Final Report

Investigation of Potential Impacts to Groundwater at Wainscott Sand & Gravel/Sand Land Facility 585 Middle Line Highway, Noyack, N.Y.

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Department of Health Services

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Executive Summary

In March of 2015, the Suffolk County Legislature passed Resolution Number 245-2015 which directed the Suffolk County Department of Health Services (SCDHS) to determine the direction of groundwater flow in the vicinity of the Wainscott Sand & Gravel/Sand Land facility (Sand Land) and to install groundwater monitoring wells and test for the presence of a number of contaminants. This resolution was enacted due to concerns regarding potential impacts to groundwater quality from vegetative organic waste management (VOWM) activities being conducted at the Sand Land site. This final report describes the investigation that was undertaken in accord with this resolution, and discusses the results that were found.

The Sand Land site is located on the eastern end of Long Island, New York in the hamlet of Noyack, within the Township of Southampton. The 50 acre site is rectangular in shape and is located at 585 Middle Line Highway, east of Millstone Road. The majority of the properties in the vicinity of the site are residential in nature and many have their potable water supplied from an on-site private well. The Bridge golf course, an approximately 280 acre 18 hole golf course, is located north of the site. The Sand Land site is a sand mine that originally began operation in the early 1960s, and is presently authorized by the New York State Department of Environmental Conservation (NYSDEC), to mine sand and gravel from 31.5 acres of the 50-acre site.

The SCDHS initiated a groundwater investigation in May of 2015. However, site access issues limited the SCDHS to the installation and sampling of off-site monitoring wells only. In January of 2016, the SCDHS released an interim report entitled "*Investigation of Potential Impacts to Groundwater at Wainscott Sand & Gravel/Sand Land Facility, 585 Middle Line Highway, Noyack, N.Y.*". This report stated that the SCDHS should pursue permission to install profile wells on the Sand Land site, close to potential source areas, in order to obtain water quality data and collect water level measurements. The SCDHS requested permission to access the site from the property owner, but the request was denied. In November 2016, the SCDHS Commissioner signed a Warrant of Access and Inspection, which was confirmed by the New York State Supreme Court in August 2017. SCDHS personnel accessed the site on October 4th, 2017 to initiate the on-site investigation and completed the on-site field work on October 18th, 2017.

The SCDHS 2015 off-site investigation and 2017 on-site investigation included the installation of a total of twenty-one monitoring wells, collection of eighty-three groundwater samples, 4 surface water samples, 4 soil samples and 10 samples of vegetative material. In the on-site groundwater monitoring wells, iron and manganese were found to significantly exceed drinking water and groundwater standards in multiple wells. Manganese exceeded the standards by almost 100 times and iron by over 200 times. Other constituents that were also found above drinking water and groundwater standards in on-site monitoring wells were thallium, sodium, nitrate, ammonia and gross alpha. It should be noted that impacts to the groundwater quality were observed

despite the significant depth to the water table encountered at the site (137 feet to 154 feet below grade).

Manganese, iron, nitrate and toluene were observed in the off-site groundwater of downgradient wells at concentrations exceeding standards and/or guidance values. Due to the geologic complexities related to the presence of clays/silts and the depths at which the iron and manganese impacts were observed in the off-site monitoring wells, it is not possible to conclusively link these impacts to the Sand Land site. However, nitrate was detected in an offsite well at a depth and location that is considered consistent with impacts from an on-site area exhibiting elevated nitrate concentrations, and is therefore likely attributable to an on-site source.

Surface/ponded water samples were collected from four locations on the site. Elevated metals concentrations as well as low and trace concentrations of two pesticides were detected in some of the surface/ponded water samples collected on site. These pesticide detections could be attributable to run-off from vegetative organic material brought into the site. Also, low and trace concentrations of analytes commonly related to water impacted by septic waste (e.g., acetaminophen, caffeine and ibuprofen) were identified in the surface/ponded water, a potential source for these compounds is unknown.

The moraine deposits in which the subject site is located is documented as having complex hydrogeologic conditions[1]. Clay and silt deposits exist throughout the area that contribute to significantly elevated local water table elevations that are inconsistent with regional water table elevations (e.g., perched water). Adding to this complexity is the proximity of the site to a regional groundwater divide. The SCDHS measured water level elevation in both on-site and off-site monitoring wells in order to establish the groundwater flow direction. The groundwater flow direction in the eastern section of the site was determined to be flowing in a westerly to slightly northwesterly direction, and groundwater on the western section of the site was found to flow westerly, with a slight southwesterly component. As groundwater moves offsite the flow characteristics will take on a more northwesterly flow direction. Additionally, data from wells installed on the site suggest the presence of downward vertical groundwater flow component, indicating this is a vital groundwater protection area. This also suggests that contaminants released on the site may flow into deeper portions of the aquifer.

Samples of the soil cuttings from the well drilling augers used to install the monitoring wells, and samples of vegetative material stored on the site indicated low concentrations of volatile organic compounds (VOCs) that did not exceed NYSDEC soil criteria. Toluene detected in an off-site monitoring well located on The Bridge golf course property, north of the site, is downgradient of toluene detected in soils and vegetative material on site. However, since toluene was not

[1] *Ground-Water Flow Paths and Traveltime to Three Small Embayments within the Peconic Estuary, Eastern Suffolk County, New York*, 1999, United States Geological Survey, Water-Resources Investigations Report 98-4181.

detected in any groundwater samples collected on the site, it is not possible to conclusively attribute this off-site groundwater detection to the Sand Land site.

In March of 2018, the SCDHS identified thirty six properties potentially served with private wells that are located generally downgradient of the subject site (twenty one these homes were previously offered testing by the SCDHS in 2015). Water quality results obtained to date indicate that all of the private wells sampled in the current survey have met all drinking water standards, and have not indicated any VOWM related water quality impacts. Since the on-site area has been identified as a deep recharge area (vertical downward groundwater flow), there is the possibility that as contaminants move off-site into the areas with private wells, the contaminants are located deeper in the aquifer, below the well screens of the private wells. However, the complex lithology of the area (e.g., the presence of clay/silt layers) can have a localized impact on the vertical migration of water and /or contaminants (e.g., perched water) as it moves off of the site. The survey is still on-going at this time, and the water quality results will continue to be evaluated as they are completed.

Conclusions

The vegetative waste management activities on the Sand Land site have had significant adverse impacts to the groundwater. The analytical results from the groundwater samples indicate impacts of elevated metals concentrations (in particular manganese and iron) and other groundwater impacts that are consistent with results observed at other VOWM sites throughout Suffolk County[1], which have been attributed to the VOWM activities performed at these sites. Detrimental groundwater impacts were observed at the Sand Land site despite the significant depth to groundwater (137 to 154 feet below grade). Additionally, data from wells installed on the site suggest the presence of downward vertical groundwater flow component, indicating this is a vital groundwater protection area. This also suggests that contaminants released on the site may flow into deeper portions of the aquifer.

Recommendations

- The SCDHS should complete sampling of the private wells in the survey area to assess possible impacts to private drinking water wells to the west and northwest of the site. Based upon the groundwater information obtained in this investigation, and the results of the private well testing thus far, the extent of the private well survey area previously determined is appropriate.

[1] *Horesblock Road Investigation, Yaphank, N.Y.*, July 2013, *Investigations of the Impacts to Groundwater Quality from Compost/Vegetative Organic Waste Management Facilities in Suffolk County*, January 22, 2016.

- Responsible state and local agencies (e.g., NYSDEC, Town of Southampton, etc.) should ensure that the activities conducted at the Sand Land facility are in compliance with all applicable codes, ordinances, permit requirements, etc., and that the activities at the site do not further impact groundwater quality.

- Should responsible regulatory agencies determine that VOWM activities are allowed to occur at this site, there should be requirements to ensure that mechanisms are in place to prevent operating practices from further detrimentally impacting groundwater and surface water quality. New York State Environmental Conservation Law section 15-0517 became effective on January 1, 2018 and requires groundwater testing and impermeable liners for land clearing debris and composting facilities; NYSDEC is in the process of establishing regulations. Since significant groundwater impacts have been identified, the requirements of the new law should be implemented as early as practicable.

- The NYSDEC should continue to inspect the facility to ensure that all materials being brought to the site are free of contamination.

Introduction

Investigations by the Suffolk County Department of Health Services (SCDHS) Office of Water Resources have shown that vegetative organic waste management (VOWM) activities can detrimentally impact groundwater quality.[1] Due to concerns that were raised regarding potential impacts to groundwater quality from VOWM activities conducted at the Wainscott Sand & Gravel/Sand Land facility (hereafter referred to as "Sand Land"), the Suffolk County Legislature passed Resolution Number 245-2015 (Appendix A) in March of 2015, directing the SCDHS to determine the direction of groundwater flow in the vicinity of the Sand Land site, and to install monitoring wells to test for the presence of various contaminants, including metals, inorganic compounds, volatile and semi-volatile organic compounds, radionuclides, and any other contaminants associated with composting facilities. In January of 2016, the SCDHS released an interim report entitled "*Investigation of Potential Impacts to Groundwater at Wainscott Sand & Gravel/Sand Land Facility, 585 Middle Line Highway, Noyack, N.Y.*". This final report describes the investigation that was undertaken in accord with this resolution, and discusses the results that were found.

Site Description

The site is located on the eastern end of Long Island, New York in the Hamlet of Noyack, within the Township of Southampton. The 50 acre site is rectangular in shape and is located at 585 Middle Line Highway, east of Millstone Road. The site is located approximately 1.5 miles south of Noyack Bay, and sits atop Long Island's Ronkonkoma Moraine, a line of high ridges extending from the vicinity of Westbury in western Long Island to Montauk Point (Figure 1). This moraine was created by a melting glacier's deposition of ice-transported sediment and rock. The majority of the properties in the vicinity of the site are residential in nature, with lot sizes ranging from approximately 2.5 to 5 acres. Many of the residential homes in the vicinity have their potable water supplied from an on-site private well. The Bridge golf course, an approximately 280 acre 18 hole golf course, is located north of the site.

Site Background

The Sand Land site is a sand mine currently owned and operated by the Sand Land Corporation. The mine originally began operation by Sand Land's predecessor in interest, Bridgehampton Sand & Gravel, Inc., in the early 1960s.[2] Sand Land Corporation has been operating since 1981 and is presently authorized pursuant to a Mined Land Reclamation Law (MLRL) permit, issued by the New York State Department of Environmental Conservation (NYSDEC), to mine sand and gravel from 31.5 acres of the 50-acre site, to a depth of 160 feet above mean sea level, which is 60 feet below the surface elevation at 220 feet.

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[1] *Horesblock Road Investigation, Yaphank, N.Y.*, July 2013, *Investigations of the Impacts to Groundwater Quality from Compost/Vegetative Organic Waste Management Facilities in Suffolk County*, January 22, 2016.

[2] *Ruling of the Chief Administrative Law Judge on Threshold Procedural Issue*, January 26, 2018, page 2.

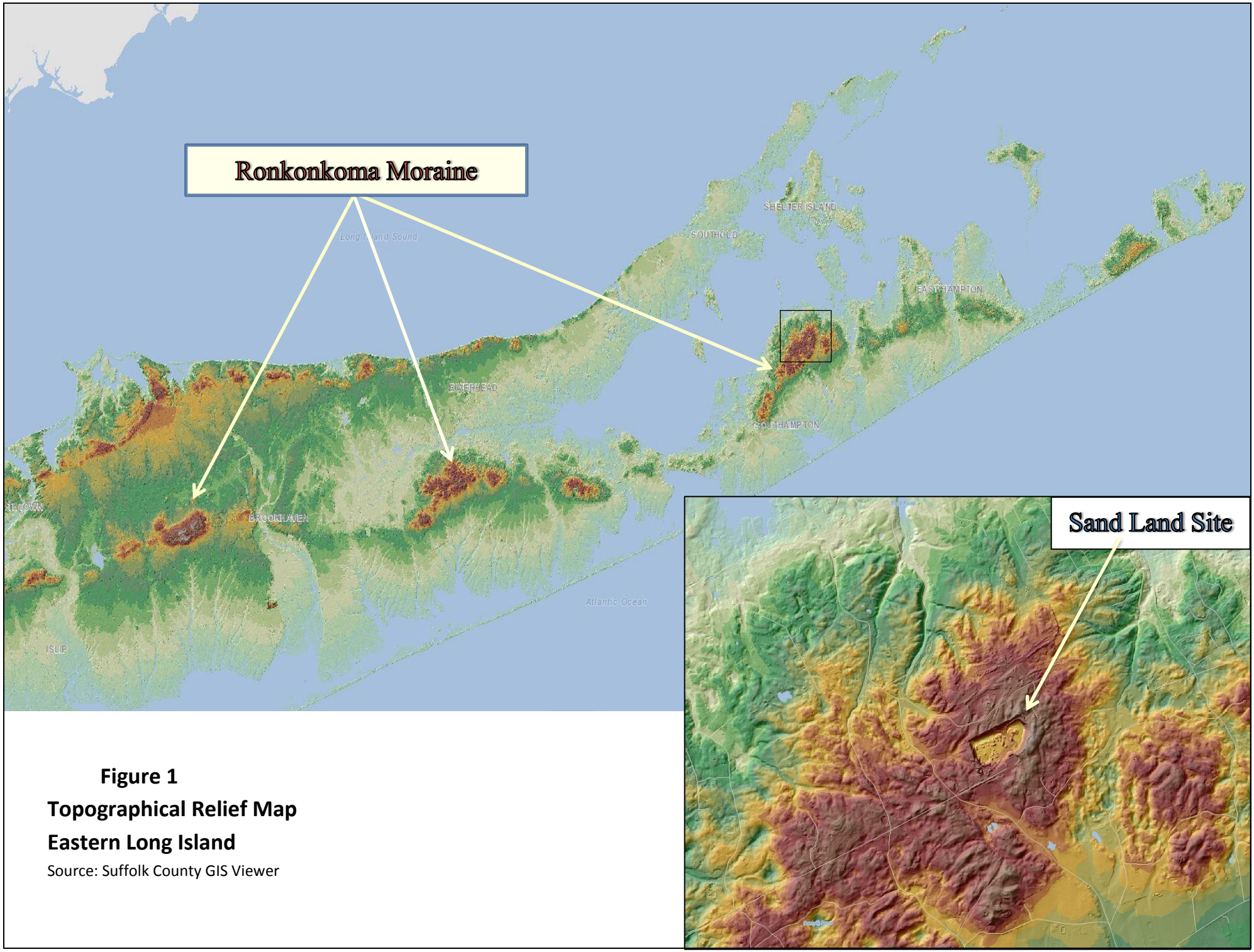

Figure 1

Topographical Relief Map

Eastern Long Island

Source: Suffolk County GIS Viewer

SCDHS Off-Site Groundwater Investigation Work Conducted in 2015-2016

In accordance with Suffolk County Resolution Number 245-2015 described above, the Suffolk County Department of Health Services (SCDHS) initiated a groundwater investigation at the Sand Land site with the installation of groundwater monitoring wells in May of 2015. Since permission to access the site was not granted by the property owner, the monitoring well locations were restricted to off-site locations. The SCDHS installed and sampled a total of twelve monitoring wells located to the south and west of the site. All monitoring wells were installed using hollow stem augers and consisted of 2 inch diameter schedule 80 PVC pipe together with five foot well screens. Wells were installed to depths ranging from 175 feet to 255 feet from grade. Eleven of the twelve SCDHS monitoring wells were sampled at multiple levels and are referred to as "temporary profile wells". Each of the temporary profile wells were initially sampled at the deepest level and then pulled up ten feet and sampled again. This process was repeated until the top of the water table was reached. This procedure resulted in the collection of two to seven samples in each well, producing in an analytical profile of the groundwater from the top of the water table down to the depth at which the well was drilled. In addition to the profile wells, permission was obtained from The Bridge golf course located to the north of the Sand Land site to sample three existing monitoring wells located on their property. Figure 2 shows the locations of the off-site monitoring wells sampled. One SCDHS well (SL-4) and the three wells located on The Bridge golf course (TW-1, TW-3 and BW-1) were sampled at one interval only (Table 1). The monitoring well sampling began on June 10, 2015 and was completed on December 8, 2015.

2015-2016 Direction of Groundwater Flow Determined from Off-Site Wells

The first six monitoring wells to be installed and sampled (SL-1, SL-2, SL-3, SL-4, SL-4S, SL-5) were located on Middle Line Highway, south of the site. After the collection of the water samples, water table elevations were determined in five of the wells (SL-1, SL-2, SL-3, SL-4S, SL-5) in order to ascertain the direction of groundwater flow. Information reviewed from the United States Geological Survey's (USGS) 2010 regional water table elevations indicated a southerly groundwater flow direction from the site. However, the water table elevations measured in the five SCDHS installed wells south of the site indicated atypical readings, and generally did not appear to be consistent with a southerly groundwater flow direction. Information obtained from the USGS Report 98-4181[1] on water flow movement specific to this area indicated that the principal groundwater flow system appears to be generally to the northwest. The moraine deposits in which the subject site is located is documented as having complex hydrogeologic conditions[2]. Low permeable deposits exist throughout the area that contribute to significantly elevated local water table elevations that are inconsistent with regional water table elevations, and result in groundwater that is "isolated from the principal flow system[3]". Adding to this complexity is the proximity of the site to a regional groundwater divide.

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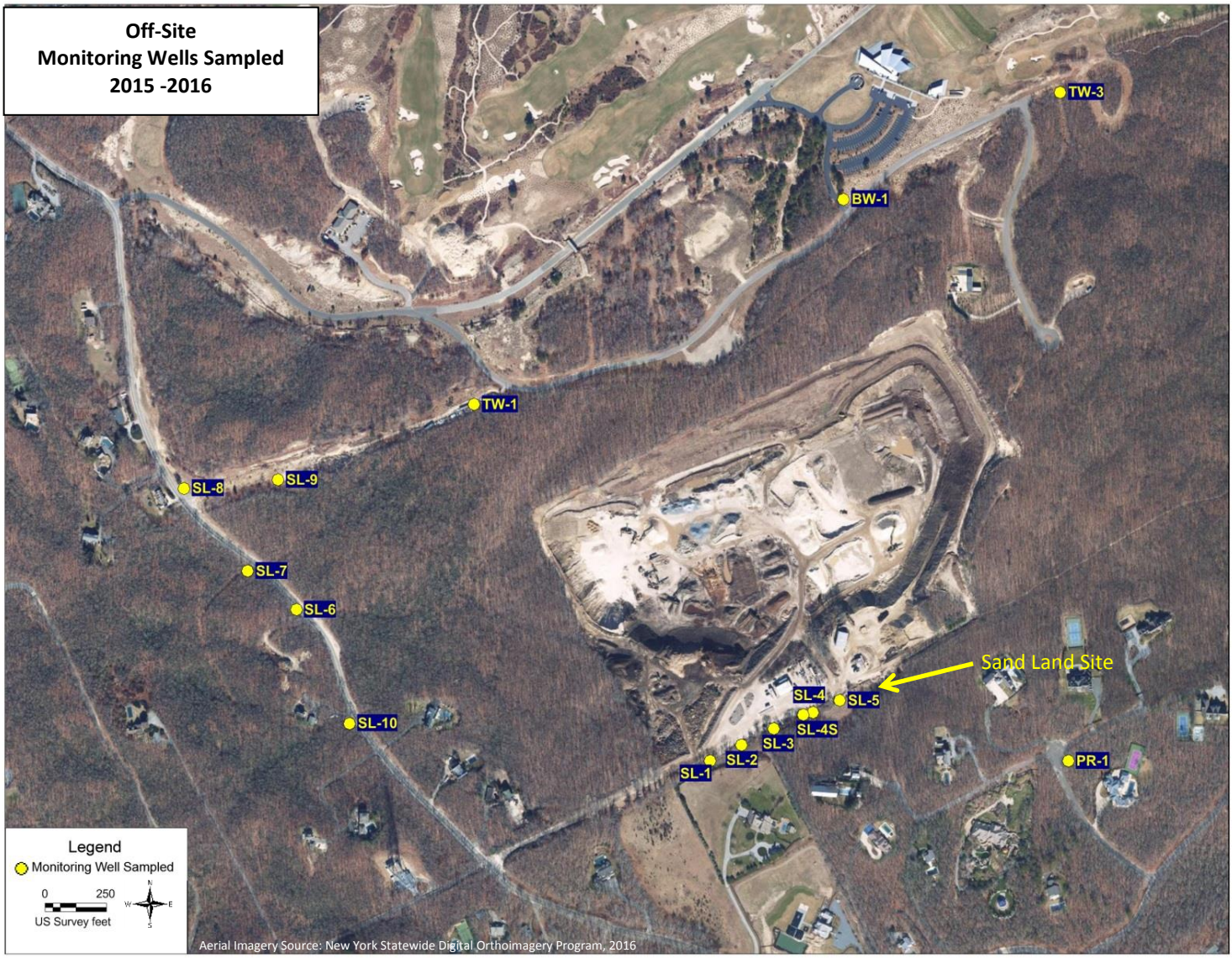
[1] *Ground-Water Flow Paths and Traveltime to Three Small Embayments within the Peconic Estuary, Eastern Suffolk County, New York*, 1999, United States Geological Survey, Water-Resources Investigations Report 98-4181.

[2] ibid, page 7.

[3] ibid, page 16.

Figure 2



In order to gather additional information regarding the discrepancies encountered with respect to the water table elevations and groundwater flow direction, five additional monitoring wells (SL-6, SL-7, SL-8, SL-9, SL-10) were installed west and northwest of the site, primarily along Millstone Road. A sixth well (PR-1) was installed on Paumanok Road, south of the site. These wells, along with three wells located on The Bridge golf course (TW-1[4], TW-3, BM-1) not installed by the SCDHS, were sampled. After sampling was completed, water level elevation measurements were collected on all twelve of the SCDHS installed monitoring wells (Table 2). This was accomplished by surveying the wells using the NGVD 29 datum from a permanent Suffolk County monitoring well (S-58959) located south of the site on Millstone Road. The equipment used for surveying was a Topcon AT-G2 auto level with tripod, fiberglass leveling rods (in feet/10ths), and depth to water was recorded using a Solinst Model 101 water level meter (in feet/10ths). The AT-G2 auto level and leveling rods were used to determine the differences in height between monitoring wells.

[4] Prior to sampling, a new dedicated submersible pump with associated wiring and tubing was installed by The Bridge golf course.

Table 1

Off-Site Monitoring Wells Sampled in 2015

Well	Well Location	Depth to Water (fbg)+	# Profile Intervals Sampled	Top Interval Level (fbg)+	Bottom Interval Level (fbg)+
SL-1	Off-site, s/o site along Middle Line Hwy	207.2’	4	210- 215’	240’-245’
SL-2	Off-site, s/o site along Middle Line Hwy	204.2’	4	210- 215’	240’-245’
SL-3	Off-site, s/o site along Middle Line Hwy	203.1’	4	210- 215’	240’-245’
SL-4	Off-site, s/o site along Middle Line Hwy	201.1	1	230’-235’	-
SL-4S	Off-site, s/o site along Middle Line Hwy	201.0’	2	200’-205’	210’-215’
SL-5	Off-site, s/o site along Middle Line Hwy	199.6’	6	200’-210’	250’-255’
SL-6	Off-site, w/o site along Millstone Rd.	164.2’	4	170’-175’	200’-205’
SL-7	Off-site, w/o site along Millstone Rd.	156.5’	5	160’-165’	200’-205’
SL-8	Off-site, w/o site along Millstone Rd.	113.9’	7	110’-115’	170’-175’
SL-9	Off-site, w/o site along Millstone Rd.	185.2’	4	190’-195’	220’-225’
SL-10	Off-site, w/o site along Millstone Rd.	178.7	3	180’-185’	200’-205’
TW-3*	Bridge Golf Course, n/o site	200’	1	239’-242’	-
BW-1*	Bridge Golf Course, n/o site	225.3’	1	216’-231’	-
TW-1*	Bridge Golf Course, n/w site	-	1	239’-242’	-
PR-1	Off-site, s/o site on Paumonak Rd.	208.9	2	210’-215’	220’-225’

* Wells TW-1, TW-3 and BW-1 were not installed by SCDHS
+ feet below grade

The leveling rods were placed on a defined measuring point (MP) which was the top of the well casings. The auto level was set up between two monitoring wells and used to record the difference in height between the two wells. This process was performed twice to ensure an accurate reading. After the heights were recorded, the auto level was then moved between the last monitoring well that was recorded and a new one. This process was continued until the heights of all the monitoring wells were recorded. When this process was completed for all the wells, the Solinst water level meter was used to determine the depth to groundwater (DTW) from the MP. The DTW was then subtracted from the MP and a groundwater elevation in feet above mean sea level (FAMSL) was calculated.

It should be noted that, as indicated in Table 2, well SL-8 exhibited an anomalous water table elevation measurement. Geophysical logs (natural gamma log) were collected with a 5MXA-1000, Matrix Geophysical Logger with 2PGA-1000 Gamma Probe (Appendix B), and for SL-8 indicate a unique profile with respect to the presence of low permeable deposits (zones or layers of silts and/or clays) and the height of the water table, when compared with other nearby wells. The geophysical logs for the other wells (Appendix B) located along Millstone Road (SL-6, SL-7 and SL-

Table 2

2016 Elevation Information
Off-site Wells

Well ID	Elevation of Measuring Point (FAMSL)*	Depth To Water (FBG)+ Collected on April 28, 2016	Groundwater Elevation (FAMSL)*	Longitude	Latitude
SL-1	223.25	207.96	15.29	-72.34162	40.97090
SL-2	220.78	204.87	15.91	-72.34116	40.97107
SL-3	218.77	203.71	15.06	-72.34068	40.97125
SL-4D	-	-	-	-72.34018	40.97141
SL-4S	217.40	201.23	16.17	-72.34020	40.97140
SL-5	215.51	200.17	15.34	-72.33970	40.97157
SL-6	175.99	163.71	12.28	-72.34776	40.97258
SL-7	169.45	156.41	13.04	-72.34849	40.97301
SL-8^	162.05	103.6	58.45	-72.34931	40.97390
SL-9	198.87	185.86	13.01	-72.34803	40.97402
SL-10	191.35	178.62	12.73	-72.34697	40.97131
PR-1	226.62	209.64	16.98	-72.33631	40.97090
S-58959	186.97	171.59	15.38	-72.34238	40.96902

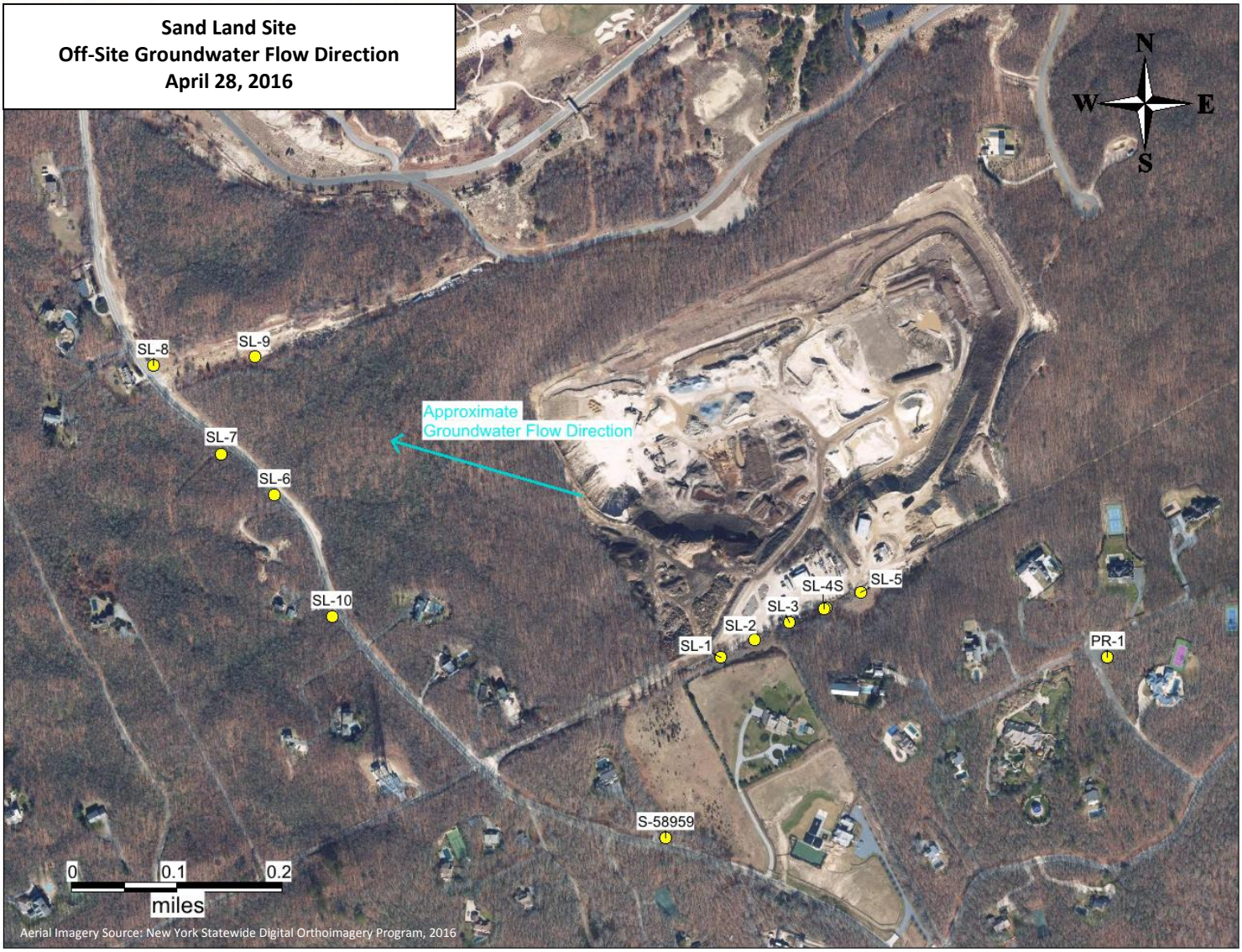
* FAMSL – Feet Above Mean Sea Level
\+ FBG – Feet Below Grade
^ Anomalous elevation, groundwater appears to be perched above the regional groundwater table. Not used in groundwater contouring.
\- *Not Collected*

10) and SL-9 located just to the east of SL-8, all indicated that low permeable deposits were situated above the elevation of the water table. The observations made during drilling of these wells support this observation. However, SL-8 showed the most complex lithology encountered, with a low permeable deposit located both above and below the water table (also verified by observations made during the drilling of the well). This indicates the possibility that the groundwater located above the low permeable layer is isolated from the principal flow system (i.e., perched) and would not be considered part of the regional groundwater flow system. The existence of this condition in this area was discussed in the USGS Report 98-4181.

The information collected regarding the water table elevations was used to determine that the approximate groundwater flow direction just west of the site appears to be in a northwest direction (Figure 3). This groundwater flow direction is consistent with the principal flow direction for this area indicated in the USGS Report 98-4181. However, it should be noted that due to the large size of the subject parcel (50 acres), the known complex hydrogeologic conditions in the area, and the extreme distance from the potential source areas to the wells located on Millstone Road, the exclusive use of wells located around the periphery of the site provide only an off-site groundwater flow direction and may not be indicative of groundwater flow across the site. In

order to determine a more definitive groundwater flow direction across the site, it was determined that monitoring wells needed to be installed on the Sand Land property.

Figure 3



2015 Groundwater Water Quality Results of Off-Site Wells

A total of 49 water samples were collected in 2015 from the twelve wells located around the Sand Land site. All of the samples were analyzed by SCDHS Public and Environmental Health Laboratory (PEHL), which is certified by the New York State Department of Health's (NYSDOH) Environmental Approval Program and the United States Environmental Protection Agency's (USEPA) National Environmental Laboratory Program. Samples were analyzed for approximately 300 compounds using applicable USEPA or SCDHS methods, as appropriate. The analyte groups that were tested are indicated in Table 3.

Table 3

SCDHS PEHL Analyte Groups Run on 2015 Groundwater Samples

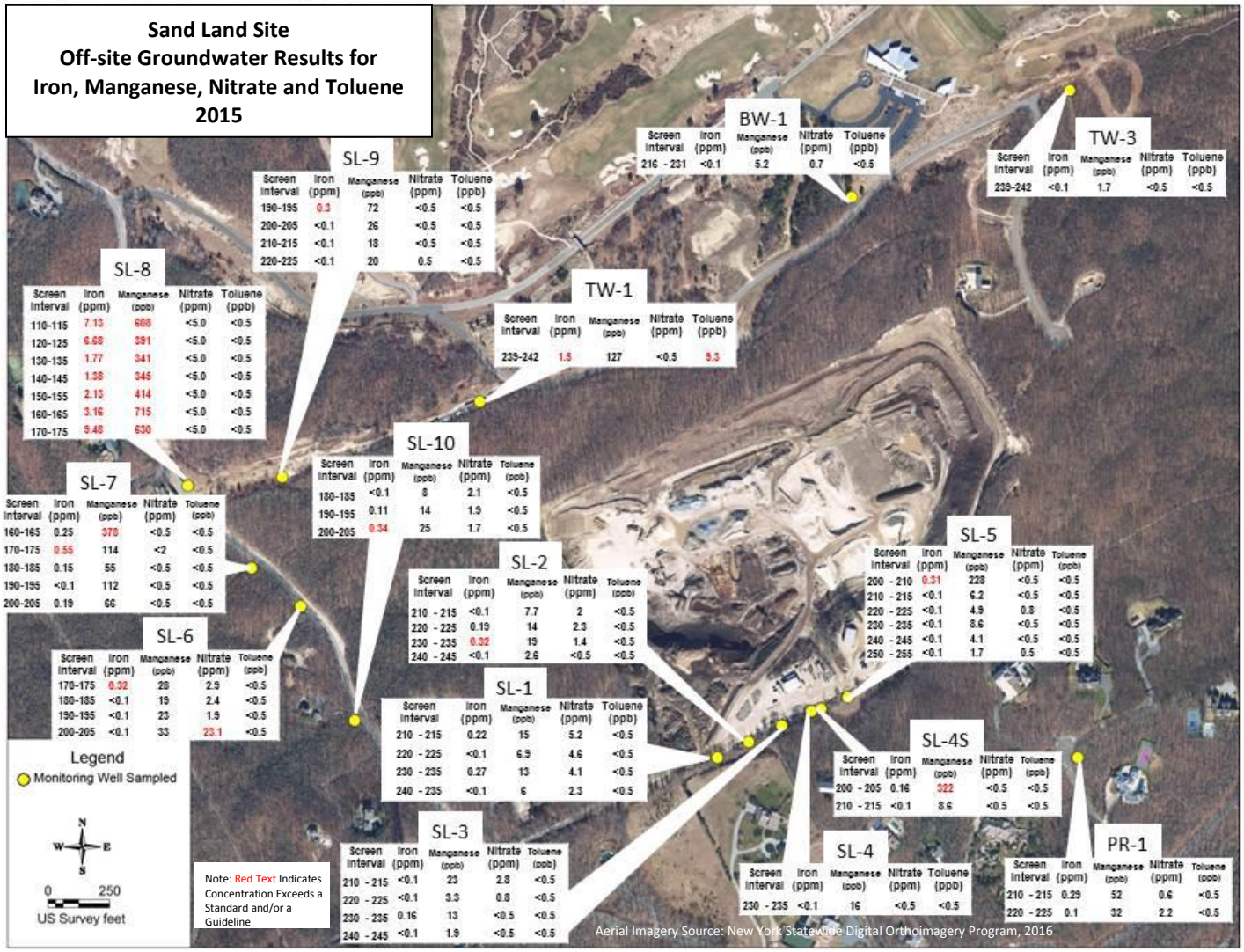
Analysis Group		Analysis Group
Metals		Chlorinated Pesticides
Volatile Organic Compounds		Chlorinated Acids
Semi-Volatile Organic Compounds		1,4-Dioxane
Standard Inorganics		Dacthal
Hexavalent Chromium*		Herbicide Metabolites
Perchlorate*		Carbamate Pesticides
Radionuclides		MBAS (Detergents)*
Microextractables		

*Note: Analysis Group was not run on all samples

A list of individual parameters analyzed in the analysis groups is included in Appendix C, and a summary of the analytical results for detected parameters is included in Appendix D.

Iron, manganese, nitrate and toluene were observed at concentrations exceeding a standard. SL-2, SL-5, SL-6 and SL-10 exhibited iron concentrations ranging from 0.31 parts per million (ppm) to 0.34 ppm, which is slightly above the groundwater standard and drinking water standard (GWS/DWS) of 0.3 ppm. Iron concentrations were detected at more significant concentrations in SL-7 (0.55 ppm), TW-1 (1.5 ppm) and SL-8, where it was detected above the standards in each of the seven profile levels, ranging from 1.38 ppm to 9.48 ppm. Manganese concentrations exceeded the GWS/DWS of 300 parts per billion (ppb) in nine samples, including the top profile levels of SL-4S (322 ppb) and SL-7 (378 ppb). The manganese concentrations also exceed the standards in all seven profile levels of well SL-8, ranging from 341 ppb to 715 ppb. The deepest profile level of SL-6 (screened at 200 to 205 feet below grade) exhibited a nitrate concentration of 23.1 ppm, the only sample to exceed the GWS/DWS of 10 ppm. TW-1 had the only detection of toluene at a concentration of 9.3 ppb, which exceeds the drinking water standard of 5 ppb. It should be noted that this well (TW-1) was not a well the SCDHS installed, it is a preexisting well located on The Bridge golf course north of the Sand Land site which the SCDHS was given permission to sample. Figure 4 shows the off-site well locations sampled, and the concentrations of iron, manganese, nitrate and toluene reported at the varying well depths. Other detections/concentrations of note include: more metals were generally detected (e.g., arsenic, beryllium, lead, vanadium), and concentrations were higher (e.g., aluminum, lithium, titanium) in the profile levels of well SL-8 relative to the samples in the other wells; the deepest profile level of SL-8 (screened 170 to 175 feet below grade) had the only detection of gross alpha at 5.2 pCi/l and

Figure 4



also had detections of Bisphenol A, DEET and caffeine. Additionally, every well with the exception of SL-6 had at least one detection of chloroform. These concentrations ranged from 0.5 ppb to 5.4 ppb. It should be noted that chloroform was detected in the pump blank samples, and the detections observed in the monitoring wells is likely due to cross contamination.

Surface Water Sample Collected May 8th 2015

To help assess potential impacts to groundwater from the activities occurring at the Sand Land site, NYSDEC staff collected a surface water sample at the facility on May 8th, 2015. The sample was obtained from an area of ponded water situated in the north-east portion of the property (Figure 5). The sample was collected by NYSDEC personnel using a stainless steel bucket and was

Figure 5

relinquished to staff from SCDHS. The sample was decanted into the appropriate laboratory containers and transported to the SCDHS PEHL. The sample was analyzed by the PEHL for the analysis groups indicated in Table 4. The results indicate that 34 analytes were detected, including numerous metals, chlordane, gross alpha, gross beta, chloride, DEET, methyl sulfide and trace detections of 2-hydoxyatazine, dichlorvos, caffeine and acetaminophen. A list of individual parameters analyzed in the analysis groups is included in Appendix C, and a copy of the test results are included in Appendix E.

Table 4

SCDHS PEHL Analyte Groups Run on 2015 On-Site Surface Water Sample

Analysis Group		Analysis Group
Metals		Chlorinated Pesticides
Volatile Organic Compounds		Chlorinated Acids
Semi-Volatile Organic Compounds		1,4-Dioxane
Standard Inorganics		Dacthal
Radionuclides		Herbicide Metabolites
Carbamate Pesticides		Microextractables

2013-2016 Private Well Survey

As a part of a SCDHS initiative to identify and sample private wells in proximity to VOWM sites throughout Suffolk County, seven private wells were identified and sampled by SCDHS immediately south of the site beginning in 2013. The results indicated, that at the time of sampling, all the samples met drinking water standards with the exception of one well which exhibited a concentration of iron slightly above the drinking water standard of 0.3 ppm. The iron concentration detected in this sample is not normally considered harmful to public health, but is an aesthetic issue. SCDHS informed the property owner regarding the available iron treatment options, including the use of a polyphosphate feeder, or water softener. Once the determination was made that the localized off-site groundwater flow direction was to the northwest from the Sand Land site, twenty-one additional properties potentially served by private wells in the vicinity (west and northwest of the site) were then contacted with offers to have SCDHS conduct water quality testing. Seven homeowners responded and had their water tested. The results indicated that, at the time of sampling, all the parameters tested in the seven wells met drinking water standards.

January 29, 2016 Interim Report

In January of 2016, the SCDHS released an interim report entitled "*Investigation of Potential Impacts to Groundwater at Wainscott Sand & Gravel/Sand Land Facility, 585 Middle Line Highway, Noyack, N.Y.*". This report documented the work described above that was completed through mid-January of 2016. It should be noted that at the time of the release of the report, sample results were pending for wells SL-6, SL-7, SL-8 SL-9, SL-10 and TW-1, and these results were not included in the report. One of the 'Next Steps' outlined in this report was to "*Pursue permission to install profile wells on the Sand Land site, as close to the potential source areas as practicable, in order to obtain water quality data and collect water level measurements*." The water quality data from the surface water sample collected on the Sand Land site on May 8, 2015 indicating elevated

concentrations of metals, and groundwater quality data received from the pending samples after the release of the report (and discussed in the *SCDHS Off-Site Groundwater Investigation Work Conducted in 2015-2016* section above) served to reinforce this recommendation. Well SL-8 exhibited degraded groundwater quality, consistent with impacts from activities related to other VOWM sites the SCDHS has investigated in Suffolk County. This well is located northwest of the subject site, and potentially hydraulically downgradient when considering the offsite groundwater flow direction west of the site (Figure 3). Known complex hydrogeological conditions in the vicinity of the Sand Land site were also identified in SL-8 (e.g., a potentially localized perched water table), making conclusions regarding the source of the degraded water quality observed in SL-8 difficult, warranting further on-site investigation closer to potential source areas (e.g., piles of vegetative organic waste).

2017 On-site Investigation

The groundwater information collected in the off-site monitoring wells in 2015 and 2016 was evaluated and it was determined that the magnitude and extent of groundwater contamination related to the site activities could not be definitively determined from the information gathered. This was due to a number of factors, including the complex hydrogeology in the area and, due to well siting limitations, the distance the offsite wells were located relative to the site and the potential contaminant sources. Results obtained had indicated the groundwater flow direction just west of the site was to the northwest, and water quality results collected from some of the profile wells west of the site (downgradient) had elevated contaminant concentrations (metals and nitrates), which were similar to those observed downgradient of other VOWM facilities investigated by the SCDHS. In order to verify the origin of these contaminants and determine the magnitude and extent of the groundwater impacts, it was determined that additional monitoring wells were needed on the Sand Land property, as close as possible to the piles of vegetative matter. Additionally, since a ponded water sample collected by the NYSDEC in 2015 contained various metals, pesticides, radiologicals and wastewater related compounds, collection of surface /ponded water samples from the site were also deemed necessary. Solid samples of the soil cuttings from the well drilling augers used to install the wells, and from the piles of vegetative material located nearest to the installed wells were also deemed necessary. This approach was generally consistent with other investigations the SCDHS had performed on VOWM sites across Suffolk County.

Site Access

The SCDHS requested permission to access the site from the property owner in order to perform the work outlined above, but this request was denied. In order for SCDHS personnel to gain access to the site to conduct the investigation, the SCDHS Commissioner, Dr. James Tomarken, signed a Warrant of Access and Inspection on November 2nd, 2016. On August 9, 2017 the New York State Supreme Court confirmed the Commissioner's Warrant of Access and Inspection.

SCHDS personnel accessed the site on October 4th, 2017 to initiate the on-site investigation and completed the on-site field work on October 18th, 2017.

2017 SCDHS Monitoring Wells

Nine temporary profile monitoring wells were installed as part of the on-site investigation (SLOS-1 through SLOS-9). The locations of these wells were determined based upon the review of historic and current aerial photographs to assess patterns of use across different areas of the 50 acre site, and also to ensure adequate geographical distribution for the determination of the groundwater flow direction across the site. Appendix F includes aerial photographs of the site taken from 1962 through 2016 depicting the locations of the 10 SCDHS monitoring wells installed for the on-site investigation. These photographs illustrate the different uses of the land in the vicinity of the wells over more than fifty years. The same procedures used for the installation and sampling of the temporary profile wells for the 2015-2016 off-site work, as described earlier, were followed for the nine temporary profile wells installed for the 2017 on-site work. In addition to the nine profile wells, one well (SLOS-10) was installed 15 feet deeper than the other wells, and was not profiled. A water level measurement was collected in this well to assist in obtaining information regarding the vertical (downward or upward) gradient of the water table (a water sample was also collected). Groundwater samples were also collected from two off-site wells (PR-1 and SL-3) located south of the site (these wells were installed as a part of the 2015-2016 work) to provide information on the ambient groundwater quality in the vicinity of the site. Information on the depths, locations, number of profile samples collected per well, etc. is contained in Table 5.

2017 Groundwater Water Quality Results of On-Site Wells

A total of 32 groundwater samples were collected from on-site wells, and two samples were collected from off-site wells. All of the samples, with the exception of four samples analyzed for perfluoroalkyl substances (PFASs) by New York State's Wadsworth Laboratory, were analyzed by the SCDHS PEHL. The analysis groups run by the PEHL are indicated in Table 6. Note that a list of individual parameters analyzed in each analysis group is included in Appendix C, and a summary of the analytical results for detected parameters is included in Appendix G.

The following is a summary of significant analytical results from the 10 wells the SCDHS installed on-site.

Metals

Monitoring wells SLOS-6, SLOS-7 and SLOS-9 exhibited the most degraded water quality with respect to metals concentrations. Manganese, thallium, iron and sodium exceeded drinking water standards and/or groundwater standards or guidance values in the following on-site monitoring wells:

- Manganese (SLOS-2, SLOS-6, SLOS-7, SLOS-9)
- Thallium (SLOS-7)

Table 5

Monitoring Wells Installed and/or Sampled by SCDHS

Well	Well Site Location Description	Depth to Water (fbg)+	# Profile Intervals Sampled	Top Interval Level (fbg)+	Bottom Interval Level (fbg)+
SLOS-1*	On site, Mulch, Organic Vegetation	151.00'	3	153'-158'	170'-175'
SLOS-2*	On site, Organic Vegetation	150.29'	3	150'-155'	170'-175'
SLOS-3*	On site, Organic Vegetation	154.29'	3	157'-162'	170'-175'
SLOS-4*	On site, near open pit and soil sorter	142.65'	3	145'-150'	165'-170'
SLOS-5*	On-site, easterly well near active sand mining	142.85'	4	145'-150'	170'-175'
SLOS-6*	On-site, easterly well near active sand mining	139.3'	4	140'-145'	170'-175'
SLOS-7*	On-site, easterly well near active sand mining	149.62'	4	140'-145'	165'-170'
SLOS-8*	On-site, western well near construction debris	137.2'	4	145'-150'	170'-175'
SLOS-9*	On-site, center of facility, north access road	143.00'	3	150'-155'	170'-175'
SLOS-10*	On-site, adjacent to SLOS-1	151.20'	1	185'-190'	185'-190'
PR-1	Off-site, South of site on Paumanok Road	209.81'	1	210'-215'	210'-215'
SL-3	Off-site, on Middle Line Highway	204.12'	1	210'-215'	210'-215'
+ feet below grade * all onsite profile wells were removed after sampling was complete					

Table 6

SCDHS PEHL Analyte Groups Run on 2017 Groundwater Samples

Analysis Group		Analysis Group
Metals		Chlorinated Pesticides
Volatile Organic Compounds		1,4-Dioxane
Semi-Volatile Organic Compounds		Dacthal
Standard Inorganics		Herbicide Metabolites
Radionuclides		Carbamate Pesticides
Perfluoroalkyl Substances*		Microextractables

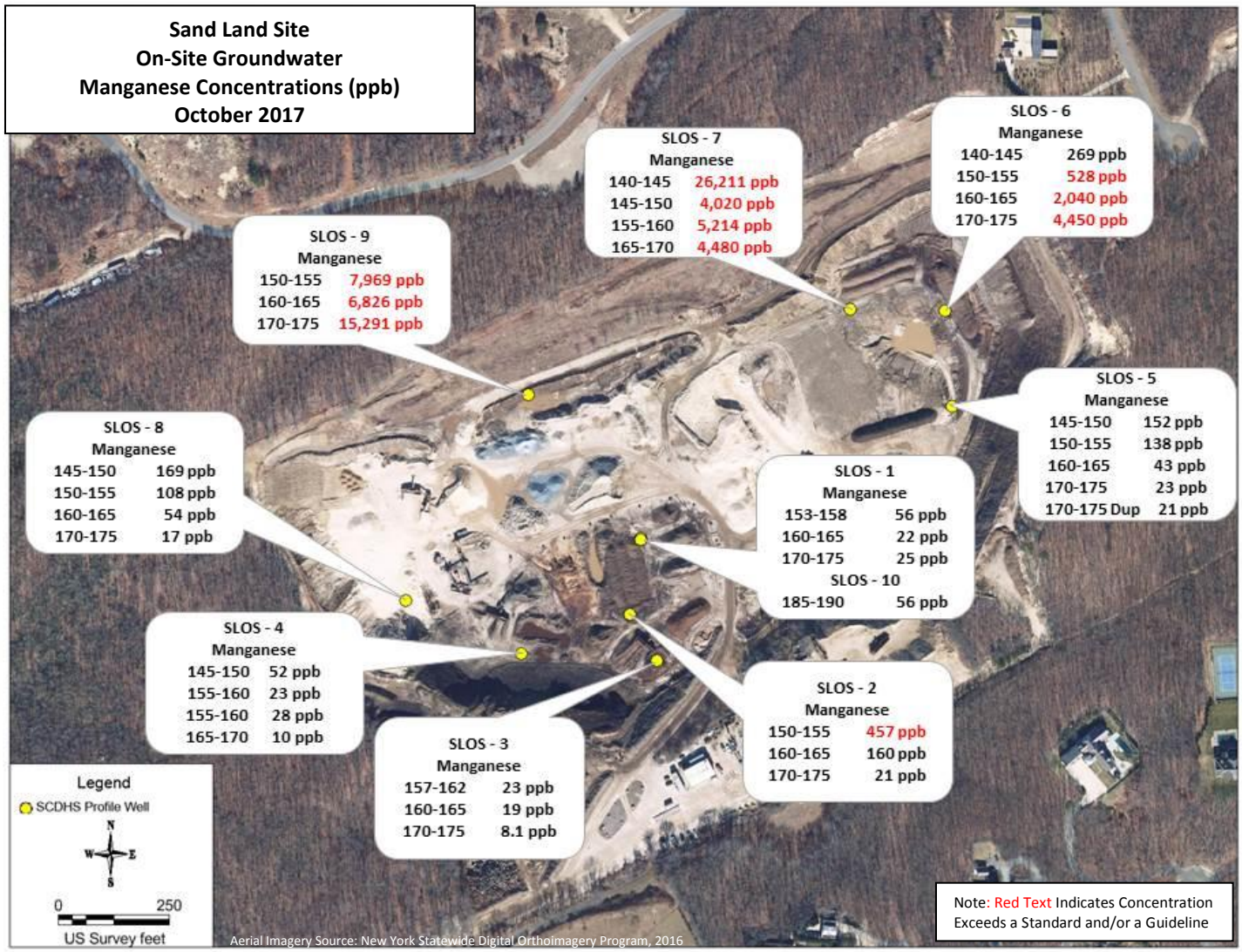
* Note: Analysis Group was not run on all samples. This analysis performed by New York State Wadsworth Laboratory.

- Iron (SLOS-1, SLOS-2, SLOS-3, SLOS-4, SLOS-5, SLOS-6, SLOS-7, SLOS-8, SLOS-9)
- Sodium (SLOS-2, SLOS-3, SLOS-4)

Manganese

Three of the four profile levels in well SLOS-6 had manganese concentrations ranging from 528 ppb to 4,450 ppb, exceeding the drinking water maximum contaminant level (MCL) and groundwater standard of 300 ppb. In well SLOS-7, all four profile levels exceeded standards for manganese. The top (water table) profile level of well SLOS-7, 140 – 145 feet below grade (fbg), had a manganese concentration of 26,211 ppb which is 87 times the drinking water and groundwater standard of 300 ppb. All three profile levels of well SLOS-9 exhibited manganese concentrations exceeding the GWS/DWS with concentrations ranging from 6,826 ppb to 15,291 ppb. SLOS-2 had a slight exceedance of the 300 ppb standard with a concentration of 457 ppb in the top profile level (150-155 fbg). Figure 6 depicts the well locations and associated manganese concentrations at the varying well depths.

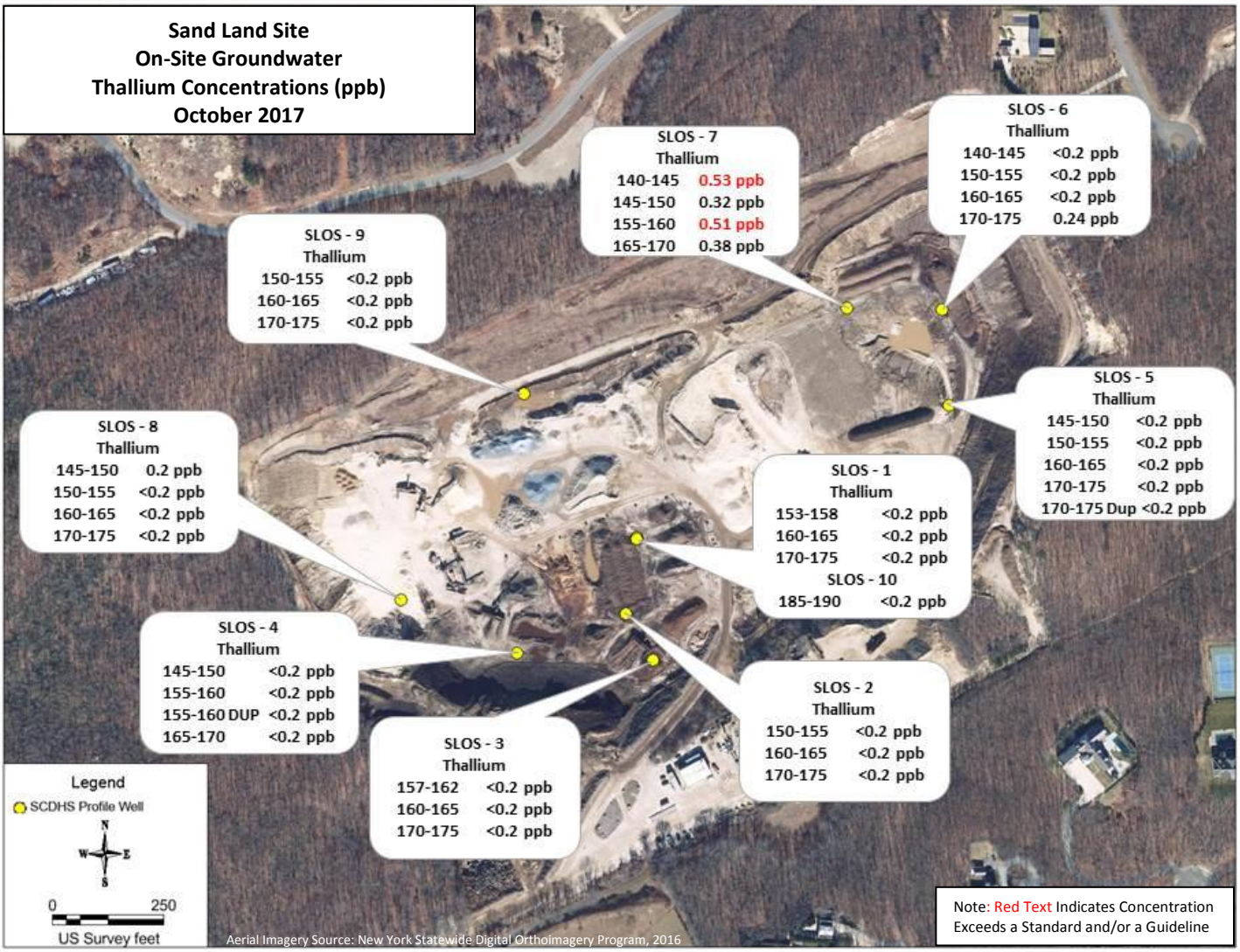
Figure 6



Thallium

Thallium was detected in all four profile levels of well SLOS-7, with concentrations in two of the four levels, 104-145 fbg (0.53 ppb) and 155-160 fbg (0.51 ppb), slightly exceeding the NYSDEC TOGs 1.1.1 Guidance values (TGV) of 0.5 ppb. Thallium was also detected below TGV in the deepest profile level of well SLOS-6, 170-175 fbg (0.24 ppb) and the uppermost (water table) level of well SLOS-8, 145-150 fbg (0.2 ppb). Figure 7 depicts the well locations and associated thallium concentrations at the varying well depths.

Figure 7

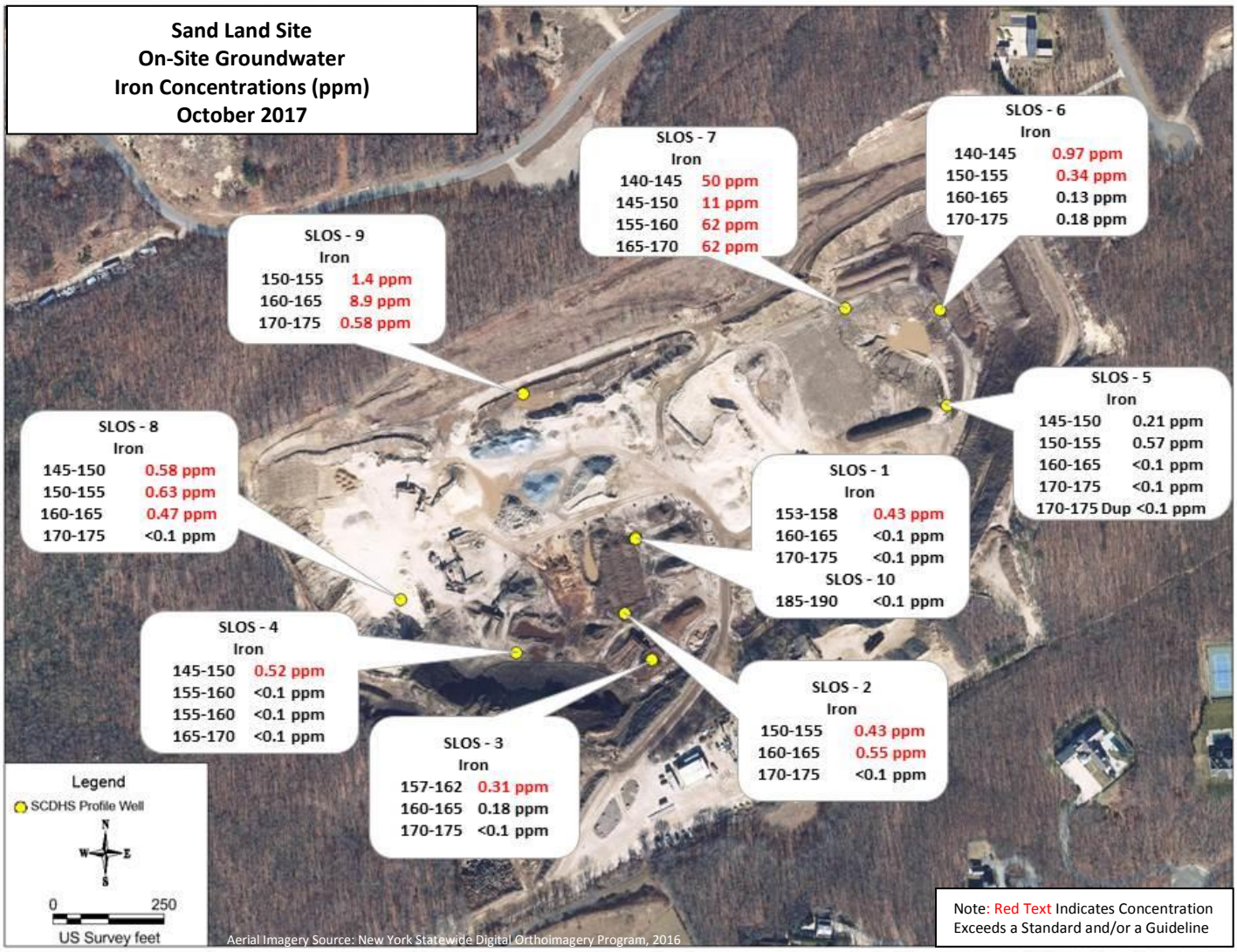


Iron

Iron was detected in concentrations exceeding the GW/DWS of 0.3 ppm in nine of the ten wells sampled on-site. SLOS-10, the deep well (screened 185 – 190 fbg) which was not profiled, had no detection of iron. Six wells, SLOS-1, SLOS-2, SLOS-3, SLOS-4, SLOS-5, SLOS-8, had iron

concentrations in one or more profile levels ranging from 0.31 ppm to 0.63 ppm. The three wells located along the northern portion of the site, SLOS-6, SLOS-7 and SLOS-9, generally had more significant iron concentrations, ranging from 0.34 ppm to 62 ppm. The highest iron concentrations were observed in the four profile levels of well SLOS-7: 140-145 fbg (50 ppm), 145-150 (11 ppm), 155-160 fbg (62 ppm) and 165-170 fbg (62 ppm). Figure 8 depicts the well locations and associated iron concentrations at the varying well depths.

Figure 8



Sodium

The sodium concentration exceeded the groundwater standard and TGV of 20 ppm in one profile level in three wells. SLOS-2, SLOS-3 and SLOS-4 exhibited concentrations of 33 ppm, 23 ppm and

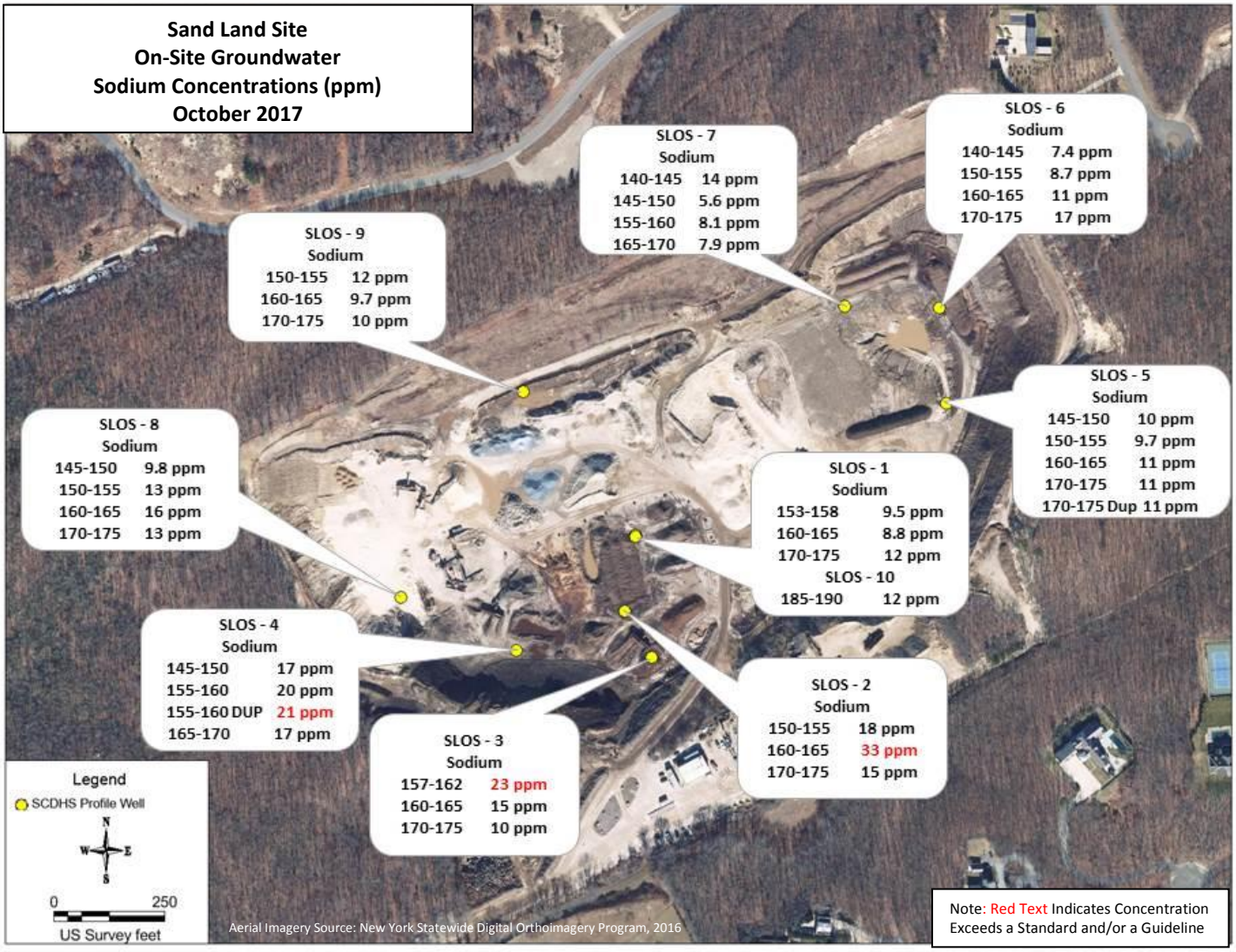
21 ppm respectively. These wells are the most southerly located of the on-site wells. Figure 9 depicts the well locations and associated sodium concentrations at the varying well depths.

Inorganic Parameters

Two inorganic parameters, nitrate and ammonia, were detected at concentrations above their respective drinking water and/or groundwater standards in the following on-site monitoring wells:

- Ammonia (SLOS-6)
- Nitrate (SLOS-2, SLOS-3, SLOS-4)

Figure 9

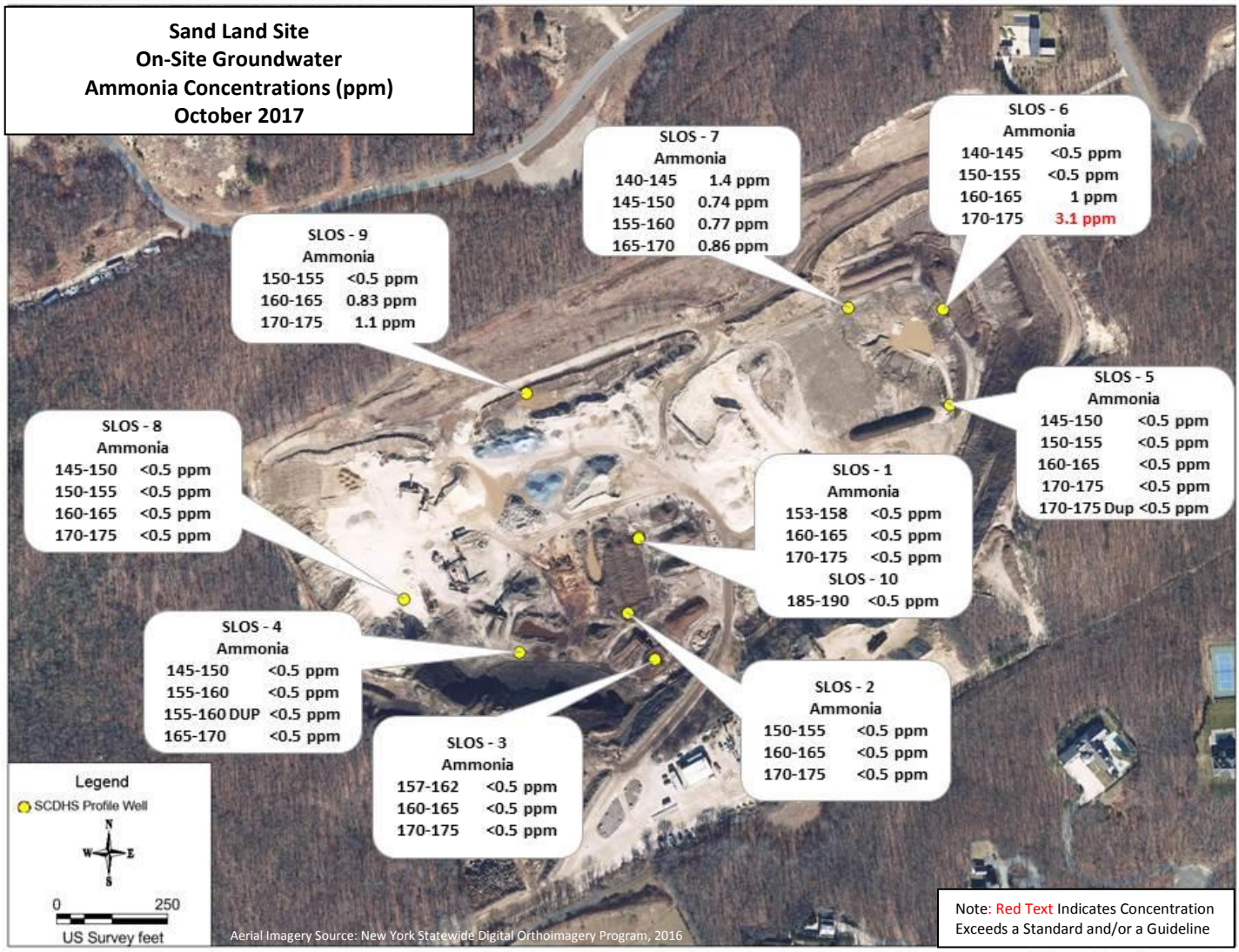


Ammonia

Ammonia was detected in the three wells located on the northern portion of the site, SLOS-6, SLOS-7 and SLOS-9. The ammonia concentration in the deepest profile level of SLOS-6 (170-175

fbg) was 3.1 ppm, the only one to exceed the 2 ppm groundwater standard. Ammonia was not detected in the other seven on-site wells. Figure 10 depicts the well locations and associated ammonia concentrations at the varying well depths.

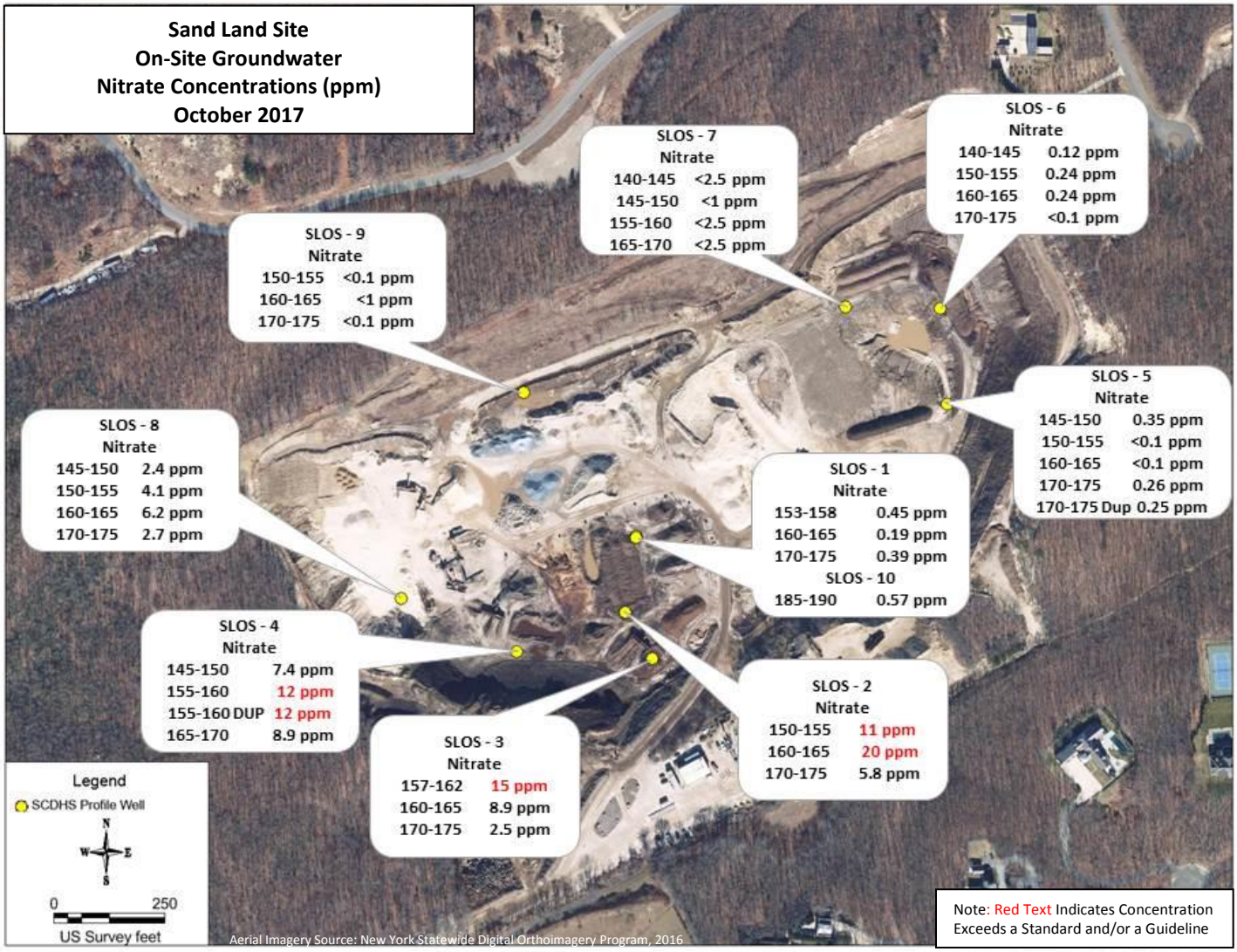
Figure 10



Nitrate

The three most southerly on-site wells (SLOS-2, SLOS-3 and SLOS-4) exhibited nitrate concentrations in excess of the GW/DWS of 10 ppm. The top two profile levels of SLOS-2 (150-155 fbg and 160-165 fbg) had nitrate concentration of 11 ppm and 20 ppm, respectively. SLOS-3 had 15 ppm of nitrate in the top level (157-162 fbg). Figure 11 depicts the well locations and associated nitrate concentrations at the varying well depths.

Figure 11



Radionuclides

Gross alpha, gross beta and tritium were analyzed in all of the on-site groundwater samples collected. No samples exceeded the groundwater standard for gross beta or the drinking water guidance value for adjusted gross beta, there were no detections of tritium in any of the samples, and one sample exceeded the drinking water standard for gross alpha as follows:

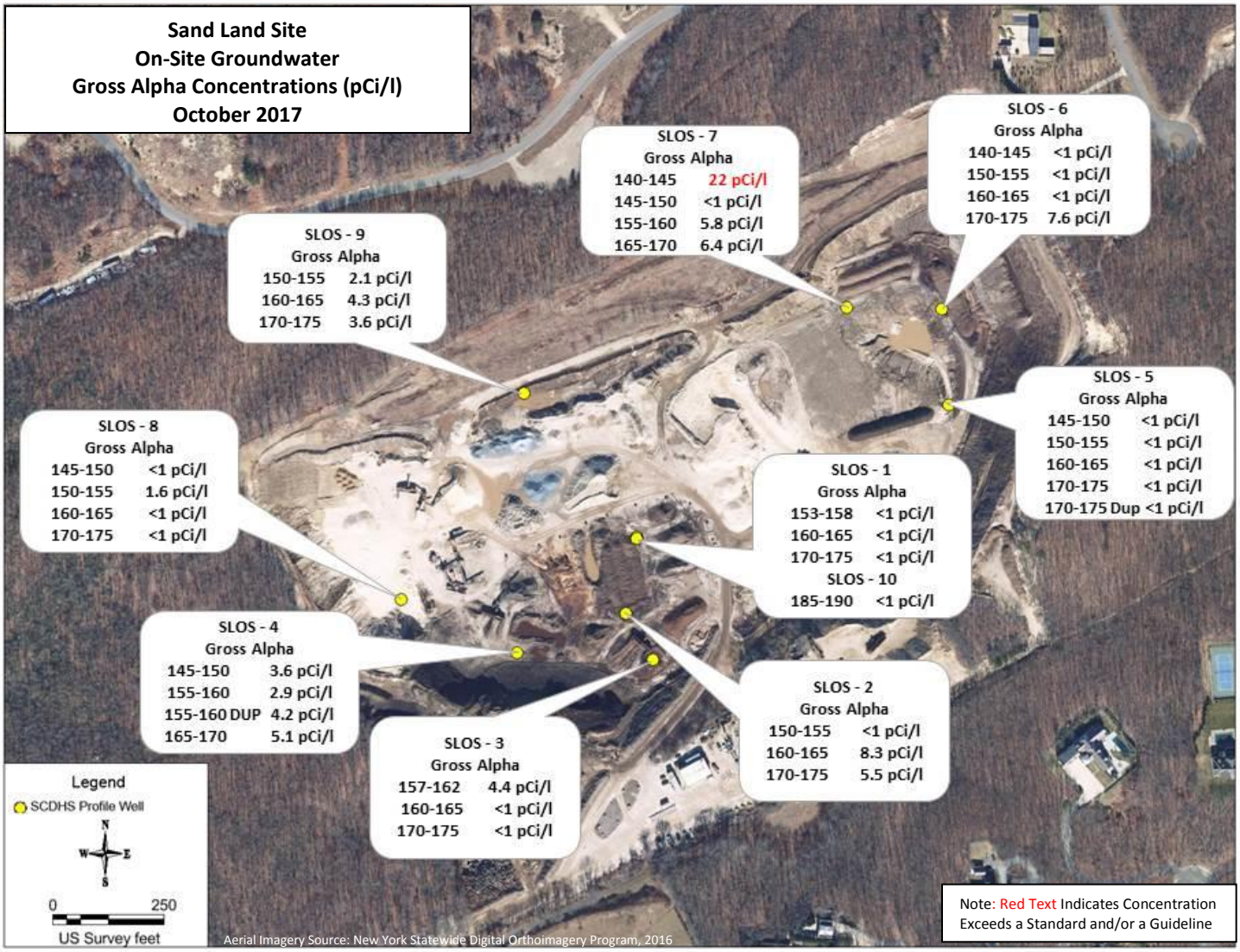
- Gross Alpha (SLOS-7)

Gross Alpha

Gross alpha was detected in fourteen of the 32 on-site groundwater samples collected. Seven of the ten wells had at least one detection of gross alpha. Wells SLOS-1, SLOS-5 and SLOS-10 had no

detections. The upper profile level (140-145 fbg) of well SLOS-7 had a concentration of 22 pCi/l, which exceeds the drinking water standard of 15 pCi/l. Figure 12 depicts the well locations and associated gross alpha concentrations at the varying well depths.

Figure 12



Other Notable Results

Other notable analytes were detected, however their concentrations either did not exceed an established drinking water or groundwater standard/guideline, or no standard/guideline currently has been established. This includes metals such as aluminum (up to 630 ppb), barium (up to 525 ppb), strontium (up to 481 ppb), and potassium (up to 161 ppm). The pesticide dichlorvos was detected at low or trace concentrations in five wells, and breakdown products of the pesticides

metolachlor (metolachlor metabolite CGA-67125) or atrazine (didealkyatrazine) were detected at trace concentrations in five different wells. Acetaminophen was detected at trace concentrations in three of the four profile levels in SLOS-7. Equilin, a naturally occurring estrogen which is found in horses, was detected in SLOS-5 at two profile levels (160-165 fbg and 179-175 fbg) at 0.9 ppb, and bisphenol A was detected at trace concentrations in
four different wells.

The uppermost profile levels (water table) of four wells (SLOS-1, SLOS-2, SLOS-3 and SLOS-7) were analyzed for perfluoroalkyl substances (PFASs). Four PFASs were detected: perfluorobutanesulonic acid (PFBS), perfluorohexanesulonic acide (PFHxS, perfluoroheptanoic acid (PFHpA), and perfluorooctanoic acid (PFOA). Two wells (SLOS-2 and SLOS-3) had four PFASs detected, three PFASs were detected in one well (SLOS-7) and the fourth well (SLOS-2) had no PFAS detections. All detected PFASs exhibited concentrations below their applicable drinking water standard[5] or health advisory level (HAL). PFOA is the only one of the PFASs detected that has a Health Advisory Level (HAL) set by the USEPA (70 parts per trillion (ppt)). Concentrations of PFOA ranged from 3.11 parts per trillion (ppt) to 8.5 ppt, which are below the HAL. All the other detected PFASs are regulated by New York State as Unspecified Organic Contaminants with a maximum contaminant level (MCL), or drinking water standard, of 50,000 ppt, and their concentrations ranged from 2.52 ppt to 7.34 ppt, well below the MCL.

2017 Groundwater Water Quality Results of Off-Site Wells

Two wells, SL-3 and PR-1, installed as a part of the 2015-2016 off-site investigation were resampled on October 23rd, 2017 Both wells had been installed as profile wells and sampled in 2015, and both remained at their uppermost profile level, 210' to 215' fbg. SL-3 is located on Middle Line Highway, directly across and south of the site, while PR-1 is located on Paumonak Road, approximately 700 feet southeast of the site. These wells were resampled in 2017, and considering a northwest groundwater flow direction across the site, their location indicates that their groundwater quality would not be impacted by site activities and serve as a reference.

Metals

Iron and sodium exceeded drinking water standards and/or groundwater standards or guidance values as follows:

- Iron (SL-3, PR-1)
- Sodium (PR-1)

[5] There is currently no chemical-specific Federal or New York State drinking water standard for PFASs; however they are regulated as Unspecified Organic Contaminants by the New York State Department of Health (NYSDOH) at a maximum contaminant level (standard) of 50,000 parts per trillion (ppt).

Iron

Iron exceeded the GW/DWS of 0.3 ppm in both wells, with SL-3 reporting 0.77 ppm and PR-1 reporting 0.42 ppm.

Sodium

PR-1 exhibited a sodium concentration of 37 ppm, which is above the NYSDEC Part 703 Groundwater Standard of 20 ppm.

Other Notable Results

Low concentrations of chloroform (2.4 ppb) and 1,4-Dioxane (0.12 ppb) were detected in SL-3. Bisphenol A was detected at trace concentrations both wells. All these detections were at concentrations below the applicable GW/DWS.

2017 On-Site Surface/Ponded Water Quality Results

Six surface water/ponded water samples were collected at four different locations on the site. Samples were collected from locations SLSW-1 and SLSW-2 on October 4, 2017. Due to logistical issues, these two samples were brought to the laboratory for analysis more than 24 hours after collection, therefore these two sites were resampled on October 10, 2017[6]. Samples were also collected at sites SLSW-3 and SLSW-4 on October 10th. Samples were analyzed by the SCDHS PEHL for the analyte groups indicated in Table 7. Note that a list of individual parameters analyzed in each analysis group is included in Appendix C, and a summary of the analytical results for detected parameters is included in Appendix H.

Table 7

SCDHS PEHL Analyte Groups Run on 2017 Surface Water/Pond Samples

Analysis Group		Analysis Group
Metals		Chlorinated Pesticides
Volatile Organic Compounds		1,4-Dioxane
Semi-Volatile Organic Compounds		Dacthal
Standard Inorganics		Herbicide Metabolites
Radionuclides		Carbamate Pesticides
Microextractables		

The following is a summary of notable analytical results from the surface/ponded water samples collected on site. It should be noted that the NYSDEC has not established water quality standards

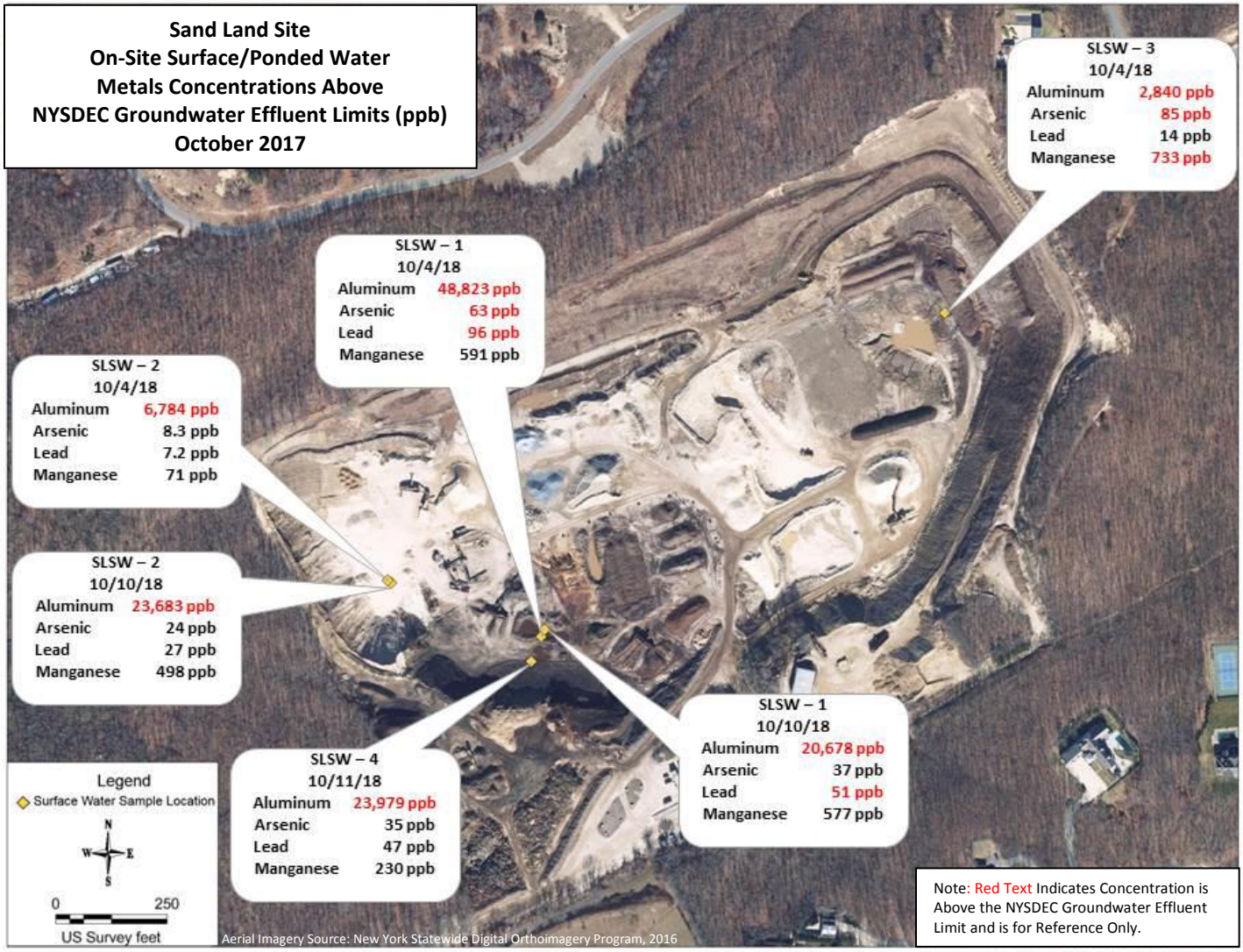
[6] Results of detected parameters for samples SLSW-1 and SLSW-2 on both October 4th and October 10th, 2017 are include in Appendix H. Only the results from the October 10th sample event will be included in the discussion.

or guidelines for ponded water generated primarily from rainfall run-off (storm water), therefore NYSDEC Groundwater Effluent Limits (GEL) Part 703.6, that have been established for the analytes detected will be used for comparison purposes only. Aluminum, arsenic, lead and manganese were reported at concentrations above the NYSDEC GELs at the following sampling locations:

- Aluminum (SLSW-1, SLSW-2, SLSW-3, SLSW-4)
- Arsenic (SLSW-3)
- Lead (SLSW-1)
- Manganese (SLSW-3)

Figure 13 illustrates the locations of the samples and concentrations of the above referenced metals detected from the surface/ponded water on the site.

Figure 13



Aluminum

Aluminum concentrations were reported above the NYSDEC GEL of 2,000 ppb in all four samples. The samples collected from SLSW-1, SLSW-2 and SLSW-4 exhibited aluminum at concentrations above 20,000 ppb, while the sample collected at SLSW-3 had a concentration of 2,840 ppb.

Arsenic

Arsenic was detected in all four surface/ponded water samples ranging from 24 ppb to 85 ppb. The result in SLSW-3 of 85 ppb was the only sample to exhibit a concentration above the NYSDEC GEL of 50 ppb.

Lead

Lead was detected in all four surface/ponded water samples ranging from 14 ppb to 51 ppb. The sample collected from site SLSW-1 with a lead concentration of 51 ppb was slightly above the NYSDEC GEL for lead of 50 ppb.

Manganese

Manganese concentrations ranged from 71 ppb to 733 ppb, and was detected at all four sites. One sample, SLSW-3 with a concentration of 733 ppb, was above the NYSDEC GEL of 600 ppb.

Other Notable Results

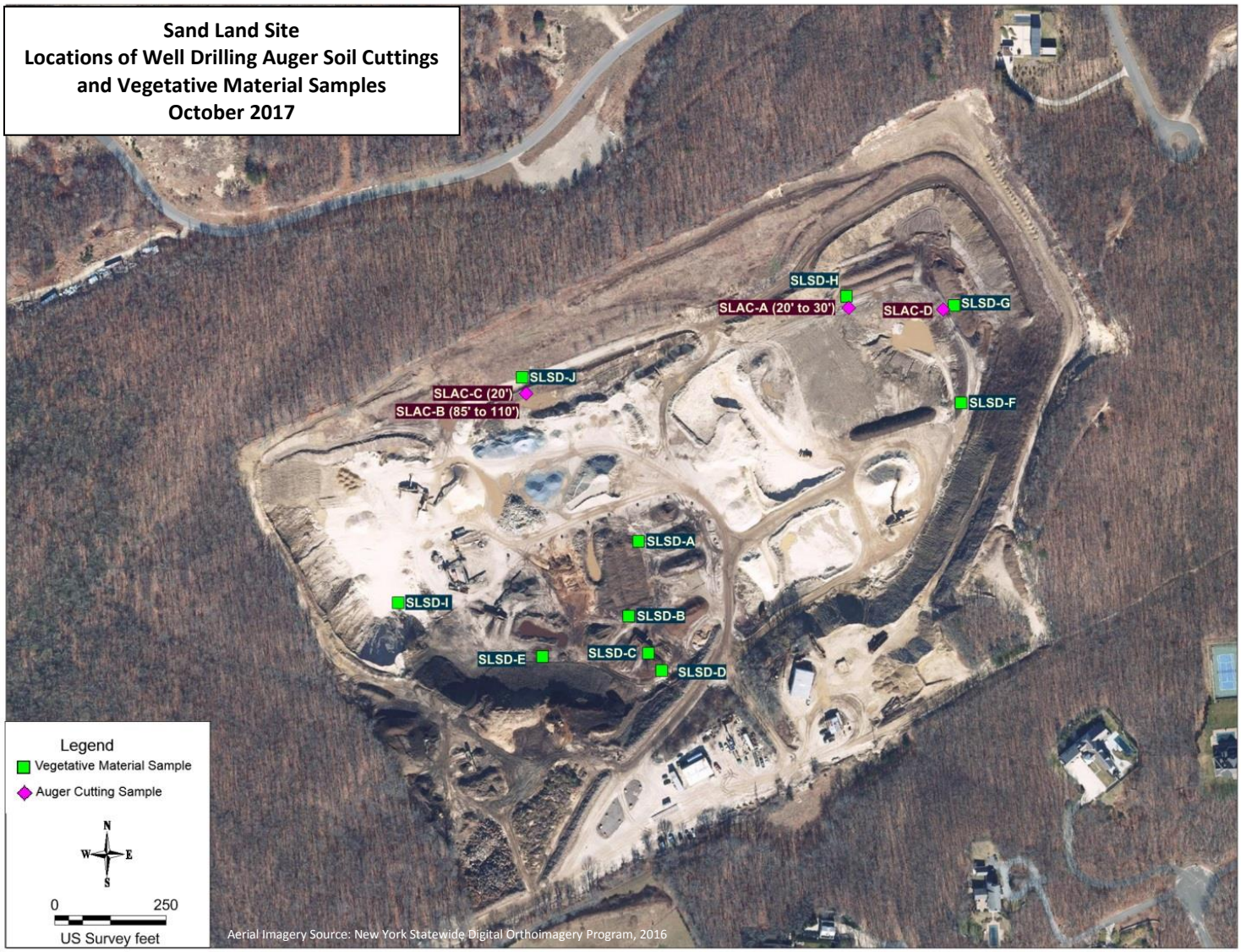
Detections and concentrations of some other analytes are of note even though there is no NYSDEC GELS established for them. The potassium concentration in SLSW-3 was reported as 230 ppm and is more than three times higher than concentrations reported from the other three sites (21 ppm to 70 ppm). Also, the chlorinated pesticide Gamma-BHC had reportable detections at two sites, SLSW-1 (0.09 ppb) and SLSW-4 (0.08 ppb). A breakdown product of the pesticide atrazine (2-hydroxyAtrazibne) had a trace concentration in SLSW-2, and the pesticide Dichlorvos was detected at sites SLSW-3 and SLSW-4, each at 0.9 ppb. Bisphenol A was detected (0.2 ppb) at site SLSW-4, and bisphenol B was detected (0.7 ppb) at SLSW-2. Acetaminophen (SLSW-2, SLSW-3), caffeine (SLSW-1) and ibuprofen (SLSW-1) were detected at trace concentrations, and it should be noted that these compounds are typically associated with water that has been impacted by sewage related discharges.

2017 Analytical Results- On-Site Soil/Vegetative Material Piles

Four soil samples were collected during well installation from cuttings produced by the drilling augers at three different wells, SLOS-6, SLOS-7, and two samples from SLOS-9. Ten samples were collected from the piles of vegetative material located in close proximity to each of the well installation sites. All the solid samples were analyzed for volatile organic compounds (VOCs) and metals. Analytical results from these samples were compared to NYSDEC Part 375 Soil Cleanup Objectives Protection of Groundwater (SCO-PG) and Part 375 Soil Cleanup Objective Unrestricted Use Guidelines (SCO-UUG). A summary of the detected analytes is included in Appendix I. Figure

14 shows the locations of the samples collected from the well drilling auger soil cuttings and piles of vegetative material.

Figure 14



Well Drilling Auger Soil Cuttings

Four samples were collected from the soil brought up on the flights of the augers (soil cuttings) used to install three of the groundwater monitoring wells. A grab sample of the soil from the cuttings was collected when a visibly noticeable change in the soil coming up on the auger flights was observed (e.g., color, texture, etc.). These grab samples were analyzed for metals and VOCs as follows: the 0 to 25 fbg interval of SLOS-6 (SLAC-D); the 20 to 30 fbg interval of SLOS-7 (SLAC-A); samples from two different depths (at 20 fbg and the 85 to 110 fbg interval) of well SLOS-9 (SLAC-

C and SLAC-B respectively). It should be noted that a single grab sample (not a composite sample) was collected from the soil cuttings of each of the intervals indicated.

Metals

Eight different metals were detected in these samples, of these eight, only two metals (manganese and zinc) have NYSDEC SCO-PG and SCO-UUG. The reported concentrations for manganese, ranging from 88 ppm to 233 ppm, and zinc at 63.5 ppm were below the NYSDEC SCO-PG and SCO-UUG of 2,000 ppm and 1,600 ppm respectively for manganese, and 2,480 ppm and 109 ppm respectively for zinc.

Volatile Organic Compounds (VOCs)

Six VOCs were detected in the soil samples collected from the well drilling auger soil cuttings in three of the four samples collected. Three of the four samples had VOC detections. SLAC-D (from the soil cuttings of well SLOS-6 – 0 to 25 fbg) had five different VOCs detected as follows: methyl ethyl ketone (11 ppb), toluene (4 ppb), tetrachloroethene (6 ppb), n-butyl acetate (8 ppb) and total xylene (6 ppb). SLAC-C (from the soil cuttings of SLOS-9 - 20 fbg) reported triclorofluoromethane (5 ppb) and tetrachloroethene (6 ppb). SLAC-B (from the soil cuttings of SLOS-9 - 85 to 110 fbg) reported toluene (5 ppb) and tetrachloroethene (5 ppb). SLAC-A (from the soil cuttings of SLOS-7 - 20 to 30 fbg) had no VOC detections reported. All the reported concentrations were below the NYSDEC SCO-PG and SCO-UUG.

Vegetative Material

Grab samples were collected from the piles of vegetative material in close proximity to each of the monitoring wells installed. Table 8 indicates the sample IDs of each vegetative material sample collected and the corresponding monitoring well in the vicinity. Two vegetative samples were collected near monitoring well SLOS-3 due to the two contrasting types of material that were located nearby the well. Since SLOS-1 and SLOS-10 were located so close to each other (SLOS-10 was the deeper well that was not profiled), one sample (SLSD-A) was adequate.

Table 8

Vegetative Material Samples and Proximate Monitoring Wells

Vegetative Sample ID	Proximate Monitoring Well		Vegetative Sample ID	Proximate Monitoring Well
SLSD-A	SLOS-1		SLSD-F	SLOS-5
SLSD-B	SLOS-2		SLSD-G	SLOS-6
SLSD-C	SLOS-3		SLSD-H	SLOS-7
SLSD-D	SLOS-3		SLSD-I	SLOS-8
SLSD-E	SLOS-4		SLSDJ	SLOS-9

Metals

Seven different metals were detected in these samples with manganese the only compound having NYSDEC SCO-PG and SCO-UUG (2,000 ppm and 1,600 ppm respectively). All the manganese concentrations were below the NYSDEC SCO-PG and SCO-UUG ranging from 50 ppm to 109 ppm. The same metals were detected in the vegetative material samples as were detected in the samples from the well drilling auger soil cuttings, with the exception of zinc.

Volatile Organic Compounds (VOCs)

VOCs were detected in four of the vegetative material piles. Concentrations in one of the samples exceed the NYSDEC SCO-PG and SCO-UUG as follows:

- Acetone (SLSD-A)

The acetone concentration in sample SLSD-A was 72 ppb, which exceeded both the Part 375 Soil Cleanup Objective for the Protection of Groundwater and Part 375 Soil Cleanup Objective for Unrestricted Use Guideline, which are both 50 ppb. Six other VOCs were detected ranging from 4 ppb to 10 ppb. SLSD-6 had four different VOCs detected, while SLSD-F had three detected, SLSD-J had two detections, while SLSD-A had only the acetone. The remaining six samples had no VOC detections reported.

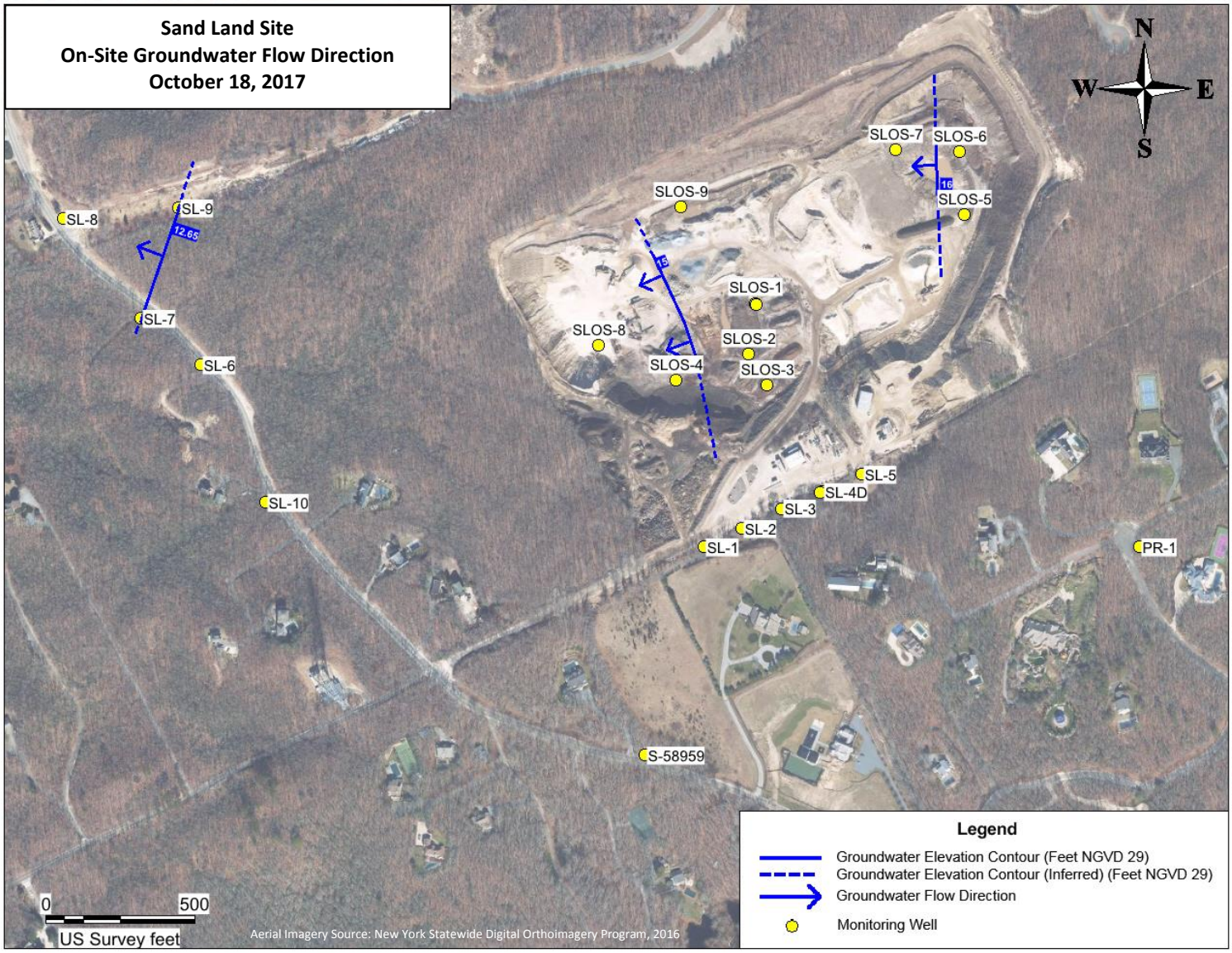
2017 Direction of Groundwater Flow Determined from On-Site Wells

The on-site groundwater flow direction was determined using nine temporary wells (SLOS-1 through SLOS-9) screened at or near the water table. Table 5 provides information on the monitoring wells installed and/or sampled in 2017. The wells were surveyed using the NGVD 29 datum from a permanent monitoring well (S-58959) located south of the site on Millstone Road. The equipment used for the groundwater flow direction survey was a Topcon AT-G2 auto level with tripod, fiberglass leveling rods (in feet/10ths), and depth to water was recorded using a Solinst Model 101 water level meter (in feet/10ths). The AT-G2 auto level and leveling rods were used to determine the differences in height between monitoring wells. The leveling rods were placed on a defined measuring point (MP) which was the top of the well casings. The auto level was set up between two monitoring wells and used to record the difference in height between the two wells. This process was performed twice to ensure an accurate reading. After the heights were recorded, the auto level was then moved between the last monitoring well that was recorded and a new one. This process was continued until the heights of all the monitoring wells were recorded. When this process was completed for all the wells, the Solinst water level meter was used to determine the depth to groundwater (DTW) from the MP. The DTW was then subtracted from the MP and a groundwater elevation in feet above mean sea level (FAMSL) was calculated.

Table 9 provides the information on the elevation of the measuring point, depth to water, the

groundwater table elevation in feet above mean sea level (FAMSL) and the latitude and longitude of all on-site wells. Table 9 also includes land surface elevations (in feet above mean sea level) for three locations (Center, West and NW Corner) in which temporary profile wells were originally planned but could not be installed due to site specific logistical issues. Suitable alternative sites for these wells were located and they were installed as wells SLOS-9, SLOS-4 and SLOS-8. Due to the large size of the site, over one third mile long, the area was split into two quadrants (eastern and western) when determining the groundwater flow. Water table elevation data from the monitoring wells in each quadrant were used to determine the groundwater flow contours. Groundwater in the eastern section of the site flows in a westerly to slightly

Figure 15



northwesterly direction and groundwater on the western section flows westerly with a slight south westerly component (Figure 15). As groundwater moves offsite the flow characteristics

Table 9

Elevation Information
2017 On-site Wells and Planned Well Sites

Well ID	Longitude	Latitude	Elevation of Measuring Point (FAMSL)* (NGVD 29)	Depth to Water (FBG)+ (Collected 10/17/2017)	Depth to Water (FBG)+ (Collected 10/18/2017)	Groundwater Elevation (FAMSL)* (Collected 10/17/2017)	Groundwater Elevation (FAMSL)* (Collected 10/18/2017)
SLOS-1	-72.34099	40.97314	166.94	151.53	151.52	15.41	15.42
SLOS-2	-72.34107	40.97267	165.85	150.52	150.50	15.33	15.35
SLOS-3	-72.34085	40.97239	170.77	155.81	155.81	14.96	14.96
SLOS-4	-72.34196	40.97243	157.85	143.00	143.00	14.85	14.85
SLOS-5	-72.33845	40.97396	159.46	143.28	143.32	16.18	16.14
SLOS-6	-72.33850	40.97454	153.29	137.12	137.16	16.17	16.13
SLOS-7	-72.33928	40.97455	156.52	140.72	140.74	15.80	15.78
SLOS-8	-72.34290	40.97276	157.98	143.47	143.46	14.51	14.52
SLOS-9	-72.34190	40.97403	165.42	150.14	150.14	15.28	15.28
SLOS-10	-72.34098	40.97313	166.86	151.47	151.47	15.39	15.39
Center#	-72.34193	40.97369	145.764^	-	-	-	-
West#	-72.34250	40.97239	151.8875^	-	-	-	-
NW Corner#	-72.34338	40.97341	158.7886^	-	-	-	-
PR-1	-72.33631	40.97090	226.62	-	210.07	-	16.55
S-58959	-72.34238	40.96902	186.97	-	172.08	-	14.89
SL-1	-72.34162	40.97090	223.25	-	208.53	-	14.72
SL-2	-72.34116	40.97107	220.78	-	205.41	-	15.37
SL-3	-72.34068	40.97125	218.77	-	204.31	-	14.46
SL-4S	-72.34020	40.97140	217.40	-	201.78	-	15.62
SL-5	-72.33970	40.97157	215.51	-	200.70	-	14.81
SL-6	-72.34776	40.97258	175.99	-	164.10	-	11.89
SL-7	-72.34849	40.97301	169.45	-	156.80	-	12.65
SL-8**	-72.34849	40.97301	162.05	-	103.50	-	58.55**
SL-9	-72.34803	40.97402	198.87	-	186.22	-	12.65
SL-10	-72.34697	40.97131	191.35	-	179.03	-	12.32

* FAMSL – Feet Above Mean Sea Level
+ FBG – Feet Below Grade
# Originally planned well sites, however wells locations were moved due to site specific logistical issues.
^Elevation of Land Surface (FAMSL). Collected using Leica CS20 controller with GS16 smart antenna
** Anomalous water table elevation, groundwater appears to be perched above the regional groundwater table. Not used in groundwater contouring.
- Not collected

takes on a more northwesterly flow direction. This off-site flow characteristic is consistent with the off-site groundwater flow direction observed in 2016 (Figure 3), and the report from the United State Geological Survey[7].

[7] *Ground-Water Flow Paths and Traveltime to Three Small Embayments within the Peconic Estuary, Eastern Suffolk County, New York*, 1999, United States Geological Survey, Water-Resources Investigations Report 98-4181

It should be mentioned that, although there can be localized variability on a large site due to changing recharge conditions within the site, the groundwater flow direction determined from the on-site wells is consistent with the regional groundwater flow direction determined in USGS Report 98-4181. Additionally, as indicated in Table 9, water table elevation measurements were collected from the on-site wells on two different dates, October 17 and October 18, 2017, and show little change, indicating negligible variability between the measurements. These water table elevation measurements were collected during a time of little or no precipitation for the previous 72 hours. Also, it should be noted that the ponded water located on the eastern portion of the property in the vicinity of SLOS-5, SLOS-6 and SLOS-7 (Figure 15) had no standing water and was completely dry. The aerial photographs used throughout this report displaying the sample locations is from 2016, and the site conditions depicted on this photograph are not representative of the site conditions in October 2017.

Using the hydrogeological information from the on-site monitoring wells and the groundwater elevations, estimates of the horizontal and vertical groundwater gradients were determined. An estimate of the horizontal gradient between well SLOS-1 and SLOS-8 was determined to be 0.0164. A downward vertical gradient was detected between the shallow and deep wells SLOS-1 and SLOS-10, respectively. This finding indicates that this area is a groundwater deep recharge area, and therefore a vital groundwater protection area. The contamination detected at multiple levels in the profile wells on-site is likely due to the presence of a downward vertical flow component.

The geologic characteristics beneath the site were determined through observations made during the construction of the well through examination of drill soil cuttings coming to the surface. In addition geophysical logs were used to determine characteristics of formation. A gamma log was performed through the hollow stem augers prior to the well installation in order to assure wells were not screened in low permeable zones. In all cases the logs indicate no clays or silts zones were encountered except in well SLOS-8. The soil characteristics in the eastern and mid-section of the mine were mostly comprised of fine to coarse sands with some gravel present. Wells installed in the most western portion of the mine did show the presence of silts and clays. Wells installed in the most eastern portion of the mine did show a surface layer (up to 30 feet thick) of dark organic soil underline by sand and gravel typically encountered in the mine at other drill sites. Geophysical gamma logs did verify the majority of the material beneath the mine was sand and only in the western portion of the mine were silts and clays encountered. Geophysical gamma logs and well drilling completion reports and are provided in Appendix B and Appendix J, respectively.

2018 Private Well Survey

Upon review of the data obtained from the 2017 on-site monitoring wells, the SCDHS reassessed the private well survey area used in 2013-2106 and is in the process of sampling additional private

wells downgradient of the Sand Land. In March of 2018, the SCDHS identified thirty six properties potentially served with private wells (twenty-one initially identified in the 2013-2016 private well survey west and northwest of the site, and fifteen new homes) that are located generally downgradient of the subject site. Notices offering free testing have been mailed and delivered to all thirty six homeowners. Sample results from private wells completed to date have not indicated any apparent water quality impacts from VOWM activities. However, the survey is still on-going at this time and the water quality results will continue to be evaluated as they are completed. All of the samples are being analyzed by the SCDHS PEHL with the exception of the perfluoroalkyl substances (PFASs), which is being analyzed by New York State's Wadsworth Laboratory. The analyte groups being run are indicated in Table 10. Note that a list of individual parameters analyzed in each analysis group is included in Appendix C.

Table 10
SCDHS PEHL Analyte Groups Run on 2018 Private Well Samples

Analysis Group		Analysis Group
Metals		Chlorinated Pesticides
Volatile Organic Compounds		1,4-Dioxane
Semi-Volatile Organic Compounds		Dacthal
Standard Inorganics		Herbicide Metabolites
Radionuclides		Carbamate Pesticides
Microextractables		Bacteria
Perfluoroalkyl Substances (PFASs)*		MBAS

*This analysis performed by New York State Wadsworth Laboratory.

Discussion

The work performed in this investigation was undertaken to comply with Suffolk County Resolution Number 245-2015, which directed the SCDHS to determine the direction of groundwater flow in the vicinity of the Sand Land site, and to install monitoring wells to test for the presence of various contaminants, including metals, inorganic compounds, volatile and semi-volatile organic compounds, and radionuclides. The SCDHS installed a total of twenty-one monitoring wells, collected eighty-three groundwater samples, 4 surface water samples, 4 soil samples and 10 samples of vegetative material for this investigation.

The groundwater results are generally consistent with impacts observed from other VOWM sites studied throughout Suffolk County. Elevated metals, in particular manganese, iron and to a lesser extent thallium, potassium and cobalt were observed. Table 11 depicts a comparison of detection frequency, maximum and mean concentrations of the metals detected in the on-site groundwater wells at the Sand Land site to statistics of approximately 1,800 untreated shallow[8] private well

[8] Private wells are typically screened forty feet into the water table, within the shallow aquifer, in accordance with the minimum requirements in the Suffolk County Department of Health Private Water Systems Standards, July 1992.

Table 11

Comparison of Metals Data
Sand Land On-Site Wells and Suffolk County Private Wells

Parameter	Investigation	# Samples Analyzed	# of Samples with Detection	% Samples with Detection	Maximum Concentration Detected	Overall Mean Concentration#	Mean Concentration of Detected^
Aluminum (ppb)	Sand Land On-Site Wells	32	32	100%	630	175	175
	Suffolk Shallow Private Wells*	1,809	969	54%	2,580	39	70
Arsenic (ppb)	Sand Land On-Site Wells	32	2	6%	2	0.6	1.6
	Suffolk Shallow Private Wells	1,809	56	3%	7	0.6	2.1
Barium (ppb)	Sand Land On-Site Wells	32	32	100%	747	222	222
	Suffolk Shallow Private Wells	1,809	1,754	97%	954	40	41
Calcium (ppm)	Sand Land On-Site Wells	32	32	100%	62	44	44
	Suffolk Shallow Private Wells	1,813	1,790	99%	125	13	13
Chromium (ppb)	Sand Land On-Site Wells	32	25	78%	9.6	2.6	3.2
	Suffolk Shallow Private Wells	1809	334	18%	30	0.7	1.7
Cobalt (ppb)	Sand Land On-Site Wells	32	16	50%	107	12	24
	Suffolk Shallow Private Wells	1,809	73	4%	30	0.6	4
Copper (ppb)	Sand Land On-Site Wells	32	6	19%	13	3.6	8.3
	Suffolk Shallow Private Wells	1,809	1,717	95%	2,727	123	129
Iron (ppm)	Sand Land On-Site Wells	32	22	69%	62	6.3	9.2
	Suffolk Shallow Private Wells	1,809	673	37%	33	0.4	1.2
Lithium (ppb)	Sand Land On-Site Wells	14	8	57%	1.7	1.0	1.4
	Suffolk Shallow Private Wells	1,149	144	13%	16	0.7	2.2
Magnesium (ppm)	Sand Land On-Site Wells	32	32	100%	33	13	13
	Suffolk Shallow Private Wells	1,815	1,780	98%	221	4.9	5.0
Manganese (ppb)	Sand Land On-Site Wells	32	32	100%	26,211	2,467	2,467
	Suffolk Shallow Private Wells	1,809	1,607	89%	20,421	123	139
Molybdenum (ppb)	Sand Land On-Site Wells	32	1	3%	1.5	0.5	1.5
	Suffolk Shallow Private Wells	1,764	14	1%	17	0.5	3.4
Nickel (ppb)	Sand Land On-Site Wells	32	32	100%	36	6.8	6.8
	Suffolk Shallow Private Wells	1,764	1,392	79%	290	2.1	2.6
Potassium (ppm)	Sand Land On-Site Wells	32	32	100%	161	26	26
	Suffolk Shallow Private Wells	1,814	1,749	96%	59	2.4	2.5
Sodium (ppm)	Sand Land On-Site Wells	32	32	100%	33	13	13
	Suffolk Shallow Private Wells	1,788	1,787	100%	1,360	24	24
Strontium (ppb)	Sand Land On-Site Wells	32	32	100%	481	213	213
	Suffolk Shallow Private Wells	1,763	1,735	98%	1,021	69	70
Thallium (ppb)	Sand Land On-Site Wells	32	6	19%	0.5	0.2	0.4
	Suffolk Shallow Private Wells	1,764	18	1%	7.3	0.1	0.8
Titanium (ppb)	Sand Land On-Site Wells	32	25	78%	37	10	13
	Suffolk Shallow Private Wells	1,764	42	2%	32	0.6	3.3
Uranium (ppb)	Sand Land On-Site Wells	32	12	38%	18	1.5	3.6
	Suffolk Shallow Private wells	1,764	9	0.5%	3	0.4	1.7
Vanadium (ppb)	Sand Land On-Site Wells	32	12	38%	2.8	0.9	1.6
	Suffolk Shallow Private Wells	1,764	59	3%	15	0.6	2.9
Zinc (ppb)	Sand Land On-Site Wells	32	8	25%	34	4.6	11
	Suffolk Shallow Private Wells	1,764	1,181	67%	20,316	141	200

* Untreated water quality data from private wells collected by the SCDHS from January 2010 – December 2017. Data are from private wells samples collected throughout all of Suffolk County, including seven private wells analyzed as a part of the 2013-2016 Sand Land private well survey.

One half the detection limit was used in the calculation of the mean for samples that had concentrations reported as not detected.

^ This is the mean concentration of only the samples that had concentrations above their respective detection limits.

samples collected throughout Suffolk County from 2010 to 2017. For comparison purposes, the data from these private wells can be considered "typical" shallow groundwater quality in Suffolk County. The table indicates that most metals were detected at higher frequency in the samples collected from the Sand Land site when compared to the those in "typical" Suffolk County private wells. Metals with a significantly higher detection frequency (more than 10 times) include cobalt (13 times), thallium (19 times), titanium (39 times), uranium (76 times) and vanadium (13 times). The overall mean concentrations[9] were significantly higher (greater than 10 times) in the Sand Land groundwater samples than the overall mean concentrations calculated from the 1,800 private wells for cobalt (20 times higher), manganese (20 times higher), and potassium (11 times higher). Also, Table 12 shows that a higher than typical detection frequency (44% vs. 10%) and mean concentrations of gross alpha (2.9 pCi/l vs. 0.65 pCi/l) were observed in the Sand Land on-site samples than in Suffolk County shallow private wells.

Table 12

Comparison of Gross Alpha Concentrations

Suffolk County Private Wells (1997-2014) and On-Site Sand Land Temporary Profile Wells

	# Samples Analyzed	Number of Detections	% Samples With Detections	Maximum Concentration (pCi/l)	Mean Concentration (pCi/l)[7]	Mean of Detects (pCi/l)	Number of Samples Exceeding MCL of 5 pCi/l	% of Samples Exceeding MCL of 5 pCi/l
Sand Land On-Site Wells	32	14	44%	22	2.9	6	1	3%
SCDHS Private Well Samples 1997-2014	1,231	118	10%	21	0.65	2.0	1	0.09%

Trace and low level detections of pesticides and wastewater related compounds were also observed, consistent with observations of other VOWM sites. Nitrates were elevated in some wells, and although some of the previously studied VOWM sites had elevated nitrates, due to past or current agricultural site use, relating these impacts to VOWM activity was not possible. However, historical aerial photographs of the Sand Land site (Appendix F) do not indicate recent or past agricultural use of the site, and therefore the elevated nitrates observed at Sand Land appear to be a result of site related VOWM activities.

Historical aerial photographs of the Sand Land site from 1962, 1969-70, 1978, 1984, 1996, 2001, 2004, 2007, 2010, 2013, 2016 and 2017 are included in Appendix F. The monitoring well locations from the 2017 on-site investigation are indicated on each photo for reference. A review of these photos shows the progression of land clearing across the parcel as the site was mined for sand. The photos from 1996 forward clearly indicate a darker material, most likely organic in nature, being stored on site in various piles. It appears as though this material was primarily stored in the center and western portions of the property, consistently through 2017. Later photos (2007 and

[9] In the calculation of the overall mean, a value of one-half the reporting limit was used in the calculations for results reported as not detected (less than the reporting limit).

later) indicate the presence of organic appearing windrows in various locations throughout the site (north, south, east, etc.). Piles of material that do not appear to be organic in nature (gray or silver in appearance) are also evident since 2001. The photos also show various excavations and regrading activities that has taken place over the site in the 55 years of the photographic record, as well as a number of surface water ponds/ditches that appear or disappear throughout the photographic record, a few of which are fairly consistently present. These photos demonstrate that the majority of the Sand Land site has been used for mining and VOWM related activities.

Figure 16 depicts the locations of the off-site monitoring wells sampled in 2015, and the on-site wells installed and sampled in October of 2017. A review of the geospatial distribution of impacted wells reveals a few general distinguishable patterns. Monitoring wells generally located on the northern portion of the site (SLOS-6, SLOS-7 and SLOS-9) had greater impacts from

Figure 16

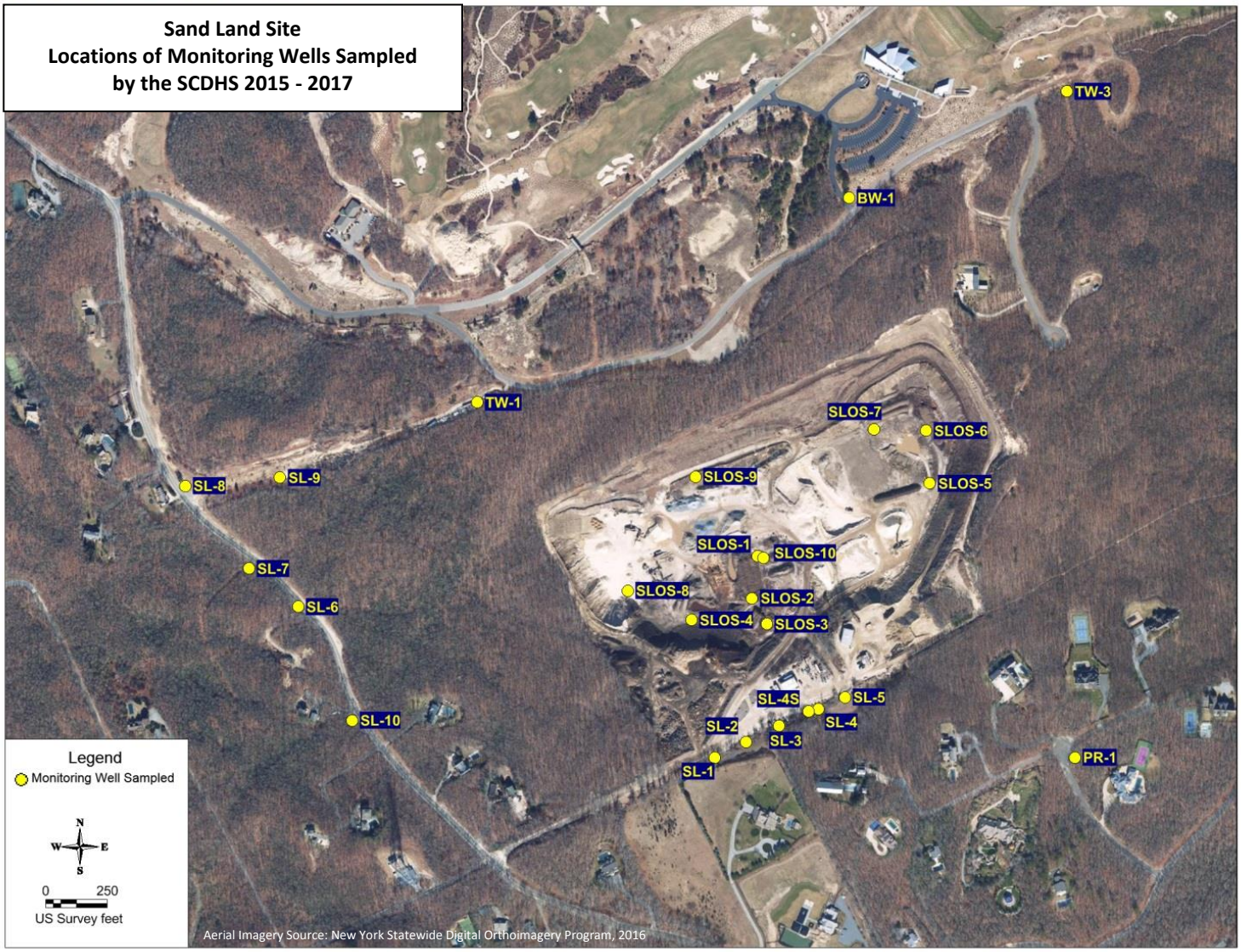
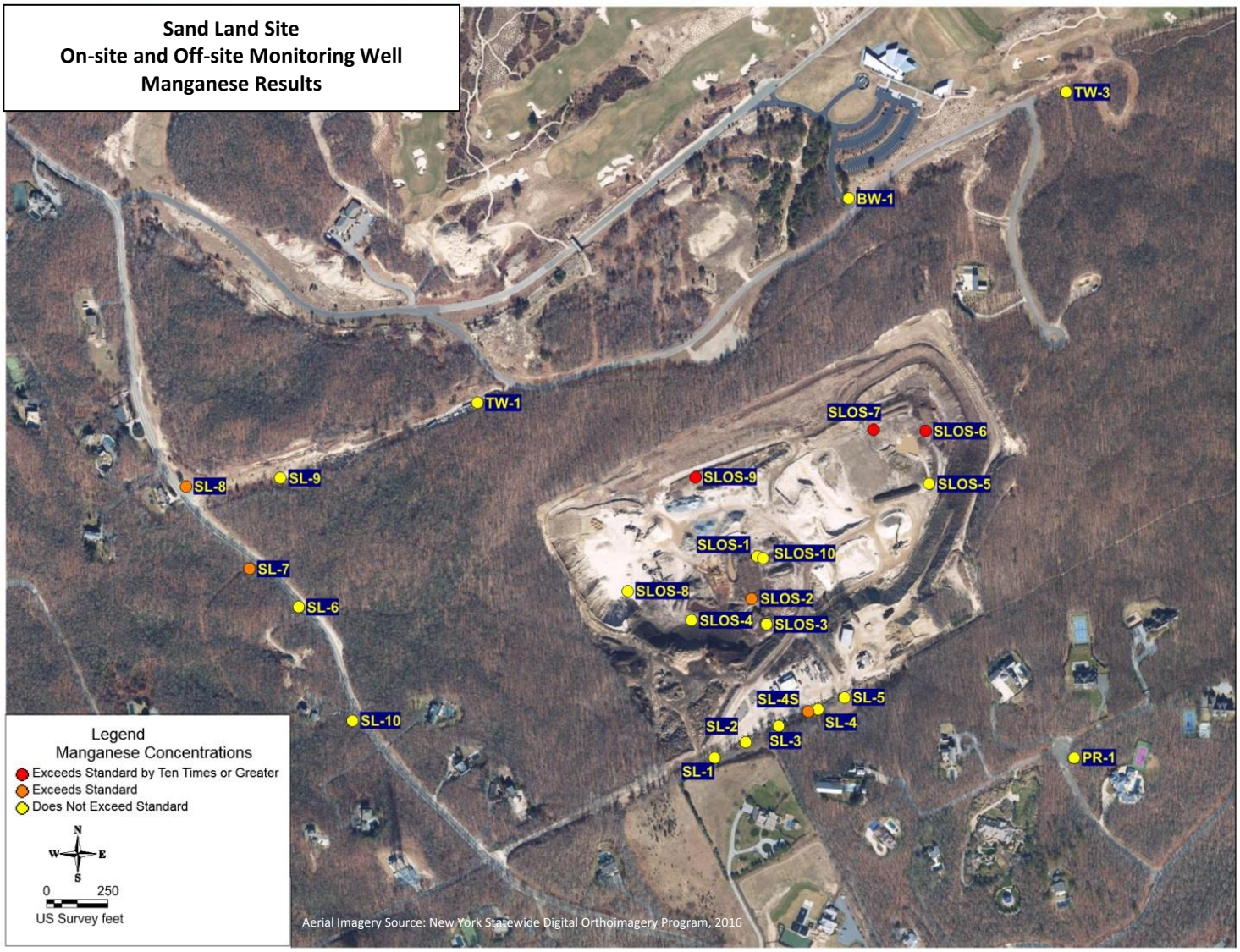


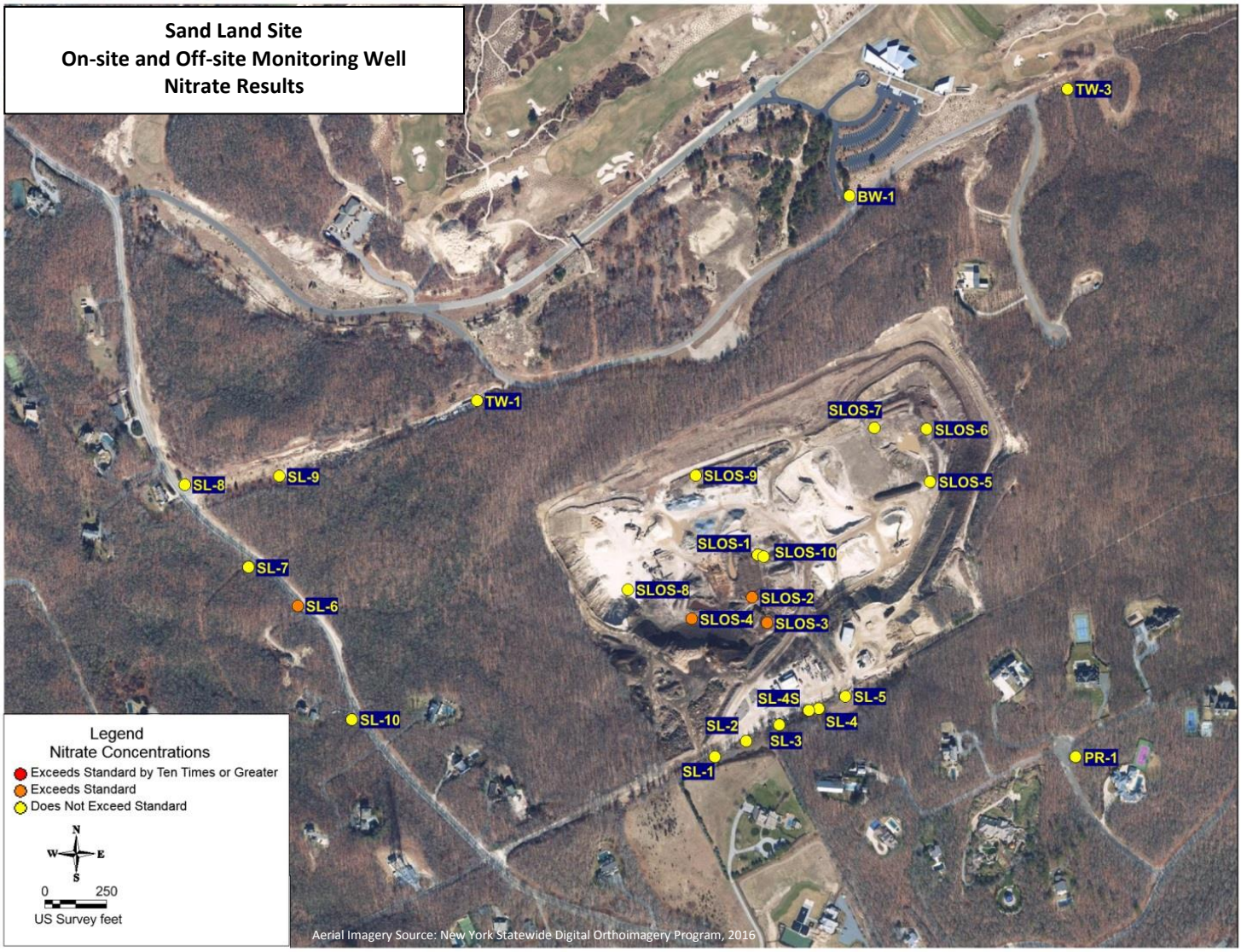
Figure 17



manganese, iron, thallium and ammonia. This trend is consistent with respect to manganese and iron in off-site wells, as SL-7 and SL-8 (the most northern monitoring wells on Millstone Road) exhibited impacts from iron and manganese (Figure 17 and Figure 18). It has been noted that the lithology observed at well SL-8 is complex, and that this well exhibits perched water conditions. Iron and manganese concentrations were elevated in every profile level tested in this well (including the upper levels). The cause of this and the role the identified clay/silt layers have on locally limiting downward water/contaminant migration, or other hydrological impacts, is unknown. However, it should also be noted that the deepest profile level of SL-8 (170 - 175 fbg), in addition to elevated iron and manganese concentrations, exhibited detections of other analytes the SCDHS has associated with VOWM groundwater impacts in the past (and were detected on-site), including gross alpha (5.2 pCi/l), bisphenol A (trace), DEET (0.3 ppb) and caffeine (trace). Due to the complexities associated with the information from this well, no definitive conclusions regarding the source(s) of the degraded water quality identified in well SL-8 can be made. This is also true with respect to the iron and manganese impacts observed in SL-6, SL-7 and SL-9, as the

elevated concentrations were observed in the upper profile levels. Again, the role of the clay/silt layers observed in these wells above the water table, and the localized effect this may have on the downward water/contaminant migration from the site is unknown, resulting in no definitive conclusions regarding the source(s) of the elevated iron and manganese in these wells.

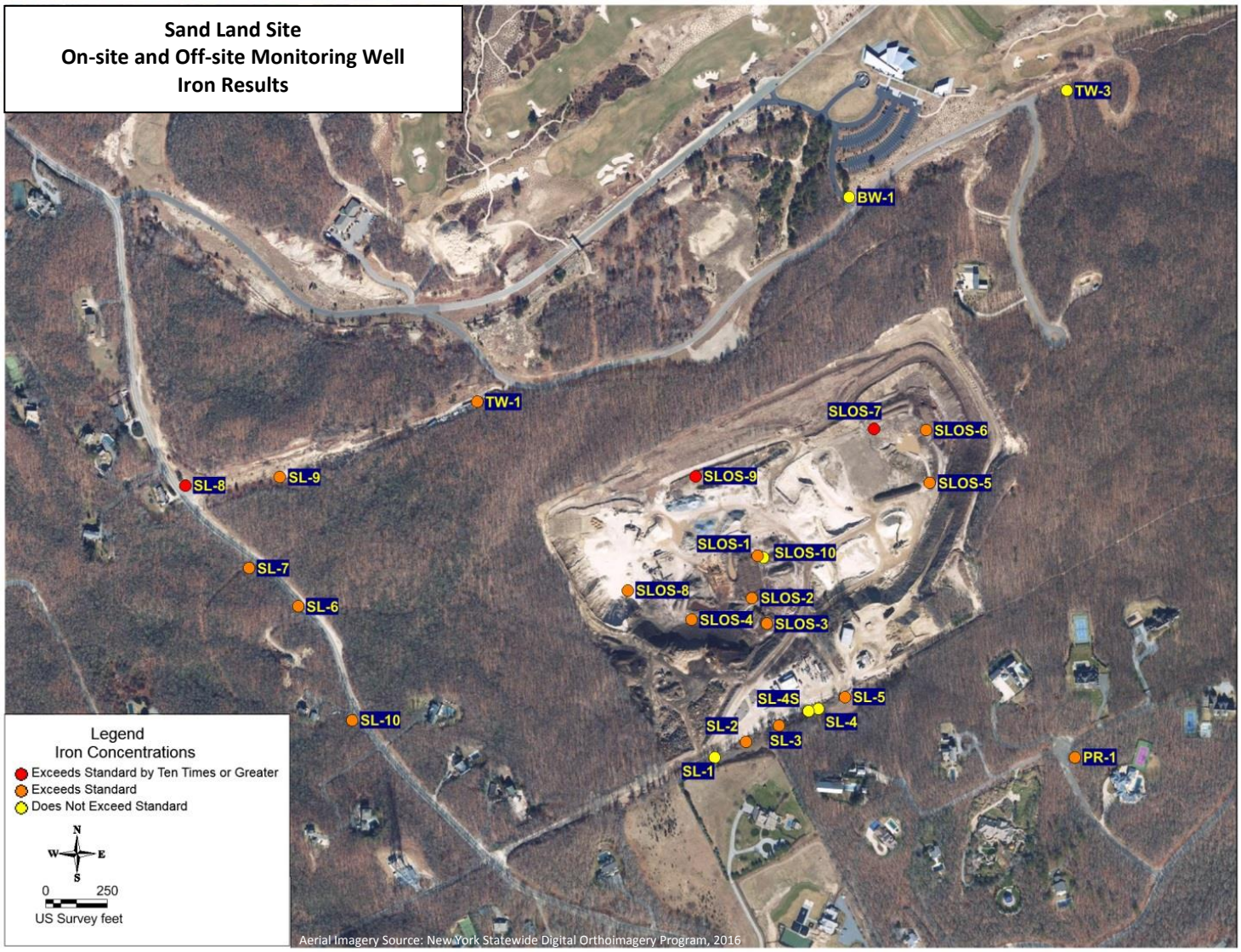
Figure 18



Monitoring wells located in the central/southern section of the site (SLOS-2, SLOS-3 and SLOS-4) exhibited elevated concentrations of nitrate. Off-site well SL-6 had the highest nitrate observed concentration (23 ppb), and is located slightly to the northwest of the SLOS-2, SLOS-3 and SLOS-4 well locations (Figure 19). These observations appear to be consistent with the groundwater flow direction of westerly /slightly northwesterly in the eastern section of the site, and a westerly/slight south westerly direction on the western section of the site, with a northwesterly flow direction as groundwater moves off of the site, that was determined by the 2015-16 off-site work and 2017 on-site work. Additionally, this elevated nitrate concentration was observed in the

deepest profile level of well SL-6 (200 – 205 fbg) and is therefore likely attributable to an on-site source. Figure 13 indicates the on-site surface/ponded water sample locations, and the concentrations of the analytes noted to be above an established NYSDEC GEL. The source of the water at these locations is presumed to be storm water run-off, and the quality of the water influenced by material that is on the ground and/or in nearby windrows or piles. Although some variations in the concentrations of the analytes are noted, there does not appear to be an obvious discernable geospatial pattern to the more elevated concentrations of metals. Low concentrations of some pesticides may be due to run-off from vegetative organic material brought into the site. Also, it should be noted that low concentrations of analytes typically related to water impacted by septic waste (e.g., acetaminophen, caffeine and ibuprofen) were identified, and that a potential source for these compounds is unknown.

Figure 19



Three of the four soil samples collected from the monitoring well drilling soil cuttings exhibited impacts from volatile organic compounds (VOCs) at concentrations below the NYSDEC SCO-PG and SCO-UUG. Two of the samples (SLAC-B and SLAC-C) were collected from the soil cuttings of the same well (SLOS-9) at different depths (20 fbg and a grab sample from the 85 to 110 fbg interval). Both of these samples contained tetrachloroethene, a chlorinated solvent, at a concentration of 5 ppb and 6 ppb, respectively, (compared to the NYSDEC SCO-PG and SCO-UUG both of which are 1300 ppb). SLAC-B had a detection of toluene, a petroleum product and common solvent, at a concentration of 5 ppb, (compared to NYSDEC SCO-PG and SCO-UUG both of which are 700 ppb). A sample of the vegetative material (SLSD-J) located in close proximity to SLOS-9 also exhibited detections of toluene and tetrachloroethene at concentrations below NYSDEC SCO-PG and SCO-UUG, 8 ppb and 9 ppb respectively. If vegetative material similar in quality to SLSD-J was used for grading and reclamation in the vicinity of SLOS-9, this may be the source of the VOC findings at the two depths in the SLOS-9 auger soil cuttings (20 fbg and 85 – 110 fbg). Figure 14 depicts the locations of the samples collected from vegetative material piles and samples collected from monitoring well installation auger soil cuttings.

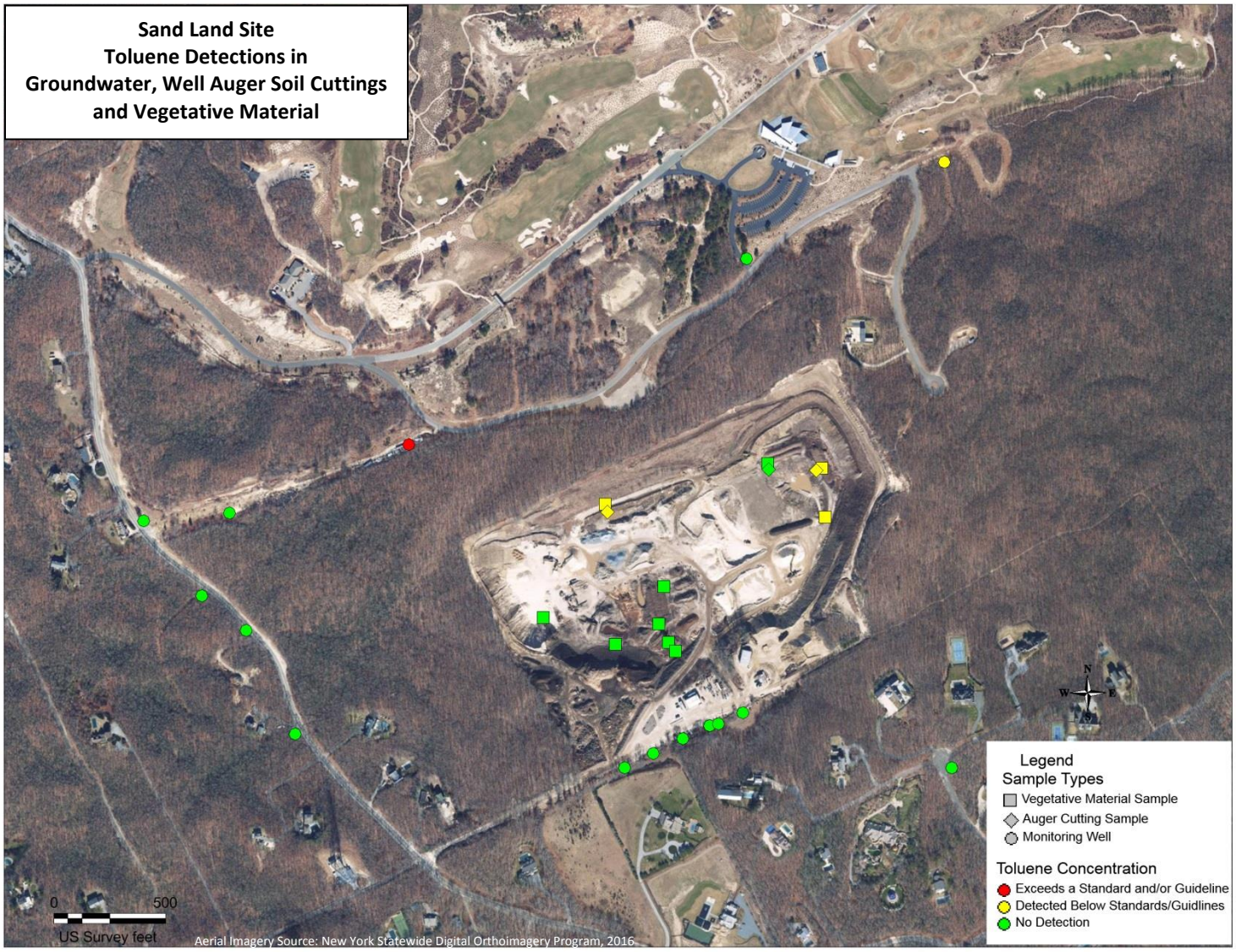
With respect to the number of VOCs detected, the auger soil cuttings from well SLOS-6 (a grab sample SLAC-D collected from the 0 to 25 fbg drilling interval) had five different VOCs detected (methyl ethyl ketone (11 ppb), toluene (4 ppb), tetrachloroethene (6 ppb), n-butyl acetate (8 ppb) and total xylene (6 ppb)), which was the most of any soil or vegetative material sample. The vegetative material sample located in the vicinity of SLOS-6 (SLSD-G) exhibited detections of four of the same VOCs found in SLAC-D (all except methyl ethyl ketone), all at concentrations below the NYSDEC SCO-PG and SCO-UUG. This indicates that the same VOC containing vegetative material piled near SLOS-6 is present in the 0 to 25 fbg interval in the soil.

The auger soil cuttings from SLOS-7 (a grab sample collected from the 20 to 30 fbg interval) did not detect VOCs, and the corresponding vegetative material sample collected in the vicinity of this well (SLSD-H) also had no VOC detections. The sample from the vegetative material pile located in the vicinity of well SLOS-5 (SLSD-F) had three VOCs detected (toluene (5 ppb), tetrachloroethene (10 ppb) and total xylene (5 ppb)), all at concentrations below the NYSDEC SCO-PG and SCO-UUG. Auger soil cuttings from the installation of SLOS-5 were not collected, so a comparison to the vegetative material detections in SLSD-F cannot be performed. The vegetative material collected near well SLOS-1 (SLSD-A) had a detection of acetone of 72 ppb, which exceeds both the NYSDEC SCO-PG and SCO-UUG of 50 ppb. Auger soil cuttings from SLOS-1 were not collected, so no comparison can be made.

It should be noted that the only groundwater volatile organic compound parameter to exceed a GW/DWS was toluene, which was collected from the off-site well TW-1 located on the southern portion of The Bridge golf course property. The reported concentration was 9 ppb, and the GW/DWS is 5 ppb. This well is located north of the Sand Land site, and northwest of wells SLOS-6

and SLOS-9. Well drilling auger soil cuttings for both of these wells (SLAC-B and SLAC-D) indicated the presence of toluene, as did the vegetative material sampled in the vicinity of these wells (Figure 20). The vegetative material sampled in the vicinity of SLOS-5 (SLSD-F), located just south of SLOS-6, also indicated the presence of toluene, however, no auger soil cuttings were sampled during the installation of this well. Considering the west/northwest groundwater flow direction that was determined for the eastern portion of the site, well TW-1 could be considered downgradient of the soil and vegetative material that had detections of toluene, and these could be a potential source of the toluene. However, since groundwater samples in SLOS-5, SLOS-6 and SLOS-9 did not contain detections of toluene in the groundwater, and this well had a recently installed submersible pump, no definitive conclusions can be made.

Figure 20



Conclusions

Due to concerns that were raised regarding potential impacts to groundwater quality from VOWM activities conducted at the Sand Land site, the Suffolk County Legislature passed a resolution directing the SCDHS to determine the direction of groundwater flow in the vicinity of the Sand Land site, and to install monitoring wells to test for the presence of various contaminants. The investigation described in this report was undertaken in accordance with this resolution. The results indicate that the groundwater flow direction in the eastern section of the site flows in a westerly to slightly northwesterly direction, and groundwater on the western section of the site flows westerly with a slight southwesterly component. As groundwater moves offsite the flow characteristics will take on a more northwesterly flow direction. Additionally, data from wells installed on the site suggest the presence of downward vertical groundwater flow component, indicating this is a vital groundwater protection area. This also suggests that contaminants released on the site may flow into deeper portions of the aquifer.

The SCDHS installed a total of twenty-one monitoring wells, collected eighty-three groundwater samples, 4 surface water samples, 4 soil samples and 10 samples of vegetative material for this investigation. The analytical results from the groundwater samples indicate impacts of elevated metals concentrations that are consistent with results observed at other VOWM sites throughout Suffolk County, and are attributable to the VOWM activities performed at these sites. It should be noted that impacts to the groundwater quality were observed despite the significant depth to the water table encountered at the site (137 feet to 154 feet). In the on-site groundwater monitoring wells iron and manganese were found to significantly exceed drinking water and groundwater standards in multiple wells. Manganese exceeded the standards by almost 100 times and iron by over 200 times. Other constituents that were also found above drinking water and groundwater standards in on-site monitoring wells were thallium, sodium, nitrate, ammonia and gross alpha. Manganese, iron, nitrate and toluene were observed in the off-site groundwater of downgradient wells at concentrations exceeding standards and/or guidance values. Surface/ponded water samples were collected from four locations on the site. Elevated metals concentrations as well as low and trace concentrations of two pesticides were detected in some of the surface/ponded water samples collected on site. These pesticide detections are likely attributable to run-off from vegetative organic material brought into the site. Also, low and trace concentrations of analytes commonly related to water impacted by septic waste (e.g., acetaminophen, caffeine and ibuprofen) were identified in the surface/ponded water, a potential source for these compounds is unknown.

Samples of the soil cutting from the well drilling augers used to install the monitoring wells, and samples of vegetative material stored on the site indicated low concentrations of VOCs that did not exceed NYSDEC soil criteria. Toluene detected in an off-site monitoring well located on The Bridge golf course property, north of the site, is downgradient of toluene detected in soils and vegetative material on site, however since water samples collected in the groundwater near the

soil and vegetative material containing the toluene did not detect toluene, definitive conclusions as to the source of toluene in the off-site monitoring well cannot be made.

The SCDHS identified thirty six properties potentially served with private wells that are generally located downgradient of the subject site. Sample results from private wells completed to date have not indicated any apparent water quality impacts from VOWM activities. Since the on-site area has been identified as a deep recharge area (vertical downward groundwater flow), there is the possibility that as contaminants move off-site into the areas with private wells, the contaminants are located deeper in the aquifer, below the well screens of the private wells. However, the complex lithology of the area (i.e., presence of clay/silt layers) can have a localized impact on the vertical migration of water and/or contaminants (e.g. perched water) as it moves off of the site. The survey is still on-going at this time, and the water quality results will continue to be evaluated as they are completed.

Recommendations

- The SCDHS should complete sampling of the private wells in the survey area to assess possible impacts to private drinking water wells to the west and northwest of the site. Based upon the groundwater information obtained in this investigation, and the results of the private well testing thus far, the extent of the private well survey area previously determined is appropriate.

- Responsible state and local agencies (e.g., NYSDEC, Town of Southampton, etc.) should ensure that the activities conducted at the Sand Land facility are in compliance with all applicable codes, ordinances, permit requirements, etc. and that the activities at the site do not further impact groundwater quality.

- Should responsible regulatory agencies determine that VOWM activities are allowed to occur at this site, there should be requirements to ensure that mechanisms are in place to prevent operating practices from further detrimentally impacting groundwater and surface water quality. New York State Environmental Conservation Law section 15-0517 became effective on January 1, 2018 and requires groundwater testing and impermeable liners for land clearing debris and composting facilities; NYSDEC is in the process of establishing regulations. Since significant groundwater impacts have been identified, the requirements of the new law should be implemented as early as practicable.

- The NYSDEC should continue to inspect the facility to ensure that all materials being brought to the site are free of contamination.

APPENDIX

A

Suffolk County Resolution No. 245-2015

Intro. Res. No. 1158-2015 Laid on Table 3/3/2015
Introduced by Legislators Schneiderman and Hahn

RESOLUTION NO. 245 -2015, DIRECTING THE DEPARTMENT OF HEALTH SERVICES TO CONDUCT GROUNDWATER TESTS FOR TOXIC CHEMICALS AT A COMPOSTING FACILITY IN NOYACK, TOWN OF SOUTHAMPTON

WHEREAS, composting activity is being conducted by the Sandland Corporation, at a facility located in Noyack, Town of Southampton, SCTM No. 0900-023.00-01.00-001.000; and
WHEREAS, this composting facility is located in a sole source aquifer area containing high quality water resources; and

WHEREAS, recent findings from a study conducted by the New York State Department of Environmental Conservation and the Suffolk County Department of Health Services on the operations at a facility on Horseblock Road, Yaphank, demonstrate the significant potential for groundwater impacts associated with composting operations; and

WHEREAS, current groundwater monitoring at the Noyack composting facility is inadequate, as it provides little or no information about drinking water quality in the surrounding community; and

WHEREAS, Noyack residents are justifiably concerned about the health and environmental risks posed by composting, which can be associated with groundwater contaminants such as manganese; and

WHEREAS, Noyack residents are requesting that the County of Suffolk perform additional groundwater monitoring at the Noyack composting facility to ensure that groundwater in the vicinity is not being adversely impacted; and

WHEREAS, the Suffolk County Department of Health Services regularly conducts groundwater tests to detect health hazards and to protect public safety; and

WHEREAS, the Department of Health Services should test the groundwater in the vicinity of the Noyack composting facility to determine whether similar testing should be conducted at other sites where composting occurs; now, therefore be it

1st **RESOLVED**, that the Suffolk County Department of Health Services is hereby authorized, empowered and directed to determine the direction of groundwater flow in the vicinity of the Noyack composting facility and to install groundwater monitoring wells to test for the presence of heavy metals, including manganese, inorganics, volatile and semi-volatile organic compounds and radioactive contaminants (radionuclides) and any other contaminants associated with composting facilities; and be it further

2nd **RESOLVED**, that the Department of Health Services is directed to keep the Noyack community informed of their testing program through public meetings, news releases and other types of community outreach; and be it further

3rd **RESOLVED**, that the Department of Health Services will conduct their groundwater quality investigation within 120 days of the effective date of this resolution; and be it further

4th **RESOLVED**, that the Department of Health Services shall compile and deliver a report to this Legislature with their findings, within 60 days of the completion of their investigation; and be it further

5th **RESOLVED**, that this Legislature, being the State Environmental Quality Review Act (SEQRA) lead agency, hereby finds and determines that this resolution constitutes a Type II action pursuant to Section 617.5(c)(20), (21) and (27) of Title 6 of the NEW YORK CODE OF RULES AND REGULATIONS (6 NYCRR) and within the meaning of Section 8-0109(2) of the NEW YORK ENVIRONMENTAL CONSERVATION LAW as a promulgation of regulations, rules, policies, procedures, and legislative decisions in connection with continuing agency administration, management and information collection, and the Suffolk County Council on Environmental Quality (CEQ) is hereby directed to circulate any appropriate SEQRA notices of determination of non-applicability or non-significance in accordance with this resolution.

DATED: April 28, 2015

APPROVED BY:

/s/ Steven Bellone
County Executive of Suffolk County

Date: May 7, 2015

APPENDIX

B

Geophysical Logs

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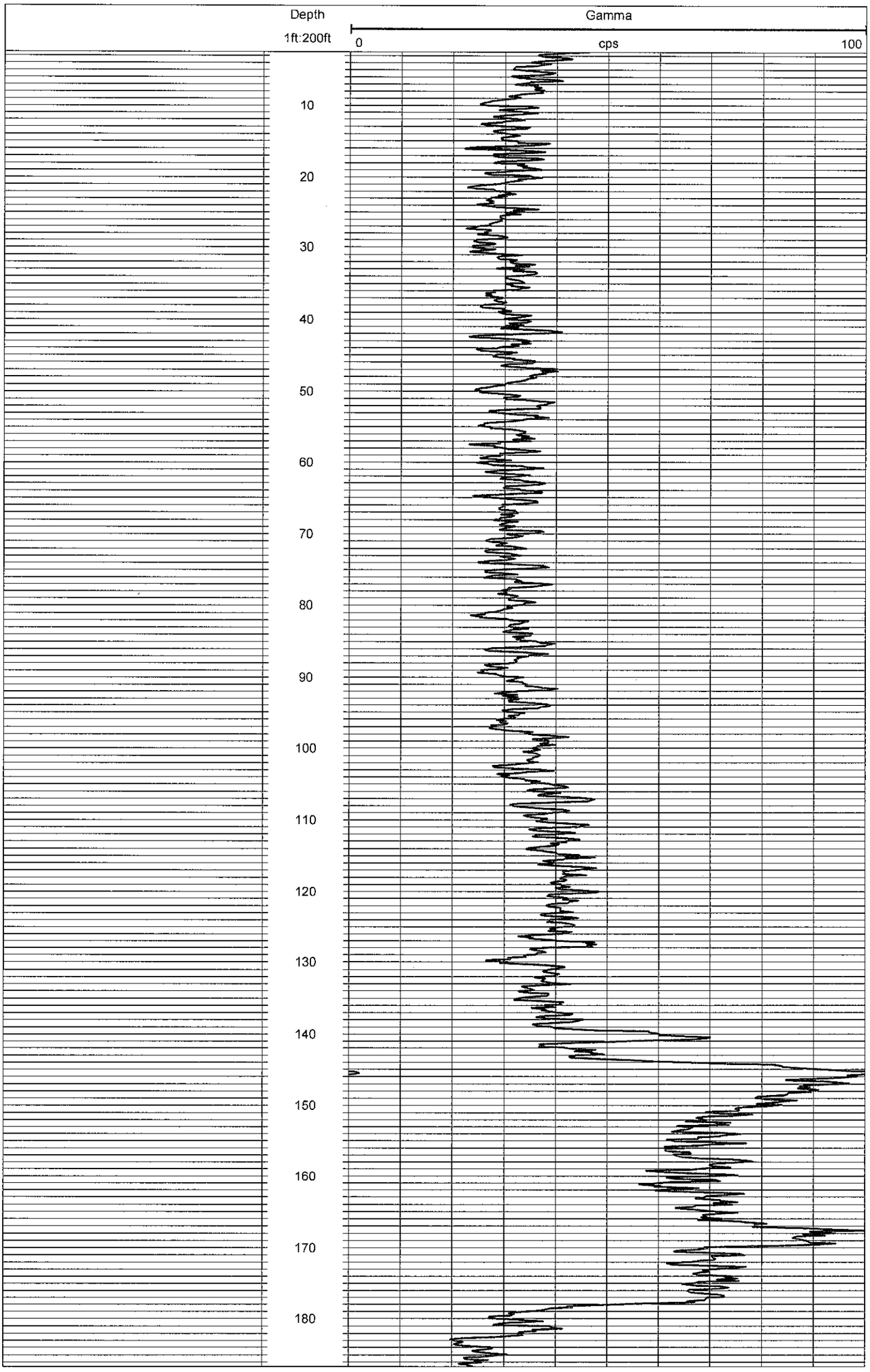
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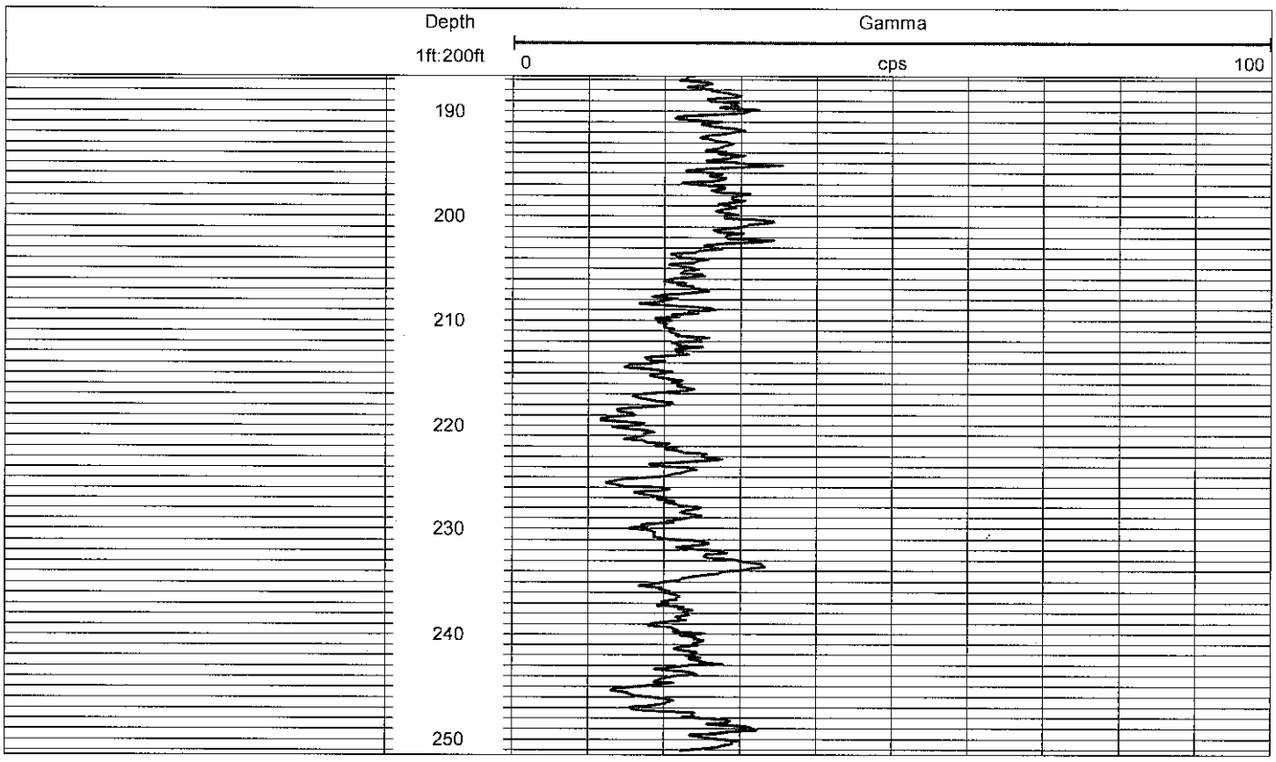

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	OTHER SERVICES

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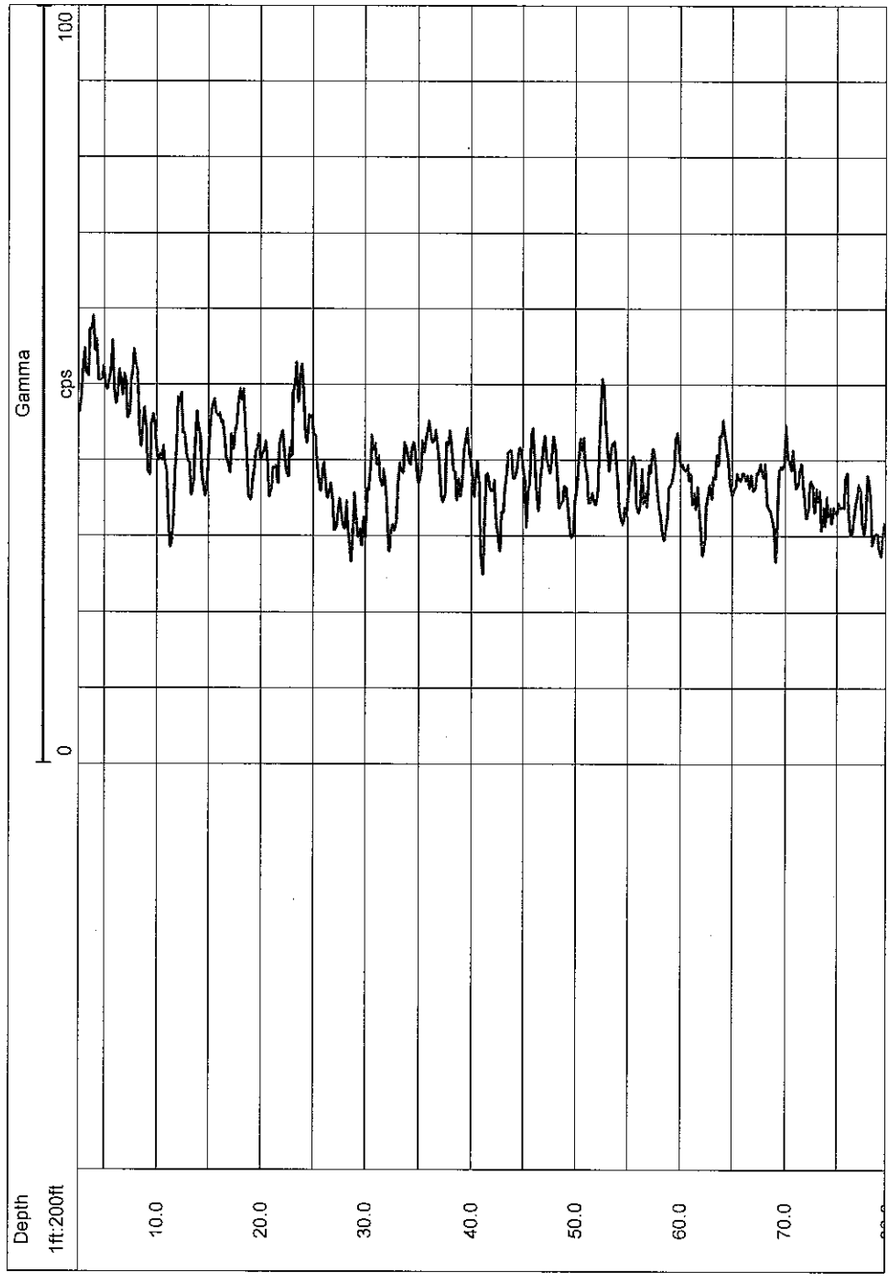

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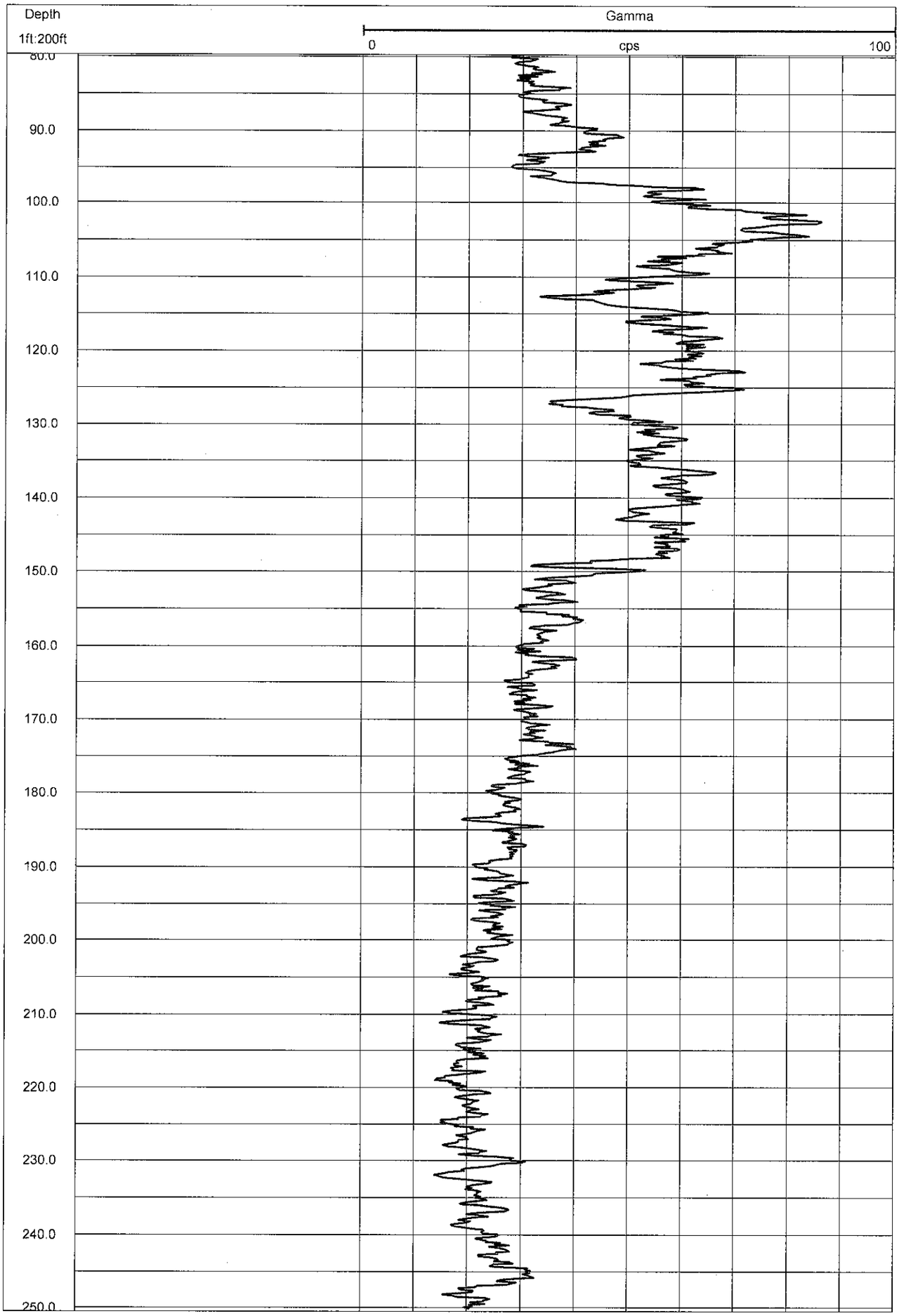
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STE	
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LOCATION SEC TWP RGE	OTHER SERVICES

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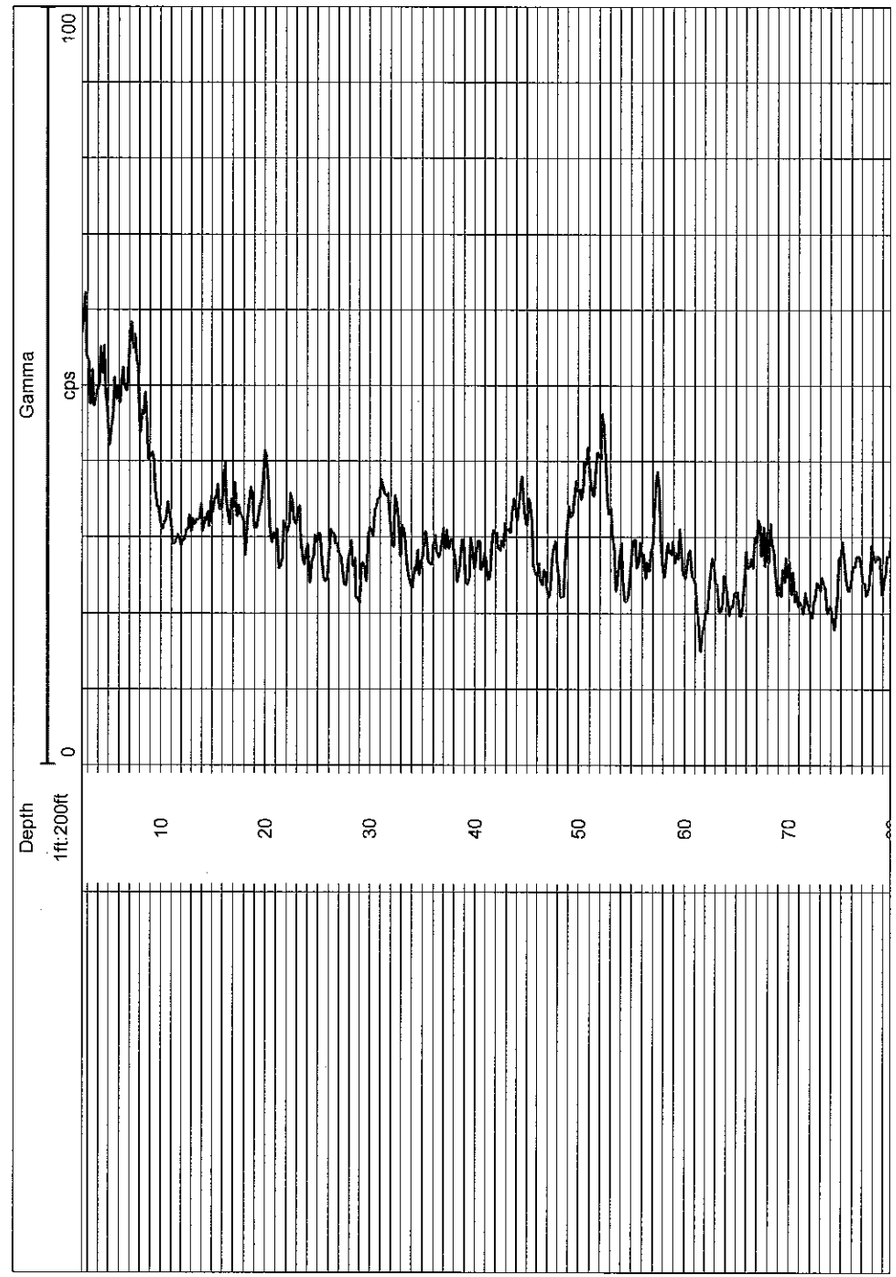

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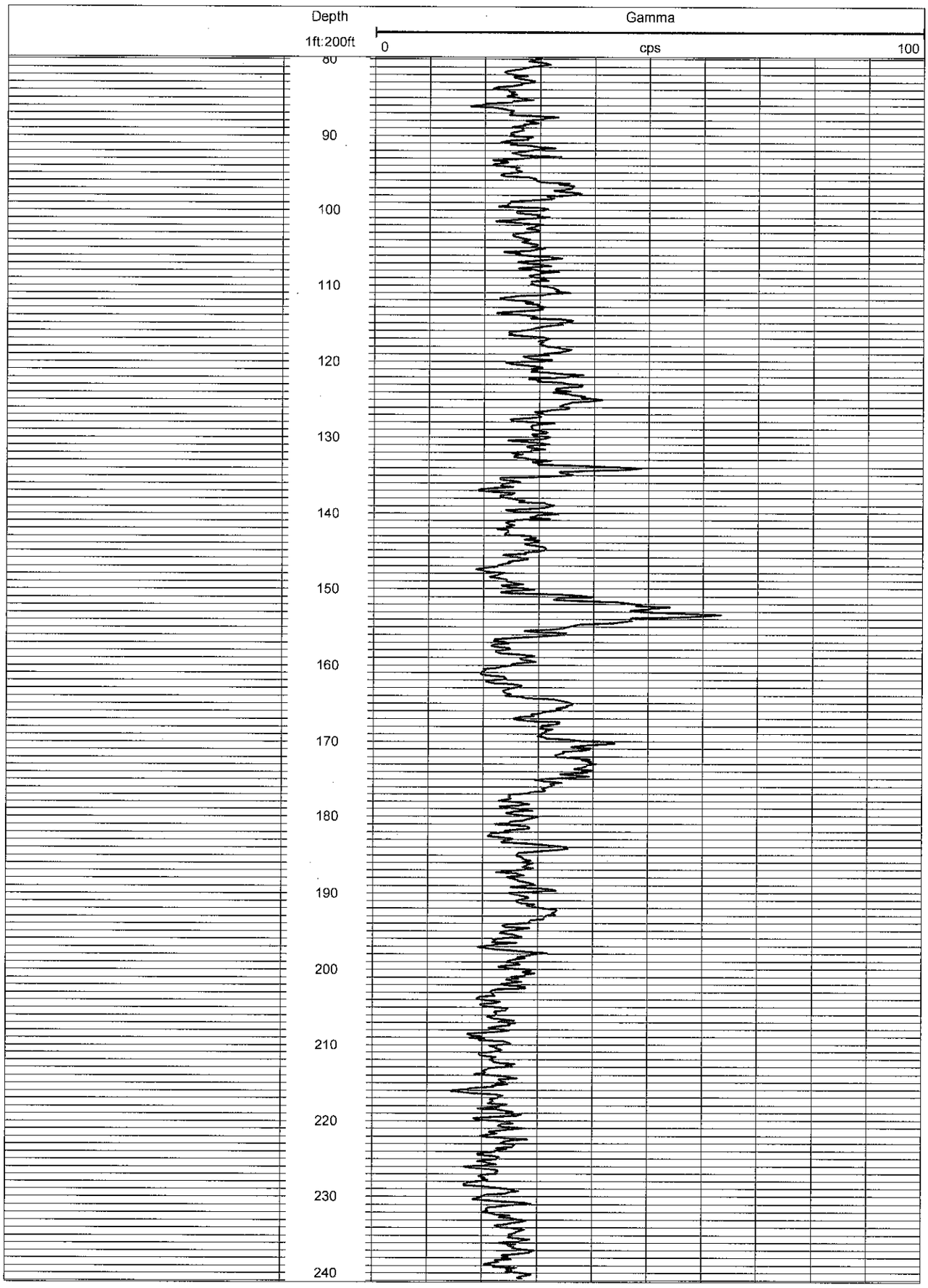
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STE	LOCATION
FILING No	SEC TWP RGE
	OTHER SERVICES

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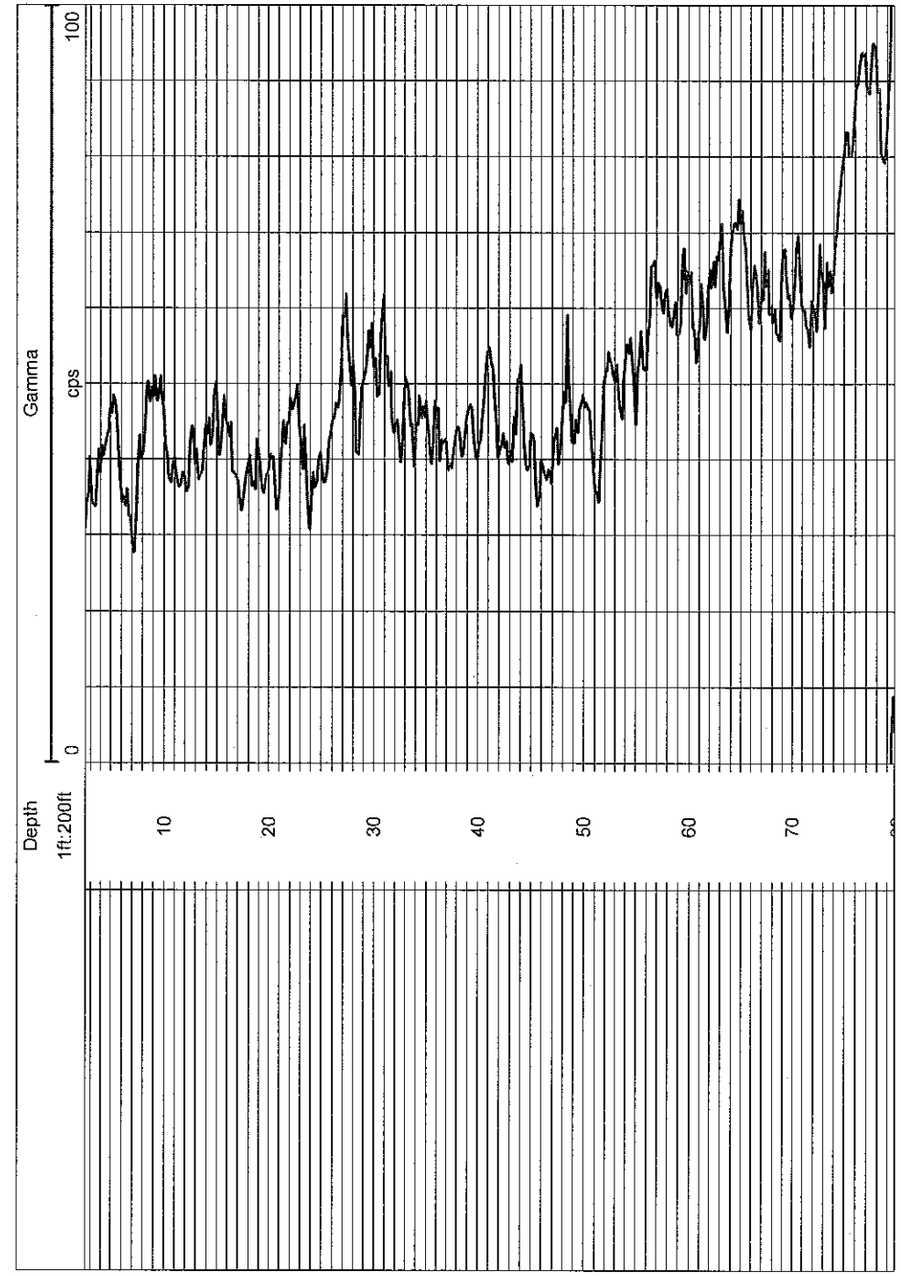

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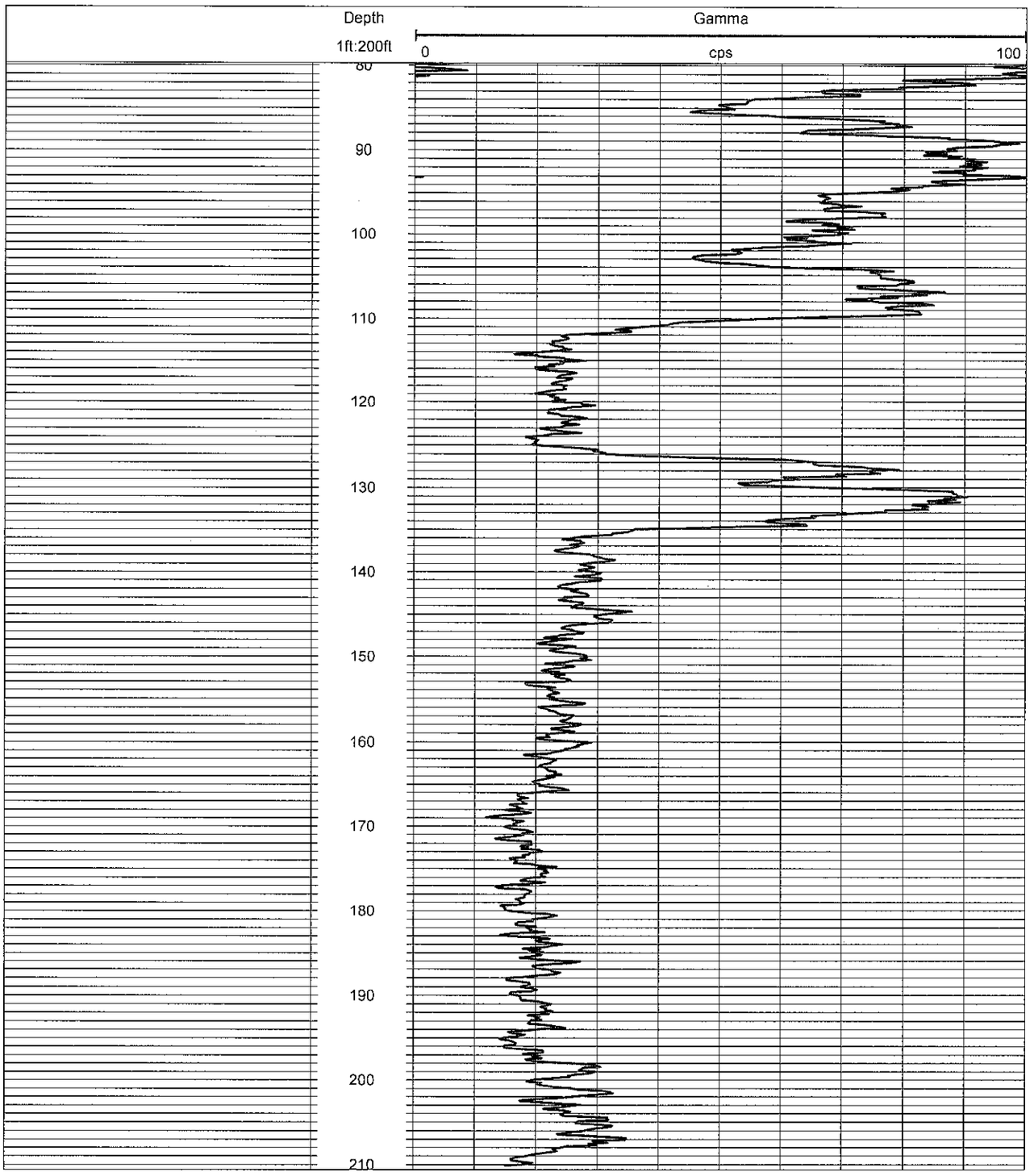
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STE	LOCATION
FILING No	SEC TWP RGE
	OTHER SERVICES

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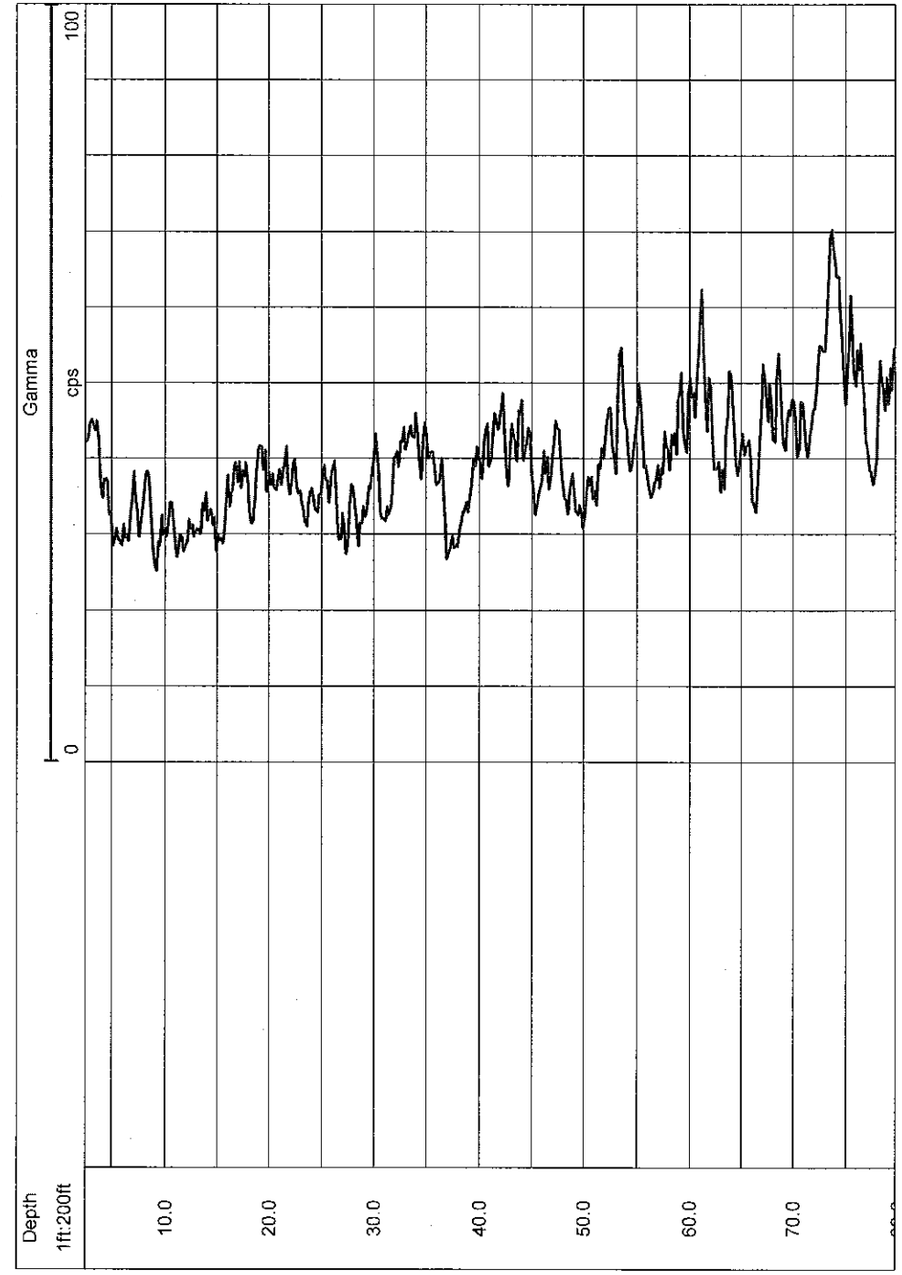

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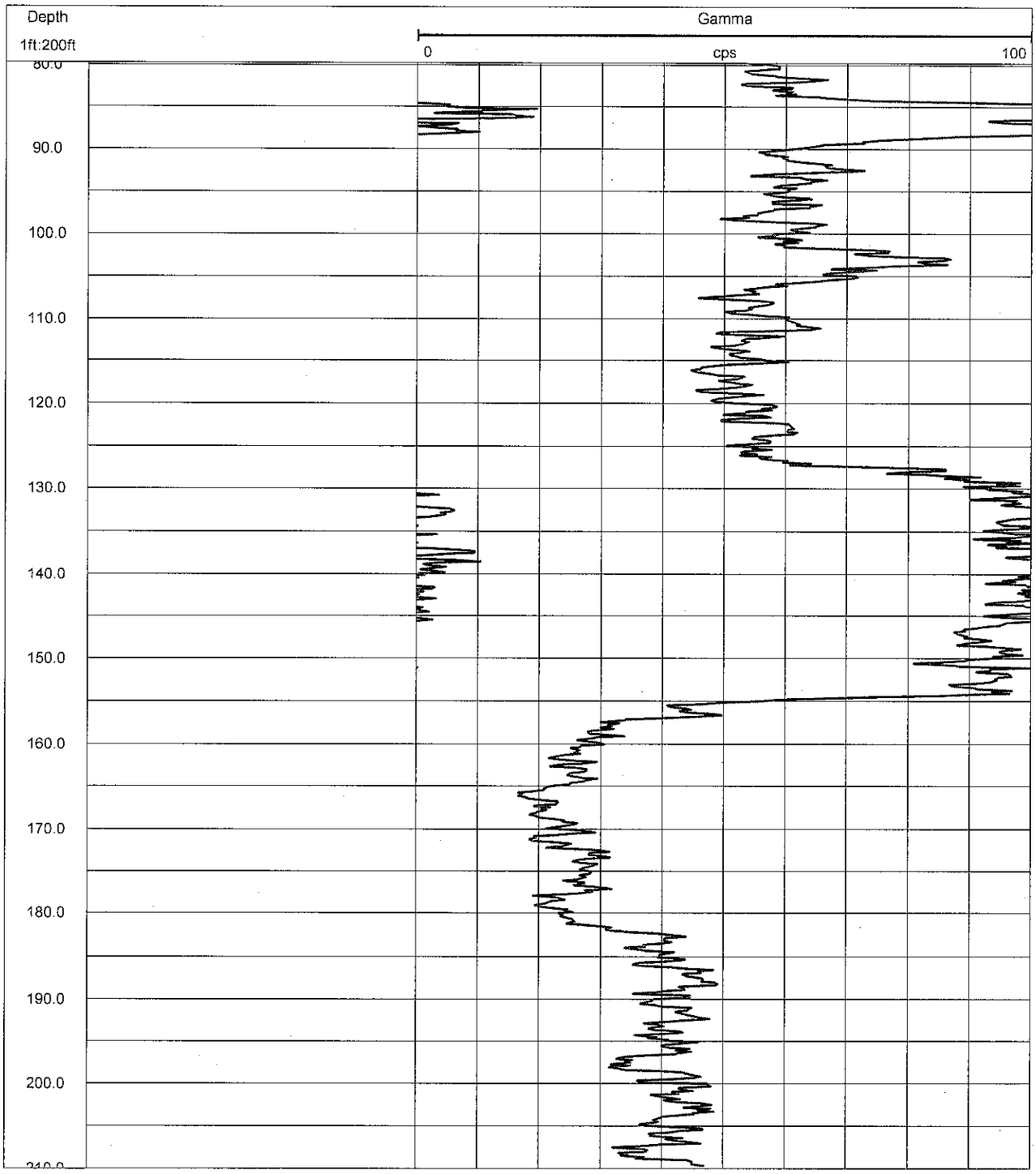
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STE	LOCATION
FILING No	SEC TWP RGE

OTHER SERVICES

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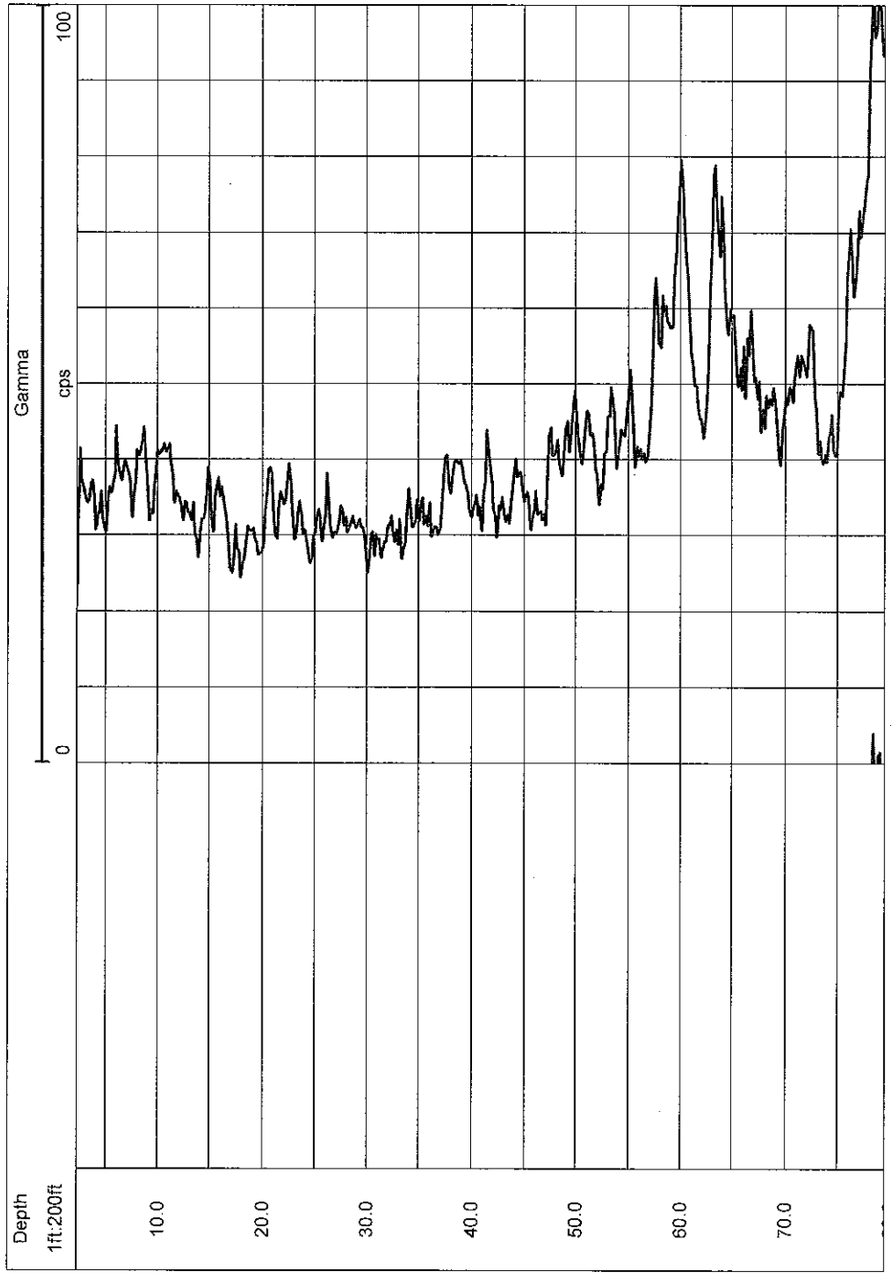

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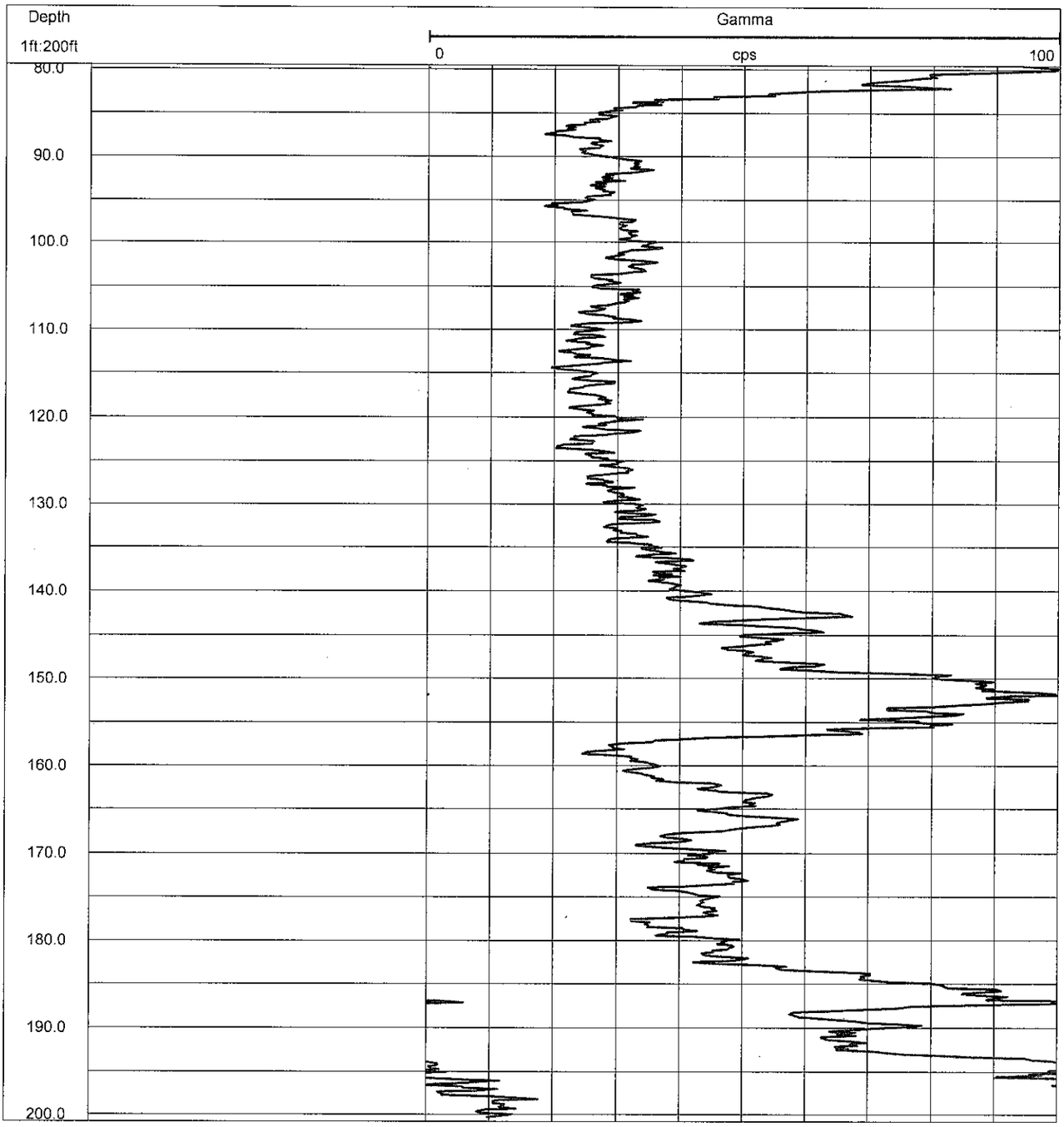
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CO Suffolk County Dept of Health	COMPANY
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CTY Bridgehampton	COUNTRY STATE
STE	LOCATION
FILING No	SEC TWP RGE

OTHER SERVICES

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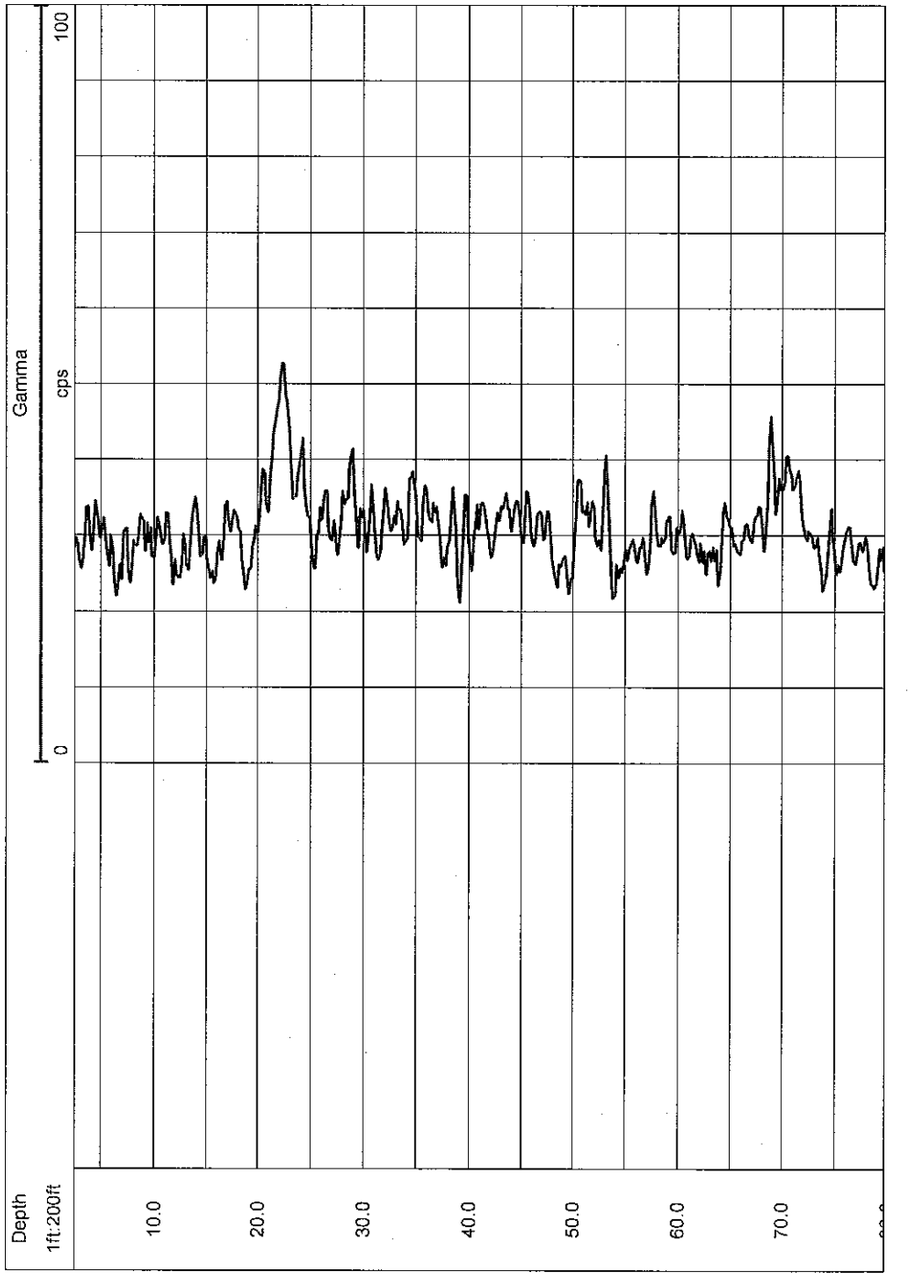

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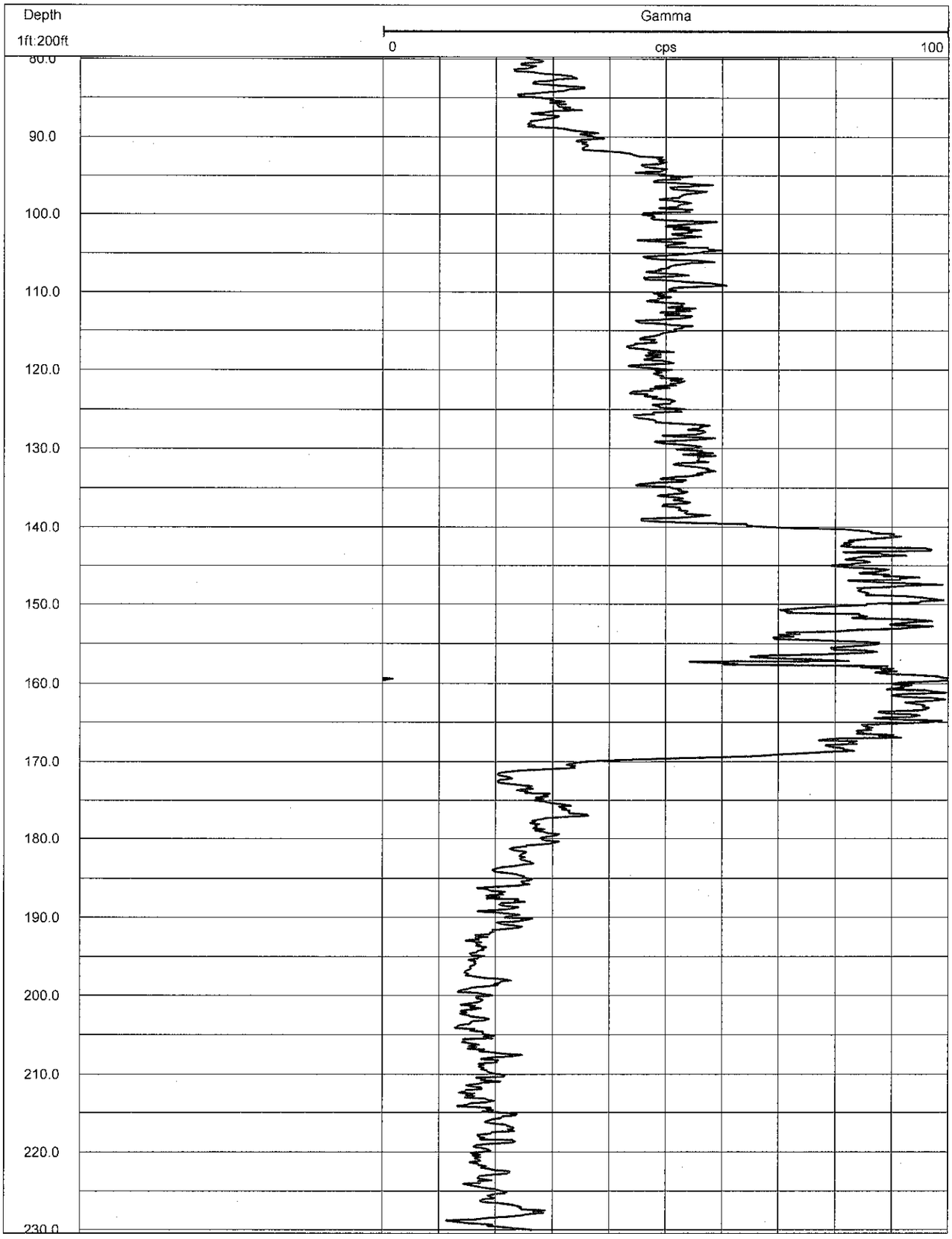
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STE	LOCATION
FILING No	SEC TWP RGE
	OTHER SERVICES

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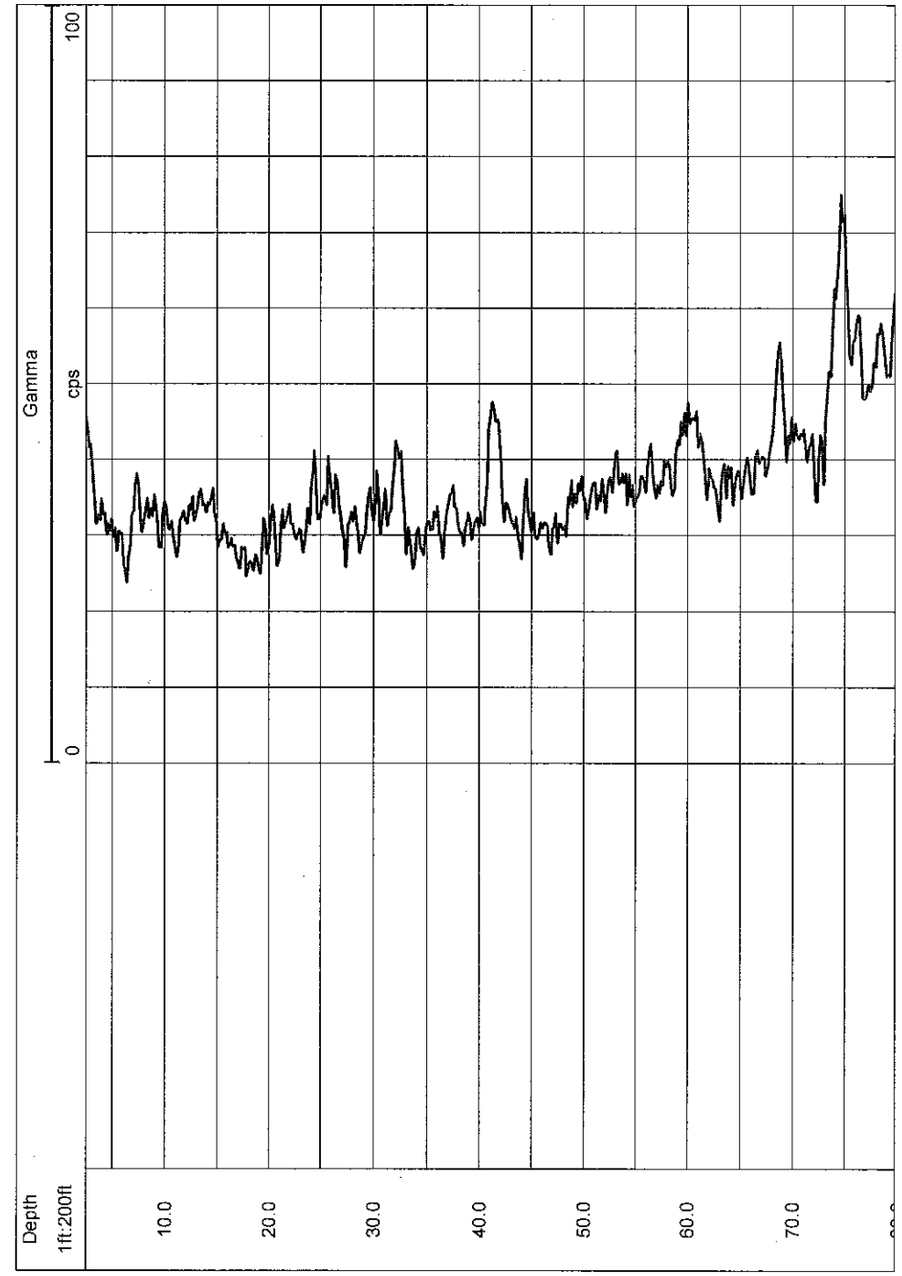

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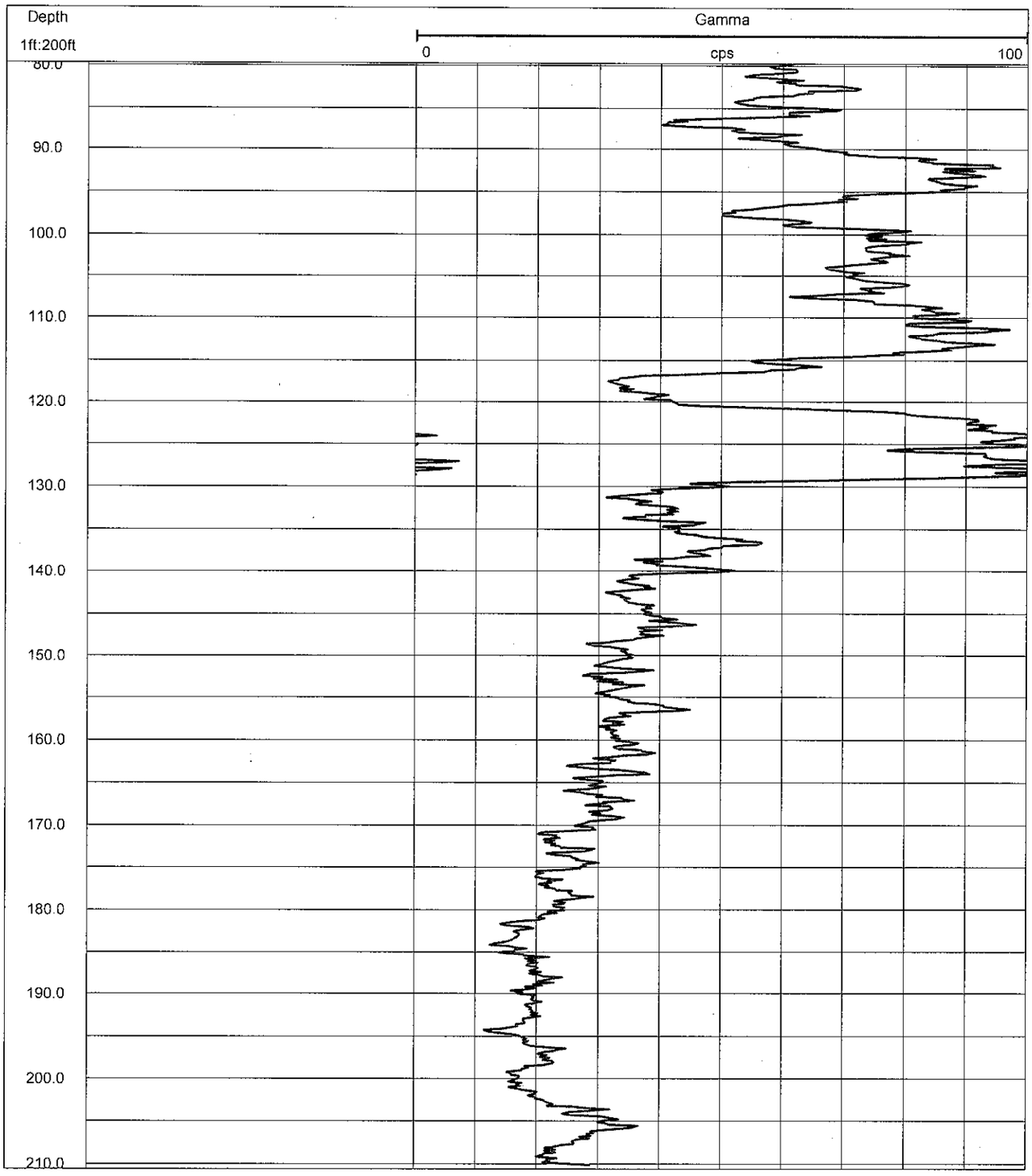
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ALT

CO SCDHS	COMPANY
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FLD	FIELD
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STE Sand Land	LOCATION
FILING No	SEC TWP RGE

OTHER SERVICES

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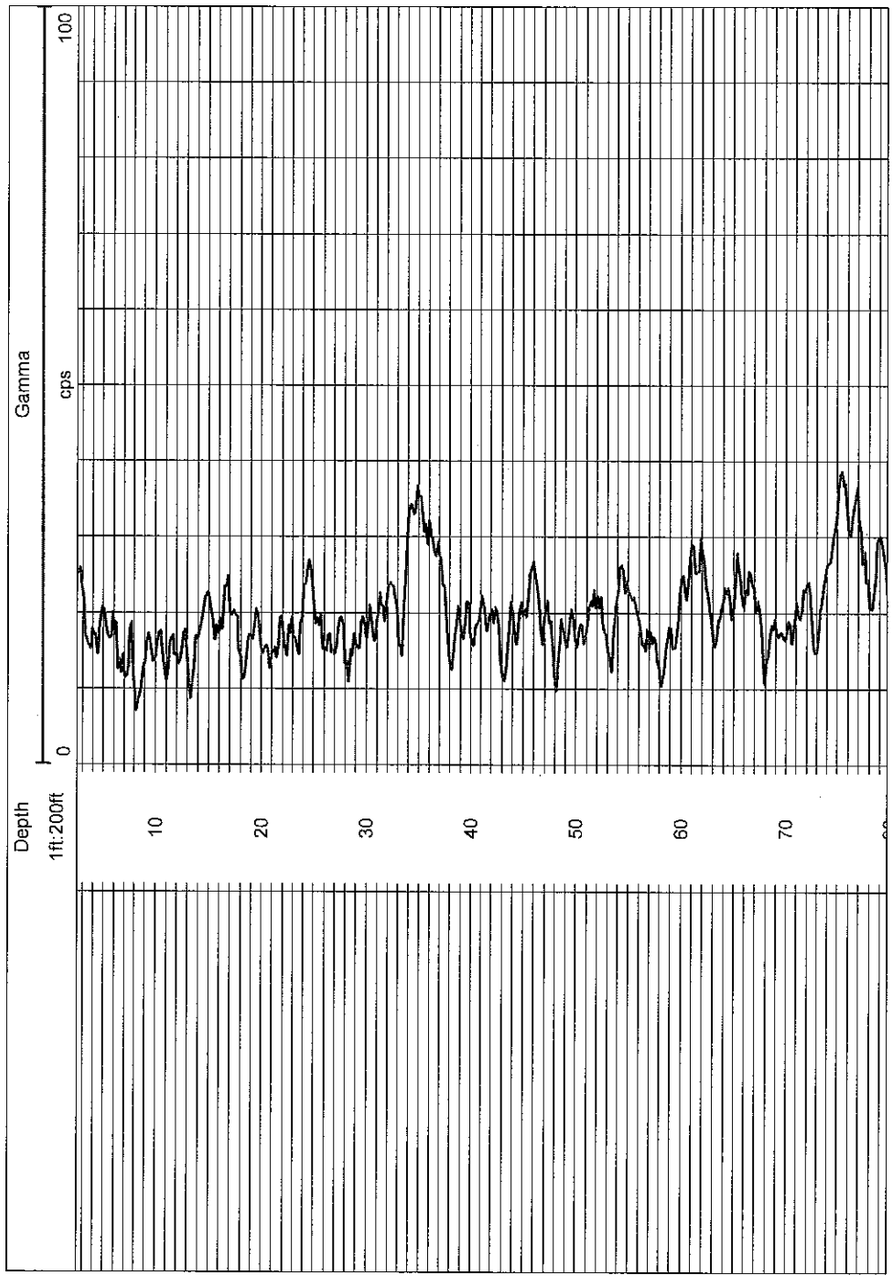

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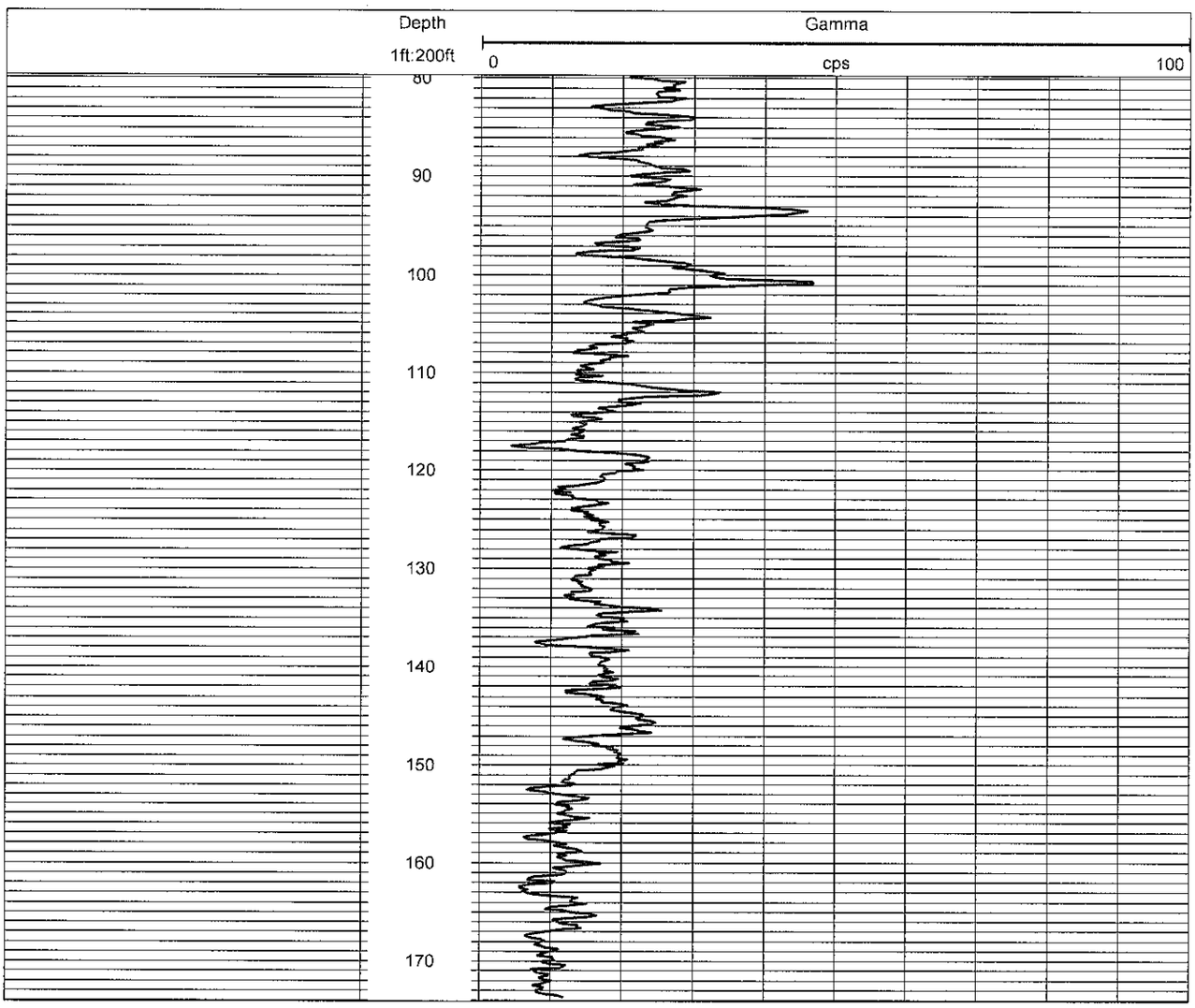
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STE Sand Land	LOCATION
FILING No	SEC TWP RGE

OTHER SERVICES

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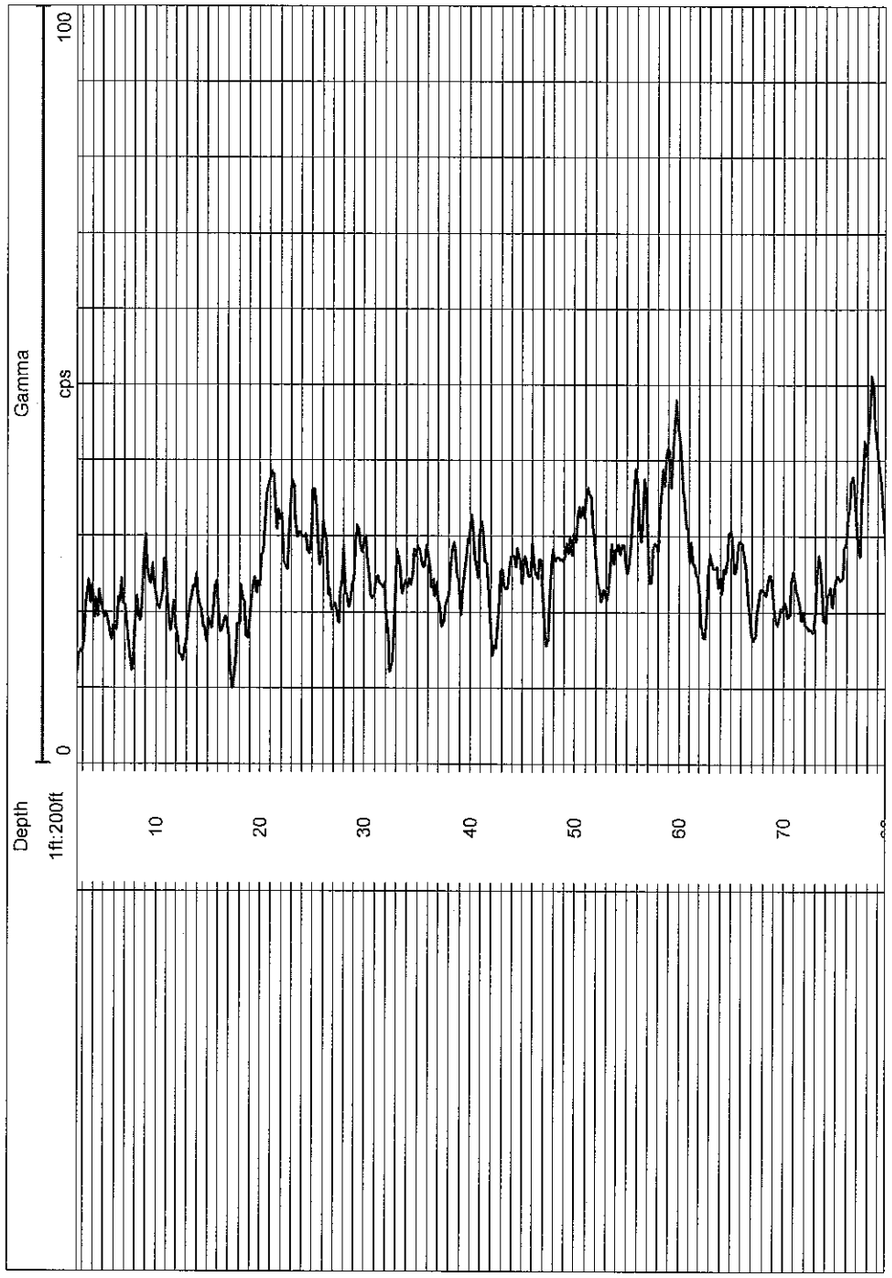

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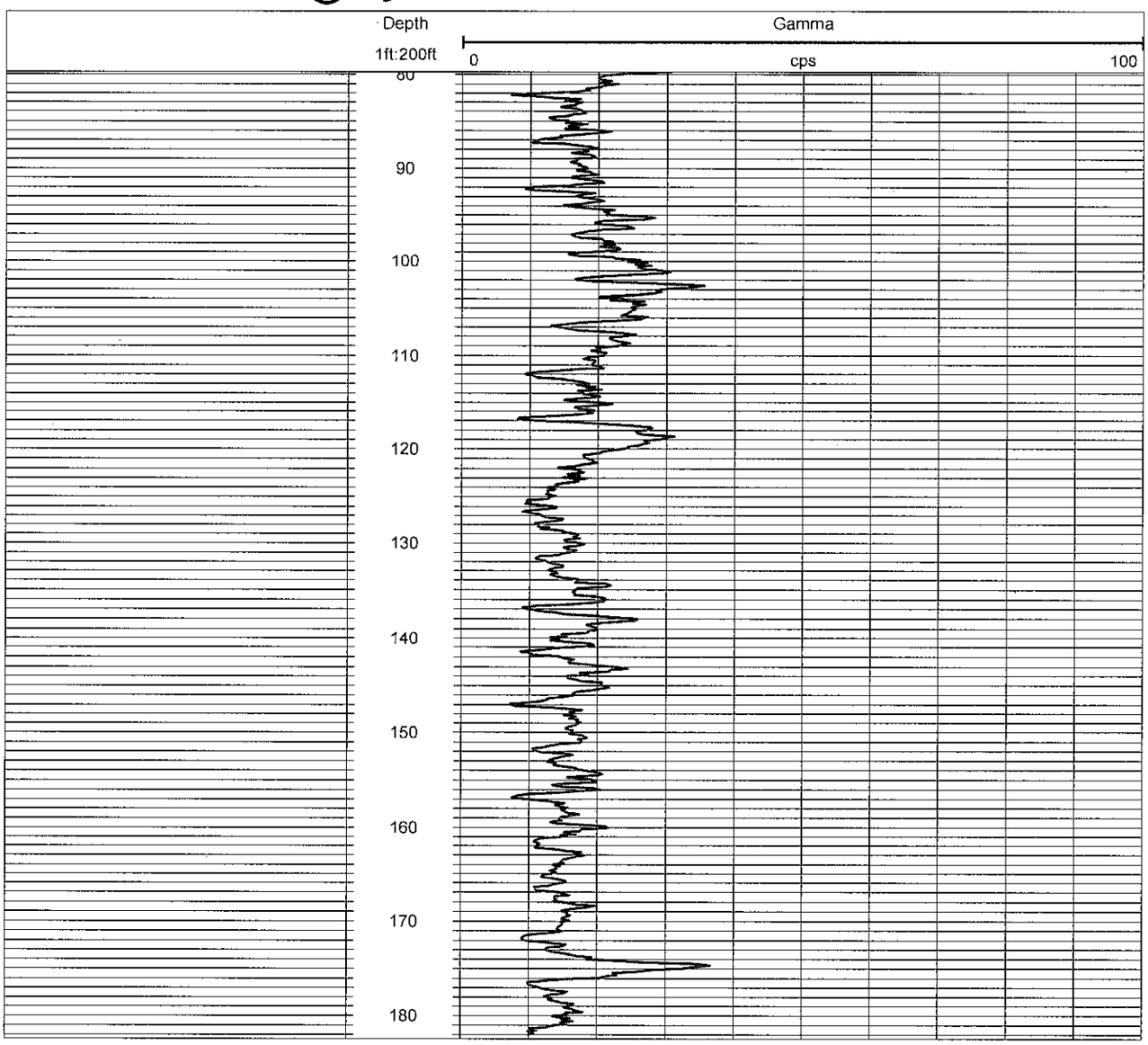
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FLD	FIELD
CTY Noyack	COUNTRY STATE
STE Sand Land	LOCATION
FILING No	SEC TWP RGE

OTHER SERVICES

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OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
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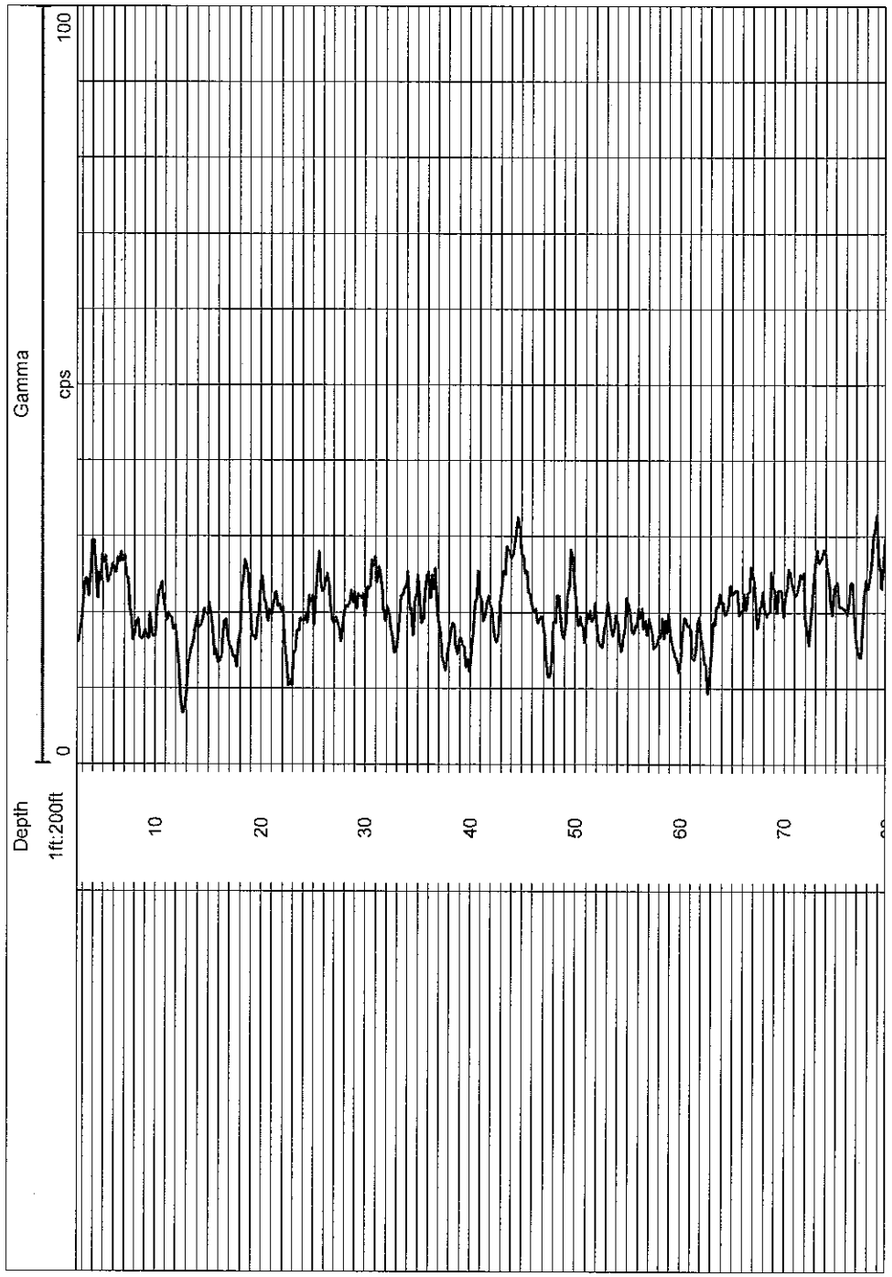
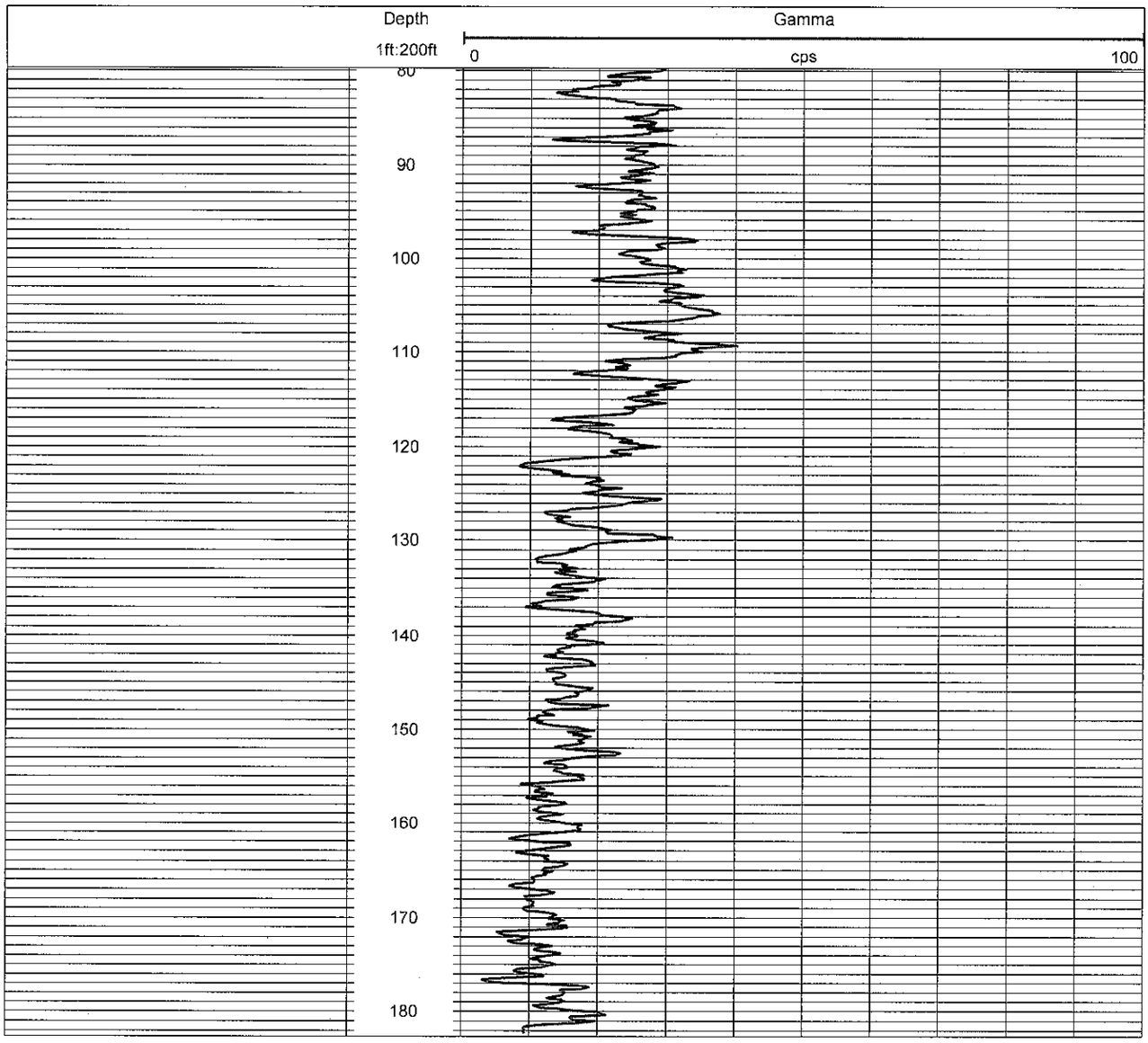


SLOS-3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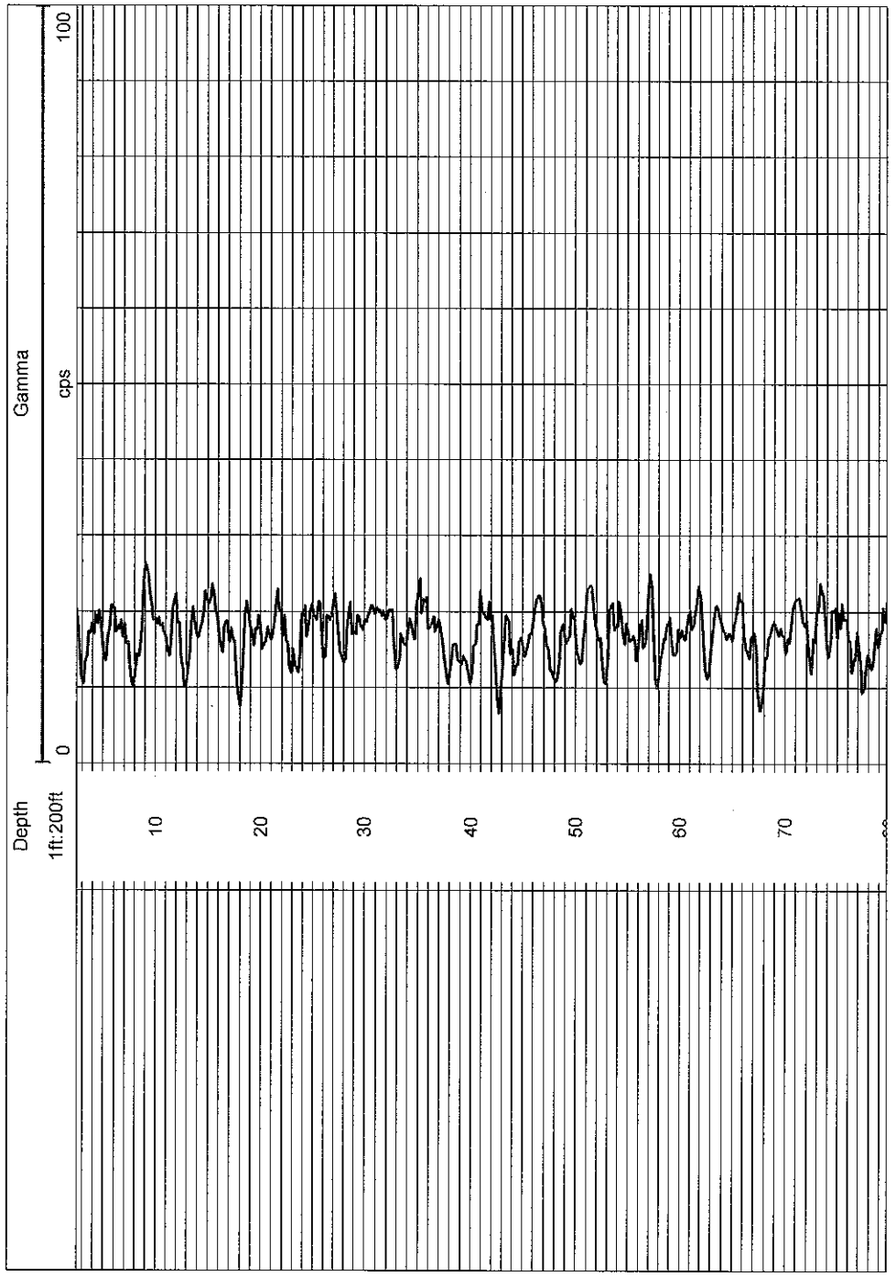
ALT

CO SCDHS	COMPANY
WELL SLOS-4	WELL ID
FLD	FIELD
CTY Noyack	COUNTRY STATE
STE Sand Land	LOCATION
FILING No	SEC TWP RGE
	OTHER SERVICES

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM		ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE		TYPE FLUID IN HOLE	
RUN No		SALINITY	
TYPE LOG		DENSITY	
DEPTH-DRILLER		LEVEL	
DEPTH-LOGGER		MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO



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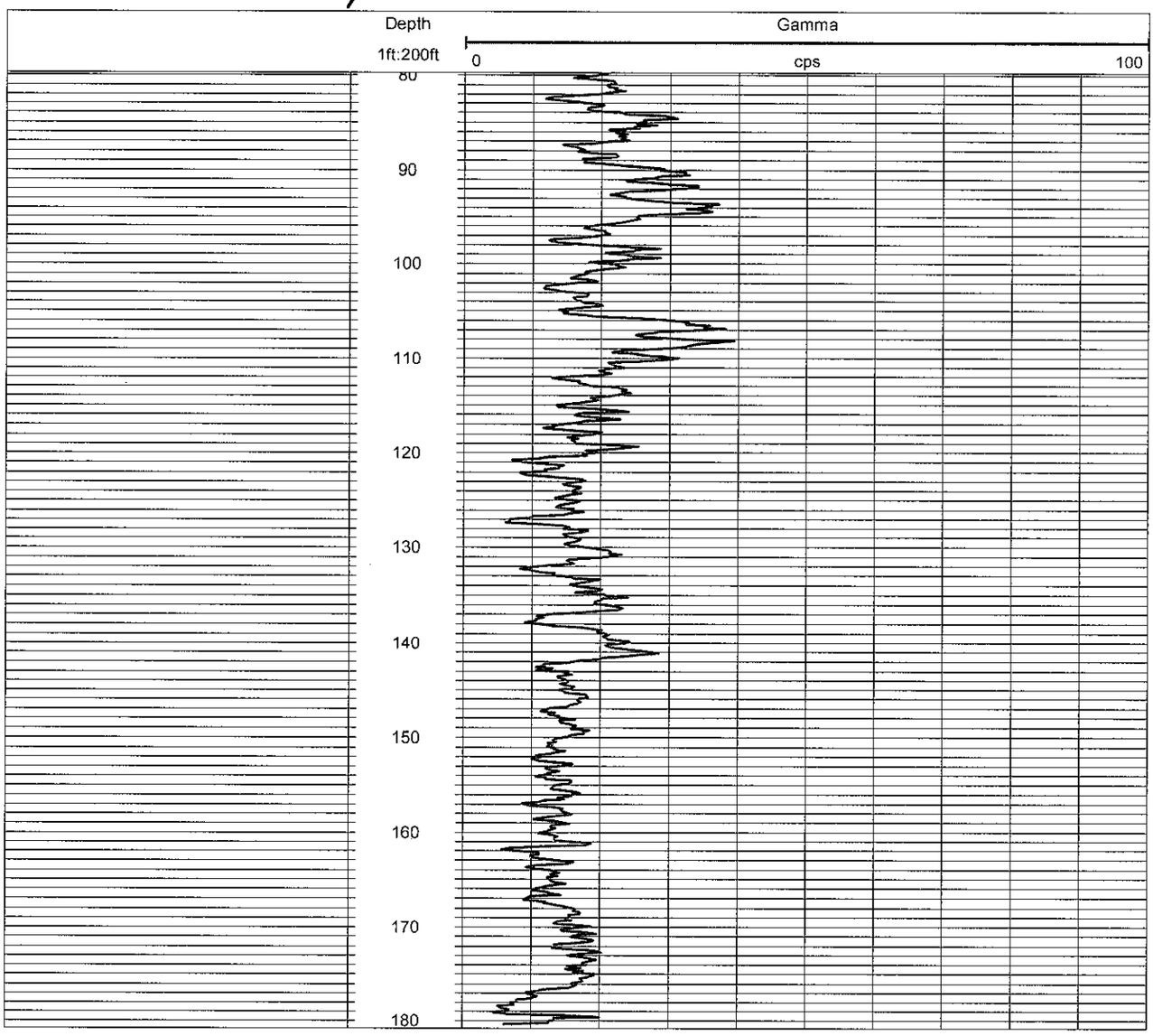
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cps
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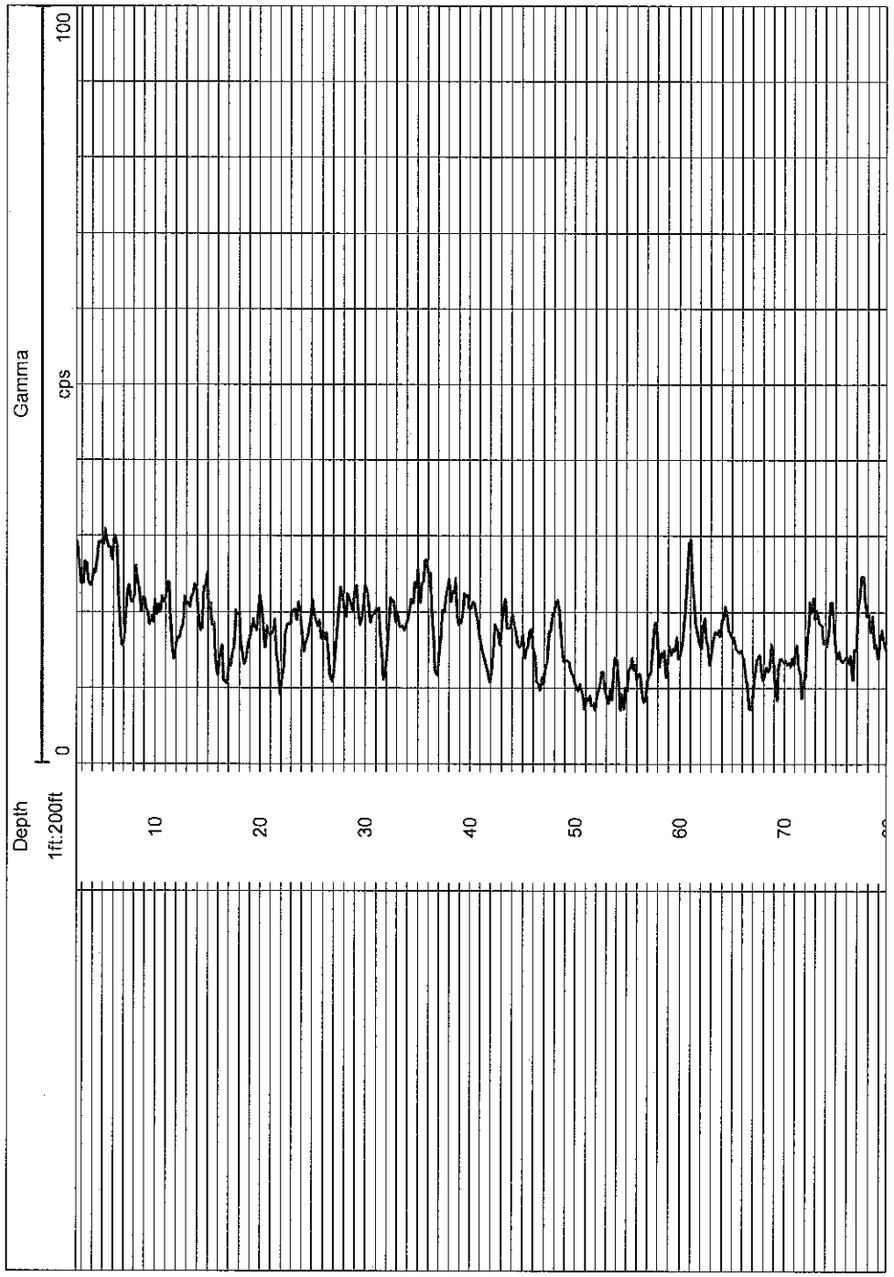
ALT

CO SCDHS	COMPANY
WELL SLOS-5	WELL ID
FLD	FIELD
CTY Noyack	COUNTRY STATE
STE Sand Land	LOCATION
FILING No	SEC TWP RGE
	OTHER SERVICES

PERMANENT DATUM	ELEVATION	K.B.
LOG MEAS. FROM	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM		G.L.

DATE		TYPE FLUID IN HOLE	
RUN No		SALINITY	
TYPE LOG		DENSITY	
DEPTH-DRILLER		LEVEL	
DEPTH-LOGGER		MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO



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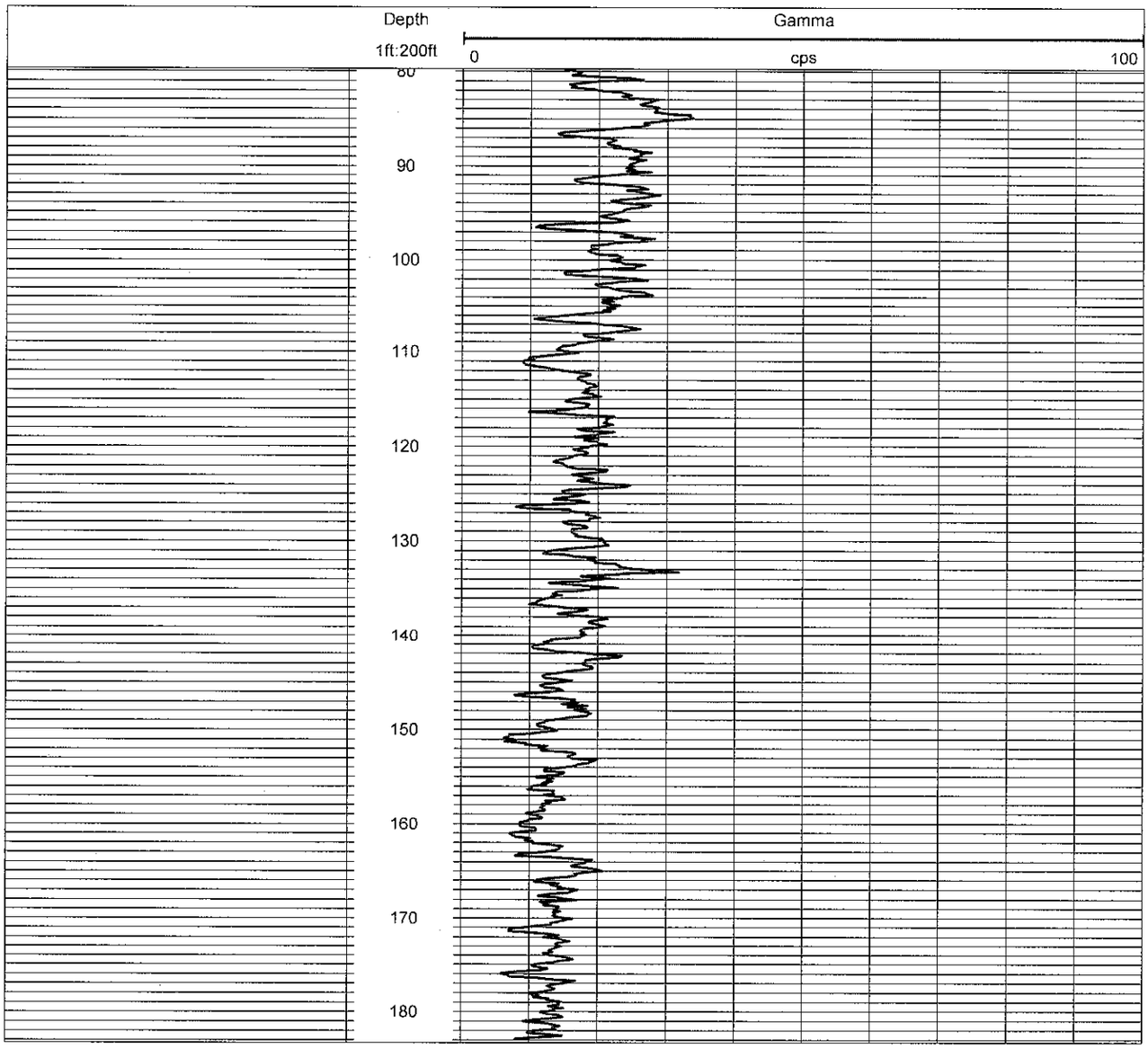
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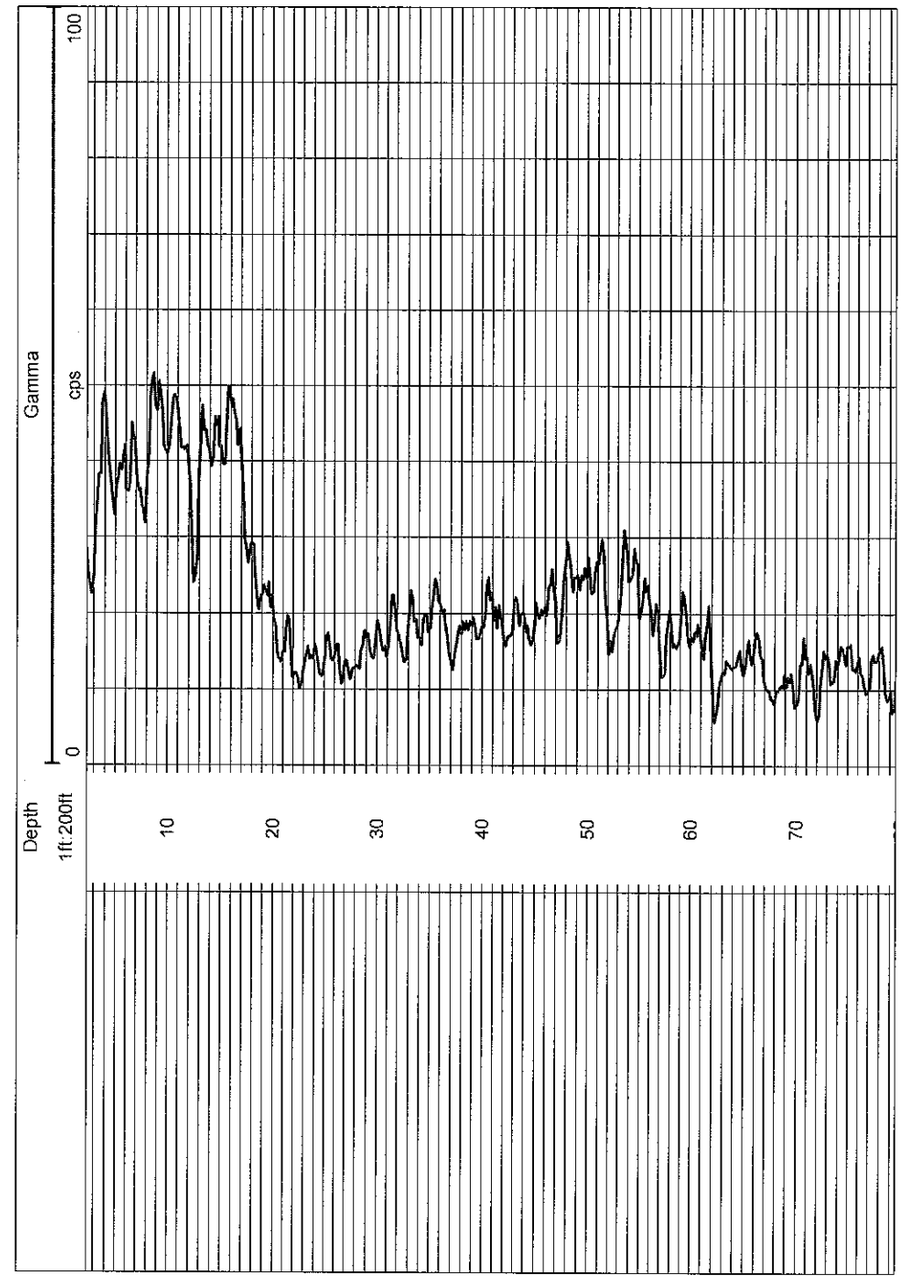
ALT

CO SCDHS	COMPANY
WELL SLOS-6	WELL ID
FLD	FIELD
CTY Noyack	COUNTRY STATE
STE Sand Land	LOCATION
FILING No	SEC TWP RGE
	OTHER SERVICES

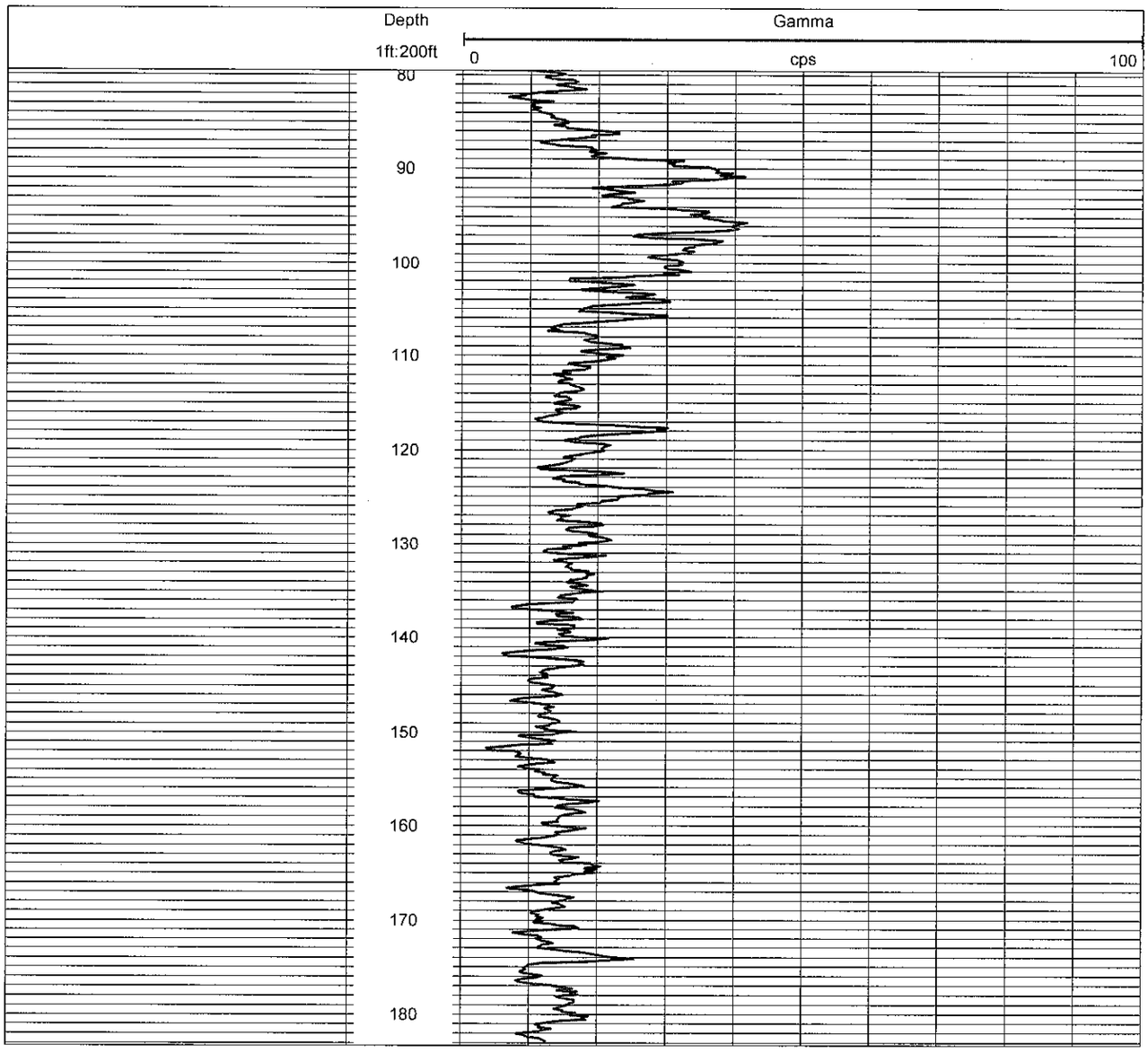
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM		ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE		TYPE FLUID IN HOLE	
RUN No		SALINITY	
TYPE LOG		DENSITY	
DEPTH-DRILLER		LEVEL	
DEPTH-LOGGER		MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO



SLOS-6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ALT

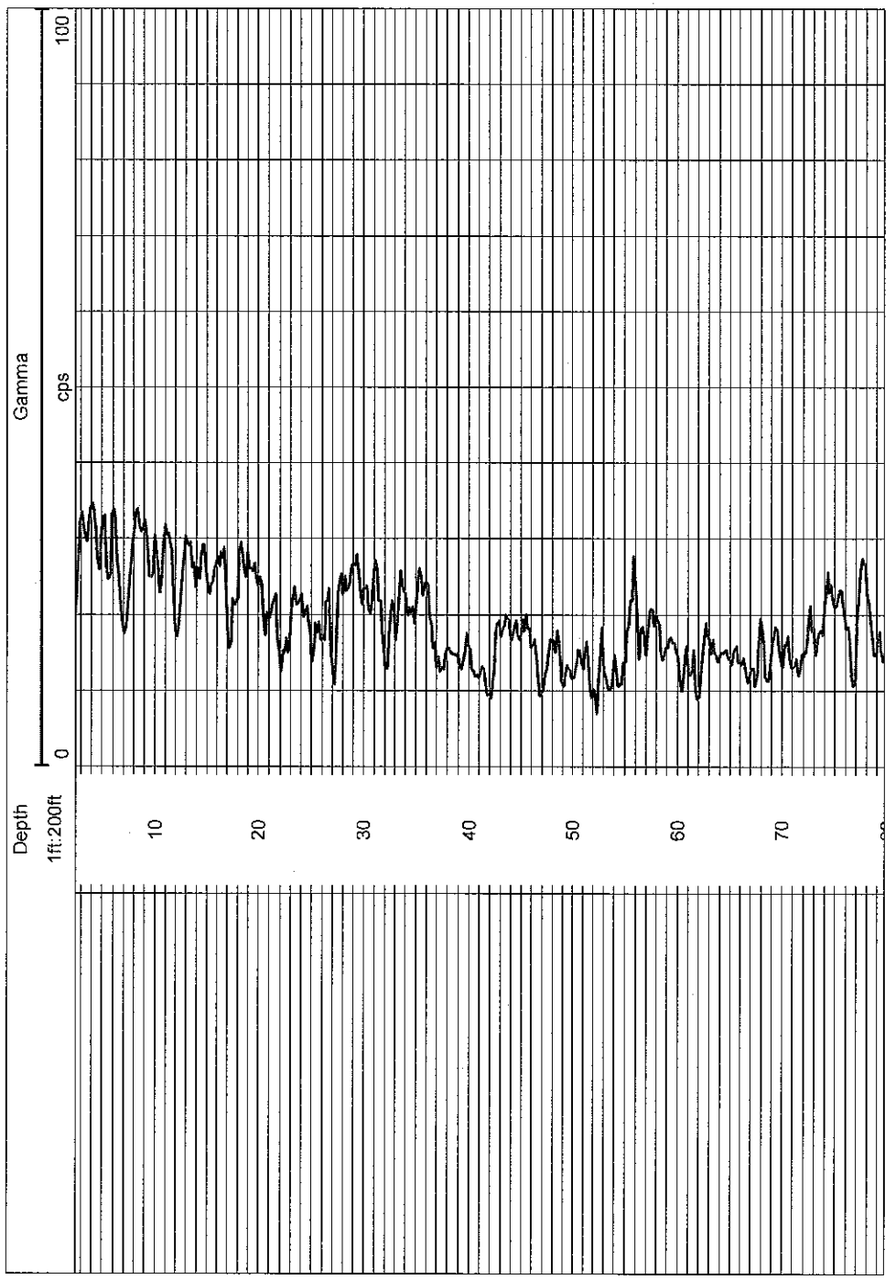
CO SCDHS	COMPANY
WELL SLOS-7	WELL ID
FLD	FIELD
CTY Noyack	COUNTRY STATE
STE Sand Land	LOCATION
FILING No	SEC TWP RGE

OTHER SERVICES

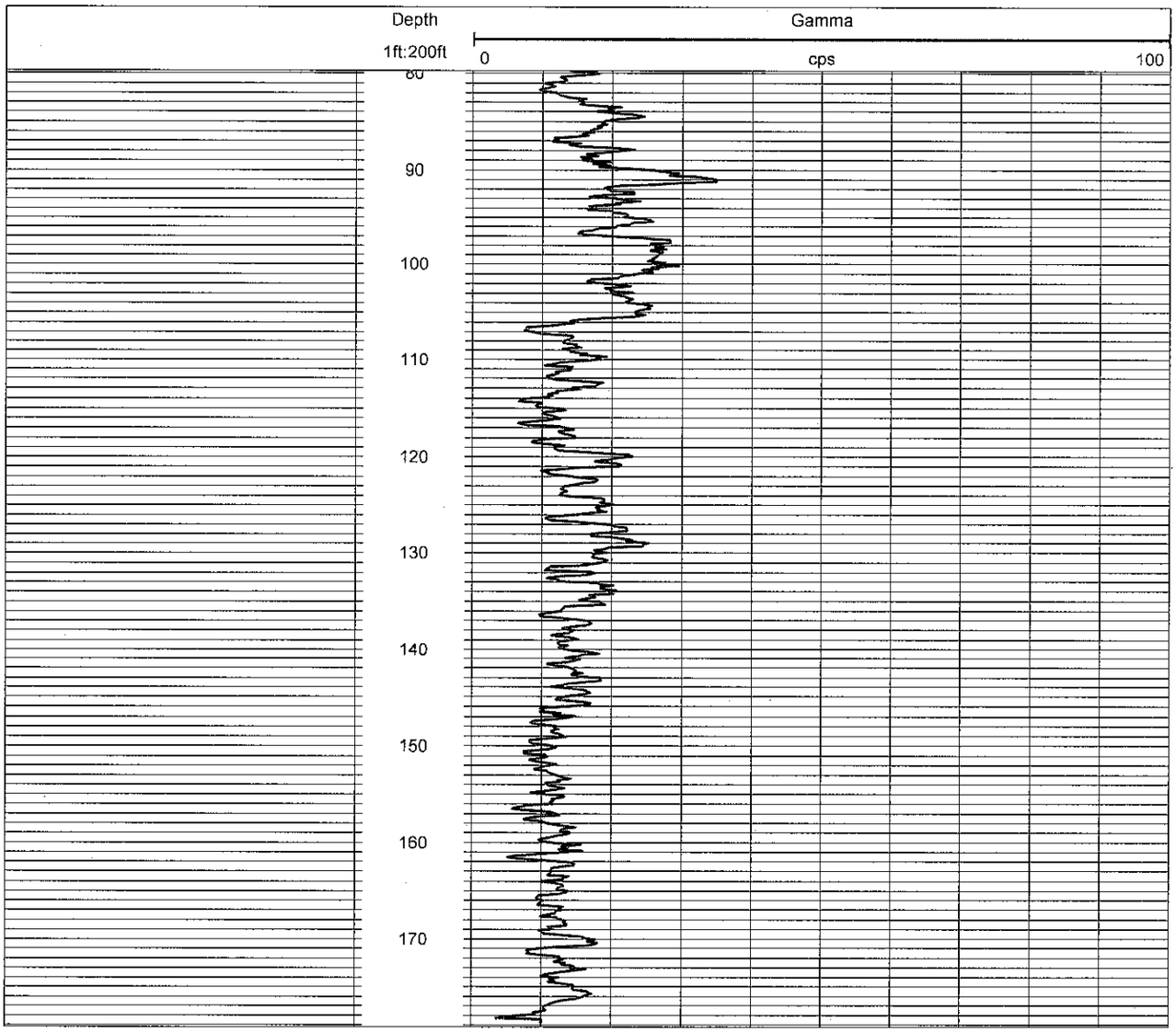
PERMANENT DATUM	ELEVATION	K.B.
LOG MEAS. FROM	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM		G.L.

DATE		TYPE FLUID IN HOLE	
RUN No		SALINITY	
TYPE LOG		DENSITY	
DEPTH-DRILLER		LEVEL	
DEPTH-LOGGER		MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO



SLOS-7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ALT

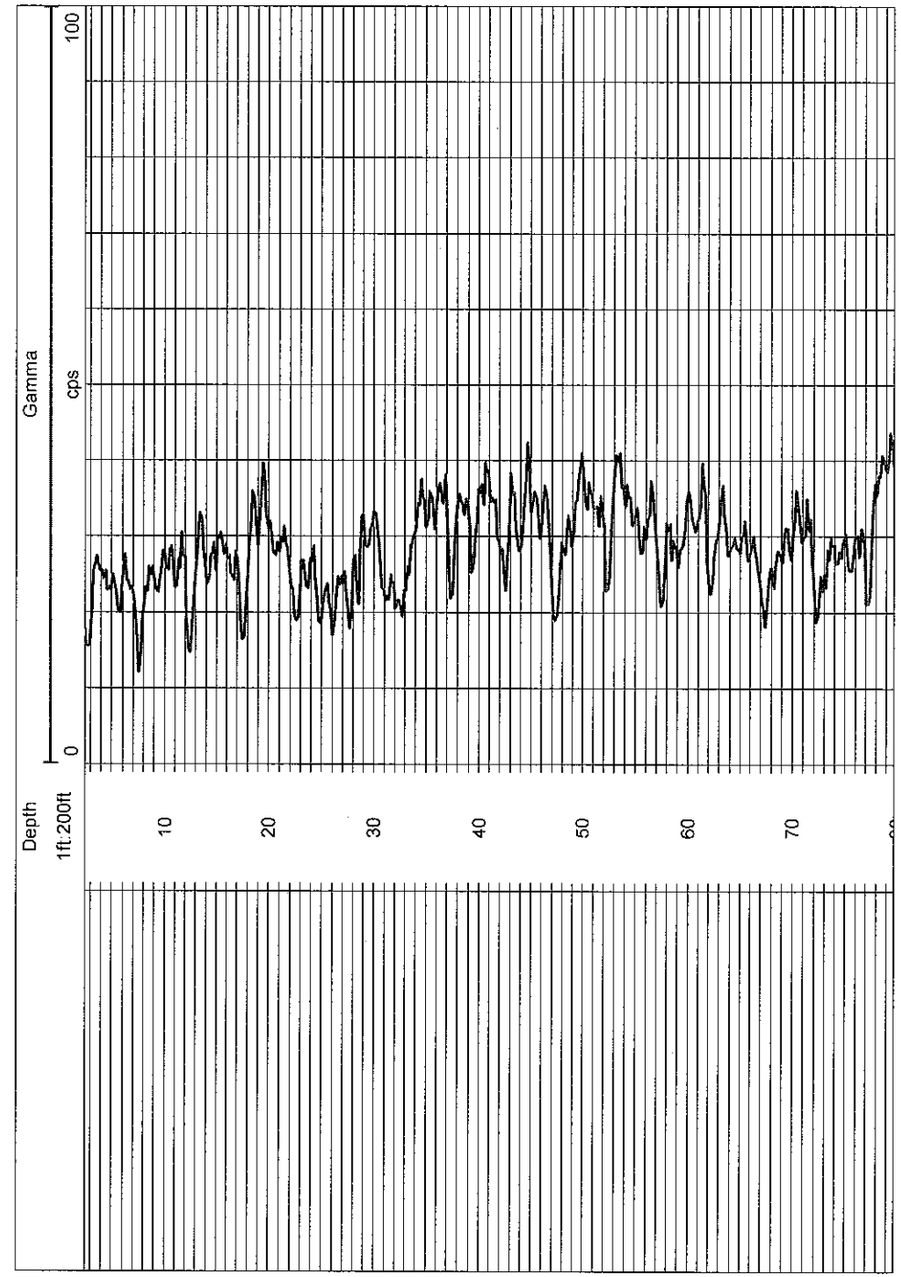
CO SCDHS	COMPANY
WELL SLOS-8	WELL ID
FLD	FIELD
CTY Noyack	COUNTRY STATE
STE Sand Land	LOCATION
FILING No	SEC TWP RGE

OTHER SERVICES

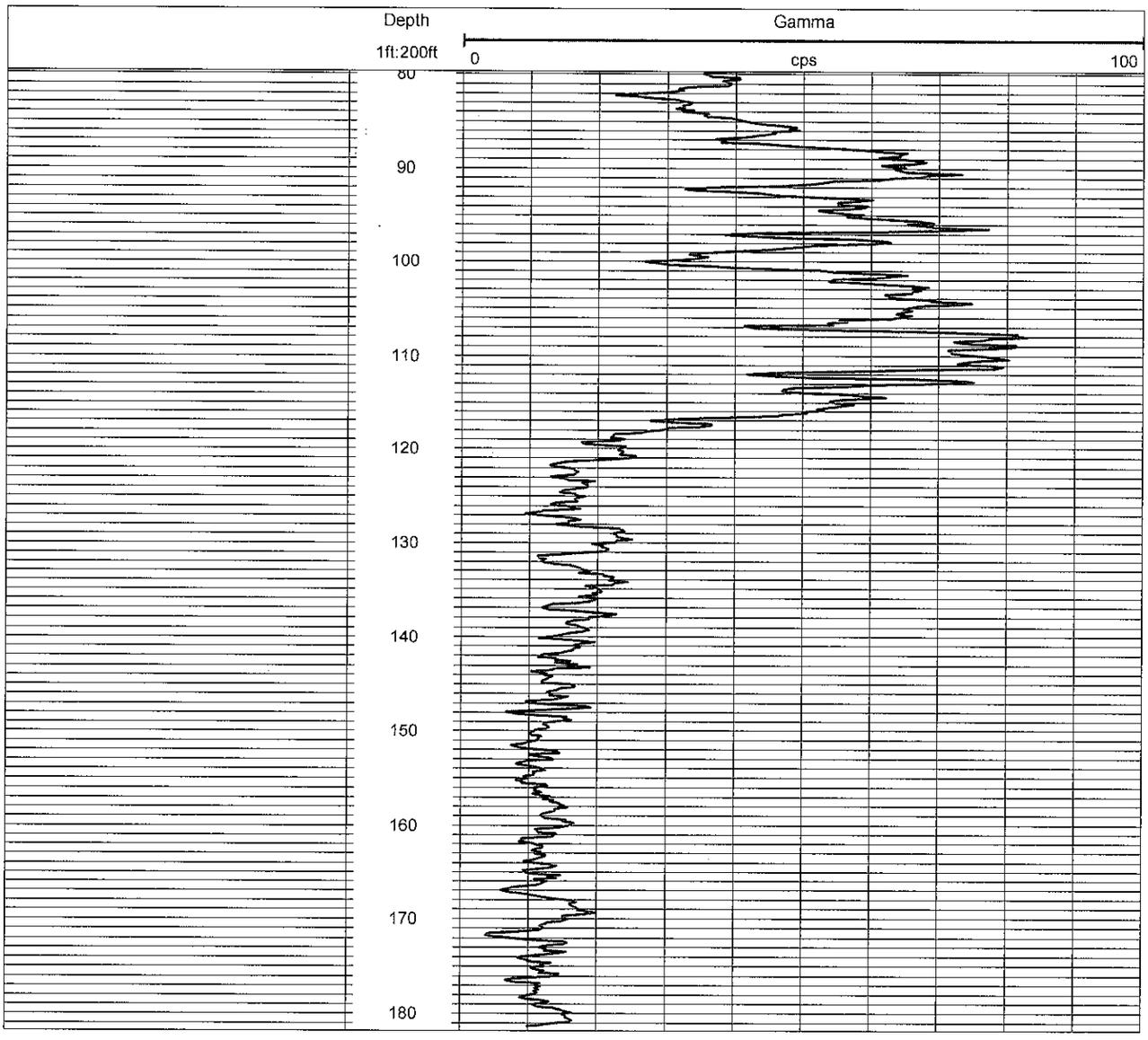
PERMANENT DATUM	ELEVATION	K.B.
LOG MEAS. FROM	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM		G.L.

DATE		TYPE FLUID IN HOLE	
RUN No		SALINITY	
TYPE LOG		DENSITY	
DEPTH-DRILLER		LEVEL	
DEPTH-LOGGER		MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO



SL05-8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Gamma
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cps
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ALT

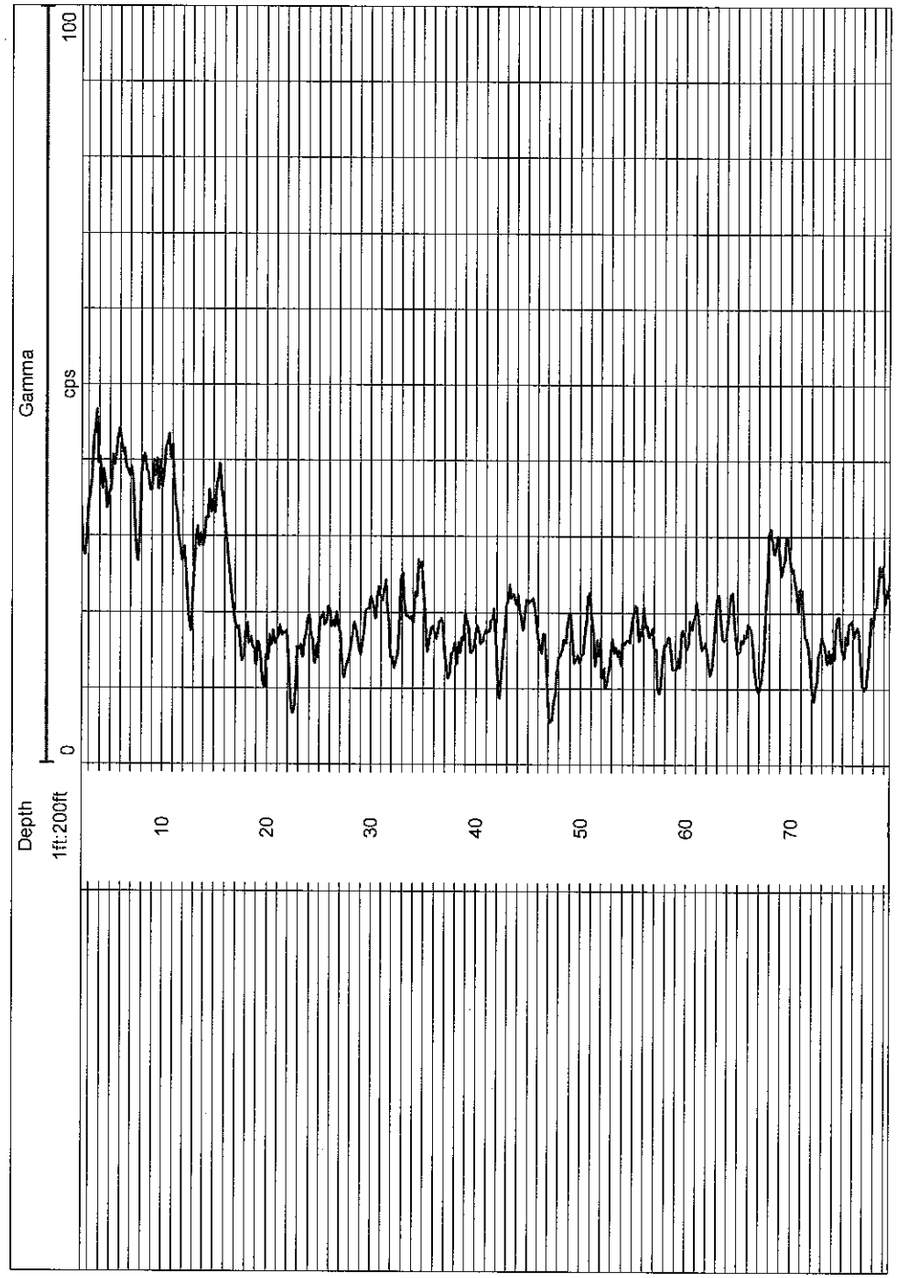
CO SCDHS	COMPANY
WELL SLOS-9	WELL ID
FLD	FIELD
CTY Noyack	COUNTRY STATE
STE Sand Land	LOCATION
FILING No	SEC TWP RGE

OTHER SERVICES

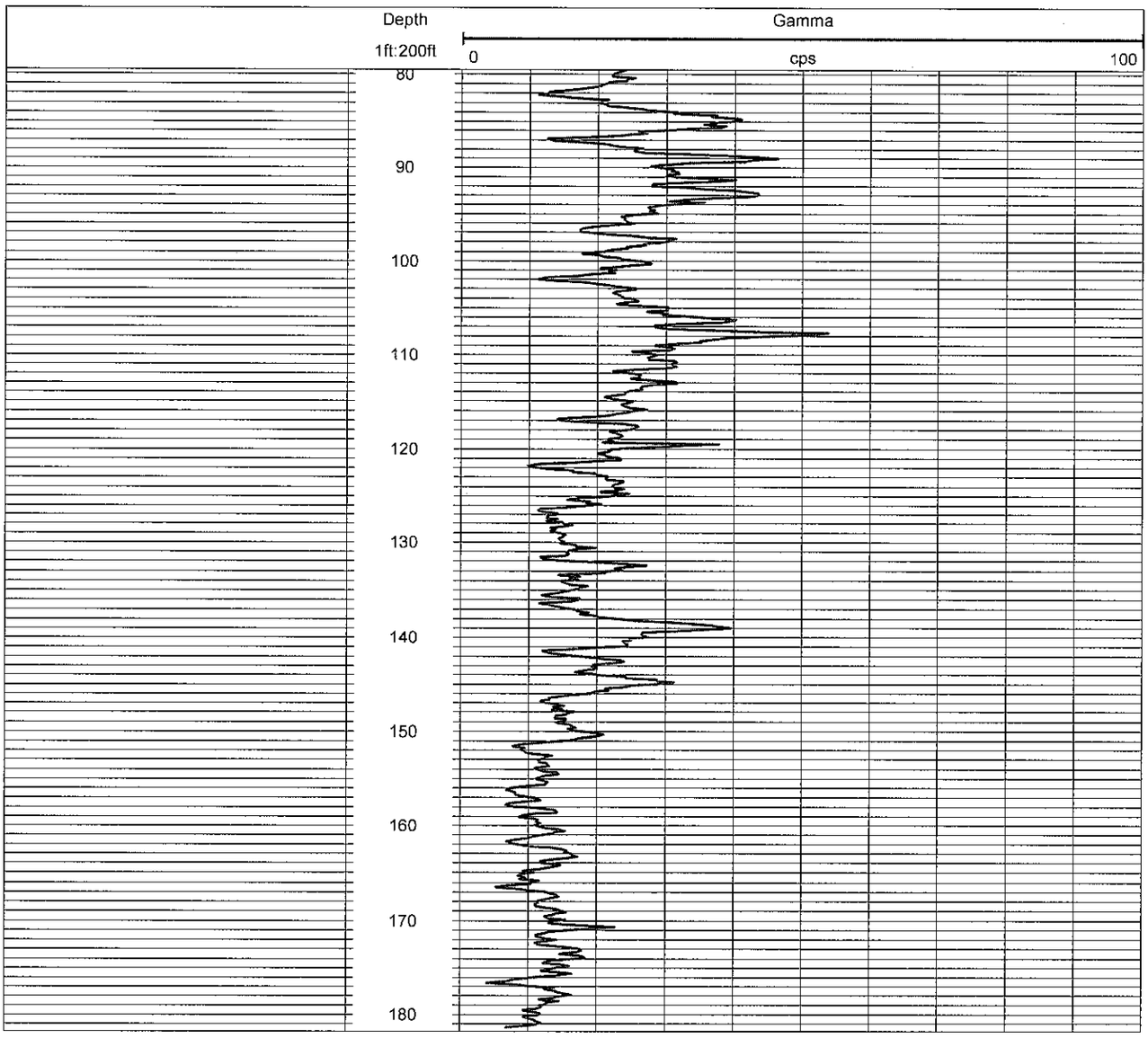
PERMANENT DATUM	ELEVATION	K.B.
LOG MEAS. FROM	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM		G.L.

DATE		TYPE FLUID IN HOLE	
RUN No		SALINITY	
TYPE LOG		DENSITY	
DEPTH-DRILLER		LEVEL	
DEPTH-LOGGER		MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO



SLOS-9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ALT

CO SCDHS
WELL SLOS-10
FLD
CTY Noyack
STE Sand Land
FILING No

COMPANY
WELL ID
FIELD
COUNTRY STATE

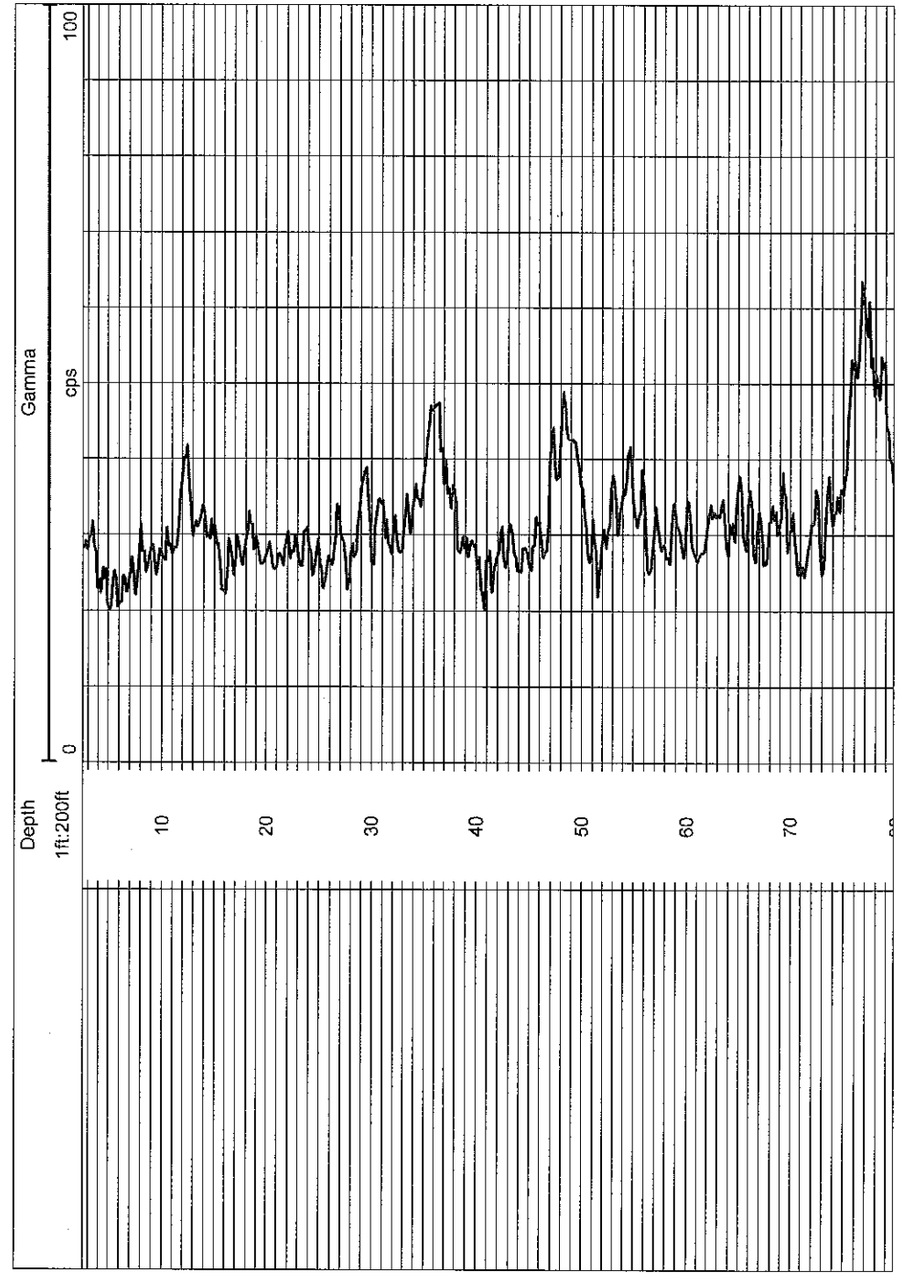
LOCATION
SEC TWP RGE

OTHER SERVICES

PERMANENT DATUM ELEVATION K.B.
LOG MEAS. FROM ABOVE PERM. DATUM D.F.
DRILLING MEAS. FROM G.L.

DATE		TYPE FLUID IN HOLE	
RUN No		SALINITY	
TYPE LOG		DENSITY	
DEPTH-DRILLER		LEVEL	
DEPTH-LOGGER		MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO



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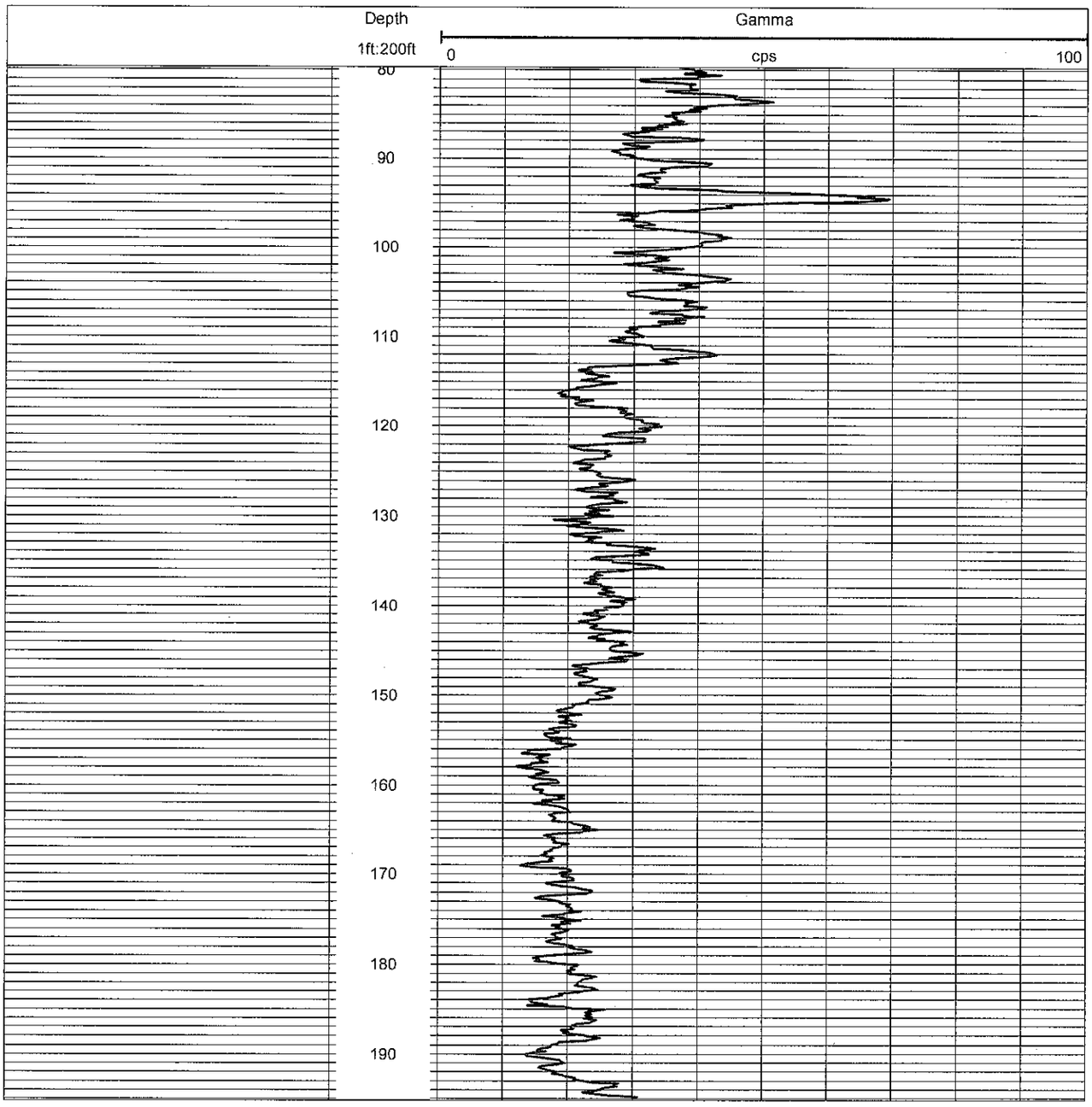
Depth
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Gamma
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cps
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APPENDIX

C

Water Sampling Analyte Groups and Analytes

Carbamate Pesticides
(SM21 6610B)
Aldicarb Sulfone ug/l
Aldicarb Sulfoxide ug/l
Aldicarb ug/l
Carbofuran ug/l
3-HYDROXY CARBO ug/l
OXAMYL ug/l
CARBARYL ug/l
1-Naphthol ug/l
METHOMYL ug/l
PROPOXUR ug/l
METHIOCARB ug/l
METHIOCARB SULFONE ug/l

Chlorinated Pesticides
(EPA Method 505)
Alpha - BHC ug/l
Beta - BHC ug/l
Gamma - BHC ug/l
Delta - BHC ug/l
Heptachlor ug/l
Chlordane ug/l
Alachlor ug/l
Methoxychlor ug/l
Endosulfan II ug/l
Endosulfan Sulfate ug/l
4,4 DDD ug/l
4,4 DDE ug/l
4,4 DDT ug/l
Endrin ug/l
Heptachlor Epoxide ug/l
Aldrin ug/l
Dieldrin ug/l
Endosulfan I ug/l
Dacthal ug/l

Mircoextractables
(EPA Method 504.1)
1,2-Dibromomethane ug/l
1,2-Dibromo-3-chloropropane ug/l

Dachtal
(HPLC/LC-GC/MS method developed at the SC PEHL)
Monomethyltetrachloroterephthalate ug/l
Tetrachloroterephthalic acid ug/l

Metals
(EPA Method 200.8)
Lithium ug/l
Beryllium ug/l
Aluminum ug/l
Titanium ug/l
Vanadium ug/l
Chromium ug/l
Manganese ug/l
Cobalt ug/l
Nickel ug/l
Copper ug/l
Zinc ug/l
Germanium ug/l
Arsenic ug/l
Selenium ug/l
Strontium ug/l
Molybdenum ug/l
Silver ug/l
Cadmium ug/l
Tin ug/l
Antimony ug/l
Tellurium ug/l
Barium ug/l
Mercury ug/l
Thallium ug/l
Lead ug/l
Thorium ug/l
Uranium ug/l

Metals
(EPA Method 200.7)
Calcium mg/l
Iron (Ferric) mg/l
Potassium mg/l
Magnesium mg/l
Sodium mg/l

1,4,Dixoxane
(EPA Method 522)
1,4-Dioxane ug/l

Note: mg/l = miligrams per liter, ug/l = micrograms per liter, ng/l = nanograms per liter, pCi/l = picocuries per liter

Herbicide Metabolites
(LC/MS/MS Method developed at SCDHS PEHL)
G-28273 ug/l
G-28279 ug/l
G-30033 ug/l
Imidacloprid ug/l
Imidacloprid Urea ug/l
Alachlor OA ug/l
Alachlor ESA ug/l
CGA-37735 ug/l
CGA-51202 ug/l
CGA-354743 ug/l
CGA-41638 ug/l
CGA-40172 ug/l
CGA-67125 ug/l
G-34048 ug/l
Malaoxon ug/l
Trichlorfon ug/l
Siduron ug/l
Dichlorvos ug/l
Propamocarb hydrochloride ug/l
2,6-Dichlorobenzamide ug/l
Ibuprofen ug/l
Gemfibrozil ug/l
Metalaxyl ug/l
Metolachlor ug/l
Tebuthiuron ug/l
Caffeine ug/l
Dinoseb ug/l
Bisphenol A ug/l
Diuron ug/l
Phenytoin (Dilantin) ug/l
4-Hydroxyphenytoin ug/l
Diethyltoluamide (DEET) ug/l
Acetaminophen ug/l
Bisphenol B ug/l
Estrone ug/l
17 alpha Ethynylestradiol ug/l
Diethylstilbestrol ug/l
17 beta Estradiol ug/l
4-Androstene-3,17-dione ug/l
Picaridin ug/l
Propachlor ESA ug/l
Propachlor OA ug/l
Testosterone ug/l
Equilin ug/l
Estriol ug/l

Standard Inorganics
(EPA Method 300)
Chloride mg/l
Sulfate mg/l SO4
Ammonia (not distilled) mg/l N
Nitrite mg/l N
Nitrate mg/l N
Bromide mg/l
Ortho-Phosphate mg/l P
Fluoride mg/l
Chlorate mg/l

Radiologicals
EPA Method 900.0
Gross Alpha pCi/l
Gross Beta pCi/l
Tritium pCi/l

Hexavalent Chromium
(EPA Method 218.7)
Hexavalent Chromium ug/l

MBAS
(SM 5540C)
MBAS (Low Sensitivity) ug/l

Perchlorate
(EPA Method 332.0)
Perchlorate ug/l

Chlorinated Acids
(EPA Method 555)
Acifluorfen ug/l
Bentazon ug/l
Chloramben ug/l
2,4-D ug/l
Dicamba ug/l
Dichloroprop ug/l
Picloram ug/l
2,4,5-TP (Silvex) ug/l
2,4-DB ug/l
3,5-Diclorobenzoic Acid ug/l
4-Nitrophenol ug/l
Dinoseb ug/l
MCPA ug/l
MCPP ug/l
Pentachlorophenol ug/l
2,4,5-T ug/l

Note: mg/l = miligrams per liter, ug/l = micrograms per liter, ng/l = nanograms per liter, pCi/l = picocuries per liter

Volatile Organic Compounds
(EPA Method 524.2)

Chlorodifluoromethane ug/l
Bromodichloromethane ug/l
2,3-Dichloropropene ug/l
cis-1,3-Dichloropropene ug/l
1,2-Dichlorobenzene (o) ug/l
1,3-Dichlorobenzene (m) ug/l
1,4-Dichlorobenzene (p) ug/l
1,1,1,2-Tetrachloroethane ug/l
1,2,3-Trichloropropane ug/l
2,2-Dichloropropane ug/l
1,3-Dichloropropane ug/l
Bromochloromethane ug/l
n-Propylbenzene ug/l
1-Bromo-2-chloroethane ug/l
1,2-Dichloropropane ug/l
Trichloroethene ug/l
Naphthalene ug/l
Hexachlorobutadiene ug/l
Methyl-tertiary-butyl-ether ug/l
Tetrachloroethene ug/l
cis-1,2-Dichloroethene ug/L
2-Chlorotoluene ug/l
Bromobenzene ug/l
2-Butanone (MEK) ug/l
Tetrahydrofuran ug/l
Ethylmethacrylate ug/l
Propanal ug/l
Carbon disulfide ug/l
1,1-Dichloroethene ug/l
1,3,5-Trimethylbenzene ug/l
1,2,4-Trimethylbenzene ug/l
Chloromethane ug/l
Trichlorofluoromethane ug/l
Vinyl chloride ug/l
p-Diethylbenzene ug/l
1,2,4,5-Tetramethylbenzene ug/l
1,2,4-Trichlorobenzene ug/l
1,2,3-Trichlorobenzene ug/l
Ethenylbenzene (Styrene) ug/l
Isopropylbenzene ug/l
Carbon tetrachloride ug/l
Benzene ug/l
Toluene ug/l
Chlorobenzene ug/l
Chlorodibromomethane ug/l
2-Bromo-1-chloropropane ug/l
Bromoform ug/l
Total Xylene ug/l
Methyl sulfide ug/l
Dimethyldisulfide ug/l
1,1-Dichloropropene ug/l
Methyl isothiocyanate ug/l
Acrylonitrile ug/l
Methacrylonitrile ug/l
Isobutane ug/l
Allyl chloride ug/l
Dichlorodifluoromethane ug/l
Chloroethane ug/l
Bromomethane ug/l
trans-1,3-Dichloropropene ug/l
1,1,2-Trichloroethane ug/l
1,1,1,2-Tetrachloroethane ug/l
Methylene chloride ug/l
1,1-Dichloroethane ug/l
trans-1,2-Dichloroethene ug/l
Chloroform ug/l
1,2-Dichloroethane ug/l
1,1,1-Trichloroethane ug/l
tert-Butylbenzene ug/l
sec-Butylbenzene ug/l
p-Isopropyltoluene ug/l
n-Butylbenzene ug/l
Ethylbenzene ug/l
o-Xylene ug/l
m,p-Xylene ug/l
1,4-Dichlorobutane ug/l
Freon 113 ug/l
Dibromomethane ug/l
4-Chlorotoluene ug/l
Diethyl ether ug/l
Methylmethacrylate ug/l
d-Limonene ug/l
n-Butane ug/l

Perfluoroalkyl Substances (PFASs)
(ISO 25101)

Perfluorobutanesulfonic acid (PFBS) ng/l
Perfluorohexanesulfonic acid (PFHxS) ng/l
Perfluoroheptanoic acid (PFHpA) ng/l
Perfluorooctanoic acid (PFOA) ng/L
Perfluorooctanesulfonic acid (PFOS) ng/L
Perfluorononanoic acid (PFNA) ng/L

Note: mg/l = miligrams per liter, ug/l = micrograms per liter, ng/l = nanograms per liter, pCi/l = picocuries per liter

Semi-Volatiles
(EPA Method 525.2)

1-Methylnaphthalene ug/l
2-Methylnaphthalene ug/l
Acenaphthene ug/l
Acenaphthylene ug/l
Acetochlor ug/l
Alachlor ug/l
Allethrin ug/l
Anthracene ug/l
Atrazine ug/l
Azoxystrobin ug/l
Benfluralin ug/l
Benzo(a)anthracene ug/l
Benzo(b)fluoranthene ug/l
Benzo(ghi)perylene ug/l
Benzo(k)fluoranthene ug/l
Benzo(a)pyrene ug/l
Benzophenone ug/l
Butyl benzyl phthalate ug/l
bis(2-ethylhexyl) adipate ug/l
bis(2-ethylhexyl) phthalate ug/l
Bisphenol A ug/l
Bloc ug/l
Bromacil ug/l
Butachlor ug/l
Butylated Hydroxyanisole ug/l
Butylated Hydroxytoluene ug/l
Carbamazepine ug/l
Carbazole ug/l
Carisoprodol ug/l
Chlordane ug/l
Chlorofenvinphos ug/l
Chloroxylenol ug/l
Chlorpyriphos ug/l
Chrysene ug/l
Cyfluthrin ug/l
Cypermethrin ug/l
Dacthal ug/l
Deltamethrin ug/l
Dibenzo(a,h)anthracene ug/l
Dibutyl phthalate ug/l
Dichlobenil ug/l
Dichlorvos ug/l
Dieldrin ug/l
Diethyl phthalate ug/l
Diethyltoluamide (DEET) ug/l
Dimethyl phthalate ug/l
Dioctyl phthalate ug/l
Disulfoton sulfone ug/l
Endosulfan Sulfate ug/l
EPTC ug/l
Ethofumesate ug/l
Ethyl parathion ug/l
Fluoranthene ug/l
Fluorene ug/l
Hexachlorobenzene ug/l
Hexachlorocyclopentadiene ug/l
Hexachloroethane ug/l
Hexazinone ug/l
Indeno(1,2,3-cd)pyrene ug/l
Iodofenphos ug/l
Iprodione ug/l
Isofenphos ug/l
Kelthane ug/l
Malathion ug/l
Metalaxyl ug/l
Methoprene ug/l
Methoxychlor ug/l
Methyl parathion ug/l
Naled (Dibrom) ug/l
Napropamide ug/l
Pendimethalin ug/l
Pentachlorobenzene ug/l
Pentachloronitrobenzene ug/l
Permethrin ug/l
Phenanthrene ug/l
Piperonyl butoxide ug/l
Prometon ug/l
Prometryne ug/l
Propachlor ug/l
Propiconazole (TILT) ug/l
Pyrene ug/l
Resmethrin ug/l
Ronstar ug/l
Simazine ug/l
Sumithrin ug/l
Tebuthiuron ug/l
Terbacil ug/l
Triadimefon ug/l
Triclosan ug/l
Trifluralin ug/l
Vinclozolin ug/l
Etofenprox ug/l
Etofenprox alpha-CO ug/l
Prallethrin ug/l

Note: mg/l = miligrams per liter, ug/l = micrograms per liter, ng/l = nanograms per liter, pCi/l = picocuries per liter

APPENDIX

D

Summary of Detected Analytes
2015 Groundwater Samples

Suffolk County Department of Health

Detected Analytes - 2015 Off-Site Groundwater Data Sand Land, Noyack

Well Information			Parameters							Metals																						
Well ID	Screen Interval (ft) (depth below grade)	Sample Date	Depth To Water (feet below grade)	Turbidity (ntu)	Temperature C	Dissolved Oxygen (ppm)	pH	Conductivity (uS)	ORP	Aluminum (ppb)	Arsenic (ppb)	Barium (ppb)	Beryllium (ppb)	Calcium (ppm)	Chromium (ppb)	Cobalt (ppb)	Iron (ppm)	Lead (ppb)	Lithium (ppb)	Magnesium (ppm)	Manganese (ppb)	Molybdenum (ppb)	Nickel (ppb)	Potassium (ppm)	Sodium (ppm)	Strontium (ppb)	Thorium (ppb)	Titanium (ppb)	Uranium (ppb)	Vanadium (ppb)	Zinc (ppb)	Hexavalent Chromium (ppb)
DEC TOGS 1.1.1 Guidance Values			-	-	-	-	-	-	-	-		-		-	-	-	-		-	35	-	-	-	-	-	-		-			2,000	-
DEC Part 703 Class GA Groundwater Standards			-	-	-	-	-	-	-	-	25	1,000		-	50	-	0.3	25	-	-	300	-	100	-	20	-		-			-	50
DOH Drinking Water Standards Subpart 5-1			-	-	-	-	-	-	-	-	10	2,000		-	100	-	0.3	15***	-	-	300	-	100	-	-	-		-			5,000	100
SL-1	210 - 215	7/1/2015	207.2	2.78	18.3	4.62	6	188	237	115	<1	43	<0.2	13	3.1	<1	0.22	<1	<1	6.9	15	1.6	2.8	1.3	11	74	<2	8.7	<0.5	<1	<5	0.21
	220 - 225	7/1/2015	207.2	0.95	18.1	4.79	6.2	212	240	17	<1	41	<0.2	16	1.5	<1	<0.1	<1	<1	7.1	6.9	<1	1.5	1.1	9.8	84	<2	1.5	<0.5	<1	<5	0.17
	230 - 235	6/30/2015	207.4	3.72	20.2	4.54	5.9	225	NA	96	<1	59	<0.2	17	7.8	<1	0.27	<1	1.7	5.3	13	1	4.9	0.89	13	87	<2	6.7	<0.5	<1	<5	0.09
	240 - 235	6/10/2015	206.8	1.75	23.7	7.14	6.1	146	NA	13	<1	28	<0.2	9.7	9	<1	<0.1	<1	<1	4.4	6	1	6.1	0.8	10	61	<2	<1	<0.5	<1	<5	0.27
SL-2	210 - 215	7/1/2015	204.2	1.52	18.7	4.92	6	239	298	9.2	<1	51	<0.2	14	2.8	<1	<0.1	<1	<1	5.5	7.7	<1	2.2	1.2	19	90	<2	<1	<0.5	<1	5.9	0.12
	220 - 225	6/30/2015	204.4	NA	19.6	5.11	6.2	160	189	75	<1	36	<0.2	8.7	4.5	<1	0.19	<1	<1	5.6	14	<1	2.9	0.79	11	63	<2	4.6	<0.5	<1	<5	0.19
	230 - 235	6/30/2015	204.4	NA	19.8	6.18	6.5	144	195	111	<1	36	<0.2	9.7	8.4	<1	0.32	<1	<1	4.2	19	1.1	5.2	0.94	10	55	<2	6.4	<0.5	<1	<5	0.24
	240 - 245	6/30/2015	204.4	NA	17.7	7.07	6.5	73	248	7.5	<1	13	<0.2	3.7	4	<1	<0.1	<1	<1	1.6	2.6	<1	2.4	0.56	6.8	22	<2	<1	<0.5	<1	<5	0.31
SL-3	210 - 215	7/7/2015	203.1	0.2	17.1	3.29	5.9	175	282	8.3	<1	60	<0.2	9.1	1	<1	<0.1	<1	<1	4.4	23	<1	1.9	2.1	15	68	<2	<1	<0.5	<1	<5	0.14
	220 - 225	7/6/2015	202.9	0.66	17.9	6.78	6.1	128	267	7.2	<1	29	<0.2	7.7	1.2	<1	<0.1	<1	<1	2.9	3.3	<1	0.8	0.56	10	49	<2	<1	<0.5	<1	<5	0.18
	230 - 235	7/6/2015	202.9	2.1	17	8.81	6.5	110	245	94	<1	22	<0.2	4.2	1.5	<1	0.16	<1	<1	2.8	13	<1	0.8	0.58	12	28	<2	5.2	<0.5	<1	<5	0.23
	240 - 245	7/6/2015	202.9	0.05	18.4	8.17	6.6	82	247	<5	<1	15	<0.2	4.2	2	<1	<0.1	<1	<1	1.9	1.9	<1	1.1	<0.5	7.4	26	<2	<1	<0.5	<1	<5	0.27
SL-4	230 - 235	7/7/2015	201.1	1.21	16.8	7.99	6.8	75	255	6.2	<1	10	<0.2	4.5	1	<1	<0.1	<1	<1	1.8	16	<1	0.9	0.61	6.3	25	<2	<1	<0.5	<1	<5	0.31
SL-4S	200 - 205	8/12/2015	201	3.19	18.3	4.36	5.9	188	233	92	<1	55	<0.2	16	1.6	4	0.16	<1	2.9	4.9	322	<1	7.8	1.1	13	85	<2	8.3	<0.5	<1	7.2	0.16
	210 - 215	8/12/2015	201	2.08	17.2	7.5	5.9	168	289	49	<1	33	<0.2	8.2	1.3	<1	<0.1	<1	1.1	4.3	8.6	<1	0.9	0.8	16	53	<2	3.2	<0.5	<1	<5	0.2
SL-5	200 - 210	7/13/2015	199.6	3.38	16.9	1.21	5.6	153	205	96	<1	48	<0.2	13	1.7	4.6	0.31	<1	3.1	4.8	228	<1	8.9	0.93	8.3	78	<2	7.4	<0.5	<1	<5	<0.03
	210 - 215	7/13/2015	199.6	0.07	16.5	6.29	6.3	141	249	<5	<1	28	<0.2	7.4	1.6	<1	<0.1	<1	<1	4.5	6.2	<1	1.1	0.79	12	47	<2	<1	<0.5	<1	<5	0.22
	220 - 225	7/8/2015	199.3	0.37	17.4	7.13	6.8	181	208	6.6	<1	26	<0.2	11	1.9	<1	<0.1	<1	<1	4.9	4.9	<1	1.3	0.81	14	59	<2	<1	<0.5	<1	<5	0.21
	230 - 235	7/8/2015	199.3	0.46	17.4	8.1	6.7	68	243	5.6	<1	11	<0.2	3.8	1.7	<1	<0.1	<1	<1	1.3	8.6	<1	1.1	<0.5	6.9	23	<2	<1	<0.5	<1	<5	0.35
	240 - 245	7/8/2015	199.3	0.4	16.2	8.15	6.9	89	233	<5	<1	10	<0.2	4.9	2.3	<1	<0.1	<1	<1	2.1	4.1	<1	1.2	0.54	8.1	29	<2	<1	<0.5	<1	<5	0.37
	250 - 255	7/7/2015	199.3	0.59	17.4	7.64	7	101	225	5.4	<1	14	<0.2	5.9	1.9	<1	<0.1	<1	<1	2.7	1.7	<1	1	0.69	9.1	33	<2	<1	<0.5	<1	<5	0.25
SL-6	170-175	11/30/2015	164.18	4.16	13.5	1.33	6.11	211.8	248	137	<1	97	<0.2	22.8	2	<1	0.32	<1	3	5.7	28	<1	3.1	1.6	9.5	116	<2	11	<0.5	<1	<5	NS
	180-185	11/30/2015	164.18	0.27	12.9	1.18	5.89	180.8	259	6	<1	77	<0.2	14.3	2	<1	<0.1	<1	2	5.7	19	<1	3.7	1.7	7.8	85	<2	<1	<0.5	<1	<5	NS
	190-195	11/24/2015	163.58	1.08	13.6	1.76	5.96	168	166	12	<1	62	<0.2	10.5	2	<1	<0.1	<1	2	7.8	23	<1	3	1.2	7.2	71	<2	<1	<0.5	<1	<5	NS
	200-205	11/24/2015	163.53	0.84	13.9	1.92	5.77	168	167	5	<1	64	<0.2	10.1	<1	<1	<0.1	<1	2	7.5	33	<1	2.9	1.2	7.5	68	<2	<1	<0.5	<1	<5	NS

Indicates concentraton exceeds a standard

NA = Not Analyzed NS = No Sampled Collected

Suffolk County Department of Health

Detected Analytes - 2015 Off-Site Groundwater Data Sand Land, Noyack

Well Information			Parameters							Metals																						
Well ID	Screen Interval (ft) (depth below grade)	Sample Date	Depth To Water (feet below grade)	Turbidity (ntu)	Temperature C	Dissolved Oxygen (ppm)	pH	Conductivity (uS)	ORP	Aluminum (ppb)	Arsenic (ppb)	Barium (ppb)	Beryllium (ppb)	Calcium (ppm)	Chromium (ppb)	Cobalt (ppb)	Iron (ppm)	Lead (ppb)	Lithium (ppb)	Magnesium (ppm)	Manganese (ppb)	Molybdenum (ppb)	Nickel (ppb)	Potassium (ppm)	Sodium (ppm)	Strontium (ppb)	Thorium (ppb)	Titanium (ppb)	Uranium (ppb)	Vanadium (ppb)	Zinc (ppb)	Hexavalent Chromium (ppb)
DEC TOGS 1.1.1 Guidance Values			-	-	-	-	-	-	-	-		-		-	-	-	-		-	35	-	-	-	-	-	-		-			2,000	-
DEC Part 703 Class GA Groundwater Standards			-	-	-	-	-	-	-	-	25	1,000		-	50	-	0.3	25	-	-	300	-	100	-	20	-		-			-	50
DOH Drinking Water Standards Subpart 5-1			-	-	-	-	-	-	-	-	10	2,000		-	100	-	0.3	15***	-	-	300	-	100	-	-	-		-			5,000	100
SL-7	160-165	11/23/2015	157.1	4.69	13.2	5.88	6.82	213	NA	131	<1	59	<0.2	24.3	2	<1	0.25	<1	2	7.2	378	<1	7.1	1.9	9.7	121	<2	7	<0.5	<1	<5	NS
	170-175	11/23/2015	157.1	4.55	12.9	5.24	6.45	236	93	292	<1	65	<0.2	29	3	1	0.55	<1	2	7.6	114	<1	4.3	1.7	9.7	135	<2	15	<0.5	<1	<5	NS
	180-185	11/19/2015	156.5	2	14.3	5.07	6.38	239	130	69	<1	69	<0.2	28.3	2	<1	0.15	<1	1	8.7	55	<1	2.8	1.4	9.8	127	<2	4	<0.5	<1	<5	NS
	190-195	11/18/2015	157.08	2.15	14.4	4.1	6.35	243	128	34	<1	53	<0.2	20.4	1	<1	<0.1	<1	<1	12.6	112	<1	1.3	1.4	8.1	121	<2	2	<0.5	<1	<5	NS
	200-205	11/18/2015	156.53	2.51	14	3.14	6.52	242	108	100	<1	53	<0.2	20.1	2	<1	0.19	<1	<1	16.7	66	<1	3	1.5	8.9	115	<2	6	<0.5	<1	<5	NS
SL-8	110-115	11/17/2015	103.12	54	15.8	6.6	6.72	109	62	4385	2	66	0.3	7.2	8	4	7.13	3	7	5.2	608	<1	8.2	2.7	10	41	<2	207	0.5	9	18	NS
	120-125	11/16/2015	102.9	7.58	16.4	7.58	6.43	83	80	4035	2	53	0.3	4.1	7	4	6.68	3	7	4.2	391	<1	7.3	2.3	8.8	27	<2	191	<0.5	10	17	NS
	130-135	11/16/2015	103.02	17.9	16	7.78	6.68	115	71	1051	1	30	<0.2	6.6	3	2	1.77	<1	2	3.6	341	<1	2.9	1.7	11.8	39	<2	56	<0.5	3	5	NS
	140-145	11/12/2015	105.1	31.8	14.6	8.11	6.14	92	NA	819	1	33	<0.2	8.6	2	1	1.38	<1	2	4.3	345	<1	2.8	1.7	17.3	50	<2	43	<0.5	2	7	NS
	150-155	11/9/2015	113.86	47.1	19.4	5.12	6.32	175	240	1382	<1	50	<0.2	9.7	4	2	2.13	1	4	5.3	414	<1	5.2	1.8	16.8	53	<2	65	<0.5	4	8	NS
	160-165	11/5/2015	113.86	65	18	1.36	7.37	213	111	1781	2	64	<0.2	16.6	5	2	3.16	2	6	7.9	715	2	5.5	2.8	14.3	76	<2	88	<0.5	5	13	NS
	170-175	11/4/2015	113.86	313	23	0.3	7.34	191	-60	5518	2	101	0.3	17.2	10	5	9.48	4	11	9	630	1	10.5	3.8	11.5	83	2	248	0.7	11	40	NS
SL-9	190-195	12/7/2015	185.18	4.3	13.3	5.14	6.38	71.6	239	135	<1	15	<0.2	2.9	2	<1	0.3	<1	<1	1.9	72	<1	3.6	0.6	7.5	20	<2	9	<0.5	<1	<5	NS
	200-205	12/7/2015	185.18	0.87	13.3	4.81	6.42	70.77	235	12	<1	12	<0.2	2.3	<1	<1	<0.1	<1	<1	1.9	26	<1	1.6	0.5	7.2	17	<2	<1	<0.5	<1	<5	NS
	210-215	12/7/2015	185.18	1.26	13.3	4.81	6.4	72.69	231	14	<1	14	<0.2	2.6	<1	<1	<0.1	<1	<1	2.1	18	<1	1.6	0.6	6.9	19	<2	1	<0.5	<1	<5	NS
	220-225	12/7/2015	185.18	0.33	13.8	4.07	5.61	75.39	284	7	<1	18	<0.2	3.2	1	<1	<0.1	<1	<1	2.1	20	<1	1.5	0.7	6.5	23	<2	<1	<0.5	<1	10	NS
SL-10	180-185	12/3/2015	178.7	3.92	12.6	4.71	6.67	202.4	221	6	<1	33	<0.2	17	1	<1	<0.1	<1	<1	7	8	<1	1.1	1.1	9.6	93	<2	<1	<0.5	<1	<5	NS
	190-195	12/3/2015	178.7	1.03	12.5	4.76	6.35	198.2	241	32	<1	39	<0.2	18.1	1	<1	0.11	<1	<1	7	14	<1	1.1	1.2	10.3	94	<2	2	<0.5	<1	<5	NS
	200-205	12/3/2015	178.7	0.47	12.5	4.35	6.24	210.9	250	142	<1	52	<0.2	20.1	2	<1	0.34	<1	1	7.2	25	<1	1.5	1.3	10.4	101	<2	10	<0.5	<1	<5	NS
TW-1	239-242	12/8/2015	199.7	1.97	11.9	3.37	5.42	76.39	166	<5	<1	16	<0.2	3.3	<1	<1	1.5	<1	<1	1.4	127	<1	1.9	1	6.9	30	<2	<1	<0.5	<1	1157	NS
TW-3	239 - 242	7/7/2015	200	0.8	13.5	7.95	6.8	89	NA	<5	<1	9.3	<0.2	5	<1	<1	<0.1	<1	<1	1.6	1.7	<1	<0.2	<0.5	6.1	36	<2	<1	<0.5	<1	275	0.21
BW-1	216 - 231	7/14/2015	225.3	1.18	29.5	2.98	5.3	133	294	14	<1	49	<0.2	9.3	<1	<1	<0.1	<1	<1	4.8	5.2	<1	1.4	1.1	7.2	67	<2	<1	<0.5	<1	<5	0.22
PR-1	210 - 215	8/31/2015	208.9	2.39	19.6	4.91	5.8	188	264	177	<1	48	<0.2	7.1	2	<1	0.29	<1	<1	5.4	52	<1	2.1	1.4	19	66	<2	10	<0.5	<1	8	0.14
	220 - 225	8/31/2015	208.9	1.92	19.4	6.6	6.4	194	248	79	<1	40	<0.2	11	2.4	<1	0.1	<1	1.1	4.6	32	<1	2.1	0.97	18	57	<2	4.7	<0.5	<1	<5	0.2

Indicates concentraton exceeds a standard

NA = Not Analyzed NS = No Sampled Collected

Suffolk County Department of Health
Detected Analytes - 2015 Off-Site Groundwater Data Sand Land, Noyack

Well Information			Standard Inorganics						Rads (pCi/l)		VOCs (ppb)			Herb Mets (ppb)					
Well ID	Screen Interval (ft) (depth below grade)	Sample Date	Chloride (ppm)	Nitrate (ppm)	Sulfate (ppm)	Total Alkalinity mg CaCO3/L	Perchlorate (ppb)	MBAS (ppb)	Gross Alpha	Gross Beta	Toluene	Chloroform*	Methylmethacrylate	Bisphenol A	Diethyltoluamide (DEET)	Metalaxyl	Alachlor OA	Caffeine	Didealkylatrazine
DEC TOGS 1.1.1 Guidance Values			-	-	-	-	-	-	-	-		-		-	-	-	-	-	-
DEC Part 703 Class GA Groundwater Standards			250	10	250	-	-	500	-	1,000	5	7		-	-	-	-	-	-
DOH Drinking Water Standards Subpart 5-1			250	10	250	-	18	-	15	50**		80		50	50	50	50	50	50
SL-1	210 - 215	7/1/2015	16	5.2	18	24	0.43	<0.1	<1	1.2±0.1	<0.5	1.7	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	220 - 225	7/1/2015	19	4.6	19	32	0.41	<0.1	<1	<1	<0.5	1.7	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	230 - 235	6/30/2015	24	4.1	14	NA	0.35	<0.1	<1	<1	<0.5	2.1	<0.5	Trace	0.2	<0.2	<0.4	<0.2	<0.8
	240 - 235	6/10/2015	13	2.3	13	NA	<0.2	NS	<1	<1	<0.5	2.2	<0.5	Trace	<0.2	<0.2	<0.4	<0.2	<0.8
SL-2	210 - 215	7/1/2015	39	2	12	32	0.21	<0.1	<1	1.1±0.1	<0.5	2.4	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	220 - 225	6/30/2015	19	2.3	11	25	0.21	<0.1	<1	<1	<0.5	1.2	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	230 - 235	6/30/2015	13	1.4	12	29	<0.2	<0.1	<1	<1	<0.5	1.9	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	240 - 245	6/30/2015	7.6	<0.5	7.4	13	<0.2	<0.1	<1	<1	<0.5	5.1	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
SL-3	210 - 215	7/7/2015	28	2.8	9.9	15	NS	<0.1	<1	2±0.1	<0.5	5.4	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	220 - 225	7/6/2015	14	0.8	9.7	26	NS	<0.1	<1	<1	<0.5	1.3	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	230 - 235	7/6/2015	17	<0.5	11	13	NS	<0.1	<1	<1	<0.5	1.8	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	240 - 245	7/6/2015	7.8	<0.5	8.1	18	NS	<0.1	<1	<1	<0.5	3.2	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
SL-4	230 - 235	7/7/2015	8.9	<0.5	7.9	13	NS	0.11	<1	<1	<0.5	2.4	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
SL-4S	200 - 205	8/12/2015	22	<0.5	6.5	NS	<0.2	<0.1	<1	1±0.1	<0.5	1.6	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	210 - 215	8/12/2015	35	<0.5	5.9	NS	<0.2	<0.1	<1	<1	<0.5	3	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
SL-5	200 - 210	7/13/2015	8	<0.5	6.9	56	NS	<0.1	<1	1.1±0.1	<0.5	<0.5	<0.5	<0.5	<0.2	<0.2	<0.4	0.2	Trace
	210 - 215	7/13/2015	17	<0.5	10	28	NS	<0.1	<1	<1	<0.5	0.7	<0.5	<0.5	<0.2	Trace	<0.4	<0.2	<0.8
	220 - 225	7/8/2015	33	0.8	11	18	NS	<0.1	<1	<1	<0.5	0.9	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	230 - 235	7/8/2015	7.4	<0.5	7.9	11	NS	<0.1	<1	<1	<0.5	3.4	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	240 - 245	7/8/2015	10	<0.5	7.8	15	NS	<0.1	<1	<1	<0.5	3.2	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	250 - 255	7/7/2015	13	0.5	8.8	16	NS	<0.1	<1	<1	<0.5	1.7	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
SL-6	170-175	11/30/2015	18	2.9	6	NS	NA	<0.1	<1	1.8±0.1	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	180-185	11/30/2015	15	2.4	6	NS	NA	<0.1	<1	1.8±0.1	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	190-195	11/24/2015	13	1.9	7	NS	NA	NS	<1	1.6±0.1	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	200-205	11/24/2015	14	23.1	7	NS	NS	NS	<1	1.3±0.1	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8

Indicates concentraton exceeds a standard
NA = Not Analyzed NS = No Sampled Collected
*Note that chloroform was detected in the pump blank samples and detections in well samples may be due to cross-contamination.

Suffolk County Department of Health
Detected Analytes - 2015 Off-Site Groundwater Data Sand Land, Noyack

Well Information			Standard Inorganics						Rads (pCi/l)		VOCs (ppb)			Herb Mets (ppb)					
Well ID	Screen Interval (ft) (depth below grade)	Sample Date	Chloride (ppm)	Nitrate (ppm)	Sulfate (ppm)	Total Alkalinity mg CaCO3/L	Perchlorate (ppb)	MBAS (ppb)	Gross Alpha	Gross Beta	Toluene	Chloroform*	Methylmethacrylate	Bisphenol A	Diethyltoluamide (DEET)	Metalaxyl	Alachlor OA	Caffeine	Didealkylatrazine
DEC TOGS 1.1.1 Guidance Values			-	-	-	-	-	-	-	-		-		-	-	-	-	-	-
DEC Part 703 Class GA Groundwater Standards			250	10	250	-	-	500	-	1,000	5	7		-	-	-	-	-	-
DOH Drinking Water Standards Subpart 5-1			250	10	250	-	18	-	15	50**		80		50	50	50	50	50	50
SL-7	160-165	11/23/2015	8	<0.5	10	NS	NA	<0.1	<1	2.0±0.1	<0.5	1.6	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	170-175	11/23/2015	<12	<2	<20	NS	NA	<0.1	<1	1.6±0.1	<0.5	1.7	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	180-185	11/19/2015	8	<0.5	12	NS	NA	<0.1	<1	1.5±0.1	<0.5	1.6	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	190-195	11/18/2015	8	<0.5	12	NS	NA	<0.1	<1	1.5±0.1	<0.5	0.8	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	200-205	11/18/2015	8	<0.5	11	NS	NA	<0.1	<1	1.5±0.1	<0.5	1.4	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
SL-8	110-115	11/17/2015	<30.0	<5.0	<50.0	NS	<0.2	<0.1	<1	2.1±0.1	<0.5	1.7	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	120-125	11/16/2015	<30.0	<5.0	<50.0	NS	NA	<0.1	<1	2.1±0.1	<0.5	3	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	130-135	11/16/2015	<30.0	<5.0	<50.0	NS	<0.2	<0.1	<1	1.7±0.1	<0.5	3.3	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	140-145	11/12/2015	31	<5.0	<50.0	NS	<0.2	NS	<1	1.5±0.1	<0.5	4.5	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	150-155	11/9/2015	30	<5.0	<50.0	NS	<0.2	<0.1	<1	1.6±0.1	<0.5	3.8	<0.5	<0.2	Trace	<0.2	<0.4	<0.2	<0.8
	160-165	11/5/2015	30	<5.0	<50.0	NS	<0.2	<0.1	<1	2.6±0.1	<0.5	2.2	<0.5	<0.2	Trace	<0.2	<0.4	<0.2	<0.8
	170-175	11/4/2015	<30.0	<5.0	<50.0	NS	<0.2	<0.1	5.2±0.2	6.1±0.2	<0.5	<0.5	<0.5	Trace	0.3	<0.2	<0.4	Trace	<0.8
SL-9	190-195	12/7/2015	11	<0.5	6	NS	NS	<0.1	<1	<1	<0.5	2.5	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	200-205	12/7/2015	11	<0.5	6	NS	NS	<0.1	<1	<1	<0.5	2.8	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	210-215	12/7/2015	10	<0.5	7	NS	NS	<0.1	<1	<1	<0.5	2.5	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	220-225	12/7/2015	9	0.5	7	NS	NS	<0.1	<1	<1	<0.5	0.8	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
SL-10	180-185	12/3/2015	15	2.1	14	NS	NS	<0.1	<1	1.1±0.1	<0.5	1.8	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	190-195	12/3/2015	14	1.9	15	NS	NS	<0.1	<1	1.4±0.1	<0.5	1.7	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
	200-205	12/3/2015	14	1.7	14	NS	NS	<0.1	<1	1.4±0.1	<0.5	1.6	<0.5	<0.2	<0.2	<0.2	<0.4	<0.2	<0.8
TW-1	239-242	12/8/2015	10	<0.5	6	NS	NS	<0.1	<1	<1	9.3	1.7	0.5	Trace	<0.2	<0.2	<0.4	<0.2	<0.8
TW-3	239 - 242	7/7/2015	8.2	<0.5	8.2	NS	NS	<0.1	<1	<1	<0.5	2.3	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
BW-1	216 - 231	7/14/2015	9.7	0.7	8.2	NS	NS	<0.1	NS	NS	<0.5	0.5	<0.5	<0.5	<0.2	<0.2	Trace	<0.2	<0.8
PR-1	210 - 215	8/31/2015	38	0.6	10	NS	<0.2	<0.1	<1	1.1±0.1	<0.5	0.5	<0.5	<0.5	<0.2	<0.2	<0.4	<0.2	<0.8
	220 - 225	8/31/2015	28	2.2	12	NS	<0.2	<0.1	<1	1±0.1	<0.5	2	<0.5	0.6	<0.2	Trace	<0.4	<0.2	<0.8

Indicates concentraton exceeds a standard
NA = Not Analyzed NS = No Sampled Collected
*Note that chloroform was detected in the pump blank samples and detections in well samples may be due to cross-contamination.

APPENDIX

E

Analytical Results
Surface Water Sample Collected on May 8, 2015

Sandland/Wainscott Sand & Gravel
585 Middle Line Highway,Noyack, NY
Sample ID: SL-1

Sample Description: Surface Water Pond, N/E Property Corner
Sample Date: 5/8/2015
Sample Collector: NYSDEC Personnel

Notes: No water quality standards have been established by the New York State Department of Environmental Conservation (NYSDEC) for stormwater. NYSDEC Groundwater Effluent Limits (GEL) established for analytes tested are indicated for comparison purposes only. GELs not shown have not been established. '*' symbol means concentrations reported exceed the Groundwater Effluent Limit (GEL). '<' symbol means "less than" indicating no detection. mg/L = milligrams per liter; ug/L = micrograms per liter.

		Result	GEL				Result	GEL	
===== Results for Sample Group: ALDICARB PESTICIDES analyzed by Suffolk County Department of Health Services =====									
Aldicarb	<	0.5	0.35	ug/L	Carbaryl	<	0.5	29.00	ug/L
Aldicarb-Sulfoxide	<	0.5	4.00	ug/L	1-Naphthol	<	0.5		ug/L
Aldicarb-Sulfone	<	0.5	2.00	ug/L	Methomyl	<	0.5	0.35	ug/L
Carbofuran	<	0.5	15.00	ug/L	Propoxur (Baygon)	<	0.5		ug/L
3-Hydroxycarbofuran	<	0.5		ug/L	Methiocarb	<	0.5		ug/L
Oxamyl	<	0.5	50.00	ug/L	Methiocarb sulfone	<	0.5		ug/L
===== Results for Sample Group: CHLORINATED PESTICIDES analyzed by Suffolk County Department of Health Services =====									
alpha-BHC	<	0.2		ug/L	4,4-DDD	<	0.2	0.30	ug/L
beta-BHC	<	0.2		ug/L	4,4-DDT	<	0.2	0.20	ug/L
gamma-BHC (Lindane)	<	0.02		ug/L	Endrin	<	0.01		ug/L
delta-BHC	<	0.2		ug/L	**Chlordane**		**0.38***	0.05	ug/L
Heptachlor	<	0.04	0.04	ug/L	Alachlor	<	0.2	0.50	ug/L
Heptachlor epoxide	<	0.02	0.03	ug/L	Methoxychlor	<	0.1	35.00	ug/L
Aldrin	<	0.2		ug/L	Endosulfan II	<	0.2		ug/L
Dieldrin	<	0.2	0.004	ug/L	Endosulfan Sulfate	<	0.2		ug/L
Endosulfan I	<	0.2		ug/L	1,2-dibromoethane	<	0.01		ug/L
Dacthal	<	0.2		ug/L	1,2-dibromo-3-chloropropane	<	0.02	0.04	ug/L
4,4-DDE	<	0.2	0.20	ug/L					
===== Results for Sample Group: DACTHAL PESTICIDES analyzed by Suffolk County Department of Health Services =====									
Monomethyltetrachloroterephthalate	<	5.		ug/L	Tetrachloroterephthalic acid	<	5.	50.00	ug/L
.									
===== Results for Sample Group: HERBICIDE METABOLITES analyzed by Suffolk County Department of Health Services =====									
Didealkylatrazine (G-28273)	<	0.8		ug/L	**Dichlorvos**		**Trace**		ug/L
Deisopropylatrazine (G-28279)	<	0.2		ug/L	Propamocarb hydrochloride	<	0.3		ug/L
Desethylatrazine (G-30033)	<	0.4		ug/L	2,6-Dichlorobenzamide	<	0.5		ug/L
Imidacloprid	<	0.2		ug/L	Ibuprofen	<	0.2		ug/L
Imidacloprid Urea	<	0.2		ug/L	Gemfibrozil	<	0.4		ug/L
Alachlor OA (Oxanilic Acid)	<	0.4		ug/L	Metalaxyl	<	0.2		ug/L
Alachlor ESA (Sulfonic Acid)	<	0.2		ug/L	Metolachlor	<	0.2		ug/L
Metolachlor metabolite (CGA-37735)	<	0.2		ug/L	Tebuthiuron	<	0.3	50.00	ug/L
Metolachlor OA (CGA-51202)	<	0.3		ug/L	**Caffeine**		**Trace**		ug/L
Metolachlor ESA (CGA-354743)	<	0.3		ug/L	Dinoseb	<	0.3	2.00	ug/L
Metolachlor metabolite (CGA-41638)	<	0.3		ug/L	Bisphenol A	<	0.2		ug/L
Metolachlor metabolite (CGA-40172)	<	0.3		ug/L	Diuron	<	0.2		ug/L
Metolachlor metabolite (CGA-67125)	<	0.3		ug/L	Phenytoin (Dilantin)	<	0.2		ug/L
2-HydroxyAtrazine (G-34048)		**Trace**		ug/L	4-Hydroxyphenytoin	<	0.5		ug/L
Malaoxon	<	0.2		ug/L	**Diethyltoluamide (DEET)**		**0.9**		ug/L
Trichlorfon	<	0.3		ug/L	**Acetaminophen**		**Trace**		ug/L
Siduron	<	0.3		ug/L	Bisphenol B	<	0.2 ug/L		
Estrone	<	0.2		ug/L	17 alpha Ethnylestradiol	<	0.5 ug/L		
Diethylstilbestrol	<	0.5		ug/L	17 beta Estradiol	<	0.5 ug/L		
4-Androstene-3,17-dione	<	0.2		ug/L	Picaridin	<	0.2 ug/L		
===== Results for Sample Group: METALS analyzed by Suffolk County Department of Health Services =====									
Silver (Ag)		**2.5**	100.00	ug/L	**Antimony (Sb)**		**0.4**	6.00	ug/L
Aluminum (Al)		**3112.***	2000.00	ug/L	Selenium (Se)	<	1.	20.00	ug/L
Arsenic (As)		**13.**	50.00	ug/L	**Strontium**		**110.**		ug/L
Barium (Ba)		**938.**	2000.00	ug/L	Tellurium	<	0.5		ug/L
Beryllium (Be)	<	0.2	3.00	ug/L	Thallium (Tl)	<	0.2	0.50	ug/L
Cadmium (Cd)	<	1.	10.00	ug/L	Thorium (Th)	<	2.		ug/L
Cobalt (Co)		**2.**		ug/L	Tin	<	0.5		ug/L
Chromium (Cr)		**4.**	100.00	**ug/L**	**Titanium (Ti)**		**129.**		ug/L
Copper (Cu)		**14.**	1000.00	**ug/L**	**Uranium**		**1.5**		ug/L
Germanium		**0.6**		**ug/L**	**Vanadium (V)**		**7.**		ug/L
Mercury (Hg)	<	0.3	1.40	ug/L	**Zinc (Zn)**		**278.**	5000.00	ug/L
Manganese (Mn)		**1.2***	0.60	mg/L	**Iron (Fe)**		**2.43***	0.60	mg/L
Molybdenum (Mo)		**3.**		ug/L	**Sodium (Na)**		**10.7**		mg/L
Nickel (Ni)		**6.5**	200.00	ug/L	**Potassium**		**32.5**		mg/L
Lead (Pb)		**8.**	50.00	ug/L	**Calcium**		**28.2**		mg/L
Lithium		**1**		ug/L	**Magnesium**		**8.8**	35.0	mg/L
===== Results for Sample Group: 1,4-Dioxane analyzed by Suffolk County Department of Health Services =====									
1,4-Dioxane	<	0.2		ug/L					
===== Results for Sample Group: RADIOLOGICAL analyzed by Suffolk County Department of Health Services =====									
Gross alpha		**16.**		pCi/L	Tritium	<	200.	20000	pCi/L
Gross beta		**43.2**		pCi/L					

Sandland/Wainscott Sand & Gravel
585 Middle Line Highway,Noyack, NY
Sample ID: SL-1

Sample Description: Surface Water Pond, N/E Property Corner
Sample Date: 5/8/2015
Sample Collector: NYSDEC Personnel

Notes: No water quality standards have been established by the New York State Department of Environmental Conservation (NYSDEC) for stormwater. NYSDEC Groundwater Effluent Limits (GEL) established for analytes tested are indicated for comparison purposes only. GELs not shown have not been established. '*' symbol means concentrations reported exceed the Groundwater Effluent Limit (GEL). '<' symbol means "less than" indicating no detection. mg/L = milligrams per liter; ug/L = micrograms per liter.

RESULTS CONTINUED FROM PRECEDING PAGE

===== Results for Sample Group: STANDARD INORGANICS analyzed by Suffolk County Department of Health Services =====

		Result	GEL	
pH-Field		**6.81**	6.5 - 8.5 su or natural gw	
Specific Conductivity-Field		**353**	um/cm	
Chloride (Cl)		**31.**	500.00	mg/L
Sulfate (SO4)	<	50.	500.00	mg/L
Ammonia (NH3-N)	<	0.5		mg/L
Nitrite (NO2-N)	<	1.0	2.00	mg/L
Nitrate	<	5.0	20.00	mg/L
Bromide	<	5.0	2.0	mg/L
Orthophosphate	<	5.0		mg/L
Fluoride	<	2.0	3.0	mg/L

===== Results for Sample Group: VOLATILE ORGANICS analyzed by Suffolk County Department of Health Services =====

		Result	GEL	
Chlorodifluoromethane	<	0.5	5.00	ug/L
Dichlorodifluoromethane	<	0.5	5.00	ug/L
Chloroethane	<	0.5	5.00	ug/L
Bromomethane	<	0.5	5.00	ug/L
Chloromethane	<	0.5	5.00	ug/L
Trichlorofluoromethane	<	0.5	5.00	ug/L
Vinyl Chloride	<	0.5	2.00	ug/L
Methylene Chloride	<	0.5	5.00	ug/L
1,1 Dichloroethane	<	0.5	5.00	ug/L
trans 1,2 Dichloroethene	<	0.5	5.00	ug/L
Chloroform	<	0.5	7.00	ug/L
1,2 Dichloroethane	<	0.5	0.60	ug/L
1,1,1 Trichloroethane	<	0.5	5.00	ug/L
Carbon Tetrachloride	<	0.5	5.00	ug/L
1-Bromo-2-Chloroethane	<	0.5	5.00	ug/L
1,2 Dichloropropane	<	0.5	1.00	ug/L
Trichloroethene	<	0.5	5.00	ug/L
Chlorodibromomethane	<	0.5	50.00	ug/L
2-Bromo-1-Chloropropane	<	0.5	5.00	ug/L
Bromoform	<	0.5	50.00	ug/L
Tetrachloroethene	<	0.5	5.00	ug/L
cis-1,2-Dichloroethene	<	0.5	5.00	ug/L
Freon 113	<	0.5	5.00	ug/L
Dibromomethane	<	0.5	5.00	ug/L
1,1 Dichloropropene	<	0.5	5.00	ug/L
Methyl Isothiocyanate	<	2.	50.00	ug/L
Carbon Disulfide	<	0.5	60.00	ug/L
Methyl Methacrylate	<	0.5	50.00	ug/L
1,1 Dichloroethene	<	0.5	5.00	ug/L
Bromodichloromethane	<	0.5	50.00	ug/L
2,3 Dichloropropene	<	0.5	5.00	ug/L
cis-1,3-Dichloropropene	<	0.5	5.00	ug/L
trans-1,3-Dichloropropene	<	0.5	5.00	ug/L
1,1,2 Trichloroethane	<	0.5	1.00	ug/L
1,1,1,2 Tetrachloroethane	<	0.5	5.00	ug/L
1,1,2,2-Tetrachloroethane	<	0.5	5.00	ug/L
1,2,3 Trichloropropane	<	0.5	0.04	ug/L
2,2 Dichloropropane	<	0.5	5.00	ug/L
1,3 Dichloropropane	<	0.5	5.00	ug/L
Bromochloromethane	<	0.5	5.00	ug/L
Benzene	<	0.5	1.00	ug/L
Toluene	<	0.5	5.00	ug/L
Chlorobenzene	<	0.5	5.00	ug/L
Ethylbenzene	<	0.5	5.00	ug/L
o-Xylene	<	0.5	5.00	ug/L
m & p-Xylene	<	0.5	5.00	ug/L
Total Xylenes	<	0.5	5.00	ug/L
2-Chlorotoluene	<	0.5	5.00	ug/L
4-Chlorotoluene	<	0.5	5.00	ug/L
Diethyl Ether	<	0.5		ug/L
Acrylonitrile	<	0.5	5.00	ug/L
Ethyl Methacrylate	<	0.5		ug/L
1,3,5 Trimethylbenzene	<	0.5	5.00	ug/L
1,2,4 Trimethylbenzene	<	0.5	5.00	ug/L
1,2 Dichlorobenzene (o)	<	0.5	5.00	ug/L
1,3-Dichlorobenzene (m)	<	0.5	5.00	ug/L
1,4-Dichlorobenzene (p)	<	0.5	5.00	ug/L
p-Diethylbenzene	<	0.5	5.00	ug/L
1,2,4,5 Tetramethylbenzene	<	0.5	5.00	ug/L
1,2,4 Trichlorobenzene	<	0.5	5.00	ug/L
1,2,3 Trichlorobenzene	<	0.5	5.00	ug/L
Ethenylbenzene (Styrene)	<	0.5	5.00	ug/L
Isopropylbenzene	<	0.5	5.00	ug/L
n-Propylbenzene	<	0.5	5.00	ug/L
tert-Butylbenzene	<	0.5	5.00	ug/L
sec-Butylbenzene	<	0.5	5.00	ug/L
p-Isopropyltoluene	<	0.5	5.00	ug/L
n-Butylbenzene	<	0.5	5.00	ug/L
Hexachlorobutadiene	<	0.5	0.50	ug/L
Methyl-Tert-Butyl-Ether (MTBE)	<	0.5	10.00	ug/L
Naphthalene	<	0.5	10.00	ug/L
1,4-Dichlorobutane	<	0.5	5.00	ug/L
Methyl Sulfide		**1.7**		ug/L
Dimethyldisulfide	<	0.5		ug/L
Bromobenzene	<	0.5	5.00	ug/L
2-Butanone (MEK)	<	20.		ug/L
Tetrahydrofuran	<	20.	50.00	ug/L
Allyl chloride	<	0.5	5.00	ug/L
Methacrylonitrile	<	0.5	5.00	ug/L
d-Limonene	<	0.5		ug/L
Propanal	<	15.		ug/L
Isobutane	<	2.		ug/L
n-Butane	<	2.		ug/L

===== Results for Sample Group: CHLORINATED ACIDS analyzed by Suffolk County Department of Health Services =====

		Result	GEL	
Acifluorfen	<	0.1		ug/L
Bentazon	<	0.1		ug/L
Chloramben	<	0.1	50.00	ug/L
2,4-D	<	0.1		ug/L
Dicamba	<	0.1	0.44	ug/L
Dichloroprop	<	0.1		ug/L
Picloram	<	0.1		ug/L
2,4,5-TP (Silvex)	<	0.1		ug/L
2,4-DB	<	0.1		ug/L
3,5-Diclorobenzoic Acid	<	0.1		ug/L
4-Nitrophenol	<	0.1		ug/L
Dinoseb	<	0.1	2.00	ug/L
MCPA	<	0.1		ug/L
MCPP	<	0.1		ug/L
Pentachlorophenol	<	0.1	2.00	ug/L
2,4,5-T	<	0.1		ug/L

Sandland/Wainscott Sand & Gravel
585 Middle Line Highway,Noyack, NY
Sample ID: SL-1

Sample Description: Surface Water Pond, N/E Property Corner
Sample Date: 5/8/2015
Sample Collector: NYSDEC Personnel

Notes: No water quality standards have been established by the New York State Department of Environmental Conservation (NYSDEC) for stormwater. NYSDEC Groundwater Effluent Limits (GEL) established for analytes tested are indicated for comparison purposes only. GELs not shown have not been established. '*' symbol means concentrations reported exceed the Groundwater Effluent Limit (GEL). '<' symbol means "less than" indicating no detection. mg/L = milligrams per liter; ug/L = micrograms per liter.

RESULTS CONTINUED FROM PRECEDING PAGE

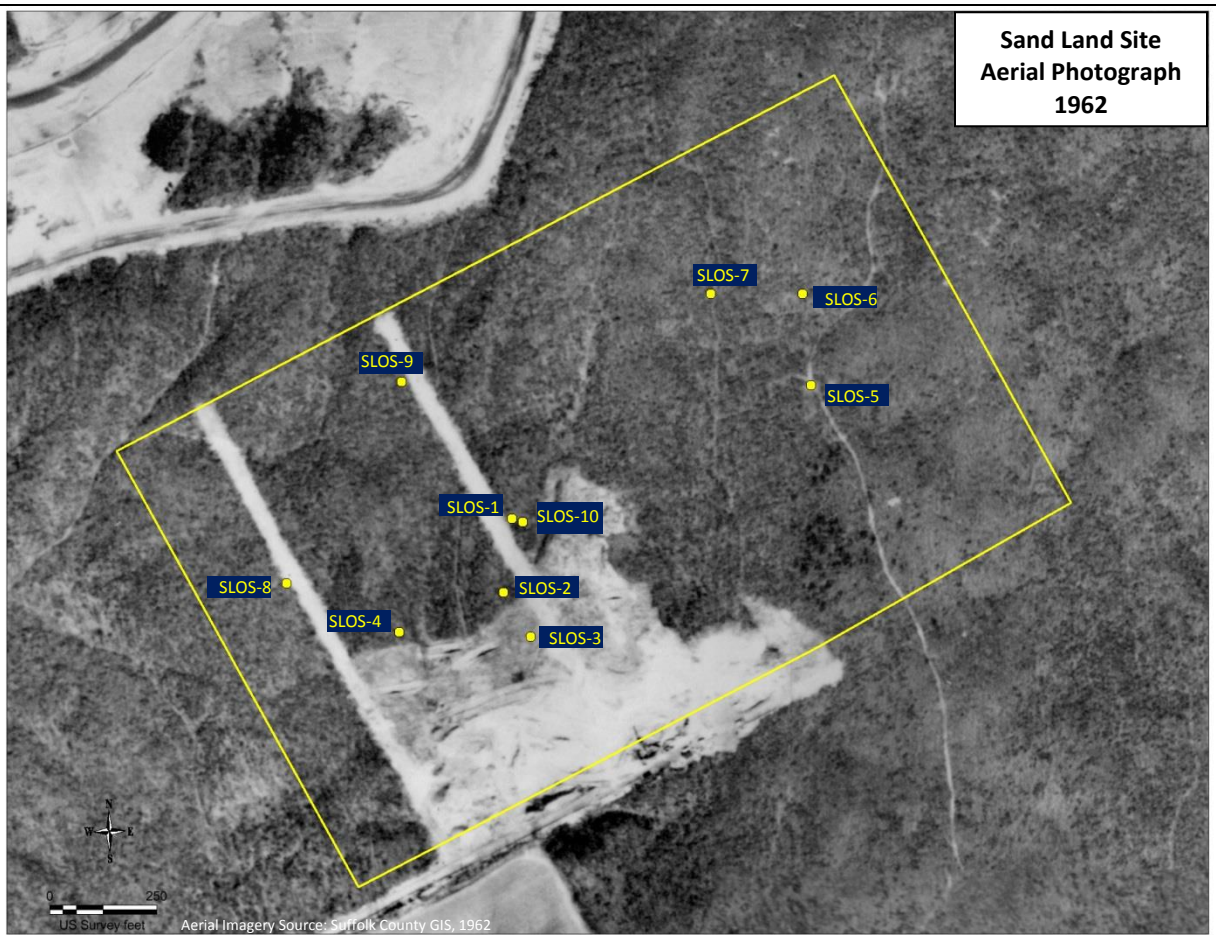
===== Results for Sample Group: SEMI-VOLATILE ORGANICS METHOD 525 analyzed by Suffolk County Department of Health Services =======

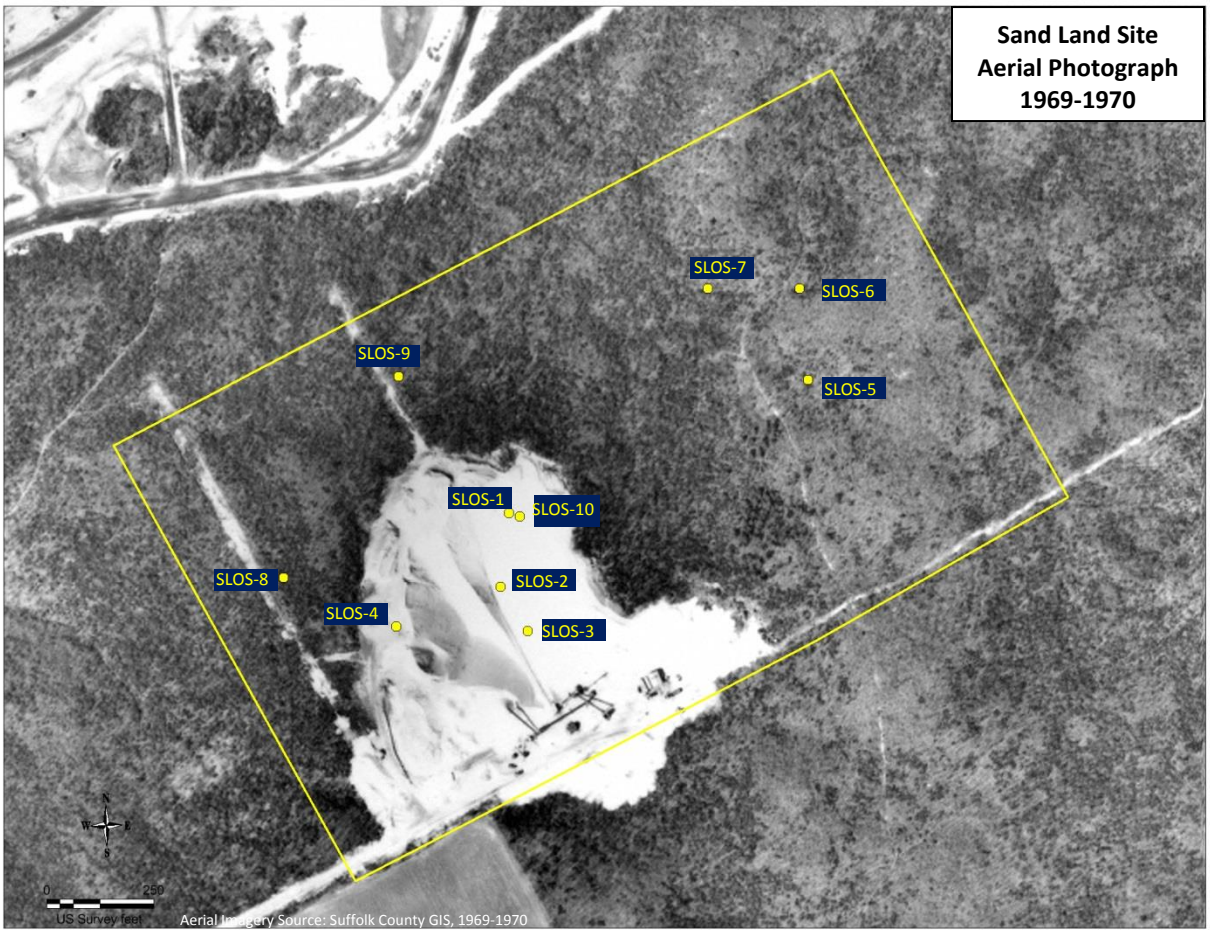
		Result	GEL				Result	GEL	
1-Methylnaphthalene	<	4.		ug/L	Endosulfan Sulfate	<	4.		ug/L
2-Methylnapthalene	<	4.		ug/L	EPTC	<	4.		ug/L
Acenaphthene	<	4.	20.00	ug/L	Ethofumesate	<	4.		ug/L
Acenaphthylene	<	4.		ug/L	Etofenprox	<	10.		ug/L
Acetochlor	<	4.		ug/L	Etofenprox alpha-CO	<	10.		ug/L
Alachlor	<	4.	0.50	ug/L	Ethyl Parathion	<	4.		ug/L
Allethrin	<	4.		ug/L	Fluoranthene	<	4.	50.00	ug/L
Anthracene	<	10.	50.00	ug/L	Fluorene	<	4.	50.00	ug/L
Atrazine	<	2.	7.50	ug/L	Hexachlorobenzene	<	2.	0.04	ug/L
Azoxystrobin	<	4.		ug/L	Hexachlorocyclopentadiene	<	2.	5.00	ug/L
Benfluralin	<	10.		ug/L	Hexachloroethane	<	20.	5.00	ug/L
Benzo(A)Anthracene	<	10.		ug/L	Hexazinone	<	20.	50.00	ug/L
Benzo(B)Fluoranthene	<	4.	0.002	ug/L	Indeno(1,2,3-cd)Pyrene	<	4.	0.002	ug/L
Benzo(GHI)Perylene	<	4.		ug/L	Iodofenphos	<	4.		ug/L
Benzo(K)Fluoranthene	<	4.	0.002	ug/L	Iprodione	<	10.		ug/L
Benzo(A)Pyrene	<	0.4	ND	ug/L	Isofenphos	<	10.		ug/L
Benzophenone	<	3.		ug/L	Kelthane	<	10.		ug/L
Benzyl butyl phthalate	<	4.		ug/L	Malathion	<	10.	7.00	ug/L
Bis(2-ethylhexyl)adipate	<	10.		ug/L	Metalaxyl	<	4.		ug/L
Bis(2-ethylhexyl)phthalate	<	60.	5.00	ug/L	Methoprene	<	4.		ug/L
Bisphenol A	<	10.		ug/L	Methoxychlor	<	2.	35.00	ug/L
Bloc	<	4.		ug/L	Methyl Parathion	<	4.	1.50	ug/L
Bromacil	<	10.	4.4	ug/L	Metolachlor	<	4.		ug/L
Butachlor	<	4.	3.50	ug/L	Metribuzin	<	4.	50.00	ug/L
Carbamazepine	<	10.		ug/L	Naled (Dibrom)	<	4.		ug/L
Carbazole	<	4.		ug/L	Napropamide	<	4.		ug/L
Carisoprodol	<	10.		ug/L	Pendimethalin	<	4.	5.00	ug/L
Chlordane	<	4.	0.05	ug/L	Pentachlorobenzene	<	4.	5.00	ug/L
Chlorofenvinphos	<	4.		ug/L	Pentachloronitrobenzene	<	4.	ND	ug/L
Chlorothalonil	<	20.	5.00	ug/L	Permethrin	<	4.		ug/L
Chloroxylenol	<	4.		ug/L	Phenanthrene	<	4.	50.00	ug/L
Chlorpyriphos	<	4.		ug/L	Piperonyl butoxide	<	10.		ug/L
Chrysene	<	4.	0.002	ug/L	Prallethrin	<	4.		ug/L
Cyfluthrin	<	4.		ug/L	Prometon	<	10.	50.00	ug/L
Cypermethrin	<	10.		ug/L	Prometryne	<	4.		ug/L
Dacthal	<	4.		ug/L	Propachlor	<	4.	35.00	ug/L
Deltamethrin	<	10.		ug/L	Propiconazole (Tilt)	<	4.		ug/L
Dibenzo(A,H)Anthracene	<	4.		ug/L	Pyrene	<	10.	50.00	ug/L
Dibutyl Phthalate	<	20.		ug/L	Resmethrin	<	4.		ug/L
Dichlobenil	<	4.		ug/L	Ronstar	<	4.		ug/L
Dichlorvos	<	10.		ug/L	Simazine	<	2.	0.50	ug/L
Dieldrin	<	4.	0.004	ug/L	Sumithrin	<	4.		ug/L
Diethyl phthalate	<	20.	50.00	ug/L	Tebuthiuron	<	10.	50.00	ug/L
Diethyltoluamide (DEET)	<	4.		ug/L	Terbacil	<	10.	50.00	ug/L
Dimethyl phthalate	<	4.	50.00	ug/L	Triadimefon	<	10.		ug/L
Dioctyl Phthalate	<	4.		ug/L	Triclosan	<	10.		ug/L
Disulfoton	<	10.	50.00	ug/L	Trifluralin	<	10.	35.00	ug/L
Disulfoton sulfone	<	4.	ND	ug/L	Vinclozolin	<	10.		ug/L

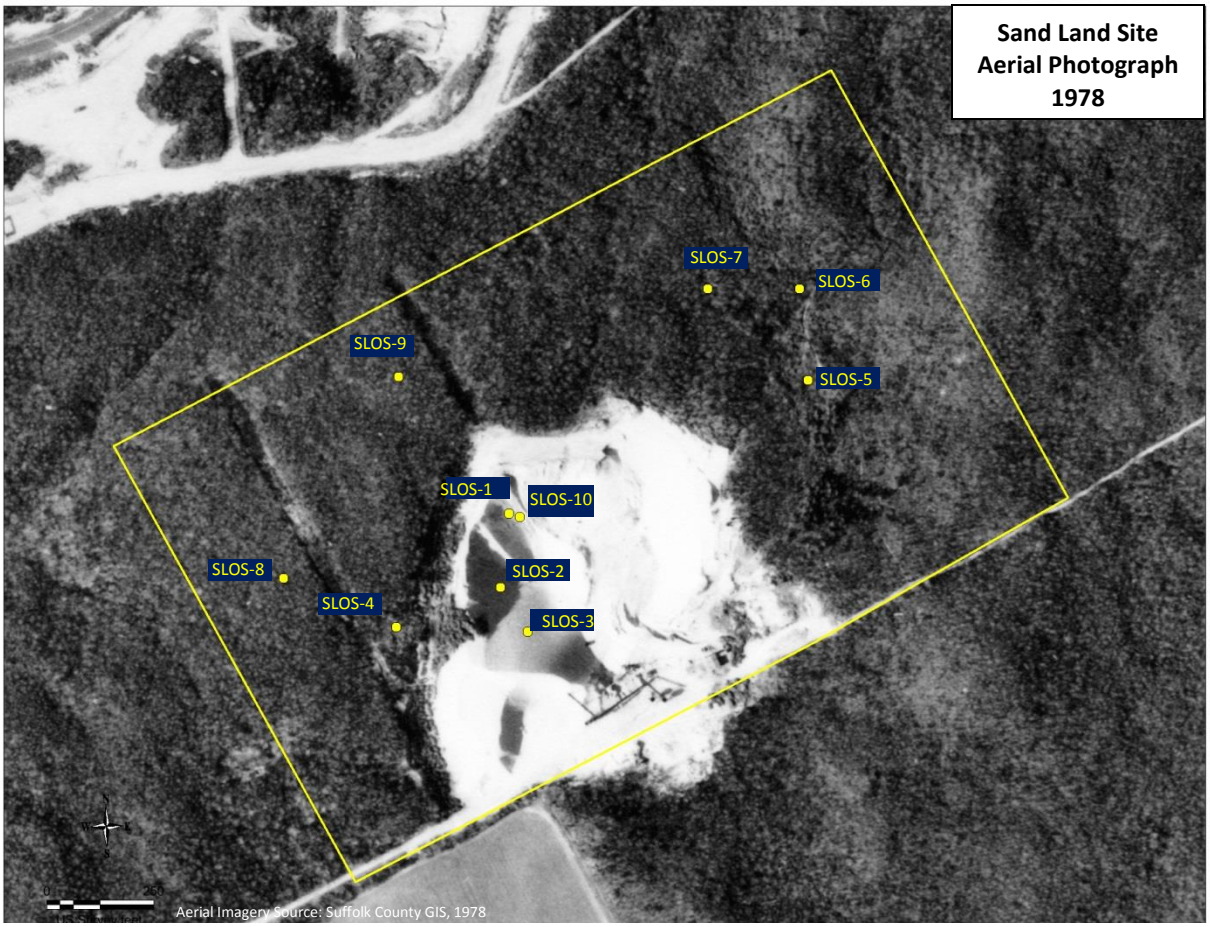
APPENDIX

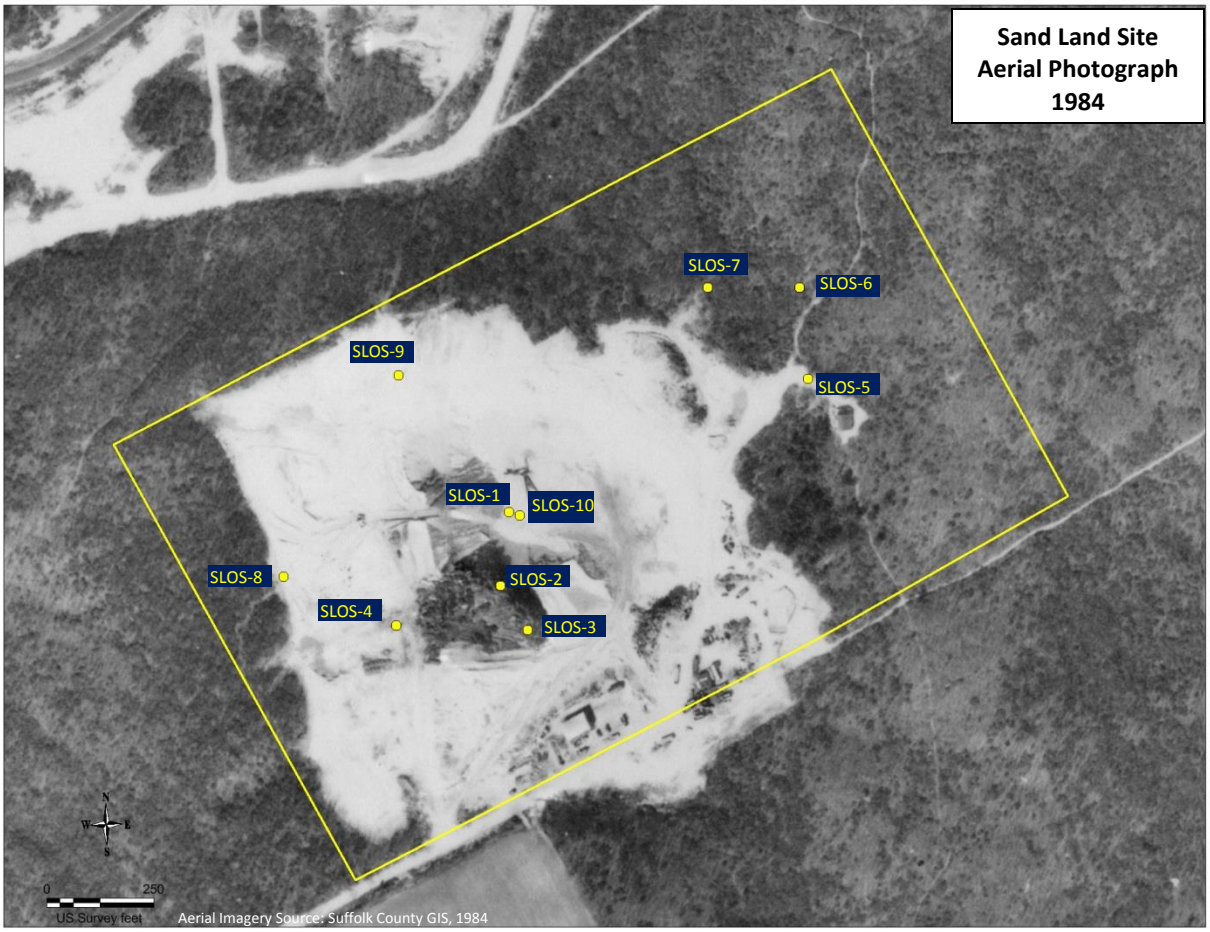
F

Historical Aerial Photographs
Sand Land Site


Sand Land Site
Aerial Photograph
1962
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: Suffolk County GIS, 1962

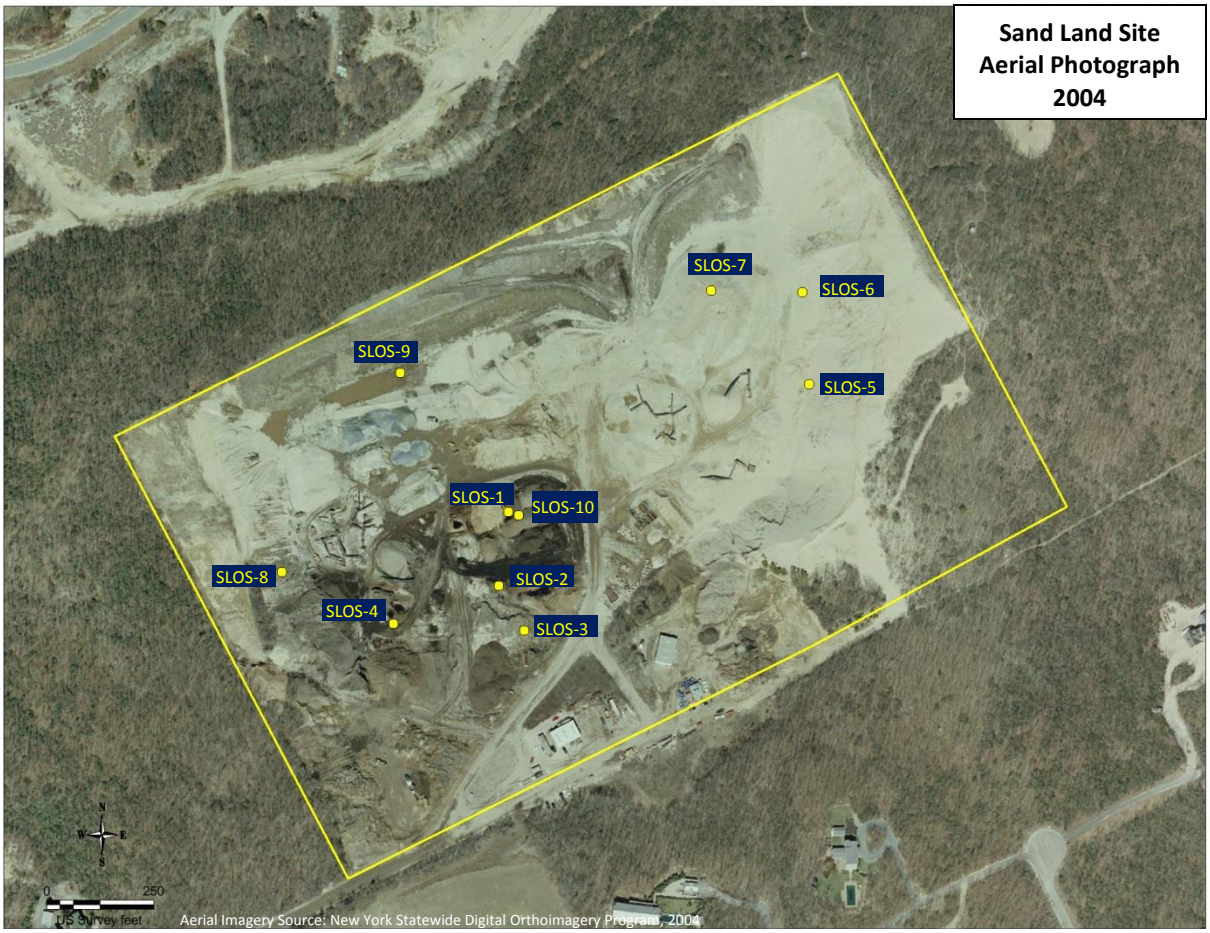

Sand Land Site
Aerial Photograph
1969-1970
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: Suffolk County GIS, 1969-1970


Sand Land Site
Aerial Photograph
1978
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
0
250
Aerial Imagery Source: Suffolk County GIS, 1978


Sand Land Site
Aerial Photograph
1984
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: Suffolk County GIS, 1984


Sand Land Site
Aerial Photograph
1996
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: Suffolk County GIS, 1996


Sand Land Site
Aerial Photograph
2001
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: New York Statewide Digital Orthoimagery Program, 2001


Sand Land Site
Aerial Photograph
2004
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: New York Statewide Digital Orthoimagery Program, 2004


Sand Land Site
Aerial Photograph
2007
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: New York Statewide Digital Orthoimagery Program, 2007


Sand Land Site
Aerial Photograph
2010
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: New York Statewide Digital Orthoimagery Program, 2010


Sand Land Site
Aerial Photograph
2013
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
US Survey feet
Aerial Imagery Source: New York Statewide Digital Orthoimagery Program, 2013


Sand Land Site
Aerial Photograph
2016
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
N
W
E
S
0
250
U.S. Survey feet
Aerial Imagery Source: New York Statewide Digital Orthoimagery Program, 2016


Sand Land Site
Aerial Photograph
2017
SLOS-7
SLOS-6
SLOS-9
SLOS-5
SLOS-1
SLOS-10
SLOS-8
SLOS-2
SLOS-4
SLOS-3
Aerial Imagery Source: Google Earth, 2017

APPENDIX

G

Summary of Detected Analytes
2017 Groundwater Samples

Suffolk County Department of Health Services
Summary of Detected Analytes - Groundwater Samples
Sand Land Investigation - October 2017

Well Information				Field Parameters						Metals																				
Well ID	Screen Interval (Feet Below Grade)	DTW (Feet Below Grade)	Sample Date	Conductivity (uS)	Temp (C)	pH	Dissolved Oxygen (ppm)	Turbidity (ntu)	Oxidation-Reduction Potential	Aluminum (ppb)	Arsenic (ppb)	Barium (ppb)	Chromium (ppb)	Cobalt (ppb)	Copper (ppb)	Lithium (ppb)	Manganese (ppb)	Molybdenum (ppb)	Nickel (ppb)	Strontium (ppb)	Thallium (ppb)	Titanium (ppb)	Uranium (ppb)	Vanadium (ppb)	Zinc (ppb)	Calcium (ppm)	Iron (ppm)	Magnesium (ppm)	Potassium (ppm)	Sodium (ppm)
DEC TOGS 1.1.1 Guidance Values				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	2,000	-	-	35	-	20
DEC Part 703 Class GA Groundwater Standards				-	-	-	-	-	-	-	25	1,000	50	-	200	-	300	-	100	-	-	-	-	-	-	-	0.3	-	-	20
DOH Drinking Water Standards Part 5-1				-	-	-	-	-	-	-	10	2,000	100	-	1,300***	-	300	-	100	-	2	-	30	-	5,000	-	0.3	-	-	-
USEPA Health Advisory Level (HAL) - Combined PFOS & PFOA				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLOS-1	153 - 158	151.3	10/10/2017	269	16.8	5.98	1.45	4.97	NS	207	<1	78	2.2	<1	<5	NA	56	<1	4.2	131	<0.2	11	<0.5	<1	<5	29	0.43	9.1	1.5	9.5
SLOS-1	153 - 158	NA	10/17/2017	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SLOS-1	160 - 165	151.3	10/10/2017	218	17.0	6.06	3.00	0.94	NS	18	<1	50	1.4	<1	<5	1.7	22	<1	2.1	108	<0.2	<1	<0.5	<1	<5	23	<0.1	6.8	1	8.8
SLOS-1	170 - 175	151.3	10/10/2017	302	17.2	5.86	0.45	0.62	NS	9.5	<1	95	8.6	<1	<5	1.5	25	<1	2.1	162	<0.2	<1	<0.5	2.3	<5	32	<0.1	10	1.3	12
SLOS-2	150 - 155	150.43	10/11/2017	854	20.0	6.39	1.02	4.16	118	228	<1	408	1.7	1.7	8.6	NA	457	<1	8.9	365	<0.2	13	2.5	<1	<5	87	0.43	17	82	18
SLOS-2	150 - 155	NA	10/17/2017	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SLOS-2 DUP	150 - 155	NA	10/17/2017	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SLOS-2	160 - 165	150.43	10/11/2017	1,263	18.0	6.16	0.94	3.87	124	268	<1	525	1.5	<1	12	NA	160	<1	5.8	441	<0.2	14	5.3	1.1	<5	99	0.55	26	161	33
SLOS-2	170 - 175	150.43	10/11/2017	610	17.2	5.49	1.67	0.93	154	22	<1	214	9.6	<1	5.6	1.5	21	<1	2.9	220	<0.2	1.1	0.86	2.8	<5	43	<0.1	12	72	15
SLOS-3	157 - 162	154.65	10/10/2017	953	18.9	6.24	3.40	5.04	127	170	<1	314	2.1	<1	<5	NA	23	<1	2.9	481	<0.2	7.6	1.4	<1	<5	101	0.31	25	67	23
SLOS-3	157 - 162	NA	10/16/2017	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SLOS-3 DUP	157 - 162	NA	10/16/2017	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SLOS-3	160 - 165	154.65	10/10/2017	664	20.2	5.97	3.34	1.74	148	83	<1	98	1.6	<1	<5	NA	19	<1	2.6	311	<0.2	4.5	0.66	<1	<5	69	0.18	16	48	15
SLOS-3	170 - 175	154.28	10/9/2017	273	16.3	5.59	4.17	0.02	NS	5.7	<1	87	2.2	<1	<5	<1	8.1	<1	1.4	127	<0.2	<1	<0.5	<1	<5	22	<0.1	9.8	8	10
SLOS-4	145 - 150	142.81	10/11/2017	557	18.0	6.21	1.41	4.92	NS	219	<1	204	1.5	<1	<5	NA	52	<1	3.2	258	<0.2	15	<0.5	<1	<5	53	0.52	14	27	17
SLOS-4	155 - 160	142.81	10/11/2017	729	17.5	6.25	0.55	1.42	NS	19	<1	286	8	<1	<5	1.2	23	<1	2.9	437	<0.2	1.5	<0.5	2.2	<5	71	<0.1	23	14	20
SLOS-4 DUP	155 - 160	142.81	10/11/2017	729	17.5	6.25	0.55	1.42	NS	21	<1	262	5.8	<1	<5	1.1	28	<1	2.8	422	<0.2	1.4	<0.5	1.6	<5	70	<0.1	23	13	21
SLOS-4	165 - 170	142.81	10/11/2017	632	17.2	6.26	1.21	0.69	NS	9.4	<1	358	<1	<1	<5	1.4	10	<1	2.1	385	<0.2	<1	<0.5	<1	<5	60	<0.1	14	28	17
SLOS-5	145 - 150	143	10/12/2017	196	15.2	5.24	0.82	1.25	193	75	<1	62	<1	2.2	<5	NA	152	<1	5	119	<0.2	4	<0.5	<1	<5	22	0.21	5.4	1.2	10
SLOS-5	150 - 155	143	10/12/2017	147	15.7	5.03	1.64	3.22	208	272	<1	46	2.5	1.9	<5	NA	138	<1	4.6	83	<0.2	15	<0.5	<1	<5	16	0.57	4	1.2	9.7
SLOS-5	160 - 165	143	10/12/2017	121	15.8	4.70	2.58	0.33	225	12	<1	32	4.5	<1	<5	<1	43	<1	2	55	<0.2	<1	<0.5	1.1	<5	8.9	<0.1	4	0.99	11
SLOS-5	170 - 175	143	10/12/2017	133	15.5	5.02	4.96	0.01	199	5.2	<1	29	3.6	<1	<5	<1	23	<1	1.4	56	<0.2	<1	<0.5	<1	<5	9.8	<0.1	4.9	0.9	11
SLOS-5 DUP	170 - 175	143	10/12/2017	133	15.5	5.02	4.96	0.01	199	<5	<1	29	3.3	<1	<5	<1	21	<1	1.3	56	<0.2	<1	<0.5	<1	<5	10	<0.1	5.1	0.94	11
SLOS-6	140 - 145	137.02	10/12/2017	98	17.1	6.11	6.22	9.71	NS	608	<1	31	2.5	2.9	<5	NA	269	<1	4.2	40	<0.2	36	<0.5	1.3	<5	6.8	0.97	2.9	2.2	7.4
SLOS-6	150 - 155	137.02	10/12/2017	138	168	5.79	1.78	5	NS	186	<1	46	1.2	8.2	<5	NA	528	<1	4.4	58	<0.2	9.1	<0.5	<1	<5	11	0.34	4.2	3.4	8.7
SLOS-6	160 - 165	137.02	10/12/2017	308	16.7	6.10	0.18	4.58	NS	57	<1	234	3.9	17	<5	1.4	2,040	<1	7.8	124	<0.2	2.8	0.72	1.2	5.5	22	0.13	11	32	11
SLOS-6	170 - 175	137.02	10/12/2017	825	16.2	6.53	0.23	3.61	NS	88	<1	462	<1	37	13	NA	4,450	<1	20	296	0.24	3.9	9.4	<1	6.3	59	0.18	26	86	17

Notes
NS = No Sample Collected
NA = Sample Collected, Analyte Not Reported
"<" = less than, indicating no detection
DUP = duplicate sample for quality control
ppm = parts per million

ppb = parts per billion
ppt = parts per trillion
uS = micro siemens
pCi = picocurie
*** Action Level for public water suppliers for Lead and Copper

*AGB = gross beta - 0.82*potassium conc. in mg/l
**AGB has a guidance activity value of 50 pCi/l that is used for screening under Subpart 5-1 of the NYS Sanitary Code
indicates concentration exceeds a standard or guidance value

Suffolk County Department of Health Services
Summary of Detected Analytes - Groundwater Samples
Sand Land Investigation - October 2017

Well Information				Radiologicals (pCi/l)			Standard Inorganics (ppm)							VOCs (ppb)	1,4 Dioxane (ppb)	Herbicide Metabolites LC/MS/MS (ppb)						Perfluoroalkyl Substances (ppt)			
Well ID	Screen Interval (Feet Below Grade)	DTW (Feet Below Grade)	Sample Date	Gross Alpha	Gross Beta	Adjusted Gross Beta* (AGB)	Chloride	Nitrate	Nitrite mg/l N	Sulfate	Ammonia	Bromide	Chlorate	Chloroform	1,4-Dioxane	Acetaminophen	Bisphenol A	Metolachlor Metabolite CGA-67125	Dichlorvos	Equilin	Didealkyatrazine	Perfluorobutanesulfonic acid (PFBS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)
DEC TOGS 1.1.1 Guidance Values				-	-	-	-	-	1	-	-	2	-	-		-	-	-	-	-	-	-	-	-	-
DEC Part 703 Class GA Groundwater Standards				-	1,000	-	250	10	1	250	2	-	-	7		-			-		-	-	-	-	-
DOH Drinking Water Standards Part 5-1				15	-	50**	250	10	1	250	-	-	-	80	50	50	50	50	50	50	50	50,000	50,000	50,000	50,000
USEPA Health Advisory Level (HAL) - Combined PFOS & PFOA				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70
SLOS-1	153 - 158	151.3	10/10/2017	<1	1.3 ± 0.1	<1	16	0.45	<0.05	15	<0.5	0.09	<0.05	0.7	<0.1	<0.2	<0.2	<0.3	Trace	<0.7	<0.8	NS	NS	NS	NS
SLOS-1	153 - 158	NA	10/17/2017	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<1.77	<1.89	<2.00	<2.00
SLOS-1	160 - 165	151.3	10/10/2017	<1	1.4 ± 0.1	<1	16	0.19	<0.05	7.9	<0.5	0.07	<0.05	1	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-1	170 - 175	151.3	10/10/2017	<1	1.7 ± 0.1	<1	16	0.39	<0.05	15	<0.5	0.13	<0.05	0.6	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-2	150 - 155	150.43	10/11/2017	<1	75 ± 1.4	7.8	56	11	<0.1	27	<0.5	0.16	<0.1	<0.5	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-2	150 - 155	NA	10/17/2017	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	4.04	3.58	3.12	8.5
SLOS-2 DUP	150 - 155	NA	10/17/2017	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	5.07	3.16	3.33	8.32
SLOS-2	160 - 165	150.43	10/11/2017	8.3 ± 0.7	126 ± 2.5	<1	114	20	<0.15	32	<0.5	0.28	<0.15	<0.5	<0.1	<0.2	<0.2	Trace	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-2	170 - 175	150.43	10/11/2017	5.5 ± 0.4	69 ± 1.4	10	44	5.8	<0.05	21	<0.5	0.15	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-3	157 - 162	154.65	10/10/2017	4.4 ± 0.4	66 ± 1.3	11	72	15	<0.05	59	<0.5	0.26	<0.05	<0.5	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-3	157 - 162	NA	10/16/2017	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6.11	7.34	2.52	3.11
SLOS-3 DUP	157 - 162	NA	10/16/2017	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	5.23	7.16	2.65	3.32
SLOS-3	160 - 165	154.65	10/10/2017	<1	47 ± 0.9	7.6	40	8.9	<0.05	41	<0.5	0.16	<0.05	NA	<0.1	<0.2	Trace	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-3	170 - 175	154.28	10/9/2017	<1	8.2 ± 0.2	1.6	17	2.5	<0.05	22	<0.5	0.11	<0.05	0.8	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-4	145 - 150	142.81	10/11/2017	3.6 ± 0.3	27 ± 0.6	4.9	42	7.4	<0.05	23	<0.5	0.16	<0.05	NA	<0.1	<0.2	<0.2	Trace	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-4	155 - 160	142.81	10/11/2017	2.9 ± 0.2	19 ± 0.4	7.5	59	12	<0.1	27	<0.5	0.22	<0.1	<0.5	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-4 DUP	155 - 160	142.81	10/11/2017	4.2 ± 0.3	18 ± 0.4	7.3	59	12	<0.1	27	<0.5	0.22	<0.1	<0.5	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-4	165 - 170	142.81	10/11/2017	5.1 ± 0.3	33 ± 0.7	10	44	8.9	<0.05	25	<0.5	0.16	<0.05	<0.5	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-5	145 - 150	143	10/12/2017	<1	2 ± 0.1	1	14	0.35	<0.05	5.2	<0.5	<0.05	<0.05	<0.5	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-5	150 - 155	143	10/12/2017	<1	1.3 ± 0.1	<1	10	<0.1	<0.05	5.8	<0.5	<0.05	<0.05	NA	<0.1	<0.2	Trace	<0.3	<0.6	<0.7	Trace	NS	NS	NS	NS
SLOS-5	160 - 165	143	10/12/2017	<1	1 ± 0.1	<1	9.7	<0.1	<0.05	6.4	<0.5	<0.05	<0.05	NA	<0.1	<0.2	<0.2	<0.3	Trace	0.9	<0.8	NS	NS	NS	NS
SLOS-5	170 - 175	143	10/12/2017	<1	1.1 ± 0.1	<1	10	0.26	<0.05	5.3	<0.5	<0.05	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	0.9	<0.8	NS	NS	NS	NS
SLOS-5 DUP	170 - 175	143	10/12/2017	<1	<1	-	10	0.25	<0.05	5.3	<0.5	<0.05	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-6	140 - 145	137.02	10/12/2017	<1	2.6 ± 0.1	<1	7.7	0.12	<0.05	6.2	<0.5	<0.05	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-6	150 - 155	137.02	10/12/2017	<1	3.8 ± 0.2	1	9.7	0.24	<0.05	5.4	<0.5	<0.05	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-6	160 - 165	137.02	10/12/2017	<1	25 ± 0.7	<1	15	0.24	<0.05	5.2	1	0.08	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-6	170 - 175	137.02	10/12/2017	7.6 ± 0.6	87 ± 1.7	17	30	<1	<0.5	<30	3.1	<0.5	<0.5	NA	<0.1	<0.2	<0.2	<0.3	Trace	<0.7	<0.8	NS	NS	NS	NS

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NA = Sample Collected, Analyte Not Reported
"<" = less than, indicating no detection
DUP = duplicate sample for quality control
ppm = parts per million

ppb = parts per billion
ppt = parts per trillion
uS = micro siemens
pCi = picocurie
*** Action Level for public water suppliers for Lead and Copper

*AGB = gross beta - 0.82*potassium conc. in mg/l
**AGB has a guidance activity value of 50 pCi/l that is used for screening under Subpart 5-1 of the NYS Sanitary Code
indicates concentration exceeds a standard or guidance value

Suffolk County Department of Health Services
Summary of Detected Analytes - Groundwater Samples
Sand Land Investigation - October 2017

Well Information				Field Parameters						Metals																				
Well ID	Screen Interval (Feet Below Grade)	DTW (Feet Below Grade)	Sample Date	Conductivity (uS)	Temp (C)	pH	Dissolved Oxygen (ppm)	Turbidity (ntu)	Oxidation-Reduction Potential	Aluminum (ppb)	Arsenic (ppb)	Barium (ppb)	Chromium (ppb)	Cobalt (ppb)	Copper (ppb)	Lithium (ppb)	Manganese (ppb)	Molybdenum (ppb)	Nickel (ppb)	Strontium (ppb)	Thallium (ppb)	Titanium (ppb)	Uranium (ppb)	Vanadium (ppb)	Zinc (ppb)	Calcium (ppm)	Iron (ppm)	Magnesium (ppm)	Potassium (ppm)	Sodium (ppm)
DEC TOGS 1.1.1 Guidance Values				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	2,000	-	-	35	-	20
DEC Part 703 Class GA Groundwater Standards				-	-	-	-	-	-	-	25	1,000	50	-	200	-	300	-	100	-	-	-	-	-	-	-	0.3	-	-	20
DOH Drinking Water Standards Part 5-1				-	-	-	-	-	-	-	10	2,000	100	-	1,300***	-	300	-	100	-	2	-	30	-	5,000	-	0.3	-	-	-
USEPA Health Advisory Level (HAL) - Combined PFOS & PFOA				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLOS-7	140 - 145	139.39	10/16/2017	1,051	21.6	6.08	1.02	5.82	-47	106	2	747	4.4	107	<5	NA	26,211	1.5	36	474	0.53	4.1	18	<1	7.2	124	50	33	23	14
SLOS-7	140 - 145	NA	10/17/2017	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SLOS-7	145 - 150	139.39	10/16/2017	202	16.4	5.81	0.85	6.08	12	217	<1	169	<1	37	<5	NA	4,020	<1	6.6	50	0.32	9.6	<0.5	<1	<5	16	11	3.8	10	5.6
SLOS-7	155 - 160	139.39	10/16/2017	516	15.8	5.59	1.74	2.98	0	92	<1	475	<1	53	<5	NA	5,214	<1	12	118	0.51	3.8	0.9	<1	8.3	37	62	8.9	15	8.1
SLOS-7	165 - 170	139.39	10/16/2017	497	15.8	5.56	1.37	4.33	10	114	1.1	500	<1	53	<5	NA	4,480	<1	15	112	0.38	6.4	1.6	<1	12	34	62	8.5	17	7.9
SLOS-8	145 - 150	143.35	10/17/2017	360	18.2	6.34	2.70	7.6	NA	343	<1	203	1.8	1.3	<5	<1	169	<1	5	157	0.2	25	<0.5	1	<5	32	0.58	8.2	29	9.8
SLOS-8	150 - 155	143.35	10/17/2017	426	18.0	6.24	1.73	6.11	NA	370	<1	220	1.8	1.1	<5	<1	108	<1	3.7	201	<0.2	27	<0.5	1	<5	40	0.63	9.3	23	13
SLOS-8	160 - 165	143.35	10/17/2017	514	18.1	6.24	1.10	6.37	NA	259	<1	290	1.6	<1	<5	<1	54	<1	2.8	245	<0.2	17	<0.5	<1	<5	51	0.47	11	25	16
SLOS-8	170 - 175	143.35	10/17/2017	383	17.8	6.30	1.25	2.71	NA	40	<1	197	2.4	<1	<5	1.1	17	<1	1.3	184	<0.2	3.6	<0.5	<1	<5	33	<0.1	7.1	33	13
SLOS-9	150 - 155	149.87	10/16/2017	568	19.2	6.30	0.20	14.6	NA	628	<1	148	1.6	23	5.1	NA	7,969	<1	20	296	<0.2	36	0.89	2	6.3	57	1.4	27	5.8	12
SLOS-9	160 - 165	149.87	10/16/2017	471	18.6	6.30	0.25	9.9	NA	630	<1	201	1.6	37	5.2	NA	6,826	<1	8.8	242	<0.2	37	0.74	1.9	7.3	48	8.9	16	9.1	9.7
SLOS-9	170 - 175	149.87	10/16/2017	458	17.6	6.22	0.43	4.97	NA	219	<1	208	<1	7.8	<5	NA	15,291	<1	14	238	<0.2	14	<0.5	<1	<5	43	0.58	14	13	10
SLOS-10	185 - 190	151.4	10/16/2017	343	18.6	5.99	0.45	0.96	NA	10	<1	90	5.1	<1	<5	1.2	56	<1	3.1	233	<0.2	<1	<0.5	1.3	34	40	<0.1	11	1.5	12
PR-1	210 - 215	209.81	10/23/2017	323	17.6	5.08	4.22	5.21	269	237	<1	85	4.6	<1	<5	<1	31	<1	4.2	117	0.2	12	<0.5	<1	<5	10	0.42	7.4	1.9	37
SL-3	210 - 215	204.12	10/23/2017	188	19.5	5.82	1.48	9.92	NA	419	<1	65	4.7	<1	<5	<1	51	<1	5.7	79	<0.2	19	<0.5	<1	5.7	11	0.77	4.2	2.5	15

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*AGB = gross beta - 0.82*potassium conc. in mg/l
**AGB has a guidance activity value of 50 pCi/l that is used for screening under Subpart 5-1 of the NYS Sanitary Code
indicates concentration exceeds a standard or guidance value

Suffolk County Department of Health Services
Summary of Detected Analytes - Groundwater Samples
Sand Land Investigation - October 2017

Well Information				Radiologicals (pCi/l)			Standard Inorganics (ppm)							VOCs (ppb)	1,4 Dioxane (ppb)	Herbicide Metabolites LC/MS/MS (ppb)						Perfluoroalkyl Substances (ppt)			
Well ID	Screen Interval (Feet Below Grade)	DTW (Feet Below Grade)	Sample Date	Gross Alpha	Gross Beta	Adjusted Gross Beta* (AGB)	Chloride	Nitrate	Nitrite mg/l N	Sulfate	Ammonia	Bromide	Chlorate	Chloroform	1,4-Dioxane	Acetaminophen	Bisphenol A	Metolachlor Metabolite CGA-67125	Dichlorvos	Equilin	Didealkyatrazine	Perfluorobutanesulfonic acid (PFBS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)
DEC TOGS 1.1.1 Guidance Values				-	-	-	-	-	1	-	-	2	-	-		-	-	-	-	-	-	-	-	-	-
DEC Part 703 Class GA Groundwater Standards				-	1,000	-	250	10	1	250	2	-	-	7		-			-		-	-	-	-	-
DOH Drinking Water Standards Part 5-1				15	-	50**	250	10	1	250	-	-	-	80	50	50	50	50	50	50	50	50,000	50,000	50,000	50,000
USEPA Health Advisory Level (HAL) - Combined PFOS & PFOA				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70
SLOS-7	140 - 145	139.39	10/16/2017	22 ± 1.1	34 ± 0.7	15	<75	<2.5	<1.3	<75	1.4	<1.3	<1.3	<0.5	<0.1	Trace	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-7	140 - 145	NA	10/17/2017	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3.13	<1.89	5.06	3.19
SLOS-7	145 - 150	139.39	10/16/2017	<1	11 ± 0.4	2.8	<30	<1	<0.5	<30	0.74	<0.5	<0.5	NA	<0.1	<0.2	<0.2	Trace	Trace	<0.7	<0.8	NS	NS	NS	NS
SLOS-7	155 - 160	139.39	10/16/2017	5.8 ± 0.4	17 ± 0.4	4.7	<75	<2.5	<1.3	<75	0.77	<1.3	<1.3	NA	<0.1	Trace	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-7	165 - 170	139.39	10/16/2017	6.4 ± 0.4	19 ± 0.5	5.1	<75	<2.5	<1.3	<75	0.86	<1.3	<1.3	<0.5	<0.1	Trace	<0.2	Trace	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-8	145 - 150	143.35	10/17/2017	<1	27 ± 0.5	3.2	19	2.4	<0.05	13	<0.5	0.08	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-8	150 - 155	143.35	10/17/2017	1.6 ± 0.2	21 ± 0.4	2.1	29	4.1	<0.05	16	<0.5	0.11	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-8	160 - 165	143.35	10/17/2017	<1	28 ± 0.8	7.5	42	6.2	<0.05	19	<0.5	0.15	<0.05	NA	<0.1	<0.2	Trace	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-8	170 - 175	143.35	10/17/2017	<1	25 ± 0.5	<1	32	2.7	<0.05	20	<0.5	0.21	<0.05	NA	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-9	150 - 155	149.87	10/16/2017	2.1 ± 0.2	6.6 ± 0.2	1.8	18	<0.1	<0.05	14	<0.5	0.16	<0.05	<0.5	<0.1	<0.2	<0.2	<0.3	0.7	<0.7	<0.8	NS	NS	NS	NS
SLOS-9	160 - 165	149.87	10/16/2017	4.3 ± 0.3	11 ± 0.3	3.5	<30	<1	<0.5	<30	0.83	<0.5	<0.5	<0.5	<0.1	<0.2	Trace	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-9	170 - 175	149.87	10/16/2017	3.6 ± 0.3	14 ± 0.4	3.3	15	<0.1	<0.05	13	1.1	0.14	<0.05	<0.5	<0.1	<0.2	<0.2	Trace	<0.6	<0.7	<0.8	NS	NS	NS	NS
SLOS-10	185 - 190	151.4	10/16/2017	<1	1.8 ± 0.1	<1	14	0.57	0.06	17	<0.5	0.12	<0.05	<0.5	<0.1	<0.2	<0.2	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
PR-1	210 - 215	209.81	10/23/2017	<1	1.7 ± 0.2	<1	79	0.49	<0.05	11	<0.5	0.08	<0.05	<0.5	<0.1	<0.2	Trace	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS
SL-3	210 - 215	204.12	10/23/2017	<1	3.1 ± 0.2	1.1	27	2.1	<0.05	14	<0.5	<0.05	0.21	2.4	0.12	<0.2	Trace	<0.3	<0.6	<0.7	<0.8	NS	NS	NS	NS

Notes
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APPENDIX

H

Summary of Detected Analytes
2017 Surface/Pond Samples

Suffolk County Department of Health Services
Summary of Detected Analytes - Surface Water Samples
Sand Land Investigation - October 2017

Sample Information		Metals																								
Location ID	Sample Date	Aluminum (ppb)	Antimony (ppb)	Arsenic (ppb)	Barium (ppb)	Beryllium (ppb)	Chromium (ppb)	Cobalt (ppb)	Copper (ppb)	Lead (ppb)	Manganese (ppb)	Molybdenum (ppb)	Nickel (ppb)	Strontium (ppb)	Thallium (ppb)	Thorium (ppb)	Tin (ppb)	Titanium (ppb)	Uranium (ppb)	Vanadium (ppb)	Zinc (ppb)	Calcium (ppm)	Iron (ppm)	Magnesium (ppm)	Potassium (ppm)	Sodium (ppm)
DEC Part 703.6 Groundwater Effluent Limitations[1]		2,000	6	50	2,000	-	100	-	400	50	600	-	200	-	-	-	-	-	-	-	5,000	-	600	-	-	-
SLSW-1	10/4/2017	48,823	0.81	63	144	1.4	48	12	122	96	591	6.1	27	248	0.32	5.3	1	1821	4.2	71	159	55	33	12	58	9.4
SLSW-1	10/10/2017	20,678	0.7	37	83	0.64	23	6.2	63	51	577	4.5	14	280	<0.2	2.3	0.67	797	2	35	75	71	16	14	61	9.9
SLSW-2	10/4/2017	6,784	0.31	8.3	23	0.22	5.7	1.7	16	7.2	71	2.7	3.4	63	<0.2	<2	<0.5	275	0.67	11	12	17	5.1	4.6	11	4.1
SLSW-2	10/10/2017	23,683	0.43	24	70	0.68	18	5.9	35	27	498	5.7	11	139	<0.2	3.5	0.61	979	2.4	35	36	35	17	10	21	8.9
SLSW-3	10/10/2017	2,840	0.63	85	34	<0.2	9.7	4.9	38	14	733	5.3	12	234	<0.2	<2	<0.5	167	1.8	14	39	74	5.8	37	230	33
SLSW-4	10/11/2017	23,979	0.88	35	73	0.67	24	5.6	57	47	230	9.3	14	158	<0.2	2.5	0.59	886	2.3	41	74	39	17	8.5	70	13

Notes
"<" = less than, indicating no detection
ppm = parts per million
ppb = parts per billion
pCi = picocurie
(1) No water quality standards have been established by the New York State Department of Environmental Conservation (NYSDEC) for stormwater. NYSDEC Groundwater Effluent Limits established for analytes detected are indicated for comparison purposes only.
[ ] indicates concentration exceeds the NYSDEC Groundwater Effluent Limit

Suffolk County Department of Health Services
Summary of Detected Analytes - Surface Water Samples
Sand Land Investigation - October 2017

Sample Information		Radiologicals (pCi/l)		Standard Inorganics (ppm)	VOCs (ppb)		Chlorinated Pesticides (ppb)	Herbicide Metabolites LC/MS/MS (ppb)							
Location ID	Sample Date	Gross Alpha	Gross Beta	Ammonia	Dimethyldisulfide	Methyl sulfide	Gamma - BHC	Acetaminophen	Bisphenol A	Bisphenol B	Caffeine	Dichlorvos	Diethyltoluamide (DEET)	2-HydroxyAtrazine	Ibuprofen
DEC Part 703.6 Groundwater Effluent Limitations[1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLSW-1	10/4/2017	11 ± 0.7	67 ± 1.4	4.8	<0.5	7.3	0.06	<0.2	<0.2	<0.2	<0.2	<0.6	0.2	<0.3	<0.2
SLSW-1	10/10/2017	3.7 ± 0.3	61 ± 1.1	2.3	2.1	22	0.09	<0.2	<0.2	<0.2	Trace	<0.6	0.2	<0.3	Trace
SLSW-2	10/4/2017	<1	12 ± 0.4	<0.5	<0.5	<0.5	<0.02	<0.2	<0.2	<0.2	<0.2	<0.6	<0.2	<0.3	<0.2
SLSW-2	10/10/2017	4.6 ± 0.3	22 ± 0.5	0.5	<0.5	<0.5	<0.02	Trace	<0.2	0.7	<0.2	<0.6	<0.2	Trace	<0.2
SLSW-3	10/10/2017	1.3 ± 0.3	130 ± 2.3	<0.5	<2.5	<2.5	<0.02	Trace	<0.2	<0.2	<0.2	0.9	<0.2	<0.3	<0.2
SLSW-4	10/11/2017	6.1 ± 0.3	70 ± 1.4	<0.5	<0.5	<0.5	0.08	<0.2	0.2	<0.2	<0.2	0.9	<0.2	<0.3	<0.2

Notes
"<" = less than, indicating no detection
ppm = parts per million
ppb = parts per billion
pCi = picocurie
(1) No water quality standards have been established by the New York State Department of Environmental Conservation (NYSDEC) for stormwater. NYSDEC Groundwater Effluent Limits established for analytes detected are indicated for comparison purposes only.
indicates concentration exceeds the NYSDEC Groundwater Effluent Limit

APPENDIX

I

Summary of Detected Analytes
2017 Well Auger Soil Cutting Samples

Suffolk County Department of Health Services
Summary of Detected Analytes - Solid Samples
Sand Land Investigation - October 2017

Sample Information				Metals (ppm)								Volatile Organic Analysis (ppb)						
Sample ID	Sample Date	Sample Location Descriptions	Sample Type	Aluminum	Calcium	Iron	Magnesium	Manganese	Potassium	Sodium	Zinc	Trichlorofluoromethane	Acetone	Methyl ehtyl ketone	Toulene	Tetrachloroethene	n-Butyl acetate	Total Xylene
NYS DEC Table 375-6.8(b) Soil Cleanup Objectives (Protection of Groundwater)				-	-	-	-	2,000	-	-	2,480	-	50	120	700	1,300	-	1,600
NYSDEC Part 375 Unrestricted Use Guidelines				-	-	-	-	1,600	-	-	109	-	50	120	700	1,300	-	260
SLAC-A	10/11/2017	Auger Soil Cuttings of SLOS-7 @ 20' to 30'	Solid	1,520	356	2,090	315	<50	265	165	<50	<4	<20	<4	<4	<4	<4	<4
SLAC-B	10/11/2017	Auger Soil Cutting of SLOS-9 (85' to 110')	Solid	8,680	1,010	14,100	2,350	233	1,430	164	<50	<4	<20	<4	5	5	<4	<4
SLAC-C	10/12/2017	Auger Soil Cutting of SLOS-9 (~20')	Solid	10,600	5,180	12,100	1,900	145	821	152	<50	5	<20	<4	<4	6	<4	<4
SLAC-D	10/18/2017	Auger Soil Cuttings from SLOS-6	Solid	6,750	2,910	6,260	1,390	87.8	434	274	63.5	<4	<20	11	4	6	8	6
SLSD-A	10/4/2017	Vicinity of SLOS-1	Solid	3,790	4,670	4,120	1,240	97	2,160	229	<50	<4	72	<4	<4	<4	<4	<4
SLSD-B	10/5/2017	Vicinity of SLOS-2	Solid	1,640	2,000	2,070	564	53.5	557	144	<50	<4	<20	<4	<4	<4	<4	<4
SLSD-C	10/5/2017	Vicinity of SLOS-3	Solid	2,480	1,420	2,720	511	54.2	409	160	<50	<4	<20	<4	<4	<4	<4	<4
SLSD-D	10/5/2017	Vicinity of SLOS-3	Solid	2,000	1,410	2,320	512	50.1	498	165	< 50	<4	<20	<4	<4	<4	<4	<4
SLSD-E	10/6/2017	Vicinity of SLOS-4	Solid	2,260	1,030	2,750	4,090	<50	394	136	<50	<4	<20	<4	<4	<4	<4	<4
SLSD-F	10/12/2017	Vicinity of SLOS-5	Solid	8,790	1,230	6,590	1,030	84.1	466	100	<50	<4	<20	<4	8	10	<4	5
SLSD-G	10/12/2017	Vicinity of SLOS-6	Solid	3,930	3,260	3,850	965	96	1,330	179	<50	<4	<20	<4	5	5	5	4
SLSD-H	10/12/2017	Vicinity of SLOS-7	Solid	3,190	3,080	3,770	847	73.9	892	152	<50	<4	<20	<4	<4	<4	<4	<4
SLSD-I	10/12/2017	Vicinity of SLOS-8	Solid	5,580	25,200	7,930	16,000	109	528	248	<50	<4	<20	<4	<4	<4	<4	<4
SLSD-J	10/12/2017	Vicinity of SLOS-9	Solid	6,350	2,320	6,340	1,110	83.9	489	128	<50	<4	<20	<4	8	9	<4	<4

Notes
"<" = less than, indicating no detection
ppm = parts per million
ppb = parts per billion
indicates concentration exceeds a standard or guidance value

APPENDIX

J

Well Drilling Completion Reports

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.970994
Longitude W072.341638

County Suffolk SL-1 20150078 Well Number S-134080

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MIDDLE LINE HIGWAY, BRIDGEHAMPTON

Depth of Well Below Surface: 250'
Depth to Groundwater From Surface: 206'

CASING

Diameter	2" in.	in.	in.	in.
Length	245' ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson	OPENINGS	10slot
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST days hours

MAXIMUM DISCHARGE gallons per min.

STATIC LEVEL PRIOR TO TEST ft. in.

LEVEL DURING MAXIMUM PUMPING ft. in.

MAXIMUM DRAWDOWN ft.

Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE

DIAMETER in.

Length ft.

SUCTION LINE

DIAMETER in.

Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

USE OF WATER

WORK STARTED 5/26/2015

COMPLETED 5/26/2015

DATE	DRILLER	REGISTRATION NO.
5/26/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

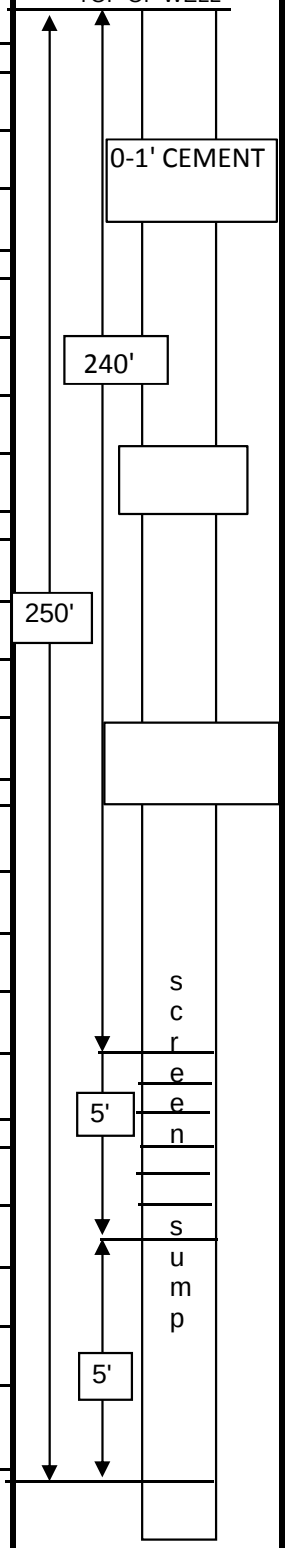
LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.

TOP OF WELL



ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.971179
Longitude W072.341216

County Suffolk SL-2 20150079 Well Number S-134081

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MIDDLE LINE HIGWAY, BRIDGEHAMPTON

Depth of Well Below Surface: 250'
Depth to Groundwater From Surface: 205'

CASING

Diameter	2" in.	in.	in.	in.
Length	245' ft.	ft.	ft.	ft.

SEALING
OPENINGS

SCREEN

Make	Johnson	OPENINGS	10slot
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE
TEST OR PERMANENT PUMP
DURATION OF TEST days hours
MAXIMUM DISCHARGE gallons per min.
STATIC LEVEL PRIOR TO TEST ft. in.
LEVEL DURING MAXIMUM PUMPING ft. in.
MAXIMUM DRAWDOWN ft.
Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE
MAKE
MODEL NUMBER
MOTIVE POWER
MAKE
H.P.
Capacity g.p.m.against ft. of discharge head
NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE

DIAMETER in.
Length ft.

SUCTION LINE

DIAMETER in.
Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

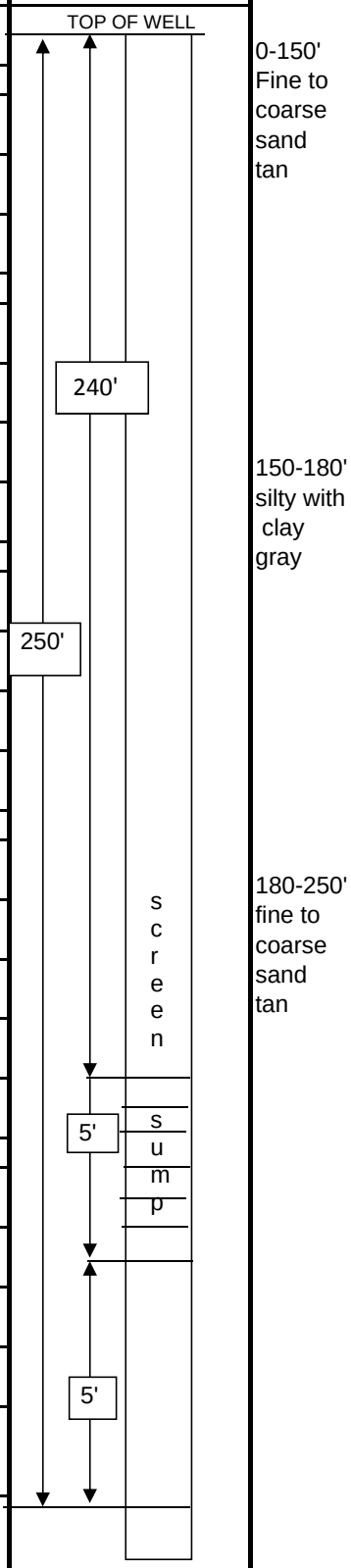
USE OF WATER

WORK STARTED 5/27/2015
COMPLETED 5/27/2015

DATE	DRILLER	REGISTRATION NO.
5/27/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG
Ground Surface
EL. _____ Ft. above sea
_____ ft.



0-150' Fine to coarse sand tan

150-180' silty with clay gray

180-250' fine to coarse sand tan

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.971317
Longitude W072.304152

County Suffolk SL-3 20150080 Well Number S-134082

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MIDDLE LINE HIGWAY, BRIDGEHAMPTON

Depth of Well Below Surface: 250'
Depth to Groundwater From Surface: 205'

CASING

Diameter	2" in.	in.	in.	in.
Length	245' ft.	ft.	ft.	ft.

SEALING
OPENINGS

SCREEN

Make	Johnson	OPENINGS	10slot
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE
TEST OR PERMANENT PUMP
DURATION OF TEST days hours
MAXIMUM DISCHARGE gallons per min.
STATIC LEVEL PRIOR TO TEST ft. in.
LEVEL DURING MAXIMUM PUMPING ft. in.
MAXIMUM DRAWDOWN ft.
Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE
MAKE
MODEL NUMBER
MOTIVE POWER
MAKE
H.P.
Capacity g.p.m.against ft. of discharge head
NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE

DIAMETER in.
Length ft.

SUCTION LINE

DIAMETER in.
Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

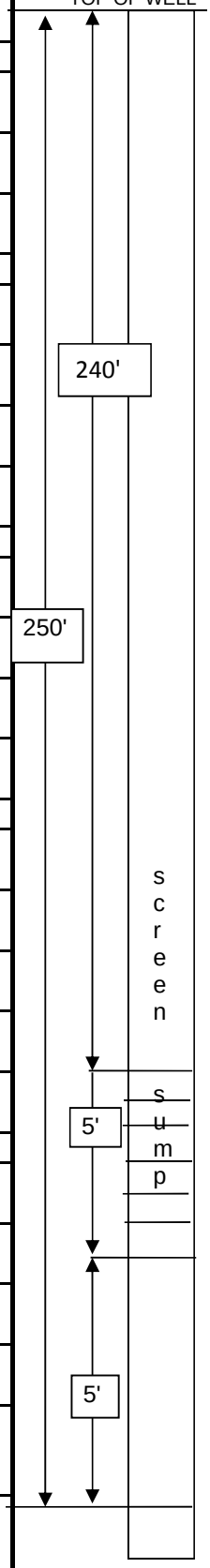
USE OF WATER

WORK STARTED 6/2/2015
COMPLETED 6/2/2015

DATE	DRILLER	REGISTRATION NO.
6/2/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG
Ground Surface
EL. _____ Ft. above sea
_____ ft.



0-30"
hard pan
silt
dark gray

30-90'
fine to
coarse
sand
tan

90-150'
silty with
clay
present
gray

150-250'
fine to
coarse
sand
tan

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.971574
Longitude W072.340083

County Suffolk SL-4 20150093 Well Number S-134083

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MIDDLE LINE HIGWAY, BRIDGEHAMPTON

Depth of Well Below Surface: 240'
Depth to Groundwater From Surface: 201'

CASING

Diameter	2" in.	in.	in.	in.
Length	235' ft.	ft.	ft.	ft.

SEALING
OPENINGS

SCREEN

Make	Johnson	OPENINGS	10slot
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE
TEST OR PERMANENT PUMP
DURATION OF TEST days hours
MAXIMUM DISCHARGE gallons per min.
STATIC LEVEL PRIOR TO TEST ft. in.
LEVEL DURING MAXIMUM PUMPING ft. in.
MAXIMUM DRAWDOWN ft.
Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity g.p.m.against ft. of discharge head
NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE
DIAMETER in.
Length ft.

SUCTION LINE
DIAMETER in.
Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

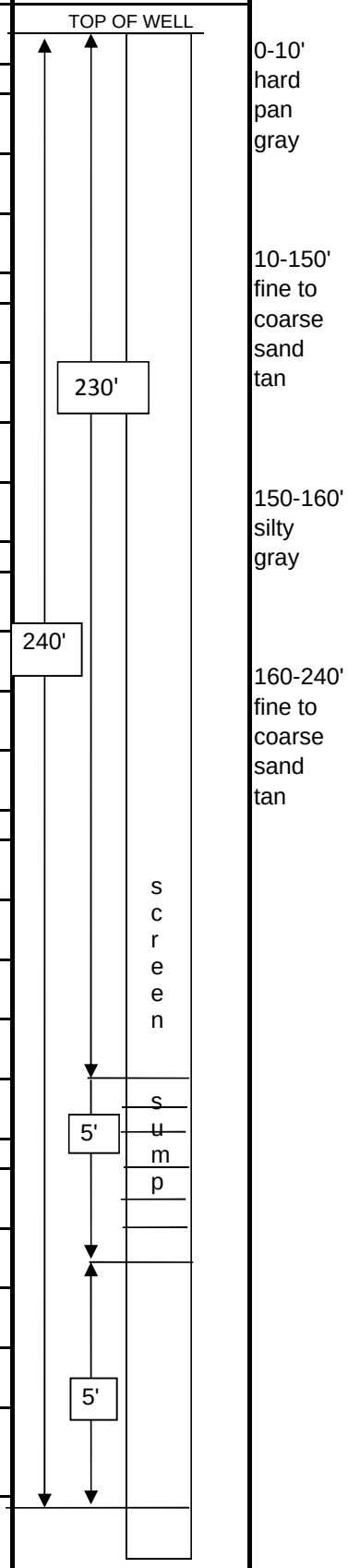
USE OF WATER

WORK STARTED 6/8/2015
COMPLETED 6/8/2015

DATE	DRILLER	REGISTRATION NO.
6/8/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG
Ground Surface
EL. _____ Ft. above sea
_____ ft.



0-10' hard pan gray

10-150' fine to coarse sand tan

150-160' silty gray

160-240' fine to coarse sand tan

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.971484
Longitude W072.340202

County Suffolk SL-4S 20150124 Well Number S-134084

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MIDDLE LINE HIGWAY, BRIDGEHAMPTON

Depth of Well Below Surface	Depth to Groundwater From Surface
220'	202.0'

CASING

Diameter	2" in.	in.	in.	in.
Length	215' ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson			
OPENINGS	10slot			
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST days hours

MAXIMUM DISCHARGE gallons per min.

STATIC LEVEL PRIOR TO TEST ft. in.

LEVEL DURING MAXIMUM PUMPING ft. in.

MAXIMUM DRAWDOWN ft.

Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER in.
Length ft.	Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

USE OF WATER

WORK STARTED 8/6/2015 COMPLETED 8/6/2015

DATE	DRILLER	REGISTRATION NO.
8/6/2015	Luis Velasquez	1854

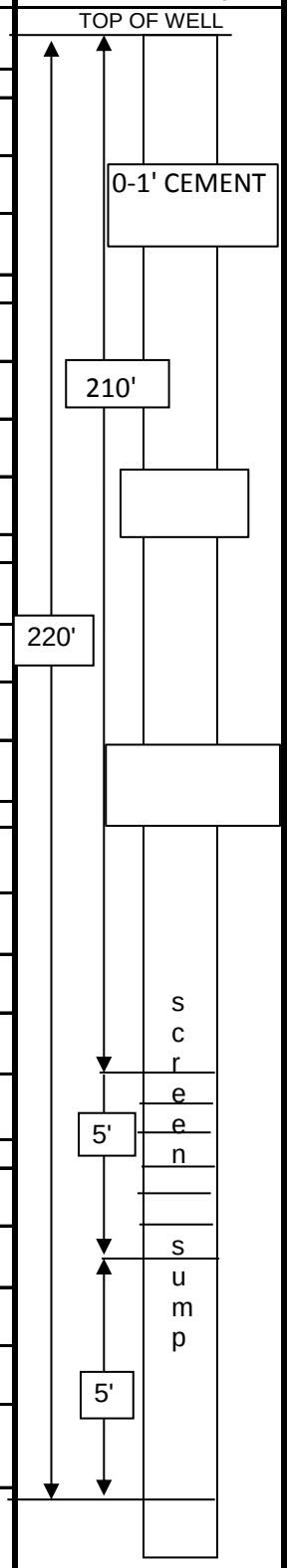
*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.



ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION Latitude N40.971682
Longitude W072.339705

County Suffolk SL-5 20150094 Well Number S-134085

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MIDDLE LINE HIGWAY, BRIDGEHAMPTON

Depth of Well Below Surface: 260'
Depth to Groundwater From Surface: 199.23'

CASING

Diameter	2" in.	in.	in.	in.
Length	255' ft.	ft.	ft.	ft.

SEALING
OPENINGS

SCREEN

Make: Johnson
OPENINGS: 10slot

Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE
TEST OR PERMANENT PUMP
DURATION OF TEST: days hours
MAXIMUM DISCHARGE: gallons per min.
STATIC LEVEL PRIOR TO TEST: ft. in.
LEVEL DURING MAXIMUM PUMPING: ft. in.
MAXIMUM DRAWDOWN: ft.
Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE
MAKE
MODEL NUMBER
MOTIVE POWER
MAKE
H.P.
Capacity: g.p.m.against ft. of discharge head
NUMBER OF BOWLS OR STAGES: ft. of total head

DROP LINE

DIAMETER: in.
Length: ft.

SUCTION LINE

DIAMETER: in.
Length: in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

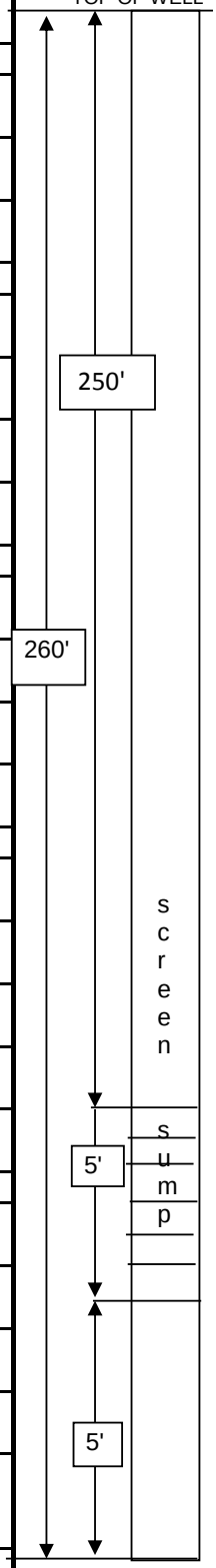
USE OF WATER

WORK STARTED: 6/9/2015
COMPLETED: 6/9/2015

DATE: 6/9/2015
DRILLER: Luis Velasquez
REGISTRATION NO.: 1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG
Ground Surface
EL._____Ft. above sea
_____ft.
TOP OF WELL



ORIGINAL- Environmental Conservation Copy

County Suffolk SL-6 20150172 Longitude W072.347740 Well Number

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MILSTONE ROAD, BRIDGEHAMPTON

Depth of Well Below Surface	Depth to Groundwater From Surface
210'	162.25

CASING

Diameter	2" in.	in.	in.	in.
Length	205' ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson	OPENINGS 10slot		
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST days hours

MAXIMUM DISCHARGE gallons per min.

STATIC LEVEL PRIOR TO TEST ft. in.

LEVEL DURING MAXIMUM PUMPING ft. in.

MAXIMUM DRAWDOWN ft.

Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER in.
Length ft.	Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

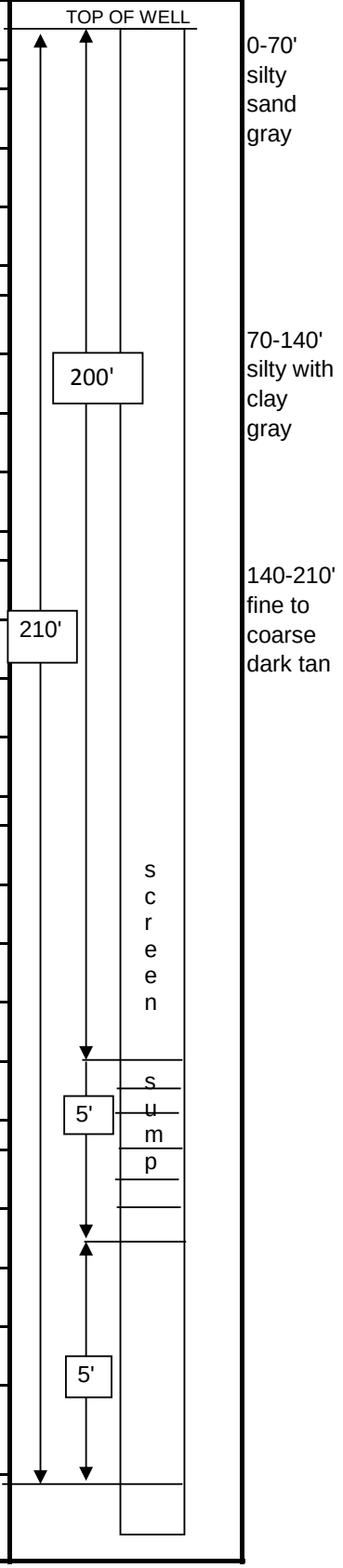
USE OF WATER

WORK STARTED	COMPLETED
10/16/2015	10/16/2015

DATE	DRILLER	REGISTRATION NO.
10/16/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG
Ground Surface
EL. Ft. above sea
ft.



ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.973056
Longitude W072.348440

County Suffolk SL-7 20150171 Well Number

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MILSTONE ROAD, BRIDGEHAMPTON

Depth of Well Below Surface: 210'

Depth to Groundwater From Surface: 156.35'

CASING

Diameter	2" in.	in.	in.	in.
Length	205' ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson		OPENINGS	10slot
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST days hours

MAXIMUM DISCHARGE gallons per min.

STATIC LEVEL PRIOR TO TEST ft. in.

LEVEL DURING MAXIMUM PUMPING ft. in.

MAXIMUM DRAWDOWN ft.

Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER in.
Length ft.	Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

USE OF WATER

WORK STARTED 10/15/2015

COMPLETED 10/15/2015

DATE	DRILLER	REGISTRATION NO.
10/15/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

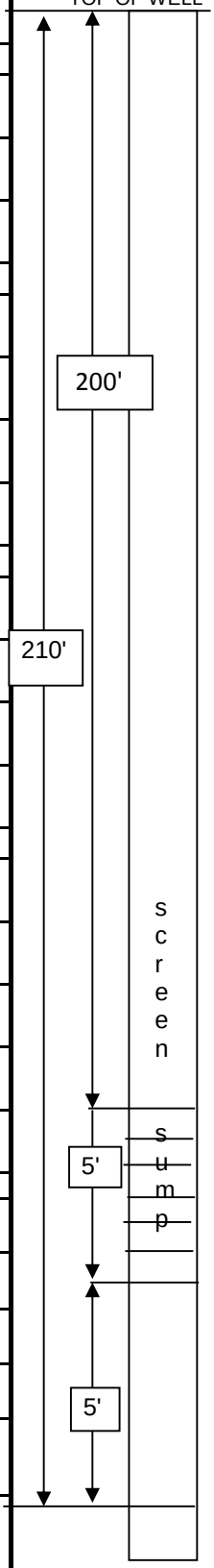
LOG

Ground Surface

EL. Ft. above sea

ft.

TOP OF WELL



0-80' silty sand gray

80-160' silty with clay dark gray

160-210' silty sand gray

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.973924
Longitude W072.349427

County Suffolk SL-8 20150170 Well Number

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MILSTONE ROAD, BRIDGEHAMPTON

Depth of Well Below Surface: 200'

Depth to Groundwater From Surface: 113.60'

CASING

Diameter	2" in.	in.	in.	in.
Length	195' ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson		OPENINGS 10slot	
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST days hours

MAXIMUM DISCHARGE gallons per min.

STATIC LEVEL PRIOR TO TEST ft. in.

LEVEL DURING MAXIMUM PUMPING ft. in.

MAXIMUM DRAWDOWN ft.

Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER in.
Length ft.	Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

USE OF WATER

WORK STARTED 10/14/2015

COMPLETED 10/14/2015

DATE	DRILLER	REGISTRATION NO.
10/14/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

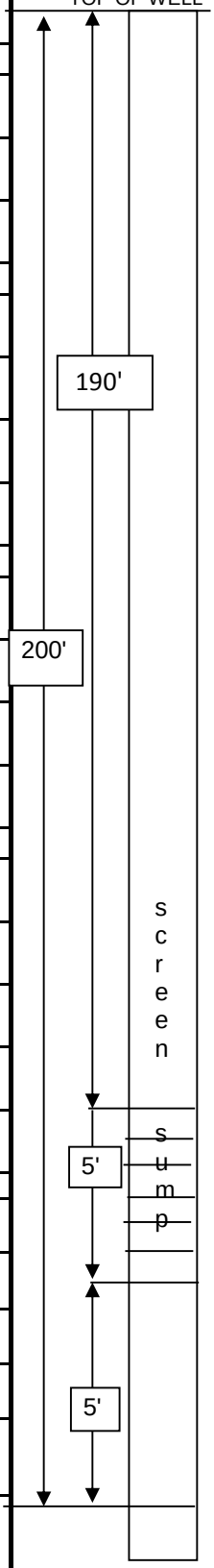
LOG

Ground Surface

EL. Ft. above sea

ft.

TOP OF WELL



0-60' silty sand gray

60-90' silty with clay gray

90-140' sand with silt gray

140-200' silty with clay gray

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.973990
Longitude W072.348013

County Suffolk SL-9 20150201 Well Number

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
COUNTRY CLUB/MILSTONE ROAD, BRIDGEHAMPTON

Depth of Well Below Surface	Depth to Groundwater From Surface
230'	185.15'

CASING

Diameter	2" in.	in.	in.	in.
Length	225' ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson	OPENINGS	10slot	
Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST days hours

MAXIMUM DISCHARGE gallons per min.

STATIC LEVEL PRIOR TO TEST ft. in.

LEVEL DURING MAXIMUM PUMPING ft. in.

MAXIMUM DRAWDOWN ft.

Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER in.
Length ft.	Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other AUGER

USE OF WATER

WORK STARTED 10/29/2015

COMPLETED 10/29/2015

DATE	DRILLER	REGISTRATION NO.
10/29/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG

Ground Surface

EL. Ft. above sea

ft.

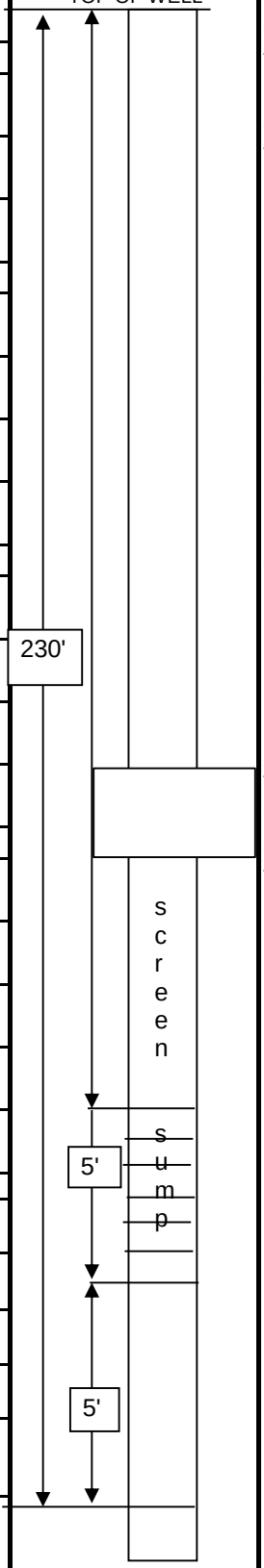
TOP OF WELL

0-90' fine to coarse sand tan

90-140' silty sand gray

140-170' silty clay gray

170-230' fine to coarse sand tan



ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.971796
Longitude W072.347138

County Suffolk SL-10 20150203 Well Number

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
MILSTONE ROAD, BRIDGEHAMPTON

Depth of Well Below Surface: 210'

Depth to Groundwater From Surface: 178.72

CASING

Diameter	2" in.	in.	in.	in.
Length	205' ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make: Johnson

OPENINGS: 10slot

Diameter	2" in.	in.	in.	in.
Length	5' ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST: days hours

MAXIMUM DISCHARGE: gallons per min.

STATIC LEVEL PRIOR TO TEST: ft. in.

LEVEL DURING MAXIMUM PUMPING: ft. in.

MAXIMUM DRAWDOWN: ft.

Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity: g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES: ft. of total head

DROP LINE	SUCTION LINE
DIAMETER: in.	DIAMETER: in.
Length: ft.	Length: in.

METHOD OF DRILLING: ☐ rotary ☐ cable tool ■ other AUGER

USE OF WATER

WORK STARTED: 11/2/2015

COMPLETED: 11/2/2015

DATE	DRILLER	REGISTRATION NO.
11/2/2015	Luis Velasquez	1854

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

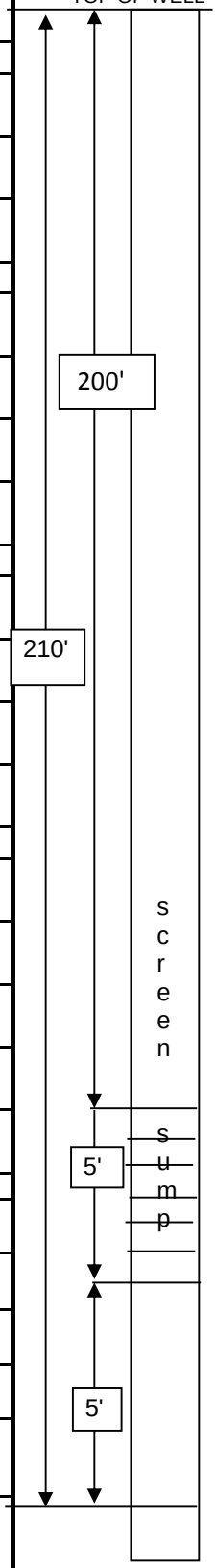
LOG

Ground Surface

EL. Ft. above sea

ft.

TOP OF WELL



0-90' silty sand fine medium tan-gray

90-130' silty with clay gray

130-210' fine to loose sand tan

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude 40.97314
Longitude -72.341

County Suffolk SLOS-1 20170121 Well Number 20170121

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
middle lane hwy Sag Harbor

Depth of Well Below Surface: 180
Depth to Groundwater From Surface: 151

CASING

Diameter	2 in.	in.	in.	in.
Length	170 ft.	ft.	ft.	ft.

SEALING
OPENINGS

SCREEN

Make	Johnson	OPENINGS	10
Diameter	2 in.	in.	in.	in.
Length	5 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 170

PUMP TEST

DATE
TEST OR PERMANENT PUMP
DURATION OF TEST: days hours
MAXIMUM DISCHARGE: gallons per min.
STATIC LEVEL PRIOR TO TEST: ft. in.
LEVEL DURING MAXIMUM PUMPING: ft. in.
MAXIMUM DRAWDOWN: ft.
Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity: g.p.m.against ft. of discharge head
NUMBER OF BOWLS OR STAGES: ft. of total head

DROP LINE
DIAMETER: in.
Length: ft.

SUCTION LINE
DIAMETER: in.
Length: in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other

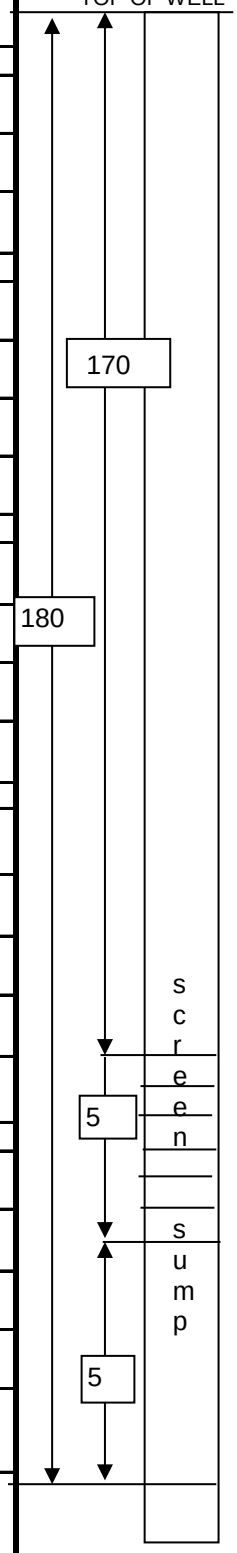
USE OF WATER
Auger

WORK STARTED 10/4/2017
COMPLETED 10/4/2017

DATE 10/4/2017 DRILLER F. Basile REGISTRATION NO. 1834

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG
Ground Surface
EL. _____ Ft. above sea
_____ ft.



0-180' Medium sand with fine sand accompanied by small rocks

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude 40.97267
Longitude -72.3411

County Suffolk SLOS-2 20170122 Well Number 20170122

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
middle lane hwy Sag Harbor

Depth of Well Below Surface: 180
Depth to Groundwater From Surface: 150.29

CASING

Diameter	2 in.	in.	in.	in.
Length	170 ft.	ft.	ft.	ft.

SEALING
OPENINGS

SCREEN

Make	Johnson	OPENINGS	10
Diameter	2 in.	in.	in.	in.
Length	5 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 170

PUMP TEST

DATE
TEST OR PERMANENT PUMP
DURATION OF TEST: days hours
MAXIMUM DISCHARGE: gallons per min.
STATIC LEVEL PRIOR TO TEST: ft. in.
LEVEL DURING MAXIMUM PUMPING: ft. in.
MAXIMUM DRAWDOWN: ft.
Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE
MAKE
MODEL NUMBER
MOTIVE POWER
MAKE
H.P.
Capacity: g.p.m.against ft. of discharge head
NUMBER OF BOWLS OR STAGES
ft. of total head

DROP LINE

DIAMETER: in.
Length: ft.

SUCTION LINE

DIAMETER: in.
Length: in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other

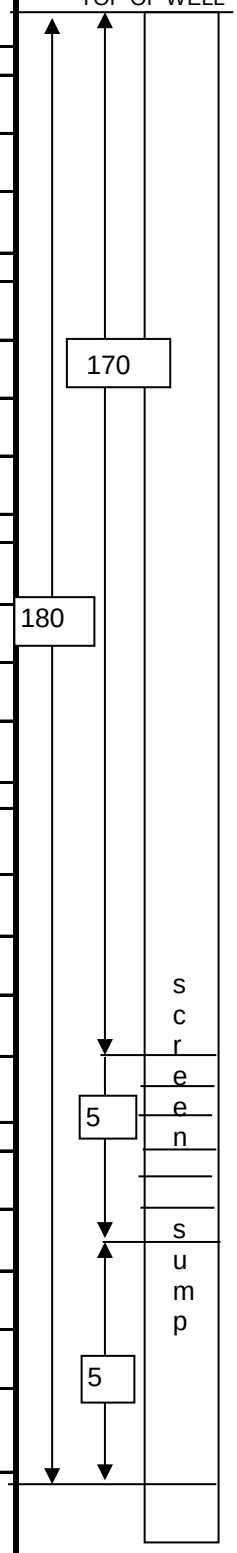
USE OF WATER
Auger

WORK STARTED 10/12/2017
COMPLETED 10/12/2017

DATE 10/12/2017
DRILLER F. Basile
REGISTRATION NO. 1834

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG
Ground Surface
EL. _____ Ft. above sea
_____ ft.
TOP OF WELL



0-180' medium light brown sand

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude 40.97239
Longitude -72.3409

County Suffolk SLOS-3 20170123 Well Number 20170123

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
middle lane hwy Sag Harbor

Depth of Well Below Surface: 180
Depth to Groundwater From Surface: 154.29

CASING

Diameter	2 in.	in.	in.	in.
Length	170 ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson	OPENINGS	10
Diameter	2 in.	in.	in.	in.
Length	5 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 170

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST: days hours

MAXIMUM DISCHARGE: gallons per min.

STATIC LEVEL PRIOR TO TEST: ft. in.

LEVEL DURING MAXIMUM PUMPING: ft. in.

MAXIMUM DRAWDOWN: ft.

Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity: g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES: ft. of total head

DROP LINE	SUCTION LINE
DIAMETER: in.	DIAMETER: in.
Length: ft.	Length: in.

METHOD OF DRILLING: ☐ rotary ☐ cable tool ■ other

USE OF WATER: Auger

WORK STARTED: 10/12/2017

COMPLETED: 10/12/2017

DATE: 10/12/2017 DRILLER: F. Basile REGISTRATION NO.: 1834

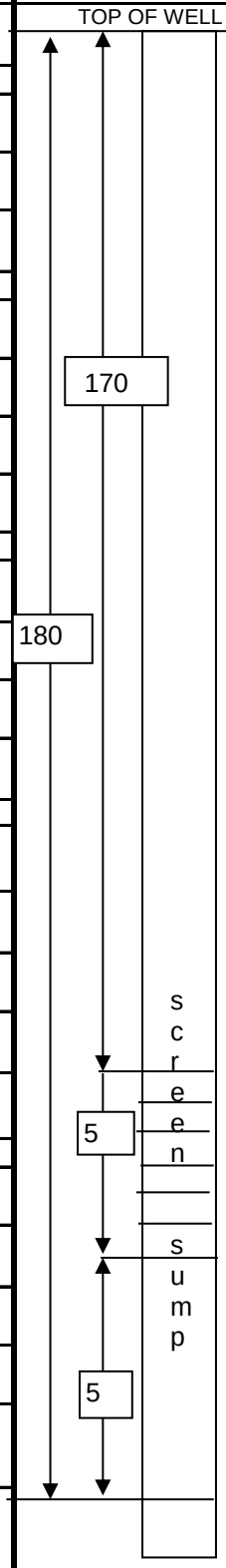
*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.



0-180' medium light brown sand

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude 40.97243
Longitude -72.342

County Suffolk SLOS-4 20170124 Well Number 20170124

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
middle lane hwy Sag Harbor

Depth of Well Below Surface: 175
Depth to Groundwater From Surface: 142

CASING

Diameter	2 in.	in.	in.	in.
Length	165 ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make: Johnson
OPENINGS: 10

Diameter	2 in.	in.	in.	in.
Length	5 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 165

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST: days hours

MAXIMUM DISCHARGE: gallons per min.

STATIC LEVEL PRIOR TO TEST: ft. in.

LEVEL DURING MAXIMUM PUMPING: ft. in.

MAXIMUM DRAWDOWN: ft.

Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity: g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES: ft. of total head

DROP LINE

DIAMETER: in.

Length: ft.

SUCTION LINE

DIAMETER: in.

Length: in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other

USE OF WATER
Auger

WORK STARTED: 10/4/2017
COMPLETED: 10/4/2017

DATE: 10/4/2017
DRILLER: F. Basile
REGISTRATION NO.: 1834

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

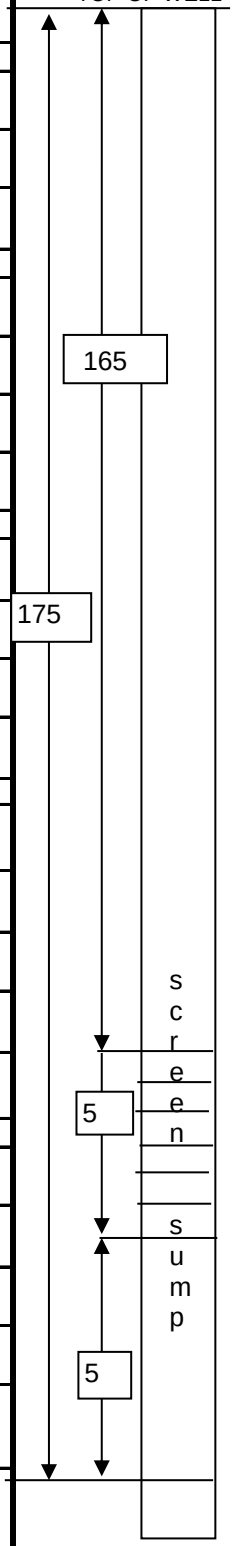
LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.

TOP OF WELL



0-175' Medium sand with fine sand accompanied by small rocks

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude 40.97396
Longitude -72.3384

County Suffolk SLOS-5 20170125 Well Number 20170125

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
middle lane hwy Sag Harbor

Depth of Well Below Surface: 180
Depth to Groundwater From Surface: 142.85

CASING

Diameter	2 in.	in.	in.	in.
Length	170 ft.	ft.	ft.	ft.

SEALING
OPENINGS

SCREEN

Make	Johnson	OPENINGS	10
Diameter	2 in.	in.	in.	in.
Length	5 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 170

PUMP TEST

DATE
TEST OR PERMANENT PUMP
DURATION OF TEST: days hours
MAXIMUM DISCHARGE: gallons per min.
STATIC LEVEL PRIOR TO TEST: ft. in.
LEVEL DURING MAXIMUM PUMPING: ft. in.
MAXIMUM DRAWDOWN: ft.
Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity: g.p.m.against ft. of discharge head
NUMBER OF BOWLS OR STAGES: ft. of total head

DROP LINE
DIAMETER: in.
Length: ft.

SUCTION LINE
DIAMETER: in.
Length: in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other

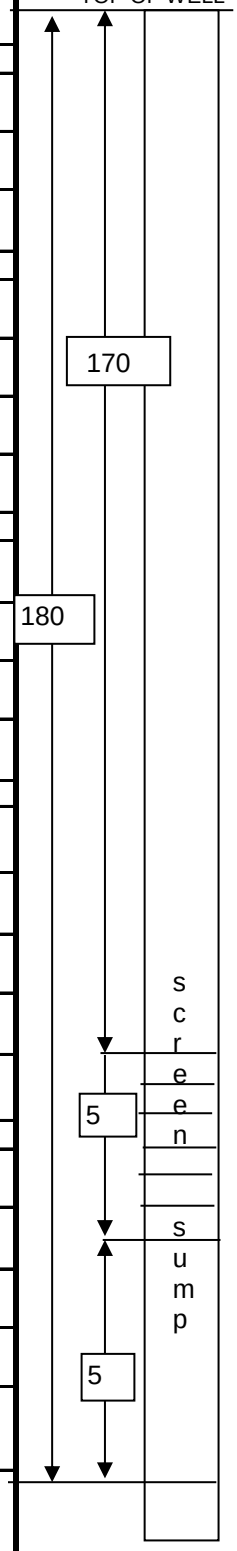
USE OF WATER
Auger

WORK STARTED 10/10/2017
COMPLETED 10/10/2017

DATE 10/10/2017 DRILLER F. Basile REGISTRATION NO. 1834

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG
Ground Surface
EL. _____ Ft. above sea
_____ ft.



0-180' medium light brown sand

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.974541
Longitude W072.338505

County Suffolk SLOS-6 20170126 Well Number S-135137

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
ON SAND LAND PROP BRIDGEHAMPTON

Depth of Well Below Surface: 180'

Depth to Groundwater From Surface: 137.02"

CASING

Diameter	2" in.	in.	in.	in.
Length	170 ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson		OPENINGS 10 SLOT	
Diameter	2" in.	in.	in.	in.
Length	5" ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING
170'

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST days hours

MAXIMUM DISCHARGE gallons per min.

STATIC LEVEL PRIOR TO TEST ft. in.

LEVEL DURING MAXIMUM PUMPING ft. in.

MAXIMUM DRAWDOWN ft.

Approx. time of return level after of pumping hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES ft. of total head

DROP LINE

DIAMETER in.

Length ft.

SUCTION LINE

DIAMETER in.

Length in.

METHOD OF DRILLING
Auger

USE OF WATER

WORK STARTED 10/10/2017

COMPLETED 10/10/2017

DATE 10/10/2017 DRILLER LUIS VELASQUEZ REGISTRATION NO. 1954

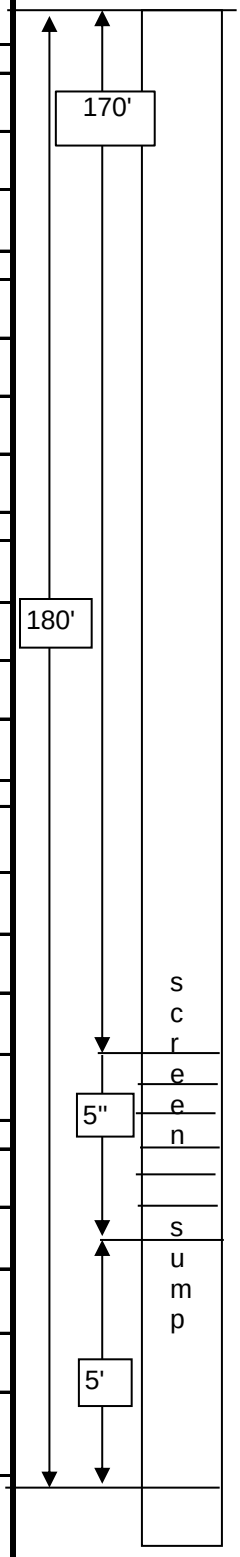
*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.



0-180' Medium light brown sand. Scattered coarse gravel and cobble 170-180'

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude 40.97455
Longitude -72.3393

County Suffolk SLOS-7 20170127 Well Number 20170127

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
middle lane hwy Sag Harbor

Depth of Well Below Surface	Depth to Groundwater From Surface
175	142.85

CASING

Diameter	2 in.	in.	in.	in.
Length	165 ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson		OPENINGS	10
Diameter	2 in.	in.	in.	in.
Length	5 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING
165

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST
days hours

MAXIMUM DISCHARGE
gallons per min.

STATIC LEVEL PRIOR TO TEST
ft. in.

LEVEL DURING MAXIMUM PUMPING
ft. in.

MAXIMUM DRAWDOWN
ft.

Approx. time of return level after of pumping
hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity
g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES
ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER in.
Length ft.	Length in.

METHOD OF DRILLING
☐ rotary ☐ cable tool ■ other

USE OF WATER
Auger

WORK STARTED
10/11/2017

COMPLETED
10/11/2017

DATE 10/11/2017 DRILLER F. Basile REGISTRATION NO. 1834

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

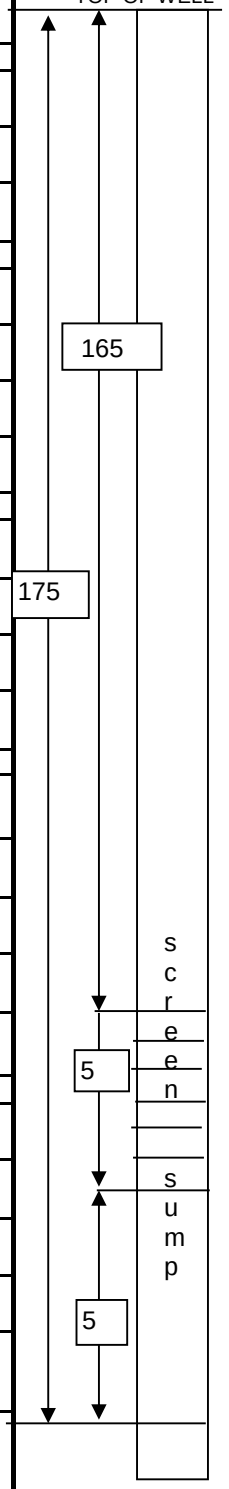
LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.

TOP OF WELL



0 -30' dark brown soild w/medium brown sand

30-175' medium brown sand and gravel

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.974027
Longitude W072.341900

County Suffolk SLOS-8 20170128 Well Number S-135136

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
ON SAND LAND PROF BRIDGEHAMPTON

Depth of Well Below Surface: 180'

Depth to Groundwater From Surface: 139.05"

CASING

Diameter	2" in.	in.	in.	in.
Length	170 ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson		OPENINGS	10 SLOT
Diameter	2" in.	in.	in.	in.
Length	5" ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING
170'

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST
days hours

MAXIMUM DISCHARGE
gallons per min.

STATIC LEVEL PRIOR TO TEST
ft. in.

LEVEL DURING MAXIMUM PUMPING
ft. in.

MAXIMUM DRAWDOWN
ft.

Approx. time of return level after of pumping
hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity
g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES
ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER in.
Length ft.	Length in.
METHOD OF DRILLING: Auger	USE OF WATER

WORK STARTED 10/11/2017 COMPLETED 10/11/2017

DATE 10/11/2017 DRILLER LUIS VELASQUEZ REGISTRATION NO. 1954

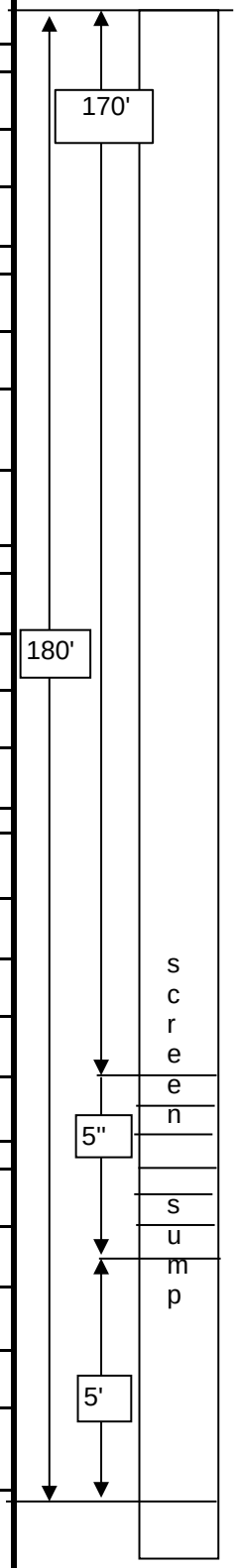
*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.



0-85' brown sand mixed with silt and gravel

85'-110' brownish gray silt with some silt and gravel

110'-180' brown sand mixed with silt and gravel

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude 40.97403
Longitude -72.3419

County Suffolk SLOS-9 20170129 Well Number 20170129

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
middle lane hwy Sag Harbor

Depth of Well Below Surface: 180
Depth to Groundwater From Surface: 149.62

CASING

Diameter	2 in.	in.	in.	in.
Length	170 ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson		OPENINGS	10
Diameter	2 in.	in.	in.	in.
Length	5 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 170

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST: days hours

MAXIMUM DISCHARGE: gallons per min.

STATIC LEVEL PRIOR TO TEST: ft. in.

LEVEL DURING MAXIMUM PUMPING: ft. in.

MAXIMUM DRAWDOWN: ft.

Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity: g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES: ft. of total head

DROP LINE	SUCTION LINE
DIAMETER: in.	DIAMETER: in.
Length: ft.	Length: in.

METHOD OF DRILLING: ☐ rotary ☐ cable tool ■ other

USE OF WATER: Auger

WORK STARTED: 10/12/2017

COMPLETED: 10/12/2017

DATE: 10/12/2017 DRILLER: F. Basile REGISTRATION NO. 1834

*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

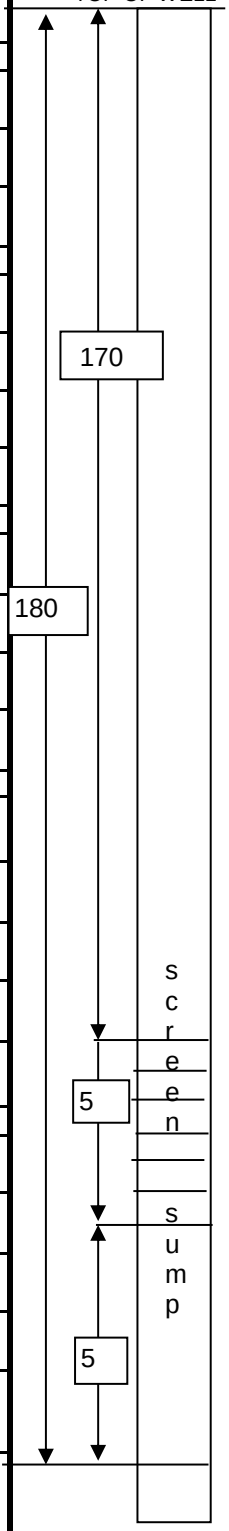
LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.

TOP OF WELL



Dark brown clay and silt 0-20'

Medium brown sand w/ silt and gravel 20'-180'

ORIGINAL- Environmental Conservation Copy

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Latitude N40.973131
Longitude W072.340985

County Suffolk SLOS-10 20170130 Well Number 0

COMPLETION REPORT-LONG ISLAND WELL

OWNER
Suffolk County Department of Health Services

ADDRESS
360 Yaphank Ave; Suite 1C; Yaphank, New York 11980

LOCATION OF WELL
ON SAND LAND PROF BRIDGEHAMPTON

Depth of Well Below Surface: 195'

Depth to Groundwater From Surface: 151.09"

CASING

Diameter	2" in.	in.	in.	in.
Length	185 ft.	ft.	ft.	ft.

SEALING

OPENINGS

SCREEN

Make	Johnson		OPENINGS	10 SLOT
Diameter	2" in.	in.	in.	in.
Length	5" ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 185'

PUMP TEST

DATE

TEST OR PERMANENT PUMP

DURATION OF TEST: days hours

MAXIMUM DISCHARGE: gallons per min.

STATIC LEVEL PRIOR TO TEST: ft. in.

LEVEL DURING MAXIMUM PUMPING: ft. in.

MAXIMUM DRAWDOWN: ft.

Approx. time of return level after of pumping: hours min.

PUMPING INSTALLED

TYPE	MAKE	MODEL NUMBER
MOTIVE POWER	MAKE	H.P.

Capacity: g.p.m.against ft. of discharge head

NUMBER OF BOWLS OR STAGES: ft. of total head

DROP LINE	SUCTION LINE
DIAMETER: in.	DIAMETER: in.
Length: ft.	Length: in.

METHOD OF DRILLING: Auger

USE OF WATER

WORK STARTED: 10/13/2017

COMPLETED: 10/13/2017

DATE: 10/13/2017 DRILLER: LUIS VELASQUEZ REGISTRATION NO.: 1954

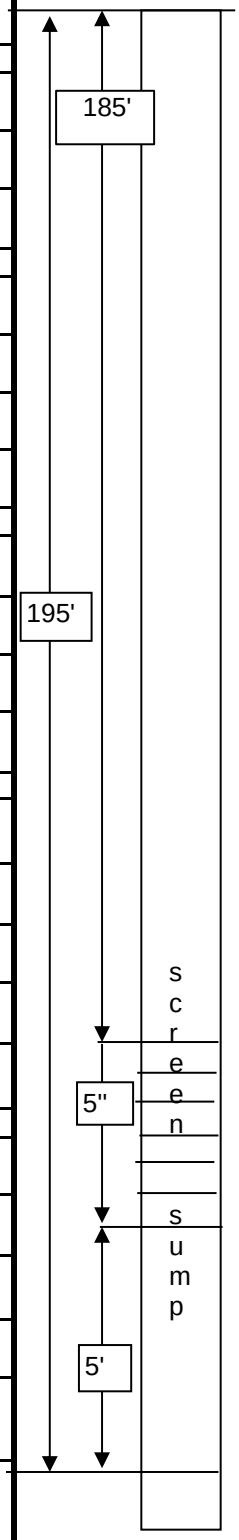
*NOTE: Show log of well materials encountered with depth below ground surface water bearing beds and water levels in each casing screen pump additional pumping test and other matters of interest. Describe repair job. See instructions as to Well Driller's Regulation and Reports.

LOG

Ground Surface

EL. _____ Ft. above sea

_____ ft.



0-195' medium light brown sand

ORIGINAL- Environmental Conservation Copy