Hsu, Benjamin

From: Tafuni, Steven
Sent: Wednesday, November 29, 2017 9:13 AM
To: SWD_Waste
Subject: FW: Southeast County Landfill OGC File No. 17-0058 - Corrective Action Plan
Attachments: R20171128 SCLF CAP Draft.pdf

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Subject: Southeast County Landfill OGC File No. 17-0058 - Corrective Action Plan

Dear Mr. Tafuni,

On behalf of Hillsborough County Public Works Department, Solid Waste Management Division, SCS Engineers is submitting the attached PDF of the draft Corrective Action Plan (CAP) for the Southeast County Landfill. This update is being submitted as a requirement of condition 9.(a) of the July 28, 2017 Consent Agreement between the State of Florida Department of Environmental Protection (FDEP) and Hillsborough County.

An initial CAP was submitted on June 26, 2017 for FDEP review. A meeting with FDEP was held on October 12, 2017. As a result of the meeting, the CAP was revised and is being resubmitted as a draft for FDEP review and comment.

Please contact Bruce Clark or me if you have any questions or require additional information.

Regards,

Bob

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DRAFT
CORRECTIVE ACTION PLAN

Presented to:

Hillsborough County Florida

Hillsborough County Public Works Department
Solid Waste Management Division
332 N. Falkenburg Road
Tampa, Florida 33619

Submitted by:

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November 28, 2017
File No. 09215600.05

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DRAFT

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Lithia, Florida

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Bruce J. Clark, P.E.
No. 31924 11/28/17

Note:
Initial Corrective Action Plan submitted on June 26, 2017

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1 INTRODUCTION

During the February 2016 groundwater-monitoring event at the Southeast County Landfill (SCLF), elevated readings were observed by the Hillsborough County Public Works Department, Solid Waste Management Division (SWMD) for select parameters at monitoring well TH-67. TH-67 is a detection well approximately 45 feet east of Phase II and monitors shallow groundwater at the SCLF. Since that time, the SWMD and its engineering Consultant, SCS Engineers (SCS), have been conducting investigations of potential causes for the elevated readings and have installed additional measures to monitor the area of concern.

As a result of the investigations, it has been determined that the most likely cause of the elevated parameters was the overtopping of the east containment berm due to elevated leachate levels within the Phase II disposal area.

The results of the on-going investigation have been shared with the Florida Department of Environmental Protection (FDEP) in multiple reports, weekly emails, and meetings. The objective of this Corrective Action Plan (CAP) is to develop actions to be taken by the SWMD to:

1) Monitor and reduce the elevated leachate levels within head on liner to an Approved Operating Level and

2) Monitor Water Quality in the area adjacent to Phase II for improvement and take necessary actions for the reduction in water quality parameters. This CAP is part of, and only related, to a Consent Agreement between the SWMD and FDEP.

The SWMD is continuing with corrective measures related to a suspected, one time release of leachate over-topping the southeastern perimeter lined berm. Condition 9.a of the Consent Agreement dated July 28, 2017 between the SWMD and the FDEP required the SWMD to submit a CAP to the FDEP for review and approval.

An initial CAP was submitted on June 26, 2017 for FDEP review. A meeting with the FDEP was held on October 12, 2017 to discuss the CAP. As a result of the meeting, the SWMD is submitting the following CAP.

2 BACKGROUND

The over-topping is believed to have occurred in the vicinity of the southeast corner of Phase II of the SCLF. The SWMD has responded to that incident with the following activities:

1) Initiated additional leachate removal measures to reduce leachate levels within the landfill to prevent another overtopping incident,

2) Began collection of water samples from monitoring wells in the area and installed additional wells to monitor and evaluate the progress of groundwater quality restoration. A formal list of activities completed to-date is provided in **Appendix A.**

   A brief summary of activities completed is listed below:

- Installed piezometers throughout the SCLF to assess the presence of liquid and its estimated depth at those locations (see **Figure 1**).

- Installed a leachate cut-off and removal trench in the Phase II disposal area to minimize potential of build-up of leachate level along the outside perimeter containment berm (see **Figure 1**).

- Installed additional groundwater monitoring wells in the suspected area of the release to assess the initial quality and the improvement in the groundwater over time (see **Figure 2**).

- Updated the estimate of how much leachate volume needs to be removed (i.e., the pumping rate) to continue to reduce liquid levels in the piezometers and the landfill.

- Installed the following features for supplemental leachate removal (see **Figure 3**):

    - Installed two vertical leachate removal wells into the waste in Phase I and II;
    - Located and jet cleaned the Phase II leachate collection header;
    - Installed pneumatic pumps in several landfill gas extraction wells to reduce leachate collected in the wells;
    - Modified a clean out on the Phase II leachate header pipe and installed a suction line and pump;
    - Installed a pump in the riser port of the cut-off trench along the perimeter berm; and,
    - The total average leachate removal, from the supplemental locations mentioned above, since August has been an additional amount of approximately 42,000 gallons per day (GPD). A table of supplement leachate removal is included in **Appendix B**.

After meeting with the FDEP in October 12, 2017, to discuss progress in reducing the potential of leachate overtopping the berm, it was agreed that the SWMD would provide to the FDEP an updated CAP summarizing future corrective actions, goals, and metrics. The CAP is provided in the following sections.

In conjunction with preparing this CAP, the SWMD is preparing a Request for Alternate Procedure (Request) to propose a maximum leachate operating depth that is consistent with the normal operating conditions within the Phase I through VI disposal area. The Request will also describe how that level will be monitored.

3 PURPOSE

The purpose and goal of the CAP is to clarify the major activities that the SWMD will conduct in order to reduce the depth of leachate in the landfill piezometers and the quantity of leachate that has built up within the landfill. The CAP also includes the proposed metrics for determining when the activities have met the stated goals, a schedule for conducting the activities, and the estimated time to complete.

4 PROPOSED CORRECTIVE ACTION PLAN

The SWMD proposes to conduct the following activities:

- Continue supplemental pumping, or removal, of leachate from the Phase I and Phase II areas of the landfill as follows:
    - Leachate removal via the Phase II header pipe (PS-2);
    - Pumping from the Phase II leachate cut-off trench riser (TPS-2B);
    - Pumping from the Phase I and II dewatering wells (DW 1-1, DW 1-2, DW 2-1, and DW 2-2);
    - Pumping from Landfill gas (LFG) extraction wells (EW-38, EW-44, EW-48, and EW-66); and,
    - Pumping from LFG condensate traps (CT-1, CT-2, and CT-3).

- Per Condition 10 of the Consent Agreement, continue quarterly sampling of groundwater monitoring wells TH-20B, TH-38B, TH-66A, TH-67, TH-79, TH-80, TH-81, and TH-82.

- Continue weekly measurements of Series 2 piezometers within Phases I-VI of the landfill and track liquid level trends. Measurements will be reported with the monthly progress report submitted to the FDEP.

- Continue daily monitoring of the leachate level in the main sump (PS-B). This data will be included in the monthly progress report submitted to the FDEP.

- Provide a monthly progress and summary report to the FDEP of the activities in the CAP. Per the Consent Agreement, this report will be submitted by the 15th of the following month.

- Equip the riser port in the leachate cut-off trench with a level sensing device that will turn the pump on if leachate appears in the riser.

- Provide an updated landfill estimated water balance to the FDEP. This will assess what the additional supplemental leachate pumping and removal volumes should be to reduce the liquid levels in the piezometers and landfill.

Additional leachate removal points and methods will be added as more data is collected. FDEP will be copied on all proposed activities related to the CAP.

5 UPDATED LANDFILL WATER BALANCE

CALCULATIONS

The execution of the liquids management plan has been a dynamic exercise. The accurate estimation of how much extra leachate needs to be removed and for how long, has been a moving target due to expected fluctuations in the leachate removal rates and unseasonal heavy

rains this year in June through September of 2017. The total rainfall over that four month span was approximately 47 inches, about 14 inches above average.

The leachate that must be removed to bring the leachate depth in the sealed Series 2 piezometer down includes:

- The liquid already held in the landfill, and
- The added liquid contributed by rainfall

Early on SCS made an estimate of the leachate in the landfill, over the 62-acre area comprising the affected parts of Phases I-VI. The estimated volume was 13.5 million gallons (MG). Based on current liquid levels (as of 11/3/2017), and using a depth that is the overall average of Series 2 piezometers, the estimated volume is 11.7 MG. The calculations are included as **Appendix C**. Revised water balance calculations will be updated and submitted to the FDEP every six months until the approved liquid level is achieved.

METRICS

The metric for accomplishing the goal of reducing leachate levels in the landfill will be based on depth of liquid in the piezometers. The following shall apply:

1. The supplemental pumping (leachate removal) shall be terminated when the depth of liquid in Series 2 piezometers reaches a combined average depth of 2.5 feet or in accordance with the Approved Operating Level to be applied for by the SWMD in an Alternative Procedure request. This allows that some piezometers may have a depth greater than 2.5 feet and some with a depth less than 2.5 feet.

2. In addition, all Series 2 piezometers shall have shown a trend of decreasing liquid depth as measured during a six month interval with allowance for less depth reduction measured during the rainy season (June through September).

SCHEDULE

It is estimated that the leachate reduction could be accomplished in approximately 2 years or less with an average supplemental leachate pumping rate of approximately 42,000 GPD. The estimated time to complete this work is highly dependent on several assumptions, including the actual volume of leachate in the landfill, the infiltration rate from rainfall, annual rainfall amounts, effectiveness of supplemental leachate pumping, days of pumping, and others.

An evaluation of the CAP, based on the submitted water balance reports, will be made at the 18-month period (following approval of the CAP) to determine if the estimated timeline will be achieved as planned or adjustments need to be made to the timeline. The schedule could be longer or shorter depending on how all of the variables come together over time.

6 GROUNDWATER MONITORING

WATER QUALITY MONITORING WELLS

The SWMD will continue to collect samples from surficial groundwater monitoring wells TH-20B, TH-38B, TH-66A, TH-67, TH-79, TH-80, TH-81, and TH-82 on a quarterly basis (February, May, August, and November). These samples will be analyzed for sodium, ammonia, chloride, and total dissolved solids. Field parameters will include temperature, pH, Conductivity, Turbidity, Dissolved Oxygen, and oxygen reduction potential (ORP). Results will be submitted to the FDEP within 60 days of completion of laboratory analysis.

Monitoring of these groundwater-monitoring wells will continue for one year following completion of the CAP. At that time, the SWMD will discuss with the FDEP discontinuing quarterly monitoring at these locations.

ADDITIONAL GROUNDWATER MONITORING WELL INSTALLATION

At the request of the FDEP, an additional monitoring well will be installed southeast of Phase II, south of TH-67, and east of TH-20B. The new monitoring well, designated as TH-83, will be used to monitor shallow groundwater quality southeast of the Phase II disposal area. The new monitoring well will be included in the supplemental sampling conducted quarterly. A proposed construction diagram is shown in **Appendix D**.

An evaluation of the water quality in monitoring wells referred to in this CAP, will be made 1-year (following approval of the CAP) against historical and regulated groundwater standards.

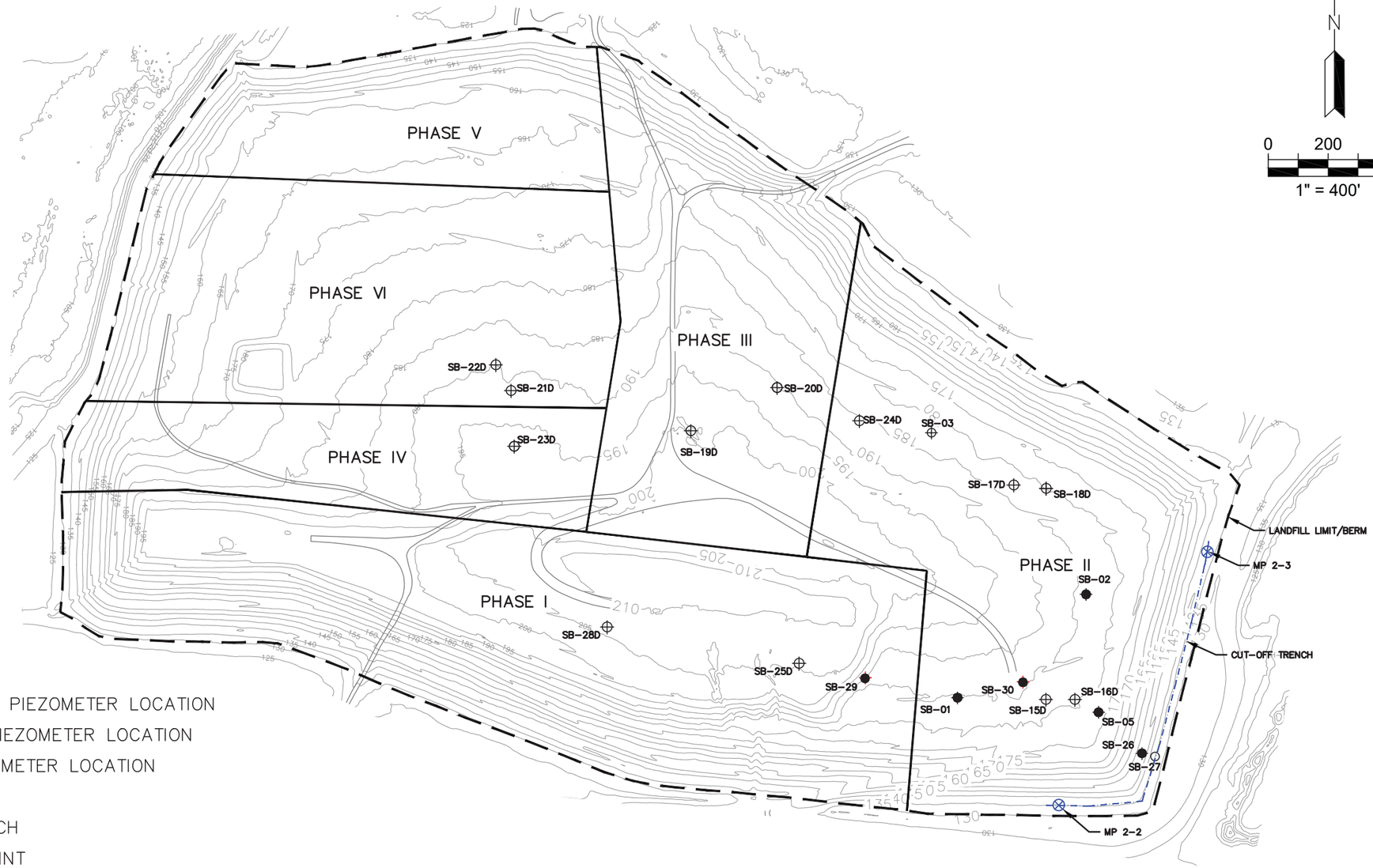
7 CAP SUBMITTALS

The SWMD will continue to submit the following reports to the FDEP.

- Monthly progress reports
  - Piezometer liquid level data
  - Leachate pumping data
  - Supplemental pumping data
  - Additional liquid removal activities
  - Submitted prior to the 15th of the following month
- Quarterly supplemental groundwater quality reports
  - Samples collected in November, February, May, and August
  - Submitted within 30-days of receiving laboratory data
- Updated water balance reports
  - Updated leachate volume estimate based on liquid levels in piezometers
  - Submitted every 6 months in May and November.

FIGURES

F:\PROJECT\09215600.03\PHASE 1\TASK 1100 - GENERAL\2.0 PHASE II GEOTECH\MONTHLY PROGRESS REPORTS\20171115\NOVEMBER 2017 MONITORING POINTS.DWG



LEGEND:

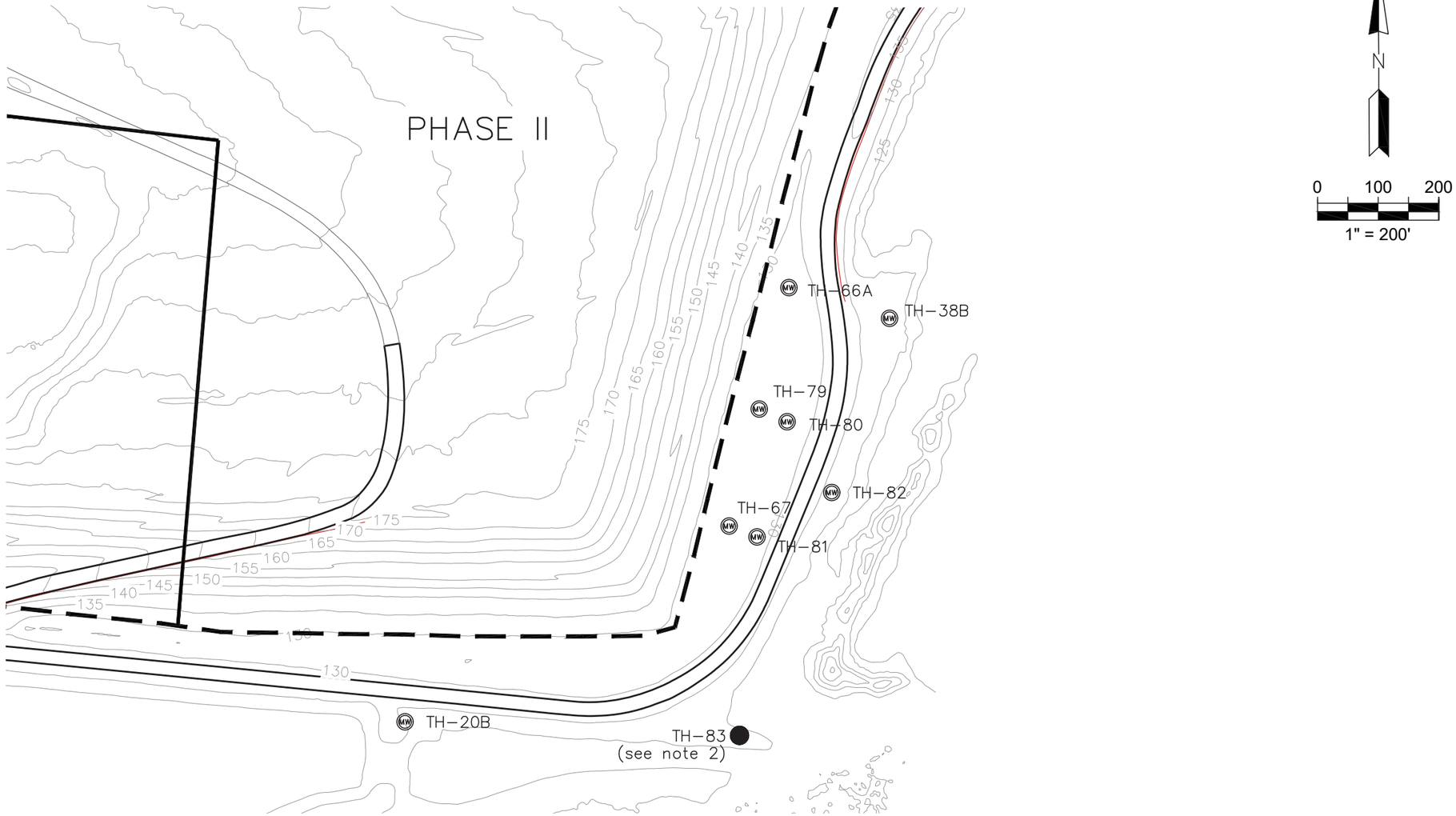
- SB-22D ⊕ SECOND SERIES PIEZOMETER LOCATION
- SB-03 ● FIRST SERIES PIEZOMETER LOCATION
- SB-27 ○ REMOVED PIEZOMETER LOCATION
- PHASE LIMIT
- CUT-OFF TRENCH
- ⊗ MONITORING POINT

NOTE:

1. TOPOGRAPHIC SURVEY BY PICKET, JANUARY 2017.

SCS ENGINEERS

FIGURE 1. MAP OF PIEZOMETERS AND MONITORING POINTS
SOUTHEAST COUNTY LANDFILL
NOVEMBER 2017



LEGEND:

GROUNDWATER MONITORING WELLS

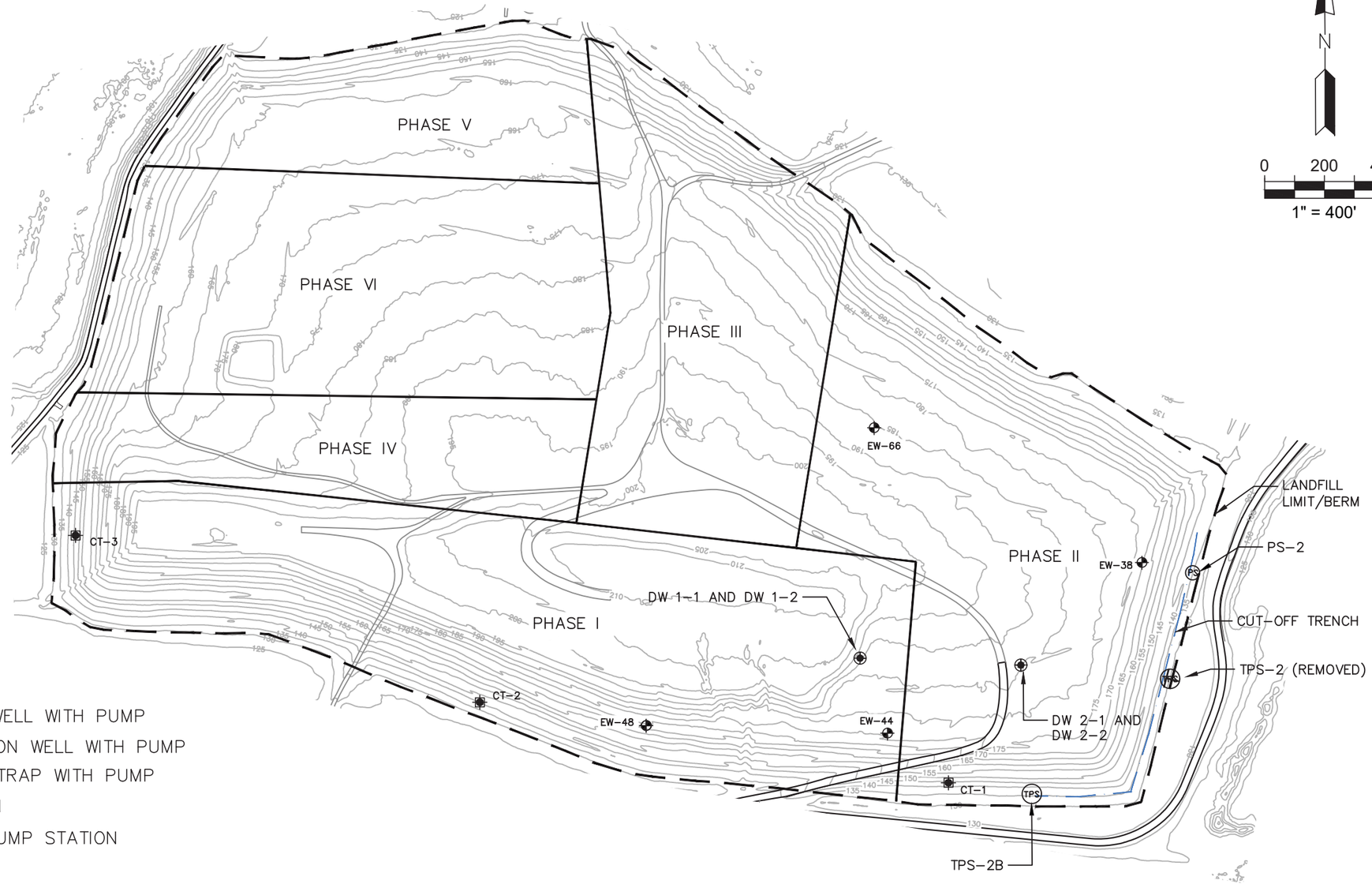
LANDFILL BOUNDARY

NOTE:
1. TOPOGRAPHIC SURVEY BY PICKETT, JANUARY 2017.
2. LOCATION OF MONITORING WELL TH-83 TO BE DETERMINED.

F:\PROJECT\09215600.03\PHASE 1\TASK 1100 - GENERAL\2.0 PHASE II GEOTECH\MONTHLY PROGRESS REPORTS\20171115\FIGURES - NOVEMBER REV CAP\NOVEMBER 2017 DEWATERING LOCATIONS REV.DWG

SCS ENGINEERS

FIGURE 2. MONITORING WELL LOCATIONS
NOVEMBER 2017



LEGEND:

- DEWATERING WELL WITH PUMP
- LFG EXTRACTION WELL WITH PUMP
- CONDENSATE TRAP WITH PUMP
- PS — PUMP STATION
- TPS — TEMPORARY PUMP STATION
- PHASE LIMIT
- CUT-OFF TRENCH

NOTE:
1. TOPOGRAPHIC SURVEY BY PICKETT, JANUARY 2017.

F:\PROJECT\09215600.03\PHASE 1\TASK 1100 - GENERAL\2.0 PHASE II GEOTECH\MONTHLY PROGRESS REPORTS\20171115\FIGURES - NOVEMBER REV CAP\NOVEMBER 2017 DEWATERING LOCATIONS REV.DWG

SCS ENGINEERS

FIGURE 3. MAP OF SUPPLEMENTAL DEWATERING LOCATIONS
NOVEMBER 2017

APPENDIX A
Completed Tasks

Appendix A
Completed Tasks
Corrective Action Plan
Southeast County Landfill

Action Item	Completion Date
Stage 1	
Install piezometers SB-01 through SB-25	March 7, 2017
Install shallow groundwater monitoring well (TH-79)	November 28, 2016
Dewater extraction wells.	January 31, 2017
Install pneumatic pumps in condensate traps (CT-1, CT-2, and CT-3) and LFG extraction wells (EW-44 and EW-48)	January 15, 2017
Installed temporary well point system	March 10, 2017
Install temporary leachate pump station No. 2 (TPS-2)	February 17, 2017
Phase I cleanout installation	March 10, 2017
Jet clean Leachate Collection System Phase I	June 13, 2017
Install 3 shallow groundwater monitoring wells (TH-80, TH-81, and TH-82).	March 9, 2017
Survey wells, sample, and test water	March 29, 2017
Provide interim status reports to the FDEP	Findings reports dated December 16, 2016 and June 26, 2017.
Submitt a draft CAP to the FDEP	April 23, 2017.
Submit final CAP to the FDEP	June 26, 2017.
Stage 2	
Design dewatering wells (DW-1 and DW-2)	May 5, 2017
Install dewatering wells (DW-1 & DW-2)/start pumpingthe FDEP.	May 19, 2017
Installed piezometers SB-26 through SB-30	April and May 2017.
Install Phase II Cut-Off Trench and begin monitoring	July 12, 2017
Phase II cleanout installation	July 12, 2017
Jet Clean Leachate Collectyion System Phase II	July 17, 2017
Weekly monitoring	On-going
Install GCL around all LFG extraction wellheads	September 30, 2017
Install 2 pneumatic pumps in LFG extraction wells (EW-38 and EW-66)	April 11, 2017
Phases I-VI fill sequence modification	Approved by FDEP July 17, 2017
Jet clean Leachate Collection System Phase III	To be completed
Stage 3 – ACTIVELY IMPLEMENTING PER CAP	
Monthly Report Level Readings in all piezometers	On-going
Review and evaluate the project performance every 90 days (Piezometers, Dewatering Wells, Trenches, and Other Points)	Schedule pending FDEP approval of CAP

Notes:

Stage 1, 2, and 3 designation from initial Corrective Action Plan submitted on June 26, 2017

APPENDIX B
Supplemental Leachate Removal

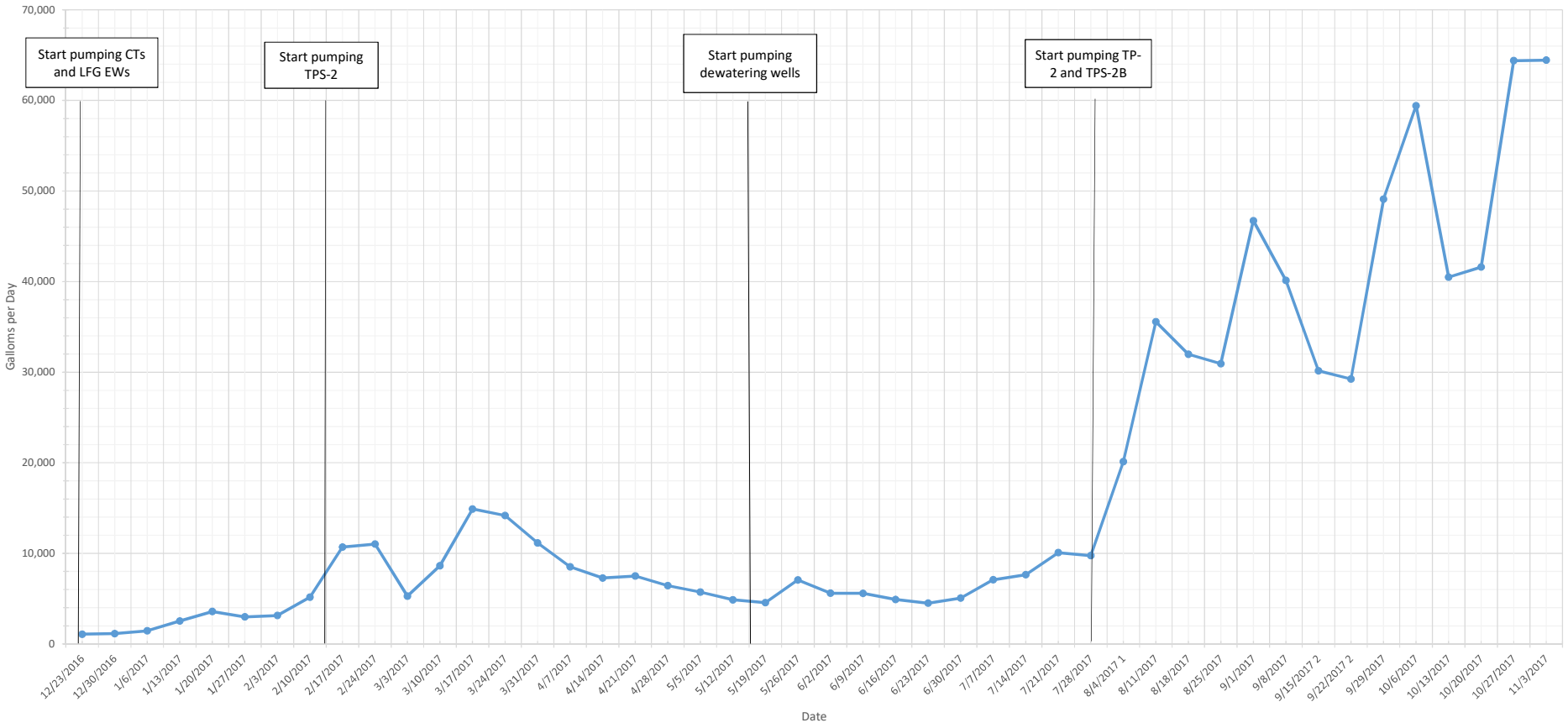
Appendix B
Weekly Supplemental Leachate Pumping Data
Liquid Assessment Monitoring
Southeast County Landfill

Week Ending	Condensate Traps (gal)	LFG Extraction Wells (gal)	Dewatering Wells (gal)	Pump Stations (gal)	Weekly Total (gal)	Daily Average (gpd)
12/23/2016	-	4,296	-	-	4,296	1,074
12/30/2016	-	8,024	-	-	8,024	1,146
1/6/2017	2,518	7,614	-	-	10,132	1,447
1/13/2017	10,516	7,201	-	-	17,717	2,531
1/20/2017	15,952	9,104	-	-	25,056	3,579
1/27/2017	12,999	7,953	-	-	20,952	2,993
2/3/2017	13,991	8,072	-	-	22,063	3,152
2/10/2017	29,162	7,025	-	-	36,187	5,170
2/17/2017	64,513	8,404	-	2,000	74,917	10,702
2/24/2017	56,760	6,811	-	13,600	77,171	11,024
3/3/2017	16,376	5,872	-	14,600	36,848	5,264
3/10/2017	13,076	5,373	-	42,000	60,449	8,636
3/17/2017	14,365	5,969	-	84,000	104,334	14,905
3/24/2017	12,218	6,003	-	81,000	99,221	14,174
3/31/2017	9,808	5,199	-	63,000	78,007	11,144
4/7/2017	5,677	4,874	-	49,000	59,551	8,507
4/14/2017	3,292	5,685	-	42,000	50,977	7,282
4/21/2017	4,025	7,550	-	41,000	52,575	7,511
4/28/2017	3,529	6,954	-	34,600	45,083	6,440
5/5/2017	2,309	6,159	-	31,600	40,068	5,724
5/12/2017	1,279	5,845	-	27,000	34,124	4,875
5/19/2017	1,815	4,793	1,169	24,100	31,877	4,554
5/26/2017	2,168	5,792	7,374	34,140	49,474	7,068
6/2/2017	2,455	5,188	7,597	23,937	39,177	5,597
6/9/2017	2,900	4,639	7,551	24,033	39,123	5,589
6/16/2017	3,176	3,367	9,120	18,636	34,299	4,900
6/23/2017	2,587	4,111	2,063	22,735	31,496	4,499
6/30/2017	3,319	4,112	6,595	21,412	35,438	5,063
7/7/2017	2,369	4,303	7,156	35,711	49,539	7,077
7/14/2017	3,522	4,376	8,569	37,025	53,492	7,642
7/21/2017	3,272	8,131	8,059	51,131	70,593	10,085
7/28/2017	3,573	10,250	8,075	46,326	68,224	9,746
8/4/2017 [1]	8,278	25,125	8,880	98,630	140,913	20,130
8/11/2017	6,541	64,449	7,701	170,324	249,015	35,574
8/18/2017	4,889	62,204	8,951	147,907	223,951	31,993
8/25/2017	4,852	62,896	9,397	139,376	216,521	30,932
9/1/2017	55,411	64,407	9,876	197,359	327,053	46,722
9/8/2017	62,183	75,863	9,912	132,878	280,836	40,119
9/15/2017 [2]	21,344	15,941	2,485	171,276	211,046	30,149
9/22/2017 [2]	21,062	24,538	7,088	152,090	204,778	29,254
9/29/2017	75,527	52,154	14,371	201,676	343,728	49,104
10/6/2017	60,611	57,347	12,037	285,947	415,942	59,420
10/13/2017	71,298	51,515	9,009	151,615	283,437	40,491
10/20/2017 [3]	78,470	57,889	1	154,888	291,248	41,607
10/27/2017	77,877	25,324	3,082	344,539	450,822	64,403
11/3/2017	88,794	51,426	15,743	295,219	451,182	64,455
Total	960,658	890,127	191,861	3,508,310	5,550,956	

Notes

1. Installed suction line in Phase II header.
2. Pumps shut down during and following Hurricane Irma.
3. Dewatering wells shutdown for inspection/maintenance.

Appendix B
Average Daily Flow



APPENDIX C
Water Balance

APPENDIX C
UPDATED LANDFILL WATER BALANCE

The accurate estimation of how much extra leachate needs to be removed and for how long, has been a moving target due to expected fluctuations in the leachate removal rates and variability of rainfall. The leachate that must be removed to bring the leachate depth in the sealed piezometer down includes:

- The liquid already held in the landfill, and
- The added liquid contributed by rainfall.

STORED LEACHATE

Early on SCS made an estimate of the leachate in the landfill, over the 62-acre area comprising the affected parts of Phases I-VI. The estimate included reducing the leachate depth from an average depth of approximately 9.3 feet (as measured in piezometers) to 2.5 feet (6.8 feet). The estimated leachate volume was 13.5 million gallons (MG). For more details see the Corrective Action Plan dated June 26, 2017 and prepared by SCS Engineers.

Since February 2017 when measurement of the liquid level in the Series 2 piezometers started, the current (September) overall average liquid depth within the 62-acre area of concern was 6.6 feet.

Thus, to update the landfill leachate volume to be removed from an averaged depth of 6.6 feet to an averaged depth of 2.5 feet, (i.e., an average reduction in depth of 6.6 – 2.5 = 4.1 feet), the volume of leachate to be removed is now 8.14 MG. The key assumptions in this volume estimate include:

- Potential area with "collectable" leachate = 2,700,000 s.f. (~62 acres)
- Average thickness of perched leachate (above the 30-inch level) = 4.1 ft.
- Percentage overall area that is dry (does not contain appreciable amount of leachate) = 30%; so 70% of area is wet,
- Percent of remaining volume containing ash = 60%;
    - Saturated ash does not provide accessible leachate – permeability is too low
    - Percent of volume containing "other wastes" = 40%
- Porosity of "other wastes" = 50%
- Fraction of leachate held in pores by capillary action = 30%; so 70% of leachate can be released.
- Conversion factor of 7.48 Gal/ft^3

Equation: (2,700,000 s.f.)(4.1 ft)(0.7)(0.4)(0.5)(0.7)(7.48 Gal/ft^3) = 8.1 MG

WATER BALANCE

The simplified water balance must also include additional leachate generated by infiltration of rainwater. The simplified water balance model that SCS is working with has the following components. Figure 1 below is a simplified graphic of the water balance components:

- Site Area = 62 acres (Phase II and portions of Phase I and III)
- Average rainfall of 4.5 inches per month (over 1 year)
- *Q1*, Rainfall Infiltration equals 15% of rainfall = 0.7 inches per month = 40,000 gpd (over 62 acres)
- Average leachate pumped from main sump (Average daily of years 2015 and 2016) = 83,900 gpd
- *Q2*, Normal leachate collection by LCS from 62 acre area = 30 % of total = 0.3 x 83,900 = 25,200 gpd (i.e. the LCS in Phase I, II and III is assumed to be only contributing 30% of total leachate)
- Estimated current liquid volume in landfill = 8.14 MG
- Extra liquid infiltration from abnormal rain months in June, July, August, and September (net increase since May 2017 over the average is 14 inches) = 3.54 million gallons
- *Q3*, Total estimated leachate stored in landfill = 8.14 + 3.54 = **11.68 MG**
- *Q4*, Average supplemental leachate pumpage (removal) since early August (includes removal from the two vertical wells, header of the collection system, and cut-off trench port only) = 42,000 gpd
- Downtime factor = 0.95

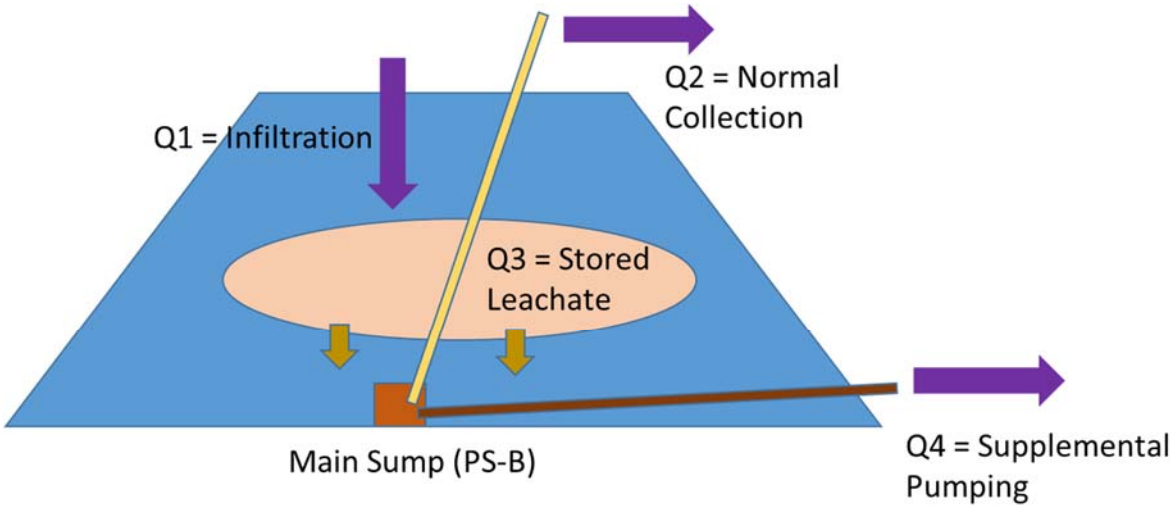


FIGURE 1. WATER BALANCE MODEL

62 acres (Phase II and parts of Phases I & III)

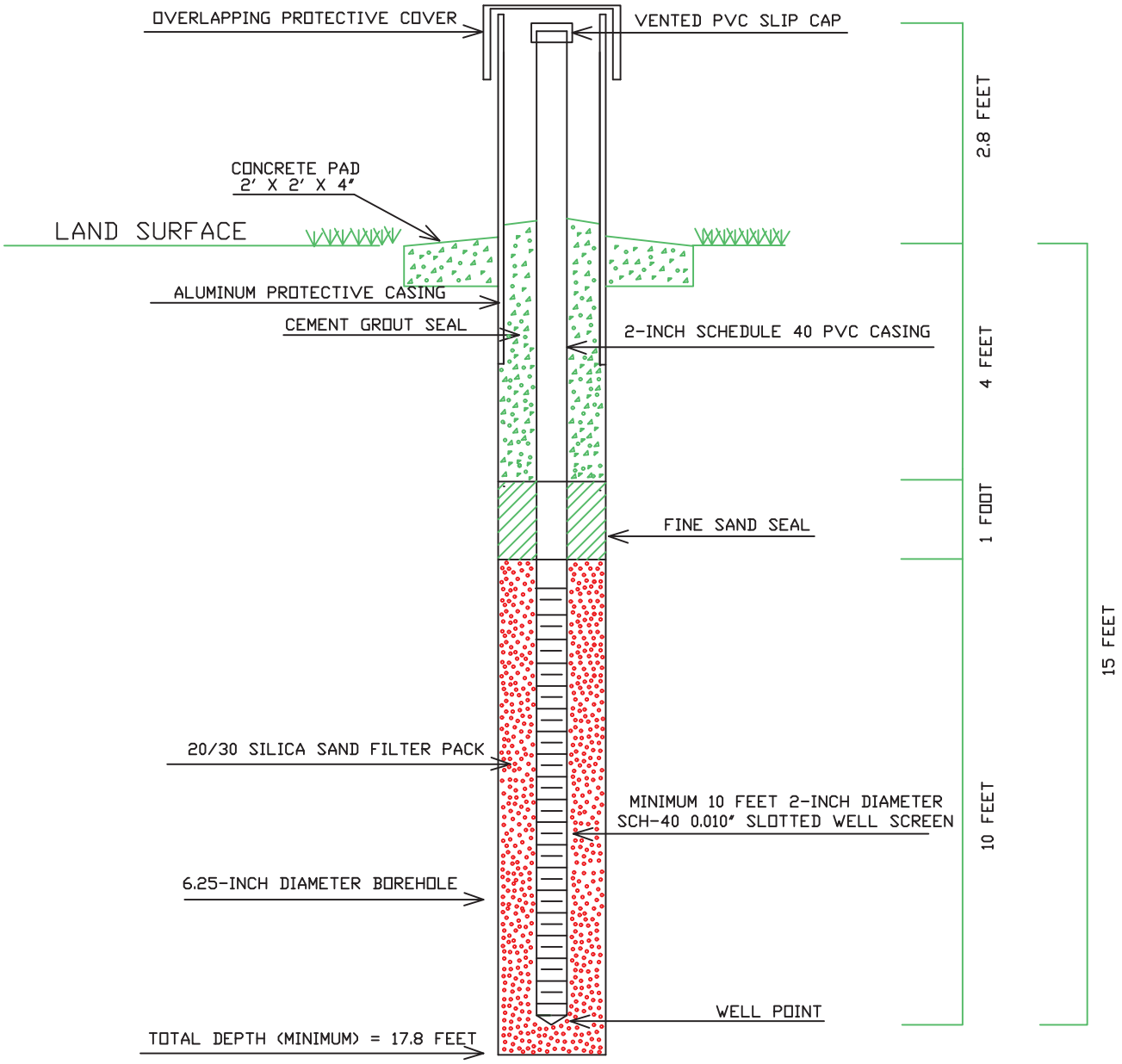
SUMMARY

The estimated total pumping time to bring the average leachate level down to the target level is calculated as follows.

- The net leachate removal rate is = *Q2* + *Q3* – *Q1* = 25,200 + 42,000 – 40,000 = 27,200 GPD.
- The approximate number of days to remove the total stored leachate at that rate is:
- Days = 11,680,000 gals. / 27,200 GPD = 429 days.
- Factor in the uptime of 95%, and pumping only 5 days per week, the time in days increases to;
- Days = 429 / 0.95 X 7/5 = 633 days. **(1.7 years)** ---→ Less than 2 years.

APPENDIX D
Proposed Well Construction

Monitoring Well Construction Details



NOT TO SCALE

HILLSBOROUGH COUNTY
PUBLIC UTILITIES DEPARTMENT

CONSTRUCTION DETAILS
SURIFICAL AQUIFER WELLS