapor Intrusion Screening Level [4]					24	1.5	--	--	0.35	--	--	--	--	--	2.4	--	--	--
Ultra Custom Care Cleaners Site Screening Level [5]					5.0	1.5	16	160	0.20	5.0	5.0	500	800	500	2.4	700	1,000	1,000
Location	Sample Date	Aquifer Zone	Screened Interval (ft bgs)	Sample ID														
BB-2	3/11/2020	Shallow	9–19	BB-2-031120	**80**	0.97	0.60	0.40 U	0.046		3.3 U	210 U	100 U	210 U	0.40 U	0.40 U	2.0 U	0.80 U
BI-3	3/9/2020	Shallow	5–10	BI-3-030920	1.1	0.39	2.4	0.20 U	**0.52**		3.3 U				0.20 U	0.20 U	1.0 U	0.40 U
BLMW-10	3/9/2020	Shallow	5–10	BLMW-10-030920	0.20 U	0.29	1.0	0.20 U	0.024		3.5	200 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-4D	3/11/2020	Deep	35 -40	UCCMW-4D-031120	0.20 U	0.20 U	0.21	0.20 U	0.020 U		**9.1**				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-5	3/10/2020	Shallow	10–20	UCCMW-5-031020	1.4	0.20 U	0.20 U	0.20 U	0.020 U		3.3 U				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-7	3/10/2020	Shallow	8–18	UCCMW-7-031020	1.4	1.3	13	0.20 U	**1.9**		**9.0**				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-8	3/11/2020	Shallow	5–15	UCCMW-8-031120	2.2	0.50	0.55	0.20 U	0.020 U		3.8	220 U	100 U	300	0.24	0.20 U	1.0 U	0.40 U
UCCMW-9	3/9/2020	Shallow	5–15	UCCMW-9-030920	0.20 U	0.20 U	0.99	0.20 U	0.15		**6.3**	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-10	3/10/2020	Shallow	5–15	UCCMW-10-031020	0.20 U	0.20 U	0.20 U	0.20 U	0.020 U		3.3 U	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-17	3/11/2020	Shallow	10–20	UCCMW-17-031120	**21**	1.2	**26**	0.21	0.020 U		3.3 U				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-18	3/11/2020	Shallow	10–20	UCCMW-18-031120	**130**	**1.7**	**19**	1.0 U	**2.8**		**6.0**				1.0 U	1.0 U	5.0 U	2.0 U
UCCMW-18	3/11/2020	Shallow	10–20	UCCMW-99-031120	**130**	**1.9**	**19**	1.0 U	**2.5**		**5.8**				1.0 U	1.0 U	5.0 U	2.0 U
UCCMW-21	3/9/2020	Shallow	12–22	UCCMW-21-031020	2.8	1.4	0.61	0.20 U	**0.25**		**5.5**				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-24	3/9/2020	Shallow	8–18	UCCMW-24-030920	0.20 U	0.20 U	0.30	0.20 U	0.020 U		**11**				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-25	3/9/2020	Shallow	8–18	UCCMW-25-030920	1.1	0.88	3.8	0.20 U	**0.75**		**17**				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-27	3/9/2020	Shallow	5–15	UCCMW-27-030920	0.20 U	0.21	3.1	0.20 U	0.094		**8.8**	210 U	100 U	250	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-28D	8/4/2020	Deep	40–50	UCCMW-28D-080420	0.20 U	0.20 U	0.20 U	0.20 U	0.020 U		3.3 U				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-29	7/13/2020	Shallow	5–15	UCCMW-29-071320	**9.2**	0.20 U	0.20 U	0.20 U	0.020 U		3.3 U				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-29D	7/13/2020	Deep	34–44	UCCMW-29D-071320	0.20 U	0.20 U	0.20 U	0.20 U	0.020 U	4.5	**5.2**				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-30D	7/14/2020	Deep	26–36	UCCMW-30D-071420	2.2	0.20 U	0.20 U	0.20 U	0.067		3.3 U	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-31D	7/13/2020	Deep	18–28	UCCMW-31D-071320	**25**	0.20 U	6.6	0.20 U	**0.24**		3.3 U	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-32	7/13/2020	Shallow	15–25	UCCMW-32-071320	**8.6**	**2.9**	3.2	0.20 U	0.043	3.0 U	3.3 U	210 U	110 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-32D	7/13/2020	Deep	30–40	UCCMW-32D-071320	0.20 U	0.20 U	0.20 U	0.20 U	0.020 U		3.3 U	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-33D	7/21/2020	Deep	49–59	UCCMW-33D-072120	0.20 U	0.20 U	0.20 U	0.20 U	0.020 U		**5.8**	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-34D	7/21/2020	Deep	35 -50	UCCMW-34D-072120	**18**	0.20 U	0.20 U	0.20 U	0.020 U		3.3 U	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-35D	7/21/2020	Deep	30 -40	UCCMW-35D-072120	0.20 U	0.20 U	0.20 U	0.20 U	0.020 U		3.3 U				0.20 U	0.20 U	1.0 U	0.40 U
UCCMW-36D	7/13/2020	Deep	15–30	UCCMW-36D-071320	**24**	0.20 U	**19**	0.20 U	**0.93**		3.3 U	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U
				UCCMW-99-071320	**24**	0.20 U	**20**	0.20 U	**0.92**		3.3 U	210 U	100 U	210 U	0.20 U	0.20 U	1.0 U	0.40 U

Notes:

Blanks are intentional; analysis was not performed.

-- Not available.

BOLD Detected exceedance of MTCA Method A/B Groundwater Criterion.

BOLD Detected exceedance of MTCA Method B Vapor Screening Level.

1 This table presents data for COPC groups with elevated detections in soil or groundwater compared to their groundwater screening levels. Results and criteria are rounded to two significant figures. Groundwater results for other analytes, including VOCs, dissolved gases, and SVOCs, are included in Attachment 4.

2 Screening levels are applicable to the total fraction. Dissolved arsenic analysis was conducted when elevated turbidity was present in the well after stabilization of water quality parameters.

3 MTCA Method A groundwater criteria are from WAC Table 720-1 for all chemicals. When MTCA Method A criteria are not available for any chemical previously identified as a COPC for the Site (i.e., cis- and trans-1,2-DCE), the criterion in this table is the lowest of MTCA Method B groundwater criteria protective of cancer and noncancer endpoints. MTCA Method B groundwater criteria are consistent with Ecology's May 2019 Cleanup Levels and Risk Calculation data tables.

4 Criteria in this table are the lowest of the MTCA Method B vapor intrusion screening levels protective of cancer and noncancer endpoints for each chemical. Development and guidance for use of criteria protective of this pathway are described in Ecology's Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action, as revised in 2019.

5 Groundwater screening levels were developed for all chemicals analyzed in groundwater during historical environmental investigations and include consideration of the criteria listed in this table, natural background, and the lowest of the Federal and State Maximum Contaminant Levels established in 40 CFR 141 and WAC 326-290-310, respectively, for each chemical.

Abbreviations:

bgs Below ground surface
BTEX Benzene, toluene, ethylbenzene, and xylenes
CAS Chemical Abstracts Service
COPC Chemical of potential concern
cVOC Chlorinated volatile organic compound
DCE Dichloroethene
Ecology Washington State Department of Ecology
ft Feet
µg/L Micrograms per liter
MTCA Model Toxics Control Act
PCE Tetrachloroethylene
SVOC Semivolatile organic compound
TCE Trichloroethylene
TPH Total petroleum hydrocarbons
VC Vinyl chloride
VOC Volatile organic compound

Qualifier:

U Analyte was not detected at the given reporting limit.

Table 3

Soil Data for Select Chemicals of Potential Concern (mg/kg) [1]

					Primary COPCs					Secondary COPCs [2]						
				Analyte Class	cVOCs					TPHs			BTEX			
				Analyte	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC	Diesel Range	Gasoline Range	Oil Range	Benzene	Ethylbenzene	Toluene	Total Xylene
				CAS No.	127-18-4	79-01-6	156-59-2	156-60-5	75-01-4	DRO	GRO	ORO	71-43-2	100-41-4	108-88-3	1330-20-7
				Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				Ultra Custom Care Cleaners Site Screening Level [3]	0.050	0.030	160	1,600	0.67	460	30	2,000	0.030	6.0	7.0	9.0
Location	Sample Date	Aquifer Zone	Depth Range (ft bgs)	Sample ID												
UCCMW-28D	7/1/2020	Deep	35.5 - 36.5	UCCMW-28D-35.5-36.5	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.000053 U	60 U	24 U	120 U	0.0011 U	0.0011 U	0.0053 U	0.0021 U
UCCMW-29	6/24/2020	Shallow	8.5 - 9.5	UCCMW-29-8.5-9.5	0.036	0.0011 U	0.0011 U	0.0011 U	0.000056 U	64 U	25 U	130 U	0.0011 U	0.0011 U	0.0056 U	0.0022 U
UCCMW-29D	6/23/2020	Deep	42.5 - 43	UCCMW-29D-42.5-43	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.000052 U	53 U	21 U	110 U	0.0010 U	0.0010 U	0.0052 U	0.0021 U
UCCMW-30D	6/25/2020	Deep	28.5 - 29.5	UCCMW-30D-28.5-29.5	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.000055 U	64 U	26 U	130 U	0.0011 U	0.0011 U	0.0055 U	0.0022 U
			35 - 36	UCCMW-30D-35-36	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.000054 U	60 U	24 U	120 U	0.0011 U	0.0011 U	0.0054 U	0.0022 U
UCCMW-31D	6/24/2020	Shallow	10 - 10.5	UCCMW-31D-10-10.5	0.00089 U	0.00089 U	0.00089 U	0.00089 U	0.000045 U	62 U	25 U	130 U	0.00089 U	0.00089 U	0.0045 U	0.0018 U
		Deep	20 - 21	UCCMW-31D-20-21	0.042	0.0011 U	0.0011 U	0.0011 U	0.000054 U	63 U	25 U	130 U	0.0011 U	0.0011 U	0.0054 U	0.0022 U
UCCMW-32	6/29/2020	Shallow	17.5 - 18.5	UCCMW-32-17.5-18.5	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.000076	62 U	25 U	120 U	0.0011 U	0.0011 U	0.0054 U	0.0022 U
				UCCMW-99-17.5-18.5	0.00091 U	0.00091 U	0.00091 U	0.00091 U	0.000077	60 U	24 U	120 U	0.00091 U	0.00091 U	0.0045 U	0.0018 U
UCCMW-32D	6/29/2020	Deep	25.5 - 26.5	UCCMW-32D-25.5-26.5	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.000052 U	63 U	25 U	130 U	0.0010 U	0.0010 U	0.0052 U	0.0021 U
			39 - 40	UCCMW-32D-39-40	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.000059 U	60 U	24 U	120 U	0.0012 U	0.0012 U	0.0059 U	0.0023 U
UCCMW-33D	6/24/2020	Deep	23 - 24	UCCMW-33D-23-24	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.000056 U	62 U	25 U	120 U	0.0011 U	0.0011 U	0.0056 U	0.0022 U
	6/25/2020	Deep	36.5 - 37.5	UCCMW-33D-36.5-37.5	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.000048 U	60 U	24 U	120 U	0.00097 U	0.00097 U	0.0048 U	0.0019 U
UCCMW-34D	6/26/2020	Deep	29.8 - 30.5	UCCMW-34D-29.8-30.5	0.00090 U	0.00090 U	0.00090 U	0.00090 U	0.000045 U				0.00090 U	0.00090 U	0.0045 U	0.0018 U
			39 - 40	UCCMW-34D-39-40	0.0058	0.00091 U	0.00091 U	0.00091 U	0.000045 U				0.00091 U	0.00091 U	0.0045 U	0.0018 U
UCCMW-35D	6/30/2020	Deep	30.5 - 31.5	UCCMW-35D-30.5-31.5	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.000053 U	60 U	24 U	120 U	0.0011 U	0.0011 U	0.0053 U	0.0021 U
UCCMW-36D	6/30/2020	Shallow	2 - 3	UCCMW-36D-2-3	**0.052 U**	**0.052 U**	0.052 U	0.052 U	0.0026 U	**490** [4]	**450**	**3,100**	**2.3**	**14**	0.26 U	6.4
		Deep	10.5 -11.5	UCCMW-36D-10.5-11.5	0.00099 U	0.00099 U	0.00099 U	0.00099 U	0.000050 U	60 U	24 U	120 U	0.0013	0.0017	0.0050 U	0.0020 U

Notes:

	Blanks are intentional; analysis was not performed.
BOLD	Detected exceedance of screening level based on MTCA Method A/B Soil Criteria for unrestricted land use.
BOLD	Detected exceedance of screening level based on simplified TEE.
BOLD	Nondetected exceedance of screening level.

1 This table presents data for COPC groups with elevated detections in soil or groundwater compared to their groundwater screening levels. Results and criteria are rounded to two significant figures. Groundwater results for other analytes, including VOCs, dissolved gases, and SVOCs, are included in Attachment 4.

2 Arsenic is not a soil COPC and was not analyzed in soil.

3 The soil screening level is the lowest of MTCA Method A/B Soil Criteria for unrestricted land use and the simplified TEE soil screening levels from WAC Table 749-2, after adjusting for natural background. Soil screening levels are protective of human health and ecological receptors via the direct contact pathway. MTCA Method A Soil Criteria for unrestricted land use are from WAC Table 740-1. When MTCA Method A criteria are not available for any chemical previously identified as a COPC for the site, the criterion in this table is the lowest of MTCA Method B soil criteria protective of cancer and noncancer endpoints for that chemical. MTCA Method B soil criteria are consistent with Ecology's May 2019 Cleanup Levels and Risk Calculation data tables.

4 The laboratory noted that the hydrocarbons in the gasoline range and lube oil range are impacting the diesel range result.

Abbreviations:

bgs	Below ground surface	ft	Feet	TEE	Terrestrial Ecological Evaluation
BTEX	Benzene, toluene, ethylbenzene, and xylenes	mg/kg	Milligrams per kilogram	TPH	Total petroleum hydrocarbons
CAS	Chemical Abstracts Service	MTCA	Model Toxics Control Act	VC	Vinyl chloride
COPC	Chemical of potential concern	PCE	Tetrachloroethylene	VOC	Volatile organic compound
cVOC	Chlorinated volatile organic compound	SVOC	Semivolatile organic compound		
DCE	Dichloroethene	TCE	Trichloroethylene		

Qualifiers:

U	Analyte was not detected at the given reporting limit.

Figures

BOTHELL WAY NE

NE 183RD ST

Ranch
Drive-In

Speedy
Glass

MAIN ST

WOODINVILLE DR

SR-522

Legend

- DGI WP Groundwater cVOC Plume Boundary (Dashed Where Inferred)
- Project Area
- Area of Potential Concern
- Ultra Custom Care Cleaners Source Property
- Parcel Boundary

Note:
· Aerial imagery obtained from Nearmap, 2020.

0 35 70 140
Scale in Feet

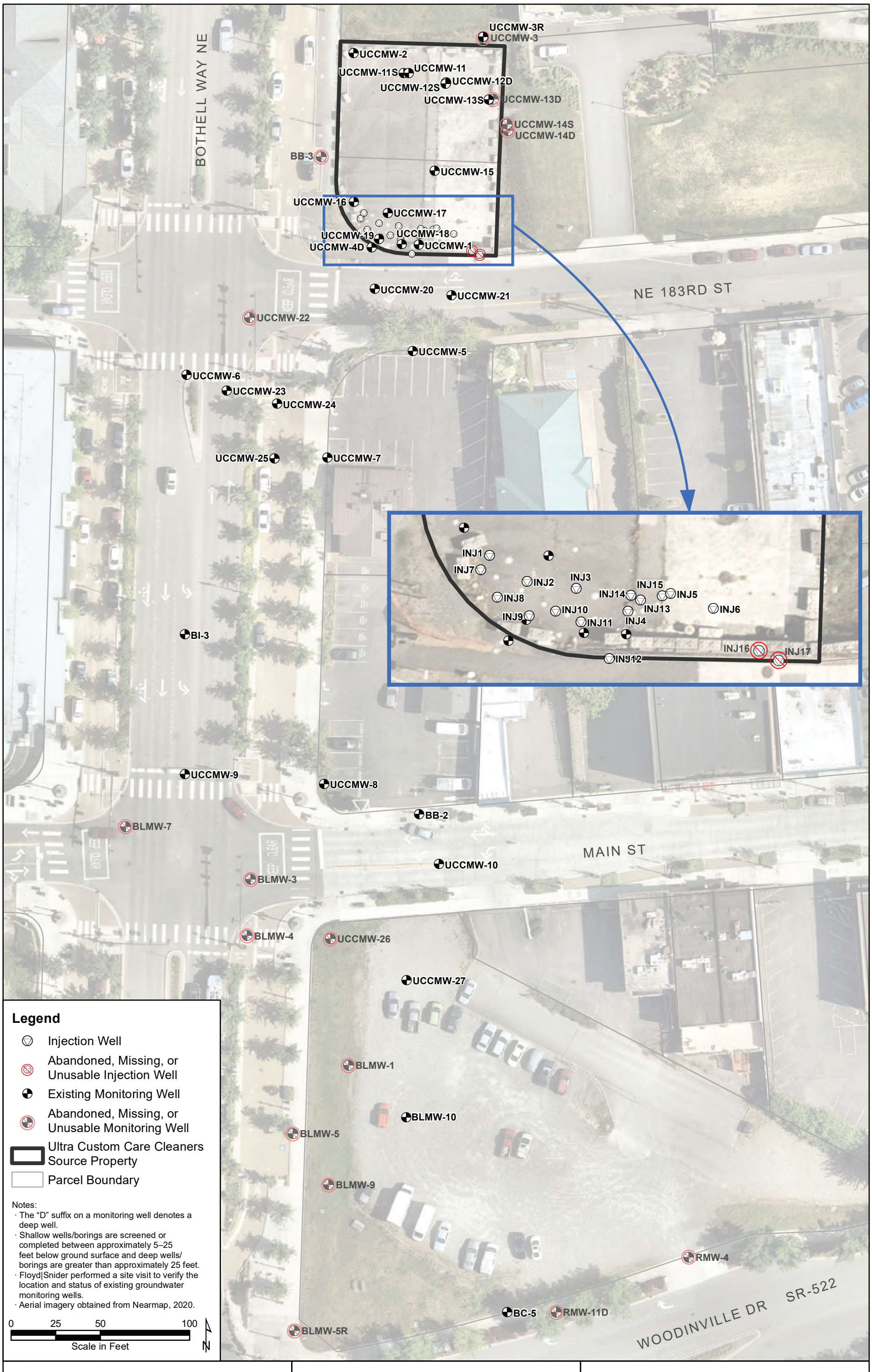
N

FLOYD | SNIDER
strategy • science • engineering

DGI Technical Memorandum
Ultra Custom Care Cleaners Site
Bothell, Washington

Figure 1
Areas of Potential Concern Requiring Further Delineation at the Ultra Custom Care Cleaners Site

I:\GIS\Projects\COBothell-Ultra\MXD\DGI Technical Memorandum\Figure 1 Areas of Potential Concern Requiring Further Delineation at the Ultra Custom Care Cleaners Site.mxd
9/16/2020



Legend

- Injection Well
- Abandoned, Missing, or Unusable Injection Well
- Existing Monitoring Well
- Abandoned, Missing, or Unusable Monitoring Well
- Ultra Custom Care Cleaners Source Property
- Parcel Boundary

Notes:

- The "D" suffix on a monitoring well denotes a deep well.
- Shallow wells/borings are screened or completed between approximately 5–25 feet below ground surface and deep wells/ borings are greater than approximately 25 feet.
- Floyd|Snider performed a site visit to verify the location and status of existing groundwater monitoring wells.
- Aerial imagery obtained from Nearmap, 2020.

0 25 50 100

Scale in Feet

N

FLOYD | SNIDER

strategy • science • engineering

DGI Technical Memorandum
Ultra Custom Care Cleaners Site
Bothell, Washington

Figure 2
Previously Installed Monitoring and Injection Well Locations

I:\GIS\Projects\COBothell-Ultra\MXD\DGI Technical Memorandum\Figure 2 Previously Installed Monitoring and Injection Well Locations.mxd
9/16/2020

UCCMW-17
UCCMW-18
UCCMW-4D
UCCMW-21
NE 183RD ST
UCCMW-5
MIP-12
MIP-09
UCCMW-28D
UCCMW-24
MIP-11
UCCMW-25
UCCMW-7
MIP-07
UCCMW-29
UCCMW-29D
MIP-08
MIP-10
MIP-14
MIP-15
BI-3
UCCMW-36D
UCCMW-30D
MIP-16
UCCMW-9
UCCMW-8
BB-2
MAIN ST
UCCMW-10
MIP-13
UCCMW-31D
MIP-05
UCCMW-27
UCCMW-32
UCCMW-32D
UCCMW-35D
BLMW-10
UCCMW-34D
MIP-04
MIP-01
MIP-02
MIP-03
UCCMW-33D
MIP-06
BOTHELL WAY NE
WOODINVILLE DR
SR-522

Legend

- New Monitoring Well and Soil Sampling Location: Sampled June/August 2020
- Existing Monitoring Well: Sampled March, 2020
- Low-Level MIP Location
- High-Level MIP Location
- Proposed Shallow Monitoring Well
- Proposed Deep Monitoring Well
- DGI WP Groundwater cVOC Plume Boundary (Dashed Where Inferred)
- Ultra Custom Care Cleaners Source Property
- Parcel Boundary

Notes:
- The "D" suffix on a monitoring well denotes a deep well.
- Shallow wells/borings are screened or completed between approximately 5–25 feet below ground surface and deep wells/ borings are greater than approximately 25 feet.
- Aerial imagery obtained from Nearmap, 2020.

Abbreviations:
cVOC = Chlorinated volatile organic compound
DGI WP = Data Gaps Investigation Work Plan
MIP = Membrane interface probe

0 35 70 140
Scale in Feet

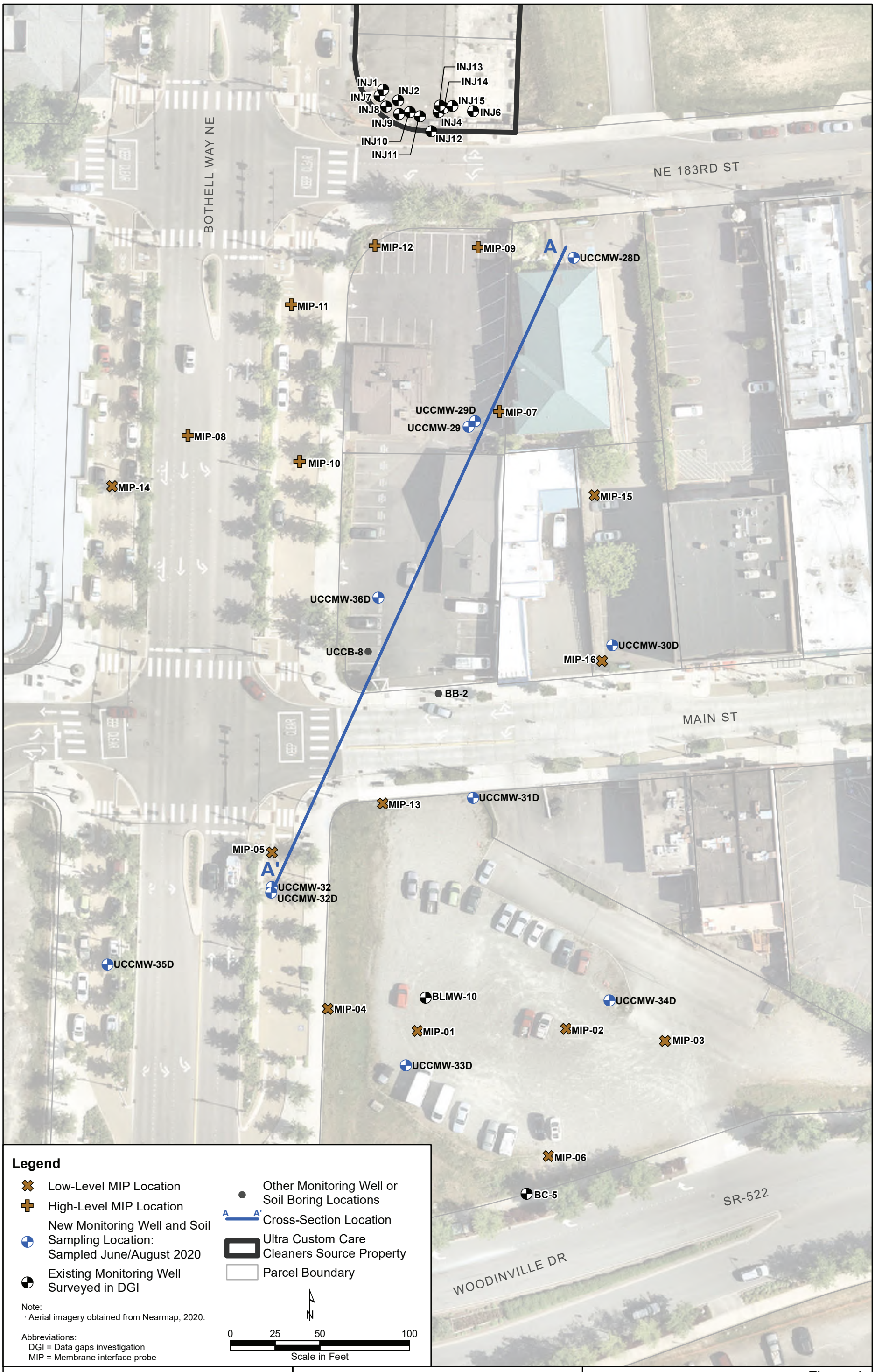
N

FLOYD | SNIDER
strategy • science • engineering

DGI Technical Memorandum
Ultra Custom Care Cleaners Site
Bothell, Washington

Figure 3
Soil, Groundwater, and Membrane Interface Probe Sampling Locations

I:\GIS\Projects\COBothell-Ultra\MXD\DGI Technical Memorandum\Figure 3 Soil, Groundwater, and Membrane Interface Probe Sampling Locations.mxd
9/14/2020

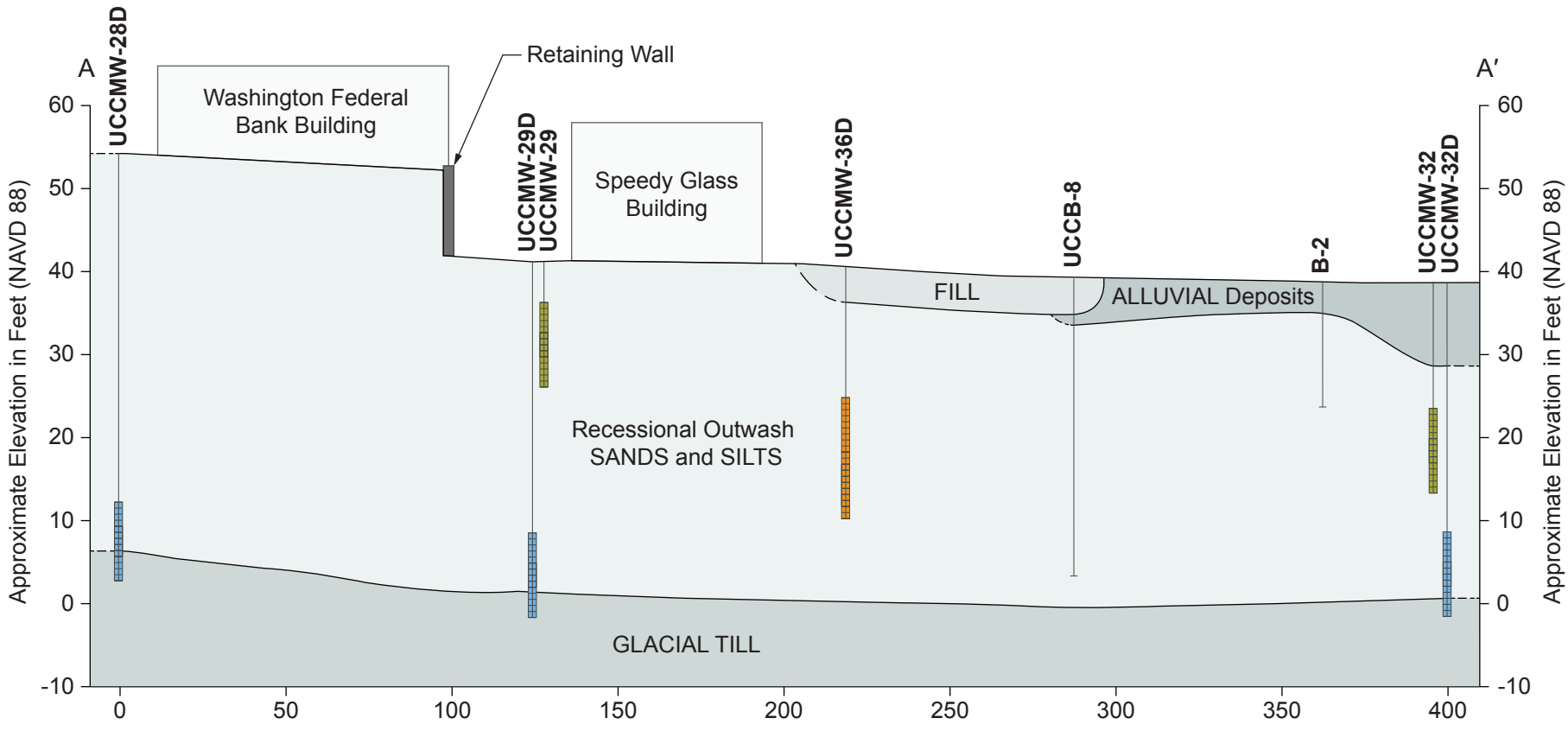


FLOYD | SNIDER
strategy • science • engineering

DGI Technical Memorandum
Ultra Custom Care Cleaners Site
Bothell, Washington

Figure 4
Locations Surveyed During Data Gaps Investigation Event and Location of Geologic Transect

I:\GIS\Projects\COBothell-Ultra\MXD\DGI Technical Memorandum\Figure 4 Locations Surveyed During Data Gaps Investigation Event and Location of Geologic Transect.mxd
9/14/2020



Legend

Max Exceedance Factor

- ≤SL
- >1–2x SL
- >2x SL
- >10x SL

Contact Boundary Between Lithologies (dashed where inferred)

Note:

- Results are compared to screening levels developed in the Data Gaps Investigation Work Plan. Screening levels are presented in Table 2.

Abbreviations:

MTCA = Model Toxics Control Act
NAVD 88 = North American Vertical Datum of 1988
SL = Screening level

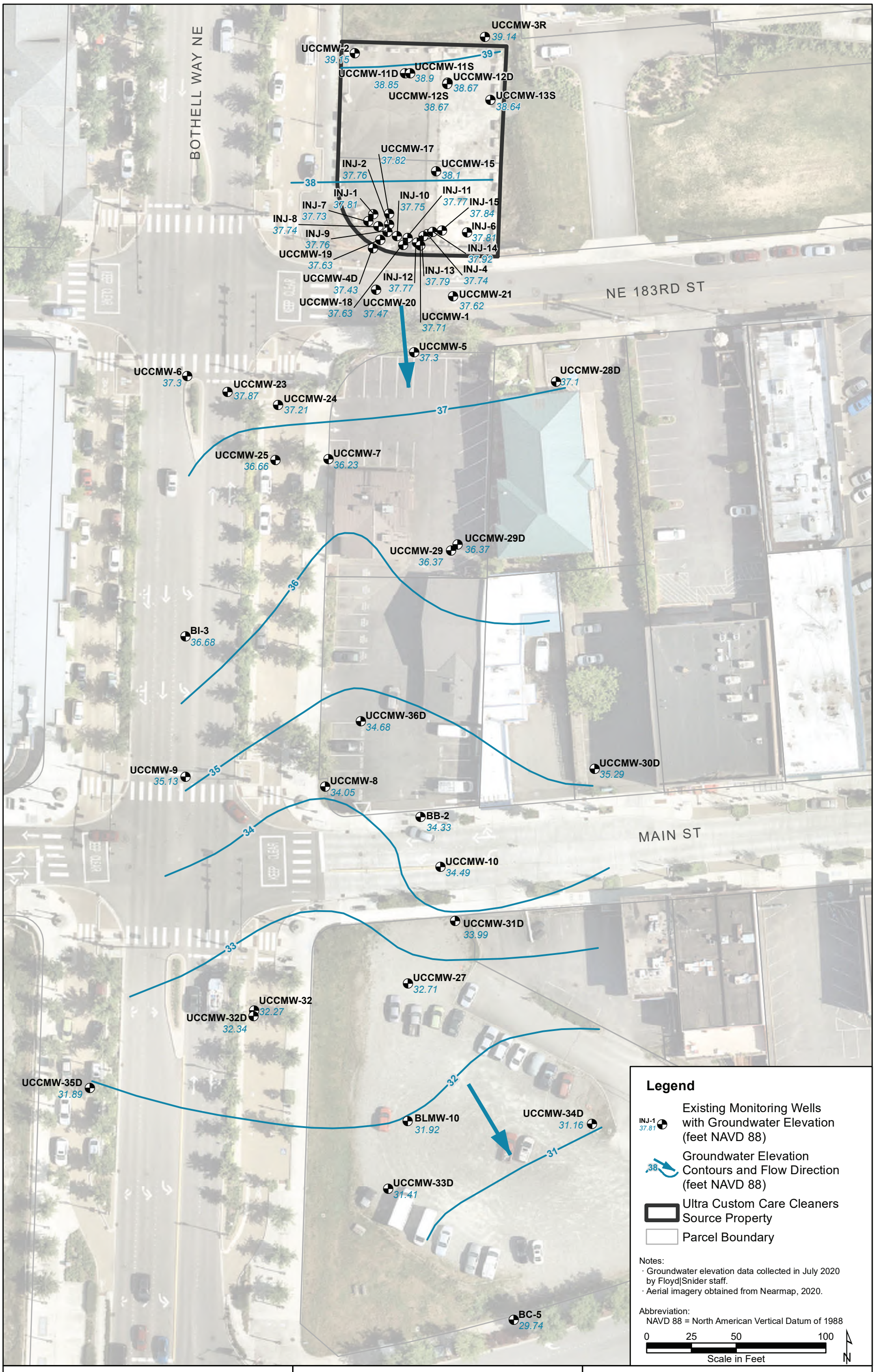
Horizontal Scale in Feet
0 50 100
0 20 40
Vertical Scale in Feet

FLOYD | SNIDER
strategy • science • engineering

DGI Technical Memorandum
Ultra Custom Care Cleaners Site
Bothell, Washington

Figure 5
Geologic Cross-Section A-A′

I:\GIS\Projects\COBothell-Ultra\AI\DGI Tech Memo\Figure 5 Geologic Cross-Section A-A'.ai
09/14/2020

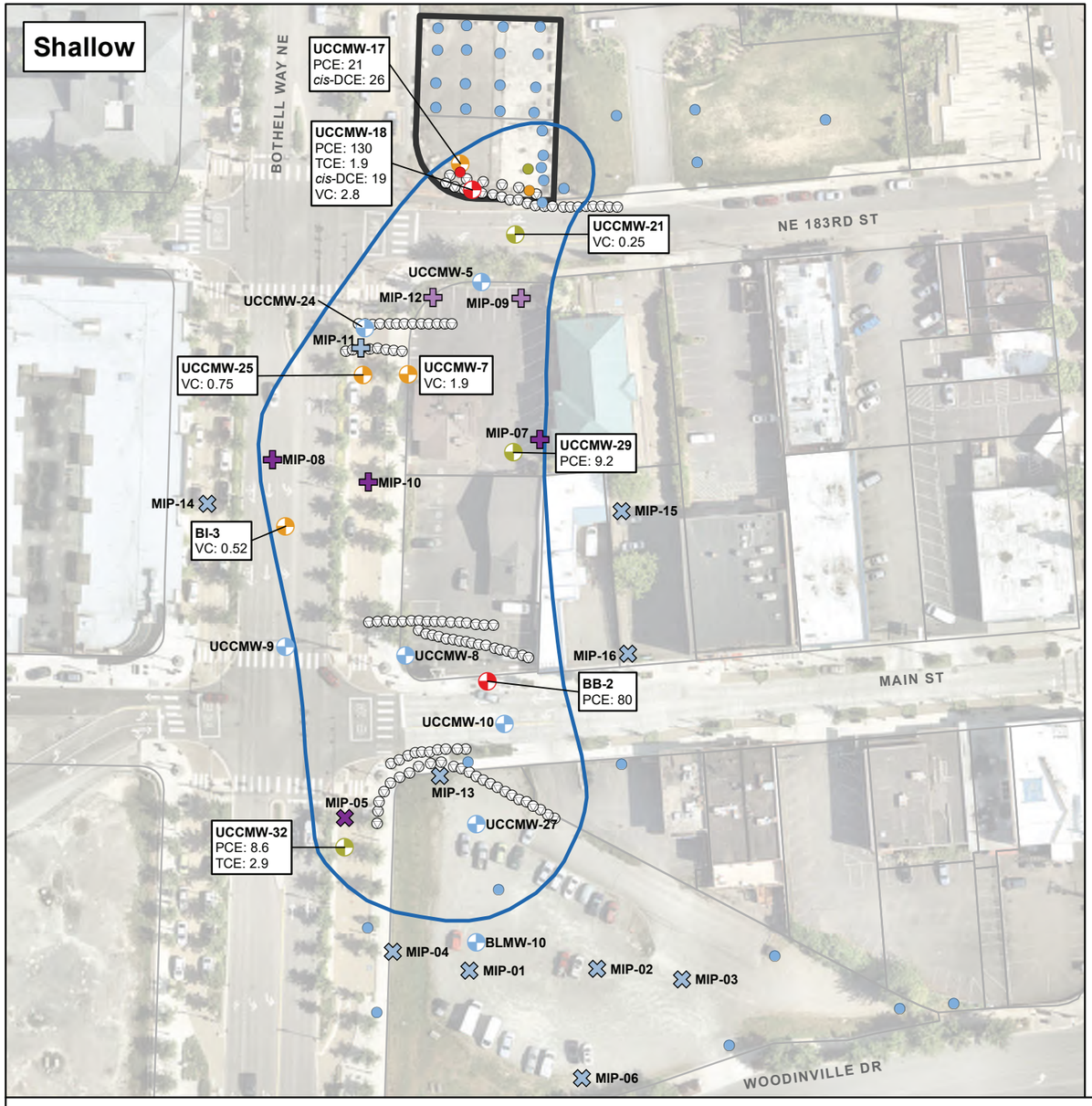


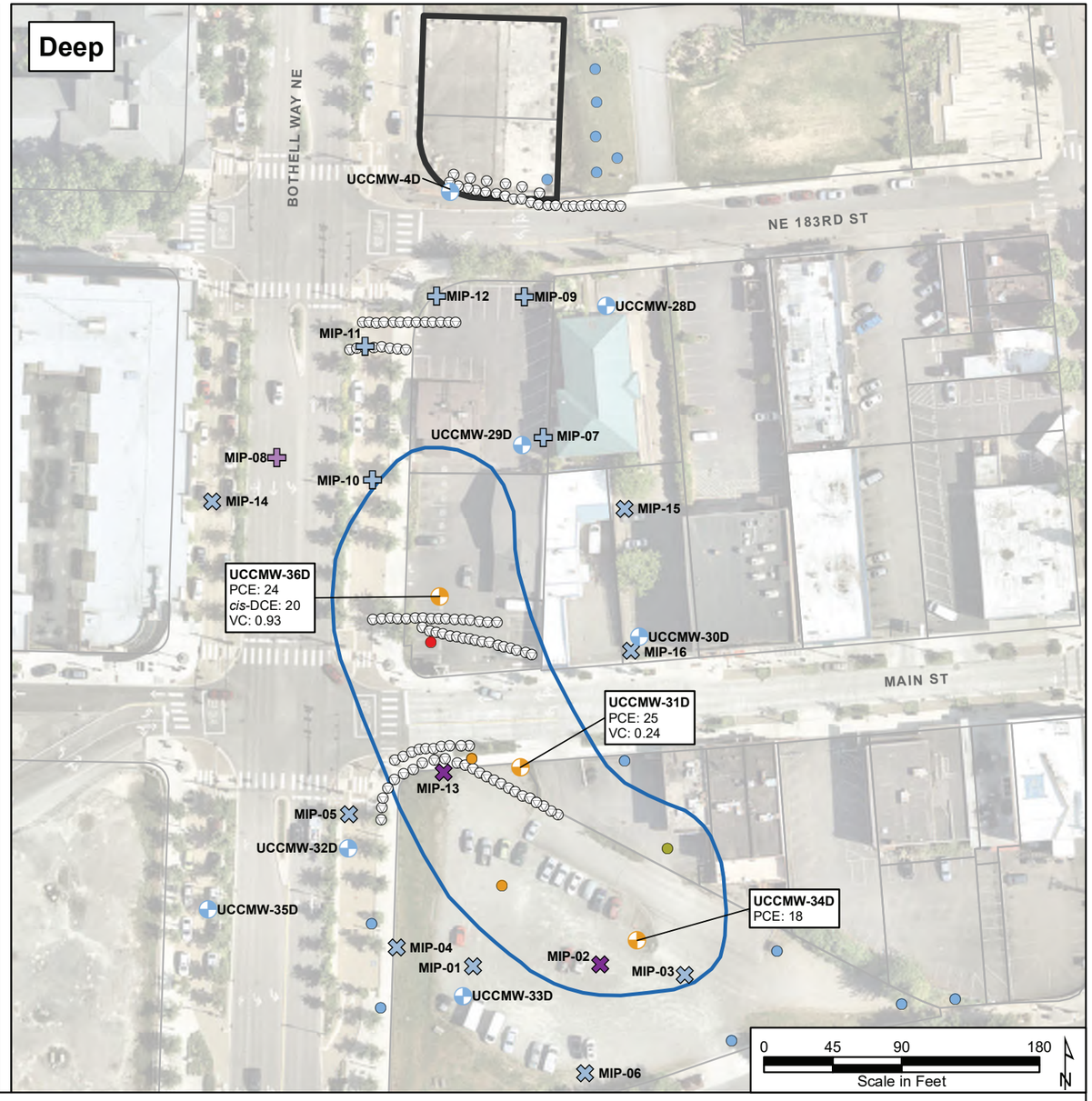
FLOYD | SNIDER
strategy • science • engineering

DGI Technical Memorandum
Ultra Custom Care Cleaners Site
Bothell, Washington

Figure 6
Groundwater Elevation(s) and Estimated Flow Direction

I:\GIS\Projects\COBothell-Ultra\MXD\DGI Technical Memorandum\Figure 6 Groundwater Elevation(s) and Estimated Flow Direction.mxd
9/14/2020





Legend

Sample Location
- Monitoring Well
- Direct Push

Max Exceedance Factor
- ≤SL
- >1–2x SL
- >2x SL
- >10x SL

MIP Locations
- Low-Level
- High-Level

MIP Response
- Presumed Clean
- Small Response
- Moderate/Large Response

- Injection Well
- DGI Tech Memo Groundwater cVOC Plume Boundary
- Parcel Boundary

Notes:
- All results are in µg/L.
- Only groundwater results from monitoring wells sampled in 2020 are shown. Callouts list results that exceed SLs in monitoring wells; among duplicates, only the maximum result is listed.
- Results are compared to SLs developed in the Data Gaps Investigation Work Plan. SLs are presented in Table 2.
- Figure shows MIP responses and groundwater monitoring well results collected during the 2020 DGI. Additionally, figure shows clean probe data used to bound the plume with no date restriction. Within the plume boundary, where interim measures were completed, probe data shown on figure were collected after 3/30/2016.
- Injection well locations were obtained from documents created by HWA.
- Aerial imagery obtained from Nearmap, 2020.

Abbreviations:
cis-DCE = *cis*-1,2-Dichloroethene
cVOC = Chlorinated volatile organic compound
DGI = Data gaps investigation
µg/L = Micrograms per liter
MIP = Membrane interface probe
PCE = Tetrachloroethene
SL = Screening level
TCE = Trichloroethene
VC = Vinyl chloride

FLOYD | SNIDER
strategy • science • engineering

DGI Technical Memorandum
Ultra Custom Care Cleaners Site
Bothell, Washington

Figure 7
Current Groundwater Quality: cVOCs

I:\GIS\Projects\COBothell-Ultra\MXD\DGI Technical Memorandum\Figure 7 Current Groundwater Quality cVOCs.mxd
9/15/2020

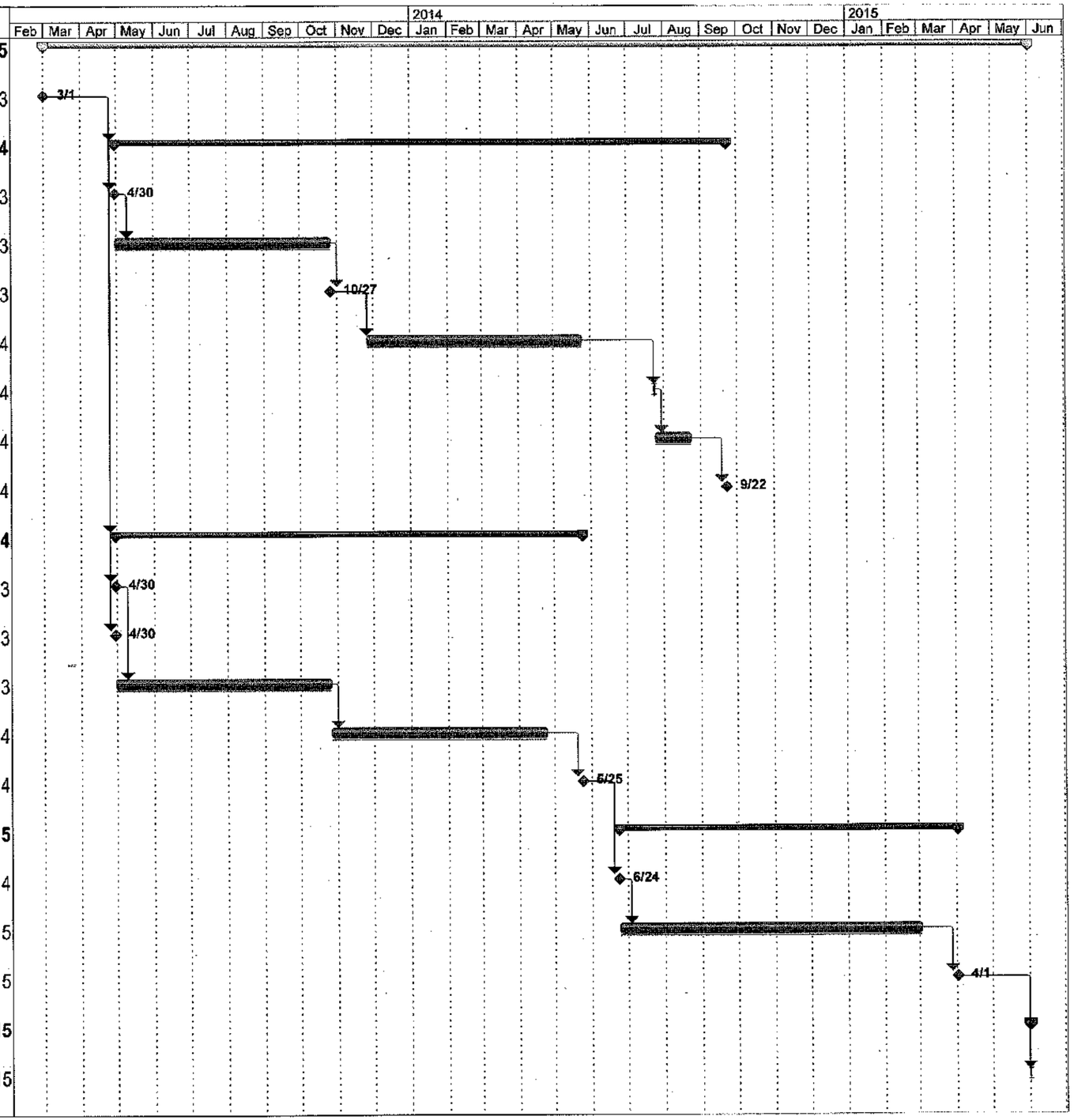
Attachment 1
Exhibit C from Agreed Order No. DE9704

EXHIBIT C:
Schedule of Deliverables

Deliverables	Due dates and details[1]
1. PLP submits draft remedial investigation (RI) report and RI data gaps work plan	60-days after effective date of Agreed Order.
2. PLP submits draft interim action work plan for source control	60-days after effective date of Agreed Order.
3. Ecology reviews	Ecology reviews draft RI report and RI data gaps workplan. Ecology reviews draft interim action work plan and determines if the interim actions are warranted, and if the interim action will not foreclose reasonable alternatives for the final cleanup action.
4. PLP implements RI data gaps work plan	Upon review, revisions, and approval of data gaps work plan by Ecology, PLP implements data gaps workplan within 30 days of Ecology's final approval.
5. PLP implements interim action work plan and public reviews	Interim action(s) to be implemented if Ecology determines interim action(s) are warranted for the site. PLP incorporates Ecology revisions to interim action work plan. Ecology conducts public comment for the draft interim action work plan. PLP implements interim action(s) within 30-days after completion of public comment and Ecology approval. PLP prepares interim action report within 60-days of completion of interim action(s). Ecology reviews and approves the interim action report.
6. PLP submits draft final RI report	Submit draft final RI report (including results of data gaps) 30 days after Ecology approves draft RI report and RI data gap results.
7. PLP submits draft feasibility study (FS) report and draft Cleanup Action Plan (DCAP)	Submit draft FS report and DCAP 30 days after Ecology approval of the draft final RI report. Conduct public comment on draft final RI report (including results of data gaps), draft FS report, and DCAP.

[1] A detailed schedule of deliverables is included below to provide additional clarification and guidance.

ID	Task Name	Start	Finish
0	**Ultra Custom Care Cleaners**	**Fri 3/1/13**	**Mon 6/1/15**
1	**Agreed Order Signed (estimated)**	Fri 3/1/13	Fri 3/1/13
2	**Interim Action**	**Tue 4/30/13**	**Mon 9/22/14**
3	Draft Interim Action Work Plan	Tue 4/30/13	Tue 4/30/13
4	Ecology Review and negotiation (estimated)	Tue 4/30/13	Sun 10/27/13
5	Final Interim Action Work Plan	Sun 10/27/13	Sun 10/27/13
6	Conduct Interim Action (estimated construction)	Tue 11/26/13	Sun 5/25/14
7	Submit Draft Interim Action Report	Thu 7/24/14	Thu 7/24/14
8	Ecology Review	Thu 7/24/14	Sat 8/23/14
9	Submit Final Interim Action Report	Mon 9/22/14	Mon 9/22/14
10	**Remedial Investigation (RI)**	**Tue 4/30/13**	**Sun 5/25/14**
11	Draft RI Data Gap Work Plan	Tue 4/30/13	Tue 4/30/13
12	Draft RI Report	Tue 4/30/13	Tue 4/30/13
13	Implement RI Data Gap Work Plan	Tue 4/30/13	Sun 10/27/13
14	Ecology Review and negotiation (estimated)	Sun 10/27/13	Fri 4/25/14
15	Draft Final RI Report	Sun 5/25/14	Sun 5/25/14
16	**Feasibility Study**	**Tue 6/24/14**	**Wed 4/1/15**
17	Submit Draft Feasibility Study Report	Tue 6/24/14	Tue 6/24/14
18	Ecology Review and negotiation (estimated)	Tue 6/24/14	Mon 3/2/15
19	Final Feasibility Study	Wed 4/1/15	Wed 4/1/15
20	**Draft Cleanup Action Plan**	**Mon 6/1/15**	**Mon 6/1/15**
21	Submit Draft Cleanup Action Plan	Mon 6/1/15	Mon 6/1/15



om Care Cleaners | Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

Attachment 2
Data Validation Memorandum and Laboratory Reports

FLOYD | SNIDER
strategy ▪ science ▪ engineering

Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101
tel: 206.292.2078 fax: 206.682.7867

Data Validation Summary

Prepared by:	Chell Black on behalf of Gretchen Heavner
Date:	September 16, 2020
Project No.:	COB-Ultra
Sample Event(s):	March 2020 DGI Work Plan Sampling June 2020 DGI Work Plan Sampling July 2020 DGI Work Plan Sampling
Sample Delivery Group(s):	OnSite Environmental 2003-094, 2003-107, 2003-124, 2006-271, 2006-299, 2006-321, 2006-334, 2006-358, 2007-015, 2007-120, 2007-131, 2007-202, and 2008-022
Sample Media:	Groundwater

MARCH 2020 DGI WORK PLAN SAMPLING

A Compliance Screening (Stages 1 & 2A) data quality review was performed on total petroleum hydrocarbons (TPH), volatile organic compound (VOC), metals, and dissolved gases data resulting from laboratory analysis. The analytical data were validated in accordance with the *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2017a) and/or *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2017b).

A total of 16 groundwater samples were submitted in three sample delivery groups, 2003-094, 2003-107, and 2003-124, to OnSite Environmental for chemical analysis by NWTPH-HCID, NWPTH-Dx, USEPA 8260D-SIM, USEPA 200.8, and RSK 175. For all sample delivery groups, the method blanks had no detections. The surrogate, matrix spike (MS), matrix spike duplicate (MSD), blank spike (BS), and blank spike duplicate (BSD) recoveries and MS/MSD, BS/BSD, and sample/sample duplicate relative percent differences all met U.S. Environmental Protection Agency (USEPA) requirements.

The laboratory noted that the RSK 175 analysis for dissolved gases was performed outside of the method holding time at the request of the project team. This note was preserved by qualifying all results for this analysis method as estimated, with the final qualifier of "J" for detected results and "UJ" for non-detect results for report tables and database entry.

Based on the data quality review, data are determined to be of acceptable quality for use as reported by the laboratory unless specifically qualified above.

JUNE 2020 DGI WORK PLAN SAMLING

A Compliance Screening (Stages 1 & 2A) data quality review was performed on TPH, VOC, SVOC, and fractional organic carbon data resulting from laboratory analysis. The analytical data were validated in accordance with USEPA's National Functional Guidelines (USEPA 2017a, 2017b).

A total of 20 soil samples were submitted in six sample delivery groups—2006-271, 2006-299, 2006-321, 2006-334, 2006-358, and 2007-015—to OnSite Environmental for chemical analysis by NWTPH-Gx/Dx, USEPA 8260D-SIM, and USEPA 8270E. OnSite Environmental contracted with AmTest Inc for the chemical analysis of fractional organic carbon by ASTM D2974-87. For all sample delivery groups, the holding times were met and the method blanks had no detections. The surrogate, MS, MSD, BS, and BSD recoveries and MS/MSD, BS/BSD, and sample/sample duplicate relative percent differences all met USEPA requirements.

Based on the data quality review, data are determined to be of acceptable quality for use as reported by the laboratory.

JULY 2020 DGI WORK PLAN SAMPLING

A Compliance Screening (Stages 1 & 2A) data quality review was performed on TPH, VOC, metals, and dissolved gases data resulting from laboratory analysis. The analytical data were validated in accordance with USEPA's National Functional Guidelines (USEPA 2017a, 2017b).

A total of 12 groundwater samples were submitted in four sample delivery groups, 2007-120, 2007-131, 2007-202, and 2008-022, to OnSite Environmental for chemical analysis by NWTPH-HCID, USEPA 8260D-SIM, USEPA 200.8, and RSK 175. For all sample delivery groups, the holding times were met and the method blanks had no detections. The surrogate, MS, MSD, BS, and BSD recoveries and MS/MSD, BS/BSD, and sample/sample duplicate relative percent differences all met USEPA requirements.

Based on the data quality review, data are determined to be of acceptable quality for use as reported by the laboratory.

REFERENCES

U.S. Environmental Protection Agency (USEPA). 2017a. *National Functional Guidelines for Inorganic Superfund Methods Data Review.* Prepared by the Office of Superfund Remediation and Technology Innovation. EPA-540-R-2017-001/OLEM 9355.0-135. January.

_____. 2017b. *National Functional Guidelines for Organic Superfund Methods Data Review.* Prepared by the Office of Superfund Remediation and Technology Innovation. EPA-540-R-2017-002/OLEM 9355.0-136. January.

Attachment 3
Columbia Technologies, LLC, Membrane Interface Probe Report

Prepared for:

FLOYD SNIDER
601 Union Street, Suite 600
Seattle, WA 98101

High-Resolution Site Assessment
Ultra Custom Care Cleaners
18304 Bothell Way NE
Bothell, WA

March 2020

CT Project Number 3893-2019-09

Submitted by:

COLUMBIA Technologies, LLC
Rockville, MD

THIS PAGE INTENTIONALLY LEFT BLANK

COLUMBIA Technologies, LLC
ONE Research Court, Suite 450
Rockville, Maryland 20850

For more information on COLUMBIA Technologies, SmartData Solutions®, and high-resolution assessment tools and protocols visit http://www.columbiatechnologies.com or call 1-888-344-2704.

Table of Contents

Page

TABLE OF CONTENTS ..... **IV**
Figures v
Appendices vi
Conversion Factors vii
Datum vii
Supplemental Information vii

SUMMARY **1**

OBJECTIVES **2**

METHODS, ASSUMPTIONS, AND PROCEDURES **3**
Membrane Interface Probe-Hydraulic Profiling Tool (MiHpt) 3

RESULTS AND DISCUSSION **5**
Chlorinated VOCs near the Source Area 5
Low-Level MIP Results 6
Hydrostratigraphy 7
Monitoring Well Assessment 10
Presentation of Data Logs and Scale 10
Conclusions 11
Issues and Limitations 12
Quality Control and Data Anomalies 12
Data Anomalies 12

REFERENCES **13**

LIST OF SYMBOLS, ABBREVIATIONS, AND ACRONYMS **14**

Figures

Figure 1 – Typical Electrical Conductivity Ranges for Basic Soil Types

Figure 2 – Example MiHpt Log (MIP-13)

Figure 3 – MiHpt Stations

Figure 4 – MIP-PID Footprint

Figure 5 – MIP-PID Results

Figure 6 – MIP-XSD Footprint

Figure 7 – MIP-XSD Results

Figure 8 – PID and HPT Results

Figure 9 – XSD and HPT Results

Figure 10 – PID vs. Total cVOC (mg/L)

Figure 11 – XSD vs. Total cVOC (mg/L)

Figure 12 – PID Cross-sectional Composite

Figure 13 – XSD Cross-sectional Composite

Appendices

APPENDIX A - Direct Sensing Equipment Description

MiHpt Equipment Description
Electrical Conductivity
Membrane Interface Probe
Hydraulic Profiling Tool
Depth Measurement

APPENDIX B – Interpretation of Qualitative Direct Sensing Data

General MIP/EC Log Interpretation
General HPT Log Interpretation
Interpreting MIP Results and Comparison to Laboratory Analyses

APPENDIX C – Quality Control Procedures

APPENDIX D – Data Logs for Membrane Interface Probe/EC with Hydraulic Profiling Tool (MiHpt) – Individual Scale

APPENDIX E – Data Logs for Membrane Interface Probe/EC with Hydraulic Profiling Tool (MiHpt) - Collective Scale

APPENDIX F – Data Logs for Low-Level Membrane Interface Probe/EC with Hydraulic Profiling Tool (LL-MiHpt) - Individual Scale

APPENDIX G – Data Logs for Low-Level Membrane Interface Probe/EC with Hydraulic Profiling Tool (LL-MiHpt) - Collective Scale

Conversion Factors

Inch/Ounce/Pound/PSI to International System of Units

Multiply	By	To obtain
Length		
Inch (in.)	2.54	Centimeter (cm)
Inch (in.)	25.4	Millimeter (mm)
Foot (ft.)	0.3048	Meter (m)
Volume		
Ounce (oz.)	29.6	Milliliters (ml)
Gallon (gal)	3.8	Liters (L)
Pressure		
Pounds per Square Inch (psi)	6.89	Kilopascals (kPa)
Hydraulic Conductivity		
Feet per day (ft/day)	0.0003527	Centimeters per second (cm/sec)

Temperature in degrees Celsius (^oC) is converted to degrees Fahrenheit (^oF) as

$(^oF) = (1.8 \times (^oC)) + 32$

Datum

Horizontal and vertical coordinates are referenced from the World Geodetic System 1984 [EPSG:4326].

Supplemental Information

Electrical conductivity (EC) is provided in millisiemens per meter (mS/meter).

Concentrations of chemical constituents in water are provided in either milligrams per liter (mg/L) or micrograms per liter (μg/L).

Concentrations of chemical constituents in soil are provided in either milligrams per kilogram (mg/kg) or micrograms per kilogram (μg/kg).

Concentrations of chemical constituents in vapor are provided in either milligrams per cubic meter (mg/m^3) or micrograms per cubic meter ($\mu g/m^3$).

High-Resolution Site Assessment, Ultra Custom Care Cleaners Bothell, WA March 2020

Summary

COLUMBIA Technologies, **LLC**, (**COLUMBIA**) in collaboration with **Floyd|Snider** conducted a High-Resolution Site Characterization (HRSC) of the properties south of the former Ultra Custom Care Cleaners facility located at 18304 Bothell Way in Bothell, Washington (the Site), during the period of March 12 through 19, 2020. The Site is currently a mixture of commercial and city-owned properties, including restaurants, a bank, and a parking lot. A Site overview map is presented in **Figure 3** following this report.

The primary objectives of this HRSC were to address data gaps in understanding the vertical and lateral extent of the chlorinated volatile organic compounds (cVOC) plume as well as further characterizing the hydrogeology of the site.

Prior investigations identified elevated levels of cVOCs in soil and groundwater at the former Ultra Custom Care Cleaners.

The survey was conducted using a combined Membrane Interface Probe (MIP) and Hydraulic Profiling Tool (HPT) system equipped with three gas chromatograph (GC) detectors (PID, FID and XSD). The combined probe is referred to as the MiHpt. See **Appendix A** at the end of this report for further information on the MiHpt equipment.

The MiHpt was operated in two different modes: 1) Low-Level mode to detect dissolved cVOCs at the edges of the dissolved phase plume and away from the source area; and 2) standard mode in the source area. The locations of the MiHpt stations were chosen by **Floyd|Snider** to address data gaps in understanding the vertical and lateral extent of the cVOC plume as well as to further characterize the hydrogeology of the site. The locations were adjusted as the investigation progressed based on the findings at the initial locations.

This survey advanced Low-Level MiHpt at ten (10) locations, and standard MiHpt at six (6) locations. These 16 direct sensing survey locations are presented in **Figure 4.**

The investigation found elevated PID and XSD levels indicating cVOCs in the groundwater over much of the Site. The majority of the cVOC responses were found below the water table.

PID/XSD responses were encountered in all the transects across the study area.

Responses along the northern transect were lower than expected, given the existing soil and groundwater data in the vicinity of the source area.

There were elevated PID and XSD responses from 30 to 50 ft bgs at the southernmost transect in 3 of 4 locations (MIP-01, MIP-02, and MIP-03), but the southernmost location had only PID response to 30 ft bgs, which was hard refusal for this borehole.

In the northern area of the Site the most elevated responses were in shallower zones (~1.5 to 5 ft bgs). There were also deeper responses in many of the locations in the northern area that increased with depth (~12.5 ft bgs to refusal).

The first detection of elevated responses tended to occur deeper moving south across the Site.

The XSD responses in the locations at the edges of the investigation were lower than those in the middle of the investigation area, however, some locations at the edges (MIP-05 and MIP-03) were elevated and may indicate that cVOCs at laboratory detectable concentrations extend past the edges of the investigation.

The shallower elevated MIP responses tended to be in zones of lower permeability soils. The deeper elevated MIP responses are generally in zones of higher permeability soils.

Dissipation tests were successful at 15 of 16 MiHpt stations and the calculated groundwater surface ranged from approximately 4 to 10 ft bgs, but in general averaged 5 ft bgs for most locations. Most of the locations exhibited both low- and high-permeability zones, with permeability (Estimated K), ranging from less than 0.1 to over 75 ft/day.

Objectives

The primary objectives of this HRSC were to address data gaps in understanding the vertical and lateral extent of the VOC plume as well as further characterizing the hydrogeology of the site.

Methods, Assumptions, and Procedures

Planning for this HRSC involved a review of available site documentation to develop an understanding of the existing Conceptual Site Model (CSM) and indications of residual cVOC impacts.

Floyd|Snider planned 16 borings in four (4) transects across the Site, in general east-west orientation, to extend south of the acknowledged source area. Target depth was 50 ft bgs. Some of the locations were adjusted in the field based on the responses seen during the investigation.

Membrane Interface Probe-Hydraulic Profiling Tool (MiHpt)

For this assessment, **COLUMBIA** used three laboratory grade chemical detectors on the MIP: a Halogen Specific Detector (XSD), a Flame-Ionization Detector (FID) and a Photo Ionization Detector (PID).

The XSD was developed to address the need for a sensitive and selective detector for halogenated compounds (i.e., cVOCs).

The MIP-XSD detects a broad spectrum of chlorinated VOCs, including the compounds of interest for this assessment. The XSD provides high halogen selectivity, making it an effective tool for identification and measurement of halogenated compounds in environments where other contaminants, such as hydrocarbons, are present. The MIP-XSD detector responds to halogenated compounds, including those containing bromine, chlorine, and fluorine.

The MIP-PID, with a 10.6 electron volt (eV) lamp, responds to a wide range of volatile aromatic compounds, including benzene, toluene, ethylbenzene, and xylenes (BTEX), as well as chlorinated ethenes such as PCE. The PID also responds well to chlorobenzene and dichlorobenzenes.

The FID is a general detector useful for detecting petroleum hydrocarbons (straight and branched chain alkanes), including methane and butane as well as for confirmation of high concentrations of compounds seen on the PID and XSD.

Additional discussion of direct sensing equipment and chemical sensors used for this assessment are provided in **Appendices A** and **B.** Quality control procedures are discussed in **Appendix C.**

COLUMBIA employed the Hydraulic Profiling Tool (HPT) with the Electrical Conductivity (EC) system to evaluate subsurface hydrostratigraphy in the area of the release.

The HPT pressure logs record changes in hydraulic pressure measured directly as water is pumped into the formation at a constant rate. These logs reveal the variability and relative hydraulic conductivity of the soil.

A high-resolution profile of the estimated hydraulic conductivity “K” is obtained following a series of tests in which the HPT pressure is allowed to dissipate to the static hydraulic pressure of the soil formation at different depths.

The combined MiHpt probe also contains an Electrical Conductivity dipole at the tip of the probe that measures the electrical conductivity (EC) of soil and groundwater.

EC measurements identify changes in the soil's electrical conductivity that can be related to changes in stratigraphy, providing insight into contaminant pathways when viewed in relation to chemical detector response.

Low EC values generally indicate coarse-grained materials (sand and gravel), while higher EC values usually indicate elevated clay content, although water chemistry and other site-specific factors, such as cementation, influence EC response as well.

General conductivity ranges for basic soil types are presented in **Figure 1**, in the next column (Geoprobe, 2015).[1]

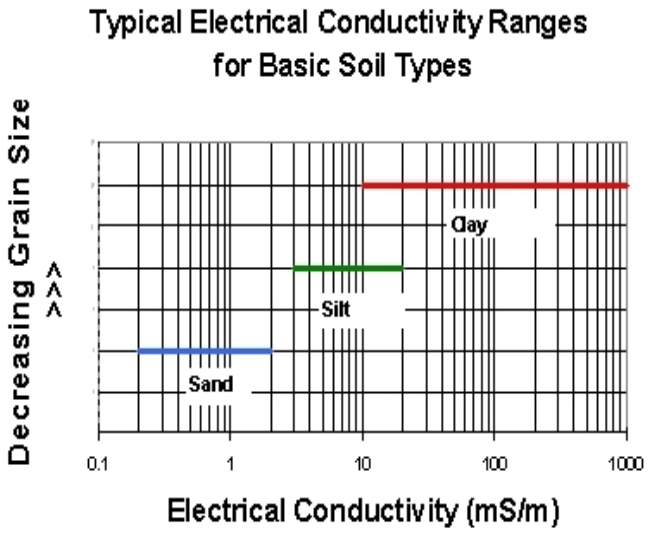


Figure 1

[1] Geoprobe Systems. January 2015. Technical Bulletin MK3201: Standard Operating Procedure for Geoprobe® Electrical Conductivity (EC) System

Results and Discussion

MiHpt borings were advanced at 16 locations as shown in **Figure 4** at the end of this report

Chlorinated VOCs near the Source Area

The MIP-PID and MIP-XSD were used to detect the possible presence of cVOCs. The HPT provided detailed vertical profiles of estimated hydraulic conductivity along each transect. All locations were pre-probed to 2 ft bgs to get through surface gravel.

The response ratios between the detectors provide clues to the chemical constituents they are detecting. Higher XSD and PID with low FID indicates a higher proportion of PCE and TCE. Decreasing XSD response and increasing PID and FID responses are indicators of a higher proportion of daughter products such as DCEs, Vinyl Chloride, and Ethene. Higher FID responses generally indicate methane. Actual chemical composition can only be determined by soil and water sampling and analysis.

First (Northern) Transect - Stations MIP-09, MIP-11, and MIP-12 were probed using a standard MIP configuration. They are located at the northern end of the Site, near NE 183rd Street, and closest to the source area. The logs are presented in **Appendices D** and **E** and the visualizations in **Figures 5** and **6** at the end of this report: The PID and XSD responses were relatively low, considering the location next to the source area. Stations MIP-09 and MIP-12 registered generally increasing responses from approximately 10 to 35 ft bgs. Station MIP-11 registered generally increasing responses from approximately 22 to 37 ft bgs, when refusal occurred. The responses in MIP-09 and MIP-11 indicate that these locations are within the dissolved phase plume. There was some response above the water table (around 5 ft bgs)`, but the bulk of the responses were below the water table (~5 ft bgs).

Second Transect - Stations MIP-07, MIP-08, MIP-10, MIP-14, and MIP-15, located midway between NE 183rd Street and Main Street, and presented in the logs in **Appendices D** and **E** and the visualizations in **Figures 5** and **6** at the end of this report: The XSD responses were higher than in the northern transect, especially MIP-08, which was located in the center of Bothell Way, NE. Station MIP-08 had the highest responses on both the PID and XSD of the standard MIP stations in this Site investigation. The peak responses were from approximately 15 to 18 ft bgs. Station MIP-10 also had high responses on both the PID and the XSD at approximately the same depth. Station MIP-07 had its highest response from approximately 8 to 13 ft bgs. The PID responses in these three stations were somewhat higher than in the northern

transect, but not dramatically higher. MIP-14 and MIP-15, at the eastern and western edges of this transect were probed using the low-level MIP configuration and are discussed in the **Low-Level MIP Results** section, below.

Low-Level MIP Results

Low-Level MIP locations were advanced at the eastern and western edges of the second transect and in the two southern transects to better define the limits and depth of the dissolved plume. Low-Level logs all contain a baseline peak at each 1-foot interval. CVOC responses are indicated by higher than baseline spikes on both the PID and the XSD.

Second Transect: Station MIP-14, which was a low-level MIP station at the western edge of this transect, registered relatively low XSD responses at approximately 8 and 30 ft bgs, when refusal occurred. It also had relatively low PID responses from approximately 21 to 28 ft bgs. The low PID and XSD responses indicate that MIP-14 is likely near the western edge of the dissolved phase plume. MIP-15, which was a low-level MIP location at the eastern edge of this transect, registered low XSD and FID responses and elevated PID responses from approximately 12 to 39 ft bgs. The elevated PID response and lower XSD response at MIP-15 may indicate a low proportion of cVOCs or a mixture of cVOCs and non-cVOC constituents. The low XSD responses indicate that MIP-15 is likely near the eastern edge of the dissolved phase cVOC plume

Third Transect - Stations MIP-05, MIP-13, and MIP-16 are located along Main Street. The logs are presented in **Appendices D** and **E** and the visualizations in **Figures 5** and **6** at the end of this report: The XSD responses in this transect were much higher than in MIP-14 and MIP-15 (all low-level stations), at the edges of the second transect. MIP-05, which was located in the east frontage road of Bothell Way NE, had the highest responses of the low-level MIP stations in this Site investigation. Both the PID and the XSD had strong responses perhaps indicating a mixture of cVOCs and daughter products. The peak responses in MIP-05 were from approximately 15 to 32 ft bgs. MIP-13 also had high responses at approximately the same depth. MIP-16 had a modest XSD response from approximately 28 to 30 ft bgs and elevated PID and FID responses from approximately 13 to 46 ft bgs, where refusal occurred. The elevated PID and modest XSD response at MIP-16 indicates a likely mixture of cVOCs and daughter products in this area. The bulk of the responses in this transect were below the water table.

Fourth (Southern) Transect – Stations MIP-01, MIP-02, MIP-03, MIP-04, and MIP-06 are located in the triangular City-owned lot north of Woodlinville Drive/SR 522.. The logs are presented in **Appendices D** and **E** and the visualizations in **Figures 5** and **6** at the end of this report: The XSD responses in MIP-01, MIP-02

and MIP-03 in this transect were lower than in MIP-05, from the third transect. These three locations had elevated PID and XSD responses from approximately 30 to 50 ft bgs, where refusal occurred. MIP-04, at the western edge of this transect, had elevated PID responses and very low XSD responses which might indicate that it is near the southwestern boundary edge of the cVOC plume.

MIP-06 is the southernmost location and it had very low XSD responses and modest PID responses, which might indicate a southern boundary of the dissolved phase plume. The boring hit refusal at approximately 30 ft bgs, which is shallower than the locations to the north, which had elevated PID and XSD responses below 30 ft bgs.

Hydrostratigraphy

As shown in **Figure 2**, below, high HPT pressure and low system flow are indicative of low permeability soils. Higher permeability is manifested by low hydraulic pressure and normal system flow. The relationship between soil permeability and cVOC concentrations is also shown in **Figure 2**.

For this site, HPT data identified soils exhibiting highly variable hydraulic conductivity. Most of the stations exhibited both permeable and impermeable zones.

First (Northern) Transect: Based on the HPT pressure readings, in the first transect there was a thin zone of low permeability at approximately 30 ft bgs.

Second Transect: In the second transect a low permeability zone was encountered at 10 to 25 ft bgs, dipping from east to west. The EC response indicates likely fine-grained soils in this zone. The highest PID and XSD responses were in this low permeability zone.

Third Transect: The zones of low permeability are not as well defined in the third transect as they are in the second transect, but there appears to be layers of low permeability starting at 10 to 15 ft bgs, dipping from east to west. The EC responses are not as well correlated to the low permeability zones as in the second transect, but there are thin layers where the EC indicates likely fine-grained soils. The highest PID and XSD responses were in this low permeability zone.

Fourth Transect: The zones of low permeability are not as well defined in the fourth transect as they are in the second transect, but there appears to be a fine-grained (high EC response), low permeability zone starting at 5 to 12 ft bgs, dipping from east to west that is above the zone of elevated PID and XSD responses. There are thin layers of low permeability in the zones of elevated PID and XSD responses, but they do not predominate the formation. The EC responses are not correlated to the low permeability zones, but there are thin layers where the EC indicates likely fine-grained soils.

All of the MiHpt locations except MIP-06 (not attempted because of high HPT

pressure throughout borhole) had successful dissipation tests. Based on the dissipation tests, the groundwater surface ranged from approximately 4 to 10 ft bgs, but in general averaged 5 ft bgs for most locations. The permeability (Estimated K), calculated from the HPT pressure and flow measurements, ranged from less than 0.1 to over 75 ft/day. The groundwater surface is depicted in the figures at the end of the report as blue disks and the HPT pressure is visualized in **Figures 9** and **10**.

Based on locations where multiple dissipation tests were performed there was no evidence that the less permeable layers were acting as aquitards.

The lower permeability strata play an important role in retaining any residual contaminant and retarding the performance of any hydraulic-based remediation system.

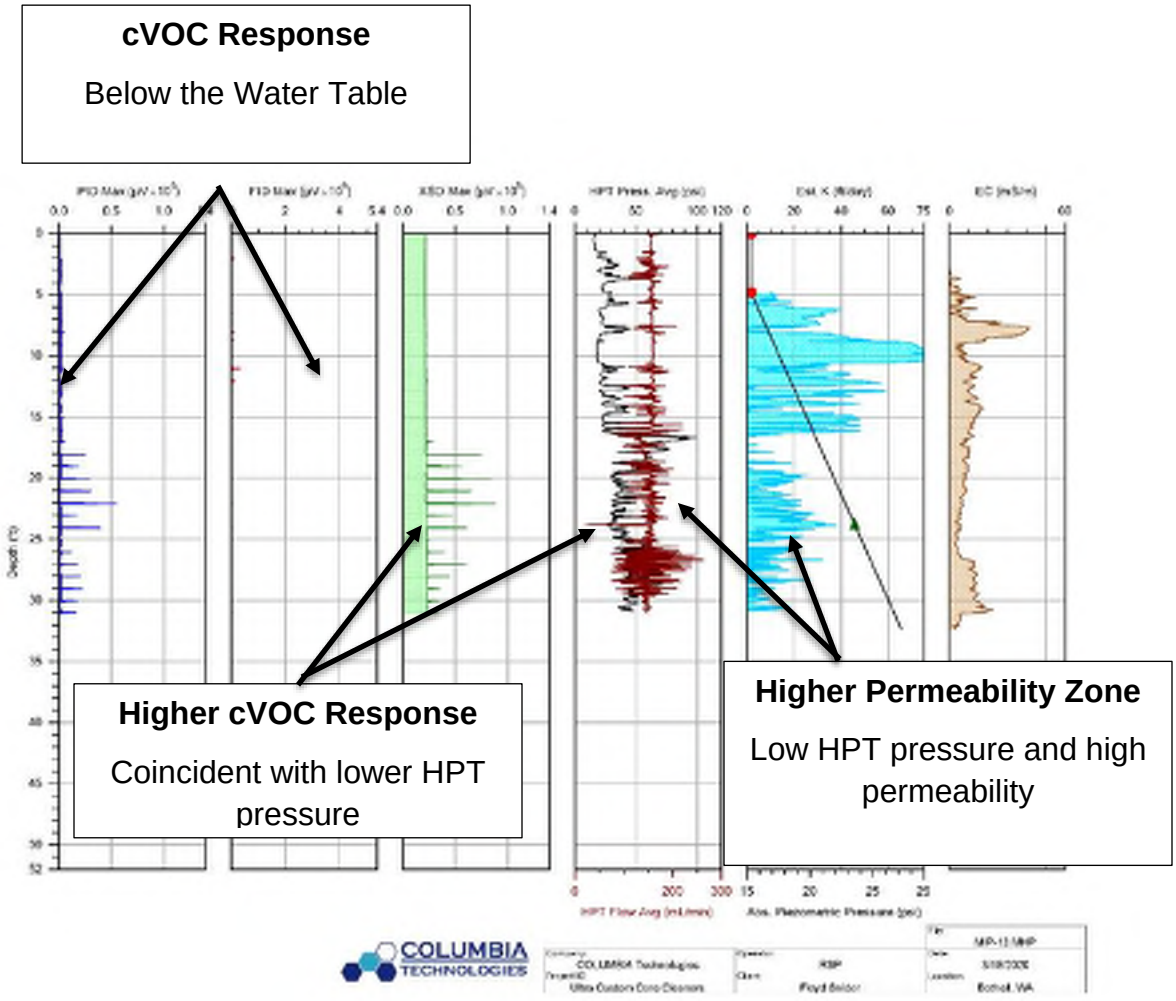


Figure 2 – Example MiHpt Log (MIP-13)

Monitoring Well Assessment

Figures 11 through **14** show the relationship between the contaminant mass as measured by the PID and XSD detectors, respectively, and concentrations measured in monitoring wells that were sampled in 2020. Most of the screened intervals in the monitoring wells are above the zones where this investigation found elevated PID and XSD responses.

Presentation of Data Logs and Scale

Individual logs of direct sensing data are presented in both individual scale for each log and on a collective scale for all of the logs in **Appendices D, E, F** and **G**.

The reader is advised to pay particular attention to the scale for each detector response for each log when comparing results from location to location and depth to depth. Of particular note, a high detector response at one depth could mask a lower response at a different depth. In addition, because of the differences in the operation of the MIP, the low-level MIP responses are not comparable to the regular MIP responses.

Conclusions

- The low responses in the first, northern transect indicate that the previous investigations adequately identified contaminant extent in that area. No “Source Area” responses were encountered during this HRSC.
- The elevated PID and XSD responses from 30 to 50 ft bgs at the southern end of the site indicate the presence of dissolved phase cVOCs in that area at depths much deeper than the existing monitoring wells.
- The elevated responses in the northern area of the site are shallower and the elevated responses tend to occur deeper moving south.
- The shallower elevated responses tend to be in zones of lower permeability.
- The deeper elevated responses tend to be in zones of higher permeability
- Based on dissipation tests, the groundwater surface ranged from approximately 4 to 10 ft bgs, but in general averaged 5 ft bgs for most locations.
- The vast majority of the cVOC responses were found below the water table.
- Most of the stations exhibited both low- and high-permeability zones, with permeability (Estimated K), ranging from less than 0.1 to over 75 ft/day.
- The zones of lower permeability appear to trend deeper from east to west and from north to south across the site. In the northern part of the site, the shallow elevated responses tend to coincide with the less permeable soil zones
- Based on stations where multiple dissipation tests were performed there was no evidence that the less permeable layers were acting as aquitards.

Issues and Limitations

It was not clear if the hard refusals were basement or simply compacted sands.

The target depth for the investigation was 50 ft bgs, but refusal prevented penetration to the target depth at most of the stations.

The wide spacing between transects and MiHpt stations limits the precisions regarding geologic and cVOC distribution concentration trend

Quality Control and Data Anomalies

The MiHpt direct sensing equipment was operated in accordance with the manufacturer's *Standard Operating Procedure for the Membrane Interface Probe*, Geoprobe Technical Bulletin MK3010 (Geoprobe, 2012) and the *Standard Practice for Direct Push Technology for Volatile Contaminant Logging with the Membrane Interface Probe (MIP)* ASTM STANDARD D7352 – 07 (ASTM International, 2007).

Performance testing was performed on each system prior to and following each survey sounding. These procedures are outlined in **Appendix C.**

MIP Performance Test Results for this project are presented **Appendix H.**

Data Anomalies

At Station MIP-03, the downhole HPT transducer failed at about 29.7 feet following a dissipation test. HPT pressure and flow results below that depth are invalid.

No other significant anomalies affecting the outcome of the data analysis were observed.

The direct-sensing logs generated for this assessment are presented in **Appendices D, E, F** and **G.**

References

A. ASTM International. 2007. Standard Practice for Direct Push Technology for Volatile Contaminant Logging with the Membrane Interface Probe (MIP) ASTM D7352 – 07.

B. Geoprobe Systems. April 2012 (Revised). Technical Bulletin MK3010: Standard Operating Procedure for Geoprobe® Membrane Interface Probe (MIP).

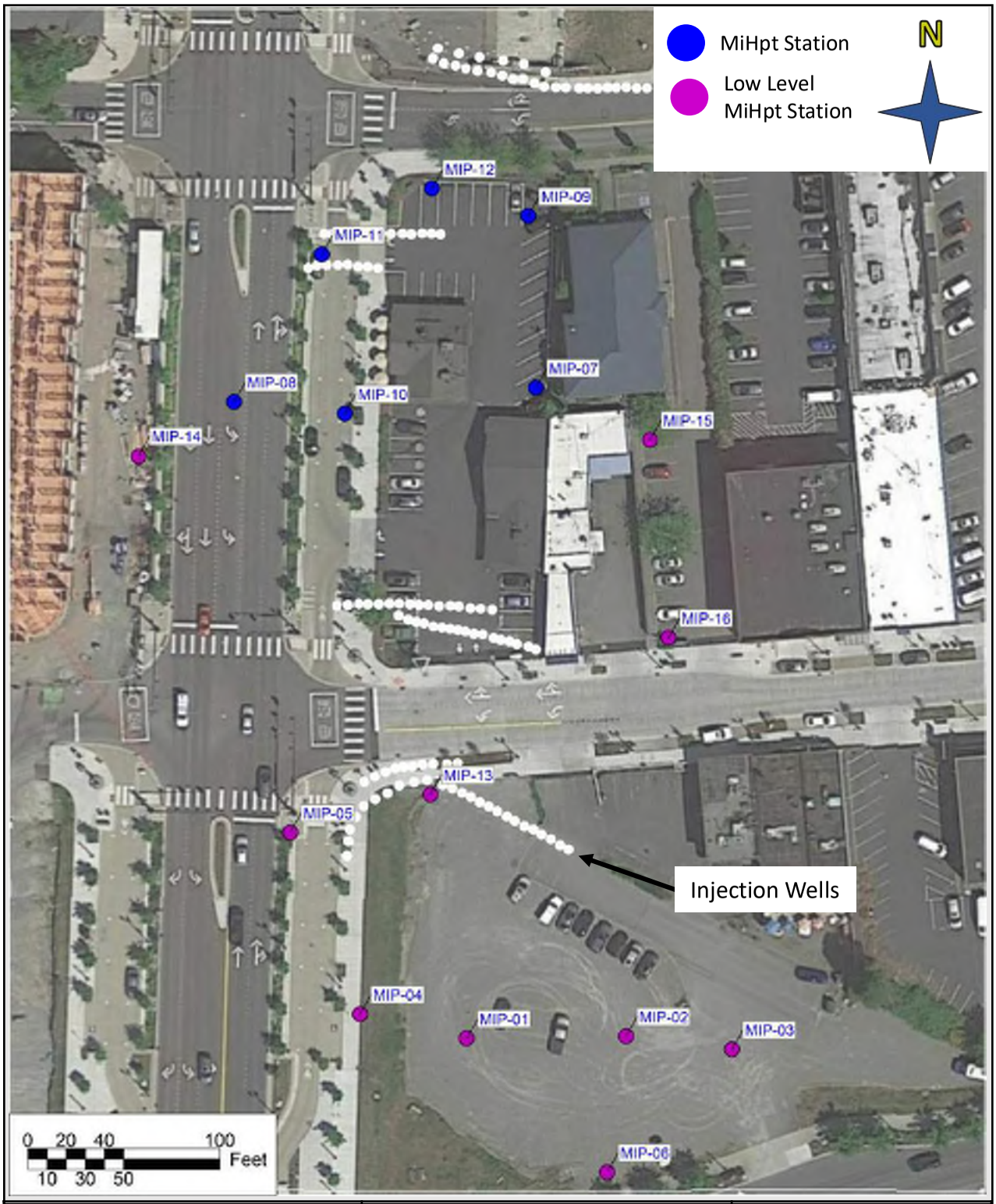
C. Geoprobe Systems. January 2015. Technical Bulletin MK3201: Standard Operating Procedure for Geoprobe® Electrical Conductivity (EC) System

List of Symbols, Abbreviations, and Acronyms

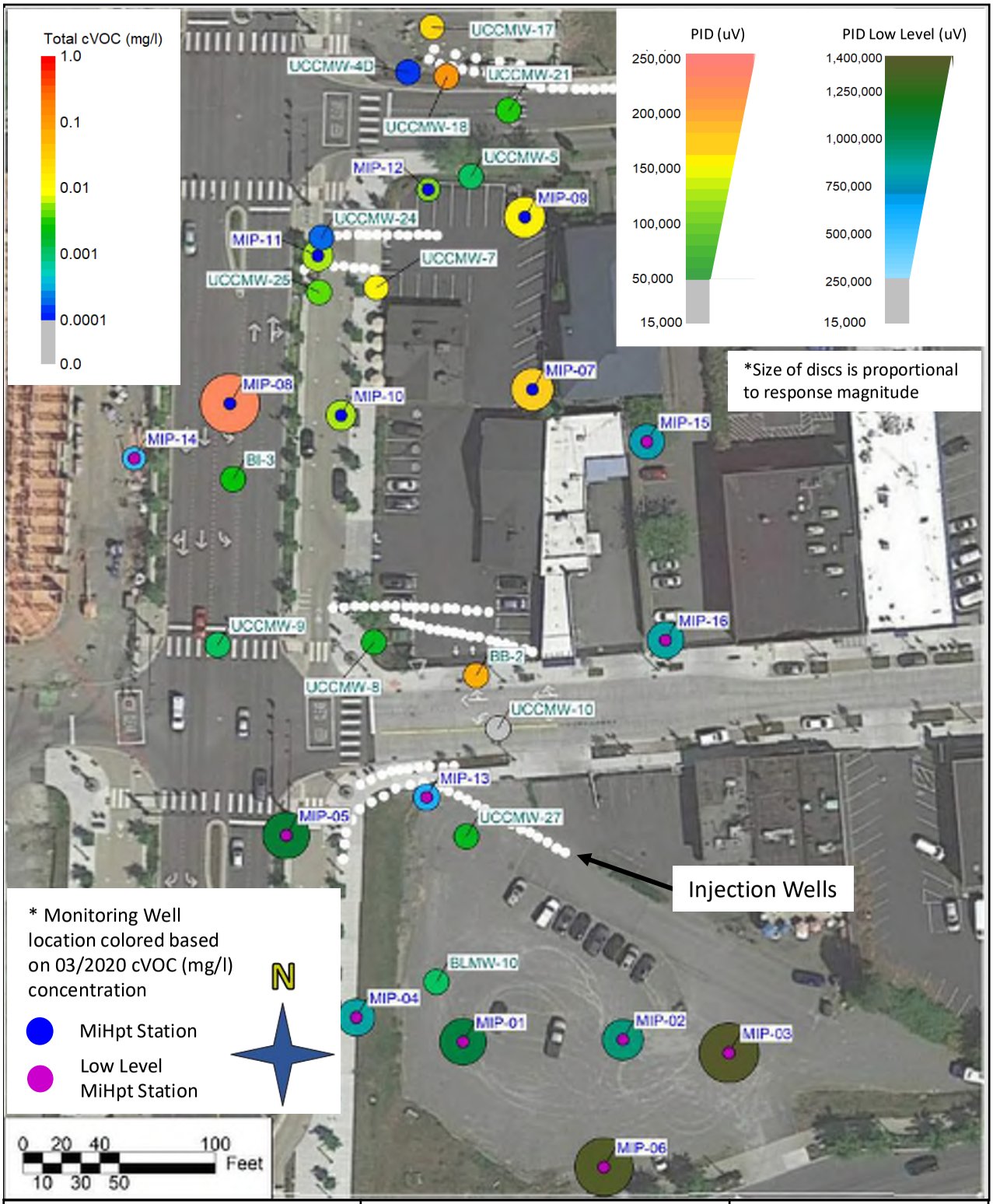
Symbol or Abbreviation	Definition
CSM	**Conceptual Site Model.** A **CSM** is a method to describe what is known or can be inferred about a site for the purpose of making a decision. A CSM generally will address physical, chemical and biological systems; contaminant release and transport; societal issues; policy, land use, and exposures.
cVOC	**Chlorinated Volatile Organic Compound.** A **VOC** containing chlorine atoms; typically, a cleaning solvent.
DCE	**Dichloroethylene.** Daughter product of PCE and TCE produced by natural degradation of the chemicals. It can be found as cis-1,2-dichloroethylene (cis-DCE) or trans-1,2-dichloroethylene (trans-DCE).
DPT	**Direct-Push Technology** (DPT) refers to a group of techniques used for subsurface investigation by driving, pushing and/or vibrating small-diameter rods into the ground.
HPT	**Hydraulic Profiling Tool**. The **HPT** is a logging **tool** that measures the pressure required to inject a flow of water into the soil as the probe is advanced into the subsurface. In addition to measurement of injection pressure, the HPT can also be used to measure hydrostatic pressure under the zero-flow condition.
PCE	**Tetrachloroethylene.** The chemical compound **PCE** is a non-flammable, liquid solvent used commonly used in dry cleaning, metal degreasing, and other manufacturing processes.
PID	**Photo Ionization Detector.** In a **PID** high-energy photons to break molecules into positively charged ions. The **PID** will only respond to components that have ionization energies at or below the energy of the photons produced by the **PID** lamp.
FID	**Flame Ionization Detector.** The FID utilizes a hydrogen flame to combust compounds in the carrier gas and responds to any molecule with a carbon-hydrogen bond.
TCE	**Trichloroethylene.** The chemical compound **TCE** is a halocarbon commonly used as an industrial solvent. It is a clear non-flammable liquid with a sweet smell.
XSD	**Halogen Specific Detector.** The **XSD** was developed for the selective detection of halogen-containing compounds.

THIS PAGE INTENTIONALLY LEFT BLANK

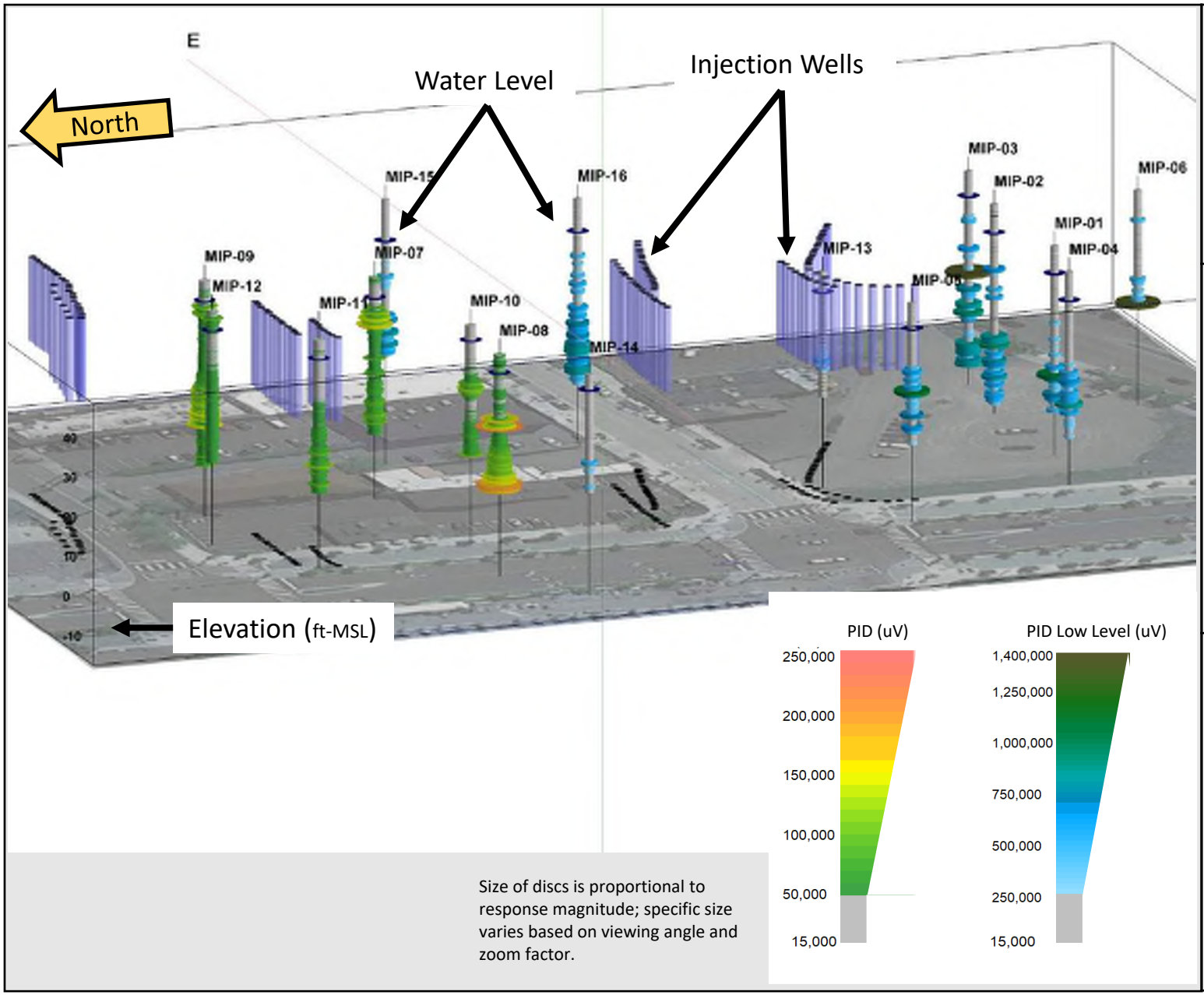
Figures



COLUMBIA TECHNOLOGIES	Ultra Custom Care Cleaners Bothell, WA	**MiHpt Stations**
	High-Resolution Site Characterization March 2020	**Figure 3**



COLUMBIA TECHNOLOGIES	Ultra Custom Care Cleaners Bothell, WA	**MIP-PID Footprint**
	High-Resolution Site Characterization March 2020	**Figure 4**



MIP-PID Results

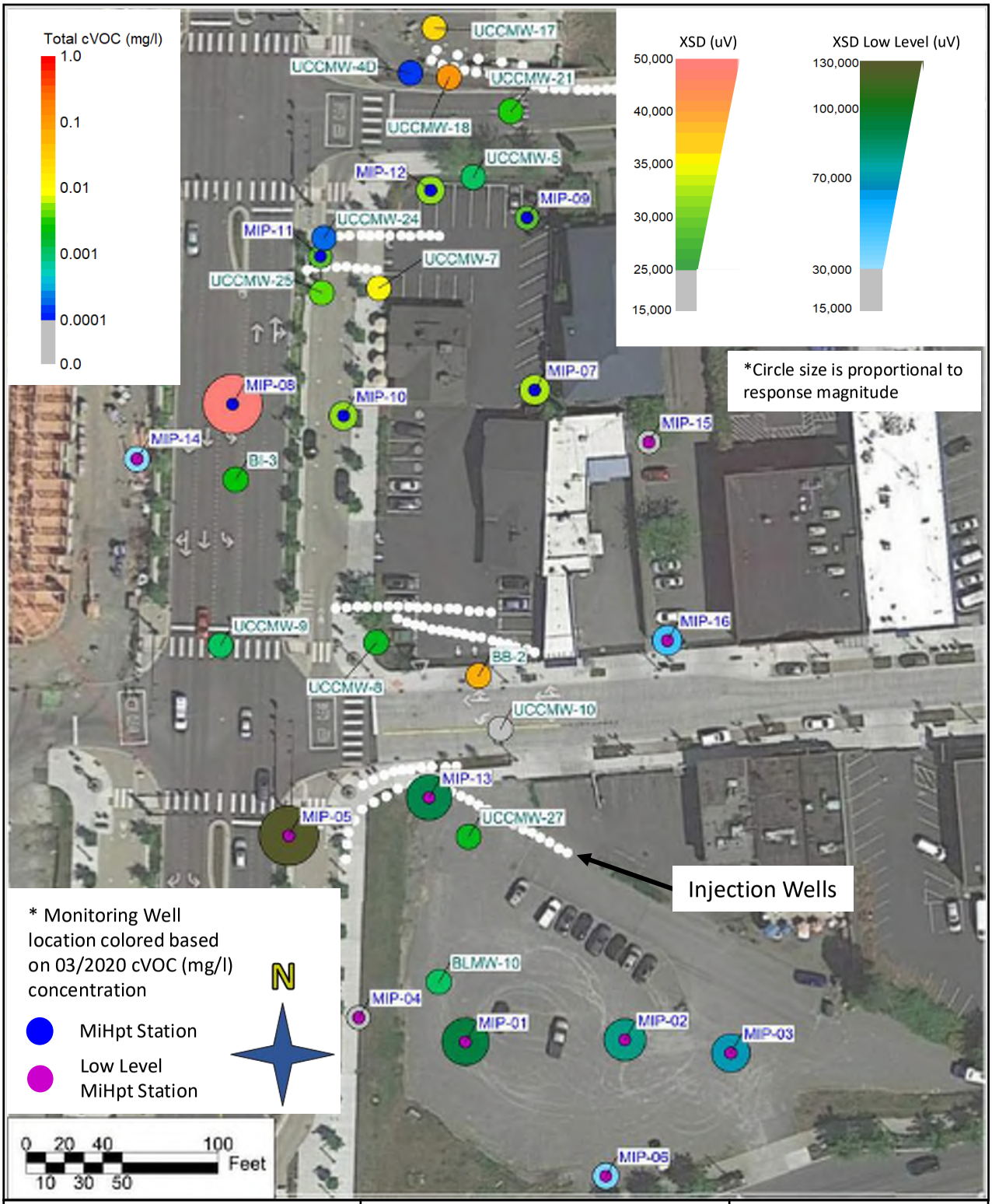
Figure 5

Ultra Custom Care Cleaners
Bothell, WA

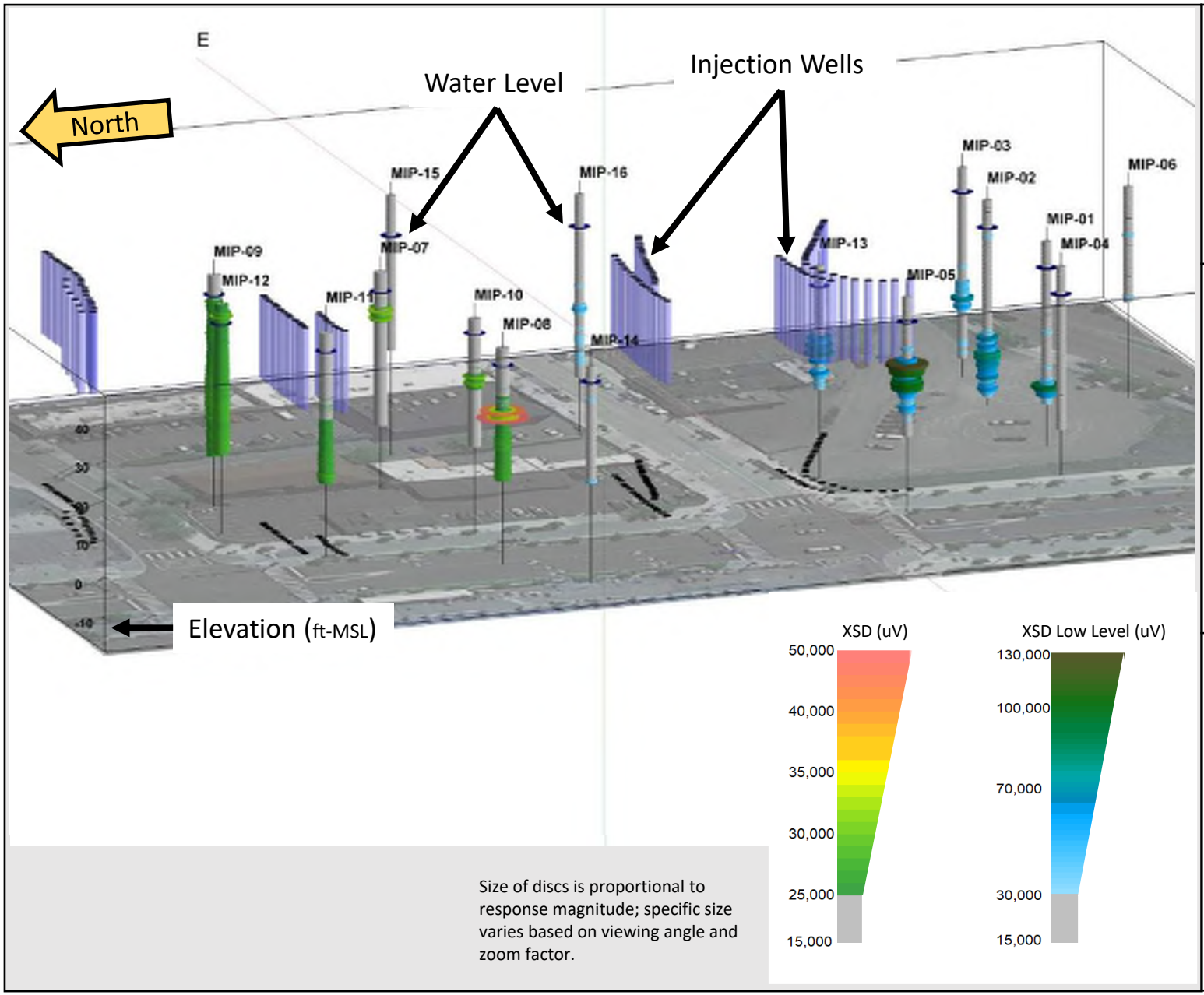
March 2020

High-Resolution Site Characterization

COLUMBIA TECHNOLOGIES



COLUMBIA TECHNOLOGIES	Ultra Custom Care Cleaners Bothell, WA	**MIP-XSD Footprint**
	High-Resolution Site Characterization March 2020	**Figure 6**



MIP-XSD Results

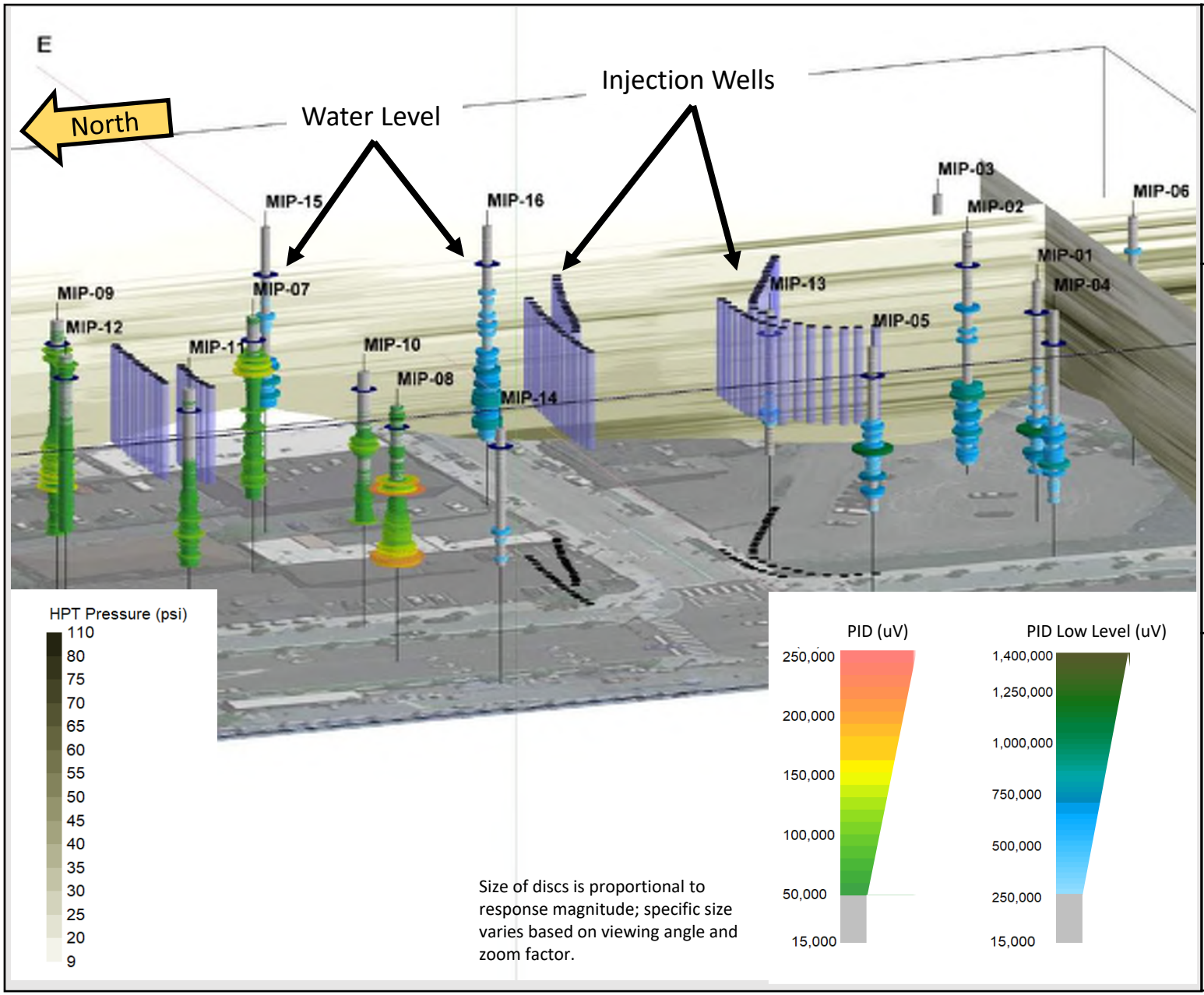
Figure 7

Ultra Custom Care Cleaners
Bothell, WA

March 2020

High-Resolution Site Characterization

COLUMBIA TECHNOLOGIES



PID and HPT Results

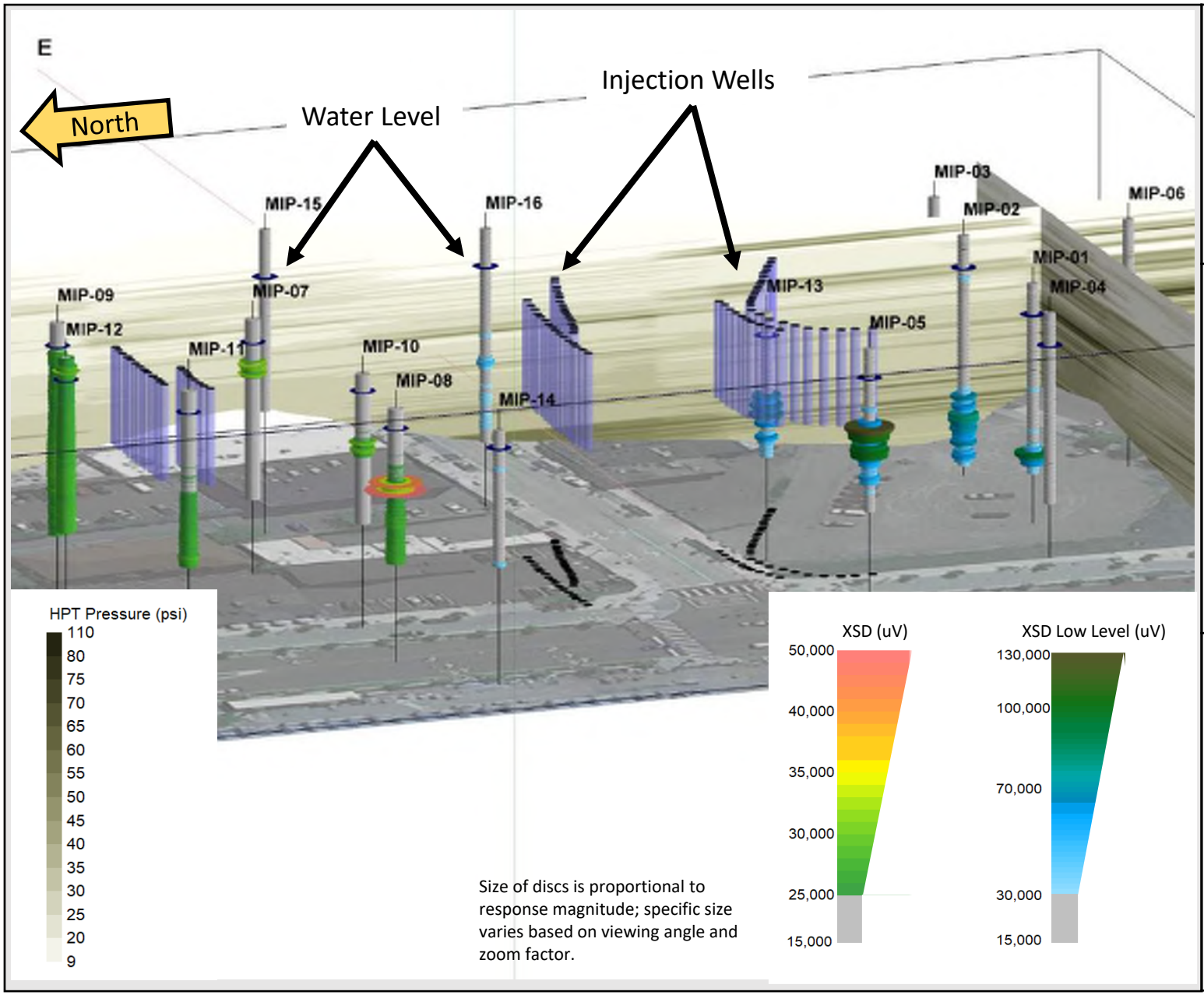
Figure 8

Ultra Custom Care Cleaners
Bothell, WA

March 2020

High-Resolution Site Characterization

COLUMBIA TECHNOLOGIES



XSD and HPT Results

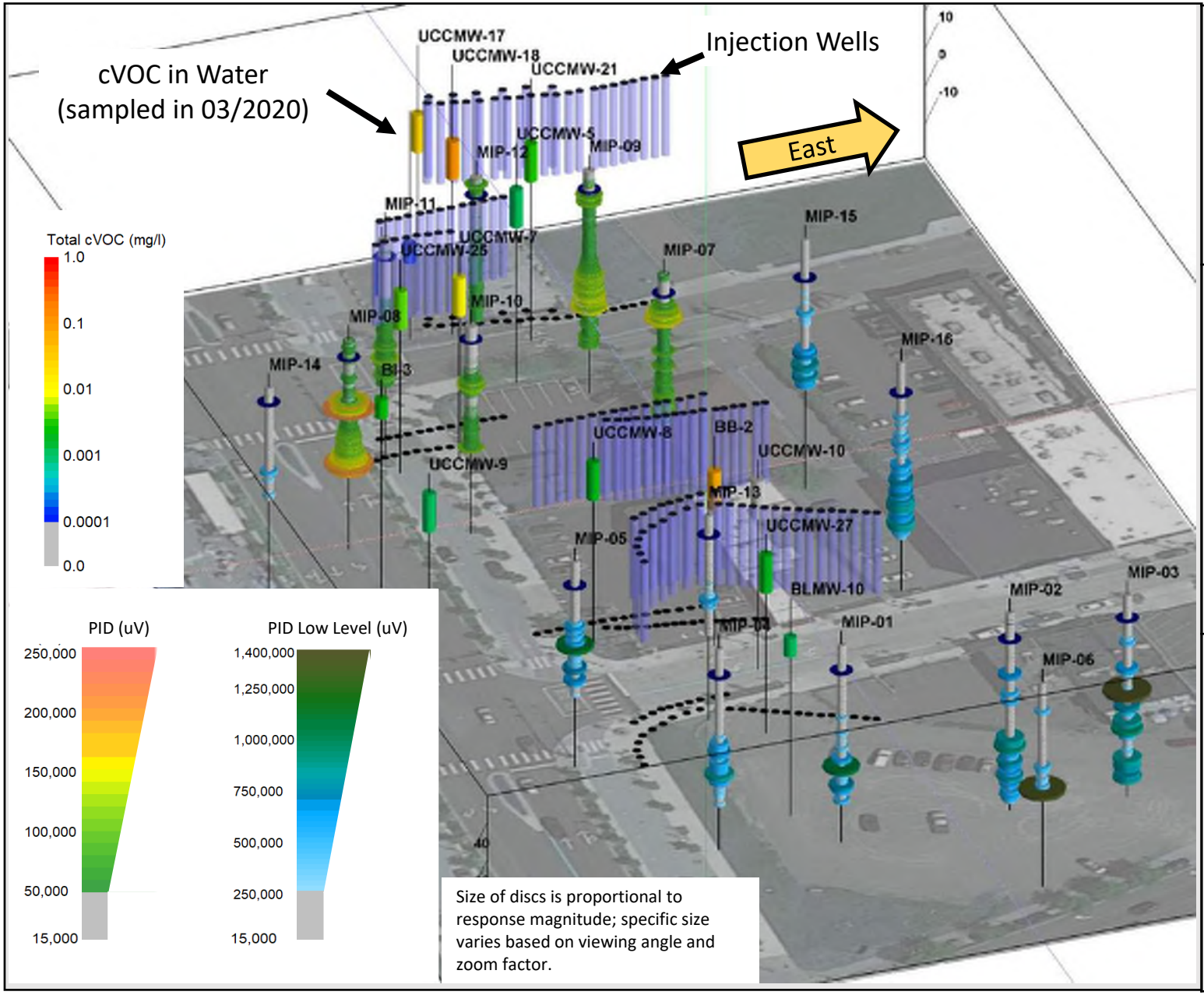
Figure 9

Ultra Custom Care Cleaners
Bothell, WA

March 2020

High-Resolution Site Characterization

COLUMBIA TECHNOLOGIES



PID vs Total cVOC (mg/l)

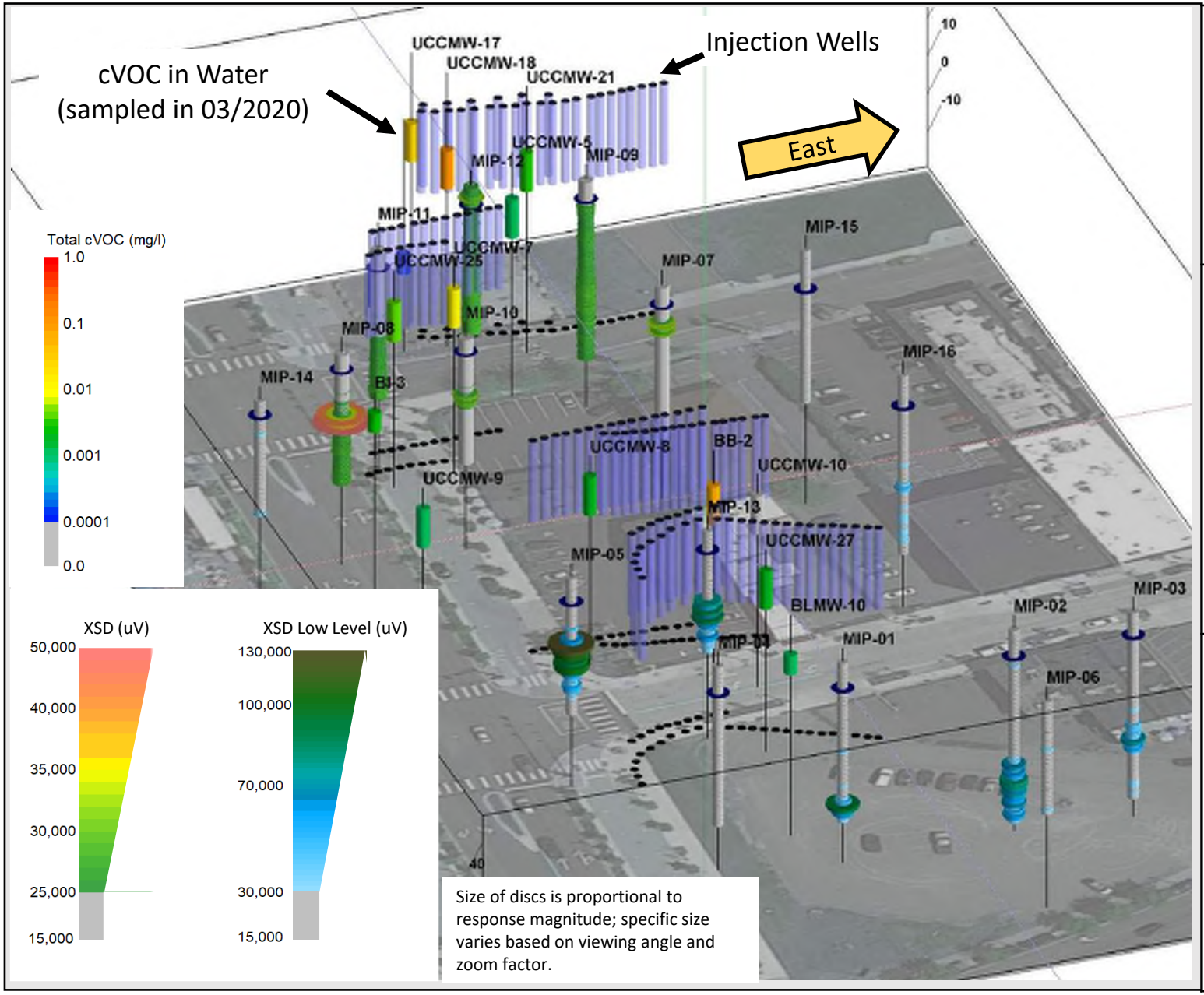
Figure 10

Ultra Custom Care Cleaners
Bothell, WA

March 2020

High-Resolution Site Characterization

COLUMBIA TECHNOLOGIES



XSD vs Total cVOC (mg/l)

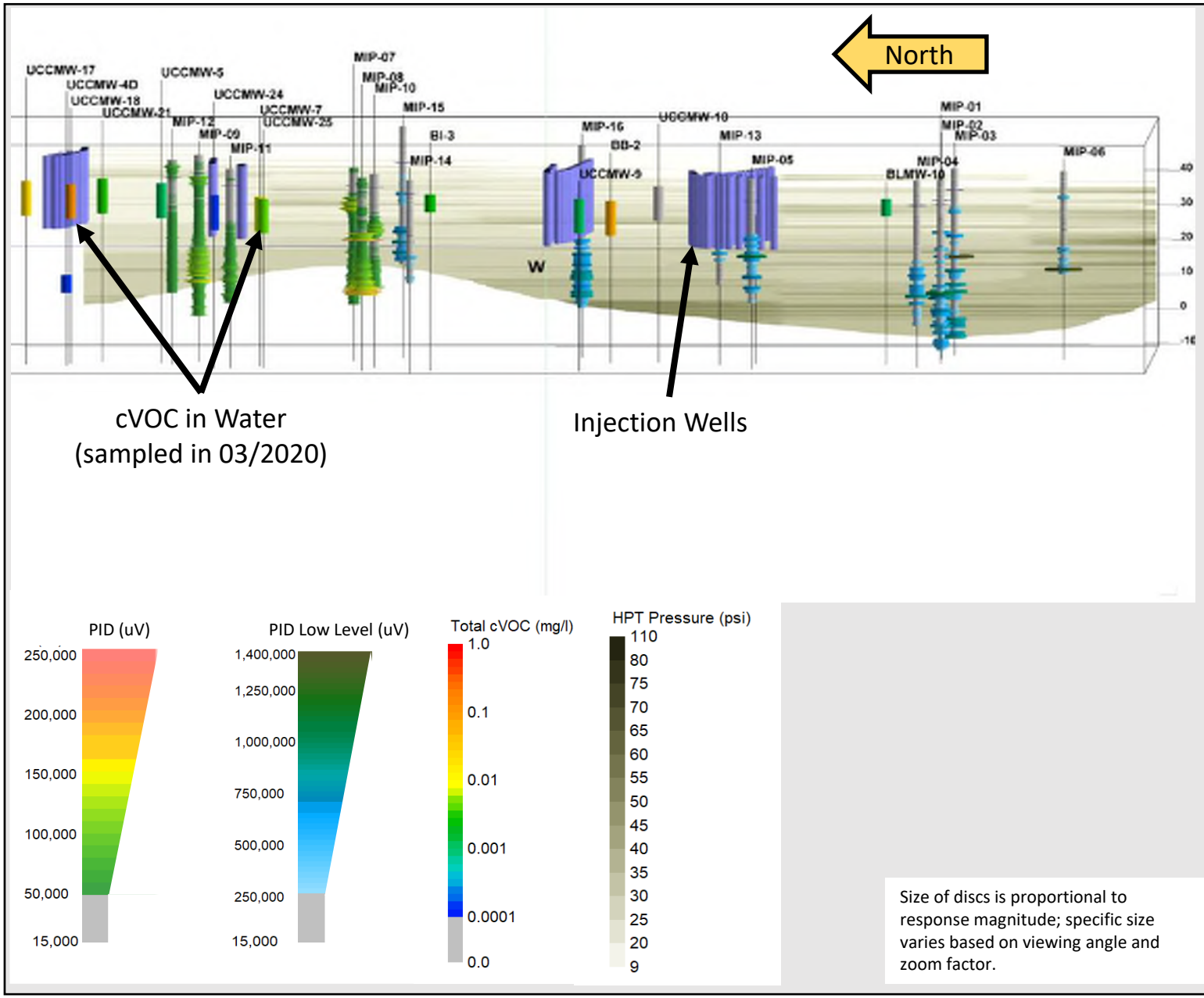
Figure 11

Ultra Custom Care Cleaners
Bothell, WA

March 2020

High-Resolution Site Characterization

COLUMBIA TECHNOLOGIES



PID Cross-sectional Composite

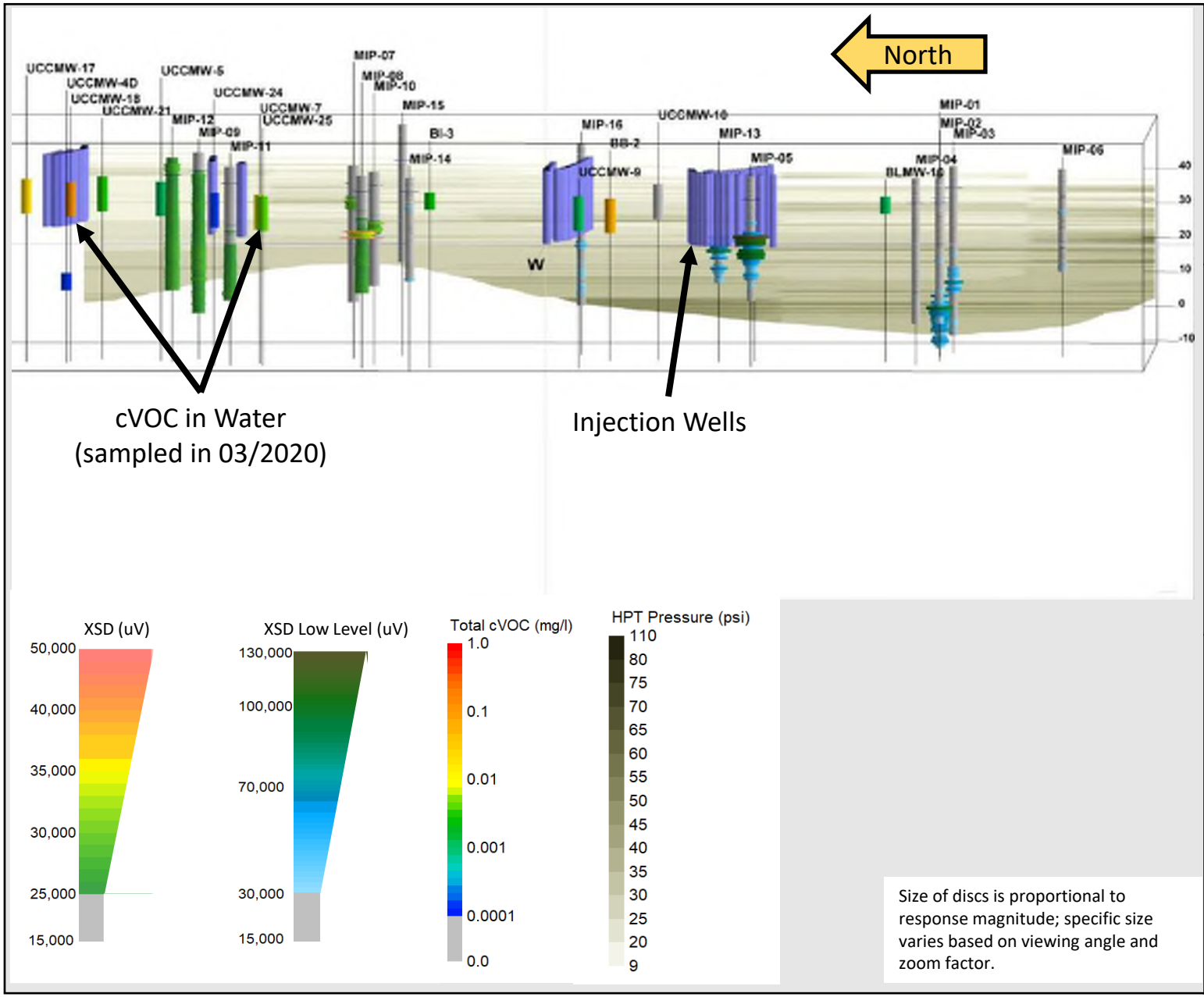
Figure 12

Ultra Custom Care Cleaners
Bothell, WA

March 2020

High-Resolution Site Characterization

COLUMBIA TECHNOLOGIES



XSD Cross-sectional Composite

Figure 13

Ultra Custom Care Cleaners
Bothell, WA

March 2020

High-Resolution Site Characterization

COLUMBIA TECHNOLOGIES

APPENDICES

APPENDIX C – Quality Control Procedures

System Quality Control Checks

Direct sensing technologies such as MIP provide qualitative or semi-quantitative direct contact measurements of conditions in the soil, water, and vapor matrix of the subsurface. Correct performance response of the instruments is determined using standards or mixtures of known values or concentrations. Before and after each measurement run, the instruments are tested with these known standards to ensure their response is within an acceptable range.

The nature of direct-sensing technology is different than a typical laboratory analysis. In the lab, a known volume of a known concentration is introduced to the system, the compounds are separated chromatographically, and the response for each individual compound is recorded. This process is highly reproducible, and precise standards exist for laboratory control limits.

These performance tests of direct sensing instruments are not calibrations, per se. While the instrument response can be expected to be linear for a single chemical compound or in the known matrix conditions of the performance test standards, matrix conditions and chemical mixtures will be highly variable throughout the measurement run in subsurface.

In MIP, for instance, subsurface compounds diffuse across the MIP membrane, enter the carrier gas stream, and are transported directly to the GC. There is no chromatographic separation, just total response with depth.

Several other factors affect direct-sensing responses.

For MIP, these factors include:

- The diffusion rate across the MIP membrane. This differs for every compound, based on:
    - Vapor pressure
    - Solubility
    - Interactions with other compounds
    - Membrane age and wear
- Ambient temperature
- Temperature of the subsurface
- Soil conditions (Clays provide a higher response than sands, due to increased back-pressure at the membrane)
- Detector response for each compound
- System performance

For these reasons, a "calibration" is not possible. The variables within compounds of interest, mixtures of compounds, and subsurface conditions cannot be standardized. However, system performance can. Therefore, COLUMBIA Technologies implements protocols to test and evaluate system performance to produce the highest quality data in the industry. The results of these performance tests are maintained with each project file and available upon request.

MIP System Performance Tests

System response is checked via Performance Tests with known compounds at known concentrations to verify that the system is responding to an acceptable

level. On the recommendation of the manufacturer, Geoprobe Systems, this minimum acceptable response level is established as five (5) times the standard deviation of the baseline noise level for each detector.

These tests vary, mostly due to ambient temperature and the age of the membrane. So, rather than looking for a specific response factor, the system is monitored for an acceptable response. When the response is not acceptable, the system is investigated, and corrective actions are implemented as necessary.

COLUMBIA Technologies performs several levels of MIP system evaluation for each project:

- Pre-Mobilization 5-Point Response Check
- Site Arrival 5-Point Response Check
- Pre-log Midpoint Response Check
- Post-Log Midpoint Response Check

For 5-point response tests, the system is evaluated at 0.10, 0.50, 1.0, 5.0, and 10.0 ppm to check response across 3 orders of magnitude of concentrations. For sites with expected petroleum contamination the system is checked using Toluene. For sites where chlorinated VOCs are expected, the system is checked using Trichloroethene (TCE). Site -specific compounds may be used where appropriate.

As an ongoing quality control check, the MIP system response is evaluated using a 1.0 ppm performance test solution prior to and upon completion of each MIP location. The resulting response values are recorded and compared to the results of the 5-point performance tests. When the response tests fall below 25% of the baseline value, corrective action must be taken.

Low-Level MIP System performance Test

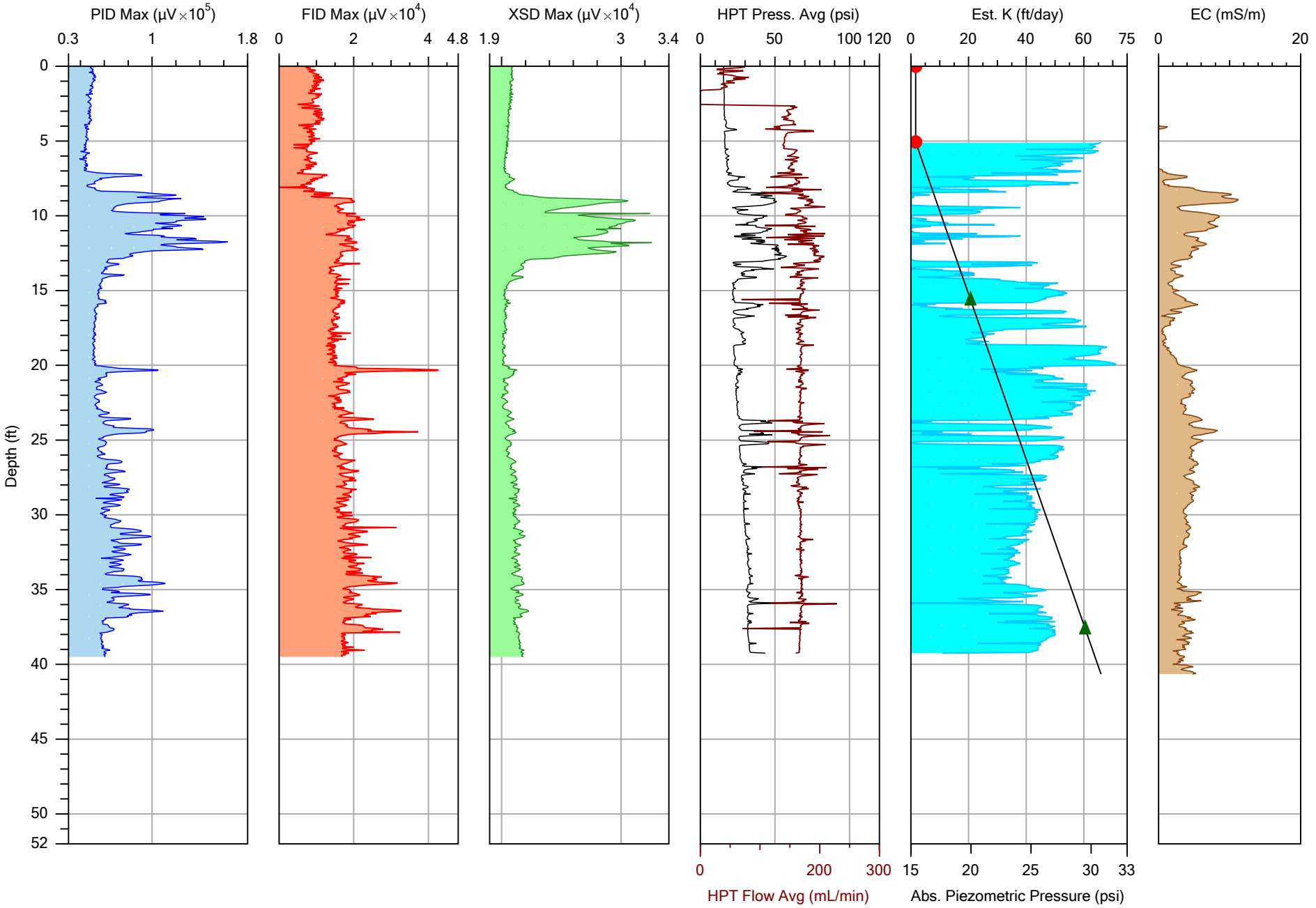
The Low-Level system is evaluated using a similar 5-point response test. The test concentrations are 10, 50, 100, 500, and 1,000 ppb, using Toluene of TCE as appropriate. Ongoing Response tests are performed using a 100-ppb solution.

HPT System Performance Test

The EC dipole is evaluated using a brass and stainless-steel test jig, resulting in known values of 55 and 290 millisiemens (mS). Results must fall within 10% of the expected values; otherwise corrective action must be performed.

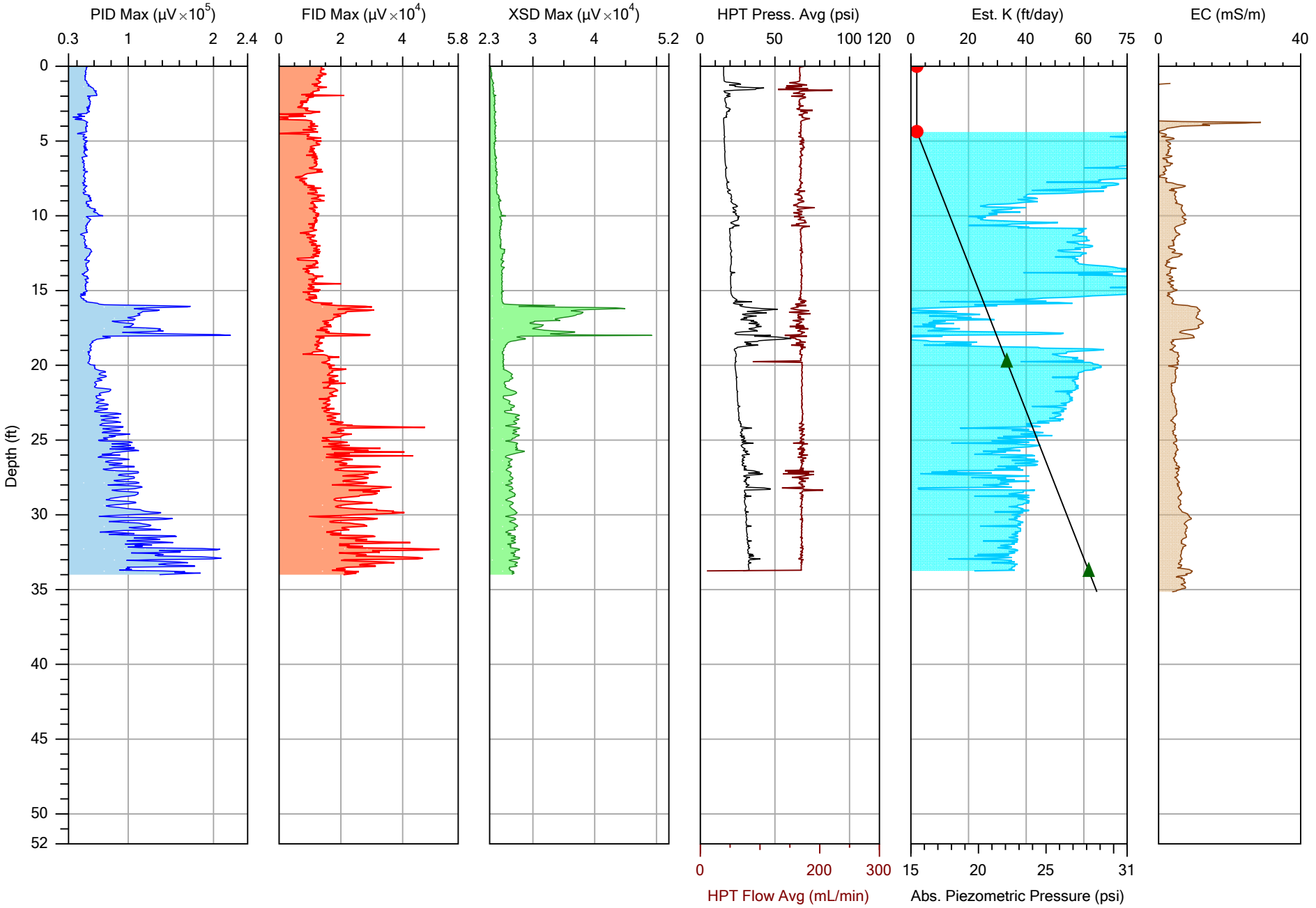
The HPT pressure and flow sensors are also evaluated using static (no flow) and dynamic (flow at approximately 150 milliliters per minute) hydraulic pressure measurements at two different head elevations, 6.0 inches apart. The difference for each test must be 0.2 psi, +/- 10%; otherwise corrective action must be performed.

APPENDIX D – Data Logs for Membrane Interface Probe/EC with Hydraulic Profiling Tool (MiHpt) – Individual Scale



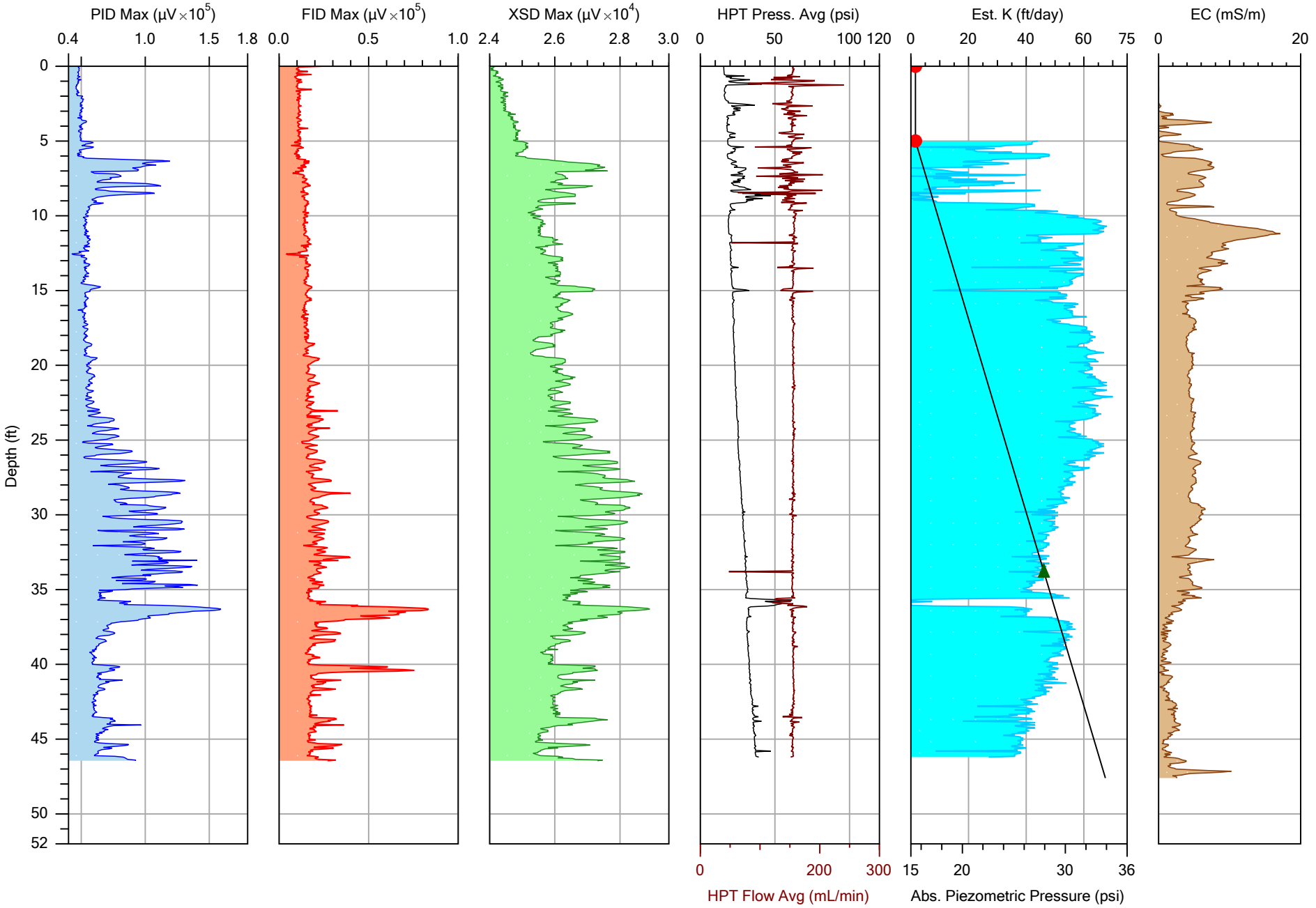
COLUMBIA TECHNOLOGIES

		File: MIP-07.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/16/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



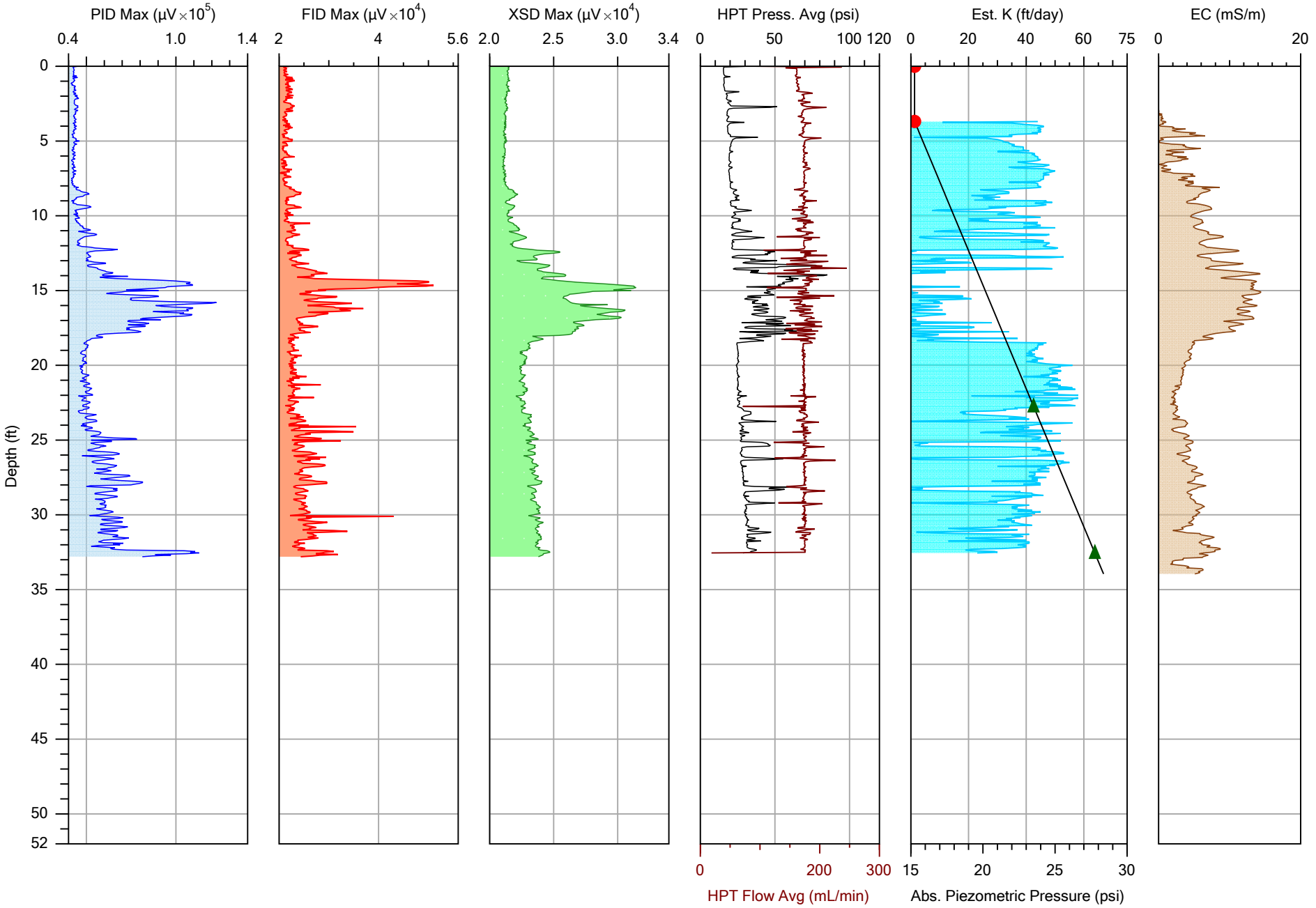
COLUMBIA TECHNOLOGIES

		File: MIP-08.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/16/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



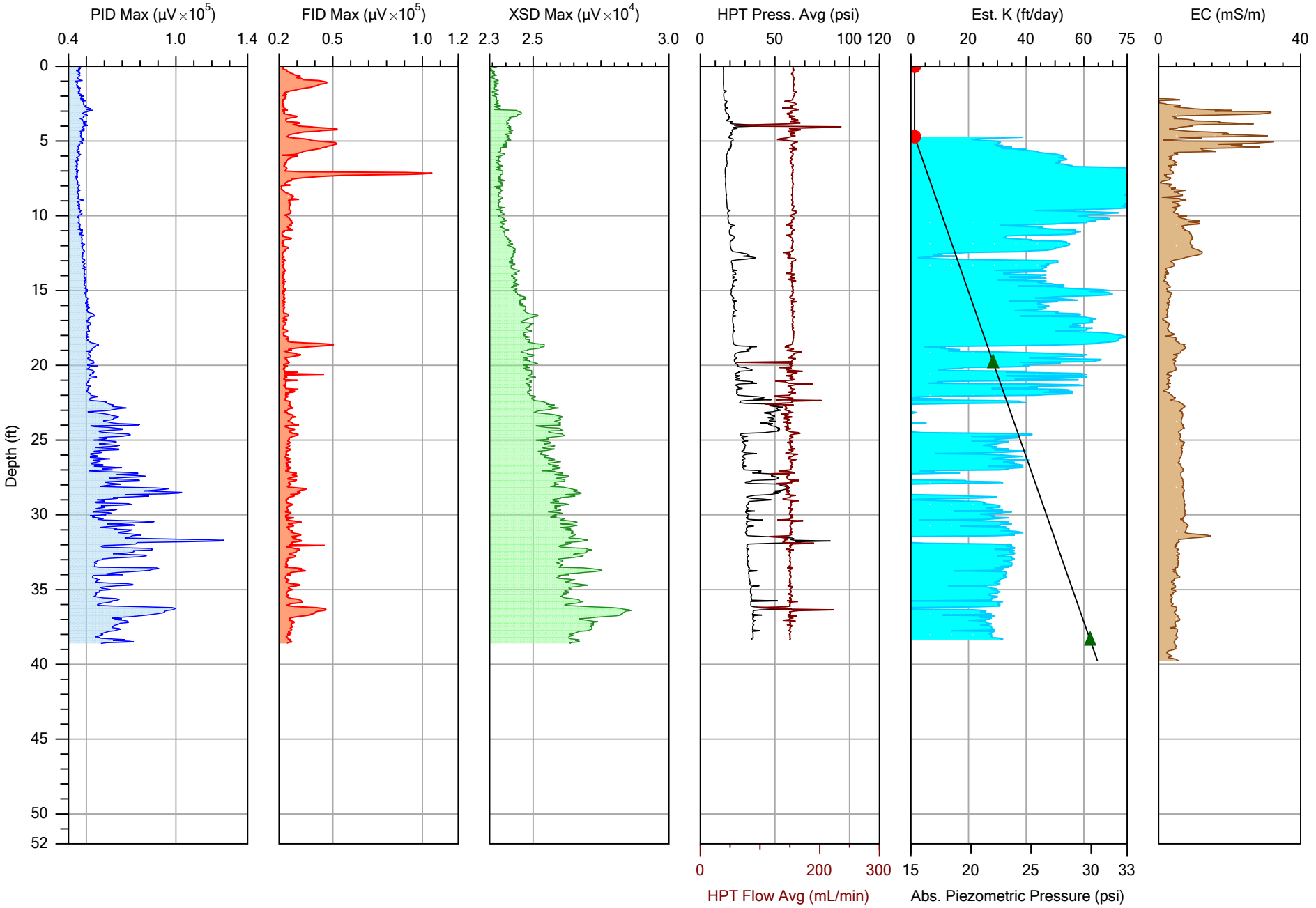
COLUMBIA TECHNOLOGIES

		File: MIP-09.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/16/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



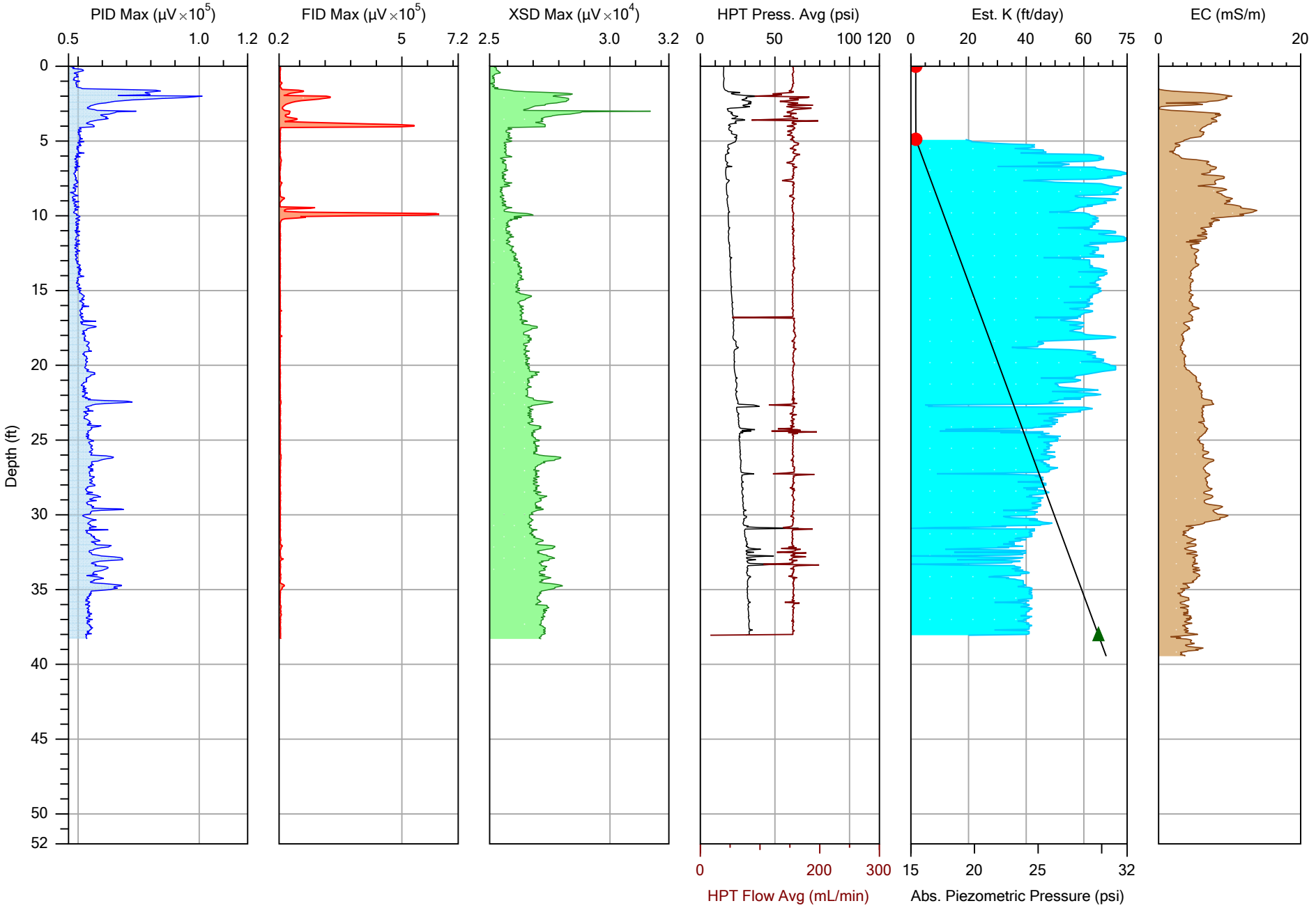
COLUMBIA TECHNOLOGIES

		File: MIP-10.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/17/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



COLUMBIA TECHNOLOGIES

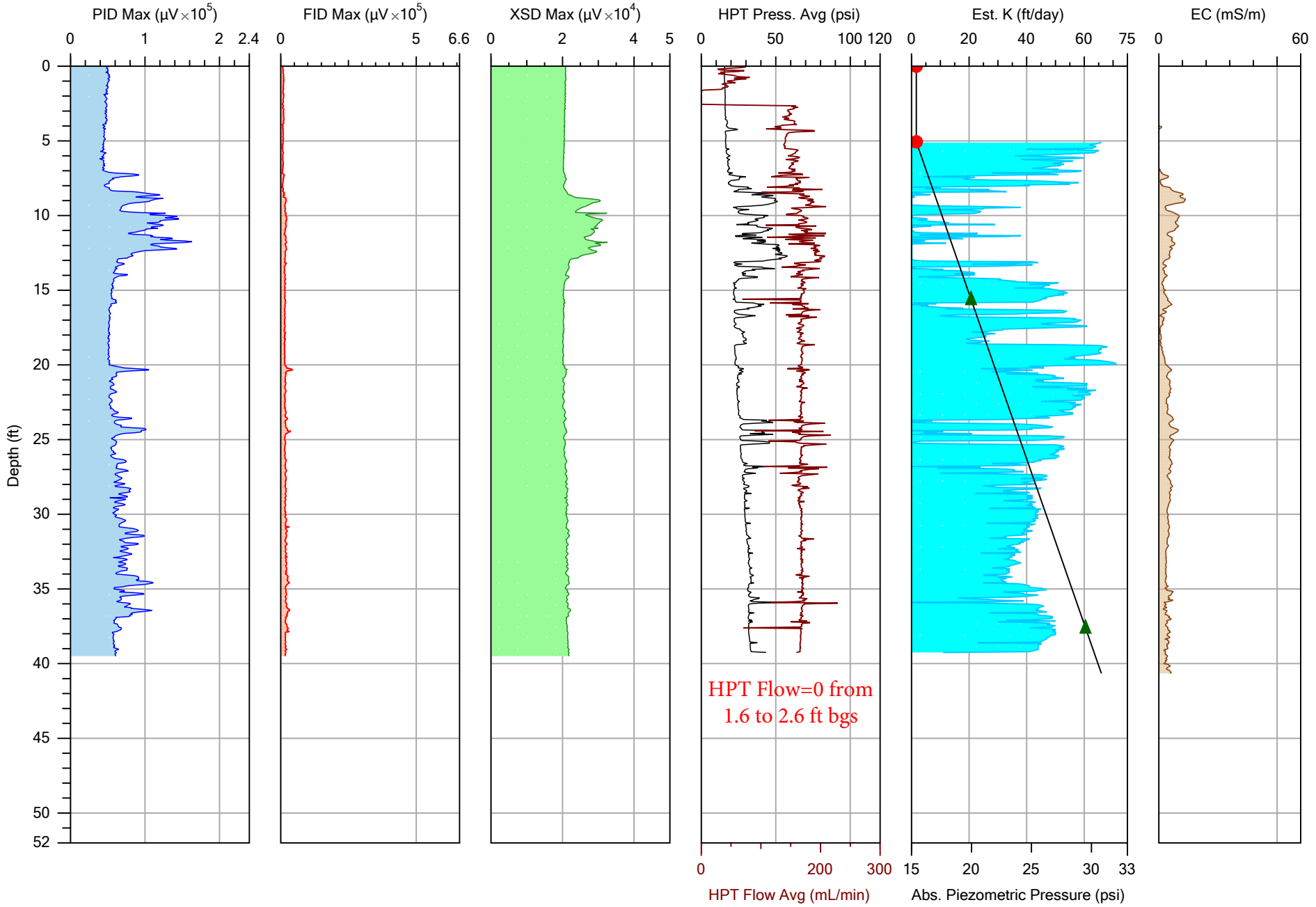
		File: MIP-11.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/17/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



COLUMBIA TECHNOLOGIES

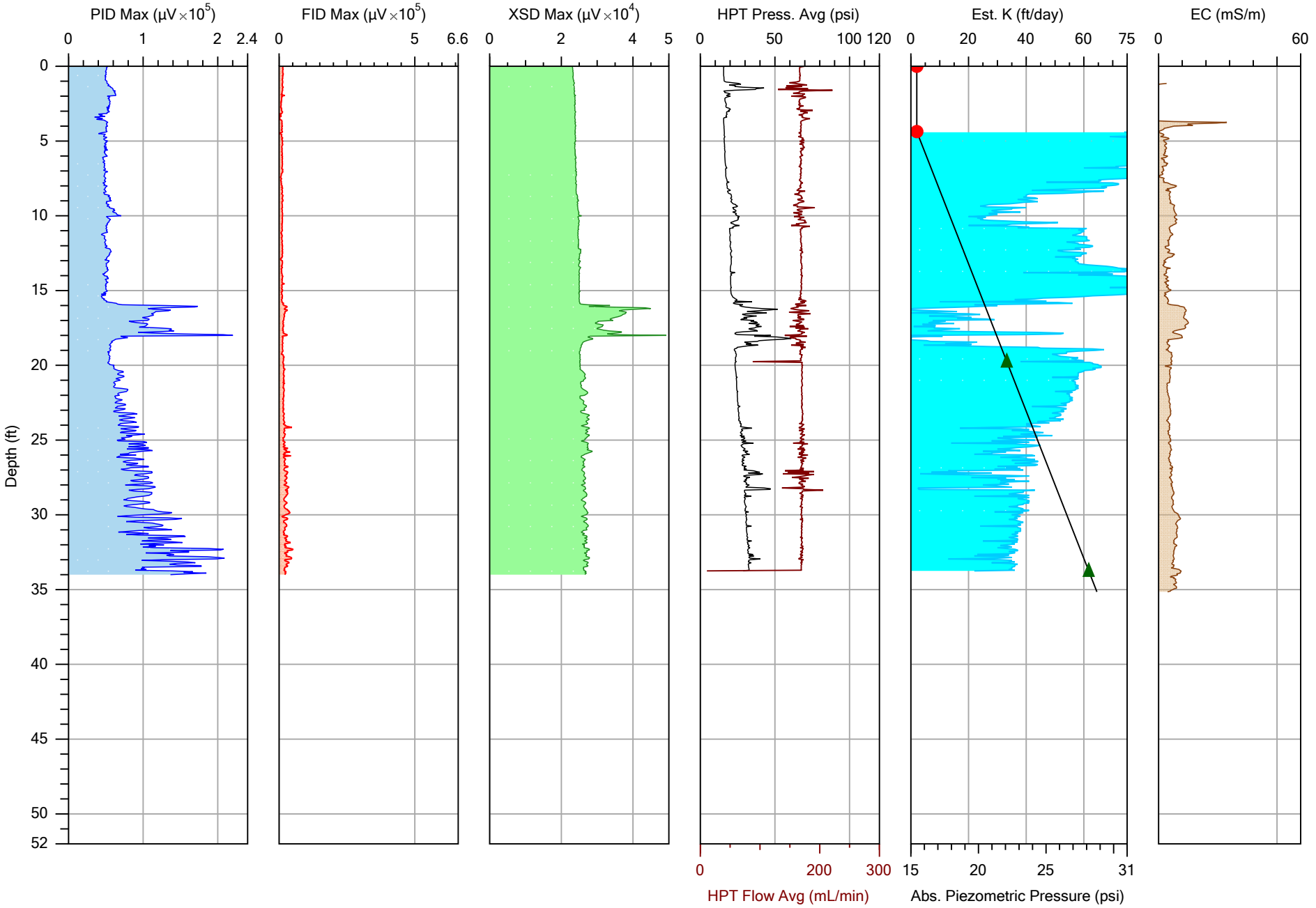
		File: MIP-12.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/17/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA

APPENDIX E – Data Logs for Membrane Interface Probe/EC with Hydraulic Profiling Tool (MiHpt) - Collective Scale



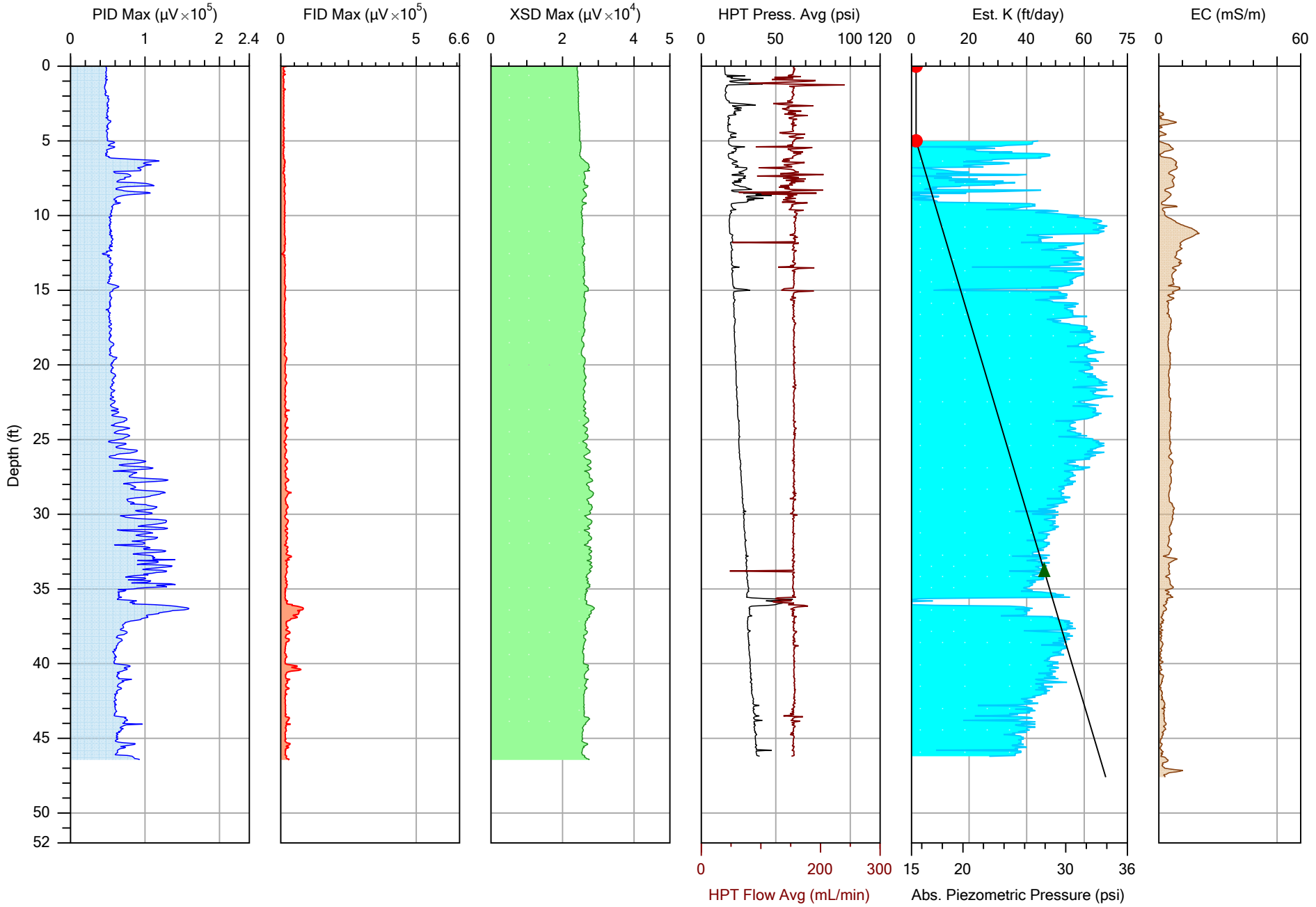
COLUMBIA TECHNOLOGIES

		File: MIP-07.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/16/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



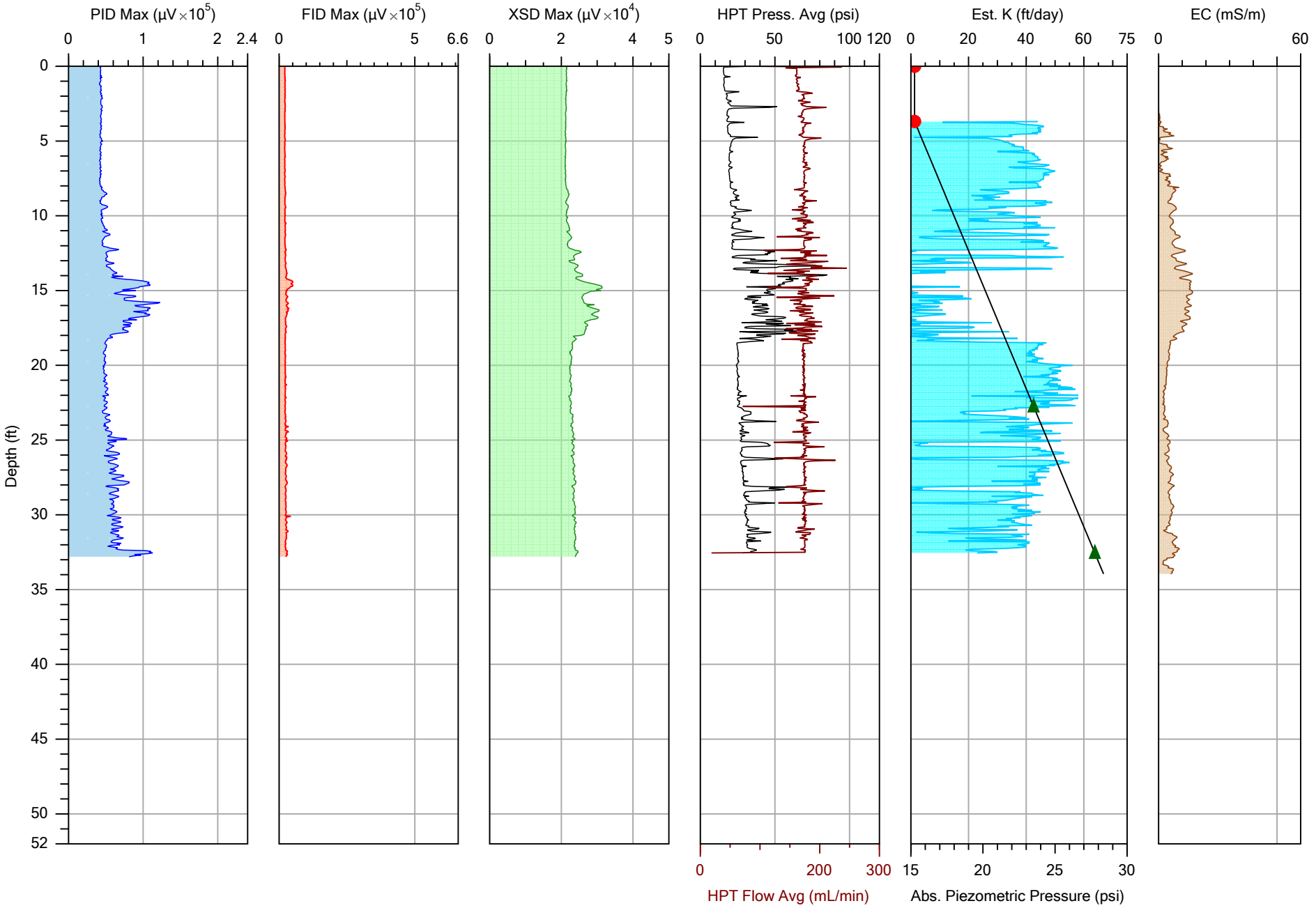
COLUMBIA TECHNOLOGIES

		File: MIP-08.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/16/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



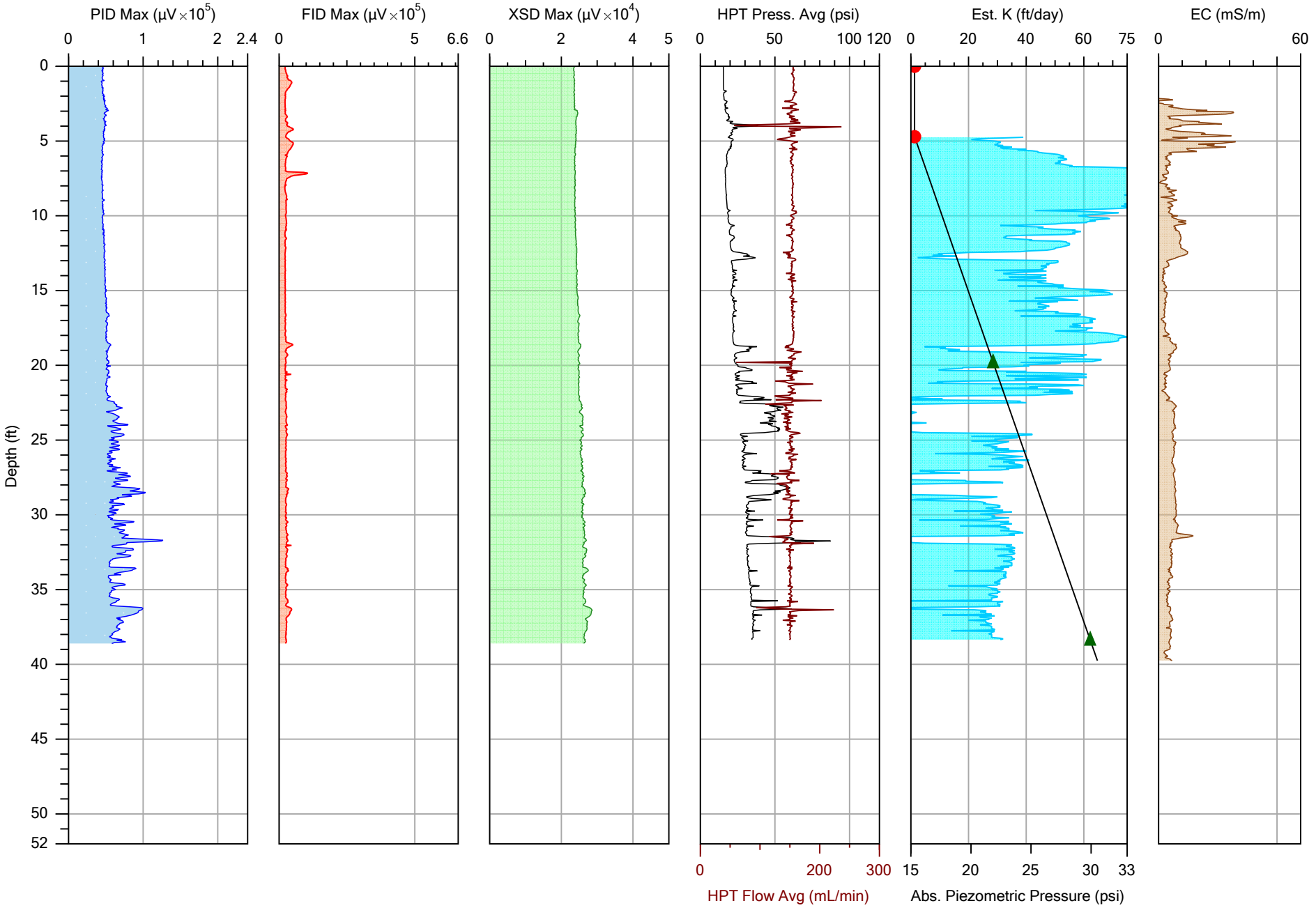
COLUMBIA TECHNOLOGIES

		File: MIP-09.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/16/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



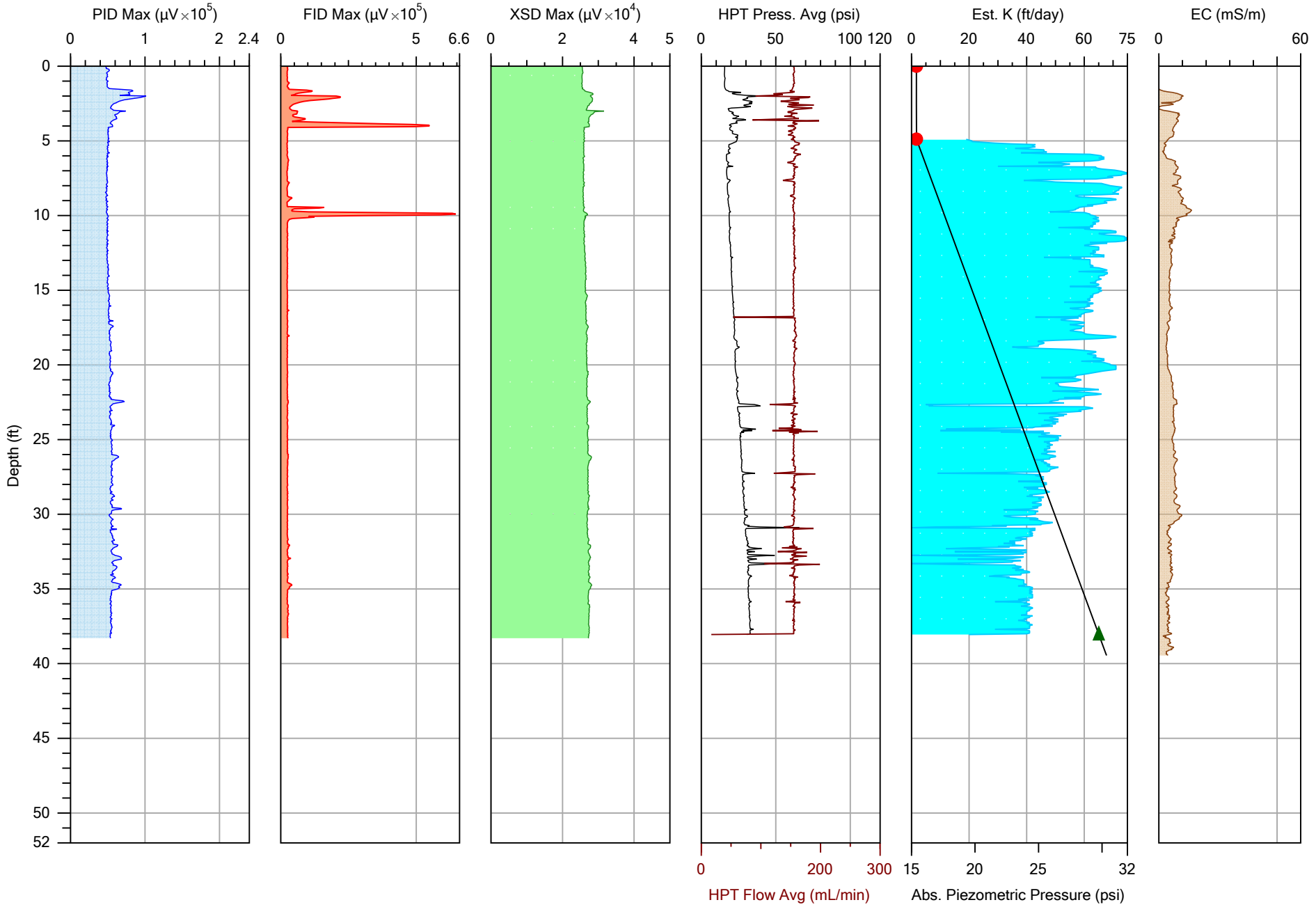
COLUMBIA TECHNOLOGIES

		File: MIP-10.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/17/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



COLUMBIA TECHNOLOGIES

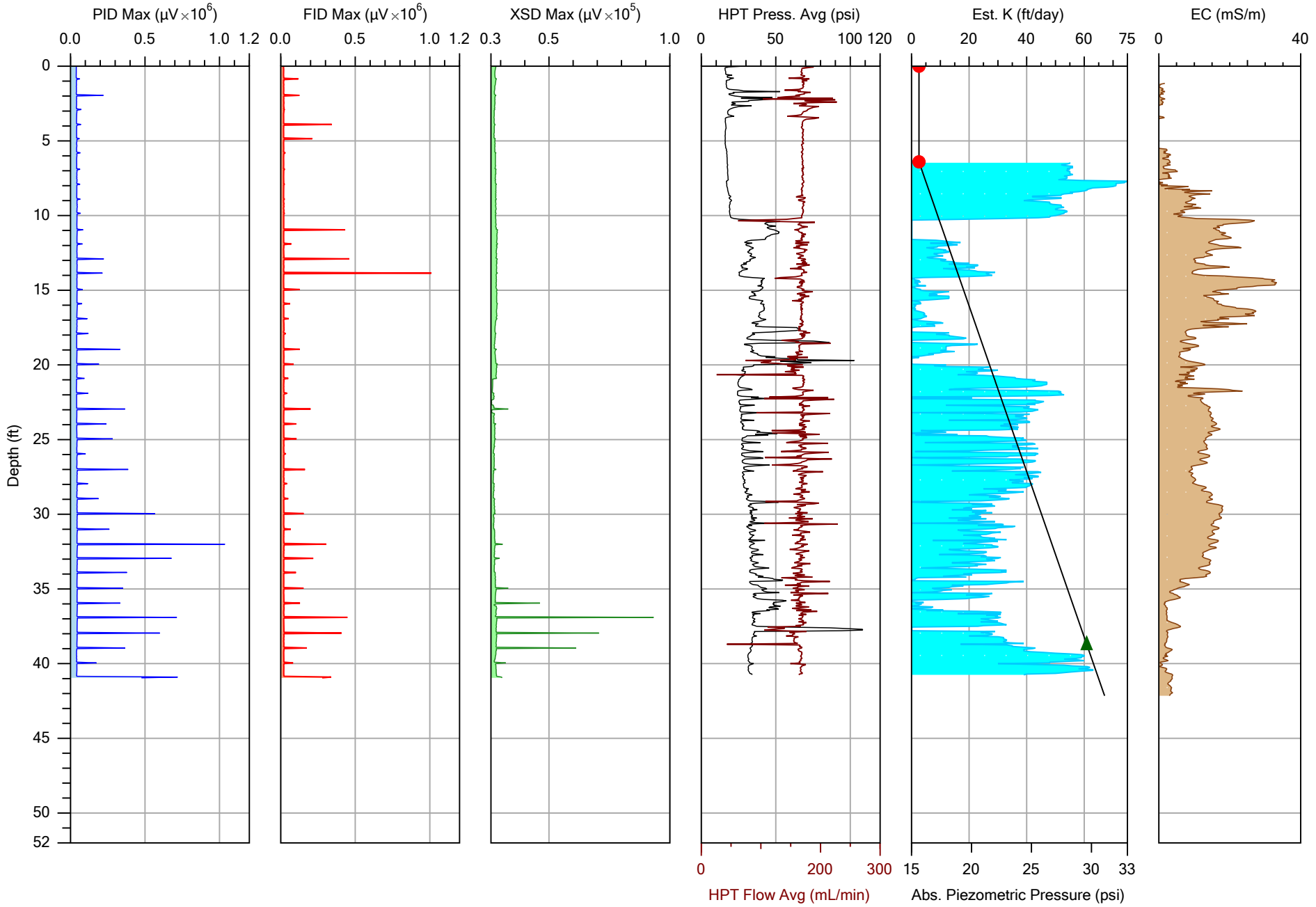
		File: MIP-11.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/17/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



COLUMBIA TECHNOLOGIES

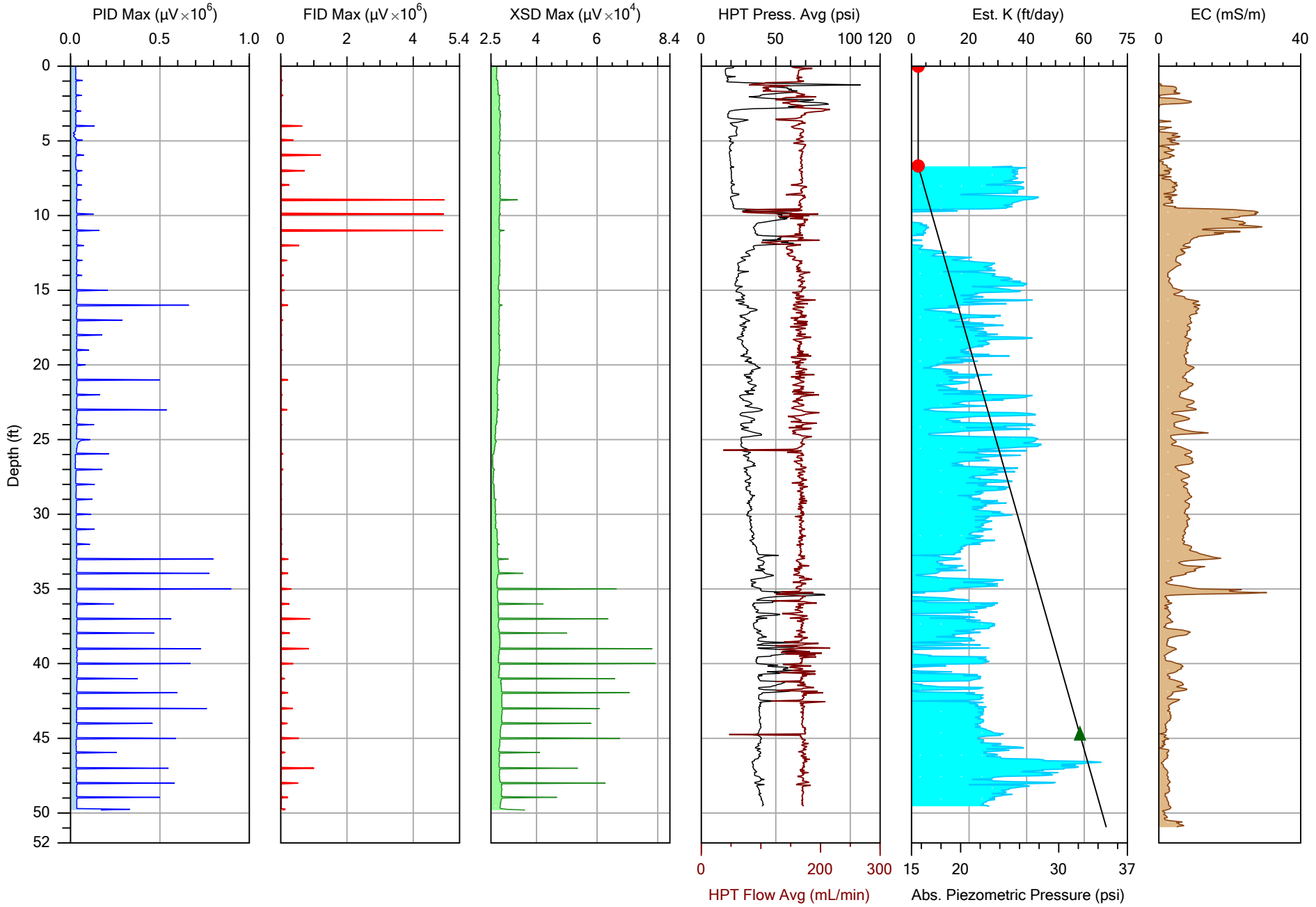
		File: MIP-12.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/17/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA

APPENDIX F – Data Logs for Low-Level Membrane Interface Probe/EC with Hydraulic Profiling Tool (LL-MiHpt) - Individual Scale



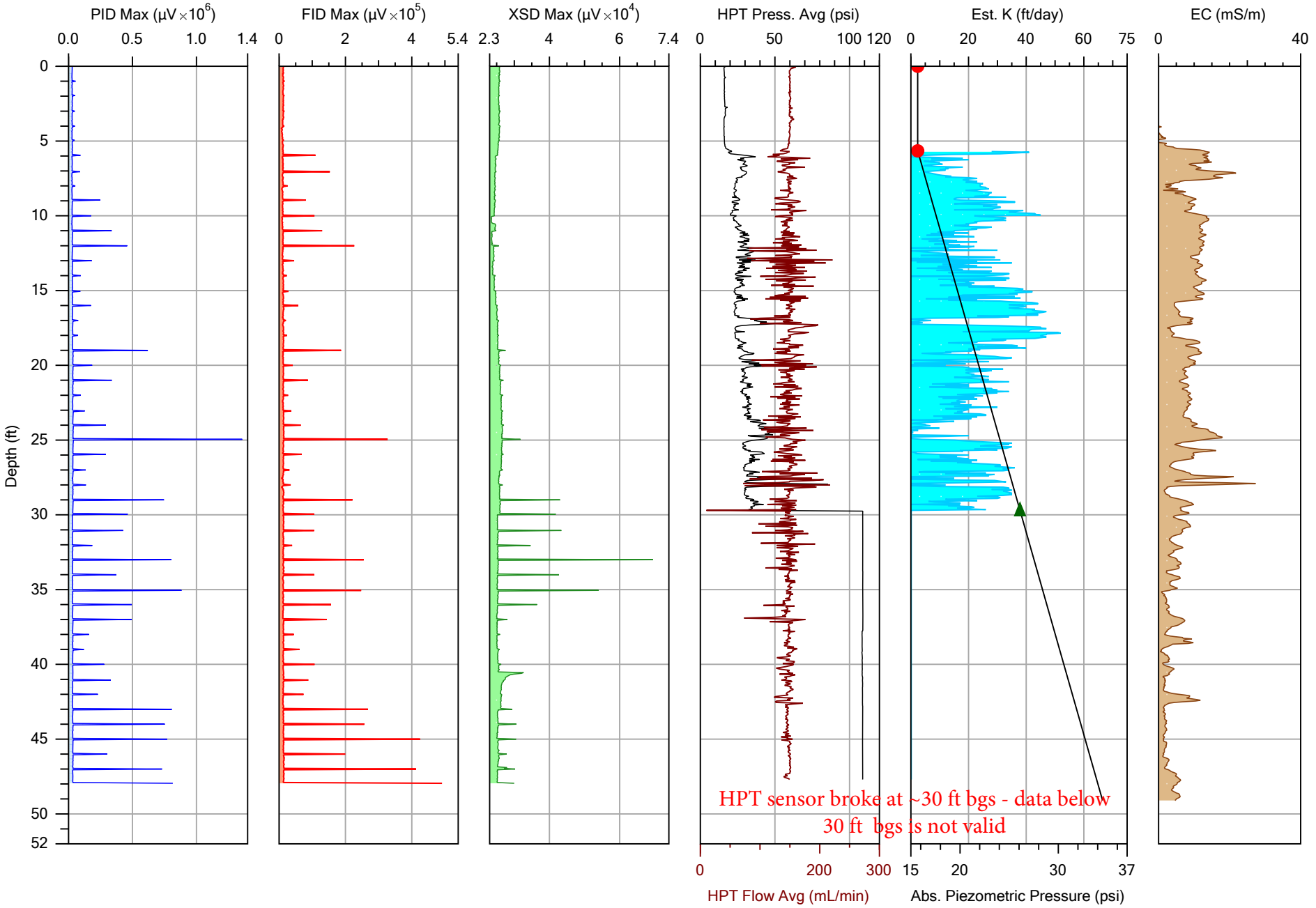
COLUMBIA TECHNOLOGIES

		File: MIP-01.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/12/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



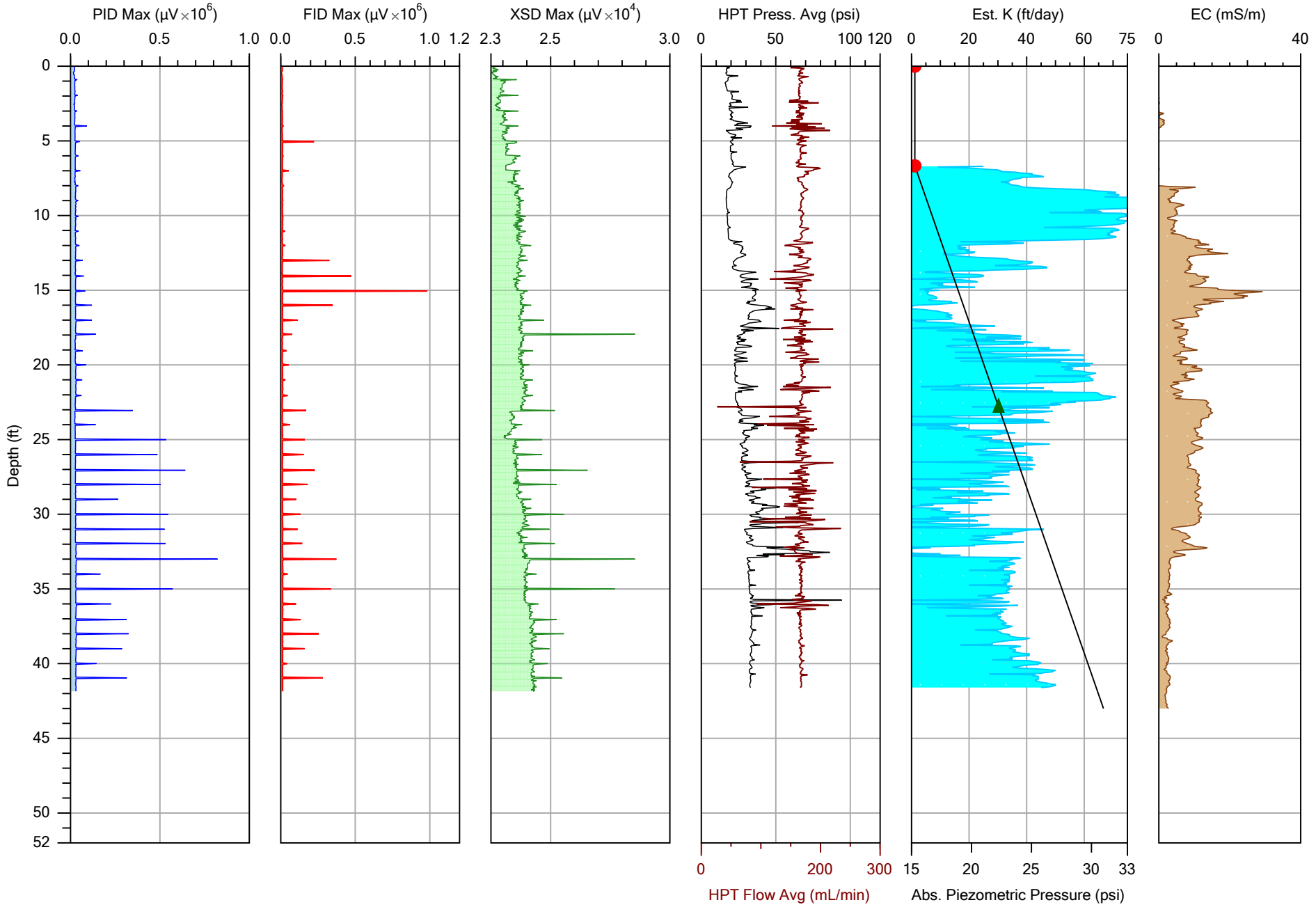
COLUMBIA TECHNOLOGIES

		File: MIP-02.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/12/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



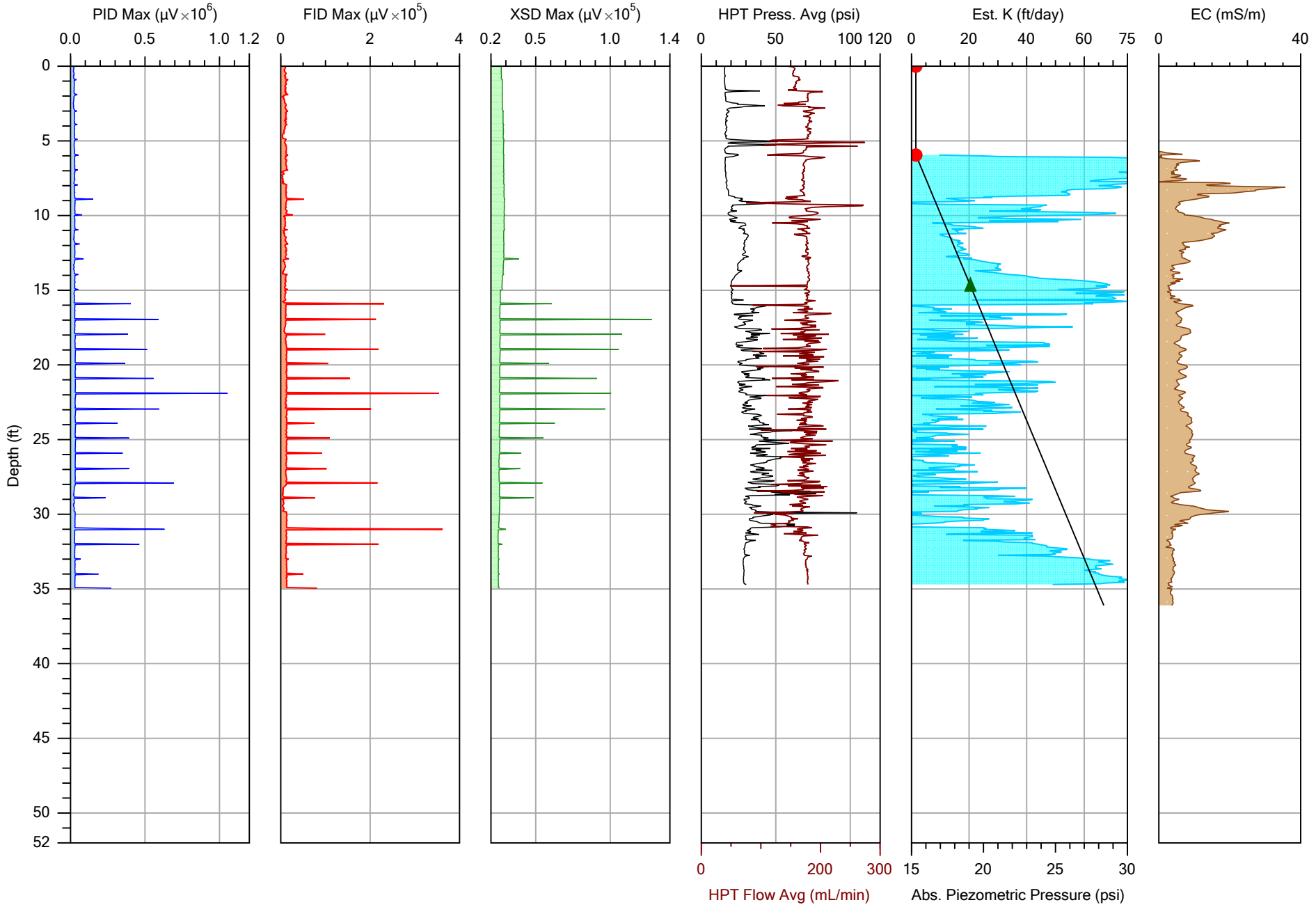
COLUMBIA TECHNOLOGIES

		File: MIP-03.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/12/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



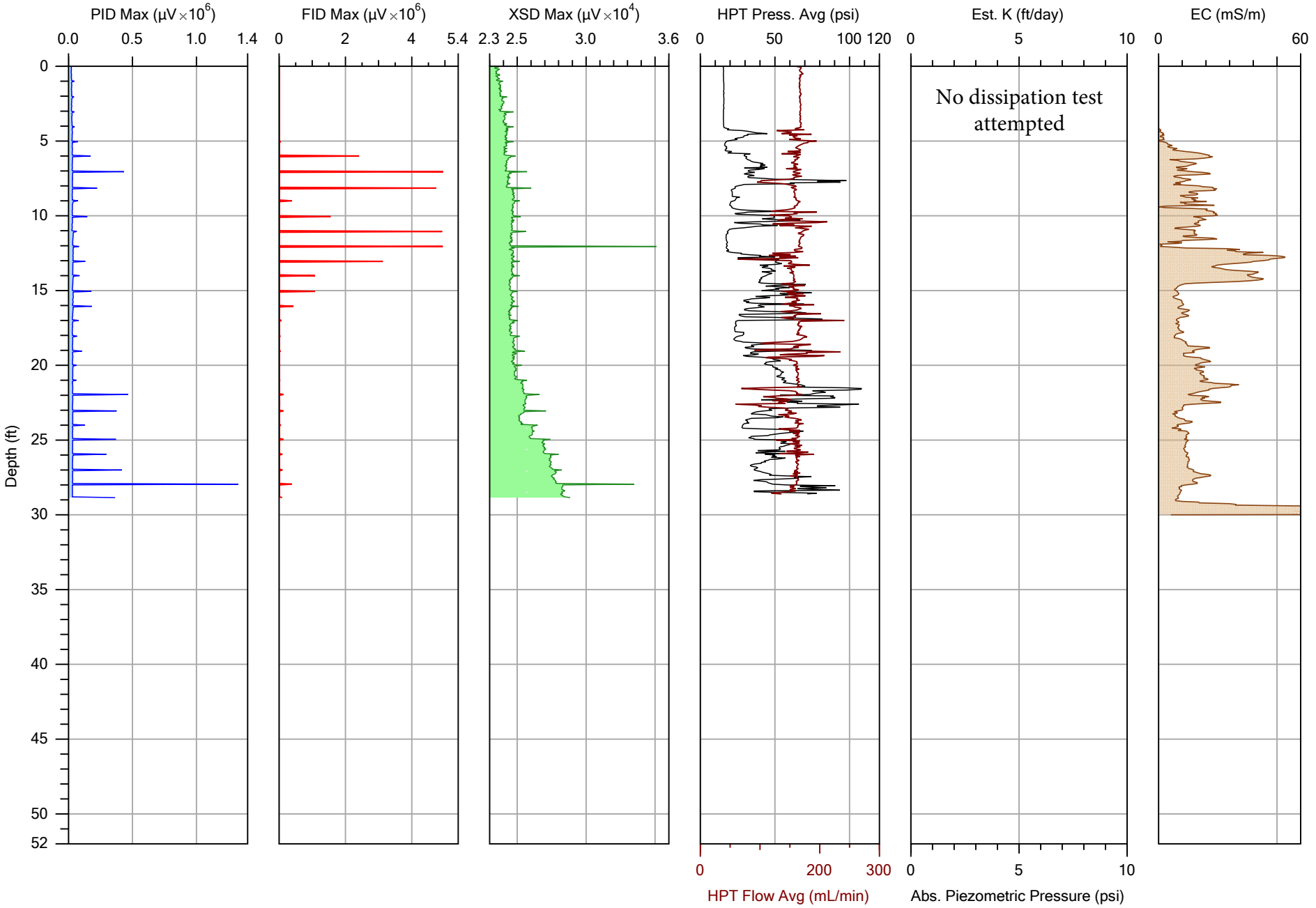
COLUMBIA TECHNOLOGIES

		File: MIP-04.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/13/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



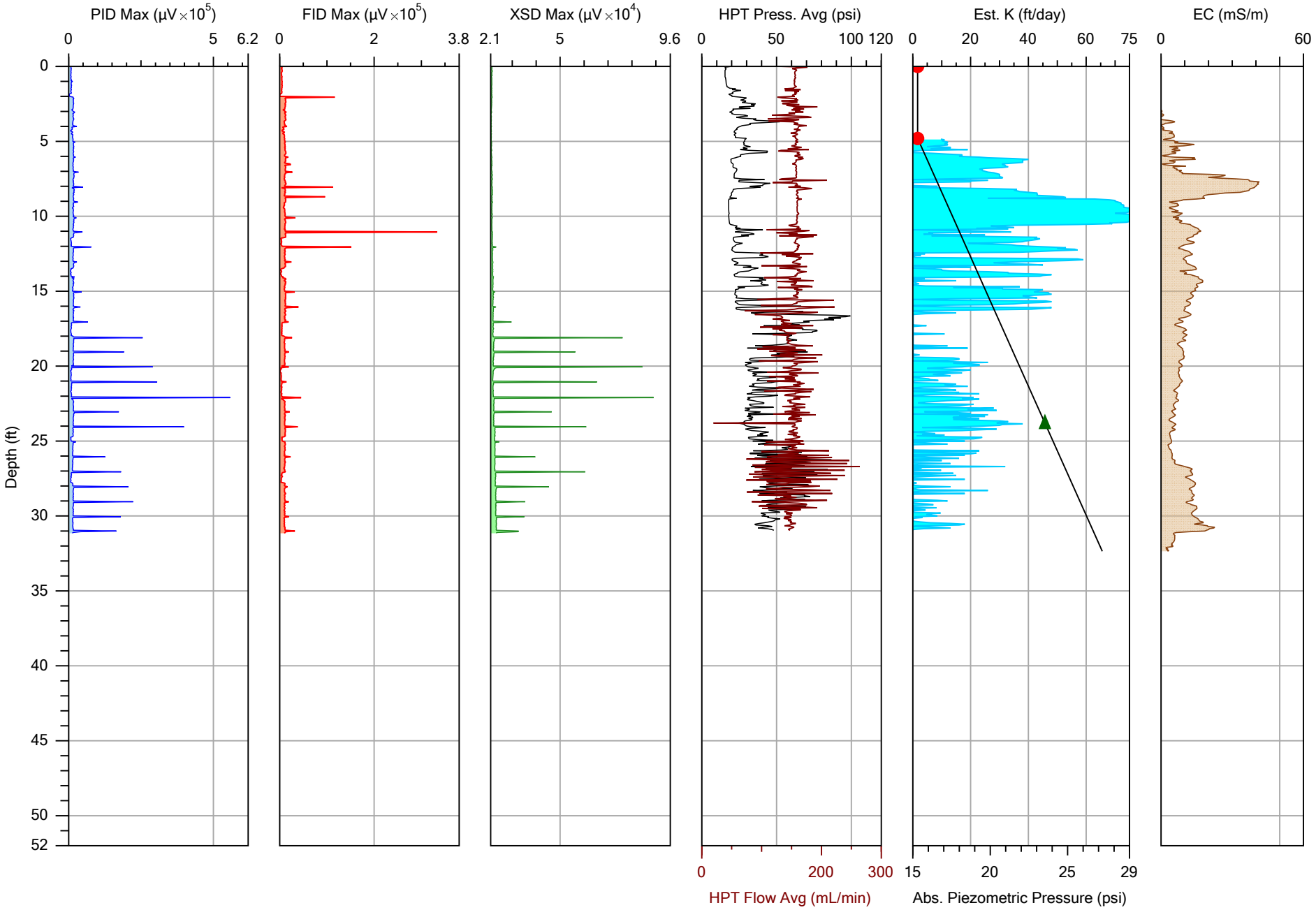
COLUMBIA TECHNOLOGIES

		File: MIP-05.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/13/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



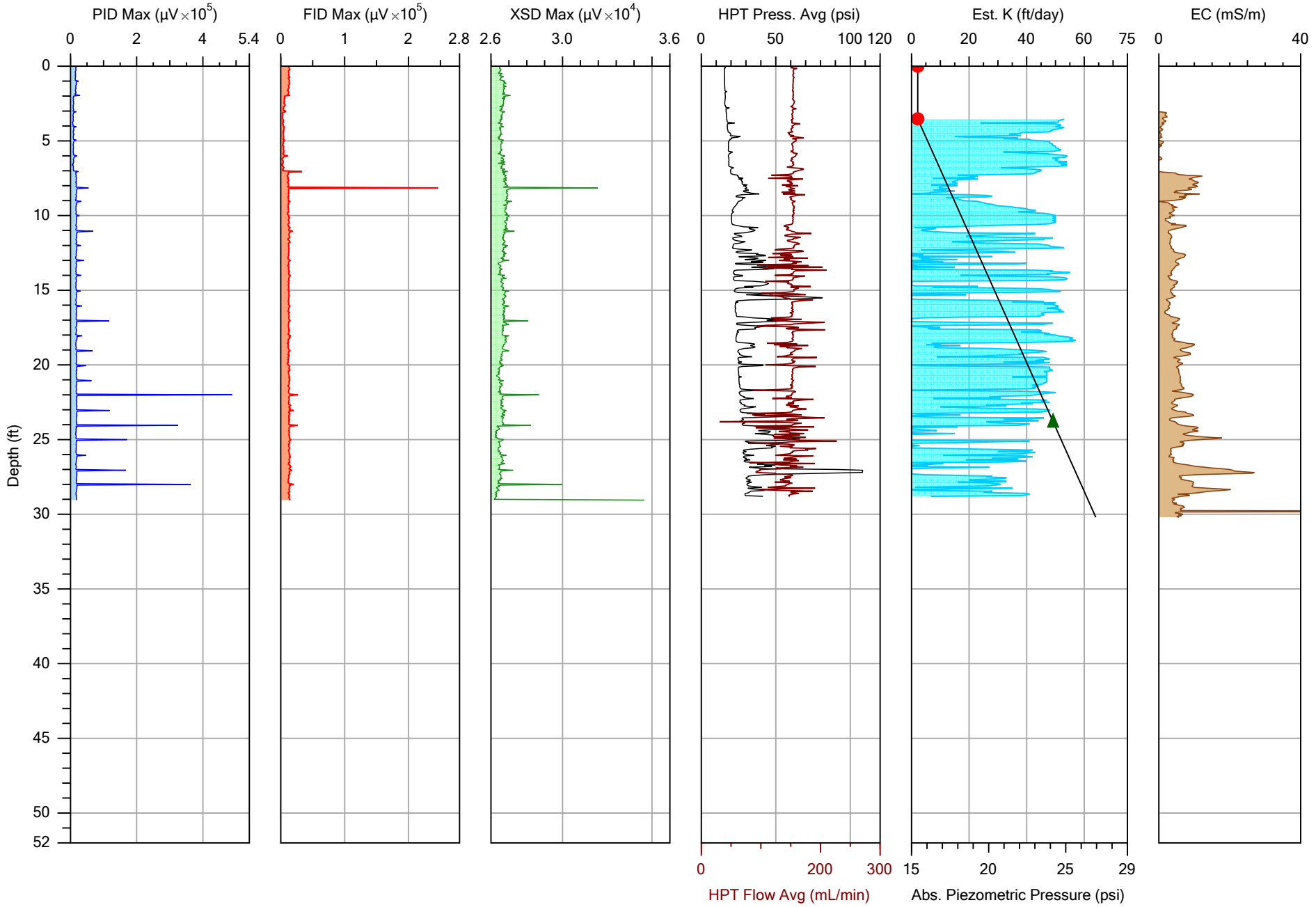
COLUMBIA TECHNOLOGIES

		File: MIP-06.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/13/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



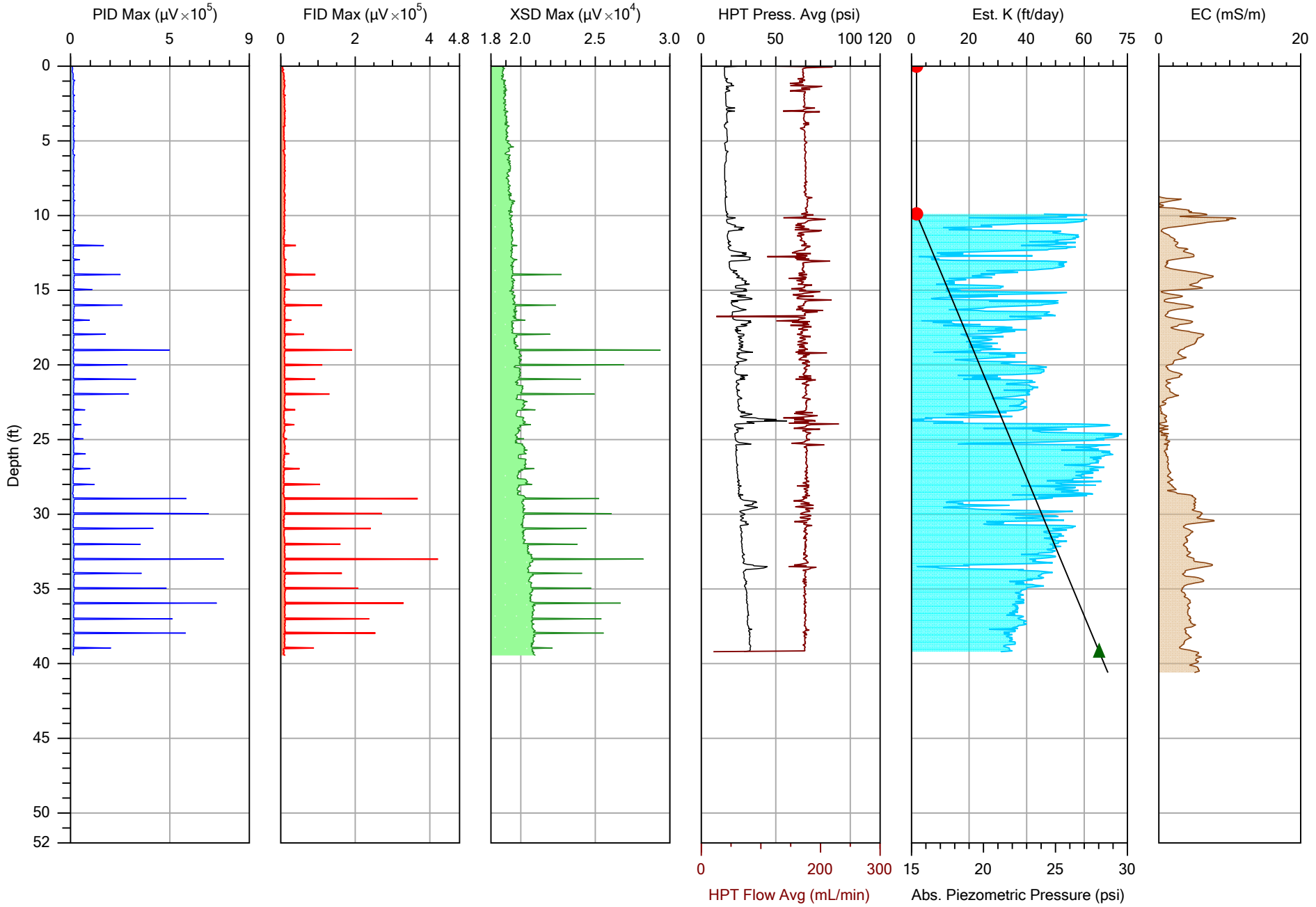
COLUMBIA TECHNOLOGIES

		File: MIP-13.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/18/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



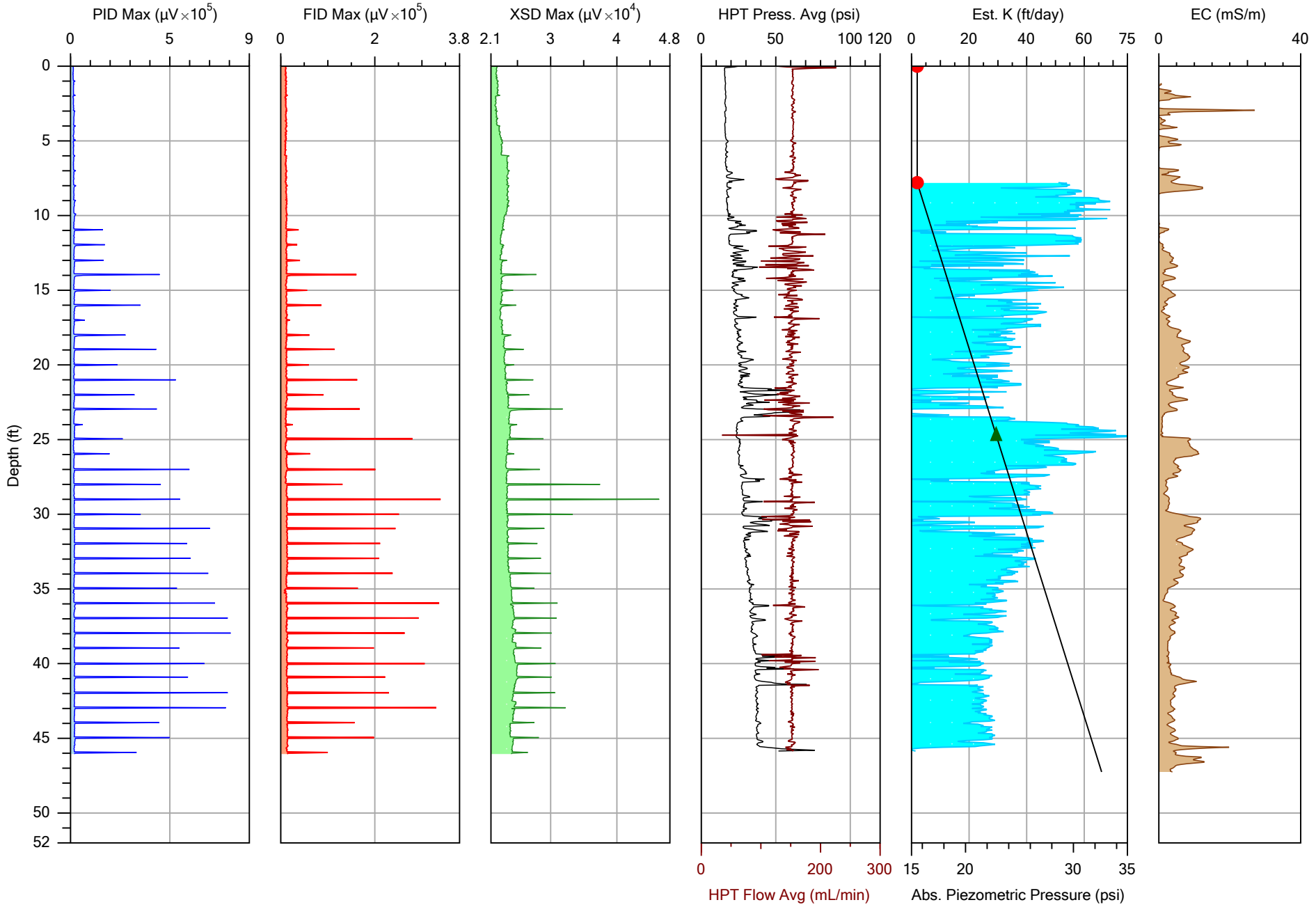
COLUMBIA TECHNOLOGIES

		File: MIP-14.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/18/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



COLUMBIA TECHNOLOGIES

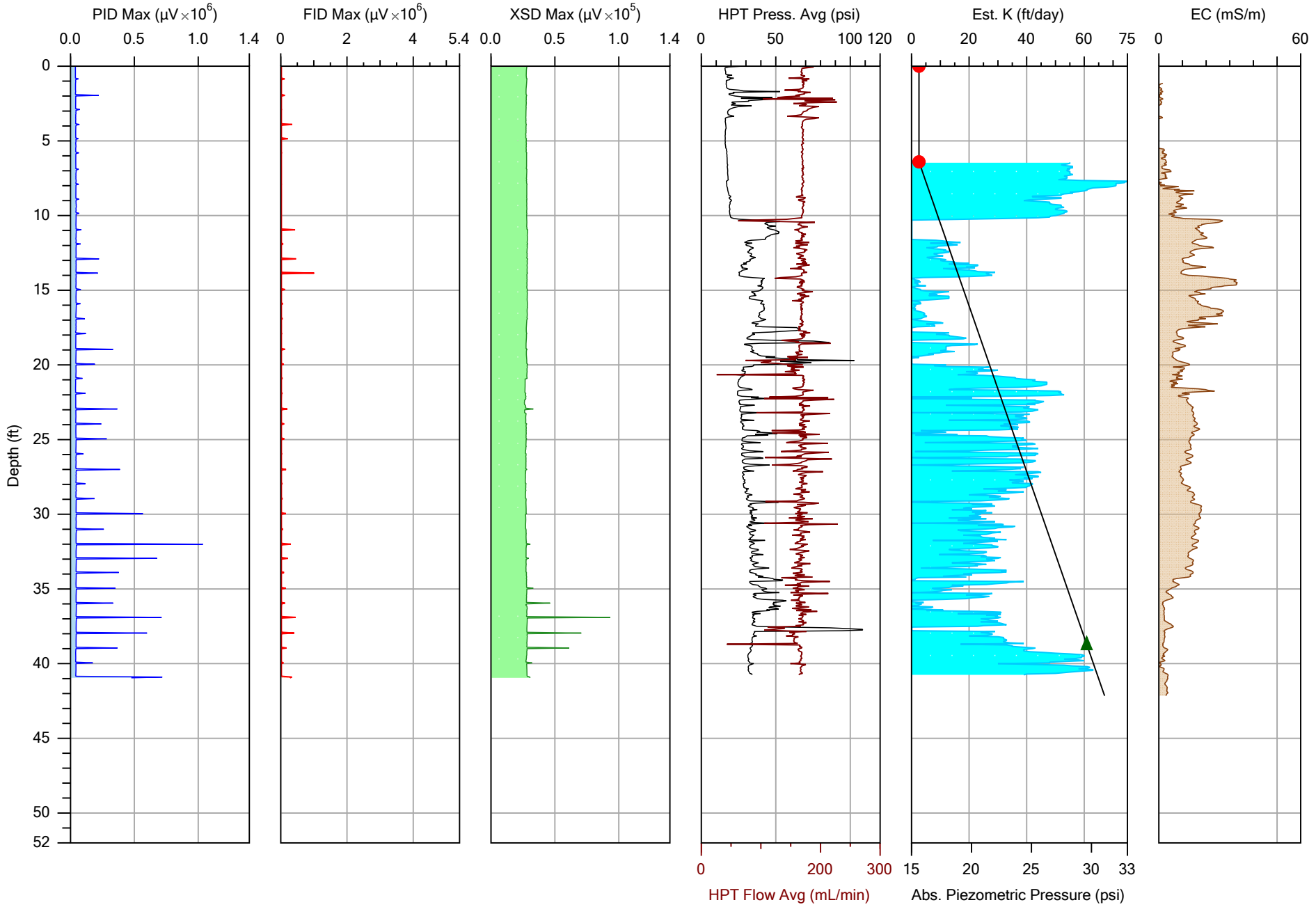
		File: MIP-15.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/19/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



COLUMBIA TECHNOLOGIES

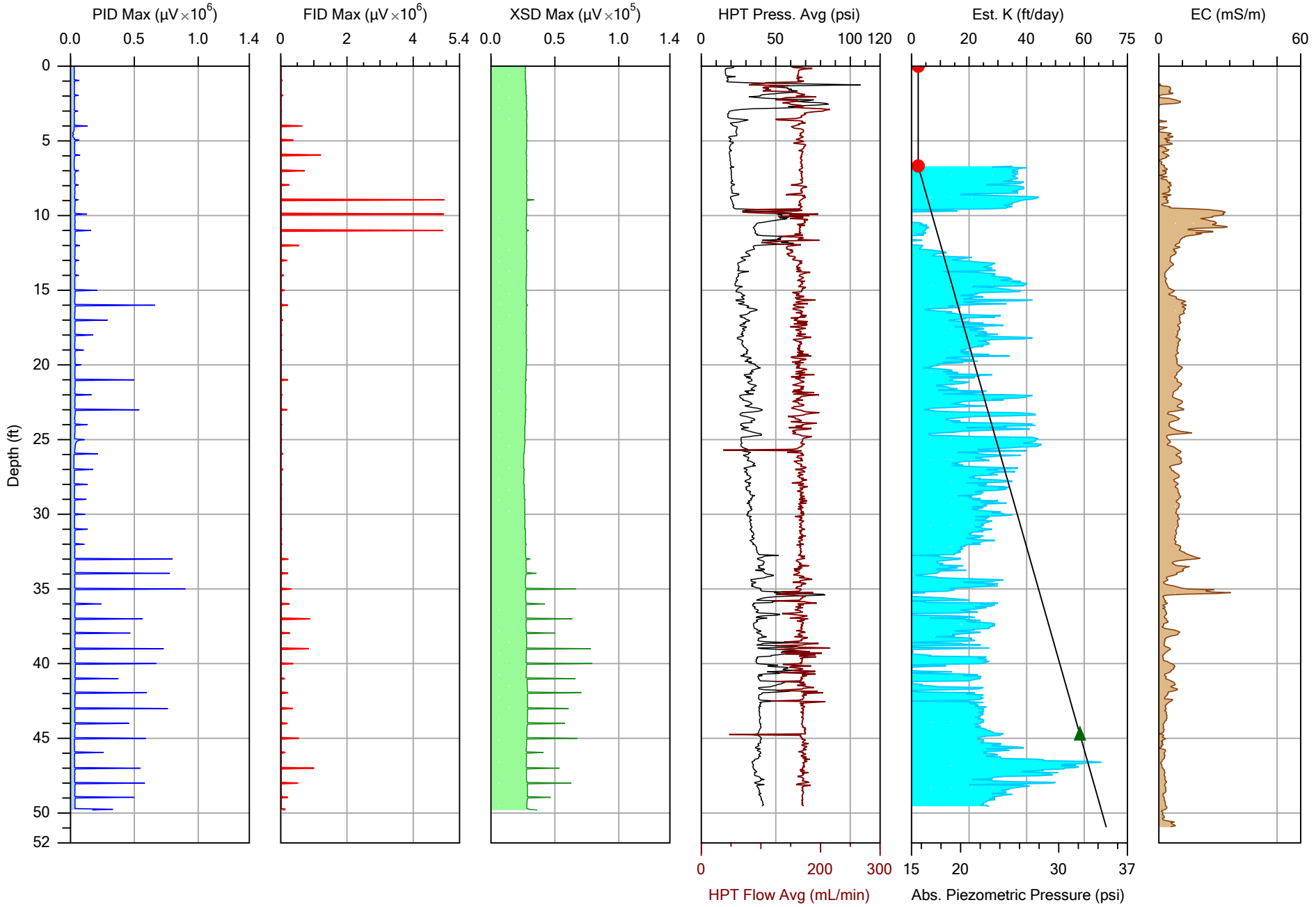
		File: MIP-16.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/19/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA

APPENDIX G – Data Logs for Low-Level Membrane Interface Probe/EC with Hydraulic Profiling Tool (LL-MiHpt) - Collective Scale



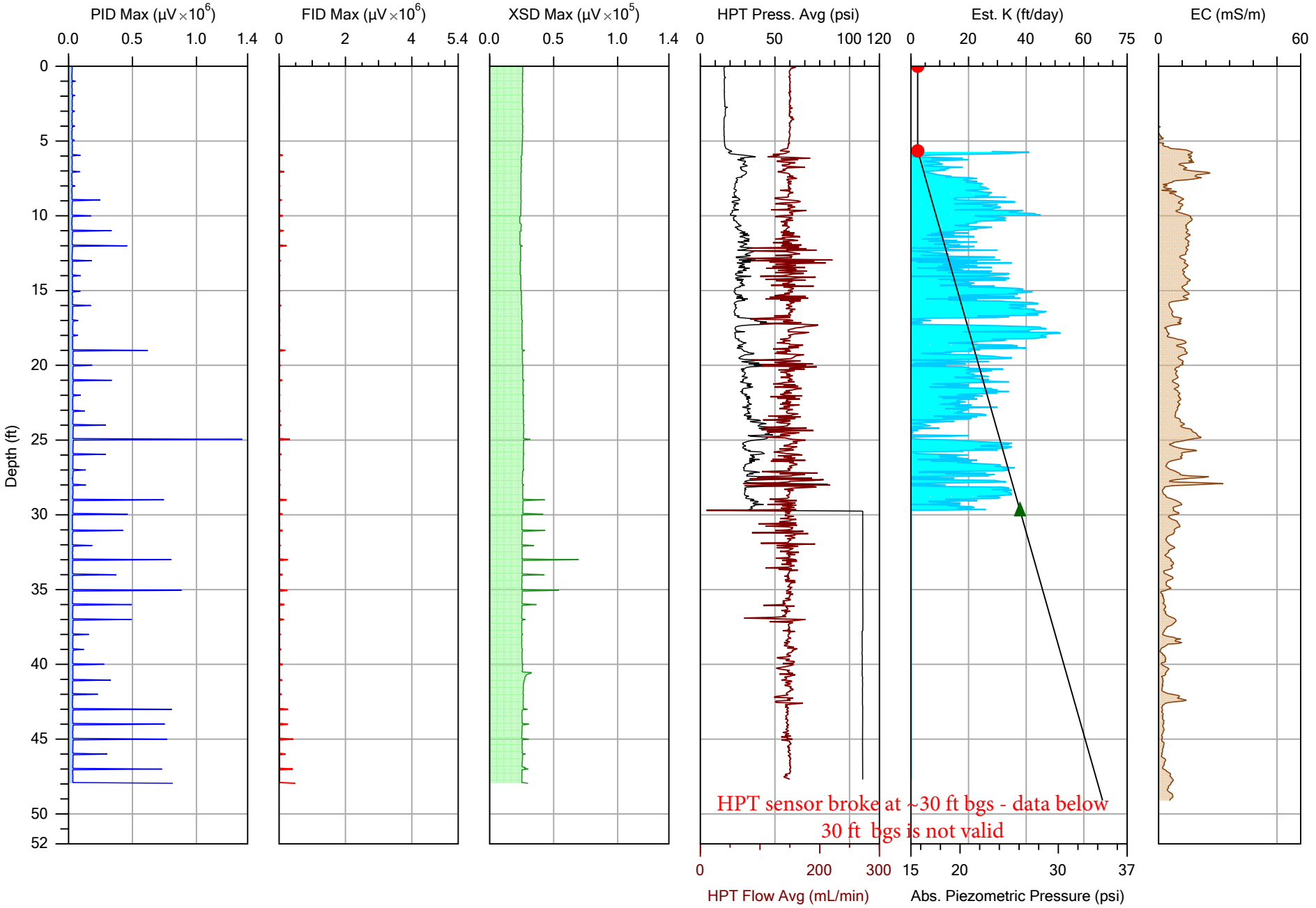
COLUMBIA TECHNOLOGIES

		File: MIP-01.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/12/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



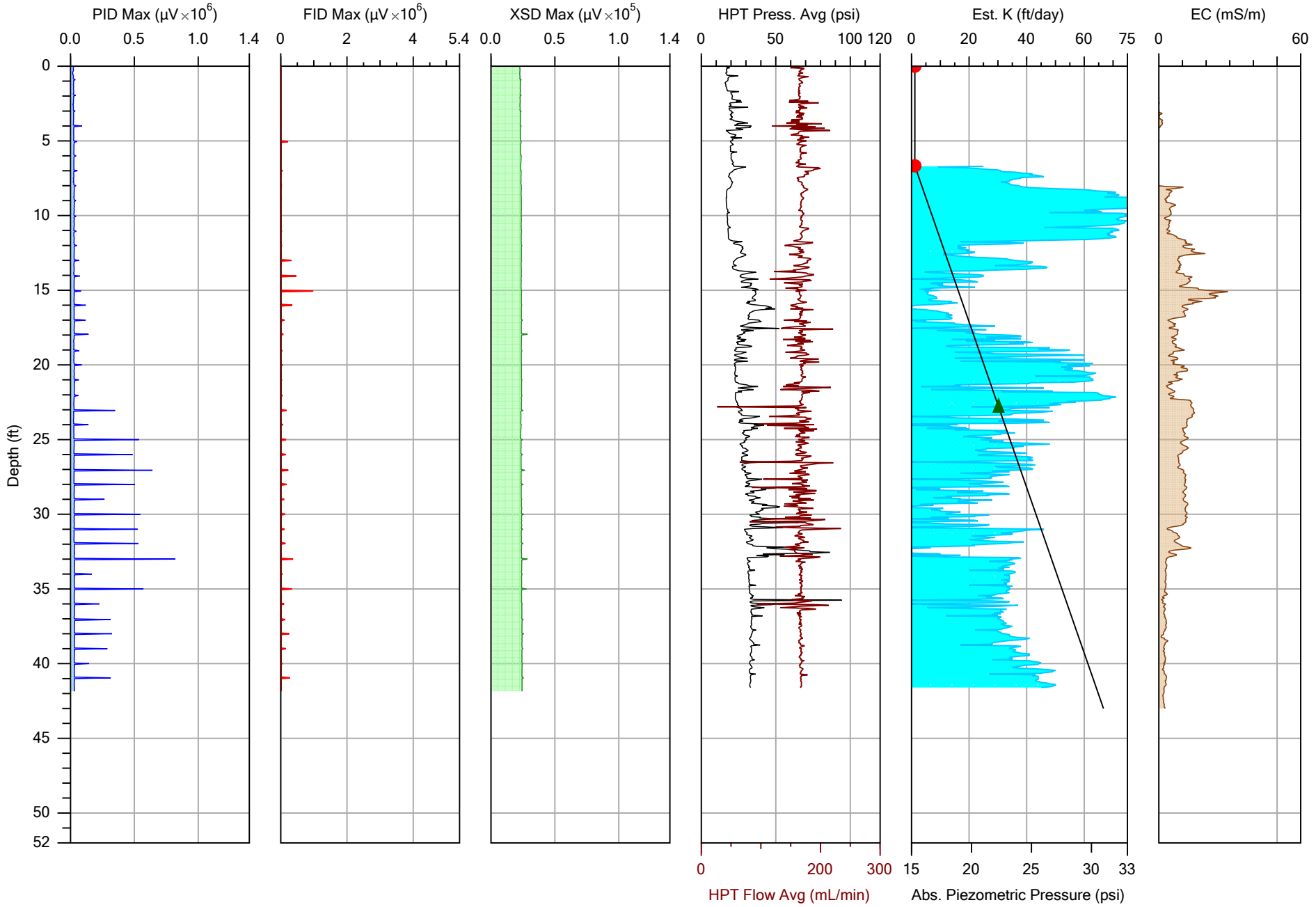
COLUMBIA TECHNOLOGIES

		File: MIP-02.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/12/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



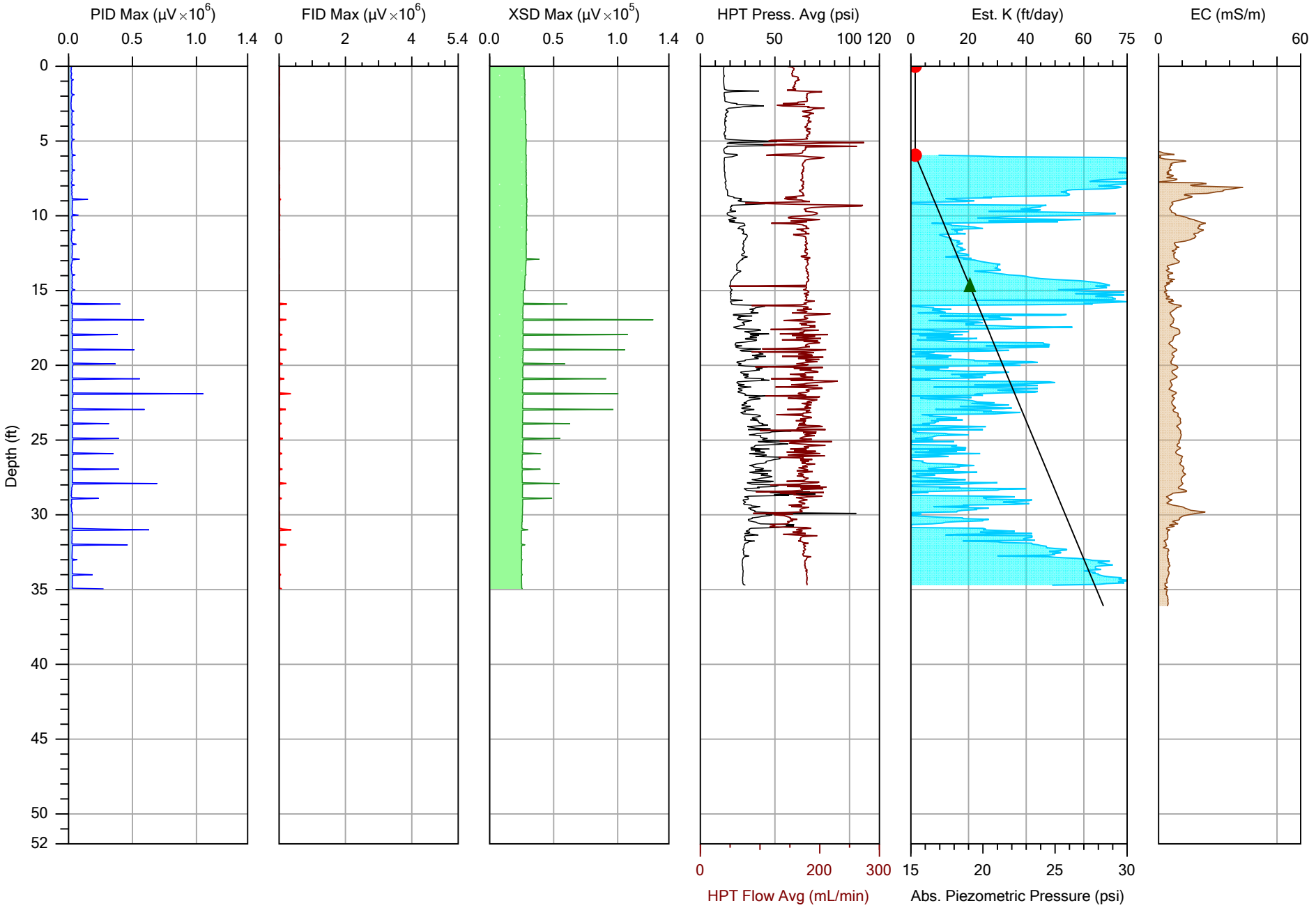
COLUMBIA TECHNOLOGIES

		File: MIP-03.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/12/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



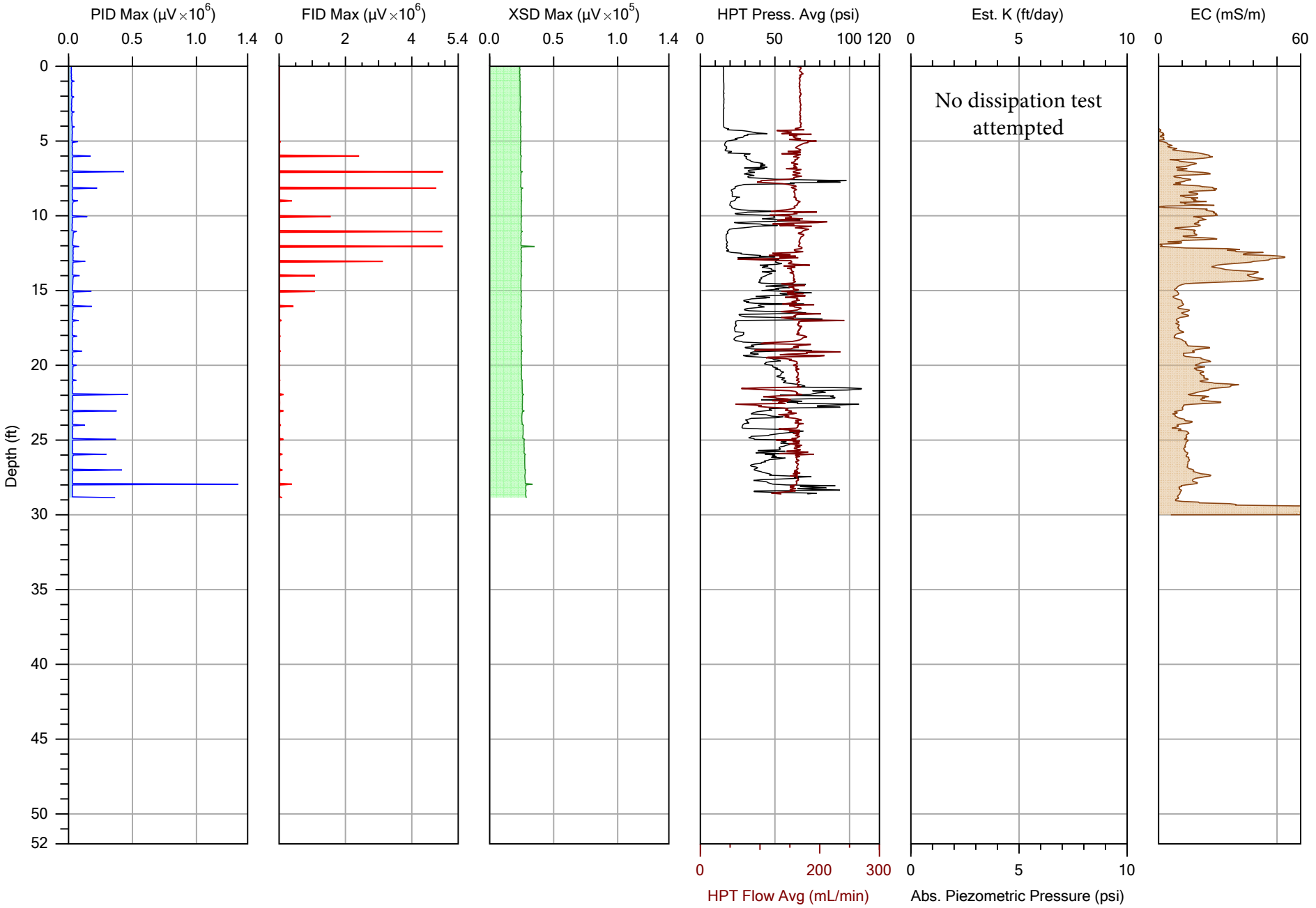
COLUMBIA TECHNOLOGIES

		File: MIP-04.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/13/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



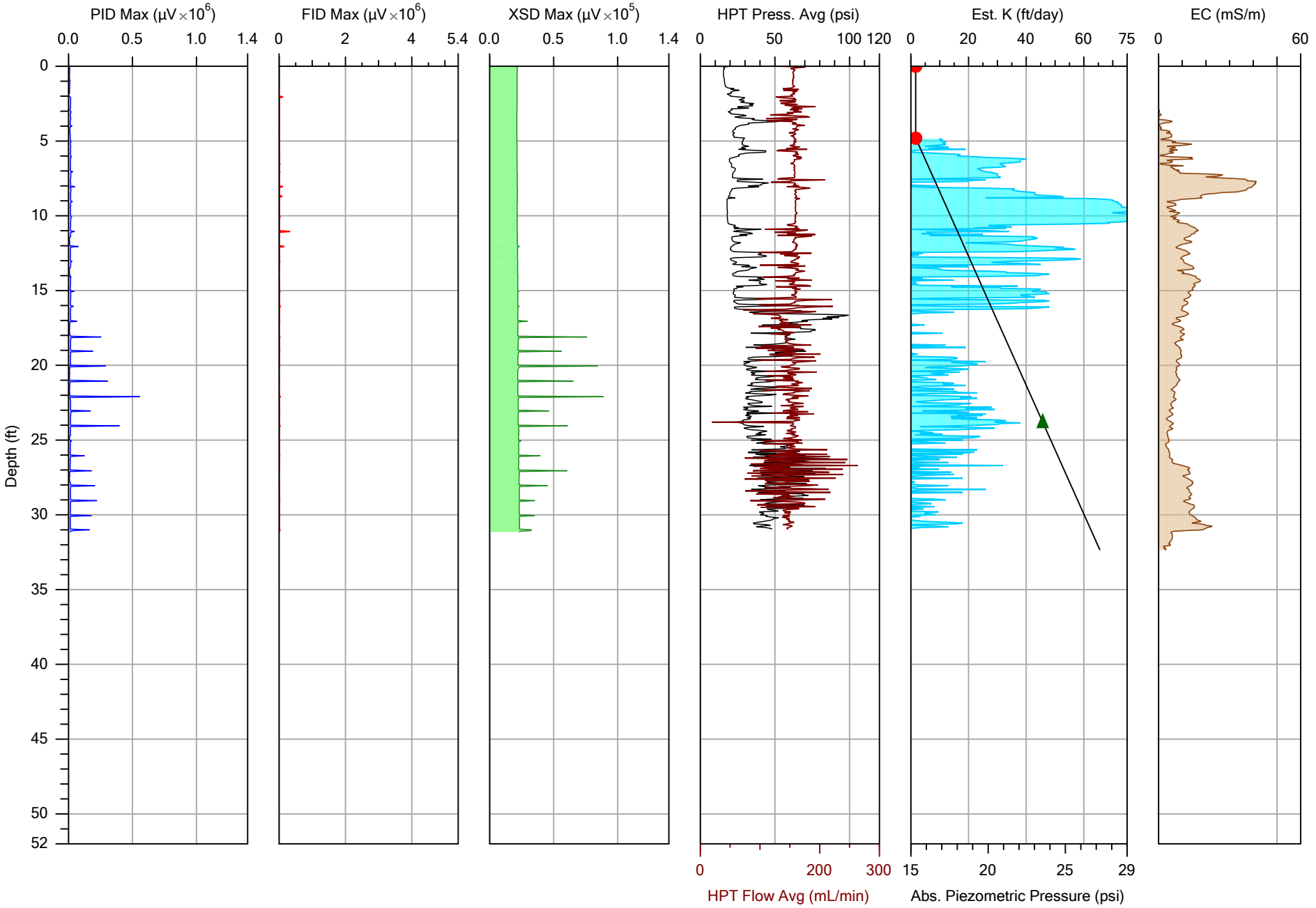
COLUMBIA TECHNOLOGIES

		File: MIP-05.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/13/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



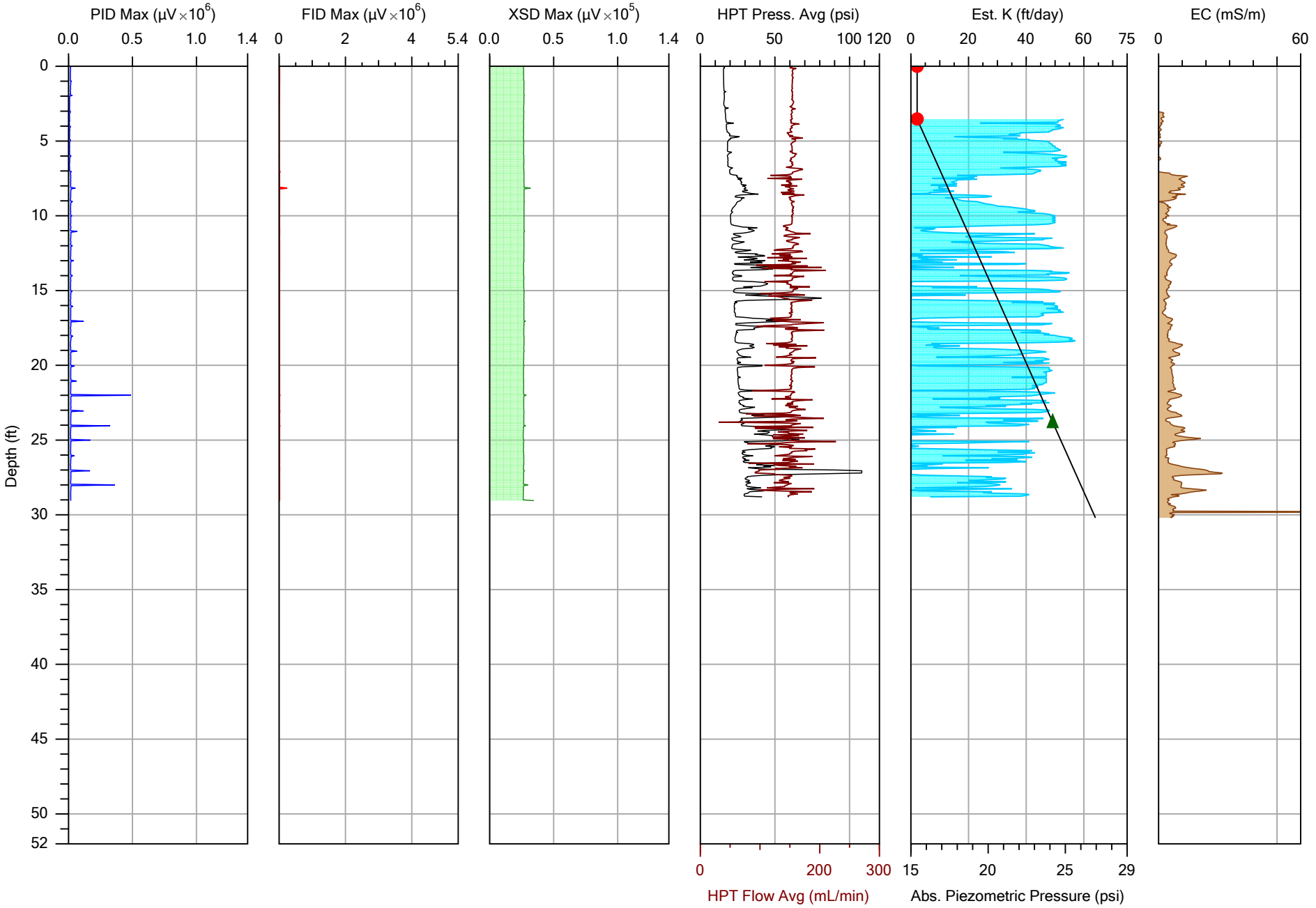
COLUMBIA TECHNOLOGIES

		File: MIP-06.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/13/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



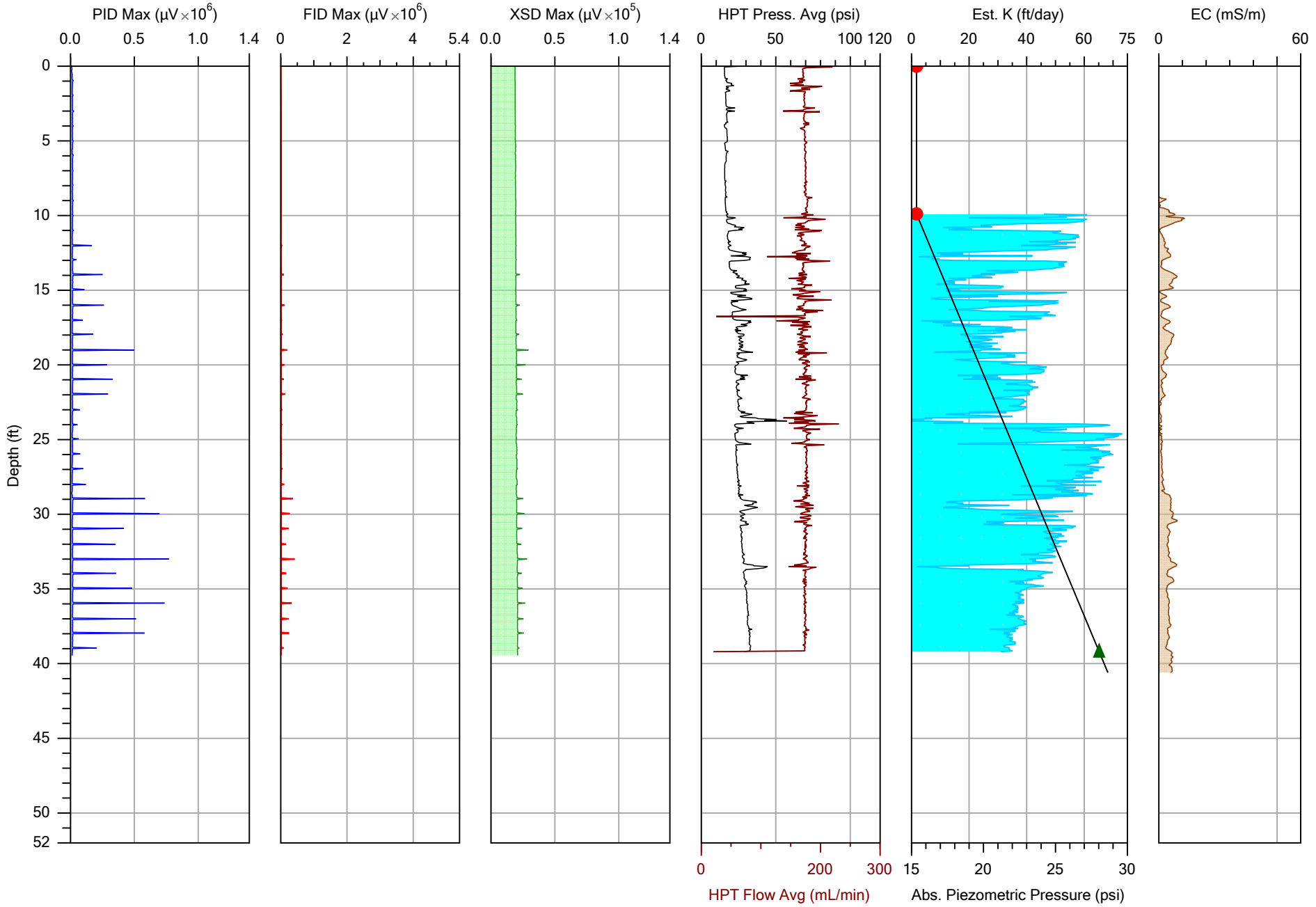
COLUMBIA TECHNOLOGIES

		File: MIP-13.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/18/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



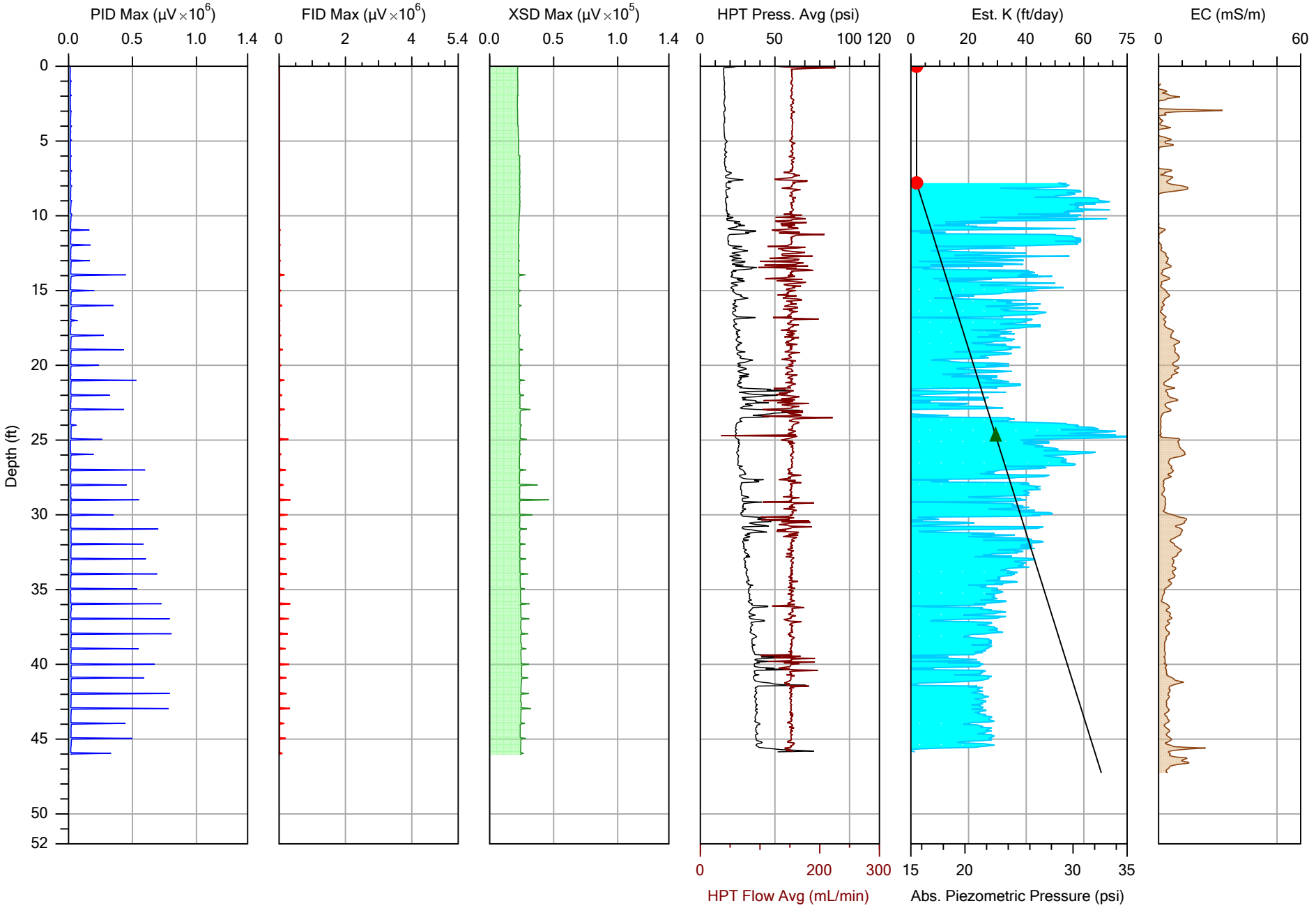
COLUMBIA TECHNOLOGIES

		File: MIP-14.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/18/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



COLUMBIA TECHNOLOGIES

		File: MIP-15.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/19/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA



COLUMBIA TECHNOLOGIES

		File: MIP-16.MHP
Company: COLUMBIA Technologies	Operator: RSP	Date: 3/19/2020
Project ID: Ultra Custom Care Cleaners	Client: Floyd Snider	Location: Bothell, WA

Attachment 4
Well Construction Logs

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-28D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **North parking lot of WA Federal Building**	ECOLOGY WELL ID: **BMP 286**
DRILLED BY: **Holt- Abe**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280502.2**	EASTING: **1302618.3**
DRILLING EQUIPMENT: **B-57 Mobile**	SCREENED INTERVAL: **40-50 ft bgs**	GROUND SURFACE ELEV.: **54.00**	TOC ELEVATION: **53.74**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **50.75**	DEPTH TO WATER (ft bgs): **22.35**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **7/1/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Asphalt	Asphalt ground surface					Protective Cover
	SM	Brown **SILTY SAND** with gravel, fine to coarse sand with fine to coarse rounded gravel; moist.					Concrete
4		No Recovery		29			Bentonite Chips
8	GM	Brown **GRAVEL** with sand and silt, fine to coarse subrounded gravel with fine to coarse sand; medium dense; moist.		29	0.0		
12							
16	ML	Brown **SANDY SILT**; stiff; moist.		10	0.0		
20							

ABBREVIATIONS:
ft bgs = feet below ground surface USCS = Unified Soil Classification System
ppm = parts per million ▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-28D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **North parking lot of WA Federal Building**	ECOLOGY WELL ID: **BMP 286**
DRILLED BY: **Holt- Abe**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280502.2**	EASTING: **1302618.3**
DRILLING EQUIPMENT: **B-57 Mobile**	SCREENED INTERVAL: **40-50 ft bgs**	GROUND SURFACE ELEV.: **54.00**	TOC ELEVATION: **53.74**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **50.75**	DEPTH TO WATER (ft bgs): **22.35**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **7/1/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
	SM	Brown **SILTY SAND**; medium dense; wet.		16	0.0		
24				26	0.0		2" Sch. 40 PVC
28				32	0.0		
32							
36		Brown **SAND**; dense; wet.		41	0.0	UCCMW-28 D-35.5-36.5 @ 1000	
40		Brown **SAND**; very dense; wet.					

ABBREVIATIONS:
ft bgs = feet below ground surface USCS = Unified Soil Classification System
ppm = parts per million ▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-28D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **North parking lot of WA Federal Building**	ECOLOGY WELL ID: **BMP 286**
DRILLED BY: **Holt- Abe**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280502.2**	EASTING: **1302618.3**
DRILLING EQUIPMENT: **B-57 Mobile**	SCREENED INTERVAL: **40-50 ft bgs**	GROUND SURFACE ELEV.: **54.00**	TOC ELEVATION: **53.74**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **50.75**	DEPTH TO WATER (ft bgs): **22.35**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **7/1/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
	SP			83	0.0		
44							#12/20 Monteray Sand
							0.010 inch slot screen
		Gray **SILTY SAND** with gravel; very dense; wet.		67			
48	SM						
	Till	Gray, diamict-like texure **TILL**; very dense; moist.		50/3			
		Refusal at 50.75-feet bgs.					

ABBREVIATIONS:
ft bgs = feet below ground surface USCS = Unified Soil Classification System
ppm = parts per million ▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-29**	
LOGGED BY: **P. Osterhout**	BORING LOCATION: **East parking area of Ranch Drive In**	ECOLOGY WELL ID: **BMP 277**	
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280407.9**	EASTING: **1302559.7**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **5-15 ft bgs**	GROUND SURFACE ELEV.: **41.79**	TOC ELEVATION: **41.49**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **15**	DEPTH TO WATER (ft bgs): **<8**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/24/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Asphalt	Asphalt ground surface					Protective Cover
1		No SPTs performed except at 8.5-feet bgs. See UCCMW-29D for soil descriptions.					Concrete
2							
3							2" Sch. 40 PVC
4							Bentonite Chips
5							
6							
7							
8							
9	SM	Tan/brown very fine to fine **SAND** with silt; some coppery laminations in the fine sand; moist to wet; no odor.		9	0.2	UCCMW-29 -8.5-9.5 @ 0825	#12/20 Monteray Sand
10		No sample collected; refer to UCCMW-29D					0.010 inch slot screen
11							
12							
13							
14							
15		Bottom of boring = 15-feet bgs.					

ABBREVIATIONS:
ft bgs = feet below ground surface USCS = Unified Soil Classification System
ppm = parts per million ▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-29D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **East parking area of Ranch Drive In**	ECOLOGY WELL ID: **BMP 276**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280411.2**	EASTING: **1302563.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **34-44 ft bgs**	GROUND SURFACE ELEV.: **41.94**	TOC ELEVATION: **41.59**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **44**	DEPTH TO WATER (ft bgs): **7**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/23/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID
0	Asphalt	Asphalt ground surface				
	SW	Brown, well-graded **SAND** with rounded to subangular gravel; loose; dry.		14	0.0	
4	GW	Dark brown **SANDY GRAVEL** fine to coarse sands and gravels, trace fines; moist to wet; no odor.		29	0.0	
		Large gravel in shoe.				
8	SM	Coppery brown **SILTY SAND**; firm; wet; no odor.		13	1.1	
		Becomes light brown.		24	0.3	
12		Saturated.				
	SP	Coarse sand lense at 13-feet bgs.		8	0.4	
	SM					
	SM-SP	Brown, fine to coarse **SAND** with variable silt. Fines lessen with depth. Saturated; no odor.		23	0.5 0.4	
16						
		Brown **SAND**; coarse sand grades downward to fine sand with trace silt; saturated; no odor.		39	0.3	
20					0.4	

Well Construction: Protective Cover; Concrete; 2" Sch. 40 PVC

ABBREVIATIONS:
ft bgs = feet below ground surface USCS = Unified Soil Classification System
ppm = parts per million ▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-29D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **East parking area of Ranch Drive In**	ECOLOGY WELL ID: **BMP 276**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280411.2**	EASTING: **1302563.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **34-44 ft bgs**	GROUND SURFACE ELEV.: **41.94**	TOC ELEVATION: **41.59**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **44**	DEPTH TO WATER (ft bgs): **7**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/23/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
	SP	Brown, medium **SAND** trace fines; saturated; no odor.		26	0.5		Bentonite Chips
	SP	Grades to fine **SAND** with trace silt; wet; no odor.		28	0.4		
24	SP			28	0.5		
	SP	Fine to medium **SAND**.		34	0.5		
28	SM	Fine **silty SAND**; wet; no odor.		40	0.4		
32	SW	Brown **SAND** becomes well-graded fine to coarse sand with sub-rounded gravel and interbedded coarse lenses and copper-colored oxidixed lenses. Wet; no odor.		40	0.5		
	SP	Brown, medium **SAND** trace gravel and silt; no odor.			0.6		
	SW	Gray lens of coarse **SAND** with gravel; wet; no odor.		48			
36	SP	Brown, fine **SAND**.			0.4		#12/20 Monteray Sand
	SW	Gray **GRAVELLY SAND**; wet; no odor. 2" gravel in shoe.		50/6			0.010 inch slot screen
40		Gray **GRAVELLY to SILTY SAND** saturated; no odor.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**		LOCATION: **Bothell, WA**	WELL ID: **UCCMW-29D**
LOGGED BY: **P. Osterhout**		BORING LOCATION: **East parking area of Ranch Drive In**	ECOLOGY WELL ID: **BMP 276**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280411.2**	EASTING: **1302563.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **34-44 ft bgs**	GROUND SURFACE ELEV.: **41.94**	TOC ELEVATION: **41.59**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **44**	DEPTH TO WATER (ft bgs): **7**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/23/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
	SW-SM	Becomes very dense; moist to dry (TILL).		50/6	0.5		
				50/1	0.1	UCCMW-29 -42.5-43 @1205	
44		Bottom of boring = 44-feet bgs.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-30D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **South parking lot of WA Federal Building**	ECOLOGY WELL ID: **BMP 280**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280286.1**	EASTING: **1302639.8**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **26-36 ft bgs**	GROUND SURFACE ELEV.: **43.79**	TOC ELEVATION: **43.42**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **40**	DEPTH TO WATER (ft bgs): **<10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/25-6/26/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Concrete	Concrete ground surface.					Protective Cover; Concrete
6	SW	Brown to gray medium **SAND** with fine to coarse gravel; loose, dry; no odor (FILL).		20	0.4		
10		Wet		34	0.2		2" Sch. 40 PVC
16		Brown very fine **SILTY SAND** with few copper-colored laminae; wet; no odor.		12	0.5		Bentonite Chips
20					0.3		

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-30D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **South parking lot of WA Federal Building**	ECOLOGY WELL ID: **BMP 280**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280286.1**	EASTING: **1302639.8**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **26-36 ft bgs**	GROUND SURFACE ELEV.: **43.79**	TOC ELEVATION: **43.42**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **40**	DEPTH TO WATER (ft bgs): **<10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/25-6/26/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID
22	SM	Brown fine **SILTY SAND**; wet; no odor.		25	0.4	
24						
26				11	0.3	
28		Brown fine **SILTY SAND**; wet; no odor.				
	SP	Fine **SAND** seam, no silt.				
		Brown fine **SILTY SAND**; wet; no odor.		15	0.5	UCCMW-30 D-28.5-29.5 @ 1605
30						
32						
34	SM					
36		Brown fine to very fine **SAND** with 10% silt; wet; no odor.		40	0.4	UCCMW-30 D-35-36 @1645
38						
40		Bottom of boring = 40-feet bgs.				

Well Construction:
- #12/20 Monteray Sand
- 0.010 inch slot screen
- Hole collapse

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-31D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **Northeast corner of Lot E,F,G**	ECOLOGY WELL ID: **BMP 278**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280201.1**	EASTING: **1302562.1**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **18-28 ft bgs**	GROUND SURFACE ELEV.: **39.28**	TOC ELEVATION: **39.08**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **36.5**	DEPTH TO WATER (ft bgs): **>10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/24/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Fill	Gravel ground surface.					Protective Cover; Concrete
6	SW	Brown **GRAVELLY SAND**; moist; no odor [FILL].		19	0.3		
10		Brown fine **SAND** with trace to 10% silt; moist; no odor.		18	0.3	UCCMW-31 D-10-10.5 @ 1105	2" Sch. 40 PVC; Bentonite Chips
16		Gray to brown medium **SAND** with lenses of fine sand; trace to 10% silt; trace gravel; wet; no odor.		18	0.3		
18	SM-SP					UCCMW-31 D-20-21 @ 1135	
20							

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-31D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **Northeast corner of Lot E,F,G**	ECOLOGY WELL ID: **BMP 278**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280201.1**	EASTING: **1302562.1**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **18-28 ft bgs**	GROUND SURFACE ELEV.: **39.28**	TOC ELEVATION: **39.08**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **36.5**	DEPTH TO WATER (ft bgs): **>10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/24/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
22		Tan/brown fine **SAND** trace to 10% silt; wet; no odor.		12	0.4	UCCMW-31 D-20-21 @ 1135	#12/20 Monteray Sand
24		Brown fine **SAND** with trace to 10% silt; wet; no odor.					0.010 inch slot screen
26		Becomes medium **SAND** with copper-colored oxidation.		30	0.4		
28							
30	SM	Brown **SILTY SAND**; saturated; no odor. Laminae of copper-colored oxidation and medium sand.		17	0.4		
32							
34							
36	SW	Brown **SILTY SAND**; saturated; no odor. Laminae of copper-colored oxidation and medium sand. Gravelly sand lense.		34	0.4		
	SP	Fine to medium **SAND**; wet; no odor. Bottom of boring = 36.5-feet bgs.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-32**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **East frontage road on corner of Bothell Way NE and Main St**	ECOLOGY WELL ID: **BMP 283**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280151.2**	EASTING: **1302449.8**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **15-25 ft bgs**	GROUND SURFACE ELEV.: **38.66**	TOC ELEVATION: **38.25**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **25**	DEPTH TO WATER (ft bgs): **7.5**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/29/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Asphalt	Asphalt ground surface No SPTs performed except at 17-feet bgs. See UCCMW-32D for soil descriptions.					Protective Cover Concrete
8							Bentonite Chips 2" Sch. 40 PVC
16	SM	Brown-gray fine **SILTY SAND**, medium dense; wet.		17		UCCMW-32 -17.5-18.5 @ 1410	#12/20 Monteray Sand 0.010 inch slot screen

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-32**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **East frontage road on corner of Bothell Way NE and Main St**	ECOLOGY WELL ID: **BMP 283**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280151.2**	EASTING: **1302449.8**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **15-25 ft bgs**	GROUND SURFACE ELEV.: **38.66**	TOC ELEVATION: **38.25**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **25**	DEPTH TO WATER (ft bgs): **7.5**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/29/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
22							
24		Bottom of boring = 25-feet bgs.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-32D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **East frontage road on corner of Bothell Way NE and Main St**	ECOLOGY WELL ID: **BMP 282**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280148.0**	EASTING: **1302449.5**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **30-40 ft bgs**	GROUND SURFACE ELEV.: **38.52**	TOC ELEVATION: **38.21**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **40**	DEPTH TO WATER (ft bgs): **7.5**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/29/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Asphalt	Asphalt ground surface					Protective Cover
2							Concrete
4							
6	SW-SM	Brown **SILTY SAND with GRAVEL**, fine to coarse and with fine, subangular gravel; medium dense; moist.		21	0.0		
8							
10	ML	Gray **CLAYEY SILT**, soft; trace fine sand; orange staining/mottling; moist.		4	0.0		
12							
14							
16	SW-SM	Brown **SILTY SAND with GRAVEL**, fine to coarse and with fine, subangular gravel; very dense; wet.		57	0.0		2" Sch. 40 PVC
18							Bentonite Chips
20							

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-32D**	
LOGGED BY: **M. Jusayan**	BORING LOCATION: **East frontage road on corner of Bothell Way NE and Main St**	ECOLOGY WELL ID: **BMP 282**	
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280148.0**	EASTING: **1302449.5**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **30-40 ft bgs**	GROUND SURFACE ELEV.: **38.52**	TOC ELEVATION: **38.21**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **40**	DEPTH TO WATER (ft bgs): **7.5**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/29/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID
		No Recovery		75		
22						
24						
26	ML	Gray fine **SANDY SILT** medium stiff; wet.		14	0.0	UCCMW-32 D-25.5-26.5 @ 0950
28						
30	SM	Brown-gray fine **SILTY SAND**, medium dense; wet.		48	0.0	
32	SP	Gray **SAND**, medium dense with trace silt and trace rounded gravels; wet.		44	0.0	
34						
36		Same as above; very dense		88/1	0.0	
38	SM	Gray **SAND with SILT**; very dense; wet.		72	0.0	
40		Bottom of boring = 40-feet bgs.		65		UCCMW-32 D-39-40 @ 1030

Well Construction: #12/20 Monteray Sand; 0.010 inch slot screen

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-33D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **Southwest corner of Lot E,F,G**	ECOLOGY WELL ID: **BMP 279**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280051.7**	EASTING: **1302524.7**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **49-59 ft bgs**	GROUND SURFACE ELEV.: **38.37**	TOC ELEVATION: **38.13**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **59**	DEPTH TO WATER (ft bgs): **>10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/24-6/25/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Fill	Gravel ground surface.					Protective Cover; Concrete
4	SW	Anthropogenic wood; then brown **GRAVELLY SAND**, loose; moist to dry. [FILL]		7	3.4		
8							
▼	ML	Dark brown **SANDY SILT**, 5 to 10% organic debris (grases/roots); soft/non-plastic; moist to wet; no odor.		0	0.3		
12							
16							
20	ML-SW	Gray-brown interbedded **SANDY SILT** and medium **GRAVELLY SAND**; wet; no odor.		29	0.3 0.4		

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-33D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **Southwest corner of Lot E,F,G**	ECOLOGY WELL ID: **BMP 279**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280051.7**	EASTING: **1302524.7**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **49-59 ft bgs**	GROUND SURFACE ELEV.: **38.37**	TOC ELEVATION: **38.13**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **59**	DEPTH TO WATER (ft bgs): **>10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/24-6/25/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
24	SM	Light brown very fine **SILTY SAND**, firm; wet; no odor.		19	0.5	UCCMW-33 D-23-24 @ 1645	2" Sch. 40 PVC
28							Bentonite Chips
32	SP	Brown fine to medium **SAND** with trace silt and trace gravel; wet; no odor.		48	0.4		
36		Brown interbedded medium **SAND** and fine **SILTY SAND**, trace grave; wet; no odor.		60	0.2	UCCMW-33 D-36.5-37.5 @ 0830	
40		Same as above.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-33D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **Southwest corner of Lot E,F,G**	ECOLOGY WELL ID: **BMP 279**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280051.7**	EASTING: **1302524.7**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **49-59 ft bgs**	GROUND SURFACE ELEV.: **38.37**	TOC ELEVATION: **38.13**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **59**	DEPTH TO WATER (ft bgs): **>10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/24-6/25/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
	SM-SP			80	0.3		
44		Gray-brown fine **SAND** to **SILTY SAND**; wet; no odor. Fines increase with depth.		61	0.3		
48							
		Gray-brown fine **SAND**; wet; no odor.		70/11	0.3		
52	SP						#12/20 Monteray Sand
							0.010 inch slot screen
		Brown fine **SAND**; wet; no odor.		50/5	0.4		
56		Becomes gray.					
	SW	Gray **GRAVELLY SAND**; very dense.					
	Till	Driller noted very hard drilling and recovered dark gray gravelly diamict off of bottom of auger flight.					
		Bottom of boring = 59-feet bgs.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-34D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **East/Middle of Lot E,F,G**	ECOLOGY WELL ID: **BMP 281**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280087.8**	EASTING: **1302638.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **35-50 ft bgs**	GROUND SURFACE ELEV.: **36.98**	TOC ELEVATION: **36.73**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **61.5**	DEPTH TO WATER (ft bgs): **4**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/26/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Fill	Gravel ground surface.					Protective Cover; Concrete
4 ▼	SW-SM	Brown **GRAVELLY SAND** with silt; wet; no odor (low recovery).		6			
8	Pt	Dark brown **PEAT**; wet; no odor.			0.4		
		Light brown **SILTY SAND**		26			
12		Coppery-colored fine **SAND** interbedded with light brown/tan very fine **SILTY SAND**; wet; no odor.		21	0.6		2" Sch. 40 PVC
16		Light brown/tan very fine **SILTY SAND**; wet; no odor.		9	0.2		
20							

ABBREVIATIONS:
ft bgs = feet below ground surface USCS = Unified Soil Classification System
ppm = parts per million ▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-34D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **East/Middle of Lot E,F,G**	ECOLOGY WELL ID: **BMP 281**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280087.8**	EASTING: **1302638.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **35-50 ft bgs**	GROUND SURFACE ELEV.: **36.98**	TOC ELEVATION: **36.73**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **61.5**	DEPTH TO WATER (ft bgs): **4**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/26/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
	SM						Bentonite Chips
24		Light brown fine **SILTY SAND** wet; no odor.		24	0.2		
28		Same as above Dark gray **SILTY SAND**; wet; no odor.		15	0.4	UCCMW-34 D-29.8-30.5	
32		Same as above					
	ML	Grades to gray **SANDY SILT** with clayey laminae.			0.2		
		Becomes brown, then grades to fine **SILTY SAND**; wet; no odor.		17			
36							
					0.4		
	SM	Light brown **SILTY SAND** with silt laminae; wet; no odor.					
40				18			

ABBREVIATIONS:
ft bgs = feet below ground surface USCS = Unified Soil Classification System
ppm = parts per million ▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-34D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **East/Middle of Lot E,F,G**	ECOLOGY WELL ID: **BMP 281**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280087.8**	EASTING: **1302638.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **35-50 ft bgs**	GROUND SURFACE ELEV.: **36.98**	TOC ELEVATION: **36.73**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **61.5**	DEPTH TO WATER (ft bgs): **4**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/26/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
44		Same as above			0.4		#12/20 Monteray Sand
	SP	Brown fine **SAND** with lense of gravelly sand at 45.75'; wet; no odor.		35	0.0		0.010 inch slot screen
48		Same as above with trace gravel		38	0.1		
	SW	Lense of medium to coarse **GRAVELLY SAND**					
52							
	SM	Brown fine **SAND to SILTY SAND**; wet; no odor.		82	0.1 0.0		
56							
60		Light brown to coppery-colored very fine to medium **SAND**.		50/5		UCCMW-34 D-60-61 @ 1505	

ABBREVIATIONS:
ft bgs = feet below ground surface USCS = Unified Soil Classification System
ppm = parts per million ▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-34D**
LOGGED BY: **P. Osterhout**	BORING LOCATION: **East/Middle of Lot E,F,G**	ECOLOGY WELL ID: **BMP 281**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280087.8**	EASTING: **1302638.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **35-50 ft bgs**	GROUND SURFACE ELEV.: **36.98**	TOC ELEVATION: **36.73**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **61.5**	DEPTH TO WATER (ft bgs): **4**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/26/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
	SW	Bottom of boring = 61.5-feet bgs.		50/5	0.0	UCCMW-34 D-60-61 @ 1505	

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-35D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **West frontage on Bothell Way NE south of Main St**	ECOLOGY WELL ID: **BMP 285**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280108.1**	EASTING: **1302358.2**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **30-40 ft bgs**	GROUND SURFACE ELEV.: **38.17**	TOC ELEVATION: **37.86**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **61.5**	DEPTH TO WATER (ft bgs): **8**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/30/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
0	Asphalt	Asphalt ground surface Drill chatter					Protective Cover Concrete
4	GP	Brown fine **SANDY GRAVEL** subangular; moist; very dense. [FILL].		77	0.0		
8 ▼		Drill chatter to 8'					
	Pt	Brown **PEAT** very soft; wet.		2	0.0		
12							
16		Gray **SILTY SAND**; medium dense; wet.		30	0.0		2" Sch. 40 PVC Bentonite Chips
20							

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-35D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **West frontage on Bothell Way NE south of Main St**	ECOLOGY WELL ID: **BMP 285**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280108.1**	EASTING: **1302358.2**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **30-40 ft bgs**	GROUND SURFACE ELEV.: **38.17**	TOC ELEVATION: **37.86**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **61.5**	DEPTH TO WATER (ft bgs): **8**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/30/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
		Brown poorly-graded **SAND with SILT**; very dense with orange mottling; wet.		50	0.0		
24		Same as above.		70	0.0		
28		Same as above.		56	0.0	UCCMW-35 D-30.5-31.5 @ 1415	
32		Same as above.		57	0.0		#12/20 Monteray Sand; 0.010 inch slot screen
36	SM						
40		Gray fine **SILTY SAND**; medium dense; wet.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-35D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **West frontage on Bothell Way NE south of Main St**	ECOLOGY WELL ID: **BMP 285**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280108.1**	EASTING: **1302358.2**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **30-40 ft bgs**	GROUND SURFACE ELEV.: **38.17**	TOC ELEVATION: **37.86**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **61.5**	DEPTH TO WATER (ft bgs): **8**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/30/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
				25			
44		Same as above.		39	0.0		
48		Same as above; very dense.		94/11	0.0		Hole collapse
52		Same as above.		86/10			
56							
60		Same as above.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT:	LOCATION:	WELL ID:
COB-Ultra	Bothell, WA	UCCMW-35D
LOGGED BY:	BORING LOCATION:	ECOLOGY WELL ID:
M. Jusayan	West frontage on Bothell Way NE south of Main St	BMP 285
DRILLED BY:	COORDINATE SYSTEM:	NORTHING:	EASTING:
Holt- John Bennett	WA State Plane NAD83 ft	280108.1	1302358.2
DRILLING EQUIPMENT:	SCREENED INTERVAL:	GROUND SURFACE ELEV.:	TOC ELEVATION:
CME-85	30-40 ft bgs	38.17	37.86
DRILLING METHOD:		TOTAL DEPTH (ft bgs):	DEPTH TO WATER (ft bgs):
Hollow Stem Auger		61.5	8
SAMPLING METHOD:		BORING DIAMETER:	DRILL DATE:
1.5" x 18" Split Spoon (SPT)		8.5"	6/30/2020

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
		Bottom of boring = 61.5-feet bgs.		86/11	0.0		

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-36D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **Parking lot in front of Speedy Glass**	ECOLOGY WELL ID: **BMP 284**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280312.7**	EASTING: **1302509.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **15-30 ft bgs**	GROUND SURFACE ELEV.: **39.43**	TOC ELEVATION: **39.10**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **31.5**	DEPTH TO WATER (ft bgs): **10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/30/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID
0	Asphalt	Asphalt ground surface				
		Brown-gray **SILTY SAND with GRAVEL**; fine to coarse sand with fine to coarse subrounded gravel; loose; moist; hydrocarbon-like odor. [FILL]			1084	UCCMW-36 D-2-3 @ 0840
4		Brown-gray fine **SILTY SAND**; loose; moist; no odor.			16.4	
6				5		
10 ▼		Gray **SAND with SILT**; medium dense; wet.		15	0.1	UCCMW-36 D-10.5-11.5 @ 0900
16	SM	Same as above, becomes brown and dense.		32	0.0	
20						

Well Construction: Protective Cover; Concrete; 2" Sch. 40 PVC; Bentonite Chips

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

FLOYD | SNIDER
strategy • science • engineering

PROJECT: **COB-Ultra**	LOCATION: **Bothell, WA**	WELL ID: **UCCMW-36D**
LOGGED BY: **M. Jusayan**	BORING LOCATION: **Parking lot in front of Speedy Glass**	ECOLOGY WELL ID: **BMP 284**
DRILLED BY: **Holt- John Bennett**	COORDINATE SYSTEM: **WA State Plane NAD83 ft**	NORTHING: **280312.7**	EASTING: **1302509.3**
DRILLING EQUIPMENT: **CME-85**	SCREENED INTERVAL: **15-30 ft bgs**	GROUND SURFACE ELEV.: **39.43**	TOC ELEVATION: **39.10**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH (ft bgs): **31.5**	DEPTH TO WATER (ft bgs): **10**
SAMPLING METHOD: **1.5" x 18" Split Spoon (SPT)**		BORING DIAMETER: **8.5"**	DRILL DATE: **6/30/2020**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	N-value	PID (ppm)	Sample ID	Well Construction
22		Brown **SILTY SAND**; medium dense; wet.		24	5.6		#12/20 Monteray Sand
24		Same as above.		25	0.0		0.010 inch slot screen
26							
28							
30		Same as above.		46			
		Bottom of boring = 31.5-feet bgs.					

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

Attachment 5
Soil and Groundwater Analytical and Field Parameter Data

Table 1
Groundwater Analytical and Field Parameter Data

		Location	BB-2	BI-3	BLMW-10	UCCMW-4D	UCCMW-5	UCCMW-7	UCCMW-8	UCCMW-9	UCCMW-10	UCCMW-17	UCCMW-18	
		Sample Date	3/11/2020	3/9/2020	3/9/2020	3/11/2020	3/10/2020	3/10/2020	3/11/2020	3/9/2020	3/10/2020	3/11/2020	3/11/2020	
		Aquifer	Shallow	Shallow	Shallow	Deep	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	
		Depth Range (feet bgs)	9–19	5–10	5–10	35 -40	10–20	8–18	5–15	5–15	5–15	10–20	10–20	
		Sample ID	BB-2-031120	BI-3-030920	BLMW-10-030920	UCCMW-4D-031120	UCCMW-5-031020	UCCMW-7-031020	UCCMW-8-031120	UCCMW-9-030920	UCCMW-10-031020	UCCMW-17-031120	UCCMW-18-031120	UCCMW-99-031120
Analyte	**CAS No.**	**Units**												
Field Parameters														
Dissolved oxygen	DO	mg/L	2.84	0.83	0.53	0.65	9.44	0.53	0.62	0.48	0.74	3.9		0.55
ORP	ORP	mV	97.8	53.8	-9.5	-19.1	140.3	-42.9	161.8	25.7	58.1	149.8		-48.3
pH	pH	pH	6.49	6.53	6.49	7.01	6.19	6.23	6.06	6.66	5.98	6.09		6.21
Turbidity	TURB	NTU	3.24	14.66	1.92	13.2	6.26	2.7	9.9	9.84	134	3.08		5.7
Dissolved Gasses														
Ethane	74-84-0	µg/L	0.22 UJ		0.22 UJ	0.22 UJ	0.22 UJ	0.22 UJ	0.22 UJ		0.22 UJ	0.22 UJ	0.22 UJ	0.22 UJ
Ethene	74-85-1	µg/L	0.29 UJ		0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ		0.29 UJ	0.29 UJ	2.3 J	2.2 J
Methane	74-82-8	µg/L	2 J		150 J	0.64 J	5.5 J	1000 J	33 J		8 J	0.55 UJ	1300 J	1400 J
Dissolved Metals														
Arsenic	7440-38-2	µg/L												
Tota Metals														
Arsenic	7440-38-2	µg/L	3.3 U	3.3 U	3.5	9.1	3.3 U	9	3.8	6.3	3.3 U	3.3 U	6	5.8
Total Petroleum Hydrocarbons														
Gasoline-range organics	GRO	µg/L	100 U		100 U				100 U	100 U	100 U			
Diesel-range organics	DRO	µg/L	210 U		200 U				220 U	210 U	210 U			
Oil-range organics	ORO	µg/L	210 U		210 U				300	210 U	210 U			
Volatile Organic Compounds														
Chlorinated Volatile Organic Compounds														
cis-1,2-Dichloroethene	156-59-2	µg/L	0.6	2.4	1	0.21	0.2 U	13	0.55	0.99	0.2 U	26	19	19
trans-1,2-Dichloroethene	156-60-5	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.21	1 U	1 U
Tetrachloroethene	127-18-4	µg/L	80	1.1	0.2 U	0.2 U	1.4	1.4	2.2	0.2 U	0.2 U	21	130	130
Trichloroethene	79-01-6	µg/L	0.97	0.39	0.29	0.2 U	0.2 U	1.3	0.5	0.2 U	0.2 U	1.2	1.7	1.9
Vinyl chloride	75-01-4	µg/L	0.046	0.52	0.024	0.02 U	0.02 U	1.9	0.02 U	0.15	0.02 U	0.02 U	2.8	2.5
Benzene, Toluene, Ethylbenzene, and Xylenes														
Benzene	71-43-2	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24	0.2 U	0.2 U	0.2 U	1 U	1 U
Ethylbenzene	100-41-4	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Toluene	108-88-3	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
Total xylenes	1330-20-7	µg/L	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2 U	2 U
Other														
1,1,1,2-Tetrachloroethane	630-20-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,1,1-Trichloroethane	71-55-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,1,2-Trichloroethane	79-00-5	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,1-Dichloroethane	75-34-3	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,1-Dichloroethene	75-35-4	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,1-Dichloropropene	563-58-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,2,3-Trichlorobenzene	87-61-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,2,3-Trichloropropane	96-18-4	µg/L	0.4 U	0.2 U	0.29 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,2,4-Trichlorobenzene	120-82-1	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,2,4-Trimethylbenzene	95-63-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,2-Dibromo-3-chloropropane	96-12-8	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
1,2-Dibromoethane	106-93-4	µg/L	0.04 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.1 U
1,2-Dichlorobenzene	95-50-1	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,2-Dichloroethane	107-06-2	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,2-Dichloropropane	78-87-5	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,3-Dichlorobenzene	541-73-1	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
1,3-Dichloropropane	142-28-9	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U

Table 1
Groundwater Analytical and Field Parameter Data

		Location	BB-2	BI-3	BLMW-10	UCCMW-4D	UCCMW-5	UCCMW-7	UCCMW-8	UCCMW-9	UCCMW-10	UCCMW-17	UCCMW-18	
		Sample Date	3/11/2020	3/9/2020	3/9/2020	3/11/2020	3/10/2020	3/10/2020	3/11/2020	3/9/2020	3/10/2020	3/11/2020	3/11/2020	
		Aquifer	Shallow	Shallow	Shallow	Deep	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	
		Depth Range (feet bgs)	9–19	5–10	5–10	35 -40	10–20	8–18	5–15	5–15	5–15	10–20	10–20	
		Sample ID	BB-2-031120	BI-3-030920	BLMW-10-030920	UCCMW-4D-031120	UCCMW-5-031020	UCCMW-7-031020	UCCMW-8-031120	UCCMW-9-030920	UCCMW-10-031020	UCCMW-17-031120	UCCMW-18-031120	UCCMW-99-031120
Analyte	**CAS No.**	**Units**												
Volatile Organic Compounds (cont.)														
Other (cont.)														
1,4-Dichlorobenzene	106-46-7	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
2,2-Dichloropropane	594-20-7	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
2-Chloroethyl vinyl ether	110-75-8	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
2-Chlorotoluene	95-49-8	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
2-Hexanone	591-78-6	µg/L	4 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U
4-Chlorotoluene	106-43-4	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Acetone	67-64-1	µg/L	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U
Bromobenzene	108-86-1	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Bromochloromethane	74-97-5	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Bromodichloromethane	75-27-4	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Bromoform	75-25-2	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
Bromomethane	74-83-9	µg/L	0.4 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Carbon disulfide	75-15-0	µg/L	0.4 U	0.2 U	0.26 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Carbon tetrachloride	56-23-5	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Chlorobenzene	108-90-7	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Chloroethane	75-00-3	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
Chloroform	67-66-3	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Chloromethane	74-87-3	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
cis-1,3-Dichloropropene	10061-01-5	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Cymene	99-87-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Dibromochloromethane	124-48-1	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Dibromomethane	74-95-3	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Dichlorodifluoromethane	75-71-8	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Hexachlorobutadiene	87-68-3	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
Iodomethane	74-88-4	µg/L	3 U	1.5 U	2.1 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	7.5 U	7.5 U
iso-Propylbenzene	98-82-8	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Methyl ethyl ketone	78-93-3	µg/L	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U
Methyl iso butyl ketone	108-10-1	µg/L	4 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U
Methylene chloride	75-09-2	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
Methyl-tert-butyl ether	1634-04-4	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Naphthalene	91-20-3	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
n-Butylbenzene	104-51-8	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
n-Propylbenzene	103-65-1	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
sec-Butylbenzene	135-98-8	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Styrene	100-42-5	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
tert-Butylbenzene	98-06-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
trans-1,3-Dichloropropene	10061-02-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Trichlorofluoromethane	75-69-4	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U
Vinyl acetate	108-05-4	µg/L	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
m,p-Xylene	108-38-3/106-42-3	µg/L	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2 U	2 U
o-Xylene	95-47-6	µg/L	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U

Note:

1 Field team noted that an air bubble may make the result biased high.

Abbreviations:

bgs Below ground surface
CAS Chemical Abstracts Service
µg/L Micrograms per liter
mg/L Milligrams per liter
mV Millivolts
NTU Nephelometric turbidity units
ORP Oxidation-reduction potential

Qualifiers:

J Analyte was detected, concentration is considered to be an estimate.
U Analyte was not detected at the given reporting limit.
UJ Analyte was not detected at the given reporting limit, which is considered to be an estimate.

Table 1
Groundwater Analytical and Field Parameter Data

		Location	UCCMW-21	UCCMW-24	UCCMW-25	UCCMW-27	UCCMW-28D	UCCMW-29	UCCMW-29D	UCCMW-30D	UCCMW-31D	UCCMW-32	UCCMW-32D	UCCMW-33D
		Sample Date	3/9/2020	3/9/2020	3/9/2020	3/9/2020	8/4/2020	7/13/2020	7/13/2020	7/14/2020	7/13/2020	7/13/2020	7/13/2020	7/21/2020
		Aquifer	Shallow	Shallow	Shallow	Shallow	Deep	Shallow	Deep	Deep	Deep	Shallow	Deep	Deep
		Depth Range (feet bgs)	12–22	8–18	8–18	5–15	40–50	5–15	34–44	26–36	18–28	15–25	30–40	49–59
		Sample ID	UCCMW-21-031020	UCCMW-24-030920	UCCMW-25-030920	UCCMW-27-030920	UCCMW-28D-080420	UCCMW-29-071320	UCCMW-29D-071320	UCCMW-30D-071420	UCCMW-31D-071320	UCCMW-32-071320	UCCMW-32D-071320	UCCMW-33D-072120
Analyte	**CAS No.**	**Units**												
Field Parameters														
Dissolved oxygen	DO	mg/L	0.34	0.48	0.34	0.76	0.5	7.29	0.24	0.39	0.28	2.16	0.39	0.33
ORP	ORP	mV	1.3	20.9	-35.4	-54.7	138.2	118.7	-91.1	140	90.1	116.4	-75.5	-118.7
pH	pH	pH	6.18	6.36	6.37	6.42	5.96	6.55	7.61	5.84	6.21	6.58	6.7	7.43
Turbidity	TURB	NTU	7.87	8.42	56.67	8.44	9.88	9.74	25.68	6.95	15.98	47.05	2.9	8.4
Dissolved Gasses														
Ethane	74-84-0	µg/L		0.22 UJ	0.22 UJ	0.22 UJ	0.29	0.22 U	0.98	3.3 U	3.3 U	0.22 U	0.22 U	2.2 U
Ethene	74-85-1	µg/L		0.29 UJ	0.29 UJ	0.29 UJ	0.29 U	0.29 U	0.71	4.3 U	4.3 U	0.29 U	0.29 U	2.9 U
Methane	74-82-8	µg/L		1100 J	8300 J	2700 J	1.2	83	410	1100	1200	32	5.9	590
Dissolved Metals														
Arsenic	7440-38-2	µg/L							4.5			3 U		
Tota Metals														
Arsenic	7440-38-2	µg/L	5.5	11	17	8.8	3.3 U	3.3 U	5.2	3.3 U	3.3 U	3.3 U	3.3 U	5.8
Total Petroleum Hydrocarbons														
Gasoline-range organics	GRO	µg/L				100 U				100 U	100 U	110 U	100 U	100 U
Diesel-range organics	DRO	µg/L				210 U				210 U	210 U	210 U	210 U	210 U
Oil-range organics	ORO	µg/L				250				210 U	210 U	210 U	210 U	210 U
Volatile Organic Compounds														
Chlorinated Volatile Organic Compounds														
cis-1,2-Dichloroethene	156-59-2	µg/L	0.61	0.3	3.8	3.1	0.2 U	0.2 U	0.2 U	0.2 U	6.6	3.2	0.2 U	0.2 U
trans-1,2-Dichloroethene	156-60-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	127-18-4	µg/L	2.8	0.2 U	1.1	0.2 U	0.2 U	9.2	0.2 U	2.2	25	8.6	0.2 U	0.2 U
Trichloroethene	79-01-6	µg/L	1.4	0.2 U	0.88	0.21	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.9	0.2 U	0.2 U
Vinyl chloride	75-01-4	µg/L	0.25	0.02 U	0.75	0.094	0.02 U	0.02 U	0.02 U	0.067	0.24	0.043	0.02 U	0.02 U
Benzene, Toluene, Ethylbenzene, and Xylenes														
Benzene	71-43-2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	100-41-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	108-88-3	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total xylenes	1330-20-7	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Other														
1,1,1,2-Tetrachloroethane	630-20-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	71-55-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	79-34-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	79-00-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	75-34-3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	75-35-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloropropene	563-58-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene	87-61-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.26 U
1,2,3-Trichloropropane	96-18-4	µg/L	0.2 U	0.29 U	0.29 U	0.29 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	120-82-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene	95-63-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-chloropropane	96-12-8	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	106-93-4	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichlorobenzene	95-50-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	107-06-2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	78-87-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	108-67-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	541-73-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane	142-28-9	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Table 1
Groundwater Analytical and Field Parameter Data

			Location	UCCMW-21	UCCMW-24	UCCMW-25	UCCMW-27	UCCMW-28D	UCCMW-29	UCCMW-29D	UCCMW-30D	UCCMW-31D	UCCMW-32	UCCMW-32D	UCCMW-33D
			Sample Date	3/9/2020	3/9/2020	3/9/2020	3/9/2020	8/4/2020	7/13/2020	7/13/2020	7/14/2020	7/13/2020	7/13/2020	7/13/2020	7/21/2020
			Aquifer	Shallow	Shallow	Shallow	Shallow	Deep	Shallow	Deep	Deep	Deep	Shallow	Deep	Deep
			Depth Range (feet bgs)	12–22	8–18	8–18	5–15	40–50	5–15	34–44	26–36	18–28	15–25	30–40	49–59
			Sample ID	UCCMW-21-031020	UCCMW-24-030920	UCCMW-25-030920	UCCMW-27-030920	UCCMW-28D-080420	UCCMW-29-071320	UCCMW-29D-071320	UCCMW-30D-071420	UCCMW-31D-071320	UCCMW-32-071320	UCCMW-32D-071320	UCCMW-33D-072120
Analyte	**CAS No.**	**Units**													
VOCs (cont.)															
Other (cont.)															
1,4-Dichlorobenzene	106-46-7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-Dichloropropane	594-20-7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chloroethyl vinyl ether	110-75-8	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	95-49-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Hexanone	591-78-6	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
4-Chlorotoluene	106-43-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Acetone	67-64-1	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	108-86-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	74-97-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	75-27-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromoform	75-25-2	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	74-83-9	µg/L	0.2 U	1 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.39 U
Carbon disulfide	75-15-0	µg/L	0.2 U	0.26 U	0.26 U	0.26 U	0.2 U	0.2 U	0.46 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon tetrachloride	56-23-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	108-90-7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	75-00-3	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	67-66-3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	74-87-3	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	10061-01-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cymene	99-87-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromochloromethane	124-48-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromomethane	74-95-3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	75-71-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	87-68-3	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Iodomethane	74-88-4	µg/L	1.5 U	2.1 U	2.1 U	2.1 U	1.6 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	4.2 U
iso-Propylbenzene	98-82-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Methyl ethyl ketone	78-93-3	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl iso butyl ketone	108-10-1	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methylene chloride	75-09-2	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl-tert-butyl ether	1634-04-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene	91-20-3	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
n-Butylbenzene	104-51-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
n-Propylbenzene	103-65-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	135-98-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Styrene	100-42-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
tert-Butylbenzene	98-06-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	10061-02-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	75-69-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl acetate	108-05-4	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m,p-Xylene	108-38-3/106-42-3	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
o-Xylene	95-47-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Note:

1 Field team noted that an air bubble may make the result biased high.

Abbreviations:

bgs Below ground surface
CAS Chemical Abstracts Service
µg/L Micrograms per liter
mg/L Milligrams per liter
mV Millivolts
NTU Nephelometric turbidity units
ORP Oxidation-reduction potential

Qualifiers:

J Analyte was detected, concentration is considered to be an estimate.
U Analyte was not detected at the given reporting limit.
UJ Analyte was not detected at the given reporting limit, which is considered to be an estimate.

Table 1
Groundwater Analytical and Field Parameter Data

		Location	UCCMW-34D	UCCMW-35D	UCCMW-36D	
		Sample Date	7/21/2020	7/21/2020	7/13/2020	
		Aquifer	Deep	Deep	Deep	
		Depth Range (feet bgs)	35 -50	30 -40	15–30	
		Sample ID	UCCMW-34D-072120	UCCMW-35D-072120	UCCMW-36D-071320	UCCMW-99-071320
Analyte	**CAS No.**	**Units**				
Field Parameters						
Dissolved oxygen	DO	mg/L	2.02 J[(1)]	1.59	0.44	
ORP	ORP	mV	57.5	-68.4	74.9	
pH	pH	pH	6.18	6.72	6.17	
Turbidity	TURB	NTU	2.2	0	2.22	
Dissolved Gasses						
Ethane	74-84-0	µg/L	6.7 U	0.22 U	2.2 U	2.2 U
Ethene	74-85-1	µg/L	8.7 U	0.29 U	2.9 U	2.9 U
Methane	74-82-8	µg/L	2600	6	840	860
Dissolved Metals						
Arsenic	7440-38-2	µg/L				
Tota Metals						
Arsenic	7440-38-2	µg/L	3.3 U	3.3 U	3.3 U	3.3 U
Total Petroleum Hydrocarbons						
Gasoline-range organics	GRO	µg/L	100 U		100 U	100 U
Diesel-range organics	DRO	µg/L	210 U		210 U	210 U
Oil-range organics	ORO	µg/L	210 U		210 U	210 U
Volatile Organic Compounds						
Chlorinated Volatile Organic Compounds						
cis-1,2-Dichloroethene	156-59-2	µg/L	0.2 U	0.2 U	19	20
trans-1,2-Dichloroethene	156-60-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	127-18-4	µg/L	18	0.2 U	24	24
Trichloroethene	79-01-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl chloride	75-01-4	µg/L	0.02 U	0.02 U	0.93	0.92
Benzene, Toluene, Ethylbenzene, and Xylenes						
Benzene	71-43-2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	100-41-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	108-88-3	µg/L	1 U	1 U	1 U	1 U
Total xylenes	1330-20-7	µg/L	0.4 U	0.4 U	0.4 U	0.4 U
Other						
1,1,1,2-Tetrachloroethane	630-20-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	71-55-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	79-34-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	79-00-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	75-34-3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	75-35-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloropropene	563-58-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene	87-61-6	µg/L	0.26 U	0.26 U	0.2 U	0.2 U
1,2,3-Trichloropropane	96-18-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	120-82-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene	95-63-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-chloropropane	96-12-8	µg/L	1 U	1 U	1 U	1 U
1,2-Dibromoethane	106-93-4	µg/L	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichlorobenzene	95-50-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	107-06-2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	78-87-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	108-67-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	541-73-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane	142-28-9	µg/L	0.2 U	0.2 U	0.2 U	0.2 U

Table 1
Groundwater Analytical and Field Parameter Data

		Location	UCCMW-34D	UCCMW-35D	UCCMW-36D	
		Sample Date	7/21/2020	7/21/2020	7/13/2020	
		Aquifer	Deep	Deep	Deep	
		Depth Range (feet bgs)	35 -50	30 -40	15–30	
		Sample ID	UCCMW-34D-072120	UCCMW-35D-072120	UCCMW-36D-071320	UCCMW-99-071320
Analyte	**CAS No.**	**Units**				
VOCs (cont.)						
Other (cont.)						
1,4-Dichlorobenzene	106-46-7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
2,2-Dichloropropane	594-20-7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
2-Chloroethyl vinyl ether	110-75-8	µg/L	1 U	1 U	1 U	1 U
2-Chlorotoluene	95-49-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
2-Hexanone	591-78-6	µg/L	2 U	2 U	2 U	2 U
4-Chlorotoluene	106-43-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Acetone	67-64-1	µg/L	5 U	5 U	5 U	5 U
Bromobenzene	108-86-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	74-97-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	75-27-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Bromoform	75-25-2	µg/L	1 U	1 U	1 U	1 U
Bromomethane	74-83-9	µg/L	0.39 U	0.39 U	0.2 U	0.2 U
Carbon disulfide	75-15-0	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Carbon tetrachloride	56-23-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	108-90-7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	75-00-3	µg/L	1 U	1 U	1 U	1 U
Chloroform	67-66-3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	74-87-3	µg/L	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	10061-01-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Cymene	99-87-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Dibromochloromethane	124-48-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Dibromomethane	74-95-3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	75-71-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	87-68-3	µg/L	1 U	1 U	1 U	1 U
Iodomethane	74-88-4	µg/L	4.2 U	4.2 U	2.1 U	2.1 U
iso-Propylbenzene	98-82-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Methyl ethyl ketone	78-93-3	µg/L	5 U	5 U	5 U	5 U
Methyl iso butyl ketone	108-10-1	µg/L	2 U	2 U	2 U	2 U
Methylene chloride	75-09-2	µg/L	1 U	1 U	1 U	1 U
Methyl-tert-butyl ether	1634-04-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene	91-20-3	µg/L	1 U	1 U	1 U	1 U
n-Butylbenzene	104-51-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
n-Propylbenzene	103-65-1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	135-98-8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Styrene	100-42-5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
tert-Butylbenzene	98-06-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	10061-02-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	75-69-4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl acetate	108-05-4	µg/L	1 U	1 U	1 U	1 U
m,p-Xylene	108-38-3/106-42-3	µg/L	0.4 U	0.4 U	0.4 U	0.4 U
o-Xylene	95-47-6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U

Note:

1 Field team noted that an air bubble may make the result biased high.

Abbreviations:

bgs Below ground surface
CAS Chemical Abstracts Service
µg/L Micrograms per liter
mg/L Milligrams per liter
mV Millivolts
NTU Nephelometric turbidity units
ORP Oxidation-reduction potential

Qualifiers:

J Analyte was detected, concentration is considered to be an estimate.
U Analyte was not detected at the given reporting limit.
UJ Analyte was not detected at the given reporting limit, which is considered to be an estimate.

Table 2
Soil Analytical and Field Parameter Data

		Location	UCCMW-28D	UCCMW-29	UCCMW-29D	UCCMW-30D		UCCMW-31D		UCCMW-32		UCCMW-32D	
		Sample Date	7/1/2020	6/24/2020	6/23/2020	6/25/2020		6/24/2020		6/29/2020		6/29/2020	
		Aquifer	Deep	Shallow	Deep	Deep		Shallow	Deep	Shallow		Deep	
		Depth Range (feet bgs)	35.5–36.5	8.5–9.5	42.5–43	28.5–29.5	35–36	10 -10.5	20–21	17.5–18.5		25.5–26.5	39–40
		Sample ID	UCCMW-28D-35.5-36.5	UCCMW-29-8.5-9.5	UCCMW-29D-42.5-43	UCCMW-30D-28.5-29.5	UCCMW-30D-35-36	UCCMW-31D-10-10.5	UCCMW-31D-20-21	UCCMW-32-17.5-18.5	UCCMW-99-17.5-18.5	UCCMW-32D-25.5-26.5	UCCMW-32D-39-40
Analyte	**CAS No.**	**Units**											
Conventionals													
Fractional organic carbon	FOC	%	0.1 U	0.27	0.41	0.24	0.12	0.14	0.41	0.95	0.35	0.11	0.35
Total organic carbon	TOC	%		0.05 U	0.05			0.05 U	0.05				
Total Petroleum Hydrocarbons													
Gasoline-range organics	GRO	mg/kg	24 U	25 U	21 U	26 U	24 U	25 U	25 U	25 U	24 U	25 U	24 U
Diesel-range organics	DRO	mg/kg	60 U	64 U	53 U	64 U	60 U	62 U	63 U	62 U	60 U	63 U	60 U
Oil-range organics	ORO	mg/kg	120 U	130 U	110 U	130 U	120 U	130 U	130 U	120 U	120 U	130 U	120 U
Semivolatile Organic Compounds													
Hexachlorobenzene	118-74-1	mg/kg	0.04 U	0.042 U	0.035 U	0.043 U	0.04 U	0.042 U	0.042 U	0.041 U	0.04 U	0.042 U	0.04 U
Hexachloroethane	67-72-1	mg/kg	0.04 U	0.042 U	0.035 U	0.043 U	0.04 U	0.042 U	0.042 U	0.041 U	0.04 U	0.042 U	0.04 U
Nitrobenzene	98-95-3	mg/kg	0.04 U	0.042 U	0.035 U	0.043 U	0.04 U	0.042 U	0.042 U	0.041 U	0.04 U	0.042 U	0.04 U
Volatile Organic Compounds													
Chlorinated Volatile Organic Compounds													
cis-1,2-Dichloroethene	156-59-2	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
trans-1,2-Dichloroethene	156-60-5	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Tetrachloroethene	127-18-4	mg/kg	0.0011 U	0.036	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.042	0.0011 U	0.00091 U	0.001 U	0.0012 U
Trichloroethene	79-01-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Vinyl chloride	75-01-4	mg/kg	0.000053 U	0.000056 U	0.000052 U	0.000055 U	0.000054 U	0.000045 U	0.000054 U	0.000076	0.000077	0.000052 U	0.000059 U
Benzene, Toluene, Ethylbenzene, and Xylenes													
Benzene	71-43-2	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Ethylbenzene	100-41-4	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Toluene	108-88-3	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
Total xylenes	1330-20-7	mg/kg	0.0021 U	0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.0018 U	0.0022 U	0.0022 U	0.0018 U	0.0021 U	0.0023 U
Other													
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,1,1-Trichloroethane	71-55-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,1,2-Trichloroethane	79-00-5	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,1-Dichloroethane	75-34-3	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,1-Dichloroethene	75-35-4	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,1-Dichloropropene	563-58-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,2,3-Trichlorobenzene	87-61-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,2,3-Trichloropropane	96-18-4	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,2,4-Trimethylbenzene	95-63-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
1,2-Dibromoethane	106-93-4	mg/kg	0.000053 U	0.000056 U	0.000052 U	0.000055 U	0.000054 U	0.000045 U	0.000054 U	0.000054 U	0.000045 U	0.000052 U	0.000059 U
1,2-Dichlorobenzene	95-50-1	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,2-Dichloroethane	107-06-2	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,2-Dichloropropane	78-87-5	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,3,5-Trimethylbenzene	108-67-8	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,3-Dichlorobenzene	541-73-1	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,3-Dichloropropane	142-28-9	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
1,4-Dichlorobenzene	106-46-7	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
2,2-Dichloropropane	594-20-7	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
2-Chloroethyl vinyl ether	110-75-8	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
2-Chlorotoluene	95-49-8	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
2-Hexanone	591-78-6	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
4-Chlorotoluene	106-43-4	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U

Table 2
Soil Analytical and Field Parameter Data

		Location	UCCMW-28D	UCCMW-29	UCCMW-29D	UCCMW-30D		UCCMW-31D		UCCMW-32		UCCMW-32D	
		Sample Date	7/1/2020	6/24/2020	6/23/2020	6/25/2020		6/24/2020		6/29/2020		6/29/2020	
		Aquifer	Deep	Shallow	Deep	Deep		Shallow	Deep	Shallow		Deep	
		Depth Range (feet bgs)	35.5–36.5	8.5–9.5	42.5–43	28.5–29.5	35–36	10 -10.5	20–21	17.5–18.5		25.5–26.5	39–40
		Sample ID	UCCMW-28D-35.5-36.5	UCCMW-29-8.5-9.5	UCCMW-29D-42.5-43	UCCMW-30D-28.5-29.5	UCCMW-30D-35-36	UCCMW-31D-10-10.5	UCCMW-31D-20-21	UCCMW-32-17.5-18.5	UCCMW-99-17.5-18.5	UCCMW-32D-25.5-26.5	UCCMW-32D-39-40
Analyte	CAS No.	Units											
Volatile Organic Compounds (cont.)													
Other (cont.)													
Acetone	67-64-1	mg/kg	0.011 U	0.011 U	0.01 U	0.011 U	0.011 U	0.022	0.011 U	0.011 U	0.0091 U	0.01 U	0.012 U
Bromobenzene	108-86-1	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Bromochloromethane	74-97-5	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Bromodichloromethane	75-27-4	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Bromoform	75-25-2	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
Bromomethane	74-83-9	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Carbon disulfide	75-15-0	mg/kg	0.0011 U	0.0011 U	0.0013	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Carbon tetrachloride	56-23-5	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Chlorobenzene	108-90-7	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Chloroethane	75-00-3	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
Chloroform	67-66-3	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Chloromethane	74-87-3	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
cis-1,3-Dichloropropene	10061-01-5	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Cymene	99-87-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Dibromochloromethane	124-48-1	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Dibromomethane	74-95-3	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Dichlorodifluoromethane	75-71-8	mg/kg	0.0014 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Hexachlorobutadiene	87-68-3	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
Iodomethane	74-88-4	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
iso-Propylbenzene	98-82-8	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Methyl ethyl ketone	78-93-3	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
Methyl iso butyl ketone	108-10-1	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
Methylene chloride	75-09-2	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
Methyl-tert-butyl ether	1634-04-4	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Naphthalene	91-20-3	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
n-Butylbenzene	104-51-8	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
n-Propylbenzene	103-65-1	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
sec-Butylbenzene	135-98-8	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Styrene	100-42-5	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
tert-Butylbenzene	98-06-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
trans-1,3-Dichloropropene	10061-02-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Trichlorofluoromethane	75-69-4	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U
Vinyl acetate	108-05-4	mg/kg	0.0053 U	0.0056 U	0.0052 U	0.0055 U	0.0054 U	0.0045 U	0.0054 U	0.0054 U	0.0045 U	0.0052 U	0.0059 U
m,p-Xylene	108-38-3/106-42-3	mg/kg	0.0021 U	0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.0018 U	0.0022 U	0.0022 U	0.0018 U	0.0021 U	0.0023 U
o-Xylene	95-47-6	mg/kg	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0011 U	0.0011 U	0.00091 U	0.001 U	0.0012 U

Note:

1 The laboratory noted that the hydrocarbons in the gasoline range and lube oil range are impacting the diesel-range result.

Abbreviations:

bgs Below ground surface
CAS Chemical Abstracts Service
mg/kg Milligrams per kilogram

Qualifier:

U Analyte was not detected at the given reporting limit.

Table 2
Soil Analytical and Field Parameter Data

		Location	UCCMW-33D		UCCMW-34D		UCCMW-35D	UCCMW-36D	
		Sample Date	6/24/2020	6/25/2020	6/26/2020		6/30/2020	6/30/2020	
		Aquifer	Deep	Deep	Deep	Deep	Deep	Shallow	Deep
		Depth Range (feet bgs)	23–24	36.5–37.5	29.8–30.5	39 -40	30.5–31.5	2–3	10.5 -11.5
		Sample ID	UCCMW-33D-23-24	UCCMW-33D-36.5-37.5	UCCMW-34D-29.8-30.5	UCCMW-34D-39-40	UCCMW-35D-30.5-31.5	UCCMW-36D-2-3	UCCMW-36D-10.5-11.5
Analyte	**CAS No.**	**Units**							
Conventionals									
Fractional organic carbon	FOC	%	0.69	0.4	0.88	0.34	0.23		0.83
Total organic carbon	TOC	%	0.05 U	0.05 U					
Total Petroleum Hydrocarbons									
Gasoline-range organics	GRO	mg/kg	25 U	24 U			24 U	450	24 U
Diesel-range organics	DRO	mg/kg	62 U	60 U			60 U	490 (1)	60 U
Oil-range organics	ORO	mg/kg	120 U	120 U			120 U	3,100	120 U
Semivolatile Organic Compounds									
Hexachlorobenzene	118-74-1	mg/kg	0.041 U	0.04 U	0.042 U	0.042 U	0.04 U	1.7 U	0.04 U
Hexachloroethane	67-72-1	mg/kg	0.041 U	0.04 U	0.042 U	0.042 U	0.04 U	1.7 U	0.04 U
Nitrobenzene	98-95-3	mg/kg	0.041 U	0.04 U	0.042 U	0.042 U	0.04 U	1.7 U	0.04 U
Volatile Organic Compounds									
Chlorinated Volatile Organic Compounds									
cis-1,2-Dichloroethene	156-59-2	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
trans-1,2-Dichloroethene	156-60-5	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Tetrachloroethene	127-18-4	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.0058	0.0011 U	0.052 U	0.00099 U
Trichloroethene	79-01-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Vinyl chloride	75-01-4	mg/kg	0.000056 U	0.000048 U	0.000045 U	0.000045 U	0.000053 U	0.0026 U	0.00005 U
Benzene, Toluene, Ethylbenzene, and Xylenes									
Benzene	71-43-2	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	2.3	0.0013
Ethylbenzene	100-41-4	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	14	0.0017
Toluene	108-88-3	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
Total xylenes	1330-20-7	mg/kg	0.0022 U	0.0019 U	0.0018 U	0.0018 U	0.0021 U	6.4	0.002 U
Other									
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,1,1-Trichloroethane	71-55-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,1,2-Trichloroethane	79-00-5	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,1-Dichloroethane	75-34-3	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,1-Dichloroethene	75-35-4	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,1-Dichloropropene	563-58-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,2,3-Trichlorobenzene	87-61-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,2,3-Trichloropropane	96-18-4	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,2,4-Trimethylbenzene	95-63-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	11	0.0016
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
1,2-Dibromoethane	106-93-4	mg/kg	0.000056 U	0.000048 U	0.000045 U	0.000045 U	0.000053 U	0.0026 U	0.00005 U
1,2-Dichlorobenzene	95-50-1	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,2-Dichloroethane	107-06-2	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,2-Dichloropropane	78-87-5	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,3,5-Trimethylbenzene	108-67-8	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.36	0.00099 U
1,3-Dichlorobenzene	541-73-1	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,3-Dichloropropane	142-28-9	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
1,4-Dichlorobenzene	106-46-7	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
2,2-Dichloropropane	594-20-7	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
2-Chloroethyl vinyl ether	110-75-8	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
2-Chlorotoluene	95-49-8	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
2-Hexanone	591-78-6	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
4-Chlorotoluene	106-43-4	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U

Table 2
Soil Analytical and Field Parameter Data

		Location	UCCMW-33D		UCCMW-34D		UCCMW-35D	UCCMW-36D	
		Sample Date	6/24/2020	6/25/2020	6/26/2020		6/30/2020	6/30/2020	
		Aquifer	Deep	Deep	Deep	Deep	Deep	Shallow	Deep
		Depth Range (feet bgs)	23–24	36.5–37.5	29.8–30.5	39 -40	30.5–31.5	2–3	10.5 -11.5
		Sample ID	UCCMW-33D-23-24	UCCMW-33D-36.5-37.5	UCCMW-34D-29.8-30.5	UCCMW-34D-39-40	UCCMW-35D-30.5-31.5	UCCMW-36D-2-3	UCCMW-36D-10.5-11.5
Analyte	**CAS No.**	**Units**							
Volatile Organic Compounds (cont.)									
Other (cont.)									
Acetone	67-64-1	mg/kg	0.011 U	0.0097 U	0.027	0.0091 U	0.011 U	0.52 U	0.015
Bromobenzene	108-86-1	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Bromochloromethane	74-97-5	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Bromodichloromethane	75-27-4	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Bromoform	75-25-2	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
Bromomethane	74-83-9	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Carbon disulfide	75-15-0	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Carbon tetrachloride	56-23-5	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Chlorobenzene	108-90-7	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Chloroethane	75-00-3	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
Chloroform	67-66-3	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Chloromethane	74-87-3	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
cis-1,3-Dichloropropene	10061-01-5	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Cymene	99-87-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.4	0.00099 U
Dibromochloromethane	124-48-1	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Dibromomethane	74-95-3	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Dichlorodifluoromethane	75-71-8	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Hexachlorobutadiene	87-68-3	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
Iodomethane	74-88-4	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
iso-Propylbenzene	98-82-8	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	2.8	0.0014
Methyl ethyl ketone	78-93-3	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
Methyl iso butyl ketone	108-10-1	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
Methylene chloride	75-09-2	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
Methyl-tert-butyl ether	1634-04-4	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Naphthalene	91-20-3	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.72	0.005 U
n-Butylbenzene	104-51-8	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	2.9	0.0024
n-Propylbenzene	103-65-1	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	9.9	0.0053
sec-Butylbenzene	135-98-8	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	1.2	0.00099 U
Styrene	100-42-5	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
tert-Butylbenzene	98-06-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
trans-1,3-Dichloropropene	10061-02-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Trichlorofluoromethane	75-69-4	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.052 U	0.00099 U
Vinyl acetate	108-05-4	mg/kg	0.0056 U	0.0048 U	0.0045 U	0.0045 U	0.0053 U	0.26 U	0.005 U
m,p-Xylene	108-38-3/106-42-3	mg/kg	0.0022 U	0.0019 U	0.0018 U	0.0018 U	0.0021 U	6.4	0.002 U
o-Xylene	95-47-6	mg/kg	0.0011 U	0.00097 U	0.0009 U	0.00091 U	0.0011 U	0.097	0.00099 U

Note:

1 The laboratory noted that the hydrocarbons in the gasoline range and lube oil range are impacting the diesel-range result.

Abbreviations:

bgs Below ground surface
CAS Chemical Abstracts Service
mg/kg Milligrams per kilogram

Qualifier:

U Analyte was not detected at the given reporting limit.