State-Licensed Disposal Area at West Valley: 2020 Annual Report

Final Report – March 2021

NYSERDA's Promise to New Yorkers:

NYSERDA provides resources, expertise, and objective information so New Yorkers can make confident, informed energy decisions.

Our Vision:

New York is a global climate leader building a healthier future with thriving communities; homes and businesses powered by clean energy; and economic opportunities accessible to all New Yorkers.

Our Mission:

Advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all.

State-Licensed Disposal Area at West Valley:

2020 Final Report

Prepared for:

New York State Energy Research and Development Authority

West Valley, NY

March 2021

This page intentionally left blank.

Table of Contents

Table of Contents continued.

List of Figures

List of Figures continued.

List of Tables

Acronyms and Abbreviations

AMSL	Above Mean Sea Level
BGS	Below Ground Surface
BOD	Biological Oxygen Demand
cm	Centimeter
COD	Chemical Oxygen Demand
Consent Order	Administrative Order on Consent
CRDL	Contract-Required Detection Limit
DEC	New York State Department of Environmental Conservation
EPA	United States Environmental Protection Agency
ft	Feet
GMP	Groundwater Monitoring Plan for the State-Licensed Disposal Area (SDA) at West Valley
LiDAR	Light Detection and Ranging
LMP	Leachate Monitoring Plan for the State-Licensed Disposal Area (SDA) at West Valley
MDC	Minimum Detectable Concentration
mg/L	Milligrams per Liter
mR/Qtr	Milliroentgens per Quarter
NAD	North American Datum
NAVD	North American Vertical Datum
NFS	Nuclear Fuel Services, Inc.
NDA	Nuclear Regulatory Commission-Licensed Disposal Area
NTU	Nephelometric Turbidity Unit
NYCRR	New York State Codes, Rules, and Regulations
NYSERDA	New York State Energy Research and Development Authority
pCi/L	Picocurie per liter
RCRA	Resource Conservation and Recovery Act
S.U.	Standard Units
SDA	State-Licensed Disposal Area
SPDES	State Pollution Discharge Elimination System
TLD	Thermoluminescent Dosimeter
TSS	Total Suspended Solids
µmhos/cm	Micromhos per Centimeter
UPL	Upper Predictive Limits
UTL	Upper Tolerance Limits
VOC	Volatile Organic Compound
WP-91	Well Point 91

Acronyms and Abbreviations continued.

WNYNSC	Western New York Nuclear Service Center
WVDP	West Valley Demonstration Project
WVSMP	West Valley Site Management Program
XR-5	Ethylene Interpolymer Alloy Geomembrane

S.1 Executive Summary

2020 PERFORMANCE

The New York State Energy Research and Development Authority (NYSERDA) maintains and monitors the State-Licensed Disposal Area (SDA) to protect public health, safety, and the environment. The SDA is located at the Western New York Nuclear Service Center (WNYNSC). This report summarizes the results of environmental monitoring, erosion monitoring, facility operations and maintenance, and waste management activities conducted during calendar year 2020 at the SDA.

In 2020, NYSERDA safely, successfully, and in full compliance with our permits and licenses, completed several field activities, including:

- Leachate and groundwater level monitoring at 63 locations with 540 separate elevation measurements.
- Routine sampling was completed at 28 locations for 2,047 individual analyses of 20 different parameters.
- Gamma radiation measurements were completed at 51 locations with 204 individual measurements.
- TLD data was collected at 11 locations with 44 individual measurements.
- Trench cap and north slope elevations were measured at 144 locations with 426 individual survey measurements.
- North slope elevations were measured at 36 new locations with 72 individual survey measurements.
- Forty-three separate inspections were performed for the buildings, waste, geomembrane cover, erosion monitoring, and workplace safety at the SDA.

The 2020 environmental monitoring data (from groundwater, surface water, stormwater, and gamma radiation measurements) indicate radioactive and/or chemical constituents in the SDA trenches are being effectively contained.

The subsurface barrier wall along the western side of the southern trenches and the geomembrane cover are effective at keeping water out of the SDA trenches, although the slight increase in Trench 14 continued during 2020. In 2020, the likely source area of this increase in Trench 14 was identified. A design to mitigate this source area was completed and approved by the New York State Department of Environmental Conservation (DEC) and the United States Environmental Protection Agency (EPA), and will be constructed in 2021. NYSERDA's monitoring data and the ongoing evaluations show that the current water levels in these trenches are not a public health and safety concern.

In addition, inspections indicate that the SDA trench caps remain stable. In areas where localized subsidence was observed, focused topographic surveys are being completed to determine if additional monitoring and mitigation actions are warranted.

In 2020, visible cracking was observed along the north slope. In addition, lateral movement in a northwesterly direction was identified. The frequency of surveys was increased to quarterly, monthly, and back to quarterly for these observed areas surveys; and 36 monitoring survey hubs were installed above and below the cracks. In 2021, based on our engineering support contractor's recommendations, NYSERDA will complete an investigation of these areas of the north slope.

The erosion control measures are effective at stabilizing the stream channels and slopes surrounding the SDA, and the West Valley Site Management Program (WVSMP) operations and maintenance actions continue to keep the SDA systems functioning properly, and the grounds in good condition. The 2020 erosion monitoring reports indicate that there were no erosion concerns identified that currently threaten the integrity of the SDA.

The 2020 precipitation total at the SDA has decreased from the high observed in 2018. NYSERDA will continue to monitor precipitation total and their impacts on the SDA.

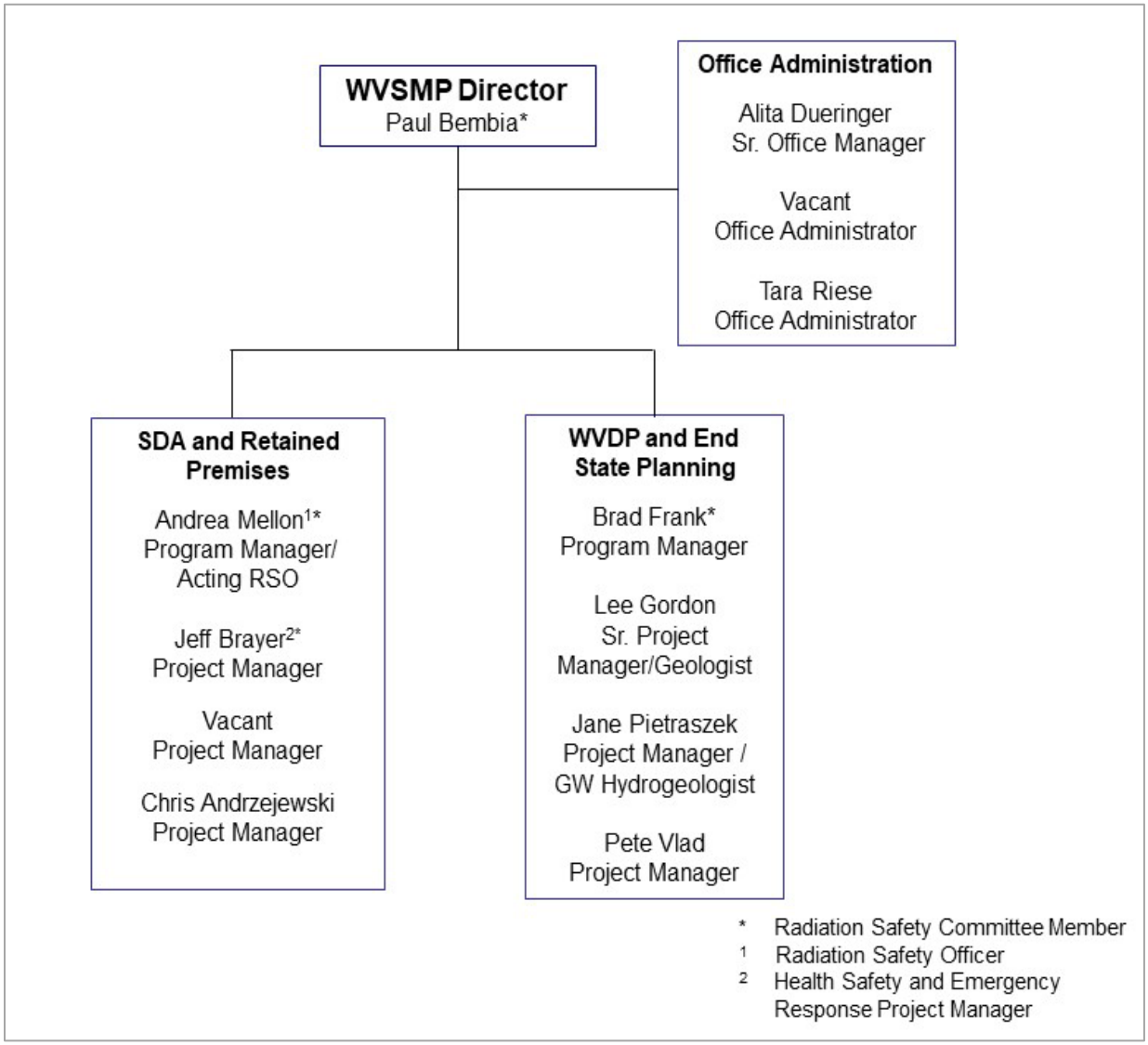
This report is prepared in accordance with the DEC radiation control regulations and the SDA radiation control program. Annual reporting requirements are specified in:

- Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York (6 NYCRR) Part 380, Rules and Regulations for the Prevention and Control of Environmental Pollution by Radioactive Materials, February 2, 2002.
- NYSDEC Radiation Control Permit #137-6, Permit No. 9-0422-00011/00011, January 15, 2020.

Part 380 Permit inspections were conducted on August 10 - 11, 2020, and on November 3, 4, 16, 18, and 23, 2020. The inspections included records review, and a visual walkover inspection of the facility, surrounding slopes and streams, and surface water and soil sample collection. The inspector noted that NYSERDA operations at the SDA were in compliance with the Part 380 regulations and the conditions of the permit.

S.2 West Valley Site Management Program

NYSERDA's WVSMP is responsible for the monitoring and maintenance, and the protection of public health, safety, and the environment at the WNYNSC. The WVSMP is comprised of 10 professionals with diverse talents and expertise. The mission of the WVSMP is to be responsible stewards of the WNYNSC, including the SDA, by using objective analysis, and soliciting multiple perspectives to identify, assess, and implement effective, enduring approaches to protect the environment, and the well-being of our workers and neighbors.



1 SDA Description

The SDA occupies approximately 15 acres of the WNYNSC (Figure 1-1) immediately adjacent to the West Valley Demonstration Project (WVDP). The SDA consists of three filled lagoons and two sets of parallel trenches that contain radioactive waste: 1 through 7 in the northern area and 8 through 14 in the southern area (see Figure 1-2). The SDA is surrounded by an eight-foot-high, chain-link fence, which includes a one-foot barbed-wire outrigger. NYSERDA controls access to the SDA by limiting the issuance of keys to the five, locked SDA gates. In addition, a contracted security service conducts routine patrols of the SDA's perimeter.

Between 1963 and 1975, Nuclear Fuel Services, Inc. (NFS) (the SDA operator at that time), placed approximately 2.4 million cubic feet (ft) of radioactive waste in trenches constructed in the native silty-clay soil. These trenches are 450 to 650 ft in length and are approximately 20 ft deep. Trench cross-sections are trapezoidal in shape, with a top width of 35 ft and a bottom-floor width of 20 ft. During construction, the trench floors were sloped along their length to allow water to drain to a low point where a trench sump was located. A vertical pipe, which extends from above the trench cap to each sump, provides a way to routinely monitor trench water elevations. The sump pipe also serves as a conduit through which water can be sampled or removed from the trenches. Each trench is covered with an eight- to 10-ft-thick mounded cap of compacted clay, and a drainage swale is located between adjacent trenches to direct precipitation away from the trenches.

Differing in both physical form and construction from other trenches, Trenches 6 and 7 were built to hold high-activity wastes that required immediate shielding. Trench 6 is a series of individual holes in which waste was placed, while Trench 7 is a narrow, shallow trench where waste containers were placed and encased in concrete. A sump was not installed in either of these two trenches.

Efforts to minimize erosion of the clay caps and infiltration of water into the trenches began in the late 1970s and early 1980s. These efforts included rolling and reseeding the trench caps as well as several larger-scale regrading, recapping, and water infiltration controls projects. Rising water elevations in Trenches 13 and 14 led NYSERDA to investigate additional water management measures; and, in 1990, NYSERDA began implementing several projects aimed at reducing water accumulation in the SDA trenches.

Figure 1-1. Map of the Western New York Nuclear Service Center

Source: NYSERDA

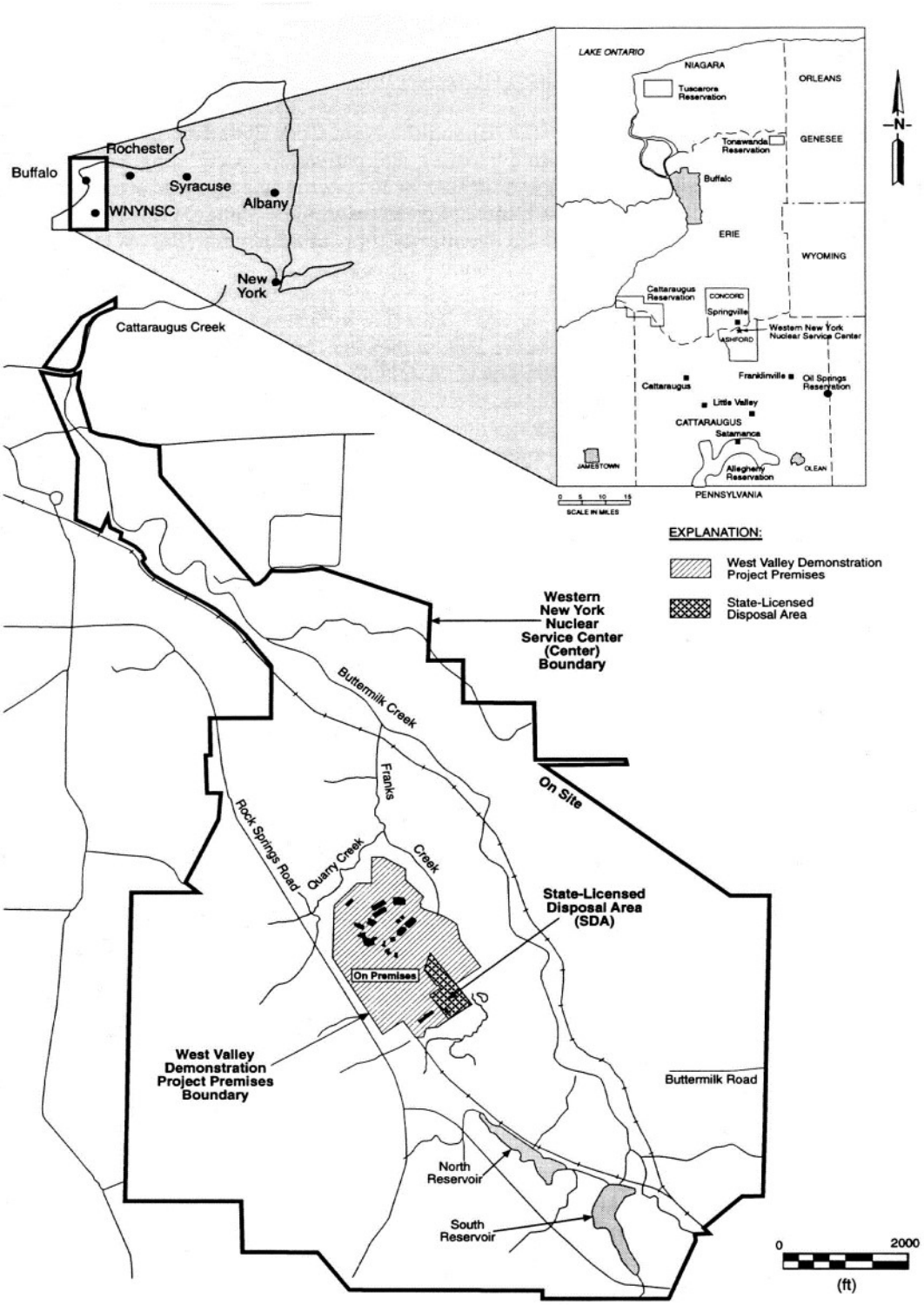


Figure 1-2. Aerial Photograph of the SDA

Source: NYSERDA

1.1 Leachate Management

Between 1990 and 1991, NYSERDA installed three tanks in two adjoining buildings at the SDA. In 1991, 8,000 gallons of leachate were pumped from Trench 14 into a 9,200-gallon fiberglass tank, located in the smaller of the two buildings. In 2009, the 8,000 gallons of leachate were removed from the fiberglass tank, placed in U.S. Department of Transportation-approved shipping containers, and shipped to a licensed and permitted treatment and disposal facility. The empty tank was removed in 2010 and shipped to a licensed facility for off-site disposal.

On December 29, 2011, NYSERDA received certification of clean closure from DEC when the portion of the Leachate Treatment Facility (SDA Solid Waste Management Unit No. 5) that stored mixed waste (i.e., leachate and Tank T-1) was removed, shipped, and treated, and the facility was sampled for confirmation that it was free of hazardous waste. Subsequently, on April 24, 2012, DEC approved NYSERDA's Protective Filer Certification for the unused portion of the Leachate Treatment Facility (two Frac tanks). On April 14, 2020, NYSERDA received notification from DEC that a *Determination of No Further Action*[1] for the SDA Solid Waste Management Unit No. 5 was made.

1.2 Trench Water Infiltration Controls

NYSERDA has completed five projects as interim measures under the Resource Conservation and Recovery Act (RCRA) 3008(h) Administrative Order on Consent (Docket No. II RCRA-3008(h) 92-0202) (Consent Order). The Consent Order authorized the EPA and DEC to issue orders requiring corrective action or such other responses as necessary to protect human health or the environment. Specific interim measures include:

- In September 1992, NYSERDA installed a soil-bentonite subsurface barrier wall along the western side of Trench 14 to prevent groundwater flow toward the south trenches (eight through 14). In June 1993, the project was completed with the installation of a very low-density polyethylene geomembrane cover over the surface of the trenches, extending from the centerline of Trench 12; across Trenches 13, 14, and the barrier wall; and terminating in a stormwater drainage swale excavated just beyond the barrier wall. Slit-trench monitoring wells were also installed on either side of the barrier wall to monitor for possible groundwater mounding upgradient of the wall.
- In 1995, NYSERDA expanded the use of the geomembrane covers at the SDA with the installation of a reinforced, ethylene interpolymer alloy geomembrane (XR-5) cover over Trenches 1 through 8, and 10 through 12. As part of this project, NYSERDA installed a stormwater management system consisting of five, geomembrane-lined stormwater basins to detain and release precipitation without increasing peak runoff from preproject conditions.

- In 1999, NYSERDA installed an XR-5 geomembrane cover on Trench 9, replacing the bioengineering management cover installed as a pilot project in 1993.
- In 2010, NYSERDA installed a new XR-5 geomembrane cover over the 1992 very low-density polyethylene geomembrane cover to ensure that water infiltration controls remained effective.
- In 2017, NYSERDA installed an XR-5 geomembrane cover on Trenches 1 through 12, placing the new geomembrane over the existing covers, and included reconfiguration and elimination of one stormwater detention area (W03), reconfiguration of the hardstand barrier area, regrading of select areas, removal of obsolete pipe penetrations, and installation of weighted ballasts to limit potential damage from wind.

1.3 Corrective Measures Study

In addition to radionuclides, the SDA trenches are known to contain materials that are classified as hazardous constituents under RCRA. Because there is a possibility that these materials could be released from the trenches, NYSERDA is required to prepare a corrective measures study under the requirements of the Consent Order. On October 6, 2010, NYSERDA submitted the *Final Focused Corrective Measures Study for the SDA at the Western New York Nuclear Service Center West Valley, New York.*[2] NYSERDA is required to submit a Final Corrective Measures Study at the time a decision is made on the ultimate disposition of the SDA.

1.4 Hazardous Waste Management Permit Application

In 2010, DEC requested that NYSERDA move from an interim status permit to a final status permit. In response, on January 6, 2011, NYSERDA submitted a draft 6 NYCRR Part 373 Hazardous Waste Management Permit Application (i.e., Corrective Action Permit Application). On February 10, 2011, DEC requested that the timeframe for review and processing of NYSERDA's Hazardous Waste Management Permit be suspended per 6 NYCRR Part 621 of the Uniform Procedures Act. NYSERDA agreed to suspend the timeframes for this application on February 23, 2011. NYSERDA met with DEC on July 18, 2012, to discuss a regulatory path forward; and on October 23, 2012, DEC informed NYSERDA that a new regulatory document (i.e., Corrective Action Only Order) for the WNYNSC would be developed when information from the Phase 1 Studies is available to better inform additional corrective action activities.

---

1 Letter, Lynn Winterberger, DEC, to Paul Bembia, NYSERDA. "Determination of No Further Action – Solid Waste Management Unit (SWMU) State-Licensed Disposal Area Unit No. 5 (SDA-5)," dated April 14, 2020.

2 NYSERDA. 2010. "Final Focused Corrective Measures Study for the State-Licensed Disposal Area at the Western New York Nuclear Service Center West Valley, New York." Prepared by Ecology and Environment, Inc.

2 Environmental Monitoring

2.1 Trench Leachate Elevations

2.1.1 Leachate Elevation Monitoring

Because the SDA trenches are constructed in a highly impermeable clay, water that enters the trenches has a tendency to accumulate. As such, routine measurements of water in the trenches (called leachate) are conducted in each sump to monitor the leachate level in each trench. One SDA trench sump is located in each of Trenches 1 through 5, 8, 9, and 11 through 13. Two sumps, designated 10N and 10S, are located in Trench 10; and one sump designated 14 and one well-point designated Well Point-91 (WP-91) are located in Trench 14 (see Figure 2-1).

Reference elevation surveys for each trench were completed in July 2018, with the elevations updated in February 2019. This survey data was used to calculate the leachate elevations in Table A-1.

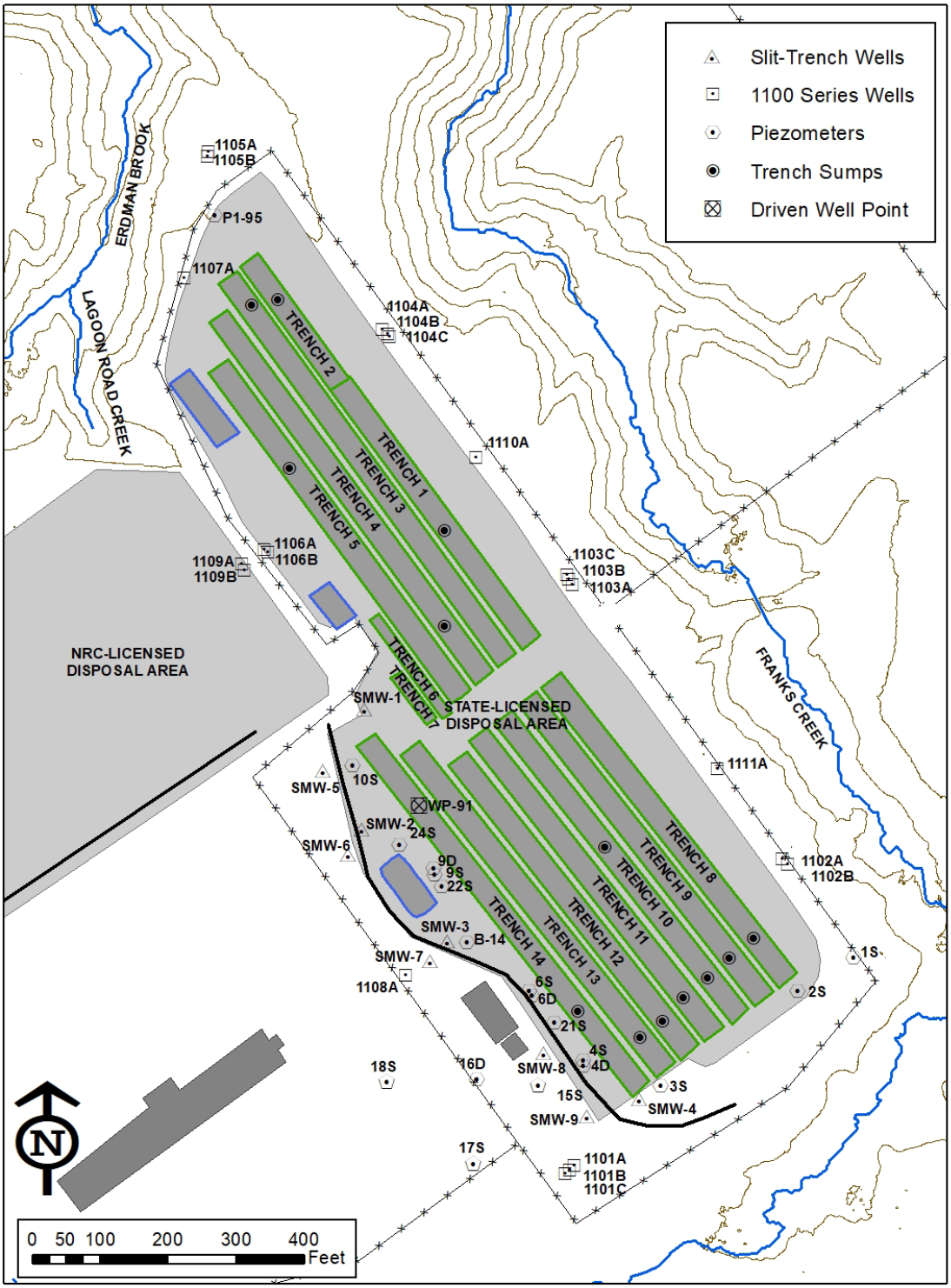
Leachate elevations are measured in the 13 trench sumps at the SDA in accordance with the *Leachate Monitoring Plan for the State-Licensed Disposal Area at West Valley* (LMP[3]). In addition to requiring the leachate elevation measurements, the LMP specifies data assessment, notification, and reporting requirements. Table A-1 presents leachate elevation data for 2020. Graphical presentations of leachate elevations over the 10-year time period (2010-2020) are presented using regression lines (red) and prediction lines (green) in Figures A-1 through A-17. In addition, the slope (rate of increase or decrease) and the R2 value (coefficient of determination) are shown on these figures. These plots will aid in the identification of leachate elevation trend changes in the trenches.

For Trenches 1 and 14, two or more regression lines and prediction interval graphs are provided. This is due to the increase in leachate identified for both of these trenches. These changes in leachate levels, or appearance of changes in leachate levels, necessitate separate regression and slope calculations.

A regression analysis is a statistical process for estimating the relationship among dependent and independent "predictor" variables. It takes into account the impacts on the dependent variable (leachate levels) when an independent variable (time) is modified. The 95 percent prediction interval provides a probable range for estimating future data based on historical results. The R2 value is a statistical ratio of how the data fit the regression line and how the data points vary around their mean. In general, the closer the value of R2 is to 1.0, the better the model fits the data.

Figure 2-1. Trench Sump and Groundwater Monitoring Locations

Source: NYSERDA



Leachate elevation measurements for 2020 were collected quarterly in March, June, September, and December (see Table A-1). Additional monthly leachate elevation measurements were taken in Trenches 13 and 14 (including WP-91) (see Section 2.1.2).

2.1.2 Leachate Elevation Trend Assessment

The LMP requires an annual assessment of long-term leachate elevation trends. The long-term statistical data assessment for 2020 (*Annual Statistical Assessment of State-Licensed Disposal Area Water Elevations - Data Through 2020*[4]) indicates that from 2000 through 2020, most trenches show a decreasing long-term leachate elevation trend (see Figure 2-2). Until 2017, Trench 1 was shown to be exhibiting an increasing long-term trend (see Figure A-1). However, Trench 1 was sampled in September 2017 and the leachate level decreased by approximately 0.48 ft (approximately six inches) during sampling, and did not recover through 2020 (see Figure A-2). Based on the regression analysis plotted in Figure A-2, since September 2017, Trench 1 has remained stable, with potentially a very small increase identified that is within the measurement uncertainty. This indicates there is little leachate in this trench, which is consistent with the results of investigations by NFS in 1970 and 1981.[5] NYSERDA will continue to monitor and evaluate the leachate elevation in Trench 1.

As described below, an increase in the Trench 14 leachate elevation has been observed since 2011 following a period of consistent decrease (see Figures 2-3 and A-14). As such, NYSERDA instituted the regression analysis to evaluate leachate elevation changes in Trench 14. Based on the regression analysis plotted in Figures 2-4 and A-15, between 2011 and 2018, Trench 14 had been increasing at approximately 0.87 inches per year. However, from the middle of 2018 through 2020, the Trench 14 leachate elevation rate has increased. Based on the regression analysis plotted on Figures 2-5 and A-16, since mid-2018, Trench 14 has been increasing at a rate of approximately 1.93 inches per year. During the fourth quarter of 2020, NYSERDA raised questions about the water level probe functionality in Trench 14. An evaluation of the probe functionality will be performed by the environmental contractor in the first quarter of 2021.

Monitoring of location WP-91 began in 2013 to supplement data from Trench 14. Evaluation of the 2020 datasets show that the leachate levels measured in WP-91, located on the north end of Trench 14, are increasing after a period of stabilization. During 2020, monthly leachate elevation measurements in WP-91 have intermittently increased or decreased by 0.01 to 0.04 ft, resulting in a net increase of 0.08 ft,

Figure 2-2. SDA Water Elevation Trends

Source: NYSERDA

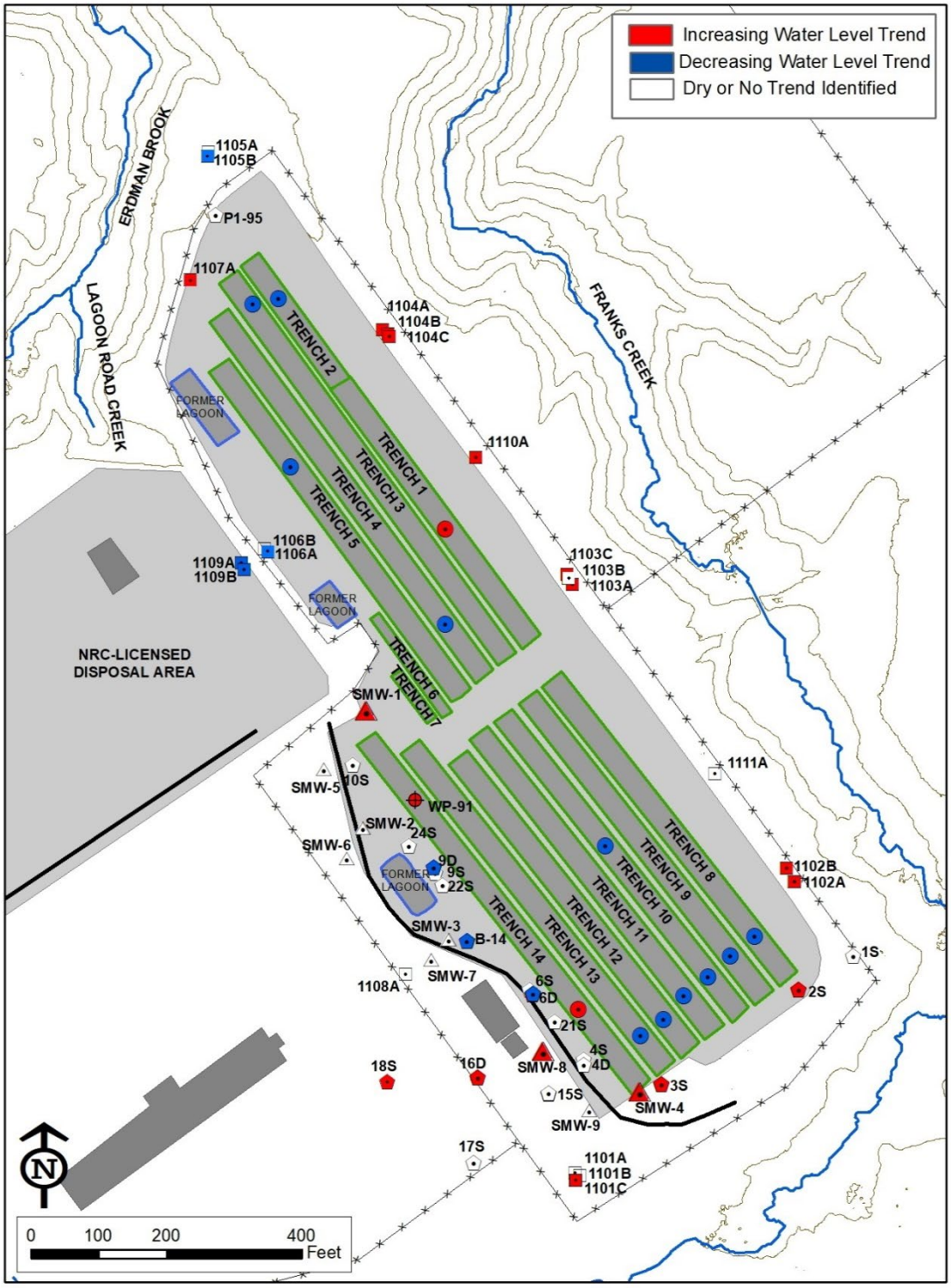
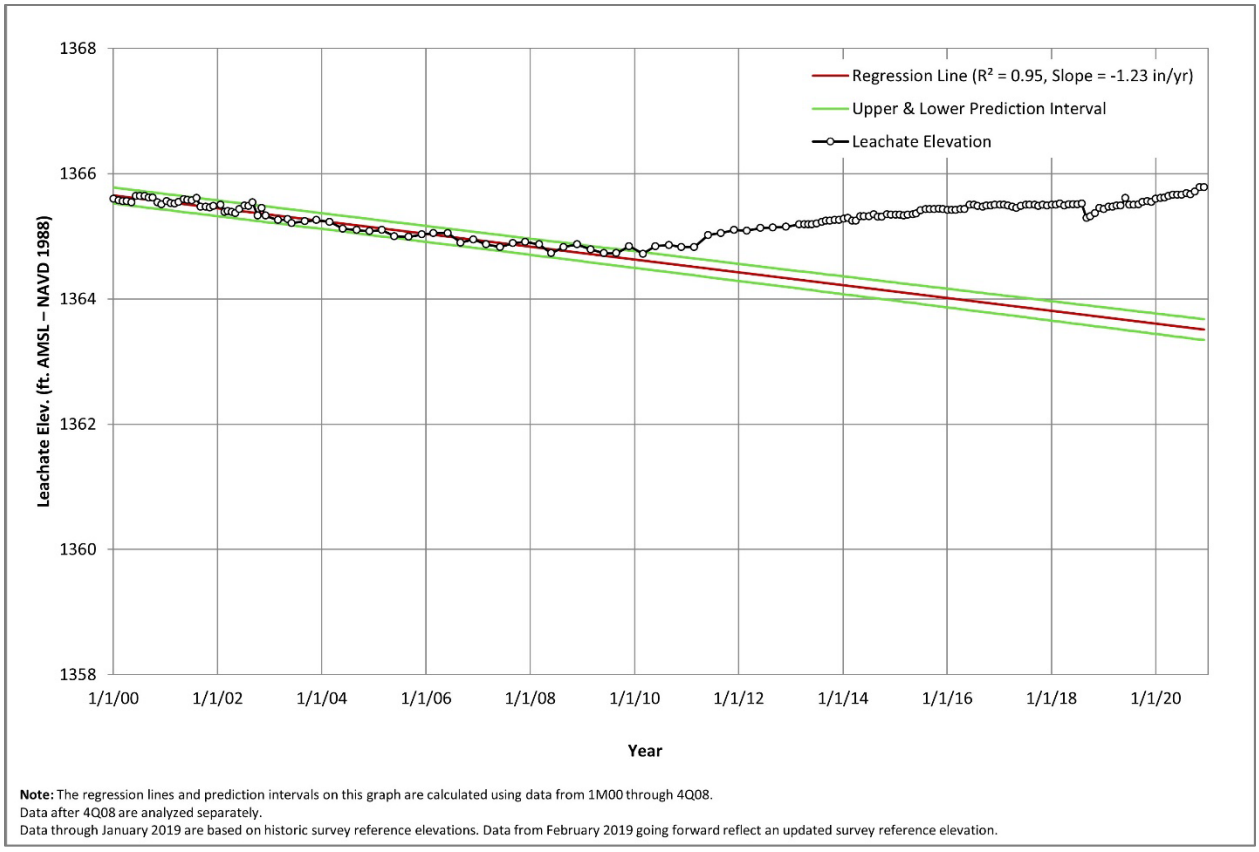


Figure 2-3. 2000 to 2008 Leachate Elevations, Trench 14

The regression line is shown in red, with the 95% prediction interval shown in green.

Source: NYSERDA



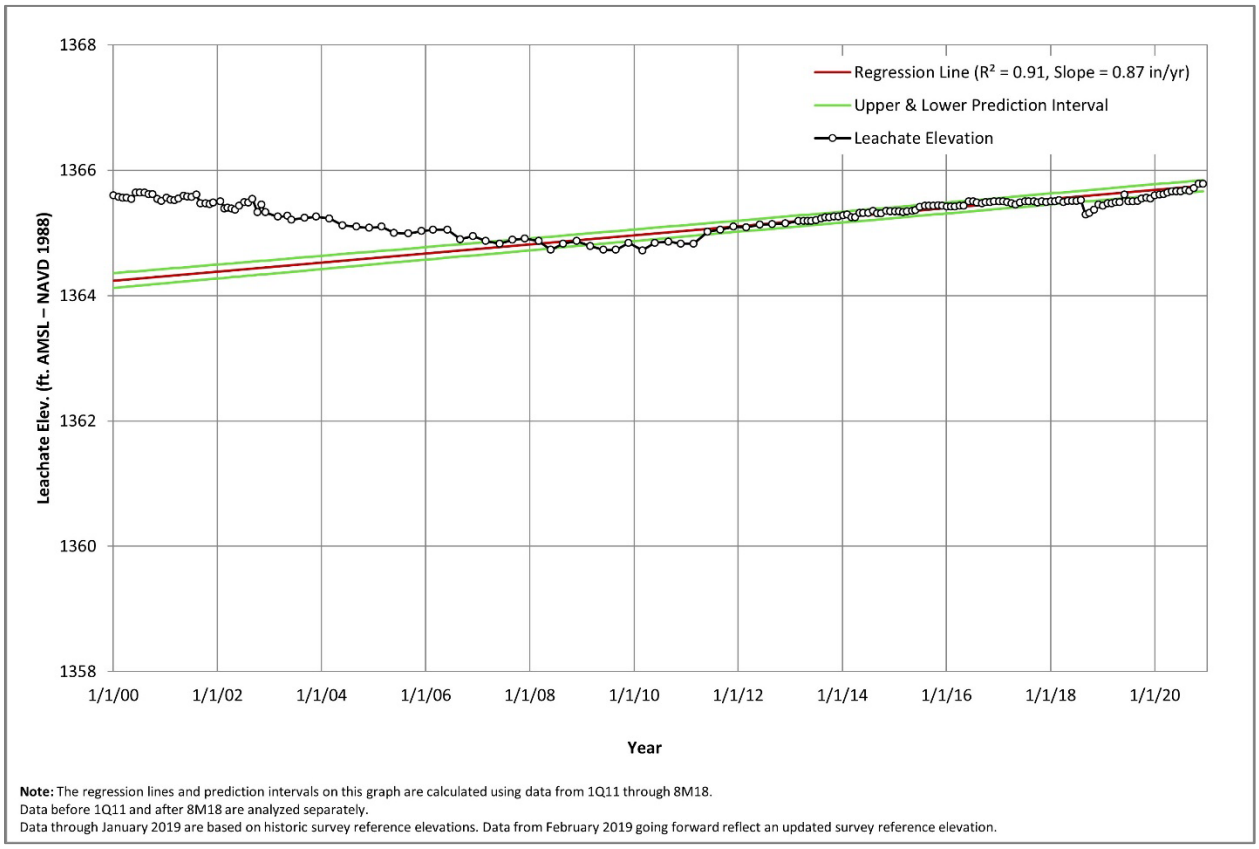
(which is below reportable requirements). However, the long-term leachate levels in WP-91 have been steadily increasing; and, based on the regression analysis plotted in Figure A-17, Trench 14 at WP-91 has been increasing at approximately 0.57 inches per year.

The current leachate levels do not represent a threat of release, or concern to health and safety for the public or the environment. NYSERDA is presently preparing to implement mitigation measures to address the Trench 14 leachate increase. NYSERDA will continue to review and evaluate leachate trends in the trenches using the regression analysis to identify changes in trends that may not be identified using the historical long-term statistical analysis.

Figure 2-4. 2011-2018 Leachate Elevations, Trench 14

Regression line is shown in red, with the 95 percent prediction interval shown in green.

Source: AECOM



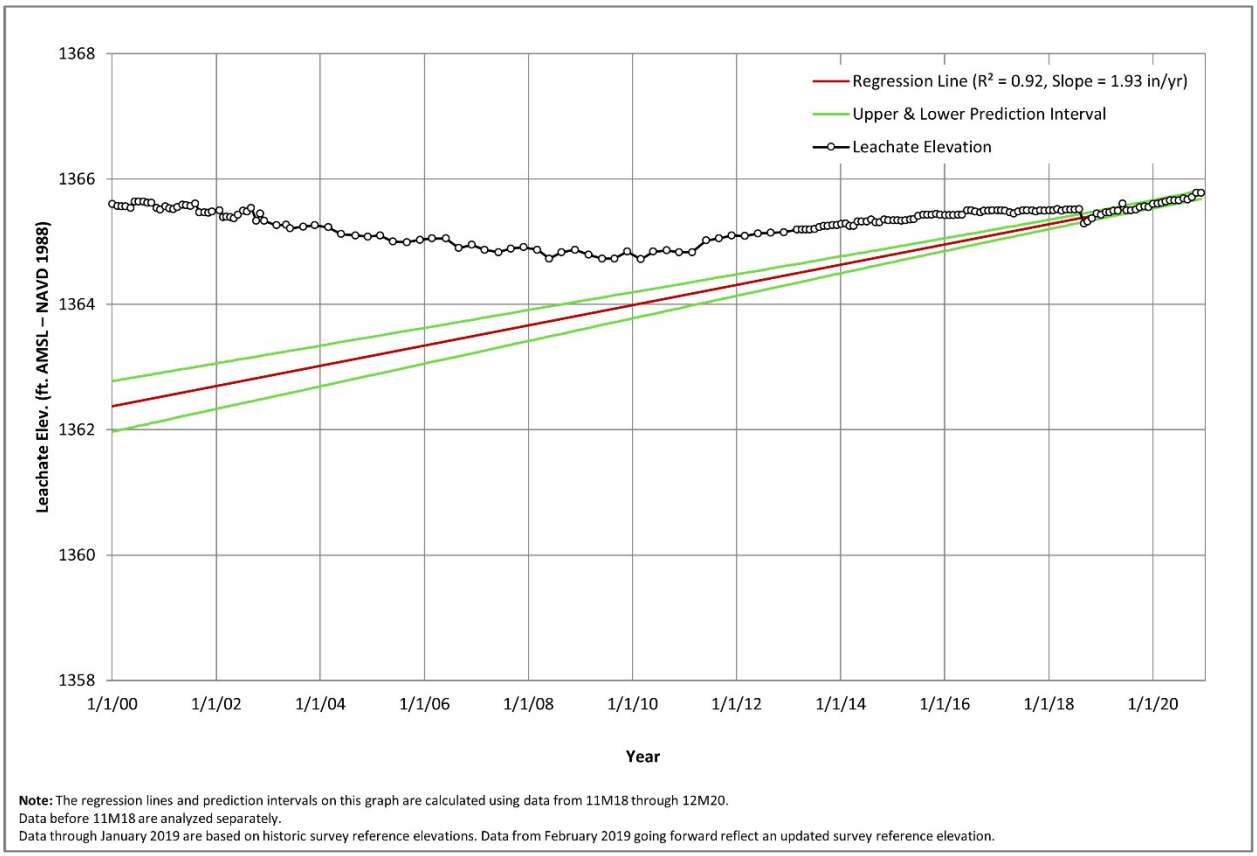
2.1.3 Trench 14 and Trench 1 Leachate Investigation

Following the installation of infiltration controls in the mid-1990s, the Trench 14 leachate elevation followed a consistent and generally predictable decreasing trend (Figures 2-3 and A-14). A noteworthy change in behavior of this trend occurred in approximately 2008 through 2011 when the decreasing trend leveled off, as shown in Figure 2-4. Small increases and decreases have been observed since 2011; but overall, the Trench 14 leachate elevation continued to increase each year, although none of the increases triggered regulatory reporting requirements.

Figure 2-5. 2018 to 2020 Leachate Elevations, Trench 14

Regression line is shown in red, with the 95 percent prediction interval shown in green.

Source: AECOM



In 2014, NYSERDA issued a contract with an independent consulting firm to conduct a detailed evaluation of the leachate increases in Trenches 14 and Trench 1. The evaluation of Trench 1 was due to a very slow increase in the leachate elevation that had been observed for several years. The purpose of this evaluation was to identify a cause or potential causes for the increase in the leachate elevation that has been observed for several years within both trenches; and, to present findings and recommendations for mitigating the increases. This evaluation has included extensive geologic and hydrologic data evaluation, resulting in a preliminary Findings and Recommendations Report, which was submitted to DEC and EPA in 2015. A work plan to address the findings and recommendations presented in the 2015 report was finalized and submitted to DEC and EPA in 2016.

Field activities began during the second quarter 2016 (installation of 24 piezometers), continued into the fourth quarter of 2016 (sampling 22 of the 24 piezometers installed in 2016), and into the fourth quarter of 2018 (installation of 11 additional piezometers), with the development and sampling conducted in the first quarter of 2019 (see Figure 2-6). Water levels were collected from the 2016 and 2018 installed piezometers and select monitoring wells through the end of 2020, and were evaluated in regard to leachate elevation increases at Trench 14. A *Final Subsurface Investigation Report for Western New York Nuclear Service Center, State-Licensed Disposal Area*,[6] was received in March 2020. Based on the findings of this report, a mitigative option of installing sheet pile to extend the barrier wall on the west side of Trench 14 to the east and around the NDA hardstand area to cut off the flow of groundwater from the hardstand will be implemented in 2021.

---

[3] Throughout this report, LMP refers to the Leachate Monitoring Plan: NYSERDA. 2019. "Leachate Monitoring Plan for the State-Licensed Disposal Area (SDA), ENV501.06."

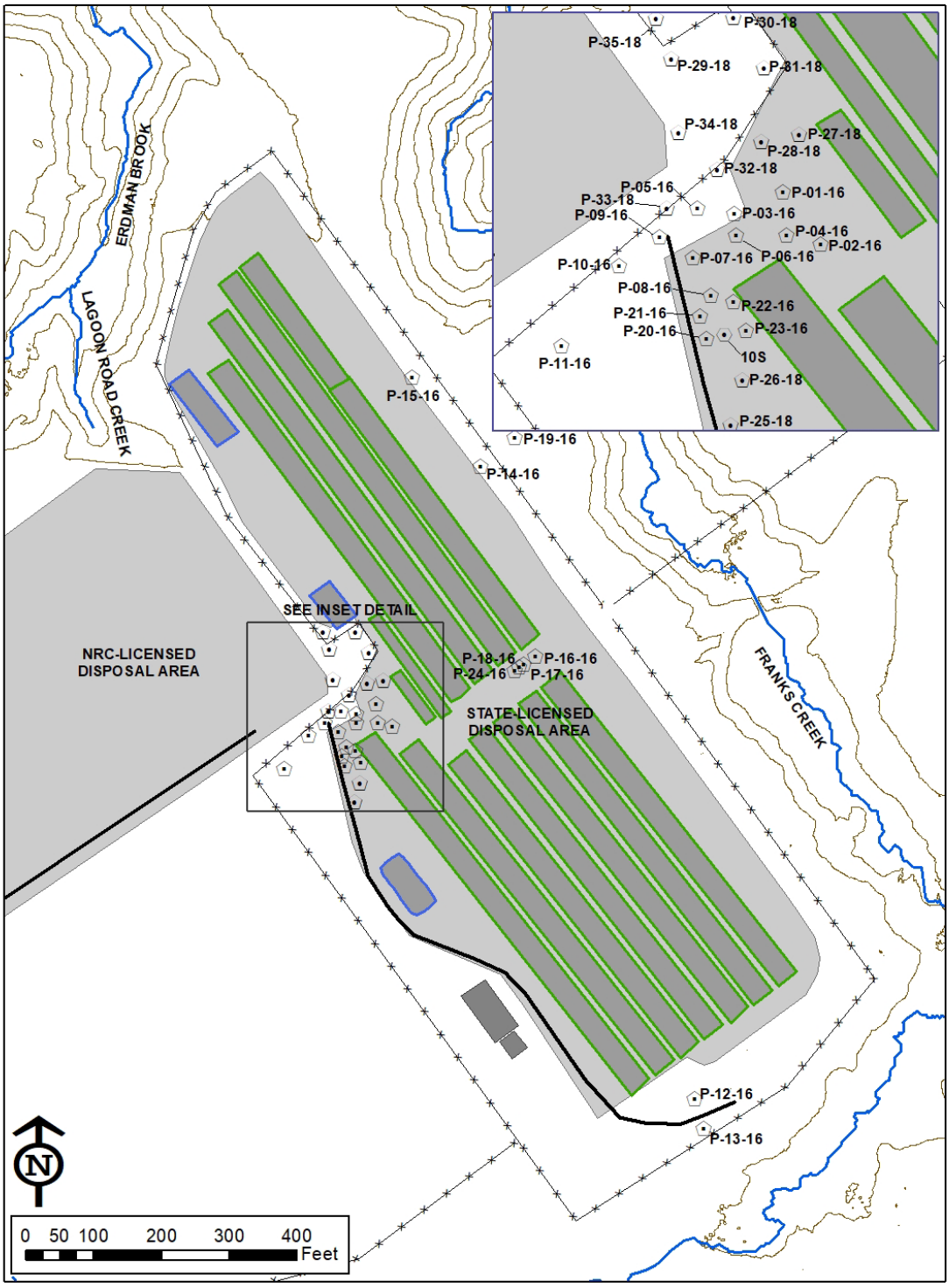
[4] NYSERDA. 2021. 2021. "Annual Statistical Assessment of State-Licensed Radioactive Waste Disposal Area Water Elevations – Data Through 2020." Prepared by AECOM.

[5] Letter, J. P. Duckworth to W. H. Lewis, "Waste Burial Trench 1 Study," dated June 5, 1981.

[6] GZA. 2020. "Final Subsurface Investigation Report for Western New York Nuclear Service Center, State-Licensed Disposal Area."

Figure 2-6. 2016 and 2018 Piezometer Locations

Source: NYSERDA



2.2 Groundwater Monitoring

The SDA groundwater monitoring network consists of 21 groundwater monitoring wells (the 1100-series wells); 19 piezometers; and nine slit-trench wells. The location of each monitoring location is shown in Figure 2-1. The purpose of the groundwater monitoring program is twofold: (1) to provide data of sufficient quality and quantity to allow detection of the migration of radionuclides or volatile organic compounds (VOCs) from the SDA via groundwater; and, (2) to provide information on hydrologic conditions near the disposal trenches. The Groundwater Monitoring Program is conducted in accordance with the *Groundwater Monitoring Plan for the State-Licensed Disposal Area at West Valley,* (GMP[7]). The 1100-series wells, piezometers, and slit-trench wells are inspected and maintained as described in the GMP.

Reference elevation surveys for each groundwater location were completed in July 2018, with the elevations updated in February 2019. This survey data was used to calculate the groundwater elevations in Tables B-2, B-4, and B-6.

2.2.1 Groundwater Elevation Monitoring

The GMP requires quarterly groundwater elevation measurements in the 1100-series wells, the piezometers, and the slit-trench wells. Well construction information for each type of well is presented in Tables B-1, B-3, and B-5. In 2020, measurements were taken in March, June, September, and December; and the results for each well are presented in Tables B-2, B-4, and B-6, respectively. In addition, monthly groundwater elevation measurements were taken at a number of locations in support of the Trench 14 leachate investigation (see Section 2.1.3).

Groundwater elevation data are used to construct quarterly groundwater elevation contour maps in North American Datum/North American Vertical Datum (NAD 83/NAVD 88) for the Weathered Lavery Till and the Kent Recessional Sequence (see Figures B-1 through B-10). The 2020 groundwater contour maps show the hydraulic gradient in the Weathered Lavery Till, in the vicinity of the disposal trenches, to be inward toward the trenches. The path of the groundwater movement in the Kent Recessional Sequence is northeasterly. These trends are consistent with historical data.

2.2.2 Groundwater Elevation Trend Assessment

An assessment of upward or downward trends in groundwater elevations was conducted for the data collected in 2020 (*Annual Statistical Assessment of State-Licensed Disposal Area Water Elevations - Elevations – Data Through 2020*[8]). The statistical assessment used groundwater elevation data from January 2000 through December 2020, and the results of the trend assessment show increasing long-term water elevation trends in: Wells 1101C, 1102B, 1103A, 1103C, 1104A, 1104B, 1104C, 1107A, and 1110A; Piezometers 2S, 3S, 16D and 18S; and Slit-Trench Wells SMW-1, SMW-4, and SMW-8. A long-term decreasing water elevation trend was observed in: Wells 1105B, 1106A, 1109A and 1109B; and Piezometers 6D, 9D, and B-14. Piezometers 4S and 9S; and Slit-Trench Wells SMW-2 and SMW-3 have been dry throughout the statistical assessment period. No upward or downward trends were found in the remaining groundwater wells at the SDA.

As Figure 2-2 shows, the majority of the wells located within the area covered by the geomembrane and immediately downgradient of the slurry wall are dry or exhibit no trend. Four locations upgradient of the slurry wall show an increasing trend. The distribution of groundwater elevations near the west side of Trench 14, and the decreasing long-term leachate elevation trends in all but two of the SDA trenches, reflect the continued effectiveness of the water infiltration controls system (i.e., subsurface barrier wall and geomembrane cover).

2.2.3 Groundwater Parameter Monitoring

In accordance with the GMP, the 1100-series wells were sampled semiannually (May and November) during 2020.

Analytical parameters monitored semiannually included gross alpha, gross beta, and tritium; and field water quality parameters (conductivity, pH, temperature, and turbidity). Analytical parameters monitored annually in 2020 included gamma-emitting radionuclides (by gamma spectroscopy); four beta-emitting radionuclides (carbon-14, iodine-129, strontium-90 [Sr-90], and technetium-99); and VOCs. Checklists of the parameters sampled at each well are presented in Tables B-7 and B-8. Groundwater analytical results for all parameters, except VOCs, are presented in Tables B-9 and B-10. VOCs are not presented because all values were below the method detection limits or practical quantitation limits.

2.2.3.1 Gross Alpha

For the May 2020 sampling event, the Upper Tolerance Limits (UTL) or Upper Predictive Limits (UPL) were exceeded for Wells 1101A, 1102A, and 1109A. Review of the historical data for these wells indicated that the results were above the mean for their respective locations but did not represent a new maximum. No increasing trend was identified and resampling was not required. For the November sampling event, UTLs/UPLs were exceeded for Wells 1101B, 1102A, 1104A, 1104C, 1107A, and 1111A. Review of the historical data for these wells indicated that the results were above the mean for their respective locations but did not represent a new maximum. No increasing trend was identified and resampling was not required.

Gross alpha results were assessed using the statistical intrawell comparison protocol described in the GMP. Results of gross alpha monitoring are consistent with historical results.

2.2.3.2 Gross Beta

For the May 2020 sampling event, the UPL/UTL was exceeded for Well 1102A. Review of the historical data for this well indicated that the result was above the mean but did not represent a new maximum. No increasing trend was indicated at this location, and resampling was not required. For the November sampling event, the UTL/UPL was exceeded for Well 1101A. Review of the historical data for this well indicated that the result was above the mean but did not represent a new maximum. No increasing trend was indicated at this location, and resampling was not required.

Gross beta results were assessed using the statistical intrawell comparison protocol described in the GMP. Results of gross beta monitoring are consistent with historical results.

2.2.3.3 Tritium

In May and November 2020, no UTLs or UPLs were exceeded for any of the sampled wells.

Tritium results were assessed using the statistical intrawell comparison protocol described in the GMP. Results of tritium monitoring are consistent with historical results.

2.2.3.4 Gamma-Emitting Radionuclides

In May, gamma spectroscopy was performed for the 14 routinely reported radionuclides. The results were generally consistent with historical results. All results for cesium-137, cobalt-57, cobalt-60, potassium-40, thallium-208, and uranium-235 were below their minimum detectable concentrations (MDC) or 2-sigma uncertainties.

Results for actinium-228 (1103C, 1106B, and 1108A); lead-212 (1105B); and radium-224 (1105B) were above their MDCs, and were qualified as estimated due to the uncertainty exceeding 50 percent of the result.

Ten results for bismuth-214 exceeded their MDCs (1101B, 1101C, 1103A, 1104A, 1105B, 1106A, 1106B, 1107A, 1109B, and 1111A). Eight of the results were qualified as estimated due to the uncertainty exceeding 50 percent of the result.

The result for cesium-134 was above its MDC and 2-sigma uncertainty (1102A).

Seven results for lead-214 exceeded their MDCs and 2-sigma uncertainties (1101B, 1101C, 1102A, 1102B, 1104A, 1106A, and 1107A). Two of those results were qualified as estimated due to the uncertainty exceeding 50 percent of the result, and one result was assigned an estimated nondetect qualifier due to the absolute value of the negative result exceeding the uncertainty.

Two results for radium-226 were above their MDCs, 2-sigma uncertainties, and the laboratory-assigned reporting limits (1101C and 1102B). The result for 1101C was qualified nondetect due to method blank contamination; and per data validation guidelines, the MDCs were replaced by the result value. Both detected results were qualified as estimated due to the MDCs exceeding the reporting limit.

Two results for thorium-234 exceeded their MDCs and 2-sigma uncertainties (1101B and 1109B). One of those results was qualified as estimated due to the uncertainty exceeding 50 percent of the result.

Calculation of statistics (mean, standard deviation, and control charting) for the 14 routinely reported gamma emitters was not required. Typically, five positive detections (as defined in the GMP) have to occur for any gamma-emitting radionuclide to require control charting. The bismuth-214 and lead-214 datasets for Well 1107A meet the minimum requirement for creating a control chart; however, the data is not suitable for creating a control chart because of the elapsed time between the positive detections. The

objective of a control chart is to analyze trends, and the recent data from Well 1107A indicates that there is not a definable trend due to the number of nondetects between 1996 and May 2020; therefore, a control chart would not be representative of current conditions at this location. A control chart will be created when occurrences of detected value are more frequently observed.

2.2.3.5 Beta-Emitting Radionuclides

Beta-emitting radionuclide sampling for carbon-14, iodine-129, Sr-90, and technicium-99 was performed in May 2020.

Results for carbon-14 were consistent with historical results and below the MDCs, which did not exceed the reporting criteria set forth in the GMP.

All May 2020 results for iodine-129 were below their MDCs and the program detection limit of 1E+00 picocurie per liter (pCi/L), which is consistent with historical results.

The Sr-90 result were consistent with historical results, and below the MDCs or 2-sigma uncertainties and contract-required detection limit (CRDL) of 1E+00 pCi/L except for Wells 1107A (6.32E+00±9.27E-01 pCi/L) (above the CRDL), and 1101B (4.54E-01±2.08E-01) (below the CRDL).

After the fifth positive detection for Sr-90 in Well 1107A (2002) was reported, control charting was initiated. The current calculated mean and control limits are based upon the initial five positive detections. Based upon the control chart for Sr-90 in Well 1107A, no trends in the data have been identified.

All 2020 results for technicium-99 were below their MDCs and the program detection limit of 5E+00 pCi/L, which is consistent with historical results.

2.2.3.6 Volatile Organic Compounds

Consistent with historical results, VOC results for samples collected in 2020 were not detected above the method detection limits or practical quantitation limits, and are not presented in this report.

2.2.3.7 Field Water Quality Parameters

Conductivity, temperature, turbidity, and pH are measured in the field during groundwater sampling. The 2020 water quality measurements were generally consistent with historical results and are reported in Table B-10. A new maximum conductivity value was seen at Well 1104C (2644 Micromhos per Centimeter [µmhos/cm]). New maximum turbidity values were seen at Well 1104A (26.8 nephelometric turbidity units[NTU]), Well 1105B (3687 NTU), and Well 1108A (1039 NTU). Historically, when a turbidity result exceeded the measurement capacity of the turbidity meter, the result has been listed as ">1000 NTU." The turbidity meter used was able to display values greater than 1000 NTUs; therefore, the "new maximum" at Wells 1101C and 1108A are not necessarily new maximums, but may be due to the increased range of the turbidity meter used in 2020, which can read up to 4000 NTUs. New maximum values for pH were recorded at Well 1104C (7.66 standard units [S.U.]), Well 1105A (8.47 S.U.), Well 1105B (8.29 S.U.), and Well 1109A (7.98 S.U.). A new maximum value for temperature was recorded at Well 1107A (15.78°C).

---

[7] Throughout this report, GMP refers to the Groundwater Monitoring Plan: NYSERDA. 2019. "Groundwater Monitoring Plan for the State-Licensed Disposal Area (SDA) at West Valley, ENV502.06."

[8] AECOM, pg. 13.

2.3 Surface Water Monitoring

During 2020, quarterly surface water samples for gross alpha, gross beta, and tritium analyses were collected at the four SDA monitoring locations (WNDCELD, WNFRC67, WNNDADR, and WNERB53). A background sampling location south (and upgradient) of the SDA on Buttermilk Creek (WFBCBKG) was also collected quarterly and is used for data comparison. An annual sample was also collected at location WFBCANL in 2020, approximately 0.75 miles northeast (and downgradient) of the SDA on Buttermilk Creek.

As shown in Figure 2-7, WNNDADR, located in Lagoon Road Creek adjacent to both the SDA and the Nuclear Regulatory Commission-Licensed Disposal Area (NDA), (and within the WVDP premises), and WNERB53, located in Erdman Brook downstream of WNNDADR, monitor surface water runoff from the SDA, NDA, and portions of the WVDP Premises. WNDCELD, located in Franks Creek on the south side of the SDA, monitors surface water from areas adjacent to the WVDP Drum Cell upstream of the SDA. WNFRC67, located downstream on Franks Creek, monitors surface water on the eastern and southern portions of the SDA.

Figure 2-8 shows WFBCBKG, located upstream of the WNYNSC in Buttermilk Creek, which monitors background surface water conditions, and WFBCANL, also located in Buttermilk Creek, which monitors Buttermilk Creek just downstream of where the Kent Recessional unit groundwater is discharged to Buttermilk Creek via groundwater seeps.

Surface water monitoring data are presented in Tables C-1 through C-6. A statistical assessment of radiological constituents (gross alpha, gross beta, and tritium) for the SDA surface water was conducted using the data collected in 2020 (*Statistical Assessment of State-Licensed Radioactive Waste Disposal Area Surface Water Constituents for 2020*[9]).

[9] NYSERDA. 2021. "Statistical Assessment of SDA Surface Water Constituents for 2020." Prepared by AECOM.

Figure 2-7. Surface Water Monitoring Locations (WNDCELD, WNFRC67, WNNDADR, and WNERB53)

Source: NYSERDA

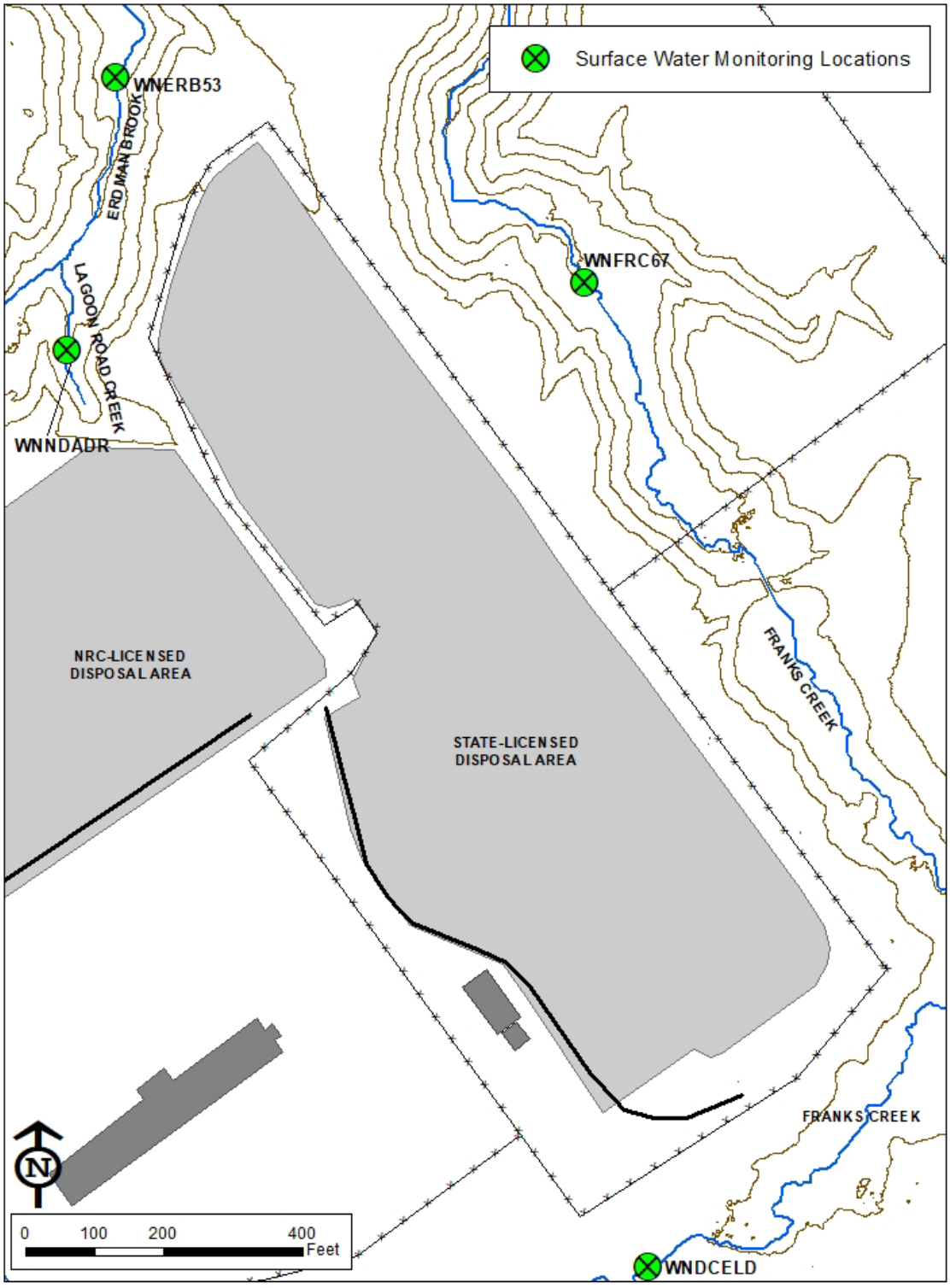
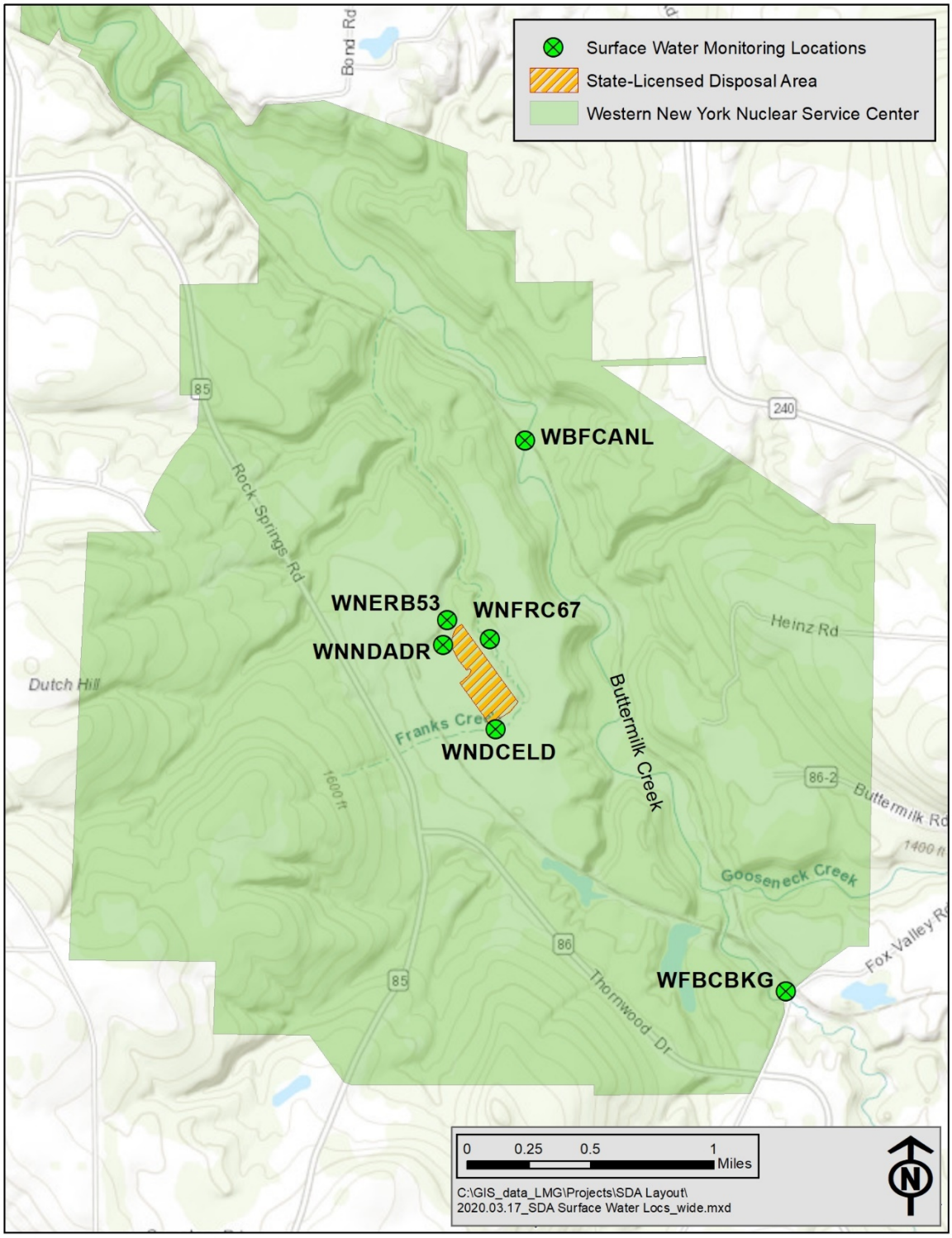


Figure 2-8. Surface Water Monitoring Locations (WFBCBKG and WFBCANL)

Source: NYSERDA



2.3.1 Radiological Parameters

2.3.1.1 Gross Alpha

The 2020 gross alpha results for all four surface water sampling locations (WNDCELD, WNFRC67, WNNDADR, and WNERB53) were statistically indistinguishable from background. All 2020 gross alpha results were below the 6 NYCRR 703.5 – Table 1 Water Quality Standards for Surface Water and Groundwater (6 NYCRR 703.5[10]) (1.5E+01 pCi/L), which is used as a comparative value for gross alpha.

2.3.1.2 Gross Beta

The 2020 gross beta results for WNDCELD and WNFRC67 were statistically indistinguishable from background. Gross beta results for WNERB53 and WNNDADR were both statistically higher than background. The results for WNERB53 are consistent with historical results prior to 2017; and, the gross beta results for WNNDADR continue to decrease since the NDA geomembrane cover and subsurface barrier wall were installed in 2008.

Figure 2-9 shows the gross beta results for WNERB53 and WNNDADR locations, and the background location (WFBCBKG).

All gross beta results were below 6 NYCRR 703.5 (1.0E+3 pCi/L), which is used as a comparative value for gross beta.

2.3.1.3 Tritium

The 2020 tritium results for all four surface water sampling locations (WNDCELD, WNFRC67, WNNDADR, and WNERB53) were statistically indistinguishable from background. Figure 2-10 shows the tritium results for WNFRC67, WNERB53, WNNDADR, and the background location (WFBCBKG). The results are consistent with historical assessments; and, WNNDADR continues to decrease since the NDA geomembrane cover and subsurface barrier wall were installed in 2008. All tritium results were below the 6 NYCRR 703.5 (2.0E±4 pCi/L), which is used as a comparative value for tritium.

---

[10] Throughout this report, 6 NYCRR 703.5 refers to Table 1 Water Quality Standards for Surface Waters and Groundwater: DEC. 1998. "6 NYCRR 703.5 – Table 1 Water Quality Standards for Surface Waters and Groundwater."

Figure 2-9. Gross Beta Results for Surface Water Monitoring Locations WNERB53 and WNNDADR Compared to WFBCBKG

Source: NYSERDA

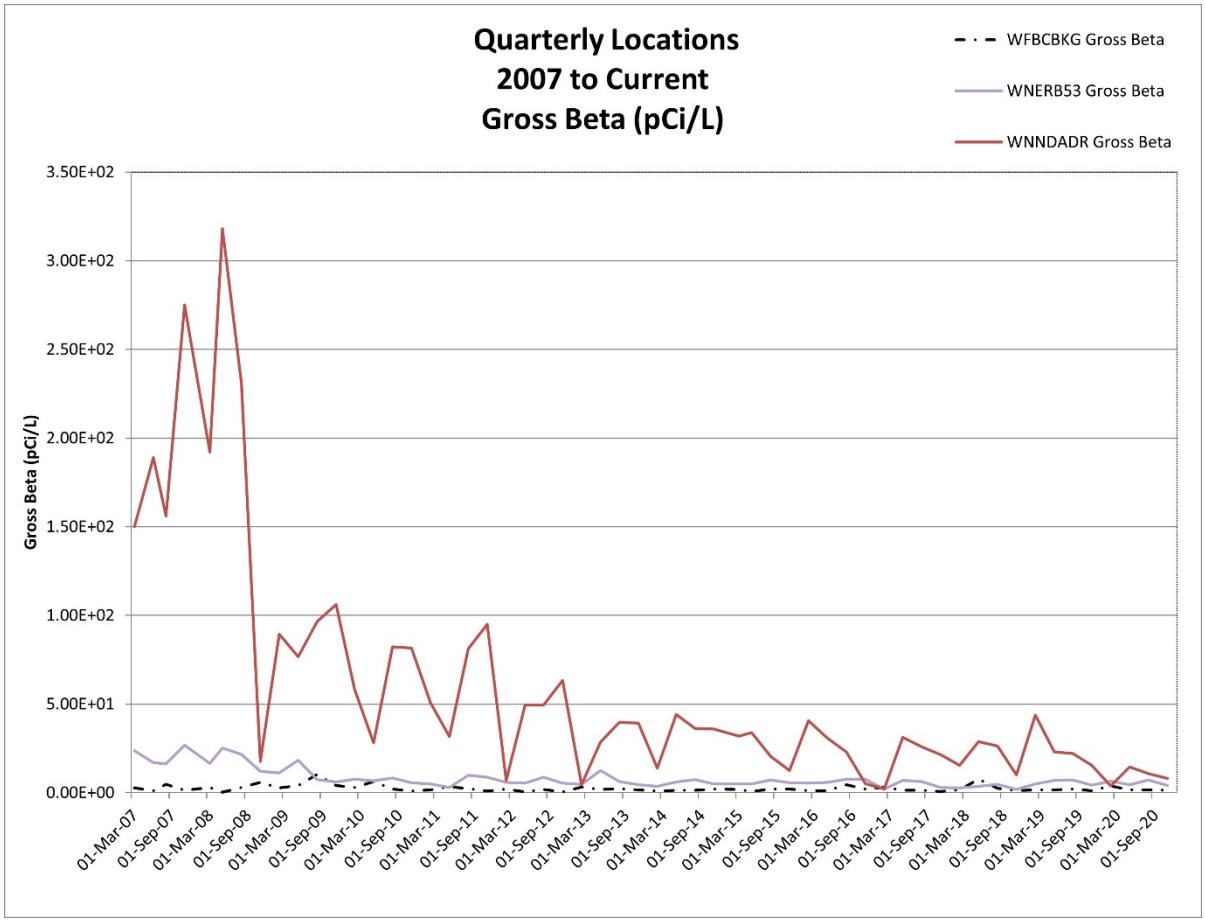
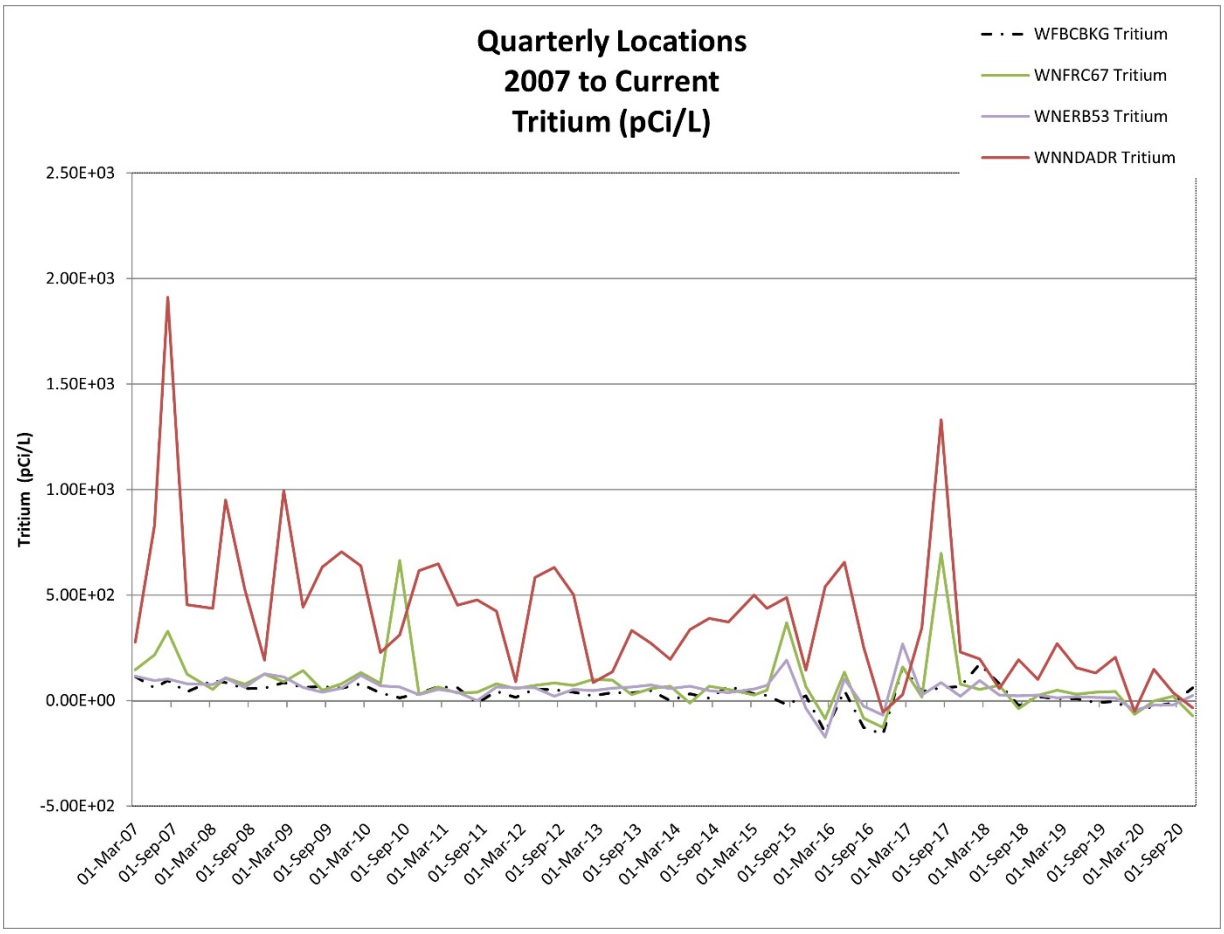


Figure 2-10. Tritium Results for Surface Water Monitoring Locations WNFRC67, WNERB53, and WNNDADR Compared to WFBCBKG

Source: NYSERDA



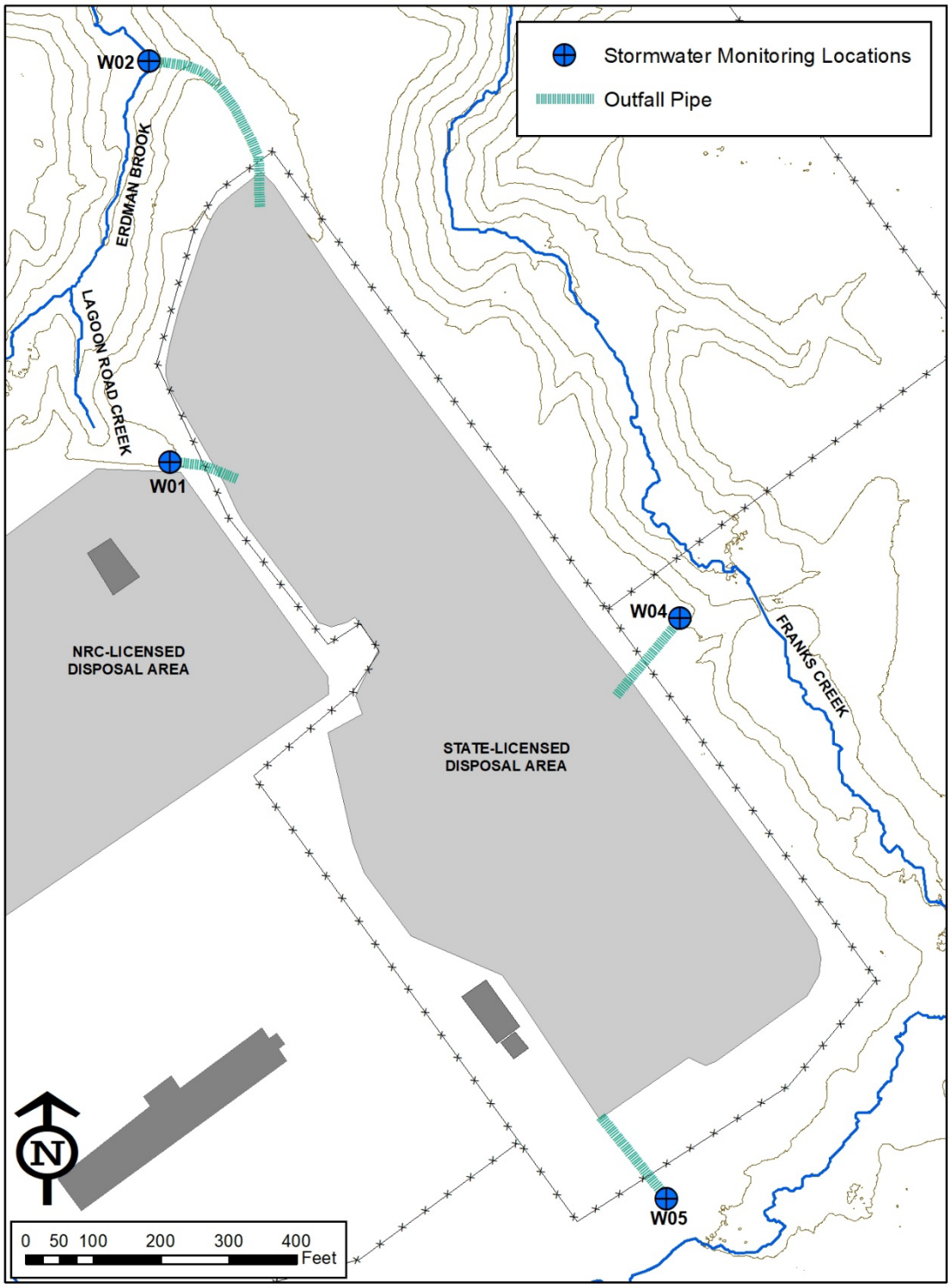
2.4 Stormwater Monitoring

As required by the SDA State Pollution Discharge Elimination System (SPDES) Permit No. NY-026971, semiannual sampling is conducted at one of the four designated SDA stormwater outfalls (as shown in Figure 2-11). During 2020, semiannual stormwater samples were collected from Outfall W01 during nonqualifying storm events on May 18 and October 29.

Composite samples from both events were analyzed for biological oxygen demand (BOD), chemical oxygen demand (COD), total nitrate-nitrite and total Kjeldahl nitrogen, total phosphorus, total suspended solids (TSS), gross alpha, gross beta, tritium, and gamma spectroscopy. Grab samples from both events were analyzed for BOD, COD, total nitrate-nitrite and total Kjeldahl nitrogen, oil and grease, total

Figure 2-11. Stormwater Monitoring Locations

Source: NYSERDA



phosphorus, TSS, pH, and temperature. Ambient rainfall samples from both events were analyzed for pH and temperature. Stormwater monitoring data for 2020 is provided in Tables C-7 and C-8, and is reported to DEC as required by the SPDES permit.

2.4.1 Radiological Parameters

2.4.1.1 Gross Alpha

The gross alpha result for the May sampling event (2.17E+00±8.95E-01 pCi/L) was above the reported MDC value of 8.69E-01 pCi/L and is a new maximum. Gross alpha results from the October 2020 sampling event were nondetect as they were below their reported MDC values.

All three results were below the 6 NYCRR 703.5 (1.5E+01 pCi/L) criteria, which is used as a comparative value for gross alpha.

2.4.1.2 Gross Beta

The gross beta results for the May and October 2020 sampling events (4.49E+00±9.77E-01 pCi/L and 3.16E+00±5.92E-01 pCi/L) were both above the reported MDC values of 9.22E-01 pCi/L (for May) and 5.25E-01 pCi/L (for October). Gross beta results have been exhibiting a decreasing trend, with the exception of the first semiannual samples for 2020, which were assigned a "J" qualifier because the MDC exceeded the CRDL, and the uncertainty was greater than 50 percent of the result. Results since the first semiannual event of 2020 are all within the recent historic range.

Both gross beta results were below the 6 NYCRR 703.5 (1.0E+03 pCi/L), which is used as a comparative value for gross beta.

2.4.1.3 Tritium

The tritium result for the May sampling event was nondetect as it was below the reported MDC value. The tritium result for October (9.68E+01±3.84E+) was above the reported MDC values of 5.92E+01 pCi/L.

Both tritium results were below the 6 NYCRR 703.5 (2.0E+04 pCi/L), which is used as a comparative value for tritium.

2.4.1.4 Gamma Spectroscopy

The results for three gamma emitters (cesium-137, cobalt-60, and potassium-40) are reported for each stormwater sampling event. In addition, gamma spectroscopy results were reviewed for an additional 145 gamma-emitting radionuclides.

Sample analysis from the October 2020 event showed radium-226 for the composite sample field duplicate (1.99E+02±1.25E+02 pCi/L) to be reported above its MDC. The result was qualified as estimated due to the 2-sigma uncertainty being greater than 50 percent of the result. The parent composite sample for radium-226 was nondetect as it was reported below its MDC. All remaining gamma spectroscopy results were reported below their respective MDC.

2.4.2 Chemical and Physical Parameters

Results for all chemical and physical parameters were below the SPDES permit limits. As required by the SPDES permit, chemical and physical results were reported to DEC's Division of Water in the Discharge Monitoring Report after each semiannual sampling event.

2.5 Gamma Radiation Monitoring

2.5.1 Overland Gamma Radiation Surveys

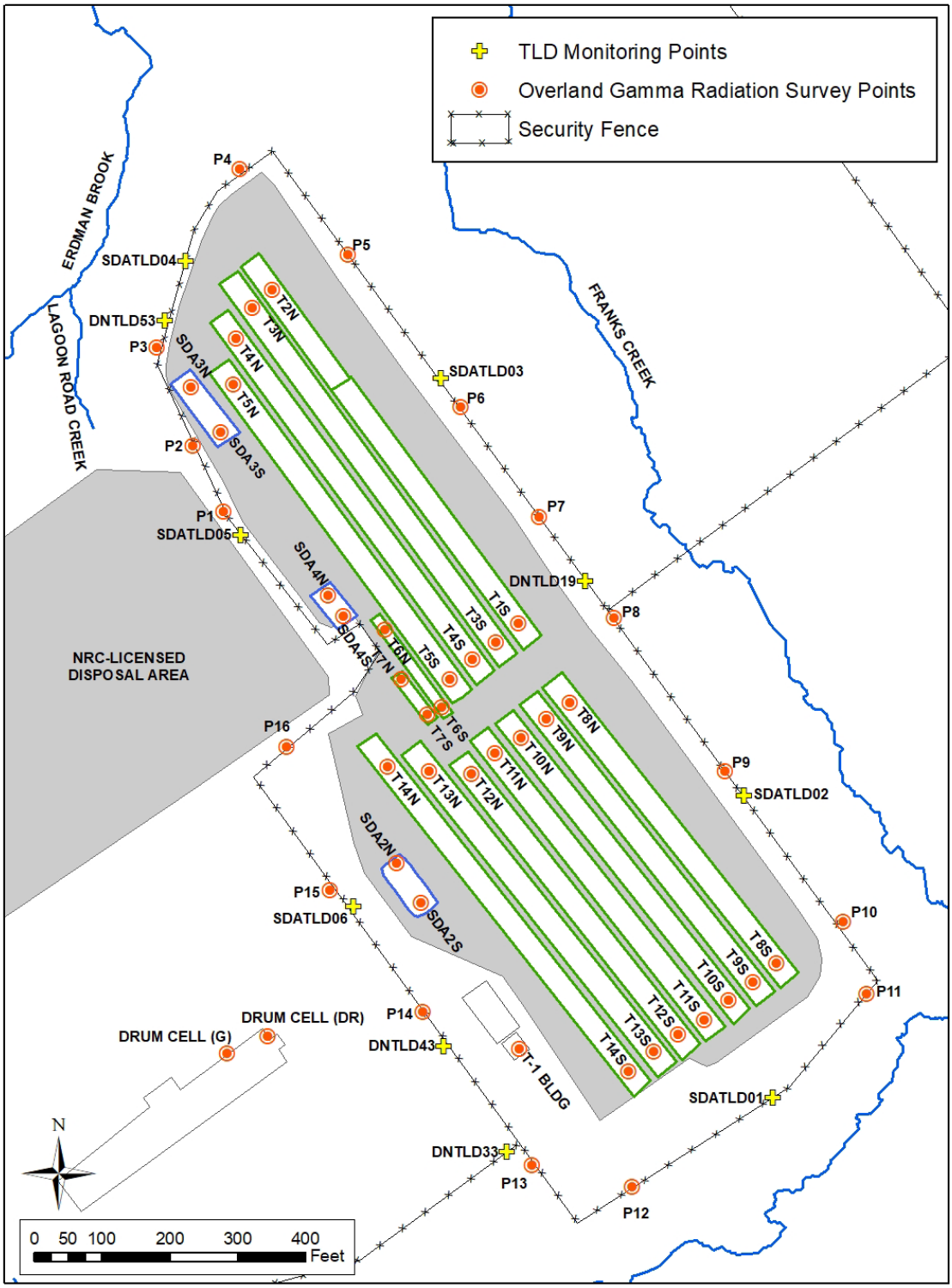
Gamma radiation surveys are performed semiannually at the SDA to maintain current data on gamma exposure levels and to monitor for changing conditions at the SDA.

As shown on Figure 2-12, radiation levels are measured at 51 fixed-survey locations in and around the SDA including:

- Thirty-two monument markers located on the north and south ends of each trench (designated as T3s, T3n, etc.), and the three filled lagoons (SDA2, SDA3, and SDA4) monitor the contribution of underground radioactive materials to the area radiation levels within the SDA.
- Sixteen SDA perimeter survey points (P-1 through P-16) marked on the chain-link fence surrounding the SDA monitor external radiation from all sources, including the WVDP. One survey point (T-1) inside the T-1 Building monitors external radiation. This location was previously used to track radiation levels from the stored Trench 14 leachate. Because the leachate was removed from the tank in 2009 and the tank was removed in 2010, this measurement is taken in the middle of the now-vacant concrete tank pad.

Figure 2-12. Gamma Radiation Monitoring Locations

Source: NYSERDA



- Two survey points (DC-[G] and DC-dr) at the WVDP Drum Cell, located west of the SDA, provide information on the radiation levels near the Drum Cell. Historically, waste in the Drum Cell created elevated radiation levels at the nearby SDA monitoring points. Radiation levels have fallen since the waste was removed from the Drum Cell in 2007.

At each fixed survey point, radiation levels are measured at one meter and one cm above the ground, floor, or building surface.

Radiation detection instruments are also monitored continuously between fixed-survey locations to identify any anomalous reading(s) exceeding three times those of the nearby fixed-survey monitoring points; no such fluctuations were identified or noted on the survey report form. Survey readings for the 2020 semiannual surveys (June and September) are provided in Table D-1.

Gamma radiation levels observed during both semiannual surveys were consistent with historical data.

2.5.2 Thermoluminescent Dosimetry Monitoring

In 2020, 22 environmental TLDs, consisting of two dosimeters at 10 designated locations around the SDA and a background location (approximately 4.5 miles southwest of the SDA outside of the Ashford Office Complex), were processed each calendar quarter to obtain the integrated environmental gamma radiation exposure from each location (see Figure 2-12). Environmental dosimeter monitoring locations are described in Table 2-1.

Table 2-1. Dosimeter Identification and Location

Source: NYSERDA

Location ID	# of Dosimeters	Monitoring Location Description
NYTLDBK	Two	Background, on the fence along the driveway from Ashford Hollow Road to the Ashford Office Complex
DNTLD19	Two	Eastern perimeter fence north of SDA buffer area access gate between Survey Points 7 & 8
DNTLD33	Two	Outside SDA fence near corner of WVDP perimeter fence and SDA fence. South of SDA Access Gate #15
DNTLD43	Two	Western perimeter fence of SDA adjacent to the main SDA Access Gate #15
DNTLD53	Two	Northwestern corner perimeter fence of SDA
SDATLD01	Two	South fence at approximate centerline of Trench 11
SDATLD02	Two	East fence middle of southern trenches next to Survey Point 9
SDATLD03	Two	East fence middle of northern trenches next to Survey Point 6
SDATLD04	Two	North fence approximate center between Trenches 3 and 4
SDATLD05	Two	West fence middle of northern trenches next to and south of Survey Point 1
SDATLD06	Two	West fence south of Survey Point 15

In addition to the four original field locations, six new monitoring locations (SDATLD01 through SDATLD06) were added to the monitoring program beginning in the first quarter of 2020. DNTLD53 and SDATLD04 monitor the northwestern and northeastern corners of the SDA, respectively, and are the closest to the WVDP, which is a potential source of external radiation exposure. DNTLD53 has consistently provided the highest results of the original monitoring locations and the results collected for new location SDATLD04 are similar to DNTLD53. Environmental TLD monitoring results for 2020 are included in Table D-2.

Based on the statistically similar results from a two-year statistical comparison of the historically used dosimeter (Harshaw Model 110) with a new dosimeter (Panasonic UD-814), the WVSMP has implemented the use of the Panasonic UD-814 dosimeter, which was provided by a new vendor during the first quarter of 2020.

This change increased the number of chips contained in each dosimeter from four chips (contained in one badge) to eight chips (contained in two badges). The chips are averaged into a single result, with the Panasonic UD-814 dosimeter providing a higher level of precision and less variability within the measurements. This precision provides less overlap between the two locations deployed at the SDA and the background location.

Also, on an annual basis, the quarterly environmental TLD results for each SDA location are compared to the background location using the Wilcox-Mann-Whitney test. The Wilcox-Mann-Whitney test is a nonparametric significance test for comparing a small number of data points (such as those available for the 2020 environmental TLD analysis).

The results of the Wilcox-Mann-Whitney test show that the 2020 ambient radiation exposures for all locations except DNTLD43 were statistically higher than background.

For the three remaining field locations (i.e., those monitored prior to 2020), DNTLD19, DNTLD33, and DNTLD53, the results were statistically higher than background, but the exposures are generally consistent with historical results.

In addition, the quarterly environmental TLD dosimeter results for 2020 were reviewed for completeness and accuracy, and to determine if there were any outliers in the dataset.

Dixon's outlier test was performed for the 2020 results for each location. The second quarter 2020 result for DNTLD53 (18.74 milliRoentgen per quarter [mR/Qtr]) and the third quarter 2020 result for SDATLD02 (18.13 mR/Qtr) were flagged as outliers. However, the DNTLD53 result is consistent with historical results and is not an outlier at any level of significance (10 percent, five percent, or one percent). In addition, due to the narrow range in the dataset (i.e., high degree of precision) within the Panasonic data, the second quarter 2020 results for DNTLD53 and the third quarter result for SDATLD02 were retained in the dataset.

2.6 Meteorological Monitoring

NYSERDA operates and maintains a suite of meteorological instruments at the SDA, including instruments to measure total precipitation (e.g., rain, snow, and sleet); temperature; relative humidity; barometric pressure; wind speed; and wind direction. The instruments are equipped with a battery-powered backup system to ensure data continuity during power outages. A quarterly summary of the daily 2020 precipitation at the SDA is provided in Tables E-1, E-2, E-3, and E-4. There were no interruptions in meteorological data collection in 2020. As indicated in the Executive Summary, the 2020 precipitation total at the SDA has decreased from the high observed in 2018. NYSERDA will continue to monitor precipitation total and their impacts on the SDA.

3 EROSION MONITORING

In accordance with the requirements of the Part 380 Permit #9-0422-00011/00011, NYSERDA has established a comprehensive erosion monitoring program at the SDA, inclusive of the surrounding slopes and streams. The objective of the program is to monitor active erosion processes that could threaten the integrity of the SDA. The monitoring ensures that erosion features are clearly identified, inspected, quantified, and, if necessary, mitigated before erosion damage can occur at the SDA.

3.1 Visual Inspections of Surrounding Stream Channels

In 2020, NYSERDA conducted monthly visual inspections of the creeks that flow around three sides of the SDA (Erdman Brook, Franks Creek, and Lagoon Road Creek). Stream channel inspections included assessments of installed erosion control structures and the results are documented in NYSERDA's Erosion Monitoring Log (per NYSERDA's *Erosion Monitoring Plan*[11]). Additional unscheduled inspections are conducted after abnormally large precipitation events (>2.5 inches/24 hours) to check for significant erosion or mass wasting. Field observations are documented and follow-up actions, if necessary, are tracked using WVSMP's maintenance log. There were no precipitation events necessitating unscheduled inspections in 2020.

3.2 Light Detection and Ranging Mapping and Orthophotography

In 2010 and 2015, NYSERDA conducted aerial Light Detection and Ranging (LiDAR) mapping and orthoimagery projects, covering both the WNYNSC and the SDA. These surveys fulfill NYSERDA's requirement to complete comprehensive topographic mapping of the SDA and adjacent premises once every five years (per NYSERDA *Erosion Monitoring Plan*[12]). Detailed topographic maps of the SDA and adjacent premises are developed at a resolution of 0.5 meters utilizing the LiDAR survey data. In 2020, NYSERDA conducted a new LiDAR survey. Figure 3-1 is a high-quality topographic map of the SDA and the surrounding area that was derived from a subset of the 2015 LiDAR data. Having separate datasets collected at different times allows the data to be examined for changes to the land surface due to erosion, deposition, and/or subsidence. These examinations reveal active erosion of streams and gullies in the watershed, as would be expected. There has been no evidence of erosion in areas adjacent to the SDA.

There have been some topographic changes at points along Erdman Brook and Franks Creek, which are directly attributable to the construction of erosion controls at these locations. The latest LiDAR survey data collected in November 2020 will be delivered to NYSERDA in spring of 2021.

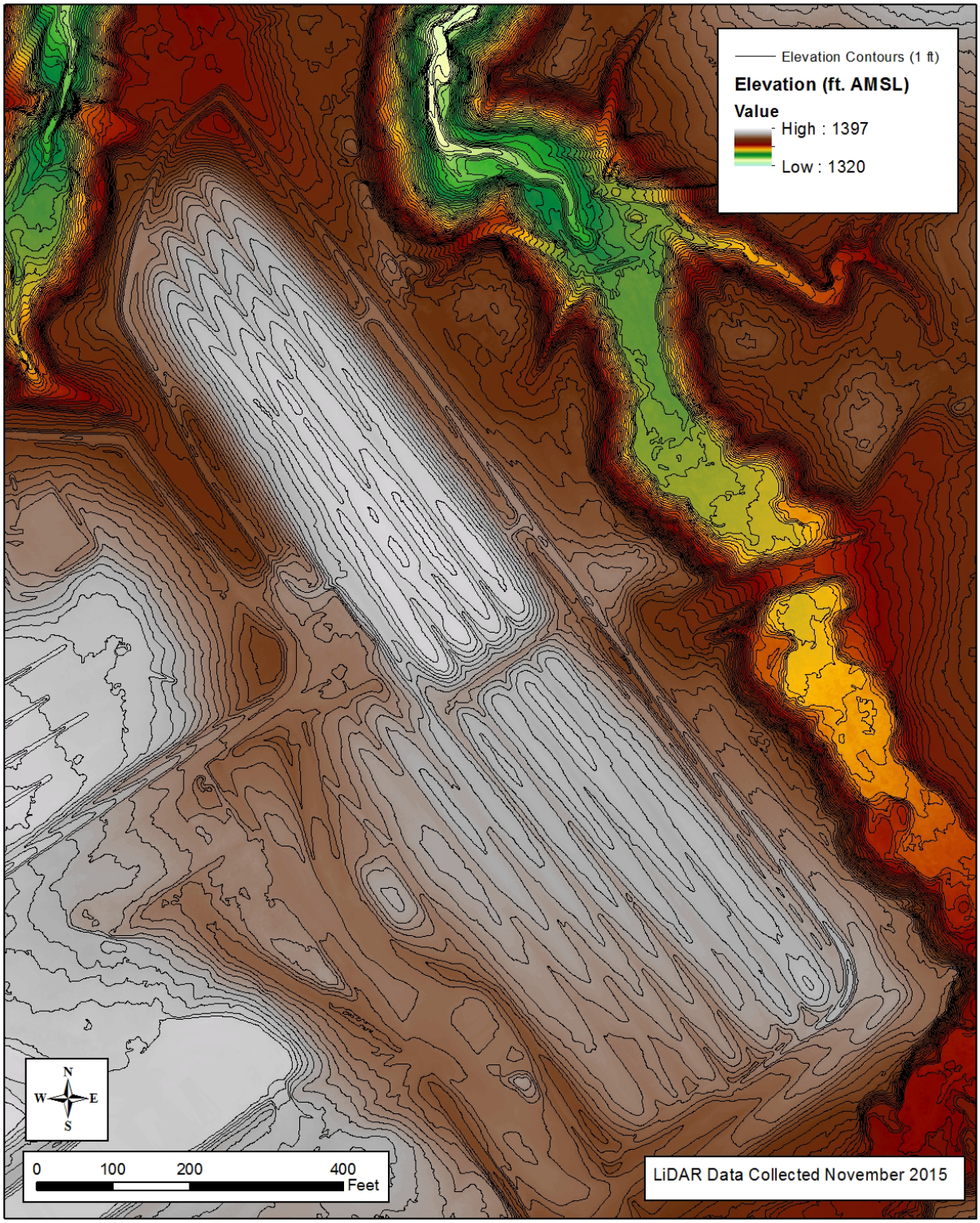
---

11 NYSERDA. 2019 "Erosion Monitoring Plan, ENV509.02."

12 Ibid.

Figure 3-1. LiDAR Topographic Map of the SDA and Surrounding Areas

Source: NYSERDA



4 Facility Operations and Maintenance

NYSERDA is responsible for the safety, operations, and maintenance of the buildings and grounds at the SDA. Both routine and nonroutine facility inspections and maintenance activities are implemented to ensure that the facility is operating as designed. In 2020, facility operations and maintenance at the SDA included:

- inspections and testing
- maintenance

4.1 Inspections and Testing

NYSERDA actively maintains the facilities at the SDA through routine inspections and testing of all physical and mechanical systems, followed by prompt corrective actions, as needed. All inspections are documented on standard forms and maintained as WVSMP records. Any deficiencies noted during these inspections and tests are tracked in WVSMP's maintenance log database, scheduled for completion, and closed out in a timely manner.

In 2020, NYSERDA completed the following inspections and tests:

- monthly SDA Building inspections
- monthly and annual fire extinguisher inspections and testing
- five walkover inspections of the entire SDA, and surrounding slopes and streams, completed under NYSERDAs *Walkover Inspection of the SDA*[13] procedure
- annual geomembrane cover system inspection per NYSERDA's *Geomembrane Cover System Inspection*[14] procedure
- nonroutine inspections of the SDA after severe weather conditions (e.g., high winds, heavy precipitation, earthquakes, etc.)

All systems and operations at the SDA are performing as designed.

---

13 NYSERDA. 2019. "Walkover Inspection of the SDA, OPS003.09"
14 NYSERDA. 2019. "Geomembrane Cover System Inspection, OPS007.05"

4.2 Operations and Maintenance

In 2020, NYSERDA completed the following routine and preventative maintenance at the SDA:

- snowplowing and vegetation control at the SDA and Bulk Storage Warehouse

NYSERDA completed the following nonroutine operations and maintenance activities at the SDA in 2020:

- replaced a blown electrical service meter and feed
- painted SDA outdoor electrical boxes and door fronts
- removed the obsolete secondary containment structure surrounding the Frac Tanks
- conducted focused topographic surveys of trench cap subsidence
- conducted monthly surveys and observations of the North Slope (see Figure 4-1)
- repaired cracks in the North Slope (see Figures 4-2 and 4-3)
- replaced the SDA Frac Tank Building overhead lights with energy efficient lights.

All nonroutine maintenance actions are tracked from start to finish in the WVSMP's maintenance log database.

Figure 4-1. Crack along the North Slope

Source: NYSERDA

Figure 4-2. Crack Repairs on SDA North Slope

Source: NYSERDA

Figure 4-3. Filling of crack on SDA North Slope

Source: NYSERDA

4.2.1 Quantitative Measurements

4.2.1.1 North Slope Survey

NYSERDA conducts an annual survey of 47 monitoring points on the North Slope of the SDA to detect slope movement. Survey data contained herein is being reported in NAD 83 for horizontal positioning, and NAVD 88 for vertical positioning or elevation. Survey data for the North Slope was collected on November 19, 2020. The survey and periodic field inspections of the North Slope area during 2020 confirmed no reportable vertical movement (e.g., slumping), but did identify small movement in a lateral northwest direction. This movement is consistent with movement that has been observed since 2017. To monitor the rate of the cracks, NYSERDA began quarterly surveys in the first quarter 2020, then moved to monthly surveys in June 2020. As the monthly measurements did not show any significant movement, the monitoring interval was reduced to quarterly as of January 2021.

In addition, NYSERDA completed field inspections of the area where surficial cracking was observed, installed 36 new survey hubs above and down slope of the cracks, and performed maintenance activities to seal the cracks.

NYSERDA routinely communicates with DEC regarding the status of the north slope, the survey data, and completed maintenance activities. In addition, NYSERDA began working with our engineering support contractor to further investigate the source of this lateral northwest movement on the north slope. These investigative activities are anticipated to begin in mid-2021.

The 2020 elevations of the North Slope monitoring points (see Figure 4-4) are provided in Table F-1. A comparison between the 2019 and 2020 data did not show any reportable changes (>0.5 ft) in the elevations of the monitoring points.

4.2.1.2 SDA Trench Cap Survey

NYSERDA also surveys the ground surface elevations along the SDA trench centerlines and monuments to monitor for trench cap settlement. NYSERDA has established fixed-trench cap elevation survey points that provide a consistent survey location each year. These annual results are compared to the previous year's data for indications of trench cap subsidence. A map identifying the location of the trench cap elevation survey points is shown in Figure 4-5 with the current survey data points presented in Table F-2.

Areas of settlement were observed in 2013 on the southernmost 100-foot sections of Trenches 8 and 13 as well as the northern area of Trench 14. Since 2014, NYSERDA has conducted a focused topographic survey in each of the areas identified above using a 10-foot grid pattern to monitor the rate of subsidence. To date, there has been less than 0.08 ft of subsidence per year.

In 2017, Trench 8 settlement was mitigated during the installation of the new geomembrane cover by installing lightweight geofoam blocks to raise the areas of settlement before covering with the new geomembrane cover. A settlement gauge was also installed to further monitor the trench cap surface of Trench 8 after the installation of the geofoam panels. The settlement gauge elevation measurements have decreased by 0.05 ft since installation in October 2017, which is within the survey measurement uncertainty. NYSERDA will continue to monitor this area of Trench 8.

NYSERDA continues to monitor the area on Trenches 13 and 14 with focused topographic surveys in areas observed to be settling or subsiding. In addition to the focused topographic surveys, periodic visual inspections of the trench caps are performed to provide a more immediate identification of cap subsidence. NYSERDA will continue to monitor all locations where subsidence has been identified in accordance with our plans and procedures, and will report subsidence to DEC as identified in the plans and procedures.

4.3 Engineered Construction Projects

There were no engineered construction projects completed in 2020. NYSERDA did engage their engineering services contractor to develop an Interim Control Measure to mitigate the infiltration of groundwater into Trench 14.[15] NYSERDA anticipates construction of this design to take place in the spring of 2021.

---

[15] McMahon McMahon & Mann Consulting Engineering and Geology, P.C. February 2021. "Design Report Trench 14 Infiltration Controls at the State-Licensed Disposal Area, West Valley Site Management Program, West Valley, New York."

Figure 4-4. North Slope Ground Surface Elevation Survey Points

Source: NYSERDA

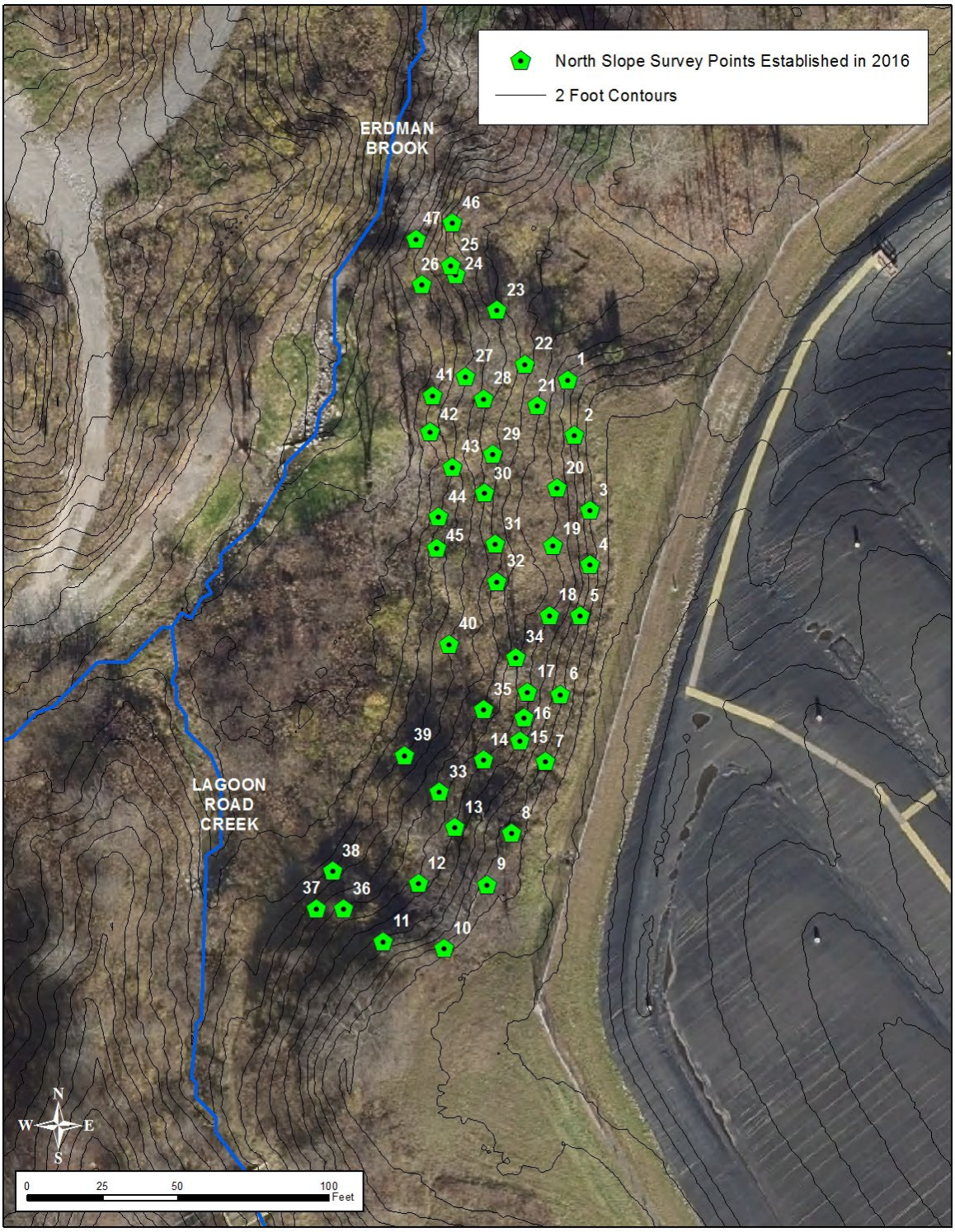
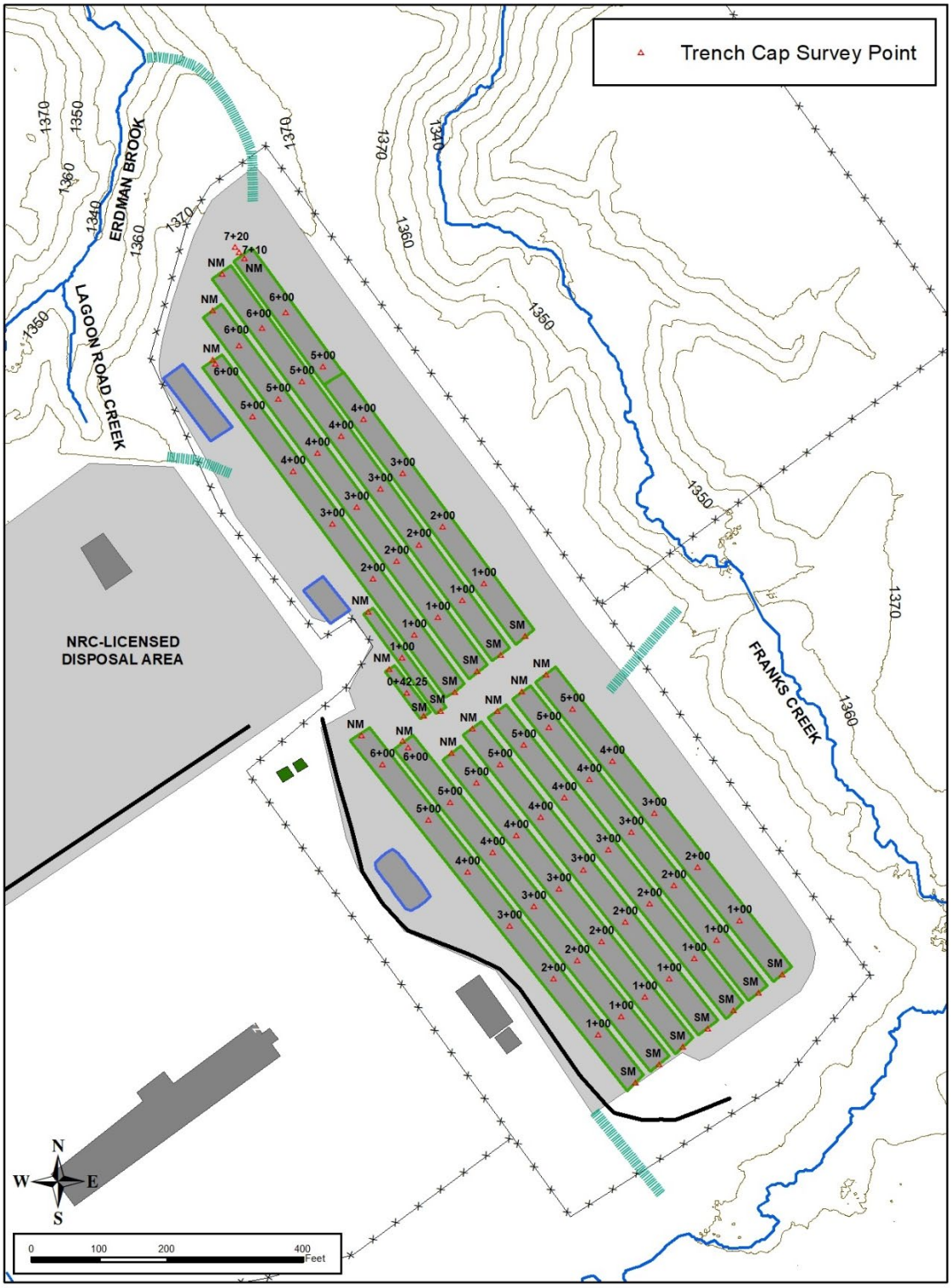


Figure 4-5. Trench Cap Ground Surface Elevation Survey Points

Source: NYSERDA



5 Waste Management

NYSERDA has developed and implemented both systems and procedures to manage the SDA in a manner that minimizes the generation of radioactive or hazardous waste.

In 2020, waste management at the SDA included:

- inspections
- waste storage

5.1 Inspections

In 2020, NYSERDA completed four waste inspections. No deficiencies were noted during these inspections.

5.2 Waste Removal and Disposal

NYSERDA is not a routine generator of waste. In 2020, no low-level radioactive waste was generated.

The total volume of waste currently in storage is 1.33 m^3. All waste currently in storage is low-level radioactive waste only.

Appendix A – Trench Leachate Elevation Data

Table A-1. 2020 Trench Elevation Data

Elevations are referenced to the NAVD 1988.

Source: NYSERDA

Trench	Jan 2	Feb 3	Mar 3	Apr 1	May 1	Jun 1
Trench 1			1364.74			1364.78
Trench 2			1360.16			1360.10
Trench 3			1358.56			1358.39
Trench 4			1361.48			1361.47
Trench 5			1361.98			1361.83
Trench 8			1360.17			1360.12
Trench 9			1359.13			1359.05
Trench 10n			1360.35			1360.26
Trench 10s			1359.49			1359.45
Trench 11			1359.15			1359.10
Trench 12			1360.03			1360.02
Trench 13	1362.21	1362.23	1362.24	1362.24	1362.23	1362.22
Trench 14	1365.60	1365.61	1365.62	1365.64	1365.66	1365.66
WP-91	1365.58	1365.57	1365.61	1365.60	1365.62	1365.62

Table A-1 continued.

Trench	Jul 2	Aug 3	Sep 1	Oct 1	Nov 3	Dec 4
Trench 1			1364.79			1364.78
Trench 2			1360.10			1360.14
Trench 3			1358.21			1357.88
Trench 4			1361.45			1361.49
Trench 5			1361.79			1361.84
Trench 8			1360.11			1360.17
Trench 9			1359.01			1359.22
Trench 10n			1360.19			1360.25
Trench 10s			1359.42			1359.41
Trench 11			1359.04			1359.04
Trench 12			1360.00			1360.00
Trench 13	1362.22	1362.21	1362.21	1362.20	1362.21	1362.21
Trench 14	1365.66	1365.69	1365.67	1365.71	1365.78	1365.78
WP-91	1365.63	1365.65	1365.63	1365.63	1365.63	1365.62

Figure A-1. 2010-2017 Leachate Elevations, Trench 1

Source: AECOM

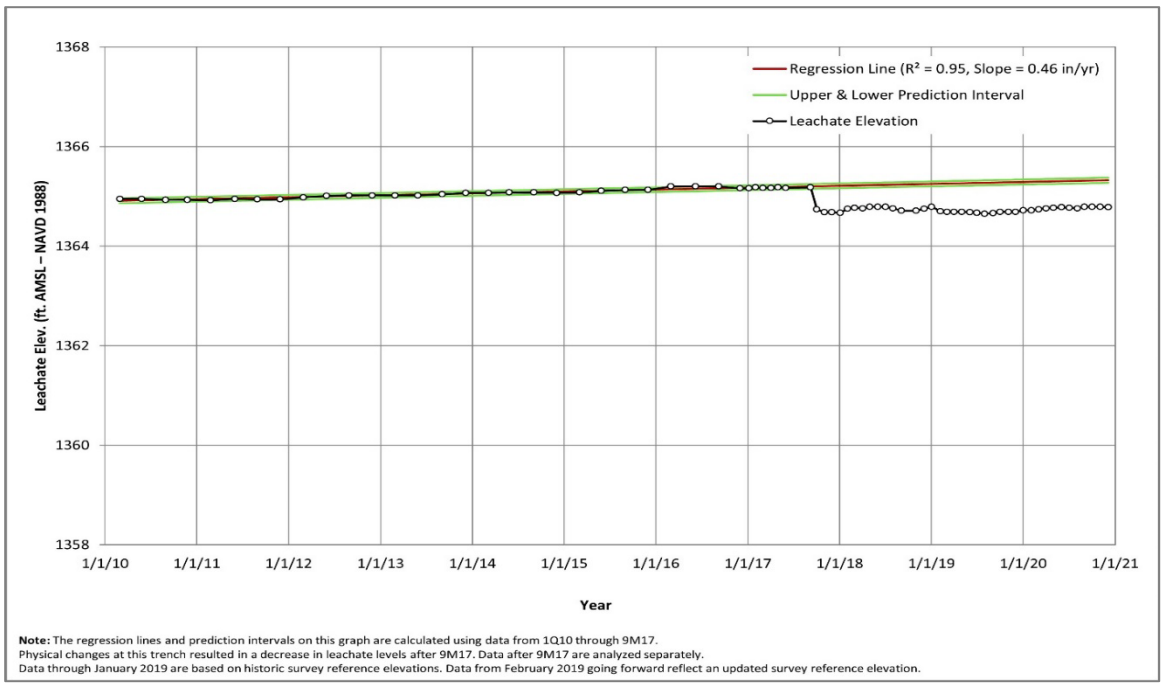


Figure A-2. 2017-2020 Leachate Elevations, Trench 1

Source: AECOM

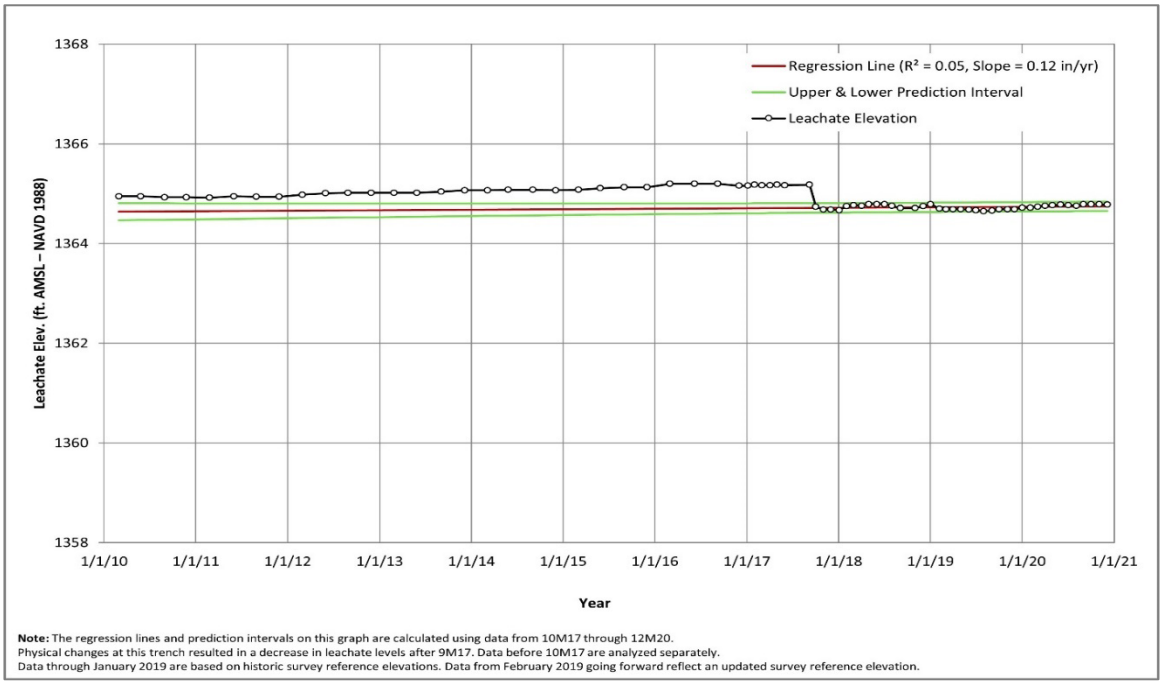


Figure A-3. 2010-2020 Leachate Elevations, Trench 2

Source: AECOM

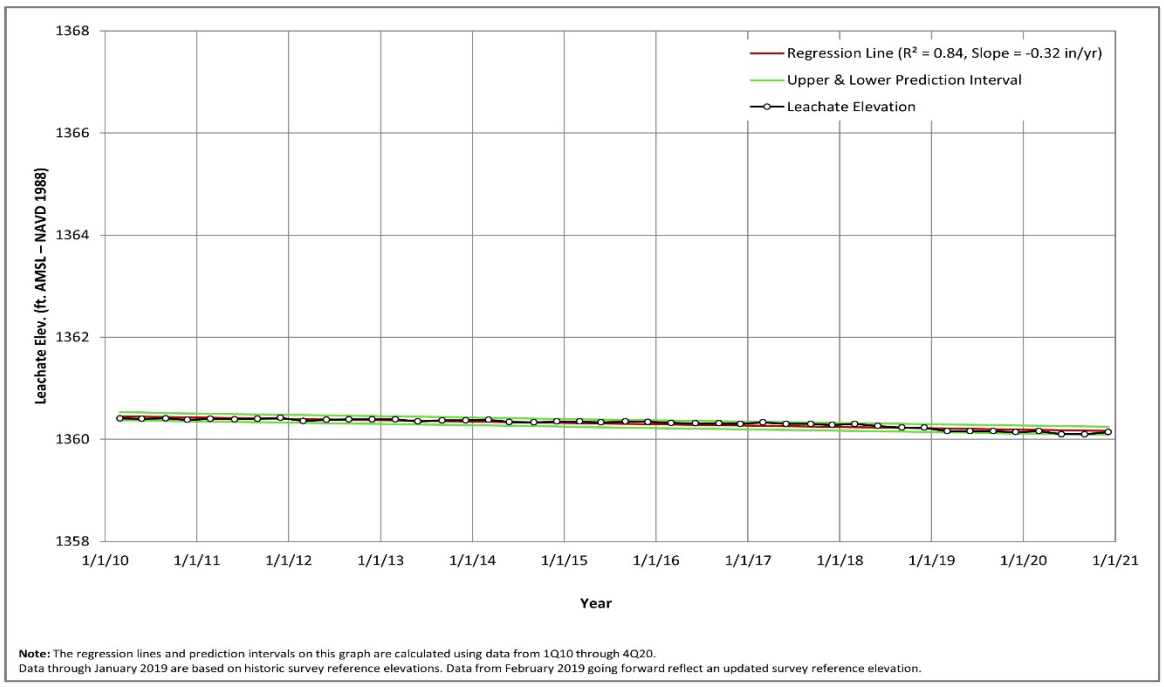


Figure A-4. 2010-2020 Leachate Elevations, Trench 3

Source: AECOM

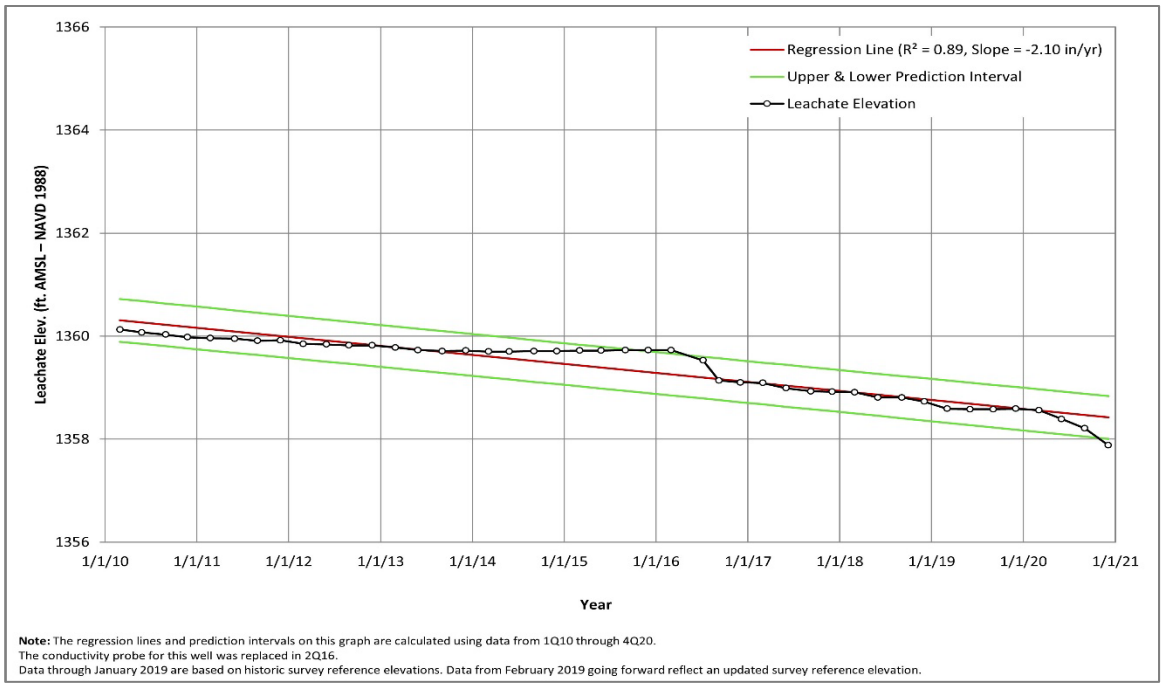
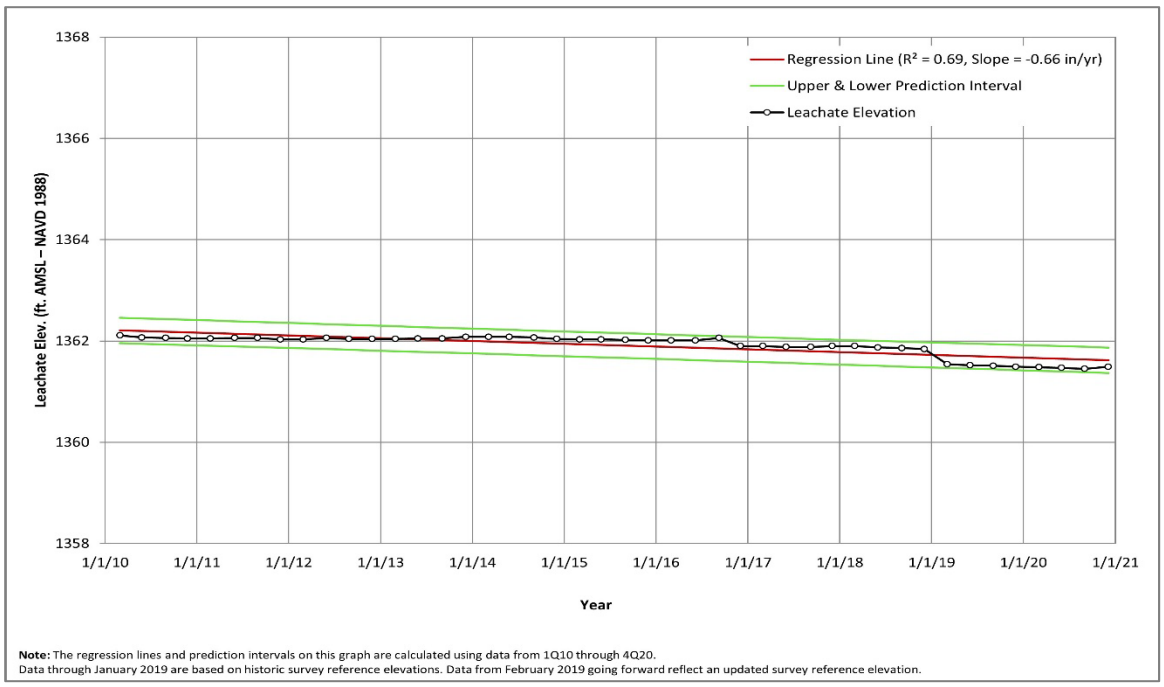


Figure A-5. 2010-2020 Leachate Elevations, Trench 4

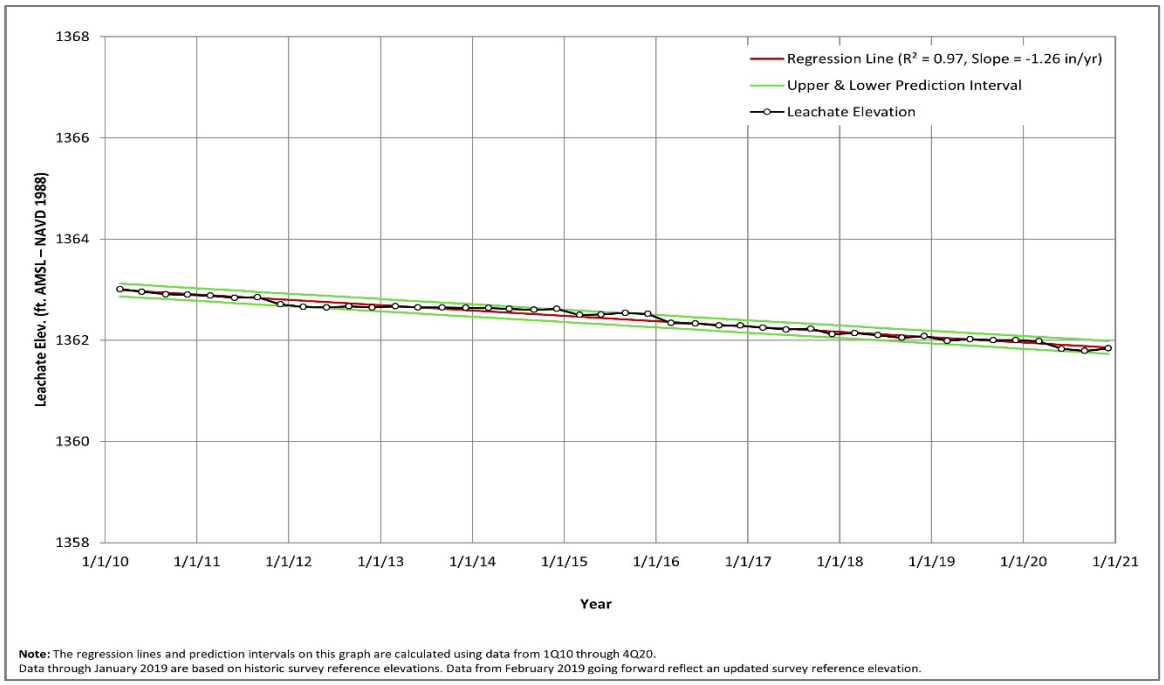
Source: AECOM



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q10 through 4Q20.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-6. 2010-2020 Leachate Elevations, Trench 5

Source: AECOM



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q10 through 4Q20.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-7. 2010-2020 Leachate Elevations, Trench 8

Source: AECOM

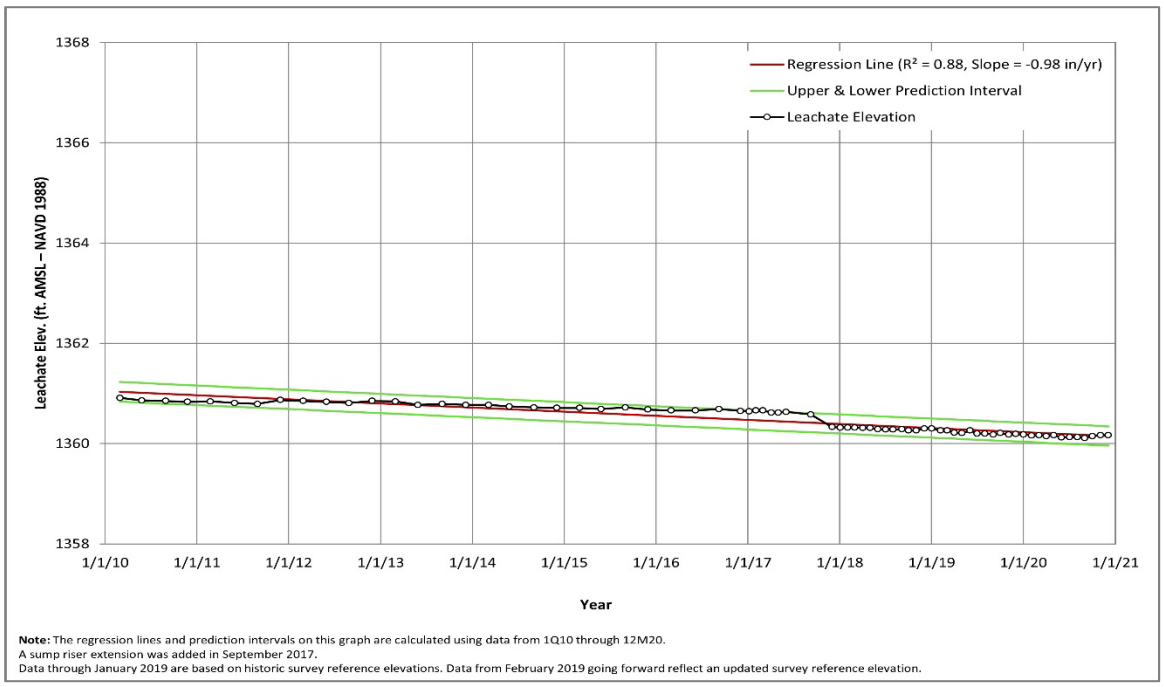


Figure A-8. 2010-2020 Leachate Elevations, Trench 9

Source: AECOM

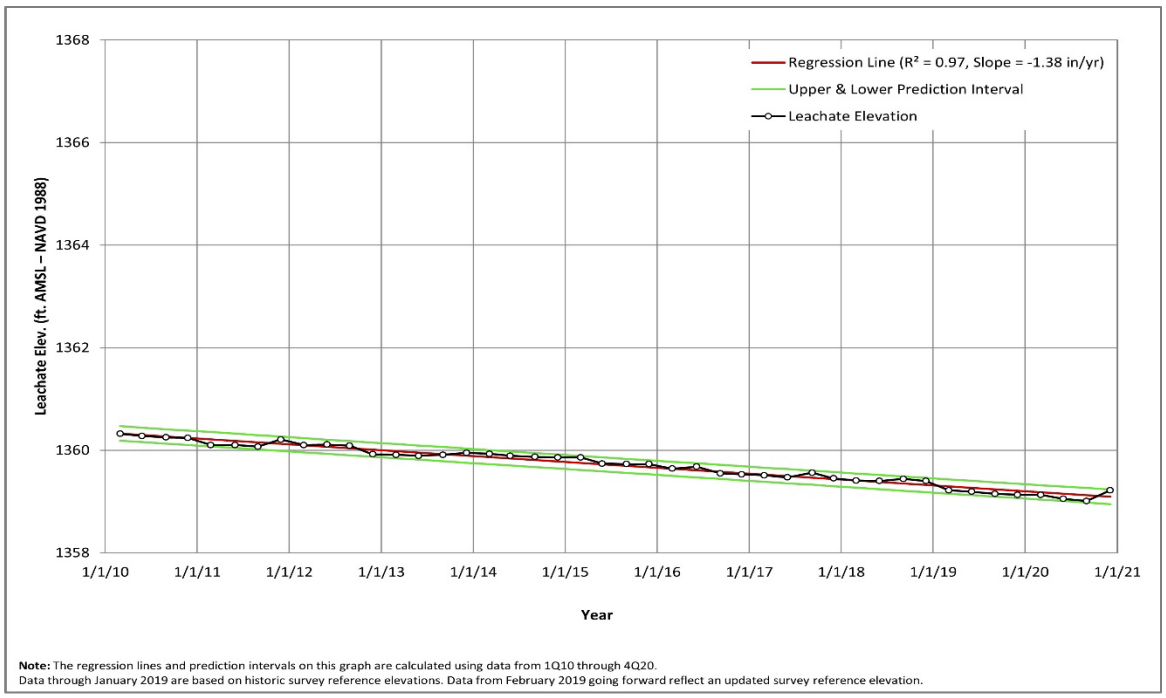
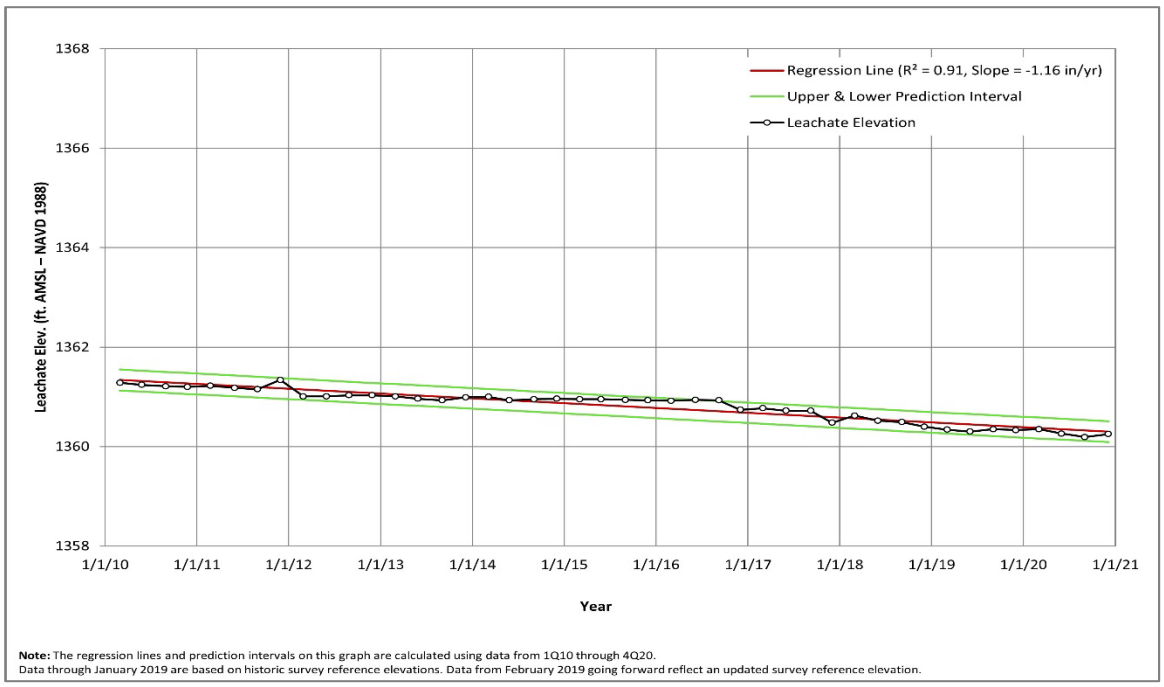


Figure A-9. 2010-2020 Leachate Elevations, Trench 10N

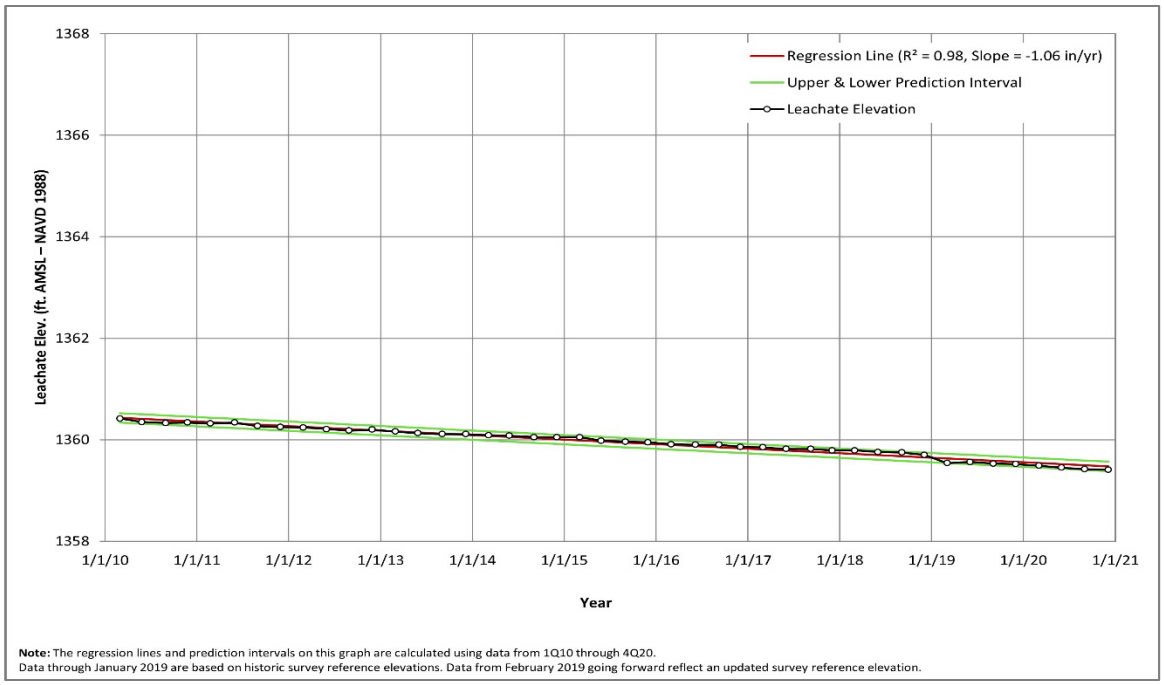
Source: AECOM



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q10 through 4Q20.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-10. 2010-2020 Leachate Elevations, Trench 10S

Source: AECOM



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q10 through 4Q20.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-11. 2010-2020 Leachate Elevations, Trench 11

Source: AECOM

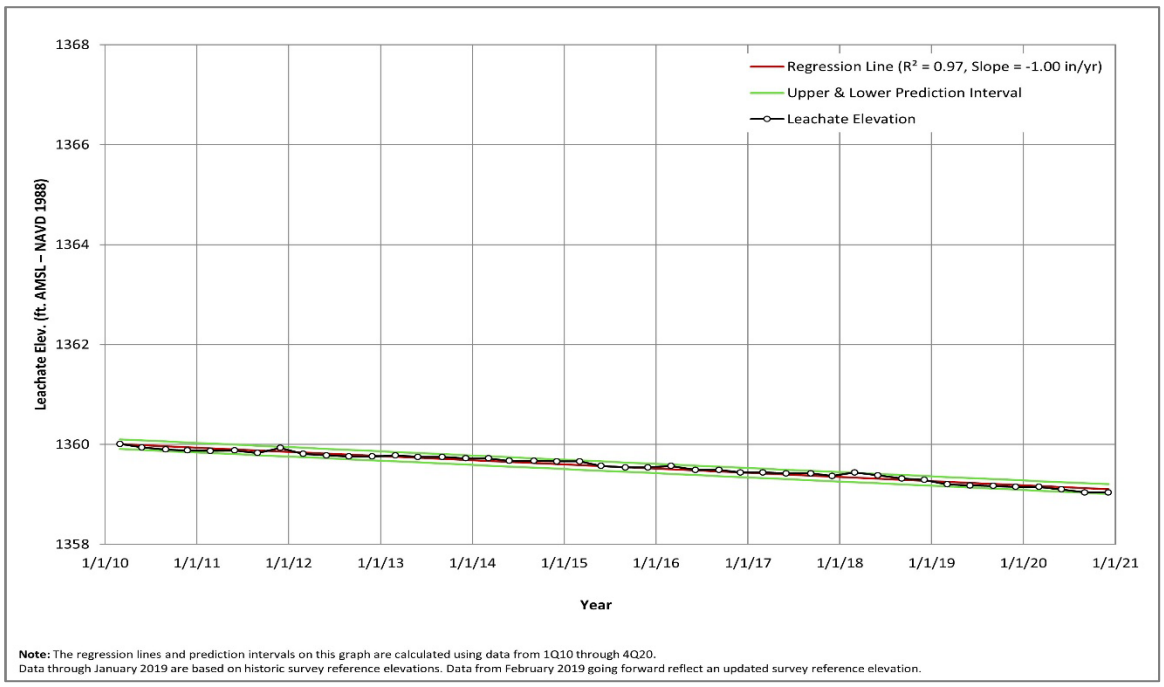


Figure A-12. 2010-2020 Leachate Elevations, Trench 12

Source: AECOM

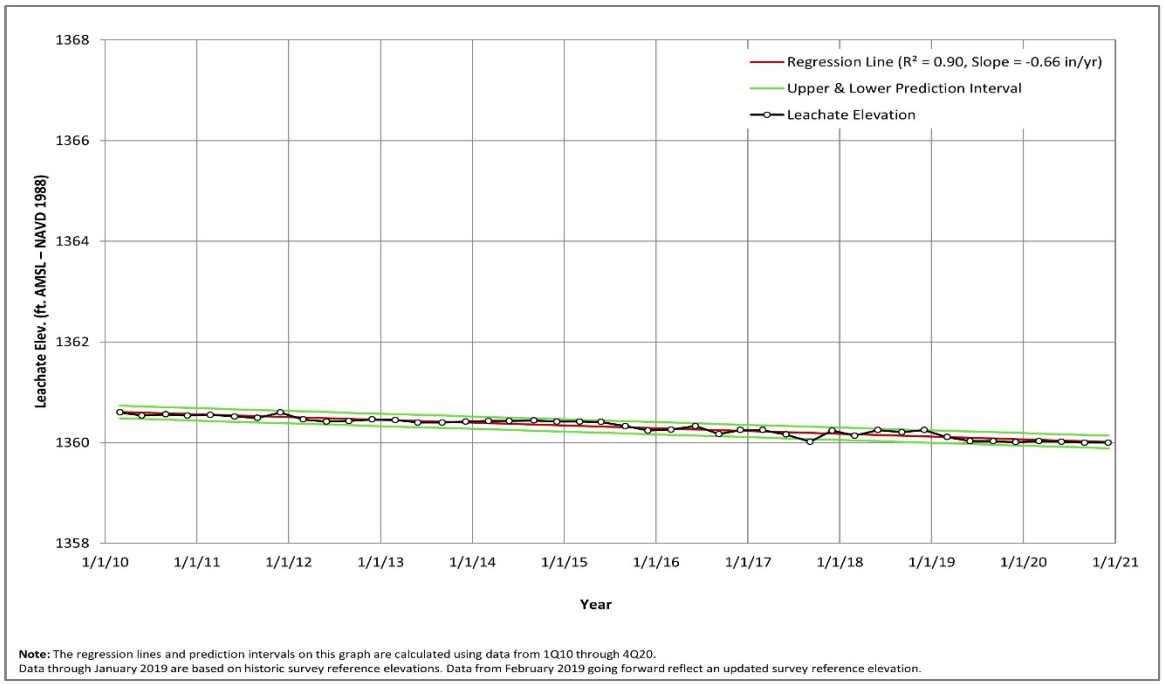


Figure A-13. 2010-2020 Leachate Elevations, Trench 13

Source: AECOM

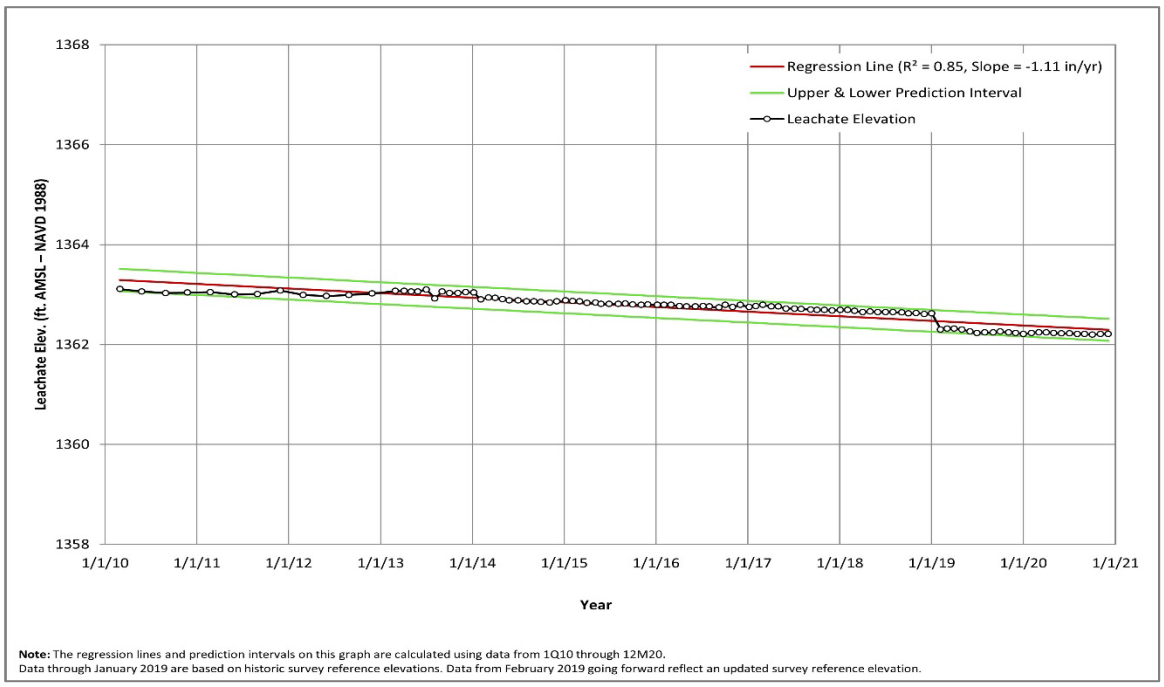


Figure A-14. 2000 to 2008, Leachate Elevations, Trench 14

Source: AECOM

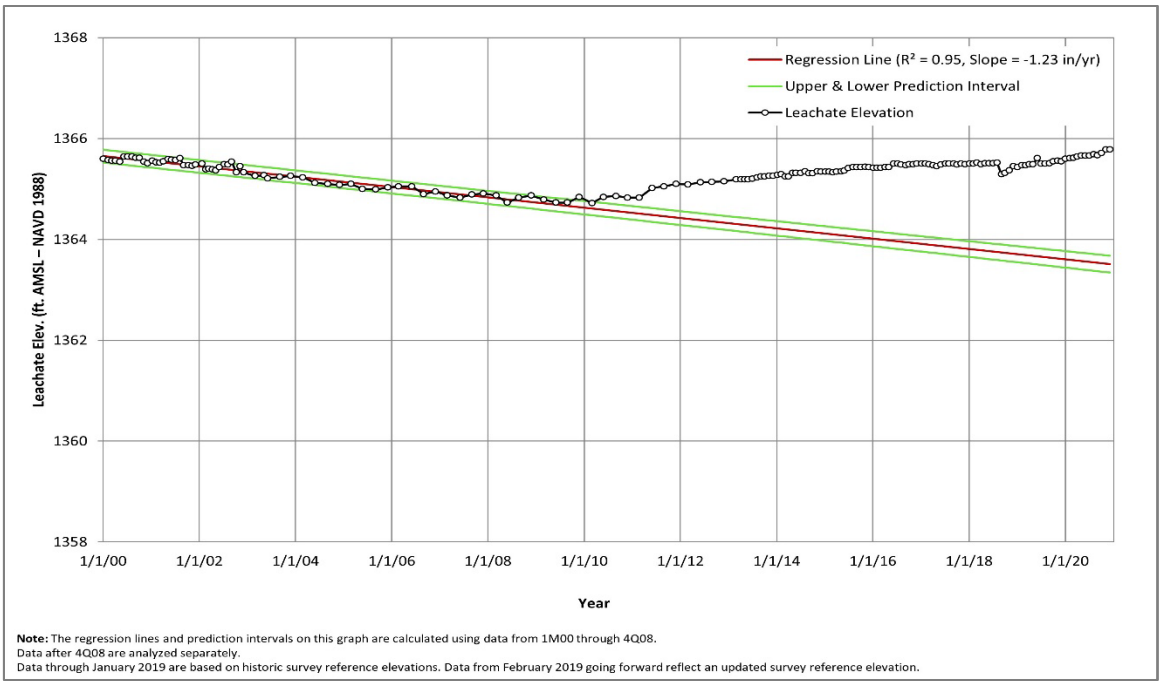


Figure A-15. 2011 to 2018 Leachate Elevations, Trench 14

Source: AECOM

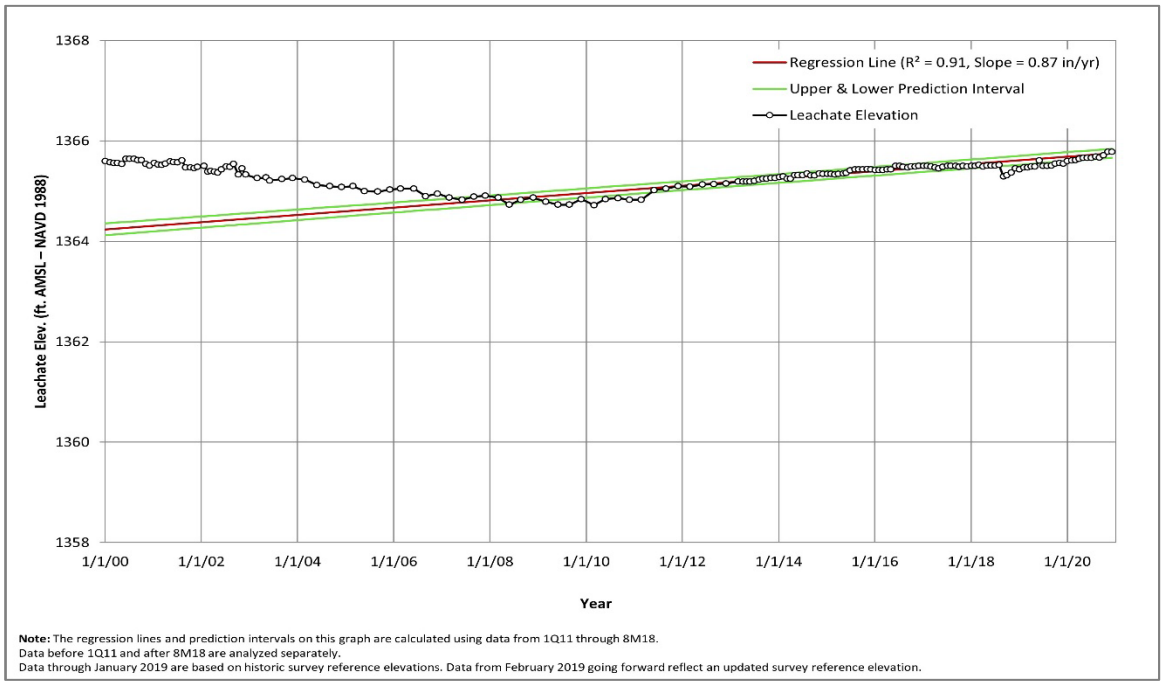


Figure A-16. 2018 to 2020 Leachate Elevations, Trench 14

Source: AECOM

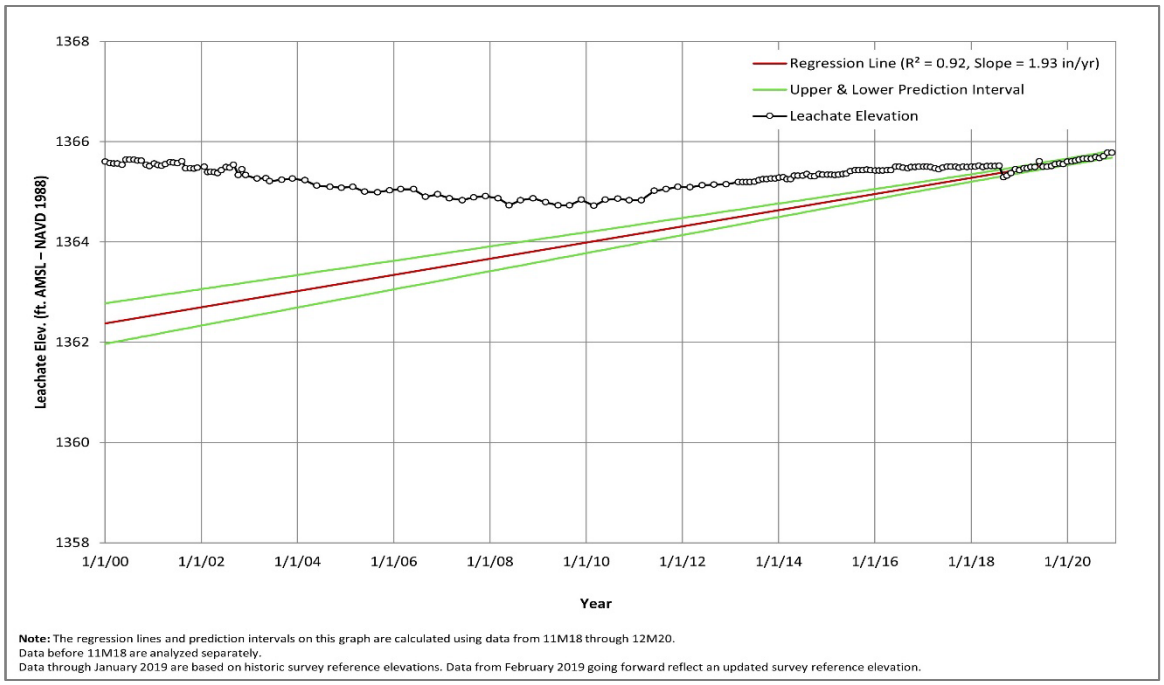
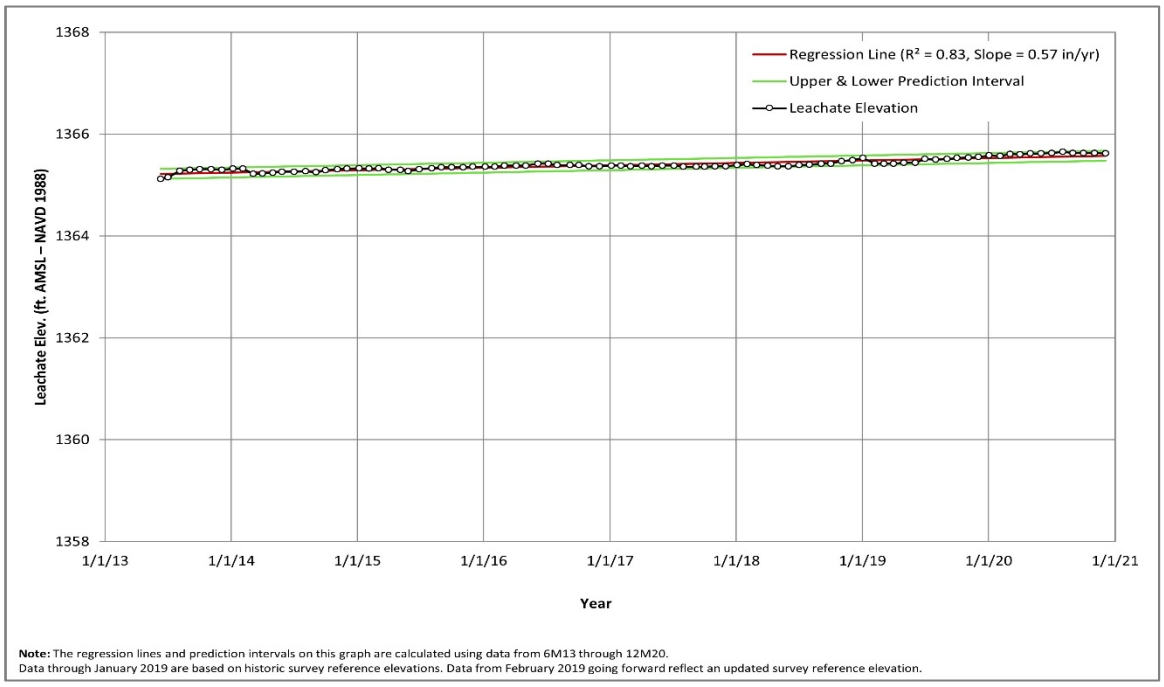


Figure A-17. 2013-2020 Leachate Elevations, WP-91

Source: AECOM



Appendix B – Groundwater Monitoring

Table B-1. Groundwater Monitoring Well Summary – SDA 1100 Series Wells

Well depths are rounded. Elevations are referenced to the NAVD of 1988 and based on well construction details.

Source: NYSERDA

Well	Well Depth (ft BGS)	Well Bottom Elevation (ft AMSL)	Screened Interval Elevations (ft AMSL)	Geologic Unit Screened
1101A	16	1362.78	1363.20 - 1373.20	W/U
1101B	30	1348.83	1349.25 - 1359.25	U
1101C	109	1269.54	1269.96 - 1284.96	L
1102A	17	1365.12	1365.54 - 1375.54	W/U
1102B	31	1351.00	1351.42 - 1361.42	U
1103A	16	1363.31	1363.73 - 1373.73	W/U
1103B	36	1343.24	1343.66 - 1358.66	U
1103C	121	1257.92	1258.34 - 1273.34	L/O
1104A	19	1356.53	1356.95 - 1371.95	W/U
1104B	36	1339.51	1339.93 - 1354.93	U
1104C	124	1251.37	1251.79 - 1261.79	L/O
1105A	21	1344.22	1344.64 - 1354.64	U
1105B	36	1329.85	1329.85 - 1344.85	U
1106A	16	1357.77	1358.19 - 1368.19	W/U
1106B	31	1343.03	1343.45 - 1353.45	U
1107A	19	1357.58	1358.00 - 1373.00	W/U
1108A	16	1364.34	1364.76 - 1374.76	W/U
1109A	16	1358.27	1358.69 - 1368.69	W/U
1109B	31	1342.43	1342.85 - 1357.85	U
1110A	20	1356.46	1356.88 - 1366.88	W/U
1111A	21	1358.63	1359.05 - 1369.05	U

Key:

L	Lacustrine Unit (Kent recessional sequence)
L/O	Lacustrine/Outwash - Kame Sand and Gravel (Kent recessional sequence)
U	Unweathered Till
W/U	Weathered/Unweathered Till

Table B-2. 2020 Groundwater Elevations - SDA 1100-Series Wells - (Ft AMSL)

Elevations are referenced to the NAVD 1988.

Source: NYSERDA

Well	Jan 2	Feb 3	Mar 3	Apr 1	May 1	Jun 1
1101A	1377.23	1377.58	1377.71	1377.46	1377.53	1369.50
1101B	1361.63	1363.61	1363.97	1363.68	1363.53	1354.35
1101C	1281.94	1281.97	1281.96	1281.74	1281.86	1281.47
1102A			1379.41			1372.95
1102B			1367.05			1366.31
1103A			1379.77			1378.40
1103B			1365.70			1363.63
1103C			1259.61			1259.34
1104A			1372.94			1368.40
1104B			1361.07			1351.60
1104C			1253.88			1253.41
1105A			1354.23			1348.78
1105B			1340.21			1333.86
1106A	1371.90	1371.61	1371.77	1371.39	1371.50	1365.36
1106B	1357.62	1357.38	1357.12	1356.72	1356.63	1352.89
1107A			1369.79			1368.78
1108A	1373.03	1374.84	1376.39	1376.28	1376.30	1370.33
1109A	1361.90	1361.93	1361.89	1361.52	1361.60	1359.53
1109B	1362.18	1362.02	1362.00	1361.65	1361.70	1359.34
1110A			1360.23			1359.11
1111A			1378.08			1376.88

Table B-2 continued.

Well	Jul 2	Aug 3	Sep 1	Oct 1	Nov 3	Dec 4
1101A	1373.56	1375.83	1375.03	1374.30	1376.45	1372.92
1101B	1357.64	1360.46	1362.29	1362.73	1361.77	1357.66
1101C	1281.66	1281.71	1281.68	1281.90	1281.77	1281.78
1102A			1376.34			1374.83
1102B			1365.32			1366.14
1103A			1376.19			1379.00
1103B			1364.59			1364.39
1103C			1259.61			1259.49
1104A			1370.46			1368.09
1104B			1360.23			1352.89
1104C			1253.50			1253.52
1105A			1352.99			1350.16
1105B			1337.80			1334.79
1106A	1367.97	1369.98	1370.27	1370.14	1371.56	1367.96
1106B	1356.15	1357.27	1357.99	1358.45	1358.43	1356.72
1107A			1368.45			1369.77
1108A	1372.75	1373.87	1373.95	1373.31	1371.98	1368.22
1109A	1361.30	1362.32	1363.01	1363.28	1363.20	1360.62
1109B	1361.36	1362.49	1363.01	1363.31	1363.22	1361.64
1110A			1359.50			1360.25
1111A			1374.86			1377.31

Table B-3. Groundwater Monitoring Well Summary – SDA Piezometers

Well depths are rounded. Elevations are referenced to the NAVD of 1988 and based on well construction details.

Source: NYSERDA

Piezometer	Well Depth (ft BGS)	Well Bottom Elevation (ft AMSL)	Screened Interval Elevations (ft AMSL)	Geologic Unit Screened
1S-91	14	1368.88	1368.88 - 1376.38	W/U
2S-91	16	1368.87	1368.87 - 1378.87	W/U
3S-91	13.5	1365.10	1365.10 - 1372.60	W/U
4S-91	11	1369.48	1369.48 - 1374.48	W/U
4D-91	29	1351.48	1351.48 - 1366.48	U
6S-91	11	1370.52	1370.52 - 1375.52	W/U
6D-91	25	1356.52	1356.52 - 1366.52	U
9S-91	9	1372.03	1372.03 - 1377.03	W/U
9D-91	25	1356.03	1356.03 - 1366.03	U
10S-91	12.4	1367.07	1367.07 - 1374.57	W/U
15S-91	13	1365.91	1365.91 - 1373.41	W/U
16D-91	25	1354.31	1354.31 - 1364.31	U
17S-91	11	1372.55	1372.55 - 1377.55	W/U
18S-91	14	1366.52	1366.52 - 1374.02	U
21S-91	16	1365.52	1365.52 - 1370.52	U
22S-91	21	1361.74	1361.74 - 1366.74	U
24S-91	18	1362.32	1362.32 - 1372.32	W/U
B-14	24	1355.89	1355.89 - 1365.89	U
P1-95[a]	7.7	1360.21	1360.21 - 1365.21	W

[a] P1-95 was installed using the direct push method.

Key:

U	Unweathered Till
W	Weathered Till
W/U	Weathered/Unweathered Till

Table B-4. 2020 Groundwater Elevations - SDA Piezometers – (Ft AMSL)

Elevations are referenced to NAVD of 1988.

Source: NYSERDA

Well/ Piezometer	Jan 2	Feb 3	Mar 3	Apr 1	May 1	Jun 1
1S			1381.01			1380.67
2S			1380.64			1380.77
3S	1375.95	1376.55	1377.30	1377.50	1377.45	1376.87
4S	dry	dry	dry	dry	dry	dry
4D	1357.27	1356.64	1356.31	1355.70	1355.68	1355.48
6S	dry	dry	dry	dry	dry	dry
6D	1361.85	1361.37	1360.84	1360.54	1360.37	1360.46
9S	dry	dry	dry	dry	dry	dry
9D	1357.19	1356.86	1356.57	1356.78	1356.45	dry
10S	1372.22	1371.73	1371.36	1371.51	1372.55	1373.29
15S	1379.59	1379.73	1379.83	1379.77	1379.71	1378.58
16D	1361.23	1361.79	1362.10	1362.14	1362.14	1362.15
17S	1382.57	1382.56	1382.67	1382.55	1382.55	1382.13
18S	1377.03	1377.64	1378.00	1377.94	1377.95	1377.95
21S	dry	dry	dry	dry	dry	dry
22S	dry	dry	dry	dry	dry	dry
24S	dry	dry	dry	dry	dry	dry
B-14	1359.20	1358.61	1358.12	1357.75	1357.57	1357.46
P1-95			1365.49			1363.71

Table B-4 continued.

Well/ Piezometer	Jul 2	Aug 3	Sep 1	Oct 1	Nov 3	Dec 4
1S			1378.33			1379.67
2S			1379.67			1378.09
3S	1376.29	1375.54	1374.01	1372.59	1372.72	1374.47
4S	dry	dry	dry	dry	dry	dry
4D	1355.76	1356.29	1356.81	1357.28	1357.47	1357.48
6S	dry	dry	dry	dry	dry	dry
6D	1361.10	1361.84	1362.63	1363.10	1363.04	1362.66
9S	dry	dry	dry	dry	dry	dry
9D	dry	1356.50	1356.46	1358.19	1358.16	1360.05
10S	1375.09	1376.39	1376.51	1375.67	1372.73	1373.09
15S	1377.73	1377.86	1377.27	1376.08	1379.76	1379.60
16D	1362.24	1362.42	1362.79	1363.04	1363.05	1363.15
17S	1380.57	1378.50	1378.29	1377.69	1379.74	1381.11
18S	1377.22	1376.12	1375.08	1374.57	1374.05	1375.46
21S	dry	dry	dry	dry	dry	dry
22S	dry	dry	dry	dry	dry	dry
24S	dry	dry	dry	dry	dry	dry
B-14	1357.83	1358.42	1358.95	1359.62	1359.71	1359.49
P1-95			1362.68			1364.86

Table B-5. Groundwater Monitoring Well Summary - SDA Slit-Trench Wells

Well depths are rounded. Elevations are referenced to the NAVD of 1988 and based on well construction details.

Source: NYSERDA

Slit Trench Well	Well Depth (ft BGS)	Well Bottom Elevation (ft AMSL)	Screened Interval Elevations (ft AMSL)	Geologic Unit Screened
SMW-1	7	1373.09	1373.29 - 1375.49	W
SMW-2	6	1374.32	1374.52 - 1376.72	W
SMW-3	6	1373.76	1373.96 - 1376.16	W
SMW-4	11	1366.37	1366.57 - 1368.77	W/U
SMW-5	7	1370.97	1371.17 - 1373.17	W
SMW-6	7	1372.53	1372.73 - 1374.93	W
SMW-7	6.5	1372.73	1372.93 - 1375.13	W
SMW-8	7	1369.51	1369.71 - 1372.71	W
SMW-9	6	1369.98	1370.18 - 1372.38	W

Key:

W	Weathered Till
W/U	Weathered/Unweathered Till

Table B-6. 2020 Groundwater Elevations - SDA Slit-Trench Wells - (Ft AMSL)

Elevations are referenced to the NAVD of 1988.

Source: NYSERDA

Well	Jan 2	Feb 3	Mar 3	Apr 1	May 1	Jun 1
SMW-1	1379.09	1378.96	1379.49	1379.48	1379.38	1379.49
SMW-2	dry	dry	dry	dry	dry	dry
SMW-3	dry	dry	dry	dry	dry	dry
SMW-4	1373.31	1374.58	1375.90	1376.24	1376.21	1375.95
SMW-5	1376.06	1376.23	1376.99	1376.45	1376.37	1376.33
SMW-6	1380.20	1380.41	1380.31	1380.04	1380.19	1378.80
SMW-7	1376.48	1377.36	1378.05	1377.14	1376.73	1376.50
SMW-8	1373.81	1373.82	1374.20	1374.32	1374.88	1375.37
SMW-9	1376.90	1376.88	1377.27	1376.92	1376.77	1376.37

Well	Jul 2	Aug 3	Sep 1	Oct 1	Nov 3	Dec 4
SMW-1	1379.24	1378.98	1378.01	1377.07	1376.97	1377.90
SMW-2	dry	dry	dry	dry	dry	dry
SMW-3	dry	dry	dry	dry	dry	dry
SMW-4	1376.08	1375.24	1373.93	1369.75	1369.32	1370.35
SMW-5	1376.12	1375.83	1375.58	1375.16	1376.10	1375.87
SMW-6	1378.02	1377.55	1376.17	1375.58	1380.28	1379.95
SMW-7	1376.02	1375.74	1375.38	1374.64	1374.01	1374.03
SMW-8	1376.90	1376.58	1375.04	1374.40	1374.15	1373.66
SMW-9	1375.69	1375.06	1373.54	1373.25	1373.06	1374.53

Figure B-1. First Quarter 2020 Weather Lavery Till Groundwater Contour Map

Source: AECOM

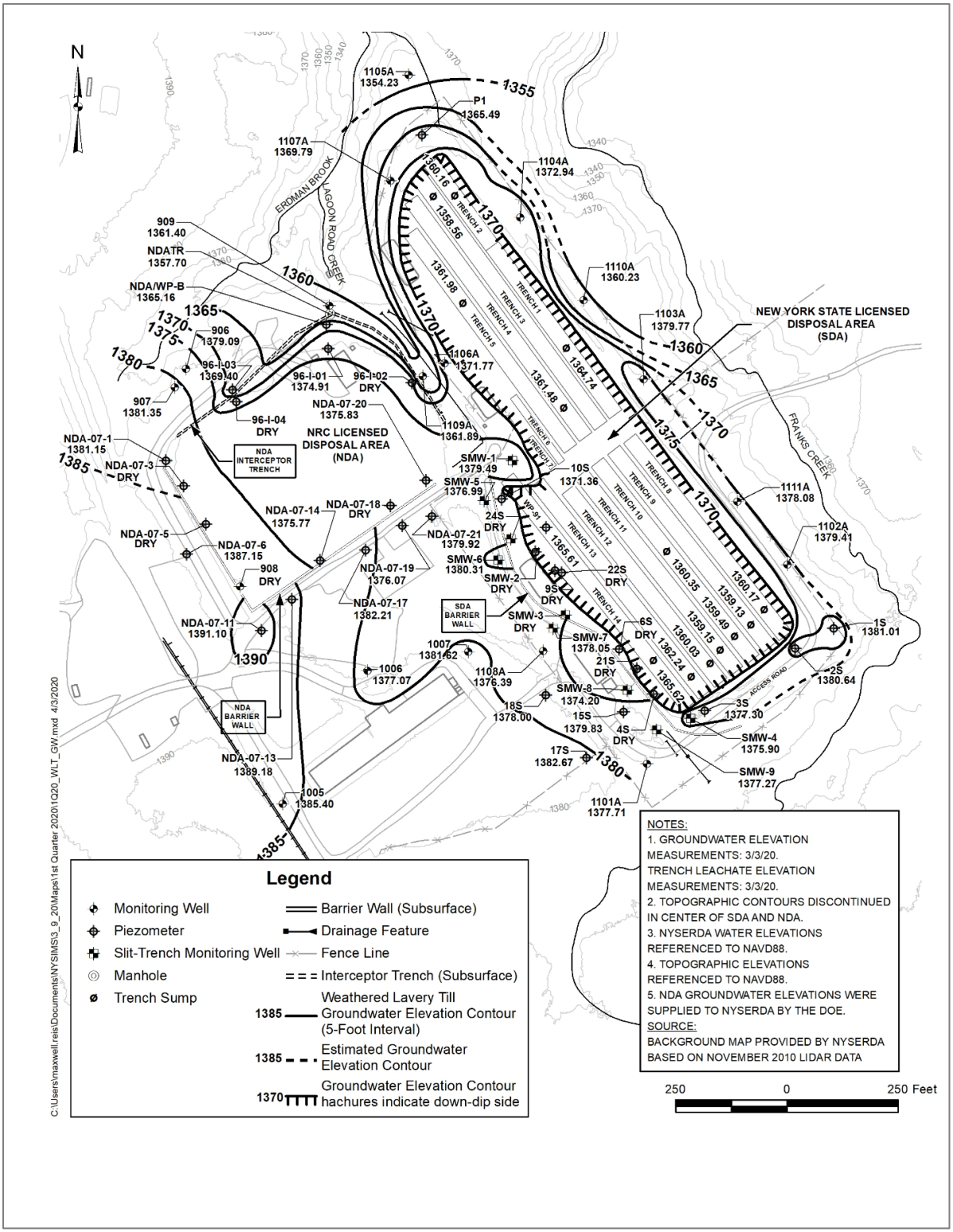


Figure B-2. First Quarter 2020 Kent Recessional Sequence Groundwater Contour Map

Source: AECOM

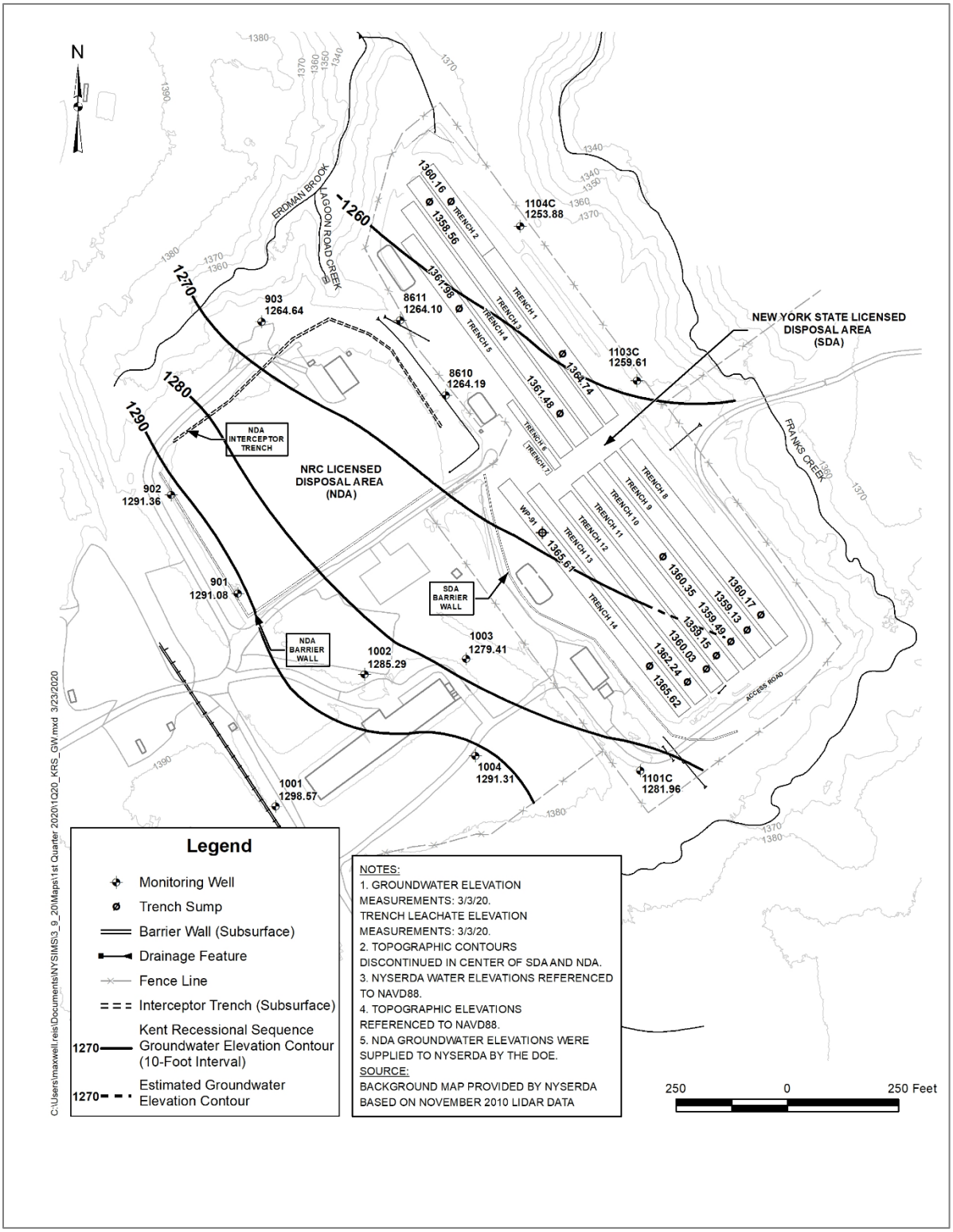


Figure B-3. Second Quarter 2020 Weathered Lavery Till Groundwater Contour Map

Source: AECOM

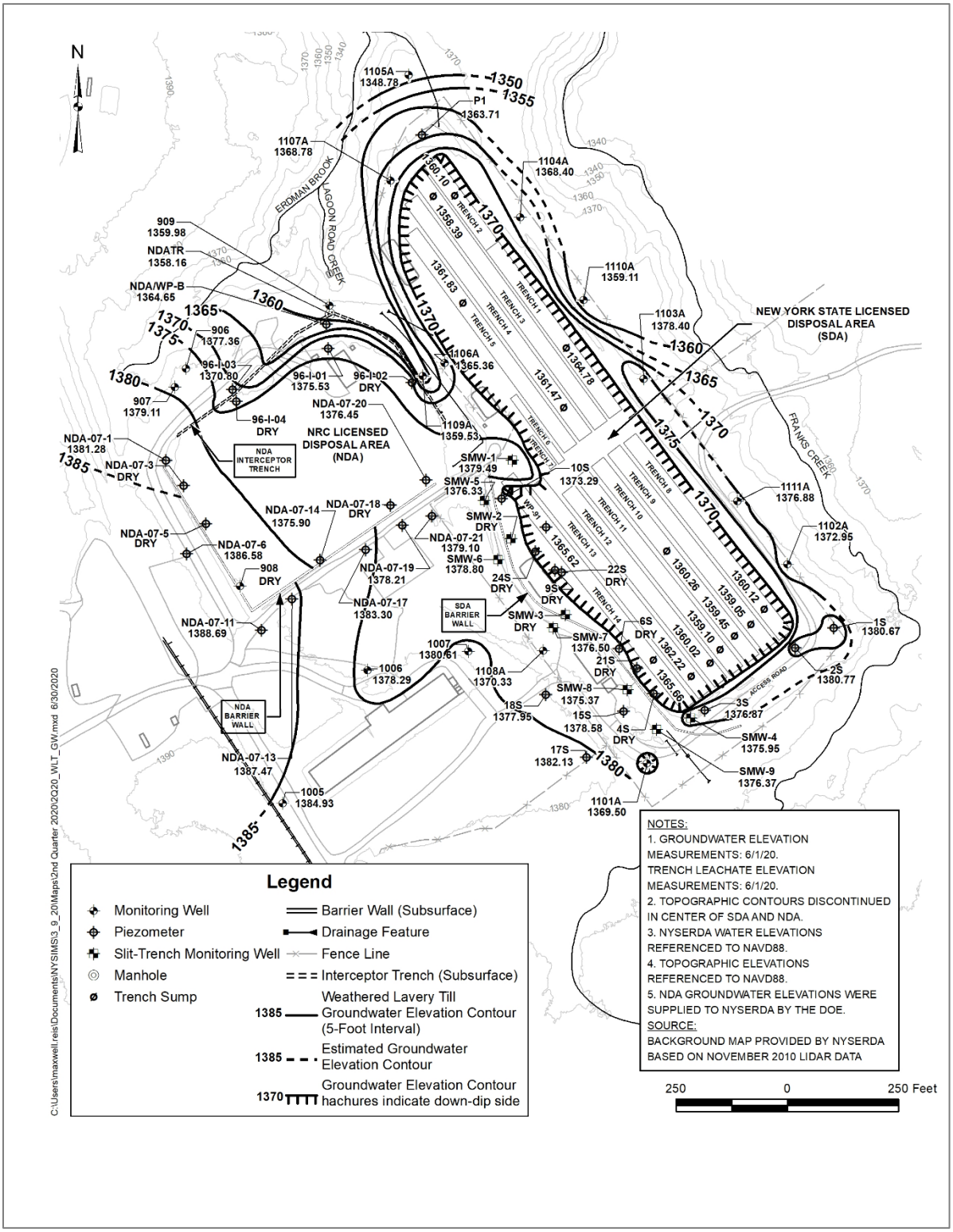


Figure B-4. Second Quarter 2020 Kent Recessional Sequence Groundwater Contour Map

Source: AECOM

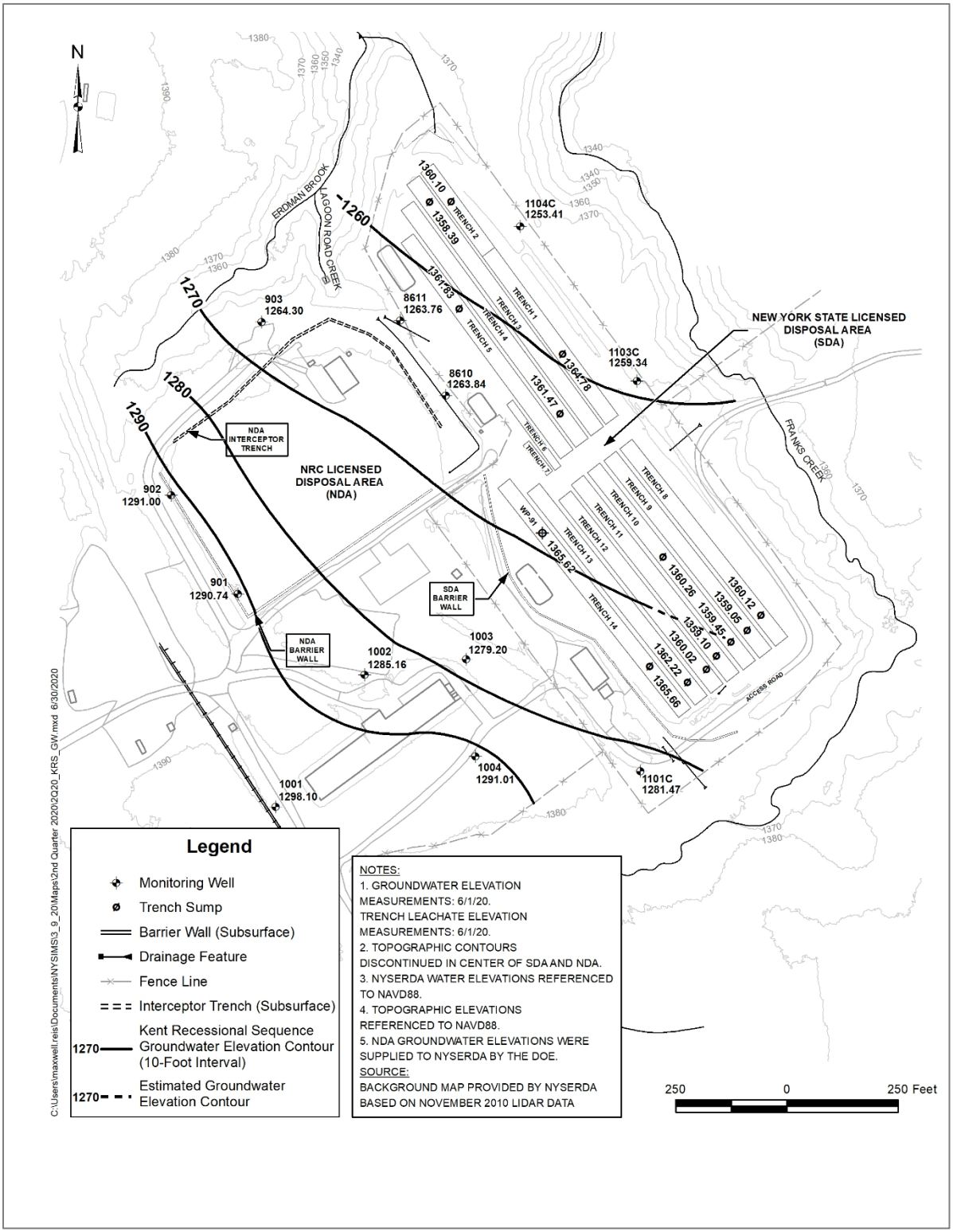


Figure B-5. Third Quarter 2020 Weathered Lavery Till Groundwater Contour Map

Source: AECOM

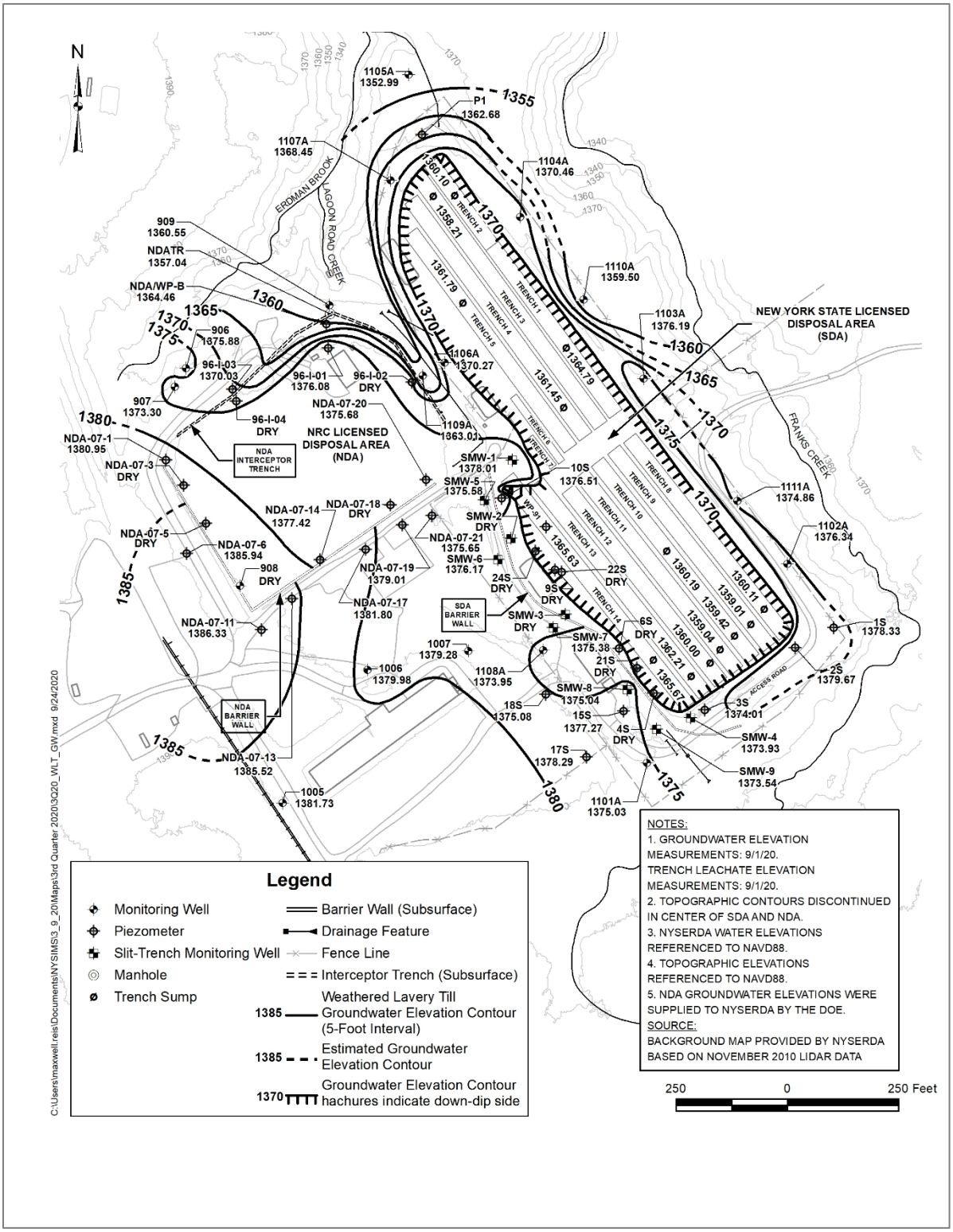


Figure B-6. Third Quarter 2020 Kent Recessional Sequence Groundwater Contour Map

Source: AECOM

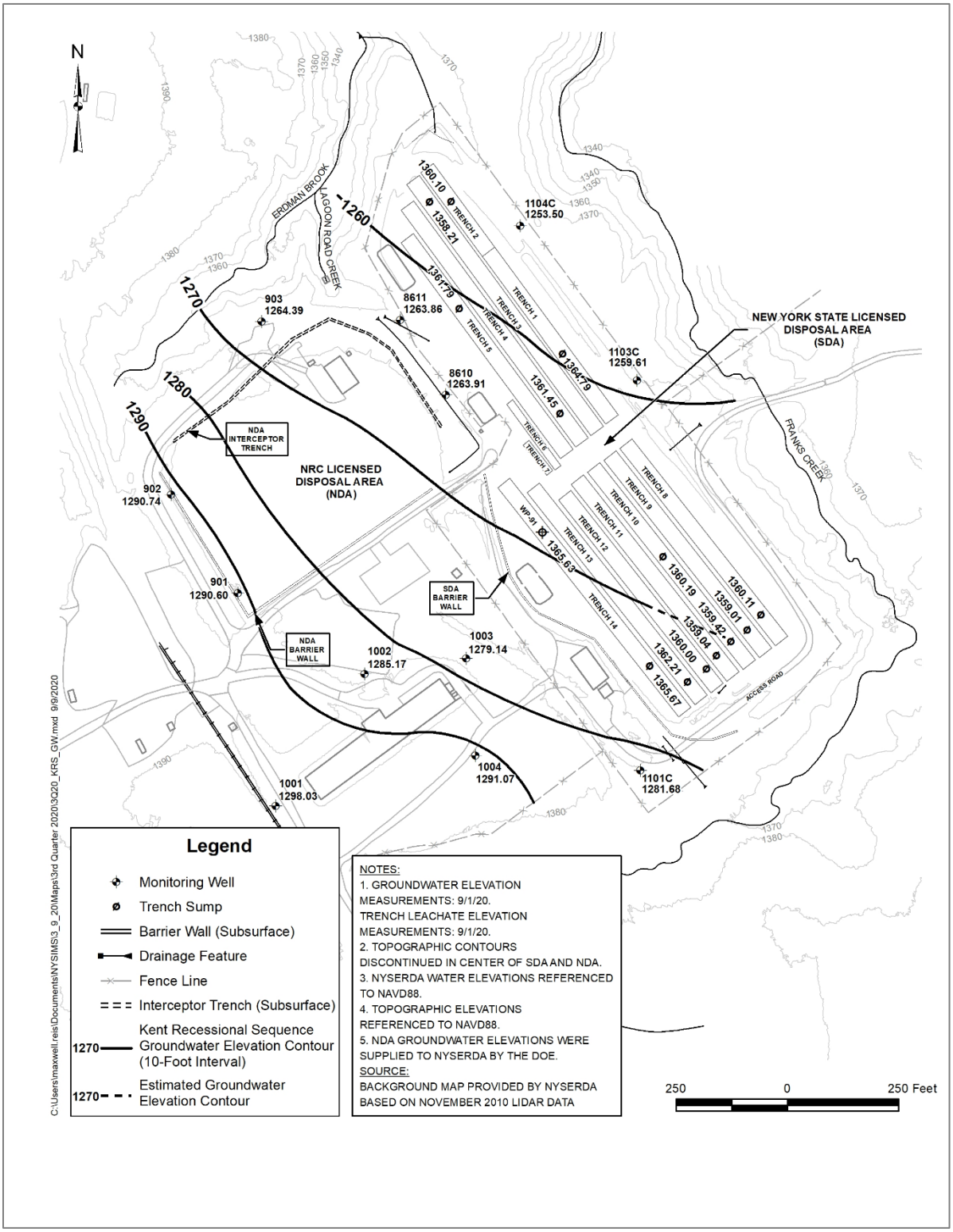


Figure B-7. Third Quarter 2020 North End Trench 14 Enhanced Groundwater Contour Map

Source: AECOM

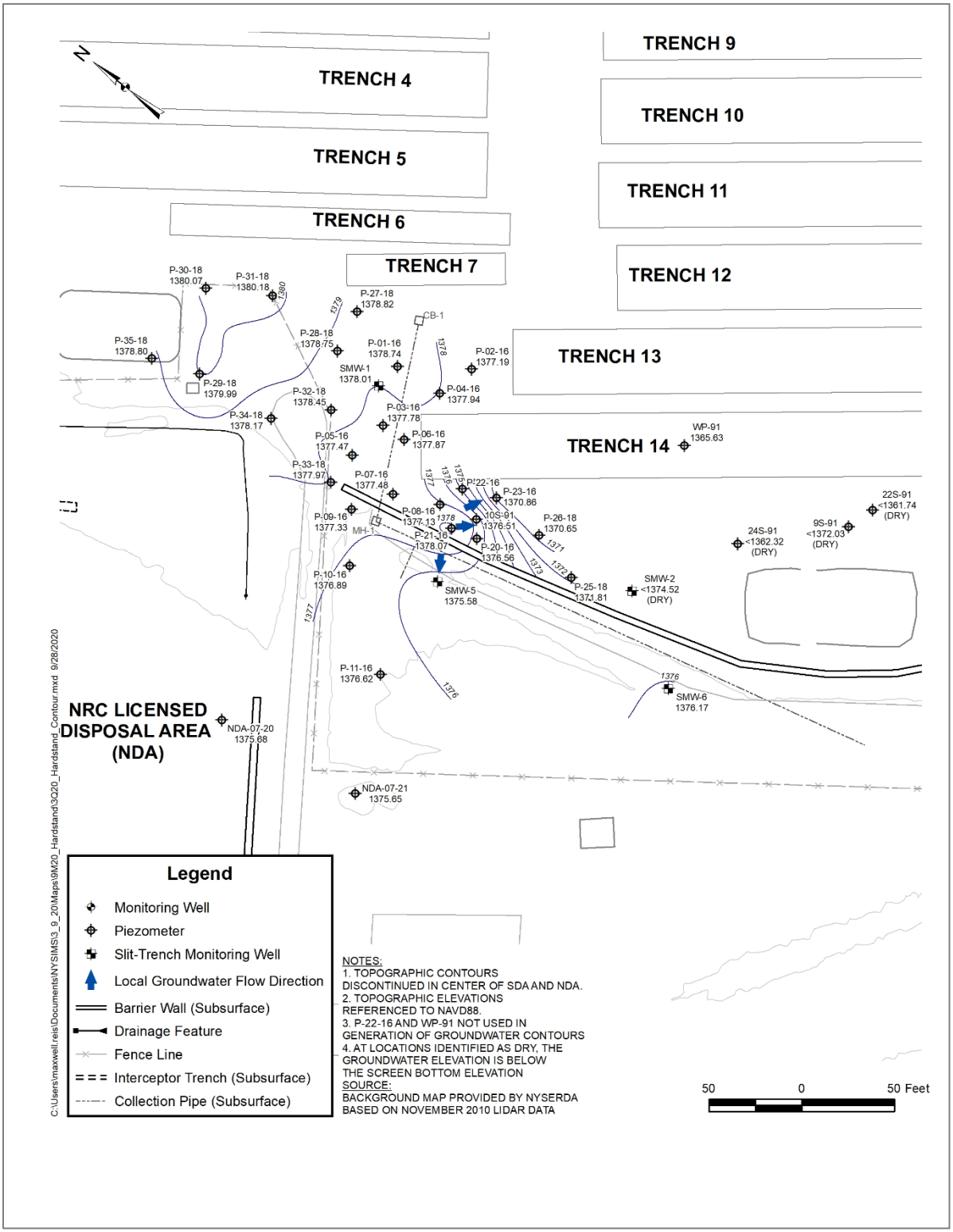


Figure B-8. Fourth Quarter 2020 Weathered Lavery Till Groundwater Contour Map

Source: AECOM

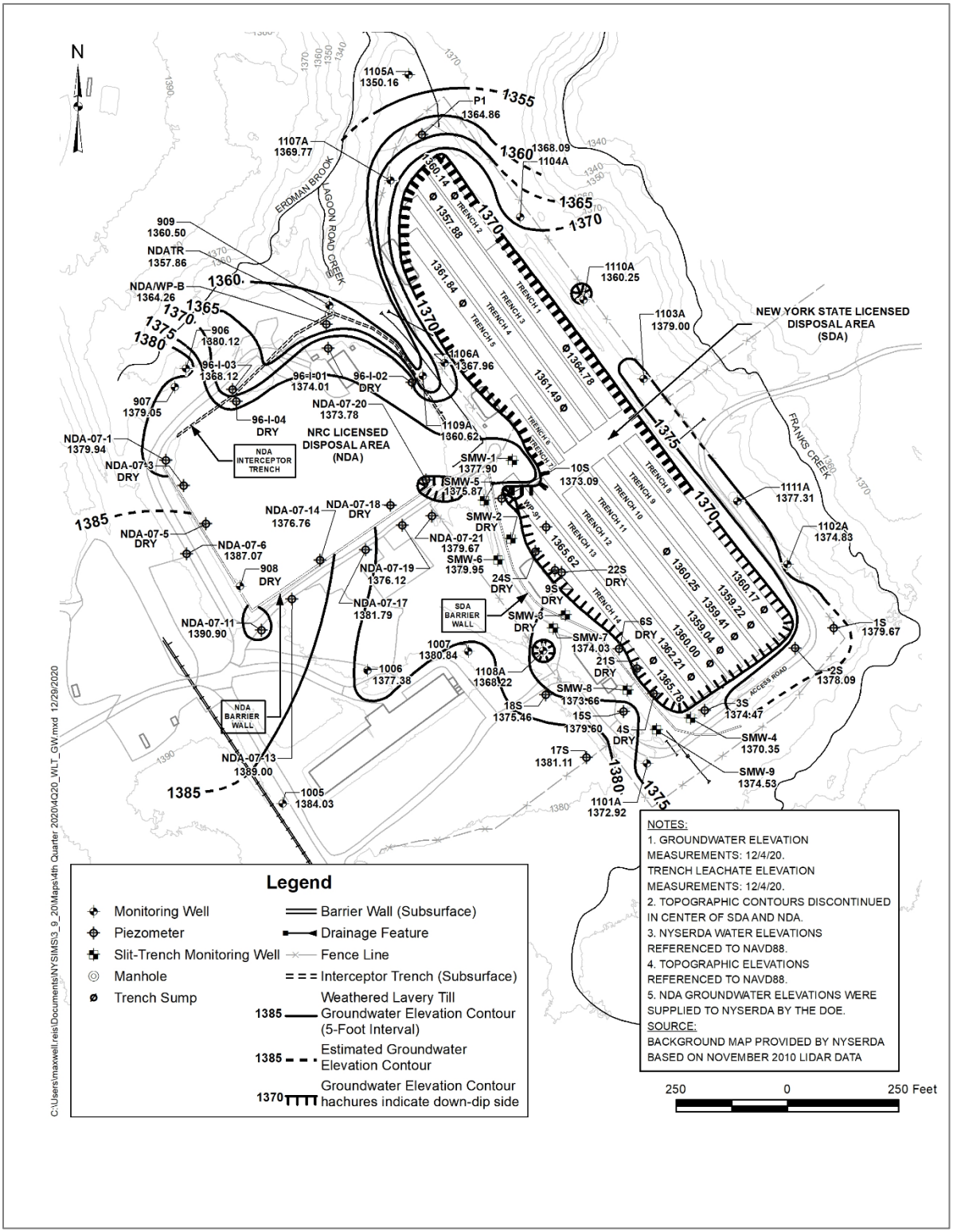


Figure B-9. Fourth Quarter 2020 Kent Recessional Sequence Groundwater Contour Map

Source: AECOM

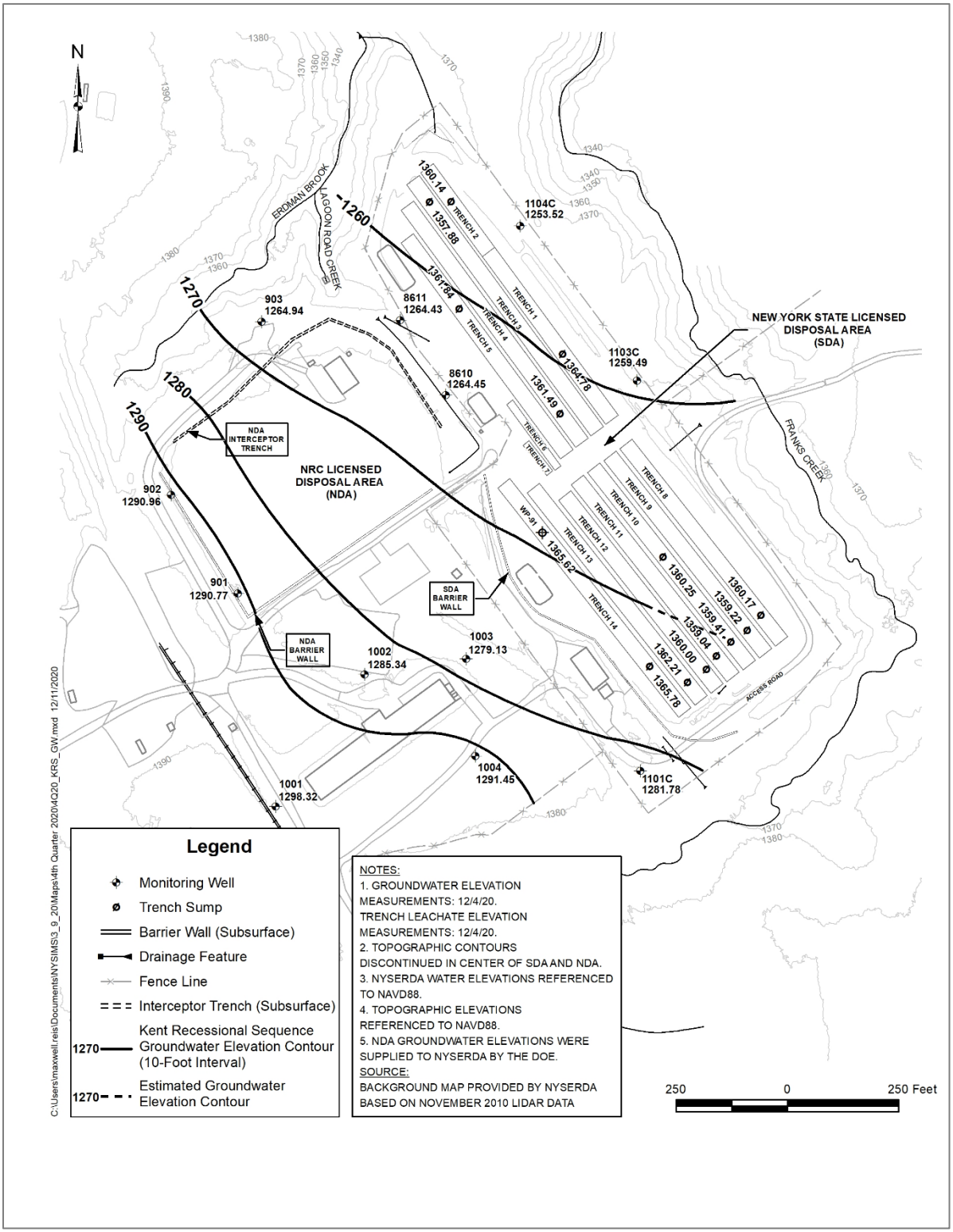


Figure B-10. Fourth Quarter 2020 North End Trench 14 Enhanced Groundwater Contour Map

Source: AECOM

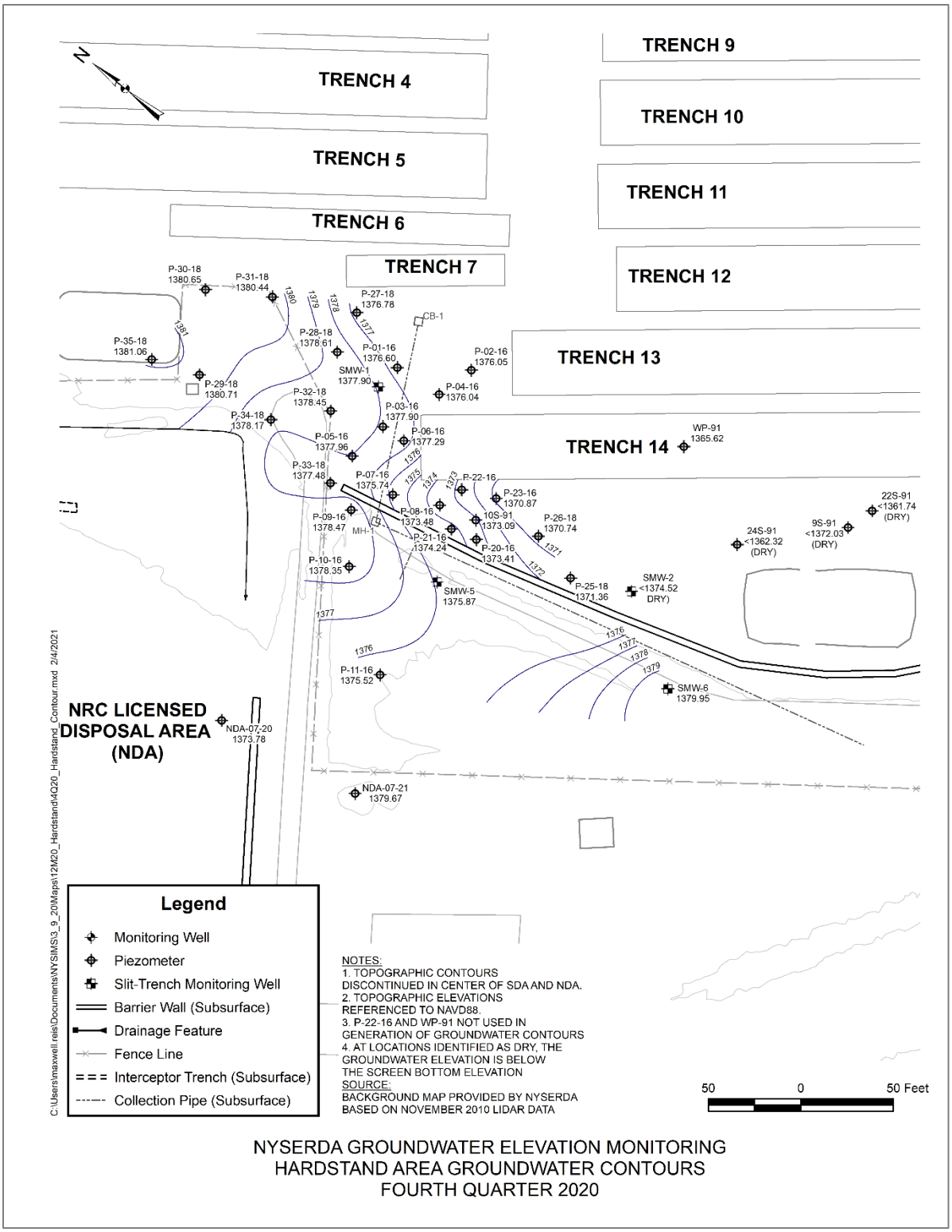


Table B-7. Semiannual Groundwater Sampling Performed in 2020

Source: NYSERDA

Well	Gross Alpha (May)	Gross Alpha (Nov)	Gross Beta (May)	Gross Beta (Nov)	Tritium (May)	Tritium (Nov)	Field Water Quality Parameters (May)	Field Water Quality Parameters (Nov)
1101A	✓	✓	✓	✓	✓	✓	✓	✓
1101B	✓	✓	✓	✓	✓	✓	✓	✓
1101C	✓	✓	✓	✓	✓	✓	✓	✓
1102A	✓	✓	✓	✓	✓	✓	✓	✓
1102B	✓	✓	✓	✓	✓	✓	✓	✓
1103A	✓	✓	✓	✓	✓	✓	✓	✓
1103B	✓	✓	✓	✓	✓	✓	✓	✓
1103C	✓	✓	✓	✓	✓	✓	Insufficient Volume	Insufficient Volume
1104A	✓	✓	✓	✓	✓	✓	✓	✓
1104B	✓	✓	✓	✓	✓	✓	✓	✓
1104C	✓	✓	✓	✓	✓	✓	✓	✓
1105A	✓	✓	✓	✓	✓	✓	✓	✓
1105B	✓	✓	✓	✓	✓	✓	✓	✓
1106A	✓	✓	✓	✓	✓	✓	✓	✓
1106B	✓	✓	✓	✓	✓	✓	✓	✓
1107A	✓	✓	✓	✓	✓	✓	✓	✓
1108A	✓	✓	✓	✓	✓	✓	✓	✓
1109A	✓	✓	✓	✓	✓	✓	✓	✓
1109B	✓	✓	✓	✓	✓	✓	✓	✓
1110A	✓	✓	✓	✓	✓	✓	✓	✓
1111A	✓	✓	✓	✓	✓	✓	✓	✓

Table B-8. Annual Groundwater Sampling Performed in 2020

Source: NYSERDA

Well	Gamma Emitters	Beta Emitters				Volatile Organic Compounds
		C-14	I-129	Sr-90	Tc-99	
1101A	✓	✓	✓	✓	✓	✓
1101B	✓	✓	✓	✓	✓	✓
1101C	✓	✓	✓	✓	✓	✓
1102A	✓	✓	✓	✓	✓	✓
1102B	✓	✓	✓	✓	✓	✓
1103A	✓	✓	✓	✓	✓	✓
1103B	✓	✓	✓	✓	✓	✓
1103C	✓	Insufficient Volume	Insufficient Volume	Insufficient Volume	Insufficient Volume	✓
1104A	✓	✓	✓	✓	✓	✓
1104B	✓	✓	✓	✓	✓	✓
1104C	✓	✓	✓	✓	✓	✓
1105A	✓	✓	✓	✓	✓	✓
1105B	✓	✓	✓	✓	✓	✓
1106A	✓	✓	✓	✓	✓	✓
1106B	✓	✓	✓	✓	✓	✓
1107A	✓	✓	✓	✓	✓	✓
1108A	✓	✓	✓	✓	✓	✓
1109A	✓	✓	✓	✓	✓	✓
1109B	✓	✓	✓	✓	✓	✓
1110A	✓	✓	✓	✓	✓	✓
1111A	✓	✓	✓	✓	✓	✓

Table B-9. 2020 Groundwater Radiological Data – SDA 1100-Series Wells

Blank entries indicate a result was not obtained, typically due to insufficient sample volume. Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table B-9, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Location	Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards		1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
1101A	05/11/20	8.15E+00±4.67E+00	J	3.69E+00±1.87E+00	J	5.54E+01±3.83E+01	U
1101A	11/03/20	4.86E+00±4.17E+00	UJ	6.13E+00±2.06E+00		-1.35E+01±3.87E+01	U
1101B	05/11/20	4.15E+00±3.12E+00	UJ	2.35E+00±1.41E+00	U	9.91E+00±3.72E+01	U
1101B	11/03/20	9.51E+00±4.06E+00	J	2.18E+00±1.40E+00	J	-5.77E+01±3.76E+01	UJ
1101C	05/04/20	1.60E+00±2.50E+00	UJ	1.88E+00±8.76E-01		-1.40E+01±3.19E+01	U
1101C	11/03/20	-9.64E-02±1.46E+00	U	2.19E+00±8.70E-01		-3.69E+01±3.78E+01	U
1102A	05/07/20	7.34E+00±4.68E+00	J	7.12E+00±2.45E+00		-9.91E+00±3.70E+01	U
1102A	11/03/20	7.08E+00±4.39E+00	J	2.69E+00±1.50E+00	J	4.59E+01±4.01E+01	U
1102B	05/07/20	3.81E+00±3.58E+00	UJ	3.36E+00±1.66E+00		-1.94E+01±3.67E+01	U
1102B	11/03/20	2.81E+00±3.48E+00	UJ	-7.69E+01±8.00E+00	UJ	-4.77E+01±3.71E+01	UJ
1103A	05/06/20	8.65E+00±4.95E+00	J	3.23E+00±1.76E+00	J	4.46E+01±4.02E+01	U
1103A	11/02/20	7.09E+00±5.75E+00	UJ	3.38E+00±2.73E+00	UJ	5.41E+01±3.71E+01	U
1103B	05/06/20	4.32E+00±3.23E+00	UJ	2.05E+00±1.65E+00	U	-3.78E+01±3.82E+01	U
1103B	11/02/20	3.03E+00±4.15E+00	UJ	2.20E+00±1.52E+00	U	-5.63E+01±3.37E+01	UJ
1103C	05/01/20	1.20E+00±4.16E+00	UJ	3.42E+00±2.04E+00	J	-2.39E+01±3.68E+01	U
1103C	11/02/20	1.94E+00±4.25E+00	UJ	2.88E+00±1.65E+00	J	-2.52E+01±3.80E+01	U
1104A	05/07/20	3.86E+00±4.03E+00	UJ	1.71E+00±1.76E+00	U	2.66E+01±3.77E+01	U
1104A	11/02/20	7.86E+00±5.03E+00	J	2.91E+00±1.63E+00	J	3.42E+01±3.52E+01	U
1104B	05/07/20	1.52E+00±3.45E+00	UJ	1.65E+00±1.40E+00	U	-1.85E+01±3.80E+01	U
1104B	11/02/20	1.11E+00±2.36E+00	UJ	2.08E+00±1.39E+00	U	-1.62E+01±3.59E+01	U
1104C	05/01/20	1.53E+01±1.35E+01	UJ	2.02E+00±6.13E+00	UJ	2.70E+00±3.82E+01	U
1104C	11/02/20	1.93E+01±1.27E+01	J	5.09E+00±4.03E+00	UJ	-3.51E+01±3.82E+01	U
1105A	05/04/20	3.80E+00±2.97E+00	UJ	-5.62E-01±1.18E+00	U	2.43E+01±3.22E+01	U
1105A	11/02/20	1.68E+00±3.05E+00	UJ	2.60E+00±1.46E+00	J	4.23E+01±3.72E+01	U
1105B	05/04/20	3.35E+00±2.38E+00	J	3.34E+00±1.25E+00		3.60E+00±3.19E+01	U
1105B	11/02/20	3.78E+00±3.07E+00	UJ	3.78E-01±1.02E+00	U	-2.75E+01±3.52E+01	U

Table B-9 continued.

Sample Location	Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards		1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
1106A	05/05/20	5.26E+00±3.80E+00	UJ	2.17E+00±1.80E+00	U	1.40E+02±3.61E+01	
1106A	11/04/20	3.09E+00±3.82E+00	UJ	2.69E+00±1.86E+00	U	1.40E+02±4.39E+01	
1106B	05/05/20	3.20E+00±3.63E+00	UJ	1.84E+00±1.76E+00	U	6.31E+00±3.20E+01	U
1106B	11/04/20	4.29E+00±3.95E+00	UJ	2.40E+00±1.71E+00	U	-5.86E+00±3.82E+01	U
1107A	05/05/20	1.06E+01±9.49E+00	UJ	2.39E+01±7.23E+00	J	2.46E+03±2.28E+02	
1107A	05/05/20	1.19E+01±1.15E+01	UJ	9.99E+00±6.46E+00	J	2.41E+03±2.23E+02	
1107A	11/04/20	2.96E+01±1.39E+01	J	1.88E+01±5.82E+00	J	2.63E+03±2.45E+02	
1108A	05/04/20	7.82E+00±4.50E+00	J	4.72E+00±2.24E+00		-1.35E+00±3.22E+01	U
1108A	11/03/20	6.96E+00±4.59E+00	J	4.28E+00±1.65E+00		-2.07E+01±3.92E+01	U
1109A	05/05/20	9.88E+00±5.51E+00	J	5.04E-02±1.88E+00	U	2.84E+02±4.57E+01	
1109A	11/04/20	4.88E+00±4.73E+00	UJ	4.64E+00±1.77E+00		3.20E+02±5.42E+01	
1109B	05/06/20	1.17E+00±1.67E+00	U	2.24E+00±1.09E+00		2.25E+02±4.75E+01	
1109B	11/04/20	1.29E+00±2.72E+00	UJ	4.36E-01±9.47E-01	U	2.07E+02±4.77E+01	
1110A	05/01/20	1.08E+01±9.55E+00	UJ	6.59E+00±4.17E+00	J	7.79E+01±3.55E+01	
1110A	11/02/20	6.45E+00±5.90E+00	UJ	5.92E+00±2.80E+00		3.83E+01±3.57E+01	U
1111A	05/07/20	1.01E+01±6.85E+00	J	7.36E-01±2.41E+00	UJ	4.37E+01±3.69E+01	U
1111A	11/03/20	1.08E+01±6.41E+00	J	3.07E+00±2.04E+00	J	2.88E+01±3.98E+01	U
1111A	11/03/20	1.42E+01±7.78E+00	J	4.68E+00±2.48E+00	J	4.10E+01±3.98E+01	U

Table B-9 continued.

Sample Location	Sample Date	Actinium 228 (pCi/L)	Q	Bismuth-214 (pCi/L)	Q	Carbon-14 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/11/20	9.20E+00±2.36E+01	U	1.04E+01±9.67E+00	U	6.45E+00±8.75E+00	U
1101B	05/11/20	-4.81E+00±3.58E+01	U	2.14E+01±1.77E+01	J	5.53E+00±8.02E+00	U
1101C	05/04/20	-3.25E+01±3.87E+01	U	2.89E+01±2.05E+01	J	-1.79E-01±7.34E+00	U
1102A	05/07/20	5.69E+00±4.04E+01	U	-1.86E+01±2.43E+01	U	2.39E+00±7.52E+00	U
1102B	05/07/20	1.75E+00±3.64E+01	U	-3.16E+00±1.29E+01	U	-1.26E+00±7.30E+00	U
1103A	05/06/20	2.03E+01±1.07E+01	U	4.46E+01±2.16E+01		1.24E+01±8.67E+00	U
1103B	05/06/20	6.82E+00±1.64E+01	U	-6.17E+00±2.79E+01	U	5.10E+00±8.01E+00	U
1103C	05/01/20	4.07E+01±3.77E+01	J	1.95E+01±2.12E+01	U		
1104A	05/07/20	-4.48E-01±2.96E+00	U	3.73E+01±1.80E+01		3.31E+00±7.50E+00	U
1104B	05/07/20	1.28E+01±2.38E+01	U	2.63E+01±1.51E+01	U	1.63E+00±7.36E+00	U
1104C	05/01/20	2.01E+01±2.67E+01	U	-1.84E+01±2.04E+01	U	2.34E+00±7.45E+00	U
1105A	05/04/20	-2.54E+01±3.21E+01	U	1.90E-01±6.22E-01	U	-4.18E-01±7.36E+00	U
1105B	05/04/20	1.67E+00±9.09E+00	U	1.90E+01±1.34E+01	J	-1.37E+00±7.34E+00	U
1106A	05/05/20	2.54E+00±1.26E+01	U	4.46E+01±2.29E+01	J	0.00E+00±7.33E+00	UJ
1106B	05/05/20	2.80E+01±2.22E+01	J	2.70E+01±1.97E+01	J	5.42E+00±7.43E+00	U
1107A	05/05/20	-2.95E+00±6.53E+00	U	5.43E+01±2.80E+01	J	1.85E+00±7.39E+00	U
1107A	05/05/20	1.44E+01±2.16E+01	U	4.15E+01±3.15E+01	J	5.65E+00±7.58E+00	U
1108A	05/04/20	3.01E+01±2.27E+01	J	2.22E+01±1.87E+01	U	3.24E+00±7.48E+00	U
1109A	05/05/20	2.85E+00±4.00E+01	U	3.44E+01±2.32E+01	U	-8.24E+00±6.70E+00	UJ
1109B	05/06/20	1.12E+01±2.65E+01	U	2.73E+01±1.66E+01	J	7.78E+00±7.79E+00	U
1110A	05/01/20	-2.56E+01±7.08E+01	U	1.07E+01±3.32E+01	U	6.46E+00±7.38E+00	U
1111A	05/07/20	1.88E-01±4.66E-01	U	3.65E+01±1.95E+01	J	1.08E+00±7.42E+00	U

Table B-9 continued.

Sample Location	Sample Date	Cesium-134 (pCi/L)	Q	Cesium-137 (pCi/L)	Q	Cobalt-57 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/11/20	4.91E+00±7.29E+00	U	1.85E+00±9.93E+00	U	-5.08E-01±4.85E+00	U
1101B	05/11/20	1.07E+01±8.32E+00	U	2.08E+00±1.03E+01	U	8.05E-01±8.20E+00	U
1101C	05/04/20	4.36E+00±8.96E+00	U	-9.31E-01±8.45E+00	U	3.75E-03±4.12E+00	U
1102A	05/07/20	1.46E+01±7.23E+00		-4.55E+00±1.22E+01	UJ	8.37E+00±9.21E+01	U
1102B	05/07/20	3.35E+00±6.60E+00	U	1.00E+00±9.12E+00	U	-2.79E+00±5.48E+00	U
1103A	05/06/20	5.23E+00±9.73E+00	U	-5.01E+00±9.42E+00	U	3.88E+00±8.53E+00	U
1103B	05/06/20	3.62E+00±7.70E+00	U	-1.85E+00±9.35E+00	U	1.86E+00±4.99E+00	U
1103C	05/01/20	1.05E+01±1.47E+01	U	-8.42E+00±1.36E+01	UJ	0.00E+00±3.30E+00	UJ
1104A	05/07/20	1.56E+00±9.25E+00	U	3.92E+00±7.09E+00	U	0.00E+00±2.90E+00	UJ
1104B	05/07/20	6.56E+00±9.16E+00	U	-3.95E+00±9.31E+00	U	6.10E-01±5.42E+00	U
1104C	05/01/20	-8.23E+00±1.03E+01	U	1.43E+00±7.30E+00	U	0.00E+00±2.91E+00	UJ
1105A	05/04/20	3.99E+00±1.06E+01	U	-2.37E+00±9.93E+00	U	4.09E+00±7.08E+00	U
1105B	05/04/20	5.61E+00±8.99E+00	U	-1.18E+00±9.19E+00	U	-3.54E+00±5.97E+00	U
1106A	05/05/20	7.43E+00±1.57E+01	U	-2.13E+00±9.10E+00	U	-2.67E+00±5.72E+00	U
1106B	05/05/20	-3.41E+00±7.86E+00	U	3.88E+00±6.92E+00	U	-2.84E-01±4.78E-01	U
1107A	05/05/20	3.52E+00±2.61E+00	U	-1.98E-01±9.57E+00	U	4.26E+00±6.67E+01	U
1107A	05/05/20	4.55E+00±8.38E+00	U	-4.94E-01±1.12E+01	U	0.00E+00±2.17E+00	UJ
1108A	05/04/20	4.91E+00±6.77E+00	U	3.30E+00±9.54E+00	U	0.00E+00±2.35E+00	UJ
1109A	05/05/20	3.93E+00±4.56E+00	U	2.49E+00±8.07E+00	U	-3.12E+00±6.78E+00	U
1109B	05/06/20	-7.68E+00±5.13E+00	UJ	2.24E+00±5.10E+00	U	3.40E+00±8.23E+00	U
1110A	05/01/20	7.71E+00±1.19E+01	U	3.79E+00±1.03E+01	U	1.31E+00±3.36E+00	U
1111A	05/07/20	4.33E+00±9.56E+00	U	3.92E+00±8.11E+00	U	0.00E+00±2.73E+00	UJ

Table B-9 continued.

Sample Location	Sample Date	Cobalt-60 (pCi/L)	Q	Iodine-129 (pCi/L)	Q	Lead-212 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/11/20	3.06E+00±5.51E+00	U	-1.08E-02±5.19E-01	U	-1.83E+00±1.93E+01	U
1101B	05/11/20	-4.31E-01±1.34E+01	U	7.01E-02±4.63E-01	U	-1.29E+01±1.70E+01	U
1101C	05/04/20	4.29E+00±2.07E+00	U	8.79E-02±3.16E-01	U	8.70E+00±1.07E+01	U
1102A	05/07/20	7.71E+00±5.33E+00	U	-3.24E-01±4.93E-01	U	-2.12E+01±2.34E+01	U
1102B	05/07/20	1.62E+00±6.73E+00	U	-1.28E-01±4.84E-01	U	-1.79E+01±1.60E+01	UJ
1103A	05/06/20	1.38E+00±8.19E+00	U	1.93E-01±3.14E-01	U	-8.43E+00±1.53E+01	U
1103B	05/06/20	-5.68E+00±1.15E+01	U	2.44E-01±4.69E-01	U	-1.28E+01±1.01E+01	UJ
1103C	05/01/20	2.88E+00±7.23E+00	U			-2.24E+01±1.36E+01	UJ
1104A	05/07/20	-2.17E+00±6.27E+00	U	-2.36E-01±4.99E-01	U	-3.40E+00±1.86E+01	U
1104B	05/07/20	4.94E+00±3.16E+00	U	-2.17E-01±5.09E-01	U	-2.20E+00±1.83E+01	U
1104C	05/01/20	-5.66E-01±8.99E+00	U	-4.13E-01±1.24E+00	UJ	9.71E+00±1.46E+01	U
1105A	05/04/20	2.46E+00±1.01E+01	U	-7.51E-02±3.32E-01	U	6.33E+00±1.04E+01	U
1105B	05/04/20	2.87E+00±6.51E+00	U	-5.96E-02±3.28E-01	U	1.73E+01±1.30E+01	J
1106A	05/05/20	5.34E-01±2.57E+00	U	-3.56E-02±2.91E-01	U	-7.96E+00±1.73E+01	U
1106B	05/05/20	-6.41E+00±4.85E+00	UJ	-3.33E-02±2.96E-01	U	-2.61E+00±1.73E+01	U
1107A	05/05/20	4.61E+00±4.15E+00	U	1.25E-01±2.92E-01	U	-1.58E+00±1.56E+01	U
1107A	05/05/20	-1.00E+00±2.57E+00	U	3.54E-01±4.38E-01	U	-1.58E+00±1.71E+01	U
1108A	05/04/20	-6.65E+00±1.14E+01	U	3.56E-02±3.44E-01	U	6.74E+00±1.13E+01	U
1109A	05/05/20	-7.56E+00±1.34E+01	U	4.38E-01±5.46E-01	U	-4.73E+00±2.08E+01	U
1109B	05/06/20	-6.41E+00±1.15E+01	U	3.53E-02±4.49E-01	U	-3.51E+00±1.50E+01	U
1110A	05/01/20	5.90E-01±4.93E+00	U	-4.87E-02±3.27E-01	U	-1.98E+01±1.76E+01	UJ
1111A	05/07/20	4.07E+00±4.12E+00	U	-1.78E-01±5.46E-01	U	-1.04E+00±1.84E+01	U

Table B-9 continued.

Sample Location	Sample Date	Lead-214 (pCi/L)	Q	Potassium-40 (pCi/L)	Q	Radium-224 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/11/20	4.95E+00±9.29E+00	U	1.84E+01±1.15E+02	U	-1.83E+00±1.93E+01	U
1101B	05/11/20	3.44E+01±1.91E+01	J	-6.04E+01±1.52E+02	U	-1.29E+01±1.70E+01	U
1101C	05/04/20	3.76E+01±1.66E+01		3.93E+01±1.15E+02	U	8.70E+00±1.07E+01	U
1102A	05/07/20	3.45E+01±1.72E+01		5.69E+01±1.10E+02	U	-2.12E+01±2.34E+01	U
1102B	05/07/20	2.31E+01±1.83E+01	J	-3.54E+01±1.32E+02	U	-1.79E+01±1.60E+01	UJ
1103A	05/06/20	2.68E+01±2.42E+01	U	1.84E+01±1.15E+02	U	-8.43E+00±1.53E+01	U
1103B	05/06/20	-2.06E+01±1.90E+01	UJ	3.33E+01±1.17E+02	U	-1.28E+01±1.01E+01	UJ
1103C	05/01/20	-1.81E+01±2.07E+01	U	-7.08E+01±1.55E+02	U	-2.24E+01±1.36E+01	UJ
1104A	05/07/20	4.89E+01±1.84E+01		-6.04E+01±1.30E+02	U	-3.40E+00±1.86E+01	U
1104B	05/07/20	1.95E+01±1.65E+01	U	-2.61E+01±1.80E+02	U	-2.20E+00±1.83E+01	U
1104C	05/01/20	9.25E+00±1.33E+01	U	5.06E+01±1.45E+02	U	9.71E+00±1.46E+01	U
1105A	05/04/20	-1.55E+00±1.71E+01	U	-1.19E+02±1.36E+02	U	6.33E+00±1.04E+01	U
1105B	05/04/20	3.68E-01±1.48E+01	U	3.93E+01±1.15E+02	U	1.73E+01±1.30E+01	J
1106A	05/05/20	4.93E+01±1.75E+01		-3.16E+01±1.25E+02	U	-7.96E+00±1.73E+01	U
1106B	05/05/20	2.99E-02±1.43E-01	U	-4.34E+01±1.58E+02	U	-2.61E+00±1.73E+01	U
1107A	05/05/20	4.41E+01±1.60E+01		-1.28E+01±1.28E+02	U	-1.58E+00±1.56E+01	U
1107A	05/05/20	1.75E+01±1.02E+01	U	-3.78E+01±1.62E+02	U	-1.58E+00±1.71E+01	U
1108A	05/04/20	5.84E-02±3.03E-01	U	-7.56E+01±1.32E+02	U	6.74E+00±1.13E+01	U
1109A	05/05/20	-6.39E+00±2.22E+01	U	-5.53E+01±1.51E+02	U	-4.73E+00±2.08E+01	U
1109B	05/06/20	-3.13E+00±1.69E+01	U	-1.37E+02±1.19E+02	UJ	-3.51E+00±1.50E+01	U
1110A	05/01/20	1.20E+01±2.11E+01	U	-1.96E+01±1.56E+02	U	-1.98E+01±1.76E+01	UJ
1111A	05/07/20	1.98E+01±1.71E+01	U	-8.34E+00±1.28E+02	U	-1.04E+00±1.84E+01	U

Table B-9 continued.

Sample Location	Sample Date	Radium-226 (pCi/L)	Q	Strontium-90 (pCi/L)	Q	Technetium 99 (pCi/L)	Q
703.5 Water Quality Standards		3.00E+00 pCi/L		8.00E+00 pCi/L			
1101A	05/11/20	-2.16E+02±2.30E+02	UJ	1.88E-01±2.21E-01	U	6.16E-01±8.93E-01	U
1101B	05/11/20	8.71E+01±1.64E+02	UJ	4.54E-01±2.08E-01		-2.38E-02±7.30E-01	U
1101C	05/04/20	2.99E+02±1.69E+02	UJ	1.66E-01±3.31E-01	U	-4.85E-01±1.20E+00	U
1102A	05/07/20	-8.99E+01±2.37E+02	UJ	7.28E-02±2.21E-01	U	8.74E-02±1.08E+00	U
1102B	05/07/20	3.22E+02±1.52E+02	J	1.75E-01±2.00E-01	U	2.78E-01±1.17E+00	U
1103A	05/06/20	-2.18E+02±2.41E+02	UJ	1.10E-01±2.14E-01	U	-3.10E-01±1.05E+00	U
1103B	05/06/20	0.00E+00±2.20E+02	UJ	4.56E-02±1.37E-01	U	-2.67E-01±1.19E+00	U
1103C	05/01/20	-1.65E+02±1.92E+02	UJ				
1104A	05/07/20	2.41E+01±1.56E+02	UJ	2.13E-01±1.71E-01	U	2.30E-01±1.24E+00	U
1104B	05/07/20	0.00E+00±1.89E+02	UJ	-7.18E-02±1.88E-01	U	-5.22E-01±1.21E+00	U
1104C	05/01/20	1.53E+02±1.83E+02	UJ	3.08E-01±3.72E-01	U	4.74E-01±8.93E-01	U
1105A	05/04/20	7.48E+01±1.48E+02	UJ	-2.81E-02±2.18E-01	U	-3.76E-01±1.14E+00	U
1105B	05/04/20	5.90E+01±1.44E+02	UJ	-8.24E-02±3.74E-01	U	-3.90E-01±1.15E+00	U
1106A	05/05/20	7.93E+01±1.57E+02	UJ	2.94E-01±2.31E-01	U	-1.99E-01±1.10E+00	U
1106B	05/05/20	-1.17E+02±1.79E+02	UJ	-1.02E-01±2.03E-01	U	-4.32E-01±7.95E-01	U
1107A	05/05/20	-3.52E+01±1.74E+02	UJ	6.32E+00±9.27E-01		6.59E-01±1.27E+00	U
1107A	05/05/20	1.41E+01±1.74E+02	UJ	5.28E+00±9.82E-01		1.33E+00±1.02E+00	U
1108A	05/04/20	-1.12E+02±1.86E+02	UJ	1.40E-01±1.90E-01	U	0.00E+00±1.23E+00	UJ
1109A	05/05/20	-1.33E+02±2.14E+02	UJ	-4.58E-01±7.73E-01	UJ	-6.93E-01±2.39E+00	U
1109B	05/06/20	0.00E+00±1.99E+02	UJ	6.00E-02±2.36E-01	U	-3.29E-01±1.26E+00	U
1110A	05/01/20	-1.42E+02±2.71E+02	UJ	-4.92E-03±1.93E-01	U	-8.85E-01±1.16E+00	U
1111A	05/07/20	4.96E+01±1.53E+02	UJ	1.40E-01±1.97E-01	U	-5.13E-01±1.22E+00	U

Table B-9 continued.

Sample Location	Sample Date	Thallium-208 (pCi/L)	Q	Thorium-234 (pCi/L)	Q	Uranium-235 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/11/20	-9.51E-01±2.79E+00	U	1.98E+01±9.68E+01	U	1.43E+01±5.11E+01	U
1101B	05/11/20	4.83E+00±8.51E+00	U	1.31E+02±1.04E+02	J	-1.21E+01±9.67E+01	U
1101C	05/04/20	-1.27E+00±8.02E+00	U	7.25E+01±8.82E+01	U	-1.23E+01±1.94E+01	U
1102A	05/07/20	-2.41E+00±9.55E+00	U	9.38E+01±1.03E+02	U	2.22E+01±5.77E+01	U
1102B	05/07/20	-8.38E+00±1.01E+01	U	6.50E+01±7.52E+01	U	1.05E+01±2.07E+01	U
1103A	05/06/20	-2.40E+00±8.72E+00	U	-2.38E+02±1.17E+02	UJ	1.65E+01±3.46E+01	U
1103B	05/06/20	2.89E-01±3.06E-01	U	4.78E+01±9.10E+01	U	-3.37E+01±2.24E+01	UJ
1103C	05/01/20	4.96E+00±4.25E+00	U	6.43E+01±1.09E+02	U	-1.82E-01±6.12E+01	U
1104A	05/07/20	6.74E-01±1.18E+00	U	6.55E+01±6.79E+01	U	-1.01E+01±3.03E+01	U
1104B	05/07/20	1.91E+00±1.20E+01	U	-2.39E+02±1.08E+02	UJ	1.11E+01±4.22E+01	U
1104C	05/01/20	2.25E+00±1.28E+01	U	6.07E+01±9.15E+01	U	1.51E+01±5.65E+01	U
1105A	05/04/20	-1.63E+00±7.58E+00	U	-1.47E+02±7.06E+01	UJ	2.14E+00±2.69E+01	U
1105B	05/04/20	8.61E+00±1.14E+01	U	-1.15E+02±1.31E+02	U	2.56E+01±4.74E+01	U
1106A	05/05/20	-2.73E+00±7.16E+00	U	6.79E+01±7.20E+01	U	4.56E+00±4.20E+01	U
1106B	05/05/20	-4.82E+00±5.54E+00	U	6.37E+01±7.93E+01	U	2.20E+01±4.63E+01	U
1107A	05/05/20	9.49E+00±1.14E+01	U	3.29E+01±7.88E+01	U	-3.33E+00±9.59E+00	U
1107A	05/05/20	3.35E-01±1.07E+01	U	6.70E+01±9.40E+01	U	2.14E+01±4.64E+01	U
1108A	05/04/20	1.22E-01±8.05E+00	U	5.22E+01±8.78E+01	U	8.76E+00±3.11E+01	U
1109A	05/05/20	5.10E+00±9.92E+00	U	-1.26E+02±1.12E+02	UJ	8.99E+00±2.31E+01	U
1109B	05/06/20	2.57E+00±6.31E+00	U	2.44E+02±1.09E+02		1.61E+01±4.60E+01	U
1110A	05/01/20	2.35E+00±1.03E+01	U	-1.72E+02±1.10E+02	UJ	-7.02E+00±1.58E+01	U
1111A	05/07/20	-5.01E+00±9.32E+00	U	3.88E+01±8.12E+01	U	2.11E+01±2.33E+01	U

Key for Qualifier Codes (Q):

J = Analyte identified. Associated result is considered estimated or uncertain.

U = Not detected above MDC and/or 2-sigma uncertainty.

UJ = Not detected above MDC and/or 2-sigma uncertainty, which may be considered estimated or uncertain.

Table B-10. 2020 Groundwater Field Parameter Data – SDA 1100-Series Wells

Blank entries indicate a result was not obtained, typically due to insufficient sample volume.

Source: NYSERDA

Sample Location	Sample Date	Conductivity (µmhos/cm)	pH	Temperature (°C)	Turbidity (NTU)
1101A	05/11/20	684	7.98	7.82	15.0
1101A	11/03/20	790	7.56	12.82	7.68
1101B	05/11/20	484	8.12	8.53	4.45
1101B	11/03/20	584	7.85	10.95	4.02
1101C	05/04/20	314	8.48	8.99	38.5
1101C	11/03/20	364	8.34	10.19	>4000
1102A	05/07/20	619	7.69	9.97	21.0
1102A	11/03/20	794	7.89	13.04	5.32
1102B	05/07/20	459	7.65	11.07	88.1
1102B	11/03/20	563	7.85	11.09	4.99
1103A	05/06/20	979	6.98	9.77	33.8
1103A	11/02/20	1251	7.55	11.45	73.0
1103B	05/06/20	550	7.54	11.89	4.84
1103B	11/02/20	650	7.70	10.50	7.09
1103C	05/01/20				
1103C	11/02/20				
1104A	05/07/20	566	7.60	9.55	6.30
1104A	11/02/20	678	7.66	11.28	26.8
1104B	05/07/20	467	7.87	10.31	5.58
1104B	11/02/20	548	7.83	9.70	1.87
1104C	05/01/20	2328	7.36	6.13	88.4
1104C	11/02/20	2644	7.66	12.36	88.7
1105A	05/04/20	545	8.47	8.08	699
1105A	11/02/20	657	7.83	9.20	93.4
1105B	05/04/20	502	8.29	9.14	3687

Table B-10 continued.

Sample Location	Sample Date	Conductivity (μmhos/cm)	pH	Temperature (°C)	Turbidity (NTU)
1105B	11/02/20	605	7.99	8.22	88.3
1106A	05/05/20	586	7.50	11.17	5.16
1106A	11/04/20	724	7.48	15.65	6.73
1106B	05/05/20	590	7.05	12.66	15.1
1106B	11/04/20	707	7.72	13.35	14.0
1107A	05/05/20	1726	6.33	11.99	2.42
1107A	11/04/20	2117	6.85	15.78	5.15
1108A	05/04/20	732	7.25	8.68	1039
1108A	11/03/20	810	7.48	12.22	>4000
1109A	05/05/20	583	7.98	10.68	2.96
1109A	11/04/20	756	7.54	15.00	1.37
1109B	05/06/20	409	7.84	11.10	17.1
1109B	11/04/20	472	7.85	14.51	10.01
1110A	05/01/20	1315	7.20	11.88	406
1110A	11/02/20	1430	7.47	10.41	8.29
1111A	05/07/20	787	7.80	10.30	5.16
1111A	11/03/20	972	7.40	12.48	21.8

Appendix C – Surface and Stormwater Data

Table C-1. 2020 SDA Surface Water Data – Lagoon Road Creek (WNNDADR)

As a comparison for the data in Table C-1, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/18/20	5.71E-01±1.05E+00	U	3.76E+00±6.34E-01		-5.32E+01±3.51E+01	UJ
05/19/20	1.38E+00±8.30E-01	J	1.44E+01±2.46E+00		1.48E+02±4.64E+01	
08/18/20	-7.46E-02±6.73E-01	U	1.08E+01±1.99E+00		3.69E+01±3.51E+01	U
11/17/20	3.59E+00±1.06E+00		7.98E+00±1.07E+00		-3.56E+01±6.93E+01	U

Table C-2. 2020 SDA Surface Water Data - Erdman Brook (WNERB53)

As a comparison for the data in Table C-2, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/18/20	1.46E+00±1.04E+00	U	6.43E+00±1.92E+00	J	-4.64E+01±3.49E+01	UJ
05/19/20	4.86E-01±6.96E-01	U	4.43E+00±1.59E+00		-2.25E+01±3.35E+01	U
08/18/20	9.57E-01±7.37E-01	U	7.18E+00±2.62E+00	J	-2.12E+01±3.39E+01	U
11/17/20	1.54E+00±9.64E-01	J	3.94E+00±1.33E+00		2.34E+01±7.63E+01	U

Table C-3. 2020 SDA Surface Water Data – Franks Creek (WNFRC67)

Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table C-3, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/18/20	-9.01E-02±7.49E-01	U	1.02E+00±5.07E-01		-6.53E+01±3.43E+01	UJ
05/19/20	2.17E-01±4.96E-01	U	1.11E+00±6.20E-01	J	-2.25E+00±3.52E+01	U
08/18/20	-5.94E-01±5.78E-01	UJ	1.88E+00±7.19E-01		1.80E+01±3.49E+01	U
08/18/20	1.40E-01±6.46E-01	U	8.55E-01±6.55E-01	U	2.16E+01±3.48E+01	U
11/17/20	3.37E-01±6.74E-01	U	1.33E+00±4.35E-01		-7.30E+01±7.12E+01	UJ

Table C-4. 2020 SDA Surface Water Data – Franks Creek (WNDCELD)

As a comparison for the data in Table C-4, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/18/20	-6.10E-01±7.29E-01	U	8.47E-01±4.38E-01	J	-5.41E+01±3.44E+01	UJ
05/19/20	-5.65E-01±6.17E-01	U	1.58E+00±6.56E-01		2.30E+01±3.48E+01	U
08/18/20	5.39E+01±3.24E+01	R	4.58E+01±9.11E+00	R	-2.75E+01±3.24E+01	R
11/17/20	6.38E-01±9.52E-01	U	1.36E+00±4.07E-01		3.24E+01±7.36E+01	U

Table C-5. 2020 SDA Surface Water Data – Buttermilk Creek: Upgradient of the SDA (WFBCBKG)

Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table C-5, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/18/20	1.58E+00±1.09E+00	U	3.74E+00±7.12E-01		-4.91E+01±3.61E+01	UJ
02/18/20	7.84E-01±1.08E+00	U	3.66E+00±8.51E-01		-6.08E+01±3.48E+01	UJ
05/19/20	5.26E-02±5.17E-01	U	1.47E+00±6.63E-01		-2.66E+01±3.32E+01	U
08/18/20	6.85E-01±5.38E-01	U	1.54E+00±8.72E-01	J	-1.31E+01±3.44E+01	U
11/17/20	5.75E-01±7.27E-01	U	1.40E+00±4.07E-01		5.95E+01±7.64E+01	U

Table C-6. 2020 SDA Surface Water Data – Buttermilk Creek: Downgradient of the SDA (WFBCANL)

Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table C-6, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
05/19/20	1.16E+00±7.57E-01	J	1.04E+00±6.30E-01	J	-3.60E+00±4.10E+01	U
05/19/20	1.31E+00±9.63E-01	U	4.32E-01±6.26E-01	U	-3.15E+00±4.10E+01	U

Key for Qualifier Codes (Q):

J = Analyte identified. Associated result is considered estimated or uncertain.

R = Rejected.

U = Not detected above MDC and/or 2-sigma uncertainty.

UJ = Not detected above MDC and/or 2-sigma uncertainty, which may be considered estimated or uncertain.

Table C-7. 2020 SDA Stormwater Radiological Data - Outfall Location W01

Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table C-7, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
05/18/20	2.17E+00±8.95E-01		4.49E+00±9.77E-01		4.01E+01±3.25E+01	U
10/29/20	3.68E-01±5.52E-01	U	3.16E+00±5.92E-01		9.68E+01±3.84E+01	
10/29/20	3.03E-01±5.20E-01	U	1.74E+00±4.14E-01		1.15E+02±4.04E+01	

Sample Date	Cesium-137 (pCi/L)	Q	Cobalt-60 (pCi/L)	Q	Potassium-40 (pCi/L)	Q
703.5 Water Quality Standards						
05/18/20	-1.26E+00±1.07E+01	U	6.52E-01±8.06E+00	U	-1.55E+01±1.38E+02	U
10/29/20	-4.08E-02±9.14E+00	U	5.63E+00±4.67E+00	U	-2.49E+01±1.40E+02	U
10/29/20	2.78E+00±8.82E+00	U	6.68E+00±7.20E+00	U	-7.18E+01±1.58E+02	U

Key for Qualifier Codes (Q):

U = Not detected above MDC and/or 2-sigma uncertainty.

Table C-8. 2020 SDA Stormwater Chemical Physical Data – Outfall Location W01

Blank entries indicate a result was not obtained, typically because it was not required. Duplicate samples on the same date indicate a field duplicate was collected and analyzed. Data are reported herein relative to the laboratory practical quantitation limit.

Source: NYSERDA

Sample Date	Sample Type	BOD (mg/L)	Q	COD (mg/L)	Q	Nitrogen, Total (mg/L)	Q	Oil & Grease (mg/L)	Q
05/18/20	Grab	9.6		33		2.9	J-	23.6	R
05/18/20	Composite	4.7		23		1.7	J		
05/18/20	Grab	8.6		40		1.6	J	4.8	U
10/29/20	Grab	2.0	U	5.0	U	0.74	J+	5.0	U
10/29/20	Composite	2.0	U	5.0	U	0.17	J		
10/29/20	Composite	2.0	U	5.0	U	0.17	J		

Sample Date	Sample Type	Total Phosphorus (mg/L)	Q	TSS (mg/L)	Q	pH (SU)	Q	Temp (°C)	Q
05/18/20	Grab	0.026	J	4.0	U	6.91		13.96	
05/18/20	Composite	0.050	U	4.0	U				
05/18/20	Ambient Rain					6.46		14.08	
05/18/20	Grab	0.026	J	4.0	U				
10/29/20	Grab	0.011	J	4.0	U	7.20		8.88	
10/29/20	Composite	0.050	U	4.0	U				
10/29/20	Ambient Rain					7.08		7.78	
10/29/20	Composite	0.050	U	4.0	U				

Key for Qualifier Codes (Q):

J = Analyte identified. Associated result is considered estimated or uncertain.

J- = Analyte identified. Associated result is considered estimated and is biased low.

J+ = Analyte identified. Associated result is considered estimated and is biased high.

U = Not detected above associated value.

UJ = Not detected above associated value, which may be considered estimated or uncertain.

R = Rejected.

Appendix D – Overland Gamma Radiation Survey & Thermoluminescent Dosimeter Data

Table D-1. 2020 Overland Gamma Radiation Survey Results

Source: NYSERDA

	June 01 (μrem/hr)		September 15 (μrem/hr)	
Location[b]	1m	1cm	1m	1cm
P-1	6	5	7	7
P-2	7	8	7	7
P-3	6	7	7	9
P-4	8	9	7	8
P-5	5	6	8	8
P-6	6	7	5	6
P-7	4	5	5	6
P-8	5	5	9	9
P-9	5	6	6	7
P-10	5	5	5	5
P-11	6	7	5	7
P-12	5	5	5	5
P-13	6	6	4	6
P-14	6	5	6	7
P-15	6	6	7	8
P-16	7	7	8	8
SDA2n	7	7	8	7
SDA2s	7	8	7	9
SDA3n	9	7	7	6
SDA3s	7	7	6	6
SDA4n	6	6	7	7
SDA4s	8	7	8	7
T1s	8	7	7	7
T2n	9	8	6	6
T3n	8	6	7	6
T3s	8	7	6	7

Table D-1 continued.

	June 01 (μrem/hr)		September 15 (μrem/hr)	
Location[b]	1m	1cm	1m	1cm
T4n	7	6	7	8
T4s	7	6	8	8
T5n	9	7	9	10
T5s	6	7	7	7
T6n	7	7	7	5
T6s	6	8	5	7
T7n	8	6	8	6
T7s	8	7	6	6
T8n	9	7	8	7
T8s	7	7	6	7
T9n	6	7	9	8
T9s	6	8	9	9
T10n	7	8	10	7
T10s	8	6	8	7
T11n	5	8	9	7
T11s	6	7	6	6
T12n	7	7	7	6
T12s	5	7	5	6
T13n	8	9	7	9
T13s	7	9	8	6
T14n	7	7	9	10
T14s	7	6	7	6
Tank T-1	5	5	7	5
DC-(G)[c]	5	5	6	5
DC-dr[c]	4	5	4	5

[b] SDA perimeter locations (P-1 through P-16) are identified on Figure 2-12. Measurements were made at one meter (1 m) and one centimeter (1 cm) from the ground, tank, or building surface.

[c] DC-(G) and DC-dr are located (at the Drum Cell) on the WVDP Premises adjacent to the SDA. The Drum Cell was used to store low-level radioactive waste drums; however, the waste was removed and shipped for off-site disposal in 2007. The DC-(G) and DC-dr measurements were made at locations on the north side and west roll-up door, respectively.

Table D-2. 2020 Thermoluminescent Dosimeter Data

Source: NYSERDA

Location	1st Qtr (mR/Qtr)	Q	2nd Qtr (mR/Qtr)	Q	3rd Qtr (mR/Qtr)	Q	4th Qtr (mR/Qtr)	Q
NYTLDBK (Background Location)	15.57±1.12		15.36±1.76		15.18±1.48		15.40±1.10	
DNTLD19 (SDA E. Fence)	16.36±1.14		15.54±1.44		16.33±1.32		16.06±1.70	
DNTLD33 (SDA SW Corner)	16.08±0.74		16.25±1.80		16.90±1.68		17.69±1.22	
DNTLD43 (SDA West Gate)	13.61±1.04		12.91±1.44		13.56±1.54		13.26±1.48	
DNTLD53 (SDA N. Fence)	19.36±0.92		18.74±1.78		19.54±1.88		19.50±1.50	
SDATLD01 (SDA S. Fence)	16.30±1.30		15.97±1.71		17.33±2.82		16.66±1.46	
SDATLD02 (SDA SE Fence)	16.43±0.94		16.25±1.37		18.13±2.04		16.22±1.58	
SDATLD03 (SDA NE Fence)	18.38±1.38		17.78±1.55		19.35±2.30		18.06±1.62	
SDATLD04 (SDA N. Fence)	20.65±1.30		19.08±1.63		20.86±1.86		20.14±1.68	
SDATLD05 (SDA NW Fence)	17.07±1.26		16.55±1.71		17.56±2.20		17.25±1.64	
SDATLD06 (SDA W. Fence)	17.53±1.26		17.19±2.31		18.77±1.84		18.19±1.14	

Appendix E - Precipitation

Table E-1. First Quarter 2020 SDA Precipitation Data (Liquid Rainfall Equivalent)

Source: NYSERDA

January 2020	Precipitation (inches)	February 2020	Precipitation (inches)	March 2020	Precipitation (inches)
1/1/2020	0.23	2/1/2020	0.05	3/1/2020	0.00
1/2/2020	0.00	2/2/2020	0.50	3/2/2020	0.23
1/3/2020	0.04	2/3/2020	0.00	3/3/2020	0.26
1/4/2020	0.24	2/4/2020	0.00	3/4/2020	0.09
1/5/2020	0.25	2/5/2020	0.11	3/5/2020	0.00
1/6/2020	0.16	2/6/2020	0.46	3/6/2020	0.05
1/7/2020	0.03	2/7/2020	0.31	3/7/2020	0.00
1/8/2020	0.16	2/8/2020	0.10	3/8/2020	0.00
1/9/2020	0.00	2/9/2020	0.12	3/9/2020	0.00
1/10/2020	0.34	2/10/2020	0.17	3/10/2020	0.14
1/11/2020	0.19	2/11/2020	0.01	3/11/2020	0.00
1/12/2020	0.13	2/12/2020	0.15	3/12/2020	0.00
1/13/2020	0.00	2/13/2020	0.27	3/13/2020	0.24
1/14/2020	0.00	2/14/2020	0.00	3/14/2020	0.00
1/15/2020	0.08	2/15/2020	0.00	3/15/2020	0.00
1/16/2020	0.33	2/16/2020	0.01	3/16/2020	0.00
1/17/2020	0.01	2/17/2020	0.00	3/17/2020	0.00
1/18/2020	0.31	2/18/2020	0.31	3/18/2020	0.17
1/19/2020	0.29	2/19/2020	0.00	3/19/2020	0.26
1/20/2020	0.00	2/20/2020	0.00	3/20/2020	0.45
1/21/2020	0.00	2/21/2020	0.00	3/21/2020	0.00
1/22/2020	0.00	2/22/2020	0.00	3/22/2020	0.00
1/23/2020	0.00	2/23/2020	0.00	3/23/2020	0.26
1/24/2020	0.07	2/24/2020	0.00	3/24/2020	0.00
1/25/2020	0.38	2/25/2020	0.05	3/25/2020	0.00
1/26/2020	0.24	2/26/2020	0.89	3/26/2020	0.01
1/27/2020	0.25	2/27/2020	0.24	3/27/2020	0.00
1/28/2020	0.00	2/28/2020	0.35	3/28/2020	0.38
1/29/2020	0.00	2/29/2020	0.13	3/29/2020	0.43
1/30/2020	0.00			3/30/2020	0.13
1/31/2020	0.00			3/31/2020	0.03
Total	**3.73**	**Total**	**4.23**	**Total**	**3.13**

Table E-2. Second Quarter 2020 SDA Precipitation Data (Liquid Rainfall Equivalent)

Source: NYSERDA

April 2020	Precipitation (inches)	May 2020	Precipitation (inches)	June 2020	Precipitation (inches)
4/1/2020	0.00	5/1/2020	0.01	6/1/2020	0.00
4/2/2020	0.01	5/2/2020	0.01	6/2/2020	0.11
4/3/2020	0.02	5/3/2020	0.00	6/3/2020	0.66
4/4/2020	0.00	5/4/2020	0.01	6/4/2020	0.08
4/5/2020	0.00	5/5/2020	0.00	6/5/2020	0.00
4/6/2020	0.00	5/6/2020	0.00	6/6/2020	0.00
4/7/2020	0.14	5/7/2020	0.01	6/7/2020	0.00
4/8/2020	0.18	5/8/2020	0.01	6/8/2020	0.00
4/9/2020	0.32	5/9/2020	0.07	6/9/2020	0.00
4/10/2020	0.23	5/10/2020	0.00	6/10/2020	0.01
4/11/2020	0.00	5/11/2020	0.40	6/11/2020	0.19
4/12/2020	0.00	5/12/2020	0.01	6/12/2020	0.00
4/13/2020	0.78	5/13/2020	0.00	6/13/2020	0.00
4/14/2020	0.02	5/14/2020	0.32	6/14/2020	0.00
4/15/2020	0.23	5/15/2020	0.86	6/15/2020	0.00
4/16/2020	0.09	5/16/2020	0.00	6/16/2020	0.00
4/17/2020	0.19	5/17/2020	0.20	6/17/2020	0.00
4/18/2020	0.05	5/18/2020	0.04	6/18/2020	0.00
4/19/2020	0.06	5/19/2020	0.00	6/19/2020	0.00
4/20/2020	0.00	5/20/2020	0.00	6/20/2020	0.00
4/21/2020	0.26	5/21/2020	0.00	6/21/2020	0.00
4/22/2020	0.01	5/22/2020	0.74	6/22/2020	0.79
4/23/2020	0.04	5/23/2020	0.08	6/23/2020	0.50
4/24/2020	0.01	5/24/2020	0.00	6/24/2020	0.00
4/25/2020	0.08	5/25/2020	0.00	6/25/2020	0.17
4/26/2020	0.27	5/26/2020	0.00	6/26/2020	0.00
4/27/2020	0.01	5/27/2020	0.00	6/27/2020	0.51
4/28/2020	0.00	5/28/2020	0.06	6/28/2020	0.00
4/29/2020	0.02	5/29/2020	0.38	6/29/2020	0.00
4/30/2020	0.37	5/30/2020	0.00	6/30/2020	0.00
		5/31/2020	0.01		
Total	**3.39**	**Total**	**3.22**	**Total**	**3.02**

Table E-3. Third Quarter 2020 SDA Precipitation Data (Liquid Rainfall Equivalent)

Source: NYSERDA

July 2020	Precipitation (inches)	August 2020	Precipitation (inches)	September 2020	Precipitation (inches)
7/1/2020	0.00	8/1/2020	0.00	9/1/2020	0.00
7/2/2020	0.00	8/2/2020	0.02	9/2/2020	0.38
7/3/2020	0.00	8/3/2020	0.95	9/3/2020	0.00
7/4/2020	0.00	8/4/2020	0.05	9/4/2020	0.05
7/5/2020	0.00	8/5/2020	0.00	9/5/2020	0.25
7/6/2020	0.22	8/6/2020	0.00	9/6/2020	0.15
7/7/2020	0.00	8/7/2020	0.00	9/7/2020	0.23
7/8/2020	0.00	8/8/2020	0.00	9/8/2020	0.00
7/9/2020	0.00	8/9/2020	0.00	9/9/2020	0.00
7/10/2020	0.00	8/10/2020	0.00	9/10/2020	0.00
7/11/2020	1.13	8/11/2020	0.00	9/11/2020	0.00
7/12/2020	0.00	8/12/2020	0.00	9/12/2020	0.01
7/13/2020	0.00	8/13/2020	0.00	9/13/2020	0.81
7/14/2020	0.00	8/14/2020	0.00	9/14/2020	0.00
7/15/2020	0.00	8/15/2020	0.20	9/15/2020	0.00
7/16/2020	1.13	8/16/2020	0.00	9/16/2020	0.00
7/17/2020	0.00	8/17/2020	0.11	9/17/2020	0.00
7/18/2020	0.00	8/18/2020	0.07	9/18/2020	0.00
7/19/2020	0.37	8/19/2020	0.00	9/19/2020	0.01
7/20/2020	0.00	8/20/2020	0.00	9/20/2020	0.00
7/21/2020	0.00	8/21/2020	0.00	9/21/2020	0.00
7/22/2020	0.27	8/22/2020	0.00	9/22/2020	0.00
7/23/2020	1.22	8/23/2020	0.00	9/23/2020	0.01
7/24/2020	0.00	8/24/2020	0.03	9/24/2020	0.00
7/25/2020	0.00	8/25/2020	0.43	9/25/2020	0.00
7/26/2020	0.00	8/26/2020	0.01	9/26/2020	0.00
7/27/2020	0.25	8/27/2020	0.79	9/27/2020	0.00
7/28/2020	0.02	8/28/2020	0.02	9/28/2020	0.00
7/29/2020	0.18	8/29/2020	0.12	9/29/2020	0.45
7/30/2020	0.00	8/30/2020	0.00	9/30/2020	0.32
7/31/2020	0.00	8/31/2020	0.00		
Total	**4.79**	**Total**	**2.80**	**Total**	**2.67**

Table E-4. Fourth Quarter 2020 SDA Precipitation Data (Liquid Rainfall Equivalent)

Source: NYSERDA

October 2020	Precipitation (inches)	November 2020	Precipitation (inches)	December 2020	Precipitation (inches)
10/1/2020	0.64	11/1/2020	0.56	12/1/2020	0.42
10/2/2020	0.31	11/2/2020	0.19	12/2/2020	0.12
10/3/2020	0.07	11/3/2020	0.01	12/3/2020	0.00
10/4/2020	0.01	11/4/2020	0.00	12/4/2020	0.02
10/5/2020	0.00	11/5/2020	0.00	12/5/2020	0.02
10/6/2020	0.00	11/6/2020	0.00	12/6/2020	0.00
10/7/2020	0.28	11/7/2020	0.00	12/7/2020	0.00
10/8/2020	0.00	11/8/2020	0.00	12/8/2020	0.00
10/9/2020	0.00	11/9/2020	0.00	12/9/2020	0.08
10/10/2020	0.03	11/10/2020	0.00	12/10/2020	0.01
10/11/2020	0.00	11/11/2020	0.23	12/11/2020	0.00
10/12/2020	0.01	11/12/2020	0.00	12/12/2020	0.14
10/13/2020	0.10	11/13/2020	0.00	12/13/2020	0.05
10/14/2020	0.02	11/14/2020	0.00	12/14/2020	0.01
10/15/2020	0.23	11/15/2020	0.57	12/15/2020	0.00
10/16/2020	0.09	11/16/2020	0.11	12/16/2020	0.18
10/17/2020	0.02	11/17/2020	0.29	12/17/2020	0.14
10/18/2020	0.02	11/18/2020	0.00	12/18/2020	0.00
10/19/2020	0.44	11/19/2020	0.01	12/19/2020	0.00
10/20/2020	0.49	11/20/2020	0.00	12/20/2020	0.01
10/21/2020	1.30	11/21/2020	0.00	12/21/2020	0.01
10/22/2020	0.30	11/22/2020	0.18	12/22/2020	0.11
10/23/2020	0.28	11/23/2020	0.11	12/23/2020	0.00
10/24/2020	0.11	11/24/2020	0.00	12/24/2020	0.85
10/25/2020	0.02	11/25/2020	0.10	12/25/2020	0.42
10/26/2020	0.07	11/26/2020	0.32	12/26/2020	0.02
10/27/2020	0.26	11/27/2020	0.01	12/27/2020	0.00
10/28/2020	0.02	11/28/2020	0.17	12/28/2020	0.18
10/29/2020	0.19	11/29/2020	0.00	12/29/2020	0.01
10/30/2020	0.03	11/30/2020	0.74	12/30/2020	0.45
10/31/2020	0.00			12/31/2020	0.08
Total	**5.34**	**Total**	**3.60**	**Total**	**3.33**

Appendix F – Ground Surface Elevation Data

Table F-1. 2019 and 2020 North Slope Monitoring Point Data

Source: NYSERDA

Location[d]	2019 Elevation[e]	Location[d]	2020 Elevation[e]
1	1367.52	1	1367.52
2	1371.05	2	1371.05
3	1372.89	3	1372.89
4	1371.82	4	1371.64
5	1370.51	5	1370.38
6	1370.24	6	1370.14
7	1371.25	7	1371.19
8	1370.92	8	1370.92
9	1370.94	9	1370.92
10	1371.18	10	1371.18
11	1364.97	11	1364.94
12	1361.28	12	1361.30
13	1363.17	13	1363.18
14	1362.40	14	1362.38
15	1365.40	15	1365.33
16	1364.66	16	1364.62
17	1364.41	17	1364.36
18	1364.71	18	1364.66
19	1364.60	19	1364.57
20	1365.11	20	1365.07
21	1362.81	21	1362.80
22	1359.21	22	1359.21
23	1357.85	23	1357.84
24	1353.50	24	1353.50
25	1353.74	25	1353.72
26	1348.75	26	1348.74
27	1352.40	27	1352.37
28	1355.54	28	1355.49

Table F-1 continued.

Location[d]	2019 Elevation[e]	Location[d]	2020 Elevation[e]
29	1357.53	29	1357.50
30	1357.13	30	1357.07
31	1358.49	31	1358.41
32	1359.43	32	1359.38
33	1359.62	33	1359.62
34	1361.93	34	1361.87
35	1359.20	35	1359.12
36	1358.44	36	1358.44
37	1356.56	37	1356.59
38	1353.31	38	1353.32
39	1352.75	39	1352.76
40	1354.28	40	1354.24
41	1348.68	41	1348.65
42	1349.49	42	1349.47
43	1352.27	43	1352.25
44	1350.39	44	1350.34
45	1351.55	45	1351.51
46	1356.30	46	1356.23
47	1351.54	47	1351.53

[d] NYSERDA established 47 new monitoring points on the north slope of the SDA in 2016 and had them surveyed on October 26, 2016, by Clear Creek Land Surveying, LLC. The new monitoring points were surveyed in the NAD 83 and NAVD 88 coordinate system, and should not be compared to survey location data prior to 2016.

[e] Coordinate System: Horizontal datum is NAD 83, NY West Zone. Vertical datum is NAVD 88. Elevations were measured on November 19, 2020 by Clear Creek Land Surveying, LLC.

Location[f]	2019			2020		
	Northing	Easting	Elevation	Northing	Easting	Elevation
CP53	892401.48	1130245.43	1374.92	892401.48	1130245.43	1374.92
1004	891032.88	1130825.12	1379.24	891032.88	1130825.12	1379.24
1005	891619.21	1130390.13	1380.72	891619.21	1130390.13	1380.72

[f] Control for the North Slope Survey was provided by the Control Points listed above.

Table F-2. 2020 SDA Trench Cap Ground Surface Elevation Data

Source: NYSERDA

Trench	Location[g]	Elevation[h]	Trench	Location[g]	Elevation[h]	Trench	Location[g]	Elevation[h]
1&2	S-M	1392.75	6	S-M	1385.81	11	S-M	1385.36
1&2	1+0	1391.86	6	1+0	1388.43	11	1+0	1384.43
1&2	2+0	1390.89	6	N-M	1390.62	11	2+0	1385.58
1&2	3+0	1390.51				11	3+0	1386.49
1&2	4+0	1389.97	7	S-M	1385.87	11	4+0	1386.90
1&2	5+0	1388.86	7	0+42.25	1384.97	11	5+0	1387.15
1&2	6+0	1386.07	7	N-M	1384.75	11	N-M	1388.64
1&2	N-M	1383.69						
1&2	7+10	1379.63	8	S-M	1390.21	12	S-M	1385.33
1&2	7+20	1377.39	8	1+0	1388.64	12	1+0	1383.69
			8	2+0	1387.85	12	2+0	1384.91
3	S-M	1392.87	8	3+0	1387.52	12	3+0	1385.99
3	1+0	1392.37	8	4+0	1387.41	12	4+0	1386.69
3	2+0	1392.29	8	5+0	1387.51	12	5+0	1386.61
3	3+0	1391.01	8	N-M	1389.04	12	N-M	1389.49
3	4+0	1390.59						
3	5+0	1389.05	9	S-M	1388.45	13	S-M	1385.21
3	6+0	1386.35	9	1+0	1386.33	13	1+0	1382.20
3	N-M	1384.18	9	2+0	1387.08	13	2+0	1384.54
			9	3+0	1387.46	13	3+0	1385.47
4	S-M	1393.28	9	4+0	1388.05	13	4+0	1386.13
4	1+0	1391.26	9	5+0	1388.43	13	5+0	1386.41
4	2+0	1392.12	9	N-M	1389.79	13	6+0	1385.18
4	3+0	1391.50				13	N-M	1387.91
4	4+0	1391.36	10	S-M	1386.57			
4	5+0	1389.44	10	1+0	1385.28	14	S-M	1385.29
4	6+0	1387.19	10	2+0	1386.45	14	1+0	1383.07
4	N-M	1387.14	10	3+0	1387.00	14	2+0	1383.77
			10	4+0	1387.59	14	3+0	1384.86
5	S-M	1393.81	10	5+0	1387.73	14	4+0	1385.31
5	1+0	1391.62	10	N-M	1389.44	14	5+0	1384.80
5	2+0	1390.92				14	6+0	1384.29
5	3+0	1390.15				14	N-M	1384.54
5	4+0	1389.50						
5	5+0	1389.58						
5	6+0	1386.68						
5	N-M	1388.33						

Table notes are on the next page.

Table F-2 continued.

[g] Location is given as X+Y where X is trench length in 100-foot increments plus Y in ft (e.g., 7+10 = 710 ft). N-M is located on the centerline mark of the north monument plaque at each trench. S-M is located on the centerline mark of the south monument plaque at each trench.

[h] Coordinate System: Horizontal datum is NAD 83, NY West Zone. Vertical datum is NAVD 88. Elevations were measured on November 19, 2020, by Clear Creek Land Surveying, LLC.

Location[i]	2019			2020		
	Northing	Easting	Elevation	Northing	Easting	Elevation
1003	891333.32	1131254.81	1384.46	891333.32	1131254.81	1384.46
1004	891032.88	1130825.12	1379.24	891032.88	1130825.12	1379.24
1005	891619.21	1130390.13	1380.72	891619.21	1130390.13	1380.72

[i] Control for the SDA Trench Cap Survey was provided by the Control Points listed above.

This page intentionally left blank.

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975.

To learn more about NYSERDA's programs and funding opportunities, visit nyserda.ny.gov or follow us on Twitter, Facebook, YouTube, or Instagram.

New York State Energy Research and Development Authority

17 Columbia Circle
Albany, NY 12203-6399

toll free: 866-NYSERDA
local: 518-862-1090
fax: 518-862-1091

info@nyserda.ny.gov
nyserda.ny.gov

State of New York
Andrew M. Cuomo, Governor

New York State Energy Research and Development Authority
Richard L. Kauffman, Chair | Doreen M. Harris, Acting President and CEO