Hawthorn Group Sampling Results Report and Revised Work Plan Cabot Portion of Cabot Carbon/Koppers Superfund Site Gainesville, Florida

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Gradient

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1 Introduction

In the Five Year Review Report for the Cabot portion (Site) of the Cabot Carbon/Koppers Superfund Site (US ACE, 2006), United States Environmental Protection Agency (US EPA) asked that additional characterization of the Hawthorn Group formation, the deeper aquifer at the Site, be performed to determine if the former Cabot Lagoons had affected this aquifer unit. In May 2008, Cabot submitted a work plan (Gradient, 2008) to address this and other issues raised in the Five Year Review Report. Given that Beazer was planning to install Hawthorn Group monitoring wells on/near the former Cabot property to delineate the downgradient extent of their (wood treating-related) groundwater plume, Cabot proposed to split groundwater samples from these new wells with Beazer and analyze the samples for pine tar indicator compounds (terpenes and terpenoids). This report presents the details and results of these Hawthorn Group sampling events conducted at the Site. This report also presents the proposed investigation of the surficial aquifer and Hawthorn Group formation at the Site.

Prior to evaluating the results of the Hawthorn Group investigation and the potential for downward contaminant migration, an understanding of the source areas at the former Cabot property is critical. The former Cabot Lagoons, which were the primary area on the former Cabot property where pine processing-related residuals were handled, were breached in 1967 by a local developer, and their contents were released and blended with surrounding soils. However, a significant source of mobile pine tar DNAPL is not believed to be present at the Lagoons, as evident from the low soil concentrations and declining groundwater concentrations recorded in surficial aquifer monitoring wells for over a decade in the Lagoon area. Even if small quantities of pine tar DNAPL were present, the high viscosity (3,000 cp: Gradient, 2005) and "sticky" consistency of pine tar is greatly expected to limit its mobility.

2 Hawthorn Group Sampling Events

As previously discussed, the US EPA approved work plan (Gradient, 2008) indicated that Cabot would split groundwater samples with Beazer during their Hawthorn Group investigation on the former Cabot property and would analyze these samples for pine tar indicator compounds (terpenes, and terpenoids).

Cabot had intended to collect groundwater samples from two Hawthorn Group well pairs (HG28S/D and HG29S/D) that Beazer had planned to install on the eastern portion of the Site (GeoTrans, 2009a). However, since access to the proposed location for well pair HG-28S/D was denied, wells HG-28S and HG-28D could not be installed by Beazer. Therefore, Cabot only collected groundwater samples from well pair HG-29S/D. Details of this sampling event are discussed in the following sections.

2.1 Sampling Methodology

In March/April 2009, Beazer installed Hawthorn Group monitoring well pair HG-29S/D downgradient of the former Cabot Lagoon area (Figure 1). Details of the installation, development and sampling of these wells were provided in a separate report submitted to US EPA (GeoTrans, 2009b). Groundwater elevation contour maps generated by Beazer for the Upper and Lower Hawthorn Group formations are included in Attachment A.

In May 2009, Weston (on behalf of Cabot) split groundwater samples from wells HG-29S and HG-29D with a representative from Beazer. In August 2009, Weston collected another round of groundwater samples from well HG-29S in order to verify field observations and analytical sampling results recorded during the May 2009 sampling event.

The low flow collection method was used to purge and sample wells HG-29S and HG-29D. Prior to groundwater sampling, monitoring wells HG-29S and HG-29D were purged using a peristaltic pump and bladder pump, respectively. Field parameters, including pH, specific conductance, dissolved oxygen, and temperature, were measured while the wells were being purged. Once the water quality readings had stabilized, groundwater samples were collected from the monitoring wells and submitted to the laboratory by Weston for analysis of terpenes and terpenoids (Method 8270C).

2.2 Sampling Results

This section presents the field observations and groundwater quality data generated during the two Hawthorn Group groundwater sampling events. Overall, these data indicate that groundwater in the Hawthorn Group formation is potentially impacted by pine tar-related constituents. However, the detection of these constituents, especially in the deeper Hawthorn Group well, may be attributable to drag down of contamination. Thus, further investigation is needed to understand the source and extent of groundwater quality impacts in the deep aquifer at the Site.

2.2.1 Field Observations

Copies of the groundwater purge forms recorded for the Hawthorn Group wells HG-29S and HG-29D during the May and August sampling events are included in Attachment B. As noted in the collection logs, the groundwater appeared yellow-colored and relatively clear as it flowed through the tubing. However, the groundwater became turbid and purple or "dark tea" in color upon contact with air in the collection bucket. Additionally, the extracted groundwater reportedly had a burnt wood or "piney" odor. See attached photos of well development water following well installation and a sample collected from HG-29S (August sampling event) included in Attachment C.

The water quality data recorded during both sampling events showed that the pH of the groundwater from shallow well HG-29S was low, at approximately 5 standard units (s.u.) (Attachment B). Data collected at deep well HG-29D during the May 2009 sampling event indicated that the pH of groundwater from this well was higher (6.4 s.u.) than the pH in the shallow well.

2.2.2 Groundwater Quality

Analytical results for both sampling events (May and August 2009) indicated the presence of borneol and camphor (terpene compounds) in shallow well HG-29S. No terpenes or terpenoids were detected in the deep well HG-29D in May 2009; this well was not resampled in August 2009. Laboratory reports for both sampling events are included in Attachment D.

Results for the May 2009 sampling event indicated that HG-29S contained borneol and camphor at concentrations of 6,000 μg/L and 2,400 μg/L, respectively (Table 1). In August 2009, data collected at HG-29S showed slightly lower levels of these terpenes, with borneol detected at 3,700 μg/L and camphor at 1,900 μg/L (Table 1). Terpenes, including borneol, camphor and other pine tar constituents, were evaluated during the Remedial Investigation and Risk Assessment for the Site. Cleanup Goals (CUG) were, however, not developed for borneol and camphor in the Record of Decision (ROD) for the Site because these compounds were not selected as Indicator Chemicals based on infrequent detections and low toxicity. Neither borneol nor camphor are listed on US EPA Region III Risk-Based Concentration (RBC) or Florida's Groundwater Cleanup Target Level (GCTL) table of screening values. Also, reference doses for camphor or borneol, from which screening criteria may be calculated using US EPA or Florida methodology, are not available on US EPA's Integrated Risk Information System (IRIS) or Health Effects Assessment Summary Table (HEAST). Thus, due to the low toxicity of these compounds, it appears that toxicity data and screening levels are not readily available.

Regardless, in order to place the detected terpene concentrations at HG-29S in proper perspective, screening criteria were calculated for camphor and borneol using a reference dose for camphor developed by New Jersey Department of Environmental Protection (NJDEP, 2004),[1] and both US EPA's RBC approach (6,570 μg/L) and the Florida GCTL approach (1,260 ug/L). Additionally, the same screening criterion was used for camphor and borneol, since the toxicity characteristics of both compounds are similar (Gosselin *et al*., 1976). The analytical results indicate that the detected terpene concentrations are less than the screening criterion developed using US EPA's RBC approach (6,570 μg/L), but higher than that using the Florida GCTL approach (1,260 ug/L). The significant difference between the two screening values can be attributed to the Relative Source Contribution factor of 20% used in the Florida GCTL calculation (University of Florida, 2005). The use of this factor, which represents the fraction of the total allowable daily intake of a compound from groundwater, results in an extremely conservative screening value. Overall, it is concluded that using US EPA recommended risk assessment guidance, the detected terpene concentrations in HG-29S pose relatively insignificant risks to human health, if this water were hypothetically used as a source of potable water. The yield of well HG-29S is extremely limited (the well went dry during well development and purging), hence this is a hypothetical scenario.

Results for groundwater samples collected by Beazer during the May and August 2009 sampling event also showed the presence of phenol and methylated phenols in groundwater. Phenol was detected at HG-29S and HG-29D at concentrations ranging up to 28,000 μg/L and 2,800 μg/L, respectively, and exceeding the site-specific CUG of 2,630 μg/L. Additionally, groundwater samples from both wells contained benzene, toluene, ethylbenzene, and xylenes on the order of 400 μg/L. The detection of these

[1] A reference dose of 0.18 mg/kg-day for camphor (NJDEP, 2004) was used in these calculations.

compounds, especially in the deeper well HG-29D, may be attributable to cross-contamination of groundwater samples. A significant downward hydraulic gradient exists between the Upper and Lower Hawthorn Group formations at the Site, *i.e.*, a head difference of approximately 30 feet is present between the upper and lower portions of the Hawthorn Group deposits. As acknowledged in the GeoTrans report (GeoTrans, 2009b), "..the hydraulic-head differential across the HG deposits is difficult to overcome during well installation at the Site." Thus, it is possible that the contaminant plume was dragged down during well installation at HG29S/D.

In order to investigate the source of the detected contamination and further evaluate groundwater quality in the eastern portion of the Site, Cabot proposes to install additional wells in the surficial aquifer and Hawthorn Group formation. Additionally, Cabot will sample these wells along with existing surficial aquifer and Hawthorn Group monitoring wells in the eastern portion of the Site. The details of the proposed investigation and sampling event are provided below.

3 Proposed Well Installation and Sampling

3.1 Proposed Investigation Objectives

In order to further assess the nature and extent of pine tar related constituents detected in the Hawthorn Group formation in the eastern portion of the Site, Cabot plans to install additional monitoring wells in both the surficial aquifer and Hawthorn Group formation. Specifically, five surficial aquifer wells and two Hawthorn Group monitoring well clusters will be installed in the eastern portion of the Site (Figure 1). The need for and location of additional Hawthorn Group monitoring wells will be evaluated after the proposed data have been collected. The objectives of the investigation and rationale for the selected well locations are discussed below.

3.1.1 Surficial Aquifer Investigation

Surficial aquifer monitoring wells will be installed both upgradient and downgradient of the former Cabot lagoons. Three upgradient surficial aquifer wells, SA-31, SA-32 and SA-33, will be installed in order to better delineate the extent of contaminant plumes migrating onto the former Cabot property. The proposed wells will be screened at the base of the surficial aquifer and will be located between potential source areas on the Koppers property and the former Cabot lagoon area (Figure 1).

Additionally, two surficial aquifer monitoring wells SA-29 and SA-30 will be installed near the former Cabot Lagoons. Monitoring well SA-29 will be installed adjacent to well pair HG-29S/D to evaluate groundwater quality at the base of the surficial aquifer. These data will help assess whether contamination at the base of the surficial aquifer was mobilized during the installation of HG-29S/D and is the cause of and/or contributing to the detection of contamination at HG-29S/D. Monitoring well SA-30 will be installed immediately downgradient of the lagoons, adjacent to proposed Hawthorn Group well pair HG-30S/D (Figure 1). Given the proximity to the former lagoons, well SA-30 will provide a better understanding of whether the former lagoons are a continuing source of contamination to the surficial aquifer.

3.1.2 Hawthorn Group Investigation

Two pairs of Hawthorn Group wells (HG-28S/D and HG-30S/D) will be initially installed downgradient of the former Cabot lagoons. Well pair HG-30S/D will be installed immediately downgradient of the former Cabot lagoons (Figure 1) to evaluate if pine tar related compounds have impacted groundwater quality in the Hawthorn Group formation (*i.e.*, determine if the former lagoons are a source of contamination to the Hawthorn Group formation). The well pair at this location will be screened at the base of the Hawthorn Group units, unless field screening indicates presence of contaminants at shallower depths. Well pair, HG-28S/D, will be installed approximately 300 feet downgradient of the former Cabot Lagoons to define the downgradient extent of contamination. The Upper and Lower Hawthorn Group wells at HG-28S/D will be screened at depths comparable to HG-29S/D (i.e., in the middle of the Hawthorn Group units), where pine tar related compounds were detected. Based on the sampling results for the two proposed Hawthorn Group well pairs, the need and location for additional Hawthorn Group well pairs at the Site will be evaluated.

3.2 Pre-Well Installation Activities

Once approval of the work plan has been received from US EPA, pre-well installation activities will be initiated. These activities include securing Site access, clearing utilities, and establishing a work staging area.

3.2.1 Site Access

Access to a total of five properties will be needed for the installation of the proposed wells. Permission to access the proposed location for well pair HG-28S/D has already been obtained by US EPA. Permission to access the remaining four properties will be sought once approval of the work plan has been received from US EPA.

3.2.2 Utility Clearance

Prior to well installation efforts, utilities in the vicinity of the drill site will be identified and marked. Utilities will be identified by using the Florida Sunshine One Call system as well as contacting personnel familiar with utilities at the proposed locations. Additionally, local utility agencies not covered by the Florida One Call system will be contacted separately as needed. Prior to drilling, a hand boring will be advanced to a depth of 4 feet below ground surface (bgs) as an added safety measure to avoid damaging underground utilities.

3.2.3 Work Staging Area

A work staging area will be established to allow for the staging of work materials. Discussion with adjacent property owners will be arranged to designate a suitable work staging area.

3.3 Health & Safety

The installation and sampling of the additional Hawthorn Group wells will be conducted in accordance with relevant Occupational Safety and Health Administration (OSHA) requirements. A site-specific health and safety plan (HASP) is maintained for the eastern portion of the Site. The HASP will be reviewed and signed by personnel working on the Site prior to commencement of any work activities. Personnel directly involved in the well installation and groundwater sampling activities will maintain current OSHA 40-hour HAZWOPER training. The work will be conducted under the supervision of a trained site health and safety coordinator. As prescribed in the site-specific HASP, daily health and safety briefings will be held prior to commencement of work. The briefings will review potential hazards to be encountered during the work day and emergency procedures.

Air monitoring will be conducted during drilling and sampling activities using a combination portable photo ionizing detector (PID) and flame ionizing detector (FID). Air monitoring readings will be recorded in the field log book. Based on past work experience at the Site, it is believed that the work activities can be completed in Level D protection.

3.4 Well Installation

The proposed shallow and deep wells will be installed using rotosonic drilling techniques. As has been previously established at the Site, the installation of multi-casing well bores for the Hawthorn Group wells can be technically challenging. The thickness of the clay units at the Site ranges from 0.5 to 7 feet. Although the HG 29S well boring data indicates that the thickness of the clay unit was more than 5 feet thick, the actual thickness of the clay units at the proposed well locations is not known. If the confining unit is relatively thin, achieving a proper seal in the upper and lower isolation casing could be difficult.

Given the challenges associated with deep well installation at the Site and for the sake of consistency, Cabot will use the same drilling and well installation procedures that have previously been used to undertake Hawthorn Group investigations at the Site. If possible, Cabot will also use the same drilling contractor previously used at the Site.

3.4.1 Surficial Aquifer Well Installation

The surficial aquifer wells will be installed by advancing a minimum 6-inch diameter boring down to the base of the shallow sand aquifer/top of the Hawthorne Group formation utilizing rotosonic drilling techniques. Lithologic samples will be collected continuously to the bottom of the bore hole. The core samples will be described by the onsite field geologist.

The surficial aquifer wells will be constructed using a 2-inch diameter by 5-foot length of stainless steel 0.010 slot size well screen and sufficient 2-inch diameter stainless steel well casing to bring the well height to ground surface. A sand filter pack will be placed around the well screen from the bottom of the borehole to approximately 2-feet above the top of the well screen. A 2-feet thick bentonite seal will be placed on top of the sand filter pack and the remainder of the borehole annulus will be filled with cement grout. The bentonite seal will be allowed to hydrate for at least 8 hours before placement of the grout. The surficial aquifer wells will be completed with either 4 inch by 4 inch aluminum protective casings or with 8 inch by 8 inch steel manhole vaults. A well construction diagram is provided in Figure 2.

3.4.2 Lower Hawthorn Group Well Installation

The Lower Hawthorn Group wells will be installed prior to the installation of the Upper Hawthorn Group wells to allow for continuous lithologic characterization of the surficial aquifer and the Hawthorn Group formation. The Lower Hawthorn Group wells will be installed by advancing a minimum 14-inch diameter borehole to a depth of approximately 1 foot into the upper clay unit. Approximately 1 to 2 feet of bentonite will be placed in the bottom of the bore hole. A 10-inch isolation casing will be inserted into the borehole and pushed into the bentonite to prevent cement grout from entering the isolation casing. The annular space between the outside of the isolation casing and the borehole wall will be filled with cement grout from bottom to top, using a tremie pipe. The grout will be allowed to cure for a minimum of 12 hours before drilling continues. If grout subsidence occurs, the remaining annular space will be re-filled with grout to ground surface.

Once the isolation casing is secure, a borehole will be advanced through the 10-inch isolation casing to a depth of approximately 1 to 2 feet into the middle clay unit. Continuous soil samples will be collected so that the lithology can be characterized and the top of the upper and middle clay units can be identified. Approximately 1 to 2 feet of bentonite will be placed in the bottom of the bore hole. A 6-inch diameter isolation casing will be inserted into the borehole and pushed into the bentonite to prevent the cement grout from entering the isolation casing. The annular space between the outside of the isolation casing and the borehole wall will be filled with cement grout from bottom to top, using a tremie pipe. The grout will be allowed to cure for a minimum of 12 hours before drilling continues. If grout subsidence occurs, the remaining annular space will be re-filled with grout to ground surface.

A third borehole will be advanced through the 6-inch isolation casing to the desired depth in the Lower Hawthorn Group formation. As previously discussed, the wells at HG-28S/D will be screened in the middle of the unit, similar to well HG-29S/D. The wells at HG-30S/D will be screened at the base of the Hawthorn Group formation. Soil cores will be collected continuously to the bottom of the borehole and characterized. A two-inch stainless steel well casing and 0.010 slot size screen will be installed in the borehole. A sand filter pack will be placed around the well screen from the bottom of the borehole to approximately 2 feet above the top of the well screen. A 2-foot-thick bentonite seal will be placed on top of the well screen and the remainder of the borehole annulus will be filled from bottom to top with cement grout. The bentonite seal will be allowed to hydrate for at least 8 hours before placement of the grout. The actual completed well depth will depend upon the elevation of the lower confining unit. A proposed well construction design is provided in Figure 3.

3.4.3 Upper Hawthorn Group Well Installation

The Upper Hawthorn Group well installation will be initiated by advancing a minimum 10-inch diameter borehole to a depth of approximately 1 foot into the upper clay unit. Approximately 1 to 2 feet of bentonite will be placed in the bottom of the bore hole. A 6-inch isolation casing will be inserted into the borehole and pushed into the bentonite to prevent cement grout from entering the isolation casing. The annular space between the outside of the isolation casing and the borehole wall will be filled with cement grout from bottom to top, using a tremie pipe. The grout will be allowed to cure for a minimum of 12 hours before drilling continues. If grout subsidence occurs, the remaining annular space will be re-filled with grout to ground surface.

Once the isolation casing is secure, a borehole will be advanced through the 6-inch isolation casing to the desired depth in the Upper Hawthorn Group formation. As previously discussed, the well at HG-28S/D will be screened in the middle of the unit, similar to well HG-29S/D. The wells at HG-30S/D will be screened at the base of the Hawthorn Group formation. Lithologic information collected at the Lower Hawthorn Group well location will be used to set the Upper Hawthorn Group well properly. A two-inch stainless steel well casing and 0.010 slot size screen will be installed in the borehole along with sufficient riser pipe to bring the well to ground surface. A sand filter pack will be placed around the well screen from the bottom of the borehole to approximately 2 feet above the top of the well screen. A 2-foot-thick bentonite seal will be placed on top of the well screen and the remainder of the borehole annulus will filled with cement grout. The bentonite seal will be allowed to hydrate for at least 8 hours before placement of the grout. The actual completed well depths will depend upon the elevation of the upper confining unit. A proposed well construction design is provided in Figure 3.

3.4.4 Borehole Logging

The on-Site geologist will prepare lithologic descriptions for the soil core samples collected during the well installation. The descriptions will include the depth intervals sampled, time of sample collection, color of material, organic vapor readings, and estimated grain size distribution. The borehole logging information will be recorded on either well logging forms or in the site-specific field log book.

3.4.5 Well Completion

The installed wells will be completed with steel, flush mounted traffic rated well vaults. The well vaults will be surrounded by minimum 3-foot by 3-foot by 6-inch concrete pad.

3.4.6 Well Development

The wells will be developed using a submersible pump to remove fluids introduced during the drilling process and to improve the hydraulic connection between the well and the aquifer. US EPA recommends that a tracer test be used to evaluate the impacts of drilling fluids on the aquifer. Thus, the potable water used during the installation of the wells will be spiked with sodium bromide tracer fluid at a concentration of approximately 500 mg/L.

During well development, pH, specific conductance, temperature, dissolved oxygen, turbidity, and bromide levels will be monitored. Well development will continue until the following criteria are met:

- Development water is relatively clear and sediment free;
- Physical indicator parameters listed above have stabilized; and
- Bromide concentration in the development water has dropped below an approximate value of 30 mg/L or until a bromide concentration asymptote is reached.

3.4.7 Surveying Well Locations & Elevations

Well locations and top of casing elevations will be determined by a Florida Registered Professional land surveyor. The horizontal locations will be referenced to Florida State Plane Coordinates and the elevations will be referenced to National Geodetic Vertical Datum 1929 (NGVD 29).

3.5 Groundwater Sampling

Groundwater sampling procedures for the proposed wells are described below and are consistent with the requirements of Florida Department of Environmental Protection (FDEP) Standard Operating Procedure FS 2200.

3.5.1 Water Level Measurement

The depth to water and total well depth will be measured in the proposed wells using an electronic water level meter that is graduated to 0.01 feet. Water level and total well depth measurements will be referenced to the top of the well casing. This information will be used to calculate well purge volumes and to assist in preparing groundwater elevation maps.

3.5.2 Groundwater Sampling & Analysis

Groundwater samples will be collected from new surficial aquifer and Hawthorn Group wells. In addition, groundwater samples will be collected from the following existing wells: HG29S, HG29D, ITW-6, ITW-7, ITW-8, ITW-9, ITW-11, ITW-15 and ITW-16. The complete list of wells to be included in the sampling event is provided in Table 2.

All wells will be purged and sampled using the low flow techniques, in accordance with FDEP standard operating procedure FS 2200. During well purging, pH, specific conductance, temperature, dissolved oxygen, and turbidity will be monitored and recorded. Purging will continue until the measured parameters have stabilized or until five casing volumes of water have been removed.

Groundwater samples will be collected when the water level has recovered to within 90% of the original groundwater elevation or within 24 hours of the completion of well purging. Groundwater samples will be collected using a disposable Teflon bailer or Teflon lined polyethylene tubing attached to a submersible pump. The groundwater samples will be discharged directly into the laboratory provided sample containers. Samples will be labeled with the well identification and analysis to be performed, as well as the date and time of sample collection. Sample collection information will be recorded on a chain of custody record that will remain with the samples until receipt by the analytical laboratory. The groundwater samples from surficial aquifer and Hawthorn Group wells will be analyzed for the following parameters (Table 2):

- Volatile organic compounds (VOCs): Method 8260 B
- Semi-volatile organic compounds (SVOCs): Method 8270C
- Terpenes & Terpenoids: Method 8270C
- Phenols: Method 8270C

Additionally, the groundwater samples from the Hawthorn Group wells, the new surficial aquifer wells, and wells ITW-15 and ITW-16 will be analyzed for the following inorganic parameters (Table 2):

- Aluminum, antimony, arsenic, beryllium, cadmium, calcium, chromium, iron, lead, magnesium, manganese, potassium, and sodium: Method 6010
- Chloride, bromide, carbonate, bicarbonate, sulfate, and nitrate: Method 300

Note, the remaining surficial aquifer wells listed in Table 2 were already sampled for these inorganic parameters after the original Hawthorn Group Work Plan was submitted to USEPA.

3.6 Equipment Decontamination

Equipment used in well installation and sample collection will be decontaminated prior to each use. A discussion of decontamination procedures is provided below.

3.6.1 Drilling Equipment

Downhole drilling equipment will be decontaminated by steam cleaning prior to drilling activities at each well. A decontamination pad will be constructed to contain the decontamination fluids and to control overspray.

3.6.2 Groundwater Sampling Equipment

Groundwater sampling equipment (water level meters, pumps, and bailers) will be decontaminated before each use as described below.

- Wash with solution of potable water and phosphate free detergent;
- Rinse with potable water;
- Rinse with Isopropanol;
- Rinse with distilled water;
- Allow to air dry as long as practical; and
- Wrap if stored for later use.

Decontamination fluids will be containerized for appropriate disposal as discussed below.

3.7 Investigative Derived Waste

Investigative derived waste (IDW) includes drill cuttings, well development and purge water, decontamination fluids and solid waste (*e.g.,* surgical gloves, paper towels, *etc.*). This section describes the handling and disposal of the IDW.

3.7.1 Drill Cuttings

Drill cuttings will be containerized in either drums or bulk storage containers (*e.g.*, roll-off box). The containers will be appropriately labeled with the Site name, well designation, date of collection, and contents. The containers will remain covered to prevent rainwater from entering the containers. Representative samples of the drill cuttings will be collected to characterize the material for disposal in accordance with the disposal facility requirements. Upon receipt of analytical data, a waste profile will be completed and transportation and disposal will be arranged. Appropriate manifests will be completed for the material prior to transportation to the disposal facility.

3.7.2 Drilling Fluids

Liquids generated during the drilling process will be containerized in drums or bulk storage containers. The containers will be appropriately labeled with the Site name, well designation, date, and contents. The containers will remain covered to prevent rainwater from entering the containers. Representative samples of the fluids will be collected to characterize the material for disposal in accordance with the disposal facility requirements. Upon receipt of analytical data, a waste profile will be completed and transportation and disposal will be arranged. Appropriate manifests will be completed for the material prior to transportation to the disposal facility.

3.7.3 Well Development Water Purge Water & Decontamination Fluids

Well development purge water and decontamination fluids will be containerized in drums or bulk storage container (*e.g.*, poly-tank) and transported to the on-site lift station for discharge. A submersible pump will be used to transfer the liquids from the storage containers directly into the lift station sump.

3.7.4 Solid Non-Hazardous Waste

Solid non-hazardous waste generated during the well installation activities will be placed in plastic garbage bags. This material will be transported to an appropriate solid waste disposal facility or transfer station.

3.8 House Keeping & Site Restoration

As each phase of work is completed, equipment that is no longer needed will be removed from the Site. At the end of each work day, equipment and material will be stored either in the work vehicles or at the lift station. Additionally, IDW generated that day will be containerized and stored in approved containers. IDW will be removed from the Site following receipt of the laboratory analytical data and completion of appropriate documentation and manifests. All other work materials will be removed from the Site upon completion of the well installation and sampling efforts. Care will be taken to organize the work site to minimize traffic and parking disruption. A work site walk will be conducted at the end of the field effort to confirm that the restoration activities are satisfactory. Results of the site walk will be documented in the field log book. Items of concerned identified during the site walk will be documented and addressed as needed.

3.9 Investigation Report

A report will be prepared that documents the well installation and sampling activities. This report will include well construction diagrams, a map depicting the surveyed well locations, borehole logs, well development and purging records, and results of the groundwater sample analyses. The report will include a discussion of the groundwater sampling results and recommendations for future actions. A draft report will be submitted to US EPA, the Florida Department of Environmental Protection (FDEP), and appropriate stake holders.

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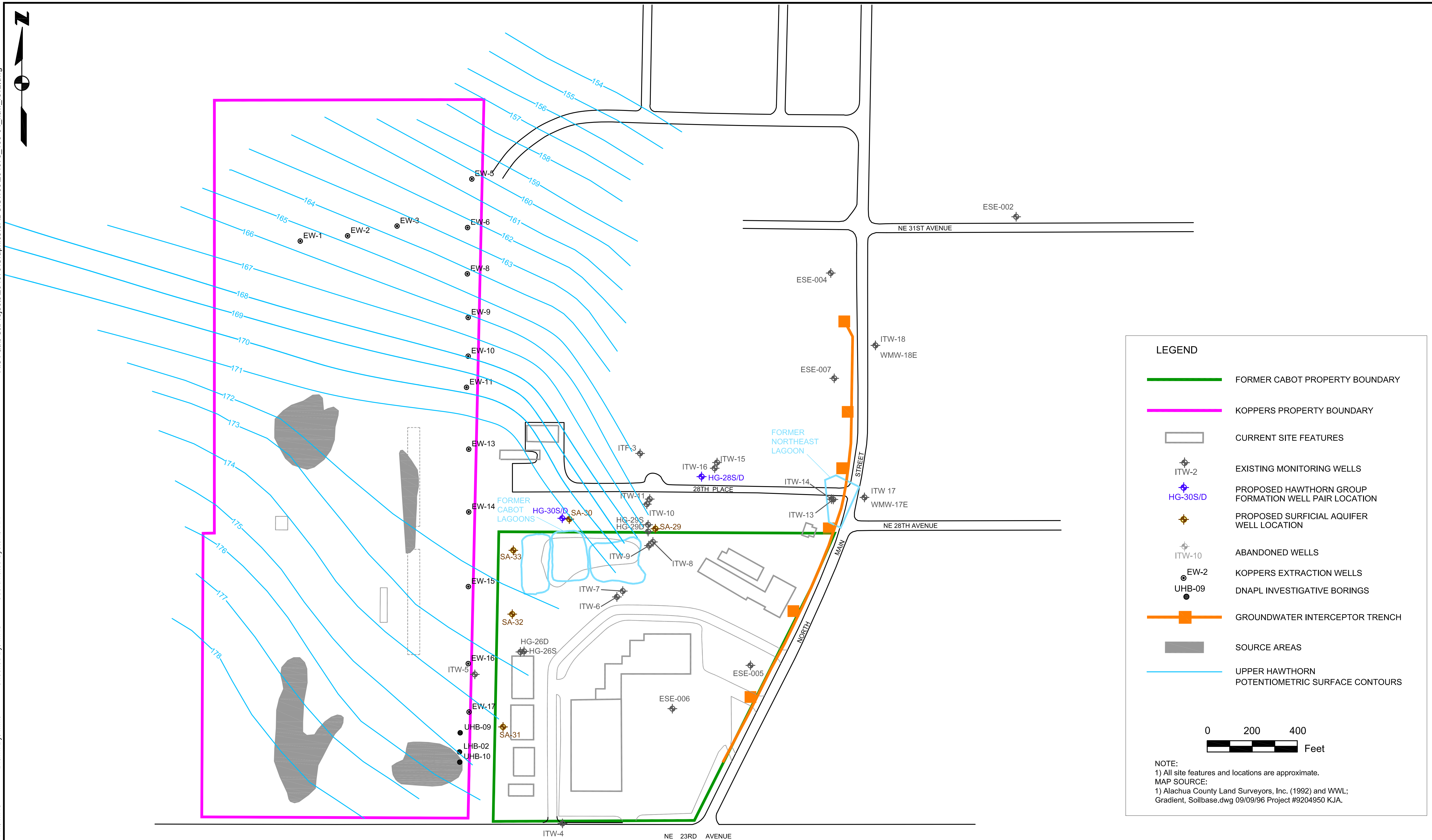


Gradient

Proposed Well Locations with Upper Hawthorn Potentiometric Surface Contours

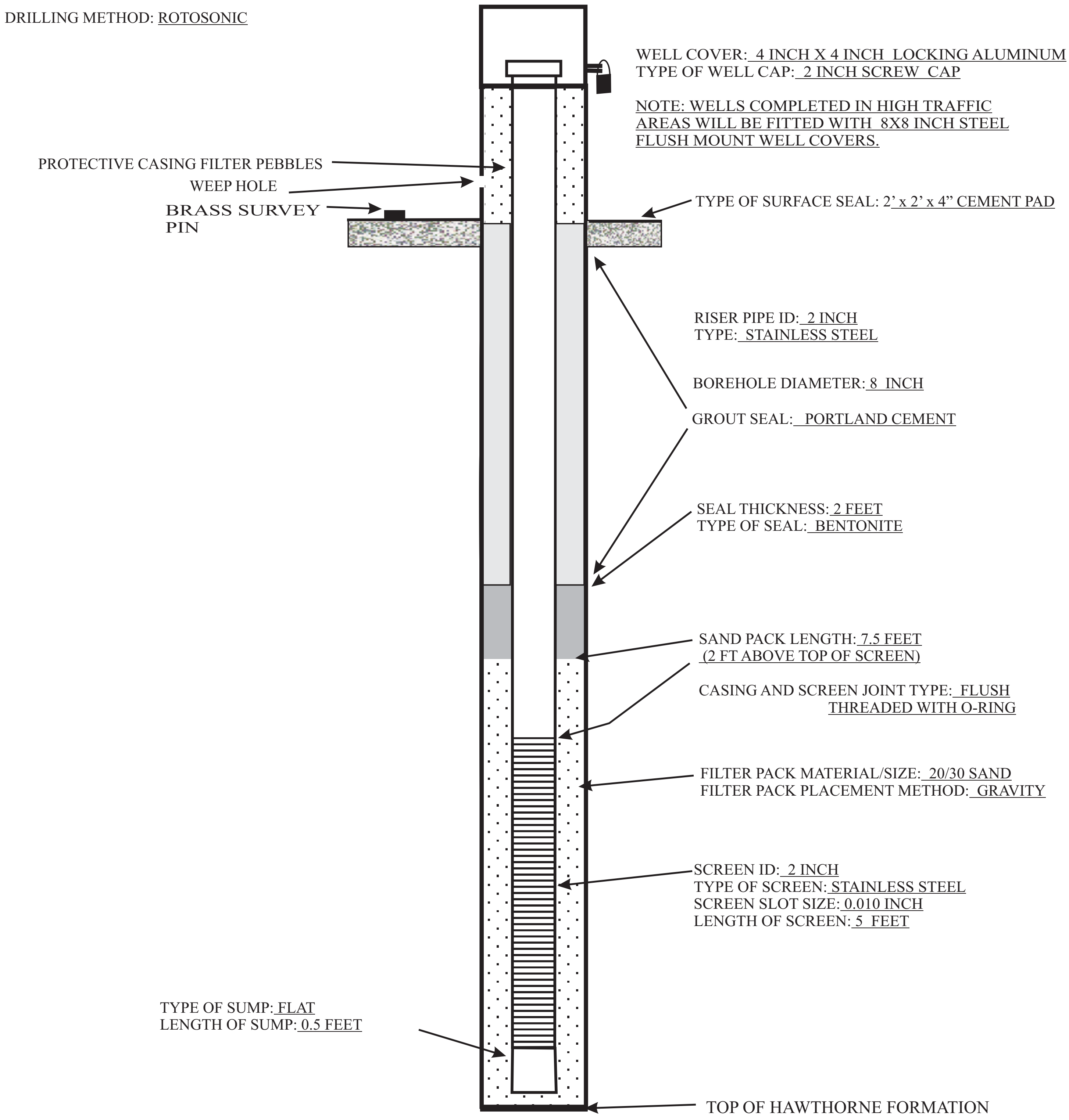
Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

FIGURE 1

Date: 10/25/2010

File Path: G:\Projects\204079\Graphics\CADGIS\105\204079_105-04_haw_rev2.dwg
Coordinates System: NA
Checked By: MHS
Drawn By: MMJ
PM: MHS
Project No.: 204079

Surficial Aquifer Well



NOT TO SCALE

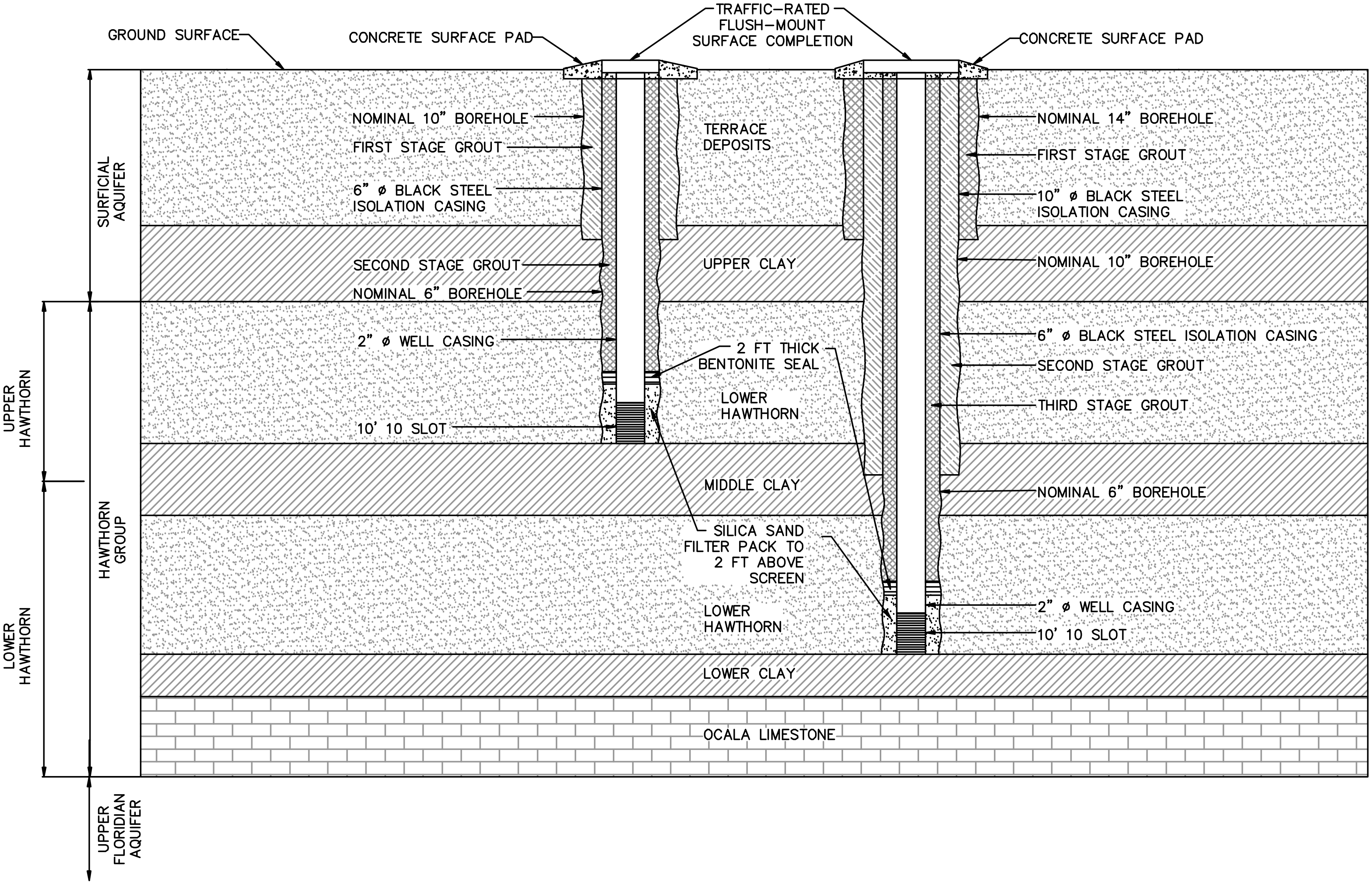
CABOT CARBON/KOPPERS SITE
GAINESVILLE, FLORIDA

SURFICIAL AQUIFER MONITOR WELL
CONSTRUCTION DIAGRAM

FIGURE 2

WESTON SOLUTIONS®

DRAWN	DATE	WORK ORDER NO.	FILE NAME
MAT	2-26-10	05791.004.004.0015	Surficial-Aquifer-Well



WESTON SOLUTIONS

PROJECT:
EASTER PORTION OF CABOT CARBON/ KOPPERS SUPERFUND SITE, GAINESVILLE, FL

TITLE:
HAWTHORN AQUIFER MONITORING WELL CONSTRUCTION DIAGRAM

FIGURE 3

SCALE: NTS

DRAWN:	DATE:	W.O. NO.:
PPOOL	3.3.10	05791.004.004.0015
CHKD BY: TAYLOR	DATE: 3.3.10	CAD NAME: WELL_DRAWING.DWG

Table 1
Summary of Hawthorn Group Well Sampling Results
Cabot Carbon/Koppers Superfund Site, Gainesville, FL

Monitoring Well ID	Well Screen Interval (feet bgs)	May-09		Aug-09	
		Borneol (μg/L)	Camphor (μg/L)	Borneol (μg/L)	Camphor (μg/L)
HG-29S	45.8 - 55.8	6,000	2,400	3,700	1,900
HG-29D	87 - 97	ND	ND	--	--

Note:
ND - Non-detect
-- Not sampled

Table 2
Proposed Monitoring Program
Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

Existing Monitoring Wells	Additional Proposed Wells	Parameters	Analytical Method
ITW-6 ITW-7 ITW-8 ITW-9 ITW-11 ITW-15 ITW-16 HG-29S HG-29D	SA-29 SA-30 SA-31 SA-32 SA-33 HG-28S HG-28D HG-30S HG-30D	VOCs SVOCs Phenol 2,4-Dimethyphenol 2-Methylphenol 3&4-Methylphenol Terpenes and terpenoids	8260B 8270C 8270C 8270C
HG-29S HG-29D ITW-15 ITW-16	SA-29 SA-30 SA-31 SA-32 SA-33 HG-28S HG-28D HG-30S HG-30D	Aluminum, antimony, arsenic, beryllium, cadmium, calcium, chromium, iron, lead, magnesium, manganese, potassium, and sodium Chloride, bromide, carbonate, bicarbonate, sulfate, and nitrate	6010 300