AP - 111

SWMU-1

2020

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
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Michelle Lujan Grisham
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James C. Kenney
Cabinet Secretary

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Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 31, 2020

John Moore
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301

RE: DISAPPROVAL
SWMU-1 INVESTIGATION REPORT
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-20-010

Dear Mr. Moore:

The New Mexico Environment Department (NMED) has reviewed the *SWMU-1 Investigation Report* (Report), dated March 31, 2020, submitted on behalf of Marathon Petroleum Company dba Western Refining Southwest Inc., Gallup Refinery (the Permittee). NMED hereby issues this Disapproval with the attached comments.

The Permittee must submit a revised Report that addresses all comments contained in the Attachment. Two hard copies and an electronic version of the revised Report must be submitted to the NMED. The Permittee must also include a redline-strikeout version in electronic format showing where all revisions to the Report have been made. The revised Report must be accompanied with a response letter that details where all revisions have been made, cross-referencing NMED's numbered comments. The Revised Report must be submitted to NMED no later than **December 31, 2020**.

If you have questions regarding this Disapproval, please contact Michiya Suzuki of my staff at 505-476-6046.

Sincerely,

Dave Cobrain
Program Manager
Hazardous Waste Bureau

cc: M. Suzuki, NMED HWB
C. Chavez, OCD
L. King, EPA Region 6 (6LCRRC)
B. Moore, WRG

File: Reading File and WRG 2020 File
HWB-WRG-20-010

Attachment

Comment 1

In the *Planned Sampling Activities* Section, page 8 of 14, the Permittee states, "[a]nalysis of samples using field screening with a flame ionization detector (FID), and submission of laboratory samples for analysis of VOCs by Method 8260, SVOCs by Method 8270, metals by Method 6010, mercury by Method 7471, and TCLP analysis for lead, mercury, and benzene [were planned]." *SWMU-1 Soil Sampling Investigation Work Plan* (Work Plan), dated September 23, 2019, states that laboratory sampling analyses of the sediments consist of total petroleum hydrocarbons (TPH), diesel range organics (DRO), and gasoline range organics (GRO). Similarly, the *Executive Summary,* page 3 of 14, states that the samples were analyzed for TPH-GRO, DRO and ORO. TPH analysis is not included in the statement. Correct the statement for accuracy in the revised Report.

Comment 2

In the *Planned Sampling Activities, Deviation from Approved Plan* Section, page 9 of 14, the Permittee states, "[d]espite dewatering with a vac truck throughout the week, AP-1 and AP-2 pond surfaces remained too unstable to collect samples from some of the planned locations. One sample location from AP-1 and all three sample locations from AP-2 had to be moved closer to shore than previously planned. In addition, due to these safety concerns, the native clay liner samples were taken only to a depth of 6 to 12 inches into the native clay rather than to the planned 8-foot depth." According to Tables 2A, 2B, and 2C, the concentrations of organic contaminants exceeded the applicable screening levels at the bottom of all soil borings in the native clay intervals. Since the boring depths were compromised due to the safety concerns, vertical extent of contamination was not evaluated. Consequently, the extent of excavation necessary to remediate soil contamination is not determined. Although the volume of excavation was estimated (e.g., AL-1 for 2,700 cubic yards), the estimation was not justified in the Report. In the revised Report, propose to resolve the safety concerns and recollect soil samples to delineate vertical extent of contamination or propose to excavate to a depth below the depressed water table for maximum soil removal.

Comment 3

In the *Planned Sampling Activities, Deviation from Approved Plan* Section, page 9 of 14, the Permittee states, "[t]he sampling plan specified equipment blank collection at a frequency of 10% of samples collected. These samples were not collected. The hand auger was decontaminated prior to each sample depth by brushing off soil and by cleaning off any sludge until the surface of the hand auger was visibly clean. The hand auger and spade were decontaminated using Simple Green™ between each sample location." Even if equipment was visibly clean, residual contaminants may have been present. Unless equipment blank is collected and tested, it is impossible to verify that the sampling equipment was clean and the analytical results were not affected by cross-contamination. Demonstrate that the acquired data is defensible without equipment blank in the revised Report.

Comment 4
In the *Planned Sampling Activities, Deviation from Approved Plan* Section, page 9 of 14, the Permittee states, "[t]he laboratory had enough remaining sample left to analyze for total mercury, but it was completed outside the holding time of 28 days. Samples of mercury that were reported as not detected are considered unusable due to the length of time between sampling and analysis." The *Laboratory Analytical Results, QA/QC Samples* Section, page 13 of 14, states that the laboratory determined that the precision, accuracy, validity, and usability of the data were not compromised; however, a justification for the usability of analytical data acquired outside the holding time is not discussed in the Report. Whether or not mercury is detected, all mercury concentrations analyzed outside the holding time are not usable for risk evaluation. In the revised Report, propose to recollect soil samples for mercury analysis or propose to excavate to a depth below the historic water table for maximum soil removal (e.g., more than ten feet bgs) to address potential risk associated with mercury.

Comment 5
In the *Field Investigation Results* Section, page 10 of 14, the Permittee states, "[p]ond sample depths ranged from surface collection to 6.5 ft below ground surface (bgs)." According to Table 1, none of the pond soil samples were collected at a depth of 6.5 feet bgs. Correct the statement for accuracy in the revised Report.

Comment 6
In the *Field Investigation Results, Summary of Field Sampling Activities* Section, page 10 of 14, the Permittee states, "[h]eadspace sampling of the samples was conducted using an FID. Only samples collected on Monday, January 13, 2020 were sampled with the FID, as the FID and its replacement would not operate properly; specifically, the flame would not stay lit." It is not clear why only flame ionization detector (FID) was used during the investigation. Photo ionization detector (PID) was also proposed in the Work Plan (page 9) and could have been used as well. Explain why a PID was not used during the investigation in the revised Report.

Comment 7
In the *Laboratory Analytical Results, VOCs* Section, page 12 of 14, the Permittee states, "[e]xceedances were observed in DRO, GRO, and Oil Range Organics (ORO) across the pond and lagoons." The concentrations of organic contaminants exceeded the applicable screening levels in all berm samples. Soils outside of the berms are potentially contaminated due to the activities associated with SWMU 1. In the revised Report, propose to submit a work plan to advance soil borings outside the berms to investigate the lateral extent of potential soil contamination or commit to expanding the remedial excavation as necessary to remove all contaminated soils to meet risk-based cleanup levels. The investigation is necessary to determine lateral extent of excavation unless all affected soils are removed.

Comment 8
In the *Laboratory Analytical Results, Metals* Section, page 12 of 14, the Permittee states, "[e]xceedances were observed for arsenic, antimony, and mercury compared to the USEPA RSL and the NMED Residential SSL." Since the mercury analysis was conducted outside the holding time, the discussion regarding the detection of mercury must be qualified in the Report. Revise the Report accordingly.

Comment 9
In the *Laboratory Analytical Results, General Chemistry* Section, page 12 of 14, the Permittee states, "[f]ree liquids were analyzed and resulted in a positive or negative result (paint filter test). Of the 97 sample locations only six resulted in a positive paint filter test resulting in the sample having free liquid." All sampling locations were too shallow. Excavation will likely be necessary below the water table. If soils are excavated below the water table, the results of the paint filter test may be different. No response required.

Comment 10
In the *Laboratory Analytical Results, Correlation of Analytical Results with FID Field Screening* Section, page 13 of 14, the Permittee states, "[t]he FID will be used during excavation to confirm that hydrocarbon contaminated soil has been excavated from the lagoons and pond along with visual indicators and laboratory confirmation sampling." Since FID failed during this investigation, PID or other appropriate instrument must be proposed for future investigations in SWMU 1. Revise the Report accordingly.

Comment 11
In the *Conclusion* Section, page 13 of 14, the Permittee states, "[t]his investigation was conducted to characterize soils and sediments in EP-1, AL-1, and AL-2 for future excavation and closure of SWMU-1." The investigation failed to characterize lateral and vertical extent of contamination necessary for the planned excavation (see Comments 2 and 7). Clarify that the investigation did not achieve the intended purpose in the revised Report.

Comment 12
In the *Conclusion* Section, page 13 of 14, the Permittee states, "volumes for excavation and disposal [are estimated] for EP-1 (non-hazardous) 11,500 yd^3, AL-1 1,700 yds^3 (listed hazardous) and AL-2 3,800 yds^3 (listed hazardous)." According to the *Executive Summary,* page 4 of 14, the estimated volumes for excavation for EP-1, AL-1, and AL-2 are listed as 11,500, 2,700, and 4,500 cubic yards (yds^3), respectively. There is a discrepancy in the estimated volumes. Regardless, the estimated volume of excavation will increase once the extent of soil contamination is delineated appropriately. Revise the Report accordingly.

Comment 13
In the *Conclusion* Section, page 13 of 14, the Permittee states, "[g]enerally, the oily sludge in the ponds had a specific gravity of 1.92, and a pH of 8.66. Of the 106 samples of sludge, only 6

had free liquids in the sample. This shows that the water accumulating in the ponds is likely from outside SWMU 1 and not coming from groundwater." Sludge is defined as a mixture of solids and liquids. All sludge samples should contain liquids. Provide a clarification in the revised Report. In addition, discuss the origin of the water accumulated in the ponds in the revised Report.

Comment 14

In the *Conclusion* Section, page 14 of 14, the Permittee states, "[f]ollowing NMED's review of these results and approval of the characterization of SWMU 1, MPC plans to proceed with the remedy implementation for the excavation and closure of the SWMU." A separate work plan is required for future remedial excavation. NMED will establish a due date for the work plan upon approval of this Report. Revise the Report accordingly.

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
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James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

January 29, 2020

John Moore
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301

RE: APPROVAL WITH MODIFICATIONS
OW-61 THROUGH OW-65 WELL INSTALLATION REPORT
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-19-020

Dear Mr. Moore:

The New Mexico Environment Department (NMED) has reviewed the *OW-61 through OW-65 Well Installation Report* (Report), dated November 2019, submitted on behalf of Marathon Petroleum Company dba Western Refining Southwest Inc., Gallup Refinery (the Permittee). NMED hereby issues this Approval with Modifications. The Permittee must address the following comments.

Comment 1

In the Executive Summary, the Permittee states, "[t]hese wells [OW-61, OW-62, OW-63, OW-64, and OW-65] were installed in March 2018 on a voluntary basis after hydrocarbons were observed in the French drain near the pond STP-1." These wells were advanced within and in close vicinity of the Tank Farm (SWMU 6); however, based on the results of shallow excavation near pond STP-1 hydrocarbons were also observed in soils above the water table near pond STP-1. The observation of SPH in shallow soils suggests that a source may also be present near pond STP-1 in addition to potential leaky tanks in the Tank Farm. Unless a source closer to STP-

1 was identified through the Laser Induced Fluorescence (LIF) study or other investigations, the source of shallow soil contamination near pond STP-1 must be investigated.

Comment 2
In Section 2, *Background,* the Permittee states, "[s]ix locations were selected as shown on Figure 1 for the installation of soil borings to search for the presence of SPH." There is a typographical error in the statement. Figure 1 depicts the location of the site. The pertinent figure is Figure 2, *Well Location Map.* No revision required.

Comment 3
In Section 4.3.1, *Well Installation,* the Permittee states that discrete soil samples were not retained for laboratory analysis. NMED requires soil sampling from every soil boring for laboratory analysis. A minimum of three soil samples should have been collected from each boring at the vadose zone with the highest PID reading, at the water table, and the boring termination depth. Include the provision for all future soil investigations conducted at the Facility. No revision required.

Comment 4
In Section 4.3.1, *Well Installation, OW-61,* the Permittee states that a strong chemical odor was detected at 10 – 12 feet below ground surface (bgs). There was no data to evaluate presence or absence of contamination above 10 feet bgs, because hydro-excavation was used during the installation of the soil boring. Since soil contamination was present in the soils at the depth of 10 feet bgs (PID reading = 1,563 ppm), the Permittee must assume soil contamination above 10 feet bgs in the vicinity of well OW-61. The transport mechanism of soil contamination may be limited to groundwater flow in the vicinity of well OW-61; however, the shallow soils were contaminated. Evaluate and explain potential causes of the shallow soil contamination (e.g., potential leaks from nearby tanks, volatilization of chemicals from smear zone) in a response letter.

Comment 5
In Section 4.3.1, *Well Installation, OW-65,* hydro-excavation was not used at the location of boring OW-65. The investigation method was appropriate at this location. It was confirmed that there was no soil contamination present above 10 feet bgs. This is the only location where hydro-excavation was not used during the installation of borings. Explain why this location did not require use of hydro-excavation for clearance in the response letter.

Comment 6
In Section 5, *Site Impacts,* the Permittee states, "[t]he measured SPH thickness increased in OW-61 from the first through the third quarter of 2018, with a decrease in the last quarter of 2018. The measured SPH thickness in OW-65 increased from the first quarter to the second quarter of 2018, but decreased in the third quarterly, only to increase to an even greater thickness in the fourth quarter of 2018." The SPH thicknesses measured in wells OW-61 and

OW-65 are recorded as 4.05 feet and 7.75 feet, respectively, during November 2018 according to Table 2, *2018 Quarterly Fluid Level Measurements.* The increase may indicate that the hydrocarbon release is potentially on-going. In the response letter, provide a table that shows the SPH thicknesses in wells OW-61 and OW-65 measured during the 2019 quarterly monitoring events.

Comment 7

In Section 5, *Site Impacts,* the Permittee states, "[t]he laboratory interpreted the results to show that the product collected at OW-61 was "mostly fresh [to] fairly fresh gasoline with a small amount of diesel range hydrocarbons present as well." The laboratory interpreted the results to show that the product collected at OW-65 was "fairly fresh gasoline mixed with diesel range hydrocarbons."" It appears SPH collected from wells OW-61 and OW-65 is similar. SPH observed in the wells likely originates from the same source. Include a discussion regarding the potential source of SPH detected in wells OW-61 and OW-65 in the response letter.

The Permittee must address all comments in this letter and submit a response letter no later than **April 30, 2020**.

This approval is based on the information presented in the document as it relates to the objectives of the work identified by NMED at the time of review. Approval of this document does not constitute agreement with all information or every statement presented in the document.

If you have questions regarding this Approval with Modifications, please contact Michiya Suzuki of my staff at 505-476-6059.

Sincerely,

Kevin Pierard
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
M. Suzuki, NMED HWB
C. Chavez, OCD
L. King, EPA Region 6 (6LCRRC)
B. Moore, WRG

File: Reading File and WRG 2020 File
HWB-WRG-19-020

Marathon Petroleum Company LP

December 16, 2019

Mr. Dave Cobrain
New Mexico Environmental Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87SOS-6303

RE: Response to Approval with Modifications
Investigation Work Plan Solid Waste Management Unit 1
Marathon Petroleum Company LP, Gallup Refinery
(dba Western Refining Southwest, Inc.)
EPA ID# NMD000333211

Dear Mr. Cobrain:

Marathon Petroleum Company LP (dba Western Refining Southwest, Inc.) Gallup Refinery is submitting this response to comments for the Investigation Work Plan for the Solid Waste Management Unit (SWMU) 1. If there are any questions, please call Brian Moore at 505-726-9745.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,
Marathon Petroleum Company LP, Gallup Refinery

Robert S. Hanks

Robert S. Hanks
Refinery General Manager

Enclosure

cc K. Van Horn NMED
C. Chavez NMOCD
B. Moore Marathon Gallup Refinery

92 Giant Crossing Road
Jamestown, NM 87347

RESPONSE TO APPROVAL WITH MODIFICATIONS SWMU-1 SOIL SAMPLING INVESTIGATION WORK PLAN

NMED Comment 1:

Under the "Scope of Activities" heading, the Permittee states, "[o]nce characterization has been completed, MPC will prepare an investigation report with results from the sampling. A risk assessment will be included with the investigation report." Since a soil removal action is planned for the remedy at the site, there is no need to conduct a risk assessment.

MPC Response 1:

The comment is acknowledged.

NMED Comment 2:

Under the heading "Scope of Activities" the Permittee states, "[s]oil recovered during sampling will be placed in roll-off boxes within the area of SWMU 1 and characterized prior to disposal." Alternately, the Permittee may return the soil cutting to the bore hole.

MPC Response 2:

The comment is acknowledged that the soil cuttings may also be returned to the bore hole.

NMED Comment 3:

Under the heading "Investigation Methods", the Permittee states, "[s]oil samples will be collected by hand-augering within SWMU 1 and along the perimeter sidewalls (Figure 3). Discrete sediment samples will be collected at 2.5-ft intervals from the surface until visual and/or instrumental contamination is no longer evident, or until a maximum depth of approximately 8 feet is reached." The Permittee does not specify if the berm sidewall samples will be collected using a hand auger or with a different tool and does not specify to what depth/horizontal position the berm sidewall samples will be collected. Provide this information in a response letter.

MPC Response 3:

SWMU 1 sidewall soil samples along the berm will be collected using a hand auger. The first sample will be collected from the top surface of the berm and advanced 1-foot vertically into the berm. The next sample will be collected approximately 2.5-foot below the top of the berm (Figure 3a) and advanced 1 foot horizontally into the berm side wall. Additional samples will be collected approximately at 2.5-foot intervals until the toe of the berm is reached. Samples at the toe of the

berm will be collected vertically from the surface, at 2.5-foot intervals to an 8-foot maximum depth or until visual staining and/or no instrumental response is detected (Figure 3a). A sample will also be collected from any saturated intervals.

NMED Comment 4:

Under the heading "Sample Collection Procedures", the Permittee states, "[fIield techniques will be applied consistently across SWMU 1 by a team of dedicated sampling personnel who may be assisted by site supervisors." RCRA Permit Section IV.J.2.d requires the presence of a qualified engineer or geologist, ensure that the proper procedures are followed in the field during sampling.

MPC Response 4:

The comment is acknowledged. A qualified geologist or engineer will be present during the sampling.

NMED Comment 5:

Under the heading "Sample Collection Procedures", item 2, regarding collection of soil and sediment samples for laboratory analysis the Permittee proposes to collect toxicity characteristic leaching procedure (TCLP samples) for lead and mercury. The Permittee must also conduct TCLP analysis for benzene.

MPC Response 5:

The comment is acknowledged. TCLP analysis for benzene will also be conducted.

NMED Comment 6:

Under the heading "Sample Collection Procedures" and the heading "Data Evaluation" the Permittee states that, "[a]nalytical data will be screened by comparison with NMED Industrial SSLs, Toxicity Characteristic levels, and the proposed (chosen) disposal facility WACs." The Permittee must also compare the analytical results to Residential SSLs and Land Disposal Restrictions, as necessary. The waste disposal facility WACs cannot be used for the risk assessment.

MPC Response 6:

The comment is acknowledged. The waste disposal facility WAC will not be used for risk assessment purposes.

NMED Comment 7:

Under the heading "Sample Collection Frequency" the Permittee states, "Sediment sample collections will be taken in accordance with the RCRA Post-Closure Permit Section IV.J.2.d.ii (Soil and Rock Sampling] and will include the following applicable intervals and depths:

- at the surface of the proposed boring locations;
- at 2.5-ft intervals;
- at the maximum depth of each boring; and
- at intervals suspected of being source or contaminated zones."

The Permittee must also collect samples from intervals where groundwater is encountered.

MPC Response 7:

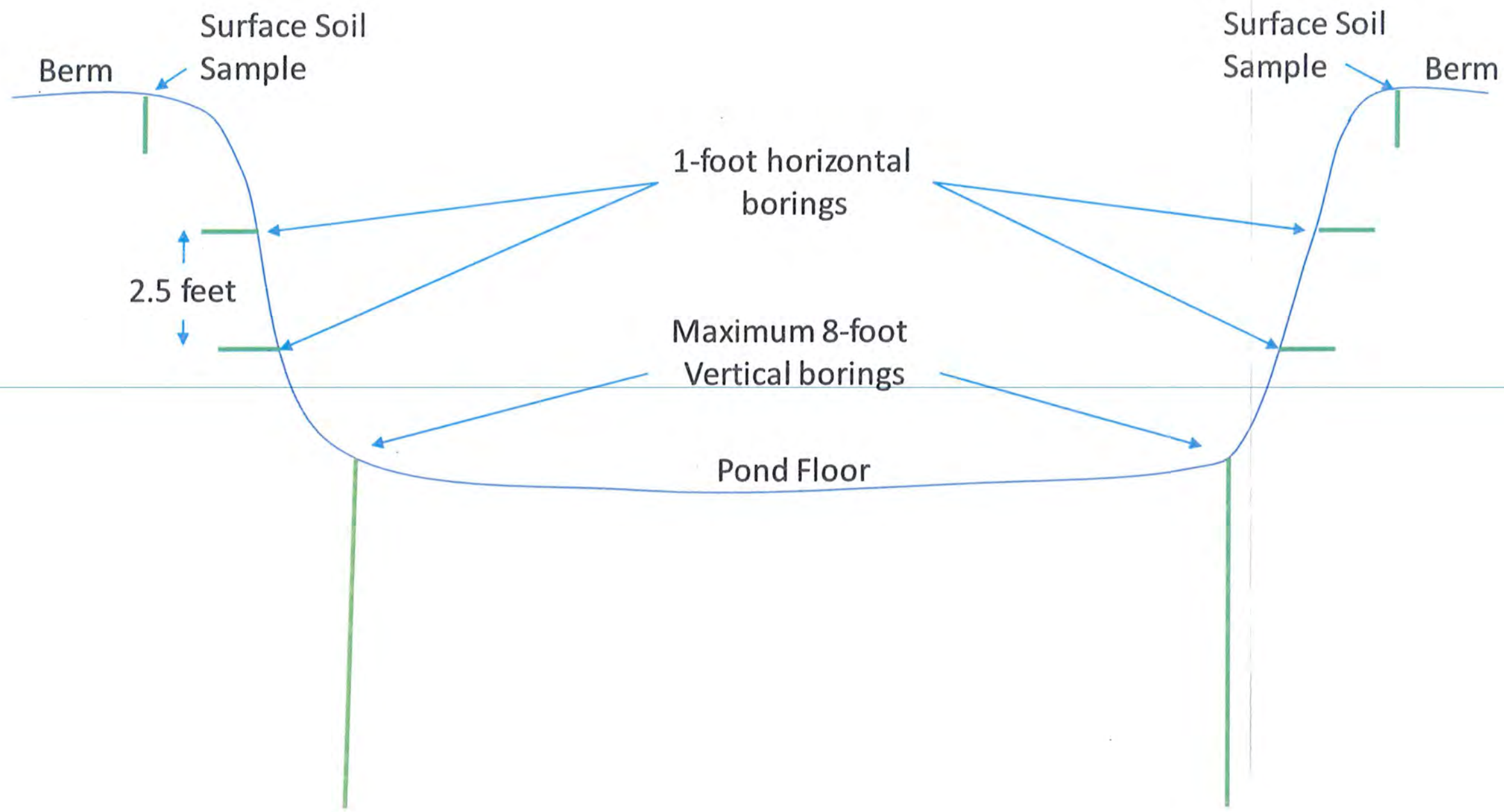
The comment is acknowledged. If groundwater is encountered, a soil sample will be collected at that interval.

NMED Comment 8:

The Permittee included a Standard Operating Procedure (SOP) (Appendix A) for soil sample collection. RCRA Permit Section IV.J.1 states that "[t]he Permittee shall provide a brief description of investigation, sampling or analytical methods and procedures...Facility standard operating procedures (SOPs) shall not be substituted for such descriptions." In the future, the Permittee must include this information within the main text of the Work Plan. The SOP appears to be field instructions for personnel and is generalized for all soil sampling rather than specific to the sampling that will take place for this project.

MPC Response 8:

The comment is acknowledged. In future work plans, standard operating procedures will be included in the text and will relate to the specific tasks for that project.



Trihydro CORPORATION
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 3a

SIDEWALL SAMPLING PLAN

SWMU 1 SOILS INVESTIGATION WORK PLAN
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: PH	Checked By: HJ	Scale: Not to Scale	Date: 11/4/19	File: SWMU-1_SideSamp_Fig1a.mxd

Marathon Petroleum Company LP

September 23, 2019

Mr. John E. Kieling, Chief
New Mexico Environmental Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87SOS-6303

RE: Investigation Work Plan Solid Waste Management Unit 1
Marathon Petroleum Company LP, Gallup Refinery
(dba Western Refining Southwest, Inc.)
EPA ID# NMD000333211

Dear Mr. Kieling:

Marathon Petroleum Company LP (dba Western Refining Southwest, Inc.) Gallup Refinery is submitting this Investigation Work Plan for the Solid Waste Management Unit (SWMU) 1. The Investigation Work Plan has been enclosed for your review. If there are any questions, please call Brian Moore at 505-726-9745.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,
Marathon Petroleum Company LP, Gallup Refinery

Robert S. Hanks

Robert S. Hanks
Refinery General Manager

Enclosure

cc K. Van Horn NMED
C. Chavez NMOCD
B. Moore Marathon Gallup Refinery

MARATHON PETROLEUM CORPORATION

GALLUP REFINING DIVISION

SWMU-1 SOIL SAMPLING INVESTIGATION WORK PLAN

SEPTEMBER 23, 2019

Approval to Proceed

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: Brian Moore

Date: 9-23-19

Title: Senior HSE Professional

Executive Summary

The Marathon Petroleum Company, Gallup Refining Division is submitting this Investigation Work Plan for the sampling of sediments contained in the former aeration lagoons and evaporation pond known as Solid Waste Management Unit (SWMU) 1.

SWMU-1 was a part of a former aggressive biological treatment unit where refinery wastewater flowed through the aeration lagoons and then into the evaporation pond. Based on this usage the aeration lagoon sediments are most likely hazardous waste and the evaporation pond sediments may be classified as non-hazardous waste. This Work Plan was developed to sample the sediments and the underlying soils to further delineate the impacts to the subsurface from historical usage.

Historical sampling and sediment thickness measurements were completed in April 2008 by Trihydro Corporation to help determine the appropriate disposal of sediments within SWMU-1. Data from the 2008 sampling was used to characterize sediments. Sediment volumes were calculated based on the approximate dimensions of the lagoons and the evaporation pond. This Work Plan and additional sampling will help to further delineate the horizontal and vertical extent of the contamination within the lagoons and pond.

This Investigation Work Plan will collect samples within the lagoons and pond of both sediments (similar to the 2008 sampling) and soils beneath the lagoon and pond sediments. This sampling will close any data gaps from the historical sampling and will be utilized to develop an excavation plan so that MPC can apply for SWMU-1 closure.

Table of Contents

Introduction

The Marathon Petroleum Company (MPC), Gallup Refining Division (Refinery) is located approximately 17 miles east of Gallup, McKinley County, New Mexico along the north side of Interstate Highway I-40 (Figure 1). The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Refinery property covers approximately 810 acres.

Trihydro Corporation (Trihydro) has prepared this report proposing an Investigation Work Plan for sampling of sediments and soils contained in, and beneath, the former aeration lagoons and evaporation pond known as Solid Waste Management Unit (SWMU) 1 at the Refinery.

The Refinery is a crude oil refinery that processes crude oil transported by pipeline or tanker truck from the Four Corners region. Various process units operated at the Refinery include: crude distillation, reformer, fluidized catalytic cracker, alkylation, sulfur recovery, merox treater, and hydrotreater. Current and past operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.

Background

SWMU-1 consists of the former aeration lagoons (AL-1 and AL-2) and an evaporation pond (EP-1). These areas were part of the aggressive biological treatment unit (ABTU) formerly used at the Refinery. Refinery wastewater flowed from AL-1 to AL-2, followed by flow to EP-1 for evaporation. Based on this usage, AL-1 and AL-2 sediments can be reasonably classified as listed hazardous waste (F037/F038), whereas sediments in EP-1 by definition would not be classified as a listed hazardous waste.

AL-1, AL-2, and EP-1 were constructed in 1987 and were in operation until 2013. AL-1 and AL-2 are approximately 0.3 acres and 0.5 acres, respectively, and EP-1 is approximately 1.3 acres. The Refinery's process wastewater would flow to an American Petroleum Institute (API) separator with benzene air strippers and then flow into the two aeration lagoons in series; the lagoons were equipped with surface aerators to help achieve biological activity. The evaporation pond would be the final phase of the wastewater treatment before being discharged to the evaporation ponds at the Refinery. AL-1, AL-2 and EP-1 are earthen surface impoundments with natural clay functioning as a bottom liner (DiSorbo 2018, Section 2.1.1).

Prior sampling of the sediments and laboratory analysis were last conducted in 2008 of AL-1, AL-2, and EP-1 (Trihydro 2008, Section 7). Laboratory sampling analyses of the sediments consisted of total petroleum

hydrocarbons (TPH), diesel range organics (DRO), and gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) method 8015, semi-volatile organic compounds (SVOCs) by USEPA method 8270, volatile organic compounds (VOCs) by USEPA Method 8260, Resource Conservation and Recovery Act (RCRA) metals by USEPA Method 6010C, and mercury by USEPA Method 7471. The Toxicity Characteristics Leaching Procedure (TCLP) analysis was not performed.

In the 2008 report (Trihydro 2008, Section 6), standards for comparison consisted of NMED Industrial Soil Screening Levels (SSLs) and EPA's Maximum Concentrations of Contaminants for the Toxicity Characteristic (CFR Title 40 Part 261). In the absence of TCLP analyses, TCLP data were approximated using an EPA-approved RCRA calculation wherein soil analytical data were decreased by a factor of 20, which allowed a comparison against RCRA Toxicity Characteristic levels as a screening tool. Exceedances with respect to these comparison standards are discussed below.

Twenty-six samples from various sediment depths in the three areas exceeded the Toxicity Characteristic for mercury, and three samples from AL-1 exceeded the Toxicity Characteristic for lead. These results for TCLP are estimates based on the approximation described above and will be confirmed with actual TCLP analyses proposed in this plan.

During this sampling Trihydro also determined the approximate thickness and volume of the sediments in SWMU-1:

- AL-1: 3.5 feet (ft) to 6.0 ft, 1,700 cubic yards (cy)
- AL-2: 6.5 ft to 9.6 ft, 3,800 cy
- EP-1: 1.2 ft to 5.1 ft, 3,200 cy

At the time of the 2008 SWMU-1 sampling event, a boat was required for access and sediment volume estimates reflect fully saturated conditions. In order to collect sediment and soil samples the ponds must be drained prior to sampling. Per MPC's conversations with the New Mexico Environmental Department (NMED) on August 14th, 2019, MPC will install French Drains along the east and south sides of SWMU-1 and two sumps on the southern side of AL-1 and AL-2 in order to dewater the ponds and prevent further groundwater infiltration.

The purpose of the previous sediment investigations was to determine and evaluate the presence, nature, and extent of contaminant releases within SWMU-1. The purpose of this sediment investigation is to further delineate the existing soil impacts to finalize an excavation and closure plan for SWMU-1. This investigation will complete characterization of the soil and volume of sediment for removal within the lagoons and pond.

Site Conditions

Surface Conditions

Local site topographic features include high ground in the southeast gradually decreasing to a lowland fluvial plain to the northwest. Elevations on the refinery property range from 7,040 ft to 6,860 ft. The area near the ponds is at an approximate elevation of 6,910 ft above mean sea level (amsl) (DiSorbo 2018).

Subsurface Conditions

The shallow subsurface soil (alluvium)is comprised of clay and silt with some inter-bedded sand layers. Cross sections through SWMU-1 (Figure 2A) are included as Figures 2B through 2D. Beneath the alluvium is the Petrified Forest Member of the Chinle Group, which primarily consists of interbedded mudstone, siltstone, and sandstone. The Alluvium/Chinle interface is as little as 15 ft below ground surface (bgs) to over 32 ft bgs beneath SWMU-1.

The groundwater within SWMU-1 is known to be shallow based on groundwater measurements taken in the area (Disorbo 2018, Table 2). The proposed French drains and sumps will remove the surface water and groundwater from the pond footprint to allow for sampling and, ultimately, excavation and closure. The surface water and shallow groundwater currently collects in the lagoons and pond. In addition, the installation of the French drain will prevent groundwater infiltration into SWMU-1 in the future to prevent re-impacting the area. The groundwater in the French drains will collect into sumps and will be transported and treated at the wastewater treatment facility.

Scope of Activities

The site sampling and investigative activities of SWMU-1 will be completed to supplement and confirm data that has previously been collected at the ponds. Pending NMED approval, MPC anticipates sampling to occur in October-November 2019.

The sediment sampling will be completed per the RCRA Post-Closure Permit Section IV.J.2.d.ii. Soil borings will be completed with a hand-auger and discrete samples will be collected in order to fill data gaps from historical sampling and to create a better understanding of underlying soil impacts.

Analytical results will be screened by comparison to NMED Industrial SSLs, Toxicity Characteristic Levels, and the chosen disposal facility's waste acceptance criteria (WAC). Soil recovered during sampling will be placed in roll-off boxes within the area of SWMU-1 and characterized prior to disposal.

Once characterization has been completed, MPC will prepare an investigation report with results from the sampling. A risk assessment will be included with the investigation report. Following the investigation report a closure plan will be submitted to NMED.

Investigation Methods

The proposed sampling locations are show on Figure 3. The proposed locations include three samples from each of the aeration lagoons and four from the evaporation pond. MPC also plans to collect 12 additional sidewall samples along the SWMU-1 berm (4 from each area).

Soil samples will be collected by hand-augering within SWMU-1 and along the perimeter sidewalls (Figure 3). Discrete sediment samples will be collected at 2.5-ft intervals from the surface until visual and/or instrumental contamination is no longer evident, or until a maximum depth of approximately 8 feet is reached. Sediments obtained will be visually inspected and classified in general accordance with ASTM D2487 (Unified Soil Classification System) and D2488 (Description and Identification of Soils). Detailed boring logs will be completed in the field by qualified field staff. Samples will be field screened for evidence of contaminants and will be recorded in the boring logs. Field screening will include taking discrete grab samples as described below and using a Flame Ionization Detector (FID) to measure hydrocarbon vapors.

Quality assurance/quality control (QA/QC) samples will be collected during sampling to monitor the validity of the sample collection procedures. Field duplicates will be collected at a rate of ten percent of all samples collected. Equipment blanks will be collected based on ten percent of the re-usable equipment; if disposable sampling equipment is used, the blanks shall be collected at a frequency of one per day. Field blank samples will also be collected once a day. The field duplicate and blank samples will be submitted to the laboratory along with the sediment samples.

Sample Collection Procedures

Samples will be collected in accordance with the confirmation sampling Standard Operating Procedure (SOP) (Appendix A). Details related to sample collection will be documented on the confirmation sampling field forms. General observations to be recorded on the field forms for each soil sample location will include sampling start and end times, weather, site conditions, sampling team members, and other affiliations present. Sample-specific information will include field sample identification, time of sample collection, sample start and end depth, collection method, sample type (i.e., composite or aliquot), soil classification and characteristics, any deviations or clarification of sampling procedures, and other observations. Field techniques will be applied consistently across SWMU-1 by a team of dedicated sampling personnel who may be assisted by site supervisors. A summary of the sampling activities is shown below:

1. Installation of 10 hand-augered borings in the pond sediments to determine depth of sediments and volume for disposal in the approximate locations shown in Figure 3. Both sediment and soil samples will be collected from the borings.

2. Collection of 10 sediment and 12 berm sludge/soil samples for laboratory analysis in the locations shown in Figure 3. Subject to WAC at the waste disposal facility, laboratory analyses will consist of:

    - pH
    - Metals, Method 6010
    - SVOCs, Method 8270
    - VOCs, Method 8260
    - TCLP (lead and mercury)
    - TPH GRO and DRO
    - Density
    - Paint Filter Test
    - Photoionization Detector (PID) – Headspace sampling

3. Analytical data will be screened by comparison with NMED Industrial SSLs, Toxicity Characteristic levels, and the proposed disposal facility WACs.

Equipment will be decontaminated before collecting each sample, and equipment decontamination will be noted on the field forms. Upon collection, samples will be placed into a clean, sealable plastic bag labeled with the field sample identification. Sample jars will be filled, labeled, and placed in a cooler. Before shipment, coolers will be packed with additional ice and one temperature blank per cooler. A chain of custody (CoC) form will accompany each sample shipment. Coolers will be sealed and shipped overnight to Hall Environmental Analytical Laboratory in Albuquerque, NM.

Sample Collection Frequency

Sediment sample collections will be taken in accordance with the RCRA Post-Closure Permit Section IV.J.2.d.ii (Soil and Rock Sampling) and will include the following applicable intervals and depths:

- at the surface of the proposed boring locations;
- at 2.5-ft intervals;
- at the maximum depth of each boring; and
- at intervals suspected of being source or contaminated zones.

Data Quality and Validation

QA/QC samples will be recorded on the field forms and CoCs. All data will be subjected to Tier II data validation to evaluate data validity.

Data Evaluation

Analytical results will be screened by comparison to NMED Industrial SSLs, Toxicity Characteristic Levels, and the chosen disposal facility's WAC. Soil recovered during sampling will be placed in roll-off boxes within the area of SWMU-1 and characterized prior to disposal.

Monitoring and Sampling Program

No groundwater, ambient air, subsurface vapor, remediation system, engineering controls, or other monitoring and sampling programs are currently being implemented at SWMU-1. A routine sampling program may be developed following excavation of the ponds if clean closure is not obtained.

Schedule

Pending NMED approval, MPC anticipates sampling to occur in October-November 2019 following the installation of the French drain and sumps in October 2019. Following the completion of sampling activities a Closure Plan will submitted to NMED for review and approval.

References

DiSorbo. 2018. Investigation Work Plan Solid Waste Management Unit (SWMU) No. 1 Aeration Basin and SWMU No. 14 Old API Separator. Gallup Refinery, Western Refining Southwest, Inc., Gallup, New Mexico, November.

Trihydro. 2008. Aeration Lagoons 1 and 2 and Evaporation Pond 1 Sediment Investigation Western Refining Company, Gallup Refinery, Gallup, New Mexico, June.

Figures

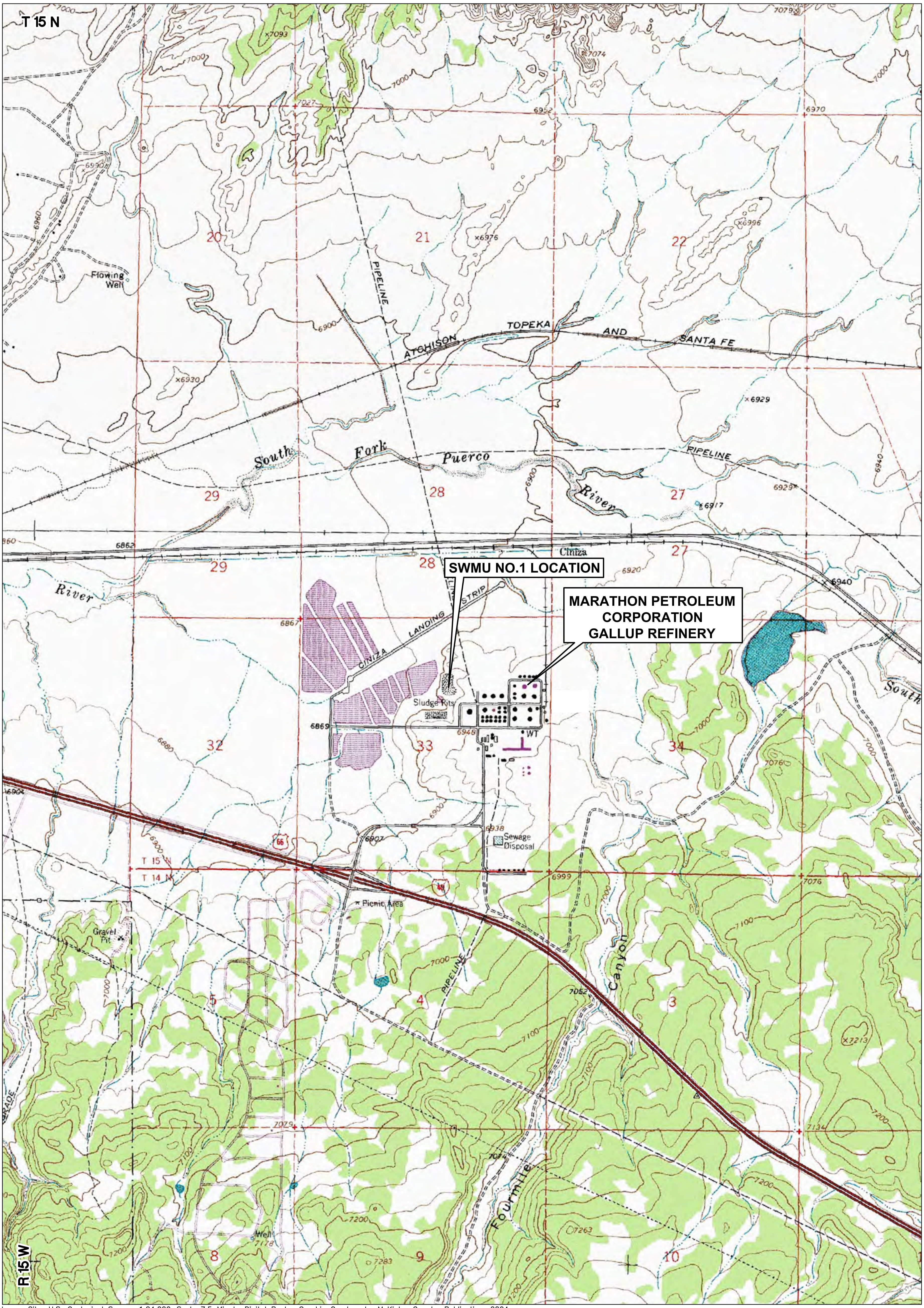


Image Cite: U.S. Geological Survey, 1:24,000–Scale 7.5 Minute Digital Raster Graphic Quadrangle, McKinley County, Publication: 2004

QUADRANGLE LOCATION

NOTE:
SITE LEGAL DESCRIPTION - TOWNSHIP 15 NORTH, RANGE 15 WEST, SECTION 33

N

0 2,000'

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FIGURE 1

REFINERY AND SWMU NO.1 LOCATION

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: JP	Scale: 1" = 2,000'	Date: 3/12/2019	File: 697-SITELOC-201903

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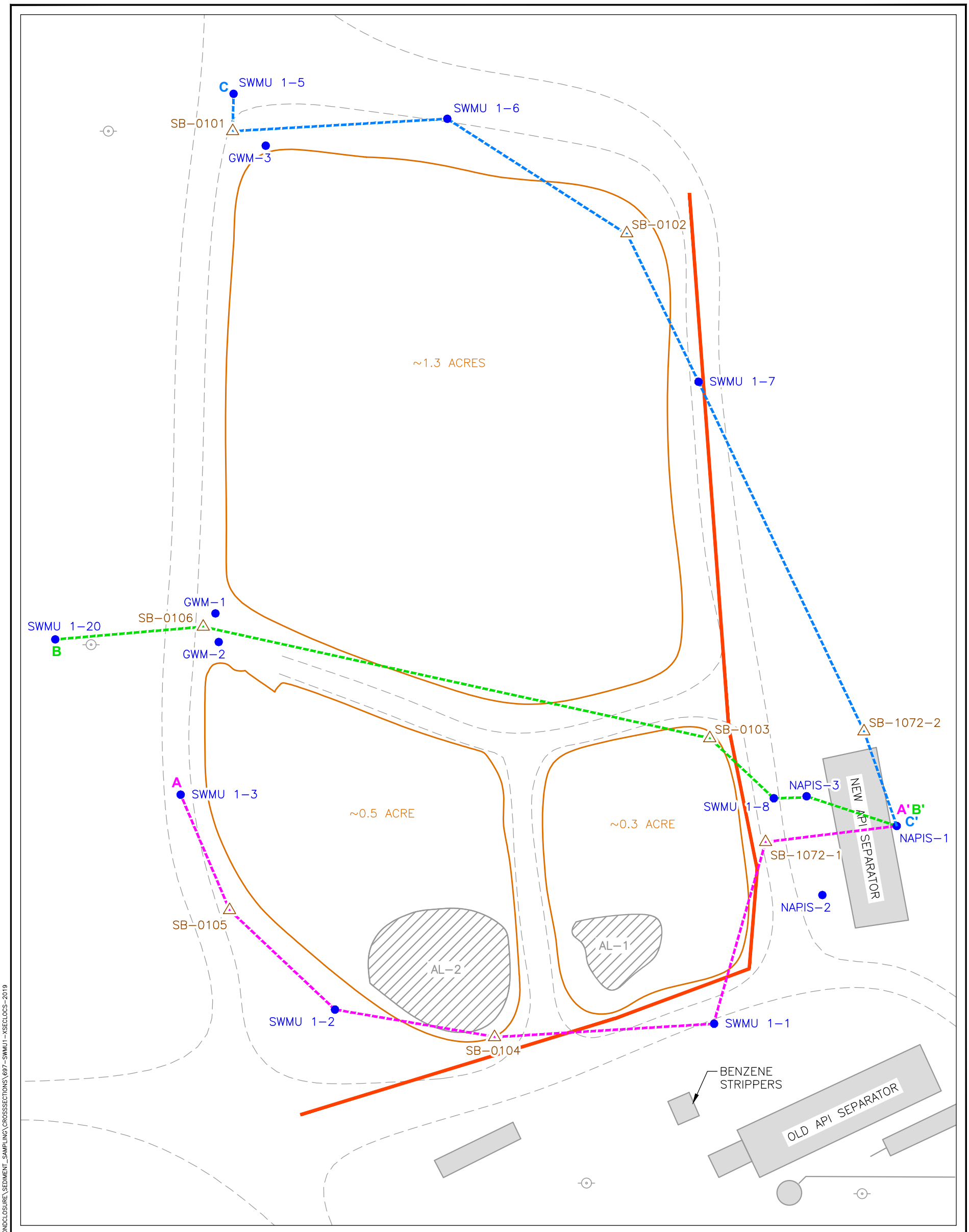

EXPLANATION

- NAPIS-2 — GROUNDWATER WELL AND DESIGNATION
- SB-0104 — SOIL SAMPLE AND DESIGNATION
- CROSS-SECTION A-A'
- CROSS-SECTION B-B'
- CROSS-SECTION C-C'
- ACCESS ROAD EDGE
- BANK/BERM EDGE
- PROPOSED 2019 GROUNDWATER INTERCEPTOR TRENCH
- EXTENT OF WATER/PSH (JULY 2019)
- BUILDING OR OTHER STRUCTURE
- UTILITY POLE

N

0 50'

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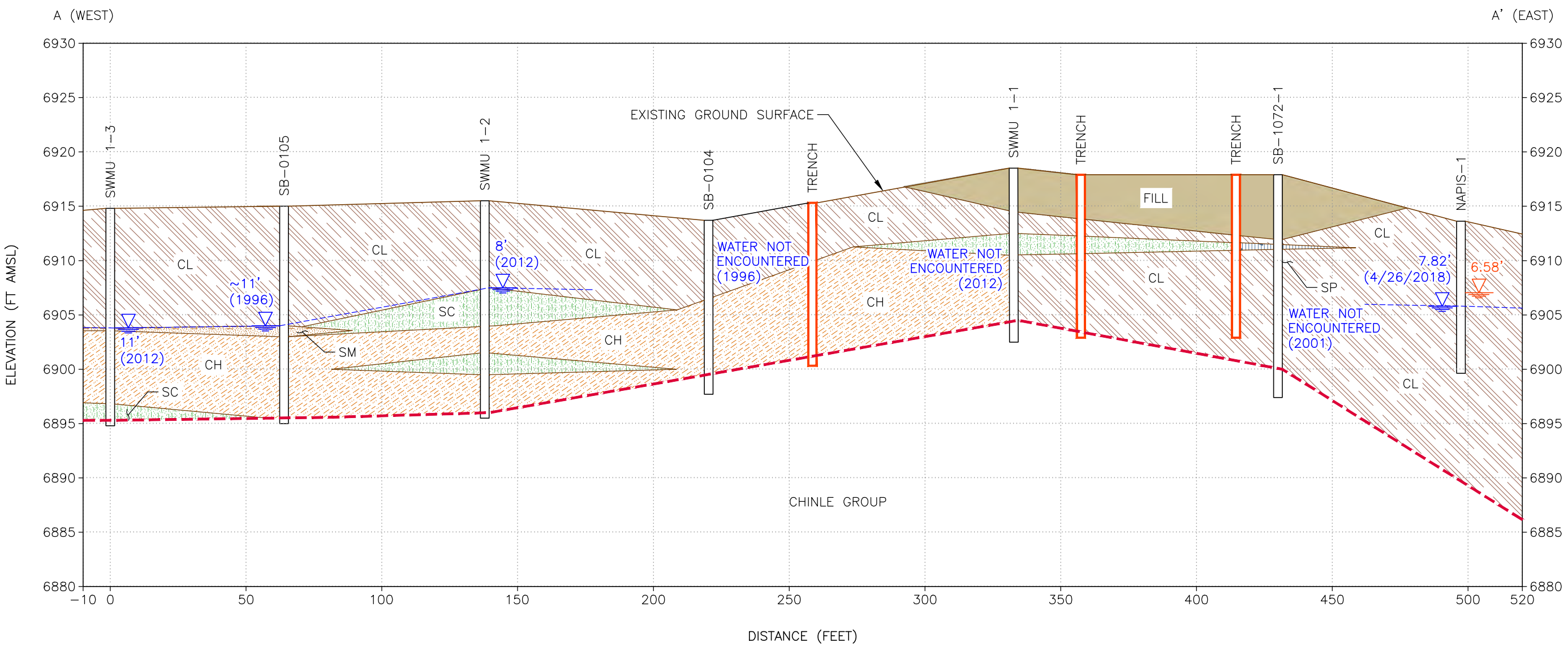
FIGURE 2A

CROSS-SECTION LOCATIONS MAP

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: PH	Scale: 1" = 50'	Date: 8/19/19	File: 697-SWMU1-XSECLOCS-2019

\\TRIHYDRO.COM\CLIENTS\TION\MARATHON\CADD\GALLUP\REPORTS\SWMU1_EVAPPONDCLOSURE\SEDIMENT_SAMPLING\CROSSSECTIONS\697-SWMU1-XSECLOCS-2019



EXPLANATION

- SB-0105 — DESIGNATION
- WELL OR BORING
- SCREENED INTERVAL
- GEOLOGIC CONTACT (DASHED WHERE INFERRED)
- CHINLE FM CONTACT
- WATER LEVEL LINE
- STATIC WATER LEVEL
- PRODUCT

- FILL
- CLAY (CL)
- FAT CLAY (CH)
- SILTY SAND (SM)
- SAND, POORLY SORTED (SP)
- SANDY CLAY / CLAYEY SAND (SC)
- PETRIFIED FOREST MEMBER - LAVENDER AND BROWN VARIEGATED MUDSTONE AND SANDSTONE
- PROPOSED 2019 GROUNDWATER INTERCEPTOR TRENCH
- FT AMSL — FEET ABOVE MEAN SEA LEVEL

0 40' HORIZONTAL SCALE

0 10' VERTICAL SCALE

VERTICAL EXAGGERATION = 4X

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FIGURE 2B

GEOLOGICAL CROSS-SECTION A-A'

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: PH	Scale: AS SHOWN	Date: 9/17/19	File: 697-SWMU1-XSECA_2019

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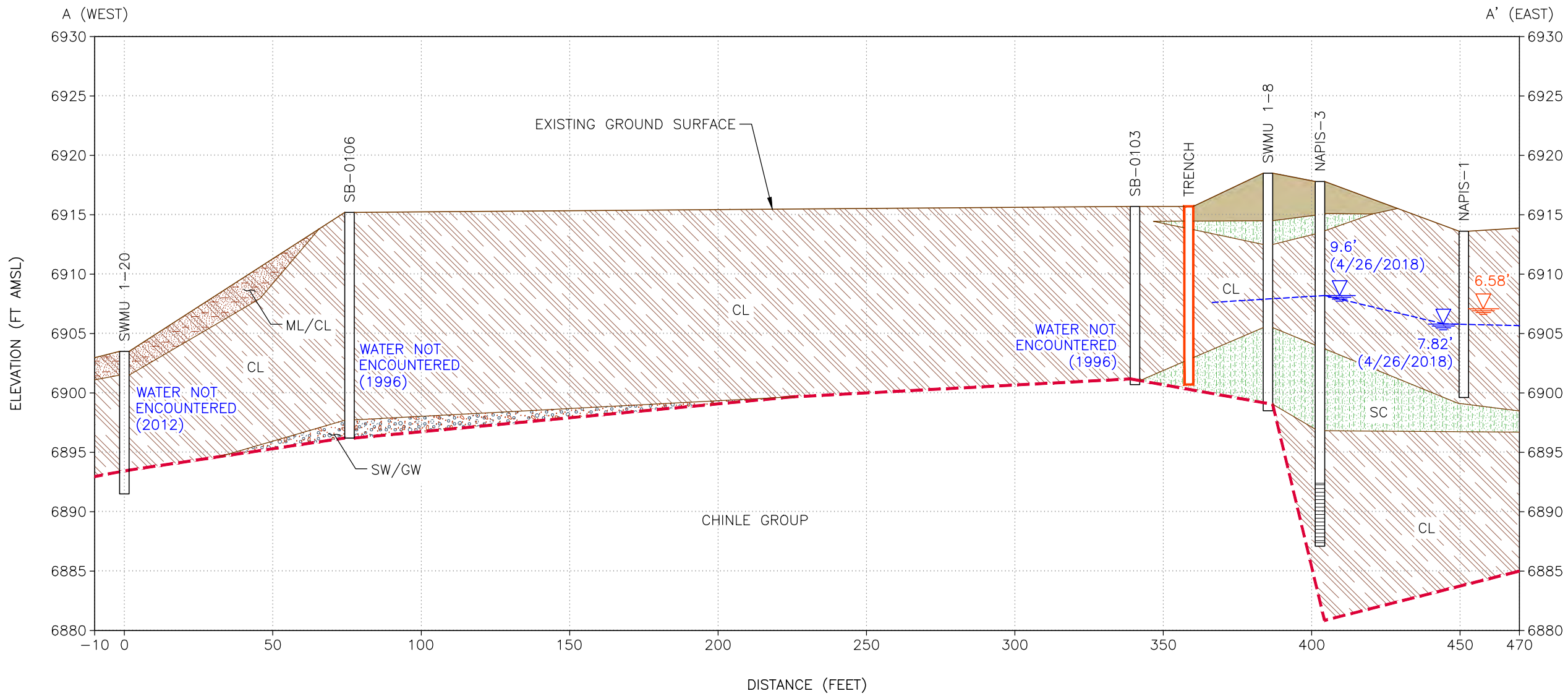
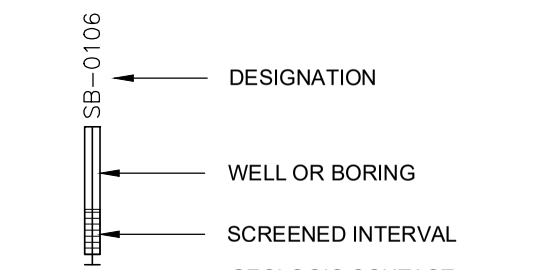
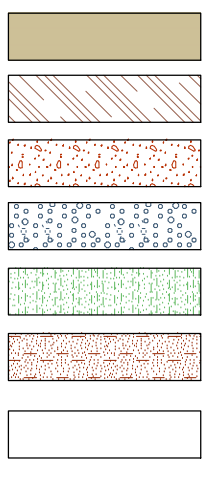


EXPLANATION





0 40' HORIZONTAL SCALE

0 10' VERTICAL SCALE

VERTICAL EXAGGERATION = 4X

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FIGURE 2C

GEOLOGICAL CROSS-SECTION B-B'

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: PH	Scale: AS SHOWN	Date: 9/18/19	File: 697-SWMU1-XSECB_2019

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C (WEST)

C' (EAST)

EXISTING GROUND SURFACE

SWMU 1-5

SB-0101

SWMU 1-6

SB-0102

SWMU 1-7 TRENCH

SB-1072-2

NAPIS-1

CL

SC

GW

CH

SP/GW

WATER NOT ENCOUNTERED (1996)

25' (2012)

9' (2012)

14' (2012)

1.1 (2012)

8' (2011)

6.58'

7.82' (4/26/2018)

CHINLE GROUP

ELEVATION (FT AMSL)

6930
6925
6920
6915
6910
6905
6900
6895
6890
6885
6880
6875
6870

0 50 100 150 200 250 300 350 400 450 500 550 575

DISTANCE (FEET)

EXPLANATION

SB-0106 — DESIGNATION

WELL OR BORING

SCREENED INTERVAL

GEOLOGIC CONTACT (DASHED WHERE INFERRED)

CHINLE FM CONTACT

WATER LEVEL LINE

STATIC WATER LEVEL

PRODUCT

FILL

CLAY (CL)

GRAVEL, WELL SORTED (GW)

SANDY CLAY / CLAYEY SAND (SC)

SAND, POORLY SORTED (SP)

FAT CLAY (CH)

PERCHED WATER ZONE

PETRIFIED FOREST MEMBER - LAVENDER AND BROWN VARIEGATED MUDSTONE AND SANDSTONE

PROPOSED 2019 GROUNDWATER INTERCEPTOR TRENCH

FT AMSL — FEET ABOVE MEAN SEA LEVEL

0 40' HORIZONTAL SCALE

0 10' VERTICAL SCALE

VERTICAL EXAGGERATION = 4X

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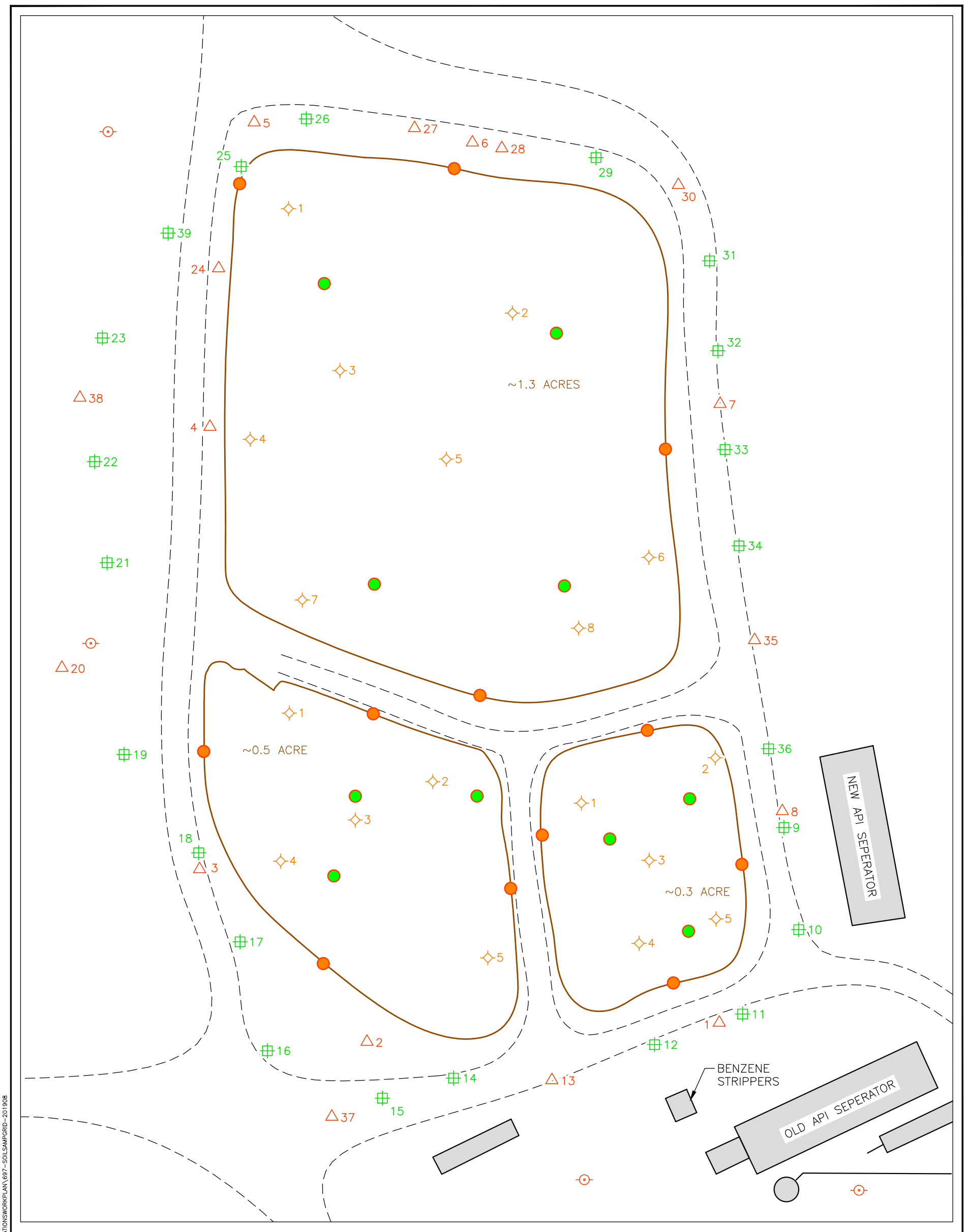
FIGURE 2D

GEOLOGICAL CROSS-SECTION C-C'

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: PH	Scale: AS SHOWN	Date: 9/18/19	File: 697-SWMU1-XSECC_2019



EXPLANATION

- ACCESS ROAD EDGE
- BANK/BERM EDGE
- 37 — PREVIOUS PERIMETER SOIL BORING AND DESIGNATION
- 16 — PREVIOUS HAND AUGER SAMPLE AND DESIGNATION
- PROPOSED 2019 POND SEDIMENT SAMPLING LOCATION
- PROPOSED 2019 BERM SAMPLING LOCATION
- 4 — 2008 SEDIMENT DEPTH MEASURING POINT AND DESIGNATION
- UTILITY POLE
- BUILDING OR OTHER STRUCTURE

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FIGURE 3

SOIL/SEDIMENT SAMPLING LOCATIONS
SWMU NO.1

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 50'	Date: 8/29/19	File: 697-SOILSAMPGRID-201908

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Attachment

memorandum

To: Sampling Team Members
From: Project Manager
Date: October 4, 2019
Re: Standard Operating Procedure – Sediment Sampling

1.0 INTRODUCTION

Sediment sampling related to site characterization and site clean-up is expected to involve source sampling of potentially contaminated sediments for characterization and profiling. Sediment sampling is expected to occur in and around the aeration lagoons and evaporation pond.

All personnel involved in sediment sampling projects are required to review this Standard Operating Procedure (SOP) before sampling to ensure the continued generation of reliable data. This SOP is based on experience gained from collecting sediment samples and the latest information available in guidance manuals. This SOP may be updated as additional experience and information are acquired.

2.0 PRE-FIELD ACTIVITIES

Several activities will be conducted prior to departure for the project site. A project team will be assigned and the members will begin coordinating the sample collection event with Marathon Petroleum Company. Field equipment will be checked and organized. Access to the areas to be sampled will be checked, and provisions made to pack the necessary equipment for delivery to the project site.

3.0 PREPARATION

The Project Manager will review the current sampling and analysis plans and work plans to determine if any documents need to be brought to the site during monitoring. The Project Manager will also evaluate whether any changes have been made in the sampling and analytical procedures, and notify the appropriate personnel.

The Sampling Team Members will review available surface water level data before leaving for the sampling site. This preparation ensures that the proper equipment and personnel are available at the site. All field screening equipment will be inspected prior to departure, ensuring that it is in proper working order. For sediment sampling, the only field monitoring equipment used will be the Photoionization detection (PID) meter and it should be calibrated and operated and according to manufacturer's recommendations.

4.0 EQUIPMENT

The following equipment is recommended for sediment sampling:

- ☐ Required personal protective equipment (PPE), listed in the site-specific health and safety plan (HASP) (generally nitrile gloves, waders, life preserver, rope and safety glasses)
- ☐ Sediment sampling devices (i.e., hand auger)
- ☐ Sampling beaker, bottles, labels, and preservatives
- ☐ Gloves
- ☐ Chain-of-custody/sample-analysis-request forms
- ☐ Flame Ionization detection meter (FID)
- ☐ Opaque Cooler(s) and bagged ice or frozen Blue Ice
- ☐ Detergent or solvent for cleaning monitoring equipment
- ☐ Brushes dedicated for decontamination
- ☐ Decontamination containers dedicated for wash, rinse 1, and rinse 2
- ☐ Paper towels
- ☐ Trash bags
- ☐ Field logbook
- ☐ Wrist watch (with digital display)

5.0 SAMPLE COLLECTION

A critical aspect of any sampling program is selection and implementation of an appropriate sampling technique. Selection of equipment and technique should be appropriate for the volume of material required and the type of analysis to be performed. In general, the sampling equipment and technique will be chosen to minimize, to the extent possible, the amount of handling a sample will undergo prior to analysis. In many cases, the material to be sampled will be easy to access, and simple "grab" samples collected using a shovel, trowel, or drive sampler are appropriate. In other cases, such as underwater or heavily saturated samples, the sediments may be difficult to access, and sampling will involve the use of specialized sediment sampling equipment. Specific analytical requirements and sampling frequencies are specified in the work plan.

Sediment samples located in dry areas will be collected from representative locations using a decontaminated drive sampler equipped with clean brass or stainless steel sampling rings, a thin-walled tube sampler or a shovel or hand trowel. The sampling device will be driven completely into the material

manually or using a manually operated auger, drive hammer, or mallet. The sampling device will then be extracted from the material using a shovel or trowel as needed. If used, filled sampling rings or the thin walled tube will then be removed from the sampling device and immediately sealed on both ends with teflon sheeting and plastic caps. Otherwise, the material will placed directly from the trowel or other appropriate sampling device into a clean glass jar. The jar will be filled completely to minimize headspace (by tamping during filling), and immediately sealed with a teflon-lined lid.

In accordance with the work plan saturated and underwater sediment samples will be collected using a hand auger, geoprobe, sediment sampler or a similar device. Samples will be collected from the shore or boat at each preselected sampling location. Underwater samples will be capped prior to breaking the surface of the water to prevent agitation of the sample and to assist in core characterization. In addition, care will be taken to prevent mixing when collecting saturated and underwater samples. Sediment will be placed in sample containers provided by the laboratory and filled to the top to minimize headspace. If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory. The sample containers will be labeled with endelible ink. Filled sample containers should be wiped dry and placed in a cooler with ice (or equivalent) for storage at the time of collection. Enough ice and protective packing material should be used to cool the samples to 4° C and ensure that the container remains intact prior to final packing and shipment.

Field screening may involve the use of a FID probe; which will be inserted into the bag and the reading taken. All samples shall be screened at as close to the same temperature as possible to obtain consistent results.

Sampling devices will be decontaminated between sampling locations using a four-stage decontamination system consisting of a two detergent/water washes and two deionized water rinses. Sample locations will be recorded with a GPS in order to accurately map the sampling locations.

Field logbooks, Sediment Sampling Field Log, and photograph logs will provide a written record of field data gathered, field observations, field equipment calibrations, the samples collected for analysis, and sample custody. Color photographs will be used to substantiate and augment the field notes, if necessary.

Figures

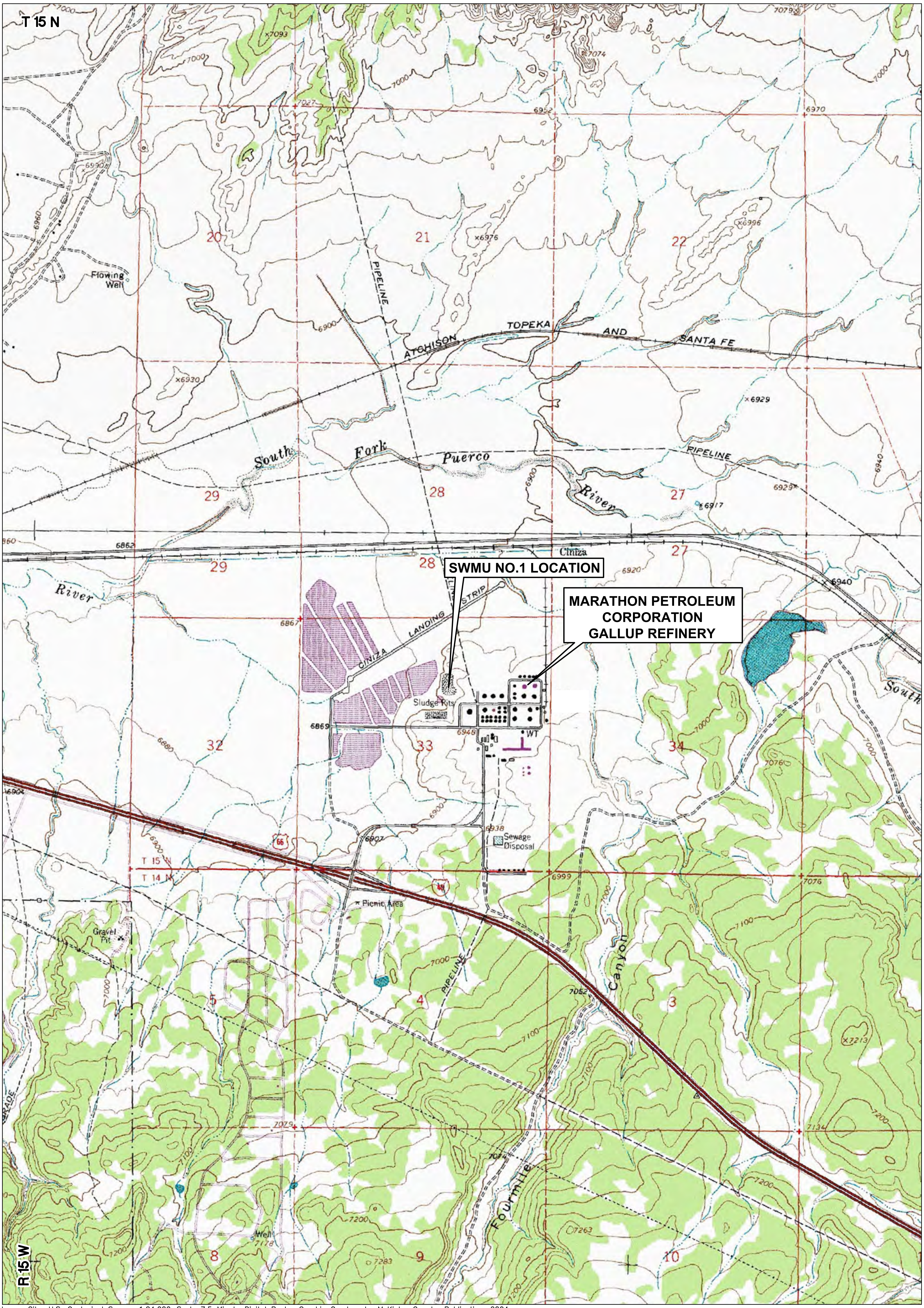
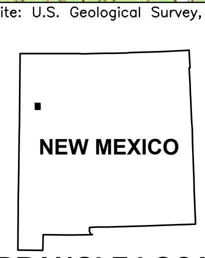


Image Cite: U.S. Geological Survey, 1:24,000–Scale 7.5 Minute Digital Raster Graphic Quadrangle, McKinley County, Publication: 2004



QUADRANGLE LOCATION

NOTE:
SITE LEGAL DESCRIPTION -
TOWNSHIP 15 NORTH,
RANGE 15 WEST, SECTION 33

N

0 2,000'

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FIGURE 1

REFINERY AND SWMU NO.1 LOCATION

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: JP	Scale: 1" = 2,000'	Date: 3/12/2019	File: 697-SITELOC-201903

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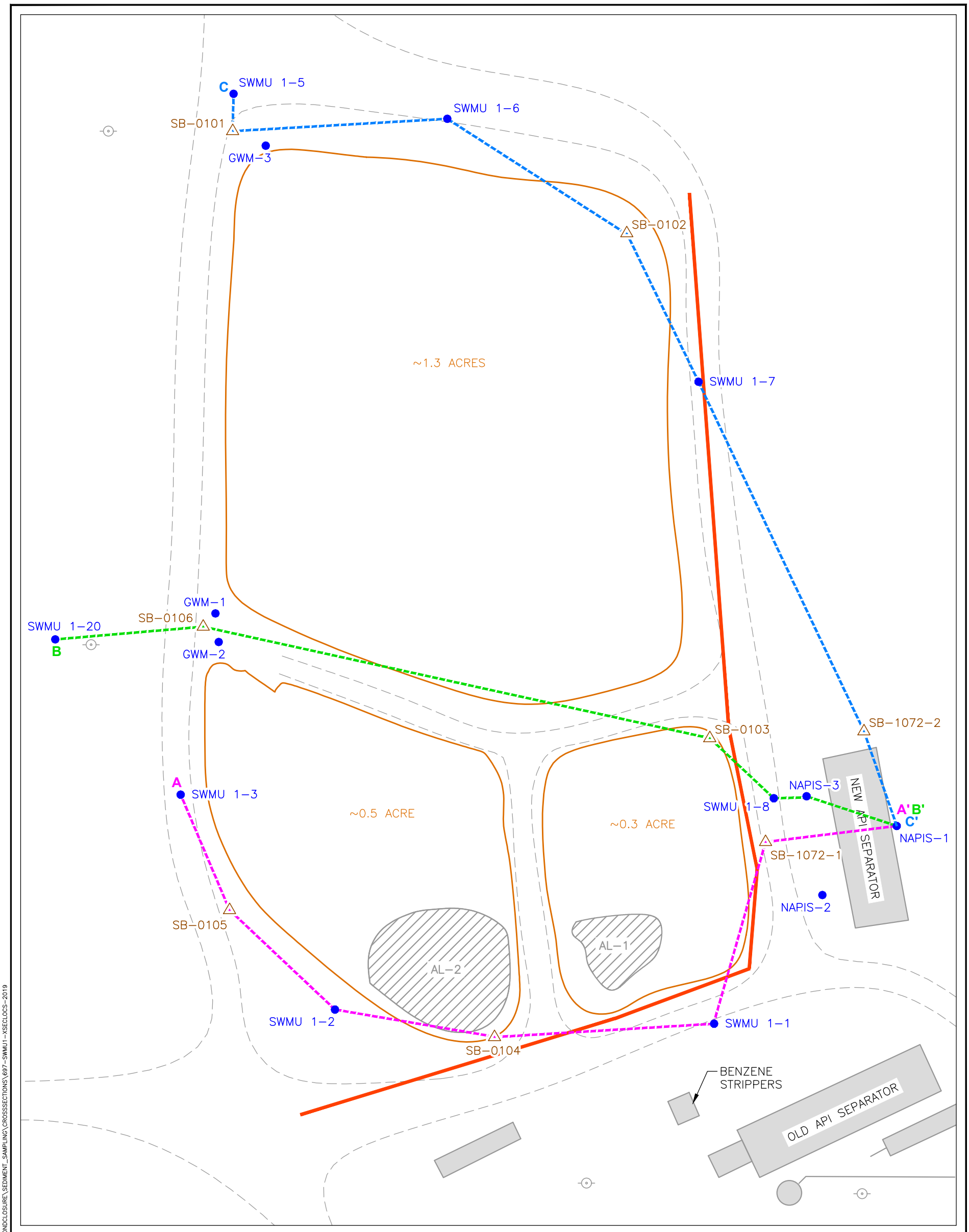

EXPLANATION

- NAPIS-2 — GROUNDWATER WELL AND DESIGNATION
- SB-0104 — SOIL SAMPLE AND DESIGNATION
- CROSS-SECTION A-A'
- CROSS-SECTION B-B'
- CROSS-SECTION C-C'
- ACCESS ROAD EDGE
- BANK/BERM EDGE
- PROPOSED 2019 GROUNDWATER INTERCEPTOR TRENCH
- EXTENT OF WATER/PSH (JULY 2019)
- BUILDING OR OTHER STRUCTURE
- UTILITY POLE

N

0 50'

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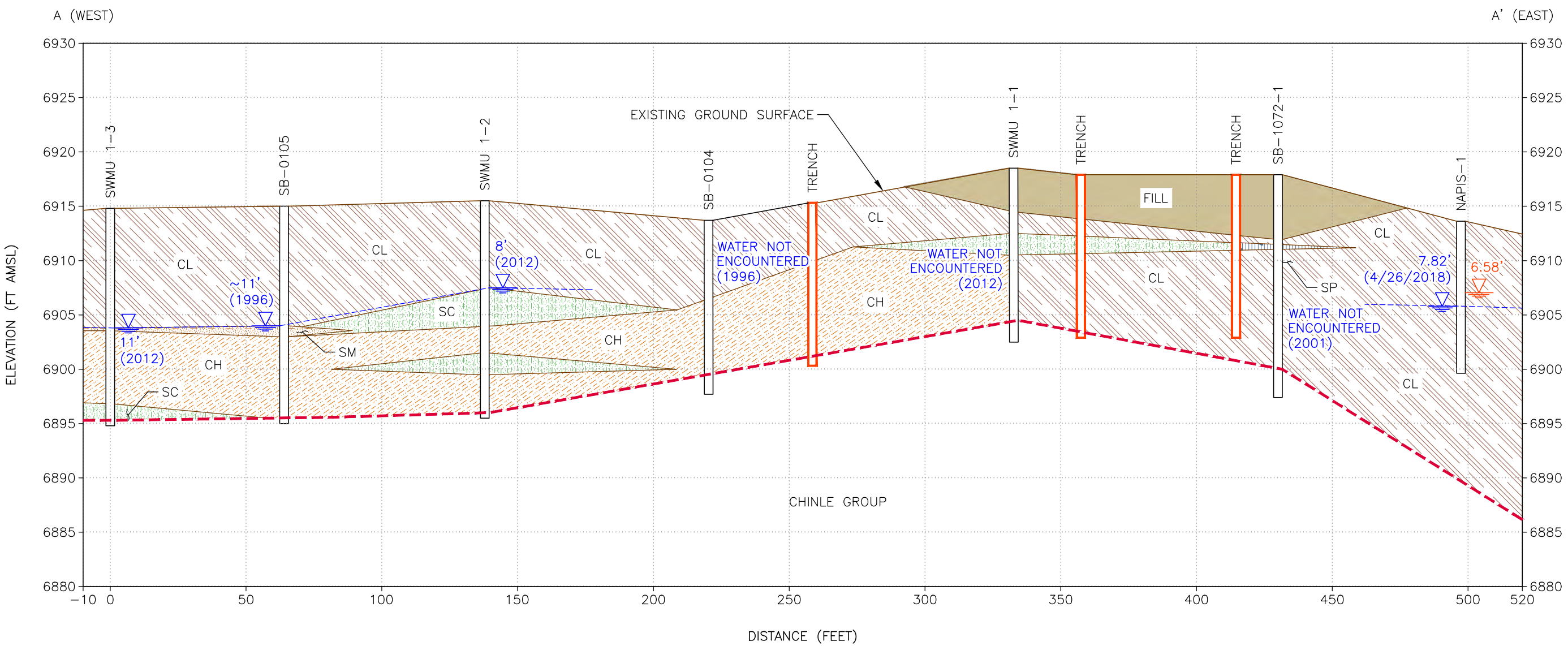
FIGURE 2A

CROSS-SECTION LOCATIONS MAP

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: PH	Scale: 1" = 50'	Date: 8/19/19	File: 697-SWMU1-XSECLOCS-2019

\\TRIHYDRO.COM\CLIENTS\TION\MARATHON\CADD\GALLUP\REPORTS\SWMU1_EVAPPONDCLOSURE\SEDIMENT_SAMPLING\CROSSSECTIONS\697-SWMU1-XSECLOCS-2019



EXPLANATION

- SB-0105 — DESIGNATION
- WELL OR BORING
- SCREENED INTERVAL
- GEOLOGIC CONTACT (DASHED WHERE INFERRED)
- CHINLE FM CONTACT
- WATER LEVEL LINE
- STATIC WATER LEVEL
- PRODUCT

- FILL
- CLAY (CL)
- FAT CLAY (CH)
- SILTY SAND (SM)
- SAND, POORLY SORTED (SP)
- SANDY CLAY / CLAYEY SAND (SC)
- PETRIFIED FOREST MEMBER - LAVENDER AND BROWN VARIEGATED MUDSTONE AND SANDSTONE
- PROPOSED 2019 GROUNDWATER INTERCEPTOR TRENCH
- FT AMSL — FEET ABOVE MEAN SEA LEVEL

0 40' HORIZONTAL SCALE

0 10' VERTICAL SCALE

VERTICAL EXAGGERATION = 4X

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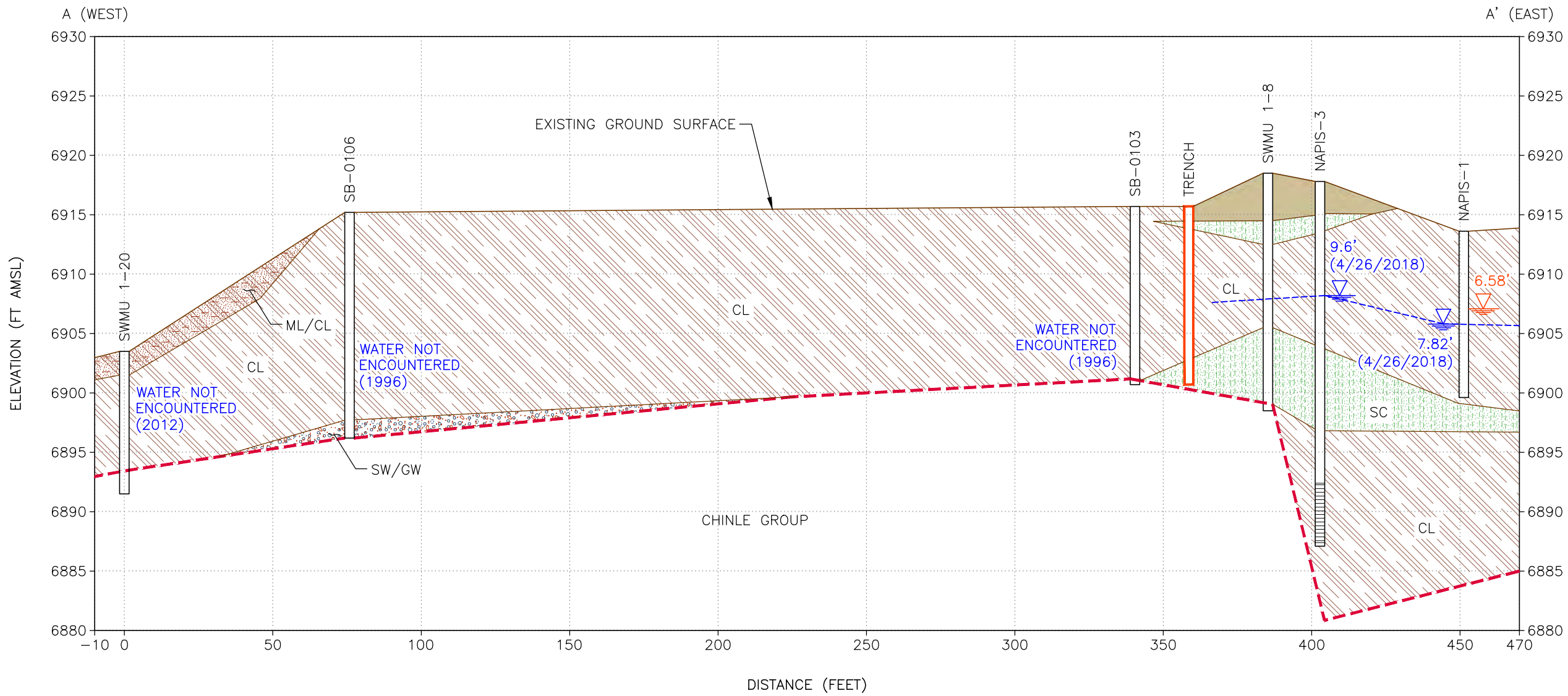
FIGURE 2B

GEOLOGICAL CROSS-SECTION A-A'

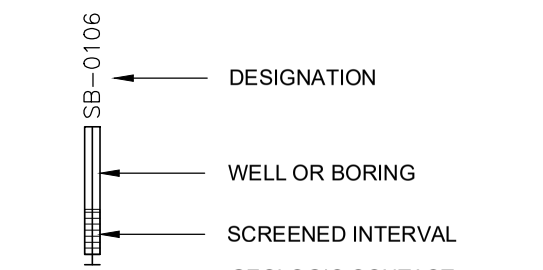
MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

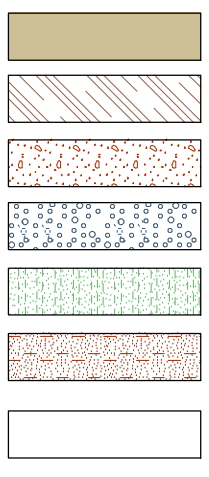
Drawn By: REP	Checked By: PH	Scale: AS SHOWN	Date: 9/17/19	File: 697-SWMU1-XSECA_2019

\\TRIHYDRO.COM\CLIENTS\VTON\MARATHON\CADD\GALLUP\REPORTS\SWMU1_EVAPPONDCLOSURE\SEDIMENT_SAMPLING\CROSSSECTIONS\697-SWMU1-XSECA_2019



EXPLANATION





0 40' HORIZONTAL SCALE

0 10' VERTICAL SCALE

VERTICAL EXAGGERATION = 4X

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FIGURE 2C

GEOLOGICAL CROSS-SECTION B-B'

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: PH	Scale: AS SHOWN	Date: 9/18/19	File: 697-SWMU1-XSECB_2019

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C (WEST)

C' (EAST)

EXISTING GROUND SURFACE

SWMU 1-5

SB-0101

SWMU 1-6

SB-0102

SWMU 1-7 TRENCH

SB-1072-2

NAPIS-1

CL

SC

GW

CH

SP/GW

WATER NOT ENCOUNTERED (1996)

25' (2012)

9' (2012)

14' (2012)

1.1 (2012)

8' (2011)

6.58'

7.82' (4/26/2018)

CHINLE GROUP

ELEVATION (FT AMSL)

6930
6925
6920
6915
6910
6905
6900
6895
6890
6885
6880
6875
6870

0 50 100 150 200 250 300 350 400 450 500 550 575

DISTANCE (FEET)

EXPLANATION

SB-0106 — DESIGNATION

WELL OR BORING

SCREENED INTERVAL

GEOLOGIC CONTACT (DASHED WHERE INFERRED)

CHINLE FM CONTACT

WATER LEVEL LINE

STATIC WATER LEVEL

PRODUCT

FILL

CLAY (CL)

GRAVEL, WELL SORTED (GW)

SANDY CLAY / CLAYEY SAND (SC)

SAND, POORLY SORTED (SP)

FAT CLAY (CH)

PERCHED WATER ZONE

PETRIFIED FOREST MEMBER - LAVENDER AND BROWN VARIEGATED MUDSTONE AND SANDSTONE

PROPOSED 2019 GROUNDWATER INTERCEPTOR TRENCH

FT AMSL — FEET ABOVE MEAN SEA LEVEL

0 40' HORIZONTAL SCALE

0 10' VERTICAL SCALE

VERTICAL EXAGGERATION = 4X

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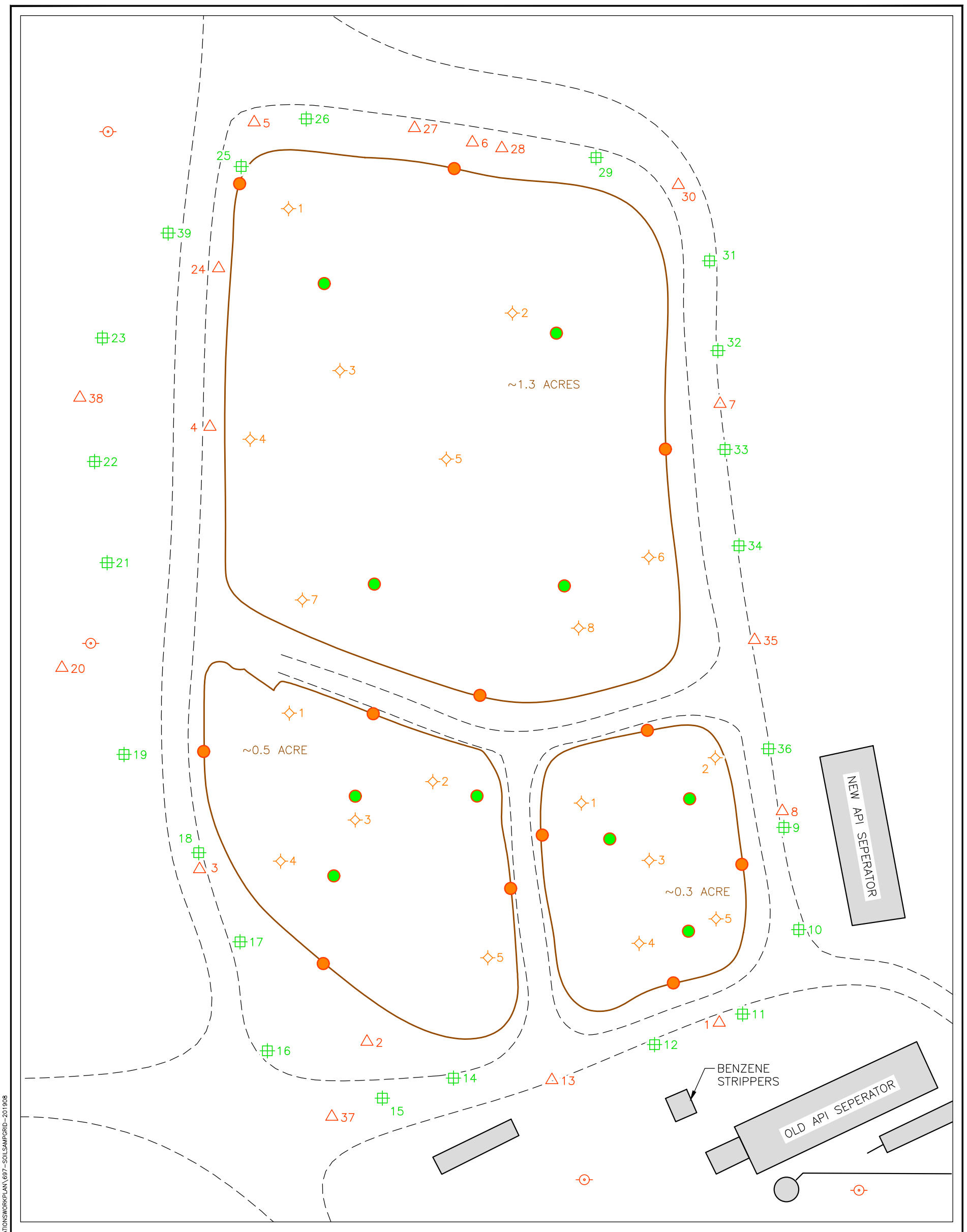
FIGURE 2D

GEOLOGICAL CROSS-SECTION C-C'

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: PH	Scale: AS SHOWN	Date: 9/18/19	File: 697-SWMU1-XSECC_2019



EXPLANATION

- ACCESS ROAD EDGE
- BANK/BERM EDGE
- 37 — PREVIOUS PERIMETER SOIL BORING AND DESIGNATION
- 16 — PREVIOUS HAND AUGER SAMPLE AND DESIGNATION
- PROPOSED 2019 POND SEDIMENT SAMPLING LOCATION
- PROPOSED 2019 BERM SAMPLING LOCATION
- 4 — 2008 SEDIMENT DEPTH MEASURING POINT AND DESIGNATION
- UTILITY POLE
- BUILDING OR OTHER STRUCTURE

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FIGURE 3

SOIL/SEDIMENT SAMPLING LOCATIONS
SWMU NO.1

MARATHON PETROLEUM CORP.
GALLUP REFINING DIVISION
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 50'	Date: 8/29/19	File: 697-SOILSAMPGRID-201908

M:_ITON_MARATHON_CADD_GALLUP_REPORTS_SWMU1_EVAPPONDCLOSURE_INVESTIGATIONSWORKPLAN_697--SOILSAMPGRID--201908

Attachment

memorandum

To: Sampling Team Members
From: Project Manager
Date: October 4, 2019
Re: Standard Operating Procedure – Sediment Sampling

1.0 INTRODUCTION

Sediment sampling related to site characterization and site clean-up is expected to involve source sampling of potentially contaminated sediments for characterization and profiling. Sediment sampling is expected to occur in and around the aeration lagoons and evaporation pond.

All personnel involved in sediment sampling projects are required to review this Standard Operating Procedure (SOP) before sampling to ensure the continued generation of reliable data. This SOP is based on experience gained from collecting sediment samples and the latest information available in guidance manuals. This SOP may be updated as additional experience and information are acquired.

2.0 PRE-FIELD ACTIVITIES

Several activities will be conducted prior to departure for the project site. A project team will be assigned and the members will begin coordinating the sample collection event with Marathon Petroleum Company. Field equipment will be checked and organized. Access to the areas to be sampled will be checked, and provisions made to pack the necessary equipment for delivery to the project site.

3.0 PREPARATION

The Project Manager will review the current sampling and analysis plans and work plans to determine if any documents need to be brought to the site during monitoring. The Project Manager will also evaluate whether any changes have been made in the sampling and analytical procedures, and notify the appropriate personnel.

The Sampling Team Members will review available surface water level data before leaving for the sampling site. This preparation ensures that the proper equipment and personnel are available at the site. All field screening equipment will be inspected prior to departure, ensuring that it is in proper working order. For sediment sampling, the only field monitoring equipment used will be the Photoionization detection (PID) meter and it should be calibrated and operated and according to manufacturer's recommendations.

4.0 EQUIPMENT

The following equipment is recommended for sediment sampling:

- ☐ Required personal protective equipment (PPE), listed in the site-specific health and safety plan (HASP) (generally nitrile gloves, waders, life preserver, rope and safety glasses)
- ☐ Sediment sampling devices (i.e., hand auger)
- ☐ Sampling beaker, bottles, labels, and preservatives
- ☐ Gloves
- ☐ Chain-of-custody/sample-analysis-request forms
- ☐ Flame Ionization detection meter (FID)
- ☐ Opaque Cooler(s) and bagged ice or frozen Blue Ice
- ☐ Detergent or solvent for cleaning monitoring equipment
- ☐ Brushes dedicated for decontamination
- ☐ Decontamination containers dedicated for wash, rinse 1, and rinse 2
- ☐ Paper towels
- ☐ Trash bags
- ☐ Field logbook
- ☐ Wrist watch (with digital display)

5.0 SAMPLE COLLECTION

A critical aspect of any sampling program is selection and implementation of an appropriate sampling technique. Selection of equipment and technique should be appropriate for the volume of material required and the type of analysis to be performed. In general, the sampling equipment and technique will be chosen to minimize, to the extent possible, the amount of handling a sample will undergo prior to analysis. In many cases, the material to be sampled will be easy to access, and simple "grab" samples collected using a shovel, trowel, or drive sampler are appropriate. In other cases, such as underwater or heavily saturated samples, the sediments may be difficult to access, and sampling will involve the use of specialized sediment sampling equipment. Specific analytical requirements and sampling frequencies are specified in the work plan.

Sediment samples located in dry areas will be collected from representative locations using a decontaminated drive sampler equipped with clean brass or stainless steel sampling rings, a thin-walled tube sampler or a shovel or hand trowel. The sampling device will be driven completely into the material

manually or using a manually operated auger, drive hammer, or mallet. The sampling device will then be extracted from the material using a shovel or trowel as needed. If used, filled sampling rings or the thin walled tube will then be removed from the sampling device and immediately sealed on both ends with teflon sheeting and plastic caps. Otherwise, the material will placed directly from the trowel or other appropriate sampling device into a clean glass jar. The jar will be filled completely to minimize headspace (by tamping during filling), and immediately sealed with a teflon-lined lid.

In accordance with the work plan saturated and underwater sediment samples will be collected using a hand auger, geoprobe, sediment sampler or a similar device. Samples will be collected from the shore or boat at each preselected sampling location. Underwater samples will be capped prior to breaking the surface of the water to prevent agitation of the sample and to assist in core characterization. In addition, care will be taken to prevent mixing when collecting saturated and underwater samples. Sediment will be placed in sample containers provided by the laboratory and filled to the top to minimize headspace. If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory. The sample containers will be labeled with endelible ink. Filled sample containers should be wiped dry and placed in a cooler with ice (or equivalent) for storage at the time of collection. Enough ice and protective packing material should be used to cool the samples to 4° C and ensure that the container remains intact prior to final packing and shipment.

Field screening may involve the use of a FID probe; which will be inserted into the bag and the reading taken. All samples shall be screened at as close to the same temperature as possible to obtain consistent results.

Sampling devices will be decontaminated between sampling locations using a four-stage decontamination system consisting of a two detergent/water washes and two deionized water rinses. Sample locations will be recorded with a GPS in order to accurately map the sampling locations.

Field logbooks, Sediment Sampling Field Log, and photograph logs will provide a written record of field data gathered, field observations, field equipment calibrations, the samples collected for analysis, and sample custody. Color photographs will be used to substantiate and augment the field notes, if necessary.