February 17, 2022

Mr. Orren Doss
Colorado Department of Labor and Employment
Division of Oil and Public Safety – Remediation Section
633 17th Street, Suite 500
Denver, Colorado 80202-3660

Subject: **Corrective Action Plan**
Poudre School District R-1
2407 Laporte Avenue
Fort Collins, Colorado 80521
OPS Event ID No. 13977
CGRS Project No. 22851

Dear Mr. Doss:

Please find the attached Corrective Action Plan (CAP) prepared by CGRS, Inc. (CGRS) on behalf of Poudre School District for the above-referenced event. The CAP describes recent investigations and corrective actions to address petroleum hydrocarbon impacts to the subsurface. This narrative describes complete exposure pathways and proposes corrective actions to address hydrocarbon impacts to those exposure pathways. The select treatment technology for the site is source removal by excavation. The planned excavation will coincide with the Poudre School Districts plans to upgrade the entire fueling facility, including the fueling area concrete slab and adjacent asphalt roadway. The following is a discussion of items addressed in preparation of the CAP.

Introduction/Site Background

The site is the Poudre School District fleet fueling facility with an above ground storage tank (AST) system including two 10,000-gallon capacity ASTs containing regular unleaded gasoline (RUL) and diesel (DSL) fuel (Tank Tag Numbers 8573-4 and 8573-5, respectively) and one 1,990-gallon capacity liquid petroleum gas-above ground (LPG-AG) containing LPG (Tank Tag Number 8573-6). Underground fiberglass reinforced plastic product piping supplies fuel to dispenser islands located to the east of the ASTs. The ASTs (RUL and DSL) at the site have been in service since 1995, and the LPG-AG has been in service since January 2019.

On February 17, 2021, Kubat Equipment and Service Company (Kubat) was onsite conducting an annual inspection and encountered unleaded gasoline fuel releasing from the secondary containment port of the fiber glass clamshell below the dispenser. The dispenser was shut down and Kubat returned on February 18, 2021 and performed a hydrostatic test on the under-dispenser containment (UDC). The UDC failed the hydrostatic test due to missing clamps on the entry boots. A confirmed release was reported to the Colorado Division of Oil & Public Safety (OPS) the following day and was subsequently assigned Event ID (EID) 13977. On February 24, 2021, Kubat installed the missing clamps, the system was defueled, and the dispenser was taken out of service.

On March 17, 2021, CGRS personnel conducted a site investigation to determine the presence, or absence, of petroleum hydrocarbons in the subsurface below the UDC. Utilizing hand auger sampling techniques, native soil below the UDC was collected (soil sample SB-01@4.5') and field screened using a photoionization detector (PID), which resulted in a reading of 1,430 parts per million (ppm). A soil sample was collected from SB-01 at 4.5 feet below ground surface (bgs), placed in clean laboratory supplied container, packed in an ice-filled cooler, and maintained at approximately four (4) degrees Celsius (°C) for transportation to eAnalytics Laboratory in Loveland, Colorado. The soil sample was submitted under chain-of-custody procedures for analysis of constituents of concern (COC) benzene, toluene, ethylbenzene, total xylenes (BTEX) and total volatile petroleum hydrocarbons (TVPH) as gasoline by United States Environmental Protection Agency (USEPA) Method 8260.

Laboratory analytical results for soil sample SB-01@4.5' exhibited a benzene concentration of 0.274 milligrams per kilogram (mg/kg), which exceeded the OPS Tier-1 Risk-Based Screening Level (RBSL) of 0.26 mg/kg. As such, additional investigation was completed to delineate the nature and extent of potential impacts to soil and groundwater.

On May 17, 2021, CGRS conducted drilling activities to evaluate for site COC concentrations in soil near the dispenser island and to investigate potential impacts to groundwater based on the shallow groundwater table at the site. Drilling efforts consisted of advancing five soil borings, utilizing hollow stem auger (HSA) drilling and continuous core sampling techniques to assess subsurface soil conditions, and to install groundwater monitoring wells. The borings were advanced to a depth of approximately 15 feet bgs. Subsurface soils are generally heterogeneous, consisting of sand, clayey sand, and gravelly sand in the vadose and upper saturated zones. The groundwater table at the site was encountered at approximately 5.5 feet bgs.

Exposure Pathways

Surficial Soil - Ingestion/Dermal Contact/Inhalation Exposure Pathway *(Closed)*
Rationale: Petroleum hydrocarbon concentrations have not been reported above Tier-1 RBSLs in surficial soil. The "Surficial Soil (Ingestion, Ambient Vapors, Particulates, Dermal Contact) Exposure Pathway" qualifies for closure.

Subsurface Soil – Leachate to Groundwater Ingestion Pathway *(Open)*
Rationale: Petroleum hydrocarbon concentrations have been reported above the RBSLs in on-site subsurface soils. As such, the "Subsurface Soil-Leachate to Groundwater Ingestion Pathway" is currently open.

Soil Vapor – Indoor Air Inhalation Exposure Pathway *(Closed)*
Rationale: The building located in closest proximity to impacted groundwater was identified as the Poudre School District Operations Center, which is approximately 140 feet downgradient from the source area and conforming to the Interstate Technology & Regulatory Council (ITRC) horizontal screening criteria for pathway elimination.

Groundwater – Indoor Air Inhalation/Enclosed Space Vapors Exposure Pathway *(Closed)*
Rationale: The building located in closest proximity to groundwater contamination was identified is the Poudre School District Operations Center, which is approximately 140 feet downgradient from the source area and conforming to the ITRC horizontal screening criteria for pathway elimination.

Groundwater – Ingestion Exposure Pathway *(Open)*
Rationale: Groundwater analytical data collected during the site investigation documents benzene and toluene concentrations exceeding the applicable RBSLs. As such, the "Groundwater-Ingestion Exposure Pathway" is

currently open. MTBE has not been detected above Tier-1 RBSLs or MRLs in any groundwater samples collected at the site. The extent of the dissolved-phase plume in groundwater is currently delineated.

Points of Exposure

Property Boundary

The property boundary POE has not been impacted, as COC concentrations were reported below Tier-1 RBSLs in both soil and groundwater in the downgradient point of compliance (POC) well MW-02.

Surficial Soils

Evidence of impacted surficial soil was not identified during the environmental assessment activities completed at the site.

Subsurface Utilities

Subsurface utilities are located adjacent to soil and impacted shallow groundwater and are currently potentially threatened. Impacts to subsurface utilities is unknown currently.

Structures

Structures have not been impacted or threatened as petroleum hydrocarbon concentrations have been defined in soil. Additionally, the dissolved-phase groundwater plume is currently defined, and therefore, this POE does not appear to be threatened.

Groundwater Wells, Surface Water, and Sensitive Environments

Based on COC concentrations and fate and transport modeling, downgradient groundwater wells, surface waters, and sensitive environments do not appear to be threatened or impacted.

Contaminant Concerns

The predominant COC is benzene, which is present in soil and groundwater. Contaminant characteristics are summarized as follows:

- Subsurface soil conditions are relatively anisotropic, consisting primarily of sand with cobbles ranging from the surface to approximately 5 feet bgs, clayey sand ranging from approximately 5 to 10 feet bgs, sandy clay from approximately 10 to 15 feet bgs, and gravelly sand at depths greater than 15 feet bgs.
- Dissolved-phase petroleum hydrocarbon impacts appear to be present in the vicinity of the source area in monitoring well MW-01.
- Contaminant mass calculations estimate that approximately 5.117-pounds (lbs) of total petroleum hydrocarbons and 0.040 lbs benzene are sorbed to the smear zone. Additionally, approximately 0.123 lbs of TVPH and 0.490 lbs of benzene mass are present in dissolved-phase groundwater.
- One soil sample collected at 4.5 feet bgs and one soil sample collected at 7 feet bgs, both near the RUL UDC, exceeded Tier-1 RBSLs.
- Depth to groundwater at the site has fluctuated from approximately 5.08 to 8.02 feet bgs, with an average depth of 6.95 feet bgs.
- The direction of groundwater flow at the site is toward the northeast at an average gradient of 0.0121 feet per foot (ft/ft).
- Hydraulic conductivity is estimated at 1.01×10^{-3} centimeters per second (cm/sec).

Soil Contamination Characteristics

During drilling efforts on May 17, 2021, soil samples were collected from each boring and field screened with a PID, using head space sampling techniques to qualitatively evaluate for the presence of volatile organic compounds (VOCs). Soil samples exhibiting the highest PID readings, within the capillary fringe and zones of potential impacts to fully characterize soil vertically and horizontally, were retained for laboratory analysis. The soil samples that were collected for laboratory analysis were placed in clean laboratory supplied containers, packed in an ice-filled cooler, and maintained at approximately 4°C for transportation to the laboratory. Soil samples were submitted under chain-of-custody procedures to eAnalytics Laboratory in Loveland, Colorado for analysis of site COC BTEX and TVPH by USEPA Method 8260. Analytical results for all soil samples were reported below laboratory analytical method reporting limits (MRLs) or below applicable RBSLs, with the exception of MW-01@7', which exhibited a benzene concentration of 3.10 mg/kg. Additionally, a TVPH concentration in MW-01@7' (536 mg/kg) exceeded the total petroleum hydrocarbons-threshold limit value (TPH-TLVs) of 500 mg/kg. Laboratory analytical results are attached and illustrated on the Soil Sample Figure included in the "Sample Location Figures" tabs of the CAP.

Subsurface soil at the site consists primarily of sand with cobbles to approximately 5 feet bgs, which overlies clayey sand from 5 to 10 feet bgs, and sandy clay from 10 to 15 feet bgs. Depth to groundwater ranges from approximately 5.08 to 8.02 feet bgs, which was confirmed by the membrane interface probe and hydraulic profiling tool (MiHPT) and optical imaging profiler (OIP-UV) borings during the high-resolution site characterization (HRSC) performed October 12 through 14, 2021.

Soil samples collected from the site contained benzene and TVPH concentrations above the Tier-1 RBSLs and TPH-TLV in two soil samples collected for this release event.

Vadose Zone Sorbed Impacts

The vadose zone soils generally consist of sand with cobbles. The surface cover immediate to the release area is paved with concrete. Petroleum hydrocarbon concentrations have not been reported above Tier-1 RBSLs in surficial soil. Petroleum hydrocarbon concentrations have been reported above the RBSLs in on-site subsurface soils. Soil sample SB-01@4.5' contained benzene concentrations above the Tier-1 RBSL. Based on the data available for the site, it is unknown if there are vadose zone impacts to subsurface utilities, though they are currently considered potentially threatened. The presence of petroleum hydrocarbon concentrations in vadose zone soils indicates the vadose zone soils are serving as a leachate pathway to groundwater.

Smear Zone Sorbed Impacts

The smear zone soils generally consist of clayey sand. Depth to water across the site ranges from 5.08 to 8.02 feet bgs and the smear zone is estimated to range within those depths. Petroleum hydrocarbon concentrations have been reported above the RBSLs in on-site subsurface soils located within the smear zone. Soil sample MW-01 at 7 feet bgs contained benzene and TVPH concentrations above the respective RBSL and TPH-TLV. During HRSC activities, elevated PID readings were observed in the smear zone. These observations were especially notable in the area north of the dispenser island in MIP-09 and MIP-15 between 6 and 7 feet bgs. Results indicate that sorbed-phase petroleum mass, from the current release event, in the smear zone is likely serving as storage and subsequent source to the dissolved-phase.

Saturated Zone Sorbed Impacts

The saturated zone soils consist primarily of clayey sand at depths of 5 to 10 feet bgs and sandy clay from 10 to 15 feet bgs, overlying gravelly sand. Groundwater elevations were generally observed in the clayey sand. Petroleum hydrocarbon concentrations have not been reported above Tier-1 RBSLs or TPH-TLV in saturated soil. During HRSC activities, elevated PID readings were observed in the saturated zone. These observations were especially notable in the area north of the dispenser island in MIP-11 at 9 feet, with smaller PID responses from 10 to 14 feet bgs. The HRSC data indicates the plume has been confined to the upper part of the saturated zone.

LNAPL

Mobile Light Non-Aqueous Phase Liquid (LNAPL) has not been encountered in the groundwater monitoring well network associated with EID 13977. During the HRSC event, soil boring OH-01 OIP-UV logs exhibited fluorescence nearly uninterrupted between 5 feet and 9 feet with the greatest percent area fluorescence (%AF) response of 19.8%AF at 8.85 feet bgs. These results indicate that LNAPL is present in the soil matrix from 5 feet to 9 feet at this location.

Soil Contaminant Mass Estimates

Contaminate mass estimates were calculated to estimate the total amount of petroleum hydrocarbon impacts on-site. It is estimated that approximately 0.040-pounds benzene and 5.117-pounds of total petroleum hydrocarbons are sorbed to the smear zone soil. Estimates suggest vadose and saturated zone soils facilitate minimal mass storage and transport for EID 13977. A conservative volume for impacted soils on-site appears to be around 4,910 cubic feet (181.85 cubic yards). TPH and benzene contaminate mass estimate calculations can be found in the "Contaminant Mass Estimates" contained in the "Design Documentation" tab of the attached CAP form.

Groundwater Contamination Characteristics

On May 17, 2021, to characterize the nature and extent of potential impacts to groundwater, monitoring wells MW-01 through MW-05 were installed in the source area, upgradient, downgradient, and cross gradient relative to the unleaded gasoline dispenser island. The monitoring wells were completed as 2-inch diameter, schedule 40 polyvinyl chloride (PVC) wells to a total depth of approximately 15 feet bgs, with 10 feet of 0.010-inch slot screen.

On May 21, 2021, site-wide groundwater levels were measured to evaluate hydraulic characteristics. Groundwater levels were measured on the north side of the well casing to the nearest 0.01-foot using an oil-water interface probe (IP). Depth to groundwater was measured between approximately 5.08 (MW-05) feet to 5.66 feet (MW-01) below the top of casing (btoc).

Subsequent to gauging the groundwater monitoring well network, groundwater samples were collected using disposable polyethylene bailers. At each location sampled, a minimum of three well casing volumes of groundwater were purged from the well prior to collecting groundwater samples. Groundwater samples were placed in clean laboratory supplied containers, packed in an ice-filled cooler, and maintained at approximately 4°C for transportation to eAnalytics Laboratory in Loveland, Colorado. Groundwater samples were submitted under chain-of-custody procedures for analysis of BTEX, methyl tertiary-butyl ether (MTBE), and TVPH by USEPA Method 8260. In addition to groundwater sample collection, groundwater monitored natural attenuation (MNA) parameters including dissolved oxygen (DO) and oxidation-reduction potential (ORP), and groundwater quality parameters including temperature, pH, and specific conductance were collected in situ from the groundwater monitoring well network.

CGRS returned to the site on July 8, 2021 and completed a groundwater monitoring event. Groundwater was collected from the groundwater monitoring well network following standard operating procedures and submitted to the lab under chain-of-custody procedures and analyzed for site COC. Laboratory analytical results exhibited COC concentrations below RBSLs in all groundwater samples, with the exception of MW-01, which exhibited a benzene concentration of 0.759 milligrams per liter (mg/L), and a toluene concentration of 1.07 mg/L.

CGRS conducted a groundwater monitoring event on October 26, 2021. Laboratory analytical results from the monitoring event exhibited concentrations of site COC below RBSLs in all groundwater samples, with the exception of MW-01, which exhibited a benzene concentration of 0.200 mg/L.

CGRS conducted a groundwater monitoring event on January 28, 2022. Laboratory analytical results reported concentrations of site COC below RBSLs in all groundwater samples, with the exception of MW-01, which exhibited a benzene concentration of 0.094 mg/L.

During the January 2022 monitoring event, anomalous depth to groundwater measurements resulted in skewed groundwater flow directions. As such, CGRS returned to the site on February 8, 2022, to conduct a groundwater gauging event. Depth to water (DTW) ranged from 7.44 to 7.89 feet bgs. The resulting groundwater flow direction was consistent with historical documentation.

The inferred groundwater flow direction trends north-northeast, historically. The average hydraulic gradient of 0.0121 feet/foot (ft/ft) was calculated between monitoring wells MW-05 and MW-02 from second quarter 2021 through first quarter 2022 data. Depth to water was observed to range from between 5.08 to 8.02 feet bgs from second quarter 2021 through first quarter 2022.

Groundwater samples collected from the site exhibited benzene and toluene concentrations exceeding Tier-1 RBSLs in monitoring well MW-01, and benzene in confirmation boring CB-01 (HRSC data). Laboratory analytical results are illustrated on the attached Groundwater Sample Figure. The inferred areal extent of the benzene plume in groundwater encompasses the area of immediately adjacent the RUL dispenser, which is consistent with the observed LNAPL in the soil profile near MW-01.

MTBE

MTBE has not been detected above Tier-1 RBSLs or MRLs in any groundwater samples collected at the site. Due to the absence of detectable MTBE, CGRS respectfully requests that MTBE be removed from the site COC and the associated laboratory analytical suite for EID 13977.

Groundwater Contaminate Mass Estimates

Contaminate Mass Estimates were calculated January 27, 2022, to estimate the total amount of petroleum impacts in groundwater. Based on SCR and MRR groundwater data, dissolved TVPH mass is approximately 0.490-pounds and dissolved benzene mass is approximately 0.123-pounds. TVPH and benzene contaminate mass estimate calculations can be found in the “Contaminant Mass Estimates” contained in the “Design Documentation” tab of the attached CAP form.

Aquifer Characterization - Slug Tests

Slug testing was performed on June 22, 2021, to evaluate aquifer characteristics and estimate hydraulic conductivity (K) of the aquifer. The slug tests were performed in three monitoring wells (MW-01, MW-02, and MW-05) utilizing an In-Situ data logger. Results of the slug tests yielded K values ranging from $3.78x10^{-4}$ to $2.15x10^{-3}$ centimeters per second (cm/sec) (1.07 to 6.08 feet per day [ft/day]). The geometric mean of the slug tests was calculated at $1.01x10^{-3}$ cm/sec (2.86 ft/day). Utilizing the hydraulic gradient of 0.012 ft/ft, and an assumed effective porosity of 25%, resulted in an estimated groundwater flow velocity of 0.14 ft/day for the site.

Tier-2 Site Specific Target Level (SSTL) Models

CGRS performed fate and transport models using RISC 5 to evaluate SSTLs for dissolved-phase COC concentrations in groundwater protective to the nearest downgradient POE, the underground electric to the northeast. SSTLs were calculated for onsite monitoring well location MW-01, where the benzene and toluene concentrations were reported above the RBSLs. The model was run with zero degradation and a simulation period of 100 years. The following table summarizes the calculated SSTLs:

Well ID	Distance from POE (meters)	Benzene SSTL (mg/L)	Toluene SSTL (mg/L)	Ethylbenzene SSTL (mg/L)	Total Xylenes SSTL (mg/L)
MW-01	20	0.014	2.9	2.0	4.1

Notes:
POE = Point of exposure
SSTL = Site-specific target level
mg/L = milligrams per liter

Based on the fate and transport model results, the dissolved-phase benzene concentration reported in MW-01 (0.759 mg/L) exceeded the calculated Tier-2 SSTL, while the dissolved-phase toluene concentration (1.07 mg/L) was reported below the Tier-2 SSTL.

Tier-3 Site Specific Target Level (SSTL) Models

CGRS performed fate and transport models using RISC 5 to evaluate Tier-3 SSTLs for dissolved-phase COC concentrations in groundwater. The Tier-3 model was simulated to the POE public right-of-way north of Laporte Avenue. SSTLs were calculated for onsite monitoring well location MW-01, where the benzene and toluene concentrations were reported above the RBSLs. The model was run with zero degradation and a simulation period of 100 years. The following table summarizes the calculated SSTLs:

Well ID	Distance from POE (meters)	Benzene SSTL (mg/L)	Toluene SSTL (mg/L)	Ethylbenzene SSTL (mg/L)	Total Xylenes SSTL (mg/L)
MW-01	85	0.11	26	46	110

Notes:
POE = Point of exposure
SSTL = Site-specific target level
mg/L = milligrams per liter

Based on the fate and transport model results, the most recent dissolved-phase benzene concentration in MW-01 (0.094 mg/L) is currently less than Tier-3 SSTLs for the site. However, the highest benzene concentration (0.759 mg/L) over the previous four quarters exceeds the Tier-3 SSTLs.

Previous Assessment

High Resolution Site Characterization

Between October 14 and October 15, 2021, CGRS and Vista GeoScience (Vista) performed HRSC to further delineate the horizontal and vertical extent of subsurface petroleum impacts. The assessment was completed with an OIP-UV system for delineating LNAPL. The OIP-UV system is combined with the hydraulic profiling tool (HPT) and electrical conductivity (EC). This OiHPT captures LNAPL ultraviolet (UV) fluorescence (%AF) and visible light images, while the HPT assists in determining injection pressure and flow. The EC tool measures soil conductivity, which helps correlate the grain size of the soil sediments. Subsequent to delineating LNAPL, a membrane interface probe (MIP) system was used to delineate sorbed and dissolved-phase volatile organic compounds (VOCs). The MIP system has also been combined with the HPT and EC to create a tool called MiHPT. The MIP tool uses both a PID and flame ionization detector (FID) to measure the distribution of sorbed and dissolved-phase VOCs.

An all-terrain vehicle (ATV) mounted HRSC system and a Geoprobe 7720DT track mounted direct push rig, along with a cargo van mounted HRSC system and a Geoprobe 78 series track mounted direct push rig, were utilized for this project. Seven OIP borings and 12 MIPs were completed to depths ranging from 14.0 feet to 18.45 feet bgs. OIP borings averaged a depth of 16.9 feet bgs, while MIP borings averaged a depth of 15.6 feet bgs. The investigation used the OiHPT tool to define the extent of LNAPL and the MiHPT borings were used to map the sorbed- and dissolved-phase contaminants.

OIP-UV

OIP-UV borings were advanced in the area of the dispenser island, in borings OH-01 through OH-07. Responses were observed to be <0.1% fluorescence at all locations, with the exception of soil boring OH-01. OH-01 OIP-UV logs indicated a significant percent area fluorescence (%AF) response of 19.8%AF at 8.85 feet bgs, and a total response between 5 and 9 feet. These results indicate that LNAPL is present in the soil matrix between 5 and 9 feet bgs in the vicinity of MW-01 and the unleaded dispenser location.

EC

EC values were collected from all HRSC borings. EC values generally ranged from approximately 10 milli-Siemens per meter (mS/m) to over 300 mS/m. Values were observed exceeding 300 mS/m at depths between 5 to 6 feet bgs, and generally remained between 100 to 125 mS/m from 5 to 14 and 16 feet bgs. The EC values decreased from approximately 100 mS/m to approximately 20 to 50 mS/m at depths between 7 and 10 feet, indicating a possible increase in grain size, which is consistent with select boring log data. Additionally, EC values decreased to 10 to 20 mS/m between 14 to 17 and increased to 100 to 125 mS/m beyond 17 feet. This increase in EC indicates the presence of fine grained less permeable lithologies. EC values were highly variable vertically, indicating variable soil conditions from highly permeable to less permeable. The HPT data at shallow intervals, 5 to 10 feet bgs, did not correlate well with EC data, indicating potential ionic compounds, such as salts.

HPT

HPT data was collected from all HRSC borings. The HPT data at shallow intervals of 5 to 10 feet bgs did not correlate well with EC data, reporting HPT values typically below 20 to 25 pounds per square inch (psi), which indicates coarse grained, permeable material. The pressures and flows generally indicated shallow zones with higher flow characteristics overlying tighter sediments. Below 10 feet bgs, HPT pressures increased to ranges of 50 to 75 psi, correlating with EC values and indicating coarse grained sediments interbedded with finer grained sediments.

MIP

Twelve (12) MIP borings (MIP-8 through MIP-19) were completed at the site. This data indicates that the area of the RUL dispenser UDC is still the main source area of the subsurface groundwater plume.

The data indicates one main depth interval with elevated PID and FID responses. The highest PID responses ranged between 600 milli-Volts (mV) to 900 mV and were observed in MIP-09, MIP-11, and MIP-15 at the 5 to 9.5 feet bgs interval. These borings are located to the north of the dispenser island and indicate that the dissolved phase groundwater plume may be trending to the north between monitoring wells MW-02 and MW-03. As such, based on this evaluation an additional well to further assess the nature and extent of the dissolved phase plume may be warranted.

Remedial Objectives

The “Subsurface Soil – Leachate to Groundwater Ingestion” and the “Groundwater – Ingestion” exposure pathways are open and require additional effort to attain Tier-1 closure of EID 13977. HRSC data indicates LNAPL is present in the soil matrix between 5 and 9 feet bgs near MW-01, which is considered source material for observed impacts to groundwater at the site. The following sections summarize the individual contaminant phases requiring abatement to attain closure of the event and the remedial objectives for those contaminant concerns.

Sorbed-Phase Impacts

Summary - Sorbed-phase petroleum hydrocarbon concentrations exceeding RBSLs for the “Subsurface Soil – Leaching to Groundwater” exposure pathways have been encountered in on-site subsurface soils. Soil sample SB-01@4.5’ exhibited benzene concentrations above the Tier-1 RBSL and MW-01@7’ exhibited benzene and TVPH concentrations above the respective RBSL and TPH-TLV. Additionally, the data indicates that “smear zone” or saturated zone impacts are contributing to groundwater impacts exceeding RBSLs and will be addressed by the remediation plan.

Remedial Objective - The remedial objective is to reduce sorbed-phase benzene and TVPH to concentrations below the Tier-1 RBSLs and TLV-TPH at MW-01 and the adjacent areas near the dispenser. The remedial objective of source mass removal via excavation should remove impacted soil, which is the source of groundwater impacts at the site. Soil and groundwater data from monitoring well MW-01R will be utilized to determine the efficacy of the remedial strategy.

Dissolved-Phase Impacts

Summary - Dissolved-phase benzene concentrations exceeding the Tier-1 RBSL have been reported in monitoring well MW-01. Fate and transport models developed for well MW-01 indicate that, at current concentrations, the north public right-of-way of LaPorte Avenue will not be impacted within the 100-year simulation period. Additionally, MIP results indicated that the dissolved phase groundwater plume potentially advances to the north between monitoring wells MW-02 and MW-03, which would be addressed by the proposed remedial technologies.

Remedial Objective – The remedial objective is to reduce dissolved-phase benzene concentrations below the Tier-1 RBSL at on-site locations.

Remedial Technology / Treatment Train

To meet remedial goals, a two-phase treatment sequence will be implemented. The proposed primary remedial technology will be soil excavation via dig and haul, which will address sorbed-phase petroleum hydrocarbon impacts and source mass material. The proposed secondary remedial technology will be applying activated carbon blended with imported clean backfill material to address potential remaining sorbed-phase mass within the excavation area and the associated dissolved-phase mass in groundwater.

Targeted Treatment Areas

The excavation treatment area, with sorbed-phase benzene and TVPH concentrations exceeding the RBSL and TLV-TPH, has been identified and delineated on-site in the vicinity of monitoring well MW-01 and the unleaded dispenser island area, encompassing approximately 400 square feet from 5 to 9 feet bgs. This area is shown in the attached Proposed Excavation Area Location Figure, Cross Section A-A’, and Cross Section B-B’ included in the “Remediation Figures” tab of the attached CAP.

Scope of Work and CAP Implementation

The CAP includes the following activities:

- Utility locates will be requested prior to subsurface activities.
- Excavate area located immediately below UDC release. Soil at midpoint and base of excavation walls and center of excavation floor will be field screened using a PID and retained for laboratory analysis. Contaminated soil excavation is anticipated to be completed by June 2022, pending CAP approval.
    - Procure Colorado Department of Public Health and Environment (CDPHE) temporary dewatering discharge permit for remediation activities (CDPHE Permit Number COG317000). Requires tank and discharge sampling events to be performed prior to and during discharge activities, as well as a remediation activities management plan (RAMP), monthly Discharge Monitoring Reports (DMRs) and a termination of coverage report.
        - Dewatering discharge analytical suite will be determined based on CDPHE permit requirements.
    - Procure dewatering and filtration system in anticipation of a conservative dewatering rate of approximately 100 gallons per minute (gpm) including:
        - Ten (10) 21,000-gallon frac tanks
        - One (1) 4-inch vacuum assisted diesel driven trash pump
        - Two (2) dual 6,000-pound Kleen Water Filter activated carbon vessel
        - One (1) 25-micron filter
        - One (1) 10-micron filter, and
        - All associated hoses, meters, fittings, and traffic barriers.
    - Dewatering discharge will be transferred via pump to the City of Fort Collins Stormwater system outfall located south of the PSD bus barn and is illustrated on the Proposed Excavation Area figure included in the “Remediation Figures” tab of the CAP.
    - The target treatment area is approximately 5-9 feet bgs and approximately 400 square feet in area.
    - Approximately 2,200 square feet of 6-inch surface concrete will be removed.
    - Impacted area overburden will be stripped from surface to approximately 5 feet bgs and staged on site for backfilling, overburden will be field screened to assess for the absence of petroleum hydrocarbons.
    - A 1:1 slope ratio will be constructed for excavation stability and egress. An estimate of 1,600 cubic feet (59.26 square yards) of petroleum hydrocarbon impacted soil will be removed and disposed of at an off-site treatment facility.
- Apply activated carbon within treatment area during excavation backfill activities. Carbon installation is expected to be completed by end of second quarter 2022, pending CAP approval.
    - A total of 4,000-pounds of 12 by 40 millimeter activated carbon will be blended with clean, imported soil and installed in the treatment area.
    - Excavation area will be backfilled with structured fill, compacted and compaction tested, and resurfaced with concrete.
- Install two additional monitoring wells (MW-01R and MW-06). Borings will be advanced using hollow-stem auger methods, to a depth of approximately 15 feet bgs, and completed as monitoring wells using 2-inch diameter, slotted PVC well materials. Soil in monitoring well MW-06 will be screened in 2-foot intervals using a PID, and the samples exhibiting the highest PID readings from the vadose and saturated zones will be retained for laboratory analysis. Installation of the new monitoring wells is anticipated to be completed in third quarter 2022, pending CAP approval. Locations of the proposed monitoring wells are

illustrated on the Proposed Monitoring Well Location Figure included in the "Remediation Figure" tab of the CAP.

- Install one monitoring well (MW-01R) west of the RUL dispenser UDC, to replace MW-01 that will be destroyed during excavation activities.
- Install one monitoring well (MW-06) north of the dispenser island and east of MW-03 in order to further delineate potential downgradient hydrocarbon impacts identified during the HRSC event.

- Monitoring activities will be conducted quarterly for a minimum of four quarters post-remediation. Groundwater samples will be collected from monitoring wells MW-01R and MW-02 through MW-06. Samples will be analyzed for BTEX and TVPH. Quarterly post-remediation monitoring is expected to be completed by end of third quarter 2023, pending CAP approval.

Performance Metrics, Remedial Milestones and Endpoint Identification

The following performance metrics and remedial milestones outlined for the site are as follows:

- Excavate identified treatment area June 2022.
- Apply activated carbon to treatment area June 2022.
- Drill and install monitoring wells MW-01R and MW-06 July 2022.
- Complete the third quarter 2022 quarterly groundwater monitoring event to evaluate the efficacy of the remedial technologies and to initiate post-remediation monitoring.
- Reduce benzene concentrations to below the Tier-1 RBSLs or calculated Tier-2 SSTLs in all monitoring wells for four consecutive quarters for pathway to closure.

Closure criteria and remedial endpoint identification for the site will be considered as follows:

- Dissolved phase benzene concentrations below the Tier-1 RBSLs and/or calculated Tier-2 SSTLs in all monitoring wells sampled for four consecutive quarters.
- Benzene concentrations below Tier-1 RBSLs in all soil samples analyzed.
- TVPH concentrations below TPH-TLV in all soil samples analyzed and/or delineated vertically and laterally from source area.

Groundwater Monitoring Network, Sampling and Reporting Frequency

Quarterly groundwater samples will be collected from monitoring wells MW-02 through MW-05 and the two new monitoring wells, MW-01R and MW-06. Samples will be analyzed for BTEX and TVPH. Performance metrics will be provided to OPS in Monitoring and Remediation Report (MRR) format on a semi-annual basis.

Sustainability

Below is a summary of sustainable actions to take place in order to minimize negative environmental, societal, and economic impacts during the life cycle of the CAP:

Quarterly Groundwater Monitoring:

- When possible, CGRS will combine the quarterly groundwater sampling event and purge water drum runs with other projects in the vicinity in order to minimize greenhouse gas (GHG) emissions from mobilization and to reduce project costs.
- Biodegradable gloves will be used during groundwater sampling to reduce landfill contaminants.

Excavation Activities:

- Work will be performed seasonally to reduce truck idling.

- Dewatering activities will be scheduled to reduce pump idling and usage.

Monitoring Well Installation:

- Subcontract to local drilling company to minimize mobilization, which will reduce costs, GHG emissions, and support local economy. The contractor will also be selected based off availability of an efficient drill rig, to minimize machine operation time.
- Biodegradable gloves will be used during soil sampling to reduce landfill contaminants.

If you have any questions regarding the attached CAP, or require any additional information, please contact Brent Everett at (970) 493-7780.

Sincerely,
CGRS, Inc.

Trevor Lee
Environmental Staff Geologist

Brent Everett, P.G.
Project Manager/Hydrogeologist
Recognized Environmental Professional #91

Attachments: 13977-22-CAP

ec. Mr. Michael Quijano, Poudre School District; mquijano@psdschools.org
Mr. John Holcombe, Poudre School District; jholcomb@psdschools.org

Department of Labor and Employment
Division of Oil and Public Safety
Remediation Section
633 17th Street, Suite 500
Denver, CO 80202-3660
303-318-8547 (technical assistance)
Website: www.colorado.gov/ops/remediation

Select One Report from the list:

Corrective Action Plan

Select a Principal Technology from the list:

Excavation

Main Purpose of CAP Modification:

Event ID: **13977**
Facility Address: **2407 LaPorte Avenue, Fort Collins**
Submittal Date: **February 17, 2022**
REP Name: **Brent Everett**

July 1, 2019
Version 2.1

Letters will be addressed to the following entities---

RESPONSIBLE PARTY INFORMATION				
Name:	Poudre School District R-1			
Address:	2407 LaPorte Avenue			
City:	Fort Collins	State:	Colorado	Zip Code:
Phone Number:	(970) 490-3555	Email:	mquijano@psdschools.org	
Contact Person:	Michael Quijano			
ENVIRONMENTAL CONSULTANT INFORMATION				
Name:	CGRS, Inc.			
Address:	1301 Academy Ct.			
City:	Fort Collins	State:	Colorado	Zip Code:
Phone Number:	970-493-7780			
Project Mgr:	Brent Everett	Email:	beverett@cgrs.com	
REP:	Brent Everett	Email:	beverett@cgrs.com	
PROPERTY OWNER INFORMATION				
Name:	Poudre School District R-1			
Address:	2407 LaPorte Avenue			
City:	Fort Collins	State:	Colorado	Zip Code:
Phone Number:	(970) 490-3555	Email:	mquijano@psdschools.org	
Contact Person:	Michael Quijano			
THIRD-PARTY CONTACTS				
Property Address:				
Name:				
Address:				
City:		State:		Zip Code:
Phone Number:		Email:		
Contact Person:				
Property Address:				
Name:				
Address:				
City:		State:		Zip Code:
Phone Number:		Email:		
Contact Person:				
Property Address:				
Name:				
Address:				
City:		State:		Zip Code:
Phone Number:		Email:		
Contact Person:				
Property Address:				
Name:				
Address:				
City:		State:		Zip Code:
Phone Number:		Email:		

Contact Person:			

80521

80524

80521

CORRECTIVE ACTION CONTAMINANT CONCERNS AND REMEDIAL O

Contaminant Phase	Contaminant Concern	Is this concern present? (1)	Remedial Objective
LNAPL	LNAPL is migrating	no	Terminate LNAPL mass migration by mass recovery or mass control
	LNAPL saturation is above residual saturation (mobile) and transmissivity is above the recoverable range	no	Recover LNAPL to the MEP (transmissivity range)
	LNAPL saturation is within the residual saturation range and a persistent source of dissolved phase or vapor phase concerns	**yes**	Identify appropriate phase change technology or excavate
Sorbed	Surficial soils impacted above Tier I RBSLs and surface is not covered by an impervious material	no	Remove or reduce surficial soil impacts to below Tier I RBSLs
	Vadose zone soil impacted above Tier I RBSLs and/or Tier II SSTLs and groundwater is impacted or potentially impacted	**yes**	Remove or reduce vadose zone soil impacts to below Tier I RBSLs and/or Tier II SSTLs
	Vadose zone soil impacted below Tier I RBSLs but groundwater impacted above Tier I RBSLs	no	Remove or reduce vadose zone mass to address contribution to groundwater
	Smear zone or saturated soil impacted and contributing to groundwater contaminant migration	**yes**	Reduce mass in smear zone and/or saturated soil to address contribution to groundwater
	Impacted groundwater above Tier I RBSLs offsite and/or SSTLs onsite	**yes**	Reduce groundwater concentrations to below Tier I RBSLs offsite and at POCs and to below Tier II SSTLs onsite
			Remove or address source material contributing to groundwater impact
			Identify alternate water supply source
			Modify the well intake

Dissolved	Domestic, irrigation, or water supply well impacted or potentially impacted above Tier I RBSLs	no	Reduce incoming groundwater concentrations to below Tier I RBSLs
			Engineered control to eliminate exposure to the receptor
	Surficial water, springs, or sensitive environment POEs impacted	no	Reduce concentrations to below Tier I RBSLs at property boundary and offsite or Tier II SSTLs onsite
			Implement measures to protect POEs from further impact
	Impacted groundwater has intercepted a utility corridor	**unknown**	Evaluate and mitigate migration potential and exposure to receptors
			Evaluate and mitigate utility worker safety concerns
Vapor	Petroleum vapor intrusion is impacting a utility corridor and/or structure	**unknown**	Remediate source (LNAPL, sorbed, dissolved) to eliminate impacts
			Engineered controls to prevent PVI

(1) "Unknown" concerns may indicate data gaps exist. Further assessment may be required.

BJECTIVES IDENTIFICATION TABLE

Treatment Area Identified?	Contaminant Mass Estimate (kg)		Proposed Remedial Option	Treatment Train Phase
	TPH	Benzene		
yes	5	0	Excavation	1
yes	5	0	Excavation	1
yes	5	0	Excavation	1
yes	0	0	Activated Carbon	2
yes	0	0	Activated Carbon	2

yes	0	0	MNA	
no				
yes			Excavation	1
no				

Overview of Remedial Technologies

Technology	Technology Description	Geology (a)		Zone (b)	
Excavation	Contaminant mass is physically removed and properly treated or disposed.	F	C	U	S
Air Sparge/Soil Vapor Extraction (AS/SVE)	AS injects air into the saturated zone to volatilize contaminants and SVE induces a vacuum to remove vapors from the vadose zone. AS or SVE can be used individually if site conditions are appropriate.		C	U	S
Biosparging and Bioventing	Air or oxygen is injected at low flow rates into the unsaturated zone (bioventing) or saturated zone (biosparging) to stimulate contaminant biodegradation.		C	U	S
Multi-Phase Extraction	An induced vacuum removes LNAPL, groundwater and vapor from the subsurface. A single pump or dual pump system may be employed and a fixed or mobile system may be designed depending on the complexity and magnitude of the environmental impact.	F (single)	C (dual)	U	S
In-Situ Chemical Oxidation (ISCO)	A chemical oxidant (e.g., H_2O_2, $NaSO_4$, O_3), typically with amendments, is introduced into the subsurface to convert contaminants into innocuous byproducts.		C		S
Activated Carbon	Activated carbon, typically with bio-nutrients and/or oxidants, is introduced in the subsurface to adsorb contaminant mass (trap) and enable biological degradation processes to occur (treat).		C		S
Surfactant-enhanced subsurface remediation (SESR)	A surfactant is injected to increase LNAPL solubilization and mobility to enable recovery of dissolved phase and LNAPL via extraction wells.		C		S
Enhanced biodegradation	Electron acceptors (i.e., oxygen, nitrate, sulfate) or nutrients (i.e., trace elements) are added to improve biodegradation rates within the saturated zone.	F	C		S
Thermal Desorption	Energy is used to heat soil, pore space, and groundwater to volatilize contaminant mass and reduce the viscosity and interfacial tension of LNAPL to enable recovery of liquid and vapor contaminants via extraction wells.	F	C	U	S
Enhanced Fluid Recovery (EFR)	LNAPL is hydraulically recovered by a vacuum-enhanced process.		C		S
Monitored Natural Attenuation (MNA) and Natural Source Zone Depletion (NSZD)	Contaminant mass is naturally degraded or depleted over time by physical, chemical, or biological processes.	F	C	U	S

(a) C = coarse-grained lithology (sands and gravels) and F = fine-grained lithology (silts and clays) that are loosely correlated to permeability. Note that other geologic factors such as consolidation, heterogeneity or fractures are also important.

(b) U = unsaturated zone, S = saturated zone.

The recommended applicable lithology is based on OPS' collective remedial application experience. Site-specific lithologies should be critically understood when considering a technology's ability to achieve the remedial objectives within the targeted treatment area(s).

CORRECTIVE ACTION CONTAMINANT CONCERNS, REMEDIAL OBJECTIVES, AND REMEDIAL TECHNOLOGIES TO CONSIDER			
Contaminant Phase	Contaminant Concern	Remedial Objective	Technologies to Consider (1)
Sorbed	Surficial soils impacted above Tier I RBSLs and surface is not covered by an impervious material	Remove or reduce surficial soil impacts to below Tier I RBSLs	• Excavation
	Vadose zone soil impacted above Tier I RBSLs and/or Tier II SSTLs and groundwater is impacted or potentially impacted	Remove or reduce vadose zone soil impacts to below Tier I RBSLs and/or Tier II SSTLs	• Excavation • AS/SVE • SVE • MPE (system or mobile, single or dual pump) • Thermal Desorption • Bioventing • NSZD
	Vadose zone soil impacted below Tier I RBSLs but groundwater impacted above Tier I RBSLs	Remove or reduce vadose zone mass to address contribution to groundwater	• Excavation • AS/SVE • SVE • MPE (system or mobile, single or dual pump) • Thermal Desorption • Bioventing • NSZD
	Smear zone or saturated soil impacted and contributing to groundwater contaminant migration	Reduce mass in smear zone and/or saturated soil to address contribution to groundwater	• Excavation • AS/SVE • AS or O_2 or O_3 or Biosparge • MPE (system or mobile, single or dual pump) • Thermal Desorption • SESR • Activated Carbon • NSZD
LNAPL	LNAPL is migrating	Terminate LNAPL mass migration by mass recovery or mass control	• Excavation • MPE (system or mobile, single or dual pump) • EFR
	LNAPL saturation is above residual saturation (mobile) and transmissivity is above the recoverable range	Recover LNAPL to the MEP (transmissivity range)	• Excavation • MPE (system or mobile, single or dual pump) • EFR
	LNAPL saturation is within the residual saturation range and a persistent source of dissolved phase or vapor phase concerns	Identify appropriate phase change technology or excavate	• Excavation • AS/SVE • Thermal Desorption • ISCO • SESR • NSZD
Dissolved	Impacted groundwater above Tier I RBSLs offsite and/or SSTLs onsite	Reduce groundwater concentrations to below Tier I RBSLs offsite and at POCs and to below Tier II SSTLs onsite	• AS/SVE • AS, O2, O3 • MPE (system or mobile, single or dual pump) • ISCO • Activated Carbon • Biosparge • Enhanced biodegradation • MNA
		Remove or address sorbed, LNAPL, or smear zone source material contributing to groundwater impact	• AS/SVE • AS, O2, O3, or Biosparge • MPE (system or mobile, single or dual pump) • Thermal Desorption • ISCO • Enhanced biodegradation • Activated Carbon
	Domestic, irrigation, or water supply well impacted or potentially impacted above Tier I RBSLs	Identify alternate water supply source	
		Modify the well intake	
		Reduce incoming groundwater concentrations to below Tier I RBSLs	• AS/SVE • AS, O2, O3, or Biosparge • MPE (system or mobile, single or dual pump) • ISCO • Activated Carbon
		Engineered control to eliminate exposure to the receptor	
	Surficial water, springs, or sensitive environment POEs impacted	Reduce incoming groundwater concentrations to below Tier I RBSLs	• AS/SVE • AS, O2, O3, or Biosparge • MPE (system or mobile, single or dual pump) • ISCO • Activated Carbon
		Implement measures to protect POEs from further impact	
	Impacted groundwater has intercepted a utility corridor	Evaluate and mitigate migration potential and exposure to receptors	
		Evaluate and mitigate utility worker safety concerns	
Vapor	Petroleum vapor intrusion is impacting a utility corridor and/or structure	Remediate source (LNAPL, sorbed, dissolved) to eliminate impacts	See sorbed, LNAPL, and dissolved phase sections above
		Engineered controls to prevent PVI	Foundation vapor barrier, sub-slab depressurization system

AS - Air Sparge
EFR - Enhanced Fluid Recovery
ISCO - In-Situ Chemical Oxidation
LNAPL - Light Non-Aqueous Phase Liquid
MEP - Maximum Extent Practicable
MNA - Monitored Natural Attenuation
MPE - Multi-Phase Extraction
NSZD - Natural Source Zone Depletion
O2 - Oxygen
O3 - Ozone
POEs - Points of Exposure
PVI - Petroleum Vapor Intrusion
RBSLs - Risk-Based Screening Levels
SESR - Surfactant-Enhanced Subsurface Remediation
SSTLs - Site-Specific Target Levels
SVE- Soil Vapor Extraction

(1) The technologies listed are familiar to OPS staff. This list is not intended to limit what may be proposed in a CAP.

Monitored Natural Attenuation Feasibility

Note: There is a MNA **Concentration vs Time** Tool and a MNA **Concentration vs Distance** Tool on this tab, complete the tool most appropriate for the event.

Concentration -vs- Distance (four consecutive quarters of data not available, typically SCR phase)

Table 1. Site Data

Average hydraulic conductivity (K) (feet/day)	2.86
Hydraulic gradient (i) (unitless)	0.012
Soil bulk density (p_b) (g/cm^3)	1.6
Effective porosity (n_e) (%)	25
Fraction organic carbon (FOC) (unitless)	0.009
Organic carbon/water partition coefficient (K_{oc}) (ml/g)	59

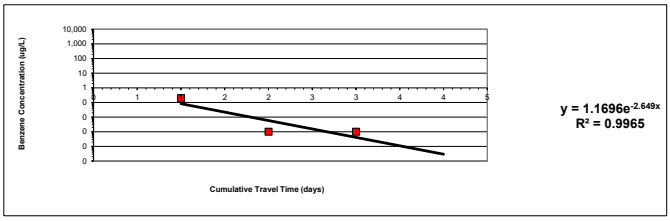


Table 2. Well Data and Calculated Cumulative Travel Times - minimum of three contaminated wells (source well and two downgradient wells)

Well	Well Location	Seepage Velocity (ft/day) V = Ki / n_e	Retardation Factor (unitless) R = 1 + (p_b/n_e)(K_{oc})(FOC)	Plume Velocity (ft/day) V_p = V / R	Distance from source well (feet)	Cumulative Travel Time (days) t = Distance / V_p	Benzene conc. (ug/L)
MW-01	Source well	0.0013728	1.03	0.001	0.0	0.0	0.2
MW-03	In-plume well	0.0013728	1.03	0.001	23.43	17647.3	0.001
MW-02	In-plume well	0.0013728	1.03	0.001	39.59	29818.9	0.001
	In-plume well	0.0013728	1.03	0.001		0.0	

Note: Example data assumes MW-C is property boundary well

Table 3. Time to cleanup (t) in property boundary well or well between the source and a POE other than the property boundary

Goal Conc. C_G (ug/L)	Current Conc. C_O (ug/L)	Decay Rate* k (day^{-1})	Time to cleanup t = [-ln(C_G/C_O)]/k t (days)	t (years)
5	0.2	2.649	-1	0.0

Note: Example data assumes MW-C is property boundary well

You may use 80% of the decay rate in a Tier 2 model.

Trend line equation:

$y = be^{-mx}$ or $C_t = C_o e^{-kt}$ where k = bulk decay rate

Typical range for the bulk decay rate (k) = 0.001 to 0.01 (0.1 to 1 percent per day).
If R^2 value < 0.36 = not a good fit; data not usable for regression analysis.
If R^2 value > 0.64 = data can easily fit a first order regression model.

Table 4. Cleanup Milestones at property boundary well (or POE well)

Monitoring Well	Time to Cleanup	Current Conc.	Decay Rate	Cleanup Goal	Milestones $C_{G\%} = C_O-[(C_O-C_G)(\%\text{ of goal}/100)]$ $t_{G\%} = [-\ln(C_{G\%}/C_O)]/k$					
					25% towards Goal		50% towards Goal		75% towards Goal	
	t (days)	C_O (ug/L)	k (day^{-1})	C_G (ug/L)	C_{G20} (ug/L)	t_{G25} (days)	C_{G50} (ug/L)	t_{G50} (days)	C_{G75} (ug/L)	t_{G75} (days)
MW-02	0	0.001	2.649	5	1	-3	3	-3	4	-3

Table 5. Cleanup Levels (C_L) and Milestones at in-plume wells

Monitoring Well	Time to Cleanup	Current Conc.	Decay Rate	Cleanup Levels $C_L = C_o e^{-kt}$	Milestones $C_{L\%} = C_O-[(C_O-C_L)(\%\text{ of goal}/100)]$ $t_{L\%} = [-\ln(C_{L\%}/C_O)]/k$					
					25% towards C_L		50% towards C_L		75% towards C_L	
	t (days)	C_O (ug/L)	k (day^{-1})	C_L (ug/L)	C_{L20} (ug/L)	t_{L25} (days)	C_{L50} (ug/L)	t_{L50} (days)	C_{L75} (ug/L)	t_{L75} (days)
MW-01	-1	0.094	2.649	2	1	-1	1	-1	2	-1
	-1		2.649	0	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!

Concentration -vs- Time (four consecutive quarters of data available)

Table 1. Well Data

Date	Days	Benzene (ug/L)		
		Well 1	Well 2	Well 3
		MW-01	MW-02	MW-03
5/21/2021	0	0.001	0.001	0.001
7/8/2021	48	0.759	0.001	0.001
10/26/2021	158	0.2	0.001	0.001
1/28/2022	252	0.094	0.001	0.001
	#NUM!			
	#NUM!			
	#NUM!			
	#NUM!			
	#NUM!			
	#NUM!			
	#NUM!			
	#NUM!			
	#NUM!			
	#NUM!			

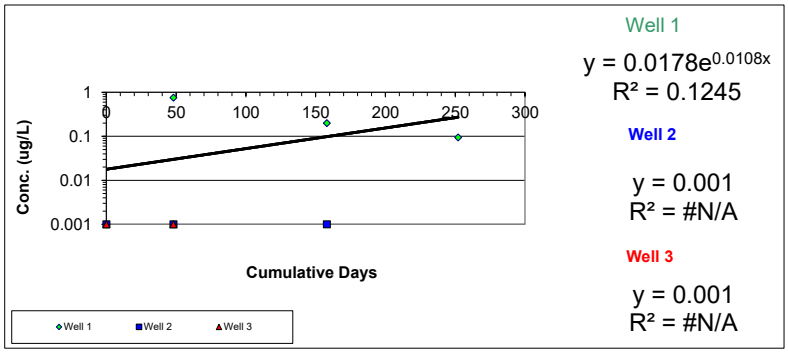


Table 2. Time to cleanup (t) in property boundary well
(or other downgradient well between the source and a POE other than and inside the property boundary)

Goal Conc. C_G (ug/L)	Current Conc. C_O (ug/L)	Decay Rate* k (day^{-1})	Time to cleanup t = [-ln(C_G/C_O)]/k t (days)	t (years)
5	0.001	0.0108	-789	-2.2

*Select most conservative valid decay rate of all wells

Trend line equation:

$y = be^{-mx}$ or $C_t = C_o e^{-kt}$ where k = bulk decay rate

Typical range for the bulk decay rate (k) = 0.001 to 0.01 (0.1 to 1 percent per day).
If R^2 value < 0.36 = not a good fit; data not usable for regression analysis.
If R^2 value > 0.64 = data can easily fit a first order regression model.

Table 3. Cleanup Milestones at property boundary well (or downgradient well)

Monitoring Well	Time to Cleanup	Current Conc.	Decay Rate	Cleanup Goal	Milestones $C_{G\%} = C_O-[(C_O-C_G)(\%\text{ of goal}/100)]$ $t_{G\%} = [-\ln(C_{G\%}/C_O)]/k$					
					25% towards Goal		50% towards Goal		75% towards Goal	
	t (days)	C_O (ug/L)	k (day^{-1})	C_G (ug/L)	C_{G20} (ug/L)	t_{G25} (days)	C_{G50} (ug/L)	t_{G50} (days)	C_{G75} (ug/L)	t_{G75} (days)
MW-02	-789	0.001	0.0108	5	1	-660	3	-724	4	-762

Table 4. Cleanup Levels (C_L) and Milestones at in-plume wells

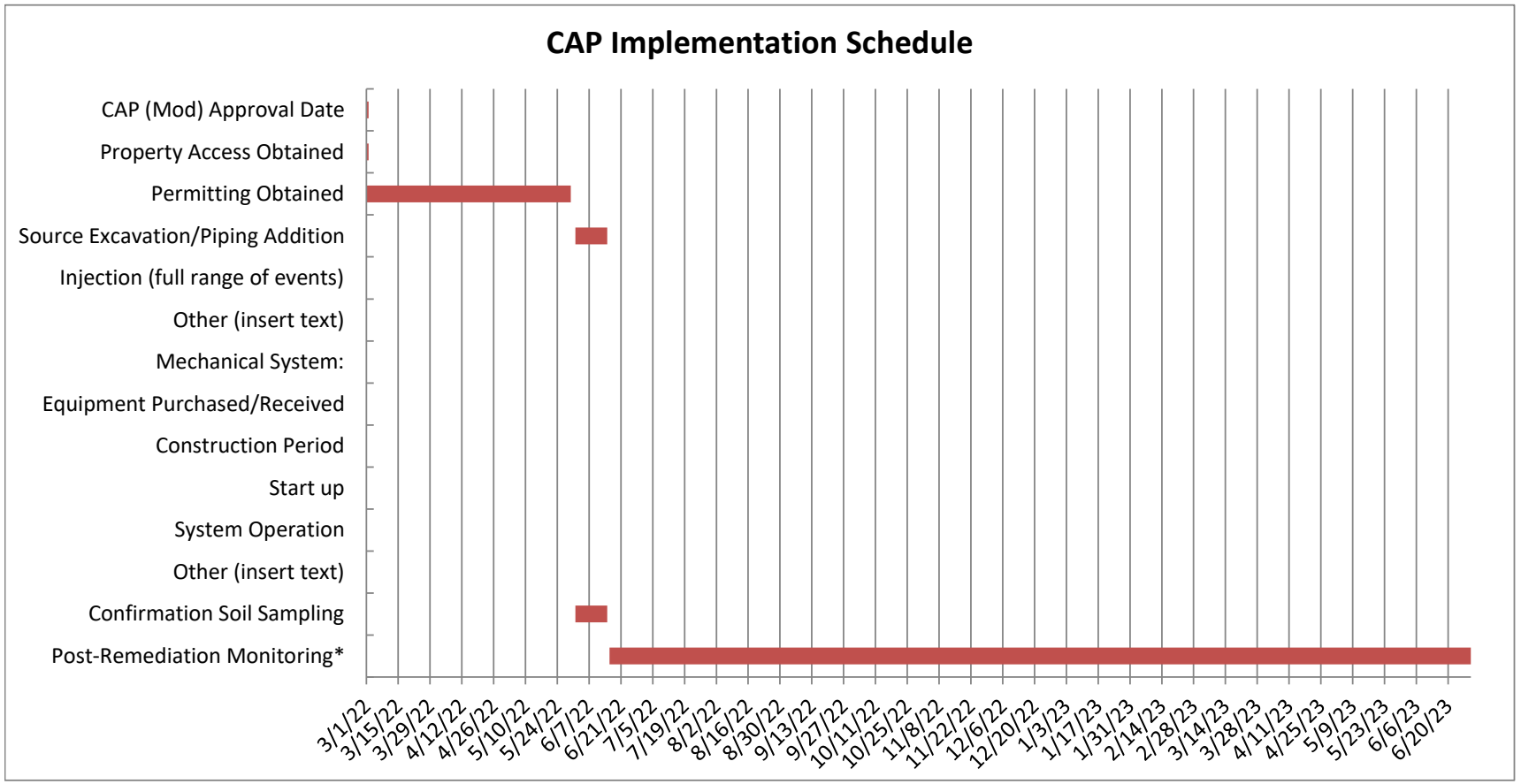
Monitoring Well	Time to Cleanup	Current Conc.	Decay Rate	Cleanup Levels $C_L = C_o e^{-kt}$	Milestones $C_{L\%} = C_O-[(C_O-C_L)(\%\text{ of goal}/100)]$ $t_{L\%} = [-\ln(C_{L\%}/C_O)]/k$					
					25% towards C_L		50% towards C_L		75% towards C_L	
	t (days)	C_O (ug/L)	k (day^{-1})	C_L (ug/L)	C_{L20} (ug/L)	t_{L25} (days)	C_{L50} (ug/L)	t_{L50} (days)	C_{L75} (ug/L)	t_{L75} (days)
MW-01	-789	0.094	0.0108	470	118	-660	235	-724	353	-762
	-789		0.0108	0	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!

CAP Implementation Schedule

Task Description	Estimated Start Date	Estimated Completion Date
CAP (Mod) Approval Date	3/1/22	
Property Access Obtained	3/1/22	3/2/22
Permitting Obtained	3/1/22	5/30/22
Source Excavation/Piping Addition	6/1/22	6/15/22
Injection (full range of events)		
Other (insert text)		
Mechanical System:		
Equipment Purchased/Received		
Construction Period		
Start up		
System Operation		
Other (insert text)		
Confirmation Soil Sampling	6/1/22	6/15/22
Post-Remediation Monitoring*	6/16/22	6/30/23
Estimated Closure Date		6/30/23

Runtime (months): 0.0

* must last four quarters post-remediation, or last six quarters post-injection



REMEDIATION ECONOMIC FEASIBILITY SUMMARY

Site Name: Poudre School District R-1 **Event ID: 13977**

Site Address: 2407 LaPorte Avenue, Fort Collins, Colorado **Submittal Date:**

Remediation Method(s): Excavation of petroleum hydrocarbon impacted soil on-site, activated carbon installation, groundwater monitoring, and monitoring well installation **CAP Effective Date:**

Event REP: Brent Everett, REP 91

EFS Start Date: 03/01/22 **EFS End Date: 06/30/23**

PHASE OF WORK CODE (PWC)	ACTIVITY CODE (AC)	TASK OR LABOR CODE (TLC)	TASK DESCRIPTION	UNITS	QUANTITY	UNIT RATE	SUBTOTAL	MARKUP	SUBTOTAL BY ACTIVITY AND TASK GROUP	TOTAL
3C Remediation system design, bid specifications & CAP report preparation										
	i. CAP design and reporting									
		Report Submittals								
3C	i.	7.3	Corrective Action Plan and Cost Estimate Preparation	report	1	$ 3,500.00	$ 3,500.00			$ 3,500.00
3C	i.	7.3	Corrective Action Plan - Excavation Research and Design: design excavation, research permitting requirements, perform excavation calculations, plan additional remediaton approaches in excavation, discussions with technical reviewer, contact subcontractors and obtain quotes, prepare reference materials for subcontractors, phone calls/emails with the City of Fort Collins and CDPHE (approximately 10 hrs of project manager and 40 hrs of staff engineer/ scientist time)	report	1	$ 5,000.00	$ 5,000.00			$ 5,000.00
			TLC-7 group - Report Submittals						$ 8,500.00	
			Activity Code i. Subtotal						$ 8,500.00	
								TOTAL 3C COSTS:		$ 8,500.00
3D Remediation system installation/excavation										
	I. Excavation			**Start Date: 6/1/22**			**End Date: 6/30/22**			
		Excavation, Transportation and Disposal of Contaminated Soil (4 days excavating and 2 days backfilling and surfacing)								
3D	I.	3.4	excavation and loading (clean overburden and soil excavated for disposal (includes 30% bulking factor and sloping)	yd^3	359	$ 11.25	$ 4,038.75			$ 4,038.75
3D	I.	3.5	transportation of soil >RBSL (bottom 4 feet of excavation removed for disposal)	tons	315	$ 7.86	$ 2,475.90			$ 2,475.90
3D	I.	3.6	disposal of soil >RBSL (includes Waste Management fees)	tons	315	$ 15.17	$ 4,778.55	$ 716.78		$ 5,495.33
3D	I.	3.7	backfill and compaction, clean site fill	yd^3	142	$ 5.50	$ 781.00			$ 781.00
3D	I.	3.7	backfill and compaction, imported (including blending 4,000 pounds of carbon in the bottom ~4 feet of the excavation)	tons	391	$ 9.23	$ 3,608.93			$ 3,608.93
3D	I.	3.8	Asphalt Removal, 4"	sft		$ 2.50	$ -			$ -
3D	I.	3.9	Concrete Removal, 6" thick	sft	2200	$ 5.25	$ 11,550.00			$ 11,550.00
3D	I.	3.11	Concrete Replacement, 6" thick	sft	2200	$ 10.50	$ 23,100.00			$ 23,100.00
3D	I.	3.99	other (Waste Management profile fee)	each	1	$ 50.00	$ 50.00	$ 7.50		$ 57.50
			TLC-3 group - Excavation, Transportation and Disposal of Contaminated Soil Subtotal						$ 51,107.41	
	Labor									

Site Name: Poudre School District R-1 **Event ID: 13977**

Site Address: 2407 LaPorte Avenue, Fort Collins, Colorado **Submittal Date:**

Remediation Method(s): Excavation of petroleum hydrocarbon impacted soil on-site, activated carbon installation, groundwater monitoring, and monitoring well installation **CAP Effective Date:**

Event REP: Brent Everett, REP 91

EFS Start Date: 03/01/22 **EFS End Date: 06/30/23**

3D	I.	5.3	project manager (10 hrs - approve on-site activities; 5 hrs - calls with field and office staff; 5 hrs - project management; 10 hrs - review permits, answer questions; 3 hrs - travel; 5 hrs - site visit)	hours	38.00	$ 129.00	$ 4,902.00			$ 4,902.00
3D	I.	5.5	staff engineer / scientist (2 hrs - waste profiling and manifesting; 3 hrs - utility locates: private and public; 6 hrs - update extensive health and safety plan; 30 hrs - oversee excavation, collecting soil and dewatering samples, and reclamation subcontractors, upload photos, documentation (8 hrs on site per day, 5 days of excavation and related activities) (10 hrs - evaluate excavation data; 4 hrs - calls w/field staff, managing subcontractors, scheduling; 10 hrs; 5 hrs - invoicing and budgeting; 1 hrs - travel; 5 hrs - site visit; 3 hrs - review excavation figures; 3 hrs - review extensive health and safety plan) Permits (10 hrs - prepare and follow-up with Dewatering Discharge Permit for CDPHE; 10 hrs - prepare and follow-up with Sewer Use; contacting and scheduling inspections; 10 hrs - prepare and follow-up with unanticipated permits)	hours	152.00	$ 94.00	$ 14,288.00			$ 14,288.00
3D	I.	5.6	senior technician - travel (1 tech, .5 hours per trip, 5 trips)	hours	2.50	$ 74.00	$ 185.00			$ 185.00
3D	I.	5.6	senior technician 2.5 hrs - mobilization (for up to 5 inspections); 7.5 hrs - on site time for dewatering inspections (1.5 hrs per inspection); 4 hrs - additional documentation for inspections)	hours	15.50	$ 74.00	$ 1,147.00			$ 1,147.00
3D	I.	5.7	draftsperson - generate new excavation and soil sample figures	hours	7.00	$ 70.00	$ 490.00			$ 490.00
3D	I.	5.9	clerical and courier	hours	5.00	$ 53.00	$ 265.00			$ 265.00
			TLC-5 group - Labor Subtotal						$ 21,277.00	
Laboratory Analysis										
3D	I.	6.1	BTEX (in-state lab) - Dewatering system: discharge	samples	30	$ 70.00	$ 2,100.00	$ 315.00		$ 2,415.00
3D	I.	6.23	Corrosivity - Dewatering system: discharge	samples	30	$ 28.00	$ 840.00	$ 126.00		$ 966.00
3D	I.	6.6	Oil & Grease - Dewatering system - discharge	samples	30	$ 70.00	$ 2,100.00	$ 315.00		$ 2,415.00
3D	I.	6.6	Oil & Grease - Dewatering system - discharge (rush charges)	samples	30	$ 60.00	$ 1,800.00	$ 270.00		$ 2,070.00
3D	I.	6.7	BTEX/TVPH (in-state lab) soil: Confirmation samples @ bottom of excavation (5), sidewall samples (4), (2) GW monitoring well boring sample, unanticipated additional samples (3)	samples	14	$ 70.00	$ 980.00	$ 147.00		$ 1,127.00
3D	I.	6.36	Total Suspended Solids (TSS) - Dewatering system: discharge	samples	30	$ 20.00	$ 600.00	$ 90.00		$ 690.00
3D	I.	6.37	TDS - Dewatering system: discharge	samples	30	$ 20.00	$ 600.00	$ 90.00		$ 690.00
3D	I.	6.98	Rush charges - for dewatering samples (BTEX)	samples	30	$ 140.00	$ 4,200.00	$ 630.00		$ 4,830.00
3D	I.	6.98	Rush charges - for dewatering samples (TSS)	samples	30	$ 40.00	$ 1,200.00	$ 180.00		$ 1,380.00
3D	I.	6.98	Rush charges - for dewatering samples (TDS)	samples	30	$ 40.00	$ 1,200.00	$ 180.00		$ 1,380.00

Site Name: Poudre School District R-1 **Event ID: 13977**

Site Address: 2407 LaPorte Avenue, Fort Collins, Colorado **Submittal Date:**

Remediation Method(s): Excavation of petroleum hydrocarbon impacted soil on-site, activated carbon installation, groundwater monitoring, and monitoring well installation **CAP Effective Date:**

Event REP: Brent Everett, REP 91

EFS Start Date: 03/01/22 **EFS End Date: 06/30/23**

3D	I.	6.98	Rush charges - for soil samples (BTEX/TVPH) (to calibrate PID readings and determine extent of excavation)	samples	9	$ 140.00	$ 1,260.00	$ 189.00		$ 1,449.00
3D	I.	6.99	Unanticipated Samples/Sampling costs	Lump Sum	1	$ 1,200.00	$ 1,200.00	$ 180.00		$ 1,380.00
			TLC-6 group - Laboratory Analyses						$ 20,792.00	
		Subcontractor								
3D	I.	8.8	Demo island, remove fueling equipment, light poles, and related fixtures. Include electrical disconnect	each	1	$ 3,355.00	$ 3,355.00	$ 503.25		$ 3,858.25
3D	I.	8.8	remediation system subcontractor (**Health & Safet**y: barricades, portable toilet, and and straw waddles for erosion control)	each	1	$ 3,365.00	$ 3,365.00			$ 3,365.00
3D	I.	8.8	remediation system subcontractor: **CGRS** (**Mobilization**: one mobilization will be paid at the beginning of the project. Includes all travel and mob-demob of equipment, materials and personnel for the project)	each	1	$ 11,252.11	$ 11,252.11			$ 11,252.11
3D	I.	8.8	De-watering Operations: Labor hours for set-up, take-down, and daily operations, fuel, after hours on call	each	1	$ 9,470.00	$ 9,470.00	$ 1,420.50		$ 10,890.50
3D	I.	8.99	Compaction testing: Includes proctor testing at every other 12" lift.	Lump sum	1	$ 2,578.00	$ 2,578.00	$ 386.70		$ 2,964.70
3D	I.	8.10	waste disposal (McDonald Farms - frac tank slurry clean out; vacuum truck, $250 per hr, 16 hours; petroleum contaminated water, $0.30 per gallon, 4,000-gallons; waste handling/manifesting/offload, $225.00)	Lump sum	1	$ 5,425.00	$ 5,425.00	$ 813.75		$ 6,238.75
			TLC-8 group - Subcontractor Subtotal						$ 38,569.31	
		Travel								
3D	I.	9.4	mileage (current IRS rate)	miles	372	$ 0.585	$ 217.62			$ 217.62
			TLC-9 group - Travel Subtotal						$ 217.62	
		On-Site Utilities - Permits								
3D	I.	10.9	Dewatering Discharge Permit - CDPHE	each	1	$ 1,000.00	$ 1,000.00	$ 150.00		$ 1,150.00
3D	I.	10.9	Annual Permit Fee - CDPHE	each	1	$ 2,000.00	$ 2,000.00	$ 300.00		$ 2,300.00
			TLC-10 group - Project-Related Office Expenses - On-Site Utilities - Permits Subtotal						$ 3,450.00	
		Field Instrumentation								
3D	I.	12.1	misc field supplies	days	5	$ 12.00	$ 60.00			$ 60.00
3D	I.	12.4	PID	days	5	$ 75.00	$ 375.00			$ 375.00
			TLC-12 group - Field Instrumentation Subtotal						$ 435.00	
		Equipment								
3D	I.	13.99	other equipment (Rental of water trailer to apply Biosolve solution for vapor suppression, necessary if dust suppression or compaction are occuring at the same time as vapor suppression)	Months	1	$ 930.00	$ 930.00	$ 139.50		$ 1,069.50
3D	I.	13.99	Dewatering system (one week, includes treatment for BTEX constituents)	Lump Sum	1	$ 36,531.00	$ 36,531.00	$ 5,479.65		$ 42,010.65
			TLC-13 group - Equipment Subtotal						$ 43,080.15	
		Materials								
3D	I.	14.99	Carbon Sacks and filters (4,000 lbs - includes delivery/ transport costs - 4 sacs, and dewatering filters)	Lump Sum	1	$ 7,212.00	$ 7,212.00	$ 1,081.80		$ 8,293.80
3D	I.	14.99	Biosolve for vapor suppresion (1 drum)	Lump Sum	1	$ 1,892.56	$ 1,892.56	$ 283.88		$ 2,176.44

Site Name: Poudre School District R-1 **Event ID: 13977**

Site Address: 2407 LaPorte Avenue, Fort Collins, Colorado **Submittal Date:**

Remediation Method(s): Excavation of petroleum hydrocarbon impacted soil on-site, activated carbon installation, groundwater monitoring, and monitoring well installation **CAP Effective Date:**

Event REP: Brent Everett, REP 91

EFS Start Date: 03/01/22 **EFS End Date: 06/30/23**

			TLC-14 group - Materials Subtotal						$ 10,470.24	
			Activity code I subtotal:						$ 189,398.74	
								TOTAL 3D COSTS:		$ 189,398.74
3G Monitoring plan implementation & report preparation; additional assessment										
Start Date: 06/09/22				**End Date: 06/30/23**				**# Events: 4**		
List wells: MW-01R, MW-02, MW-03, MW-04, MW-05, and MW-06										
Reporting schedule:										
g. Monitoring plan implementation										
			Groundwater Sampling							
3G	g.	4.1	**sample 6 wells**-includes all labor and equipment (bailer, water level indicator/interface probe, temp, conductivity, pH, DO, ORP meter(s), hand tools, cones, safety equipment, PPE, etc.) (Quarterly: MW-1R, MW-2, MW-3, MW-4, MW-5, MW-6)	wells	24	$ 115.00	$ 2,760.00			$ 2,760.00
			TLC-4 group - Groundwater Sampling Subtotal						$ 2,760.00	
			Labor							
3G	g.	5.2	REP (2 hrs/quarter)	hours	8.00	$ 139.00	$ 1,112.00			$ 1,112.00
3G	g.	5.3	project manager (3 hr - approve on-site activities; 2.5 hrs - project management)	hours	22.00	$ 129.00	$ 2,838.00			$ 2,838.00
3G	g.	5.5	staff engineer / scientist (staff per event, 4 event: 5 hr - order labels/COC and notify property owners; 15 hrs - field work review, documentaiton, and debriefing; 5 hr - call to office staff)	hours	25.00	$ 94.00	$ 2,350.00			$ 2,350.00
3G	g.	5.6	senior technician (5 hrs - 1 technicians per event, 2.5 hrs travel per tech, 4 event)	hours	30.00	$ 74.00	$ 2,220.00			$ 2,220.00
3G	g.	5.9	clerical and courier	hours	1.00	$ 53.00	$ 53.00			$ 53.00
			TLC-5 group - Labor Subtotal						$ 8,573.00	
			Laboratory Analysis							
3G	g.	6.9	BTEX/MTBE/TVPH (in-state lab) (8260/8015 - water) (Quarterly: MW-1R, MW-2, MW-3, MW-4, MW-5, MW-6)	samples	24	$ 70.00	$ 1,680.00	$ 252.00		$ 1,932.00
			TLC-6 group - Laboratory Analyses						$ 1,932.00	
			Travel							
3G	g.	9.4	mileage (current IRS rate)	miles	224	$ 0.575	$ 128.80			$ 128.80
			TLC-9 group - Travel Subtotal						$ 128.80	
			Investigation-Derived Waste							
3G	g.	11.5	water disposal (offsite treatment)	gallons	180	$ 0.60	$ 108.00	$ 16.20		$ 124.20
3G	g.	11.99	other (waste handling/manifesting/offload)	each	3	$ 80.00	$ 240.00	$ 36.00		$ 276.00
			TLC-11 group - Investigation-Derived Waste Subtotal						$ 400.20	
			Field Instrumentation							
3G	g.	12.1	misc field supplies	days	4	$ 12.00	$ 48.00			$ 48.00
3G	g.	12.12	metal detector	days	2	$ 45.00	$ 90.00			$ 90.00
			TLC-12 group - Field Instrumentation Subtotal						$ 138.00	
			Equipment							
3G	g.	13.24	consultant vacuum truck (vacuum purged groundwater drums) (3 hrs per trip, 1 trip)	hours	3	$ 110.00	$ 330.00			$ 330.00
			TLC-13 group - Equipment Subtotal						$ 330.00	
			Materials							

Site Name: Poudre School District R-1 **Event ID: 13977**

Site Address: 2407 LaPorte Avenue, Fort Collins, Colorado **Submittal Date:**

Remediation Method(s): Excavation of petroleum hydrocarbon impacted soil on-site, activated carbon installation, groundwater monitoring, and monitoring well installation **CAP Effective Date:**

Event REP: Brent Everett, REP 91

EFS Start Date: 03/01/22 **EFS End Date: 06/30/23**

3G	g.	14.4	drums (prefer poly or used steel)	drums	3	$ 55.00	$ 165.00	$ 24.75		$ 189.75
			TLC-14 group - Materials Subtotal						$ 189.75	
			Activity Code g. Subtotal						$ 14,451.75	
	i. Data review & reporting									
	Labor									
3G	g.	5.5	staff engineer / scientist (prepare groundwater sample figure, GW elev figure, plume figures and QA/QC from drafter)	hours	30.00	$ 94.00	$ 2,820.00			$ 2,820.00
3G	g.	5.7	draftsperson	hours	10.00	$ 70.00	$ 700.00			$ 700.00
			TLC-5 group - Labor Subtotal						$ 3,520.00	
			Activity Code i. Subtotal						$ 3,520.00	
	k. Drilling			**Number of wells: 2**						
3G	k.	2.1	drilling (2" well, auger, < 50') (2 well to 15 feet)	feet	30	$ 22.00	$ 660.00	$ 99.00		$ 759.00
3G	k.	2.2	mobilization / demobilization (50 miles round trip)	miles	140	$ 4.50	$ 630.00	$ 94.50		$ 724.50
3G	k.	2.4	completion of borehole as 2" MW (2 well to 15-ft)	feet	30	$ 22.00	$ 660.00	$ 99.00		$ 759.00
3G	k.	2.8	decontamination	days	1	$ 150.00	$ 150.00	$ 22.50		$ 172.50
3G	k.	2.96	monitoring well permit	wells	2	$ 100.00	$ 200.00	$ 30.00		$ 230.00
3G	k.	2.97	number of wells (insert in EFS for all well installations)	wells	2					
3G	k.	5.2	REP	hours	2.00	$ 139.00	$ 278.00			$ 278.00
3G	k.	5.3	project manager	hours	4.00	$ 129.00	$ 516.00			$ 516.00
3G	k.	5.5	staff engineer / scientist (2 hr field prep, 8 hrs drilling oversight, .5 hrs mobe) (3 hrs permitting, locates) (data eval, schedule, subcontractor and client correspondence, work order, off-site access)	hours	25.50	$ 94.00	$ 2,397.00			$ 2,397.00
3G	k.	5.7	draftsperson	hours	2.00	$ 70.00	$ 140.00			$ 140.00
3G	k.	5.9	clerical and courier	hours	1.00	$ 53.00	$ 53.00			$ 53.00
3G	k.	6.7	BTEX/TVPH (in-state lab) (2 soil samples per well, 1-well)	samples	2	$ 70.00	$ 140.00	$ 21.00		$ 161.00
3G	k.	8.14	potholing (includes coring; up to 1 hr/location)	hours	2	$ 255.00	$ 510.00	$ 76.50		$ 586.50
3G	k.	8.15	potholing mileage (140 miles RT)	miles	140	$ 3.00	$ 420.00	$ 63.00		$ 483.00
3G	k.	9.4	mileage (current IRS rate) (6 miles RT)	miles	140	$ 0.585	$ 81.90			$ 81.90
3G	k.	11.1	soil disposal (not dig and haul) (soil cuttings and pothole slurry)	drums	6	$ 100.00	$ 600.00	$ 90.00		$ 690.00
3G	k.	11.7	waste transport (submit backup) (soil cuttings and pothole slurry)	trips	1	$ 300.00	$ 300.00	$ 45.00		$ 345.00
3G	k.	11.99	other (waste handling/manifesting/offload) (soil cuttings and pothole slurry)	list units	1	$ 75.00	$ 75.00	$ 11.25		$ 86.25
3G	k.	12.1	misc field supplies	days	1	$ 12.00	$ 12.00			$ 12.00
3G	k.	12.4	PID	days	1	$ 75.00	$ 75.00			$ 75.00
3G	k.	14.4	drums (prefer poly or used steel) (soil cuttings and pothole slurry)	drums	6	$ 55.00	$ 330.00	$ 49.50		$ 379.50
3G	k.	14.99	other materials (tax on drums purchase (city 3.25%, county 1%, state 2.9 %)= 7.15 %	list units	6	$ 23.60	$ 141.57	$ 21.24		$ 162.81
			Activity Code k. Subtotal						$ 9,091.96	
	i. Data review & reporting									
3G	i.	7.1	Monitoring and Remediation Report (MRR) - no system- semi-annually	report	1.00	$ 2,503.00	$ 2,503.00			$ 2,503.00

Site Name: Poudre School District R-1 **Event ID: 13977**

Site Address: 2407 LaPorte Avenue, Fort Collins, Colorado **Submittal Date:**

Remediation Method(s): Excavation of petroleum hydrocarbon impacted soil on-site, activated carbon installation, groundwater monitoring, and monitoring well installation **CAP Effective Date:**

Event REP: Brent Everett, REP 91

EFS Start Date: 03/01/22 **EFS End Date: 06/30/23**

3G	i.	7.2	Monitoring and Remediation Report (MRR) - system/implementation report- semi-annually	report	1.00	$ 3,643.00	$ 3,643.00			$ 3,643.00
			Activity Code i. Subtotal						$ 6,146.00	
								TOTAL 3G COSTS:		$ 33,209.71

PHASE OF WORK COST SUMMARY

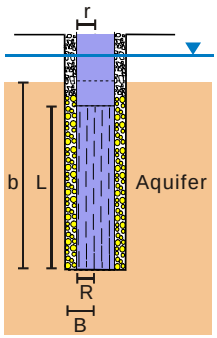
PHASE OF WORK CODE AND DESCRIPTION		EFS TOTAL COSTS
3C	**Remediation system design, bid specifications & CAP report preparation**	**$ 8,500.00**
3D	**Remediation system installation/excavation**	**$ 189,398.74**
3G	**Monitoring plan implementation & report preparation; additional assessment**	**$ 33,209.71**
GRAND TOTAL		**$ 231,108.44**

Poudre School District 2407 Laporte Avenue Fort Collins, Colorado OPS Event ID 13977
Hydraulic Gradient Calculations

Well ID	Date	GW Elevation (feet)	GW Elevation difference (feet)	Distance between wells (feet)	Gradient between wells		
MW-02	5/21/2021	93.10	1.31	106	0.0124	**2H 2021 Average**	**0.0123**
MW-05	5/21/2021	94.41					
MW-02	7/8/2021	91.54	1.30	106	0.0123		
MW-05	7/8/2021	92.84					
MW-02	10/26/2021	90.75	1.24	106	0.0117	**1H 2022 Average**	**0.0120**
MW-05	10/26/2021	91.99					
MW-02	2/8/2022	90.75	1.30	106	0.0123		
MW-05	2/8/2022	92.05					
						Historical Average	**0.0121**

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Wells**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO



	Name	Penetration	R [ft]	L [ft]	r [ft]	B [ft]
1	MW-1 Test 2	Fully	0.0833	7.52	0.0833	0.344

CGRS, Inc.
1301 Academy Court
Fort Collins, CO 80524

Slug Test - Water Level Data

Project: Poudre School District

Number: 22851

Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-1 Test 2	Test Well: MW-1 Test 2
Test conducted by: CGRS	Test date: 6/23/2021	
Water level at t=0 [ft]: 7.86	Static water level [ft]: 6.15	Water level change at t=0 [ft]: 1.71

	Time [min]	Water Level [ft]	WL Change [ft]
1	0	7.86	1.71
2	0.01	7.93	1.78
3	0.03	7.72	1.57
4	0.04	7.53	1.38
5	0.06	7.34	1.19
6	0.07	7.21	1.06
7	0.09	7.10	0.95
8	0.11	7.00	0.85
9	0.12	6.92	0.77
10	0.14	6.87	0.72
11	0.17	6.83	0.68
12	0.19	6.80	0.65
13	0.21	6.78	0.63
14	0.24	6.76	0.61
15	0.26	6.75	0.60
16	0.29	6.75	0.60
17	0.32	6.74	0.59
18	0.35	6.74	0.59
19	0.39	6.73	0.58
20	0.42	6.73	0.58
21	0.46	6.73	0.58
22	0.5	6.73	0.58
23	0.54	6.73	0.58
24	0.58	6.73	0.58
25	0.63	6.73	0.58
26	0.68	6.73	0.58
27	0.73	6.73	0.58
28	0.79	6.72	0.57
29	0.85	6.73	0.58
30	0.91	6.72	0.57
31	0.98	6.72	0.57
32	1.05	6.72	0.57
33	1.12	6.72	0.57
34	1.2	6.72	0.57
35	1.29	6.72	0.57
36	1.37	6.72	0.57
37	1.47	6.72	0.57
38	1.57	6.72	0.57
39	1.67	6.72	0.57
40	1.78	6.72	0.57
41	1.9	6.72	0.57
42	2.03	6.72	0.57
43	2.16	6.72	0.57
44	2.3	6.72	0.57
45	2.45	6.72	0.57
46	2.61	6.72	0.57

CGRS, Inc.
1301 Academy Court
Fort Collins, CO 80524

Slug Test - Water Level Data

Project: Poudre School District

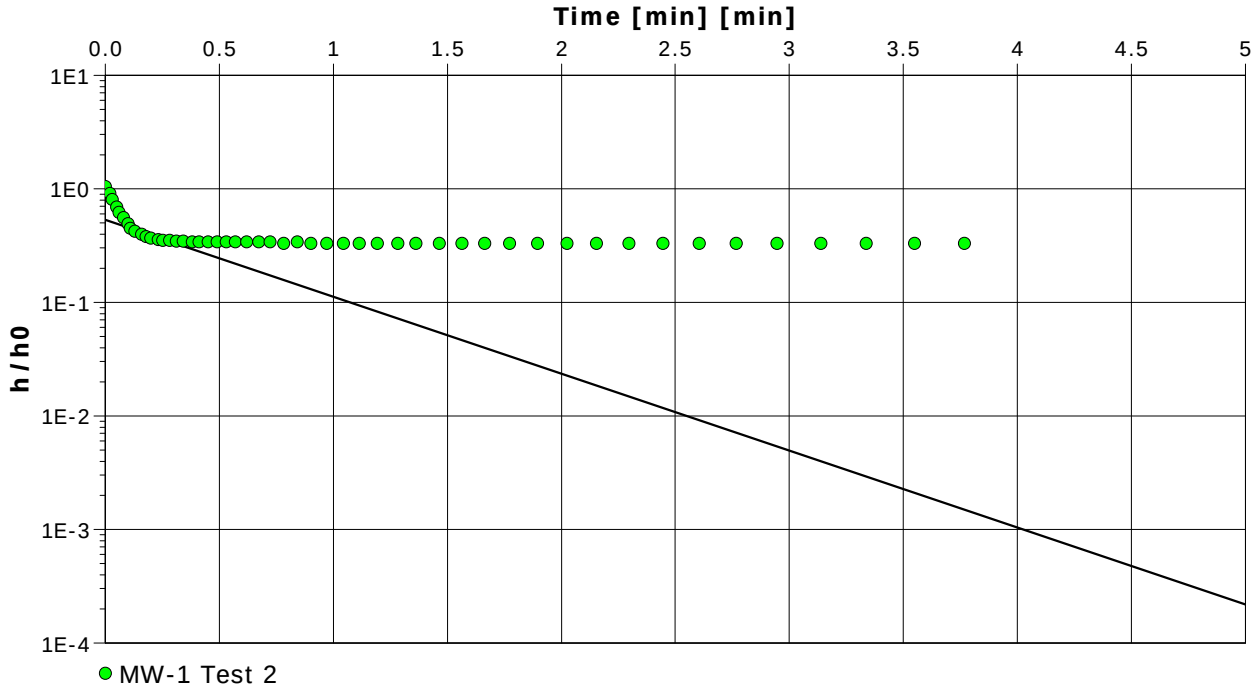
Number: 22851

Client: Poudre School District

	Time [min]	Water Level [ft]	WL Change [ft]
47	2.77	6.72	0.57
48	2.95	6.72	0.57
49	3.14	6.72	0.57
50	3.34	6.72	0.57
51	3.55	6.72	0.57
52	3.77	6.72	0.57

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	Slug Test Analysis Report
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-1 Test 2	Test Well: MW-1 Test 2
Test conducted by: CGRS		Test date: 6/23/2021
Analysis performed by: CGRS	MW-1 Test 3	Date: 6/23/2021
Aquifer Thickness: 7.52 ft		



Calculation after Bouwer && Rice

Observation well	K [ft/d]	
MW-1 Test 2	3.62×10^{0}	

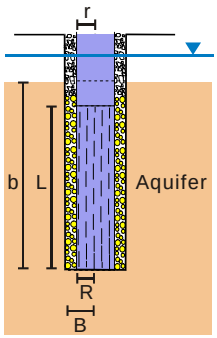
CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Slug Test - Analyses Report**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-1 Test 2	Test Well: MW-1 Test 2
Test conducted by: CGRS		Test date: 6/23/2021
Aquifer Thickness: 7.52 ft		

	Analysis Name	Analysis performed b	Date	Method name	Well	T [ft²/d]	K [ft/d]	S
1	MW-1 Test 3	CGRS	6/23/2021	Bouwer && Rice	MW-1 Test 2		3.62×10^{0}	

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Wells**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO



	Name	Penetration	R [ft]	L [ft]	r [ft]	B [ft]
1	MW-1 Test 4	Fully	0.0833	7.52	0.0833	0.344

CGRS, Inc.
1301 Academy Court
Fort Collins, CO 80524

Slug Test - Water Level Data

Project: Poudre School District

Number: 22851

Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-1 Test 4	Test Well: MW-1 Test 4
Test conducted by: CGRS	Test date: 6/23/2021	
Water level at t=0 [ft]: 7.59	Static water level [ft]: 6.15	Water level change at t=0 [ft]: 1.44

	Time [min]	Water Level [ft]	WL Change [ft]
1	0	7.59	1.44
2	0.01	7.94	1.79
3	0.03	7.68	1.53
4	0.04	7.49	1.34
5	0.05	7.33	1.18
6	0.07	7.19	1.04
7	0.08	7.08	0.93
8	0.1	6.99	0.84
9	0.12	6.92	0.77
10	0.14	6.87	0.72
11	0.16	6.83	0.68
12	0.18	6.81	0.66
13	0.2	6.79	0.64
14	0.22	6.77	0.62
15	0.25	6.76	0.61
16	0.27	6.76	0.61
17	0.3	6.75	0.60
18	0.33	6.75	0.60
19	0.36	6.74	0.59
20	0.4	6.74	0.59
21	0.43	6.73	0.58
22	0.47	6.73	0.58
23	0.51	6.73	0.58
24	0.55	6.73	0.58
25	0.59	6.73	0.58
26	0.64	6.73	0.58
27	0.69	6.73	0.58
28	0.75	6.73	0.58
29	0.8	6.73	0.58
30	0.86	6.72	0.57
31	0.92	6.73	0.58
32	0.99	6.72	0.57
33	1.06	6.72	0.57
34	1.13	6.73	0.58
35	1.21	6.72	0.57
36	1.3	6.73	0.58
37	1.38	6.73	0.58
38	1.48	6.73	0.58
39	1.58	6.73	0.58
40	1.68	6.72	0.57
41	1.79	6.72	0.57
42	1.91	6.72	0.57
43	2.04	6.72	0.57
44	2.17	6.72	0.57
45	2.31	6.72	0.57
46	2.46	6.72	0.57

CGRS, Inc.
1301 Academy Court
Fort Collins, CO 80524

Slug Test - Water Level Data

Project: Poudre School District

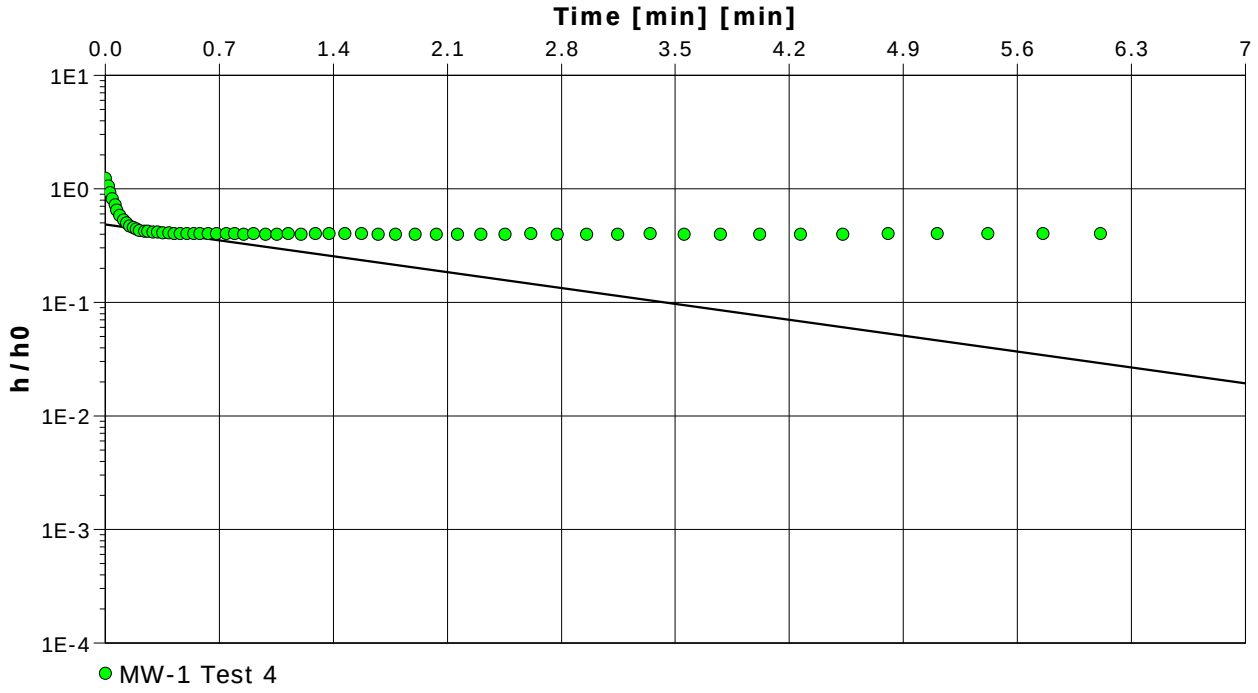
Number: 22851

Client: Poudre School District

	Time [min]	Water Level [ft]	WL Change [ft]
47	2.62	6.73	0.58
48	2.78	6.72	0.57
49	2.96	6.72	0.57
50	3.15	6.72	0.57
51	3.35	6.73	0.58
52	3.56	6.72	0.57
53	3.78	6.72	0.57
54	4.02	6.72	0.57
55	4.27	6.72	0.57
56	4.53	6.72	0.57
57	4.81	6.73	0.58
58	5.11	6.73	0.58
59	5.42	6.73	0.58
60	5.76	6.73	0.58
61	6.11	6.73	0.58

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	Slug Test Analysis Report
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-1 Test 4	Test Well: MW-1 Test 4
Test conducted by: CGRS		Test date: 6/23/2021
Analysis performed by: CGRS	MW-1 Test 4	Date: 6/23/2021
Aquifer Thickness: 7.52 ft		



Calculation after Bouwer && Rice

Observation well	K [ft/d]	
MW-1 Test 4	1.07×10^{0}	

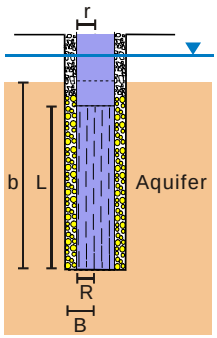
CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Slug Test - Analyses Report**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-1 Test 4	Test Well: MW-1 Test 4
Test conducted by: CGRS		Test date: 6/23/2021
Aquifer Thickness: 7.52 ft		

	Analysis Name	Analysis performed b	Date	Method name	Well	T [ft²/d]	K [ft/d]	S
1	MW-1 Test 4	CGRS	6/23/2021	Bouwer && Rice	MW-1 Test 4		1.07×10^{0}	

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Wells**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO



	Name	Penetration	R [ft]	L [ft]	r [ft]	B [ft]
1	MW-2 Test 2	Fully	0.0833	7.52	0.0833	0.344

CGRS, Inc.
1301 Academy Court
Fort Collins, CO 80524

Slug Test - Water Level Data

Project: Poudre School District

Number: 22851

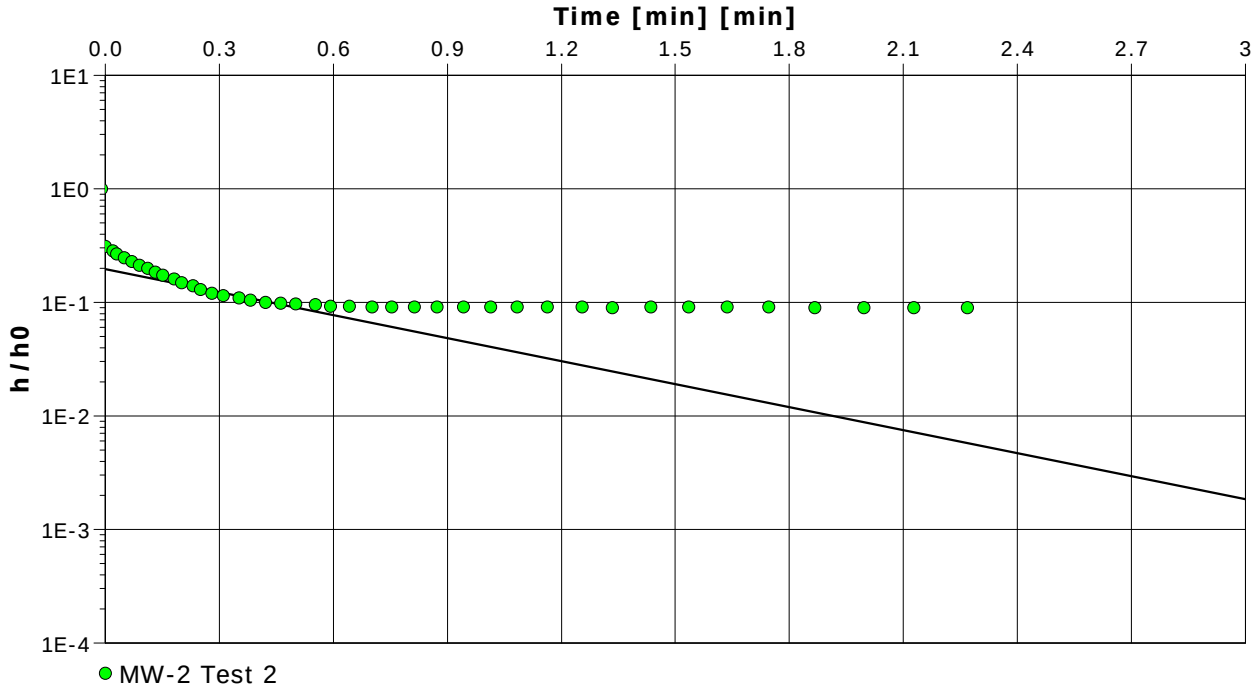
Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-2 Test 2	Test Well: MW-2 Test 2
Test conducted by: CGRS	Test date: 6/23/2021	
Water level at t=0 [ft]: 11.53	Static water level [ft]: 6.15	Water level change at t=0 [ft]: 5.38

	Time [min]	Water Level [ft]	WL Change [ft]
1	0	11.53	5.38
2	0.01	7.82	1.67
3	0.03	7.68	1.53
4	0.04	7.58	1.43
5	0.06	7.48	1.33
6	0.08	7.39	1.24
7	0.1	7.30	1.15
8	0.12	7.22	1.07
9	0.14	7.15	1.00
10	0.16	7.08	0.93
11	0.19	7.01	0.86
12	0.21	6.95	0.80
13	0.24	6.90	0.75
14	0.26	6.85	0.70
15	0.29	6.80	0.65
16	0.32	6.77	0.62
17	0.36	6.74	0.59
18	0.39	6.71	0.56
19	0.43	6.69	0.54
20	0.47	6.68	0.53
21	0.51	6.67	0.52
22	0.56	6.66	0.51
23	0.6	6.65	0.50
24	0.65	6.65	0.50
25	0.71	6.64	0.49
26	0.76	6.64	0.49
27	0.82	6.64	0.49
28	0.88	6.64	0.49
29	0.95	6.64	0.49
30	1.02	6.64	0.49
31	1.09	6.64	0.49
32	1.17	6.64	0.49
33	1.26	6.64	0.49
34	1.34	6.63	0.48
35	1.44	6.64	0.49
36	1.54	6.64	0.49
37	1.64	6.64	0.49
38	1.75	6.64	0.49
39	1.87	6.63	0.48
40	2	6.63	0.48
41	2.13	6.63	0.48
42	2.27	6.63	0.48

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	Slug Test Analysis Report
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-2 Test 2	Test Well: MW-2 Test 2
Test conducted by: CGRS		Test date: 6/23/2021
Analysis performed by: CGRS	MW-2 Test 2	Date: 6/23/2021
Aquifer Thickness: 7.96 ft		



Calculation after Bouwer && Rice

Observation well	K [ft/d]	
MW-2 Test 2	3.62×10^{0}	

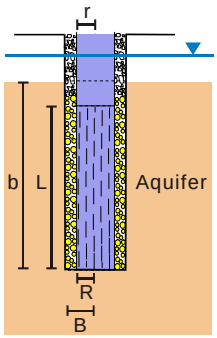
CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Slug Test - Analyses Report**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-2 Test 2	Test Well: MW-2 Test 2
Test conducted by: CGRS		Test date: 6/23/2021
Aquifer Thickness: 7.96 ft		

	Analysis Name	Analysis performed b	Date	Method name	Well	T [ft²/d]	K [ft/d]	S
1	MW-2 Test 2	CGRS	6/23/2021	Bouwer && Rice	MW-2 Test 2		3.62×10^{0}	

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Wells**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO



	Name	Penetration	R [ft]	L [ft]	r [ft]	B [ft]
1	MW-2 Test 4	Fully	0.0833	7.52	0.0833	0.344

CGRS, Inc.
1301 Academy Court
Fort Collins, CO 80524

Slug Test - Water Level Data

Project: Poudre School District

Number: 22851

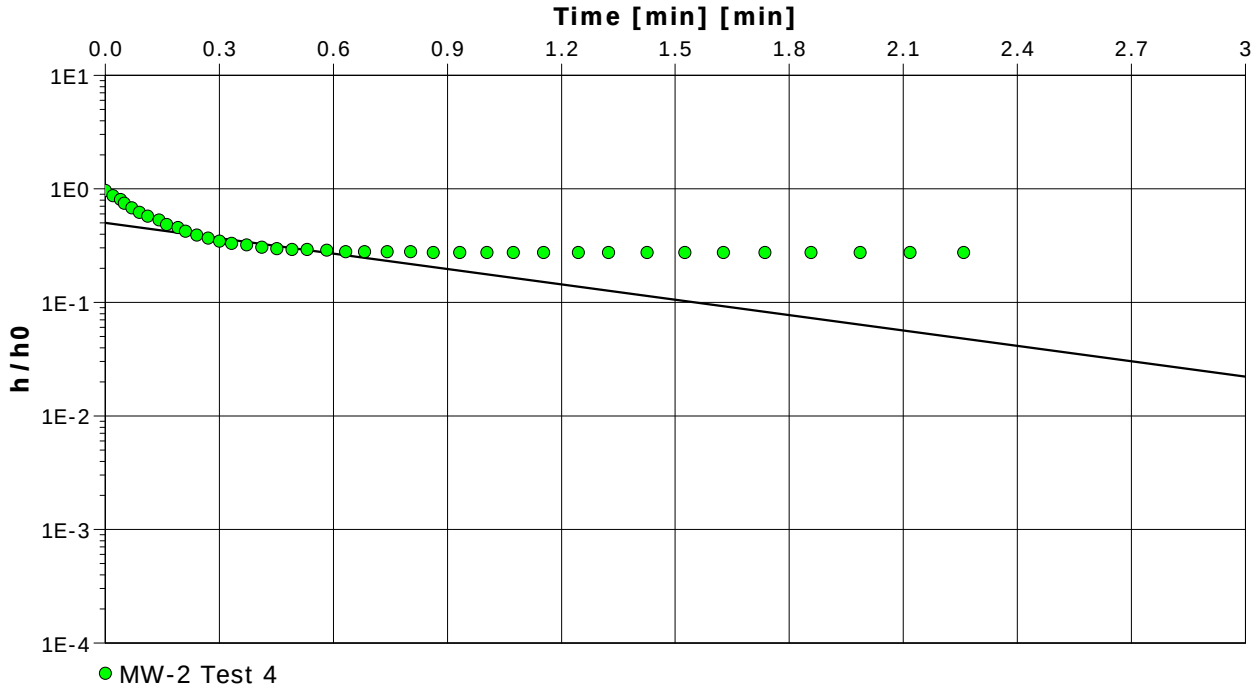
Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-2 Test 4	Test Well: MW-2 Test 4
Test conducted by: CGRS	Test date: 6/23/2021	
Water level at t=0 [ft]: 7.93	Static water level [ft]: 6.15	Water level change at t=0 [ft]: 1.78

	Time [min]	Water Level [ft]	WL Change [ft]
1	0	7.93	1.78
2	0.01	7.88	1.73
3	0.03	7.70	1.55
4	0.05	7.59	1.44
5	0.06	7.47	1.32
6	0.08	7.36	1.21
7	0.1	7.26	1.11
8	0.12	7.18	1.03
9	0.15	7.10	0.95
10	0.17	7.02	0.87
11	0.2	6.96	0.81
12	0.22	6.90	0.75
13	0.25	6.85	0.70
14	0.28	6.81	0.66
15	0.31	6.77	0.62
16	0.34	6.74	0.59
17	0.38	6.72	0.57
18	0.42	6.70	0.55
19	0.46	6.68	0.53
20	0.5	6.67	0.52
21	0.54	6.67	0.52
22	0.59	6.66	0.51
23	0.64	6.65	0.50
24	0.69	6.65	0.50
25	0.75	6.65	0.50
26	0.81	6.65	0.50
27	0.87	6.64	0.49
28	0.94	6.64	0.49
29	1.01	6.64	0.49
30	1.08	6.64	0.49
31	1.16	6.64	0.49
32	1.25	6.64	0.49
33	1.33	6.64	0.49
34	1.43	6.64	0.49
35	1.53	6.64	0.49
36	1.63	6.64	0.49
37	1.74	6.64	0.49
38	1.86	6.64	0.49
39	1.99	6.64	0.49
40	2.12	6.64	0.49
41	2.26	6.64	0.49

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Slug Test Analysis Report**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-2 Test 4	Test Well: MW-2 Test 4
Test conducted by: CGRS		Test date: 6/23/2021
Analysis performed by: CGRS	MW-2 Test 4	Date: 6/23/2021
Aquifer Thickness: 7.96 ft		



Calculation after Bouwer && Rice

Observation well	K [ft/d]	
MW-2 Test 4	2.41×10^{0}	

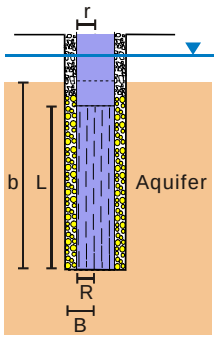
CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Slug Test - Analyses Report**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-2 Test 4	Test Well: MW-2 Test 4
Test conducted by: CGRS		Test date: 6/23/2021
Aquifer Thickness: 7.96 ft		

	Analysis Name	Analysis performed b	Date	Method name	Well	T [ft²/d]	K [ft/d]	S
1	MW-2 Test 4	CGRS	6/23/2021	Bouwer && Rice	MW-2 Test 4		2.41×10^{0}	

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Wells**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO



	Name	Penetration	R [ft]	L [ft]	r [ft]	B [ft]
1	MW-5 Test 2	Fully	0.0833	8.45	0.0833	0.344

CGRS, Inc.
1301 Academy Court
Fort Collins, CO 80524

Slug Test - Water Level Data

Project: Poudre School District

Number: 22851

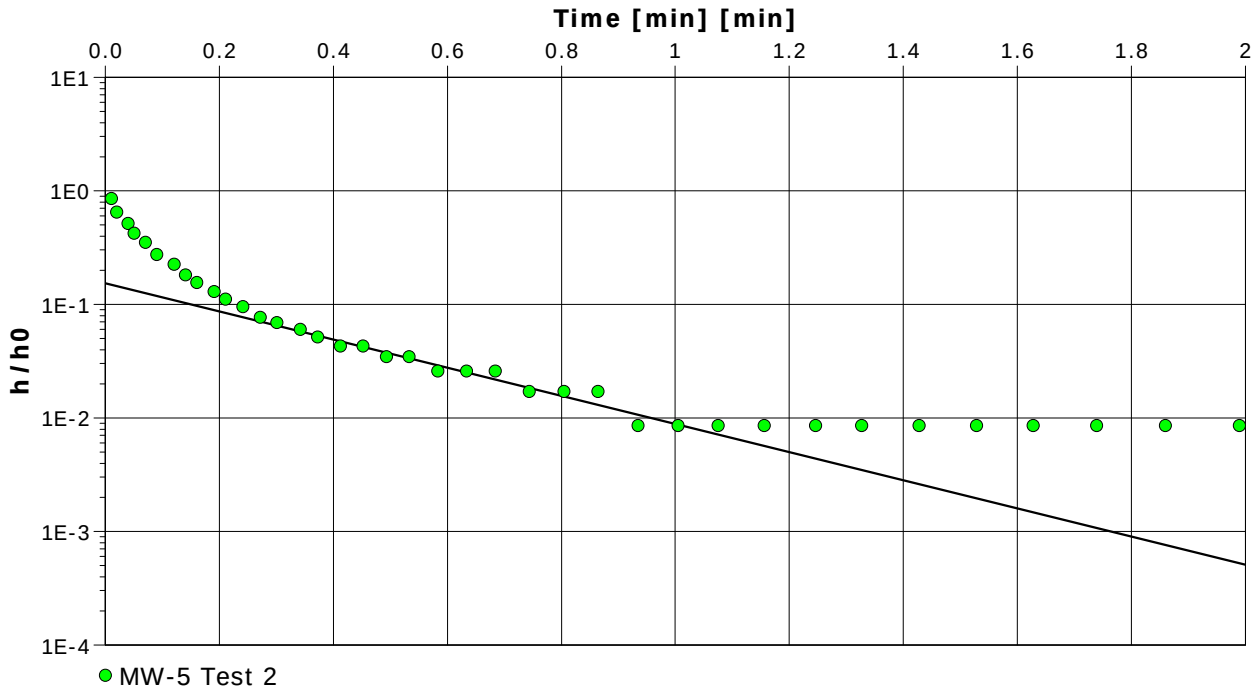
Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-5 Test 2	Test Well: MW-5 Test 2
Test conducted by: CGRS	Test date: 6/23/2021	
Water level at t=0 [ft]: 7.31	Static water level [ft]: 6.15	Water level change at t=0 [ft]: 1.16

	Time [min]	Water Level [ft]	WL Change [ft]
1	0	7.31	1.16
2	0.02	7.15	1.00
3	0.03	6.91	0.76
4	0.05	6.75	0.60
5	0.06	6.64	0.49
6	0.08	6.56	0.41
7	0.1	6.47	0.32
8	0.13	6.41	0.26
9	0.15	6.36	0.21
10	0.17	6.33	0.18
11	0.2	6.30	0.15
12	0.22	6.28	0.13
13	0.25	6.26	0.11
14	0.28	6.24	0.09
15	0.31	6.23	0.08
16	0.35	6.22	0.07
17	0.38	6.21	0.06
18	0.42	6.20	0.05
19	0.46	6.20	0.05
20	0.5	6.19	0.04
21	0.54	6.19	0.04
22	0.59	6.18	0.03
23	0.64	6.18	0.03
24	0.69	6.18	0.03
25	0.75	6.17	0.02
26	0.81	6.17	0.02
27	0.87	6.17	0.02
28	0.94	6.16	0.01
29	1.01	6.16	0.01
30	1.08	6.16	0.01
31	1.16	6.16	0.01
32	1.25	6.16	0.01
33	1.33	6.16	0.01
34	1.43	6.16	0.01
35	1.53	6.16	0.01
36	1.63	6.16	0.01
37	1.74	6.16	0.01
38	1.86	6.16	0.01
39	1.99	6.16	0.01

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Slug Test Analysis Report**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-5 Test 2	Test Well: MW-5 Test 2
Test conducted by: CGRS		Test date: 6/23/2021
Analysis performed by: CGRS	MW-5 Test 2	Date: 6/23/2021
Aquifer Thickness: 7.86 ft		



Calculation after Bouwer && Rice

Observation well	K [ft/d]	
MW-5 Test 2	6.08×10^{0}	

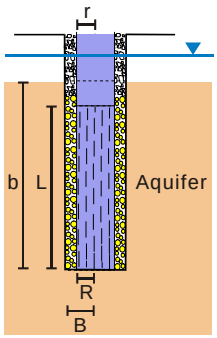
CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Slug Test - Analyses Report**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-5 Test 2	Test Well: MW-5 Test 2
Test conducted by: CGRS		Test date: 6/23/2021
Aquifer Thickness: 7.86 ft		

	Analysis Name	Analysis performed b	Date	Method name	Well	T [ft²/d]	K [ft/d]	S
1	MW-5 Test 2	CGRS	6/23/2021	Bouwer && Rice	MW-5 Test 2		6.08×10^{0}	

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Wells**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO



	Name	Penetration	R [ft]	L [ft]	r [ft]	B [ft]
1	MW-5 Test 4	Fully	0.0833	7.86	0.0833	0.344

CGRS, Inc.
1301 Academy Court
Fort Collins, CO 80524

Slug Test - Water Level Data

Project: Poudre School District

Number: 22851

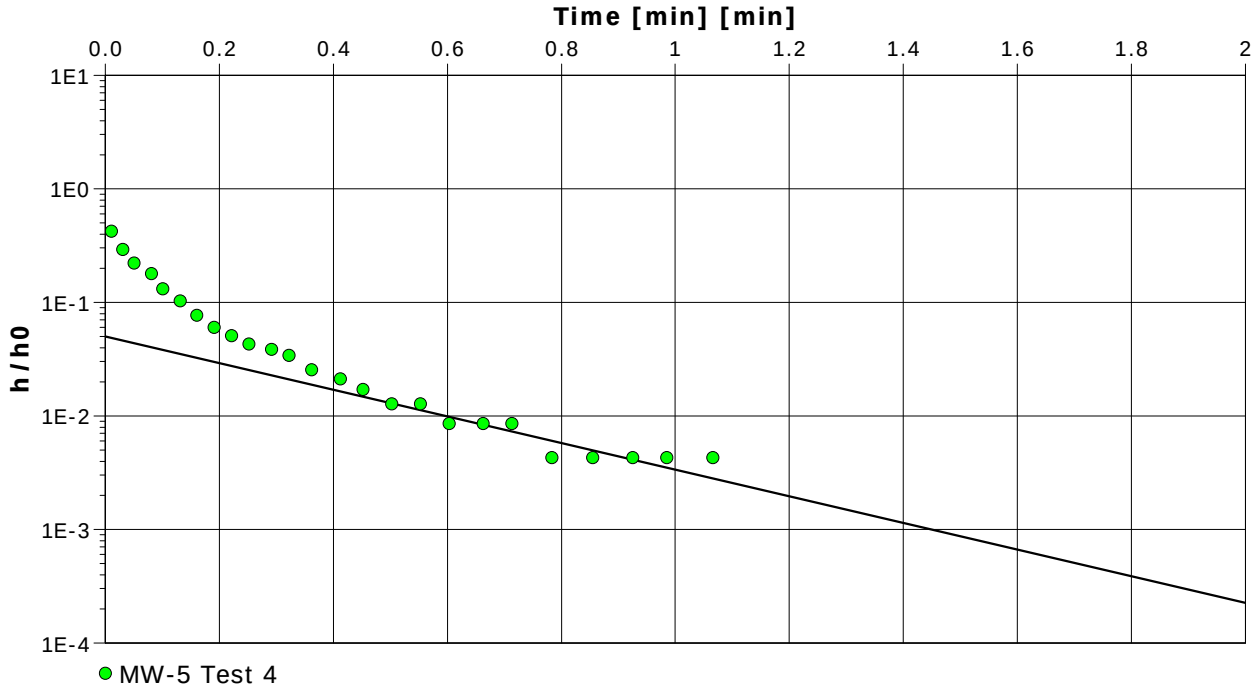
Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-5 Test 4	Test Well: MW-5 Test 4
Test conducted by: CGRS	Test date: 6/23/2021	
Water level at t=0 [ft]: 8.49	Static water level [ft]: 6.15	Water level change at t=0 [ft]: 2.34

	Time [min]	Water Level [ft]	WL Change [ft]
1	0	8.49	2.34
2	0.02	7.14	0.99
3	0.04	6.84	0.69
4	0.06	6.67	0.52
5	0.09	6.57	0.42
6	0.11	6.46	0.31
7	0.14	6.39	0.24
8	0.17	6.33	0.18
9	0.2	6.29	0.14
10	0.23	6.27	0.12
11	0.26	6.25	0.10
12	0.3	6.24	0.09
13	0.33	6.23	0.08
14	0.37	6.21	0.06
15	0.42	6.20	0.05
16	0.46	6.19	0.04
17	0.51	6.18	0.03
18	0.56	6.18	0.03
19	0.61	6.17	0.02
20	0.67	6.17	0.02
21	0.72	6.17	0.02
22	0.79	6.16	0.01
23	0.86	6.16	0.01
24	0.93	6.16	0.01
25	0.99	6.16	0.01
26	1.07	6.16	0.01
27	1.16	6.15	0.00
28	1.25	6.15	0.00
29	1.34	6.15	0.00
30	1.45	6.15	0.00
31	1.55	6.15	0.00
32	1.65	6.15	0.00
33	1.77	6.15	0.00

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	Slug Test Analysis Report
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-5 Test 4	Test Well: MW-5 Test 4
Test conducted by: CGRS		Test date: 6/23/2021
Analysis performed by: CGRS	MW-5 Test 4	Date: 6/23/2021
Aquifer Thickness: 7.86 ft		



Calculation after Bouwer && Rice

Observation well	K [ft/d]	
MW-5 Test 4	6.08×10^{0}	

CGRS, Inc. 1301 Academy Court Fort Collins, CO 80524	**Slug Test - Analyses Report**
	Project: Poudre School District
	Number: 22851
	Client: Poudre School District

Location: 2407 Laporte Avenue, Fort Collins CO	Slug Test: MW-5 Test 4	Test Well: MW-5 Test 4
Test conducted by: CGRS		Test date: 6/23/2021
Aquifer Thickness: 7.86 ft		

	Analysis Name	Analysis performed b	Date	Method name	Well	T [ft²/d]	K [ft/d]	S
1	MW-5 Test 4	CGRS	6/23/2021	Bouwer && Rice	MW-5 Test 4		6.08×10^{0}	

Summary of Clean-up Levels

MW-01 to MW-02

Dissolved Phase Groundwater Source

The receptor considered is: Adult Resident - Upper Percentile **7/20/2021** **EID 13977**

Exposure pathways depending on this source:

Ingestion of Groundwater

Site-Specific Target Levels (SSTLs) for Dissolved Phase Groundwater Source

	SSTL [mg/l]	Original Source Concentration [mg/l]	Chemical Solubility [mg/l]
Benzene	1.1E-02	7.6E-01	1.8E+03
Ethylbenzene	1.5E+00	5.9E-02	1.7E+02
Toluene	2.1E+00	1.1E+00	5.3E+02
Xylenes (total)	3.0E+00	3.9E-01	1.1E+02

Summary of Input Values Used in Fate and Transport Model

Model Description: MW-01 to MW-02

Source media: Groundwater (dissolved phase concentration) **7/20/2021** **EID 13977**
Saturated zone model (dissolved phase source)

Aquifer Properties			
Effective porosity	cm3/cm3	2.5E-01	Default
Fraction organic carbon	g oc/g soil	9.0E-03	Default
Hydraulic conductivity	m/d	8.7E-01	SCR slug geomean
Soil bulk density	g/cm3	1.6E+00	Q32021
Hydraulic gradient	m/m	1.2E-02	

Groundwater Source Geometry			
*****Pulse Source. Length of pulse:**	**yr**	**1.0E+02**	Default
Total thickness of source	m	1.0E+00	Default
Length of source	m	1.0E+01	Default
Width of source	m	1.0E+01	Default

Receptor Well Location			
Distance downgradient	m	1.5E+01	POE Figure
Distance cross-gradient	m	0.0E+00	
Depth to top of well screen	m	0.0E+00	
Depth to bottom of well screen	m	1.0E+00	Default
Number of vertical points used to calculate conc.	-	2.0E+00	
Longitudinal dispersivity code calculated. See output file.			
Transverse dispersivity code calculated. See output file.			
Vertical dispersivity code calculated. See output file.			
Dissolved Source for Groundwater Model [mg/l]			
Benzene	mg/l	7.6E-01	
Ethylbenzene	mg/l	5.9E-02	
Toluene	mg/l	1.1E+00	
Xylenes (total)	mg/l	3.9E-01	

Chemical Properties	**Units**	**Benzene**	**Ethylbenzene**	**Toluene**	**Xylenes (total)**
Diffusion coefficient in air	cm2/s	8.8E-02	7.5E-02	8.7E-02	8.5E-02
Diffusion coefficient in water	cm2/s	9.8E-06	7.8E-06	8.6E-06	9.9E-06
Solubility	mg/l	1.8E+03	1.7E+02	5.3E+02	1.1E+02
Kd (total soil partition coefficient)	L/kg	ND	ND	ND	ND
KOC (organiChem carbon partition coefficient	L/kg	5.9E+01	3.6E+02	1.8E+02	3.8E+02
Henry's Law coefficient	m3-H2O)/(m3-air	2.3E-01	3.2E-01	2.7E-01	2.1E-01
Molecular weight	g/mol	7.8E+01	1.1E+02	9.2E+01	1.1E+02
Degradation rate, saturated zone	1/d	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Summary of Clean-up Levels

MW-01 to Underground Electric

Dissolved Phase Groundwater Source

The receptor considered is: Adult Resident - Upper Percentile **7/20/2021** **EID 13977**

Exposure pathways depending on this source:

Ingestion of Groundwater

Site-Specific Target Levels (SSTLs) for Dissolved Phase Groundwater Source

	SSTL [mg/l]	Original Source Concentration [mg/l]	Chemical Solubility [mg/l]
Benzene	1.4E-02	7.6E-01	1.8E+03
Ethylbenzene	2.0E+00	5.9E-02	1.7E+02
Toluene	2.9E+00	1.1E+00	5.3E+02
Xylenes (total)	4.1E+00	3.9E-01	1.1E+02

Summary of Input Values Used in Fate and Transport Model

Model Description: MW-01 to Underground Electric

Source media: Groundwater (dissolved phase concentration) **7/20/2021** **EID 13977**
Saturated zone model (dissolved phase source)

Aquifer Properties			
Effective porosity	cm3/cm3	2.5E-01	Default
Fraction organic carbon	g oc/g soil	9.0E-03	Default
Hydraulic conductivity	m/d	8.7E-01	SCR slug geomean
Soil bulk density	g/cm3	1.6E+00	Default
Hydraulic gradient	m/m	1.2E-02	Q3 2021

Groundwater Source Geometry			
*****Pulse Source. Length of pulse:**	**yr**	**1.0E+02**	Default
Total thickness of source	m	1.0E+00	Default
Length of source	m	1.0E+01	Default
Width of source	m	1.0E+01	Default

Receptor Well Location			
Distance downgradient	m	2.0E+01	POE Figure
Distance cross-gradient	m	0.0E+00	
Depth to top of well screen	m	0.0E+00	
Depth to bottom of well screen	m	1.0E+00	Default
Number of vertical points used to calculate conc.	-	2.0E+00	
Longitudinal dispersivity code calculated. See output file.			
Transverse dispersivity code calculated. See output file.			
Vertical dispersivity code calculated. See output file.			

Dissolved Source for Groundwater Model [mg/l]		
Benzene	mg/l	7.6E-01
Ethylbenzene	mg/l	5.9E-02
Toluene	mg/l	1.1E+00
Xylenes (total)	mg/l	3.9E-01

Chemical Properties	**Units**	**Benzene**	**Ethylbenzene**	**Toluene**	**Xylenes (total)**
Diffusion coefficient in air	cm2/s	8.8E-02	7.5E-02	8.7E-02	8.5E-02
Diffusion coefficient in water	cm2/s	9.8E-06	7.8E-06	8.6E-06	9.9E-06
Solubility	mg/l	1.8E+03	1.7E+02	5.3E+02	1.1E+02
Kd (total soil partition coefficient)	L/kg	ND	ND	ND	ND
KOC (organiChem carbon partition coefficient	L/kg	5.9E+01	3.6E+02	1.8E+02	3.8E+02
Henry's Law coefficient	m3-H2O)/(m3-air	2.3E-01	3.2E-01	2.7E-01	2.1E-01
Molecular weight	g/mol	7.8E+01	1.1E+02	9.2E+01	1.1E+02
Degradation rate, saturated zone	1/d	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Summary of Clean-up Levels

MW-01 to Property Boundary

Dissolved Phase Groundwater Source **7/20/2021** **EID 13977**

The receptor considered is: Adult Resident - Upper Percentile

Exposure pathways depending on this source:

Ingestion of Groundwater

Site-Specific Target Levels (SSTLs) for Dissolved Phase Groundwater Source

	SSTL [mg/l]	Original Source Concentration [mg/l]	Chemical Solubility [mg/l]
Benzene	8.6E-02	7.6E-01	1.8E+03
Ethylbenzene	2.8E+01	5.9E-02	1.7E+02
Toluene	1.9E+01	1.1E+00	5.3E+02
Xylenes (total)	6.2E+01	3.9E-01	1.1E+02

Summary of Input Values Used in Fate and Transport Model

Model Description: MW-01 to Property Boundary

Source media: Groundwater (dissolved phase concentration) **7/20/2021** **EID 13977**
Saturated zone model (dissolved phase source)

Aquifer Properties			
Effective porosity	cm3/cm3	2.5E-01	Default
Fraction organic carbon	g oc/g soil	9.0E-03	Default
Hydraulic conductivity	m/d	8.7E-01	SCR slug geomean
Soil bulk density	g/cm3	1.6E+00	Default
Hydraulic gradient	m/m	1.2E-02	Q3 2021

Groundwater Source Geometry			
*****Pulse Source. Length of pulse:**	**yr**	**1.0E+02**	
Total thickness of source	m	1.0E+00	Default
Length of source	m	1.0E+01	Default
Width of source	m	1.0E+01	Default

Receptor Well Location			
Distance downgradient	m	7.4E+01	POE Figure
Distance cross-gradient	m	0.0E+00	
Depth to top of well screen	m	0.0E+00	
Depth to bottom of well screen	m	1.0E+00	Default
Number of vertical points used to calculate conc.	-	2.0E+00	
Longitudinal dispersivity code calculated. See output file.			
Transverse dispersivity code calculated. See output file.			
Vertical dispersivity code calculated. See output file.			
Dissolved Source for Groundwater Model [mg/l]			
Benzene	mg/l	7.6E-01	
Ethylbenzene	mg/l	5.9E-02	
Toluene	mg/l	1.1E+00	
Xylenes (total)	mg/l	3.9E-01	

Chemical Properties	**Units**	**Benzene**	**Ethylbenzene**	**Toluene**	**Xylenes (total)**
Diffusion coefficient in air	cm2/s	8.8E-02	7.5E-02	8.7E-02	8.5E-02
Diffusion coefficient in water	cm2/s	9.8E-06	7.8E-06	8.6E-06	9.9E-06
Solubility	mg/l	1.8E+03	1.7E+02	5.3E+02	1.1E+02
Kd (total soil partition coefficient)	L/kg	ND	ND	ND	ND
KOC (organiChem carbon partition coefficient	L/kg	5.9E+01	3.6E+02	1.8E+02	3.8E+02
Henry's Law coefficient	m3-H2O)/(m3-air	2.3E-01	3.2E-01	2.7E-01	2.1E-01
Molecular weight	g/mol	7.8E+01	1.1E+02	9.2E+01	1.1E+02
Degradation rate, saturated zone	1/d	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Summary of Clean-up Levels

MW-01 to Across the Street

Dissolved Phase Groundwater Source

The receptor considered is: Adult Resident - Upper Percentile **7/20/2021** **EID 13977**

Exposure pathways depending on this source:

Ingestion of Groundwater

Site-Specific Target Levels (SSTLs) for Dissolved Phase Groundwater Source

	SSTL [mg/l]	Original Source Concentration [mg/l]	Chemical Solubility [mg/l]
Benzene	1.1E-01	7.6E-01	1.8E+03
Ethylbenzene	4.6E+01	5.9E-02	1.7E+02
Toluene	2.6E+01	1.1E+00	5.3E+02
Xylenes (total)	1.1E+02	3.9E-01	1.1E+02

Summary of Input Values Used in Fate and Transport Model

Model Description: MW-01 to Across the Street

Source media: Groundwater (dissolved phase concentration) **7/20/2021** **EID 13977**
Saturated zone model (dissolved phase source)

Aquifer Properties			
Effective porosity	cm3/cm3	2.5E-01	Default
Fraction organic carbon	g oc/g soil	9.0E-03	Default
Hydraulic conductivity	m/d	8.7E-01	SCR slug geomean
Soil bulk density	g/cm3	1.6E+00	Default
Hydraulic gradient	m/m	1.2E-02	Q32021

Groundwater Source Geometry			
*****Pulse Source. Length of pulse:**	**yr**	**1.0E+02**	
Total thickness of source	m	1.0E+00	Default
Length of source	m	1.0E+01	Default
Width of source	m	1.0E+01	Default

Receptor Well Location			
Distance downgradient	m	8.5E+01	POE Figure
Distance cross-gradient	m	0.0E+00	
Depth to top of well screen	m	0.0E+00	
Depth to bottom of well screen	m	1.0E+00	Default
Number of vertical points used to calculate conc.	-	2.0E+00	
Longitudinal dispersivity code calculated. See output file.			
Transverse dispersivity code calculated. See output file.			
Vertical dispersivity code calculated. See output file.			
Dissolved Source for Groundwater Model [mg/l]			
Benzene	mg/l	7.6E-01	
Ethylbenzene	mg/l	5.9E-02	
Toluene	mg/l	1.1E+00	
Xylenes (total)	mg/l	3.9E-01	

Chemical Properties	**Units**	**Benzene**	**Ethylbenzene**	**Toluene**	**Xylenes (total)**
Diffusion coefficient in air	cm2/s	8.8E-02	7.5E-02	8.7E-02	8.5E-02
Diffusion coefficient in water	cm2/s	9.8E-06	7.8E-06	8.6E-06	9.9E-06
Solubility	mg/l	1.8E+03	1.7E+02	5.3E+02	1.1E+02
Kd (total soil partition coefficient)	L/kg	ND	ND	ND	ND
KOC (organiChem carbon partition coefficient	L/kg	5.9E+01	3.6E+02	1.8E+02	3.8E+02
Henry's Law coefficient	m3-H2O)/(m3-air	2.3E-01	3.2E-01	2.7E-01	2.1E-01
Molecular weight	g/mol	7.8E+01	1.1E+02	9.2E+01	1.1E+02
Degradation rate, saturated zone	1/d	0.0E+00	0.0E+00	0.0E+00	0.0E+00

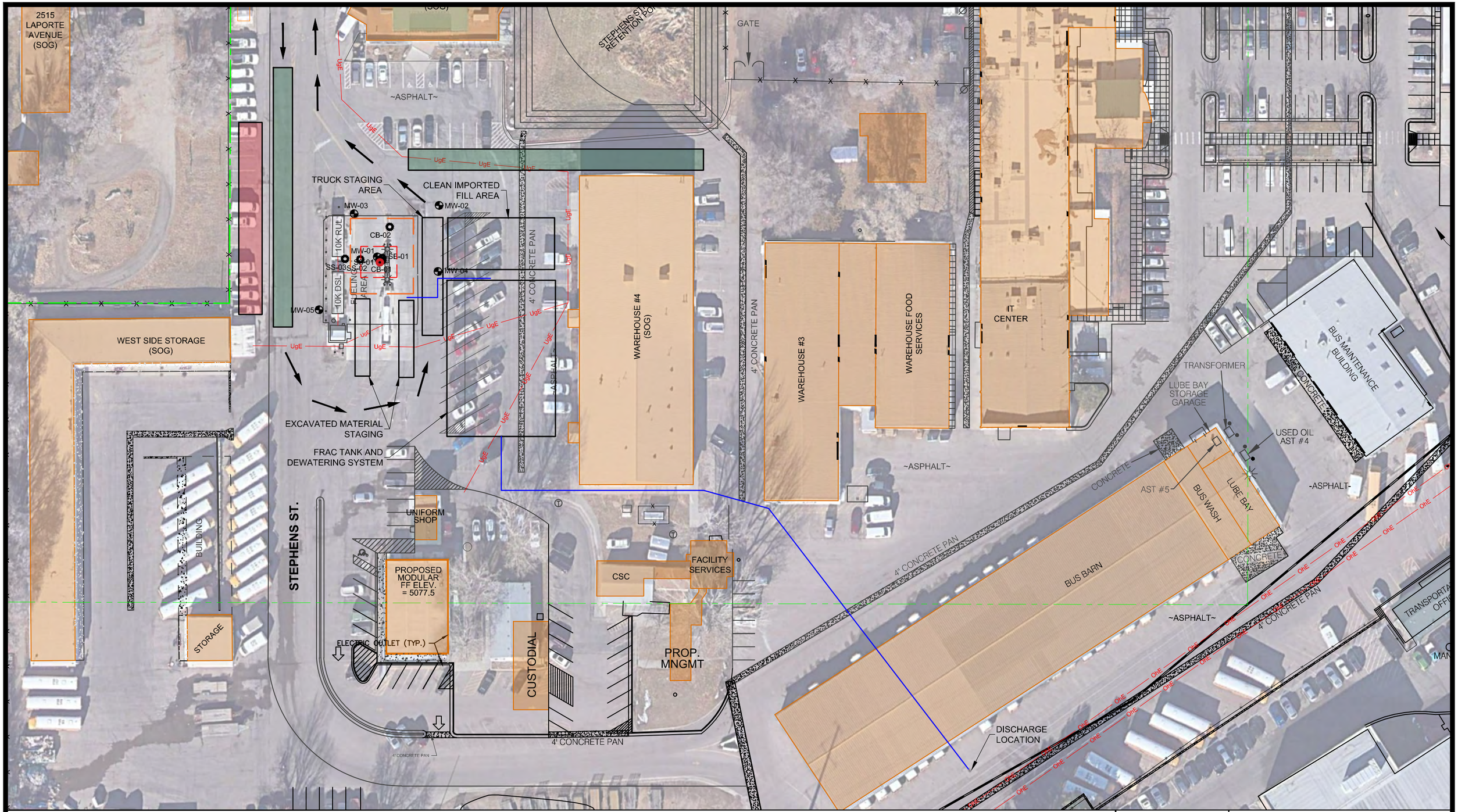
Estimated Petroleum Hydrocarbon Mass Calculations
Poudre School District R-1
January 27, 2022
2407 Laporte Avenue, Fort Collins, CO
OPS Event ID: 13977
CGRS Project: 22851

Dissolved TPH Mass in Groundwater	Units	Quantity	Comments
Geometric Mean of TPH Concentration (C)	mg/L	**5.01**	Geometric Mean of TPH reported in wells within the inferred area of the dissolved Benzene plume including: MW-1
Source Area (A)	sqft	**525**	Encompassing approximate area of inferred benzene plume
Source Area Thickness (T)	ft	**3**	Assumed in top 3 ft of aquifer
Volume (V)	ft	**1,575**	T x A
Porosity (P)	%	**25**	Assumed
Total Dissolved TPH Mass	**lbs**	**0.123**	(V*28.3L/cuft*P*C mg/L*2.2E-6lbs/mg)
	kg	**0.056**	
Dissolved Benzene Mass in Groundwater	**Units**	**Quantity**	**Comments**
Average Benzene Concentration	mg/L	**0.200**	average MW-1
Source Area Length (L)	ft	**50**	Encompassing approximate area of inferred benzene plume
Source Area Width (W)	ft	**11**	Encompassing approximate area of inferred benzene plume
Area (A)	sqft	525	L x W
Source Area Thickness (T)	ft	**3**	assumed in top 3 ft of aquifer
Volume (V)	ft	1,575	T x A
Porosity (P)	%	**25**	assumed
Dissolved Benzene Mass	**lbs**	**0.490**	(V * 28.3L/cuft * P * C mg/L * 2.2E-6lbs/mg)
	kg	**0.222**	
TPH - Total Petroleum Hydrocarbons as Gasoline and Diesel			ft - feet
mg/kg - milligrams per kilogram			cuft - cubic feet
mg/L - milligrams per liter			sqft - square feet
% - percent			lbs - pounds
Blue represents estimated input values			lbs/cuft - pounds per cubic feet

Estimated Petroleum Hydrocarbon Mass Calculations
Poudre School District R-1
January 27, 2022
2407 Laporte Avenue, Fort Collins, CO
OPS Event ID: 13977
CGRS Project: 22851

Sorbed TPH Mass in Soil	Units	Quantity	Comments
Geometric Mean of TPH Concentration (C)	mg/kg	**20**	Geometric Mean of TPH concentrations in soil samples within the area where TPH concentrations were above 500 mg/kg, including: SB-1, MW-1, MW-3, SS-1. SS-2, and CB-1)
Source Area (A)	sqft	**937**	Encompassing approximate area of the soil samples listed above
Source Area Thickness (T)	ft	**3**	Impacted soil reported between 4' and 7' bgs
Volume (V)	cuft	**2,811**	T x A
Density (clayey sand) (D lbs/cu ft)	lbs/cuft	**90**	Assumed base on soil type
Total Sorbed TPH Mass	**lbs**	**5.117**	(C mg/kg / 1x10^6 * D * V)
	kg	**2.321**	
Sorbed Benzene Mass in Soil	**Units**	**Quantity**	**Comments**
Geometric Mean of Benzene Concentration (C)	mg/kg	**0.09**	Geometric Mean of benzene concentrations in soil samples within the area where TPH concentrations were above 500 mg/kg, including: MW-1, MW-2, SB-1, SS-1, CB-1, and CB-2)
Source Area (A)	sqft	**982**	Encompassing approximate area of the soil samples listed above
Source Area Thickness (T)	ft	**5**	Impacted soil reported between 4' and 9' bgs
Volume (V)	cuft	**4,910**	T x A
Density (clayey sand) (D lbs/cuft)	lbs/cuft	**90**	Assumed base on soil type
Total Sorbed Benzene Mass	**lbs**	**0.0400**	(C mg/kg / 1x10^6 * D * V)
	kg	**0.0182**	

TPH - Total Petroleum Hydrocarbons as Gasoline and Diesel			ft - feet
mg/kg - milligrams per kilogram			cuft - cubic feet
mg/L - milligrams per liter			sqft - square feet
% - percent			lbs - pounds
Blue represents estimated input values			lbs/cuft - pounds per cubic feet



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION
- LEAK LOCATION & CENTER OF MAX FLUORESCENCE RESPONCE DETECTION
- OPEN FOR TRAVEL
- CLOSED FOR TRAVEL
- FRAC TANK HOSE PATH
- SURFACE EXCAVATION AREA (CONCRETE)
- IMPACTED SOIL EXCAVATION AREA
- TRUCK TRAVEL PATH
- TELEPHONE MANHOLE
- POWER POLE
- STREETLIGHT
- BUILDING
- (SOG) SLAB ON GRADE
- APPROXIMATE PROPERTY BOUNDARY
- FENCE
- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST
- AST ABOVE GROUND STORAGE TANK
- FUEL DISPENSERS

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 10 20 30 40 50 60

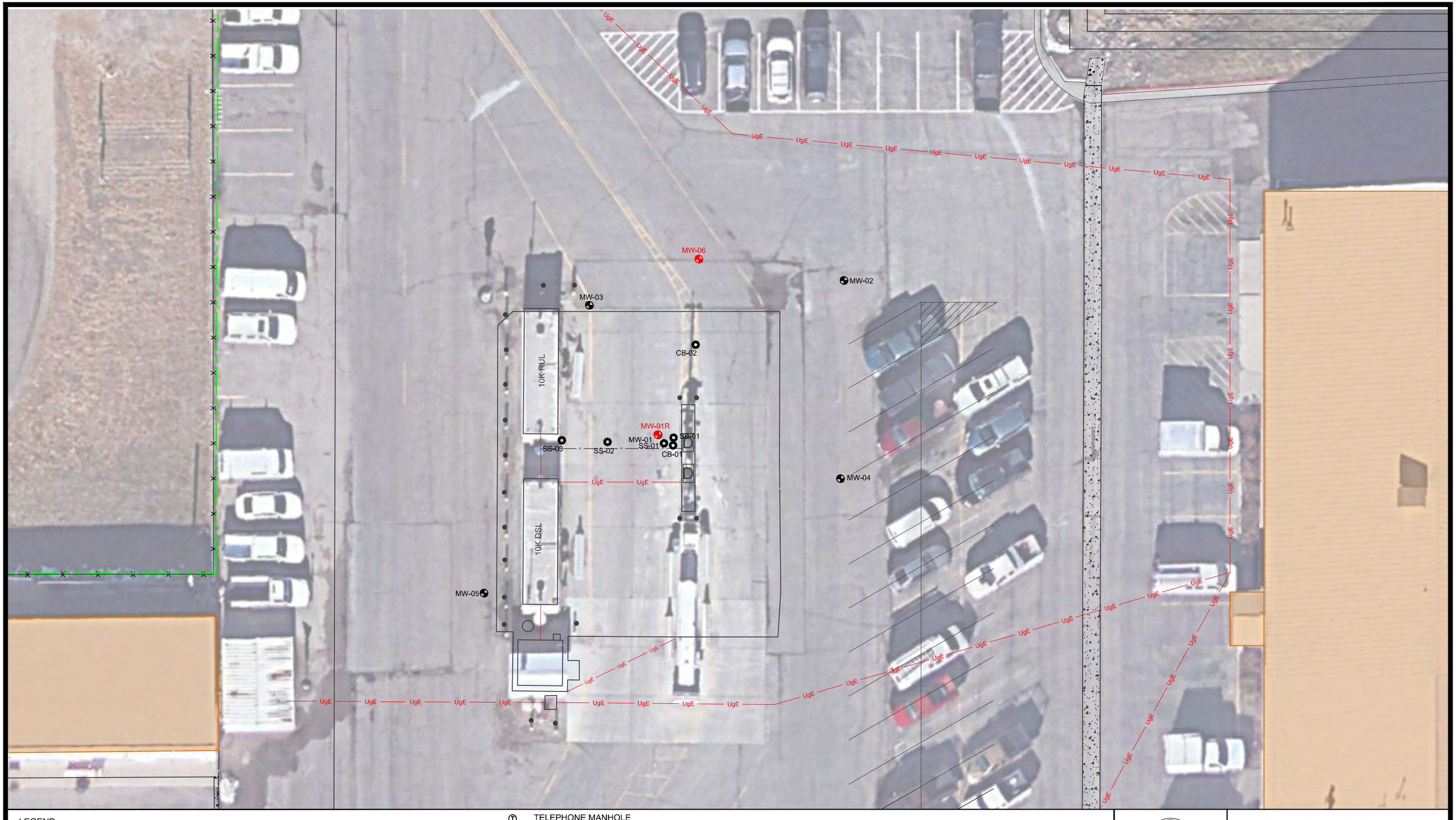
SCALE IN FEET

PROPOSED EXCAVATION FIGURE

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE:	REVIEW:
2/15/2022	

CGRS SOLUTIONS DELIVERED



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION
- MW-01 PROPOSED MONITORING WELL LOCATION

- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST
- AST ABOVE GROUND STORAGE TANK
- D FUEL DISPENSERS
- APPROXIMATE PROPERTY BOUNDARY
- FENCE

- TELEPHONE MANHOLE
- POWER POLE
- STREETLIGHT
- BUILDING
- (SOG) SLAB ON GRADE

NOTE: **BOLD** VALUES INDICATE CONCENTRATION EXCEEDS THE APPLICABLE REGULATORY GUIDELINES

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 5 10 15 20

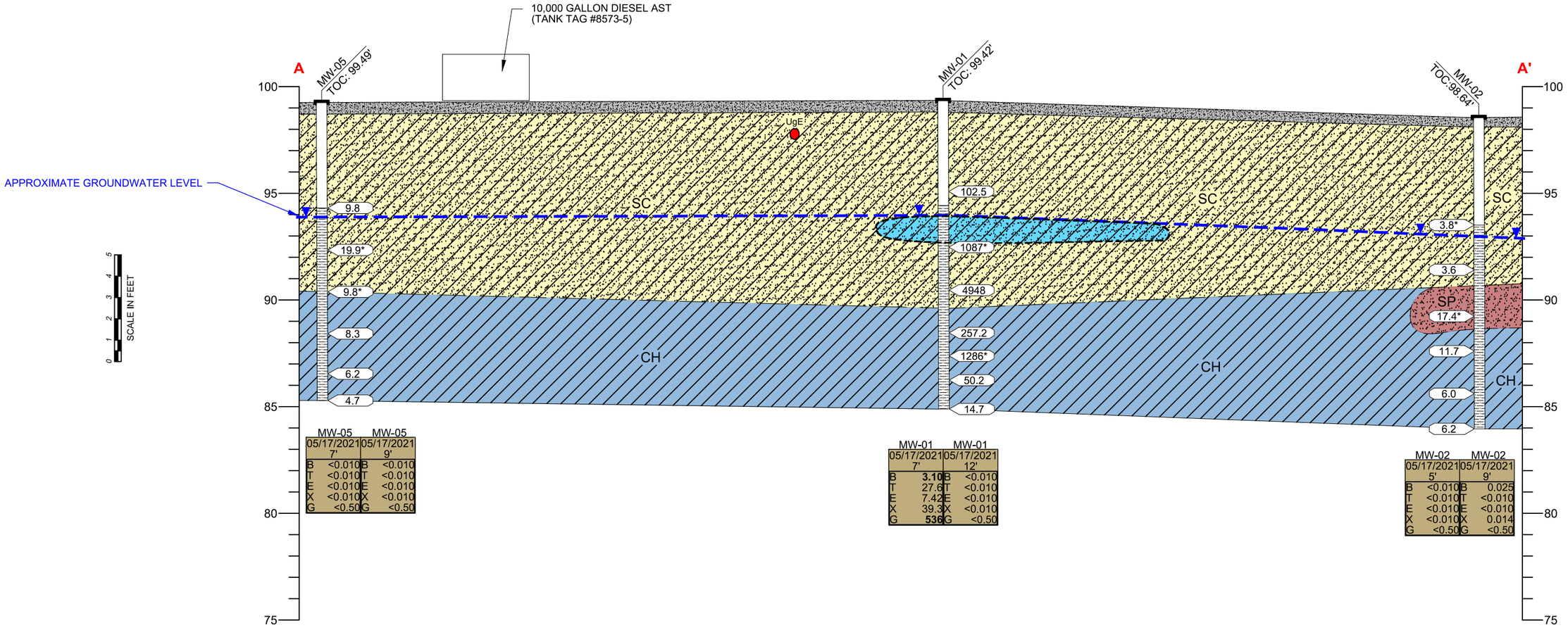
SCALE IN FEET

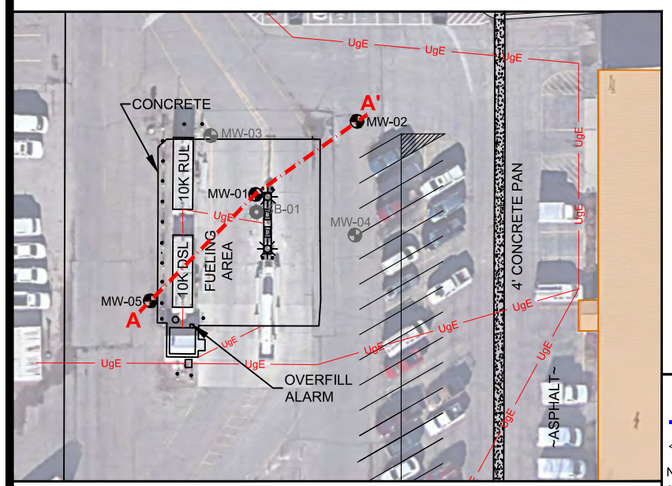
PROPOSED MONITORING WELL LOCATION FIGURE

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE:	REVIEW:
2/16/2022	

CGRS SOLUTIONS DELIVERED





TRANSECT LOCATION

0 10 20 30 40 50 60
SCALE IN FEET

0 5 10
SCALE IN FEET

LEGEND

APPROXIMATE GROUNDWATER LEVEL

0.0 PID READING (ppm)

NOTES:
- * DENOTES SAMPLE RETAINED FOR ANALYSIS
- TOC = TOP OF CASING ELEVATION (IN FEET)
- **BOLD** VALUES INDICATE CONCENTRATION EXCEEDS THE RISK BASED SCREENING LEVEL

SAMPLE DATE SAMPLE DEPTH
B BENZENE (mg/kg)
T TOLUENE (mg/kg)
E ETHYLBENZENE (mg/kg)
X TOTAL XYLENES (mg/kg)
G TOTAL VOLATILE PETROLEUM HYDROCARBONS AS GASOLINE (mg/kg)

CLAYEY SAND (SC)

SANDY CLAY (CH)

SAND (SP)

APPROXIMATE AREA OF IMPACTED GROUNDWATER

CONCRETE

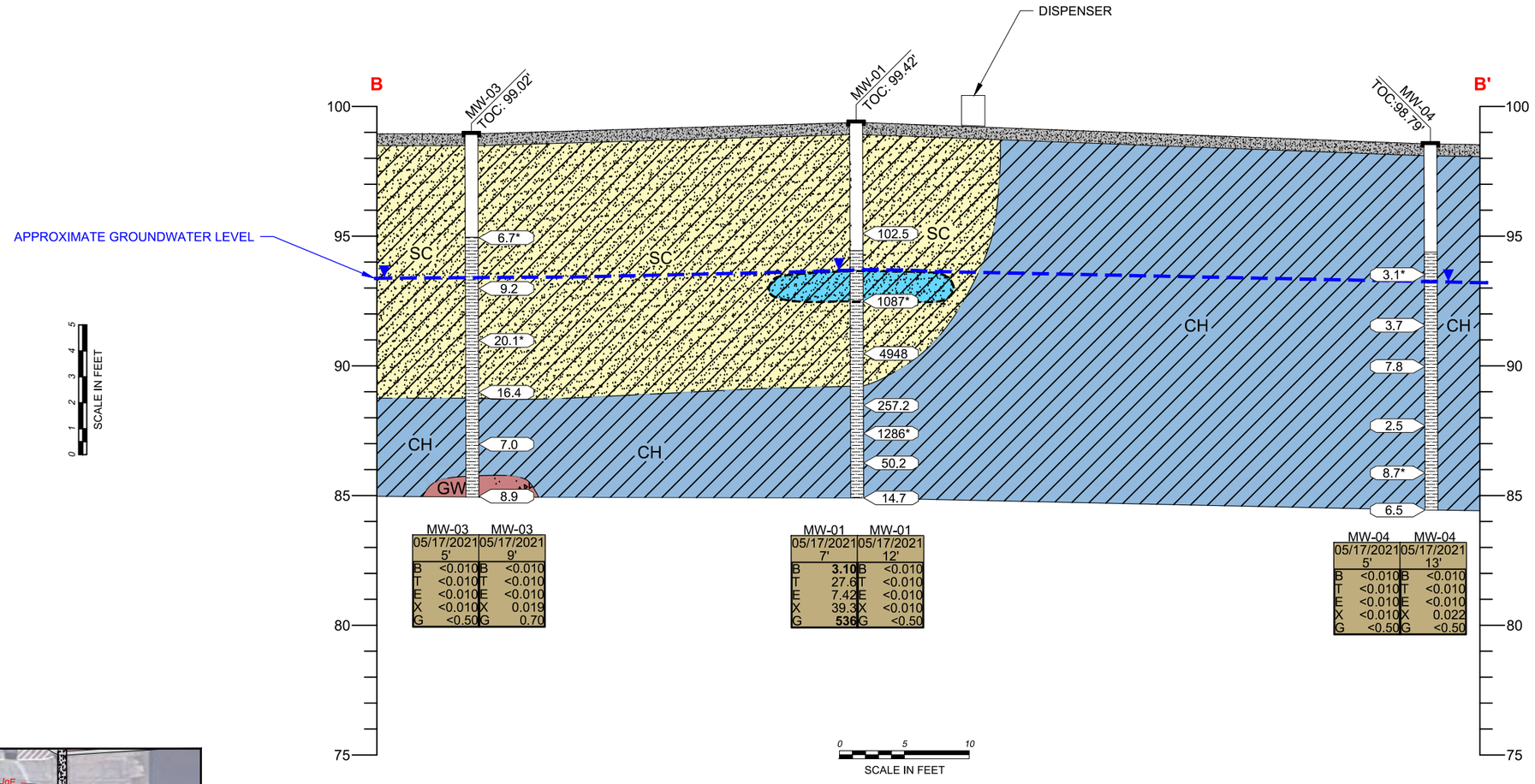
UgE UNDERGROUND ELECTRIC LINE

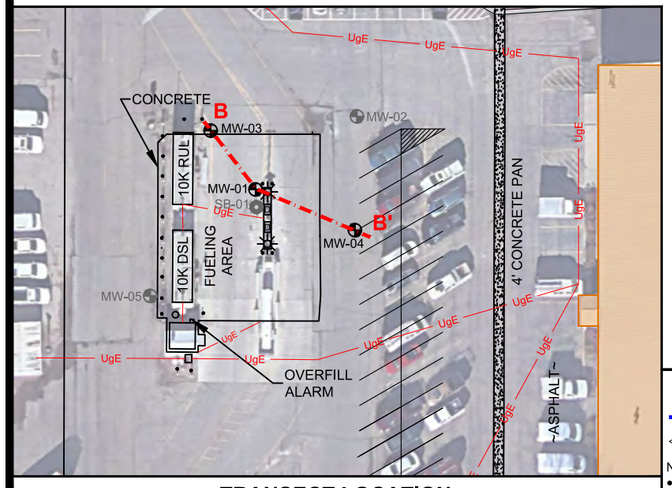
GEOLOGIC TRANSECT DIAGRAM (A-A')

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	CLB
DATE:	REVIEW:
7/29/2021	

CGRS SOLUTIONS DELIVERED





TRANSECT LOCATION

0 10 20 30 40 50 60
SCALE IN FEET

LEGEND

APPROXIMATE GROUNDWATER LEVEL

0.0 PID READING (ppm)

NOTES:
- * DENOTES SAMPLE RETAINED FOR ANALYSIS
- TOC = TOP OF CASING ELEVATION (IN FEET)
- **BOLD** VALUES INDICATE CONCENTRATION EXCEEDS THE RISK BASED SCREENING LEVEL

SAMPLE DATE
SAMPLE DEPTH
B BENZENE (mg/kg)
T TOLUENE (mg/kg)
E ETHYLBENZENE (mg/kg)
X TOTAL XYLENES (mg/kg)
G TOTAL VOLATILE PETROLEUM HYDROCARBONS AS GASOLINE (mg/kg)

CLAYEY SAND (SC)

SANDY CLAY (CH)

GRAVELLY SAND (GW)

APPROXIMATE AREA OF IMPACTED GROUNDWATER

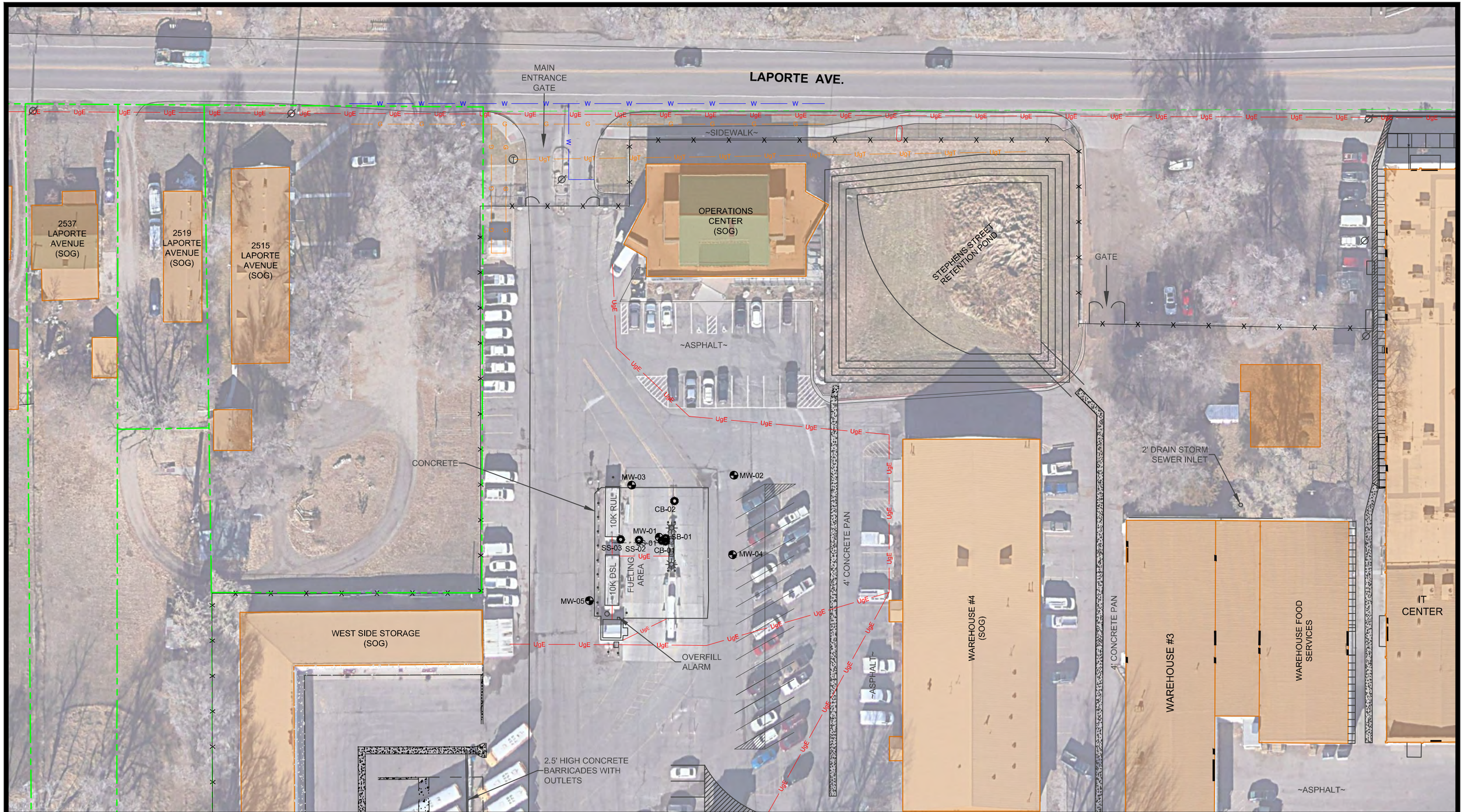
CONCRETE

GEOLOGIC TRANSECT DIAGRAM (B-B')

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	CLB
DATE:	REVIEW:
7/30/2021	

CGRS SOLUTIONS DELIVERED



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION
- TELEPHONE MANHOLE
- FUEL DISPENSERS
- POWER POLE
- STREETLIGHT
- BUILDING
- UgT UNDERGROUND TELEPHONE LINE
- UgE UNDERGROUND ELECTRIC LINE
- W WATER LINE
- G GAS LINE
- FENCE
- APPROXIMATE PROPERTY BOUNDARY
- (SOG) SLAB ON GRADE
- AST ABOVE GROUND STORAGE TANK
- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 10 20 30 40 50

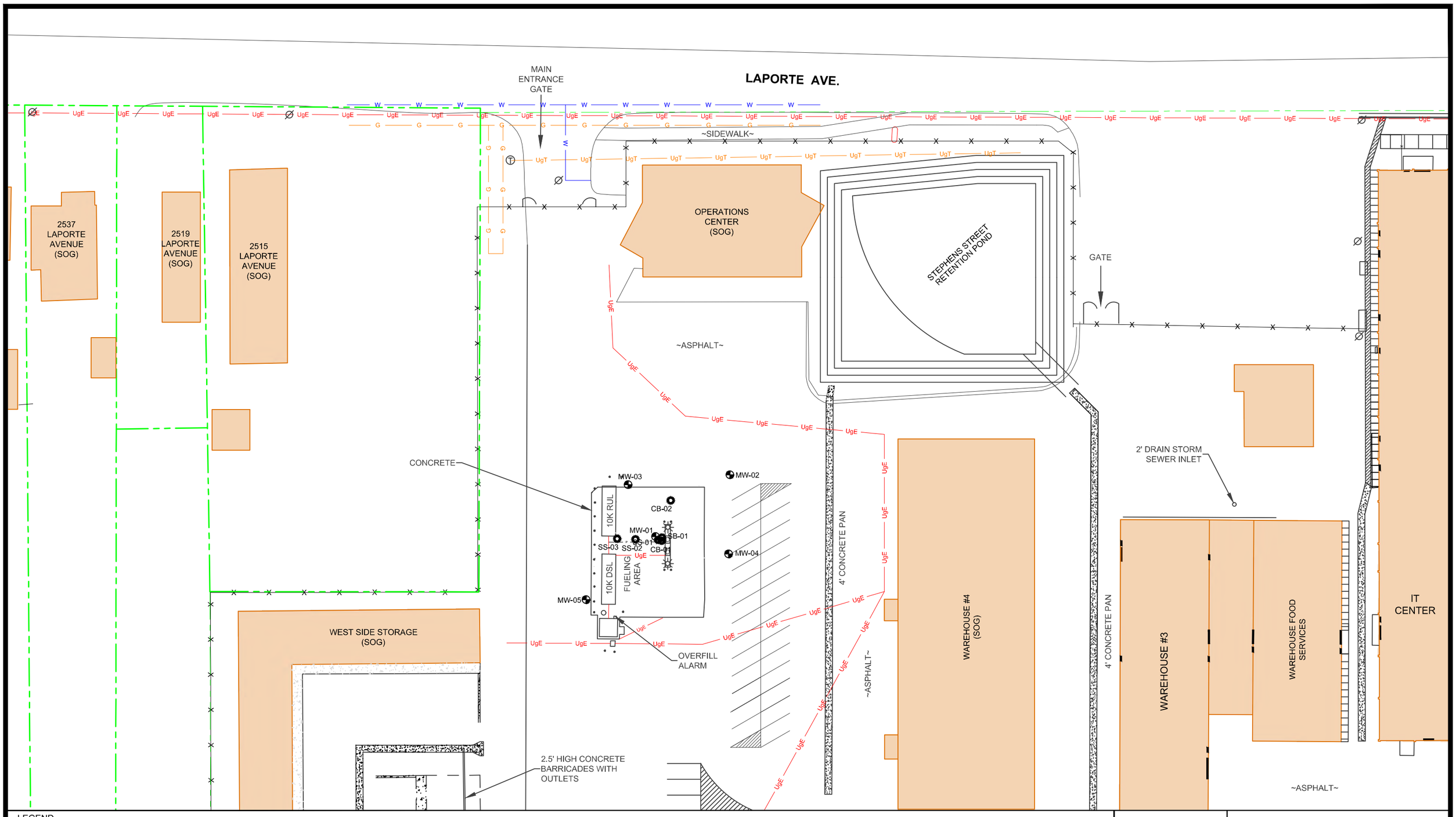
SCALE IN FEET

POE LOCATION FIGURE

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE:	REVIEW:
2/16/2022	

CGRS SOLUTIONS DELIVERED



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION
- TELEPHONE MANHOLE
- FUEL DISPENSERS
- POWER POLE
- STREETLIGHT
- BUILDING
- UgT UNDERGROUND TELEPHONE LINE
- UgE UNDERGROUND ELECTRIC LINE
- W WATER LINE
- G GAS LINE
- FENCE
- APPROXIMATE PROPERTY BOUNDARY
- (SOG) SLAB ON GRADE
- AST ABOVE GROUND STORAGE TANK
- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 10 20 30 40 50

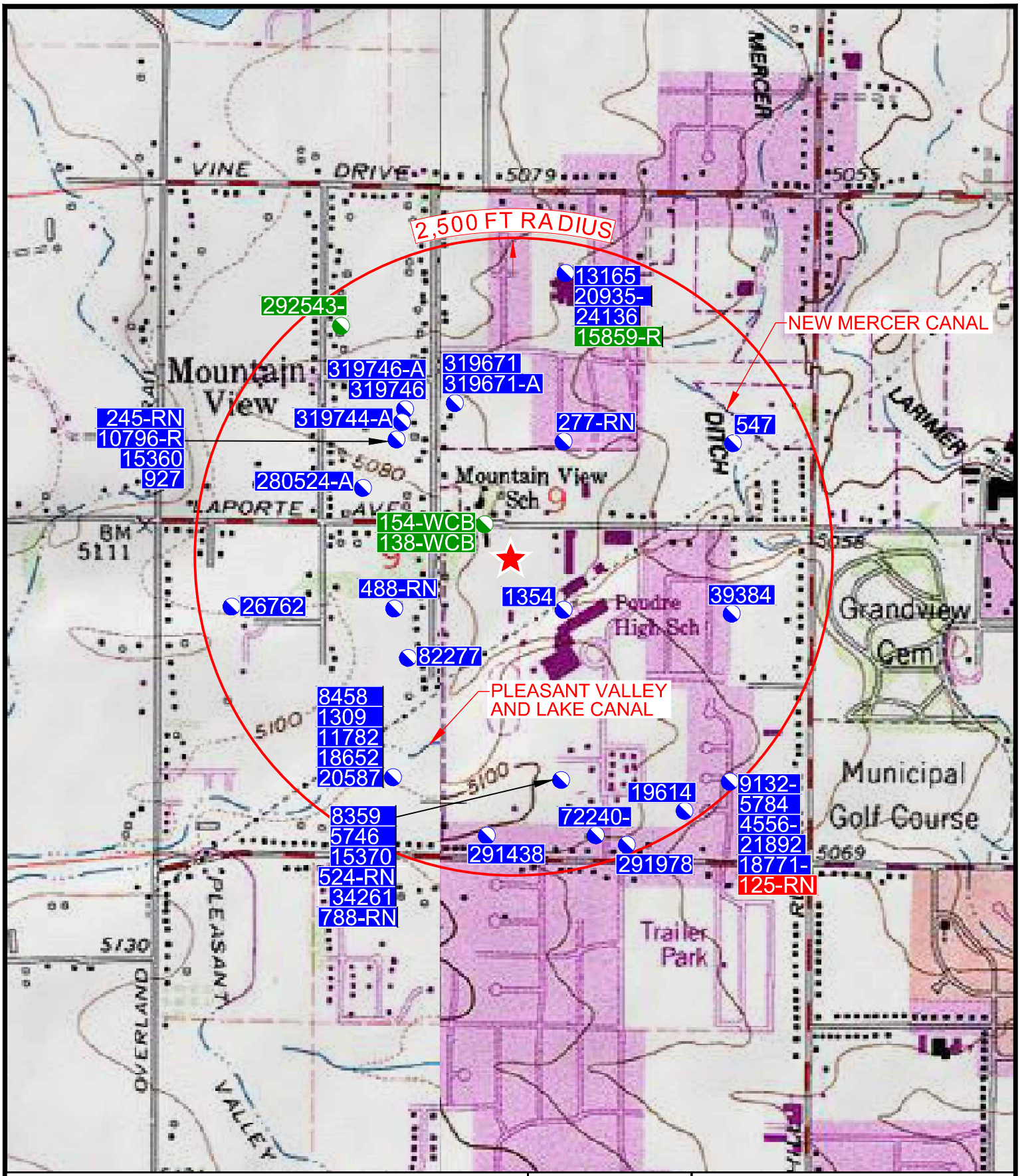
SCALE IN FEET

POE LOCATION FIGURE

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE: 2/16/2022	REVIEW:

CGRS SOLUTIONS DELIVERED



LEGEND

COLORADO

■ QUADRANGLE LOCATION

★ SITE LOCATION

1354 DOMESTIC WATER WELL

292543 IRRIGATION WELL

125-RN STOCK

NUMERALS WITH WELL SYMBOLS DENOTE ASSOCIATED PERMIT NUMBER

0 500 1000

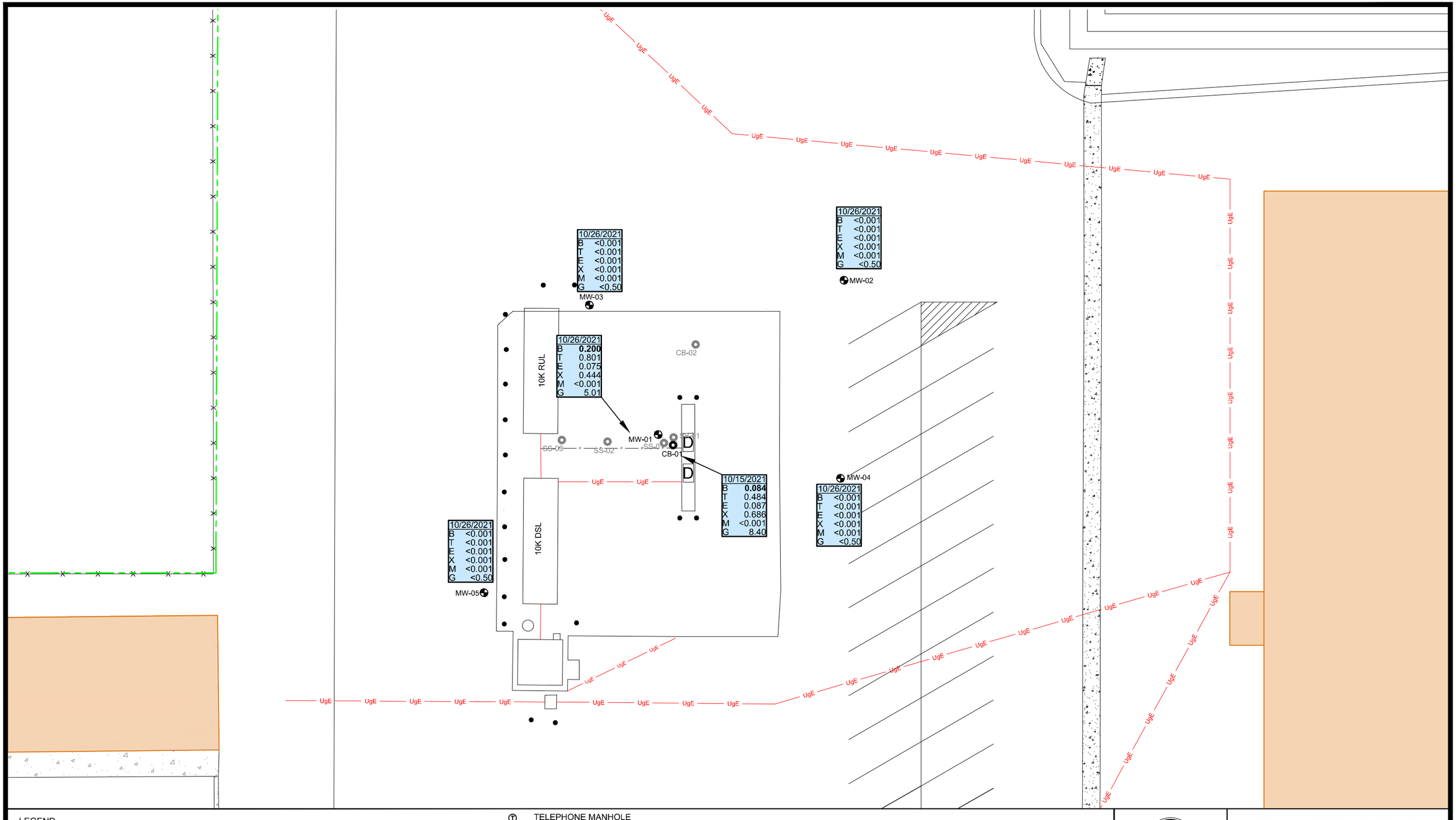
SCALE IN FEET

WATER WELL & SURFACE WATER FIGURE

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	CLB
DATE:	REVIEW:
7/28/2021	

CGRS SOLUTIONS DELIVERED



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION

- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST
- AST ABOVE GROUND STORAGE TANK
- D FUEL DISPENSERS
- APPROXIMATE PROPERTY BOUNDARY
- FENCE

- TELEPHONE MANHOLE
- POWER POLE
- STREETLIGHT
- BUILDING
- (SOG) SLAB ON GRADE

NOTE: **BOLD** VALUES INDICATE CONCENTRATION EXCEEDS THE APPLICABLE REGULATORY GUIDELINES

- B BENZENE (mg/L)
- T TOLUENE (mg/L)
- E ETHYLBENZENE (mg/L)
- X TOTAL XYLENES (mg/L)
- M METHYL TERT-BUTYL ETHER (mg/L)
- G TOTAL VOLATILE PETROLEUM HYDROCARBONS AS GASOLINE (mg/L)

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 5 10 15 20

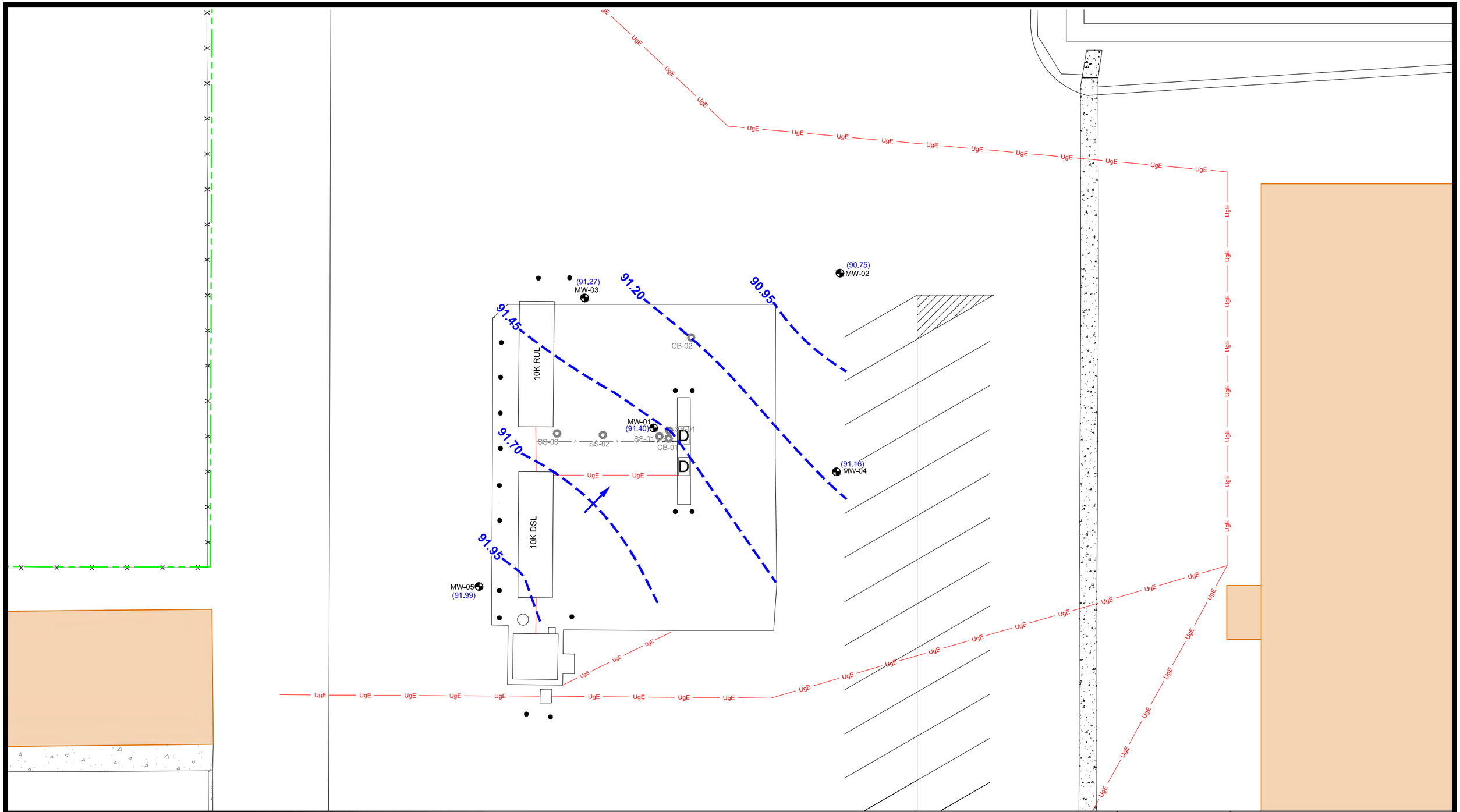
SCALE IN FEET

GROUNDWATER SAMPLE FIGURE

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE:	REVIEW:
2/15/2022	

CGRS SOLUTIONS DELIVERED



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION
- INFERRED GROUNDWATER ELEVATION CONTOUR
- (91.40) GROUNDWATER ELEVATION (FEET)
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE PROPERTY BOUNDARY
- FENCE
- TELEPHONE MANHOLE
- POWER POLE
- STREETLIGHT
- BUILDING
- (SOG) SLAB ON GRADE
- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST
- AST ABOVE GROUND STORAGE TANK
- D FUEL DISPENSERS

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 5 10 15 20

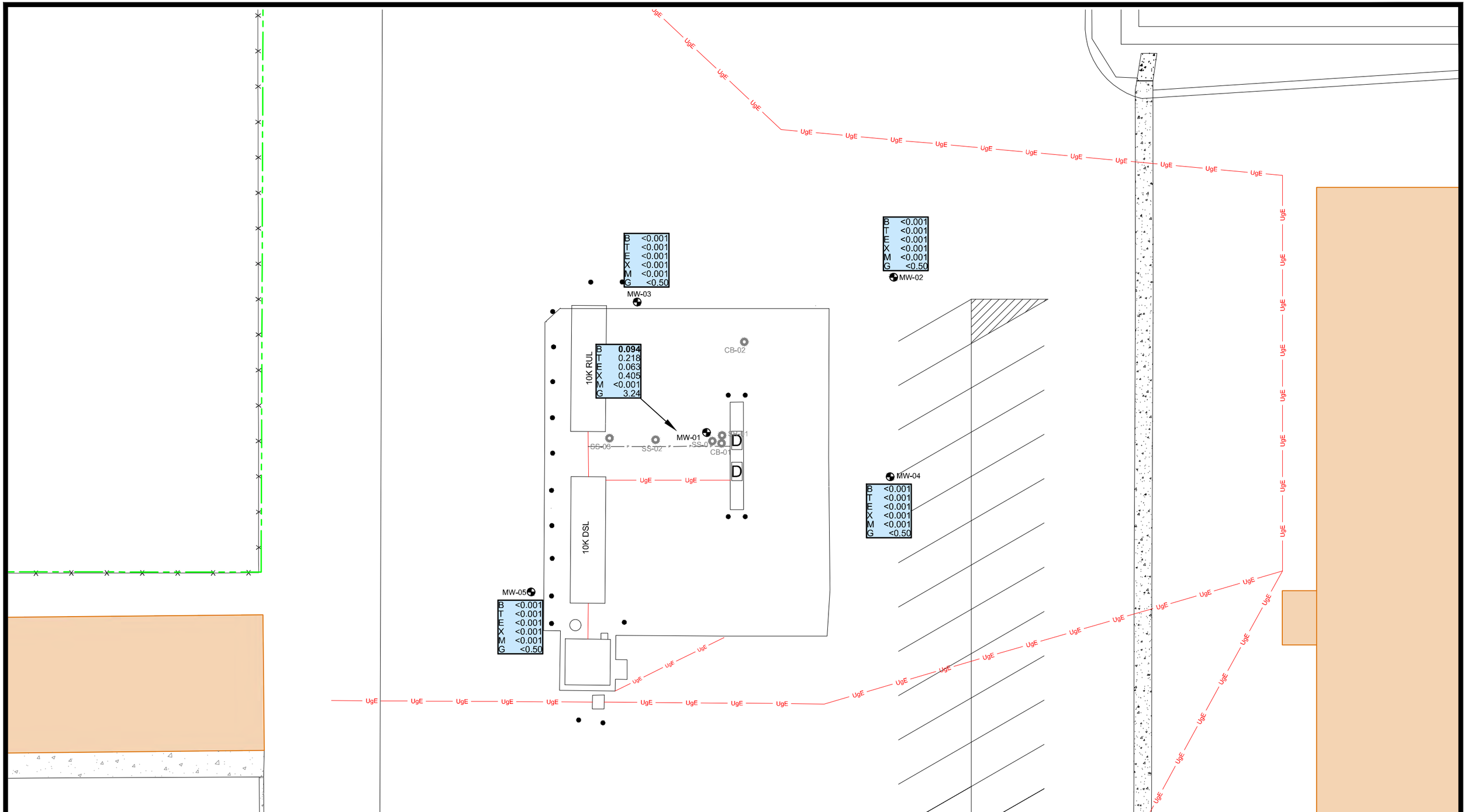
SCALE IN FEET

GROUNDWATER ELEVATION FIGURE
October 26, 2021

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE:	REVIEW:
2/16/2022	

CGRS SOLUTIONS DELIVERED



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION

- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST
- AST ABOVE GROUND STORAGE TANK
- D FUEL DISPENSERS
- APPROXIMATE PROPERTY BOUNDARY
- FENCE
- TELEPHONE MANHOLE
- POWER POLE
- STREETLIGHT
- BUILDING
- (SOG) SLAB ON GRADE

NOTE: **BOLD** VALUES INDICATE CONCENTRATION EXCEEDS THE APPLICABLE REGULATORY GUIDELINES

- B BENZENE (mg/L)
- T TOLUENE (mg/L)
- E ETHYLBENZENE (mg/L)
- X TOTAL XYLENES (mg/L)
- M METHYL TERT-BUTYL ETHER (mg/L)
- G TOTAL VOLATILE PETROLEUM HYDROCARBONS AS GASOLINE (mg/L)

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 5 10 15 20

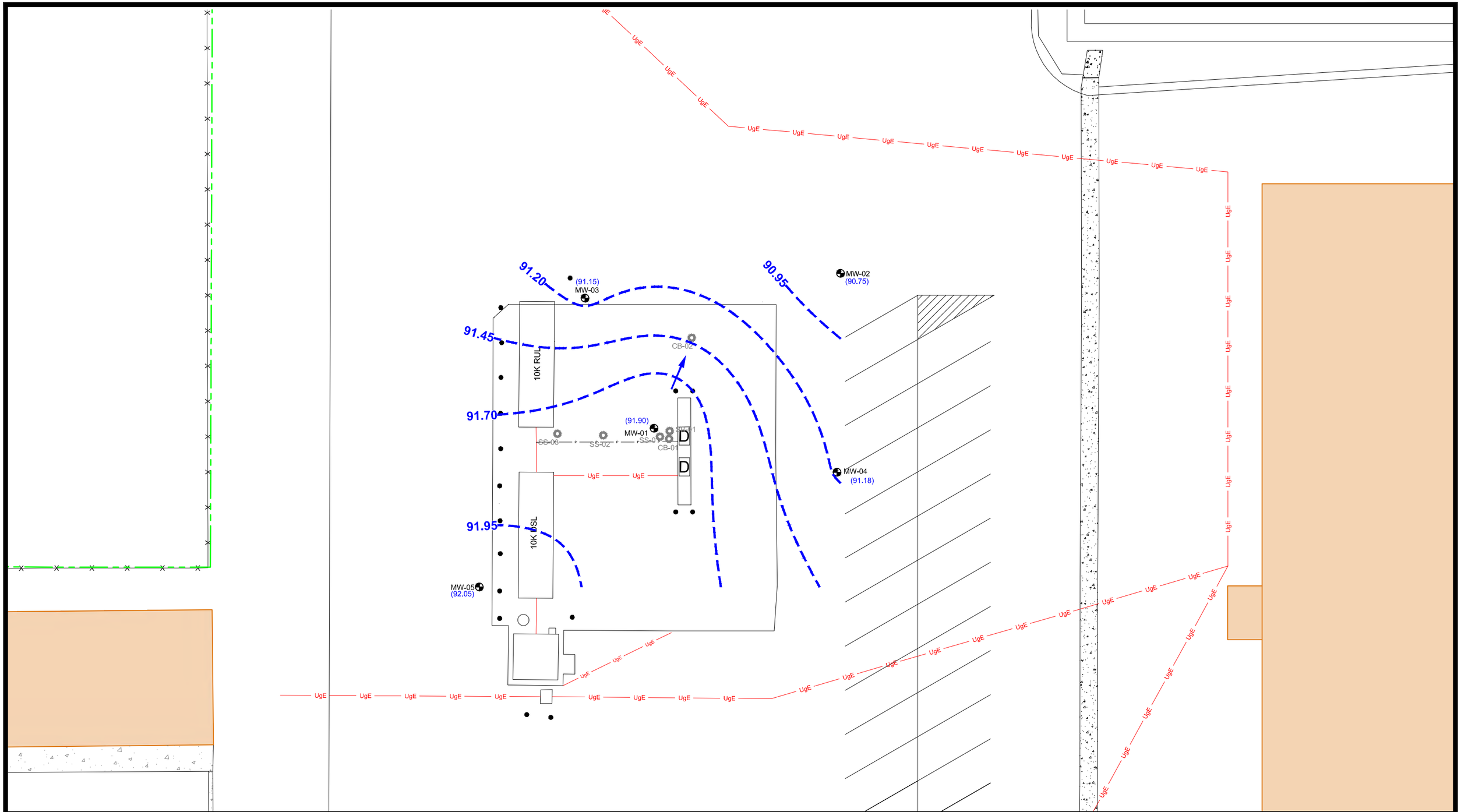
SCALE IN FEET

GROUNDWATER SAMPLE FIGURE
January 28, 2022

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE:	REVIEW:
2/16/2022	

CGRS SOLUTIONS DELIVERED



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION
- INFERRED GROUNDWATER ELEVATION CONTOUR
- (91.40) GROUNDWATER ELEVATION (FEET)
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE PROPERTY BOUNDARY
- FENCE
- TELEPHONE MANHOLE
- POWER POLE
- STREETLIGHT
- BUILDING
- (SOG) SLAB ON GRADE
- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST
- AST ABOVE GROUND STORAGE TANK
- D FUEL DISPENSERS

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 5 10 15 20

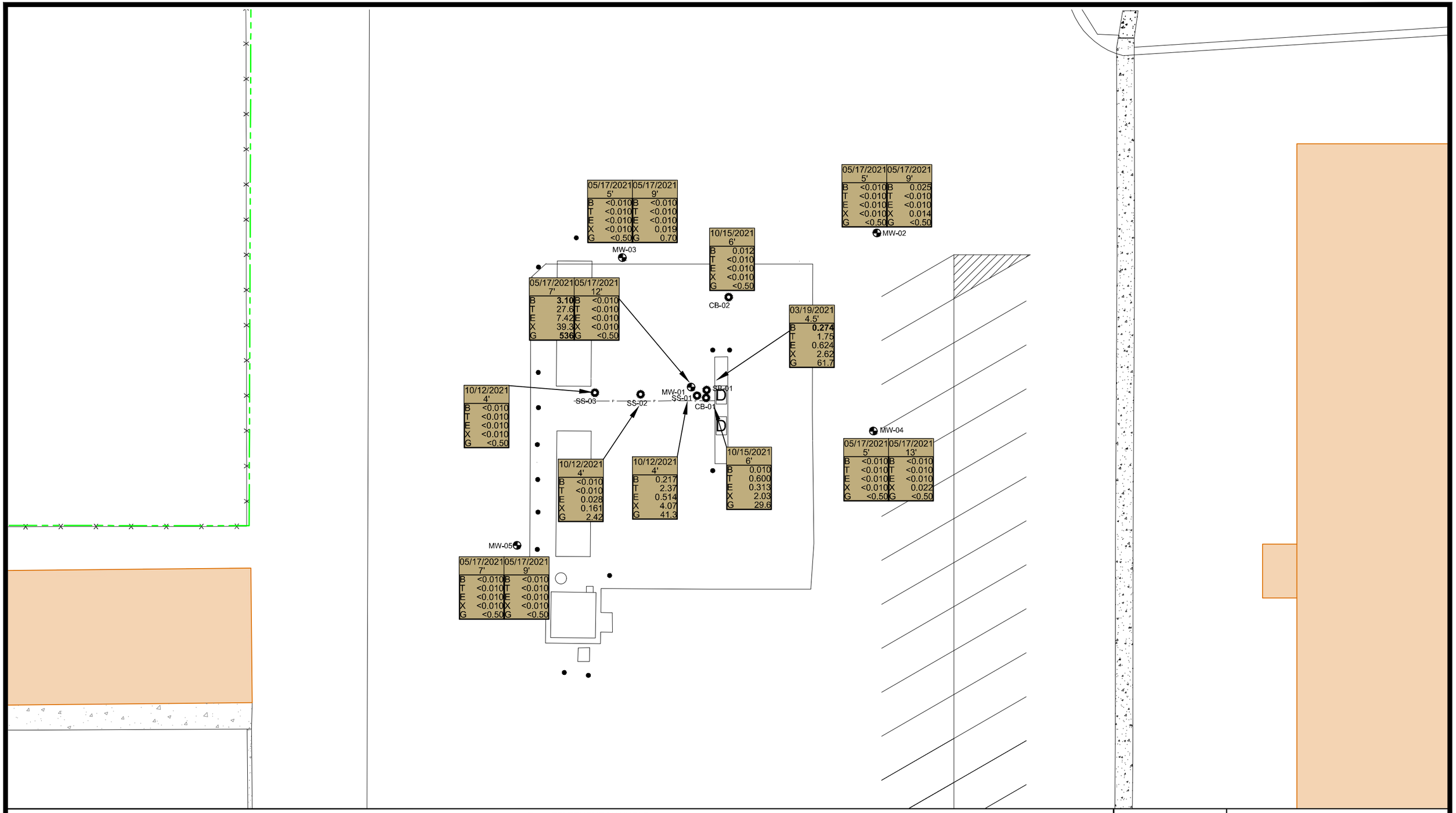
SCALE IN FEET

GROUNDWATER ELEVATION FIGURE
February 8, 2022

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE:	REVIEW:
2/16/2022	

CGRS SOLUTIONS DELIVERED



LEGEND

- MW-01 MONITORING WELL LOCATION
- SS-01 SOIL SAMPLING LOCATION
- SB-01 SOIL BORING LOCATION
- CB-01 CONFIRMATION BORING LOCATION

- DSL DIESEL 10,000 GALLON AST
- RUL REGULAR UNLEADED GASOLINE 10,000 GALLON AST
- AST ABOVE GROUND STORAGE TANK
- D FUEL DISPENSERS
- APPROXIMATE PROPERTY BOUNDARY
- FENCE

- TELEPHONE MANHOLE
- POWER POLE
- STREETLIGHT
- BUILDING
- (SOG) SLAB ON GRADE

NOTE: **BOLD** VALUES INDICATE CONCENTRATION EXCEEDS THE APPLICABLE REGULATORY GUIDELINES

SAMPLE DATE SAMPLE DEPTH	
B	BENZENE (mg/kg)
T	TOLUENE (mg/kg)
E	ETHYLBENZENE (mg/kg)
X	TOTAL XYLENES (mg/kg)
G	TOTAL VOLATILE PETROLEUM HYDROCARBONS AS GASOLINE (mg/kg)

ALL LOCATIONS APPROXIMATE UNLESS OTHERWISE NOTED

NORTH

0 5 10 15 20

SCALE IN FEET

SOIL SAMPLE FIGURE

POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, COLORADO

PROJECT:	DRAFT:
22851	TJQ
DATE:	REVIEW:
2/16/2022	

CGRS SOLUTIONS DELIVERED

Vista GeoScience

Advanced Site Characterization
& Optimized In-Situ Remediation

January 27, 2022

Brent Everett
CGRS, Inc.
1301 Academy Court,
Fort Collins, CO 80524

Via: E-Mail: beverett@cgrs.com

Re: Vista Project No. 21209.01;
FINAL REPORT: High-Resolution Site Characterization
Poudre School District at 2407 Laporte Ave., Fort Collins,
CO OPS EID 13977; CGRS Project No. 22851

Dear Brent,

Attached is the Final Data Summary Report for the High-Resolution Site Characterization and Subsurface Imaging services conducted at 2407 Laporte Avenue in Fort Collins, Colorado between October 14, 2021 and October 15, 2021. Please feel free to contact us if you have any questions regarding the report, methods, survey results, or interpretation.

We appreciate the opportunity to provide you with these services, and we look forward to teaming with you on future projects.

Sincerely,

David Fontana
Direct Imaging Specialist/Environmental Scientist
dfontana@vistageoscience.com

Reviewed by:

Digitally signed by John V. Fontana
Date: 2022.01.27 14:06:20 -07'00'

John V. Fontana, CPG, CWD
President, CEO

Vista GeoScience Subsurface Imaging Systems

High Resolution Site Characterization Data Summary Report

Poudre School District
2407 Laporte Ave, Fort Collins, CO
OPS EID # 13977

Prepared for:

CGRS SOLUTIONS DELIVERED

December 21, 2021

Table of Contents

1 Project Overview

CGRS, Inc. (CGRS) contracted Vista GeoScience, LLC (Vista) to conduct High-Resolution Site Characterization (HRSC) services at the Poudre School District site located in Fort Collins, Colorado. The objective of the site investigation was to characterize the site by delineating any residual and mobile fuel lighter non-aqueous phase liquid (LNAPL) using the Ultraviolet Optical Imaging Profiler (OIP-UV) system and measure hydrostratigraphic characteristics using the Hydraulic Profiling Tool (HPT) and Electrical Conductivity (EC). The combined version of this tool was utilized for efficiency of data collection and is referred to as OiHPT (OIP-UV+HPT+EC). After mobile fuels were delineated the remaining objective was to delineate any sorbed or dissolved phase contaminants using the Membrane Interface Probe (MIP) and measure hydrostratigraphic characteristics using the Hydraulic Profiling Tool and Electrical Conductivity. The combined version of this tool was utilized for efficiency of data collection and is referred to as MiHpt (MIP+HPT+EC). The halogen specific detector (XSD) was not used on this site since chlorinated compounds were neither targeted nor anticipated. It should be noted that all 19 HRSC survey locations were selected by CGRS before the survey began.

HRSC tools used to conduct the survey included:

- **Membrane Interface Probe** tool used to measure the distribution of sorbed and dissolved phase Volatile Organic Compounds (VOCs). The MIP detectors utilized included:
  - Photo Ionization Detector (PID)
  - Flame Ionization Detector (FID)
- **Ultraviolet Optical Imaging Profiler** tool used to measure residual and mobile fuel LNAPL distribution.
- **Electrical Conductivity** dipole array configuration used to measure soil conductivity. EC is integrated into the above OIP and MIP tools.
- **Hydraulic Profile Tool** used to measure injection pressure, injection flow, and estimated hydraulic conductivity. HPT is integrated into the above OIP and MIP tools and is used only when the ambient temperature is above freezing.

A cargo van mounted HRSC system and a Geoprobe 78 series mounted direct push rig were mobilized to the site on the 14th of October for the first day of the survey. On October 15th, the second day of the survey, an additional (4WD-ATV mounted) HRSC system and Geoprobe 78 series mounted direct push rig were mobilized to the site so that the entire survey could be completed in the schedule window allowed by the school district. The survey was completed on October 15th, 2021.

The investigation was conducted entirely on the Poudre School District property. The survey began with the OiHPT tooling to define the extent of the residual and mobile LNAPL. As the survey continued the MiHpt tool was used to map sorbed and dissolved phase contaminants. The survey began with a proposed target depth of either 20’ BGS or any depth where a low sustainable rate of push (ROP) results in refusal. As the survey progressed, on the 14th of October, CGRS made the determination that the original proposed target depth of 20’ bgs could be lessened for each borehole based on the contamination detected at shallower intervals in each borehole.

Confirmation soil coring was performed after the HRSC survey was completed. Two confirmation soil borings were completed. Confirmation soil borings were placed in close proximity to the HRSC survey locations with the highest fluorescence and PID responses.

1.1 Site Background

The fueling facility consists of above ground storage tanks (ASTs) containing unleaded gasoline, diesel and liquid petroleum gas. Supply underground fiberglass reinforced plastic piping exists to the east of the ASTs. The ASTs have been in service since 1995 and have had two previous confirmed release events which were closed. The latest release event was discovered by Kubat who conducted an inspection of a dispenser in February of 2021. CGRS confirmed the release with hand auger sampling methods and monitor well installations.

1.2 Quality Assurance/Quality Control

Vista's Subsurface Imaging Technicians have gone through the complete Geoprobe Direct Imaging training program for operating, maintaining, and troubleshooting these systems. Vista follows the Geoprobe SOP and ASTM method for the data collection process and operation of the systems. Carrier gas flow, carrier gas pressure, water pressure and flow, system voltages, membrane block temperature, rate of penetration, and other system parameters are monitored and recorded continuously. These values are preserved for later review in the electronic log data files and can be plotted in log form or exported to spreadsheets or ASCII data files for importing into other data mapping systems, if desired. Any out of specification conditions that occur during the borehole logging sets off an alarm, integrated into the software, to alert the operator so they can flag and note such anomalies in the log files. Any critical errors that may affect detector response or data are reported in the summary tables along with any system changes conducted during the survey. Note that all response tests are recorded with each log in the INF subfile for later verification.

Approximately quarterly Vista conducts a multi-point response test on the MIP instrumentation and probes to ensure the system is responding is it did on the tests conducted when the system was originally delivered from the manufacturer. Response tests are also performed on the tools and sensors before and after each log run. Descriptions of these response tests are in the following sections.

1.2.1 Membrane & PID/FID Detectors

A 10 ppm benzene aqueous standard was used to check the response of the PID and FID. Since halogenated VOCs were not anticipated at the site, the XSD was not utilized.

All standards are freshly prepared and diluted using distilled water to ensure the accuracy of each response test. The standard is applied to the membrane before and after each log run to ensure that the detectors are responding as expected before and after each log. The aqueous standard in a VOA vial is placed directly against the membrane for 45 seconds and the response is measured on the data acquisition system. The responses are compared to historical responses for the set of instruments and detectors being used. If the response is out of the expected range, troubleshooting steps are performed to determine why the response is less than adequate. These steps can include, but are not limited to,

checking variables such as the semipermeable membrane, gas flows, gas pressures, block temperatures, etc., all of which can influence the detector response.

1.2.2 HPT Pressure Sensor Check

The HPT pressure sensor is installed in the connection tube just above the MIP membrane on the MiHpt probe tool and just above the OIP window on the OiHPT probe tool. The sensor is tested before and after each log by submerging the sensor in a vertical tube filled with water. The pressure sensor is tested under two different operating conditions (with water flowing and without water flowing) while submerged in the tube. Varying head pressures are used during testing by placing the sensor at two different water depths. The difference in pressures is measured to determine the precision and accuracy of the sensor and gauge the local atmospheric pressure. If the sensor fails the test it is replaced, and all QA/QC checks are run again before the probe is used. Test results are recorded in the digital log files.

Note that this test only checks the validity of the downhole pressure sensor and does not detect leaks that may occur only under high formation injection pressures. This requires careful observation during log runs where an experienced operator can detect potentially invalid pressure signatures and then perform “plug” tests on the system.

1.2.3 EC Dipole Check

The electrical conductivity dipole array is tested by separately applying two different resistors across the dipole and measuring the specific conductance reported by the software. The Direct Imaging passes or fails the EC based on the percent difference between the target conductivity result and the actual conductivity result. If the EC fails the test and there is no wiring continuity issue, the tool is replaced. Test results are recorded in the digital log files.

1.2.4 OIP-UV

The OIP-UV camera and ultraviolet light source is tested by applying actual fuel and oil products, contained in a quartz cuvette, against the sapphire window of the camera on the OIP-UV tool. The response value, referred to as the Percent Area Fluorescence (%AF), is measured and recorded, and the results are compared to historical values for each product. The visible light source is tested by placing an object with colored printing on it against the window in place of a fuel or oil product. All OIP-UV testing images are saved for future reference.

NOTE: *Any issues or out of spec results with any of the above quality control tests are reported in the Boring Log Summary tables in Section 4, along with a discussion of the resolution and/or potential effects on the data or if the log is continued under those conditions.*

2 HRSC Survey Results and Observations

The HRSC probe locations are shown in the maps in Section 3 of this report. A data acquisition summary table for each tool is presented in Section 4, and the HRSC logs for each tool are presented in Section 5. The map of the probe locations was generated using visual references on site. Locations were saved in a Google Earth .kmz file and used to generate a color-coded map displaying relative maximum values.

The Summary Tables in section 4 provide summaries of the MiHpt and OiHPT probe boring data collected during the survey. Any issues, settings adjustments, logging starts and stops, interesting features, etc., are noted in the summary tables. The MiHpt and OiHPT Response Summary Tables, also in section 4, provide the maximum delta response values for each detector and the depth at which these maximum responses were seen for each location.

The OiHPT and MiHpt logs in Section 5 are presented with two types of scale settings for each tool. Selected logs are also presented in cross sections.

- In the *Common Scale Logs* all the chemical/sensor detector scales (ex. PID, FID, Fluorescence, EC, Pressure, Flow, etc.) are set to the maximum and minimum values common to the entire set of logs so that the relative response at each location can be compared across the entire site.
- The *Individually Scaled Logs* are shown with the maximum sensor value (seen on the X-axis) scaled on each individual log to show as much detail in the sensor response as possible. This will exaggerate the appearance of detection signals on logs with a relatively low maximum response and give the appearance of increased baseline noise as well.

The OiHPT individually scaled logs also include multiple selected images at given depths. Depths of each image are indicated above each image along with the image type.

Note that all borings were pre-cleared for utilities from 0-5 feet below surface, therefore, no data is shown on the logs in that depth interval.

2.1 Soil Electrical Conductivity

The EC tool measures the combined conductivity of the soil particles and groundwater. Finer grain lithology, such as clays, generally produce higher conductivity readings than coarser grain lithology such as sand/gravels. However, ionic compounds (salts) will increase conductivity with an increase in concentration. The EC data is also used in combination with HPT-Pressure data to calculate groundwater specific electrical conductance, which is a measurement of the conductivity of the total dissolved solids (TDS) in the groundwater. Road salts and similar contaminants can interfere with a lithologic interpretation using EC data. If there is no ionic interference, EC response will generally correlate well with HPT-injection pressure (P).

In general, EC values were highly variable across the site. Electrical conductivity typically ranged from approximately 10 mS/m to between 200 and 300 mS/m; however, log OH-03 did have EC values exceeding 300 mS/m between 5’ and 6’ below ground surface (bgs). EC values generally remained between 100 mS/m and 125 mS/m from 5’ to between 14’ and 16’ bgs. Several logs showed a drop in EC within this zone, from approximately 100 mS/ to approximately 20-50 mS/m, at depths between 7’ and

10’ bgs. This drop in EC indicates a possible increase in sediment grain size, when compared to the surrounding intervals, at the depth intervals where the comparatively lower EC values are seen. Logs that showed this drop in EC between 7’ and 10’ bgs were OH-01, OH-06, MIP-10, MIP-12, MIP-13, MIP-16, and MIP-18.

In the deeper intervals of the surveyed locations, EC often decreased to approximately 10-20 mS/m at depth intervals starting between 14’ and 17’ bgs and remained between approximately 10-20 mS/m for as little as thin as a few vertical inches (as seen on log OH-05) to as thick as 3 vertical feet or the total depth of the log (as seen on log MIP-19). Again, these lower EC values indicate an increase in sediment grain size when compared to characteristics of the surrounding depth intervals. Logs which continued to intervals deeper than this low EC formation showed an increase in EC from approximately 10-20 mS/m to approximately 125-225 mS/m. This increase in EC starts at the deepest interval of the low EC formation and continues to the total depth of each log when present. This is an indication that sediments have a fine grain size at these deepest intervals of the survey. This increase in EC at deep intervals can generally be seen at depths greater than 16 bgs, and is present on logs OH-01, OH-02, OH-05, MIP-08 through MIP-11, MIP-15, and MIP-17.

Typically, high EC values are associated with high HPT pressures because a high EC often indicates a higher content in finer grained materials like silts sand clays, and high HPT pressures often less permeable soils. Areas where HPT pressures remained low while EC values are high could indicate possible ionic compounds (high total dissolved solids) present in the soils. High levels of ionic compounds, such as those caused by road salts or remediation products leaching into the soil and groundwater, can cause interference in EC by elevating the EC readings.

EC correlated moderately well with the HPT pressure across the site, with the exception of the shallowest intervals between 5’and 9’ bgs, and it is possible that any ionic compounds present in the soils in these shallowest intervals had an effect on the EC detector at this site.

2.2 Hydraulic Profile Tool (Hydrostratigraphy)

The Hydraulic Profile Tool (HPT), sometimes called Injection Flow Logging, measures soil permeability by injecting water into the formation through a small, screened port on the side of the probe. A pressure sensor measures the injection pressure (P) caused by formation resistance and the pump system at the surface measures the flow rate (Q). Relative permeability can be interpreted by analyzing the HPT Pressure (HPT-P) and HPT Flow (HPT-Q) data. From this data, an estimated hydraulic conductivity can be calculated below the static water level if the static water level is known. A dissipation test can be done in a permeable zone below the water table to measure head pressure at that depth and can be used, in conjunction with a measurement of ambient pressure, to calculate the static water level. Static water level data was not collected as a part of this survey but can be included if requested using extrapolated groundwater level data from nearby monitoring wells. Note that an HPT-P indicating no back pressure caused by the formation (the highest possible permeability) would be equal to approximately 12 psi due to the atmospheric pressure being measured by the HPT sensor. Also note the highest possible HPT-P is approximately 100-110 psi and is determined by the blow-off valve in the HPT pump controller.

Throughout the site there was a relatively consistent increase in HPT-P as depth increased. This indicates that there is an increase in the consolidation of sediments and a decrease in permeability as depth increases at all survey locations. Note that HPT Pressure and HPT Flow (HPT-Q) were not recorded between 5' and 11' BGS on log MIHPT_01. Note that an HPT-P indicating no back pressure caused by the formation (the highest possible permeability) would be equal to approximately 12 psi due to atmospheric pressure being measured by the HPT sensor.

Across the site, HPT pressure and flows indicated a mixture of coarse to fine grain sediments with high to low flow characteristics across the entirety of the site. HPT pressure remained low indicating highly permeable materials for most shallow intervals throughout the site. HPT pressure was moderate, indicating moderately permeable sediments for much of the depth intervals between 10' and 16' bgs for most logs. HPT Pressure was high, indicating sediments with very low permeability, for very few intervals throughout the site; however, logs that did have high HPT pressures all showed these pressures in the deeper intervals of each log, typically deeper 14' bgs.

At the shallowest intervals (between 5' and 7-10' bgs) HPT-P suggests relatively permeable sediments exhibiting low pressures, typically below 20-25 psi. This indicates primarily coarser grained content sediments, or low compaction, throughout these shallow intervals. Log examples of this being particularly prominent are MIP-08 through MIP-13 and OH-01. The HPT data at these shallow intervals does not correlate well with the EC data on these logs where we see an EC response of between 50 and 130 mS/m at these shallow intervals on most logs, indicating potential ionic compounds, such as salts.

Starting at approximately 10' bgs, and often continuing to the TD of each log, the HPT pressure and flows indicated moderate permeability. This is inferred by the moderate to high HPT flow rates with moderate to high HPT pressures. These moderate to high HPT pressures ranged from approximately 25 psi to approximately 100 psi, with the majority of these pressures ranging from 50-75 psi, and intermittent intervals of low HPT pressures that fall below 50 psi. These HPT pressures would indicate moderate permeability throughout these depth intervals with intermittent intervals of high permeability where the HPT pressures fall below 25 psi. This indicates some coarse grain sediments interbedded throughout mostly finer grained sediments. These HPT pressures generally correlate well with EC data that was collected in the same intervals in that EC values range between approximately 75 and 125 mS/m; these EC values can represent sediments that are mixtures of fine and large grain materials that have moderate flow characteristics.

A noteworthy formation seen in the deeper intervals is where the HPT pressure drop of below approximately 40 psi correlates well with the significant drop in EC seen between approximately 14'-17' bgs with values of 10-20 mS/m. This correlating drop can be seen very prominently on MIP-09, MIP-15 and MIP-17, and indicates a significant zone with very high permeability, likely comprised of primarily coarse grain sediments, such as sands or gravels. This zone can be seen less prominently on MIP-11 and MIP-19.

Logs that did show a maintained increase in pressure above approximately 80-110 psi usually logged this increase in pressure between 15' and 16' BGS, but logs OH-04 and OH-07 all had this increase in pressure at deeper intervals of between 18' and 20' BGS, and logs OH-01, OH-02, and OH-04 started as shallow as

11’ bgs. The high HPT pressure values reached and exceeded pressures of 80 psi at varying depths on logs OH-01 through OH-07, MIP-08, MIP-13, MIP-15, MIP-16, and MIP-19.

Dissipation tests are performed in permeable layers to determine estimated hydraulic conductivities (K_{est}) and piezometric head. Successful dissipation tests require a highly permeable zone, within the saturated zone, to conduct the test in an efficient manner that will yield useful data. Estimated hydraulic conductivity can only be calculated if a dissipation test is performed or if the water table elevation is input into the software, which can be done in post processing of the logs. No dissipation tests were performed as a part of this survey; however, estimated hydraulic conductivity can be plotted in post processing of the logs if the water table elevation data is provided. No dissipation tests were performed as a part of this survey.

2.3 OIP-UV Fluorescence (LNAPL)

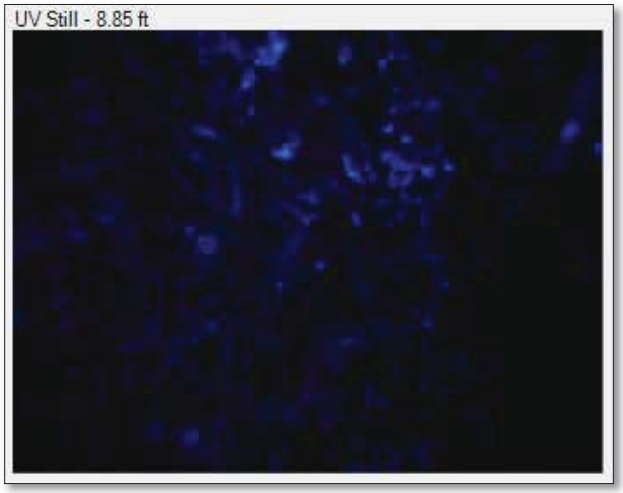
OIP-UV %AF can range from 0.1 %AF up to 100 %AF in highly saturated LNAPL. It should be noted that any %AF response, even 0.1 %AF, indicates the presence of LNAPL within the formation if the fluorescence response is not the result of interference from fluorescent materials such as calcareous minerals, fluorescent debris, etc.

The only log which recorded a fluorescence response was seen directly west of the source area (dispenser island) at location OH-01. This response was significant with the highest fluorescence response of that log being 19.8 %AF. In order to determine the extent of the LNAPL plume, OH-01 was surrounded to the north, south, east, and west with additional OiHPT locations; however, none of the surrounding surveyed locations detected any fluorescence. This suggests that the LNAPL contamination has not had time to disperse beyond OH-01.

The fluorescence seen at OH-01 extends almost uninterrupted from 5’ bgs to 9’ bgs. It is noteworthy that the depth intervals where the fluorescence is seen correlate strongly with very low HPT pressures seen in the shallowest intervals of this log; Almost all of the depth intervals where fluorescence is present have HPT pressures of less than 20 psi and all have HPT pressures of less than 25 psi. Additionally, the HPT pressures show a significant increase from 20 psi to almost 40 psi at 9’ bgs, and subsequently increase to 80-100 psi between 10’ and 11’ bgs. This increase in HPT pressure is an indication that formation permeability decreases sharply between 9’ and 11’ bgs on log OH-01. This increase in HPT pressure at 9’ bgs, in conjunction with the fluorescence responses ceasing below 9’ bgs, is a strong indication that the LNAPL at OH-09 present in the coarser grain sediments shallower than 9’ bgs and is confined vertically by the increase in fine grain sediments that starts between 9’and 10’ bgs.

Below are images that have been taken from log OH-01. The first set of images were taken with the UV light (left) and white LED light (right) and were taken at the same depth interval. This depth interval is in the low HPT pressure formation. Note that these images show the fluorescence in the UV light image (left) and depict the grain size of the sedimentation that the fluorescing LNAPL is present in in the white LED light image (right). The width of the image is 10mm.

OH-01 at 8.85' BGS



OH-01 at 8.85' BGS

Below are more images that have been taken from log OH-01 using the white LED light. These images were taken in the high HPT pressure zone at depth intervals deeper than where fluorescence was seen. Note the finer grain size of sedimentation when compared to the images above.

H-01 at 11.80' BGS

OH-01 at 16.70' BGS

Fluorescence responses can sometimes be attributed to mineral fluorescence being detected by the software and logged as %AF; however, no evidence of mineral fluorescence was noted as being detected throughout the survey.

2.4 MIP Response (VOCs)

The MiHpt tool was advanced into the soil at a consistent target rate of 4 feet per minute, with probe advancement halted for 45 seconds at intervals of one foot. This method of probe advancement allows time for the heater block to heat up soils immediately surrounding the MIP membrane and increases the volatility of dissolved phase and sorbed VOCs which, in return, increases sensitivity of the system. As a result of this sampling method sharp spikes may appear in intervals of one foot. This may give the appearance that the strongest concentrations of VOCs are appearing only at these spikes of one-foot intervals when in fact these spikes are typically caused by the 45 second halts in probe advancement. The halt in probe advancement for 45 seconds is executed for three main purposes; to allow time for the heater block to return to an optimal operating temperature as to increase contaminate volatility, to increase sensitivity of the detector systems, and to mimic conditions under which response tests occur. A very sharp increase several orders of magnitude over background may also indicate residual NAPL; however, detections indicating residual LNAPL were not observed on this site.

MiHpt logs include one graph each of the PID and FID detectors. Each of these graphs include a secondary scale and graph overlay of the EC response. Response peak sizes are used to determine the size of the actual response seen from contaminates above the background noise on each detector. This response peak size can be calculated at any given interval by taking the highest response value of the given interval and subtracting from it the response value seen before the peak occurred. These response peak values are also sometimes referred to as “delta” response values.

The largest detector responses were seen at the north end of the survey, north and north-northeast of OH-01, with the largest response occurring at MIP-09 with a delta response value of 899 mV. Only three logs, logs MIP-11, MIP-09, and MIP-15, had PID responses that were above 200 mV throughout the entire survey. All three of these logs had responses which were similar in magnitude, all ranging between 600 and 900 mV, and had similar depth intervals at which these responses were seen. Most of the strongest responses on these logs were seen between 5’ and 9.5’ bgs. MIP-09 and MIP- 15 both had strong PID responses between 6’ and 7’ bgs; log MIP-11 had a strong PID response only at 9’ bgs. Log MIP-15 was the outlier to this relatively small data set of strong PID responses, with significant responses seen between 10’ and 12’ bgs, and again at 13.5’ bgs. It is noteworthy that, similar to the fluorescence response seen at OH-01, all of the strong PID responses (responses ranging from 600-900mV) were seen in the shallow intervals that correlate well with low HPT pressures. Again, these low HPT pressures are typical of large grain sediments with high permeability, such as sands.

Though the majority of the strong PID responses were contained to the shallower intervals, each of the three logs had smaller responses that extended to slightly deeper intervals 11’ bgs at MIP-09, 12’ bgs at MIP-11, and 14’ bgs at MIP-15; however, all of the PID responses seen at intervals deeper than 10’ bgs were less than approximately 400 mV in magnitude. These smaller PID responses reside in depth intervals where there is moderate HPT pressure (between 25 and 75 psi) which indicates moderate permeabilities at these intervals. Sediments with moderate permeabilities may be a mix of both fine and large grain sediments such as sandy clays.

FID response data correlated well with the PID response data in that the largest responses were seen at MIP-09, MIP-11, and MIP-15, and had a very strong correlation between the depth of PID and FID

responses. As a result, the no further interpretation of the FID responses is necessary, and the interpretation of the PID responses is considered sufficient for both the PID and FID data.

Throughout the entire survey, contaminant responses seem to be mostly confined to the shallowest intervals above 9’ bgs which exhibit low HPT pressures and are likely comprised of mostly large grain sediments with high permeability such as sands.

Note that the MIP detectors are very sensitive to total hydrocarbons and areas with low responses may indicate residual hydrocarbons with no impacts above MCLs soil or groundwater. This is particularly important to note for this site because PID response values of less than 600-900 mV are relatively low.

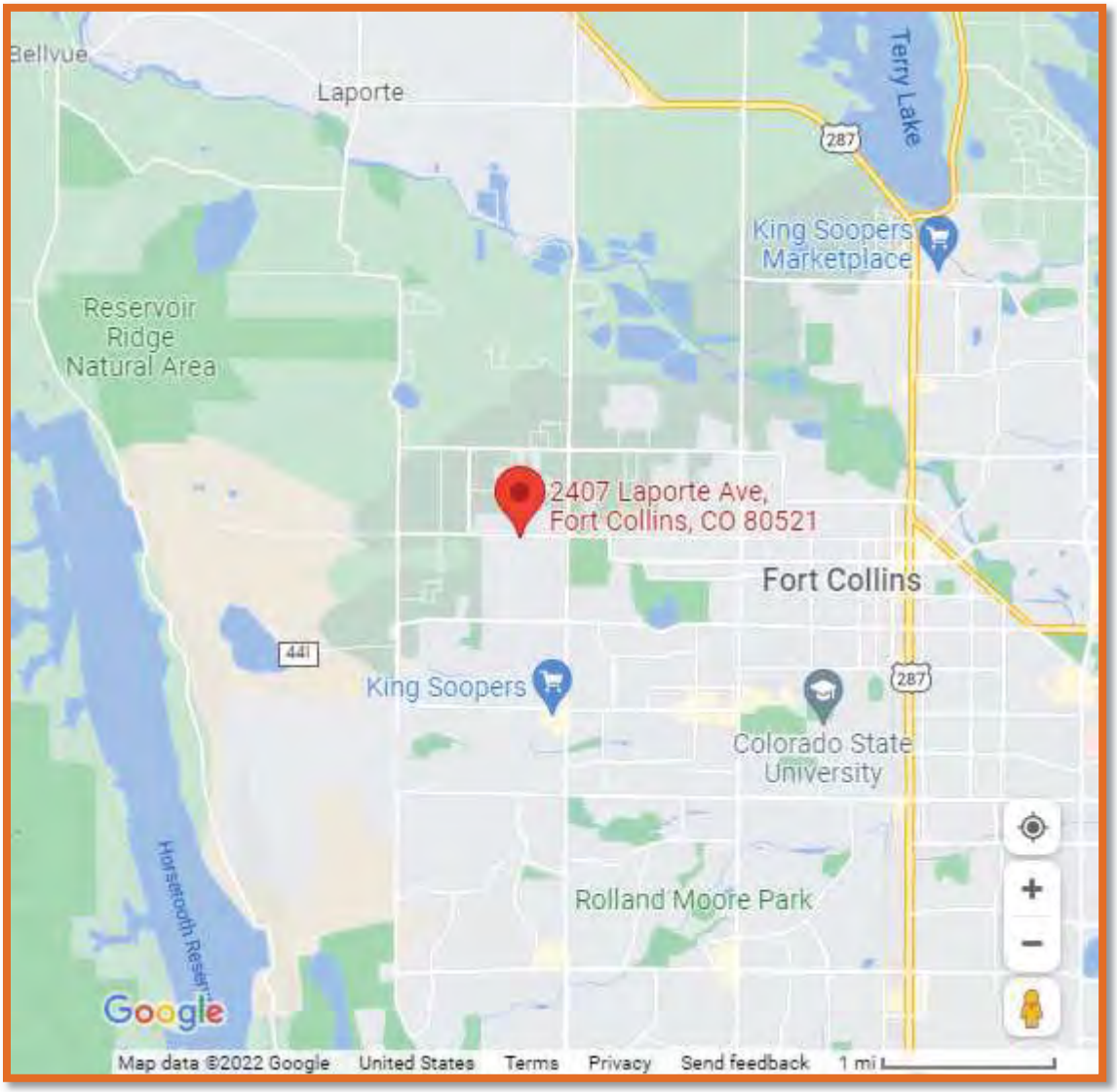
Standard operating protocol for Vista GeoScience is to advance the probe a minimum of 5 to 10 vertical feet below the last significant detector response seen before ending each log. Due to the overall objective of the survey, and the limited amount of fluorescence LNAPL contamination seen in the OiHPT data, logs were ended at a membrane depth of approximately 15-19’ bgs and not extended 5-10’ beyond significant responses. This decision was made in after consulting with and the approval of onsite CGRS personnel.

In summary, a simple pattern is seen at the site. The LNAPL release is confined the area around OH-01. The dissolved phase plume resulting from the LNAPL presence is migrating in a north-northeast direction, intersecting with MIP09, MIP-15 and MIP-11. The plume has been confined to the upper part of the aquifer and has not become confined significantly below the water table.

3 Survey Map

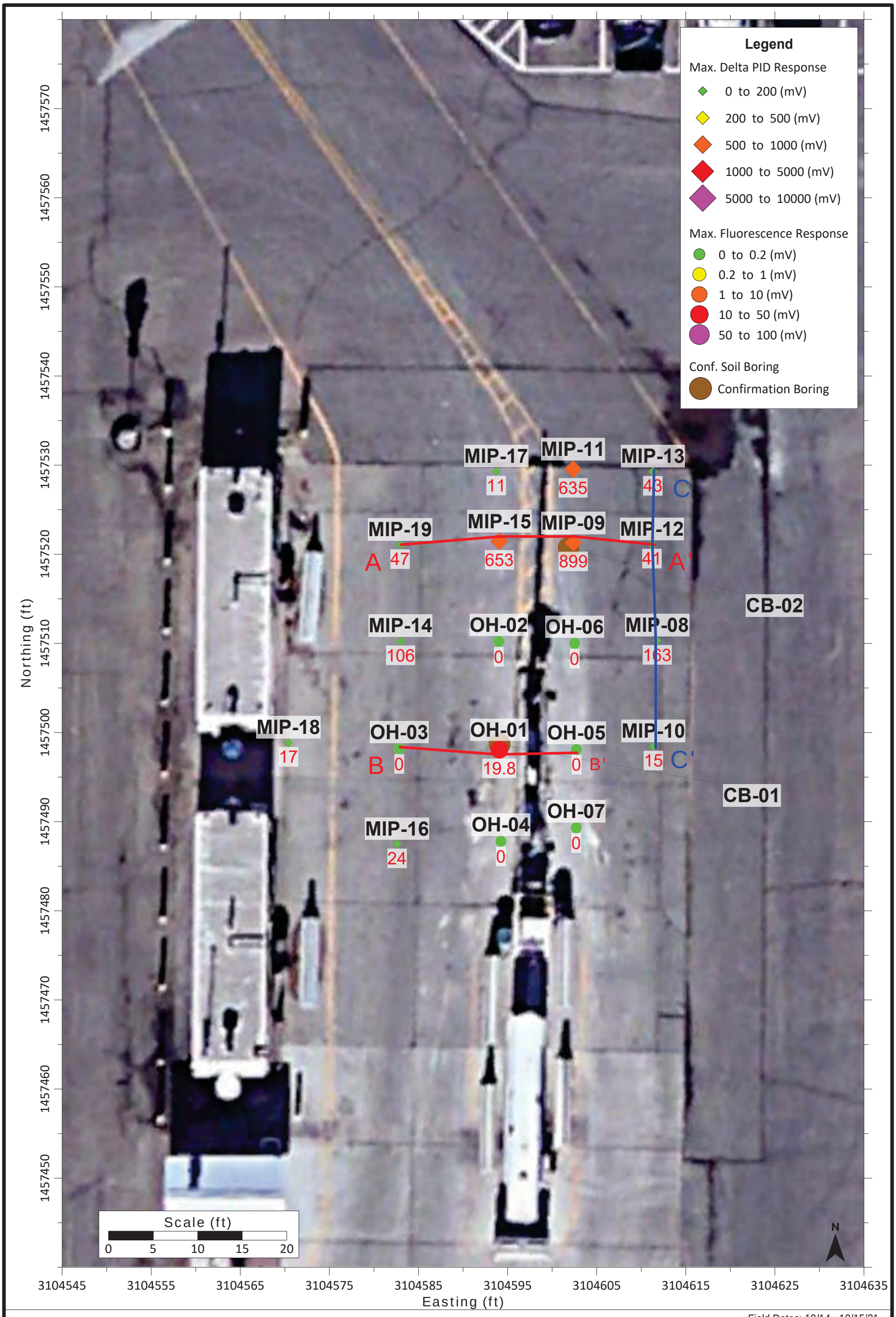
3.1 General Site Location Map

Fort Collins, CO



3.2 HRSC Boring & Cross Section Location Maps

NOTE: The maximum MIP response for each detector is calculated by subtracting the baseline signal level preceding each **maximum** response peak. This is referred to as the response peak size or the delta response value. The value directly below each HRSC location (written in red) denotes either the maximum delta response value of the PID or the maximum %AF seen on that log. The cross sections included in this report can be seen on one of the maps below.

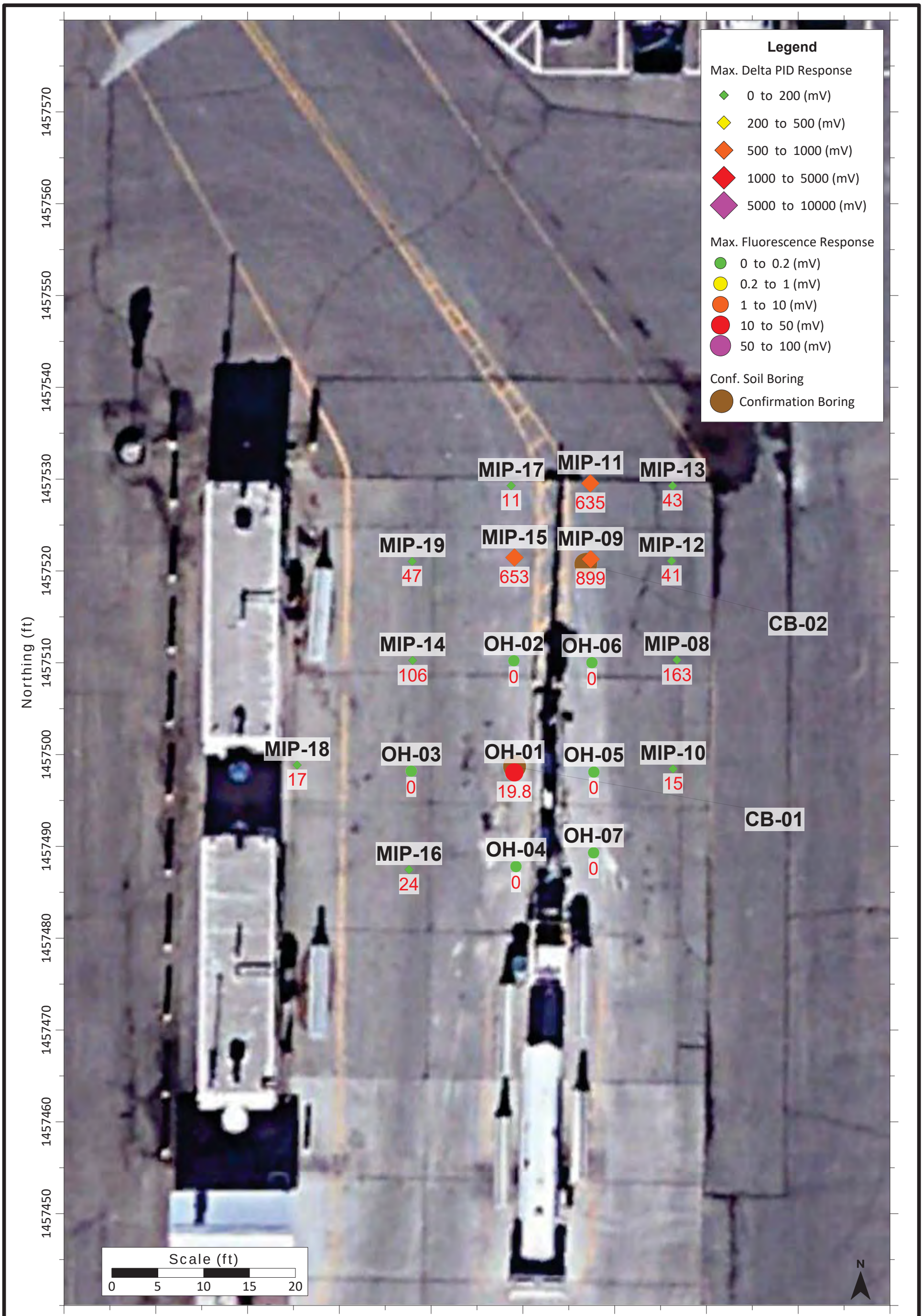


HRSC Survey Cross Section Map

Client: CGRS
Site: Poudre School District
OIPS EID 31977
2407 Laporte Ave
Fort Collins, CO

Vista GeoScience
130 Capital Drive, Suite A
Golden, Colorado 80401
PH: 303-277-1694
FAX: 303-278-0104
www.VistaGeoScience.com

Field Dates: 10/14 - 10/15/21
Drafted: 12/22/21
Drafted by: DAF
Base Map: Google Earth Image
Scale: 1inch = 10 feet
Projection: Colorado North State Plane
Datum: NAD 83
Locations provided by Vista



PID and Fluorescence Response Map

Client: CGRS
Site: Poudre School District
OIPS EID 31977
2407 Laporte Ave
Fort Collins, CO

Vista GeoScience
130 Capital Drive, Suite A
Golden, Colorado 80401
PH: 303-277-1694
FAX: 303-278-0104
www.VistaGeoScience.com

Field Dates: 10/14 - 10/15/21
Drafted: 12/22/21
Drafted by: DAF
Base Map: Google Earth Image
Scale: 1inch = 10 feet
Projection: Colorado North State Plane
Datum: NAD 83
Locations provided by Vista

4 Boring Log Data Summary Tables

4.1 OiHPT Summary Table

Original Location ID	Final Log File Name	Start Time and Date	Total OIP Depth (feet bgs)	Max Fluorescence Response (%AF)	Field Notes	Refusal at Total Probe Depth
APPLIES TO ALL BORINGS: All borings were cleared for utilities from 0' BGS to a minimum of 5' BGS and backfilled prior to drilling using bentonite chips or crumbles from approximately 1' BGS to the total depth of the utility clearing.						
SPECIAL NOTE: HPT data may not have been recorded if temperatures were too low to allow HPT usage. Optical Power refers to the amperage supplied to the camera and lights inside the OIHPT tool. Visible mode is the OIP camera mode which uses a white LED light to see the soil at the OIP window depth. The UV light is turned off while in visible mode, and therefore fluorescence data is not recorded at those intervals if applicable.						
OH-01	OH-01	0927 10/14/21	18.45	19.8	None.	No
OH-02	OH-02b	1057 10/14/21	17.30	0.0	None.	No
OH-03	OH-03	1115 10/14/21	15.80	0.0	HPT flow was turned off from 4.00' to 4.15' bgs; therefore, HPT flow may not accurately reflect soil characteristics at those depths. This location was only potholed to approximately 4' bgs.	No
OH-04	OH-04	1213 10/14/21	16.65	0.0	None.	No
OH-05	OH-05	1259 10/14/21	16.85	0.0	None.	No
OH-06	OH-06	1347 10/14/21	15.10	0.0	None.	No
OH-07	OH-07	1418 10/14/21	18.30	0.0	None.	No

4.2 OiHPT Response Summary Table

Original Location ID	Final Log File Name	Total OIP Depth (feet bgs)	Max Fluorescence Response (%AF)	Depth of Max Fluorescence Response (feet bgs)
SPECIAL NOTE: The UV light is turned off while in visible mode, and therefore fluorescence data is not recorded at those intervals if applicable.				
OH-01	OH-01	18.45	19.8	6.65
OH-02	OH-02b	17.30	0.0	n/a
OH-03	OH-03	15.80	0.0	n/a
OH-04	OH-04	16.65	0.0	n/a
OH-05	OH-05	16.85	0.0	n/a
OH-06	OH-06	15.10	0.0	n/a
OH-07	OH-07	18.30	0.0	n/a

4.3 MiHpt Summary Table

Original Location ID	Final Log File Name	Start Time and Date	Total MIP Depth (feet bgs)	Notes	Refusal at Total Probe Depth
APPLIES TO ALL BORINGS: 10ppm Benzene standards were exposed to the membrane for all response tests. All borings were cleared for utilities from 0' bgs to a minimum of 5' bgs and backfilled prior to drilling using bentonite chips or crumbles from approximately 1' bgs to the total depth of the utility clearing.					
SPECIAL NOTE: The maximum response for each detector is calculated by subtracting the background response level preceding each response peak from the peak response value. HPT data may not have been recorded if temperatures were too low to allow HPT usage.					
MIP-08	MIP-08	0907 10/15/21	16.95	None.	No
MIP-09	MIP-09	0953 10/15/21	16.05	None.	No
MIP-10	MIP-10	1006 10/15/21	15.95	None.	No
MIP-11	MIP-11	1031 10/15/21	15.00	None.	No
MIP-12	MIP-12	1051 10/15/21	14.95	To compare responses between the Van HRSC setup (gas chromatograph, probe, trunkline, etc.) and the ATV HRSC setup, the post log response test for this log was performed using the ATV's benzene standard only. Also, note that the post log response test may indicate that two benzene standards were used, but only one was used for the post log response test.	No
MIP-13	MIP-13	1105 10/15/21	15.40	None.	No
MIP-14	MIP-14	1123 10/15/21	14.95	Low post log response for benzene; the membrane was replaced after this log.	No
MIP-15	MIP-15	1129 10/15/21	17.10	None.	No

MIP-16	MIP-16	1236 10/15/21	15.90	None.	No
MIP-17	MIP-17	1214 10/15/21	15.00	None.	No
MIP-18	MIP-18	13:20 10/15/21	14.00	None.	No
MIP-19	MIP-19	12:48 10/15/21	16.05	None.	No

4.4 MiHpt Response Summary Table

Original Location ID	Final Log File Name	Depth of Maximum PID Delta Response (feet bgs)	Maximum PID Delta Response (mV)	Depth of Maximum FID Delta Response (feet bgs)	Maximum FID Delta Response (mV)	Gain Settings
SPECIAL NOTE: The delta response value is calculated by subtracting the baseline response value preceding each response peak from the peak response value.						
MIP-08	MIP-08	6.95	163	8.10	23	High
MIP-09	MIP-09	7.10	899	7.15	274	High
MIP-10	MIP-10	6.90	15	15.95	14	High
MIP-11	MIP-11	9.20	635	9.25	227	High
MIP-12	MIP-12	6.85	41	14.00	32	High
MIP-13	MIP-13	5.95	43	5.90	26	High
MIP-14	MIP-14	5.95	106	13.45	80	High
MIP-15	MIP-15	6.90	653	6.90	159	High
MIP-16	MIP-16	7.15	24	14.65	17	High
MIP-17	MIP-17	7.00	11	8.20	14	High
MIP-18	MIP-18	12.95	17	12.95	1	High
MIP-19	MIP-19	11.00	47	11.05	7	High

5 MiHpt & OiHPT Logs

5.1 Individual Scale OiHPT Logs with Selected UV Images

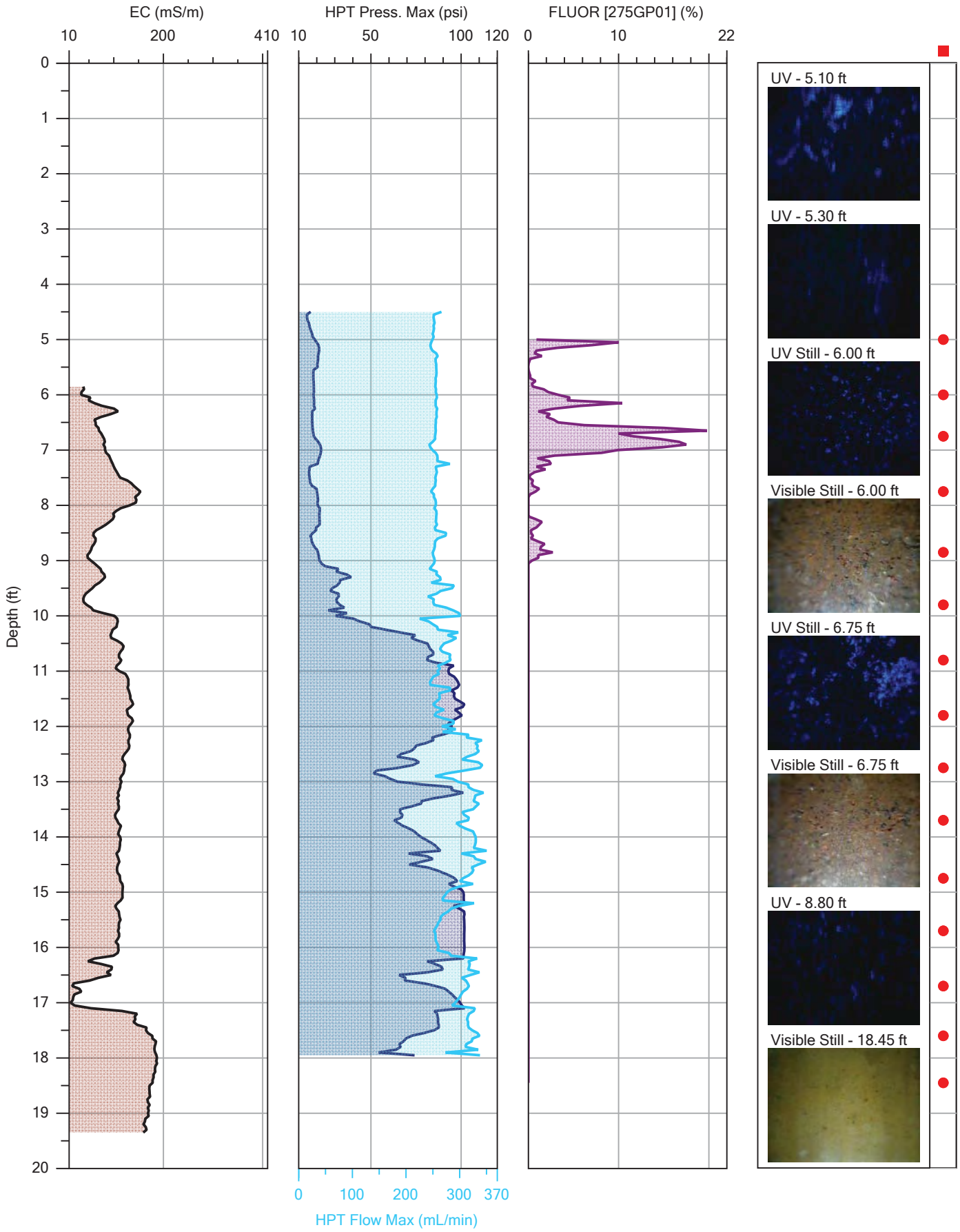
All logs are individually scaled to the maximum X-axis value (sensor response value) for each log and the maximum Y-axis value (depth) for the entire set of logs. This allows for increased detail on each individual log.

Multiple UV fluorescence and visible images are displayed for the individually scaled OiHPT logs. See Appendix A for the entire set of images from each log. The following are descriptions for the information accompanying these selected images and the types of images displayed:

Depth: The depth at which the image was captured.

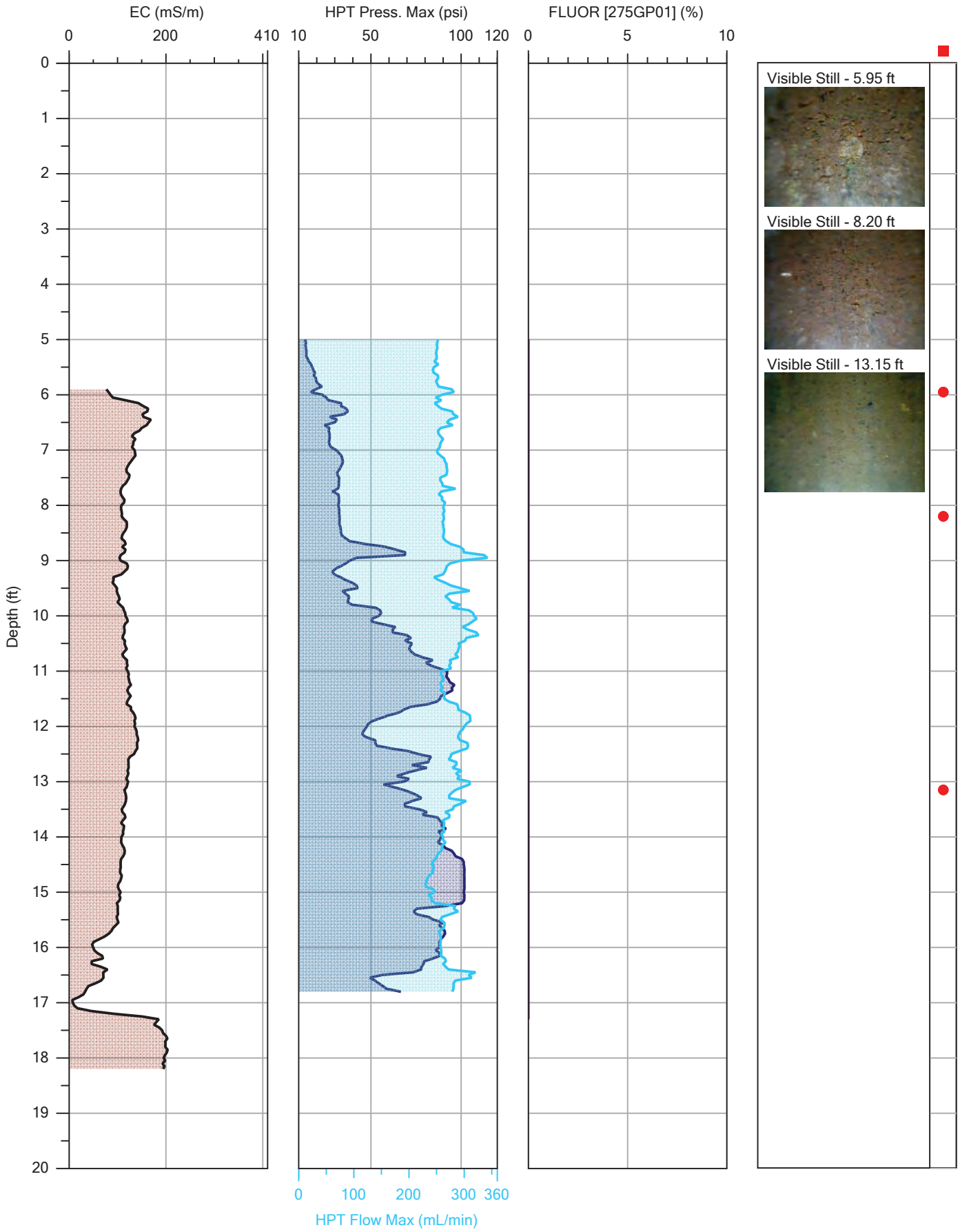
Type: The type of image presented, either UV, UV still, Visible, or Visible Still. The notation of UV or Visible notes wether the UV LED or the white light LED was used to capture the image. The notation of "still" refers to an image that was captured manually by the operator.

The graph axis labeled **FLUOR [275GP01] (%)** represents the Percent Area Fluorescence (%AF) response using the 275GP01 image filters and is the percentage of area in the image determined to be fluorescence by the software using this filter.



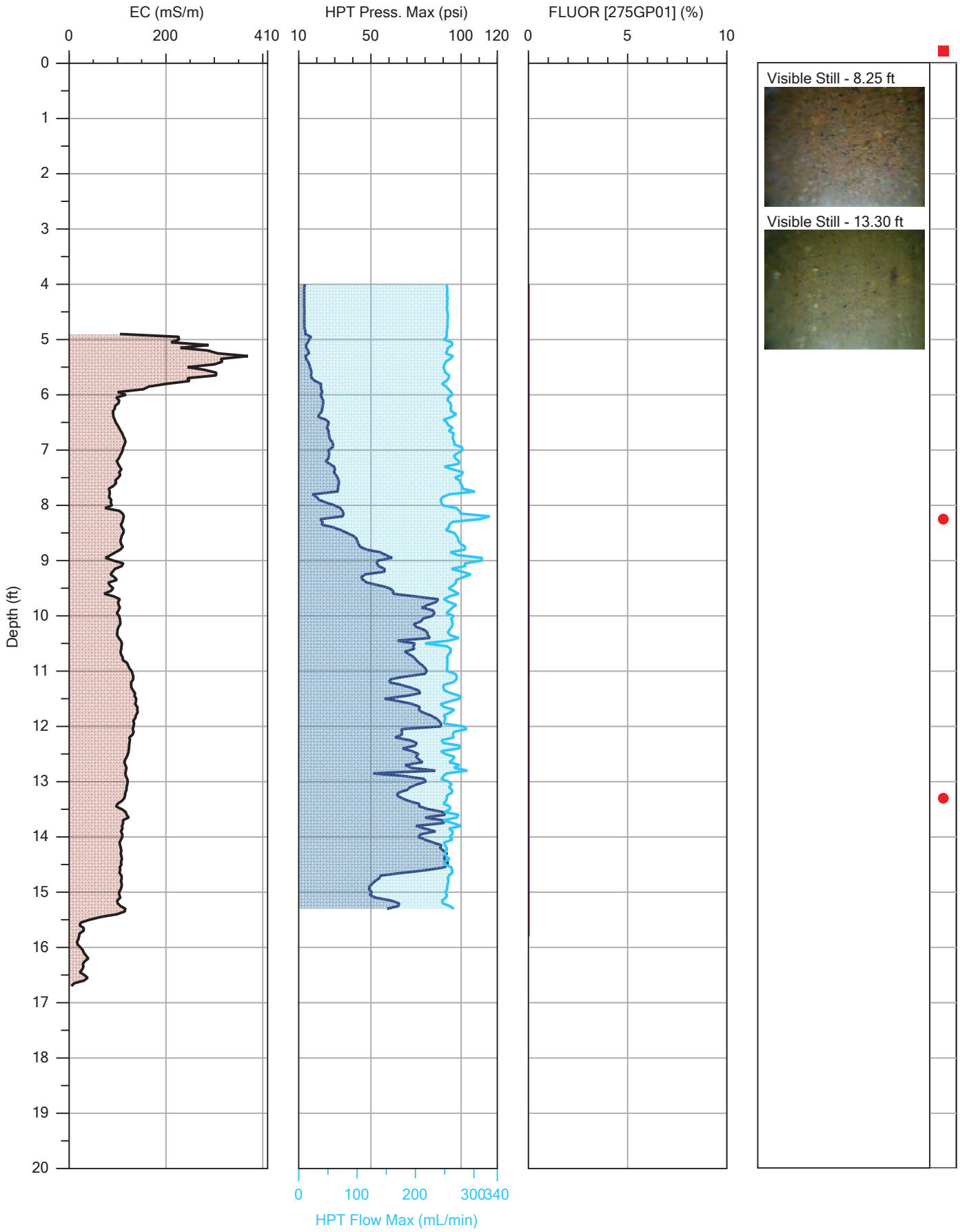
Vista GeoScience Subsurface Imaging Systems

		File: OH-01.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



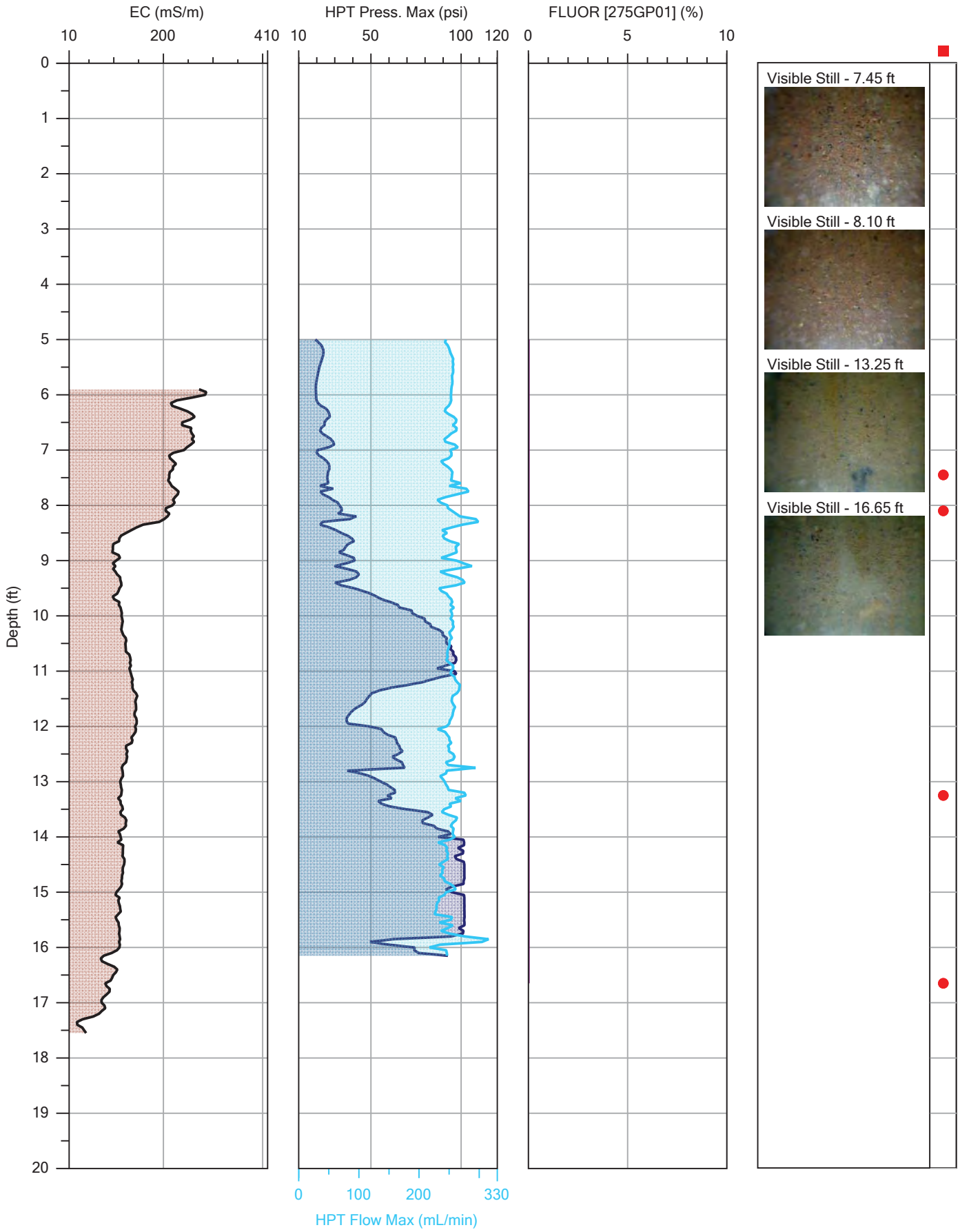
Vista GeoScience Subsurface Imaging Systems

		File: OH-02B.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



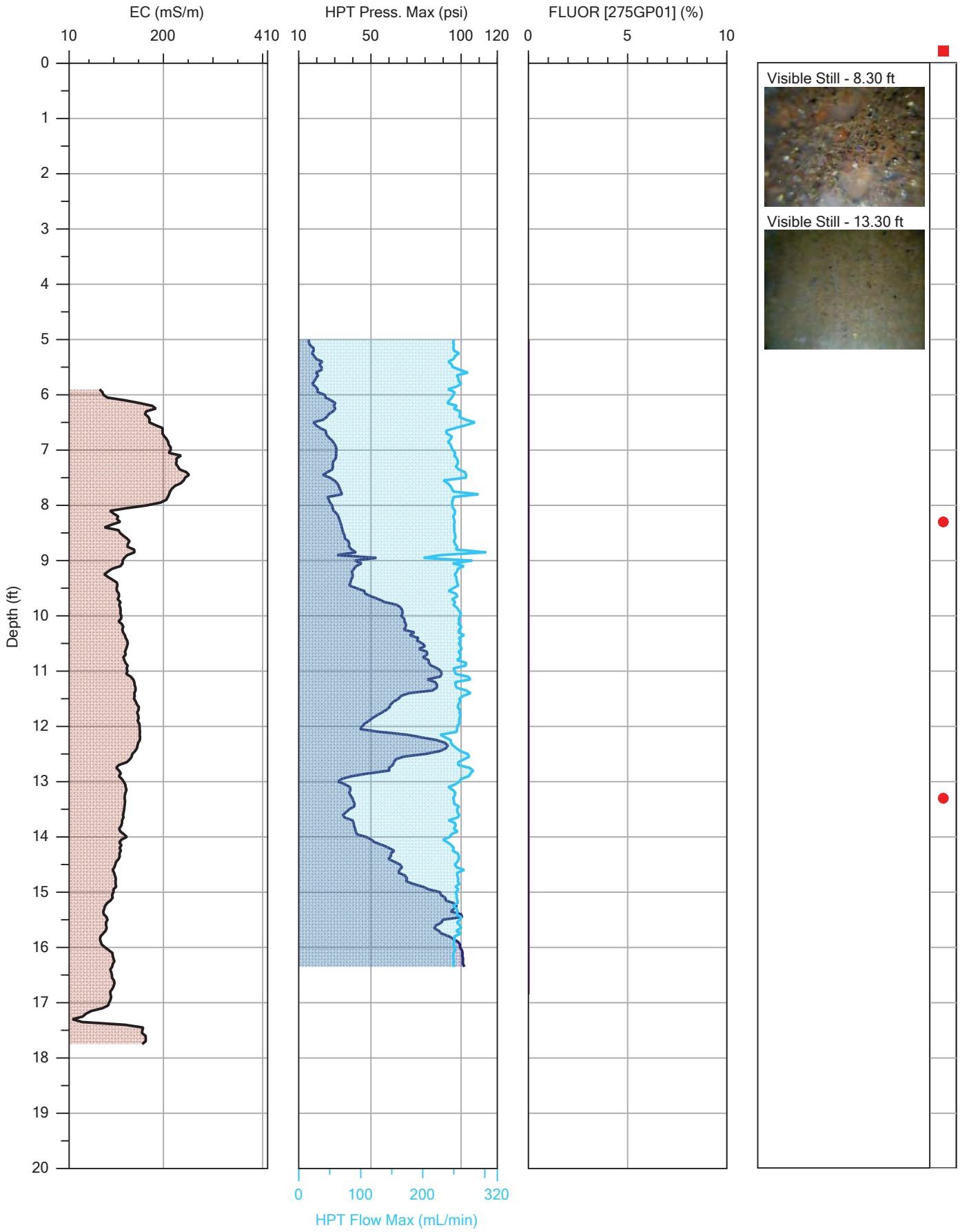
Vista GeoScience Subsurface Imaging Systems

		File: OH-03.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



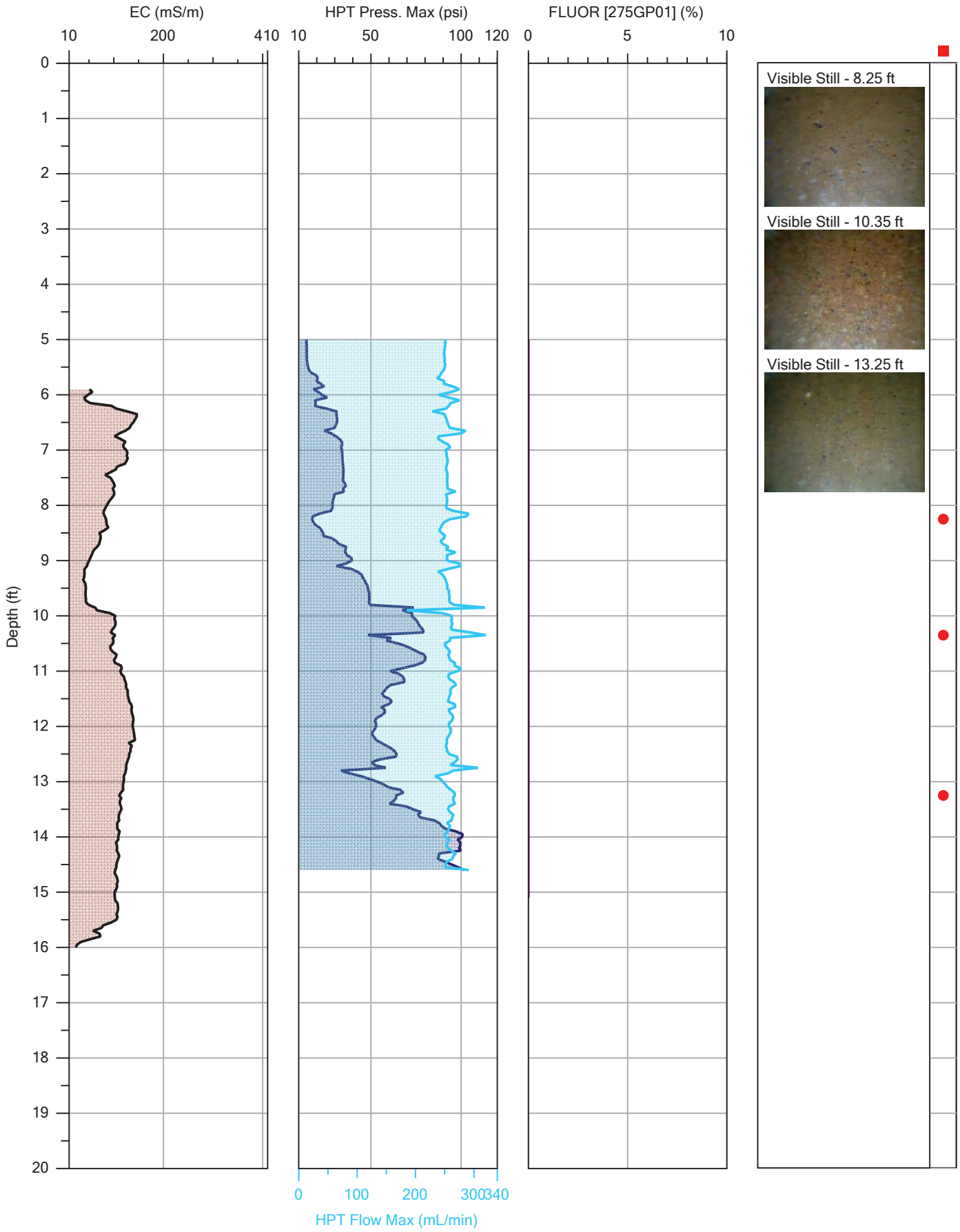
Vista GeoScience Subsurface Imaging Systems

			File: OH-04.OIHP
Company: Vista GeoScience		Operator: DF	Date: 10/14/2021
Project ID: 21209.01		Client: CGRS	Location: Fort Collins, CO



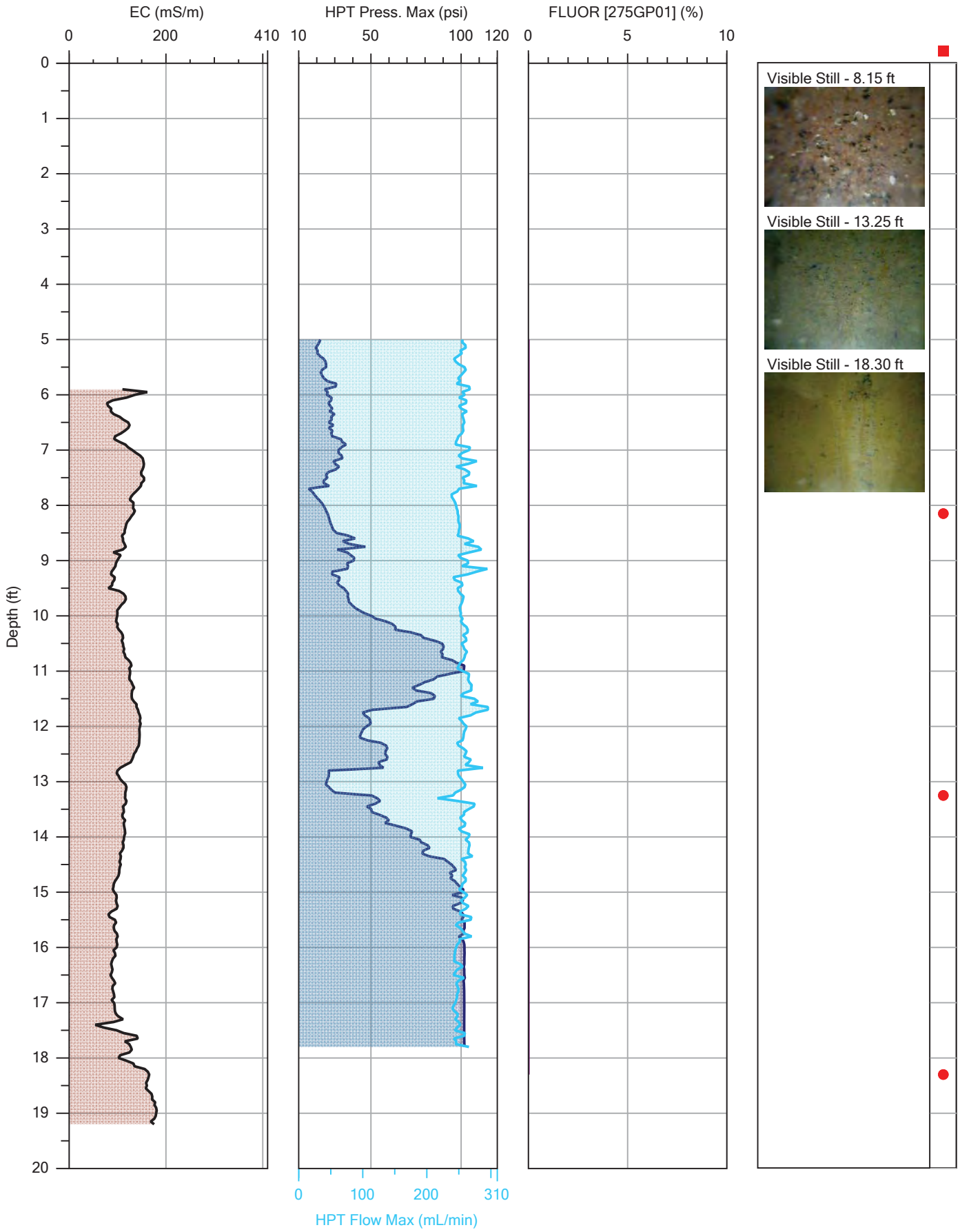
Vista GeoScience Subsurface Imaging Systems

		File: OH-05.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



Vista GeoScience Subsurface Imaging Systems

			File: OH-06.OIHP
Company: Vista GeoScience		Operator: DF	Date: 10/14/2021
Project ID: 21209.01		Client: CGRS	Location: Fort Collins, CO

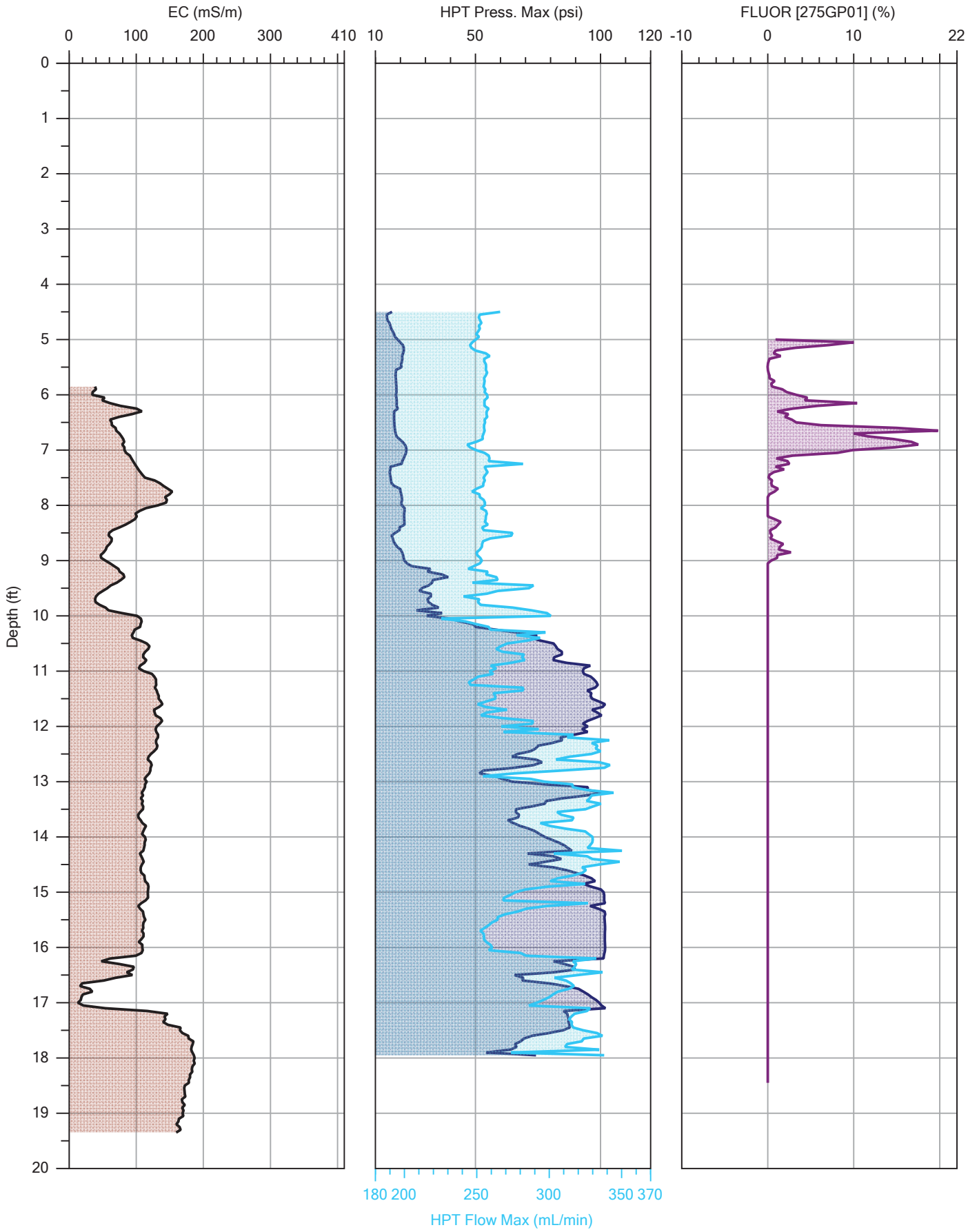


Vista GeoScience Subsurface Imaging Systems

		File: OH-07.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO

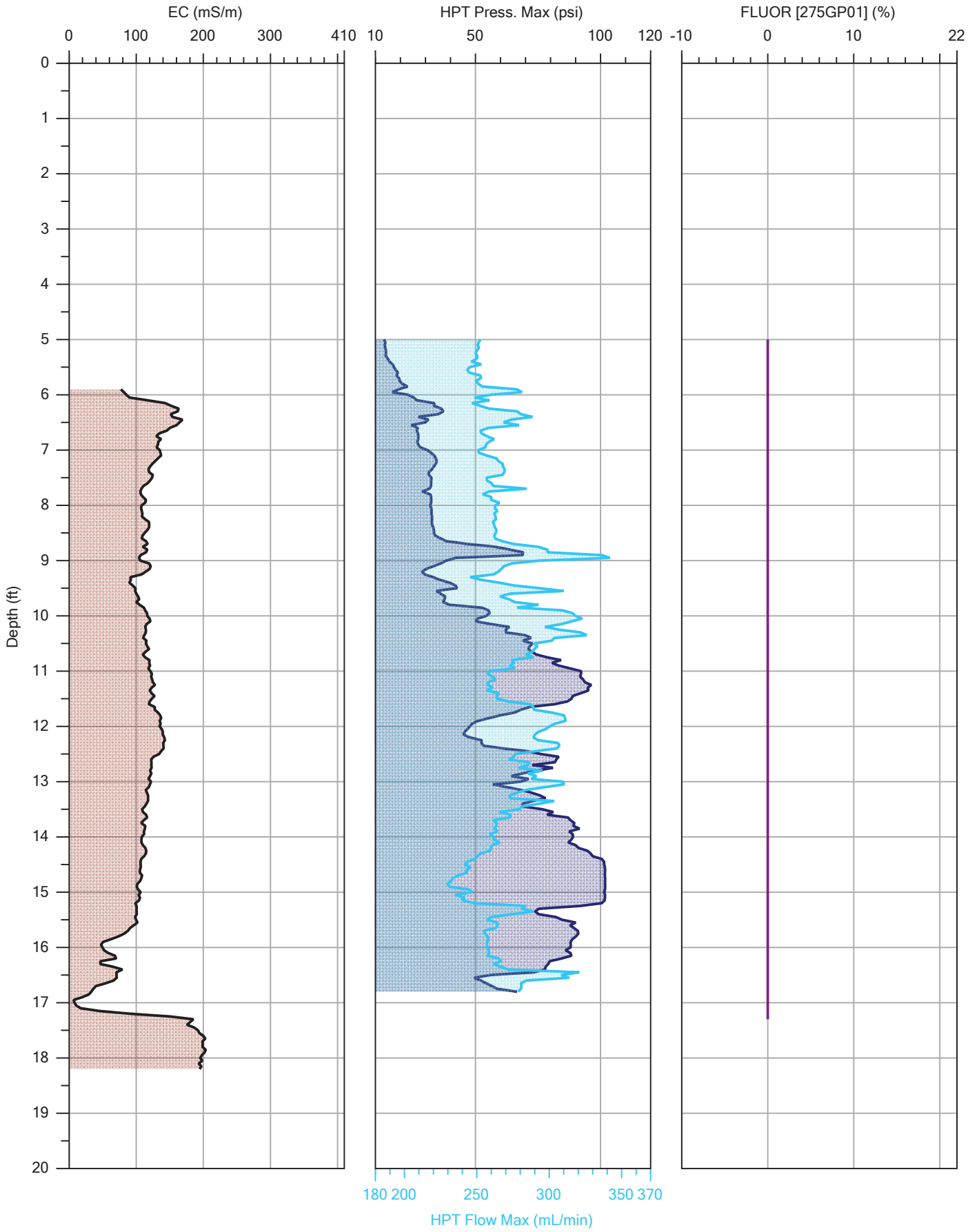
5.2 Common Scaled OiHPT Logs

All logs are scaled to the maximum X-axis value (sensor response value) and maximum Y-axis value (depth) for the entire data set. This is useful when comparing logs across the entire site.



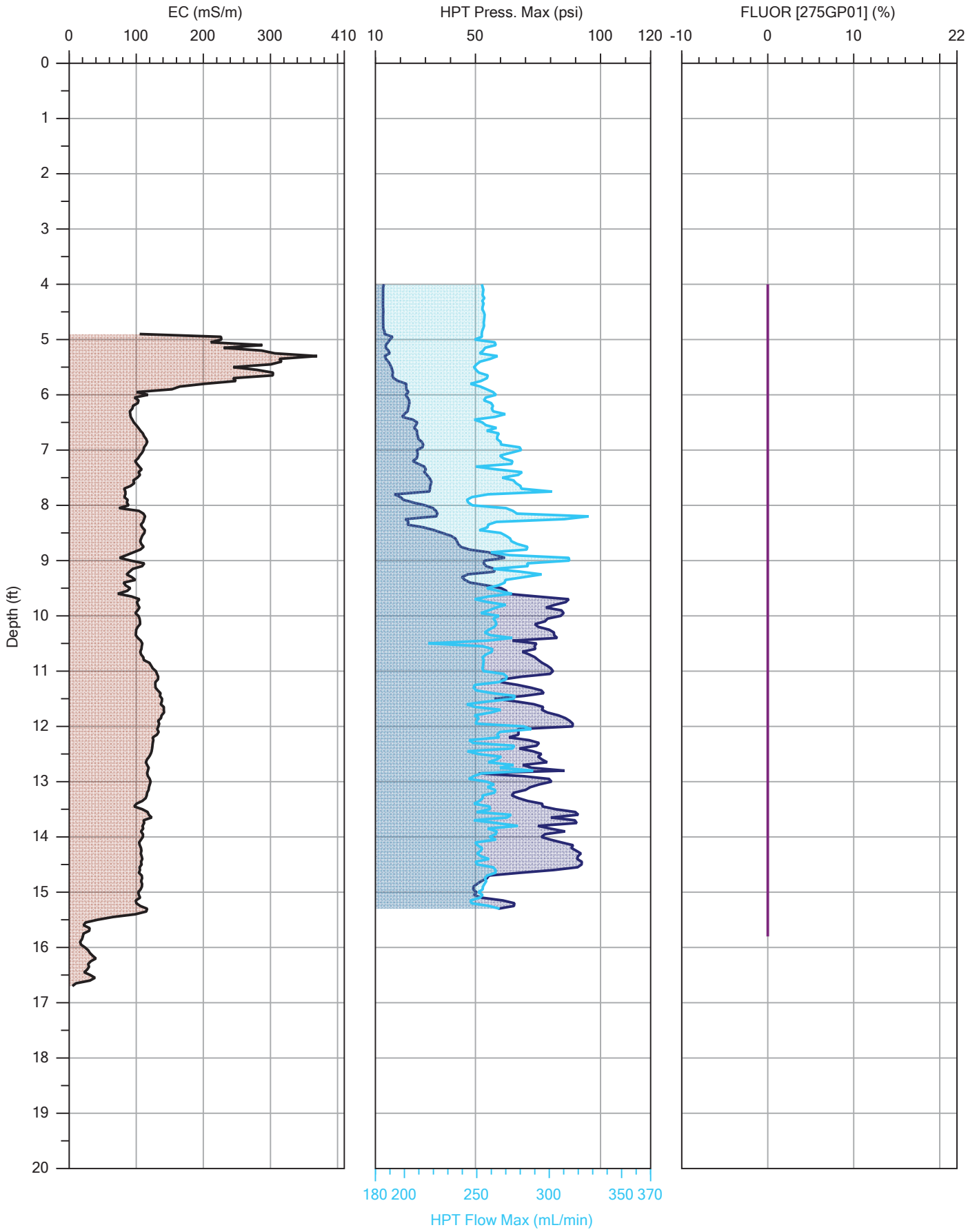
Vista GeoScience Subsurface Imaging Systems

		File: OH-01.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



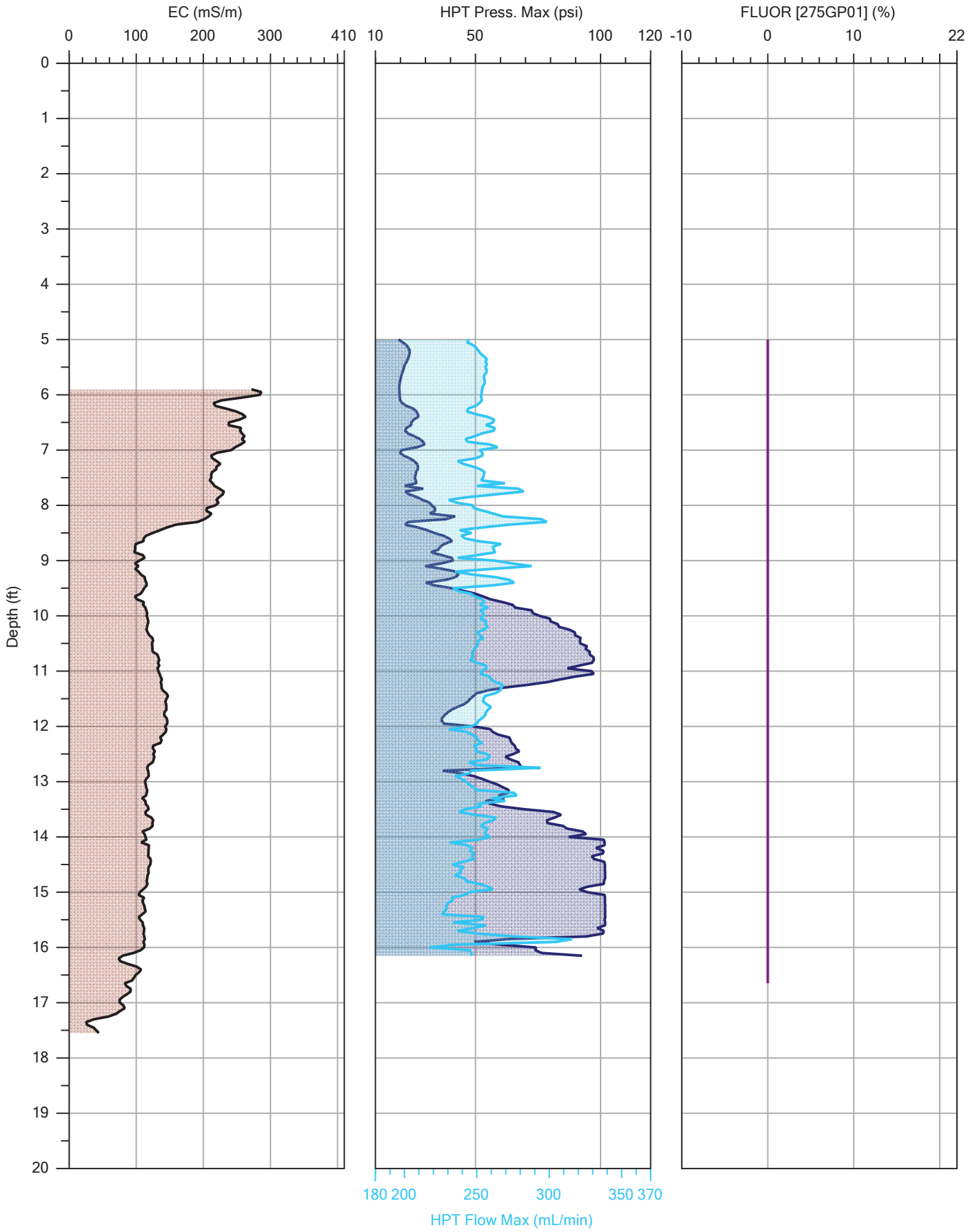
Vista GeoScience Subsurface Imaging Systems

		File: OH-02B.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



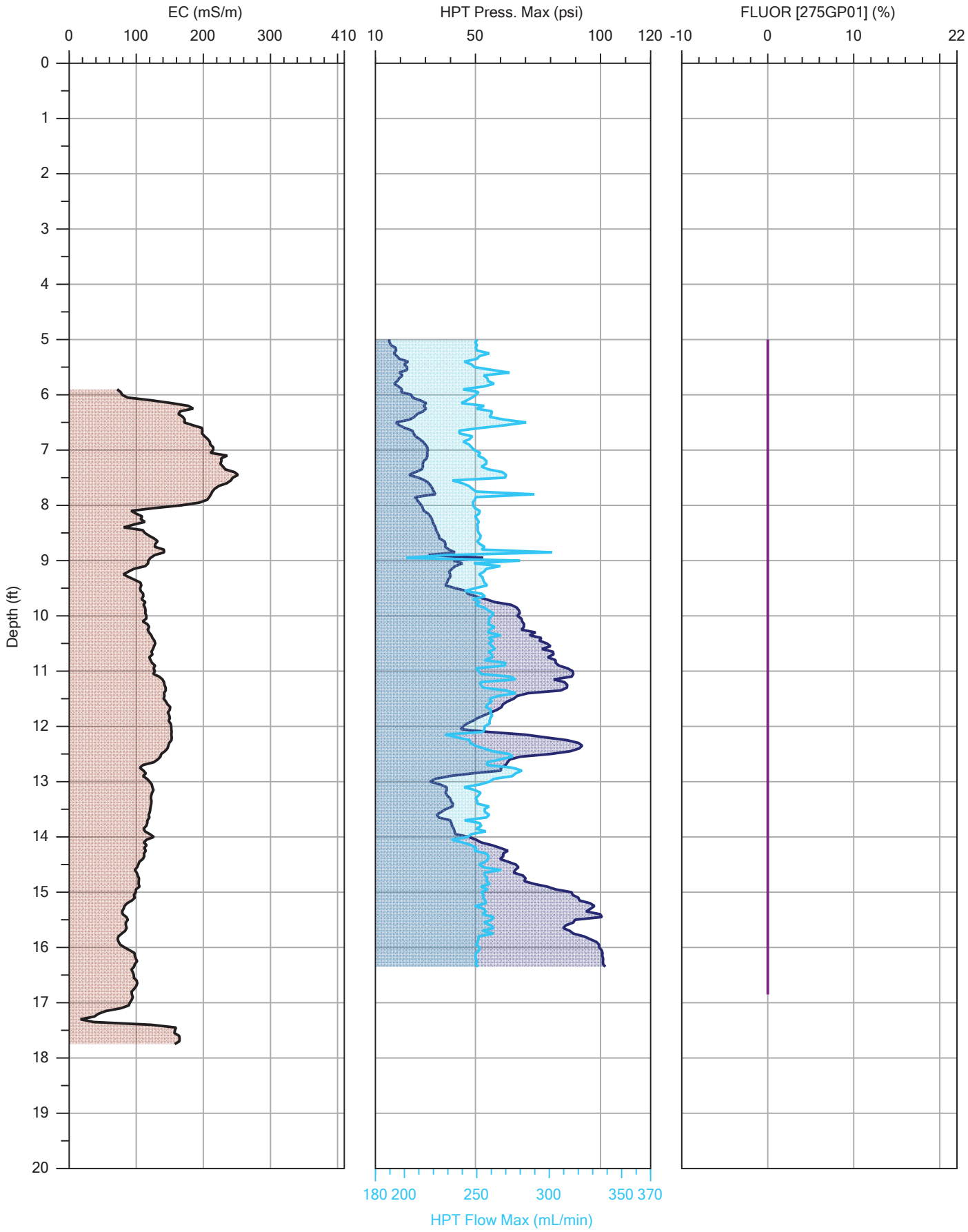
Vista GeoScience Subsurface Imaging Systems

		File: OH-03.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



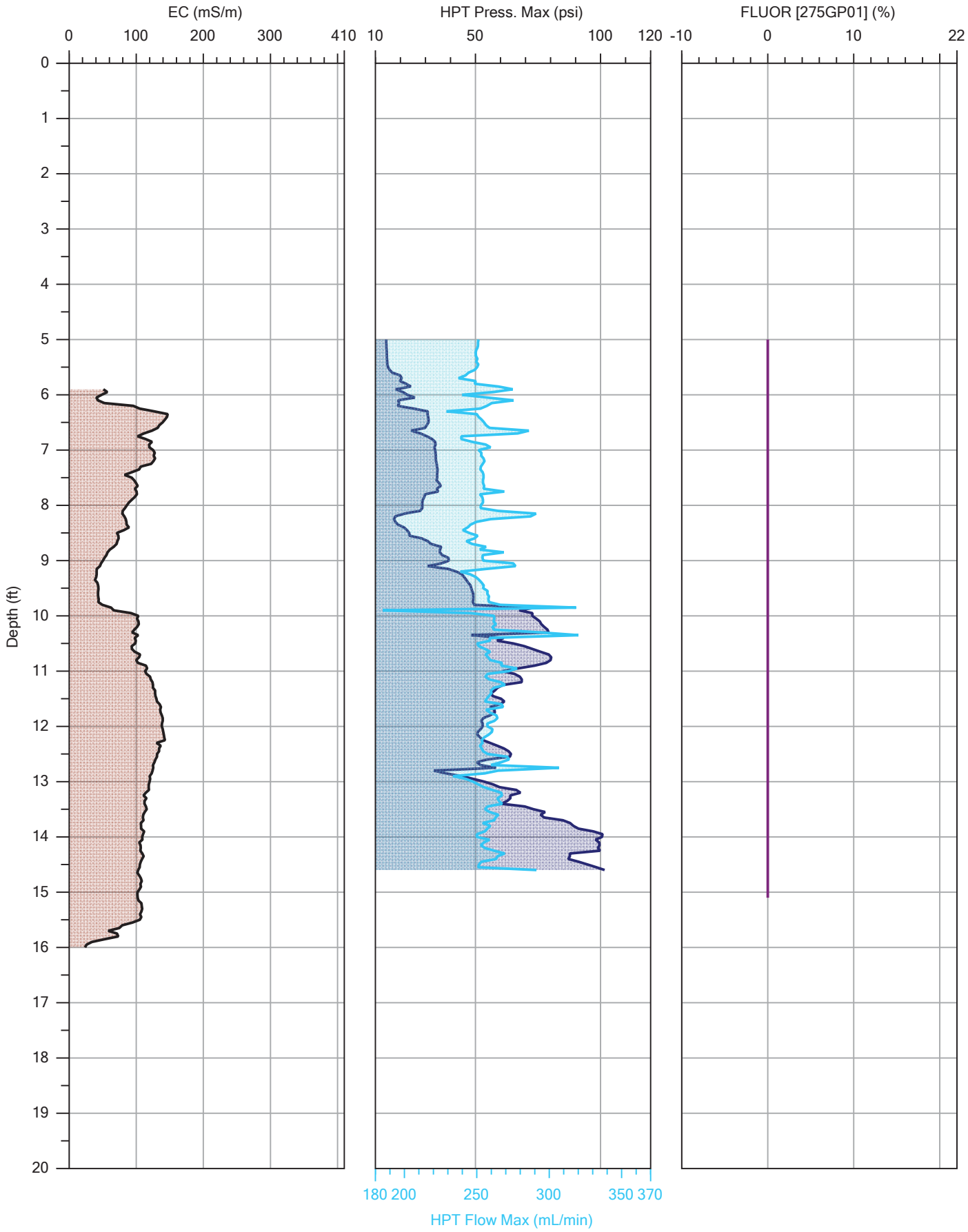
Vista GeoScience Subsurface Imaging Systems

		File: OH-04.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



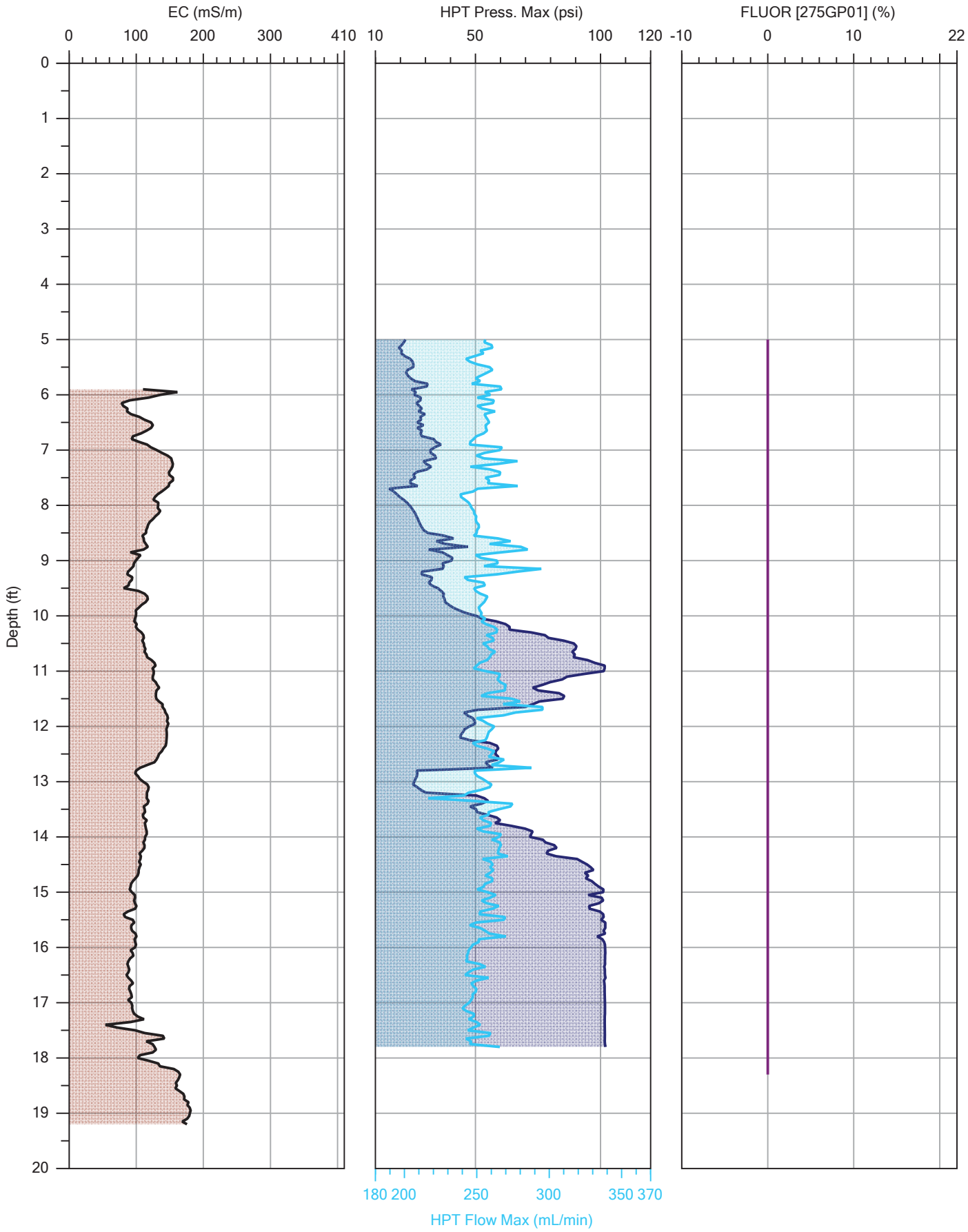
Vista GeoScience Subsurface Imaging Systems

		File: OH-05.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



Vista GeoScience Subsurface Imaging Systems

		File: OH-06.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO

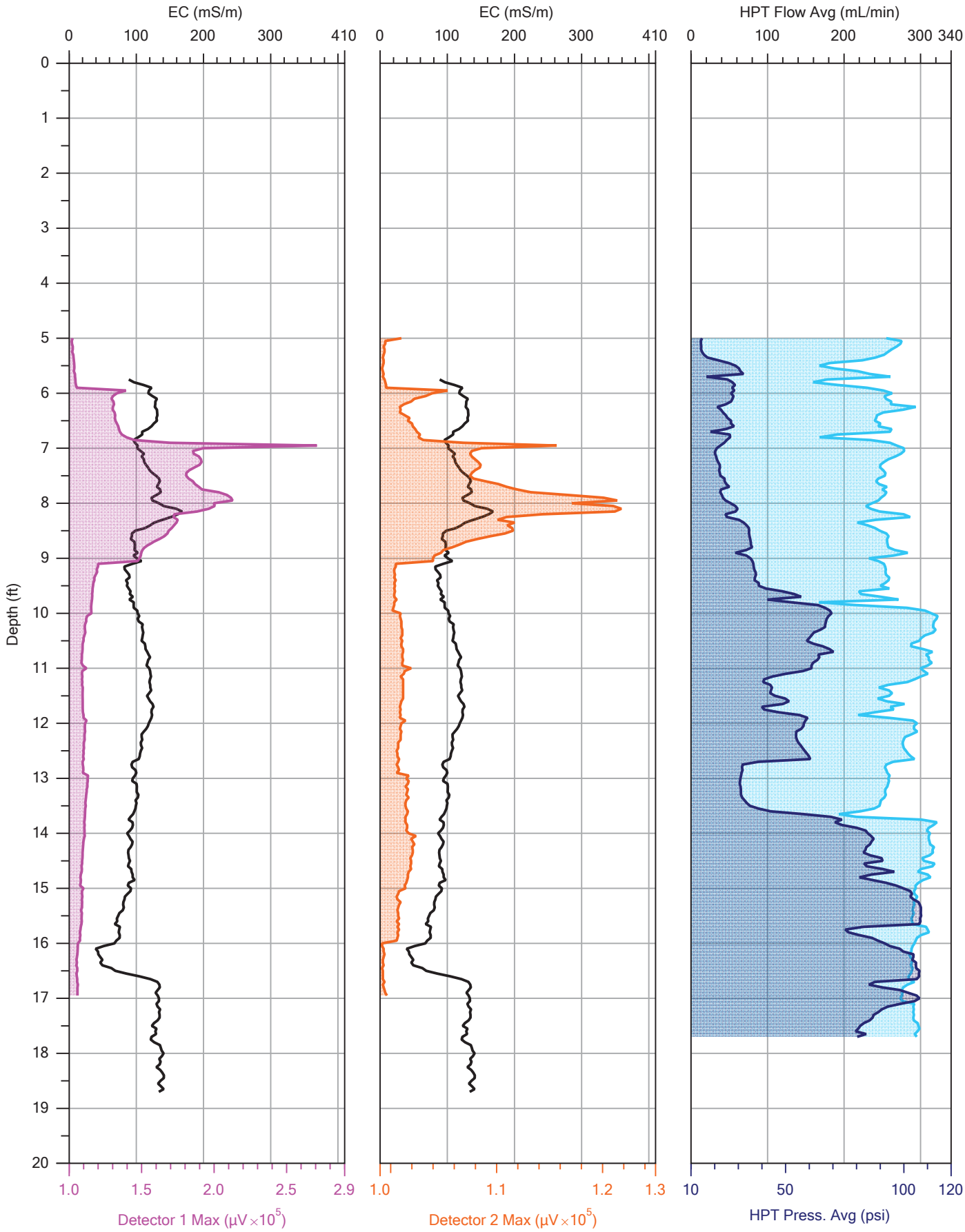


Vista GeoScience Subsurface Imaging Systems

		File: OH-07.OIHP
Company: Vista GeoScience	Operator: DF	Date: 10/14/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO

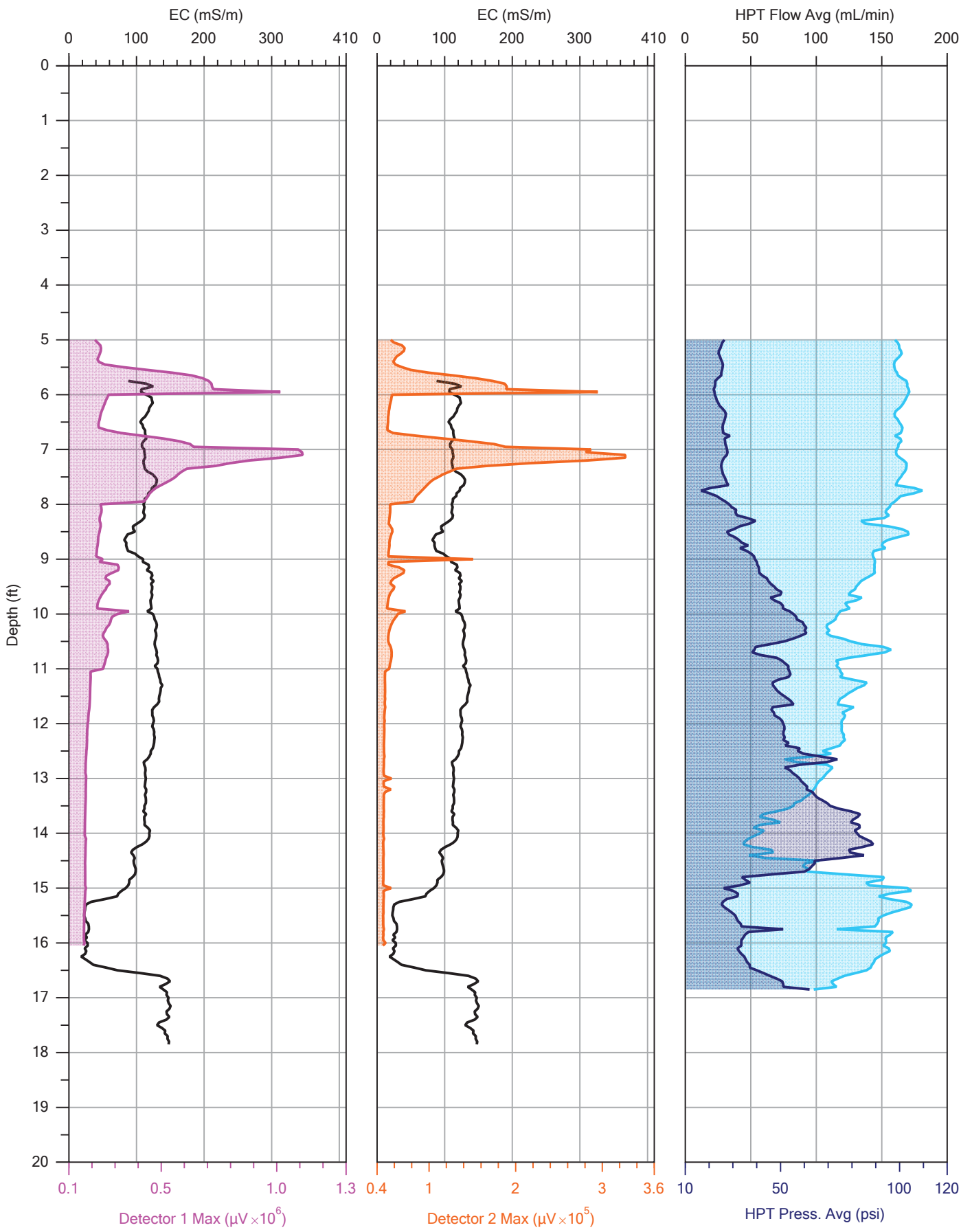
5.3 Individually Scaled MiHpt Logs

All logs are individually scaled to the maximum X-axis value (sensor response value) for the each log and maximum Y-axis value (depth) for the entire data set. This allows for increased detail on each individual log.



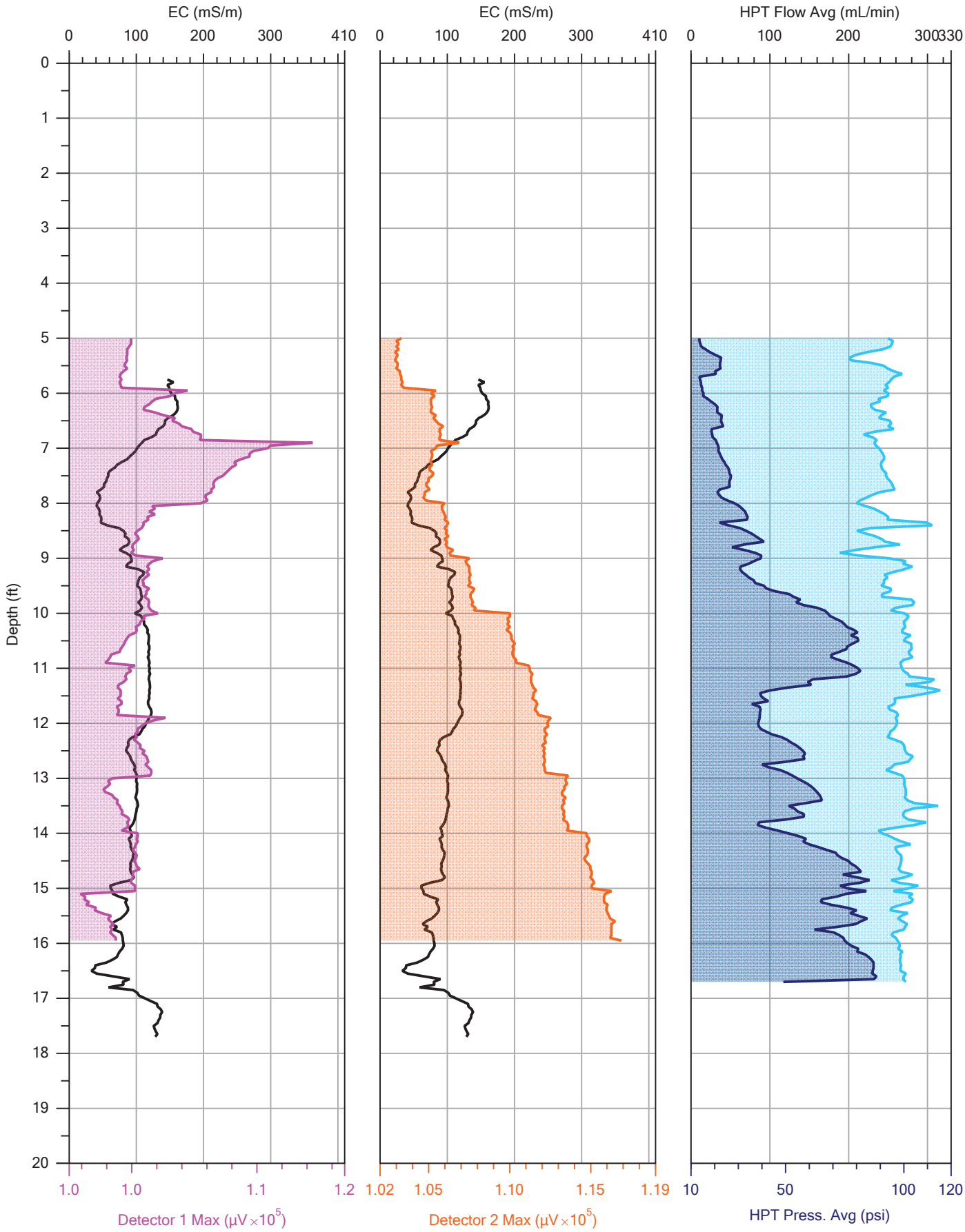
Vista GeoScience Subsurface Imaging Systems

		File: MIP-08.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



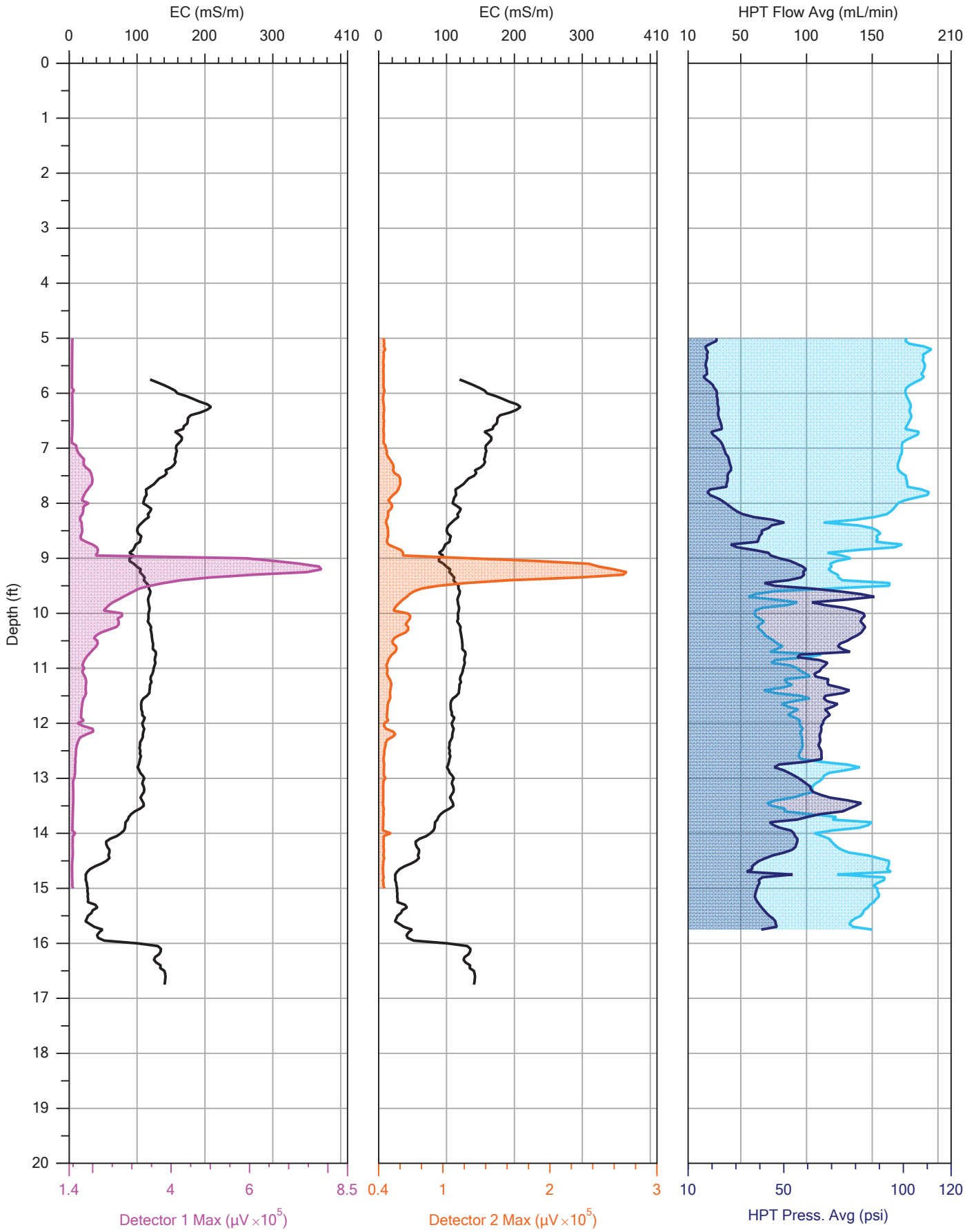
Vista GeoScience Subsurface Imaging Systems

		File: MIP-09.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



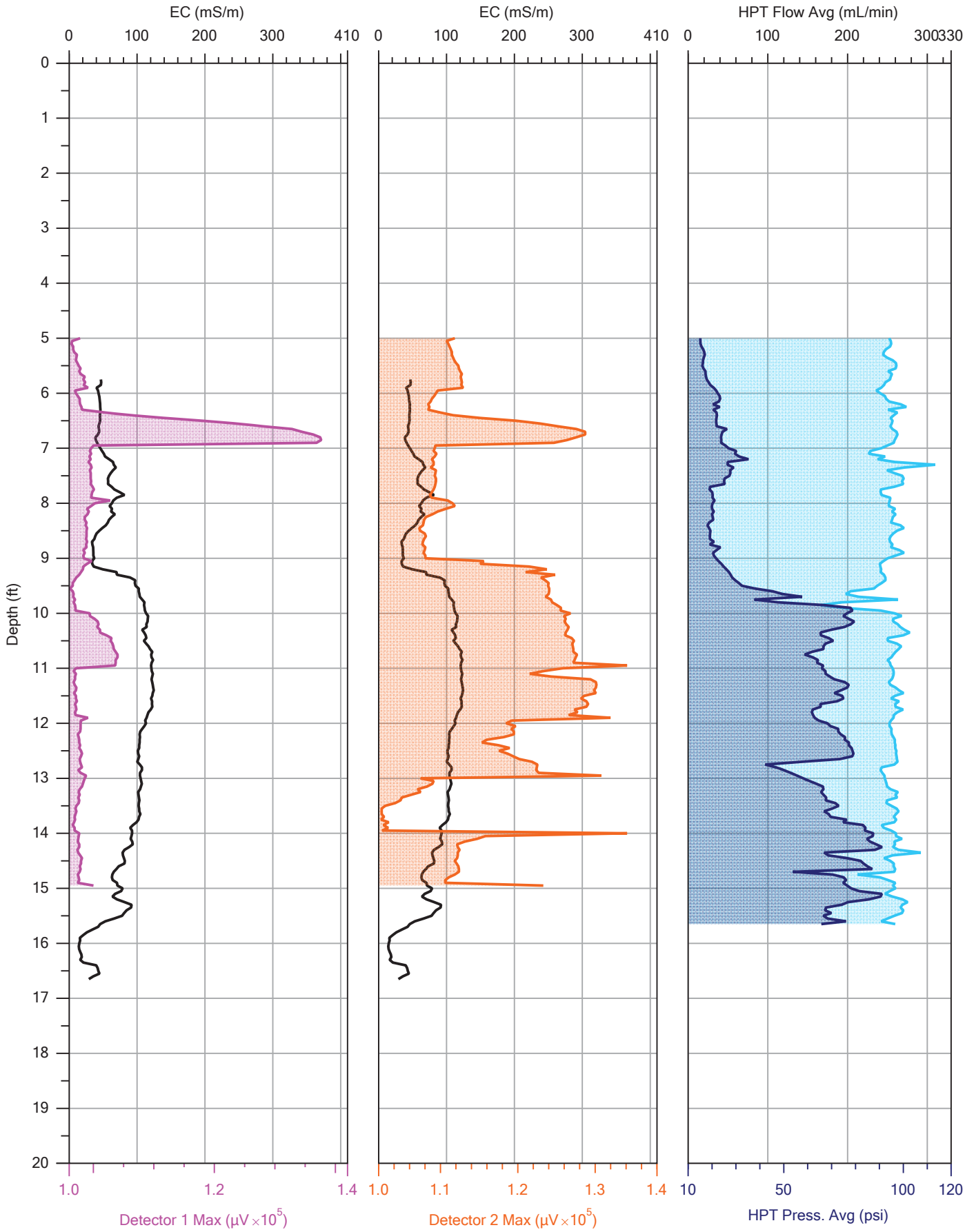
Vista GeoScience Subsurface Imaging Systems

		File: MIP-10.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



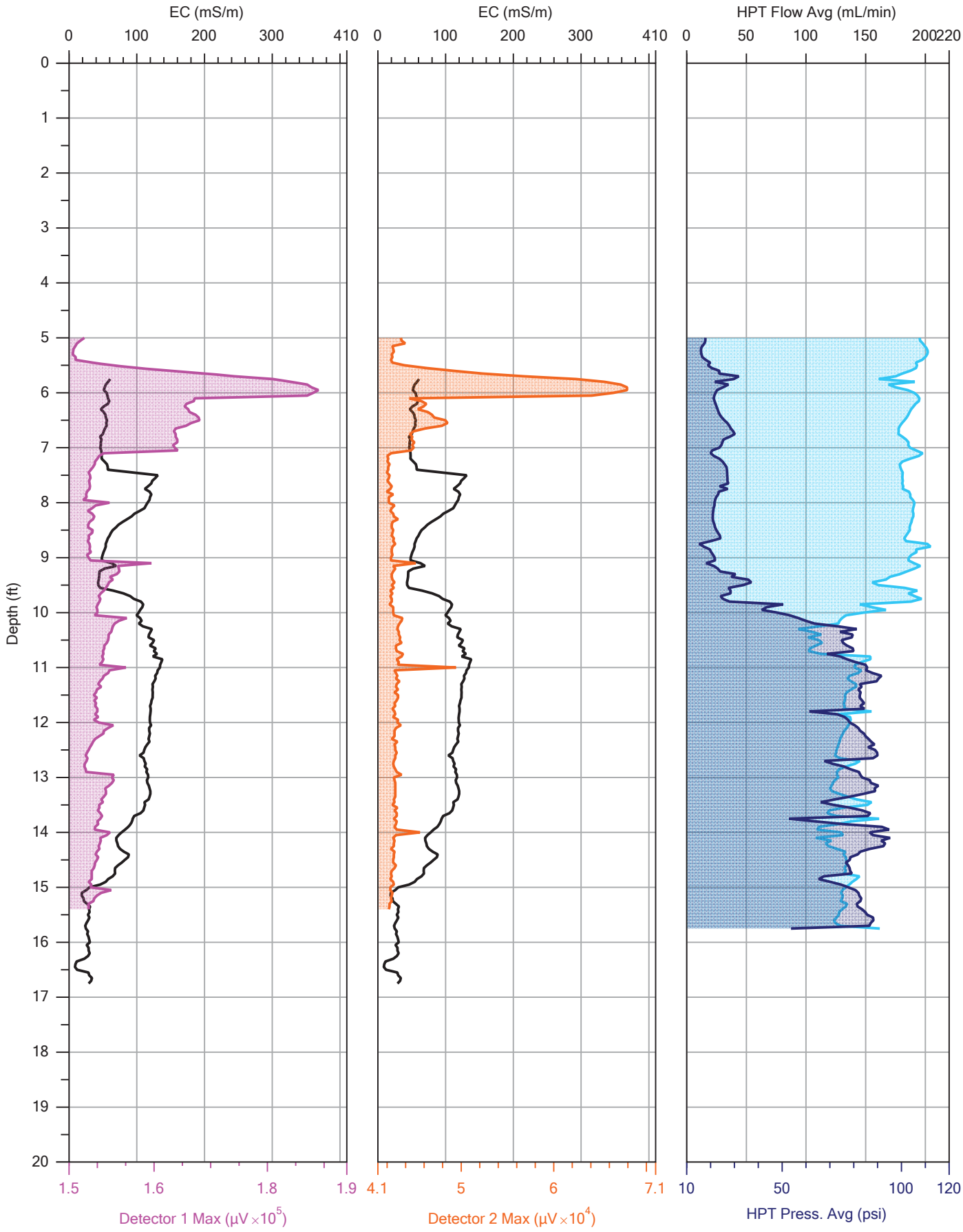
Vista GeoScience Subsurface Imaging Systems

		File: MIP-11.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



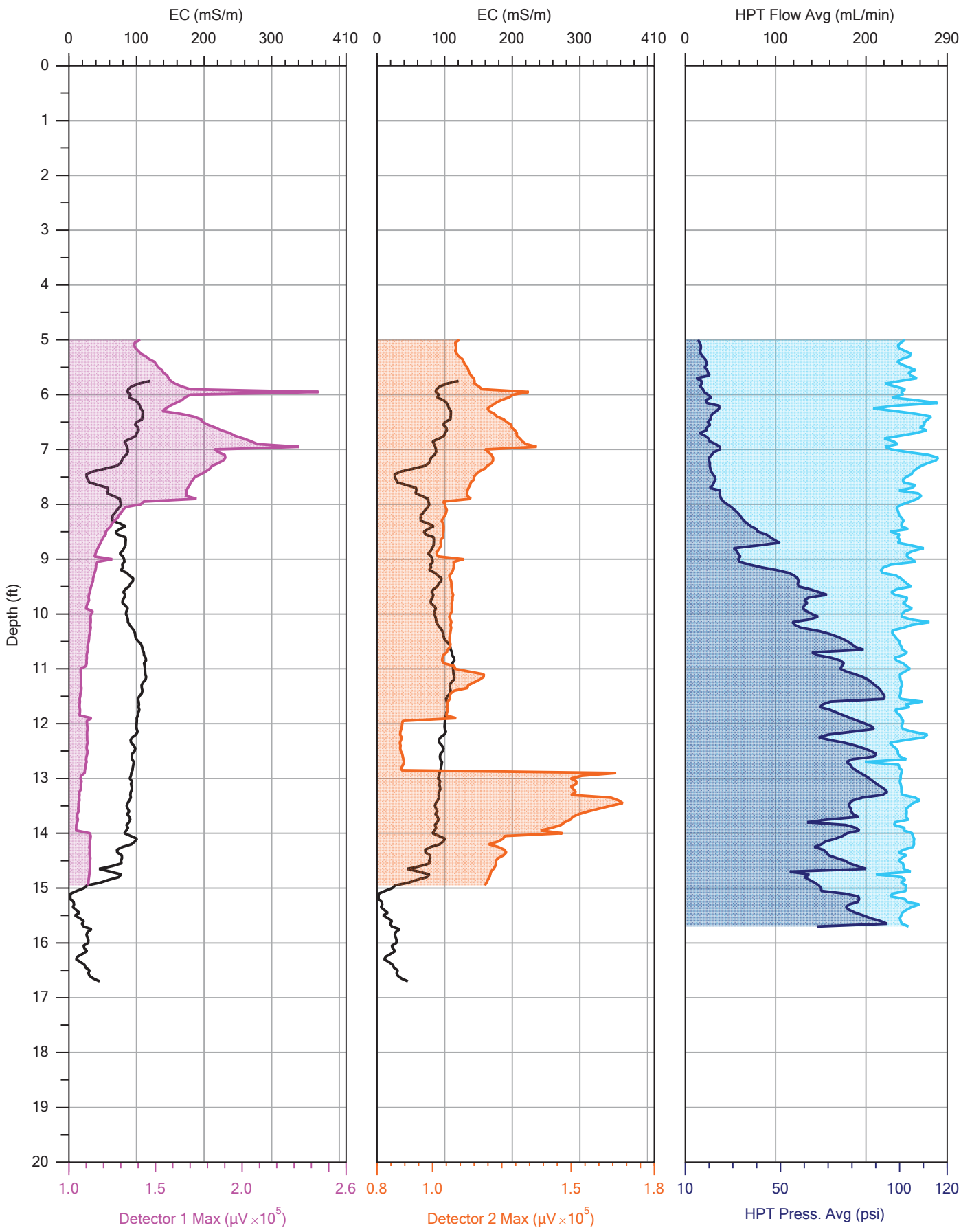
Vista GeoScience Subsurface Imaging Systems

		File: MIP-12.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



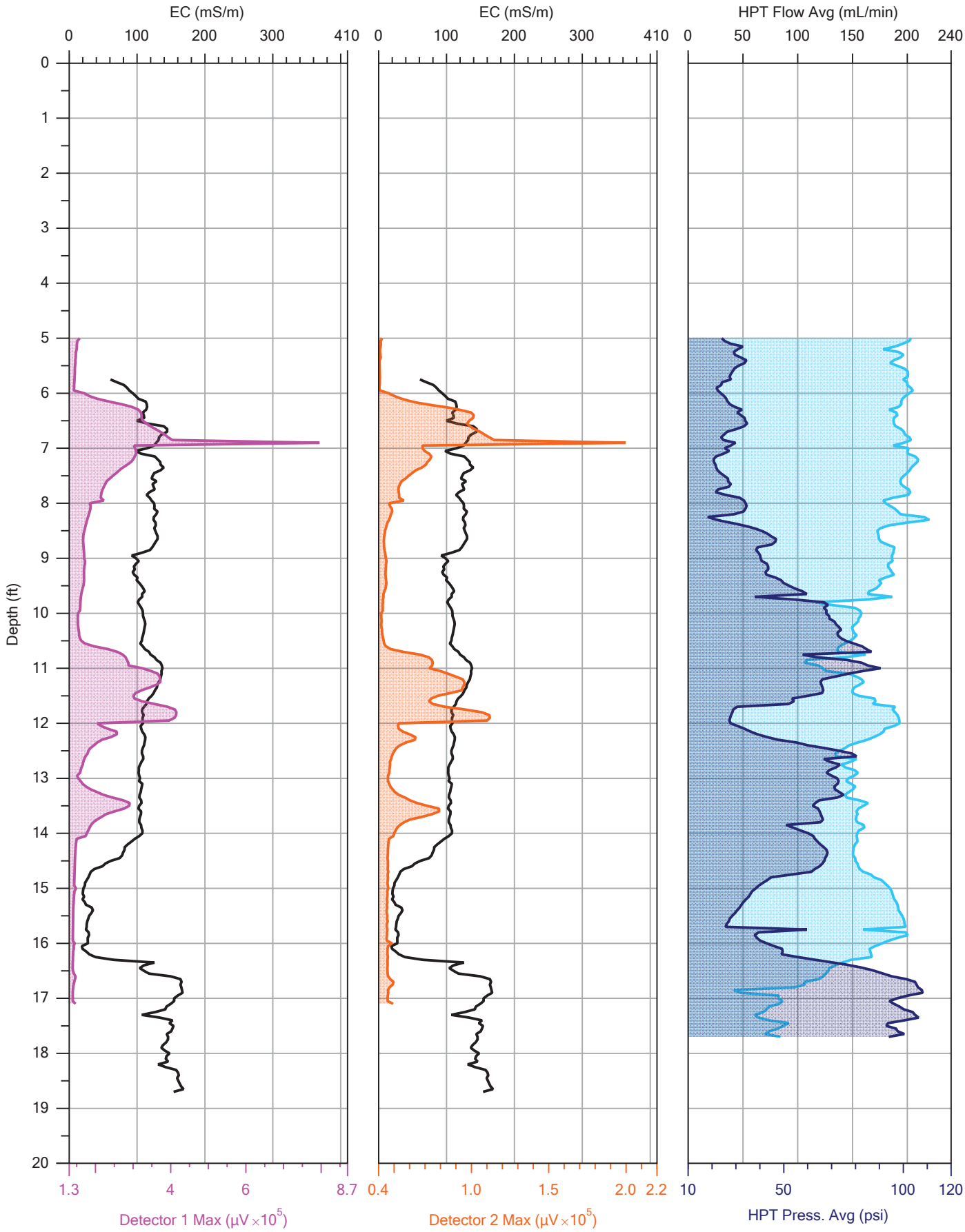
Vista GeoScience Subsurface Imaging Systems

		File: MIP-13.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



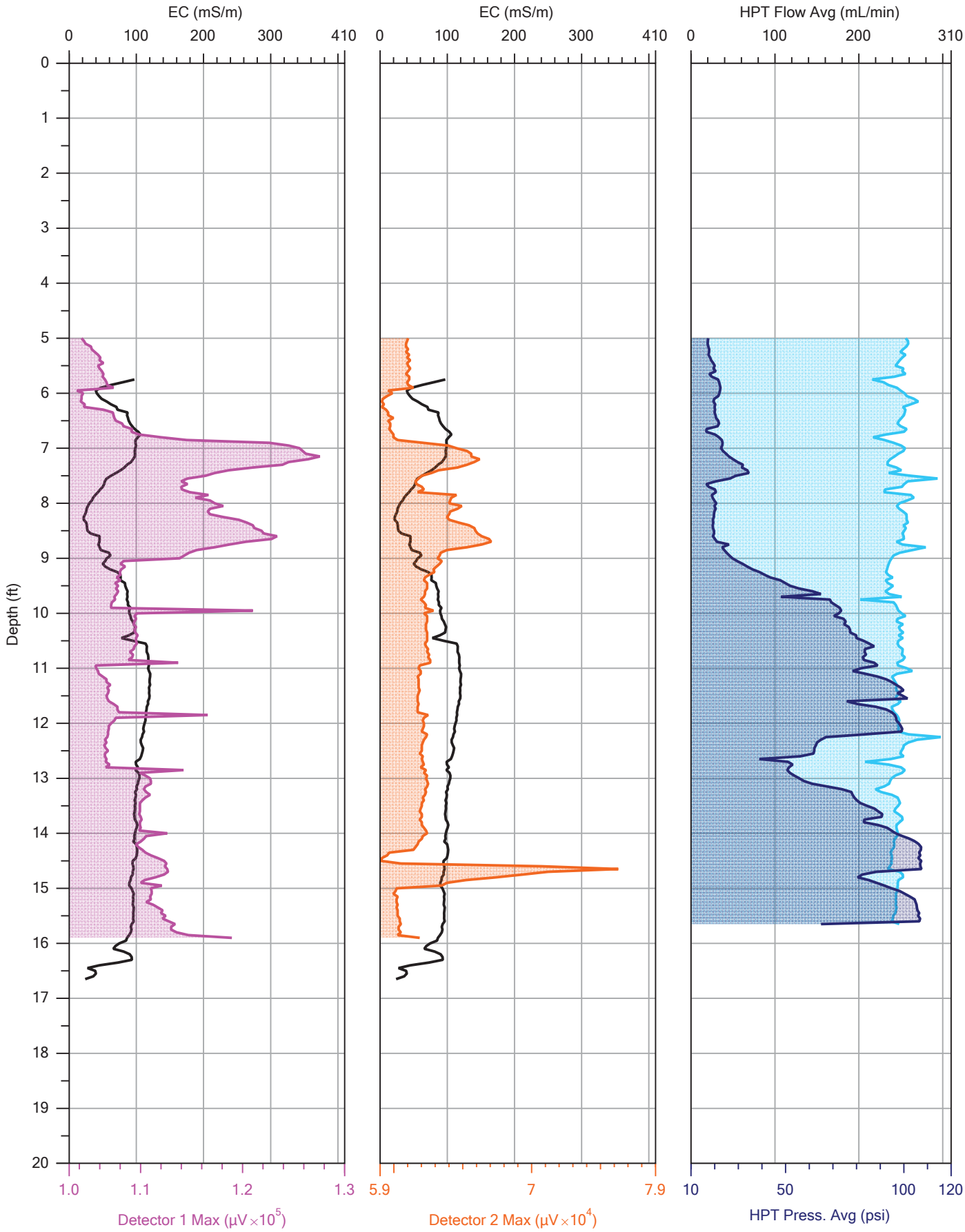
Vista GeoScience Subsurface Imaging Systems

		File: MIP-14.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



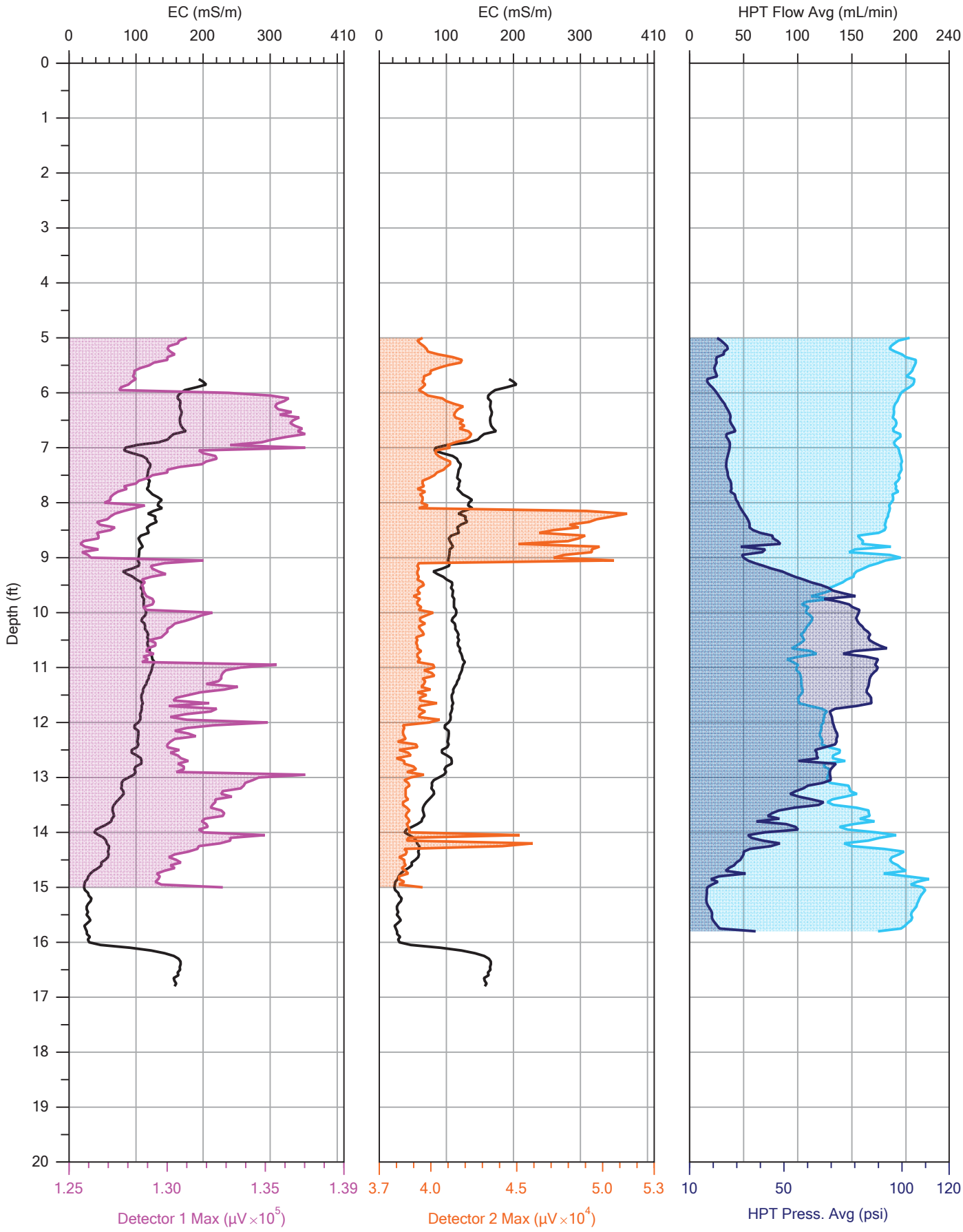
Vista GeoScience Subsurface Imaging Systems

		File: MIP-15.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



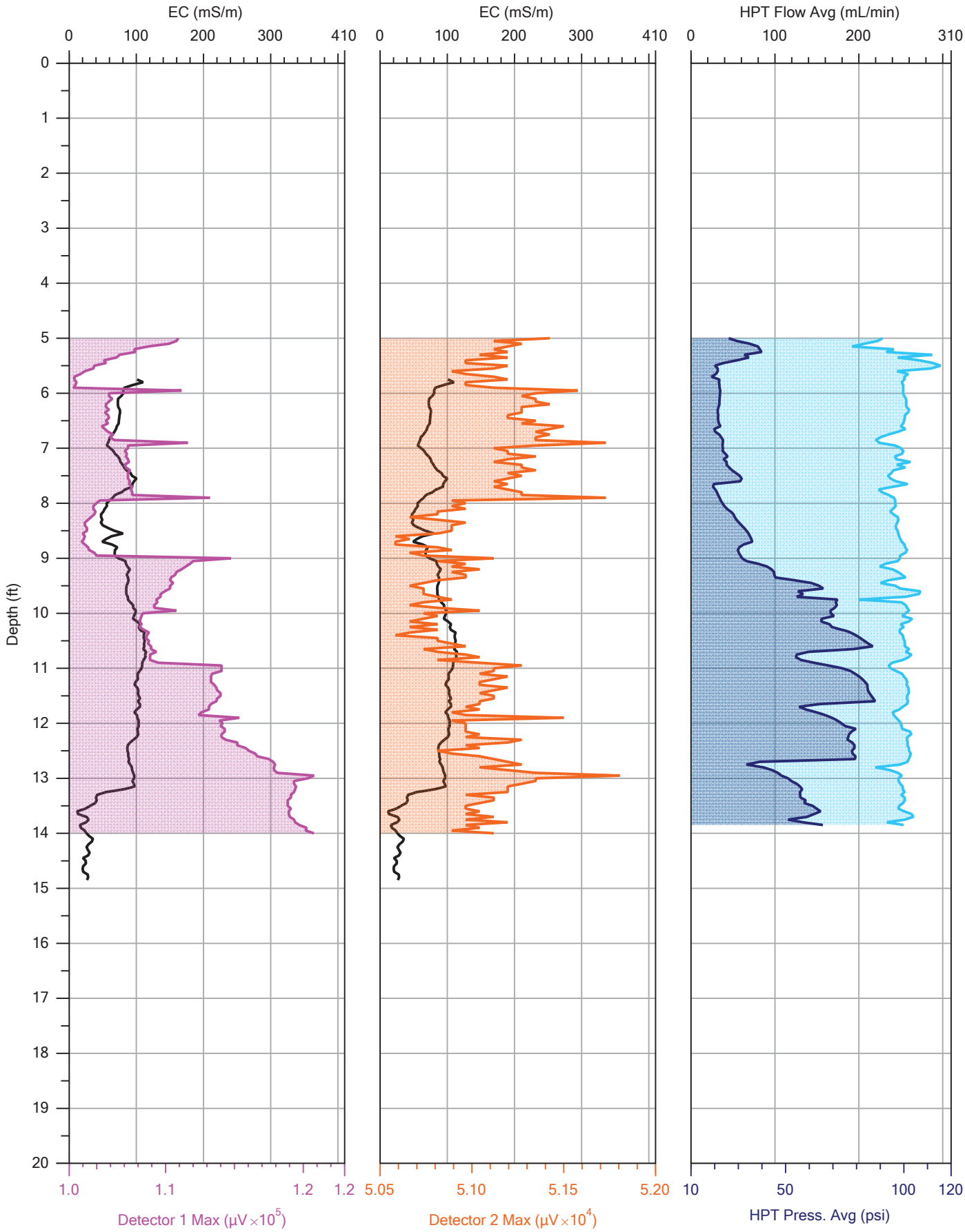
Vista GeoScience Subsurface Imaging Systems

		File: MIP-16.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



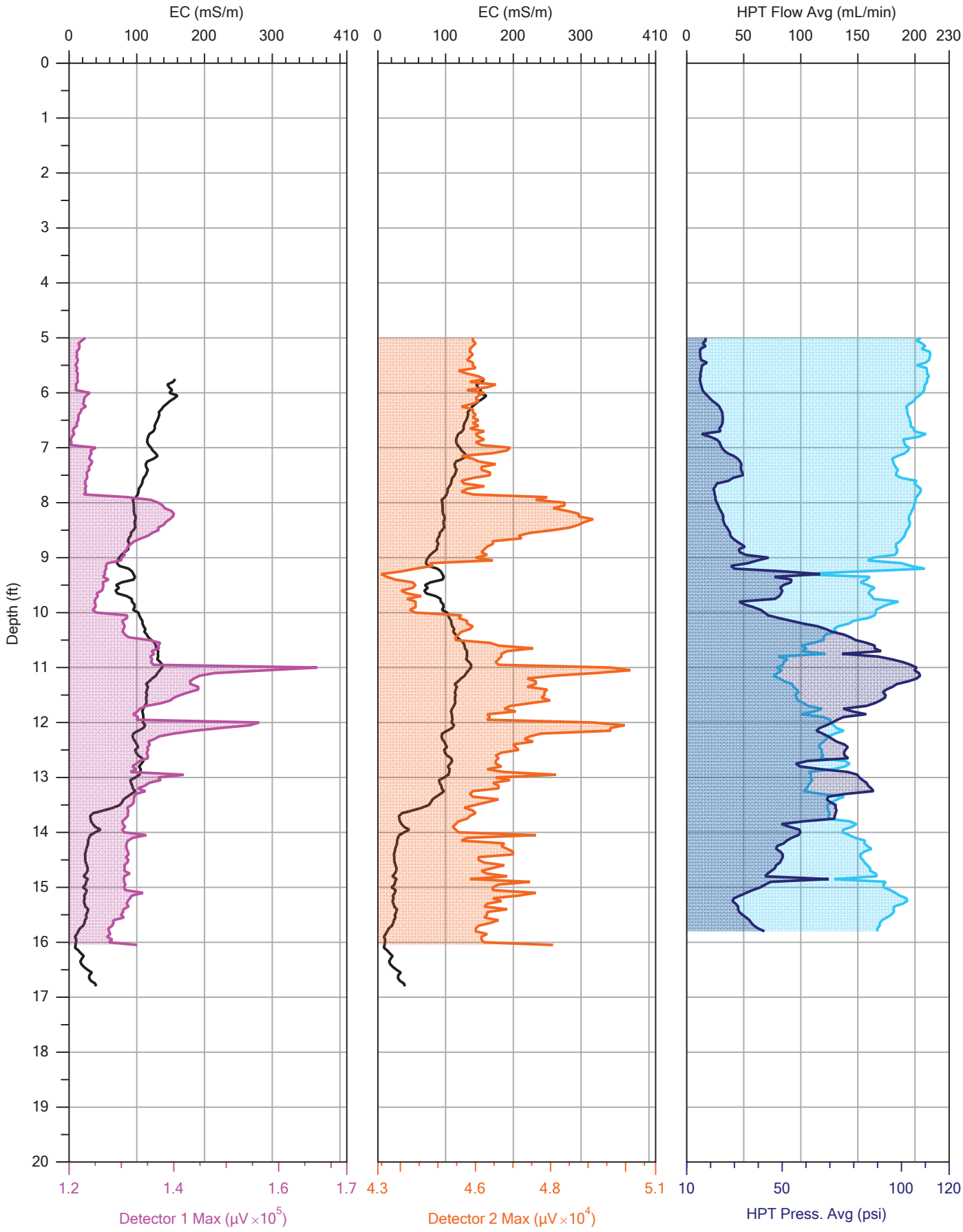
Vista GeoScience Subsurface Imaging Systems

			File: MIP-17.MHP
Company: Vista GeoSience		Operator: MB	Date: 10/15/2021
Project ID: 21209.01		Client: CGRS	Location: Fort Collins



Vista GeoScience Subsurface Imaging Systems

		File: MIP-18.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO

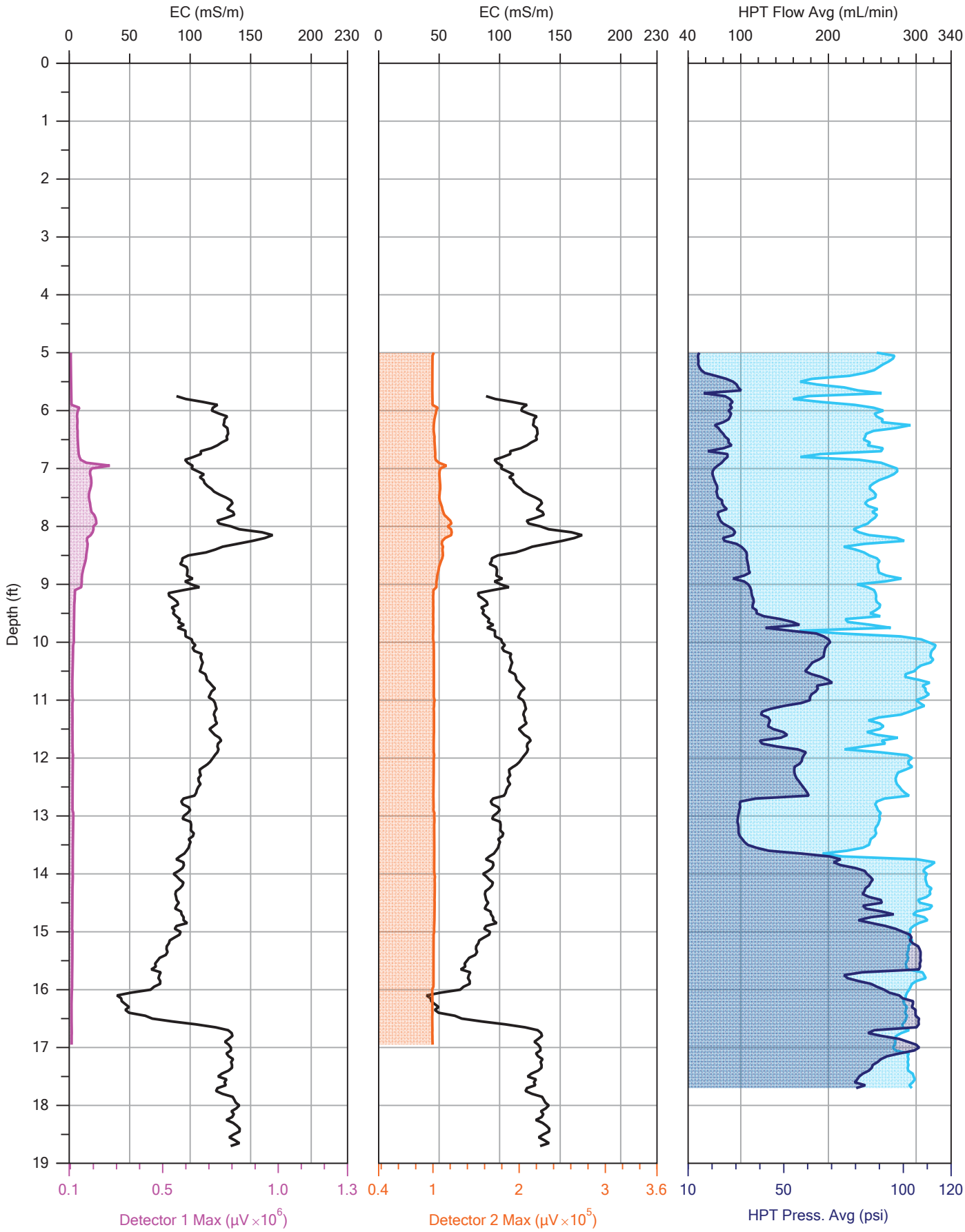


Vista GeoScience Subsurface Imaging Systems

		File: MIP-19.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins

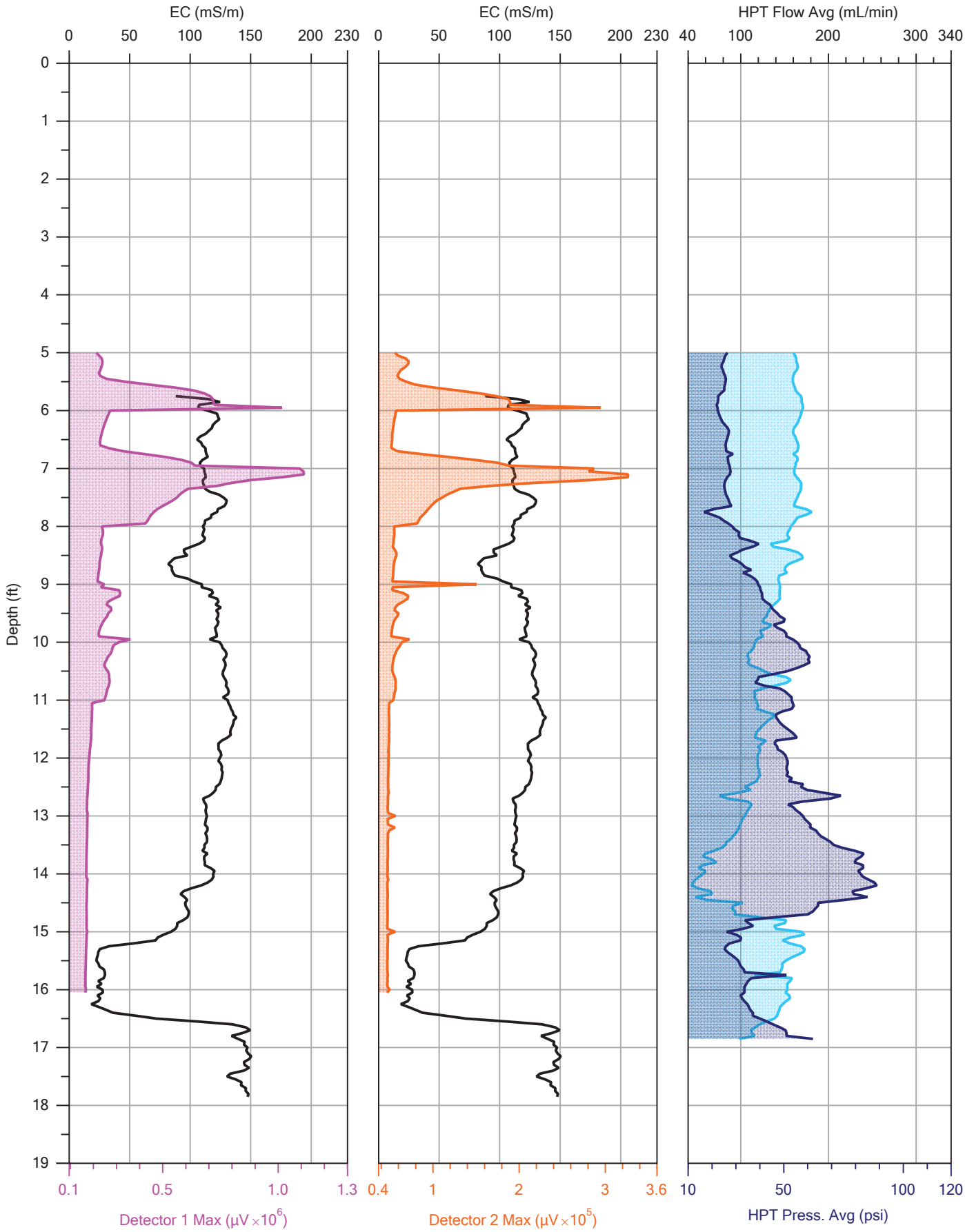
5.4 Common Scaled MiHpt Logs

All logs are scaled to the maximum X-axis value (sensor response value) and maximum Y-axis value (depth) for the entire data set. This is useful when comparing logs using the same scale across the entire site.



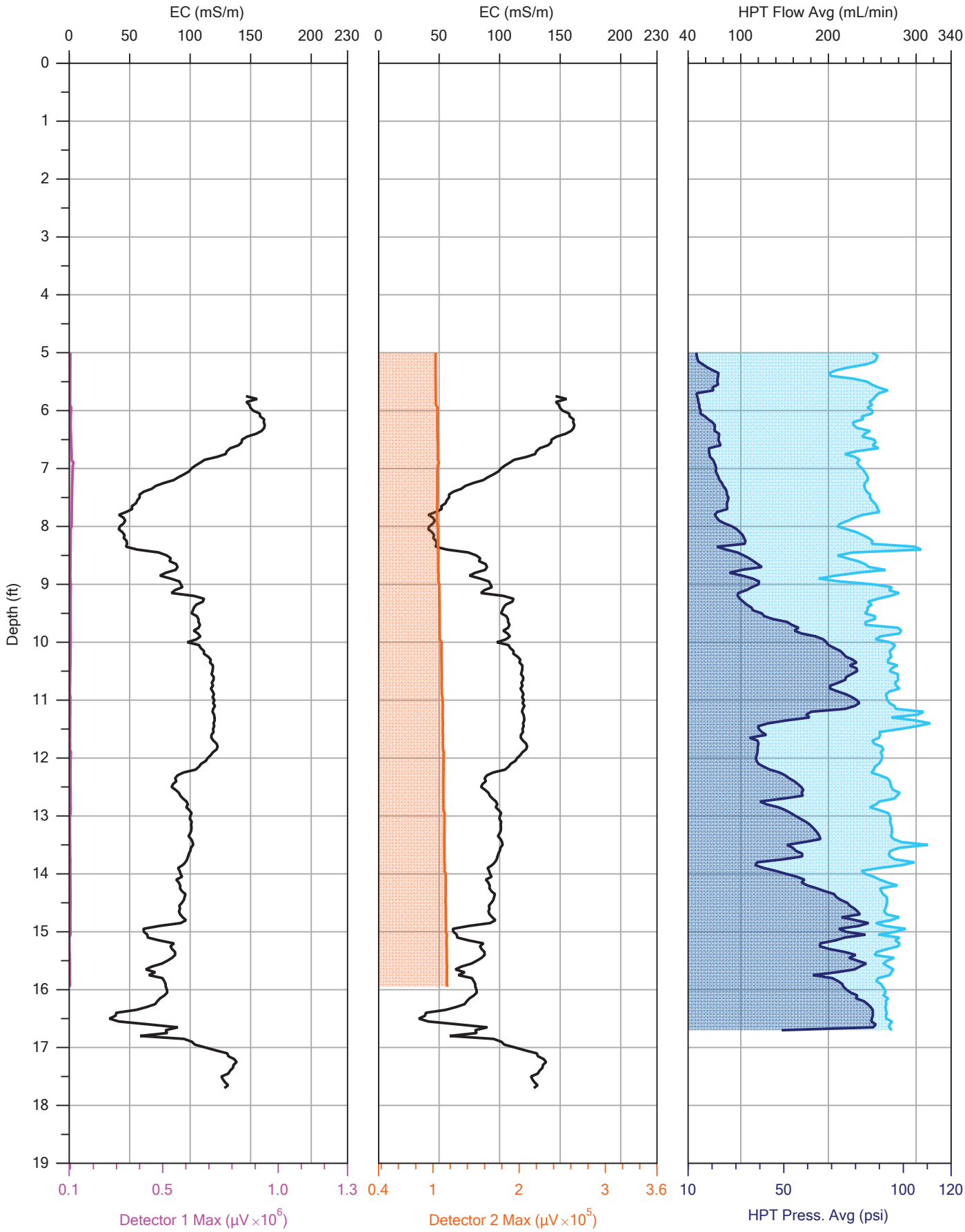
Vista GeoScience Subsurface Imaging Systems

		File: MIP-08.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



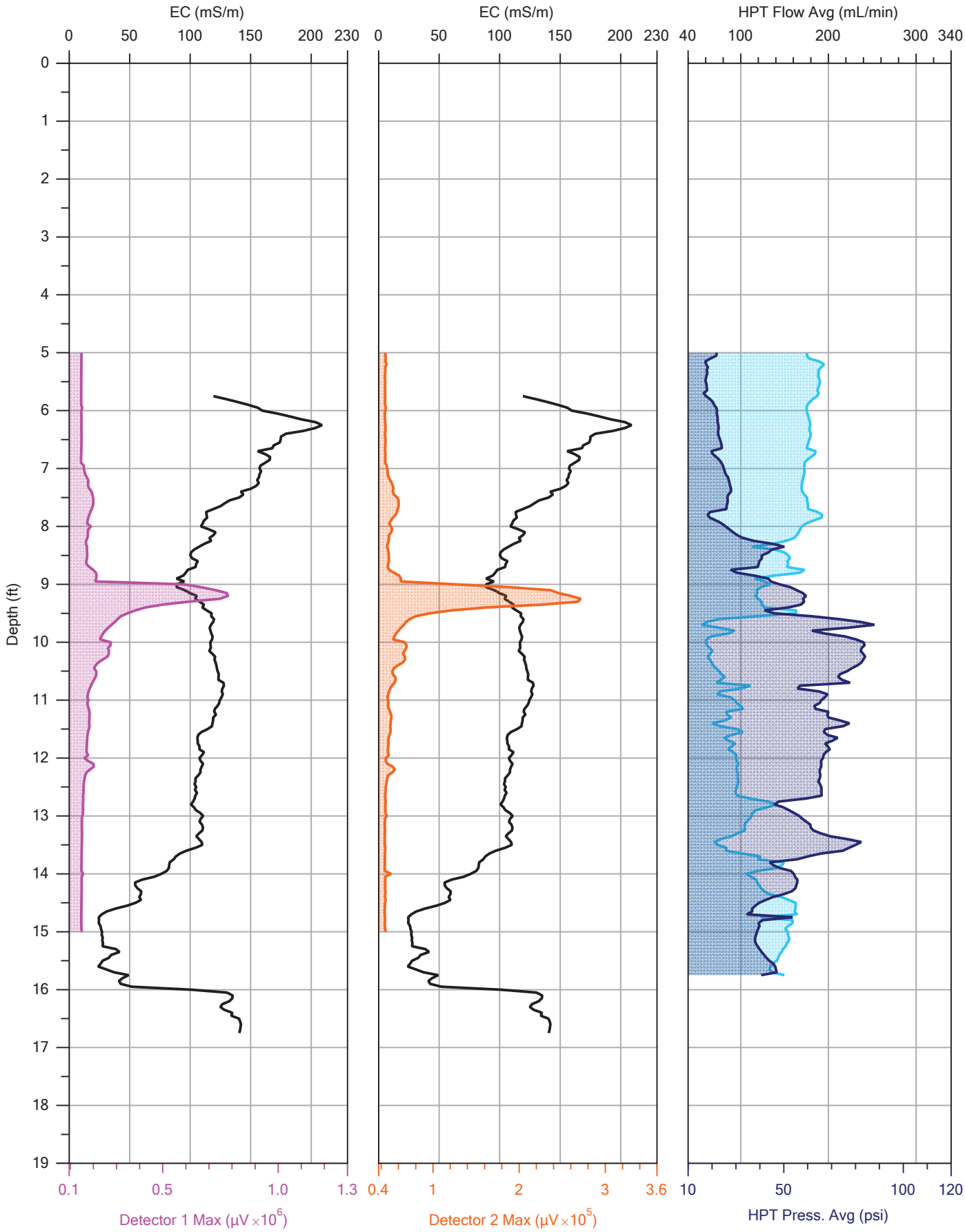
Vista GeoScience Subsurface Imaging Systems

		File: MIP-09.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



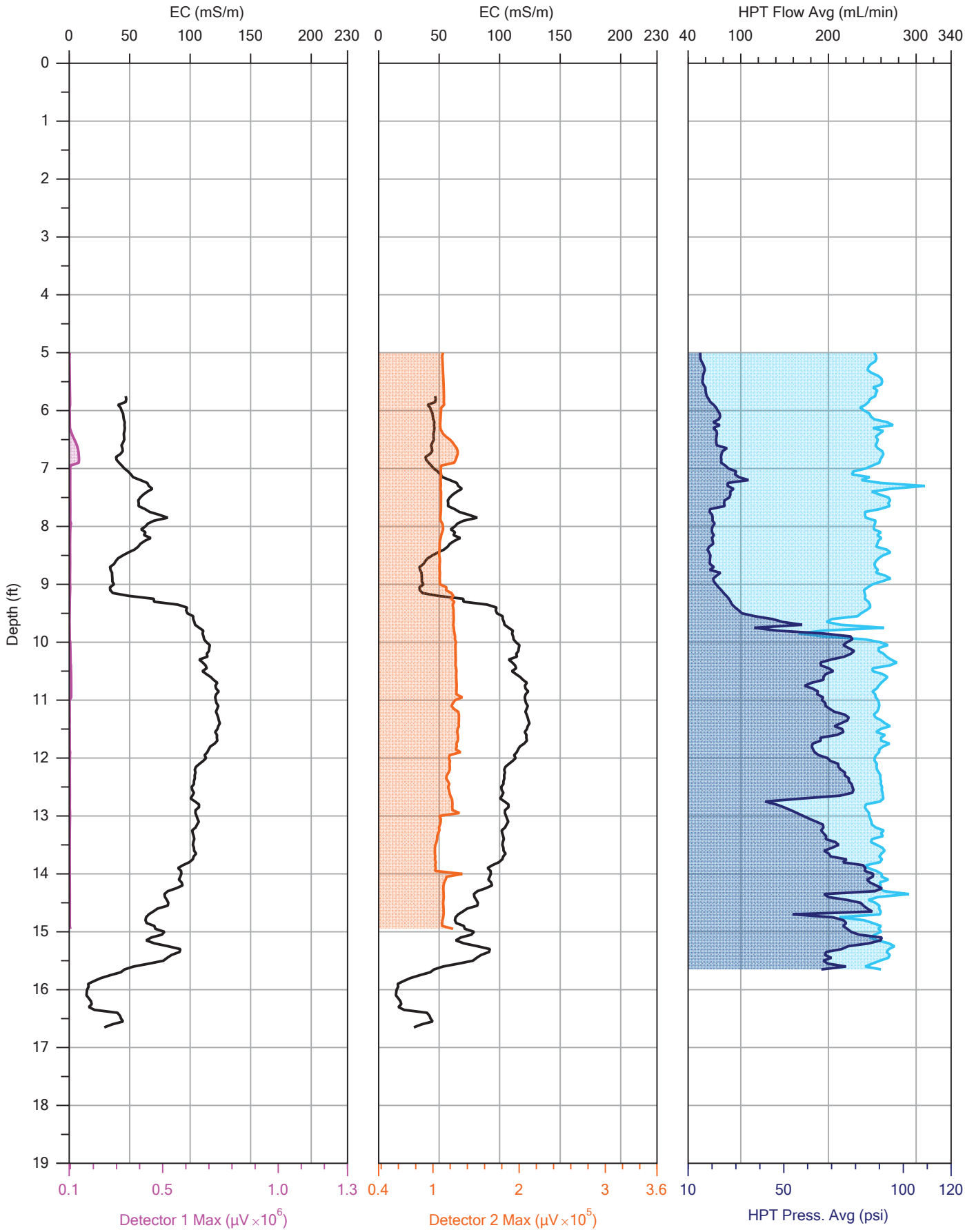
Vista GeoScience Subsurface Imaging Systems

		File: MIP-10.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



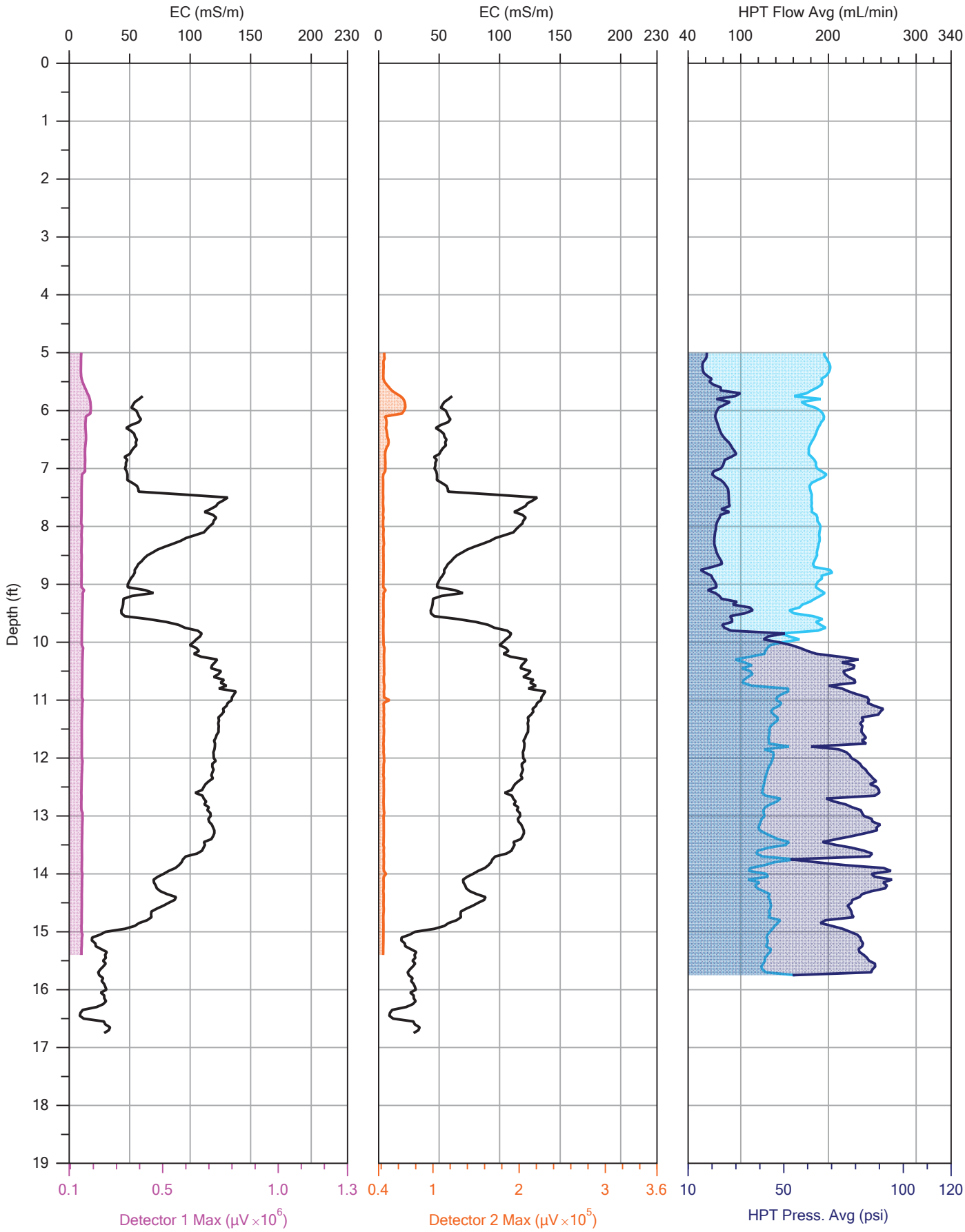
Vista GeoScience Subsurface Imaging Systems

		File: MIP-11.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



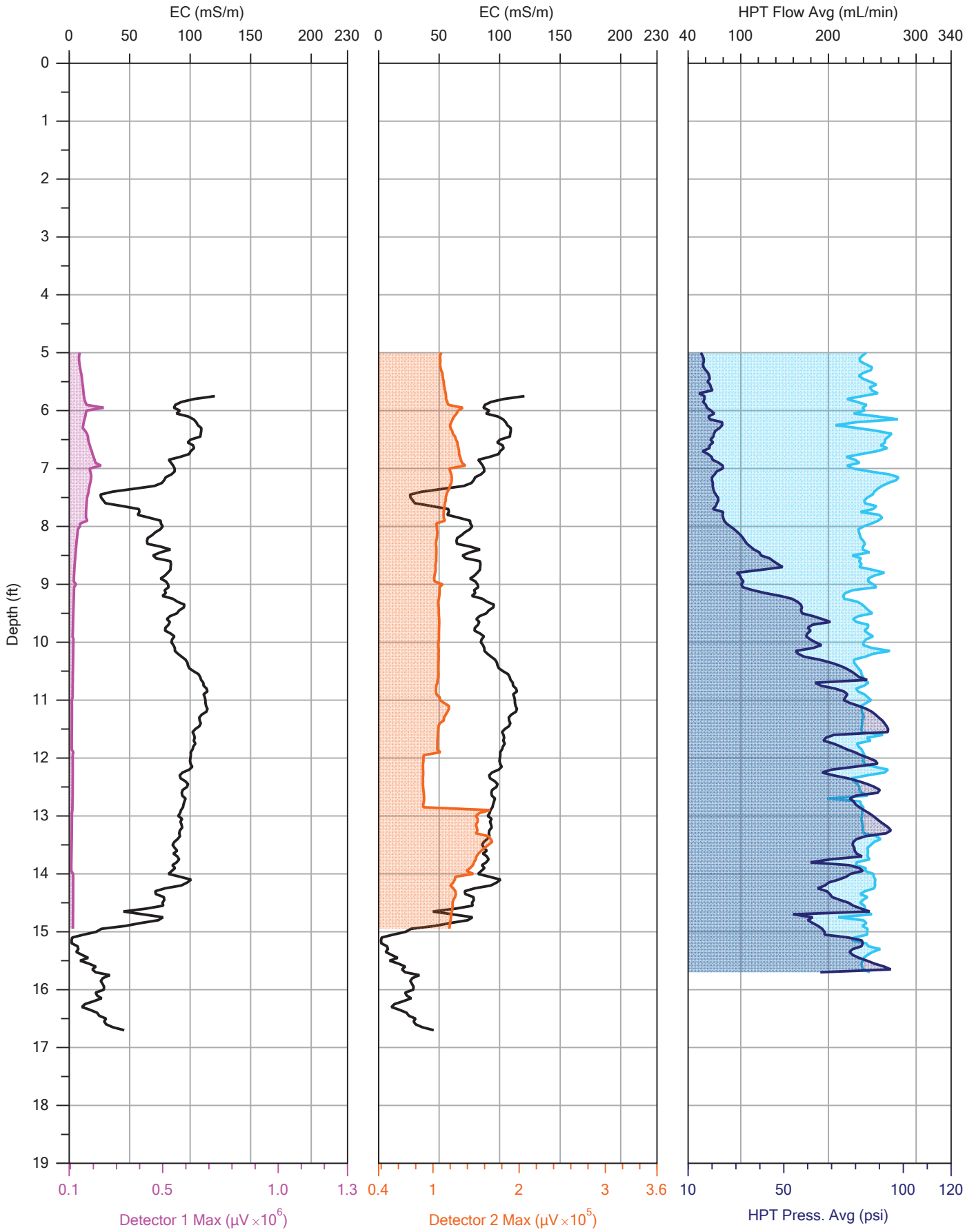
Vista GeoScience Subsurface Imaging Systems

		File: MIP-12.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



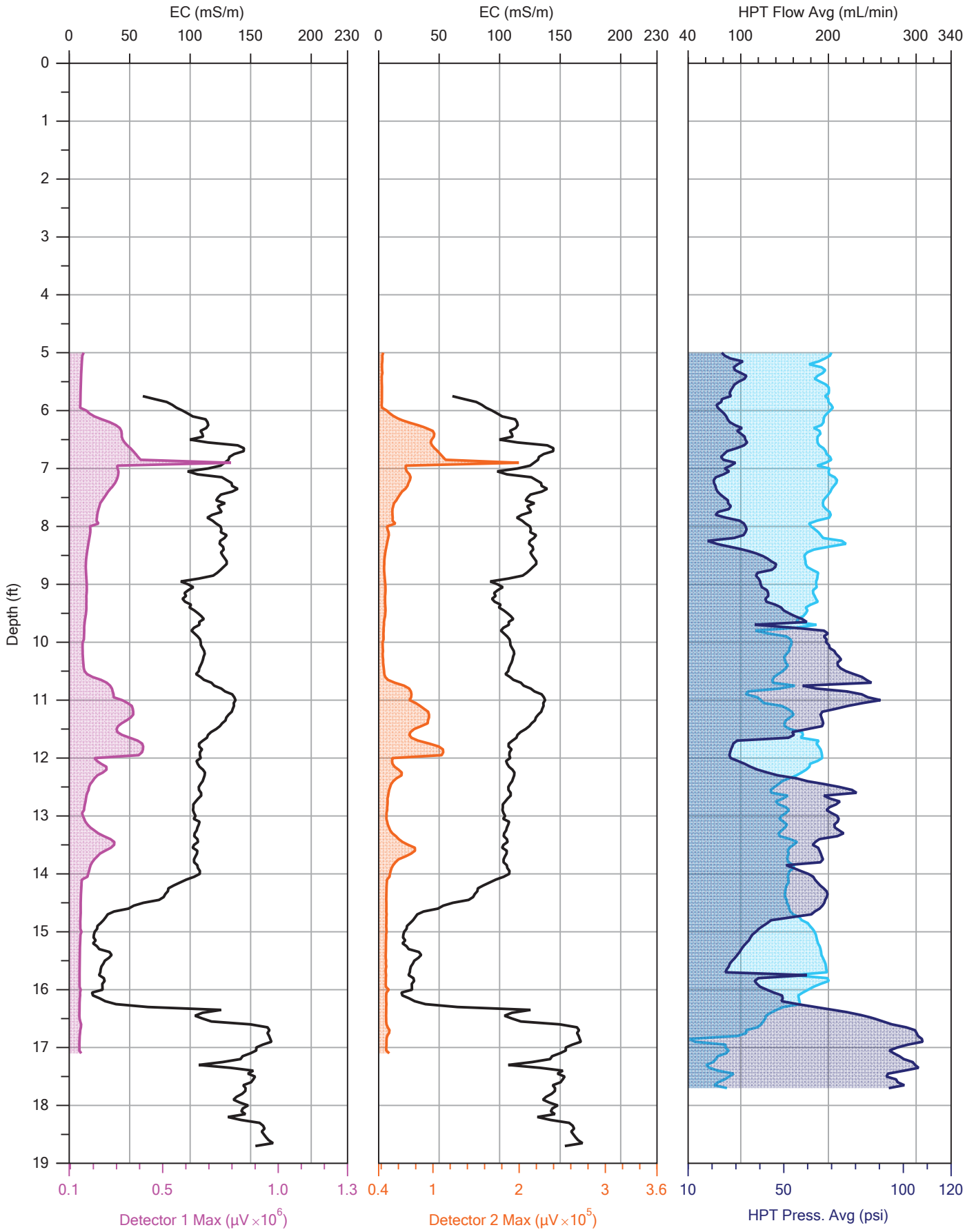
Vista GeoScience Subsurface Imaging Systems

		File: MIP-13.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



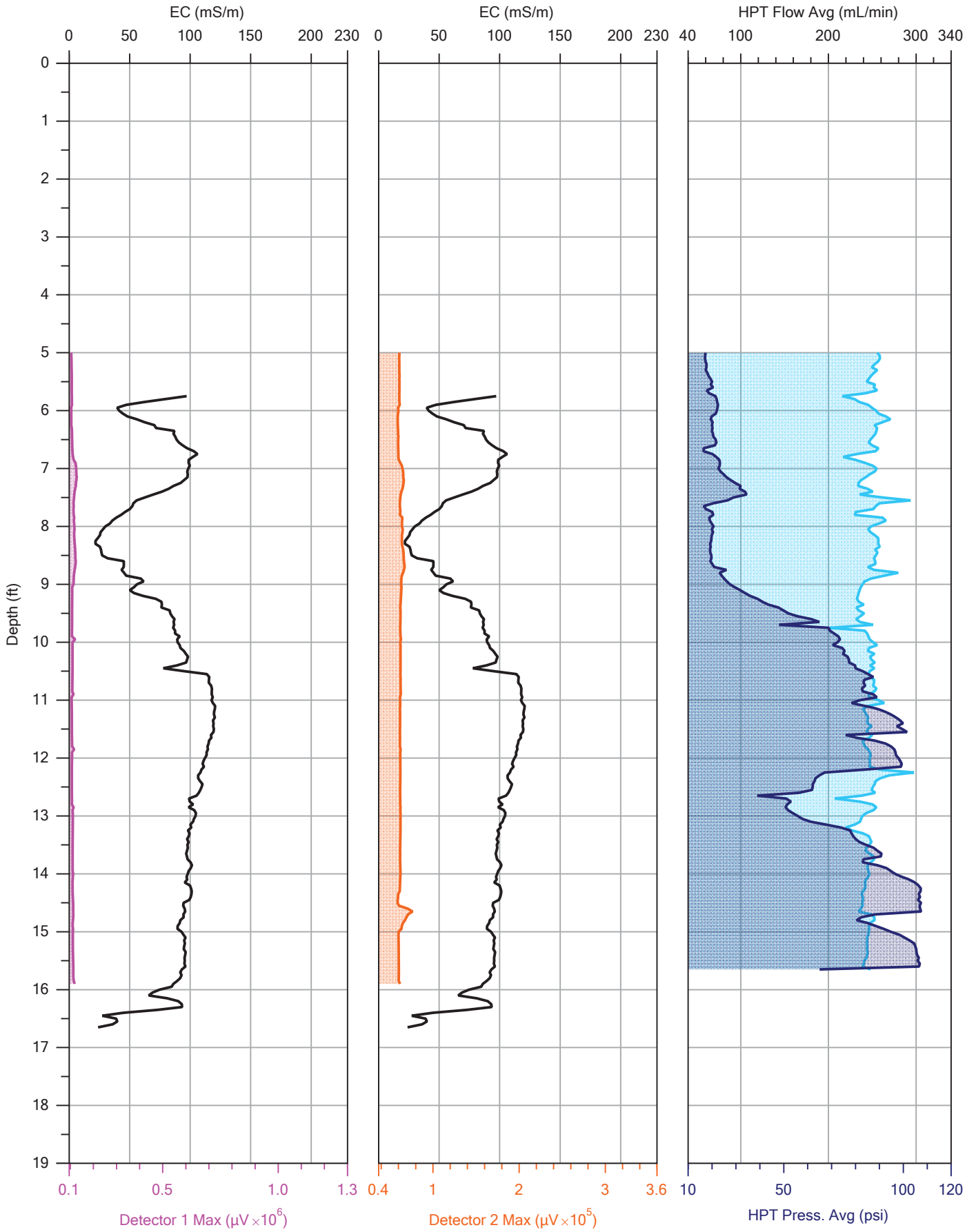
Vista GeoScience Subsurface Imaging Systems

		File: MIP-14.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



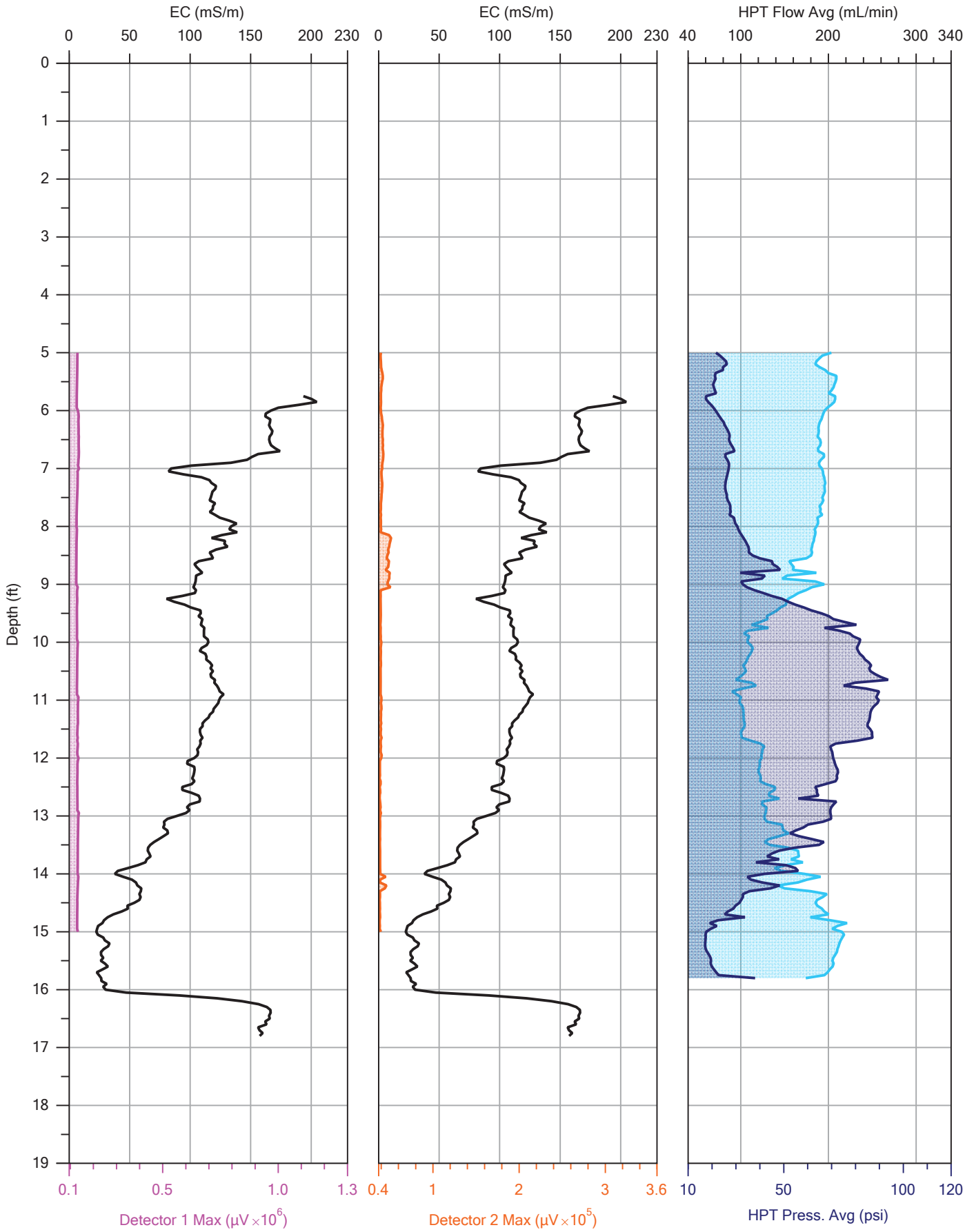
Vista GeoScience Subsurface Imaging Systems

		File: MIP-15.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



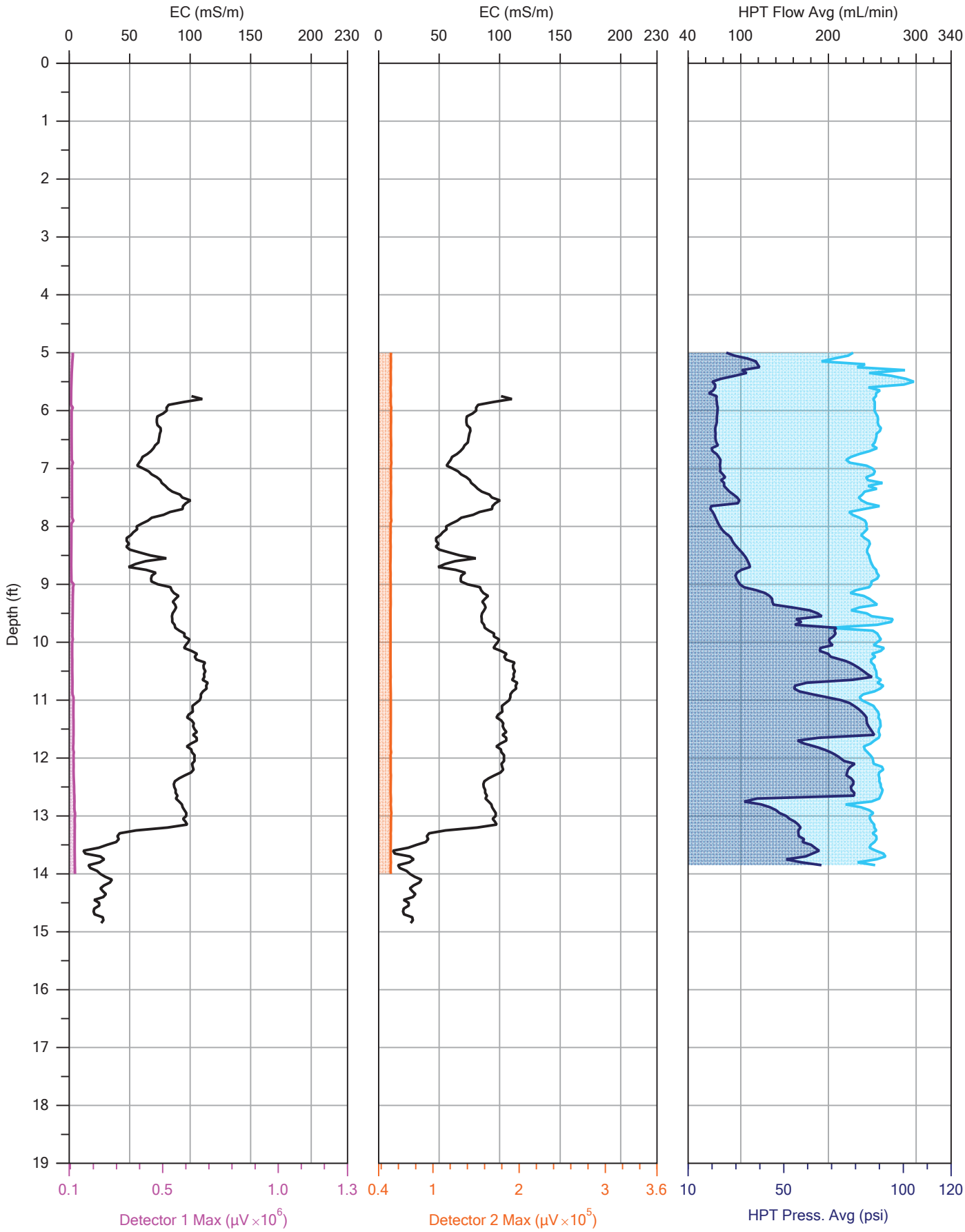
Vista GeoScience Subsurface Imaging Systems

		File: MIP-16.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



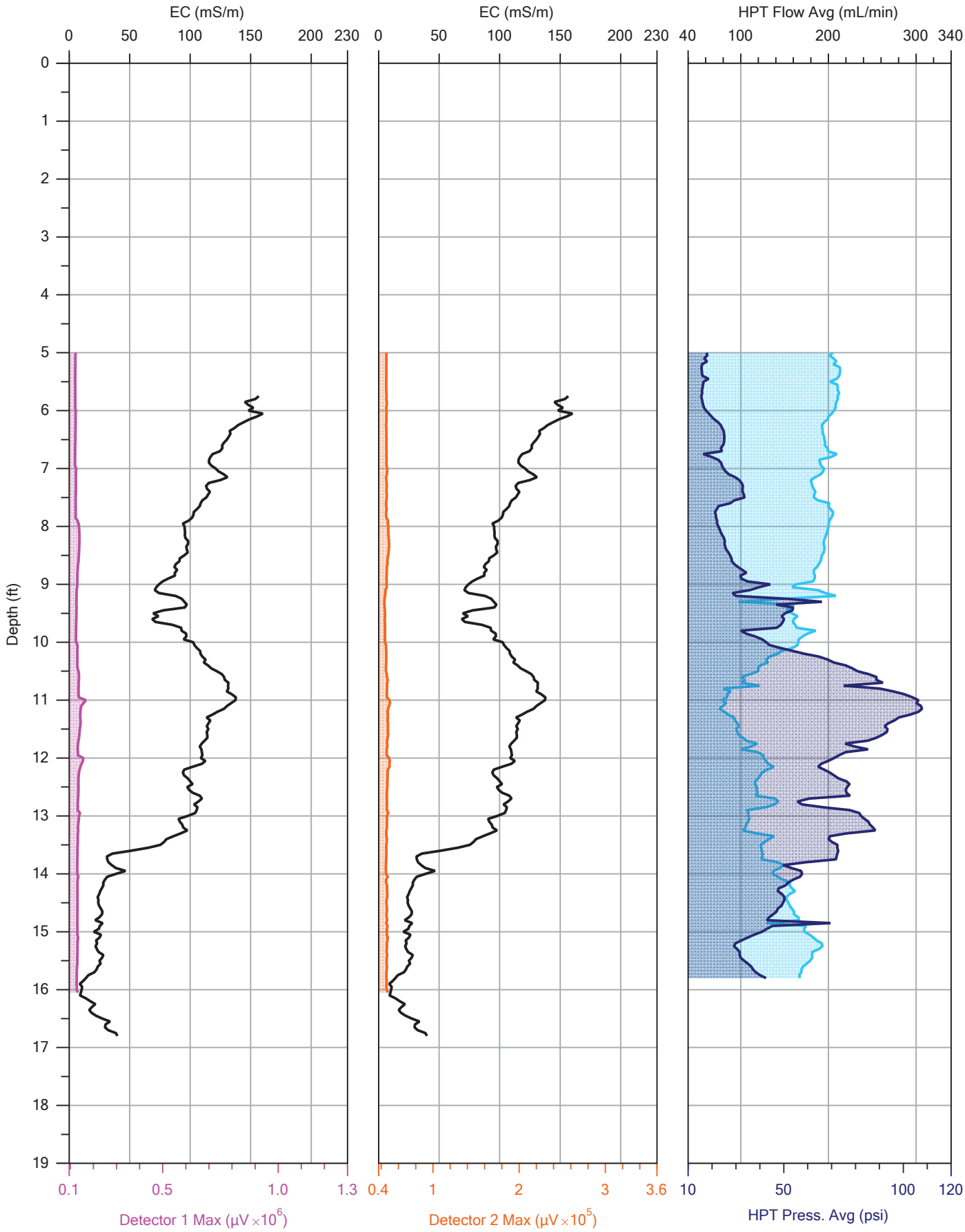
Vista GeoScience Subsurface Imaging Systems

		File: MIP-17.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins



Vista GeoScience Subsurface Imaging Systems

		File: MIP-18.MHP
Company: Vista GeoScience	Operator: DF	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins, CO



Vista GeoScience Subsurface Imaging Systems

		File: MIP-19.MHP
Company: Vista GeoSience	Operator: MB	Date: 10/15/2021
Project ID: 21209.01	Client: CGRS	Location: Fort Collins

5.5 Cross Sections of Logs

All MiHpt and OiHPT cross sections are scaled to the maximum X-axis value (sensor response value) and maximum Y-axis value (depth) for the entire data set. Cross sections are presented in a West-East or North-South boring profile.

REMEDIATION ECONOMIC FEASIBILITY SUMMARY

Site Name: Poudre School District **Event ID: 13977**

Site Address: 2407 LaPorte Avenue **Submittal Date:**

Remediation Method(s): Excavation

CAP Effective Date:

Event REP: Brent Everett #91

EFS Start Date: **EFS End Date:**

PHASE OF WORK CODE (PWC)	ACTIVITY CODE (AC)	TASK OR LABOR CODE (TLC)	TASK DESCRIPTION	UNITS	QUANTITY	UNIT RATE	SUBTOTAL	MARKUP	SUBTOTAL BY ACTIVITY AND TASK GROUP	TOTAL
3D Remediation system installation/excavation										
	I. Excavation		Excavation Bottom Dimensions ~38' x 38' w/ 1:1 Slope to Depth of ~9' deep BGS Dispose of bottom 5' and reuse top 4' of overburden for backfill							
3D	I.	3.4	excavation and loading (clean overburden and soil excavated for disposal (includes 30% bulking factor and sloping)	yd^3	359	$ 11.25	$ 4,038.75			$ 4,038.75
3D	I.	3.5	excavation removed for disposal). Native excavated soil 1.45 tons per cyd.	tons	315	$ 7.86	$ 2,475.90			$ 2,475.90
3D	I.	3.7	backfill and compaction, clean site fill	yd^3	142	$ 5.50	$ 781.00			$ 781.00
3D	I.	3.7	backfill and compaction, imported (including blending 4,000 pounds of carbon and ORC in the groundwater). Import material: Recycled Concrete structural fill. 1.8 tons per cyd, compacted.	tons	391	$ 36.75	$ 14,369.25			$ 14,369.25
3D	I.	3.9	Concrete removal, 6" thick, according to bore log	sft	2200	$ 5.25	$ 11,550.00			$ 11,550.00
3D	I.	3.11	**OPTION:** Concrete replacement, 6" thick, according to bore logs.	sft	2200	$ 10.50	$ 23,100.00			$ 23,100.00
3D	I.	8.8	Demo island; Remove structure, concrete, under dispenser containments, and light pole cassions	each	1	$ 3,355.00	$ 3,355.00			$ 3,355.00
3D	I.	8.8	remediation system subcontractor (**Health & Safet**y: barricades, portable toilet, and straw waddles for erosion control)	each	1	$ 3,365.00	$ 3,365.00			$ 3,365.00
3D	d.	8.8	remediation system subcontractor: **CGRS** (**Mobilization**: one mobilization will be paid at the beginning of the project. Includes all travel and mob-demob of equipment, materials and personnel for the project)	each	1	$ 11,252.11	$ 11,252.11			$ 11,252.11
3D	I.	8.8	De-watering Operations: Labor hours for set-up, take-down, and daily operations, fuel, after hours on-call	each	1	$ 9,470.00	$ 9,470.00			$ 9,470.00
3D	I.	8.99	compaction testing. Includes proctor and testing at every other 12" lift.	ls	1	$ 2,578.00	$ 2,578.00			$ 2,578.00
3D	I.	14.99	other materials (4,000 pounds of granular activated carbon, including delivery)	each			$ -			$ -
3D	I.	14.99	other materials (one 55-gallon drum of BioSolve for use in suppressing petroleum hydrocarbon odors during excavation, includes estimated shipping/freight costs)	each			$ -			$ -
			Activity Code I. Subtotal						$ 86,335.01	
							TOTAL 3D COSTS:			$ 86,335.01

United Rentals

FLUID SOLUTIONS
BRANCH DEN
2033 E 58TH AVE
DENVER CO 80216-1517
303-288-1638
303-288-0061 FAX

RENTAL QUOTE

199631617

Customer #	: 387190
Quote Date	: 01/24/22
Estimated Out	: 02/21/22 08:00 AM
Estimated In	: 03/21/22 08:00 AM
UR Job Loc	: 1301 ACADEMY COURT,
UR Job #	: 141
Customer Job ID:	
P.O. #	: TBD
Requested By	: BRENT EVERETT
Written By	: JARED HICKS
Salesperson	: JARED HICKS

Job Site

CITYOF FT. COLLINS
1301 ACADEMY COURT
FORT COLLINS CO 80524

Office: 970-493-7780 **Cell:** 970-714-9400

CGRS INC
1301 ACADEMY CT
FORT COLLINS CO 80524-8957

This is not an invoice
Please do not pay from this document

RENTAL ITEMS:

Qty	Equipment	Description	Minimum	Day	Week	4 Week	Estimated Amt.
2	6103510	FILTER 6K LB HI/PRES KLEEN WATER		250.00	750.00	1,500.00	3,000.00
2	5201003	PUMP 4" VAC ASSIST - DIESEL		300.00	600.00	1,800.00	3,600.00
5	536/2920	HOSE 4X20 RUBBER SUCTION - CAMLOCK		30.00	60.00	180.00	900.00
16	536/6620	HOSE 4X50 LAYFLAT DISCHARGE - CAMLOCK		30.00	60.00	180.00	2,880.00
2	6101030	FILTER 4" 4 BAG CS		225.00	450.00	1,350.00	2,700.00
10	6055110	TANK 21K GAL FXDAXL VPR TIGHT LINED SM		26.00	182.00	728.00	7,280.00
1	523/1104	FLOW METER MAGNETIC 4"		80.00	240.00	720.00	720.00
4	545/1330	8" ROAD CROSSING NECKED DOWN TO 4"		250.00	500.00	1,500.00	6,000.00

Rental Subtotal: 27,080.00

SALES/MISCELLANEOUS ITEMS:

Qty	Item		Price	Unit of Measure	Extended Amt.
4000	CARBON 12X40 VIRGIN	[VGAC 1000 12X40/CALGN]	1.803	POUND	7,212.00
100	BAGS, 25 MICRON FILTER	[PES25P2SH/AJR]	3.500	EACH	350.00
100	BAG, 10 MICRON FILTER	[PES10P2SH/AJR]	3.500	EACH	350.00
1	SMM FEE	[SMM/MCI]	72.000	EACH	72.00
1	ENVIRONMENTAL SERVICE CHARGE	[ENV/MCI]	99.000	EACH	99.00
1	DELIVERY CHARGE		4290.000	EACH	4,290.00
1	PICKUP CHARGE		4290.000	EACH	4,290.00

Sales/Misc Subtotal: 16,663.00

Agreement Subtotal: 43,743.00
Tax: 2,985.16
Estimated Total: 46,728.16

COMMENTS/NOTES:

CONTACT: BRENT EVERETT
DELIVERY AT 8AM ON APRIL 8, 2021 AT THE
FRONT ENTRANCE

This proposal may be withdrawn if not accepted within 30 days. The above referenced Rental Protection Plan, environmental, and tax charges are estimates and are subject to change.