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December 27, 2022
File No. 03.0033554.04

Via E-Mail

Mr. Joseph Martella
Rhode Island Department of Environmental Management (RIDEM)
Office of Land Revitalization and Sustainable Materials Management
235 Promenade Street
Providence, Rhode Island 02908

Re: Replacement Monitoring Wells Installation Work Plan
642 Allens Avenue
Providence, Rhode Island
RIDEM Case No. 98-004 / Site Remediation File No. SR-28-1152

Dear Mr. Martella:

On behalf of National Grid LNG LLC (National Grid), GZA GeoEnvironmental, Inc. (GZA) is pleased to present to the Rhode Island Department of Environmental Management (RIDEM) this *Replacement Monitoring Wells Installation Work Plan* for the Former 642 Allens Avenue Manufactured Gas Plant (MGP) located at 642 Allens Avenue in Providence, Rhode Island (the Site). National Grid LNG LLC is the tenant to The Narragansett Electric Company (TNEC) d/b/a Rhode Island Energy and is reinstalling certain wells that were decommissioned in 2016 to accommodate onsite project activities. Specifically, this Work Plan focuses on replacing wells located within the Fields Point Liquefier Project (FPLP) Short Term Response Action (STRA) work area.

BACKGROUND

The Site consists of approximately 41 acres of land located within an industrial waterfront area, with frontage on Allens Avenue to the west, and bounded to the north, northwest and east by the Providence River. The Site was the location of a former MGP and is currently occupied by an active natural gas regulating station, liquefied natural gas (LNG) storage and distribution facility, natural gas operations facility, and a cement storage and distribution facility.

As presented in the November 16, 2016 *Completion of Monitoring Well Decommissioning and Upcoming Groundwater Monitoring Activities Letter*, monitoring well closure activities were conducted between June 27, 2016 and July 9, 2016. As part of this work, National Grid decommissioned forty-two (42) of the seventy-four (74) available monitoring wells located at the Site: RCA-3, RCA-5, RCA-11, RCA-14, RCA-20, RCA-29, RCA-32, RCA-33, RCA-38, RCA-40, VHB-3, VHB-6, VHB-7, VHB-8R, VHB-10, VHB-13, VHB-18, VHB-21, VHB-22, VHB-23, CHES RW-1, CHES RW-2, CHES RW-3, CHES RW-4, CHES RW-5, RW-1, ESS RW-1, ESS RW-2, U-1, GZ-204, GZ-216, GZ-311D, GZ-312D, GZ-312S, GZ-313D, GZ-314D, GZ-314S, GZ-315D, GZ-318D, GZ-320D, GZ-401, and GZ-403. Two (2) inactive monitoring wells (RCA-7 and RCA-13) were also decommissioned during this effort. The wells were decommissioned by Geologic Earth Exploration, Inc. of Norfolk, Massachusetts.

Consistent with Rhode Island Water Quality Regulations (<https://rules.sos.ri.gov/regulations/part/250-150-05-3>), the monitoring wells were decommissioned by splitting or removing the PVC well casing and then filling the remaining borehole with grout. On behalf of TNEC, five (5) monitoring wells (GZ-500S, GZ-500D, GZ-501S, GZ-502S, and GZ-503S) were subsequently installed on Site from September 14 to September 15, 2021 by New England Geotech via geoprobe drilling techniques, to replace the seven (7) monitoring wells within the former Holder 18/21 area (RCA-11, VHB-8R, VHB-10, VHB-18, GZ-320D, GZ-401, and GZ-403). The current annual groundwater monitoring program includes collection of groundwater elevation readings from thirty-six (36) groundwater wells across the Site and the collection of groundwater quality samples from seventeen (17) monitoring wells: RCA-1, RCA-12R, RCA-15, RCA-22, RCA-31, RCA-36, VHB-1, VHB-20, GZ-201, GZ-301D, GZ-304D, GZ-309D, GZ-319D, GZ-500S, GZ 500D,



GZ-501S, and GZ-502S. These well locations were chosen to provide a representative evaluation of overall Site groundwater quality.

This Work Plan describes the installation of replacement monitoring wells VHB-3, GZ-311D, VHB-21, GZ-318D, RCA-3, GZ-313D, RCA-5, GZ-315D, and VHB-22 within the FLP laydown and STRA work area. These locations were selected based on current access in consideration of the status of on-going facility upgrade projects. Previous Site investigations and response actions¹, as well as spatial representation were also considered in selecting these locations.

PROPOSED SCOPE OF WORK

Nine (9) replacement monitoring wells will be installed (VHB-3R, GZ-311DR, VHB-21R, GZ-318DR, RCA-3R, GZ-313DR, RCA-5R, GZ-315DR, and VHB-22R) as shown on the attached **Figure 1, Replacement Monitoring Well Location Plan**. **Table 1, Proposed Replacement Monitoring Wells**, presents the proposed method of installation, anticipated depth and screen interval, and the general location for each well. Please note that based on field conditions and the results of utility clearance, the monitoring well locations shown on **Figure 1** may require modification. As these are replacement monitoring wells, no analytical testing for soil is proposed.

Prior to performing these well installations, GZA will conduct Site reconnaissance to coordinate DigSafe® clearance and to visually evaluate access restrictions. GZA will also subcontract ground penetrating radar (GPR) services in the areas of planned well locations and coordinate with National Grid to evaluate the locations with the layout of known utilities and other possible historical features.

As shown on **Figure 1**, the nine (9) replacement monitoring wells are planned to replace selected decommissioned monitoring wells and to supplement existing monitoring well coverage at the Site.

As presented in **Table 1**, borings VHB-3R, VHB-21R, RCA-3R, RCA-5R, and VHB-22R will be advanced to a depth of 15 feet bgs, borings GZ-311DR and GZ-315DR will be advanced to 30 feet bgs, and borings GZ-318DR and GZ-313DR will be advanced to 35 feet bgs. Borings will be performed via geoprobe drilling techniques with dedicated continuous sampling sleeves. Soil samples in sleeves will be collected in two-foot increments during the advancement of the borings. A GZA field engineer will be on the Site to record boring activities, collect samples for field screening and characterization, and complete boring logs at each location. The recovered soil from each sample interval will be logged using modified Burmeister classification system, field-screened for presence of total volatile organic compounds (TVOCs) with a Photoionization Detector (PID) and evaluated for the presence of staining and odors. GZA will also perform photo-documentation of each soil sampling interval.

The wells will be constructed of 2-inch diameter Schedule 40 PVC in accordance with standards specified in Rhode Island Water Quality Regulations (<https://rules.sos.ri.gov/regulations/part/250-150-05-3>) to a total depth of approximately 15 feet bgs (shallow wells – VHB-3R, VHB-12R, RCA-3R, RCA-5R, VHB-22R) or 30-35 feet bgs (deep wells – GZ-311DR, GZ-318DR, GX-313DR, GZ-315DR). For each shallow well, the screen will be set to span the natural water table encountered during drilling (typically within the fill unit or underlying sand unit – currently assumed to be approximately 10 to 12 feet bgs). For the deep well, the screen will be set with midpoint at least 10 feet below the natural water table encountered during drilling. A sand filter pack will be installed in the annular space around the well screen and extended approximately 1 foot above the well screen. An approximate 1-foot (minimum) bentonite seal will be placed above the filter pack and the remaining borehole above the bentonite will be backfilled with clean filter sand. A concrete surficial seal with a protective standpipe will be installed to protect the wells.

The newly installed wells will be developed to remove sediment build-up. This process will be performed by surging a bailer repeatedly the length of the well screen followed by the removal of at least ten (10) standing water column volumes. Groundwater will be removed via a combination of bailing and pumping techniques. During development, GZA will monitor

¹ For details regarding the previous Site investigations and response actions completed at the Site, hydrogeologic setting and observed impacts, please refer to the February 1995 *Summary Report Phase 1A Field Investigations* prepared by Resource Controls Associates (RCA), April 2003 *Site Investigation Report (SIR)* prepared by VHB, the January 2009 *Oxide Box Waste Summary Memo* prepared by VHB, the April 27, 2016 *Short Term Response Action Plan (STRAP)– Holder 18/21 Capping Project* prepared by GZA, the May 10, 2016 *STRAP Addendum – Holder 18/21 Capping Project* prepared by GZA, the May 12, 2017 *STRAP – Field Point Liquefaction Project* prepared by GZA, and the October 11, 2017 *STRAP Addendum –Liquefaction Project* prepared by GZA.



the turbidity of the extracted water to evaluate the effectiveness of the development activities. Well development will continue until the water quality is reasonably non-turbid or until the minimum purge volume is achieved.

The down-hole drilling tools and samplers will be decontaminated between each sample interval with a minimum of potable water and Alconox® detergent.

Soil cuttings, wash water (i.e., decontamination water), and well development water generated during drilling will be field-screened for total volatile organic compounds (VOCs) with a PID and then placed in 55-gallon drums for subsequent characterization and off-site disposal at an appropriate licensed facility.


GZA will prepare a Site-specific HASP for this exploration work that addresses the applicable requirements of 29 CFR 1910.120 and 1926.65 to cover field activities performed as part of this investigation program. These procedures will be followed to be protective of worker safety as well as safety to nearby receptors. Prior to well installation operations, an exclusion zone will be set-up around the drilling rig operation to limit access to the work area. This exclusion zone will be maintained and modified as needed during the work activities. Spoils from the drilling activities will be immediately containerized within labeled and sealed 55-gallon drums for disposal off-site at an appropriate licensed facility.

We anticipate that the work described herein will be performed during Winter 2023 and that the newly installed monitoring wells will be sampled as part of the Fall 2023 annual groundwater sampling round at the Site.

Should you have any questions or comments regarding the information presented herein, please do not hesitate to contact the undersigned or Drew Shelby from National Grid at 508-243-3962.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.


Anders Brandon
Scientist II


Igor Runge, PhD
Consultant/Reviewer


Margaret S. Kilpatrick, P.E.
Principal

Attachments: Figure 1 - Proposed Replacement Monitoring Well Location Plan
Table 1 - Proposed Replacement Monitoring Wells

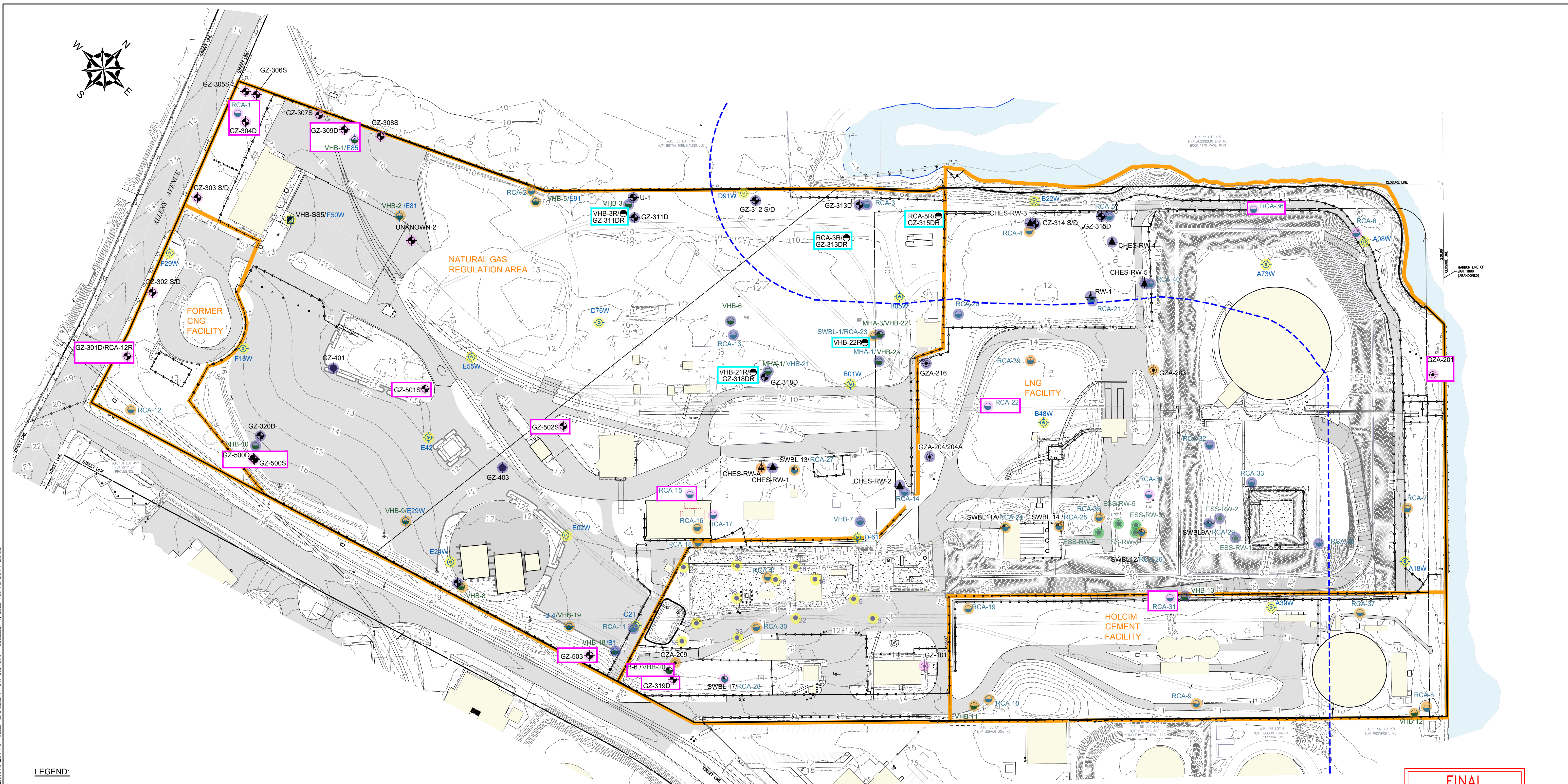
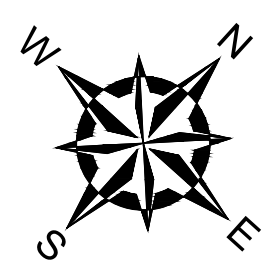
cc: Amy Willoughby – Rhode Island Energy
Drew Shelby – National Grid

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FIGURE 1

PROPOSED REPLACEMENT MONITORING WELL LOCATION PLAN



LEGEND:

	PROPERTY LINE
	SITE AREA BOUNDARY
	INTERIOR PROPERTY LINE
	EXISTING BUILDING
	UTILITY POLE
	STEEL POST
	LIGHT POLE
	EDGE OF WATER
	FENCE
	RAILROAD TRACKS
	EXISTING CONTOUR (MAJOR 5 FOOT INTERVAL)
	EXISTING CONTOUR (MINOR 1 FOOT INTERVAL)
	PAVEMENT
	CONCRETE
	200 FOOT CRMC JURISDICTIONAL LIMIT

MONITORING WELL LEGEND:

	GZ-500 S/D	MONITORING WELL INSTALLED BY GZA IN 2021
	GZ-401	MONITORING WELL INSTALLED BY GZA IN 2015
	GZ-314 S/D	MONITORING WELL INSTALLED BY GZA IN 2014
	GZA-206	MONITORING WELL INSTALLED BY GZA IN 2005
	VHB-7	MONITORING WELL INSTALLED BY VHB IN 2002 AND 2003
	F47	TEMPORARY WELL POINT INSTALLED BY ESS IN 1999 AND 2000
	1	TEMPORARY WELL POINT INSTALLED BY ESS IN 1999
	RCA-40	MONITORING WELL INSTALLED BY RCA IN 1996
	CHES-RW-A	RECOVERY WELL INSTALLED BY CHES OBSERVED BY GZA IN 2017
	RW-1	RECOVERY WELL INSTALLED BY CHES OBSERVED BY GZA IN 2014
	CHES-RW-1	RECOVERY WELL INSTALLED BY CHES OBSERVED BY VHB IN 2002
	ESS-RW-1	RECOVERY WELL INSTALLED BY ESS IN 1999 AND 2000
	GZ-311R	PROPOSED REPLACEMENT MONITORING WELL

MONITORING WELL LEGEND CONTINUED:

	ACTIVE MONITORING WELLS
	DECOMMISSIONED OR DESTROYED MONITORING WELLS (PRE-2016)
	2016 DECOMMISSIONED MONITORING WELLS
	TEMPORARY MONITORING WELL-ASSUMED DESTROYED
	RECOVERY WELLS
	MONITORING WELL SAMPLED IN 2021
	PROPOSED REPLACEMENT MONITORING WELL

NOTES:
THIS SHEET IS SUBJECT TO SHEET N1 GENERAL NOTES.

FINAL
ISSUED FOR PERMITTING

0 40 80 160 240
SCALE IN FEET 1" = 80'

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NATIONAL GRID			
MONITORING WELL REPLACEMENT PROGRAM			
642 ALLENS AVE PROVIDENCE, RHODE ISLAND			
REPLACEMENT MONITORING WELL LOCATION PLAN			
PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		nationalgrid	
PROJ MGR: MSK	DESIGNED BY: AB	REVIEWED BY: MSK	CHECKED BY: JJC
DATE: DECEMBER, 2022	DRAWN BY: LDT	PROJECT NO: 33554.01	SCALE: AS NOTED
		REVISION NO: 0	DRAWING
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2022 - GZA GeoEnvironmental, Inc. GZA-PA-RW-33554.01_SIN(DIGRES)CAD(DWG)33554.01_REPLACEMENT MONITORING WELLS REPLACEMENT PLAN-2021.DWG 1 DECEMBER 1, 2022 1:38 PM USA THERMAL



TABLE 1

PROPOSED REPLACEMENT MONITORING WELLS

Table 1 Proposed Replacement Monitoring Wells642 Allens Avenue
Providence, Rhode Island

Job No. 03.0033554.01

11/17/2022

Proposed Exploration Number	Type of Exploration	Method of Installation	Expected Depth of Exploration	Expected Depth of Screening	General Location / Purpose
VHB-3R	Replacement Shallow Monitoring Well	Geoprobe	15 feet bgs	5-15 feet bgs	Replacement monitoring well for VHB-3
GZ-311DR	Replacement Deep Monitoring Well	Geoprobe	30 feet bgs	20-30 feet bgs	Replacement monitoring well for GZ-311D
VHB-21R	Replacement Shallow Monitoring Well	Geoprobe	15 feet bgs	5-15 feet bgs	Replacement monitoring well for VHB-21
GZ-318DR	Replacement Deep Monitoring Well	Geoprobe	35 feet bgs	25-35 feet bgs	Replacement monitoring well for GZ-318D
RCA-3R	Replacement Shallow Monitoring Well	Geoprobe	15 feet bgs	5-15 feet bgs	Replacement monitoring well for RCA-3
GZ-313DR	Replacement Deep Monitoring Well	Geoprobe	35 feet bgs	25-35 feet bgs	Replacement monitoring well for GZ-313D
RCA-5R	Replacement Shallow Monitoring Well	Geoprobe	15 feet bgs	5-15 feet bgs	Replacement monitoring well for RCA-5
GZ-315DR	Replacement Deep Monitoring Well	Geoprobe	30 feet bgs	20-30 feet bgs	Replacement monitoring well for GZ-315D
VHB-22R	Replacement Shallow Monitoring Well	Geoprobe	15 feet bgs	5-15 feet bgs	Replacement monitoring well for VHB-22