Hsu, Benjamin

From: Chamberlain, Justin
Sent: Tuesday, August 21, 2018 11:51 AM
To: Hsu, Benjamin
Subject: FW: West Pasco Resource Recovery - 45799 - Class I WQMPER
Attachments: WQMPER-WPRR-ID 45799-May 2018.pdf

From: Allan Biddlecomb <abiddlecomb@pascocountyfl.net>
Sent: Friday, June 01, 2018 2:17 PM
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Cc: John Power <jpower@pascocountyfl.net>; Justin G. Roessler <jroessler@pascocountyfl.net>; Carrie S. Kimble <ckimble@pascocountyfl.net>
Subject: West Pasco Resource Recovery - 45799 - Class I WQMPER

Justin, Steve,

Attached is the Class I facilities WQMPER for the report period of 2nd Semi 2015 through 2nd Semi 2017 (2S15–2S17). Please do not hesitate to contact us if you have any questions.

Thank You,
Allan

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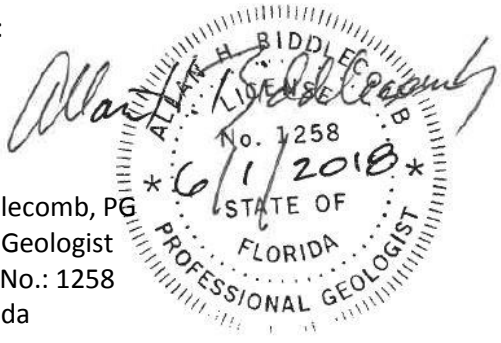
Water Quality Monitoring Plan Evaluation Report
Semester II 2015 through Semester II 2017
West Pasco Resource Recovery – Class I Landfill
WACS ID 45799

May 2018

Certification:



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Appendices

Section 1: Introduction

1.1 Background

This Water Quality Monitoring Plan Evaluation Report (WQMPER) utilizes portions of descriptive text and some of the formatting and figures from previous WQMPERs prepared by CDM Smith. As reported by CDW Smith in previous WQMPER reports, the West Pasco Class I Landfill (site) is located at 14230 Hayes Road, Spring Hill, Florida in northwest Pasco County, approximately 2.5 miles north of State Road 52. The property is approximately 800 acres in size. Other facilities on the property that are part of the Pasco County Solid Waste System include the Resource Recovery Facility (Waste-to-Energy Plant) and the West Pasco Class III Landfill. The site is operated under the Power Plant Siting Act (PPSA), 403.501-518, Florida Statutes (F.S.).

Figure 1-1 is a site plan showing the property boundaries, adjacent roadways, the six disposal cells (Cells A-1, A-2, A-3, A-4, SW-1, and SW-2), and other features. Solid waste Cells SW-1 and SW-2 are used for the disposal of municipal solid waste (MSW) whenever the MSW cannot be combusted in the Resource Recovery Facility. The filling of Cell SW-1 began in June of 1990 and the filling of Cell SW-2 began in November of 2004. Cell SW-2 is the only cell being filled with MSW at this time.

Ash Cells A-1, A-2, A-3 and A-4 have been used for the disposal of ash produced from the combustion of MSW at the Resource Recovery Facility. The filling of Ash Cell A-1 occurred from 1990 to December 1996. The filling of Ash Cell A-2 occurred from December 1996 to May 2003. The filling of Ash Cell A-3 occurred from May 2003 to May 2011. Cell A-4 began receiving ash in May 2011 and is currently being used for ash disposal. The ash disposal and solid waste cells at the facility are all constructed with double liner systems that includes leachate collection.

1.2 Purpose

This report is submitted in accordance with the requirements of 62-701.510(8)(b), F.A.C., which states the following: “A technical report, signed and sealed by a professional geologist or professional engineer with experience in hydrogeologic investigations, shall be submitted to the Department every two and one-half years during the active life of the facility, and every five years during the long-term care period. The report shall summarize and interpret the water quality and water level measurements collected during the past two and one-half years or five years for facilities in long-term care. The report shall contain, at a minimum, the following:

1. Tabular displays of any data which shows that a monitoring parameter has been detected, and graphical displays of any leachate key indicator parameters detected (such as pH, specific conductance, TDS, TOC, sulfate, chloride, sodium and iron), including hydrographs for all monitor wells;
2. Trend analyses of any monitoring parameters consistently detected;
3. Comparisons among shallow, middle, and deep zone wells;
4. Comparisons between background water quality and the water quality in detection and compliance wells;
5. Correlations between related parameters such as total dissolved solids and specific conductance;
6. Discussion of erratic and/or poorly correlated data;
7. An interpretation of the ground water contour maps, including an evaluation of ground water flow rates; and
8. An evaluation of the adequacy of the water quality monitoring frequency and sampling locations based upon site conditions.”

1.3 Report Period

This report is submitted for the five water quality monitoring events from the second semiannual sampling of 2015 (2S15) through the second semiannual sampling of 2017 (2S17). The sampling events performed are as follows:

2S15	October 2015
1S16	April 2016
2S16	October & November 2017
1S17	April & May 2017
2S17	October & November 2017 (and 2 wells sampled in January 2018)

1.4 Water Quality Monitoring Plan

CDM Smith prepared a revised water quality monitoring plan (WQMP) in 2014 for the Class I Landfill. Semiannual monitoring has proceeded in accordance with this WQMP. There are 29 groundwater monitoring wells designated in the WQMP. The wells designated for monitoring background, detection, and compliance, and the aquifer monitored, are as follows:

Background Monitoring Wells	
2MW-1	Surficial Aquifer
2MW-2	Surficial Aquifer
2MW-6	Surficial Aquifer
2MW-27S	Surficial Aquifer
4MW-1	Floridan Aquifer
4MW-2	Floridan Aquifer
4MW-6	Floridan Aquifer
2MW-15AD	Floridan Aquifer
2MW-27D	Floridan Aquifer
4MW-27	Floridan Aquifer
4MW-27D	Floridan Aquifer

Detection Monitoring Wells	
2MW-13D	Surficial Aquifer
2MW-17S	Surficial Aquifer
2MW-24S	Surficial Aquifer
2MW-25S	Surficial Aquifer
2MW-26S	Surficial Aquifer
4MW-11D	Floridan Aquifer
4MW-12D	Floridan Aquifer
4MW-13D	Floridan Aquifer
4MW-14D	Floridan Aquifer
2MW-18D	Floridan Aquifer
2MW-19D	Floridan Aquifer
2MW-24D	Floridan Aquifer
2MW-25D	Floridan Aquifer
2MW-26D	Floridan Aquifer

Compliance Monitoring Wells	
2MW-4	Surficial Aquifer
2MW-5	Surficial Aquifer
4MW-4	Floridan Aquifer
4MW-5	Floridan Aquifer

Figure 1-1 shows locations of all active monitoring wells for the Class I and Class III Landfills at the West Pasco Resource Recovery site. **Table 1-1** is a summary table of well construction details for all active monitoring wells. Groundwater samples are collected by Pasco County Environmental Laboratory Division personnel in accordance with quality assurance requirements specified in Specific Condition E.1 of the Site Certification. Most inorganic laboratory analyses are performed by Pasco County. Organic compounds and some inorganic analytes (metals) are analyzed by a contracted laboratory.

There are no surface water monitoring locations designated at the facility. However, in the event that a discharge to surface water from the facility should occur, samples would be collected in accordance with Specific Condition E.8. There were no discharges to surface water from the facility during the 2S15 through 2S17 report period.

Section 2: Evaluation of Groundwater Elevation Hydrographs and Contour Maps

In accordance with Rule 62-701.510(8)(b), part 7, FAC, this section includes interpretation of the groundwater contour maps and also hydrographs and groundwater flow rates for the 2S15 – 2S17 report period. **Table 2-1** includes groundwater elevations in both Class I and Class III monitoring wells through the 2S15 – 2S17 report period. Hydrographs for the groundwater elevation data are presented in **Figure 2-1**. Contour maps for the surficial aquifer and Floridan aquifer groundwater elevations during the report period are included in **Appendix A**. For the purposes of this report, only the groundwater elevations in Class I monitoring wells are shown in the hydrographs (**Figure 2-1**) and discussed in the following sections.

2.1 Groundwater Elevation Hydrographs

Monitoring well 2MW-4 is screened in sediments that would comprise the surficial aquifer if saturated but remained dry during the report period. Several surficial aquifer monitoring wells (2MW-5, 2MW-13D, 2MW-25S, and 2MW-26S) were reported as "dry" but contained enough water to get an accurate measure of the groundwater elevation for some of the report period events. For these instances they were reported as dry because the wells purged dry prior to sampling due to low levels in the wells and/or very slow recharge or recovery rates. Surficial aquifer wells in which groundwater was present and could be purged and sampled during at least one of the sampling events were monitoring wells 2MW-1, 2MW-2, 2MW-6, 2MW-17S, 2MW-24S, and 2MW-27S.

Monitoring wells 4MW-1, 4MW-2, 4MW-4, 4MW-5, 4MW-6, 4MW-11D, 4MW-12D, 4MW-13D, 4MW-14D, 2MW-15AD, 2MW-18D, 2MW-19D, 2MW-24D, 2MW-25D, 2MW-26D, 2MW-27D, 4MW-27, and 4MW-27D are screened in the Floridan aquifer and were all under saturated conditions during the report period.

Hydrographs presented in **Figure 2-1** show that groundwater elevations fluctuated up to approximately 6 to 7 feet throughout the report period with high elevations during the fall events (October and November) and lower elevations during spring events (April and May). Surficial aquifer elevations are generally consistent with those of the Floridan aquifer, and all wells showed greater fluctuation from dry season to wet season during this report period compared to the 1S13 through 1S15 report period described in the previous WQMPER prepared by CDM Smith.

2.2 Groundwater Elevation Contour Maps

Contour maps for the surficial and Floridan aquifers as measured and reported throughout the 2S15 – 2S17 report period are included in **Appendix A**. Consistent with previous mapping and reporting by CDM Smith, the groundwater flow direction in the surficial aquifer, where present, and the Floridan aquifer was generally from southeast to northwest. Flow directions and gradients appear to be generally consistent with time. The compliance wells to the northwest, 2MW-5 and 4MW-5, appear to have slightly higher elevations for some events which causes a curve in the groundwater contours indicating periodic flow from the west or northwest.

2.3 Groundwater Flow Rate Calculations

The hydraulic gradient for each event and aquifer was estimated using a three-point solution with groundwater level data from the groundwater contour maps. For the surficial aquifer the hydraulic gradients for each event were 0.0020 for the 2S15 event, 0.0021 for the 1S16 event, 0.0035 for the 2S16 event, 0.0033 for the 1S17 event,

and 0.0024 for the 2S17 event. The average gradient for the surficial aquifer calculated for the 2S15 – 2S17 report period was 0.0027.

For the Floridan aquifer the hydraulic gradients for each event were 0.0021 for the 2S15 event, 0.0026 for the 1S16 event, 0.0025 for the 2S16 event, 0.0026 for the 1S17 event, and 0.0019 for the 2S17 event. The average gradient for the Floridan aquifer calculated for the 2S15 – 2S17 report period was 0.0023.

The average horizontal seepage velocities in the surficial and Floridan aquifers were estimated using the two-dimensional form of Darcy's Law below:

$$V_s = (K_h\, i) / n_e$$

where: V_s = Horizontal seepage velocity (feet/day)
K_h = Horizontal hydraulic conductivity (feet/day)
i = Hydraulic gradient
n_e = Effective porosity

The surficial aquifer hydraulic conductivity determined and utilized in previous CDM Smith reports is 8.7 feet/day and the effective porosity is 30 percent (or 0.30). Using these values and the average surficial aquifer hydraulic gradient of 0.0027, the average groundwater flow rate in the surficial aquifer is 0.077 feet/day or 2.32 feet/month.

The Floridan aquifer hydraulic conductivity determined and utilized in previous CDM Smith reports is 9.0 feet/day and the effective porosity is 15 percent (or 0.15). Using these values and the average surficial aquifer hydraulic gradient of 0.0023, the average groundwater flow rate in the surficial aquifer is 0.140 feet/day or 4.20 feet/month.

Section 3: Evaluation of Groundwater Quality Data

In accordance with Rule 62-701.510(8)(b), parts 1 through 6, FAC, this section includes tabular display for detected parameters, trend analyses for parameters consistently detected, comparisons of wells in different zones, comparisons between background and detection/compliance wells, parameter correlations, and discussion of erratic and poorly correlated data for the 2S15 through 2S17 report period.

3.1 Groundwater Quality Parameters Detected

Tables 3-1 through **3-15** provide tabular summaries of monitoring results from the 2S15 through 2S17 report period. These tables are organized by parameter and also sorted by aquifer. The tables also show highlighted values where parameters exceed applicable Primary Drinking Water Standards (PDWS) or Secondary Drinking Water Standards (SDWS) in rule 62-550 FAC, or Groundwater Cleanup Target Levels (GCTL) in rule 62-777 FAC. Concentration versus time graphs are included as **Figures 3-1** through **3-15,** corresponding to the tables, to show graphical displays of parameters that were detected consistently (three times or more) during the 2S15 through 2S17 report period. These graphs are organized to show trends by background versus detection/compliance and also show trends and comparisons amongst wells installed to different zones at the same locations. In addition, the detection wells are grouped for the Ash Monofill (A-1 through A-4) and the MSW Landfill (SW-1 and SW-2).

For most of the parameters plotted in Figures 3-1 through 3-15, all monitoring wells are shown in the graphs. Several parameters (ammonia, nickel, vanadium, and zinc) only had a few monitoring wells with any consistent detections; therefore, only those wells with the consistent detections were plotted. For reference though, all of the monitoring results for the plotted parameters can be seen in Tables 3-1 through 3-15.

Conductivity

Table 3-1 and Figure 3-1 show that conductivity (specific conductance) levels were measured up to approximately 1000 micromhos per centimeter (umhos/cm). The highest levels were measured in the monitoring wells 4MW-1 and 4MW-2 (both Floridan background). Very slight increasing trends are observable in nearly all monitoring wells except some of the background wells appear to be stable through the report period.

pH

Table 3-2 and Figure 3-2 show that measured levels of pH were all within expected ranges with none exceeding the upper limit of 8.5 standard units (SU) and only a few measured below the lower limit of 6.5 SU. Only monitoring wells 2MW-1, 2MW-2, and 2MW-17S (all 3 surficial background), had consistent levels below the 6.5 SU lower limit. As noted, each of these wells are installed into the surficial aquifer where lower levels of pH are not uncommon or unexpected.

Turbidity

Table 3-3 and Figure 3-3 show that turbidity appeared sporadically in monitoring wells with levels up to 63.2 nephalometric turbidity units (NTU) detected in 2MW-1 (surficial background well) during 2S16. In several monitoring wells turbidity was measured at higher levels in the earlier events of the report period (i.e., 2S15 and 1S16) but then measured at lower values in subsequent events.

Chloride

Table 3-4 and Figure 3-4 show that all monitoring wells were well below the 250 mg/L SDWS for chloride with maximum concentrations reaching 137 and 138 milligrams per liter (mg/L) in 4MW-1 (Floridan background well) during 2S16 and 2S17, respectively. The background monitoring wells 2MW-27S, 4MW-1, 4MW-2, and 4MW-27 had the highest consistent levels of chloride. All other wells had chloride concentrations below 100 mg/L.

Total Dissolved Solids

Table 3-5 and Figure 3-5 show that total dissolved solids (TDS) was generally below the SDWS of 500 mg/L in all monitoring wells except 4MW-1 and 4MW-2 (both Floridan background wells). Only 4MW-1 appears to have recurring TDS with any consistency, apparently at times during higher groundwater elevations.

Ammonia

Table 3-6 shows that ammonia was absent or detected at only very low concentrations below the 2.8 mg/L GCTL in single events in all monitoring wells throughout the report period except for 4MW-27D (Floridan background well). Figure 3-6 shows that the level of ammonia in 4MW-27D is consistent and with maximum concentrations of 0.24 and 0.22 mg/L in 1S17 and 2S17, respectively.

Nitrate

Table 3-7 and Figure 3-7 show that nitrate exceeded the PDWS in only two instances: in 2MW-17S (surficial background well) during 2S16, and in 2MW-25D (Floridan detection well) during 2S17. The concentration in 2MW-17S declined in 1S17 but the overall trend could be interpreted as increasing. Monitoring well 2MW-24S also has an increasing trend for the 3 events that samples could be obtained, but this well is still below the PDWS. The detections in all other monitoring wells appear to range from stable to either very slightly decreasing or very slightly increasing trends.

Arsenic

Table 3-8 and Figure 3-8 show that concentrations of arsenic were well below the PDWS of 10 micrograms per liter (ug/L). All arsenic concentrations were at or below 2 ug/L except for a level of 5.8 ug/L in 4MW-5 (Floridan compliance well) during 2S17. Amongst all monitoring wells no discernable trends are evident except that the concentration in 4MW-5 was the only detected arsenic in the two events of 2017—arsenic was not detected in any other wells during 1S17 and 2S17.

Barium

Table 3-9 and Figure 3-9 show that barium was detected at multiple locations but at concentrations far below the 2000 ug/L PDWS. Several monitoring wells had barium measured in the range of 80 to 100 ug/L during 2S15 and then at much lower concentrations through subsequent events (even at concentrations an order of magnitude lower, e.g., in 4MW-2, 4MW-4, 4MW-11D, 4MW-13D).

Copper

Table 3-10 and Figure 3-10 show that copper has only been detected consistently in a few wells. All detections are far below the 1000 ug/L SDWS with a maximum detection of 7.8 ug/L in 2MW-26D (Floridan detection well) during 2S15. Copper is another parameter for which there are a number of higher concentrations during 2S15 which mostly decreased in concentration or were reported as no detection in subsequent events.

Iron

Table 3-11 and Figure 3-11 show that iron, like barium and copper mentioned previously, was generally reported at higher concentrations in 2S15 and 1S16 with the exception of monitoring well 2MW-24S (surficial detection well) during 2S16 which was the highest iron concentration reported for that well for the 5 events. Other high concentrations considered to be sporadic or anomalously high during 1S16 include 2MW-15AD and 2MW-27D (Floridan background wells) and 2MW-24D and 2MW-19D (Floridan detection wells). Otherwise, the overall trends indicate decreasing iron concentrations, perhaps due to improvements in sampling and/or analysis methods. There is little correlation with turbidity though there are some higher turbidity levels for some high iron concentrations, for example turbidity at 33.6 NTU and iron at 374 ug/L in 2MW-15AD during 1S16; turbidity at 54.6 NTU and iron at 925 ug/L in 2MW-19D during 1S16; and turbidity at 60.8 NTU and iron at 3600 ug/L in 2MW-24S during 2S16. However, not all high iron concentrations had correspondingly high turbidity, for example turbidity not detected (0 NTU) and iron at 3630 ug/L in 2MW-24D during 1S16. The exceedances of the SDWS for iron of 300 ug/L are few, all occurring during 1S16 except the aforementioned exceedance in 2S16, and followed by a decline to a concentration well below the SDWS.

Nickel

Table 3-12 and Figure 3-12 show that nickel was detected in only 3 monitoring wells, at consistent concentrations, but at levels well below the PDWS of 100 ug/L. Two of the wells with detections of nickel were 4MW-1 and 2MW-27D (Floridan background wells), and one was 2MW-24S (surficial detection well). The maximum concentration of nickel detected was 19.1 ug/L in 2MW-24S during 1S17.

Sodium

Table 3-13 and Figure 13 show that sodium was detected numerous times at low concentrations below the PDWS of 160 mg/L, with few discernable trends (i.e., relatively stable). Monitoring well 4MW-1 (Floridan background well) shows a slight increasing trend and 2MW-27D and 4MW-27 (Floridan background wells) show slight decreasing trends. All 3 of these wells have a higher sodium concentration (mostly above 40 mg/L) than all other Class I monitoring wells.

Vanadium

Table 3-14 and Figure 3-14 show that vanadium, like nickel, also appeared in 2 background and 1 detection monitoring well. While vanadium concentrations were mostly below detection limits or at low concentrations, there was one exceedance of the 49 ug/L GCTL reported: an exceedance at 100 ug/L in 4MW-27 (Floridan background well) during 2S15. Subsequent concentrations in 4MW-27 were well below the GCTL and there do not appear to be any correlations to the high 2S15 level (e.g., no turbidity).

Zinc

Table 3-15 and Figure 3-15 show that zinc only appeared consistently in monitoring well 2MW-15AD (background Floridan) during first 3 events (2S15 – 2S16), but was below detection limits in the most recent events (1S17 and 2S17). Concentrations were all far below the 5000 ug/L SDWS with a maximum concentration reported in 2MW-26D (Floridan detection well) at 19.0 ug/L during 2S15. Table 3-15 shows that the multiple wells with detections of zinc in 2S15 and 1S16 had no detections in the subsequent 2S16 – 2S17 events.

3.2 Groundwater Quality in Background Monitoring Wells

Background Surficial Aquifer Monitoring Wells

Background monitoring wells in the surficial aquifer with any exceedances of standards or GCTLs include the following:

2MW-1:	pH at 5.82 SU (2S16) and 6.08 SU (2S17)	(SDWS: pH should be between 6.5 – 8.5 SU)
2MW-2:	pH between 4.64 and 5.15 SU (2S16 – 2S17)	
2MW-6:	pH at 5.73 SU (2S17)	
2MW-27S:	iron at 354 ug/L (2S16)	(SDWS = 300 ug/L)

All background surficial aquifer wells were below the 8.5 SU upper limit for pH but several were below the 6.5 lower limit, as might be expected in the surficial aquifer. Higher concentrations of iron occurred during 2S16 and lower concentrations were detected subsequently though 2MW-27S was a dry well for one of the following events.

Background Floridan Aquifer Monitoring Wells

Background monitoring wells in the Floridan aquifer with any exceedances of standards or GCTLs include the following:

4MW-1:	pH at 4.63 SU (2S15)	(SDWS: pH should be between 6.5 – 8.5 SU)
	TDS between 590 and 600 mg/L (2S15 – 2S17)	(SDWS = 500 mg/L)
4MW-2:	pH at 6.48 SU (2S15)	
	TDS at 1502 mg/L (2S15)	
2MW-15AD:	iron at 374 ug/L (1S16)	(SDWS = 300 ug/L)
2MW-27D:	iron at 578 ug/L (1S16)	
4MW-27:	vanadium at 100 ug/L (2S15)	(GCTL = 49 ug/L)
4MW-27D:	pH at 4.42 SU (2S16)	

All background Floridan aquifer wells were below the 8.5 SU upper limit for pH but 3 were below the 6.5 lower limit. Across all monitoring wells, it appears that most of the out-of-range levels for pH (i.e., below 6.5 SU or above 8.5 SU) occur in earlier events for the Floridan aquifer as compared to later events for the surficial aquifer (see Table 3-2). TDS was detected above the SDWS in 4MW-1 and 4MW-2, with the levels in 4MW-1 appearing to correspond to higher groundwater elevations. Iron exceedances in 2MW-15AD and 2MW-27D occurred during 1S16 and iron in these wells was below detection limits during all subsequent events. The exceedance of vanadium in 4MW-27D appears to be a one-time high concentration but the parameter continues to be detected at lower concentrations through 2S17.

3.3 Groundwater Quality in Detection and Compliance Monitoring Wells

Detection and Compliance Surficial Aquifer Monitoring Wells

Detection and compliance monitoring wells in the surficial aquifer with any exceedances of standards or GCTLs include the following:

2MW-6:	pH at 5.73 SU	(SDWS: pH should be between 6.5 – 8.5 SU)
2MW-17S:	pH between 5.88 and 6.29 SU (1S16 – 2S17),	
	nitrate at 11.9 mg/L (2S16)	(PDWS = 10 mg/L)
2MW-24S:	iron 3600 ug/L (2S16)	(SDWS = 300 ug/L)

All detection and compliance surficial aquifer wells were below the 8.5 SU upper limit for pH but several were below the 6.5 lower limit. As stated above, low pH is commonly observed in the surficial aquifer. The PDWS exceedance of nitrate in 2MW-17S was a one-time elevated concentration during 2S16 following which levels fell to below the standard in subsequent events. The high concentration of iron in 2MW-24S during 2S16 appears anomalously high with lower concentrations detected subsequently.

Detection and Compliance Floridan Aquifer Monitoring Wells

Detection and compliance monitoring wells in the Floridan aquifer with any exceedances of standards or GCTLs include the following:

4MW-4:	pH at 6.25 SU (2S15)	(SDWS: pH should be between 6.5 – 8.5 SU)
4MW-11D:	pH at 6.42 SU (2S15)	
4MW-14D:	pH at 6.20 SU (1S16)	
2MW-19D:	iron at 925 ug/L	(SDWS = 300 ug/L)
2MW-24D:	pH at 6.14 SU (1S16), iron at 3630 ug/L	
2MW-25D:	nitrate at 376 mg/L	(PDWS = 10 mg/L)

All detection and compliance Floridan aquifer wells were below the 8.5 SU upper limit for pH but several were below the 6.5 lower limit. Iron detected above the SDWS in 2MW-19D and 2MW-24D were, like the other wells and detections described above, sporadic in earlier events (e.g., 1S16 and 2S16) but at low concentrations or below detection limits in more recent events (e.g., 1S17 and 2S17). Nitrate detected in 2MW-25D at such a high concentration above the PDWS is unexpected and anomalously high compared to preceding less than 1 mg/L concentrations during 2S15 – 1S17. It is expected that this is laboratory error and that the next sampling, occurring within several weeks of submittal of this report, will show a lower concentration.

3.4 Trends and Correlations

Most trends can be observed in Figures 3-1 through 3-15. A summary of trends are as follows:

Conductivity:	Increasing trends are observable in nearly all monitoring wells though some are only slightly increasing, and some of the background wells appear to be stable.
pH:	Mostly stable with some fluctuation. Surficial background well 2MW-2 and surficial detection well 2MW-17S showed a decreasing trend to below 6.5 SU.
Turbidity:	Sporadic with higher concentrations occurring mostly in earlier events, especially 1S16.
Chloride:	Increasing trends in Floridan background well 4MW-1 and Floridan detection well 2MW-25D, but very slight decreasing trends observable in several other background and detection wells. All concentrations are well below the SDWS.
TDS:	Stable to very slight decreasing trends in most of the monitoring wells, except increasing trends in surficial detection well 2MW-17S and Floridan detection wells 2MW-25D and 2MW-26D.
Ammonia:	Very slight increasing trend in Floridan background well 4MW-27D, but concentration is still well below the GCTL.
Nitrate:	Mostly stable to either very slight increasing or slight decreasing trends, all well below the PDWS, except for 2 exceedances noted previously. Surficial detection wells 2MW-17S and 2MW-24S have greater increasing trends, but surficial background well 2MW-2 and Floridan background wells 4MW-1 and 4MW-27 have decreasing trends.
Arsenic:	Sporadic with no real trend as most detections occur during 2S15 through 2S16, except for higher concentration in Floridan compliance well MW-5 during 2S17 which is considered anomalous though still below the PDWS.
Barium:	Mostly stable with a few slightly increasing and a few slightly decreasing trends, except for the anomalously high concentrations noted during 2S15. However, all concentrations are far below the PDWS.

Copper:	Stable to very slightly decreasing trends, all far below the SDWS.
Iron:	Most monitoring wells appear to have decreasing trends aside from, or disregarding, the 1S16 and 2S16 sporadic/anomalous high concentrations in Floridan background wells 2MW-15AD and 2MW-27D, surficial detection well 2MW-24S, and Floridan detection wells and 2MW-24D and 2MW-19D.
Nickel:	Of the 3 wells that detected nickel, Floridan background well 4MW-1 is very slightly increasing, Floridan background well 2MW-27D appears to be stable, and surficial detection well is decreasing. All are well below the PDWS.
Sodium:	Mostly stable, level trends with slightly decreasing trends in Floridan background wells 2MW-27D and 4MW-27. Floridan background well 4MW-1 shows the greatest fluctuation and a very slight increasing trend (conductivity and chloride in this well show a clearly increasing trend but TDS shows a decreasing trend, and all 4 parameters fluctuate to some degree in a manner corresponding to groundwater levels). Sodium in all monitoring wells is well below the PDWS.
Vanadium:	Recently increasing in Floridan background well 4MW-2, decreasing from an exceedance (potentially anomalously high) in Floridan background well 4MW-27, and decreasing to below detection limits in surficial detection well 2MW-24S.
Zinc:	Decreasing trend to below detection limits in Floridan background well 2MW-15AD.

As described above, and as would typically be expected, there are some correlations between sodium, chloride, TDS, and conductivity. There also appears to be a corresponding correlation between these parameters their increasing concentration during events with increasing groundwater elevation. However, based on the concentrations in relation to trends and standards or GCTL this does not appear to be a significant observation for monitoring and compliance at the facility.

Comparisons of monitoring wells in different zones such shallow, middle, deep zones, or in the case of this site the surficial aquifer and different depths within the Floridan aquifer, show that groundwater quality in many of the well clusters track and fluctuate similarly between the zones. However, since the wells at clusters are in different aquifers, or are in different zones of the Floridan aquifer where there are different flow regimes with varying flow velocity and other conditions, not all wells fluctuate and track similarly for all parameters.

A notable correlation which is not water quality related is the tracking of water elevations in monitoring wells in the different zones. All monitoring wells track very closely, and many of the wells have groundwater elevations that a tenth or several tenths of a foot.

3.5 Erratic and Poorly Correlated Data

Across the 5 monitoring events in the 2S15 – 2S17 report period there is an apparent difference between the first 2 events and subsequent 3 events in terms of several of the parameters. Several of the metals have higher detections in the laboratory analyses of the first 2 events than subsequent events, as can be seen in the graphs for barium, copper, and iron (Figures 3-9, 3-10, and 3-11). Since this variation or difference occurred at the beginning of the report period there is a high degree of confidence that groundwater quality is not fluctuating as much as seen in the first 2 events. The differences are likely due to either the different laboratories performing analyses and/or the different analysis methods used through those events (for example, iron analyzed using EPA Method 200.7 versus EPA Method 6010).

Several instances of erratic data occurred during the report period, all apparently isolated and sporadic in occurrence, including those parameters that were detected at single high concentrations with no similar recurrence. All of these are considered to be potential cases of field method or laboratory error or inconsistency. Examples include pH in 4MW-27D (low level) during 2S16, TDS in 4MW-2 during 2S15, TDS (low level) in 2MW-27D during 1S17, nitrate in 2MW-25D during 2S17 (to be confirmed as not recurring), iron in at least 5 instances (different wells) as seen on Figure 3-11, and vanadium in 4MW-27 during 2S15.

Section 4: Conclusions and Adequacy of the Monitoring Frequency and Sampling Locations

4.1 Conclusions

In summary, this report is submitted in accordance with the requirements of 62-701.510(8)(b), F.A.C. as the Water Quality Monitoring Plan Evaluation Report (WQMPER) for the West Pasco Resource Recovery Class Landfill facilities located at 14230 Hayes Road, Spring Hill, Florida. The report period for this WQMPER includes five water quality monitoring events from the second semiannual sampling of 2015 (2S15) through the second semiannual sampling of 2017 (2S17). The monitoring well network consists of a total of 29 wells: 11 surficial aquifer monitoring wells and 18 Floridan aquifer monitoring wells. There are no surface water monitoring locations designated at the facility and during the report period there were no discharges to surface water that would have necessitated sampling.

Conclusions for this WQMPER are as follows:

- Groundwater elevations fluctuated 6 to 7 feet during the report period. The groundwater elevations in all wells tracked consistently and closely from drier to wetter periods, and differences between wells in different aquifers or zones were very small.

- Several monitoring wells were reported as “dry” during the report period which was an indication of either the groundwater level being too low to sample or the level being low combined with extremely low recharge or recovery rate of the wells which prevented adequate sampling.

- Consistent with mapping and reporting prior to the report period, the groundwater flow direction in the surficial aquifer, where present, and the Floridan aquifer were generally from southeast to northwest. Flow directions and gradients appear to be generally consistent with time.

- Compliance monitoring wells to the northwest, 2MW-5 and 4MW-5, appear to have slightly higher elevations for some events which causes a curve in the groundwater contours indicating periodic flow from the west or northwest. These wells do not appear to monitor flow from the landfill cells and do not appear to be necessary to meet monitoring requirements.

- Overall water quality monitoring results during the 2S15 – 2S17 report period was very good. There are no detections which should cause concern for compliance or operations.

- No significant trends in water quality were determined that would require further investigation or evaluation.

- Sporadic and anomalous high concentrations, some above standards or GCTLs, were detected throughout the report period. Most occurred in the first 2 events (2S15 and 1S16) followed by analytical results consistent with previous levels. These data are not interpreted as groundwater quality concerns as subsequent concentrations were all below standards or GCTLs, but are attributed to field or laboratory method errors or inconsistencies. Exceptions to this conclusion include pH in MW-2 and MW-17S which was detected at consistently low levels; however, lower pH is typically expected in surficial aquifer groundwater quality.

- With regards to background water quality monitoring in the Floridan aquifer, well 4MW-27D (the deepest of the 4 well cluster, monitoring at 146 to 156 feet deep) does not appear to be a necessary monitoring point.

4.2 Adequacy of the Monitoring Frequency and Sampling Locations

Monitoring should continue in accordance with the 2014 WQMP revision except that consideration should be given to amending the plan to utilize several wells for groundwater level monitoring only but to preserve the wells in case they are needed for future water quality monitoring. Wells to consider dropping from routine compliance water quality monitoring include:

Well	Current role in WQMP	Justification for Stopping Water Quality Monitoring
4MW-27D	Floridan background well – deepest (146-156 ft deep) of 3 Floridan wells at the same location	Not needed for monitoring Floridan background quality since there are 2 shallower zones monitored in same aquifer at 27-42 and 67-77 ft deep
2MW-4	Surficial compliance well – located approximately 1,000 ft north of the MSW landfill	This well is too far from the MSW cell to adequately monitor as a compliance well and the well is consistently dry
4MW-4	Floridan compliance well – located approximately 600 ft north of the MSW landfill	This well is too far from the MSW cell to adequately monitor as a compliance well
2MW-5	Surficial compliance well – located approximately 1,400 ft west of the MSW landfill and approximately 2,500 north-northwest of the ash monofill	This well is appears to monitor groundwater quality from the west and southwest, the well is too far from the landfill cells to adequately monitor as a compliance well, and the well is consistently dry
4MW-5	Floridan compliance well – located approximately 1,400 ft west of the MSW landfill and approximately 2,500 north-northwest of the ash monofill	This well is too far from the landfill cells to adequately monitor as a compliance well

TABLES

Table 1-1. Construction Summary for Active Class I Landfill Monitoring Wells, West Pasco Resource Recovery

Well I.D.	Well Designation	Location		Ground Elevation (ft, NGVD)	Top of Casing (ft, NGVD)	Riser Height (ft, als)	Screened/Open Hole Section				Total Depth (ft, bls)
		Latitude North	Longitude West				Well Type (dia.)	Length	Depth (ft, bls)	Elevation (ft, NGVD)	
Surficial Aquifer Monitoring Wells											
2MW-1	Background	28 22' 05.8"	82 33' 48.1"	46.7	49.95	3.25	Screened (2")	10	8.5 - 18.5	38.2 - 28.2	18.5
2MW-2	Background	28 22' 12.3"	82 33' 11.9"	52.8	56.41	3.61	Screened (2")	5	29.5 - 34.5	23.3 - 18.3	34.5
2MW-4	Compliance	28 22' 57.7"	82 33' 31.4"	51.3	54.77	3.47	Screened (2")	5	10.5 - 15.5	40.8 - 35.8	15.5
2MW-5	Compliance	28 22' 46.7"	82 33' 52.2"	45.3	49.17	3.87	Screened (2")	4	4.0 - 8.0	41.3 - 37.3	8.0
2MW-6	Background	28 22' 32.7"	82 33' 11.1"	53.0	56.11	3.11	Screened (2")	10	20.0 - 30.0	33.0 - 23.0	30.0
2MW-13D	Detection	28 22' 27.2"	82 33' 38.7"	49.1	52.39	3.29	Screened (2")	9.5	7.8 - 17.3	41.3 - 31.8	18.0
2MW-17S	Detection	28 22' 47.8"	82 33' 30.5"	53.8	53.42	-0.38	Screened (2")	15	23.0 - 38.0	30.8 - 15.8	41.0
2MW-24S	Detection	28 22' 21.6"	82 33' 43.4"	47.4	50.37	2.97	Screened (2")	15	11.0 - 26.0	36.4 - 26.4	26.0
2MW-25S	Detection	28 22' 21.7"	82 33' 49.7"	45.3	47.84	2.57	Screened (2")	10	4.5 - 14.5	40.8 - 30.8	14.5
2MW-26S	Detection	28 22' 18.8"	82 33' 52.7"	51.1	54.16	3.06	Screened (2")	10	10.0 - 20.0	41.1 - 31.1	20.0
2MW-27S	Background	28 22' 12.8"	82 33' 47.4"	47.5	50.44	2.94	Screened (2")	10	8.0 - 18.0	39.5 - 29.5	18.0
Floridan Aquifer Monitoring Wells											
4MW-1	Background	28 22' 05.5"	82 33' 48.1"	46.5	50.34	3.84	Screened (2")	28	32.0 - 60.0	14.5 - -13.5	60.0
4MW-2	Background	28 22' 12.2"	82 33' 11.9"	53.0	56.11	3.11	Screened (2")	28	42.0 - 70.0	11.0 - -17.0	70.0
4MW-4	Compliance	28 22' 52.5"	82 33' 30.3"	48.1	50.81	2.71	Screened (2")	28	22.0 - 50.0	26.1 - 0.5	50.0
4MW-5	Compliance	28 22' 47.2"	82 33' 53.4"	45.4	49.06	3.66	Screened (2")	32	68.0 - 100.0	-22.6 - -54.6	100.0
4MW-6	Background	28 22' 32.7"	82 33' 11.3"	52.4	55.93	3.53	Screened (2")	27	73.0 - 100.0	-20.6 - -47.6	100.0
4MW-11D	Detection	28 22' 27.5"	82 33' 28.5"	61.9	65.00	3.10	Screened (2")	25	27.0 - 52.0	34.9 - 9.9	52.0
4MW-12D	Detection	28 22' 27.4"	82 33' 33.9"	51.8	55.03	3.23	Screened (2")	25	30.0 - 55.0	21.8 - -3.2	55.0
4MW-13D	Detection	28 22' 27.3"	82 33' 38.1"	51.2	54.04	2.84	Screened (2")	10	26.0 - 36.0	25.2 - 15.2	36.0
4MW-14D	Detection	28 22' 22.8"	82 33' 39.0"	49.0	52.00	3.00	Screened (2")	25	25.0 - 50.0	24.0 - -1.0	50.0
2MW-15AD	Background	28 22' 22.6"	82 33' 32.1"	51.9	54.71	2.85	Screened (2")	10	34.0 - 44.0	17.9 - 7.9	44.0
2MW-18D	Detection	28 22' 47.2"	82 33' 36.1"	50.0	52.75	2.75	Screened (2")	15	25.0 - 40.0	25.0 - 10.0	40.0
2MW-19D	Detection	28 22' 39.0"	82 33' 37.3"	50.0	52.25	2.23	Screened (2")	10	45.0 - 55.0	5.5 - -5.0	55.0
2MW-24D	Detection	28 22' 21.6"	82 33' 43.4"	47.4	50.55	3.15	Screened (2")	10	34.0 - 44.0	13.4 - 3.4	44.0
2MW-25D	Detection	28 22' 21.7"	82 33' 49.5"	45.2	47.87	2.67	Screened (2")	15	17.0 - 32.0	28.2 - 13.2	32.0
2MW-26D	Detection	28 22' 18.9"	82 33' 52.7"	51.2	54.13	2.93	Screened (2")	10	42.0 - 52.0	9.2 - -0.8	52.0
2MW-27D	Background	28 22' 12.7"	82 33' 47.3"	47.2	50.32	3.12	Screened (2")	15	27.0 - 42.0	20.2 - 5.2	42.0
4MW-27	Background	28 22' 12.8"	82 33' 46.9"	46.8	49.60	2.80	Openhole (4" csg)	10	67.0 - 77.0	-20.2 - - 30.2	77.0
4MW-27D	Background	28 22' 12.8"	82 33' 47.1"	46.3	49.28	3.01	Openhole (4" csg)	10	146.0 - 156.0	-99.7 - -100.7	156.0

NOTES:

NGVD National Geodetic Vertical Datum of 1929

als Above land surface

bls Below land surface

dia. Diameter

Table 2-1. Groundwater Elevations in Class I and Class III Monitoring Wells, October 2015 to October 2017, West Pasco Resource Recovery

Monitoring Wells	Groundwater Elevations (Feet, NGVD)				
	2 S 15 Oct-15	1 S 16 Apr-16	2 S 16 Oct-16	1 S 17 Apr-17	2 S 17 Oct-17
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	Dry	Dry	36.00	30.91*	36.95
2MW-2	37.93	34.70	38.06	32.36	38.49
2MW-4	Dry	Dry	Dry	Dry	Dry
2MW-5	Dry	Dry	38.62*	Dry	38.96*
2MW-6	Dry	Dry	34.31*	Dry	35.07
2MW-13D	Dry	Dry	Dry	Dry	33.29*
2MW-17S	32.32	26.93	29.92	24.12	31.04
2MW-24S	34.20*	29.72*	32.77	27.05	33.86
2MW-25S	34.34*	Dry	32.92*	Dry	33.88*
2MW-26S	Dry	Dry	33.28*	Dry	34.24*
2MW-27S	Dry	Dry	34.56	28.94*	35.44
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	36.79	33.59	36.14	31.12	37.00
4MW-2	37.84	34.13	37.45	31.60	37.93
4MW-4	32.25	27.21	29.88	24.07	30.97
4MW-5	33.09	27.86	30.71	24.93	31.83
4MW-6	36.11	31.67	34.75	29.35	35.46
4MW-11D	35.16	30.83	33.78	27.74	34.66
4MW-12D	34.32	29.98	32.67	26.93	33.70
4MW-13D	33.86	29.45	32.26	26.55	33.16
4MW-14D	34.66	30.04	33.10	27.40	34.03
2MW-15AD	36.52	33.23	36.06	30.16	36.89
2MW-18D	31.87	27.15	29.80	24.19	30.89
2MW-19D	32.50	27.88	30.57	24.81	31.65
2MW-24D	34.11	29.75	32.75	27.06	33.67
2MW-25D	34.26	29.97	32.89	27.32	33.80
2MW-26D	34.49	30.39	32.28	27.72	34.17
2MW-27D	35.38	31.86	34.62	29.11	35.40
4MW-27	35.46	31.76	34.62	29.20	35.50
4MW-27D	35.49	31.75	34.63	29.23	35.45
Class III Landfill Surficial Aquifer Monitoring Wells[+]					
2MW-3A	Dry	Dry	Dry	Dry	Dry
2MW-7	Dry	Dry	Dry	Dry	Dry
2MW-8	Dry	Dry	34.65*	Dry	34.67*
2MW-9	Dry	Dry	40.14*	Dry	Dry
2MW-10	Dry	Dry	Dry	Dry	Dry
Class III Landfill Floridan Aquifer Monitoring Wells[+]					
4MW-3A	32.82	28.15	Dry	25.54	31.99
4MW-7	34.34	30.04	32.83	27.52	33.84
4MW-8	34.42	30.02	32.57	27.42	33.77
4MW-9	33.41	28.74	31.48	25.96	32.57
4MW-21	34.12	29.45*	32.68	26.98	33.64
4MW-22	33.23	28.95	31.46	25.94	32.34

NOTES:

Datum: National Geodetic Vertical Datum of 1929 (NGVD 29).

* : Groundwater elevation appears representative but reported as purging dry during sampling due to low level in well or very slow recharge/recovery, and consequently not sampled.

[+] : Class III landfill groundwater elevations included only for reference with respect to to groundwater groundwater elevation contour maps included in Apprendix B.

Table 3-1. Conductivity Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Conductivity reported in umhos/cm				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	86	-	32
2MW-2	98	181	94	113	90
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	84
2MW-13D	-	-	-	-	-
2MW-17S	149	243	385	385	309
2MW-24S	-	-	422	422	522
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	780	-	761
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	745	741	982	667	964
4MW-2	188	203	223	216	212
4MW-4	377	284	429	431	433
4MW-5	472	354	609	568	597
4MW-6	127	182	155	140	154
4MW-11D	339	186	390	319	372
4MW-12D	358	299	449	410	416
4MW-13D	358	304	465	418	445
4MW-14D	344	314	408	366	412
2MW-15AD	236	241	312	253	336
2MW-18D	399	300	516	477	508
2MW-19D	400	596	479	479	512
2MW-24D	450	456	546	541	526
2MW-25D	373	544	731	731	734
2MW-26D	318	442	585	623	591
2MW-27D	538	341	758	787	771
4MW-27	531	248	682	667	689
4MW-27D	301	337	278	279	276

All results in the table are in micromhos per centimeter (umhos/cm)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	There is no standard or Groundwater Cleanup Target Level (GCTL) for this parameter
umhos/cm	Micromhos per centimeter
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-2. pH in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - pH reported in Standard Units				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	5.82	-	6.08
2MW-2	6.78	7.78	5.15	4.64	4.69
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	5.73
2MW-13D	-	-	-	-	-
2MW-17S	6.73	6.29	5.88	5.88	6.00
2MW-24S	-	-	6.64	6.64	6.64
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	6.81	-	6.92
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	4.63	6.94	7.02	7.27	6.77
4MW-2	6.48	7.85	7.00	7.74	7.68
4MW-4	6.25	7.29	7.11	7.24	7.24
4MW-5	7.76	7.46	7.04	7.14	7.22
4MW-6	6.85	7.53	7.86	8.00	7.13
4MW-11D	6.42	7.38	7.33	7.32	7.46
4MW-12D	7.40	7.40	7.32	7.32	7.25
4MW-13D	7.01	7.54	7.44	7.21	7.24
4MW-14D	6.90	6.20	7.19	7.41	7.21
2MW-15AD	6.71	7.74	7.39	7.61	7.31
2MW-18D	7.00	7.01	7.06	7.08	7.11
2MW-19D	7.03	6.71	7.06	7.06	6.98
2MW-24D	7.65	6.14	7.27	7.35	7.44
2MW-25D	7.33	7.03	7.11	7.17	7.04
2MW-26D	7.36	7.16	7.22	7.28	7.12
2MW-27D	7.39	7.59	7.16	7.41	7.31
4MW-27	6.86	7.81	7.32	7.33	7.24
4MW-27D	6.51	7.72	4.42	7.76	7.58

All results in the table are in Standard Units (SU)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
Upper limit = 8.5 Lower limit = 6.5	Concentration is outside of upper or lower limits for the Secondary Drinking Water Standard (SDWS) in rule 62-550,
SU	Standard Units
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-3. Turbidity Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Turbidity reported in NTU				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	63.2	-	42.6
2MW-2	0.0	4.2	0.768	0.0	0.1
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	4.3
2MW-13D	-	-	-	-	-
2MW-17S	3.4	24.6	1.28	1.5	1.2
2MW-24S	-	-	60.8	60.8	4.1
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	1.67	-	0.3
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	0.0	1.4	0.06	0.0	0.3
4MW-2	0.0	1.8	0.143	0.0	0.1
4MW-4	1.2	0.0	0.95	0.0	0.0
4MW-5	0.0	0.0	0.32	0.0	0.4
4MW-6	0.0	0.8	0.37	0.0	0.0
4MW-11D	10.8	0.0	0.67	0.2	0.5
4MW-12D	0.0	0.0	0.5	0.0	0.1
4MW-13D	0.0	0.0	0.49	0.2	0.2
4MW-14D	1.3	0.0	0.56	2.4	2.6
2MW-15AD	0.0	33.6	1.2	10.6	0.9
2MW-18D	5.5	2.4	1.77	1.5	1.6
2MW-19D	1.8	54.6	1.04	1.04	2.6
2MW-24D	0.0	0.0	0.2	0.0	0.1
2MW-25D	0.0	17.4	0.75	0.0	2.4
2MW-26D	0.0	10.2	0.28	0.0	0.5
2MW-27D	0.0	10.7	0.99	1.9	2.7
4MW-27	0.0	0.0	0.199	0.5	1.9
4MW-27D	0.0	0.5	3.03	53.6	32.7

All results in the table are in nephalometric turbidity units (NTU)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	There is no standard or Groundwater Cleanup Target Level (GCTL) for this parameter
NTU	Nephalometric turbidity units
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-4. Chloride Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Chloride reported in mg/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	1.55	-	1.51
2MW-2	7.18	8.42	5.3	6.25	6.89
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	11
2MW-13D	-	-	-	-	-
2MW-17S	2.66	13.5	40.3	88.9	32.3
2MW-24S	-	-	17.9	33.7	7.89
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	82	-	90
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	52.7	112	137	88.5	138
4MW-2	11.2	5.7	5.5	5.91	5.84
4MW-4	17.6	16.6	16.6	17	19.2
4MW-5	56.6	126	64	64.5	64.4
4MW-6	4.37	4.51	4.4	4.68	4.61
4MW-11D	37.1	26.4	25.7	17.4	21.5
4MW-12D	30.6	34.1	29.3	45.7	22
4MW-13D	24.4	23.4	21.3	21.2	20.4
4MW-14D	26.7	26.4	23.5	22.8	23.5
2MW-15AD	8.86	9.23	9.2	6.77	11.5
2MW-18D	32.8	31.9	30.2	34.1	31.9
2MW-19D	19.3	45.4	20.1	25.6	18.8
2MW-24D	59.8	55.4	46.4	64.8	48.1
2MW-25D	23.6	87	77.1	82.7	87.4
2MW-26D	52.7	60	52.2	64.8	55.8
2MW-27D	115	120	106	111	104
4MW-27	122	107	92.8	89.9	102
4MW-27D	4.93	5.13	8.57	5	5.27

All results in the table are in milligrams per liter (mg/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Secondary Drinking Water Standard (SDWS) in rule 62-550, SDWS for Chloride is 250 mg/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-5. Total Dissolved Solids Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - TDS reported in mg/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	78	-	52
2MW-2	72	86	112	80	60
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	68
2MW-13D	-	-	-	-	-
2MW-17S	104	130	298	326	252
2MW-24S	-	-	272	242	288
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	484	-	460
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	590	478	600	430	580
4MW-2	1502	134	172	122	116
4MW-4	252	248	238	246	243
4MW-5	368	372	368	390	356
4MW-6	94	84	82	84	80
4MW-11D	236	214	234	200	202
4MW-12D	252	250	266	264	228
4MW-13D	262	262	266	252	246
4MW-14D	244	334	238	226	226
2MW-15AD	180	172	162	148	182
2MW-18D	286	308	292	290	288
2MW-19D	262	278	252	266	258
2MW-24D	326	236	328	328	310
2MW-25D	268	436	450	454	416
2MW-26D	226	338	346	368	324
2MW-27D	370	480	452	158	448
4MW-27	356	444	392	414	400
4MW-27D	148	154	148	158	156

All results in the table are in milligrams per liter (mg/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Secondary Drinking Water Standard (SDWS) in rule 62-550, SDWS for TDS is 500 mg/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-6. Ammonia Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Ammonia reported in mg/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	0.07 U	-	0.05 U
2MW-2	0.04 U	0.04 U	0.07 U	0.07 U	0.05 U
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	0.05 U
2MW-13D	-	-	-	-	-
2MW-17S	0.04 U	0.14 I	0.07 U	0.07 U	0.05 U
2MW-24S	-	-	0.07 U	0.07 U	0.05 U
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	0.07 U	-	0.05 U
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	0.04 U	0.04 U	0.07 U	0.07 U	0.05 U
4MW-2	0.04 U	0.04 U	0.07 U	0.07 U	0.13 I
4MW-4	0.04 U	0.04 U	0.07 U	0.07 U	0.05 U
4MW-5	0.04 U	0.04 U	0.07 U	0.07 U	0.05 U
4MW-6	0.04 U	0.17 I	0.07 U	0.07 U	0.05 U
4MW-11D	0.04 U	0.04 U	0.07 U	0.07 U	0.05 U
4MW-12D	0.04 U	0.04 U	0.07 U	0.07 U	0.05 U
4MW-13D	0.04 U	0.04 I	0.07 U	0.07 U	0.05 U
4MW-14D	0.04 U	0.04 U	0.07 U	0.07 U	0.05 U
2MW-15AD	0.04 U	0.05 I	0.07 U	0.07 U	0.05 U
2MW-18D	0.04 U	0.04 I	0.07 U	0.07 U	0.05 U
2MW-19D	0.04 U	0.04 U	0.07 U	0.07 U	0.05 U
2MW-24D	0.04 U	0.11 I	0.07 U	0.07 U	0.05 U
2MW-25D	0.04 U	0.05 I	0.07 U	0.07 U	0.05 U
2MW-26D	0.04 U	0.05 I	0.07 U	0.07 U	0.05 U
2MW-27D	0.04 U	0.04 I	0.07 U	0.07 U	0.05 U
4MW-27	0.04 U	0.05 I	0.07 U	0.07 U	0.07 I
4MW-27D	0.04 U	0.2 I	0.18 I	0.24	0.22

All results in the table are in milligrams per liter (mg/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Groundwater Cleanup Target Level (GCTL) in rule 62-777, GCTL for Ammonia is 2.8 mg/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-7. Nitrate Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Nitrate reported in mg/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	0.11	-	0.04 U
2MW-2	6.26	5.09	4.21	5.76	3.70
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	2.56
2MW-13D	-	-	-	-	-
2MW-17S	3.60	4.13	11.9	2.62	6.59
2MW-24S	-	-	3.33	3.57	5.96
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	0.50	-	0.93
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	1.70	1.21	1.82	0.52 J	1.64
4MW-2	1.03	1.11	1.08	1.03	0.82
4MW-4	0.32	0.36	0.39	0.39	0.44
4MW-5	0.73	0.73	0.71	0.76	0.57
4MW-6	0.58	0.60	0.57	0.56	0.46
4MW-11D	0.78	0.59	0.58	0.45	0.62
4MW-12D	0.69	0.78	0.57	0.63	0.89
4MW-13D	0.07 I	0.05 I	0.03 U	0.03 U,J	0.04 U
4MW-14D	0.69	0.60	0.53	0.56 J	0.54
2MW-15AD	0.47	0.18	0.19	0.03 U,J	0.20 I
2MW-18D	0.50	0.50	0.84	0.93	0.82
2MW-19D	0.31	0.21	0.65	0.41	0.36
2MW-24D	1.56	1.62	1.51	1.61	1.73
2MW-25D	0.27	0.98	0.72	0.91	376
2MW-26D	0.55	0.32	0.33	0.24	0.46
2MW-27D	1.21	1.35	1.37	1.35	1.41
4MW-27	0.97	0.54	0.39	0.33	0.20
4MW-27D	0.12 I	0.03 I	0.03 U	0.04 U	0.04 U

All results in the table are in milligrams per liter (mg/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Primary Drinking Water Standard (PDWS) in rule 62-550, PDWS for Nitrate is 10 mg/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-8. Arsenic Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Arsenic reported in ug/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	0.5 U	-	5.0 U
2MW-2	9.9 U	0.93 U	0.5 U	5.0 U	5.0 U
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	5.0 U
2MW-13D	-	-	-	-	-
2MW-17S	9.9 U	0.93 U	5.0 U	5.0 U	5.0 U
2MW-24S			1.2	5.0 U	5.0 U
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	5.0 U	-	5.0 U
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	9.9 U	0.93 U	0.5 U	5.0 U	5.0 U
4MW-2	9.9 U	0.93 U	0.97 I	5.0 U	5.0 U
4MW-4	9.9 U	0.93 U	5.0 U	5.0 U	5.0 U
4MW-5	9.9 U	1.3 I	5.0 U	5.0 U	5.8 I
4MW-6	9.9 U	0.93 U	5.0 U	5.0 U	5.0 U
4MW-11D	9.9 U	0.93 U	0.68 I	5.0 U	5.0 U
4MW-12D	9.9 U	0.96 I	0.62 I	5.0 U	5.0 U
4MW-13D	9.9 U	0.93 U	0.5 U	5.0 U	5.0 U
4MW-14D	9.9 U	0.93 U	0.52 I	5.0 U	5.0 U
2MW-15AD	9.9 U	2.0 I	5.0 U	5.0 U	5.0 U
2MW-18D	9.9 U	0.93 U	5.0 U	5.0 U	5.0 U
2MW-19D	9.9 U	0.93 U	5.0 U	5.0 U	5.0 U
2MW-24D	9.9 U	0.93 U	0.5 U	5.0 U	5.0 U
2MW-25D	9.9 U	1.3 I	0.56 I	5.0 U	5.0 U
2MW-26D	9.9 U	1.0 I	0.77 I	5.0 U	5.0 U
2MW-27D	9.9 U	1.0 I	5.0 U	5.0 U	5.0 U
4MW-27	9.9 U	1.2 I	5.0 U	5.0 U	5.0 U
4MW-27D	9.9 U	0.93 U	5.0 U	5.0 U	5.0 U

All results in the table are in micrograms per liter (ug/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Primary Drinking Water Standard (PDWS) in rule 62-550, PDWS for Arsenic is 10 ug/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-9. Barium Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Barium reported in ug/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	8.1 I	-	5.0 U
2MW-2	56 I	55 I	50.2	56.4	41.5
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	20.9
2MW-13D	-	-	-	-	-
2MW-17S	84 I	15 I	15.8	23.8	14.6
2MW-24S	-	-	34.9	25.4	27.9
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	35.9	-	32.3
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	35 I	32 I	37.9	26.2	36.4
4MW-2	73 I	7.4 I	25.0 U	6.6 I	7.4 I
4MW-4	92 I	9.5 I	8.6 J	8.6 I	8.4 I
4MW-5	11 I	12 I	10.6	11.4	10.7
4MW-6	5 U	6.3 I	5.0 U	7.0 I	5.7 I
4MW-11D	85 I	7.7 I	7.8 I	7.5 I	8.1 I
4MW-12D	8 I	7.4 I	7.8 I	7.7 I	8.0 I
4MW-13D	94 I	8.6 I	8.7 I	8.9 I	8.8 I
4MW-14D	12 I	12 I	11.1	10.8	11.4
2MW-15AD	11 I	17 I	9.7 J	8.5 I	11.3
2MW-18D	98 I	11 I	10.3	10.5	10.2
2MW-19D	10 I	13 I	9.8 J	9.3 I	10.7
2MW-24D	18 I	17 I	15.9	16.7	18.6
2MW-25D	17 I	26 I	22.2	25.0	26.0
2MW-26D	15 I	21 I	17.1	19.5	17.8
2MW-27D	21 I	36 I	28.0	30.7	29.9
4MW-27	31 I	23 I	20.9	22.2	21.2
4MW-27D	10 I	12 I	10.5	12.7	10.7

All results in the table are in micrograms per liter (ug/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Primary Drinking Water Standard (PDWS) in rule 62-550, PDWS for Barium is 2000 ug/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-10. Copper Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Copper reported in ug/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	2.5 U	-	2.5 U
2MW-2	3.5 I	4.1	5.7	3.9 I	2.5 U
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	2.5 U
2MW-13D	-	-	-	-	-
2MW-17S	3.5 I	0.9	2.5 U	2.5 U	5.1
2MW-24S	-	-	3.4 I	2.5 U	2.5 U
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	2.5 U	-	2.6 I
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	3 U	0.5	2.5 U	2.5 U	2.5 U
4MW-2	3 U	0.13 U	12.5 U	2.5 U	2.5 U
4MW-4	3.1 I	0.38 I	2.5 U	2.5 U	2.5 U
4MW-5	3.8 I	0.13 U	4.5 I	2.5 U	2.8 I
4MW-6	3 U	0.13 U	2.5 U	2.5 U	2.5 U
4MW-11D	3 U	0.17 I	2.5 U	2.5 U	2.5 U
4MW-12D	3 U	0.13 U	2.5 U	2.5 U	2.5 U
4MW-13D	4.6 I	0.15 I	2.5 U	2.5 U	2.5 U
4MW-14D	3 U	0.13 U	2.5 U	2.5 U	2.5 U
2MW-15AD	4 I	0.89	2.5 U	2.5 U	2.5 U
2MW-18D	3 U	0.14 I	2.5 U	2.5 U	2.5 U
2MW-19D	3 U	1.3	2.5 U	2.5 U	2.5 U
2MW-24D	4.1 I	0.13 U	2.5 U	2.5 U	2.5 U
2MW-25D	4.4 I	0.39 I	2.5 U	2.5 U	2.5 U
2MW-26D	7.8 I	0.57	2.5 U	2.5 U	2.5 U
2MW-27D	3.8 I	0.71	2.5 U	2.5 U	2.5 U
4MW-27	3.8 I	0.39 I	2.5 U	2.5 U	2.6 I
4MW-27D	3.1 I	0.15 I	2.5 U	2.9 I	2.5 U

All results in the table are in micrograms per liter (ug/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Secondary Drinking Water Standard (SDWS) in rule 62-550, SDWS for Copper is 1000 ug/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-11. Iron Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Iron reported in ug/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	182	-	50.9
2MW-2	115	124	26.2 I	33.6 I	20.0 U
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	39.9 I
2MW-13D	-	-	-	-	-
2MW-17S	43.5	132	20.0 U	20.0 U	20.0 U
2MW-24S	-	-	3600	220	45.1
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	354	-	295
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	2 U	2.9 I	20.0 U	20.0 U	20.0 U
4MW-2	5.6 I	3.5 I	100 U	20.0 U	20.0 U
4MW-4	24.3	36.3	20.0 U	20.0 U	20.0 U
4MW-5	43.2	76.9	20.0 U	20.0 U	20.0 U
4MW-6	3.7 I	3.1 I	20.0 U	20.0 U	20.0 U
4MW-11D	55.9	70.5	20.0 U	20.0 U	20.0 U
4MW-12D	3.8 I	5.1 I	20.0 U	20.0 U	20.0 U
4MW-13D	9.1 I	18.0	20.0 U	20.0 U	20.0 U
4MW-14D	163	114	40.7	24.8 I	23.7 I
2MW-15AD	13.5	374	28.7 J	20.0 U	20.0 U
2MW-18D	6.8 I	50.1	20.0 U	20.0 U	20.0 U
2MW-19D	49.3	925	20.0 U	20.0 U	20.0 U
2MW-24D	2.4 I	3630	20.0 U	20.0 U	20.0 U
2MW-25D	14.1	170	20.0 U	51.6	28.0 I
2MW-26D	6.7 I	143	20.0 U	20.0 U	20.0 U
2MW-27D	5.4 I	578	20.0 U	20.0 U	20.0 U
4MW-27	3.5 I	37.9	57.6	71.8	73.5
4MW-27D	24.1	63.8	74.7	91.3	67.8

All results in the table are in micrograms per liter (ug/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Secondary Drinking Water Standard (SDWS) in rule 62-550, SDWS for Iron is 300 ug/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-12. Nickel Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Nickel reported in ug/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	2.5 U	-	2.5 U
2MW-2	1.2 U	0.93 I	2.5 U	2.5 U	2.5 U
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	2.5 U
2MW-13D	-	-	-	-	-
2MW-17S	1.2 U	1.5 I	2.5 U	2.5 U	2.5 U
2MW-24S			13.9	19.1	2.8 I
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	2.5 U	-	3.0 I
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	1.2 U	7.6	5 I	3.3 I	4.5 I
4MW-2	1.2 U	1.3 I	2.5 U	2.5 U	2.5 U
4MW-4	1.2 U	3.5 I	2.5 U	2.5 U	2.5 U
4MW-5	1.2 U	4.2 I	2.5 U	2.5 U	2.5 U
4MW-6	1.2 U	0.83 I	2.5 U	2.5 U	2.5 U
4MW-11D	1.2 U	2.4 I	2.5 U	2.5 U	2.5 U
4MW-12D	1.2 U	2.6 I	2.5 U	2.5 U	2.5 U
4MW-13D	1.2 U	3.8 I	2.5 U	2.5 U	2.5 U
4MW-14D	1.2 U	3.6 I	2.5 U	2.5 U	2.5 U
2MW-15AD	1.2 U	3.9 I	2.5 U	2.5 U	2.5 U
2MW-18D	1.2 U	3.5 I	2.5 U	2.5 U	2.5 U
2MW-19D	1.2 U	5.3	2.5 U	2.5 U	2.5 U
2MW-24D	1.2 U	4.1 I	2.5 U	2.5 U	2.8 I
2MW-25D	1.2 U	6.4	2.5 U	na	2.7 I
2MW-26D	1.2 U	4.7 I	2.5 U	2.5 U	2.5 U
2MW-27D	2.8 I	7.2	2.5 J	3.4 I	3.4 I
4MW-27	1.2 U	5.0	2.5 U	2.5 U	3.6 I
4MW-27D	1.2 U	1.5 I	2.5 U	2.5 U	2.5 U

All results in the table are in micrograms per liter (ug/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Primary Drinking Water Standard (PDWS) in rule 62-550, PDWS for Nickel is 100 ug/L
na	Not analyzed
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-13. Sodium Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Sodium reported in mg/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	1.6	-	1.2
2MW-2	4.06	3.64	3.1	3.3	3.4
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	2.0
2MW-13D	-	-	-	-	-
2MW-17S	1.68	2.38	7.9	8.3	4.8
2MW-24S	-	-	5.3	11.6	6.4
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	42.5	-	38.1
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	55.5	53.9	71.0	47.5	66.7
4MW-2	2.9	2.84	2.6	2.5	2.9
4MW-4	5.7	7.36	5.8	5.4	5.4
4MW-5	24.2	26.8	26.9	26.7	23.7
4MW-6	2.53	2.56	3.2	2.7	2.4
4MW-11D	9.98	7.96	9.2	6.7	7.3
4MW-12D	7.42	7.77	10.0	8.4	8.2
4MW-13D	9.85	9.25	10.5	9.5	9.6
4MW-14D	11.3	12.2	12.3	10.8	10.8
2MW-15AD	4.22	4.37	4.6	3.3	5.4
2MW-18D	10.9	10.7	24.4	11.3	11.7
2MW-19D	6.86	6.48	8.2	7.8	8.0
2MW-24D	25.6	25.5	25.6	23.4	25.6
2MW-25D	10.2	40.0	39.3	40.6	40.5
2MW-26D	33.9	27.6	27.9	29.9	27.8
2MW-27D	66.9	50.6	53.6	55.5	50.3
4MW-27	50.7	39.9	41.3	41.3	38.2
4MW-27D	6.95	3.48	3.8	3.2	3.0

All results in the table are in milligrams per liter (mg/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Primary Drinking Water Standard (PDWS) in rule 62-550, PDWS for Sodium is 160 mg/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

Table 3-14. Vanadium Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Vanadium reported in ug/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	5.0 U	-	5.0 U
2MW-2	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	5.0 U
2MW-13D	-	-	-	-	-
2MW-17S	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
2MW-24S	-	-	21.9	26.6	5.0 U
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	5.0 U	-	5.0 U
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
4MW-2	7.8 U	7.8 U	5.0 U	5.1 I	5.4 I
4MW-4	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
4MW-5	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
4MW-6	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
4MW-11D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
4MW-12D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
4MW-13D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
4MW-14D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
2MW-15AD	7.8 U	8.0 I	5.0 U	5.0 U	5.0 U
2MW-18D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
2MW-19D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
2MW-24D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
2MW-25D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
2MW-26D	11.0	7.8 U	5.0 U	5.0 U	5.0 U
2MW-27D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U
4MW-27	100	19.0	12.4	10.2	11.4
4MW-27D	7.8 U	7.8 U	5.0 U	5.0 U	5.0 U

All results in the table are in micrograms per liter (ug/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Groundwater Cleanup Target Level (GCTL) in rule 62-777, GCTL for Vanadium is 49 ug/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

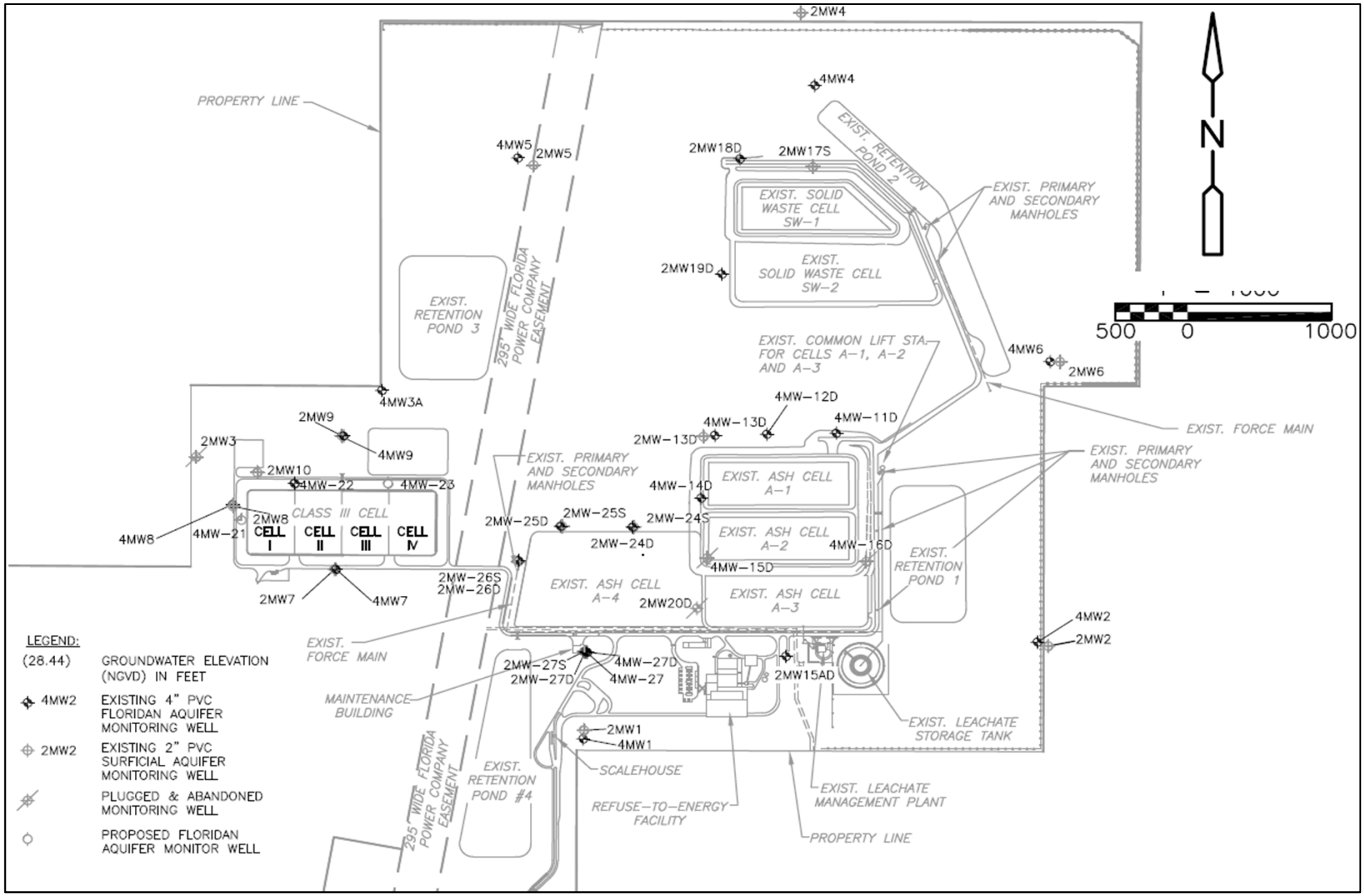
Table 3-15. Zinc Concentrations in Class I Landfill Monitoring Wells, 2S15 through 2S17, West Pasco Resource Recovery

	Groundwater Quality Results - Zinc reported in ug/L				
	2S15	**1S16**	**2S16**	**1S17**	**2S17**
Class I Landfill Surficial Aquifer Monitoring Wells					
2MW-1	-	-	12.5 I	-	10.0 U
2MW-2	4.2 I	8.5	10.0 U	10.0 U	10.0 U
2MW-4	-	-	-	-	-
2MW-5	-	-	-	-	-
2MW-6	-	-	-	-	10.0 U
2MW-13D	-	-	-	-	-
2MW-17S	3.0 U	2.5 I	10.0 U	10.0 U	10.0 U
2MW-24S	-	-	11.3 I	10.0 U	10.0 U
2MW-25S	-	-	-	-	-
2MW-26S	-	-	-	-	-
2MW-27S	-	-	10.0 U	-	10.0 U
Class I Landfill Floridan Aquifer Monitoring Wells					
4MW-1	3.0 U	0.88 U	10.0 U	10.0 U	10.0 U
4MW-2	3.0 U	0.88 U	10.0 U	10.0 U	10.0 U
4MW-4	3.0 U	1.0 I	10.0 U	10.0 U	10.0 U
4MW-5	3.0 U	0.88 U	10.0 U	10.0 U	10.0 U
4MW-6	3.0 U	0.88 U	10.0 U	10.0 U	10.0 U
4MW-11D	13.0	0.88 U	10.0 U	10.0 U	10.0 U
4MW-12D	3.0 U	1.1 I	10.0 U	10.0 U	10.0 U
4MW-13D	3.0 U	0.88 U	10.0 U	10.0 U	10.0 U
4MW-14D	3.0 U	1.1 I	10.0 U	10.0 U	10.0 U
2MW-15AD	7.2 I	3.4 I	10.4 J	10.0 U	10.0 U
2MW-18D	3.0 U	0.88 U	10.0 U	10.0 U	10.0 U
2MW-19D	3.0 U	3.9 I	10.0 U	10.0 U	10.0 U
2MW-24D	12.0	0.88 U	10.0 U	10.0 U	10.0 U
2MW-25D	6.8 I	1.2 I	10.0 U	10.0 U	10.0 U
2MW-26D	19.0	2.0 I	10.0 U	10.0 U	10.0 U
2MW-27D	7.6 I	3.4 I	10.0 U	10.0 U	10.0 U
4MW-27	3.1 I	2.6 I	10.0 U	10.0 U	10.0 U
4MW-27D	3.0 U	0.88 U	10.0 U	10.0 U	10.0 U

All results in the table are in micrograms per liter (ug/L)

U	Not detected (value shown is method detection limit)
I	Detected below the practical quantitation limit (value shown is an estimated value)
J	Estimated value based on results outside of quality control values
-	No sample / dry well
	Concentration exceeds the Secondary Drinking Water Standard (SDWS) in rule 62-550, SDWS for Zinc is 5000 ug/L
ug/L	Micrograms per liter
mg/L	Milligrams per liter

FIGURES



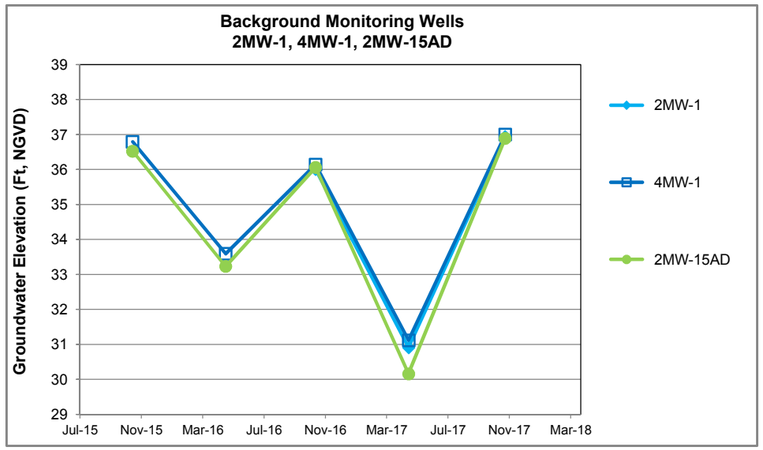
Source: CDM Smith,
1S13-1S15 WQMPER

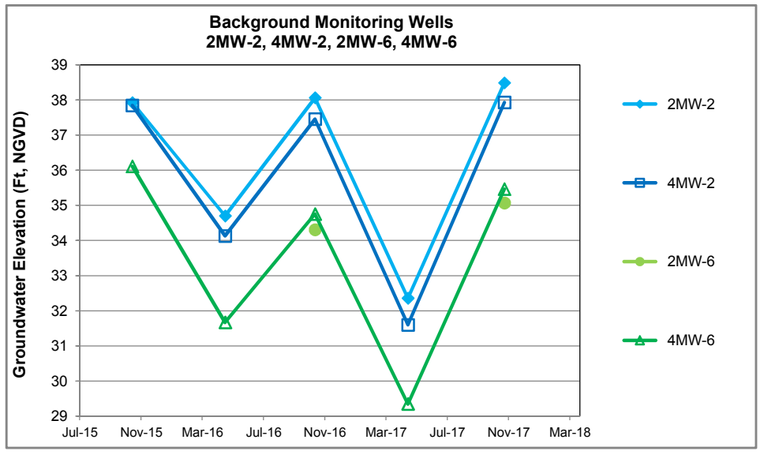
Figure 1-1

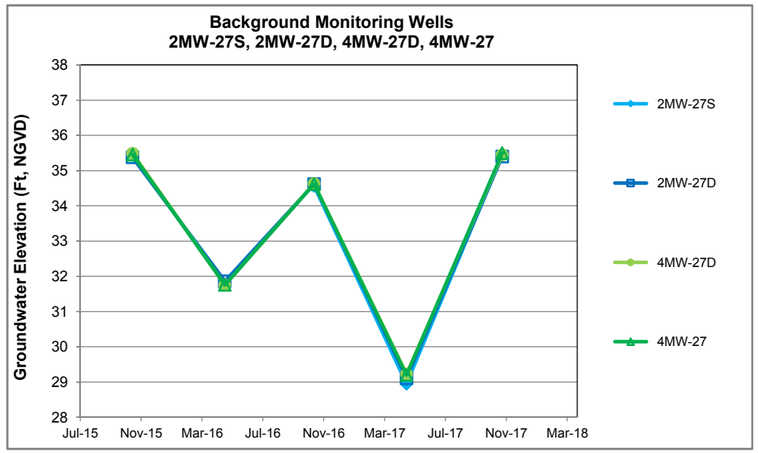
Monitoring Well Locations at the Class I and Class III Landfills

West Pasco Resource Recovery

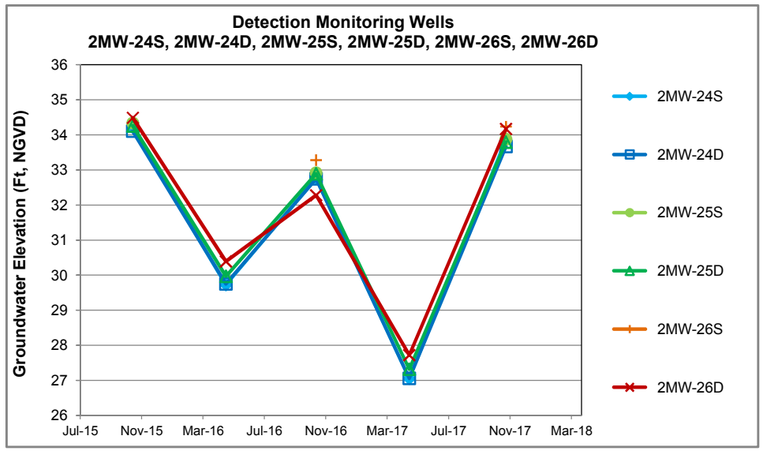
BACKGROUND MONITORING WELLS

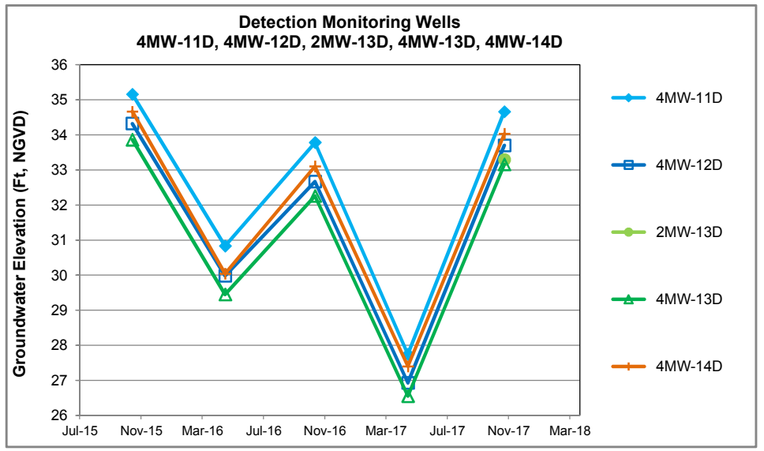


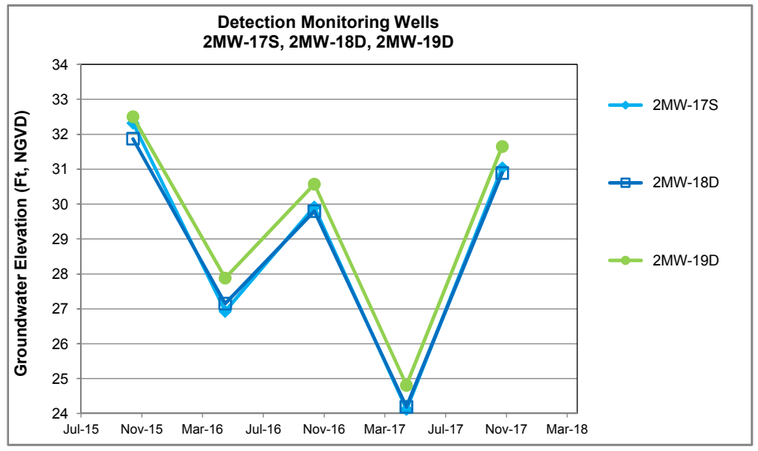




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

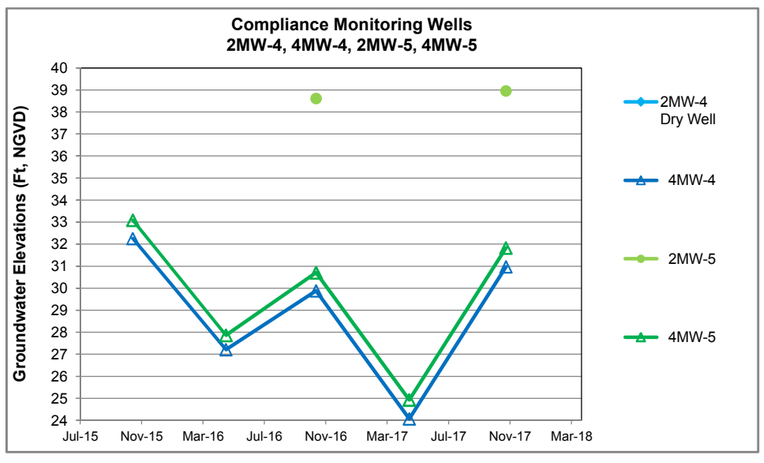
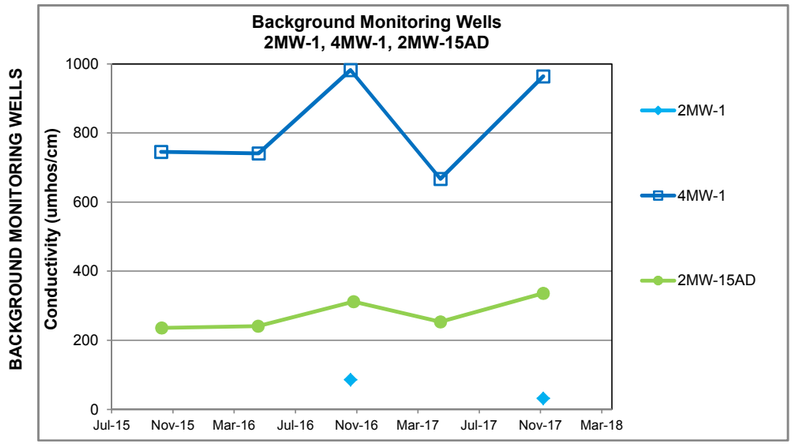
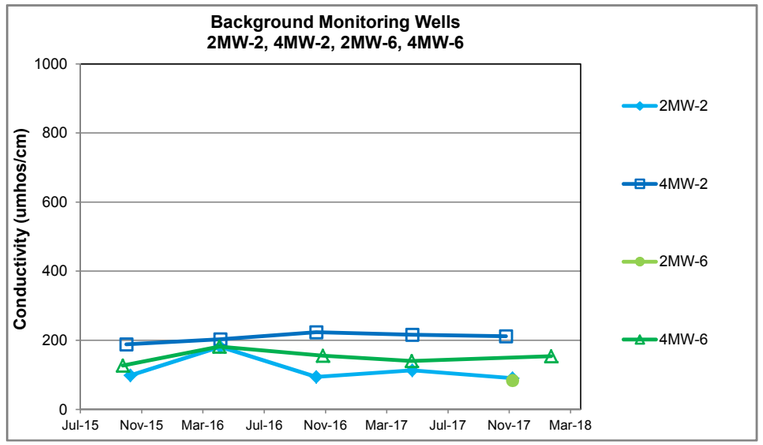
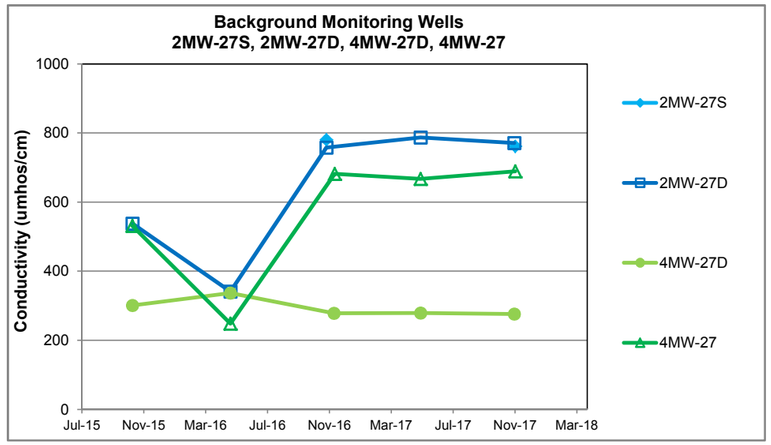
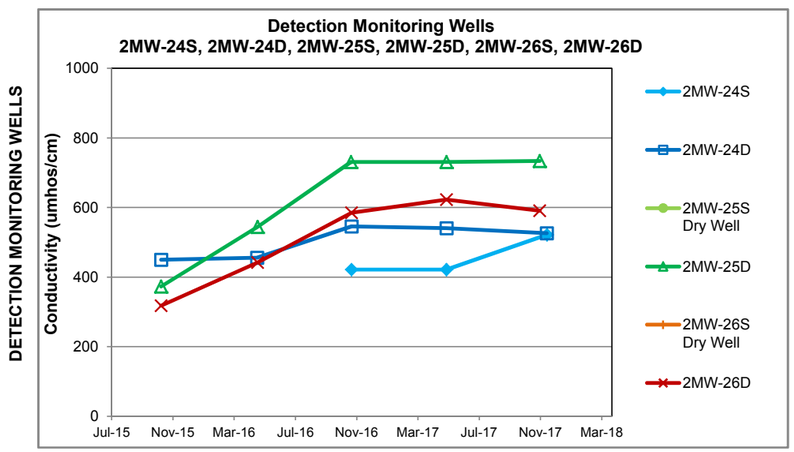


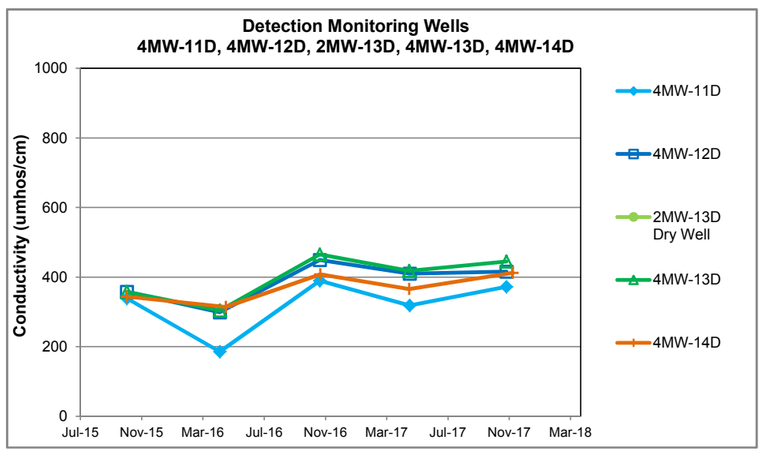
Figure 2-1
Groundwater Elevations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

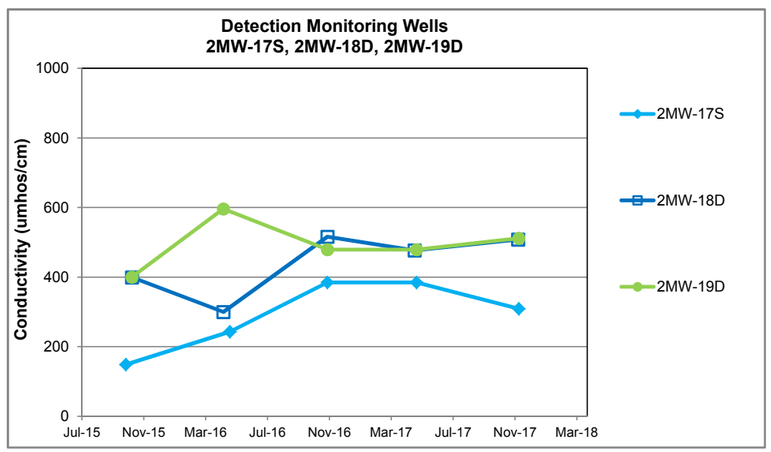












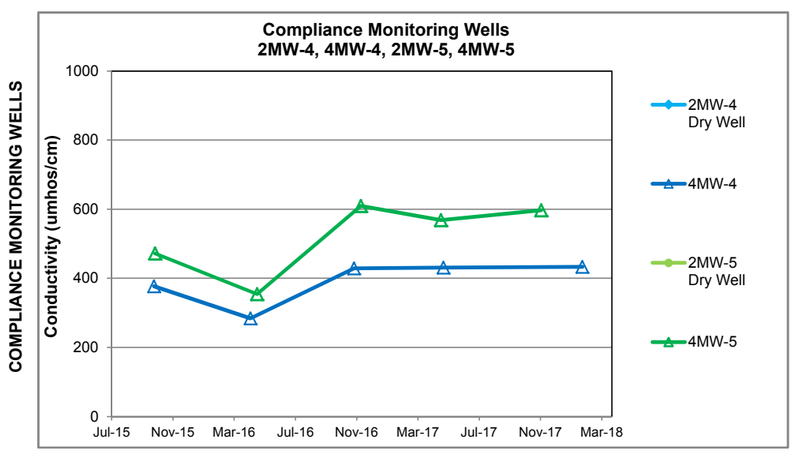
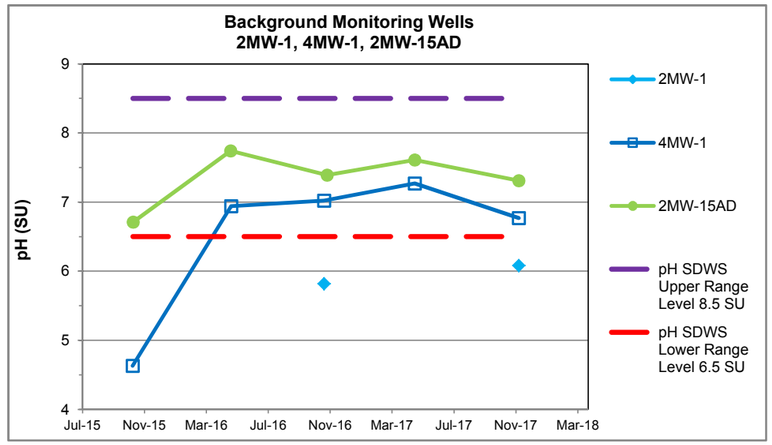
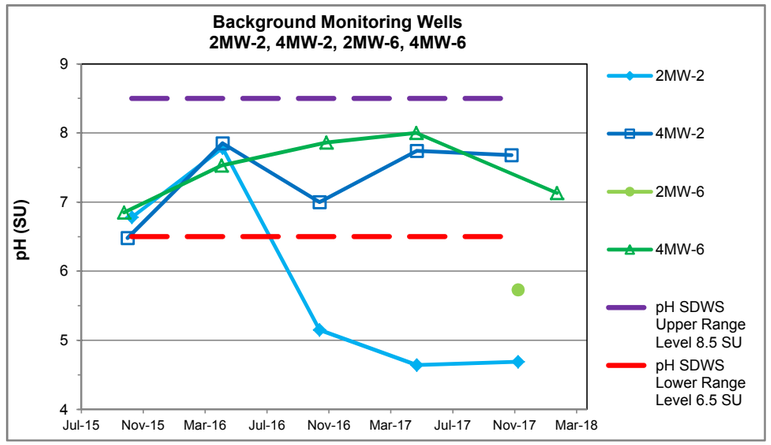
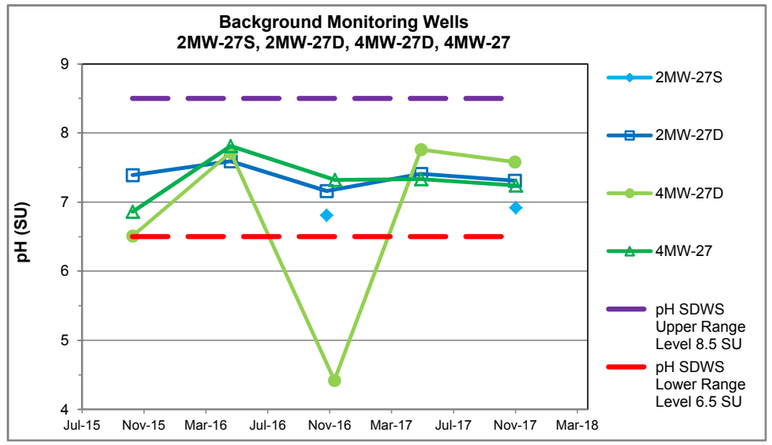


Figure 3-1
Conductivity Levels in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

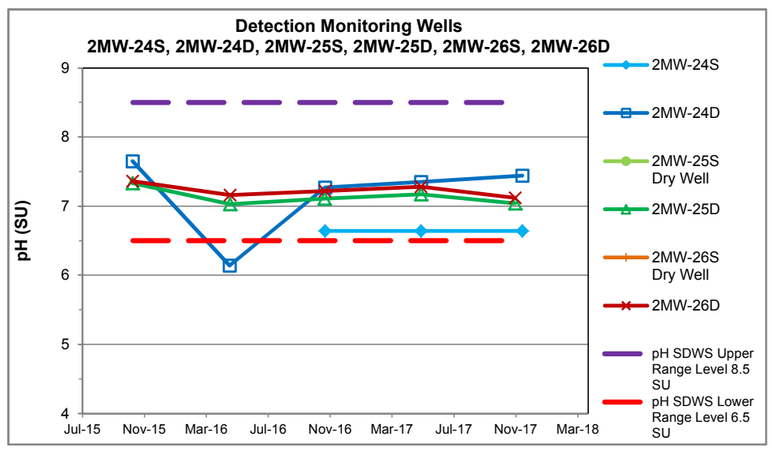
BACKGROUND MONITORING WELLS

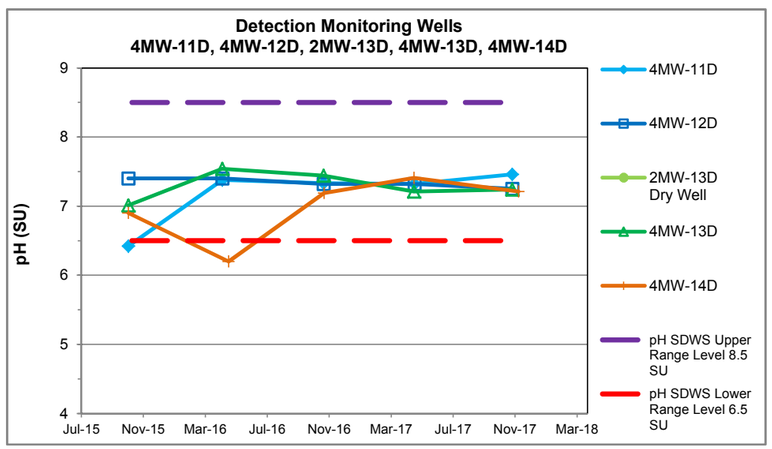


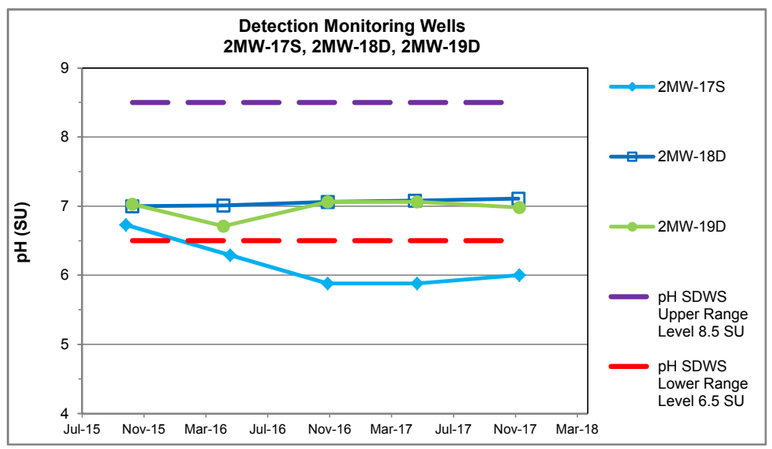




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

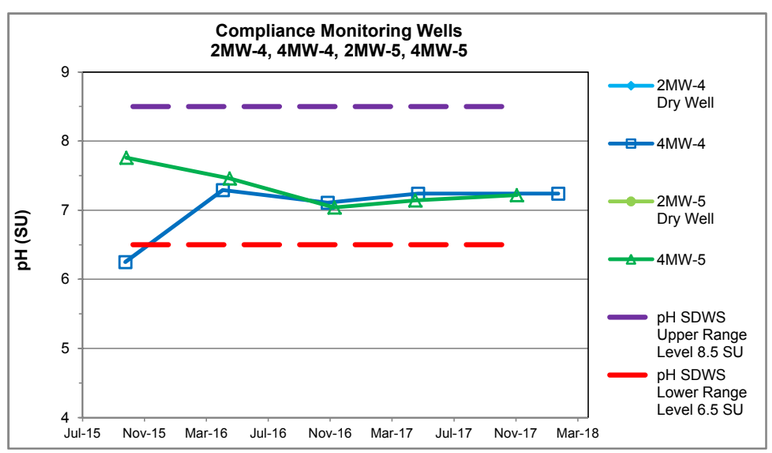
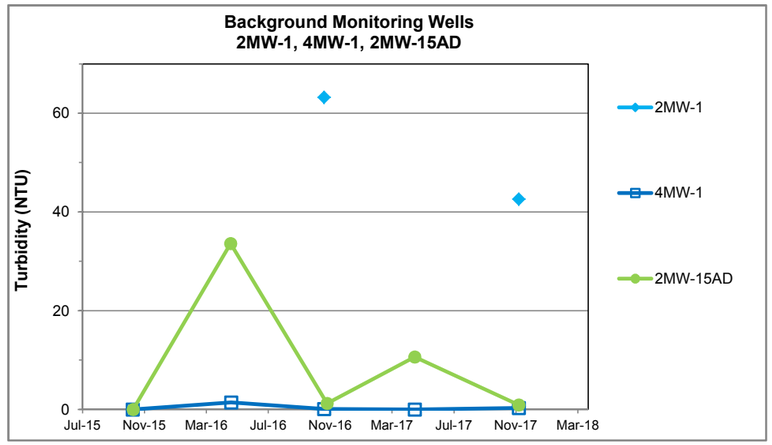
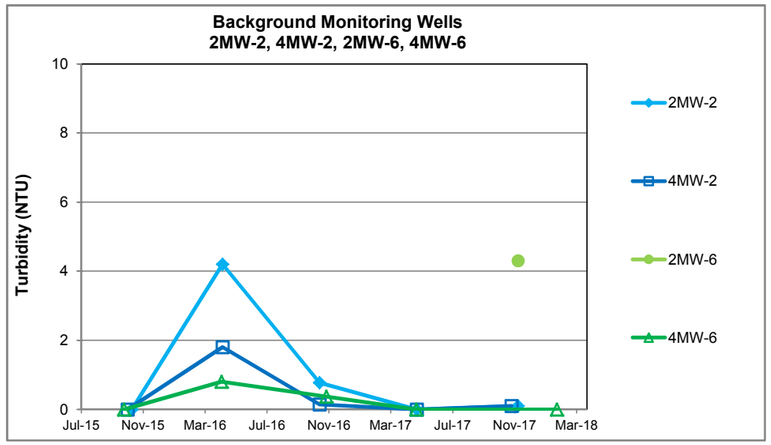
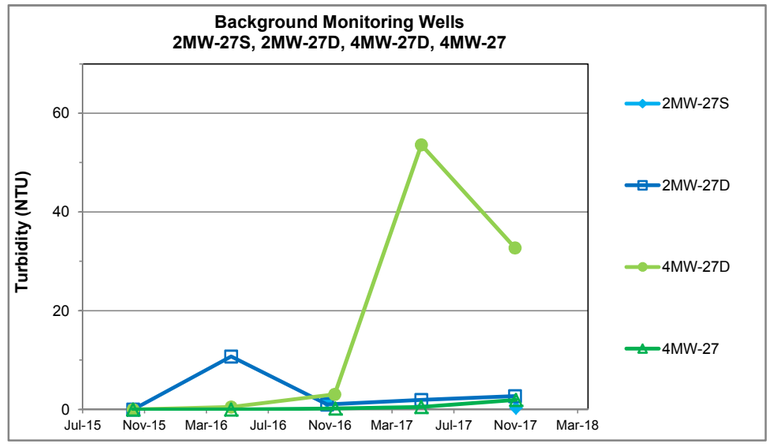


Figure 3-2
pH Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

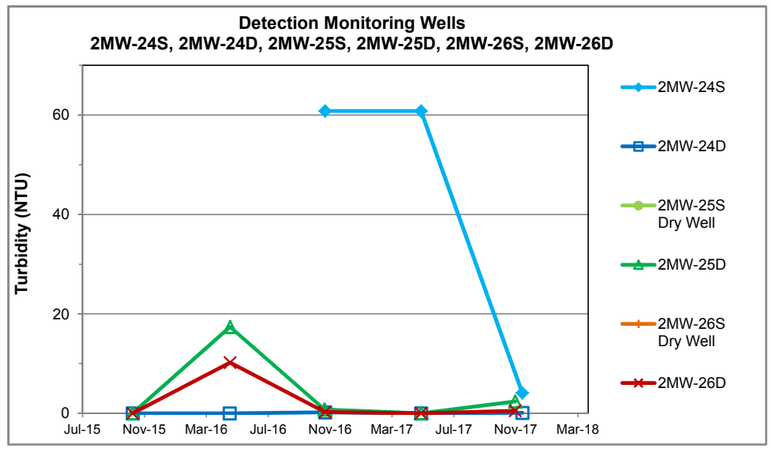
BACKGROUND MONITORING WELLS

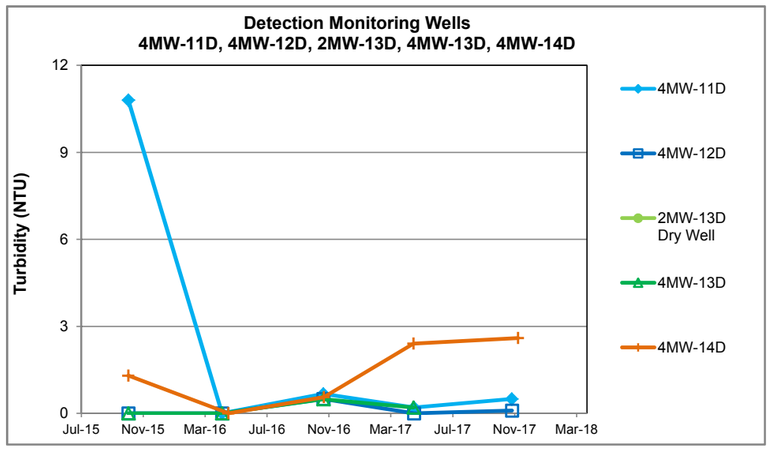


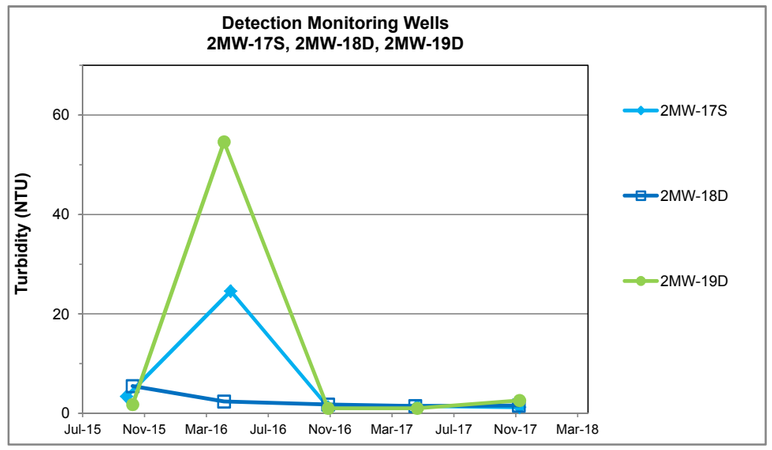




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

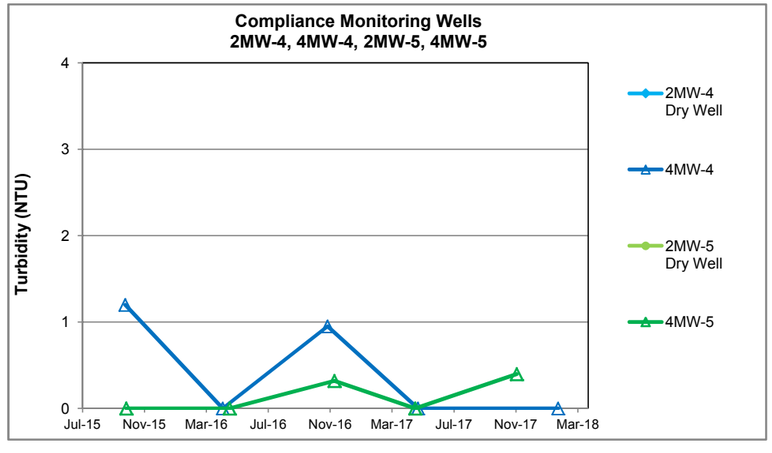
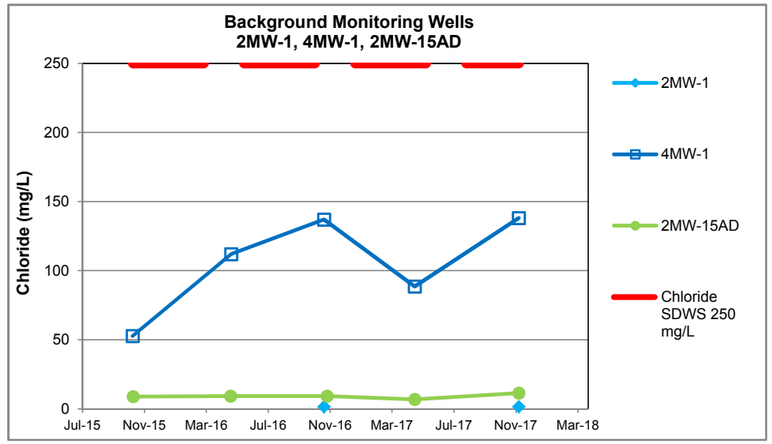
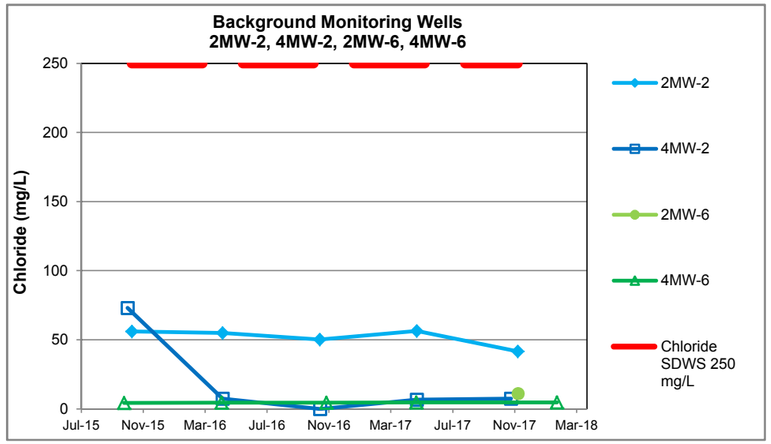
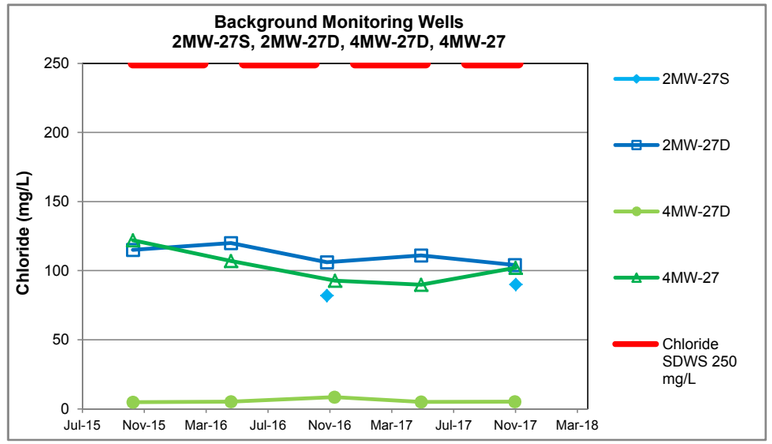


Figure 3-3
Turbidity Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

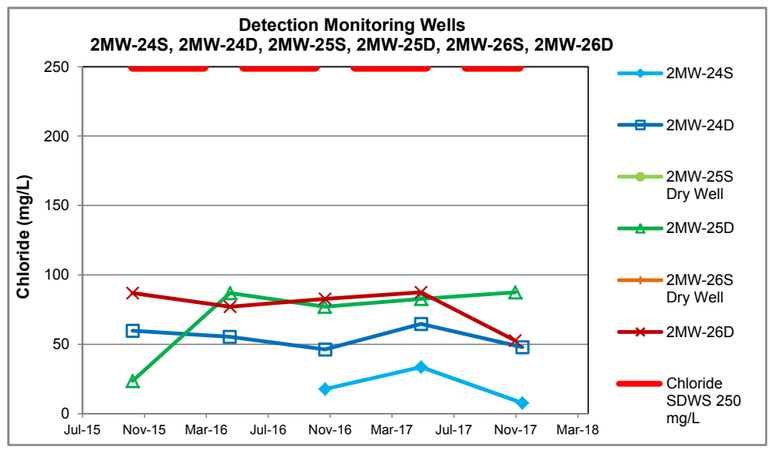
BACKGROUND MONITORING WELLS

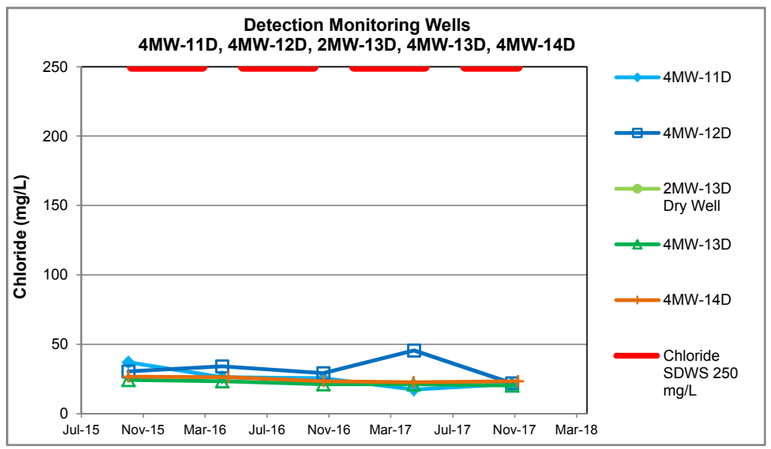


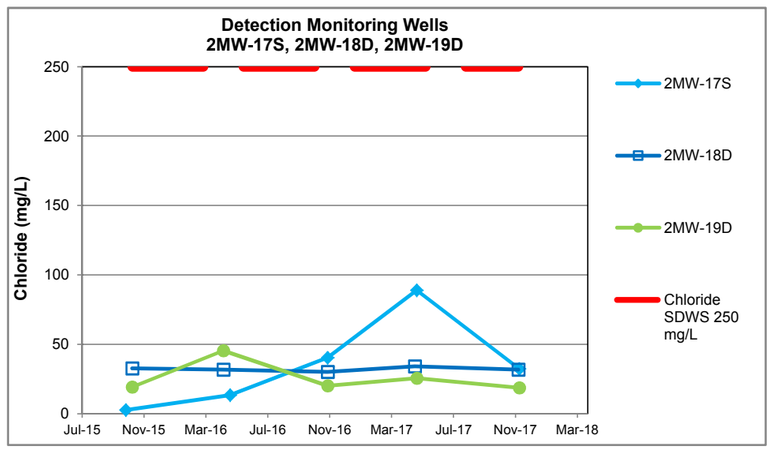




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

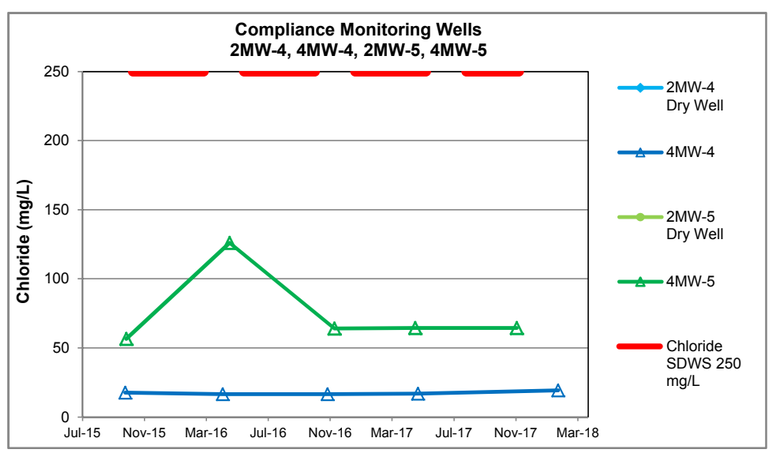
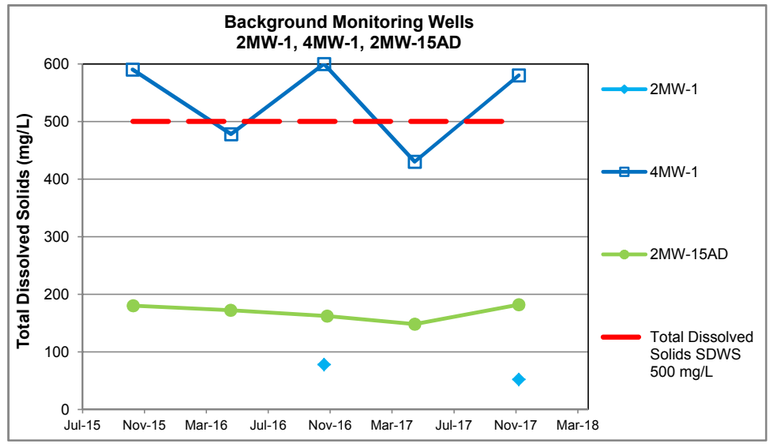
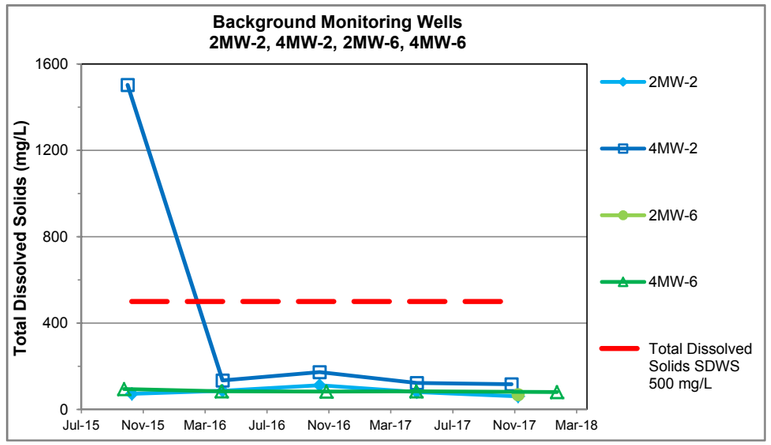
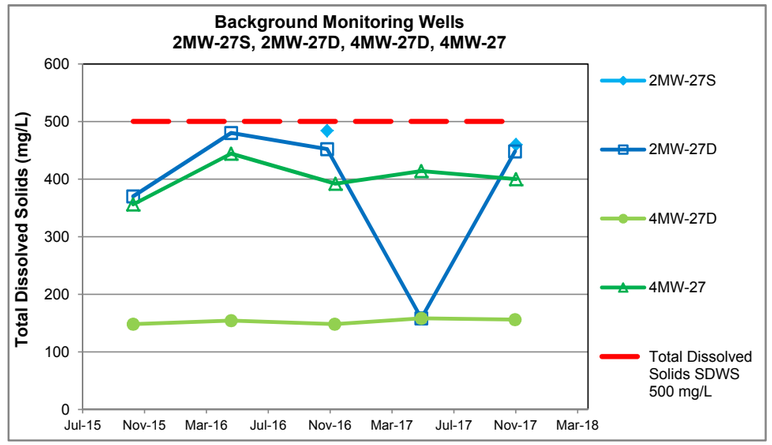


Figure 3-4
Chloride Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

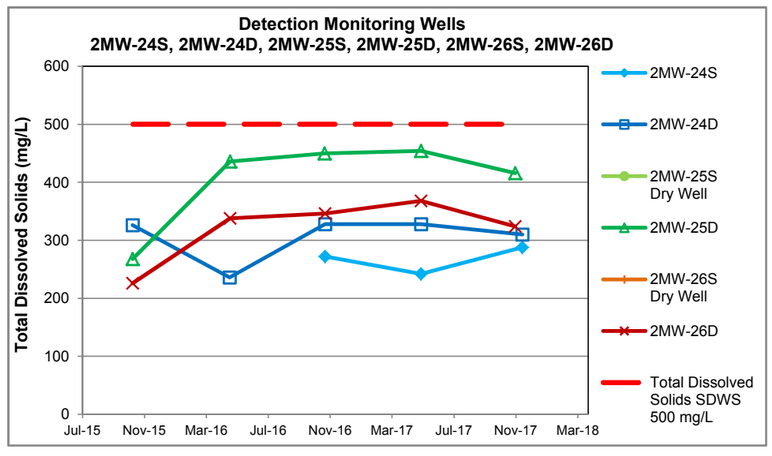
BACKGROUND MONITORING WELLS

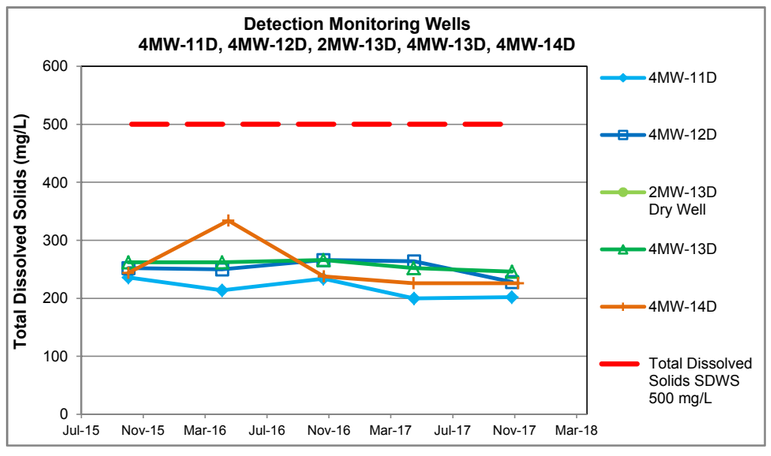


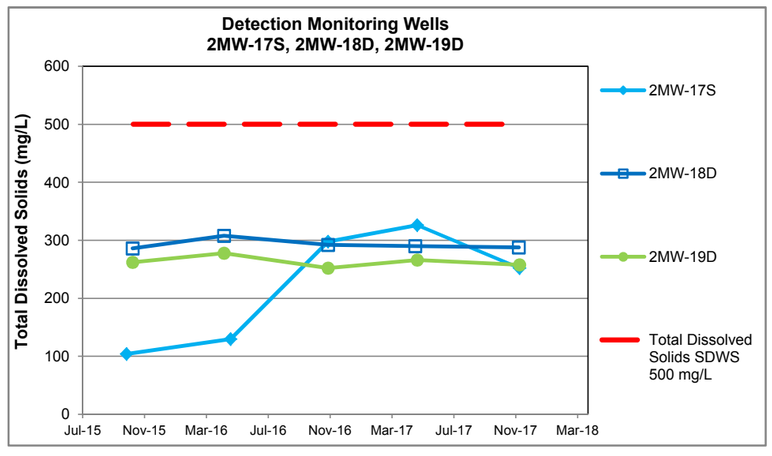




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

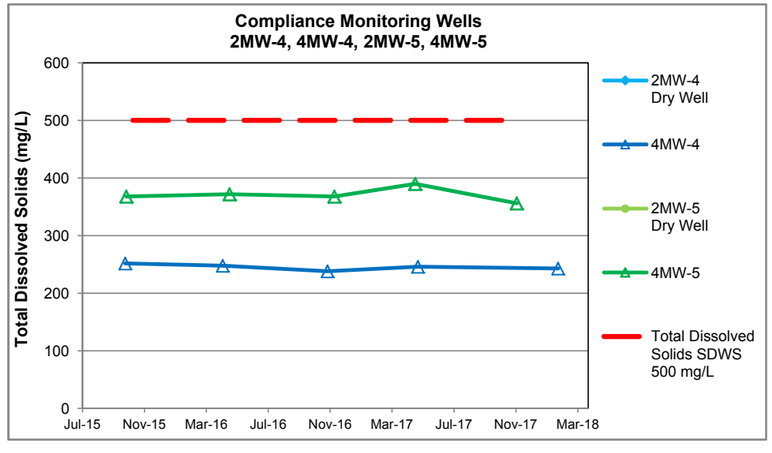


Figure 3-5
Total Dissolved Solids Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

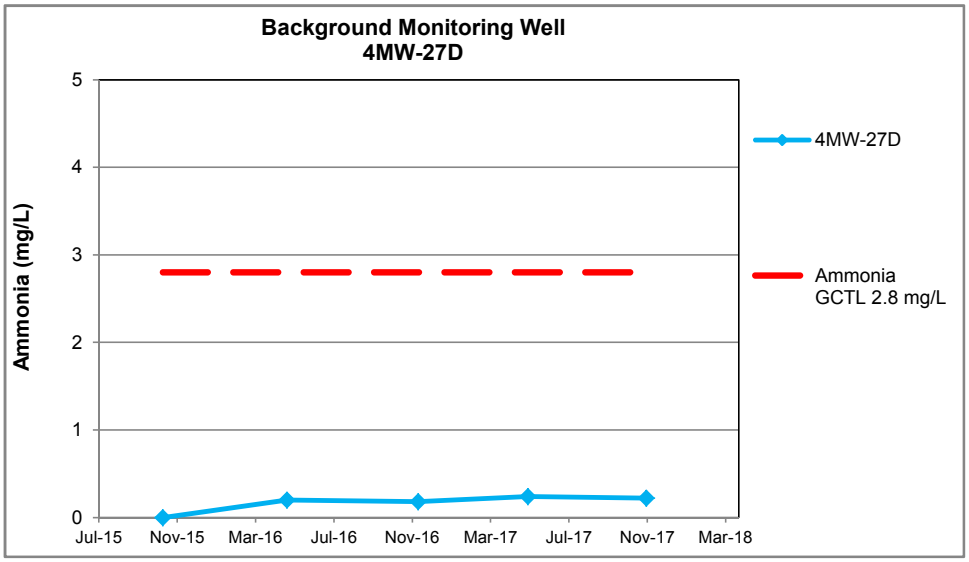
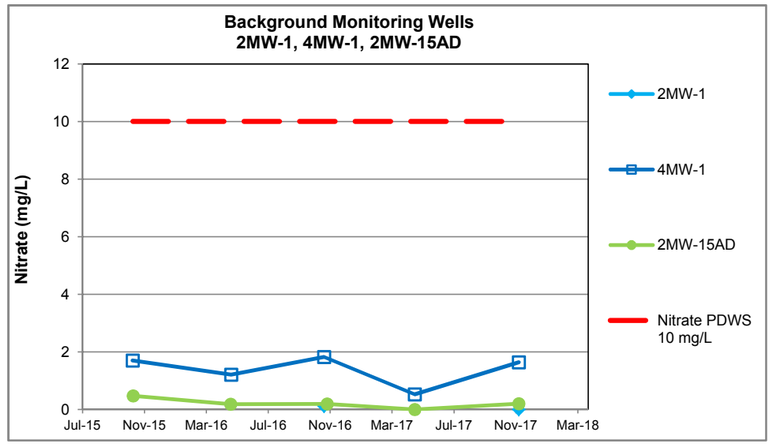
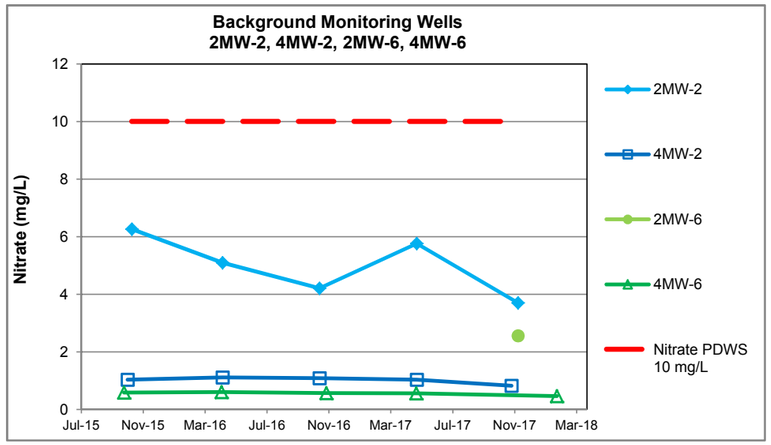


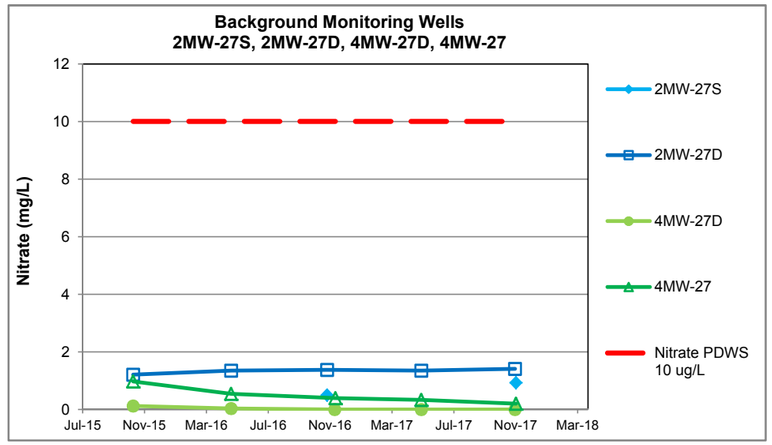
Figure 3-6
Ammonia Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

Note: No other monitoring wells had consistent or significant detections of Ammonia

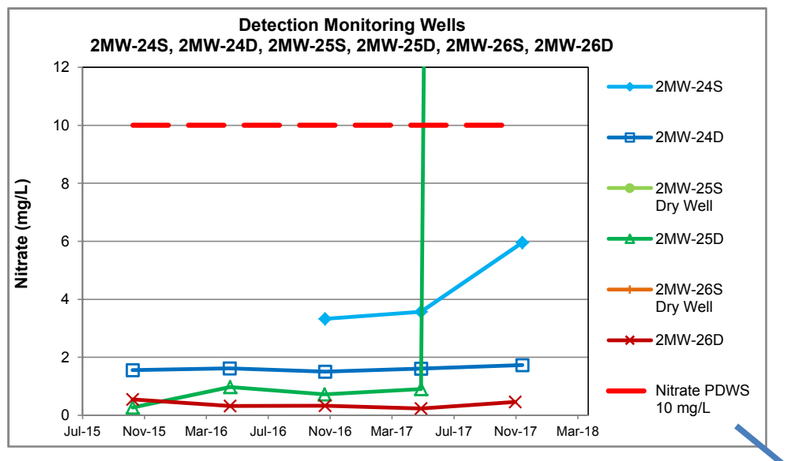
BACKGROUND MONITORING WELLS

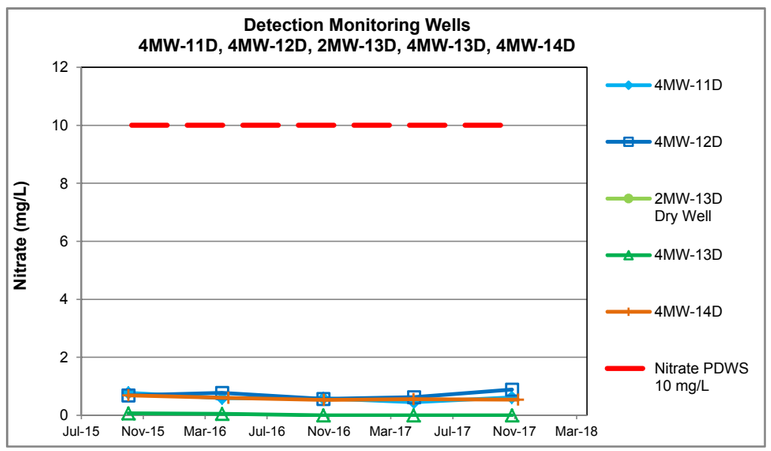


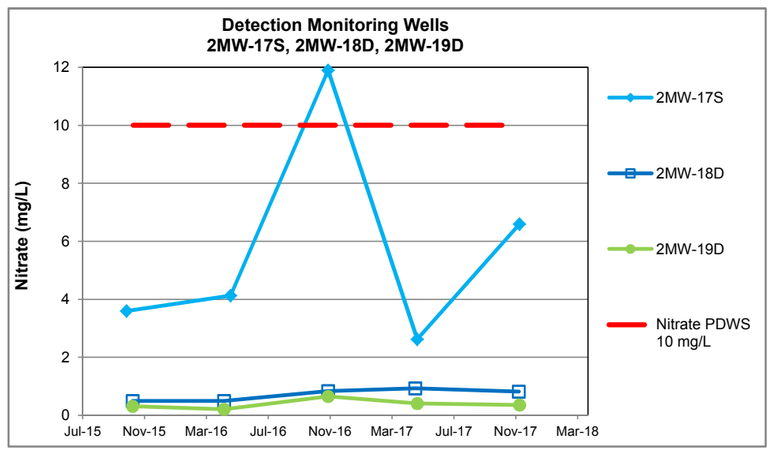




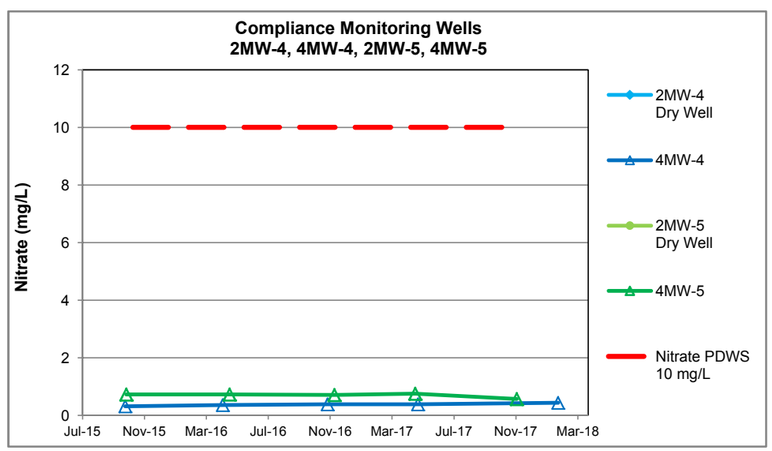
DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS



Vertical Axis Scale Expanded

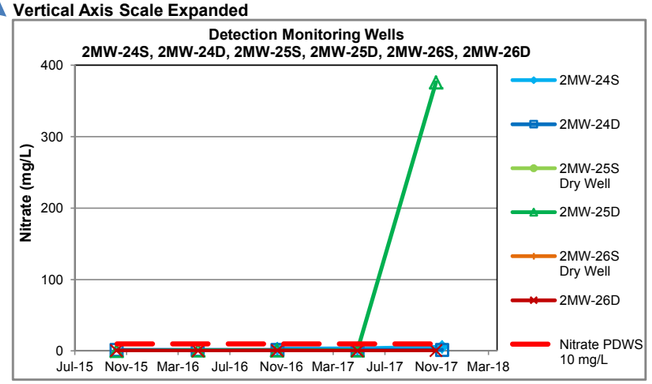
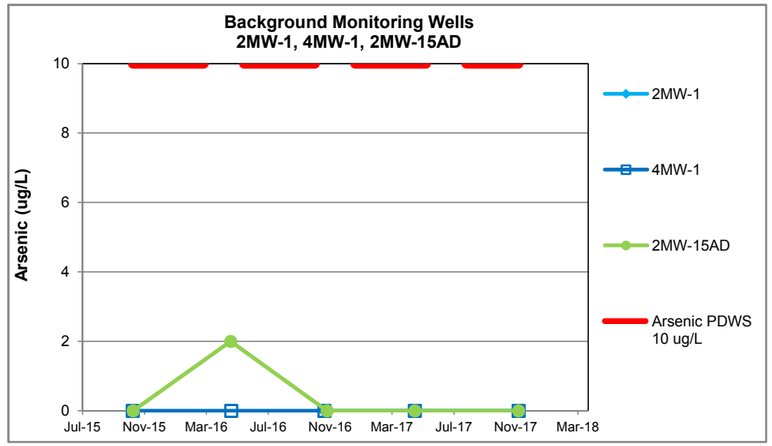
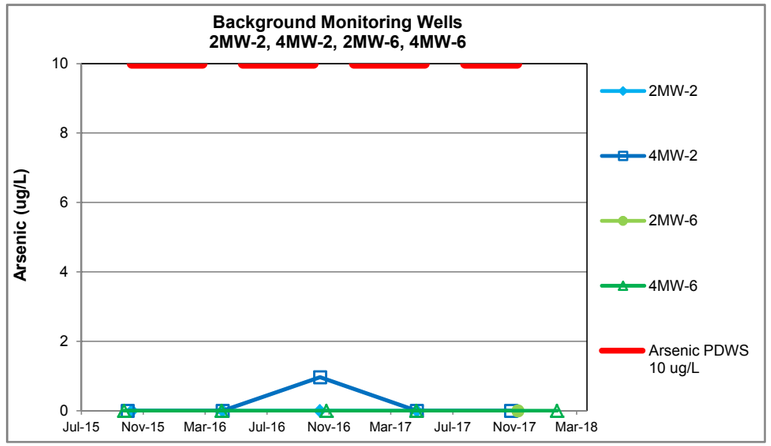
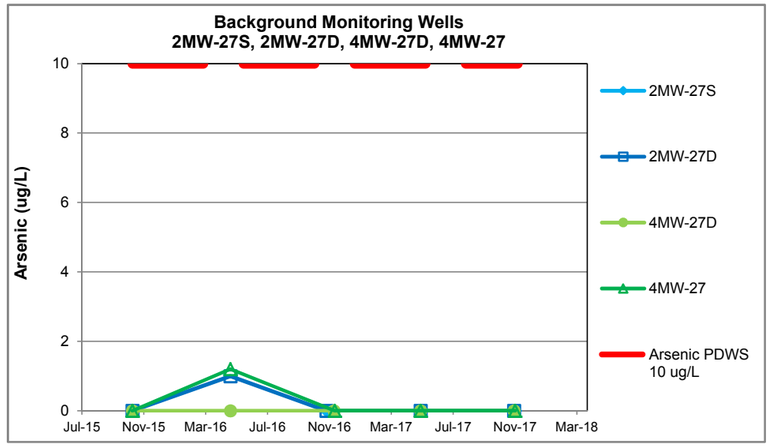


Figure 3-7
Nitrate Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

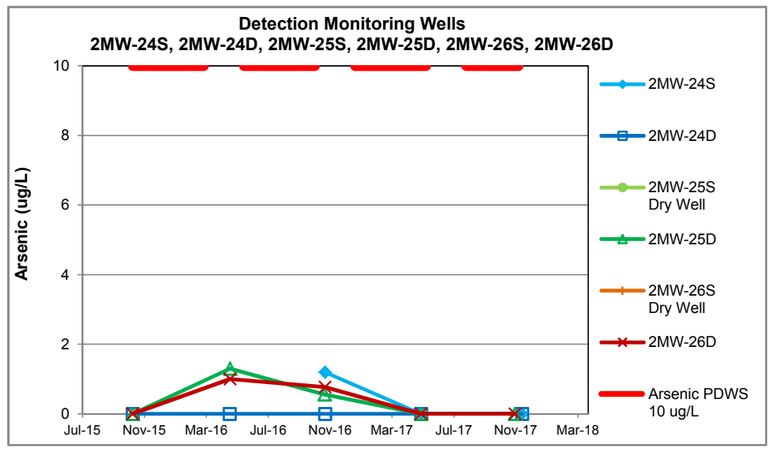
BACKGROUND MONITORING WELLS

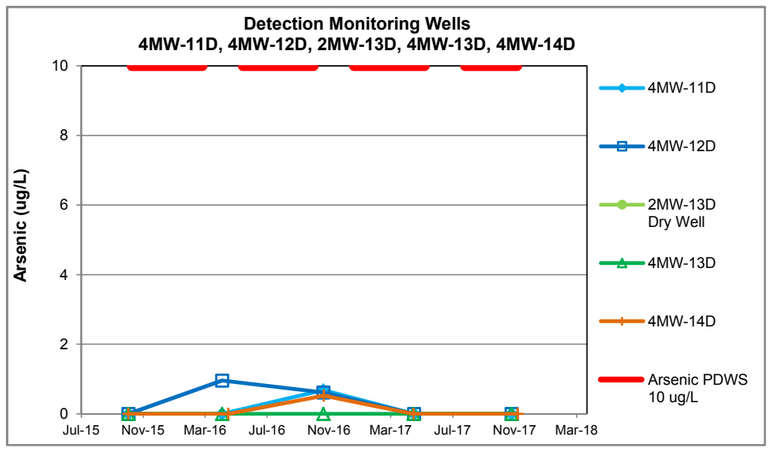


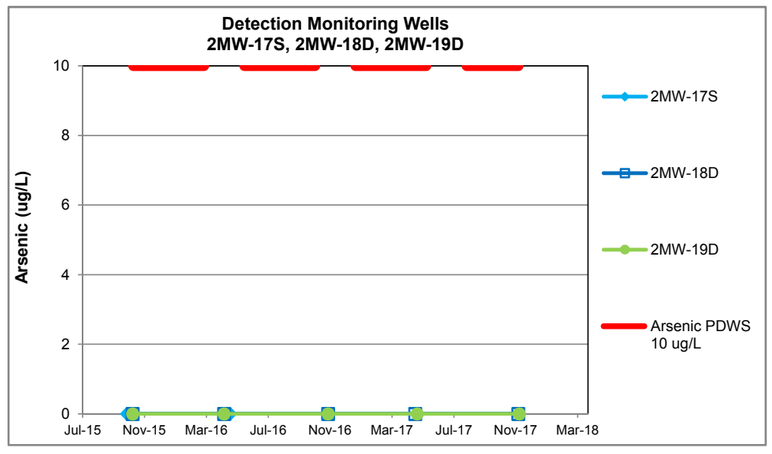




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

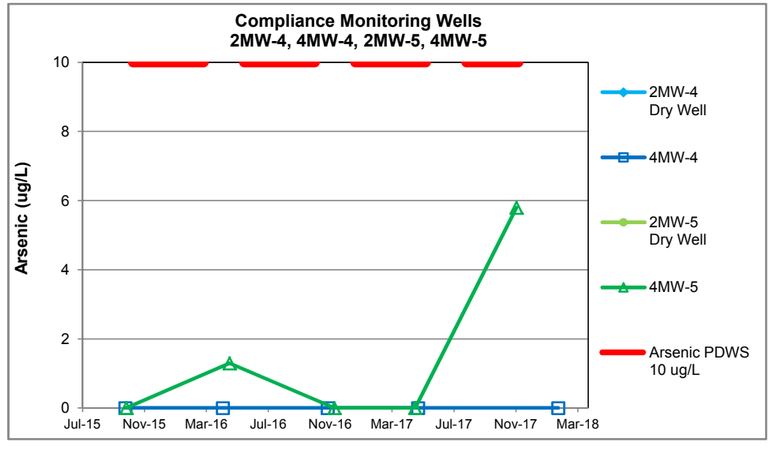
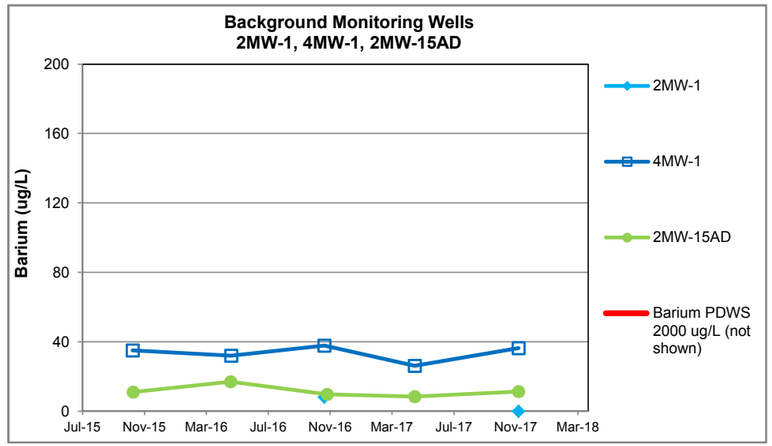
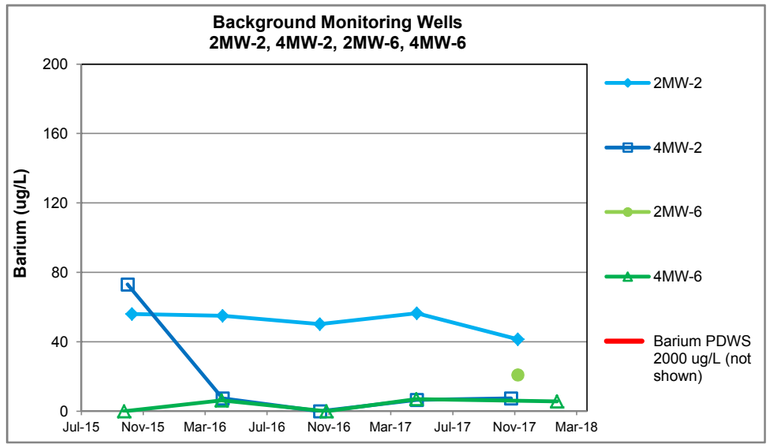
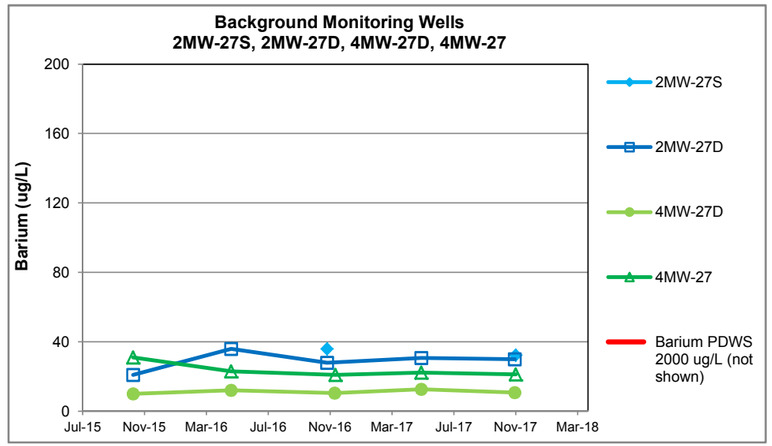


Figure 3-8
Arsenic Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

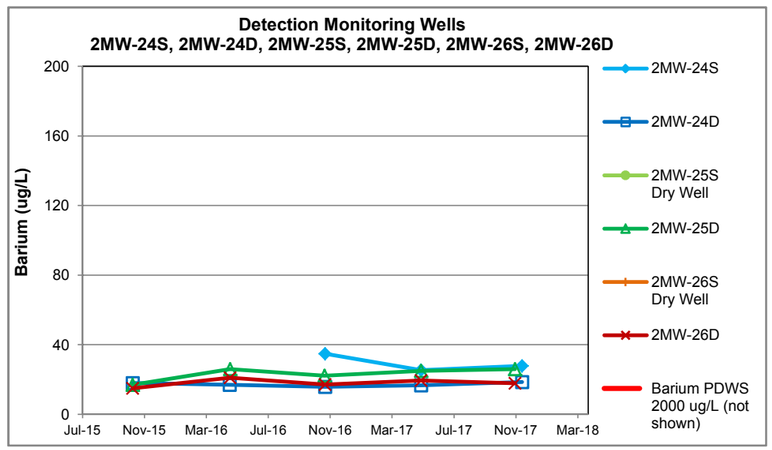
BACKGROUND MONITORING WELLS

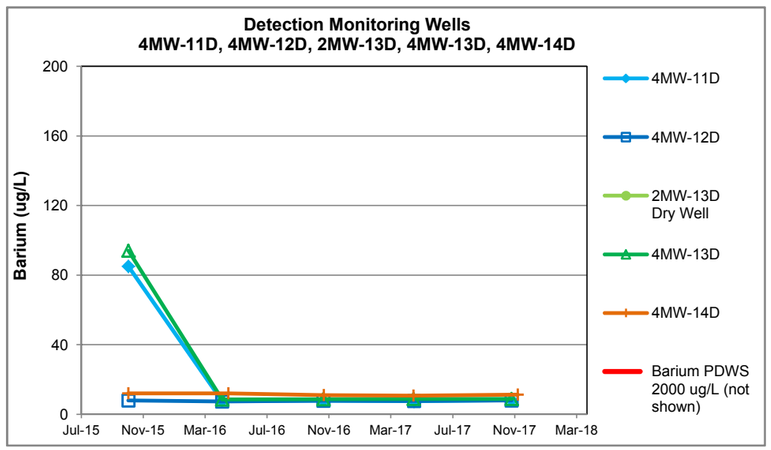


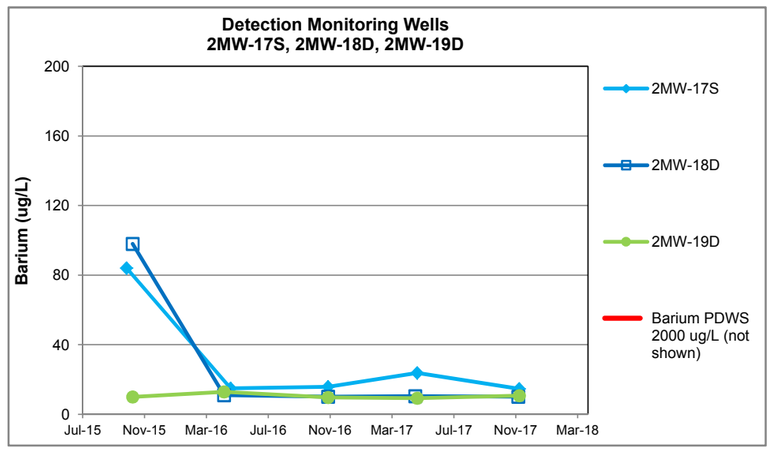




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

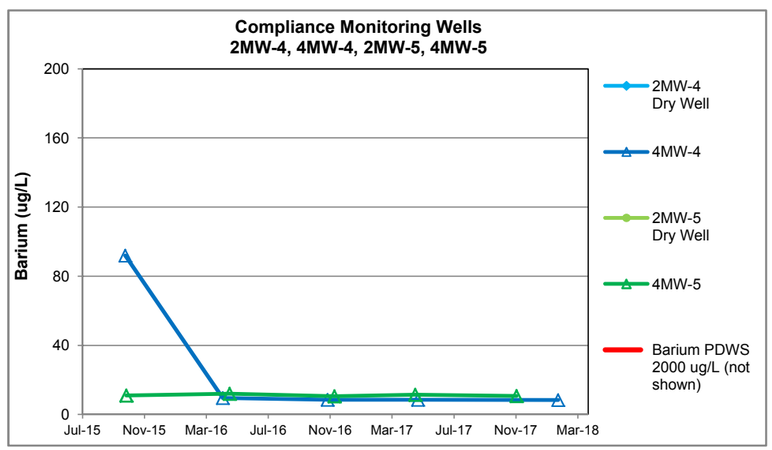
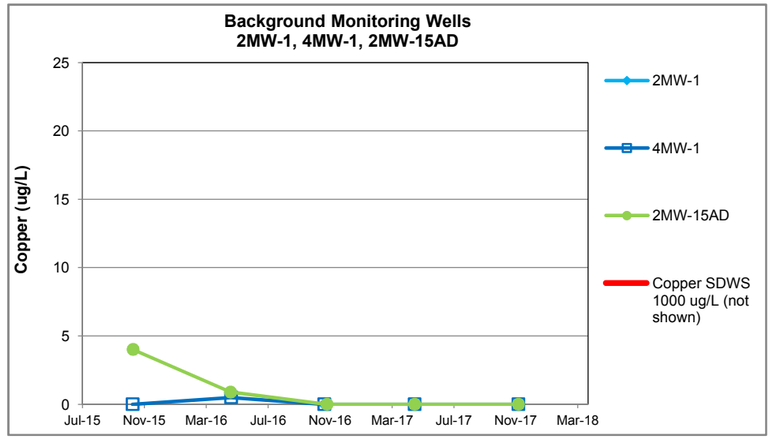
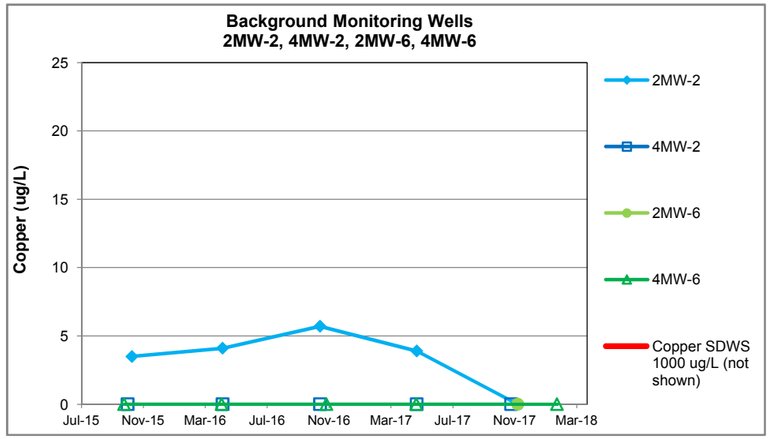
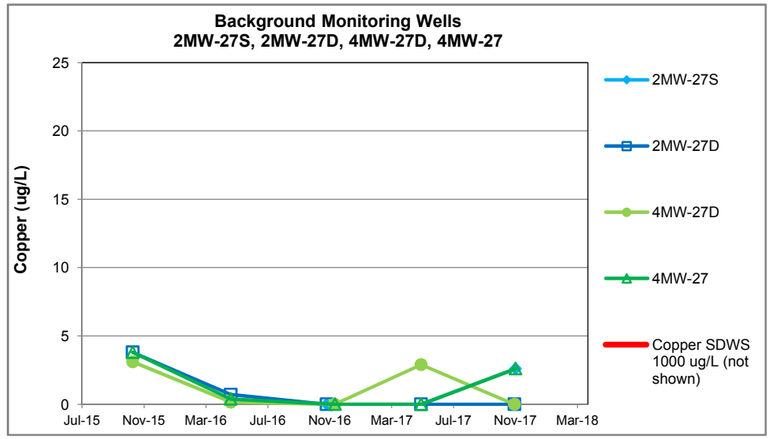


Figure 3-9
Barium Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

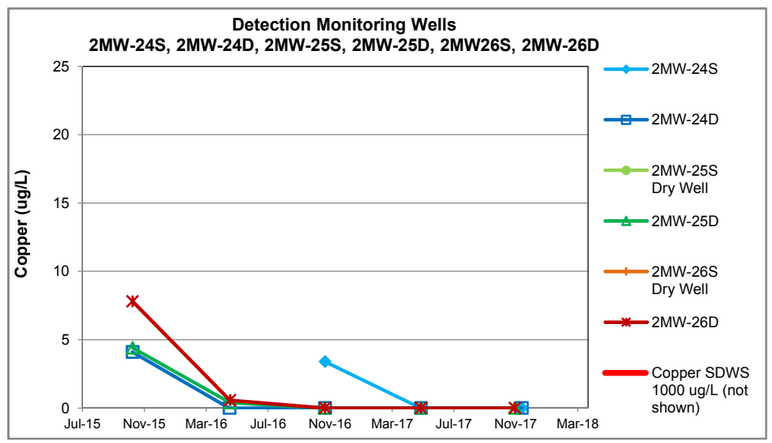
BACKGROUND MONITORING WELLS

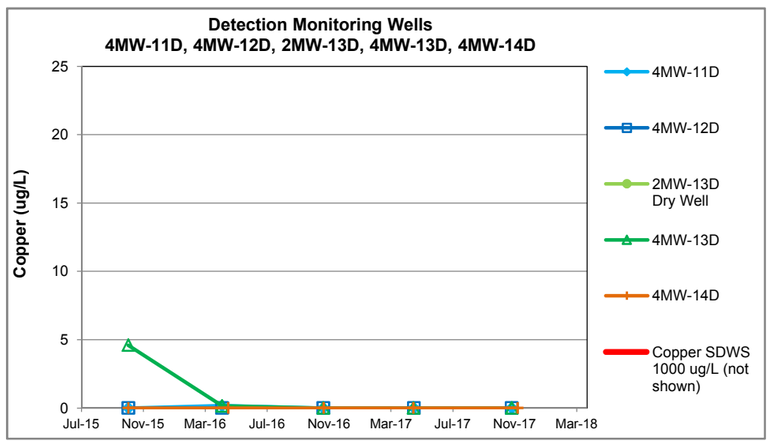


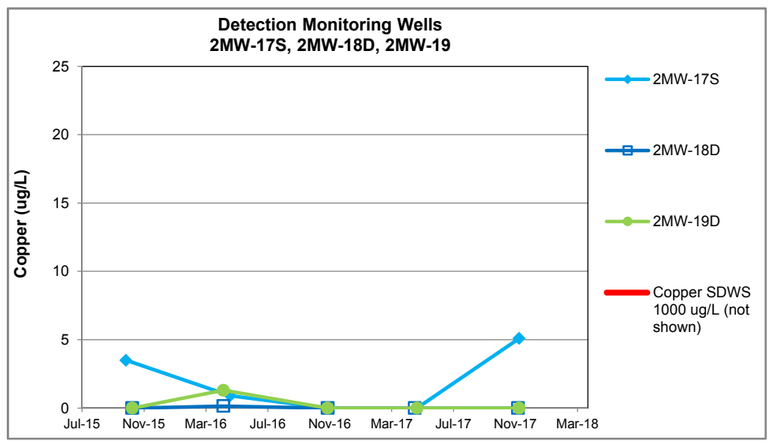




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

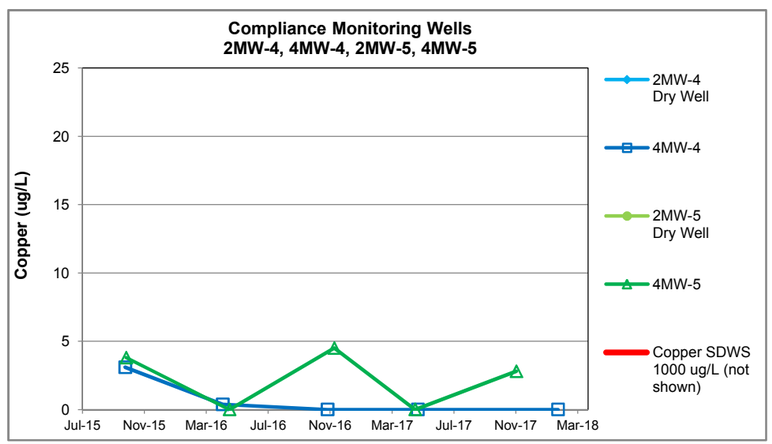
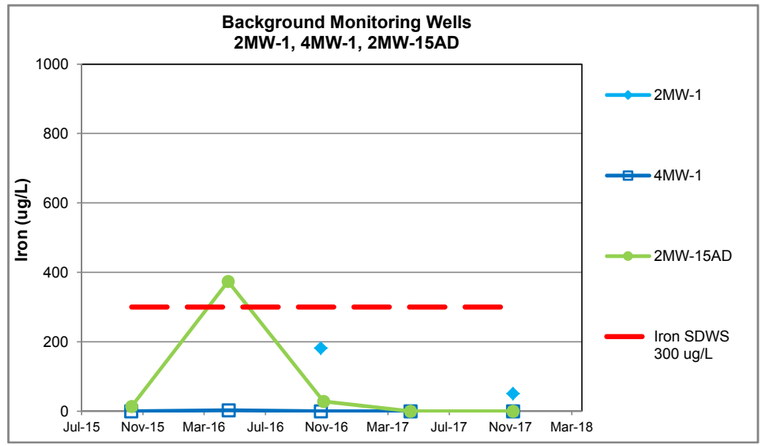
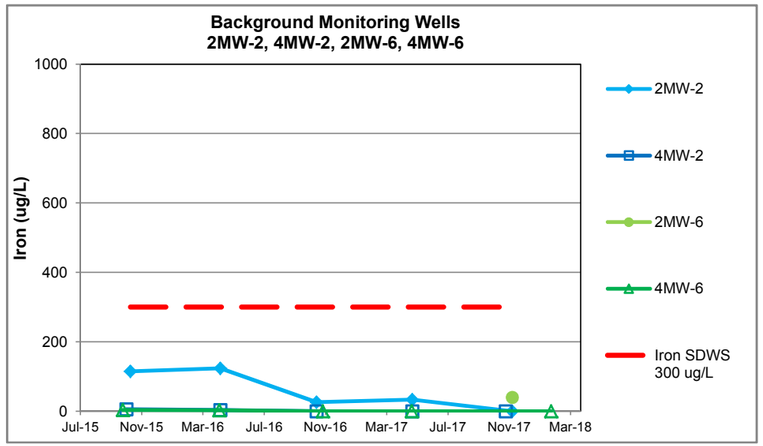
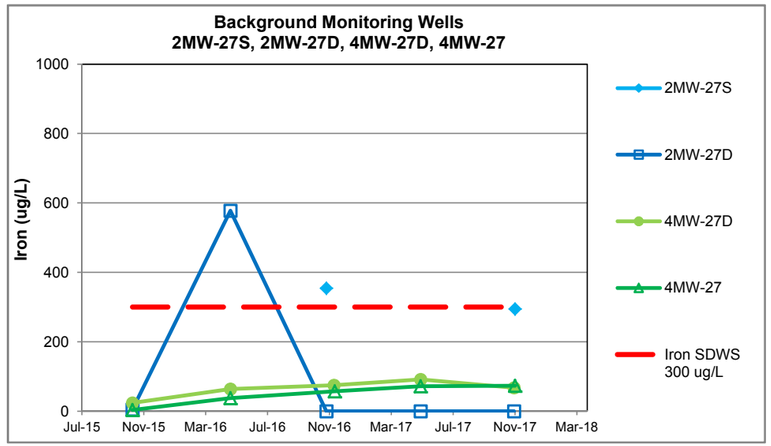


Figure 3-10
Copper Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

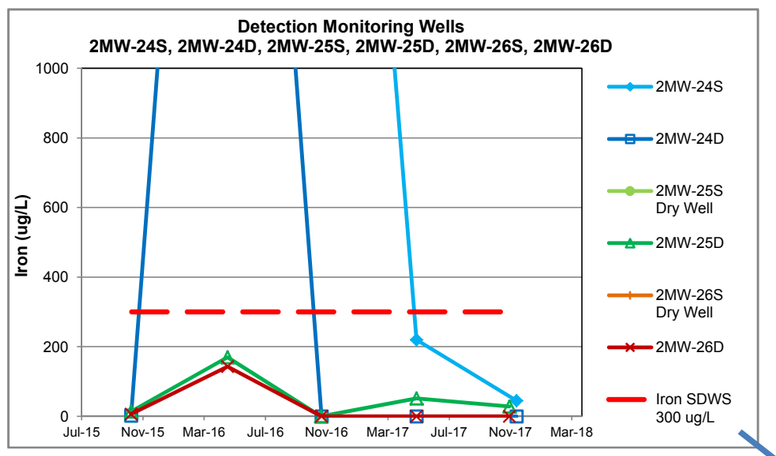
BACKGROUND MONITORING WELLS

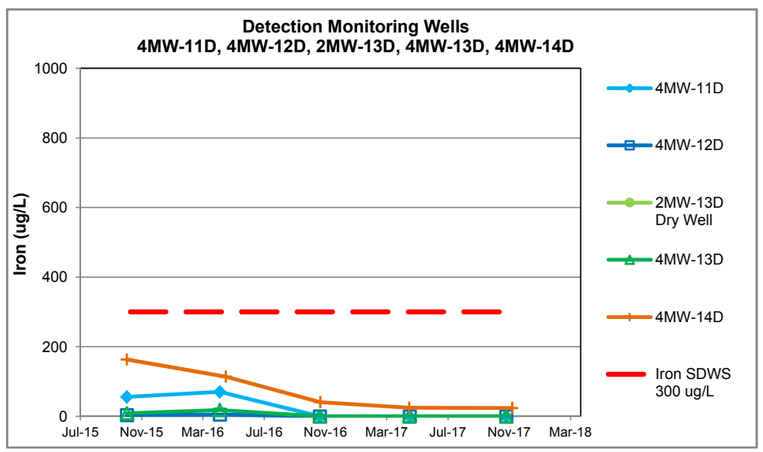


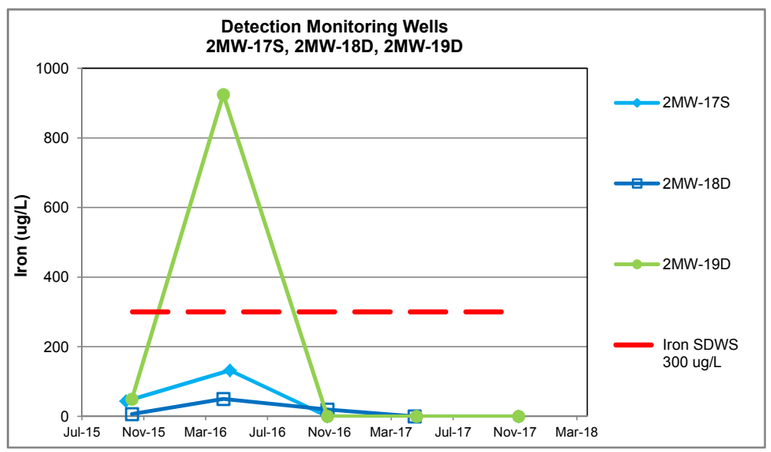




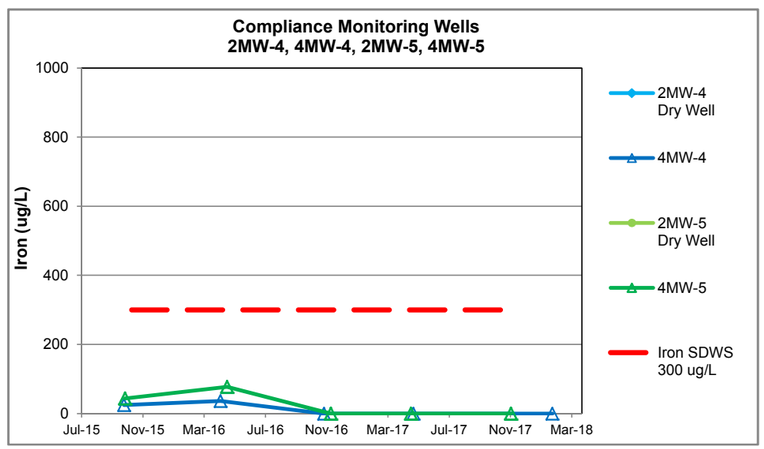
DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS



Vertical Axis Scale Expanded

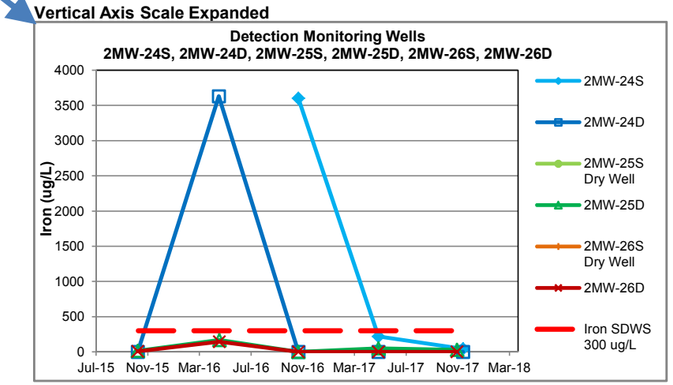
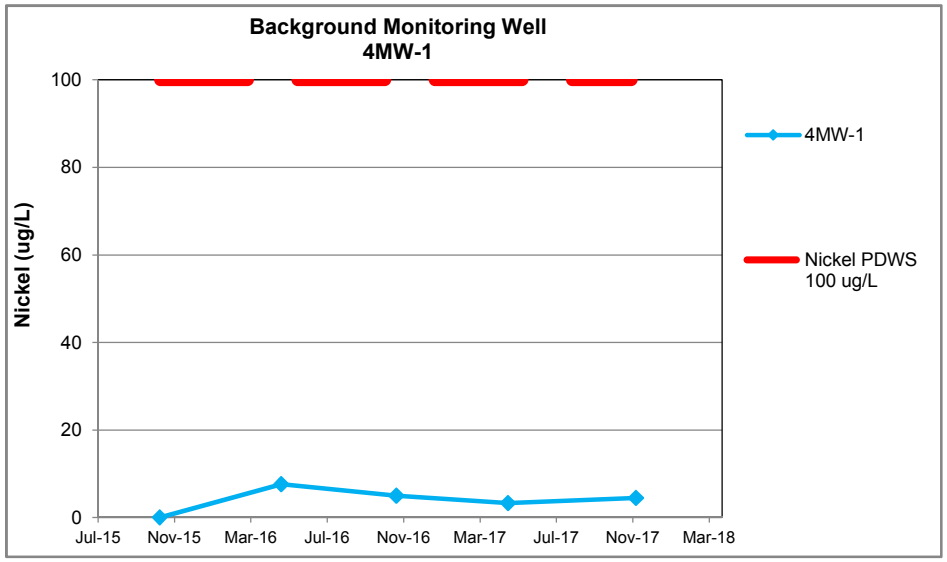
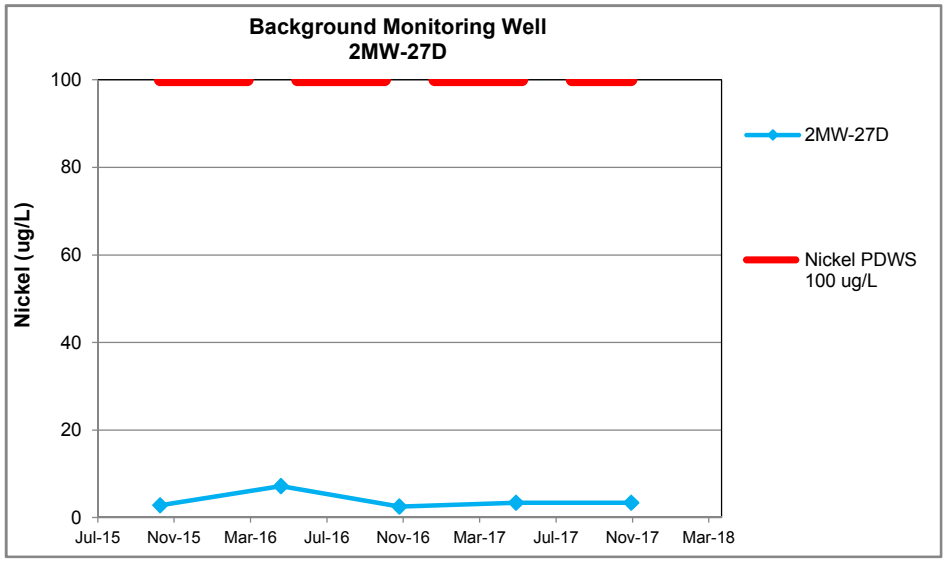


Figure 3-11
Iron Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

BACKGROUND MONITORING WELLS





DETECTION MONITORING WELLS

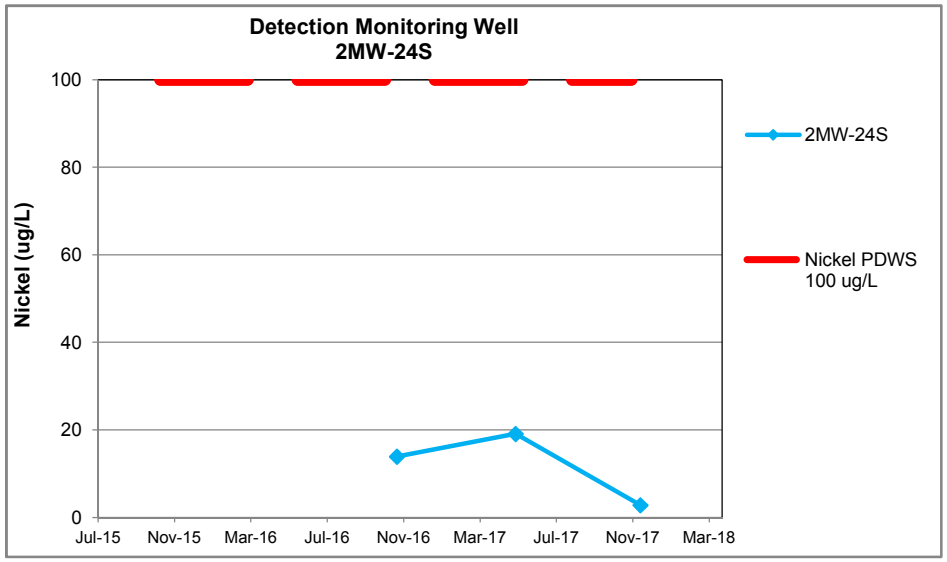
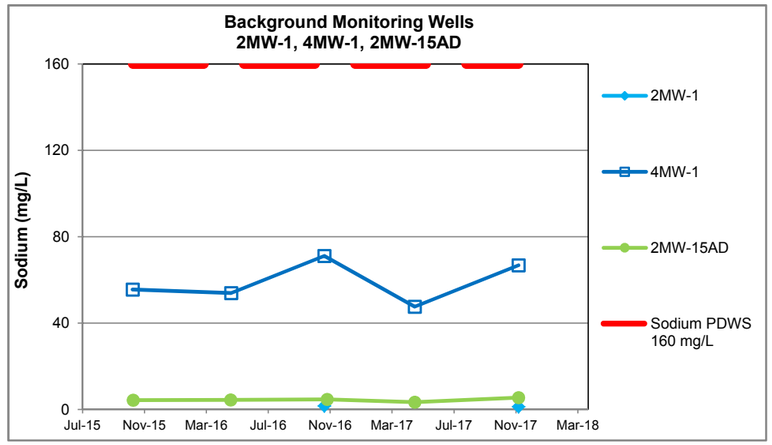
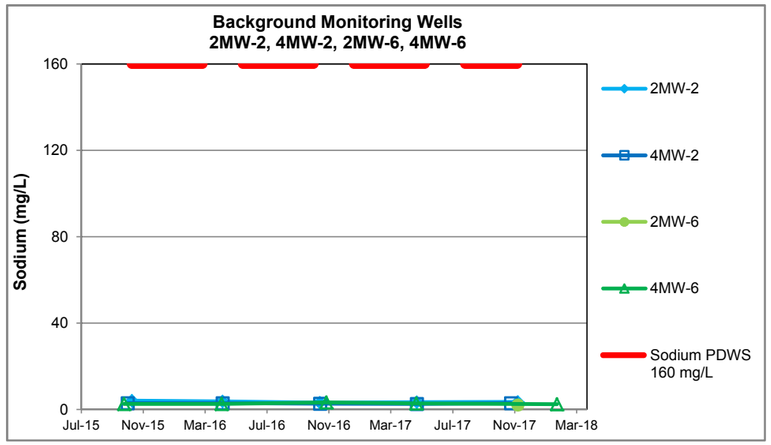


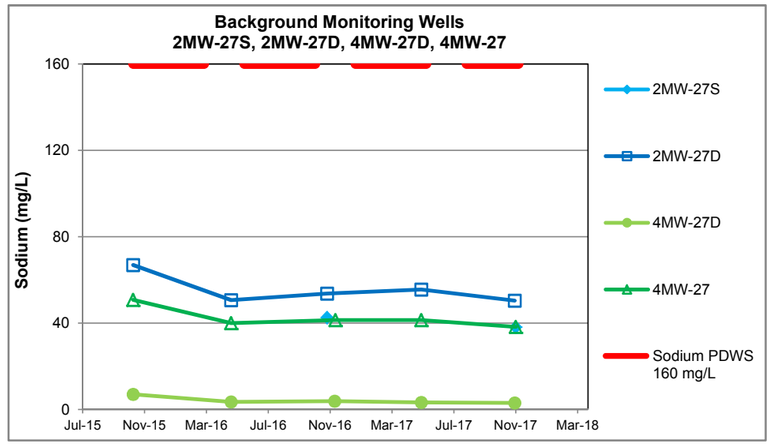
Figure 3-12
Nickel Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

Note: No other monitoring wells had consistent or significant detections of Nickel

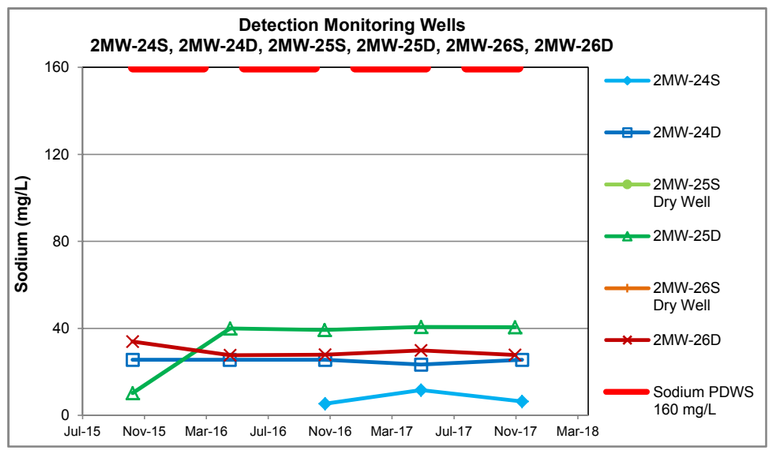
BACKGROUND MONITORING WELLS

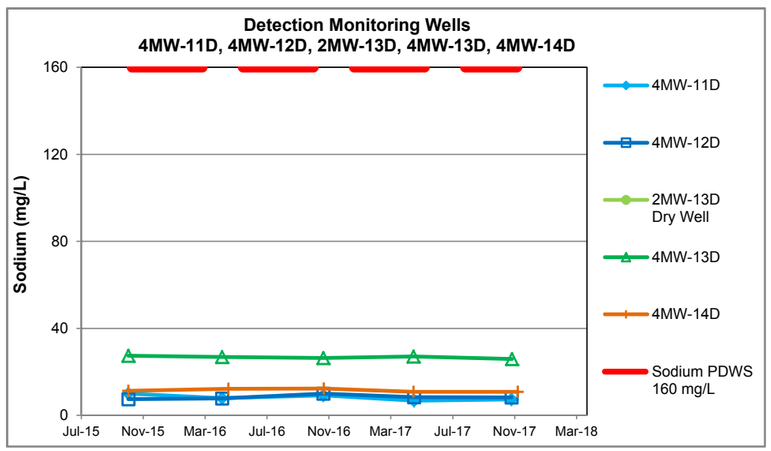


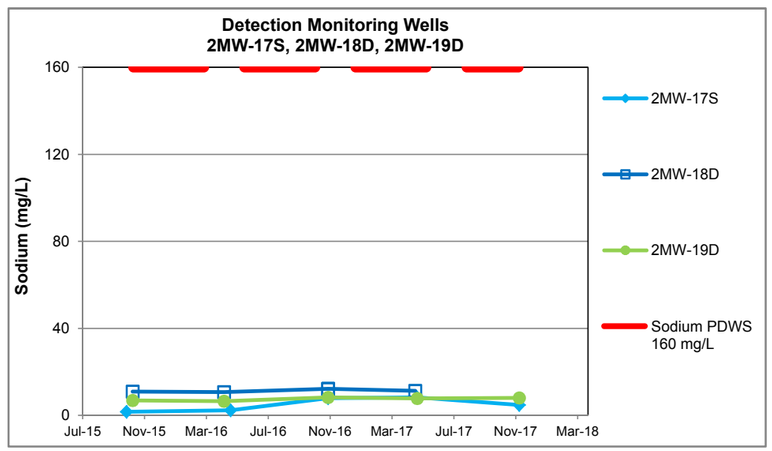




DETECTION MONITORING WELLS







COMPLIANCE MONITORING WELLS

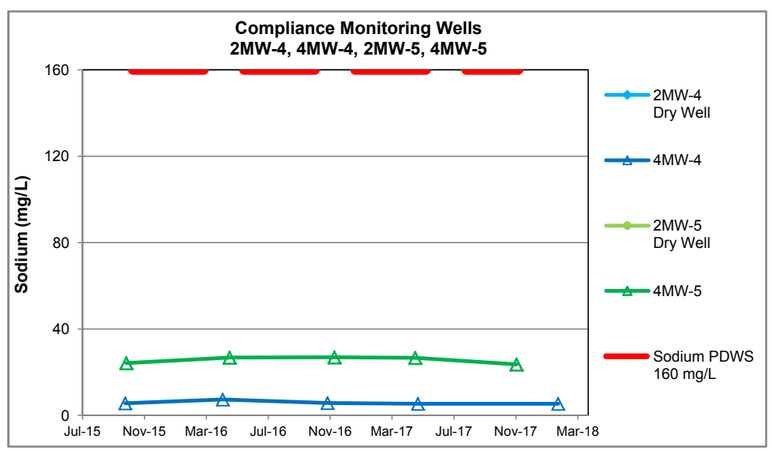
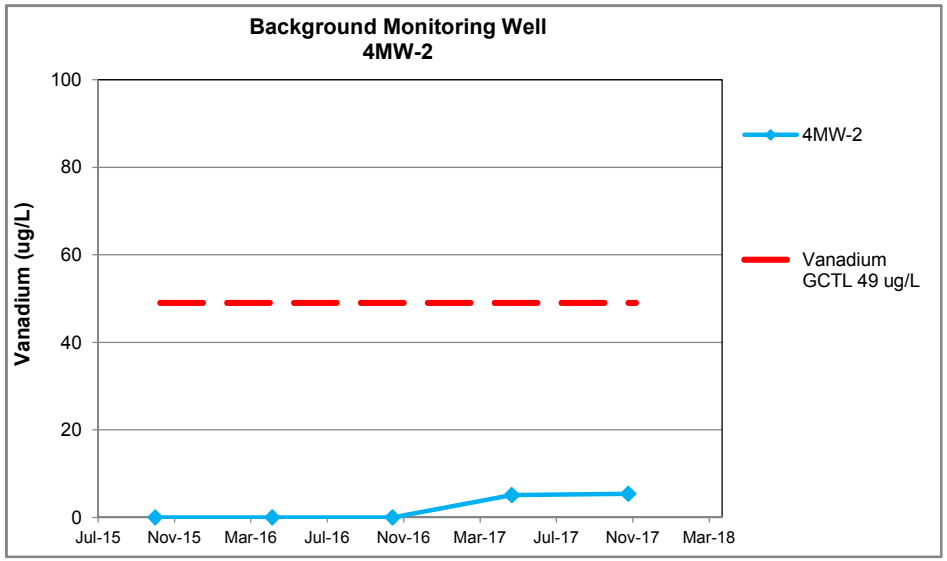
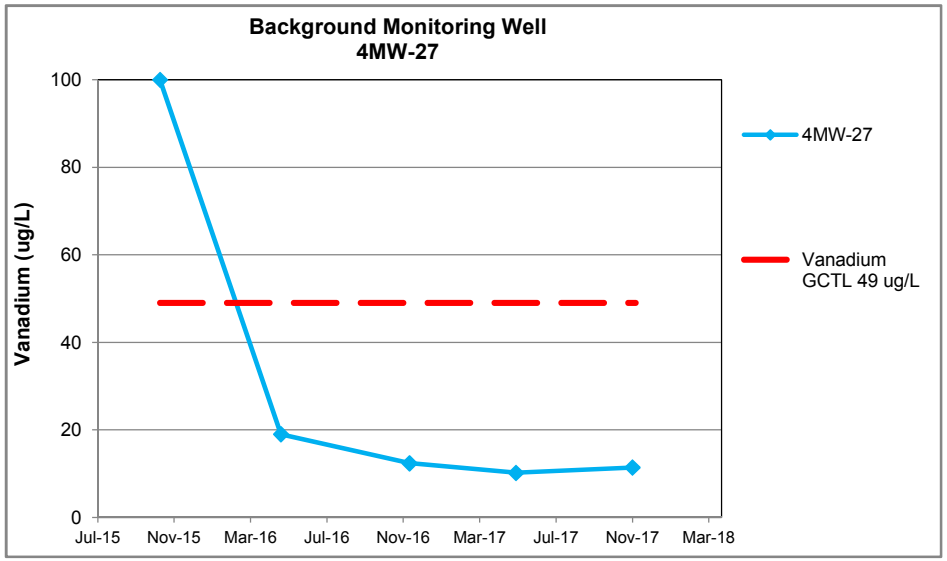


Figure 3-13
Sodium Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

BACKGROUND MONITORING WELLS





DETECTION MONITORING WELLS

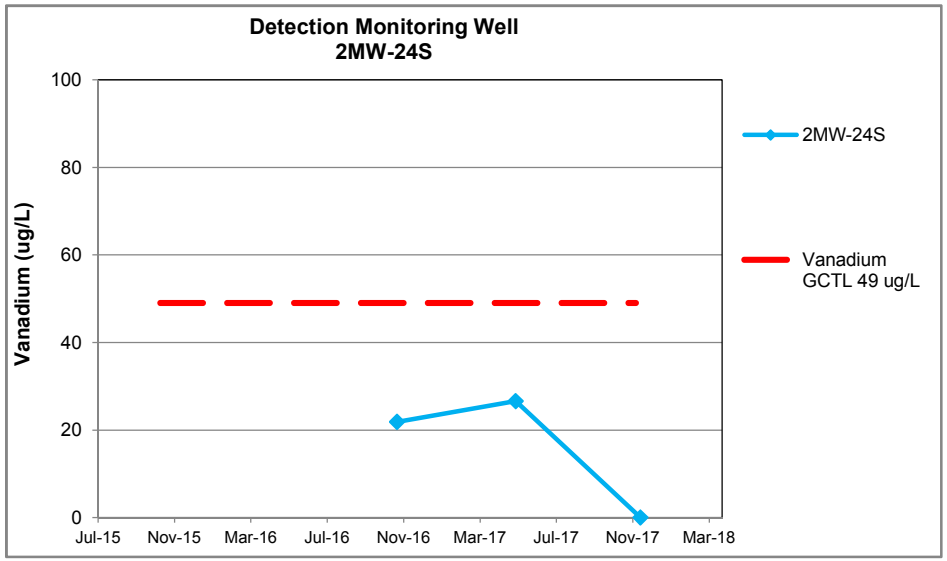


Figure 3-14
Vanadium Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

Note: All other wells had no detections of Vanadium

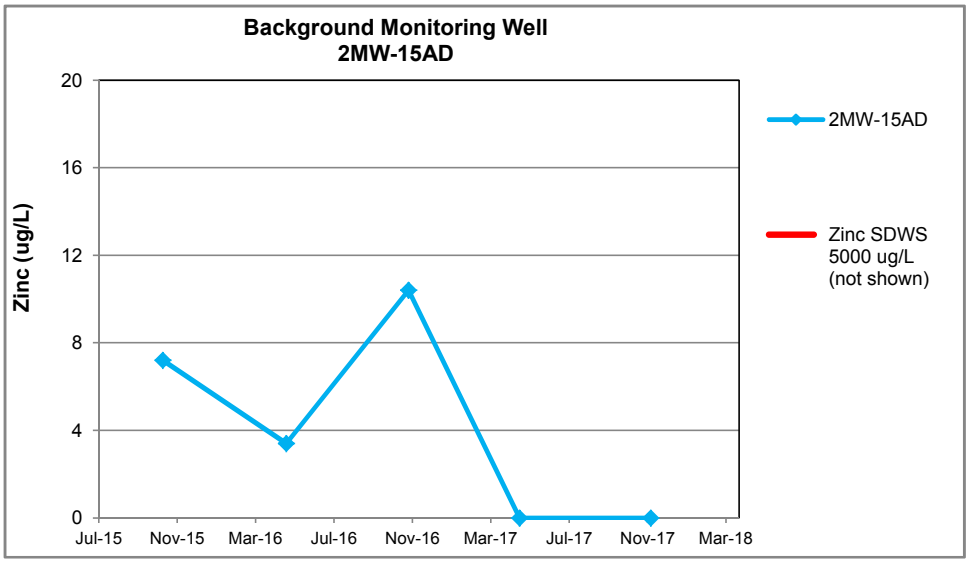
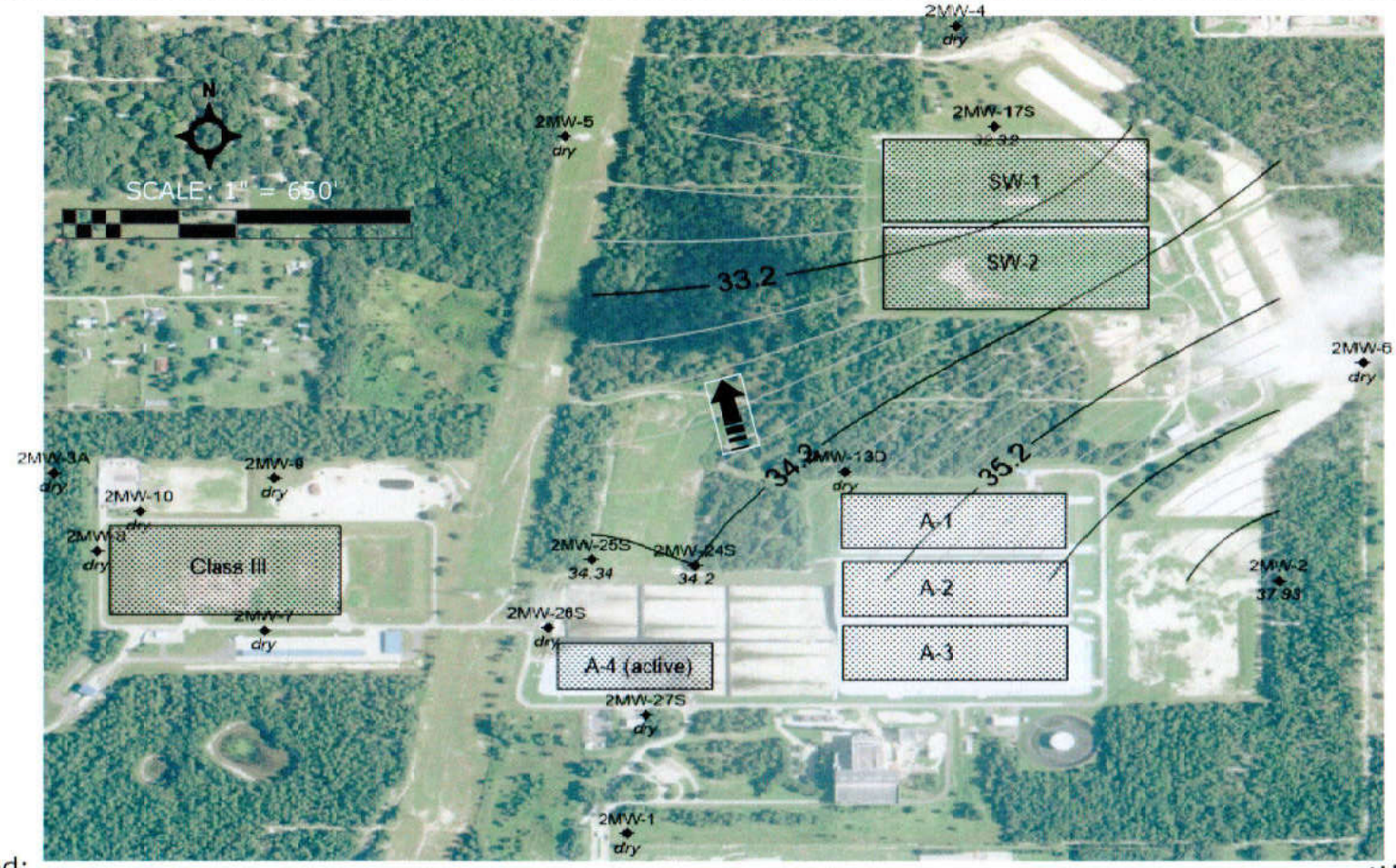


Figure 3-15
Zinc Concentrations in Class I Landfill Monitoring Wells
West Pasco Resource Recovery
2S15 through 2S17

Note: No other monitoring wells had consistent or significant detections of Zinc

APPENDIX A



NOTE: Water Elevations Indicated are likely the Floridan aquifer

Legend:

FW-1 Monitoring Well Designation

71.7 Observed Groundwater Elevation (FT NGVD 1988)

72 Groundwater Elevation Contour (FT NGVD 1988)

Waste Disposal Area

Direction of Groundwater Flow

JASON M. GORRIE LICENSE No. 55341 STATE OF FLORIDA PROFESSIONAL ENGINEER

POTENTIOMETRIC SURFACE OF THE SURFICIAL AQUIFER

WEST PASCO SOLID WASTE FACILITY

PREPARED BY

Jason M. Gorrie, P.E.

DATE

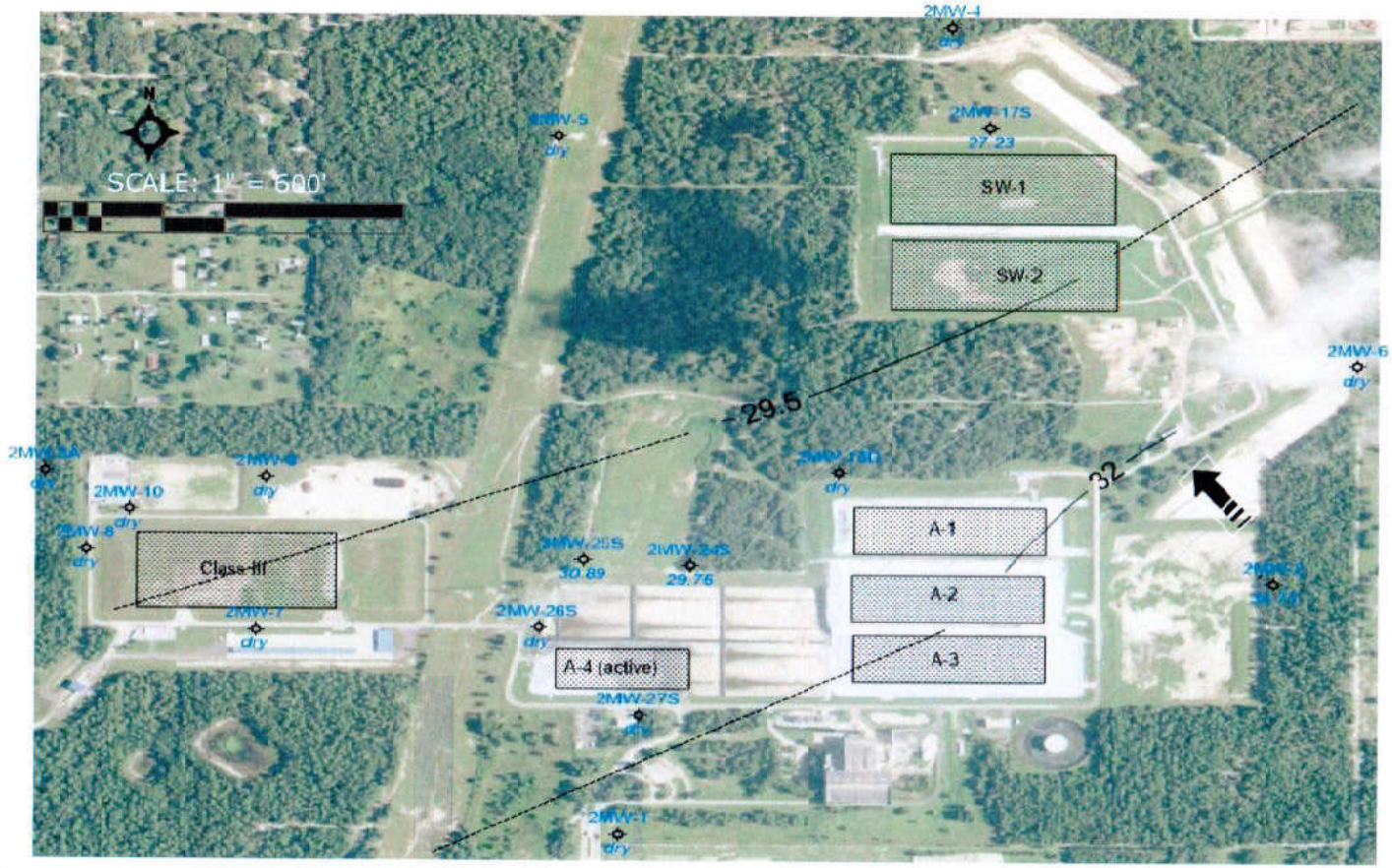
DATA SOURCE

Pasco County Environmental Laboratory
9/22/2015 - 9/28/2015

ING ENGINEERING

COMPLIANCE PERIOD

3rd Qtr 2015



NOTE: Water Elevations Indicated are likely the Floridan aquifer

Legend:

2MW-10 Monitoring Well Designation

71.7 Observed Groundwater Elevation (FT NGVD 1988)

72 Groundwater Elevation Contour (FT NGVD 1988)

Waste Disposal Area

Direction of Groundwater Flow

POTENTIOMETRIC SURFACE OF THE SURFICIAL AQUIFER

WEST PASCO SOLID WASTE FACILITY

PREPARED BY

Jason M. Gorrie, P.E.

JASON M. GORRIE LICENSE No. 55844 STATE OF FLORIDA PROFESSIONAL ENGINEER

DATE

6/9/2016

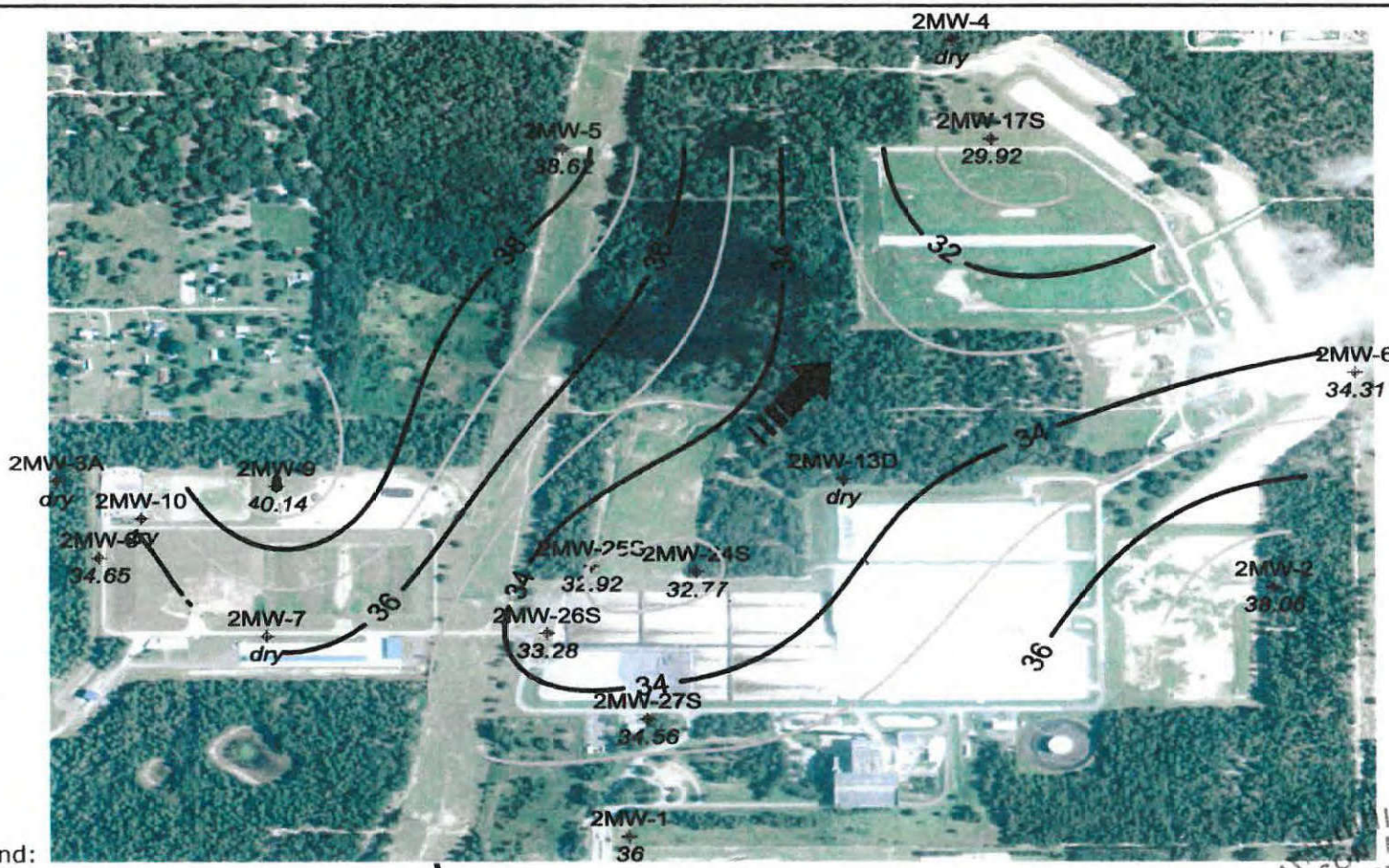
DATA SOURCE

Pasco County Environmental Laboratory
4/11/2016

JMG ENGINEERING

COMPLIANCE PERIOD

2nd Qtr 2016



Legend:

4MW-22 — Monitoring Well Designation

71.7 — Observed Groundwater Elevation (FT NGVD 1988)

72 — Groundwater Elevation Contour (FT NGVD 1988)

Waste Disposal Area

Direction of Groundwater Flow

SCALE: 1" = 600'

JASON M. GORRIE LICENSE No. 55341 STATE OF FLORIDA PROFESSIONAL

POTENTIOMETRIC SURFACE OF THE SURFICIAL AQUIFER

WEST PASCO SOLID WASTE FACILITY

PREPARED BY

Jason M. Gorrie, P.E.

DATE

2/8/2017

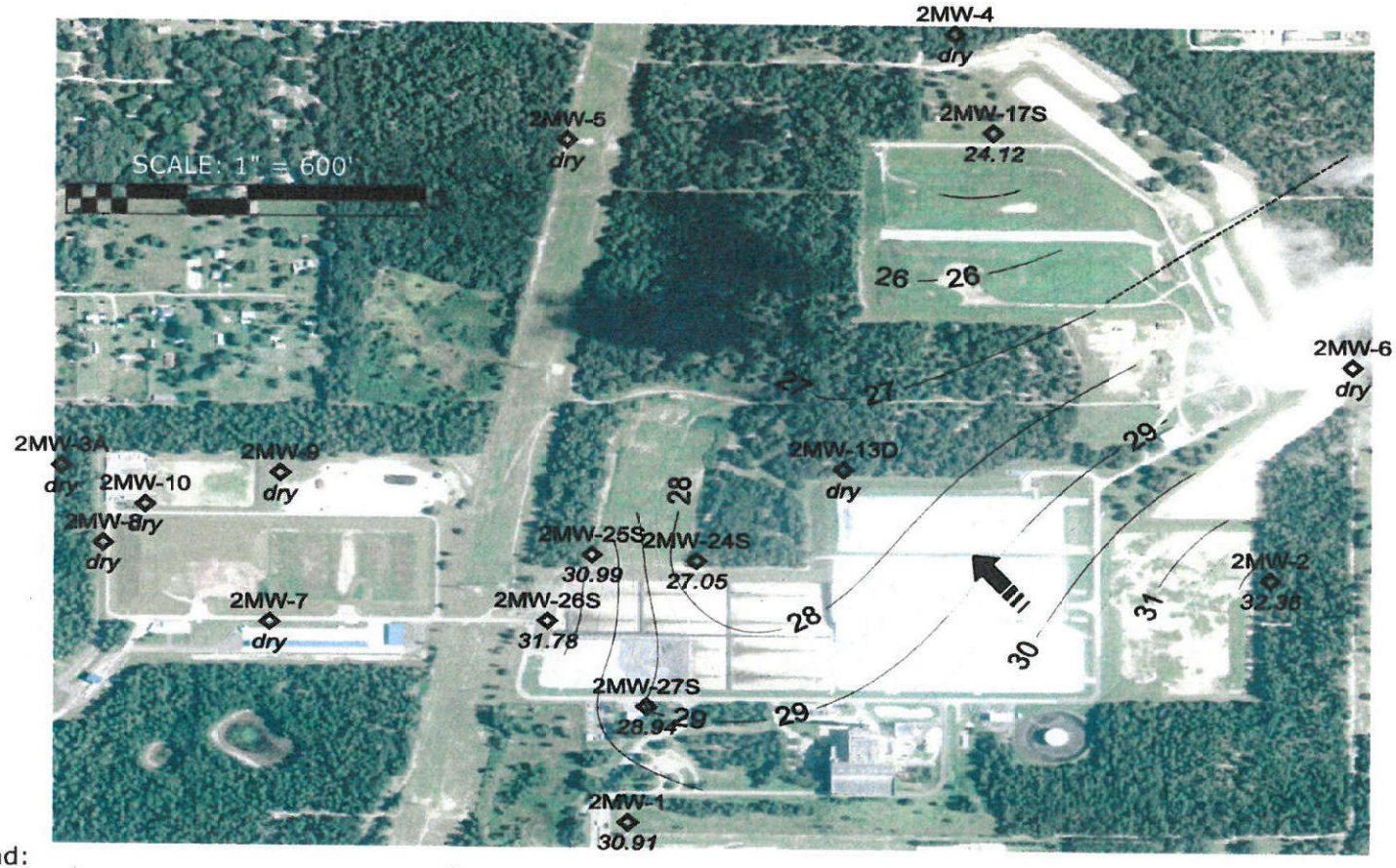
DATA SOURCE

Pasco County Environmental Laboratory
10/18//2016

JMG ENGINEERING

COMPLIANCE PERIOD

4th Qtr 2016



Legend:

2MW-10 Monitoring Well Designation

71.7 Observed Groundwater Elevation (FT NGVD 1988)

72 Groundwater Elevation Contour (FT NGVD 1988)

Waste Disposal Area

Direction of Groundwater Flow

NOTE: Water Elevations Indicated are likely the Floridan aquifer

JASON M. GORRIE LICENSE No. 55341 STATE OF FLORIDA PROFESSIONAL ENGINEER

POTENTIOMETRIC SURFACE OF THE SURFICIAL AQUIFER

WEST PASCO SOLID WASTE FACILITY

PREPARED BY

Jason M. Gorrie, P.E.

DATE

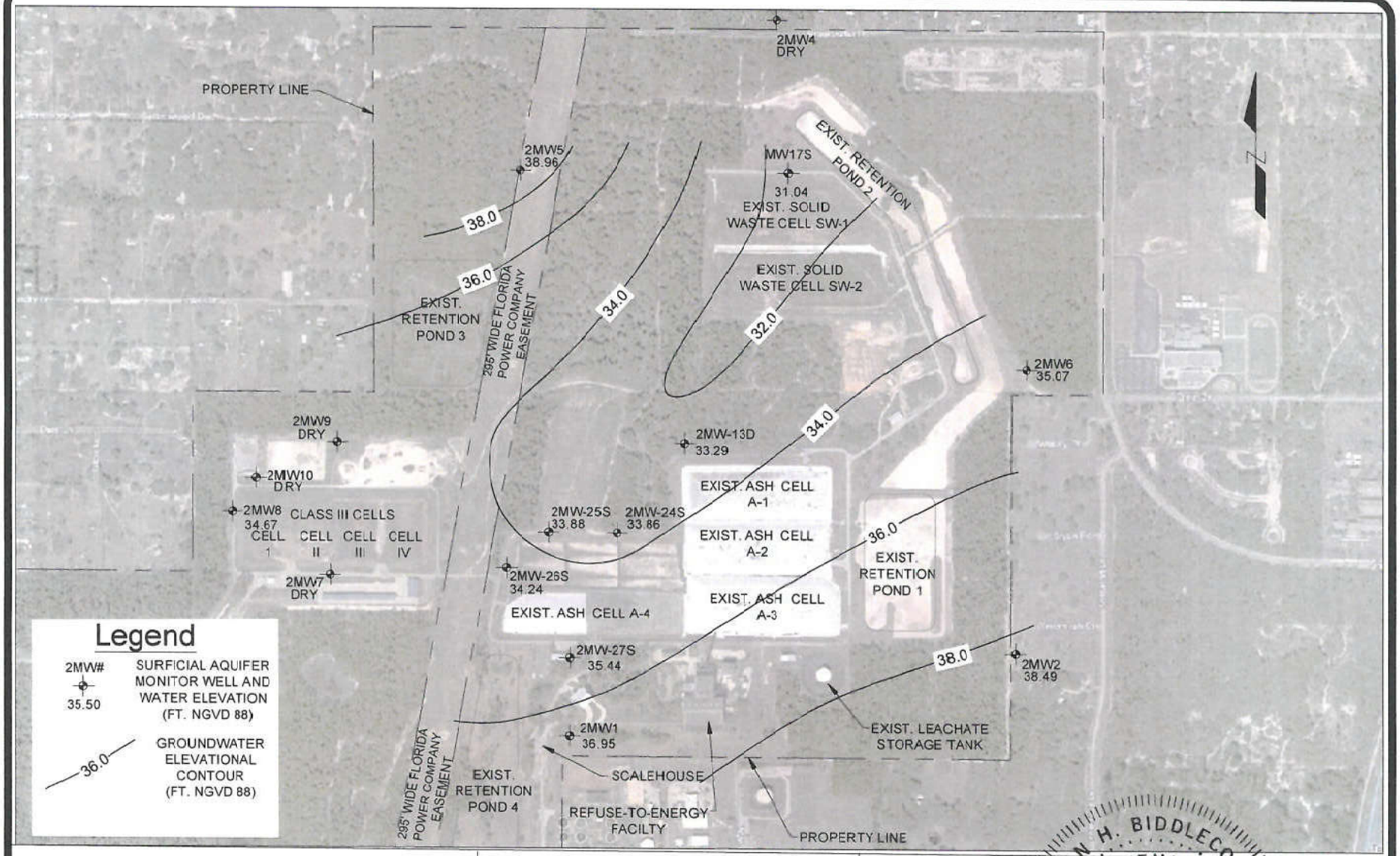
DATA SOURCE

Pasco County Environmental Laboratory
4/18/2017

JMG ENGINEERING

COMPLIANCE PERIOD

2nd Qtr 2017



WEST PASCO RESOURCE RECOVERY FACILITY

Surficial Aquifer Groundwater Contour Map 4th Qtr 2017

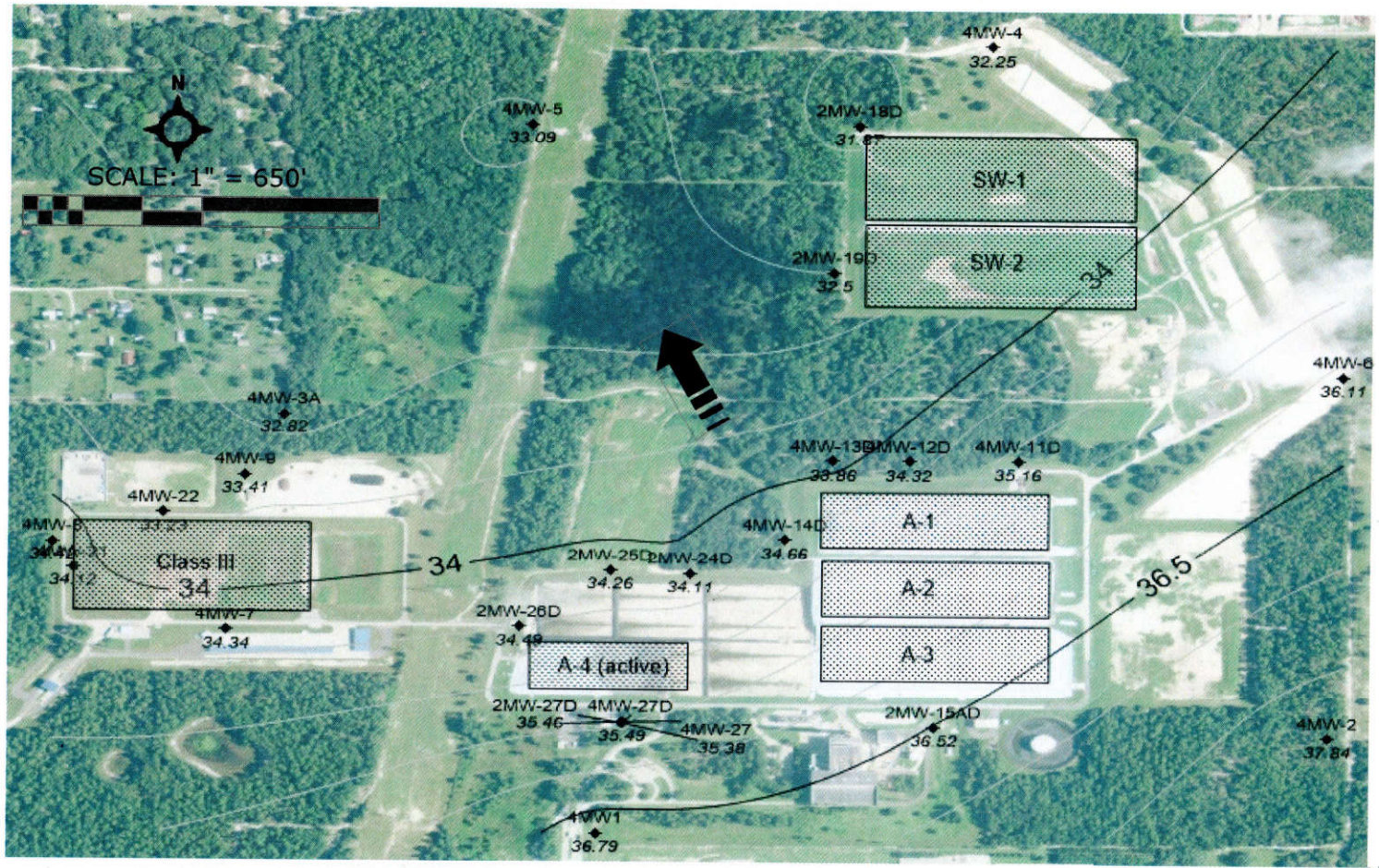
Scale

0 1000 2000 Feet

Project Number:	Date Measured:
18-701.00	October 24th, 2017

ALLAN H. BIDDLECOMB LICENSE No. 1258 STATE OF FLORIDA PROFESSIONAL GEOLOGIST

Approved By:
Allan Biddlecomb PG



Legend:

FW-1 Monitoring Well Designation

71.7 Observed Groundwater Elevation (FT NGVD 1988)

72 Groundwater Elevation Contour (FT NGVD 1988)

Waste Disposal Area

Direction of Groundwater Flow

POTENTIOMETRIC SURFACE OF THE FLORIDAN AQUIFER

WEST PASCO SOLID WASTE FACILITY

PREPARED BY

Jason M. Gorrie, P.E.

JASON M. GORRIE LICENSE No. 55341 STATE OF FLORIDA PROFESSIONAL ENGINEER

DATE

2/4/2016

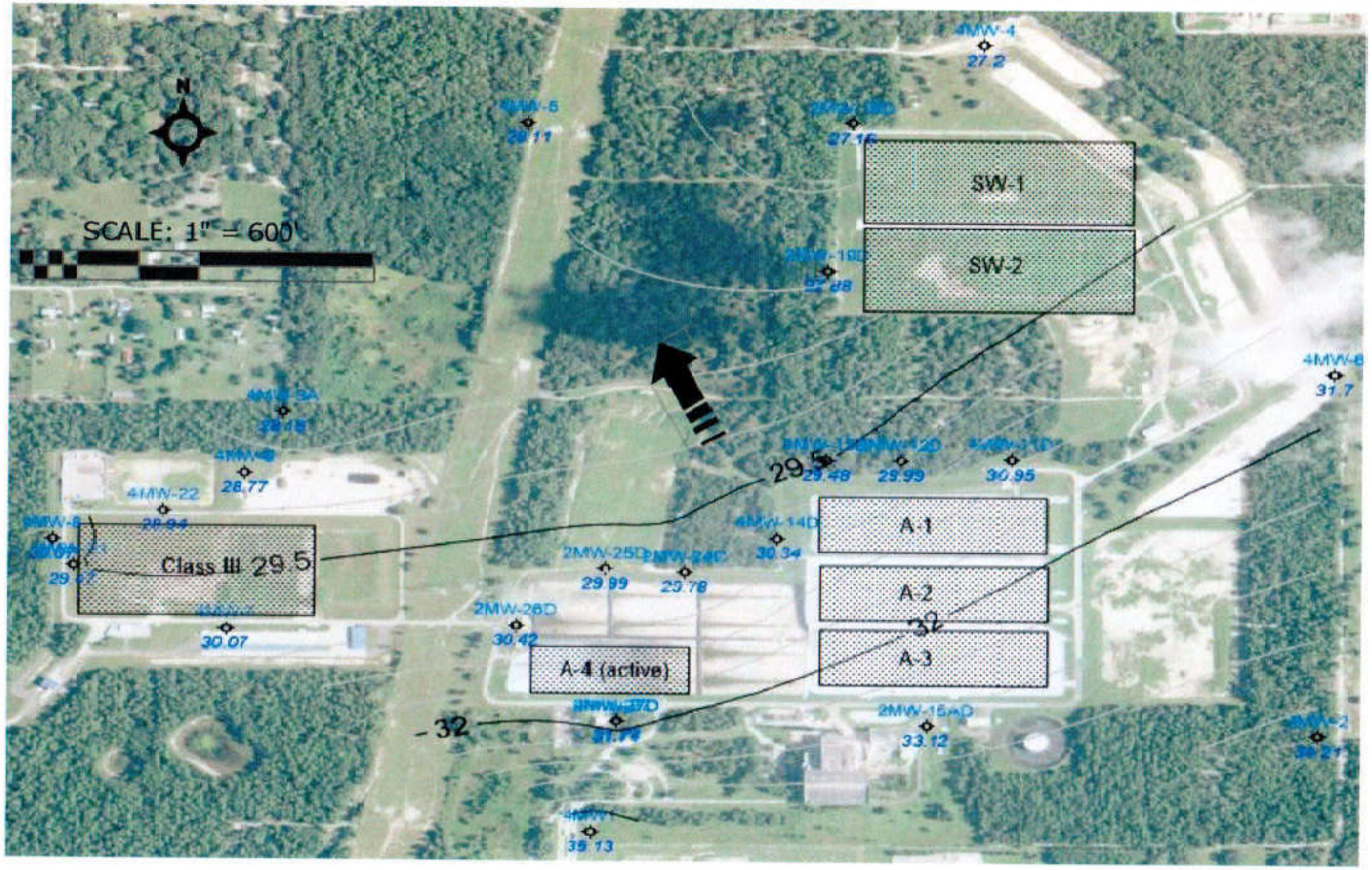
DATA SOURCE

Pasco County Environmental Laboratory
9/22/2015 - 9/28/2015

JMG ENGINEERING

COMPLIANCE PERIOD

3rd Qtr 2015



Legend:

4MW-22 — Monitoring Well Designation

71.7 — Observed Groundwater Elevation (FT NGVD 1988)

72 — Groundwater Elevation Contour (FT NGVD 1988)

Waste Disposal Area

Direction of Groundwater Flow

POTENTIOMETRIC SURFACE OF THE FLORIDAN AQUIFER

WEST PASCO SOLID WASTE FACILITY

PREPARED BY

Jason M. Gorrie, P.E.

DATE

6/9/2016

DATA SOURCE

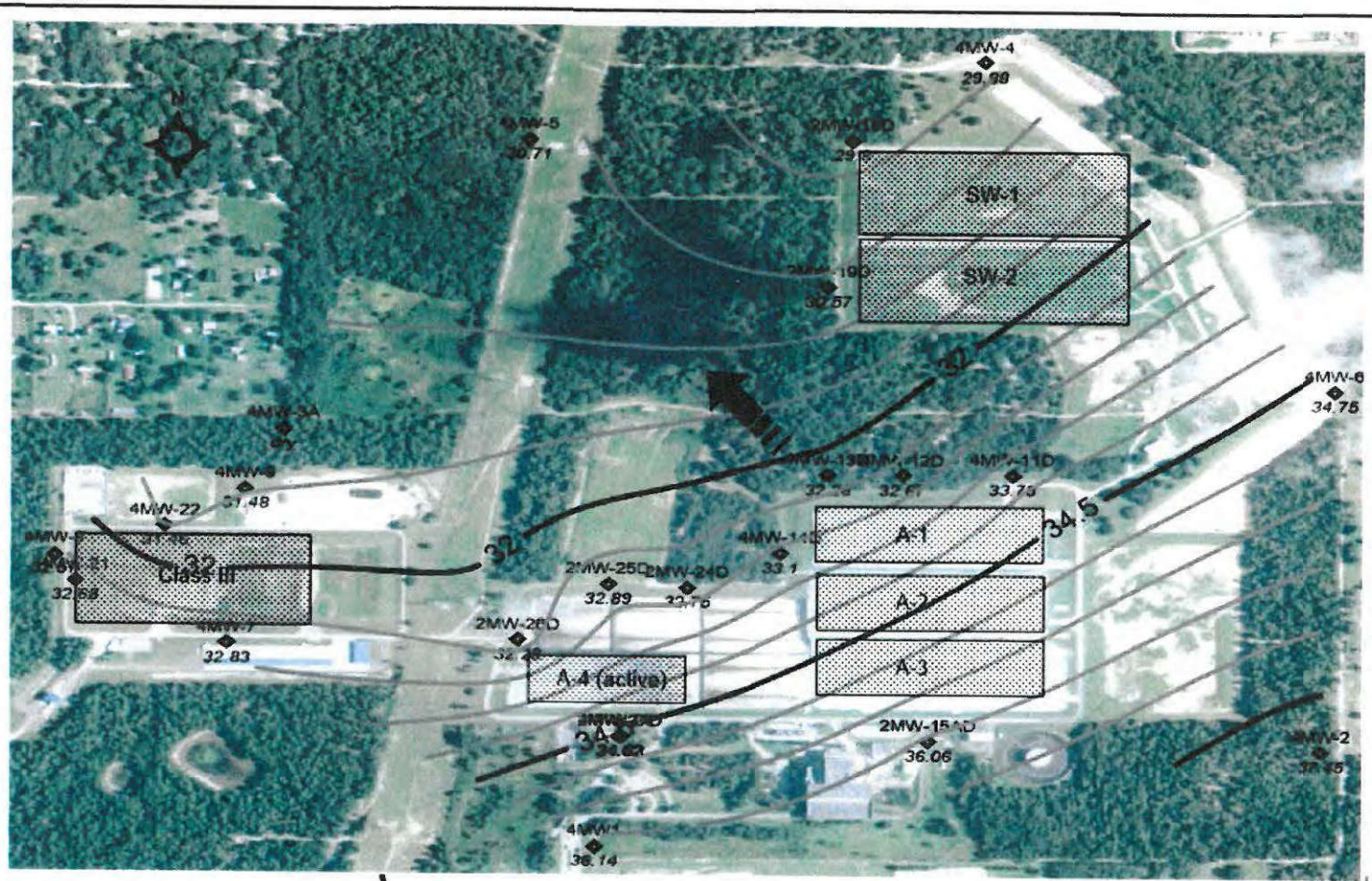
Pasco County Environmental Laboratory
4/11/2016

COMPLIANCE PERIOD

2nd Qtr 2016

JMG ENGINEERING

JASON M. GORRIE LICENSE No. 56341 STATE OF FLORIDA PROFESSIONAL ENGINEER



Legend:

4MW-22 — Monitoring Well Designation

71.7 — Observed Groundwater Elevation (FT NGVD 1988)

72 — Groundwater Elevation Contour (FT NGVD 1988)

Waste Disposal Area

Direction of Groundwater Flow

SCALE: 1" = 600'

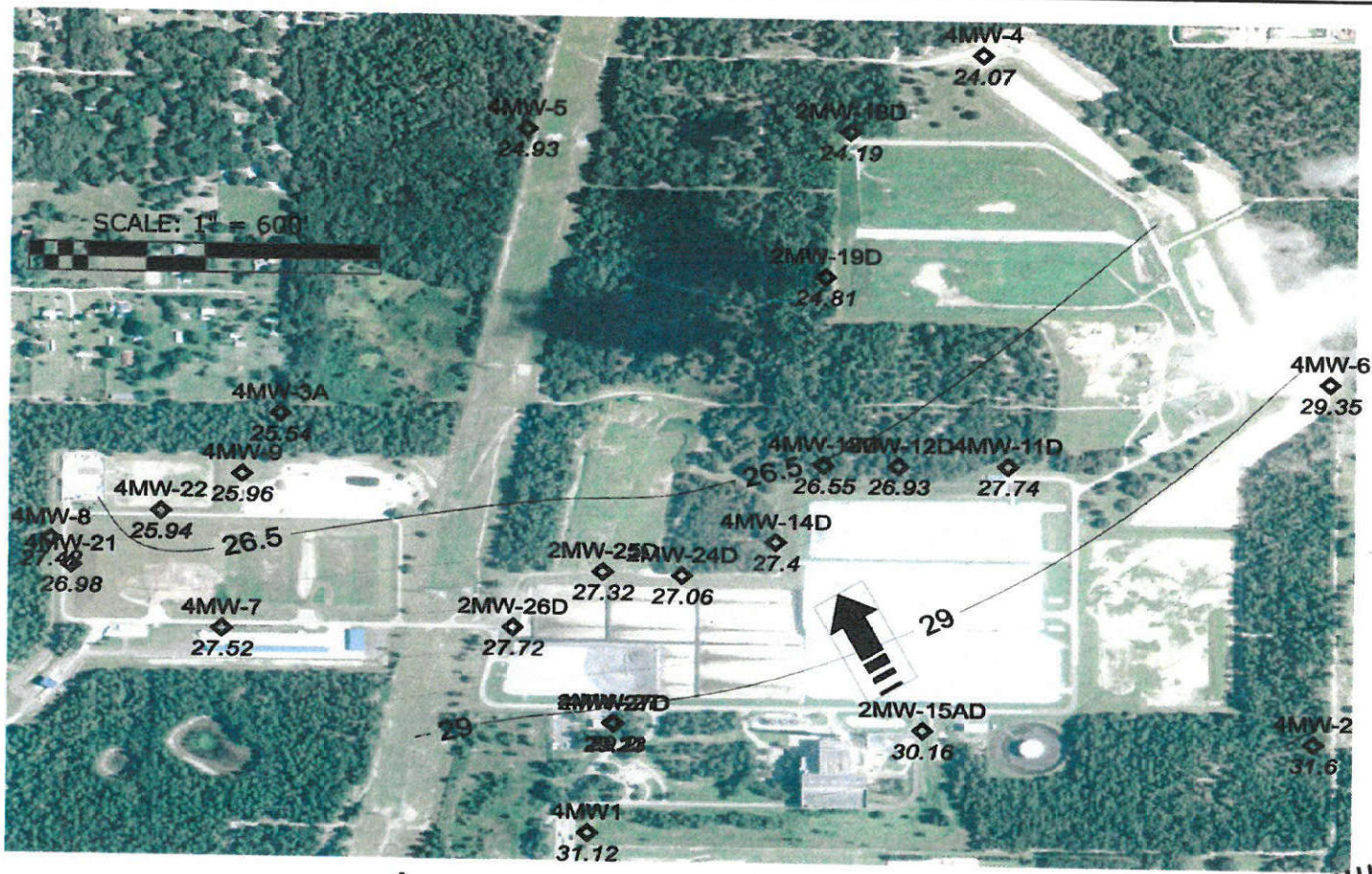
JASON M. GORRIE LICENSE No. 55341 STATE OF FLORIDA PROFESSIONAL ENGINEER

POTENTIOMETRIC SURFACE OF THE FLORIDAN AQUIFER

WEST PASCO SOLID WASTE FACILITY

PREPARED BY	DATE
Jason M. Gorrie, P.E.	2/8/2017
DATA SOURCE	COMPLIANCE PERIOD
Pasco County Environmental Laboratory 10/18//2016	4th Qtr 2016

JMG ENGINEERING



Legend:

4MW-22 — Monitoring Well Designation

71.7 — Observed Groundwater Elevation (FT NGVD 1988)

72 — Groundwater Elevation Contour (FT NGVD 1988)

Waste Disposal Area

Direction of Groundwater Flow

JASON M. GORRIE — No. 55341 — STATE OF FLORIDA — PROFESSIONAL ENGINEER

POTENTIOMETRIC SURFACE OF THE FLORIDAN AQUIFER

WEST PASCO SOLID WASTE FACILITY

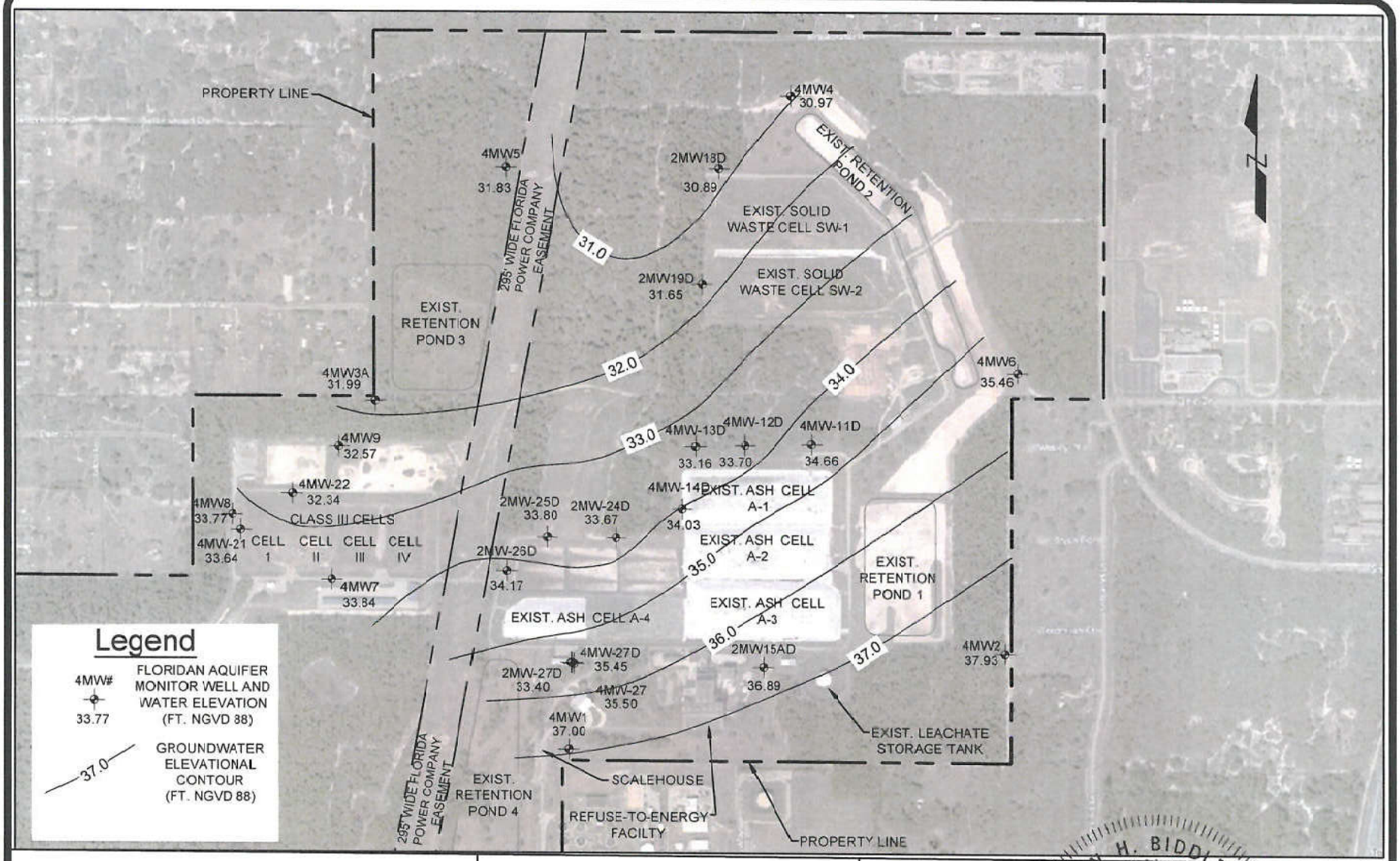
PREPARED BY: Jason M. Gorrie, P.E.

DATE: 7/20/17

DATA SOURCE: Pasco County Environmental Laboratory 4/18/2017

JMG ENGINEERING

COMPLIANCE PERIOD: 2nd Qtr 2017



WEST PASCO RESOURCE RECOVERY FACILITY

Floridan Aquifer Groundwater Contour Map 4th Qtr 2017

Scale
0 1000 2000 Feet

Project Number:	Date Measured:
18-701.00	October 24th, 2017

ALLAN H. BIDDLECOMB LICENSE No. 1218 STATE OF FLORIDA PROFESSIONAL GEOLOGIST

Allan H. Biddlecomb 11/7/2017

Approved By:
Allan Biddlecomb PG