LMS/PIN/N01347

Pinellas Environmental Restoration Project

Sitewide Environmental Monitoring Semiannual Progress Report for the Young – Rainey STAR Center December 2008 through May 2009

June 2009

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Abbreviations

bls	below land surface
°C	degrees Celsius
cDCE	cis-1,2-dichloroethene
CMIP	Corrective Measures Implementation Plan
CMS	Corrective Measures Study
CMT	continuous multi-channel tubing
COPC	contaminants of potential concern
CTL	Cleanup Target Level
DOE	U.S. Department of Energy
EA	environmental assessment
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FONSI	Finding of No Significant Impacts
ft	feet
ft/ft	feet per foot
FY	fiscal year
HSWA	Hazardous and Solid Waste Amendments
HRC	Hydrogen Release Compound®
IC	Institutional Control
ICM	interim corrective measure
IRAP	Interim Remedial Action Plan
IWNF	Industrial Wastewater Neutralization Facility
LDA	large-diameter auger
LM	Office of Legacy Management
MCL	maximum contaminant level
MDL	method detection limit
MSL	mean sea level
µmhos/cm	micromhos per centimeter
µg/L	micrograms per liter
mg/L	milligrams per liter
mV	millivolt

NAPL	non-aqueous phase liquid
NEPA	National Environmental Policy Act
NGVD	national geodetic vertical datum
NTU	Nephelometric Turbidity Units
PCIC	Pinellas County Industrial Council
QA/QC	quality assurance/quality control
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RPD	relative percent difference
STAR Center	Young - Rainey Science, Technology, and Research Center
SWMU	solid-waste management unit
TCE	trichloroethene
TCOPC	total contaminants of potential concern
tDCE	trans-1,2-dichloroethene
VC	vinyl chloride
VOCs	volatile organic compounds
WWNA	Wastewater Neutralization Area

1.0 Introduction

The Young - Rainey Science, Technology, and Research Center (STAR Center) is a former U.S. Department of Energy (DOE) facility constructed in the mid-1950s in Pinellas County, Florida. The 99-acre STAR Center is located in Largo, Florida, and lies in the northeast quarter of Section 13, Township 30 South, Range 15 East (Figure 1). While it was owned by DOE, the facility primarily manufactured neutron generators for nuclear weapons. Other products manufactured at the STAR Center have included radioisotopically powered thermoelectric generators, thermal batteries, specialty capacitors, crystal resonators, neutron detectors, lightning-arrestor connectors, and vacuum-switch tubes. In 1987, the U.S. Environmental Protection Agency (EPA) performed a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (EPA 1988) at the site to gather information on potential releases of hazardous materials. In February of 1990, EPA issued a Hazardous and Solid Waste Amendments (HSWA) permit to DOE, enabling DOE to investigate and perform remediation activities in those areas designated as solid-waste management units (SWMUs), contaminated by hazardous materials resulting from DOE operations. On March 17, 1995, DOE sold the facility to the Pinellas County Industrial Council (PCIC). The sales contract included clauses to ensure continued compliance with federal, state, and local regulations while DOE remediates the site. On July 1, 1999, the PCIC was disestablished, and ownership of the STAR Center changed to the Pinellas County government. In November 2000, the State of Florida received HSWA authorization from EPA. The Florida Department of Environmental Protection (FDEP) issued a new HSWA permit to DOE in January 2002. The permit was reissued on August 21, 2007, and was modified under the provisions of Section 403.722, Florida Statutes and Chapters 62-4, 62-160, 62-730, 62-777, and 62-780, Florida Administrative Code (F.A.C.), to incorporate the Global Risk Based Corrective Action (RBCA) regulations.

The administration of DOE activities at the facility is the responsibility of the DOE Office of Legacy Management (LM) in Grand Junction, Colorado. S.M. Stoller Corporation (Stoller), a prime contractor to DOE-LM, provides technical support to DOE for remediation and closure of all active SWMUs on site.

The EPA RFA Report and the HSWA permit identified 15 sites at the former DOE facility that may have experienced environmental contamination as a result of past activities. Upon completion of the RCRA Facility Investigation (DOE 1991), 11 of the 15 SWMUs were recommended by DOE and approved by EPA Region IV and FDEP for no further action (DOE 1994b). A twelfth site, the Former Pistol Range Site, was remediated in 1993; it was recommended by DOE, and approved by EPA Region IV and FDEP, for no further action.

Two additional SWMUs, the West Fenceline Site and the Wastewater Neutralization Area/ Building 200 (WWNA/Building 200), were identified after the HSWA permit was issued, bringing the total to 17 SWMUs that have been identified and investigated at the STAR Center. The remediation of the West Fenceline Site was completed in 1997, and DOE recommended—and EPA Region IV and FDEP approved—no further action, for a total of 13 SWMUs remediated. A Corrective Measures Study (CMS)/Corrective Measures Implementation Plan (CMIP) was prepared and submitted in 1997 to EPA Region IV and FDEP to address the contamination at the WWNA/Building 200 Area.

Therefore, there are currently four SWMUs that have contamination in the surficial aquifer groundwater at levels in excess of protective standards. These four SWMUs are the Old Drum Storage Site (PIN06), the Industrial Drain Leaks-Building 100 Area (PIN12), the Northeast Site (PIN15), and the WWNA/Building 200 Area (PIN18). Two SWMUs, PIN06 and PIN12, are collectively known as the Building 100 Area. Figure 2 depicts the location of the four SWMUs.

Regarding the WWNA/Building 200 Area (PIN18) SWMU, on December 20, 2005, DOE received concurrence from FDEP to shut down the groundwater recovery system and begin monitoring to determine a closure approach through FDEP's RBCA regulations. The 1-year closure monitoring program specified by FDEP began in October 2005 and was completed in October 2006. A No Further Action With Controls Proposal was submitted to FDEP on March 14, 2007.

DOE proposes to proceed with closure of the WWNA under RMO II Option IID and to apply the default poor quality arsenic Cleanup Target Level (CTL) of 100 micrograms per liter (μg/L) to on-site groundwater. Soil cleanup was completed in 1999 and approved by FDEP. Therefore, acceptance of this closure proposal by FDEP indicates that both soil and groundwater cleanup are complete.

DOE is working with the landowner (Pinellas County Industrial Development Authority) to establish Institutional Controls (ICs) at the site that will: (1) restrict future land use to industrial purposes; (2) prohibit the installation of shallow wells for groundwater use; and (3) limit the depth of excavations. Once ICs are in place, there will be no potential for current or future exposure to contaminated groundwater. ICs will need to be established and approved by FDEP before a formal No Further Action determination can be made. Currently, DOE is working with the STAR Center in the development of a covenant that incorporates the ICs that will then become part of DOE's Long-Term Surveillance and Maintenance Plan at this site.

Additional background information relative to each SWMU is briefly described below. This document also serves as the semiannual progress report for each of these four SWMUs. The results of monitoring activities and a summary of ongoing and projected work are provided in this report.

1.1 Building 100 Area

The Building 100 Area (PIN06 and PIN12) is located in the southeast portion of the STAR Center. The Old Drum Storage Site is the former location of a concrete storage pad equipped with a drain and containment system used to store hazardous waste including methylene chloride, ignitable liquids, arsenic, and calcium chromate solids (DOE 1987a). Empty drums containing residual waste solvents were also stored in this area (DOE 1987b). The concrete pad was located near the northwest corner of Building 100. The pad was removed in October 1983 in accordance with an FDEP closure permit (DOE 1987a), and a closure report was submitted to FDEP in August 1986 (DOE 1986). The decommissioning of the pad and the cessation of drum storage effectively removed the potential for a future contaminant source at PIN06.

Building 100 is the largest building at the STAR Center and covers approximately 11 acres. In the past, offices, laboratories, and production facilities for DOE were housed in the building.

SWMU PIN12 consists of the liquid waste drainage system that formerly served Building 100. Four individual drainage systems (sanitary, chemical, health physics, and storm water) were present within the building. In 1989, all four drainage systems were investigated, including verifying the system routing and the condition of underground and aboveground piping and ancillary equipment (EMC 1989). As a result of this investigation, the health physics and chemical drainage systems were flushed, grouted, and abandoned (DOE 1997). Some of the chemical drain lines were replaced by an aboveground system currently used by tenants of the building.

A CMS and CMIP were completed and approved for the Building 100 Area because volatile organic compounds (VOCs) concentrations measured in groundwater at the Old Drum Storage Site (PIN06) and one monitoring well located at the northwest corner of Building 100 (PIN12) exceeded the Safe Drinking Water Act and FDEP maximum contaminant levels (MCLs). Subsequent investigations revealed elevated VOCs concentrations under Building 100 and downgradient to the southeast as well. On August 15, 2000, EPA approved the Building 100 CMIP Addendum; FDEP approved the document on November 15, 1999.

In May 2001, DOE began an analysis of the potential remediation strategies for the three Building 100 Area tasks: plume control, source treatment, and dissolved phase treatment. The *Building 100 Area Remediation Technology Screening Report* (DOE 2001) assembled a list of remediation technologies, categorized them into the remediation tasks, and conducted an initial screening of the technologies. This initial screening eliminated the technologies that obviously would not work and recommended technologies that should be retained for detailed evaluation at a later time.

The *Building 100 Area Plume Control Technology Selection Report*, prepared in February 2002, conducted a detailed evaluation of five plume control technologies and recommended that enhanced bioremediation should be implemented for plume control at the Building 100 Area.

In-situ enhanced bioremediation to control the plume of dissolved contaminants at the Building 100 Area began as a pilot study on March 11, 2003. Hydrogen Release Compound® (HRC) was injected through nine injection points surrounding each of three monitoring wells. Groundwater samples were collected from each of the three monitoring wells at approximately 2-month intervals through May 2004 to track the progress of HRC at remediating site contaminants. HRC was selected because it is a proven technology for optimizing degradation rates of chlorinated hydrocarbons dissolved in groundwater. The continuous hydrogen source provided by the HRC can reduce the concentration of dissolved phase chlorinated hydrocarbons by greatly enhancing the reductive dechlorination process that occurs naturally at the Building 100 Area. The *In-Situ Enhanced Bioremediation Technology to Control the Plume of Dissolved Contaminants at the Building 100 Area of the Young - Rainey STAR Center Pilot Test* (Safety and Ecology 2004) final report was received from the subcontractor on April 5, 2004. The results of the pilot test indicate that the injection of HRC had a limited influence in the pilot test area. This conclusion is based on increasing concentrations of the metabolic acids (as produced from HRC) and the decreasing concentrations of sulfate and iron and the observation of ethene at one location. A supplemental sampling event was conducted in May 2004, after which the pilot test was considered complete.

Several years have passed since the Building 100 Area CMS Report (DOE 1994a), the CMIP (DOE 1996a), and the CMIP Addendum (DOE 1998) were written. Therefore, in July 2006, the Building 100 Area CMS Report Addendum was prepared to update site conditions, discuss the regulatory framework, and re-evaluate active remediation alternatives for this SWMU. Based on the recommendations included in this report, FDEP and DOE continue to discuss the closure strategy for this SWMU. One recommendation that FDEP agreed on has already been implemented, with the shutdown of the two recovery wells at Building 100 on August 21, 2006.

1.2 Northeast Site

In the late 1960s, before the construction of the East Pond, drums of waste and construction debris were disposed of in the swampy area of the Northeast Site. The East Pond was excavated in 1968 as a borrow pit. In 1986, an expansion of the East Pond was initiated to create additional storm-water retention capacity. Excavation activities ceased when contamination was detected directly west of the East Pond. EPA identified the Northeast Site as a SWMU (EPA 1992). An Interim Corrective Measures (ICM) Study was developed and submitted to EPA, and approval of this document was received in October 1991. An interim groundwater recovery system for the Northeast Site was installed, and operation commenced in January 1992.

The groundwater treatment system, as initially installed, consisted of four recovery wells equipped with pneumatic recovery pumps, a holding tank, centrifugal transfer pumps, and approximately 2,500 feet (ft) of transfer and secondary containment piping. During 1993, DOE proposed a reconfigured system for the site, consisting of four shallow and three deep recovery wells. After EPA approved the upgrade, the system was reconfigured and became operational on March 1, 1994.

Between August and October 1995, after EPA and FDEP granted their approval, a portion of the Northeast Site was excavated to remove debris and other materials that could inhibit future corrective measures. The location of the areas of excavation was based primarily on the results of a geophysical survey and knowledge of existing utility locations. Detailed descriptions of the debris-removal activities were submitted to EPA and FDEP as part of the *Northeast Site Interim Measures Quarterly Progress Report* (DOE 1996b).

In 1996, DOE submitted a CMIP to EPA Region IV and FDEP. This plan was approved by both regulatory agencies in 1997. As part of the Northeast Site CMS and CMIP, a pump-and-treat system, in conjunction with a subsurface hydrogeologic barrier wall to prevent the migration of the contaminant plume, was identified as the best available technology. A pretreatment system for iron removal, an air-stripper unit, and a tank for holding treated groundwater before discharge to the Pinellas County Publicly Owned Treatment Works were recommended. The treatment system was constructed in early 1997 and became operational by July 1997, with seven Northeast Site recovery wells and two Building 100 recovery wells pumping to the system influent tank. Subsequently several additional recovery wells were installed, and some of the old recovery wells were abandoned.

During 1997, anaerobic bioremediation and rotary steam stripping pilot tests were conducted in the northern and southern portions of the Northeast Site, respectively. These tests were designed by an Innovative Treatment Remediation Demonstration group of regulatory and industry

members to provide remedial options at the STAR Center. At the conclusion of the field tests in July 1997, pump-and-treat technology resumed at the Northeast Site.

An *Interim Measures Work Plan for Remediation of Non-Aqueous Phase Liquids* (NAPLs) *at the Northeast Site* was submitted to FDEP in late November 2001. The purpose of this document was to present the plan for the ICM to remediate non-aqueous phase liquids (NAPLs) at the Northeast Site. An ICM was considered to be warranted because it supported the long-term corrective action to remediate the dissolved phase contamination in the surficial aquifer to FDEP drinking water MCLs. Without this measure, NAPLs would continue to act as a source of dissolved contamination, resulting in contaminant concentrations in groundwater well above the MCLs. FDEP approved this document on January 10, 2002.

Concurrent with the preparation of the ICM Plan, a National Environmental Policy Act (NEPA) Environmental Checklist recommending a Categorical Exclusion was approved by DOE on December 19, 2001. The categorical exclusion of the Area A pilot test activity was approved based on the fact that the NAPL remediation of Area A was a small-scale, short-term cleanup action and the siting, construction, and operation of treatment facilities were temporary and pilot-scale in size. Additionally, activities of this nature were evaluated in the 1995 *Environmental Assessment* (EA) *of Corrective Action at the Northeast Site* (DOE 1995).

A NEPA Action Review was conducted for the interim measure source removal action at Area B in October of 2002. A summary of the review concluded that Area B remediation would impact an area of approximately 38,000 square ft. The footprint of the above-ground treatment system would be about 80 ft by 80 ft, and an estimated 84,000 gallons per day of groundwater would be processed over a 24-week period of operation. The proposed interim measure, although not specifically identified in the 1995 EA, was determined to be within the scope of the proposed actions. The remedial activity would occur within the same physical boundaries and address the same contaminants identified in the EA, but in a more concentrated form. Because the EA provided for "design modifications to reflect technological advances or site-specific conditions," it was determined that the NAPL remediation of Area B was within the scope of the existing EA. However, this flexibility was not mentioned in the Finding of No Significant Impacts (FONSI) document signed in May 1995 (Glass 1995). Therefore, it was determined that the appropriate action under NEPA would require an amendment to the FONSI to include the broader scope of activities from the EA and any additional impacts from the NAPL removal action. The FONSI was amended, reviewed by the DOE-Idaho NEPA Planning Board, and approved by the DOE Grand Junction Office NEPA Compliance Officer on February 24, 2003.

Construction of the NAPL Area A treatment system began in late May 2002, and system startup occurred on September 26, 2002. NAPL treatment was completed on February 28, 2003. Three post-treatment sampling events occurred in March, May, and August 2003. Demobilization activities began in early March and were completed in September 2003. The *Northeast Site Area A NAPL Remediation Final Report* (DOE 2003b), describing thermal remediation of Area A, was sent to stakeholders on September 25, 2003.

At the end of February 2004, a contract was awarded for the remediation of NAPL Area B using the electro-thermal dynamic stripping process. Construction of the NAPL Area B treatment system began in July 2004 and was completed in early August 2005. Operations began on August 16, 2005, and were completed on June 12, 2006. Heating resumed in a focused area from

July 19, 2006, until August 25, 2006, to address groundwater concentrations that exceeded remediation goals at two locations. The treatment system was permanently shut down on August 29, 2006. Approximately 18,000 pounds of contaminants were removed during operations. Confirmatory sampling activities were completed by the end of September 2006. The *Final Report Northeast Site Area B NAPL Remediation Project at the Young - Rainey STAR Center Largo, Pinellas County, Florida* (DOE 2007) describes Area B remediation.

DOE has conducted four phases of soil sampling at the Northeast Site from August 2007 through June 2008, during which 754 soil samples were collected from 85 soil borings and analyzed for VOCs. The results of this investigation are described in detail in the *Northeast Site Source Characterization Data Report* (DOE 2008c). Concurrent to source area characterization, DOE conducted a feasibility study (DOE 2008a) and determined the best method for source removal was soil excavation by large-diameter auger (LDA). An *Interim Remedial Action Plan for Source Removal at the Northeast Site* (DOE 2008b) was prepared in August 2008 and approved by FDEP on August 22, 2008. The objective of this Interim Remedial Action was to remove the source of contamination at the site. An engineering design was developed and a source removal subcontract awarded in 2008. Source removal began in January 2009 and was completed in May 2009.

1.3 WWNA/Building 200 Area

The WWNA/Building 200 Area includes the active Industrial Wastewater Neutralization Facility (IWNF), the area around Building 200, and the area south of the neutralization facility. The IWNF refers to the physical treatment facility that currently receives sanitary and industrial wastewater and has been in operation since 1957.

A CMS Report and CMIP were completed in 1997 for this SWMU because vinyl chloride (VC), trichloroethene (TCE), and arsenic were detected in surficial aquifer groundwater at concentrations above federal and state MCLs. The recommended remediation alternative for the WWNA/Building 200 Area was groundwater recovery with the Building 100 Area wells and an additional recovery well located in the WWNA. The CMIP recommended that recovered water from the additional well be discharged directly to the IWNF. This well was designed to withdraw surficial aquifer groundwater directly from the arsenic plume and thereby reduce the contaminant mass and prevent contaminant migration.

FDEP's response to the CMS/CMIP, concerning arsenic contamination in the upper 2 ft of soil, suggested that a treatment technology, air sparging, was eliminated too early. DOE then proposed a multi-phased Interim Action that included operating the recovery well for 6 months, then pulsing the system, as well as performing geochemical analyses and leaching studies of the site. On January 21, 1999, FDEP approved the proposed interim remedial action.

Additionally, EPA Region IV also approved the interim remedial action and concurred with FDEP's position regarding the arsenic contamination. EPA also requested an addendum or modification to the CMIP that would address DOE's final selection of the remediation technology and include a timeline for the completion of these activities.

In early June 1999, the WWNA recovery well commenced operation. All arsenic concentrations in water from the WWNA recovery well, PIN18−RW01, were below the STAR Center's daily

maximum discharge standard for arsenic in wastewater of 0.20 milligrams per liter (mg/L) until shutdown.

Additional details concerning the impacts of groundwater extraction are reported in the WWNA/Building 200 Area CMIP Addendum (DOE 2000b). Modifications to the recovery of groundwater were proposed based on data collected through November 1999 and consisted of the installation of two new recovery wells screened at shallow intervals and the abandonment of RW01. The CMIP Addendum was submitted to the regulators and approved by FDEP and EPA in 2000. A Statement of Basis (DOE 2000a) was issued by DOE in late September 2000. This document provides a summary of environmental investigations and proposed cleanup alternatives for the WWNA/Building 200 Area. Part of DOE's proposed final action for the WWNA was to shut down the three extraction wells and begin a 1-year monitoring period. Verbal approval for this action was received from FDEP on December 20, 2005, and the wells were shut down that day.

A No Further Action With Controls Proposal for the WWNA/Building 200 Area was submitted to FDEP on March 14, 2007. FDEP approved the No Further Action With Controls Proposal on May 24, 2007, and requested that DOE submit an updated Statement of Basis. Submittal of this document is awaiting finalization of the institutional controls for the WWNA. Currently, DOE is working with the STAR Center to implement the appropriate restrictive covenants necessary to accommodate the proposed remedy for this site.

1.4 Site Update

RBCA rules are currently being evaluated for applicability to assist in expediting closure at some or all of the SWMUs at the STAR Center. Technical discussions regarding RBCA as the proposed final action continued between FDEP and DOE.

Pinellas County is planning a major utility line and road construction effort along Bryan Dairy and Belcher Roads that is scheduled to start in 2010. DOE has evaluated the effect that the Building 100 Area contaminant plume might have upon road construction activities along the east and south sides of the STAR Center and has chosen to treat groundwater obtained from the County's dewatering contractor. Once brought to the surface through dewatering activities, groundwater will be transported to an onsite air stripper and the treated water will be discharged to the STAR Center's IWNF and subsequently discharged to the publically owned treatment works.

An interim remedial action plan (IRAP) is being finalized that details the use of groundwater pumping to control the contaminant plume that is moving offsite to the south of the Building 100 Area. One recovery well will be used to capture contaminated groundwater, and the extracted water will be treated at the surface using air stripping. The treated water will be discharged to the STAR Center's IWNF. The IRAP was submitted to FDEP in March 2009. Groundwater recovery is planned to start in July 2009.

On January 14, 2009, LDA operations commenced at the Northeast Site and were completed on May 22, 2009. Two hundred forty-three large-diameter and 352 small-diameter borings were completed. Approximately 8,387 cubic yards of soil were excavated; of this total, 4,667 cubic yards were removed as clean overburden and 3,720 cubic yards of contaminated soils were

removed, characterized for waste disposal, and disposed of as non-hazardous waste at a RCRA Subtitle D landfill. Additional information regarding the 4.5 Acre Site LDA work can be found in the *Interim Remedial Action Final Report for Source Removal at the 4.5 Acre Site*. This report will be finalized in the next few months.

In May 2009, three continuous multi-channel tubing (CMT) monitoring wells were installed south of Bryan Dairy Road as part of the Building 100 Area plume delineation task. Each of these three CMT wells have screened intervals from approximately 9−18, 20−29, and 31−40 ft bls, making a total of nine wells. Analytical results from these wells show no contaminant detections. See Section 3.2.2 for more information regarding the analytical results from these wells.

1.5 Site Activities

- Water-level measurements were obtained from all accessible monitoring wells, recovery wells, and ponds on March 18, 2009.
- The semiannual sampling event was conducted from March 19−31, 2009, and included collection of water samples from 128 wells and 5 surface water locations at the STAR Center.
- The results of the semiannual sampling event were reported (this document).
- Performed source area removal at the Northeast Site.

2.0 Water-Level Elevations

2.1 Work Conducted and Methods

On March 18, 2009, depth-to-water measurements were taken at all accessible monitoring wells, former extraction wells, and ponds at the STAR Center and two off-site ponds. The water levels were measured with an electronic water-level indicator or directly from a staff gauge. Groundwater elevations are listed in Table 1.

2.2 Groundwater Flow

Groundwater and surface-water elevations were used to construct sitewide groundwater contour maps of the shallow and deep surficial aquifers for the March data (Plates 1 and 2, respectively). Individual contour maps were also constructed for the shallow and deep surficial aquifers at the Northeast Site and the Building 100 Area (Figure 3 through Figure 6).

Previously, water levels throughout the STAR Center indicated that the water table was highest in the general area around the West Pond. As groundwater flowed from this discharge area, it dispersed to the west, south, and east. A new pattern was first observed in the shallow surficial aquifer around the West Pond and Pond 5 in September 2006, and this new pattern was observed again in March 2009. As shown on Plates 1 and 2, the West Pond and Pond 5 now act as discharge points for the surficial aquifer. During recent construction activities at the site, the West Pond was cleaned out, Pond 5 was excavated, and the two ponds were connected by an

underground pipe. This construction work seems to have changed the flow pattern in this area of the site to what is now observed. The flow pattern in the deep surficial aquifer is consistent with previously observed flow patterns.

At the Northeast Site, the natural pattern of flow generally to the east was again observed in March 2009. Water-table elevations indicate that the East Pond acted as a discharge point for the shallow surficial aquifer in March 2009 (Figure 3). In the shallow surficial aquifer at the Northeast Site, the hydraulic gradient was about 0.003 feet per foot (ft/ft), with flow toward the east (Plate 1). Calculations using Darcy's Law, along with approximations of 1 ft/day for hydraulic conductivity and 0.3 for effective porosity, indicate that groundwater at the Northeast Site is estimated to move about 3−4 ft/year. This velocity is consistent with the velocities observed since March 2006. Similar flow patterns were observed in the deep surficial aquifer (Plate 2).

At Building 100, the surficial aquifer is no longer influenced by groundwater withdrawals from recovery wells PIN12-RW01 and -RW02 that were shut off in August 2006. For the past 5 years, shallow groundwater beneath Building 100 has been observed to flow to the southeast under a very slight gradient. This flow pattern was observed again in March 2009. The hydraulic gradient at the Building 100 Area was about 0.002 ft/ft. Using the approximations mentioned above, groundwater flow velocity in this area is estimated to be about 2.4 ft/year.

Water-level elevations in the three wells screened in the upper part of the Floridan aquifer are presented in Table 2. The water levels in these wells indicate that the potentiometric surface of the Floridan aquifer at the site was about 1.0 to 1.6 ft higher in September 2008 than in March 2009.

Surface-water elevations were recorded from the East, South, Southwest, and West Ponds, Pond 5, the pond immediately north of the 4.5 Acre Site, and the pond just east of Belcher Road, and they are presented in Table 3. All the ponds are hydraulically connected to the shallow surficial aquifer system (Plate 1).

3.0 Groundwater Sampling and Analytical Results

3.1 Work Performed

During the annual sampling event at the STAR Center in March 2009, groundwater samples were collected from 128 monitoring wells. VOCs analyses were performed on 128 samples using EPA method SW-846 8260B. Aluminum and iron were analyzed in 30 samples from Northeast Site wells using EPA method SW-846 6010B. Laboratory reports are provided in Appendix A. In addition, seven samples were also collected from the Building 100 Area for analysis of carbon stable isotopes (Table 4).

All samples were collected in accordance with the Stoller *Sampling Procedures for the Young - Rainey STAR Center and 4.5 Acre Site* (DOE 2006), using FDEP procedures. All samples except those for stable isotope analysis were submitted to TestAmerica, Tampa, Florida, for analysis. The stable isotope samples were sent to Microseeps in Pittsburgh, Pennsylvania. TestAmerica,

Tampa, is accredited by the Florida Department of Health in accordance with the National Environmental Laboratory Accreditation Conference (certification number E84282). All monitoring wells were micropurged using a dedicated bladder pump or peristaltic pump. Sampling was performed when the field measurements stabilized. Table 5 lists field measurements of pH, specific conductance, dissolved oxygen, oxidation-reduction potential, turbidity, and temperature recorded at the time the samples were collected. Measurements were made with a flow cell and a multiparameter instrument.

3.2 Analytical Results

3.2.1 Northeast Site (PIN15)

Concentrations of contaminants of potential concern (COPCs) in samples collected from wells at the Northeast Site (PIN15) are presented in Table 6, which, for comparison purposes, also shows the previous year of data. Figure 7 shows the total COPCs (TCOPCs) concentrations at the Northeast Site. In March 2009, the highest TCOPCs concentration, 750 µg/L, was measured in well PIN15−0537. This well also contained the highest concentration for any single analyte, VC at 480 µg/L. This is a considerably lower maximum TCOPCs concentration relative to recent data. This is due to the fact that the wells that have contained the highest concentrations were not sampled during this event because they were excavated during source removal activities that were conducted in early 2009.

Thirty wells were sampled for iron and aluminum (Table 7).

3.2.2 Building 100 Area (PIN06, PIN09, PIN10, PIN12, and PIN21)

TCOPCs concentrations in samples collected from wells at the Building 100 Area are included in Table 8, which, for comparison purposes, also shows the previous year of data. Figure 8 shows the March 2009 TCOPCs concentrations, the highest of which was measured in well S35B at 38,320 µg/L. This well also contained the highest concentration for any single analyte, cDCE at 20,000 µg/L.

In May 2009, nine new monitoring wells were installed off-site to the south on the Better Business Forms Property (Figure 9) to aid in delineating the potential off-site contaminant plume. No contaminants were detected in these wells (Table 8).

3.3 Quality Assurance/Quality Control

The results from the analytical laboratory, TestAmerica Laboratories Tampa, were checked for quality assurance/quality control (QA/QC) through duplicate samples and trip blanks. Detected analytes for each duplicate sample collected from the STAR Center are listed in Table 9. The duplicate sample results were compared and the relative percent differences (RPDs) between the results were calculated. The duplicate results from location PIN12−0530 for cis-1,2-dichloroethene (cDCE), 1,1-dichloroethene, and VC did not meet EPA recommended laboratory duplicate criteria of less than 20 RPD for results that are greater than 5 times the practical quantitation limit. There were no errors identified that would explain the poor precision. These results were not qualified because the magnitude of the difference was relatively small.

With the exception of the three anlaytes discussed above, all data passed QA/QC criteria at a Class A level, indicating that the data may be used for quantitative and qualitative purposes.

As specified in the *Sampling Procedures for the Young - Rainey STAR Center and 4.5 Acre Site* (DOE 2006), duplicate samples should be collected at a frequency of one duplicate for every 20 or fewer samples. For the STAR Center and the 4.5 Acre Site, there were 128 samples collected for volatile analysis and 9 duplicates. There were 30 samples collected for metal analysis and 4 duplicates. The duplicate requirements for this sampling event were met. Seventeen trip blanks and two equipment blanks were collected during this event.

A data validation software module for identifying and tracking anomalous groundwater data within the SEEPro database was used to generate a report of analytical results that fall outside of historical minimum or maximum values. There were no errors associated with these result and the data are acceptable as qualified.

4.0 Data Interpretation

The purpose of this data-interpretation section is to aid in the evaluation of plume stability. Time-versus-concentration plots and plume maps were generated to aid in the interpretation.

While most of the previous documents for the Pinellas site have compared groundwater contaminant concentrations to drinking water standards (i.e., MCLs), those standards are not the applicable default CTLs for the purpose of evaluating site remediation under RBCA. Based on a comprehensive review of background data for the site (DOE 2003a), it has been determined that aluminum and iron levels in the shallow groundwater in the site vicinity are naturally elevated and far exceed State of Florida Secondary Drinking Water Standards (Chapter 62-550, Florida Administrative Code [F.A.C.]). Specifically, the average background concentration of 1.1 mg/L for aluminum exceeds the 0.2 mg/L secondary standard, and the average background concentration for iron (9.3 mg/L) exceeds the 0.3 mg/L secondary standard. The ambient shallow groundwater in the area is therefore designated as “poor quality” as defined in 62-780.200 (35), F.A.C. Thus, the applicable groundwater CTLs are those for groundwater of “low yield/poor quality” provided in Table 1 of Chapter 62-777, F.A.C. In essence, these CTL values are a factor of 10 higher than the MCL values.

4.1 Contaminant Concentration Trends

Monitoring well PIN15–0569 was chosen to evaluate plume stability at the Northeast Site. Well PIN15−0569 is located near the leading edge of the contaminant plume at the Northeast Site (Figure 7). The VC concentration in this well shows an overall decreasing concentration trend (Figure 10), indicating a stable or shrinking contaminant plume in the vicinity of this well.

In the past, monitoring wells PIN21–0512 and PIN12–S73C were chosen to evaluate plume stability at the Building 100 Area because they are the monitoring wells nearest the property boundaries. However, well PIN21−0512 was removed from the routine sampling schedule for 2009 in favor of sampling the newer wells closer to the property boundary (Figure 8). Well PIN12−0530 contains the highest contaminant concentrations in this area, so a time-

concentration plot for this well is shown instead (Figure 11). As discussed in Section 3.3, duplicate sample results for well 0530 have failed RPD requirements, so Figure 11 reflects average concentrations for sampling events where duplicate samples were collected. Figure 12 shows the VC concentration in well S73C. Well S73C shows a decreasing VC concentration trend from 2002 to late 2003, followed by a relatively stable trend since that time. These stable and decreasing concentration trends indicate a stable or shrinking contaminant plume near the property boundaries.

Figure 13 shows the TCE, cDCE, trans-1,2-DCE (tDCE), and VC concentrations in well PIN12−0524, located near the southeast corner of Building 100. The concentration trends in this well suggest that a pulse of TCE, DCE, and VC is moving through the aquifer. The concentration trends in well 0524, particularly the significant TCE decrease, indicate that the slug is nearly past the well.

4.2 Plume Maps

For each SWMU, plume maps based on results from the March 2009 annual sampling event were generated for the TCOPCs as well as selected COPCs. The compound-specific CTL has been utilized to draw the inferred plume boundary for each COPC (i.e., concentrations below the CTL were not included in the plume area). Estimated values (J or B qualified data) were not used when the TCOPCs values were calculated. The outline of the 2008 plume is also shown on the maps for comparison. A sitewide plume map is included as Plate 3.

Plume maps for the Northeast Site have been generated for TCOPCs (Figure 7), TCE (Figure 14), cDCE (Figure 15), and VC (Figure 16). Plume maps for methylene chloride, benzene, and toluene have been shown in past reports, but these compounds were either not detected or detected at concentrations well below their respective CTLS, so plume maps for these COPCs are not shown.

The TCE and cDCE plumes and part of the VC plume are shown on the plume maps without any current monitoring wells or supporting data to define the plumes because the well in these areas were either excavated during the recent source removal activities or were unable to be sampled due to these activities. Due to this lack of data, the 2008 plume boundaries were used and labeled as the 2009 plumes. While it is likely that significant portions of these plumes currently do not exist due to the excavation activities, the actual plume boundaries will need to be redefined once new monitoring wells are installed.

Plume maps for the Building 100 Area have been generated for TCOPCs (Figure 8), TCE (Figure 17), cDCE (Figure 18), and VC (Figure 19). Results from the three wells installed south of Bryan Dairy Road indicated that the contaminant plume extended to this area, but no contaminants were detected in the six wells located east of Belcher Road.

4.3 Geochemical Parameters

Geochemical parameters measured in the field in all wells at the STAR Center during March 2009 are summarized in Table 5. Figures 20 through 23 show the values of dissolved oxygen and oxygen-reduction potential for each well at the Northeast Site and the Building 100

Area. Generally, conditions across the STAR Center are reducing as evidenced by the low values of dissolved oxygen and oxygen reduction potential.

5.0 Upcoming Tasks

The following major tasks are planned for the next semiannual period (June through November 2009):

- Potential installation of additional monitoring wells south of Bryan Dairy Road.
- Start up of recovery well PIN12-RW03 to capture contaminated groundwater near the southern property boundary at the Building 100 Area and a shallow-tray air stripper to treat recovered groundwater.
- Semiannual sampling and analysis of groundwater and water level measurement in August 2009.

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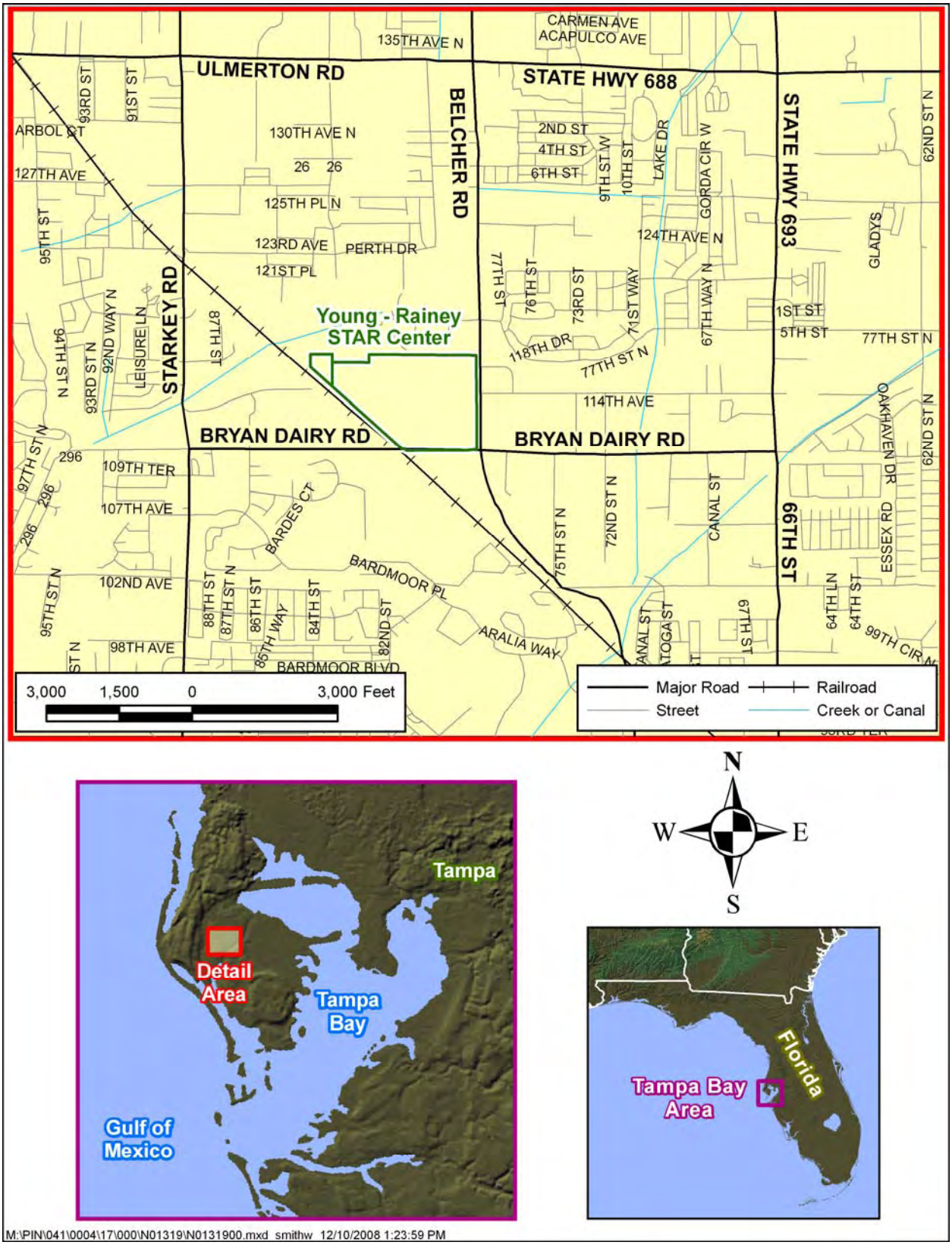

Figure 1. Young - Rainey STAR Center Location

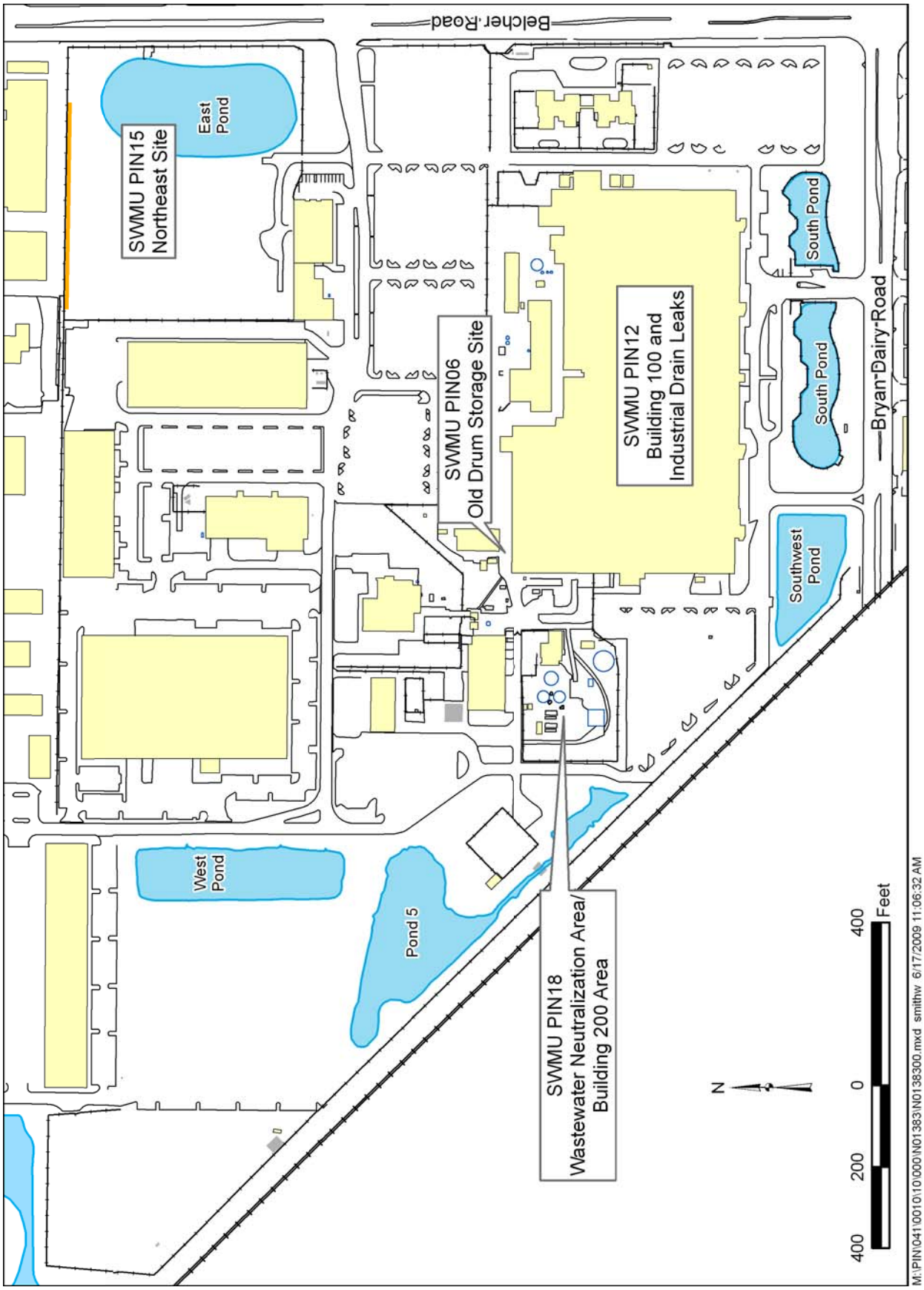

Figure 2. Location of STAR Center Solid Waste Management Units (SWMUs)

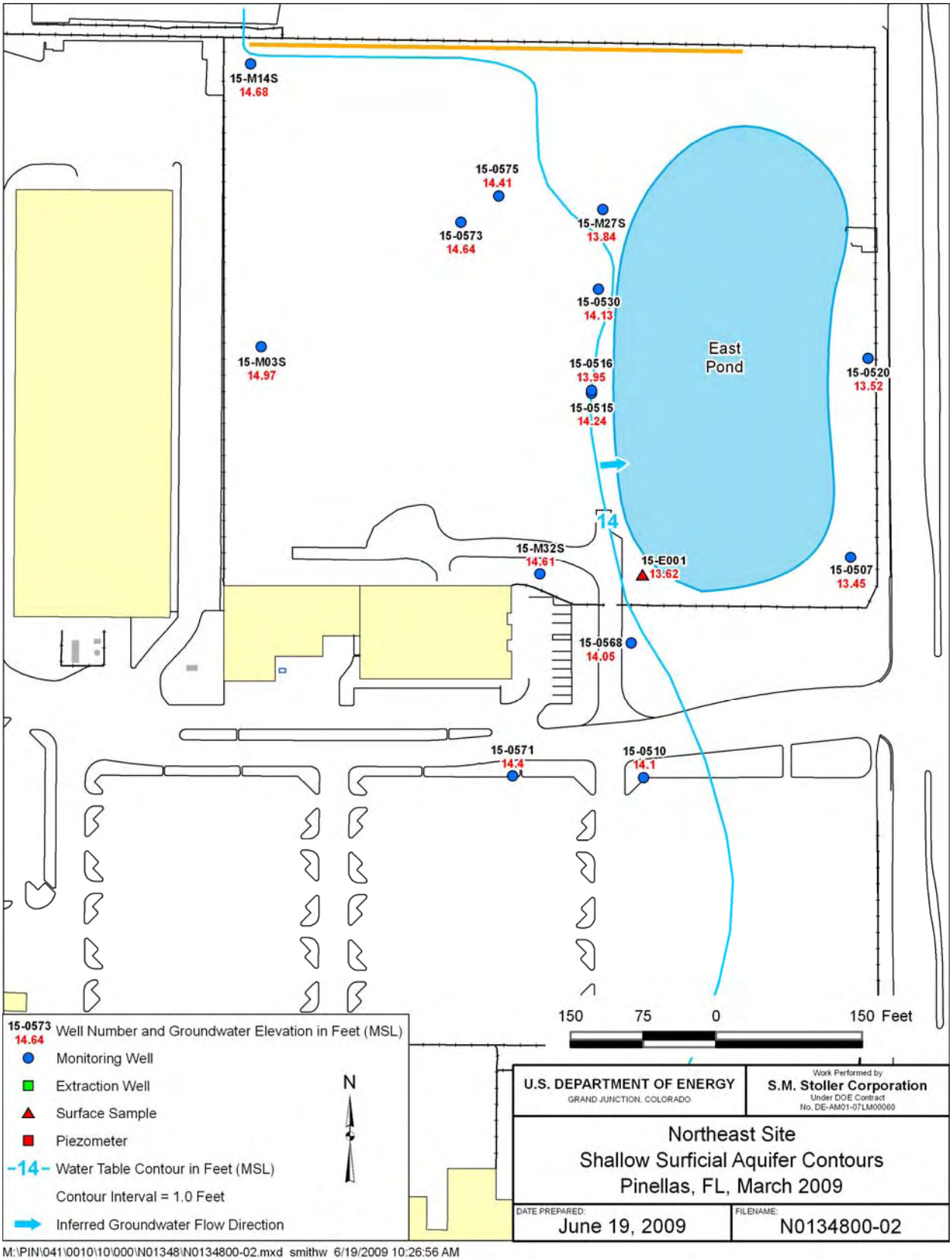

Figure 3. Groundwater Elevations and Shallow Surficial Aquifer Flow, Northeast Site, March 2009

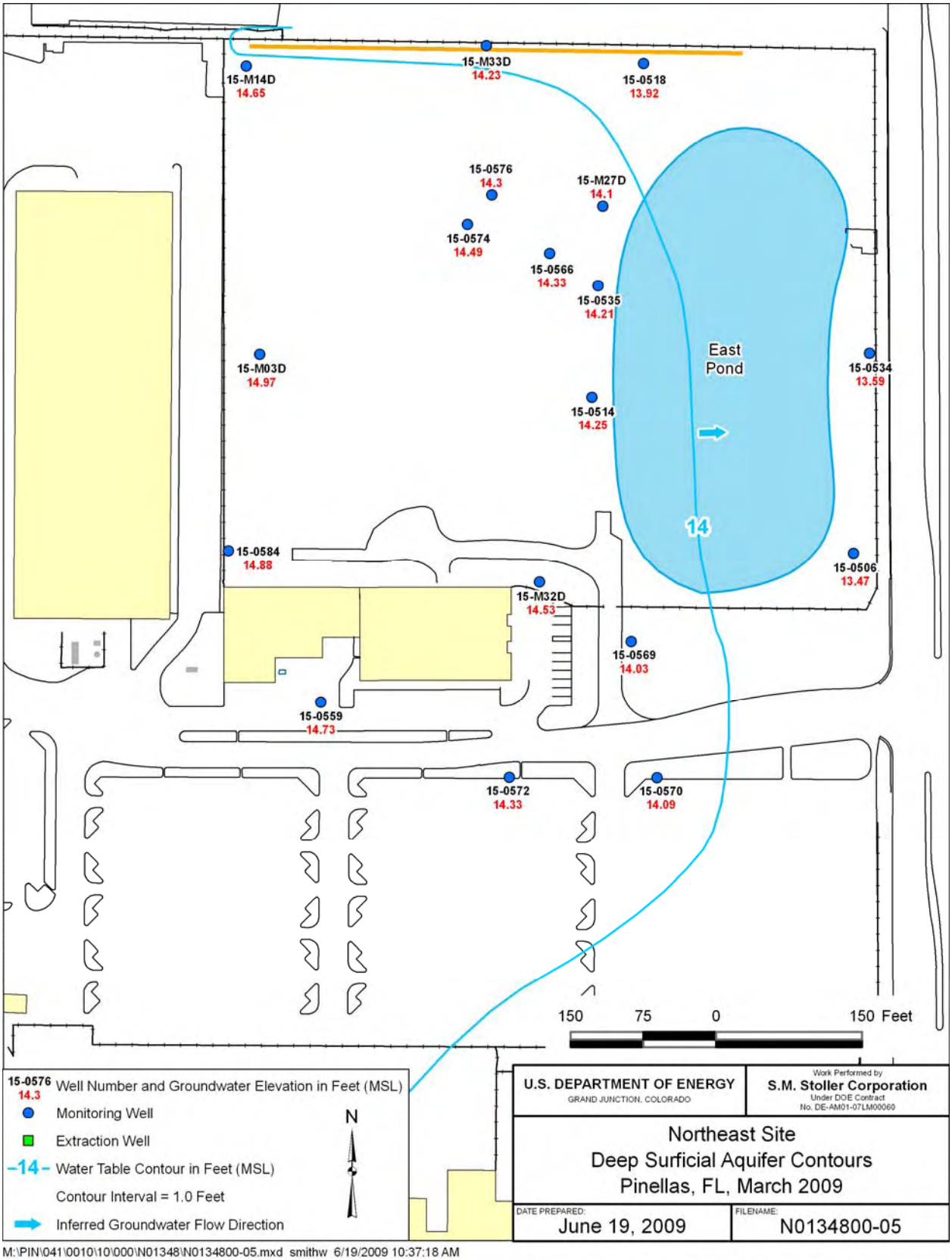

Figure 4. Groundwater Elevations and Deep Surficial Aquifer Flow, Northeast Site, March 2009

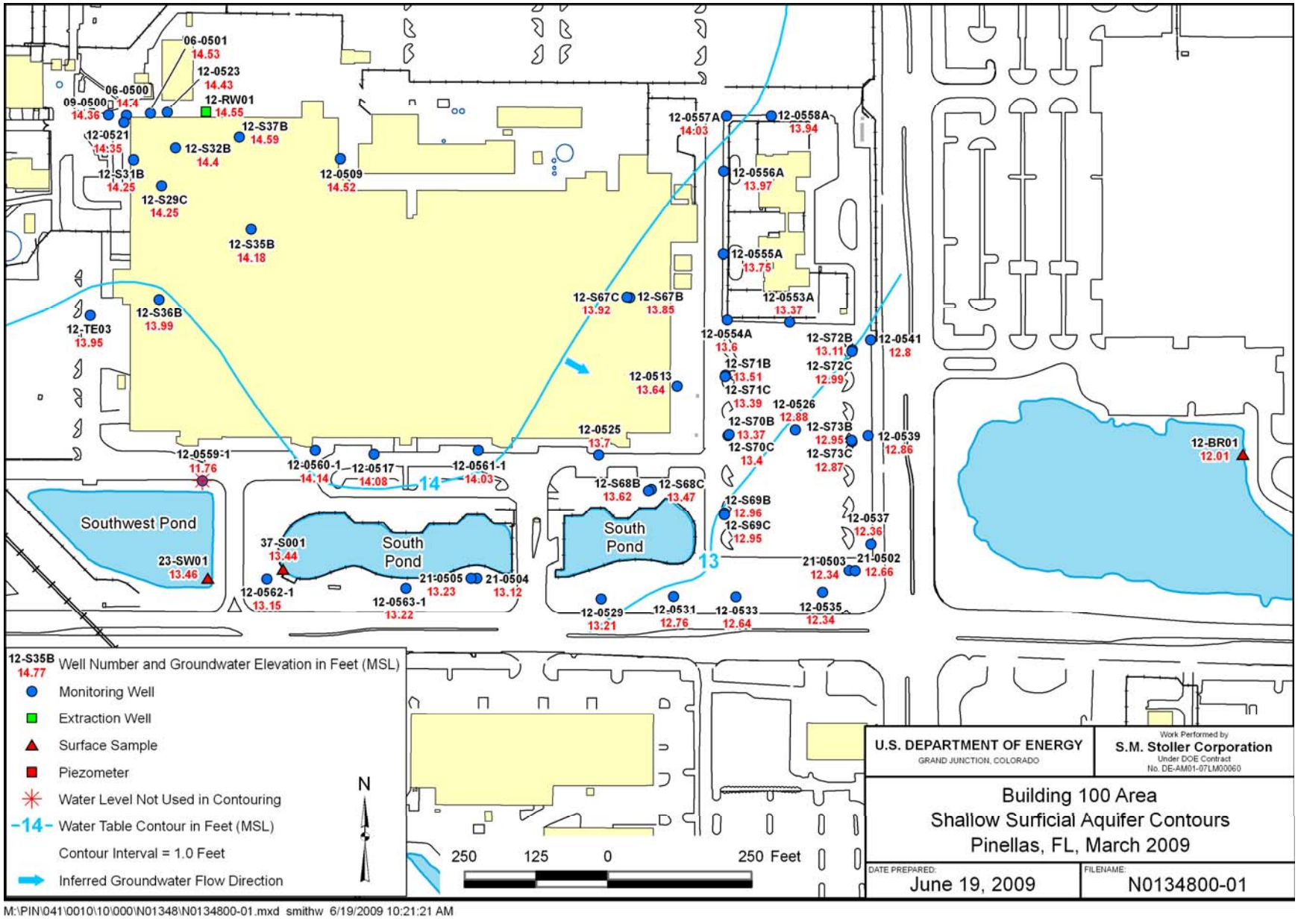

Figure 5. Groundwater Elevations and Shallow Surficial Aquifer Flow, Building 100 Area, March 2009

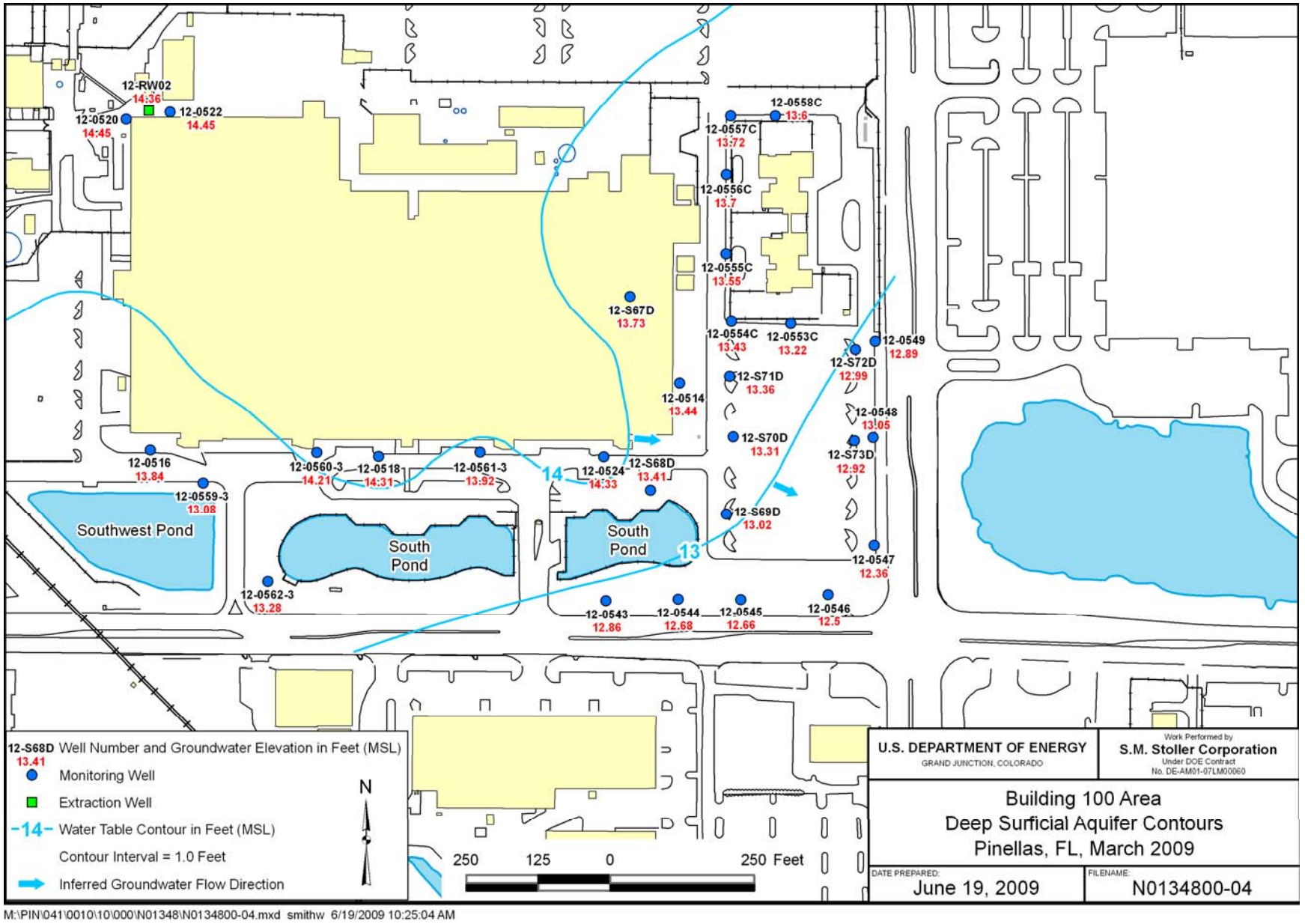

Figure 6. Groundwater Elevations and Deep Surficial Aquifer Flow, Building 100 Area, March 2009

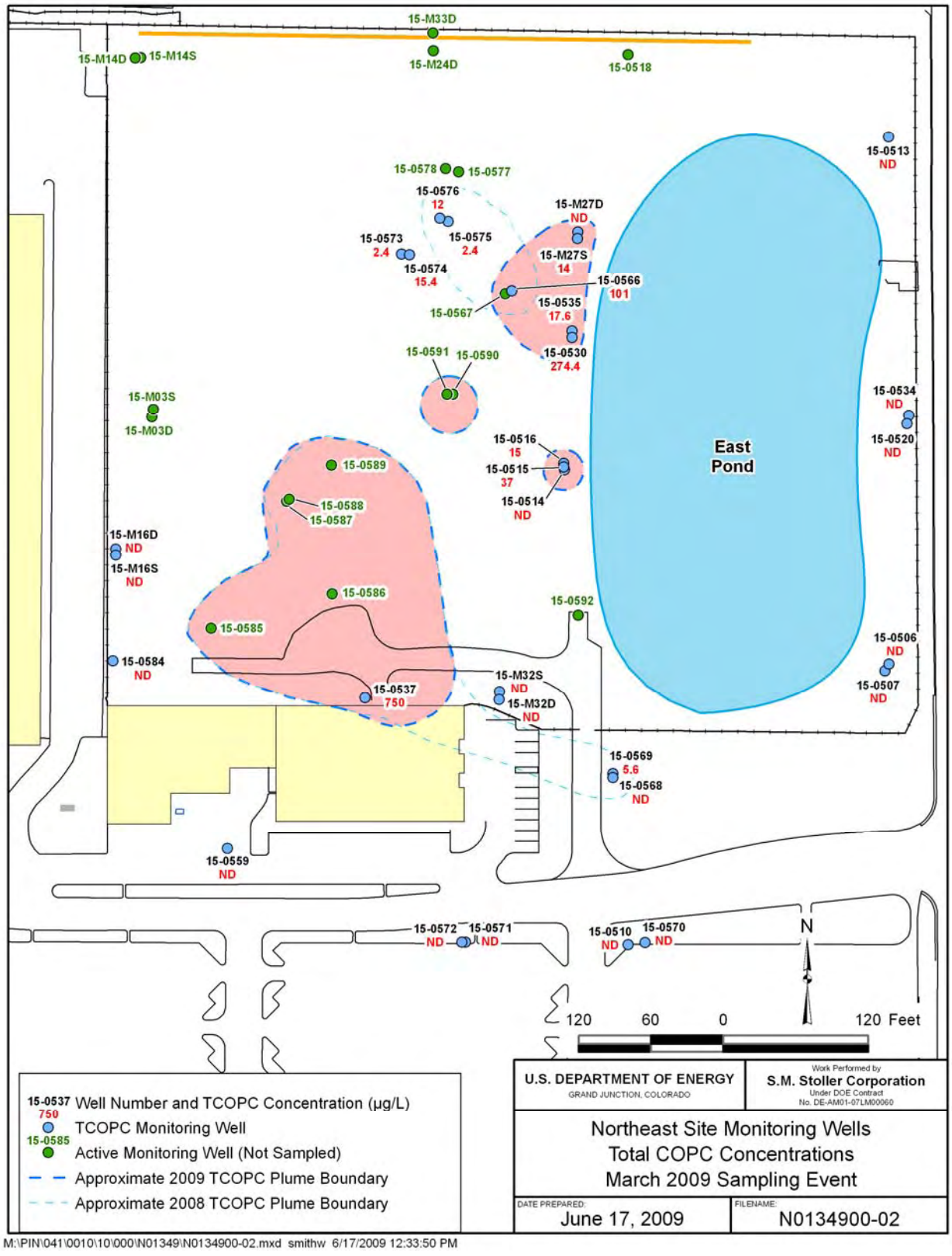

Figure 7. Northeast Site Total COPC Concentrations March 2009 Sampling Event

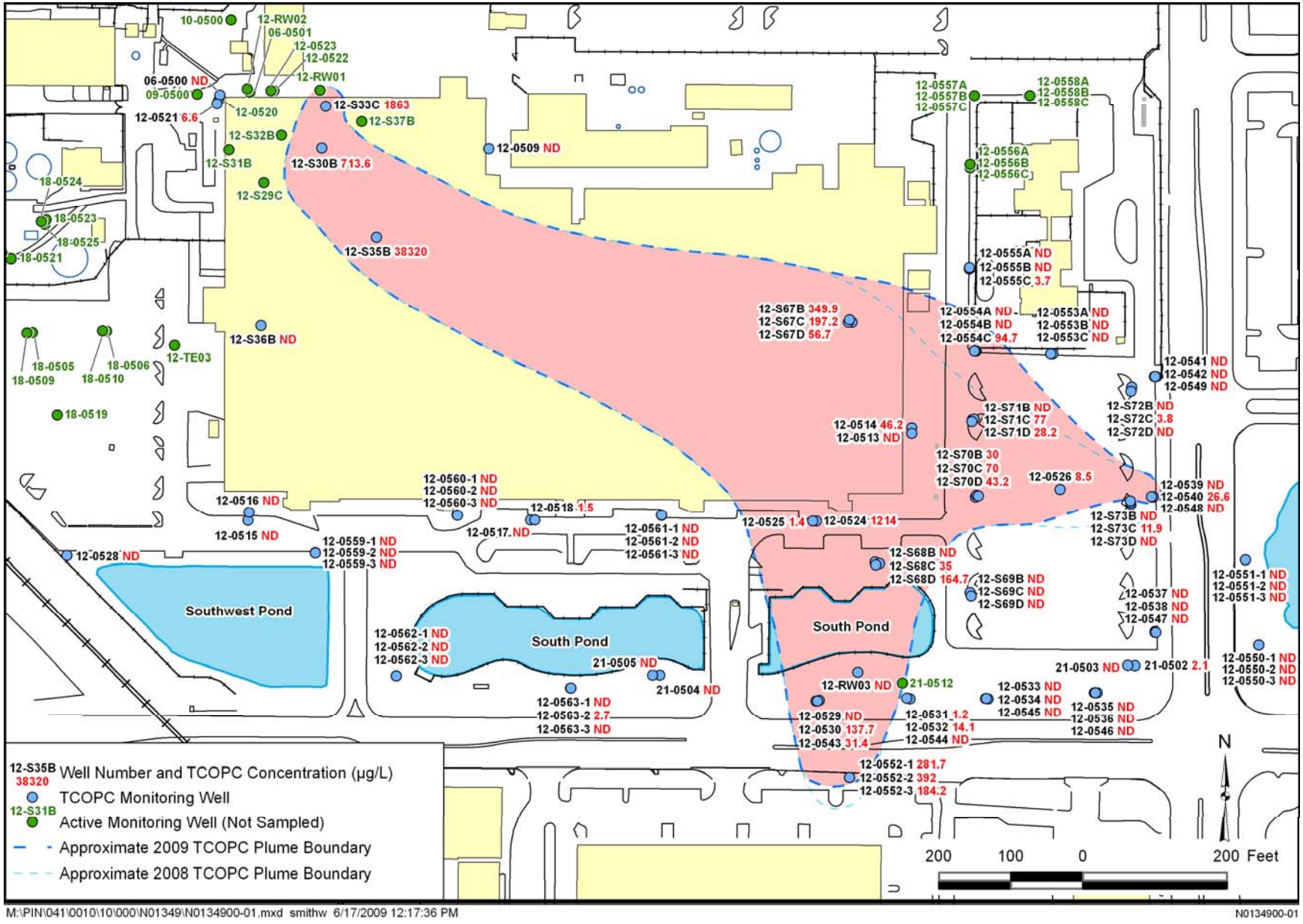

Figure 8. Building 100 Area Total COPC Concentrations March 2009 Sampling Event

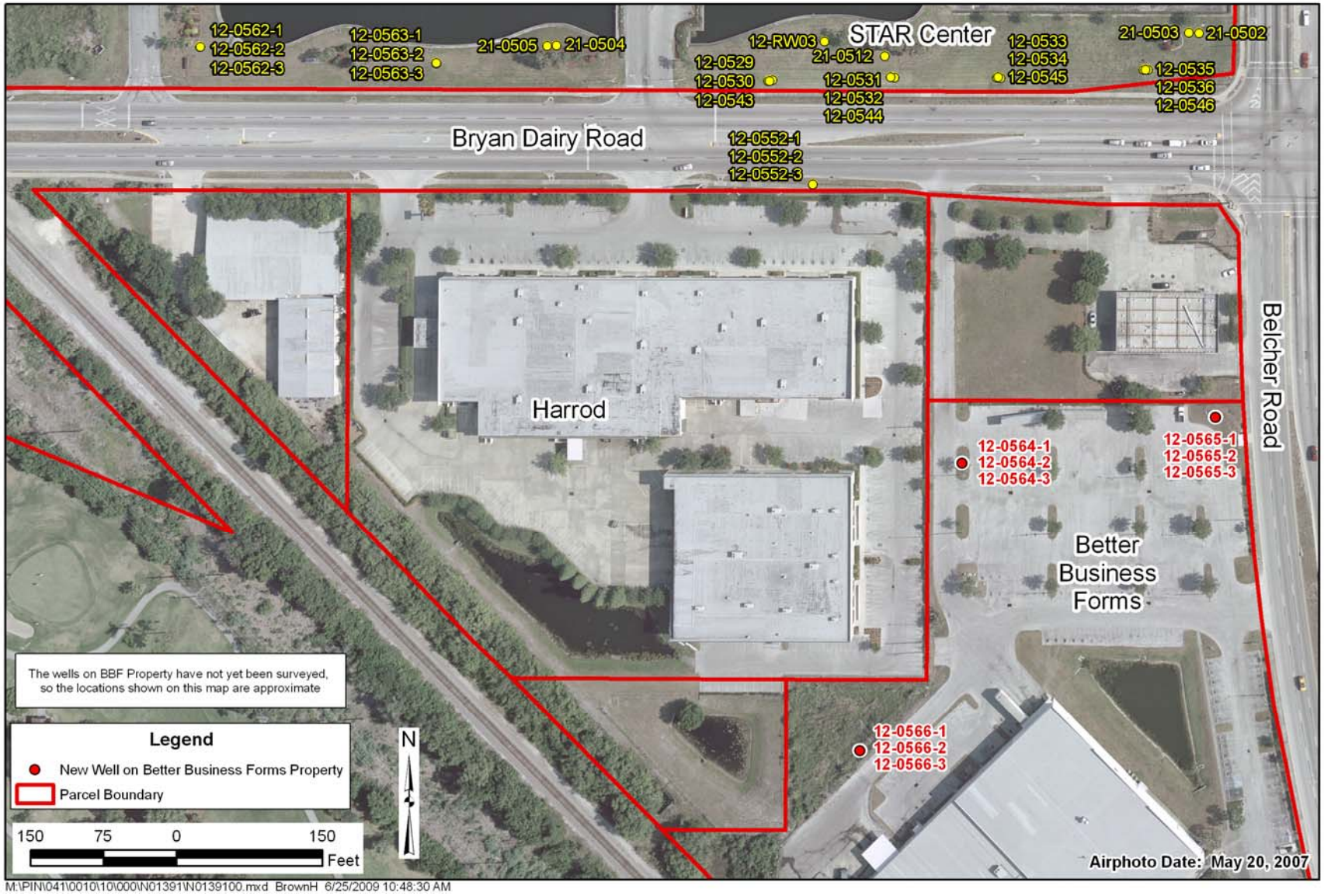

Figure 9. Location of New Wells on Better Business Forms Property

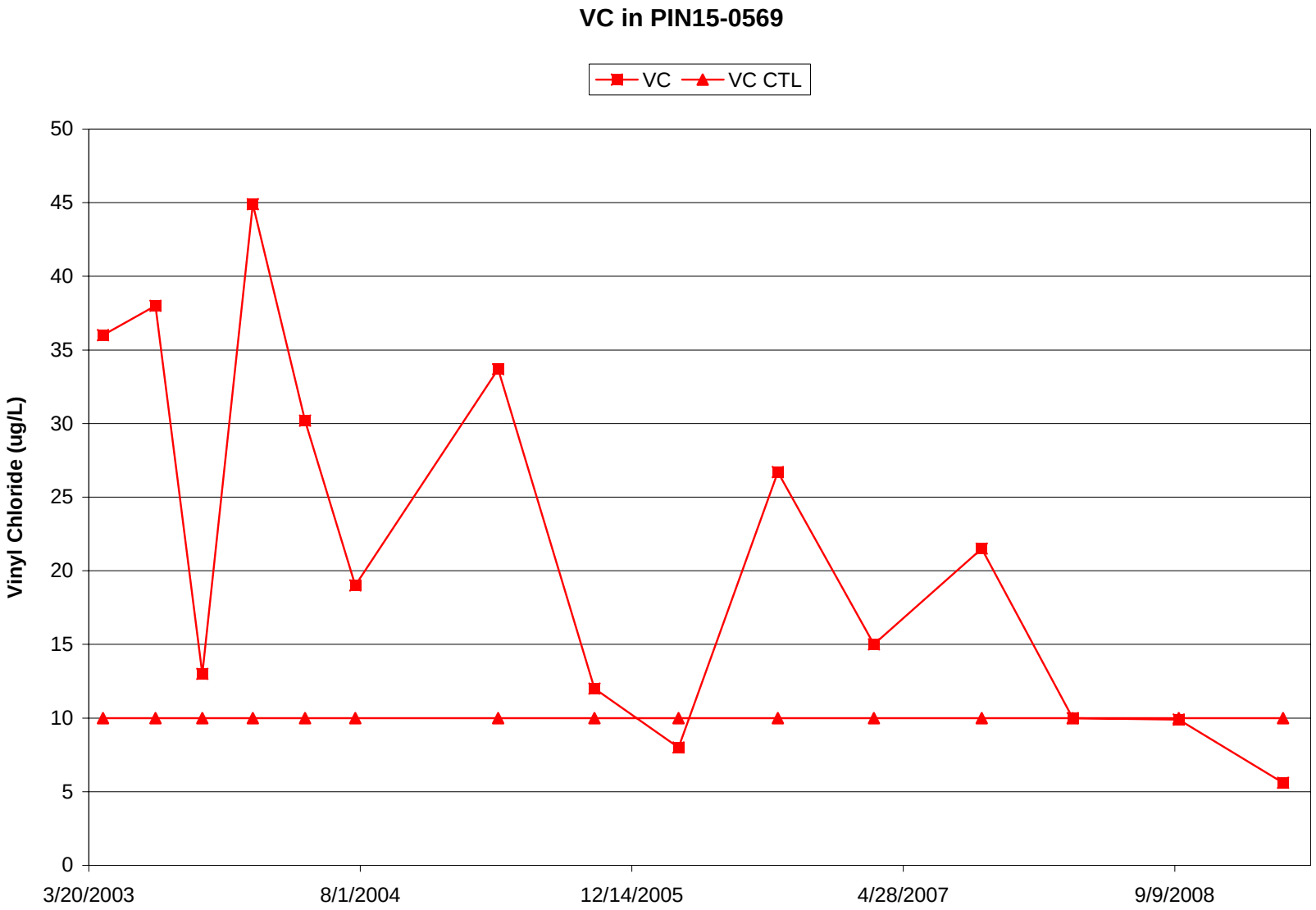

Figure 10. VC in PIN15-0569, Northeast Site

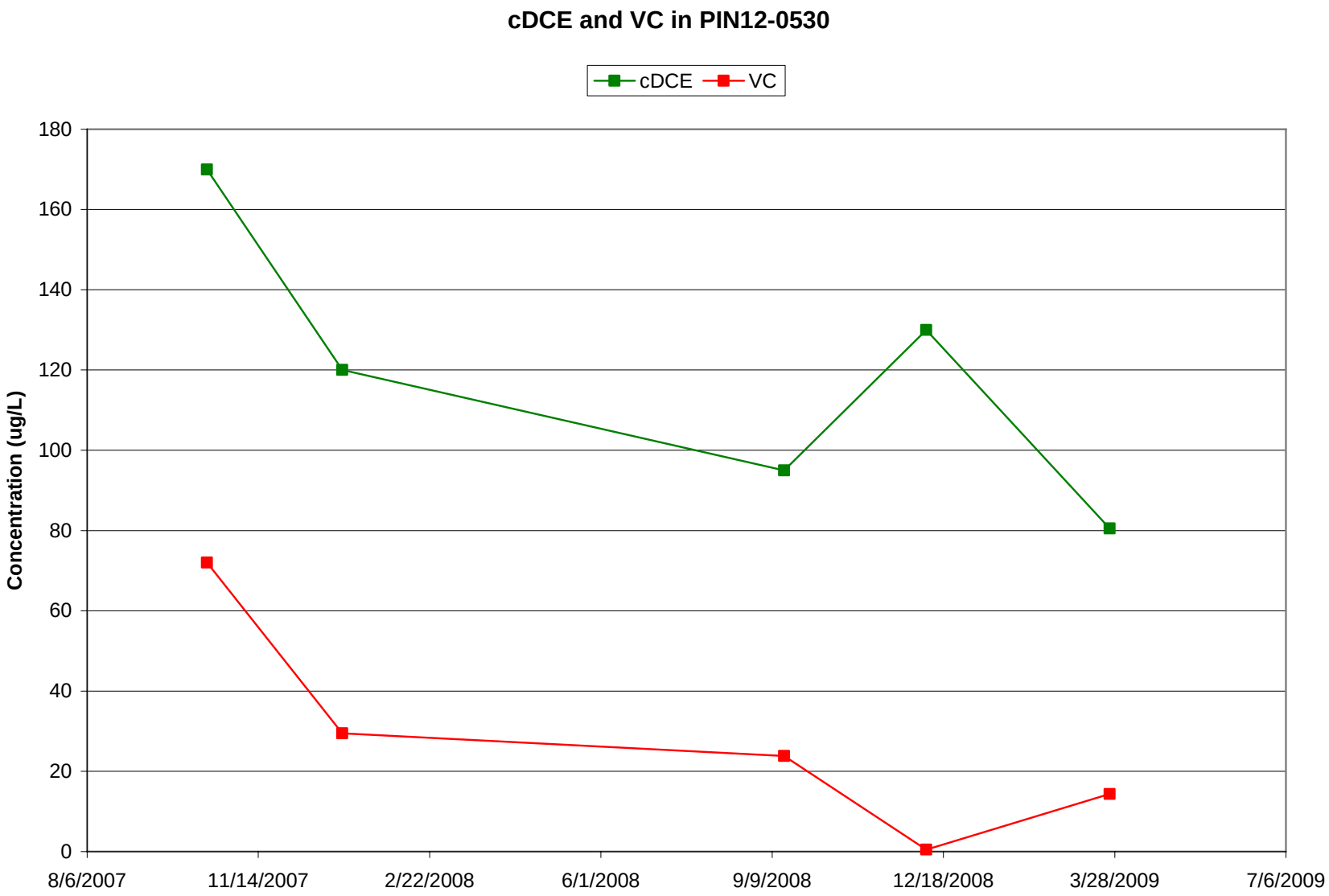

Figure 11. VC in PIN12-0530, Building 100 Area

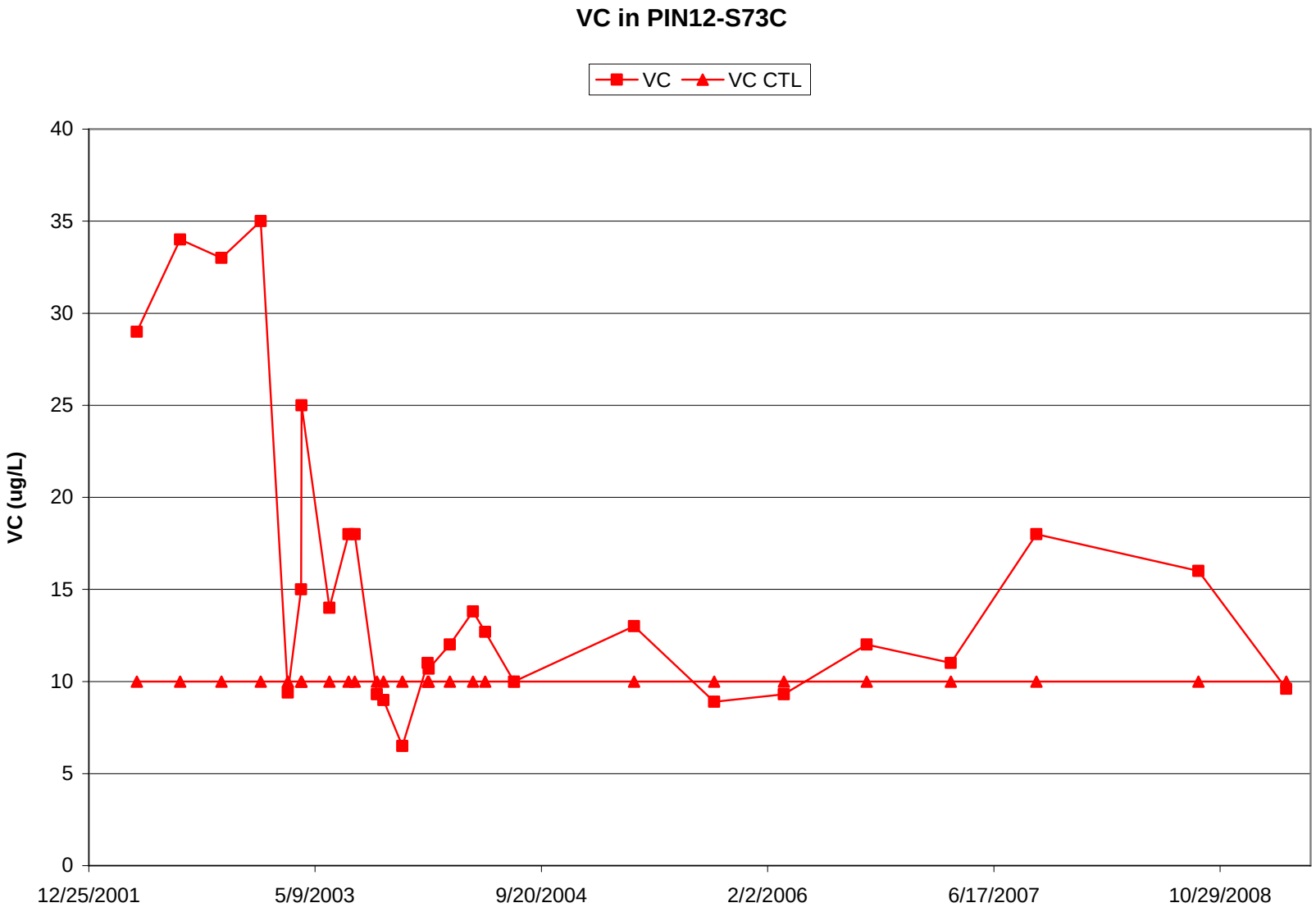

Figure 12. VC in PIN12-S73C

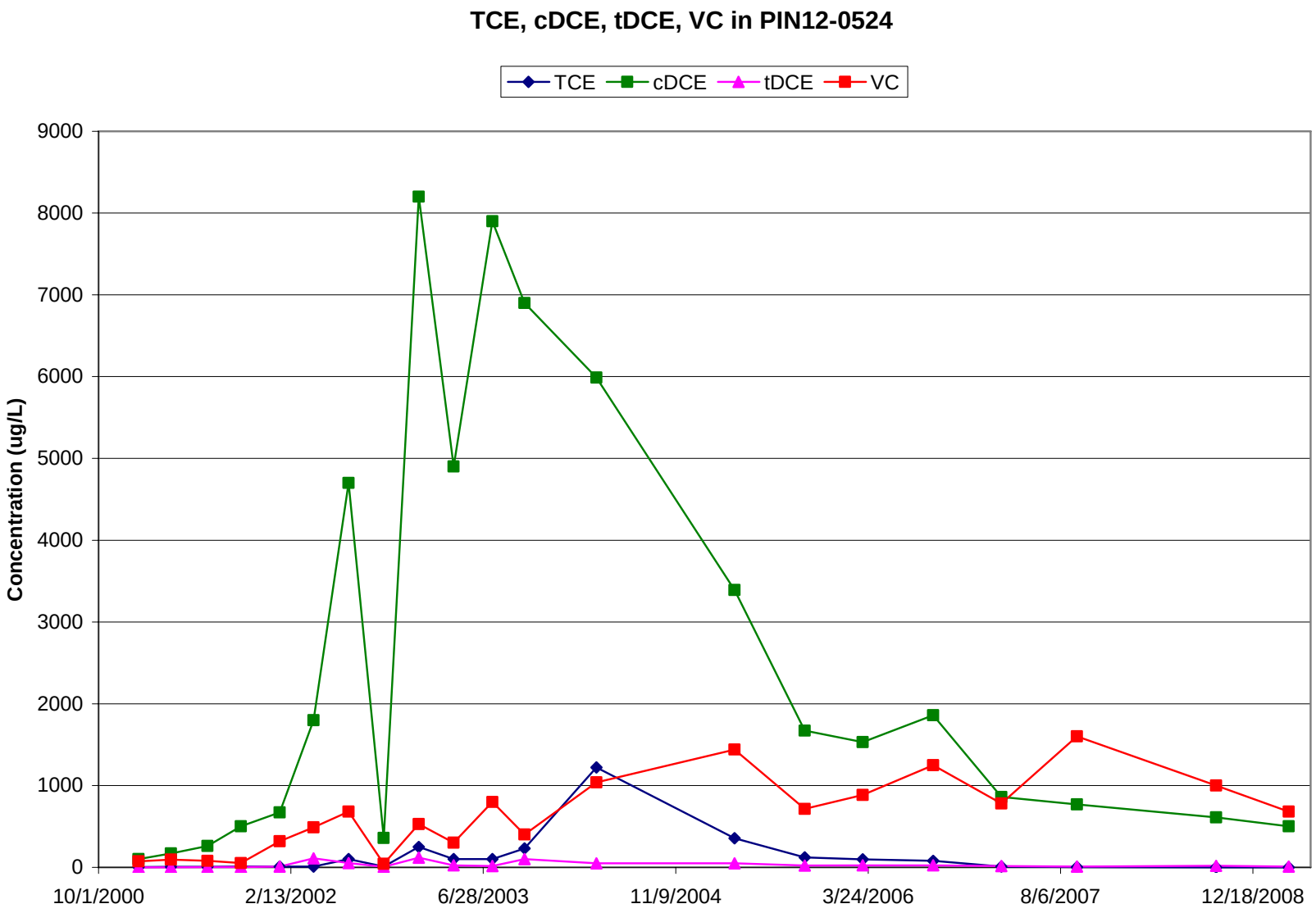

Figure 13. TCE, cDCE, tDCE, VC in PIN12-0524, Building 100 Area

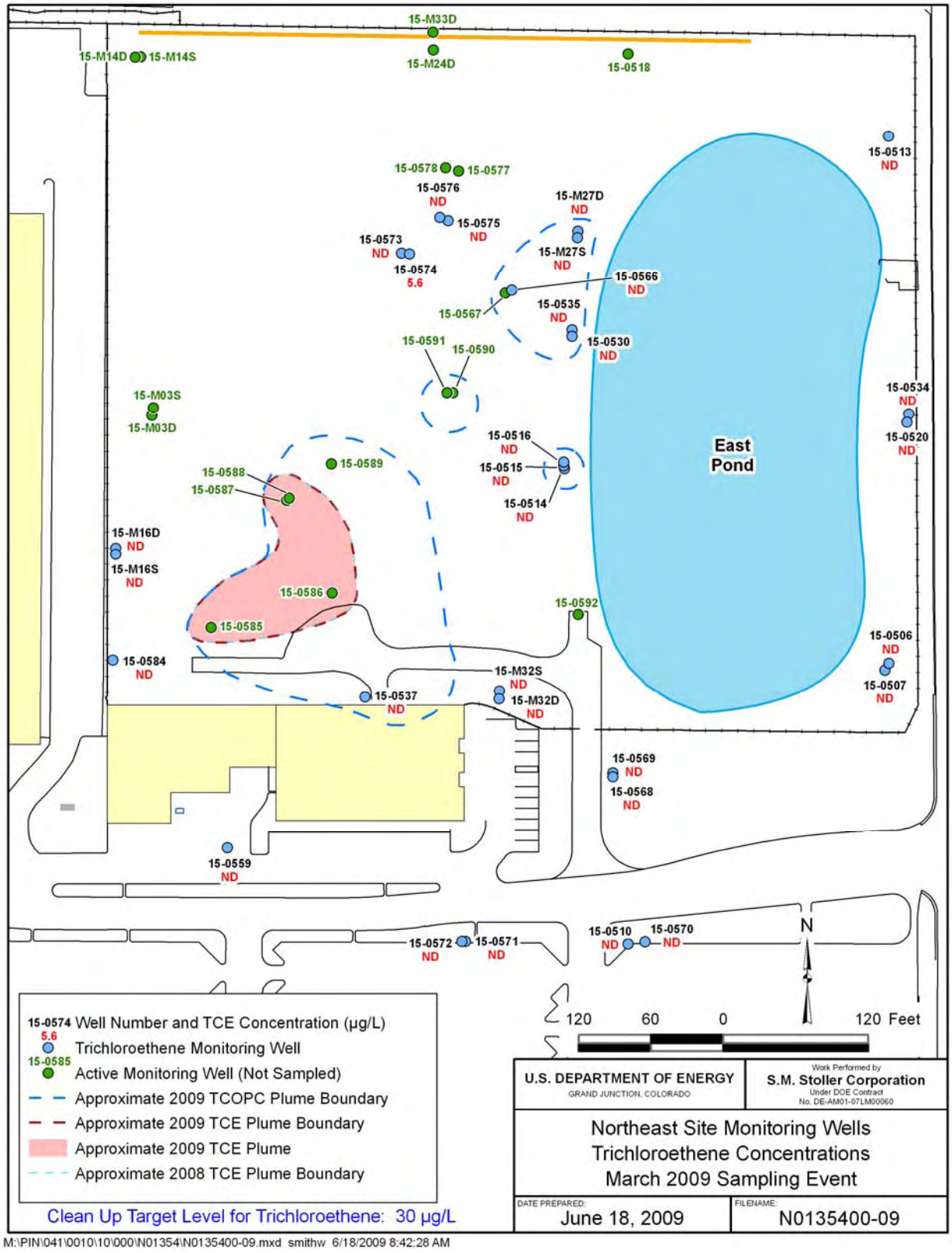

Figure 14. Northeast Site Trichloroethene Concentrations March 2009 Sampling Event

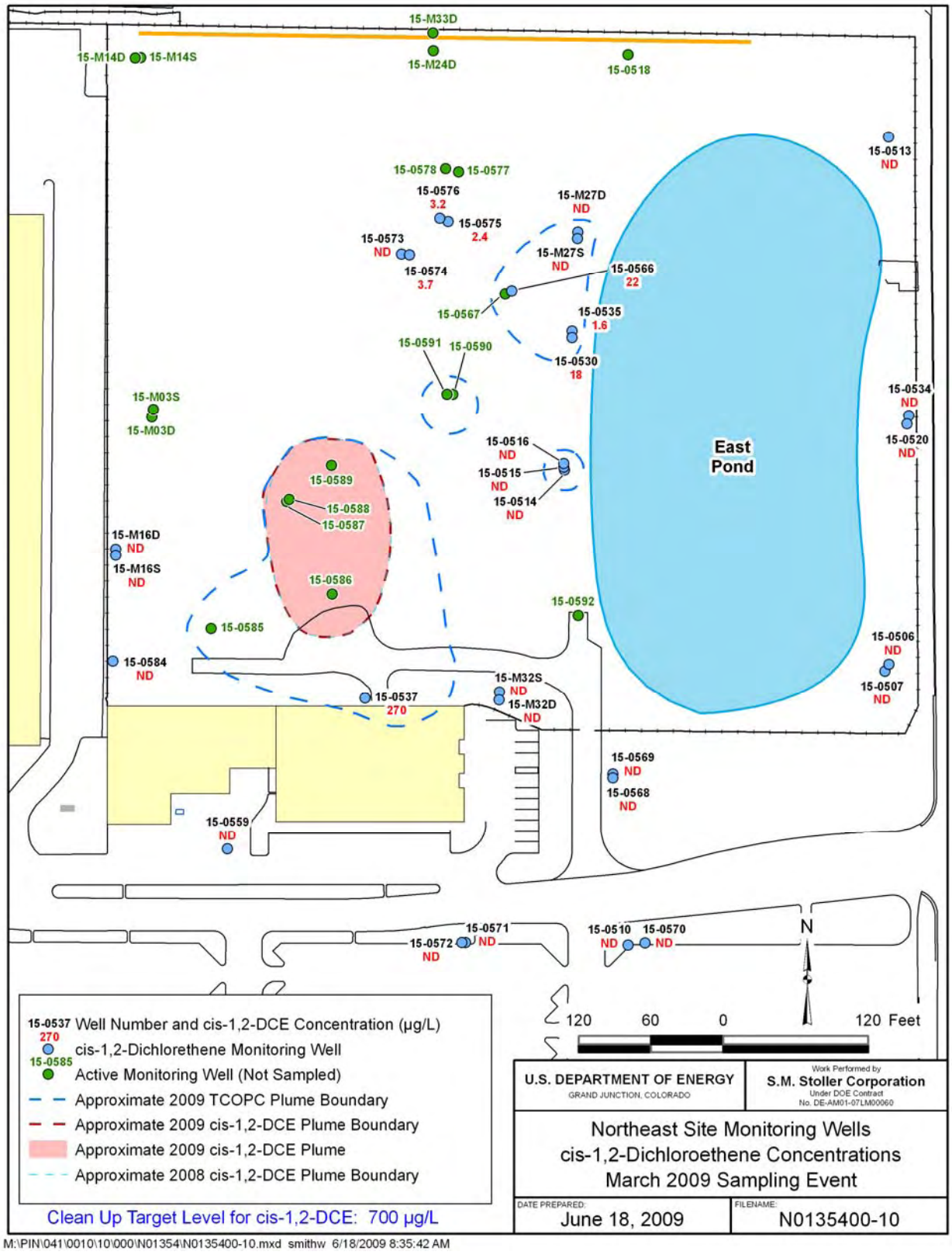

Figure 15. Northeast Site cDCE Concentrations March 2009 Sampling Event

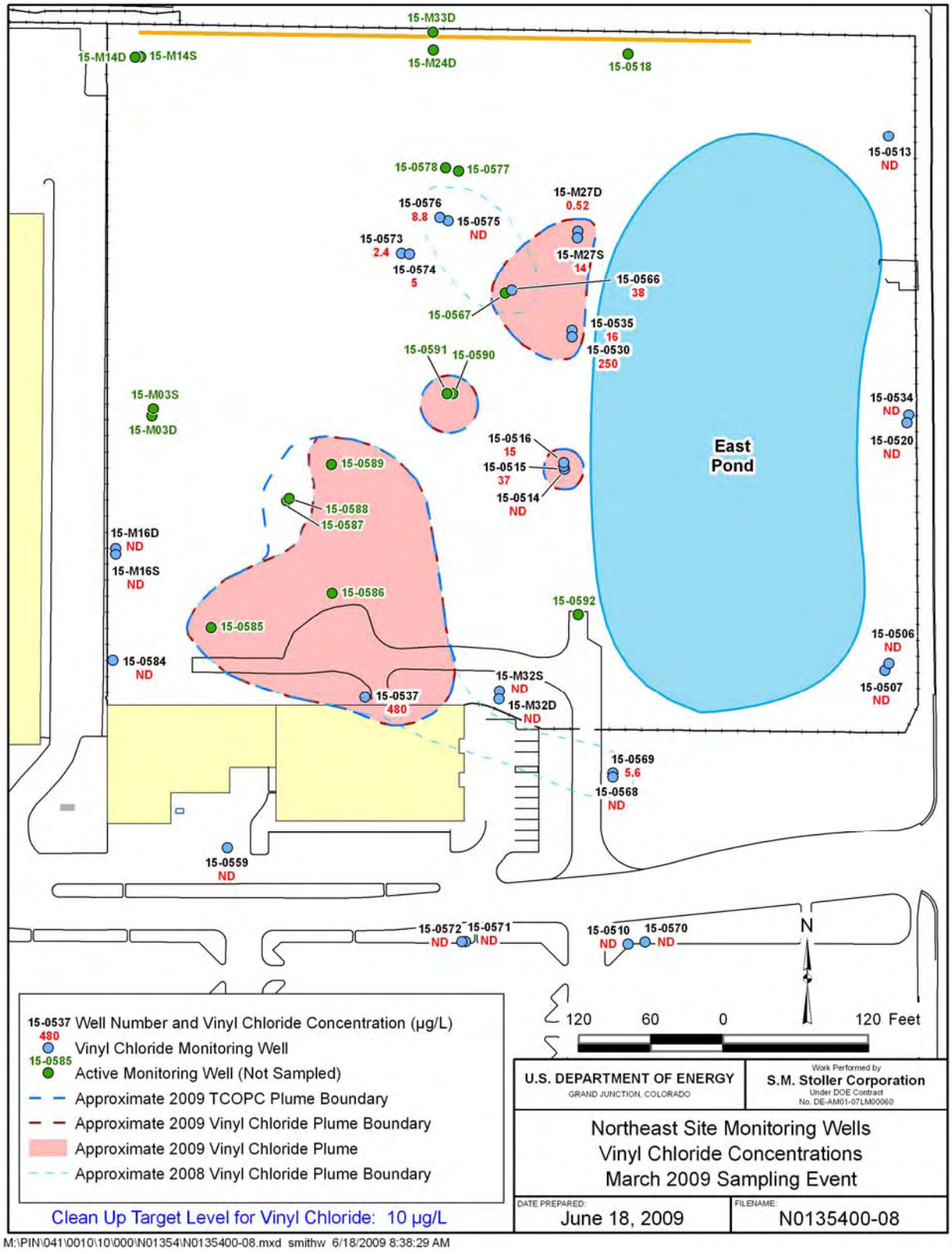

Figure 16. Northeast Site Vinyl Chloride Concentrations March 2009 Sampling Event

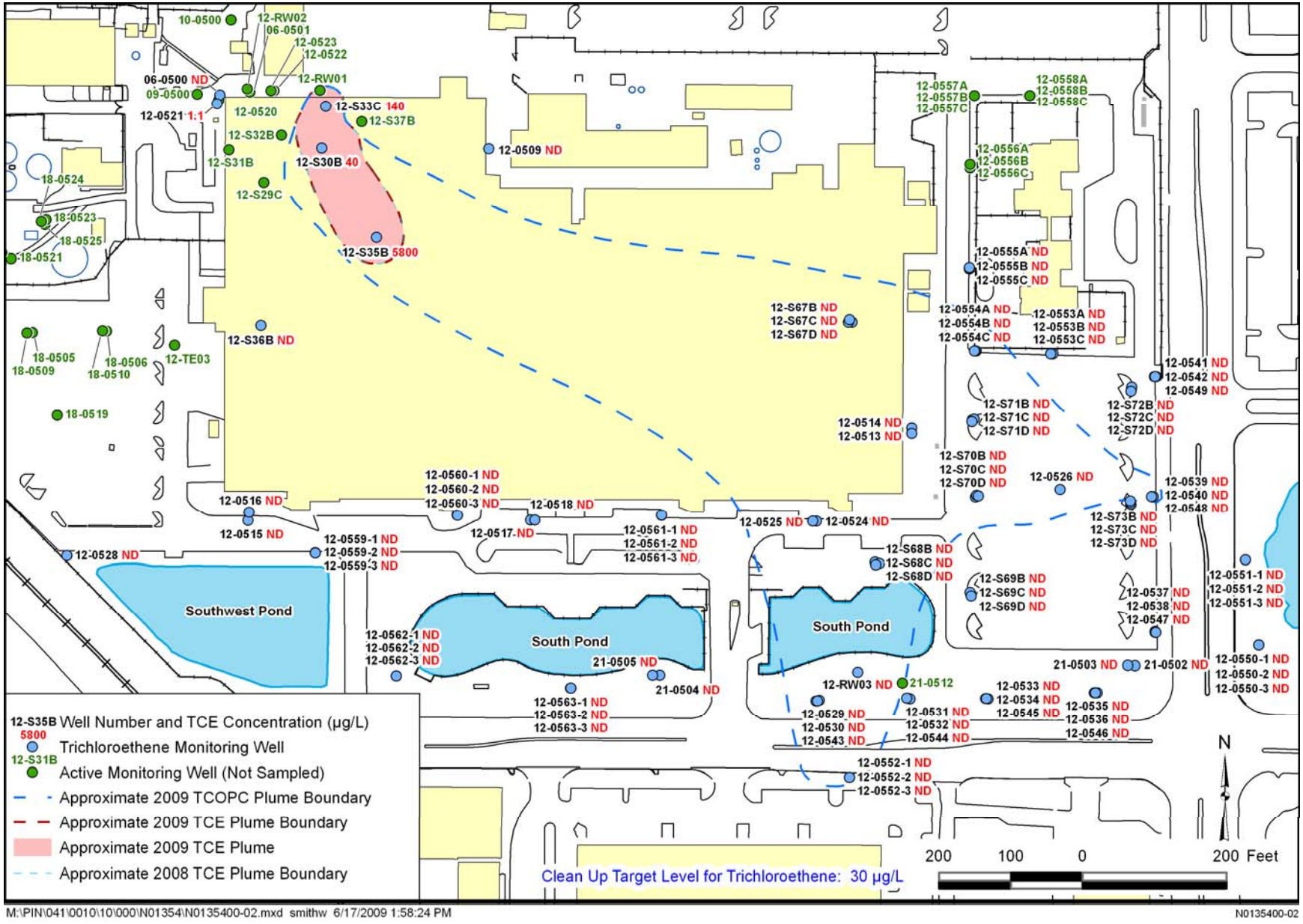

Figure 17. Trichloroethene Plume, Building 100 Area

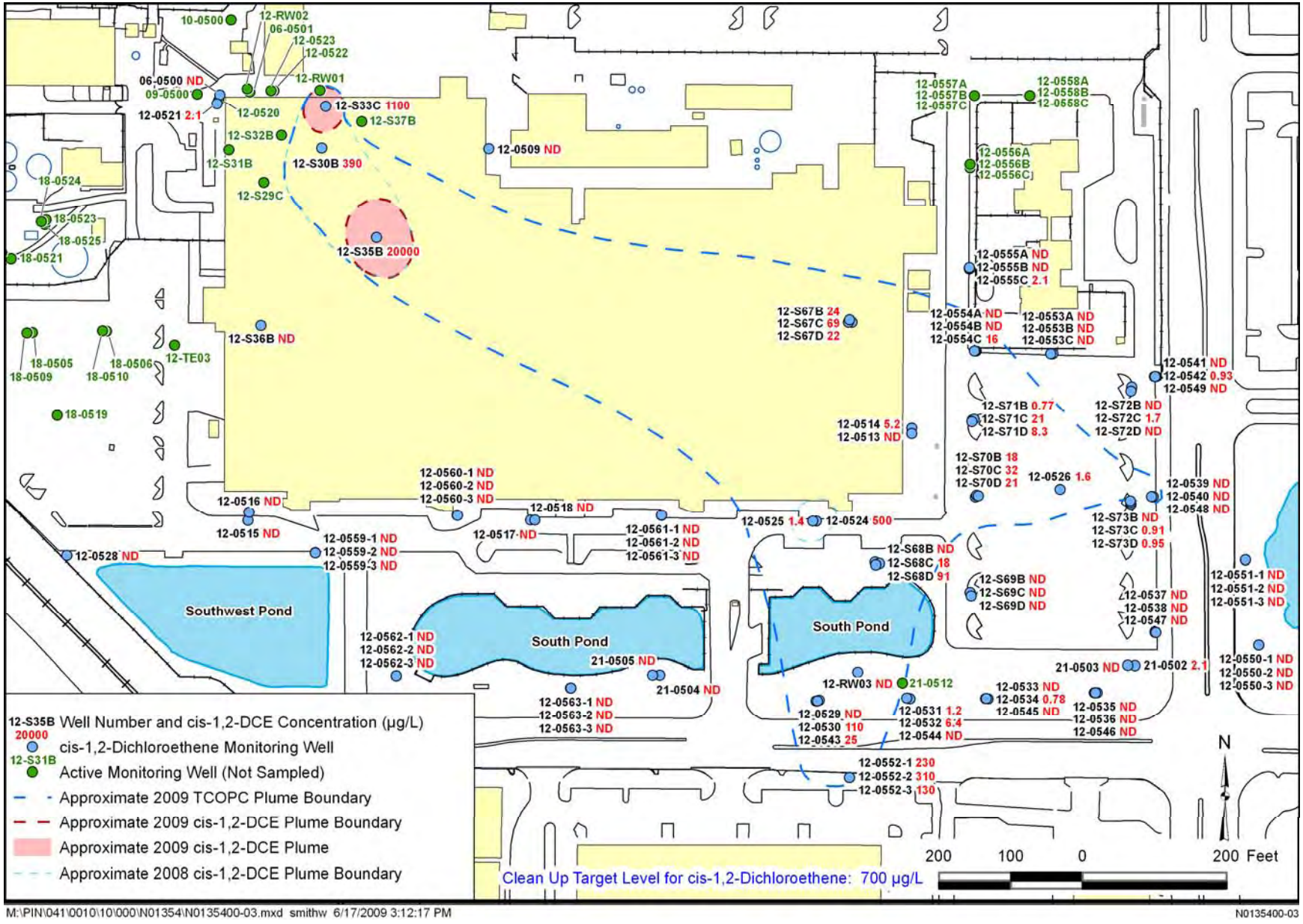

Figure 18. cDCE Plume, Building 100 Area

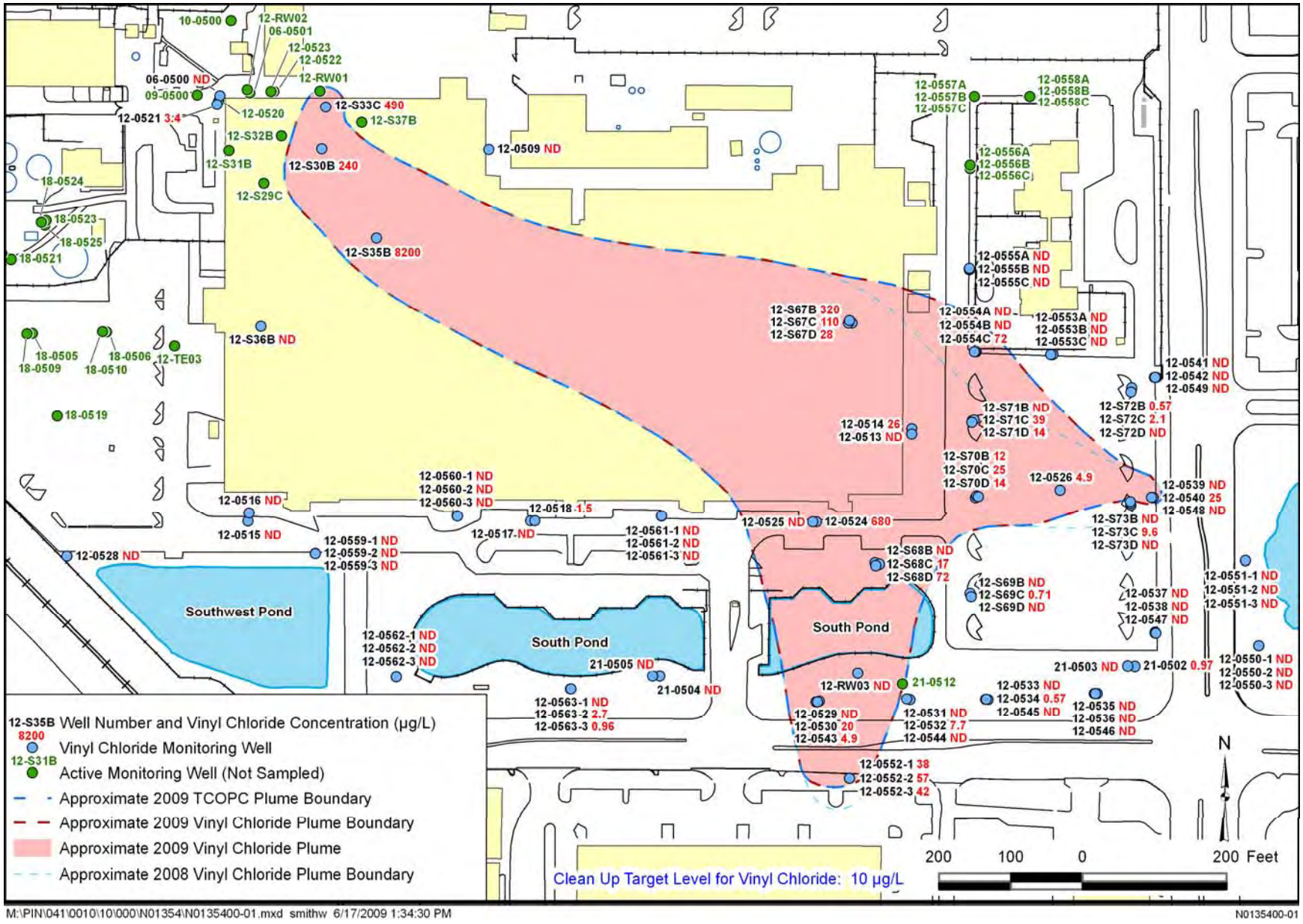

Figure 19. VC Plume, Building 100 Area

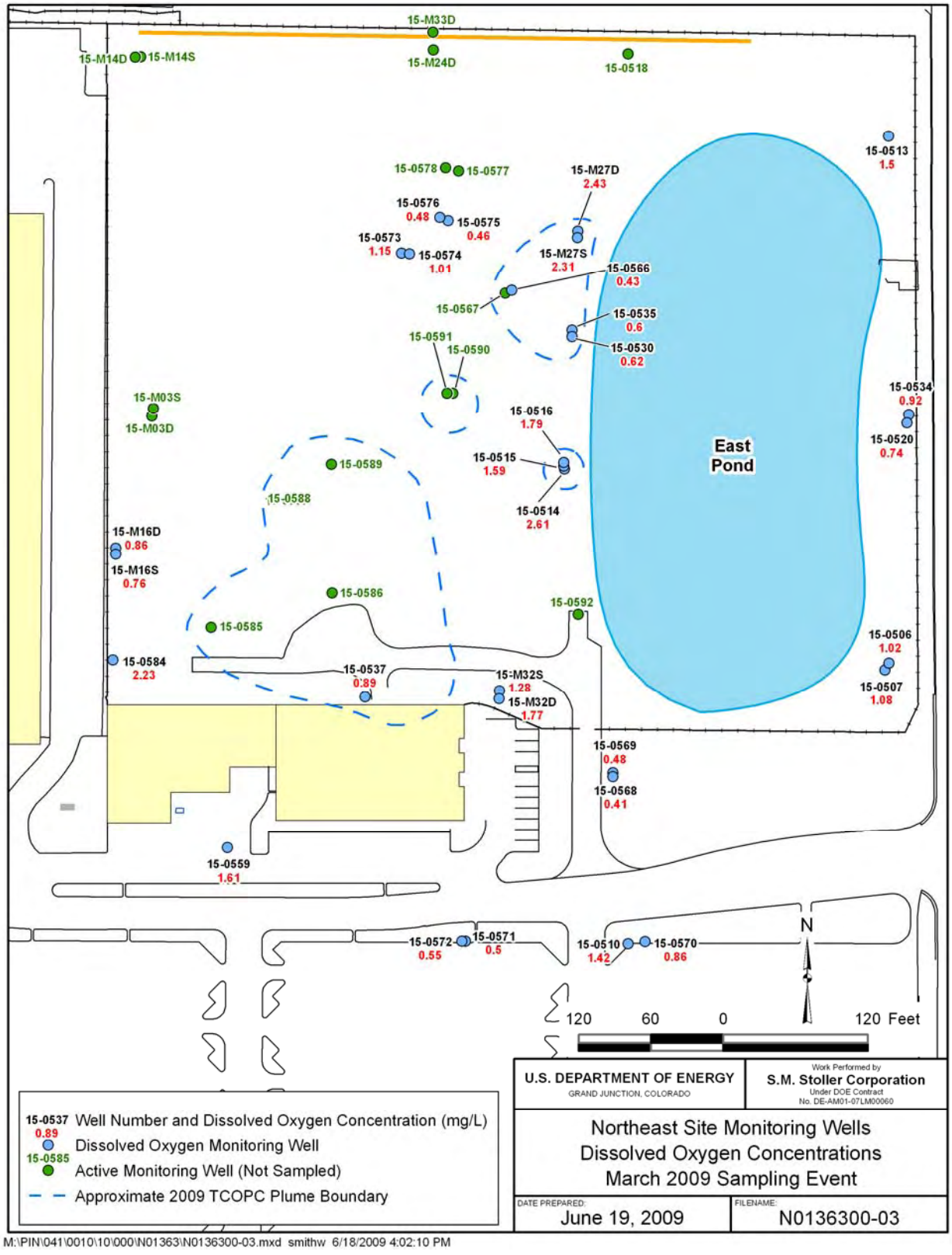

Figure 20. Northeast Site Dissolved Oxygen Values March 2009 Sampling Event

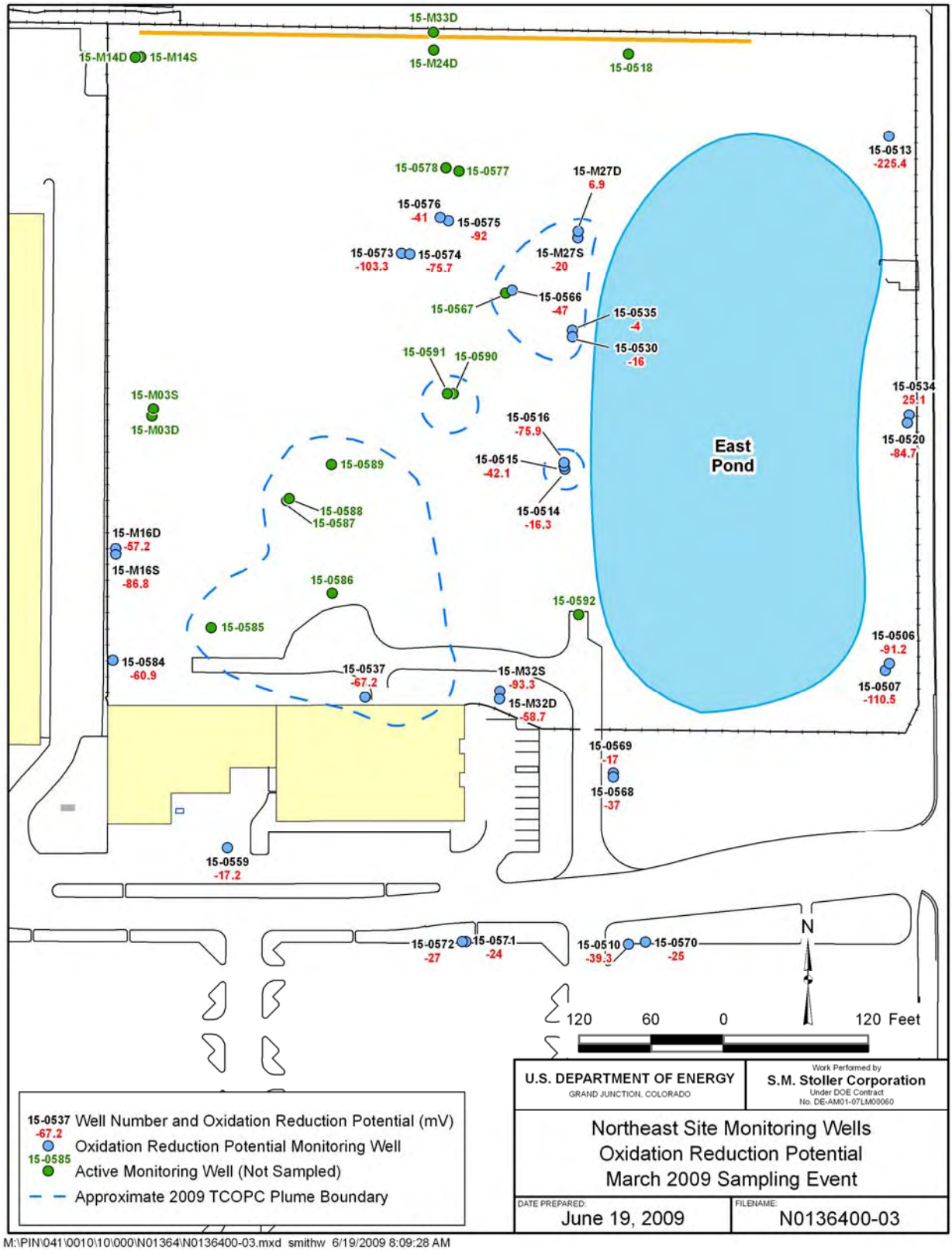

Figure 21. Northeast Site Oxidation-Reduction Potential Values

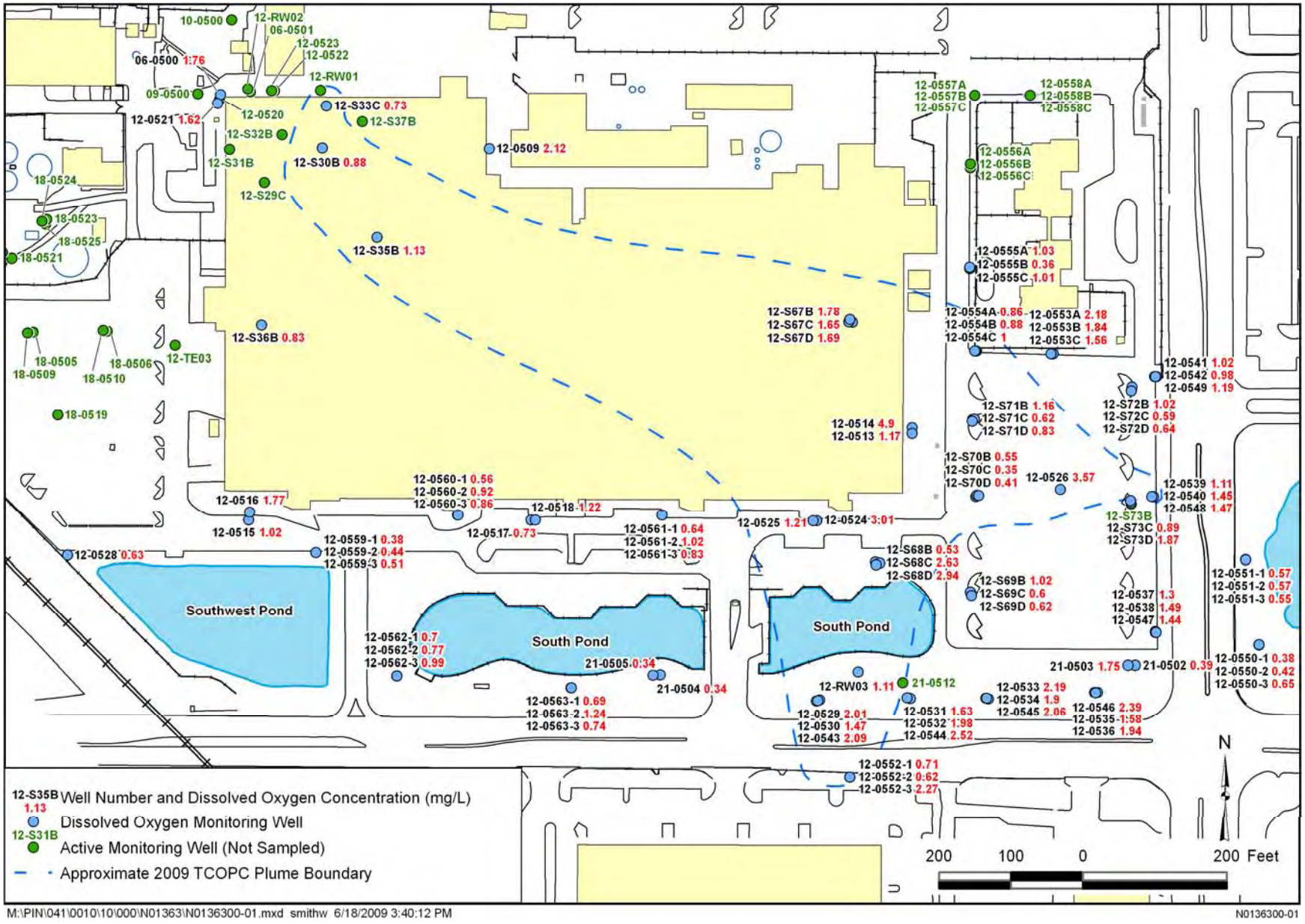

Figure 22. Building 100 Area Dissolved Oxygen Values March 2009 Sampling Event

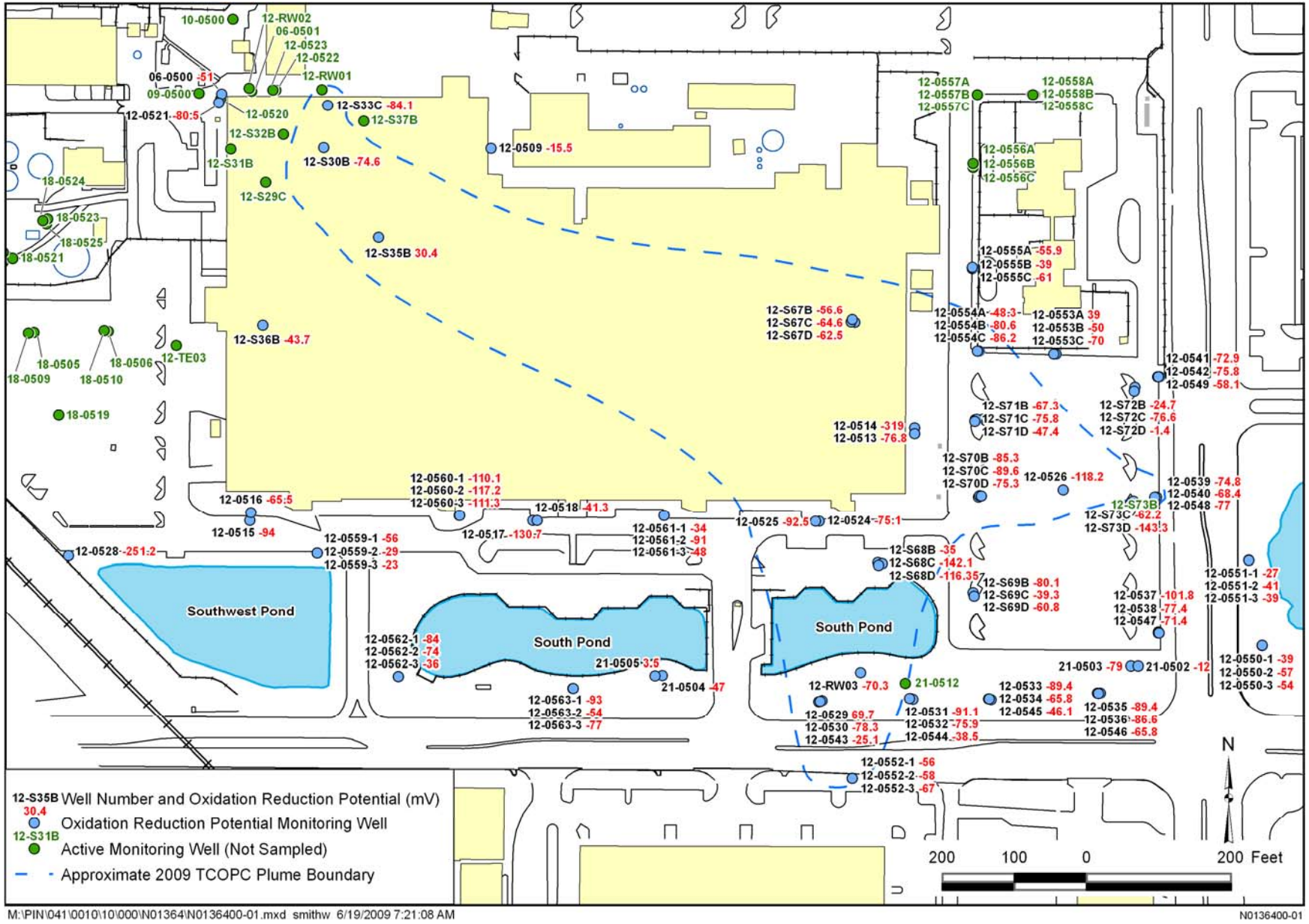

Figure 23. Building 100 Area Oxidation-Reduction Potential Values

Table 1. Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Groundwater Elevation (ft NGVD)
	Date	Time		
PIN02	**Sitewide Piezometers**			
PZ03	3/18/09	14:29	4.61	15.09
PZ04	3/18/09	14:22	3.07	15.13
PZ05	3/18/09	15:09	3.53	14.57
PZ08	3/18/09	14:54	4.49	13.91
PZ09	3/18/09	15:36	4.06	13.94
PZ10	3/18/09	12:00	4.78	14.10
PZ11	3/18/09	12:00	4.57	14.31
Building 100 Area				
PIN06				
0500	3/18/09	14:42	3.60	14.40
0501	3/18/09	14:46	3.77	14.53
PIN09				
500	3/18/09	14:31	3.61	14.36
PIN10				
0500	3/18/09	14:56	NM	NM
PIN12				
0509	3/18/09	14:58	3.52	14.52
0513	3/18/09	08:35	4.86	13.64
0514	3/18/09	08:40	5.06	13.44
0515	3/18/09	15:48	4.27	13.63
0516	3/18/09	16:03	4.16	13.84
0517	3/18/09	16:07	3.82	14.08
0518	3/18/09	16:13	3.63	14.31
0520	3/18/09	14:41	3.56	14.45
0521	3/18/09	14:39	3.70	14.35
0522	3/18/09	14:50	3.75	14.45
0523	3/18/09	14:49	3.73	14.43
0524	3/18/09	14:06	3.08	14.33
0525	3/18/09	14:15	3.72	13.70
0526	3/18/09	10:07	3.94	12.88
0527	3/18/09	15:27	12.66	5.41
0528	3/18/09	15:44	11.91	5.69
0529	3/18/09	13:44	3.59	13.21
0530	3/18/09	13:46	3.95	12.85
0531	3/18/09	13:25	3.24	12.76
0532	3/18/09	13:32	3.22	12.78
0533	3/18/09	13:11	2.86	12.64
0534	3/18/09	13:24	2.96	12.54
0535	3/18/09	10:55	2.96	12.34
0536	3/18/09	11:01	2.99	12.31
0537	3/18/09	10:38	3.20	12.36

Table 1 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Groundwater Elevation (ft NGVD)
	Date	Time		
0538	3/18/09	10:39	3.22	12.34
0539	3/18/09	09:10	3.57	12.86
0540	3/18/09	09:19	3.67	12.76
0541	3/18/09	08:46	4.86	12.80
0542	3/18/09	09:00	4.81	12.85
0543	3/18/09	13:47	4.07	12.86
0544	3/18/09	13:33	3.28	12.68
0545	3/18/09	13:25	2.84	12.66
0546	3/18/09	11:02	2.79	12.50
0547	3/18/09	10:28	3.28	12.36
0548	3/18/09	09:22	3.39	13.05
0549	3/18/09	09:01	4.77	12.89
0553A	3/18/09	12:25	4.74	13.37
0553B	3/18/09	12:30	4.88	13.23
0553C	3/18/09	12:31	4.89	13.22
0554A	3/18/09	11:03	4.64	13.60
0554B	3/18/09	12:21	4.76	13.48
0554C	3/18/09	12:23	4.81	13.43
0555A	3/18/09	12:32	4.14	13.75
0555B	3/18/09	12:42	4.30	13.59
0555C	3/18/09	12:43	4.34	13.55
0556A	3/18/09	12:45	4.04	13.97
0556B	3/18/09	12:51	4.26	13.75
0556C	3/18/09	12:52	4.31	13.70
0557A	3/18/09	12:54	4.09	14.03
0557B	3/18/09	13:01	4.39	13.73
0557C	3/18/09	13:02	4.40	13.72
0558A	3/18/09	13:03	4.27	13.94
0558B	3/18/09	13:08	4.59	13.62
0558C	3/18/09	13:09	4.61	13.60
0559-1	3/18/09	16:15	6.23	11.76
0559-2	3/18/09	16:21	5.26	12.73
0559-3	3/18/09	16:22	4.91	13.08
0560-1	3/18/09	16:14	3.58	14.14
0560-2	3/18/09	16:17	3.51	14.21
0560-3	3/18/09	16:18	3.51	14.21
0561-1	3/18/09	15:34	4.19	14.03
0561-2	3/18/09	16:06	4.26	13.96
0561-3	3/18/09	16:07	4.30	13.92
0562-1	3/18/09	16:35	5.11	13.15
0562-2	3/18/09	16:36	5.04	13.22
0562-3	3/18/09	16:37	4.98	13.28
0563-1	3/18/09	16:18	4.05	13.22

Table 1 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Groundwater Elevation (ft NGVD)
	Date	Time		
0563-2	3/18/09	16:30	3.93	13.34
0563-3	3/18/09	16:31	3.96	13.31
RW01	3/18/09	14:50	3.70	14.55
RW02	3/18/09	14:46	3.97	14.36
RW03	3/18/09	13:34	4.42	13.08
S29C	3/18/09	13:22	4.26	14.25
S31B	3/18/09	13:28	4.26	14.25
S32B	3/18/09	13:18	4.11	14.40
S33C	3/18/09	13:00	3.95	14.56
S35B	3/18/09	13:32	4.33	14.18
S36B	3/18/09	12:47	4.52	13.99
S37B	3/18/09	13:12	3.92	14.59
S67B	3/18/09	13:43	4.62	13.85
S67C	3/18/09	13:59	4.55	13.92
S67D	3/18/09	14:00	4.75	13.73
S68B	3/18/09	13:48	4.28	13.62
S68C	3/18/09	14:03	4.43	13.47
S68D	3/18/09	14:04	4.49	13.41
S69B	3/18/09	10:20	3.04	12.96
S69C	3/18/09	10:27	3.05	12.95
S69D	3/18/09	10:28	2.98	13.02
S70B	3/18/09	10:13	3.33	13.37
S70C	3/18/09	10:19	3.30	13.40
S70D	3/18/09	10:19	3.39	13.31
S71B	3/18/09	08:13	4.89	13.51
S71C	3/18/09	08:30	5.01	13.39
S71D	3/18/09	08:32	5.04	13.36
S72B	3/18/09	09:01	5.09	13.11
S72C	3/18/09	09:07	5.21	12.99
S72D	3/18/09	09:08	5.21	12.99
S73B	3/18/09	09:23	4.05	12.95
S73C	3/18/09	10:06	4.13	12.87
S73D	3/18/09	10:06	4.08	12.92
TE03	3/18/09	15:30	3.05	13.95
PIN21				
0502	3/18/09	10:39	2.54	12.66
0503	3/18/09	10:54	2.86	12.34
0504	3/18/09	16:07	4.48	13.12
0505	3/18/09	16:08	4.17	13.23
PIN15	**Northeast Site**			
0506	3/18/09	09:02	3.53	13.47
0507	3/18/09	09:05	3.55	13.45
0510	3/18/09	15:12	3.42	14.10

Table 1 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Groundwater Elevation (ft NGVD)
	Date	Time		
0513	3/18/09	08:56	12.53	5.07
0514	3/18/09	09:47	3.25	14.25
0515	3/18/09	09:45	3.26	14.24
0516	3/18/09	09:41	3.45	13.95
0518	3/18/09	08:54	3.88	13.92
0520	3/18/09	09:00	3.68	13.52
0530	3/18/09	09:39	3.27	14.13
0534	3/18/09	08:58	3.71	13.59
0535	3/18/09	09:36	3.39	14.21
0559	3/18/09	10:39	4.06	14.73
0566	3/18/09	09:36	3.17	14.33
0567	3/18/09	09:34	NM	NM
0568	3/18/09	14:44	4.45	14.05
0569	3/18/09	15:11	4.35	14.03
0570	3/18/09	15:18	3.89	14.09
0571	3/18/09	15:19	3.07	14.40
0572	3/18/09	15:27	3.18	14.33
0573	3/18/09	09:31	3.74	14.64
0574	3/18/09	09:26	3.93	14.49
0575	3/18/09	09:15	3.43	14.41
0576	3/18/09	09:19	3.18	14.30
0584	3/18/09	10:21	3.82	14.88
M03D	3/18/09	10:00	3.13	14.97
M03S	3/18/09	10:17	3.13	14.97
M14D	3/18/09	08:47	3.35	14.65
M14S	3/18/09	08:49	3.32	14.68
M27D	3/18/09	09:06	3.50	14.10
M27S	3/18/09	09:13	3.76	13.84
M32D	3/18/09	09:58	3.27	14.53
M32S	3/18/09	09:57	3.19	14.61
M33D	3/18/09	08:51	3.37	14.23
PIN18	**Wastewater Neutralization Area**			
0500	3/18/09	14:18	5.76	14.34
0502	3/18/09	14:01	5.77	14.23
0503	3/18/09	15:06	3.25	14.43
0504	3/18/09	15:28	5.20	14.40
0505	3/18/09	15:19	3.63	14.25
0506	3/18/09	15:21	NM	NM
0507	3/18/09	15:12	3.45	14.28
0508	3/18/09	15:35	5.10	14.40
0509	3/18/09	15:14	3.53	14.30
0510	3/18/09	15:25	3.76	14.00
0519	3/18/09	15:26	4.14	14.14

Table 1 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Groundwater Elevation (ft NGVD)
	Date	Time		
0520	3/18/09	14:27	3.94	14.06
0521	3/18/09	14:27	3.92	14.18
0522	3/18/09	14:22	3.93	14.17
0523	3/18/09	14:30	5.18	14.22
0524	3/18/09	14:28	4.76	14.24
0525	3/18/09	14:30	4.59	14.31
0526	3/18/09	15:05	4.81	13.79
RW02	3/18/09	14:17	6.01	14.09
RW03	3/18/09	14:20	4.14	14.16
RW0501	3/18/09	14:16	5.80	14.20

NM = not measured

Table 2. Floridan Aquifer Monitoring Well Water Elevations

Well Identification	September 2008 Water Level Elevation (ft, MSL)	March 2009 Water Level Elevation (ft, MSL)
PIN12-0527	6.98	5.87
PIN12-0528	6.84	5.18
PIN15-0513	6.58	5.53

Table 3. Surface Water Elevations

Location	Measurement		Groundwater Elevation (ft NGVD)
	Date	Time	
PIN01	**Pond 5**		
P501	3/18/09	15:00	13.46
P502	3/18/09	14:52	13.79
PIN02	**West Pond**		
W005	3/18/09	14:30	14.25
PIN 12	**Belcher Road Pond**		
BR01	3/18/09	14;41	12.01
PIN15	**East Pond**		
E001	3/18/09	9:49	13.62
PIN23	**Southwest Pond**		
SW01	3/18/09	15:00	13.46
PIN37	**South Pond**		
S001	3/18/09	16:37	13.44

Table 4. Carbon Stable Isotope Results

Well	TCE $\delta^{13}C$ (‰)	cDCE $\delta^{13}C$ (‰)	VC $\delta^{13}C$ (‰)
12-S35B	−7.81	−20.85	−27.34
12-S67C	ND	−19.49	−29.00
12-S71C	ND	−19.58	−25.25
12-S73C	ND	ND	−18.22
12-0524	ND	−0.78	−37.02
12-0530	ND	−23.75	−30.98
12-0552-2	ND	−23.66	−33.31

ND = not detected.

Table 5. Field Measurements of Samples Collected at the STAR Center

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN06	**Old Drum Storage Site**						
0500	3–13	20.47	639	0.8	6.75	-51	1.76
PIN12	**Building 100 Area**						
0509	3–13	19.54	752	1.9	6.88	-15.5	2.12
0513	15–25	20.45	785	6.59	6.78	-76.8	1.17
0514	30–40	21.98	1,644	29.3	6.42	-319	4.9
0515	15–25	23.05	590	1.15	6.94	-94	1.02
0516	30–40	22.99	1,418	2.06	6.77	-65.5	1.77
0517	15–25	26.24	553	28.4	7.05	-130.7	0.73
0518	30–40	24.49	674	5.76	6.87	-41.3	1.22
0521	19.5–29.5	21.79	558	11.6	6.93	-80.5	1.62
0524	27–37	25.68	1,536	2.4	6.61	-75.1	3.01
0525	12–22	23.42	782	6.25	6.86	-92.5	1.21
0526	19.5–29.5	26.73	1,805	2.03	6.45	-118.2	3.57
0527	118–137.9	27.79	1,888	2.71	6.98	-175.6	0.92
0528	127–146.9	23.5	1,289	0.33	7.15	-251.2	0.63
0529	10–20	20.31	648	11.3	6.89	69.7	2.01
0530	19.5–29.5	20.76	966	9.4	6.79	-78.3	1.47
0531	10–20	21.02	1,052	187	6.82	-91.1	1.63
0532	20–30	22.03	998	17.6	6.8	-75.9	1.98
0533	10–20	20.03	1,097	14.1	6.84	-89.4	2.19
0534	20–30	20.75	1,139	7	6.77	-65.8	1.9
0535	10–20	20.49	661	52.2	6.93	-89.4	1.58
0536	20–30	21.01	781	6.2	6.81	-86.6	1.94
0537	10–20	23.55	1,108	26.8	6.93	-101.8	1.3
0538	20–30	24.11	1,143	5.8	6.72	-77.4	1.49
0539	9.5–19.5	24.71	704	16.8	6.73	-74.8	1.11
0540	20–30	24.42	1,941	9.5	6.55	-68.4	1.45
0541	10–20	24.79	661	75.9	6.77	-72.9	1.02
0542	20–30	25.01	829	10.4	6.79	-75.8	0.98
0543	28–38	21.45	1,485	8.3	6.83	-25.1	2.09
0544	30–40	21.97	1,492	11.2	6.82	-38.5	2.52
0545	29.5–39.5	21.2	1,557	8.5	6.81	-46.1	2.06
0546	29.5–39.5	21.33	1,260	24.3	6.84	-65.8	2.39
0547	29.5–39.5	24.53	1,394	27.5	6.72	-71.4	1.44
0548	30–40	24.04	1,943	23.8	6.73	-77	1.47
0549	30–40	25.6	1,476	15	6.76	-58.1	1.19
0550-1	9–18	22.9	1,246	12.4	6.43	-39	0.38
0550-2	20–29	24.67	1,246	31.2	6.46	-57	0.42
0550-3	31–40	25.78	1,413	7.35	6.59	-54	0.65
0551-1	9–18	24.75	1,106	11.3	6.36	-27	0.57
0551-2	20–29	25.59	1,143	7.89	6.41	-41	0.57
0551-3	31–40	26.47	1,392	11.9	6.53	-39	0.55
0552-1	9–18	25.3	1,032	13.1	6.5	-56	0.71
0552-2	20–29	24.04	1,073	15.3	6.49	-58	0.62

Table 5 (continued). Field Measurements of Samples Collected at the STAR Center

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
0552-3	31–40	26.39	1,385	11.7	6.53	-67	2.27
0553A	3–13	24.19	1,143	13.6	6.37	39	2.18
0553B	13–23	25.54	1,128	26.5	6.4	-50	1.84
0553C	23–33	26.28	712	16.9	6.61	-70	1.56
0554A	3–13	21.99	777	15.6	6.55	-48.3	0.86
0554B	13–23	22.81	783	11.2	6.7	-80.6	0.88
0554C	23–33	23	943	12.8	6.81	-86.2	1
0555A	2.5–12.5	20.86	355	12.4	6.7	-55.9	1.03
0555B	13–23	25.14	356	17.9	6.98	-39	0.36
0555C	23–33	25.56	617	10.7	6.65	-61	1.01
0559-1	9–18	24.63	1,148	6.89	6.52	-56	0.38
0559-2	20–29	25.05	1,550	22.1	6.52	-29	0.44
0559-3	31–40	25.28	1,742	7.41	6.55	-23	0.51
0560-1	9–18	24.37	853	16.2	6.93	-110.1	0.56
0560-2	20–29	25.77	723	114	7.03	-117.2	0.92
0560-3	31–40	26.4	1,170	153	6.83	-111.3	0.86
0561-1	9–18	24.46	547	9.9	6.8	-34	0.64
0561-2	20–29	25.61	728	17.8	6.91	-91	1.02
0561-3	31–40	26.42	1,347	15.2	6.48	-48	0.83
0562-1	9–18	22.06	671	11	6.8	-84	0.7
0562-2	20–29	23.38	1,208	22.6	6.63	-74	0.77
0562-3	31–40	22.48	1,712	16.3	6.72	-36	0.99
0563-1	9–18	20.88	605	18	6.9	-93	0.69
0563-2	20–29	23.69	1,211	15.2	6.57	-54	1.24
0563-3	31–40	22.51	1,597	14.5	6.68	-77	0.74
RW03	3–38	19.44	848	2.4	7.01	-70.3	1.11
S30B	5–15	20.66	1,503	3.2	6.82	-74.6	0.88
S33C	11–21	19.84	962	60.8	6.75	-84.1	0.73
S35B	5–15	20.81	1,848	13.5	6.54	30.4	1.13
S36B	5–15	20.37	759	24.9	6.5	-43.7	0.83
S67B	10–19.83	18.66	1,257	26	6.78	-56.6	1.78
S67C	20–29.83	19.23	1,013	30.9	6.82	-64.6	1.65
S67D	30–39.83	19.25	1,110	133	6.81	-62.5	1.69
S68B	10–20	23.47	857	8.72	6.41	-35	0.53
S68C	18–28	24.11	1,147	5.72	6.64	-142.1	2.63
S68D	30–40	24.58	1,572	3	6.63	-116.35	2.94
S69B	10–20	25.71	633	16.8	6.91	-80.1	1.02
S69C	20–30	26.38	928	5.6	6.7	-39.3	0.6
S69D	30–40	26.63	1,602	3.28	6.73	-60.8	0.62
S70B	10–20	25.63	1,300	189	6.73	-85.3	0.55
S70C	20–30	25.31	1,571	181	6.67	-89.6	0.35
S70D	30–40	25.08	1,667	60.4	6.63	-75.3	0.41
S71B	10–20	25.07	1,287	110	6.73	-67.3	1.16
S71C	20–30	26.1	1,556	178	6.63	-75.8	0.62
S71D	30–40	26.34	1,533	108	6.65	-47.4	0.83

Table 5 (continued). Field Measurements of Samples Collected at the STAR Center

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
S72B	10–20	25.99	1,976	29	6.11	-24.7	1.02
S72C	20–30	26.81	796	14	6.7	-76.6	0.59
S72D	30–40	26.78	1,481	15.3	6.7	-1.4	0.64
S73B	10–20	26.41	1,031	101	6.37	-	-
S73C	20–30	27.32	2,136	92.5	6.31	-62.2	0.89
S73D	30–40	26.1	2,817	95	6.27	-143.3	1.87
PIN15	**Northeast Site**						
0506	12–21.5	23.37	1,458	1.03	6.77	-91.2	1.02
0507	5–14.5	22.89	1,336	7.05	6.8	-110.5	1.08
0510	4–13.5	23.56	472	12.9	7.16	-39.3	1.42
0513	135–149.6	22.5	1,464	0.2	6.97	-225.4	1.5
0514	15.5–25.5	21.89	1,659	8.4	6.63	-16.3	2.61
0515	7.6–17.6	20.48	954	2.1	6.69	-42.1	1.59
0516	0.3–10.3	19.23	1,000	10.5	6.841	-75.9	1.79
0520	5–14.5	24.61	1,286	1.28	6.82	-84.7	0.74
0530	5–14.5	23.62	1,291	3.81	6.23	-16	0.62
0534	19.5–29	25.55	1,961	19.4	6.77	25.1	0.92
0535	20.5–30	23.84	1,482	17.5	6.37	-4	0.6
0537	17.5–30	20.74	1,093	7.6	6.78	-67.2	0.89
0559	22–31.5	24.6	1,415	26.3	6.75	-17.2	1.61
0566	19–28.5	24.67	1,252	193	6.58	-47	0.43
0568	10–20	23.89	1,013	22.1	6.63	-37	0.41
0569	20–30	23.57	1,609	16.7	6.4	-17	0.48
0570	20–30	27.81	1,955	39.6	6.37	-25	0.86
0571	10–20	24.72	1,202	17.4	6.45	-24	0.5
0572	20–30	26.91	1,330	17.2	6.43	-27	0.55
0573	5–15	24.76	1,559	2.3	6.74	-103.3	1.15
0574	18–28	25.56	1,069	0.76	6.64	-75.7	1.01
0575	5–15	23.04	2,284	3.86	6.68	-92	0.46
0576	20–30	26.58	1,212	54.9	6.55	-41	0.48
0584	20–30	24.29	1,182	96.6	6.82	-60.9	2.23
E001	–	20.45	779	2.8	7.81	49.9	5.33
M16D	18.5–28.5	25.59	1,176	8.03	6.74	-57.2	0.86
M16S	5–14.5	23.85	991	106	6.76	-86.8	0.76
M27D	21–31	20.41	1,755	6.1	6.68	6.9	2.43
M27S	6–16	19.52	1,332	9.8	6.6	-20	2.31
M32D	14–24	20.69	1,077	22.3	6.82	-58.7	1.77
M32S	3–13	18.35	731	15	7.08	-93.3	1.28
PIN21	**Perimeter Monitoring Wells**						
0502	7–17	22.79	1,380	4.35	6.49	-12	0.39
0503	20–28	23.34	839	46.3	6.71	-79	1.75
0504	7–17	21.43	669	18.4	6.61	-47	0.34
0505	20–28	23.27	850	3.63	6.54	3.5	0.34

[a]Temperature corrected to 25 °C.
- = not measured

Table 6. COPC Concentrations at the Northeast Site
(reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	Total 1,2-DCE[b]	Vinyl chloride	Methylene chloride	Benzene	Toluene	Total COPC[c]
CTL:			30	700	630	10	50	10	10,000	
PIN15	Northeast Site									
0506	12–21.5	2/27/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0507	5–14.5	2/27/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0510	4–13.5	3/5/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0513	135–149.6	2/27/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0514	15.5–25.5	2/27/08	<0.5	<0.65	3	2	<4	<0.5	<0.51	5
		3/25/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0515	7.6–17.6	2/27/08	<0.5	<0.65	ND	4.3	<4	<0.5	<0.51	4.3
		3/26/09	<0.5	<0.65	ND	37	<4	0.74J	<0.51	37
0516	0.3–10.3	2/28/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	15	<4	<0.5	<0.51	15
0520	5–14.5	2/27/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0530	5–14.5	2/27/08	<0.5	<0.65	ND	3.2	<4	<0.5	<0.51	3.2
		3/26/09	<0.5	18	22.9	250	<4	1.5	<0.51	274.4
0534	19.5–29	2/27/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0535	20.5–30	2/27/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	1.6	1.6	16	<4	<0.5	<0.51	17.6
0537	17.5–30	3/3/08	<0.5	240	241.8	600	<4	4	<0.51	845.8
		9/11/08	0.73J	510	517.9	930	<4	3.8	<0.51	1,451.7
		3/25/09	<5	270	270	480	<40	<5	<5.1	750
0559	22–31.5	3/5/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/28/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0560	19–28.5	2/29/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0561	5–14.5	2/29/08	<0.5	<0.65	ND	0.62J	<4	<0.5	<0.51	ND
0566	19–28.5	2/29/08	5.4	13	23	5.3	<4	<0.5	<0.51	33.7
		3/26/09	<0.5	22	62	38	<4	1	<0.51	101
0567	5–14.5	2/29/08	1.2	26	34.8	31	<4	1.4	<0.51	68.4
		9/12/08	0.63J	20	26.6	47	<4	1.4	<0.51	75
0568	10–20	3/5/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		9/16/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0569	20–30	3/5/08	<0.5	<0.65	ND	10	<4	<0.5	0.69J	10
		9/16/08	<0.5	<0.65	ND	9.9	<4	<0.5	<0.51	9.9
		3/27/09	<0.5	<0.65	ND	5.6	<4	<0.5	<0.51	5.6

Table 6 (continued). COPC Concentrations at the Northeast Site (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	Total 1,2-DCE[b]	Vinyl chloride	Methylene chloride	Benzene	Toluene	Total COPC[c]
CTL:			**30**	**700**	**630**	**10**	**50**	**10**	**10,000**	
0570	20–30	3/5/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/27/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0571	10–20	3/27/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0572	20–30	3/27/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0573	5–15	2/28/08	<0.5	<0.65	0.5J	2.8	<4	0.64J	<0.51	2.8
		3/25/09	<0.5	<0.65	0.47J	2.4	<4	<0.5	<0.51	2.4
0574	18–28	2/28/08	3.9	3	3	3	<4	<0.5	<0.51	9.9
		3/25/09	5.6	3.7	4.8	5	<4	<0.5	<0.51	15.4
0575	5–15	2/28/08	<0.5	1.4	1.4	0.73J	<4	0.85J	<0.51	1.4
		3/25/09	<0.5	2.4	2.4	<0.5	<4	0.55J	<0.51	2.4
0576	20–30	2/28/08	<0.5	1.7	1.7	14	<4	<0.5	<0.51	15.7
		3/25/09	<0.5	3.2	3.2	8.8	<4	<0.5	<0.51	12
0577	5–15	2/28/08	<0.5	<0.65	0.56J	1.1	<4	2.4	<0.51	3.5
0578	20–30	2/28/08	<0.5	0.68J	0.68J	<0.5	<4	<0.5	<0.51	ND
0584	20–30	3/4/08	<0.5	<0.65	ND	0.59J	<4	<0.5	<0.51	ND
		9/12/08	<0.5	<0.65	ND	0.74J	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
0585	20–30	3/4/08	250	140	140	20	<4	0.76J	5.7	415.7
		9/11/08	8.6	370	371.4	28	<4	0.75J	3.7	411.7
0586	20–30	3/4/08	120	2,000	2,008	640	<4	5.2	14	2,787.2
		9/16/08	120	1,100	1,135	540	<4	2.8	12	1,809.8
0587	20–30	3/3/08	3,900	16,000	16,000	<120	<1,000	<120	1,300	21,200
		9/11/08	890	14,000	14,110	180	<4	9.2	1,300	16,489.2
0588	5–15	3/3/08	<25	1,800	1,800	<25	<200	<25	<26	1,800
		9/11/08	0.66J	630	635	19	<4	2.4	5.9	662.3
0589	20–30	3/4/08	29	1,400	1,406	520	<4	59	100	2,114
		9/15/08	8.4	1,100	1,130	2,400	<4	48	1,600	5,186.4
0590	20–30	2/29/08	11	240	246	26	<4	0.96J	2.1	285.1
		9/15/08	<0.5	<0.65	ND	1.8	<4	5.2	0.56J	7
0591	5–15	3/4/08	<0.5	3.3	3.3	0.52J	<4	3.4	1.5	8.2
		9/15/08	0.94J	130	133.2	27	<4	0.59J	<0.51	160.2
0592	20–30	3/4/08	<0.5	<0.65	ND	<0.5	<4	26	0.94J	26
		9/16/08	<0.5	<0.65	ND	<0.5	<4	12	<0.51	12
E001	–	12/9/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
M16D	18.5–28.5	3/4/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/25/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
M16S	5–14.5	3/25/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
M27D	21–31	2/29/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/26/09	<0.5	<0.65	ND	0.52J	<4	<0.5	<0.51	ND
M27S	6–16	2/29/08	<0.5	3.7	5.4	3.5	<4	<0.5	<0.51	8.9
		3/26/09	<0.5	<0.65	ND	14	<4	<0.5	<0.51	14

Table 6 (continued). COPC Concentrations at the Northeast Site (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	Total 1,2-DCE[b]	Vinyl chloride	Methylene chloride	Benzene	Toluene	Total COPC[c]
CTL:			**30**	**700**	**630**	**10**	**50**	**10**	**10,000**	
M32D	14–24	3/4/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/25/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
M32S	3–13	3/4/08	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND
		3/25/09	<0.5	<0.65	ND	<0.5	<4	<0.5	<0.51	ND

[a]Before December 18, 2003 "<" values are reporting limits. On or after December 18, 2003 "<" values are method detection limits.
[b]Total 1,2-DCE is the sum of cDCE and tDCE.
[c]Total COPC is the sum of the individual COPC concentrations. The cDCE value is not part of the total COPC value because these values are included in the total 1,2-DCE value. "J" values are not included in the total COPC value.

ND = Not detected.
J = Estimated value, result is between the reporting limit and the method detection limit.

Table 7. Aluminum and Iron Concentrations Measured at the Northeast Site (reported in µg/L)

Well	Aluminum	Iron
Cleanup Target Level:	**2,000**	**3,000**
0506	200	1,600
0507	700	1,300
0510	460	690
0513	<50	<50
0514	840	1,900
0515	65 B	1,600
0516	63 B	5,100
0520	100 B	1,700
0530	180 B	3,100
0534	1,200	530
0535	1,900	630
0537	54 B	4,800
0559	1,500	320
0566	9,000	4,300
0568	620	850
0569	1,200	3,900
0570	1,900	500
0571	490	2,500
0572	740	980
0573	82 B	720
0574	<50	4,500
0575	60 B	1,800
0576	1,000	1,600
0584	3,000	2,600
M16D	250	4,000
M16S	1,600	5,500
M27D	730	600
M27S	<50	3,300
M32D	210	5,700
M32S	140 B	9,900

< = not detected
B= estimated value

Table 8. COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
CTL:			**30**	**700**	**1,000**	**630**	**70**	**10**	
Industrial Drain Leaks Bldg 100 / Old Drum Storage Site									
PIN06									
0500	3–13	2/27/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
PIN12									
0509	3–13	3/4/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0513	15–25	3/4/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/28/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0514	30–40	3/4/08	<0.5	<0.65	12	12	<0.45	<0.5	12
		9/13/08	<0.5	5.6	16	21.6	<0.45	33	54.6
		3/30/09	<0.5	5.2	15	20.2	<0.45	26	46.2
0515	15–25	3/1/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0516	30–40	3/1/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0517	15–25	3/1/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0518	30–40	3/1/08	<0.5	<0.65	<0.44	ND	<0.45	1.1	1.1
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	1.5	1.5
0521	19.5–29.5	2/27/08	<0.5	<0.65	<0.44	ND	<0.45	1.1	1.1
		3/27/09	1.1	2.1	<0.44	2.1	<0.45	3.4	6.6
0524	27–37	3/1/08	<5	820	12	832	41	1,300	2,173
		9/13/08	<0.5	610	18	628	27	1,000	1,655
		3/21/09	<0.5	500	10	510	24	680	1,214
0525	12–22	3/1/08	<0.5	0.91J	<0.44	0.91J	<0.45	<0.5	ND
		9/13/08	<0.5	2.2	<0.44	2.2	<0.45	0.88J	2.2
		3/21/09	<0.5	1.4	<0.44	1.4	<0.45	<0.5	1.4
0526	19.5–29.5	3/1/08	<0.5	<0.65	1.4	1.4	<0.45	1.9	3.3
		9/11/08	<0.5	0.83J	1.1	1.1	<0.45	3.8	4.9
		3/21/09	<0.5	1.6	2	3.6	<0.45	4.9	8.5
0527	118–137.9	3/4/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/26/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0528	127–146.9	3/1/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0529	10–20	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0530	19.5–29.5	9/16/08	<0.5	30J	0.68J	30	1.4	4.6J	36
		12/8/08	<0.5	130	1.2	131.2	5.7	<0.5	136.9
		3/25/09	<0.5	110J	1.5J	111.5	6.2J	20J	137.7

Table 8 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
CTL:			**30**	**700**	**1,000**	**630**	**70**	**10**	
0531	10–20	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	1.2	<0.44	1.2	<0.45	<0.5	1.2
0532	20–30	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	9	9
		3/24/09	<0.5	6.4	<0.44	6.4	<0.45	7.7	14.1
0533	10–20	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0534	20–30	9/17/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	0.78J	<0.44	0.78J	<0.45	0.57J	ND
0535	10–20	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/23/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0536	20–30	9/17/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/23/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0537	10–20	9/14/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0538	20–30	9/14/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0539	9.5–19.5	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0540	20–30	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	4.9	4.9
		12/9/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	1.6	1.6	<0.45	25	26.6
0541	10–20	9/14/08	<0.5	0.68J	<0.44	0.68J	<0.45	<0.5	ND
		3/31/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0542	20–30	9/14/08	<0.5	1.3	<0.44	1.3	<0.45	<0.5	1.3
		3/30/09	<0.5	0.93J	<0.44	0.93J	0.51J	<0.5	ND
0543	28–38	9/16/08	<0.5	3.1	<0.44	3.1	<0.45	2.7	5.8
		3/24/09	<0.5	25	<0.44	25	1.5	4.9	31.4
0544	30–40	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	0.66J	ND
		3/24/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0545	29.5–39.5	9/17/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0546	29.5–39.5	9/17/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/23/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0547	29.5–39.5	9/14/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0548	30–40	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0549	30–40	9/14/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0550-1	9–18	9/14/08	<0.5	2.7	<0.44	2.7	<0.45	<0.5	2.7
		3/31/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND

Table 8 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
CTL:			**30**	**700**	**1,000**	**630**	**70**	**10**	
0550-2	20–29	9/14/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/31/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0550-3	31–40	9/15/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/31/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0551-1	9–18	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0551-2	20–29	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0551-3	31–40	9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0552-1	9–18	9/14/08	0.87J	380	5.8	385.8	24	82	491.8
		3/25/09	<0.5	230J	2.7J	232.7	11J	38J	281.7
0552-2	20–29	9/14/08	<0.5	360	9	369	35	110	514
		3/25/09	<0.5	310	5	315	20	57	392
0552-3	31–40	9/14/08	<0.5	120	1.7	121.7	8.3	33	163
		3/25/09	<0.5	130	2.3	132.3	9.9	42	184.2
0553A	3–13	9/13/08	3.6	11	2.2	13.2	<0.45	1.8	18.6
		12/20/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0553B	13–23	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		12/20/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0553C	23–33	9/13/08	<0.5	1.6	<0.44	1.6	<0.45	0.52J	1.6
		12/20/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0554A	3–13	9/13/08	1.6	3.5	0.71J	3.5	<0.45	0.64J	5.1
		12/20/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0554B	13–23	9/13/08	1.2	2.5	0.65J	2.5	<0.45	0.74J	3.7
		12/20/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0554C	23–33	9/13/08	<0.5	17	1.5	18.5	4.3	66	88.8
		12/20/08	<0.5	13	1.8	14.8	2.5	58	75.3
		3/21/09	<0.5	16	2.9	18.9	3.8	72	94.7
0555A	2.5–12.5	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0555B	13–23	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/21/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0555C	23–33	9/13/08	<0.5	1.6	<0.44	1.6	<0.45	<0.5	1.6
		3/21/09	<0.5	2.1	1.6	3.7	<0.45	<0.5	3.7
0556A	3–13	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0556B	13–23	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0556C	23–33	9/13/08	<0.5	3.9	1.5	5.4	<0.45	<0.5	5.4

Table 8 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
CTL:			**30**	**700**	**1,000**	**630**	**70**	**10**	
0557A	3–13	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0557B	13–23	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0557C	23–33	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0558A	3–13	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0558B	13–23	9/13/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0558C	23–33	9/13/08	<0.5	1.2	<0.44	1.2	<0.45	<0.5	1.2
0559-1	9–18	12/8/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0559-2	20–29	12/8/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0559-3	31–40	12/8/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0560-1	9–18	12/5/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/28/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0560-2	20–29	12/5/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/28/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0560-3	31–40	12/5/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/28/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0561-1	9–18	12/6/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/28/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0561-2	20–29	12/6/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/28/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0561-3	31–40	12/6/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/28/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0562-1	9–18	12/8/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/23/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0562-2	20–29	12/8/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/23/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0562-3	31–40	12/8/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0563-1	9–18	12/5/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0563-2	20–29	12/5/2008	<0.5	<0.65	<0.44	ND	<0.45	1.9	1.9
		3/24/2009	<0.5	<0.65	<0.44	ND	<0.45	2.7	2.7
0563-3	31–40	12/5/2008	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/2009	<0.5	<0.65	<0.44	ND	<0.45	0.96J	ND
0564-1	9–18	5/12/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0564-2	20–29	5/13/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0564-3	31–40	5/13/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0565-1	9–18	5/12/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0565-2	20–29	5/12/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0565-3	31–40	5/12/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND

Table 8 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
CTL:			**30**	**700**	**1,000**	**630**	**70**	**10**	
0566-1	10–19	5/13/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0566-2	21–30	5/13/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0566-3	32–41	5/13/2009	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
S30B	5–15	2/29/08	62	2,900	190	3,090	66	980	4,198
		9/12/08	53	1,700	98J	1,700	43	600	2,396
		3/20/09	40	390	36	426	7.6	240	713.6
S33C	11–21	2/29/08	200	5,100	91	5,191	430	1,300	7,121
		9/12/08	61	870	30	900	93	600	1,654
		3/20/09	140	1,100	63	1,163	70	490	1,863
S35B	5–15	2/29/08	14,000	37,000	7,900	44,900	<220	17,000	75,900
		9/12/08	9,700	36,000	6,500	42,500	<220	17,000	69,200
		3/20/09	5,800	20,000	4,100	24,100	220	8,200	38,320
S36B	5–15	2/29/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/20/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
S67B	10–19.83	2/27/08	<0.5	19	4.9	23.9	<0.45	430	453.9
		9/15/08	<0.5	19	4.7	23.7	<0.45	310	333.7
		3/25/09	<0.5	24	5.9	29.9	0.51J	320	349.9
S67C	20–29.83	2/27/08	<0.5	270	49	319	4.3	100	423.3
		9/15/08	<0.5	210	35	245	2.5	160	407.5
		3/25/09	<0.5	69	17	86	1.2	110	197.2
S67D	30–39.83	2/27/08	<0.5	39	9.6	48.6	0.78J	40	88.6
		9/15/08	<0.5	29	7.8	36.8	0.53J	44	80.8
		3/25/09	<0.5	22	6.7	28.7	<0.45	28	56.7
S68B	10–20	3/5/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/10/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
S68C	18–28	3/5/08	<0.5	7	<0.44	7	<0.45	10	17
		9/10/08	<0.5	10	<0.44	10	<0.45	15	25
		3/30/09	<0.5	18	<0.44	18	<0.45	17	35
S68D	30–40	3/5/08	<0.5	90	1.7	91.7	0.56JJ	75	166.7
		9/10/08	<0.5	110	1.8	111.8	<0.45	110	221.8
		3/30/09	<0.5	91	1.7	92.7	<0.45	72	164.7
S69B	10–20	3/5/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/10/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
S69C	20–30	3/5/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/11/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	0.71J	ND
S69D	30–40	3/5/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/11/08	<0.5	0.83J	<0.44	0.83J	<0.45	0.74J	ND
		3/27/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND

Table 8 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
CTL:			**30**	**700**	**1,000**	**630**	**70**	**10**	
S70B	10–20	3/1/08	1.3	19	0.72J	19	<0.45	13	33.3
		9/13/08	<0.5	15	0.79J	15	<0.45	15	30
		3/27/09	<0.5	18	0.54J	18	<0.45	12	30
S70C	20–30	3/1/08	2.3	34	18	52	<0.45	23	77.3
		9/13/08	<0.5	26	14	40	0.83J	27	67
		3/30/09	<0.5	32	13	45	0.79J	25	70
S70D	30–40	3/1/08	8	35	11	46	<0.45	12	66
		9/13/08	<0.5	17	8.5	25.5	0.72J	15	40.5
		3/30/09	<0.5	21	8.2	29.2	0.69J	14	43.2
S71B	10–20	3/1/08	0.52J	3.1	<0.44	3.1	<0.45	<0.5	3.1
		9/11/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	0.77J	<0.44	0.77J	<0.45	<0.5	ND
S71C	20–30	3/1/08	0.7J	28	23	51	<0.45	34	85
		9/11/08	<0.5	21	13	34	<0.45	33	67
		3/24/09	<0.5	21	17	38	0.46J	39	77
S71D	30–40	3/1/08	0.88J	10	7.2	17.2	<0.45	13	30.2
		9/13/08	<0.5	8.8	5.2	14	<0.45	16	30
		3/24/09	<0.5	8.3	5.9	14.2	<0.45	14	28.2
S72B	10–20	3/5/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/15/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/23/09	<0.5	<0.65	<0.44	ND	<0.45	0.57J	ND
S72C	20–30	3/5/08	<0.5	0.82J	<0.44	0.82J	0.53J	<0.5	ND
		9/15/08	<0.5	1.2	<0.44	1.2	0.5J	<0.5	1.2
		3/23/09	<0.5	1.7	<0.44	1.7	<0.45	2.1	3.8
S72D	30–40	3/5/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/15/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/23/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
S73B	10–20	3/4/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/11/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
S73C	20–30	3/4/08	<0.5	<0.65	4.8	4.8	<0.45	18	22.8
		9/11/08	<0.5	<0.65	3.2	3.2	<0.45	16	19.2
		3/24/09	<0.5	0.91J	2.3	2.3	<0.45	9.6	11.9
S73D	30–40	3/4/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/11/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/27/09	<0.5	0.95J	<0.44	0.95J	<0.45	<0.5	ND
PIN21									
0502	7–17	3/4/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	2.1	<0.44	2.1	<0.45	0.97J	2.1
0503	20–28	3/4/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/15/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/30/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND

Table 8 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
CTL:			**30**	**700**	**1,000**	**630**	**70**	**10**	
0504	7–17	3/1/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0505	20–28	3/1/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		9/16/08	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
		3/24/09	<0.5	<0.65	<0.44	ND	<0.45	<0.5	ND
0512	20–29.5	9/10/08	<0.5	7.6	<0.44	7.6	<0.45	13	20.6

[a]"<" values are reporting limits.
[b]Total 1,2-DCE is the sum of cDCE and tDCE.
[c]Total COPC is the sum of the individual COPC concentrations. The cDCE and tDCE values are not part of the total COPC value because these values are included in the total 1,2-DCE value. "J" values are not included in the total COPC value.
ND = Not detected.
J = Estimated value, result is between the reporting limit and the method detection limit.

Table 9. Relative Percent Difference (RPD) for Duplicate Samples

Sample ID	Duplicate ID	Analyte	Result	Dup Result	MDL	Units	RPD
PIN12-0554C	PIN24-0506	1,1-Dichloroethane	58	59	0.52	µg/L	1.71
PIN12-0554C	PIN24-0506	1,1-Dichloroethylene	3.8	3.4	0.45	µg/L	11.11
PIN12-0554C	PIN24-0506	cis-1,2-Dichloroethylene	16	15	0.65	µg/L	6.45
PIN12-0554C	PIN24-0506	trans-1,2-Dichloroethylene	2.9	3.1	0.44	µg/L	6.67
PIN12-0554C	PIN24-0506	Vinyl chloride	72	67	0.5	µg/L	7.19
PIN12-0530	PIN24-0500	1,1-Dichloroethylene	6.2	3.1	0.45	µg/L	66.67
PIN12-0530	PIN24-0500	cis-1,2-Dichloroethylene	110	51	0.65	µg/L	73.29
PIN12-0530	PIN24-0500	Vinyl chloride	20	8.7	0.5	µg/L	78.75
PIN12-0540	PIN24-0501	Vinyl chloride	25	21	0.5	µg/L	17.39
PIN15-0506	PIN24-0507	Iron	1.6	1.6	0.05	mg/L	0
PIN15-0520	PIN24-0508	Iron	1.7	1.8	0.05	mg/L	5.71
PIN15-0559	PIN24-0509	Aluminum	1.5	1.4	0.05	mg/L	6.90

MDL = method detection limit