EXHIBIT E

MONITORING AND ADAPTIVE MANAGEMENT PLAN

MONITORING AND ADAPTIVE MANAGEMENT PLAN

Prepared For:

TWIN PINES MINERALS, LLC
SAUNDERS DEMONSTRATION MINE
ST. GEORGE, CHARLTON COUNTY, GEORGIA

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1.0 Executive Summary

This Groundwater & Surface Water Monitoring and Adaptive Management Plan was developed by Twin Pines Minerals, LLC (TPM) to support operations at the Saunders Demonstration Mine, a proposed heavy mineral sand mine in Charlton County, Georgia. Several permit applications associated with the mine are currently pending before Georgia EPD, including a surface mining permit, a groundwater use permit, and a wastewater discharge permit.

This Plan is designed to monitor the impact of the proposed mining activities on water levels and water quality in the vicinity of the mine, including potential impacts to the Okefenokee Swamp. Studies previously submitted by TPM—including groundwater models prepared by Dr. Robert Holt and a water chemistry analysis prepared by Jacobs—demonstrate that impacts will be minimal. Monitoring will be performed to confirm the correctness of these studies, to provide an "early warning" system to detect unexpected impacts, and to explain how TPM will respond to such results.

The Plan calls for the installation of a network of weather stations and groundwater and surface water monitoring points in the vicinity of the mine. The piezometers will be used to monitor both water levels and water quality. Together with the weather stations, data collected from this network will enable TPM (and Georgia EPD) to:

- Monitor changes in groundwater levels due to precipitation, recharge, and runoff
- Characterize the response of surface water levels to precipitation and groundwater levels
- Relate precipitation to groundwater levels and recharge
- Identify changes in groundwater and surface water levels induced by the moving mine pit
- Quantify changes in post-mining water levels
- Assess water quality during and after mining

Part 3 shows the location of monitoring stations (piezometers, staff gauges, and weather stations) from which data will be collected. The Monitoring and Adaptive Management Plan for water levels is provided in Part 4. Water quality is addressed in Part 5.

2.0 Site Description and Background

Twin Pines Minerals, LLC proposes to mine heavy mineral sands along Trail Ridge in Charlton County, Georgia (Figure 1). The proposed demonstration mine is located 3.2 miles west of St. George, Georgia, and north of Georgia State Highway Route 94. The proposed mine is 2.9 miles east of the Okefenokee National Wildlife Refuge and is depicted in Figure 2.

Trail Ridge is a 0.6- to 1.2-mile wide and 99-mile long topographic ridge that separates the Okefenokee Basin and Swamp from the coastal plain of Georgia (Force and Rich, 1979). It represents the crest of a former beach complex and was formed as inland sand dunes (e.g., Pirkle et al. 1993) near the proposed Twin Pines Minerals, LLC Saunders Demonstration Mine. The ridge forms a hydrologic divide between the Okefenokee swamplands to the west and the Saint Marys River to the east.

The project study area is underlain by a surficial aquifer perched on the clays of the upper Hawthorn Group, which is the upper confining unit of the Floridan Aquifer in the region (e.g., Williams and Kuniansky, 2016). The water table is very shallow, with water depths of only a few feet. The hydrologic divide is created by the topography of Trail Ridge. Recharge to the surficial aquifer atop the ridge causes groundwater on the east side of the ridge to flow to the east, and groundwater on the west of the ridge to flow to the west (Figures 3 through 8).

It is expected to take about 4 years to mine the entire 577.4-acre site. Mining will advance at a rate of 100 to 200 feet per day. The mine pit will be approximately 100 feet wide, 500 feet long, and 50 feet below ground surface (bgs). Once the mined pit reaches a length of approximately 500 feet, processed sands will be returned to the pit as mining continues to advance. Mining will begin in the southwest corner of the site and proceed in alternating parallel strips running from west to east, and then east to west, and so on until the entire site is mined.

3.0 Location of Monitoring Stations

3.1 Piezometers

3.1.1. <u>Existing Piezometers</u>

Fourteen (14) piezometers have been installed outside, but in the vicinity of the mine footprint. Seven (7) are within 2,000 feet of the proposed mine footprint (PZ14, PZ25S/D, PZ43, PZ44, PZ57S/D), and seven (7) between 2,000 and 4,500 feet (PZ13, PZ24, PZ47, PZ48S/D, PZ56S/D). The locations are depicted in Figure 9.

All are equipped with In-Situ, Inc. Rugged Troll 200 non-vented data logger/cable combinations. These piezometers were installed between January and May 2019, and thus have been recording background groundwater level data for a period of between 1 and 1.5 years.

3.1.2. <u>New Piezometers</u>

a) <u>Location</u>

Twenty-four (24) additional piezometers will be installed within the footprint of the mine. These will be identified as:

Proposed New Piezometers					
MPZ-01S	MPZ-04	MPZ-07	MPZ-10D	MPZ-13D	MPZ-16S
MPZ-01D	MPZ-05S	MPZ-08	MPZ-11	MPZ-14	MPZ-17S
MPZ-02	MPZ-05D	MPZ-09	MPZ-12	MPZ-15	MPZ-17D
MZP-03	MPZ-06	MPZ-10S	MPZ-13S	MPZ-16S	MPZ-18

Piezometers MPZ-01D, MPZ-05D, MPZ-10D, MPZ-13D, MPZ-16D, and MPZ17D will be constructed as deep piezometers and used to monitor water levels and water quality from the lower portion of the Surficial Aquifer below the mining depth.

A new piezometer will be installed approximately every 2,000 feet in an east-west direction and every 1,000 feet in the north-south direction. The spacing will provide four rows of piezometers (approximately 16 piezometers), covering an area of roughly 577 acres, or approximately one piezometer every 36 acres. The approximate locations of the new piezometers are depicted in Figure 10, which will be updated after the new piezometers are installed. This spacing was developed to monitor the predicted drawdowns due to the moving mine, which has an estimated cone of depression of approximately 1,000 feet wide and 2,000 feet long (Figure 11).

All piezometers will be equipped with In-Situ, Inc. Rugged Troll 200 non-vented data logger/cable combinations for water level monitoring during active mining and the post-mining period and the water level data recorded will be used to verify the results of the groundwater models.

b) Construction Details - Piezometers

Piezometers MPZ-01S, MPZ-02, MPZ-03, MPZ-04, MPZ-05S, MPZ-06, MPZ-07, MPZ-08, MPZ-09, MPZ-10S, MPZ-11, MZP-12, MPZ-13S, MPZ-14, MPZ-15, MPZ-16S MPZ-17S, and MPZ-18 will be drilled and constructed to a depth of approximately 50 feet bgs. Deep piezometers MPZ-01D, MPZ-05D, MPZ-10D, MPZ-13D, MPZ-16D and MPZ-17D will be drilled and constructed to a depth of approximately 80 feet bgs using a sonic drill rig. The deep piezometers will be used to monitor water levels and water quality beneath the mine footprint. During installation of the new piezometers, continuous soil cores will be collected and described by an on-site geologist. Boring and well construction logs will be prepared for each newly constructed piezometer.

Piezometers MPZ-01S, MPZ-02, MPZ-03, MPZ-04, MPZ-05S, MPZ-06, MPZ-07, MPZ-08, MPZ-09, MPZ-10S, MPZ-11, MZP-12, MPZ-13S, MPZ-14, MPZ-15, MPZ-16S MPZ-17S, and MPZ-18 will be constructed with 40 feet of 0.010-inch slotted screen, 2-inch diameter, threaded-joint, schedule 40 PVC with a screened interval from a depth of 10 to 50 feet bgs. From the top of the screen to approximate land surface (about 10 feet) will be cased with solid 2-inch diameter, schedule 40 PVC riser. A filter pack of 20/40 graded filter sand will be placed around the screen to a depth of approximately eight feet bgs. A two-foot thick bentonite pellet seal will be placed above the top of the filter sand. The remaining annular space above the bentonite seal (about six feet) will be grouted to land surface using a cement/bentonite grout. A metal, flush-mount, bolt-down, protective cover will be installed over the piezometer at land surface to include a 2-foot x 2-foot x 4-inch thick concrete pad. A typical piezometer construction detail is shown on Figure 12.

Deep piezometers MPZ-01D, MPZ-05D, MPZ-10D, MPZ-13D, MPZ-16D and MPZ-17D will be constructed with 10 feet of 0.010-inch slotted screen, 2-inch diameter, threaded-joint, schedule 40 PVC with a screened interval from a depth of 70 to 80 feet bgs. From the top of the screen to approximate land surface (about 50 feet) will be cased with solid 2-inch diameter, schedule 40 PVC riser. A filter pack of 20/40 graded filter sand will be placed around the screen to a depth of approximately 68 feet bgs. A two-foot thick bentonite pellet seal will be placed above the top of the filter sand. The remaining annular space above the bentonite seal (about 66 feet) will be grouted to land surface using a cement/bentonite grout. A metal, flush-mount, bolt-down, protective cover will be installed over the piezometer at land surface to include a 2-foot x 2-foot x 4-inch thick concrete pad. A typical deep piezometer construction detail is shown on Figure 13.

Each piezometer will be developed until the column of water in the well is relatively free of visible sediment, and the pH, temperature, turbidity, and specific conductivity have stabilized. Each piezometer will then be fitted with a Rugged Troll 200 non-vented data logger/cable combination in order to continuously monitor groundwater levels.

c) Sequencing of New Piezometer Installation Relative to Progression of Mining

Once initiated, mining will advance at an estimated rate of about 100 to 200 feet per day, and piezometers within the mine footprint will periodically be excavated and reinstalled during the mining progression. The general procedures for the removal and reinstallation of piezometers are discussed below:

- Within one or two days of the advancing mine face reaching a piezometer, the transducer will be removed, and the piezometer will subsequently be excavated by the advancing drag-line excavator,
- Within approximately five to seven days of mining, the open excavation pit will be backfilled with post-processed soils,
- Within five to ten days of backfilling the excavation, a replacement piezometer will be installed in the approximate location of above-referenced excavated piezometer.

The replacement piezometer will be developed and fitted with the Rugged Troll transducer that was removed from the previous piezometer in order to continue monitoring of groundwater levels.

These procedures were designed to ensure that a full complement of piezometers will be maintained to monitor groundwater level data as the mining progresses.

3.2 Staff Gauges

Six (6) staff gauges will be used to monitor surface water levels: SG02, SG11, SG24, SG26, SG27, SG22. Locations are shown in Figure 14.

Each staff gauge location is equipped with In-Situ, Inc. Rugged Troll 200 non-vented data logger/cable combinations for recording water elevations.

Each staff gauge segment measures approximately 3.3 feet in length and is mounted to either a metal post or a pressure-treated wood post so that the base of the gauge is positioned at ground surface. The data loggers have been installed at each staff gauge with the transducers tip positioned at the approximate ground surface. Each data logger/cable combination has been recording background surface-water level data for a period of between 1 to 1.5 years. These staff gauges will continue to be used for recording surface water elevations throughout mining and during the post mining period (approximate 3.5 to 4 years).

3.3 Weather Stations

TPM personnel installed three HOBO rain gauge data loggers at the site in November 2018. The three rain gauge locations (RG01, RG02, and RG03) were installed in the northern, central, and southern portions of the project study area (Figure 15). The data loggers for each rain gauge record the accumulation of precipitation in units of hundredths of an inch.

4.0 Water Level Monitoring and Adaptive Management Plan

4.1 Frequency of Water Level Monitoring

Water level data will be recorded using Rugged Troll data loggers. Data loggers will initially be programmed to record water level measurements at the following intervals:

Monitoring Station	Piezometer/Staff Gauge ID	Time Interval[1]
Piezometers within mine footprint	MPZ-01 through MPZ-18	10-minutes
Piezometers within 2,000 of mine footprint	PZ14 PZ25S/D PZ43 PZ44 PZ57S/D	1-hour
Piezometers between 2,000 and 4,000 feet of mine footprint	PZ13 PZ24 PZ47 PZ48S/D PZ56S/D	1-hour
Staff gauges	SG02 SG11 SG22 SG24 SG26 SG27	1-hour

For the first month of mining, data loggers will be downloaded twice per week to evaluate water levels within and adjacent to the proposed mine. During the second, third, and fourth months of mining, data loggers will be downloaded monthly. Thereafter, data loggers will be downloaded quarterly.

4.2 Frequency of Weather Station Monitoring

Data from the weather stations will be manually downloaded in the field by TPM representatives on a monthly or bi-monthly basis. During the proposed course of mining, rain gauge data will continue to be manually downloaded in the field once every two weeks.

4.3 Data Analysis

Water levels and precipitation data collected during mining will be presented graphically and compared to historical data. Hydrographs will used to illustrate trends or seasonal changes in water level impacts from the mine. Any unexpected fluctuations in water level data, as defined in Part 4.4, will trigger adaptive management as described in Part 4.5.

4.4 Action Levels

Seasonal groundwater level fluctuations at the project area historically have ranged between 2 and 5.5 feet bgs. Any observed fluctuation in groundwater data outside the mine footprint in excess of 6 feet bgs will trigger the requirements set forth in 4.5 if water levels do not recover within 90 days.

Surface water level fluctuations in the six staff gauges have ranged from completely dry to 3 feet. Our studies have shown that in this topographically-driven groundwater system, streams

[1] The intervals stated above and the frequency of downloads may be adjusted as needed during the life of the mine.

and wetlands are supplied by groundwater discharging at land surface and precipitation. As a result, surface water across portions of the site are dry during periods of decreased groundwater levels and low precipitation. Therefore, trigger requirements for adaptive management will be based on the above-refenced observed fluctuations in groundwater data.

4.5 Adaptive Management

If the conditions described in Part 4.4 are observed, TPM will notify the Director within 30 days. Such notice will include the monitoring data along with any relevant information.

No further action will be required if the unexpected condition can be attributed to factors unrelated to the mining activity. If other causes for the change in water level conditions cannot be identified, TPM shall conduct further investigations to determine the significance and causation of such changes.

5.0 Water Quality Monitoring and Adaptive Management Plan

5.1 Background Data

An important consideration in the development of this monitoring plan is that the mining and beneficiation facilities will not use nor add contaminants which could then impact the site groundwater and surface waters from neither the mining nor the beneficiation processes. Also, the site will not be subject to any of the traditional/typical contaminant monitoring programs such as RCRA, CERCLA, etc.

Extensive site characterization activities, including groundwater and surface water quality monitoring has been performed in March 2019 and February, March-April, May, July, August, September, and October 2020. This data and future water quality monitoring performed during mine operation will be used to assess for water quality impacts as a result of mining activities.

5.2 Monitoring Locations and Frequency During Mining

<u>Groundwater Monitoring Locations</u>

Based on reviews of groundwater flow data in the mining area, the following monitoring locations and sampling frequency will be established to monitor groundwater quality of the Surficial Aquifer beneath the mining area (Figure 16).

Groundwater Monitoring Station	Sampling Frequency and Duration[2]	
	During Mining[3]	Post Mining[4]
MPZ-01S/D MPZ-02 MPZ-03 MPZ-04 MPZ-05S/D MPZ-06 MPZ-10S/D MPZ-13S/D MPZ-14 MPZ-16S/D MPZ-17S/D MPZ-18	Quarterly	Semi-annual

<u>Groundwater Constituents of Potential Concern (COPC)</u>

Review of existing pre-mining groundwater quality data was used to develop a concise list of COPCs for the site's monitoring program. The groundwater COPCs are listed in Table 1 below

Table 5.2-1. Water Quality Parameters and COPCs to be Measured in Groundwater Samples	
Parameter / COPC	Laboratory Method
Arsenic, Total and Dissolved	EPA 200.8
Lead, Total and Dissolved	EPA 200.8
Gross Alpha	EPA 900.0
Radium-226 + Radium-228	EPA 904.0 & 903.1
Aluminum, Total and Dissolved	EPA 200.8
Iron, Total and Dissolved	EPA 200.8
Manganese, Total and Dissolved	EPA 200.8
Total Dissolved Solids (TDS)	SM2540C or Field Measured
Zinc, Total and Dissolved	EPA 200.8
pH	Field Measured
Specific Conductivity	Field Measured
Water Temperature	Field Measured
Oxidation-Reduction Potential (ORP)	Field Measured
Turbidity	Field Measured

[2] Based on the results of water quality sampling and the progression of the mine, the frequency of water quality sampling and number of monitoring locations may periodically be adjusted (i.e. increased or decreased) during the life of the mine (i.e. if increasing concentrations are observed, sampling frequency may be increased to better define the trend).

[3] Beginning one month after mining begins

[4] Beginning the day after mining ends and extending for a period equal to the period of active mining

<u>Surface Water Monitoring Locations</u>

Stormwater runoff and water from infrequent mine dewatering activities will be directed primarily to the east of the site into the Boone Creek watershed. Three existing monitoring locations listed below shown on Figure 17 are proposed to monitor water quality in surface waters which may receive runoff from the mining and wet processing areas.

Surface Water Monitoring Station	Sampling Frequency and Duration[5]	
	During Mining[6]	Post Mining[7]
MSW-BG04 MSW-BG05 MSW-BG06	Quarterly	Semi-annual

Review of existing pre-mining background surface water quality data was used to develop a concise list of COPCs for the site's monitoring program. The surface water COPCs are listed in Table 2 below.

Table 5.2-2. Water Quality Parameters and COPCs to be Measured in Surface Water Samples		
Parameter / COPC		Laboratory Method
Lead, Total and Dissolved		EPA 200.8
Mercury, Total		EPA 1631E
Zinc, Total and Dissolved		EPA 200.8
Total Hardness		SM2340B
pH		Field Measured
Dissolved Oxygen (DO)		Field Measured
Specific Conductivity		Field Measured
Water Temperature		Field Measured
Turbidity		Field Measured
Total Organic Carbon (TOC)		EPA 200.7
Total Phosphorus		EPA 200.7
Total Nitrogen	Nitrogen, Total Kjeldahl (TKN)	EPA 351.2
	Nitrogen, Nitrate+Nitrite	EPA 353.2

[5] Based on the results of water quality sampling and the progression of the mine, the frequency of water quality sampling and number of monitoring locations may periodically be adjusted (i.e. increased or decreased) during the life of the mine (i.e. if increasing concentrations are observed, sampling frequency may be increased to better define the trend).

[6] Beginning one month after mining begins

[7] Beginning the day after mining ends and extending for a period equal to the period of active mining

5.3 Sample Collection and Data Analysis Procedures

Groundwater sampling procedures, chain of custody, field parameter measurement, and field QA/QC will be performed in accordance with the Region 4 US Environmental Protection Agency (EPA), Science and Ecosystem Support Division Operating Procedure, Groundwater Sampling (SESDPROC-301-R4), effective April 26, 2017.

Surface water sampling procedures and field QA/QC will be performed in general accordance with the Region 4 US Environmental Protection Agency (EPA), Science and Ecosystem Support Division Operating Procedure, Surface Water Sampling (SESDPROC-201-R4), effective December 16, 2016. Low-level mercury sampling will be performed in accordance with EPA Method 1669.

5.3.1. Procedures

a) Equipment Decontamination Procedures

Any reusable sampling equipment that may contact the interior of the piezometer, groundwater, or surface water will be decontaminated in the field immediately prior to use, or in the office/lab and protected using aluminum foil and/or plastic. For sampling events requiring non-dedicated sampling equipment, decontamination procedures will consist of rinsing the equipment once with distilled or deionized water, brushing the equipment with a solution of distilled or deionized water and a phosphate free laboratory-quality detergent, and finally rinsing the equipment with distilled or deionized water.

b) Water Level Measurements – (Piezometers Only)

Prior to purging and sampling, water level measurements will be made at each piezometer by utilizing a dedicated or portable water level indicator, tape, or other suitable measuring device capable of achieving an accuracy of 0.01 foot. The depth to water in each piezometer will be measured on the same day and prior to purging. The measuring device will be used in accordance with the manufacturer's recommendations and/or directions. Measurements of the depth to water from the top of the piezometer casing (designated monitoring point) will be to the nearest 0.01 foot, and the value will be recorded. Total depths will be measured at each piezometer and recorded.

c) Piezometer Purging Procedures

Prior to the collection of groundwater samples, each piezometer will be purged to ensure that fresh aquifer water is being sampled. Purging of each piezometer will be completed using either a peristaltic or electric submersible pump. Due to the depths of the proposed piezometers and the high groundwater tables at the site (i.e. excessive purge volumes), low-flow purging procedures may be utilized. During low-flow purging, the pump or tubing intake will be located within the screened interval and at a depth that will remain under water at all times. During low-flow purging:

- The pumping rate will be set at a speed that produces minimal and stable drawdown within the well,
- The pumping rate will be measured using a graduated cylinder or graduated bucket and a stop watch,
- The groundwater level, pumping rate, and field parameters (pH, water temperature, specific conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity) will be monitored and recorded every 5 to 10 minutes (or as appropriate),

- The field parameters will be measured using a calibrated multi-parameter instrument and flow-through cell,
- Purging will be considered complete and sampling will begin when the field measured parameters have stabilized. Stabilization is considered complete when three consecutive readings are within the following limits:

Parameter	Maximum variation
Turbidity	10% for values greater than 10 NTU
Dissolved Oxygen	0.2 mg/L or 10% saturation,
Oxidation-Reduction Potential	20 millivolts,
Specific Conductance	5%,
pH	0.1 standard unit

d) Sample Collection and Preservation – Piezometers

Groundwater sampling is the process of obtaining, containerizing, preserving, and shipment of a groundwater sample after the purging process is complete. Appropriate devices to be used to collect groundwater samples from piezometers include: peristaltic or electric submersible pumps. Alternative sampling devices/methods may be utilized if the alternative device/method is approved for use in EPA field sampling guidance literature.

During sample collection, each piezometer will be sampled with equipment and methodologies that minimize the potential for alteration or contamination of the sample and that are capable of obtaining a sample representative of the formation groundwater. Care will be taken to avoid placing clean sampling equipment on the ground or on any contaminated surface. Additionally, personnel who contact sampling equipment that may contact the interior of the monitoring well or the groundwater will wear new powderless latex or nitrile gloves. Gloves will be changed between sample locations to avoid cross-contamination.

Field personnel responsible for sample collection will record, at a minimum, the following:

- Date, time and technician’s name
- Piezometer number and well depth
- Well casing material and inside diameter
- Static water level prior to purging
- Sampling equipment used
- Volume of water purged prior to sampling
- Sample container numbers, types, sizes, and preservatives
- pH, specific conductance, dissolved oxygen, oxidation-reduction potential, turbidity, and temperature of water samples
- Comments about sample color, odor, and unusual characteristics
- Comments about weather conditions
- Comments about accessibility and condition of piezometer

Groundwater collected from each piezometer will be slowly discharged into laboratory provided sample containers of the appropriate size and type, and with the preservatives, if any, appropriate for the analytical tests required. The sample container will be labeled with the following information:

- Site name
- Sample ID
- Project reference number
- Collected date and time
- Sampler's name
- Analysis required
- Preservative, if any

The laboratory will specify the preservation methods based on knowledge of methods and procedures approved by the Georgia EPD or EPA.

e) Sample Collection and Preservation – Surface Water

Surface water samples will be collected directly into the laboratory provided container from the surface water body or by decanting the water sample from a collection device such as an unpreserved laboratory provided plastic container. The field sampler will face upstream if there is a current and collect the sample without disturbing the bottom sediment. Alternative sampling devices/methods may be utilized if the alternative device/method is approved for use in EPA field sampling guidance literature. Water quality samples collected for low-level mercury analysis (EPA Method 1631E) will be collected in general accordance with EPA Method 1669.

Each surface water sample will be collected with equipment and methodologies that minimize the potential for alteration or contamination of the sample. Care will be taken to avoid placing clean sampling equipment on the ground or on any contaminated surface. Additionally, personnel who contact sampling equipment will wear new powderless latex or nitrile gloves. Gloves will be changed between sample locations to avoid cross-contamination.

Field personnel responsible for sample collection will record, at a minimum, the following:

- Date, time and technician's name
- Sample location identifier
- Sampling equipment used
- Sample container numbers, types, sizes, and preservatives
- pH, specific conductance, dissolved oxygen, oxidation-reduction potential, and temperature of water samples
- Comments about sample color, odor, and unusual characteristics
- Comments about weather conditions
- Comments about accessibility and condition of the sample locations

Surface water samples will be collected into laboratory provided sample containers of the appropriate size and type, and with the preservatives appropriate for the analytical tests required. The sample container will be labeled with the following information:

- Site name
- Sample ID
- Project reference number
- Collected date and time
- Sampler's name
- Analysis required
- Preservative, if any

The laboratory will specify the preservation methods based on knowledge of methods and procedures approved by the Georgia EPD or EPA.

f) <u>Sample Shipment</u>

Upon completion of sample collection at each piezometer and/or surface water monitoring point, each laboratory provided container will be properly sealed, labeled and placed in ice in a cooler for preservation and transport to a Georgia EPD approved laboratory for analysis. Chain of custody forms will be completed in the field at the time of sampling of each sample location. Samples will be transported to the laboratory via courier or shipped via overnight delivery using FedEx or UPS delivery.

g) <u>Laboratory Analysis</u>

Water quality samples will be analyzed for the constituents specified in Table 1. The analytical list may be revised during the life of the mine. Laboratory analysis will be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136.

h) <u>Quality Assurance and Quality Control</u>

A quality-assurance and quality-control program (QA/QC) will be part of the sampling protocol and a requirement of the laboratory chosen to provide analytical services. At a minimum, field QA/QC per sampling event will require the collection of an equipment-rinse blank if equipment is field cleaned and re-used on-site. Additional QA/QC sampling such as field or trip blanks may also analyzed as deemed necessary.

The laboratory QA/QC program will be a written program and will describe the accuracy and completeness of the laboratory data; the documentation of procedures for calibration and maintenance of laboratory equipment, for analysis of samples, for computing and validating test data, and for chain-of-custody control; and the control and security of all documentation. Laboratory QA/QC standards will be initiated with the receipt of samples and will be maintained throughout the record-keeping period.

i) <u>Chain-of-Custody</u>

The chain-of-custody program will allow tracing the possession and handling of individual samples from the time of field collection through the completion of laboratory analysis.

j) Evaluation of Analytical Data

Results of the field measured and analytical data will be tabulated for each monitoring event. The data will be analyzed for trends and compared to applicable groundwater protection and in-stream water quality standards. The purpose of the trend analysis will be to evaluate if concentrations are declining, remaining constant (no discernable change), or increasing.

5.3.2. Data Analysis and Reporting

Water chemistry data will be regularly compared to background concentration and applicable regulatory standards. In addition, a statistical summary of water quality data collected at each sampling location will be prepared and selected data will be presented graphically to illustrate trends or seasonal changes in water quality. A summary water quality report will be submitted to Georgia EPD on a quarterly basis during the first year, and annually thereafter.

Water quality reports will include groundwater contour maps, results of water quality analysis for the period of monitoring, and trend graphs of concentrations. Water chemistry data will be evaluated and compared to background concentrations and applicable regulatory standards. In addition, a statistical summary of water quality data collected at each sampling location will be prepared and selected data will be presented graphically to illustrate trends or seasonal changes in water quality.

5.3.3. Data Review & Adaptive Management

Water chemistry data will be evaluated and compared to background concentrations and applicable regulatory standards. The data will also be evaluated for trends that could indicate changes in water quality. If changes in water quality are observed that can be directly attributed to the mining activity, TPM will notify the Director within 30 days. Such notice will include the monitoring data along with any other relevant information.

No further action will be required if the reported changes in water quality can be attributed to factors unrelated to the mining activity. If other causes for the change in water quality conditions cannot be identified, TPM shall conduct further investigations to determine the significance and causation of such changes.

6.0 REFERENCES

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FIGURES

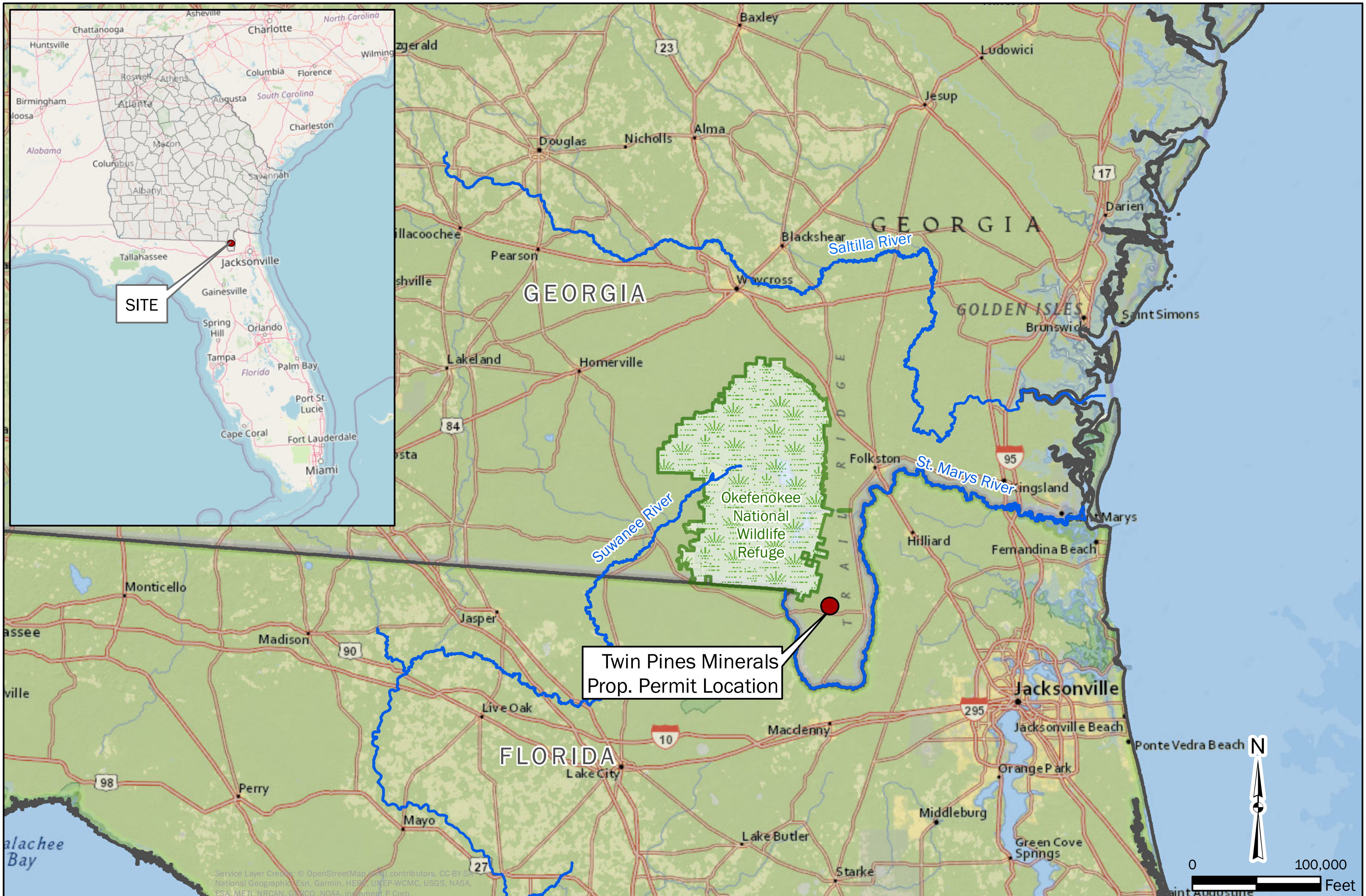


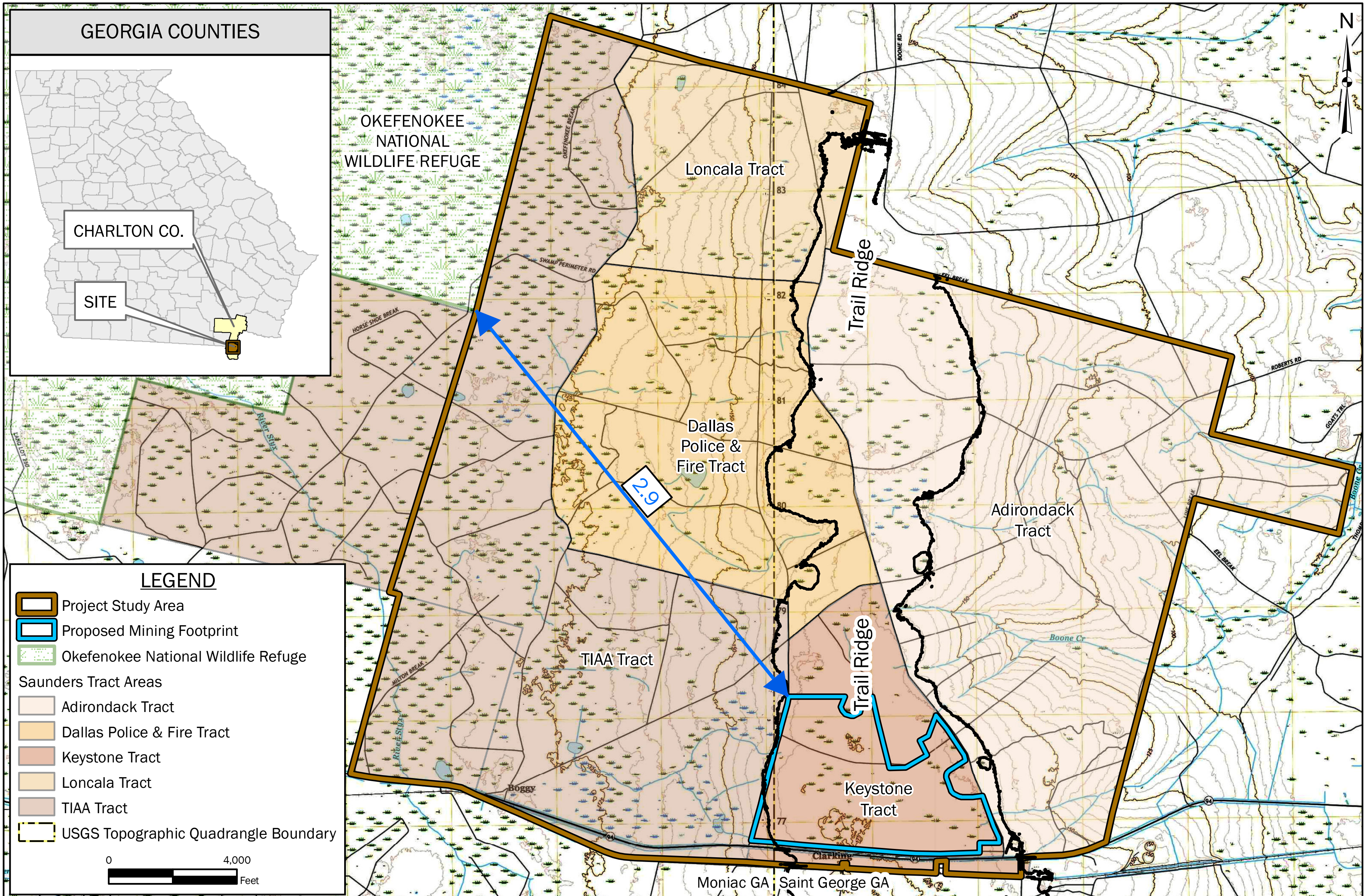
FIGURE 1: LOCATION OF THE PROPOSED SAUNDERS DEMONSTRATION MINE

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

INSET BASEMAP: Open Street Map; BASEMAP: National Geographic World Map (See Service Layer Credits).

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/10/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 100,000 ft



TTL

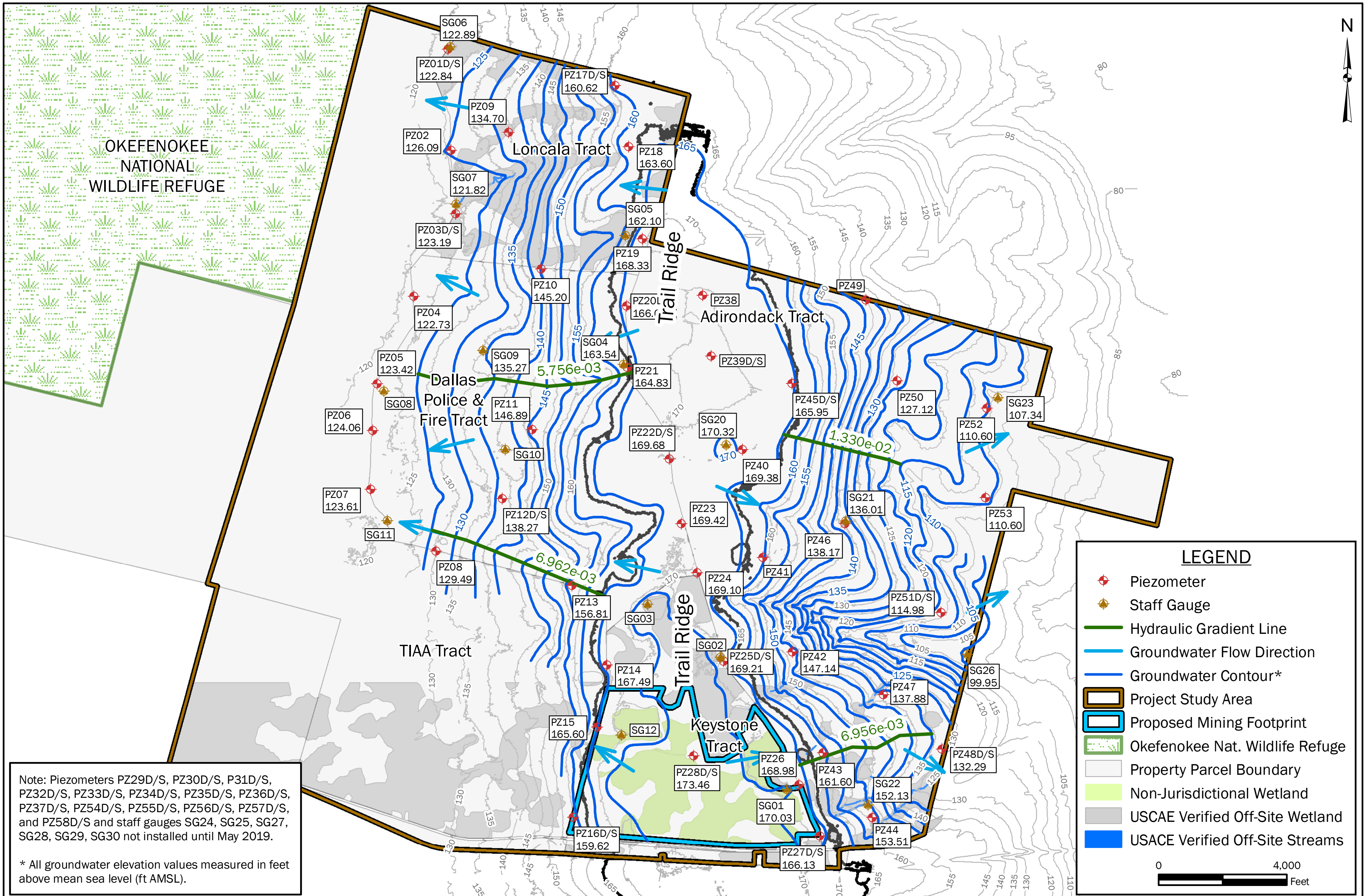
FIGURE 2: PROJECT STUDY & MINING AREA LOCATION MAP

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

BASEMAP: Moniac (W) & Saint George (E), Georgia, USGS 7.5 Minute Quadrangle Map, 2020 (5-ft Contour Interval).

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/10/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 4,000 ft



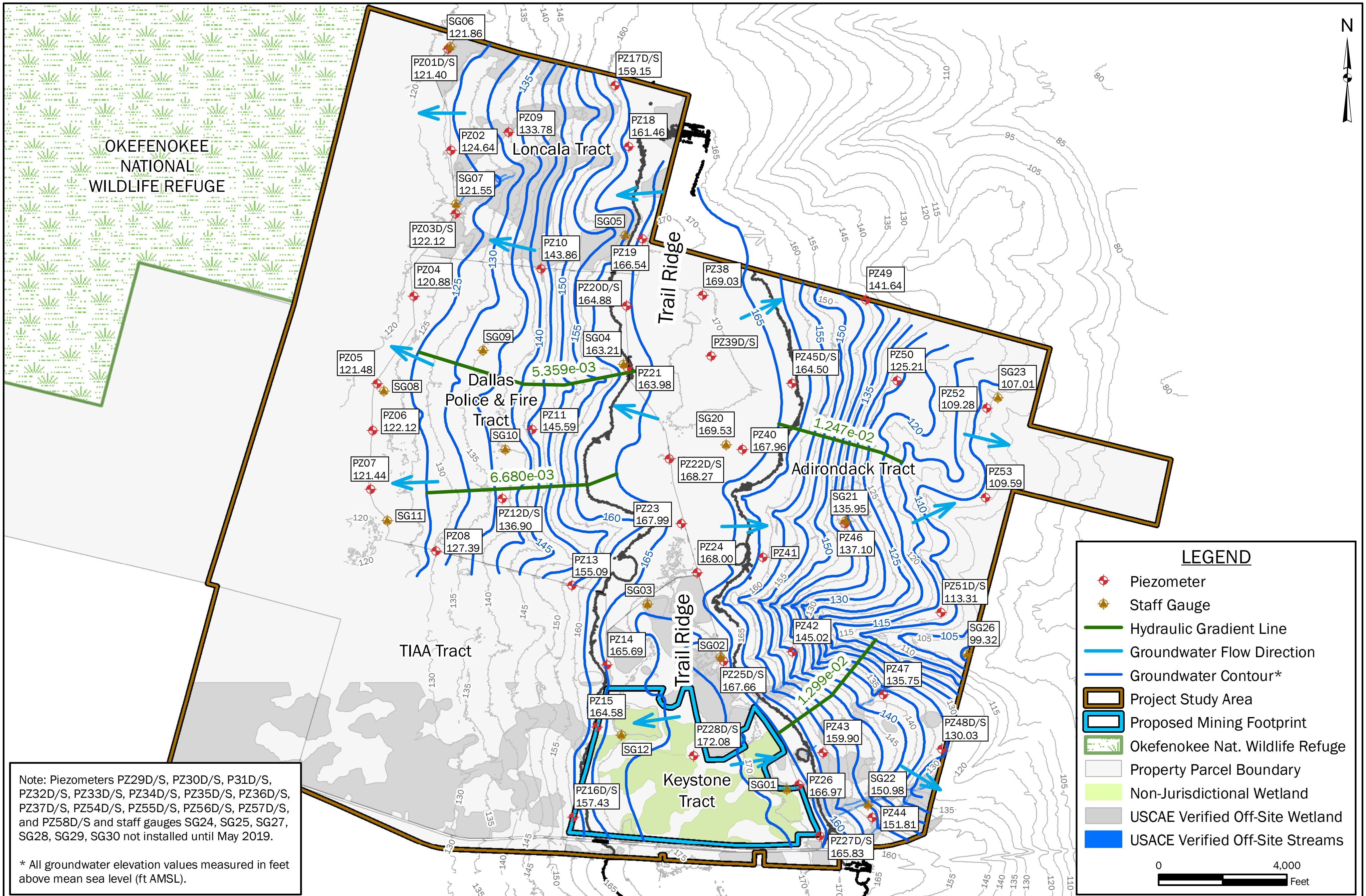
TTL

FIGURE 3: POTENTIOMETRIC SURFACE MAP OF THE SURFICIAL AQUIFER (JANUARY 26, 2019)

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/10/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 4,000 ft



TTL

FIGURE 4: POTENTIOMETRIC SURFACE MAP OF THE SURFICIAL AQUIFER (APRIL 26, 2019)

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/10/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 4,000 ft

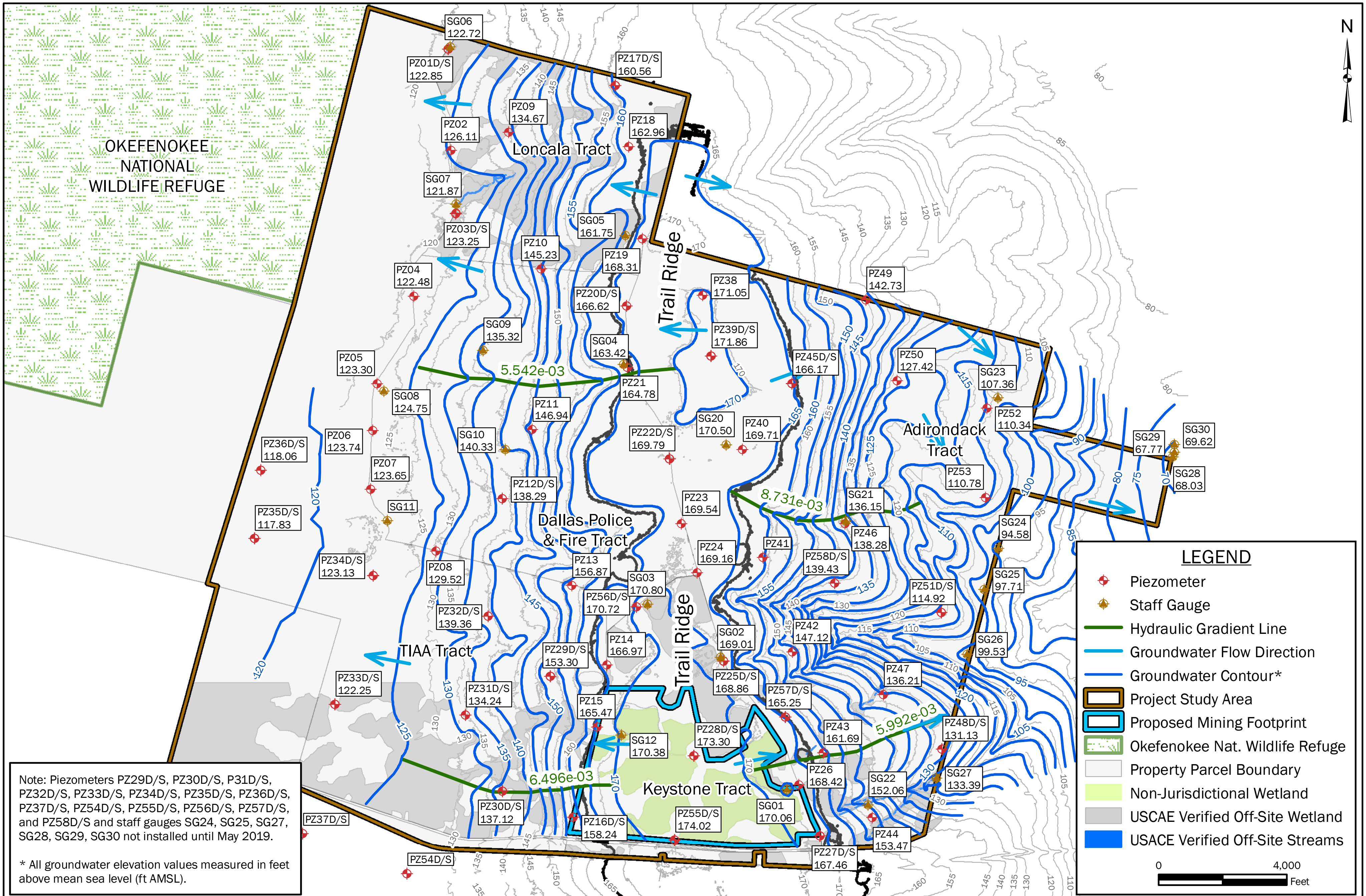


FIGURE 5: POTENTIOMETRIC SURFACE MAP OF THE SURFICIAL AQUIFER (JULY 26, 2019)

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/10/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 4,000 ft

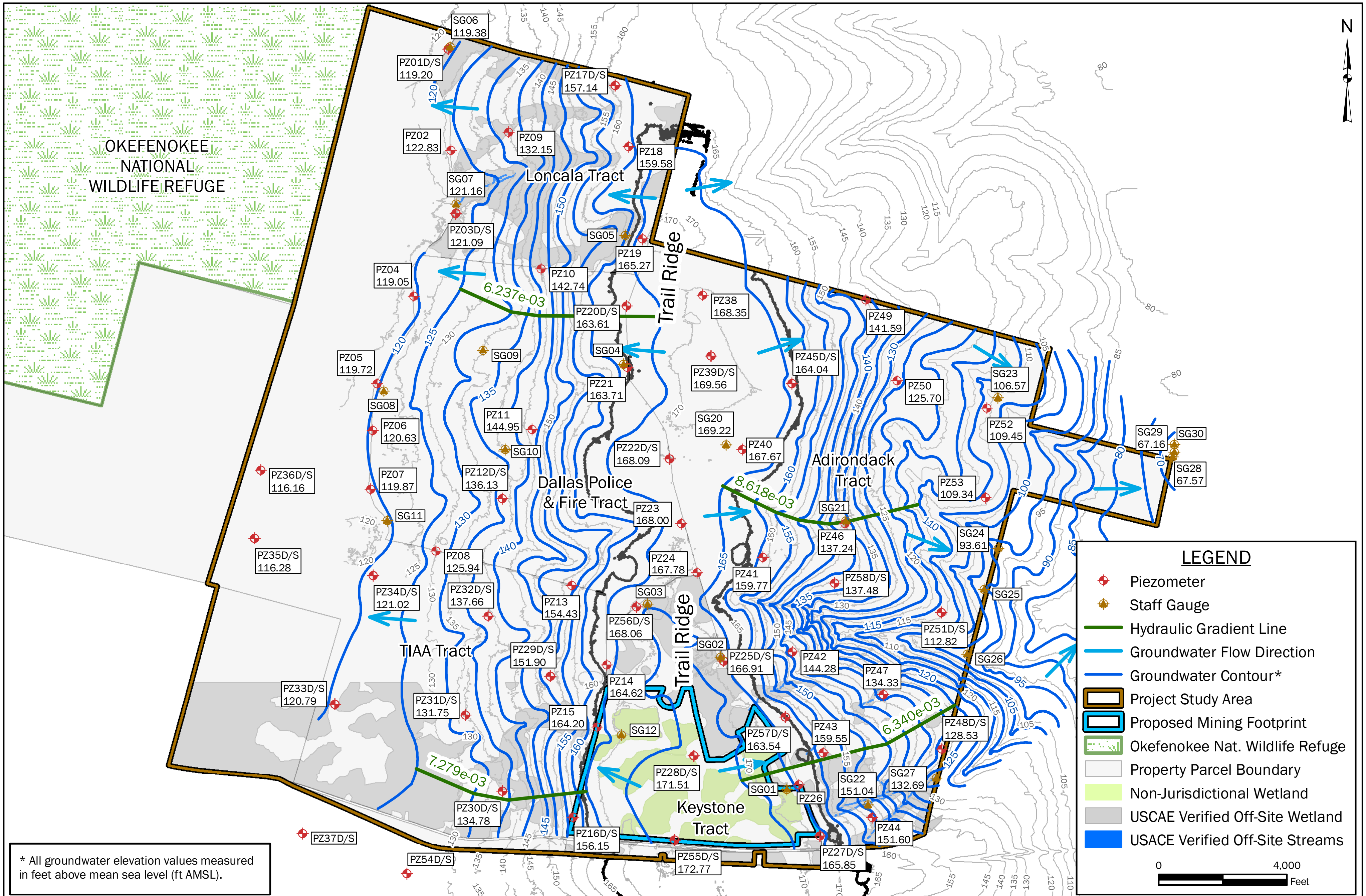


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FIGURE 6: POTENTIOMETRIC SURFACE MAP OF THE SURFICIAL AQUIFER (OCTOBER 26, 2019)

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK	
CHECKED BY: JRS	
DRAWING DATE: 11/10/2020	
REVISION DATE: N/A	
TTL JOB NO.: 000180200804.00	
APPROX. SCALE:	1 in = 4,000 ft

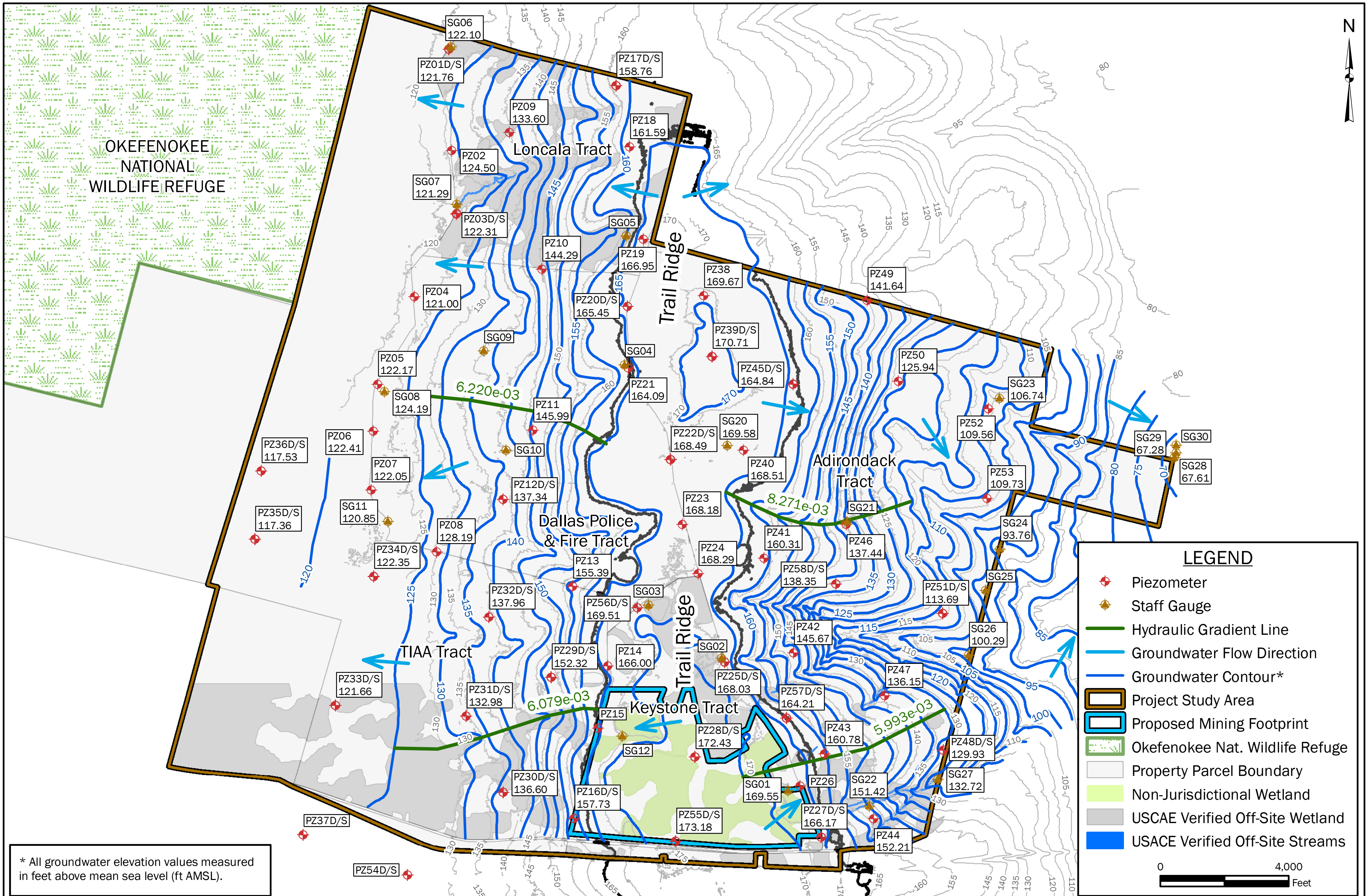


FIGURE 7: POTENTIOMETRIC SURFACE MAP OF THE SURFICIAL AQUIFER (JANUARY 26, 2020)

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/10/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 4,000 ft

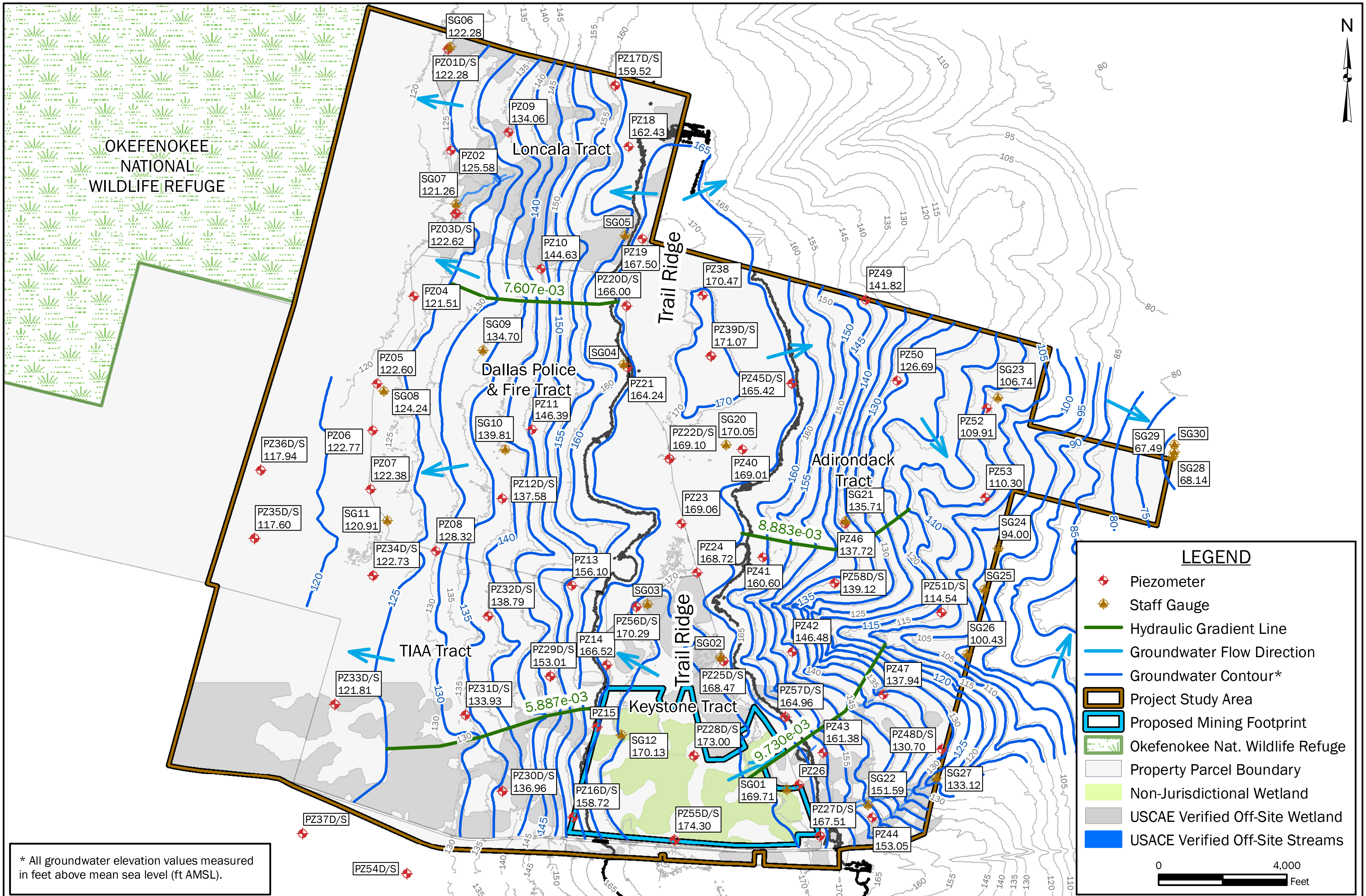
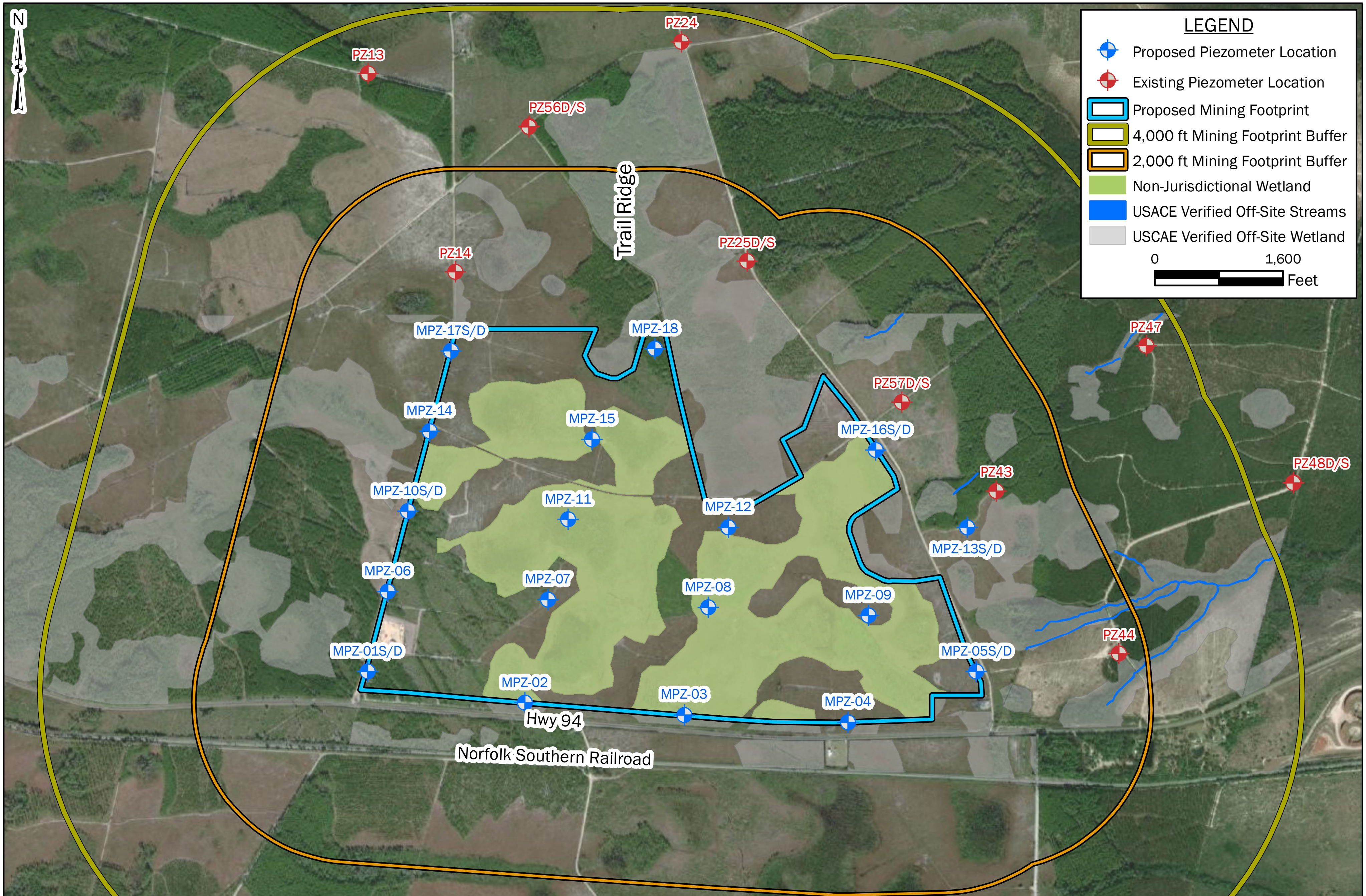


FIGURE 8: POTENTIOMETRIC SURFACE MAP OF THE SURFICIAL AQUIFER (APRIL 26, 2020)

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK	
CHECKED BY: JRS	
DRAWING DATE: 11/10/2020	
REVISION DATE: N/A	
TTL JOB NO.: 000180200804.00	
APPROX. SCALE:	1 in = 4,000 ft



TTL

FIGURE 9: GROUNDWATER LEVEL MONITORING LOCATION MAP

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

BASEMAP: Maxar, Vivid Imagery, 11/20/2019 (0.5 m Resolution).

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/13/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 1,600 ft

TTL

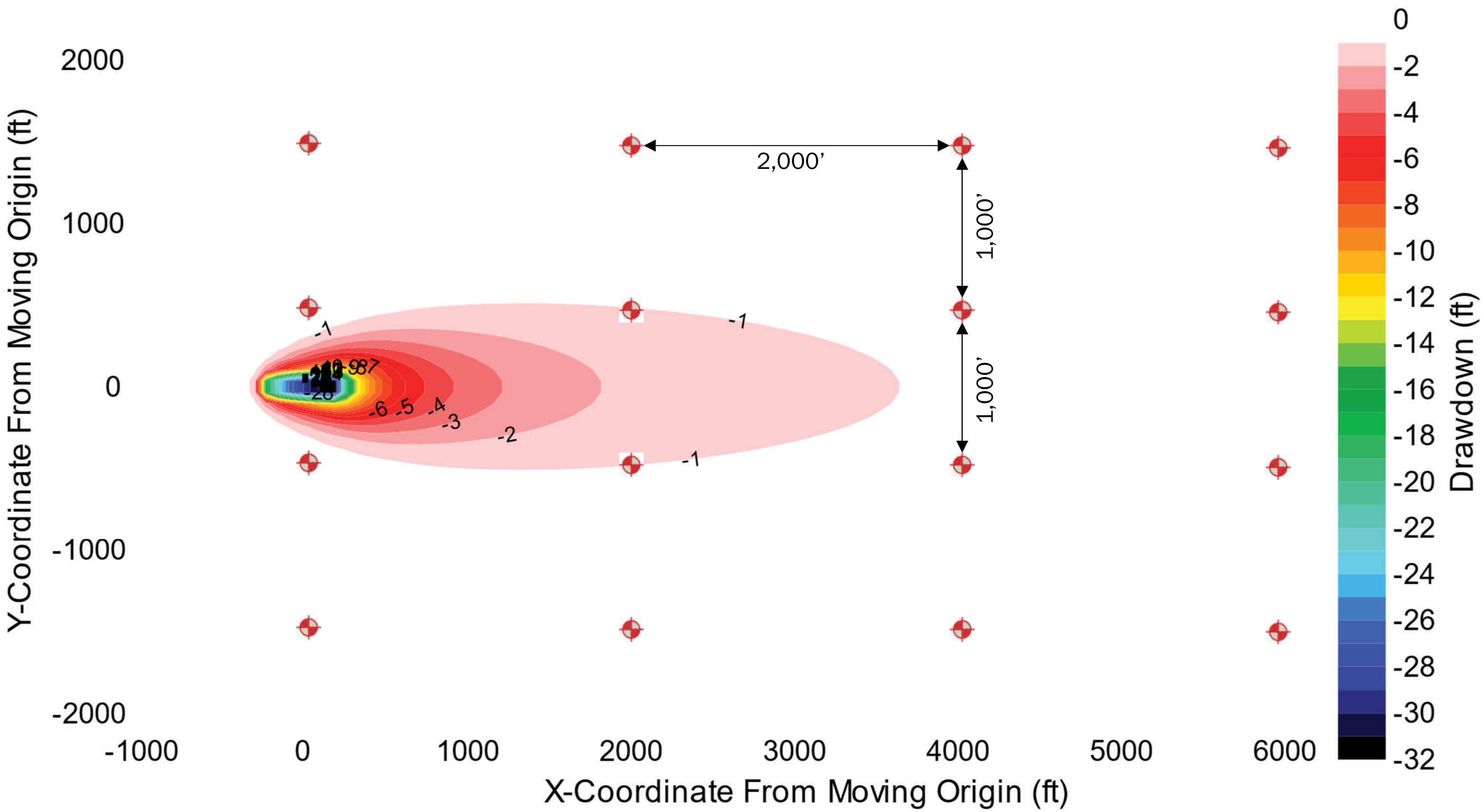
FIGURE 10: PROPOSED PIEZOMETER LOCATION MAP

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

BASEMAP: Maxar, Vivid Imagery, 11/20/2019 (0.5 m Resolution).

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/12/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 1,000 ft



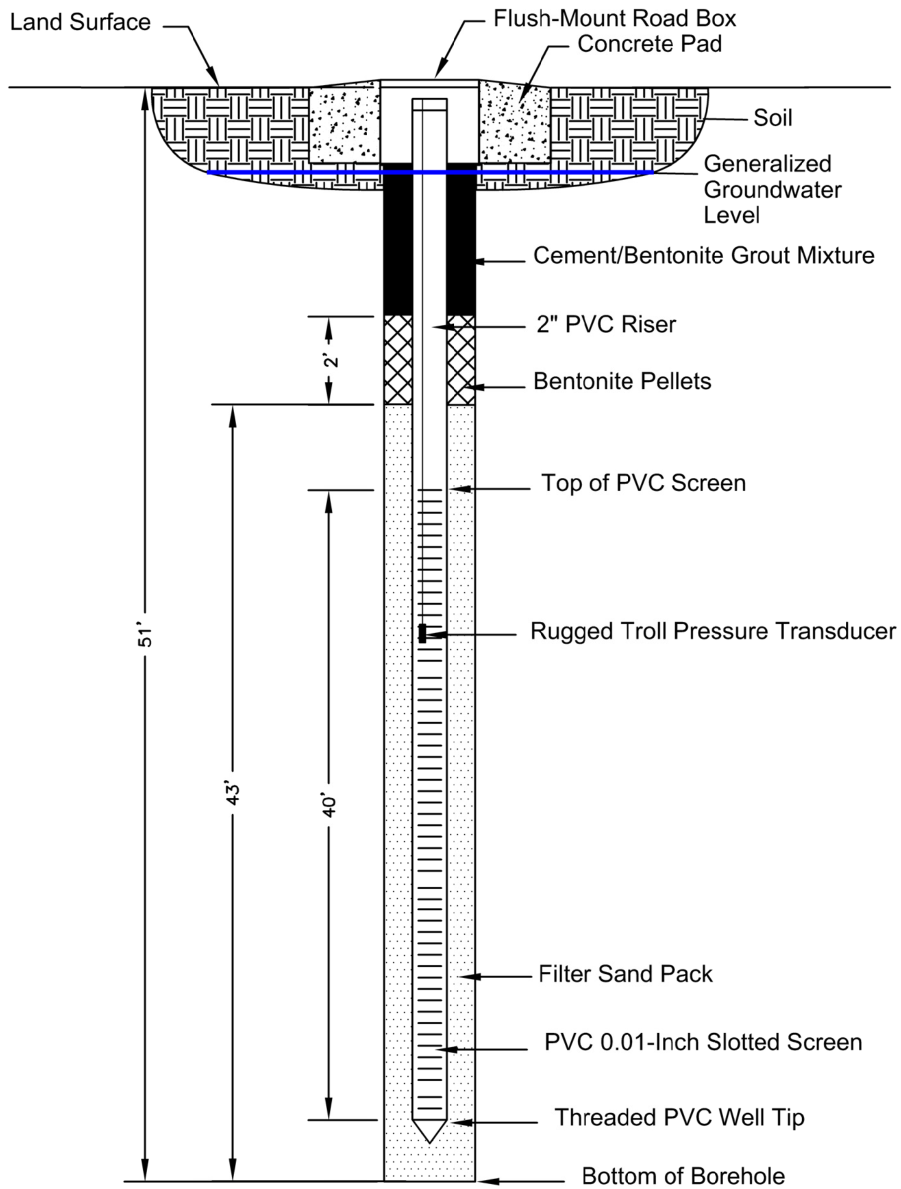
TTL

FIGURE 11: PREDICTIVE DRAWDOWN DUE TO THE MOVING MINE

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK	
CHECKED BY: JRS	
DRAWING DATE: 11/10/2020	
REVISION DATE: N/A	
TTL JOB NO.: 000180200804.00	
APPROX. SCALE:	



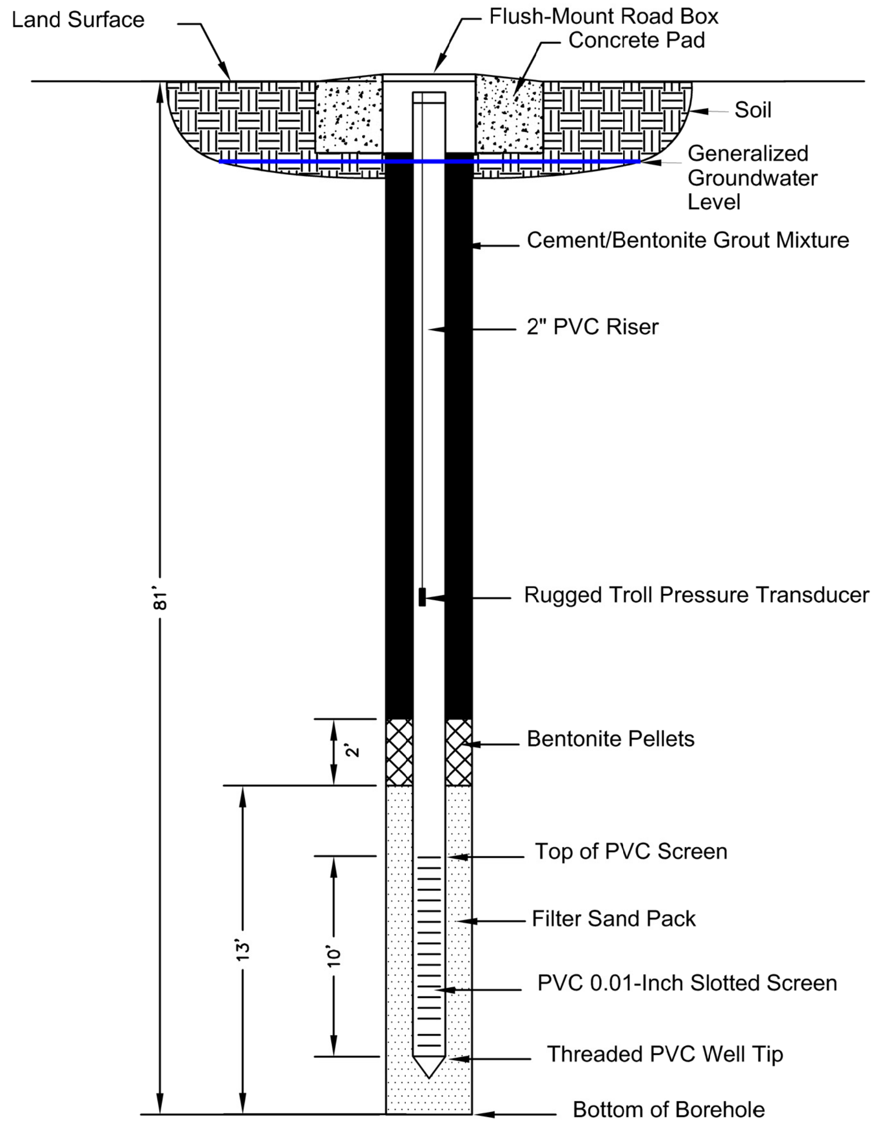
TTL

FIGURE 12: TYPICAL PIEZOMETER CONSTRUCTION DETAIL

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA
COUNTY, STATE

Drawn By: DEK
Checked By: JRS
Date: 11/9/2020
Proj. No.: 000180200804.00
File Name: Typical Well Diagrams.dwg



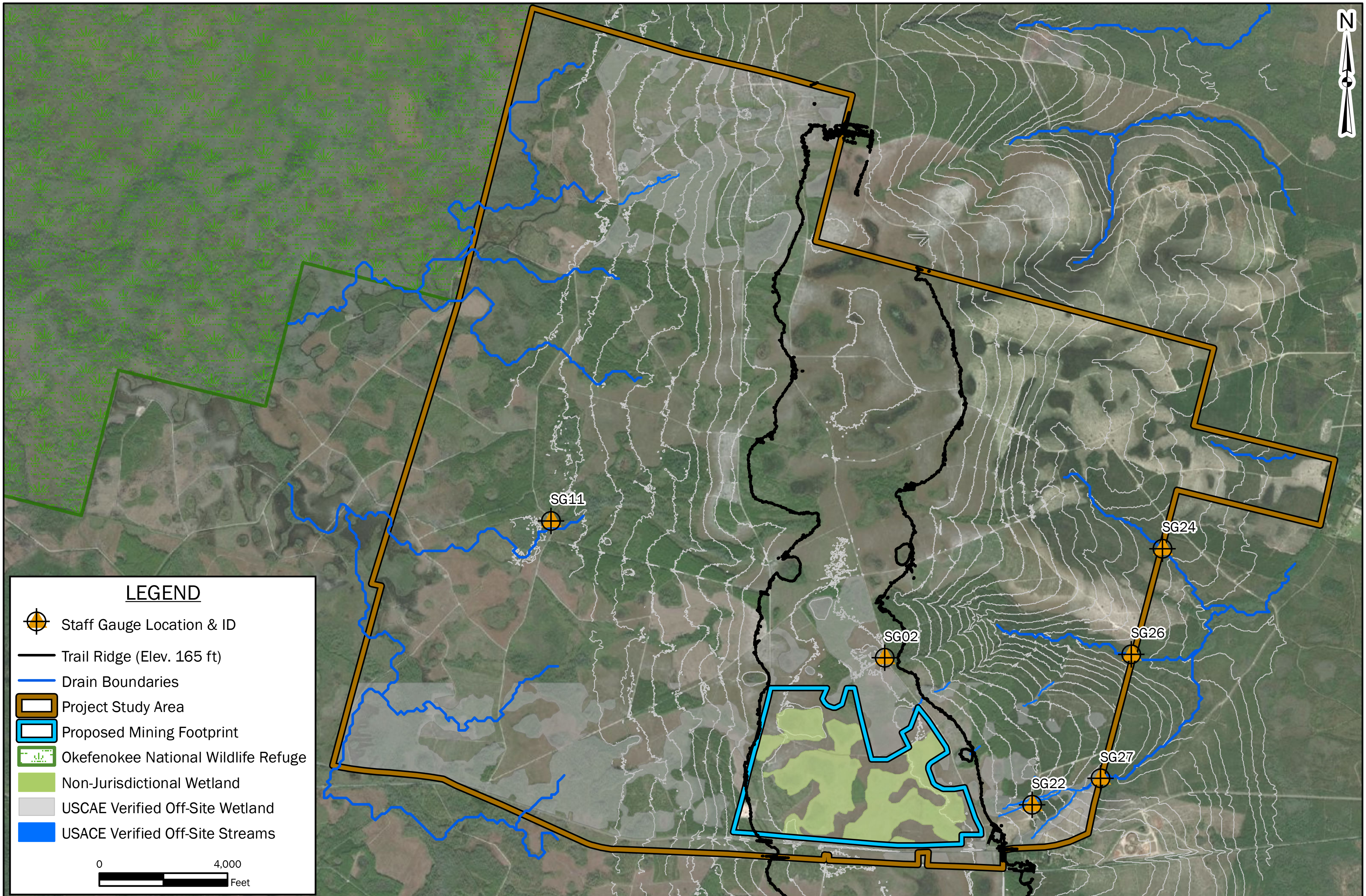
NOT TO SCALE

FIGURE 13: TYPICAL DEEP PIEZOMETER CONSTRUCTION DETAIL

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA
COUNTY, STATE

Drawn By: DEK
Checked By: JRS
Date: 11/9/2020
Proj. No.: 000180200804.00
File Name:
Typical Well Diagrams.dwg



TTL

FIGURE 14: SURFACE WATER LEVEL MONITORING LOCATION MAP

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

BASEMAP: Maxar, Vivid Imagery, 11/20/2019 (West, 0.5 m Resolution), 3/24/2018 (East, 0.46 m Resolution).

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/10/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 4,000 ft

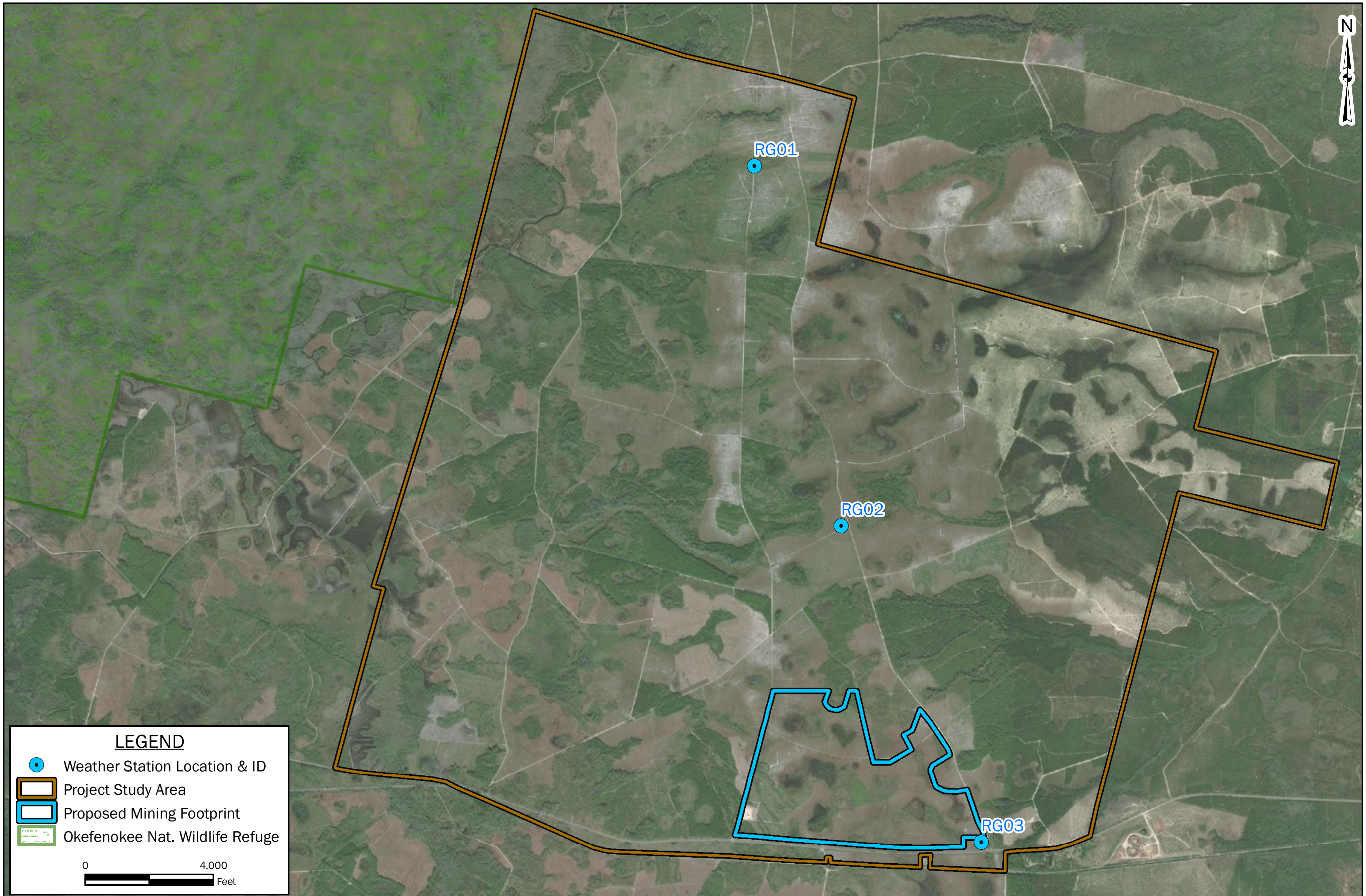


FIGURE 15: WEATHER STATION LOCATION MAP

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

BASEMAP: Maxar, Vivid Imagery, 11/20/2019 (West, 0.5 m Resolution), 3/24/2018 (East, 0.46 m Resolution).

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/13/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 4,000 ft

FIGURE 16: GROUNDWATER QUALITY MONITORING LOCATION MAP

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

BASEMAP: Maxar, Vivid Imagery, 11/20/2019 (0.5 m Resolution).

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/12/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 1,000 ft

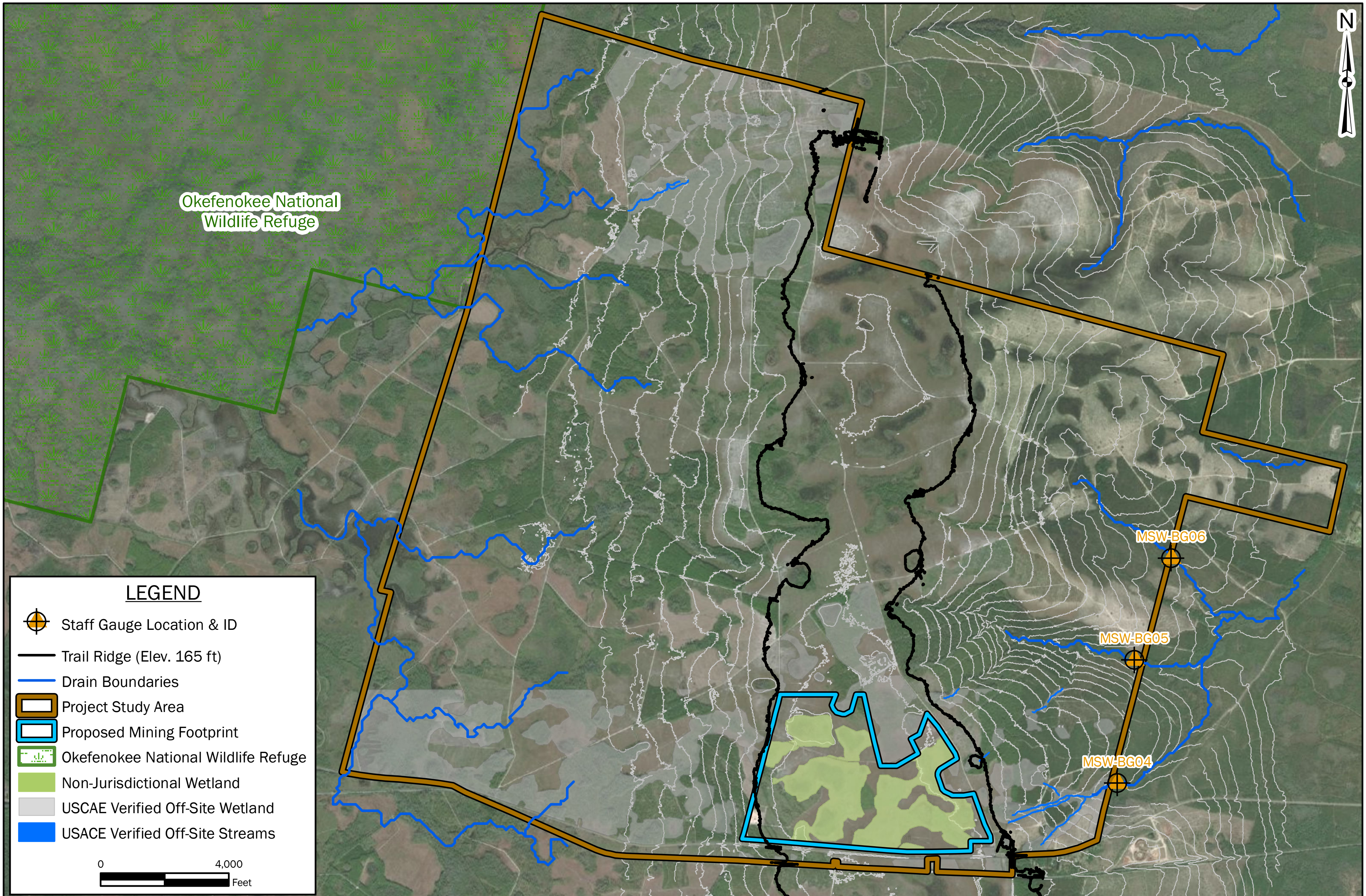


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FIGURE 17: SURFACE WATER QUALITY MONITORING LOCATION MAP

TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE

ST. GEORGE, CHARLTON COUNTY, GEORGIA

BASEMAP: Maxar, Vivid Imagery, 11/20/2019 (West, 0.5 m Resolution), 3/24/2018 (East, 0.46 m Resolution).

DRAWN BY: DEK
CHECKED BY: JRS
DRAWING DATE: 11/12/2020
REVISION DATE: N/A
TTL JOB NO.: 000180200804.00
APPROX. SCALE: 1 in = 4,000 ft