

Remedial Excavation Work Plan

Rangely Weber Sand Unit
Collection Station 47
Pit CS-47B (COGCC Spill #10501)
Rio Blanco County, Colorado



Submitted to:

Kris Neidel
Colorado Oil and Gas
Conservation Commission
796 Megan Avenue, Suite 201
Rifle, CO 81650

Submitted by:

Stantec Consulting Services Inc.
2000 South Colorado Boulevard,
Suite 2-300
Denver, CO 80222

On Behalf of:

Adriane Gifford
Chevron Environmental
Management Company
1400 Smith Street, Room 07080
Houston, TX 77002

June 26, 2018

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

Table of Contents

1.0	INTRODUCTION	1.1
1.1	OBJECTIVES.....	1.1
2.0	BACKGROUND.....	2.2
2.1	LOCATION.....	2.2
2.2	GEOLOGY AND HYDROGEOLOGY	2.2
2.3	SITE HISTORY	2.2
3.0	SCOPE OF WORK	3.4
3.1	PERMITTING	3.5
3.2	HEALTH AND SAFETY	3.5
3.3	REMEDIAL EXCAVATION	3.6
3.3.1	Utility Encroachment	3.6
3.3.2	Field Documentation	3.6
3.3.3	Monitoring Well Abandonment and Installation	3.6
3.3.4	Excavation Activities	3.7
3.3.5	Infrastructure Removal.....	3.7
3.3.6	In-Situ Treatment	3.8
3.3.7	Backfilling Activities	3.8
3.3.8	Soil Management	3.9
3.4	SAMPLING AND ANALYSIS.....	3.9
3.4.1	Sample Collection	3.9
3.4.2	Decontamination Procedures.....	3.9
3.4.3	Sample Labeling	3.10
3.4.4	Quality Assurance and Quality Control Samples.....	3.10
3.4.5	Sample Custody.....	3.10
3.4.6	Laboratory Analysis.....	3.11
4.0	GROUNDWATER MONITORING	4.12
5.0	REPORTING	5.13
6.0	PROJECT IMPLEMENTATION SCHEDULE	6.14
7.0	REFERENCES.....	7.15

LIST OF FIGURES

Figure 1	Site Plan
Figure 2	Proposed Excavation

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

This document entitled Remedial Excavation Work Plan was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of Chevron Environmental Management Company (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by: _____
(signature)

Mike Stauthamer
Project Scientist

Reviewed by: _____
(signature)

Brent Lucyk
Senior Geologist

Reviewed by: _____
(signature)

Erin O'Malley
Environmental Engineer

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec), on behalf of Chevron Environmental Management Company (Chevron), is pleased to provide the Colorado Oil and Gas Conservation Commission (COGCC) with this Remedial Excavation Work Plan (Work Plan) for Rangely Collection Station 47, Pit CS-47B (registered as Remediation Project No. 10501) in Rio Blanco County, Colorado (the Site; **Figure 1**).

1.1 OBJECTIVES

Results from 2017 soil and groundwater assessments at the Site indicated that total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and total xylenes (BTEX), and polycyclic aromatic hydrocarbons (PAHs) exceeded COGCC Table 910-1 criteria in select locations. Chevron proposed excavation, in-situ treatment, and off-site soil disposal (remedial excavation activities) as the preferred remedial technology to address soil and groundwater concentrations exceeding COGCC Table 910-1 criteria (Stantec, 2018), and this Work Plan provides a scope of work for those proposed activities.

The objectives of the proposed remedial excavation activities include:

- Removal of vadose zone soils (from the surface to transiently inundated capillary fringe above the groundwater) exceeding COGCC Table 910-1 criteria by excavation and off-site soil disposal;
- Reduce dissolved-phase hydrocarbon concentrations through enhanced biodegradation by in-situ application of calcium nitrate to the excavation floor;
- Adhere to final remediation guidelines provided in the COGCC Series 900; and
- Obtain regulatory closure of Pit CS-47B (Remediation Project No. 10501).

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

2.0 BACKGROUND

2.1 LOCATION

Rangely Collection Station 47 is located within an active oil and gas field that is bordered by the town of Rangely, Colorado to the south, the White River (the River) to the north and west, and Rangely's waste water treatment ponds to the east. The River is approximately 600 feet to the north and the waste water treatment ponds are approximately 650 feet to the east. Pit CS-47B is located on privately owned land leased by Chevron. It lies within a relatively flat river valley at an elevation of approximately 5,200 feet above mean sea level (amsl) with upland areas rising 400 to 500 feet above the valley to the north and south.

2.2 GEOLOGY AND HYDROGEOLOGY

The near surface geology of Pit CS-47B consists primarily of sandy silts to approximately 11 to 13 feet below ground surface (ft bgs) and coarse to fine grain sands and gravels to 20 ft bgs.

Groundwater elevations fluctuate approximately 2 feet seasonally. In 2017, groundwater elevation ranged from 5,193.99 ft above mean sea level (AMSL) in well MW-02 during June 2017 to 5,191.96 ft AMSL in well MW-026 during December 2017 groundwater sampling events. Groundwater flow direction is toward the west-southwest.

2.3 SITE HISTORY

During decommissioning of Pit CS-47 in October 2016, soil impacts were noted below the liner based upon visual observation, odor, and photoionization detector (PID) measurements. From these observations, soil was excavated to approximately 10 ft bgs, which was just above the groundwater table. Confirmation soil samples collected from the north (CS47-NW), east (CS47-EW), and west (CS47-WW) sidewalls exhibited concentrations below COGCC Table 910-1 criteria. Confirmation soil samples collected from the south sidewall (CS47-SW) and excavation floor (CS47-ESB2) exhibited concentrations that exceeded the COGCC Table 910-1 criteria for TPH. Additionally, the concentration of benzo(a)anthracene and the laboratory reporting limit (LRL) for benzene exceeded the COGCC Table 910-1 criteria for both samples.

Subsequently, four hand auger borings (CS47-AH1 through CS47-AH4) were advanced south of Pit CS-47 in November 2016 to define the horizontal extent of TPH soil impacts. The soil samples collected from the borings defined the horizontal extent of TPH to below COGCC Table 910-1 criteria. In January 2017, approximately 1,085 cubic yards of impacted soil were excavated from the floor and south sidewall of Pit CS-47. A second confirmation sample collected from the south sidewall (also named CS47-SW) exhibited concentrations below COGCC Table 910-1 criteria for TPH and BTEX. Because the floor of the excavation was at the groundwater table, a groundwater sample (CS47-PW) was collected instead of a soil sample. Dissolved BTEX

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

concentrations were below the COGCC Table 910-1 criteria in the groundwater sample; however, a sheen was observed on the groundwater surface. As a result, groundwater was removed during excavation activities and disposed of at the Chevron treatment plant. All impacted soils were applied to the Chevron-operated landfarm in Rangely, Colorado. With COGCC approval, the Pit CS-47 excavation was backfilled and graded to match the surrounding area.

With a sheen observed on the groundwater surface, the COGCC requested additional monitoring wells be installed to determine if petroleum hydrocarbon impacts were present in groundwater. In response to this request, monitoring wells MW-01 through MW-05 were installed downgradient and cross-gradient of former Pit CS-47. During installation, TPH concentrations in collected soil samples were below COGCC Table 910-1 criteria, with the exception of MW-01, where 2,651 milligrams per kilogram (mg/kg) TPH was observed at a depth of 8-13 ft bgs. Following installation, BTEX concentrations in groundwater samples from monitoring wells MW-01, MW-02, MW-03, MW-04, MW-05 and previously installed monitoring well TW-01 were below the COGCC Table 910-1 criteria (Stantec, 2017).

On August 17, 2017, Stantec submitted the *Soil Characterization Report—Pit CS-47* to the COGCC detailing the investigation activities conducted on May 15, 2017, as well as conclusions and recommendations. The COGCC agreed that hydrocarbon impacts to soil at MW-01 were from a different source and likely attributed to a secondary collection pit (Pit CS-47B). The COGCC approved the closure request for Pit CS-47 (Remediation Project No. 9141) on December 18, 2017 and requested additional site characterization activities be conducted at Pit CS-47B under Remediation Project No. 10501 to further delineate hydrocarbon impacts to soil and groundwater (Stantec, 2017).

On April 10, 2018, Stantec submitted the *Soil and Groundwater Characterization Report - Pit CS-47B NO. 10501* to the COGCC detailing the investigation activities conducted at Pit CS-47B between October 28 and November 8, 2017 and recommended remedial excavation as the preferred strategy to remediate soil and groundwater concentrations above COGCC Table 910-1 criteria (Stantec, 2018). The following sections of this Work Plan provide further details regarding the proposed remediation activities.

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

3.0 SCOPE OF WORK

The remedial excavation scope of work for Pit CS-47B includes removal of impacted soils by excavation to approximately 1-foot above groundwater, in-situ treatment through the introduction of bio-enhancing material at the excavation floor and backfilling the area to surrounding grade. The proposed excavation area is shown on **Figure 2**. Various Site improvements (i.e., road improvements) will be required to provide safe and effective access to the excavation area before remediation can be initiated. Excavated soils will be disposed of off-site.

Results from the October and November 2017 assessment indicate that soils are present above COGCC Table 910-1 criteria for TPH, benzene, benzo(a)anthracene, and benzo(a)pyrene and those compounds are considered the Site constituents of concern (COCs).

While arsenic concentrations exceeded the COGCC Table 910-1 criteria of 0.39 mg/kg in all soil boring locations where it was analyzed, concentrations in those locations were less than the average Colorado state background concentration of 11 mg/kg and therefore is not considered a COC at the Site.

The following remedial activities are proposed:

- COGCC Environmental Staff will be provided a minimum of 72-hour notice prior to mobilization of the remedial excavation team;
- Although disturbance activities will be less than 1-acre, best management practices outlined in Chevron's Storm Water Management Plan (SWMP) will be followed during Site preparation, excavation, and backfill activities.
- Removal of non-impacted overburden soils, as applicable, prior to addressing impacted soils. Overburden soils would be placed in separate stockpiles according to soil horizons (e.g., topsoil, clay, etc.);
- Based on the results of the previous soil assessments, soils found to contain TPH concentrations that exceed COGCC Table 910-1 criteria will be removed. Final dimensions of the excavation will be based on field screening using a PID and visual observations.
- Impacted soils will be excavated and transported to Chevron's Landfarm (Facility ID 149001) or RN Industries Piceance Creek landfarm in Rio Blanco County for off-site disposal;
- Waste manifests will be collected for the final documentation report and submitted on a supplemental eForm 27 when project closure is requested;

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

- In-situ treatment will consist of mixing calcium nitrate fertilizer with the bottom 2-feet of backfill at the excavation floor. This amendment will enhance the anaerobic biodegradation of residual petroleum hydrocarbon-impacted groundwater and smear zone soils;
- Prior to utilizing imported material for backfill, soil analysis will be conducted that adheres to COGCC Table 910-1 criteria; and
- As indicated above, this is planned as a prescribed excavation and backfill will be backfilled following:
 - Impacted soil is removed per the proposed excavation plan shown on Figure 2.
 - At the extents of the excavation, there are no visual indications of hydrocarbon staining and no elevated PID measurements.

3.1 PERMITTING

The Colorado Department of Public Health and Environment Water Quality Control Division – Stormwater Program requires the development of a SWMP for construction activities (i.e., ground surface disturbing activities) affecting at least 1-acre of land. The Work at Pit CS-47B will affect less than 1 acre of land; however, the best management practices (BMPs) outlined in Chevron's SWMP will still be followed during site preparation, excavation, and backfilling activities.

3.2 HEALTH AND SAFETY

Stantec will update an existing site-specific health and safety plan (HASP) to cover the field activities described herein. The HASP will outline potential hazards to Stantec field personnel and subcontractors during the field activities. Permit to work documentation will be prepared when warranted, and job safety analyses (JSAs) will be created and continuously modified to cover any additional contingencies realized in the field. The HASP will also include required personal protective equipment (PPE) to be worn by all field personnel for each task. In addition, Stantec will produce a Journey Management Plan (JMP) in an attempt to prevent losses associated with motor vehicle incidents. A copy of Stantec's HASP and JMP will be available on-site during all field activities.

Health and safety tailgate meetings will be held three times daily (in the morning, after lunch prior to re-initiating work, and at the end of the work day) throughout the duration of the project with Stantec personnel and all other subcontracted personnel on-site. These meetings will be utilized to promote awareness of health and safety concerns and to help promote incident-free operations throughout the duration of the project.

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

Subcontractors will also develop a Site-specific HASP and JSAs for tasks applicable to their scope of work. Appropriate subcontractor HASPs will also be available on Site.

3.3 REMEDIAL EXCAVATION

3.3.1 Utility Encroachment

As required by law, the Utility Notification Center of Colorado (UNCC) will be notified at least 48-hours before any intrusive activities. In addition to notifying the UNCC, Stantec will review all subsurface assessment and excavation locations with Chevron operations staff prior to breaking ground. No intrusive work will be conducted within 5-feet of a known underground utility.

Since on-site soils are sandy, the remedial excavation will likely require a 1.5 horizontal to 1 vertical slope. The sloped soils on the eastern side of the excavation may encroach on active utilities, depending on the actual extent of impacts between boring SB-9 and SB-13 (**Figure 2**) and the actual location and depth of the utilities within the pipeline corridor. Therefore, it may be necessary to leave impacted soil in place to avoid potentially damaging the active pipelines within this corridor. As shown on **Figure 1** and **Figure 2**, there are four active lines and one abandoned line, which include:

- #1: 6-inch Fiberglass Produced Water Line;
- #26: 3-inch Produced Gas Line;
- #27: 4-inch Steel Oil/Water Line; and
- #34: 1-Subsurface Electrical Line.
- #15: 4-Inch Abandoned Steel Line.

Based on the nature of these lines, specifically, the 6-inch fiberglass produced water line, the facility operations have placed an established setback of 5-feet. If petroleum hydrocarbon impacts extend beyond what can safely be excavated, the extent of the excavation will be surveyed, and remaining impacts documented and submitted to the COGCC.

3.3.2 Field Documentation

The final excavation limits will be documented using a survey grade global positioning system (GPS) and field notes. Waste manifests and load tickets generated from the disposal of impacted soils will be collected and submitted with final documentation.

3.3.3 Monitoring Well Abandonment and Installation

Monitoring well (MW-1) is located within the excavation boundaries. Prior to excavation, MW-1 will be abandoned per State of Colorado rules and regulations for water well construction,

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

pump installation, cistern installation, and monitoring and observation hole/well construction (2 CCR 402-2).

Following excavation activities, MW-1 will be reinstalled to monitor groundwater conditions post remediation. See section 4.0 for proposed groundwater monitoring schedule.

3.3.4 Excavation Activities

The results of the subsurface assessment conducted in 2017 and results from previous assessments were used to generate proposed limits of the remedial excavation as shown on **Figure 2**. During a conference call on May 24, 2017, the COGCC indicated a prescribed excavation would be appropriate for the level of assessment already completed. The proposed excavation is designed to remove soils with concentrations more than COGCC Table 910-1 criteria for TPH, benzene, benzo(a)anthracene, or benzo(a)pyrene (see **Figure 2**). Final dimensions of the excavation will be based on field screening using a PID and visual observations. If the field screen indicates potentially impacted soil beyond the soil excavation plan, additional soil samples will be collected to confirm soil above COGCC Table 910-1 criteria has been removed.

The excavation boundary (**Figure 2**) is rectangular and approximately 83-feet long, 35-feet wide on the eastern excavation wall, and 47-feet wide on the western excavation wall. Soils will be excavated to approximately 1-foot above groundwater, or between 10 and 11-ft deep. Approximately 1,200 cubic yards of impacted soils will be removed and transported off-site to Chevron's landfarm or RN Industries for treatment.

Non-impacted overburden soils will be removed, as applicable, prior to addressing impacted soils. Overburden soils will be placed in separate stockpiles according to soil type and excavation depth (e.g., topsoil, sand, and silt, etc.) to facilitate returning the different soil types to depths from which they were removed.

During the excavation activities, dust and vapors will be controlled as necessary by the application of fresh water or applying cover (e.g., tarping with plastic sheeting).

Access to excavations left open overnight will be controlled using the following techniques:

- Temporary fencing at least 4-feet tall will be erected on all sides; and
- An earthen escape ramp will be installed for excavations exceeding 4-feet in depth.

3.3.5 Infrastructure Removal

Stantec does not expect to find unidentified subsurface infrastructure, but if historical structures are encountered during the remedial excavation activities, they will be removed, if possible. Any remaining equipment will be removed; flow lines will be isolated, drained, and removed; and oil

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

field related debris (e.g., scrap debris, scrap metal, etc.) will be removed from the area and properly disposed of off-site.

3.3.6 In-Situ Treatment

Vadose zone soil excavation is proposed to approximately 1-foot above the groundwater table. To treat residual petroleum hydrocarbons in the smear zone and groundwater, a calcium nitrate fertilizer will be placed at the excavation floor as a soil amendment to enhance bioremediation in soil and groundwater. The calcium nitrate fertilizer will be placed and mixed using the excavator within the bottom 2-feet of the excavation floor.

In-situ bioremediation is a technology that encourages growth and reproduction of indigenous microorganisms to enhance biodegradation of organic constituents in the saturated zone. In-situ bioremediation can effectively degrade organic constituents that are dissolved in groundwater and adsorbed onto the aquifer matrix. In-situ bioremediation is dependent on the type of microorganisms, the type of contaminant, the availability of electron acceptors, and the hydrogeological conditions at a site. Petroleum hydrocarbons will degrade both aerobically and anaerobically. The technology proposed in this work plan is intended to accelerate anaerobic biodegradation. In this anaerobic process, nitrate-reducing bacteria will utilize nitrate (NO_3^-) as an electron acceptor to degrade petroleum hydrocarbons in the soil and groundwater.

Most sites have billions of bacteria in the soil and groundwater that are readily capable of degrading petroleum hydrocarbons if geochemical conditions are suitable. Geochemical conditions are considered suitable when electron acceptors are available for the biodegradation processes. However, many petroleum-impacted sites are electron acceptor limited, so bioremediation kinetics are dependent upon the rate at which new electron acceptors are delivered to the subsurface through infiltration and dispersion. Addition of the calcium nitrate fertilizer will provide the electron acceptor (nitrate) needed for the bacteria in the soil and groundwater to degrade the residual petroleum hydrocarbons.

3.3.7 Backfilling Activities

Following completion of the remedial excavation activities described in Section 3.3.4, the excavation will be backfilled to the existing grades at the Site.

Soil will be placed in loose lifts not exceeding 2-feet in height and compacted to non-yielding conditions. Compaction methods may include a vibratory roller, excavator bucket, or proof rolling with equipment.

Fill material may consist of:

- Imported fill;
- Overburden materials removed during excavation preparation; or

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

- Materials from an onsite borrow source.

The intent is to only use fill materials that meet COGCC Table 910 criteria. Onsite borrow will only be utilized if it can be done in a manner consistent with the natural landscape. Areas established for borrow sources will be graded and dressed appropriately. Overburden materials removed during excavation preparation will be replaced in the excavation at levels consistent with pre-excavation activities, to the extent possible.

3.3.8 Soil Management

Excavated soils will be managed in stockpiles lined with plastic sheeting, as needed, to prevent cross-contamination. The stockpiles will be managed to minimize erosion and runoff. Potential strategies for erosion control include silt fence, straw bales, or covering with plastic sheeting.

Overburden soil stockpiles will also be managed to preserve the integrity and quantity of the soil (minimize contamination and soil loss due to erosion). Stockpile locations will be selected as to minimize adverse impact to the area and facilitate construction traffic.

Impacted soils will be transported to Chevron's Landfarm (Facility ID 149001) or RN Industries Piceance Creek landfarm in Rio Blanco County for off-site disposal. Impacted soils will be hauled off-site for disposal as soon as practical. When feasible, these soils may be loaded directly into haul trucks instead of being temporarily stockpiled. Waste manifests or load tickets generated from the disposal of impacted soils will be collected and submitted with final documentation.

In the event of rain, best practices will be exercised to mitigate run-off (e.g., construction of earthen berms, use of straw bales/waddles, or silt fence) as appropriate.

3.4 SAMPLING AND ANALYSIS

3.4.1 Sample Collection

Clean soil borings have been observed along the north, south, east, and west sides of the excavation, therefore, approximate horizontal excavation boundaries have been determined (**Figure 2**). Under the following circumstances, additional soil samples may be collected to demonstrate all impacted soils have been removed from CS-47B:

- Field screening determines impacts extend beyond the proposed horizontal excavation limits;

These soil samples will be surveyed, as discussed in Section 3.3.2.

3.4.2 Decontamination Procedures

Any non-dedicated or non-disposable sampling equipment that comes into contact with soil will be decontaminated before and after each use. Sampling implements, such as spatulas and

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

trowels, will be washed with a Liquinox® water solution and rinsed with distilled water before and after sample collection. Construction and assessment equipment will be decontaminated utilizing best practices, as appropriate, to reduce the potential for contamination.

3.4.3 Sample Labeling

If soil sample collection is necessary, containers will be assembled and properly labeled. The sample label will be attached directly to the sample container. The sample label will include the following information:

- Project name;
- Sample identification (unique identification for each sample location);
- Date sampled;
- Time sampled (24-hour);
- Initials of sampler(s); and
- Preservative in the sample container, if any.

3.4.4 Quality Assurance and Quality Control Samples

If additional soil samples are necessary, quality assurance/quality control (QA/QC) samples will be collected as follows:

- Duplicates – Duplicate soil samples will be collected to evaluate the laboratory's performance by comparing the analytical results of two samples collected at the same location. Duplicate samples will be collected at a rate of approximately 5 percent (%).

3.4.5 Sample Custody

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the laboratory or processed for disposal. All samples will be held at temperature of 4 degrees Celsius (°C) or less in a cooler until delivery to the laboratory. Samples will be shipped to the laboratory via FedEx® (or equivalent) under chain-of-custody procedures. A project specific chain-of-custody record will be utilized by field personnel to document possession of all samples collected for chemical analysis. Chain-of-custody forms will accompany samples at all times. When transferring possession of the samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of transfer on the record. The chain-of-custody will be placed in a sealed plastic bag and taped to the inside of the cooler. The cooler will be securely sealed prior to presentation to the delivery service. A commercial delivery service (e.g., FedEx®) will be identified by company name only; the delivery service is not required to sign the chain-of-custody. At the laboratory, the chain-of-custody will

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

be compared with sample labels to ensure that the information is consistent. The chain-of-custody record will include, but is not limited to, the following information:

- Project name and number;
- Name(s) and signatures of samplers;
- Sample ID (unique ID for each sample location);
- Date and time of collection;
- Number and type of containers;
- Required analyses;
- Laboratory name and address; and
- Signatures documenting change of sample custody.

3.4.6 Laboratory Analysis

Any soil samples selected for submittal to the laboratory will be analyzed for:

- TPH-diesel range organics (DRO) (C10-C28) by U.S. Environmental Protection Agency (EPA) Method 8015C;
- TPH-gasoline range organics (GRO) (C6-C10) by EPA Method 8015C;
- BTEX by EPA Method 8260B; and
- Polycyclic aromatic hydrocarbons (PAHs) (COGCC Table 910) by EPA Method 8270D.

Benzene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd) pyrene were the only constituents of concern exceeding COGCC Table 910 criteria observed during previous site assessment activities. Constituents with method detection limits greater than Allowable Limits will not be acceptable. The laboratory has determined the necessary test methods to obtain method detection limits that meet the COGCC Table 910 criteria.

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

4.0 GROUNDWATER MONITORING

As described in the *Soil and Groundwater Characterization Report – Pit CS-47B No. 10501*, Stantec estimates that the slight exceedances of chlorides and sulfates in groundwater will decrease following the excavation of vadose zone soils associated with Pit CS-47B. When comparing the 2016 and 2017 groundwater analytical data, there is a marked decrease in chloride and sulfate concentrations in wells MW-03 through MW-05 following removal of source mass from the original CS-47 pit. Stantec assumes this trend will be similar upon completion of remedial activities at Pit CS-47B.

Semi-annual groundwater monitoring will be conducted for one year following remedial excavation activities. Subsequent groundwater monitoring after the fall of 2019 will be based on groundwater analytical results relative to COGCC Table 910-1 criteria.

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

5.0 REPORTING

To facilitate timely regulatory closure of Pit CS-47B, the following components will be submitted to the COGCC in a final documentation report:

- A written project summary including schedule information;
- Excavation details (location and dimensions of excavations; excavation quantities);
- Final compliance soil sample analytical results with mapped locations;
- Impacted soil disposal information with waste manifests or load tickets; and
- Import soil analytical results.

A closure request will be filed after successful completion of remediation activities indicating the impacted soils were properly abated. A separate closure request will be filed following the decrease of sulfate and chloride concentrations in groundwater below COGCC Table 910-1 criteria.

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

6.0 PROJECT IMPLEMENTATION SCHEDULE

The following project implementation schedule is tentative and is contingent on acceptance of the Work Plan by both the COGCC and the third-party property owner. The intent is to have COGCC closure of Pit CS-47B (Remediation Project No. 10501) in 2019. The following is the proposed schedule:

- June 2018: Submit the Work Plan to the COGCC for acceptance.
- July 13, 2018: Obtain acceptance of the Work Plan by the COGCC.
- 3Q/4Q 2018: Complete soil abatement activities.
- 4Q 2018: File closure request with the COGCC.
- 4Q 2018: Regulatory closure of Pit CS-47B.
- 2019: Quarterly Groundwater Monitoring.

REMEDIAL EXCAVATION WORK PLAN

Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

7.0 REFERENCES

Stantec, 2018. Soil and Groundwater Characterization Report – Pit CS-47B No. 10501. Rangely, Colorado. Colorado Oil and Gas Conservation Commission - Remediation Project No. 10501. April 10, 2018

Stantec, 2017. Soil Characterization Report – Pit CS-47. Rangely, Colorado. Colorado Oil and Gas Conservation Commission - Remediation Project No. 9141. August 17, 2017

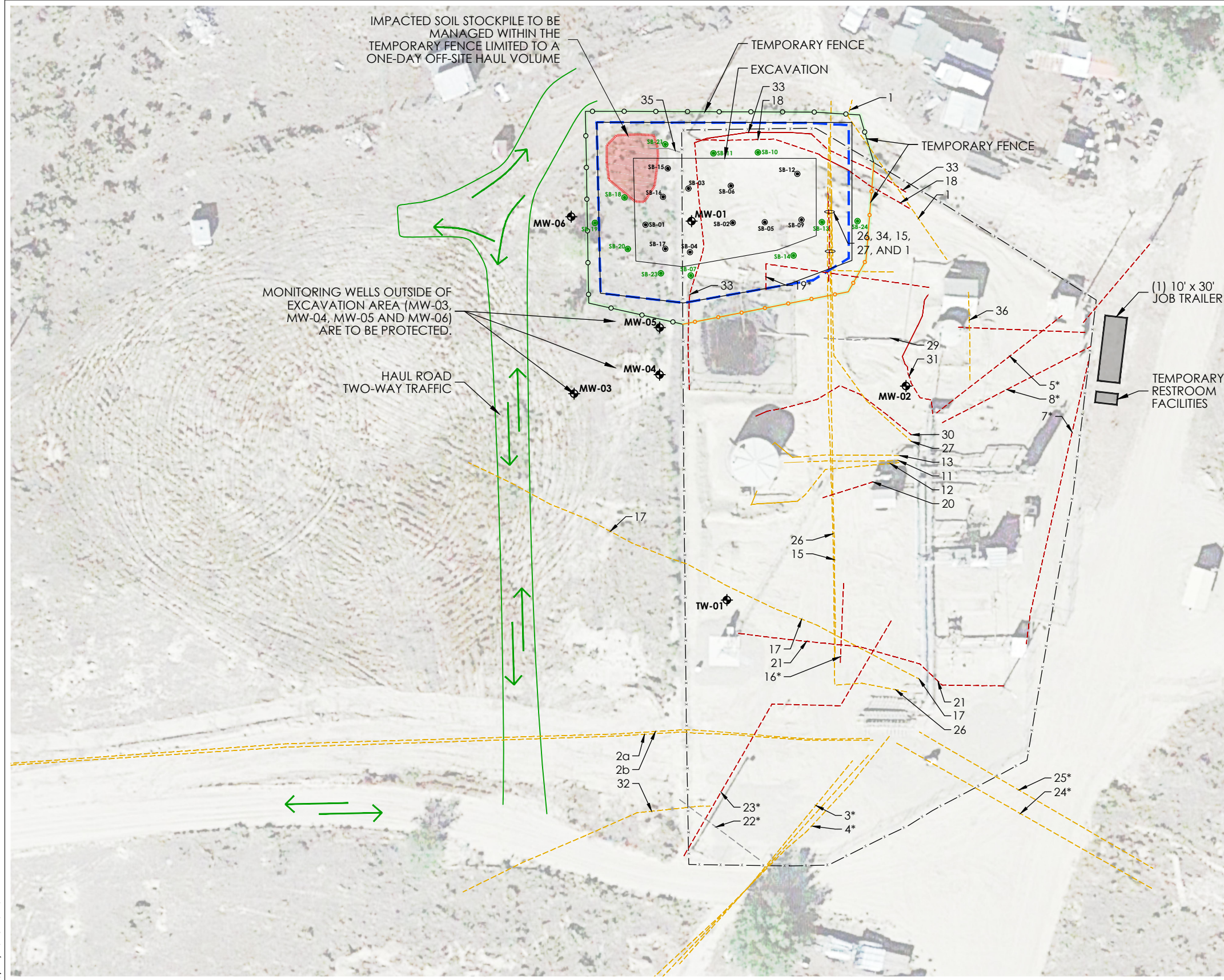
Table 910-1. Colorado Department of Natural Resources - Colorado Oil and Gas Conservation Commission (COGCC), 2018. Series 900 Rules. May 1, 2018.

REMEDIAL EXCAVATION WORK PLAN

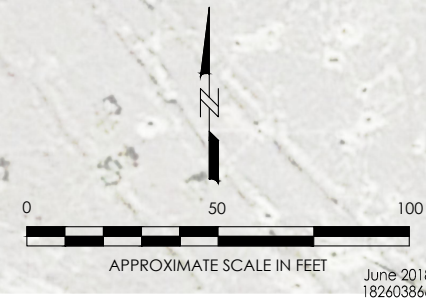
Rangely Weber Sand Unit, Collection Station 47
Pit CS-47B (COGCC Spill #10501), Rio Blanco County, Colorado
June 26, 2018

FIGURES

U:\182603866\05.REPORT_DELIV\DRAWING_DESIGN\CAD_FIG\DWG_182603866_RANGELY_47B_2018.DWG
6/22/2018 10:46 AM



#	LINE	SIZE	TYPE
1	Produce Water	6	Fiberglass
2a	Rector 12X Flowlines	3	Fiberglass
2b	WH Coltharp A-5-X	3	Fiberglass
3	HEFLEY Header Bulk & Test	3&4	Fiberglass
4	WYCOLTHARP A-6X	3	Fiberglass
5	Instrument Air	2	Galvanized
6	Pipe Rack	Various	SS & CS
7	Electrical 480V	3	Conduit
8	Electrical	1	Steel
9	Pit Overflow Line	6	Unknown
10	CS Fence	8	Steel & Chain
11	Pit Tank Inlet	10	CS
12	Pit Tank Resurck	3	CS
13	Bulk Line	4	CS
15	CPL Abandoned	4	Steel
16	Electrical Conduit	2	Conduit
17	Gas Outlet	3	SS
18	North Overhead Light	1	Conduit
19	Old Pit Monitor	1	Conduit
20	Electrical to Pit Tank	1	Conduit
21	Comm Tower to Building	NA	Conduit
22	Abandoned Pipes	4	Steel & Cut Off??
23	South Overhead Light	1	Conduit
24	Rodeo Header Bulk & Test	3&4	Fiberglass
25	JCOL,WCOL,&WALU Flowlines	3&4	Fiberglass
26	Produced Gas	3	Steel
27	Oil/Water Drain	4	Steel
29	Buried Steel Pipe (Culvert)	12	Steel
30	Cathodic Protection	1	Conduit
31	Cathodic Protection	1	Conduit
32	Former CPL Line	4	Steel
33	Cathodic Protection	1	Conduit
34	Electrical	1	Conduit
35	Unknown Steel Pipe	4	Steel
36	Former Gas Line	6	Steel



2000 South Colorado Blvd., Suite 2-300
Denver, CO 80222
www.stantec.com

Legend

- x — x — FENCE LINE
- CABLE, CATHODIC OR ELECTRICAL (BURIED OR ABOVE GROUND)
- - - GAS LINE (BURIED OR ABOVE GROUND)
- - - UNKNOWN STEEL PIPE (BURIED OR ABOVE GROUND)
- MW-01 MONITORING WELL
- SB-01 SOIL BORING
- TEMPORARY FENCE (6-FT CHAIN LINK)
- TEMPORARY FENCE (ORANGE CONSTRUCTION)
- PROPOSED EXCAVATION LIMITS

Notes

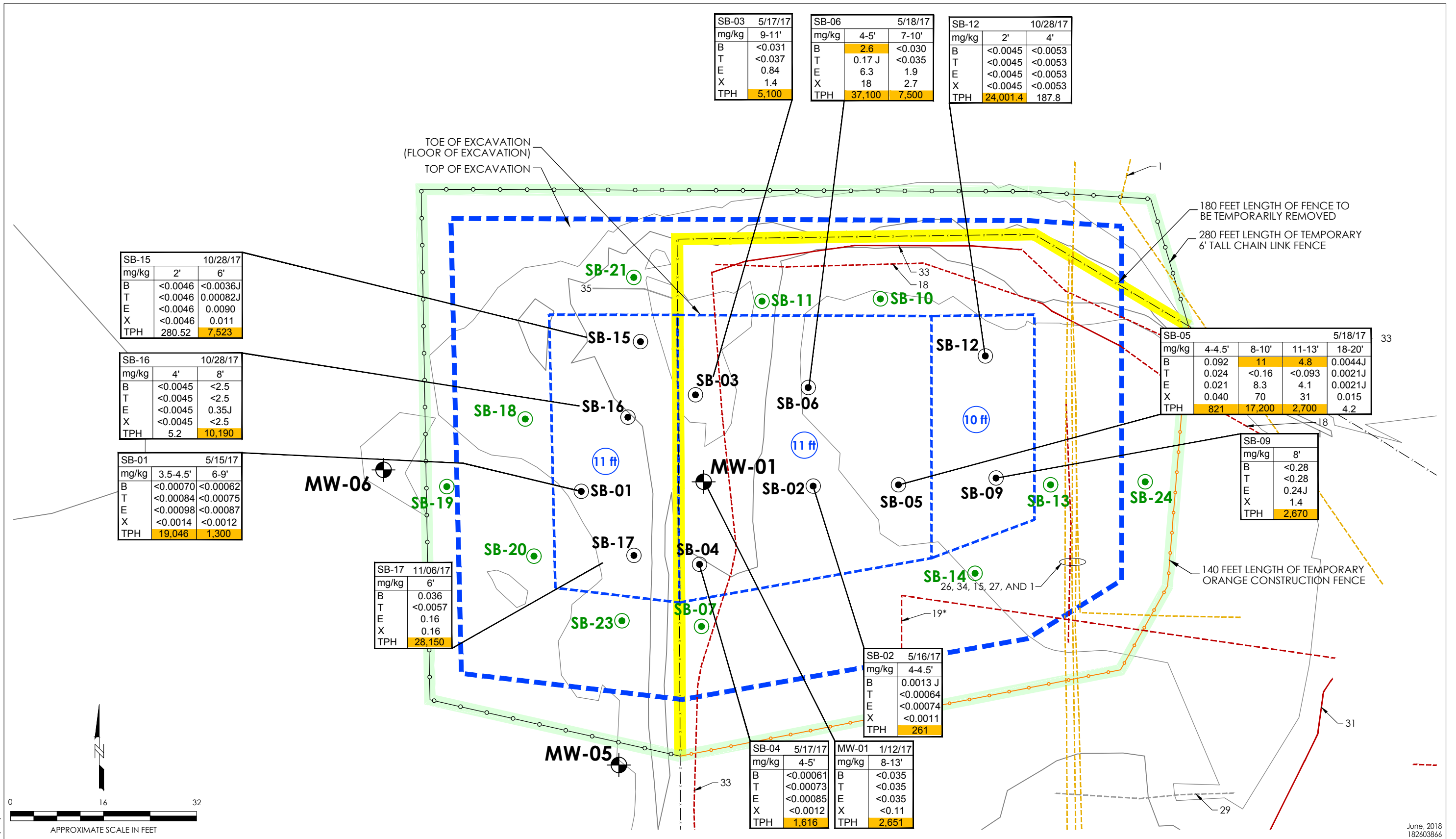
*UTILITIES FROM PREVIOUS CONSULTANT.COULD NOT BE FIELD VERIFIED DURING MAY 2018 UTILITY LOCATE.

Client/Project
Chevron EMC
Rangely CS-47B No. 10501

Figure No.
1
Title
SITE PLAN

DRAFT

U:\182603866\05_REPORT_DELIV\DRAWING_DESIGN\CAD_FIG\DWG_182603866_RANGELY_47B_2018.DWG
6/22/2018 10:53 AM



2000 South Colorado Blvd., Suite 2-300
Denver, CO 80222
www.stantec.com