June 5, 2020

Robert Dunn
State of South Carolina
Department of Health and Environmental Control
Bureau of Land & Waste Management
Underground Storage Tank Management Division
2600 Bull Street
Columbia, South Carolina 29201

ATC - An Atlas Company

7499 Parklane Road
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Columbia, SC 29223

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RE: Corrective Action Plan
Circle K Store # 2720886
(Release # 4 reported 8/2/2018)
4315 Savannah Highway
Ravenel, Charleston County, South Carolina
Site ID # 01589
ATC Project No. CIRK088611

Dear Mr Dunn:

ATC, at the request of Circle K Stores, Inc. is submitting the enclosed Corrective Action Plan for groundwater remediation at site # 01589, Circle K store # 2720886, Ravenel, SC, related to the release reported on 8/2/2018 An Underground Injection Control Permit package is included and has also been provided separately to the SCDHEC Bureau of Water. If you have any questions or require additional information, please contact Fred Lyke or Brad Hubbard, at (803) 735-0003.

Sincerely,

ATC – An Atlas Company

H. Brad Hubbard, P.G.
Project Manager

cc: Mr Alan Cubberly, Circle K Stores, Inc.
SCDHEC Stakeholder Distribution List

Corrective Action Plan

Circle K Store # 2720886
UST Site # 01589
4315 Savannah Highway
Ravenel, South Carolina 29470

Submitted for:

Circle K Stores, Inc.
1100 Situs Court, Suite 100
Raleigh, NC 27606

Submitted by:
ATC –An Atlas Company
7499 Parklane Road, Suite 112
Columbia, SC 29223
803-735-0003
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Corrective Action Plan
Circle K Store # 2720886
4315 Savannah Highway,
Ravenel (Charleston Co.), SC
UST ID # 01589, Release 4, CA # 57799
ATC Project #CIRK088611

H. Brad Hubbard, PG
Sr. Project Geologist
Brad.Hubbard@atcgs.com

Fred Lyke, P.G.
Branch Manager
Fred.Lyke@atcgs.com

June 5, 2020

Submitted to:

South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management
UST Management Division
Corrective Action Section
2600 Bull Street
Columbia, South Carolina 29201

On Behalf of:

Circle K Stores, Inc.
Attn: Brent Puzak
1100 Situs Court, Suite 100
Raleigh, North Carolina 27606

Submitted By:

ATC – An Atlas Company
Suite 112
7499 Parklane Road
Columbia, SC 29223
Phone: (803) 735-0003
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Underground Storage Tank Site Rehabilitation Contractor Certification No. 313

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1.0 INTRODUCTION

ATC Group Services, LLC (ATC) has prepared this Corrective Action Plan (CAP) for the Circle K Store # 2720886 site, located at 1435 Savannah Highway, in Charleston County, South Carolina (UST Site # 01589). The CAP was developed pursuant to awarding of the active correction action contract between Circle K Stores, Inc. (Circle K) and SCDHEC (cost agreement # 61117). This CAP is intended to address the remediation of free-phase gasoline product and petroleum-impacted groundwater at the site.

1.1 Site Information

A site topographic location map is presented as ***Figure 1*** and a site map with current monitoring and recovery wells is presented as ***Figure 2***. The facility has historically transacted as a convenience store distributing retail gasoline and diesel fuel. The subject property is owned by the *Gregorie Land Company, LLC* (P.O. Box 248, Mount Pleasant, SC 29465-0248; Telephone: (843) 884-4153). The site is located in the southwestern quadrant of the intersection between Savannah Highway (U.S. Highway 17) and South Carolina Highway 162, east of Ravenel, in Charleston County, SC. The properties located immediately adjacent to the subject property have been commercially developed or remain wooded. According to the SCDHEC UST registry database, the release has a South Carolina Risk-Based Corrective Action (SCRBCA) risk classification score of 1E, based on the presence of free product on surface water in the immediate vicinity.

The site is situated in the lower Coastal Plain physiographic province and is at an estimated elevation of 20 feet above mean sea level. The site has no apparent slope. It is situated approximately 2,000 feet south and southwest of Wallace River, a sensitive ecological zone estuary. Based on the Tier II Assessment data, site soils are dominantly fine to medium sand, slightly silty and clayey in layers. The water table occurs at depths

of one to three feet across the site, and shallow groundwater flow is to the northwest. Utilities available to the site vicinity include water and sewer service. Natural gas and telecom utilities are also along Savannah Highway. It is assumed these are within the saturated zone of the water table in the site vicinity. Although public water service is available, there are a number of in use potable and non-potable wells in an approximately 2,000-foot radius of the site, primarily to the northwest, west and southwest.

1.2 Release Investigation History

Information available in the SCDHEC Underground Storage Tank (UST) Registry database indicates that four (4) USTs have been in operation at the site since 1/1/90. Three (3) USTs exhibiting storage capacities of 10,000 gallons each, store regular unleaded gasoline, premium-grade unleaded gasoline and diesel fuel. A single 6,000 gallon UST stores medium-grade unleaded gasoline. According to data available in the SCDHEC UST Registry, four (4) petroleum releases at the site have been documented. Petroleum release #1 was confirmed on 12/31/91 and received a No Further Action (NFA) designation on 8/29/94. Petroleum release # 2 was confirmed on 2/10/94 and received an NFA designation on 9/27/07. A third petroleum release at the site was assigned on 2/26/18. This release received an NFA on 11/2/18.

Following a significant precipitation event on 08/02/18, suspected gasoline product was identified in the grassed median between northbound and southbound U.S. Highway 17 northwest of the subject property. Suspected gasoline was additionally observed filling cracks in the asphalt of both the southern and northern shoulders of the southbound lane of U.S. Highway 17. Circle K retained ATC to perform emergency abatement measures, and by 08/28/18, approximately 1,270 gallons of product and over 20,000 gallons of petroleum-impacted water had been recovered from shallow sumps installed on the site, and from stormwater drains located in the highway median, and pooled product on the western edge of the highway. On 08/08/18, tank tightness testing performed on the UST System operating at the site determined that the gravity-fed

remote fill lines supplying the regular and mid-grade unleaded gasoline USTs and the diesel fuel UST had lost integrity. In accordance with the SCDHEC directive of 08/21/18, ATC performed a Tier II Assessment of the release. The results of investigation were submitted in the Tier II Assessment Report of 12/21/18.

For the Tier II Assessment, a total of 57 screening points were installed to attempt to delineate the free-phase and dissolved contamination in shallow groundwater. An additional eight soil samples were collected to assess soil conditions. As a result of screening, a total of 31 shallow (Type 2) monitoring wells, three deep cased (Type 3) monitoring wells, and six 4-inch diameter recovery wells were installed. The assessment indicated that the flow of groundwater in the upper (shallow) portion of the surficial aquifer was to the northwest, at a relatively flat gradient (0.012 feet per foot) Depth to the water table ranged from 1.3 to 7.6 feet below grade. The potentiometric flow in the lower portion of the surficial aquifer was determined to be to the northeast, at a gradient of 0.031 feet per foot. Seepage velocities were calculated as 2.76 feet/year to the northwest for the shallow portion of the surficial aquifer and 3.04 feet/year for the lower portion of the surficial aquifer. Soil in the upper portion was predominantly slightly silty and clayey sand. In the deeper portion, the percentage of sand relative to silt and clay was even higher. Free phase product was detected in wells 01589 MW-6 (2.3 ft.), 01589 RW-5 (2.8 ft.), and 01589 RW-6 (3.11 ft.). Chemicals of Concern (CoCs) in groundwater above SCDHEC risk-based screening levels (RBSLs) included benzene, toluene, ethylbenzene, total xylenes, naphthalene, MtBE, tert-Butyl alcohol (tBA), tert-Amyl alcohol (tAA), ethyl-tert Butyl ether (EtBE), and ethyl alcohol (ethanol). The lateral extent of dissolved CoCs above RBSLs was delineated by the well network, and with the exception of benzene in deep well 01589 DW-1, the vertical extent was delineated. Surficial water samples were collected from nine established sampling points in and around the site, including standing pooled water and natural water courses. One of these (SW-4) was found to contain benzene above its RBSL. This sample location is standing water approximately 200 feet north of the site. The other eight sample locations did not contain detectable levels of CoCs.

In conjunction with the Tier II Assessment, private water wells within an approximately 2,000-foot radius of the site identified by SCDHEC personnel were sampled following permission from the owners. These wells, identified as WSW-1 through WSW-29, were variously sampled on 8/17/18 through 8/29/18, 9/27/18, 10/31/18 and 11/9/18. Results have indicated that no CoCs have been detected in any of these wells. A presentation of the wells' location and ownership is included in ***Table 1***.

In conjunction with, and following the completion of the Tier II Assessment, there was as-needed vacuum skimming of any residual product atop standing water on the western side of US Highway 17, as well as monitoring and replaced of oil absorbent booms. ATC performed an aggressive fluid/vapor recovery (AFVR) treatment at SCDHEC's request on 12/17/18, resulting in the removal of 266 gallons of product.

Subsequent to the Tier II Assessment, SCDHEC, on 01/21/19 issued a directive for additional assessment and installation of recovery wells, followed by multiple AFVR events. Seven additional shallow monitoring wells were installed, as well as an additional six recovery wells. AFVR events were performed on several recovery and monitoring wells within the US Highway 17 median on the following dates: 1/25/19, 2/19/19, 3/4/19, 3/18/19, and 4/8/19, and in on-site wells on 3/14/19. A total of 2,234 gallons of product was removed during these six events, yielding the total free product removal effort since initiation of emergency abatement procedures at 3,503 gallons.

Based on the findings to date, SCDHEC ranked the release as a category 1E, and determined that the next course of action was Active Corrective Action (ACA). SCDHEC, in consultation with Circle K, solicited performance-based lump sum bids for ACA from interested qualified UST contractors in a bid package dated 11/22/19. On 1/30/20, ATC was selected as the responsive winning contractor, and cost agreement no. 61117 was issued to Circle K for payment of ACA funding. Following acceptance of the contract, Circle K and SCDHEC directed ATC to perform a pre-ACA Groundwater Monitoring Event. This assessment was conducted in March of 2020, with results reported in the Initial Groundwater Monitoring Report dated 4/13/20. SCDHEC subsequently issued a Corrective Action Plan Notice To Proceed on 4/16/20.

1.3 Purpose of CAP

Previous assessments at the site had established the presence of potential receptors for soil and groundwater contamination at the site, including sensitive property usage, the presence of underground utilities, surface water features, potable and non-potable water wells, groundwater discharge areas, and possible future usage. The following significant findings were established:

- The site and surrounding properties have been established as commercial and residential.
- Significant free phase product remains in place beneath the site, extending north below both lanes of Savannah Highway, a dual lane arterial highway, and extending onto the northern shoulder of the highway. Due to the shallow water table, heavy precipitation has previously flushed product up to ground surface.
- There are permanent surface water features within approximately 100 feet of the site boundaries which have been impacted by the release, or have a high potential to be impacted in the future. There is a sensitive ecological receptor (Wallace River) situated 2,000 feet to the north and northeast.
- There are approximately 30 private water wells, both in use and out of service, within an approximately 2,000-foot radius of the site. It is believed that most obtain water from the Black Creek aquifer, below the influence of any groundwater impact derived from this release.
- No underground structures such as basements, cellars or vaults were identified on the site property or on adjacent properties. Utilities are located along US Highway17 along the northern edge of the site, and along the northern edge of the highway, and are within the saturated zone of the shallow water table. Stormwater drains and piping located in the median north and northeast of the site are known conduits for contaminant migration and these were the target of abatement activities.

SCDHEC established two corrective action goals for this release:

- Removal of measurable free product from all monitoring and recovery wells at the site, as well as removal of any remaining product from surface water features and stormwater systems.
- Remediation of dissolved levels of groundwater impact in specified wells at the site to meet and maintain target levels.

Using baseline sampling results submitted to SCDHEC from sampling conducted in July and August 2019, SCDHEC calculated dissolved constituent site-specific target levels (SSTLs) for chemicals of concern (CoCs) in monitoring wells, recovery wells, water wells and surface water sample locations to protect sensitive receptors. The SSTLs were published in the contract bid document and are represented on the following table, along with the baseline sampling results presented in the bidding document, and the results of the pre-corrective action sampling performed in March of 2020.

Well/Sample Location		B	T	E	X	M	N	tBA	tAA	Eth	EtBE
	SSTL	6	1,324	869	11,400	51	28	1,526	295	21,596	57
	BL	**17,700**	**40,400**	**2,290**	11,400	**1,850**	<250	<25,000	<25,000	<50,000	<2,500
01589 MW01	3/20	**19,300**	**44,200**	**2,460**	11,100	**1,890**	**342**	<25,000	<25,000	**84,400**	<2,000
	SSTL	5	1,144	775	9,250	45	26	1,453	264	14,610	51
	BL	**10,000**	**21,600**	**1,690**	9,250	**559**	**236**	<12,500	**16,200**	<25,000	<1,250
01589 MW02	3/20	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**
	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW03	3/20	1.8	<1	<1	<1	<1	<1	<100	<100	<200	<10
	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW04	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW05	3/20	<1	<1	<1	<1	<1	**16.9**	<100	<100	<200	<10
	SSTL	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP
	BL	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**
01589 MW06	3/20	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**
	SSTL	21	8,500	2,390	12,700	200	67	3,356	1,247	40,000	222
	BL	**9,210**	**34,100**	2,390	12,700	<200	**271**	<20,000	<20,000	<40,000	<2,000
01589 MW07	3/20	**10,600**	**37,800**	2,140	12,000	<250	**317**	<25,000	<25,000	<50,000	<2,500
	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW08	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW09	3/20	<1	0.46 J	<1	<1	1.7	<1	<100	<100	<200	<10
	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW10	3/20	<1	<1	<1	<1	<1	0.74 J	<100	<100	<200	<10
	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW11	3/20	<1	<1	<1	<1	<1	0.39 J	<100	<100	<200	<10

01589 MW12	SSTL	7	13	47	25	10	9	250	382	1,000	26
	BL	**410**	12.7	46.5	24.5	9.8	9.1	<250	**1,370**	<1,000	25.9
	3/20	**609**	**18.9**	**81.2**	**52.4**	**13.8**	**11.7**	<500	**1,140**	<1,000	**34.6 J**
01589 MW13	SSTL	7	20	490	1,630	5	30	500	334	1,000	100
	BL	**31.2**	19.5	490	1,630	<5	**164**	<500	<500	<1,000	<50
	3/20	**36.5**	16.6	439	1,290	<4	**234**	<400	<400	<800	<40
01589 MW14	SSTL	5	5	5	10	5	4	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	**4.1**	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW15	SSTL	7	1,534	870	4,850	50	29	1,758	352	10,000	73
	BL	**2,840**	**7,910**	**982**	4,850	<50	**120**	<5,000	**6,950**	<10,000	<500
	3/20	**1,020**	1,510	288	1,690	4.6 J	**36.8**	<1,250	**1,060 J**	<2,500	<125
01589 MW16	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW17	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW18	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW19	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW20	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW21	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW22	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW23	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	1.8	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	1.4	<1	<100	<100	<200	<10

01589 MW24	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	0.5 J	<1	<1	<1	0.55 J	<1	<100	<100	<200	<10
01589 MW25	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW26	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW27	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	0.71 J	<100	<100	<200	<10
01589 MW28	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW29	SSTL	5	5	5	10	7	5	100	100	1,000	100
	BL	2.2	<1	<1	<1	**7.4**	<1	<100	<100	<200	<10
	3/20	**10.4**	<1	<1	<1	**28.9**	<1	63.3 J	87.2 J	<200	8.8 J
01589 MW30	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW31	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	0.36 J	<1	<100	<100	<200	<10
01589 MW32	SSTL	13	9	10	17	11	2	200	284	1,000	100
	BL	**306**	**9.3**	9.7	**17.1**	**11.4**	<2	<200	284	<400	<20
	3/20	340	2.1	3.2	15.4	5.9	1.6 J	<100	181 J	<200	9.2 J
01589 MW33	SSTL	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP	NMFP
	BL	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**
	3/20	4,180	13,200	1,760	8,670	57.5 J	356	<12,500	<12,500	<25,000	<1,250
01589 MW34	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 MW35	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10

01589 MW36	SSTL	6	102	113	223	5	13	100	148	1,000	100
	BL	**14.5**	102	113	223	<1	12.9	<100	148	<200	<10
	3/20	1.3	10	59.9	67	<1	7.3	<100	<100	<200	<10
01589 MW37	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	0.65 J	<100	<100	<200	<10
01589 MW38	SSTL	74	5	5	2	11	5	100	138	1,000	100
	BL	73.6	<1	<1	**2.1**	**11.2**	<1	<100	138	<200	<10
	3/20	41.1	<1	<1	<1	3.1	1.5	<100	<100	<200	<10
01589 DMW01	SSTL	7	6	6	10	5	5	100	100	1,000	100
	BL	7.4	1.1	1.1	<1	<1	<1	<100	<100	<200	<50
	3/20	5.5	1.3	0.95 J	<1	0.49 J	<1	<100	<100	<200	<10
01589 DMW02	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 DMW03	SSTL	5	5	5	10	0.31 J	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 DMW04	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 DMW05	SSTL	5	5	5	10	5	5	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
	3/20	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 RW04	SSTL	3	5	5	10	5	5	100	100	1,000	100
	BL	**3.3**	<1	<1	<1	1.4	<1	<100	<100	<200	<10
	3/20	1.2	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 RW12	SSTL	5	1,144	556	5,080	45	26	1,453	264	10,000	51
	BL	**1,360**	**6,410**	556	5,080	**236**	**170**	<5,000	**5,030**	<10,000	<500
	3/20	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**	**FP**
01589 WSW12	SSTL	0.5	5	5	10	5	2	100	100	1,000	100
	BL	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<100	<100	<200	<10
01589 WSW13	SSTL	0.5	5	5	10	5	2	100	100	1,000	100
	BL	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<100	<100	<200	<10
01589 WSW15	SSTL	0.5	5	5	10	5	2	100	100	1,000	100
	BL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<100	<1
01589 WSW16	SSTL	0.5	5	5	10	5	2	100	100	1,000	100
	BL	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<100	<100	<200	<10

01589 SW01	SSTL	2	2	2	6	5	2	100	100	1,000	100
	BL	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01589 SW02	SSTL	2	2	2	6	5	2	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10
01589 SW03	SSTL	2	2	2	6	5	2	100	100	1,000	100
	BL	<1	<1	<1	<1	<1	<1	<100	<100	<200	<10

All units in micrograms per liter (ug/L)

SSTL –Site specific target level

BL –Baseline level concentration

3/20 – Pre-corrective action sampling event March 2020

FP – Free product present; NMFP – no measurable free product (SSTL)

NR – Not recorded (sample location dry)

J – Estimated concentration between detection limit and reporting limit

Values in red exceed the corresponding SSTL

Based on comparison with the pre-solicitation baseline sampling results, SSTLs are exceeded for the following chemicals of concern (reported in micrograms per liter):

Benzene

Well	Baseline	SSTL	Mass (µg/L) reduction required
01589 MW01	17,700	6	17,694
01589 MW02	10,000	5	9,995
01589 MW07	9,210	21	9,189
01589 MW12	410	7	403
01589 MW13	31.2	7	24.2
01589 MW15	2,840	7	2,453
01589 MW32	306	13	293
01589 MW36	14.5	6	8.5
01589 RW12	1,360	5	1,355

Total benzene reduction required, µg/L: 41,414.7

Toluene

Well	Baseline	SSTL	Mass (µg/L) reduction required
01589 MW01	40,400	1,324	39,076
01589 MW02	21,600	1,144	29,456
01589 MW07	34,100	8,500	25,600
01589 MW15	7,910	1,534	6,376
01589 RW12	6,410	1,144	5,266

Total toluene reduction required, µg/L: 105,774

Ethylbenzene

Well	Baseline	SSTL	Mass (µg/L) reduction required
01589 MW01	2,290	869	1,421
01589 MW02	1,690	775	825
01589 MW15	982	870	112

Total ethylbenzene reduction required, µg/L: 2,358

Xylenes (total)

Total xylenes reduction required, µg/L: 0

MtBE

Well	Baseline	SSTL	Mass (µg/L) reduction required
01589 MW01	1,850	51	1,799
01589 MW02	559	45	513
01589 RW12	236	45	191

Total MtBE reduction required, µg/L: 2,503

Naphthalene

Well	Baseline	SSTL	Mass (µg/L) reduction required
01589 MW02	236	26	210
01589 MW07	271	67	204
01589 MW13	164	30	134
01589 MW15	120	29	91
01589 RW12	170	26	144

Total naphthalene reduction required, µg/L: 783

Tert-Amyl Alcohol

Well	Baseline	SSTL	Mass (µg/L) reduction required
01589 MW02	16,200	264	15,936
01589 MW12	1,370	382	988
01589 MW15	6,950	352	6,598
01589 RW12	5,030	264	4,766

Total tert-amyl alcohol reduction required, µg/L: 28,288

Tert-Butyl Alcohol

Total tert-butyl alcohol reduction required, µg/L: 0

Ethyl Alcohol (Ethanol)

Total ethyl alcohol reduction required, µg/L: 0

Ethyl tert-Butyl Ether

Total ethyl tert-butyl ether reduction required, µg/L: 0

Total Dissolved CoC mass to reduce: 181,120.7 µg/L

In accordance with the SCDHEC Corrective Action Guidelines, additional scaled site maps depicting groundwater concentrations for the CoCs are included in this CAP. ***Figure 3*** presents a groundwater elevation contour map as measured during the sampling event of March 2020 for the shallow (water table) monitoring wells. ***Figure 4*** presents a potentiometric surface map of groundwater flow for deeper-screened well depths for March 2020. ***Figure 5*** is a free product extent map based on March 2020 data. ***Figures 6, 7, 8, 9, 10*** and ***11*** are plume extent maps from the Tier II Assessment in 2018 for benzene, toluene, ethylbenzene, xylenes, MtBE, and naphthalene. ***Figure 12*** is a Geologic Transect Location map from the 2018 Tier II Assessment. ***Figures 13*** and ***14*** are geologic cross-sections constructed parallel to and perpendicular, respectively, to the dominant groundwater flow direction (from the 2018 Tier II assessment). ***Figure 15*** presents the locations of surface water samples used in the Tier II Assessment and proposed for used in the CAP. ***Figure 16*** shows the locations of identified private water wells within 2000 feet of the site boundaries. ***Table 1*** lists the property owner names and addresses identified as water well owners on ***Figure 16***.

2.0 REMEDIATION TECHNOLOGY

The remediation objective is to (1) remove residual free-phase petroleum product (also referred to as light non-aqueous-phase liquid, or LNAPL) from the site and (2) reduce the petroleum chemicals of concern (COC) in groundwater to concentration levels which are equal to or less than the site-specific target levels (SSTLs) as defined in the Corrective Action Solicitation. To that end, ATC is proposing the use of a “Trap & Treat®” in-situ chemical/biological applicant, Boss200®, developed by Remediation Products, Inc. (RPI) in conjunction with AST Environmental (AST).

The product is typically mixed with water to create a slurry that can be applied using a variety of techniques including: Direct push injection, soil mixing techniques, and trenching. It is commonly employed in plume wide treatment including treatment of LNAPL source, mid, and downgradient plume regions. Plume area treatment is normally accomplished using slurry injection across the impacted thickness at a number of points located using a triangular grid pattern. Effective barriers can be constructed by injection using a tight point grid layout or through trenching or soil mixing.

BOS 200® provides a unique opportunity to utilize two proven technologies to effectively remediate petroleum hydrocarbon sites. The two technologies are 1) the trapping of the contaminants via carbon adsorption and 2) the subsequent treatment via biological degradation within the BOS 200® matrix as the product incorporates both aerobic and anaerobic biological processes.

These two proven and very powerful remediation mechanisms make what is called the "Trap and Treat" process. The "Trap" provides the immediate mass reduction and plume control, while the "Treat" provides the continued long-term remedial degradation.
The product comes as a fine-grained dry material which consists of: carbon, calcium sulfate, nitrate, phosphate, and ammonia in a proprietary blend. BOS 200® is 77% by weight carbon and up to 19% gypsum, the sulfate source. Gypsum is 79% by weight sulfate which translates to approximately 15% by weight sulfate in BOS 200®. The BOS 200® is mixed with water and a facultative blend of microbes (inoculation with aerobic and anaerobic microbes) to create a solids suspension. This is now an ideal environment for the biological process, where hydrocarbons are adsorbed on to BOS 200® particles made up of:

- Electron Acceptors: oxygen, nitrate, and sulfate (primary)
- Nutrients - phosphorus and nitrogen
- Aerobic and anaerobic blend of microbes (over 27 species of microbes)

One of the advantages of the product is that the design approach can vary from a treatment objective where a complete immediate contaminant mass removal from the groundwater is achieved, to a partial contaminant mass reduction working in conjunction with the biological process driving the groundwater cleanup effort, or any number of somewhere in between. The end effect is that plume can be controlled in a short period of time and treatment can be extended over a longer period of time.

The success in achieving cleanup goals is not just in the product installed, but the distribution of the product in subsurface. Distribution is controlled by the injection techniques used: i.e., vertical and horizontal spacing as a function of soil type, high pressure injection vs. low pressure injection, and top down vs. bottom up. For this site, given the soil type and contaminant mass, we propose to optimize the injectate distribution by 1) using top down techniques, 2) using relatively high flow (~70 gpm) injections generating targeted exit velocities of 8,000 to 12,000 feet per minute leaving the injection tip providing radial mixing of the BOS 200® slurry with the sandy formation, and 3) adjusting the horizontal and vertical injection spacing.

It is expected that the injection pressures will vary from 400 to 600 psig (measured at the discharge of the injection pump - the injection system pressure loss is ~300 psig depending on length and diameter of hoses and injection tip geometry). The discussion of the vertical and horizontal injection spacing is provided below for each of the injection areas.

2.1 Remedial Design Characterization (RDC)

Based on AST's review of the existing data, there is limited saturated soil data in the targeted treatment area. In order to fill this data gap, it is proposed to perform supplemental saturated soil and groundwater sampling. The data generated will optimize the injection approach to promote effective remediation and minimize cost. The RDC data will be used to:

- Determine the mass of contamination residing in the saturated soil and groundwater as a function of horizontal and vertical location within the proposed treatment area, see attached figure.
- Refine the conceptual site model.

The supplemental sampling will extend to approximately 15 feet or refusal. The scope of work associated with the RDC effort is as follows:

2.1.1 Soil Sampling

Approximately forty-seven (47) continuous soil borings, to approximately five feet below ground surface (bgs) will be installed. The soil borings will be analyzed every two feet,

starting at two feet below ground surface (bgs), and from discrete intervals identified to be visibly stained or with elevated PID readings. Approximately 376 soil samples will be collected and analyzed.

2.1.2 Groundwater Sampling

At twenty three (23) of the soil boring locations, a cluster of up to two nested micro-wells (implants) will be installed. The implants will be screened at four feet intervals from three to seven ft bgs and eight to 12 feet bgs. Implants consist of small diameter (~1/2") polyethylene tubing with holes drilled to create discrete screened sections. The implants can be installed inside the Geoprobe® dual-tube rods or completed soil borings. A one foot bentonite seal will be placed between the screen intervals and from the top of the shallow screen to the surface. The new groundwater implants and all impacted monitoring wells on-site will be sampled and analyzed.

2.1.3 Analyses

The soil and groundwater samples will be analyzed by the RPI Group Project Support Laboratory in Golden, Colorado for volatile organic compounds (VOCs) and Total Volatile Petroleum Hydrocarbons using Method 8260B. The groundwater will be analyzed for anions (nitrate, nitrite and sulfate) using Method 300.1, and dissolved gases using RSK 175. The laboratory analysis is for remedial design use only and is not for regulatory compliance.

It is estimated that it will require seven workdays to complete the soil borings and groundwater sampling. The results of this RDC will be used to finalize the BOS 200® loadings throughout the proposed injection areas. The final design loadings will vary with depth and location based on the distribution of contaminants' mass.

2.2 Injection Design

The RDC results will determine the total mass present within the formation and if there will be a long term maintenance program involving the addition of terminal electron acceptors into the existing Recovery Well (RW) network to support the biological treatment to achieve closure levels at this site. Tracking post injection dissolved phase

contaminant trends (BTEX, TVPH), along with the terminal electron acceptor trends, specifically sulfate, will determine when additional terminal electron acceptors would need to be added to the formation.

The preliminary BOS 200® injection design has been prepared using the following approach/basis:

1. Historical data from groundwater sampling (i.e., analytical results, the screened interval of the wells, etc) were used to determine the horizontal and vertical targets for injection.

2. Using the same data for each area a contaminant mass loading on a unit basis (lb. benzene per ft^3 of impacted media) was determined for each of the designated areas.

3. The contaminant mass loadings were then used to determine the BOS 200® loadings (lbs. installed per ft^3 of impacted media) necessary to remediate a specific depth interval within each injection area.

4. Due to the current remediation goals, the LNAPL present in the wells, and groundwater concentrations data it is expected to require a minimum of approximately two to three years to achieve the remedial goals using a Kenetic Design approach. This approach uses the traditional BOS 200® design process, with the addition of starch, yeast extract, and sodium sulfate to assist in the stimulation of a robust biological system that exceeds the performance of standard BOS 200®. This approach is advantageous as it reduces costs or potentially removes the need for a second injection event. The only need for an additional injection would be to add supplementary terminal electron acceptors (i.e nitrates or sulfates) to sustain the biological activity. With this kinetic design approach, biological treatment drives the cleanup time.

The specific design for the saturated zones for the treatment areas are as follows:

On-site Injection Areas including Upgradient MW-15 Area

Injection Area A (Defined by MW-15 groundwater benzene concentrations 1.0 mg/l)

- Total Treatment Area: 1,060 ft^2
- Number of Injection Points & Horizontal Spacing: 43 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing:194 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~20 lbs. per injection interval (15 gallon shot volume) = 3,870 lbs. of BOS 200®
- Bacteria Concentrate: 8 gallons
- Supplemental Sulfate: 20 lbs per interval = 3,870 lbs
- Food Grade Starch: 5 lbs per interval = 968 lbs
- Yeast Extract: 0.25 lbs per interval = 48 lbs

Injection Area B (Defined by MW-12 and MW-2 groundwater benzene concentrations 1.0 mg/l)

- Total Treatment Area: 4,760 ft^2
- Number of Injection Points & Horizontal Spacing: 190 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 855 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~20 lbs. per injection interval (15 gallon shot volume) = 17,100 lbs. of BOS 200®
- Bacteria Concentrate: 34 gallons
- Supplemental Sulfate: 20 lbs per interval = 17,100 lbs
- Food Grade Starch: 5 lbs per interval = 4,2745 lbs
- Yeast Extract: 0.25 lbs per interval = 214 lbs

Injection Area C (Defined by MW-32 groundwater benzene concentrations 0.340 mg/l)

- Total Treatment Area: 2,030 ft^2
- Number of Injection Points & Horizontal Spacing: 81 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 855 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~15 lbs. per injection interval (15 gallon shot volume) = 5,468 lbs. of BOS 200®
- Bacteria Concentrate: 11 gallons
- Supplemental Sulfate: 20 lbs per interval = 7,290 lbs
- Food Grade Starch: 5 lbs per interval = 1,823 lbs
- Yeast Extract: 0.25 lbs per interval = 91 lbs

Injection Area D (Defined by MW-1 and MW-3 groundwater benzene concentrations 19.3 mg/l)

- Total Treatment Area: 2,900 ft^2
- Number of Injection Points & Horizontal Spacing: 116 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 522 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~30 lbs. per injection interval (15 gallon shot volume) = 15,660 lbs. of BOS 200®
- Bacteria Concentrate: 31 gallons
- Supplemental Sulfate: 15 lbs per interval = 7,830 lbs
- Food Grade Starch: 5 lbs per interval = 2,610 lbs
- Yeast Extract: 0.25 lbs per interval = 131 lbs

Injection Area E (Defined by RW-2 and RW-3 groundwater benzene concentrations 19.3 mg/l)

- Total Treatment Area: 4,950 ft^2
- Number of Injection Points & Horizontal Spacing: 198 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 891 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~30 lbs. per injection interval (15 gallon shot volume) = 26,730 lbs. of BOS 200®
- Bacteria Concentrate: 53 gallons
- Supplemental Sulfate: 15 lbs per interval = 13,365 lbs
- Food Grade Starch: 5 lbs per interval = 4,455 lbs
- Yeast Extract: 0.25 lbs per interval = 223 lbs

Off-site Injection Areas

Injection Area F (Defined by MW-5 and MW-6 groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 12,500 ft^2
- Number of Injection Points & Horizontal Spacing: 500 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 2,250 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 56,250 lbs. of BOS 200®
- Bacteria Concentrate: 113 gallons
- Supplemental Sulfate: 20 lbs per interval = 45,000 lbs
- Food Grade Starch: 5 lbs per interval = 11,250 lbs
- Yeast Extract: 0.25 lbs per interval = 563 lbs

Injection Area G (Defined by RW-11 groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 2,800 ft^2
- Number of Injection Points & Horizontal Spacing: 112 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 504 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 12,600 lbs. of BOS 200®
- Bacteria Concentrate: 25 gallons
- Supplemental Sulfate: 20 lbs per interval = 10,080 lbs
- Food Grade Starch: 5 lbs per interval = 2,520 lbs
- Yeast Extract: 0.25 lbs per interval = 126 lbs

Injection Area H (Groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 575 ft^2
- Number of Injection Points & Horizontal Spacing: 23 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 104 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 2,588 lbs. of BOS 200®
- Bacteria Concentrate: 5 gallons
- Supplemental Sulfate: 15 lbs per interval = 2,070 lbs
- Food Grade Starch: 5 lbs per interval = 518 lbs
- Yeast Extract: 0.25 lbs per interval = 26 lbs

Injection Area I (Groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 575 ft^2
- Number of Injection Points & Horizontal Spacing: 23 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 104 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 2,588 lbs. of BOS 200®
- Bacteria Concentrate: 5 gallons
- Supplemental Sulfate: 15 lbs per interval = 2,070 lbs
- Food Grade Starch: 5 lbs per interval = 518 lbs
- Yeast Extract: 0.25 lbs per interval = 26 lbs

Injection Area J (RW-12 groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 2,810 ft^2
- Number of Injection Points & Horizontal Spacing: 112 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 504 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 12,600 lbs. of BOS 200®
- Bacteria Concentrate: 25 gallons
- Supplemental Sulfate: 20 lbs per interval = 10,080 lbs
- Food Grade Starch: 5 lbs per interval = 2,520 lbs
- Yeast Extract: 0.25 lbs per interval = 126 lbs

Injection Area K (MW-29 groundwater benzene concentrations 0.015 mg/l)

- Total Treatment Area: 3,650 ft^2
- Number of Injection Points & Horizontal Spacing: 146 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 104 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~15 lbs. per injection interval (15 gallon shot volume) = 5,475 lbs. of BOS 200®
- Bacteria Concentrate:11 gallons
- Supplemental Sulfate: 10 lbs per interval = 7,300 lbs
- Food Grade Starch: 5 lbs per interval = 3,650 lbs
- Yeast Extract: 0.25 lbs per interval = 183 lbs

Injection Area L (MW-13 groundwater benzene concentrations 0.037 mg/l)

- Total Treatment Area: 990 ft^2
- Number of Injection Points & Horizontal Spacing: 40 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 180 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~15 lbs. per injection interval (15 gallon shot volume) = 1,350 lbs. of BOS 200®
- Bacteria Concentrate: 3 gallons
- Supplemental Sulfate: 10 lbs per interval = 1,800 lbs
- Food Grade Starch: 5 lbs per interval = 900 lbs
- Yeast Extract: 0.25 lbs per interval = 45 lbs

2.3 Supplemental AFVR Treatments

Supplemental AFVR treatments will be undertaken to (1) remove residual LNAPL observed in monitoring and recovery wells, and (2) to influence the hydrology of the treatment area to assist contact of the BOS 200® application with the residual entrapped LNAPL in the capillary fringe of the water table aquifer. During the initial application, AFVR treatments will focus on wells with current measurable LNAPL, such as MW-6 and RW-12, and the following wells to influence hydrologic conditions:

- Area A: MW-15
- Area B: MW-2, MW-12, MW-33
- Area C: MW-32
- Area D: RW-1, RW-7
- Area E: RW-2, RW-3
- Area F: RW-5, RW-6, RW-8, RW-9, RW-10
- Area G: RW-11
- Area J: RW-12
- Area K: MW-29
- Area L: MW-13

3.0 IMPLEMENTATION SCHEDULE

3.1 Groundwater Monitoring

In accordance with the terms of the corrective action contract between Circle K and SCDHEC, performance monitoring, as part of the Corrective Action System Evaluation (CASE), will be performed at the following frequencies:

(1) Initial Baseline sampling to be undertaken on all site wells (SSTL wells and non-SSTL wells), SCDHEC - designated recovery wells, designated water supply wells, and designated surface water sample locations. Results have been presented to SCDHEC in an amended report of April 15, 2020.
(2) Semi-annual sampling will be performed on all site wells (SSTL wells and non-SSTL wells) and SCDHEC - designated recovery wells, private water wells, and surface water sample locations. Sampling will be performed in the approximate schedule of January and June of each calendar year.

A tabulation of all water wells identified within a 2000-foot radius of the site is presented in ***Table 1***. As indicated in the table, four wells (WSW-12, WSW-13, WSW-15, and WSW-16) are to be included in the performance monitoring program. Each CASE report will include descriptions of sampling methodology, including pre-sample purging as required in the SCDHEC UST QAPP (unless a low-flow or approved non-purging method is utilized), appropriate data tables, to include` mass removal calculations, figures showing groundwater flow and distribution of chemical s of concern (CoCs), and an effectiveness evaluation of the remedial approach and a plan for CAP amendment if necessary to achieve remedial goals. All CASE reports will be signed by a Professional Engineer or Professional Geologist registered in South Carolina.

3.2 Air Monitoring

Air monitoring and presentation of an air quality emissions model is not a required component of the corrective action planned for this site.

3.3 Operation and Maintenance

There are no Operations and Maintenance requirements for the proposed remedial technology, as the injections will involve temporary injection points and there is no permanent infrastructure such as pumps, holding tanks, regulators, blowers, etc.

3.4 Reporting

Upon completion of the system installation, and receipt of the Permit To Operate, ATC will prepare an as-built system installation report. The report will contain SCDHEC well record forms (SCDHEC 1903) signed by a SC-certified well driller for the injection points. Performance monitoring will be documented in the semi-annual submittal of CASE reports. CASE reports will provide documentation on corrective action effectiveness, groundwater flow and concentrations of CoCs), and calculation of SSTL mass removal. CASE reports will be signed by either a SC-registered professional engineer or SC-registered professional geologist. If SSTL mass removal accomplishes a performance milestone (as outlined in the ACA award), an interim corrective action invoice may be submitted.

CASE reports will be provided to SCDHEC and to Circle K project manager, and to specified stakeholders as identified from the Corrective Action Solicitation. Stakeholders will be contacted to confirm whether they wish to continue to receive the reports, and documentation from those opting out will be provided to SCDHEC and Circle K. A listing of the stakeholders is included in ***Appendix A***.

3.5 Quality Control

Quality Control and Quality Assurance will be provided by ATC, in accordance with the SCDHEC Quality Assurance Program Plan for the Underground Storage Tank Management Division, Revision no. 2 (QAPP), and the ATC Annual Contractor Quality

Assurance Plan (ACQAP). This will include proper documentation of field activities and construction details, in-field review of SOPs for planned tasks, administrative oversight, documentation of equipment calibration, and collection of quality control samples (such as duplicates and blanks). All laboratory analytical results presented for CASE Reports will be performed by laboratories certified for the applicable analytical procedure by SCDHEC.

3.6 Implementation Time Frame

The proposed project implementation schedule is as follows, once the public notice period has expired, the CAP is approved, and approval proceed has been received.

Task 1: Collection of soil and water samples for remedial design
Duration: Seven days sample collection, 3 weeks data receipt and design
Task 2: Injections in on-site areas
Duration: Approximately 20 days, including mob/demob
Task 3: AFVR control in on-site areas
Duration: One week (5 days)
Task 4: Effectiveness monitoring
Duration: Approximately 30 days following initial on-site injections
Task 5: Injections in off-site areas (as needed)
Duration: Approximately 15 days, depending on effort needed
Task 6: Post Injection Monitoring for enhanced biodegradation
Duration: Semi-annual

3.7 Expected Project Life

Per the terms of the ACA award, the estimated project duration is 60 months or less.

3.8 Termination and Abandonment

When it has been established that the COC mass above SSTL mass has been removed, and all compliance wells have reached their SSTL goals, a period of post-remediation

monitoring will commence. Approximately three months (one calendar quarter) after determination that SSTL goals are achieved, post-system sampling will be performed and results submitted in a CASE report. If the results continue to demonstrate that SSTL goals have been maintained, SCDHEC may direct the installation of up to six (6) verification wells (VW), installed at locations and to depths of their specification. The wells will be installed by a SC-certified well driller, developed, and sampled approximately six months (two calendar quarters) following system decommission, along with all applicable site monitoring wells and water wells. SCDHEC may elect at that time to split samples. The results will be submitted in a CASE report, and if SSTL goals are achieved for the monitoring wells and the verification wells, a verification of ACA completion will be issued for the site.

Following issuance of the verification of ACA completion, any permanent components related to the system will be decommissioned and/or removed. The final step will be abandonment of all monitoring wells (including verification wells) and recovery wells/trenches associated with the release (unless certain wells are requested to remain in place by either SCDHEC or Circle K). Well abandonments will be performed by a SC-certified well driller. A site closure report, including well abandonment logs, will be submitted upon completion of all decommission activities. At that time, the final invoice for corrective action can be submitted per the award specifications.

4.0 PERMITTING

Permits will include all necessary permits required by state, county and local governmental agencies. All permits will be the responsibility of the contractor. At this time, state-issued permits will consist of those issued by SCDHEC, to include, as needed, monitoring/recovery/injection well installation permits, underground injection control permits, permit to construct and permit to operate. A NPDES permit for the discharge of treated wastewater is not anticipated for the planned remedial approach. Air emissions monitoring and permitting will not be required for this activity. SCDOT highway easements if required will be the responsibility of the contractor.

The Underground Injection Control Well Permit Application is included in ***Appendix B.***

5.0 REMARKS

The findings, conclusions, and recommendations contained in this document represent our professional opinions. These opinions are based upon currently accepted hydrogeological and engineering practices at this time and location. No warranty is implied or intended.

6.0 REFERENCES

ATC, August 29, 2018, Free Product Abatement Report, Circle K # 2720886, 4315 Savannah Highway, Ravenel, South Carolina.

ATC, November 1, 2018, Line Closure Report, Circle K # 2720886, 4315 Savannah Highway, Ravenel, South Carolina.

ATC, November 2, 2018, Water Supply Well Sampling Report, Circle K # 2720886, 4315 Savannah Highway, Ravenel, South Carolina.

ATC, December 21, 2018, Tier II Assessment Report, Circle K # 2720886, 4315 Savannah Highway, Ravenel, South Carolina.

ATC, July 31, 2019, Additional Assessment Report, Circle K # 2720886, 4315 Savannah Highway, Ravenel, South Carolina.

ATC, August 23, 2019, Addendum to Groundwater Sampling Report, Circle K # 2720886, 4315 Savannah Highway, Ravenel, South Carolina.

ATC, April 13, 2020, Groundwater Assessment Report-Corrective Action Initial Report, Circle K # 2720886, 4315 Savannah Highway, Ravenel, South Carolina.

SCDHEC, April 2013, *Quality Assurance Program Plan for the Underground Storage Tank Management Division, Revision no. 2*, Bureau of Land and Waste Management, Columbia, South Carolina.

SCDHEC, November 12, 2019, Corrective Action Solicitation, Circle K Store # 2720886, UST site # 01589.

TABLES

Table 1
Sample ID and Homeowner Information
Circle K # 270886
Ravenel. SC

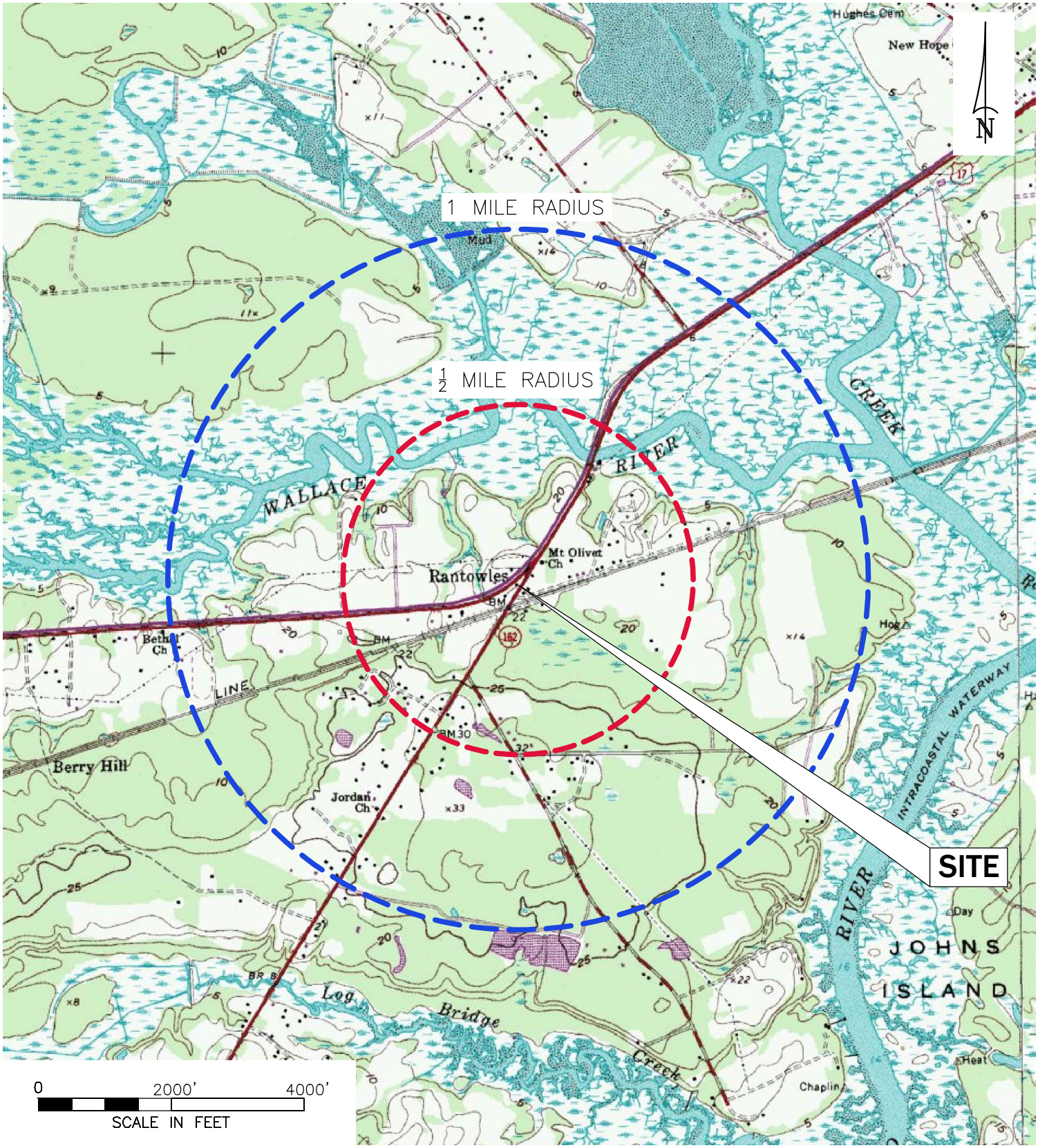
Well ID	Name	Address	Comments / Notes
WSW-1	Marsha Farrior	6033 Postell Ravenel, SC 29070	
WSW-2 WSW-2D	Ralph and Susan McKenzie	6047 Postell Ravenel, SC 29070	
WSW-3	Nannette Picirillo	6036 Postell Ravenel, SC 29470	
WSW-4	David and Rhiannon McPherson	6050 Postell Ravenel, SC 29470	
WSW-5	Harry Wilson	6057 Postell Ravenel, SC 29470	
WSW-6	David and Lori Bates	6061 Postell Ravenel, SC 29470	
WSW-7	Patrick and Harriet Frazier	6065 Postell Ravenel, SC 29470	
WSW-8	James and Margaret Kilgallen	6079 Postell Ravenel, SC 29470	
WSW-9	Merlin and Priscilla Burbage	4358 Wallace Creek Way Ravenel, SC 29470	
WSW-10	Terry and Vickie Wilkinson	4354 Wallace Creek Way Ravenel, SC 29470	
WSW-11	Preston and Sue Mullinax	4355 Wallace Creek Way Ravenel, SC 29470	
WSW-12	McCombs Road, LLC	4317 McCombs Rd Hollywood, SC 29449	selected for monitoring
WSW-13	Gilbert and Lynn Maybry	4318 McCombs Rd Hollywood, SC 29449	selected for monitoring
WSW-14	Elizabeth Postell	4292 Savannah Hwy Ravenel, SC 29470	
WSW-15	LaRoche	4360 Savannah Hwy Ravenel, SC 29470	selected for monitoring

Table 1
Sample ID and Homeowner Information
Circle K # 270886
Ravenel. SC

Well ID	Name	Address	Comments / Notes
WSW-16	Steen	4367 Savannah Hwy Ravenel, SC 29470	selected for monitoring
WSW-17	Florence Brown	4276 Railroad Ave Hollywood, SC 29470	
WSW-18	Frank Miller	4230 Railroad Ave Hollywood, SC 29470	
WSW-19	John Prioleau	5812 Caboose Ave Hollywood, SC 29470	
WSW-20	Harry Brown	4252 Railroad Ave Hollywood, SC 29470	Well not sampled, access not provided.
WSW-21	Rosetta Geddes	5834 Caboose Ave Hollywood, SC 29470	Well not sampled, resident denied access.
WSW-22	Frank Prioleau	5840 Caboose Ave Hollywood, SC 29470	
WSW-23	Carrie Wright	5851 Caboose Ave Hollywood, SC 29470	
WSW-24	Lake Aire RV Park	4375 Highway 162 Hollywood, SC 29449	
WSW-25	John Miller Sr.	5627 Sands Rd Hollywood, SC 29449	
WSW-26	Loretta Doctor	4441 Highway 162 Hollywood, SC 29449	
WSW-27	Julia Ann Harvin	5710 Chaplins Landing Hollywood, SC 29449	Well not sampled, resident denied access.
WSW-28	Barbara Ferrara	4408 Highway 162 Hollywood, SC 29449	Well not sampled, no electricity to well pump.
WSW-29	John Dunmyer	4422 Highway 162 Hollywood, SC 29449	Well not sampled, property provided municipal water.

Note: well locations in yellow shading have been selected by SCDHEC for remediation monitoring

FIGURES



TITLE **FIGURE 1**

SITE LOCATION MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

UST PERMIT #01589

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CAD FILE		PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007.

- BENCHMARK
- TPED TELEPHONE PEDESTAL
- SDMH STORM DRAIN MAN HOLE
- SDMH TELEPHONE HAND HOLE
- WM WATER METER
- WV WATER VALVE
- FH FIRE HYDRANT
- TSP SIGNAL POLE
- PP POWER POLE
- LP LIGHT POLE
- USTF UNDERGROUND STORAGE TANK FILL
- RTCB ROLL TOP CATCH BASIN
- SIGN
- SSCO SANITARY SEWER CLEAN OUT
- THH–2'x3' TRAFFIC SIGNAL HAND HOLE
- DI–2'x3' DROP INLET
- TSBX TRAFFIC SIGNAL CONTROL BOX
- OE OVERHEAD ELECTRIC LINE
- W WATER LINE
- FO FIBER OPTIC LINE
- MONITORING WELL (TYPE II)
- MONITORING WELL (TYPE III)
- RECOVERY WELL

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DATE	PROJECT NO.
05/27/2020	CIRK088610

SCALE	REV. BY
1"=90'	

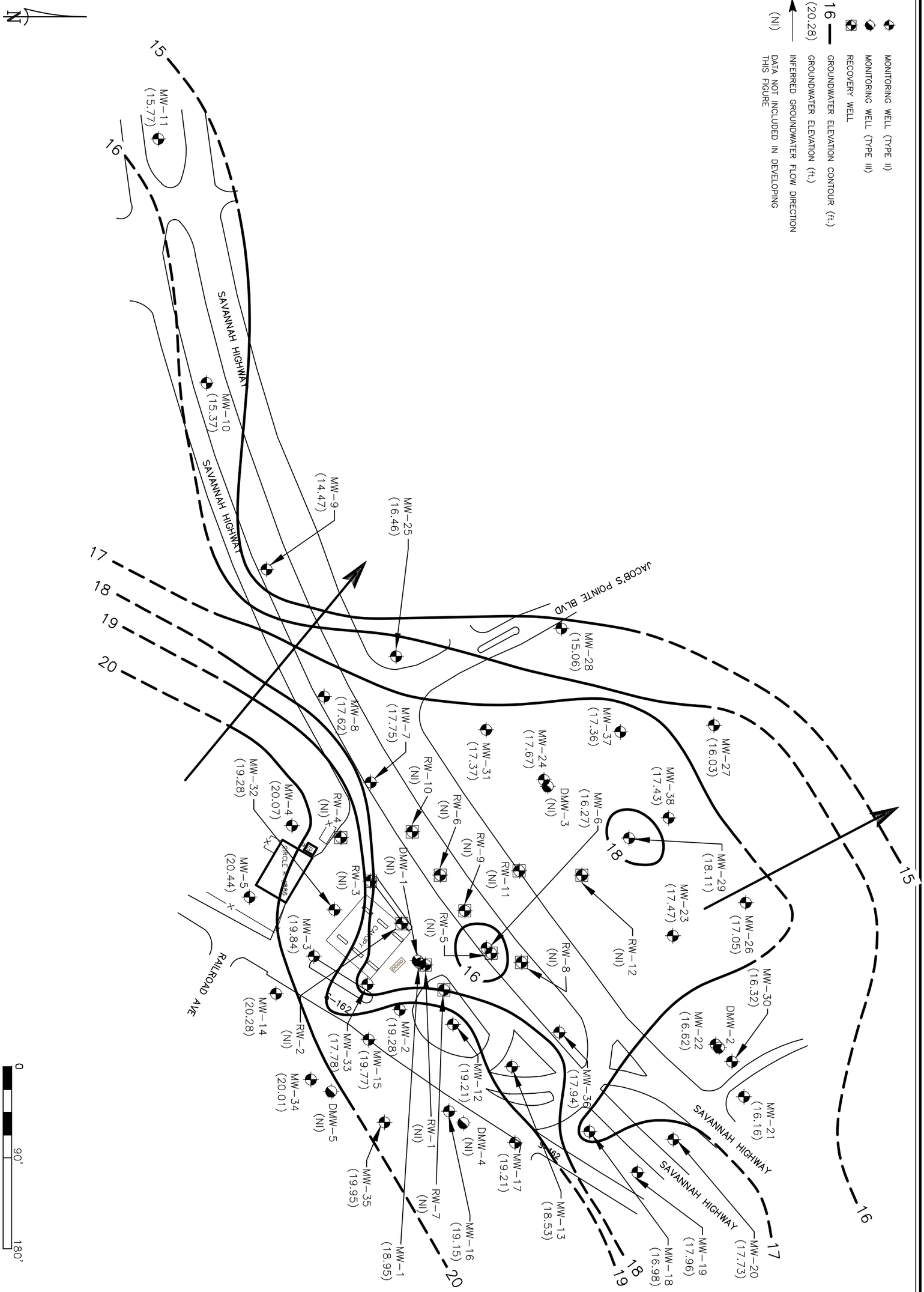
PREP. BY	
BH	

CAD FILE	TYPE CODE
1252215.dwg	

UST PERMIT #01589

TITLE **FIGURE 2**
SITE MAP WITH MONITORING & RECOVERY WELL NETWORK
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

NOTES:



NOTES:
1. GROUNDWATER ELEVATIONS WERE MEASURED ON 03/02/2020.

TITLE **FIGURE 3** UST PERMIT #01589

POTENTIOMETRIC SURFACE MAP - SHALLOW WELLS
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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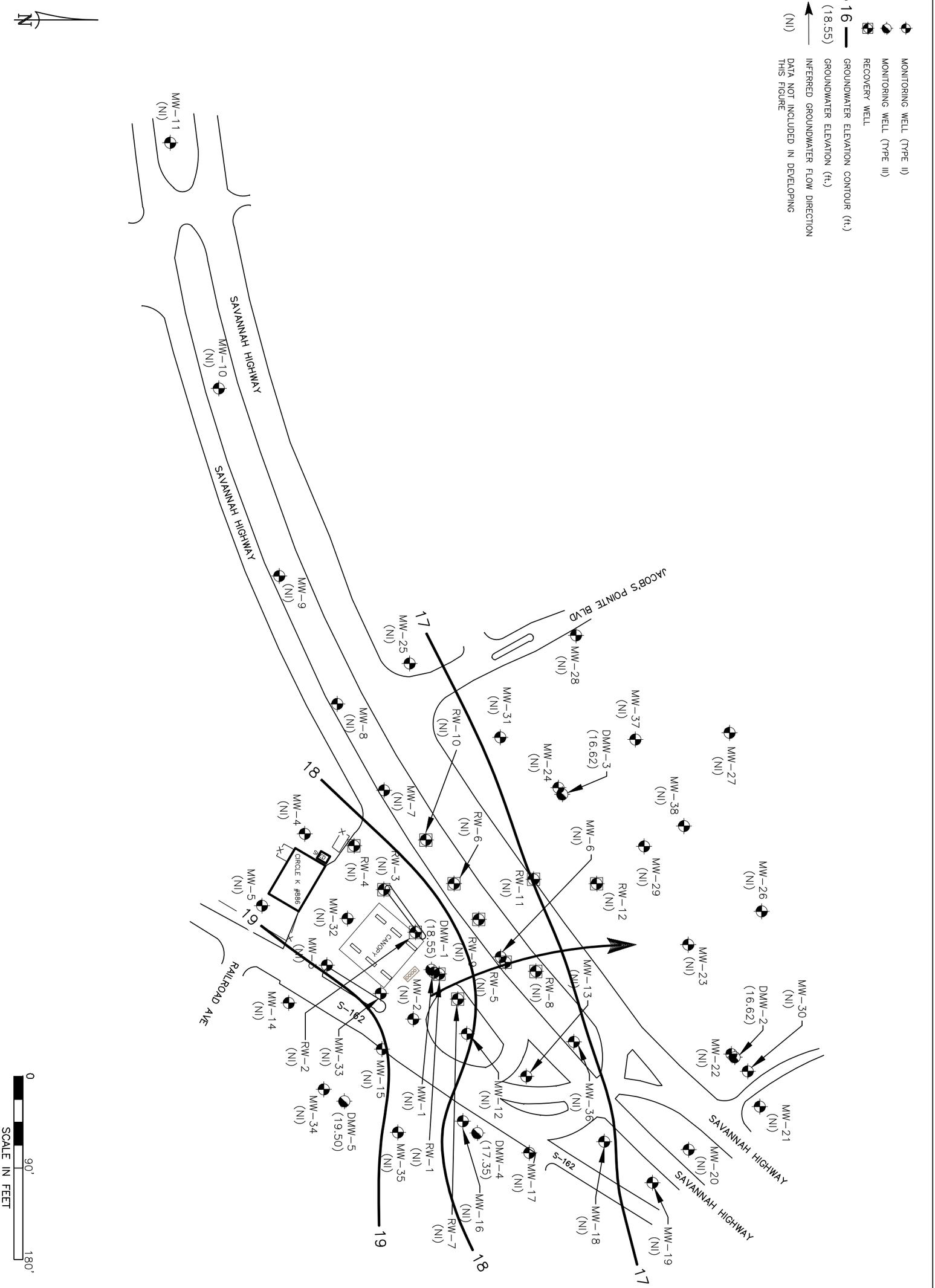

NOTES:
1. GROUNDWATER ELEVATIONS WERE MEASURED ON 03/02/2020.

TITLE **FIGURE 4** UST PERMIT #01589

POTENTIOMETRIC SURFACE MAP - DEEP WELLS
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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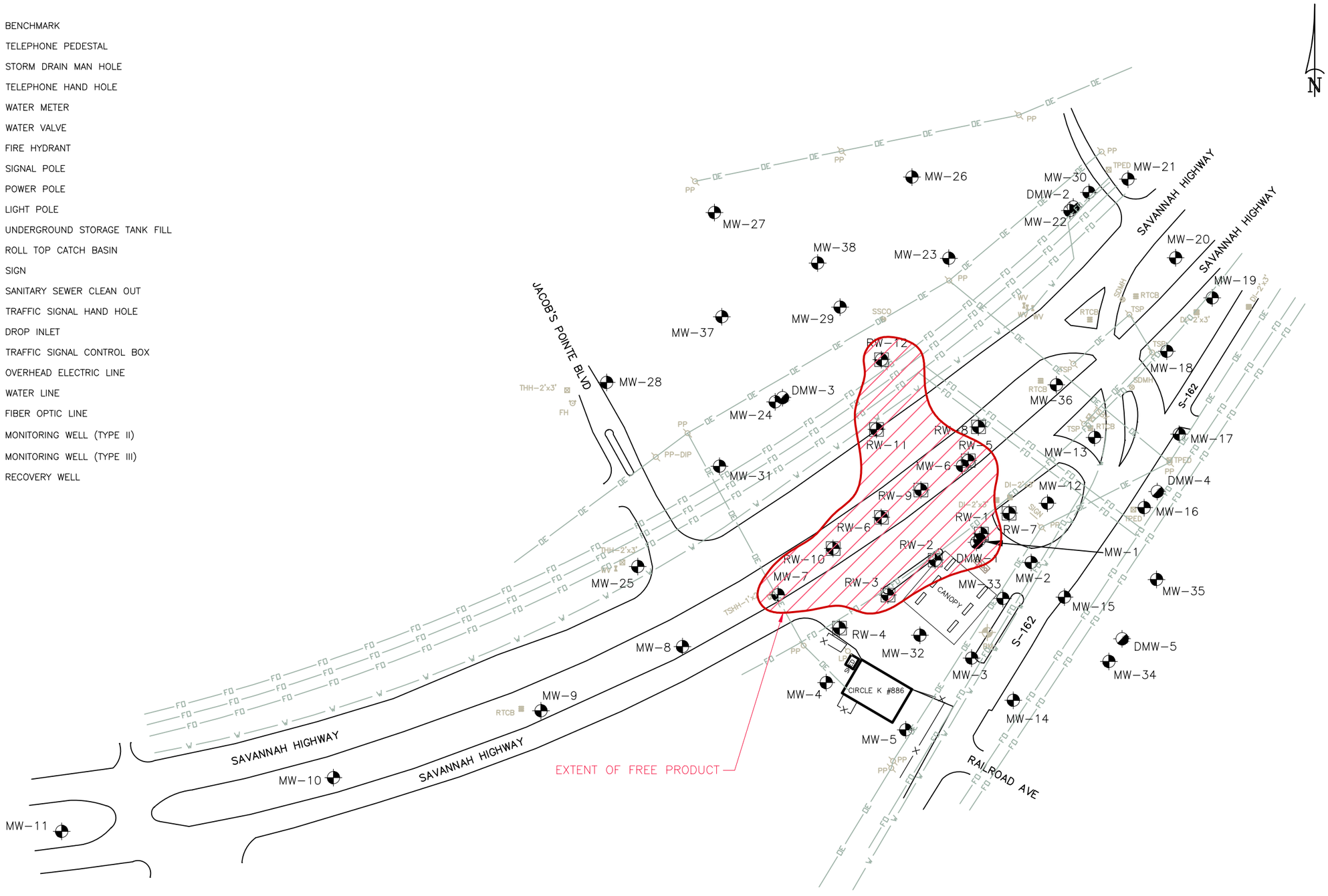
SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007.

- BENCHMARK
- TPED — TELEPHONE PEDESTAL
- SDMH — STORM DRAIN MAN HOLE
- SDMH — TELEPHONE HAND HOLE
- WM — WATER METER
- WV — WATER VALVE
- FH — FIRE HYDRANT
- TSP — SIGNAL POLE
- PP — POWER POLE
- LP — LIGHT POLE
- USTF — UNDERGROUND STORAGE TANK FILL
- RTCB — ROLL TOP CATCH BASIN
- SIGN
- SSCO — SANITARY SEWER CLEAN OUT
- THH–2'x3' — TRAFFIC SIGNAL HAND HOLE
- DI–2'x3' — DROP INLET
- TSBX — TRAFFIC SIGNAL CONTROL BOX
- DE — OVERHEAD ELECTRIC LINE
- W — WATER LINE
- FO — FIBER OPTIC LINE
- MONITORING WELL (TYPE II)
- MONITORING WELL (TYPE III)
- RECOVERY WELL



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PROJECT NO.	DATE	SCALE	REV. BY	PREP. BY	TYPE CODE
CIRK088610	05/27/2020	1"=90'		BH	

UST PERMIT #01589

TITLE **FIGURE 5**
FREE PRODUCT EXTENT MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

CAD FILE: 1252215.dwg

NOTES:

05/27/2020 11:33am – Steve Thompson – H:\125 – ATC__1252215_p1-05-27-20.dwg

SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007.

- BENCHMARK
- TPED — TELEPHONE PEDESTAL
- SDMH — STORM DRAIN MAN HOLE
- SDMH — TELEPHONE HAND HOLE
- WM — WATER METER
- WV — WATER VALVE
- FH — FIRE HYDRANT
- TSP — SIGNAL POLE
- PP — POWER POLE
- LP — LIGHT POLE
- USTF — UNDERGROUND STORAGE TANK FILL
- RTCB — ROLL TOP CATCH BASIN
- SIGN
- SSCO — SANITARY SEWER CLEAN OUT
- THH–2'x3' — TRAFFIC SIGNAL HAND HOLE
- DI–2'x3' — DROP INLET
- TSBX — TRAFFIC SIGNAL CONTROL BOX
- OE — OVERHEAD ELECTRIC LINE
- W — WATER LINE
- FO — FIBER OPTIC LINE
- MONITORING WELL (TYPE II)
- MONITORING WELL (TYPE III)
- RECOVERY WELL

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PROJECT NO.	DATE	SCALE	REV. BY	PREP. BY
CIRK088610	05/27/2020	1"=90'		BH

UST PERMIT #01589

TITLE **FIGURE 6**
BENZENE CONCENTRATION ISOPLETH MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

CAD FILE	TYPE CODE
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NOTES:

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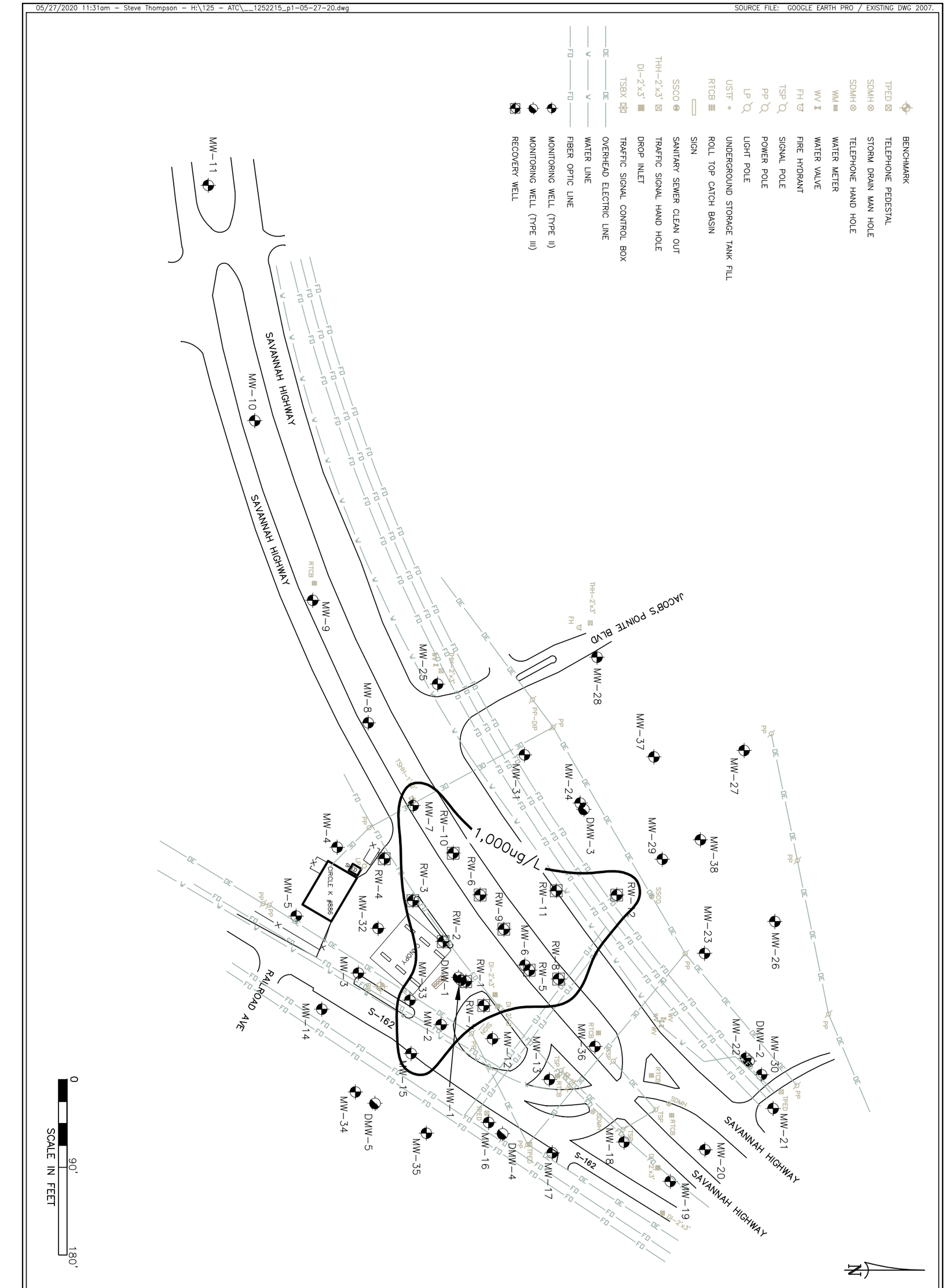

NOTES:
1. CONCENTRATION DATA FROM 11/2018.

TITLE **FIGURE 7** UST PERMIT #01589

TOLUENE CONCENTRATION ISOPLETH MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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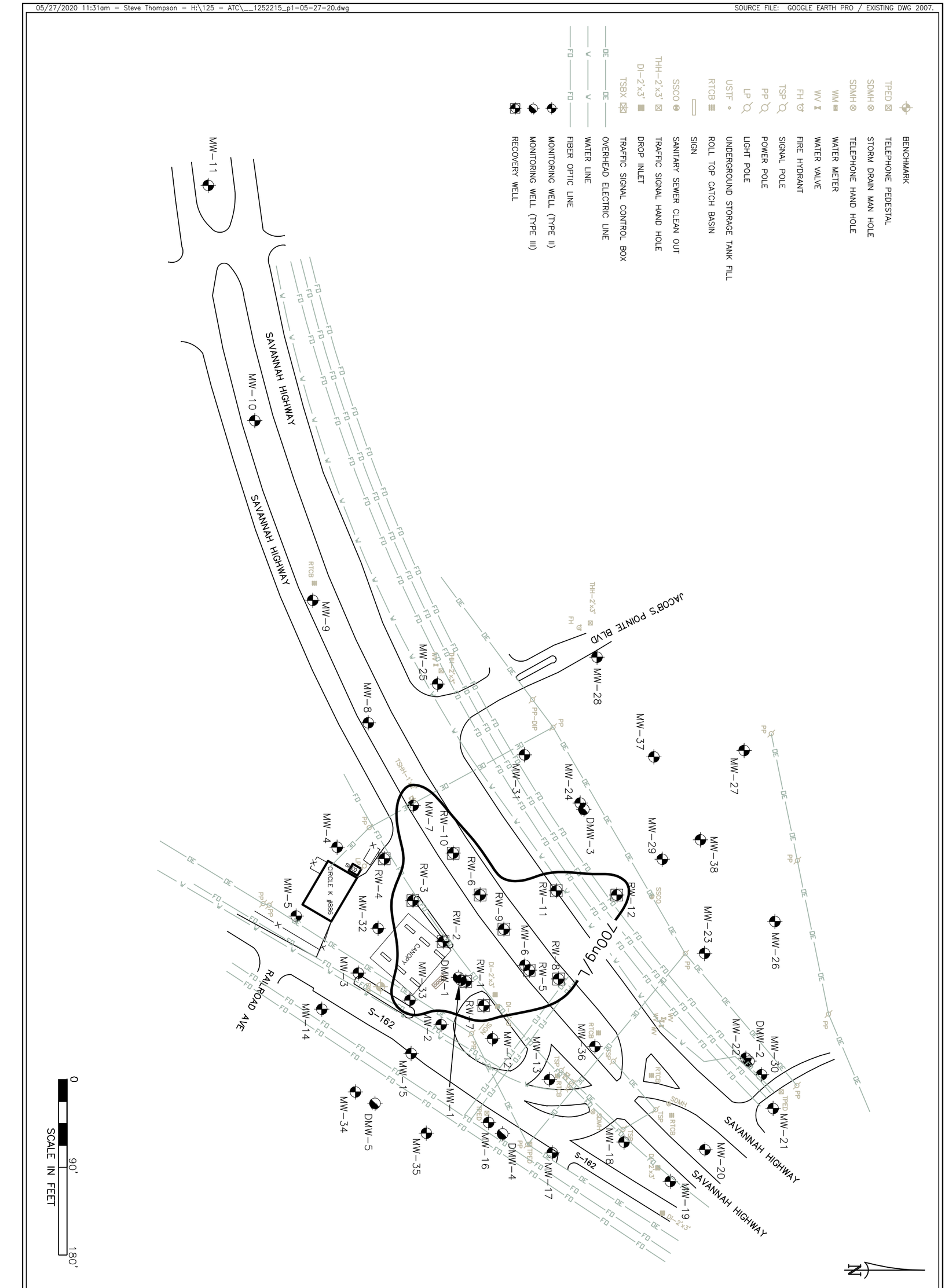

NOTES:
1. CONCENTRATION DATA FROM 11/2018.

TITLE **FIGURE 8** UST PERMIT #01589

ETHYLBENZENE CONCENTRATION ISOPLETH MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007.

- BENCHMARK
- TPED TELEPHONE PEDESTAL
- SDMH STORM DRAIN MAN HOLE
- SDMH TELEPHONE HAND HOLE
- WM WATER METER
- WV WATER VALVE
- FH FIRE HYDRANT
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- PP POWER POLE
- LP LIGHT POLE
- USTF UNDERGROUND STORAGE TANK FILL
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- W WATER LINE
- FO FIBER OPTIC LINE
- MONITORING WELL (TYPE II)
- MONITORING WELL (TYPE III)
- RECOVERY WELL

NOTES:
1. CONCENTRATION DATA FROM 11/2018.

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TITLE **FIGURE 9**
TOTAL XYLENE CONCENTRATION ISOPLETH MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

PROJECT NO.	DATE	SCALE	REV. BY	PREP. BY
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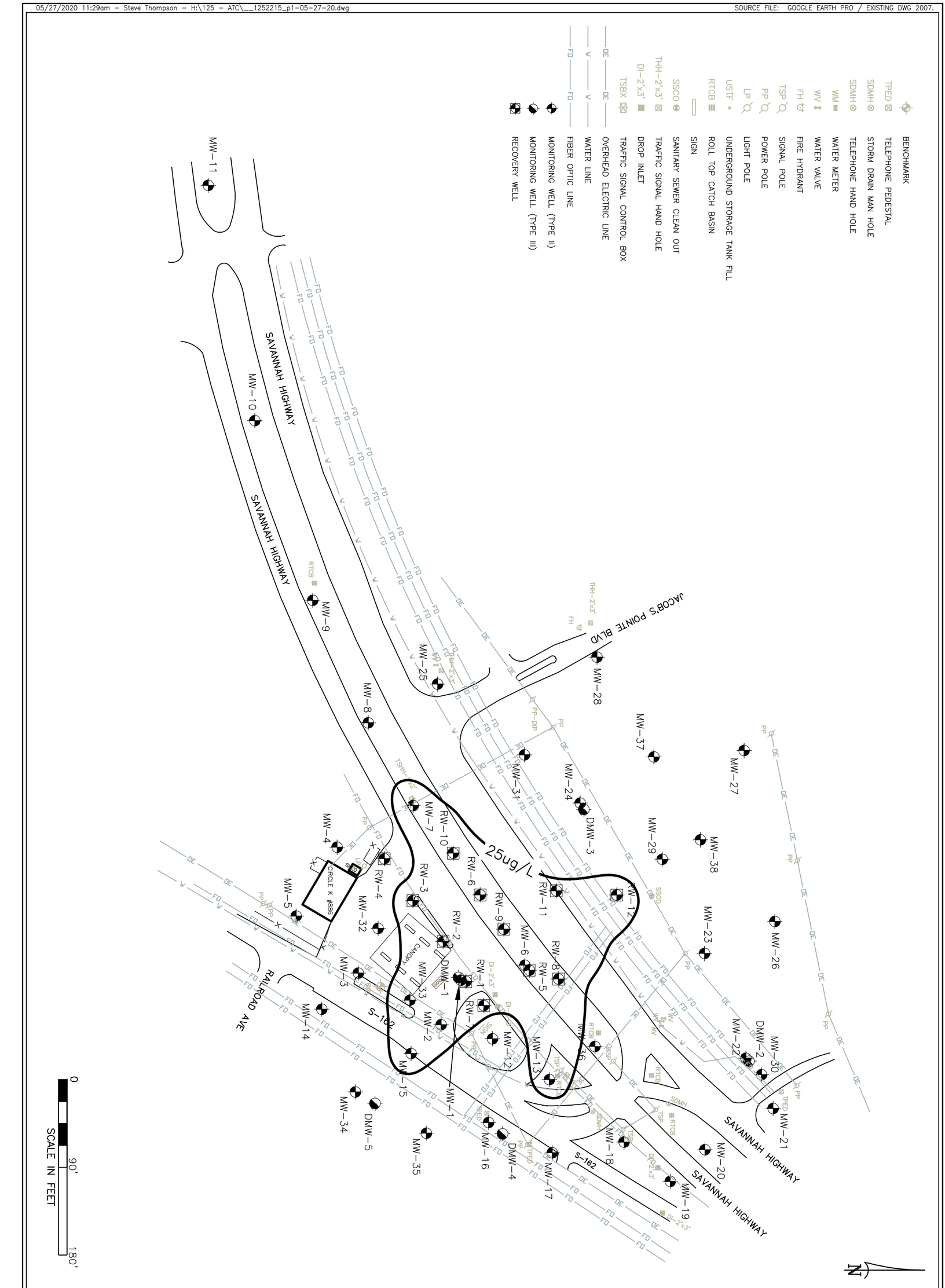

NOTES:
1. CONCENTRATION DATA FROM 11/2018.

TITLE **FIGURE 10** UST PERMIT #01589

NAPHTHALENE CONCENTRATION ISOPLETH MAP
CIRCLE K #2720886
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RAVENEL, SOUTH CAROLINA

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CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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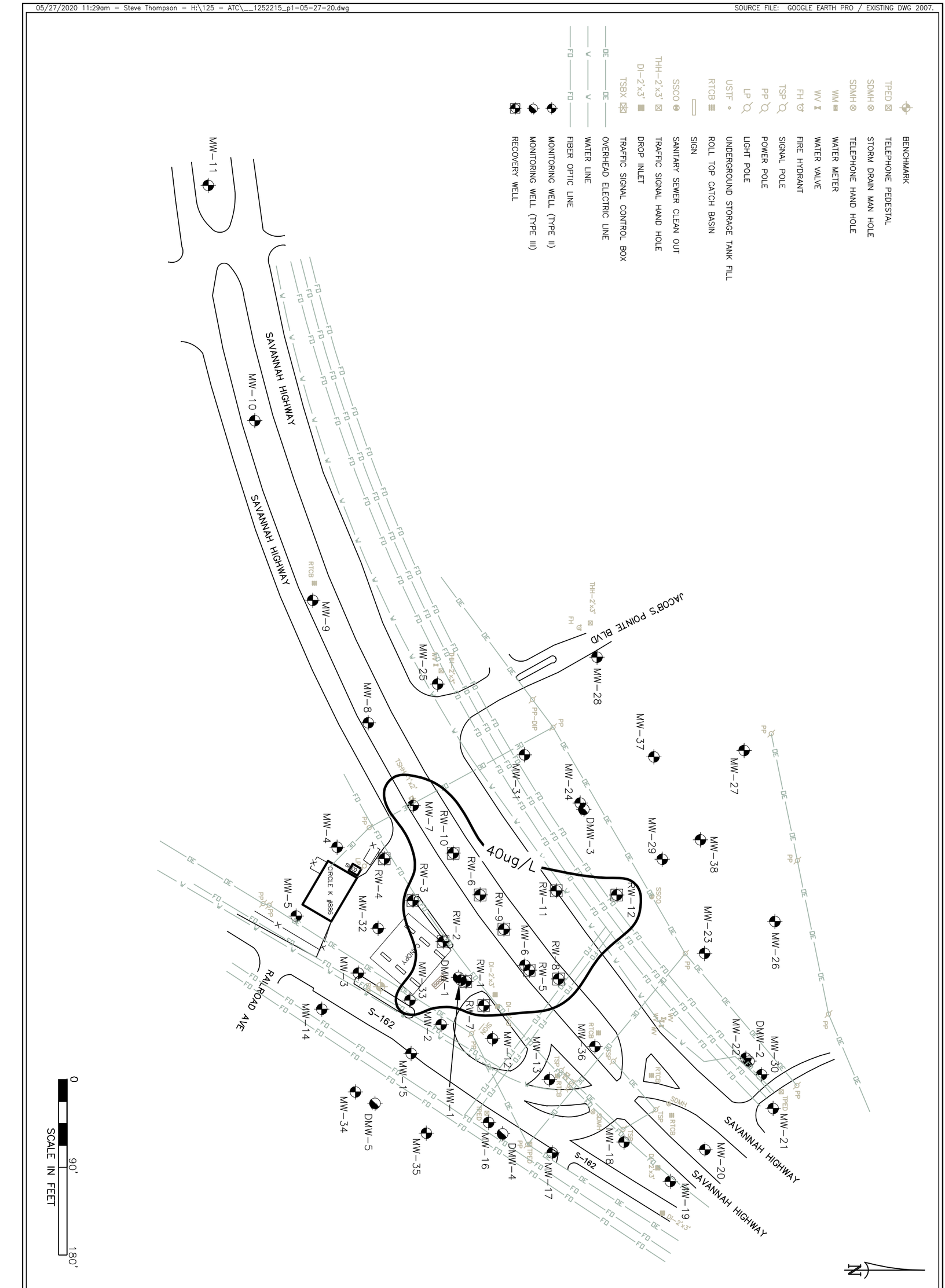

NOTES:
1. CONCENTRATION DATA FROM 11/2018.

TITLE **FIGURE 11** UST PERMIT #01589

MTBE CONCENTRATION ISOPLETH MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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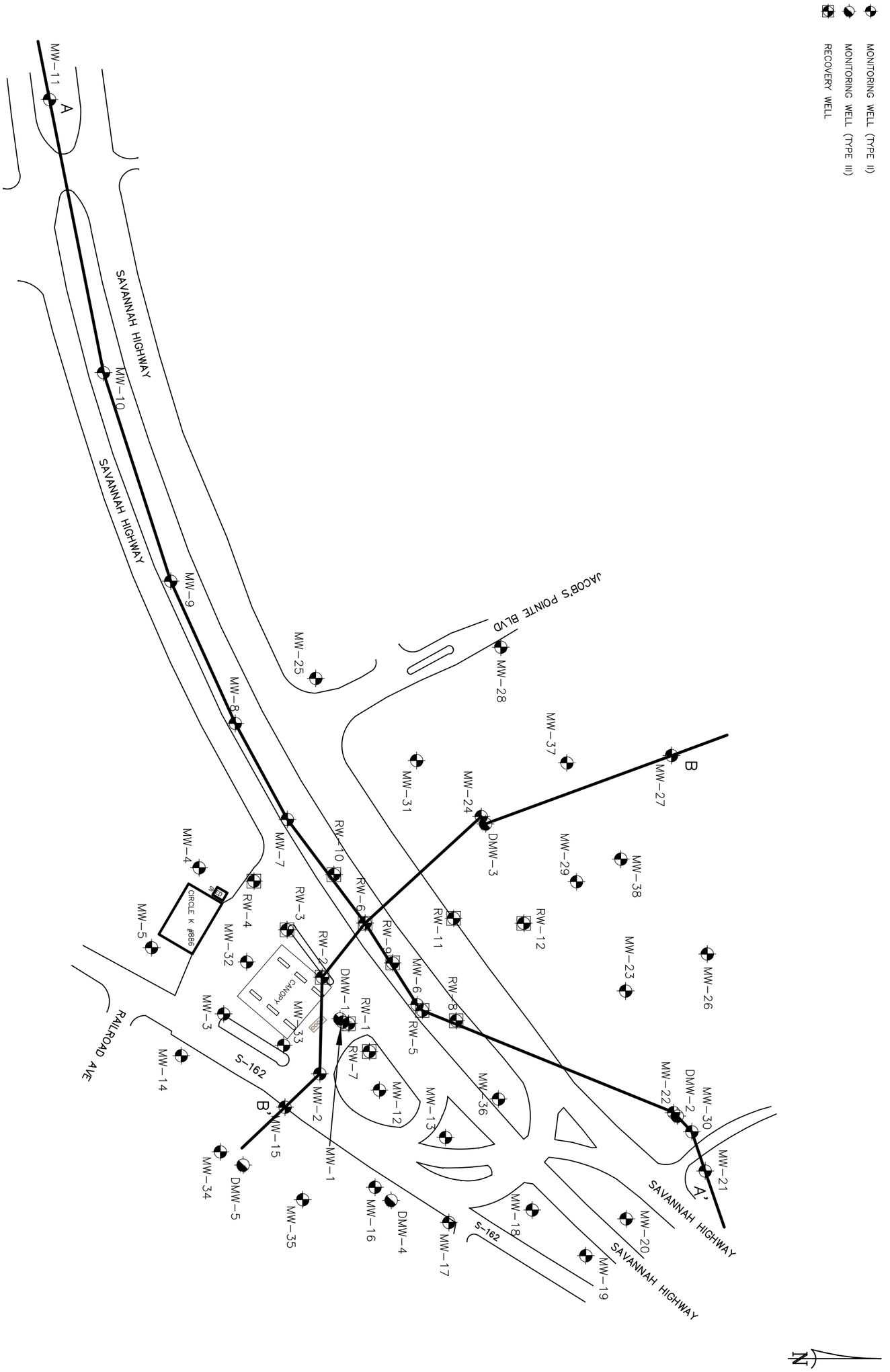

NOTES:

TITLE **FIGURE 12** UST PERMIT #01589

GEOLOGIC CROSS-SECTION LOCATION MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
1252215.dwg		BH		1"=90'	05/27/2020	CIRK088610

SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007

A

A'

25.00'
20.00'
15.00'
10.00'
5.00'
0.00'
-5.00'
-10.00'
-15.00'

MW-11 (18.13')
MW-10 (17.63')
MW-9 (16.50')
MW-8 (19.14')
MW-7 (19.55')
RW-6 (19.20')
MW-6 (19.33')
RW-5 (19.76')
MW-22 (18.79')
DMW-2 (18.81')
MW-30 (18.06')
MW-21 (16.16')

EXTENT OF COCs > RBSL

MW-9 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	14
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	15J
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	0.58J
tert-BUTYL FORMATE	<5.0

MW-6 ug/L	GROUNDWATER 11/28/18
NOT SAMPLED / 0.76' OF FREE PRODUCT	

RW-6 ug/L	GROUNDWATER 11/28/18
NOT SAMPLED / 1.31' OF FREE PRODUCT	

RW-5 ug/L	GROUNDWATER 11/28/18
NOT SAMPLED / 0.36' OF FREE PRODUCT	

MW-11 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-10 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-8 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	9.8J
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-7 ug/L	GROUNDWATER 11/29/18
BENZENE	**12,000**
TOLUENE	**45,000**
ETHYLBENZENE	**2,600**
TOTAL XYLENES	**13,000**
MTBE	<200
NAPHTHALENE (8260B)	**320**
NAPHTHALENE (8270D)	**310**
1,2-DICHLOROETHANE	<200
ETHYL tert-BUTYL ALCOHOL	<4,000
DIISOPROPYL ETHER	<200
ETHANOL	<20,000
tert-BUTYL ALCOHOL	<4,000
tert-AMYL ALCHOL	**17,000**
tert-AMYL METHYL ETHER	<2,000
ETHYL tert-BUTYL ETHER	**98J**
tert-BUTYL FORMATE	<1,000

MW-22 ug/L	GROUNDWATER 11/29/18
BENZENE	**6.5**
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	0.41J
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-30 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-21 ug/L	GROUNDWATER 11/29/18
BENZENE	0.57J
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	15J
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	0.58J
tert-BUTYL FORMATE	<5.0

DMW-2 ug/L	GROUNDWATER 11/28/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

WATER TABLE

MW-11 (18.13') WELL IDENTIFICATION / TOP OF CASING

WELL CASING

WELL SCREEN

10 5 2.5 0

SCALE IN FEET

0 50 100 200

CLAY, dark olive gray, firm

SAND, tan to olive gray, fine grained, poorly graded

AREA OF FREE PRODUCT

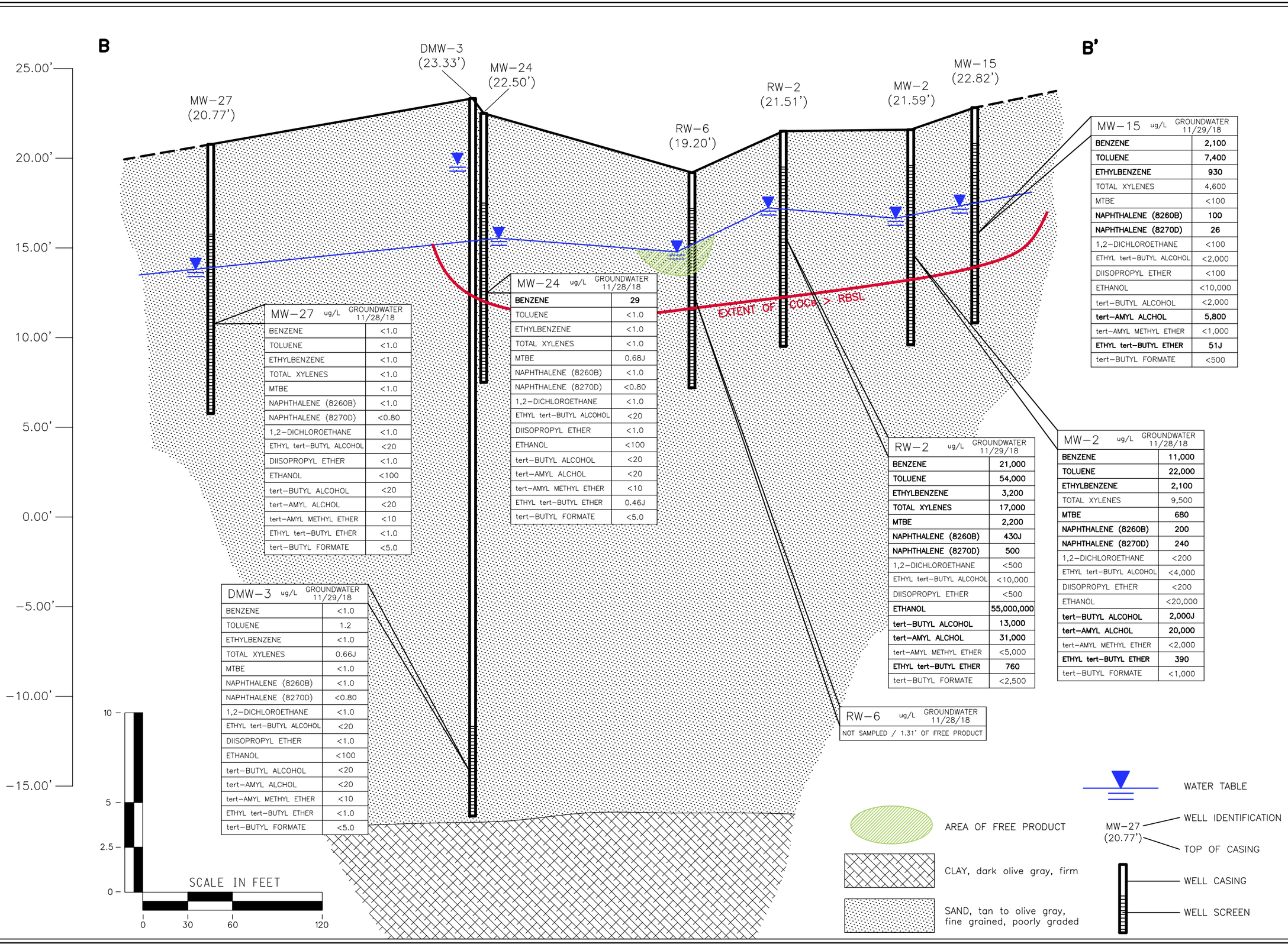
NOTES:
1. GROUNDWATER SAMPLES COLLECTED ON 11/28-29/2018.
2. CONCENTRATION IN BOLD EQUAL OR EXCEED THE CORRESPONDING RBSL
3. J - ESTIMATED VALUE

ATC
ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING
7499 Parklane Road, Suite 112
Columbia, South Carolina 29223
(803) 735-0003 FAX (803) 741-2444

PROJECT NO. CIRK088610
DATE 05/27/2020
SCALE AS SHOWN
REV. BY
PREP. BY BH
TYPE CODE
CAD FILE 1252215.dwg

TITLE **FIGURE 13**
GEOLOGIC CROSS-SECTION A-A'
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

05/27/2020 11:25am - Steve Thompson - H:\125 - ATC__1252215_p2-05-27-20.dwg



NOTES:
1. GROUNDWATER SAMPLES COLLECTED ON 11/28-29/2018.
2. CONCENTRATION IN BOLD EQUAL OR EXCEED THE CORRESPONDING RBSL
3. J - ESTIMATED VALUE

TITLE **FIGURE 14**
GEOLOGIC CROSS-SECTION B-B'
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

CAD FILE 1252215.dwg
TYPE CODE
PREP. BY BH
REV. BY
SCALE AS SHOWN
DATE 05/27/2020
PROJECT NO. C1RK088610

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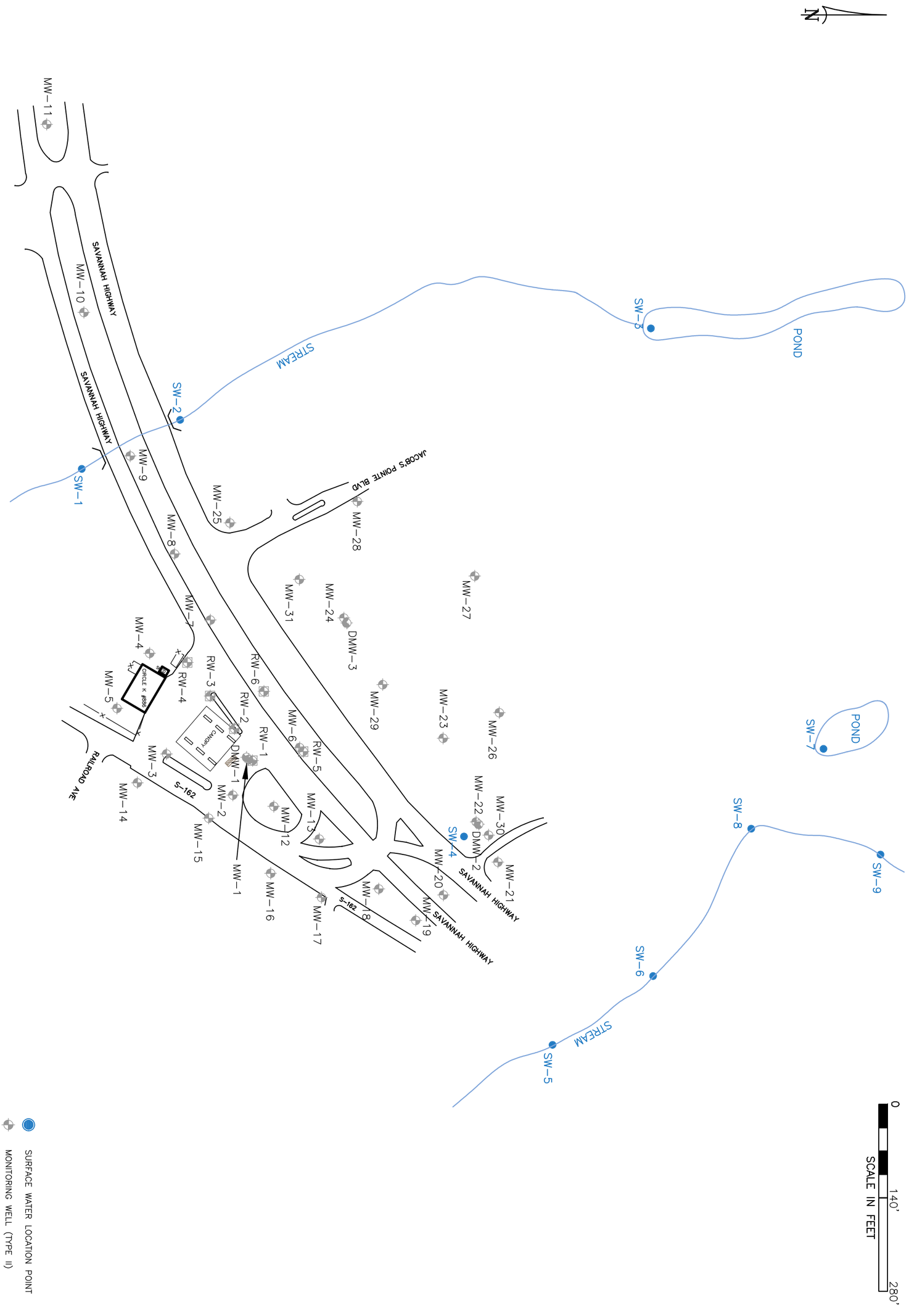

NOTES:

TITLE **FIGURE 15**

SURFICIAL WATER SAMPLE LOCATIONS MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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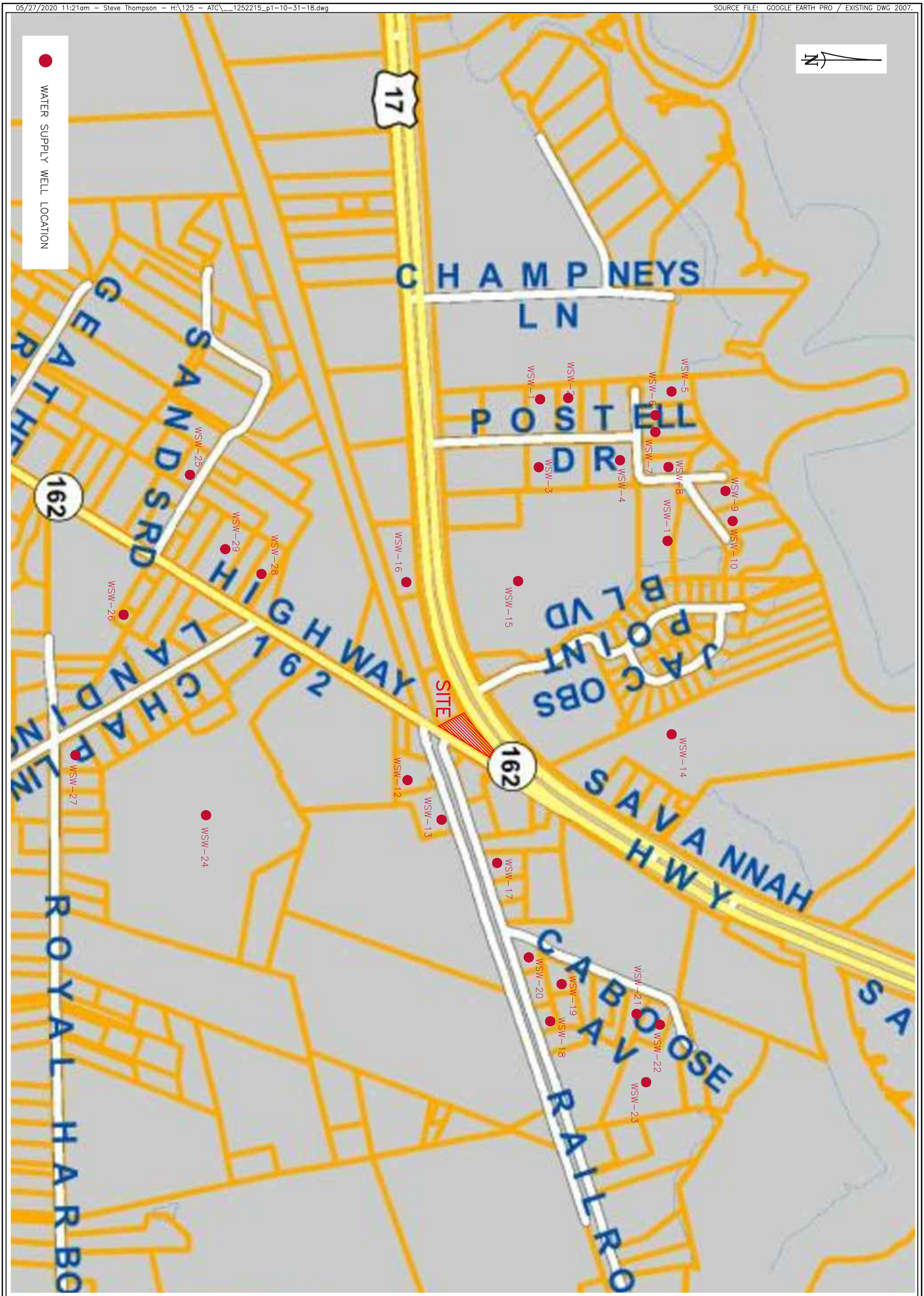

NOTES:

TITLE **FIGURE 16**
PRIVATE WATER WELL LOCATION MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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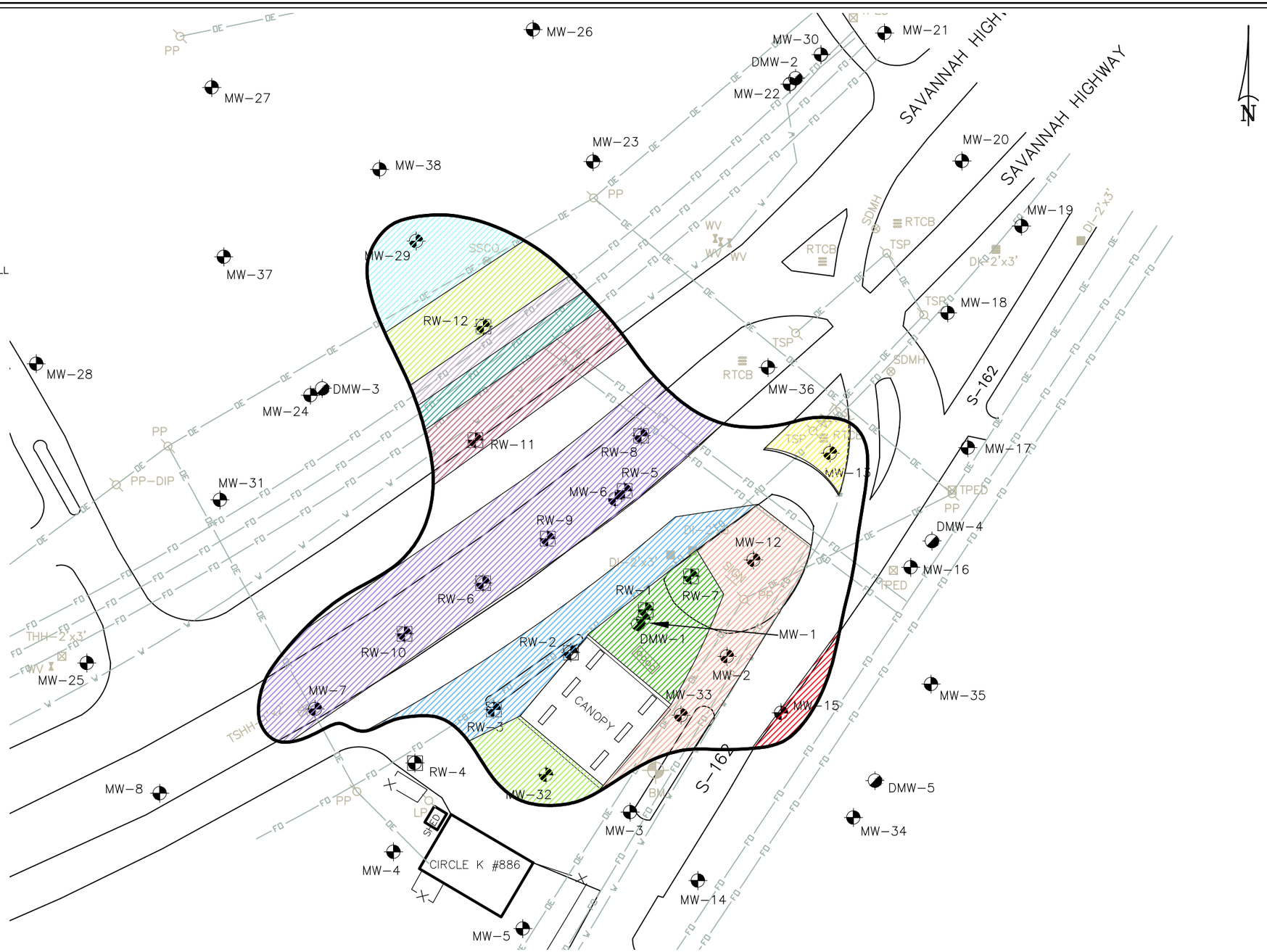
CAD FILE	TYPE CODE	PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
1252215.dwg		BH		N.T.S.	05/27/2020	CIRK088610

SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007.

BENCHMARK
TELEPHONE PEDESTAL (TPED)
STORM DRAIN MAN HOLE (SDMH)
TELEPHONE HAND HOLE (SDMH)
WATER METER (WM)
WATER VALVE (WV)
FIRE HYDRANT (FH)
SIGNAL POLE (TSP)
POWER POLE (PP)
LIGHT POLE (LP)
UNDERGROUND STORAGE TANK FILL (USTF)
ROLL TOP CATCH BASIN (RTCB)
SIGN
SANITARY SEWER CLEAN OUT (SSCO)
TRAFFIC SIGNAL HAND HOLE (THH-2'x3')
DROP INLET (DI-2'x3')
TRAFFIC SIGNAL CONTROL BOX (TSBX)
OVERHEAD ELECTRIC LINE (OE)
WATER LINE (W)
FIBER OPTIC LINE (FO)
MONITORING WELL (TYPE II)
MONITORING WELL (TYPE III)
RECOVERY WELL



TREATMENT ZONE A
TREATMENT ZONE B
TREATMENT ZONE C
TREATMENT ZONE D
TREATMENT ZONE E
TREATMENT ZONE F
TREATMENT ZONE G
TREATMENT ZONE H
TREATMENT ZONE I
TREATMENT ZONE J
TREATMENT ZONE K
TREATMENT ZONE L

0 60' 120'
SCALE IN FEET

NOTES:

TITLE **FIGURE 17**
UST PERMIT #01589
PROPOSED BOSS 200 ® TREATMENT ZONES
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

CAD FILE 1252215.dwg
TYPE CODE
PREP. BY BH
REV. BY
SCALE 1"=60'
DATE 05/27/2020
PROJECT NO. CIRK088610

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Columbia, South Carolina 29223
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06/03/2020 10:58am — Steve Thompson — H:\125 — ATC__1252215_p1-05-27-20.dwg

APPENDIX A

STAKEHOLDER LISTING

CIRCLE K 2720886, UST Permit #01589
Charleston County

Distribution List for Plans and Reports

	Contact Name	Contact Address	Tax Map #
1.	(Responsible Party) CIRCLE K STORE INC, C/O MR BRENT PUZAK	1100 SITUS COURT STE 100 RALEIGH NC 27606	
2.	(Property Owner) GREGORIE LAND COMPANY LLC	PO BOX 2085 PHOENIX, AZ 85072	2450000149,2450000058
3.	BELLSOUTH TELECOMMUNICATIONS LLC	754 PEACHTREE STREET NE ROOM 3A95 ATLANTA, GA 30308	2440000126, 2440000184, 2440000182
4.	NANCY R HUDSON	509 CENTER ST, MT PLEASANT SC 29464-5006	2440000120
5.	ICHC INVESTMENTS LLC	117 N JEFFERSON ST #301, CHICAGO, IL 60661	2440000261
6.	EVELYN B. POSTELL (WSW15)	1613 WAYAH DR, CHARLESTON, SC 29414-5889	2440000106
7.	J&B DEVELOPMENT LLC	1027 BETHANY ST, N. CHARLESTON, SC 29405	2440000185
8.	ELIZABETH L POSTELL	4292 SAVANNAH HWY, RAVENEL, SC 29470	2440000104
9.	STEEN PROPERTIES LLC (WSW16)	4658 SAVANNAH HWY, ADAMS RUN, SC 29426	2450000056
10.	MCCOMBS ROAD LLC (WSW12)	6495 ETHEL POST OFFICE RD MEGGETT, SC 29449	2450000061
11.	GILBERT & LYNN MABRY (WSW13)	4318 MCCOMBS RD RAVENEL, SC 29470	2450000062
12.	FLORENCE BROWN	4276 RAILROAD AVE, RAVENEL, SC 29470	2440000118
13.	DON HESHER (JACOBS POINT HOMEOWNERS ASSOCIATION)	6070 JACOBS POINT BOULEVARD RAVENEL, SC 29470	
14.	OPAL BALDWIN	6385 SAVANNAH HIGHWAY RAVENEL, SC 29470	TOWN OF RAVENEL, MAYOR
15.	MARK BLOOMER	5962 HWY 165 STE 100, RAVENEL, SC 29470	TOWN OF RAVENEL
16.	PRISCILLA & WALKER BURBAGE	4358 WALLACE CREEK WAY RAVENEL, SC 29470	
17.	CAROL CARAWAY	5707 CONNERS ST, RAVENEL, SC 29470	
18.	HAROLD 'BUCK' DUKES	4500 ROSE DRIVE RAVENEL, SC 29470	RAVENEL TOWN COUNCIL
19.	NANCY & GEORGE FERACCO	6099 JACOBS POINT BOULEVARD RAVENEL, SC 29470	
20.	MARTIN FLETES	6057 JACOBS POINT BOULEVARD RAVENEL, SC 29470	
21.	PATRICK FRAZIER	6065 POSTELL DRIVE, RAVENEL, SC 29470	
22.	SCOTT INFINGER	5953 HWY 165, RAVENEL, SC 29470	
23.	JAMIE & MARGAUX KILGALLEN	6079 POSTELL DRIVE, RAVENEL, SC 29470	
24.	TOM MASI	6036 POSTELL DRIVE, RAVENEL, SC 29470	
25.	PRESTON & SUE MULLINAX	4355 WALLACE CREEK WAY RAVENEL, SC 29470	
26.	AMY MYLIN	6210 ROBINSON STREET, RAVENEL, SC 29470	
27.	NANETTE PICCIRILLO	6036 POSTELL DRIVE, RAVENEL, SC 29470	
28.	JOAN PRIOLEAU	5840 CABOOSE AVE, RAVENEL, SC 29470	
29.	NEAL VAN SEYOC	663 OLD JACKSONBORO RD RAVENEL, SC 29470	
30.	STEVE TUMBLESTON	6670 PEPPER GRASS TRAIL RAVENEL, SC 29470	RAVENEL TOWN COUNCIL
31.	TERRY WILKINSON	4354 WALLACE CREEK WAY RAVENEL, SC 29470	WALLACE CREEK WAY

32.	EDWARD T. WRIGHT	5860 CABOOSE AVENUE, HOLLYWOOD, SC 29470	
33.			
34.			

*Information is subject to change due to sale or other exchange of property

Adjacent Facilities

	Facility Name	Facility Address	UST Permit #
1.	H C EVANS EXXON	4389 SAVANNAH HWY, RAVENEL, SC, 29470	01521
2.	REYNOLDS 66	HWY 162 & McCOMBS RD, CHARLESTON, SC, 29407	01613
3.	PETER MILLERS	4213 SAVANNAH HWY, RAVENEL, SC, 29470	16779
4.			
5.			

APPENDIX B

INJECTION WELL PERMIT APPLICATION

Form I UIC	D H E C Underground Injection Control Permit Application Ground-Water Protection Division (Collected under the Authority of Title 48 Chapter I of the 1976 South Carolina Code of Laws)	I. EPA ID NUMBER U	T/A	C

Read attached instructions before starting.
For OfficialUse Only

Application Approved month day year	Date Received month day year	Permit Well Number

Comments

II. Facility Name and Address	III. Owner/Operator and Address
Facility Name: Circle K Store # 2720886	Owner/OperatorName: Circle K Stores, Inc.
Street Address: 4315 Savannah Highway	Street Address: 1100 Situs Court, Suite 100
City: Ravenel; State: SC; Zip Code: 29470	City: Raleigh; State: NC; Zip Code: 27606

IV. Ownership Status (Select One)

☐ A. Federal ☐ B. State ☒ C. Private
☐ D. Public ☐ E. Other (Explain)

V. SIC Codes

5411

VI. Well Status (Select A, B or C)

☐ A. Operating | Date Started *(MM/DD/YYYY)* | ☐ B. Modification/Conversion ☒ C. Proposed

VII. Type of Permit Requested - Class and Type of Well (see reverse)

A. Class(es) enter code(s)	B. Type(s) enter code(s)	C. If class is "other" or type is code 'Y', explain	D. Number of Wells per type
V.A.	I		1,584

VIII. Location of Wells or Approximate Center of field or Project

C	A. Latitude				B. Longitude			
I	Deg	Min	Sec		Deg	Min	Sec	
	32.78182				-80.149655			

IX. Attachments

Complete the following questions on a separate sheet(s) and number accordingly; see instructions for Classes 11, 111, and V, complete and submit on a separate sheet(s) attachments A-U as appropriate. Attach maps where required. List attachments by letter which are applicable and include with your application.

X. Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

A. Name (Type or Print)	Title	B. Phone No.
Brent Reid Rural	Director NAEG	904-219-7170

C. Signature	D. Date Signed (MM/DD/YYYY)
	6/4/20

DHEC2502(08/1997)

Well Class and Type Codes

Class I			Industrial, municipal, and other injection wells for the subsurface disposal of fluids. (Prohibited)
Class II			Oil and gas production and storage related injection wells.
	Type	"D"	Produced fluid disposal well
		"R"	Enhanced recovery well
		"R"	Hydrocarbon storage well (excluding natural gas)
		"X"	Other Class II wells
Class III			Special process injection wells.
	Type	"G"	Solution mining well
		"S"	Sulfur mining well by frasch process
		"U"	Uranium mining well (excluding solution mining of conventional mines)
		"X"	Other Class III wells
Class IV			Hazardous or radioactive waste disposal injection wells. (Prohibited)
Class V.A			Injection wells not included in Class I, II, III, IV or V.B
	Type	"A"	Storm runoff drainage wells
		"B"	Aquifer recharge wells
		"C"	Salt-water intrusion barrier wells
		"D"	Subsidence control wells
		"E"	Backfill wells associated with subsurface mining
		"F"	Geothermal energy recovery wells
		"G"	Experimental technology well
		"H"	Natural gas storage wells
		"I"	Corrective action wells
Class V.B			Non-contact return flow system wells
	Type	"A"	Heat pump return flow wells
	Type	"B"	Cooling water return flow wells

Instructions for Attachments to Form 1
Underground Injection Control
for Corrective Action Wells
(effective 01/91)

The following ATTACHMENTS should be submitted with an underground injection control (UIC) permit application for Class V.A. corrective action wells associated with aquifer remediation that are to be used to inject fluid whose chemical constituents are below all drinking water standards, as established under R.61-58.5.

Attachment A: Activity for Review

Submit a brief description of the activities to be conducted that require a UIC permit.

Attachment B: Well Construction Details

Submit schematic or other appropriate drawings of the surface and subsurface construction details of the recovery and injection wells.

Attachment C: Operating Data

Submit the following proposed operating data for each injection well:

1) Average and maximum daily rate and volume of fluid to be injected. In addition, indicate the average and maximum daily rate and volume of fluid to be withdrawn from each recovery well. Verification of the aquifer's hydraulic ability to produce and accept the quantities proposed should be presented.

2) Average and maximum injection pressure.

3) Pumping schedule (i.e. continuous, alternating cycles, etc.).

4) Proposed ranges in the concentration of all contaminant constituents within the injection fluid. Include comprehensive ground-water quality data from a "worst case" well sample.

5) Length of time the project is expected to require injection to complete remediation (to ensure the effective dates of the permit will allow sufficient time to complete the project).

Attachment D: Monitoring Program

Discuss the planned monitoring program in detail:

1) Include a discussion of monitoring devices, sampling frequency (sufficient to verify treatment system efficiency), sampling protocol, sampling location, parameters to be analyzed, and proposed method(s) of analysis.

2) This plan should indicate how, through monitoring, the proposed contaminant levels in the injectate will be verified.

3) This plan should also clearly illustrate exactly how hydraulic control of the contaminant plume (and injectate, where relevant) will be verified through monitoring (i.e., piezometers, quality analyses, etc.).

Attachment E: Existing or Pending State/Federal Permits

List the program and permit number of any existing State or Federal permits for the facility (i.e., NPDES, RCRA, UST, etc.).

Attachment F: Description of Business

Give a brief description of the nature of the business of the facility and any immediately adjacent facilities.

Attachment G: Area of Review

1) The area of review should be a fixed radius of 1/4 mile from the injection well, the outermost injection wells (if a wellfield).

2) If a fixed radius is not selected, the methods and the calculations used to determine the size of the area of review should be submitted.

Attachment H: Maps of Wells and Area of Review

1) Submit a topographic map of the area, extending one mile beyond the project property boundaries. This map should show all hazardous waste treatment, storage, or disposal facilities, and all intake and discharge structures associated with the project facility. Any known areas of soil and/or ground-water contamination within a one mile radius should be indicated. Also indicate all surface bodies of water, springs, mines (surface and subsurface), quarries, and other pertinent surface features such as residences, roads, and geologic faults (known or suspected).

2) A scaled map(s) should be included which shows the name and/or number and the location of ALL production, injection, monitoring, abandoned and dry wells within the area of review. This should be accomplished by file and field surveys. Information regarding the construction (i.e., total depth, diameter, casing/screened intervals, grouting, etc.) and the current status (i.e., actively used, temporarily abandoned, permanently abandoned) of ALL wells within the area of review should be submitted. If any wells have been abandoned, details on the method the wells were abandoned (i.e., cemented/grouted, filled with sand, etc.) should be included.

3) A potentiometric map of the project site should be submitted which accurately locates all monitoring wells and proposed recovery and injection wells and outlines the horizontal extent of both the free-phase contaminant (where applicable) and dissolved contaminant plumes. Include all water level and product thickness data. The date and time that water levels and product thicknesses were measured should be indicated.

Attachment I: Cross Sections/Diagrams

1) Geologic cross sections indicating the lithology and stratigraphy of the site and the horizontal and vertical extent of the contaminant plume, should be submitted. At least two stratigraphic cross sections, one parallel and one perpendicular to the horizontal ground-water flow direction, should be submitted. In areas where the site stratigraphy is complex, additional cross sections should be submitted to clearly illustrate the local conditions.

2) A schematic diagram, in the form of a cross section, showing the proposed remediation system with the components of flow (above and below ground) and all associated appurtenances (i.e., stripping tower, piping, wells, etc.).

Attachment J: Name and Depth of Underground Sources of Drinking Water (USDW's)

Identify and describe all aquifers which may be affected by the injection.

Attachment K: Hydraulic Control

1) Sufficient supporting data (i.e. time/drawdown data, Theis curves and methods, calculations, etc.), used to determine aquifer characteristics to verify complete hydraulic control over the contaminant plume (and injectate, if proposed injectate quality does not conform to classified ground-water standards) during injection should be submitted. At a minimum, values should be given for transmissivity, hydraulic conductivity, effective porosity and specific yield.

2) Demonstrate the presence and magnitude of, or the absence of, any vertical hydraulic gradient at the site. If a vertical hydraulic gradient exists, show how its direction and magnitude are incorporated in the calculations demonstrating hydraulic control.

3) Ground-water flow computer models (especially 2-D map view with potentiometric and flow lines) may be utilized and submitted. All calculations should be in English units. All model-derived data and maps should be properly labeled and keyed so as to be clearly understood.

Subsequent Action

After receipt of a complete Underground Injection Control Permit Application, the Department will make a determination to deny or issue a Permit to Construct the injection well(s). After the well(s) is/are constructed, the Department should be notified in writing of the well(s) completion and sent a copy of the completed well record form(s) signed by a South Carolina certified well driller which illustrates the "as built" well construction. If the system is in compliance with the approved application, the Department may then issue an Approval to Operate. This Approval to Operate is the final permission necessary prior to injection.

Attachment A: Activity for Review

The remediation objective is to (1) remove residual free-phase petroleum product (also referred to as light non-aqueous-phase liquid, or LNAPL) from the site and (2) reduce the petroleum chemicals of concern (COC) in groundwater to concentration levels which are equal to or less than the site-specific target levels (SSTLs) as defined in the Corrective Action Solicitation. To that end, ATC is proposing the use of a “Trap & Treat®” in-situ chemical/biological applicant, Boss200®, developed by Remediation Products, Inc. (RPI) in conjunction with AST Environmental (AST).

The product is typically mixed with water to create a slurry that can be applied using a variety of techniques including: Direct push injection, soil mixing techniques, and trenching. It is commonly employed in plume wide treatment including treatment of LNAPL source, mid, and downgradient plume regions. Plume area treatment is normally accomplished using slurry injection across the impacted thickness at a number of points located using a triangular grid pattern. Effective barriers can be constructed by injection using a tight point grid layout or through trenching or soil mixing.

BOS 200® provides a unique opportunity to utilize two proven technologies to effectively remediate petroleum hydrocarbon sites. The two technologies are 1) the trapping of the contaminants via carbon adsorption and 2) the subsequent treatment via biological degradation within the BOS 200® matrix as the product incorporates both aerobic and anaerobic biological processes.

These two proven and very powerful remediation mechanisms make what is called the “Trap and Treat” process. The “Trap” provides the immediate mass reduction and plume control, while the “Treat” provides the continued long-term remedial degradation.

The product comes as a fine-grained dry material which consists of: carbon, calcium sulfate, nitrate, phosphate, and ammonia in a proprietary blend. BOS 200® is 77% by weight carbon and up to 19% gypsum, the sulfate source. Gypsum is 79% by weight sulfate which translates to approximately 15% by weight sulfate in BOS 200®. The BOS 200® is mixed with water and a facultative blend of microbes (inoculation with aerobic and anaerobic microbes) to create a solids suspension. This is now an ideal environment for the biological process, where hydrocarbons are adsorbed on to BOS 200® particles made up of:

- Electron Acceptors: oxygen, nitrate, and sulfate (primary)
- Nutrients - phosphorus and nitrogen
- Aerobic and anaerobic blend of microbes (over 27 species of microbes)

One of the advantages of the product is that the design approach can vary from a treatment objective where a complete immediate contaminant mass removal from the groundwater is achieved, to a partial contaminant mass reduction working in conjunction with the biological process driving the groundwater cleanup effort, or any number of somewhere in between. The end effect is that plume can be controlled in a short period of time and treatment can be extended over a longer period of time.

The success in achieving cleanup goals is not just in the product installed, but the distribution of the product in subsurface. Distribution is controlled by the injection techniques used: i.e., vertical and horizontal spacing as a function of soil type, high pressure injection vs. low pressure injection, and top down vs. bottom up. For this site, given the soil type and contaminant mass, we propose to optimize the injectate distribution by 1) using top down techniques, 2) using relatively high flow (~70 gpm) injections generating targeted exit velocities of 8,000 to 12,000 feet per minute leaving the injection tip providing radial mixing of the BOS 200® slurry with the sandy formation, and 3) adjusting the horizontal and vertical injection spacing.

It is expected that the injection pressures will vary from 400 to 600 psig (measured at the discharge of the injection pump - the injection system pressure loss is ~300 psig depending on length and diameter of hoses and injection tip geometry). The discussion of the vertical and horizontal injection spacing is provided below for each of the injection areas.

On-site Injection Areas including Upgradient MW-15 Area

Injection Area A (Defined by MW-15 groundwater benzene concentrations 1.0 mg/l)

- Total Treatment Area: 1,060 ft^2
- Number of Injection Points & Horizontal Spacing: 43 points on 5’ triangular grid pattern
- Total Number of Injections and Vertical Spacing:194 injections, 4’-12’ vertical treatment zone (alternate 4’, 6’, 8’, 10’, 12’ bgs and 5’, 7’, 9’, 11’ bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~20 lbs. per injection interval (15 gallon shot volume) = 3,870 lbs. of BOS 200®
- Bacteria Concentrate: 8 gallons
- Supplemental Sulfate: 20 lbs per interval = 3,870 lbs
- Food Grade Starch: 5 lbs per interval = 968 lbs
- Yeast Extract: 0.25 lbs per interval = 48 lbs

Injection Area B (Defined by MW-12 and MW-2 groundwater benzene concentrations 1.0 mg/l)

- Total Treatment Area: 4,760 ft^2
- Number of Injection Points & Horizontal Spacing: 190 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 855 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~20 lbs. per injection interval (15 gallon shot volume) = 17,100 lbs. of BOS 200®
- Bacteria Concentrate: 34 gallons
- Supplemental Sulfate: 20 lbs per interval = 17,100 lbs
- Food Grade Starch: 5 lbs per interval = 4,2745 lbs
- Yeast Extract: 0.25 lbs per interval = 214 lbs

Injection Area C (Defined by MW-32 groundwater benzene concentrations 0.340 mg/l)

- Total Treatment Area: 2,030 ft^2
- Number of Injection Points & Horizontal Spacing: 81 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 855 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~15 lbs. per injection interval (15 gallon shot volume) = 5,468 lbs. of BOS 200®
- Bacteria Concentrate: 11 gallons
- Supplemental Sulfate: 20 lbs per interval = 7,290 lbs
- Food Grade Starch: 5 lbs per interval = 1,823 lbs
- Yeast Extract: 0.25 lbs per interval = 91 lbs

Injection Area D (Defined by MW-1 and MW-3 groundwater benzene concentrations 19.3 mg/l)

- Total Treatment Area: 2,900 ft^2
- Number of Injection Points & Horizontal Spacing: 116 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 522 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~30 lbs. per injection interval (15 gallon shot volume) = 15,660 lbs. of BOS 200®
- Bacteria Concentrate: 31 gallons
- Supplemental Sulfate: 15 lbs per interval = 7,830 lbs
- Food Grade Starch: 5 lbs per interval = 2,610 lbs
- Yeast Extract: 0.25 lbs per interval = 131 lbs

Injection Area E (Defined by RW-2 and RW-3 groundwater benzene concentrations 19.3 mg/l)

- Total Treatment Area: 4,950 ft^2
- Number of Injection Points & Horizontal Spacing: 198 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 891 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~30 lbs. per injection interval (15 gallon shot volume) = 26,730 lbs. of BOS 200®
- Bacteria Concentrate: 53 gallons
- Supplemental Sulfate: 15 lbs per interval = 13,365 lbs
- Food Grade Starch: 5 lbs per interval = 4,455 lbs
- Yeast Extract: 0.25 lbs per interval = 223 lbs

Off-site Injection Areas

Injection Area F (Defined by MW-5 and MW-6 groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 12,500 ft^2
- Number of Injection Points & Horizontal Spacing: 500 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 2,250 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 56,250 lbs. of BOS 200®
- Bacteria Concentrate: 113 gallons
- Supplemental Sulfate: 20 lbs per interval = 45,000 lbs
- Food Grade Starch: 5 lbs per interval = 11,250 lbs
- Yeast Extract: 0.25 lbs per interval = 563 lbs

Injection Area G (Defined by RW-11 groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 2,800 ft^2
- Number of Injection Points & Horizontal Spacing: 112 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 504 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 12,600 lbs. of BOS 200®
- Bacteria Concentrate: 25 gallons
- Supplemental Sulfate: 20 lbs per interval = 10,080 lbs
- Food Grade Starch: 5 lbs per interval = 2,520 lbs
- Yeast Extract: 0.25 lbs per interval = 126 lbs

Injection Area H (Groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 575 ft^2
- Number of Injection Points & Horizontal Spacing: 23 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 104 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 2,588 lbs. of BOS 200®
- Bacteria Concentrate: 5 gallons
- Supplemental Sulfate: 15 lbs per interval = 2,070 lbs
- Food Grade Starch: 5 lbs per interval = 518 lbs
- Yeast Extract: 0.25 lbs per interval = 26 lbs

Injection Area I (Groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 575 ft^2
- Number of Injection Points & Horizontal Spacing: 23 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 104 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 2,588 lbs. of BOS 200®
- Bacteria Concentrate: 5 gallons
- Supplemental Sulfate: 15 lbs per interval = 2,070 lbs
- Food Grade Starch: 5 lbs per interval = 518 lbs
- Yeast Extract: 0.25 lbs per interval = 26 lbs

Injection Area J (RW-12 groundwater benzene concentrations 13.6 mg/l)

- Total Treatment Area: 2,810 ft^2
- Number of Injection Points & Horizontal Spacing: 112 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 504 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~25 lbs. per injection interval (15 gallon shot volume) = 12,600 lbs. of BOS 200®
- Bacteria Concentrate: 25 gallons
- Supplemental Sulfate: 20 lbs per interval = 10,080 lbs
- Food Grade Starch: 5 lbs per interval = 2,520 lbs
- Yeast Extract: 0.25 lbs per interval = 126 lbs

Injection Area K (MW-29 groundwater benzene concentrations 0.015 mg/l)

- Total Treatment Area: 3,650 ft^2
- Number of Injection Points & Horizontal Spacing: 146 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 104 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~15 lbs. per injection interval (15 gallon shot volume) = 5,475 lbs. of BOS 200®
- Bacteria Concentrate:11 gallons
- Supplemental Sulfate: 10 lbs per interval = 7,300 lbs
- Food Grade Starch: 5 lbs per interval = 3,650 lbs
- Yeast Extract: 0.25 lbs per interval = 183 lbs

Injection Area L (MW-13 groundwater benzene concentrations 0.037 mg/l)

- Total Treatment Area: 990 ft^2
- Number of Injection Points & Horizontal Spacing: 40 points on 5' triangular grid pattern
- Total Number of Injections and Vertical Spacing: 180 injections, 4'-12' vertical treatment zone (alternate 4', 6', 8', 10', 12' bgs and 5', 7', 9', 11' bgs)
- BOS 200® Loadings & Amount Total Amount per Area: ~15 lbs. per injection interval (15 gallon shot volume) = 1,350 lbs. of BOS 200®
- Bacteria Concentrate: 3 gallons
- Supplemental Sulfate: 10 lbs per interval = 1,800 lbs
- Food Grade Starch: 5 lbs per interval = 900 lbs
- Yeast Extract: 0.25 lbs per interval = 45 lbs

The Safety Data Sheet for BOS 200® is included in the Appendix.

Attachment B.

Injections of BOS 200® will be performed through direct insertion of 1.5-inch diameter Geoprobe rods with special injection tools. At each injection location, the drive rod will be advanced to specified injection intervals to the terminal depth of 12 feet below grade (vertical). The injection points are to be placed at 5-ft. intervals from each other in a triangular grid pattern in each of the assigned treatment areas. Injections will alternate between each injection point starting from the top downward, at either 4, 6, 8, 10 and 12 feet, or at 5, 7, 9, and 11 feet below grade. Injection points will be oriented vertically except for selected injection points in Areas E, F and G. In these treatment areas, injection points may be oriented as far as 45 degrees from the vertical to allow for maximum penetration beneath the roadway of Savannah Highway.

Upon completion of each injection, the remaining annulus of each injection boring will be plugged with hydrated bentonite clay to the ground surface.

Schematics of both the vertically-oriented and angled injection points are included in the Appendix. Locations of the treatment areas are indicated in the Appendix as Figure 17 from the Corrective Action Plan (CAP).

Attachment C: Operating Data

For this site, given the soil type and contaminant mass, we propose to optimize the injectate distribution by 1) using top down techniques, 2) using relatively high flow (~70 gpm) injections generating targeted exit velocities of 8,000 to 12,000 feet per minute leaving the injection tip providing radial mixing of the BOS 200® slurry with the sandy formation, and 3) adjusting the horizontal and vertical injection spacing. It is expected that the injection pressures will vary from 400 to 600 psig (measured at the discharge of the injection pump - the injection system pressure loss is ~300 psig depending on length and diameter of hoses and injection tip geometry).

Attachment D: Monitoring Program

Performance monitoring, as part of the Corrective Action System Evaluation (CASE), will be completed at the following frequencies:

(1) Initial Baseline sampling to be undertaken on all site wells (SSTL wells and non-SSTL wells), SCDHEC - designated recovery wells, designated water supply wells, and designated surface water sample locations.
(2) Semi-annual sampling will be performed on all site wells (SSTL wells and non-SSTL wells) and SCDHEC - designated recovery wells, private water wells, and surface water sample locations. Sampling will be performed in the approximate schedule of January and June of each calendar year.

Each CASE report will include descriptions of sampling methodology, including pre-sample purging as required in the SCDHEC UST QAPP (unless a low-flow or approved non-purging method is utilized), appropriate data tables, to include` mass removal calculations, figures showing groundwater flow and distribution of chemical s of concern (CoCs), and an effectiveness evaluation of the remedial approach and a plan for CAP amendment if necessary to achieve remedial goals. All CASE reports will be signed by a Professional Engineer or Professional Geologist registered in South Carolina.

Attachment E

Circle K Stores, Inc has contracted ATC to perform site rehabilitation activities at the Circle K Store no, 2720886 facility in Ravenel, Charleston County, SC. To the best of ATC's knowledge, there are no current federal, state, or local environmental permits (including discharge permits), other than the UST registration (SCDHEC # 01589).

Attachment F

The site and UST system (gasoline, 3 grades, and diesel fuel) are owned by Circle K Stores, Inc. The USTs remain in service and the facility is currently functioning as a convenience store with retail sale of gasoline and diesel motor fuel. The surrounding properties consist of

- A multi-lane divided highway, Savannah Highway (US 17), to the north, beyond which is wooded land, and the Jacobs Point residential area,
- SC Highway 162 to the east, beyond which are a church (Mt. Olivet Ref. Episcopal), commercial (Nancy's Exotic Plants) and undeveloped properties,
- undeveloped land, SC 162, Railroad Avenue and CSX railroad to the south, and
- undeveloped land, Savannah Highway, and a medical facility (Rai Care Center) to the west.

Attachments G & H

A topographic map illustrating the Area of Review with 1-mile and 0.5-mile radii from the site indicated, is provided in the Appendix as Figure 1 from the CAP. Based on previous well surveys, there are 29 identified private potable and non-potable water wells located within a 0.25-mile radius. A water well location map is included in the Appendix as Figure 16 from the CAP. Information on well depths was very limited, with one well confirmed to be at a depth of 1,400 feet and another identified as an irrigation well with a depth of 50 feet (surficial aquifer). Previous sampling results from 2018 and 2019 have shown that no water well has contained detectable levels of petroleum constituents. Information obtained from the SC Department of Natural Resources Coastal Plain Well Inventory (figure attached) has identified that of four nearby wells, three are extended to total depths of 520 to 480 feet below ground surface, with open boreholes extending from 177 to 119 feet below ground surface (Black Creek Aquifer). One well was reported to be a domestic well extending to only 58 feet (surficial aquifer). Groundwater elevation contour maps for the uppermost and lower portion of the surficial aquifer from measurements made in March of 2020 are also attached in the Appendix as Figures 3 and 4 from the CAP. Groundwater flow in the uppermost portion is shown to be dominantly northwest, while flow in the deeper portion is shown to be northeast. Also included in the Appendix are a Free Product Extent Map for March 2020 (Figure 5 from the CAP) and Historic Groundwater Analytical Data (Table 3 from the March 2020 Groundwater Monitoring Report).

Attachment I

A cross section location map is included in the Appendix as Figure 12 from the CAP. Geologic cross sections A-A' and B-B' are included in the Appendix as Figures 13 and 14, respectively, from the CAP. These cross sections depict the site lithology and contaminant levels as of the Tier II Assessment in 2018.

Attachment J

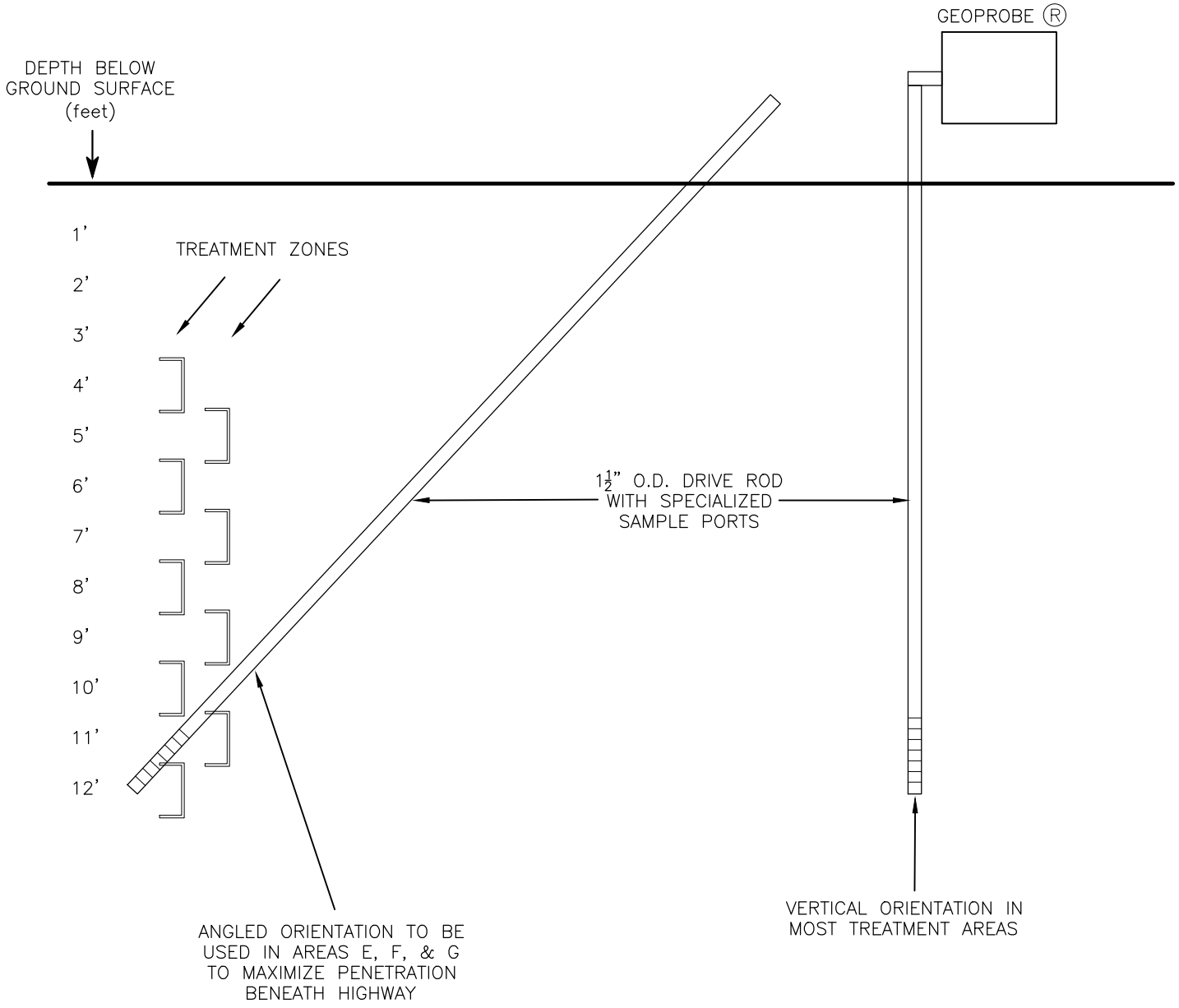
The shallow surficial aquifer at the site extends from depths of approximately 3 feet below ground surface to at least 40 feet (as assessed from deep monitoring wells installed at the site). The presence of at least two nearby water wells (one used for irrigation, the other unknown) indicates that these wells likely extend to the base of the surficial aquifer. The surficial aquifer is likely not used as a drinking water source due to poor ambient quality and yield. The base of the surficial aquifer is thought to be defined by the Cooper Marl, which was not encountered at the site but is thought to be present at or below 50 feet below grade. Most wells in the vicinity extend from approximately 100 to 500 feet or more below grade, which is thought to be the Black Creek Aquifer, a regional water source.

Attachment K

The 12 target areas for treatment measure approximately 39,000 square feet in total .The depth to water in this area is typically between 3 and 4 feet below ground surface (bgs). The dominant lithology at the site, based on boring logs, is slightly silty and slightly clayey fine sand, with sand content increasing with depth. The hydraulic conductivity, from the 2018 Tier II Assessment, was calculated as an average of 98.757 ft./year in the uppermost portion of the surficial aquifer. The seepage velocity in the uppermost portion of the surficial aquifer was calculated at 2.76 ft./year, using a horizontal gradient of 0.012 and an estimated porosity of 0.43. The flow of groundwater in the uppermost portion of the surficial aquifer was determined to be to the northwest. The hydraulic conductivity was calculated as an average of 42.144 ft./year in the lower portion of the surficial aquifer. The seepage velocity in the lower portion of the surficial aquifer was calculated at 3.04 ft./year, using a horizontal gradient of 0.031 and an estimated porosity of 0.43. The flow of groundwater in the lower portion of the surficial aquifer was determined to be to the northeast. No vertical groundwater gradient was interpreted between adjacent wells screened in the uppermost and lower portions of the surficial aquifer.

Appendix

Schematic of Injection Points
Treatment Area Location Map (Figure 17 from CAP)
Area of Review (Figure 1 from CAP)
Water Well Location Map (Figure 16 from CAP)
SCDNR Coastal Plain Well Inventory Display
Groundwater Flow-Uppermost Portion of Surficial Aquifer (Figure 3 from CAP)
Groundwater Flow-Lower Portion of Surficial Aquifer (Figure 4 from CAP)
Cross Section Location Map (Figure 12 from CAP)
Cross Section A-A' (Figure 13 from CAP)
Cross Section B-B' (Figure 14 from CAP)
Free Product Extent Map, March 2020 (Figure 5 from CAP)
Historic Groundwater Analytical Data (Table 3 from the March 2020 Groundwater Monitoring Report)
Safety Data Sheet, BOS 200®



TITLE

INJECTION POINT SCHEMATIC FOR BOSS 200® APPLICATION
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

7499 Parklane Road, Suite 112
Columbia, South Carolina 29223
(803) 735-0003 FAX (803) 741-2444

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CAD FILE		PREP. BY	REV. BY	SCALE	DATE	PROJECT NO.
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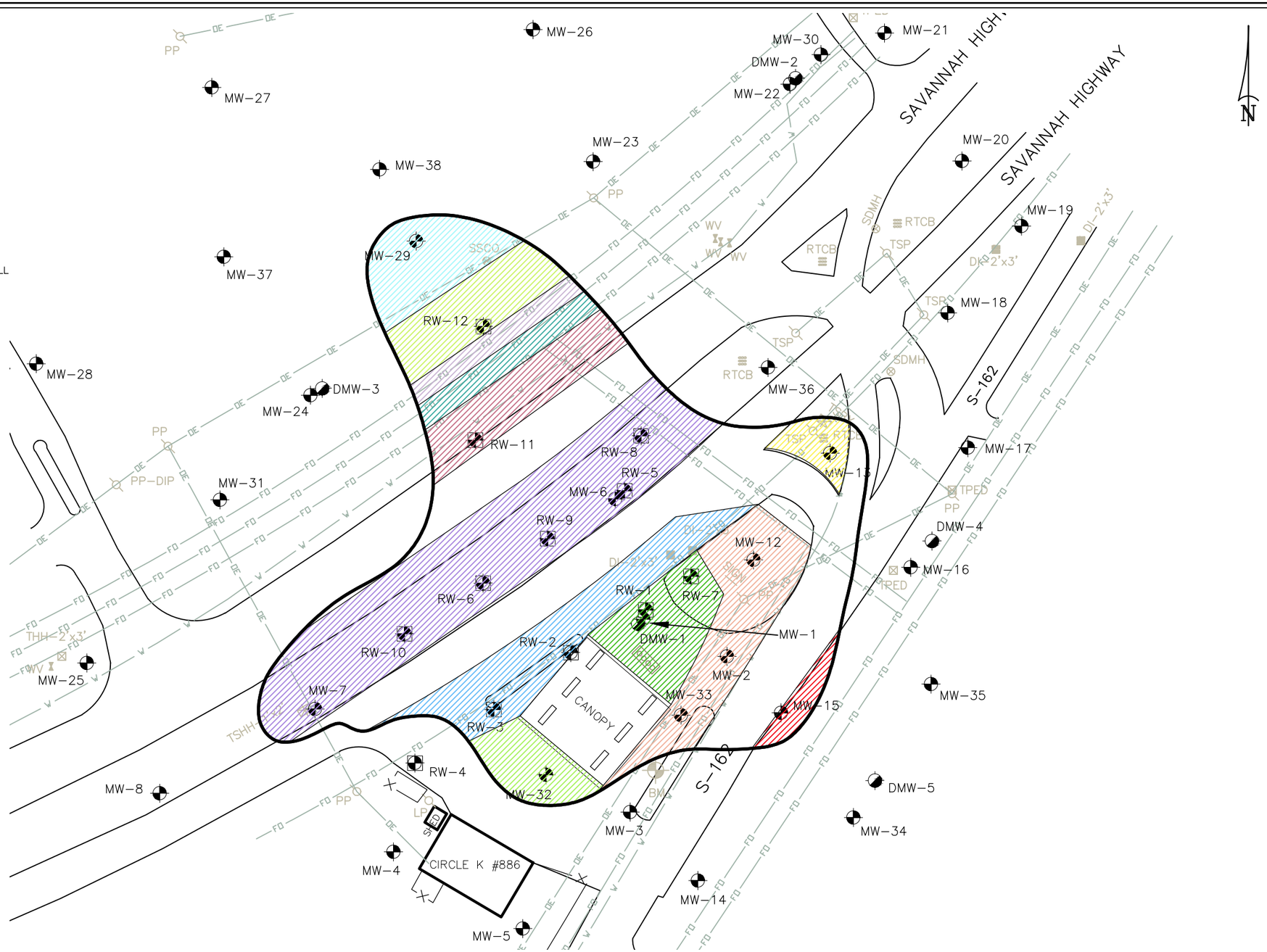
SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007.

BENCHMARK
TELEPHONE PEDESTAL (TPED)
STORM DRAIN MAN HOLE (SDMH)
TELEPHONE HAND HOLE (SDMH)
WATER METER (WM)
WATER VALVE (WV)
FIRE HYDRANT (FH)
SIGNAL POLE (TSP)
POWER POLE (PP)
LIGHT POLE (LP)
UNDERGROUND STORAGE TANK FILL (USTF)
ROLL TOP CATCH BASIN (RTCB)
SIGN
SANITARY SEWER CLEAN OUT (SSCO)
TRAFFIC SIGNAL HAND HOLE (THH-2'x3')
DROP INLET (DI-2'x3')
TRAFFIC SIGNAL CONTROL BOX (TSBX)
OVERHEAD ELECTRIC LINE (OE)
WATER LINE (W)
FIBER OPTIC LINE (FO)
MONITORING WELL (TYPE II)
MONITORING WELL (TYPE III)
RECOVERY WELL



TREATMENT ZONE A
TREATMENT ZONE B
TREATMENT ZONE C
TREATMENT ZONE D
TREATMENT ZONE E
TREATMENT ZONE F
TREATMENT ZONE G
TREATMENT ZONE H
TREATMENT ZONE I
TREATMENT ZONE J
TREATMENT ZONE K
TREATMENT ZONE L

0 60' 120'
SCALE IN FEET

NOTES:

TITLE **FIGURE 17**
UST PERMIT #01589
PROPOSED BOSS 200 ® TREATMENT ZONES
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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REV. BY
SCALE 1"=60'
DATE 05/27/2020
PROJECT NO. CIRK088610

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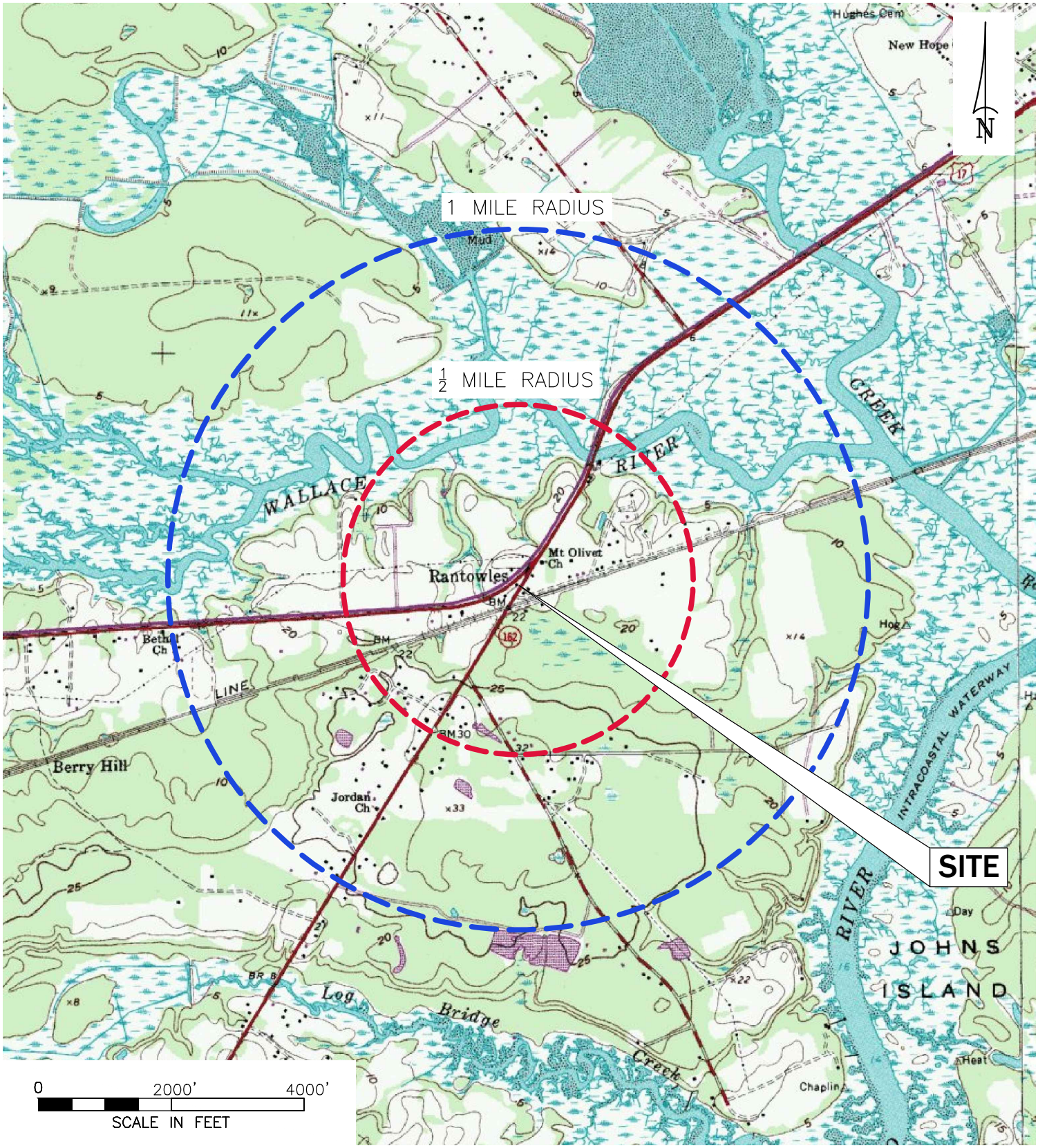

TITLE **FIGURE 1**

SITE LOCATION MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

UST PERMIT #01589

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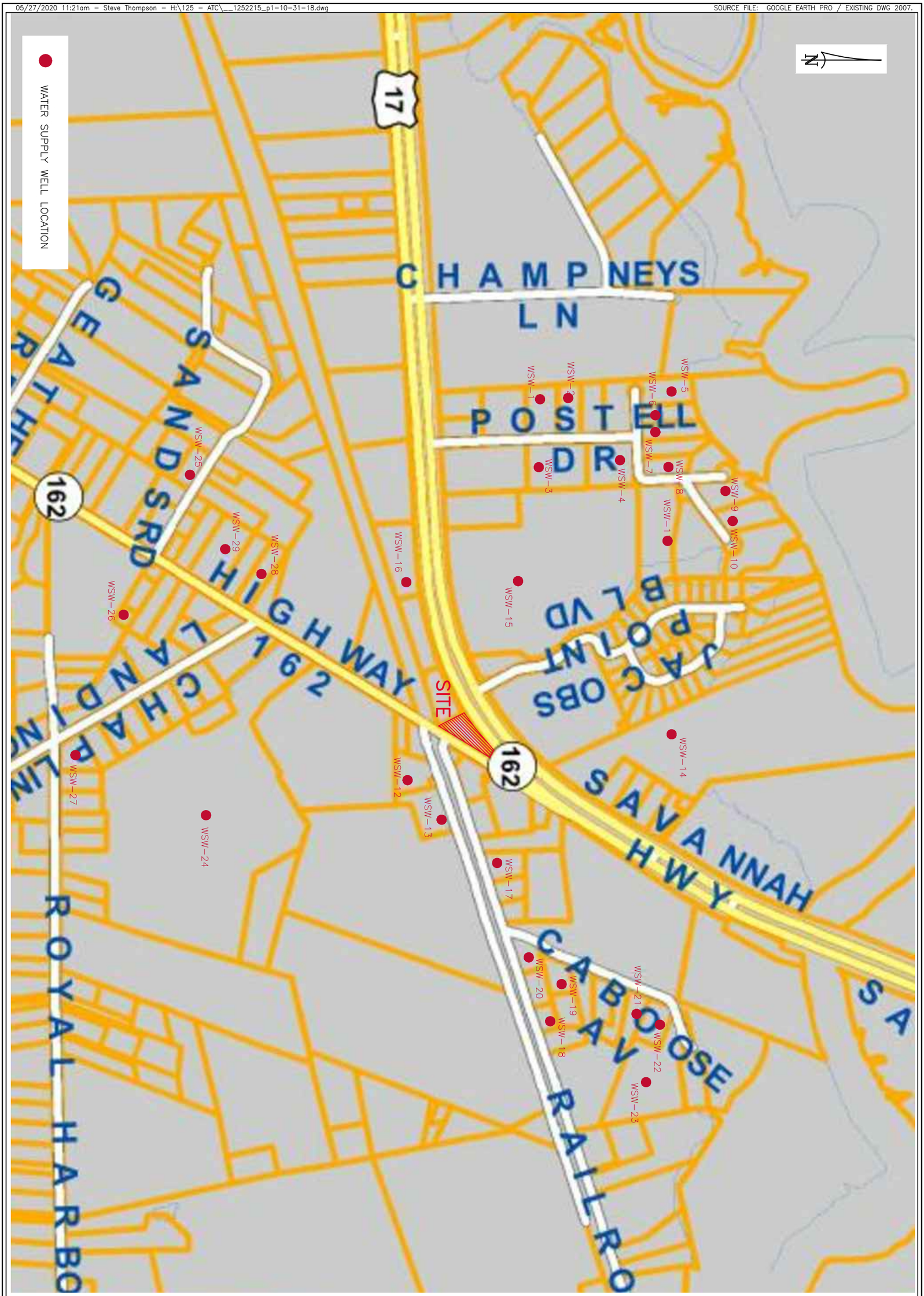

NOTES:

TITLE **FIGURE 16**
PRIVATE WATER WELL LOCATION MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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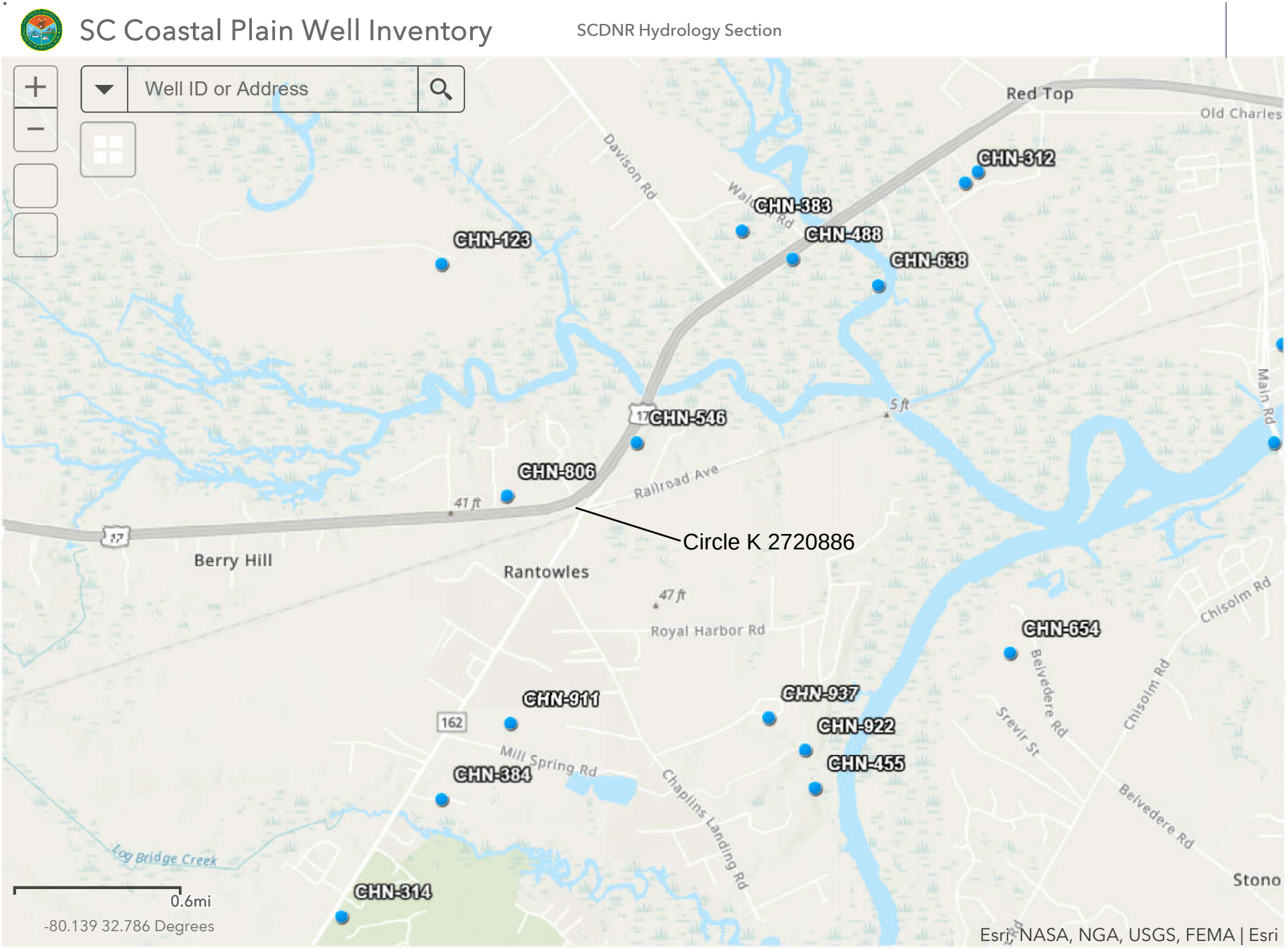
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SCDNR Hydrology Section
Well ID or Address
Red Top
Old Charles
CHN-312
CHN-383
CHN-488
CHN-638
CHN-123
CHN-546
CHN-806
Circle K 2720886
Berry Hill
Rantowles
Railroad Ave
Davison Rd
Main Rd
Chisolm Rd
Belvedere Rd
Royal Harbor Rd
Mill Spring Rd
Chaplins Landing Rd
Log Bridge Creek
Stono
CHN-654
CHN-937
CHN-922
CHN-455
CHN-911
CHN-384
CHN-314
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5 ft
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0.6mi
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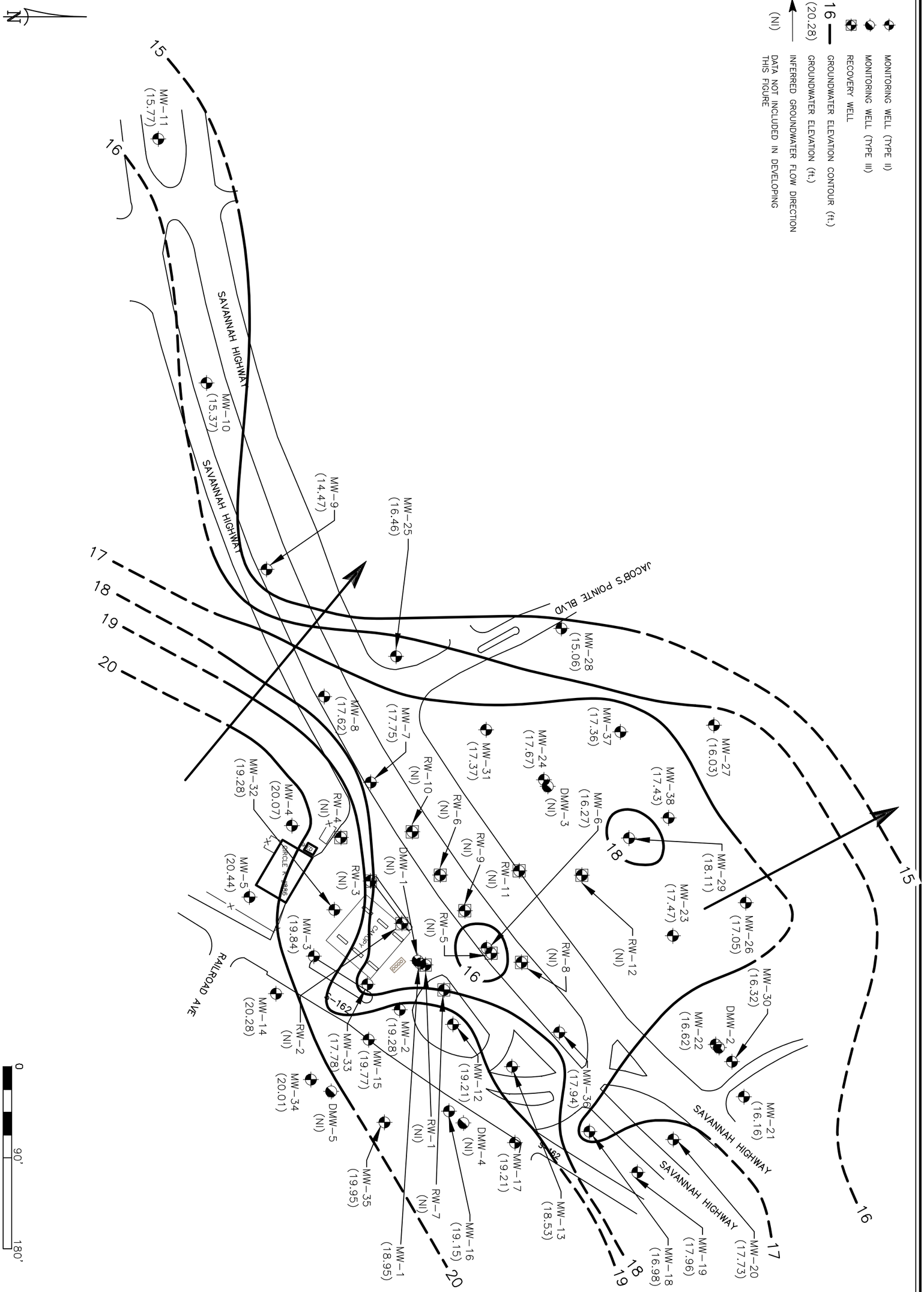
Esri, NASA, NGA, USGS, FEMA | Esri



NOTES:
1. GROUNDWATER ELEVATIONS WERE MEASURED ON 03/02/2020.

TITLE **FIGURE 3** UST PERMIT #01589

POTENTIOMETRIC SURFACE MAP - SHALLOW WELLS
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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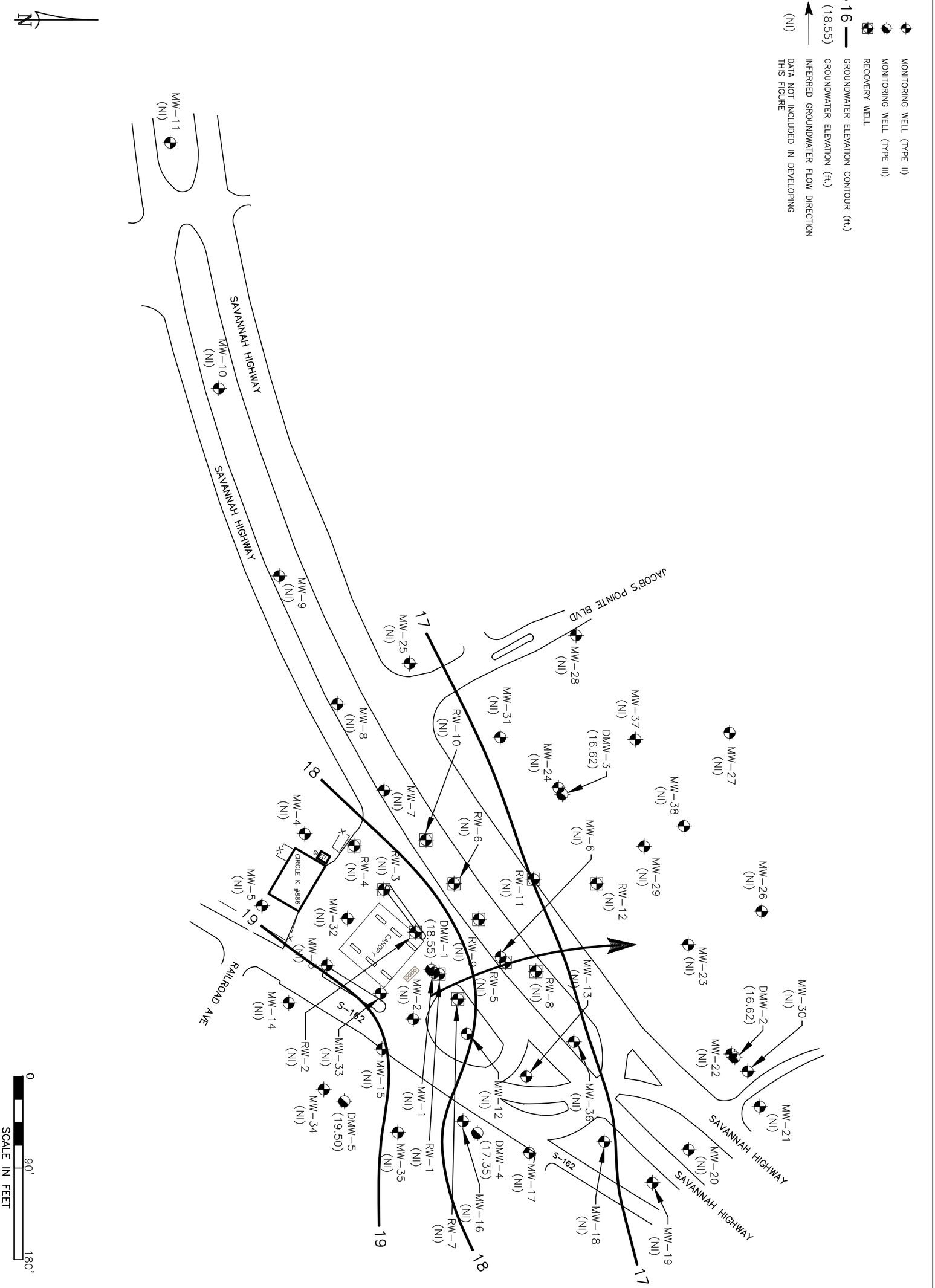

NOTES:
1. GROUNDWATER ELEVATIONS WERE MEASURED ON 03/02/2020.

TITLE **FIGURE 4** UST PERMIT #01589

POTENTIOMETRIC SURFACE MAP - DEEP WELLS
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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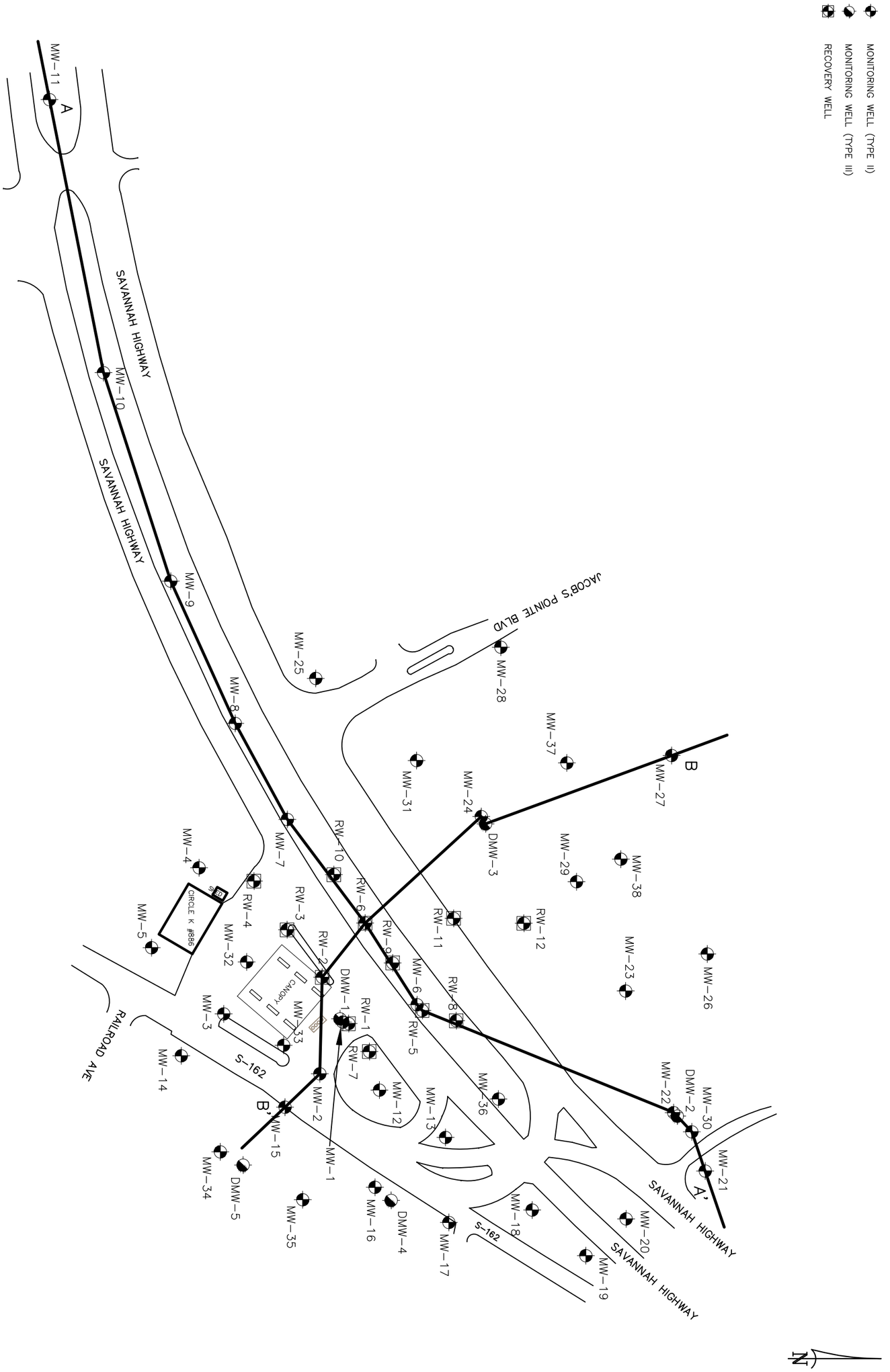

NOTES:

TITLE **FIGURE 12** UST PERMIT #01589

GEOLOGIC CROSS-SECTION LOCATION MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

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Columbia, South Carolina 29223
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SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007

A

A'

25.00'
20.00'
15.00'
10.00'
5.00'
0.00'
-5.00'
-10.00'
-15.00'

MW-11 (18.13')
MW-10 (17.63')
MW-9 (16.50')
MW-8 (19.14')
MW-7 (19.55')
RW-6 (19.20')
MW-6 (19.33')
RW-5 (19.76')
MW-22 (18.79')
DMW-2 (18.81')
MW-30 (18.06')
MW-21 (16.16')

EXTENT OF COCs > RBSL

MW-9 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	14
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	15J
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	0.58J
tert-BUTYL FORMATE	<5.0

MW-6 ug/L	GROUNDWATER 11/28/18
NOT SAMPLED / 0.76' OF FREE PRODUCT	

RW-6 ug/L	GROUNDWATER 11/28/18
NOT SAMPLED / 1.31' OF FREE PRODUCT	

RW-5 ug/L	GROUNDWATER 11/28/18
NOT SAMPLED / 0.36' OF FREE PRODUCT	

MW-11 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-10 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-8 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	9.8J
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-7 ug/L	GROUNDWATER 11/29/18
BENZENE	**12,000**
TOLUENE	**45,000**
ETHYLBENZENE	**2,600**
TOTAL XYLENES	**13,000**
MTBE	<200
NAPHTHALENE (8260B)	**320**
NAPHTHALENE (8270D)	**310**
1,2-DICHLOROETHANE	<200
ETHYL tert-BUTYL ALCOHOL	<4,000
DIISOPROPYL ETHER	<200
ETHANOL	<20,000
tert-BUTYL ALCOHOL	<4,000
tert-AMYL ALCHOL	**17,000**
tert-AMYL METHYL ETHER	<2,000
ETHYL tert-BUTYL ETHER	**98J**
tert-BUTYL FORMATE	<1,000

MW-22 ug/L	GROUNDWATER 11/29/18
BENZENE	**6.5**
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	0.41J
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-30 ug/L	GROUNDWATER 11/29/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

MW-21 ug/L	GROUNDWATER 11/29/18
BENZENE	0.57J
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	15J
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	0.58J
tert-BUTYL FORMATE	<5.0

DMW-2 ug/L	GROUNDWATER 11/28/18
BENZENE	<1.0
TOLUENE	<1.0
ETHYLBENZENE	<1.0
TOTAL XYLENES	<1.0
MTBE	<1.0
NAPHTHALENE (8260B)	<1.0
NAPHTHALENE (8270D)	<0.80
1,2-DICHLOROETHANE	<1.0
ETHYL tert-BUTYL ALCOHOL	<20
DIISOPROPYL ETHER	<1.0
ETHANOL	<100
tert-BUTYL ALCOHOL	<20
tert-AMYL ALCHOL	<20
tert-AMYL METHYL ETHER	<10
ETHYL tert-BUTYL ETHER	<1.0
tert-BUTYL FORMATE	<5.0

WATER TABLE

MW-11 (18.13') WELL IDENTIFICATION / TOP OF CASING

WELL CASING

WELL SCREEN

10 5 2.5 0

SCALE IN FEET

0 50 100 200

CLAY, dark olive gray, firm

SAND, tan to olive gray, fine grained, poorly graded

AREA OF FREE PRODUCT

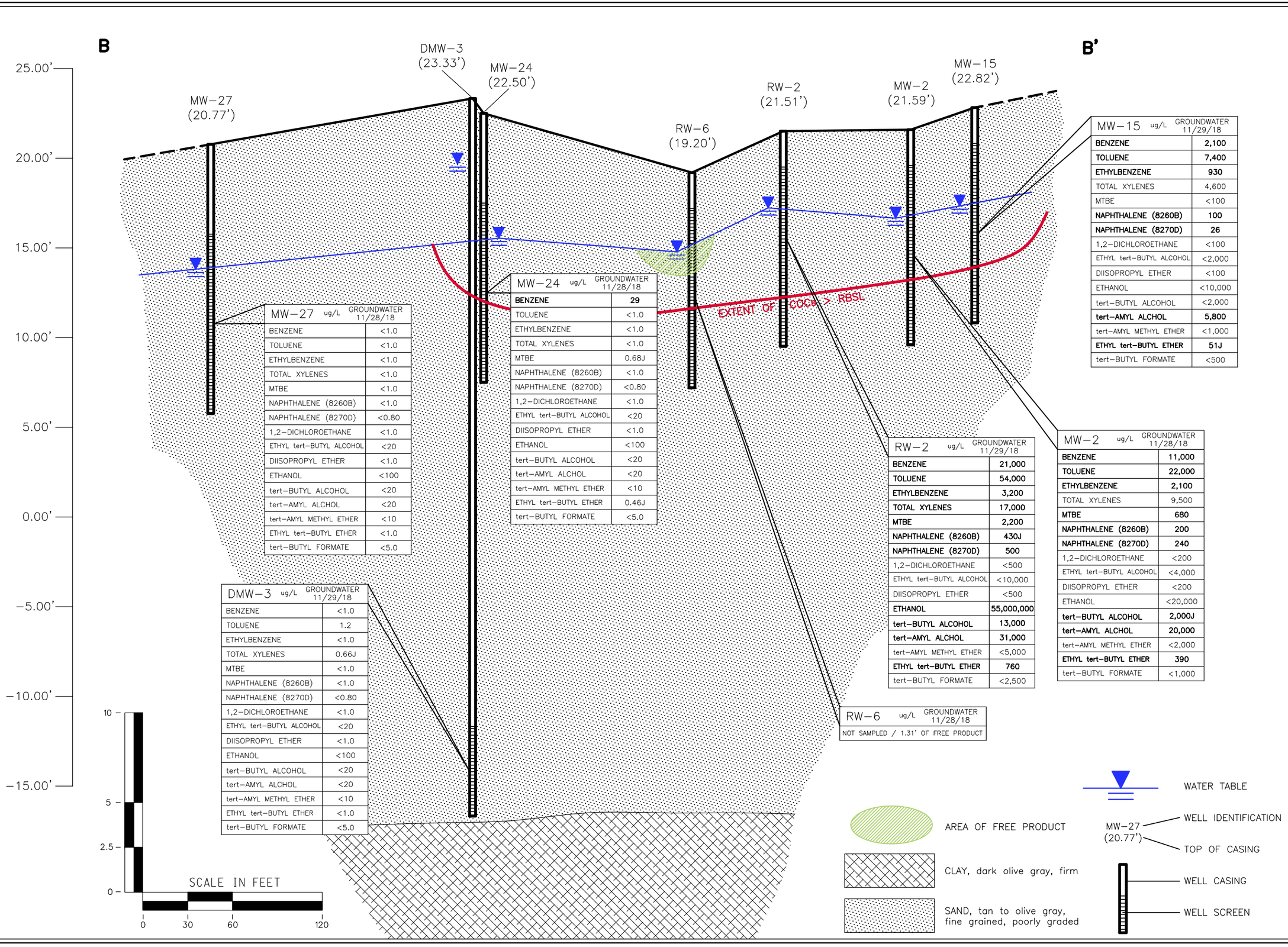
NOTES:
1. GROUNDWATER SAMPLES COLLECTED ON 11/28-29/2018.
2. CONCENTRATION IN BOLD EQUAL OR EXCEED THE CORRESPONDING RBSL
3. J - ESTIMATED VALUE

ATC
ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING
7499 Parklane Road, Suite 112
Columbia, South Carolina 29223
(803) 735-0003 FAX (803) 741-2444

PROJECT NO. CIRK088610
DATE 05/27/2020
SCALE AS SHOWN
REV. BY
PREP. BY BH
TYPE CODE
CAD FILE 1252215.dwg

TITLE **FIGURE 13**
GEOLOGIC CROSS-SECTION A-A'
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

05/27/2020 11:25am - Steve Thompson - H:\125 - ATC__1252215_p2-05-27-20.dwg



NOTES:
1. GROUNDWATER SAMPLES COLLECTED ON 11/28-29/2018.
2. CONCENTRATION IN BOLD EQUAL OR EXCEED THE CORRESPONDING RBSL
3. J - ESTIMATED VALUE

TITLE **FIGURE 14**
GEOLOGIC CROSS-SECTION B-B'
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

CAD FILE 1252215.dwg
TYPE CODE
PREP. BY BH
REV. BY
SCALE AS SHOWN
DATE 05/27/2020
PROJECT NO. C1RK088610

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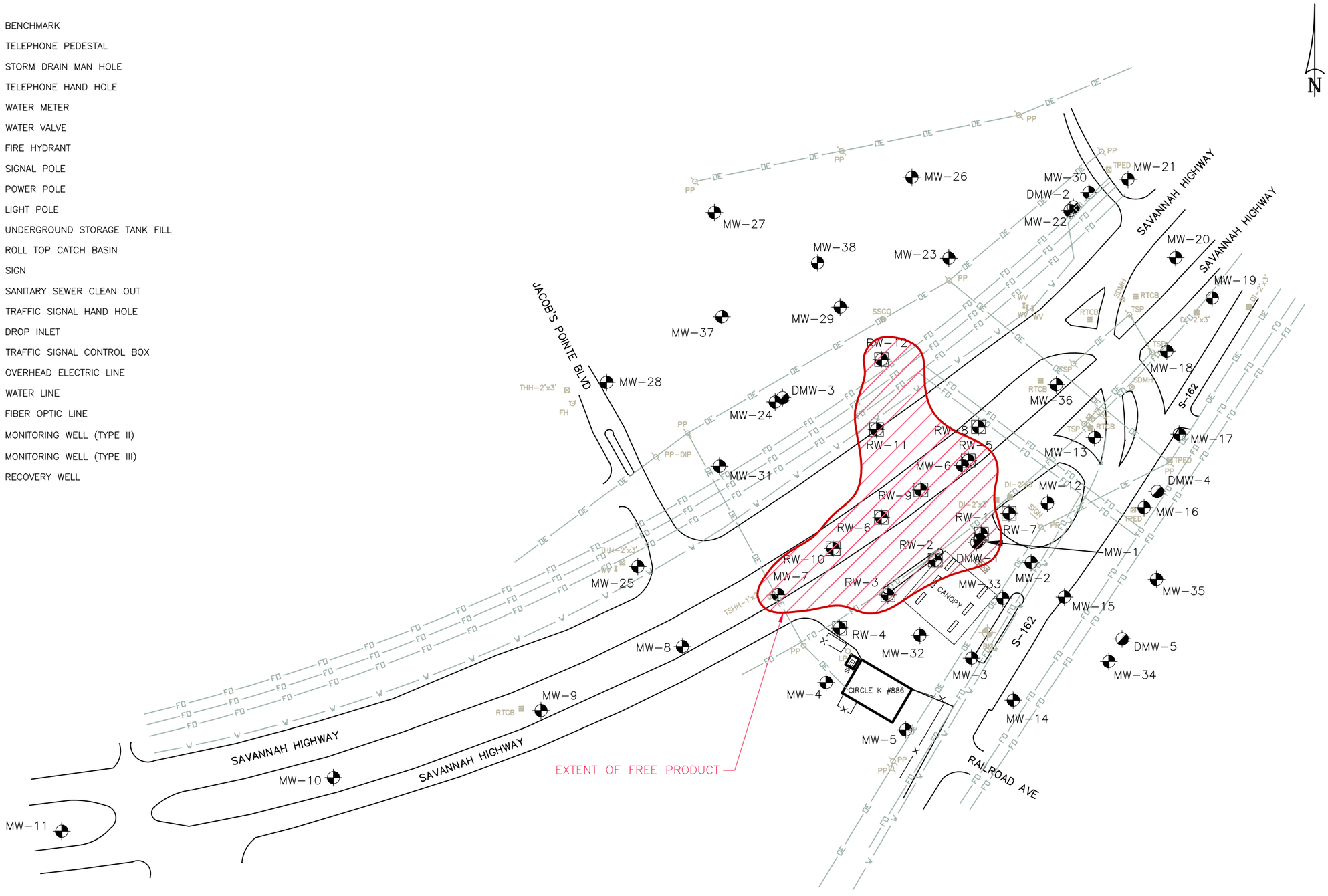
Columbia, South Carolina 29223
(803) 735-0003 FAX (803) 741-2444

SOURCE FILE: GOOGLE EARTH PRO / EXISTING DWG 2007.

- BENCHMARK
- TPED — TELEPHONE PEDESTAL
- SDMH — STORM DRAIN MAN HOLE
- SDMH — TELEPHONE HAND HOLE
- WM — WATER METER
- WV — WATER VALVE
- FH — FIRE HYDRANT
- TSP — SIGNAL POLE
- PP — POWER POLE
- LP — LIGHT POLE
- USTF — UNDERGROUND STORAGE TANK FILL
- RTCB — ROLL TOP CATCH BASIN
- SIGN
- SSCO — SANITARY SEWER CLEAN OUT
- THH–2'x3' — TRAFFIC SIGNAL HAND HOLE
- DI–2'x3' — DROP INLET
- TSBX — TRAFFIC SIGNAL CONTROL BOX
- DE — OVERHEAD ELECTRIC LINE
- W — WATER LINE
- FO — FIBER OPTIC LINE
- MONITORING WELL (TYPE II)
- MONITORING WELL (TYPE III)
- RECOVERY WELL



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(803) 735-0003 FAX (803) 741-2444

PROJECT NO.	DATE	SCALE	REV. BY	PREP. BY	TYPE CODE
CIRK088610	05/27/2020	1"=90'		BH	

UST PERMIT #01589

TITLE **FIGURE 5**
FREE PRODUCT EXTENT MAP
CIRCLE K #2720886
4315 SAVANNAH HIGHWAY
RAVENEL, SOUTH CAROLINA

CAD FILE: 1252215.dwg

NOTES:

05/27/2020 11:33am – Steve Thompson – H:\125 – ATC__1252215_p1-05-27-20.dwg

Table 3
Historical Groundwater Analytical Data
Circle K 2720886
4315 Savannah Highway
Ravenel, Charleston County, South Carolina
UST Permit #01589

Monitoring Well Identification	Sample Date	Petroleum Constituents (ug/L)							Oxygenates (ug/L)							
		Benzene	Toluene	Ethylbenzene	Xylenes,Total	Methyl tert butyl ether	Naphthalene	(1,2 Dichloroethane 1,2 DCA)	ethyl tert-Butyl alcohol	Diisopropyl ether	Ethanol	tert-Butyl alcohol	tert-Amyl alcohol	tert-Amyl methyl ether	ethyl tert-Butyl ether	tert-Butyl formate
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**
01589 MW-1	3/3/2020	**19300**	**44200**	**2460**	**11100**	**1890**	**342**	<250	<25000	<250	**84400**	<25000	**40000**	<2500	<2500	<12500
	07/10/2019	**17700**	**40400**	**2290**	**11400**	**1850**	<250	<250	<25000	<250	<50000	<25000	<25000	<2500	<2500	<12500
	11/28/2018	**23000**	**62000**	**3600**	**18000**	**3100**	**440J**	<500	<10000	<500	**38000J**	**4100J**	**29000**	<5000	**880**	<2500
01589 MW-2	3/3/2020	**0.02 Feet of free product - not sampled**														
	07/10/2019	**10000**	**21600**	**1690**	9250	**559**	**236**	<125	<12500	<125	<25000	<12500	**16200**	<1250	<1250	<6250
	11/28/2018	**11000**	**22000**	**2100**	9500	**680**	**200**	<200	<4000	<200	<20000	**2000J**	**20000**	<2000	**390**	<1000
01589 MW-3	3/3/2020	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	4.7	2.9	<1.0	0.94J	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	14J	<10	<1.0	<5.0
01589 MW-4	3/3/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-5	3/3/2020	<1.0	<1.0	<1.0	<1.0	<1.0	16.9	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-6	3/3/2020	**1.09 feet of free product - not sampled**														
	07/08/2019	**no sample collected due to the presence of 0.09 feet of free product**														
	11/28/2018	**no sample collected due to the presence of 0.76 feet of free product**														
01589 MW-7	3/3/2020	**10600**	**37800**	**2140**	**12000**	<250	**317**	<250	<25000	<250	<50000	<25000	<25000	<2500	<2500	<12500
	07/09/2019	**9210**	**34100**	**2390**	**12700**	<200	**271**	<200	<20000	<200	<40000	<20000	<20000	<2000	<2000	<10000
	11/29/2018	**12000**	**45000**	**2600**	**13000**	<200	**320**	<200	<4000	<200	<20000	<4000	**17000**	<2000	**98J**	<1000
01589 MW-8	3/4/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	9.8J	<10	<1.0	<5.0
01589 MW-9	3/4/2020	<1.0	0.46 J	<1.0	<1.0	1.7	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	14	<1.0	<1.0	<20	<1.0	<100	<20	15J	<10	0.58J	<5.0
01589 MW-10	3/4/2020	<1.0	<1.0	<1.0	<1.0	<1.0	0.74 J	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**

Notes:
Units = µg/L NE = Not established
"<" = Not detected at or above the laboratory reporting limit
RBSL = May 15, 2001 Risk Based Screening Level
Bold concentrations equal or exceed the corresponding RBSL

Table 3
Historical Groundwater Analytical Data
Circle K 2720886
4315 Savannah Highway
Ravenel, Charleston County, South Carolina
UST Permit #01589

Monitoring Well Identification	Sample Date	Petroleum Constituents (ug/L)							Oxygenates (ug/L)							
		Benzene	Toluene	Ethylbenzene	Xylenes,Total	Methyl tert butyl ether	Naphthalene	(1,2 Dichloroethane 1,2 DCA)	ethyl tert-Butyl alcohol	Diisopropyl ether	Ethanol	tert-Butyl alcohol	tert-Amyl alcohol	tert-Amyl methyl ether	ethyl tert-Butyl ether	tert-Butyl formate
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**
01589 MW-11	3/4/2020	<1.0	<1.0	<1.0	<1.0	<1.0	0.39 J	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-12	3/3/2020	**609**	18.9	81.2	52.4	13.8	11.7	<5.0	<500	<5.0	<1000	<500	**1140**	<50.0	34.8 J	<250
	07/10/2019	**410**	12.7	46.5	24.5	9.8	9.1	<2.5	<250	<2.5	<500	<250	**1370**	<25.0	25.9	<125
	11/28/2018	**700**	35	110	70	<20	19J	<20	<400	<20	<2000	<400	**330J**	<200	18J	<100
01589 MW-13	3/3/2020	**36.5**	16.6	439	1290	<4.0	**234**	<4.0	<400	<4.0	<800	<400	<400	<40.0	<40.0	<200
	07/10/2019	**31.2**	19.5	490	1630	<5.0	**164**	<5.0	<500	<5.0	<1000	<500	<500	<50.0	<50.0	<250
	11/28/2018	**130**	80	**1300**	3900	<20	**470**	<20	<400	<20	<2000	<400	<400	<200	<20	<100
01589 MW-14	3/3/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	4.1	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-15	3/4/2020	**1020**	**1510**	288	1690	4.6 J	**36.8**	<12.5	<1250	<12.5	<2500	<1250	**1060 J**	<125	<125	<625
	07/10/2019	**2840**	**7910**	**982**	4850	<50.0	**120**	<50.0	<5000	<50.0	<10000	<5000	**6950**	<500	<500	<2500
	11/29/2018	**2100**	**7400**	**930**	4600	<100	**100**	<100	<2000	<100	<10000	<2000	**5800**	<1000	**51J**	<500
01589 MW-16	3/4/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-17	3/4/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-18	3/3/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-19	3/3/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-20	3/3/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**

Notes:
Units = µg/L NE = Not established
"<" = Not detected at or above the laboratory reporting limit
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Table 3
Historical Groundwater Analytical Data
Circle K 2720886
4315 Savannah Highway
Ravenel, Charleston County, South Carolina
UST Permit #01589

Monitoring Well Identification	Sample Date	Petroleum Constituents (ug/L)							Oxygenates (ug/L)							
		Benzene	Toluene	Ethylbenzene	Xylenes,Total	Methyl tert butyl ether	Naphthalene	1,2 Dichloroethane (1,2 DCA)	ethyl tert-Butyl alcohol	Diisopropyl ether	Ethanol	tert-Butyl alcohol	tert-Amyl alcohol	tert-Amyl methyl ether	ethyl tert-Butyl ether	tert-Butyl formate
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**
01589 MW-21	3/3/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	0.57J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-22	3/3/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	**6.5**	<1.0	<1.0	0.41J	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-23	03/03/2020	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<100	1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	1.8	<1.0	<1.0	<100	1.3	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	5.1	<1.0	<1.0	<20	3.5	<100	31	**340**	<10	<1.0	<5.0
01589 MW-24	03/03/2020	0.50 J	<1.0	<1.0	<1.0	0.55 J	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	**29**	<1.0	<1.0	<1.0	0.68J	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	0.46J	<5.0
01589 MW-25	03/03/2020	<1.0	<1.0	<1.0	<1.0	2.9	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-26	03/03/2020	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	<1.0	1.6	0.83J	3.9	0.88J	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-27	03/03/2020	<1.0	<1.0	<1.0	<1.0	<1.0	0.71 J	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-28	03/03/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	<1.0	<1.0	<1.0	<1.0	0.43J	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-29	03/03/2020	**10.4**	<1.0	<1.0	<1.0	28.9	<1.0	<1.0	<100	0.41 J	<200	63.3 J	87.2 J	<10.0	8.8 J	<50.0
	07/09/2019	2.2	<1.0	<1.0	<1.0	7.4	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	**55**	<1.0	<1.0	<1.0	**84**	<1.0	<1.0	<20	1	<100	150	190	5.7J	27	<5.0
01589 MW-30	03/03/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 MW-31	03/03/2020	<1.0	<1.0	<1.0	<1.0	0.36 J	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	<1.0	<1.0	<1.0	<1.0	4.4	2.6	<1.0	<20	<1.0	<100	<20	<20	<10	3.5	<5.0
01589 MW-32	03/03/2020	**340**	2.1	3.2	15.4	5.9	1.6 J	<2.0	<200	<2.0	<400	<200	181 J	<20.0	9.2 J	<100
	07/09/2019	**306**	9.3	9.7	17.1	11.4	<2.0	<2.0	<200	<2.0	<400	<200	**284**	<20.0	<20.0	<100
01589 MW-33	03/04/2020	**4180**	**13200**	**1760**	8670	**57.5 J**	**356**	<125	<12500	<125	<25000	<12500	<12500	<1250	<1250	<6250
	07/08/2019	**no sample collected due to the presence of 0.11 feet of free product**														
01589 MW-34	03/04/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	1.1	<200	<100	<100	<10.0	<10.0	<50.0
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**

Notes:
Units = µg/L NE = Not established
"<" = Not detected at or above the laboratory reporting limit
RBSL = May 15, 2001 Risk Based Screening Level
Bold concentrations equal or exceed the corresponding RBSL

Table 3
Historical Groundwater Analytical Data
Circle K 2720886
4315 Savannah Highway
Ravenel, Charleston County, South Carolina
UST Permit #01589

Monitoring Well Identification	Sample Date	Petroleum Constituents (ug/L)							Oxygenates (ug/L)							
		Benzene	Toluene	Ethylbenzene	Xylenes, Total	Methyl tert butyl ether	Naphthalene	1,2 Dichloroethane (1,2 DCA)	ethyl tert-Butyl alcohol	Diisopropyl ether	Ethanol	tert-Butyl alcohol	tert-Amyl alcohol	tert-Amyl methyl ether	ethyl tert-Butyl ether	tert-Butyl formate
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**
01589 MW-35	03/04/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
01589 MW-36	03/04/2020	1.3	10.0	59.9	67.0	<1.0	7.3	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	**14.5**	102	113	223	<1.0	12.9	<1.0	<100	<1.0	<200	<100	148	<10.0	<10.0	<50.0
01589 MW-37	03/03/2020	<1.0	<1.0	<1.0	<1.0	<1.0	0.65 J	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
01589 MW-38	03/03/2020	**41.1**	<1.0	<1.0	<1.0	3.1	1.5	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	**73.6**	<1.0	<1.0	2.1	11.2	<1.0	<1.0	<100	<1.0	<200	<100	138	<10.0	<10.0	<50.0
01589 DMW-1	03/03/2020	**5.5**	1.3	0.95 J	<1.0	0.49 J	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	**7.1**	1.1	1.1	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	**130**	16	14	48	12	1.3	<1.0	<20	<1.0	<100	24	190	<10	6.5	<5.0
01589 DMW-2	03/03/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 DMW-3	03/03/2020	<1.0	<1.0	<1.0	<1.0	0.31 J	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/09/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/29/2018	<1.0	1.2	<1.0	0.66J	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	<20	<10	<1.0	<5.0
01589 DMW-4	03/04/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
01589 DMW-5	03/04/2020	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
01589 RW-1	03/04/2020	**0.81 feet of free product - not sampled**														
	07/10/2019	**12300**	**27900**	**1700**	**11800**	**1400**	**283**	<200	<20000	<200	<40000	<20000	<20000	<2000	<2000	<10000
	11/28/2018	**20000**	**47000**	**2100**	**10000**	**3400**	<500	<500	<10000	<500	<50000	**5100J**	**34000**	<5000	**750**	<2500
01589 RW-2	03/04/2020	**0.56 feet of free product - not sampled**														
	07/08/2019	**no sample collected due to the presence of 0.18 feet of free product**														
	11/28/2018	**21000**	**54000**	**3200**	**17000**	**2200**	**430J**	<500	<10000	<500	**55000000**	**13000**	**31000**	<5000	**760**	<2500
01589 RW-3	03/04/2020	**0.56 feet of free product - not sampled**														
	07/08/2019	**no sample collected due to the presence of 1.56 feet of free product**														
	11/28/2018	**15000**	**41000**	**2800**	**15000**	**530**	**360J**	<500	<10000	<500	<50000	<10000	**21000**	<5000	<500	<2500
01589 RW-4	03/04/2020	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	07/10/2019	3.3	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<100	<1.0	<200	<100	<100	<10.0	<10.0	<50.0
	11/28/2018	**15**	5.6	2.8	6.9	<1.0	<1.0	<1.0	<20	<1.0	<100	<20	77	<10	<1.0	<5.0
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**

Notes:
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Table 3
Historical Groundwater Analytical Data
Circle K 2720886
4315 Savannah Highway
Ravenel, Charleston County, South Carolina
UST Permit #01589

Monitoring Well Identification	Sample Date	Petroleum Constituents (ug/L)							Oxygenates (ug/L)							
		Benzene	Toluene	Ethylbenzene	Xylenes, Total	Methyl tert butyl ether	Naphthalene	1,2 Dichloroethane (1,2 DCA)	ethyl tert-Butyl alcohol	Diisopropyl ether	Ethanol	tert-Butyl alcohol	tert-Amyl alcohol	tert-Amyl methyl ether	ethyl tert-Butyl ether	tert-Butyl formate
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**
01589 RW-5	03/04/2020	**2.52 feet of free product - not sampled**														
	07/08/2019	**no sample collected due to the presence of 1.64 feet of free product**														
	11/28/2018	**no sample collected due to the presence of 0.36 feet of free product**														
01589 RW-6	03/04/2020	**1.67 feet of free product - not sampled**														
	07/08/2019	**no sample collected due to the presence of 2.00 feet of free product**														
	11/28/2018	**no sample collected due to the presence of 1.31 feet of free product**														
01589 RW-7	03/04/2020	**0.16 feet of free product - not sampled**														
	07/08/2019	**no sample collected due to the presence of 0.45 feet of free product**														
01589 RW-8	03/04/2020	**1690**	**3550**	587	2570	**48.0**	**103**	<25.0	<2500	<25.0	<5000	<2500	**3900**	<250	<250	<1250
	07/08/2019	**no sample collected due to the presence of 0.30 feet of free product**														
01589 RW-9	03/04/2020	**13600**	**31200**	**2460**	**12500**	**2250**	**446**	<200	<20000	<200	**831000**	**10200 J**	**82800**	<2000	<2000	<10000
	07/08/2019	**no sample collected due to the presence of 0.86 feet of free product**														
01589 RW-10	03/04/2020	**0.57 feet of free product - not sampled**														
	07/08/2019	**no sample collected due to the presence of 1.37 feet of free product**														
01589 RW-11	03/04/2020	**6.0 feet of free product - not sampled**														
	07/08/2019	**no sample collected due to the presence of 1.50 feet of free product**														
01589 RW-12	03/04/2020	**Heavy sheen of free product and water; artesian conditions - not sampled**														
	07/10/2019	**4360**	**6410**	556	5080	**236**	**170**	<50.0	<5000	<50.0	<10000	<5000	**5030**	<500	<500	<2500
RBSL		**5.0**	**1,000**	**700**	**10,000**	**40.0**	**25.0**	**5.0**	**NE**	**150**	**10,000**	**1,400**	**240**	**128**	**47.0**	**NE**

Notes:
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TRAP & TREAT® BOS 200®

Safety Data Sheet

Issued: 06/05/2015
Supersedes: 12/30/2011
Version: 1.0

SECTION 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1. Product identifier

Product name : Activated Carbon

Product form : Mixture

Product code : 3967

Other means of identification : Activated Carbon

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Adsorbent

1.3. Details of the supplier of the safety data sheet

Calgon Carbon Corporation
P.O. Box 717
Pittsburgh, PA 15230
412-787-6700

1.4. Emergency telephone number

Emergency number : CHEMTREC (24 HRS): 1-800-424-9300

SECTION 2: Hazards Identification

2.1. Classification of the substance or mixture

GHS-US classification

Combustible Dust H232

Not classified as a simple asphyxiant. Product does not displace oxygen in the ambient atmosphere, but slowly adsorbs oxygen from a confined space when wet. Under conditions of anticipated and recommended use, product does not pose an asphyxiation hazard.

2.2. Label elements

GHS-US labeling

Signal word (GHS-US) : **Warning**

Hazard statements (GHS-US) : H232 - May form combustible dust concentrations in air

2.3. Other hazards

Other hazards not contributing to the classification : Wet activated carbon can deplete oxygen from air in enclosed spaces. If use in an enclosed space is required, procedures for work in an oxygen deficient environment should be followed.

2.4. Unknown acute toxicity (GHS-US)

No data available

SECTION 3: Composition/Information on Ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%
Activated Carbon	(CAS No) 7440-44-0	≥ 80
Gypsum (Hydrated calcium sulfate)	(CAS No) 13397-24-5	< 20

SECTION 4: First Aid Measures

4.1. Description of first aid measures

First-aid measures general : If exposed or concerned, get medical attention/advice. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use. Never give anything to an unconscious person.

First-aid measures after inhalation : IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

First-aid measures after skin contact : IF ON SKIN (or clothing): Remove affected clothing and wash all exposed skin with water for at least 15 minutes.

First-aid measures after eye contact : IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Remove contact lenses if present and easy to do so. Continue rinsing.

First-aid measures after ingestion : IF SWALLOWED: Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center or medical professional. Get medical attention if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : Not expected to present a significant hazard under anticipated conditions of normal use. However, dust may cause irritation and redness of the eyes, irritation of the skin and respiratory system. The effects of long-term, low-level exposures to this product have not been determined.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting Measures

5.1. Extinguishing media

Suitable extinguishing media : Water spray. Carbon dioxide. Dry chemical. Foam. Sand.

Unsuitable extinguishing media : None known.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Dust may be combustible under specific conditions. May be ignited by heat, sparks or flames.

Explosion hazard : Dust may form explosive mixture in air.

Reactivity : No dangerous reactions known under normal conditions of use. Carbon oxides, ammonia, or toxic halide fumes may be emitted upon combustion of the material.

5.3. Advice for firefighters

Firefighting instructions : Wear NIOSH-approved self-contained breathing apparatus suitable for the surrounding fire. Use water spray or fog for cooling exposed containers. Evacuate area.

SECTION 6: Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate area. Keep upwind. Ventilate area. Spill should be handled by trained clean-up crews properly equipped with respiratory equipment and full chemical protective gear (see Section 8).

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent entry to sewers and public waters. Avoid release to the environment. Product is not soluble, but can cause particulate emission of discharged into waterways. Dike all entrances to sewers and drains to avoid introducing material to waterways. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment : Sweep or shovel spills into appropriate container for disposal. Minimize generation of dust.

Methods for cleaning up : Sweep or shovel spills into appropriate container for disposal. Minimize generation of dust. Dispose of material in compliance with local, state, and federal regulations.

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and Storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid dust formation. Avoid contact with skin, eyes and clothing. Do not handle until all safety precautions have been read and understood. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Keep away from sources of ignition - No smoking.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container tightly closed in a cool, dry, and well-ventilated place. Keep away from ignition sources.

SECTION 8: Exposure Controls/Personal Protection

8.1. Control parameters

Activated Carbon (7440-44-0)*	
OSHA PEL (TWA) (mg/m³)	≤ 5 (Respirable Fraction) ≤ 15 (Total Dust)

Gypsum (Hydrated calcium sulfate) (13397-24-5)*	
OSHA PEL (TWA) (mg/m³)	≤ 5 (Respirable Fraction) ≤ 15 (Total Dust)

*Exposure limits are for inert or nuisance dust. No specific exposure limits have been established for this activated carbon product by OSHA or ACGIH.

8.2. Exposure controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment with flammable materials. Ensure adequate ventilation, especially in confined areas. Wet activated carbon can deplete oxygen from air in enclosed spaces. If use in an enclosed space is required, procedures for work in an oxygen deficient environment should be followed.

Personal protective equipment : Gloves. Safety glasses. Insufficient ventilation: wear respiratory protection.

Hand protection : Gloves should be classified under Standard EN 374 or ASTM F1296. Suggested glove materials are: Neoprene, Nitrile/butadiene rubber, Polyethylene, Ethyl vinyl alcohol laminate, PVC or vinyl. Suitable gloves for this specific application can be recommended by the glove supplier.

Eye protection : Use eye protection suitable to the environment. Avoid direct contact with eyes.

Skin and body protection : Wear long sleeves, and chemically impervious PPE/coveralls to minimize bodily exposure.

Respiratory protection : Use NIOSH-approved dust/particulate respirator. Where vapor, mist, or dust exceed PELs or other applicable OELs, use NIOSH-approved respiratory protective equipment.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Granular, powder, or pelletized substance
Color	: Black
Odor	: Odorless
Odor threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: Not applicable
Melting point	: Not applicable
Freezing point	: Not applicable
Boiling point	: Not applicable
Flash point	: No data available
Auto-ignition temperature	: > 220 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: > 220 °C
Vapor pressure	: Not applicable
Relative vapor density at 20 °C	: Not applicable
Apparent density	: 0.4 - 0.8 g/cc
Solubility	: Carbon and gypsum are insoluble; fertilizer components are soluble
Log Pow	: Not applicable
Log Kow	: Not applicable
Viscosity, kinematic	: Not applicable
Viscosity, dynamic	: Not applicable
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosive limits	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and Reactivity

10.1. Reactivity

No dangerous reactions known under normal conditions of use.

10.2. Chemical stability

Stable under use and storage conditions as recommended in section 7.

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

Avoid dust formation. Heat. Ignition sources. Exposure to high concentrations of organic compounds may cause bed temperature to rise.

10.5. Incompatible materials

Alkali metals. Strong oxidizing agents.

10.6. Hazardous decomposition products

Carbon monoxide (CO), carbon dioxide (CO_2). Ammonia. Toxic halide fumes.

SECTION 11: Toxicological Information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Activated Carbon (7440-44-0)	
LD50 oral rat	> 2000 mg/kg

Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Not classified

Respiratory or skin sensitisation : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Silica: Crystalline, quartz (14808-60-7)	
IARC group	1 - Carcinogenic to humans
The International Agency for Research on Cancer (IARC) has classified "silica dust, crystalline, in the form of quartz or cristobalite" as carcinogenic to humans (group 1). However these warnings refer to crystalline silica dusts and do not apply to solid activated carbon containing crystalline silica as a naturally occuring, bound impurity. As such, we have not classified this product as a carcinogen in accordance with the US OSHA Hazard Communication Standard (29 CFR §1910.1200) but recommmend that users avoid inhalation of product in a dust form.	

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Symptoms/injuries after inhalation : Not classified

Symptoms/injuries : Not expected to present a significant hazard under anticipated conditions of normal use. However, dust may cause irritation and redness of the eyes, irritation of the skin and respiratory system. The effects of long-term, low-level exposures to this product have not been determined.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal Considerations

13.1. Waste treatment methods

Waste treatment and disposal methods : Vacuum or shovel material into a closed container. Dispose in a safe manner in accordance with local/national regulations. Do not allow the product to be released into the environment.

Additional information : Activated carbon is an adsorbent media; hazard classification is generally determined by the adsorbate. Consult U.S. EPA guidelines listed in 40 CFR 261.3 for more information on hazardous waste disposal.

SECTION 14: Transport Information

14.1. In accordance with DOT

Not classified as hazardous for domestic land transport

UN-No.(DOT)	: None on finished product
DOT NA no.	: None on finished product
Proper Shipping Name (DOT)	: Not regulated
Department of Transportation (DOT) Hazard Classes	: None on finished product
Hazard labels (DOT)	: None on finished product
Packing group (DOT)	: None on finished product
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	: None on finished product

14.2. Transport by sea

Not classified as hazardous for water transport

IMO / IMDG

UN/NA Identification Number	: None on finished product
UN- Proper Shipping Name	: Not regulated
Transport Hazard Class	: None on finished product

14.3. Air transport

Not classified as hazardous for air transport

ICAO / IATA

UN/NA No	: None on finished product
UN- Proper Shipping Name	: Not regulated
Transport Hazard Class	: None on finished product
Packing Group	: None on finished product
Marine Pollutant	: None on finished product

14.4. Additional information

Other information : Under the UN classification for activated carbon, all activated carbons have been identified as a class 4.2 product. However, this product type or an equivalent has been tested according to the *United Nations Transport of Dangerous Goods* test protocol for a "self-heating substance" (*United Nations Transportation of Dangerous Goods, Manual of Tests and Criteria, Part III, Section 33.3.1.6 - Test N.4 - Test Method for Self Heating Substances)* and it has been specifically determined that this product type or an equivalent does not meet the definition of a DOT self-heating substance (class 4.2) or any other hazard class.

SECTION 15: Regulatory Information

15.1. US Federal regulations

Activated Carbon Profile 85	
All chemical substances in this product are listed in the EPA (Environment Protection Agency) TSCA (Toxic Substances Control Act) Inventory or are exempt.	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard
Cobalt (7440-48-4)*	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313	
SARA Section 313 - Emission Reporting	0.1 %

*Present below de minimis level

15.2. International regulations

No additional information available

15.3. US State regulations

California Proposition 65

WARNING: This product contains, or may contain, trace quantities of a substance(s) known to the state of California to cause cancer, birth defects, or other reproductive harm.

Silica: Crystalline, quartz (14808-60-7)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
Yes	No	No	No	NA
Cobalt (7440-48-4)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
Yes	No	No	No	NA
Titanium dioxide (13463-67-7)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
Yes	No	No	No	NA

Aluminum oxide (1344-28-1)
U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Massachusetts - Right to Know List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
Calcium sulfate (7778-18-9)
U.S. - Massachusetts - Right to Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
Silica: Crystalline, quartz (14808-60-7)
U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right to Know List

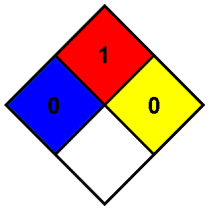
Gypsum (Hydrated calcium sulfate) (13397-24-5)
U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
Ammonium Nitrate (6484-52-2)
U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) List
Limestone (1317-65-3)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other Information

Indication of changes	:	Revision 1.0: New SDS Created.
Revision Date	:	06/05/2015
Other information	:	Author: CJS.
For internal use only	:	PR #85

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

NFPA health hazard	:	0 - Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.
NFPA fire hazard	:	1 - Must be preheated before ignition can occur.
NFPA reactivity	:	0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health	:	0
Flammability	:	1
Physical	:	0
Personal Protection	:	

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. The information is this document applies to this specific material as supplied. It may not be valid if product is used in combination with other materials. It is the user's responsibility to determine the suitability and completeness of this information for their particular use. While the information and recommendations set forth herein are believed to be accurate as of the date hereof, Calgon Carbon Corporation makes no warranty with respect to the same, and disclaims all liability for reliance thereon.