Appendix D.2

Recovery Well Installation Work Plan

Glenwood Drive

April 22, 2025

Note: Attachments not included

Sunoco Pipeline L.P.

Recovery Well Installation Work Plan

Glenwood Drive, Washington Crossing, PA 18977

Upper Makefield Township
Bucks County, PA

April 22, 2025

Table of Contents

1 General 1
1.1 Site Overview 1
1.2 Site Geology 1
2 Recovery Well Installation 2
2.1 Pre-Drilling Protocol 2
2.2 Soil Sampling 2
2.3 Findings: Borehole Geophysics and Routine Gauging 3
2.4 Well Installation 3
2.5 Domestic Supply Well Monitoring 4
2.6 Air and Noise Monitoring 4
2.7 Surveying 5
2.8 Well Development Procedures 5
2.9 Investigation-Derived Waste Management 5
2.10 Health, Safety, and Security 5
3 References 6

Figure

Figure 1 – Subsurface Utility Survey Map and Proposed Recovery Well Locations

Attachments

Attachment 1 – Standard Operating Procedures

Attachment 2 – Laboratory Accreditation

Attachment 3 - Rettew Borehole Geophysics Report

Attachment 4 – County Health Department Well Permit

Attachment 5 – Laboratory Analytical Report (Drilling Water Source)

Attachment 6 – Recovery Well Schematic

Attachment 7 – Air and Nosie Monitoring Plan for Recovery Well Installation

Attachment 8 – Waste Management Plan

Attachment 9 – Health & Safety Plan

Attachment 10 – Traffic Plan

Acronyms and Abbreviations

bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Total Xylenes
DEP	Pennsylvania Department of Environmental Protection
DOT	Pennsylvania Department of Transportation
EDB	1,2-Dibromoethane
EDC	1,2-Dichloroethane
GES	Groundwater & Environmental Services, Inc.
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
LNAPL	Light Non-Aqueous Phase Liquid
MTBE	Methyl tert-butyl ether
NAD	North American Datum
NAVD	North American Vertical Datum
NRCS	Natural Resources Conservation Service
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
SPLP	Sunoco Pipeline L.P.
TOC	Top-of-Casing
TMB	Trimethylbenzene
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1 General

Groundwater & Environmental Services, Inc. (GES), on behalf of Sunoco Pipeline L.P. (SPLP), has prepared this *Recovery Well Installation Work Plan for Glenwood Drive, Washington Crossing, PA 18977* for the SPLP Site located at the Intersection of Glenwood Drive and Walker Road, Upper Makefield Township, Bucks County, Pennsylvania. The objective of this Work Plan is to install three (3) recovery wells (RW-2, RW-3, RW-4) in the township easement of Glenwood Drive, Washington Crossing, PA 18977 as further described herein.

All activities will be performed in accordance with GES Standard Operating and Health and Safety Procedures. Proposed activities outlined in this plan will be conducted between the hours of 9:00 am and 5:00 pm, Monday through Saturday. The tasks of this investigation are detailed below. A Pennsylvania-licensed and GES-approved driller will be contracted to perform the work on-site. All work will be performed under the supervision of qualified GES staff and will be approved by a Pennsylvania-licensed Professional Geologist.

The following is a description of the proposed scope of work.

1.1 Site Overview

The Site is situated in a rural residential area in Upper Makefield Township, Bucks County, Pennsylvania at geographic coordinates 40.27033, -74.87508. In January 2025, SPLP identified a release of petroleum hydrocarbons (jet fuel) from a 14-inch diameter pipeline, which was subsequently exposed for repairs. During the initial rapid response, light non-aqueous phase liquid (LNAPL) from the release was detected on groundwater and Site investigation and remediation efforts were initiated.

1.2 Site Geology

The Site area is underlain by the Lockatong Formation (Trl), which is a Triassic-age, dark-gray to black argillite (a fine-grained sedimentary to weakly metamorphosed rock composed of indurated clay particles cemented by silica with no cleavage), having some zones of black shale and, locally, thin layers of impure calcareous shale, with a maximum reported thickness of approximately 3,800 feet. The reference section is along the Delaware River between Point Pleasant and Lumberville, Bucks County, Pennsylvania, approximately 15 miles northwest of the Site area. Bedding in the Lockatong is moderately well-developed and flaggy and thick. Joints have a blocky pattern, and are moderately developed, closely spaced, steeply dipping, and open. It is moderately resistant to weathering and is moderately weathered to a shallow depth, with small elongate and triangular fragments resulting from rapid hydration of minerals in exposed rock, with a moderately thick overlying mantle (Geyer and Wilshusen, 1982). There are no fractures or faults mapped in the immediate Site area; there are two synclines (valley-shaped bedrock structures) mapped 5-6 miles to the west of the area.

The local area is mapped as representative of good surface drainage, with joint openings providing a secondary porosity; both weathered and unweathered rock matrices have a low

primary porosity and low permeability. The average groundwater yield is 35 gallons per minute, with lithology being an important factor in well yield (Geyer and Wilshusen, 1982).

According to the September 26, 2023, United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey report, the Site area lies within the Uxb Urban land (65%) - Penn (25%) - other (10%) soil complex. This complex is described as having 0-8% slope, elevation of 200-1000 feet, and mean annual precipitation of 36-55 inches. The depth to bedrock is 10 to 100 inches, and the available water supply in the upper 0-60 inches is described as low to very low. The soil is derived from a parent material ranging from artificially covered areas to residuum weathered from shale and siltstone, is well-drained with very low runoff, and has a depth to water table of more than 80 inches.

2 Recovery Well Installation

2.1 Pre-Drilling Protocol

The Pennsylvania One-Call Public Utility mark-out service (PA One-Call) will be contacted prior to performing any subsurface investigative activities at the Site to renew the mark-out of public utilities initially conducted in April 2025. The PA One-Call service identifies the locations of the subsurface public utilities (electric, natural gas, water, telephone, etc.), but not the private utilities for which they are not responsible. A private subsurface utility survey was conducted on Glenwood Drive by Stantec on April 8-9, 2025. The locations of the private utilities and proposed recovery wells are depicted on **Figure 1**.

A 2-foot by 2-foot opening will be saw cut in the asphalt road surface at each borehole location. Each borehole will be hand-cleared via vacuum excavation or other hand tools to a minimum depth of five feet below ground surface (bgs) or refusal to ensure the borehole is clear of potential unidentified utilities or other subsurface features. The borehole shall be cleared a minimum of two inches in diameter larger than the drill bit to be used to allow for visual inspection of potential obstructions. Soil will be routinely screened with a photoionization detector (PID) during utility clearing activities and the GES scientist will characterize the soil according to the Unified Soil Classification System (USCS) by recording the color, composition, and moisture content on a drilling log. The GES Standard Operating Procedure (SOP) for subsurface clearance protocol is included in **Attachment 1**.

2.2 Soil Sampling

Up to two soil samples from each borehole may be collected for submittal for laboratory analysis using low-level methanol sampling test kits to document soil quality at the boring location. At a minimum, one soil sample will be collected from the soil/bedrock interface or from the soil/groundwater interface, whichever is first encountered. One additional soil sample will be collected from the soil column at the interval eliciting the highest PID response (i.e., anything greater than 20 parts per million-volume). The GES SOPs for soil sampling and soil screening are included in **Attachment 1**.

The soil samples will be transported under proper chain-of-custody documentation to Pace Laboratories. Soil samples will be analyzed for the PA Department of Environmental Protection (DEP) Leaded / Unleaded gasoline / Aviation Fuel parameters benzene, toluene, ethylbenzene,

and total xylenes (BTEX), methyl tert-butyl ether (MTBE), isopropylbenzene, naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, 1,2-dichloroethane (EDC), and ,2-dibromoethane (EDB) via United States Environmental Protection Agency (USEPA) Method 8260D, and total lead USEPA Method 6010. The laboratory accreditation is provided as **Attachment 2**.

2.3 Findings: Borehole Geophysics and Routine Gauging

A downhole geophysical survey was completed in the potable well at [redacted] Glenwood Drive on February 10, 2025. The potable well is located approximately 240 southwest of the nearest proposed recovery well location and 320 feet southwest of the farthest proposed recovery well location (**Figure 1**). The following are notable features identified from the borehole geophysics conducted on the potable well at [redacted] Glenwood Drive:

- The total depth of the well was measured at approximately 141.0 feet below "top of casing" (TOC).
- The depth to water was measured at 28.9 feet below TOC at the beginning of the survey.
- The diameter of the casing at the surface was measured to be nominally 6 inches, and the bottom of the casing was located at approximately 29.8 feet below TOC.
- The caliper log showed notable enlargements due to fracturing centered near 32.0, 45.5, 67.5, 79.0, and 131.5 feet below TOC.

The Rettew Borehole Geophysics report is provided as **Attachment 3**. Well gauging at the potable well is conducted on a near daily frequency. The depth to water measured in the potable well ranges from 24.44 feet to 34.12 feet below TOC.

The findings provided above support installing the recovery wells to a maximum targeted depth of approximately 70 feet bgs at the locations shown on **Figure 1**. Based on the findings during borehole advancement, the depth of the well may be modified in the field.

2.4 Well Installation

A well permit application has been approved by Bucks County Department of Health (**Attachment 4**). The well permit from Upper Makefield Township is pending. The general recovery well installation scope of work is summarized as follows:

- The recovery wells will be constructed with 4-inch diameter Sch. 40 polyvinyl chloride (PVC) solid casing from the asphalt road surface grade to a depth of approximately 8 feet below grade, with threaded-coupled 4-inch diameter, 0.020-inch slot Sch. 40 PVC well screen from a depth of approximately 8 feet below grade to the completed well depth.
- The drilling technique will be air rotary.
- A nominal 8-inch diameter borehole will be drilled to a depth of approximately 10-15 feet bgs (at least 2 feet into bedrock) using air rotary drilling technology and, if needed, a temporary steel casing will be installed to hold the overburden and preclude bore collapse while the remainder of the well is completed. Following well completion, the temporary steel casing, if needed, will be removed.

- During drilling activities, the GES scientist will characterize the soil according to the USCS by recording the color, composition, moisture content, and lithology on a drilling log.
- Soil/drill cuttings will be screened with a PID to determine the relative presence or absence of volatile organic compounds (VOCs).
- RW-2, RW-3, and RW-4 will be finished as flush mount wells with a 12-inch diameter, traffic-rated steel, bolt-down cover. The PVC casing inside the traffic box will also be fitted with a water-tight locking gripper plug to prevent incursion of surface water into the well.
- A 2-foot by 2-foot concrete pad will be constructed around the flush mount well covers at each recovery well location, and will be sloped to match the asphalt surface grade to allow for runoff of surface water and preserve the integrity of the concrete and surrounding asphalt.
- Water from an approved source will be utilized during drilling, if necessary. The source of the water is from the private water well from the well driller's facility. It is not anticipated that a significant volume of water will be required, but it may be necessary to prevent dust generation. The laboratory analytical results are included as **Attachment 5**.
- Upon completion, the driller will submit the drilling records to the Pennsylvania Department of Conservation and Natural Resources.

GES SOPs for well drilling and well development are included in **Attachment 1**. A schematic of the recovery well construction is included in **Attachment 6**.

2.5 Domestic Supply Well Monitoring

Per discussions between PADEP and SPLP on April 21, 2025, nearby domestic supply wells located on Glenwood Drive and Walker Road will be monitored during the drilling activities outlined in this plan, if landowner consent and access is provided. Liquid level data will be recorded for each domestic well monitored. An interface probe will be used to record liquid level data twice per day at one location on Glenwood Drive and twice per day at one location on Walker Road. In addition, water may be collected from various domestic well locations on Glenwood Drive and Walker Road on a routine basis with a bailer for visual inspection. However, it should be noted that due to spacers and/ or wire guards existing in certain domestic wells, a bailer may not be deployed for visual inspection. Additionally, during drilling, a potable well at a property on Glenwood Drive will be gauged with an interface probe every 2-4 hours, if landowner consent and access is provided. Data obtained from domestic well monitoring will be documented accordingly. SOPs for water level gauging and visual inspections are in **Attachment 1**.

Lastly, transducers will be deployed in a former domestic supply well on Spencer Road and in RW-1 (also located on Spencer Road) during drilling activities outlined in this plan.

2.6 Air and Noise Monitoring

Outdoor air monitoring and sampling and noise monitoring will be implemented at properties in the Mt. Eyre Manor neighborhood during the drilling activities outlined in this plan. Air monitoring and sampling and noise monitoring will generally occur along the perimeter of the Properties, primarily between the area where recovery well installation activities will occur (the work area)

and nearby residences. The objectives and scope are more fully detailed in Plan included in **Attachment 7**.

2.7 Surveying

The elevation and location of the newly installed recovery well will initially be recorded using a Trimble GPS unit. Following the well installation activities, a professional surveyor licensed in the Commonwealth of Pennsylvania will collect the horizontal datum utilizing the Pennsylvania State Plane Coordinates, North American Datum (NAD) 83, South Zone recorded to the nearest 0.1 foot and the vertical ground surface and top-of-casing (TOC) elevations utilizing North American Vertical Datum (NAVD) 88 recorded to the nearest 0.01 foot.

2.8 Well Development Procedures

The newly installed recovery wells will be properly developed based upon the groundwater conditions encountered, typically 24 hours after the surface pad and outer protective casing are installed. RW-2, RW-3, and RW-4 will be developed by the drilling contractor during installation to remove the residual materials remaining in the well after installation has been completed, and to try to re-establish the natural hydraulic flow conditions which may have been disturbed by well construction, around the immediate vicinity of the well. Liquids produced during well development will be managed as noted in Section 2.8. The SOP for well development is in **Attachment 1**.

2.9 Investigation-Derived Waste Management

Construction debris, soil, and drill-cuttings generated during well installation activities will be containerized in Pennsylvania Department of Transportation (DOT)-approved, steel 55-gallon drums for disposal in accordance with the Waste Management Plan dated February 26, 2025. A vacuum truck will be on-Site to assist with the removal of groundwater from the containment area. The vacuum truck will take the waste off-site to a designated facility at the completion of the well installation. All available laboratory analytical data will be provided to prepare the waste profile for the vacuum truck, which will be signed as Generator Knowledge. All waste generated during well installation activities will be transported off-Site for disposal at a PADEP permitted waste facility as outlined in Waste Management Plan (**Attachment 8**).

2.10 Health, Safety, and Security

All field activities will be conducted in accordance with the site-specific Health and Safety Plan (HASP) prepared by GES for this site (**Attachment 9**). GES personnel engaged in on-Site activities will have the training necessary to perform each of the prescribed tasks. Familiarity with the guidance documents and standards listed below is required prior to engaging in on-Site activities:

- Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Standard (OSHA 29CFR1910.120)
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985) (NIOSH/OSHA/USCG/EPA)

- Health and Safety Requirements for Employees Engaged in Field Activities (EPA Order 1440.2)

Safety measures will be implemented to manage traffic and pedestrian flow during well installation activities, including contracting a traffic control flagger team. Road opening permits will be obtained prior to commencement of the well installations. Clear and safe routes of personnel ingress and egress will be established by work zone separation, visibility, signage, barriers (including sound barriers), training, and communication. A Traffic Plan dated April 11, 2025 is included as **Attachment 10**.

A clearly demarcated work zone will be utilized to restrict unauthorized access. The only personnel that should be in the immediate work zone near the drill rig are the drilling company and GES support personnel. Warning signs that indicate potential hazards and safety protocols, as well as emergency contact information, will be posted at prominent locations at the work zone. All other personnel near the work zone must remain at least 10 feet away from the immediate work area in the event that person does not have the proper training certifications or personal protective equipment (i.e., steel toe boots, hearing protection, etc.). Crossing into the immediate work area is considered a breach of security.

Daily health, safety, and security meetings will be conducted to review training, standard operating procedures, job hazard analysis, work scopes, and hazard communication. The equipment will remain staged at the borehole until drilling is complete. All equipment within the work zone will be secured overnight to prevent theft or unauthorized use. The vacuum truck will depart site each day.

3 References

Geyer, A.R., and J.P. Wilshusen. 1982. *Engineering Characteristics of the Rocks of Pennsylvania, Second Edition*, Pennsylvania Geologic Survey, Harrisburg, PA.

United States Department of Agriculture, Natural Resources Conservation Service. September 26, 2023. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Figure

Stantec

Legend

Approximate Utility Locations
- Communications
- Electric
- Underground Piping

Proposed Recovery Well Locations

N

0 20 40 60 Feet
(At original document size of 11x17)
1 in = 60 feet

Notes

1. Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
2. Data Sources: Stantec
3. Background: USGS Topo Layers (TMN): USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road data; Natural Earth Data; U.S. Department of State HIU; NOAA National Centers for Environmental Information. Data refreshed February, 2025.
Nearmap WMS Server:

Project Location
Upper Makefield Township,
Bucks County, PA

Prepared by GWC on 2025-04-10
TR Review by XXX on 2025-xx-xx
IR Review by XXX on 2025-xx-xx

Client/Project 195603566
Energy Transfer Marketing & Terminals L.P.
ET Washington Crossing

Figure No.
1

Title
Subsurface Utility Survey Map and Proposed Recovery Well Locations

\\us0245-prfss01\shared_projects\195603566\03_data\gis_cad\gis\PRO\utilities map.aprx Revised: 2025-04-10 By: GCurry

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.