Prepared for

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SEMI-ANNUAL GROUNDWATER MONITORING REPORT NO. 12 JANUARY THROUGH JUNE 2014

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PROFESSIONAL ENGINEER CERTIFICATION

I certify that I am a qualified engineer who has received a baccalaureate or post-graduate degree in the natural science or engineering, and have sufficient training and experience in environmental assessment and corrective measures, as demonstrated by state registration and completion of accredited university courses, that enable me to make sound professional judgments. I further certify that this report was prepared by myself or by a subordinate working under my direction.

_____

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1. INTRODUCTION

1.1 Background

1.1.1 Site Location and Description

The Chemtrade Solutions LLC (CSL), formerly General Chemical LCC facility (Site) is located on Central Avenue in the City of East Point, Fulton County, Georgia (**Figure 1-1**). The approximate Site location corresponds to latitude of 33.67 and longitude of 84.44. The Site property is bounded by North Martin Street and the Charles A. Green Recreational Facilities on the north side, Randall and Bayard Streets on the east side, Central Avenue and an industrial (metal recycling) facility on the south side, and Central Avenue on the west side. The general area surrounding the CSL facility consists of industrial land uses bordered by some residential properties toward the north and northeast directions. Another industrial site is located on the adjacent property to the northwest of the CSL facility.

The Site, as shown in an aerial view on **Figure 1-1**, consists of a process building, a warehouse structure, and an office building. During operation, there were four Hi-Clay Alumina (HCA) storage cells (herein referred to as HCA cells) located on the Site. These cells were removed during the period of 2003 to 2005, and the area was returned to beneficial use in 2006.

1.1.2 Summary of Recent Regulatory Activities

Subsequent to the issue of the 2002 Corrective Action Plan (CAP), GCL voluntarily elected to remove the HCA material from the on-site cells.

Following excavation and removal of the HCA, a revised CAP was issued by GCL on 2 October 2006. A Georgia Environmental Protection Division (GaEPD) letter dated 16 January 2007 provided comments and a request for additional work followed by resubmission of the revised CAP.

GCL submitted a revised CAP incorporating GaEPD comments on 30 March 2007.

GaEPD completed review and issued a conditional approval of the revised CAP on 4 September 2007. Pursuant to the revised CAP, groundwater and surface water samples were collected for aluminum and sulfate analysis.

GCL submitted a voluntary remediation plan application (VRPA) in January 2013. The VRPA proposed: (i) delineation of the horizontal extent of sulfate contamination in groundwater; (ii) continued semi-annual sampling of monitoring wells screened in the partially weathered rock (PWR) and surface water sampling locations; (iii) conduct a storm water drain assessment and implement any necessary repairs to prevent groundwater from entering the storm drain system; and (iv) institutional controls on affected properties through the placement of unified environmental covenants.

In a letter dated 10 April 2013, GaEPD approved the VRPA. GaEPD issued comments on the VRPA on 12 April 2013.

General Chemical LLC was acquired by Chemtrade Solutions LLC on 24 January 2014. The General Chemical LLC name will be used when historically accurate and Chemtrade Solutions will be used for activities after the acquisition date.

1.2 Objectives and Scope

The objective of this report is to present the results for the semi-annual groundwater monitoring activities conducted at the CSL site in April 2014. This is the third semi-annual report submitted to GaEPD following approval of the VRPA in April 2013. However, this report is issued as "Semi-annual Groundwater Monitoring Report No.12" to avoid confusion with previous reports issued under the CAP. This report provides a summary of the activities performed and the results of the field and laboratory measurements that were obtained during this monitoring period.

This report presents the results of the following activities:

- Sampling of 6 on-site wells (**Figure 1-2**);
- Sampling of 3 off-site wells (**Figure 1-2**); and
- Sampling of surface water at one on-site and three off-site locations (**Figure 1-3**).

1.3 Overview

This semi-annual groundwater monitoring report summarizes the results of field sampling activities performed by Geosyntec in April 2013. The report is organized as follows:

- Section 2 presents a summary of site characterization information including site geology and hydrogeology, field investigations, nature and extent of environmental impact, and site-specific groundwater and contaminant transport conceptual modeling.
- Section 3 presents the results from sampling of monitoring wells and surface water from the Site.
- Section 4 discusses the sampling procedures used to obtain groundwater and stormwater samples from the Site
- Section 5 summarizes the results of quality assurance/quality control (QA/QC) evaluation of the data obtained during this monitoring period.
- Section 6 presents conclusions that are based on the data and provide recommendations for future activities.
- Data from this monitoring period are presented in the Appendices. Analytical laboratory reports for water samples are presented in **Appendix A**. Field Forms used during well sampling are presented in **Appendix B**.

2 SITE CHARACTERIZATION

2.1 Site Geology and Hydrogeology

This section presents an overview of the Site hydrogeologic conditions. Information on the Site hydrogeology was obtained during the Site investigation activities, conducted in May 1998 in support of the Compliance Status Report (CSR) [Geosyntec, 1999].

The occurrence and movement of groundwater in the Piedmont formation is generally within two hydrogeologic units. A shallow hydrogeologic unit typically occurs within the soils and saprolite (weathered residuum which mantles bedrock). A layer of partially weathered rock (PWR) typically forms a transition between the saprolite and the fractured bedrock. A deeper hydrogeologic unit generally occurs within the fractured bedrock.

Groundwater in the shallow hydrogeologic unit usually occurs under water table (i.e., unconfined) conditions. Groundwater flow is controlled by local topographic features, where recharge occurs in upland areas and discharge occurs in drainage features such as streams, rivers, or lakes. Recharge to the shallow hydrogeologic unit is primarily the result of infiltrating precipitation. Groundwater in the deeper water-bearing zone is associated with secondary porosity (fractures or open spaces) within the crystalline bedrock and flow is controlled by the distribution and degree of interconnection of these openings in the rock. The deeper hydrogeologic unit is fully saturated.

Based on the results of the field investigation, the shallow hydrogeologic unit is conceptualized as an unconfined, homogeneous, and isotropic deposit of sandy clay with a hydraulic conductivity of approximately 4×10^{-5} to 2×10^{-4} cm/s, a hydraulic gradient of approximately 0.003 to 0.03, and an effective porosity of about 20 percent. Groundwater is believed to generally flow at about 16.4 ft per year from west to east across the Site and advection is believed to be the dominant contaminant transport mechanism.

The CSL Site is in an area of relatively steep topography adjacent to a small intermittent stream that discharges to the South River. As can be seen on the aerial photograph of the Site presented in **Figure 1.2**, industrial operations at the Site have resulted in regrading and leveling of a significant portion of the Site (i.e., vegetated areas east of the process buildings). Groundwater flow at the Site is generally west to east.

The lithology of the Site consists primarily of clayey fill material overlying saprolite as depicted on **Figure**s **2-1 through 2-3**, which illustrate hydrogeologic cross-sections that show the Site features and geology. The fill material, which varies in thickness, covers most of the Site and consists of sandy to gravelly red micaceous clay. The saprolite, encountered in all fourteen of the monitoring wells drilled at the Site, consists of highly weathered schist consisting of orange to red clay with kaolinite and mica. Foliation and other relict rock texture are still well preserved and were visible in samples, but the material comprises mostly clay and mica which is formed by the deep weathering of the feldspar minerals. Competent bedrock, as defined by auger refusal, was generally encountered between 20 to 60 feet below ground surface (bgs).

2.2 Summary of Previous Site Investigations

The aluminum concentrations observed in the Site soil during the course of the CSR investigation are within the range typically seen in Piedmont soils (i.e., 70,000 to 100,000 mg/kg). The samples, in which the aluminum concentrations were elevated, were limited to locations of accumulation of more strongly weathered material. Therefore, based on detected concentrations of aluminum in soil samples, industrial activities at the Site have not resulted in a significant increase in aluminum concentrations in the soil [Geosyntec, 1999].

The HCA was removed between 2003 and 2006. Sulfate concentrations vary according to the nature of the material analyzed and were related to the proximity to former HCA cells. In places where the undisturbed soils directly underlie former HCA cells, sulfate concentrations in these soils were typically higher than those of other undisturbed soils. Following removal of the HCA, underlying soils were sampled and analyzed for sulfate, and soils exhibiting sulfate concentrations over 10,300 mg/kg (95% Upper Confidence Limit for all samples was 3,143 mg/kg) were removed.

3. GROUNDWATER AND STORM DRAIN SAMPLING

This section presents the details of the sampling of six on-site wells, and three off-site groundwater wells and one on-site and three off-site stormwater storm drains.

3.1 Groundwater Potentiometric Conditions

Groundwater elevations were measured prior to sampling wells during the April sampling event. The measurements were performed on 14 April 2014. All monitoring wells were gauged. The water level measurements from delineation soil borings and PZ-07 are included in the analysis to provide water level detail offsite however they were not gauged during this round of sampling. The groundwater sampling and water level measurements from the delineation borings are attached as Addendum 1 to this report. The results of the groundwater elevation measurements are provided in **Table 3-1**.

The potentiometric map for April 2014 readings is shown in **Figure 3-1**. This map shows the typical Piedmont pattern of flow following topography towards surface water features, which act as collectors and discharge points for the groundwater. Since there are no streams at the Site, the groundwater is flowing towards the local topographic low which is aligned parallel with North Martin Street and the storm drain system. The general potentiometric pattern is consistent with the overall drainage flow pattern to the east-southeast towards the South River.

Water level measurements were recorded in wells screened in saprolite and shallow competent rock. In preparing the potentiometric map from water level measurements, generally no distinction was made as to whether the wells were shallow or deep, in saprolite or bedrock. Such distinctions were not appropriate for two reasons: (i) the Piedmont is characterized by a single saturated zone consisting of saprolite and bedrock that are hydraulically connected; and (ii) the vertical components of the head gradient are similar or small compared to the horizontal components.

3.2 Groundwater Sampling

3.2.1 Introduction

Groundwater samples were collected on 14-16 April 2014. Groundwater samples were submitted for analysis for sulfate using EPA Method 9056A and aluminum using EPA

Method 6010C. The pH was measured in the field using EPA Method 150.1. The groundwater sampling results are presented in **Table 3-2**. Laboratory results are presented in **Appendix A** and field forms are presented in **Appendix B**.

3.2.2 Groundwater Constituent Summary

Sulfate was detected at all monitoring wells during the April 2014 sampling event. The measured sulfate concentrations were lower in the off-site wells, 110 mg/l at EPW-01 at the northwestern boundary of the Site, and 30 mg/l at EPW-02 to the east of the Site. Sulfate concentration in off-site well EPW-03D was 26 mg/l. On-site well OW-1A at the western boundary was measured at 47 mg/l. The background monitoring well GCW-01D at the upgradient edge of the site had 240 mg/l of sulfate. The results indicate groundwater entering the site contains background concentrations of sulfate between 47 to 110 mg/l as measured at OW-1A and EPW-01. These values are also consistent with the upgradient storm drain location SW-09 where sulfate has been measured between <0.1 to 92 mg/l. Sulfate concentrations along the northern property boundary at GCW-04D were 5,400 mg/l. Sulfate at the eastern boundary at GCW-02D and GCW-03D were 3,000 and 4,500 mg/l, respectively. The source area monitoring well (GCW-05) sulfate concentration was 790 mg/l.

Aluminum was detected at seven of the nine monitoring wells during the April 2014 sampling event. The concentrations were low at the off-site wells, 12.9 mg/l at EPW-01 at the northwestern boundary of the Site and <0.1 at EPW-02 and EPW-03D, located to the east and northeast of the Site, respectively. On-site well OW-1A at the western boundary had 0.7 mg/l of aluminum. The background monitoring wells GCW- 01D at the upgradient edge of the site contained 6.2 mg/l. The results indicate groundwater entering the site contains background concentrations of aluminum between 0.7 to 12.9 as measured at OW-1A and EPW-01. These values are also consistent with the upgradient storm drain location SW-09 where aluminum has been measured between <0.1 to 4.87 mg/l. The aluminum concentration along the northern property boundary at GCW-04D was 505 mg/l. Aluminum concentrations at the eastern boundary at GCW-02D and GCW-03D were 197 and 333 mg/l, respectively. The source area monitoring well (GCW-05) aluminum concentration was 1.1 mg/l.

The pH measurements were generally consistent across the site. The off-site wells EPW-01, -02, and -03 ranged from 4.7 to 6.2 standard units (s.u.). The upgradient wells GCW-01D and OW-1A were 3.9 and 4.2 s.u. respectively. The northern and eastern

wells were similar and ranged from 3.3 to 3.7 s.u. The pH for source area monitoring well (GCW-05) was measured at 6.9 s.u.

3.2.3 Comparison to Previous Results for Groundwater

Table 3-3 summarizes statistical trend analysis of both aluminum and sulfate data in groundwater. Mann-Kendall trend analysis was performed using available data for each monitoring well at a 95% confidence level. The procedure and methodologies employed in the analysis of the data are consistent with Georgia EPD and United States Environmental Protection Agency (EPA) recommended procedures. These methods meet the performance criteria specified in the rules of the Georgia EPD, Chapter 391-3-4-.14(19) and the technical standards described in the EPA "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Unified Guidance," dated March 2009.

Historical trend graphs for sulfate and pH are shown in **Figure 3-2**. Sulfate concentrations generally decreased or were stable in off-site and on-site wells in groundwater. The sulfate concentrations in monitoring wells GCW-01D, GCW-03D, GCW-04D, GCW-05, EPW-03D and OW-1A showed a statistically significant decreasing trend. This is consistent with the previous semi-annual report. Neither decreasing nor increasing trends were calculated for sulfate concentrations in monitoring wells GCW-02D, EPW-01 and EPW-02. Similarly, aluminum concentrations also decreased or were stable in groundwater. A statistically significant decreasing trend was calculated for aluminum in monitoring wells EPW-02 and OW-01A. Neither decreasing nor increasing trends were calculated for aluminum in the remainder of the wells. The pH measurements were generally stable. The pH measured at on-site wells was generally lower than the pH measured at the off-site wells except for the source area well which had a pH similar to background.

Several conditions not related to the site may slow the return of the site to background concentrations of site constituents, following removal of source materials. These include the following:

- The pH of the groundwater in upgradient wells (OW-1A and GCW-01D) is low. Measured pH values 4.2 and 3.9 s.u. respectively. The low pH condition of groundwater entering the site will slow a return to background conditions for pH and aluminum.

- The pH of rainwater at the site was measured at less than 5 during the HCA removal, therefore infiltrating rainfall will not have a significant effect in terms of raising the groundwater pH in the short-term.

- The area surrounding the site has a number of other sources of sulfate in groundwater resulting from previous operations. Potential sulfate sources include a former battery cracking plant, a former fertilizer manufacturer, two off-site HCA disposal areas operated by others, and a former agricultural chemical manufacturer.

It is encouraging that no significant impacts have been detected at downgradient wells EPW-02 or EPW-03D. The sulfate concentrations at EPW-02 appear stable and are similar to regional background conditions of 46 to 130 mg/l as observed at well EPW-01. EPW-03D is located approximately 200 feet from the site boundary. Sulfate concentrations at EPW-03D are similar to the regional background, and trends are decreasing. The pH trend at the EPW-03D is stable and typical for the Piedmont with measurements generally around 5.5. The decreasing sulfate concentrations and stable pH indicate impacts from the site, if they ever existed, are minimal and decreasing with time. The concentration of constituents of concern from both on-site and off-site sources appear to have attenuated to background levels prior to reaching EPW-02 or EPW-03D.

The removal of the HCA source material appears to be resulting in the site returning to background conditions over time. The sulfate concentrations are in decline at downgradient wells. However, it will take time for residuals to mix with infiltration and incoming groundwater and for geochemical conditions to stabilize.

3.3 Storm Drain Sampling

3.3.1 Introduction

Storm drain water samples were collected from one on-site and three off-site storm drains in April 2014. Surface water flows in the storm drain system in the following sequence: SW-09, SW-06, SW-02, SW-07 from upstream to downstream. The purpose of the storm drain sampling program was to evaluate potential impacts to the storm drain system as requested by GaEPD. Stormwater samples were submitted for analysis for sulfate using EPA Method 9056A and aluminum using EPA Method 6010C. The

pH was measured in the field using EPA Method 150.1. The stormwater sampling locations are shown on **Figure 1-3**. The stormwater sampling results are presented in **Table 3-4**. Laboratory results are presented in **Appendix A** and field forms are presented in **Appendix B**.

3.3.2 Storm Drain Constituent Summary

Sulfate was detected at SW-02, SW-09 and SW-07 during the April 2014 sampling event. A sample was collected cross gradient (SW-06) at a location in the Charles A. Green Recreational Facilities. Sulfate was measured at 1,900 mg/l. At the downgradient and on-site location (SW-02), sulfate was measured at 7,300 mg/l which is a significant increase from previous results of 1,500 mg/l. Geosyntec will resample the location to verify the results are representative and will report the result to GAEPD. The discharge of the storm drain to surface water was sampled at SW-07. The sulfate concentration was measured at 440 mg/l which is consistent with the 540 mg/l concentration from last year.

Aluminum was detected at storm drain water monitoring locations during the April 2014 sampling event. The upgradient (SW-09) aluminum concentration was 2.24 mg/l which is an increase from non-detect last year. The sample for aluminum collected cross gradient (SW-06) was measured at 145 mg/l. At the downgradient and on-site location (SW-02) aluminum was measured at 593 which is a significant increase from 112 mg/l last year. The discharge of the storm drain to surface water was sampled at SW-07. The aluminum concentrations was measured at 35.8 mg/l.

3.3.3 Comparison to Previous Results for Storm Drains

Table 3-5 summarizes statistical trend analysis of both aluminum and sulfate data in storm drains. Mann-Kendall trend analysis was performed using available data for each monitoring well at a 95% confidence level. The procedure and methodologies employed in the analysis of the data are consistent with Georgia EPD and United States Environmental Protection Agency (EPA) recommended procedures. These methods meet the performance criteria specified in the rules of the Georgia EPD, Chapter 391-3-4-.14(19) and the technical standards described in the EPA "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Unified Guidance," dated March 2009.

Historical trend graphs for sulfate, aluminum and pH are shown in **Figure 3-3**. Sulfate concentrations were generally stable or increasing. Aluminum concentrations were generally stable or increasing between sampling events. The pH measurements were relatively stable showing minor changes between sampling events at the same location.

Several conditions not related to the site may slow the return of the site to background concentrations of site constituents, following removal of source materials. These include the following:

- The pH of rainwater at the site was measured at less than 5 during the HCA removal, therefore infiltrating rainfall will not have a significant effect in terms of raising the stormwater pH.

- The area surrounding the site has a number of other sources of sulfate in groundwater resulting from previous operations. Potential sulfate sources include a former battery cracking plant, a former fertilizer manufacturer, two off-site HCA disposal areas operated by others, and a former agricultural chemical manufacturer.

Identification of an off-site source upgradient of delineation boring DB-5.

4. SAMPLE COLLECTION PROCEDURES

4.1 Summary

In April 2014, samples were collected from 9 monitoring wells. Samples from monitoring wells were collected using dedicated tubing and low-flow purging techniques. Samples were placed in 250 ml polyethylene containers. The containers for aluminum were acidified with approximately 2 ml of nitric acid. Sulfate samples were preserved by refrigeration. The sampling containers and preservatives were provided by Analytical Services, Inc. located in Norcross, Georgia. The containers were labeled and stored on ice in a cooler until time for shipment to the laboratory. The samples were packed in ice in a cooler and shipped by overnight courier or hand delivered to the laboratory. Chain-of-custody documents were completed and included with each shipment.

4.2 Monitoring Well Sampling Procedure

Monitoring wells were sampled using peristaltic pumps. Peristaltic pumps were used since the depth to water was less than 29 ft bgs, which is the maximum practical lift a peristaltic pump can achieve. The advantages of peristaltic pumps are that they produce low rates of flow with minimal surging and can be decontaminated more thoroughly when compared to bailers or other types of pumps by simply replacing the tubing in the pump head. The pump-head tubing is silicone, while the down-hole tubing is polyethylene.

Low flow purging is conducted by purging groundwater from the well at a low, constant rate for an extended period of time with the pump intake set directly opposite the well screen. This method creates a localized flow system in the well directly between the screen and pump intake, eliminating the need to remove large volumes of casing storage while ensuring that the sample collected is representative of the surrounding ground water. For this project, a purge rate of approximately 500 mL/min was extracted until the turbidity was stable at less than 20 NTUs or until other field parameters were stable. Additionally, a purge volume of at least five gallons was removed, when possible, to represent at least three pore volumes of the screened zone of the well.

To ensure that the samples collected are representative of the ground water in the formation, field parameters are measured throughout the purging process. Temperature (^{o}C), conductivity (mS/cm), pH (s.u.), redox potential (mV), and turbidity (NTU) are measured using a Horiba U-52 or equivalent water quality meter. Measurements were taken in an enclosed flow-through cell to minimize the effects of contact with air.

After the field parameters have stabilized, the flow-through cell was disconnected and the sample is collected directly from the pump discharge tubing without adjusting the flow rate. This method ensures that the sample is representative of the ground water surrounding the respective location.

4.3 Groundwater Sampling Decontamination Procedure

Down well tubing was dedicated to each monitoring well by securing to the well cap and placing the tubing completely in the well when not in use. Pump-head tubing for the peristaltic pump was discarded after each use.

4.4 Storm Drain Sampling Procedure

Storm drain water was sampled using peristaltic pumps or by hand. The pump-head tubing is silicone, while the down-hole tubing is polyethylene.

Storm drain water sampling was performed at the upgradient (SW-09), on-site (SW-02) and crossgradient (SW-06) locations by lowering tubing into storm drain manholes and placing the end of the tube near the outlet for the manhole. This ensured water from multiple inlets was mixed prior to sample collection. The downgradient (SW-07) sample was collected by hand at the outlet to the storm drain at the discharge to the stream.

For peristaltic pump samples, a purge rate of approximately 500 mL/min was maintained until the turbidity was stable at less than 20 NTUs or until other field parameters were stable. To ensure that the samples collected are representative of the storm drain water, field parameters are measured throughout the purging process. Temperature (^{o}C), conductivity (mS/cm), pH (s.u.), redox potential (mV), and turbidity (NTU) are measured using a Horiba U-52 or equivalent water quality meter. Measurements were taken in an enclosed flow-through cell to minimize the effects of contact with air.

After the field parameters have stabilized, the flow-through cell was disconnected and the sample is collected directly from the pump discharge tubing without adjusting the flow rate. This method ensures that the sample is representative of the storm drain water surrounding the respective location.

For hand samples, a location near the center of the flow and free of surface debris was selected. The sample was collected from beneath the surface by inserting the container opening down into the water then inverting underwater. The field parameters were measured by inserting the water quality instrument in the flow at the sampling location.

4.5 Storm Drain Sampling Decontamination Procedure

Drop tubing and pump-head tubing for the peristaltic pump were discarded after each use.

5. QUALITY ASSURANCE/QUALITY CONTROL

The field and analytical data from this reported semi-annual groundwater monitoring period was reviewed by Mr. Brian Jacobson with Geosyntec. The data review included evaluation of the field and laboratory quality assurance/quality control (QA/QC) parameters in order to assess the integrity of the data obtained for this project including: documentation, holding times, laboratory control samples, and laboratory matrix spike analyses. The documentation and results of the QA/QC analyses are found in the laboratory reports provided in **Appendix A**. Evaluation of these parameters was used to assess the precision, accuracy, representativeness, comparability, and completeness of the data.

Based on the review of the field and laboratory data, the data obtained from this field investigation are considered to be of acceptable quality and are fully usable with the qualifications as designated by the data validation process. Details of the QA/QC review of the data are presented in the following sections.

5.1 Documentation

Field sampling forms and chain-of-custody forms were evaluated for completeness. Field records were considered to be usable and to provide a reasonable record of field activities and samples collected. This review indicated that field sampling and custody transfer procedures were adequately documented and the integrity of the samples was not compromised.

5.2 Holding Times

All samples were processed and analyzed by the laboratory using the correct analytical methods and within the prescribed holding times.

5.3 Reporting Limits

The laboratory reporting limits for sulfate by Method 9056A varied from 5 to 1000 mg/l depending on the required dilution to measure a result. The laboratory reporting limits for aluminum by Method 6010C varied between 0.1 mg/l and 2 mg/l. The required quantitation limits for this project were met for all data, except in cases where sample dilution was required because of high concentrations of target analytes or matrix interference.

5.4 Accuracy

The accuracy of the data was evaluated by examining the percent recovery (%R) of matrix spikes and matrix spike duplicate (MS and MSD), and laboratory control samples (LCS). A post digestion spike was also performed for aluminum analysis to evaluate possible matrix effects of the digestate. The %Rs met the laboratory-specific QC limits for the laboratory QC LCS samples. The MS samples for sulfate and aluminum were outside the %R limits for MS and MSD samples as well as for the post digestion spike. The low recoveries were due to the low spike concentration in relation to the actual sample concentration of aluminum and sulfate (sample concentration much greater than the spiked amount). The data were judged acceptable for use based on the acceptable %R for the LCS samples.

5.5 Representativeness

Representativeness was evaluated to assess the degree to which sample results represent the actual concentrations of constituents in groundwater. Representativeness was evaluated qualitatively by reviewing sampling procedures and laboratory analytical procedures. Based on this review, the samples yielded results that provided a good qualitative representation of constituent concentrations in groundwater.

A qualitative evaluation of representativeness was also performed by examining the analysis of laboratory method blanks. Constituents were not detected above the reporting limit in any of the method blanks. This evaluation further demonstrates that the analytical data are representative of actual conditions.

5.6 Comparability

The current field and laboratory methods were compared to methods used during past monitoring periods in order to evaluate the comparability of data obtained during the current monitoring period to data previously obtained. The recommended reporting limits were used for all constituents. The data presented in this report are consistent with the data presented in previous reports.

5.7 Completeness

Completeness was measured by determining the percentage of usable data obtained from samples for this project. The project sample results were found to be 100 percent complete and usable without qualification.

6. CONCLUSIONS

6.1 Groundwater

The results of the six years of data collection indicate concentrations of constituents of concern are generally showing significant decreasing trends for on-site monitoring wells. The HCA source material has been removed for over eight years. While many factors can influence concentrations at any given point in time, (e.g., time since removal of the source, hydrogeologic conditions, and precipitation patterns) it is encouraging to see that concentrations of monitored constituents in the latest round of sampling indicate a decrease and that the general trend is decreasing. Groundwater levels (elevations) have been generally stable since 2008.

Sulfate concentrations show a statistically significant decreasing trend in four of five on-site groundwater wells. The decreasing trends are consistent with source removal followed by natural attenuation of the remaining pore water.

Aluminum concentrations did not vary in a consistent direction between sampling events. Total aluminum concentration is pH dependent and since Piedmont soils contain high levels of naturally occurring aluminum, this phenomenon is not unexpected. Additionally, aluminum hydroxide can migrate as a colloid in groundwater. As shown in **Figure 6-1**, on-site wells consistently had aluminum concentrations above solubility limits indicating solid colloidal aluminum was likely being measured in the groundwater samples. Elimination of the colloidal aluminum would result in at least an order of magnitude reduction in total aluminum measured. For example, as shown on **Figure 6-1**, the measured total aluminum concentration was 29 mg/l, whereas the maximum soluble concentration at pH 4.0 is 0.6 mg/l, a 98 percent decrease from the reported value. The natural filtering of the aluminum floc particles by the soil as the water migrates off site may explain the rapid reduction in observed aluminum concentrations with increasing distance from the former source area.

The pH measurements were generally stable or increasing between the sampling events. While this is encouraging, we believe that local precipitation which has been measured with a pH less than 5 standard units will limit recovery of groundwater pH. The depressed pH will continue to allow naturally occurring aluminum to be mobilized from site soils. However, the aluminum does not appear to migrate off site.

6.2 Storm Drains

Sixteen sampling events have been performed for storm drains. Storm drain water and groundwater are related due to leaks in the storm drains that allow the infiltration/exfiltration of stormwater and groundwater depending on the relative water levels. The stormwater constituent concentrations and pH will vary slowly due to the low groundwater flow velocity across the site (previously estimated at 16.4 ft. per year). The potential presence of off-site sources may slow the return of the stormwater to background conditions. Factors that may slow a return to background include the following:

- The pH of the groundwater in upgradient wells (OW-1A and GCW-01D) is low. Measured pH values were 4.2 and 3.9 s.u., respectively. The low pH values of groundwater entering the site will slow a return to background conditions of stormwater mixed with groundwater exiting the site. The pH of stormwater in the cross-gradient sampling location was measured at 3.8 s.u. This water mixes with on-site stormwater lowering the pH.

- The pH of rainwater at the site was measured at less than 5 during the HCA removal, therefore infiltrated rainfall and stormwater will not have a significant effect in terms of raising the stormwater pH in the short-term.

- The area surrounding the site has a number of other sources of sulfate in groundwater resulting from previous operations. These sites may be contributing the elevated sulfate concentrations noted at SW-06 that were measured at 1,900 mg/l. Potential sulfate sources include a former battery cracking plant, a former fertilizer manufacturer, two off-site HCA disposal areas operated by others, and a former agricultural chemical manufacturer.

The sulfate concentrations at the upgradient monitoring point (SW-09) were lower than on-site (SW-02) or cross-gradient (SW-06) monitoring points. Downgradient (SW-07) sulfate concentration at the exit to the storm drain and the start of open channel flow was measured at 440 mg/l which is above the site background concentration of 46 to 51 mg/l.

The on-site (SW-02) concentrations were lower than the upstream cross-gradient (SW-06) location indicating limited impact, if any, from on-site contributions. Since the on-

site source has been removed and potential off-site sources likely remain the relative contribution from the Site would be expected to continue to decrease with time. As presented in **Figure 3-3**, the time trend analysis shows a continued impact from the upstream SW-06, which is consistent with source removal on site and active potential impacts by a residual plume.

7. REFERENCES

Geosyntec (1999), "*Compliance Status Report*", General Chemical Corporation, East Point, Georgia", prepared by Geosyntec Consultants, February 1999

Geosyntec (2002), "*Revised Corrective Action Plan, General Chemical Corporation, East Point, Georgia"*, prepared by Geosyntec Consultants, February 2002

Geosyntec (2006), "*Site restoration Report, General Chemical Corporation, East Point, Georgia"*, prepared by Geosyntec Consultants, February 2006

Geosyntec (2007), "*Revised Corrective Action Plan, General Chemical Corporation, East Point, Georgia"*, prepared by Geosyntec Consultants, February 2007

Geosyntec (2013), "*Voluntary Remediation Plan Application, General Chemical Corporation, East Point, Georgia"*, prepared by Geosyntec Consultants, January 2013

TABLES

Table 3-1
Well Construction Data and Groundwater Elevations
April
Chemtrade Solutions Site
East Point, Georgia

Location	Well Casing Elevation	Adjacent Soil Elevation	Screen Interval (ft bgs)	Depth to Water (ft)	Groundwater Elevation (ft msl)
				Apr-14	Apr-14
GCW-01S	1023.6	1024.0	15-25	10.0	1013.6
GCW-01M	1023.8	1024.1	34-44	10.0	1013.8
GCW-01D	1023.9	1024.2	58-68	9.3	1014.6
GCW-02S	983.6	983.9	16-26	3.9	979.7
GCW-02D	983.4	983.8	34-44	3.4	980.1
GCW-02V	984.7	985.0	85.5-95.5	3.6	981.1
GCW-03S	981.3	981.6	11-21	4.4	976.9
GCW-03D	981.2	981.6	28-38	4.0	977.2
GCW-04S	996.6	997.0	13-23	8.3	988.4
GCW-04M	997.0	997.4	30-40	8.6	988.5
GCW-04D	996.8	997.1	50-60	8.2	988.6
GCW-04V	996.7	997.0	114-124	9.1	987.6
GCW-05	995.1	994.9	80-90	4.2	990.9
EPW-01	1017.5	1017.7	24.51(1)	15.8	1001.8
EPW-02	980.0	980.3	19.41(1)	9.5	970.4
EPW-03S	984.5	984.8	12-22	9.1	975.5
EPW-03M	984.3	984.6	29-39	8.9	975.4
EPW-03D	984.6	984.9	46-56	8.9	975.7
OW-1A(2)	1030.6	1027.9	23.5-33.5(3)	11.9	1018.7
PZ-1	996.1	996.1	9-19	N/A	N/A
PZ-7	997.9	997.9	9-19	N/A	N/A
DB-01	1031.21	1027.6	N/A	N/A	N/A
DB-02	1008.66	1009.0	N/A	N/A	N/A
DB-03	998.10	993.3	N/A	N/A	N/A
DB-04	992.64	992.3	N/A	N/A	N/A
DB-05	1014.68	1014.7	N/A	N/A	N/A

Notes:
(1): Screen length is unknown. Total depth of the well is indicated in the Table.
(2): Well OW-1A has a casing extending above ground surface 2.7 ft.
(3): Screen interval measured 7 November 2012.
NA: Not available

Table 3-2
Groundwater Sampling Results
April 2014
Chemtrade Solutions Site
East Point, Georgia

Location	pH (-) EPA 150.1	Sulfate (mg/l) EPA 9056A	Aluminum (mg/l) EPA6010C
GCW-01D	3.9	240	6.2
GCW-02D	3.5	3000	197
GCW-03D	3.3	4500	333
GCW-04D	3.7	5400	505
GCW-05	6.9	790	1.1
EPW-01	4.7	110	12.9
EPW-02	5.3	30	<0.1
EPW-03D	6.2	26.0	<0.1
OW-1A	4.2	47	0.7
Duplicates	--	26[(1)]	<0.1[(1)]

Notes:
[(1)]: Duplicate was taken from EPW-03D

Table 3-3
Summary of Statistical Trend Analysis
In Groundwater Samples
Chemtrade Solutions Site
East Point, Georgia

Well ID	Parameter	Mann-Kendall Trend Analysis at 95% Confidence Level
GCW-01D	Alumimum	No Trend
GCW-02D		No Trend
GCW-03D		No Trend
GCW-04D		No Trend
GCW-05		No Trend
EPW-01		No Trend
EPW-02		Decreasing
EPW-03D		No Trend
OW-1A		Decreasing
GCW-01D	Sulfate	Decreasing
GCW-02D		No Trend
GCW-03D		Decreasing
GCW-04D		Decreasing
GCW-05		Decreasing
EPW-01		No Trend
EPW-02		No Trend
EPW-03D		Decreasing
OW-1A		Decreasing

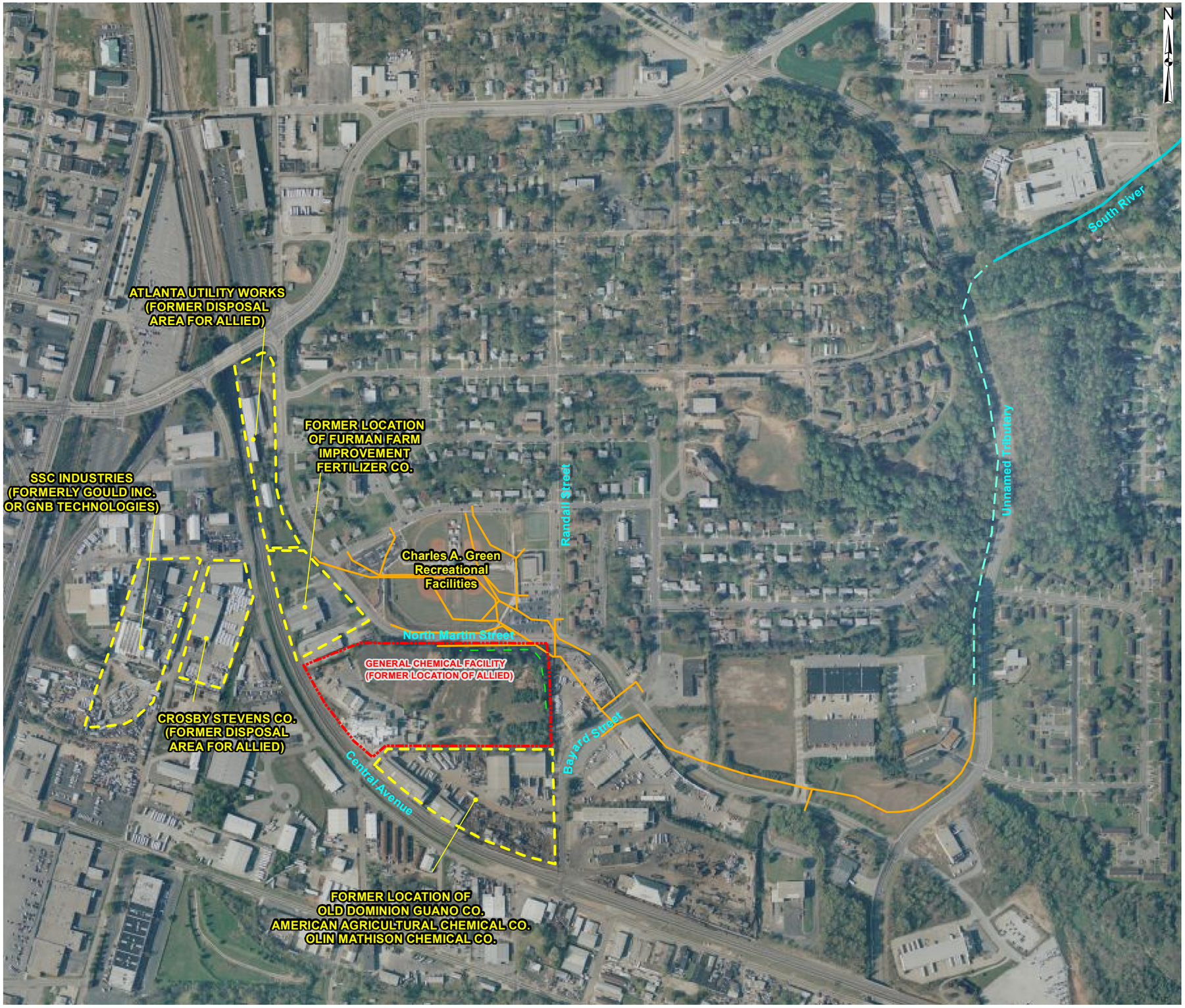
Table 3-4
Storm Drain Sampling Results
April 2014
Chemtrade Solutons Site
East Point, Georgia

Location	Description	pH (-) EPA 150.1	Sulfate (mg/l) EPA 9056A	Aluminum (mg/l) EPA6010C
SW-02	On-site	3.4	7300	593
SW-06	Cross-Gradient	3.8	1900	145
SW-07	Downgradient	4.2	440	35.8
SW-09	Upgradient	3.9	<0.1	2.24
Duplicate	Duplicate SW-07	--	400.0	38.0

Table 3-5
Summary of Statistical Trend Analysis
In Storm Drain Samples
Chemtrade Solutions Site
East Point, Georgia

Sample Location	Parameter	Mann-Kendall Trend Analysis at 95% Confidence Level
SW-02	Alumimum	Increasing
SW-06		Increasing
SW-07		No Trend
SW-09		Increasing
SW-02	Sulfate	Increasing
SW-06		Increasing
SW-07		No Trend
SW-09		No Trend

FIGURES



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SITE VICINITY MAP

Chemtrade Solutions
EAST POINT, GEORGIA

Legend

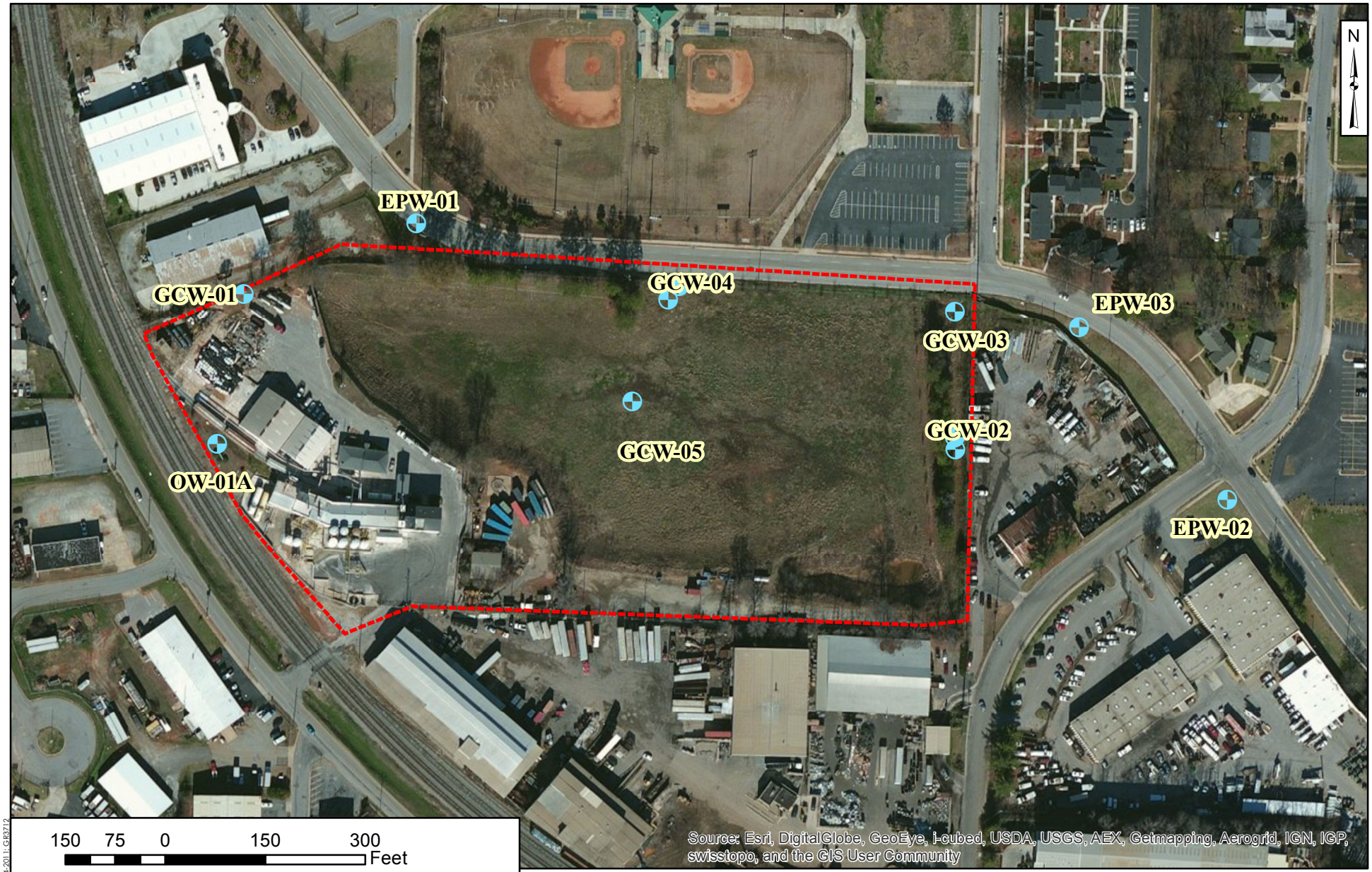
- Approximate Property Line
- Approximate Site Property
- Storm Drain
- Unnamed Tributary
- SouthRiver
- French Drain

500 250 0 500 1,000
Feet

Geosyntec consultants

ATLANTA, GEORGIA

July 2014	SCALE: 1" = 500'
PROJECT NO. GR5060	FIGURE NO. 1-1
DOCUMENT NO.	FILE NO. Figure 1-2.mxd



150 75 0 150 300 Feet

Legend

Monitoring Well

Approximate Property Boundary

Geosyntec consultants
Kennesaw, GA

July 2014

MONITORING WELLS LOCATION MAP

Chemtrade Solutions, East Point, GA

Figure **1-2**

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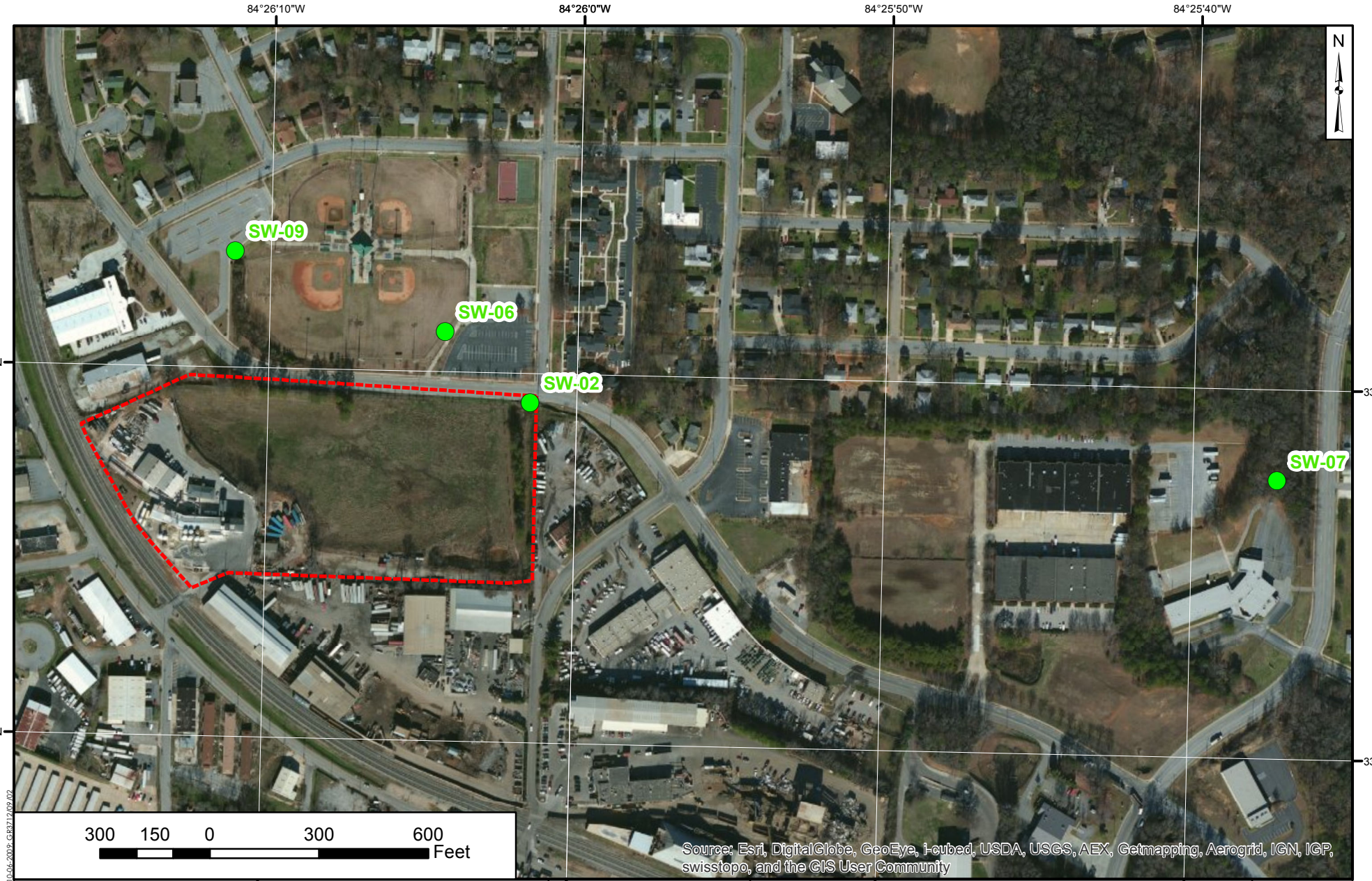

Legend

Surface Water Sample Location

Approximate Property Boundary

Geosyntec consultants
Kennesaw, GA

JULY 2014

STORM DRAIN SAMPLE LOCATION MAP

Chemtrade Solutions, Atlanta, GA

Figure
1-3

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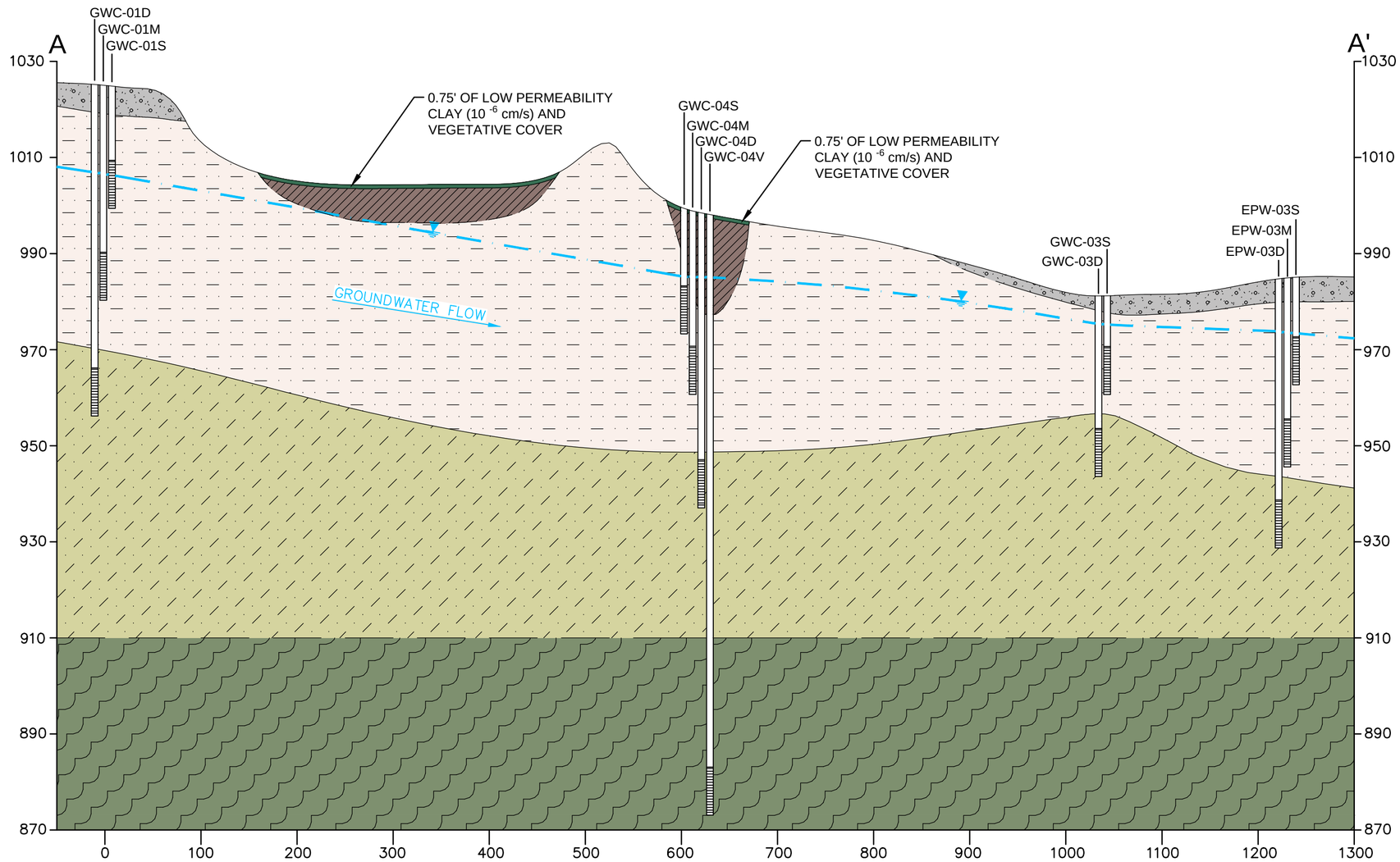
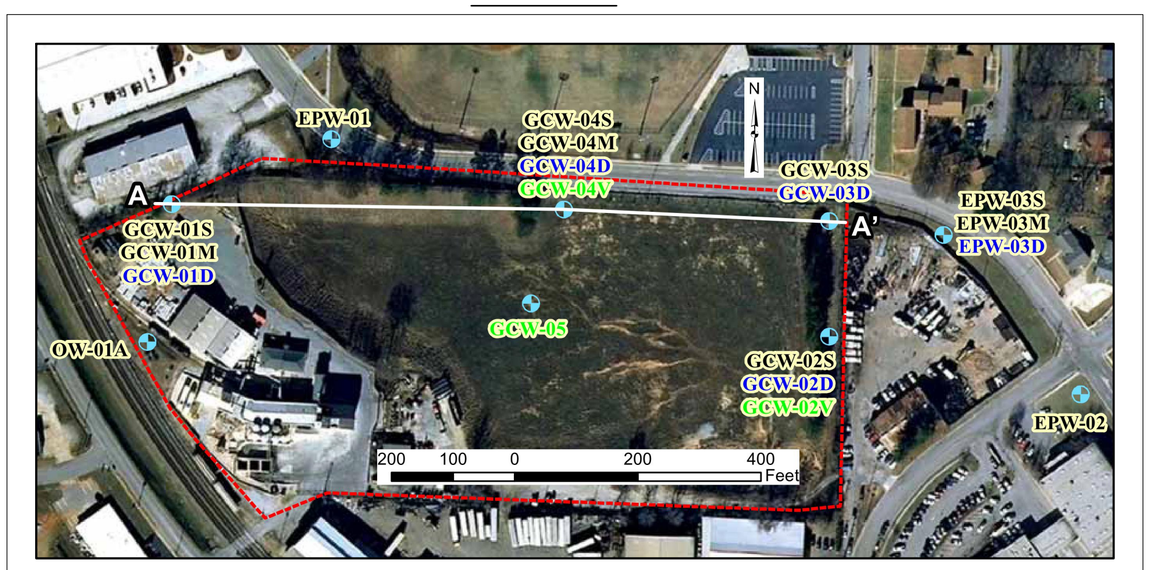
GEOLOGIC AND HYDROGEOLOGIC CROSS SECTION ALONG A-A'



KEY MAP



LEGEND

- 0.75' THICK LOW PERMEABILITY CLAY (10 $^{-6}$ cm/s) AND VEGETATIVE COVER
- GRAVELLEY CLAY, FILL
- CLAY, FILL AFTER EXCAVATION
- SILTY SAND, RELICT SCHISTOCITY, MICACEOUS (SAPROLITE)
- PARTRIALLY WEATHERED SCHIST
- BEDROCK (SCHIST)
- LITHOLOGIC CONTACT, DASHED WHERE INFERRED
- MONITORING WELL SCREEN ZONE WITH WATER ELEVATION (FEET MSL), NOVEMBER, 2012

0 100' 200'

HORIZONTAL SCALE IN FEET
VERTICAL EXAGGERATION = 5X

Geosyntec consultants

DATE:	JUN-13	SCALE:	AS SHOWN
PROJECT NO.	GR5060/12	FILE NO.	5060F001
DOCUMENT NO.	GA 130020	FIGURE NO.	2-1

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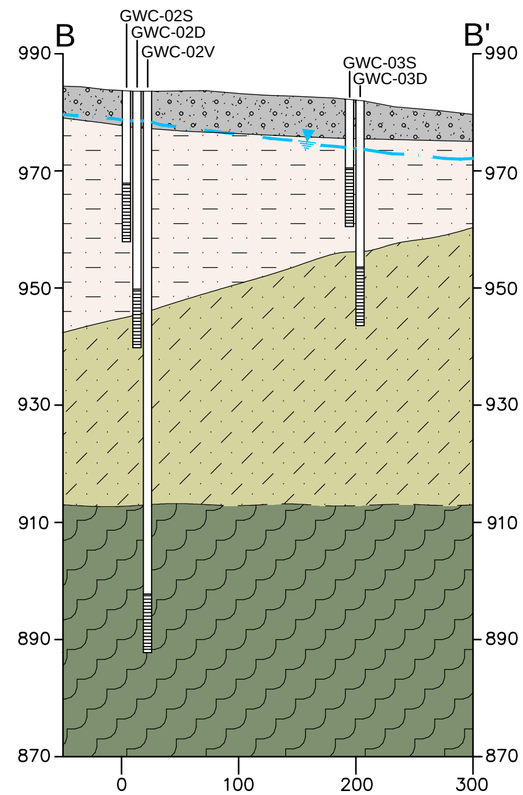
GEOLOGIC AND HYDROGEOLOGIC CROSS SECTION ALONG B-B'



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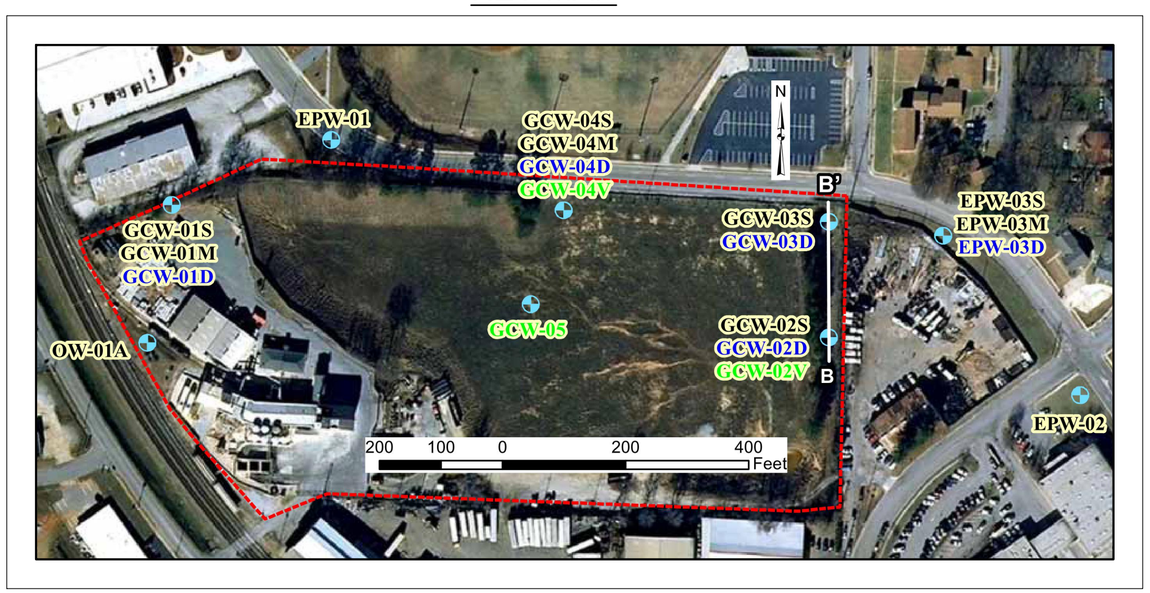

LEGEND

- GRAVELLEY CLAY, FILL
- SILTY SAND, RELICT SCHISTOCITY, MICACEOUS (SAPROLITE)
- PARTRIALLY WEATHERED SCHIST
- BEDROCK (SCHIST)
- LITHOLOGIC CONTACT, DASHED WHERE INFERRED
- MONITORING WELL SCREEN ZONE WITH WATER ELEVATION (FEET MSL), NOVEMBER, 2012

0 100' 200'

HORIZONTAL SCALE IN FEET
VERTICAL EXAGGERATION = 5X

Geosyntec consultants

DATE:	JUN–13	SCALE:	AS SHOWN
PROJECT NO.	GR5060/12	FILE NO.	5060F001
DOCUMENT NO.	GA 130020	FIGURE NO.	2-2

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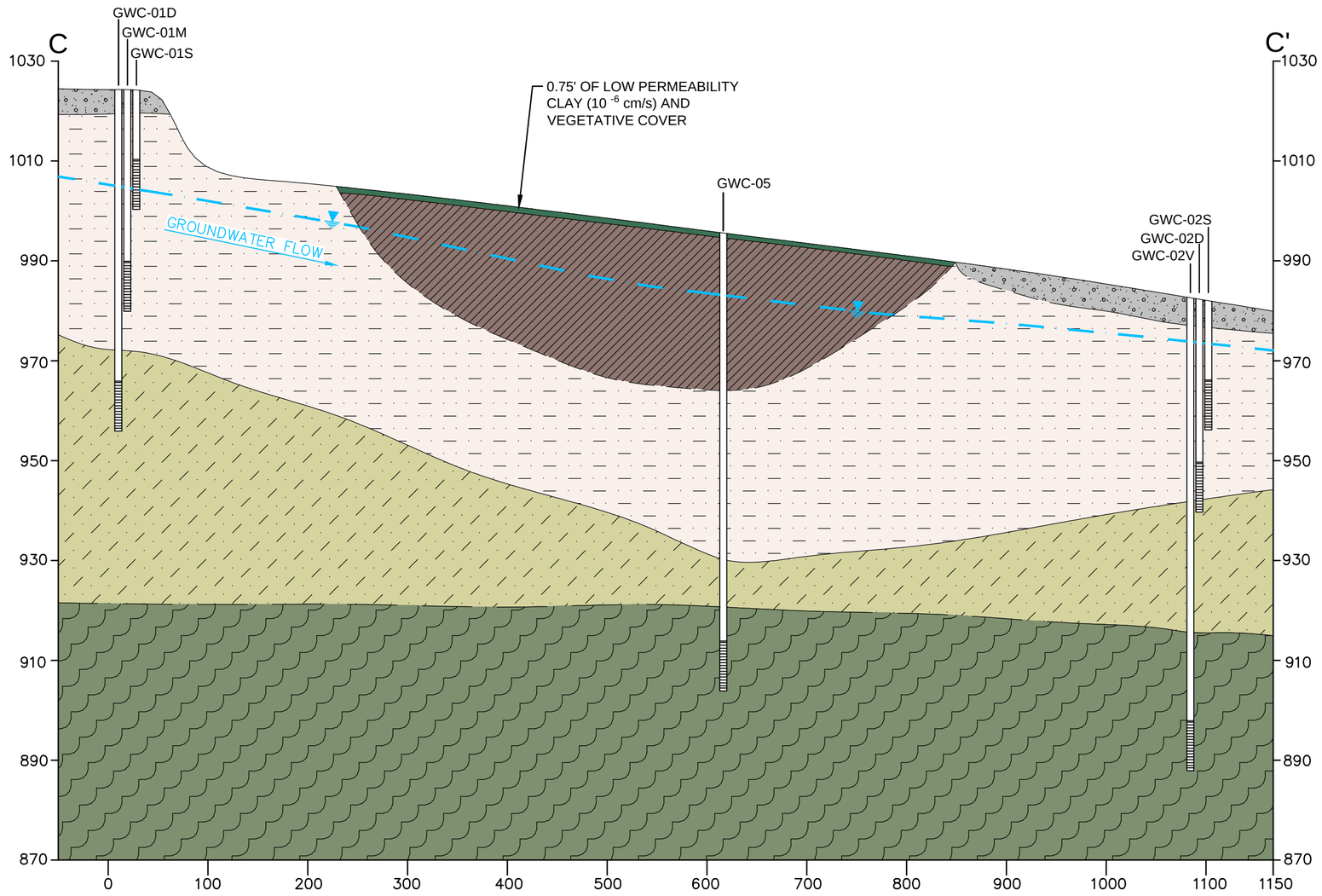
GEOLOGIC AND HYDROGEOLOGIC CROSS SECTION ALONG C-C'



KEY MAP

LEGEND

- 0.75' THICK LOW PERMEABILITY CLAY (10 $^{-6}$ cm/s) AND VEGETATIVE COVER
- GRAVELLEY CLAY, FILL
- CLAY, FILL AFTER EXCAVATION
- SILTY SAND, RELICT SCHISTOCITY, MICACEOUS (SAPROLITE)
- PARTRIALLY WEATHERED SCHIST
- BEDROCK (SCHIST)
- LITHOLOGIC CONTACT, DASHED WHERE INFERRED
- MONITORING WELL SCREEN ZONE WITH WATER ELEVATION (FEET MSL), NOVEMBER, 2012

0 100' 200'

HORIZONTAL SCALE IN FEET
VERTICAL EXAGGERATION = 5X

Geosyntec consultants

DATE:	JUN-13	SCALE:	AS SHOWN
PROJECT NO.	GR5060/12	FILE NO.	5060F001
DOCUMENT NO.	GA 130020	FIGURE NO.	2-3

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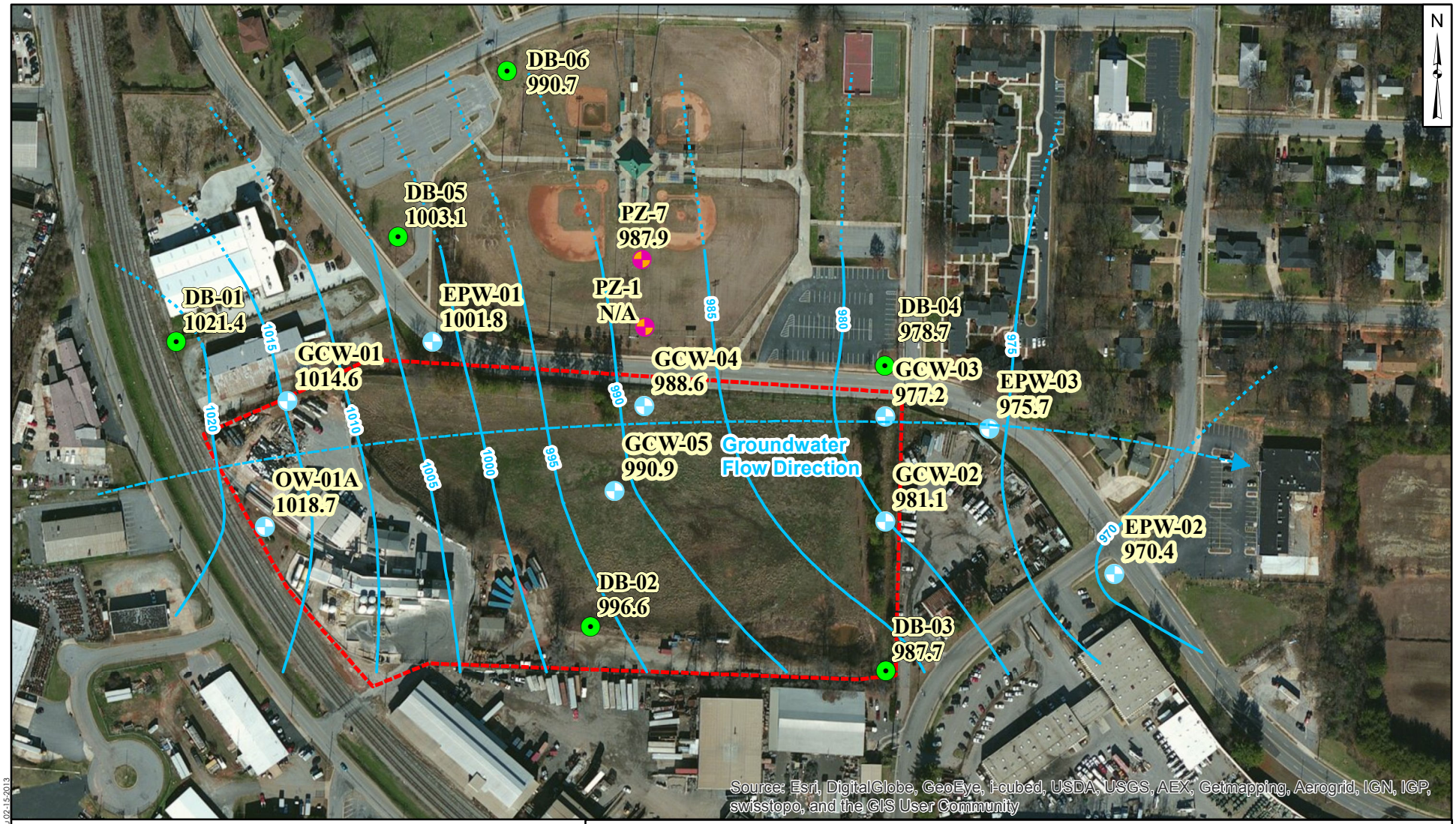


Legend

- Delineation Boring (Data from 2013)
- Piezometer (Data from 2013, Elevation in ft MSL)
- Monitoring Well (Elevation in ft MSL)
- April 2014 Groundwater Contours
- Approximate Property Boundary

200 100 0 200 400 Feet

Geosyntec consultants

Kennesaw, GA

July 2014

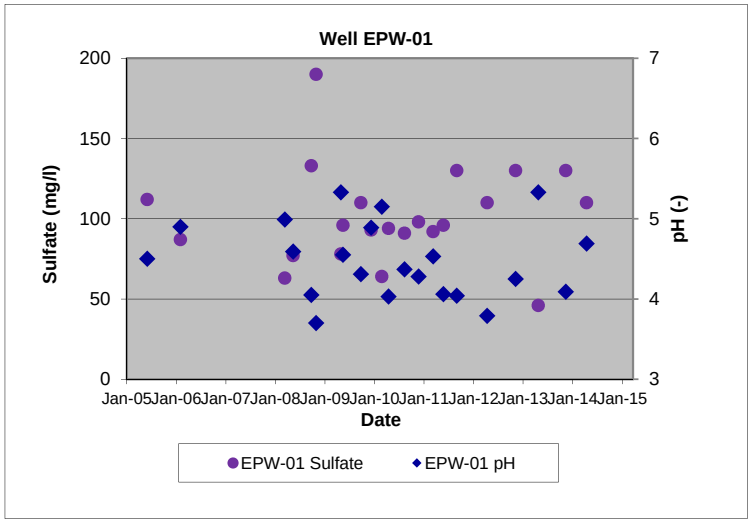
POTENTIOMETRIC SURFACE MAP

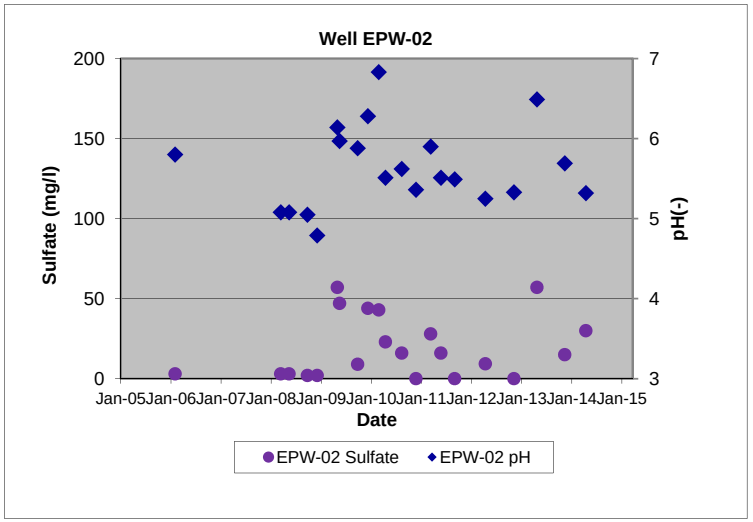
Chemtrade Solutions, East Point, GA

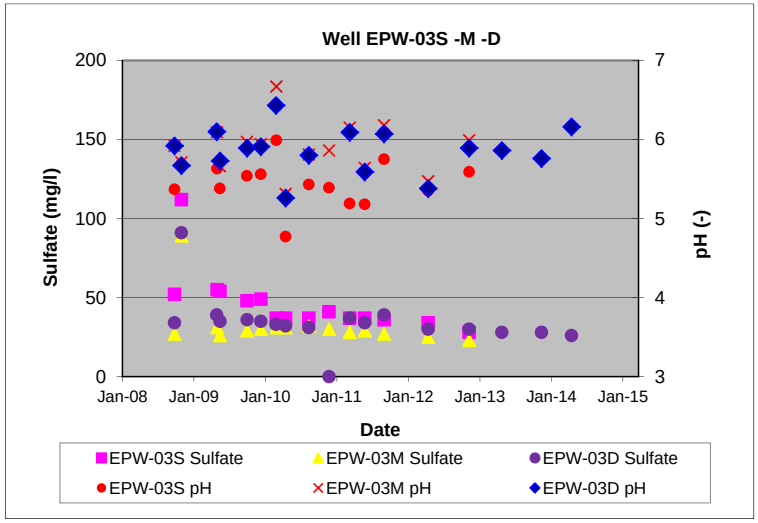
Figure 3-1

N:\geochem\GIS\MXDs\January 2013 Potmap.mxd/DYfru 02-15-2013

Figure 3-2
Monitoring Well Sulfate and pH Trends
Chemtrade Solutions Site
East Point, Georgia







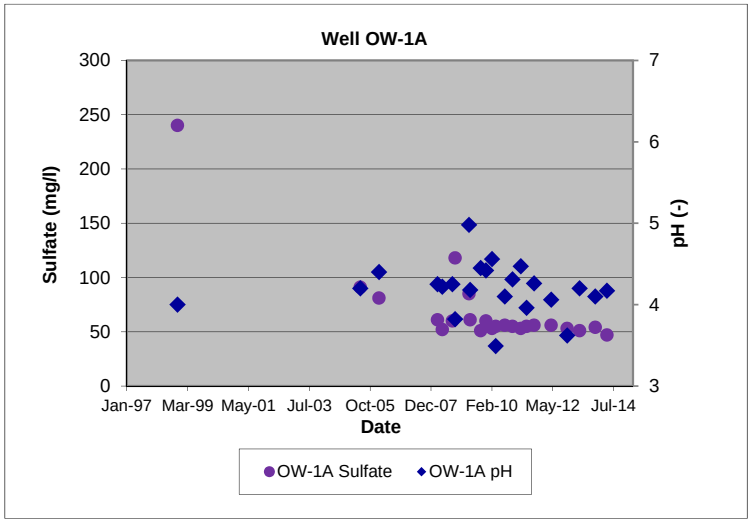
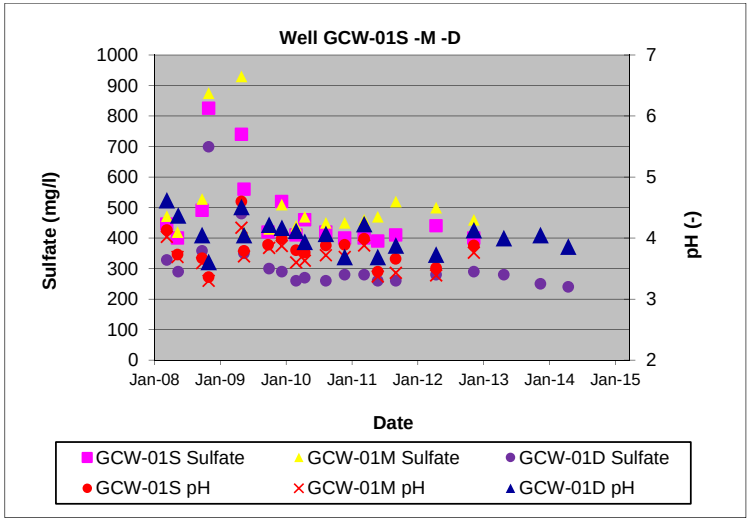
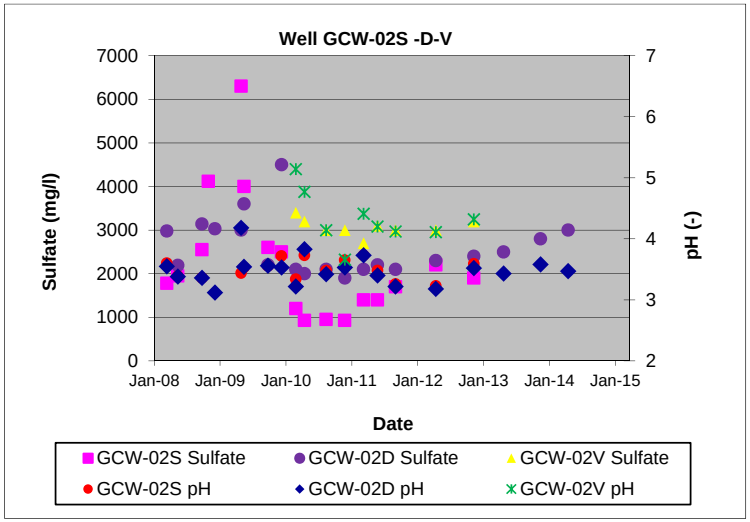
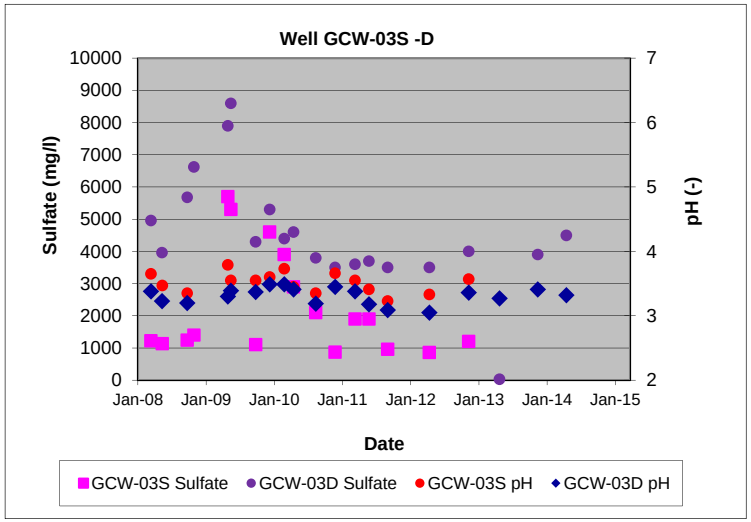


Figure 3-2 (Cont)
Monitoring Well Sulfate and pH Trends
Chemtrade Solutions Site
East Point, Georgia







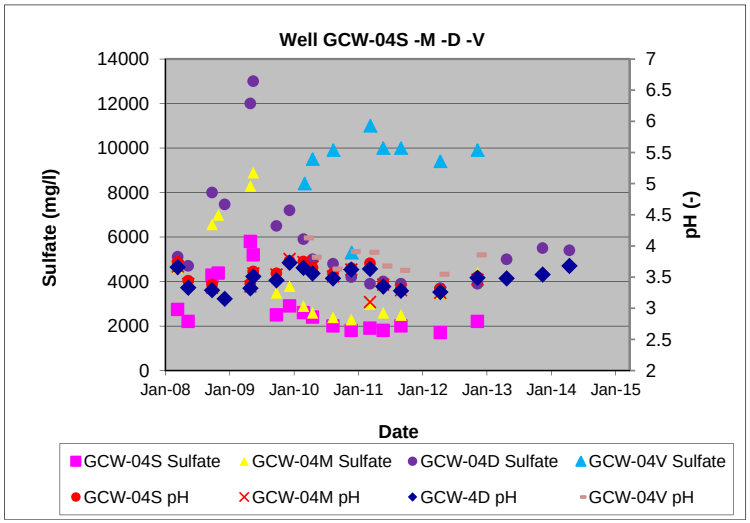


Figure 3-2 (Cont)
Monitoring Well Sulfate and pH Trends
General ChemicalChemtrade Solutions
East Point, Georgia

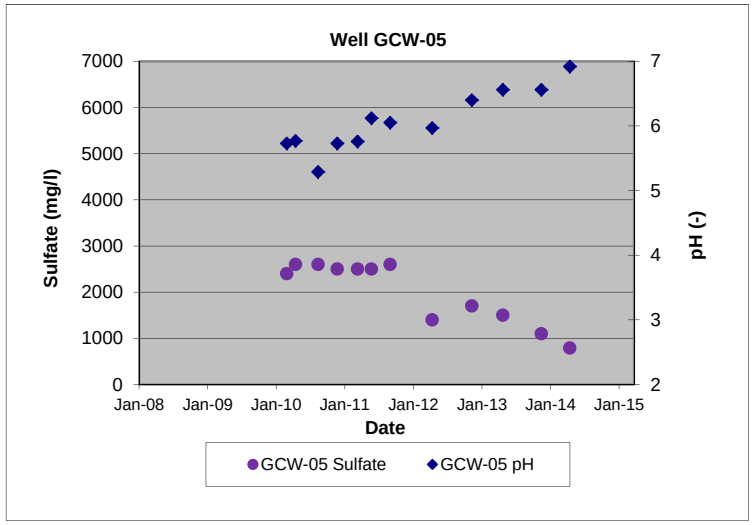
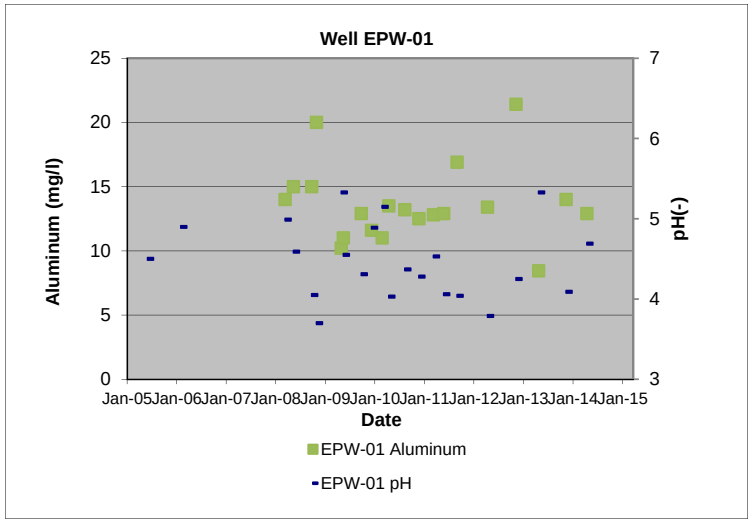
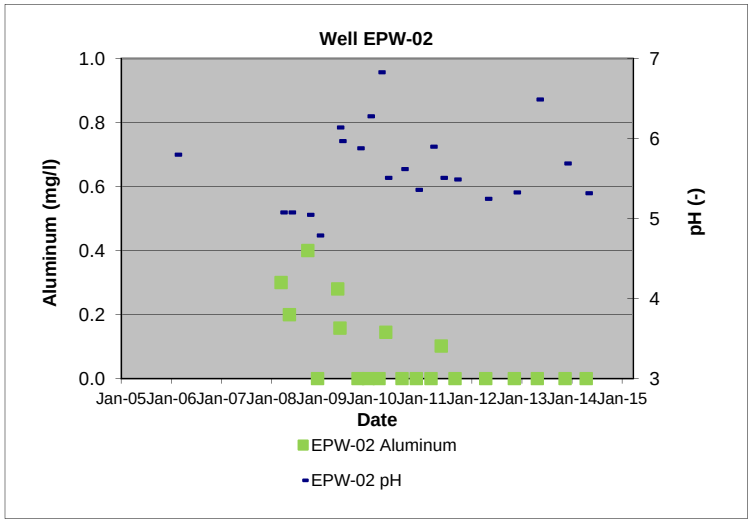
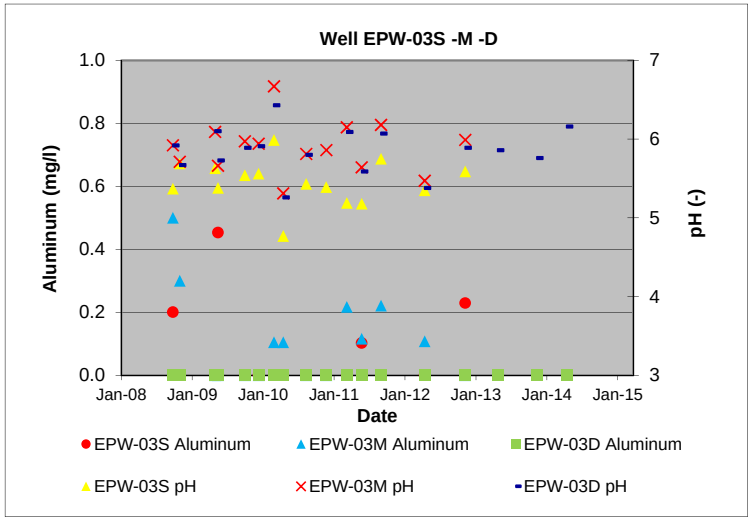
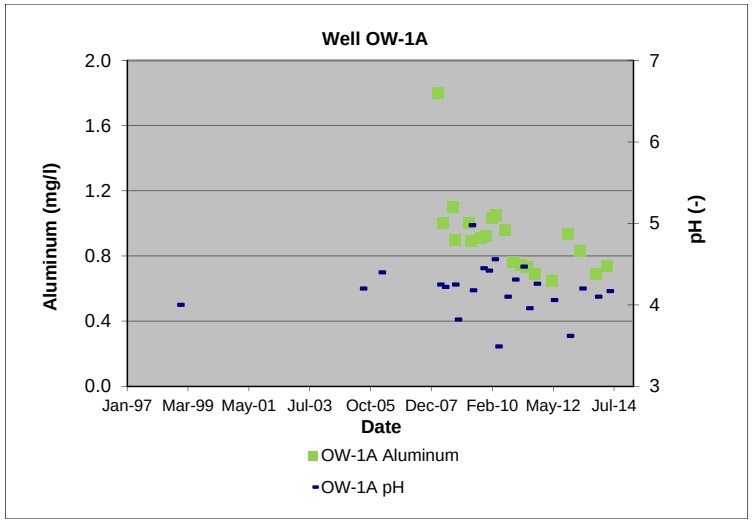


Figure 3-2 (Cont)
Monitoring Well Aluminum and pH Trends
Chemtrade Solutions Site
East Point, Georgia









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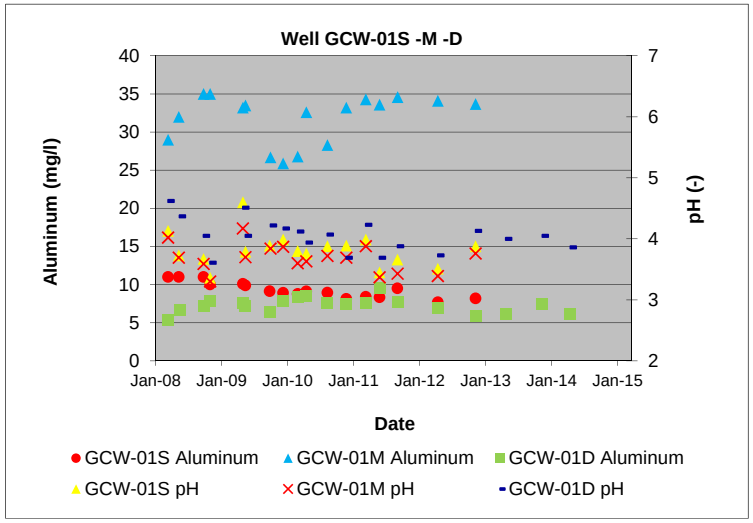
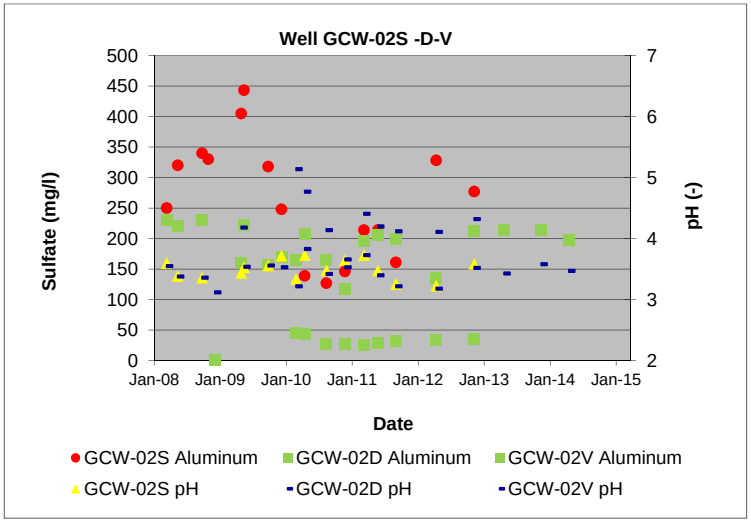
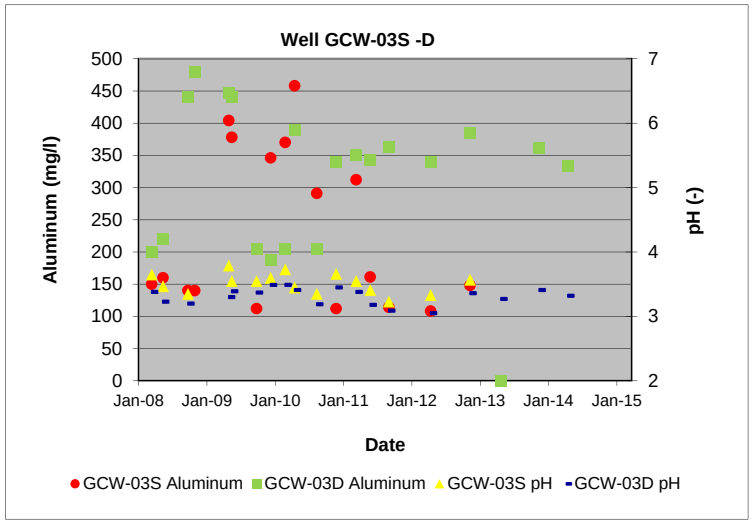
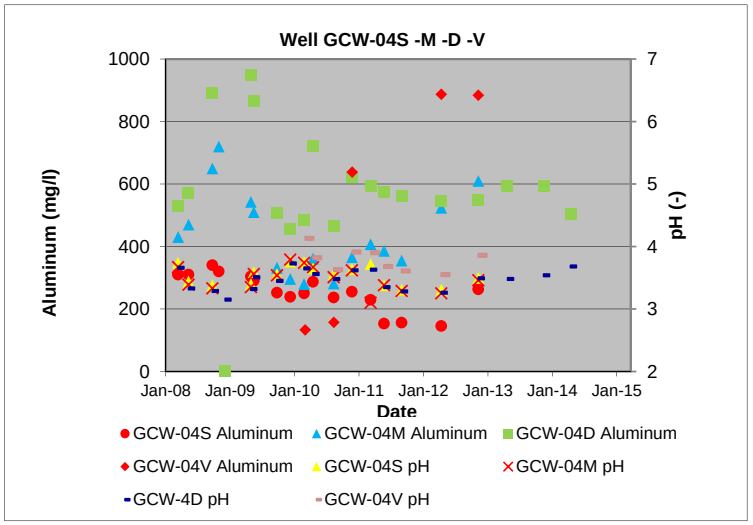
Monitoring Well Aluminum and pH Trends
Chemtrade Solutions Site
East Point, Georgia









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Monitoring Well Aluminum and pH Trends
Chemtrade Solutions Site
East Point, Georgia

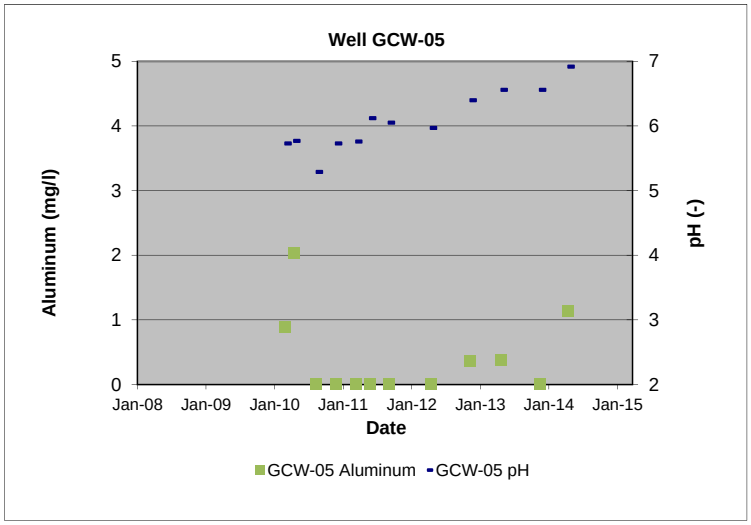
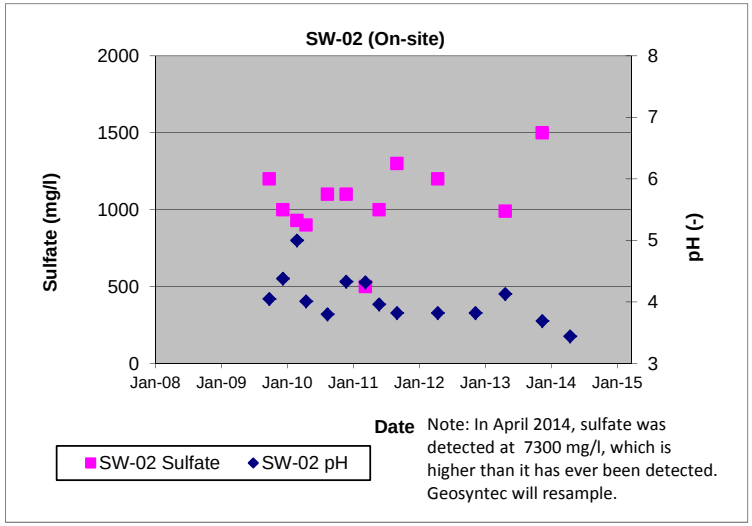
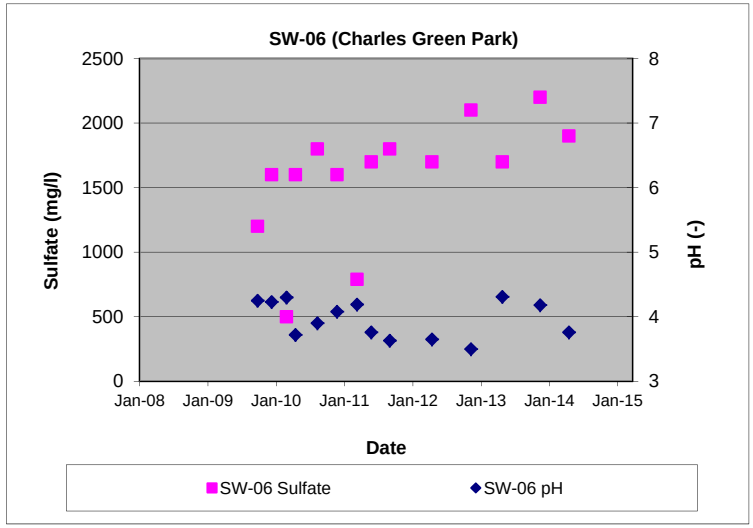
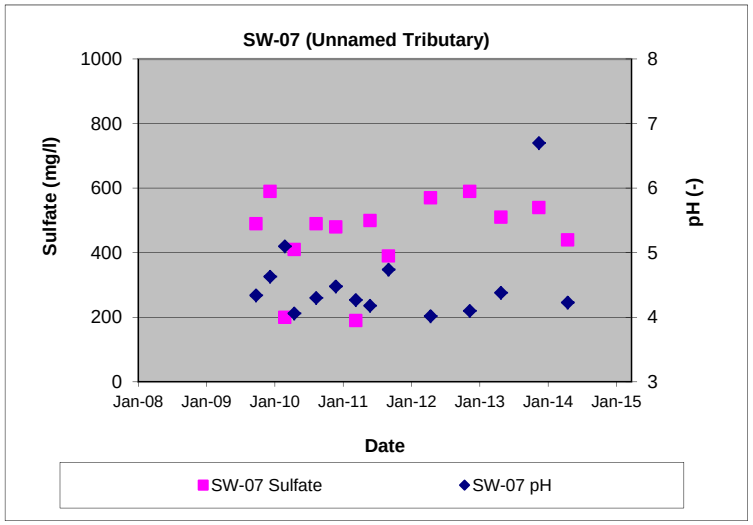


Figure 3-3
Storm Drain Sulfate and pH Trends
Chemtrade Solutions Site
East Point, Georgia







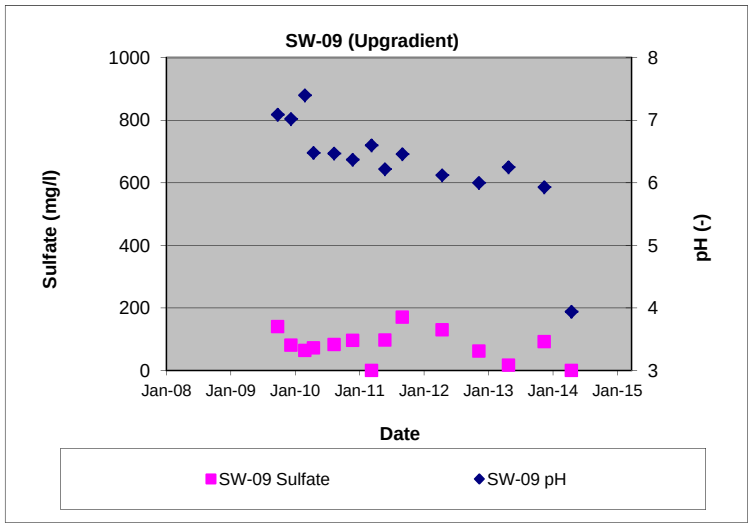
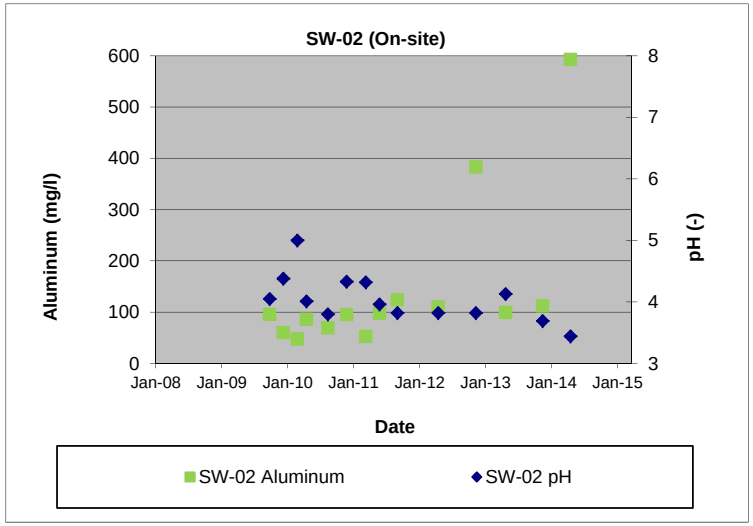
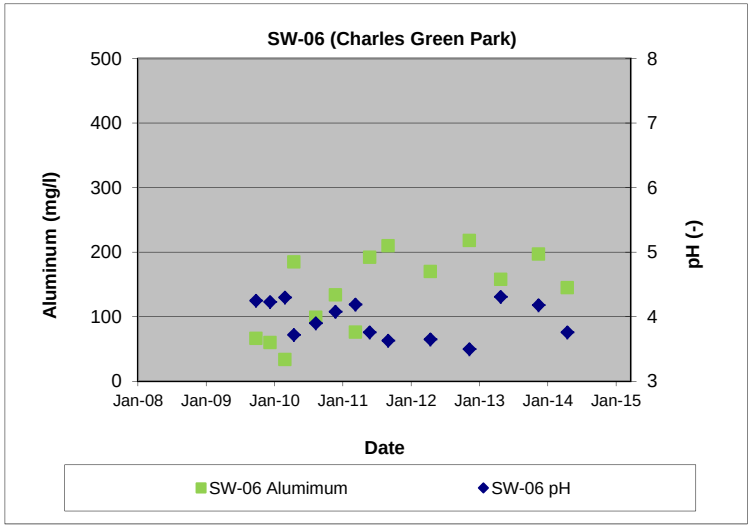
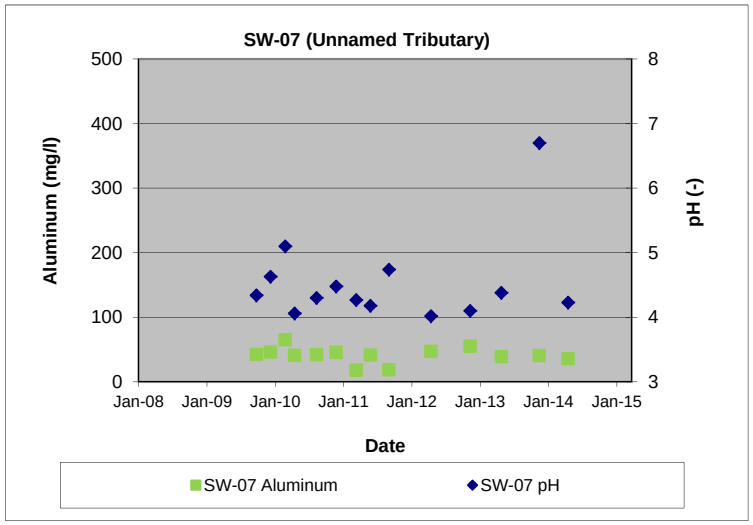


Figure 3-3 (Cont)
Storm Drain Aluminum and pH Trends
Chemtrade Solutions Site
East Point, Georgia







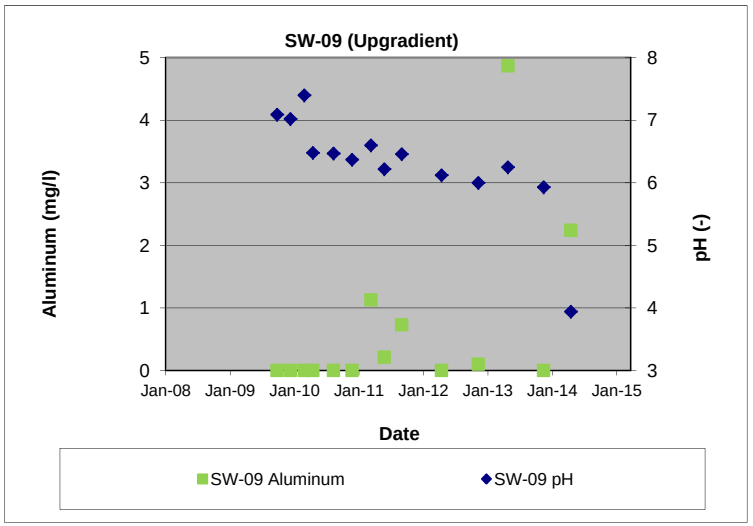
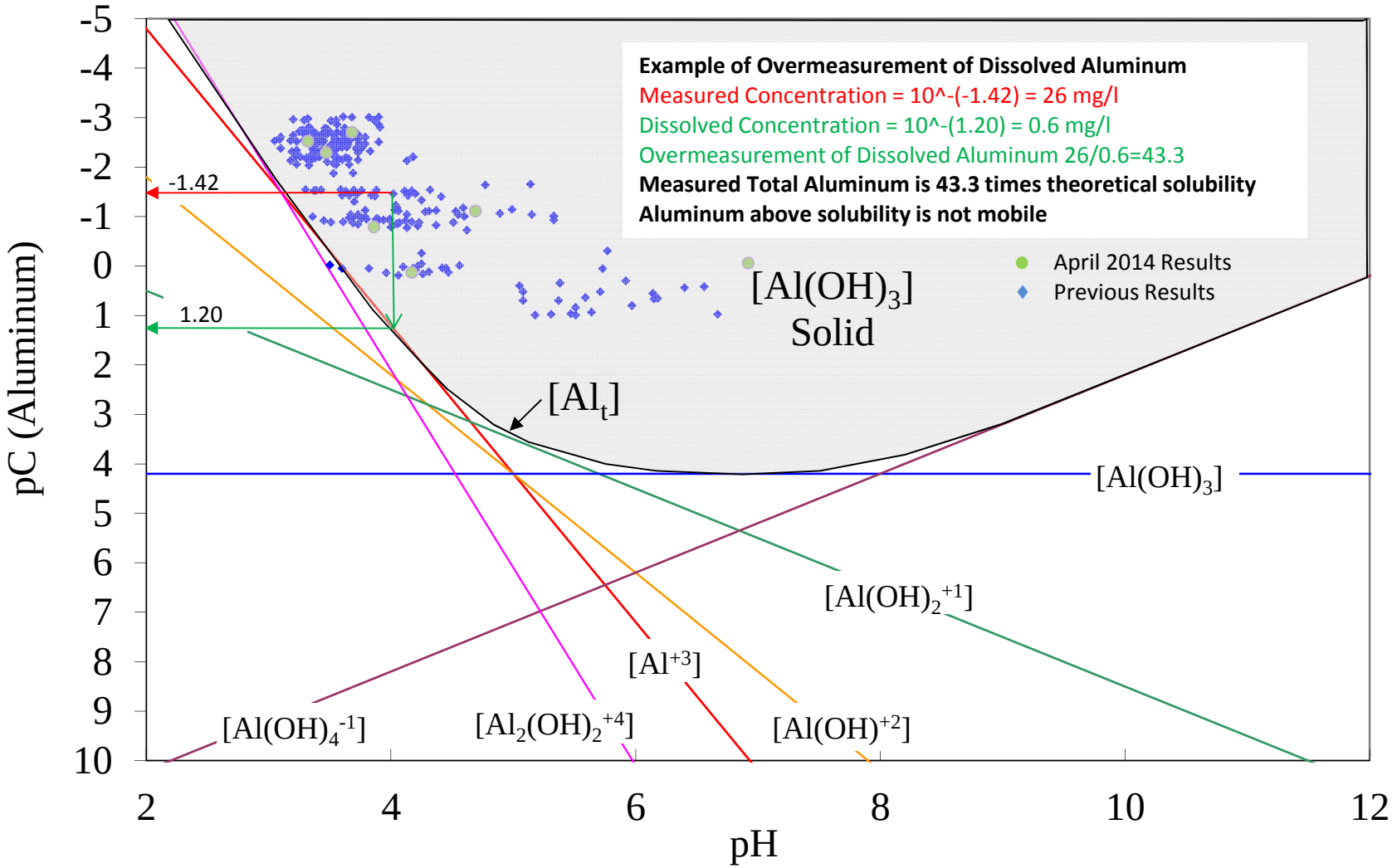


Figure 6-1
Chemtrade Solutions
Groundwater Sampling
April 2014
Aluminum Results Analysis



APPENDIX A

GROUNDWATER AND STORM DRAIN LABORATORY RESULTS

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ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

Laboratory Report

Prepared For:

Geosyntec Consultants Inc.
1255 Roberts Blvd N.W.
Kennesaw, GA 30144

Attention: Mr. Brian Jacobson

Report Number: AXD0513
April 29, 2014
Project: General Chemical
Project #:[none]

We appreciate the opportunity to provide the analytical support for your project. The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Approved:

Project Manager

This report may not be reproduced, except in full, without written approval from Analytical Services, Inc.
Analytical Services, Inc. certifies that the following analytical results meet all requirements of the National Environmental Laboratory Accreditation Conference(NELAC).
All test results relate only to the samples analyzed.

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Kennesaw GA, 30144
Attention: Mr. Brian Jacobson

April 29, 2014

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GCW-05	AXD0513-01	Ground Water	04/14/14 12:40	04/16/14 13:35
GCW-4D	AXD0513-02	Ground Water	04/14/14 14:20	04/16/14 13:35
EPW-3D	AXD0513-03	Ground Water	04/14/14 16:00	04/16/14 13:35
EPW-01	AXD0513-04	Ground Water	04/14/14 17:00	04/16/14 13:35
EPW-02	AXD0513-05	Ground Water	04/15/14 09:00	04/16/14 13:35
GCW-01D	AXD0513-06	Ground Water	04/15/14 10:30	04/16/14 13:35
OW-1A	AXD0513-07	Ground Water	04/15/14 12:00	04/16/14 13:35
GCW-02D	AXD0513-08	Ground Water	04/15/14 13:25	04/16/14 13:35
GCW-3D	AXD0513-09	Ground Water	04/15/14 15:00	04/16/14 13:35
SW-07	AXD0513-10	Surface Water	04/16/14 08:15	04/16/14 13:35
SW-02	AXD0513-11	Surface Water	04/16/14 09:00	04/16/14 13:35
SW-06	AXD0513-12	Surface Water	04/16/14 09:15	04/16/14 13:35
SW-09	AXD0513-13	Surface Water	04/16/14 09:45	04/16/14 13:35
Dup-1	AXD0513-14	Ground Water	04/15/14 00:00	04/16/14 13:35
Dup-2	AXD0513-15	Surface Water	04/16/14 00:00	04/16/14 13:35

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April 29, 2014

Report No.: AXD0513
Client ID: GCW-05
Date/Time Sampled: 4/14/2014 12:40:00PM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-01
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	790	500	mg/L	EPA 9056A		100	4/17/14 21:42	4/17/14 21:42	4040410	ANC
Metals, Total										
Aluminum	1.14	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:01	4040459	FBS

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Report No.: AXD0513
Client ID: GCW-4D
Date/Time Sampled: 4/14/2014 2:20:00PM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-02
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	5400	1000	mg/L	EPA 9056A		200	4/18/14 15:18	4/18/14 15:18	4040410	ANC
Metals, Total										
Aluminum	505	1.00	mg/L	EPA 6010C		10	4/21/14 9:40	4/21/14 16:11	4040459	FBS

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Report No.: AXD0513
Client ID: EPW-3D
Date/Time Sampled: 4/14/2014 4:00:00PM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-03
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	26	5.0	mg/L	EPA 9056A		1	4/18/14 1:30	4/18/14 1:30	4040410	ANC
Metals, Total										
Aluminum	ND	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:07	4040459	FBS

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Report No.: AXD0513
Client ID: EPW-01
Date/Time Sampled: 4/14/2014 5:00:00PM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-04
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	110	25	mg/L	EPA 9056A		5	4/18/14 1:50	4/18/14 1:50	4040410	ANC
Metals, Total										
Aluminum	12.9	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:16	4040459	FBS

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Report No.: AXD0513
Client ID: EPW-02
Date/Time Sampled: 4/15/2014 9:00:00AM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-05
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	30	10	mg/L	EPA 9056A		2	4/18/14 2:11	4/18/14 2:11	4040410	ANC
Metals, Total										
Aluminum	ND	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:19	4040459	FBS

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Report No.: AXD0513
Client ID: GCW-01D
Date/Time Sampled: 4/15/2014 10:30:00AM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-06
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	240	50	mg/L	EPA 9056A		10	4/18/14 2:32	4/18/14 2:32	4040410	ANC
Metals, Total										
Aluminum	6.19	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:22	4040459	FBS

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April 29, 2014

Report No.: AXD0513
Client ID: OW-1A
Date/Time Sampled: 4/15/2014 12:00:00PM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-07
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	47	10	mg/L	EPA 9056A		2	4/19/14 0:15	4/19/14 0:15	4040450	ANC
Metals, Total										
Aluminum	0.741	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:25	4040459	FBS

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Report No.: AXD0513
Client ID: GCW-02D
Date/Time Sampled: 4/15/2014 1:25:00PM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-08
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	3000	500	mg/L	EPA 9056A		100	4/19/14 0:36	4/19/14 0:36	4040450	ANC
Metals, Total										
Aluminum	197	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:28	4040459	FBS

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Report No.: AXD0513
Client ID: GCW-3D
Date/Time Sampled: 4/15/2014 3:00:00PM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-09
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	4500	1000	mg/L	EPA 9056A		200	4/21/14 17:19	4/21/14 17:19	4040450	ANC
Metals, Total										
Aluminum	333	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:31	4040459	FBS

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April 29, 2014

Report No.: AXD0513
Client ID: SW-07
Date/Time Sampled: 4/16/2014 8:15:00AM
Matrix: Surface Water

Project: General Chemical
Lab Number ID: AXD0513-10
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	440	120	mg/L	EPA 9056A		25	4/19/14 1:17	4/19/14 1:17	4040450	ANC
Metals, Total										
Aluminum	35.8	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:34	4040459	FBS

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April 29, 2014

Report No.: AXD0513
Client ID: SW-02
Date/Time Sampled: 4/16/2014 9:00:00AM
Matrix: Surface Water

Project: General Chemical
Lab Number ID: AXD0513-11
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	7300	1000	mg/L	EPA 9056A		200	4/22/14 13:30	4/22/14 13:30	4040486	ANC
Metals, Total										
Aluminum	593	2.00	mg/L	EPA 6010C		20	4/21/14 9:40	4/21/14 16:14	4040459	FBS

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April 29, 2014

Report No.: AXD0513
Client ID: SW-06
Date/Time Sampled: 4/16/2014 9:15:00AM
Matrix: Surface Water

Project: General Chemical
Lab Number ID: AXD0513-12
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	1900	500	mg/L	EPA 9056A		100	4/21/14 15:57	4/21/14 15:57	4040486	ANC
Metals, Total										
Aluminum	145	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:40	4040459	FBS

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Report No.: AXD0513
Client ID: SW-09
Date/Time Sampled: 4/16/2014 9:45:00AM
Matrix: Surface Water

Project: General Chemical
Lab Number ID: AXD0513-13
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	ND	25	mg/L	EPA 9056A		5	4/21/14 16:17	4/21/14 16:17	4040486	ANC
Metals, Total										
Aluminum	2.24	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:43	4040459	FBS

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April 29, 2014

Report No.: AXD0513
Client ID: Dup-1
Date/Time Sampled: 4/15/2014 12:00:00AM
Matrix: Ground Water

Project: General Chemical
Lab Number ID: AXD0513-14
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	26	5.0	mg/L	EPA 9056A		1	4/17/14 17:34	4/17/14 17:34	4040410	ANC
Metals, Total										
Aluminum	ND	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:52	4040459	FBS

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Report No.: AXD0513
Client ID: Dup-2
Date/Time Sampled: 4/16/2014 12:00:00AM
Matrix: Surface Water

Project: General Chemical
Lab Number ID: AXD0513-15
Date/Time Received: 4/16/2014 1:35:00PM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
Inorganic Anions										
Sulfate	400	120	mg/L	EPA 9056A		25	4/17/14 22:03	4/17/14 22:03	4040410	ANC
Metals, Total										
Aluminum	37.7	0.100	mg/L	EPA 6010C		1	4/21/14 9:40	4/21/14 14:55	4040459	FBS

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Attention: Mr. Brian Jacobson

April 29, 2014

Report No.: AXD0513

Inorganic Anions - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 4040410 - EPA 300.0										
Blank (4040410-BLK1)					Prepared & Analyzed: 04/17/14					
Sulfate	ND	5.0	mg/L							
LCS (4040410-BS1)					Prepared & Analyzed: 04/17/14					
Sulfate	10.3	5.0	mg/L	10.000		103	90-110			
Matrix Spike (4040410-MS1)		**Source: AXD0520-07**			Prepared & Analyzed: 04/17/14					
Sulfate	99.0	5.0	mg/L	10.000	99.9	0	90-110			QM-02
Matrix Spike (4040410-MS2)		**Source: AXD0520-06**			Prepared & Analyzed: 04/18/14					
Sulfate	111	5.0	mg/L	10.000	113	0	90-110			QM-02
Matrix Spike Dup (4040410-MSD1)		**Source: AXD0520-07**			Prepared & Analyzed: 04/17/14					
Sulfate	99.0	5.0	mg/L	10.000	99.9	0	90-110	0.04	15	QM-02
Batch 4040450 - EPA 9056A										
Blank (4040450-BLK1)					Prepared & Analyzed: 04/18/14					
Sulfate	ND	5.0	mg/L							
LCS (4040450-BS1)					Prepared & Analyzed: 04/18/14					
Sulfate	10.2	5.0	mg/L	10.000		102	90-110			
Matrix Spike (4040450-MS1)		**Source: AXD0567-05**			Prepared & Analyzed: 04/18/14					
Sulfate	59.1	5.0	mg/L	10.000	54.8	43	90-110			QM-02
Matrix Spike (4040450-MS2)		**Source: AXD0567-12**			Prepared & Analyzed: 04/18/14					
Sulfate	62.7	5.0	mg/L	10.000	59.3	34	90-110			QM-02

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Report No.: AXD0513

Inorganic Anions - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 4040450 - EPA 9056A										
Matrix Spike Dup (4040450-MSD1)		**Source: AXD0567-05**			Prepared & Analyzed: 04/18/14					
Sulfate	59.1	5.0	mg/L	10.000	54.8	43	90-110	0.05	15	QM-02
Batch 4040486 - EPA 9056A										
Blank (4040486-BLK1)					Prepared & Analyzed: 04/21/14					
Sulfate	ND	5.0	mg/L							
LCS (4040486-BS1)					Prepared & Analyzed: 04/21/14					
Sulfate	10.2	5.0	mg/L	10.000		102	90-110			
Matrix Spike (4040486-MS1)		**Source: AXD0604-28**			Prepared & Analyzed: 04/21/14					
Sulfate	21.3	5.0	mg/L	10.000	12.1	93	90-110			
Matrix Spike Dup (4040486-MSD1)		**Source: AXD0604-28**			Prepared & Analyzed: 04/21/14					
Sulfate	21.3	5.0	mg/L	10.000	12.1	92	90-110	0.2	15	

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Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

Geosyntec Consultants Inc.
1255 Roberts Blvd N.W.
Kennesaw GA, 30144
Attention: Mr. Brian Jacobson

April 29, 2014

Report No.: AXD0513

Metals, Total - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 4040459 - EPA 3010A										
Blank (4040459-BLK1)					Prepared & Analyzed: 04/21/14					
Aluminum	ND	0.100	mg/L							
LCS (4040459-BS1)					Prepared & Analyzed: 04/21/14					
Aluminum	1.02	0.100	mg/L	1.0000		102	80-120			
Matrix Spike (4040459-MS1)		**Source: AXD0442-01**			Prepared & Analyzed: 04/21/14					
Aluminum	1.42	0.100	mg/L	1.0000	0.371	105	75-125			
Matrix Spike Dup (4040459-MSD1)		**Source: AXD0442-01**			Prepared & Analyzed: 04/21/14					
Aluminum	1.45	0.100	mg/L	1.0000	0.371	108	75-125	2	20	
Post Spike (4040459-PS1)		**Source: AXD0442-01**			Prepared & Analyzed: 04/21/14					
Aluminum	1.39		mg/L	1.0000	0.371	102	80-120			

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April 29, 2014

Laboratory Certifications

Code	Description	Number	Expires
LA	Louisiana	02069	06/30/2014
NC	North Carolina	381	12/31/2014
NELAC	FL DOH (Non-Pot. Water, Solids) Eff:: 07/01/2013	E87315	06/30/2014
SC	South Carolina	98011001	06/30/2014
TX	Texas	T104704397-08-TX	03/31/2015
VA	Virginia	1340	12/14/2014

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April 29, 2014

Legend

Definition of Laboratory Terms

ND - None Detected at the Reporting Limit
TIC - Tentatively Identified Compound
CFU - Colony Forming Units
SOP - Method run per ASI Standard Operating Procedure
RL - Reporting Limit
DF - Dilution Factor
***** - Analyte not included in the NELAC list of certified analytes.

Sample Information

N-Nitrosodiphenylamine breaks down to diphenylamine in the GCMS; both analytes are reported as N-Nitrososdiphenylamine. ASI is not NELAC certified for diphenylamine.

Phthalic acid and phthalic anhydride are reported as dimethyl phthalate

Maleic acid and maleic anhydride are reported as dimethyl malate

1,2-Diphenylhydrazine breaks down to azobenzene in the GCMS; both analytes are reported as azobenzene

Definition of Qualifiers

QM-02 The spike recovery is outside acceptance limits due to insignificant spike amount as compared to sample concentration.

Note: Unless otherwise noted, all results are reported on an as received basis.

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1255 Roberts Blvd N.W.
Kennesaw GA, 30144
Attention: Mr. Brian Jacobson

April 29, 2014

229086

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ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS
110 TECHNOLOGY PARKWAY NORCROSS, GA 30092
(770) 734-4200 : FAX (770) 734-4201 : www.asi-lab.com

CHAIN OF CUSTODY RECORD

PAGE: 1 OF 1

CLIENT NAME: Joseph Iwanski
CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER: Geosyntec 1255 Roberts Blvd, Suite 200 Kennesaw, Georgia 678.202.9500
REPORT TO: JIwanski@Geosyntec.com CC:
REQUESTED COMPLETION DATE: PO #:
PROJECT NAME/STATE: General Chemical, East Point, GA
PROJECT #:

CONTAINER TYPE: P
PRESERVATION #: 7
ANALYSIS REQUESTED: Metals - Aluminum

DATE	TIME	MATRIX CODE*	COMPOSITE	GRAB	# of CONTAINERS	SAMPLE IDENTIFICATION	REMARKS/ADDITIONAL INFORMATION
4/14/14	1040	GW		X	2	GW-05	1
	1400				2	GW-4D	2
	1600				2	ERW-3D	3
	1700				2	ERW-01	4
4/15/14	0900				2	ERW-02	5
	1030				2	GW-01D	6
	1200				2	OW-1A	7
	1325				2	GW-02D	8
	1500				2	GW-3D	9
4/16/14	0815	SW			2	SW07	10
	0900				2	SW02	11
	0915				2	SW06	12

CONTAINER TYPE: A - P - PLASTIC; B - A - AMBER GLASS; G - CLEAR GLASS; I - V - VOA VIAL; D - S - STERILE; N - O - OTHER

PRESERVATION: 1 - HCl, 4°; 2 - H2SO4, 4°; 3 - HNO3, 4°; 4 - NaOH, 4°; 5 - NaOH/ZnAc, 4°; 6 - Na2S2O3, 4°; 7 - 4°

*MATRIX CODES: DW - DRINKING WATER; WW - WASTEWATER; GW - GROUNDWATER; SW - SURFACE WATER; ST - STORM WATER; W - WATER; S - SOIL; SL - SLUDGE; SD - SOLID; A - AIR; L - LIQUID; P - PRODUCT

SAMPLED BY AND TITLE: Hydrogeologist Jessie Gallegos 4/16/14 1335 — DATE/TIME:
RELINQUISHED BY: — DATE/TIME: 4/16/14 1336
RECEIVED BY: — DATE/TIME:
RELINQUISHED BY: — DATE/TIME:
RECEIVED BY/LAB: — DATE/TIME: 4/16/14 1335
SAMPLE SHIPPED VIA: UPS FED-EX COURIER CLIENT OTHER:
pH/ Labeled Preserved Yes or No
Temperature: 2°
Custody Seal: Intact Broken Missing
Cooler #:
Please use Black ink to complete form.

FOR LAB USE ONLY
LAB #: AX10513
In-house Location:
Entered into LIMS:

ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

Geosyntec Consultants Inc.
1255 Roberts Blvd N.W.
Kennesaw GA, 30144
Attention: Mr. Brian Jacobson

April 29, 2014

229185

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(770) 734-4200 : FAX (770) 734-4201 : www.asi-lab.com

CHAIN OF CUSTODY RECORD

PAGE: #2 OF #2

CLIENT NAME: Joseph Iannuzzi
CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER: Geosyntec 1255 Roberts Blvd, Suite 200 Kennesaw, GA (678) 202-9550
REPORT TO: Jiannuzzi@geosyntec.com
CC:
REQUESTED COMPLETION DATE:
PO #:
PROJECT NAME/STATE: General Chemical East Point, GA
PROJECT #:

ANALYSIS REQUESTED

DATE	TIME	MATRIX CODE	COMPOSITE	GRAB	SAMPLE IDENTIFICATION	# of CONTAINERS	Sulfide	Total Alkalinity	REMARKS/ADDITIONAL INFORMATION
4/16/14	0945	SW		X	SW-09	2	X	X	13
—	—	GW		X	Dup 1	2	X	X	14
—	—	SW		X	Dup 2	2	X	X	15

CONTAINER TYPE / PRESERVATION

CONTAINER TYPE	PRESERVATION
P - PLASTIC	1 - HCl, 4°
A - AMBER GLASS	2 - H2SO4, 4°
G - CLEAR GLASS	3 - HNO3, 4°
V - VOA VIAL	4 - NaOH, 4°
S - STERILE	5 - NaOH/ZnAc, 4°
O - OTHER	6 - Na2S2O3, 4°
	7 - 4°

*MATRIX CODES:

DW - DRINKING WATER		S - SOIL	
WW - WASTEWATER		SL - SLUDGE	
GW - GROUNDWATER		SD - SOLID	
SW - SURFACE WATER		A - AIR	
ST - STORM WATER		L - LIQUID	
W - WATER		P - PRODUCT	

SAMPLED BY AND TITLE: J. Gilbertus / Invoice Manager — DATE/TIME: 4/16/14 13:35
RELINQUISHED BY: — DATE/TIME: 4/16/14 13:36
RECEIVED BY: — DATE/TIME:
RELINQUISHED BY: — DATE/TIME:
RECEIVED BY/LAB: — DATE/TIME: 4/16/14 1335
SAMPLE SHIPPED VIA: UPS FED-EX COURIER CLIENT OTHER:
pH: Labeled/Preserved: Yes or No — Temperature: 2°C — Custody Seal: Intact Broken Missing — Cooler #
Please use Black ink to complete form.

FOR LAB USE ONLY
LAB #: AX00513
In-house Locations:
Entered Into LIMS: AH

ASI

ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Norcross, GA 30092
(770) 734-4200 FAX (770) 734-4201

LOG-IN CHECKLIST **Printed: 4/29/2014 3:27:42PM**

Attn: Mr. Brian Jacobson

Client: Geosyntec Consultants Inc.
Project: General Chemical
Date Received: 04/16/14 13:35

Work Order: AXD0513
Logged In By: Charles Hawks

OBSERVATIONS

#Samples: 15 **#Containers:** 30

Minimum Temp(C): 2.0 **Maximum Temp(C):** 2.0 **Custody Seal(s) Used:** Yes

CHECKLIST ITEMS

COC included with Samples	YES
Sample Container(s) Intact	YES
Chain of Custody Complete	YES
Sample Container(s) Match COC	YES
Custody seal Intact	YES
Temperature in Compliance	YES
Sufficient Sample Volume for Analysis	YES
Zero Headspace Maintained for VOA Analyses	YES
Samples labeled preserved (If Applicable)	YES
Samples received within Allowable Hold Times	YES
Samples Received on Ice	YES
Preservation Confirmed	YES

Comments:

APPENDIX B

GROUNDWATER AND STORM DRAIN SAMPLING FORM

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: GCW-05 Project #: _____

Sampler: J. Gallegos DATE: April Month; 14 Day; 2014 Year

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
1135	X	X			4.24		20.84	1.64	6.45	-29	~~0.00~~ 91.5	clear
1140		X			6.55		20.53	1.54	6.65	-74	146	clear
1150		X			9.10		19.89	1.43	6.92	-86	157	
1200		X			11.20		19.79	1.42	6.90	-81	182	
1210		X					19.95	1.41	6.90	-81	160	
1220		X			14.95		20.60	1.40	6.92	-82	155	
1230		X	X				20.84	1.39	6.92	-81	136	
1240				X	18.40							

Depth to water (ft): 4.24 Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity: _____ mS/Cm Turbidity (NTU): _____

DO (mg/L): _____ Temperature (°C): _____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump _____

Pump Rate: _____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

- Collected sample at 1230 hrs, stopped sampling at 1240 hrs.
- Turbidity not going down significantly.

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: GCW 4D

Project #: _____

Sampler: J. Gallegos

DATE: 4 Month; 14 Day; 14 Yea

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
1248	X				8.21							
1250		X			9.0		20.50	0.987	6.24	-13	80.6	
1305		X					18.96	0.341	5.12	143	14.3	
1315		X			10.30		18.16	0.252	4.90	244	13.2	
1325		X			10.30		18.04	1.40	4.31	293	10.1	
1335		X			10.30		18.18	2.92	3.68	378	8.63	
1345		X			10.30		18.17	2.92	3.68	381	9.08	
1350		X			10.30		18.11	2.94	3.69	390	8.35	
1355		X			10.30		18.10	2.95	3.69	394	7.61	
1400		X	X		10.30		18.09	2.96	3.68	396	7.56	
1420				X								

Depth to water (ft): 8.21 Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity: _____ mS/Cm Turbidity (NTU): _____

DO (mg/L): _____ Temperature (°C): _____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump

Pump Rate: ____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

Sample at 1420 hrs

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: EPW-3D

Project #: _____

Sampler: J. Gallegos

DATE: 09 Month; 14 Day; 14 Year

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
1453	X				8.86							
1455		X			9.24		18.58	0.471	4.75	340	19.9	
1510		X			9.25		18.60	0.415	5.29	293	7.11	
1520		X			9.14		18.63	0.337	6.01	245	1.43	
1530		X			9.15		18.63	0.323	6.14	232	0.28	
1535		X			9.15		18.63	0.322	6.15	226	0.00	
1540		X			9.15		18.72	0.322	6.15	221	0.00	
1545		X	X		9.15		18.91	0.320	6.16	217	0.00	

Depth to water (ft): 8.86 Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity: _____ mS/Cm Turbidity (NTU): _____

DO (mg/L): _____ Temperature (°C): _____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump _____

Pump Rate: _____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

- Collected sample at 1600
- Collected Dup 01 at 1600

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: EPW-01 Project #: _____

Sampler: J. Gallegos DATE: 4 Month; 14 Day; 14 Year

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
1610	X	X			15.7							
1615		X			16.15		18.31	0.232	4.82	276	0.00	
1625		X										
1630		X					18.13	0.230	4.77	291	0.00	
1635		X			16.75		17.69	0.225	4.64	328	0.00	
1640		X					17.78	0.223	4.68	326	0.00	
1645		X			16.84		17.81	0.222	4.69	324	0.00	
1650		X	X		16.83		17.86	0.221	4.69	324	0.00	
1700				X								

Depth to water (ft): _____ Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity:_____ mS/Cm Turbidity (NTU): _____

DO (mg/L):_____ Temperature (°C):_____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump _____

Pump Rate: _____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

Sample at 1700 hrs

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: EPW-02 Project #: _____

Sampler: _____ DATE: 4 Month; 16 Day; 14 Yea

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
0800	X	X			9.38		17.39	0.376	5.38	141	27.2	
0810		X	X		11.8		17.32	0.352	5.75	96	0.0	
0820		X			11.89		17.33	0.292	5.52	111	0.0	
0830		X			12.02		17.42	0.230	5.26	128	0.0	
0840		X			11.82		17.42	0.210	5.33	125	0.00	
0850		X	X		11.85		17.41	0.210	5.32	125	0.00	

Depth to water (ft): _____ Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity:_____ mS/Cm Turbidity (NTU): _____

DO (mg/L):_____ Temperature (°C):_____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump _____

Pump Rate: _____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

Sample at 0900

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: GCW-07D

Sampler: J. Gallegos

Project #: _____

DATE: 04 Month; 15 Day; 14 Year

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
0924	X				9.2							
0926		X			9.70		17.17	0.522	4.01	247	0.00	
0946		X			9.85		17.32	0.534	3.90	313	0.00	
0956		X			9.85		17.31	0.536	3.85	380	0.00	
1006		X			9.85		17.21	0.535	3.86	386	0.00	
1020		X			9.85		17.15	0.538	3.85	391	0.00	
1025		X	X	X								
1030				X								

Depth to water (ft): _____ Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity: _____ mS/Cm Turbidity (NTU): _____

DO (mg/L): _____ Temperature (°C): _____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump _____

Pump Rate: _____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

Sample at 1030 hrs

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: OW-1A Project #: _____

Sampler: J. Gallegos DATE: 4 Month; 15 Day; 14 Yea

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
1050	X				11.82							
1100		X			12.20		13.95	0.197	3.92	365	0.0	
1110		X			12.37		14.09	0.195	3.95	369	0.0	
1120		X			12.39		14.69	0.191	4.04	368	0.0	
1130		X					15.15	0.188	4.10	364	0.0	
1140		X					15.35	0.184	4.15	365	0.0	
1145		X					15.37	0.183	4.16	365	0.00	
1150		X	X		12.49		15.44	0.182	4.17	364	0.00	
1200				X	12.48							

Depth to water (ft): _____ Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity:_____ mS/Cm Turbidity (NTU): _____

DO (mg/L):_____ Temperature (°C):_____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump _____

Pump Rate: _____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

Sample at 1200 hrs

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: GW-02D

Project #: _____

Sampler: J. Gallagor

DATE: 4 Month: 15 Day: 14 Yea

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
1225	X				3.20							
1230		X			3.29		15.89	3.00	3.35	428	0.0	
1245		X			3.35		16.03	3.00	3.37	432	0.0	
1255		X			3.30		16.29	2.97	3.42	437	0.0	
1305		X			3.30		16.37	2.89	3.44	439	0.0	
1315		X			3.30		16.47	2.73	3.46	439	0.0	
1325			X		3.30		16.45	2.63	3.47	443	0.0	

Depth to water (ft): _____ Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity: _____ mS/Cm Turbidity (NTU): _____

DO (mg/L): _____ Temperature (°C): _____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump

_____

Pump Rate: _____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

Geosyntec consultants

Ground Water Sampling Measurements

Well ID: GCW-30 Project #: _____

Sampler: J. Gallegos DATE: 4 Month; 15 Day; 14 Year

Time	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft.BTOC)	Volume removed (gal.)	Temperature (°C)	Conductivity (mS/cm) (ATC)	pH (ATC)	Redox Potential (ORP) (± mv)	Turbidity (NTU)	Appearance of Water
1345	X				3.80							
1350		X			4.20		15.60	3.58	3.30	395	177	
1400		X			4.22		15.60	3.59	3.30	406	0.00	
1410		X			4.23		15.74	3.31	3.31	427	0.00	
1420		X			4.24		15.93	3.62	3.31	432		3.89
1430		X			4.25		16.00	3.60	3.32	425	3.78	Sun came out.
1440		X			4.25		16.03	3.61	3.33	412	0.04	
1445		X			4.25		15.98	3.61	3.32	416	0.00	
1448			X									

Depth to water (ft): _____ Depth to bottom (ft)_____ Depth of water (H, ft): _____

Diameter of well (d, in): _____ Vol. of water to be purged (V, gal): _____ (use equation below)

For a 2" well **V = 0.163*H**, For a 4" well **V=0.653*H**, For a 6" well **V=1.469*H**

Total Volume of water Purged (V, gal): _____

Stabilization Parameters for at least three consecutive measurements

Turbidity: ±10% or <10 NTU **ORP ±10 mV**

pH: ± 0.1 Units **DO ±10%**

Specific Conductance: ± 10%

Temperature ±10%

Meter Calibration

Meter Number: Calibrated by: Date Calibrated:

Calibration Measurements: pH: _____ Conductivity: _____ mS/Cm Turbidity (NTU): _____

DO (mg/L): _____ Temperature (°C): _____

Split, Blank, Duplicate, & Filtered Samples

Sample ID Description

Miscellaneous

Type of pump _____

Pump Rate: _____ ml/min or gpm

Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)

Sample at 1500

Location East Point, GA Date 4/16/14

Project / Client General Chemical

- 0800: J. Gallegos on Site.
  - Weather: Sunny, cold, ~30°F
  - Heavy rains occurred 4/14/14 to 4/15/14.

Horiba Calibration Check

Temp = 18.92° C
pH = 3.99
ORP = 281 mV
Cond = 4.45 mS/cm
Turb = 0.00 NTU
DO = 9.49 mg/L DO

Location East Point, GA Date 4/16/14

Project / Client General Chemical

Scale

~~Surface~~

Surface Water Samples

ID	Time	Temp	pH	Cond	ORP	Turb	DO (mg/L)
SW07	0815	14.06	4.23	0.786	284	35.7	8.32
Dup2	same	same	same	same	same	same	same
SW02	0900	12.31	3.49	2.48	375	0.00	5.88
SW06	0915	11.96	3.76	1.78	395	0.00	10.70
SW09	0945	10.39	3.94	0.103	365	14.8	11.07

☆ Note: Dup2 taken from SW07 location