Geomatrix

December 17, 2007
Project 9464.002

Robin Harrover, Hazardous Waste Specialist
Washington State Department of Ecology
Hazardous Waste and Toxics Reduction
Northwest Regional Office
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Bellevue, Washington 98008-5452

Subject: Final Remedial Investigation Report
PSC Kent Facility
Kent, Washington
WAD991281767

Dear Ms. Harrover:

Enclosed is the Final Remedial Investigation (RI) Report for the PSC Kent Facility. Geomatrix Consultants, Inc. (Geomatrix), prepared the report and following letter on behalf of Philip Services Corporation (PSC). PSC submitted a Draft Remedial Investigation Report (Draft RI) to the Washington State Department of Ecology (Ecology) on March 31, 2004. Ecology issued a letter with review and comment on the Draft RI to PSC on February 13, 2007. PSC and Geomatrix discussed the comments with Ecology in a meeting on March 7, 2007, to resolve issues outlined in the comments related to the Final RI Report. Subsequent to the meeting with Ecology, PSC submitted a work plan (Additional RI Work Plan [Geomatrix, 2007]) to Ecology in April 2007 outlining additional site characterization studies to address data gaps raised by Ecology in their comments. The work plan was approved by Ecology in a letter dated May 11, 2007. The field work was completed during summer and fall 2007, along with additional groundwater monitoring.

Geomatrix has updated the enclosed Final RI Report to incorporate the information collected during the recent field work, to incorporate the last three years of monitoring data, and to address Ecology's comments.

This letter presents the response to Ecology's comments agreed to in the meeting on March 7, 2007. Ecology's specific requests are listed below followed by our response in italics.

Response to Comments and Requests

Request 1. Please outline the facility location on each of the Historical Aerial Photographs in Appendix 2A.

Appendix 2A of the Final RI has been amended.

Request 2. To clarify what the concentrations of pesticides are in soils in the transfer yard, include a proposed work plan in the Final RI Report to conduct sampling of native soils in the transfer yard for the pesticides listed above. Ecology will consider a proposal for non-composite samples. Include a schedule in the proposed work plan with dates for completion of the sampling and analysis by August 2007, completion of the evaluation, and submittal of the Supplement to the Final RI Report.

Geomatrix installed four direct push borings GP-1 to GP-4 in the transfer yard in June 2007 and discretely sampled native soils for pesticides, as proposed in Additional RI Work Plan (Geomatrix, 2007) submitted to and approved by Ecology. The results of this investigation are included and discussed in the Final RI Report, Section 6.3.3.3.

Request 3. To provide groundwater data for pesticides, include in the Final RI Report a proposed work plan to conduct two quarters of groundwater sampling and analysis of MW-131-I for the pesticides identified as Contaminants of Possible Concern (COPCs). Provide the results of sampling and analysis and an evaluation of these results to Ecology in a supplement to the Final RI Report. Include a schedule in the proposed work plan with dates for the sampling and analysis, completion of the evaluation, and submittal of the Supplement to the Final RI Report.

In April 2007, PSC added pesticides to the suite of analytes analyzed at MW-131-I, as proposed in the Additional RI Work Plan (Geomatrix, 2007) submitted to and approved by Ecology. This well has been sampled for pesticides during the second and third quarters of 2007. The results of the analyses are included and discussed in the Final RI Report. In Ecology's letter approval of the Additional RI Work Plan dated May 11, 2007, Ecology requested that PSC continue quarterly monitoring for pesticides at MW-131-I until Ecology has reviewed and approved the Final RI Report. PSC will continue quarterly monitoring for pesticides at this well.

Request 4. Ecology still finds that a well east of the Philip Kent facility is needed to help define the eastern extent of contamination that may be migrating beyond the facility boundaries. Please re-evaluate the proposed well location to determine where it will be possible to install the well, MW-129. Since the shallow aquifer is frequently unable to be sampled due to under-saturated conditions, consider installing this well in the intermediate aquifer.

In the Final RI Report, submit a work plan for the new proposed well location for Ecology approval. The work plan should propose a date for installing MW-129.

In a supplemental report to the Final RI Report, provide two quarters of monitoring results and evaluate the results of sampling and analysis for the analytes listed in Attachment B to the Resource Conservation and Recovery Act (RCRA) Permit.

In June 2007, PSC installed MW-129-I in the intermediate aquifer to the east of the facility, as proposed in the Ecology-approved Additional RI Work Plan (Geomatrix, 2007). This well has been sampled starting in the 3rd quarter of 2007. The results of the analyses are included and discussed in the Final RI Report. In Ecology's May 11, 2007, letter approval of the Additional RI Work Plan, Ecology requested that PSC continue quarterly monitoring at MW-129-I until Ecology has reviewed the Final RI Report. PSC will continue quarterly monitoring at this well. In the May 2007 letter, Ecology also requested that pesticides (Method 8081 low level and 8141) be added to the suite of analytes for MW-129-I in order to cover the possible migration of pesticides from the northeastern quadrant of the facility off site to the northeast. MW-129-I will be analyzed for pesticides on a quarterly basis from the 3rd quarter 2007 onward.

Request 5. The report states, "The apparent groundwater mound was likely the result of surface water leaking into MW-6."

Ecology points out that former Tank T3A, a wastewater storage tank, was recognized as leaking in July 1993. At that time, Burlington Environmental Inc. made the determination and reported it to Ecology. The leak was identified due to unaccounted for changes in the wastewater levels within the tank. The tank was removed and scrapped in 1994. The release from this tank, which was within 20 to 30 feet of MW-6, was likely to be a significant contributor to the observed groundwater mound.

Incorporate the information from the previous paragraph into the Final RI Report along with the hypothesis Philip Kent has given in the Draft RI Report for the cause of the groundwater mound near former Monitoring Well MW-6.

Section 4.8 has been amended to incorporate this hypothesis.

Request 6. NOTE: The MTCA regulations specify in WAC 173-340 that "ground water shall be classified as potable to protect drinking water beneficial uses" unless certain criteria listed in the regulation can be demonstrated. Philip Kent included a section in the Draft RI Report to make this demonstration for the aquifer underneath the Philip Kent facility.

Item 5 presents Ecology's comments with regard to Philip's groundwater beneficial use demonstration. Ecology's response regarding the groundwater beneficial use demonstration is given at the end of Item 5.

Incorporate Ecology's comments and determinations from Item 5 below into the relevant sections of the Final RI Report, and include Ecology's beneficial use determinations in the preparation of the Feasibility Study.

Section 5.1.3 has been amended to incorporate Ecology's comments and determinations. Background values for arsenic in groundwater are no longer used in calculating arsenic screening levels. The beneficial use of the shallow water-bearing unit and intermediate aquifer is protection of surface water. Protection of groundwater as a drinking water source is the highest beneficial use for groundwater in the deep aquifer of the PSC Kent Facility.

Request 7. An exposure point, in addition to those currently identified in the RI Report, is groundwater that has migrated from the site to current or future public or private municipal water supply wells.

Add this exposure point to the list of exposure points identified at the Kent facility in the Final RI Report.

Section 5.1.5.3 has been amended to identify this potential exposure point.

Request 8. Please discuss the pathway described above in Section 5.1.5.5 and add it to the diagram in Figure 5.1 of the Draft RI Report and incorporate this into the Final RI Report.

Section 5.1.5.5 and Figure 5.1 have been amended to include this pathway.

Request 9. For the Final RI Report, identify all detected constituents in soil and groundwater in separate tables, one for detected soil constituents and one for detected groundwater constituents. This request is for a list of the names of the constituents rather than the detected values for those constituents.

Detected constituents in soil and groundwater are listed in Tables 5-6 and 5-7, respectively.

Request 10. For the Final RI Report, update Tables 5-2 and 5-4 from the Draft RI Report with screening levels for constituents that now have risk-based cleanup levels available. For constituents with "no risk- based cleanup levels available," indicate on Tables 5-2 and 5-4 whether each of these constituents is detected in the soil or groundwater and what screening levels are proposed for these constituents.

Draft RI Tables 5-2 and 5-4 have been replaced by Final RI Tables 5-3 and 5-5. Cleanup levels are now current with Ecology's Cleanup Levels and Risk Calculation (CLARC) website, and incorporate practical quantitation limits (PQLs). All constituents now have risk-based cleanup levels available. A discussion of how the screening levels were developed is provided in Section 5.0 of the Final RI Report.

Request 11. Please check the values for constituents in Table 5-4, from the Draft RI Report, against current MTCA Method B standard formula values for carcinogens and non-carcinogens and submit a revised Table 5-4 in the Final RI Report using the updated MTCA Method B results to establish new groundwater screening levels.

Where needed, revise Table 5-3, from the Draft RI Report, using the updated groundwater screening levels for calculating updated soil screening levels and submit this revised table in the Final RI Report

And finally, revise Section 6 of the Draft RI Report, where needed, to reflect the new screening levels and incorporate this revised section (including revised figures) into the Final RI Report.

Draft RI Tables 5-3 and 5-4 have been replaced by Final RI Tables 5-4 and 5-5. Cleanup levels are now current with the CLARC website, and incorporate PQLs. Section 6 has been revised where needed to reflect the new screening levels. All tables, figures, and appendices that showed screening levels have been updated to reflect changes.

Request 12. Submit a data report that documents all values above the detection level for each sample analysis included in the RI Report, Volume II, Appendix 6A. In other words, the detection level and all detected values of a constituent shall be reported and tabulated in the data report. Please submit the data using the same format as Tables C-I, C-2, C-3, and C-4 in the Soil Analysis Report, March 2002. Insert a column for reporting the PQL of the constituent analysis.

New Appendix 6G includes soil results values above detection level for each analysis included in Appendix 6A. A column was added for the PQL.

Request 13. Submit to Ecology both a hard copy and an electronic copy of the data report, described above in Request 12. Submit the data report as an Appendix to the Final RI Report. Also, revise and re submit this data report to include the additional data collected for the Supplemental Report to the Final RI Report.

Appendix 6G has been updated with results through the third quarter 2007 monitoring, and is included in two formats – hard copy and electronic copy (CD).

Request 14. From the Draft RI Report for the Final RI Report, update and re-submit Figures 6-1 through 6-22, as needed, to incorporate values above the detection level that were previously documented only to a reporting level with a value higher than the detection level.

Figures 6-1 to 6-22 have been updated with soil results from GP-1 to GP-4. In addition, where available, values between the reporting limit and detection limit have been posted on the figures, whereas before they were posted as being not detected above the reporting limit. This changed Figures 6-2 (methylene chloride), 6-4 (benzo(a)pyrene), 6-5 (benzo(b)fluoranthene), 6-6 (benzo(k)fluoranthene), 6-8 (chrysene), 6-9 (naphthalene), 6-18 (cadmium), 6-20 (mercury), 6-21 (gasoline), and 6-22 (diesel) slightly.

Request 15. In the Final RI Report, submit a data report that documents all values above the detection level for groundwater sample analyses included in the Draft RI Report, Volume II, Appendix 6B. The detection level and all detected values of a constituent shall be reported and tabulated in the data report. Please sort the data report by analyte. After sorting the data by analyte, sort each analyte by sample location listing the sample location generally from north to south. Keep a column for reporting the PQL of the constituent analysis.

New Appendix 6H includes groundwater results values above the detection level for each analysis included in Appendix 6B. A column was added for the PQL.

Request 16. Submit to Ecology both a hard copy and an electronic copy of the data report described above in Request 15.

Appendix 6H is included in two formats – hard copy and electronic copy (CD).

Request 17. In addition to the groundwater representations described in the comments above, which are already in the Draft RI Report, submit 3-dimensional drawings (fence diagrams) with contours shown in cross-section of the maximum detected sample results for each well of the current monitoring well system. Use the mid-point of the well screen as the location for the sample result and contour the diagram using the values plotted for all the wells. Prepare at least one fence diagram for each of the following constituents: Benzene, Arsenic, 1,1-Dichloroethane, Hexavalent Chromium, Trichloroethylene, Cyanide, Vinyl Chloride, Lead, Pentachlorophenol, and Diesel.

For each fence diagram, be sure to include each and every well in the monitoring system (combining all shallow, intermediate, and deep wells together in the same fence diagram), even if analytical results were below the detection limit for the constituent in that well. Include representation of the subsurface soil horizons. The diagram may be divided into different views, or portions (not to exceed 2), if there is too much information to represent on one drawing.

Ecology realizes that for each constituent the maximum values from each well sampled will possibly be from different sampling events. Therefore, these diagrams are not meant to represent actual conditions at a point in time. They are intended to conservatively display the potential magnitude and extent of contamination for each constituent and provide additional input to the conceptual model of where each contaminant is present in the subsurface relative to the subsurface geology underneath the facility.

Three-dimensional (3-D) fence diagrams for the above constituents have been prepared and included in the Final RI Report. The diagrams also show subsurface geology.

Request 18. Add the parameter, Hexavalent Chromium, back to the list of parameters for which groundwater is being analyzed, as defined by the RCRA Permit, Attachment B. Include the results of two quarters of well system groundwater monitoring for Hexavalent Chromium in the Supplemental Report to the Final RI Report.

In April 2007, PSC added hexavalent chromium to the list of parameters for which groundwater is being analyzed, as proposed in the Ecology-approved Additional RI Work Plan (Geomatrix, 2007). All current groundwater system wells have been sampled for hexavalent chromium during the second and third quarters, 2007. The results of the analyses are included and discussed in the Final RI Report. In Ecology's May 11, 2007, letter approving the Additional RI Work Plan, Ecology requested that PSC continue quarterly monitoring for hexavalent chromium until Ecology has reviewed the Final RI Report. PSC will continue quarterly monitoring for hexavalent chromium.

In the process of updating the RI Report, which included calculation of new screening levels and evaluating 4 years of the most recent additional quarterly groundwater monitoring data, Geomatrix determined that several COPCs identified in the Draft RI Report are no longer found to be present in groundwater above the site screening levels and therefore are no longer considered COPCs for groundwater. These constituents are acetone, methylene chloride, tetrachloroethene, 2,6-dinitrotoluene, 3,3-dichlorobenzidine, bis(2-chloroethyl) ether, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, n-nitrosodipropylamine, pentachlorophenol, diesel range organics, and lube oil range organics. Several constituents not identified in the Draft RI Report as COPCs in groundwater have been found to exceed the updated RI screening levels and are, therefore, included as COPCs. The new COPCs are 1,1-dichloroethene, methyl tert-butyl ether, chrysene, 4,4'-DDD, iron, and manganese.

Calculation of new screening levels also meant that the following COPCs were removed for soil: Aroclor 1254, Alachlor, and Aldrin. The following COPCs were added for soil: p-isopropyltoluene, sec-butylbenzene, 2-methylnaphthalene, Coumaphos, delta-BHC, endosulfan sulfate, cyanide, selenium, silver, and zinc. The Final RI Report has been updated to include discussion of these COPCs.

If you have any questions or require additional information, please do not hesitate to call either of the undersigned at (206) 342-1760.

Sincerely yours,
GEOMATRIX CONSULTANTS, INC.

Zanna Satterwhite, LG
Project Geologist

Gary Dupuy, LG, LHG
Principal Hydrogeologist

Enclosure
Revised Remedial Investigation Report

cc: Lou LaRosa, PSC

Final Remedial Investigation Report

PSC Kent Facility

Kent, Washington

Prepared for:

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December 2007

Project No. 9464

Geomatrix

FINAL REMEDIAL INVESTIGATION REPORT

PSC Kent Facility
Kent, Washington

December 17, 2007
Project 9464

This report was prepared by the staff of Geomatrix Consultants, Inc., under the supervision of the Geologist whose seal and signature appear hereon.

The findings, recommendations, specifications, or professional opinions are presented within the limits described by the client, in accordance with generally accepted professional engineering and geologic practice. No warranty is expressed or implied.

2568

ZANNA A. SATTERWHITE 12/17/07

Zanna Satterwhite
Licensed Geologist #2568
Expiration Date: May 4, 2008

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ACRONYMS & ABBREVIATIONS

µg/l	Micrograms per liter
ADL	Arthur D. Little
AOCs	Areas of Concern
ASTDR	Agency for Toxic Substances and Disease Registry
ARARs	applicable or relevant and appropriate requirements
1,1-DCE	1,1-dichloroethene
1,2-DCE	cis- and trans-1,2-dichloroethene
AST	aboveground storage tank
ASTM	American Society for Testing Materials
b.p.	Boiling point
BEI	Burlington Environmental, Inc.
bgs	Below the ground surface
BNA	Base neutral acids
BTEX	Benzene, toluene, ethylbenzene and xylenes
CD	Compact disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	Cubic feet per second
Chempro	Chemical Processors, Inc.
cis-1,2-DCE	cis-1,2-dichloroethene
CLARC	Cleanup Levels and Risk Calculation
cm/s	Centimeters per second
CO_2	Carbon dioxide
COPC	Chemicals of potential concern
CSM	conceptual site model
CSCSL	Ecology Confirmed and Suspected Contaminated Sites List
CSM	Conceptual Site Model
DCA	Dichloroethane
1,1-DCE	1,1-dichloroethene
DOH	Washington State Department of Health
DTW	Depth to water
Ecology	Washington State Department of Ecology
EDR	Environmental Data Resources, Inc.
EP	Extraction procedure (toxicity test)
EPA	U.S. Environmental Protection Agency
EPH	Extractable petroleum hydrocarbons
Facility	PSC Kent Facility
FS	Feasibility Study
GC	Gas chromatograph
GC/MS	Gas chromatrography/mass spectrometry
Geomatrix	Geomatrix Consultants, Inc.

ACRONYMS & ABBREVIATIONS
(Continued)

GRO	Gasoline-range organics
HPAH	Heavy polycyclic aromatic hydrocarbons
HSWA	Hazardous and Solid Waste Amendments
LCS	Laboratory control spike
LQGs	large quantity generators
LPAH	Light polycyclic aromatic hydrocarbons
LRO	Lube oil range organics
LUST	Leaking underground storage tanks
MCL	Maximum contaminant level
MDL	Method detection limit
mg/kg	Milligram per kilogram
mg/L	Milligrams per liter
MIBK	Methyl isobutyl ketone
MP	Measuring point
MQO	Method quality objective
MRL	Method reporting limit
MS/MSD	Matrix spike/matrix spike duplicate
MSL	Mean sea level
MTBE	Methyl tert-butyl ether
MTCA	Model Toxics control Act
MV	Millivolts
NAPL	Nonaqueous phase liquid
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRWQC	National Recommended Water Quality Criteria (for Priority and Non Priority Toxic Pollutants)
O&M	Operation and maintenance
ORP	Oxidation reduction potential
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PCE	Tetrachloroethene
PID	Photoionization detector
POTW	Publicly owned treatment works
ppb	Parts per billion
ppbv	Parts per billion by volume
PPE	Personal protective equipment
ppm	Parts per million
PQL	Practical Quantitation Limit
PRG	Preliminary remediation goal
PSC	Philip Services Corporation
PVC	Poly vinyl chloride

ACRONYMS & ABBREVIATIONS
(Continued)

RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RCW	Revised Code of Washington
Redox	Reduction/oxidation
RFI	RCRA Facility Investigation
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RO	Reverse osmosis
RPD	Relative percent difference
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SEE	Sweet-Edwards/EMCON
SIM	Selective ion monitoring
SOP	Standard operating procedure
SPU	Seattle Public Utilities
SQGs	small-quantity generators
SVE	Soil vapor extraction
SVOC	Semivolatile organic compounds
SWMU	Solid Waste Management Unit
TCA	Trichloroethane
TCE	Trichloroethene
TCLP	Toxicity characteristic leaching procedure
THC	Total hydrocarbons
TMB	Trimethylbenzene
TPH	Total petroleum hydrocarbon
TSD	Treatment, storage or disposal
UCL	Upper confidence limit
USC	United States Code
USGS	U.S. Geological Survey
UST	Underground storage tank
UV	Ultraviolet
VOC	Volatile organic compound
VPH	Volatile petroleum hydrocarbons
WAC	Washington Administrative Code
WDOH	Washington State Department of Health
WSDOT	Washington State Department of Transportation

FINAL REMEDIAL INVESTIGATION REPORT

PSC Kent Facility
Kent, Washington

1.0 INTRODUCTION

Philip Services Corporation (PSC) owns and operates a Resource Conservation and Recovery Act (RCRA) permitted hazardous waste treatment, storage, and disposal (TSD) facility at 20245 77th Avenue South in Kent, Washington. PSC has conducted a Remedial Investigation at the Kent facility and the results of this investigation are summarized in this report. The investigation was conducted and the report prepared following requirements outlined in the facility's RCRA Part B operating permit.

1.1 BACKGROUND

In December 1989, the U.S. Environmental Protection Agency (EPA) issued a RCRA 3013 order requiring investigation of the nature and extent of soil and groundwater contamination. The requirements of this order were fulfilled in 1991 by the completion of a RCRA Facility Investigation (RFI) (SEE, 1991). In August 1998, the facility's current Part B Permit (WAD 991 281 767) was issued jointly by EPA and the Washington Department of Ecology (Ecology) (Ecology, 1998). Part VII of the RCRA Part B permit outlines specific requirements relating to corrective action at the facility. EPA has granted Ecology primacy for RCRA, allowing Ecology to enforce RCRA corrective actions under the Washington State Dangerous Waste Regulations (WAC 173-303), which incorporate the state's Model Toxics Control Act (MTCA) regulations (WAC 173-340) by reference. Consequently, Ecology is currently overseeing the corrective actions process at the PSC Kent facility. Although the same basic process is followed under both regulations, the terminology within MTCA regulations differs from that in the federal RCRA regulations. For example, the RCRA facility investigation under MTCA is referred to as a Remedial Investigation (RI).

Environmental investigations have been conducted at the facility under the 3013 order and the Part B permit since 1989. The results of these investigations are presented in this report together with a characterization of the nature and extent of contamination at the facility. Following Ecology review and approval, the results of this report will allow PSC to proceed to the next phase of the corrective action process, the feasibility study (FS). The options for final remedies at the facility will be presented in the FS report, and Ecology will select the final remedy after soliciting input from the public.

1.2 OBJECTIVES OF THE REMEDIAL INVESTIGATION

As outlined in the Work Plan for Remedial Investigation (PSC, 1999a), the objectives of the RI are to characterize the site-specific geology, hydrogeology and possible subsurface contamination, building on the results of previously conducted environmental investigations, and to collect sufficient data for planning and implementing possible interim measures and/or corrective measures.

1.3 ORGANIZATION AND SCOPE OF THE REMEDIAL INVESTIGATION REPORT

The RI report for the PSC Kent facility is organized to include the following elements:

- Section 2: site description, including a history of the PSC Kent property
- Section 3: description of investigative activities
- Section 4: geological and hydrogeological characterization
- Section 5: conceptual site model and identification of screening levels
- Section 6: nature and extent of contamination
- Section 7: conclusions
- Section 8: modifications to permit attachments
- Section 9: references

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The PSC Kent facility is located at 20245 77th Avenue South, Kent, in King County, Washington in the SE 1/4 of Section 1, Township 22 North, Range 4 East. The Kent facility lies within the Green River valley about 2 miles north of downtown Kent and about 4 miles south of the City of Renton. The site location is shown in Figure 2-1. The site and surrounding area are zoned for general industrial land use by the City of Kent (City of Kent, 2002).

2.1.1 Facility Layout

The PSC Kent property, referred to in this report as the "site", is located on a 6.25-acre parcel of land that can be divided into two areas, the waste management facility and the hazardous waste transfer yard, as shown in Figure 2-2. The RCRA-regulated waste management facility, herein referred to as "the facility," operates on the eastern 3 acres of the property. The facility consists of an office, a process containment building, container storage areas, a tank farm consisting of 35 aboveground storage tanks, and a treatment and stabilization building. Container storage areas include the north and south container storage pads and the process containment building, which has storage areas for flammable waste, laboratory packs, and household waste. Existing facility operations include wastewater treatment, stabilization/solidification, labpacking, lab-scale treatment, and waste processing (e.g., consolidation, can crushing, shredding, baling, etc.).

The surface of the facility is entirely covered by asphalt or concrete. The facility is surrounded by an earthen berm constructed about 2 feet above the lot elevation to retain spills and rainwater falling within the facility area. Rainwater falling within the facility area is collected in an underground drainage system and, if necessary, directed to an oil-water separator located on the northwest corner of the property. Stormwater is treated on site and discharged to the King County publicly owned treatment works (POTW) (SEE, 1990).

A 10-day Washington State Department of Transportation (WSDOT) hazardous waste transfer yard is located on the remaining 3.25 acres of the property. The transfer yard was constructed in 2001 and includes concrete pads and containment for transfer trailers and roll-off boxes, a fully lined stormwater retention pond, and a bio-filtration swale. The swale drains to a drainage ditch running along the northern edge of the property. Flow through the ditch is diverted into a culvert along the northern edge of the facility.

A 6-foot-high chain-link fence restricts access to the property. A similar fence surrounds the stormwater containment pond on the western half of the property.

2.1.2 Surrounding Area

The site and the area surrounding the site are zoned as M3, for general industrial land use (City of Kent, 2002). South of the property beyond 206th Street, at 20609 77th Avenue South, is Central Pre-Mix Inc. Sawdust Supply, a landscaping materials provider owned by Milan G. Moss. Mutual Building Materials, a manufacturer of concrete blocks and products, is located to the west of the PSC property. The eastern boundary of the facility is 77th Avenue South, across which lie the Burlington Northern railroad tracks. Colonial Cedar Company, Inc., lies east of the railroad tracks at 7800 South 206th Street.

The PSC Kent facility is located in a heavily industrial area of the city. A number of current and former chemical handlers are located within a 1-mile radius of the facility (EDR, 2003):

- Two active and four former Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites
- 12 large-quantity generators (LQGs)
- 129 small-quantity generators (SQGs) listed on the Resource Conservation and Recovery Information System (RCRIS)
- 19 sites on Ecology's Confirmed and Suspected Contaminated Sites List (CSCSL)
- 21 leaking underground storage tank (LUST) sites
- 10 sites that have undergone voluntary remediation.

These sites are summarized in Table 2-1 and their locations are depicted on Figure 2-3.

2.2 SITE HISTORY

Historical aerial photographs (Appendix 2A) show that land use at the PSC Kent property and in the surrounding area was primarily agricultural during the first half of the 20th century. The facility is outlined on the aerial photographs included in Appendix 2A. A 1936 aerial photograph shows three buildings that appear to resemble residential and farm structures (e.g., a barn or greenhouse) at the southern end of the eastern 3 acres of the PSC Kent property. The 1936 photograph also shows wheat-type agricultural crop activity occurring on the remainder of the facility property. A 1946 aerial photograph shows no changes in land use (SEE, 1990).

In a 1960 aerial photograph, industrial activities are apparent within approximately 1 mile of the PSC Kent property. Increasing expansion of industrial land use is evident in a 1974 aerial photograph, but the future facility area remains agricultural, with the same buildings intact. The 1974 aerial photograph shows on-site drainage patterns and irrigation ditches on the 6.25-acre property, including a small irrigation pond (approximately 20 feet in diameter) in the northwest corner of the property (Earth Consultants, 1980). A concrete block greenhouse structure and an irrigation system located in the southern half of the property prior to facility construction have also been described (Earth Consultants, 1980), indicating that land use prior to the construction of the facility was for agricultural and residential purposes only. The review of aerial photographs indicates that by 1980, the 6.25-acre property was cleared of all buildings and crops and appears to have been filled and regraded prior to facility construction (SEE, 1990). Historical aerial photos and topographic maps are presented in Appendix 2A.

2.2.1 Facility Operational History

In late 1980, Crosby and Overton, Inc., began developing the site as a commercial treatment and storage facility for oily wastewater. At that time, the process containment building and a treatment building were constructed, and the aboveground tank systems were installed. Prior to operational start-up in April 1981, the site property was paved with asphalt in traffic areas and with concrete in loading/unloading and containment areas (SAIC, 1996). Hazardous waste management activities at the facility included the processing and treatment of acids, caustics, oily wastes, phenols, cyanide wastes, sludges, and aqueous metal-bearing wastes. In addition, the facility has been used for the commercial storage and transfer of polychlorinated biphenyl (PCB) contaminated materials in a designated area of the enclosed process containment building since 1985. Construction of the present stabilization building was completed in November 1988.

Chemical Processors, Inc. (Chempro), a majority owned subsidiary of Burlington Resources, Inc., acquired the Kent facility from Crosby and Overton, Inc., in October of 1989. Chempro continued to operate the Kent facility as a storage and treatment facility for hazardous wastes. Metal containment pans were used as secondary containment in the current north and south container storage areas until October 1990, when the current configuration was constructed (Chempro, 1990).

Until December 1988, the facility sent overflow stormwater from the truck unloading area and drum storage area into the ditch along the northern edge of the property. In December 1988, a closed-loop storm-water system was created, directing stormwater to an oil/water separator and to a wastewater treatment system.

One 10,000-gallon gasoline underground storage tank (UST), one 10,000-gallon diesel UST, and one 5,000-gallon gasoline UST were removed from the area of the current north and south container storage pads in January 1991. There appeared to be a leaking joint in the sump piping that ran through the tank pit. Approximately 705 cubic yards of contaminated soil was removed from the excavation. Confirmation sampling showed no residual contamination, and the excavation was back-filled with clean sand and gravel fill (Chempro, 1991).

In 1991, the owner of the property to the north, Milan G. Moss, installed a culvert and filled in the ditch along the northeastern portion of the ditch that is on Mr. Moss's property. The ditch remains unlined along the northern edge of the western parcel of the PSC property.

In January 1992, Chempro changed its name to Burlington Environmental, Inc. (BEI). In December 1993, Philip Environmental, Inc., a Canadian company, purchased BEI. In August 1997, Philip Environmental merged with two other publicly traded companies to form Philip Services Corp. In 1999, Philip Services Corp. reorganized under Chapter 11 bankruptcy and emerged from the financial restructuring in 2000 as Philip Services Corporation. Philip Services Corporation filed Chapter 11 bankruptcy on June 2, 2003, in Houston, Texas. Philip Services Corporation emerged from the financial restructuring on December 31, 2003. The ownership of the Kent Facility has not changed in any of the corporate acquisitions, mergers, or reorganization of the Philip parent company. Currently, BEI continues to be the legal owner of the facility and a wholly owned subsidiary of Philip Services Corporation.

In March 1996, a fire occurred in the stabilization pit; in May 1996, another fire occurred in the shredder resulting from chromic acids solids. No releases to soil or groundwater at the site resulted from these fires.

In late 2001, upgrades were made to the western parcel as part of the construction of a 10-day transfer yard. These upgrades included pavement of most of the western parcel, and a fully lined stormwater containment pond, and bio-filtration swale. The pond accepts stormwater runoff from the 10-day transfer yard.

No changes relating to the operational history of the site have occurred since 2001.

2.2.2 Regulatory History

The regulatory history of the facility began in August 1980 when Crosby and Overton submitted a Notification of Hazardous Waste Activity form identifying the facility as a TSD facility. In November 1980, Crosby and Overton submitted a RCRA Part A permit application and was granted interim status as a hazardous waste TSD facility. In November 1988, Crosby and Overton, Inc., submitted a RCRA Part B permit application to become a permitted TSD facility.

In December 1989, a 3013 Order was issued for the Kent facility under RCRA (EPA, 1989b). This order required that a proposal be submitted to determine the nature and extent of soil and groundwater contamination from the release of hazardous waste and/or hazardous constituents at and/or from the facility. Completion of an RFI in early 1990 and the submittal of the final report in April 1991 satisfied the conditions of the 3013 Order.

EPA completed a RCRA facility assessment (RFA) between 1993 and 1996 (SAIC, 1996) in preparation for issuing the Hazardous and Solid Waste Amendments (HSWA) 3004 section of the RCRA Part B operating permit. In September 1998, EPA and Ecology jointly issued the final RCRA TSD Part B permit (the permit) to PSC for the Kent facility (Ecology, 1998). The permit became effective on September 28, 1998.

The solid waste management units (SWMUs) and areas of concern (AOCs) for the facility were identified during two RCRA RFAs conducted in 1988 (TetraTech, 1988) and 1996 (SAIC, 1996). During permit negotiations between PSC and Ecology, a majority of the SWMUs were consolidated into four AOCs:

- AOC 1–Former USTs
- AOC 2–Tank Farm
- AOC 3–Stabilization Area
- AOC 4–Stormwater Drainage System

The locations of these AOCs are presented in Figure 2-2. AOC No. 1 consisted of three USTs (16,000-gallon gasoline, 10,000-gallon diesel, and 5,000-gallon gasoline), which were located between the current north and south container storage pads. AOC No. 2, the tank farm, is located in the northeastern corner of the property and consists of aboveground storage tank (AST) units containing petroleum products, various solvents, caustics, and treatment operations. The ASTs are located within containment structures. AOC No. 3, the stabilization area, is located south of the tank farm and consists of a concrete-lined pit. The area also includes tanks T-5305, T-5306, and T-5307. AOC No. 4 includes the site's stormwater drainage system, the associated catch basins and sumps, underground piping, and the formerly exposed ditch on the north side of the facility. A detailed description of each SWMU is presented in Appendix 8C.

Several modifications to the corrective action section of the facility's operating permit have been made since the permit was issued in 1998. These modifications include the following:

- Permit modification KTMOD 7-1 which revises the procedures for decommissioning monitoring wells was approved by Ecology on April 7, 2003. A public notice was sent on May 8, 2003.
- On April 7, 2003, Ecology pre-approved permit modification KTMOD 9-11 which removes polychlorinated biphenyls (PCBs) and all inorganic constituents with the exception of arsenic from the groundwater monitoring analyte list permit specified in Attachment B of the facility's Part B Permit. PSC submitted this modification on April 11, 2003. A public notice was sent on May 8, 2003.
- On April 7, 2003, Ecology also pre-approved permit modification KTMOD 10-11 which changes the corrective action schedule to postpone a pumping test until the Feasibility Study, if necessary, and to change the due date of the Draft Remedial Investigation Report to April 1, 2004. PSC submitted this modification on May 9, 2003 and a public notice was sent on May 13, 2003.
- On May 11, 2007, Ecology approved permit modification KTMOD 22-1 which extended the due date of the Final Remedial Investigation Report from March 13, 2007, to December 15, 2007. PSC submitted this request on March 7, 2007, and a public notice was sent on June 18, 2007.

2.3 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

A number of environmental investigations have been conducted at the site as part of the RCRA permitting process and in response to the RCRA 3013 order. These investigations and resulting reports are summarized briefly below. The investigations conducted as part of the remedial investigation are discussed in subsequent sections of this report.

- **Final Report, RCRA Facility Assessment (RFA), Crosby & Overton, Inc., Kent Washington. (Tetra Tech, July 1988):** This report combines the findings of the Preliminary Review (PR) and Visual Site Inspection (VSI) of the RFA. The investigations concluded that the facility was being operated in an environmentally responsible manner and that there is no direct evidence of any significant releases from waste management units.

- **Revised Kent Facility Solid Waste Management Unit Report (Chemical Processors, Inc., December 1990):** This report was prepared in response to an EPA request for information regarding potential releases of hazardous waste or hazardous constituents from any existing or closed solid waste management units. Twelve closed SWMUs and seven known releases were identified. Only two of the identified releases, the piping joint failure discovered in January 1988, and the potential releases to the drainage ditch, are likely to have potentially impacted soil and/or groundwater.

- **Sampling and Analysis Report on a Commercial Hazardous Waste Management Facility in Kent Washington (Arthur D. Little, January 1989):** Groundwater, soil, sediment and surface water samples were collected from the facility to determine the nature and extent of contamination and the need for further examination.

- **Report on Groundwater Sampling Study Done at Crosby and Overton's Kent Plant Two, 20245 76th Avenue South, Kent WA (Crosby & Overton Inc., April 1989):** Five monitoring wells, MW-1 through MW-5, were installed and sampled. Groundwater samples were analyzed for volatile organic compounds (VOCs), acid/base/neutral extractable compounds (BNAs), pesticides, PCBs, and metals. Although the highest concentrations were detected at MW-3, analytical results for all wells were below applicable USEPA drinking water standards.

- **Environmental Assessment, Crosby & Overton Kent Facility (Sweet-Edwards/EMCON Inc., August 1989):** Seven new monitoring wells, MW-7S and -7D through MW-12, were installed. Groundwater samples were collected from six existing wells (MW-1 through MW-6), seven new wells and two temporary borings, T-1 and T-2. Samples were analyzed for VOCs, BNAs, pesticides, PCBs, and total and dissolved metals. Acetone, BTEX, chlorinated solvent compounds, polyaromatic hydrocarbons (PAHs) and phthalates, and at low concentrations, metals and pesticides, were detected in groundwater at the facility. The higher concentrations were detected in the northern part of the facility near the tank farm where an oily sheen was observed on the groundwater. Analytical results from MW-8 through MW-10 near the USTs suggest that the USTs had not leaked. A groundwater mound near MW-6 was noted. Phenols, PAHs, VOCs and metals were detected in surface water in the drainage ditch.

- **Report on Removal of USTs at Chempro Kent Facility (Chemical Processors, Inc., January 1991):** One 10,000-gallon gasoline UST, one 10,000-gallon diesel UST and one 5,000-gallon gasoline UST were removed from the area of the current north and south container storage pads in January 1991. There appeared to be a leaking joint in the sump piping that ran through the tank pit. Approximately 705 cubic yards of contaminated soil was removed from the excavation. Confirmation sampling showed no residual contamination and the excavation was back-filled with clean sand and gravel fill. Monitoring wells MW-9 and MW-10, located in the tank pit areas, were removed.

- **Chemical Processors, Inc. Kent Facility Investigation Report, Volumes 1 through IV (Sweet-Edwards/EMCON, Inc., April 1991):** This report was prepared to satisfy the RCRA 3013 order. Three shallow-aquifer monitoring wells, MW-13, MW-14, and MW-15, one shallow piezometer, PZ-1, one intermediate-aquifer monitoring well, MW-16, and two temporary borings, T-3 and T-4, were installed. Groundwater samples were collected from the new and existing monitoring wells and the temporary borings, and analyzed for VOCs, BNAs, pesticides, and total and dissolved metals. Petroleum related compounds, chlorinated solvent compounds, and metals were detected in groundwater, with the highest concentrations detected in the area underlying and to the northwest of the tank farm. Two surface water samples, W-4 and W-5, were collected from the drainage ditch, and were found to contain low concentrations of VOCs, semivolatile organic compounds (SVOCs), PCBs, and metals. Rising-head slug tests were conducted at eleven wells and there was still an apparent groundwater mound at MW-6.

- **RCRA Facility Assessment, Preliminary Review/VSI Report, Burlington Environmental, Inc., Kent Washington (SAIC, January 1996):** Another RFA was conducted at the facility between 1993 and 1996. The RFA identified 42 SWMUs and one AOC. Further investigation was recommended for 21 SWMUs and the AOC and no further action required was recommended for the remaining 21 SWMUs.

- **2000 Quarterly Corrective Action Reports (PSC, April, July, October 2000; January 2001):** Nine monitoring wells, MW-17 through MW-20, MW-22 through MW-25 and MW-24D, were installed in July 2000. MW-15 and PZ-1 were abandoned due to improper installation and to prepare for new construction, respectively. A surface water sample SW-8 was collected from the drainage ditch along the northern part of the property and a groundwater sample was collected from a temporary boring, HA-9. Benzene, xylenes, 1,1-dichloroethene (1,1-DCE), tetrachloroethene (PCE), trichloroethene (TCE), vinyl chloride, hexachlorobutadiene, bis (2-ethylhexyl) phthalate, pentachlorophenol, diesel-range total petroleum hydrocarbons (TPH) and arsenic were detected in groundwater at concentrations exceeding the most stringent of the MTCA Method A and B cleanup levels during the July sampling event.

  Monitoring wells MW-1, MW-2, MW-3, MW-12, MW-13, MW-14, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23, MW-24, and MW-25 were abandoned in November 2000 as many of these wells were fully or partially screened in the silt unit. Prior to abandonment, groundwater samples were collected from all existing wells and analyzed for VOCs, SVOCs, PCBs, TPH, and metals. 1,1-Dichloroethene, 1,4-dichlorobenzene, benzene, vinyl chloride, TPH-diesel, TPH-gasoline, TPH-lube, hexavalent chromium, arsenic, cadmium, lead and mercury were detected above applicable MTCA Method A and B in groundwater samples collected in October 2000.

- **2001 Quarterly Corrective Action Reports (PSC, April, July, October 2001; January 2002):** Sixteen monitoring wells were installed between January 29, 2001 and February 15, 2001. These include: MW-112-S, MW-123-S, and MW-118-S screened in the shallow unit; MW-102-I1, MW-113-I1, MW-114-I1, MW-118-I1, MW-120-I1, MW-124-I1, and MW-125-I1 screened in the upper part of the Intermediate unit; MW-112-I2, MW-117-I2, MW-120-I2, MW-122-I2, MW-123-I screened in the lower part of the Intermediate unit; and MW-112-D screened in the deep unit. The new wells and two existing wells, MW-16 and MW-24D, were first sampled in February 2001. Analytical results showed that benzene, vinyl chloride, 1,2-dichloroethane, nickel, arsenic, and gas and diesel range TPH exceeded applicable MTCA Method A and B cleanup levels. A stormwater pipe integrity test was conducted in March 2001. Joint failures were observed in several segments and a break in the pipe was observed in one segment.

- **2002 Quarterly Corrective Action Reports (PSC, April, July, October 2002a, January 2003):** Following the procedures outlined in the Kent Stormwater Pipeline Repair and Replacement Work Plan (PSC, 2002), pipelines D and E through the southern and eastern parking lots, respectively, were excavated and replaced in May and June 2002. Confirmatory soil samples were collected from below the old pipelines, and sent to the lab for analysis for VOCs, TPH-D, and arsenic. Pipeline F and catch basin 6 at the end of Pipeline F were cleaned and inspected using a video camera and appear to be sound. The joint failures in Pipelines A and B were repaired.

  During November 2002, several changes were made to the groundwater monitoring well network following the Addendum II to RI Work Plan (PSC, 2002b). Five monitoring wells (MW-112-I2, MW-120-I2, MW-113-I1, MW-125-I1, MW-118-S) were decommissioned on November 18, 2002. Ten monitoring wells (MW-102-S, MW-117-S, MW-122-S, MW-126-S, MW-126-I, MW-127-S, MW-128-I, MW-130-I, MW-131-I, MW-132-S) were installed at the site between November 18 and November 22, 2002. No VOCs, SVOCs, or diesel range total petroleum hydrocarbons were detected in any of the soil samples collected during the installation of the wells and the inorganic constituents that were detected were detected at concentrations below the MTCA Method B cleanup levels for industrial land use. Eight soil cores from MW-126-I, MW-131-I, and MW-128-I were submitted for geotechnical analysis for porosity, hydraulic conductivity, grainsize analysis, and organic carbon content.

  Two direct push soil borings (GP-125-I, GP-123-S) were completed in November 2002. A water sample (GP-125-I-11-15-1102) was collected for laboratory analysis for VOCs, SVOCs, PCBs, total metals, cyanide, TPH, and hexavalent chromium.

Three soil cores from GP-125-I were submitted for geotechnical analysis for porosity, hydraulic conductivity, grainsize analysis, and organic carbon content.

- **Groundwater Analysis Report (PSC, 2002d):** The Groundwater Analysis Report provided a revised interpretation of site stratigraphy, an overview of potential sources of contamination at the facility, a discussion of groundwater flow patterns, and a summary of the nature and extent of groundwater contamination at the facility. The site stratigraphy was revised, identifying a shallow water-bearing unit, a single intermediate aquifer and a deep aquifer at the facility. Several deficiencies were identified in the facility's current groundwater-monitoring network that presented obstacles to the efficient collection of representative data to adequately meet the objectives of the Remedial Investigation Report. The report included PSC's proposed strategy for addressing these deficiencies, including proposed revisions to the monitoring network and proposed methods for implementing these revisions. This proposal outlined PSC's plans to abandon five existing monitoring wells and replace them with twelve new monitoring wells, eight screened in the shallow water-bearing unit and four screened in the intermediate aquifer.

- **Soil Analysis Report (PSC, 2002c):** The Soil Analysis Report provided a summary of soil characterization efforts conducted at the facility since the late 1980s, and a summary of the nature and extent of soil contamination in each area of the site, including the former underground storage tank (UST) area, the tank farm, the stabilization area, the stormwater drainage system, and the current transfer yard area. A discussion of the suspected sources of chemicals of concern (COCs) and recommendations for additional soil characterization work were also included. Petroleum-impacted soils were detected in the tank farm area and along certain parts of the stormwater drainage system; however, the extent of these impacted areas appears to be very limited.

- **Surface Water Analysis Report (PSC, 2002e):** The Surface Water Analysis Report provided a summary of the surface water characterization efforts conducted since the late 1980s.

- **2003 Quarterly Corrective Action Reports (PSC, April, July, October 2003, January 2004):** On February 8, 2003, as part of the RI, a soil boring, GP-118-D, was completed in the deep aquifer, at a depth of 48 feet below ground surface (bgs). This work was described in the Addendum II to the Remedial Investigation Workplan. One groundwater sample (GP-118-D-36-40) was collected for laboratory analysis for VOCs, SVOCs, PCBs, total metals, cyanide, total petroleum hydrocarbons, and hexavalent chromium. Five soil cores were collected and submitted for geotechnical analysis for porosity, hydraulic conductivity, grainsize analysis, and organic carbon content.

- **Addendum to the Groundwater Analysis Report (PSC, 2004):** The Addendum to the Groundwater Analysis Report provided a re-interpretation of the site hydrostratigraphy and groundwater flow patterns. Although the intermediate aquifers had been re-interpreted as a single intermediate aquifer with discontinuous interbedded silt in 2002, more recent analysis suggests that, although these units are hydraulically connected, they should indeed be treated separately. This report also presented a site conceptual exposure model which was used to select soil and groundwater screening levels. These screening levels were used to identify chemicals of potential concern (COPCs) in soil and groundwater. A discussion of the potential fate and transport of these COPCs was also presented.

- **2004 Quarterly Corrective Action Reports (PSC, April, July, October 2004a, January 2005).** Routine quarterly groundwater monitoring with results reported to Ecology.
- **2005 Quarterly Corrective Action Reports (PSC, April, July, October 2005, January 2006).** Routine quarterly groundwater monitoring with results reported to Ecology.
- **2006 Quarterly Corrective Action Reports (PSC, April, July, October 2006, January 2007).** Routine quarterly groundwater monitoring with results reported to Ecology.
- **2007 Quarterly Corrective Action Reports (PSC, April, July, October 2007):** On June 15, 2007, as part of the RI, four soil borings, GP-1 through GP-4, were completed in the transfer yard, at a maximum depth of 8 feet bgs. This work was described in the Additional Remedial Investigation Work Plan (Geomatrix Consultants, Inc. [Geomatrix], 2007). Four soil samples were collected for laboratory analysis for pesticides. On June 15, 2007, a new monitoring well (MW-129-I) was installed at the site following the Additional RI Work Plan (Geomatrix, 2007)

2.4 KNOWN AND SUSPECTED RELEASES

A number of releases have occurred at the site since the facility began operations in 1981. While most of these releases remained within secondary containment, several resulted in the release of contamination to soil and/or groundwater at the site. These releases are summarized in this section.

Documented releases of hazardous compounds outside concrete-contained areas at the facility include the following:

- **Tank T9A waste oil overfill:** In August 1983, Tank T9A was overfilled with waste oil. The spill consisted of approximately 2,000 gallons of waste oil. The oil was contained in the tank farm site, pumped up using a vacuum truck, and returned to Tank T9A. At the time of the spill, the tank farm surface consisted of asphalt. Stained asphalt was removed and shipped to a RCRA-permitted landfill. A concrete surface was subsequently installed in the tank farm area (SEE, 1990).

- **Waste paint drum leak:** In July 1985, a 55-gallon drum of waste paint was dropped while being moved to the drum storage area. The spill consisted of approximately 20 gallons of waste paint. The spill was covered with absorbent material, swept up, and shipped to a RCRA-permitted landfill. The asphalt was washed down with high-pressure water, and the wash water was treated through the wastewater treatment plant (SEE, 1990).

- **Sump piping leak:** In January 1988, it was discovered that a seal had failed in an underground pipe joint connected to a sump located just east of the wastewater treatment building. The area of the leaking sump was used from 1981 to 1987 to wash out drums and trucks. Hazardous constituents in the waste may have included heavy metals, oil, and organic compounds. The area was concrete-lined and graded so that runoff drained to the north into the sump. The sump was plumbed with a short, underground pipe connecting it to another sump inside the wastewater treatment building. Ecology was notified of the incident, and approximately 40 cubic yards of contaminated soil was excavated, manifested, and shipped to a RCRA-permitted landfill. Ecology inspected the spill site after excavation and did not require additional soil removal or testing of the remaining soil. A PVC liner was installed prior to backfilling with clean soil. A building addition was constructed in this area and a new sump installed (SEE, 1990).

- **Leaking stormwater pipe:** In 1991, during the excavation of three USTs from the area of the current north and south container storage area, evidence of a release from a leaking joint in the storm drain system was observed. All standing water was pumped from the excavation and 705 cubic yards of soil was excavated (Chempro, 1991). Confirmatory samples indicated that residual contamination was below current MTCA cleanup levels.

- **Stabilization area release:** In March 1992, during a RCRA compliance evaluation inspection, it was noted that waste had spilled over the east concrete wall of the stabilization area because the unit had been overfilled. Waste migrated through a gap in an outer sheet-metal wall and onto the adjacent ground surface (SAIC, 1996). However, no information is available as to the type of waste that was released.

- **Oily water spill:** In August 1995, approximately 5 gallons of oily water spilled outside of containment in the northwest corner of the facility. The material was recovered and approximately 2 cubic yards of contaminated soil was removed and transferred to containers for proper off-site disposal.

- **Tank farm abandoned pipeline:** In January 1999, during the construction of the unloading pad near the tank farm, an abandoned pipeline was encountered and released approximately 10 to 15 gallons of a diesel and water mixture. Contaminated soil was excavated and transferred to containers for off-site disposal.

- **Tank farm abandoned pipeline:** In April 2000, a diesel-based material leaked from an abandoned pipeline into an excavation near the tank farm. The material was recovered, and contaminated soil was excavated and transferred to containers for proper off-site disposal.

Some historical releases that have not been formally documented may have occurred at the site. The evidence of these historical releases includes land use prior to facility construction in 1980, aerial photographs, and visual observations during site inspections.

- Because of the site's former agricultural use, agricultural pesticides, including arsenic pesticides, may have been used at the site. Pesticides have been detected in surficial soils and intermittently at trace levels in the uppermost groundwater (SEE, 1990).
- Aerial reconnaissance conducted in July 1985 reported an oily sheen and accumulation of oily wastes in the drainage ditch along the northern perimeter of the facility, extending about 1,000 feet to the west (SEE, 1990).
- During visual site inspections by EPA in 1988, a sheen was noted on surface water in the drainage ditch (SEE, 1990)

3.0 DESCRIPTION OF INVESTIGATIVE ACTIVITIES

Environmental investigations have been conducted at the facility under the 3013 order and the Part B permit since 1989. The field activities associated with these investigations are described below.

3.1 SOIL INVESTIGATIONS

Soil samples have been collected as part of numerous environmental investigations at the site since 1988. This section describes soil characterization activities within the different areas of the site, including the former UST area, the tank farm, the stabilization area, the stormwater drainage system, and the current transfer yard area.

The soil sampling methodologies implemented during the soil sampling events at the site between 1991 and 2007 are described in PSC's standard operating procedures (SOPs) (Appendix 3A). Soil sampling methods employed during the soil investigations conducted at the facility prior to 1991 by Arthur D. Little, Inc., (ADL) and Sweet-Edwards/EMCON, Inc., (SEE) are discussed in their respective reports. Sampling methodologies employed during the pre-1991 investigations generally agree with the methods presented in Appendix 3A.

Soil samples collected at the site are summarized in Table 3-1. The locations of all soil samples collected at the site are presented in Figure 3-1. Soil samples were submitted to laboratories for physical property testing or for chemical analyses. Table 3-2 summarizes the various analyses performed for each soil sample.

3.1.1 AOC No. 1–Former USTs

In 1989, investigations were conducted in AOC No. 1 to evaluate the soil conditions adjacent to the USTs. Three soil borings (MW-9, MW-10, and MW-11), subsequently converted to monitoring wells, were completed in this area.

The USTs were removed in January 1991. After removal of the 5,000-gallon UST, petroleum contamination was noted on the groundwater surface (approximately 10 ft bgs). Following the excavation of approximately 705 cubic yards of contaminated soil, 13 confirmation samples (Kent Plant 15 through 27) were collected from the sidewalls and bottom of the excavation.

3.1.2 AOC No. 2–Tank Farm

Investigations were conducted in the tank farm area in June 1989 (SEE, 1989) and March 1990 (SEE, 1990). Five soil borings, three of which were converted to monitoring wells, were completed in this area (T-1, T-2, MW-8, MW-13, and MW-16).

In June and July 2000, ten monitoring wells were installed and nine hand auger borings (HA-2, HA -3, HA -5 through -11) were completed in the tank farm area. During these installations, soil samples were collected from four of the monitoring wells (MW-20, MW-21, MW-23 and MW-24D) and submitted for chemical analysis. Two samples were analyzed from each of these borings based on field screening results and the planned screen intervals of the monitoring wells. Nine soil samples (HA-2, HA -3, HA -5 through -11) were also collected from the hand auger borings and submitted for chemical analysis (PSC, 2000).

In November 2002, a soil sample (MW-127-6-8) was collected from the direct push boring for MW-127-S on the eastern side of the tank farm in order to determine the extent of petroleum-impacted soils in the fill unit in the tank farm. Two additional soil samples (MW-102-2-4 and MW-102-4-6) were collected from the direct push boring for MW-102 northwest of the tank farm.

3.1.3 AOC No. 3–Stabilization Area

The initial investigation in the stabilization area consisted of a hand auger boring outside of the stabilization building (ADL, 1989). Two monitoring wells (MW-12 and MW-14) were completed near the building in 1989, and soil samples were collected for analysis (SEE, 1989). Two borings (HA-2 and HA-3) were completed in July 2000 as part of the RI to determine whether sumps associated with the stabilization pit had leaked (PSC, 2000).

3.1.4 AOC No. 4–Stormwater Drainage System

AOC No. 4 includes the site’s stormwater drainage system, the associated catch basins and sumps, underground piping, and the formerly exposed ditch on the north side of the facility. Two soil samples (S1 and S2) were collected with a hand auger from the ditch in November 1988 (ADL, 1989)[1]. A total of five additional soil samples were collected from the ditch via hand auger in June 1989 (S-1, S-2, and S-4) and March 1990 (S-10 and S-11) (SEE, 1989; SEE, 1990).

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[1] All available soil data with the exception of samples S1 and S2 were included in this comparison. As discussed in the *Soil Analysis Report*, the elevated concentrations of SVOCs, PCBs and inorganic constituents detected in drainage ditch samples S1 and S2, collected on 11/30/88, were not reproducible during two subsequent sampling events (S-2 and HA-8) in the area, and thus, do not appear to be representative of current site conditions.

In January 1999, an abandoned pipeline was encountered and released approximately 10 to 15 gallons of a diesel and water mixture (PSC, 1999b). Three confirmation soil samples (KT-Pipe-5, -6, and -7) were collected following the removal of petroleum-affected soils.

In February 1999, facility personnel found the pipeline beneath the main driveway to be deteriorating. In March 1999, the pipeline was removed, visibly contaminated soil was excavated, and five confirmatory soil samples were collected (KT-SSP-0399-1 through -5) (PSC, 2000). Three borings (HA-5, HA-6, and HA-7) were completed in July 2000 as part of the RI to determine whether catch basins or the associated piping junctions adjacent to the tank farm had leaked (PSC, 2000).

In May 2002 during the replacement of the stormwater pipelines just south and east of the process building, soil surrounding the pipelines was excavated. A total of 17 confirmatory soil samples (KT-PIPE-D1 through -D8 and KT-PIPE-E1 through -E7) were collected from the excavations prior to backfilling the excavations with clean fill.

3.1.5 Process and Storage Areas

Several soil samples have been collected within and characterize any soil contamination in the process and storage areas. The current and former process and storage areas include the current can crush area, dumpster area, storage area, the north container loading/unloading pad, the process containment building, the indoor lab pack area, the north and south container storage areas and the check-in area. Two soil borings (T-3 and T-4) were completed in the drum storage and handling area in February 1990 (SEE, 1990).

3.1.6 Transfer Yard

Multiple soil samples have been collected on the 3-acre transfer yard parcel on the west side of the property. This parcel was undeveloped until the transfer yard was completed in 2001. Soil investigations were completed in this area in 1988 (ADL, 1989), 1989 (SEE, 1989), 1990 (SEE, 1990), and 2007 (Geomatrix, 2007). One soil sample (S5) was collected from the undeveloped portion of the site during the 1988 investigation and is considered to be representative of background conditions in the site area. For the 1989 investigation, the undeveloped parcel was divided into quadrants S-5 through S-8. Four test pits were completed in each quadrant and composite soil samples representative of fill (S-5F, S-6F, and S-7F) and native materials (S-5N, S-6N, S-7N, and S-8N) were collected from each of the test pits. Two additional soil samples were collected from the borings MW-7, completed June 1989, and MW-15, completed February 1990, during the installation of the respective monitoring wells.

In June 2007, Geomatrix collected discrete soil samples from four direct push soil borings (GP-1 to GP-4) in the general vicinity of the four test pit quadrants sampled as composites in 1989 (Geomatrix, 2007).

Soil analytical results from June 2007 have undergone validation following EPA Contract Laboratory Program National Functional Guidelines (EPA, 1999 and 2004). Validation reports for soil results are provided in Appendix 6I.

3.2 SURFACE WATER INVESTIGATIONS

Surface water measurements and samples have been collected as part of multiple environmental investigations at the site since 1988. This section describes the surface water characterization activities that have been conducted, including surface water sampling activities.

3.2.1 Surface Water Levels

A surface water staff gauge was installed in the drainage ditch in the late 1980s to monitor surface water elevation fluctuations relative to groundwater elevations. Surface water elevations were measured for several quarters. This staff gauge was replaced in January 2001 with another surface water staff gauge installed in the drainage ditch on the north end of the facility. The gauge consists of a small diameter post, with a measuring tape attached, placed in the center of the ditch. It was surveyed on February 20, 2001, by Hugh Goldsmith and Associates, Inc., with the elevation of the top of the gauge measured as 29.52 feet NAVD 1988.

Surface water measurements referencing the second staff gauge began in March 2001 and were conducted monthly until May 2005, and quarterly thereafter. A surface water measurement was not collected in May 2001.

3.2.2 Surface Water Sampling

Since 1988, eleven surface water samples have been collected for chemical analyses from the ditch running along the north side of the facility property. This section describes the collection and analyses of the surface water samples. All surface water samples are summarized in Table 3-3, and approximate sampling locations are presented in Figure 3-2.

3.2.2.1 Sampling Methodology

Two surface water samples were collected from locations W1 and W2, in the ditch at the northwest corner of the facility and at the northeast corner of the site, respectively, on November 30, 1988. Two surface water grab samples were collected from locations W-1 and

W-2 on June 28 and 29, 1989, respectively. The samples were collected by submerging sample bottles in standing water in the ditch (ADL, 1988).

Two samples were collected at sample locations W-4 and W-5, in the drainage ditch to the north of the facility and in the portion of the ditch in the northwestern corner of the property, respectively, on March 14, 1990. Field parameters, including pH, conductance, and temperature were recorded at the time of sampling (Chempro, 1990).

Additional surface water grab samples were collected at W-4 and W-5 on November 29, 1990 and on March 14, 1991. Field parameters, including pH, conductance, and temperature were recorded at the time of sampling during the March 1991 event (SEE, 1991).

Surface water sample SW-8 was collected on June 28, 2000, approximately six inches below the water surface. The sample was collected using a peristaltic pump to bypass algae covering the top of the water (PSC, 2000).

3.2.2.2 Sample analyses

Surface water samples were submitted to a laboratory for chemical analyses. Table 3-4 summarizes the analyses conducted on each sample. The results of these analyses are presented in Section 6. Water quality measurements were also made just prior to the collection of surface water samples.

3.3 GROUNDWATER INVESTIGATIONS

Groundwater samples and measurements have been collected from several networks of monitoring wells and temporary borings at the site. This section describes the installation of the wells, the collection and analysis of groundwater samples and, in some cases, the decommissioning of the wells at the site.

3.3.1 Former Well Networks

Groundwater samples and measurements have been collected from several networks of monitoring wells at the facility. Well construction details are provided in Table 3-5 and the locations of these wells are provided in Figure 3-3. A number of wells at the site have been abandoned due to problems with well construction or screen placement. Details on the well abandonments are provided in Table 3-6.

Two groundwater monitoring wells were installed in November 1988: Well W4, a leak detection well at the edge of the drainage ditch at the northwestern corner of the facility, and Well W5, a monitoring well at the edge of the drainage ditch in the northeastern corner of the facility. Groundwater samples were collected from both monitoring wells and analyzed for VOCs, SVOCs, pesticides, PCBs, metals and cyanide (ADL, 1988). No information is available regarding the location of these wells and only partial analytical reports are available for the samples collected from these wells.

Five monitoring wells, MW-1 through MW-5, were installed in February 1989. Seven monitoring wells, MW-7S and MW-7D through MW-12, were installed during a July 1989 assessment and four monitoring wells, MW-13 though MW-16, were installed during the 1991 assessment. Several wells, MW-6, MW-7S, MW-7D, MW-8, and MW-11 were abandoned in the early to mid 1990's due to poor well construction and condition. Two wells, MW-9 and MW-10, were damaged during the UST removal in 1991 and were subsequently abandoned.

Ten additional monitoring wells, MW-17 through MW-25 and MW-24D, were installed in July 2000. During installation of monitoring wells and soil borings in 2000, PSC determined that many of the monitoring wells that existed at the site and that were installed in July 2000 were improperly installed. A number of the wells were screened across both the silt aquitard and the intermediate aquifer: MW-2, MW-3, MW-12, MW-13, MW-14, MW-17, MW-18, MW-20, MW-21, MW-22, and MW-24. These wells did not provide a representative sample of the groundwater quality or elevation in either unit and also had the potential to provide preferential pathways for the vertical migration of groundwater containing dissolved contaminants and NAPL. Furthermore, these wells could not be used to gain information on the hydraulic properties of the aquifer materials at the site. In addition, wells MW-1, MW-23, and MW-25 were also found to be screened in the silt aquitard. Wells screened in the silt aquitard do not provide any useful information about contamination and water flow, because the silt unit is not a productive aquifer. These wells were all abandoned in 2000 and replaced with a new monitoring well network in early 2001.

Fifteen monitoring wells were installed between January 29, 2001, and February 15, 2001:

- MW-112-S, MW-123-S, and MW-118-S screened in the shallow unit
- MW-102-I1, MW-113-I1, MW-114-I1, MW-118-I1, MW-120-I1, MW-124-I1, and MW-125-I1 screened in the upper Intermediate unit

- MW-112-I2, MW-117-I2, MW-122-I2, MW-123-I screened in the lower Intermediate unit
- MW-112-D screened in the deep unit

While a number of these wells are part of the current monitoring well network, a re-evaluation of site stratigraphy in 2002 indicated that several of the monitoring wells (MW-112-I2, MW-120-I2, MW-113-I1, MW-125-I1, MW-118-S) were screened partially or fully in the aquitards identified at the site. These wells did not provide valuable information about groundwater flow and contaminant transport, and did not provide information that was representative of the aquifer in which they were supposedly placed. As a result, these five monitoring wells (MW-112-I2, MW-120-I2, MW-113-I1, MW-125-I1, MW-118-S) were decommissioned on November 18, 2002.

3.3.2 Current Monitoring Well Network

Ten monitoring wells (MW-102-S, MW-117-S, MW-122-S, MW-126-S, MW-126-I, MW-127-S, MW-128-I, MW-130-I, MW-131-I, and MW-132-S) were installed at the site between November 18 and November 22, 2002, and one monitoring well, MW-129-I, was installed northeast of the site across 77th Avenue South on June 15, 2007. The current monitoring network includes these wells plus several previously installed monitoring wells, including MW-112-S and MW-123-S screened in the shallow unit; MW-102-I1, MW-114-I1, MW-118-I1, MW-120-I1 and MW-124-I1 screened in Zone A of the Intermediate unit; MW-117-I2, MW-122-I2, and MW-123-I screened in Zone B of the Intermediate unit; and MW-16, MW-24D, and MW-112-D screened in the deep unit. The well construction details for the current monitoring well network are summarized in Table 3-5 and well construction diagrams are presented in Appendix 3B. The locations of the wells in the current monitoring well network are provided in Figure 3-4.

3.3.3 Groundwater Sampling

Groundwater samples were collected during five groundwater monitoring events between 1989 and 1991. Following the purging of at least three well casing volumes, samples were collected using a peristaltic pump with Tygon tubing or Teflon bailer (SEE, 1989, 1990, and 1991). The analytes for each sample during each sampling event are summarized in Table 3-7.

Groundwater samples have been collected quarterly from the monitoring well network since July 2000. Groundwater sampling has been conducted using a low-flow methodology described in PSC’s SOP No. 124, presented in Appendix 3A. The groundwater samples collected were submitted for chemical analysis for VOCs, SVOCs, PCBs, and inorganic constituents, as specified in Attachment B of the facility's Part B Permit. In April 2003, PCBs and all inorganic constituents with the exception of arsenic were removed from the groundwater monitoring analyte list under Ecology-approved permit modification KTMOD 9-1.

In April 2007, hexavalent chromium was added back to the suite of groundwater parameters listed on the RCRA Permit Attachment B analyzed as part of routine groundwater monitoring, and pesticides were added to the groundwater monitoring analyte list for MW-129-I and MW-131-I under Ecology-mandated permit modification KTMOD 22-1.

Water quality parameters including temperature, redox potential, dissolved oxygen, specific conductivity, turbidity, and pH are measured prior to the collection of groundwater samples under PSC SOP 124. Although not required by the facility's permit, a number of samples have been analyzed for geochemical parameters such as alkalinity, sulfate/sulfide, ferrous/ferric iron, carbon dioxide, and dissolved organic carbon, which have been used in the fate and transport evaluation, provided in Section 6. A summary of samples that have been analyzed for these geochemical parameters is presented in Table 3-7.

Groundwater samples have also been collected from temporary borings during the RI. These include samples from temporary borings T-3 and T-4 in February 1990, HA-9 and HA-11 in July 2000, GP-125-I in November 2002 and GP-118-D in February 2003. The depths of these samples and the analytes for which they were analyzed are summarized in Table 3-7.

In addition, quarterly groundwater samples have been collected from new well MW-129-I since July 2007, in accordance with RCRA Permit Attachment B.

3.3.4 Water level measurement

Water levels have been measured and recorded at each location monthly from July 2000 to May 2005, and quarterly since May 2005. The methodology for collecting these measurements is provided in Appendix 3A.

3.3.5 Groundwater Data Evaluation

Because of the problems identified with screen placement in a number of wells that made up the previous monitoring well networks, there can only be limited confidence in any conclusions drawn from data collected from these wells. The water level measurements from the wells in the former monitoring well networks cannot be used to determine groundwater flow patterns, but groundwater analytical results can be used to help characterize the compounds present in groundwater and the approximate magnitude of the concentrations. However, there is limited confidence in any conclusions regarding the fate and transport of these compounds within groundwater at the site. Consequently, groundwater flow patterns have been characterized using only water level measurements from the current monitoring well network. The characterization of the nature and extent of contamination in groundwater has been presented with emphasis on the data from the current network.

All groundwater analytical results from February 2001 to the present have undergone validation following EPA Contract Laboratory Program National Functional Guidelines (EPA, 1999 and 2004). Validation reports for groundwater analytical results are provided in Appendix 6C.

3.4 STORMWATER PIPELINE TESTING AND REPAIR

PSC contracted with Pipeline Video and Cleaning of Auburn, Washington, to conduct pipe integrity tests of the underground stormwater pipeline system during February and March 2001 pursuant to Section VII.C.8.b.5.(e) of the facility's permit. Pressure testing was not possible in most lines because parts of some lines are constructed of corrugated steel. Therefore, video recording was used to identify the faults in the pipelines.

The first step in the process was to clean the pipelines using a vacuum truck. All wastewater and sludge removed by the vacuum truck was handled in the Kent facility and properly disposed of. Once the lines were cleared, a video camera was snaked down the pipeline to identify the type of material the pipeline was constructed of, the diameter of the pipeline, and any faults in the pipeline. The camera recorded the length of the pipeline as it moved through it, and the location of faults is identified in Figure 3-5. The following faults were identified:

- Segment A: One joint failure in the pipeline was noted at 213 feet from the south end of the pipe.
- Segment B: Four joint failures in the pipeline were identified at 125 feet, 144 feet, 157 feet, and 174 feet from the north end of the pipe.
- Segment E: There was one pipe break identified in this pipeline at 78.2 feet from the east end of the pipeline.
- There were no faults identified in Segments C and D.

- PSC was not able to evaluate the integrity of Segments F, G, and H during this assessment due to access restrictions and the limitations of the video equipment.

Segments D and E were constructed of corrugated metal, which appeared to have numerous hairline fractures in the video recording of the pipeline. As a result, these two segments were replaced. Following the procedures outlined in the Kent Storm Water Pipeline Repair and Replacement Work Plan (PSC, 2002a), pipelines D and E through the eastern parking lot and southern drum check-in area, respectively, were excavated and replaced in May and June 2002. Confirmatory soil samples were collected from below the old pipelines, and sent to the lab for analysis for VOCs, TPH-D and arsenic. The joint failures in Pipelines A and B were also repaired by injecting a polyurethane grout into the section of pipeline that contains the joint faults. Pipeline F was cleaned and inspected using a video camera and appears to be sound. Catch basin 6, at the end of Pipeline F, was inspected using a video camera and no cracks or failures requiring repair were observed. Pipeline F and Catch basin 6 were originally going to be filled in place and abandoned. However, these parts of the stormwater drainage system provide additional capacity for managing stormwater during peak events. As this section of the system appeared to be sound, it was retained in the stormwater drainage system to provide additional capacity and minimize the extent of standing water during heavy rain events.

4.0 GEOLOGICAL AND HYDROGEOLOGICAL CHARACTERIZATION

This section discusses geological and hydrogeological characterization of the PSC Kent facility.

4.1 PHYSICAL AND HYDROLOGICAL SETTING

The PSC Kent facility is located within the Green River Valley, between Seattle and Tacoma. The river valley is located within the Puget Lowland, a north-south trending basin, approximately 200 miles long and averaging about 40 miles wide, shown in Figure 4-1. The Green River originates on Mt. Rainier and flows generally northward into the Duwamish River which discharges to Elliott Bay in Seattle. The Green River Valley is bounded on the east and west by the Covington and Des Moines plateaus, respectively (Woodward et al., 1995). The valley is approximately two miles wide and is generally flat. The Green River meanders along the western margin of the valley floor about 1.5 miles west of the facility.

The drainage ditch, which runs along the northern border of the western half of the PSC Kent property, extends from the railroad tracks on the west of the site to a culvert along the northern property boundary on the eastern half of the property, as shown in Figure 2-2. The culvert was constructed by Moss, the property owner to the north, and consists of 12-inch diameter PVC piping held in place by concrete blocks in 1991. The part of the ditch in which the culvert is located was filled in at this time. The culvert drains into another ditch running along 77th Avenue South, which also accepts surface runoff from the property to the north. This ditch runs north along 77th Avenue South adjacent to Moss property and then northwest to Mill Creek, a tributary to Springbrook Creek. Springbrook Creek flows into the Black River several miles north of the site, which ultimately, like the Green River, joins the Duwamish River.

4.2 REGIONAL GEOLOGY

Three primary assemblages are found in the Puget Lowland: bedrock (deepest), Quaternary deposits, and alluvial sediments (most shallow) : Tertiary and older sedimentary, volcaniclastic, volcanic, and metamorphic rock units collectively form the regional basement confining unit. The depth to bedrock is at least several hundred feet at the PSC Kent facility. Bedrock was not encountered in two deep borings within one mile of the facility at total depths of 111 and 120 meters (approximately 333 and 360 feet), respectively (Buchanan-Banks and Collins, 1994). The total thickness of unconsolidated sediments overlying bedrock is approximately 200 to 300 meters (approximately 600 to 900 feet) in the PSC Kent area, and increases to the southwest (Buchanan-Banks and Collins, 1994).

Multiple Pleistocene glacial advances, both continental and alpine, have modified the regional geologic setting of the Puget Lowland. The Quaternary deposits overlying bedrock generally are composed of regional drift sequences separated by unconformities and by nonglacial fluvial and lacustrine sediments. Pleistocene glacial deposits of sand and gravel are overlain by recent alluvial deposits (SEE, 1990). These alluvial deposits commonly consist of fine sand, silty fine sand, fine sandy silt and non-plastic silt, locally containing coarse gravel and cobbles. Because of shifting depositional channels, individual layers of sands and silts are not laterally continuous over large areas and interfingering is common (Galster and LaPrade, 1991).

4.3 REGIONAL HYDROGEOLOGY

The Puget Sound aquifer system is composed of unconsolidated alluvial, glacial, and interglacial sediments of Quaternary age (Vaccaro et al., 1998), typified by alternating sequences of coarse- and fine-grained deposits serving as local aquifers and aquitards. The aquifer units generally consist of coarse-grained outwash deposited during glacial advances and retreats, proglacial deposits, and fluvial sediments deposited during glacial interstades. The aquitards are primarily composed of till, glaciomarine, mudflow, and lake deposits. Vaccaro et al. (1998) suggest that no significant regional flow system currently exists in the Puget Sound aquifer system. Rather, the aquifer system consists of subregional flow systems that are typically isolated from each other. Within these flow systems, groundwater generally flows towards larger surface water features such as the Green River, but local minor surface water features can also influence shallow groundwater flow systems.

Groundwater typically moves from topographic highs to topographic lows such as stream drainages or saltwater bodies. Within aquifer units, groundwater movement is predominantly horizontal. Within the semiconfining and confining units (the aquitards), groundwater movement is predominantly vertical. Vertical gradients are usually downward, except near streams and saltwater bodies where gradients are upward. Groundwater in the uppermost aquifer unit typically occurs under water-table conditions, while groundwater in the deeper units is confined (Vaccaro et al., 1998).

4.4 LOCAL HYDROGEOLOGIC INTERPRETATION

A conceptual model of the local stratigraphy at the facility was created based on lithological logs from soil borings completed at the site. Soil boring logs are presented in Appendix 4A. Four cross sections, located as shown in Figure 4-2, identify geological and hydrologic units. These cross sections are presented in Figures 4-3 through 4-6. (In addition, three-dimensional [3-D] block diagrams representing the site are included in Section 6).

The following local geologic units have been identified at the facility, listed in order of increasing depth:

- Fill unit
- Upper silt and clay unit
- Upper silty sand unit
- Intermediate silt unit
- Intermediate sand unit
- Lower silt unit
- Lower sand unit
- Deep silt unit

In the Groundwater Analysis Report , the upper silty sand unit, the intermediate silt unit, and the intermediate sand unit were considered as a single unit, referred to as the upper sand and silt unit. However, additional analysis of local stratigraphy, including data from the most recent boreholes, suggested that these units should be treated as distinct units for several reasons that will be discussed in the following sections. Each of the local geologic units is discussed in more detail below. Analyses of grain size and total organic carbon (TOC) for each unit are summarized in Tables 4-1 and 4-2.

4.4.1 Fill Unit

The uppermost unit at the site, referred to as the fill unit, consists of poorly sorted sands, gravel and cobbles added to the site as pre-load prior to the construction of the facility in 1980 and following the UST excavation in 1991. The thickness of the fill unit varies from about 2 feet (GP-125-I) to about 9 feet (MW-118-I1). Based on lithological samples collected from borings at the site, the unit appears to be continuous across the site. The western half of the property was regraded in October 2001 during the construction of the transfer yard, but fill is still likely to be continuous in this area. However, since the fill unit is associated with site construction, it is not expected to be present beyond the property boundary, except possibly to the east, where the roadbed area of 77th Avenue South likely has fill. Because of the difficulties obtaining representative samples of this coarse unit, samples were not collected and no geotechnical data are available.

4.4.2 Upper Silt and Clay Unit

A naturally deposited silt and clay unit underlies the fill unit. The silt and clay unit contains varying amounts of silt and clay, with sand and organic material. Borehole logging indicated some portions are predominantly clay. Geotechnical testing of selected samples indicated a clay content of up to 50%, based on grain size analysis (PSC, 2000 and 2001). The silt and clay are gray, soft to medium stiff, and locally contain varying amounts of sand and organic matter. The unit generally appears massive, and is believed to be the uppermost surface of the unconsolidated deposits in the Green River Valley. The thickness of the unit varies from about 1 foot (MW-118-I1) to about 9 feet (MW-122-I2) across the facility, as depicted in the cross sections. Total organic carbon measurements for the unit range from 0.13% at MW-22 to 1.8% at MW-112-I2 (PSC, 2000 and 2001).

The upper silt and clay unit appears to have been continuous across the facility before the 1991 removal of three underground storage tanks east of the process containment building. In the area of the former underground storage tanks, approximately 705 cubic yards of soil, including the upper silt layer, was removed from an area measuring approximately 40 feet by 40 feet. Before excavation, the natural silt layer in this area had a thickness of approximately 5 to 10 feet. The excavation was backfilled with sand and gravel. Other than this excavation area, the silt and clay unit appears to be continuous across facility based on lithological data.

4.4.3 Upper Silty Sand Unit

A silty sand deposit underlies the upper silt unit. The sand is typically fine- to medium-grained, black to brown to gray, and loose to medium dense, with a significant (generally greater than 15 percent) silt content. This unit is locally interbedded with silt or clean sand. The thickness of this unit varies across the site from about 1 foot (MW-123-I) to about 12 feet (MW-117-I2). Total organic carbon content in the upper silty sand was approximately 0.11% at MW-112-I2 (PSC, 2001).

4.4.4 Intermediate Silt Unit

The intermediate silt is gray, soft to medium stiff and contains various amounts of sand and organic material. Based on the interpretation of the cross sections, the silt unit appears to be continuous in the eastern and southeastern portions of the site, but discontinuous in the northwest portion of the facility and in the western half of the site. The thickness of this unit varies across the site from 0 to about 7 feet (MW-123-I).

4.4.5 Intermediate Sand Unit

An intermediate sand unit underlies the intermediate silt unit, or the upper silty sand unit where the silt unit is not present. The sand is typically fine- to medium-grained, black to brown to gray, and loose to medium dense, generally with less than 15 percent silt. Discontinuous silt interbeds are locally present, especially in the southern portion of the facility (Section D-D'). The thickness of this unit varies across the site from about 2 feet (MW-120-I2) to 9 or more feet (MW-16).

4.4.6 Lower Silt Unit

A lower silt unit has been encountered in all borings completed to a depth of at least 25 feet. This silt unit contains up to about 25% clay (Table 4-1) (PSC, 2000 and 2001). The silt is light olive gray to medium dark gray, soft to medium stiff, and sometimes contains sand and organic material. The clay is medium dark gray with brownish gray streaks, medium stiff with organic material. The thickness of the lower silt unit varies across the facility from about 2 feet (MW-123- I) to about 10 feet (GP-118-D). The silt unit appears to be continuous across the facility.

4.4.7 Lower Sand Unit

A sand deposit below the lower silt unit was encountered in all deep borings. The sand is fine- to medium-grained, olive black to dark brown, and dense. The silt layers within the unit typically occur as individual stringers. The silt layers contain varying amounts of clay, sometimes with organic matter, are light olive gray to dark gray, and soft to stiff. The thickness of this unit varies from about 5 feet (GP-118-D) to at least 8 feet (MW-16). Total organic carbon content in this unit was 0.24% at MW-112-I2 (PSC, 2001).

4.4.8 Deep Silt Unit

The deep silt unit consists of firm, gray to brown to black, clayey silt and sandy silt. This is the lowest stratigraphic unit identified at the site. Deeper boreholes (e.g., MW-16, GP-118-D) penetrated but did not drill through the unit. A thickness of more than 10 feet was encountered at MW-16, and based on the limited number of boreholes that have penetrated the deep silt unit, it appears to be continuous across the site.

4.5 LOCAL HYDROGEOLOGIC UNITS

Eight hydrogeologic units have been identified in the material underlying the facility. These units are listed below, in order of increasing depth, along with the geologic unit to which they correspond:

- Shallow water-bearing unit (fill unit)
- Upper aquitard (upper silt and clay unit)
- Intermediate aquifer Zone A (upper silty sand unit)
- Intermediate aquitard (intermediate silt unit)
- Intermediate aquifer Zone B (intermediate sand unit)
- Lower aquitard (lower silt unit)
- Deep aquifer (lower sand unit)
- Deep aquitard (deep silt unit)

Site stratigraphy was re-evaluated based on the most recent lithological information. A review of these data indicates that the upper and lower portions of the intermediate aquifer are more distinct than previously thought and should be considered separately. The intermediate aquifers have been designated as the intermediate aquifer Zone A and the intermediate aquifer Zone B, as described below.

Table 4-3 lists the results of the hydraulic tests that have been completed for the facility, including field (in-situ) and laboratory (ex-situ) testing. The hydraulic test results corresponding to each hydrogeologic unit are discussed separately below.

4.5.1 Shallow Water-Bearing Unit

The shallow water-bearing unit (fill unit) is hydraulically unconfined and is generally continuous across the facility, but is not expected to extend beyond the property boundaries. It is bounded above by the ground surface and below by the upper silt aquitard in all areas of the site except near monitoring well MW-118-I1, where underground storage tank excavation has removed the upper silt aquitard and replaced it with fill. The upper fill unit is not considered an aquifer because its saturated thickness is relatively low during the higher recharge periods in late fall through spring, and the unit becomes unsaturated during the summer and early fall low rainfall period, as evidenced by dry monitoring wells during this period.

The depth to the base of the fill is variable, resulting in areas where water can pool above the underlying upper silt aquitard in discontinuous pockets. Cross section C-C' illustrates this variability at MW-127-S, where the maximum fill depth is greater than at borings on either side, and at MW-112-D, where another deeper area of fill can be noted. The variability in fill depth has a significant impact on the proper interpretation of water levels in the shallow water-bearing unit, as discussed in more detail in Section 4.6.

Because it is difficult to obtain representative samples of the shallow water-bearing unit and because it is not continuously saturated, there are no estimates for horizontal hydraulic conductivity of the shallow water bearing unit, and limited estimates for vertical hydraulic conductivity. However, estimates can be obtained from literature sources. Literature values for hydraulic conductivity for sands and gravels range from approximately 1 x 10-1 to 1 cm/sec (Freeze and Cherry, 1979). Vertical hydraulic conductivities measured from geotechnical samples collected at the site range from 1.1x10-2 to 1.5x10-2 cm/sec (Table 4-3). Based on the assumption that on a local scale, the horizontal hydraulic conductivity is typically about ten times the vertical hydraulic conductivity (Freeze and Cherry, 1979), a value of 1.3x10-1 cm/sec is assumed to be representative of the horizontal hydraulic conductivity for this unit. Total volumetric porosities for the shallow water-bearing unit were estimated to range from 44% to 53% based on bulk density and specific gravity tests (Table 4-3). Total porosity describes the total volume of voids in the matrix, but groundwater can not flow through all of these voids because only a fraction of the voids are interconnected. Effective porosity describes the percentage of interconnected pore space through which groundwater can flow. An effective porosity of 20% was estimated for a fill material consisting of poorly sorted sands, gravel, and cobbles, based on literature values (Driscoll, 1986).

4.5.2 Upper Aquitard

The upper aquitard corresponds to the upper silt and clay geologic unit, and appears to be continuous across the PSC Kent facility except at the excavated area around monitoring well MW-118-I1. Where present, the unit is bounded above by the shallow water-bearing unit and below by Zone A of the intermediate aquifer. Based on water levels measured in shallow water-bearing unit monitoring wells and in intermediate aquifer Zone A monitoring wells, it appears that, like the shallow water-bearing unit, the upper aquitard is partially unsaturated during the late summer and early fall.

The elevation of the contact between the shallow water-bearing unit and the upper aquitard varies from about 23 feet (MW-118-I1 and MW-123-S) to about 26 feet (MW-112-D). In general, the elevation of the upper surface of the aquitard is relatively uniform across the facility.

Estimates of the vertical hydraulic conductivity of the upper aquitard have been obtained by geotechnical laboratory analyses (Table 4-3) and range from < 1.0 x 10-8 cm/s for silty clay (MW-112-I2) (PSC, 2001) to 6.8 x 10-6 cm/s for silt (MW-19). These values are within the ranges given for silt/loess (~10-7 cm/s to10-4 cm/s) and clays (~10-10 cm/s to 10-7 cm/s) by Freeze and Cherry (1979).

The volumetric porosity of the upper aquitard has been estimated to between 0.44 at MW131-I and 0.58 at MW-17. These values fall within and exceed the range typically associated with silts (0.35 – 0.50), but fall within the range given for clays (0.40 – 0.70) (Freeze and Cherry, 1979), which is consistent with the presence of a significant fraction of clay.

4.5.3 Intermediate Aquifer Zone A

Zone A of the intermediate aquifer corresponds to the upper silty sand geologic unit and appears to be present throughout the PSC facility. The unit is fully saturated year-round and is hydraulically confined by the overlying upper aquitard except in the vicinity of MW-118-S, where the overlying aquitard was removed during the UST excavation. The elevation of the upper surface of Zone A varies across the facility from about 23 feet (MW-19) to about 16 feet (MW-122-I2) and the thickness of Zone A varies from about 1 foot (MW-123-I) to about 12 feet (MW-117-I2).

Vertical hydraulic conductivity of Zone A of the intermediate aquifer (MW-112-I2, MW-128-I, and MW-131-I) was estimated to be between 2.6 x 10-5 and 2.0 x 10-3 cm/s. These values for hydraulic conductivity fall within the range of literature values reported for silty sand (~ 10-5 to 10-1 cm/s) (Freeze and Cherry, 1979). The total porosity was estimated to be between 0.43 and 0.47 (PSC, 2001).

No estimates of horizontal hydraulic conductivity are available for Zone A. However, slug tests performed on three wells screened across the entire intermediate aquifer may provide a reasonable estimate of the horizontal hydraulic conductivity, since the aquifer consists of sand and silt. The three estimates are 1.1 x 10-2 cm/s (MW-7S), 2.1 x 10-3 cm/s (MW-14) and 3 x 10-3 cm/s (MW-15). These values fall within the range of values reported in the literature for silty sand. Consequently, an average horizontal hydraulic conductivity of 5.4 x 10-3 cm/sec is assumed for Zone A.

4.5.4 Intermediate Aquitard

The intermediate aquitard corresponds to the intermediate silt unit and separates Zone A and Zone B of the intermediate aquifer. This aquitard appears to be continuous in the eastern and central parts of the facility and the western part of the site, but is locally absent in much of the northwest and southern portions of the facility. The thickness of this unit varies across the site from 0 to about 7 feet (MW-123-I).

The vertical hydraulic conductivity of the intermediate aquitard (GP-118-D and MW-126-I) was estimated to be between 4.1 x 10-7 and 1.3 x 10-6 cm/s and the total porosity was estimated to be between 0.54 and 0.55 (PSC, 2001). These values for hydraulic conductivity fall within the range of the values reported in the literature for silt (10-7 to 10-3 cm/s) (Freeze and Cherry, 1979).

4.5.5 Intermediate Aquifer Zone B

Zone B of the intermediate aquifer corresponds to the intermediate sand geologic unit and appears to be present throughout the PSC facility. The unit is fully saturated and is overlain by the intermediate aquitard, where present, or by Zone A of the intermediate aquifer. The elevation of the upper surface of Zone B varies across the facility from about 18 feet (MW-117-I2) to about 7 feet (MW-122-I2). Where fully penetrated, the observed thickness of Zone B of the intermediate aquifer varies from about 2 feet (MW-120-I2) to about 9 feet (MW-16).

The vertical hydraulic conductivity of the sand from Zone B of the intermediate aquifer (GP-118-D, GP-125-I, and MW-126-I) was estimated to be between 6.1 x 10-7 and 1.5 x 10-3 cm/s and the total porosity was estimated to be between 0.45 and 0.56 (PSC, 2001) (Table 4-3). The higher values for hydraulic conductivity fall within the range of the literature values reported for clean sand (5 x 10-4 cm/s to 1 cm/s) (Freeze and Cherry, 1979), but the lower value is less than the literature-reported range. Vertical hydraulic conductivities, especially those measured in lab tests, are typically lower than horizontal hydraulic conductivities and are affected by the presence of any fine-grained layers. As such, the low end of the estimated hydraulic conductivities may reflect the presence of a silt lens in the sample rather than the true hydraulic conductivity of the sand.

No estimates of horizontal hydraulic conductivity are available for this aquifer. Assuming that an average horizontal hydraulic conductivity for the sandy portions of Zone B is an order of magnitude greater than the highest measured vertical hydraulic conductivity, a value of 1.5 x 10-2 cm/sec is assumed to be representative of the horizontal hydraulic conductivity of Zone B.

4.5.6 Lower Aquitard

The lower aquitard corresponds to the lower silt geologic unit. A lower aquitard was encountered in all deep borings, including MW-16, MW-24D, MW-112-D, MW-120-I2, MW-123-I, GP-118-D, GP-125-I, suggesting that the aquitard is continuous across the facility. The lower aquitard is fully saturated and is bounded above by Zone B of the intermediate aquifer and below by the deep aquifer. The elevation of the upper surface of the lower silt aquitard varies from about 5 feet (MW-125-I1) to about 3 feet (MW-24D). The thickness of the lower silt aquitard varies from about 1 foot (MW-123-I) to about 7 feet (MW-125-I1).

No estimates of the horizontal hydraulic conductivity are available for this unit. The vertical hydraulic conductivity has been estimated from laboratory tests to be 8.4 x 10-8 cm/s for silty clay (MW-112-I2) and 2.8 x 10-6 cm/s for clayey silt (GP-118-D). The hydraulic conductivity values fall within the range given for clays (~ 10-10 cm/s to 10-7 cm/s) and for silts (~ 10-7 cm/s to 10-4 cm/s) by Freeze and Cherry (1979).

The unit’s total volumetric porosity was estimated to be approximately 0.66 for both silty clay and clayey silt in laboratory tests. These values fall within the range given for clays (0.40 to 0.70) but are higher than the range given for silt (0.35 to 0.50) by Freeze and Cherry (1979), consistent with the presence of a significant clay fraction within this unit.

4.5.7 Deep Aquifer

The deep aquifer corresponds to the lower sand geologic unit and has been observed at all deep borings completed to depths of at least 30 ft bgs. The aquifer is hydraulically confined by the overlying lower silt aquitard. The elevation of the upper surface of the deep aquifer varies from 3 feet (MW-123-I) to –1 foot (MW-125-I1). The thickness of the deep aquifer varies from 9 feet (MW-16) to 21.5 feet (MW-7D) in locations where the entire thickness was measured.

The horizontal hydraulic conductivity of the deep aquifer was estimated at MW-7D and MW-16 in a rising-head slug test (SEE, 1991). The estimated hydraulic conductivities were 1.6x10-4 cm/s and 1.7x10-3 cm/s which are within the range for silty sand (~ 10-5 to 10-1cm/s) given by Freeze and Cherry (1979). The vertical hydraulic conductivity of a sample of sand from MW-112-D was estimated at 2.3 x 10-2 cm/s during laboratory testing. This value is within the range given for clean sand (~ 5 x 10-4 cm/s to 1 cm/s) by Freeze and Cherry (1979).

The total porosity of the deep aquifer was estimated to be approximately 0.44 in laboratory tests. Literature values for the total porosity of sand range from 0.25 to 0.50 (Freeze and Cherry, 1979). An effective porosity of 25% was assumed to be representative of the materials in the deep aquifer.

4.5.8 Deep Aquitard

The deep aquitard corresponds to the deep silt unit and lies beneath the deep aquifer. This aquitard appears to be continuous across the site. No hydraulic conductivity testing has been performed on this unit; however, given its similarities in texture and origin to the shallow and intermediate silt units, it is likely to have similar hydraulic characteristics.

4.6 GROUNDWATER FLOW PATTERNS

Groundwater elevation data for the current monitoring well network were reviewed to determine groundwater flow patterns and rates in the water-bearing units identified at the facility. In addition, the potential for a hydraulic connection between the water bearing units and local surface water bodies was evaluated. The groundwater flow rates and directions will be considered in the nature and extent evaluation in Section 6.

4.6.1 Shallow Water-Bearing Unit

As discussed in Section 4.5.1, the shallow water-bearing unit is dry during the summer and fall. Unconfined conditions within the shallow water-bearing unit, combined with seasonally low water levels and variations in elevation of the top of the underlying silt unit, result in conditions where discontinuous pools of groundwater occur above the underlying aquitard during parts of the year. Figure 4-7 presents water level data for selected wells from 2003 to 2007 to illustrate the seasonal changes in hydraulic response of the shallow water-bearing unit. Periods of likely hydraulic continuity within the unit are shaded.

During January 2003, significant variations in water level elevations were present that would result in an unrealistic range of hydraulic gradients if hydraulic continuity is assumed for this relatively high permeability unit. However, as water levels rose in February because of accumulating winter recharge, the difference in measured hydraulic heads and associated hydraulic gradients between the wells decreased, and hydraulic continuity is assumed to have existed. Through March, April, and May the wells respond in a generally uniform fashion to changes in water levels within the unit; thus, ongoing hydraulic continuity is assumed to have been present.

Beginning in June, several wells dried up, and the water level trend for well MW-112-S did not respond with the same trend as the remaining saturated wells, suggesting hydraulic isolation. Water levels continued to drop through July and August, and all the wells were dry in September. During the fall and winter recharge period some hydraulic isolation appeared to be present until December. Fall of 2003 was significantly wetter than the fall of 2002; thus, higher water levels and hydraulic continuity occurred earlier in the wet season.

Quarterly water level maps for the shallow water-bearing unit are presented in Figures 4-8 through 4-11 for fourth quarter 2006 (4Q06) through third quarter 2007 (3Q07). The seasonal lack of hydraulic continuity within the aquifer has been considered in preparation of these maps, with water level contours presented only when hydraulic continuity was likely. In general, groundwater flow directions were variable, depending on the quarter, which is not unexpected in an unconfined aquifer with variable recharge. In general, flow in the northeastern portion of the facility was to the northeast, with groundwater leaving the site and likely flowing north along and into the ditch on 77th Avenue South, or recharging the intermediate aquifer. Groundwater flow near the western and exposed portion of the drainage ditch was to the north or northwest toward the ditch, with some expected local variations when recharge from the ditch was occurring, as discussed below. Groundwater flow directions in the southerly portion of the site appear to be more variable, ranging from southeast, east, to northeast, but only one well, MW-117-S, is available for measurement to compare with wells further to the north.

Water level data have been collected from a staff gauge located in the drainage ditch along the north edge of the site and posted on the water level maps. A review of these data indicates that the ditch is likely hydraulically connected to the shallow water-bearing unit, based on similar water levels between the ditch and adjacent wells MW-102-S and MW-132-S. The table below summarizes the water level information and assumed recharge/discharge status for the ditch and adjacent well MW-132-S.

	Staff Gauge Water Level (ft)	**MW-132-S Water Level (ft)**	**Aquifer Recharge/ Discharge Status**
January 7, 2003	24.82	25.93	Discharge
February 13, 2003	25.77	25.85	Discharge
March 17, 2003	26.26	26.42	Discharge
April 11, 2003	26.27	26.14	Recharge
May 5, 2003	25.82	25.38	Recharge

	Staff Gauge Water Level (ft)	MW-132-S Water Level (ft)	Aquifer Recharge/ Discharge Status
June 16, 2003	24.72	<24.18	Recharge
July 7, 2003	24.72	<24.18	Recharge
August 18, 2003	dry	<24.18	None
September 19, 2003	dry	<24.18	None
October 15, 2003	dry	<24.18	None
November 25, 2003	28.92	26.1	Recharge
December 9, 2003	28.67	26.11	Recharge
January 12, 2004	27.92	26.23	Recharge
February 19, 2004	26.82	26.16	Recharge
March 31, 2004	26.84	25.99	Recharge
April 9, 2004	28.01	25.71	Recharge
May 25, 2004	dry	<24.18	None
June 25, 2004	dry	<24.18	None
July 22, 2004	dry	<24.18	None
August 26, 2004	29.1	<24.18	Recharge
September 27, 2004	29.14	24.45	Recharge
October 25, 2004	28.93	25.42	Recharge
November 19, 2004	29.06	25.84	Recharge
December 3, 2004	29.19	25.79	Recharge
January 10, 2005	29.02	25.99	Recharge
February 25, 2005	28.89	25.64	Recharge
March 4, 2005	28.88	25.75	Recharge
April 22, 2005	28.91	25.92	Recharge
May 12, 2005	29.17	25.86	Recharge
July 6, 2005	29.42	<24.18	Recharge
October 12, 2005	29.26	<24.18	Recharge
January 12, 2006	28.65	26.7	Recharge
April 7, 2006	dry	25.86	None
July 7, 2006	dry	<24.18	None
October 5, 2006	29.32	<24.18	Recharge
January 15, 2007	dry	26.46	None
March 30, 2007	28.72	26.49	Recharge
July 6, 2007	dry	dry	None

From January through March 2003, groundwater adjacent to the ditch moved north and discharged to the ditch from the shallow water-bearing unit, with somewhat lower water levels in the ditch than in the unit. However, since then, the ditch has likely received higher stormwater volumes, or possibly has been draining poorly because of a blockage, creating a significant difference in water levels with higher levels in the ditch and water flowing into the shallow water bearing unit. During the dry season, the ditch was dry.

Based on the interpretations presented on the water level maps, a range of hydraulic gradients has been calculated during the periods when hydraulic continuity was assumed to be present (January through March),to determine potential flow rates within the aquifer. The highest hydraulic gradients were observed in the northeast part of the site, around wells MW-123-S and MW-127-S, with a range from 0.005 in January to 0.003 in March. However, both of these wells are completed somewhat deeper than the other monitoring wells in the shallow zone, and are likely impacted by a decrease in hydraulic head with depth observed at the site (downward hydraulic gradient). Therefore, the hydraulic gradients calculated for this unit are likely to be somewhat higher than are actually present, resulting in conservatively high estimates of groundwater flow rates. The hydraulic gradient of approximately 0.002, observed across the site from the center to the north in January (Figure 4-9), is probably more representative of typical conditions for the unit during saturated periods.

Groundwater flow rates have been calculated based on an assumed hydraulic conductivity of 1.3x10-1 cm/sec, discussed in Section 4.5.1. Using a range of hydraulic gradients from 0.002 to 0.005, the Darcy flow velocities range from 0.2 m/day to 0.5 m/day. If effective porosity, which is assumed to be approximately 0.2 for the shallow water-bearing unit, is considered, estimated linear velocities (the average velocity at which water actually moves through the pore spaces) range from 0.5 m/day to 2.5 m/day (1200 ft/yr to 3000 ft/yr). This range represents a relatively high rate of groundwater flow, but actual flow paths are limited by discharge to the ditch north of the site and to the ditch on 77th Avenue South and by seasonally unsaturated conditions.

4.6.2 Intermediate Aquifer Zone A

Water level maps for Zone A of the intermediate aquifer are presented in Figures 4-12 through 4-15 for 4Q06 through 3Q07. Water levels were lower in Zone A than in the shallow water-bearing zone, indicating a downward hydraulic gradient across the upper aquitard. The hydraulic head differences between the shallow water-bearing zone and Zone A aquifers ranged from approximately 0.3 to about 0.9 feet during the period when the shallow unit was hydraulically continuous.

The groundwater flow rate and direction in Zone A of the intermediate aquifer appear to vary seasonally. During wetter portions of the year, when Zone A was being recharged from the upper water bearing zone, groundwater flow directions were similar in both units. During this period, Zone A of the intermediate aquifer had a generally east and northeast flow in the eastern half of the site, with a southeast component in the southern portion of the site and a northwest component in the northwest part of the site. However, during the summer dry period in July through September, when a very slight groundwater mound (based on supplemental 0.1 ft contours) appeared to be present as part of a change in the flow regime, a trend toward northwest groundwater flow over most of the site was apparent. This northwesterly trend is more consistent with groundwater flow directions in Zone B of the intermediate aquifer, discussed below, and with expected regional groundwater flow toward the Green River. In October, gradients were very flat, but by November the wet season pattern reappeared.

Based on the interpreted groundwater flow regime in Zone A of the intermediate aquifer, a range of hydraulic gradients has been calculated to determine potential flow rates within Zone A. The highest hydraulic gradients were observed in the north part of the site during the wet season, with a maximum gradient of about 0.005 in January. The lowest hydraulic gradients were observed in October, with an estimated gradient of approximately 0.0007. Groundwater flow rates have been calculated based on an assumed hydraulic conductivity of 5.4x10-3 cm/sec, discussed in Section 4.5. Using a range of gradients from 0.0007 to 0.005, the Darcy flow velocities range from 3.3x10-3 m/day to 2.3x10-2 m/day. Assuming an effective porosity, of approximately 0.25 in Zone A of the intermediate aquifer, estimated average linear velocities range from 1.3x10-2 m/day to 9.3x10-2 m/day (16 ft/yr to 110 ft/yr). This represents moderate groundwater flow rates consistent with the type of aquifer materials present.

4.6.3 Intermediate Aquifer Zone B

Water level maps for 4Q06 through 3Q07 for Zone B of the intermediate aquifer are presented in Figures 4-16 through 4-19. Water levels were lower in Zone B than in Zone A, indicating downward hydraulic gradients. A comparison between Zone A and Zone B of the intermediate aquifer indicates that hydraulic head differences between the zones ranged from approximately 0.2 to 0.5 feet. Groundwater flow directions within Zone B trended generally to the northwest, with some months showing more westerly or northerly flow. This is consistent with expected regional groundwater flow toward the Green River, located to the west and northwest of the site.

The water level maps have been reviewed to determine a range in hydraulic gradients for calculation of potential flow rates within Zone B. Hydraulic gradients are typically lower in Zone B of the intermediate aquifer than in overlying zones. Observed gradients range from 0.0002 to 0.001. Groundwater flow rates have been calculated based on an assumed hydraulic conductivity of 1.5x10-2 cm/sec, discussed in Section 4.5. Using a range of hydraulic gradients from 0.0002 to 0.001, the Darcy flow velocities range from 6.52.6x10-3 m/day to 1.3x10-2 m/day. Assuming an effective porosity of approximately 0.25, average linear velocities are estimated to range from 1.0x10-2 m/day to 5.2x10-2 m/day (12 ft/yr to 62 ft/yr). As in Zone A, Zone B of the intermediate aquifer has moderate groundwater flow rates.

4.6.4 Deep Aquifer

Quarterly water level maps for 4Q06 through 3Q07 for the deep aquifer are presented in Figures 4-20 through 4-23. Three monitoring wells, which are located in the northeast portion of the site, are screened in the deep aquifer. Water levels were lower in the deep aquifer than in Zone B of the intermediate aquifer, suggesting that downward gradients are present between the zones. A comparison of water level maps for Zone B and deep aquifers indicates that hydraulic head differences between the aquifers range from approximately 0.3 to 0.5 feet. Groundwater flow directions within the deep aquifer had a general northwest trend, similar to Zone B of the intermediate aquifer, with some months showing more westerly or northerly flow. This is consistent with expected regional groundwater flow toward the Green River, located to the west and northwest of the site.

A range in hydraulic gradients has been calculated based on the water level maps to determine potential flow rates within the aquifer. Observed gradients ranged from approximately 0.0001 to 0.0008. Groundwater flow rates were calculated using the higher of two hydraulic conductivity values determined through slug tests, 1.7x10-3 cm/sec, discussed in Section 4.5. Using the range of gradients noted above, the Darcy flow velocities range from 1.5x10-4 m/day to 1.2x10-3 m/day. If porosity is taken into account (assumed to be 0.25), estimated average linear velocities range from 6.0x10-4 m/day to 4.7x10-3 m/day (0.7 ft/yr to 6 ft/yr). This range is representative of relatively low groundwater flow rates within the deep aquifer.

4.7 SUMMARY OF HYDROGEOLOGIC CONCEPTUAL MODEL

Four aquifer zones have been identified at the site: the seasonally saturated shallow water-bearing unit, Zones A and B of the intermediate aquifer, and the deep aquifer. During the wet season, which is generally in the winter and spring months, when the shallow water-bearing unit is saturated, groundwater flow appears to be towards the northeast in the northeast portion of the site. A hydraulic connection likely exists between the drainage ditch on the north side of the property and the shallow water-bearing zones, based on similar water level elevations. Groundwater flow near the western and exposed portion of the drainage ditch is to the north or northwest toward the ditch, with some expected local variations when recharge from the ditch is occurring.

Groundwater flow in Zone A of the intermediate aquifer is generally towards the northwest following expected regional flow lines toward the Green River; however, during the winter and spring months, there is a distinct northeasterly flow component in parts of the site that is associated with recharge from the shallow water-bearing unit. Groundwater flow paths in Zone B of the intermediate aquifer and in the deep aquifer are generally toward the northwest. Consistent downward vertical hydraulic gradients have been measured between the water-bearing units at the site.

Groundwater flow rates within the shallow aquifer zone are relatively high, but actual flow paths are expected to be limited by a combination of some seasonal discharge to the ditch north of the site and to the ditch on 77th Avenue South, and by seasonally unsaturated conditions. Both Zone A and Zone B of the intermediate aquifer have moderate groundwater flow rates, while the deep aquifer has relatively low flow rates.

4.8 FORMER GROUNDWATER MOUND NEAR FORMER MONITORING WELL MW-6

An evaluation of the status of the groundwater mound that previously formed near the location of former monitoring well MW-6 was conducted. No evidence of a groundwater mound was found in the water level data from wells surrounding the area where the former monitoring well MW-6 was located. The apparent groundwater mound was likely the result of surface water leaking into MW-6. During an inspection in 1993, MW-6 was found to be poorly constructed with an inadequate surface seal, which likely contributed to the abnormal water level noted in this well. MW-6 was decommissioned in 1994. As another possible cause of the former groundwater mound, former Tank T3A, a wastewater storage tank, was recognized as leaking in July 1993. At that time, Burlington Environmental, Inc., made the determination and reported it to Ecology. The leak was identified due to unaccounted for changes in the wastewater levels within the tank. The tank was removed and scrapped in 1994. The release from this tank, which was within 20 to 30 feet of MW-6, was possibly a contributor to the observed groundwater mound.

5.0 SITE CONCEPTUAL MODEL AND IDENTIFICATION OF SCREENING LEVELS

Under MTCA, the primary objective of the RI is to identify the nature and extent of contamination at the site. To focus this effort on compounds that pose potential risks to human health and the environment, chemical concentrations are compared with applicable screening levels based on the protection of human health and the environment. As part of the RI, MTCA requires the development of a conceptual site model (CSM) to identify site-specific contaminant transport and exposure pathways. Site-specific screening levels were developed based on the complete exposure pathways identified in the CSM. These site-specific groundwater and soil screening levels were derived from MTCA Method C cleanup levels for the protection of human health, terrestrial ecological benchmarks, background concentrations and practical quantitation limits.[2] The screening levels were used to identify chemicals of potential concern (COPCs). The nature and extent of these COPCs are evaluated in Section 6.

The CSM identifies human and environmental receptors based on land use and activities at and near the site, and characterizes the nature of their contact with impacted media at and near the site. If a receptor has the potential to contact impacted media, a potentially complete exposure pathway is said to exist.

The CSM for the PSC Kent facility is based on current and assumed future industrial land use at the site and continued industrial and commercial land use in the surrounding area. The following sections identify potential human receptors and complete exposure pathways for the site. The CSM is summarized in Figure 5-1. No CSM was developed for terrestrial environmental receptors per WAC 173-340-7491 (1)(c)(i) because there is less than 1.5 acres of contiguous undeveloped land on the site or within 500 feet of the site.

5.1 CHARACTERIZATION OF EXPOSURE SETTING

The facility is currently an active TSDF located in an industrial area of Kent. The surface of the facility is entirely covered by buildings, asphalt, or concrete. With the exception of the northern portion of the transfer yard, lined stormwater retention pond, and the bioswale, the PSC Kent property is covered with concrete or asphalt. The northern portion of the transfer yard is covered in gravel and is used as a parking area for staff personal vehicles and tractor-trailer trucks. An 8-foot high chain-link fence restricts access to the property.

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[2] Although the facility contains several regulated dangerous waste management units, which must typically be evaluated using assumptions protective of residential exposures, the methodology used in this RI is consistent with WAC 173-303-610, which states that alternative requirements protective of human health and the environment may be applied when a dangerous waste management unit is situated among other SWMUs/areas of concern (AOCs), and both are likely to have contributed to releases in the area.

5.1.1 Local Land Use

The properties surrounding the facility include other commercial and industrial facilities. Future land use at the site and in the surrounding area is expected to be industrial based on historical use, location, and current and expected future land-use zoning. The PSC Kent property has been zoned as M3, general industrial, by the City of Kent (City of Kent, 2002). The area within a one-mile radius of the PSC Kent property is zoned almost entirely as M1, M2 or M3, for light to general industrial land use. A small area approximately 7/8 of a mile east of the facility is zoned for low density single-family residences. The Valley Freeway (SR 167) runs between this residential area and the facility. A narrow strip of property along the East Valley Highway (84th Avenue), approximately one-half mile east of the facility, is zoned as Gateway Commercial, a designation used for commercial services along major transportation corridors located within a primarily industrial area. Consequently, the PSC Kent property meets the MTCA definition of an industrial property (WAC 173-340-200).

5.1.2 Local Surface Water Classification

The tributaries of Mill Creek and the Green River are the closest surface water bodies to the site. The Green River and its tributaries have been classified as Class A surface water bodies (WAC 173-201A). The uses of Class A surface water bodies include domestic, agricultural and industrial water supplies; stock watering; fish, shellfish and wildlife habitat; and commerce and navigation. Groundwater at the facility is expected to ultimately discharge to these surface water bodies either directly or via the seasonally water-bearing drainage ditches that run along the northern border of the property and north along 77th Avenue S.

5.1.3 Groundwater Beneficial Use

The highest beneficial use of groundwater in the identified water bearing units in the area of the facility was identified to determine whether human or environmental receptors have the potential to be exposed to chemicals of potential concern (COPCs) in groundwater. The designation of the highest beneficial use of groundwater in a particular area is established by several different agencies, including Ecology, the Washington State Department of Health, and county and city governments. The requirements, rules, and guidance of each of these agencies were considered in the determination of the highest beneficial use of groundwater.

5.1.3.1 Groundwater Beneficial Use – Shallow Water Bearing Unit and Intermediate Aquifers

According to WAC 173-340-720, groundwater cleanup levels at a particular location must be based on the highest beneficial use of groundwater, that is, use as drinking water. Information from a number of sources indicates that groundwater in the upper two water-bearing units identified at the facility do not currently serve as a source of drinking water in the vicinity of the facility:

- There are no water supply wells screened within the upper two water bearing units identified at the facility within one mile of the facility (Ecology, 2003; USGS, 2001; EDR, 2003).
- A review of Ecology's well log files for the area within a 1-mile radius of the facility, indicated only monitoring wells and temporary dewatering wells screened in the water bearing units identified at the facility (Ecology, 2003).
- A survey of the EPA Office of Water Public Water System database (EDR, 2003) and United States Geological Survey (USGS) Water Well database (USGS, 2003) indicated that there are no supply wells within one mile downgradient and cross-gradient of the facility.
- No residential or public supply wells are known to exist within the area between the facility and Mill Creek (Ecology, 2003). The vicinity is served by the Kent Public Utilities water system, which is supplied by six groundwater wells. These wells are located in the Green River Valley alluvial deposits within two miles of the facility but are upgradient and much deeper, with production well screens at depths between 180 and 432 feet bgs. The deep alluvial deposits in which these wells are screened exhibit an upward vertical hydraulic gradient, as demonstrated by a number of artesian wells that are screened in these deposits. As a result, these deep alluvial deposits are not believed to be hydraulically connected to the water-bearing units identified at the facility.

The highest beneficial use of groundwater in the upper two water-bearing units identified at the PSC Kent facility is the protection of surface water, since groundwater at the facility discharges to surface water. The seasonal nature of the shallow aquifer, since it becomes dry in the summer and fall seasons, means that the man-made ditch on the northern property boundary will likely not be a location for groundwater discharge from the site during these times of the year. Also, a portion of this ditch has had a culvert installed. However, since the shallow aquifer is intermittent and may discharge to the ditch for part of the year, and since the intermediate aquifer is also shallow (10 to 25 ft bgs), the beneficial use of these two zones is protection of surface water.

5.1.3.2 Groundwater Beneficial Use – Deep Aquifer

The deep aquifer is a potential future source for drinking water. It is potentially interconnected to deeper aquifer sources of drinking water. Therefore, protection of groundwater as a drinking water source is the highest beneficial use for groundwater in the deep aquifer of the PSC Kent Facility.

5.1.4 Identification of Potential Receptors

Potential receptors are identified and described with respect to characteristics that influence exposure, such as location relative to the site, activity patterns, and the presence of sensitive subpopulations. Consideration is given to the characteristics of the current populations, as well as those of any potential future populations that may differ under any reasonable foreseeable future site activities and uses. This section contains a description of the potentially exposed persons who live, work, play, visit, or otherwise come to the site or surrounding environment.

Under current and assumed future land use at the facility, potential receptors are limited to the following:

- Office workers who primarily work inside
- Industrial workers who primarily work outdoors at the facility
- Construction and utility workers who may be involved in excavation activities but are present at the site for only short durations (typically less than six months)
- Site visitors who are present at the site for very short durations (typically fewer than 10 days per year)

Under current and assumed future land use in the area surrounding the facility, potential receptors are limited to the following:

- Office workers who primarily work inside
- Industrial workers who primarily work outside in off-site areas
- Construction and utility workers who may be involved in excavation activities but are present at off-site areas for only short durations (typically less than six months)
- Site visitors who are present at off-site areas for very short durations
- Individuals using surface water as a source of drinking water, industrial water and agricultural water
- Ecological receptors in area surface water

5.1.5 Identification of Exposure Pathways

The exposure pathway is the course that the constituent takes from the source of the material to the receptor of concern. A complete exposure pathway includes the following elements:

- A constituent source and a mechanism for its release to the environment
- An environmental transport medium
- A point where any of the potentially exposed populations can contact the impacted medium
- An exposure route at the contact point

Each of these items will be discussed separately for the site and surrounding area.

5.1.5.1 Constituent Sources and Release Mechanisms

As discussed in the GWAR (PSC, 2002d), the primary sources of contamination at the site are releases from tanks and piping and constituents spilled at the site. The primary release mechanisms resulting in soil and groundwater contamination at the site are leaks and spills.

5.1.5.2 Environmental Transport Media

Constituents have been detected in soil and groundwater at the site. Furthermore, contaminated groundwater at the facility may migrate from the facility, impacting groundwater in off-site areas. Some of the more volatile constituents detected in soil and groundwater could potentially volatilize into soil gas, which could then migrate to indoor air of nearby buildings. It is assumed that concentrations of volatile compounds migrating from soil gas to outdoor air will be negligible due to rapid mixing and dilution in ambient air under normal working conditions. However, volatile compounds may migrate from soil gas to outdoor air in trenches during excavation activities. As the site is capped, constituents detected in surface soil are not likely to be mobilized in fugitive dust and constituents detected in soil are also not likely to leach to groundwater unless the cap is removed in the future. Constituents in groundwater in the shallow water-bearing unit and the intermediate aquifer potentially may migrate to local surface water bodies via the drainage ditch along the northern border of the facility.

5.1.5.3 Potential Exposure Points

Exposure points are any points where potentially exposed populations may contact the impacted medium. Potential exposure points were identified in three types of media:

- Media that are confirmed to be impacted by constituents originating at the facility

- Media currently suspected to be impacted by constituent migration
- Media that may be impacted by constituent migration in the future

The following potential exposure points were identified at the Kent facility:

- Surface soil not covered by asphalt, gravel, concrete or buildings[3]
- Subsurface soil exposed during excavation activities
- Fugitive dust particles from surface soil suspended in air
- Groundwater exposed during excavation activities;
- Vapors migrating from soil and groundwater to soil gas to indoor air
- Constituents migrating from groundwater to surface water in the drainage ditch along the northern border of the facility and eventually to Mill Creek
- Groundwater that has migrated from the site to current or future public or private municipal water supply wells

5.1.5.4 Exposure Routes

An exposure route is the mechanism by which a receptor comes into contact with a COPC. The constituents can enter the body by three primary routes:

- Ingestion of water, food, and/or soil
- Inhalation of vapors and particulates
- Dermal contact with water or soil

These three primary exposure routes were evaluated for each identified receptor to determine if complete exposure pathways exist for each identified exposure point and migration pathway.

5.1.5.5 Potentially Complete Exposure Pathways

The exposure pathway is the course that the constituent takes from the source of the contamination to the receptor of concern, encompassing the source, the migration pathway, the exposure point, the receptor, and the exposure route. The potentially complete exposure pathways identified for the facility and surrounding area are shown in Figure 5-1 and include:

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[3] All surface soil, with the exception of the parking area north of the transfer yard, is currently covered by asphalt, gravel, concrete, or buildings, and thus, does not represent a current exposure point. However, the surface soil could be an exposure point in the future if the asphalt, gravel, concrete or buildings are removed.

Soil

- Future on-site office worker exposed to volatiles migrating from soil into indoor air;
- Future on-site industrial worker exposed to surface soil via incidental ingestion, dermal contact and inhalation of fugitive dust; and
- On-site construction/utility worker exposed to subsurface soil via incidental ingestion, dermal contact and inhalation of fugitive dust during excavation activities.

Groundwater

- Future on-site or off-site office worker exposed to volatiles migrating from groundwater into indoor air;
- On-site or off-site construction/utility worker exposed to groundwater via incidental ingestion and dermal contact; and
- Future off-site office worker or resident ingesting contaminated groundwater that has migrated from the Philip Kent facility to a public or private municipal water supply well.

Surface Water

- Recreational user exposed to constituents in surface water; and
- Ecological receptors exposed to constituents in surface water.

A number of potentially complete exposure pathways have been identified for the site. However, for many of the pathways, adverse effects from exposure would occur only if the constituents in soil and groundwater at the facility are transported to the potential exposure points at concentrations of concern. The potential fate and transport of the constituents detected in soil and groundwater at the facility is discussed in Section 6.

5.2 IDENTIFICATION OF CONSTITUENTS OF POTENTIAL CONCERN

To focus the RI on chemicals that potentially pose risks to human health or the environment, COPCs in soil and groundwater were identified for the site by comparing the concentrations present to soil and groundwater screening levels. Screening levels are conservatively selected constituent concentrations in environmental media that are considered to be protective of human health and the environment under specified exposure conditions. Those constituents present at concentrations lower than the identified screening levels are not considered to pose an unacceptable risk to human health and the environment. Constituents present at concentrations greater than applicable screening levels warrant further evaluation and are discussed in Section 6.

5.2.1. Identification of Screening Levels

Conservative screening levels were developed for each constituent detected in soil and groundwater at the site for each of the complete exposure pathways identified in Section 5.1 following MTCA guidance for cleanup levels. MTCA cleanup levels are constituent concentrations that are protective of human health and the environment under specified exposure conditions, and thus, are appropriate for use as screening levels for constituents detected at the site. Method A cleanup levels are appropriate for sites with few contaminants, Method B cleanup levels may be used for all sites, and Method C cleanup levels are appropriate for sites with specific limited exposure conditions. The methods used for each medium may differ based on the potential exposure pathways identified as complete for that medium. The resulting screening levels are highly conservative and are sufficiently protective of all current and potential future complete exposure pathways at the site.

Screening levels include consideration of natural background concentrations in soil (WAC 173-340-709), and practical quantitation limits (PQLs) for both soil and groundwater (WAC 173-340-705(6) and WAC 173-340-707). The PQLs for soil and groundwater are shown in Tables 5-1 and 5-2, respectively.

5.2.1.1 Soil Screening Levels

Table 5-3 shows soil screening levels chosen for the facility for this RI. It should be noted that soil screening levels apply only to vadose zone soil. The saturated zone (below the water table) is addressed through groundwater screening levels, and data for soil below the water table are used only qualitatively to evaluate groundwater conditions. The following procedure was used to select screening levels.

- Determine MTCA Method C soil cleanup levels protective of direct contact using Ecology’s Cleanup Levels and Risk Calculation (CLARC) database in October 2007 (CLARC, 2007). MTCA Method C soil cleanup levels (WAC 173-340-745 (5)(b)) were selected as soil screening levels for this evaluation, because the site meets the definition of an industrial property (WAC 173-340-200). MTCA Method C soil cleanup levels are protective of human health under industrial exposure scenarios and when applicable, the health of environmental receptors. The protection of terrestrial ecological receptors is considered in the development of Method C soil cleanup levels provided there is sufficient habitat to support these receptors. Because there is less than 1.5 acres of contiguous undeveloped land on the site or within 500 feet of the site, the protection of terrestrial ecological receptors was not considered in the development of MTCA C soil cleanup levels per WAC 173-340-7491 (1)(c)(i). Where values were not available in CLARC, EPA Region IX 2004 preliminary remediation goals (PRGs) were used (lowest of industrial values); these are footnoted in Table 5-3.

- Calculate soil cleanup levels protective of groundwater for each constituent using the MTCASGL workbook. For the protection of human health, MTCA Method C soil cleanup levels consider exposure via direct contact and the protection of groundwater. Concentrations protective of direct contact with soil are based on WAC 173-340-745(5)(b)(iii)(B) and are summarized in Table 5-3. Concentrations based on the protection of groundwater were developed using MTCA's fixed-parameter three-phase partitioning model [WAC 173-340-747(4)(b)] and acceptable groundwater concentrations used as groundwater screening levels, which are identified in Section 5.2.1.2. Default assumptions provided in MTCA were used in the model with one exception: site-specific data were used for fractional organic carbon, as depicted in Table 5-4. The assumptions and resulting soil concentrations are summarized in Table 5-4. The soil cleanup levels protective of groundwater are also shown in Table 5-4. The preliminary groundwater cleanup levels discussed in Section 5.2.1.2 , as well as values taken directly from CLARC for K_{oc}, K_d, and H were used to calculate soil screening level protective of groundwater, using the MTCASGL spreadsheet. Where values were not available in CLARC, references are listed on the right hand side of the table.

- The lowest of the above cleanup levels based on direct contact and the protection of groundwater was selected as the initial screening level.

- WAC 173-340-745 allows the adjustment of Standard Method C industrial soil cleanup levels such that they are at least as stringent as applicable state and federal laws and all other cleanup levels protective of human health and the environment at the site, but are not less than natural background concentrations. Natural background is defined in MTCA as "the concentration of hazardous substance consistently present in the environment that has not been influenced by localized human activities" (WAC 173-340-200). The volcanically derived soils of the Puget Sound area have been shown to have naturally elevated concentrations of arsenic, among other elements. Also, low concentrations of some particularly persistent organic compounds, such as PCBs, can be found in surface soils and sediment throughout much of the state due to global use of these hazardous substances. These low concentrations are considered "natural background" (WAC 173-340-200). Information on background concentrations of metals in soil is available for soils located throughout Washington State (Ecology, 1994). Natural background levels for metals in soil were taken as the values defined by Ecology for the Puget Sound area (Ecology, 1994). These natural background concentrations are included in Table 5-3. If the background concentration for the compound is greater than the initial screening level, the background concentration was selected as the screening level.

- Screening levels were compared to PQLs. PQLs were obtained from the current project laboratory, Washington State-certified Columbia Analytical Services (Columbia) of Kelso, Washington. Columbia performs low level analysis and selective ion monitoring (SIM) analyses for VOC and SVOC analyses to attain PQLs below typical reporting limits. Applicable analytical methods, method detection limits (MDLs), and PQLs (Columbia and federal) are provided in Table 5-1. Soil PQLs in Table 5-1 were established in accordance with WAC 173-340-707.

- If the PQL was higher than the screening level, the PQL was chosen as the final screening level (Table 5-3).

The final values were used as soil screening levels to identify COPCs in soil in Section 6.

5.2.1.2 Groundwater Screening Levels

Table 5-5 shows groundwater screening levels chosen for the facility for this RI. Although there is likely significant attenuation in constituent concentrations between groundwater at the site and where the water reaches a surface water body such as Mill Creek or the Green River, no attenuation was considered in this screening level evaluation. The following procedure was used to select screening levels.

- MTCA Method A or B groundwater cleanup levels were determined using the CLARC website in October 2007. Although groundwater in the upper two water-bearing units identified at the facility does not meet MTCA's definition of potable groundwater, MTCA Method B groundwater cleanup levels, which are based on potable groundwater use, were conservatively selected as initial groundwater screening levels. MTCA Method A and B groundwater cleanup levels are protective of exposures to water used as a source of drinking water. Groundwater Method A levels were applied only if there was no method B value listed in CLARC. For constituents without a MTCA level in CLARC, EPA (2004) Region IX PRGs were used; these are footnoted in Table 5-5.

- MTCA Method B surface water cleanup levels were determined using CLARC in October 2007. The Green River and its tributary, Mill Creek, are the closest surface water resources of note in the area and are located approximately 1 mile and 0.5 mile from the site, respectively. MTCA Method B surface water cleanup levels are protective of recreational uses of the Green River. The Green River is classified as a source of water for domestic, agricultural, and industrial water supplies; stock watering; fish, shellfish, and wildlife habitat; and commerce and navigation. Water concentrations protective of drinking water use, fish and shellfish ingestion, and the health of resident fish and shellfish should be adequately protective of all of the identified surface water beneficial uses.

- Federal and state applicable or relevant and appropriate requirements (ARARs) consistent with 173-340-720(3)(b)(i) for groundwater and surface water ARARs ,were determined using CLARC in October 2007. Surface Water ARARs listed in Table 5-5 include the National Recommended Water Quality Criteria for Priority and Non-Priority Toxic Pollutants (NRWQC) (EPA, 2006), the National Toxics Rule 40 CFR 131, Clean Water Act §304, and Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A). Water Quality Standards for the Surface Water of the State of Washington (WAC 173-201A) and the National Recommended Water Quality Criteria (EPA, 2006) are water concentrations protective of the health of aquatic receptors.

- The initial groundwater screening level was selected from the lowest of (1) the risk-based water concentrations that are protective of potable groundwater use and protective of surface water (MTCA Method A/B groundwater cleanup levels), (2) the risk-based water concentrations that are protective of surface water beneficial uses (MTCA Method B surface water cleanup levels), and (3) state and federal surface water quality criteria.

- Applicable PQLs were established for groundwater in the same manner used for soil, as described in Section 5.2.1.1 (Table 5-2).

- If a PQL is higher than an initial screening level, the PQL was chosen as the final screening level, as shown in Table 5-5.

These final screening levels were used as groundwater screening levels to identify COPCs in groundwater in Section 6.

5.3 IDENTIFICATION OF CONSTITUENTS OF POTENTIAL CONCERN

Constituents that have been detected in soil and groundwater at the facility are presented in Tables 5-6 and 5-7, respectively. In order to focus the nature and extent evaluation on constituents that potentially pose risks to human health or the environment, COPCs in soil and groundwater were identified for the site by comparing the concentrations present to soil and groundwater screening levels. Screening levels are conservatively selected constituent concentrations in environmental media that are considered to be protective of human health and the environment under specified exposure conditions. Those constituents present at concentrations lower than the identified screening levels are not considered to pose an unacceptable risk to human health and the environment. Constituents present at concentrations greater than applicable screening levels warrant further evaluation and are discussed in Section 6.

6.0 NATURE AND EXTENT OF CONTAMINATION

A number of environmental investigations have been conducted at the PSC Kent facility in response to RCRA 3008(h) and 3013 orders and as part of the RI. This section evaluates the analytical data associated with these investigations to determine a representative data set, identifies chemicals of potential concern in soil and groundwater, and describes the nature and extent of these COPCs in the environmental media sampled at the site.

6.1 DATA EVALUATION

Soil analytical results are available for soil samples collected between 1988 and 2007. All soil analytical results associated with the samples described in Section 3 were evaluated to determine a representative data set for the discussion of the nature and extent of soil contamination. Soil analytical data are summarized in Appendix 6A and laboratory analytical data for the summer 2007 soil sampling event are presented in Appendix 6I. A summary of results for detected analytes in soil is included as Appendix 6G.

Groundwater analytical results are available for groundwater samples collected from 1988 to 1991 and from 2000 to the present. All groundwater analytical results associated with the samples described in Section 3 were evaluated to determine a representative data set for the discussion of the nature and extent of groundwater contamination. Groundwater analytical data are summarized in Appendix 6B and laboratory analytical data for the quarterly monitoring events are presented in Appendix 6C. A summary of results for detected analytes in groundwater is included as Appendix 6H.

The data set considered in the nature and extent discussion was selected by evaluating data qualifiers associated with the available data and whether the data are likely to be representative of current conditions. Representative data were further evaluated to determine COPCs that require additional consideration in the nature and extent evaluation.

6.1.1 Evaluation of Qualified and Coded Data

For analytical results, various qualifiers and codes are attached to certain data by either the laboratories conducting the analyses or by persons performing data validation. These qualifiers often pertain to quality assurance/quality control (QA/QC) problems and generally address questions concerning constituent identity, constituent concentration, or both. All data qualifiers must be evaluated to determine if the detected constituent concentration is valid and should be considered to be representative of site concentrations (EPA, 1989a).

Coded data for this project had U, B, D, L, J, UJ, NJ, or R qualifiers, which indicate the following:

- U: Compound analyzed for, but not detected, or restated as undetected
- B: Analyte was found in associated blank as well as in sample
- D: Compound identified in an analysis at a secondary dilution factor
- L: No analyte was detected at the reported concentration level
- J: Value is estimated (EPA, 1989a)
- UJ: Restatement as undetected and estimated
- NJ: Analyte was tentatively identified and estimated
- R: Value is rejected because specific QA/QC criteria were not met

Data with B qualifiers were considered to be representative of blank contamination and were not further evaluated. However, data with U, D, L, or J qualifiers were further evaluated.

6.1.2 Selection of a Representative Data Set

Soil analytical results are available for samples collected at the site and in the surrounding area between 1988 and 2007. Samples S1 and S2 were not included in the representative data set. As discussed in the Soil Analysis Report (PSC, 2002a), the elevated concentrations of SVOCs, PCBs, and inorganic constituents detected in drainage ditch samples S1 and S2, collected on 11/30/88, were not reproducible during two subsequent sampling events (S-2 and HA-8) in the area, and thus, do not appear to be representative of current site conditions. None of the soil areas sampled have since been excavated; thus, all of the other sample results are still relevant. Therefore, except for S1 and S2, all soil analytical results collected since 1988 were retained in the representative data set and were evaluated further in this section.

As discussed in Section 3, a number of the monitoring wells for the site have been abandoned and replaced due to problems with their construction or placement of their screens. While groundwater samples collected from the former monitoring well networks are not directly comparable to those from the current monitoring well network, these older results can be evaluated to determine which compounds may have been present in groundwater in the different areas of the site. An evaluation of the older data provides insight into the patterns of chemical concentrations observed in groundwater in the current monitoring well network. The historical groundwater data have not undergone data validation.

Groundwater analytical results from samples collected since January 2003 from the current monitoring well network represent the most current and accurate information available for the nature and extent of groundwater contamination at the site. The analytical results from these groundwater-sampling events have been validated following EPA Contract Laboratory Program National Function Guidelines (EPA, 1999 and 2004). As a result, groundwater analytical results from 2003 to the present (third quarter 2007) were selected as a representative data set for use in the selection of COPCs and the description of the nature and extent of groundwater contamination. Historical groundwater analytical results from samples collected as part of the RI between 2000 and 2002 are used as a point of reference for trends over time.

6.2 SELECTION OF COPCS

In order to focus the nature and extent evaluation on chemicals that potentially pose risks to human health or the environment, COPCs in soil and groundwater were identified for the site by comparing constituent concentrations to the soil and groundwater screening levels identified in Section 5. Screening levels are conservatively selected constituent concentrations in environmental media that are considered to be protective of human health and the environment under specified exposure conditions. Those constituents present at concentrations lower than the identified screening levels are not considered to pose an unacceptable risk to human health and the environment. Constituents present at concentrations greater than applicable screening levels warrant further evaluation and are discussed in Sections 6.3 and 6.4.

6.2.1 Soil COPCs

The representative data set identified in Section 6.1 was used in the identification of soil COPCs. Soil COPCs were identified by comparing the maximum detected constituent concentrations in soil with soil screening levels developed in Section 5, as summarized in Table 6-1. The constituents in the list below were identified as COPCs in soil.

Chemicals of Potential Concern (COPCs) in Soil [1]

- **Benzene**
- **Methylene chloride**
- **p-Isopropyltoluene (p-cymene)**
- **sec-Butylbenzene**

- **Antimony**
- Arsenic
- Cadmium
- Copper
- **Cyanide**
- Mercury
- Selenium
- Silver
- **Thallium**
- Zinc

- **1,4-Dichlorobenzene**
- **2-Methylnaphthalene**
- **Benzo(a)anthracene**
- **Benzo(a)pyrene**
- **Benzo(b)fluoranthene**
- **Benzo(k)fluoranthene**
- **Carbazole**
- **Chrysene**
- **Naphthalene**

- Gasoline range organics
- Diesel range organics
- Lube oil range organics

- **4,4-DDD**
- **4,4-DDE**
- **4,4-DDT**
- **alpha-Chlordane**
- **Coumaphos**
- **delta-BHC**
- **Dieldrin**
- **Endosulfan sulfate**
- **gamma-BHC (Lindane)**
- **gamma-Chlordane**
- **Heptachlor epoxide**
- **Mevinphos (Phosdrin)**

Notes:

1. **Bold** text indicates COPC based on protection of groundwater only.

Of the COPCs listed above, the following were detected at concentrations exceeding their screening level in less than 5% of samples analyzed: p-isopropyltoluene, sec-butylbenzene, 1,4-dichlorobenzene, 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, naphthalene, silver, and zinc. Nearly all of the compounds in the table above were identified as COPCs based on the protection of groundwater. If soil at the site remains covered by buildings and pavement in the future, infiltration of groundwater is likely to be negligible, and compounds in soil will be effectively prevented from leaching to groundwater. The fact that few of the COPCs found in soil have been detected in groundwater above screening levels is strong evidence of the effectiveness of the site controls in minimizing leaching to groundwater. If leaching to groundwater is not a complete pathway in the future, the number of soil COPCs is greatly reduced, as indicated by the table above. The extent and likely fate of the COPCs identified in soil at the site, based on all potentially complete exposure pathways, is described in Section 6.3.

6.2.2 Groundwater COPCs

Groundwater analytical data from the most recent four quarters in 2006 and 2007 were compared with screening levels selected in Section 5 in order to identify current COPCs in groundwater. The 2006 and 2007 data best represent current conditions in groundwater near the facility. The comparison, summarized in Tables 6-2, 6-3, and 6-4 for the shallow water-bearing unit, intermediate aquifer, and deep aquifer, respectively, resulted in the following compounds being identified as COPCs.

Chemicals of Potential Concern (COPCs) in Groundwater		
Shallow Water-bearing Unit	**Intermediate Aquifer**	**Deep Aquifer**
Benzene Methyl tert-butyl ether Vinyl Chloride Bis(2-ethylhexyl) phthalate Chrysene Arsenic Cyanide Iron Manganese	1,1-Dichloroethene Trichloroethene Vinyl chloride 4,4'-DDD Arsenic Cyanide Iron Manganese	Vinyl Chloride Arsenic Cyanide Iron Manganese

Of the COPCs listed above, only vinyl chloride, 4,4'-DDD, arsenic, cyanide, iron, and manganese were detected at concentrations exceeding screening levels in more than 5% of the groundwater samples for which they were analyzed during the last four quarters. The remainder of the COPCs had minimal detections above their respective screening levels. In addition, 4,4'-DDD was detected in only one sample of three samples analyzed. The extent and likely fate of the COPCs identified in groundwater at the site is described in the following section.

6.3 NATURE AND EXTENT OF COPCS

This section describes the nature and extent of COPCs in soil, groundwater, and surface water at the site. COPC concentrations in the subsurface are dynamic as a result of a variety of fate and transport processes. Thus, consideration of the dominant fate and transport mechanisms that act on those COPCs, as well as consideration of the physical properties of each COPC, is critical to an accurate interpretation of the nature and extent of the COPCs at the site. This section first presents the relevant fate and transport processes at the site, and the local groundwater geochemistry and its effects on the nature and extent of COPCs. Then, the nature and extent of COPCs in soil, groundwater, and surface water are discussed in turn for each type of compound. Except for soil COPCs, the discussion of the nature and extent of COPCs in each medium is presented for the site as a whole rather than separately for each identified SWMU. Because chemical releases do not necessarily remain within the boundaries of SWMUs or AOCs following a release, a site-wide approach of discussing the nature and extent of COPCs is more efficient and appropriate.

6.3.1 Fate and Transport Processes

Chemicals in the subsurface environment are subject to a variety of transportation and transformation processes, such as transport, sorption, transformation/degradation, and volatilization. Several of these natural processes and their effects on chemical transport in the unsaturated (vadose zone) and saturated (groundwater zone) are discussed in more detail below. The physical properties which describe the tendency for each of these processes are summarized in Tables 5-4 and 6-5 for each of the COPCs identified in soil and groundwater at the site.

6.3.1.1 Transport

Transport of chemicals in the subsurface environment occurs in the pore spaces of the soil matrix in three phases: (1) dissolved in soil moisture, (2) volatilized in pore gas, and (3) in an immiscible phase.

Chemicals introduced into the terrestrial environment may move by several separate pathways and mechanisms which include runoff into streams and other surface water bodies, volatilization into the atmosphere, and leaching from the soil to groundwater. The aqueous solubility of a compound is a critical property controlling the mass of material that can be transported in the subsurface as a function of time. Highly soluble chemicals can move quickly through the vadose zone and are generally mobile in groundwater.

6.3.1.2 Sorption

Movement of chemicals through the vadose and saturated zones is primarily a liquid-phase process which involves water movement and the solute. Sorption is the removal of the solute from a solution through electrostatic or chemical interactions with a solid surface (Srinivasan and Mercer, 1987). Sorption can occur as a result of the affinity of the solute for the solid, or the lack of affinity of the solute for the solution. The lack of a solute's affinity for water is termed hydrophobicity and is typified by many non-polar organic compounds. Hydrophobic chemicals adsorb readily to soil organic matter and clay particles and will not migrate significantly from the region of initial introduction into the soil profile.

The rate of migration of hydrophobic chemicals dissolved in groundwater is also slowed by sorption to soil. This sorption retards the velocity of the dissolved phase chemical in relation to the velocity of the groundwater. The tendency for a chemical to adsorb to soil particles is described by the adsorption coefficient, K_d. The adsorption or distribution coefficient, K_d, is the ratio of the adsorbed concentration of a compound to its dissolved concentration (Dragun, 1988). Thus, chemicals with large K_d values will be sorbed to a greater extent than chemicals with low K_d values. For organic molecules, K_d is the product of the soil organic carbon coefficient, K_{oc}, and the fraction organic carbon content of the soil (f_{oc}). For inorganic compounds, such as metals, K_d is primarily determined by the valence of the dissolved ions and the cation exchange capacity (CEC) of the soil. The CEC describes the number of binding sites (in hydrogen milliequivalents) available per 100 grams of soil. The sorption of both organic and inorganic constituents typically increases with increasing organic carbon contents, as the constituents may sorb directly to or form complexes with the organic matter.

6.3.1.3 Transformation and Degradation

Transformation and degradation processes include the chemical and biological mechanisms that determine the fate of a chemical and its persistence in soil or groundwater. Dominant transformation and degradation processes include biodegradation, chemical hydrolysis, photolysis, and oxidation-reduction. These processes can be either aerobic or anaerobic depending upon the nature and extent of the contamination and site-specific conditions. The time scale for these processes is usually discussed in terms of the half-life for the chemical and can range from hours to decades.

One of the most important degradation processes in the subsurface environment is biodegradation. Biodegradation is the process by which organic compounds are broken down into simpler compounds by naturally occurring microorganisms. Like many organisms, including humans, microbes obtain energy required for growth and activity through a series of coupled oxidation and reduction reactions, which involve the transfer of electrons from electron donor compounds to electron acceptor compounds, resulting in the release of energy. Electron donors are compounds in relatively reduced states, such as organic matter, petroleum hydrocarbons, chlorinated solvents, and dissolved hydrogen while electron acceptors are compounds in relatively oxidized states such as dissolved oxygen, nitrate, ferric iron (Fe(III)), sulfate, and carbon dioxide. The ability of microorganisms to break down different contaminants is dependent upon the availability of electron acceptors and donors as well as the chemical condition of their environment. Biodegradation is described in more detail in Appendix 6D.

6.3.1.4 Volatilization

Volatilization of a compound depends on its vapor pressure, water solubility, and molecular weight. The Henry's Law constant combines vapor pressure with solubility to provide a means of estimating the transfer of a compound from water to air. Compounds with Henry's Law constants of 0.001 atm-m3/mole or lower do not volatilize readily, while those with a value of greater than 1.0 atm-m3/mole will be found primarily in the vapor phase. Metals tend to have very low vapor pressures at room temperature, and thus very low Henry's Law constants. Therefore, volatilization is not a significant process in the transport of metals.

6.3.2 Groundwater Geochemistry

Information about the groundwater geochemistry has also been collected for the current monitoring well network. Evaluation of these geochemical parameters along with contaminant concentrations can help to explain the nature and extent of contamination at the site. Water quality parameters including temperature, dissolved oxygen, turbidity, redox potential, and specific conductance are recorded just before groundwater samples are collected during each quarterly sampling event. A summary of these parameters is presented in Table 6-6. Selected groundwater samples have also been analyzed for sulfide/sulfate, nitrate, ferrous iron, dissolved organic carbon, carbon dioxide and alkalinity, summarized in Table 6-7. The information from these parameters can provide evidence of biodegradation and can aid in the interpretation of other chemical data by providing potential explanations of fate and transport mechanisms. A brief description of each of these parameters is provided below.

6.3.2.1 Dissolved Oxygen

The concentration of dissolved oxygen in groundwater varies greatly but can be an important factor controlling the mobility of many inorganic constituents and the biodegradation of xenobiotic organic constituents. Oxygen in groundwater typically reacts with any oxidizable material in its flow path, and thus, unless the groundwater is located near the point of recharge, dissolved oxygen levels are typically very low (Hem, 1985). Obtaining accurate dissolved oxygen field measurements is often highly problematic due to highly sensitive field equipment (Wiedemeier et al., 1999). These problems were observed at the site during 2001 and 2002. The dissolved oxygen readings were inconsistent and, in many cases where dissolved oxygen was measured at levels exceeding solubility, appeared inaccurate. Since PSC began using a new, more accurate water quality probe in 2003, the measured dissolved oxygen concentrations have typically been below 1 mg/L. This is consistent with dissolved oxygen concentrations measured in groundwater from the alluvial aquifers underlying the Kent Valley, which have averaged 0.6 mg/L, among the lowest of all aquifers within the southwestern King County aquifer network (Woodward et al., 1995).

6.3.2.2 Specific Conductance

Specific conductance is often used as an approximation of the dissolved solids content and can help to verify that samples are obtained from the same groundwater system.. In natural waters, dissolved solids vary from 55% to 75% of the specific conductance (Hem, 1985). In the alluvial aquifers of southwestern King County, the dissolved solids concentration in groundwater expressed in mg/L is approximately 65% of the specific conductance value expressed in µS/cm at 25°C (Woodward et al., 1995). Specific conductivity ranged between 84 µS/cm and 5,085 µS/cm in the shallow water-bearing unit, between 95 µS/cm and 1,880 µS/cm in the intermediate aquifer, and between 128 µS/cm and 1,008 µS/cm in the deep aquifer.

6.3.2.3 pH

pH is a measure of the hydrogen ion concentration in solution and is an indication of the balance between acids and bases in water. The pH of the groundwater in the shallow water-bearing unit, intermediate aquifer, and deep aquifer appears to consistently fall between 5.3 and 7.8, indicating relatively neutral groundwater.

6.3.2.4 Redox Potential

Redox potential is a measure of electron activity and indicates the relative tendency of a solution to accept or transfer electrons. As the reserve of electron acceptors is depleted by microbial activity, redox potential decreases, indicating a reducing environment. Conversely, a high concentration of electron acceptors results in a high redox potential indicative of an oxidizing environment. Because oxygen is one of the most energetic electron acceptors, it is consumed first, and thus, redox potential can also indicate whether the environment is aerobic or anaerobic. Redox potentials in groundwater typically range between -400 millivolts (mV) and 800 mV. Redox potentials greater than approximately 750 mV correspond to oxidizing or aerobic environments. While reductive dechlorination can occur in anaerobic conditions, the optimum range for this process is below a redox potential of approximately -150 mV, where sulfate reduction and methanogenesis occur (Weidemeier et al. 1999). The measured redox potential represents the dominant environment within the sample area; however, more oxidizing or reducing conditions may be occurring within microsites in the same area.

Field instrumentation is not always sensitive enough to accurately measure redox potential in groundwater, and thus, field measurements should be supported by data on oxidized and reduced constituent concentrations. The average redox potentials in all of the water-bearing units indicate moderately reducing conditions in which nitrate, manganese, and iron reduction can occur.

6.3.2.5 Redox Pairs: nitrite/nitrate, ferric/ferrous iron, sulfide/sulfate

Another indicator of the redox conditions within an aquifer is the presence of reduced forms of many naturally occurring elements. Nitrate (oxidized form) concentrations were available for former monitoring wells screened in the intermediate aquifer. Nitrite (reduced form) is a very short-lived form of nitrogen and thus is very difficult to measure. However, nitrate is quickly reduced in the absence of a more energetic electron acceptor, and thus, the presence of nitrate should indicate that reducing conditions are not strong. Nitrate was detected at very low concentrations in five of fourteen samples suggesting a slightly reducing environment.

The oxidized form of iron, ferric iron (Fe(III)), is not soluble and thus, the presence of dissolved iron in groundwater indicates that reduced iron, ferrous iron (Fe II), is present. Ferrous iron was detected in all samples for which it was analyzed except one, indicating reducing conditions.

Sulfide (reduced form) and sulfate (oxidized form) concentrations were available for former monitoring wells screened in the intermediate aquifer prior to 2004, and from current wells after 2004. Overall, sulfide concentrations were lower than sulfate concentrations suggesting that the reducing conditions in groundwater are not so strong that sulfate reduction is occurring.

6.3.2.6 Dissolved Organic Carbon

The concentration of dissolved organic carbon is a measure of the naturally occurring organic carbon in the aquifer. Its presence can indicate that reducing conditions are likely regardless of the presence of anthropogenic carbon. Dissolved organic carbon concentrations ranged between 12.7 mg/L and 230 mg/L.

6.3.2.7 Alkalinity

Alkalinity is important in the maintenance of groundwater pH because it buffers the groundwater system against acids generated both during aerobic and anaerobic biodegradation. Changes in alkalinity are most pronounced during aerobic respiration, denitrification, iron reduction, and sulfate reduction and less pronounced during methanogenesis. In general, alkalinity concentrations in the southern part of the site tended to be lower than those from the northern part of the site.

6.3.2.8 Carbon Dioxide

Metabolic processes operating during the biodegradation of petroleum hydrocarbons and other organic compounds lead to the production of carbon dioxide. Carbon dioxide produced can be removed by the natural carbonate buffering system of the aquifer. No apparent pattern has been observed in the carbon dioxide concentrations in groundwater at the site.

6.3.3 Nature and Extent of Soil COPCs

Thirty-eight COPCs were identified in soil at the site by comparing the maximum detected concentrations in soil with conservative risk-based screening levels. The primary migration pathway of concern for COPCs in soil located above the water table[4] is the migration of soil COPCs to groundwater. The potential for completion of this migration pathway is currently minimized by the asphalt, concrete, and buildings covering most of the soil on the property. These coverings severely limit the infiltration of rainwater into the underlying soil. However, the surface coverings could potentially be removed in the future, increasing the potential for migration of soil COPCs to groundwater. In addition, as most releases to soil likely occurred early in the operational history of the facility, many of the organic COPCs in soil have likely weathered, reducing the mobility of the remaining constituents. This section describes the distribution and likely mobility of the COPCs identified in soil if the surface covering is removed.

6.3.3.1 Volatile Organic Compounds

Volatile organic compounds (VOCs) benzene, methylene chloride, p-isopropyltoluene (p-cymene), and sec-butylbenzene were identified as COPCs in soil at the site. Of these COPCs only benzene and methylene chloride were detected at concentrations exceeding their screening level in more than 5% of samples analyzed.

Benzene

Benzene, a component of light end petroleum products such as gasoline, is expected to be relatively mobile in the environment but will also likely be lost from soil and groundwater as a result of rapid volatilization and/or biodegradation (HSDB, 2003). Benzene readily biodegrades to water and carbon dioxide or methane under a variety of geochemical conditions (Wiedemeier et al., 1999), although biodegradation in soils has been reported to occur more quickly under aerobic conditions.

Benzene was detected in five soil samples (MW-8, 6.5 ft bgs; MW-23, 3 and 7.5 ft bgs; HA-6, 4.5 ft bgs) collected from the tank farm area and one soil sample (KT-Pipe-7, 1 ft bgs) collected from the stabilization area at concentrations exceeding the screening level of 0.0084 mg/kg.

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[4] COPCs in soil below the water table is assumed to be at equilibrium with groundwater and will be accounted for the in groundwater fate and transport evaluation.

Benzene concentrations in soil samples are presented in Figure 6-1. While benzene concentrations in soil will likely continue to be reduced by volatilization and biodegradation, any remaining benzene in soil may leach to groundwater although migration should be limited since the site is covered. This is confirmed by the fact that although benzene has been detected in groundwater, the areal extent of benzene in groundwater is very limited.

Methylene Chloride

Methylene chloride, a chlorinated methane often used as a pesticide and laboratory cleaning agent (HSDB, 2003), is a common laboratory contaminant in environmental samples (EPA, 1989a). Chlorinated methanes such as methylene chloride are expected to be relatively mobile in the environment but will also likely be lost from soil and groundwater as a result of volatilization and/or biodegradation (HSDB, 2004). Methylene chloride can be formed as a product of the biodegradation of chloroform and can undergo both aerobic or anaerobic biodegradation (Wiedemeier et al., 1999) with aerobic biodegradation rates typically on the order of days (HSDB, 2004).

Methylene chloride concentrations detected in soil samples at the site are presented in Figure 6-2. Concentrations of methylene chloride that exceed the screening level of 0.024 mg/kg were detected in 13 soil samples: 3 soil samples collected in the stabilization area (KT-Pipe-5, 1 ft bgs; KT-Pipe-6, 1 ft bgs; KT-Pipe-7, 1 ft bgs), 2 samples collected along the stormwater pipeline system (HA-5, 7 ft bgs; KT-SSP-0399-4, 3.5 ft bgs), 1 sample collected near the tank farm (HA-8, 4 ft bgs), and at MW-8 (6.5 feet bgs), T-1 (5.5 feet bgs), HA-10 (1 ft bgs), MW-21 (5 and 7.5 ft bgs), HA-3 (9 ft bgs), and HA-2 (5 ft bgs). However, methylene chloride was not detected in soil samples collected in areas directly adjacent to these samples, indicating that if the methylene chloride is present in the soil samples, its extent is limited. Methylene chloride has been detected only very sporadically in groundwater, indicating that the methylene chloride present in soil has likely volatilized or biodegraded, is possibly a laboratory contaminant, or is in such low concentrations that it is not likely to leach to groundwater at concentrations above groundwater screening levels.

p-Isopropyltoluene (p-cymene)

p-Isopropyltoluene was detected above its screening level of 3.94 mg/kg in only one sample – HA-9, at a concentration of 4.22 mg/kg. All other detections (9 out of 10) were well below the screening level (i.e., 1.51 mg/kg or less).

sec-Butylbenzene

sec-Butylbenzene was detected above its screening level of 1.20 mg/kg in only one sample, HA-9, at a concentration of 1.48 mg/kg. All other detections (9 out of 10) were below the screening level (i.e., 1.05 mg/kg or less).

6.3.3.2 Polycyclic Aromatic Hydrocarbons/SVOCs

A number of polycyclic aromatic hydrocarbons (PAHs), including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, and naphthalene, were identified as COPCs in soil. Of these COPCs, only carbazole was detected at concentrations exceeding its screening level in more than 5% of samples analyzed. PAHs occur in the environment both naturally and as a result of anthropogenic releases of petroleum products. With the exception of naphthalene, PAHs are typically fairly immobile in the environment because of their low water solubilities, low volatilization potential, and strong tendencies to adsorb to soil. Biodegradation is the primary natural mechanism of reduction of PAH concentrations in soil with half-lives on the order of 0.5-1 year typically reported (HSDB, 2003). Naphthalene is similar to benzene in mobility and also readily biodegradable.

PAH concentrations detected in soil at the site are presented in Figures 6-3 through 6-9. PAHs were detected at concentrations exceeding screening levels in soil samples collected from boring MW-23 in the tank farm. Most PAHs were not detected in adjacent soil samples from HA-9 (3 ft bgs), MW-127-S (8 ft bgs), and T-2 (5.5 ft bgs), indicating that the extent of PAH impacted soil is limited. Naphthalene was detected in one soil sample from HA-9 (3 ft bgs) at a concentration exceeding the soil screening level. Biodegradation is likely to reduce PAH concentrations over time and strong adsorption is likely to prevent leaching to groundwater in the future. PAHs have not been detected consistently in groundwater at the site, confirming the limited soil impacts and the low mobility of these compounds.

2-Methylnaphthalene

2-Methylnaphthalene was detected above its screening level of 27.33 mg/kg in only one sample, HA-10, at a concentration of 84 mg/kg. All other detections (13 out of 14) were below the screening level (i.e., 19 mg/kg or less).

1,4-Dichlorobenzene

1,4-Dichlorobenzene, used as an insecticide and air deodorant, is expected to have moderate to low mobility in soils due to its strong tendency to adsorb to soil. 1,4-Dichlorobenzene will volatilize from soil but is not reported to biodegrade significantly (HSDB, 2004).

1,4-Dichlorobenzene was detected in a single soil sample (MW-8, 6.5 ft bgs) collected just outside the tank farm in the process and storage area at a concentration of 0.23 mg/kg, which exceeds the screening level of 0.12 mg/kg. 1,4-Dichlorobenzene has not been detected in any other soil sample or groundwater sample collected at the site. As a result, 1,4-dichlorobenzene is not likely to leach to groundwater at concentrations above the groundwater screening level.

6.3.3.3 Pesticides

The pesticides 4,4’-DDD, 4,4’-DDE, 4,4’-DDT,, alpha-chlordane, coumaphos, delta-BHC, dieldrin, endosulfan sulfate, gamma-BHC (lindane), gamma-chlordane, heptachlor epoxide, and mevinphos (phosdrin) were identified as COPCs in soil. The concentrations of 4,4’-DDD, 4,4’-DDE, 4,4’-DDT, alpha-chlordane, gamma-chlordane, dieldrin, heptachlor epoxide, gamma-BHC (lindane), and mevinphos (phosdrin) detected in soil are presented in Figures 6-10 through 6-16. The highest concentrations of DDT (and metabolites DDE and DDD), alpha-chlordane, gamma-chlordane, heptachlor epoxide, lindane, and dieldrin were detected in the western half of the property prior to the construction of the transfer yard and along the exposed portion of the drainage ditch. Resampling of transfer yard soils in 2007 (Geomatrix, 2007) showed that concentrations of pesticides in discrete soil samples collected from native soils did not differ appreciably from the 1989 composite soil sampling results from the same area (SEE, 1989). The pesticides detected in soil are likely associated with the historical agricultural land use at the site and are currently covered with fill, preventing current exposures. These compounds are typically immobile in the environment due to a strong tendency to adsorb to soil and low water solubilities. In addition, concentrations can be reduced over time through biodegradation, photodegradation, and abiotic reactions, such as hydrolysis. Mevinphos (phosdrin) was detected at concentrations exceeding screening levels in two soil samples in the area of the tank farm, T-1 and T-2 (5.5 foot depth). Phosdrin is more mobile in the environment than most other pesticides, but is also subject to rapid biotic or abiotic degradation with a reported half life of less than two weeks (HSDB, 2004). No pesticides are expected to migrate to groundwater at concentrations that exceed the groundwater screening levels.

6.3.3.4 Inorganic Constituents

Antimony, arsenic, cadmium, copper, cyanide, mercury, selenium, silver, thallium, and zinc were identified as COPCs in soil based on either the protection of groundwater or natural background concentrations. Of these inorganic COPCs, silver and zinc were detected at concentrations exceeding their screening level in less than 5% of samples analyzed. Each of these constituents is found naturally in the environment at varying concentrations and background concentrations in soil in the Puget Sound area are presented in Table 5-3. The mobility of each inorganic constituent in soil is dependent upon a number of factors including soil organic matter and geochemical conditions.

Antimony

Antimony occurs naturally in the environment but is also present as a result of emissions from copper smelting operations. Antimony's adsorption to soil and sediment is primarily correlated with the availability of iron, manganese, and aluminum oxides as it coprecipitates with these minerals. In its elemental form, antimony is not soluble in water but it can form a number of water-soluble anionic species (ATSDR, 1992a). No Puget Sound area specific background concentration has been adopted for antimony, but background concentrations reported for the western US ranged between 1.1mg/kg and 2.6 mg/kg (Shacklette and Boerngen, 1984).

Antimony was detected in two surface soil samples (S4 and CS-5, 1 ft bgs) collected in the late 1980s at concentrations exceeding the screening level of 5.52 mg/kg; however, it was not detected in the five groundwater samples for which it was analyzed. Because antimony has been detected only in surface soil and not in groundwater, and because it may not be present in a mobile form, it is not expected to leach to groundwater at significant concentrations.

Arsenic

Naturally elevated concentrations of arsenic have been detected in both soil and groundwater throughout western Washington (Ecology, 1994; WDOH, 1999). The elevated arsenic concentrations may be a result of a number of factors, including arsenic deposition from the former ASARCO Tacoma smelter located in Ruston (KCEHD, 2000); widespread use of arsenical pesticides under agriculture throughout the region; arsenic-rich minerals in the sediments that form the soils and aquifer materials throughout the region (Welch et al., 2000); and arsenic mobilization and transport from Tertiary bedrock in the foothills of the Cascade Mountains, as has been observed in the area of Granite Falls, Washington (Troost, 2002). A background arsenic concentration of 7.3 mg/kg was reported for the Puget Sound area (Ecology, 1994).

Arsenic in soil exists in various oxidation states and chemical species, depending upon soil pH and redox potential. Arsenate [(As(V)], a fairly immobile species, predominates in aerobic soils and arsenite [As(III)], the more mobile species, predominates under slightly reducing conditions in soils. Most of the arsenic in soils, particularly those of volcanic derivation, is associated with amorphous iron and aluminum minerals, and thus, is only available for leaching when these minerals are reduced (HSDB, 2004). As a result, arsenic present even seasonally in soil below the water table could leach to groundwater, particularly if the groundwater conditions are reducing. However, as soon as the groundwater mixes with more oxidized groundwater, much of the arsenic is likely to precipitate from solution.

Arsenic concentrations detected in soil ranged between 0.773 mg/kg and 40 mg/kg, as shown in Figure 6-17, with an average detected concentration of 5.46 mg/kg, which is consistent with the background concentration for the Puget Sound area. However, arsenic was detected at concentrations exceeding the soil screening level of 7.3 mg/kg in 14 samples: 6 samples (CS-6 to CS-8, between 0 and 6 ft bgs; and S-10 at 1 ft bgs) collected in the transfer yard, 1 sample (T-2, 5.5 ft bgs) collected in the tank farm area, 1 sample (HA-8, 4 ft bgs) collected just to the northwest of the tank farm, and also in samples collected at MW-12 (7 ft bgs), S4 (1 ft bgs), HA-3 (9 ft bgs), HA-5 (7 ft bgs), HA-6 (4.5 ft bgs), and HA-7 (4.5 ft bgs). The soil arsenic concentrations detected in the tank farm area may have resulted in the elevated arsenic concentrations in groundwater measured in this area. Arsenic was not detected in the leachate from three vadose zone soil samples collected during the May 2002 stormwater pipeline repair activities and submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis or in 12 vadose zone soil samples collected between 1988 and 1990 and submitted for Extraction Procedure Toxicity Test (EPTox) analysis, as summarized in Table 6-8. Even if the soil covering were removed in the future, leaching of arsenic from soils above the seasonal high water table elevation is unlikely as the geochemical conditions in the unsaturated zone would likely remain aerobic, preventing the reduction of arsenic to the more mobile As(III).

Cadmium

Cadmium is one of the most mobile of the heavy metals but its mobility is strongly influenced by the pH and by sorption to mineral surfaces, hydrous metal oxides, and organic materials. Cadmium is most mobile under acidic conditions, and is not strongly influenced by the oxidizing or reducing potential of the system (ATSDR, 1999a).

Cadmium was detected at concentrations exceeding the soil screening level of 0.8 mg/kg in 13 soil samples collected from the tank farm area and the transfer yard area at concentrations ranging between 94 mg/kg (CS-5, 6 ft bgs) and 0.863 mg/kg (MW-20, 4 ft bgs), as shown in Figure 6-18. Cadmium has been detected only sporadically in groundwater, and concentrations above the groundwater screening level appear to be associated with quantification of cadmium in suspended particulates, as discussed in the next section. In addition, cadmium was not detected in groundwater samples collected from the transfer yard area which remained uncovered until October 2001. Furthermore, cadmium was not detected in the leachate from three vadose zone soil samples collected during the May 2002 stormwater pipeline repair activities and submitted for TCLP analysis or in 12 vadose zone soil samples collected between 1988 and 1990 and submitted for EPTox analysis, as summarized in Table 6-8. Based on these results, cadmium is not expected to leach to groundwater at significant concentrations.

Copper

Copper movement in soil is generally controlled by its adsorption to organic matter, carbonate minerals, clay minerals, or hydrous iron and manganese oxides. Copper binds to soil much more strongly than other divalent cations, and thus, the mobility of copper in soil is not as strongly affected by changes in pH as are other metals (ATSDR, 2002). A background soil copper concentration of 36.4 mg/kg was reported for the Puget Sound area (Ecology, 1994).

Copper was detected in six soil samples (S4, 1 ft bgs; MW-12, 7 ft bgs; HA-8, 4 ft bgs; CS-6, 6 ft bgs; CS-7, 6 ft bgs; and MW-24D, 6 ft bgs) at concentrations exceeding the soil screening level of 36.4 mg/kg, as shown in Figure 6-19. The highest detected concentration, 356 mg/kg, was detected at S4, to the northeast of the stabilization area. The copper concentration detected in an additional sample collected from the same area (MW-14, 6.5 ft bgs) was significantly lower (14 mg/kg), suggesting that the extent of elevated copper concentrations in this area is very limited. In addition, copper was not detected in leachate from a sample collected at the same location and submitted for Extraction Procedure Toxicity Test (EPTox) analysis. Copper was not detected in the leachate from three vadose zone soil samples collected during the May 2002 stormwater pipeline repair activities and submitted for TCLP analysis and was detected in the leachate from only two of 12 samples collected between 1988 and 1990 and submitted for EPTox analysis, as summarized in Table 6-8. The detected leachate concentrations, 16 µg/L and 20 µg/L, are above the groundwater screening level of 3.5 µg/L. However, the copper in soil is not expected to leach to groundwater at concentrations above the screening level, which is consistent with most groundwater monitoring data.

Cyanide

Cyanide was detected above the screening level of 0.1 mg/kg in twelve soil samples, ranging from a concentration of 0.122 mg/kg in sample MW-24D (6 ft bgs) to 0.655 mg/kg in sample HA-10 (1 ft bgs).

Mercury

Mercury occurs naturally in volcanically derived soils as well as a result of emissions from anthropogenic activities such as chlor-alkali production, cement manufacturing, and smelting operations, including copper smelting. Mercury has three valence states and is found in the environment in the metallic form and in the form of various inorganic and organic complexes. In soils and surface waters, mercury can exist in the mercuric (Hg+2) and mercurous (Hg+1) states as a number of complex ions with varying water solubilities. Mercury tends to exist in volatile forms (e.g., metallic mercury and dimethylmercury) at low pHs (<3) and in solid forms at more moderate pHs (>4). Hg+2 can be microbially reduced to the more volatile elemental mercury. Adsorption of mercury in soil is decreased with increasing pH and/or chloride ion concentrations and leaching is a relatively insignificant transport process in soils (ATSDR, 1999c). A background soil mercury concentration of 0.07 mg/kg was reported for the Puget Sound area (Ecology, 1994).

Mercury was detected in soil throughout the property at concentrations up to 2.03 mg/kg exceeding the screening level of 0.07 mg/kg, as shown in Figure 6-20. The distribution of mercury in soil at the facility suggests that it may be associated with area background conditions, possibly resulting from deposition from the former ASARCO smelter in Tacoma or associated with fill materials used at the site. Mercury was not detected in the leachate from three vadose zone soil samples collected during the May 2002 stormwater pipeline repair activities and submitted for TCLP analysis or in 12 vadose zone soil samples collected between 1988 and 1990 and submitted for EPTox analysis, as summarized in Table 6-8. As a result, mercury in soil is not expected to leach to groundwater at concentrations above the groundwater screening level. Mercury has not been detected in groundwater in the shallow water-bearing unit.

Selenium

Selenium was detected at concentrations exceeding the screening level of 0.78 mg/kg in nine soil samples, at concentrations ranging from 0.802 mg/kg (HA-6 at 7 ft bgs) to 1.83 mg/kg (HA-8 at 4 ft bgs).

Silver

Silver was detected at concentrations exceeding the screening level of 0.61 mg/kg in two soil samples with a concentration of 1 mg/kg (CS-5 at 1 ft bgs and S4 at 1 ft bgs).

Thallium

Thallium occurs naturally in trace amounts in soil but is also released to the environment in emissions from cement factories and smelting operations. Thallium has a strong affinity for soil but can also be found in soluble inorganic compounds (ATSDR, 1992b). No Puget Sound area specific background concentration has been adopted for thallium, but background concentrations reported for the western United States ranged between 2.4 mg/kg and 31 mg/kg (Shacklette and Boerngen, 1984).

Thallium was detected concentrations exceeded the screening level of 0.34 mg/kg in two soil samples, one (S-4, 1 ft bgs at 11 mg/kg) collected along the northwestern portion of the drainage ditch, and the other (CS-5, 1 ft bgs, at 12 mg/kg) in the transfer area. Similar to antimony, thallium was detected in only surface soil samples. As it has not been detected in deeper soils at the site, it is not expected to leach to groundwater at concentrations that exceed the groundwater screening level.

Zinc

Zinc was detected at concentrations exceeding the screening level of 85.1 mg/kg in two soil samples, KT-SSP-0399-4 from 3.5 feet, and S4 from 1 foot, with concentrations of 87.2 mg/kg and 194 mg/kg, respectively.

6.3.3.5 Total Petroleum Hydrocarbons

Total petroleum hydrocarbons, more commonly known as TPH, is a complex mixture of hundreds of chemicals, each with individual fate and transport characteristics. Constituents that fall within the gasoline range of TPH are typically fairly mobile within the environment while those within the diesel range of TPH are typically less mobile. The biodegradation of petroleum hydrocarbons has been reported for numerous sites under a wide variety of geochemical conditions, indicating that it is likely to occur at most sites (Wiedemeier et al., 1999).

Gasoline range, diesel range, and oil range organics have been detected in soil at concentrations exceeding the screening levels in the area of the tank farm and in a single sample collected south of the tank farm along the stormwater pipeline, as shown in Figures 6-21 and 6-22. The highest concentrations of gasoline range organics were detected in the tank farm area at concentrations ranging between 1.39 mg/kg (MW-21, 7.5 ft bgs) and 1,710 mg/kg (HA-9, 3 ft bgs), with the highest concentrations in surficial soil samples. Diesel range organics were detected in two soil samples collected from the tank farm (HA-10, 1 ft bgs; HA-9, 3 ft bgs) and one sample along the stormwater pipeline (KT-SSP-0399-4; 3.5 ft bgs) at concentrations exceeding the soil screening level of 2,000 mg/kg. Lube oil range organics were also detected in three soil samples collected from the tank farm area (HA-10, 1 ft bgs; HA-9, 3 ft bgs; MW-23, 3 ft bgs) at concentrations exceeding the soil screening level of 2,000 mg/kg.

The extent of the elevated TPH concentrations detected along the stormwater pipeline appears to be very limited, and thus, should the pavement be removed in the future, any potential leaching would not likely significantly impact groundwater quality. The TPH in the tank farm area appears to be associated with surficial releases of petroleum. Petroleum-impacted soil has been detected outside the tank farm area but the detected concentrations are below soil screening levels.

Diesel and lube oil range organics have not been detected in the last year of groundwater samples in the immediate vicinity of the apparent release (the tank farm area).

6.3.3.6 Summary of Nature and Extent of COPCs in Soil

A summary of the nature and extent of COPCs in soil is presented for each of the AOCs at the site in this section.

AOC No. 1: Former USTs

Soil sampling in the area of the former USTs was conducted during tank removal in 1991 and during the installation of groundwater monitoring wells MW-9, MW-10 and MW-11 in 1989. No COPCs were detected in soil samples collected from this area.

AOC No. 2: Tank Farm Area

A review of available soil data indicates that the tank farm may be the primary source for releases to the soil and groundwater. Compounds that have been detected in soil from the tank farm area at concentrations exceeding the soil screening levels include: benzene; 1,4-dichlorobenzene; PCBs; inorganic constituents including arsenic, cadmium, and copper; and gasoline range, diesel range and lube oil range organics. Higher concentrations have been detected in the surface soil than in subsurface soil in petroleum impacted areas suggesting a surficial release. Groundwater has been impacted by a subset of these COPCs; however, the magnitude and extent are very limited (see Section 6.3.4 for details).

AOC No. 3: Stabilization Area

Copper is the only COPC identified in soil in the stabilization area at concentrations exceeding the soil screening level. The areal extent of copper-impacted soil appears to be very limited; copper has not been detected in the shallow groundwater nor is copper expected to leach to groundwater.

AOC No. 4: Stormwater Drainage System

PAHs, cadmium, and diesel range organics were detected at concentrations exceeding soil screening levels in the area of the stormwater drainage system and drainage ditch. The extent of the impacted areas for PAHs appears to be limited to a small area north of the tank farm along the drainage ditch while the cadmium and diesel impacted areas of AOC 4 appear to be limited to a very small area south of the tank farm.

Process and Storage Area

Several soil samples were collected from the process and storage areas of the facility. However, no COPCs were detected at concentrations exceeding soil screening levels in these samples.

Transfer Yard

A number of soil samples were collected from the area of the current transfer yard prior to the construction of the yard in 2001, and then again in 2007. Pesticides and inorganic constituents (copper and cadmium) were detected in soil samples from this area at concentrations exceeding soil screening levels. The pesticides appear to be associated with the historical agricultural land use in the area while copper and cadmium concentrations may be associated with fill material used across the site during construction. None of these COPCs are present in groundwater.

Summary of Fate and Transport of COPCs in Soil

Although methylene chloride was identified as a COPC in soil at the site, it is either very limited in extent or may be associated with laboratory contamination. Similarly, the distribution of antimony, mercury, and thallium suggests that the detected concentrations of these constituents are associated with area background conditions or from the original fill.

The surface of the facility and most of the transfer yard is entirely covered with asphalt, concrete, or buildings effectively preventing the leaching of soil COPCs to groundwater. As long as this covering remains in place, leaching is assumed to be negligible. If the covering is removed in the future, leaching may still have a negligible effect on groundwater concentrations due to the low frequency of detection of most COPCs and the natural attenuation processes that have been acting to reduce concentrations present in the soil. The only area on the site where COPCs in soil have also impacted groundwater is the area of the Tank Farm (AOC 2). However, the COPCs in groundwater are a much smaller subset of those found in soil, the concentrations are generally very low, and the areal extent of groundwater impacts is limited.

6.3.4 Nature and Extent of Groundwater COPCs

VOCs, SVOCs, PAHs, pesticides, and inorganic constituents were identified as COPCs in groundwater at the site. The known nature and extent of these constituents in groundwater at the facility is presented in this section. In addition, the potential fate and transport of these COPCs off-site were evaluated based on the properties of each COPC, the groundwater flow patterns characterized in Section 4, and the actual groundwater monitoring results, and are also described in this section. The majority of the COPCs identified in groundwater at the site were identified based on the protection of surface water. Protection of surface water receptors is extremely conservative since other than the drainage ditch at the north end of the site, the nearest surface water receptor is Mill Creek, which is located approximately 0.5 mile from the facility.

Section VII.C.11.b.16 of the facility's operating permit requires that isopleth concentration maps be created for the contaminants detected in groundwater at the site. However, these maps cannot be created for most of the COPCs identified in groundwater at the site because of the low detection frequencies. Isopleth maps were created only for those COPCs that were detected in at least four samples from a given water-bearing unit during a given quarter since the fourth quarter of 2006 (note that isopleths maps were not created for methyl tert-butyl ether [MTBE], iron, or manganese). These maps are referred to in the description of the nature and extent of COPCs in groundwater in this section.

6.3.4.1 Volatile Organic Compounds

Benzene, 1,1-dichloroethene (1,1-DCE), methyl tert-butyl ether, TCE, and vinyl chloride were identified as COPCs in groundwater.

Benzene

Similar to its behavior in soil, benzene readily volatilizes and biodegrades in groundwater and is expected to be relatively mobile in the environment (HSDB, 2004). During the last four quarters (fourth quarter 2006 and first through third quarters 2007), benzene was detected at concentrations exceeding the groundwater screening level of 0.795 µg/L at two locations (MW-123-S and MW-112-S). The highest benzene concentrations were detected at MW-123-S (15 to 44 µg/L) screened in the shallow water-bearing zone. However, benzene was not detected in the two downgradient shallow water-bearing zone wells (MW-126-S and MW-127-S) or in MW-123-I, which is screened in the intermediate aquifer, suggesting that the extent of the elevated benzene concentrations is limited and that no significant lateral or vertical migration of benzene is occurring. Although MW-112-S was dry during all but the first and second quarters of 2007, an evaluation of historical data indicates that benzene concentrations in most wells appear to be decreasing over time or are detected at consistently low concentrations, as illustrated in Figure 6-23. Benzene was not detected in groundwater samples from the deep aquifer, with the exception of MW-24D which had a detection during fourth quarter 2006 of 0.15 µg/l, which is well below the screening level for benzene of 0.795 µg/l. MW-24D has never had another detection of benzene. A 3-D fence diagram showing the maximum concentrations of benzene over time in all aquifers is illustrated in Figure 6-24.

Methyl tert-butyl ether

The methyl tert-butyl ether screening level of 24 µg/L was exceeded in only two samples – MW-123-S from first quarter 2007 and MW-123-S from second quarter 2007, at concentrations of 85 and 87 µg/L respectively. All other detections of methyl tert-butyl ether were below 7.3 µg/L , which is well below the screening level.

Chlorinated Ethenes

Chlorinated ethenes TCE and vinyl chloride are often used as solvents and degreasing agents in a wide variety of industries (HSDB, 2003) and are readily biodegraded under the correct geochemical conditions. Highly chlorinated ethenes, such as TCE, typically biodegrade more quickly under anaerobic conditions while the less chlorinated ethenes, such as vinyl chloride, typically degrade more quickly under aerobic conditions. The biodegradation of chlorinated ethenes occurs by step-wise dechlorination; thus, PCE degrades to TCE, which degrades to cis-1,2-dichloroethene (cis-1,2-DCE), then vinyl chloride, and finally ethene and ethane, as presented in Figure 6-25. Chlorinated ethenes are expected to be relatively mobile in the environment but will also likely be lost from soil and groundwater as a result of volatilization and/or biodegradation (HSDB, 2004).

During the last four quarters, 1,1-dichloroethene (1,1-DCE) and TCE were detected at concentrations exceeding the screening level in only one well at the facility – MW-120-I1. 1,1-DCE was detected in MW-120-I1 at concentrations ranging from 0.21 µg/L (fourth quarter 2006) to 0.17 µg/l (third quarter 2007), exceeding the screening level of 0.057 µg/L. TCE was detected in MW-120-I1 at concentrations ranging from 1.3 µg/L (fourth quarter 2006) to 0.79 µg/l (third quarter 2007), exceeding the screening level of 0.11 µg/L. During the last four quarters, vinyl chloride was detected at concentrations exceeding the screening level in only three monitoring wells at the facility – MW-112-S, MW-120-I1, and MW-24D. Vinyl chloride was detected consistently at MW-120-I1 at concentrations ranging between 1.9 µg/L and 2.6 µg/L, exceeding the screening level of 0.025 µg/L. An examination of historical concentrations of 1,1-DCE, TCE, and vinyl chloride, as well as 1,1-dichloroethane (1,1-DCA), in MW-120-I1 indicates that all four constituents are decreasing, as illustrated in Figure 6-26.

A Mann-Kendall analysis for 1,1-DCE, TCE, and vinyl chloride in MW-120-I1 shows that all three constituents have shrinking trends. Worksheets adapted from Ecology guidance documents (Ecology, 2005) were used to assess trends in the concentrations of TCE, 1,1-DCE, and vinyl chloride in groundwater from well MW-120-I1. The spreadsheets from Package A, Module 1 of the Natural Attenuation Tool Package use the Mann-Kendall trend test (Gilbert, R.O., 1987, Statistical Methods for Environmental Pollution Monitoring, John Wiley & Sons) and a confidence level of 85 percent to assess trends in the data (expanding, stable, shrinking, or no trend observed). Mann-Kendall trends were calculated with at least four data points for TCE, 1,1-DCE, and vinyl chloride that exceeded the detection limit. Results for MW-120-I1 show shrinking plume stabilities for TCE, 1,1-DCE, and vinyl chloride: The results of the assessment are summarized below:

Well	**Trichloroethene**	**1,1-Dichloroethene**	**Vinyl chloride**
MW-120-I1	shrinking	shrinking	shrinking

The concentrations at which TCE and vinyl chloride have been detected do not suggest the presence of DNAPL. Chlorinated ethenes have been detected in downgradient well MW-124-

I1 at low concentrations (1,1-DCA up to 0.76 µg/L and cis-1,2-DCE up to 0.20 µg/L), but have not been detected in downgradient well MW-122-I2, indicating that the extent of chlorinated ethenes in Zone A of the intermediate aquifer appears to be limited to the area near MW-120-I1 and MW-124-I1. In addition, chlorinated ethenes have not been detected in groundwater from Zone B of the intermediate aquifer (with the exception of 1,1-DCA in MW-123-I) or in the deep aquifer (with the exception of 1,1-DCA in MW-16 and MW-24D; and cis-1,2-DCE and vinyl chloride in MW-24D). The consistent detection of chlorinated solvent compounds in only one well, MW-120-I1, and the presence of vinyl chloride at concentrations greater than those of the parent compounds TCE and 1,1-dichloroethene, suggest that biodegradation is limiting the lateral and vertical migration of chlorinated ethenes in groundwater at the site. Consequently, chlorinated ethenes in groundwater are not expected to migrate off site.

Three-dimensional (3-D) fence diagrams showing the maximum concentrations of TCE, 1,1-dichloroethane, and vinyl chloride over time in all aquifers are illustrated in Figures 6-27 to 6-29, respectively.

6.3.4.2 Semivolatile Organic Compounds

Two SVOCs, namely bis(2-ethylhexyl) phthalate ,and chrysene, were identified as COPCs in groundwater and are discussed in detail in the following sections.

Bis(2-ethylhexyl) phthalate

Phthalates, a group of compounds that were formerly used as pesticides and currently used as plasticizers and ink solvents, are common laboratory contaminants. Phthalates tend to exhibit low mobility in the environment due to low water solubilities, low volatilization potential, and strong tendencies to adsorb to soil (HSDB, 2003).

During the last four quarters (4Q06 through 3Q07), bis(2-ethylhexyl) phthalate was detected in only two groundwater samples from the shallow water-bearing unit: (1) during the first quarter 2007 sampling event at MW-117-S (2.7 µg/L) and (2) during the first quarter 2007 sampling event at MW-123-S (0.33 J µg/L). The results for a number of samples collected during the first quarter 2007 sampling event were restated as undetected due to method and field blank contamination, suggesting that the two detections of bis(2-ethylheyxyl) phthalate in groundwater could also be attributed to laboratory contamination, even though one of the results was not validated as such (Appendix 6C). A review of historical groundwater analytical results indicates that bis(2-ethylhexyl) phthalate has not been detected consistently in any wells at the site, supporting the hypothesis that the sporadic detections are associated with laboratory contamination.

PAHs

One PAH, chrysene, was identified as a COPC in groundwater. Chrysene is typically fairly immobile in the environment because of its low water solubility, low volatilization potential, and strong tendency to adsorb to soil. Sorption and biodegradation are the primary natural mechanisms of reduction of chrysene concentrations in groundwater (HSDB, 2007).

Chrysene was detected in MW-102-S during the third quarter 2007 sampling event at concentrations exceeding the screening level of 0.02 μg/l. A review of historical data indicates that chrysene has been detected sporadically at low concentrations in groundwater at the facility. Because chrysene has a low water solubility, a strong affinity for soil, and has not been detected frequently across the facility, chrysene detected in groundwater is likely a result of sediment in the groundwater sample (turbid samples) and is likely not representative of dissolved concentrations. The more mobile PAH, naphthalene, has not been detected in groundwater since 2005, supporting the likely case that these detections are not representative of actual groundwater impacts. As a result, PAHs are not considered a COPC for further consideration.

6.3.4.3 TPH

The TPH analysis quantifies all hydrocarbons within certain carbon ranges and thus, can include petroleum-related hydrocarbons as well as naturally occurring hydrocarbons found in organic matter (NTPHWG, 1998). In areas with organic-rich sediments, the inclusion of naturally occurring hydrocarbons can lead to over-estimates of petroleum hydrocarbon concentrations. Ecology's TPH method allows the use of a sample cleanup procedure to remove biogenic hydrocarbons from the sample before it is analyzed for TPH using the NWTPH-Dx method. This cleanup procedure has been used on all groundwater samples collected since April 2002 and has resulted in a significant decrease in the reported concentrations of diesel range and lube oil range organics in groundwater at the facility, as illustrated in Figure 6-30. A detailed description of the procedure and its effects on the concentrations of diesel range organics detected in groundwater at the site is presented in Appendix 6E.

During 2003, diesel range organics were sporadically detected at concentrations exceeding the screening level of 0.5 mg/L in shallow water-bearing unit wells and intermediate aquifer wells across the facility. However, a number of the results may be false positive results as the diesel analysis chromatograms for several of the samples show peaks earlier than the range typical of diesel suggesting potential quantification of naturally occurring organic matter with the groundwater samples. Diesel range organics have not been detected in groundwater at the site since April 2004, when they were detected in one well, MW-123-S. Figures 6-31a,b, 6-32a–d, and 6-33a–d show diesel non-detections in the shallow water-bearing unit, intermediate aquifer Zone A, and intermediate aquifer Zone B, respectively, for 4Q06 through 3Q07.

A 3-D fence diagram showing the maximum concentrations of diesel over time in all aquifers is illustrated in Figure 6-34.

6.3.4.4 Pesticides

One pesticide, 4,4’-DDD, was identified as a COPC in groundwater.

DDD is a metabolite of DDT (and metabolites). 4,4’-DDD was detected in one sample, MW-131-I, during the third quarter 2007 sampling event, at a concentration of 0.00055 µg/l, which is only slightly above the screening level of 0.0005 µg/l. The detection of 4,4’-DDD in groundwater is likely associated with the historical agricultural land use at the site. 4,4’-DDD is typically immobile in the environment due to a strong tendency to adsorb to soil and a low water solubility. In addition, concentrations can be reduced over time through biodegradation, photodegradation, and abiotic reactions, such as hydrolysis.

6.3.4.5 Inorganic Constituents

Inorganic constituents arsenic, cyanide, iron, and manganese were identified as current COPCs in groundwater. Cadmium, copper, chromium, lead, and mercury have not been analyzed in groundwater since 2003, but they were included as COPCs in the Draft RI, and the most recent (2003) results for these constituents are discussed below.

Arsenic

A 3-D fence diagram showing the maximum concentrations of arsenic over time in all aquifers is illustrated in Figure 6-35.

From 4Q06 to 3Q07, arsenic was detected at concentrations exceeding the groundwater screening level of 0.5 µg/L in all groundwater samples that were analyzed for arsenic. The highest concentrations of arsenic were detected at two shallow water bearing unit wells located in the tank farm area and the treatment-stabilization area, MW-123-S and MW-112-S.

Concentrations at these wells ranged between 39.4 µg/L at MW-112-S and 81.8 µg/L at MW-123-S. However, the maximum arsenic concentration detected in groundwater from MW-126-S, downgradient of these wells, was 5.1 µg/L. This suggests that the elevated arsenic concentrations in the shallow water-bearing unit are limited to the tank farm area and that arsenic is not migrating off site at significant concentrations. Arsenic concentrations in groundwater in 1Q07 and 2Q07 are depicted in Figures 6-36a and 6-36b, respectively, for the shallow water-bearing unit.

During the last four quarters, arsenic concentrations in Zone A of the intermediate aquifer ranged from 2.2 µg/L at MW-122-I2 during the second quarter 2007 to 20.1 µg/L at MW-117-I2 during the second quarter 2007. Arsenic concentrations in Zone B of the intermediate aquifer ranged from 5.3 µg/L at MW-123-I during the fourth quarter 2006 to 24 µg/L at MW-126-I during the second quarter 2007. Arsenic concentrations in groundwater during the last four quarters are depicted in Figures 6-37a through 6-37d for Zone A of the intermediate aquifer, and Figures 6-38a through 6-38d for Zone B of the intermediate aquifer.

Arsenic concentrations in the deep aquifer ranged from 1.1 µg/L in MW-16 during the second quarter 2007 to 2.9 µg/L at MW-24D during the third quarter 2007 sampling event.

Arsenic concentrations in groundwater at the site have not exhibited any significant increasing or decreasing trends over time, as illustrated in Figure 6-39, with the exception of Intermediate Zone A well MW-117-I2, which has increased in arsenic since second quarter 2005. The highest concentrations have been associated with the shallow water-bearing unit in the tank farm area and are likely associated with soil concentrations in this area combined with reducing conditions in groundwater in the same area. Arsenic concentrations decrease substantially downgradient from the tank farm area, as conditions likely become more oxidizing.

Naturally elevated concentrations of arsenic have been detected in both soil and groundwater throughout Western Washington (Ecology, 1994; WDOH, 1999). Reports of groundwater arsenic concentrations exceeding the state and federal primary maximum contaminant level (MCL)[5] of 10 ppb in public water supply systems throughout western Washington are numerous (WDOH, 1999). In groundwater, arsenic typically exists as oxyanions with oxidation states of III (arsenite) and V (arsenate). The dominance of arsenite (HnAsO3n-3) or

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[5] Primary MCLs are chemical, physical, and bacteriological standards selected to prevent adverse health effects while secondary MCLs are standards developed to control factors such as taste and odor. Primary and secondary MCLs are set by the Washington State Department of Health (WAC 246-290 and WAC 246-291) and the United States Environmental Protection Agency (40 CFR 141, 143). While the private water supply well serving a single-family residence is not required by law to meet these standards, these standards are recommended for use with single family wells in order to protect the health of the users (DOH, 2001).

arsenate (HnAsO4n-3) is strongly dependent upon the pH and Eh of the groundwater (Vance, 1995). The reduction of arsenate to arsenite can promote arsenic mobility because arsenite is generally less strongly adsorbed to aquifer materials than is arsenate. Arsenic mobility in groundwater is usually controlled by redox conditions, pH, biological activity, and adsorption/desorption reactions and increases with increasing pH and more reducing conditions (Hinkle and Polette, 1998). Arsenic can also form insoluble sulfides with reduced sulfate under strongly reducing conditions.

Virtually all groundwater sample results from the facility are above the screening level of 0.5 μg/L for arsenic. In general, elevated arsenic levels in groundwater can be due to any of the following contributors:

- arsenic mass contributed from releases on site;
- arsenic mass contributed from increased mobilization/solubility in the saturated zone on site due to localized geochemical conditions caused by historic organic releases of contaminants to groundwater. These reducing conditions potentially may be favorable to mobilizing arsenic from soil into groundwater; and
- arsenic mass contributed from groundwater upgradient of the site.

Arsenic mass has not been significantly contributed from releases on site. Arsenic has not been used at the site historically. There may have been a limited release of arsenic-bearing material to soil in the tank farm area. The extent of this release appears to be limited to the extent of the tank farm, and the arsenic concentrations detected through the remainder of the site are associated with area background conditions. As discussed in Section 6.3.3.4, only 14 soil samples have exceeded the soil screening level for arsenic, and the maximum result (40 mg/kg) was less than 6 times the screening level. Arsenic was not detected in the leachate from three vadose zone soil samples submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis or in 12 vadose zone soil samples submitted for Extraction Procedure Toxicity Test (EPTox) analysis. Even if the soil covering were removed in the future, leaching of arsenic from soils above the seasonal high water table elevation is unlikely as the geochemical conditions in the unsaturated zone would likely remain aerobic, preventing the reduction of arsenic to the more mobile As(III).

To estimate the arsenic mass contributed from increased mobilization/solubility in the saturated zone on-site due to geochemical conditions and previous organic releases in groundwater at the site, oxidation–reduction potential (ORP) results were plotted with arsenic results for the wells with the highest concentrations of arsenic. Figures 6-40 to 6-44 show plots of arsenic concentration and ORP over time as well as scatter plots of ORP versus arsenic concentrations for MW-112-S, MW-123-S, MW-127-S, MW-117-I2, and MW-126-I, respectively. No correlation could be made between ORP and arsenic. Diesel concentrations over time were then plotted with arsenic trends for the same wells (Figures 6-45 to 6-49). Many of these wells had sparse diesel detections, so the graphs were not useful. Nondetections were plotted as half the reporting limits. No correlation was noted between diesel and arsenic concentrations, except for well MW-112-S, in which arsenic increased as diesel decreased. This suggests that diesel degradation has created reducing conditions favorable to mobilizing arsenic from soil into groundwater. Three-dimensional fence plots of maximum detected concentrations of arsenic and diesel are shown in Figures 6-35 and Figure 6-34, respectively. The areas of high diesel tend to correspond with areas of high arsenic concentration.

To determine arsenic mass contributed from groundwater upgradient of the site, upgradient and downgradient wells were selected for each groundwater zone at the site (Table 6-9). Arsenic concentrations over the lifetime of each well were averaged, and a standard deviation calculated. As shown in Table 6-9, in the Intermediate Zone B and the Deep Aquifer, average arsenic concentrations in downgradient groundwater are not appreciably different from average arsenic concentrations in upgradient groundwater. In Intermediate Zone A, the average arsenic concentrations in the upgradient wells are up to four times higher than the average arsenic concentration in the Intermediate Zone A downgradient well, indicating that arsenic mass is being contributed to the site from upgradient groundwater in this zone.

In the shallow water-bearing unit, groundwater flow direction is inconsistent. As a result, two different wells were used to represent “downgradient” conditions: MW-126-S and MW-127-S. Average arsenic concentrations in samples from downgradient well MW-127-S are up to 10 times higher than the average arsenic concentration in samples from upgradient well MW-117-S. These data indicate that arsenic concentrations in the shallow water-bearing unit have been affected by the site activities, likely as a result of geochemical conditions associated with hydrocarbon impacts.

To conclude, (1) elevated arsenic levels in groundwater at the facility, particularly in the shallow zone, are affected by localized geochemical conditions caused by historic organic releases of contaminants such as diesel to groundwater. However, geochemical trends for arsenic are not clear. (2) Concentrations of arsenic in upgradient and downgradient wells in the Intermediate Zone B and Deep Aquifers do not differ appreciably. (3) Arsenic mass is being contributed to facility groundwater from groundwater upgradient of the site in Intermediate Zone A.

Cadmium

Cadmium, often found in phosphate fertilizers as well as naturally in the earth's crust, is more mobile in aquatic environments than most other heavy metals. Cadmium exists in groundwater as the hydrated ion, or as ionic complexes with other inorganic or organic substances. Because cadmium exists only in the +2 oxidation state in water, aqueous cadmium is not strongly influenced by the oxidizing or reducing potential of the water. However, under reducing conditions, cadmium may form cadmium sulfide, which is poorly soluble and tends to precipitate. Precipitation and sorption to mineral surfaces, hydrous metal oxides, and organic materials are the most important processes for removal of cadmium from solution. Cadmium concentrations in water are inversely related to the pH and the concentration of organic material in the water (ATSDR, 1999a).

Cadmium was detected in one groundwater sample from MW-123-S during the first quarter 2003 sampling event at a concentration of 2.53 µg/L, just exceeding the groundwater screening level of 2.31 µg/L. The detected cadmium may have been associated with the quantification of cadmium in suspended soil particles as the groundwater quality measurements made just prior to sampling indicated an elevated, but stable, turbidity (13.1 NTU). A review of historical groundwater data indicates that cadmium has been detected only sporadically at concentrations ranging between 0.28 µg/L and 3.6 µg/L, and has not ever been detected at the same sampling location more than once. Therefore, the cadmium detected at the site is not thought to be associated with a release from the site and is not expected to migrate significantly in groundwater in the future. Cadmium has not been analyzed in groundwater at the site since 2003.

Chromium

Chromium is found naturally at elevated concentrations in volcanically derived minerals (ATSDR, 2000), such as those which form the aquifer matrix at the site (HSDB, 2003). Chromium is typically present as the highly toxic Cr (VI) under strongly oxidizing conditions and the much less toxic Cr(III) under moderately oxidizing to reducing conditions (Lyman et al, 1987). Consequently, the chromium detected in groundwater samples was likely all present as Cr(III). The solubility of Cr (III) is controlled by precipitation as hydroxides and oxides, as well as sorption (Lyman et al., 1987).

During 2003, chromium was detected in only two groundwater samples (MW-123-S, 1/10/03 and GP-118-D) at concentrations exceeding the screening level of 10 μg/L. However, these results are likely elevated because of the presence of chromium in suspended soil particles as both groundwater samples were somewhat turbid. The highest chromium concentrations historically detected in groundwater were in the shallow water-bearing unit in the area of the tank farm. As groundwater samples from this area are often turbid, the elevated chromium concentrations detected in groundwater could be associated with turbid samples. Chromium has not been detected in wells near the property boundary. Thus, chromium is not expected to migrate significantly in groundwater in the future.

Chromium has not been analyzed in groundwater at the site since 2003, with the exception of hexavalent chromium, which has been analyzed in samples from all wells beginning in the second quarter 2007. Since 2Q07, hexavalent chromium has been detected in only two wells: Intermediate Zone A well MW-120-I1 at an estimated concentration of 0.03 J mg/L in April 2007, and Intermediate Zone B well MW-130-I at an estimated concentration of 0.02 J mg/L in April 2007. These concentrations were both below the hexavalent chromium screening level of 0.05 mg/L.

A 3-D fence diagram showing the maximum concentrations of hexavalent chromium over time in all aquifers is illustrated in Figure 6-50.

Copper

Copper exists in three oxidation states: +2, +1, and 0. Copper has a strong affinity for soil and typically exhibits low mobility in the environment, except at low pH (<4) (ATSDR, 2002). Copper was detected at concentrations exceeding the screening level in two groundwater samples (MW-114-I1, 1/9/03 and GP-118-D). However, these results are likely elevated because of the presence of copper in suspended soil particles in turbid groundwater samples. Historically, copper was detected at concentrations exceeding the screening level in only 3 of 174 groundwater samples. The copper detected in groundwater at the site is not considered to be associated with a release. Therefore, copper is not expected to migrate from the property at concentrations exceeding the screening levels. Copper has not been analyzed in groundwater at the site since 2003.

Cyanide

Cyanide is found naturally in the fruits, seeds, roots, and leaves of numerous plants, and is used in metal-finishing and herbicides (ATSDR, 1997). Cyanide occurs most commonly as hydrogen cyanide in water, although it can also occur as the cyanide ion, alkali and alkaline earth metal cyanides (potassium cyanide, sodium cyanide, calcium cyanide), relatively stable metallocyanide complexes (ferricyanide complex [Fe(CN)6]-3), moderately stable metallocyanide complexes (complex nickel and copper cyanide), or easily decomposable metallocyanide complexes (zinc cyanide [Zn(CN)2], cadmium cyanide [Cd(CN)2]). Hydrogen cyanide and the alkali metal cyanides are not likely to be strongly sorbed onto sediments and suspended solids because of their high water solubilities. Mobility is lowest in soils with low pH and high concentrations of free iron oxides, positively charged particles, and clays. Cyanide concentrations can be reduced as a result of biodegradation (ATSDR, 1997).

During the last four quarters, cyanide was detected most frequently in the deep aquifer, and sporadically in the shallow water-bearing unit and intermediate aquifer. The consistent detection in the deep aquifer, which appears to be relatively unimpacted by recent site activities, suggests that the cyanide might be a result of historical herbicidal use in the area or natural conditions. The cyanide concentrations in the deep aquifer ranged from 20 μg/L to a maximum of 40 μg/L at MW-24-D during the third quarter 2007, exceeding the screening level of 10 μg/l. Cyanide concentrations also exceeded the screening level in samples from shallow water-bearing unit wells MW-102-S, MW-112-S, MW-122-S, and MW-127-S, with a maximum concentration of 40 μg/L in MW-122-S during the first and second quarters 2007. Cyanide concentrations also exceeded the screening level in Intermediate Zone A wells MW-114-I1 and MW-117-I2, and Intermediate Zone B well MW-126-I, with a maximum concentration of 340 μg/L in MW-114-I1 during first quarter 2007. Cyanide concentrations in groundwater during the period 4Q06 through 3Q07 are depicted in Figures 6-51a and 6-51b for the shallow water-bearing unit, Figures 6-52a through 6-52d for Zone A of the intermediate aquifer, and Figures 6-53a through 6-53d for Zone B of the intermediate aquifer.

As cyanide is likely present as hydrogen cyanide, it is expected to be very mobile in groundwater. Based on the sporadic pattern and low concentration at which cyanide has been detected in the shallow water-bearing unit and intermediate aquifer, its concentrations are expected to be reduced by dilution and dispersion, as groundwater migrates to the ditch along the north of the facility. Similarly, although detected more consistently in the deep aquifer, cyanide concentrations are likely to attenuate significantly prior to reaching the Green River, located approximately one-half mile to the northwest of the facility. Thus, cyanide detected in groundwater at the facility is not expected to reach surface water at concentrations exceeding the screening levels.

A 3-D fence diagram showing the maximum concentrations of cyanide over time in all aquifers is illustrated in Figure 6-54.

Iron

The iron screening level of 300 µg/L was exceeded in 33 of 34 samples where it was detected. Iron is consistently detected between approximately 20,000 and 100,000 µg/L across the entire site, indicating that iron is an area issue and not a result of impacts from the facility. The only wells that have ever had concentrations of iron below the screening level are MW-102-S and MW-122-S.

However, over the last year, the highest concentrations of iron were detected in samples from wells MW-123-S, MW-114-I1, and MW-123-I, with a maximum concentration of 140,000 µg/L in MW-123-S in January 2007. These three wells are all in the tank farm area. When plotted with ORP, the trends in iron concentration over time for these wells do not appear to be related to reducing conditions; however, these three wells are in an area of previous diesel-affected groundwater which could have contributed to reducing conditions and the precipitation of iron.

Lead

Lead, which occurs naturally in the environment, was also used as a paint and gasoline additive until the early 1990's (ATSDR, 1999b). Elevated lead concentrations in soil in the Puget Sound area have been associated with historical emissions from the ASARCO Smelter in Tacoma (KCEHD, 2000). The mobility of lead in groundwater is limited by the formation of insoluble lead sulfates, carbonates, hydroxides, and phosphates (ATSDR, 1999b).

During 2003, lead was detected in one groundwater sample from location GP-118-D at a concentration exceeding the screening level. However, this sample was somewhat turbid, and thus, the elevated lead result may have been associated with the presence of particulate matter suspended in the groundwater sample. A review of historical groundwater data indicates that lead has not been detected consistently at concentrations exceeding the groundwater screening level in any area of the site. As a result, lead is not expected to migrate significantly in groundwater in the future. Lead has not been analyzed in groundwater at the site since 2003.

A 3-D fence diagram showing the maximum concentrations of lead over time in all aquifers is illustrated in Figure 6-55.

Manganese (dissolved)

The manganese screening level of 50 µg/L was exceeded in all 34 samples which had detections. Manganese is consistently detected between approximately 1,000 and 8,000 µg/L across the entire site, indicating that manganese is an area issue and not a result of impacts from the facility. No wells on site have ever had concentrations of manganese below the screening level of 50 µg/L.

However, over the last year, the highest concentrations of manganese were detected in wells MW-123-S, MW-114-I1, and MW-123-I, with a maximum of 16,100 µg/L in MW-123-S in January 2007. These three wells are all in the tank farm area. When plotted with ORP, the manganese trends for these wells do not appear to be related to reducing conditions; however, these three wells are in an area of previous diesel-affected groundwater, which could have contributed to reducing conditions.

Mercury

Mercury is used in a wide variety of industrial processes and occurs naturally in the environment. The element has three valence states and is found in the environment in the metallic form and in the form of various inorganic and organic complexes. In soils and surface waters, mercury can exist in the mercuric (Hg+2) and mercurous (Hg+1) states as a number of complex ions with varying water solubilities. Mercury tends to exist in volatile forms (e.g., metallic mercury and dimethylmercury) at low pH (<3) and in solid forms at more moderate pH (>4). Hg+2 can be microbially reduced to the more volatile elemental mercury. Adsorption of mercury in soil is decreased with increasing pH and/or chloride ion concentrations and leaching is a relatively insignificant transport process in soils. The most common organic form of mercury, methylmercury, is soluble and mobile in the environment (ATSDR, 1999c).

During 2003, mercury was detected in one groundwater sample collected from the intermediate aquifer (MW-123-I, first quarter sampling event) at a concentration of 1.88 µg/L, which exceeded the groundwater screening level of 0.012 µg/L. Mercury had not been detected in groundwater at this location prior to this sampling event. As the sample was slightly turbid, it is likely that the detected mercury is associated with suspended soil particles, rather than dissolved phase mercury. Historically, mercury has been detected in only two other groundwater samples which were also both turbid. Therefore, mercury is not considered a groundwater contaminant and is not expected to migrate from the property at concentrations exceeding the screening levels. Mercury has not been analyzed in groundwater at the site since 2003.

6.3.5 Summary of Nature and Extent of Groundwater COPCs

Twelve COPCs were identified in groundwater at the site. However, most of these COPCs were detected infrequently and randomly over a very limited areal extent. In addition, a number of the detections appear to be associated with anomalous results or laboratory and sampling artifacts. Of the 12 identified COPCs, only 7 (benzene, trichloroethene, vinyl chloride, arsenic, cyanide, iron, and manganese) were detected consistently at the site. These COPCs, with the exception of cyanide, appear to be related to a release from AOC 2, the Tank Farm. However, the lateral and vertical extent of these COPCs appears to be limited, and they do not appear to be migrating from the site at concentrations exceeding groundwater screening levels. Groundwater in the deep aquifer does not appear to have been impacted by releases at the facility.

- Benzene was detected at concentrations exceeding groundwater screening levels in the shallow water-bearing unit near the tank farm (AOC 2) and stabilization area (AOC 3).

- TCE or vinyl chloride was detected in the shallow water-bearing unit near the stabilization area (MW-112-S), in Zone A of the intermediate aquifer (MW-120-I1), and in deep well MW-24D in the process and storage area. These compounds have not been detected in any other wells at the site, indicating that their extent is limited to these areas within AOC-2 and AOC-3. In addition, biodegradation appears to be reducing the concentrations of chlorinated ethenes in groundwater.

- The distribution of arsenic concentrations in groundwater at the site indicates that there may have been a limited release of arsenic-bearing material in the tank farm area which is mobile in groundwater under reducing conditions. The extent of this release appears to be limited to the extent of the tank farm and the arsenic concentrations detected through the remainder of the site are associated with area background conditions.

- The distribution of iron and manganese concentrations in groundwater at the site indicate that historical tank farm area releases could have contributed to reducing conditions and higher levels of iron and manganese. The extent of the highest concentrations of iron and manganese appear to be limited to the area of the tank farm; the concentrations detected through the remainder of the site are associated with area background conditions.

- The distribution of cyanide in water-bearing units at the facility indicates that elevated cyanide concentrations detected in the deep aquifer are likely associated with area background conditions.
- Pentachlorophenol and diesel were two constituents that were detected above screening levels in the older groundwater data but have not been detected in the last three years and are no longer considered site COPCs. A 3-D fence diagram for maximum historic concentrations of pentachlorophenol is provided in Figure 6-56.

No groundwater impacts appear to be associated with releases from the AOC No. 3, the stabilization area, AOC No. 4, the storm-water pipeline system, or the AOC No. 1, the former UST area.

6.4 NATURE AND EXTENT OF SURFACE WATER COPCS

Surface water samples have been collected as part of numerous environmental investigations at the site since 1988. This section describes the results of surface water characterization activities. The surface water analytical results are presented in full in Appendix 6F. Table 6-10 summarizes the analytical results for VOCs, SVOCs, PCBs and pesticides, and inorganic compounds detected in surface water samples. This table also includes a comparison of detections to the Minimum Surface Water Protection Screening Level, which is the lowest of state and federal surface water criteria that are protective of both the health of aquatic species and human consumption of fish. These criteria include MTCA Method B surface water cleanup levels, and Surface Water ARARs including the National Recommended Water Quality Criteria for Priority and Non-Priority Toxic Pollutants (NRWQC) (EPA, 2006), National Toxics Rule (40 CFR 131), Clean Water Act (§304), and Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A). Table 6-11 summarizes all available measurements of field water quality recorded at the time of sampling for surface water samples.

6.4.1 VOCs

2-Butanone, acetone, benzene, carbon disulfide, xylenes, methylene chloride, and toluene were the only VOCs detected in surface water samples from the drainage ditch. No VOCs were detected at concentrations exceeding the established surface water criteria.

6.4.2 SVOCs

Several SVOCs, including 2,4-dimethylphenol, benzo(b)fluoranthene, benzo(k)fluoranthene, benzoic acid, benzyl alcohol, bis(2-ethylhexyl) phthalate, di-n-octyl phthalate, fluoranthene, p-cresol, phenol, and pyrene, were detected in the surface water samples from the drainage ditch as presented in Table 6-10. However, only three constituents exceeded the established surface water criteria: bis(2-ethylhexyl) phthalate, benzo(b)fluoranthene, and benzo(k)fluoranthene. Concentrations of bis(2-ethylhexyl) phthalate, which ranged between 1.4 µg/L and 8 µg/L, exceeded the established surface water criteria, which range between 1.2 µg/L and 399 µg/L. Bis(2-ethylhexyl) phthalate is a common laboratory contaminant, often reported in older analytical results. Bis(2-ethylhexyl) phthalate has a relatively low water solubility and a strong tendency to adsorb to soil (HSDB, 2004), and thus it is likely that if the concentrations measured in surface water samples were not associated with laboratory contamination, they were associated with soil particulates suspended in solution, as the samples were not filtered.

One sample had a concentration of benzo(b)fluoranthene and benzo(k)fluoranthene of 1.3 µg/L, exceeding the established surface water criteria which range between 0.0028 µg/L and 0.0296 µg/L.

6.4.3 PCBs

Aroclor 1260 was the only PCB detected in surface water samples, but the detected concentrations, which ranged from 0.4 µg/L to 1.8 µg/L, exceeded the PQL, which is 0.02 µg/L. However, as with bis(2-ethylhexyl) phthalate, Aroclor 1260 has a very low water solubility and is expected to adsorb strongly to soil (HSDB, 2004). Consequently, it is likely that the Aroclor 1260 concentrations detected in surface water samples are associated with soil particulates suspended in solution, as the samples were not filtered.

6.4.4 Pesticides

Several pesticides, including atrazine, dursban, ethoprop, and malathion, were detected in surface water samples collected from the drainage ditch. However, only concentrations of dursban (0.2 µg/L) and malathion (0.4 µg/L) were detected at concentrations exceeding their respective established surface water criteria, 0.041 µg/L and 0.1 µg/L. Similar to Aroclor 1260 and bis(2-ethylhexyl) phthalate, dursban has a very low water solubility and is expected to adsorb strongly to soil particles if released to water (HSDB, 2004). Consequently, it is likely that the dursban concentrations detected in surface water samples are associated with soil particulates suspended in solution, as the samples were not filtered. Malathion is not expected to adsorb to soil particles if released to water and thus may have been detected as a result of historical pesticide use in the area of the facility. Malathion is expected to biodegrade rapidly in surface water with complete degradation reported within several weeks (HSDB, 2002). As each of these compounds was only detected one time in a sample collected approximately 13 years ago, it is not likely that they currently represent a significant source of contamination in surface water at the facility.

6.4.5 Inorganic Compounds

The examination of the distribution of inorganic compounds in surface water is complicated by the fact that concentrations of inorganic constituents in surface water can be attributed to a number of different sources. Many inorganic constituents occur in natural waters at varying levels. These constituents may also be mobilized from sediments due to localized geochemical conditions. Finally, these constituents may be also detected in groundwater and surface water as a result of a release.

Surface water criteria for inorganic compounds are established for dissolved concentrations in surface water. Inorganic compounds in particular often have a strong affinity for soil in a soil/water system, and thus, surface water samples that contain suspended soil particles may show artificially elevated concentrations of inorganic compounds that are not actually representative of the concentrations of dissolved phase constituents. Only the comparison of dissolved-phase concentrations of inorganics to dissolved phase surface water criteria will be discussed as the criteria are based on dissolved phase concentrations.

Dissolved-phase arsenic, barium, chromium, nickel, copper, zinc, and iron were detected in surface water samples collected from the drainage ditch along the northern property boundary. However, only three inorganic constituents, arsenic, iron and zinc, were detected at concentrations exceeding the established surface water criteria. Each of these compounds is discussed in detail below.

6.4.5.1 Arsenic

Dissolved-phase arsenic was detected in three samples at concentrations ranging between 2.2J µg/L and 23 µg/L, exceeding the surface water criteria for arsenic, which range between 0.018 µg/L and 17.68 µg/L.

6.4.5.2 Chromium

In natural waters, dissolved chromium is typically present as either Cr3+ or Cr6+. Dissolved-phase chromium was detected in three surface water samples at concentrations ranging between 37 µg/L and 52.5 µg/L, but the concentrations were not reported separately for each species. The detected concentrations were below the established surface water criteria for Cr3+ but exceeded the criteria for Cr6+. Cr3+ typically predominates under reducing conditions at pH values between 5 and 9 (Hem, 1985), as is likely present in surface water from the drainage ditch (Table 6-11). Consequently, the dissolved chromium detected in surface water is likely below the appropriate surface water criteria.

6.4.5.3 Iron

Dissolved-phase iron was detected in three samples at concentrations (2,070 µg/L, 2,500 µg/L and 7,000 µg/L) exceeding the surface water criteria for iron (300 µg/L and 1,000 µg/L). Iron is one of the most abundant elements in the earth's crust, and is present in high concentrations in the soils in western Washington. Similar to arsenic, iron is mobilized under reducing conditions. The elevated iron concentrations detected in surface water in the drainage ditch are likely a result of the presence of soil particulates in turbid samples or iron mobilized by reducing conditions resulting from the growth of vegetation within the ditch, rather than a release from the facility.

6.4.5.4 Zinc

Dissolved-phase zinc was also detected in two samples at concentrations (100 µg/L and 480 µg/L) exceeding the surface water criteria which range between 7,400 µg/L and 16,548 µg/L. Zinc, the most mobile of the heavy metals, is typically found in soluble complexes at neutral and acidic pH as was measured in surface water from the drainage ditch. The elevated zinc concentrations detected in surface water in the drainage ditch are likely a result of the presence of soil particulates in turbid samples rather than a release from the facility.

6.4.6 Summary of Nature and Extent of Surface Water COPCs

Chemical concentrations detected in surface water collected from the drainage ditch along the northern border of the property were compared against state and federal surface water criteria protective of ecological and human receptors. Six organic constituents (bis(2-ethylhexyl) phthalate, benzo(b)fluoranthene, benzo(k)fluoranthene, Aroclor 1260, dursban, and malathion) and three inorganic constituents (arsenic, iron, and zinc) were detected at concentrations exceeding their respective surface water quality criteria. With the exception of malathion, the concentrations of the organic compounds in surface water are likely to have been associated with soil particulates suspended in surface water samples. Malathion was detected in only one sample at a concentration of less than 1 µg/L and as it is expected to biodegrade rapidly, is likely to be no longer present. Arsenic concentrations detected in surface water are likely associated with elevated natural background arsenic concentrations throughout the region. The constituents detected in surface water do not appear to be related to impacts from the site.

6.5 SUMMARY OF NATURE AND EXTENT OF COPCS

The potential for the migration of the COPCs identified in soil, groundwater, and surface water at concentrations exceeding site-specific screening levels is unlikely under both current and future land-use scenarios. Migration is unlikely due to the relatively low concentrations of COPCs detected throughout the site, the discontinuous saturated conditions in the shallow water-bearing zone, and moderate to low groundwater flow rates in the intermediate and deep aquifer zones. In addition, concentrations of organic COPCs in groundwater are expected to attenuate as they migrate from the source areas because of a variety of natural processes including adsorption, dispersion, dilution, changes in geochemistry, and biodegradation.

The majority of COPCs are present at low concentrations that only just exceed the conservative screening criteria and have been only sporadically detected, suggesting that the impacts are extremely limited and are not likely to migrate to surface water. The Tank Farm area appears to have had a release that has impacted both soil and groundwater at concentrations above the conservative screening criteria; however, the groundwater impacts from this release are relatively minor and the extent is limited to a small area around and slightly down gradient of the tank farm. There is no evidence of off-site migration and strong evidence of natural attenuation of the COPCs in groundwater limiting the potential for future offsite migration.

7.0 CONCLUSIONS

A summary of the major findings of this remedial investigation is presented in this section, including conclusions regarding site hydrogeology, the nature and extent of chemicals of potential concern, and the potential for future off-site impacts.

7.1 HYDROGEOLOGIC CONCEPTUAL MODEL

The surface hydrostratigraphy at the site includes four aquifers of interest, each separated by a silt and/or clay aquitard. The four aquifers are:

1. Shallow Water-Bearing Unit, which is only saturated during the winter and spring seasons. During saturated periods, the flow is northeast toward and likely into the drainage ditch.
2. Intermediate Aquifer – Zone A, which is continuously saturated. Flow is generally to the northeast but varies seasonally as a result of recharge from the Shallow Water-Bearing Unit.
3. Intermediate Aquifer – Zone B, which has a more consistent flow pattern to the northwest or west.
4. Deep Aquifer, which is hydraulically confined and has low flow rates northwesterly toward the Green River.

Groundwater flow rates within the shallow aquifer zone are relatively high, but actual flow paths are expected to be limited by a combination of some seasonal discharge to the ditch north of the site and to the ditch on 77th Avenue South, and by seasonally unsaturated conditions. Both Zone A and Zone B of the intermediate aquifer have moderate groundwater flow rates, while the deep aquifer zone has relatively low groundwater flow rates.

7.2 CONCEPTUAL EXPOSURE MODEL

- A CSM was developed to identify human and environmental receptors based on current and assumed future land use and activities at and near the site, and to characterize the nature of these receptors' contact with impacted media at and near the site. The CSM is based on current and assumed future industrial land use at the site and continued industrial and commercial land use in the surrounding area. The highest beneficial use of groundwater in the area was determined to be (1) protection of surface water, which in the area of the site is classified for uses including recreation, habitat, and a source of domestic water; and (2) protection of drinking water. Shallow groundwater on the site potentially discharges to a storm runoff ditch on the north side of the property. The nearest downgradient surface water receptors are in Mill Creek, located approximately one-half mile from the facility, and the Green River, located approximately one mile from the facility. The

> potentially complete exposure pathways identified for the facility and surrounding area include industrial workers and visitors on-site exposed to COPC-impacted soil, offsite construction or utility workers exposed to groundwater, future off-site office workers or residents ingesting contaminated groundwater that has migrated from the Philip Kent facility to a public or private municipal water supply well, and human and ecological exposures to surface water..

Site-specific screening levels were developed based on these potentially complete exposure pathways in order to determine the COPCs in soil and groundwater at the site.

7.3 NATURE & EXTENT OF COPCS

The nature and extent of COPCs in soil and groundwater are discussed below by individual AOC followed by a general conclusion on the site as a whole.

AOC No. 1: Former USTS

Soil sampling in the area of the former USTs was conducted during tank removal in 1991 and during the installation of groundwater monitoring wells MW-9, MW-10 and MW-11 in 1989. No COPCs were detected in soil samples collected from this area. There has been no evidence of groundwater impacts in this area.

AOC No. 2: Tank Farm Area

A review of available soil data indicates that the tank farm is likely the only area at the site that has had a release that has impacted both soil and groundwater. Benzene, 1,4-dichlorobenzene, PCBs, inorganic constituents (arsenic, cadmium, and copper), and TPH in the gasoline range, diesel range, and lube oil range have been detected in soil from the tank farm area at concentrations exceeding the soil screening levels. Higher concentrations have been detected in the surface soil in petroleum-impacted areas suggesting a surficial release(s).

Benzene, trichloroethene, vinyl chloride, and arsenic have been detected consistently in the shallow and intermediate groundwater at the site in the general area of the Tank Farm and extending northwest into the north end (non-operating portion) of the Transfer Yard. Groundwater in the deep aquifer does not appear to have been impacted by releases at the facility, with the exception of very low concentrations of vinyl chloride at MW-24D. However, the areal and vertical extent of these COPCs in groundwater appears to be limited and they do not appear to be migrating from the site at concentrations exceeding groundwater screening levels with the exception of arsenic. The extent of the groundwater impacts is roughly bounded by the MW-102 well nest to the north, the MW-132 well nest to the west, the MW-126 well nest to the east, and the MW-112 well nest to the south.

AOC No. 3: Stabilization Area

Copper is the only COPC identified in soil in the stabilization area at concentrations exceeding the soil screening level. The extent of copper-impacted soil appears to be very limited and there are no impacts to groundwater in this area.

AOC No. 4: Stormwater Drainage System

PAHs, cadmium and diesel range organics were detected at concentrations exceeding soil screening levels in the area of the stormwater drainage system and drainage ditch. However, these exceedances were sporadic and the extent of the impacted areas for each of these constituents appears to be very limited.

Process and Storage Areas

The process and storage areas were not identified as an AOC but include several SWMUs. Several soil samples were collected from the process and storage areas of the facility. However, no COPCs were detected at concentrations exceeding soil screening levels in these samples. There are no groundwater impacts in this area.

Transfer Yard

A number of soil samples were collected from the area of the current transfer yard prior to the construction of the yard in 2001, and again in 2007. Pesticides and inorganic constituents (copper and cadmium) were detected in soil samples from this area at concentrations exceeding soil screening levels. The pesticides appear to be associated with the historical agricultural land use in the area while the copper and cadmium concentrations may be associated with the fill used during construction in the area. There are no groundwater impacts resulting from activities at the Transfer Yard.

Potential Fate and Transport

A qualitative fate and transport evaluation was conducted for the COPCs identified in soil and groundwater at the site. The potential for migration of the COPCs identified in soil and groundwater to receptors at concentrations exceeding site-specific screening levels is unlikely due to (1) the relatively low concentrations of COPCs detected throughout the site, (2) discontinuous saturated conditions in the shallow water-bearing zone, and (3) moderate to low groundwater flow rates in the intermediate and deep aquifer zones. In addition, COPC concentrations in groundwater are expected to attenuate as they migrate from the source areas due to a variety of natural processes including adsorption, dispersion, dilution, changes in geochemistry, and biodegradation.

Groundwater monitoring will be sufficient to continue the evaluation of these limited impacts in the future.

7.4 COCs

Groundwater and soil COPCs listed in Section 6.0 are summarized in Table 7-1. As discussed in Section 6.0, the following process was used to identify COPCs for consideration in the RI with the data sets described in Section 6.0:

- Constituents that were never detected above the reporting limits were eliminated as potential COPCs; and
- For constituents that were detected, if any detection was above the screening level, the constituent was retained as a COPC.

Since several of these COPCs were detected in less than 5 percent of the samples analyzed, this COPCs list will be narrowed down to establish constituents of concern (COCs) during the FS phase of the project.

8.0 MODIFICATIONS TO PERMIT ATTACHMENTS

Section VII.C.11.b requires updates of four permit attachments:

- Attachment A: Corrective Action Technical Document Compendium
- Attachment B: Groundwater Monitoring Parameters
- Attachment C: Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs)
- Attachment D: Soil Monitoring Parameters

Each of these attachments has been updated as described below.

8.1 ATTACHMENT A: CORRECTIVE ACTION TECHNICAL DOCUMENT COMPENDIUM

Attachment A of the permit is the Corrective Action Technical Document Compendium. This attachment was updated, as required by Section VII.C.11.b.5 of the permit, and is presented in Appendix 8A. Once approved by Ecology, the updated attachment will become Attachment AA of the permit.

8.2 ATTACHMENT B: GROUNDWATER MONITORING PARAMETERS

Attachment B of the facility's Part B Permit summarizes the groundwater monitoring parameters required for the site. Permit modification KTMOD 9-11 removed PCBs and all inorganic constituents except arsenic from the groundwater monitoring analyte list specified in Attachment B.

PSC proposes a revision of the analyte list to update the current Attachment B and address inconsistencies and typographical errors. As current analytical methods are continually being modified with improvements in efficiency and accuracy and new, more effective methods are continually being developed, PSC also proposes to remove the analytical method requirement from the analyte list. PSC will select an appropriate EPA-approved analytical method such that sample reporting limits will fall below applicable screening levels wherever possible.

A revised Attachment B is presented in Appendix 8B, and once approved by Ecology, will become Attachment BB of the permit.

8.3 ATTACHMENT C: SOLID WASTE MANAGEMENT UNITS (SWMUS) AND AREAS OF CONCERN (AOCS)

Attachment C of the permit lists the SWMUs and AOCs identified at the site and presents a number of requests by Ecology for clarification on various aspects of the operations and investigations conducted within specific SWMUs and AOCs. Attachment C was updated and the comments addressed as provided in Appendix 8C. Once approved by Ecology, the revised Attachment C will become Attachment CC of the permit.

8.4 ATTACHMENT D: SOIL MONITORING PARAMETERS

Attachment D of the facility's Part B Permit summarizes the soil monitoring parameters required for soil samples collected at the site. PSC proposes a revision of the analyte list to update the current Attachment D and address inconsistencies and typographical errors. A revised Attachment D is presented in Appendix 8D, and once approved by Ecology, will become Attachment DD of the permit.

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TABLES

TABLE 2-1

SUMMARY OF CURRENT AND FORMER CHEMICAL HANDLERS WITHIN 1 MILE OF PSC KENT FACILITY[1]

PSC Kent Facility
Kent, Waashington

Map ID[2]	Site Name[3]	Address	Distance from Site (miles)	Direction	Database Source[4]	Compounds Handled/Contaminants[5]	Affected Media
A	Brite Sol Services	19929 77th Ave. S	0 - 1/8	NW	RCRIS-LQG	---[6]	---
21	BC Equipment Co	20320 80th Ave. S	1/8 - 1/4	E	RCRIS-SQG	---	---
16, E	Colonial Cedar Co Inc	7800 S 208th St.	1/8 - 1/4	SE	ICR LUST CSCSL	Petroleum products	Groundwater, soil
B	Maralco	7730 S 202nd St.	1/8 - 1/4	NE	RCRIS-SQG CSCSL	Metals	Surface water, sediment, soil, and groundwater
20	Walman Optical Co	20417 80th Ave. S	1/8 - 1/4	E	RCRIS-SQG	---	---
G	BSB Diversfied Co Inc	8202 S 200th St.	1/4 - 1/2	NW	CERCLIS-NFRAP CORRACTS RCRIS-SQG CSCSL	Treatment, storage, and disposal facility (possibly former); halogenated organics, metals, corrosive wastes, phenolic compounds, nonhalogenated solvents	Groundwater, soil
C	Tri Way Industries Kent	7748 S 200th St.	1/4 - 1/2	NNE	RCRIS-LQG	---	---
	Western Processing TruSt. Fund	20015 72nd Ave. S	1/4 - 1/2	WNW	RCRIS-LQG	---	---
G	Automatic Products Co Inc	20021 80th Ave. S 3A	1/4 - 1/2	NE	RCRIS-SQG	---	---
43	Boeing Aerospace 7 136 Bldg	20221 72nd Ave. S	1/4 - 1/2	W	RCRIS-SQG	---	---
O	CB Equipment Co 78th Ave	19640 78th Ave. S	1/4 - 1/2	NNE	RCRIS-SQG	---	---
J	Eurotek Store Fixture Co	7028 S 204th St.	1/4 - 1/2	W	RCRIS-SQG	---	---
O	Foamex LP	19635 78th Ave. S	1/4 - 1/2	NNE	RCRIS-SQG TRIS	---	---
N	Henry H Ketcham Lumber Co Inc	20215 84th Ave. S	1/4 - 1/2	ENE	RCRIS-SQG	---	---
H	Kent City Fire Dept Vehicle	20676 72nd Ave. S	1/4 - 1/2	WSW	RCRIS-SQG	---	---
G	Maestro	20021 80th Ave. S Unit 7	1/4 - 1/2	NE	RCRIS-SQG	---	---
22	Malcolm Drilling Co Inc	7808 S 207th Ct.	1/4 - 1/2	SE	RCRIS-SQG		---
D	Metro Hauling Inc	20848 77th Ave. S	1/4 - 1/2 1/4 - 1/2	S	ICR LUST	Petroleum products	Groundwater, soil
F	Mutual Materials Co Kent Plant	7406 S 206th St.	1/4 - 1/2 1/4 - 1/2	WSW	ICR LUST	Petroleum products	Soil
F	Mutual Materials Co Truck Shop	7414 S 206th St.	1/4 - 1/2	WSW	RCRIS-SQG	---	---
M	Panasonic Services Co	20421 84th Ave. S	1/4 - 1/2	E	RCRIS-SQG	---	---
40	Paragon trade Brands	20232 72nd Ave. S	1/4 - 1/2	WNW	RCRIS-SQG	---	---
G	Petrocard Systems Inc	20007 80th Ave. S	1/4 - 1/2 1/4 - 1/2	NE	LUST ICR	Petroleum products	Groundwater
N	S & B Truck Services	20245 84th Ave. S	1/4 - 1/2	E	RCRIS-SQG	---	---
F	South Seattle Auto Auction Body & Paint	7415 S 206th St.	1/4 - 1/2	WSW	RCRIS-SQG	---	---
L	Sunset Foundry Co Inc	8228 S 206th St.	1/4 - 1/2 1/4 - 1/2	ESE	ICR RCRIS-SQG	Nonhalogenated solvents	Groundwater
55	Temple International	19801 78th Ave. S	1/4 - 1/2	NNE	RCRIS-SQG	---	---
	Tennat Co Contract Applications	20021 80th Ave. S	1/4 - 1/2	NE	RCRIS-SQG	---	---
L, M	Valley Freeway Corporate Park	84th Ave. S, S 208th St.	1/4 - 1/2	ENE	ICR	Petroleum products	Groundwater, soil
X	Western Processing Co.	7215 S 196th St.	1/4 - 1/2	NW	NPL CERCLIS RCRIS-SQG	Metals, phthalates, chlorinated solvents, BNAs, PCBs, phenolic compounds, nonhalogenated solvents, PAHs,	Surface water, groundwater, soil
AK	212th Chevron	8315 S 212th St.	1/2 - 1	SE	LUST	Petroleum products	---
BL	AAD Trailer	21810 84th Ave. South	1/2 - 1	SSE	CERCLIS	---	---

TABLE 2-1

SUMMARY OF CURRENT AND FORMER CHEMICAL HANDLERS WITHIN 1 MILE OF PSC KENT FACILITY[1]

PSC Kent Facility
Kent, Waashington

Map ID[2]	Site Name[3]	Address	Distance from Site (miles)	Direction	Database Source[4]	Compounds Handled/Contaminants[5]	Affected Media
AI	Admac Inc	7035 S 212th St.	1/2 - 1	SW	RCRIS-SQG	---	---
BM	Air Mac	6651 S 216th St.	1/2 - 1	SW	RCRIS-SQG	---	---
BF	American Steel LLC	19022 80th Ave. S	1/2 - 1	NNE	LUST RCRIS-SQG ICR	Petroleum products	Soil
AO	Arco #5219	21214 84th Ave. S	1/2 - 1	SE	LUST	Petroleum products	---
AB	Associated Welding Machine	19635 70th Ave. S	1/2 - 1	NW	RCRIS-SQG	---	---
U	Auto Body Perfection	7405 S 212th St. No. 123	1/2 - 1	SSW	RCRIS-SQG	---	---
275	Aztec WeSt. Inc	6406 S 196th St.	1/2 - 1	WNW	RCRIS-SQG	---	---
AX	Blind N Drape Factory	8627 S 212th St.	1/2 - 1	SE	RCRIS-SQG	---	---
V	Boeing A & M Space Center	20403 68th Ave. S	1/2 - 1	W	TRIS CERCLIS-NFRAP CORRACTS RCRIS-LQG	Treatment, storage, and disposal	---
R	Boeing Kent Benaroya	20651 84th Ave. S	1/2 - 1	ESE	CSCSL ICR CERCLIS-NFRAP CORRACTS RCRIS-LQG	Halogenated organic compounds, metals, PCBs, petroleum products, nonhalogenated solvents	Soil, groundwater
V	Boeing Space Center	20403 68th Ave. S	1/2 - 1	W	LUST ICR	Halogenated organic compounds, petroleum products	Soil, groundwater
AR	BP #11054	21208 68th Ave. S	1/2 - 1	SW	ICR	Petroleum products	Soil, groundwater
AR	BP Store #5492	21208 68th Ave. S	1/2 - 1	SW	LUST	Petroleum products	Soil, groundwater
AS	Bredero Price Inc	19805 87th Ave. S	1/2 - 1	ENE	RCRIS-SQG	---	---
BG	Brothers Painting Svc Inc	19428 66th Ave. S Q 107	1/2 - 1	NW	RCRIS-SQG	---	---
108	Budget Panels Inc	20219 87th Ave. S Building H	1/2 - 1	E	RCRIS-SQG	---	---
222	Burnham Services Co Inc	20003 89th Ave. S	1/2 - 1	ENE	RCRIS-SQG	---	---
BH	Chemical Waste Management	19002 72nd Ave. S	1/2 - 1	NNW	RCRIS-SQG	---	---
AR	Circle K Store 5492 BP Oil	21208 68th Ave. S	1/2 - 1	SW	RCRIS-SQG	---	---
AE	CNC Precision Machinging Inc	19622 70th Ave. S	1/2 - 1	NW	RCRIS-SQG	---	---
U	Collins Transport Shop	7405 S 212th St. No. 125	1/2 - 1	SSW	RCRIS-SQG	---	---
AB	Complex Chemicals Corp	19645 70th Ave. S	1/2 - 1	NW	RCRIS-SQG	---	---
AW	Crain Industries Truck Shop	19416 84th Ave. S	1/2 - 1	NE	RCRIS-SQG	---	---
AM	Davis Wire Corp	19411 80th Ave. S	1/2 - 1	NNE	RCRIS-LQG TRIS	---	--- ---
BM	Diamond Power Western Svc Ctr	6649 S 216th St.	1/2 - 1	SW	RCRIS-SQG	---	---
BL	Ernie's Fuel Stop	21804 84th Ave. S	1/2 - 1	SSE	LUST ICR	Petroleum products	Soil, groundwater
AK	Exxon #7 3383	8315 S 212th St.	1/2 - 1	SE	ICR	Petroleum products, nonhalogenated solvents	Soil, groundwater
AG	Fairway Ornamental Iron Inc	7038 S 196th St.	1/2 - 1	NW	RCRIS-SQG	---	---
S	Far WeSt. Freight Spill/Carter	7470 S 212th St.	1/2 - 1	SSW	ICR	Petroleum products	Soil
U	FarweSt. Freight Shop	7405 S 212th St., Suite 122	1/2 - 1	SSW	RCRIS-SQG	---	---
BD	Fawcett Painting Inc	8260 S 192nd St.	1/2 - 1	NNE	RCRIS-SQG	---	---
BM	Federal Express Corp Sea	6633 S 216th St.	1/2 - 1	SW	RCRIS-SQG	---	---

TABLE 2-1

SUMMARY OF CURRENT AND FORMER CHEMICAL HANDLERS WITHIN 1 MILE OF PSC KENT FACILITY[1]

PSC Kent Facility
Kent, Waashington

Map ID[2]	Site Name[3]	Address	Distance from Site (miles)	Direction	Database Source[4]	Compounds Handled/Contaminants[5]	Affected Media
BI	Fedex Ground	21840 76th Ave. S	1/2 - 1	S	RCRIS-SQG	---	---
209	Flint Ink Corp	19305 72nd Ave. S	1/2 - 1	NNW	RCRIS-SQG	---	---
AZ	Flow International Corp	21440 68th Ave. S	1/2 - 1	SW	RCRIS-SQG	---	---
AZ	Flowdril Corp	21414 68th Ave. S	1/2 - 1	SW	RCRIS-SQG	---	---
BM	Fresh Products Inc	6701 S 216th St.	1/2 - 1	SW	RCRIS-SQG	---	---
AO	FT Crowe & Co	21229 84th Ave. S	1/2 - 1	SE	RCRIS-SQG	---	---
123	General Electric Credit Auto Auctions	19443 77th Ave. S	1/2 - 1	N	LUST	Petroleum products	Soil
AH	Haworth Inc Lunstead Operation	8655 S 208th St.	1/2 - 1	ESE	RCRIS-LQG TRIS	---	--- ---
365	HC Auto Care Inc Kent	21716 84th Ave. S	1/2 - 1	SSE	RCRIS-SQG	---	---
AA	Hexcel Corp CRTM	25802 74th Ave. S	1/2 - 1	NE	RCRIS-SQG	---	---
97	Hexcel Corp KSG	7850 S 196th St.	1/2 - 1	NNE	RCRIS-LQG	Oxygenated solvents	---
AA	Hexcel Corp Structures	19819 84th Ave. S	1/2 - 1	NE	TRIS RCRIS-LQG	---	---
BJ	Honeywell Intl Inc Seaport Sit	21857 76th Ave. S	1/2 - 1	S	RCRIS-SQG	---	---
AY	Huntsman Packaging Corp	8039 S 192nd St.	1/2 - 1	NNE	RCRIS-LQG	---	---
AL	Hydraulic Repair & Design Inc	6942 S 196th St.	1/2 - 1	NW	CSCSL CERCLIS-NFRAP RCRIS-LQG	Metals, nonhalogenated solvents, halogenated organic compounds	Soil, groundwater
BA	Hytek Finishes Co	8127 S 216th St.	1/2 - 1	SSE	RCRIS-LQG TRIS	---	--- ---
212	Insulthane Corp	7800 S 192nd St.	1/2 - 1	N	RCRIS-SQG	---	---
AD	International Leasing Co Inc	8220 S 212th St.	1/2 - 1	SE	RCRIS-SQG	---	---
194	Ivy Hi Lift Kent Br	8810 S 208th St.	1/2 - 1	ESE	RCRIS-SQG	---	---
Q	John Manville International	7615 S 212th St.	1/2 - 1	S	TRIS	---	---
BE	K & D Equipment	8808 S 212th St.	1/2 - 1	SE	RCRIS-SQG	---	---
AW	KBP & Fabrications Inc	19412 84th Ave. S	1/2 - 1	NE	RCRIS-SQG	---	---
AE	Kent Obrien Facility	19621 70th Ave. S	1/2 - 1	NW	LUST	Petroleum products	Soil
AQ	Kent SOC 070963	19616 68th St. S	1/2 - 1	NW	LUST	Petroleum products	Soil, groundwater
235	Key Mechanical of Washington	19430 68th Ave. S	1/2 - 1	NW	RCRIS-SQG	---	---
192	KP Corp Kent Documentation Center	20866 89th Ave. S Building Q	1/2 - 1	E	RCRIS-SQG	---	---
AC	Lile International Co Kent	20413 87th Ave. S	1/2 - 1	E	RCRIS-SQG	---	---
X	Lindal Property	72nd Ave. S & S 196th St.	1/2 - 1	NNW	CSCSL	Metals, petroleum products	Surface water, groundwater, soil
124	Liquid Waste Disposal Co	7113 S 196th St.	1/2 - 1	NNW	CERCLIS-NFRAP CORRACTS CSCSL RCRIS-SQG	Halogenated organic compounds, nonhalogenated organic compounds, PAHs	Soil, sediments, groundwater
259	Little Deli-Mart	19243 84th Ave. S	1/2 - 1	NNE	LUST	Petroleum products	Soil, groundwater
AG	Maestro Kent	7031 S 196th St. Bay 5	1/2 - 1	NW	RCRIS-SQG	---	---
260	Master Halco Inc	19240 East Valley Highway	1/2 - 1	NNE	LUST	Petroleum products	Soil, groundwater
AM	Mechanical Products Mfg Co Inc	8001 S 194th St.	1/2 - 1	NNE	RCRIS-SQG	---	---
AU	Merlinos Macaroni Kent	8247 S 194th St.	1/2 - 1	NNE	RCRIS-SQG	---	---
AP	Mill Creek Site	West Valley Hwy. & S 196th St.	1/2 - 1	NW	CSCSL	Metals	---
AH	Mitek Industries	8467 S 208th St., Building N	1/2 - 1	ESE	RCRIS-SQG	---	---

TABLE 2-1

SUMMARY OF CURRENT AND FORMER CHEMICAL HANDLERS WITHIN 1 MILE OF PSC KENT FACILITY[1]

PSC Kent Facility
Kent, Waashington

Map ID[2]	Site Name[3]	Address	Distance from Site (miles)	Direction	Database Source[4]	Compounds Handled/Contaminants[5]	Affected Media
BC	Motor Cargo Inc Kent	8200 S 216th St.	1/2 - 1	SSE	RCRIS-SQG ICR	Petroleum products	Soil, groundwater
AL	National Truck and Paint Specialists	6915 S 196th St.	1/2 - 1	NW	RCRIS-SQG	---	---
BF	North American Machining Product	19056 80th Ave. S	1/2 - 1	NNE	RCRIS-SQG	---	---
U	Northwest Beverages	7405 S 212th St. Unit 12	1/2 - 1	SSW	RCRIS-SQG	---	---
AS	Northwest Corp Park Kent	19801 87th Ave. S	1/2 - 1	ENE	RCRIS-SQG	---	---
BG	Odonnell Brigham & Partners	19437 66th Ave. S	1/2 - 1	NW	RCRIS-SQG	---	---
BB	Oleary Electric Util Const Inc	9012 S 208th St.	1/2 - 1	ESE	RCRIS-SQG	---	---
P	Olympic Auto Glass Inc	20640 84th Ave. S	1/2 - 1	ESE	RCRIS-SQG	---	---
AD	Olympic Steamship Co Inc	8220 S 212th St.	1/2 - 1	SE	LUST RCRIS-SQG CSCSL ICR	Petroleum products, nonhalogenated solvents	Soil, groundwater
AX	Olympus Environmental Inc	8647 S 212th St.	1/2 - 1	SE	RCRIS-SQG	---	---
AD	Pacific Beverage Service Supply	8220 S 212th St. Slamon	1/2 - 1	SE	RCRIS-SQG	---	---
BL	Pacific Industrial Resources	21812 84th Ave. S	1/2 - 1	SSE	RCRIS-SQG	---	---
127	Pacific North Equipment Kent	22431 83rd Ave. S	1/2 - 1	SE	RCRIS-SQG ICR	Petroleum products, metals	Soil
Y	Pacific NorthweSt. Group A	20848 84th Ave. S	1/2 - 1	ESE	RCRIS-SQG	---	---
AX	Pacific Ventures Inc	8647 S 212th St. Building D	1/2 - 1	SE	RCRIS-SQG	---	---
383	Petzold Bros Inc	8445 S 218th St.	1/2 - 1	SSE	RCRIS-SQG	---	---
AS	Polar Graphics	19801 87th Ave. S	1/2 - 1	ENE	RCRIS-SQG	---	---
245	PPG Traning Center Kent	21522 84th Ave. S	1/2 - 1	SE	RCRIS-SQG	---	---
BF	Premier Ind Inc DBA Western Ind	19041 80th Ave. S	1/2 - 1	NNE	RCRIS-SQG	---	---
W	PSE Fleet Operations	8001 S 212th St.	1/2 - 1	SSE	RCRIS-SQG	---	---
Z	Quaker State Facility	8005 S 196th St.	1/2 - 1	NNE	ICR	Petroleum products	Soil
AB	Recovery Systems Inc	19632 70th Ave. S Bay 2	1/2 - 1	NW	RCRIS-SQG	---	---
86	Reynolds Aluminum Recycling	7855 S 212th St.	1/2 - 1	SSE	RCRIS-SQG	---	---
AJ	Ropak Northwest	20024 87th Ave. S Building F	1/2 - 1	ENE	RCRIS-SQG	---	---
	S 192nd Kent	S 192nd St. & 80th Ave. S	1/2 - 1	NNE	RCRIS-SQG		---
AW	Scarsella Bros Inc	19440 84th Ave. S	1/2 - 1	NE	CSCSL LUST ICR	Petroleum products	Surface water, soil, sediment, groundwater
225	Seattle Pacific Ind Inc	21216 72nd Ave. S	1/2 - 1	SSW	RCRIS-SQG	---	---
AD	Shultz Distributing	8220 S 212th St.	1/2 - 1	SE	ICR	Petroleum products	Soil, groundwater
BB	Signal Electric Inc	9012 S 208th St.	1/2 - 1	ESE	LUST	Petroleum products	Soil, groundwater
BA	Stone Container Corp	8106 S 216th St.	1/2 - 1	SSE	RCRIS-SQG	---	---
BE	Sun Chemical Corporation	8810 S 212th St.	1/2 - 1	SE	RCRIS-SQG CSCSL ICR	Petroleum products, halogenated organic compounds, metals, nonhalogenated solvents	Soil, groundwater, surface water, sediment
BH	Superior Silk Screen Inc	19000 72nd Ave. S	1/2 - 1	NNW	RCRIS-SQG	---	---
T	Taylor Edwards	21255 76th Ave. S	1/2 - 1	S	RCRIS-SQG CSCSL LUST ICR	Petroleum products, nonhalogenated solvents	Soil, groundwater

TABLE 2-1

SUMMARY OF CURRENT AND FORMER CHEMICAL HANDLERS WITHIN 1 MILE OF PSC KENT FACILITY[1]

PSC Kent Facility
Kent, Waashington

Map ID[2]	Site Name[3]	Address	Distance from Site (miles)	Direction	Database Source[4]	Compounds Handled/Contaminants[5]	Affected Media
AI	TCW Realty Fund Via Holding Co	7015 S 212th St.	1/2 - 1	SW	RCRIS-SQG	---	---
BK	Tri State ConSt. Inc Kent	8615 S 192nd St.	1/2 - 1	NE	RCRIS-SQG ICR LUST	Petroleum products	Soil
230	TRM Copy Center	6644 S 196th Pl.	1/2 - 1	NW	RCRIS-SQG	---	---
246	TRM Copy Centers Corp	19309 West Valley Highway	1/2 - 1	NE	RCRIS-SQG	---	---
BC	Truck Svc Inc Kent	8207 S 216th St.	1/2 - 1	SSE	RCRIS-SQG	---	---
236	UltraKote	6830 S 216th St.	1/2 - 1	SSW	RCRIS-LQG	---	---
185	United Graphics	21409 72nd Ave. S	1/2 - 1	SSW	RCRIS-SQG	---	---
AU	Uresco Construction Materials	8246 S 194th St.	1/2 - 1	NNE	LUST ICR	Petroleum products	Soil, groundwater
AQ	US WeSt. Communications Inc	19616 68th Ave. S	1/2 - 1	NW	RCRIS-SQG	Petroleum products	Soil, groundwater
AG	USWCom Kent	7031 S 196th St., Bay 1	1/2 - 1	NW	RCRIS-SQG	---	---
AP	USWCom Ket Obrien CO	19640 68th Ave. S	1/2 - 1	NW	RCRIS-SQG ICR RCRIS-SQG	---	---
371	Utilx Corp	22404 66th Ave. S	1/2 - 1	NW	RCRIS-SQG	---	---
AD	Van Waters and Rogers Inc	8201 S 212th St.	1/2 - 1	SE	CORRACTS ICR RCRIS-LQG	Treatment, storage, and disposal facility; petroleum products, volatile organic compounds	Groundwater
AD	Vopak USA Inc	8201 S 212th St.	1/2 - 1	SE	CSCSL	Metals	Soil
AC	Weber Aircraft Inc Kent	20410 87th Ave. S	1/2 - 1	E	RCRIS-SQG	---	---
133	WeSt. CoaSt. Machine Tools Inc	20826 68th Ave. S	1/2 - 1	WSW	RCRIS-SQG	---	---
X	Western Processing Co Inc	7215 S 196th St.	1/2 - 1	NNW	RCRIS-SQG CSCSL	---	---
AX	Wilbur Ellis Co Kent	8643 S 212th St.	1/2 - 1	SE	RCRIS-SQG	---	---
263	Wildfire Pacific Inc	19308 80th Ave. S	1/2 - 1	NW	RCRIS-SQG	---	---
214	Wyeth AyerSt. Laboratories	19255 80th Ave. S	1/2 - 1	NNE	RCRIS-SQG	---	---
AN	Yellow Frieght System	19604 84th Ave. S	1/2 - 1	NE	ICR	---	---
P	Yuasa Inc	20612 84th Ave. S	1/2 - 1	ESE	RCRIS-SQG	---	---

Notes:

1. Based on report from Environmental Data Resources, Inc. (2003).
2. Map ID refers to map grid on Figure 2-3.
3. Site name as listed in Environmental Dta Resouces, Inc., report (2003).
4. CSCSL = Washington State Department of Ecology's Contaminated and Suspected Contaminated Sites List;
   RCRIS-LQG = Resource Conservation and Recovery Information System (RCRIS) large quantity generator;
   RCRIS-SQG = RCRIS small quantity generator;
   ICR = Washington State Department of Ecology Independent cleanup actions;
   LUST = Leaking Underground Storage Tank List;
   CERCLIS-NFRAP = U.S. Environmental Protection Agency Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS)-No Further Remedial Action Planned;
   TRIS = Toxics Release Inventory System;
   CORRACTS = Handlers with Resource Conservation and Recovery Act (RCRA) Corrective Action activity.
5. Abbreviations: BNA = base neutral/acid extractable;
   PCBs = polychlorinated biphenyls;
   PAHs = polycyclic aromatic hydrocarbons.
6. --- = information not available.

TABLE 3-1

SUMMARY OF SOIL SAMPLES COLLECTED

PSC Kent Facility
Kent, Washington

Area(s) of Concern	Sample ID	Sample Date	Site ID	Sample Depth (feet bgs)[1]	USCS[2]	Sample Type	Additional Sampling Information[3]	Report Reference
4	S1	11/30/88	S1	1	NA	Surface Soil/Sediment	Sampled from the ditch using a stainless-steel hand auger	Arthur D. Little, Inc., 1989, Sampling and Analysis Report on a Commercial Hazardous Waste Management Facility in Kent, Washington, January.
4	S2	11/30/88	S2	1	NA	Surface Soil/Sediment	Sampled from the ditch using a stainless-steel hand auger	
3	S4	11/30/88	S4	1	NA	Surface Soil/Sediment	Sampled from just east of the stabilization area using a stainless-steel hand auger	
Transfer yard	MW-7-1	06/19/89	MW-7	2.5 to 4	ML	Soil Boring	Sampled using a 3-inch O.D. split spoon sampler	Sweet-Edwards/EMCON, 1989, Environmental Assessment, Crosby & Overton Facility, August.
2	MW-8-S-1	06/18/89	MW-8	5 to 6.5	SM	Soil Boring	Sampled using a 3-inch O.D. split spoon sampler	
1	MW-9-S-1	06/14/89	MW-9	4.5 to 6	SP	Soil Boring	Sampled using a 3-inch O.D. split spoon sampler	
1	MW-10-S-1	06/14/89	MW-10	3 to 4.5	SP	Soil Boring	Sampled using a 3-inch O.D. split spoon sampler	
1	MW11-2	06/23/89	MW-11	5 to 6.5	CH	Soil Boring	Sampled using a 3-inch O.D. split spoon sampler	
3	MW12-2	06/26/89	MW-12	5 to 6.5	CL/ML	Soil Boring	Sampled using a 3-inch O.D. split spoon sampler	
4	S-1	06/01/89	S-1	0 to 1	NA	Surface Soil/Sediment	Sampled from the ditch using a stainless-steel hand auger fitted with an acetate sleeve	
4	S-2	06/01/89	S-2	0 to 1	NA	Surface Soil/Sediment	Sampled from the ditch using a stainless-steel hand auger fitted with an acetate sleeve	
4	S-4	06/01/89	S-4	0 to 1	NA	Surface Soil/Sediment	Sampled from the ditch using a stainless-steel hand auger fitted with an acetate sleeve	
Transfer yard	S-5F	06/01/89	S-5	2	NA	Composite Sample	Composite sample taken with and mixed with a stainless steel spoon	
Transfer yard	S-5N	06/01/89	S-5	6	NA	Composite Sample	Sampled using a stainless-steel hand auger fitted with an acetate sleeve, composited in a stainless steel bowl	
Transfer yard	S-6F	06/01/89	S-6	2	NA	Composite Sample	Composite sample taken with and mixed with a stainless steel spoon	
Transfer yard	S-6N	06/01/89	S-6	6	NA	Composite Sample	Sampled using a stainless-steel hand auger fitted with an acetate sleeve, composited in a stainless steel bowl	
Transfer yard	S-7F	06/01/89	S-7	2	NA	Composite Sample	Composite sample taken with and mixed with a stainless steel spoon	
Transfer yard	S-7N	06/01/89	S-7	6	NA	Composite Sample	Sampled using a stainless-steel hand auger fitted with an acetate sleeve, composited in a stainless steel bowl	
Transfer yard	S-8N	06/01/89	S-8	6	NA	Composite Sample	Sampled using a stainless-steel hand auger fitted with an acetate sleeve, composited in a stainless steel bowl	
2	T-1-1	06/01/89	T-1	4.5 to 5.5	ML	Soil Boring	Sampled using a 3-inch O.D. split spoon sampler	
2	T-2-1	06/01/89	T-2	4.5 to 5.5	ML	Soil Boring	Sampled using a 3-inch O.D. split spoon sampler	

TABLE 3-1

SUMMARY OF SOIL SAMPLES COLLECTED

PSC Kent Facility
Kent, Washington

Area(s) of Concern	Sample ID	Sample Date	Site ID	Sample Depth (feet bgs)[1]	USCS[2]	Sample Type	Additional Sampling Information[3]	Report Reference
2	MW13-2	02/26/90	MW-13	4.5 to 6	SM	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	Sweet-Edwards/EMCON, 1990, Kent Facility Investigation, Chemical Processors, Inc., 3013 Order, Docket No. 1089-11-17-3013, July.
3	MW14-2	02/23/90	MW-14	5 to 6.5	ML	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	
Transfer yard	MW15-2	02/22/90	MW-15	3.5 to 5	ML	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	
2	MW16-2	03/02/90	MW-16	5 to 6.5	SM	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	
2	MW16-3	03/02/90	MW-16	6.5 to 8	ML	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	
2	MW16-4	03/02/90	MW-16	8.5 to 9.5	ML	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	
2	MW16-5	03/02/90	MW-16	9.5 to 11	ML/SM	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	
4	S10-1	03/14/90	S-10	1	SM	Surface Soil/Sediment	Sampled using a stainless-steel hand auger fitted with an acetate sleeve from the ditch	
4	S11-1	03/14/90	S-11	1	SM	Surface Soil/Sediment	Sampled from the ditch using a stainless-steel hand auger fitted with an acetate sleeve	
Process & Storage Area	T-3-2	02/27/90	T-3	6 to 7.5	ML	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	
	T-4-2	02/27/90	T-4	5.5 to 7	ML	Soil Boring	Sampled using 2 or 3-inch O.D. split barrel sampler	
1	Kent Plant 15	02/04/91	Kent Plant 15	14	NA	Post-excavation	Sample collected from floor of UST excavation	PSC, 1998, Letter report to Ecology re: Leaking Underground Storage Tank Final Cleanup Report for CHEMPRO located at 20245 76th Avenue South, Kent, Washington, August 13.
1	Kent Plant 16	02/04/91	Kent Plant 16	8 to 10	NA	Post-excavation	Sample collected from sidewall of UST excavation	
1	Kent Plant 17	02/04/91	Kent Plant 17	8 to 10	NA	Post-excavation	Sample collected from sidewall of UST excavation	
1	Kent Plant 18	02/04/91	Kent Plant 18	8 to 10	NA	Post-excavation	Sample collected from sidewall of UST excavation	
1	Kent Plant 19	02/05/91	Kent Plant 19	14	NA	Post-excavation	Sample collected from floor of UST excavation	
1	Kent Plant 20	02/05/91	Kent Plant 20	8 to 10	NA	Post-excavation	Sample collected from sidewall of UST excavation	
1	Kent Plant 21	02/05/91	Kent Plant 21	8 to 10	NA	Post-excavation	Sample collected from sidewall of UST excavation	
1	Kent Plant 22	02/05/91	Kent Plant 22	14	NA	Post-excavation	Sample collected from floor of UST excavation	
1	Kent Plant 23	02/05/91	Kent Plant 23	14	NA	Post-excavation	Sample collected from floor of UST excavation	
1	Kent Plant 24	02/05/91	Kent Plant 24	8 to 10	NA	Post-excavation	Sample collected from sidewall of UST excavation	
1	Kent Plant 25	02/05/91	Kent Plant 25	8 to 10	NA	Post-excavation	Sample collected from sidewall of UST excavation	
1	Kent Plant 26	02/05/91	Kent Plant 26	8 to 10	NA	Post-excavation	Sample collected from sidewall of UST excavation	
1	Kent Plant 27	02/05/91	Kent Plant 27	14	NA	Post-excavation	Sample collected from floor of UST excavation	
3	KT-PIPE-5	01/19/99	KT-PIPE-5	1	NA	Post-excavation	Sampled using a stainless steel spoon	PSC, 1999, Letter report to Ecology re: Discovery of Piping During Excavation of New Staging Area at the Burlington Environmental Inc., a wholly owned subsidiary of Philip Services Corp., Kent Facility, RCRA TSD Facility Permit WAD 991281767, January 25.
3	KT-PIPE-6	01/19/99	KT-PIPE-6	1	NA	Post-excavation	Sampled using a stainless steel spoon	
3	KT-PIPE-7	01/19/99	KT-PIPE-7	1	NA	Post-excavation	Sampled using a stainless steel spoon	

TABLE 3-1

SUMMARY OF SOIL SAMPLES COLLECTED
PSC Kent Facility
Kent, Washington

Area(s) of Concern	Sample ID	Sample Date	Site ID	Sample Depth (feet bgs)[1]	USCS[2]	Sample Type	Additional Sampling Information[3]	Report Reference
4	KT-SSP-0399-1	03/01/99	KT-SSP-0399-1	3.5 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	PSC, 2000, Letter report to Ecology re: Philip Service Corp.'s Corrective Actions Progress Report for RCRA TSD Facility Permit for Burlington Environmental Inc. Kent facility, WAD 991281767, April 13.
4	KT-SSP-0399-2	03/01/99	KT-SSP-0399-2	3.5 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-SSP-0399-3	03/01/99	KT-SSP-0399-3	3.5 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-SSP-0399-4MS	03/01/99	KT-SSP-0399-4	3.5 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-SSP-0399-5	03/01/99	KT-SSP-0399-5	3.5 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
2 & 3	HA-2-0600	07/14/00	HA-2	5	NA	Soil Boring	Split spoon with jackhammer-driven Geoprobe	PSC, 2000, Letter reports to Ecology re: Philip Service Corp.'s Corrective Actions Progress Report for RCRA TSD Facility Permit for Burlington Environmental Inc. Kent facility, WAD 991281767, July 14 and October 12.
2 & 3	HA-3-0600	07/14/00	HA-3	9	NA	Soil Boring	Split spoon with jackhammer-driven Geoprobe	
2 & 4	HA-5-0600	07/05/00	HA-5	7	NA	Soil Boring	Geoprobe sampler with acetate liner	
2 & 4	HA-6-0600	07/05/00	HA-6	4.5	NA	Soil Boring	Split spoon with jackhammer-driven Geoprobe	
2 & 4	HA-7-0600	07/05/00	HA-7	4.5	NA	Soil Boring	Geoprobe sampler with acetate liner	
4	HA-8-0600	07/05/00	HA-8	4 to 6	NA	Soil Boring	Split spoon with manual hammer and jackhammer-driven Geoprobe	
4	HA-9-8-0600	07/05/00	HA-8	4 to 6	NA	Soil Boring	Split spoon with manual hammer and jackhammer-driven Geoprobe	
2	HA-9-0600	07/05/00	HA-9	3	NA	Soil Boring	Split spoon with jackhammer-driven Geoprobe	
2	HA-10-0600	07/14/00	HA-10	1	NA	Soil Boring	Split spoon with jackhammer-driven Geoprobe	
2	HA-11-0600	07/14/00	HA-11	4	NA	Soil Boring	Split spoon with jackhammer-driven Geoprobe	
2	MW-20-MAX-0600	06/28/00	MW-20	4 to 6	CL	Soil Boring	4-inch O.D.H.S.A. Sample collected at depth of highest organic vapor headspace measurement	
2	MW-20-SCR-0600	06/28/00	MW-20	10	CL	Soil Boring	4-inch O.D.H.S.A. Sample collected from the center of the screened interval	
2	MW-21-MAX-0600	07/14/00	MW-21	5 to 7.5	SM	Soil Boring	4-inch O.D.H.S.A. Sample collected at depth of highest organic vapor headspace measurement	
2	MW-21-SCR-0600	07/14/00	MW-21	7.5	CL	Soil Boring	4-inch O.D.H.S.A. Sample collected from the center of the screened interval	
2	MW-23-MAX-0600	07/07/00	MW-23	3	SP	Soil Boring	4-inch O.D.H.S.A. Sample collected at depth of highest organic vapor headspace measurement	
2	MW-23-SCR-0600	07/07/00	MW-23	7.5 to 9	CL	Soil Boring	4-inch O.D.H.S.A. Sample collected from the center of the screened interval	
2	MW-24D-MAX-0600	06/28/00	MW-24D	6	ML	Soil Boring	4-inch O.D.H.S.A. Sample collected at depth of highest organic vapor headspace measurement	
2	MW-24D-SCR-0600	06/28/00	MW-24D	34 to 36	SW	Soil Boring	4-inch O.D.H.S.A. Sample collected from the center of the screened interval	

TABLE 3-1

SUMMARY OF SOIL SAMPLES COLLECTED

PSC Kent Facility
Kent, Washington

Area(s) of Concern	Sample ID	Sample Date	Site ID	Sample Depth (feet bgs)[1]	USCS[2]	Sample Type	Additional Sampling Information[3]	Report Reference
4	KT-Pipe-D-1-6"	05/31/02	D1	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	PSC, 2002, Kent Storm Water Pipeline Repair and Replacement Work Plan, February.
4	KT-Pipe-D-9-1-6	05/31/02	D1	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-Pipe-D-2-6"	05/31/02	D2	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-Pipe-D-3-6"	05/31/02	D3	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-Pipe-D-4-6"	05/31/02	D4	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-PIPE-D-5-6"	05/30/02	D5	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-PIPE-D-6-6"	05/30/02	D6	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-PIPE-D-7-6"	05/30/02	D7	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-PIPE-D-8-6"	05/30/02	D8	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-PIPE-E-1-24"	05/21/02	E1	3 to 5	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-PIPE-E-2-6"	05/21/02	E2	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-PIPE-E-3-6"	05/21/02	E3	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-PIPE-E-4-6"	05/21/02	E4	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-Pipe-E-5-6"	05/22/02	E5	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-Pipe-E-6-6"	05/22/02	E6	3 to 4	NA	Post-excavation	Sampled using a stainless steel spoon	
4	KT-Pipe-E-7-24"	05/22/02	E7	3 to 5	NA	Post-excavation	Sampled using a stainless steel spoon	
4	MW-102S-2-4	11/19/02	MW-102S	2 to 4	GM	Soil Boring	Sample collected using a geoprobe sampler with acetate liner	PSC, 2002b, Addendum II to the Remedial Investigation Work Plan.
4	MW-102-S-4-6	11/19/02	MW-102-S	4 to 6	GM	Soil Boring	Sample collected using a geoprobe sampler with acetate liner	
2	MW-127-S-6-8	11/19/02	MW-127-S	6 to 8	GM	Soil Boring	Sample collected using a geoprobe sampler with acetate liner	
Transfer yard	GP-1-3.0	6/15/2007	GP-1	2.25 to 3	SM	Soil Boring	Discrete sample collected using a geoprobe sampler with acetate liner	Geomatrix, 2007, Additional RI Work Plan.
Transfer yard	GP-2-3.0	6/15/2007	GP-2	2.25 to 3	ML	Soil Boring	Discrete sample collected using a geoprobe sampler with acetate liner	
Transfer yard	GP-3-3.5	6/15/2007	GP-3	2 to 3.5	ML	Soil Boring	Discrete sample collected using a geoprobe sampler with acetate liner	
Transfer yard	GP-9-3-3.5	6/15/2007	GP-3	2 to 3.5	ML	Soil Boring	Discrete sample collected using a geoprobe sampler with acetate liner	
Transfer yard	GP-4-2.5	6/15/2007	GP-4	1.5 to 2.5	ML	Soil Boring	Discrete sample collected using a geoprobe sampler with acetate liner	

Notes:

1. bgs = below ground surface.
2. USCS (Unified Soil Classification System) Identification:
   CH = clays of high plasticity;
   CL = clays with sand and silt;
   ML = silts with fine sands and clayey fine sands;
   SM = sands with fines;
   SP = sands (poorly graded);
   SW = well-graded sands, little or no fines;
   GM = silty gravel;
   NA = Not Available.
3. Abbreviations:
   O.D. = outisde diameter;
   UST = underground storage tank;
   O.D.H.S.A. = outside diameter hollow stem auger.

TABLE 3-2

SUMMARY OF SOIL SAMPLE ANALYSES

PSC Kent Facility
Kent, Washington

Sample ID[1]	Site ID	Sample Date	Sample Depth (feet bgs)[2]	VOCs (8240/8260)[3]	SVOCs (625/8270)[4]	PCBs (8080/8081/8082)[5]	Pesticides (8140)[6]	Chlorinated Herbicides (8150)[7]	TPH HCID[8]	TPH-Gx[9]	TPH-Dx[10]	TPH (8015)[11]	TPH (418.1)[12]	As only	Pb only	Hg only	Cr+6	Metals (7060/6010)[13]	Total Cyanide (9010)[14]
S1	S1	11/30/88	0-1	X	X	X	X											X	X
S2	S2	11/30/88	0-1	X	X	X	X											X	X
S4	S4	11/30/88	0-1	X	X	X	X											X	X
MW-7-1	MW-7S	06/19/89	2.5-4	X	X	X												X	X
MW-8-S-1	MW-8	06/18/89	5-6.5	X	X	X												X	X
MW-9-S-1	MW-9	06/14/89	4.5-6	X															X
MW-10-S-1	MW-10	06/14/89	3-4.5	X	X	X												X	X
MW11-2	MW-11	06/23/89	5.0-6.5	X															
MW-12-2	MW-12	06/12/89	5-6.5	X	X	X												X	X
S-1	S-1	06/01/89	4.5-5.5	X	X		X											X	X
S-2	S-2	06/01/89	0-1	X	X		X											X	X
S-4	S-4	06/01/89	0-1	X	X		X											X	X
S-5F	S-5	06/01/89	0-1	X	X		X											X	X
S-5N	S-5	06/01/89	NA	X	X		X											X	X
S-6F	S-6	06/01/89	NA	X	X		X											X	X
S-6N	S-6	06/01/89	NA	X	X		X											X	X
S-7F	S-7	06/01/89	NA	X	X		X											X	X
S-7N	S-7	06/01/89	NA	X	X		X											X	X
S-8N	S-8	06/01/89	NA	X	X		X											X	X
T-1-1	T-1	06/01/89	4.5-5.5	X	X	X	X											X	X
T-2-1	T-2	06/01/89	4.5-5.5	X	X	X	X											X	X
MW13-2	MW-13	02/26/90	4.5-6.0	X	X	X	X											X	
MW14-2	MW-14	02/23/90	5.0-6.0	X	X	X	X											X	
MW15-2	MW-15	02/22/90	3.5-5.0	X	X	X	X											X	
MW16-2	MW-16	03/02/90	5.0-6.5					X										X	
MW16-3	MW-16	03/02/90	6.5-8.0	X	X	X	X												
MW16-4	MW-16	03/02/90	8.0-9.0															X	
MW16-5	MW-16	03/02/90	9.5-11.0	X	X	X	X											X	
S10-1	Ditch S-10	03/14/90	0-1	X	X	X	X											X	
S11-1	Ditch S-11	03/14/90	0-1	X	X	X	X											X	
T3-2	T-3	02/27/90	6.0-7.5	X	X	X	X	X										X	
T4-2	T-4	02/27/90	5.5-7.0	X	X	X	X	X										X	
Kent Plant 15	Kent Plant 15	02/04/91	14									X							
Kent Plant 16	Kent Plant 16	02/04/91	8-10									X							
Kent Plant 17	Kent Plant 17	02/04/91	8-10									X							
Kent Plant 18	Kent Plant 18	02/04/91	8-10									X							
Kent Plant 19	Kent Plant 19	02/05/91	14									X							
Kent Plant 20	Kent Plant 20	02/05/91	8-10									X							
Kent Plant 21	Kent Plant 21	02/05/91	8-10									X							
Kent Plant 22	Kent Plant 22	02/05/91	14									X							

TABLE 3-2

SUMMARY OF SOIL SAMPLE ANALYSES

PSC Kent Facility
Kent, Washington

Sample ID[1]	Site ID	Sample Date	Sample Depth (feet bgs)[2]	VOCs (8240/8260)[3]	SVOCs (625/8270)[4]	PCBs (8080/8081/8082)[5]	Pesticides (8140)[6]	Chlorinated Herbicides (8150)[7]	TPH HCID[8]	TPH-Gx[9]	TPH-Dx[10]	TPH (8015)[11]	TPH (418.1)[12]	As only	Pb only	Hg only	Cr+6	Metals (7060/6010)[13]	Total Cyanide (9010)[14]
Kent Plant 23	Kent Plant 23	02/05/91	14									X							
Kent Plant 24	Kent Plant 24	02/05/91	8-10									X							
Kent Plant 25	Kent Plant 25	02/05/91	8-10									X							
Kent Plant 26	Kent Plant 26	02/05/91	8-10									X							
Kent Plant 27	Kent Plant 27	02/05/91	14									X							
KT-PIPE-5	KT-PIPE-5	01/19/99	3.5	X					X						X				
KT-PIPE-6	KT-PIPE-6	01/19/99	3.5	X					X						X				
KT-PIPE-7	KT-PIPE-7	01/19/99	3.5	X					X						X				
KT-SSP-0399-1	KT-SSP-0339-1	03/01/99	3.5	X	X	X				X	X							X	X
KT-SSP-0399-2	KT-SSP-0339-2	03/01/99	3.5	X	X	X				X	X							X	X
KT-SSP-0399-3	KT-SSP-0339-3	03/01/99	3.5	X	X	X				X	X							X	X
KT-SSP-0399-4MS	KT-SSP-0339-4	03/01/99	3.5	X	X	X				X	X							X	X
KT-SSP-0399-5	KT-SSP-0339-5	03/01/99	3.5	X	X	X				X	X							X	X
HA-2-0600	HA-2	07/14/00	5-6.5	X	X	X				X	X						X	X	X
HA-3-0600	HA-3	07/14/00	9-11	X	X	X				X	X						X	X	X
HA-5-0600	HA-5	07/05/00	7-9	X	X	X				X	X						X	X	X
HA-6-0600	HA-6	07/05/00	4.5-6.5	X	X	X				X	X						X	X	X
HA-7-0600	HA-7	07/05/00	4.5-8.5	X	X	X				X	X						X	X	X
HA-8-0600	HA-8	07/05/00	4-6	X	X	X				X	X						X	X	X
HA-9-8-0600 *	HA-8	07/05/00	4-6	X	X	X				X	X						X	X	X
HA-9-0600	HA-9	07/05/00	3-5	X	X	X				X	X						X	X	X
HA-10-0600	HA-10	07/14/00	1-2.5	X	X	X				X	X						X	X	X
HA-11-0600	HA-11	07/14/00	4-7	X	X	X				X	X						X	X	X
MW-20-MAX-0600	MW-20	06/28/00	4-6	X	X	X				X	X							X	X
MW-20-SCR-0600	MW-20	06/28/00	10-12	X	X	X				X	X							X	X
MW-21-MAX-0600	MW-21	07/14/00	5-6.5	X	X	X				X	X						X	X	X
MW-21-SCR-0600	MW-21	07/14/00	7.5-9	X	X	X				X	X						X	X	X
MW-23-MAX-0600	MW-23	07/07/00	3	X	X	X				X	X							X	X
MW-23-SCR-0600	MW-23	07/07/00	7.5	X	X	X				X	X							X	X
MW-24D-MAX-0600	MW-24D	06/28/00	6	X	X	X				X	X							X	X
MW-24D-SCR-0600	MW-24D	06/28/00	34	X	X	X				X	X							X	X
KT-Pipe-D-1-6"	D1	05/31/02	3-4	X							X							X	
KT-Pipe-D-9-1-6" *	D1	05/31/02	3-4	X							X							X	
KT-Pipe-D-2-6"	D2	05/31/02	3-4	X							X			X					
KT-Pipe-D-3-6"	D3	05/31/02	3-4	X							X			X					
KT-Pipe-D-4-6"	D4	05/31/02	3-4	X							X			X					
KT-PIPE-D-5-6"	D5	05/30/02	3-4	X							X			X					
KT-PIPE-D-6-6"	D6	05/30/02	3-4	X							X			X					
KT-PIPE-D-7-6"	D7	05/30/02	3-4	X							X			X					
KT-PIPE-D-8-6"	D8	05/30/02	3-4	X							X			X					
KT-PIPE-E-1-24"	E1	05/21/02	3-5	X							X			X					
KT-PIPE-E-2-6"	E2	05/21/02	3-4	X							X			X					
KT-PIPE-E-3-6"	E3	05/21/02	3-4	X							X			X					
KT-PIPE-E-4-6"	E4	05/21/02	3-4	X							X			X					

TABLE 3-2

SUMMARY OF SOIL SAMPLE ANALYSES

PSC Kent Facility
Kent, Washington

Sample ID[1]	Site ID	Sample Date	Sample Depth (feet bgs)[2]	VOCs (8240/8260)[3]	SVOCs (625/8270)[4]	PCBs (8080/8081/8082)[5]	Pesticides (8140)[6]	Chlorinated Herbicides (8150)[7]	TPH HCID[8]	TPH-Gx[9]	TPH-Dx[10]	TPH (8015)[11]	TPH (418.1)[12]	As only	Pb only	Hg only	Cr+6	Metals (7060/6010)[13]	Total Cyanide (9010)[14]
KT-Pipe-E-5-6"	E5	05/22/02	3-4	X							X							X	
KT-Pipe-E-6-6"	E6	05/22/02	3-4	X							X			X					
KT-Pipe-E-7-24"	E7	05/22/02	3-5	X							X			X					
MW-102S-2-4	MW-102S	11/19/02	2-4	X	X						X							X	
MW-102-S-4-6	MW-102-S	11/19/02	4-6	X	X						X							X	
MW-127-S-6-8	MW-127-S	11/19/02	6-8	X	X						X							X	
GP-1-3.0	GP-1	6/15/2007	2.25-3				X												
GP-2-3.0	GP-2	6/15/2007	2.25 -3				X												
GP-3-3.5	GP-3	6/15/2007	2-3.5				X												
GP-9-3-3.5*	GP-3	6/15/2007	2-3.5				X												
GP-4-2.5	GP-4	6/15/2007	1.5-2.5				X												

Notes

1. * = Duplicate sample.
2. bgs = Below ground surface.
3. VOCs = Volatile organic compounds, analyzed by U.S. Environmental Protection Agency (EPA) Method 8240 or 8260.
4. SVOCs = Semivolatile organic compounds, analyzed by EPA Method 625/8270.
5. PCBs = Polychlorinated biphenyls, analyzed by EPA Method 8080/8081/8082.
6. Analyzed by EPA Method 8140.
7. Analyzed by EPA Method 8150.
8. TPH-HCID = Total petroleum hydrocarbons, hydrocarbon identification.
9. TPH-Gx = Total petroleum hydrocarbons, as gasoline.
10. TPH-Dx = Total petroleum hydrocarbons, as diesel.
11. TPH = Total petroleum hydrocarbons, analyzed by EPA Method 8015.
12. TPH = Total petroleum hydrocarbons, analzyed by EPA Method 418.1.
13. Analyzed by EPA Method 7060/6010
14. Analyzed by EPA Method 9010.

TABLE 3-3

SUMMARY OF SURFACE WATER SAMPLES COLLECTED

PSC Kent Facility
Kent, Washington

Location	Date	Description
W-1	Nov-88	Standing water, outfall to drainage ditch, northwest corner of the lot
	Jun-89	See Figure 2-1 from Environmental Assessment 8/8/89
W-2	Nov-88	Standing water, drainage ditch, northeast corner of site
	Jun-89	See Figure 2-1 from Environmental Assessment 8/8/89
W-4	Mar-90	Northwest or upstream portion of the ditch, about 10 yards north of facility
	Nov-90	
	Apr-91	
W-5	Mar-90	Northeast or downstream portion of ditch, northwest corner of property
	Nov-90	
	Apr-91	
SW-8	Jun-00	Northeast part of uncovered portion of ditch

TABLE 3-4

SUMMARY OF SURFACE WATER SAMPLES AND ANALYSES

PSC Kent Facility
Kent, Washington

Sample Location	Date	Volatile Organic Compounds	Semivolatile Organic Compounds	Pesticides	Polychlorinated Biphenyls	Dissolved Metals	Total Metals	Total Cyanide	Total Suspended Solids	Total Petroleum Hydrocarbons, as Gasoline	Total Petroleum Hydrocarbons, as Diesel	Sampling Method
W-1	Nov-88	X	X	X	X		X	X				Submerse bottle
W-2	Nov-88	X	X	X	X		X	X				Submerse bottle
W-1	Jun-89	X	X	X	X	X	X	X				Submerse bottle
W-2	Jun-89	X	X	X	X	X	X	X				Submerse bottle
W-4	Mar-90	X	X	X	X	X	X					Submerse bottle
W-5	Mar-90	X	X	X	X	X	X					Submerse bottle
W-4	Nov-90	X	X	X		X	X					Submerse bottle
W-5	Nov-90	X	X	X		X	X					Submerse bottle
W-4	Mar-91	X	X			X	X		X			Submerse bottle
W-5	Mar-91	X	X			X	X		X			Submerse bottle
SW-8	Jun-00	X	X		X		X	X		X	X	Peristaltic pump

TABLE 3-5

WELL CONSTRUCTION DETAILS

PSC Kent Facility
Kent, Washington

Well ID	Date Installed	Screened Interval (feet bgs)[1]	Total Depth of Well Screen (feet bgs)	Top of Seal (feet bgs)	Bottom of Seal (feet bgs)	Top of Sand Pack (feet bgs)	Bottom of Sand Pack (feet bgs)	First Unit Borehole Diameter (in inches) and Depth (in feet)	Second Unit Borehole Diameter (in inches) and Depth (in feet)	Well Diameter (inches)	Riser Type	Screen Type	Sand Type	Seal Type	Standpipe (SP) or Flush Mount (FM)
Current Monitoring Well Network															
Shallow Water-bearing Unit															
MW-102-S	11/20/2002	2.75 to 5.75	5.75	1.5	2.25	2.25	5.75	8.25"	NA[2]	2	Schedule 40 PVC[3]	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-112-S	2/1/2001	3.0 to 6.5	6.5	1	2.5	2.5	7	8.25"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-117-S	11/20/2002	2 to 4	4	1.5	2	2	4	8.25"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-122-S	11/20/2002	1.5 to 3.5	3.5	0.5	1	1	3.5	8.25"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-123-S	2/1/2001	3 to 6	6	1	2.5	2.5	6.5	8.25"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	SP
MW-126-S	11/22/2002	3 to 6	6	1.5	2.5	2.5	6	8.25"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-127-S	11/20/2002	3 to 8	8	1.5	2.5	2.5	8	8.25"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-132-S	11/20/2002	1.5 to 4	1.5	0.5	1	1	4	8.25"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
Intermediate Aquifer, Zone A															
MW-102-I1	2/8/2001	13.5 to 18.5	18.5	2	12.5	12.5	19	14.25" to 5.5'	8.25" from 5' to 19.0'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	SP
MW-114-I1	2/4/2001	11.5 to 13.5	13.5	1	11	11	14	14.25" to 5'	8.25" from 5' to 15.0'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-117-I2	2/6/2001	14 to 19	19	1	13	13	19.5	14.25" to 5'	8.25" from 5' to 19.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-118-I1	1/30/2001	13.5 to 16	16	1	13	13	16.5	14.25" to 9'	8.25" from 9' to 17.0'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-120-I1	2/12/2001	12 to 17	17	1	11.5	11.5	17.5	14.25" to 6'	8.25" from 6' to 17.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-120-I2	2/7/2001	15.5 to 20.5	20.5	1	14.5	14.5	20.5	14.25" to 5.5'	8.25" from 5.5' to 21.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	SP
MW-124-I1	2/8/2001	12 to 16.5	16.5	1	11.5	11.5	17	14.25" to 6'	8.25" from 6' to 18'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-129-I	6/15/2007	11 to 16	16	1	3	3	16	2	NA	1	Schedule 40 PVC	Pre-pack Schedule 40 PVC, 0.010"-slot, #20/40 sand	#2/12	Bentonite chips	FM
MW-131-I	11/19/2002	8.5 to 13.5	13.5	2	8	8	14.5	14.25" to 4.5'	8.25" from 4.5' to 14.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM

TABLE 3-5

WELL CONSTRUCTION DETAILS

PSC Kent Facility
Kent, Washington

Well ID	Date Installed	Screened Interval (feet bgs)[1]	Total Depth of Well Screen (feet bgs)	Top of Seal (feet bgs)	Bottom of Seal (feet bgs)	Top of Sand Pack (feet bgs)	Bottom of Sand Pack (feet bgs)	First Unit Borehole Diameter (in inches) and Depth (in feet)	Second Unit Borehole Diameter (in inches) and Depth (in feet)	Well Diameter (inches)	Riser Type	Screen Type	Sand Type	Seal Type	Standpipe (SP) or Flush Mount (FM)
Current Monitoring Well Network															
Intermediate Aquifer, Zone B															
MW-123-I	1/31/2001	21 to 26	26	1	20	20	26.5	14.25" to 8.5'	8.25" from 8.5' to 26.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	SP
MW-126-I	11/22/2002	20.5 to 25.5	25.5	2	20	20	26.5	14.25" to 6.5'	8.25" from 6.5' to 26.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	NA
MW-128-I	11/22/2002	21.5 to 26.5	26.5	2	21	21	29.5	14.25" to 5.5'	8.25" from 5.5' to 27.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-130-I	11/19/2002	18.5 to 22	22	2	18	18	23	14.25" to 6'	8.25" from 6' to 23'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	SP
Deep Aquifer															
MW-16	3/7/1990	33.3 to 38.3	38.5	2	31.7	31.7	40.3	14.25" to 4'	8.25" from 4' to 50'	2	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	#2/12	Bentonite chips and grout	FM
MW-112-D	2/5/2001	38.5 to 43.5	43.5	1	37.5	37.5	44	14.25" to 7'	8.25" from 7' to 44'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-24D	6/28/2000	29 to 39	39	2.5	27	27	39	8.25"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
Abandoned wells															
MW-1	2/8/1989	3 to 13	13	NA	NA	NA	NA	NA	NA	4	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	NA	Bentonite pellets	NA
MW-2	2/7/1989	3 to 13	13	NA	NA	NA	NA	NA	NA	4	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	NA	Bentonite pellets	NA
MW-3	2/7/1989	4 to 14	14	NA	NA	NA	NA	NA	NA	4	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	NA	Bentonite pellets	NA
MW-4	2/7/1989	4 to 14	14	NA	NA	NA	NA	NA	NA	4	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	NA	Bentonite pellets	NA
MW-5	2/7/1989	3 to 13	13	NA	NA	NA	NA	NA	NA	4	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	NA	Bentonite pellets	NA
MW-6	NA	NA	7.83	NA	NA	NA	NA	NA	NA	12	NA	NA	NA	NA	NA
MW-7S	6/19/1989	4.5 to 14.5	14.5	1	2.5	2.5	15.5	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#10/20	Bentonite chips	FM
MW-7D	6/21/1989	38 to 48	48	1	31.5	31.5	51.5	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#10/20	Bentonite slurry	FM
MW-8	6/16/1989	4 to 14.5	14.5	1	2	2	16	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#10/20	Bentonite chips	FM
MW-9	6/14/1989	4 to 14	14	1	2	2	16	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#10/20	Bentonite chips	FM
MW-10	6/14/1989	5 to 15	15	2	4	4	16	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#10/20	Bentonite chips	FM
MW-11	6/23/1989	5.5 to 15.5	15.5	1.5	4	4	16	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#10/20	Bentonite chips	FM

TABLE 3-5

WELL CONSTRUCTION DETAILS

PSC Kent Facility
Kent, Washington

Well ID	Date Installed	Screened Interval (feet bgs)[1]	Total Depth of Well Screen (feet bgs)	Top of Seal (feet bgs)	Bottom of Seal (feet bgs)	Top of Sand Pack (feet bgs)	Bottom of Sand Pack (feet bgs)	First Unit Borehole Diameter (in inches) and Depth (in feet)	Second Unit Borehole Diameter (in inches) and Depth (in feet)	Well Diameter (inches)	Riser Type	Screen Type	Sand Type	Seal Type	Standpipe (SP) or Flush Mount (FM)
Abandoned wells (Continued)															
MW-12	6/26/1989	5 to 15	15	1	3	3	16	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#10/20	Bentonite chips	FM
MW-13	2/25/1990	5 to14.4	15.2	1	4	4	15.5	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	#10/20	Bentonite chips	FM
MW-14	2/23/1990	5.5 to 14.8	15.7	1	3.5	3.5	15.5	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	#10/20	Bentonite chips	FM
MW-15	2/22/1990	5.4 to 14.30	14.7	1	3.5	3.5	15.5	NA	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.20"-slot	#10/20	Bentonite chips	SP
MW-17	6/29/2000	4 to 14	14	1	3	3	14	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-18	7/7/2000	5 to 15	15	1	3	3	15	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-19	6/29/2000	3.5 to 13.5	13.5	1	3	3	13.5	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-20	6/28/2000	2 to 12	12	0.5	1.5	1.5	12	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-21	7/14/2000	5 to 15	15	1	3	3	15	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-22	6/29/2000	3.5 to 13.5	13.5	1	3	3	13.5	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-23	7/7/2000	5 to 15	15	1	3	3	15	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-24	6/28/2000	3 to 13	13	1	3	3	13	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-25	7/7/2000	5 to 15	15	1	3	3	15	8.5"	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips	FM
MW-112-I2	2/14/2001	24 to 27	27	1	23.5	23.5	27.5	14.25" to 5'	8.25" from 5' to 37.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-113-I1	2/12/2001	12.5 to 13.5	13.5	1	12	12	14	14.25" to 7'	8.25" from 5' to 18.0'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	SP
MW-118-S	1/29/2001	7 to 12	12	1	5	5	12.5	14.25" to 15'	NA	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-120-I2	2/15/2001	23 to 28	28	1	22	22	28.5	14.25" to 6.5'	8.25" from 5' to 28.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM
MW-125-I1	2/13/2001	12 to 13.5	13.5	1	11.5	11.5	14	14.25" to 5.5'	8.25" from 5.5' to 30.5'	2	Schedule 40 PVC	Schedule 40 PVC, 0.10"-slot	#2/12	Bentonite chips and grout	FM

Notes:
1. bgs = Below ground surface.
2. NA = not available.
3. PVC = Polyvinyl chloride.

TABLE 3-6

SUMMARY OF WELL ABANDONMENT[1]

PSC Kent Facility
Kent, Washington

Well Number	Installation Date	Abandonment Date	Total Depth Drilled (feet)	Screened Interval (feet)	Casing Diameter (inches)	Rationale for Abandonment[2]
MW-1	2/8/1989	11/6/2000	13	3-10	6	Screened in silt unit. Only well screened in this unit. Not a productive unit.
MW-2	2/7/1989	11/18/2000	13	3-10	4	Screened in silt confining unit and intermediate aquifer.
MW-3	2/7/1989	11/17/2000	14	4-10	4	Screened in silt confining unit and intermediate aquifer.
MW-4	2/7/1989	6/15/1999	14	4-10	4	Poor construction and condition. No surface seal on well.
MW-5	2/7/1989	6/15/1999	13	3-10	4	Poor construction and condition. No surface seal on well.
MW-6	NA	11/16/1994	7.83	N/A	12	Poor construction and condition. No surface seal on well.
MW-7S	6/19/1989	12/14/1993	15.5	4.5-14.5	2	Lack of integrity; screen failure.
MW-7D	6/21/1989	12/14/1993	51.5	38.0-48.0	2	NA
MW-8	6/16/1989	2/1/1991	16.5	4.5-14.5	2	Poor well construction.
MW-9	6/14/1989	3/1/1991	16.5	4.0-14.0	2	Purpose of well was to monitoring USTs; USTs were removed and well was damaged in process.
MW-10	6/14/1989	3/1/1991	16.5	5.0-15.0	2	Purpose of well was to monitoring USTs; USTs were removed and well was damaged in process.
MW-11	6/23/1989	5/1/1996	16.5	5.5-15.5	2	Poor surface seal integrity and probable leakage to groundwater as indicated by consistently high water level elevations.
MW-12	6/26/1989	11/17/2000	16.5	5.0-15	2	Screened in silt confining unit and intermediate aquifer.
MW-13	2/25/1990	11/6/2000	15.5	5.0-14.4	2	Screened in silt confining unit and intermediate aquifer.
MW-14	2/23/1990	11/6/2000	15.5	5.5-14.8	2	Screened in silt confining unit and intermediate aquifer.
MW-15	2/22/1990	6/29/2000	15.5	5.4-14.3	2	Poor construction and condition. Broken riser.
PZ-1	3/7/1990	6/29/2000	16	5-14	2	Facility expansion in this area.
LDW	1988	11/16/1994	5.17	NA	12	No surface seal on leak-detection well. Poor well construction. Possible route for stormwater intrusion.
MW-17	6/29/2000	11/6/2000	14	4-14	8.5	Screened in silt confining unit and intermediate aquifer.
MW-18	7/7/2000	11/18/2000	15	5-15	8.5	Screened in silt confining unit and intermediate aquifer.
MW-19	6/29/2000	11/6/2000	14	3.5-13.5	8.5	Screened too close to silt/sand interface.
MW-20	6/28/2000	11/18/2000	12	2-12	8.5	Screened in silt confining unit and intermediate aquifer.
MW-21	7/14/2000	11/6/2000	15	5-15	8.5	Screened in silt confining unit and intermediate aquifer.
MW-22	6/29/2000	11/6/2000	13.5	3.5-13.5	8.5	Screened in silt confining unit and intermediate aquifer.

TABLE 3-6

SUMMARY OF WELL ABANDONMENT[1]

PSC Kent Facility
Kent, Washington

Well Number	Installation Date	Abandonment Date	Total Depth Drilled (feet)	Screened Interval (feet)	Casing Diameter (inches)	Rationale for Abandonment[2]
MW-23	7/7/2000	11/18/2000	15	5-15	8.5	Screened at bottom of silt confining unit.
MW-24	6/28/2000	11/17/2000	13	3-13	8.5	Screened in silt confining unit and intermediate aquifer.
MW-25	7/7/2000	11/16/2000	15	5-15	8.5	Screened at bottom of silt confining unit.
MW-118-S	1/29/2001	11/12/2002	12	7-12	2	Upper aquitard is discontinuous here due to UST removal. Therefore, the shallow unit and the intermediate aquifer are hydrologically indistinguishable here.
MW-113-I1	2/12/2001	11/12/2002	13.5	12.5-13.5	2	Screened in upper aquitard.
MW-125-I1	2/13/2001	11/12/2002	13.5	12-13.5	2	Screened in upper aquitard.
MW-120-I2	2/15/2001	11/12/2002	28	23-28	2	Screened in intermediate aquifer and lower aquitard.
MW-112-I2	2/14/2001	11/12/2002	27	24-27	2	Screened in the lower aquitard.

Notes:
1. NA = Not available.
2. UST = Underground storage tank.

TABLE 3-7

SUMMARY OF GROUNDWATER SAMPLE ANALYSES

PSC Kent Facility

Kent, Washington

Site ID	Sample Date	VOCs[1]	SVOCs[2]	PCBs[3]	Pesticides	Total Metals	Dissolved Metals	Cyanide	BTEX[4]	TPH[5]	Herbicides	Cr+VI	Alkalinity	Sulfide/ Sulfate	Total Iron	DO[6]	Carbon Dioxide	Methane, Ethane, Ethene
GP-118-D	2/8/2003	x	x	x		x		x		x		x						
GP-125-I	11/22/2002	x	x	x		x		x		x		x						
HA-11	7/14/2000	x	x	x			x	x		x		x						
HA-9	7/5/2000	x								x		x						
MW-1	2/24/1989	x	x	x	x	x												
MW-1	6/22-29/89	x	x	x	x	x	x											
MW-1	Feb/Mar 1990	x	x	x	x	x	x											
MW-1	11/28-29/1990	x	x			x	x											
MW-1	4/8/1991	x	x			x	x											
MW-1	7/18/2000	x	x	x			x	x		x		x	x	x	x	x	x	
MW-1	10/5/2000	x	x	x			x	x		x		x	x	x	x	x	x	
MW-2	2/24/1989	x	x	x	x	x												
MW-2	6/22-29/89	x	x	x	x	x	x											
MW-2	Feb/Mar 1990	x	x	x	x	x	x											
MW-2	11/28-29/1990	x	x			x	x											
MW-2	4/8/1991	x	x			x	x											
MW-2	7/19/2000	x	x	x			x	x		x		x						
MW-2	10/4/2000	x	x	x			x	x		x		x						
MW-3	2/24/1989	x	x	x	x	x												
MW-3	6/22-29/89	x	x	x	x	x	x											
MW-3	Feb/Mar 1990	x	x	x	x	x	x											
MW-3	11/28-29/1990	x	x			x	x											
MW-3	4/8/1991	x	x			x	x											
MW-3	7/17/2000	x	x	x			x	x		x		x	x	x	x	x	x	
MW-3	10/4/2000	x	x	x			x	x		x		x	x	x	x	x	x	
MW-4	2/24/1989	x	x	x	x	x												
MW-4	6/22-29/89	x	x	x	x	x	x											
MW-4	Feb/Mar 1990	x	x	x	x	x	x											
MW-4	11/28-29/1990	x	x			x	x											
MW-4	4/9/1991	x	x			x	x											
MW-5	2/24/1989	x	x	x	x	x												
MW-5	6/22-29/89	x	x	x	x	x	x											
MW-5	Feb/Mar 1990	x	x	x	x	x	x											
MW-5	11/28-29/1990	x	x			x	x											
MW-5	4/9/1991	x	x			x	x											
MW-6	11/30/1988	x	x	x	x	x		x										
MW-6	6/22-29/89	x	x	x	x	x	x											
MW-6	Feb/Mar 1990	x	x	x	x	x	x											
MW-6	11/28-29/1990	x	x			x	x											
MW-6	4/8/1991	x	x			x	x											
MW-7D	6/22-29/89	x	x	x	x	x	x											
MW-7D	Feb/Mar 1990	x	x	x	x	x	x											
MW-7D	4/9/1991	x	x			x	x											
MW-7S	6/22-29/89	x	x	x	x	x	x											
MW-7S	Feb/Mar 1990	x	x	x	x	x	x											
MW-7S	4/9/1991	x	x			x	x											
MW-8	6/22-29/89	x	x	x	x	x	x											
MW-8	Feb/Mar 1990	x	x	x	x	x	x	x			x							
MW-8dup	Feb/Mar 1990	x	x	x	x	x	x	x			x							
MW-8	11/28-29/1990	x	x			x	x											
MW-9	6/22-29/89								x	x								
MW-9	Feb/Mar 1990	x	x	x	x	x	x											
MW-9	11/28-29/1990	x	x			x	x											
MW-10	6/22-29/89	x	x	x	x	x	x											
MW-10	Feb/Mar 1990	x	x	x	x	x	x											
MW-11	6/22-29/89								x	x								
MW-11	Feb/Mar 1990	x	x	x	x	x	x											
MW-11	4/8/1991	x	x			x	x											
MW-12	6/22-29/89	x	x	x	x	x	x											
MW-12	Feb/Mar 1990	x	x	x	x	x	x											
MW-12	11/28-29/1990	x	x			x	x											
MW-12	4/8/1991	x	x			x	x											
MW-12	7/20/2000	x	x	x			x	x		x		x						
MW-12	10/9/2000	x	x	x			x	x		x		x						
MW-13	Feb/Mar 1990	x	x	x	x	x	x											
MW-13	11/28-29/1990	x	x			x	x											
MW-13	4/8/1991	x	x			x	x											
MW-13	7/19/2000	x	x	x			x	x		x		x						
MW-13	10/3/2000	x	x	x			x	x		x		x						
MW-14	Feb/Mar 1990	x	x	x	x	x	x											
MW-14	11/28-29/1990	x	x			x	x											
MW-14	4/8/1991	x	x			x	x											
MW-14	7/20/2000	x	x	x			x	x		x		x						
MW-14	10/3/2000	x	x	x			x	x		x		x						
MW-15	Feb/Mar 1990	x	x	x	x	x	x											
MW-15	11/28-29/1990	x	x			x	x											
MW-15	4/9/1991	x	x			x	x											
MW-16	Feb/Mar 1990	x	x	x	x	x	x											
MW-16dup	Feb/Mar 1990	x	x	x	x	x	x											
MW-16	11/28-29/1990	x	x		x	x	x											
MW-16	4/8/1991	x	x			x	x											
MW-16	7/19/2000	x	x	x			x	x		x		x						
MW-16	10/4/2000	x	x	x			x	x		x		x						
MW-16	2/23/2001	x	x	x		x		x		x		x						
MW-16	4/26/2001	x	x	x		x		x		x		x						
MW-16	7/13/2001	x	x	x		x		x		x		x						
MW-16	10/18/2001	x	x	x		x		x		x		x						
MW-16	1/17/2002	x	x	x		x		x		x		x						
MW-16	4/16/2002	x	x	x		x		x		x		x						
MW-16	7/16/2002	x	x	x	x	x		x		x		x						
MW-16	10/15/2002	x	x	x	x	x		x		x		x						
MW-16	1/8/2003	x	x	x		x		x		x		x	x				x	x

TABLE 3-7

SUMMARY OF GROUNDWATER SAMPLE ANALYSES
PSC Kent Facility
Kent, Washington

Site ID	Sample Date	VOCs[1]	SVOCs[2]	PCBs[3]	Pesticides	Total Metals	Dissolved Metals	Cyanide	BTEX[4]	TPH[5]	Herbicides	Cr+VI	Alkalinity	Sulfide/ Sulfate	Total Iron	DO[6]	Carbon Dioxide	Methane, Ethane, Ethene
MW-16	4/15/2003	X	X			X		X		X		X	X				X	X
MW-16	7/8/2003	X	X			X		X		X			X				X	X
MW-16	10/1/2003	X	X			X	X	X		X			X				X	X
MW-16	1/12/2004	X	X			X	X	X		X			X	X	X		X	X
MW-16	4/14/2004	X	X			X	X	X		X			X	X	X		X	X
MW-16	7/27/2004	X	X			X	X	X		X			X	X	X		X	X
MW-16	10/7/2004	X	X			X	X	X		X			X	X	X		X	X
MW-16	1/12/2005	X	X			X	X	X		X			X	X	X		X	X
MW-16	4/29/2005	X	X			X	X	X		X			X	X	X		X	X
MW-16	7/11/2005	X	X			X	X	X		X			X	X	X		X	X
MW-16	10/17/2005	X	X			X	X	X		X			X	X	X		X	X
MW-16	1/26/2006	X	X			X	X	X		X			X	X	X		X	X
MW-16	4/11/2006	X	X			X	X	X		X			X	X	X		X	X
MW-16	7/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-16	10/9/2006	X	X			X	X	X		X			X	X	X		X	X
MW-16	1/22/2007	X	X			X	X	X		X			X	X	X		X	X
MW-16	4/4/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-16	7/10/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-17	7/18/2000	X	X	X			X	X		X		X	X	X	X	X	X	
MW-17	10/5/2000	X	X	X			X	X		X		X	X	X	X	X		
MW-18	7/18/2000	X	X	X			X	X		X		X	X	X	X	X	X	
MW-18	10/2/2000	X	X	X			X	X		X		X	X	X	X	X	X	
MW-19	7/20/2000	X	X	X			X	X		X		X						
MW-19	10/5/2000	X	X	X			X	X		X		X						
MW-20	7/20/2000	X	X	X			X	X		X		X	X	X	X	X	X	
MW-20	10/9/2000	X	X	X			X			X		X	X	X	X	X	X	
MW-21	7/21/2000	X	X	X			X	X		X		X	X	X	X	X	X	
MW-21	10/3/2000	X	X	X			X	X		X		X	X	X	X	X	X	
MW-22	7/19/2000	X	X	X			X	X		X		X						
MW-22	10/5/2000	X	X	X			X	X		X		X						
MW-23	7/19/2000	X	X	X			X	X		X		X	X	X	X	X	X	
MW-23	10/3/2000	X	X	X			X	X		X		X	X	X	X	X	X	
MW-24	7/17/2000	X	X	X			X	X		X		X						
MW-24	10/4/2000	X	X	X			X	X		X		X						
MW-24D	7/17/2000	X	X	X			X	X		X		X						
MW-24D	10/4/2000	X	X	X			X	X		X		X						
MW-24D	2/23/2001	X	X	X		X		X		X		X						
MW-24D	4/27/2001	X	X	X		X		X		X		X						
MW-24D	7/11/2001	X	X	X		X		X		X		X						
MW-24D	10/18/2001	X	X	X		X		X		X		X						
MW-24D	1/15/2002	X	X	X		X		X		X		X						
MW-24D	4/17/2002	X	X	X		X		X		X		X						
MW-24D	7/16/2002	X	X	X	X	X		X		X		X						
MW-24D	10/15/2002	X	X	X	X	X		X		X		X						
MW-24D	1/10/2003	X	X	X		X		X		X		X						
MW-24D	4/15/2003	X	X			X		X		X		X						
MW-24D	7/8/2003	X	X			X		X		X								
MW-24D	10/1/2003	X	X			X		X		X								
MW-24D	1/12/2004	X	X			X		X		X								
MW-24D	4/14/2004	X	X			X		X		X								
MW-24D	7/26/2004	X	X			X		X		X								
MW-24D	10/4/2004	X	X			X		X		X								
MW-24D	1/11/2005	X	X			X		X		X								
MW-24D	4/28/2005	X	X			X		X		X								
MW-24D	7/11/2005	X	X			X		X		X								
MW-24D	10/13/2005	X	X			X		X		X								
MW-24D	1/24/2006	X	X			X		X		X								
MW-24D	4/11/2006	X	X			X		X		X								
MW-24D	7/11/2006	X	X			X		X		X								
MW-24D	10/9/2006	X	X			X		X		X								
MW-24D	1/18/2007	X	X			X		X		X								
MW-24D	4/4/2007	X	X			X		X		X		X						
MW-24D	7/10/2007	X	X			X		X		X		X						
MW-25	7/18/2000	X	X	X			X	X		X		X						
MW-25	10/5/2000	X	X	X				X		X		X						
MW-25	10/5/2000						X											
MW-102-I1	2/23/2001	X	X	X		X		X		X		X						
MW-102-I1	4/27/2001	X	X	X		X		X		X		X						
MW-102-I1	7/13/2001	X	X	X		X		X		X		X						
MW-102-I1	10/18/2001	X	X	X		X		X		X		X						
MW-102-I1	1/15/2002	X	X	X		X		X		X		X						
MW-102-I1	4/16/2002	X	X	X		X		X		X		X						
MW-102-I1	7/15/2002	X	X	X	X	X		X		X		X						
MW-102-I1	10/15/2002	X	X	X	X	X		X		X		X						
MW-102-I1	1/7/2003	X	X	X		X		X		X		X	X				X	X
MW-102-I1	4/15/2003	X	X			X		X		X		X	X				X	X
MW-102-I1	7/8/2003	X	X			X		X		X			X				X	X
MW-102-I1	10/1/2003	X	X			X		X		X			X				X	X
MW-102-I1	1/14/2004	X	X			X		X		X			X	X	X		X	X
MW-102-I1	4/14/2004	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	7/26/2004	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	10/4/2004	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	1/11/2005	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	4/29/2005	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	7/8/2005	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	10/13/2005	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	1/16/2006	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	4/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	7/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	10/6/2006	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	1/17/2007	X	X			X	X	X		X			X	X	X		X	X
MW-102-I1	4/2/2007	X	X			X	X	X		X		X	X	X	X		X	X

TABLE 3-7

SUMMARY OF GROUNDWATER SAMPLE ANALYSES

PSC Kent Facility
Kent, Washington

Site ID	Sample Date	VOCs[1]	SVOCs[2]	PCBs[3]	Pesticides	Total Metals	Dissolved Metals	Cyanide	BTEX[4]	TPH[5]	Herbicides	Cr+VI	Alkalinity	Sulfide/ Sulfate	Total Iron	DO[6]	Carbon Dioxide	Methane, Ethane, Ethene
MW-102-I1	7/9/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-102-S	1/7/2003	X	X	X		X		X		X		X	X				X	X
MW-102-S	4/15/2003	X	X			X		X		X		X	X				X	X
MW-102-S	1/14/2004	X	X			X		X		X			X		X		X	X
MW-102-S	4/14/2004	X	X			X		X		X			X		X		X	X
MW-102-S	10/4/2004	X	X			X		X		X			X		X		X	X
MW-102-S	1/11/2005	X	X			X		X		X			X		X		X	X
MW-102-S	4/27/2005	X	X			X		X		X			X		X		X	X
MW-102-S	7/11/2005	X	X			X		X		X			X		X		X	X
MW-102-S	10/17/2005	X	X			X		X		X			X		X		X	X
MW-102-S	1/16/2006	X	X			X		X		X			X		X		X	X
MW-102-S	4/13/2006	X	X			X		X		X			X		X		X	X
MW-102-S	7/10/2006	X	X			X		X		X			X		X		X	X
MW-102-S	10/6/2006	X	X			X		X		X								X
MW-102-S	1/17/2007	X	X			X		X		X			X		X			X
MW-102-S	4/2/2007	X	X			X		X		X		X	X		X		X	X
MW-102-S	7/13/2007	X	X			X		X		X		X	X		X		X	X
MW-112-D	2/26/2001	X	X	X		X		X		X		X						
MW-112-D	4/26/2001	X	X	X		X		X		X		X						
MW-112-D	7/11/2001	X	X	X		X		X		X		X						
MW-112-D	10/17/2001	X	X	X		X		X		X		X						
MW-112-D	1/14/2002	X	X	X		X		X		X		X						
MW-112-D	4/18/2002	X	X	X		X		X		X		X						
MW-112-D	7/18/2002	X	X	X	X	X		X		X		X						
MW-112-D	10/14/2002	X	X	X	X	X		X		X		X					X	
MW-112-D	1/13/2003	X	X	X		X		X		X		X						
MW-112-D	4/15/2003	X	X			X		X		X		X						
MW-112-D	7/10/2003	X	X			X		X		X								
MW-112-D	9/30/2003	X	X			X		X		X								
MW-112-D	1/15/2004	X	X			X		X		X								
MW-112-D	4/16/2004	X	X			X		X		X								
MW-112-D	7/27/2004	X	X			X		X		X								
MW-112-D	10/5/2004	X	X			X		X		X								
MW-112-D	1/14/2005	X	X			X		X		X								
MW-112-D	5/3/2005	X	X			X		X		X								
MW-112-D	7/7/2005	X	X			X		X		X								
MW-112-D	10/18/2005	X	X			X		X		X								
MW-112-D	1/18/2006	X	X			X		X		X								
MW-112-D	4/13/2006	X	X			X		X		X								
MW-112-D	7/13/2006	X	X			X		X		X								
MW-112-D	10/6/2006	X	X			X		X		X								
MW-112-D	1/18/2007	X	X			X		X		X								
MW-112-D	4/3/2007	X	X			X		X		X		X						
MW-112-D	7/9/2007	X	X			X		X		X		X						
MW-112-I2	2/26/2001	X	X	X		X		X		X		X	X				X	X
MW-112-I2	4/26/2001	X	X	X		X		X		X		X	X				X	X
MW-112-I2	7/11/2001	X	X	X		X		X		X		X	X				X	X
MW-112-I2	10/17/2001	X	X	X		X		X		X		X	X				X	X
MW-112-I2	1/14/2002	X	X	X		X		X		X		X	X				X	X
MW-112-I2	4/18/2002	X	X	X		X		X		X		X	X				X	X
MW-112-I2	7/18/2002	X	X	X	X	X		X		X		X	X				X	X
MW-112-I2	10/14/2002	X	X	X	X	X		X		X		X	X				X	X
MW-112-S	2/26/2001	X								X								
MW-112-S	2/27/2001		X	X		X		X		X								
MW-112-S	7/12/2001	X	X	X		X		X		X		X						
MW-112-S	10/19-24/2001	X	X	X		X		X		X		X						
MW-112-S	1/16/2002	X	X	X		X		X		X		X						
MW-112-S	4/17/2002	X	X	X		X		X		X		X						
MW-112-S	7/18-19/2002		X	X	X	X		X		X		X						
MW-112-S	10/16-17/2002	X	X	X	X	X		X		X		X						
MW-112-S	4/15/2003	X	X			X		X		X		X						
MW-112-S	1/15/2004	X	X			X		X		X								
MW-112-S	4/28/2005	X	X			X		X		X								
MW-112-S	1/18/2006	X	X			X		X		X								
MW-112-S	1/17/2007	X	X			X		X		X								
MW-112-S	4/2/2007	X	X			X		X		X		X						
MW-113-I1	2/27/2001	X	X	X		X		X		X		X						
MW-113-I1	4/26/2001	X	X	X		X		X		X		X						
MW-113-I1	7/16/2001	X	X	X		X		X		X		X						
MW-113-I1	10/18/2001	X	X	X		X		X		X		X						
MW-113-I1	1/16/2002	X	X	X		X		X		X		X						
MW-113-I1	4/16/2002	X	X	X		X		X		X		X						
MW-113-I1	7/19/2002	X	X	X	X	X		X		X		X						
MW-113-I1	10/17/2002	X	X	X	X	X		X		X		X						
MW-114-I1	2/27/2001	X	X	X		X		X		X		X						
MW-114-I1	4/25/2001	X	X	X		X		X		X		X						
MW-114-I1	7/16/2001	X	X	X		X		X		X		X						
MW-114-I1	10/23/2001	X	X	X		X		X		X		X						
MW-114-I1	1/16/2002	X	X	X		X		X		X		X						
MW-114-I1	4/17/2002	X	X	X		X		X		X		X						
MW-114-I1	7/16/2002	X	X	X	X	X		X		X		X						
MW-114-I1	10/16/2002	X	X	X	X	X		X		X		X						
MW-114-I1	1/9/2003	X	X	X		X		X		X		X	X				X	X
MW-114-I1	4/18/2003	X	X			X		X		X		X	X				X	X
MW-114-I1	7/11/2003	X	X			X		X		X			X				X	X
MW-114-I1	10/3/2003	X	X			X		X		X			X				X	X
MW-114-I1	1/19/2004	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	4/19/2004	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	7/28/2004	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	10/6/2004	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	1/13/2005	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	5/3/2005	X	X			X	X	X		X			X	X	X		X	X

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PSC Kent Facility
Kent, Washington

Site ID	Sample Date	VOCs[1]	SVOCs[2]	PCBs[3]	Pesticides	Total Metals	Dissolved Metals	Cyanide	BTEX[4]	TPH[5]	Herbicides	Cr+VI	Alkalinity	Sulfide/ Sulfate	Total Iron	DO[6]	Carbon Dioxide	Methane, Ethane, Ethene
MW-114-I1	7/11/2005	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	10/18/2005	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	1/26/2006	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	4/14/2006	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	7/13/2006	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	10/11/2006	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	1/22/2007	X	X			X	X	X		X			X	X	X		X	X
MW-114-I1	4/5/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-114-I1	7/13/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-117-I2	2/22/2001	X	X	X		X		X		X		X	X				X	X
MW-117-I2	5/2/2001	X	X	X		X		X		X		X	X				X	X
MW-117-I2	7/17/2001	X	X	X		X		X		X		X	X				X	X
MW-117-I2	10/16/2001	X	X	X		X		X		X		X	X				X	X
MW-117-I2	1/16/2002	X	X	X		X		X		X		X	X				X	X
MW-117-I2	4/18/2002	X	X	X		X		X		X		X	X				X	X
MW-117-I2	7/17/2002	X	X	X	X	X		X		X		X	X				X	X
MW-117-I2	10/16/2002	X	X	X	X	X		X		X		X	X				X	X
MW-117-I2	1/14/2003	X	X	X		X		X		X		X	X				X	X
MW-117-I2	4/21/2003	X	X			X		X		X		X	X				X	X
MW-117-I2	7/10/2003	X	X			X		X		X			X				X	X
MW-117-I2	9/30/2003	X	X			X		X		X			X				X	X
MW-117-I2	1/20/2004	X	X			X		X		X			X	X	X		X	X
MW-117-I2	4/15/2004	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	7/28/2004	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	10/5/2004	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	1/13/2005	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	5/2/2005	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	7/12/2005	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	10/19/2005	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	1/18/2006	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	4/12/2006	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	7/12/2006	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	10/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	1/23/2007	X	X			X	X	X		X			X	X	X		X	X
MW-117-I2	4/3/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-117-I2	7/13/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-117-S	4/21-22/2003	X	X			X		X		X		X						
MW-117-S	1/19/2004	X	X			X		X		X								
MW-117-S	4/15/2004	X	X			X		X		X								
MW-117-S	4/28/2005	X	X			X		X		X								
MW-117-S	1/18/2006	X	X			X		X		X								
MW-117-S	4/12/2006	X	X			X		X		X								
MW-117-S	1/23/2007	X	X			X		X		X								
MW-117-S	4/3/2007	X	X			X		X		X		X						
MW-118-I1	2/22/2001	X	X	X		X		X		X		X	X				X	X
MW-118-I1	5/2/2001	X	X	X		X		X		X		X	X				X	X
MW-118-I1	7/17/2001	X	X	X		X		X		X		X	X				X	X
MW-118-I1	10/19/2001	X	X	X		X		X		X		X	X				X	X
MW-118-I1	1/17/2002	X	X	X		X		X		X		X	X				X	X
MW-118-I1	4/19/2002	X	X	X		X		X		X		X	X				X	X
MW-118-I1	7/17/2002	X	X	X	X	X		X		X		X	X				X	X
MW-118-I1	10/16/2002	X	X	X	X	X		X		X		X	X				X	X
MW-118-I1	1/9/2003	X	X	X		X		X		X		X	X				X	X
MW-118-I1	4/18/2003	X	X			X		X		X		X	X				X	X
MW-118-I1	7/10/2003	X	X			X		X		X			X				X	X
MW-118-I1	9/30/2003	X	X			X		X		X			X				X	X
MW-118-I1	1/20/2004	X	X			X		X		X								
MW-118-I1	4/15/2004	X	X			X		X		X								
MW-118-I1	7/28/2004	X	X			X		X		X								
MW-118-I1	10/6/2004	X	X			X		X		X								
MW-118-I1	1/14/2005	X	X			X		X		X								
MW-118-I1	5/3/2005	X	X			X		X		X								
MW-118-I1	7/12/2005	X	X			X		X		X								
MW-118-I1	10/19/2005	X	X			X		X		X								
MW-118-I1	1/24/2006	X	X			X		X		X								
MW-118-I1	4/14/2006	X	X			X		X		X								
MW-118-I1	7/13/2006	X	X			X		X		X								
MW-118-I1	10/10/2006	X	X			X		X		X								
MW-118-I1	1/22/2007	X	X			X		X		X								
MW-118-I1	4/3/2007	X	X			X		X		X		X						
MW-118-I1	7/13/2007	X	X			X		X		X		X						
MW-118-S	2/22/2001	X	X	X		X		X		X		X						
MW-118-S	5/2/2001	X	X	X		X		X		X		X	X				X	X
MW-118-S	7/12/2001	X	X	X		X		X		X		X	X				X	X
MW-118-S	10/19/2001	X	X	X		X		X		X		X	X				X	X
MW-118-S	1/17/2002	X	X	X		X		X		X		X	X				X	X
MW-118-S	4/19/2002	X	X	X		X		X		X		X	X				X	X
MW-118-S	7/17/2002	X	X	X	X	X		X		X		X	X				X	X
MW-118-S	10/16/2002	X	X	X	X	X		X		X		X	X				X	X
MW-120-I1	2/27/2001	X	X	X		X		X		X		X	X				X	X
MW-120-I1	4/27/2001	X	X	X		X		X		X		X	X				X	X
MW-120-I1	7/12/2001	X	X	X		X		X		X		X	X				X	X
MW-120-I1	10/23/2001	X	X	X		X		X		X		X	X				X	X
MW-120-I1	1/17/2002	X	X	X		X		X		X		X	X				X	X
MW-120-I1	4/18/2002	X	X	X		X		X		X		X	X				X	X
MW-120-I1	7/18/2002	X	X	X	X	X		X		X		X	X				X	X
MW-120-I1	10/17/2002	X	X	X	X	X		X		X		X	X				X	X
MW-120-I1	1/10/2003	X	X	X		X		X		X		X	X				X	X
MW-120-I1	4/16/2003	X	X			X		X		X		X	X				X	X
MW-120-I1	7/11/2003	X	X			X		X		X			X				X	X
MW-120-I1	9/30/2003	X	X			X		X		X			X				X	X
MW-120-I1	1/19/2004	X	X			X		X		X			X	X	X		X	X

TABLE 3-7

SUMMARY OF GROUNDWATER SAMPLE ANALYSES

PSC Kent Facility
Kent, Washington

Site ID	Sample Date	VOCs[1]	SVOCs[2]	PCBs[3]	Pesticides	Total Metals	Dissolved Metals	Cyanide	BTEX[4]	TPH[5]	Herbicides	Cr+VI	Alkalinity	Sulfide/ Sulfate	Total Iron	DO[6]	Carbon Dioxide	Methane, Ethane, Ethene
MW-120-I1	4/14/2004	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	7/26/2004	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	10/5/2004	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	1/14/2005	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	5/2/2005	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	7/8/2005	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	10/18/2005	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	1/23/2006	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	4/12/2006	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	7/12/2006	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	10/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	1/23/2007	X	X			X	X	X		X			X	X	X		X	X
MW-120-I1	4/6/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-120-I1	7/11/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-120-I2	2/27/2001	X	X	X		X		X		X		X	X				X	X
MW-120-I2	5/2/2001	X	X	X		X		X		X		X	X				X	X
MW-120-I2	7/12/2001	X	X	X		X		X		X		X	X				X	X
MW-120-I2	10/23/2001	X	X	X		X		X		X		X	X				X	X
MW-120-I2	1/17/2002	X	X	X		X		X		X		X	X				X	X
MW-120-I2	4/18/2002	X	X	X		X		X		X		X	X				X	X
MW-120-I2	7/18/2002	X	X	X	X	X		X		X		X	X				X	X
MW-120-I2	10/17/2002	X	X	X	X	X		X		X		X	X				X	X
MW-122-S	1/10/2003	X	X	X		X		X		X		X						
MW-122-S	4/18/2003	X	X			X		X		X		X						
MW-122-S	1/13/2004	X	X			X		X		X								
MW-122-S	4/13/2004	X	X			X		X		X								
MW-122-S	1/12/2005	X	X			X		X		X								
MW-122-S	4/27/2005	X	X			X		X		X								
MW-122-S	1/25/2006	X	X			X		X		X								
MW-122-S	4/11/2006	X	X			X		X		X								
MW-122-S	1/19/2007	X	X			X		X		X								
MW-122-S	4/4/2007	X	X			X		X		X		X						
MW-123-I	2/26/2001	X	X	X		X		X		X		X						
MW-123-I	4/25/2001	X	X	X		X		X		X		X						
MW-123-I	7/13/2001	X	X	X		X		X		X		X						
MW-123-I	10/23/2001	X	X	X		X		X		X		X						
MW-123-I	1/15/2002	X	X	X		X		X		X		X						
MW-123-I	4/16/2002	X	X	X		X		X		X		X						
MW-123-I	7/17/2002	X	X	X	X	X		X		X		X						
MW-123-I	10/17/2002	X	X	X	X	X		X		X		X						
MW-123-I	1/8/2003	X	X	X		X		X		X		X						
MW-123-I	4/16/2003	X	X			X		X		X		X						
MW-123-I	7/8/2003	X	X			X		X		X								
MW-123-I	10/1/2003	X	X			X		X		X								
MW-123-I	1/16/2004	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	4/16/2004	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	7/27/2004	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	10/6/2004	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	1/12/2005	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	4/29/2005	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	7/8/2005	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	10/13/2005	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	1/16/2006	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	4/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	7/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	10/6/2006	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	1/18/2007	X	X			X	X	X		X			X	X	X		X	X
MW-123-I	4/3/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-123-I	7/9/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-123-S	2/26/2001	X	X	X		X		X		X		X						
MW-123-S	4/25/2001	X	X	X		X		X		X		X	X				X	X
MW-123-S	7/13-17/2001	X	X	X		X		X		X		X						
MW-123-S	1/17/2002	X	X	X		X		X		X		X						
MW-123-S	4/16/2002	X	X	X		X		X		X		X						
MW-123-S	7/17-19/2002	X	X	X	X	X		X		X		X						
MW-123-S	1/10/2003	X		X		X		X		X		X	X				X	X
MW-123-S	4/16/2003	X	X			X	X	X		X		X	X				X	X
MW-123-S	1/16/2004	X	X			X	X	X		X			X	X	X		X	X
MW-123-S	4/13/2004	X	X			X	X	X		X			X	X	X		X	X
MW-123-S	4/26/2005	X	X			X	X	X		X			X	X	X		X	X
MW-123-S	1/16/2006	X	X			X	X	X		X			X	X	X		X	X
MW-123-S	4/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-123-S	1/18/2007	X	X			X	X	X		X			X	X	X		X	X
MW-123-S	4/2/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-124-I1	2/23/2001	X	X	X		X		X		X		X	X				X	X
MW-124-I1	4/27/2001	X	X	X		X		X		X		X	X				X	X
MW-124-I1	7/16/2001	X	X	X		X		X		X		X	X				X	X
MW-124-I1	10/23-24/2001	X	X	X		X		X		X		X	X				X	X
MW-124-I1	1/15/2002	X	X	X		X		X		X		X	X				X	X
MW-124-I1	4/17/2002	X	X	X		X		X		X		X	X				X	X
MW-124-I1	7/16/2002	X	X	X	X	X		X		X		X	X				X	X
MW-124-I1	10/15/2002	X	X	X	X	X		X		X		X	X				X	X
MW-124-I1	1/8/2003	X	X	X		X		X		X		X						
MW-124-I1	4/16/2003	X	X			X	X	X		X		X						
MW-124-I1	7/8/2003	X	X			X		X		X								
MW-124-I1	10/1/2003	X	X			X	X	X		X								
MW-124-I1	1/14/2004	X	X			X	X	X		X								
MW-124-I1	4/19/2004	X	X			X	X	X		X								
MW-124-I1	7/26/2004	X	X			X	X	X		X								
MW-124-I1	10/4/2004	X	X			X	X	X		X								
MW-124-I1	1/11/2005	X	X			X	X	X		X								
MW-124-I1	4/27/2005	X	X			X	X	X		X								

TABLE 3-7

SUMMARY OF GROUNDWATER SAMPLE ANALYSES

PSC Kent Facility
Kent, Washington

Site ID	Sample Date	VOCs[1]	SVOCs[2]	PCBs[3]	Pesticides	Total Metals	Dissolved Metals	Cyanide	BTEX[4]	TPH[5]	Herbicides	Cr+VI	Alkalinity	Sulfide/ Sulfate	Total Iron	DO[6]	Carbon Dioxide	Methane, Ethane, Ethene
MW-124-I1	7/7/2005	X	X			X		X		X								
MW-124-I1	10/13/2005	X	X			X	X	X		X								
MW-124-I1	1/24/2006	X	X			X	X	X		X								
MW-124-I1	4/13/2006	X	X			X	X	X		X								
MW-124-I1	7/11/2006	X	X			X	X	X		X								
MW-124-I1	10/9/2006	X	X			X	X	X		X								
MW-124-I1	1/18/2007	X	X			X	X	X		X								
MW-124-I1	4/4/2007	X	X			X	X	X		X		X						
MW-124-I1	7/10/2007	X	X			X	X	X		X		X						
MW-125-I1	2/27/2001	X	X	X		X		X		X		X	X				X	X
MW-125-I1	4/25/2001	X	X	X		X		X		X		X	X				X	X
MW-125-I1	7/10/2001	X	X	X		X		X		X		X	X				X	X
MW-125-I1	10/15/2001	X	X	X		X		X		X		X	X				X	X
MW-125-I1	1/16/2002	X	X	X		X		X		X		X	X				X	X
MW-125-I1	4/19/2002	X	X	X		X		X		X		X	X				X	X
MW-125-I1	7/15/2002	X	X	X	X	X		X		X		X	X				X	X
MW-125-I1	10/14/2002	X	X	X	X	X		X		X		X	X				X	X
MW-126-I	1/9/2003	X	X	X		X		X		X		X	X				X	X
MW-126-I	4/16/2003	X	X			X		X		X		X	X				X	X
MW-126-I	7/8/2003	X	X			X		X		X			X				X	X
MW-126-I	10/3/2003	X	X			X		X		X			X				X	X
MW-126-I	1/15/2004	X	X			X		X		X			X	X	X		X	X
MW-126-I	4/16/2004	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	7/27/2004	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	10/4/2004	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	1/11/2005	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	4/29/2005	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	7/11/2005	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	10/17/2005	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	1/23/2006	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	4/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	7/10/2006	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	10/6/2006	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	1/18/2007	X	X			X	X	X		X			X	X	X		X	X
MW-126-I	4/5/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-126-I	7/11/2007	X	X			X	X	X		X		X	X	X	X		X	X
MW-126-S	4/16/2003	X	X			X		X		X		X						
MW-126-S	1/15/2004	X	X			X		X		X								
MW-126-S	4/13/2004	X	X			X		X		X								
MW-126-S	1/11/2005	X	X			X		X		X								
MW-126-S	4/26/2005	X	X			X		X		X								
MW-126-S	1/23/2006	X	X			X		X		X								
MW-126-S	4/10/2006	X	X			X		X		X								
MW-126-S	1/18/2007	X	X			X		X		X								
MW-126-S	4/5/2007	X	X			X		X		X		X						
MW-127-S	1/9/2003	X	X	X		X		X		X		X						
MW-127-S	4/17/2003	X	X			X		X		X		X						
MW-127-S	1/15/2004	X	X			X		X		X								
MW-127-S	4/13/2004	X	X			X		X		X								
MW-127-S	1/13/2005	X	X			X		X		X								
MW-127-S	4/26/2005	X	X			X		X		X								
MW-127-S	7/7/2005	X	X			X		X		X								
MW-127-S	1/26/2006	X	X			X		X		X								
MW-127-S	4/12/2006	X	X			X		X		X								
MW-127-S	7/11/2006	X	X			X		X		X								
MW-127-S	1/18/2007	X	X			X		X		X								
MW-127-S	4/5/2007	X	X			X		X		X		X						
MW-127-S	7/11/2007	X	X			X		X		X		X						
MW-128-I	1/9/2003	X	X	X		X		X		X		X						
MW-128-I	4/18/2003	X	X			X		X		X		X						
MW-128-I	7/10/2003	X	X			X		X		X								
MW-128-I	9/30/2003	X	X			X		X		X								
MW-128-I	1/19/2004	X	X			X		X		X								
MW-128-I	4/16/2004	X	X			X		X		X								
MW-128-I	7/27/2004	X	X			X		X		X								
MW-128-I	10/5/2004	X	X			X		X		X								
MW-128-I	1/14/2005	X	X			X		X		X								
MW-128-I	4/29/2005	X	X			X		X		X								
MW-128-I	7/7/2005	X	X			X		X		X								
MW-128-I	10/18/2005	X	X			X		X		X								
MW-128-I	1/25/2006	X	X			X		X		X								
MW-128-I	4/12/2006	X	X			X		X		X								
MW-128-I	7/12/2006	X	X			X		X		X								
MW-128-I	10/11/2006	X	X			X		X		X								
MW-128-I	1/22/2007	X	X			X		X		X								
MW-128-I	4/5/2007	X	X			X		X		X		X						
MW-128-I	7/12/2007	X	X			X		X		X		X						
MW-129-I	7/13/2007	X	X			X		X		X		X						
MW-130-I	1/13/2003	X	X	X		X		X		X		X						
MW-130-I	4/18/2003	X	X			X	X	X		X		X						
MW-130-I	7/11/2003	X	X			X		X		X								
MW-130-I	10/3/2003	X	X			X		X		X								
MW-130-I	1/13/2004	X	X			X		X		X								
MW-130-I	4/15/2004	X	X			X		X		X								
MW-130-I	7/28/2004	X	X			X		X		X								
MW-130-I	10/6/2004	X	X			X		X		X								
MW-130-I	1/14/2005	X	X			X		X		X								
MW-130-I	4/28/2005	X	X			X		X		X								
MW-130-I	7/7/2005	X	X			X		X		X								
MW-130-I	10/18/2005	X	X			X		X		X								
MW-130-I	1/24/2006	X	X			X		X		X								
MW-130-I	4/14/2006	X	X			X		X		X								

TABLE 3-7

SUMMARY OF GROUNDWATER SAMPLE ANALYSES

PSC Kent Facility
Kent, Washington

Site ID	Sample Date	VOCs[1]	SVOCs[2]	PCBs[3]	Pesticides	Total Metals	Dissolved Metals	Cyanide	BTEX[4]	TPH[5]	Herbicides	Cr+VI	Alkalinity	Sulfide/ Sulfate	Total Iron	DO[6]	Carbon Dioxide	Methane, Ethane, Ethene
MW-130-I	7/12/2006	X	X			X		X		X								
MW-130-I	10/10/2006	X	X			X		X		X								
MW-130-I	1/19/2007	X	X			X		X		X								
MW-130-I	4/6/2007	X	X			X		X		X		X						
MW-130-I	7/12/2007	X	X			X		X		X		X						
MW-131-I	1/13/2003	X	X	X		X		X		X		X	X				X	X
MW-131-I	4/17/2003	X	X			X		X		X		X	X				X	X
MW-131-I	7/11/2003	X	X			X		X		X			X				X	X
MW-131-I	10/3/2003	X	X			X		X		X			X				X	X
MW-131-I	1/16/2004	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	4/16/2004	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	7/29/2004	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	10/7/2004	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	1/14/2005	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	5/3/2005	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	7/12/2005	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	10/19/2005	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	1/25/2006	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	4/13/2006	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	7/13/2006	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	10/11/2006	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	1/19/2007	X	X			X	X	X		X			X	X	X		X	X
MW-131-I	4/6/2007	X	X		X	X	X	X		X		X	X	X	X		X	X
MW-131-I	7/12/2007	X	X		X	X	X	X		X		X	X	X	X		X	X
MW-132-S	1/14/2003	X	X	X		X		X		X		X						
MW-132-S	4/21/2003	X	X			X		X		X		X						
MW-132-S	1/13/2004	X	X			X		X		X								
MW-132-S	4/27/2005	X	X			X		X		X								
MW-132-S	4/11/2006	X	X			X		X		X								
MW-132-S	1/19/2007	X	X			X		X		X								
MW-132-S	4/4/2007	X	X			X		X		X		X						
T-1	6/22-29/89	X	X	X	X	X	X		X	X								
T-2	6/22-29/89	X	X	X	X	X	X		X	X								
T-3	Feb/Mar 1990	X	X	X	X	X	X	X			X							
T-3	Feb/Mar 1990	X	X	X	X	X	X	X			X							
T-4	Feb/Mar 1990	X	X	X	X	X	X											
T-4	Feb/Mar 1990	X	X	X	X	X	X											

Notes:

1. VOCs = Volatile organic compounds.
2. SVOCs = Semivolatile organic compounds.
3. PCBs = Polychlorinated biphenyls.
4. BTEX = Benzene, toluene, ethylbenzene, and xylenes.
5. TPH = Total petroleum hydrocarbons.
6. DO = Dissolved oxygen.

TABLE 4-1

SUMMARY OF GRAIN SIZE ANALYSES

PSC Kent Facility
Kent, Washington

Sample Location	Sample Depth (feet bgs)[1]	% Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Total Sand	% Silt	%Clay
Grain Size (microns)		>4750	4750-2000	2000-425	425-75	4750-75	75-3	<3
Fill Unit/Shallow Water-Bearing Unit								
MW-126-I	2-4	8.8	2.8	5.7	52.9	61.4	27.3	2.5
MW-128-I	2-3	39.2	11.6	15.5	19.3	46.4	12.7	1.8
Upper Silt and Clay Unit/Upper Aquitard								
GP-118-D	8-9	0	0	0.1	37.1	37.2	56.4	6.4
GP-125-I	5-7	9	2.9	3.2	12.7	18.8	48.9	23.4
MW-17	8-10	0	0	0.4	3	3.4	86.8	9.7
MW-18	10-12	0	0	4.4	10.7	15.1	72.8	12
MW-22	8-10	0	0.4	0.6	34	35	52	13.1
MW-25	8-10	4.6	1.6	7.6	18.9	28.1	55.7	11.6
MW-112-I2	6-8.5	0.5	0.8	1.6	5.3	7.7	68.5	23.2
MW-126-I	8-10	0	0.2	0.8	13.1	14.1	64.7	21.2
MW-128-I	3-4	16.6	5.2	7.7	16	28.9	40.2	14.4
MW-128-I	11-12	0.7	0	0.2	7.1	7.3	78.6	13.3
MW-131-I	3-4	0.5	1.3	2.8	16.5	20.6	54.9	24.1
Intermediate Silty Sand Unit/Intermediate Aquifer Zone A								
MW-19	8-10	0	0	0.2	34	34.2	51.9	13.9
MW-112-I2	13-15.5	0	0	0.1	86.1	86.2	13.8	0
MW-120-I2	9.5-12	4.8	3.8	1.9	6	11.7	37.4	46.1
MW-128-I	12-13	0	0	0.1	70.1	70.2	28.6	1.2
MW-131-I	8.5-10.5	0	0	0.1	53.2	53.3	42.7	4.1
Intermediate Silt Unit/Intermediate Aquitard								
GP-118-D	17-18	0	0	0.2	1.1	1.3	85.3	13.4
GP-125-I	21-22	0	0	2.4	8.5	10.9	44.6	44.4
MW-112-I2	23-25.5	0	0	0.5	1.9	2.4	45.7	51.8
MW-126-I	16-18	0	0	0.3	2.3	2.6	62.2	35.1
Intermediate Silty Sand Unit/Intermediate Aquifer Zone B								
GP-118-D	22-24	0	0.2	4.2	64.5	68.9	25.5	5.7
GP-125-I	22-23	0	0	0.7	84.5	85.2	10.2	4.6
MW-126-I	20-22	0	0	0.2	95.7	95.9	1.4	2.7
Lower Silt Unit/Lower Aquitard								
GP-118-D	31-32	0.3	0.9	2.6	2.6	6.1	79.1	14.5
MW-112-I2	27-29.5	0	0.1	1.4	1.2	2.7	70.7	26.5
Lower Sand Unit/Deep Aquifer								
GP-118-D	39-40	0	0.1	21.1	74	95.2	0	0
MW-112-I2	37.5-40	0	0.1	23.8	71.8	95.7	4.3	0

Notes:

1. bgs = Below ground surface.

TABLE 4-2

SUMMARY OF ORGANIC CARBON CONTENT

PSC Kent Facility
Kent, Washington

Sample Location	Sample Depth (feet bgs)[1]	TOC[2] (%)	CEC (meq/100 g)[3]
Fill Unit/Shallow Water-Bearing Unit	**Average:**	**0.79**	
MW-126-I	2-4	0.79	---[4]
MW-128-I	2-3	<0.1	---
Upper Silt and Clay Unit/Upper Aquitard	**Average:**	**0.68**	
GP-118-D	8-9	0.398	---
GP-125-I	5-7	1.08	---
MW-17	8-10	0.29	11
MW-18	10-12	0.56	13
MW-19	8-10	0.21	8.1
MW-22	8-10	0.13	6.9
MW-25	8.5-10	0.24	13
MW-112-I2	6-8.5	0.64	---
MW-112-I2	9.5 - 12	1.8	15
MW-126-I	8-10	0.167	---
MW-128-I	3-4	1.93	---
MW-128-I	11-12	<0.1	---
MW-131-I	3-4	0.22	---
Intermediate Silty Sand Unit/Intermediate Aquifer Zone A	**Average:**	**0.21**	
MW-112-I2	13-15.5	0.11	4.6
MW-120-I2	9.5-12	0.17	47
MW-128-I	12-13	0.362	---
MW-131-I	8.5-10.5	<0.1	---
Intermediate Silt Unit/Intermediate Aquitard	**Average:**	**0.72**	
GP-118-D	17-18	0.503	---
GP-125-I	21-22	1.43	---
MW-112-I2	23-25.5	0.23	3.2
MW-126-I	16-18	0.723	---
Intermediate Silty Sand Unit/Intermediate Aquifer Zone B	**Average:**	**0.60**	
GP-118-D	22-24	0.54	---
GP-125-I	22-23	0.652	---
MW-126-I	20-22	<0.1	---
Lower Silt Unit/Lower Aquitard	**Average:**	**1.11**	
GP-118-D	31-32	1.58	---
MW-112-I2	27-29.5	0.64	6.9
Lower Sand Unit/Deep Aquifer	**Average:**	**0.24**	
GP-118-D	39-40	<0.1	---
MW-112-I2	37.5-40	0.24	2.6

Notes:
1. bgs = Below ground surface.
2. TOC = Total organic carbon.
3. CEC = Cation exchange capacity in milliequivalents per 100 grams.
4. --- = Not measured or not available.

TABLE 4-3

SUMMARY OF HYDRAULIC PROPERTIES

PSC Kent Facility
Kent, Washington

Location	Sample Depth[1] (feet bgs)	Horizontal Hydraulic Conductivity[2] (cm/s)	Vertical Hydraulic Conductivity (cm/s)	Method[3]	Volumetric Porosity[4]
Fill Unit/ Shallow Water-Bearing Unit					
MW-126-I	2-4	---[5]	0.0106	b	0.46
MW-128-I	2-3	---	0.0148	b	0.44
Upper Silt and Clay Unit/Upper Aquitard					
GP-118-D	8-9	---	0.00000537	a	0.50
GP-125-I	5-7	---	0.0000000377	a	0.49
MW-17	8 - 10	---	0.0000023	a	0.58
MW-18	10 - 12	---	0.0000025	a	0.53
MW-19	8 - 10	---	0.0000068	a	0.48
MW-22	8 - 10	---	0.0000025	a	0.49
MW-25	8 - 10	---	0.0000001	a	0.49
MW-112-I2	6 - 8.5	---	0.0000013	a	0.47
MW-112-I2	9.5 - 12	---	< 0.00000001	a	0.55
MW-120-I2	9.5-12	---	< 0.00000001	a	0.55
MW-126-I	8-10	---	0.0000000196	a	0.54
MW-128-I	3-4	---	0.0000000578	a	0.53
MW-128-I	11-12	---	0.000000255	a	0.51
MW-131-I	3-4	---	0.000000209	a	0.44
Intermediate Silty Sand Unit/Intermediate Aquifer Zone A					
MW-112-I2	13 - 15.5	---	0.000026	a	0.47
MW-128-I	12-13	---	0.00195	b	0.43
MW-131-I	8.5-10.5	---	0.000239	b	0.45
Intermediate Silt Unit/Intermediate Aquitard					
GP-118-D	17-18	---	0.00000131	a	0.54
GP-125-I	21-22	---	0.0000000406	a	0.72
MW-126-I	16-18	---	0.000000408	a	0.55
Intermediate Silty Sand Unit/Intermediate Aquifer Zone B					
GP-118-D	22-24	---	0.000000612	a	0.55
GP-125-I	22-23	---	0.0015	b	0.56
MW-126-I	20-22	---	0.0000625	b	0.45
Lower Silt Unit/Lower Aquitard					
GP-118-D	31-32	---	0.0000028	a	0.61
MW-112-I2	23 - 25.5	---	0.000000084	a	0.66
MW-112-I2	27 - 29.5	---	0.00000045	a	0.66
Lower Sand Unit/Deep Aquifer					
GP-118-D	39-40	---	0.0123	b	0.44
MW-7D	38 - 48	0.00016	---	---	---
MW-16	33.3 - 38.3	0.0017	---	---	---
MW-112-D	37.5 - 40	---	0.023	b	---

Notes:

1. bgs = Below ground surface. For slug tests, the sample depth is the well's screen interval.
2. cm/s = centimeters per second. Field, single-well:slug, rising-head, Bouwer and Rice (1976).
3. Lab permeameter test methods: (a) flexible wall falling head, ASTM D-5084, (b) rigid wall, constant head, ASTM D-2434.
4. Calculated from bulk density and specific gravity, ASTM D-854 and ASTM D-2216.
5. --- = Not analyzed.

TABLE 5-1

SOIL PRACTICAL QUANTITATION LIMITS

PSC Kent Facility
Kent, Washington

Concentrations in milligrams per kilogram (mg/kg)

Constituent	CAS No.[1]	EPA Analytical Method[2]	Columbia[3] Method Detection Limit (mg/kg)	Columbia Method Reporting Limit (mg/kg)	Initial Applicable PQL[4] (mg/kg)	Federal Reporting Limit[5] (mg/kg)	Final Applicable PQL[6] (mg/kg)
Volatile Organic Compounds (VOCs)							
1,1,1-Trichloroethane	71-55-6	8260	0.000066	0.005	0.00066	0.005	0.00066
1,1-Dichloroethene	75-35-4	8260	0.000057	0.005	0.00057	0.005	0.00057
1,1-Dichloroethane	75-34-3	8260	0.000068	0.005	0.00068	0.005	0.00068
1,2,4-Trimethylbenzene	95-63-6	8260	0.00007	0.02	0.0007	0.005	0.0007
1,3,5-Trimethylbenzene	108-67-8	8260	0.000069	0.02	0.00069	0.005	0.00069
2-Butanone (MEK)	78-93-3	8260	0.0011	0.02	0.011	0.005	0.005
2-Methylpentane	107-83-5	8260	0.005	0.005	0.005	0.006	0.005
3-Methylpentane	96-14-0	8260	0.005	0.005	0.005	0.007	0.005
4-Methyl-2-pentanone (MIK)	108-10-1	8260	0.00022	0.02	0.0022	0.009	0.0022
Acetone	67-64-1	8260	0.0018	0.02	0.018	0.01	0.01
Benzene	71-43-2	8260	0.000079	0.005	0.00079	0.011	0.00079
Carbon disulfide	75-15-0	8260	0.000057	0.005	0.00057	0.012	0.00057
cis -1,2-Dichloroethene	156-59-2	8260	0.0001	0.005	0.001	0.013	0.001
Ethylbenzene	100-41-4	8260	0.000065	0.005	0.00065	0.014	0.00065
Hexachloroethane	67-72-1	8260	0.003	0.01	0.01	0.015	0.01
Isopropylbenzene (cumene)	98-82-8	8260	0.00005	0.02	0.0005	0.016	0.0005
m,p-Xylene	136777-61-2	8260	0.00015	0.005	0.0015	0.017	0.0015
Methylcyclopentane	96-37-7	8270	0.005	0.005	0.005	--[7]	0.005
Methylene chloride	75-09-2	8260	0.00014	0.01	0.0014	0.018	0.0014
m-Xylene[8]	108-38-3	8260	0.000075	0.0025	0.00075	0.019	0.00075
n-Butyl alcohol (n-butanol)	71-36-3	8260	0.026	0.2	0.2	0.021	0.021
n-Butylbenzene	104-51-8	8260	0.000096	0.02	0.00096	0.022	0.00096
n-Hexane	110-54-3	8260	0.00016	0.01	0.0016	0.023	0.0016
n-Propylbenzene	103-65-1	8260	0.000054	0.02	0.00054	0.024	0.00054
o-Xylene	95-47-6	8260	0.000057	0.005	0.00057	0.025	0.00057
p-Isopropyltoluene (p-cymene)	99-87-6	8260	0.000066	0.02	0.00066	0.008	0.00066
p-Xylene	106-42-3	8260	0.000075	0.0025	0.00075	0.026	0.00075
sec-Butylbenzene	135-98-8	8260	0.000072	0.02	0.00072	0.027	0.00072
Styrene	100-42-5	8260	0.000067	0.005	0.00067	0.028	0.00067
Tetrachloroethene	127-18-4	8260	0.000076	0.005	0.00076	0.029	0.00076
Toluene	108-88-3	8260	0.00013	0.005	0.0013	0.03	0.0013
Trichloroethene	79-01-6	8260	0.00007	0.005	0.0007	0.031	0.0007
Vinyl chloride	75-01-4	8260	0.000094	0.005	0.00094	0.032	0.00094
Xylenes (total)[9]	1330-20-7	8260	0.000207	0.01	0.00207	0.033	0.00207

TABLE 5-1

SOIL PRACTICAL QUANTITATION LIMITS

PSC Kent Facility
Kent, Washington

Concentrations in milligrams per kilogram (mg/kg)

Constituent	CAS No.[1]	EPA Analytical Method[2]	Columbia[3] Method Detection Limit (mg/kg)	Columbia Method Reporting Limit (mg/kg)	Initial Applicable PQL[4] (mg/kg)	Federal Reporting Limit[5] (mg/kg)	Final Applicable PQL[6] (mg/kg)
Semivolatile Organic Compounds (SVOCs)							
1,2-Dichlorobenzene	95-50-1	8270	0.000065	0.005	0.00065	0.66	0.00065
1,3-Dichlorobenzene	541-73-1	8270	0.000056	0.005	0.00056	0.66	0.00056
1,4-Dichlorobenzene	106-46-7	8270	0.0001	0.005	0.001	0.66	0.001
2-Methylnaphthalene	91-57-6	8270 SIM	0.00039	0.005	0.0039	0.66	0.0039
2,4-Dimethylphenol	105-67-9	8270	0.0055	0.05	0.05	0.66	0.05
2,4-Dinitrotoluene	121-14-2	8270	0.0015	0.01	0.01	0.66	0.01
2,6-Dinitrotoluene	606-20-2	8270	0.002	0.01	0.01	0.66	0.01
3,3'-Dichlorobenzidine	91-94-1	8270	0.0037	0.1	0.037	1.3	0.037
4-Methylphenol (p-cresol)	106-44-5	8270	0.0015	0.01	0.01	0.66	0.01
Acenaphthene	83-32-9	8270 SIM	0.00023	0.005	0.0023	0.66	0.0023
Acenaphthylene	208-96-8	8270 SIM	0.00024	0.005	0.0024	0.66	0.0024
Anthracene	120-12-7	8270 SIM	0.00047	0.005	0.0047	0.66	0.0047
Benzo(a)anthracene	56-55-3	8270 SIM	0.00048	0.005	0.0048	0.66	0.0048
Benzo(a)pyrene	50-32-8	8270 SIM	0.00014	0.005	0.0014	0.66	0.0014
Benzo(b)fluoranthene	205-99-2	8270 SIM	0.00025	0.005	0.0025	0.66	0.0025
Benzo(ghi)perylene	191-24-2	8270 SIM	0.00064	0.005	0.005	0.66	0.005
Benzo(k)fluoranthene	207-08-9	8270 SIM	0.00015	0.005	0.0015	0.66	0.0015
Bis(2-chloroethyl) ether	111-44-4	8270	0.0019	0.01	0.01	0.66	0.01
Bis(2-Ethylhexyl) phthalate	117-81-7	8270	0.007	0.1	0.07	0.66	0.07
Carbazole	86-74-8	8270	0.0013	0.01	0.01	--	0.01
Chrysene	218-01-9	8270 SIM	0.00025	0.005	0.0025	0.66	0.0025
Dibenzo(a,h)anthracene	53-70-3	8270 SIM	0.00028	0.005	0.0028	0.66	0.0028
Dibenzofuran	132-64-9	8270 SIM	0.00059	0.005	0.005	0.66	0.005
Dimethyl phthalate	131-11-3	8270	0.001	0.01	0.01	0.66	0.01
Di-n-Butyl phthalate	84-74-2	8270	0.0079	0.02	0.02	--	0.02
Di-n-Octyl phthalate	117-84-0	8270	0.0017	0.01	0.01	--	0.01
Fluoranthene	206-44-0	8270 SIM	0.00061	0.005	0.005	0.66	0.005
Fluorene	86-73-7	8270 SIM	0.0005	0.005	0.005	0.66	0.005
Hexachlorobutadiene	87-68-3	8270	0.0025	0.01	0.01	0.66	0.01
Hexachlorocyclopentadiene	77-47-4	8270	0.029	0.05	0.05	0.66	0.05
Indeno(1,2,3-cd)pyrene	193-39-5	8270 SIM	0.00016	0.005	0.0016	0.66	0.0016
Naphthalene	91-20-3	8270 SIM	0.00037	0.005	0.0037	0.66	0.0037
Nitrobenzene	98-95-3	8270	0.0022	0.01	0.01	0.66	0.01
N-Nitroso-di-n-propylamine	621-64-7	8270	0.0024	0.01	0.01	0.66	0.01
Pentachlorophenol	87-86-5	8270	0.02	0.1	0.1	3.3	0.1
Phenanthrene	85-01-8	8270 SIM	0.00075	0.005	0.005	0.66	0.005
Phenol	108-95-2	8270	0.002	0.03	0.02	0.66	0.02
Pyrene	129-00-0	8270 SIM	0.00037	0.005	0.0037	0.66	0.0037

TABLE 5-1

SOIL PRACTICAL QUANTITATION LIMITS

PSC Kent Facility
Kent, Washington

Concentrations in milligrams per kilogram (mg/kg)

Constituent	CAS No.[1]	EPA Analytical Method[2]	Columbia[3] Method Detection Limit (mg/kg)	Columbia Method Reporting Limit (mg/kg)	Initial Applicable PQL[4] (mg/kg)	Federal Reporting Limit[5] (mg/kg)	Final Applicable PQL[6] (mg/kg)
Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides							
4,4'-DDD	72-54-8	8081	0.00012	0.001	0.001	--	0.001
4,4'-DDE	72-55-9	8081	0.0001	0.001	0.001	--	0.001
4,4'-DDT	50-29-3	8081	0.000064	0.001	0.00064	--	0.00064
Alachlor[10]	15972-60-8	8081	0.0026	0.05	0.026	--	0.026
Aldrin	309-00-2	8081	0.00015	0.001	0.001	--	0.001
alpha-Chlordane	5103-71-9	8081	0.00023	0.001	0.001	--	0.001
Aroclor 1254	11097-69-1	8082	0.0017	0.01	0.01	--	0.01
Aroclor 1260	11096-82-5	8082	0.0017	0.01	0.01	--	0.01
Coumaphos[10]	56-72-4	8141	0.0135	0.1	0.1	0.1	0.1
Delta-BHC	319-86-8	8081	0.000055	0.001	0.00055	--	0.00055
Dieldrin	60-57-1	8081	0.00029	0.001	0.001	--	0.001
Endosulfan I	959-98-8	8081	0.00017	0.001	0.001	--	0.001
Endosulfan II	33213-65-9	8081	0.00019	0.001	0.001	--	0.001
Endosulfan sulfate	1031-07-8	8081	0.000079	0.001	0.00079	--	0.00079
Endrin aldehyde	7421-93-4	8081	0.000053	0.001	0.00053	--	0.00053
Eptam (S-Ethyl dipropylthiocarbamate)[10]	759-94-4	8321	0.3	0.3	0.3	--	0.3
Fensulfothion[10]	115-90-2	8141	0.0187	0.25	0.187	0.04	0.04
gamma-BHC (Lindane)	58-89-9	8081	0.00015	0.001	0.001	--	0.001
gamma-Chlordane	5103-74-2	8081	0.000064	0.001	0.00064	--	0.00064
Heptachlor epoxide	1024-57-3	8081	0.00013	0.001	0.001	--	0.001
Mevinphos (Phosdrin)[10]	7786-34-7	8141	0.0052	0.35	0.052	0.25	0.052
Metals							
Aluminum	7429-90-5	6020 / 200.8	2	0.5	0.5	--	0.5
Antimony	7440-36-0	6020 / 200.8	0.05	0.03	0.03	--	0.03
Arsenic	7440-38-2	6020 / 200.8	0.5	0.1	0.1	--	0.1
Barium	7440-39-3	6020 / 200.8	0.05	0.03	0.03	--	0.03
Beryllium	7440-41-7	6020 / 200.8	0.02	0.02	0.02	--	0.02
Boron	7440-42-8	6021 / 200.8	2	10	10	--	10
Cadmium	7440-43-9	6020 / 200.8	0.02	0.008	0.008	--	0.008
Chromium	7440-47-3	6020 / 200.8	0.2	0.04	0.04	--	0.04
Hexavalent chromium (Cr+VI)	18540-29-9	7196A	0.06	0.5	0.5	--	0.5
Cobalt	7440-48-4	6020 / 200.8	0.02	0.003	0.003	--	0.003
Copper	7440-50-8	6020 / 200.8	0.1	0.1	0.1	--	0.1
Cyanide	57-12-5	9010/9012	0.03	0.1	0.1	--	0.1
Iron	7439-89-6	6010/200.7	3	4	4	--	4
Lead	7439-92-1	6020 / 200.8	0.05	0.02	0.02	--	0.02
Manganese	7439-96-5	6020 / 200.8	0.05	0.04	0.04	--	0.04
Mercury	7439-97-6	7471A	0.02	0.006	0.006	--	0.006
Molybdenum	7439-98-7	6020 / 200.8	0.05	0.05	0.05	--	0.05
Nickel	7440-02-0	6020 / 200.8	0.2	0.05	0.05	--	0.05
Selenium	7782-49-2	6020 / 200.8	1	0.4	0.4	--	0.4
Silver	7440-22-4	6020 / 200.8	0.02	0.02	0.02	--	0.02
Thallium	7440-28-0	6020 / 200.8	0.02	0.003	0.003	--	0.003
Vanadium	7440-62-2	6020 / 200.8	0.2	0.04	0.04	--	0.04
Zinc	7440-66-6	6020 / 200.8	0.5	0.2	0.2	--	0.2

TABLE 5-1

SOIL PRACTICAL QUANTITATION LIMITS

PSC Kent Facility
Kent, Washington

Concentrations in milligrams per kilogram (mg/kg)

Constituent	**CAS No.[1]**	**EPA Analytical Method[2]**	**Columbia[3] Method Detection Limit (mg/kg)**	**Columbia Method Reporting Limit (mg/kg)**	**Initial Applicable PQL[4] (mg/kg)**	**Federal Reporting Limit[5] (mg/kg)**	**Final Applicable PQL[6] (mg/kg)**
Total Petroleum Hydrocarbons (TPH)							
TPH as gasoline	86290-81-5	NWTPH-G[11]	0.59	5	5	--	5
TPH as diesel	68334-30-5	NWTPH-Dx[12]	1.2	25	12	--	12
TPH as lube oil	--	NWTPH-Dx[12]	2.9	100	29	--	29

Notes:

1. CAS No. = Chemical Abstract Service identification number.
2. U.S. Environmental Protection Agency laboratory method number or as noted. SIM = Selective Ion Monitoring.
3. Columbia = Columbia Analytical Services, Inc., Kelso, Washington (project laboratory).
4. PQL = Practical Quantitation Limit. Columbia method reporting limit (MRL) selected as the Initial Applicable PQL, unless the Columbia MRL was greater than 10 times the Columbia method detection limit (MDL), in which case 10 times the MDL value is considered the initial applicable PQL [per WAC 173-340-707(a)].
5. Federal Reporting Limits from U.S. Environmental Protection Agency SW-846 on-line (EPA, 2007).
6. If the initial applicable PQL was greater than the federal reporting limit, then the federal reporting limit was selected as the final applicable PQL [WAC 173-340-707(b)].
7. -- = Not Available
8. MDL/MRL for m-xylene, and p-xylene was MDL/MRL for m,p-xylene divided in half.
9. MDL/MRL for total xylenes was MDL/MRL for m,p-xylene + MDL/MRL for o-xylene.
10. MDL/MRL from Agriculture & Priority Pollutants Laboratories, Inc. (APPL), not Columbia.
11. Analyzed by Northwest Total Petroleum Hydrocarbons, gasoline, method.
12. Analyzed by Northwest Total Petroleum Hydrocarbons, diesel, method.

TABLE 5-2

GROUNDWATER PRACTICAL QUANTITATION LIMITS

PSC Kent Facility
Kent, Washington

Concentrations in micrograms per liter (µg/L)

Constituent	CAS No.[1]	Analytical Method[2]	Columbia[3] Method Detection Limit (µg/L)	Columbia Method Reporting Limit (µg/L)	Initial Applicable PQL[4] (µg/L)	Federal Reporting Limit[5] (µg/L)	Final Applicable PQL[6] (µg/L)
Volatile Organic Compounds (VOCs)							
1,1,1-Trichloroethane	71-55-6	8260	0.116	0.5	0.5	1	0.5
1,1-Dichloroethene	75-35-4	8260 SIM	0.0061	0.02	0.02	1	0.02
1,1-Dichloroethane	75-34-3	8260	0.101	0.5	0.5	1	0.5
1,1,2-Trifluoroethane	430-66-0	8260	1	1	1	--[7]	1
1,2,4-Trimethylbenzene	95-63-6	8260	0.141	2	1.41	1	1
1,2-Dibromoethane	106-93-4	8260	0.0981	2	0.981	--	0.981
1,3,5-Trimethylbenzene	108-67-8	8260	0.121	2	1.21	1	1
2-Butanone (MEK)	78-93-3	8260	2.3	20	20	1	1
2-Hexanone	591-78-6	8260	3.96	20	20	--	20
2-Methylpentane	107-83-5	8260	0.49	1	1	1	1
3-Methylpentane	96-14-0	8260	0.41	1	1	1	1
4-Methyl-2-pentanone (MIK)	108-10-1	8260	2.7	20	20	1	1
Acetone	67-64-1	8260	4.08	20	20	1	1
Benzene	71-43-2	8260	0.136	0.5	0.5	1	0.5
Carbon disulfide	75-15-0	8260	0.159	0.5	0.5	1	0.5
Chlorobenzene	108-90-7	8260	0.134	0.5	0.5	1	0.5
Chloroethane	75-00-3	8260	0.226	0.5	0.5	1	0.5
Chloroform	67-66-3	8260	0.136	0.5	0.5	1	0.5
Chloromethane	74-87-3	8260	0.136	0.5	0.5	1	0.5
cis-1,2-Dichloroethene	156-59-2	8260	0.116	0.5	0.5	1	0.5
Ethylbenzene	100-41-4	8260	0.13	0.5	0.5	1	0.5
Ethyl tert-butyl ether	637-92-3	8260	0.07	2	0.7	1	0.7
Hexachloroethane	67-72-1	8260	0.024	0.2	0.2	1	0.2
Isopropylbenzene (cumene)	98-82-8	8260	0.105	2	1.05	1	1
m,p-Xylene	136777-61-2	8260	0.219	0.5	0.5	1	0.5
Methylcyclopentane	96-37-7	8270	0.42	1	1	--	1
Methylene chloride	75-09-2	8260	0.193	2	1.93	1	1
Methyl tert-amyl ether	994-05-8	8260	0.0852	2	0.852	1	0.852
Methyl tert-butyl ether	1634-04-4	8260	0.0734	0.5	0.5	1	0.5
m-Xylene	108-38-3	8260	0.1095	0.25	0.25	1	0.25
n-Butyl alcohol (n-butanol)	71-36-3	8260	54	250	250	1	1
n-Butylbenzene	104-51-8	8260	0.221	2	2	1	1
n-Hexane	110-54-3	8260	0.182	1	1	1	1
n-Propylbenzene	103-65-1	8260	0.098	2	0.98	1	0.98
o-Xylene	95-47-6	8260	0.102	0.5	0.5	1	0.5
p-Isopropyltoluene (p-cymene)	99-87-6	8260	0.128	2	1.28	1	1
p-Xylene	106-42-3	8260	0.1095	0.25	0.25	1	0.25
sec-Butylbenzene	135-98-8	8260	0.127	2	1.27	1	1
tert-Butyl alcohol	75-65-0	8260	1.031	20	10.31	1	1
Tetrachloroethene	127-18-4	8260	0.126	0.5	0.5	1	0.5
Toluene	108-88-3	8260	0.108	0.5	0.5	1	0.5
trans-1,2-Dichloroethene	156-60-5	8260	0.143	0.5	0.5	1	0.5
Trichloroethene	79-01-6	8260 SIM	0.0067	0.02	0.02	1	0.02
Vinyl chloride	75-01-4	8260 SIM	0.0035	0.02	0.02	1	0.02
Xylene (total)	1330-20-7	8260	0.321	1	1	1	1

TABLE 5-2

GROUNDWATER PRACTICAL QUANTITATION LIMITS

PSC Kent Facility
Kent, Washington

Concentrations in micrograms per liter (µg/L)

Constituent	CAS No.[1]	Analytical Method[2]	Columbia[3] Method Detection Limit (µg/L)	Columbia Method Reporting Limit (µg/L)	Initial Applicable PQL[4] (µg/L)	Federal Reporting Limit[5] (µg/L)	Final Applicable PQL[6] (µg/L)
Semivolatile Organic Compounds (SVOCs)							
1,2-Dichlorobenzene	95-50-1	8270	0.111	0.5	0.5	10	0.5
1,4-Dichlorobenzene	106-46-7	8270	0.114	0.5	0.5	10	0.5
2-Methylnaphthalene	91-57-6	8270 SIM	0.0023	0.02	0.02	10	0.02
2-Methylphenol	95-48-7	8270	0.11	0.5	0.5	10	0.5
2,4-Dichlorophenol	120-83-2	8270 SIM	0.0235	0.5	0.235	11	0.235
2,4-Dimethylphenol	105-67-9	8270	2.2	4	4	10	4
2,4-Dinitrotoluene	121-14-2	8270	0.018	0.2	0.18	10	0.18
2,6-Dinitrotoluene	606-20-2	8270	0.033	0.2	0.2	10	0.2
3,3'-Dichlorobenzidine	91-94-1	8270	0.428	2	2	20	2
4-Methylphenol (p-cresol)	106-44-5	8270	0.12	0.5	0.5	10	0.5
Acenaphthene	83-32-9	8270 SIM	0.0044	0.02	0.02	10	0.02
Acenaphthylene	208-96-8	8270 SIM	0.0034	0.02	0.02	10	0.02
Anthracene	120-12-7	8270 SIM	0.0036	0.02	0.02	10	0.02
Benzo(a)anthracene	56-55-3	8270 SIM	0.0026	0.02	0.02	10	0.02
Benzo(a)pyrene	50-32-8	8270 SIM	0.0043	0.02	0.02	10	0.02
Benzo(b)fluoranthene	205-99-2	8270 SIM	0.0023	0.02	0.02	10	0.02
Benzo(ghi)perylene	191-24-2	8270 SIM	0.0029	0.02	0.02	10	0.02
Benzo(k)fluoranthene	207-08-9	8270 SIM	0.0025	0.02	0.02	10	0.02
Bis(2-chloroethyl) ether	111-44-4	8270	0.035	0.2	0.2	10	0.2
Bis(2-Ethylhexyl) phthalate	117-81-7	8270	0.13	1	1	10	1
Butyl benzyl phthalate	85-68-7	8270	0.018	0.2	0.18	10	0.18
Carbazole	86-74-8	8270	0.018	0.2	0.18	--	0.18
Chrysene	218-01-9	8270 SIM	0.0034	0.02	0.02	10	0.02
Dibenzo(a,h)anthracene	53-70-3	8270 SIM	0.0025	0.02	0.02	10	0.02
Dibenzofuran	132-64-9	8270 SIM	0.0046	0.02	0.02	10	0.02
Dimethyl phthalate	131-11-3	8270	0.021	0.2	0.2	10	0.2
Di-n-butyl phthalate	84-74-2	8270	0.023	0.2	0.2	10	0.2
Di-n-octyl phthalate	117-84-0	8270	0.018	0.2	0.18	10	0.18
Fluoranthene	206-44-0	8270 SIM	0.0044	0.02	0.02	10	0.02
Fluorene	86-73-7	8270 SIM	0.0038	0.02	0.02	10	0.02
Hexachlorobutadiene	87-68-3	8270	0.027	0.2	0.2	10	0.2
Hexachlorocyclopentadiene	77-47-4	8270	0.19	1	1	10	1
Indeno(1,2,3-cd)pyrene	193-39-5	8270 SIM	0.0026	0.02	0.02	10	0.02
Isophorone	78-59-1	8270	0.016	0.2	0.16	10	0.16
Naphthalene	91-20-3	8270 SIM	0.003	0.02	0.02	10	0.02
Nitrobenzene	98-95-3	8270	0.028	0.2	0.2	10	0.2
N-Nitroso-di-n-propylamine	621-64-7	8270	0.037	0.2	0.2	10	0.2
Pentachlorophenol	87-86-5	8270	0.34	1	1	50	1
Phenanthrene	85-01-8	8270 SIM	0.005	0.02	0.02	10	0.02
Phenol	108-95-2	8270	0.063	0.5	0.5	10	0.5
Pyrene	129-00-0	8270 SIM	0.0035	0.02	0.02	10	0.02

TABLE 5-2

GROUNDWATER PRACTICAL QUANTITATION LIMITS

PSC Kent Facility
Kent, Washington

Concentrations in micrograms per liter (µg/L)

Constituent	CAS No.[1]	Analytical Method[2]	Columbia[3] Method Detection Limit (µg/L)	Columbia Method Reporting Limit (µg/L)	Initial Applicable PQL[4] (µg/L)	Federal Reporting Limit[5] (µg/L)	Final Applicable PQL[6] (µg/L)
Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides							
4,4'-DDD	72-54-8	8081	0.0001	0.0005	0.0005	--	0.0005
4,4'-DDE	72-55-9	8081	0.00016	0.0005	0.0005	--	0.0005
4,4'-DDT	50-29-3	8081	0.00033	0.0005	0.0005	--	0.0005
Alachlor[10]	15972-60-8	8081 LL	0.007	0.01	0.01	--	0.01
Aldrin	309-00-2	8081	0.000054	0.0005	0.0005	--	0.0005
alpha-BHC	319-84-6	8081	0.00006	0.0005	0.0005	9.1	0.0005
alpha-Chlordane	5103-71-9	8081	0.000072	0.0005	0.0005	--	0.0005
Aroclor 1254	11097-69-1	8082	0.011	0.02	0.02	--	0.02
Aroclor 1260	11096-82-5	8082	0.011	0.02	0.02	--	0.02
Coumaphos[10]	56-72-4	8141 LL	0.13	0.2	0.2	2	0.2
Delta-BHC	319-86-8	8081	0.00018	0.0005	0.0005	--	0.0005
Dieldrin	60-57-1	8081	0.0004	0.0005	0.0005	--	0.0005
Endosulfan I	959-98-8	8081	0.000067	0.0005	0.0005	13	0.0005
Endosulfan II	33213-65-9	8081	0.000087	0.0005	0.0005	--	0.0005
Endrin	72-20-8	8081	0.000083	0.0005	0.0005	17	0.0005
Eptam (S-Ethyl dipropylthiocarbamate)[10]	759-94-4	8321	4	4	4	--	4
Fensulfothion[10]	115-90-2	8141 LL	0.16	0.5	0.5	0.8	0.5
gamma-BHC (Lindane)	58-89-9	8081	0.000092	0.0005	0.0005	--	0.0005
gamma-Chlordane	5103-74-2	8081	0.00015	0.0005	0.0005	--	0.0005
Heptachlor epoxide	1024-57-3	8081	0.000065	0.0005	0.0005	--	0.0005
Methoxychlor	72-43-5	8081	0.00017	0.0005	0.0005	--	0.0005
Mevinphos (Phosdrin)[10]	7786-34-7	8141 LL	0.0716	0.7	0.7	5	0.7
Metals							
Aluminum	7429-90-5	6020 / 200.8	0.3	2	2	--	2
Antimony	7440-36-0	6020 / 200.8	0.03	0.05	0.05	--	0.05
Arsenic	7440-38-2	6020 / 200.8	0.08	0.5	0.5	--	0.5
Barium	7440-39-3	6020 / 200.8	0.02	0.05	0.05	--	0.05
Beryllium	7440-41-7	6020 / 200.8	0.008	0.02	0.02	--	0.02
Boron	7440-42-8	6020 / 200.8	0.09	0.5	0.5	--	0.5
Cadmium	7440-43-9	6020 / 200.8	0.008	0.02	0.02	--	0.02
Chromium	7440-47-3	6020 / 200.8	0.07	0.2	0.2	--	0.2
Hexavalent chromium (Cr+VI)	18540-29-9	7196A	30	50	50	--	50
Cobalt	7440-48-4	6020 / 200.8	0.005	0.02	0.02	--	0.02
Copper	7440-50-8	6020 / 200.8	0.02	0.1	0.1	--	0.1
Cyanide	57-12-5	9010/9012	3	10	10	20	10
Iron	7439-89-6	6020 / 200.8	3	20	20	--	20
Lead	7439-92-1	6020 / 200.8	0.009	0.02	0.02	--	0.02
Manganese	7439-96-5	6020 / 200.8	0.02	0.05	0.05	--	0.05
Mercury	7439-97-6	7470A	0.00003	0.0002	0.0002	--	0.0002
Molybdenum	7439-98-7	6020 / 200.8	0.03	0.05	0.05	--	0.05
Nickel	7440-02-0	6020 / 200.8	0.07	0.2	0.2	--	0.2
Selenium	7782-49-2	6020 / 200.8	0.4	1	1	--	1
Silver	7440-22-4	6020 / 200.8	0.009	0.02	0.02	--	0.02
Thallium	7440-28-0	6020 / 200.8	0.003	0.02	0.02	--	0.02
Vanadium	7440-62-2	6020 / 200.8	0.08	0.2	0.2	--	0.2
Zinc	7440-66-6	6020 / 200.8	0.1	0.5	0.5	--	0.5

TABLE 5-2

GROUNDWATER PRACTICAL QUANTITATION LIMITS

PSC Kent Facility
Kent, Washington

Concentrations in micrograms per liter (µg/L)

Constituent	**CAS No.**[1]	**Analytical Method**[2]	**Columbia**[3] **Method Detection Limit (µg/L)**	**Columbia Method Reporting Limit (µg/L)**	**Initial Applicable PQL**[4] **(µg/L)**	**Federal Reporting Limit**[5] **(µg/L)**	**Final Applicable PQL**[6] **(µg/L)**
Total Petroleum Hydrocarbons (TPH)							
TPH as gasoline	86290-81-5	NWTPH-G[11]	13	50	50	--	50
TPH as diesel	68334-30-5	NWTPH-Dx[12]	11	250	110	--	110
TPh as lube oil	--	NWTPH-Dx[12]	19	500	190	--	190

Notes:

1. CAS No. = Chemical Abstract Service identification number.
2. U.S. Environmental Protection Agency laboratory method number or as noted. SIM = Selective Ion Monitoring.
3. Columbia = Columbia Analytical Services, Inc., Kelso, Washington (project laboratory).
4. PQL = Practical Quantitaiont Limit. Columbia method reporting limit (MRL) selected as the initial applicable PQL, unless the Columbia MRL was greater than 10 times the Columbia Method Detection Limit (MDL), in which case 10 times the MDL value is considered the initial applicable PQL [per WAC 173-340-707(a)].
5. Federal Reporting Limits from U.S. Environmental Protection Agency SW-846 on-line (EPA, 2007).
6. If the initial applicable PQL was greater than the federal reporting limit, then the federal reporting limit was selected as the final applicable PQL [WAC 173-340-707(b)].
7. -- = Not Available.
8. MDL/MRL for m-xylene, and p-xylene was MDL/MRL for m,p-xylene divided in half.
9. MDL/MRL for total xylenes was MDL/MRL for m,p-xylene + MDL/MRL for o-xylene.
10. MDL/MRL from Agriculture & Priority Pollutants Laboratories, Inc. (APPL), not Columbia.
11. Analyzed by Northwest Total Petroleum Hydrocarbons, gasoline, method.
12. Analyzed by Northwest Total Petroleum Hydrocarbons, diesel, method.

TABLE 5-3

SELECTION OF APPLICABLE SOIL SCREENING LEVELS

PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

Compound	CAS Number[1]	MTCA Cleanup Levels Protective of Human Health[2]			Natural Background[3]	Initial Soil Screening Level[4]	Final Applicable Practical Quantitation Limit	Final Soil Screening Level[5]	Basis
		Method C - Direct Contact		Protection of Groundwater					
		Carcinogen	Noncarcinogen						
Volatile Organic Compounds (VOCs)									
1,1,1-Trichloroethane	71-55-6	---[6]	3.15E+06	3.74E+00	---	3.74E+00	6.60E-04	**3.74E+00**	Protection of groundwater
1,1-Dichloroethene	75-35-4	2.19E+02	1.80E+05	7.04E-04	---	7.04E-04	5.70E-04	**7.04E-04**	Protection of groundwater
1,1-Dichloroethane	75-34-3	---	3.50E+05	7.76E+00	---	7.76E+00	6.80E-04	**7.76E+00**	Protection of groundwater
1,2,4-Trimethylbenzene	95-63-6	---	1.80E+05	1.10E+02	---	1.10E+02	7.00E-04	**1.10E+02**	Protection of groundwater
1,3,5-Trimethylbenzene	108-67-8	---	1.80E+05	2.83E+01	---	2.83E+01	6.90E-04	**2.83E+01**	Protection of groundwater
2-Butanone (MEK)	78-93-3	---	2.10E+06	2.17E+01	---	2.17E+01	5.00E-03	**2.17E+01**	Protection of groundwater
2-Methylpentane[7]	107-83-5	---	2.10E+05	1.09E+02	---	1.09E+02	5.00E-03	**1.09E+02**	Protection of groundwater
3-Methylpentane[7]	96-14-0	---	2.10E+05	1.12E+02	---	1.12E+02	5.00E-03	**1.12E+02**	Protection of groundwater
4-Methyl-2-pentanone (MIK)	108-10-1	---	2.80E+05	3.78E+00	---	3.78E+00	2.20E-03	**3.78E+00**	Protection of groundwater
Acetone	67-64-1	---	3.50E+05	3.25E+00	---	3.25E+00	1.00E-02	**3.25E+00**	Protection of groundwater
Benzene	71-43-2	2.39E+03	1.40E+04	8.42E-03	---	8.42E-03	7.90E-04	**8.42E-03**	Protection of groundwater
Carbon disulfide	75-15-0	---	3.50E+05	8.58E+00	---	8.58E+00	5.70E-04	**8.58E+00**	Protection of groundwater
cis- 1,2-Dichloroethene	156-59-2	---	3.50E+04	5.49E-01	---	5.49E-01	1.00E-03	**5.49E-01**	Protection of groundwater
Ethylbenzene	100-41-4	---	3.50E+05	1.32E+01	---	1.32E+01	6.50E-04	**1.32E+01**	Protection of groundwater
Hexachloroethane	67-72-1	9.38E+03	3.50E+03	2.55E-01	---	2.55E-01	1.00E-02	**2.55E-01**	Protection of groundwater
Isopropylbenzene (cumene)	98-82-8	---	3.50E+05	1.05E+02	---	1.05E+02	5.00E-04	**1.05E+02**	Protection of groundwater
m,p-Xylene	1330-20-7	---	7.00E+05	4.40E+01	---	4.40E+01	1.50E-03	**4.40E+01**	Protection of groundwater
Methylcyclopentane[7]	96-37-7	---	2.10E+05	4.11E+01	---	4.11E+01	5.00E-03	**4.11E+01**	Protection of groundwater
Methylene chloride	75-09-2	1.75E+04	2.10E+05	2.37E-02	---	2.37E-02	1.40E-03	**2.37E-02**	Protection of groundwater
m-Xylene	108-38-3	---	7.00E+06	2.65E+02	---	2.65E+02	7.50E-04	**2.65E+02**	Protection of groundwater
n-Butyl alcohol (n-butanol)	71-36-3	---	3.50E+05	3.75E+00	---	3.75E+00	2.10E-02	**3.75E+00**	Protection of groundwater
n-Butylbenzene[8]	104-51-8	---	2.3E+03	6.21E+01	---	6.21E+01	9.60E-04	**6.21E+01**	Protection of groundwater
n-Hexane	110-54-3	---	2.10E+05	2.27E+02	---	2.27E+02	1.60E-03	**2.27E+02**	Protection of groundwater
n-Propylbenzene[8]	103-65-1	---	2.3E+03	1.92E+01	---	1.92E+01	5.40E-04	**1.92E+01**	Protection of groundwater
o-Xylene	95-47-6	---	7.00E+06	3.13E+02	---	3.13E+02	5.70E-04	**3.13E+02**	Protection of groundwater
p-Isopropyltoluene (p-cymene)[9]	99-87-6	---	3.50E+05	3.94E+00	---	3.94E+00	6.60E-04	**3.94E+00**	Protection of groundwater
p-Xylene	106-42-3	---	7.00E+06	3.91E+02	---	3.91E+02	7.50E-04	**3.91E+02**	Protection of groundwater
sec-Butylbenzene[8]	135-98-8	---	1.7E+03	1.20E+00	---	1.20E+00	7.20E-04	**1.20E+00**	Protection of groundwater
Styrene	100-42-5	4.40E+03	7.00E+05	1.43E-01	---	1.43E-01	6.70E-04	**1.43E-01**	Protection of groundwater
Tetrachloroethene	127-18-4	2.40E+02	3.50E+04	1.59E-02	---	1.59E-02	7.60E-04	**1.59E-02**	Protection of groundwater
Toluene	108-88-3	---	2.80E+05	1.18E+01	---	1.18E+01	1.30E-03	**1.18E+01**	Protection of groundwater
Trichloroethene	79-01-6	3.30E+02	1.10E+03	1.55E-03	---	1.55E-03	7.00E-04	**1.55E-03**	Protection of groundwater
Vinyl chloride	75-01-4	8.75E+01	1.05E+04	1.95E-04	---	1.95E-04	9.40E-04	**9.40E-04**	Protection of groundwater
Xylene (total)	1330-20-7	---	7.00E+05	4.40E+01	---	4.40E+01	2.07E-03	**4.40E+01**	Protection of groundwater

TABLE 5-3

SELECTION OF APPLICABLE SOIL SCREENING LEVELS

PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

Compound	CAS Number[1]	MTCA Cleanup Levels Protective of Human Health[2]			Natural Background[3]	Initial Soil Screening Level[4]	Final Applicable Practical Quantitation Limit	Final Soil Screening Level[5]	Basis
		Method C - Direct Contact		Protection of Groundwater					
		Carcinogen	Noncarcinogen						
Semi-Volatile Organic Compounds (SVOCs)									
1,2-Dichlorobenzene	95-50-1	---	3.15E+05	1.77E+01	---	1.77E+01	6.50E-04	**1.77E+01**	Protection of groundwater
1,3-Dichlorobenzene	541-73-1	---	---	1.07E+01	---	1.07E+01	5.60E-04	**1.07E+01**	Protection of groundwater
1,4-Dichlorobenzene	106-46-7	5.47E+03	---	1.20E-01	---	1.20E-01	1.00E-03	**1.20E-01**	Protection of groundwater
2-Methylnaphthalene	91-57-6	---	1.40E+04	2.73E+01	---	2.73E+01	3.90E-03	**2.73E+01**	Protection of groundwater
2,4-Dimethylphenol	105-67-9	---	7.00E+04	3.98E+00	---	3.98E+00	5.00E-02	**3.98E+00**	Protection of groundwater
2,4-Dinitrotoluene	121-14-2	---	7.00E+03	2.44E-03	---	2.44E-03	1.00E-02	**1.00E-02**	Protection of groundwater
2,6-Dinitrotoluene	606-20-2	---	3.50E+03	1.75E-01	---	1.75E-01	1.00E-02	**1.75E-01**	Protection of groundwater
3,3'-Dichlorobenzidine	91-94-1	2.92E+02	---	1.53E-01	---	1.53E-01	3.70E-02	**1.53E-01**	Protection of groundwater
4-Methylphenol (p-cresol)	106-44-5	---	1.75E+04	3.56E-01	---	3.56E-01	1.00E-02	**3.56E-01**	Protection of groundwater
Acenaphthene	83-32-9	---	2.10E+05	3.17E+02	---	3.17E+02	2.30E-03	**3.17E+02**	Protection of groundwater
Acenaphthylene	208-96-8	---	---	1.13E-02	---	1.13E-02	2.40E-03	**1.13E-02**	Protection of groundwater
Anthracene	120-12-7	---	1.05E+06	1.13E+04	---	1.13E+04	4.70E-03	**1.13E+04**	Protection of groundwater
Benzo(a)anthracene	56-55-3	1.80E+01	---	7.15E-01	---	7.15E-01	4.80E-03	**7.15E-01**	Protection of groundwater
Benzo(a)pyrene	50-32-8	1.80E+01	---	1.94E+00	---	1.94E+00	1.40E-03	**1.94E+00**	Protection of groundwater
Benzo(b)fluoranthene	205-99-2	1.80E+01	---	2.46E+00	---	2.46E+00	2.50E-03	**2.46E+00**	Protection of groundwater
Benzo(ghi)perylene[10]	191-24-2	1.80E+01	---	5.60E+00	---	5.60E+00	5.00E-03	**5.60E+00**	Protection of groundwater
Benzo(k)fluoranthene	207-08-9	1.80E+01	---	2.46E+00	---	2.46E+00	1.50E-03	**2.46E+00**	Protection of groundwater
Bis(2-chloroethyl) ether	111-44-4	1.19E+02	---	2.32E-03	---	2.32E-03	1.00E-02	**1.00E-02**	Protection of groundwater
Bis(2-ethylhexyl) phthalate	117-81-7	9.38E+03	7.00E+04	1.33E+01	---	1.33E+01	7.00E-02	**1.33E+01**	Protection of groundwater
Carbazole	86-74-8	6.56E+03	---	1.50E+00	---	1.50E+00	1.00E-02	**1.50E+00**	Protection of groundwater
Chrysene	218-01-9	1.80E+01	---	7.96E-01	---	7.96E-01	2.50E-03	**7.96E-01**	Protection of groundwater
Dibenzo(a,h)anthracene	53-70-3	1.80E+01	---	3.58E+00	---	3.58E+00	2.80E-03	**3.58E+00**	Protection of groundwater
Dibenzofuran	132-64-9	---	7.00E+03	2.61E+01	---	2.61E+01	5.00E-03	**2.61E+01**	Protection of groundwater
Dimethyl phthalate	131-11-3	---	3.50E+06	1.28E+02	---	1.28E+02	1.00E-02	**1.28E+02**	Protection of groundwater
Di-n-butyl phthalate	84-74-2	---	3.50E+05	2.57E+02	---	2.57E+02	2.00E-02	**2.57E+02**	Protection of groundwater
Di-n-octyl phthalate	117-84-0	---	7.00E+04	2.66E+06	---	7.00E+04	1.00E-02	**7.00E+04**	Protection of direct contact
Fluoranthene	206-44-0	---	1.40E+05	4.43E+02	---	4.43E+02	5.00E-03	**4.43E+02**	Protection of groundwater
Fluorene	86-73-7	---	1.40E+05	4.96E+02	---	4.96E+02	5.00E-03	**4.96E+02**	Protection of groundwater
Hexachlorobutadiene	87-68-3	1.68E+03	7.00E+02	2.38E+00	---	2.38E+00	1.00E-02	**2.38E+00**	Protection of groundwater
Hexachlorocyclopentadiene	77-47-4	---	2.10E+04	8.00E+02	---	8.00E+02	5.00E-02	**8.00E+02**	Protection of groundwater
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E+01	---	6.94E+00	---	6.94E+00	1.60E-03	**6.94E+00**	Protection of groundwater
Naphthalene	91-20-3	---	7.00E+04	1.97E+01	---	1.97E+01	3.70E-03	**1.97E+01**	Protection of groundwater
Nitrobenzene	98-95-3	---	1.75E+03	6.36E-02	---	6.36E-02	1.00E-02	**6.36E-02**	Protection of groundwater
N-Nitroso-di-n-propylamine	621-64-7	1.88E+01	---	1.28E-03	---	1.28E-03	1.00E-02	**1.00E-02**	Protection of groundwater
Pentachlorophenol	87-86-5	1.09E+03	1.05E+05	6.32E-02	---	6.32E-02	1.00E-01	**1.00E-01**	Protection of groundwater
Phenanthrene[11]	85-01-8	---	1.40E+05	3.46E+01	---	3.46E+01	5.00E-03	**3.46E+01**	Protection of groundwater
Phenol	108-95-2	---	2.10E+06	3.30E+01	---	3.30E+01	2.00E-02	**3.30E+01**	Protection of groundwater
Pyrene	129-00-0	---	1.05E+05	3.27E+03	---	3.27E+03	3.70E-03	**3.27E+03**	Protection of groundwater

TABLE 5-3

SELECTION OF APPLICABLE SOIL SCREENING LEVELS

PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

		MTCA Cleanup Levels Protective of Human Health[2]							
		Method C - Direct Contact							
Compound	CAS Number[1]	Carcinogen	Noncarcinogen	Protection of Groundwater	Natural Background[3]	Initial Soil Screening Level[4]	Final Applicable Practical Quantitation Limit	Final Soil Screening Level[5]	Basis
Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides									
4,4'-DDD	72-54-8	5.47E+02	---	2.29E-03	---	2.29E-03	1.00E-03	**2.29E-03**	Protection of groundwater
4,4'-DDE	7786-34-7	3.86E+02	---	4.30E-03	---	4.30E-03	1.00E-03	**4.30E-03**	Protection of groundwater
4,4'-DDT	50-29-3	3.86E+02	1.75E+03	3.39E-02	---	3.39E-02	6.40E-04	**3.39E-02**	Protection of groundwater
Alachlor	15972-60-8	1.62E+03	3.50E+04	2.49E-02	---	2.49E-02	2.60E-02	**2.60E-02**	Protection of groundwater
Aldrin	309-00-2	7.70E+00	1.10E+02	2.44E-03	---	2.44E-03	1.00E-03	**2.44E-03**	Protection of groundwater
alpha-Chlordane[12]	5103-71-9	3.80E+02	1.80E+03	2.91E-03	---	2.91E-03	1.00E-03	**2.91E-03**	Protection of groundwater
Aroclor 1254	11097-69-1	---	7.00E+01	2.00E-01	---	2.00E-01	1.00E-02	**2.00E-01**	Protection of groundwater
Aroclor 1260[13]	11096-82-5	6.60E+01	---	1.64E+00	---	1.64E+00	1.00E-02	**1.64E+00**	Protection of groundwater
Coumaphos[14]	56-72-4	---	8.75E+02	2.33E+00	---	2.33E+00	1.00E-01	**2.33E+00**	Protection of groundwater
Delta-BHC[15]	319-86-8	1.01E+02	1.05E+03	8.17E-03	---	8.17E-03	5.50E-04	**8.17E-03**	Protection of groundwater
Dieldrin	60-57-1	8.20E+00	1.75E+02	1.28E-03	---	1.28E-03	1.00E-03	**1.28E-03**	Protection of groundwater
Endosulfan I[16]	959-98-8	---	2.10E+04	3.56E-02	---	3.56E-02	1.00E-03	**3.56E-02**	Protection of groundwater
Endosulfan II[16]	33213-65-9	---	2.10E+04	3.81E-02	---	3.81E-02	1.00E-03	**3.81E-02**	Protection of groundwater
Endosulfan Sulfate[16]	1031-07-8	---	2.10E+04	2.27E-04	---	2.27E-04	7.90E-04	**7.90E-04**	Protection of groundwater
Endrin aldehyde	7421-93-4	---	1.10E+03	1.52E+02	---	1.52E+02	5.30E-04	**1.52E+02**	Protection of groundwater
Eptam (S-ethyl dipropylthiocarbamate)	759-94-4	---	8.75E+04	4.20E+00	---	4.20E+00	3.00E-01	**4.20E+00**	Protection of groundwater
Fensulfothion	115-90-6	---	8.75E+02	1.36E-01	---	1.36E-01	4.00E-02	**1.36E-01**	Protection of groundwater
gamma-BHC (Lindane)	58-89-9	1.01E+02	1.05E+03	2.64E-03	---	2.64E-03	1.00E-03	**2.64E-03**	Protection of groundwater
gamma-Chlordane[12]	5103-74-2	3.80E+02	1.80E+03	2.91E-03	---	2.91E-03	6.40E-04	**2.91E-03**	Protection of groundwater
Heptachlor epoxide	1024-57-3	1.40E+01	4.60E+01	4.15E-03	---	4.15E-03	1.00E-03	**4.15E-03**	Protection of groundwater
Mevinphos (Phosdrin)	7786-34-7	---	8.75E+02	9.60E-02	---	9.60E-02	5.20E-02	**9.60E-02**	Protection of groundwater
Metals									
Aluminum[8]	7429-90-5	---	1.02E+06	---[17]	---	1.02E+06	5.00E-01	**1.02E+06**	Protection of direct contact
Antimony	7440-36-0	---	1.40E+03	5.06E+00	5.00E+00[18]	5.06E+00	3.00E-02	**5.06E+00**	Protection of groundwater
Arsenic	7440-38-2	8.75E+01	1.05E+03	2.92E-01	7.30E+00	7.30E+00	1.00E-01	**7.30E+00**	Natural background
Barium	7440-39-3	---	7.00E+05	8.24E+02	---	8.24E+02	3.00E-02	**8.24E+02**	Protection of groundwater
Beryllium	7440-41-7	---	7.00E+03	6.32E+01	6.00E-01	6.32E+01	2.00E-02	**6.32E+01**	Protection of groundwater
Boron	7440-42-8	---	7.00E+05	---	---	7.00E+05	1.00E+01	**7.00E+05**	Protection of direct contact
Cadmium	7440-43-9	---	3.50E+03	3.45E-02	8.00E-01	8.00E-01	8.00E-03	**8.00E-01**	Natural background
Chromium[19]	7440-47-3	---	5.25E+06	4.22E+00	4.82E+01	4.82E+01	4.00E-02	**4.82E+01**	Natural background
Hexavalent chromium (Cr+VI)	18540-29-9	---	1.05E+04	1.92E+01	---	1.92E+01	5.00E-01	**1.92E+01**	Protection of groundwater
Cobalt	7440-48-4	---	2.04E+04	---[17]	---	2.04E+04	3.00E-03	**2.04E+04**	Protection of direct contact
Copper	7440-50-8	---	1.30E+05	1.55E+00	3.64E+01	3.64E+01	1.00E-01	**3.64E+01**	Natural background
Cyanide	57-12-5	---	7.00E+04	5.75E-02	---	5.75E-02	1.00E-01	**1.00E-01**	Protection of groundwater
Iron	7439-89-6	---	---	---	5.87E+04	5.87E+04	4.00E+00	**5.87E+04**	Natural background
Lead	7439-92-1	---	---	1.08E+02	1.68E+01	1.08E+02	2.00E-02	**1.08E+02**	Protection of groundwater
Manganese	7439-96-5	---	4.90E+05	1.49E+02	1.15E+03	1.15E+03	4.00E-02	**1.15E+03**	Natural background

TABLE 5-3

SELECTION OF APPLICABLE SOIL SCREENING LEVELS
PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

		MTCA Cleanup Levels Protective of Human Health[2]							
		Method C - Direct Contact							
Compound	**CAS Number[1]**	**Carcinogen**	**Noncarcinogen**	**Protection of Groundwater**	**Natural Background[3]**	**Initial Soil Screening Level[4]**	**Final Applicable Practical Quantitation Limit**	**Final Soil Screening Level[5]**	**Basis**
Metals (Continued)									
Mercury	7439-97-6	---	1.05E+03	1.25E-02	7.00E-02	7.00E-02	6.00E-03	**7.00E-02**	Natural background
Molybdenum	7439-98-7	---	1.75E+04	---[17]	---	1.75E+04	5.00E-02	**1.75E+04**	Protection of direct contact
Nickel	7440-02-0	---	7.00E+04	6.39E+01	3.82E+01[18]	6.39E+01	5.00E-02	**6.39E+01**	Protection of groundwater
Selenium	7782-49-2	---	1.75E+04	5.20E-01	7.80+01[18]	7.80E-01	4.00E-01	**7.80E-01**	Natural background
Silver	7440-22-4	---	1.75E+04	5.44E-02	6.10E+01[18]	6.10E-01	2.00E-02	**6.10E-01**	Natural background
Thallium	7440-28-0	---	2.45E+02	3.42E-01	---	3.42E-01	3.00E-03	**3.42E-01**	Protection of groundwater
Vanadium	7440-62-2	---	2.45E+04	2.24E+03	---	2.24E+03	4.00E-02	**2.24E+03**	Protection of groundwater
Zinc	7440-66-6	---	1.05E+06	3.98E+01	8.51E+01	8.51E+01	2.00E-01	**8.51E+01**	Natural background
Total Petroleum Hydrocarbons (TPH) [20]									
TPH as gasoline	86290-81-5	---	3.00E+01	---	---	3.00E+01	5.00E+00	**3.00E+01**	Protection of direct contact
TPH as diesel	68334-30-5	---	2.00E+03	---	---	2.00E+03	1.20E+01	**2.00E+03**	Protection of direct contact
TPH as lube oil	---	---	2.00E+03	---	---	2.00E+03	2.90E+01	**2.00E+03**	Protection of direct contact

Notes:
1. CAS = Chemical Abstract Service.
2. MTCA = Model Toxics Control Act.
3. Puget Sound natural background levels as calculated by Ecology (1994).
4. Initial soil screening level is the lesser of the MTCA cleanup levels. If natural background levels exceed the lower MTCA cleanup level, the initial soil screening level is the natural background concentration.
5. Final soil screening level is set as the initial soil screening, except if initial soil screening level is less than final applicable practical quantitation limit (PQL), in which case the PQL is the final soil screening level.
6. -- = Not established, or not applicable, or otherwise not available.
7. Cleanup level for n-hexane used for 2-methylpentane, 3-methylpentane, methylcyclopentane.
8. Cleanup levels for n-butylbenzene, n-propylbenzene, sec-butylbenzene, aluminum, and cobalt are based on 2004 EPA Region 9 preliminary remediation goals (PRGs) since no MTCA cleanup levels are listed in the CLARC database (Ecology, 2007).
9. Cleanup level for isopropylbenzene used for p-isopropyltoluene.
10. Cleanup level for benzo(b)fluoranthene was used for benzo(ghi)perylene.
11. Cleanup level for fluoranthene was used for phenanthrene.
12. Cleanup levels for chlordane were used for alpha- and gamma-chlordane.
13. Cleanup level for total PCBs was used for Aroclor 1260.
14. Cleanup level for mevinphos used for coumaphos.
15. Cleanup level for gamma-BHC was used for delta-BHC.
16. Cleanup level for Endosulfan was used for Endosulfan I, II, and Endosulfan sulfate.
17. Distribution coefficient (K_d) for aluminum, cobalt, and molybdenum were not available, and these constituents were not detected in groundwater at the site. Therefore soil screening levels protective of groundwater were not calculated.
18. Values for antimony, selenium, and silver are state wide background levels; no regional data calculated.
19. Chromium value is for chromium III.
20. TPH cleanup levels are MTCA Method A cleanup levels; no Method C cleanup levels are available.

TABLE 5-4

CALCULATION OF VADOSE ZONE SOIL SCREENING LEVELS BASED ON PROTECTION OF GROUNDWATER

PSC Kent Facility
Kent, Washington

Vadose Zone Soil Screening Level = $C_w * CF * DF * [K_d + (O_w + O_a * H)/P_b]$

Parameter	Description	Units	Values	Reference/Source
SSL	Soil Screening Level based on groundwater protection	mg/kg	chemical-specific	Calculated
C_w	Groundwater screening level	µg/L	chemical-specific	See Table 5-5
CF	Conversion factor, µg to mg	mg/µg	1.00E-03	Conversion
DF_{vad}	Dilution factor, vadose zone	unitless	20	WAC 173-340
DF_{sat}	Dilution factor, saturated zone	unitless	1	WAC 173-340
K_d	Distribution coefficient	cm^3/g	chemical-specific	Calculated
O_w	Water-filled soil porosity	unitless	0.3	WAC 173-340
O_a	Air-filled soil porosity	unitless	0.13	WAC 173-340
n	Total saturated porosity	unitless	0.43	Site-specific data
H	Henry's Law constant	unitless	chemical-specific	EPA, 1996; EPA, 2007b; Montgomery, 1996
P_b	Dry soil bulk density	g/cm^3	1.5	WAC 173-340
K_{oc}	Soil organic carbon partition coefficient	cm^3/g	chemical-specific	EPA, 1996; EPA, 2007b; Montgomery, 1996
f_{oc}	Fraction organic carbon	unitless	0.005	Site-specific data

Compound	CAS Number[1]	C_w	K_{oc}	K_d	H	SSL (DF = 20)	Source (if other than CLARC [Ecology, 2007])[2]
Volatile Organic Compounds (VOCs)							
1,1,1-Trichloroethane	71-55-6	2.00E+02	1.35E+02	6.75E-01	7.05E-01	3.74E+00	
1,1-Dichloroethene	75-35-4	5.70E-02	6.50E+01	3.25E-01	1.07E+00	7.04E-04	
1,1-Dichloroethane	75-34-3	8.00E+02	5.30E+01	2.65E-01	2.30E-01	7.76E+00	
1,2,4-Trimethylbenzene	95-63-6	4.00E+02	2.71E+03	1.36E+01	2.52E-01	1.10E+02	Chemfate, Recommended Value, Henry's Law Constant converted used EPA converter (EPA, 2007b)
1,3,5-Trimethylbenzene	108-67-8	4.00E+02	6.61E+02	3.31E+00	3.59E-01	2.83E+01	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)

TABLE 5-4

CALCULATION OF VADOSE ZONE SOIL SCREENING LEVELS BASED ON PROTECTION OF GROUNDWATER

PSC Kent Facility
Kent, Washington

Compound	CAS Number[1]	C_w	K_{oc}	K_d	H	SSL (DF = 20)	Source (if other than CLARC [Ecology, 2007])[2]
Volatile Organic Compounds (VOCs) (Continued)							
2-Butanone (MEK)	78-93-3	4.80E+03	5.20E+00	2.60E-02	2.29E-03	2.17E+01	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
2-Methylpentane	107-83-5	4.80E+02	1.02E+03	5.11E+00	6.99E+01	1.09E+02	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b); Koc: HSDB (2004)
3-Methylpentane	96-14-0	4.80E+02	1.10E+03	5.50E+00	6.87E+01	1.12E+02	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b); Koc: HSDB (2004)
4-Methyl-2-pentanone (MIK)	108-10-1	6.40E+02	1.90E+01	9.50E-02	5.64E-03	3.78E+00	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Acetone	67-64-1	8.00E+02	5.75E-01	2.88E-03	1.59E-03	3.25E+00	
Benzene	71-43-2	7.95E-01	6.20E+01	3.10E-01	2.28E-01	8.42E-03	
Carbon disulfide	75-15-0	8.00E+02	4.57E+01	2.29E-01	1.24E+00	8.58E+00	
cis-1,2-Dichloroethene	156-59-2	7.00E+01	3.55E+01	1.78E-01	1.67E-01	5.49E-01	
Ethylbenzene	100-41-4	5.30E+02	2.04E+02	1.02E+00	3.23E-01	1.32E+01	
Hexachloroethane	67-72-1	1.40E+00	1.78E+03	8.90E+00	1.59E-01	2.55E-01	
Isopropylbenzene (cumene)	98-82-8	8.00E+02	4.54E+02	2.27E+00	4.74E+01	1.05E+02	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b)
m,p-Xylene	1330-20-7	1.60E+03	2.30E+02	1.15E+00	2.80E-01	4.40E+01	
Methylcyclopentane	96-37-7	4.80E+02	5.59E+02	2.80E+00	1.48E+01	4.11E+01	Chemfate,Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Methylene chloride	75-09-2	4.60E+00	1.00E+01	5.00E-02	8.98E-02	2.37E-02	
m-Xylene	108-38-3	1.10E+04	1.96E+02	9.80E-01	3.01E-01	2.65E+02	
n-Butyl alcohol (n-butanol)	71-36-3	8.00E+02	6.92E+00	3.46E-02	3.60E-04	3.75E+00	

TABLE 5-4

CALCULATION OF VADOSE ZONE SOIL SCREENING LEVELS BASED ON PROTECTION OF GROUNDWATER

PSC Kent Facility
Kent, Washington

Compound	CAS Number[1]	C_w	K_{oc}	K_d	H	SSL (DF = 20)	Source (if other than CLARC [Ecology, 2007])[2]
Volatile Organic Compounds (VOCs) (Continued)							
n-Butylbenzene	104-51-8	2.43E+02	2.50E+03	1.25E+01	6.50E-01	6.21E+01	Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
n-Hexane	110-54-3	4.80E+02	3.40E+03	1.70E+01	7.40E+01	2.27E+02	
n-Propylbenzene	103-65-1	2.43E+02	7.41E+02	3.71E+00	4.29E-01	1.92E+01	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b)
o-Xylene	95-47-6	1.10E+04	2.41E+02	1.21E+00	2.13E-01	3.13E+02	
p-Isopropyltoluene (p-Cymene)	99-87-6	8.00E+02	1.450647	7.25E-03	4.50E-01	3.94E+00	Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
p-Xylene	106-42-3	1.10E+04	3.10E+02	1.55E+00	3.10E-01	3.91E+02	
sec-Butylbenzene	135-98-8	2.43E+02	1.41E+00	7.05E-03	4.50E-01	1.20E+00	Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Styrene	100-42-5	1.50E+00	9.12E+02	4.56E+00	1.13E-01	1.43E-01	
Tetrachloroethene	127-18-4	5.00E-01	2.65E+02	1.33E+00	7.54E-01	1.59E-02	
Toluene	108-88-3	6.40E+02	1.40E+02	7.00E-01	2.72E-01	1.18E+01	
Trichloroethene	79-01-6	1.10E-01	9.40E+01	4.70E-01	4.22E-01	1.55E-03	
Vinyl chloride	75-01-4	2.50E-02	1.86E+01	9.30E-02	1.11E+00	1.95E-04	
Xylene (total)	1330-20-7	1.60E+03	2.30E+02	1.15E+00	2.80E-01	4.40E+01	
Semivolatile Organic Compounds (SVOCs)							
1,2-Dichlorobenzene	95-50-1	4.20E+02	3.79E+02	1.90E+00	7.79E-02	1.77E+01	
1,3-Dichlorobenzene	541-73-1	3.20E+02	2.93E+02	1.47E+00	1.07E-01	1.07E+01	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
1,4-Dichlorobenzene	106-46-7	1.82E+00	6.16E+02	3.08E+00	9.96E-02	1.20E-01	

TABLE 5-4

CALCULATION OF VADOSE ZONE SOIL SCREENING LEVELS BASED ON PROTECTION OF GROUNDWATER

PSC Kent Facility
Kent, Washington

Compound	CAS Number[1]	C_w	K_{oc}	K_d	H	SSL (DF = 20)	Source (if other than CLARC [Ecology, 2007])[2]
Semivolatile Organic Compounds (SVOCs) (Continued)							
2-Methylnaphthalene	91-57-6	3.20E+01	8.50E+03	4.25E+01	2.12E-02	2.73E+01	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b)
2,4-Dimethylphenol	105-67-9	1.60E+02	2.09E+02	1.05E+00	8.20E-05	3.98E+00	
2,4-Dinitrotoluene	121-14-2	1.80E-01	9.55E+01	4.78E-01	3.80E-06	2.44E-03	
2,6-Dinitrotoluene	606-20-2	1.60E+01	6.92E+01	3.46E-01	3.06E-05	1.75E-01	
3,3'-Dichlorobenzidine	91-94-1	2.00E+00	7.24E+02	3.62E+00	1.64E-07	1.53E-01	
4-Methylphenol (p-cresol)	106-44-5	4.00E+01	4.90E+01	2.45E-01	3.24E-05	3.56E-01	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Acenaphthene	83-32-9	6.43E+02	4.90E+03	2.45E+01	6.40E-03	3.17E+02	
Acenaphthylene	208-96-8	2.00E-02	5.62E+03	2.81E+01	4.62E-03	1.13E-02	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Anthracene	120-12-7	4.80E+03	2.35E+04	1.17E+02	2.67E-03	1.13E+04	
Benzo(a)anthracene	56-55-3	2.00E-02	3.58E+05	1.79E+03	1.37E-04	7.15E-01	
Benzo(a)pyrene	50-32-8	2.00E-02	9.69E+05	4.84E+03	4.63E-05	1.94E+00	
Benzo(b)fluoranthene	205-99-2	2.00E-02	1.23E+06	6.15E+03	4.55E-03	2.46E+00	
Benzo(ghi)perylene	191-24-2	2.00E-02	2.80E+06	1.40E+04	1.35E-05	5.60E+00	Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Benzo(k)fluoranthene	207-08-9	2.00E-02	1.23E+06	6.15E+03	3.40E-05	2.46E+00	
Bis(2-chloroethyl) ether	111-44-4	2.00E-01	7.60E+01	3.80E-01	7.38E-04	2.32E-03	
Bis(2-Ethylhexyl) phthalate	117-81-7	1.20E+00	1.11E+05	5.56E+02	4.18E-06	1.33E+01	
Carbazole	86-74-8	4.38E+00	3.39E+03	1.70E+01	6.26E-07	1.50E+00	
Chrysene	218-01-9	2.00E-02	3.98E+05	1.99E+03	3.88E-03	7.96E-01	
Dibenzo(a,h)anthracene	53-70-3	2.00E-02	1.79E+06	8.95E+03	6.03E-07	3.58E+00	

TABLE 5-4

CALCULATION OF VADOSE ZONE SOIL SCREENING LEVELS BASED ON PROTECTION OF GROUNDWATER

PSC Kent Facility
Kent, Washington

Compound	CAS Number[1]	C_w	K_{oc}	K_d	H	SSL (DF = 20)	Source (if other than CLARC [Ecology, 2007])[2]
Semivolatile Organic Compounds (SVOCs) (Continued)							
Dibenzofuran	132-64-9	3.20E+01	8.13E+03	4.06E+01	8.71E-03	2.61E+01	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Dimethyl phthalate	131-11-3	1.60E+04	4.00E+01	2.00E-01	4.29E-06	1.28E+02	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Di-n-butyl phthalate	84-74-2	1.60E+03	1.57E+03	7.84E+00	3.85E-08	2.57E+02	
Di-n-octyl phthalate	117-84-0	3.20E+02	8.32E+07	4.16E+05	2.74E-03	2.66E+06	
Fluoranthene	206-44-0	9.02E+01	4.91E+04	2.45E+02	6.60E-04	4.43E+02	
Fluorene	86-73-7	6.40E+02	7.71E+03	3.85E+01	2.61E-03	4.96E+02	
Hexachlorobutadiene	87-68-3	4.40E-01	5.40E+04	2.70E+02	3.30E-01	2.38E+00	
Hexachlorocyclopentadiene	77-47-4	4.00E+01	2.00E+05	1.00E+03	1.11E+00	8.00E+02	
Indeno(1,2,3-cd)pyrene	193-39-5	2.00E-02	3.47E+06	1.74E+04	6.56E-05	6.94E+00	
Naphthalene	91-20-3	1.60E+02	1.19E+03	5.96E+00	1.98E-02	1.97E+01	
Nitrobenzene	98-95-3	4.00E+00	1.19E+02	5.95E-01	9.84E-04	6.36E-02	
N-Nitroso-di-n-propylamine	621-64-7	2.00E-01	2.40E+01	1.20E-01	9.23E-05	1.28E-03	
Pentachlorophenol	87-86-5	1.00E+00	5.92E+02	2.96E+00	1.00E-06	6.32E-02	
Phenanthrene	85-01-8	9.02E+01	3.80E+03	1.90E+01	1.73E-03	3.46E+01	Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Phenol	108-95-2	4.80E+03	2.88E+01	1.44E-01	1.63E-05	3.30E+01	
Pyrene	129-00-0	4.80E+02	6.80E+04	3.40E+02	4.51E-04	3.27E+03	
Pesticides, Polychlorinated Biphenyls (PCBs) and Herbicides							
4,4'-DDD	72-54-8	5.00E-04	4.58E+04	2.29E+02	1.64E-04	2.29E-03	
4,4'-DDE	7786-34-7	5.00E-04	8.60E+04	4.30E+02	8.60E-04	4.30E-03	
4,4'-DDT	50-29-3	5.00E-04	6.78E+05	3.39E+03	3.32E-04	3.39E-02	
Alachlor	15972-60-8	1.08E+00	1.91E+02	9.55E-01	3.43E-07	2.49E-02	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Aldrin	309-00-2	5.00E-04	4.87E+04	2.43E+02	6.97E-03	2.44E-03	

TABLE 5-4

CALCULATION OF VADOSE ZONE SOIL SCREENING LEVELS BASED ON PROTECTION OF GROUNDWATER

PSC Kent Facility
Kent, Washington

Compound	CAS Number[1]	C_w	K_{oc}	K_d	H	SSL (DF = 20)	Source (if other than CLARC [Ecology, 2007])[2]
Pesticides, Polychlorinated Biphenyls (PCBs) and Herbicides (Continued)							
alpha-Chlordane[3]	5103-71-9	5.70E-04	5.10E+04	2.55E+02	1.99E-03	2.91E-03	
Aroclor 1254	11097-69-1	2.00E-02	3.09E+05	5.00E+02	3.42E-01	2.00E-01	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b), EPA, 2007c
Aroclor 1260	11096-82-5	2.00E-02	8.20E+05[4]	4.10E+03	1.37E-02	1.64E+00	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Coumaphos	56-72-4	4.00E+00	2.23E+03	2.89E+01	1.26E-06	2.33E+00	Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b),EPA, 2007c
Delta-BHC	319-86-8	1.90E-02	4.26E+03	2.13E+01	1.75E-05	8.17E-03	Chemfate,Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Dieldrin	60-57-1	5.00E-04	2.55E+04	1.28E+02	6.19E-04	1.28E-03	
Endosulfan I	959-98-8	5.60E-02	6.32E+03	3.16E+01	2.90E-04	3.56E-02	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Endosulfan II	33213-65-9	5.60E-02	6.77E+03	3.39E+01	1.60E-05	3.81E-02	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Endosulfan sulfate	1031-07-8	2.30E-03	9.48E+02	4.74E+00	1.33E-05	2.27E-04	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b), EPA, 2007c
Endrin aldehyde	7421-93-4	2.00E+02	7.58E+03	3.79E+01	1.71E-04	1.52E+02	Chemfate, Henry's Law Constant converted used EPA converter (EPA, 2007b), EPA, 2007c
Eptam (S-Ethyl dipropylthiocarbamate)	759-94-4	2.00E+02	1.43E+03	8.50E-01	6.50E-04	4.20E+00	Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b), EPA, 2007c

TABLE 5-4

CALCULATION OF VADOSE ZONE SOIL SCREENING LEVELS BASED ON PROTECTION OF GROUNDWATER

PSC Kent Facility
Kent, Washington

Compound	CAS Number[1]	C_w	K_{oc}	K_d	H	SSL (DF = 20)	Source (if other than CLARC [Ecology, 2007])[2]
Pesticides, Polychlorinated Biphenyls (PCBs) and Herbicides (Continued)							
Fensulfothion	115-90-2	4.00E+00	1.56E+02	1.50E+00	4.13E-07	1.36E-01	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b), EPA, 2007c
gamma-BHC (Lindane)	58-89-9	1.90E-02	1.35E+03	6.76E+00	5.74E-04	2.64E-03	
gamma-Chlordane[3]	5103-74-2	5.70E-04	5.10E+04	2.55E+02	1.99E-03	2.91E-03	
Heptachlor epoxide	1024-57-3	5.00E-04	8.30E+04	4.15E+02	3.90E-04	4.15E-03	
Mevinphos (Phosdrin)	7786-34-7	4.00E+00	2.00E+02	1.00E+00	2.61E-09	9.60E-02	Chemfate, Chemfinder, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Metals							
Aluminum	7429-90-5	8.70E+01	---	---[5]	0.00E+00	---	
Antimony	7440-36-0	5.60E+00	---	4.50E+01	0.00E+00	5.06E+00	
Arsenic	7440-38-2	5.00E-01	---	2.90E+01	0.00E+00	2.92E-01	
Barium	7440-39-3	1.00E+03	---	4.10E+01	0.00E+00	8.24E+02	
Beryllium	7440-41-7	4.00E+00	---	7.90E+02	0.00E+00	6.32E+01	
Boron	7440-42-8	3.20E+03	---	---	0.00E+00	---	
Cadmium	7440-43-9	2.50E-01	---	6.70E+00	0.00E+00	3.45E-02	
Chromium	7440-47-3	1.10E+01	---	1.90E+01	0.00E+00	4.22E+00	
Hexavalent Chromium (Cr+VI)	18540-29-9	5.00E+01	---	1.90E+01	0.00E+00	1.92E+01	
Cobalt	7440-48-4	7.30E+02	---	---5	0.00E+00	---	
Copper	7440-50-8	3.50E+00	---	2.20E+01	0.00E+00	1.55E+00	
Cyanide	57-12-5	1.00E+01	1.74E+01	8.70E-02	5.44E-03	5.75E-02	Chemfate, SRC PhysProp Database, Henry's Law Constant converted used EPA converter (EPA, 2007b)
Iron	7439-89-6	3.00E+02	---	---	0.00E+00	---	
Lead	7439-92-1	5.40E-01	---	1.00E+04	0.00E+00	1.08E+02	
Manganese	7439-96-5	5.00E+01	---	1.48E+02	0.00E+00	1.49E+02	K_d: Dragun (1988)
Mercury	7439-97-6	1.20E-02	---	5.20E+01	4.70E-01	1.25E-02	
Molybdenum	7439-98-7	8.00E+01	---	---5	0.00E+00	---	

TABLE 5-4

CALCULATION OF VADOSE ZONE SOIL SCREENING LEVELS BASED ON PROTECTION OF GROUNDWATER

PSC Kent Facility
Kent, Washington

Compound	CAS Number[1]	C_w	K_{oc}	K_d	H	SSL (DF = 20)	Source (if other than CLARC [Ecology, 2007])[2]
Metals (Continued)							
Nickel	7440-02-0	4.90E+01	---	6.50E+01	0.00E+00	6.39E+01	
Selenium	7782-49-2	5.00E+00	---	5.00E+00	0.00E+00	5.20E-01	
Silver	7440-22-4	3.20E-01	---	8.30E+00	0.00E+00	5.44E-02	
Thallium	7440-28-0	2.40E-01	---	7.10E+01	0.00E+00	3.42E-01	
Vanadium	7440-62-2	1.12E+02	---	1.00E+03	0.00E+00	2.24E+03	
Zinc	7440-66-6	3.20E+01	---	6.20E+01	0.00E+00	3.98E+01	
Total Petroleum Hydrocarbons (TPH)							
TPH as gasoline	86290-81-5	8.00E+02	---	0.00E+00	---	3.20E+00	
TPH as Diesel	68334-30-5	5.00E+02	---	0.00E+00	---	2.00E+00	
TPH as Lube Oil	---	5.00E+02	---	0.00E+00	---	2.00E+00	

Notes:

1. CAS Number = Chemical Abstract Service identification number.
2. Sources:
   Chemfate: SRC (Syracuse Research Corporation), 2007, http://www.syrres.com/esc/efdb.htm.
   Chemfinder: ChemFinder, 2007, On-line chemical database, http://chemfinder.cambridgesoft.com/, CambridgeSoft Corporation.
3. Values for chlordane were used for alpha- and gamma-chlordane.
4. Used a K_{oc} for total PCBs for Aroclor 1260 because no specific K_{oc} for Aroclor 1260 was found.
5. Distribution coefficients (K_d) for aluminum, cobalt, and molybdenum were not available, and these constituents were not detected in groundwater at the site. Therefore soil screening levels protective of groundwater were not calculated.
6. Cr+VI were used for chromium.

TABLE 5-5

SELECTION OF APPLICABLE GROUNDWATER SCREENING LEVELS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Compound	CAS Number[2]	MTCA Method A/B Groundwater Cleanup Levels[3]		MTCA Method B Surface Water Cleanup Levels[3]		State and Federal Water Quality Criteria Freshwater AL[4]		Groundwater ARAR[5]	Surface Water ARAR-NTR HH[6]	Surface Water ARAR-CWA HH[7]	Final Applicable Practical Quantitation Limit[8]	Groundwater Screening Level[9]	Basis
		Carc.	Noncarc.	Carc.	Noncarc.	Acute	Chronic						
Volatile Organic Compounds (VOCs)													
1,1,1-Trichloroethane	71-55-6	---	7,200	---	416,666.67	---	---	200	---	---	0.5	**200**	Protection of drinking water use
1,1-Dichloroethene	75-35-4	0.0729	400	1.93	23,000	---	---	7	0.057	330	0.02	**0.057**	Protection of surface water
1,1-Dichloroethane	75-34-3	---	800	---	---	---	---	---	---	---	0.5	**800**	Protection of drinking water use
1,1,2-Trifluoroethane[10]	430-66-0	---	480,000	---	---	---	---	---	---	---	1	**480,000**	Protection of drinking water use
1,2,4-Trimethylbenzene	95-63-6	---	400	---	---	---	---	---	---	---	1	**400**	Protection of drinking water use
1,2-Dibromoethane	106-93-4	0.00051	---	---	---	---	---	0.05	---	---	0.981	**0.981**	Practical quantitation limit
1,3,5-Trimethylbenzene	108-67-8	---	400	---	---	---	---	---	---	---	1	**400**	Protection of drinking water use
2-Butanone (MEK)	78-93-3	---	4,800	---	---	---	---	---	---	---	1	**4,800**	Protection of drinking water use
2-Hexanone[11]	591-78-6	---	4,800	---	---	---	---	---	---	---	20	**4,800**	Protection of drinking water use
2-Methylpentane[12]	107-83-5	---	480	---	---	---	---	---	---	---	1	**480**	Protection of drinking water use
3-Methylpentane[12]	96-14-0	---	480	---	---	---	---	---	---	---	1	**480**	Protection of drinking water use
4-Methyl-2-pentanone (MIK)	108-10-1	---	640	---	---	---	---	---	---	---	1	**640**	Protection of drinking water use
Acetone	67-64-1	---	800	---	---	---	---	---	---	---	1	**800**	Protection of drinking water use
Benzene	71-43-2	0.795	32	22.66252266	2000	---	---	5	1.2	2.2	0.5	**0.795**	Protection of drinking water use
Carbon disulfide	75-15-0	---	800	---	---	---	---	---	---	---	0.5	**800**	Protection of drinking water use
Chlorobenzene	108-90-7	---	160	---	5000	---	---	100	680	130	0.5	**100**	Protection of drinking water use
Chloroethane	75-00-3	15	3,200	---	---	---	---	---	---	---	0.5	**15**	Protection of drinking water use
Chloroform	67-66-3	7.2	80	280	6900	---	---	80	5.7	5.7	0.5	**5.7**	Protection of surface water
Chloromethane	74-87-3	3.4	---	130	---	---	---	---	---	---	0.5	**3.4**	Protection of drinking water use
cis-1,2-Dichloroethene	156-59-2	---	80	---	---	---	---	70	---	---	0.5	**70**	Protection of drinking water use
Ethylbenzene	100-41-4	---	800	---	6,913.58	---	---	700	3,100	530	0.5	**530**	Protection of surface water
Ethyl tert-butyl ether[13]	637-92-3	24	6,900	---	---	---	---	---	---	---	0.7	**24**	Protection of drinking water use
Hexachloroethane	67-72-1	3.1	8	5.33	29.8	---	---	---	1.9	1.4	0.2	**1.4**	Protection of surface water
Isopropylbenzene (cumene)	98-82-8	---	800	---	---	---	---	---	---	---	1	**800**	Protection of drinking water use
m,p-Xylene	1330-20-7	---	1,600	---	---	---	---	11,000	---	---	0.5	**1,600**	Protection of drinking water use
Methylcyclopentane[12]	96-37-7	---	480	---	---	---	---	---	---	---	1	**480**	Protection of drinking water use
Methylene chloride	75-09-2	5.83	480	960.2194787	172,839.51	---	---	5	4.7	4.6	1	**4.6**	Protection of surface water
Methyl tert-amyl ether[13]	994-05-8	24	6,900	---	---	---	---	---	---	---	0.852	**24**	Protection of drinking water use
Methyltert-butyl ether	1634-04-4	24	6,900	---	---	---	---	---	---	---	0.5	**24**	Protection of drinking water use
m-Xylene	108-38-3	---	16,000	---	---	---	---	11,000	---	---	0.25	**11,000**	Protection of drinking water use
n-Butyl alcohol (n-butanol)	71-36-3	---	800	---	---	---	---	---	---	---	1	**800**	Protection of drinking water use
n-Butylbenzene[14]	104-51-8	---	243	---	---	---	---	---	---	---	1	**243**	Protection of drinking water use
n-Hexane	110-54-3	---	480	---	---	---	---	---	---	---	1	**480**	Protection of drinking water use
n-Propylbenzene[14]	103-65-1	---	243	---	---	---	---	---	---	---	0.98	**243**	Protection of drinking water use
o-Xylene	95-47-6	---	16,000	---	---	---	---	11,000	---	---	0.5	**11,000**	Protection of drinking water use
p-Isopropyltoluene (p-cymene)[15]	99-87-6	---	800	---	---	---	---	---	---	---	1	**800**	Protection of drinking water use
p-Xylene	106-42-3	---	16,000	---	---	---	---	11,000	---	---	0.25	**11,000**	Protection of drinking water use
sec-Butylbenzene[14]	135-98-8	---	243	---	---	---	---	---	---	---	1	**243**	Protection of drinking water use
tert-Butyl alcohol[15]	75-65-0	---	4,800	---	---	---	---	---	---	---	1	**4800**	Protection of drinking water use
Tetrachloroethene	127-18-4	0.081	80	0.39	847.2524812	---	---	5	0.8	0.69	0.5	**0.5**	Practical quantitation limit

TABLE 5-5

SELECTION OF APPLICABLE GROUNDWATER SCREENING LEVELS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Compound	CAS Number[2]	MTCA Method A/B Groundwater Cleanup Levels[3]		MTCA Method B Surface Water Cleanup Levels[3]		State and Federal Water Quality Criteria Freshwater AL[4]		Groundwater ARAR[5]	Surface Water ARAR-NTR HH[6]	Surface Water ARAR-CWA HH[7]	Final Applicable Practical Quantitation Limit[8]	Groundwater Screening Level[9]	Basis
		Carc.	Noncarc.	Carc.	Noncarc.	Acute	Chronic						
Volatile Organic Compounds (VOCs) (Continued)													
Toluene	108-88-3	---	640	---	19,000	---	---	1,000	6,800	1,300	0.5	**640**	Protection of drinking water use
trans-1,2-Dichloroethene	156-60-5	---	160	---	33,000	---	---	100	---	140,000	0.5	**100**	Protection of drinking water use
Trichloroethene	79-01-6	0.11	2.4	1.5	71	---	---	5	2.7	2.5	0.02	**0.11**	Protection of drinking water use
Vinyl chloride	75-01-4	0.0292	24	3.693151841	6,647.673314	---	---	2	2	0.025	0.02	**0.025**	Protection of surface water
Xylene (total)	1330-20-7	---	1,600.00	---	---	---	---	11,000	---	---	1	**1,600**	Protection of drinking water use
Semivolatile Organic Compounds (SVOCs)													
1,2-Dichlorobenzene	95-50-1	---	720	---	4,196.642686	---	---	600	2,700	420	0.5	**420**	Protection of surface water
1,4-Dichlorobenzene	106-46-7	1.82	---	4.857225331	---	---	---	75	400	63	0.5	**1.82**	Protection of drinking water use
2-Methylnaphthalene	91-57-6	---	32	---	---	---	---	---	---	---	0.02	**32**	Protection of drinking water use
2-Methylphenol	95-48-7	---	400	---	---	---	---	---	---	---	0.5	**400**	Protection of drinking water use
2,4-Dichlorophenol	120-83-2	---	24	---	190	---	---	---	93	77	0.235	**24**	Protection of drinking water use
2,4-Dimethylphenol	105-67-9	---	160	---	552.7915976	---	---	---	---	380	4	**160**	Protection of drinking water use
2,4-Dinitrotoluene	121-14-2	---	32	---	1,364.522417	---	---	---	0.11	0.11	0.18	**0.18**	Practical quantitation limit
2,6-Dinitrotoluene	606-20-2	---	16	---	---	---	---	---	---	---	0.2	**16**	Protection of drinking water use
3,3'-Dichlorobenzidine	91-94-1	0.194	---	0.046164398	---	---	---	---	0.04	0.021	2	**2**	Practical quantitation limit
4-Methylphenol (p-cresol)	106-44-5	---	40	---	---	---	---	---	---	---	0.5	**40**	Protection of drinking water use
Acenaphthene	83-32-9	---	960	---	642.7915519	---	---	---	---	670	0.02	**642.7915519**	Protection of surface water
Acenaphthylene	208-96-8	---	---	---	---	---	---	---	---	---	0.02	**0.02**	Practical quantitation limit
Anthracene	120-12-7	---	4,800	---	25,925.92593	---	---	---	9,600	8,300	0.02	**4,800**	Protection of drinking water use
Benzo(a)anthracene	56-55-3	0.012	---	0.029595806	---	---	---	---	0.0028	0.0038	0.02	**0.02**	Practical quantitation limit
Benzo(a)pyrene	50-32-8	0.012	---	0.029595806	---	---	---	0.2	0.0028	0.0038	0.02	**0.02**	Practical quantitation limit
Benzo(b)fluoranthene	205-99-2	0.012	---	0.029595806	---	---	---	---	0.0028	0.0038	0.02	**0.02**	Practical quantitation limit
Benzo(ghi)perylene[17]	191-24-2	0.012	---	0.029595806	---	---	---	---	0.0028	0.0038	0.02	**0.02**	Practical quantitation limit
Benzo(k)fluoranthene	207-08-9	0.012	---	0.029595806	---	---	---	---	0.0028	0.0038	0.02	**0.02**	Practical quantitation limit
Bis(2-chloroethyl) ether	111-44-4	0.0398	---	0.854	---	---	---	---	0.031	0.03	0.2	**0.2**	Practical quantitation limit
Bis(2-Ethylhexyl) phthalate	117-81-7	6.25	320	3.561253561	398.8603989	---	---	6	1.8	1.2	1	**1.2**	Protection of surface water
Butyl benzyl phthalate	85-68-7	---	3,200	---	1300	---	---	---	---	1,200	0.18	**1,200**	Protection of surface water
Carbazole	86-74-8	4.38	---	---	---	---	---	---	---	---	0.18	**4.38**	Protection of drinking water use
Chrysene	218-01-9	0.012	---	0.029595806	---	---	---	---	0.0028	0.0038	0.02	**0.02**	Practical quantitation limit
Dibenzo(a,h)anthracene	53-70-3	0.012	---	0.029595806	---	---	---	---	0.0028	0.0038	0.02	**0.02**	Practical quantitation limit
Dibenzofuran	132-64-9	---	32	---	---	---	---	---	---	---	0.02	**32**	Protection of drinking water use
Dimethyl phthalate	131-11-3	---	16,000	---	72,000	---	---	---	310,000	270,000	0.2	**16,000**	Protection of drinking water use
Di-n-butyl phthalate	84-74-2	---	1,600	---	2,913.025385	---	---	---	2,700	2,000	0.2	**1,600**	Protection of drinking water use
Di-n-octyl phthalate	117-84-0	---	320	---	---	---	---	---	---	---	0.18	**320**	Protection of drinking water use
Fluoranthene	206-44-0	---	640	---	90.17713366	---	---	---	300	130	0.02	**90.17713366**	Protection of surface water
Fluorene	86-73-7	---	640	---	3,456.790123	---	---	---	1,300	1,100	0.02	**640**	Protection of drinking water use
Hexachlorobutadiene	87-68-3	0.561	1.6	29.89061742	186.5174527	---	---	---	0.44	0.44	0.2	**0.44**	Protection of surface water
Hexachlorocyclopentadiene	77-47-4	---	48	---	3580	---	---	50	240	40	1	**40**	Protection of surface water
Indeno(1,2,3-cd)pyrene	193-39-5	0.012	---	0.029595806	---	---	---	---	0.0028	0.0038	0.02	**0.02**	Practical quantitation limit

TABLE 5-5

SELECTION OF APPLICABLE GROUNDWATER SCREENING LEVELS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Compound	CAS Number[2]	MTCA Method A/B Groundwater Cleanup Levels[3]		MTCA Method B Surface Water Cleanup Levels[3]		State and Federal Water Quality Criteria Freshwater AL[4]		Groundwater ARAR[5]	Surface Water ARAR-NTR HH[6]	Surface Water ARAR-CWA HH[7]	Final Applicable Practical Quantitation Limit[8]	Groundwater Screening Level[9]	Basis
		Carc.	Noncarc.	Carc.	Noncarc.	Acute	Chronic						
Semi-Volatile Organic Compounds (SVOCs) (Continued)													
Isophorone	78-59-1	46	1,600	1600	120,000	---	---	---	8.4	35	0.16	**8.4**	Protection of surface water
Naphthalene	91-20-3	---	160	---	4,938.271605	---	---	---	---	---	0.02	**160**	Protection of drinking water use
Nitrobenzene	98-95-3	---	4	---	448.5454312	---	---	---	17	17	0.2	**4**	Protection of drinking water use
N-Nitroso-di-n-propylamine	621-64-7	---	---	0.819403474	---	---	---	---	---	0.005	0.2	**0.2**	Practical quantitation limit
Pentachlorophenol	87-86-5	0.729	480	4.910213244	7,070.707071	19	13	1	0.28	0.27	1	**1**	Practical quantitation limit
Phenanthrene[18]	85-01-8	---	640	---	90.17713366	---	---	---	300	130	0.02	**90.17713366**	Protection of surface water
Phenol	108-95-2	---	4,800	---	1,111,111.111	---	---	---	21,000	21,000	0.5	**4,800**	Protection of drinking water use
Pyrene	129-00-0	---	480	---	2,592.592593	---	---	---	960	830	0.02	**480**	Protection of drinking water use
Pesticides, Polychlorinated Biphenyls and Herbicides													
4,4'-DDD	72-54-8	0.365	---	0.000503847	---	1.1	0.001	---	0.00083	0.00031	0.0005	**0.0005**	Practical quantitation limit
4,4'-DDE	7786-34-7	0.257	---	0.000356	---	1.1	0.001	---	0.00059	0.00022	0.0005	**0.0005**	Practical quantitation limit
4,4'-DDT	50-29-3	0.257	8	0.000355656	0.0242	1.1	0.001	---	0.00059	0.00022	0.0005	**0.0005**	Practical quantitation limit
Alachlor	15972-60-8	1.08	160	---	---	---	---	---	---	---	0.01	**1.08**	Protection of drinking water use
Aldrin	309-00-2	0.0026	0.24	8.1641E-05	0.01665477	2.5	0.0019	---	0.00013	0.000049	0.0005	**0.0005**	Practical quantitation limit
alpha-BHC	319-84-6	0.014	---	0.0079	---	---	---	---	0.0039	0.0026	0.0005	**0.0026**	Protection of surface water
alpha-Chlordane[19]	5103-71-9	0.25	8	0.00131337	0.091935908	2.4	0.0043	2	0.00057	0.0008	0.0005	**0.00057**	Protection of surface water
Aroclor 1254	11097-69-1	---	0.32	---	0.001661918	---	0.014	---	---	---	0.02	**0.02**	Practical quantitation limit
Aroclor 1260	11096-82-5	---	---	---	---	---	0.014	---	---	---	0.02	**0.02**	Practical quantitation limit
Coumaphos[20]	56-72-4	---	4	---	---	---	---	---	---	---	0.2	**4**	Protection of drinking water use
delta-BHC[21]	319-86-8	0.0673	4.8	0.038351961	5.982905983	0.95	0.08	0.2	0.019	0.98	0.0005	**0.019**	Protection of surface water
Dieldrin	60-57-1	0.00547	0.8	8.67436E-05	0.027757951	0.24	0.0019	---	0.00014	0.000052	0.0005	**0.0005**	Practical quantitation limit
Endosulfan I[22]	959-98-8	---	96	---	58	0.22	0.056	---	---	---	0.0005	**0.056**	Protection of surface water
Endosulfan II[22]	33213-65-9	---	96	---	58	0.22	0.056	---	---	---	0.0005	**0.056**	Protection of surface water
Endrin	72-20-8	---	4.8	---	0.2	0.086	0.0023	2	0.76	0.059	0.0005	**0.0023**	Protection of surface water
Eptam (S-ethyl dipropylthiocarbamate)	759-94-4	---	200	---	---	---	---	---	---	---	4	**200**	Protection of drinking water use
Fensulfothion	115-90-6	---	4	---	---	---	---	---	---	---	0.5	**4**	Protection of drinking water use
gamma-BHC (Lindane)	58-89-9	0.0673	4.8	0.038351961	5.982905983	0.95	0.08	0.2	0.019	0.98	0.0005	**0.019**	Protection of surface water
gamma-Chlordane[19]	5103-74-2	0.25	8	0.00131337	0.091935908	2.4	0.0043	2	0.00057	0.0008	0.0005	**0.00057**	Protection of surface water
Heptachlor epoxide	1024-57-3	0.0048	0.1	0.0000635	0.00301	0.52	0.0038	0.2	0.0001	0.000039	0.0005	**0.0005**	Practical quantitation limit
Methoxychlor	72-43-5	---	80	---	8.4	---	0.03	40	---	100	0.0005	**0.03**	Protection of surface water
Mevinphos (Phosdrin)	7786-34-7	---	4	---	---	---	---	---	---	---	0.7	**4**	Protection of drinking water use
Metals													
Aluminum	7429-90-5	---	---	---	---	750	87	---	---	---	2	**87**	Protection of surface water
Antimony	7440-36-0	---	6.4	---	1,037.04	---	---	6	14	5.6	0.05	**5.6**	Protection of surface water
Arsenic	7440-38-2	0.0583	4.8	0.098204265	17.67676768	340	150	10	0.018	0.018	0.5	**0.5**	Practical quantitation limit
Barium	7440-39-3	---	3,200	---	---	---	---	2,000	---	1,000	0.05	**1,000**	Protection of surface water
Beryllium	7440-41-7	---	32	---	272.9044834	---	---	4	---	---	0.02	**4**	Protection of drinking water use
Boron	7440-42-8	---	3,200	---	---	---	---	---	---	---	0.5	**3,200**	Protection of drinking water use
Cadmium	7440-43-9	---	8	---	20.25462963	0.82	0.25	5	---	---	0.02	**0.25**	Protection of surface water

TABLE 5-5

SELECTION OF APPLICABLE GROUNDWATER SCREENING LEVELS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Compound	CAS Number[2]	MTCA Method A/B Groundwater Cleanup Levels[3]		MTCA Method B Surface Water Cleanup Levels[3]		State and Federal Water Quality Criteria Freshwater AL[4]		Groundwater ARAR[5]	Surface Water ARAR-NTR HH[6]	Surface Water ARAR-CWA HH[7]	Final Applicable Practical Quantitation Limit[8]	Groundwater Screening Level[9]	Basis
		Carc.	Noncarc.	Carc.	Noncarc.	Acute	Chronic						
Metals (Continued)													
Chromium	7440-47-3	---	24,000	---	243000	15	11	100	---	---	0.2	**11**	Protection of surface water
Hexavalent chromium (Cr+VI)	18540-29-9	---	48	---	486.1111111	15	11	100	---	---	50	**50**	Practical quantitation limit
Cobalt[14]	7440-48-4	---	730	---	---	---	---	---	---	---	0.02	**730**	Protection of drinking water use
Copper	7440-50-8	---	592	---	2,664.61	4.6	3.5	1,300	---	---	0.1	**3.5**	Protection of surface water
Cyanide	57-12-5	---	--	---	51,851.85	22	5.2	200	700	140	10	**10**	Practical quantitation limit
Iron	7439-89-6	---	---	---	---	1,000	---	---	---	300	20	**300**	Protection of surface water
Lead	7439-92-1	---	15	---	---	14	0.54	15	---	---	0.02	**0.54**	Protection of surface water
Manganese	7439-96-5	---	2,240	---	---	---	---	---	---	50	0.05	**50**	Protection of surface water
Mercury	7439-97-6	---	4.8	---	---	1.4	0.012	2	0.14	---	0.0002	**0.012**	Protection of surface water
Molybdenum	7439-98-7	---	80	---	---	---	---	---	---	---	0.05	**80**	Protection of drinking water use
Nickel	7440-02-0	---	320	---	1,103.23	440	49	100	610	610	0.2	**49**	Protection of surface water
Selenium	7782-49-2	---	80	---	2,700.62	20	5	50	---	170	1	**5**	Protection of surface water
Silver	7440-22-4	---	80	---	25,925.93	0.32	---	---	---	---	0.02	**0.32**	Protection of surface water
Thallium	7440-28-0	---	1.12	---	1.56449553	---	---	2	1.7	0.24	0.02	**0.24**	Protection of surface water
Vanadium	7440-62-2	---	112	---	---	---	---	---	---	---	0.2	**112**	Protection of drinking water use
Zinc	7440-66-6	---	4,800	---	16,548.46	35	32	---	---	7,400	0.5	**32**	Protection of surface water
Total Petroleum Hydrocarbons (TPH)													
TPH as gasoline	86290-81-5	---	800	---	---	---	---	---	---	---	50	**800**	Protection of drinking water use
TPH as diesel	68334-30-5	---	500	---	---	---	---	---	---	---	110	**500**	Protection of drinking water use
TPH as lube oil	---	---	500	---	---	---	---	---	---	---	190	**500**	Protection of drinking water use

Notes:

1. All screening levels input from CLARC, October 2007, unless otherwise noted.
2. CAS Number = Chemical Abstract Service identification number.
3. Model Toxics Control Act (MTCA) Method A or Method B cleanup level for carcinogenic (carc.) and noncarcinogenic (noncarc.) exposure. Method A was applied only if no Method B cleanup level was available.
4. Freshwater screening level protective of aquatic life (AL) based on acute and chronic exposure.
5. Groundwater screening level based on applicable and relevant or appropriate requirements (ARARs).
6. Surface water screening level based on National Toxics Rule (NTR) as the applicable and relevant or appropriate requirements (ARAR)
7. Surface water screening level based on Clean Water Act (CWA) as applicable and relevant or appropriate requirement (ARAR).
8. Practical quantitation limits (PQLs) provided by Columbia Analytical Services, Inc., the project laboratory.
9. Groundwater screening level is set as the lowest applicable screening level or cleanup level, except if the resulting value is less than the PQL, then the PQL is the groundwater screening level.
10. Cleanup level for 1,1,2-trichloro-1,2,2-trifluoroethane used for 1,1,2-trifluoroethane.
11. Cleanup level for 2-butanone used for 2-hexanone.
12. Cleanup level for n-hexane used for 2-methylpentane, 3-methylpentane, methylcyclopentane.
13. Cleanup level for methyl tert-butyl ether used for ethyl t-butyl ether and methyl tert-amyl ether.
14. Cleanup levels for sec-Butylbenzene, n-butylbenzene, n-propylbenzene and cobalt based on 2004 EPA Region 9 Preliminary Remedial Goals (PRGs) since no values available in CLARC (Ecology, 2007).
15. Cleanup level for isopropylbenzene used for p-isopropyltoluene.
16. Cleanup level for isobutyl alcohol used for tert-butyl alcohol.
17. Cleanup level for benzo(b)fluoranthene was used for benzo(ghi)perylene.
18. Cleanup level for fluoranthene was used for phenanthrene.
19. Cleanup levels for chlordane were used for alpha- and gamma-chlordane.
20. Cleanup level for mevinphos used for coumaphos.
21. Cleanup level for gamma-BHC was used for delta-BHC.
22. Cleanup levels for Endosulfan used for Endosulfan I and II.

TABLE 5-6

DETECTED CONSTITUENTS IN SOIL (ALL EVENTS)

PSC Kent Facility
Kent, Washington

Volatile Organic Compounds	
Constituent	**CAS Number[1]**
1,1,1-Trichloroethane	71-55-6
1,1-Dichloroethene	75-35-4
1,2,4-Trimethylbenzene	95-63-6
2-Butanone (MEK)	78-93-3
2-Methylpentane	107-83-5
3-Methylpentane	96-14-0
Acetone	67-64-1
Benzene	71-43-2
Carbon disulfide	75-15-0
Ethylbenzene	100-41-4
Isopropylbenzene (cumene)	98-82-8
m,p-Xylenes	1330-20-7
Methylcyclopentane	96-37-7
Methylene chloride	75-09-2
m-Xylene	108-38-3
n-Butylbenzene	104-51-8
n-Propylbenzene	103-65-1
o-Xylene	95-47-6
p-Isopropyltoluene (p-cymene)	99-87-6
p-Xylene	106-42-3
sec-Butylbenzene	135-98-8
Styrene	100-42-5
Tetrachloroethene	127-18-4
Toluene	108-88-3

Semivolatile Organic Compounds	
Constituent	**CAS Number**
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
2-Methylnaphthalene	91-57-6
4-Methylphenol	106-44-5
Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Anthracene	120-12-7
Benzo(a)anthracene	56-55-3
Benzo(a)pyrene	50-32-8
Benzo(b)fluoranthene	205-99-2
Benzo(ghi)perylene	191-24-2
Benzo(k)fluoranthene	207-08-9
Bis(2-ethylhexyl) phthalate (BEHP)	117-81-7
Carbazole	86-74-8
Chrysene	218-01-9
Dibenzo(a,h)anthracene	53-70-3
Dibenzofuran	132-64-9
Di-n-butyl phthalate	84-74-2
Di-n-octyl phthalate	117-84-0
Fluoranthene	206-44-0
Fluorene	86-73-7
Hexachlorobutadiene	87-68-3
Hexachlorocyclopentadiene	77-47-4
Indeno(1,2,3-cd)pyrene	193-39-5
Naphthalene	91-20-3
Phenanthrene	85-01-8
Phenol	108-95-2
Pyrene	129-00-0

Pesticides	
Constituent	**CAS Number**
4,4'-DDD	72-54-8
4,4'-DDE	72-55-9
4,4'-DDT	50-29-3
Alachlor	15972-60-8
Aldrin	309-00-2
alpha-Chlordane	5103-71-9
Coumaphos	56-72-4
delta-BHC	319-86-8
Dieldrin	60-57-1
Endosulfan I	959-98-8
Endosulfan II	33213-65-9
Endosulfan sulfate	1031-07-8
Endrin aldehyde	7421-93-4
S-ethyl dipropylthiocarbamate (S-EPTC)	759-94-4
Fensulfothion	115-90-2
Lindane (gamma-BHC)	58-89-9
gamma-Chlordane	5566-34-7
Heptachlor epoxide	1024-57-3
Mevinphos (Phosdrin)	7786-34-7

Polychlorinated Biphenyls	
Constituent	**CAS Number**
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5

Metals	
Constituent	**CAS Number**
Aluminum	7429-90-5
Antimony	7440-36-0
Arsenic	7440-38-2
Barium	7440-39-3
Beryllium	7440-41-7
Boron	7440-42-8
Cadmium	7440-43-9
Calcium	7440-70-2
Chromium	7440-47-3
Chromium (Hexavalent) (+VI)	18540-29-9
Cobalt	7440-48-4
Copper	7440-50-8
Cyanide	57-12-5
Iron	7439-89-6
Lead	7439-92-1
Magnesium	7439-95-4
Manganese	7439-96-5
Mercury	7439-97-6
Molybdenum	7439-98-7
Nickel	7440-02-0
Potassium	7440-09-7
Selenium	7782-49-2
Silicon dioxide	7631-86-9
Silver	7440-22-4
Sodium	7440-23-5
Thallium	7440-28-0
Vanadium	7440-62-2
Zinc	7440-66-6

Total Petroleum Hydrocarbons	
Constituent	**CAS Number**
Diesel	68334-30-5
Gasoline	86290-81-5
Lube Oil	N/A

Notes:
1. CAS = Chemical Abstract Service.

TABLE 5-7

DETECTED CONSTITUENTS IN GROUNDWATER (ALL EVENTS)

PSC Kent Facility
Kent, Washington

Volatile Organic Compounds

Constituent	CAS Number[1]	Constituent	CAS Number
1,1,1-Trichloroethane	71-55-6	Ethylbenzene	100-41-4
1,1-Dichloroethene	75-35-4	Ethyl tert-butyl ether	637-92-3
1,1-Dichloroethane	75-34-3	Hexachlorobutadiene	87-68-3
1,1,2-Trifluoroethane	430-66-0	Hexachloroethane	67-72-1
1,2,4-Trimethylbenzene	95-63-6	Isopropylbenzene (cumene)	98-82-8
1,2,3-Trichlorobenzene	87-61-6	m,p-Xylenes	1330-20-7
1,2-Dibromoethane	106-93-4	Methylcyclopentane	96-37-7
1,2-Dichloroethane	107-06-2	Methylene chloride	75-09-2
1,3,5-Trimethylbenzene	108-67-8	Methyl tert-amyl ether	994-05-8
2-Butanone (MEK)	78-93-3	Methyl tert-butyl ether	1634-04-4
2-Hexanone	591-78-6	m-Xylene	108-38-3
2-Methylpentane	107-83-5	n-Butylbenzene	104-51-8
3-Methylpentane	96-14-0	n-Hexane	110-54-3
4-Methyl-2-pentanone (MIK)	108-10-1	n-Propylbenzene	103-65-1
Acetone	67-64-1	o-Xylene	95-47-6
Benzene	71-43-2	p-Isopropyltoluene (p-cymene)	99-87-6
Carbon disulfide	75-15-0	p-Xylene	106-42-3
Carbon tetrachloride	56-23-5	sec-Butyl-benzene	135-98-8
Chlorobenzene	108-90-7	tert-Butyl alcohol	75-65-0
Chloroethane	75-00-3	Tetrachloroethene	127-18-4
Chloroform	67-66-3	Toluene	108-88-3
Chloromethane	74-87-3	trans-1,2-Dichloroethene	156-60-5
cis-1,2-Dichloroethene	156-59-2	Trichloroethene	79-01-6
Dibromochloromethane	124-48-1	Trichlorofluoromethane	75-69-4
Dichloro-difluoromethane	75-71-8	Vinyl chloride	75-01-4
Ethanol	64-17-5		

Semivolatile Organic Compounds

Constituent	CAS Number	Constituent	CAS Number
1,2-Dichlorobenzene	95-50-1	Benzo(ghi)perylene	191-24-2
1,4-Dichlorobenzene	106-46-7	Benzoic acid	65-85-0
2,4,5-Trichlorophenol	95-95-4	Bis(2-chloroethyl) ether	111-44-4
2,4,6-Trichlorophenol	88-06-2	Bis(2-ethylhexyl) phthalate (BEHP)	117-81-7
2,4-Dichlorophenol	120-83-2	Butyl benzyl phthalate	85-68-7
2,4-Dimethylphenol	105-67-9	Chrysene	218-01-9
2,4-Dinitrotoluene	121-14-2	Dibenzo(a,h)anthracene	53-70-3
2,6-Dinitrotoluene	606-20-2	Dibenzofuran	132-64-9
2-Chloronaphthalene	91-58-7	Diethyl phthalate	84-66-2
2-Methylnaphthalene	91-57-6	Dimethyl phthalate	131-11-3
2-Methylphenol	95-48-7	Di-n-butyl phthalate	84-74-2
2-Nitrophenol	88-75-5	Fluoranthene	206-44-0
3,3-Dichlorobenzidine	91-94-1	Fluorene	86-73-7
4-Bromophenyl phenyl ether	101-55-3	Hexachlorobenzene	118-74-1
4-Chloro-3-methylphenol	59-50-7	Indeno(1,2,3-cd)pyrene	193-39-5
4-Chlorophenyl phenyl ether	7005-72-3	Isophorone	78-59-1
4-Methylphenol	106-44-5	Naphthalene	91-20-3
4-Nitroaniline	100-01-6	Nitrobenzene	98-95-3
Acenaphthene	83-32-9	N-Nitrosodipropylamine	621-64-7
Acenaphthylene	208-96-8	Pentachlorophenol	87-86-5
Anthracene	120-12-7	Phenanthrene	85-01-8
Benzo(a)anthracene	56-55-3	Phenol	108-95-2
Benzo(a)pyrene	50-32-8	Pyrene	129-00-0
Benzo(b)fluoranthene	205-99-2		

Total Petroleum Hydrocarbons

Constituent	CAS Number
Diesel	68334-30-5
Lube Oil	N/A
Gasoline	86290-81-5

Conventionals

Constituent	CAS Number
Bicarbonate Alkalinity (as $CaCO_3$)	71-52-3
Carbon Dioxide	124-38-9
Nitrate (as N)	14797-55-8
Sulfate	14808-79-8
Sulfide	18496-25-8
Total Alkalinity (as $CaCO_3$)	471-34-1

Pesticides

Constituent	CAS Number
4,4'-DDD	72-54-8
Aldrin	309-00-2
alpha-BHC	319-84-6
alpha-Chlordane	5103-71-9
Endosulfan I	959-98-8
Endrin	72-20-8
gamma-Chlordane	5566-34-7
Lindane (gamma-BHC)	58-89-9
Methoxychlor	72-43-5

Metals

Constituent	CAS Number
Arsenic	7440-38-2
Barium	7440-39-3
Cadmium	7440-43-9
Chromium	7440-47-3
Chromium (Hexavalent) (+VI)	18540-29-9
Copper	7440-50-8
Cyanide	57-12-5
Ferric iron	GIS-FERRIC
Ferrous iron	GIS-FERROUS
Iron	7439-89-6
Lead	7439-92-1
Manganese	7439-96-5
Mercury	7439-97-6
Nickel	7440-02-0
Selenium	7782-49-2
Silver	7440-22-4
Zinc	7440-66-6

Notes:

1. CAS = Chemical Abstract Service.

TABLE 6-1

SELECTION OF COPCs IN SOIL (FROM ALL EVENTS)[1]

PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

Analyte	CAS Number[2]	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Average Detected Concentration	Screening Level	COPC?	Number of Exceedences[3]
Volatile Organic Compounds (VOCs)										
1,1,1-Trichloroethane	71-55-6	68	1	1%	0.0035	0.0035	0.0035	3.74	No	---
1,1-Dichloroethene	75-35-4	68	1	1%	0.0007	0.0007	0.0007	0.0007	No	---
1,2,4-Trimethylbenzene	95-63-6	44	15	34%	0.024	26.9	5.19	110.25	No	---
1,3,5-Trimethylbenzene	108-67-8	44	13	30%	0.016	4.48	0.99	28.29	No	---
2-Butanone (MEK)	78-93-3	69	17	25%	0.001	1.3	0.12	21.72	No	---
2-Methylpentane	107-83-5	27	1	4%	0.11	0.11	0.11	109.13	No	---
3-Methylpentane	96-14-0	27	1	4%	0.074	0.074	0.07	111.88	No	---
Acetone	67-64-1	69	27	39%	0.0012	1.2	0.22	3.25	No	---
Benzene	**71-43-2**	**68**	**7**	**10%**	**0.0031**	**2**	**0.44**	**0.0084**	**Yes**	**5**
Carbon disulfide	75-15-0	68	3	4%	0.0037	0.056	0.03	8.58	No	---
Ethylbenzene	100-41-4	68	17	25%	0.0032	4.3	0.99	13.23	No	---
Isopropylbenzene (cumene)	98-82-8	44	9	20%	0.046	4.49	0.78	105.25	No	---
m,p-Xylenes	1330-20-7	64	24	38%	0.0012	12	1.96	43.98	No	---
methylcyclopentane	96-37-7	27	4	15%	0.0029	0.085	0.03	41.07	No	---
Methylene chloride	**75-09-2**	**69**	**27**	**39%**	**0.0008**	**9.8**	**0.50**	**0.024**	**Yes**	**13**
m-Xylene	108-38-3	5	1	20%	0.0761	0.0761	0.08	265.34	No	---
n-Butylbenzene	104-51-8	44	8	18%	0.084	4.32	1.07	62.08	No	---
n-Propylbenzene	103-65-1	44	10	23%	0.11	1.93	0.63	19.19	No	---
o-Xylene	95-47-6	49	12	24%	0.017	1.6	0.46	313.16	No	---
p-Isopropyltoluene (p-cymene)	**99-87-6**	**44**	**10**	**23%**	**0.034**	**4.22**	**0.88**	**3.94**	**Yes**	**1**
p-Xylene	106-42-3	5	1	20%	0.0761	0.0761	0.08	390.91	No	---
sec-Butylbenzene	**135-98-8**	**25**	**9**	**36%**	**0.053**	**1.48**	**0.47**	**1.20**	**Yes**	**1**
Styrene	100-42-5	68	1	1%	0.051	0.051	0.05	0.14	No	---
Tetrachloroethene	127-18-4	68	2	3%	0.002	0.016	0.009	0.016	No	---
Toluene	108-88-3	69	29	42%	0.0004	1.2	0.19	11.82	No	---

TABLE 6-1

SELECTION OF COPCs IN SOIL (FROM ALL EVENTS)[1]

PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

Analyte	CAS Number[2]	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Average Detected Concentration	Screening Level	COPC?	Number of Exceedences[3]
Semivolatile Organic Compounds (SVOCs)										
1,2-Dichlorobenzene	95-50-1	87	5	6%	0.023	1	0.28	17.65	No	---
1,3-Dichlorobenzene	541-73-1	44	2	5%	0.0049	0.0053	0.01	10.72	No	---
1,4-Dichlorobenzene	**106-46-7**	**87**	**4**	**5%**	**0.008**	**0.23**	**0.07**	**0.12**	**Yes**	**1**
2-Methylnaphthalene	**91-57-6**	**46**	**14**	**30%**	**0.12**	**84**	**10.60**	**27.33**	**Yes**	**1**
4-Methylphenol (p-cresol)	106-44-5	43	1	2%	0.098	0.098	0.098	0.36	No	---
Acenaphthene	83-32-9	46	5	11%	0.033	3.5	1.61	317.42	No	---
Anthracene	120-12-7	46	6	13%	0.083	5	1.68	11295.86	No	---
Benzo(a)anthracene	**56-55-3**	**46**	**5**	**11%**	**0.054**	**0.79**	**0.25**	**0.72**	**Yes**	**1**
Benzo(a)pyrene	**50-32-8**	**47**	**10**	**21%**	**0.044**	**6.8**	**0.89**	**1.94**	**Yes**	**1**
Benzo(b)fluoranthene	**205-99-2**	**47**	**3**	**6%**	**0.041**	**7.1**	**2.48**	**2.46**	**Yes**	**1**
Benzo(ghi)perylene	191-24-2	46	3	7%	0.49	4.2	1.83	5.60	No	---
Benzo(k)fluoranthene	**207-08-9**	**47**	**4**	**9%**	**0.04**	**3.4**	**1.31**	**2.46**	**Yes**	**1**
Bis(2-ethylhexyl) phthalate	117-81-7	47	21	45%	0.055	13	2.24	13.34	No	---
Carbazole	**86-74-8**	**17**	**1**	**6%**	**3.25**	**3.25**	**3.25**	**1.50**	**Yes**	**1**
Chrysene	**218-01-9**	**47**	**9**	**19%**	**0.053**	**8.5**	**1.19**	**0.796**	**Yes**	**2**
Dibenzo(a,h)anthracene	53-70-3	46	1	2%	0.053	0.053	0.05	3.58	No	---
Dibenzofuran	132-64-9	46	3	7%	0.13	4.6	2.18	26.14	No	---
Di-n-butyl phthalate	84-74-2	46	2	4%	0.093	0.27	0.18	257.12	No	---
Di-n-octyl phthalate	117-84-0	46	1	2%	0.15	0.15	0.15	70,000	No	---
Fluoranthene	206-44-0	47	12	26%	0.042	22	2.29	443.09	No	---
Fluorene	86-73-7	46	10	22%	0.18	8.9	2.62	495.81	No	---
Hexachlorobutadiene	87-68-3	25	2	8%	0.13	0.28	0.21	2.38	No	---
Hexachlorocyclopentadiene	77-47-4	46	1	2%	0.17	0.17	0.17	800.24	No	---
Indeno(1,2,3-cd)pyrene	193-39-5	46	3	7%	0.38	3.8	1.54	6.94	No	---
Naphthalene	**91-20-3**	**87**	**26**	**30%**	**0.11**	**20**	**3.85**	**19.7**	**Yes**	**1**
Phenanthrene	85-01-8	46	18	39%	0.028	20	3.55	34.63	No	---
Phenol	108-95-2	46	1	2%	0.12	0.12	0.12	33.02	No	---
Pyrene	129-00-0	47	13	28%	0.058	22	2.17	3265.54	No	---

TABLE 6-1

SELECTION OF COPCs IN SOIL (FROM ALL EVENTS)[1]

PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

Analyte	CAS Number[2]	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Average Detected Concentration	Screening Level	COPC?	Number of Exceedences[3]
Pesticides and Polychlorinated Biphenyls (PCBs)										
4,4'-DDD	**72-54-8**	**26**	**16**	**62%**	**0.0029**	**1.5**	**0.581**	**0.0023**	**Yes**	**16**
4,4'-DDE	**72-55-9**	**26**	**15**	**58%**	**0.011**	**0.6**	**0.250**	**0.0043**	**Yes**	**15**
4,4'-DDT	**50-29-3**	**26**	**15**	**58%**	**0.0064**	**1.7**	**0.303**	**0.034**	**Yes**	**12**
Alachlor	15972-60-8	23	1	4%	0.018	0.018	0.018	0.026	No	---
Aldrin	309-00-2	25	1	4%	0.002	0.002	0.002	0.0024	No	---
alpha-Chlordane	**5103-71-9**	**26**	**16**	**62%**	**0.0008**	**0.15**	**0.047**	**0.0029**	**Yes**	**7**
Aroclor 1254	11097-69-1	43	2	5%	0.013	0.034	0.024	0.20009	No	---
Aroclor 1260	11096-82-5	44	5	11%	0.0144	0.2	0.08	1.64	No	---
Coumaphos	**56-72-4**	**22**	**3**	**14%**	**0.084**	**3.0**	**1.69**	**2.33**	**Yes**	**1**
delta-BHC	**319-86-8**	**25**	**3**	**12%**	**0.0024**	**0.018**	**0.011**	**0.0082**	**Yes**	**2**
Dieldrin	**60-57-1**	**26**	**12**	**46%**	**0.005**	**0.24**	**0.034**	**0.0013**	**Yes**	**12**
Endosulfan I	959-98-8	25	1	4%	0.027	0.027	0.027	0.036	No	---
Endosulfan II	33213-65-9	25	6	24%	0.0027	0.035	0.018	0.038	No	---
Endosulfan sulfate	**1031-07-8**	**25**	**4**	**16%**	**0.0034**	**0.048**	**0.015**	**0.00079**	**Yes**	**4**
Endrin aldehyde	7421-93-4	4	1	25%	0.0032	0.0032	0.0032	152.35	No	---
S-Ethyl dipropylthiocarbamate (EPTC)	759-94-4	19	3	16%	0.039	0.11	0.064	4.20023	No	---
Fensulfothion	115-90-2	23	2	9%	0.038	0.045	0.042	0.136	No	----
gamma-Chlordane	**5103-74-2**	**26**	**16**	**62%**	**0.0008**	**0.16**	**0.054**	**0.0029**	**Yes**	**14**
Heptachlor epoxide	**1024-57-3**	**26**	**6**	**23%**	**0.0014**	**0.036**	**0.012**	**0.0042**	**Yes**	**4**
gamma-BHC (Lindane)	**58-89-9**	**26**	**11**	**42%**	**0.0013**	**0.024**	**0.008**	**0.0026**	**Yes**	**8**
Mevinphos (Phosdrin)	**7786-34-7**	**23**	**3**	**13%**	**0.068**	**0.19**	**0.136**	**0.096**	**Yes**	**2**

TABLE 6-1

SELECTION OF COPCs IN SOIL (FROM ALL EVENTS)[1]

PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

Analyte	CAS Number[2]	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Average Detected Concentration	Screening Level	COPC?	Number of Exceedences[3]
Inorganic Constituents										
Aluminum	7429-90-5	2	2	100%	12,600	15,800	14,200	1,022,000	No	---
Antimony	**7440-36-0**	**7**	**2**	**29%**	**11**	**12**	**11.50**	**5.52**	**Yes**	**2**
Arsenic	**7440-38-2**	**85**	**60**	**71%**	**0.773**	**40**	**5.46**	**7.3**	**Yes**	**14**
Barium	7440-39-3	67	66	99%	0.017	164	51.38	824	No	---
Beryllium	7440-41-7	2	1	50%	0.3	0.3	0.3	63.22	No	---
Boron	7440-42-8	2	2	100%	5	19	12.00	700,000	No	---
Cadmium	**7440-43-9**	**67**	**26**	**39%**	**0.18**	**94**	**4.55**	**0.8**	**Yes**	**13**
Chromium	7440-47-3	67	48	72%	5.92	37	18.72	48.2	No	---
Chromium (Hexavalent) (+VI)	18540-29-9	11	10	91%	0.502	1.18	0.69	19.2	No	---
Cobalt	7440-48-4	2	2	91%	6	15	10.50	20,440	No	---
Copper	**7440-50-8**	**56**	**42**	91%	**0.016**	**356**	**31.17**	**36.4**	**Yes**	**6**
Cyanide	**57-12-5**	**32**	**14**	91%	**0.082**	**0.655**	**0.19**	**0.1**	**Yes**	**12**
Iron	7439-89-6	8	8	91%	13,400	38,400	20,788	58,700	No	---
Lead	7439-92-1	70	38	91%	0.625	91.3	13.62	108	No	---
Manganese	7439-96-5	2	2	91%	330	709	520	1,146	No	---
Mercury	**7439-97-6**	**67**	**29**	91%	**0.00372**	**2.03**	**0.50**	**0.07**	**Yes**	**23**
Molybdenum	7439-98-7	2	2	91%	1	4	2.50	17,500	No	---
Nickel	7440-02-0	56	43	91%	0.021	32	14.40	63.90	No	---
Selenium	**7782-49-2**	**45**	**18**	91%	**0.314**	**1.83**	**0.85**	**0.78**	**Yes**	**9**
Silver	**7440-22-4**	**65**	**16**	91%	**0.039**	**1**	**0.21**	**0.61**	**Yes**	**2**
Thallium	**7440-28-0**	**7**	**2**	91%	**11**	**12**	**11.50**	**0.34**	**Yes**	**2**
Vanadium	7440-62-2	2	2	91%	40	47	43.50	2240.45	No	---
Zinc	**7440-66-6**	**56**	**56**	91%	**0.01**	**194**	**32.47**	**85.1**	**Yes**	**2**

TABLE 6-1

SELECTION OF COPCs IN SOIL (FROM ALL EVENTS)[1]

PSC Kent Facility
Kent, Washington

concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)

Analyte	CAS Number[2]	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Average Detected Concentration	Screening Level	COPC?	Number of Exceedences[3]
Total Petroleum Hydrocarbons (TPH)										
Diesel	**68334-30-5**	**41**	**24**	**59%**	**8.3**	**15,900**	**1,415.00**	**2,000**	**Yes**	**3**
Gasoline	**86290-81-5**	**22**	**18**	**82%**	**0.788**	**1,710**	**215.00**	**30**	**Yes**	**7**
Lube Oil	GIS_LUBEOIL	**39**	**18**	**46%**	**5.64**	**5,720**	**747.47**	**2,000**	**Yes**	**3**

Notes:

1. **Bold** text indicates that constituent identified as constituent of potential concern (COPC). The constituent table excludes samples S1 and S2 (see explanation in text).
2. CAS Number = Chemical Abstract Service identification number.
3. Number of samples that exceeded screening level for that constituent.

TABLE 6-2

IDENTIFICATION OF COPCs IN GROUNDWATER
SHALLOW WATER-BEARING UNIT (4Q06 TO 3Q07)

PSC Kent Facility
Kent, Washington

All concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Compound	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Screening Level	COPC?
Volatile Organic Compounds (VOCs)							
1,1,2-Trifluoroethane	19	1	5%	110	110	480,000	No
1,1-Dichloroethane	19	4	21%	0.16	0.47	800	No
1,2-Dibromoethane	19	2	11%	0.0054	0.0072	0.981	No
2-Hexanone	19	1	5%	16	16	4,800	No
3-Methylpentane	19	1	5%	0.55	0.55	480	No
Acetone	19	1	5%	12	12	800	No
Benzene	**19**	**4**	**21%**	**0.59**	**44**	**0.795**	**Yes**
Carbon disulfide	19	2	11%	0.2	0.35	800	No
Chloroform	19	1	5%	0.25	0.25	5.70	No
cis-1,2-Dichloroethene	19	2	11%	0.26	0.36	70	No
Ethylbenzene	19	2	11%	0.43	0.6	530	No
Isopropylbenzene (cumene)	19	2	11%	0.32	0.36	800	No
m,p-Xylenes	19	2	11%	0.41	0.55	1600	No
methylcyclopentane	19	2	11%	0.58	0.71	480	No
Methylene chloride	19	2	11%	0.23	2.2	4.6	No
Methyl tert-butyl ether	**19**	**4**	**21%**	**4.2**	**87**	**24**	**Yes**
n-Hexane	19	2	11%	0.19	0.39	480	No
o-Xylene	19	2	11%	0.13	0.18	11,000	No
p-Isopropyltoluene (p-cymene)	19	2	11%	0.26	0.46	800	No
tert-Butyl alcohol	19	1	5%	1,100	1,100	4,800	No
Toluene	19	1	5%	0.39	0.39	640	No
Vinyl chloride	**19**	**2**	**11%**	**0.05**	**0.11**	**0.025**	**Yes**
Semi-Volatile Organic Compounds (SVOCs)							
2,4-Dichlorophenol	18	2	11%	0.22	0.47	24	No
2,4-Dimethylphenol	18	2	11%	1.1	4.7	160	No
2-Methylnaphthalene	18	1	6%	0.023	0.023	32	No
2-Methylphenol	18	1	6%	0.13	0.13	400	No
Bis(2-ethylhexyl) phthalate (BEHP)	**18**	**2**	**11%**	**0.33**	**2.7**	**1.2**	**Yes**
Fluoranthene	18	2	11%	0.038	0.32	90.18	No
Isophorone	18	1	6%	0.83	0.83	8.4	No
Phenanthrene	18	1	6%	0.15	0.15	90.177134	No
Pyrene	18	1	6%	0.22	0.22	480	No
Chrysene	**18**	**2**	**11%**	**0.012**	**0.068**	**0.02**	**Yes**
Indeno(1,2,3-cd)pyrene	18	1	6%	0.0087	0.0087	0.02	No
Inorganic Constituents							
Iron (total)	**5**	**5**	**100%**	**130**	**140,000**	**300**	**Yes**
Arsenic (dissolved)	**4**	**4**	**100%**	**2.5**	**75.5**	**0.5**	**Yes**
Arsenic (total)	**18**	**18**	**100%**	**1.8**	**81.8**	**0.5**	**Yes**
Manganese (total)	**1**	**1**	**100%**	**1,240**	**1,240**	**50**	**Yes**
Manganese (dissolved)	**4**	**4**	**100%**	**89**	**16,100**	**50**	**Yes**
Cyanide	**19**	**10**	**53%**	**3**	**40**	**10**	**Yes**
Total Petroleum Hydrocarbons (TPH)							
Gasoline	19	2	11%	15	85	800	No

Notes:
1. **Bold** text indicates that constituent was identified as a constituent of potential concern (CPOC).

TABLE 6-3

IDENTIFICATION OF COPCs IN GROUNDWATER
INTERMEDIATE AQUIFER, ZONES A AND B (4Q06 TO 3Q07)[1]

PSC Kent Facility
Kent, Washington

All concentrations in microgram per liter (µg/L) = parts per billion (ppb)

Compound	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Screening Level	COPC?
Volatile Organic Compounds (VOCs)							
1,1,2-Trifluoroethane	49	6	12%	1.5	120	480000	No
1,1-Dichloroethane	49	24	49%	0.26	1.5	800	No
1,1-Dichloroethene	**49**	**4**	**8%**	**0.17**	**0.21**	**0.057**	**Yes**
1,2,4-Trimethylbenzene	49	2	4%	0.18	1.5	400	No
1,3,5-Trimethylbenzene	49	1	2%	0.41	0.41	400	No
Acetone	49	1	2%	5.7	5.7	800	No
Benzene	49	12	24%	0.15	0.5	0.795	No
Chlorobenzene	49	4	8%	0.62	0.86	100	No
Chloroethane	49	1	2%	0.28	0.28	15	No
Chloroform	49	1	2%	0.43	0.43	5.7	No
Chloromethane	49	2	4%	0.2	0.49	3.4	No
cis-1,2-Dichloroethene	49	14	29%	0.13	38	70	No
Ethylbenzene	49	1	2%	0.21	0.21	530	No
Ethyl tert-butyl ether	49	2	4%	0.08	0.08	24	No
m,p-Xylenes	49	5	10%	0.29	0.74	1,600	No
Methyl tert-amyl ether	49	2	4%	0.16	0.18	24	No
Methylcyclopentane	49	2	4%	0.19	0.22	480	No
Methylene chloride	49	2	4%	0.39	0.51	4.6	No
Methyl tert-butyl ether	49	24	49%	0.34	7.3	24	No
n-Hexane	49	9	18%	0.2	1.1	480	No
n-Propylbenzene	49	1	2%	0.25	0.25	243	No
o-Xylene	49	6	12%	0.11	0.8	11,000	No
tert-Butyl alcohol	49	6	12%	2.9	40.9	4800	No
Tetrachloroethene	49	2	4%	0.14	0.16	0.5	No
Toluene	49	4	8%	0.14	14	640	No
trans-1,2-Dichloroethene	49	4	8%	0.57	0.61	100	No
Trichloroethene	**49**	**4**	**8%**	**0.79**	**1.3**	**0.11**	**Yes**
Vinyl chloride	**49**	**4**	**8%**	**1.9**	**2.6**	**0.025**	**Yes**
Semivolatile Organic Compounds (SVOCs)							
2,4-Dimethylphenol	49	1	2%	0.35	0.35	160	No
2-Methylnaphthalene	49	3	6%	0.028	0.061	32	No
Butyl benzyl phthalate	49	2	4%	0.034	0.19	1200	No
Fluoranthene	49	3	6%	0.023	0.028	90.18	No
Isophorone	49	1	2%	0.17	0.17	8.4	No
Phenanthrene	49	1	2%	0.023	0.023	90.17713366	No
Pyrene	49	4	8%	0.023	0.03	480	No
Dibenzo(a,h)anthracene	49	1	2%	0.0037	0.0037	0.02	No
Pesticides and Polychlorinated Biphenyls (PCBs)							
4,4'-DDD	**3**	**1**	**33%**	**0.00055**	**0.00055**	**0.0005**	**Yes**
Aldrin	3	2	67%	0.00014	0.00026	0.0005	No
alpha-BHC	3	1	33%	0.00032	0.00032	0.0026	No
alpha-Chlordane	3	1	33%	0.00031	0.00031	0.00057	No
Endosulfan I	3	1	33%	0.0002	0.0002	0.056	No
Endrin	3	1	33%	0.00024	0.00024	0.0023	No
gamma-Chlordane	3	1	33%	0.00016	0.00016	0.00057	No
gamma-BHC (Lindane)	3	1	33%	0.0016	0.0016	0.019	No
Methoxychlor	3	1	33%	0.0007	0.0007	0.03	No
Inorganic Constituents							
Iron (total)	**28**	**28**	**100%**	**18,000**	**110,000**	**300**	**Yes**
Arsenic (dissolved)	**13**	**12**	**92%**	**2.3**	**15.9**	**0.5**	**Yes**
Arsenic (total)	**49**	**49**	**100%**	**2.2**	**24**	**0.5**	**Yes**
Manganese (dissolved)	**29**	**29**	**100%**	**1,470**	**9,600**	**50**	**Yes**
Chromium (Hexavalent)	25	2	8%	20	30	50	No
Cyanide	**49**	**20**	**41%**	**2**	**340**	**10**	**Yes**
Total Petroleum Hydrocarbons (TPH)							
Gasoline	49	2	4%	41	87	800	No

Notes:
1. **Bold** text indicates that constituent was identified as a constituent of potential concern (CPOC).

TABLE 6-4

IDENTIFICATION OF COPCs IN GROUNDWATER
DEEP AQUIFER (4Q06 to 3Q07)

PSC Kent Facility
Kent, Washington

All concentrations in microgram per liter (µg/L) = parts per billion (ppb)

Compound	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detected Concentration	Maximum Detected Concentration	Screening Level	COPC?
Volatile Organic Compounds (VOCs)							
1,1,2-Trifluoroethane	12	4	33%	14.8	60	480000	No
1,1-Dichloroethane	12	8	67%	0.16	2	800	No
2-Butanone (MEK)	12	1	8%	7.4	7.4	4,800	No
Acetone	12	1	8%	26	26	800	No
Benzene	12	1	8%	0.15	0.15	0.795	No
Chloroethane	12	1	8%	0.23	0.23	15	No
cis-1,2-Dichloroethene	12	4	33%	0.23	0.37	70	No
Methyl tert-butyl ether	12	7	58%	0.23	0.53	24	No
tert-Butyl alcohol	12	2	17%	10	8.7	4800	No
Toluene	12	1	8%	0.21	0.21	640	No
Vinyl chloride	**12**	**4**	**33%**	**0.05**	**0.1**	**0.025**	**Yes**
Semivolatile Organic Compounds (SVOCs)							
2,4-Dichlorophenol	12	1	8%	0.05	0.05	24	No
Fluoranthene	12	1	8%	0.02	0.02	90.18	No
Isophorone	12	1	8%	0.026	0.026	8.4	No
Phenanthrene	12	1	8%	0.019	0.019	90.17713366	No
Phenol	12	1	8%	0.92	0.92	4,800	No
Pyrene	12	1	8%	0.02	0.02	480	No
Chrysene	12	2	17%	0.0059	0.017	0.02	No
Indeno(1,2,3-cd)pyrene	12	1	8%	0.0099	0.0099	0.02	No
Inorganic Constituents							
Iron (total)	**4**	**4**	**100%**	**38,000**	**49,000**	**300**	**Yes**
Arsenic (dissolved)	**3**	**3**	**100%**	**0.97**	**1.3**	**0.5**	**Yes**
Arsenic (total)	**12**	**12**	**100%**	**1.1**	**2.9**	**0.5**	**Yes**
Manganese (dissolved)	**4**	**4**	**100%**	**1,780**	**3,330**	**50**	**Yes**
Cyanide	**12**	**12**	**100%**	**20**	**40**	**10**	**Yes**

Notes:

1. **Bold** text indicates that constituent was identified as a constituent of potential concern (CPOC).

TABLE 6-5

SUMMARY OF PHYSICAL PROPERTIES OF DETECTED CHEMICALS[1]

PSC Kent Facility
Kent, Washington

Compound	CAS Number[2]	Diffusivity in Air D_i (cm^2/s)[3]	Diffusivity in Water D_w (cm^2/s)[3]	Water Solubility S (mg/L)[4]
Volatile Organic Compounds				
1,1,1-Trichloroethane	71-55-6	7.80E-02 a	8.80E-06 a	1.33E+03 a
1,1-Dichloroethene	75-35-4	9.00E-02 g	1.00E-05 g	2.30E+03 d
1,1-Dichloroethane	75-34-3	7.42E-02 a	1.05E-05 a	5.06E+03 a
1,2,4-Trimethylbenzene	95-63-6	7.50E-02 e	7.10E-06 e	5.70E+01 f
1,3,5-Trimethylbenzene	108-67-8	7.50E-02 e	7.10E-06 e	4.82E+01 f
2-Butanone (MEK)	78-93-3	8.95E-02 e	9.80E-06 e	2.68E+05 a
2-Methylpentane	107-83-5	1.64E-02 b	8.22E-06 b	1.40E+01 f
3-Methylpentane	96-14-0	1.64E-02 b	8.22E-06 b	1.28E+01 f
4-Methyl-2-pentanone (MIK)	108-10-1	7.50E-02 e	7.80E-06 e	1.90E+04 f
Acetone	67-64-1	1.24E-01 a	1.14E-05 a	miscible c
Benzene	71-43-2	8.80E-02 a	9.80E-06 a	1.75E+03 a
Carbon disulfide	75-15-0	1.04E-01 a	1.00E-05 a	1.19E+03 a
cis-1,2-Dichloroethene	156-59-2	7.36E-02 a	1.13E-05 a	3.50E+03 a
Ethylbenzene	100-41-4	7.50E-02 a	7.80E-06 a	1.69E+02 a
Hexachloroethane	67-72-1	2.50E-03 a	6.80E-06 a	5.00E+01 a
Isopropylbenzene (cumene)	98-82-8	7.50E-02 e	7.10E-06 e	5.00E+01 f
m,p-Xylene	1330-20-7	7.00E-02 a	7.80E-06 a	1.78E+02 a
Methylcyclopentane	96-37-7	1.68E-02 b	8.95E-06 b	4.20E+01 c
Methyl tert-butyl ether	1634-04-4	8.00E-02 g	1.05E-05 g	5.00E+04 d
Methylene chloride	75-09-2	1.01E-01 a	1.17E-05 a	1.30E+04 a
m-Xylene	108-38-3	7.00E-02 a	7.80E-06 a	1.78E+02 a
n-Butyl alcohol (n-butanol)	71-36-3	8.00E-02 a	9.30E-06 a	2.00E+01 c
n-Butylbenzene	104-51-8	7.50E-02 e	7.80E-06 e	5.00E+01 c
n-Hexane	110-54-3	2.00E-01 e	7.80E-06 e	1.30E+01 c
n-Propylbenzene	103-65-1	7.50E-02 e	7.80E-06 e	6.02E+01 c
o-Xylene	95-47-6	8.70E-02 a	1.00E-05 a	1.75E+02 c
p-Isopropyltoluene (p-cymene)	99-87-6	7.50E-02 e	7.10E-06 e	5.00E+01 f
p-Xylene	106-42-3	7.00E-02 e	7.80E-06 e	2.00E+02 c
sec-Butylbenzene	135-98-8	7.50E-02 e	7.80E-06 e	1.71E+02 c
Tetrachloroethene	127-18-4	7.20E-02 a	8.20E-06 a	2.00E+02 a
Toluene	108-88-3	8.70E-02 a	8.60E-06 a	5.26E+02 a
Trichloroethene	79-01-6	7.90E-02 a	9.10E-06 a	1.10E+03 a
Vinyl chloride	75-01-4	1.06E-01 a	1.23E-05 a	2.76E+03 a
Xylenes (total)	1330-20-7	7.00E-02 e	7.80E-06 e	1.78E+02 a

TABLE 6-5

SUMMARY OF PHYSICAL PROPERTIES OF DETECTED CHEMICALS[1]

PSC Kent Facility
Kent, Washington

Compound	CAS Number[2]	Diffusivity in Air D_i (cm^2/s)[3]		Diffusivity in Water D_w (cm^2/s)[3]		Water Solubility S (mg/L)[4]	
Semivolatile Organic Compounds							
1,2-Dichlorobenzene	95-50-1	6.90E-02	a	7.90E-06	a	1.56E+02	f
1,4-Dichlorobenzene	106-46-7	6.90E-02	e	7.90E-06	e	7.38E+01	a
2-Methylnaphthalene	91-57-6	5.90E-02	e	7.50E-06	e	2.54E+01	c
2,4-Dimethylphenol	105-67-9	5.84E-02	a	8.69E-06	a	4.20E+03	c
2,4-Dinitrotoluene	121-14-2	2.03E-01	a	7.06E-06	a	2.70E+02	c
2,6-Dinitrotoluene	606-20-2	3.27E-02	a	7.26E-06	a	3.00E+02	c
3,3'-Dichlorobenzidine	91-94-1	1.94E-02	a	6.74E-06	a	4.00E+00	c
4-Methylphenol (p-cresol)	106-44-5	1.62E-02	b	7.70E-06	c	1.80E+04	c
Acenaphthene	83-32-9	4.21E-02	a	7.69E-06	a	4.24E+00	a
Acenaphthylene	208-96-8	1.28E-02	b	7.46E-06	b	3.93E+00	c
Anthracene	120-12-7	3.24E-02	a	7.74E-06	a	4.34E-02	a
Benzo(a)anthracene	56-55-3	5.10E-02	a	9.00E-06	a	9.40E-03	a
Benzo(a)pyrene	50-32-8	4.30E-02	a	9.00E-06	a	1.62E-03	a
Benzo(b)fluoranthene	205-99-2	2.26E-02	a	5.56E-06	a	1.50E-03	a
Benzo(ghi)perylene	191-24-2	9.74E-03	b	5.48E-06	b	2.60E-04	c
Benzo(k)fluoranthene	207-08-9	2.26E-02	a	5.56E-06	a	8.00E-04	a
Bis(2-chloroethyl) ether	111-44-4	6.90E-02	a	7.53E-06	a	1.72E+04	a
Bis(2-ethylhexyl) phthalate	117-81-7	3.51E-02	a	3.66E-06	a	3.40E-01	a
Carbazole	86-74-8	3.90E-02	a	7.03E-06	a	7.48E+00	a
Chrysene	218-01-9	2.48E-02	a	6.21E-06	a	1.60E-03	a
Dibenzo(a,h)anthracene	53-70-3	2.02E-02	a	5.18E-06	a	2.49E-03	a
Dibenzofuran	132-64-9	6.01E-02	e	1.00E-05	e	1.03E+01	f
Dimethyl phthalate	131-11-3	1.19E-02	b	6.60E-06	c	4.29E+03	c
Di-n-butyl phthalate	84-74-2	4.38E-02	a	7.86E-06	a	1.12E+01	a
Di-n-octyl phthalate	117-84-0	1.51E-02	a	3.58E-06	a	2.00E-02	a
Fluoranthene	206-44-0	3.02E-02	a	6.35E-06	a	2.06E-01	a
Fluorene	86-73-7	3.63E-02	a	7.88E-06	a	1.98E+00	c
Hexachlorobutadiene	87-68-3	1.51E-02	b	6.55E-06	b	2.55E+00	c
Hexachlorocyclopentadiene	77-47-4	1.60E-02	a	7.21E-06	a	2.80E+00	a
Indeno(1,2,3-cd)pyrene	193-39-5	1.90E-02	a	5.66E-06	a	2.20E-05	a
Naphthalene	91-20-3	5.90E-02	a	7.50E-06	a	3.10E+01	a
Nitrobenzene	98-95-3	7.60E-02	a	8.60E-06	a	1.90E+03	c
N-Nitroso-di-n-propylamine	621-64-7	5.45E-02	a	8.17E-06	a	9.90E+03	c
Pentachlorophenol	87-86-5	5.60E-02	a	6.10E-06	a	1.40E+01	f
Phenanthrene	85-01-8	1.20E-02	b	6.69E-06	b	1.29E+00	c
Phenol	108-95-2	8.20E-02	a	9.10E-06	a	6.70E+04	c
Pyrene	129-00-0	2.72E-02	a	7.24E-06	a	1.35E-01	a

TABLE 6-5

SUMMARY OF PHYSICAL PROPERTIES OF DETECTED CHEMICALS[1]

PSC Kent Facility
Kent, Washington

Compound	CAS Number[2]	Diffusivity in Air D_i (cm^2/s)[3]	Diffusivity in Water D_w (cm^2/s)[3]	Water Solubility S (mg/L)[4]
Pesticides, Polychlorinated Biphenyls and Herbicides				
4,4'-DDD	72-54-8	1.69E-02 a	4.76E-06 a	9.00E-02 a
4,4'-DDE	7786-34-7	---[5]	4.60E-06 c	1.20E-01 a
4,4'-DDT	50-29-3	1.37E-02 a	4.95E-06 a	2.50E-02 a
alpha-Chlordane	5103-71-9	1.18E-02 a	4.37E-06 a	5.60E-02 a
Aroclor 1260	11096-82-5	---	5.30E-06 c	8.00E+01 c
Dieldrin	60-57-1	1.25E-02 a	4.74E-06 a	1.95E-01 a
Endosulfan II	33213-65-9	1.15E-02 b	4.55E-06 b	2.80E-01 c
Eptam (S-Ethyl dipropylthiocarbamate) (EPTC)	759-94-4	1.09E-02 b	6.17E-02 b	3.75E+02 f
Fensulfothion	115-90-6	9.91E-03 b	5.59E-06 b	1.54E+03 f
gamma-Chlordane	5103-74-2	1.18E-02 a	4.37E-06 a	1.85E+00 c
Lindane (gamma-BHC)	58-89-9	1.42E-02 a	7.34E-06 a	6.80E+00 a
Mevinphos (Phosdrin)	7786-34-7	---	6.30E-06 c	miscible c
Metals				
Aluminum	7429-90-5	---	---	0.00E+00
Antimony	7440-36-0	---	---	0.00E+00
Arsenic	7440-38-2	---	---	0.00E+00
Barium	7440-39-3	---	---	0.00E+00
Beryllium	7440-41-7	---	---	0.00E+00
Cadmium	7440-43-9	---	---	0.00E+00
Chromium	7440-47-3	---	---	0.00E+00
Cobalt	7440-48-4	---	---	0.00E+00
Copper	7440-50-8	---	---	0.00E+00
Cyanide	57-12-5	---	---	0.00E+00
Lead	7439-92-1	---	---	0.00E+00
Manganese	7439-96-5	---	---	0.00E+00
Mercury	7439-97-6	---	---	0.00E+00
Molybdenum	7439-98-7	---	---	0.00E+00
Nickel	7440-02-0	---	---	0.00E+00
Selenium	7782-49-2	---	---	0.00E+00
Silver	7440-22-4	---	---	0.00E+00
Thallium	7440-28-0	---	---	0.00E+00
Vanadium	7440-62-2	---	---	0.00E+00
Zinc	7440-66-6	---	---	0.00E+00

Notes:

1. Sources noted as follows:
   - (a) EPA, 2001;
   - (b) calculated using the methods of Lyman et al., 1990;
   - (c) Montgomery, 1996;
   - (d) Ecology, 2001;
   - (e) EPA, 2002;
   - (f) HSDB, 2004;
   - (g) EPA, 2004;
2. CAS = Chemical Abstract Service
3. Unit in square centimeters per second (cm^2/s).
4. Units in milligrams per liter (mg/L).
5. -- = Not available.

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2001							
Shallow Water-bearing Unit Wells							
MW-112-S	2/26/2001	0.60	48.74	6.2	1,500	-29	6.20
	4/26/2001	23.20	55.92	---[5]	1,574	59	6.47
	7/11/2001	1.20	67.80	4.3	1,760	-54	5.80
	10/18/2001	4.57	62.12	11.0	1,256	90	6.59
MW-118-S	2/22/2001	0.50	50.90	23.6	850	-38	6.80
	5/2/2001	49.40	53.78	4.0	768	61	6.59
	7/12/2001	8.30	69.01	15.8	677	175	6.36
	10/19/2001	7.15	63.07	0.6	853	-4	6.38
MW-123-S	2/26/2001	0.40	50.18	107.9	2,800	-95	6.50
	4/25/2001	109.00	54.70	14.1	2,540	-11	6.50
	7/13/2001	9.27	61.03	16.5	2,589	231	6.43
	10/18/2001	dry	dry	dry	dry	dry	dry
Intermediate Aquifer Wells							
MW-102-I1	2/23/2001	0.90	52.34	28.3	640	-91	6.40
	4/27/2001	67.20	54.34	6.9	586	-122	6.48
	7/13/2001	8.53	62.65	3.9	600	-57	6.35
	10/18/2001	-7.79	57.32	0.3	740	-23	6.37
MW-112-I2	2/26/2001	0.40	55.22	8.7	930	-91	6.30
	4/26/2001	11.80	57.83	12.7	867	-119	6.41
	7/11/2001	1.20	60.60	8.6	970	-46	5.78
	10/17/2001	7.13	58.52	2.0	987	-47	6.33
MW-113-I1	2/27/2001	0.50	53.06	149.8	913	-21	5.95
	4/26/2001	15.20	53.22	19.1	911	-9	6.39
	7/16/2001	10.79	57.00	12.8	888	148	6.25
	10/18/2001	-6.69	58.48	4.2	1,098	23	6.14
MW-114-I1	2/27/2001	0.70	51.08	21.8	1,880	-64	6.23
	4/25/2001	105.10	53.91	7.4	1,642	-60	6.33
	7/16/2001	10.94	59.05	4.2	1,636	-52	6.20
	10/23/2001	0.02	59.03	2.2	1,687	-176	6.42
MW-117-I2	2/22/2001	0.20	54.50	73.4	510	-88	6.80
	5/2/2001	90.60	54.97	35.2	489	-82	6.50
	7/17/2001	8.36	58.19	4.2	471	-36	6.36
	10/16/2001	8.88	57.96	1.9	608	-51	6.39
MW-118-I1	2/22/2001	0.30	54.14	15.9	690	-89	6.50
	5/2/2001	80.90	54.63	10.2	623	-106	6.55
	7/17/2001	9.13	57.45	0.6	591	-31	6.41
	10/19/2001	5.75	60.46	1.4	699	-44	6.43

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2001							
Intermediate Aquifer Wells (Continued)							
MW-120-I1	2/27/2001	0.50	53.78	20.9	719	-81	6.36
	4/27/2001	50.60	54.34	2.0	670	-90	6.48
	7/12/2001	9.93	58.66	2.2	683	-24	6.37
	10/23/2001	5.06	60.82	2.4	757	-113	6.43
MW-120-I2	1/27/2001	0.50	55.04	12.0	671	-65	6.29
	5/2/2001	67.70	55.56	3.8	682	-119	6.41
	7/12/2001	3.10	59.99	3.9	696	-44	6.27
	10/23/2001	3.48	57.85	3.1	735	-130	6.55
MW-122-I2	2/27/2001	0.60	52.88	44.2	1,080	-53	6.01
	4/25/2001	122.10	55.22	3.0	878	-47	6.44
	7/17/2001	10.24	56.79	4.5	868	227	6.24
	10/19/2001	4.77	56.83	0.9	1,051	-33	6.33
MW-123-I	2/26/2001	0.50	54.14	36.0	1,400	-63	6.00
	4/25/2001	112.90	58.53	19.5	1,324	-41	6.32
	7/13/2001	10.28	56.75	8.9	1,329	147	6.24
	10/23/2001	0.33	57.39	3.1	1,392	-143	6.49
MW-124-I1	2/23/2001	1.00	51.62	89.9	1,700	-3	6.70
	4/27/2001	12.50	52.32	34.3	1,696	105	6.82
	7/16/2001	10.71	59.23	6.8	1,494	35	6.61
	10/23/2001	2.22	57.82	10.0	1,245	225	6.84
MW-125-I1	2/27/2001	0.50	50.72	66.3	1,620	-66	6.42
	4/25/2001	110.80	55.22	13.5	1,343	-57	6.54
	7/10/2001	38.70	61.16	27.5	1,311	-143	6.33
	10/15/2001	-0.64	61.46	28.0	1,563	-88	6.43
Deep Aquifer Wells							
MW-16	2/23/2001	0.50	54.14	4.9	800	-139	6.50
	4/26/2001	11.00	56.30	6.6	658	-241	7.28
	7/13/2001	8.85	62.96	28.5	692	-56	6.69
	10/18/2001	8.85	56.94	11.2	748	-133	7.16
MW-112-D	2/26/2001	0.50	55.22	85.4	580	-86	6.30
	4/26/2001	35.10	58.15	6.0	547	-64	6.45
	7/11/2001	1.00	60.10	8.1	507	-70	6.01
	10/17/2001	8.81	58.82	9.0	597	-30	6.35
MW-24D	2/23/2001	0.70	51.80	79.5	1,000	-108	6.30
	7/11/2001	5.00	59.90	5.4	1,000	-70	5.92
	4/27/2001	13.80	54.57	22.9	856	-31	6.39
	10/18/2001	11.77	55.15	10.0	786	-18	6.36

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2002							
Shallow Water-Bearing Unit Wells							
MW-112-S	1/15/2002	3.49	49.94	4.8	944	238	6.54
	4/15/2002	---	52.22	1.9	995	102	5.28
	7/17/2002	6.48	67.38	1.8	1,218	103.6	6.24
	10/14/2002	3.14	66.99	1.8	1,037	-315	7.84
MW-118-S	1/17/2002	8.18	50.22	38.4	697	237	6.63
	4/19/2002	5.93	51.34	1.3	648	168	6.09
	7/17/2002	7.50	66.53	4.0	749	0.3	6.17
	10/16/2002	0.65	64.98	4.8	651	-329	7.56
MW-123-S	1/15/2002	5.31	48.34	39.0	2,557	277	6.32
	4/16/2002	1.57	49.85	3.0	2,815	-53	6.04
	7/15/2002	7.77	64.95	19.0	3,173	-91	6.26
	10/16/2002	dry	dry	dry	dry	dry	dry
Intermediate Aquifer Wells							
MW-102-I1	1/15/2002	3.45	53.43	49.0	565	203	6.62
	4/16/2002	7.52	52.73	9.3	549	-65	6.11
	7/15/2002	7.69	59.30	5.4	510	-24	6.19
	10/15/2002	2.14	56.31	0.1	427	-301	7.53
MW-112-I2	1/14/2002	4.69	56.23	2.0	751	-47	6.43
	4/18/2002	-10.56	57.30	4.7	631	-19	6.01
	7/18/2002	8.49	58.64	1.6	732	-17.5	6.08
	10/14/2002	3.56	62.24	13.7	669	-300	7.49
MW-113-I1	1/16/2002	5.08	51.03	52.6	694	223	6.41
	4/16/2002	2.81	52.09	13.5	751	16	5.98
	7/19/2002	3.59	58.62	7.5	818	-34.1	5.93
	10/17/2002	2.61	61.64	3.9	743	-340	7.34
MW-114-I1	1/16/2002	4.58	51.20	13.9	1,469	256	6.36
	4/17/2002	1.19	52.57	7.8	1,490	-69	5.86
	7/16/2002	7.64	58.15	13.1	1,628	-47.3	5.97
	10/16/2002	3.10	62.40	7.6	1,347	-309	7.30
MW-117-I2	1/16/2002	5.44	52.45	29.1	467	233	6.54
	4/18/2002	4.33	55.52	4.9	451	77	6.09
	7/17/2002	6.43	60.38	2.7	513	-41.6	6.19
	10/16/2002	2.49	57.03	1.5	439	-325	7.52
MW-118-I1	1/17/2002	7.83	53.13	25.5	513	240	6.58
	4/19/2002	6.72	53.70	8.6	530	102	
	7/17/2002	6.42	61.21	11.2	578	-55	6.20
	10/16/2002	2.73	61.20	14.2	514	-336	7.56

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (μS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2002							
Intermediate Aquifer Wells (Continued)							
MW-120-I1	1/17/2002	5.99	54.55	21.0	686	221	6.34
	4/18/2002	1.29	53.75	18.7	649	-82.6	5.96
	7/18/2002	10.86	59.96	4.4	722	-33.6	6.09
	10/17/2002	1.33	60.06	3.1	621	-343.9	7.43
MW-120-I2	1/17/2002	6.67	54.35	28.8	767	249	6.32
	4/18/2002	0.70	55.40	4.9	788	-51	5.85
	7/18/2002	6.40	62.13	0.7	842	-66.4	6.10
	10/17/2002	2.56	57.54	4.1	735	-323	7.29
MW-122-I2	1/16/2002	5.93	52.13	16.5	825	243	6.35
	4/17/2002	2.36	53.67	3.9	774	-55	5.82
	7/19/2002	6.77	59.67	3.2	903	-15.3	6.03
	10/16/2002	3.64	61.44	1.4	801	-328	7.40
MW-123-I	1/15/2002	3.65	53.86	48.2	1,333	218	6.32
	4/16/2002	0.56	53.70	4.8	1,246	-23	5.83
	7/17/2002	8.67	59.81	4.4	1,365	-41.3	5.97
	10/17/2002	2.85	56.86	3.8	1,150	-321	7.29
MW-124-I1	1/15/2002	4.94	52.45	52.0	1,246	231	6.74
	4/17/2002	2.31	51.55	8.3	999	234	6.08
	7/16/2002	8.16	61.82	1.0	1,125	33.9	6.34
	10/15/2002	3.37	64.89	2.8	990	-321	7.63
MW-125-I1	1/16/2002	3.54	53.37	50.0	1,211	279	6.47
	4/19/2002	4.53	52.23	20.8	1,096	337	6.14
	7/15/2002	7.62	63.26	11.4	1,294	-84.9	6.20
	10/14/2002	4.00	61.51	4.8	1,137	-278	7.67
Deep Aquifer Wells							
MW-16	1/17/2002	5.35	52.67	38.4	680	255	6.54
	4/16/2002	8.26	54.37	4.0	544	-29	6.13
	7/16/2002	7.92	67.80	10.6	631	-65.8	6.21
	10/15/2002	2.65	59.95	4.9	609	-316	7.53
MW-112-D	1/14/2002	6.67	55.28	50.0	473	144	6.51
	4/18/2002	4.04	56.37	4.9	454	-35	6.01
	7/18/2002	9.40	59.72	2.1	525	-20.6	6.13
	10/14/2002	3.31	61.66	12.4	409	-308	7.49
MW-24D	1/15/2002	3.38	52.10	160.0	835	218	6.44
	4/17/2002	0.94	53.88	4.9	869	-66	5.85
	7/16/2002	5.59	59.90	4.8	985	-47.8	6.03
	10/15/2002	2.44	60.86	11.2	677	-304	7.44

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)^1	Temperature (F)^2	Turbidity (NTU)^3	Specific Conductivity (µS/cm)^4	Redox Potential (millivolts)	pH (pH units)
2003							
Shallow Water-bearing Unit Wells							
MW-102-S	1/7/2003	1.03	49.59	1.4	727.9	375	5.91
	4/15/2003	0.76	54.09	4.9	1859	406	6.06
	7/8/2003	dry	dry	dry	dry	dry	dry
	10/1/2003	dry	dry	dry	dry	dry	dry
MW-112-S	1/7/2003	dry	dry	dry	dry	dry	dry
	4/15/2003	0.93	52.50	2.12	973.7	505	6.51
	7/10/2003	0.69	67.93	1.22	880.3	344	6.52
	10/1/2003	dry	dry	dry	dry	dry	dry
MW-117-S	1/10/2003	dry	dry	dry	dry	dry	dry
	4/21/2003	2.18	53.51	9.1	742.8	519	6.48
	7/8/2003	dry	dry	dry	dry	dry	dry
	10/1/2003	dry	dry	dry	dry	dry	dry
MW-122-S	1/10/2003	1.19	47.37	1.2	1440	348	6.63
	4/18/2003	0.50	54.23	1.4	819.7	380	6.56
	7/8/2003	dry	dry	dry	dry	dry	dry
	10/1/2003	dry	dry	dry	dry	dry	dry
MW-123-S	1/10/2003	0.84	46.62	13.1	3130	499	6.57
	4/16/2003	0.86	51.31	14.7	3398	568	6.42
	7/8/2003	dry	dry	dry	dry	dry	dry
	10/1/2003	dry	dry	dry	dry	dry	dry
MW-126-S	1/10/2003	dry	dry	dry	dry	dry	dry
	4/16/2003	1.76	51.82	1.5	481.5	392	6.35
	7/8/2003	dry	dry	dry	dry	dry	dry
	10/1/2003	dry	dry	dry	dry	dry	dry
MW-127-S	1/9/2003	0.43	53.92	3.2	770.9	261	6.29
	4/17/2003	0.73	52.57	0.4	741.1	492	6.27
	7/8/2003	dry	dry	dry	dry	dry	dry
	10/1/2003	dry	dry	dry	dry	dry	dry
MW-132-S	1/13/2003	8.18	46.49	22.5	460.8	465	6.84
	4/18/2003	0.98	52.95	10.4	515	383	6.54
	7/8/2003	dry	dry	dry	dry	dry	dry
	10/1/2003	dry	dry	dry	dry	dry	dry
Intermediate Aquifer Wells							
MW-102-I1	1/7/2003	0.43	56.35	7.5	647	151	6.56
	4/15/2003	0.83	54.19	2.3	556	405	6.46
	7/8/2003	0.72	57.52	0.9	513.9	149	6.47
	10/1/2003	0.63	61.56	0.8	527.3	188	6.40

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2003							
Intermediate Aquifer Wells (Continued)							
MW-114-I1	1/9/2003	0.39	55.24	21.7	1,691	198	6.35
	4/18/2003	0.47	53.22	4.6	1,573	437	6.24
	7/11/2003	0.73	61.05	1.8	1,172	218	6.31
	10/3/2003	0.29	61.03	1.9	989.5	353	6.33
MW-117-I2	1/14/2003	0.53	55.83	4.9	558.4	206	6.55
	4/21/2003	0.63	54.00	2.8	541.4	499	6.36
	7/10/2003	0.52	61.14	1.8	568.8	192	6.41
	9/30/2003	0.67	61.65	0.9	588.6	182	6.36
MW-118-I1	1/9/2003	0.58	55.85	3.8	634.6	186	6.55
	4/18/2003	0.61	54.03	2.9	630.1	485	6.47
	7/10/2003	0.46	61.02	4.1	650	158	6.53
	9/30/2003	0.55	62.49	1.3	686.8	148	6.53
MW-120-I1	1/10/2003	0.46	56.88	10.5	894.3	225	6.44
	4/16/2003	0.66	57.34	3.8	801.3	421	6.33
	7/11/2003	0.51	62.44	1.7	807.7	195	6.43
	9/30/2003	0.74	66.02	1.0	798.3	166	6.33
MW-122-I2	1/10/2003	0.53	55.69	32.7	959.5	311	6.47
	4/18/2003	0.48	55.31	2.1	955.6	408	6.26
	7/10/2003	0.57	61.61	1.4	979.1	203	6.43
	10/3/2003	0.78	57.76	1.2	1,024	368	6.31
MW-123-I2	1/8/2003	0.71	53.67	3.4	1,464	227	6.34
	4/16/2003	0.64	55.17	3.7	1,438	397	6.21
	7/8/2003	0.74	59.65	0.8	1,431	167	6.22
	10/1/2003	0.37	59.59	3.2	945.7	204	6.23
MW-124-I1	1/8/2003	0.67	52.43	5.7	1,149	402	6.58
	4/16/2003	0.86	54.86	12.9	1,070	374	6.37
	7/8/2003	0.55	61.41	4.2	1,109	207	6.49
	10/1/2003	1.08	59.95	8.0	1,084	522	6.44
MW-126-I	1/9/2003	0.50	56.46	3.6	997.1	252	6.36
	4/16/2003	0.60	56.86	3.8	943.3	398	6.24
	7/8/2003	0.68	58.44	1.2	918.9	155	6.28
	10/3/2003	0.36	58.28	1.2	681.2	264	6.30
MW-128-I	1/9/2003	0.57	55.71	4.3	1,087	211	6.43
	4/18/2003	0.78	55.02	4.9	1,013.0	540	6.28
	7/10/2003	0.56	58.01	0.8	906.0	189	6.29
	9/30/2003	0.61	58.35	1.8	1,229	163	6.31
MW-130-I	1/13/2003	0.73	53.01	4.6	788.5	153	6.46
	4/18/2003	0.50	54.97	14.0	750.9	423	6.25
	7/11/2003	0.75	54.73	1.7	741.4	517	6.40
	10/3/2003	0.66	55.00	3.1	765.8	399	6.36

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2003							
Intermediate Aquifer Wells (Continued)							
MW-131-I	1/13/2003	0.68	56.34	24.6	832	166	6.59
	4/17/2003	0.78	54.25	3.2	817.1	506	6.45
	7/11/2003	0.46	62.49	1.2	827.5	200	6.47
	10/3/2003	0.48	65.30	4.5	822.6	191	6.39
Deep Aquifer Wells							
MW-16	1/8/2003	0.36	54.19	8.6	671.1	171	6.54
	4/15/2003	0.68	56.43	4.8	724.4	404	6.32
	7/8/2003	0.74	58.60	1.3	695	145	6.40
	10/1/2003	0.66	59.83	22.9	675.9	196	6.47
MW-112-D	1/13/2003	0.58	55.31	8.9	539.7	170	6.52
	4/15/2003	0.75	55.29	3.3	526.7	478	6.36
	7/10/2003	0.53	59.68	2.8	547.6	202	6.39
	9/30/2003	0.58	59.45	1.8	518.6	190	6.30
MW-24D	1/10/2003	0.47	53.28	10.9	762.3	265	6.49
	4/15/2003	0.62	54.70	2.9	1,002	364	6.17
	7/8/2003	0.55	56.88	2.6	1,008	162	6.33
	10/1/2003	0.66	57.27	1.6	680.3	216	6.37
2004							
Shallow Water-bearing Unit Wells							
MW-102-S	1/14/2004	1.11	47.03	21.6	2,709	377	6.62
	4/14/2004	0.61	55.42	23.2	4,575	456	6.60
	7/26/2004	dry	dry	dry	dry	dry	dry
	10/4/2004	0.57	63.63	5.0	2,529	441	5.65
MW-112-S	1/15/2004	1.05	48.13	1.6	1,204	505	6.60
	4/13/2004	dry	dry	dry	dry	dry	dry
	7/26/2004	dry	dry	dry	dry	dry	dry
	10/4/2004	dry	dry	dry	dry	dry	dry
MW-117-S	1/19/2004	0.77	46.24	1.9	637.5	426	6.68
	4/15/2004	1.62	60.94	1.0	494.3	443	6.55
	7/26/2004	dry	dry	dry	dry	dry	dry
	10/4/2004	dry	dry	dry	dry	dry	dry
MW-122-S	1/13/2004	2.60	41.23	0.9	425.1	487	6.72
	4/13/2004	1.27	55.71	0.2	932	472	6.48
	7/26/2004	dry	dry	dry	dry	dry	dry
	10/4/2004	dry	dry	dry	dry	dry	dry
MW-123-S	1/16/2004	0.90	47.59	110.0	4,792	471	6.72
	4/13/2004	0.71	59.83	65.1	4,903	467	6.55
	7/26/2004	dry	dry	dry	dry	dry	dry
	10/4/2004	dry	dry	dry	dry	dry	dry

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2004							
Shallow Water-bearing Unit Wells (Continued)							
MW-126-S	1/15/2004	3.04	45.46	2.0	344.7	487	6.14
	4/13/2004	0.92	58.78	0.1	526.3	463	6.29
	7/26/2004	dry	dry	dry	dry	dry	dry
	10/4/2004	dry	dry	dry	dry	dry	dry
MW-127-S	1/15/2004	0.73	50.76	2.8	611.6	454	6.31
	4/13/2004	0.68	60.19	1.3	629.7	471	6.06
	7/26/2004	dry	dry	dry	dry	dry	dry
	10/4/2004	dry	dry	dry	dry	dry	dry
MW-132-S	1/13/2004	7.46	44.80	10.3	461.8	444	6.75
	4/13/2004	2.02	54.25	12.1	406.1	475	6.42
	7/26/2004	dry	dry	dry	dry	dry	dry
	10/4/2004	dry	dry	dry	dry	dry	dry
Intermediate Aquifer Wells							
MW-102-I1	1/14/2004	0.62	55.27	3.9	616.7	380	6.49
	4/14/2004	0.69	54.34	12.1	420.5	411	6.47
	7/26/2004	0.41	63.16	0.8	523.1	380	6.68
	10/4/2004	0.60	60.10	0.6	554.9	372	6.41
MW-114-I1	1/19/2004	0.18	53.06	8.9	682	470	6.37
	4/19/2004	0.36	56.17	18.6	406.9	442	6.23
	7/28/2004	0.60	61.14	4.7	523.7	384	6.42
	10/6/2004	0.46	61.29	4.7	461.6	423	6.05
MW-117-I2	1/20/2004	0.31	54.88	4.0	529.7	360	6.36
	4/15/2004	0.72	54.32	3.6	332.2	445	6.21
	7/28/2004	0.57	63.12	3.8	392.7	388	6.54
	10/5/2004	0.57	61.79	1.2	436.7	393	6.37
MW-118-I1	1/20/2004	0.47	56.03	2.5	564.6	424	6.54
	4/15/2004	0.69	55.87	2.7	370.3	442	6.47
	7/28/2004	0.59	61.56	2.3	400.5	394	6.67
	10/6/2004	0.33	64.36	5.4	380.8	390	6.34
MW-120-I1	1/19/2004	0.44	55.80	3.0	648.4	433	6.39
	4/14/2004	0.45	53.87	1.0	524.8	373	6.34
	7/26/2004	0.61	62.47	3.9	689.4	408	6.37
	10/5/2004	0.57	64.60	1.8	509.3	408	6.14
MW-122-I2	1/13/2004	0.38	53.06	3.4	888.6	481	6.39
	4/15/2004	0.61	54.61	0.7	437.4	446	6.18
	7/29/2004	0.72	58.08	1.2	451.6	393	6.48
	8/10/2004	0.50	61.81	1.4	559.1	402	6.59
	10/5/2004	0.76	62.74	0.8	578.5	389	6.04

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2004							
Intermediate Aquifer Wells (Continued)							
MW-123-I2	1/16/2004	0.67	55.42	3.6	1,711	357	6.31
	4/16/2004	0.46	55.90	4.0	378.3	435	6.15
	7/27/2004	0.56	59.25	0.8	510.9	411	6.39
	10/6/2004	0.66	59.36	2.7	408.4	423	5.99
MW-124-I1	1/14/2004	1.07	52.70	18.9	1,282	457	6.43
	4/19/2004	0.44	55.17	50.2	617.8	469	6.28
	7/26/2004	0.66	62.80	10.3	958.5	427	6.45
	10/4/2004	0.56	59.88	7.6	1,023	404	6.19
MW-126-I	1/15/2004	0.48	56.44	1.7	721.8	482	6.36
	4/16/2004	0.37	57.06	4.4	340.6	425	6.18
	7/27/2004	0.60	58.64	1.4	436	405	6.52
	10/4/2004	0.45	58.96	0.4	515	379	6.11
MW-128-I	1/19/2004	0.83	56.25	0.4	824.5	504	6.33
	4/16/2004	0.85	55.42	1.1	431.1	451	6.13
	7/27/2004	1.74	63.05	4.5	544	411	6.38
	10/5/2004	1.19	57.65	3.0	523.4	416	6.12
MW-130-I	1/13/2004	0.58	53.92	11.1	774.5	457	6.32
	4/15/2004	0.58	53.58	6.5	415.2	431	6.27
	7/28/2004	0.63	57.40	2.2	400.6	406	6.74
	10/6/2004	0.55	55.98	1.0	371.9	419	6.14
MW-131-I	1/16/2004	0.86	54.68	23.8	970.0	486	6.44
	4/16/2004	0.56	55.63	5.1	455.4	453	6.28
	7/29/2004	0.55	66.88	3.2	571.5	401	6.55
	8/10/2004	0.44	66.15	3.3	658.5	415	6.40
	10/7/2004	0.49	64.87	2.9	475.9	432	6.34
Deep Aquifer Wells							
MW-16	1/12/2004	0.68	55.15	0.9	793	389	6.43
	4/14/2004	0.57	55.17	1.6	539	428	6.32
	7/27/2004	0.65	58.41	0.8	514.9	413	6.40
	10/7/2004	0.76	57.79	1.2	331.5	437	6.51
MW-112-D	1/15/2004	0.72	55.29	3.8	615	464	6.44
	4/16/2004	0.58	55.72	3.6	322.1	430	6.26
	7/27/2004	0.55	63.12	2.0	398.8	385	6.69
	10/5/2004	0.68	57.49	1.2	408.3	388	6.42
MW-24D	1/12/2004	0.46	54.34	2.1	897.1	360	6.34
	4/14/2004	0.53	54.09	2.1	616.3	439	6.25
	7/26/2004	0.46	58.41	0.8	575.3	407	6.40
	10/4/2004	0.45	56.77	1.3	816.4	406	6.07

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2005							
Shallow Water-bearing Unit Wells							
MW-102-S	1/11/2005	1.10	44.06	3.3	949.9	580	6.10
	4/27/2005	0.37	54.66	3.8	185.7	484	6.28
	7/11/2005	0.58	66.88	3.1	649.3	374	6.08
	10/17/2005	0.63	62.38	95.7	5,085	455	6.72
MW-112-S	1/11/2005	dry	dry	dry	dry	dry	dry
	4/28/2005	0.51	56.26	1.8	249.1	514	6.62
	7/7/2005	dry	dry	dry	dry	dry	dry
	10/13/2005	dry	dry	dry	dry	dry	dry
MW-117-S	1/11/2005	dry	dry	dry	dry	dry	dry
	4/28/2005	0.57	62.65	1.7	251.6	475	6.86
	7/7/2005	dry	dry	dry	dry	dry	dry
	10/13/2005	dry	dry	dry	dry	dry	dry
MW-122-S	1/12/2005	1.06	45.32	1.2	537.9	476	6.86
	4/27/2005	0.65	54.77	1.4	287.7	457	6.76
	7/7/2005	dry	dry	dry	dry	dry	dry
	10/13/2005	dry	dry	dry	dry	dry	dry
MW-123-S	1/11/2005	dry	dry	dry	dry	dry	dry
	4/26/2005	0.20	57.33	44.8	4,207.5	496	6.79
	7/7/2005	dry	dry	dry	dry	dry	dry
	10/13/2005	dry	dry	dry	dry	dry	dry
MW-126-S	1/11/2005	2.11	45.55	1.9	678.7	506	6.94
	4/26/2005	0.43	54.18	0.5	638.8	481	6.63
	7/7/2005	dry	dry	dry	dry	dry	dry
	10/13/2005	dry	dry	dry	dry	dry	dry
MW-127-S	1/13/2005	0.78	51.67	3.1	379.4	499	6.44
	4/26/2005	0.39	55.98	1.2	555	476	6.44
	7/7/2005	0.47	67.50	0.7	291.2	247	6.21
	10/13/2005	dry	dry	dry	dry	dry	dry
MW-132-S	1/11/2005	dry	dry	dry	dry	dry	dry
	4/27/2005	0.85	54.50	8.9	193.4	451	6.63
	7/7/2005	dry	dry	dry	dry	dry	dry
	10/13/2005	dry	dry	dry	dry	dry	dry
Intermediate Aquifer Wells							
MW-102-I1	1/11/2005	0.58	52.74	10.9	715.6	491	6.55
	4/29/2005	0.27	53.96	4.1	114.9	465	6.62
	7/8/2005	0.46	57.49	0.4	368.1	198	6.51
	10/13/2005	0.42	59.59	0.7	571	141	6.78

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2005							
Intermediate Aquifer Wells (Continued)							
MW-114-I1	1/13/2005	0.44	51.42	29.6	474.6	498	6.44
	5/3/2005	0.41	54.07	15.8	110.8	492	6.53
	7/11/2005	0.44	64.24	8.8	474.7	332	6.30
	10/18/2005	0.60	59.85	2.6	1,200	198	6.61
MW-117-I2	1/13/2005	0.62	56.48	8.9	460.7	403	6.54
	5/2/2005	0.24	58.08	3.0	95.6	501	6.40
	7/12/2005	0.53	61.41	2.0	297.6	416	6.40
	10/19/2005	0.34	61.70	1.2	420.3	335	6.66
MW-118-I1	1/14/2005	0.37	52.63	3.8	389.6	405	6.66
	5/3/2005	0.22	59.81	1.3	199	472	6.69
	7/12/2005	0.60	59.85	0.8	328.1	503	6.41
	10/19/2005	0.32	61.97	4.1	605.7	455	6.65
MW-120-I1	1/14/2005	0.38	51.26	4.2	378.8	432	6.52
	5/2/2005	0.39	57.87	3.5	112.5	496	6.60
	7/8/2005	0.64	60.75	2.8	365	371	6.37
	10/18/2005	0.49	61.97	1.8	681.5	229	6.65
MW122-I2	1/12/2005	0.63	54.45	15.4	655	489	6.48
	4/28/2005	0.40	55.65	4.5	173.2	488	6.45
	7/7/2005	0.40	56.71	1.2	425.8	472	6.25
	10/17/2005	0.57	60.42	0.7	828.6	229	6.64
MW-123-I2	1/12/2005	0.60	54.16	1.2	687.1	463	6.39
	4/29/2005	0.25	55.22	2.0	115.4	477	6.37
	7/8/2005	0.63	56.98	0.9	512.2	483	6.18
	10/13/2005	0.70	58.17	1.9	1,336	162	6.53
MW-124-I1	1/11/2005	1.15	48.24	10.6	896.1	514	6.47
	4/27/2005	0.51	60.08	13.9	255.2	491	6.50
	7/8/2005	0.76	60.76	3.4	491.7	293	6.41
	10/13/2005	0.80	58.96	12.5	870.1	279	6.66
MW-126-I	1/11/2005	0.71	54.18	4.3	645.4	497	6.47
	4/29/2005	0.23	56.12	1.6	111.8	468	6.49
	7/11/2005	0.43	58.77	0.6	388.3	475	6.17
	10/17/2005	0.39	58.98	2.4	703	152	6.68
MW-128-I	1/14/2005	0.65	54.77	1.6	496.2	400	6.49
	4/29/2005	0.34	56.61	1.1	126.9	472	6.49
	7/7/2005	0.83	60.42	3.2	244	404	6.22
	10/18/2005	1.19	58.06	2.8	1,020	216	6.63
MW-130-I	1/14/2005	0.47	53.47	7.1	454	477	6.49
	4/28/2005	0.32	53.91	2.1	152	482	6.58
	7/7/2005	0.53	54.36	0.9	325.9	399	6.35
	10/18/2005	0.36	55.38	4.0	621.7	436	6.49

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2005							
Intermediate Aquifer Wells (Continued)							
MW-131-I	1/14/2005	0.39	54.91	13.2	514.4	479	6.51
	5/3/2005	0.15	57.81	3.6	271	480	6.57
	7/12/2005	0.39	63.68	4.3	405.4	438	6.32
	10/19/2005	0.36	63.19	9.7	759.2	303	6.63
Deep Aquifer Wells							
MW-16	1/12/2005	0.73	54.03	4.6	698.1	467	6.66
	4/29/2005	0.31	55.96	1.8	177	485	6.74
	7/11/2005	0.19	59.83	3.5	687.2	153	6.73
	10/17/2005	0.38	58.10	3.6	517.4	128	6.99
MW-112-D	1/14/2005	0.60	54.12	3.7	387.2	290	6.57
	5/3/2005	0.30	58.60	2.5	194.9	467	6.53
	7/7/2005	0.40	60.03	3.0	198.8	385	6.35
	10/18/2005	0.28	58.82	3.9	482.2	407	6.57
MW-24D	1/11/2005	0.80	53.42	3.0	767	498	6.48
	4/28/2005	0.28	56.35	2.2	148.1	476	6.44
	7/11/2005	0.55	57.11	0.9	619.5	491	6.27
	10/13/2005	0.31	56.70	2.1	555.5	150	6.73
2006							
Shallow Water-bearing Unit Wells							
MW-102-S	1/16/2006	1.47	47.52	2.9	617	519	6.41
	4/13/2006	0.30	49.01	2.3	737	493	5.45
	7/10/2006	0.90	64.98	6.4	928.1	403	7.12
	10/5/2006	1.11	59.52	8.6	1209	297	5.94
MW-117-S	1/18/2006	5.58	49.77	2.01	483	490	6.72
	4/12/2006	0.90	54.73	0.9	470.1	444	5.99
	7/10/2006	dry	dry	dry	dry	dry	dry
	10/5/2006	dry	dry	dry	dry	dry	dry
MW-122-S	1/25/2006	2.81	48.00	1.21	844	468	6.97
	4/11/2006	0.93	54.37	0.2	778.1	455	5.85
	7/10/2006	dry	dry	dry	dry	dry	dry
	10/5/2006	dry	dry	dry	dry	dry	dry
MW-123-S	1/16/2006	0.43	46.92	15.10	4642	526	6.78
	4/10/2006	0.27	51.33	17.9	4438	481	5.90
	7/10/2006	dry	dry	dry	dry	dry	dry
	10/5/2006	dry	dry	dry	dry	dry	dry
MW-126-S	1/23/2006	1.31	49.32	1.42	1077	497	6.23
	4/10/2006	1.22	50.56	1.4	1,147	441	5.55
	7/10/2006	dry	dry	dry	dry	dry	dry
	10/5/2006	dry	dry	dry	dry	dry	dry

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2006							
Shallow Water-bearing Unit Wells (Continued)							
MW-127-S	1/26/2006	0.37	48.90	0.97	518	473	6.56
	4/12/2006	0.22	53.82	0.8	544.4	452	5.62
	7/11/2006	0.24	68.07	4.4	376.5	138	7.26
	10/5/2006	dry	dry	dry	dry	dry	dry
MW-132-S	1/16/2006	dry	dry	dry	dry	dry	dry
	4/11/2006	1.27	49.57	0.7	329.4	451	5.71
	7/10/2006	dry	dry	dry	dry	dry	dry
	10/5/2006	dry	dry	dry	dry	dry	dry
Intermediate Aquifer Wells							
MW-102-I1	1/16/2006	0.46	54.03	5.76	950	480	6.59
	4/10/2006	0.20	55.60	1.0	699.8	427	5.61
	7/10/2006	0.18	57.60	0.7	7,54.6	172	7.25
	10/6/2006	0.27	58.46	0.2	574.1	-75	6.61
MW-114-I1	1/26/2006	0.37	49.57	14.90	1349	479	6.53
	4/14/2006	0.34	50.13	12.7	7,74.8	478	5.67
	7/13/2006	0.38	62.47	9.4	7,53.4	386	7.33
	10/11/2006	0.25	58.17	3.3	573.5	-52	7.11
MW-117-I2	1/18/2006	0.36	56.79	2.62	582	512	6.63
	4/12/2006	0.21	55.31	0.9	611.4	445	5.67
	7/12/2006	0.18	59.70	3.9	553.7	275	7.32
	10/10/2006	0.08	62.40	0.8	420.1	-75	7.36
MW-118-I1	1/24/2006	0.30	56.88	4.01	752	479	6.68
	4/14/2006	0.22	53.35	2.9	649.1	465	5.83
	7/13/2006	0.12	61.84	1.0	588	342	7.23
	10/10/2006	0.30	60.08	0.4	494.2	-89	7.23
MW-120-I1	1/23/2006	0.93	53.42	4.38	855	467	6.59
	4/12/2006	0.23	54.61	1.2	669	464	5.64
	7/12/2006	0.16	59.31	2.1	7,70.2	310	7.35
	10/10/2006	0.21	62.15	0.1	5,65.5	-91	7.14
MW-122-I2	1/25/2006	0.22	53.42	4.01	992	496	6.55
	4/11/2006	0.27	53.10	0.2	867	465	5.66
	7/12/2006	0.29	56.12	1.6	878.7	414	7.09
	10/9/2006	0.21	59.63	0.6	674.1	-43	6.62
MW-123-I2	1/16/2006	0.34	54.59	0.85	1678	458	6.49
	4/10/2006	0.21	56.16	0.7	1,508	435	5.48
	7/11/2006	0.11	58.55	0.8	945.4	193	7.14
	10/6/2006	0.22	57.18	0.5	616.1	-55	6.39

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2006							
Intermediate Aquifer Wells (Continued)							
MW-124-I1	1/24/2006	0.89	48.92	5.20	961	504	6.55
	4/13/2006	0.18	51.66	12.8	967.8	482	5.65
	7/11/2006	0.65	62.73	14.1	959	378	7.20
	10/9/2006	0.91	54.99	6.8	717.8	15	7.05
MW-126-I	1/23/2006	0.24	57.24	1.29	892	482	6.52
	4/10/2006	0.11	55.98	1.2	824.3	417	5.76
	7/10/2006	0.06	58.46	0.3	697.4	148	7.24
	10/6/2006	0.24	57.94	0.0	493.6	-72	6.59
MW-128-I	1/25/2006	0.26	55.81	0.79	1127	501	6.51
	4/12/2006	0.30	57.67	0.2	770.9	468	5.41
	7/12/2006	0.63	58.77	2.9	801.6	346	7.16
	10/11/2006	0.32	60.24	1.3	660.1	110	6.61
MW-130-I	1/24/2006	0.21	53.67	2.77	791	495	6.64
	4/14/2006	0.25	51.60	0.4	733.6	481	5.64
	7/12/2006	0.05	53.85	0.8	706.6	232	7.39
	10/10/2006	0.20	55.80	0.2	516.6	-50	6.92
MW-131-I	1/25/2006	0.29	53.49	3.50	964	486	6.64
	4/13/2006	0.35	54.93	3.5	928.7	478	5.68
	7/13/2006	0.21	64.53	3.6	785.3	205	7.38
	10/11/2006	0.20	66.40	1.1	747.8	-67	6.99
Deep Aquifer Wells							
MW-16	1/26/2006	0.14	54.41	3.96	605	484	6.89
	4/11/2006	0.14	56.77	3.9	528.5	453	5.99
	7/10/2006	0.18	59.47	18.9	688	174	7.36
	10/9/2006	0.15	59.05	4.1	546.4	-91	7.09
MW-112-D	1/18/2006	0.32	55.33	1.89	595	501	6.65
	4/13/2006	0.11	55.87	1.8	629.5	457	5.70
	7/13/2006	0.22	58.12	3.1	536.9	379	7.25
	10/6/2006	0.26	57.96	2.6	485.3	-60	6.63
MW-24D	1/24/2006	0.28	53.91	0.80	941	500	6.62
	4/11/2006	0.15	55.24	0.5	700.9	473	5.54
	7/11/2006	0.11	57.70	0.7	639.2	209	7.23
	10/9/2006	0.26	56.30	0.4	528.4	-58	7.13
2007							
Shallow Water-bearing Unit Wells							
MW-102-S	1/17/2007	0.25	44.42	3.5	477.2	199	6.34
	4/2/2007	0.76	35.51	8.2	197.5	167	6.51
	7/9/2007	0.89	66.24	2.0	586.6	220	5.97

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2007							
Shallow Water-bearing Unit Wells (Continued)							
MW-112-S	1/17/2007	0.44	47.71	3.2	1472	154	6.61
	4/2/2007	0.56	35.62	7.6	246.2	166	6.52
	7/9/2007	dry	dry	dry	dry	dry	dry
MW-117-S	1/23/2007	1.02	45.91	2.2	277.6	179	6.72
	4/3/2007	2.14	41.72	9.4	154	154	7.03
	7/9/2007	dry	dry	dry	dry	dry	dry
MW-122-S	1/19/2007	6.41	40.50	3.4	302	156	6.75
	4/4/2007	0.71	33.53	12.5	111	153	6.79
	7/9/2007	dry	dry	dry	dry	dry	dry
MW-123-S	1/18/2007	0.00	41.07	42.8	3571	217	6.68
	4/2/2007	0.00	71.06	14.1	450.4	172	6.70
	7/9/2007	dry	dry	dry	dry	dry	dry
MW-126-S	1/18/2007	1.83	44.53	2.0	258.4	92	6.47
	4/5/2007	0.72	34.61	10.5	114.1	196	6.60
	7/9/2007	dry	dry	dry	dry	dry	dry
MW-127-S	1/18/2007	0.11	46.44	6.1	340.2	95	6.65
	4/5/2007	0.32	36.05	11.4	84	-131	6.88
	7/11/2007	0.36	63.45	2.0	235.5	139	6.12
MW-132-S	1/19/2007	4.39	40.28	10.4	274.5	167	6.74
	4/4/2007	0.89	37.54	12.6	144.2	172	6.66
	7/9/2007	dry	dry	dry	dry	dry	dry
Intermediate Aquifer Wells							
MW-102-I1	1/17/2007	0.00	54.79	31.9	807.7	176	6.49
	4/2/2007	0.57	42.67	12.3	155.4	142	6.53
	7/9/2007	0.52	60.55	3.0	325.3	216	6.10
MW-114-I1	1/20/2007	0.21	50.31	41.4	393.6	174	6.51
	4/5/2007	0.27	65.12	15.8	144.5	231	6.89
	7/13/2007	0.36	61.92	2.2	250.1	239	6.02
MW-117-I2	1/23/2007	0.22	57.07	3.7	251.8	150	6.70
	4/3/2007	0.17	37.40	13.0	113	139	6.62
	7/13/2007	0.18	59.31	0.4	172	220	6.17
MW-118-I1	1/22/2007	0.13	57.00	0.9	358.4	139	6.65
	4/3/2007	0.20	37.83	13.2	131.9	149	6.62
	7/13/2007	0.22	59.99	1.1	204.5	227	6.04
MW-120-I1	1/23/2007	0.43	53.42	3.9	366.2	182	6.55
	4/6/2007	0.20	35.38	15.2	147.1	7	6.73
	7/11/2007	0.26	61.92	2.2	259	198	6.01
MW-122-I2	1/19/2007	0.09	54.21	11.9	508.6	179	6.56
	4/4/2007	0.33	49.42	12.9	147.2	181	6.35
	7/11/2007	0.27	59.07	1.9	247.4	198	5.99

TABLE 6-6

SUMMARY OF WATER QUALITY PARAMETERS
QUARTERLY GROUNDWATER SAMPLING EVENTS
2001-2007

PSC Kent Facility
Kent, Washington

Well ID	Date	Dissolved Oxygen (ppm)[1]	Temperature (F)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS/cm)[4]	Redox Potential (millivolts)	pH (pH units)
2007							
Intermediate Aquifer Wells (Continued)							
MW-123-I2	1/18/2007	0.06	54.73	0.5	650.5	127	6.49
	4/3/2007	0.28	36.12	12.2	178.2	164	6.47
	7/9/2007	0.27	59.45	1.3	309.9	230	5.91
MW-124-I1	1/18/2007	0.67	49.05	47.2	472.1	110	6.54
	4/4/2007	0.81	98.06	10.1	147.4	189	6.44
	7/10/2007	0.86	63.50	8.9	364.7	202	6.20
MW-126-I	1/18/2007	0.13	55.51	1.9	430.4	101	6.63
	4/5/2007	0.20	37.02	13.7	111.7	-169	7.01
	7/11/2007	0.24	58.86	0.6	196.5	170	6.02
MW-128-I	1/22/2007	0.69	56.70	1.6	449.5	171	6.45
	4/5/2007	0.27	36.10	15.3	158.2	-87	6.75
	7/12/2007	0.90	59.49	3.0	249.2	246	5.99
MW-129-I	7/13/2007	0.55	58.96	0.6	178.9	241	5.72
MW-130-I	1/19/2007	0.10	51.57	4.3	423	153	6.57
	4/6/2007	0.20	36.73	12.5	138.1	33	6.56
	7/12/2007	0.26	55.08	2.2	227.9	225	5.92
MW-131-I	1/19/2007	0.21	51.96	15.3	460	128	6.59
	4/6/2007	0.20	38.77	12.9	158.6	15	6.75
	7/12/2007	0.36	62.89	2.9	305.7	229	6.07
Deep Aquifer Wells							
MW-16	1/22/2007	0.00	54.48	12.1	408.6	164	6.71
	4/4/2007	0.16	42.85	12.7	146	172	6.68
	7/10/2007	0.33	58.24	22.0	274.5	216	6.09
MW-112-D	1/18/2007	0.15	55.26	3.6	385.8	103	6.66
	4/3/2007	0.26	34.20	14.1	128.3	151	6.50
	7/9/2007	0.36	57.72	3.2	429	237	6.03
MW-24D	1/18/2007	0.08	53.83	4.3	408.7	108	6.61
	4/4/2007	0.23	35.33	12.6	135.7	179	6.47
	7/10/2007	0.29	59.05	1.6	256.9	210	5.93

Notes:
1. ppm = Parts per million.
2. F = Degrees Fahrenheit.
3. NTU = Nephelometric turbidity units.
4. µS/cm = Microsiemens per centimeter.
5. --- = data unavailable.

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-1	3/13/1990											127,000				
MW-1	4/8/1991											160,00				120,000
MW-1	7/18/2000				695,000	352,000	45,200 D	2,650	2,000 U	2,000 U		192,000 DB	100 U	635	24.1 JB	
MW-1	10/5/2000				350,000	370,000	104,000 DB	2,180	2.00 U	2.00 U		187,000 DB	100 U	200 U	20,000 U	
MW-2	3/14/1990											7,310				
MW-2	4/8/1991											5,300				10,000
MW-3	3/13/1990											40,100				
MW-3	4/8/1991											39,000				470,000
MW-3	7/17/2000				211,000	151,000	30,400 D	5,380	10,000 U	10,000 U		27,800	100 U	474	26.3 JB	
MW-3	10/4/2000				190,000	106,000	656,00 DB	2,780	2.00 U	2.00 U		26,800	39 J	5,000	20,000 U	
MW-4	3/12/1990											10,400				
MW-4	4/9/1991											17,000				27,000
MW-5	3/12/1990											5,960				
MW-5	4/9/1991											3,200				7,000
MW-6	3/13/1990											18,600				
MW-6	4/8/1991											36,000				92,000
MW-7D	3/12/1990											748				
MW-7D	4/9/1991											1,300				19,000
MW-7S	3/13/1990											19,100				
MW-7S	4/9/1991											17,000				170,000
MW-8	3/14/1990											142,000				
MW-9	3/13/1990											50,800				
MW-11	4/8/1991											15,000				37,000
MW-12	3/13/1990											50,400				
MW-12	4/8/1991											71,000				140,000
MW-13	3/13/1990											40,800				
MW-13	4/8/1991											41,000				110,000
MW-14	3/13/1990											46,500				
MW-14	4/8/1991											35,000				65,000
MW-15	3/12/1990											9,900				
MW-15	4/9/1991											8,000				110,000
MW-16	3/14/1990											30,900				
MW-16	4/8/1991											34,000				73,000

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-16	1/8/2003				239,000	184,000		10,300	10.0 U	10.0 U						
MW-16	4/15/2003	5,000 U	5,000 U	260,000	260,000	122,000		4,440	10.0 U	10.0 U						
MW-16	7/8/2003	5,000 U	5,000 U	248,000	248,000	79,400		8,190	10.0 U	10.0 U						
MW-16	10/1/2003	5,000 U	5,000 U	241,000	241,000	97,200		9,380	10.0 U	10.0 U						
MW-16	1/12/2004	5,000 U	5,000 U	275,000	275,000	196,000		17,900	10.0 U	10.0 U	43,550	46,000		865	20,000 U	
MW-16	4/14/2004	5,000 U	5,000 U	272,000	272,000	167,000		14,100	10.0 U	10.0 U	45,280	47,000		400 U	20,000 U	
MW-16	7/27/2004	5,000 U	5,000 U	256,000	256,000	213,000		15,900	10.0 U	10.0 U	49,000	51,000		400 U	20,000 U	
MW-16	10/7/2004	5,000 U	5,000 U	250,000	250,000	170,000		11,800 D	10.0 U	10.0 U	44,400	47,000		754	20,000 U	
MW-16	1/12/2005	5,000 U	5,000 U	249,000	249,000	159,000		14,700 D	10.0 U	10.0 U	37,300	41,000		2,220	20,000 U	
MW-16	4/29/2005	1,000 U	1,000 U	270,000	270,000	105,000					33,500	36,000		4,900	300 U	
MW-16	7/11/2005	1,000 U	1,000 U	231,000	231,000	56,000		6,000	0.5	0.55 U	28,200	32,000		10,000	300 U	
MW-16	10/17/2005	1,000 U	1,000 U	238,000	238,000	104,000		5,600	0.35 U	0.55 U	30,700	34,000		10,300	5 U	
MW-16	1/26/2006	1,000 U	1,000 U	262,000	262,000	340,000		6,700	2.4	0.98 J	27,700	31,000		1,700	5 U	
MW-16	4/11/2006	800 U	800 U	251,000	251,000	341,000		5,400	0.83	0.55 U	22,000	25,000		1,800	70	
MW-16	7/10/2006	800 U	800 U	287,000	287,000	418,000		7,200	0.5	0.55 U	40,600	44,000		60 U	9 U	
MW-16	10/9/2006	800 U	800 U	289,000	289,000	469,000		9,300	0.9	0.26 J		49,000		2,100	20 J	
MW-16	1/22/2007	800 U	800 U	258,000	258,000			7,000	0.32 J	0.16 J	36,000	38,000		600	100	
MW-16	4/4/2007	800 U	800 U	267,000	267,000	447,000		7,900	1.4	0.51 J	36,500	40,000		1,000	200 U	
MW-16	7/10/2007	800 U	800 U	282,000	282,000	657,000		6,600	0.76	0.26 J	43,000	46,000		300	200 J	
MW-17	7/18/2000				201,000	55,400	12,600 D	2,770	400 U	400 U		21,300	59 J	6,810	30.5 JB	
MW-17	10/5/2000				212,000	57,400	36,200 DB	1,160	2.00 U	2.00 U		36,600	55 J	406	20,000 U	
MW-18	7/18/2000				258,000	61,600	12,700 D	1,320	200 U	200 U		6,610	100 U	2,060	28.4 JB	
MW-18	10/2/2000				337,000	32,600	28,000 DB					13,900	100 U	356	20,000 U	
MW-20	7/20/2000				400,000	83,600	37,000 D	1,510	200 U	200 U		25,500	100 U	27,700 D	22 JB	
MW-20	10/9/2000				290,000	62,500	92,400 D	740	2.00 U	2.00 U		19,500	100 U	55,800 DB	20,000 U	
MW-21	7/21/2000				645,000	135,000	75,800 D	2,480	1,250 U	1,250 U	52,000		100 U	58,900 D	30.5 JB	
MW-21	10/3/2000				867,000	177,000	166,000 DB	1,460	2.00 U	2.00 U		97,900	43 J	72,500 D	20,000 U	
MW-23	7/19/2000				948,000	484,000	133,000 D				34,800		100 U	6,600	43.3 JB	
MW-23	10/3/2000				1,160,000	321,000	230,000 DB	1,830	2.00 U	2.00 U		98,300	58 J	545	20,000 U	
MW-102-I1	1/7/2003				206,000	161,000		14,000	10.0 U	10.0 U						
MW-102-I1	4/15/2003	5,000 U	5,000 U	187,000	187,000	82,200		2,760	10.0 U	10.0 U						
MW-102-I1	7/8/2003	5,000 U	5,000 U	177,000	177,000	98,900		7,850	10.0 U	10.0 U						
MW-102-I1	10/1/2003	5,000 U	5,000 U	169,000	169,000	10,6000		7,640	10.0 U	10.0 U						

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-102-I1	1/14/2004	5,000 U	5,000 U	163,000	163,000	110,000		11,400	10.0 U	10.0 U	47,790	50,000		400 U	20,000 U	
MW-102-I1	4/14/2004	5,000 U	5,000 U	170,000	170,000	137,000		8,750	10.0 U	10.0 U	46,230	48,000		400 U	20,000 U	
MW-102-I1	7/26/2004	5,000 U	5,000 U	166,000	166,000	178,000		7,430	10.0 U	10.0 U	54,200	55,000		400 U	20,000 U	
MW-102-I1	10/4/2004	5,000 U	5,000 U	192,000	192,000	127,000		5,170 D	10.0 U	10.0 U		56,000		400 U	20,000 U	
MW-102-I1	1/11/2005	5,000 U	5,000 U	213,000	213,000	189,000		11,300 D	10.0 U	10.0 U	61,910	64,000		400 U	20,000 U	
MW-102-I1	4/29/2005	1,000 U	1,000 U	218,000	218,000	140,000					63,000	65,000		180 U	300 U	
MW-102-I1	7/8/2005	1,000 U	1,000 U	228,000	228,000	76,000		4,100	0.64	0.55 U	68,700	71,000		100 U	500 J	
MW-102-I1	10/13/2005	1,000 U	1,000 U	220,000	220,000	149,000		3,100	0.35 U	0.55 U	66,800	70,000		100 U	5 U	
MW-102-I1	1/16/2006	1,000 U	1,000 U	278,000	278,000	437,000		4,100	0.67	0.55 U	81,500	85,000		100 U	5 U	
MW-102-I1	4/10/2006	800 U	800 U	264,000	264,000	388,000		3,100	0.38 U	0.55 U	81,300	85,000		60 U	9 U	
MW-102-I1	7/10/2006	800 U	800 U	283,000	283,000	454,000		2,400	0.38 U	0.55 U	58,900	84,000		60 U	9 U	
MW-102-I1	10/6/2006	800 U	800 U	268,000	268,000	449,000		2,200	0.55	0.26 J		81,000		60 U	9 U	
MW-102-I1	1/17/2007	800 U	800 U	325,000	325,000			3,100	0.28 J	10.0 U	87,500	91,000		60 U	9 U	
MW-102-I1	4/2/2007	800 U	800 U	308,000	308,000	573,000		2,400	0.23 J	0.12 J	87,700	91,000		7 U	200 U	
MW-102-I1	7/9/2007	800 U	800 U	365,000	365,000	987,000		1,700	0.3 J	0.17 J	94,000	97,000		7 U	400 J	
MW-102-S	1/7/2003				60,400	39,200		14.7	10.0 U	10.0 U						
MW-102-S	4/15/2003	5,000 U	5,000 U	247,000	247,000	31,200		1.86	10.0 U	10.0 U						
MW-102-S	1/14/2004	5,000 U	5,000 U	454,000	454,000	124,000		26.9	10.0 U	10.0 U	0	1,800		38,200 D	20,000 U	
MW-102-S	4/14/2004	5,000 U	5,000 U	628,000	628,000	120,000		106	10.0 U	10.0 U	2,100	2,100		32,400 D	20,000 U	
MW-102-S	10/4/2004	5,000 U	5,000 U	189,000	189,000	140,000		22.5	10.0 U	10.0 U	436	810		42,600 D	20,000 U	
MW-102-S	1/11/2005	5,000 U	5,000 U	119,000	119,000	91,800		109	10.0 U	10.0 U	0	220		31,200 D	20,000 U	
MW-102-S	4/27/2005	1,000 U	1,000 U	152,000	152,000	255,000		71	0.35 U	0.55 U	250	280		31,900	300 U	
MW-102-S	7/11/2005	1,000 U	1,000 U	220,000	220,000	62,000		35	0.35 U	0.55 U	480	590		29,000	400 J	
MW-102-S	10/17/2005	1,000 U	1,000 U	841,000	841,000	157,000		6	0.35 U	0.55 U	5,310	8,600		24,500	5 U	
MW-102-S	1/16/2006	1,000 U	1,000 U	132,000	132,000	186,000		15	0.38 U	0.55 U	1,000 U	710		10,800	120	
MW-102-S	4/13/2006	800 U	800 U	142,000	142,000	172,000		28	0.38 U	0.55 U	1,000	580		15,400	90	
MW-102-S	7/10/2006	800 U	800 U	239,000	239,000	330,000		120	0.38 U	0.55 U	1,000 U	600		24,100	50	
MW-102-S	10/6/2006							11	10.0 U	10.0 U						
MW-102-S	1/17/2007	800 U	800 U	138,000	138,000			18	10.0 U	10.0 U	8 U	560		28,900	18 U	
MW-102-S	4/2/2007	800 U	800 U	72,000	72,000	141,000		2.5	10.0 U	10.0 U	4 U	130		17,600	200 U	
MW-102-S	7/9/2007							43	10.0 U	10.0 U						
MW-102-S	7/10/2007										3 U	1,100				
MW-102-S	7/13/2007	800 U	800 U	224,000	224,000	367,000								25,900	200 J	

Geomatrix

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-112-D	10/14/2002					134,000										
MW-112-I2	2/26/2001				408,000	239,000		8,010	10.0 U	10.0 U						
MW-112-I2	4/26/2001				375,000	239,000		9,200	10.0 U	10.0 U						
MW-112-I2	7/11/2001				344,000	179,000		10,500	10.0 U	10.0 U						
MW-112-I2	10/17/2001				330,000	225,000		10,300	10.0 U	10.0 U						
MW-112-I2	1/14/2002				332,000	202,000		13,300	10.0 U	10.0 U						
MW-112-I2	4/18/2002				286,000	211,000		5,550	10.0 U	10.0 U						
MW-112-I2	7/18/2002				309,000	240,000		5,510	10.0 U	10.0 U						
MW-112-I2	10/14/2002				354,000	226,000		21,700	10.0 U	10.0 U						
MW-114-I1	1/9/2003				483,000	604,000		3,900	10.0 U	10.0 U						
MW-114-I1	4/18/2003	5,000 U	5,000 U	572,000	572,000	383,000 J		2,210	10.0 U	10.0 U						
MW-114-I1	7/11/2003	5,000 U	5,000 U	445,000	445,000	269,000		1,280	10.0 U	10.0 U						
MW-114-I1	10/3/2003	5,000 U	5,000 U	532,000	532,000	233,000		3,020	10.0 U	10.0 U						
MW-114-I1	1/19/2004	5,000 U	5,000 U	600,000	600,000	536,000		777	10.0 U	10.0 U		140,000		6,240	20,000 U	
MW-114-I1	4/19/2004	5,000 U	5,000 U	507,000	507,000	379,000		1,920	10.0 U	10.0 U	122,160	120,000		7,250	20,000 U	
MW-114-I1	7/28/2004	5,000 U	5,000 U	490,000	490,000	339,000		1,680	10.0 U	10.0 U	127,900	130,000		15,900 D	20,000 U	
MW-114-I1	10/6/2004	5,000 U	5,000 U	513,000	513,000	495,000		1,480 D	10.0 U	10.0 U	124,000	130,000		10,300 D	20,000 U	
MW-114-I1	1/13/2005	5,000 U	5,000 U	560,000	560,000	505,000		3,050 D	10.0 U	10.0 U	116,700	120,000		1,420	20,000 U	
MW-114-I1	5/3/2005	1,000 U	1,000 U	566,000	566,000	313,000		1,000	0.35 U	0.55 U	130,000	130,000		600	300 U	
MW-114-I1	7/11/2005	1,000 U	1,000 U	508,000	508,000	278,000		1,000	0.35 U	0.55 U	118,000	120,000		8,500	300 U	
MW-114-I1	10/18/2005	1,000 U	1,000 U	582,000	582,000	336,000					120,000	120,000		3,200	5 U	
MW-114-I1	1/26/2006	1,000 U	1,000 U	556,000	556,000	857,000		2,400	0.38 U	0.55 U	121,000	120,000		1,100	5 U	
MW-114-I1	4/14/2006	800 U	800 U	32,000	32,000	48,000		2,400	0.38 U	0.55 U	122,000	120,000		60 U	9 U	
MW-114-I1	7/13/2006	800 U	800 U	536,000	536,000	788,000		870	0.38 U	0.55 U	110,000	110,000		2,800	9 U	
MW-114-I1	10/11/2006	800 U	800 U	570,000	570,000	862,000		1,400	0.2 J	0.12 J		110,000		3,300	20 J	
MW-114-I1	1/22/2007	800 U	800 U	520,000	520,000			1,800	0.25 J	0.10 J	100,000	100,000		300	33 J	
MW-114-I1	4/5/2007	800 U	800 U	483,000	483,000	828,000		1,700	0.10 U	0.10 U	96,700	100,000		7 U	200 U	
MW-114-I1	7/13/2007	800 U	800 U	540,000	540,000	1,290,000		810	0.10 U	0.10 U	107,000	110,000		5,700	400 J	
MW-117-I2	2/22/2001				189,000	88,700 J		1,940	10.0 U	10.0 U						
MW-117-I2	5/2/2001				196,000	93,800		1,560	10.0 U	10.0 U						
MW-117-I2	7/17/2001				189,000	122,000		3,280	10.0 U	10.0 U						
MW-117-I2	10/16/2001				202,000	97,700		1,830	10.0 U	10.0 U						
MW-117-I2	1/16/2002				201,000	102,000		1,470	10.0 U	10.0 U						

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-117-I2	4/18/2002				220,000	118,000		1,520	10.0 U	10.0 U						
MW-117-I2	7/17/2002				246,000	159,000		1,530	10.0 U	10.0 U						
MW-117-I2	10/16/2002				226,000	149,000		563	10.0 U	10.0 U						
MW-117-I2	1/14/2003				229,000	133,000		2,530	10.0 U	10.0 U						
MW-117-I2	4/21/2003	5,000 U	5,000 U	216,000	216,000	48,200		1570	10.0 U	10.0 U						
MW-117-I2	7/10/2003	5,000 U	5,000 U	240,000	240,000	170,000		62.7 J	10.0 U	10.0 U						
MW-117-I2	9/30/2003	5,000 U	5,000 U	238,000	238,000	155,000		1,050	10.0 U	10.0 U						
MW-117-I2	1/20/2004	5,000 U	5,000 U	529,000	529,000	204,000		341	10.0 U	10.0 U	42,410	45,000		400 U	20,000 U	
MW-117-I2	4/15/2004	5,000 U	5,000 U	303,000	303,000	144,000		1,110	10.0 U	10.0 U	52,210	54,000		400 U	20,000 U	
MW-117-I2	7/28/2004	5,000 U	5,000 U	276,000	276,000	157,000		513	10.0 U	10.0 U	46,100	49,000		1,220	20,000 U	
MW-117-I2	10/5/2004	5,000 U	5,000 U	243,000	243,000	108,000		296	10.0 U	10.0 U	34,800	37,000		2,660	20,000 U	
MW-117-I2	1/13/2005	5,000 U	5,000 U	247,000	247,000	158,000		327	10.0 U	10.0 U	38,200	42,000		1,410	20,000 U	
MW-117-I2	5/2/2005	1,000 U	1,000 U	238,000	238,000	76,000 J		130	0.35 U	0.55 U	41,100	44,000		800	300 U	
MW-117-I2	7/12/2005	1,000 U	1,000 U	201,000	201,000	74,000		55	0.35 U	0.55 U	32,300	35,000		900	300 U	
MW-117-I2	10/19/2005	1,000 U	1,000 U	199,000	199,000	110,000					26,700	30,000		700	5 U	
MW-117-I2	1/18/2006	1,000 U	1,000 U	222,000	222,000	302,000		280	0.38 U	0.55 U	33,300	37,000		60 U	5 U	
MW-117-I2	4/12/2006	800 U	800 U	336,000	336,000	476,000		980	0.38 U	0.55 U	54,900	58,000		60 U	9 U	
MW-117-I2	7/12/2006	800 U	800 U	340,000	340,000	524,000		1,200	0.38 U	0.55 U	57,000	60,000		9,900	9 U	
MW-117-I2	10/10/2006	800 U	800 U	135,000	135,000	215,000		280	10.0 U	10.0 U		21,000		700	9 U	
MW-117-I2	1/23/2007	800 U	800 U	176,000	176,000			460	10.0 U	10.0 U	27,000	30,000		70 J	20 J	
MW-117-I2	4/3/2007	800 U	800 U	210,000	210,000	318,000		1,200	0.38 J	0.18 J	28,800	32,000		7 U	200 U	
MW-117-I2	7/13/2007	800 U	800 U	98,000	98,000	182,000		270	0.26 J	0.13 J	15,000	18,000		900	200 U	
MW-118-I1	2/22/2001				284,000	140,000 J		21,400	10.0 U	10.0 U						
MW-118-I1	5/2/2001				269,000	134,000		21,700	10.0 U	10.0 U						
MW-118-I1	7/17/2001				267,000	135,000		28,900	10.0 U	10.0 U						
MW-118-I1	10/19/2001				265,000	94,200		22,900	10.0 U	10.0 U						
MW-118-I1	1/17/2002				258,000	119,000			10.0 U	10.0 U						
MW-118-I1	4/19/2002				262,000	143,000		24,400	10.0 U	10.0 U						
MW-118-I1	7/17/2002				269,000	128,000		24,000	10.0 U	10.0 U						
MW-118-I1	10/16/2002				279,000	113,000		25,400	10.0 U	10.0 U						
MW-118-I1	1/9/2003				257,000	142,000		22,000	10.0 U	10.0 U						
MW-118-I1	4/18/2003	5,000 U	5,000 U	267,000	267,000	77,400 J		28,100	10.0 U	10.0 U						
MW-118-I1	7/10/2003	5,000 U	5,000 U	276,000	276,000	166,000		18,900	10.0 U	10.0 U						

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-118-I1	9/30/2003	5,000 U	5,000 U	282,000	282,000	144,000		15,500	10.0 U	10.0 U						
MW-118-S	5/2/2001				354,000	132,000		10,100	10.0 U	10.0 U						
MW-118-S	7/12/2001				369,000	95,000		6,120	10.0 U	10.0 U						
MW-118-S	10/19/2001				388,000	71,600		6,250	10.0 U	10.0 U						
MW-118-S	1/17/2002				367,000	61,600			10.0 U	10.0 U						
MW-118-S	4/19/2002				372,000	144,000		6,950	10.0 U	10.0 U						
MW-118-S	7/17/2002				408,000	157,000		4,450	10.0 U	10.0 U						
MW-118-S	10/16/2002				423,000	151,000		10,500	10.0 U	10.0 U						
MW-120-I1	2/27/2001				251,000	104,000		1,250	10.0 U	10.0 U						
MW-120-I1	4/27/2001				236,000	154,000		743	10.0 U	10.0 U						
MW-120-I1	7/12/2001				232,000	130,000		1,030	10.0 U	10.0 U						
MW-120-I1	10/23/2001				234,000	102,000		975	10.0 U	10.0 U						
MW-120-I1	1/17/2002				251,000	66,000		1,380	10.0 U	10.0 U						
MW-120-I1	4/18/2002				244,000	166,000		1,460	10.0 U	10.0 U						
MW-120-I1	7/18/2002				262,000	208,000		1,300	10.0 U	10.0 U						
MW-120-I1	10/17/2002				256,000	128,000		1,880	10.0 U	10.0 U						
MW-120-I1	1/10/2003				266,000	192,000		1,210	10.0 U	10.0 U						
MW-120-I1	4/16/2003	5,000 U	5,000 U	248,000	248,000	187,000		1,600	10.0 U	10.0 U						
MW-120-I1	7/11/2003	5,000 U	5,000 U	250,000	250,000	80,100		1,380	10.0 U	10.0 U						
MW-120-I1	9/30/2003	5,000 U	5,000 U	252,000	252,000	184,000		3,090	10.0 U	10.0 U						
MW-120-I1	1/19/2004	5,000 U	5,000 U	295,000	295,000	230,000		729	10.0 U	10.0 U	49,700	53,000		13,100 D	20,000 U	
MW-120-I1	4/14/2004	5,000 U	5,000 U	287,000	287,000	171,000		2,780	10.0 U	10.0 U	46,820	48,000		9,610	20,000 U	
MW-120-I1	7/26/2004	5,000 U	5,000 U	258,000	258,000	186,000		3,810	10.0 U	10.0 U	48,800	51,000		7,480	20,000 U	
MW-120-I1	10/5/2004	5,000 U	5,000 U	277,000	277,000	140,000		1,990 D	10.0 U	10.0 U	50,700	52,000		10,200 D	20,000 U	
MW-120-I1	1/14/2005	5,000 U	5,000 U	269,000	269,000	197,000		1,940 D	10.0 U	10.0 U	42,760	45,000		11,300 D	20,000 U	
MW-120-I1	5/2/2005	1,000 U	1,000 U	276,000	276,000	141,000		620	0.35 U	0.55 U	56,400	59,000		16,700	300 U	
MW-120-I1	7/8/2005	1,000 U	1,000 U	273,000	273,000	101,000		670	0.35 U	0.55 U	53,500	56,000		12,100	300 U	
MW-120-I1	10/18/2005	1,000 U	1,000 U	272,000	272,000	150,000					49,500	52,000		5,200	5 U	
MW-120-I1	1/23/2006	1,000 U	1,000 U	292,000	292,000	330,000		870	0.38 U	0.55 U	47,000	50,000		8,600	5 U	
MW-120-I1	4/12/2006	800 U	800 U	326,000	326,000	454,000		1,200	0.38 U	0.55 U	58,900	62,000		8,900	12 J	
MW-120-I1	7/12/2006	800 U	800 U	338,000	338,000	543,000		1,100	0.38 U	0.55 U	58,900	62,000			9 U	
MW-120-I1	10/10/2006	800 U	800 U	306,000 J	306,000 J	472,000		1,600	0.39 J	0.65 J		55,000		3,600	11 J	
MW-120-I1	1/23/2007	800 U	800 U	334,000	334,000			920	0.29 J	0.36 J	99,700	57,000		7,000	41 J	

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-120-I1	4/6/2007	800 U	800 U	406,000	406,000	680,000		1,400	0.37 J	0.68 J	58,100	61,000		5,900	200 U	
MW-120-I1	7/11/2007	800 U	800 U	400,000	400,000	845,000		1,200	0.34 J	0.6 J	62,000	65,000		4,200	400 J	
MW-120-I2	2/27/2001				249,000	112,000		17,300	10.0 U	10.0 U						
MW-120-I2	5/2/2001				258,000	110,000		22,600	10.0 U	10.0 U						
MW-120-I2	7/12/2001				263,000	180,000		22,300	10.0 U	10.0 U						
MW-120-I2	10/23/2001				269,000	97,300		12,600	10.0 U	10.0 U						
MW-120-I2	1/17/2002				313,000	92,400		19,800	10.0 U	10.0 U						
MW-120-I2	4/18/2002				353,000	275,000		11,500	10.0 U	10.0 U						
MW-120-I2	7/18/2002				365,000	342,000		19,500	10.0 U	10.0 U						
MW-120-I2	10/17/2002				371,000	251,000		24,600	10.0 U	10.0 U						
MW-122-I2	2/27/2001				346,000	147,000		3,010	10.0 U	10.0 U						
MW-122-I2	10/17/2005											41,000				
MW-122-S	4/13/2004											150 U				
MW-123-I	1/16/2004	5,000 U	5,000 U	512,000	512,000	210,000		31,300	10.0 U	10.0 U	103,700	110,000		400 U	20,000 U	
MW-123-I	4/16/2004	5,000 U	5,000 U	499,000	499,000	491,000		22,000	10.0 U	10.0 U	100,700	100,000		400 U	20,000 U	
MW-123-I	7/27/2004	5,000 U	5,000 U	494,000	494,000	544,000		26,400	10.0 U	10.0 U	107,900	110,000		400 U	20,000 U	
MW-123-I	10/6/2004	5,000 U	5,000 U	517,000	517,000	464,000		22,200 D	10.0 U	10.0 U	102,000	100,000		400 U	20,000 U	
MW-123-I	1/12/2005	5,000 U	5,000 U	533,000	533,000	478,000		26,100 D	10.0 U	10.0 U	103,030	110,000		400 U	20,000 U	
MW-123-I	4/29/2005	1,000 U	1,000 U	510,000	510,000	371,000					104,000	110,000		180 U	300 U	
MW-123-I	7/8/2005	1,000 U	1,000 U	558,000	558,000	304,000		12,000	0.35 U	0.55 U	111,000	110,000		100 U	300 U	
MW-123-I	10/13/2005	1,000 U	1,000 U	536,000	536,000	389,000		11,000	0.91	0.55 U	110,000	110,000		100 U	5 U	
MW-123-I	1/16/2006	1,000 U	1,000 U	541,000	541,000	860,000		13,000	0.54	0.55 U	114,000	120,000		100 U	5 U	
MW-123-I	4/10/2006	800 U	800 U	550,000	550,000	671,000		11,000	0.38 U	0.55 U	111,000	110,000		60 U	9 U	
MW-123-I	7/10/2006	800 U	800 U	500,000 J	500,000 J	918,000		11,000	0.38 U	0.55 U	104,000	110,000		60 U	9 U	
MW-123-I	10/6/2006	800 U	800 U	542,000	542,000	908,000		12,000	0.36 J	0.11 J		110,000		50 J	9 U	
MW-123-I	1/18/2007	800 U	800 U	445,000 J	445,000 J			13,000	0.25 J	0.10 U	103,000	110,000		100 J	9 U	
MW-123-I	4/3/2007	800 U	800 U	583,000	583,000	1,070,000		12,000	0.35 J	0.10 U	98,700	110,000		7 U	200 U	
MW-123-I	7/9/2007	800 U	800 U	577,000	577,000	1,510,000		93,00	0.31 J	0.17 J	100,000	110,000		7 U	500 J	
MW-123-S	4/25/2001				1,110,000	391,000		9,670	10.0 U	10.0 U						
MW-123-S	1/10/2003				1,050,000	377,000		7,750	10.0 U	10.0 U						
MW-123-S	4/16/2003	5,000 U	5,000 U	974,000	974,000	320,000		1,470	10.0 U	10.0 U						
MW-123-S	1/16/2004	5,000 U	5,000 U	1,470,000	1,470,000	415,000		12,600	10.0 U	10.0 U	183,350	190,000		25,800 D	20,000 U	
MW-123-S	4/13/2004	5,000 U	5,000 U	1,440,000	1,440,000	613,000		8,060	10.0 U	10.0 U	153,280	160,000		132,000 D	20,000 U	

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-123-S	4/26/2005	1,000 U	1,000 U	1,330,000	1,330,000	424,000		1,600	0.35 U	0.55 U	156,000	160,000		120,000	300 U	
MW-123-S	1/16/2006	1,000 U	1,000 U	1,220,000	1,220,000	1,680,000		5,700	0.38 U	0.55 U	83,900	870,00		25,100	5 U	
MW-123-S	4/10/2006	800 U	800 U	1,300,000	1,300,000	1,650,000		4,300	0.38 U	0.55 U	143,000	150,000		4,000	9 U	
MW-123-S	1/18/2007	800 U	800 U	1,090,000 J	1,090,000 J			5,300	0.38 J	10.0 U	137,000	140,000		11,800	60	
MW-123-S	4/2/2007	800 U	800 U	1,090,000	1,090,000	1,550,000		4,400	0.39 J	0.17 J	118,700	120,000		2,000	200 U	
MW-124-I1	2/23/2001				492,000	92,400		1,140	10.0 U	10.0 U						
MW-124-I1	4/27/2001				534,000	88,900		681	10.0 U	10.0 U						
MW-124-I1	7/16/2001				548,000	19,400		1,220	10.0 U	10.0 U						
MW-124-I1	10/23/2001							112	10.0 U	10.0 U						
MW-124-I1	10/24/2001				388,000	48,900										
MW-124-I1	1/15/2002				547,000	50,200		73.6	10.0 U	10.0 U						
MW-124-I1	4/17/2002				614,000	12,2000		220	10.0 U	10.0 U						
MW-124-I1	7/16/2002				492,000	95,000		271	10.0 U	10.0 U						
MW-124-I1	10/15/2002				457,000	32,600		398	10.0 U	10.0 U						
MW-125-I1	2/27/2001				681,000	291,000		7,950	10.0 U	10.0 U						
MW-125-I1	4/25/2001				699,000	319,000		23,500	10.0 U	10.0 U						
MW-125-I1	7/10/2001				635,000	80,100		26,500	10.0 U	10.0 U						
MW-125-I1	10/15/2001				712,000	31,7000		24,300	10.0 U	10.0 U						
MW-125-I1	1/16/2002				631,000	194,000		20,600	10.0 U	10.0 U						
MW-125-I1	4/19/2002				626,000	290,000		14,800	10.0 U	10.0 U						
MW-125-I1	7/15/2002				613,000	238,000		3,820	10.0 U	10.0 U						
MW-125-I1	10/14/2002				657,000	334,000		22,100	10.0 U	10.0 U						
MW-126-I	1/9/2003				355,000	384,000		16,200	10.0 U	10.0 U						
MW-126-I	4/16/2003	5,000 U	5,000 U	312,000	312,000	225,000		19,300	10.0 U	10.0 U						
MW-126-I	7/8/2003	5,000 U	5,000 U	366,000	366,000	230,000		10,000	10.0 U	10.0 U						
MW-126-I	10/3/2003	5,000 U	5,000 U	329,000	329,000	263,000		10,000	10.0 U	10.0 U						
MW-126-I	1/15/2004	5,000 U	5,000 U	332,000	332,000	254,000		27,600	10.0 U	10.0 U	97,050	99,000		400 U	20,000 U	
MW-126-I	4/16/2004	5,000 U	5,000 U	301,000	301,000	310,000		19,000	10.0 U	10.0 U	84,680	87,000		400 U	20,000 U	
MW-126-I	7/27/2004	5,000 U	5,000 U	301,000	301,000	341,000		18,900	10.0 U	10.0 U	95,000	97,000		400 U	20,000 U	
MW-126-I	10/4/2004	5,000 U	5,000 U	314,000	314,000	198,000		18,800 D	10.0 U	10.0 U	82,000	85,000		400 U	20,000 U	
MW-126-I	1/11/2005	5,000 U	5,000 U	304,000	304,000	302,000		31,700 D	10.0 U	10.0 U	87,580	91,000		400 U	20,000 U	
MW-126-I	4/29/2005	1,000 U	1,000 U	342,000	342,000	229,000					86,800	90,000		180 U	300 U	
MW-126-I	7/11/2005	1,000 U	1,000 U	316,000	316,000	51,000		11,000	0.67	0.55 U	93,100	96,000		100 U	300 U	

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
MW-126-I	10/17/2005	1,000 U	1,000 U	306,000	306,000	193,000		12,000	0.87	0.55 U	86,600	90,000		100 U	5 U	
MW-126-I	1/23/2006	1,000 U	1,000 U	346,000	346,000	539,000		13,000	1.2	0.55 U		89,000		60 U	5 U	
MW-126-I	4/10/2006	800 U	800 U	346,000	346,000	499,000		9,800	0.73	0.55 U	91,300	95,000		60 U	9 U	
MW-126-I	7/10/2006	800 U	800 U	338,000	338,000	543,000		8,700	0.38 U	0.55 U	89,600	93,000		60 U	9 U	
MW-126-I	10/6/2006	800 U	800 U	299,000	299,000	524,000		11,000	0.31 J	0.1 J		84,000		60 U	9 U	
MW-126-I	1/18/2007	800 U	800 U	257,000 J	257,000 J			13,000	0.52	0.10 U	85,000	88,000		60 J	9 U	
MW-126-I	4/5/2007	800 U	800 U	324,000	324,000	610,000		11,000	0.85	0.26 J	83,500	87,000		7 U	200 U	
MW-126-I	7/11/2007	800 U	800 U	320,000	320,000	735,000		9,300	1.8	0.65 J	82,000	86,000		7 U	200 J	
MW-126-S	4/13/2004											6,700				
MW-126-S	1/23/2006										39,900					
MW-127-S	4/13/2004											79,000				
MW-129-I	7/13/2007	800 U	800 U	124,000	124,000	346,000		58	0.10 U	0.10 U	46,000	49,000		12,400	600 J	
MW-131-I	1/13/2003				351,000	123,000		2,690	10.0 U	10.0 U						
MW-131-I	4/17/2003	5,000 U	5,000 U	334,000	334,000	51,200		1,800	10.0 U	10.0 U						
MW-131-I	7/11/2003	5,000 U	5,000 U	319,000	319,000	41,700		1,140	10.0 U	10.0 U						
MW-131-I	10/3/2003	5,000 U	5,000 U	339,000	339,000	124,000		3,770	10.0 U	10.0 U						
MW-131-I	1/16/2004	5,000 U	5,000 U	325,000	325,000	98,400		4,330	10.0 U	10.0 U	32,900	36,000		328,00 D	20,000 U	
MW-131-I	4/16/2004	5,000 U	5,000 U	312,000	312,000	162,000		1,990	10.0 U	10.0 U	37,590	40,000		37,100 D	20,000 U	
MW-131-I	7/29/2004	5,000 U	5,000 U	304,000	304,000	177,000		1,160	10.0 U	10.0 U	36,500	39,000		38,000 D	20,000 U	
MW-131-I	10/7/2004	5,000 U	5,000 U	313,000	313,000	186,000		1,460 D	10.0 U	10.0 U	34,900	36,000		35,800 D	20,000 U	
MW-131-I	1/14/2005	5,000 U	5,000 U	325,000	325,000	204,000		3,180 D	10.0 U	10.0 U	36,160	39,000		33,900 D	20,000 U	
MW-131-I	5/3/2005	1,000 U	1,000 U	344,000	344,000	114,000		690	0.35 U	0.55 U	41,000	44,000		34,700	300 U	
MW-131-I	7/12/2005	1,000 U	1,000 U	340,000	340,000	130,000		380	0.35 U	0.55 U	46,800	50,000		39,000	300 U	
MW-131-I	10/19/2005	1,000 U	1,000 U	326,000	326,000	171,000					43,600	47,000		31,000	5 U	
MW-131-I	1/25/2006	1,000 U	1,000 U	362,000	362,000	522,000		2,700	0.73	0.55 U	46,400	50,000		19,400	5 U	
MW-131-I	4/13/2006	800 U	800 U	370,000	370,000	525,000		2,800	0.52	0.55 U	49,100	52,000		10,600	60	
MW-131-I	7/13/2006	800 U	800 U	440,000	440,000	659,000		1,100	0.38 U	0.55 U	54,300	58,000		13,300	60	
MW-131-I	10/11/2006	800 U	800 U	426,000	426,000	513,000		1,200	0.12 J	0.12 J				8,300	43 J	
MW-131-I	1/19/2007	800 U	800 U	388,000 J	388,000 J			1,700	0.21 J	0.10 U	49,000	52,000		4,200	60	
MW-131-I	4/6/2007	800 U	800 U	446,000	446,000	724,000		2,500	0.41 J	0.11 J	48,500	52,000		2,000	200 U	
MW-131-I	7/12/2007	800 U	800 U	473,000	473,000	859,000		960	0.11 J	0.12 J	52,000	56,000		1,500	200 J	
T-3	2/27/1990											95,500				
T-4	2/27/1990											53,100				

TABLE 6-7

SUMMARY OF GEOCHEMICAL PARAMETERS[1]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L) = parts per billion (ppb)

Site ID	Sample Date	Carbonate Alkalinity (as $CaCO_3$)	Hydroxide Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Carbon Dioxide	Dissolved Organic Carbon	Methane	Ethane	Ethene	Ferric Iron	Total Iron	Nitrate (as N)	Sulfate	Sulfide	Total Suspended Solids
W-4	3/14/1990											2,070				
W-4	4/9/1991											3,400				
W-5	3/14/1990											7,000				
W-5	4/8/1991											2,500				

Notes:

1. Data flags are as follows:
   U = Compound was analyzed for, but not detected at practical quantitation limit indicated, or restatement as undetected.
   D = Compound identified in an analysis at a secondary dilution factor.
   B = Analyte was found in associated blank as well as in sample.
   J = Value is estimated (EPA, 1989a).
   UJ = Restatement as undetected at practical quantitation limit indicated. Quantitation limit is estimated.
   DB = Analyte was found in associated blank as well as in sample and also identified in an analysis at a secondary dilution factor.
   JB = Analyte was found in associated blank as well as in sample and is estimated.

TABLE 6-8

SUMMARY OF RESULTS OF SOIL LEACHATE ANALYSIS

PSC Kent Facility
Kent, Washington

All concentrations in milligrams per liter (mg/L) = parts per million (ppm)

Site ID	Sample Date	Sample Depth (feet bgs)[1]	Method[2]	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Selenium	Silver	Zinc
CB2	5/24/2002	0	TCLP	<0.0500[3]	0.356	<0.0500	<0.0500	---[4]	---	<0.0500	<0.00100	---	<0.0500	<0.0500	---
D1	5/31/2002	2.6	TCLP	<0.0500	0.302	<0.0500	<0.0500	---	---	<0.0500	<0.00100	---	<0.0500	---	---
E5	5/22/2002	3.5	TCLP	<0.0500	0.284	<0.0500	<0.0500	---	---	<0.0500	<0.00100	---	<0.0500	<0.0500	---
MW-7S	6/19/1989	4	EPTox	<0.1	<0.01	<0.01	<0.01	<0.01	---	<0.05	<0.001	0.021	<0.1	<0.01	0.034
MW-8	6/16/1989	6.5	EPTox	<0.1	0.045	<0.01	<0.01	0.016	---	<0.05	<0.001	<0.02	<0.1	<0.01	0.034
MW-10	6/15/1989	4.5	EPTox	<0.1	0.052	<0.01	<0.01	<0.01	---	<0.05	<0.001	<0.02	<0.1	<0.01	0.010
MW-12	6/26/1989	7	EPTox	<0.1	0.24	<0.01	<0.01	<0.01	---	<0.05	<0.001	0.021	<0.1	<0.01	0.055
MW-13	2/26/1990	6	EPTox	<0.1	0.03	<0.01	<0.01	0.02	5.02	<0.05	<0.001	<0.02	---	<0.01	<0.01
MW-14	2/23/1990	6.5	EPTox	<0.1	0.03	<0.01	<0.01	<0.01	0.80	<0.05	<0.001	<0.02	---	<0.01	<0.01
MW-15	2/22/1990	5	EPTox	<0.1	0.03	<0.01	<0.01	<0.01	1.22	<0.05	<0.001	<0.02	---	<0.01	<0.01
S-1	6/27/1989	5.5	EPTox	<0.1	0.037	<0.01	<0.01	<0.01	---	<0.05	<0.001	<0.02	<0.1	<0.01	0.030
S-2	6/27/1989	1	EPTox	<0.1	0.077	<0.01	<0.01	<0.01	---	<0.05	<0.001	<0.02	<0.1	<0.01	0.039
S-4	6/27/1989	1	EPTox	<0.1	0.021	<0.01	<0.01	<0.01	---	<0.05	<0.001	<0.02	<0.1	<0.01	0.020
T-1	6/21/1989	5.5	EPTox	<0.1	0.049	<0.01	<0.01	<0.01	---	<0.05	<0.001	<0.02	<0.1	<0.01	0.043
T-2	6/21/1989	5.5	EPTox	<0.1	0.041	<0.01	<0.01	<0.01	---	<0.05	<0.001	0.021	<0.1	<0.01	0.017

Notes:

1. bgs = below ground surface.
2. TCLP = Toxicity characteristic leachate procedure;
   EPTox = extraction procedure toxicity test.
3. < indicates analyte not detected at practical quantitation limit indicated.
4. -- = Not analyzed.

TABLE 6-9

ARSENIC CONCENTRATIONS IN UPGRADIENT AND DOWNGRADIENT WELLS[1, 2]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L)

Date	Hydrogeologic Unit and Well Identifier[3]										
	SWBU (Up)	SWBU (Down)	SWBU (Down)[4]	IZA (Up)	IZA (Up)[4]	IZA (Up)[4]	IZA (Down)	IZB (Up)	IZB (Down)	Deep (Up)	Deep (Down)
	MW-117-S	MW-126-S	MW-127-S	MW-117-I2	MW-131-I	MW-114-I1	MW-122-I2	MW-128-I	MW-130-I	MW-112-D	MW-16
14-Mar-90											3.2 B
29-Nov-90											1.4 J
08-Apr-91											5 U[5]
19-Jul-00											1.2
04-Oct-00											1
26-Feb-01				6.4		9.2	4.6			3.5	0.5
26-Apr-01				6.4		8.1	2.8			2.2	1.8
11-Jul-01				6.5		8.9	2.4			1.9	1.4
17-Oct-01				6.6		9.1	4.2			1.6	1.2
14-Jan-02				4.5		7.7	1.8			1.3	0.5 U
18-Apr-02				5		8.2	2.1			1.2	0.5 U
18-Jul-02				4.6		9.2	1.9			1.2	0.5 U
14-Oct-02				5		9	2			1	0.4
13-Jan-03			33	3.9	8.9	8.1	1.7	9.6	8.4	1.2	0.56
15-Apr-03	2.3	1.2	28.2	3.9	6.9	7	1.4	7.8	7.6	1.4	1
10-Jul-03				5.2	9	8.4	1.9	9.2	8.1	1.4	0.47
30-Sep-03				6.2	10.4	9.1	1.9	8.2	8.8	1.2	0.25
15-Jan-04	1	1.3	25.4	6.9	6.8	7.4	2.3	7.8	8.9	1.2	0.37
16-Apr-04	1.6	5.3	37.6	7.9	6.3	8.4	1.7	8.1	8.3	1.1	0.43
27-Jul-04				6.7	8.4	9.6	1.8	8.2	8	1.1	0.4
05-Oct-04				7.2	7.3	10.5	2	8.3	8.2	1.3	0.37
14-Jan-05		5.6	41.4	7.7	7.7	9.1	2	8.8	9	1.2	0.38
03-May-05	7.5	5.6	41.7	7.3	7.9	10.1	2.9	9.4	9.6	1.2	1.5
07-Jul-05			44.8	6.9	8	12	2.8	9.3	9.7	1.6	1.5

TABLE 6-9

ARSENIC CONCENTRATIONS IN UPGRADIENT AND DOWNGRADIENT WELLS[1, 2]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L)

Date	SWBU (Up) MW-117-S	SWBU (Down) MW-126-S	SWBU (Down)[4] MW-127-S	IZA (Up) MW-117-I2	IZA (Up)[4] MW-131-I	IZA (Up)[4] MW-114-I1	IZA (Down) MW-122-I2	IZB (Up) MW-128-I	IZB (Down) MW-130-I	Deep (Up) MW-112-D	Deep (Down) MW-16
	Hydrogeologic Unit and Well Identifier[3]										
18-Oct-05				6.1	8.9	11.9	2.6	9.2	8.5	0.63	0.75
18-Jan-06		2	25.7	8.7	6.5	9.4	2.4	8.6	8.1	0.21 U	0.17 U
13-Apr-06	2.7	2.4	29.8	11.7	6.8	11	2.1	8.1	8.8	1.5	1
13-Jul-06			33.5	12.7	6.4	9.2	1.6	8	7.8	1.2	0.8
06-Oct-06				11.6	9	10.6	2.6	8.5	8.7	1.8	1.4
18-Jan-07	2.2	1.8	17.8	15.7	7.4	10.5	2.9	9.9	8.7	1.5	1.7
03-Apr-07	4.6	5.1	21.5	20.1	7.1	9.6	2.2	9	8.9	1.4	1.1
09-Jul-07			29.5	17.9	7.8	11.1	2.5	9.4	9	1.6	1.4
Mean	3.1	3.4	31.5	8.1	7.8	9.3	2.3	8.7	8.6	1.4	0.8
SD	2.2	2.0	8.2	4.2	1.1	1.3	0.7	0.7	0.6	0.6	0.5

Notes:

1. U = Arsenic not detected at reporting limit indicated. One-half the reporting limit was used for calculations.
2. Data flags are as follows:
   B = Laboratory blank contamination;
   J = Estimated value.
3. SWBU = Shallow Water-Bearing Unit; IZA = Intermediate Aquifer Zone A; IZB = Interimediate Aquifer Zone B; Deep = Deep Aquifer;
   Up = upgradient well; down = downgradient well.
4. Alternative down or upgradient wells (seasonal).
5. Result not used in mean calculation.

TABLE 6-10

SUMMARY OF SURFACE WATER ANALYTICAL RESULTS[1, 2]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L)

Compound	Minimum Detected Concentration	Maximum Detected Concentration	Minimum Surface Water Protection Screening Level
Volatile Organic Compounds			
2-Butanone (MEK)	8.1	290	--[3]
Acetone	9.4 J	900	--
Benzene	0.136	0.136	1.2
Carbon disulfide	2.2	2.2	--
m,p-Xylenes	0.286	0.286	--
methylene chloride	0.8 J	1.4	4.6
Toluene	1.63	30	1,300
Semivolatile Organic Compounds (SVOCs)			
2,4-Dimethylphenol	29 M	29 M	380
4-Methylphenol (p-cresol)	26	1,400	--
Benzo(b)fluoranthene & benzo(k)fluoranthene	**1.3**	**1.3**	0.02
benzoic acid	2.6 J	370	64,000
benzyl alcohol	92	92	--
Bis(2-ethylhexyl) phthalate	**1.4**	**8**	1.2
Di-n-octyl phthalate	1	1	2,000
Fluoranthene	1 J	1.6	90.2
Phenol	1 M	230	21,000
Pesticides and Polychlorinated Biphenyls (PCBs)			
Aroclor 1260	**0.4 J**	**1.8**	0.02
Atrazine	0.2	0.2	--
Chlorpyrifos (dursban)	**0.2**	**0.2**	0.041
Ethoprop (mocap)	0.1	0.1	--
malathion (cythion)	**0.4**	**0.4**	0.1
Dissolved Inorganic Constituents			
Arsenic	**2.2 J**	**23**	0.5
Barium	18	260	1,000
Chromium	**34**	**52.5**	11
Copper	7.5	7.5	3.5
Iron	**2,070**	**7,000**	300
Nickel	24	33	49
Zinc	20	**480**	32
Total Inorganic Constituents			
Aluminum	**1,300**	**6,060**	87
Arsenic	**4.6 J**	**22**	0.5
Barium	27.4	160	1,000
Boron	70	72	--
Cadmium	**0.278 J**	**0.278 J**	0.25
Calcium	29,300	31,100	--
Chromium	3.8	**38**	11
Cobalt	4	4	--

TABLE 6-10

SUMMARY OF SURFACE WATER ANALYTICAL RESULTS[1, 2]

PSC Kent Facility
Kent, Washington

concentrations in micrograms per liter (µg/L)

Compound	Minimum Detected Concentration	Maximum Detected Concentration	Minimum Surface Water Protection Screening Level
Total Inorganic Constituents (Continued)			
Copper	**9.48**	**28**	3.5
Iron	**3,400**	**10,700**	300
Lead	**1.81**	**8.3**	0.54
Magnesium	3,520	5,010	--
Manganese	**640**	**818**	50
Mercury	**0.2**	**0.2**	0.012
Molybdenum	5	5	--
Nickel	5.1	35	49
Potassium	15,200	16,100	--
Selenium	0.904	0.904	5
Silica	14,700	21,600	--
Silver	0.095	0.095	0.32
Sodium	27,300	30,300	--
Vanadium	12	29	--
Zinc	**103**	**540**	32

Notes:
1. Data qualifiers are as follows:
   B = Laboratory blank contamination;
   J = Estimated value;
   M = Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.
2. Values in **bold** exceed surface water screening level.
3. -- = Surface water screening level not established.

TABLE 6-11

SUMMARY OF SURFACE WATER QUALITY

PSC Kent Facility
Kent, Washington

Sample Location	Sample Date	Sample Time	Parameter	Results	Units[1]
W-1	6/28/1989	10:50	Conductance	1184	µS/cm
W-1	6/28/1989	10:50	pH	4.11	pH units
W-1	6/28/1989	10:50	Temperature	14	C
W-4	3/14/1990	15:50	Conductance	229	µS/cm
W-4	3/14/1990	15:50	pH	5.7	pH units
W-4	3/14/1990	15:50	Temperature	12	C
W-4	4/9/1991	12:15	Conductivity	489	not available
W-4	4/9/1991	12:15	pH	6.64	pH units
W-4	4/9/1991	12:15	Temperature	14	C
W-5	3/14/1990	10:50	Conductance	405	µS/cm
W-5	3/14/1990	10:50	pH	5.48	pH units
W-5	3/14/1990	10:50	Temperature	8	C
W-5	4/8/1991	16:00	Conductivity	557	not available
W-5	4/8/1991	16:00	pH	6.69	pH units
W-5	4/8/1991	16:00	Temperature	10	C

Notes:
1. µS/cm = Microsiemans per centimeter.

TABLE 7-1

COPCs IN SOIL AND GROUNDWATER[1]

PSC Kent Facility
Kent, Washington

Constituent	Soil	Shallow Aquifer	Intermediate Aquifer	Deep Aquifer
Volatile Organic Compounds (VOCs)				
1,1-Dichloroethene	O		**X**	
Benzene	**X**	**X**	O	O
Methylene chloride	**X**	O	O	
methyl tert-butyl ether		**X**	O	O
p-Isopropyltoluene (p-cymene)	X	O		
sec-Butylbenzene	X			
Trichloroethene			**X**	
Vinyl chloride		**X**	**X**	**X**
Seivolatile Organic Compounds (SVOCs)				
1,4-Dichlorobenzene	X			
2-Methylnaphthalene	X	O	O	
Benzo(a)anthracene	X			
Benzo(a)pyrene	X			
Benzo(b)fluoranthene	X			
Benzo(k)fluoranthene	X			
Bis(2-ethylhexyl) phthalate	O	**X**		
Carbazole	**X**			
Chrysene	X	**X**		O
Naphthalene	X			
Phenanthrene	O	O	O	O
Pesticides				
4,4'-DDD	**X**		**X**	
4,4'-DDE	**X**			
4,4'-DDT	**X**			
alpha-Chlordane	**X**		O	
Coumaphos	**X**			
delta-BHC	**X**			
Dieldrin	**X**			
Endosulfan sulfate	**X**			
gamma-BHC (Lindane)	**X**		O	
gamma-Chlordane	**X**		O	
Heptachlor epoxide	**X**			
Mevinphos (Phosdrin)	**X**			
Inorganic Constituents				
Antimony	**X**			
Arsenic	**X**	**X**	**X**	**X**
Cadmium	**X**			
Copper	**X**			
Cyanide	**X**	**X**	**X**	**X**
Iron	O	**X**	**X**	**X**
Manganese	O	**X**	**X**	**X**
Mercury	**X**			

TABLE 7-1

COPCs IN SOIL AND GROUNDWATER[1]

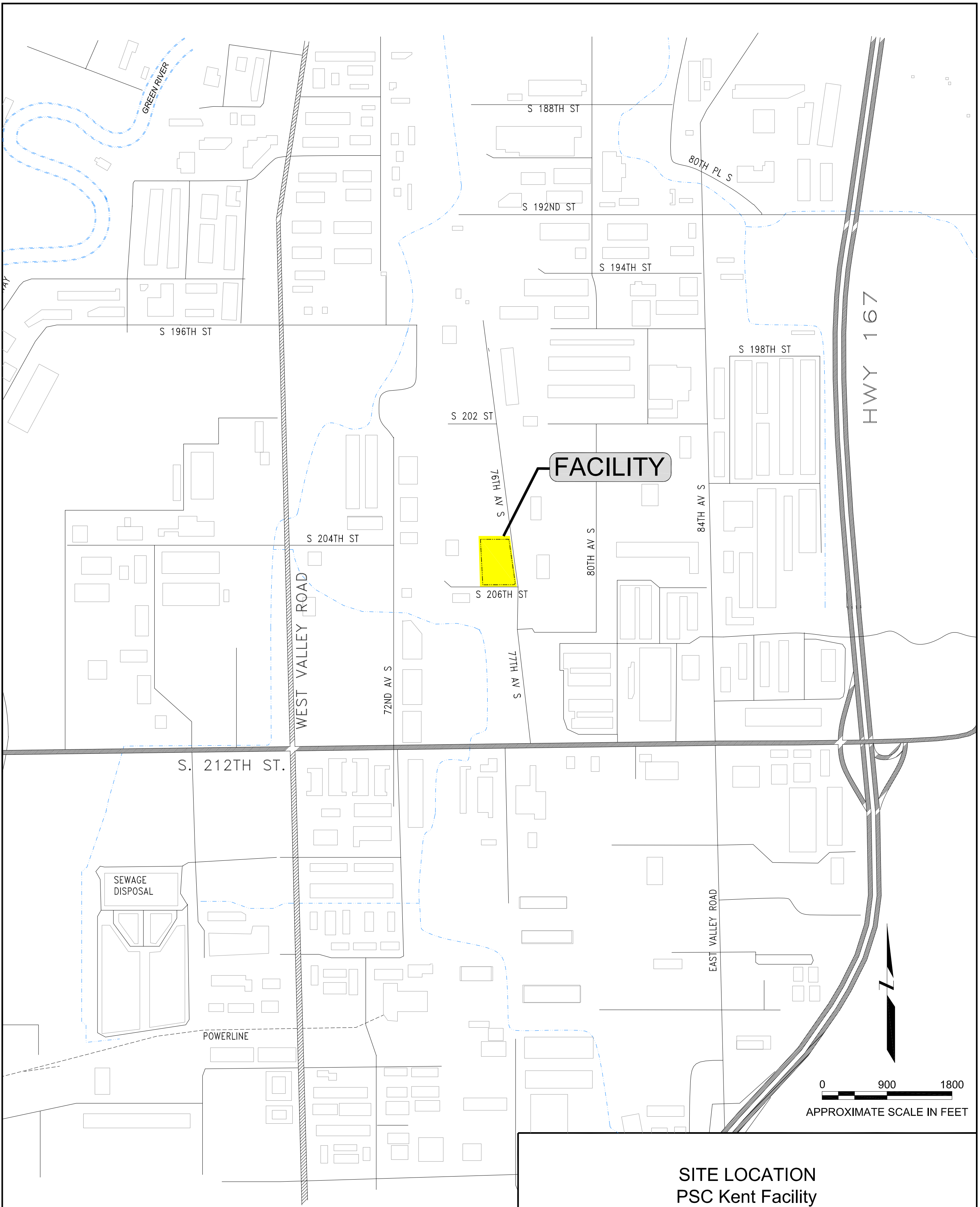
PSC Kent Facility
Kent, Washington

Constituent	Soil	Shallow Aquifer	Intermediate Aquifer	Deep Aquifer
Inorganic Constituents (Continued)				
Selenium	**X**			
Silver	X			
Thallium	**X**			
Zinc	X			
Total Petroleum Hydrocarbons (TPH)				
Diesel	**X**			
Gasoline	**X**	O	O	
Lube oil	**X**			

Notes:

1. Only those constituents detected above the screening level in soil (ever) or groundwater (4Q06 to 3Q07) are shown in this table.
X = Constituent detected above screening level (all results through July 2007 for soil; results from 4Q06 to 3Q07 for groundwater).
X = Constituent detected at concentration exceeding screening level in more than 5% of samples analyzed.
O = Consituent detected below screening level (all results through July 2007 for soil; results from 4Q06 to 3Q07 for groundwater).

FIGURES



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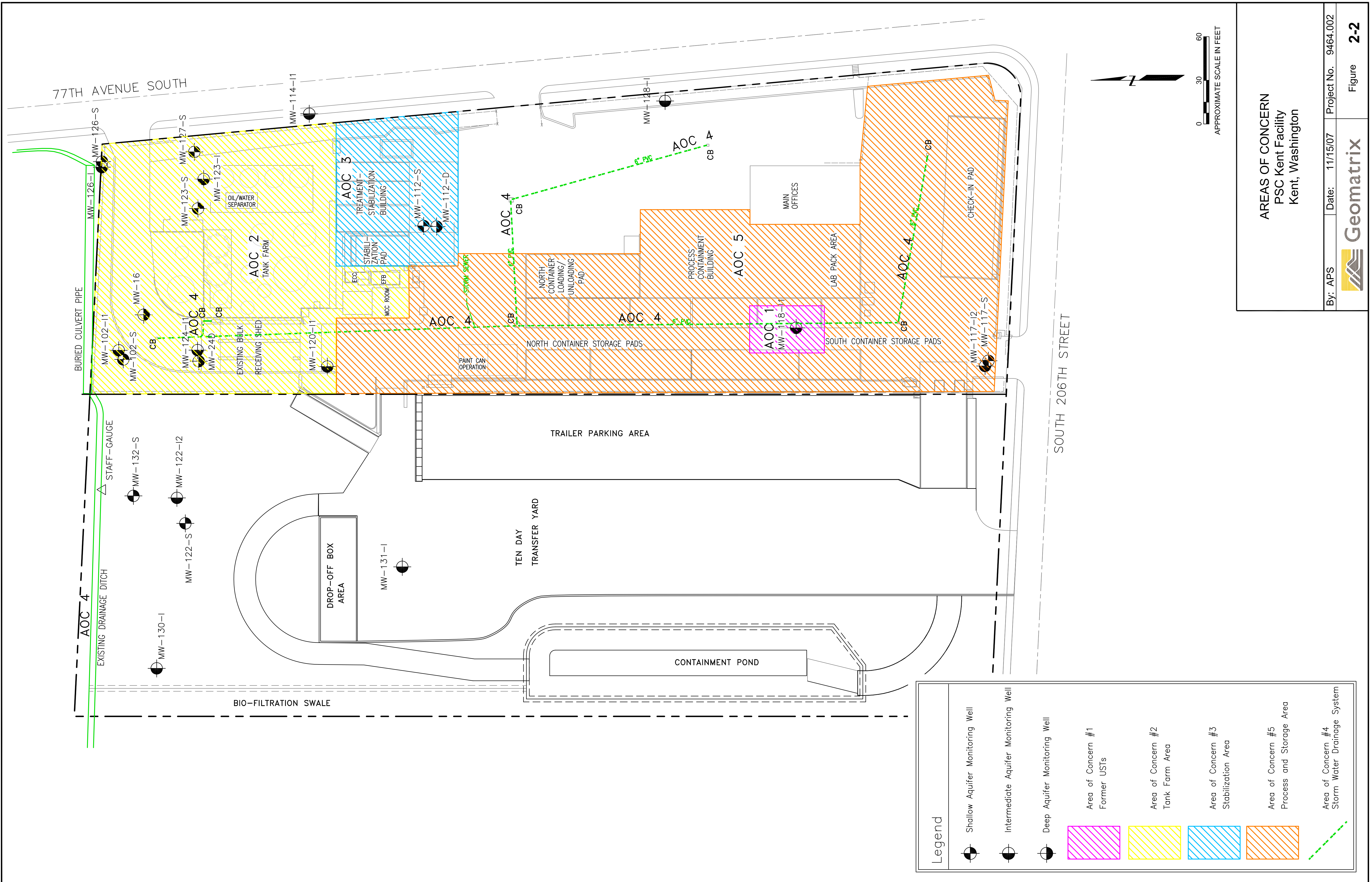
SITE LOCATION
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/11/07	Project No. 9464.002
Geomatrix		Figure **2-1**



AREAS OF CONCERN
PSC Kent Facility
Kent, Washington

By: APS
Date: 11/15/07
Project No. 9464.002
Geomatrix
Figure 2-2

Plot Date: 11/15/07 - 9:22am, Plotted by: astenberg
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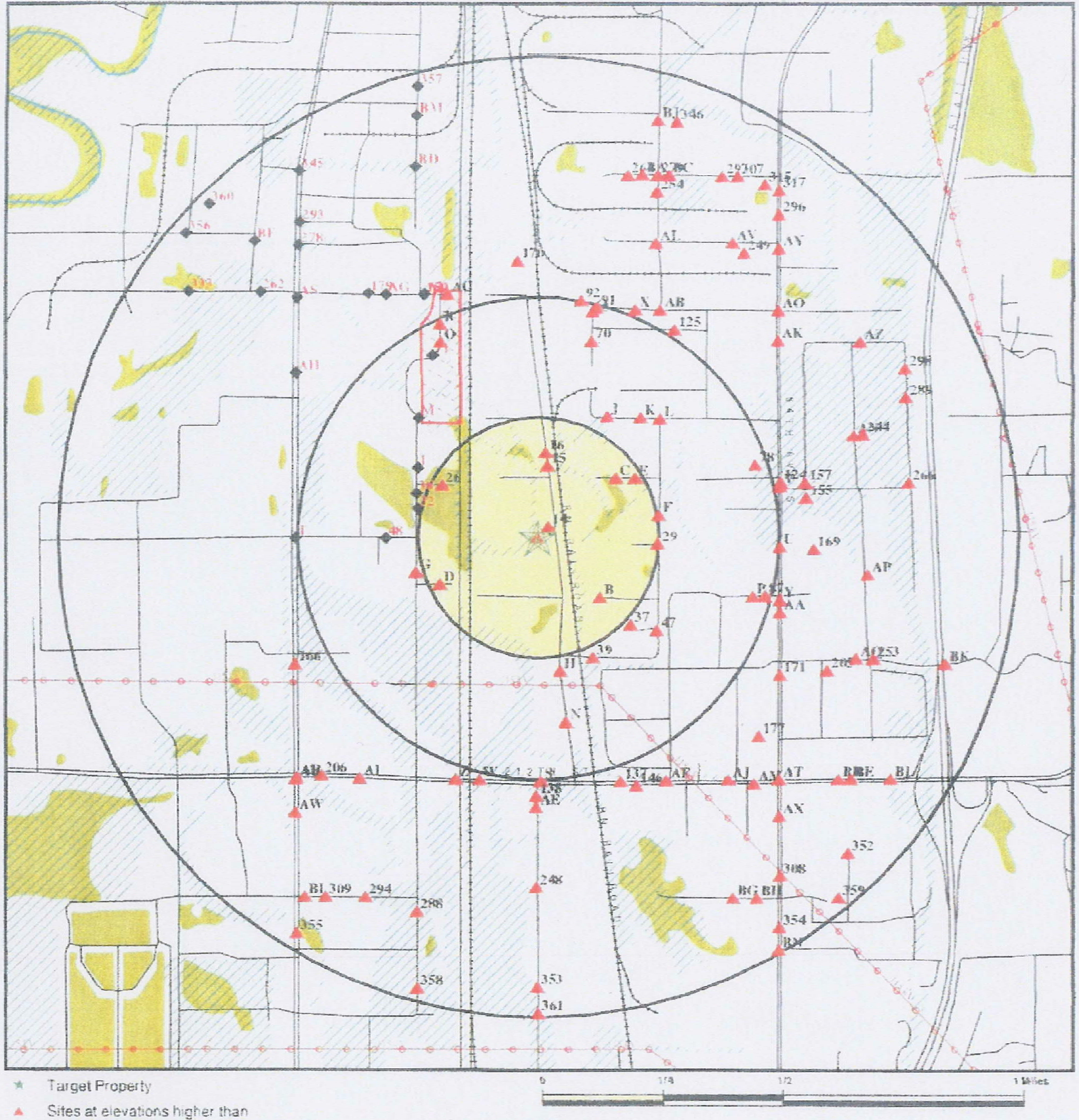
OVERVIEW MAP - 1018414.3s - Philip Services Corporation



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Coal Gasification Sites
- ☐ National Priority List Sites
- ☐ Landfill Sites
- ☐ Dept. Defense Sites
- Power transmission lines
- Oil & Gas pipelines
- ▨ 100-year flood zone
- ▨ 500-year flood zone
- ▨ Federal Wetlands

Source: EDR-2003

CURRENT AND FORMER CHEMICAL HANDLERS WITHIN ONE MILE OF PSC KENT FACILITY
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 2-3

Plot Date: 11/15/07 - 9:26am, Plotted by: astenberg
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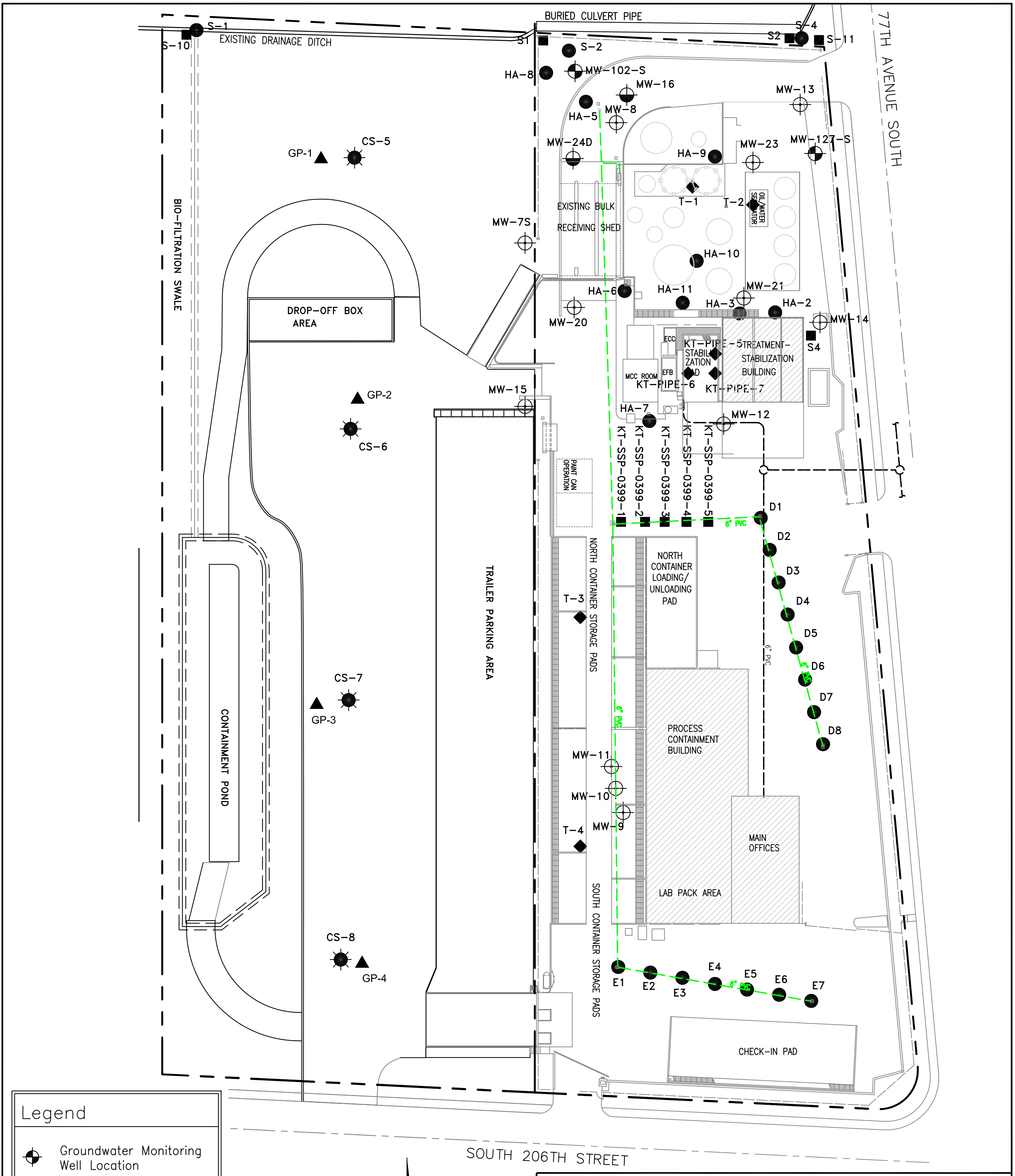

Legend

⌖ Groundwater Monitoring Well Location

⌖ Abandoned Groundwater Monitoring Well Location

✹ Composite Soil Sample Location

■ Soil Sample Location

● Soil Sample Location

◆ Soil Sample Location

0 40 80

APPROXIMATE SCALE IN FEET

SOIL SAMPLE LOCATIONS
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/11/07	Project No. 9464.002
Geomatrix		Figure 3-1

Plot Date: 12/11/07 - 2:05pm, Plotted by: astenberg
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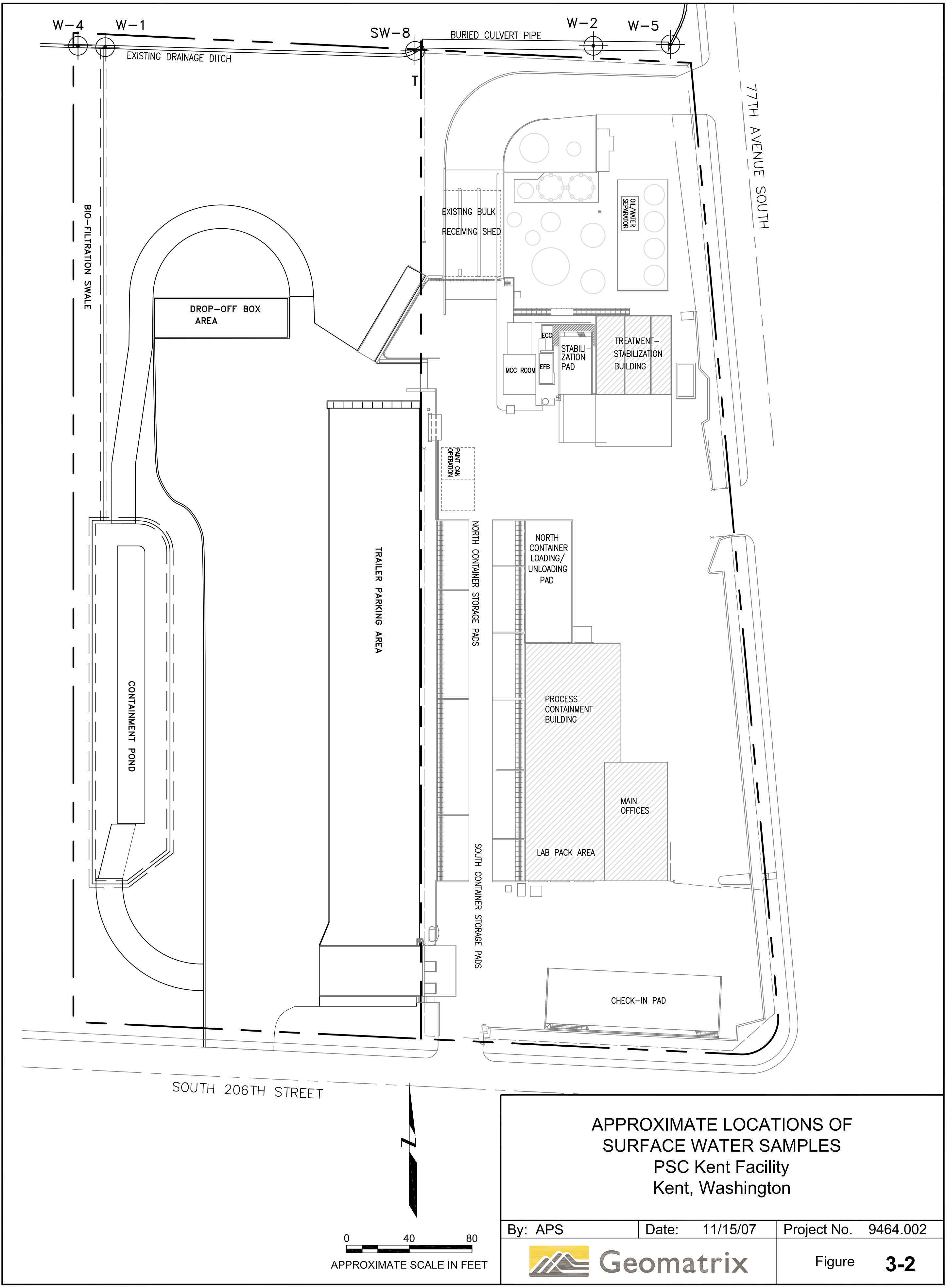

APPROXIMATE LOCATIONS OF SURFACE WATER SAMPLES
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **3-2**

Plot Date: 11/15/07 - 9:27am, Plotted by: astenberg
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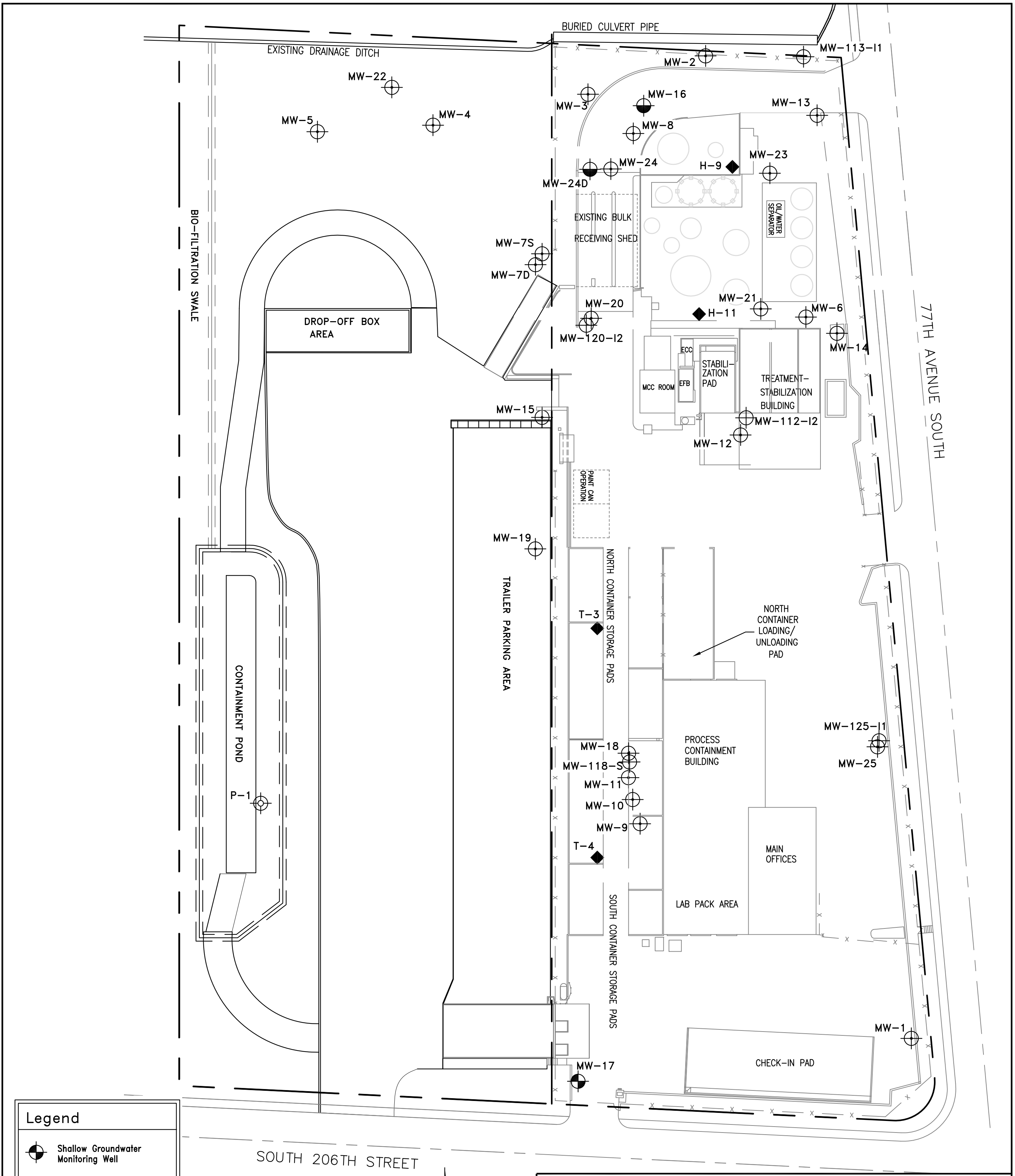

Legend

- Shallow Groundwater Monitoring Well
- ⊕ Abandoned Well (2002)
- ⊕ Abandoned Piezometer
- ◆ Test Boring
- ■ Surface Water Sample Location
- △ Staff Gauge

N

0 40 80

APPROXIMATE SCALE IN FEET

FORMER GROUNDWATER SAMPLING LOCATIONS
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 3-3

Plot Date: 11/15/07 - 9:28am, Plotted by: astenberg
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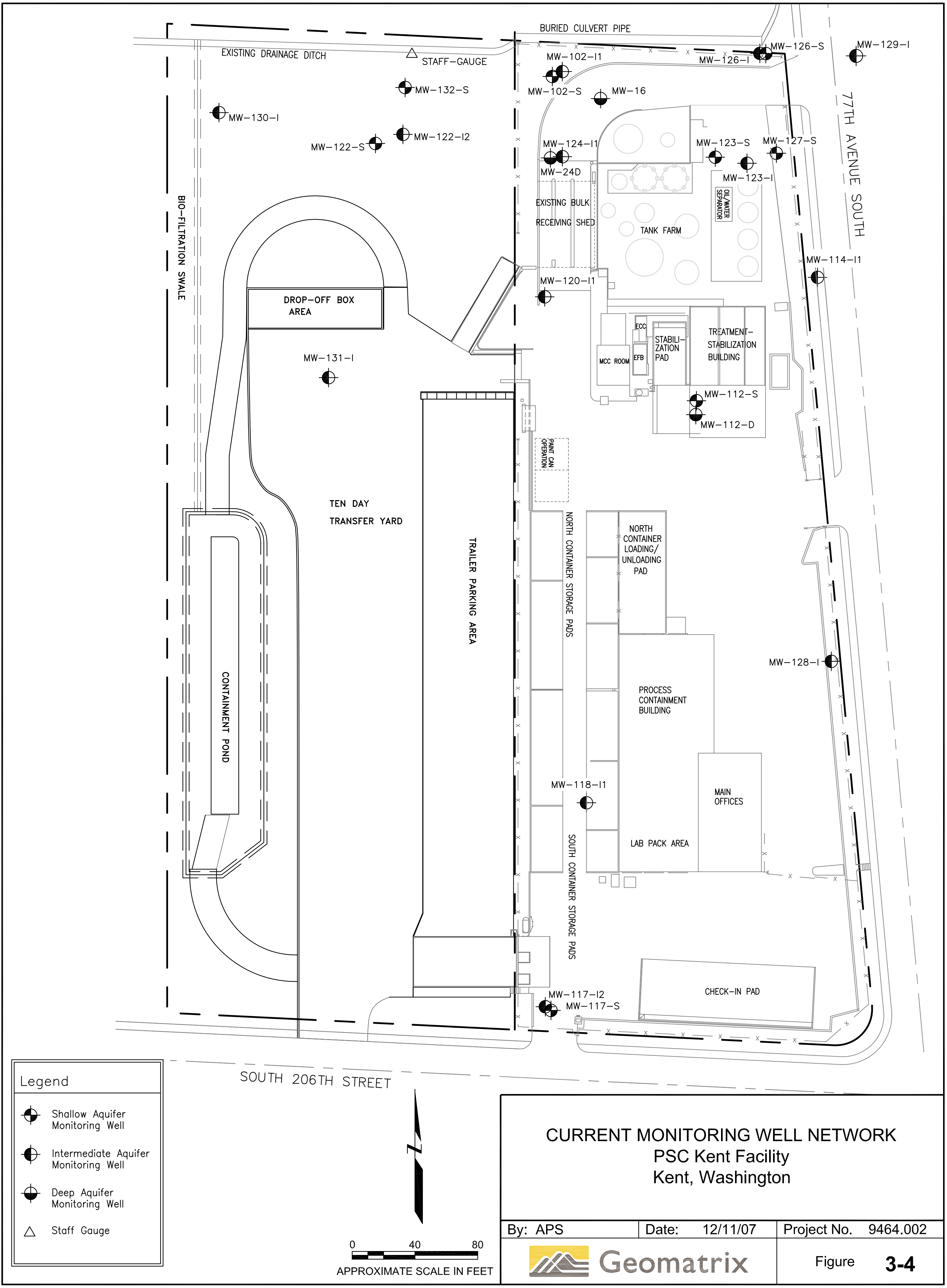

Legend

- Shallow Aquifer Monitoring Well
- Intermediate Aquifer Monitoring Well
- Deep Aquifer Monitoring Well
- △ Staff Gauge

CURRENT MONITORING WELL NETWORK
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/11/07	Project No. 9464.002
Geomatrix		Figure 3-4

Plot Date: 12/11/07 - 2:20pm, Plotted by: astenberg
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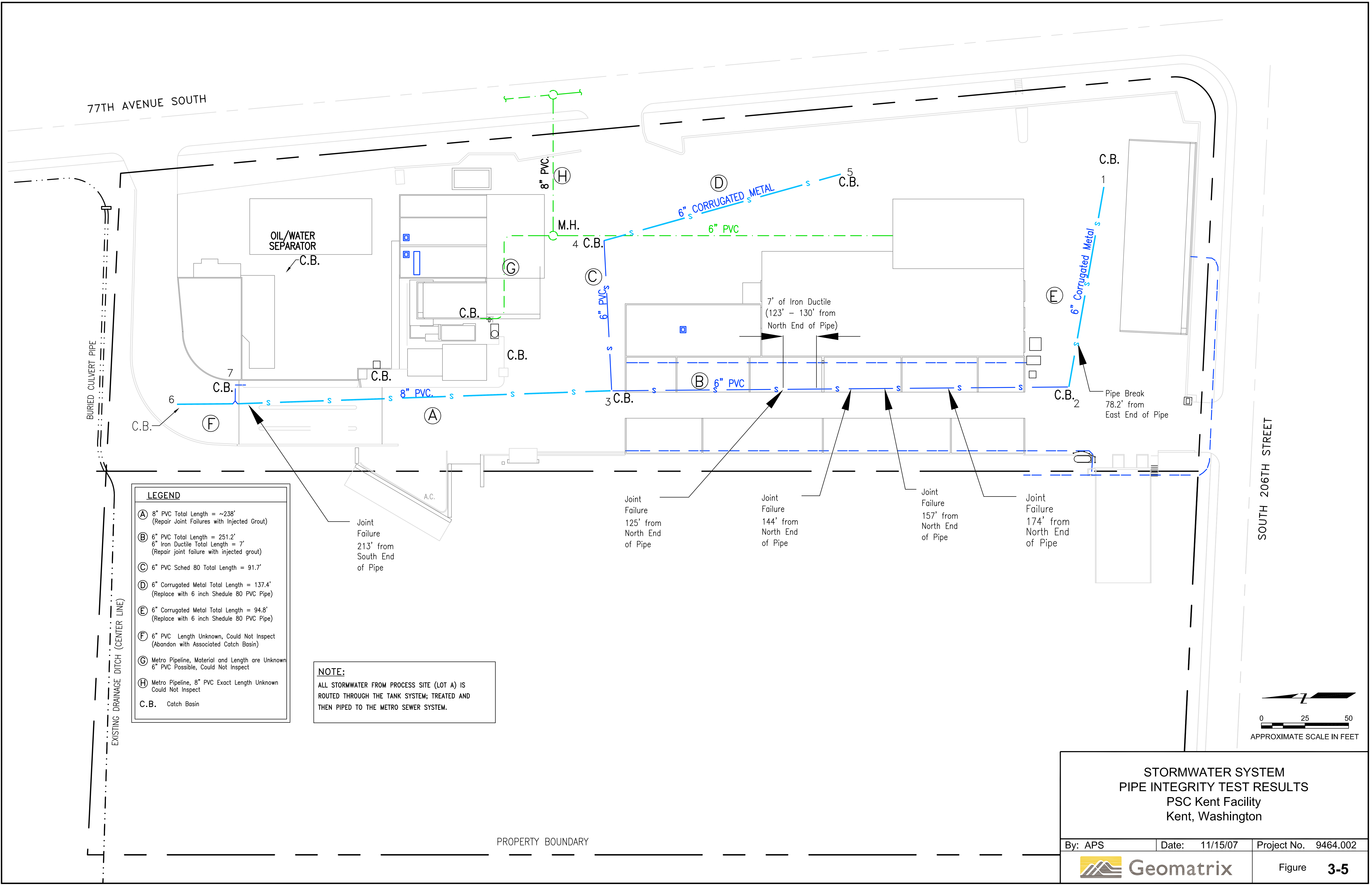


LEGEND

- Ⓐ 8" PVC Total Length = ~238'
  (Repair Joint Failures with Injected Grout)
- Ⓑ 6" PVC Total Length = 251.2'
  6" Iron Ductile Total Length = 7'
  (Repair joint failure with injected grout)
- Ⓒ 6" PVC Sched 80 Total Length = 91.7'
- Ⓓ 6" Corrugated Metal Total Length = 137.4'
  (Replace with 6 inch Shedule 80 PVC Pipe)
- Ⓔ 6" Corrugated Metal Total Length = 94.8'
  (Replace with 6 inch Shedule 80 PVC Pipe)
- Ⓕ 6" PVC Length Unknown, Could Not Inspect
  (Abandon with Associated Catch Basin)
- Ⓖ Metro Pipeline, Material and Length are Unknown
  6" PVC Possible, Could Not Inspect
- Ⓗ Metro Pipeline, 8" PVC Exact Length Unknown
  Could Not Inspect
- C.B. Catch Basin

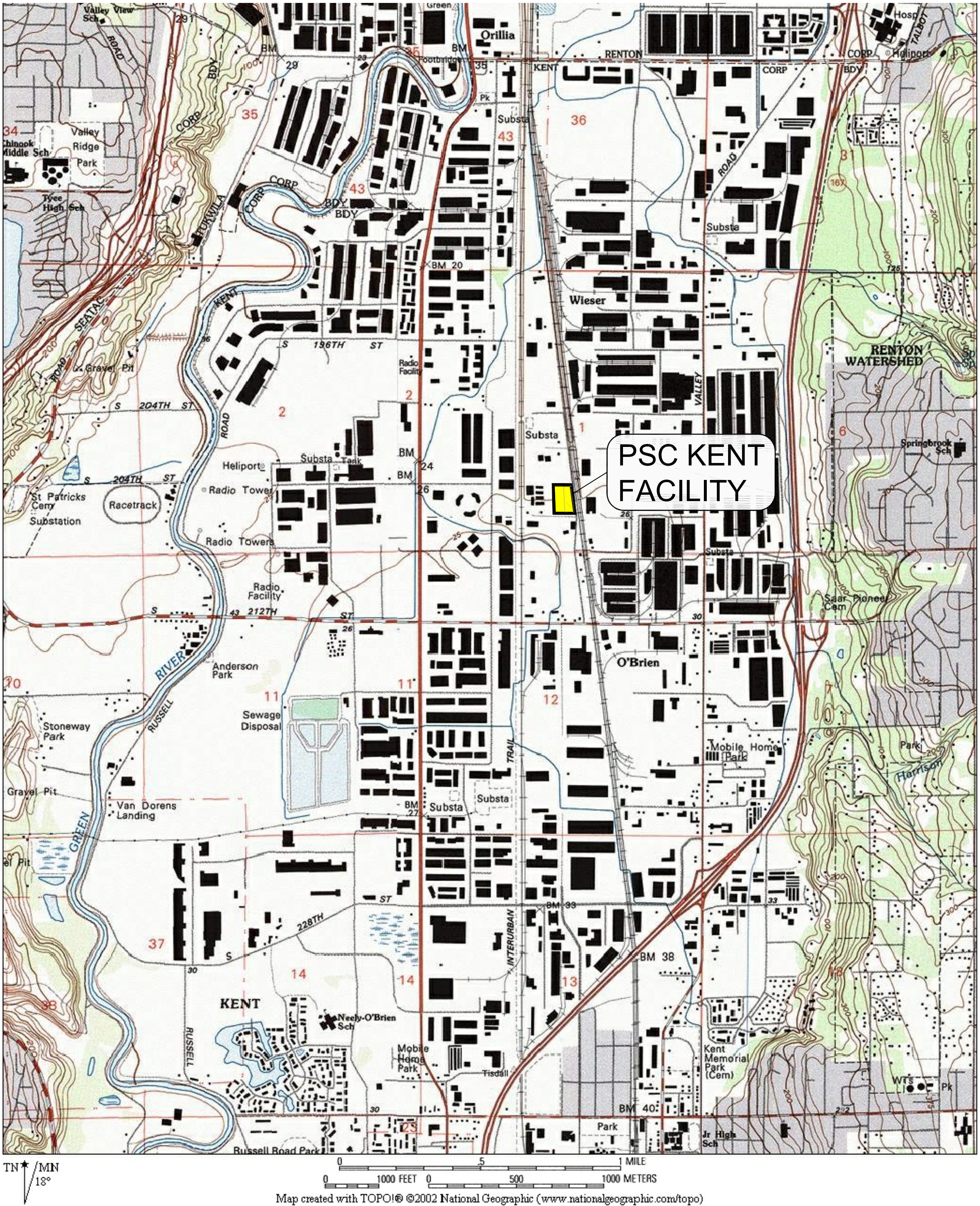
NOTE:

ALL STORMWATER FROM PROCESS SITE (LOT A) IS ROUTED THROUGH THE TANK SYSTEM; TREATED AND THEN PIPED TO THE METRO SEWER SYSTEM.

STORMWATER SYSTEM
PIPE INTEGRITY TEST RESULTS
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 3-5

Plot Date: 11/15/07 - 9:30am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 3-5_StormSystem_PSC-Kent.dwg

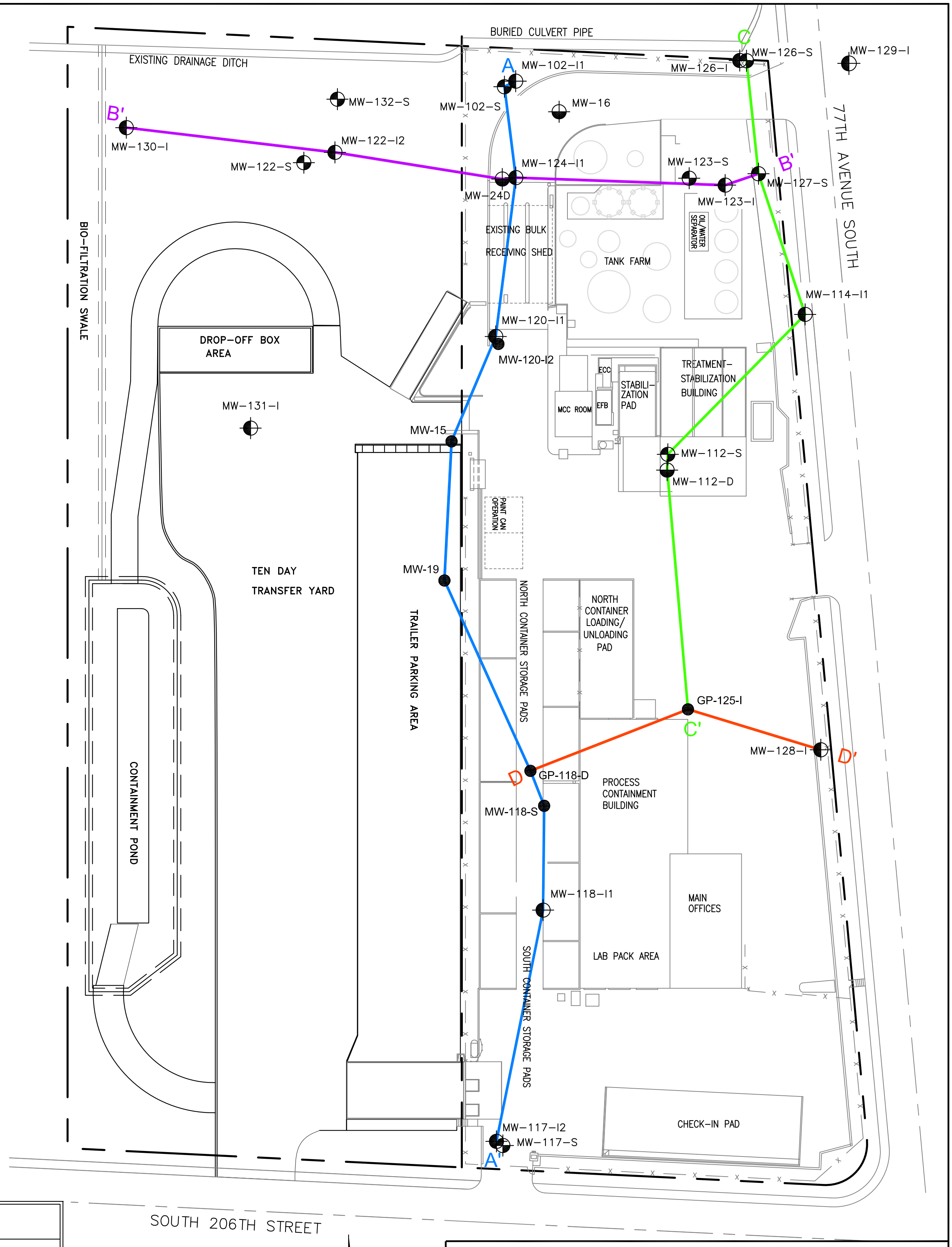


Map created with TOPO!® ©2002 National Geographic (www.nationalgeographic.com/topo)

LOCATION OF KENT FACILITY
WITHIN THE GREEN RIVER VALLEY
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **4-1**

Plot Date: 11/15/07 - 9:30am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-1_VicinityTopo_PSC-Kent.dwg



Legend

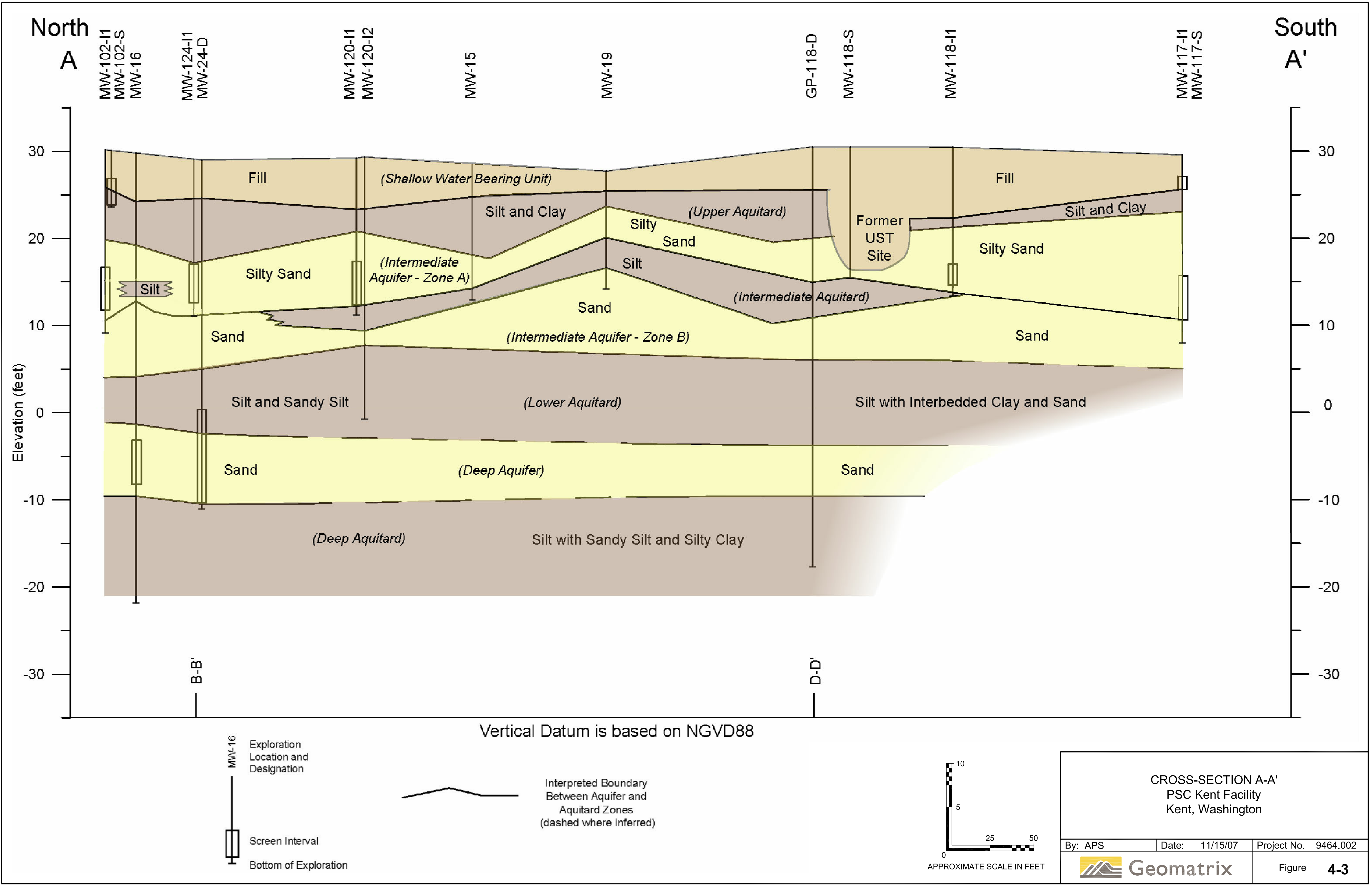
- ⊕ Shallow Aquifer Monitoring Well
- ⊕ Intermediate Aquifer Monitoring Well
- ⊕ Deep Aquifer Monitoring Well
- ● Borings used for Lithology only

0 40 80
APPROXIMATE SCALE IN FEET

CROSS-SECTION LOCATIONS
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-2

Plot Date: 11/15/07 - 9:31am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-2_Cross-SectLocations_PSC-Kent.dwg



CROSS-SECTION A-A'
PSC Kent Facility
Kent, Washington

By: APS | Date: 11/15/07 | Project No. 9464.002

Geomatrix

Figure 4-3

Plot Date: 11/15/07 - 9:32am, Plotted by: astenberg
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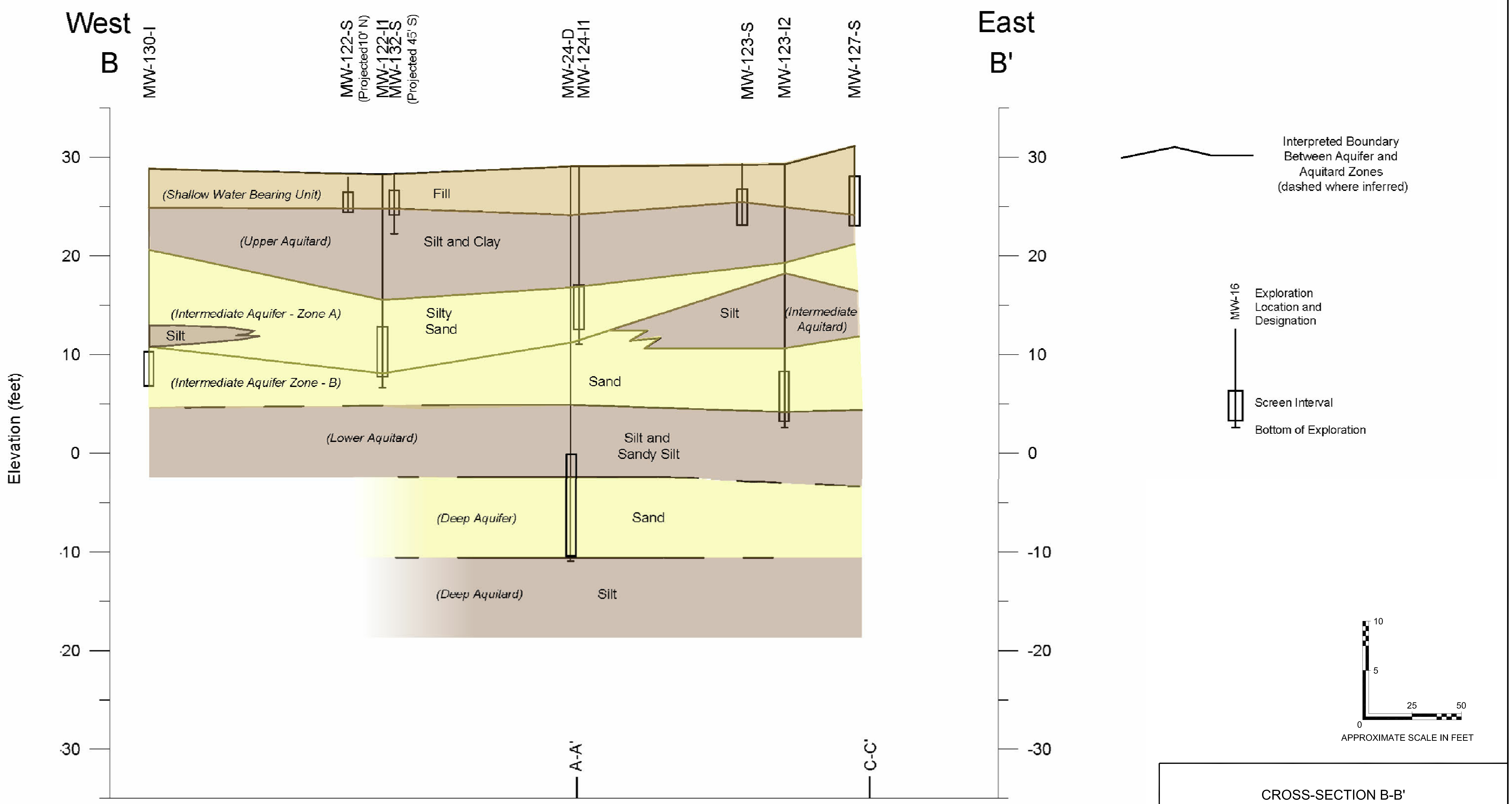

Vertical Datum is based on NGVD88

CROSS-SECTION B-B'
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-4

Plot Date: 11/15/07 - 9:33am, Plotted by: astenberg
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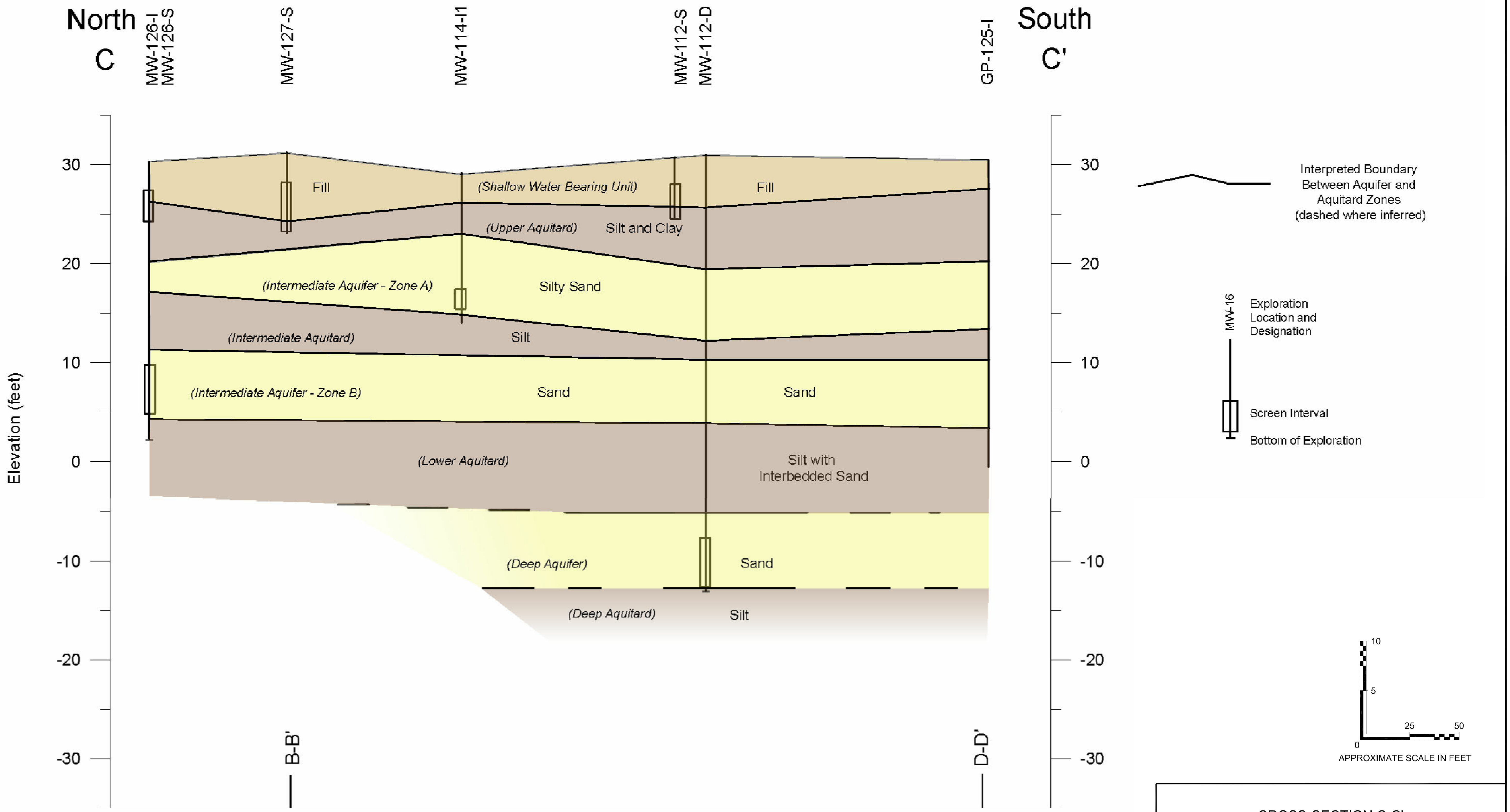

Vertical Datum is based on NGVD88

CROSS-SECTION C-C'
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-5

Plot Date: 11/15/07 - 9:34am, Plotted by: astenberg
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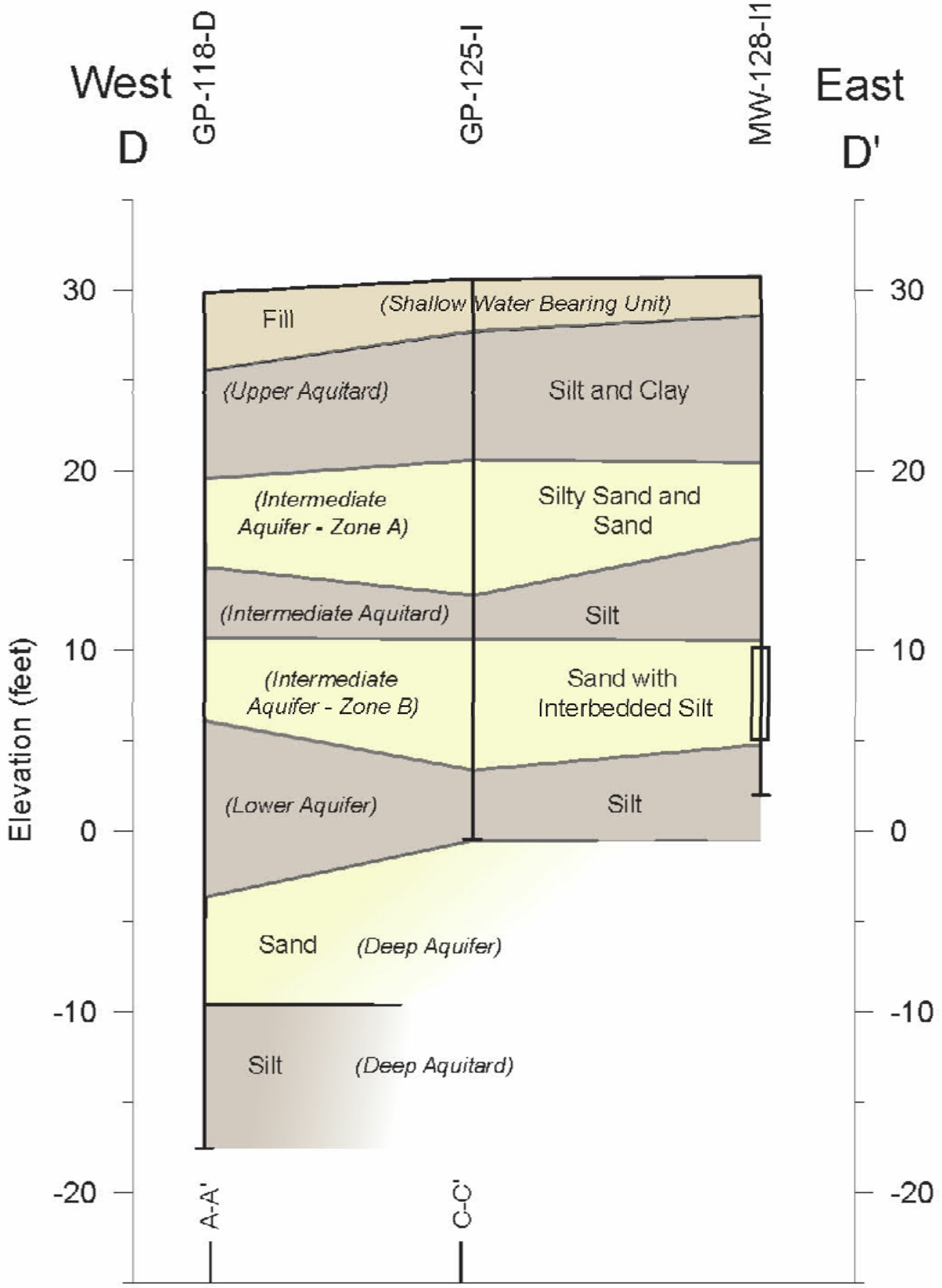
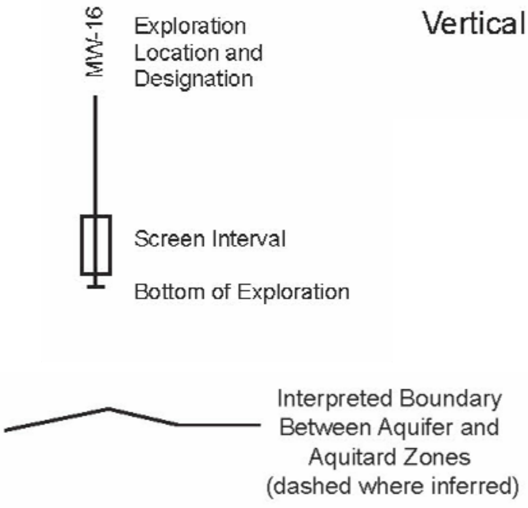
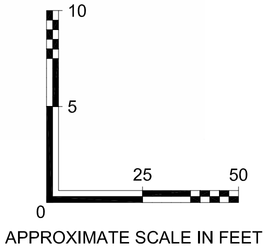


Vertical Datum is based on NGVD88



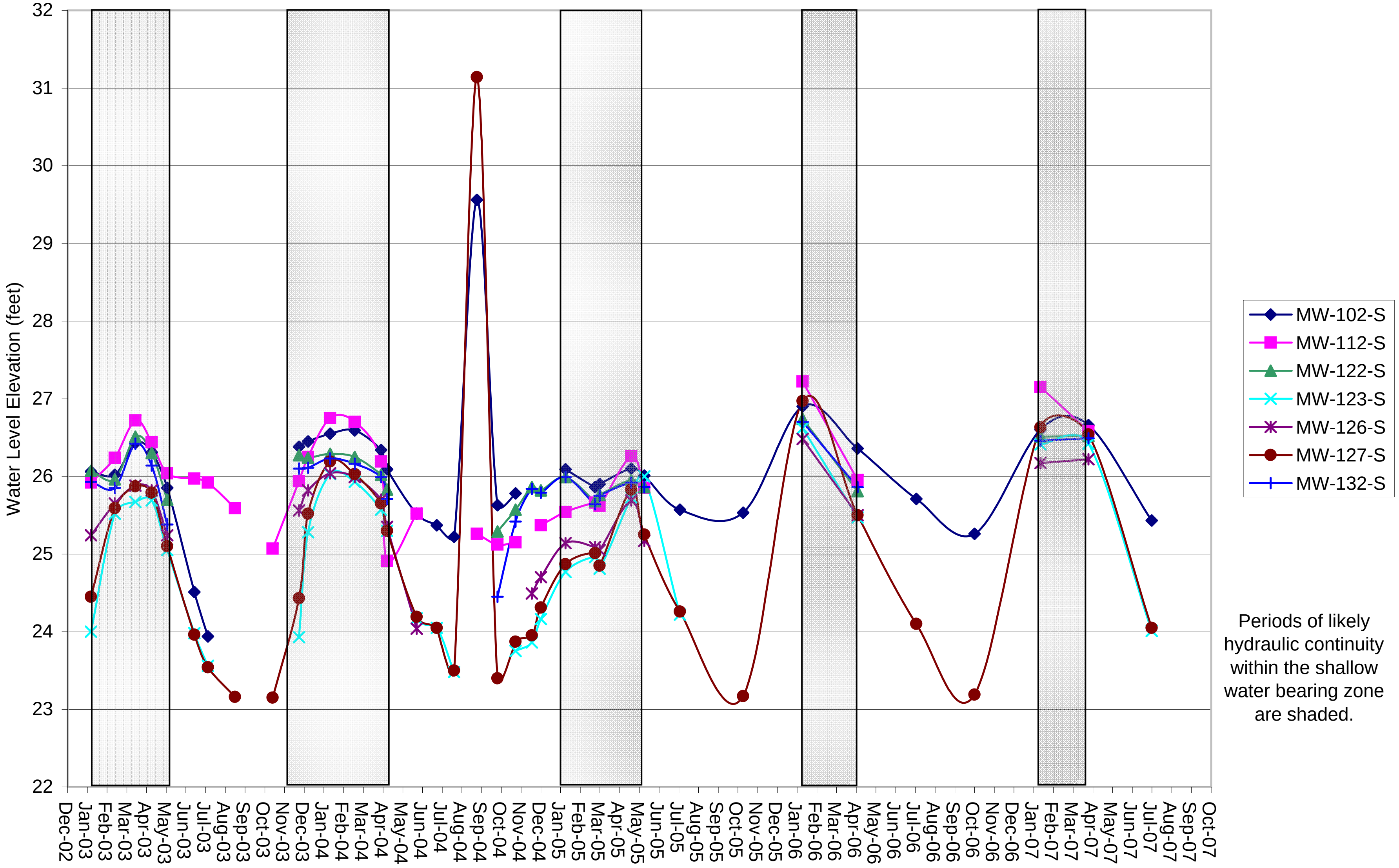


CROSS-SECTION D-D'
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **4-6**

Plot Date: 11/15/07 - 9:35am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-3 thru 4-6_Cross-SectABCD_PSC-Kent.dwg

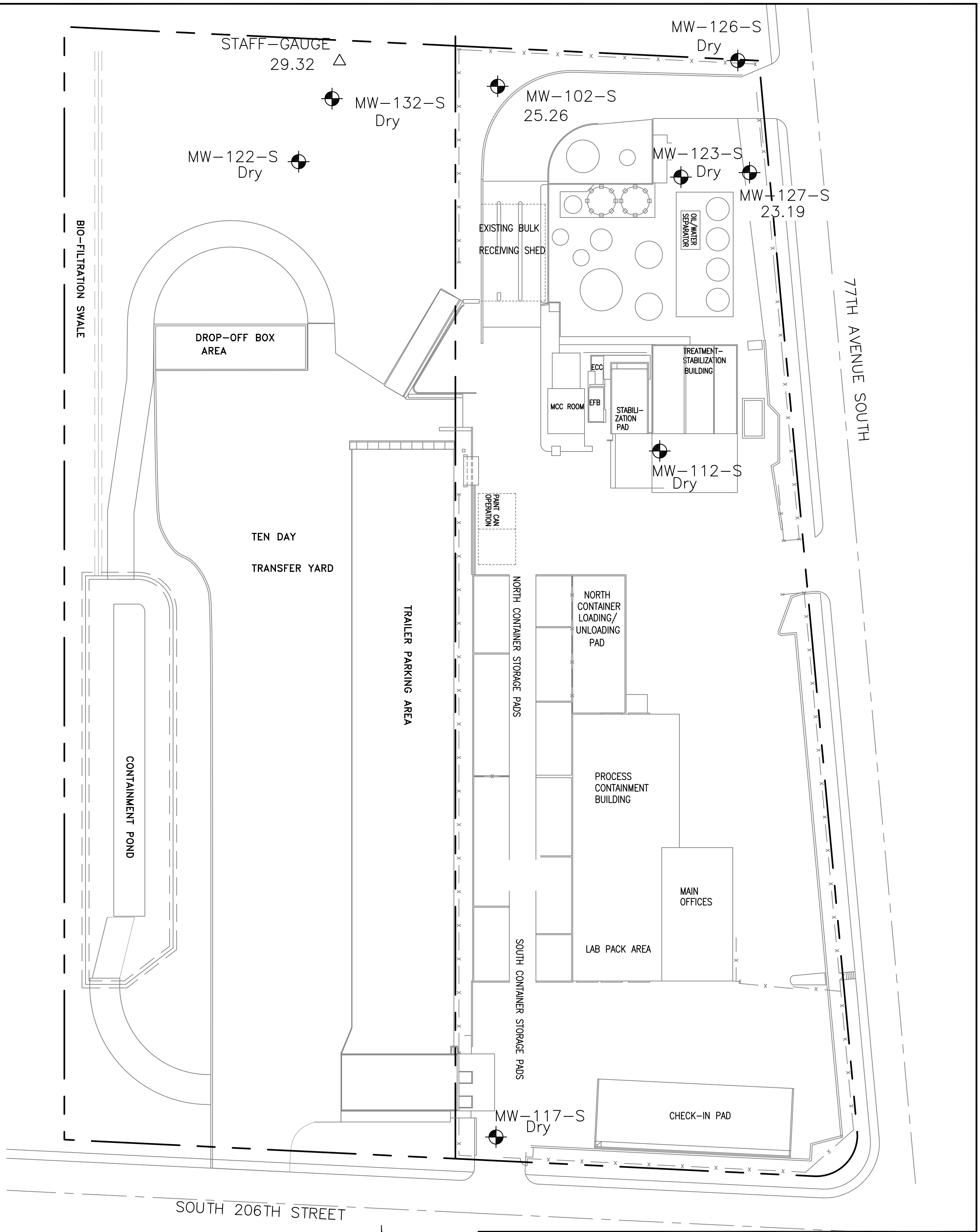
S:\9464\003_RI\Data\Fig 4-7.xls



Periods of likely hydraulic continuity within the shallow water bearing zone are shaded.

WATER LEVEL DATA FOR SELECTED SHALLOW WATER-BEARING UNIT WELLS
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **4-7**



Legend

⌖ Shallow Aquifer Monitoring Well with Water Level (feet)

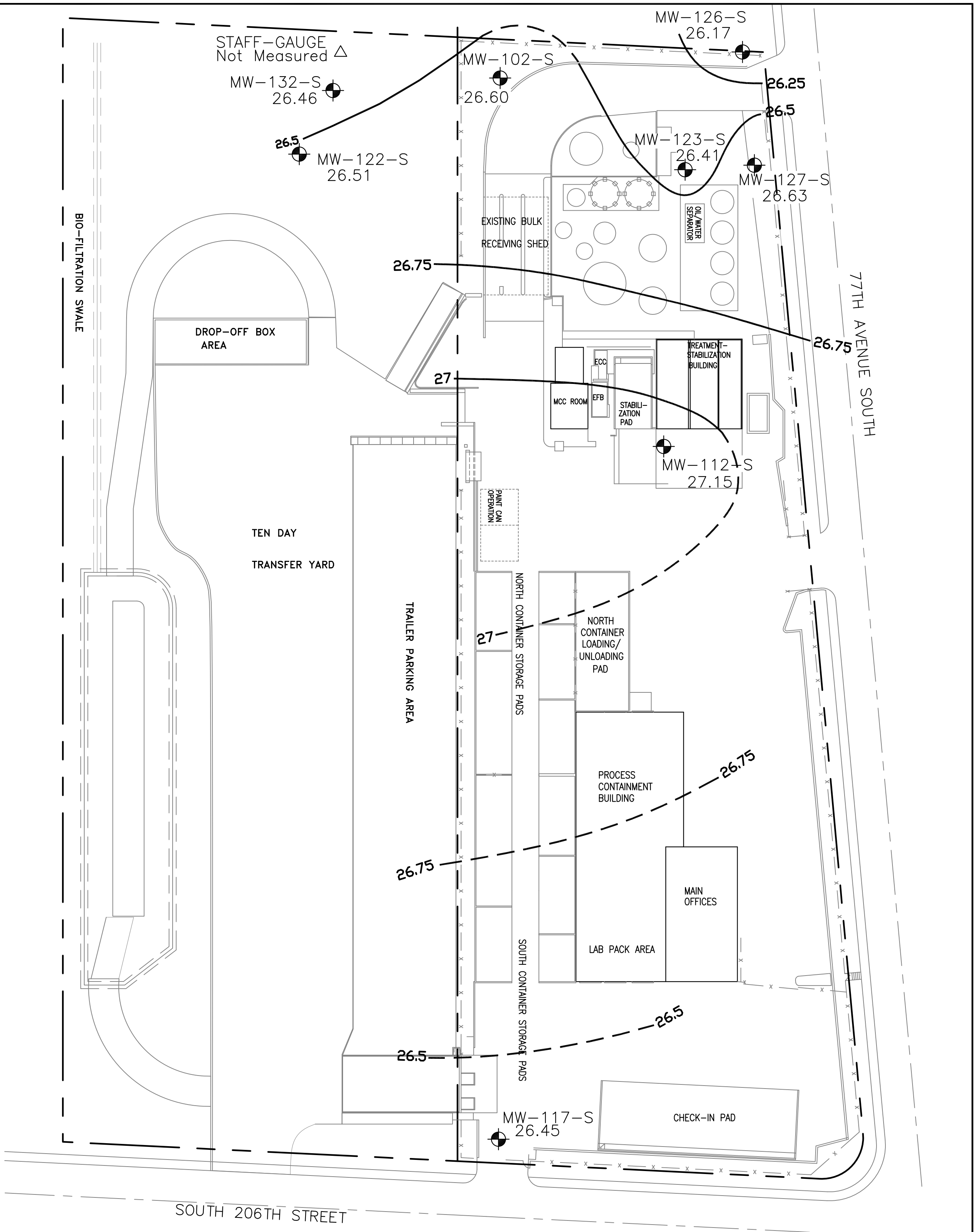
0 40 80

APPROXIMATE SCALE IN FEET

GROUNDWATER ELEVATIONS, OCTOBER 5, 2006, SHALLOW WATER-BEARING UNIT
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-8

Plot Date: 11/15/07 - 9:38am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-8_4Q06-ShallowGW_PSC-Kent.dwg



Legend

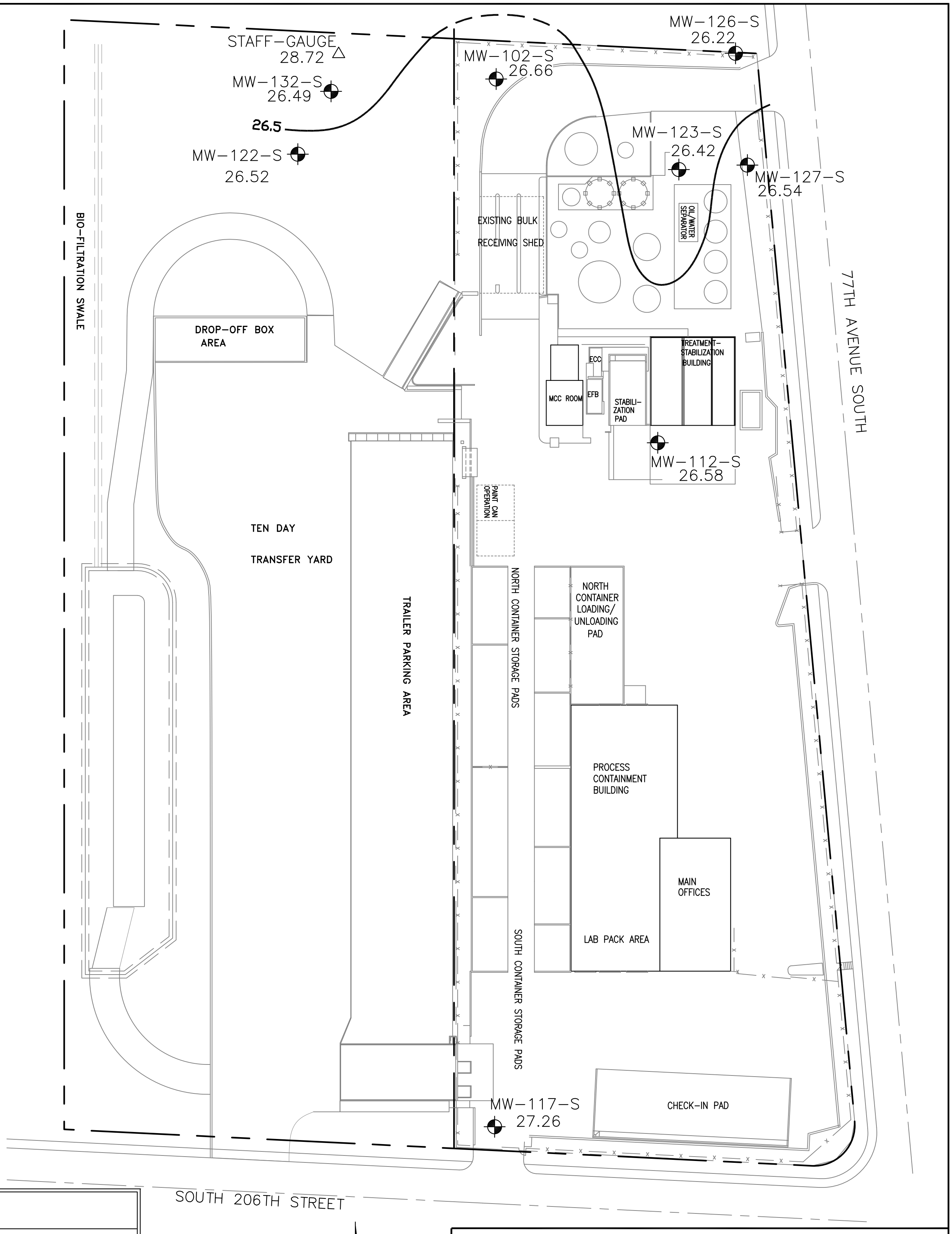
⊕	Shallow Aquifer Monitoring Well with Water Level (feet)
∽	Water Elevation Contour

Contour Interval = 0.25 (feet)

GROUNDWATER ELEVATIONS, JANUARY 15, 2007, SHALLOW WATER-BEARING UNIT
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **4-9**

Plot Date: 11/15/07 - 9:46am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-9_1Q07sh_ShallowGW_PSC-Kent-rev.dwg



Legend

- ⊕ Shallow Aquifer Monitoring Well with Water Level (feet)
- ∽ Water Elevation Contour

Contour Interval = 0.25 (feet)

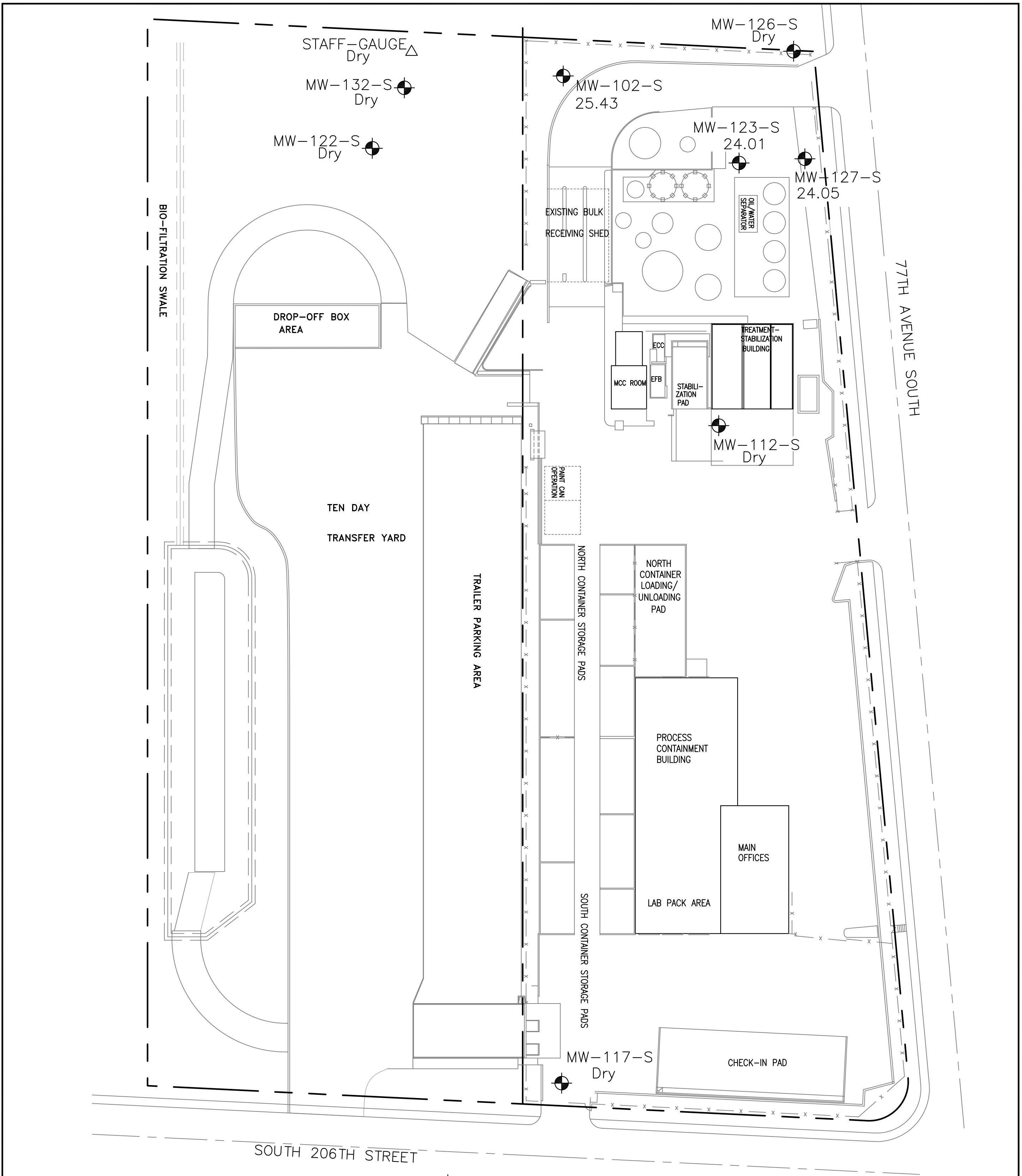
Note: Water level from Well MW–117–S is not considered representative and is not used in contouring this map.

0 40 80
APPROXIMATE SCALE IN FEET

GROUNDWATER ELEVATIONS, MARCH 30, 2007, SHALLOW WATER-BEARING UNIT
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-10

Plot Date: 11/15/07 - 9:50am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-10_2Q07-SH_ShallowGW_PSC-Kent.dwg



Legend

⌖ Shallow Aquifer Monitoring Well with Water Level (feet)

Note: Data not contoured because of likely hydraulic discontinuities caused by low water levels.

0 40 80

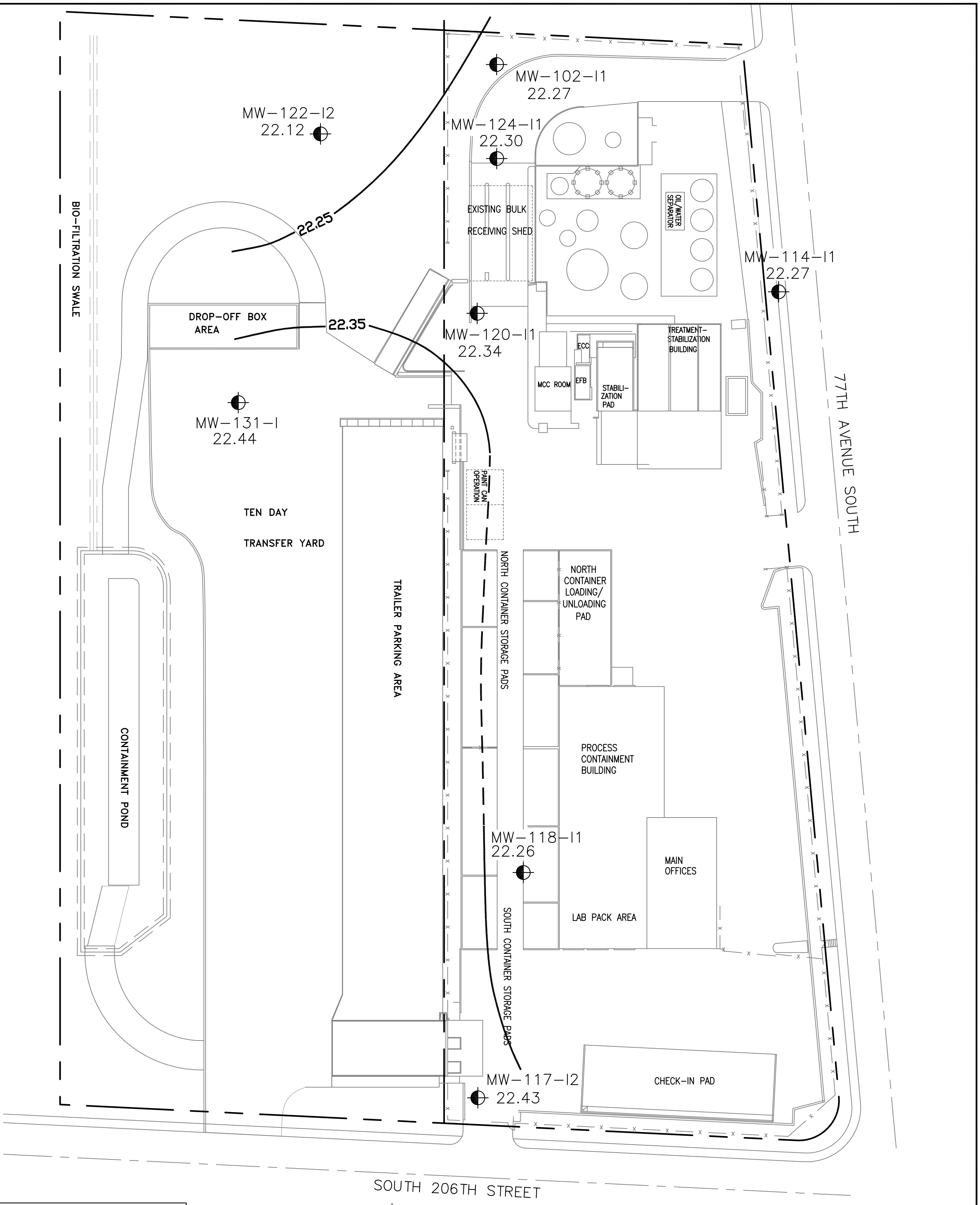
APPROXIMATE SCALE IN FEET

GROUNDWATER ELEVATIONS, JULY 6, 2007, SHALLOW WATER-BEARING UNIT

PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-11

Plot Date: 11/15/07 - 9:52am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-11_3Q07sh_Shallow Water Bearing UnitGW_PSC-Kent.dwg



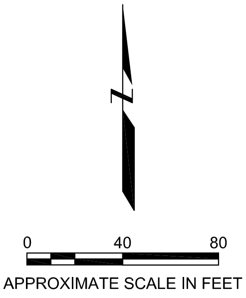
Legend

⊕ Intermediate Aquifer Monitoring Well with Water Level (feet)

∽ Water Elevation Contour

Contour Interval = 0.25 (feet)

Supplemental Contour Interval = 0.10 (feet)

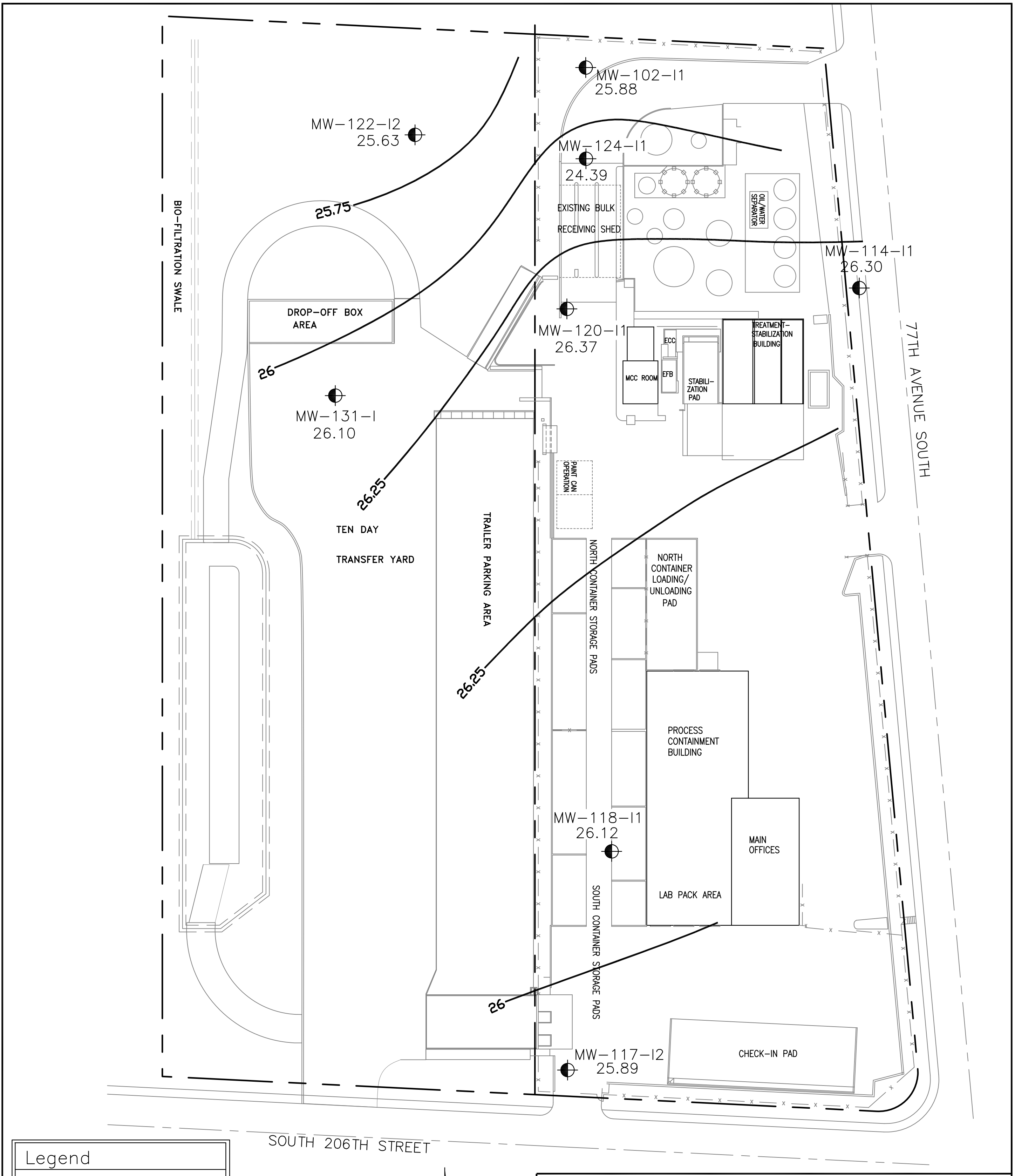


GROUNDWATER ELEVATIONS, OCTOBER 5, 2006, ZONE A INTERMEDIATE AQUIFER

PSC Kent Facility
Kent, Washington

By: APS	Date: 12/11/07	Project No. 9464.002
Geomatrix		Figure **4-12**

Plot Date: 12/11/07 - 12:09pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-12_4q06-ia_Zone A Intermediate Aquifer_PSC-Kent.dwg



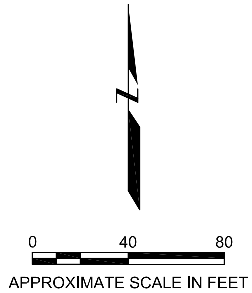
Legend

● Intermediate Aquifer Monitoring Well with Water Level (feet)

Water Elevation Contour

Contour Interval = 0.25 (feet)

Note: Water level data from well MW−124−I1 is not used in contouring due to stabilization problems.

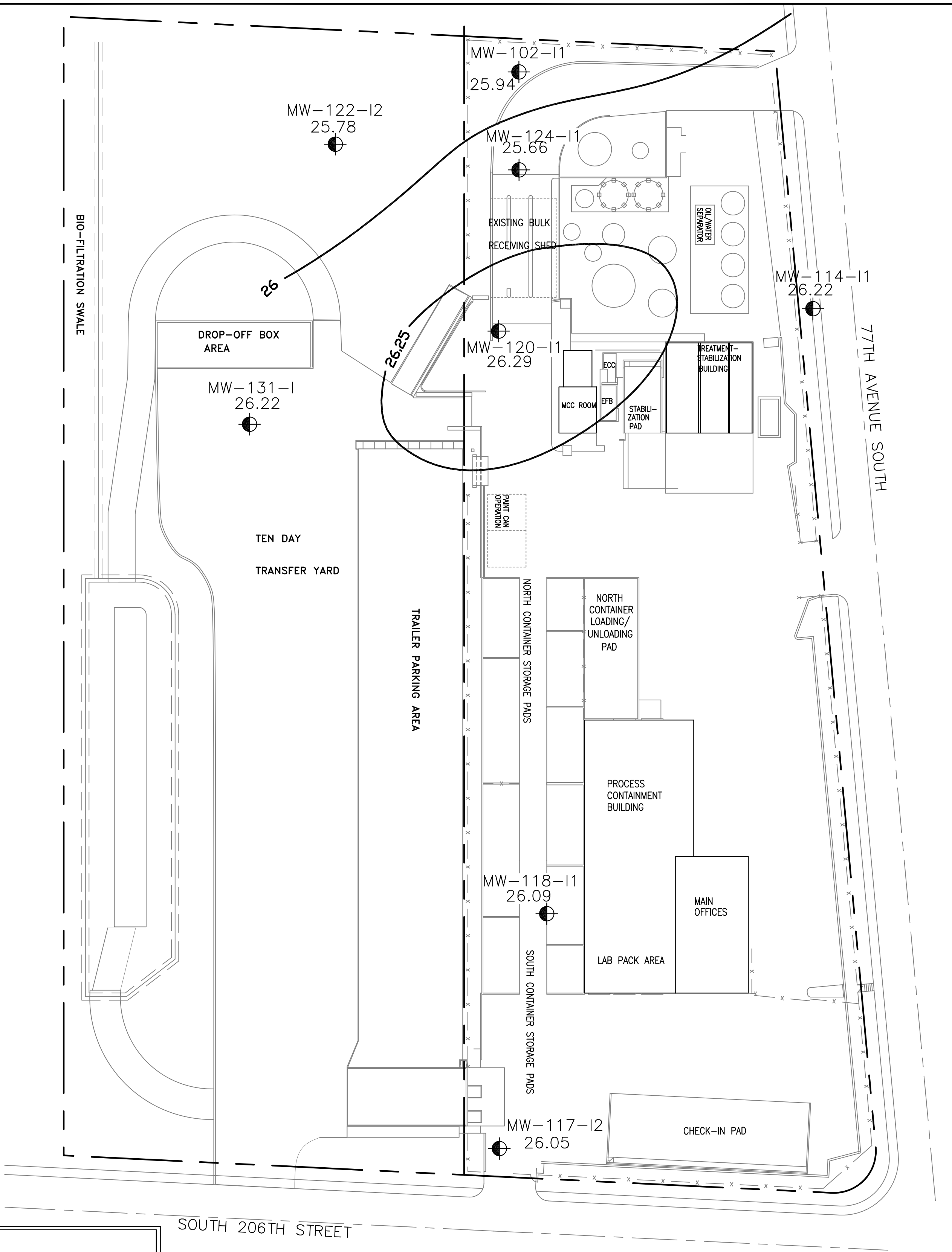


GROUNDWATER ELEVATIONS, JANUARY 15, 2007, ZONE A INTERMEDIATE AQUIFER

PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **4-13**

Plot Date: 11/15/07 - 9:58am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-13_1Q07_I1_Zone A Intermediate AquiferGW_PSC-Kent.dwg



Legend

● Intermediate Aquifer Monitoring Well with Water Level (feet)

∼ Water Elevation Contour

Contour Interval = 0.25 (feet)

Note: Water level data from well MW−124−I1 was not used in contouring this map due to stabilization problems.

N

0 40 80

APPROXIMATE SCALE IN FEET

GROUNDWATER ELEVATIONS, MARCH 30, 2007, ZONE A INTERMEDIATE AQUIFER

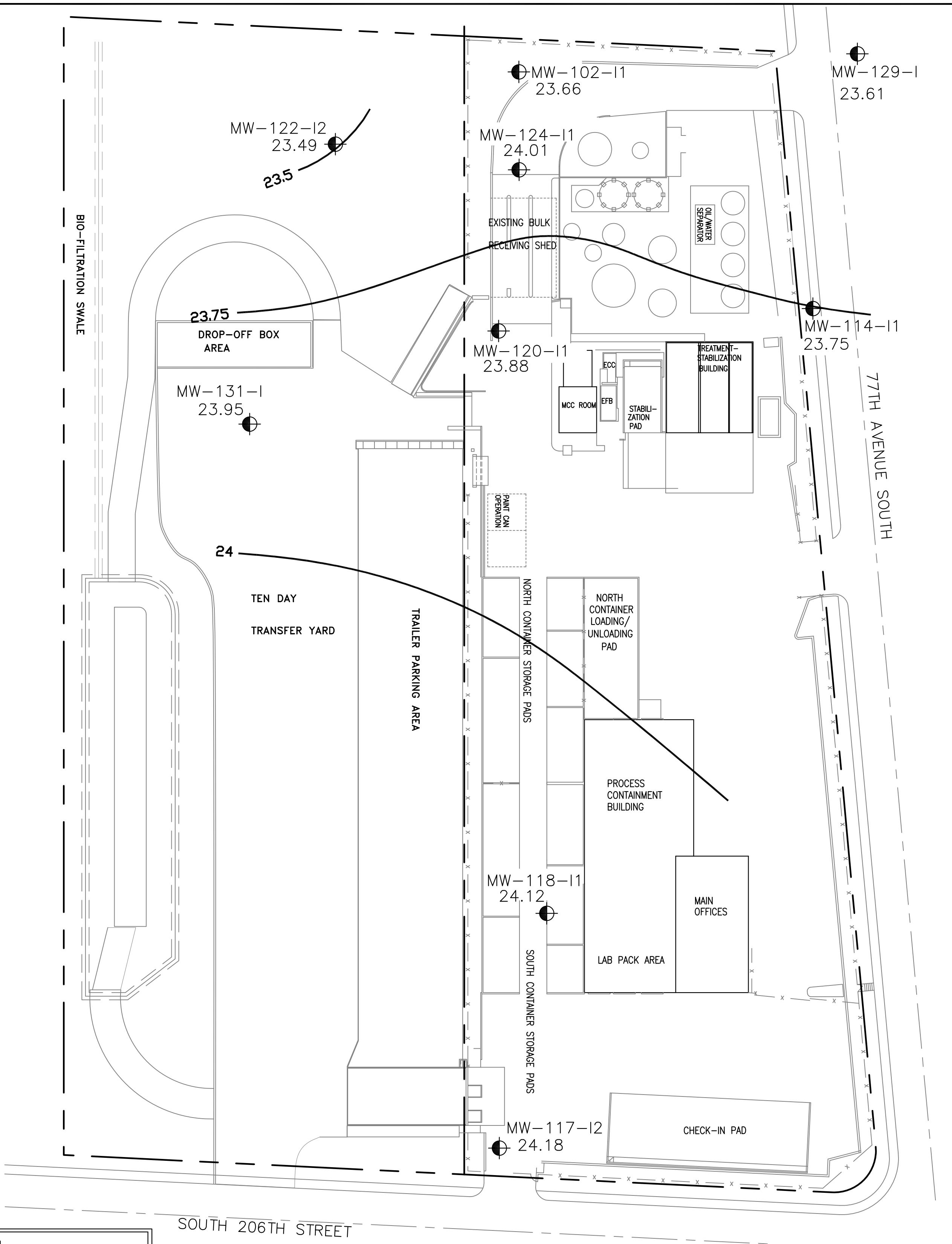
PSC Kent Facility

Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-14

Plot Date: 11/15/07 - 9:59am, Plotted by: astenberg

Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-14_2Q07-I1_Zone A IntermediateGW_PSC-Kent.dwg



Legend

⊕ Intermediate Aquifer Monitoring Well with Water Level (feet)

∽ Water Elevation Contour

Contour Interval = 0.25 (feet)

Note: Water level data from well MW−124−I1 was not used in contouring this map due to stabilization

N

0 40 80

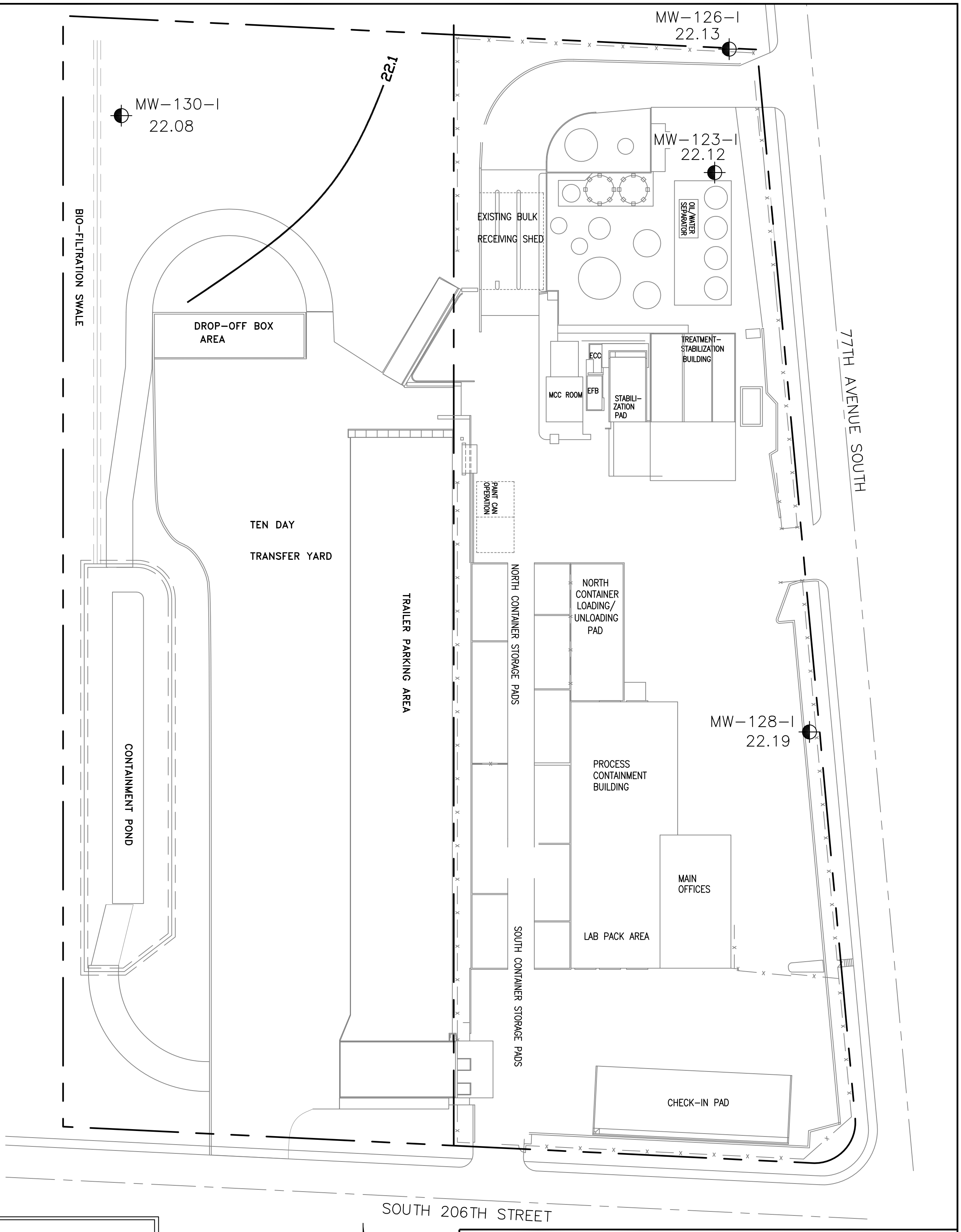
APPROXIMATE SCALE IN FEET

GROUNDWATER ELEVATIONS, JULY 6, 2007, ZONE A INTERMEDIATE AQUIFER

PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-15

Plot Date: 11/15/07 - 10:01am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-15_3q07_I1_Zone A IntermediateGW_PSC-Kent.dwg



Legend

- ⊕ Intermediate Aquifer Monitoring Well with Water Level (feet)
- ∽ Water Elevation Contour

Contour Interval = 0.25 (feet)

Supplemental Contour Interval = 0.10 (feet)

0 40 80

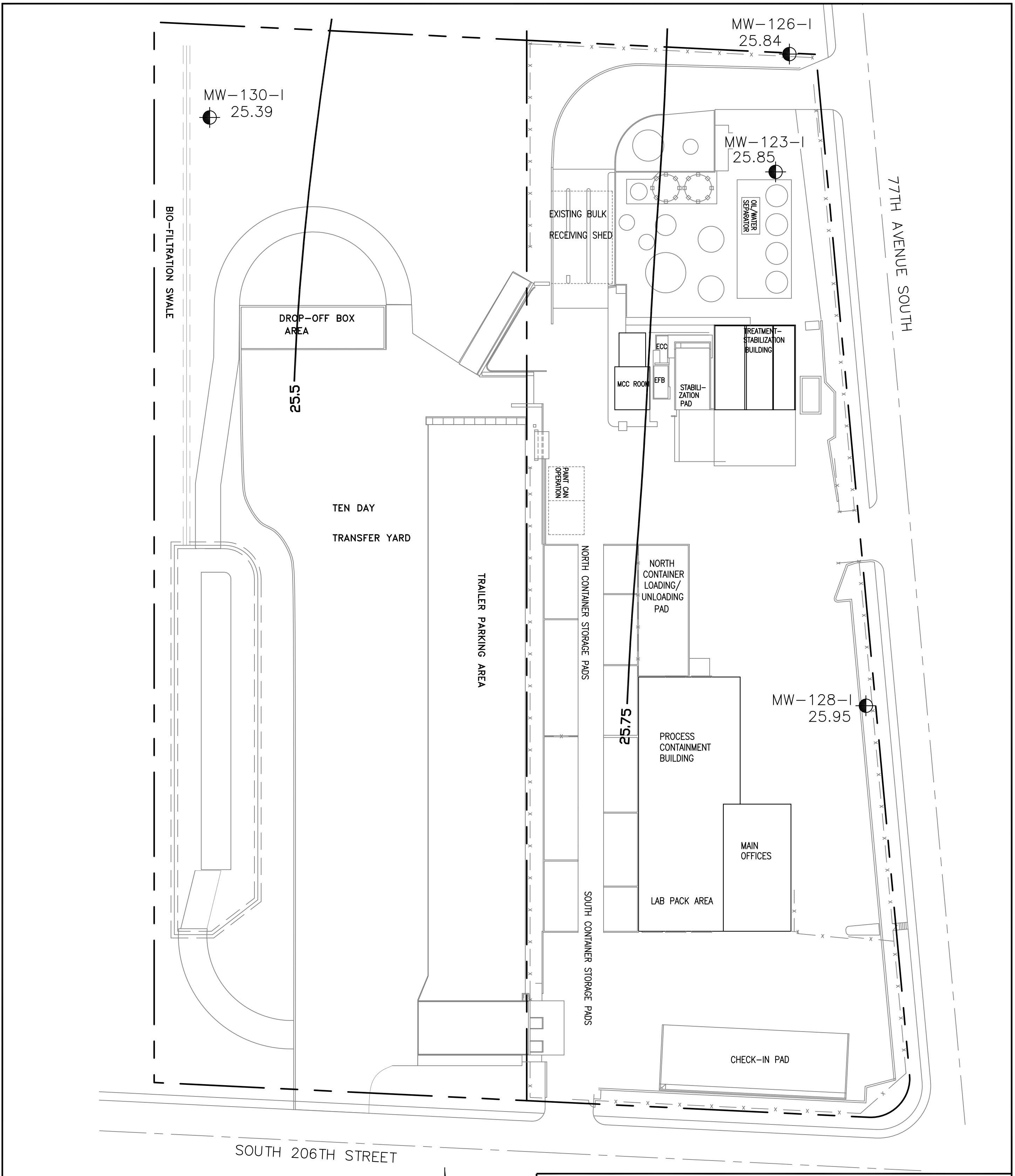
APPROXIMATE SCALE IN FEET

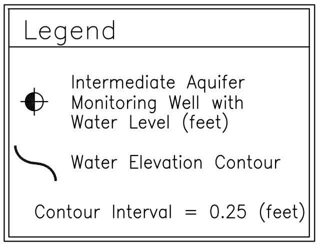
GROUNDWATER ELEVATIONS, OCTOBER 5, 2006, ZONE B INTERMEDIATE AQUIFER

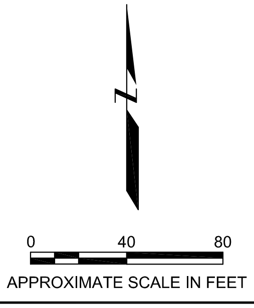
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/11/07	Project No. 9464.002
Geomatrix		Figure 4-16

Plot Date: 12/11/07 - 12:11pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-16_4q06_ib_Zone B Intermediate AquiferGW_PSC-Kent.dwg



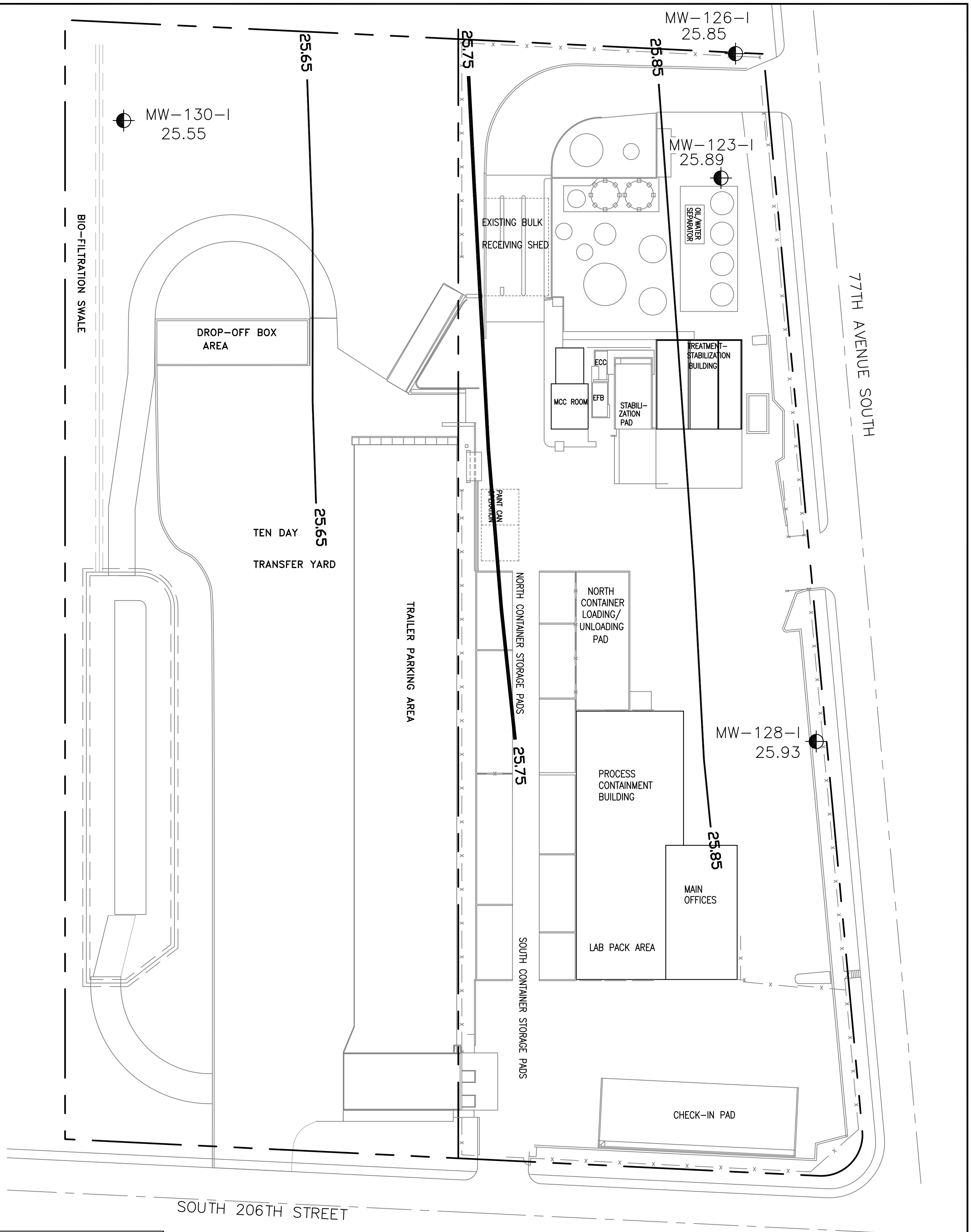




GROUNDWATER ELEVATIONS, JANUARY 15, 2007
ZONE B INTERMEDIATE AQUIFER
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **4-17**

Plot Date: 11/15/07 - 10:10am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-17_1Q07-I2_Zone B IntermediateGW_PSC-Kent.dwg



Legend

⊕ Intermediate Aquifer Monitoring Well with Water Level (feet)

∫ Water Elevation Contour

Contour Interval = 0.25 (feet)

Supplemental Contour Interval = 0.10 (feet)

N

0 40 80

APPROXIMATE SCALE IN FEET

GROUNDWATER ELEVATIONS, MARCH 30, 2007, ZONE B INTERMEDIATE AQUIFER
PSC Kent Facility
Kent, Washington

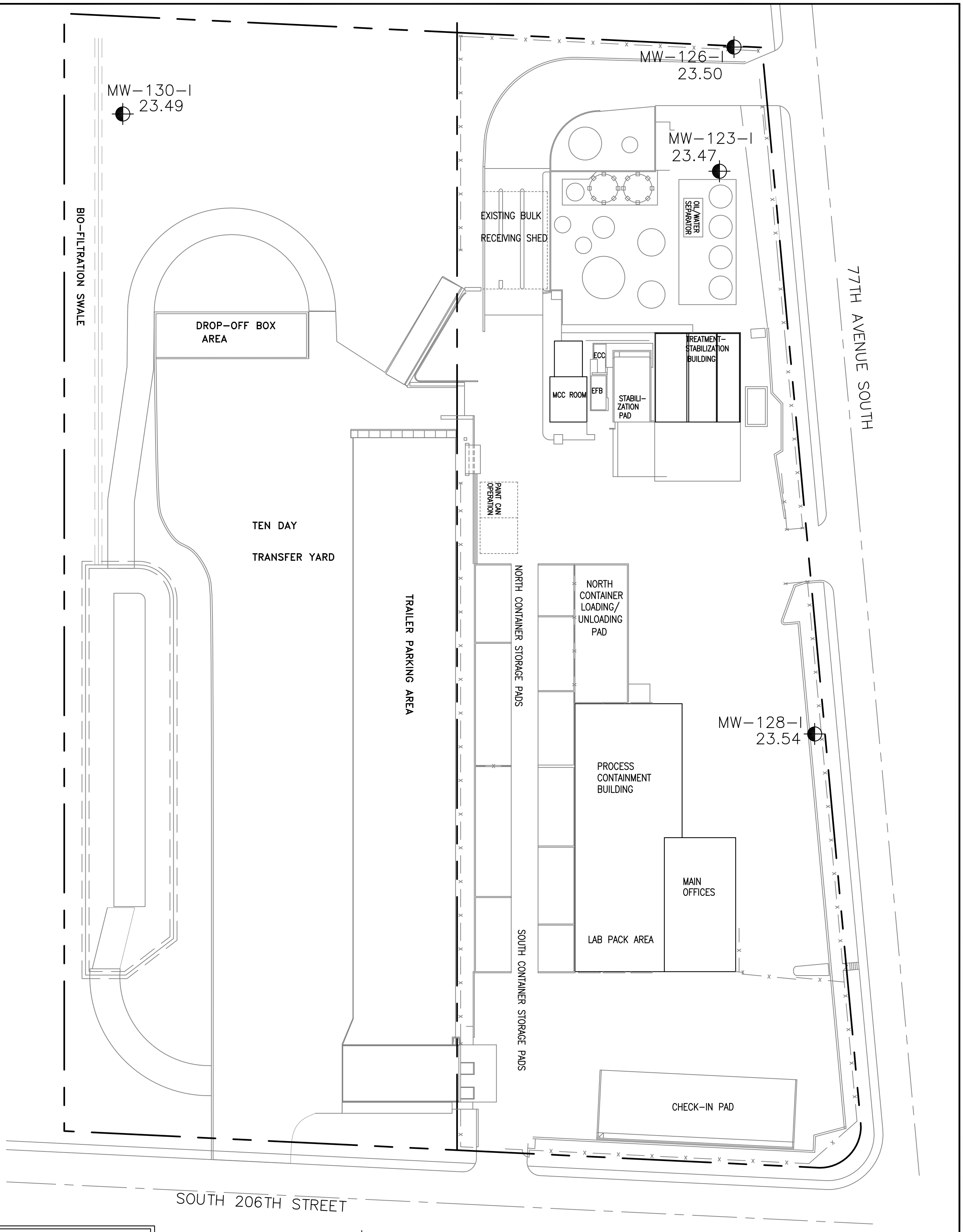
By: APS | Date: 11/15/07 | Project No. 9464.002

Geomatrix

Figure **4-18**

Plot Date: 11/15/07 - 10:17am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-18_2Q07-I2_Zone B IntermediateGW_PSC-Kent.dwg

Plot Date: 11/15/07 - 10:18am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-19_3Q07_I2_Zone B Intermediate AquiferGW_PSC-Kent.dwg



Legend

⊕ Intermediate Aquifer Monitoring Well with Water Level (feet)

∫ Water Elevation Contour

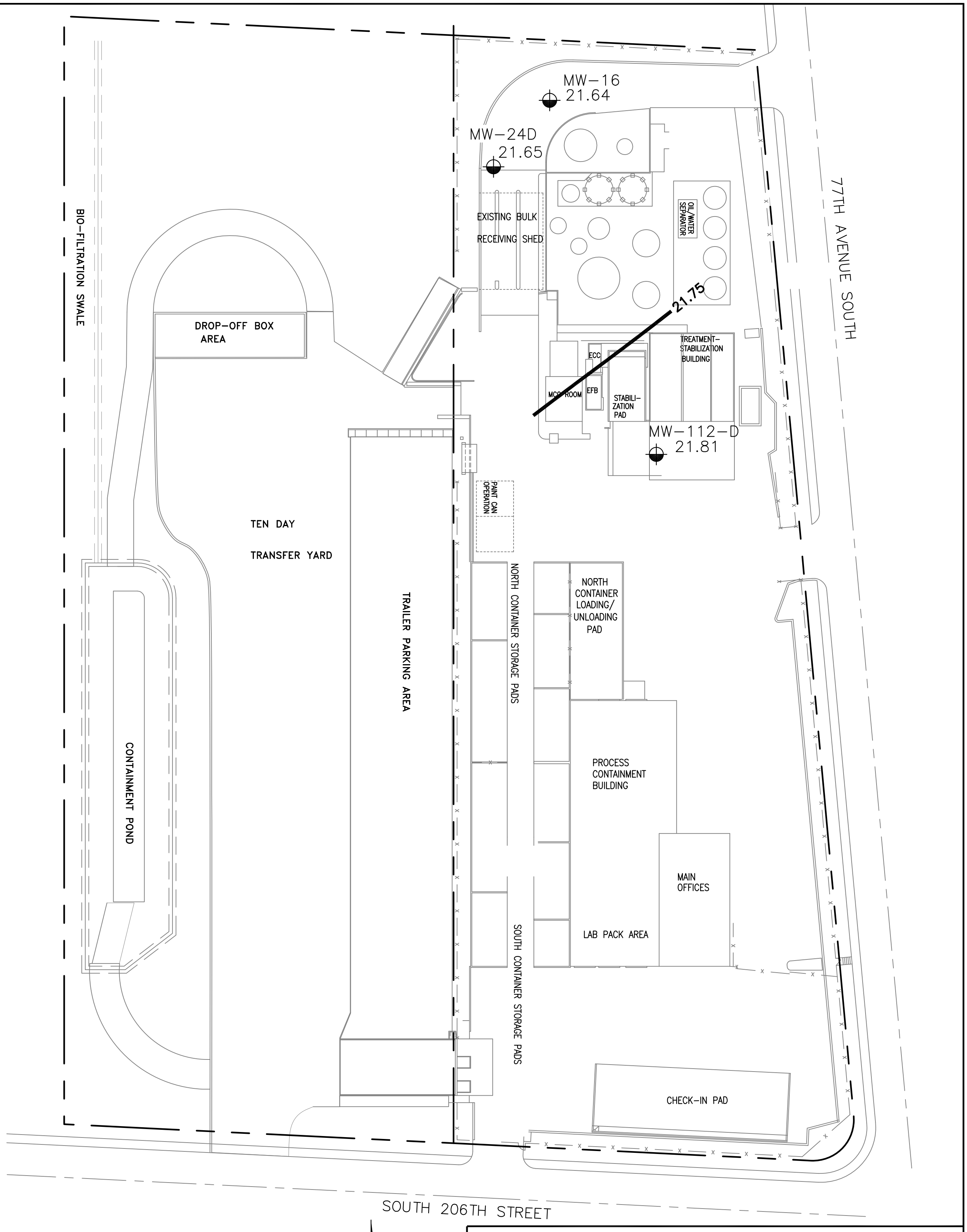
Contour Interval = 0.25 (feet)

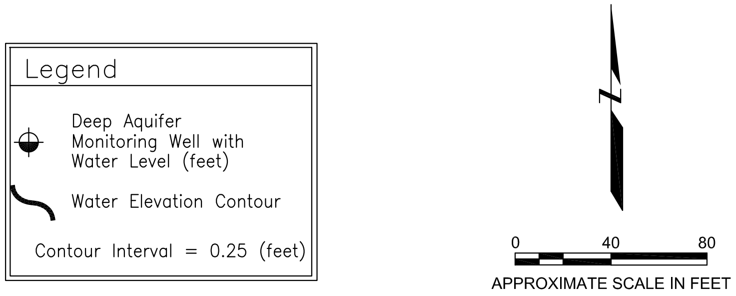
Supplemental Contour Interval = 0.10 (feet)

GROUNDWATER ELEVATIONS, JULY 6, 2007, ZONE B INTERMEDIATE AQUIFER

PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-19

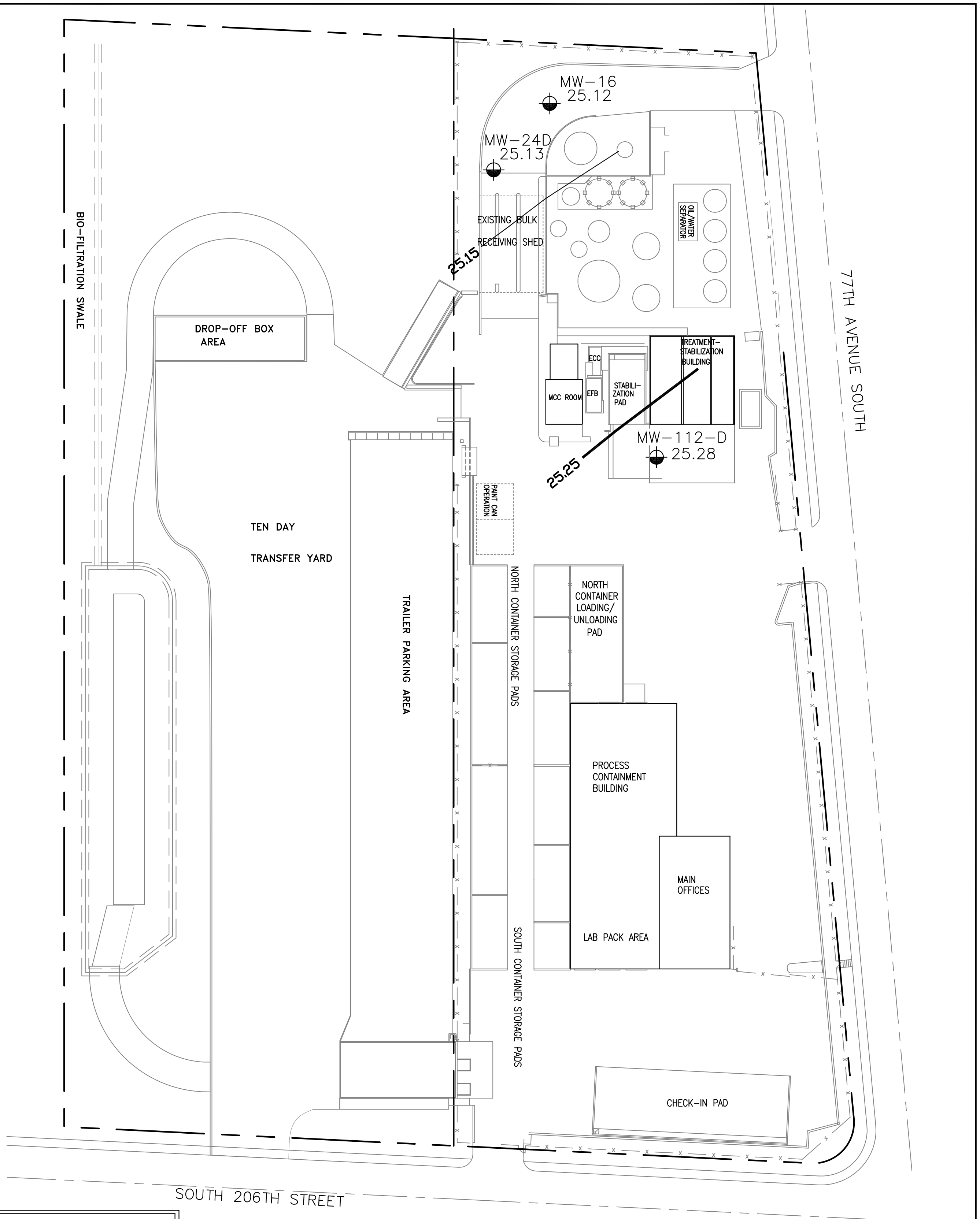




GROUNDWATER ELEVATIONS, OCTOBER 5, 2006, DEEP AQUIFER
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-20

Plot Date: 11/15/07 - 10:19am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-20_4q06d_Deep AquiferGW_PSC-Kent.dwg



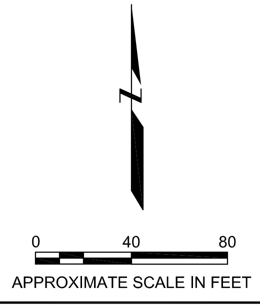
Legend

⊕ Deep Aquifer Monitoring Well with Water Level (feet)

Water Elevation Contour

Contour Interval = 0.25 (feet)

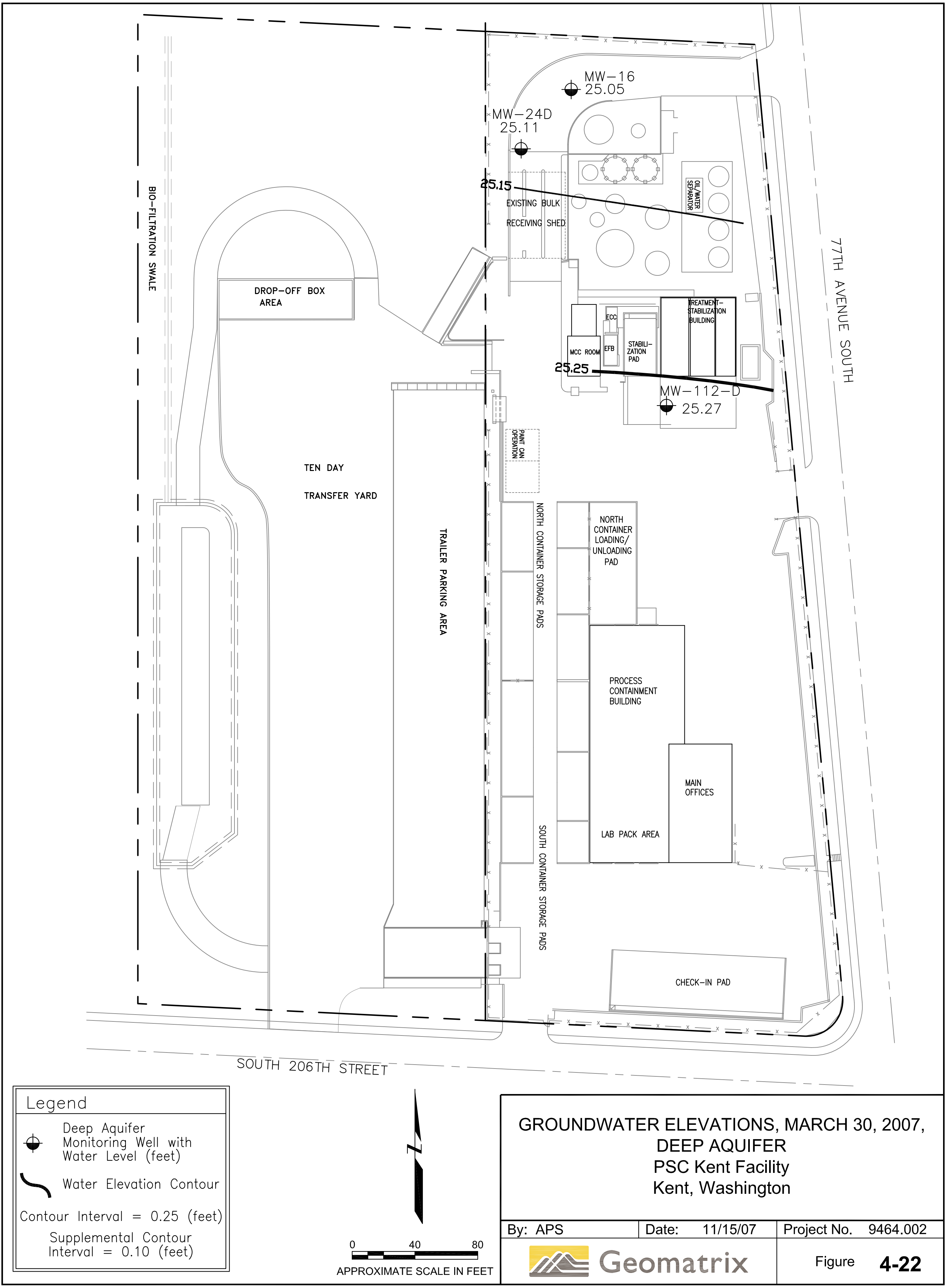
Supplemental Contour Interval = 0.10 (feet)



GROUNDWATER ELEVATIONS, JANUARY 15, 2007, DEEP AQUIFER
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-21

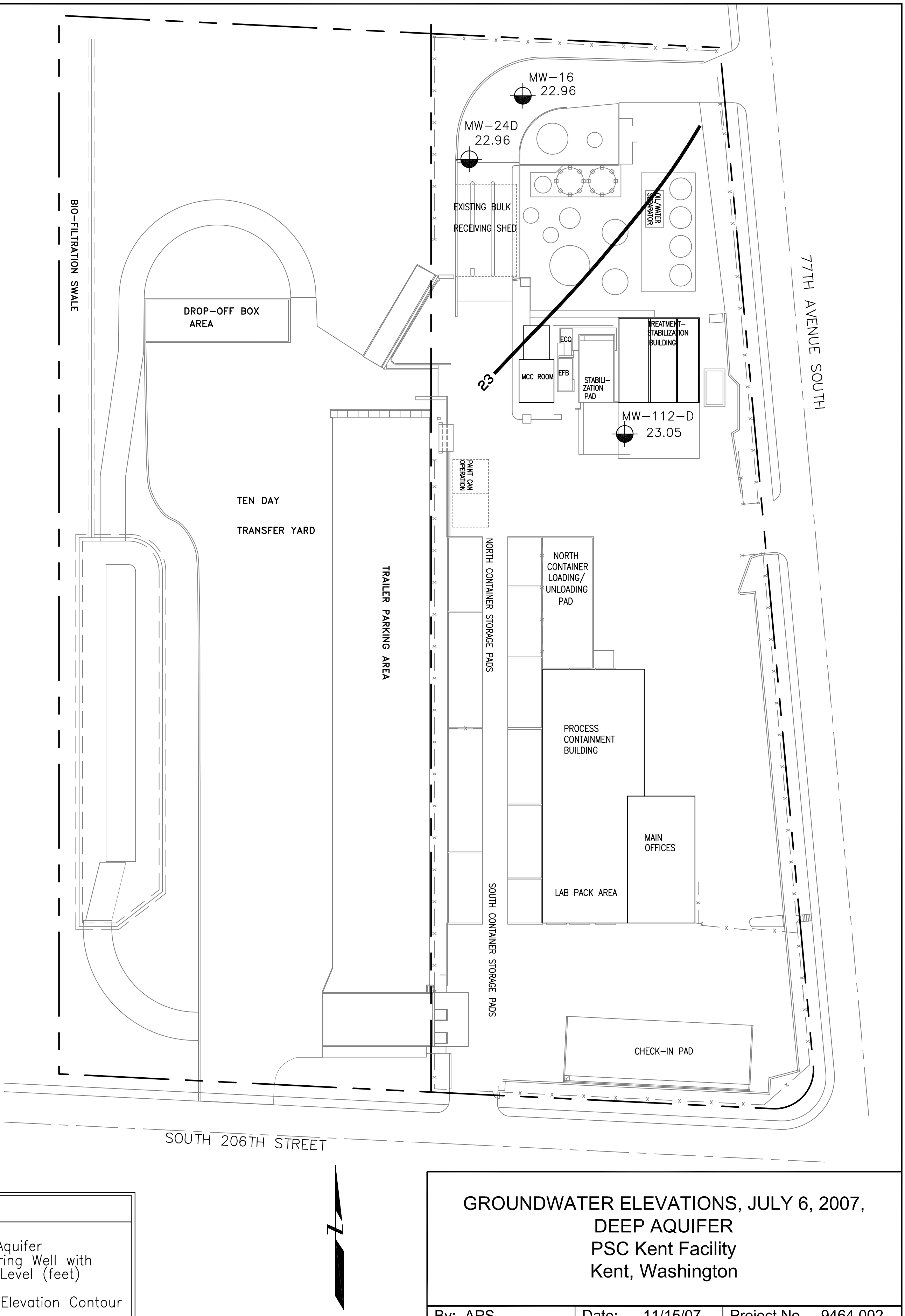
Plot Date: 11/15/07 - 10:21am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-21_1Q07d_Deep AquiferGW_PSC-Kent.dwg



GROUNDWATER ELEVATIONS, MARCH 30, 2007, DEEP AQUIFER
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **4-22**

Plot Date: 11/15/07 - 10:25am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-22_2Q07-d_Deep AquiferGW_PSC Kent.dwg



Legend

⊕ Deep Aquifer Monitoring Well with Water Level (feet)

∫ Water Elevation Contour

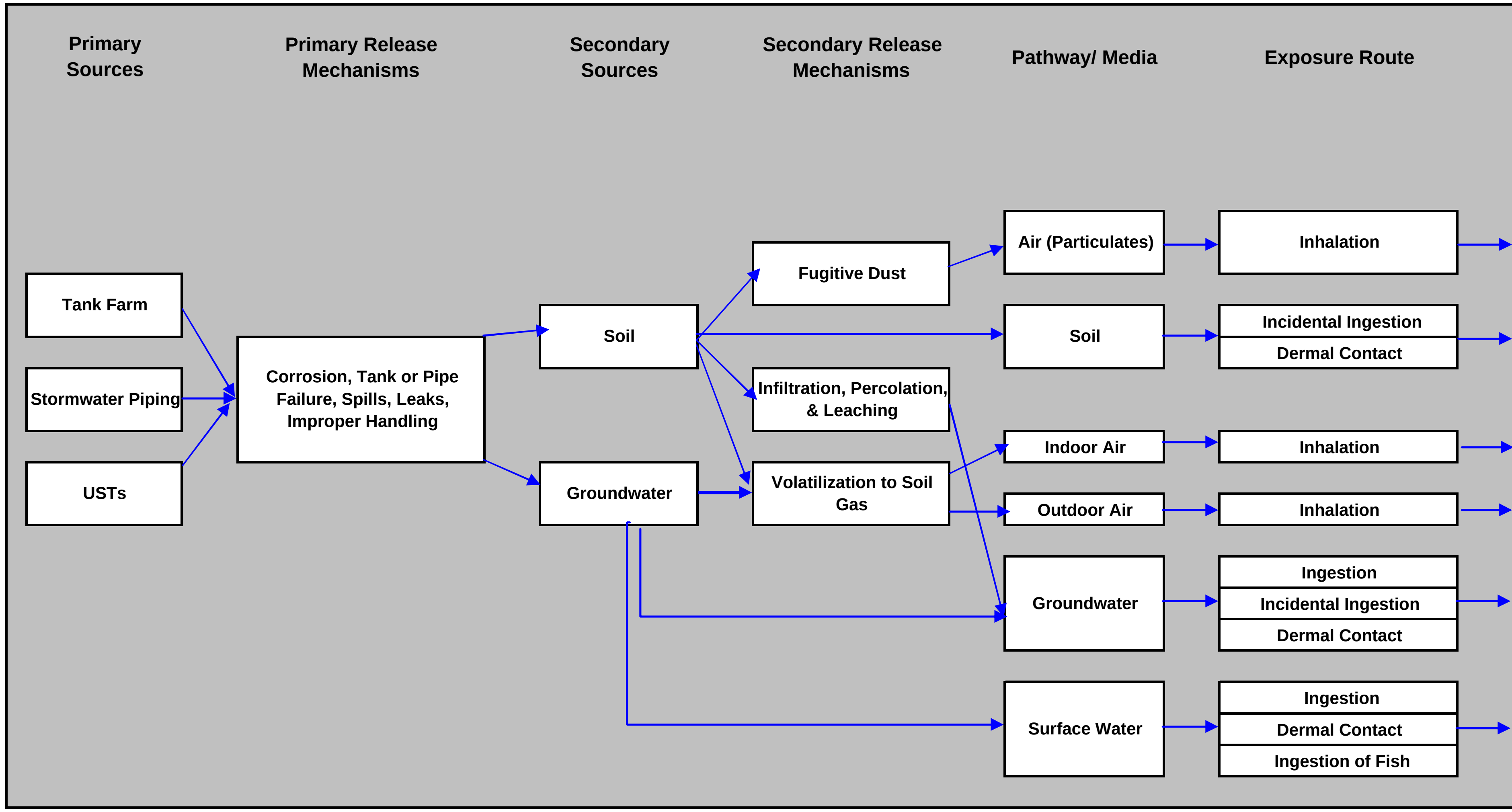
Contour Interval = 0.25 (feet)

0 40 80
APPROXIMATE SCALE IN FEET

GROUNDWATER ELEVATIONS, JULY 6, 2007,
DEEP AQUIFER
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 4-23

Plot Date: 11/15/07 - 10:25am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 4-23_3q07d_Deep AquiferGW_PSC-Kent.dwg



Potential Receptors

Pathway/ Media	Exposure Route	Resident C	Resident F	Office Worker C	Office Worker F	Industrial Worker C	Industrial Worker F	Construction/ Utility Worker C	Construction/ Utility Worker F	Site Visitor C	Site Visitor F	Surface Water User C	Surface Water User F	Ecological Receptor C	Ecological Receptor F
Air (Particulates)	Inhalation	--	--	--	--	--	▨x*	--	x*	--	x*	--	--	--	--
Soil	Incidental Ingestion	--	--	--	--	--	▨x*	▨x	x	--	--	--	--	--	--
	Dermal Contact	--	--	--	--	--	▨x*	▨x	x	--	--	--	--	--	--
Indoor Air	Inhalation	--	--	▨x	▨x	--	--	--	--	x	x	--	--	--	--
Outdoor Air	Inhalation	--	--	--	--	x	x	▨x	▨x	x	x	--	--	--	--
Groundwater	Ingestion	--	x	--	--	--	--	--	--	--	--	--	--	--	--
	Incidental Ingestion	--	x	--	x	--	--	▨x	▨x	--	--	--	--	--	--
	Dermal Contact	--	--	--	--	--	--	▨x	▨x	--	--	--	--	--	--
Surface Water	Ingestion	--	--	--	--	--	--	--	--	--	--	--	▨x	--	▨x
	Dermal Contact	--	--	--	--	--	--	--	--	--	--	--	▨x	--	▨x
	Ingestion of Fish	--	--	--	--	--	--	--	--	--	--	--	▨x	--	▨x

KEY

→	Potential Transport or Exposure Pathway
--	Incomplete Exposure Pathway
x	Potentially Complete Exposure Pathway
▨x	Most highly exposed receptor
*	Assumes cap removed in the future
C	Current land use
F	Future land use

CONCEPTUAL SITE MODEL
PSC Kent Facility
Kent, Washington

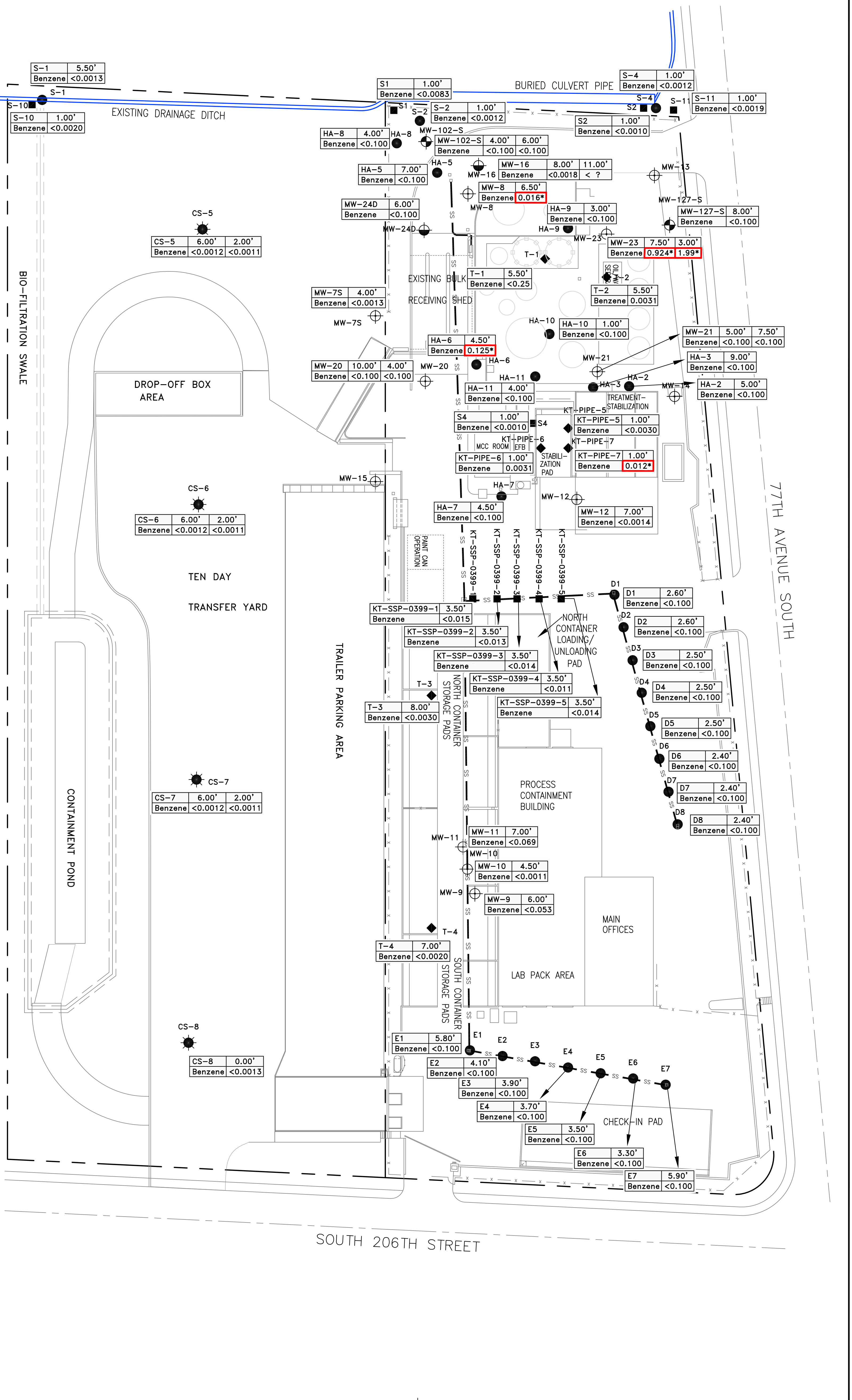
By: APS
Date: 11/15/07
Project No.: 9464.002

Geomatrix

Figure **5-1**

S:\9464\003_RI\Data\Figure 5-1-ADAM1.xls

Plot Date: 11/15/07 - 10:47am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-1_Benzene_PSC-Kent.dwg



Legend

- ⊕ Groundwater Monitoring Well Location
- ⌖ Abandoned Groundwater Monitoring Well Location
- ✹ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- ss Storm Water Drainage System
- NT Indicates Not Tested
- ▭* Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Benzene = 8.42E-03 mg/kg

Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

0 30 60
APPROXIMATE SCALE IN FEET

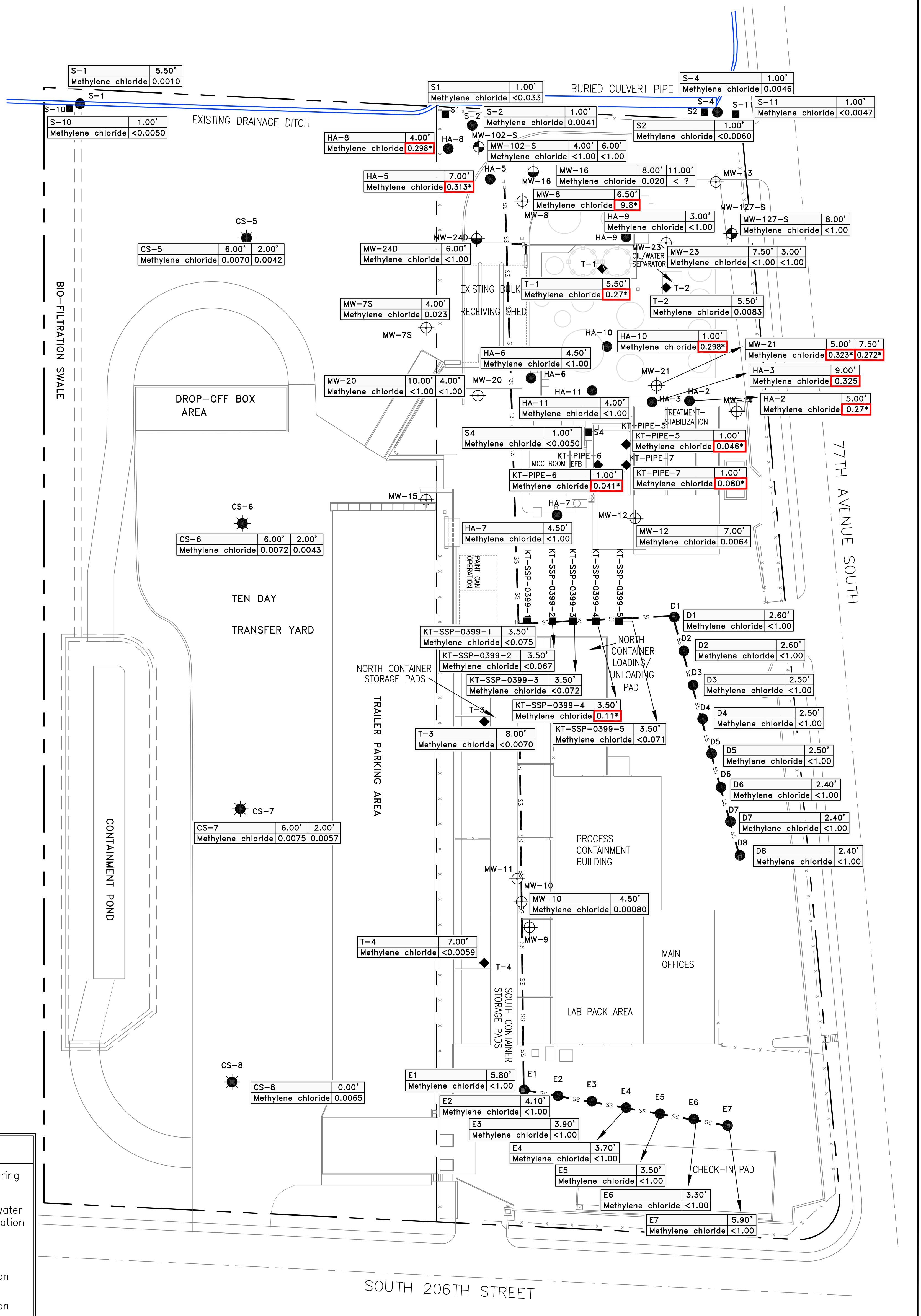
BENZENE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS | Date: 11/15/07 | Project No. 9464.002

Geomatrix

Figure 6-1

Plot Date: 11/15/07 - 10:47am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-2_meth chlor_PSC-Kent.dwg



Legend

- ⯐ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✹ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- ss Storm Water Drainage System
- NT Indicates Not Tested
- 🟥* Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Methylene Chloride
= 2.37E-02 mg/kg

Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

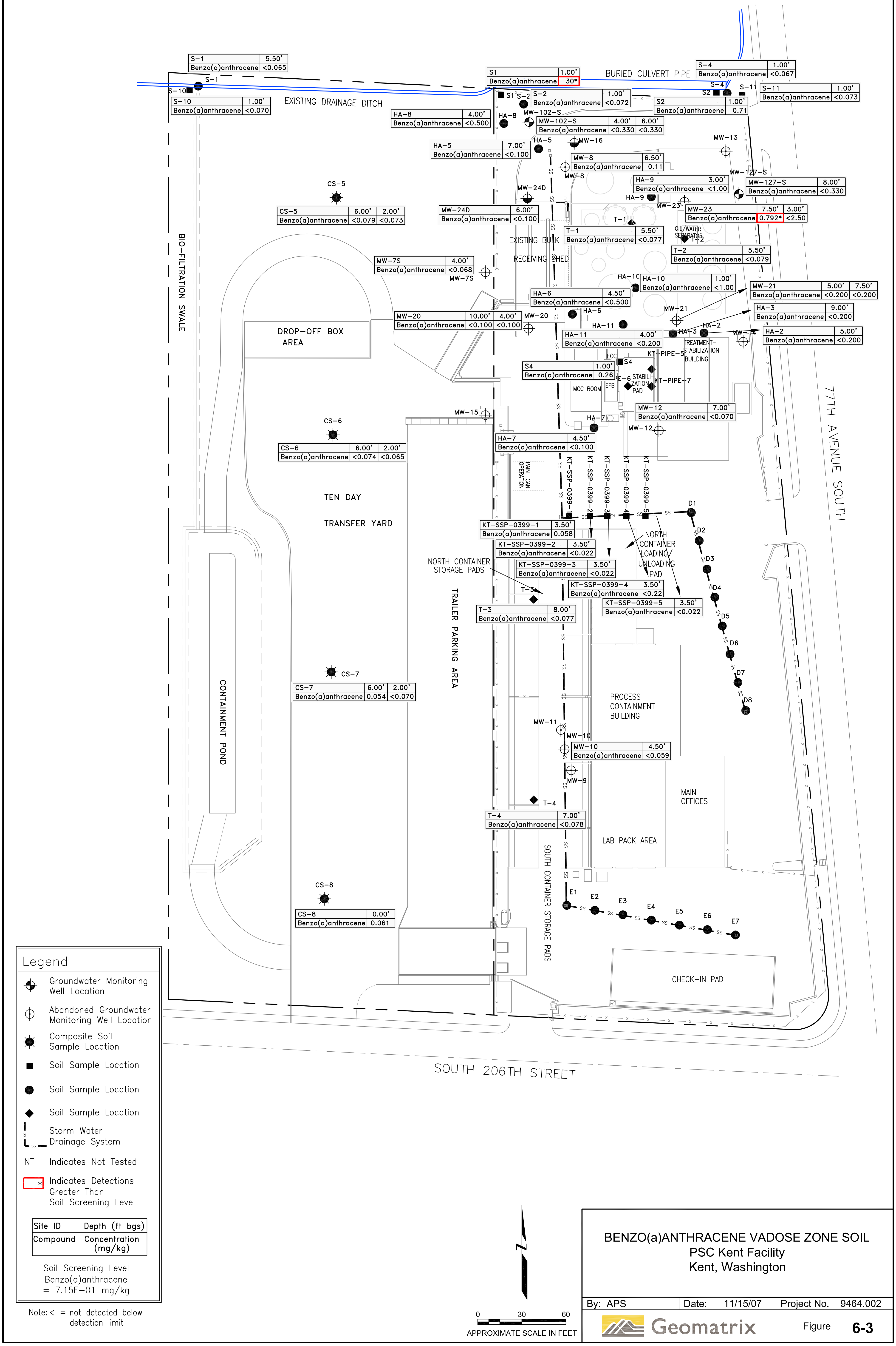
METHYLENE CHLORIDE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS | Date: 11/15/07 | Project No. 9464.002

Geomatrix

Figure 6-2

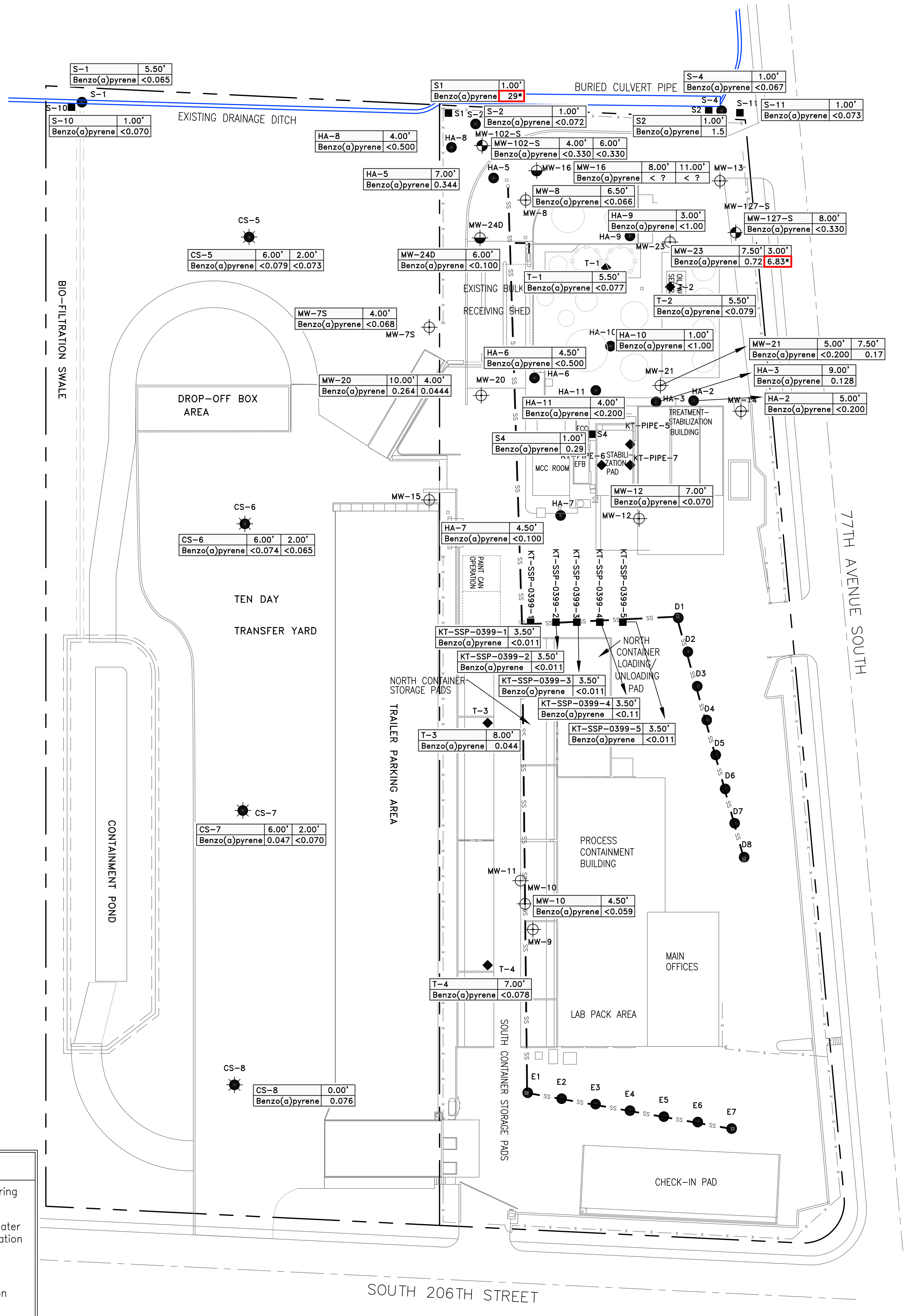
Plot Date: 11/15/07 - 10:50am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-3_Benzo a anth_PSC-Kent.dwg



BENZO(a)ANTHRACENE VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-3

Plot Date: 11/15/07 - 10:51am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-4_Benzo a pyrene_PSC-Kent.dwg



Legend

⊕	Groundwater Monitoring Well Location
⌖	Abandoned Groundwater Monitoring Well Location
✸	Composite Soil Sample Location
■	Soil Sample Location
●	Soil Sample Location
◆	Soil Sample Location
ss	Storm Water Drainage System
NT	Indicates Not Tested
▭*	Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level
Benzo(a)pyrene
= 1.94E+00 mg/kg

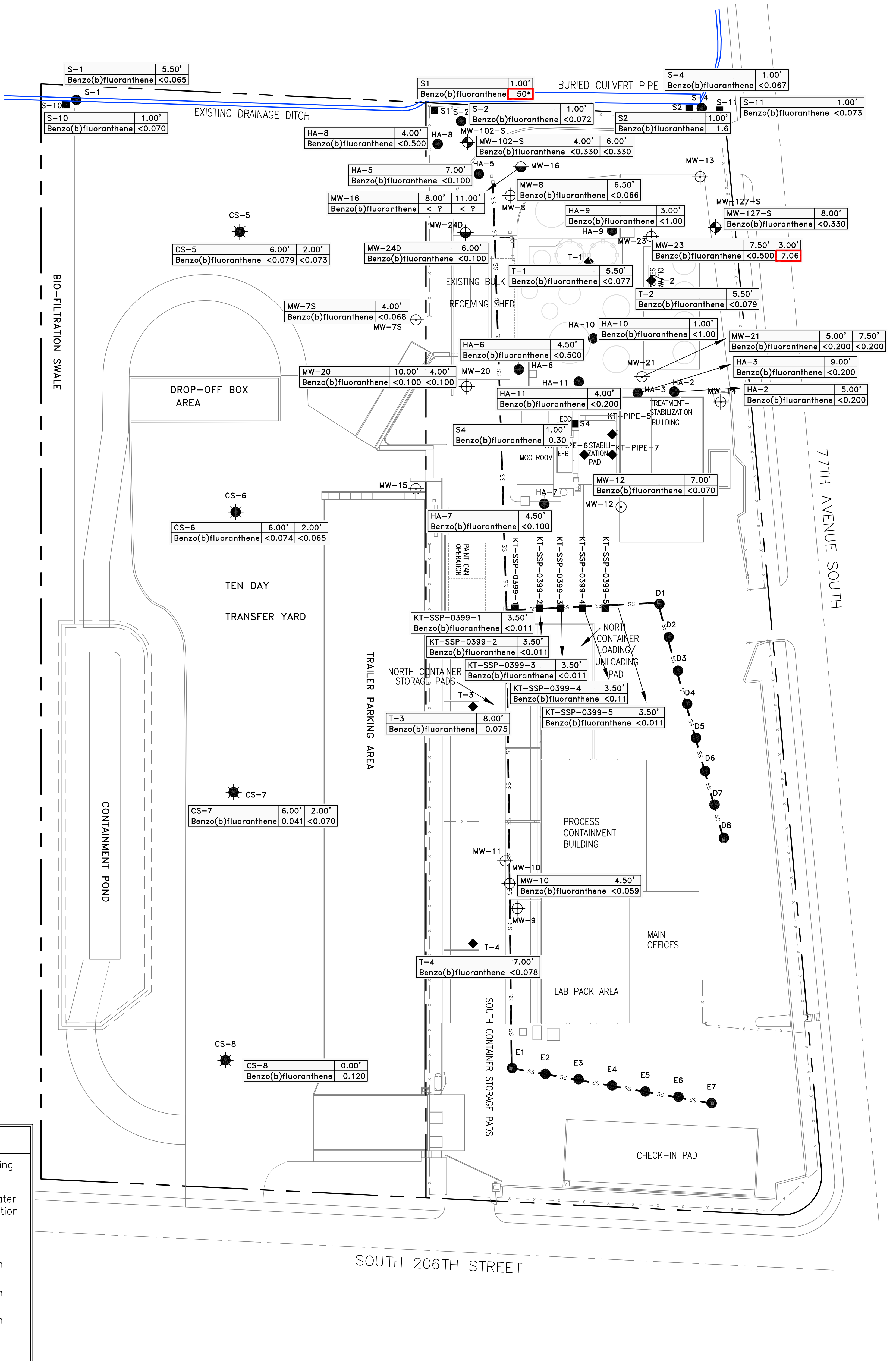
Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

0 30 60
APPROXIMATE SCALE IN FEET

BENZO(a)PYRENE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-4

Plot Date: 11/15/07 - 10:52am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-5_Benzo b fluor_PSC-Kent.dwg



Legend

⊕	Groundwater Monitoring Well Location
⊕	Abandoned Groundwater Monitoring Well Location
✹	Composite Soil Sample Location
■	Soil Sample Location
●	Soil Sample Location
◆	Soil Sample Location
ss	Storm Water Drainage System
NT	Indicates Not Tested
*	Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level
Benzo(b)fluoranthene = 2.46E+00 mg/kg

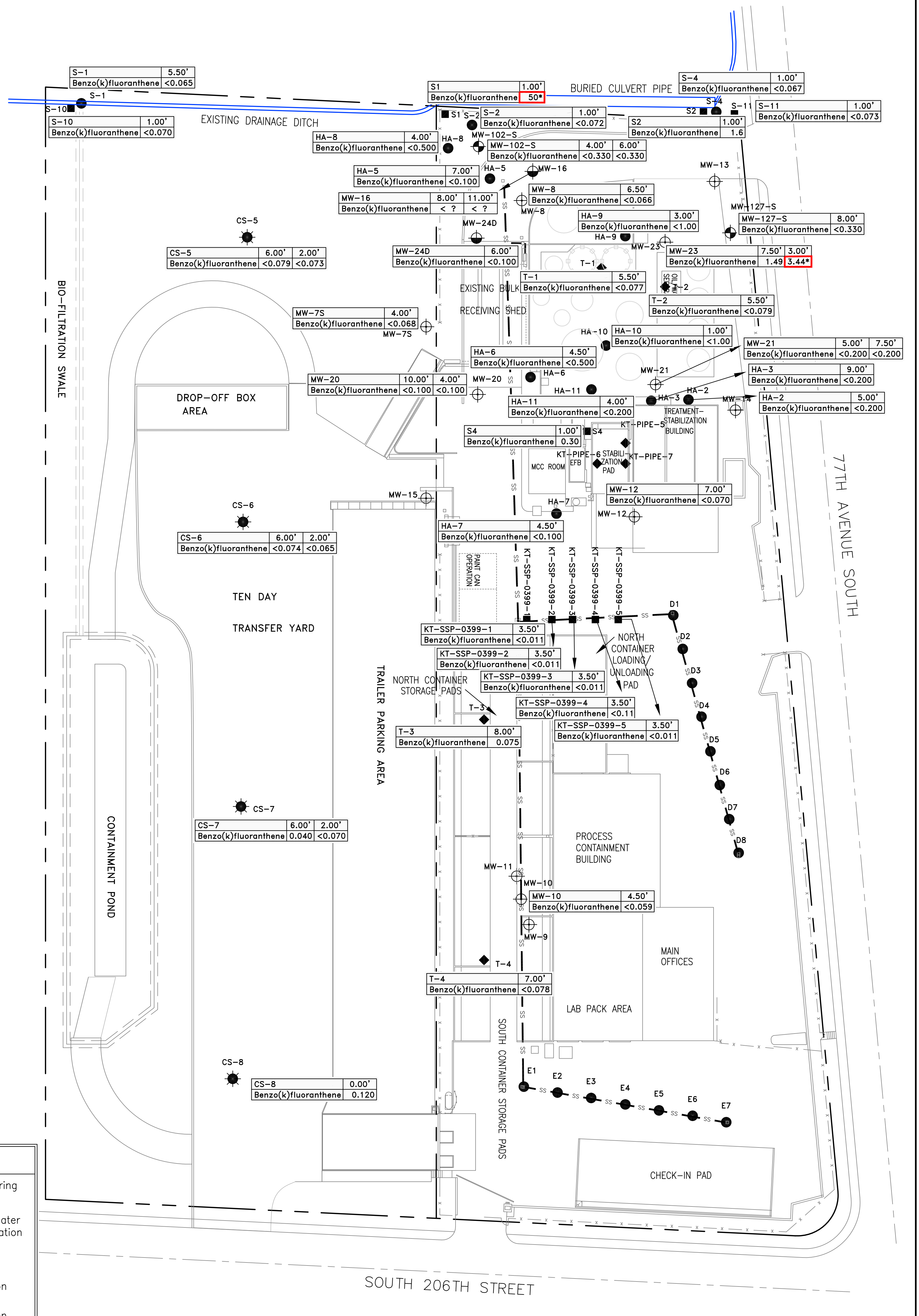
Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

0 30 60
APPROXIMATE SCALE IN FEET

BENZO(b)FLUORANTHENE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-5

Plot Date: 11/15/07 - 10:52am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-6_Benzo k fluor_PSC-Kent.dwg



Legend

- ⌖ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✹ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- ss Storm Water Drainage System
- NT Indicates Not Tested
- 🟥* Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level
Benzo(k)fluoranthene
= 2.46E+00 mg/kg

Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

0 30 60
APPROXIMATE SCALE IN FEET

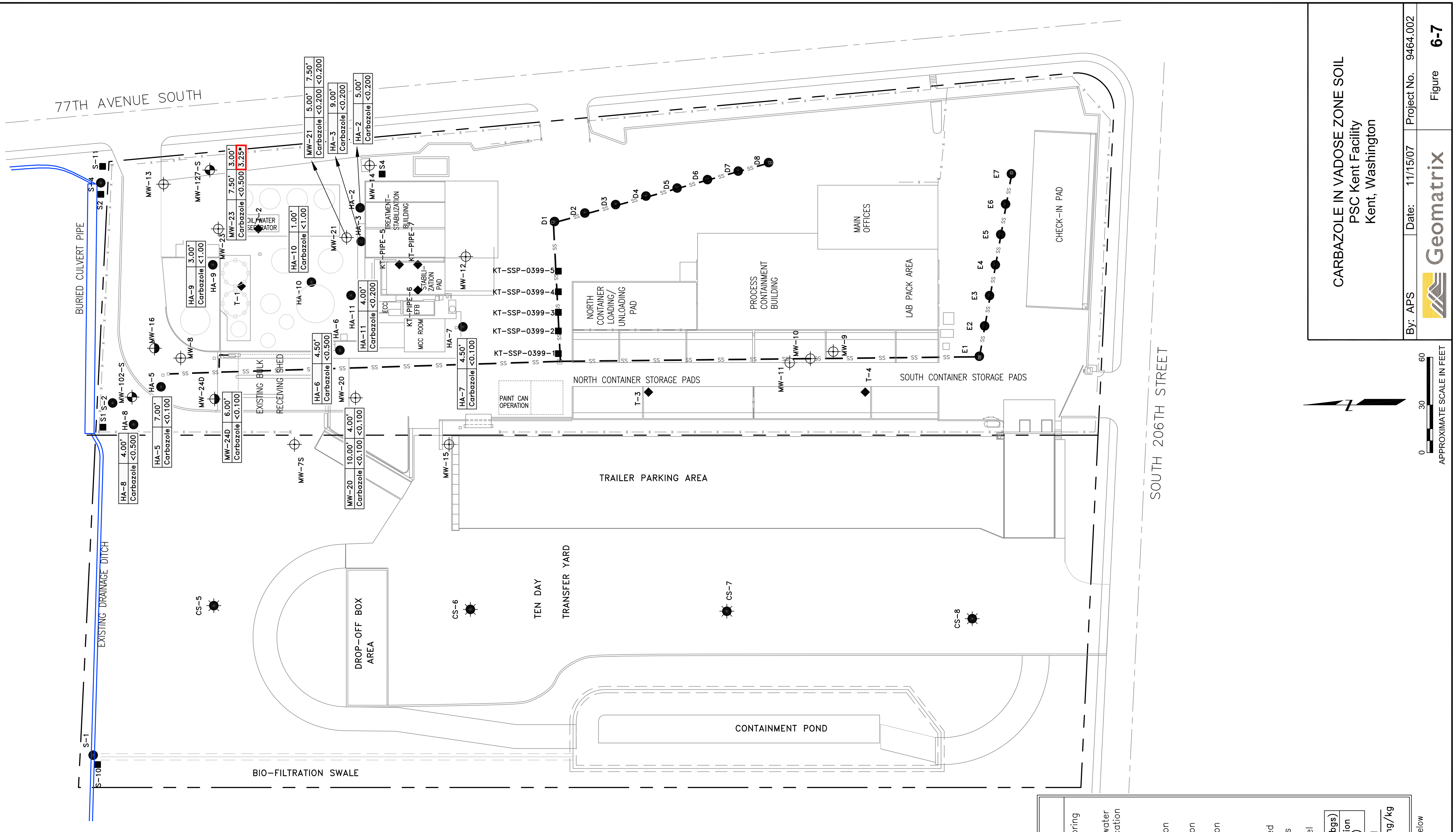
BENZO(k)FLUORANTHENE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-6

CARBAZOLE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS
Date: 11/15/07
Project No. 9464.002
Figure **6-7**

Geomatrix



Legend

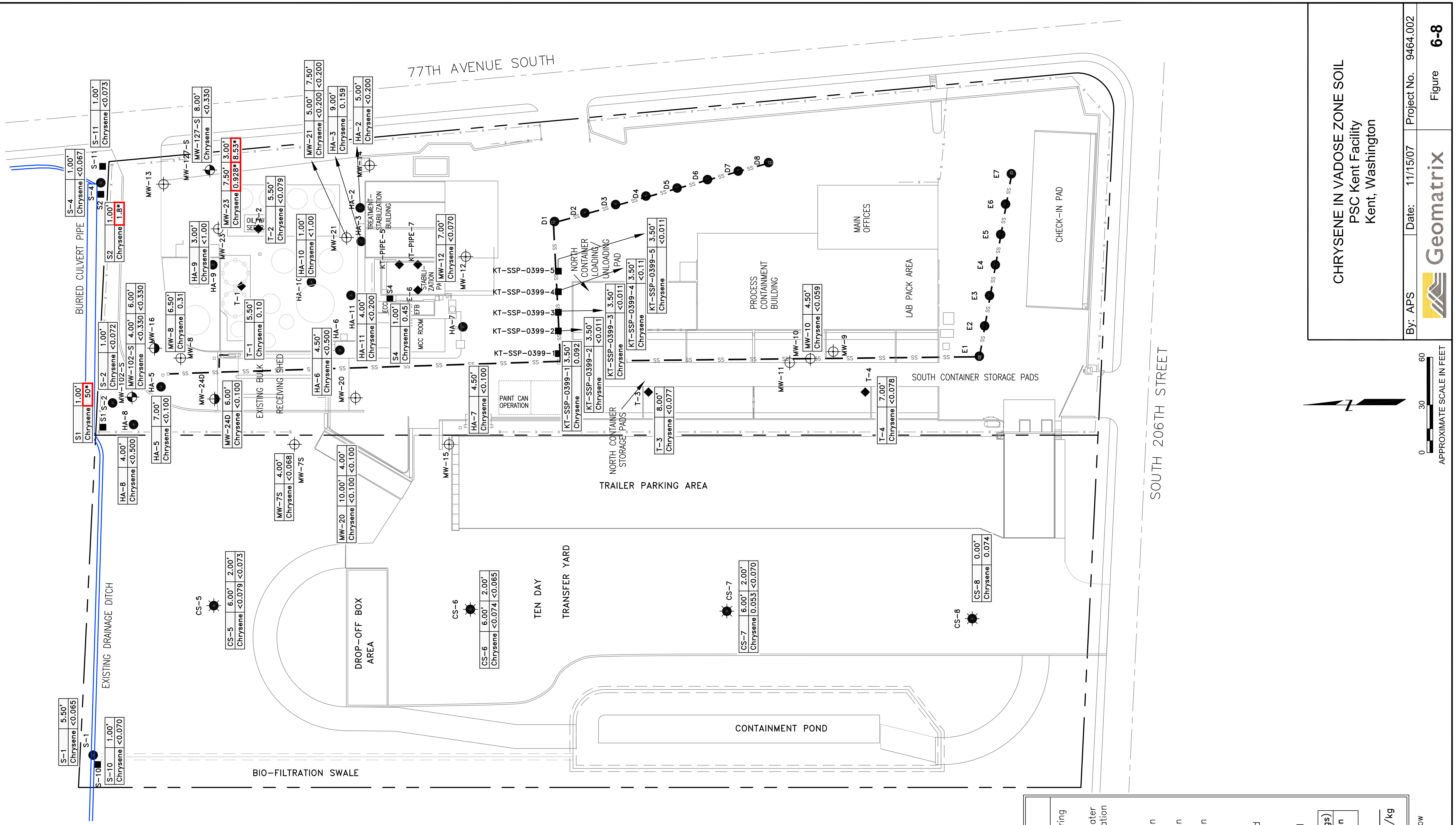
- Groundwater Monitoring Well Location
- Abandoned Groundwater Monitoring Well Location
- Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- SS Storm Water Drainage System
- NT Indicates Not Tested
- * Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level
Carbazole = 1.50E+00 mg/kg

Note: < = not detected below detection limit

Plot Date: 11/15/07 - 10:53am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-7_Carbazole_PSC-Kent.dwg



Legend

- ⊕ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✸ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- ss Storm Water Drainage System
- NT Indicates Not Tested
- * Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Chrysene = 7.96E–01 mg/kg

Note: < = not detected below detection limit

CHRYSENE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

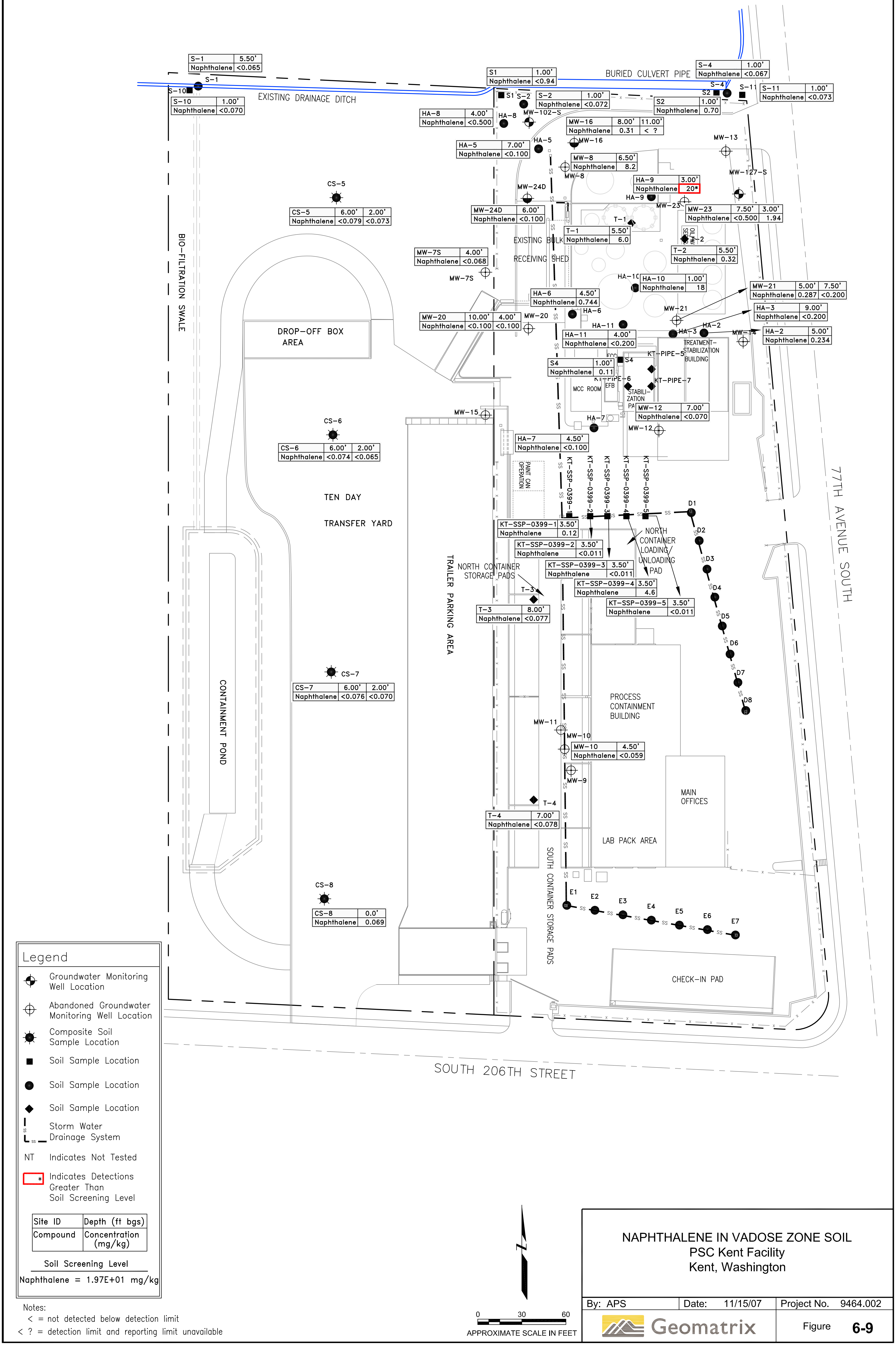
By: APS
Date: 11/15/07
Project No. 9464.002

Geomatrix

Figure 6-8

Plot Date: 11/15/07 - 10:53am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-8_Chrysene_PSC-Kent.dwg

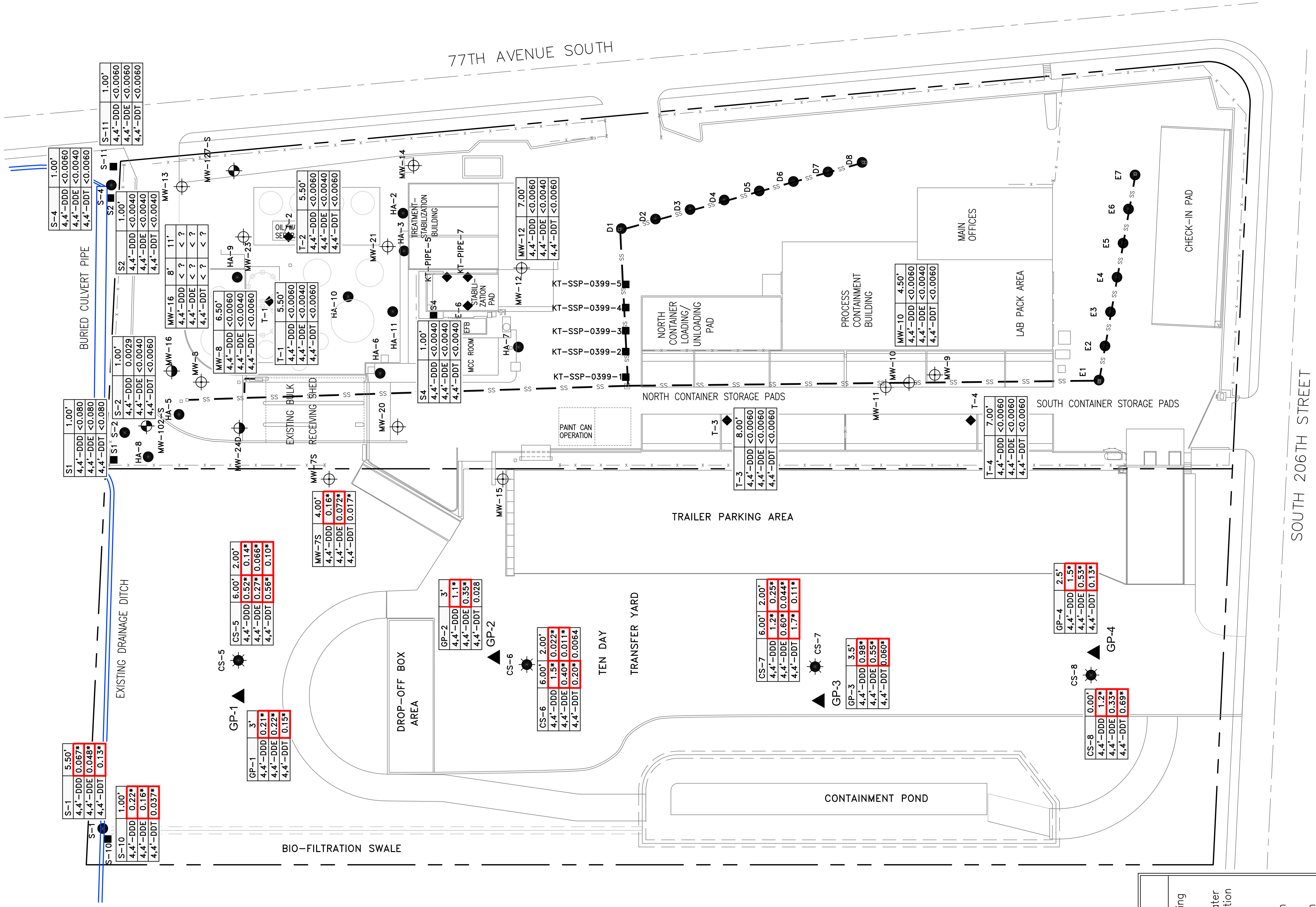
Plot Date: 11/15/07 - 10:56am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-9_Napthalene_PSC-Kent.dwg



Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

NAPHTHALENE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-9



Legend

- ⊕ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✹ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- ss Storm Water Drainage System
- NT Indicates Not Tested
- 🟥 * Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level
4,4-DDD = 2.29E-03
4,4-DDE = 4.30E-03
4,4-DDT = 3.39E-02

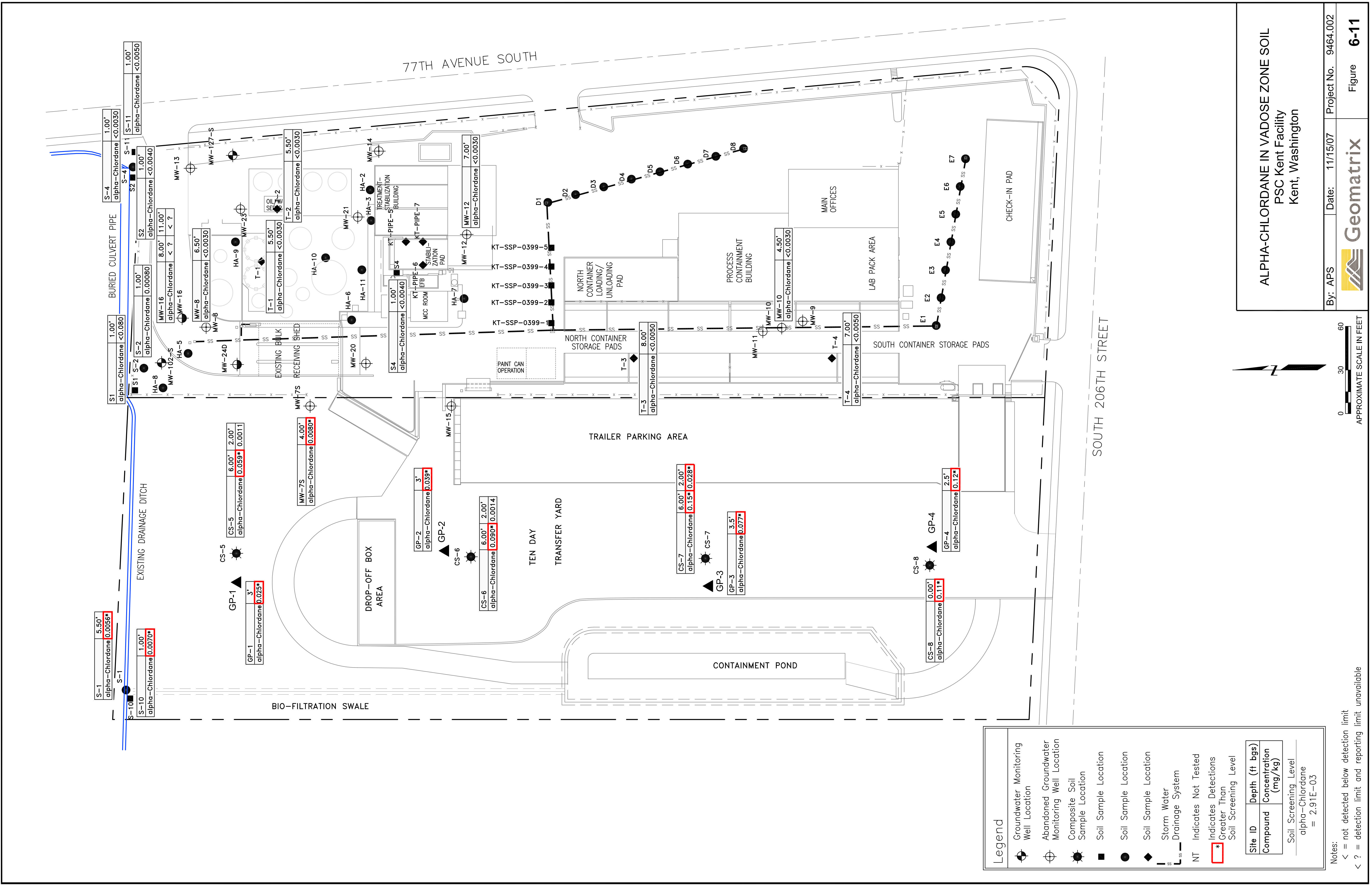
Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

4,4'-DDD, 4,4'-DDE, 4,4'-DDT IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS | Date: 11/15/07 | Project No. 9464.002

Geomatrix | Figure 6-10

Plot Date: 11/15/07 - 10:57am, Plotted by: astenberg
Drawing Path: S:\9464\003_R\CAD\, Drawing Name: Figure 6-10_4-4-DD-_PSC-Kent.dwg



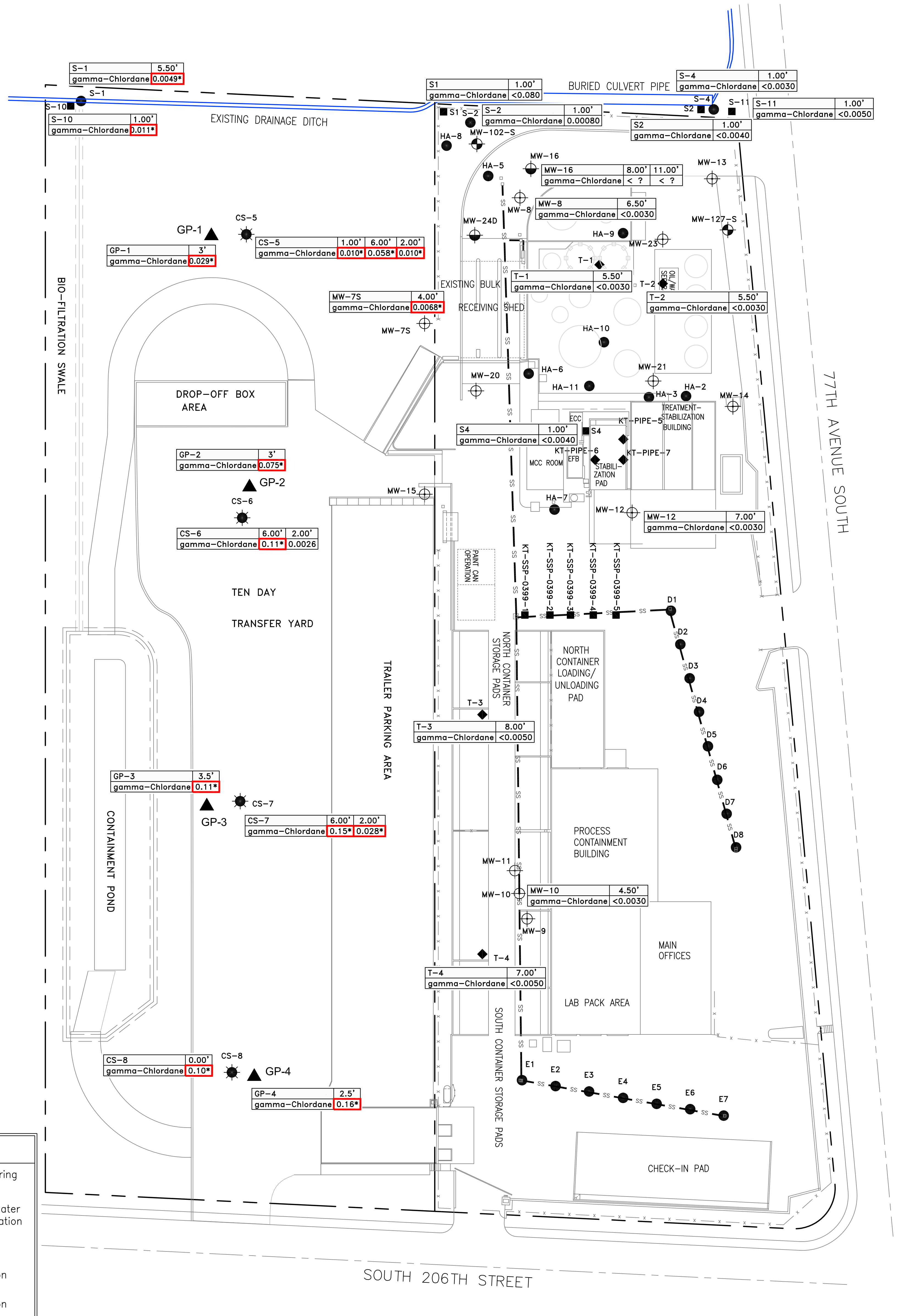
Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

ALPHA-CHLORDANE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS
Date: 11/15/07
Project No. 9464.002
Geomatrix
Figure 6-11

Plot Date: 11/15/07 - 11:00am, Plotted by: astenberg
Drawing Path: S:\9464\003_R\CAD\, Drawing Name: Figure 6-11_Alpha-Chlor_PSC-Kent.dwg

Plot Date: 11/15/07 - 11:13am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-12_gamma-Chlor_PSC-Kent.dwg



Legend

⊕	Groundwater Monitoring Well Location
⊕	Abandoned Groundwater Monitoring Well Location
✸	Composite Soil Sample Location
■	Soil Sample Location
●	Soil Sample Location
◆	Soil Sample Location
ss	Storm Water Drainage System
NT	Indicates Not Tested
🟥*	Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level
gamma-Chlordane
= 2.91E-03 mg/kg

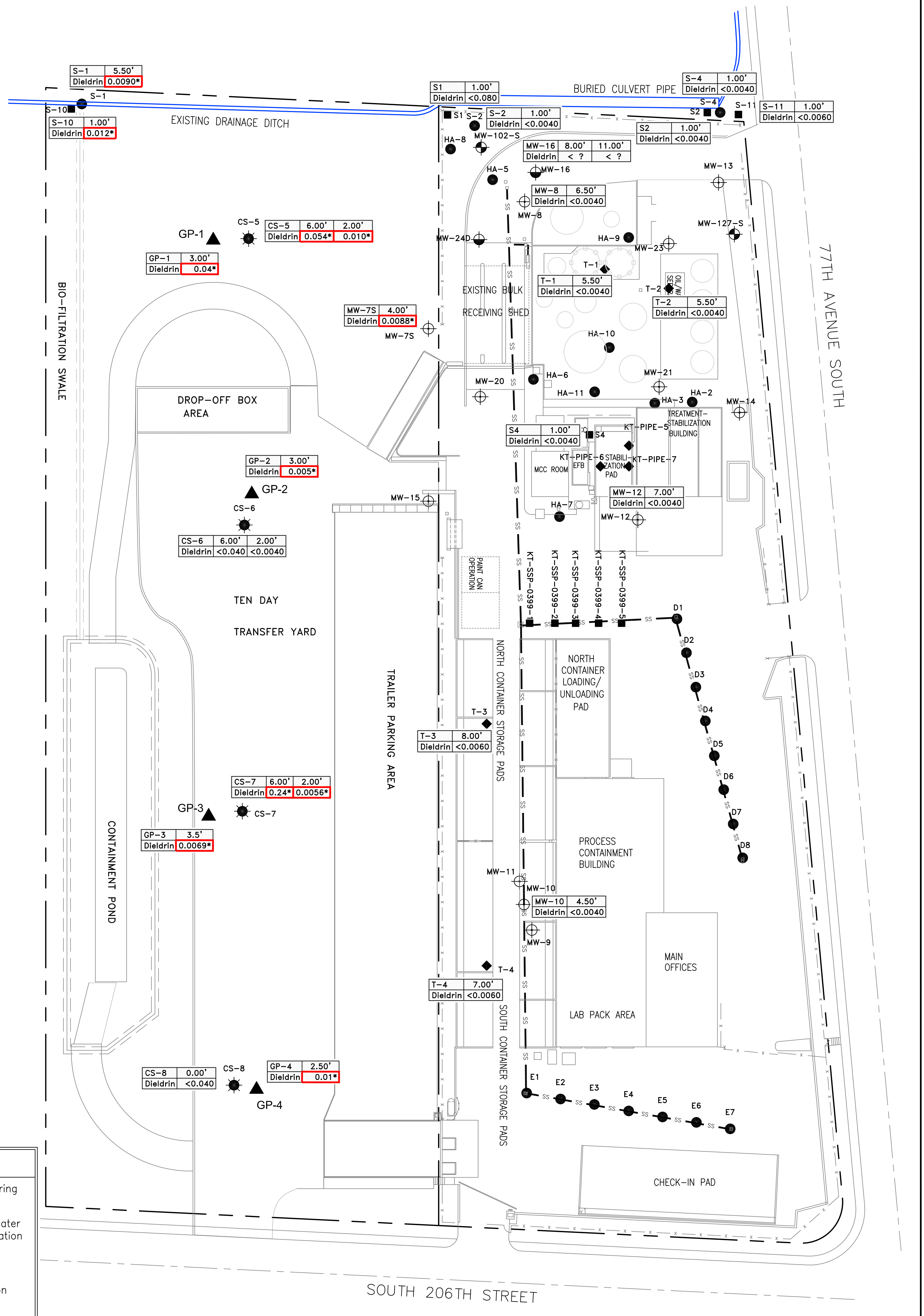
Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

0 30 60
APPROXIMATE SCALE IN FEET

GAMMA-CHLORDANE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-12

Plot Date: 11/15/07 - 11:14am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-13_Dieldrin_PSC-Kent.dwg



Legend

- ⊕ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✹ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- SS Storm Water Drainage System
- NT Indicates Not Tested
- 🟥* Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Dieldrin = 1.28E-03 mg/kg

Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

0 30 60
APPROXIMATE SCALE IN FEET

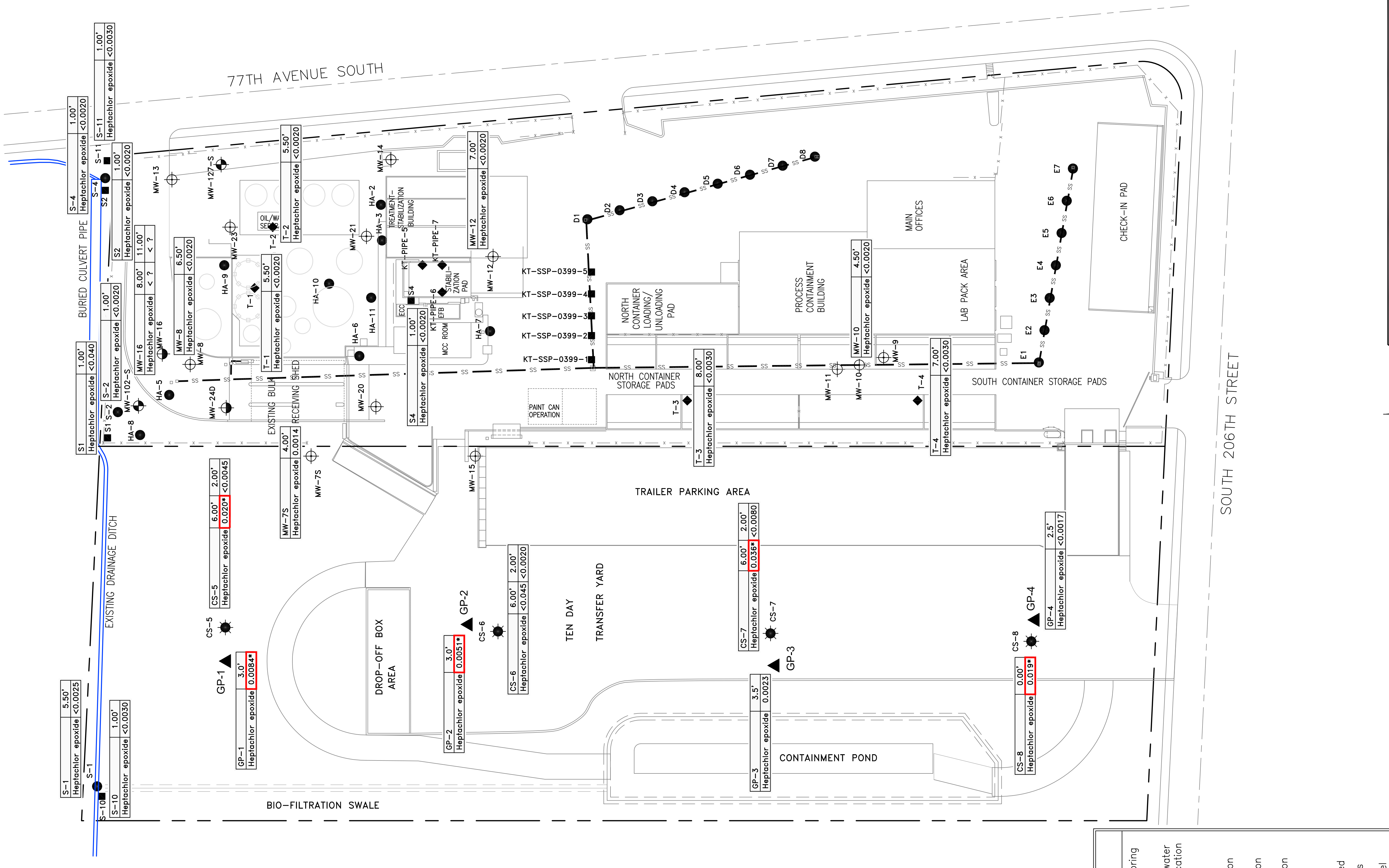
N

DIELDRIN IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS | Date: 11/15/07 | Project No. 9464.002

Geomatrix

Figure 6-13



Legend

- Groundwater Monitoring Well Location
- Abandoned Groundwater Monitoring Well Location
- Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- ss Storm Water Drainage System
- NT Indicates Not Tested
- * Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

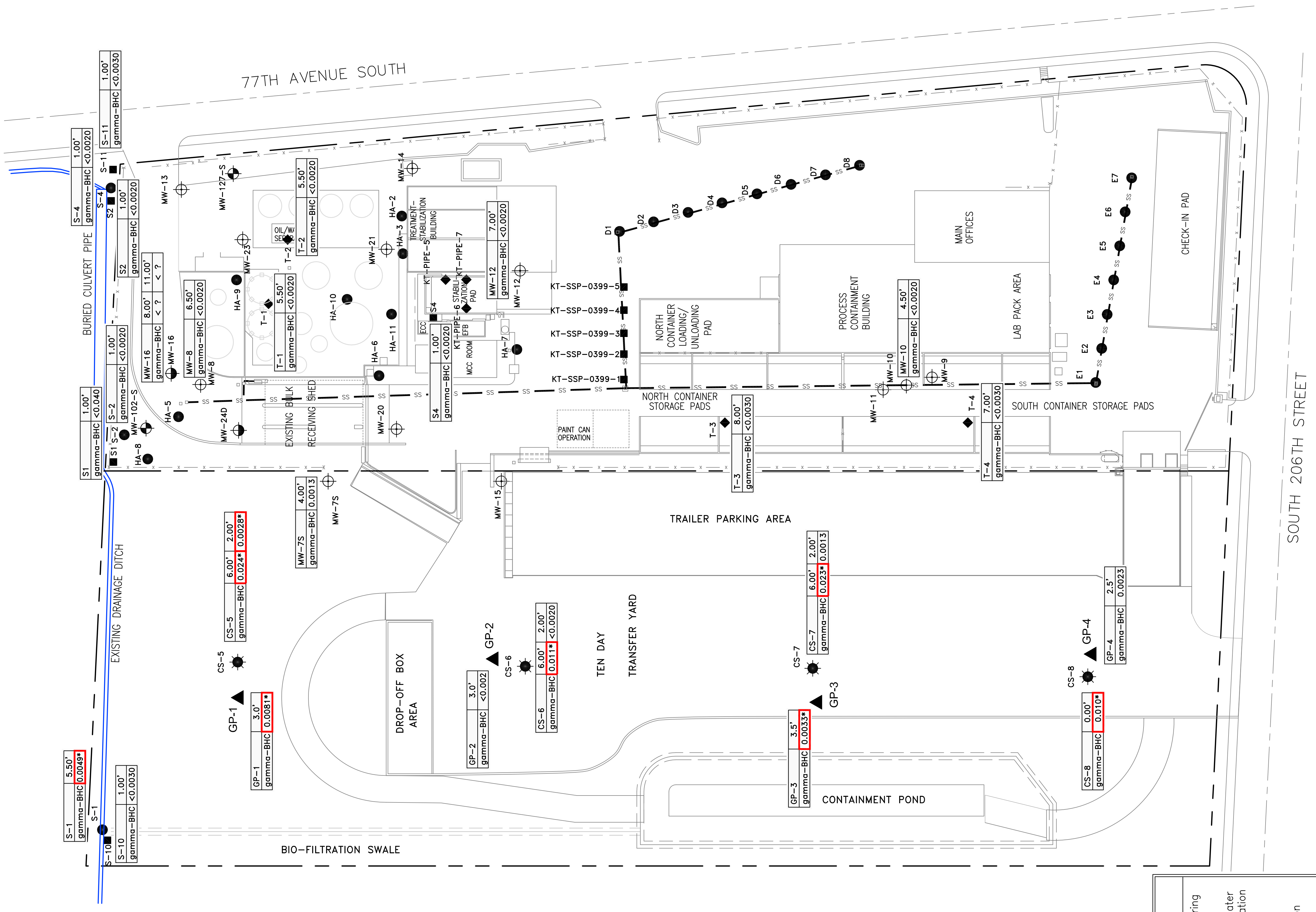
Heptachlor Epoxide = 4.15E-03 mg/kg

Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

HEPTACHLOR EPOXIDE IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS
Date: 11/15/07
Project No. 9464.002
Geomatrix
Figure 6-14

Plot Date: 11/15/07 - 11:14am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-14_heptachlor_PSC-Kent.dwg



GAMMA-BHC (LINDANE) IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS
Date: 11/15/07
Project No. 9464.002
Geomatrix
Figure **6-15**

Legend

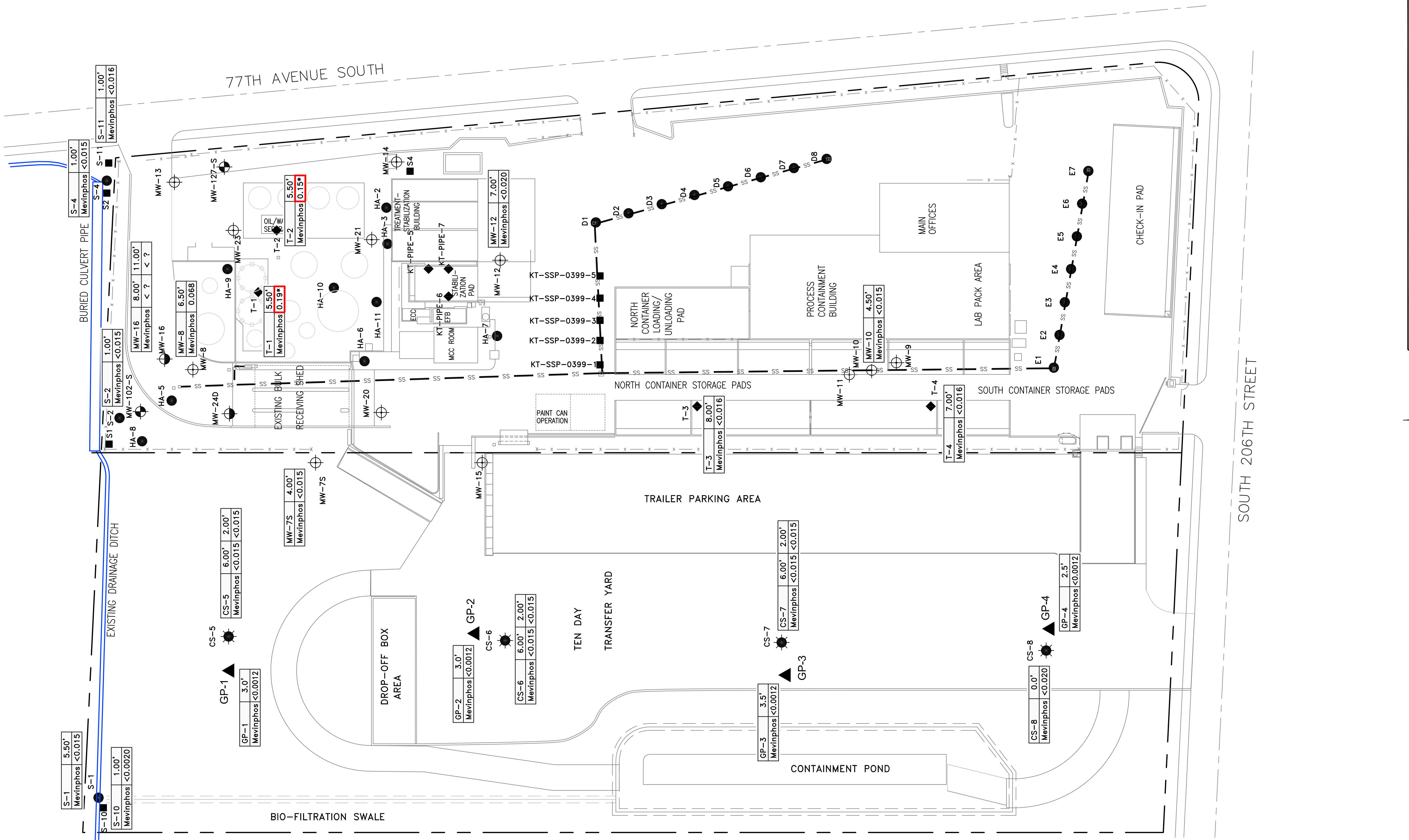
◓	Groundwater Monitoring Well Location
⊕	Abandoned Groundwater Monitoring Well Location
✹	Composite Soil Sample Location
■	Soil Sample Location
●	Soil Sample Location
◆	Soil Sample Location
ss	Storm Water Drainage System
NT	Indicates Not Tested
*	Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level
gamma-BHC
= 2.64E-03 mg/kg

Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

Plot Date: 11/15/07 - 11:15am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-15_gamma BHC-PSC-Kent.dwg



Legend

- ⊕ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✷ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- — SS — Storm Water Drainage System
- NT Indicates Not Tested
- * Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Phosdrin = 9.60E-02 mg/kg

Notes:
< = not detected below detection limit
< ? = detection limit and reporting limit unavailable

MEVINPHOS (PHOSDRIN) IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

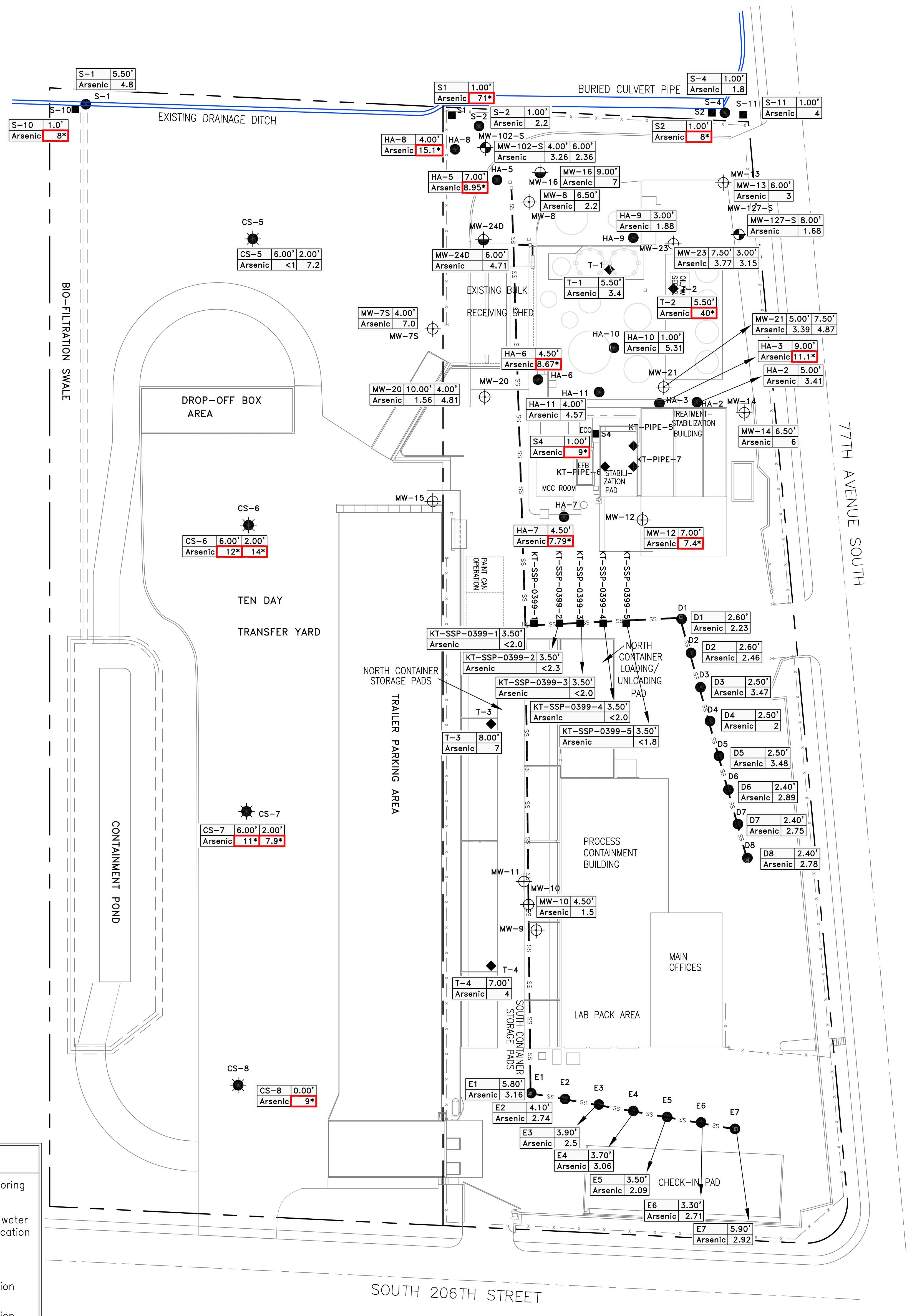
By: APS
Date: 11/15/07
Project No. 9464.002

Geomatrix

Figure 6-16

Plot Date: 11/15/07 - 11:16am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-16_phosdrin_PSC-Kent.dwg

Plot Date: 11/15/07 - 11:17am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-17_arsenic_PSC-Kent.dwg



Legend

⌖	Groundwater Monitoring Well Location
⊕	Abandoned Groundwater Monitoring Well Location
✹	Composite Soil Sample Location
■	Soil Sample Location
●	Soil Sample Location
◆	Soil Sample Location
┗ ss	Storm Water Drainage System
NT	Indicates Not Tested
🟥*	Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Arsenic = 7.30E+00 mg/kg

Note: < = not detected below detection limit

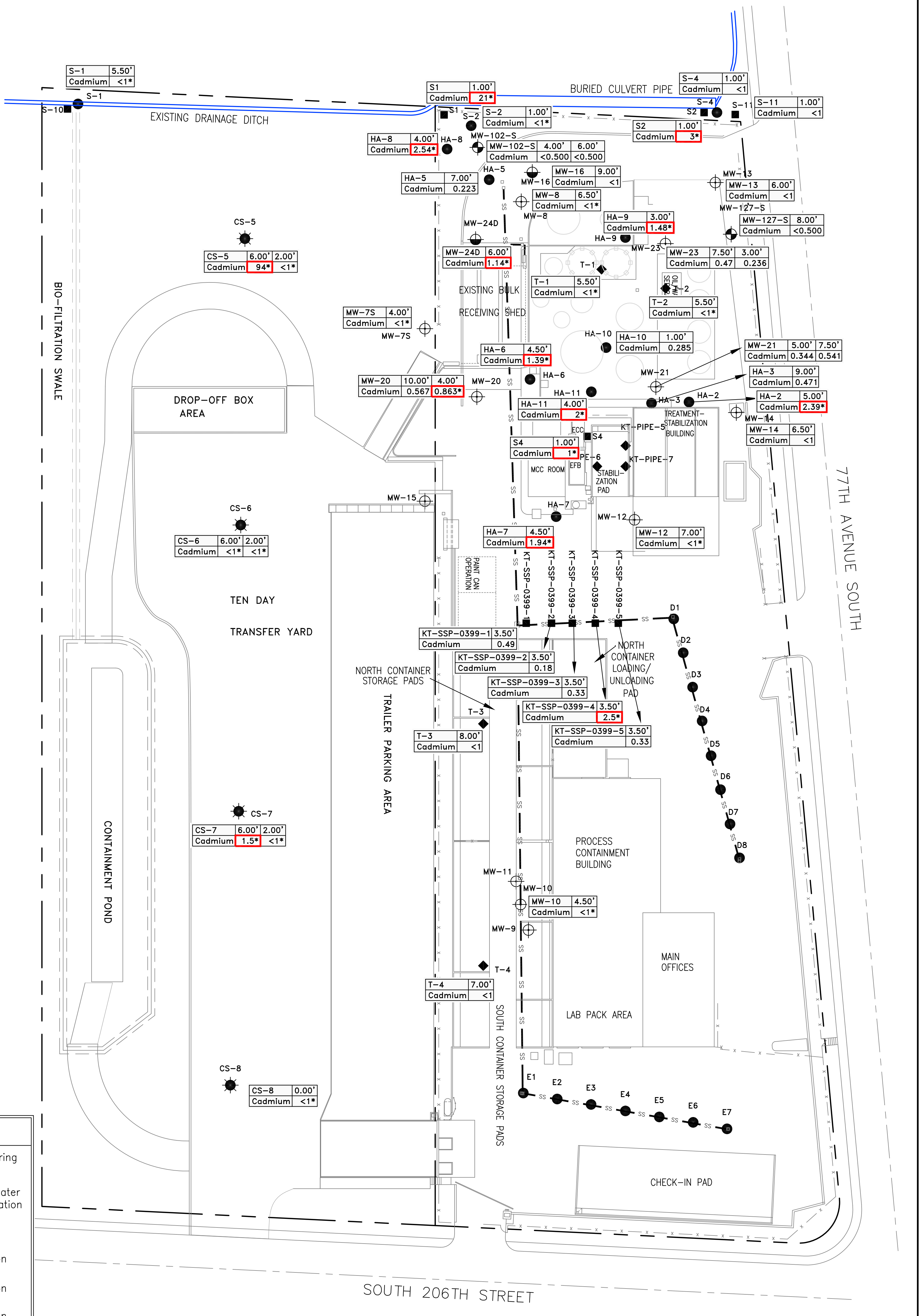
N

0 30 60
APPROXIMATE SCALE IN FEET

ARSENIC IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-17

Plot Date: 11/15/07 - 11:18am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-18_cadmium_PSC-Kent.dwg



N

0 30 60
APPROXIMATE SCALE IN FEET

Legend

⊕	Groundwater Monitoring Well Location
⊕	Abandoned Groundwater Monitoring Well Location
✹	Composite Soil Sample Location
■	Soil Sample Location
●	Soil Sample Location
◆	Soil Sample Location
SS	Storm Water Drainage System
NT	Indicates Not Tested
🟥 *	Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Cadmium = 8.00E-01 mg/kg

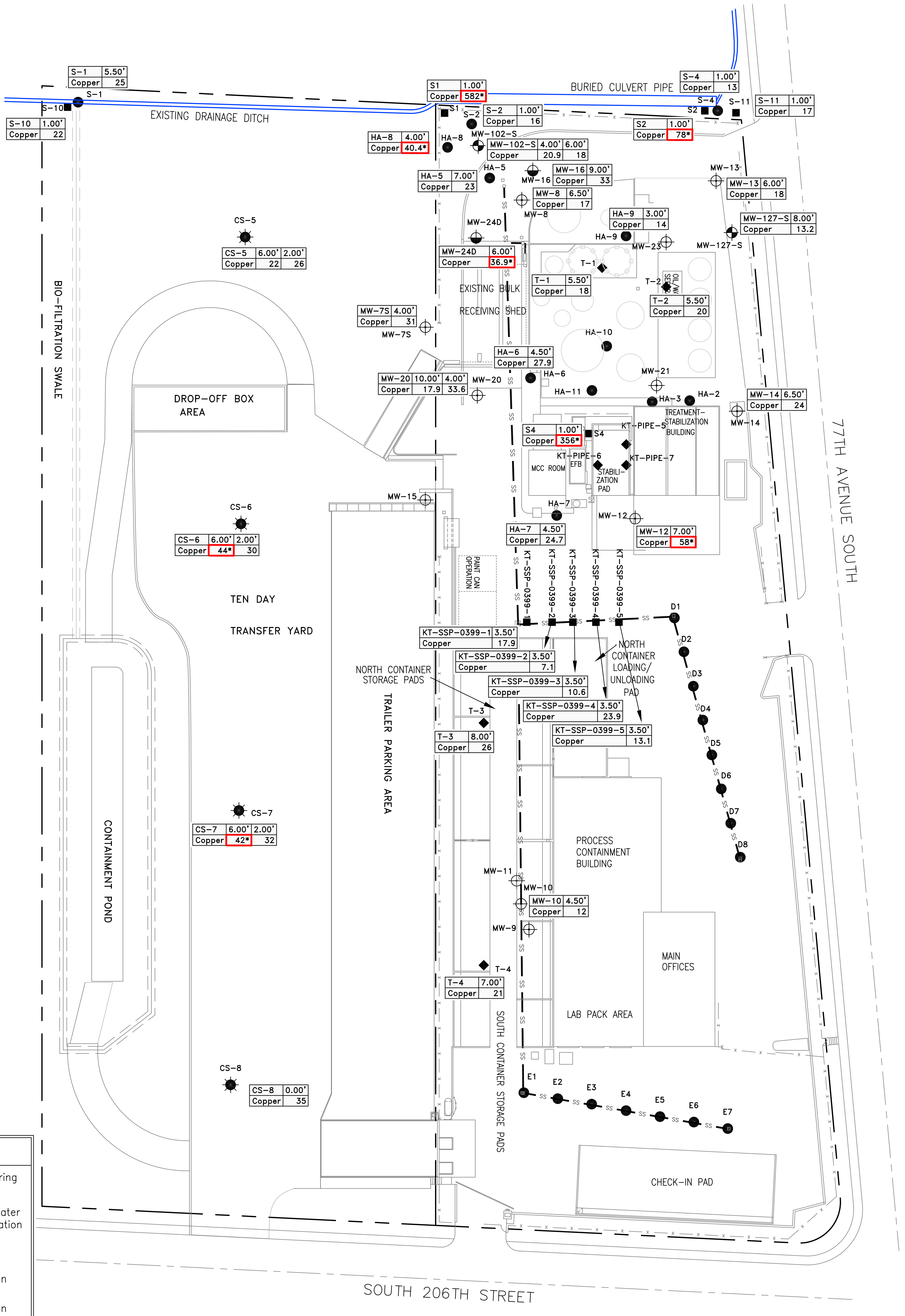
Note: < = not detected below detection limit

<1* = not detected below MRL (MDL unavailable)

CADMIUM IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-18

Plot Date: 11/15/07 - 11:18am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-19_copper_PSC-Kent.dwg



Legend
- ⊕ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✹ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- ss Storm Water Drainage System
- NT Indicates Not Tested
- 🟥* Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Copper = 3.64E+01 mg/kg

Note: < = not detected below detection limit

0 30 60
APPROXIMATE SCALE IN FEET

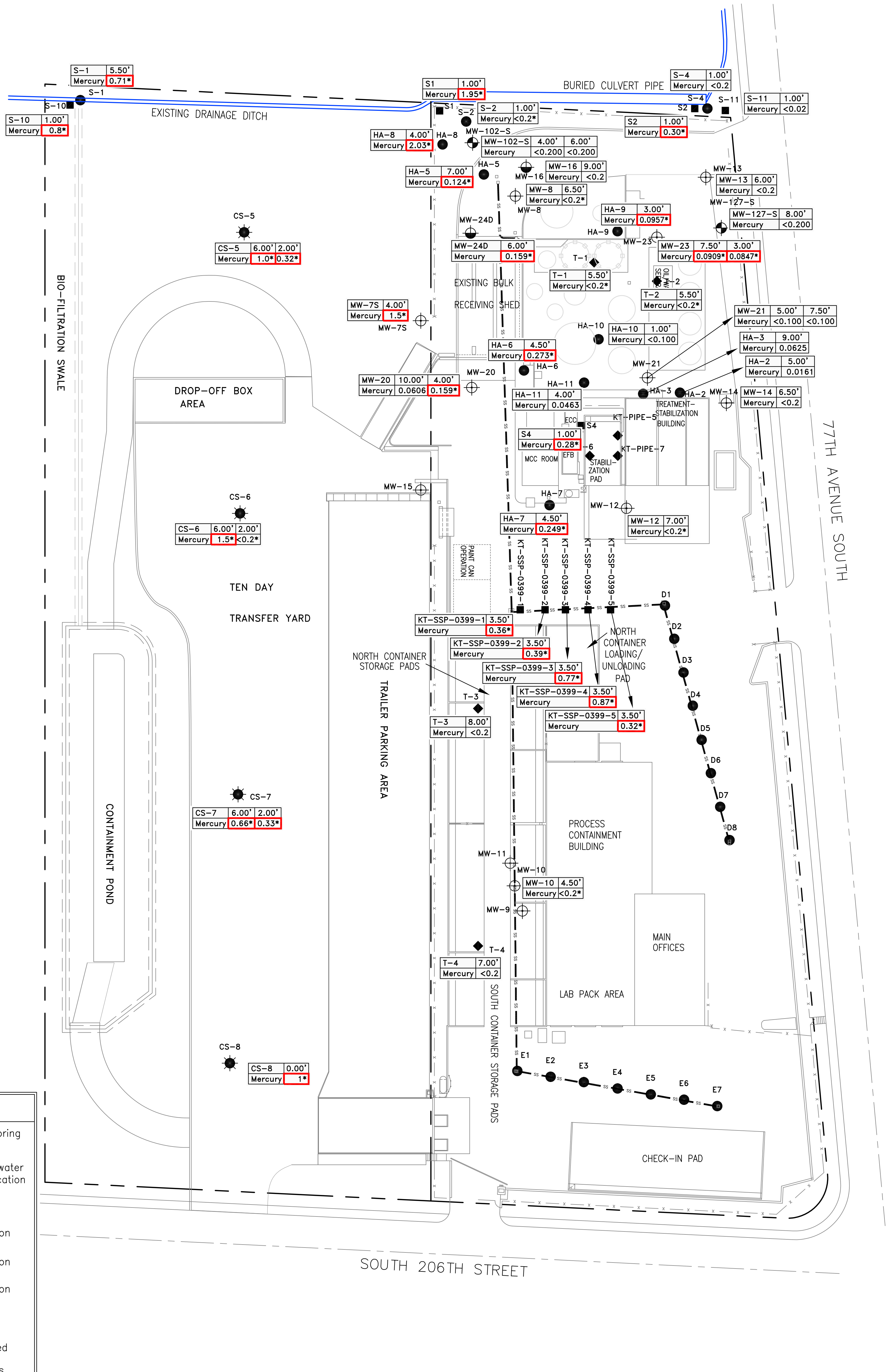
COPPER IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS | Date: 11/15/07 | Project No. 9464.002

Geomatrix

Figure 6-19

Plot Date: 11/15/07 - 11:19am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-20_mercury_PSC-Kent.dwg



Legend

⊕	Groundwater Monitoring Well Location
⊕	Abandoned Groundwater Monitoring Well Location
✸	Composite Soil Sample Location
■	Soil Sample Location
●	Soil Sample Location
◆	Soil Sample Location
ss	Storm Water Drainage System
NT	Indicates Not Tested
🟥*	Indicates Detections Greater Than Soil Screening Level

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Mercury = 7.00E-02 mg/kg

Note: < = not detected below detection limit

<0.2* = not detected below MRL (0.2) (MDL unavailable)

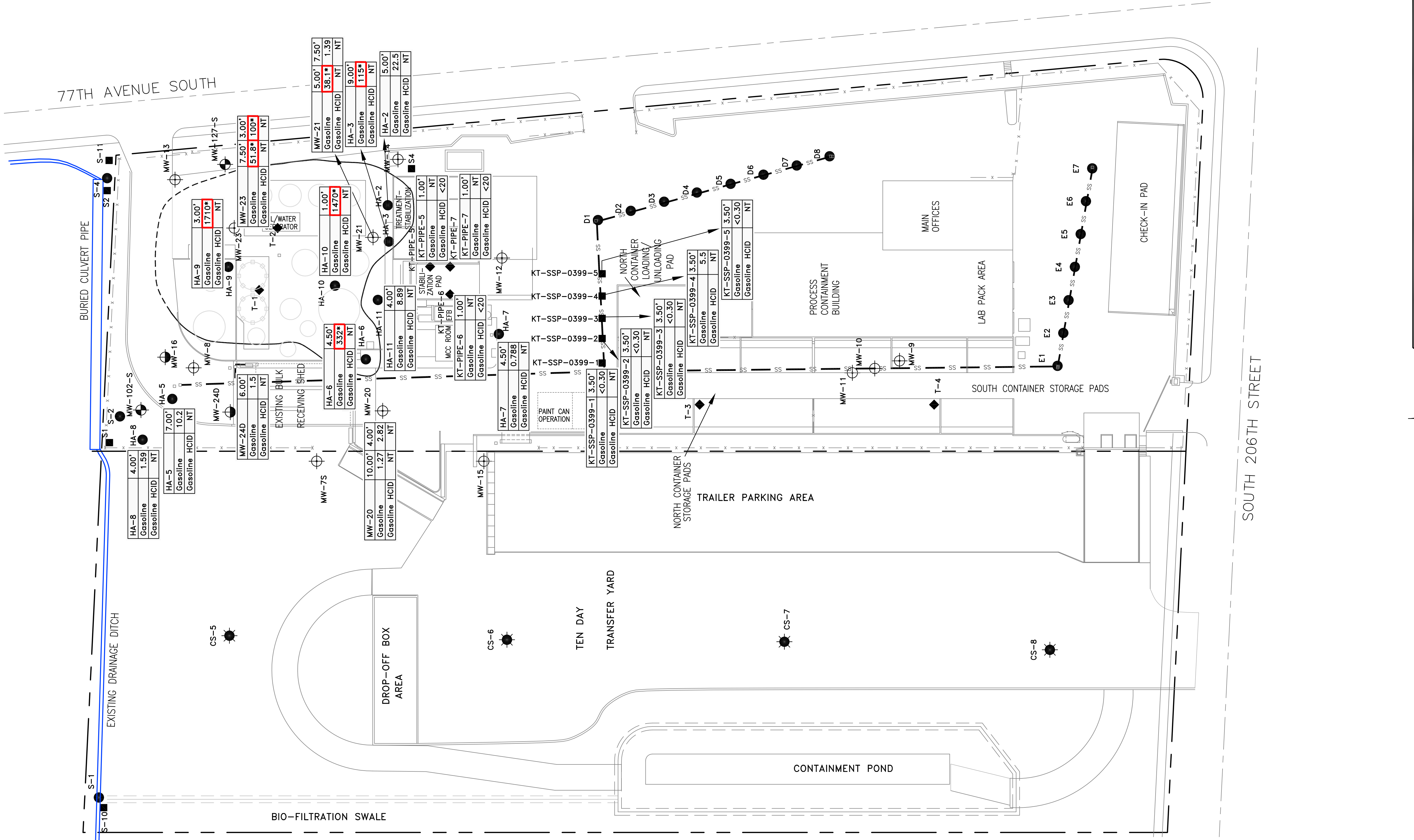
MERCURY IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS
Date: 11/15/07
Project No. 9464.002

Geomatrix

Figure 6-20

Plot Date: 11/15/07 - 11:20am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-21_Gasoline_PSC-Kent.dwg



0 30 60
APPROXIMATE SCALE IN FEET

Legend

- ◕ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✹ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- — SS — Storm Water Drainage System
- NT Indicates Not Tested
- * Indicates Detections Greater Than Soil Screening Level
- Contour Interval 30 (mg/kg)

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

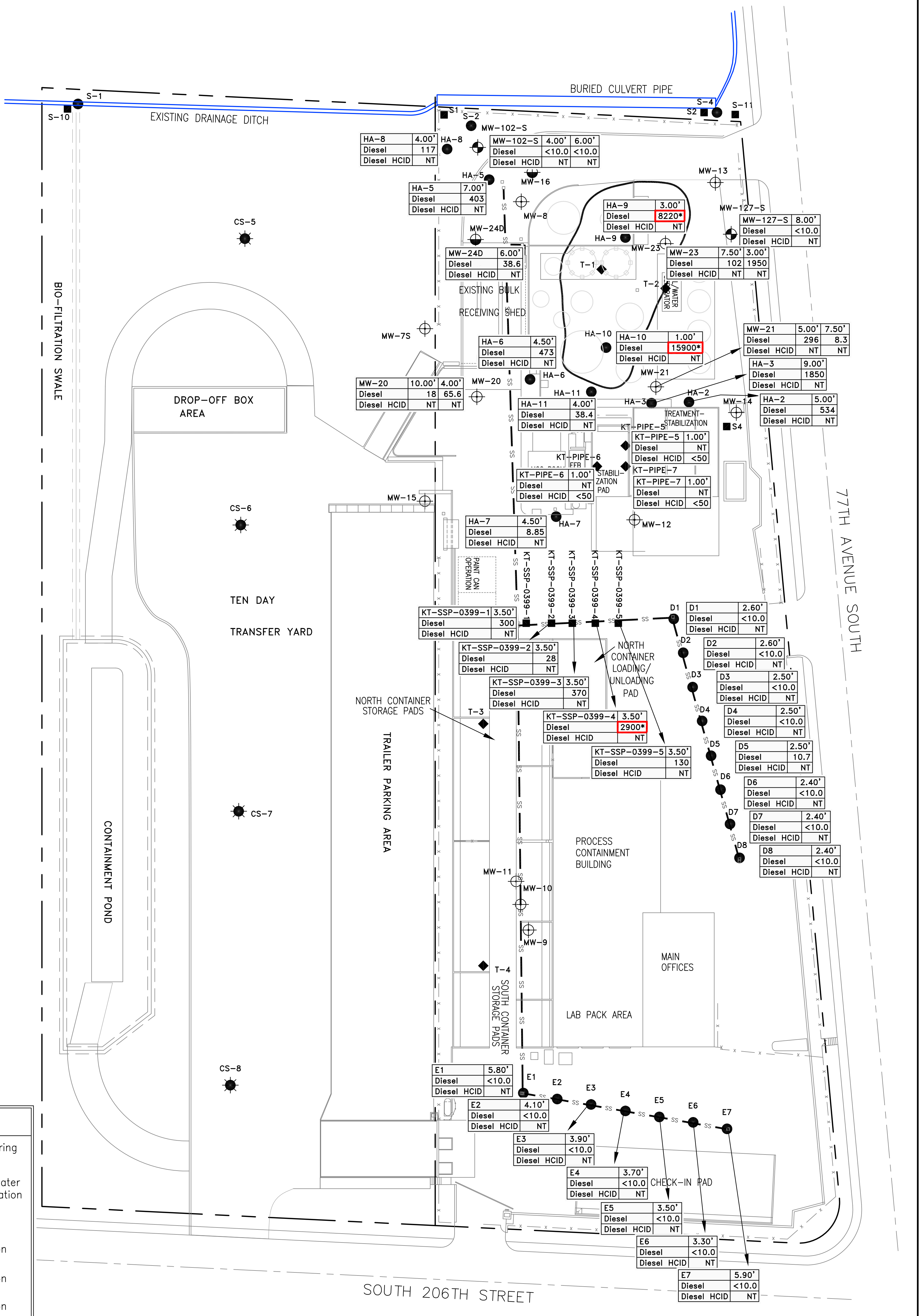
Gasoline = 3.00E+01 mg/kg

Note: < = not detected below detection limit

GASOLINE RANGE ORGANICS IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS
Date: 11/15/07
Project No. 9464.002
Geomatrix
Figure **6-21**

Plot Date: 11/15/07 - 11:21am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-22_Diesel_PSC-Kent.dwg



Legend

- ⊕ Groundwater Monitoring Well Location
- ⊕ Abandoned Groundwater Monitoring Well Location
- ✸ Composite Soil Sample Location
- ■ Soil Sample Location
- ● Soil Sample Location
- ◆ Soil Sample Location
- SS Storm Water Drainage System
- NT Indicates Not Tested
- 🟥 * Indicates Detections Greater Than Soil Screening Level
- Contour Interval 2000 (mg/kg)

Site ID	Depth (ft bgs)
Compound	Concentration (mg/kg)

Soil Screening Level

Diesel = 2.00E+03 mg/kg

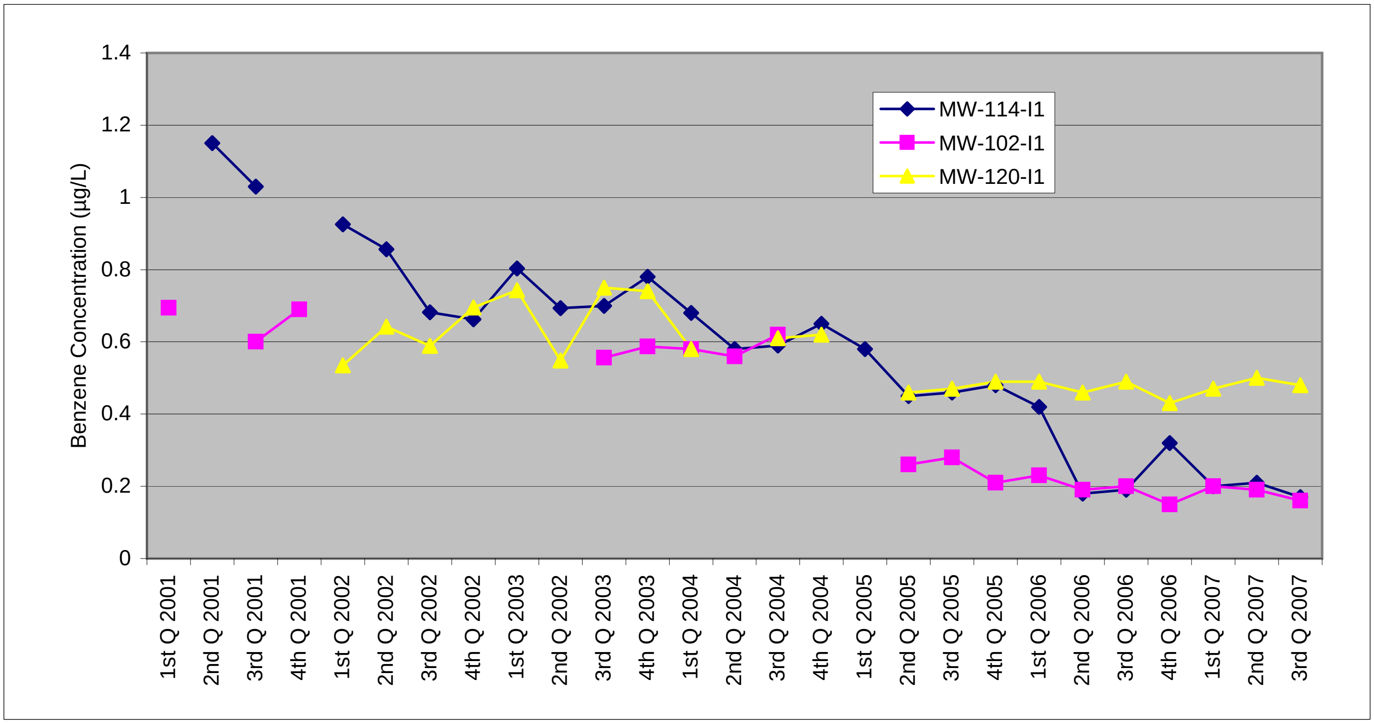
Note: < = not detected below detection limit

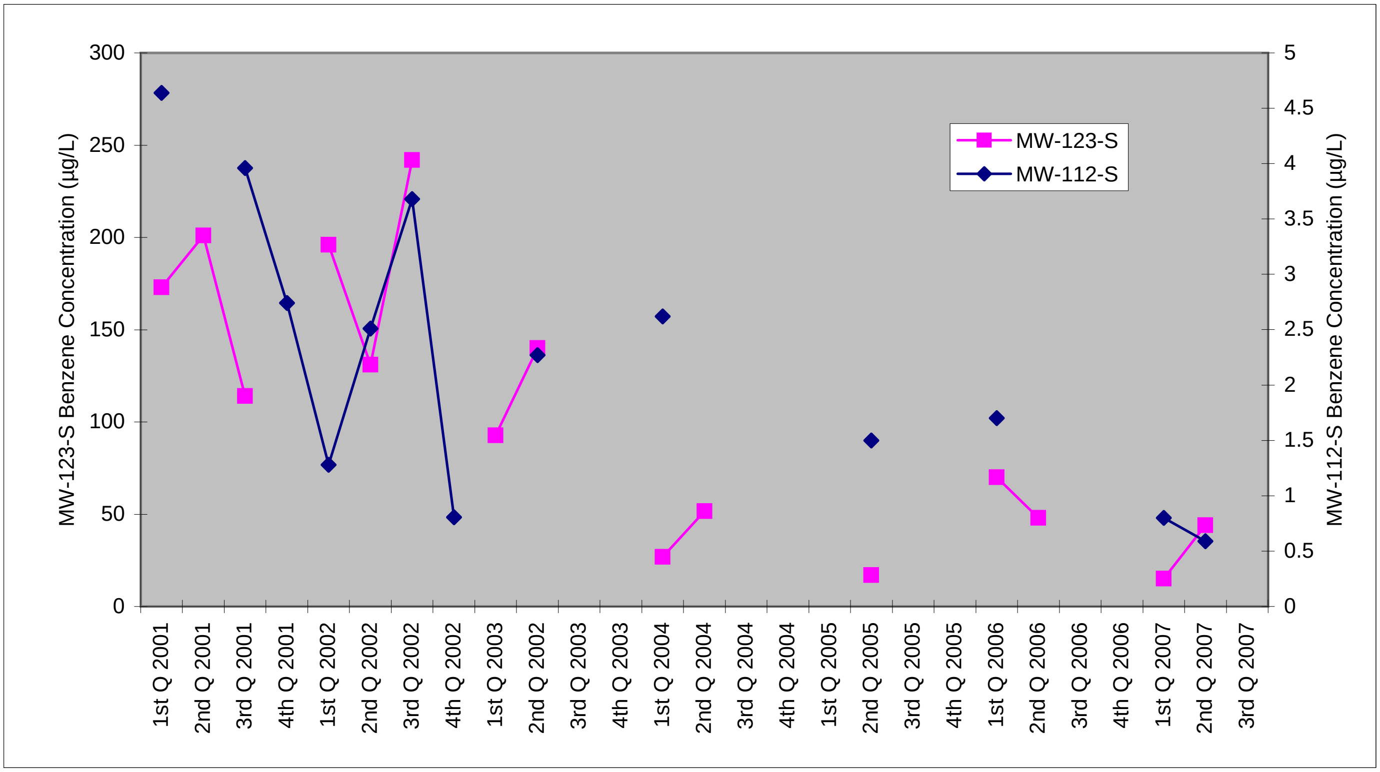
N

0 30 60
APPROXIMATE SCALE IN FEET

DIESEL RANGE ORGANICS IN VADOSE ZONE SOIL
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-22





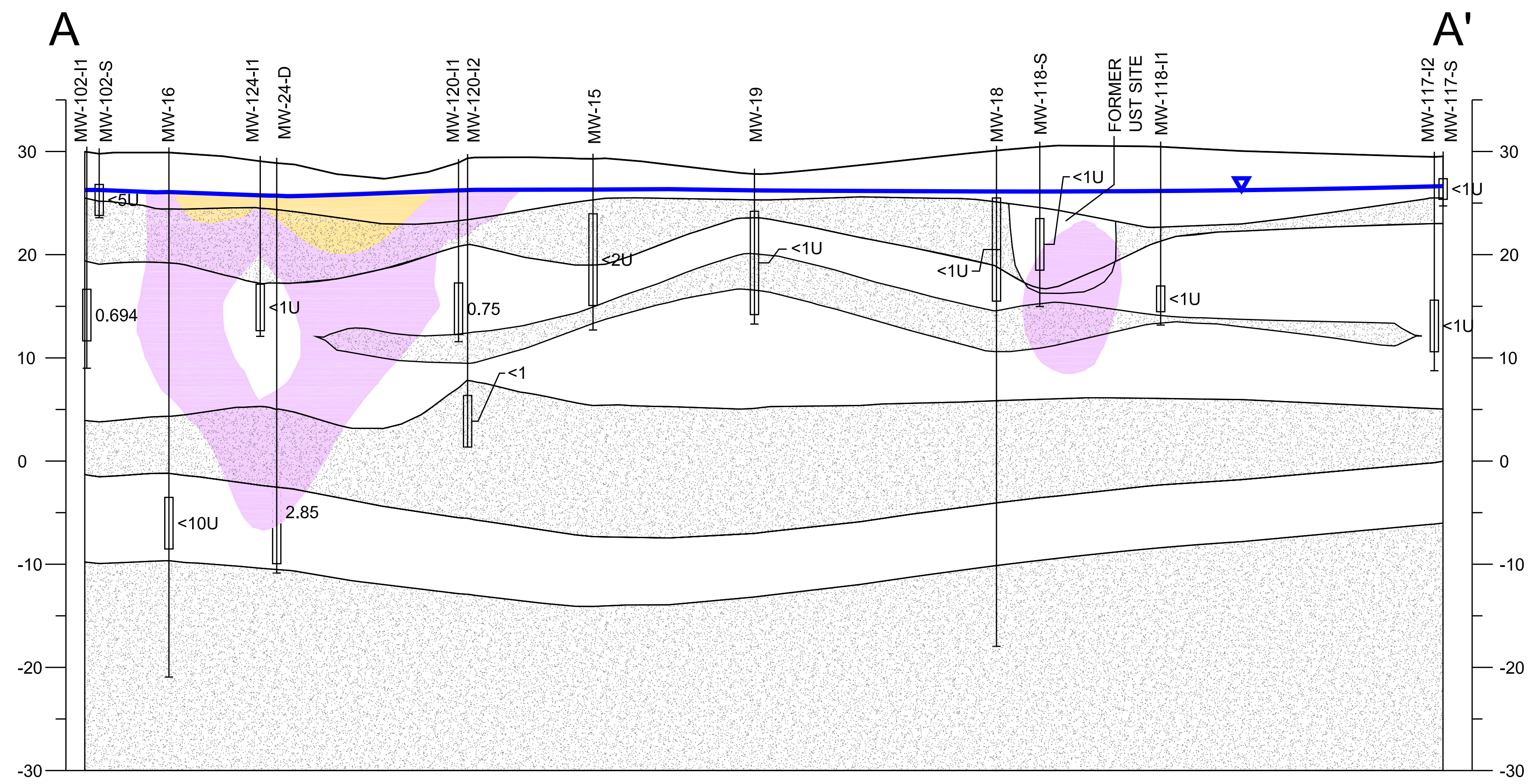
Note: non-detections are not plotted.

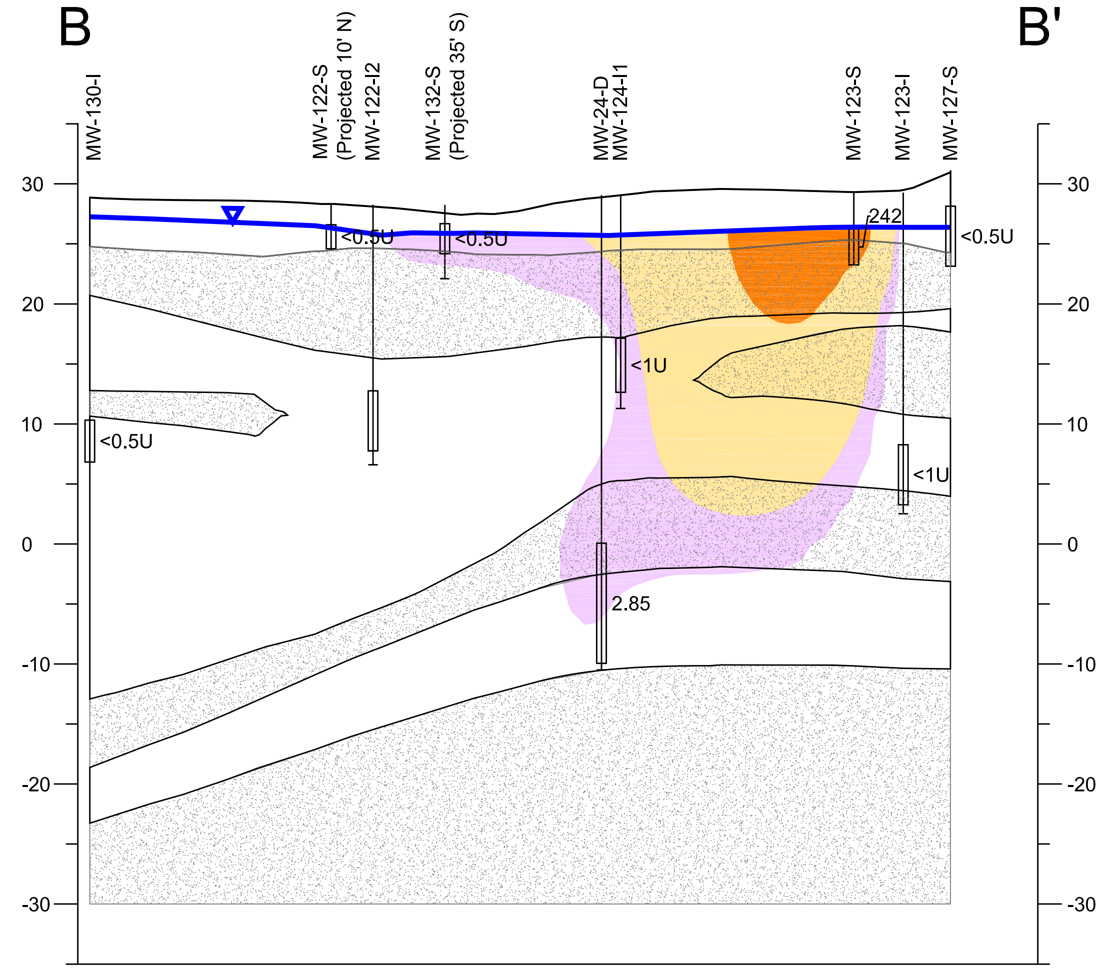
BENZENE CONCENTRATIONS IN GROUNDWATER OVER TIME

PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **6-23**

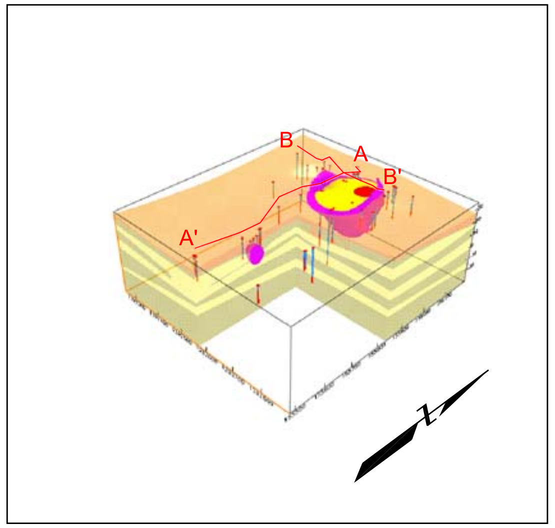
S:\9464\003_RI\Data\concentrations over time-adam.xls





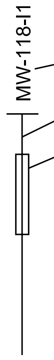
SCREENING LEVEL

BENZENE 0.795 ppb



THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 0.795 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION



WELL NAME

BLANK CASING

PERFORATED CASING

---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION

<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED

J VALUE IS ESTIMATED

<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED

APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)

☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER

▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

- ▨ ≥ 0.795 ppb
- ▨ ≥ 10 ppb
- ▨ ≥ 100 ppb

Geomatrix

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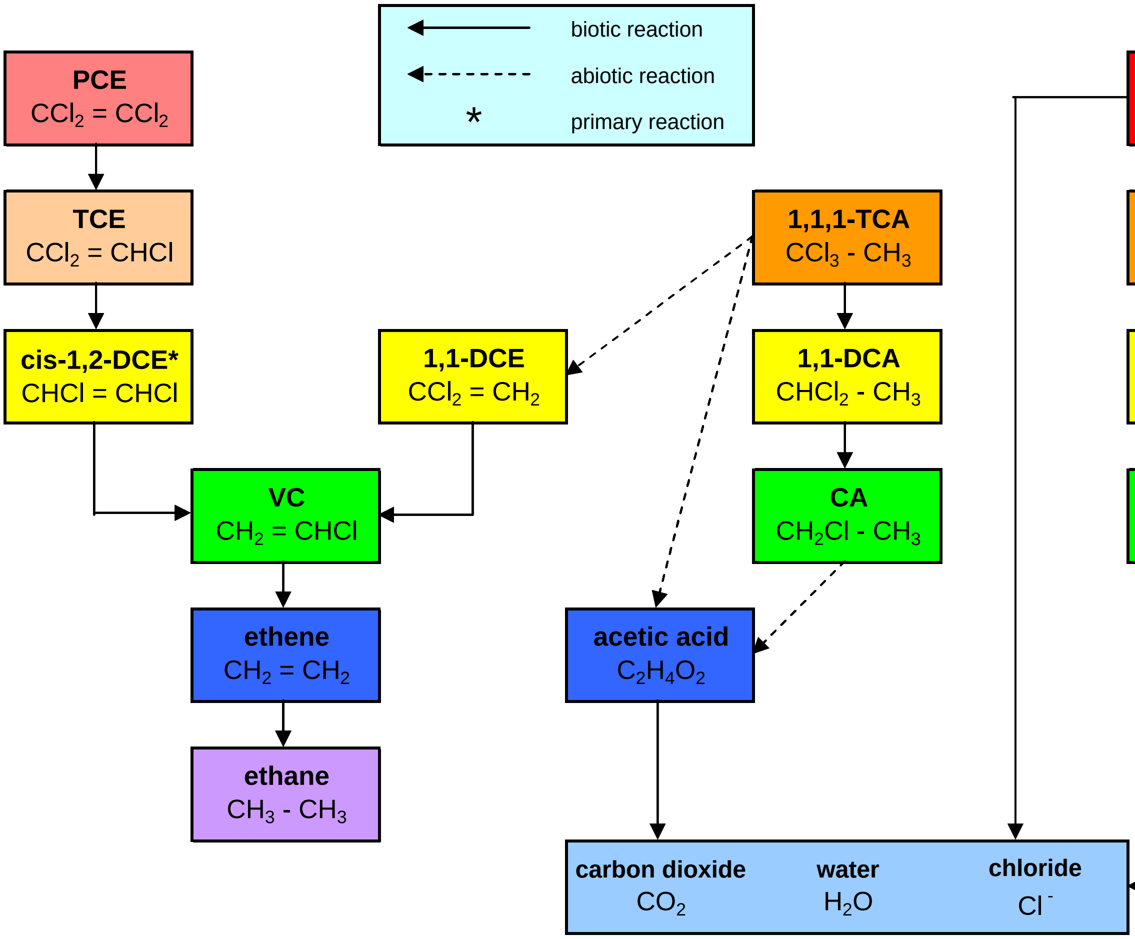
Seattle, Washington 98101
(206) 342-1760

PSC KENT FACILITY
KENT, WASHINGTON

THREE–DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMUM BENZENE CONCENTRATIONS
IN GROUNDWATER

DATE:
SCALE:
SHEET: OF SHEETS
PROJ No: 9464.002
FIGURE 6–24

Plot Date: 12/05/07 - 10:39am, Plotted by: lurmy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg



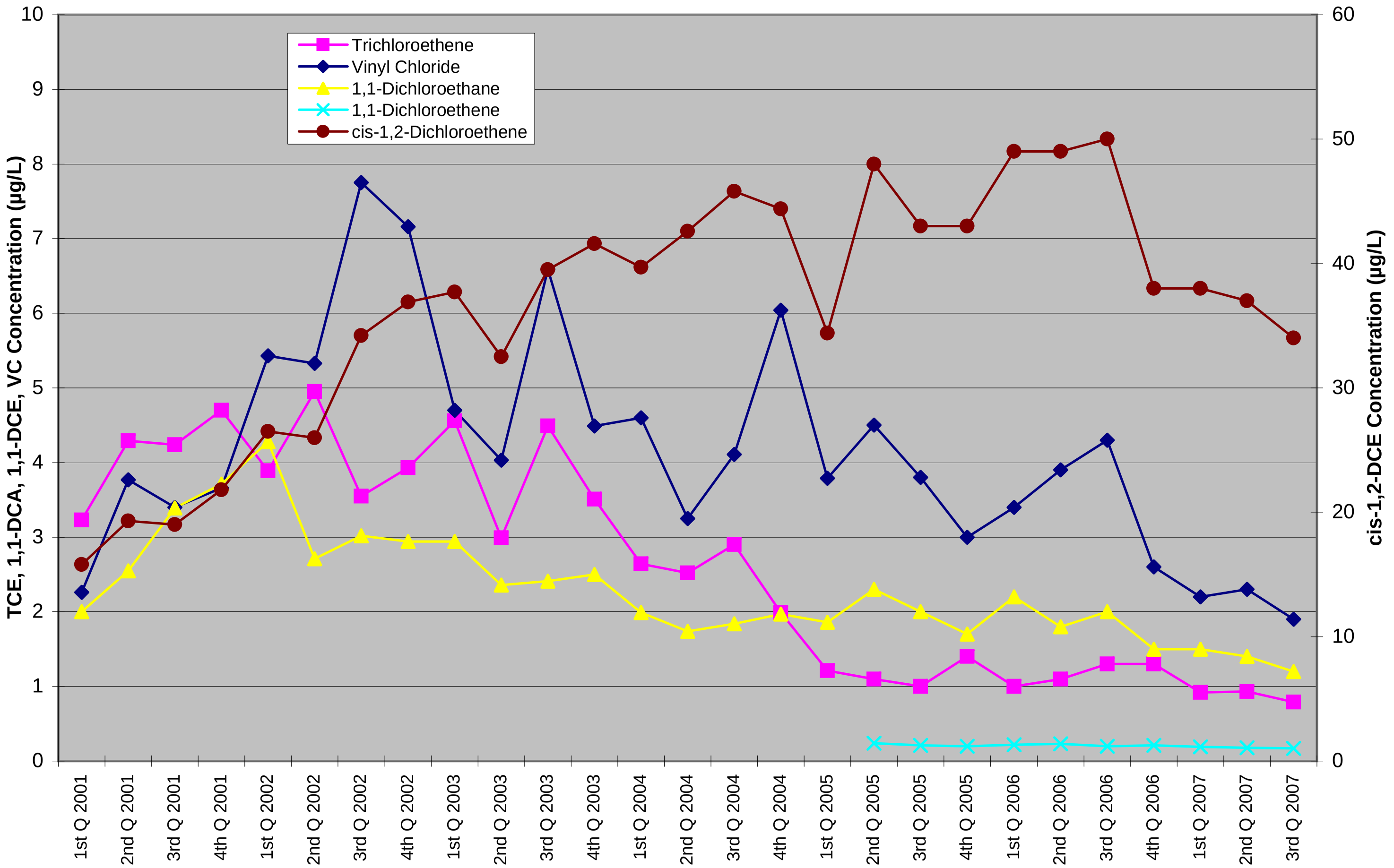
(Adapted from Weidemeier et al, 1999; after McCarty and Semprini, 1994; after Vogel et al, 1987)

Notes:
PCE: Tetrachloroethene
TCE: Trichloroethene
cis-1,2-DCE: Cis-1,2-Dichloroethene
1,1-DCE: 1,1-Dichloroethene
VC: Vinyl chloride
1,1,1-TCA: 1,1,1-Trichoroethane
1,1-DCA: 1,1-Dichloroethane
CA: Chloroethane
CT: Carbon tetrachloride
TCM: Trichloromethane (chloroform)
DCM: Dichloromethane (methylene chloride)
CM: Chloromethane

S:\9464003_RI\Data\Figure 6-25.xls

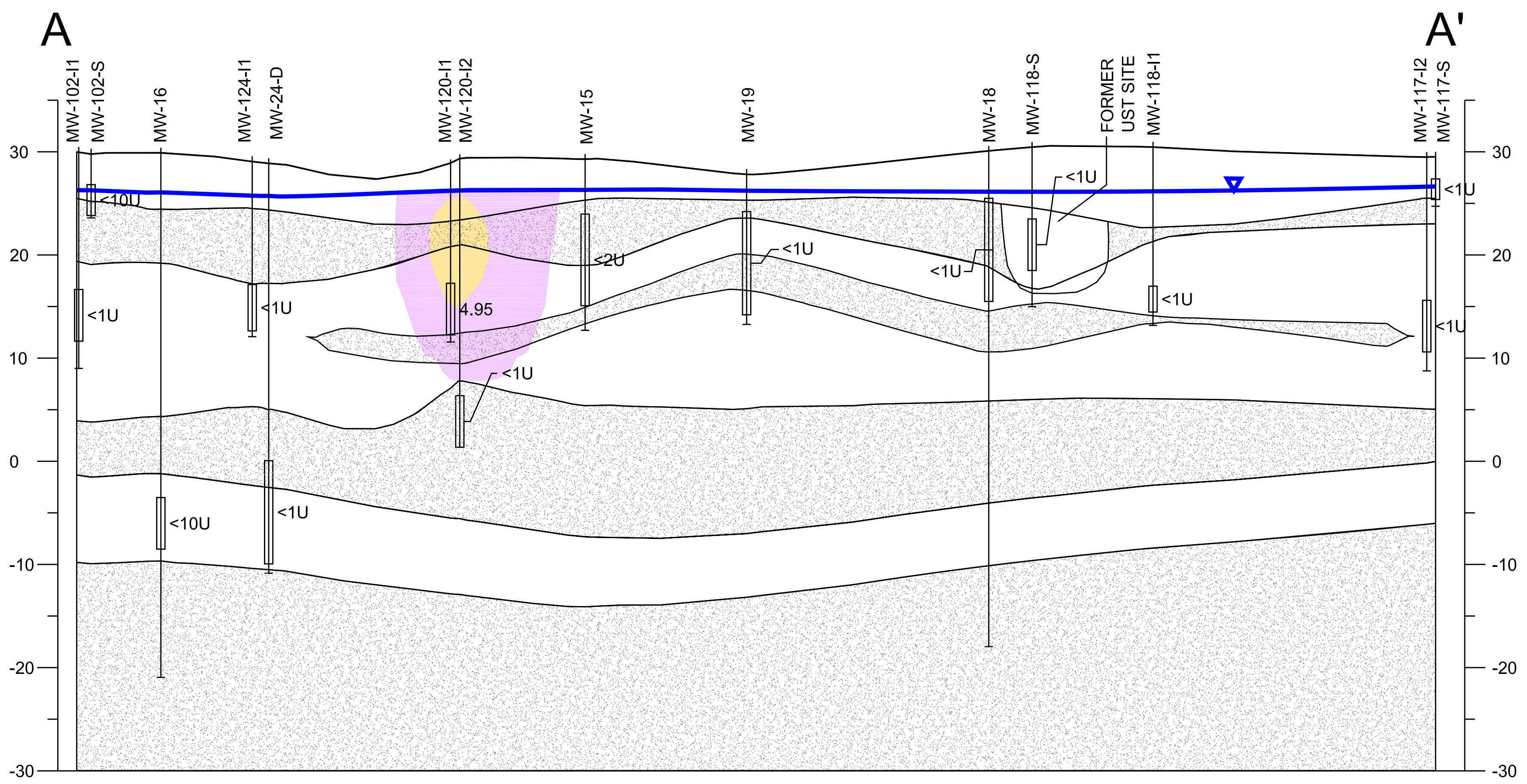
ABIOTIC AND BIOTIC TRANSFORMATION PATHWAYS
FOR SELECTED CHLORINATED SOLVENTS
PSC Kent Facility
Kent, Washington

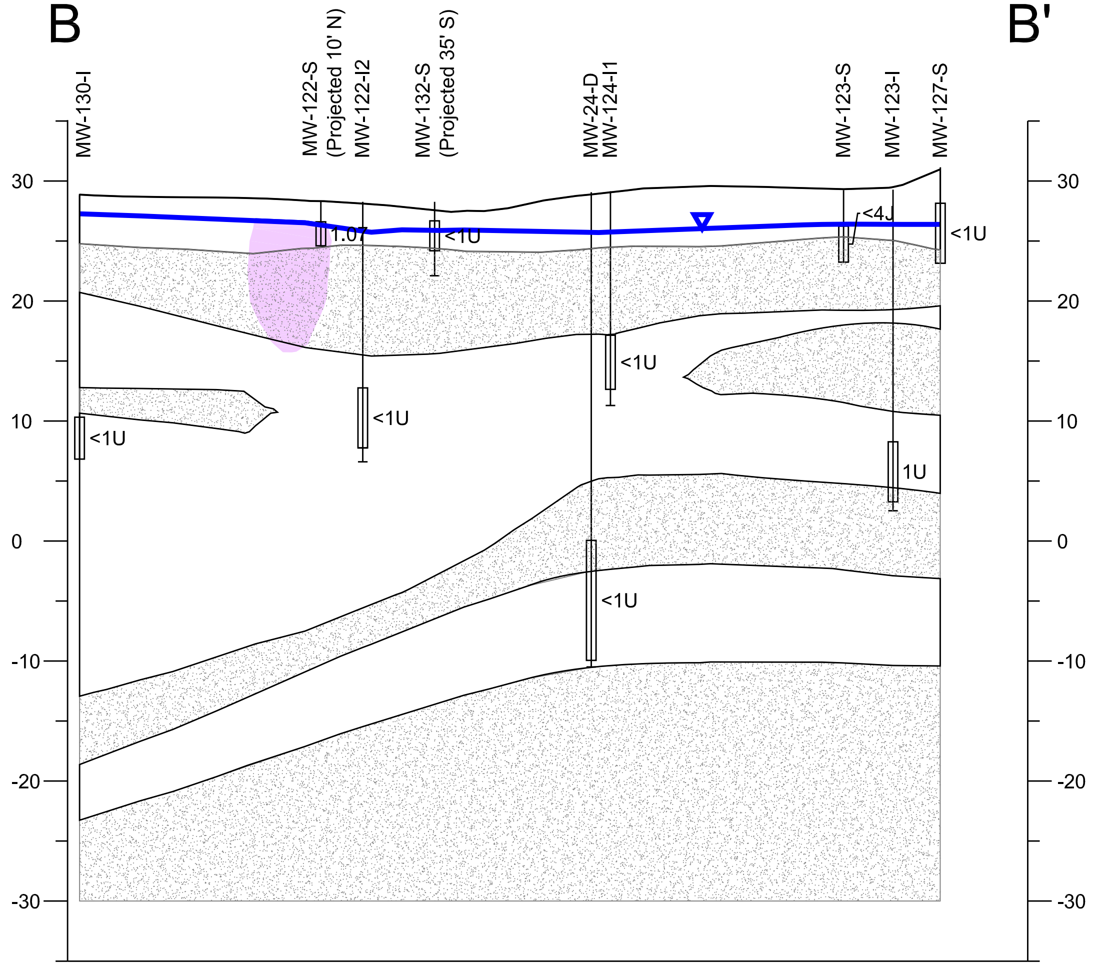
By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **6-25**



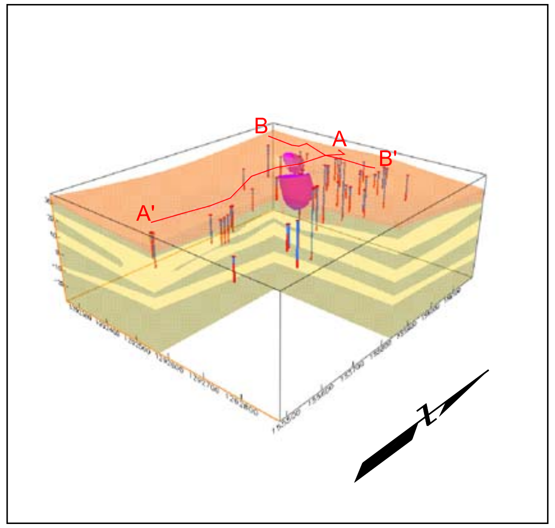
CHLORINATED ETHENE CONCENTRATIONS
IN MW-120-I1 OVER TIME
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure: **6-26**





0 VERTICAL 10
0 HORIZONTAL 40



THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 0.11 ppb AND LOCATION OF CROSS-SECTION

SCREENING LEVEL

TRICHLOROETHENE 0.11 ppb

EXPLANATION

MW-118-I1 — WELL NAME
BLANK CASING
PERFORATED CASING
---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION
<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED
J VALUE IS ESTIMATED
<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED

▽ APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)
☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER
▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≥0.11 ppb
🟨 ≥5 ppb

Geomatrix

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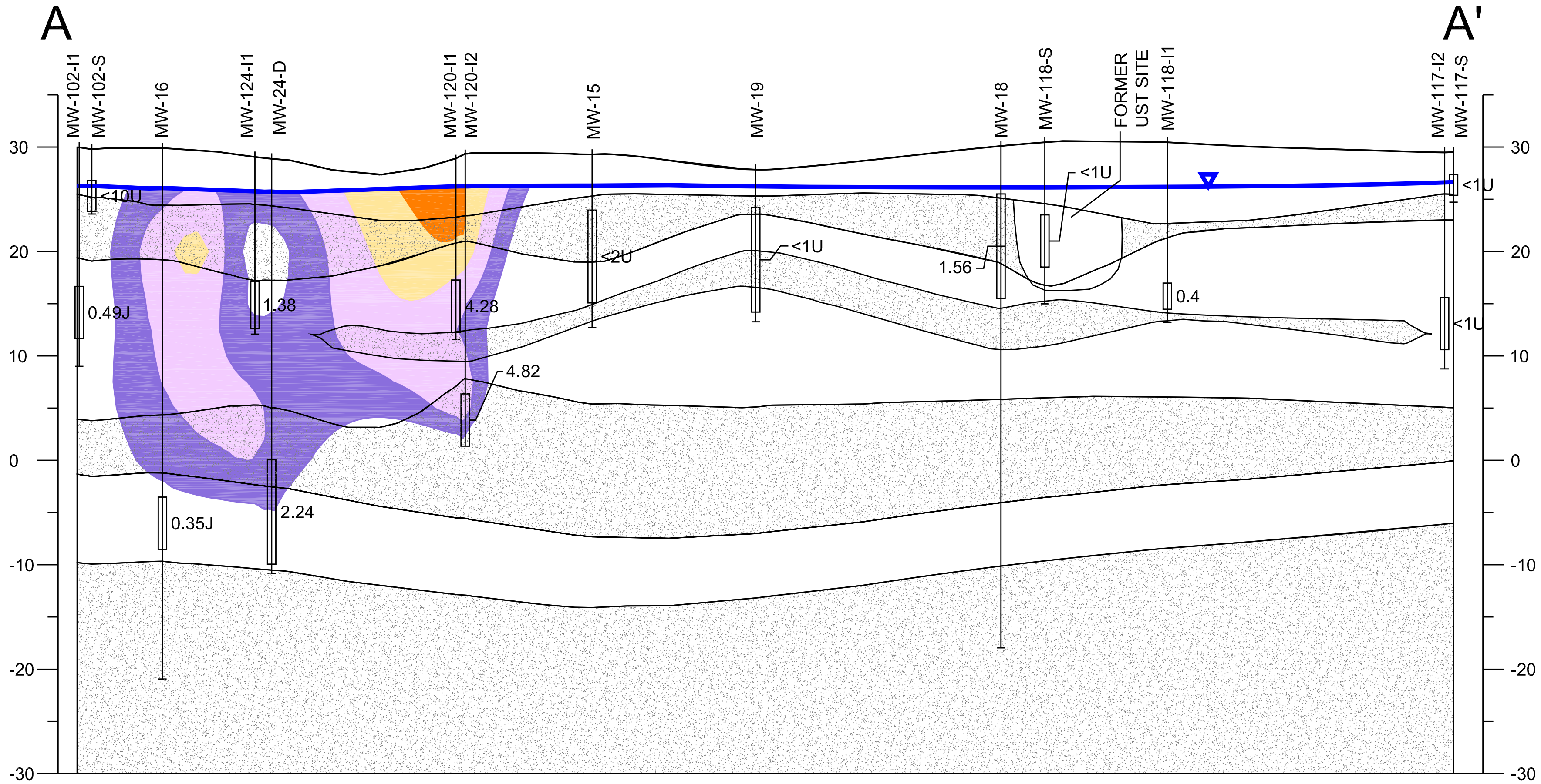
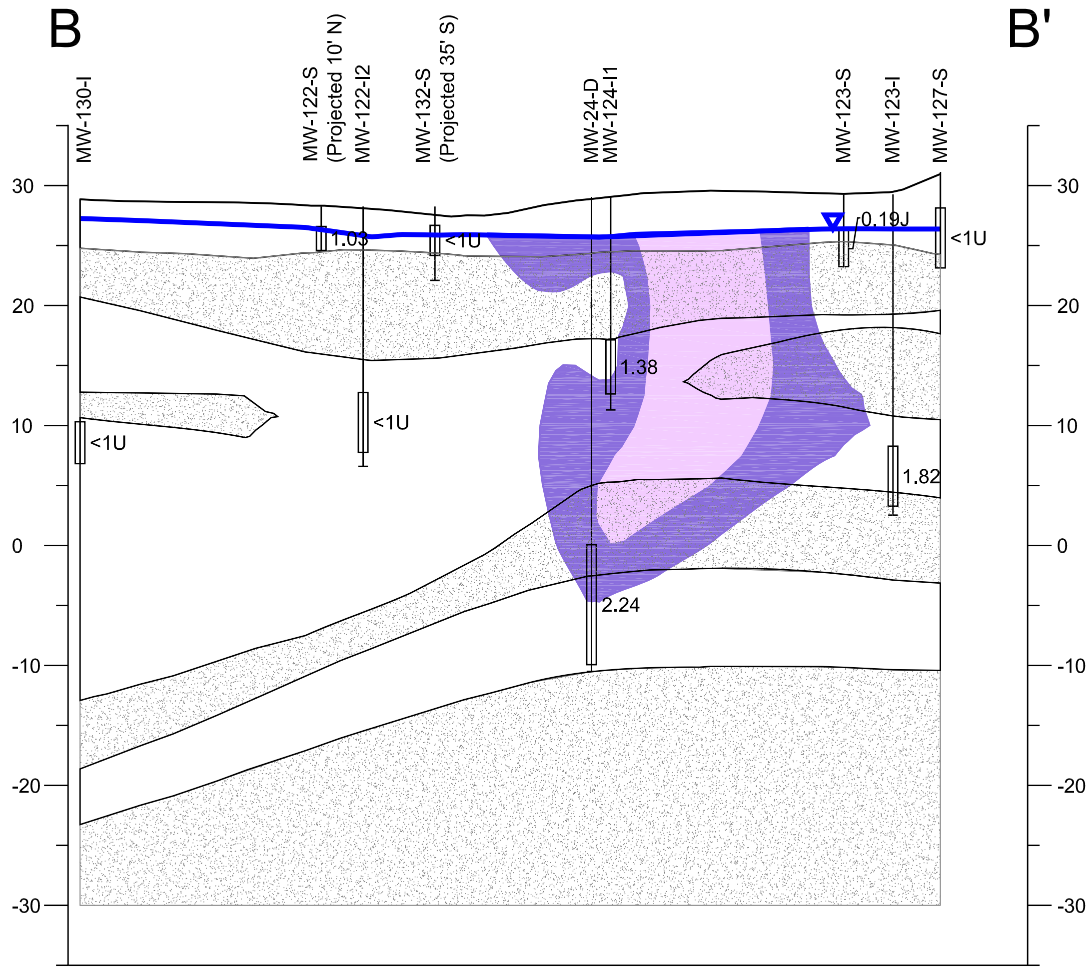
KENT, WASHINGTON

THREE–DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMUM TRICHLOROETHENE CONCENTRATIONS
IN GROUNDWATER

DATE:
SCALE:
SHEET: OF SHEETS
PROJ No: 9464.002
FIGURE 6–27

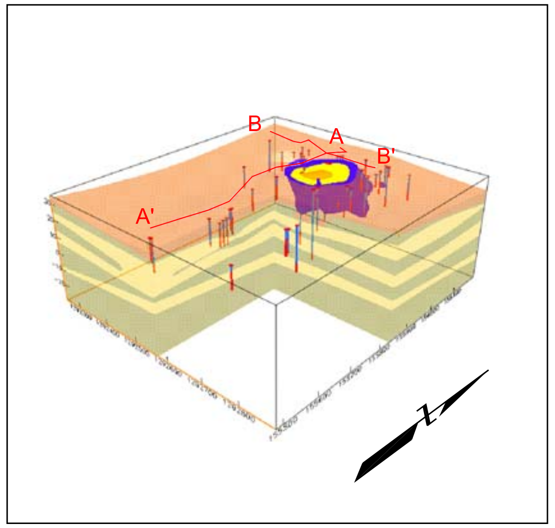
Plot Date: 12/05/07 - 10:50am, Plotted by: tummy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg





SCREENING LEVEL
1,1-DICHLOROETHANE 800 ppb

0 VERTICAL 10
0 HORIZONTAL 40



THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 800 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION

MW-118-I1 WELL NAME
BLANK CASING
PERFORATED CASING
---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION
<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED
J VALUE IS ESTIMATED
<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED

APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)

☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER

▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≥2 ppb
■ ≥4 ppb
🟨 ≥6 ppb
🟧 ≥8 ppb

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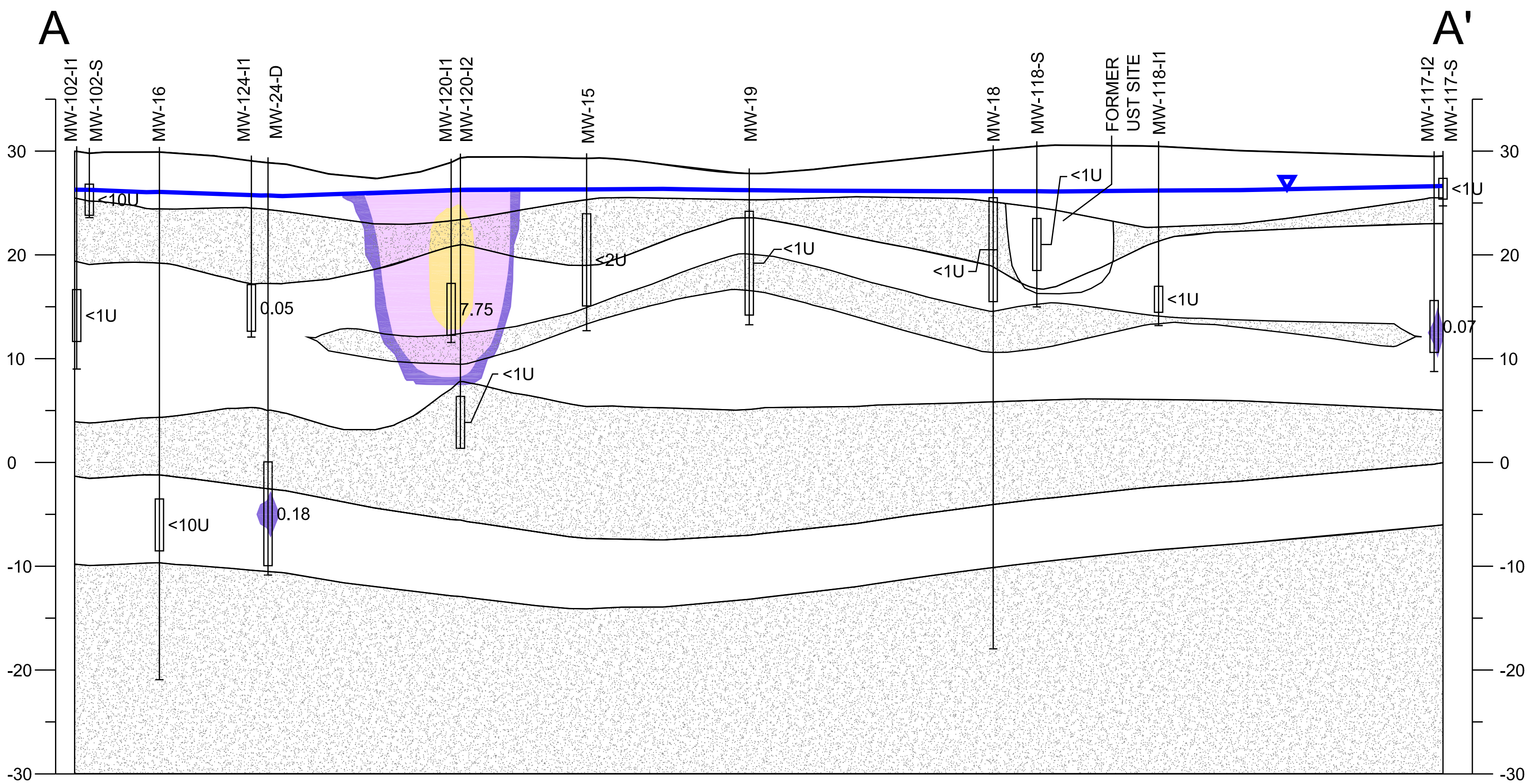
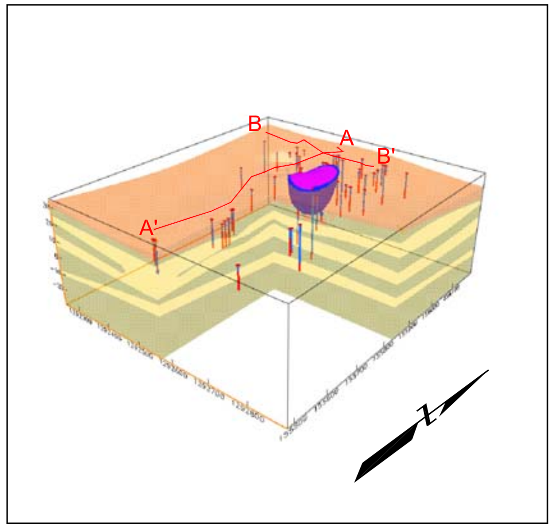
THREE-DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMUM 1,1-DICHLOROETHANE CONCENTRATIONS
IN GROUNDWATER

DATE:
SCALE:
SHEET: OF SHEETS
PROJ No: 9464.002
FIGURE 6-28

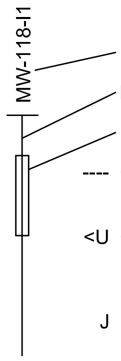
Plot Date: 12/05/07 - 10:38am, Plotted by: lurmy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg



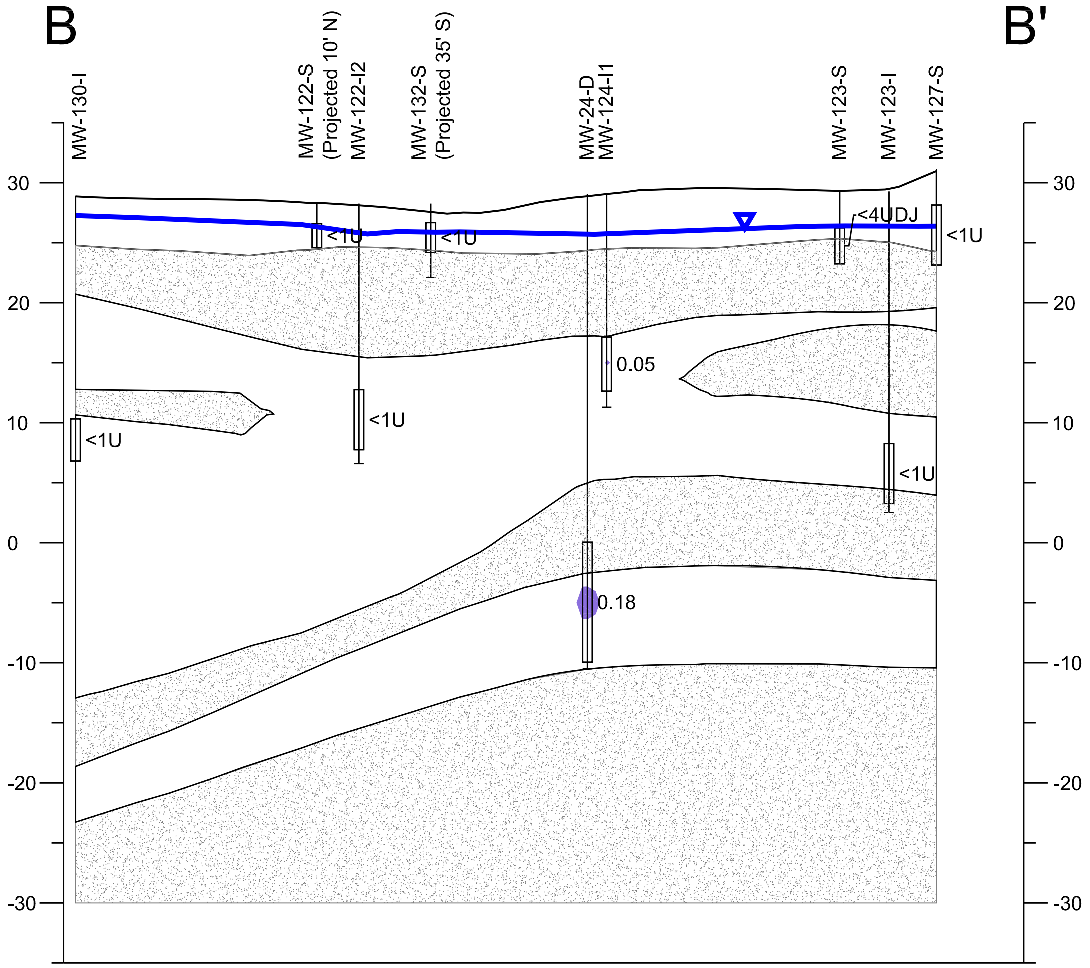


THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 0.025 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION



WELL NAME
BLANK CASING
PERFORATED CASING
---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION
<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED
J VALUE IS ESTIMATED
<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED



SCREENING LEVEL
VINYL CHLORIDE 0.025 ppb

▽ APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)

☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER

▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≥0.025 ppb

■ ≥0.5 ppb

🟨 ≥5 ppb

0 VERTICAL 10
0 HORIZONTAL 40

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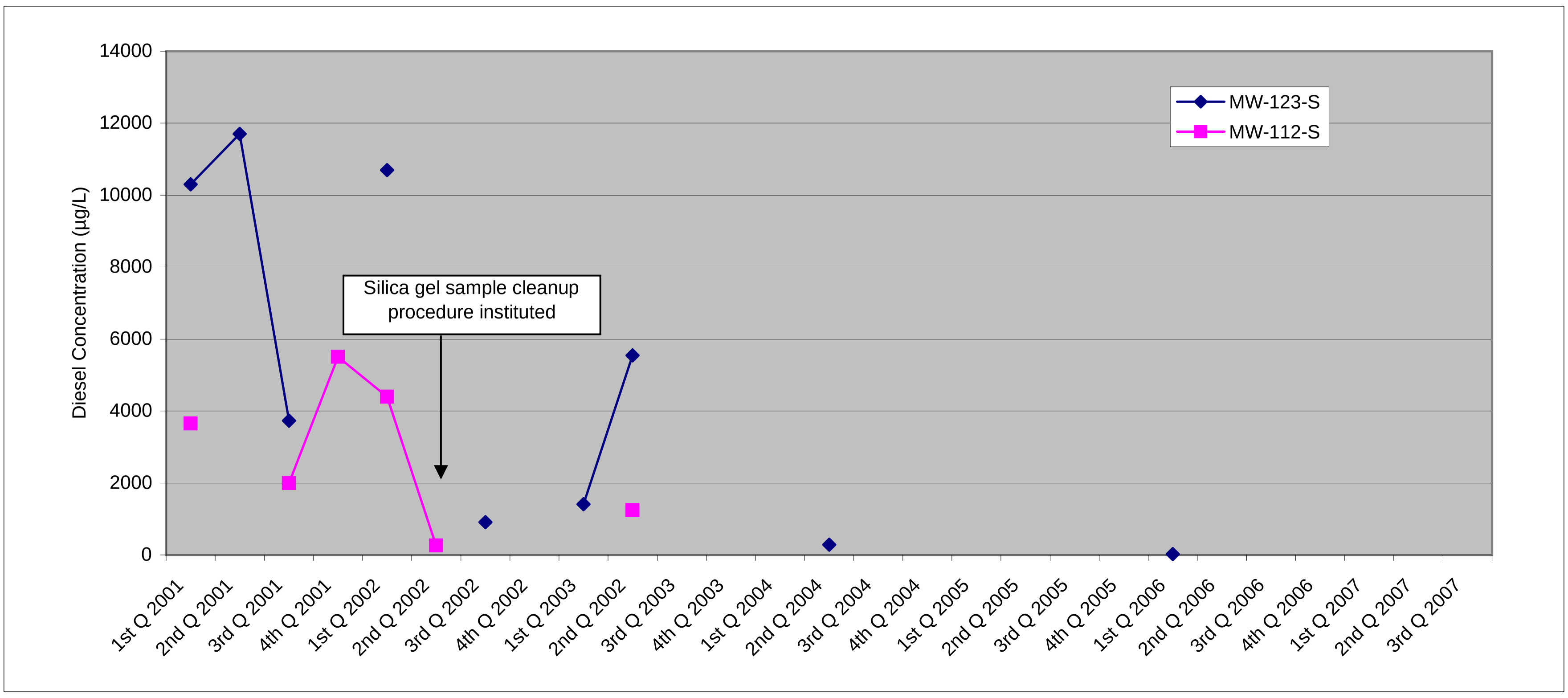
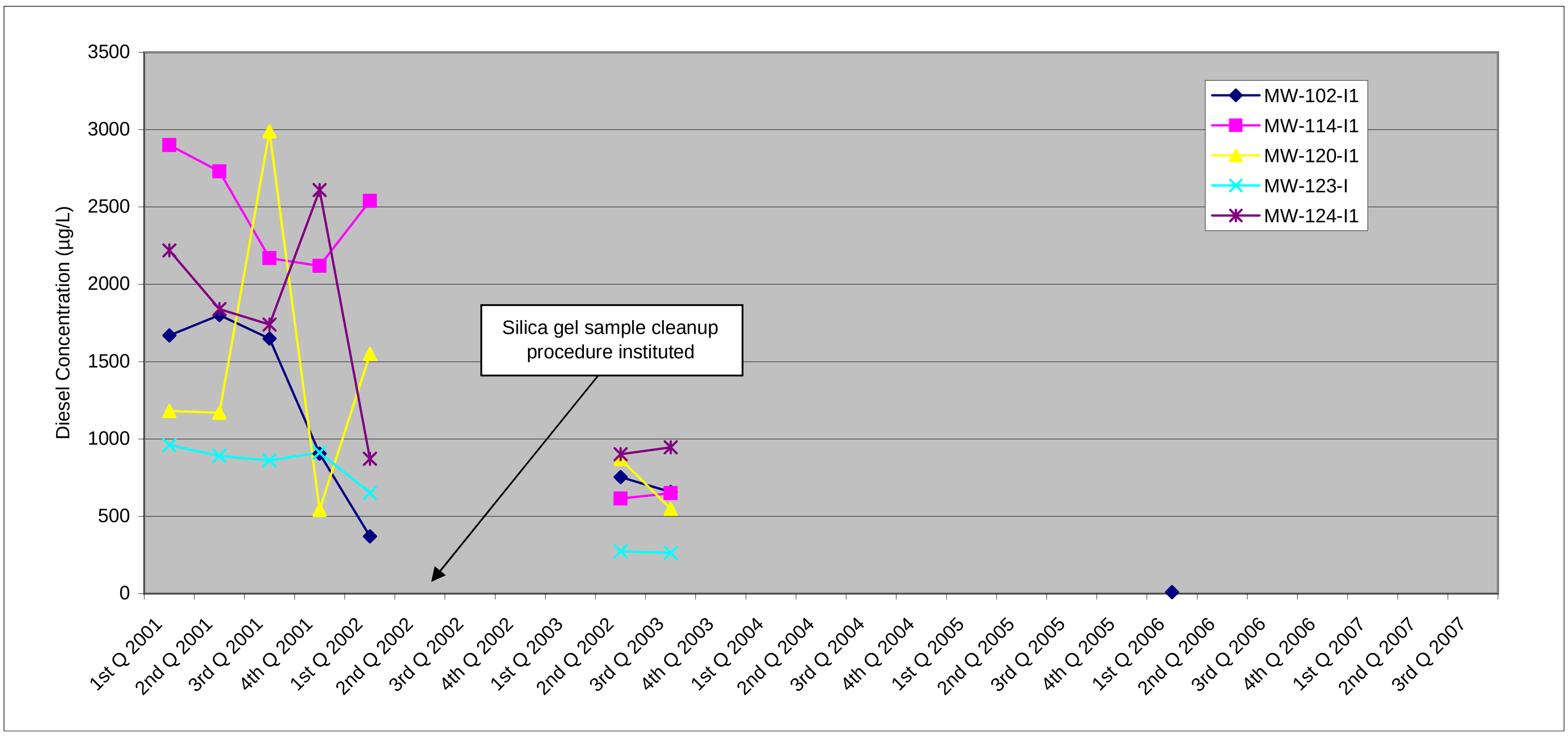
THREE–DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMUM VINYL CHLORIDE CONCENTRATIONS
IN GROUNDWATER

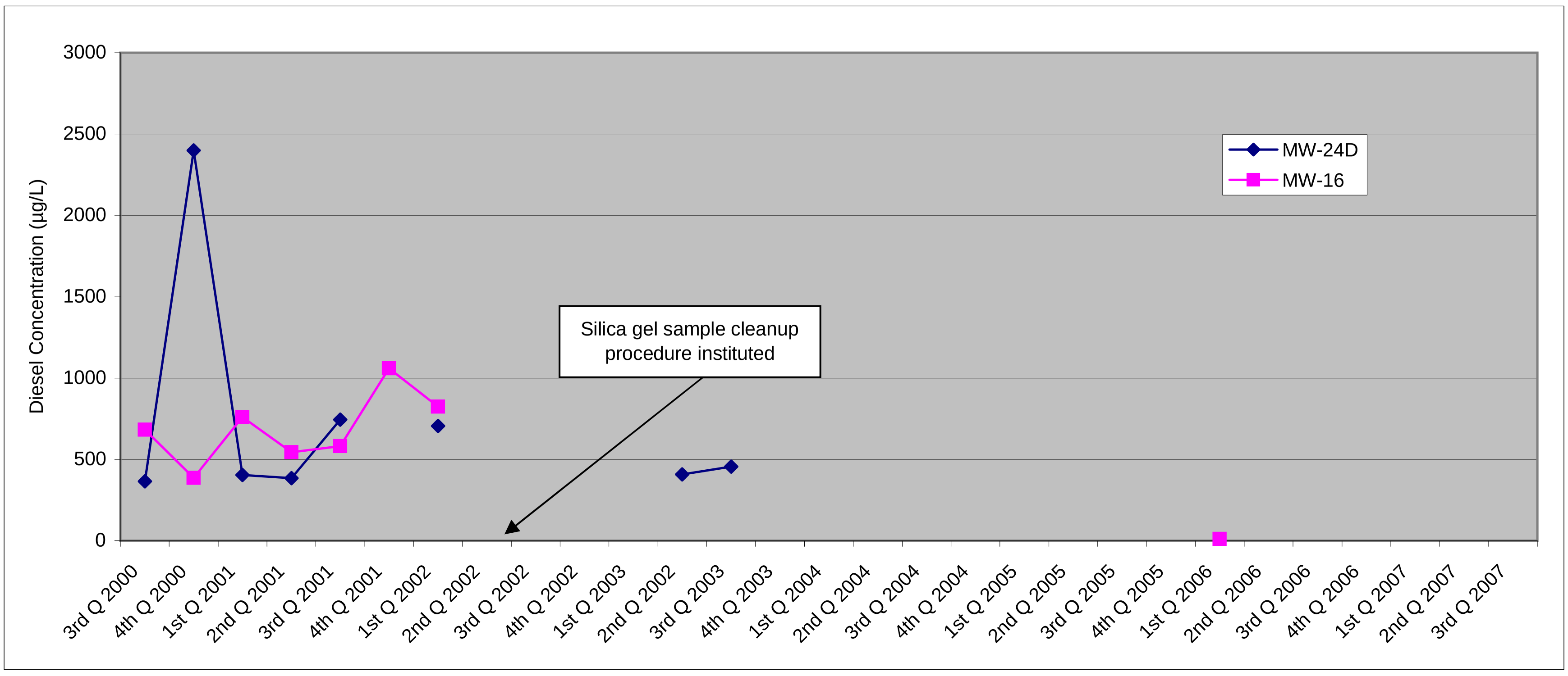
DATE:	
SCALE:	
SHEET: OF SHEETS	
PROJ No: 9464.002	FIGURE 6–29

Plot Date: 12/05/07 - 10:34am, Plotted by: lurmy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg

S:\9464\003_RI\Data\concentrations over time-adam.xls







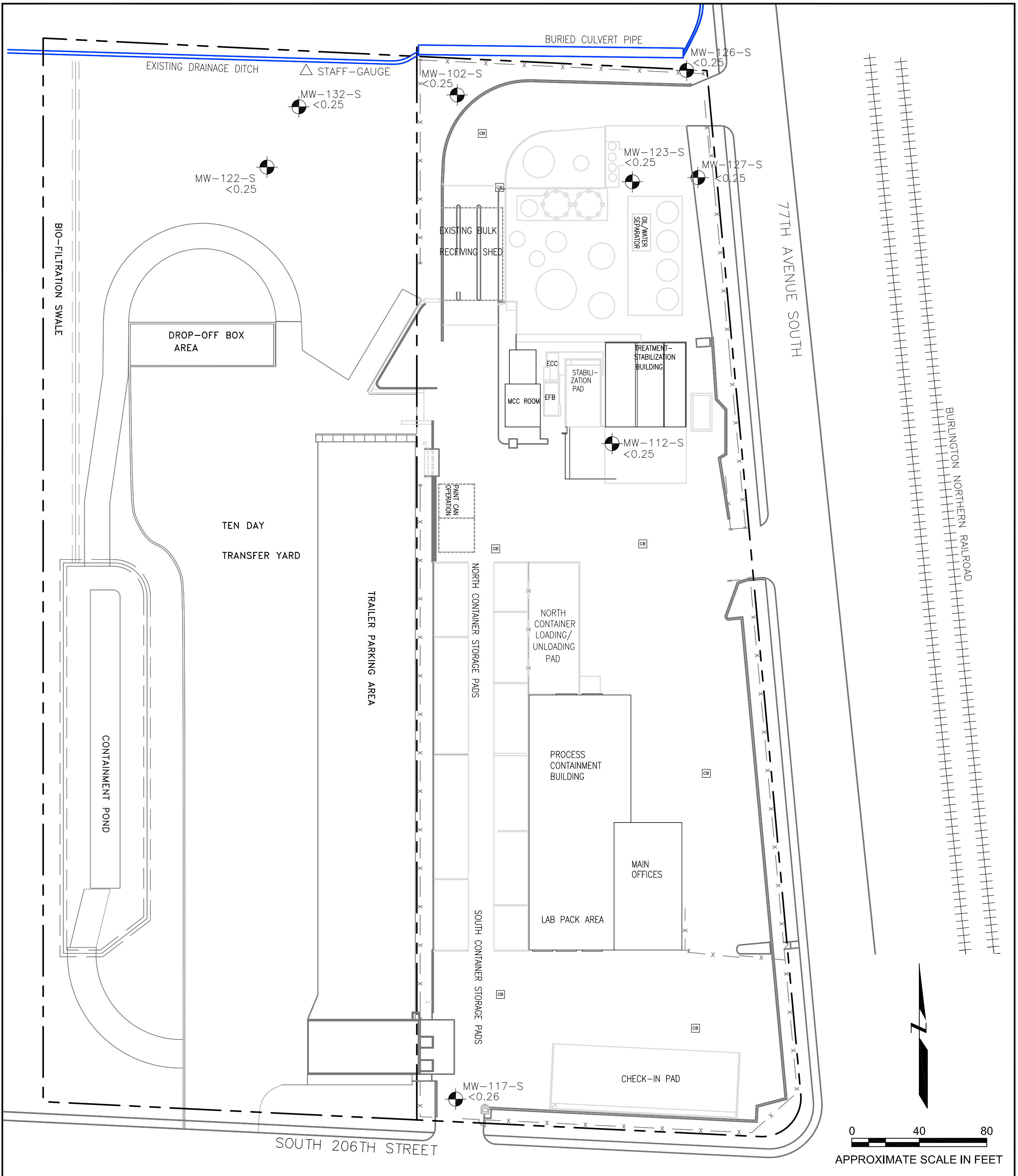
Note: non-detections are not plotted.

CONCENTRATIONS OF DIESEL RANGE
ORGANICS IN GROUNDWATER OVER TIME
PSC Kent Facility
Kent, Washington

By: APS | Date: 11/15/07 | Project No.: 9464.002

Geomatrix

Figure **6-30**



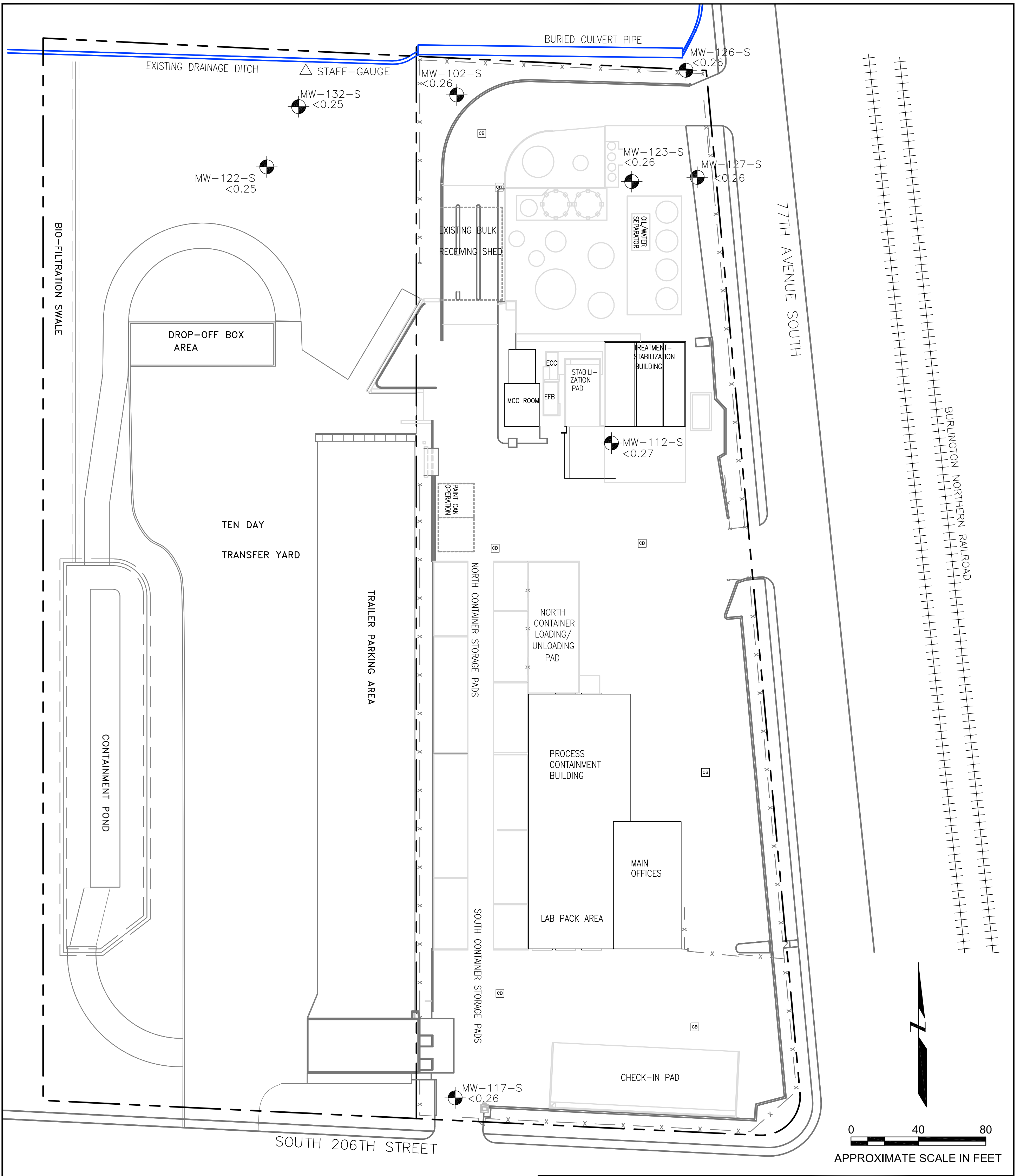
EXPLANATION

⯐ SHALLOW WATER-BEARING UNIT MONITORING WELL WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN SHALLOW WATER-BEARING UNIT
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-31a**

Plot Date: 11/15/07 - 11:31am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-31a_DieselSh1Q07_PSC-Kent.dwg



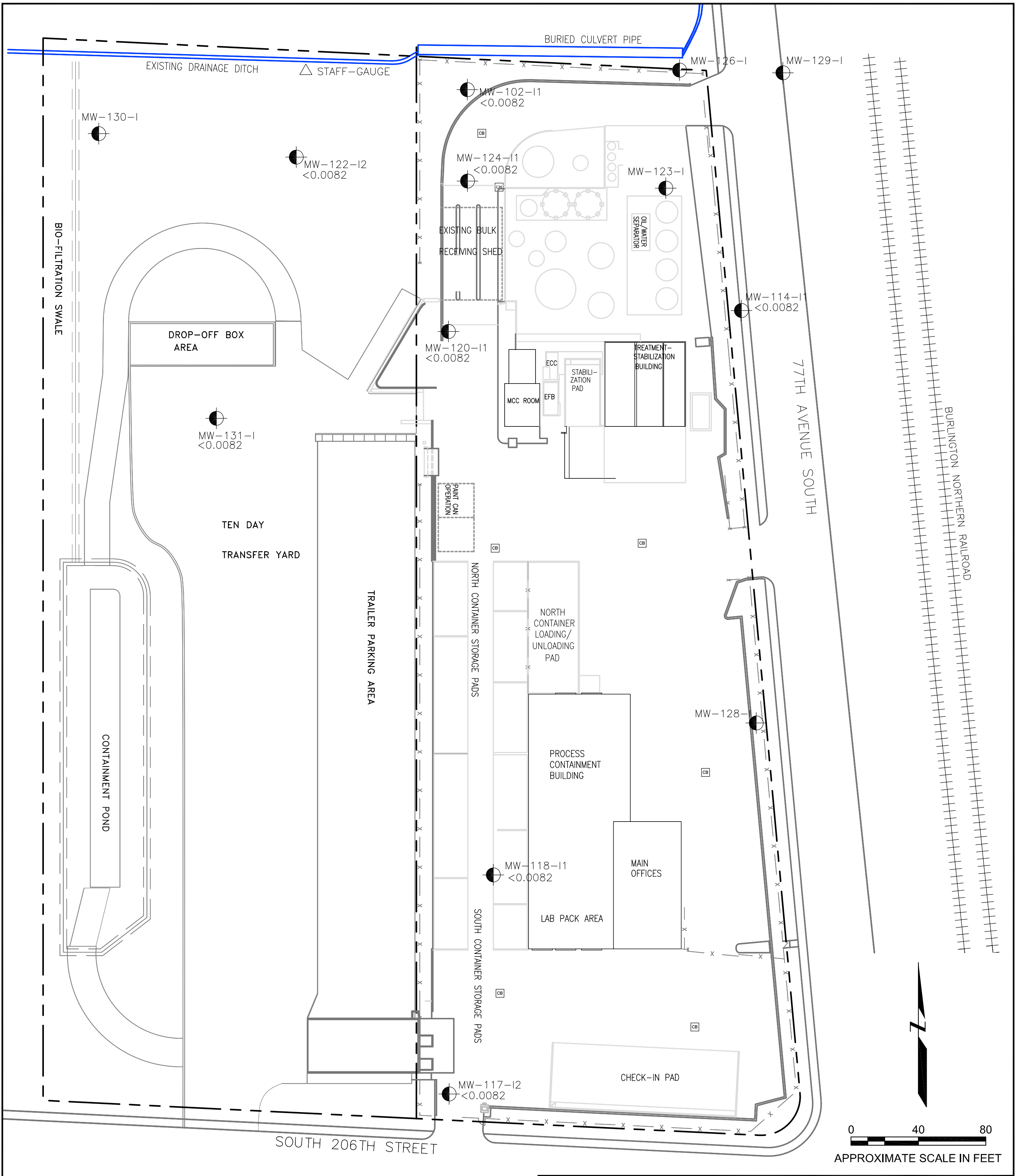
DIESEL IN SHALLOW WATER-BEARING UNIT
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-31b**

EXPLANATION

⊕ SHALLOW WATER-BEARING UNIT MONITORING WELL WITH CHEMICAL CONCENTRATION (mg/L)

Plot Date: 11/15/07 - 11:32am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-31b_DieselSh2Q07_PSC-Kent.dwg



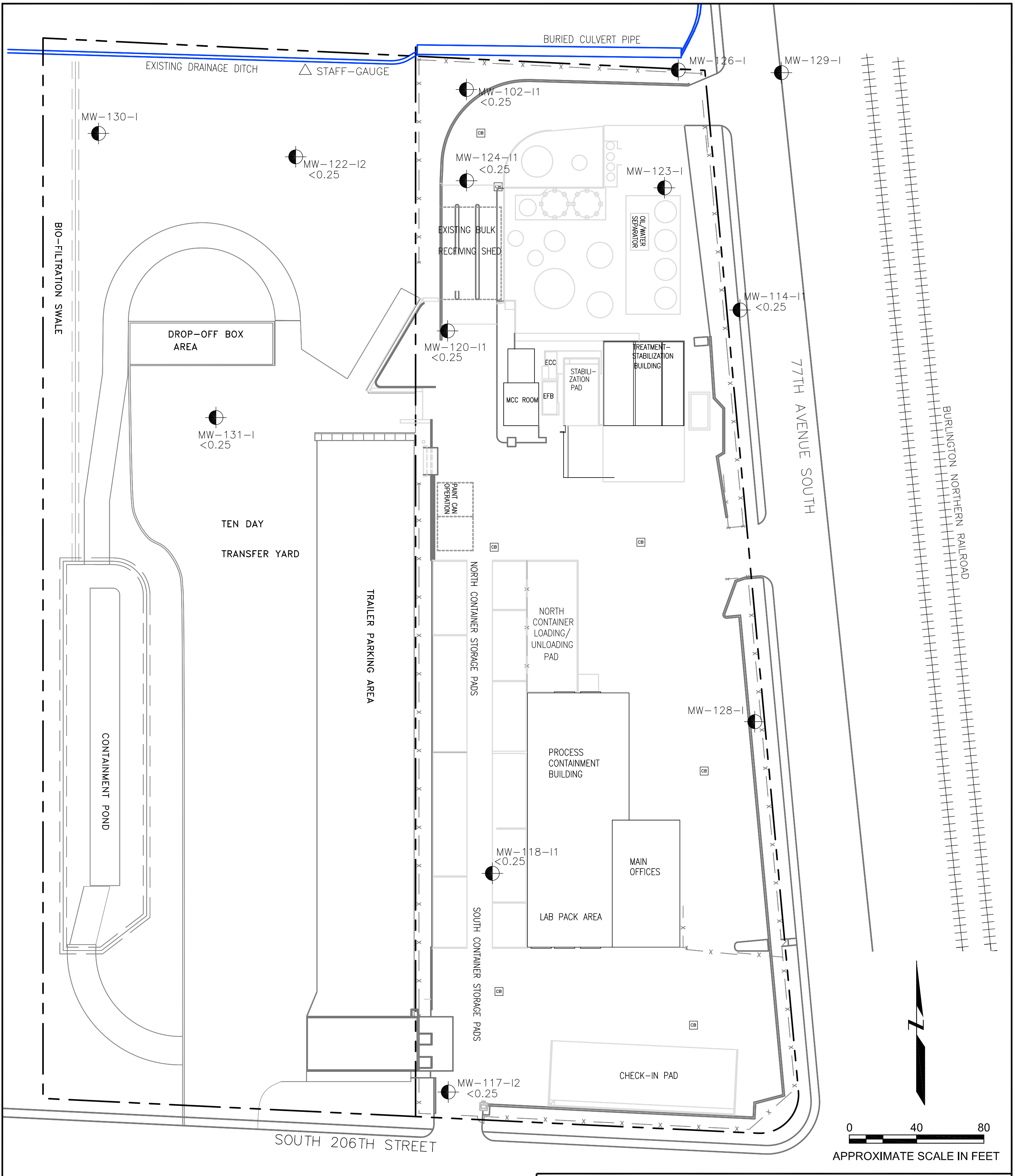
EXPLANATION

● INTERMEDIATE ZONE A MONITORING WELL WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN ZONE A - INTERMEDIATE AQUIFER
FOURTH QUARTER 2006
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/12/07	Project No. 9464.002
Geomatrix		Figure 6-32a

Plot Date: 12/12/07 - 4:20pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-32a_Diesel-A-Int4Q06_PSC-Kent.dwg



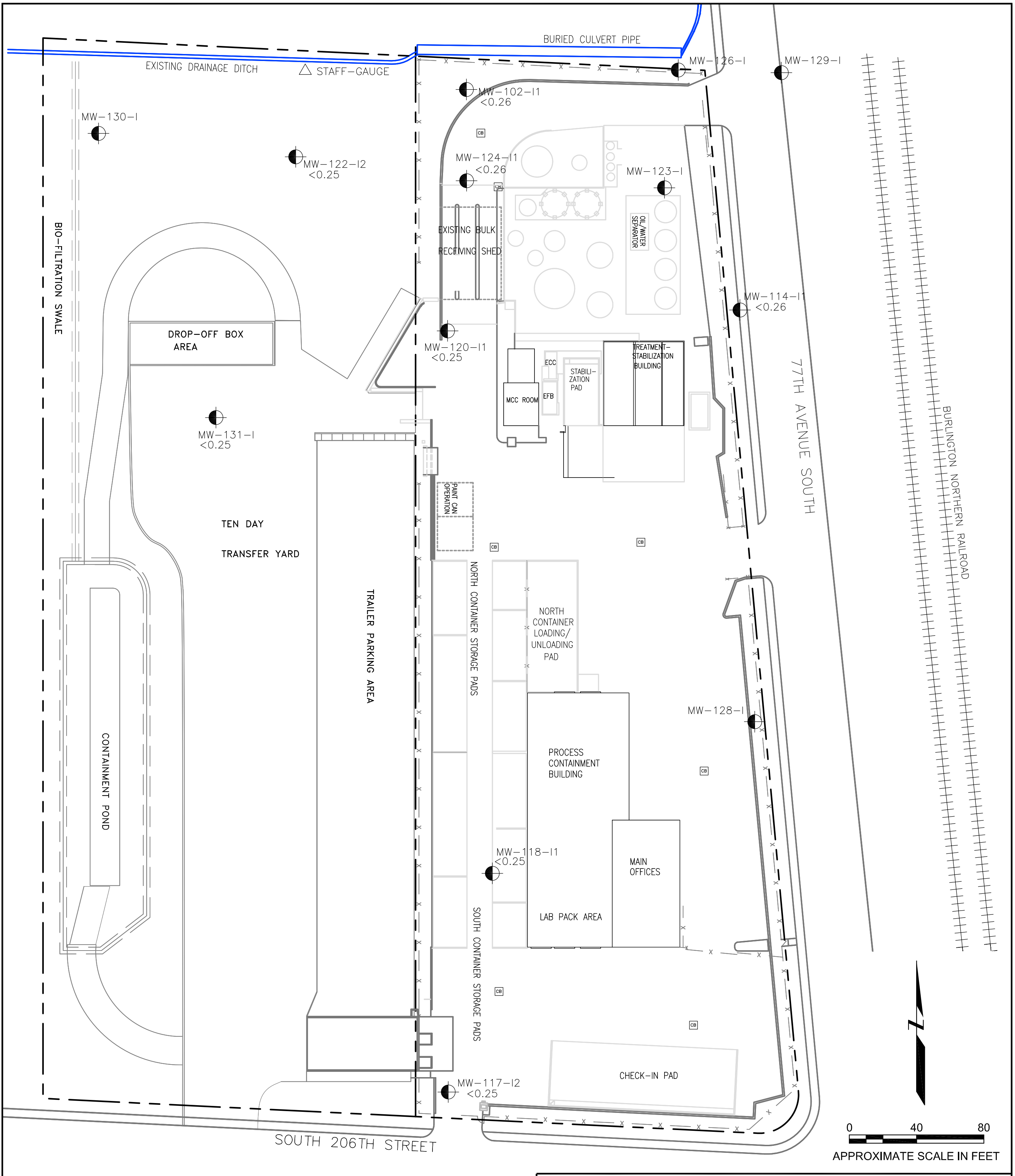
EXPLANATION

◐ INTERMEDIATE ZONE A MONITORING WELL
WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN ZONE A - INTERMEDIATE AQUIFER
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/12/07	Project No. 9464.002
Geomatrix		Figure **6-32b**

Plot Date: 12/12/07 - 4:19pm, Plotted by: astenberg
Drawing Path: S:\9464\003_R\CAD\, Drawing Name: Figure 6-32b_Diesel-A-Int1Q07_PSC-Kent.dwg



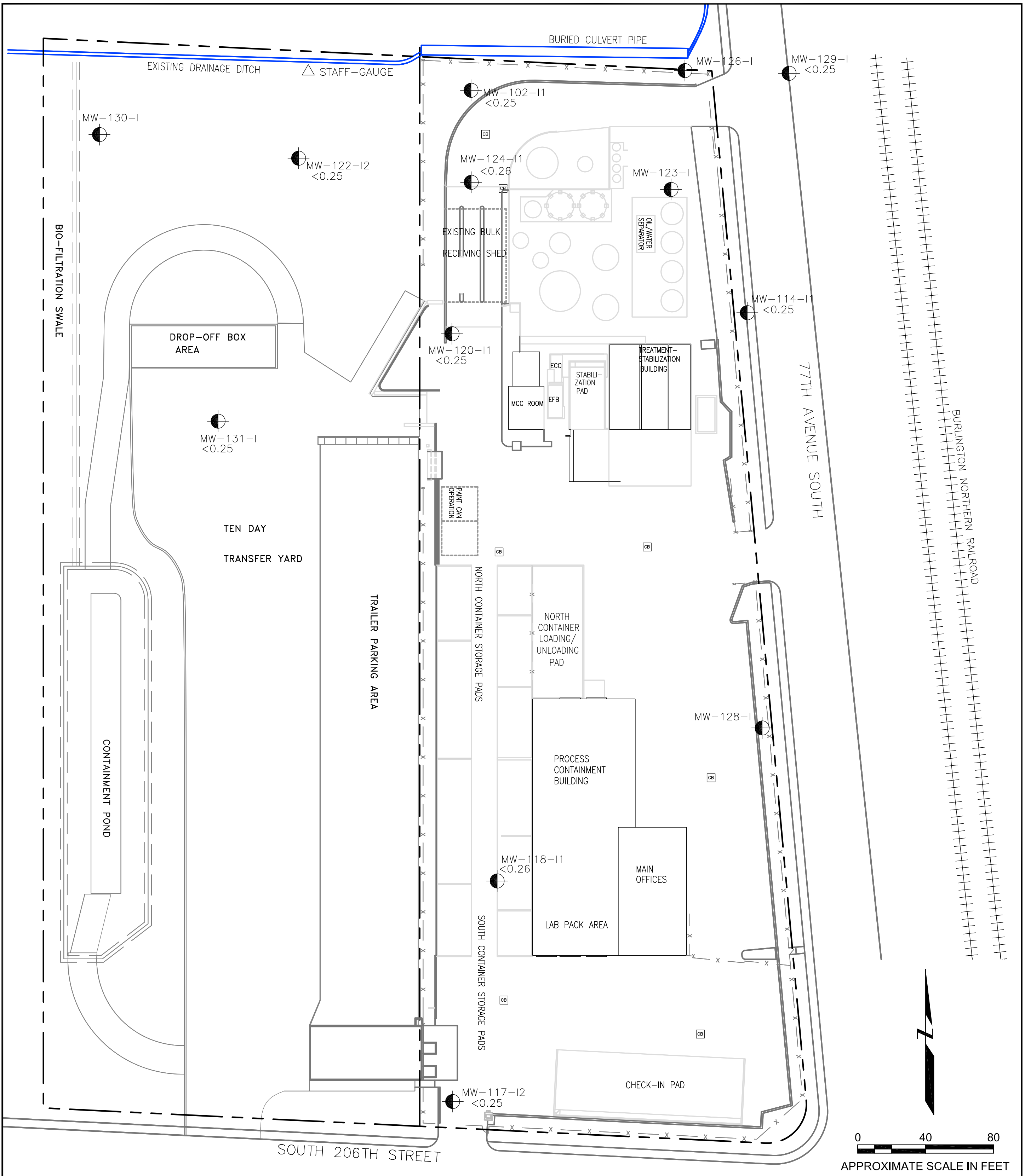
EXPLANATION

⊕ INTERMEDIATE ZONE A MONITORING WELL WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN ZONE A - INTERMEDIATE AQUIFER
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/12/07	Project No. 9464.002
Geomatrix		Figure **6-32c**

Plot Date: 12/12/07 - 4:21pm, Plotted by: astenberg
Drawing Path: S:\9464\003_R\CAD\, Drawing Name: Figure 6-32c_Diesel-A-Int2Q07_PSC-Kent.dwg



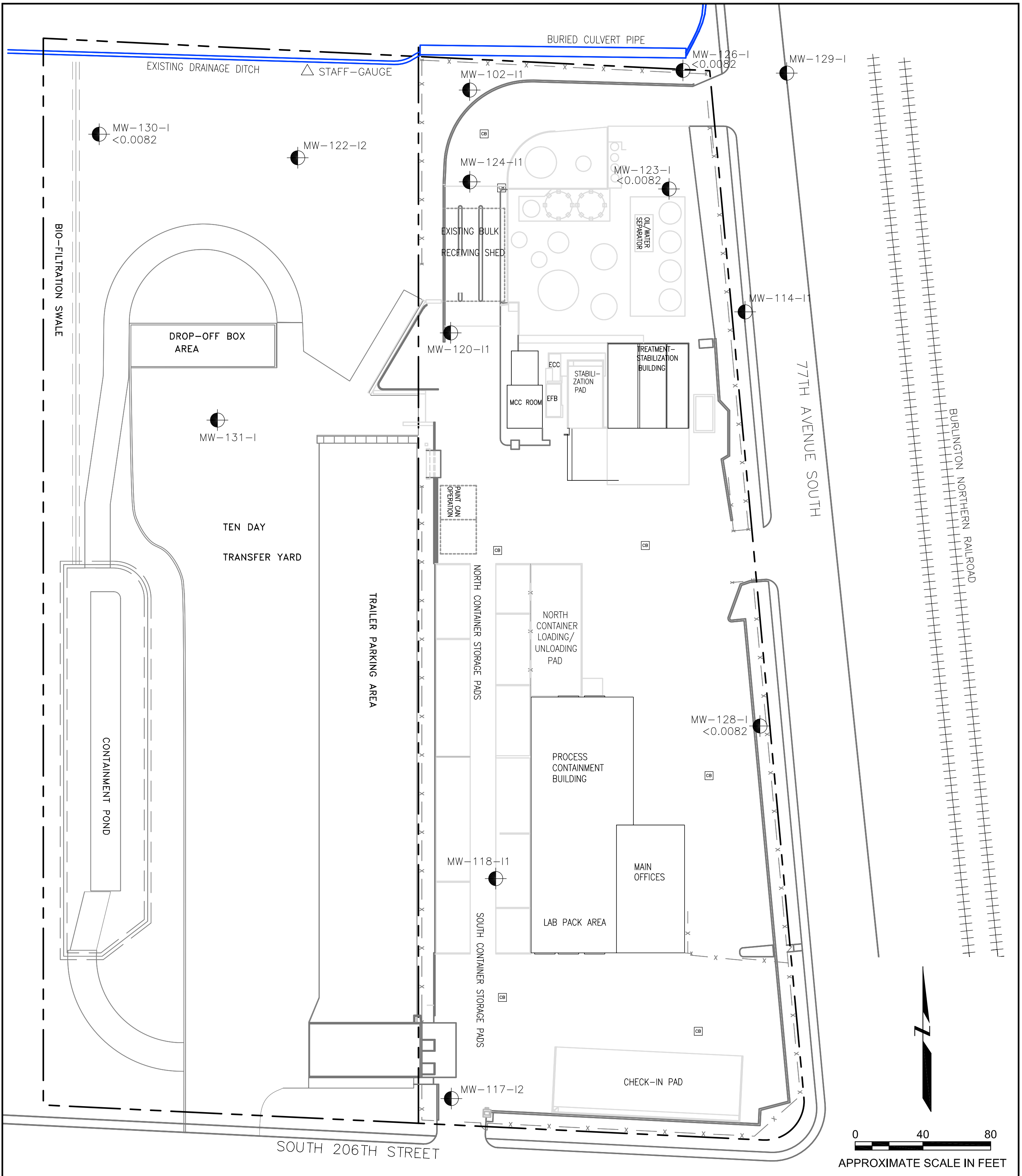
EXPLANATION

⊕ INTERMEDIATE ZONE A MONITORING WELL WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN ZONE A - INTERMEDIATE AQUIFER
THIRD QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/12/07	Project No. 9464.002
Geomatrix		Figure **6-32d**

Plot Date: 12/12/07 - 4:23pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-32d_Diesel-A-Int3Q07_PSC-Kent.dwg



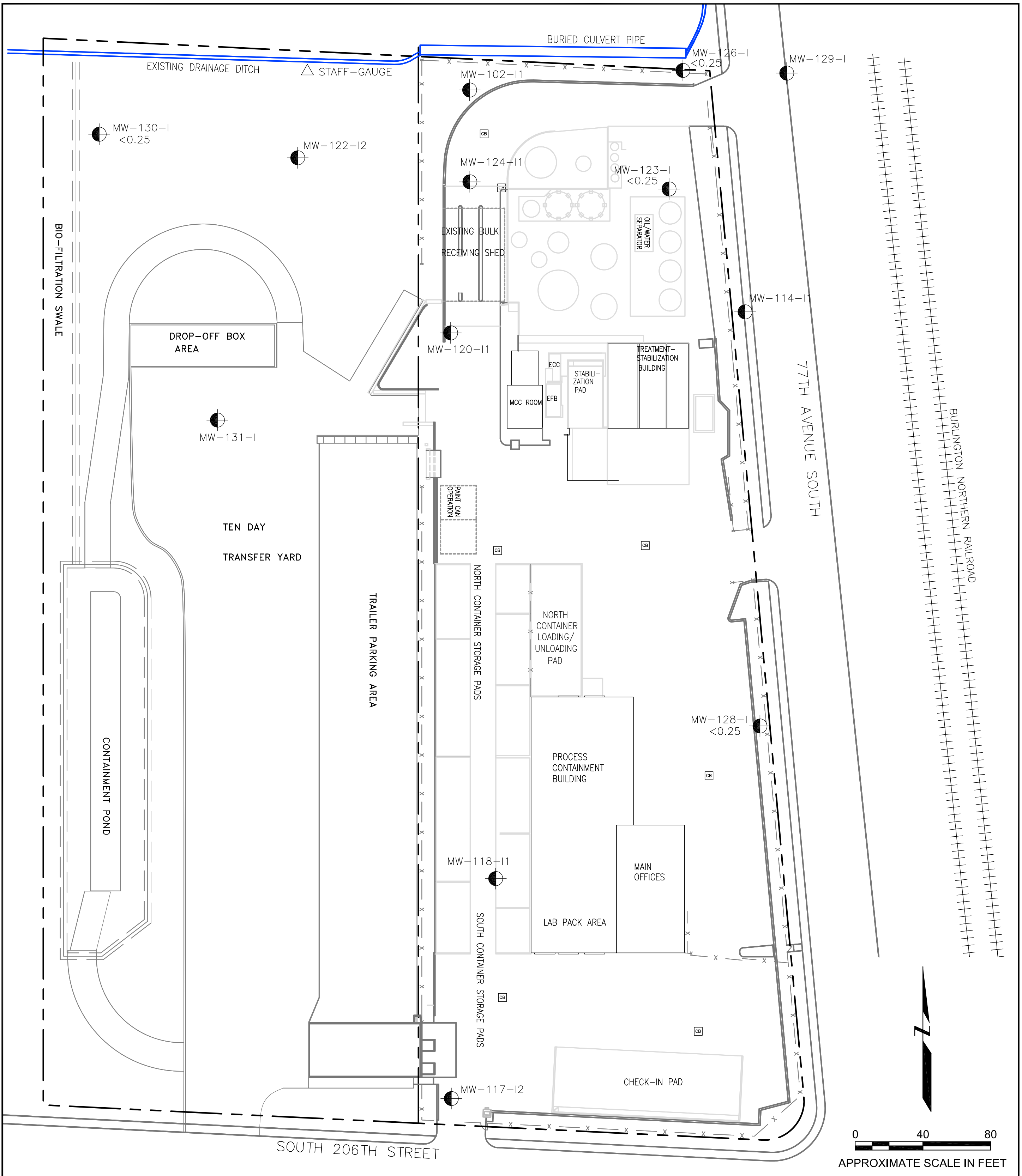
EXPLANATION

◐ INTERMEDIATE ZONE B UNIT MONITORING WELL WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN ZONE B - INTERMEDIATE AQUIFER
FOURTH QUARTER 2006
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/12/07	Project No. 9464.002
Geomatrix		Figure **6-33a**

Plot Date: 12/12/07 - 4:25pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-33a_Diesel-B-Int4Q06_PSC-Kent.dwg



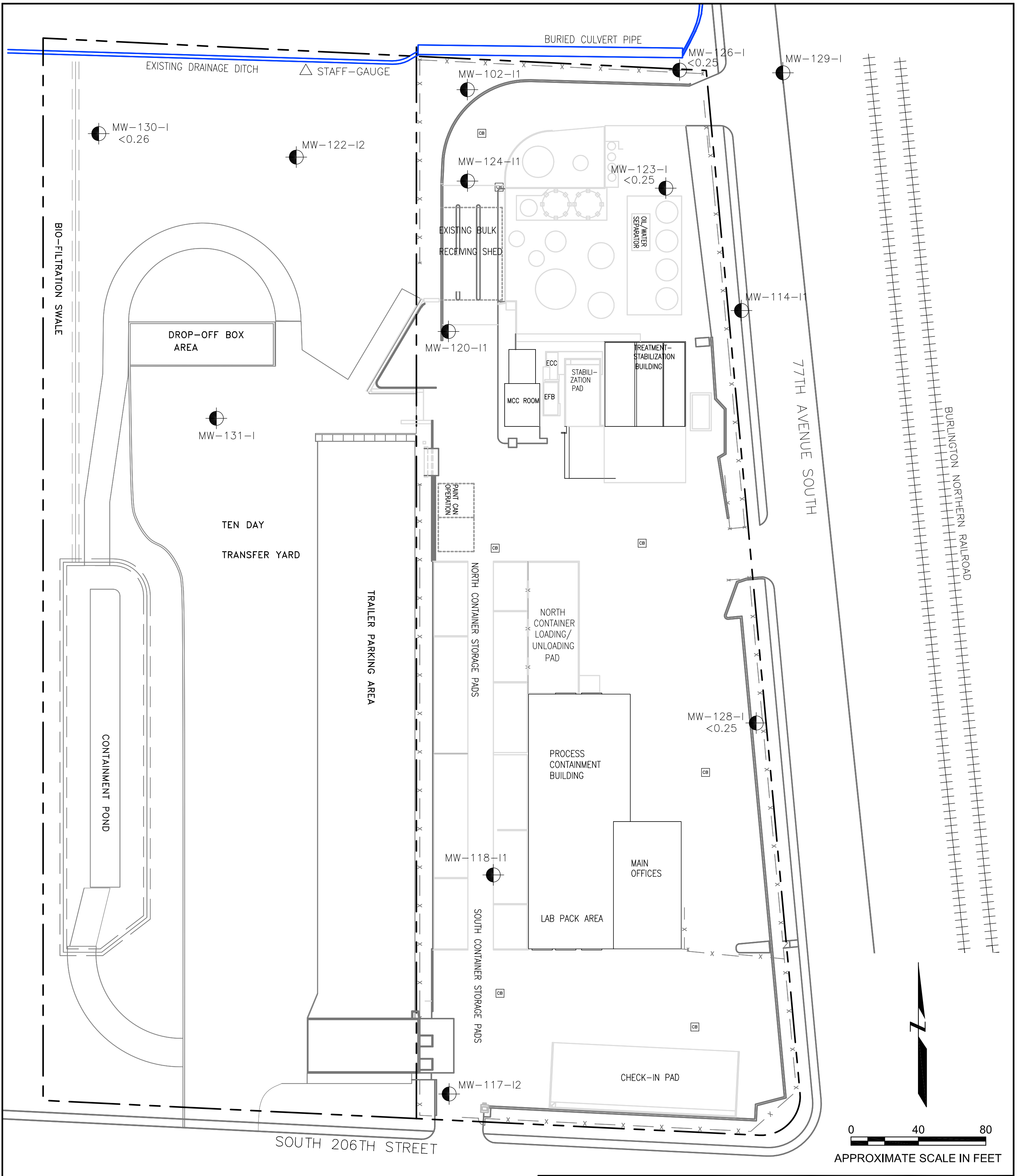
EXPLANATION

● INTERMEDIATE ZONE B MONITORING WELL
WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN ZONE B - INTERMEDIATE AQUIFER
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/12/07	Project No. 9464.002
Geomatrix		Figure **6-33b**

Plot Date: 12/12/07 - 4:26pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-33b_Diesel-B-Int1Q07_PSC-Kent.dwg



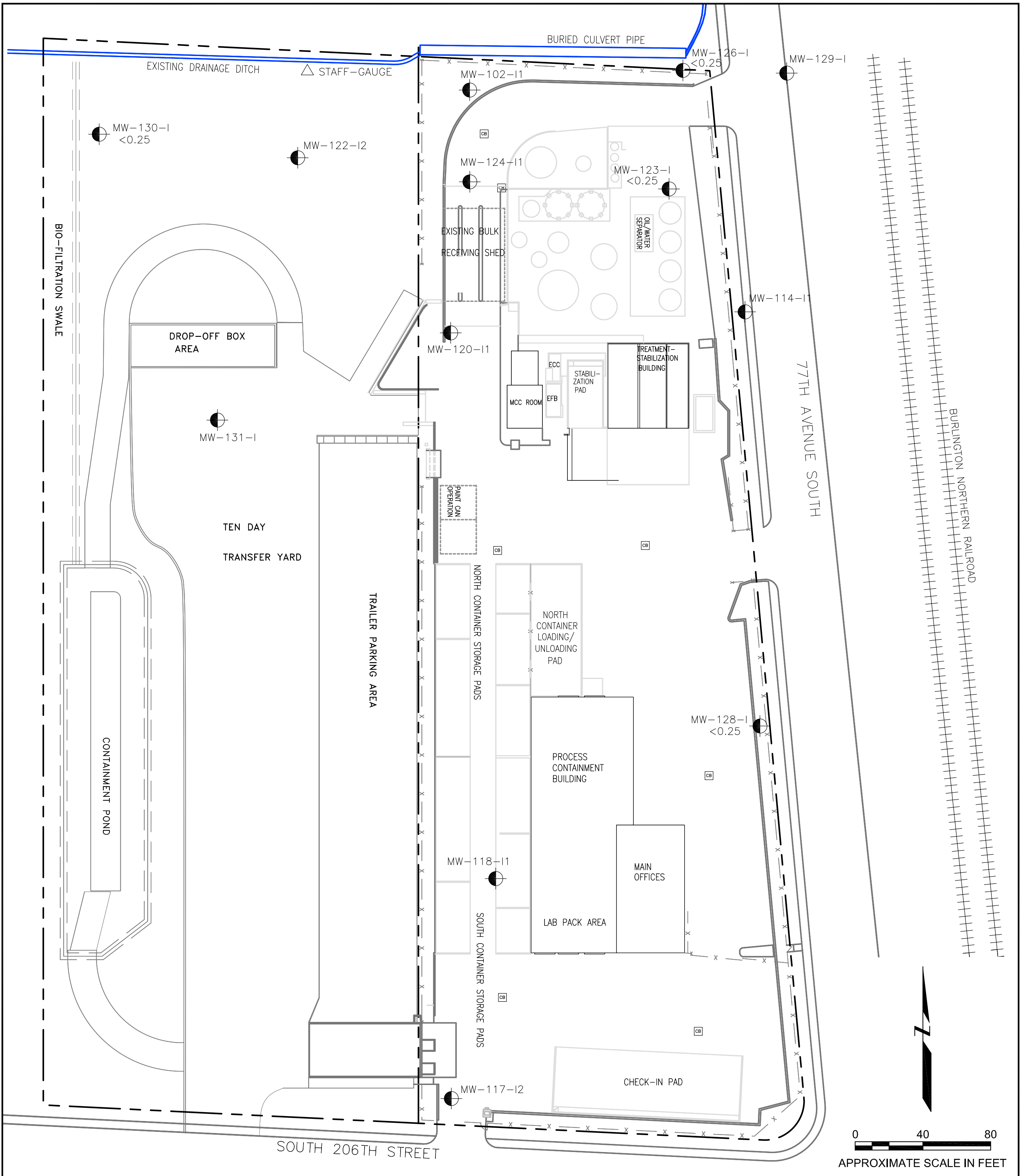
EXPLANATION

◐ INTERMEDIATE ZONE B MONITORING WELL WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN ZONE B - INTERMEDIATE AQUIFER
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/12/07	Project No. 9464.002
Geomatrix		Figure **6-33c**

Plot Date: 12/12/07 - 4:26pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-33c_Diesel-B-Int2Q07_PSC-Kent.dwg



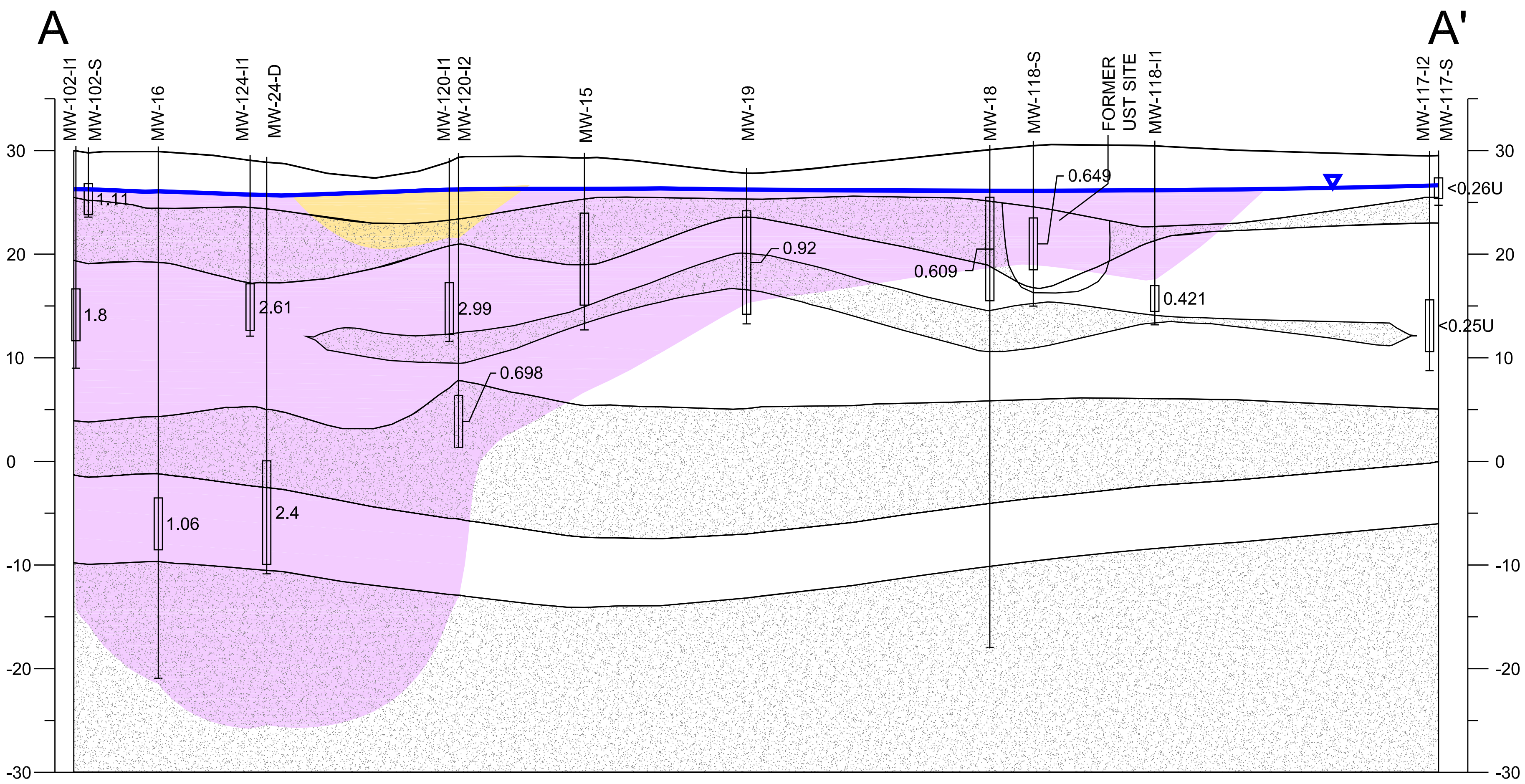
EXPLANATION

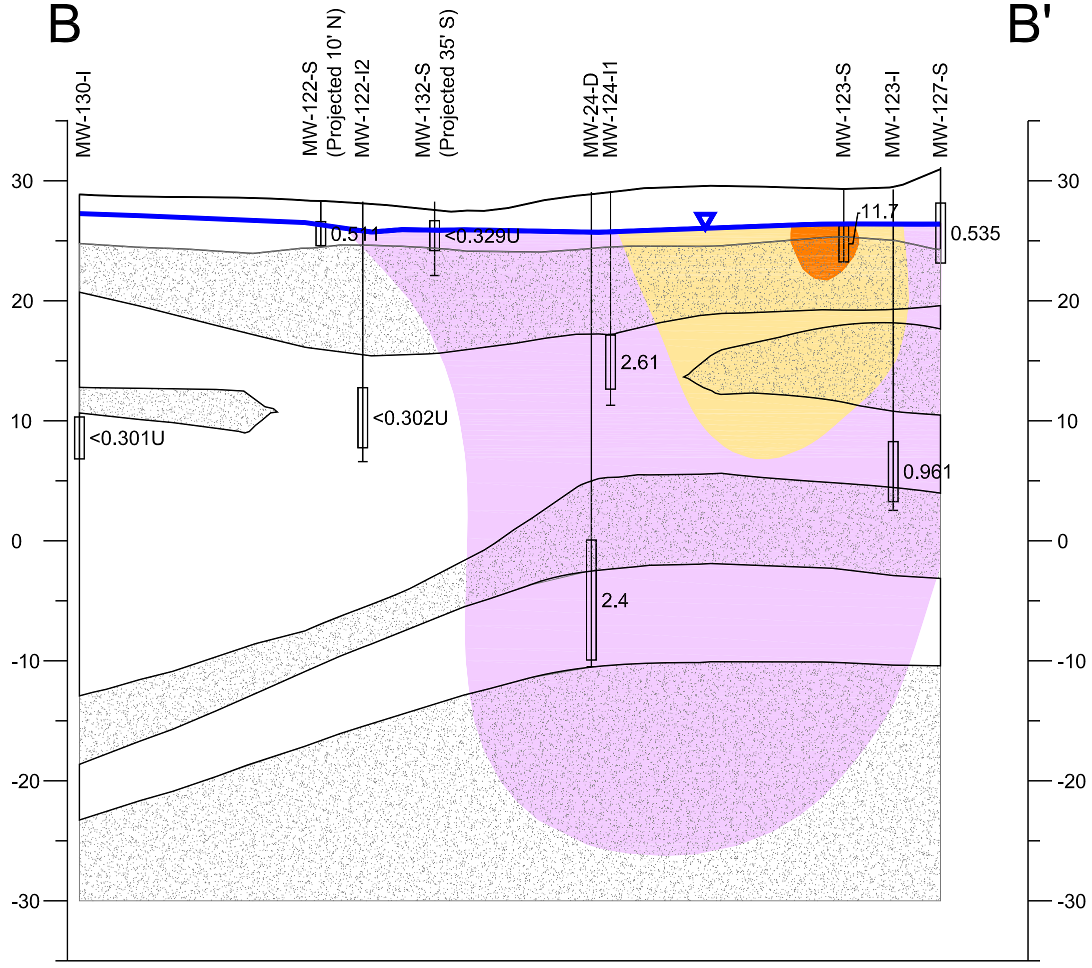
● INTERMEDIATE ZONE B MONITORING WELL WITH CHEMICAL CONCENTRATION (mg/L)

DIESEL IN ZONE B - INTERMEDIATE AQUIFER
THIRD QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 12/12/07	Project No. 9464.002
Geomatrix		Figure **6-33d**

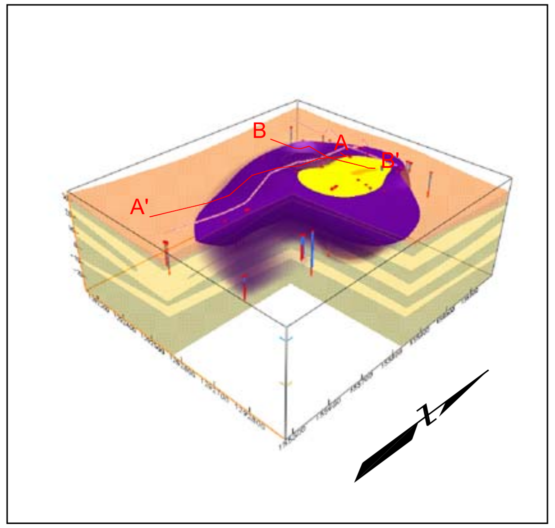
Plot Date: 12/12/07 - 4:27pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-33d_Diesel-B-Int3Q07_PSC-Kent.dwg





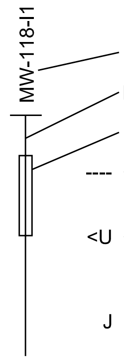
0 VERTICAL 10
0 HORIZONTAL 40

SCREENING LEVEL
DIESEL 500 ppb



THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 500 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION



WELL NAME
BLANK CASING
PERFORATED CASING
---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION
<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED
J VALUE IS ESTIMATED
<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED

▽ APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)

☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER

▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≥500 ppb

🟨 ≥5000 ppb

🟧 ≥10000 ppb

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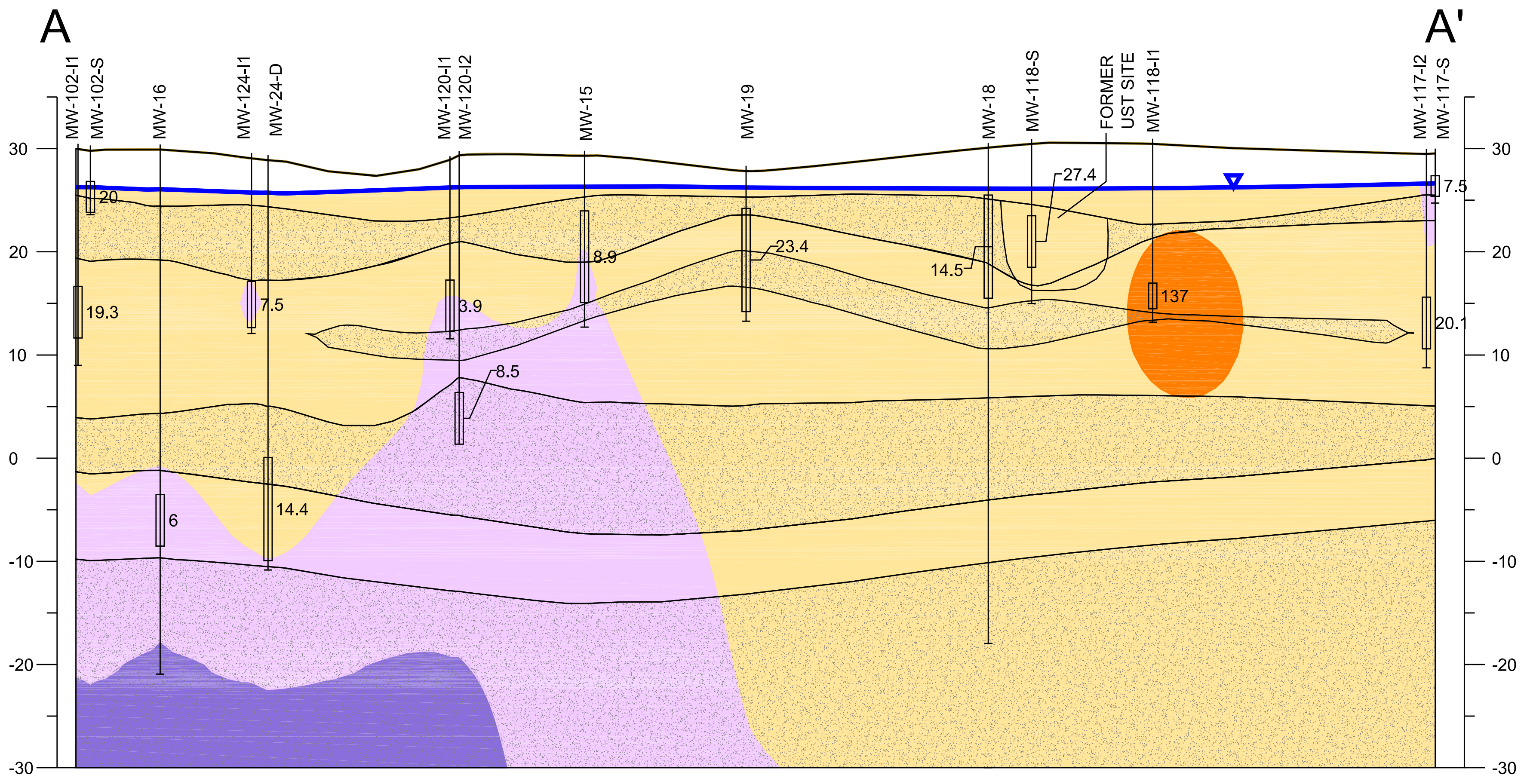
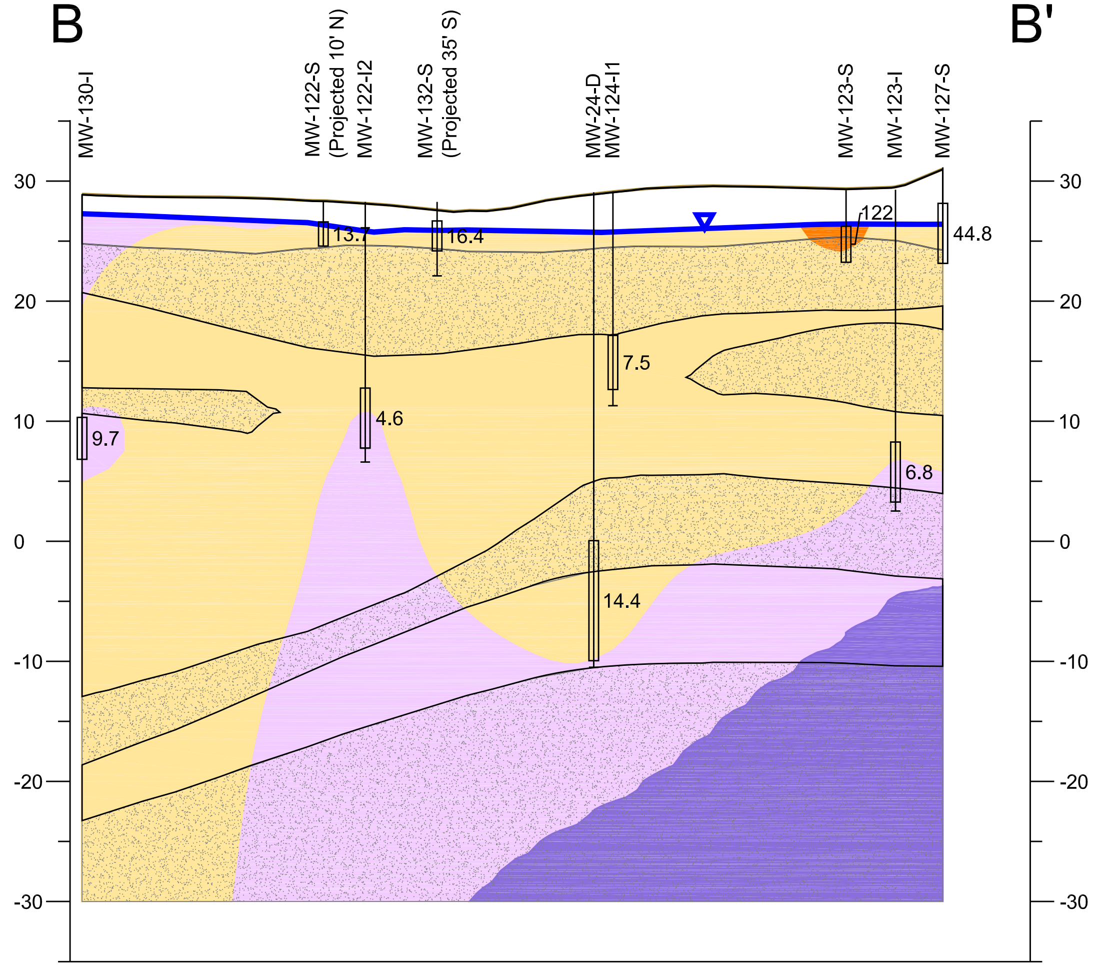
KENT, WASHINGTON

THREE–DIMENSIONAL FENCE DIAGRAM SHOWING MAXIMUM DIESEL CONCENTRATIONS IN GROUNDWATER

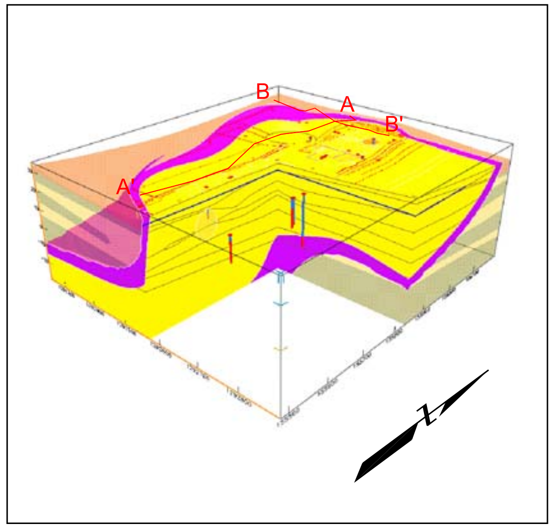
DATE:	
SCALE:	
SHEET: OF SHEETS	
PROJ No: 9464.002	FIGURE 6–34

Plot Date: 12/05/07 - 10:43am, Plotted by: lurmy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg



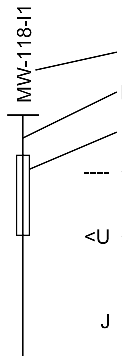


SCREENING LEVEL
ARSENIC 0.5 ppb



THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 0.5 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION



WELL NAME
BLANK CASING
PERFORATED CASING
---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION
<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED
J VALUE IS ESTIMATED
<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED

▽ APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)
☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER
▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≤0.5 ppb
🟪 ≥ 0.5 ppb
🟨 ≥ 10 ppb
🟧 ≥ 100 ppb

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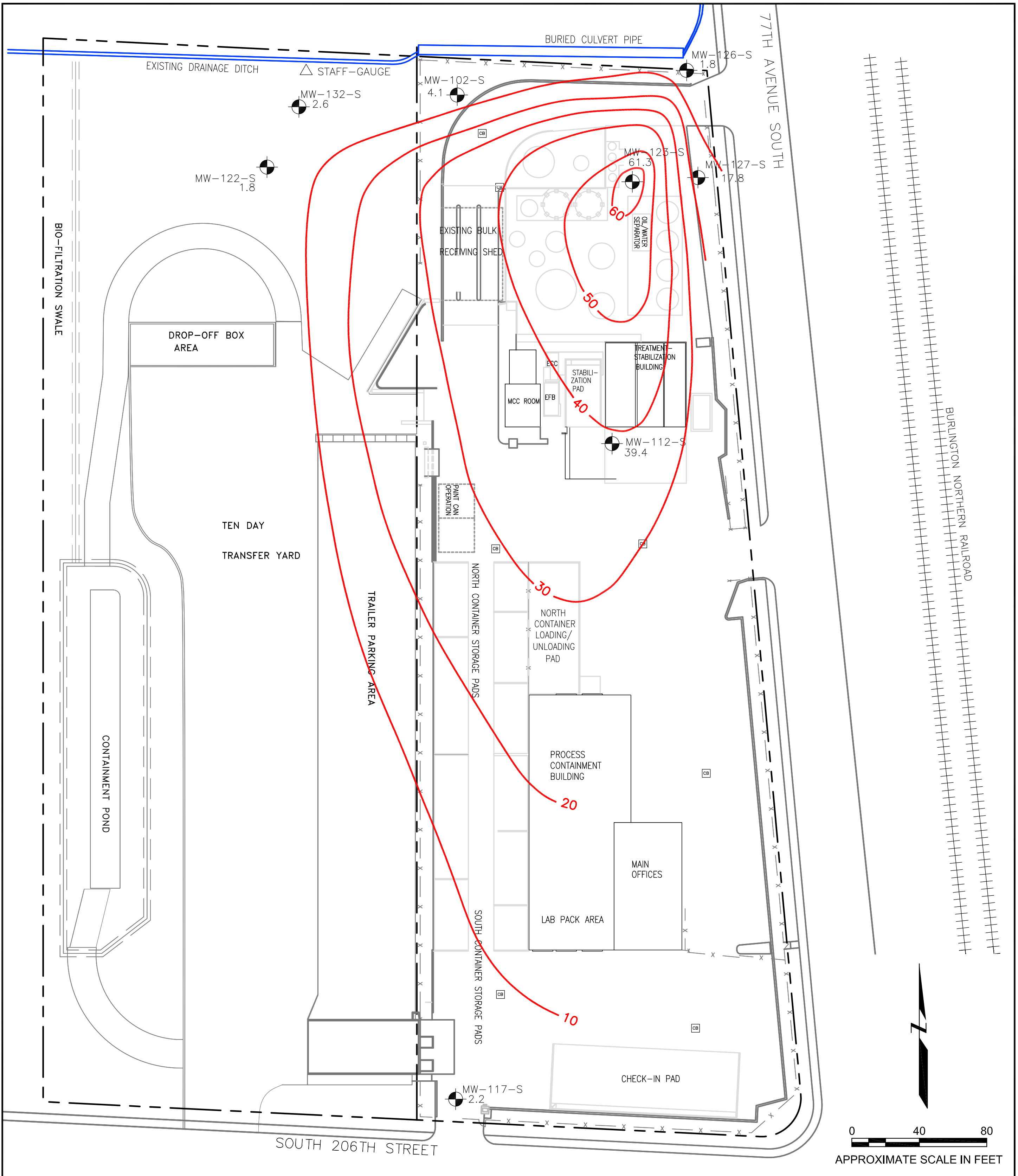
KENT, WASHINGTON

THREE-DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMIUM ARSENIC CONCENTRATIONS
IN GROUNDWATER

DATE:	
SCALE:	
SHEET: OF SHEETS	
PROJ No: 9464.002	FIGURE 6-35

Plot Date: 12/05/07 - 10:36am, Plotted by: lurmy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg



EXPLANATION

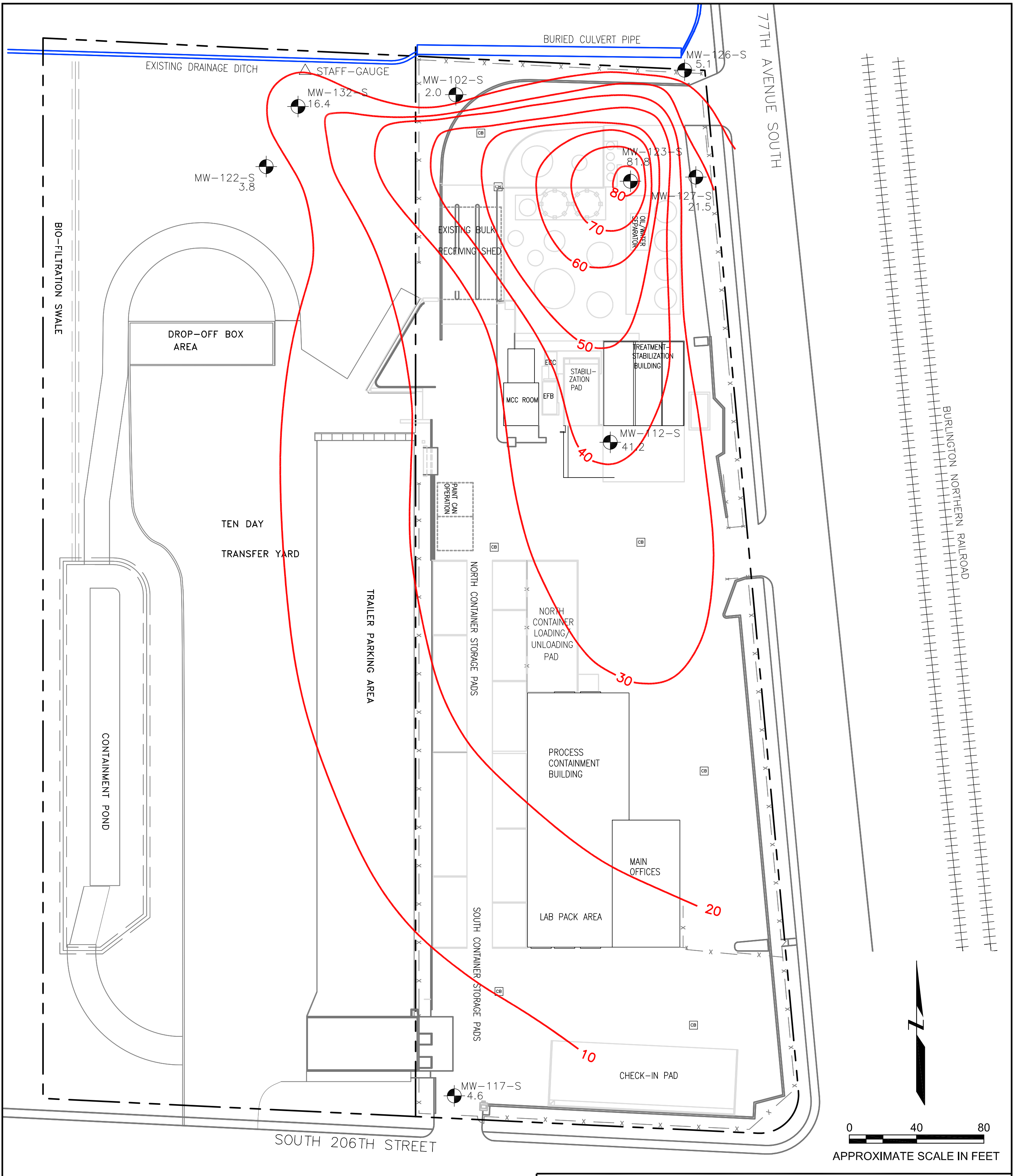
SHALLOW WATER-BEARING UNIT MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN µg/L (ppb)
CONTOUR INTERVAL = 10 (µg/L)

ARSENIC IN SHALLOW WATER-BEARING UNIT
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-36a**

Plot Date: 11/15/07 - 11:51am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-36a_ArsenicSh1Q07_PSC-Kent.dwg



EXPLANATION

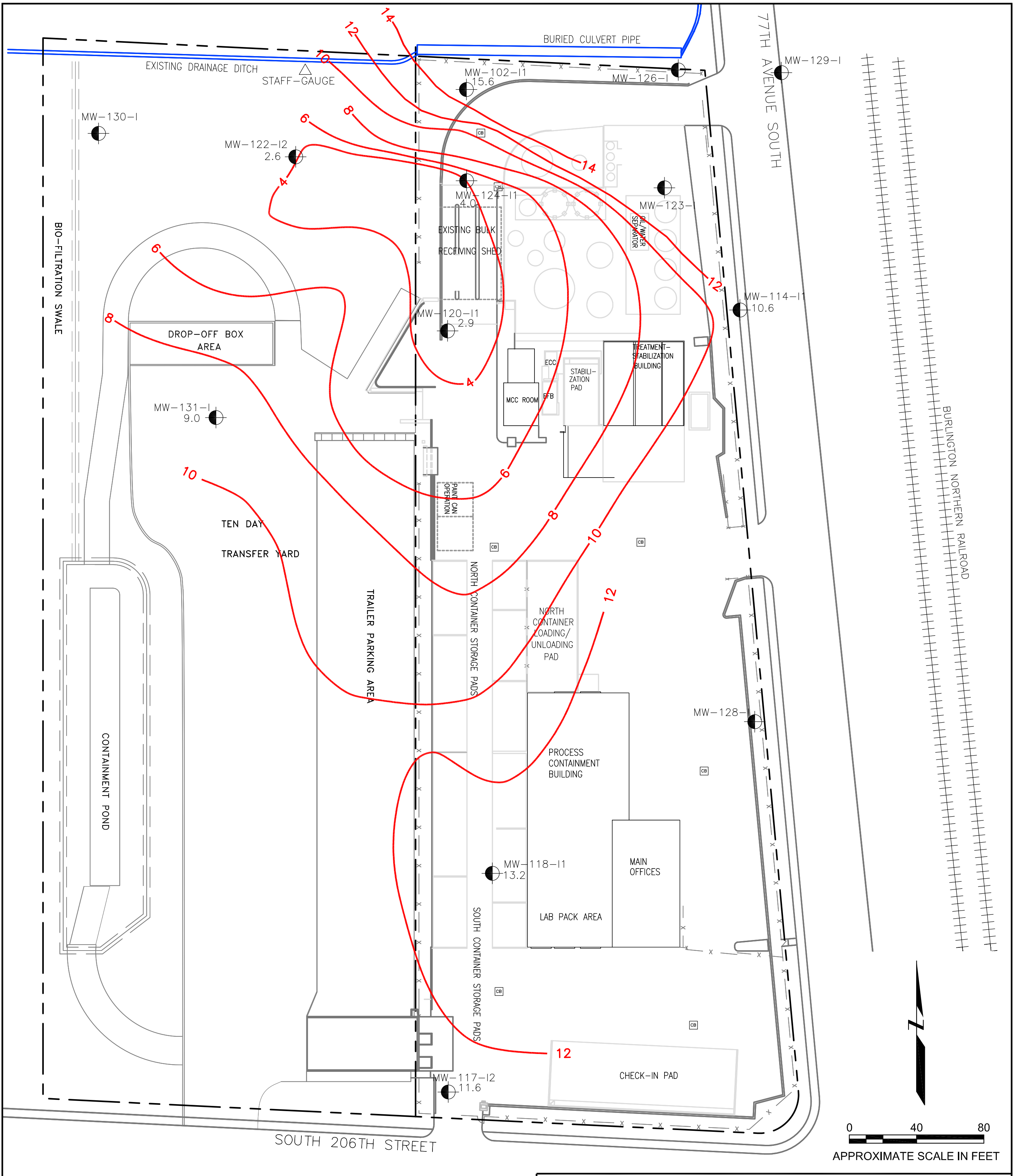
⊕ SHALLOW WATER-BEARING UNIT MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN µg/L (ppb)
CONTOUR INTERVAL = 10 (µg/L)

ARSENIC IN SHALLOW WATER-BEARING UNIT
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-36b**

Plot Date: 11/15/07 - 11:52am, Plotted by: astenberg
Drawing Path: S:\9464\003_R\CAD\, Drawing Name: Figure 6-36b_ArsenicSh2Q07_PSC-Kent.dwg



EXPLANATION

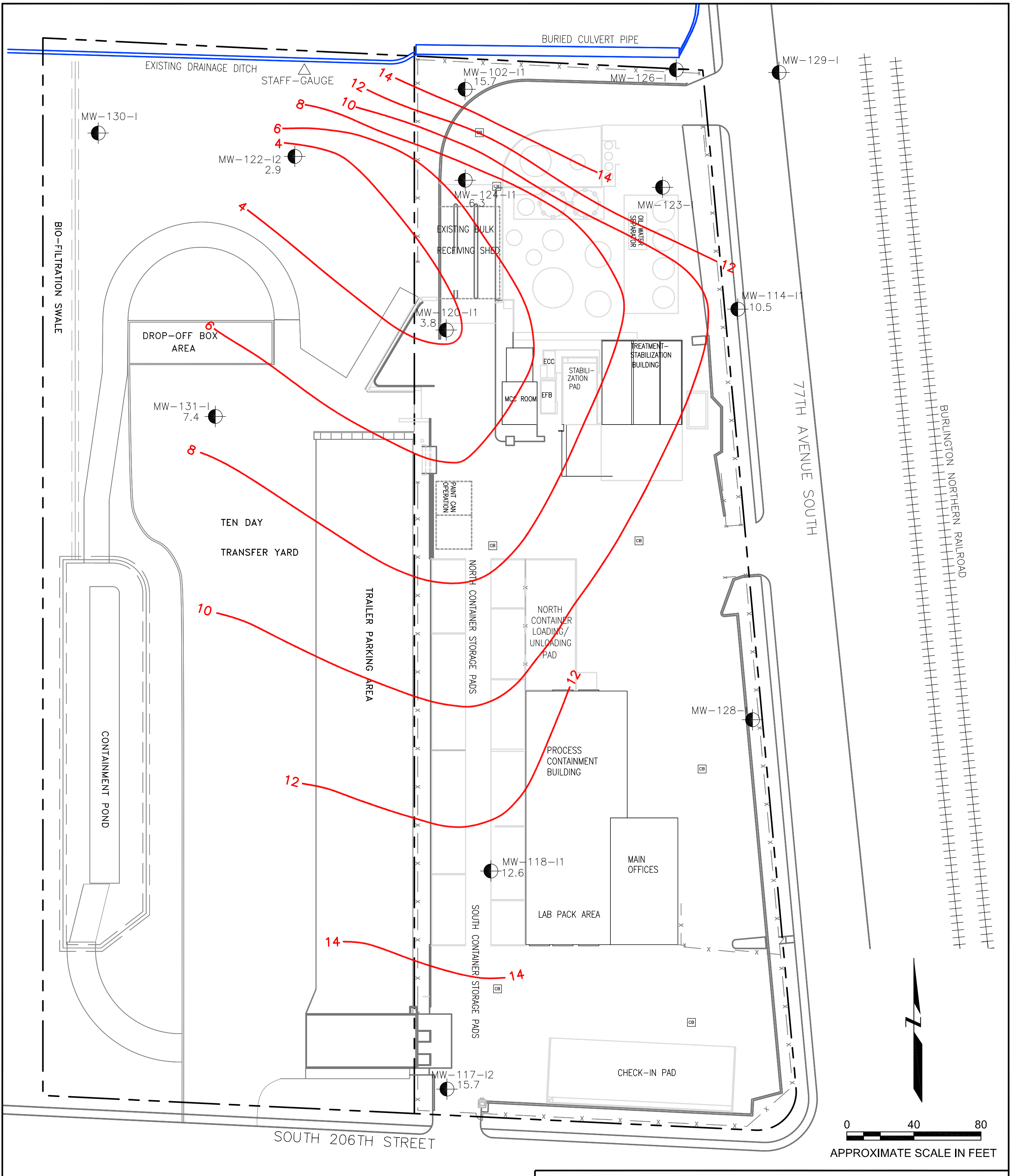
⊕ INTERMEDIATE AQUIFER MONITORING WELL
WITH CHEMICAL CONCENTRATION (µg/L)

〜 CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN µg/L (ppb)
CONTOUR INTERVAL = 2 (µg/L)

ARSENIC IN ZONE A - INTERMEDIATE AQUIFER
FOURTH QUARTER 2006
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-37a

Plot Date: 11/15/07 - 11:57am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-37a_Arsenic-A-Int4Q06_PSC-Kent.dwg



EXPLANATION

● INTERMEDIATE AQUIFER MONITORING WELL
WITH CHEMICAL CONCENTRATION (µg/L)

〰 CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN µg/L (ppb)
CONTOUR INTERVAL = 2 (µg/L)

ARSENIC IN ZONE A - INTERMEDIATE AQUIFER
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-37b

Plot Date: 11/15/07 - 11:58am, Plotted by: astenberg
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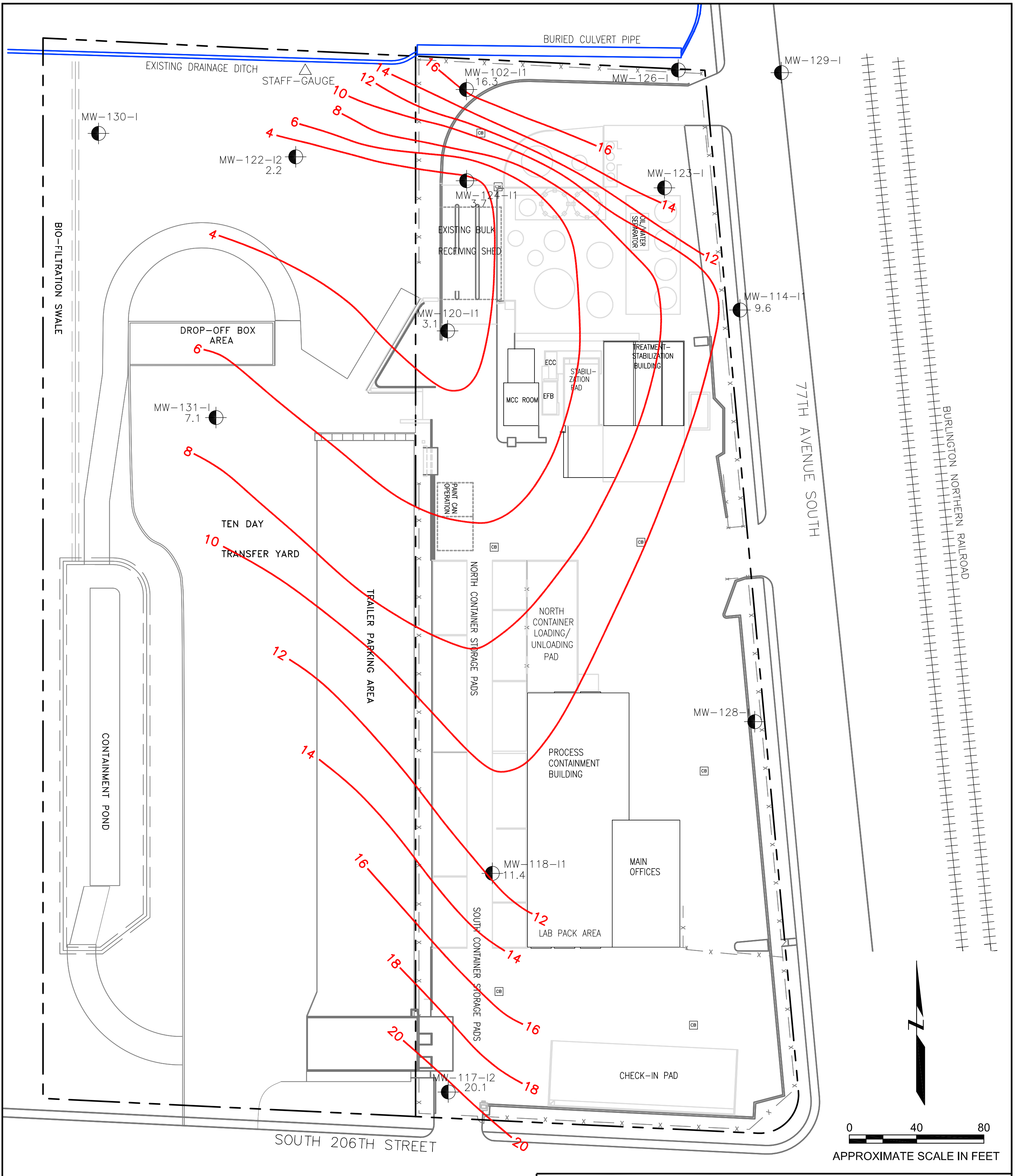


EXPLANATION

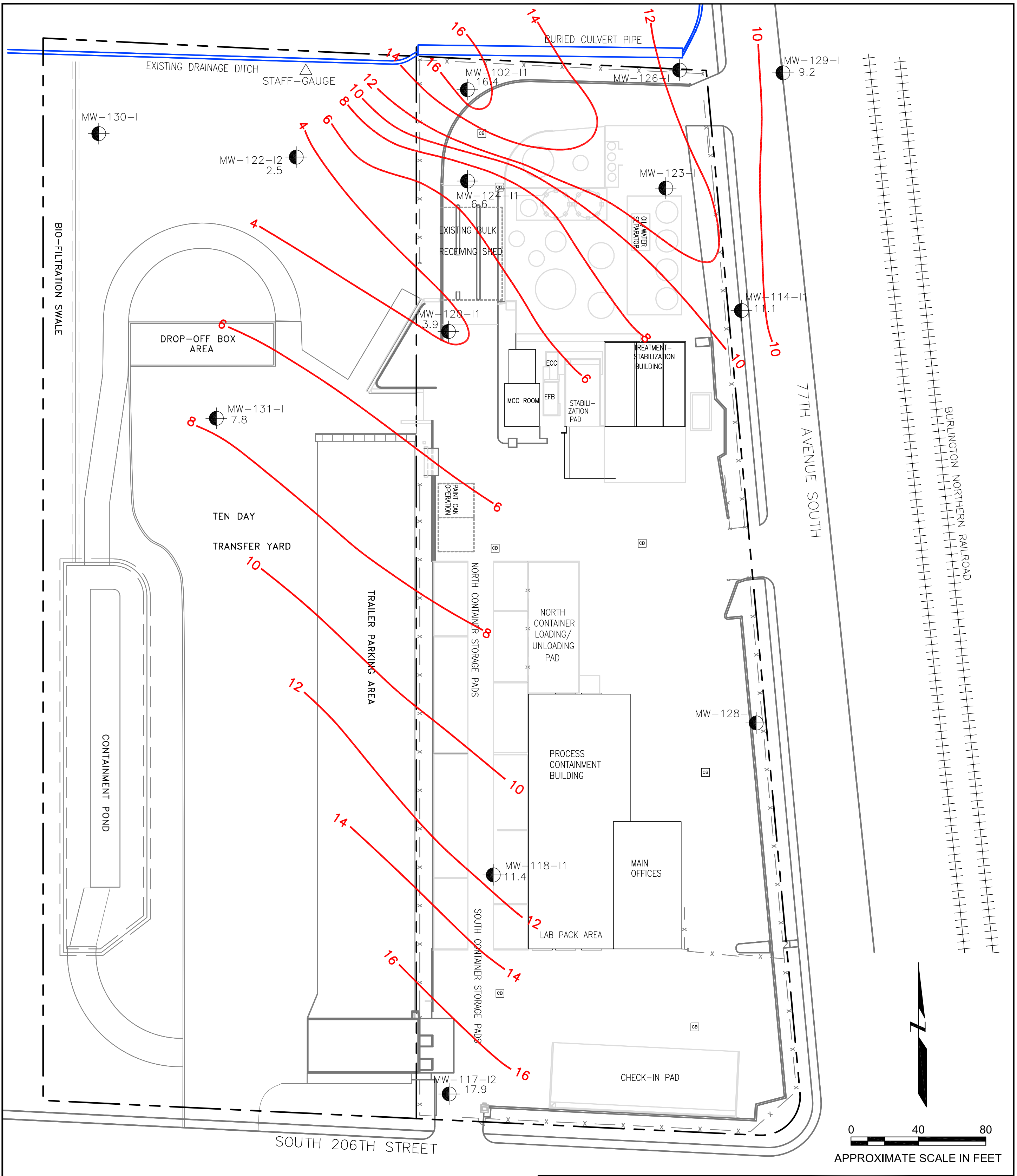
⊕ INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

〰 CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN µg/L (ppb)
CONTOUR INTERVAL = 2 (µg/L)

ARSENIC IN ZONE A - INTERMEDIATE AQUIFER
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-37c

Plot Date: 11/15/07 - 11:59am, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-37c_Arsenic-A-Int2Q07_PSC-Kent.dwg



EXPLANATION

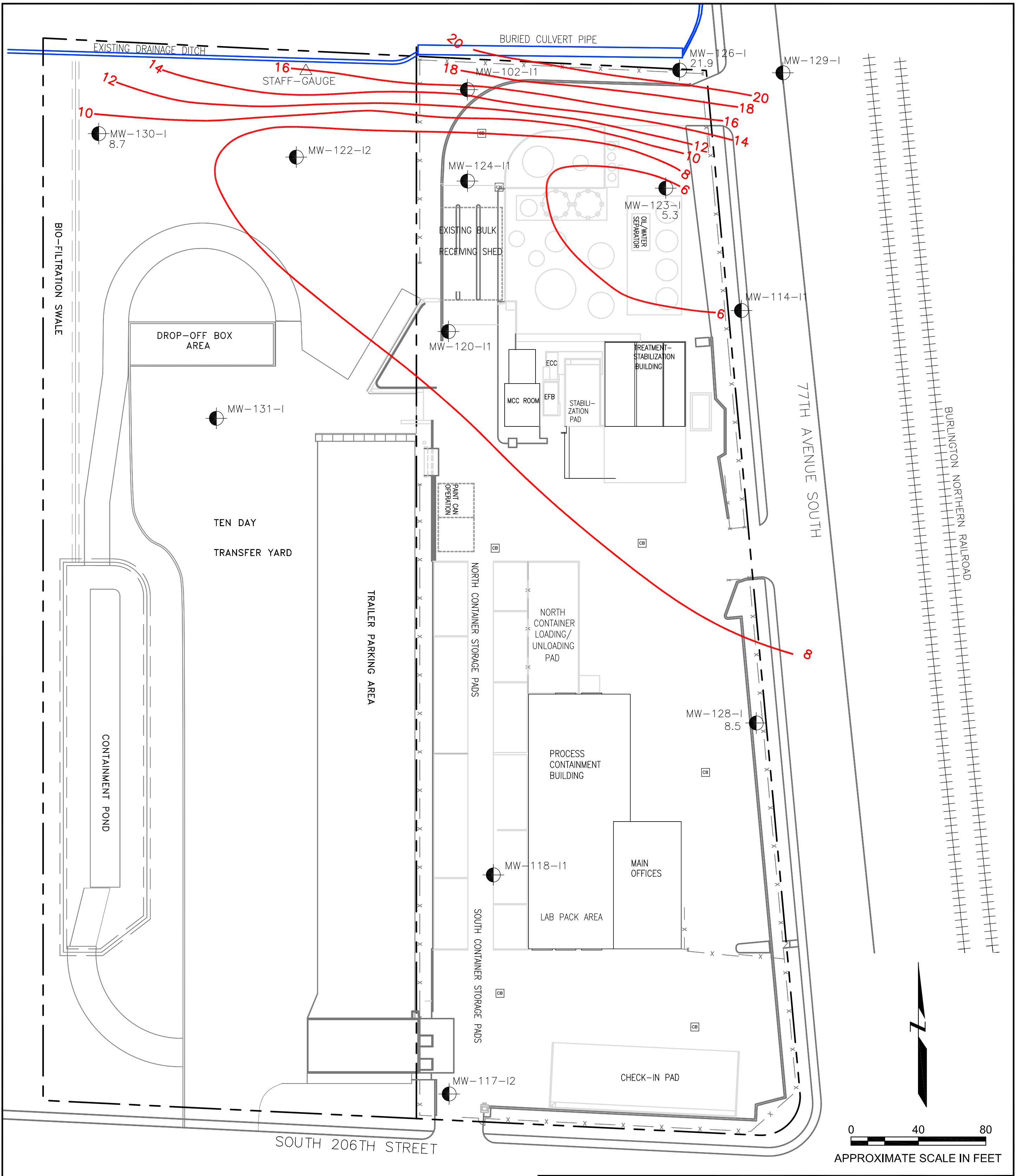
INTERMEDIATE AQUIFER MONITORING WELL
WITH CHEMICAL CONCENTRATION (μg/L)

CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN μg/L (ppb)
CONTOUR INTERVAL = 2 (μg/L)

ARSENIC IN ZONE A - INTERMEDIATE AQUIFER
THIRD QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-37d

Plot Date: 11/15/07 - 12:00pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-37d_Arsenic-A-Int3Q07_PSC-Kent.dwg



EXPLANATION

● INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

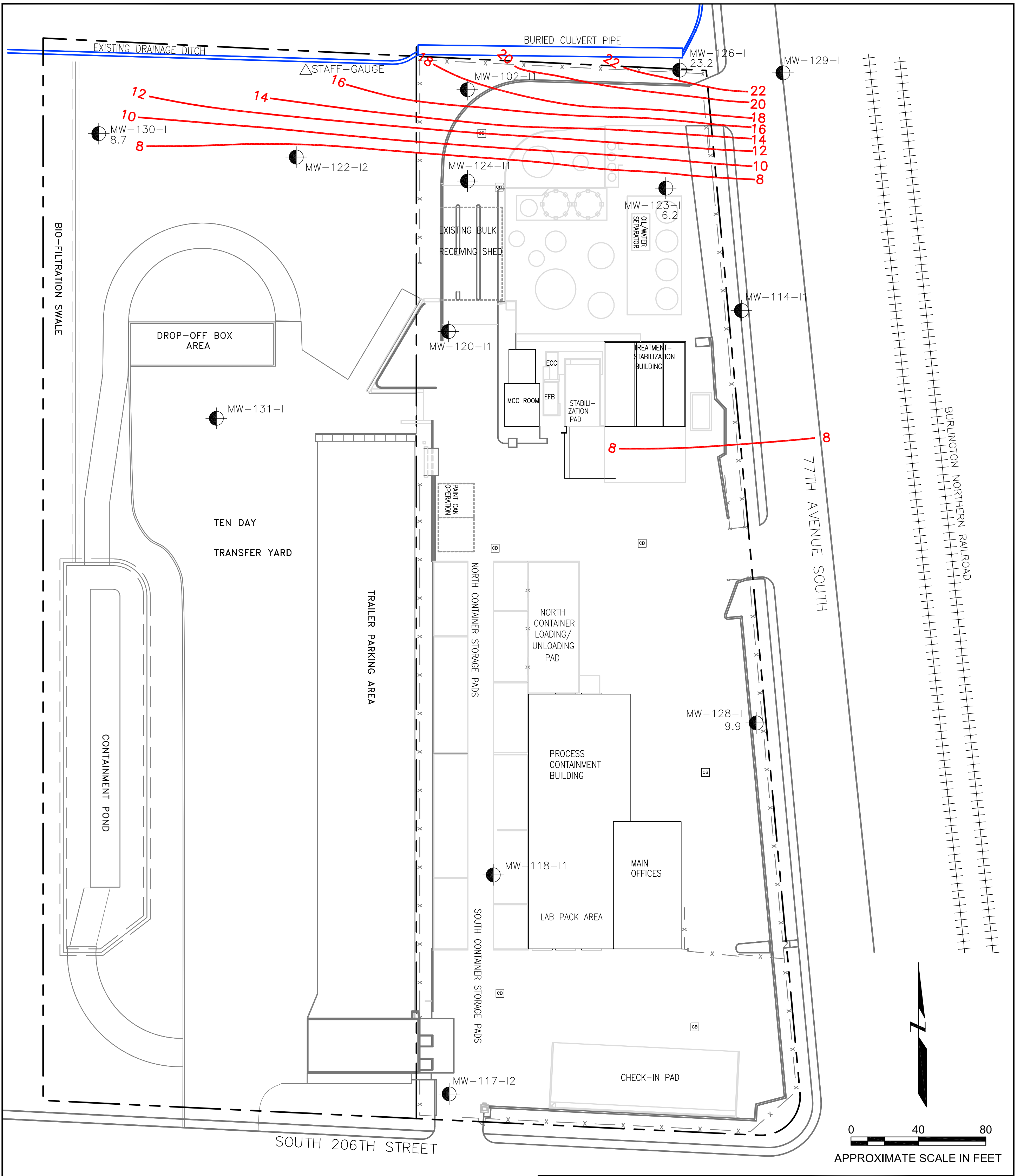
CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN µg/L (ppb)
CONTOUR INTERVAL = 2 (µg/L)

ARSENIC IN ZONE B - INTERMEDIATE AQUIFER
FOURTH QUARTER 2006

PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-38a**

Plot Date: 11/15/07 - 12:01pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-38a_Arsenic-B-Int4Q06_PSC-Kent.dwg



EXPLANATION

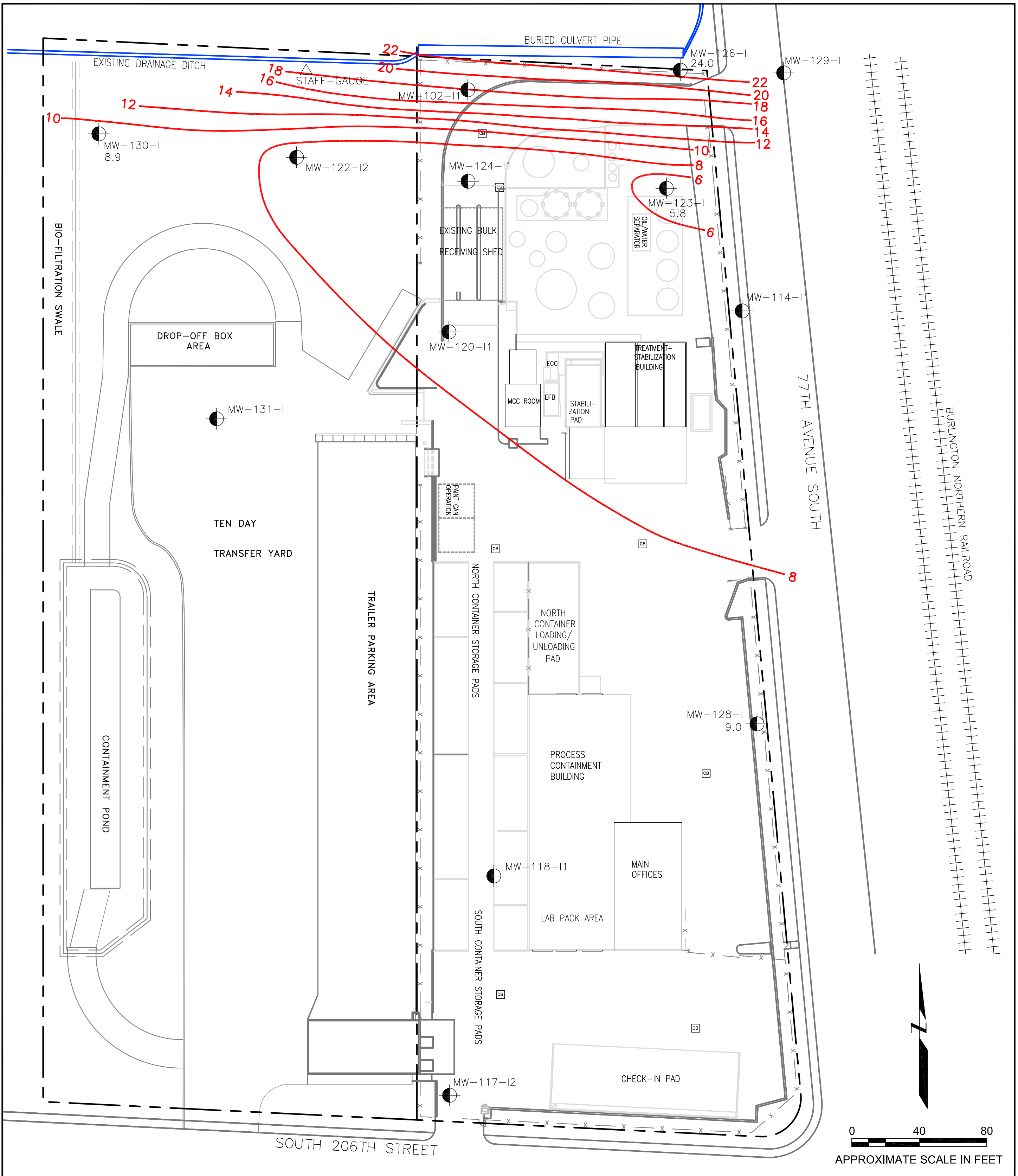
◐ INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

〜 CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN µg/L (ppb)
CONTOUR INTERVAL = 2 (µg/L)

ARSENIC IN ZONE B - INTERMEDIATE AQUIFER
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-38b**

Plot Date: 11/15/07 - 12:01pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-38b_Arsenic-B-Int1Q07_PSC-Kent.dwg



EXPLANATION

◐	INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (μg/L)
〰	CHEMICAL CONCENTRATION CONTOUR TOTAL ARSENIC IN μg/L (ppb) CONTOUR INTERVAL = 2 (μg/L)

ARSENIC IN ZONE B - INTERMEDIATE AQUIFER
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-38c

Plot Date: 11/15/07 - 12:02pm, Plotted by: astenberg
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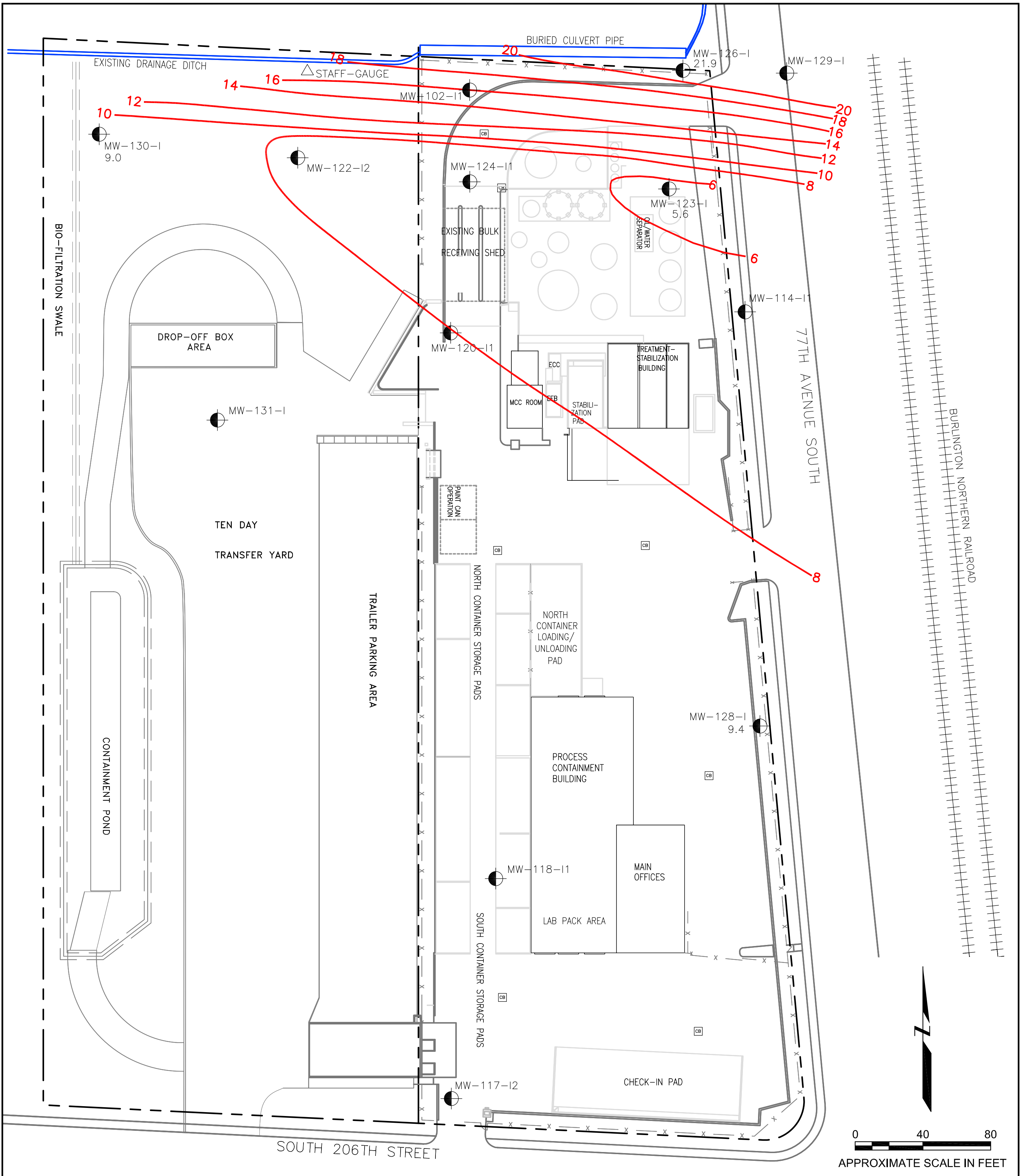


EXPLANATION

⊕ INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

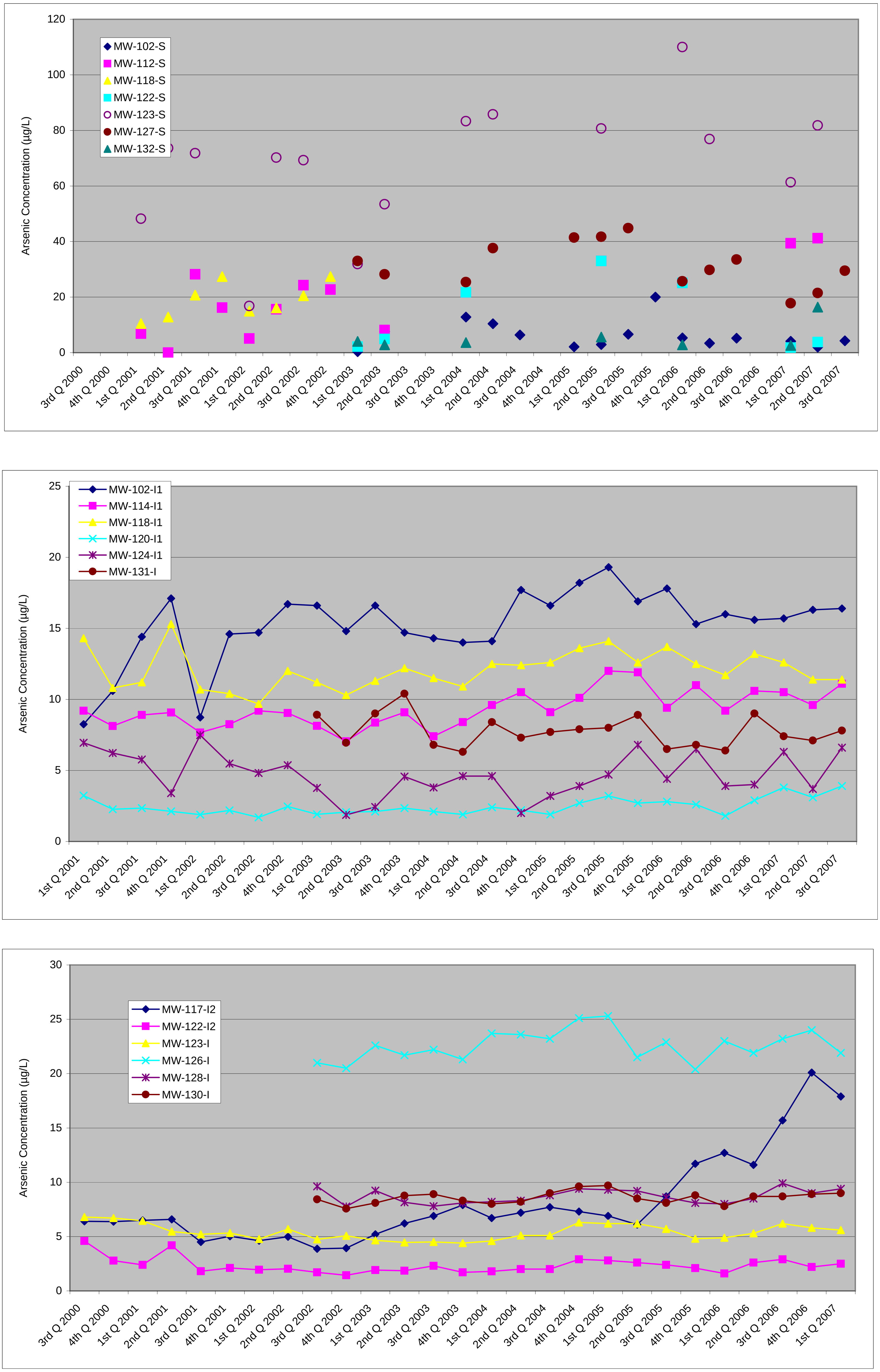
CHEMICAL CONCENTRATION CONTOUR
TOTAL ARSENIC IN µg/L (ppb)
CONTOUR INTERVAL = 2 (µg/L)

ARSENIC IN ZONE B - INTERMEDIATE AQUIFER
THIRD QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-38d

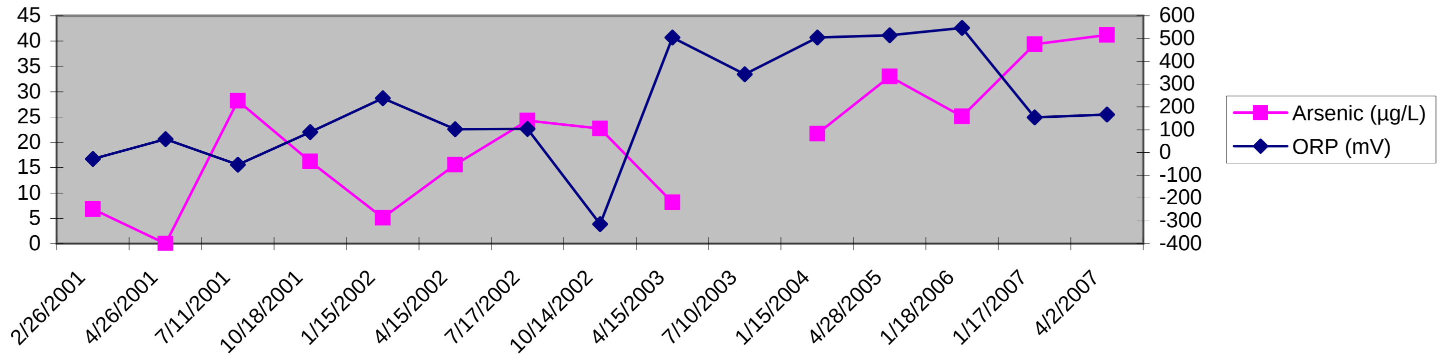
Plot Date: 11/15/07 - 12:03pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-38d_Arsenic-B-Int3Q07_PSC-Kent.dwg

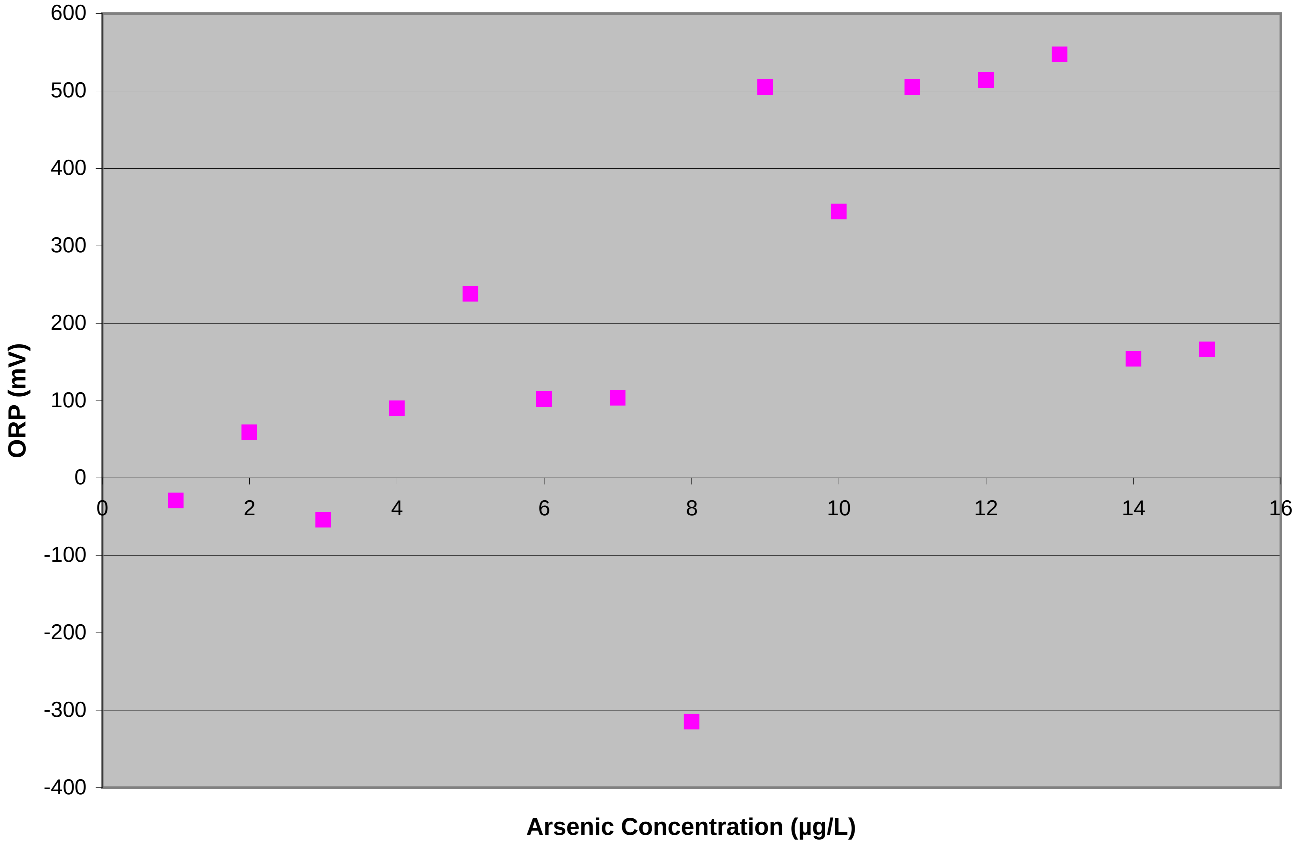
S:\9464\003_RI\Data\concentrations over time-adam.xls



TOTAL ARSENIC CONCENTRATIONS IN
GROUNDWATER OVER TIME
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **6-39**

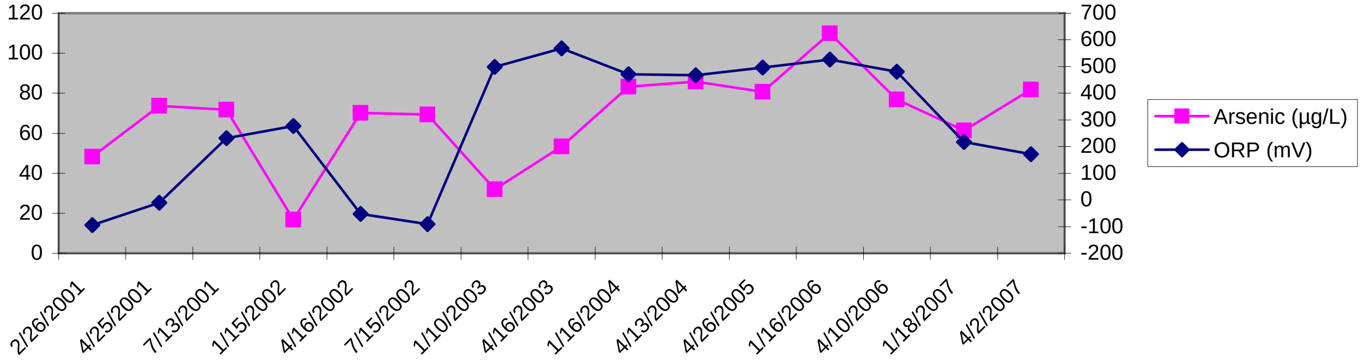


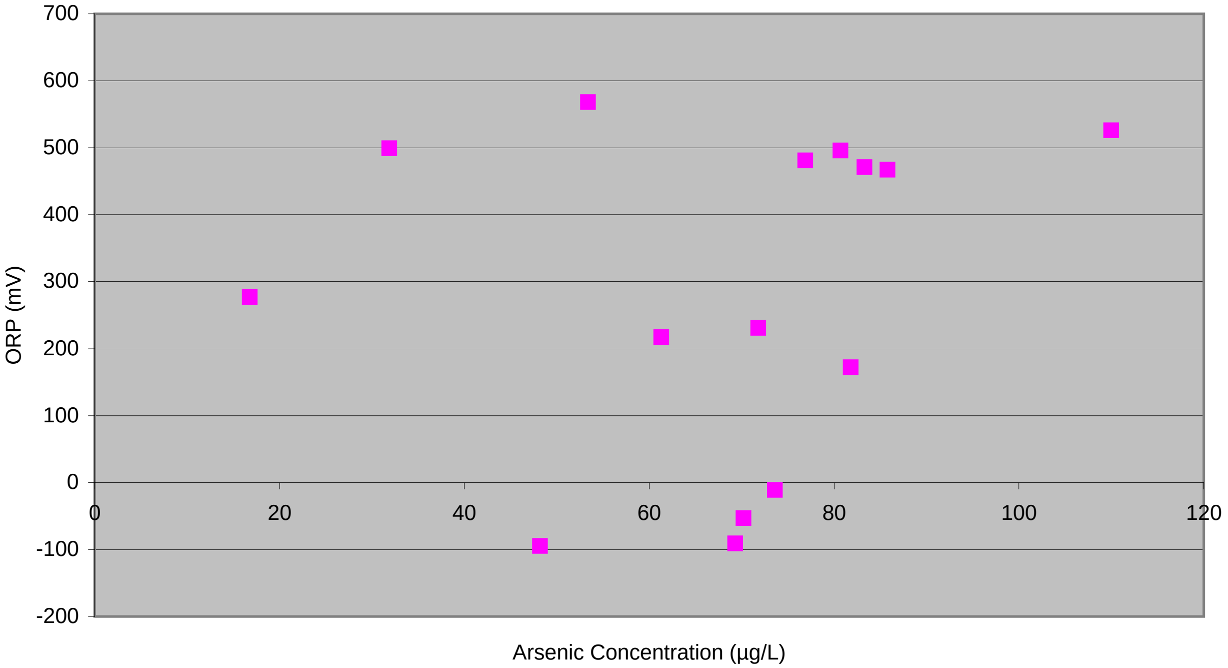


ARSENIC CONCENTRATION AND OXIDATION-REDUCTION POTENTIAL, MW-112-S
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **6-40**

S:\9464\003_RI\Data\Figs 6-XX Arsenic and ORP-ADAM.xls

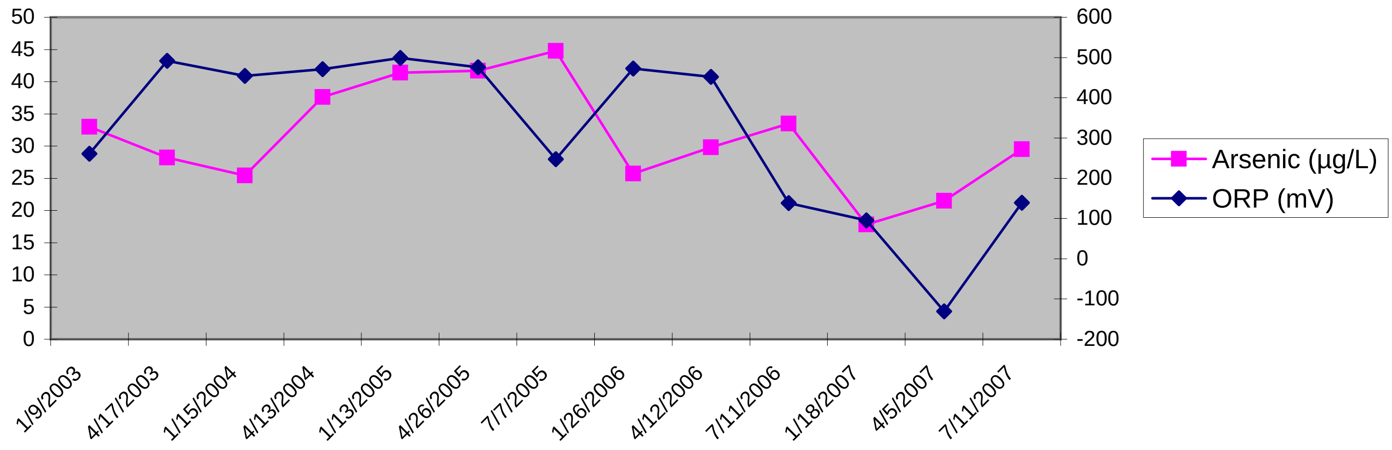


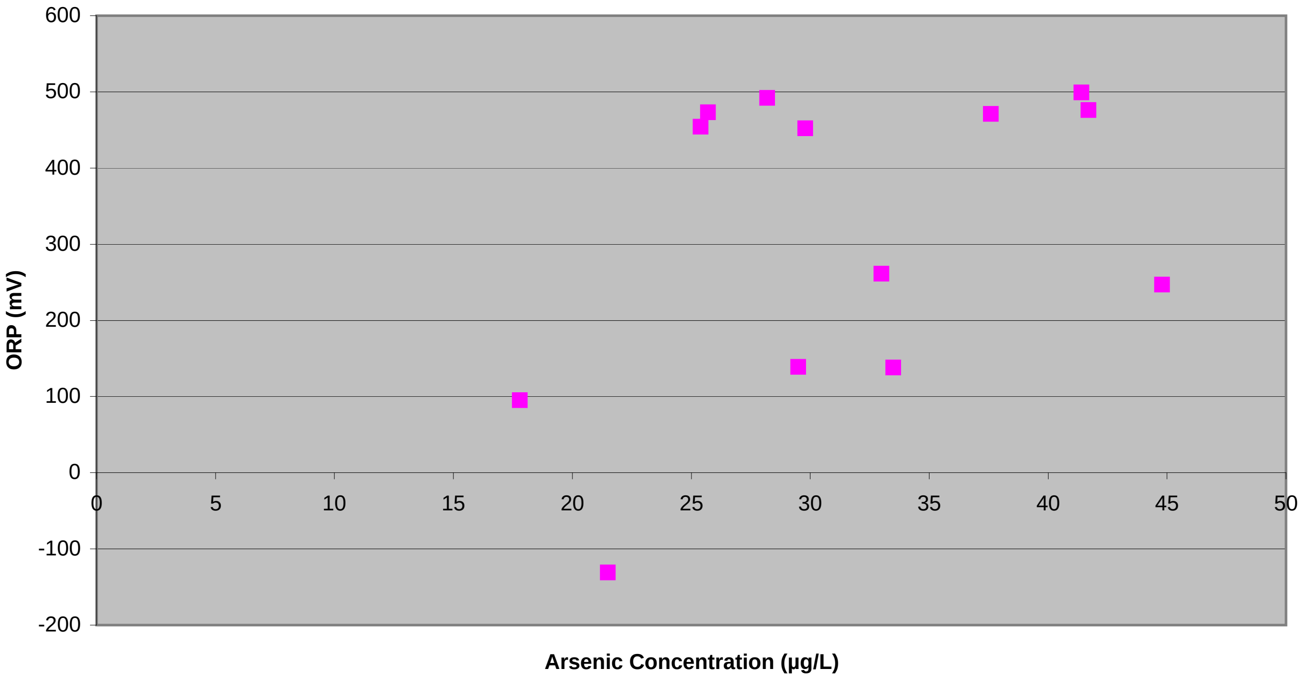


S:\9464\003 RI\Data\Figs 6-XX Arsenic and ORP-ADAM.xls

ARSENIC CONCENTRATION AND OXIDATION-REDUCTION POTENTIAL, MW-123-S
PSC Kent Facility
Kent, Washington

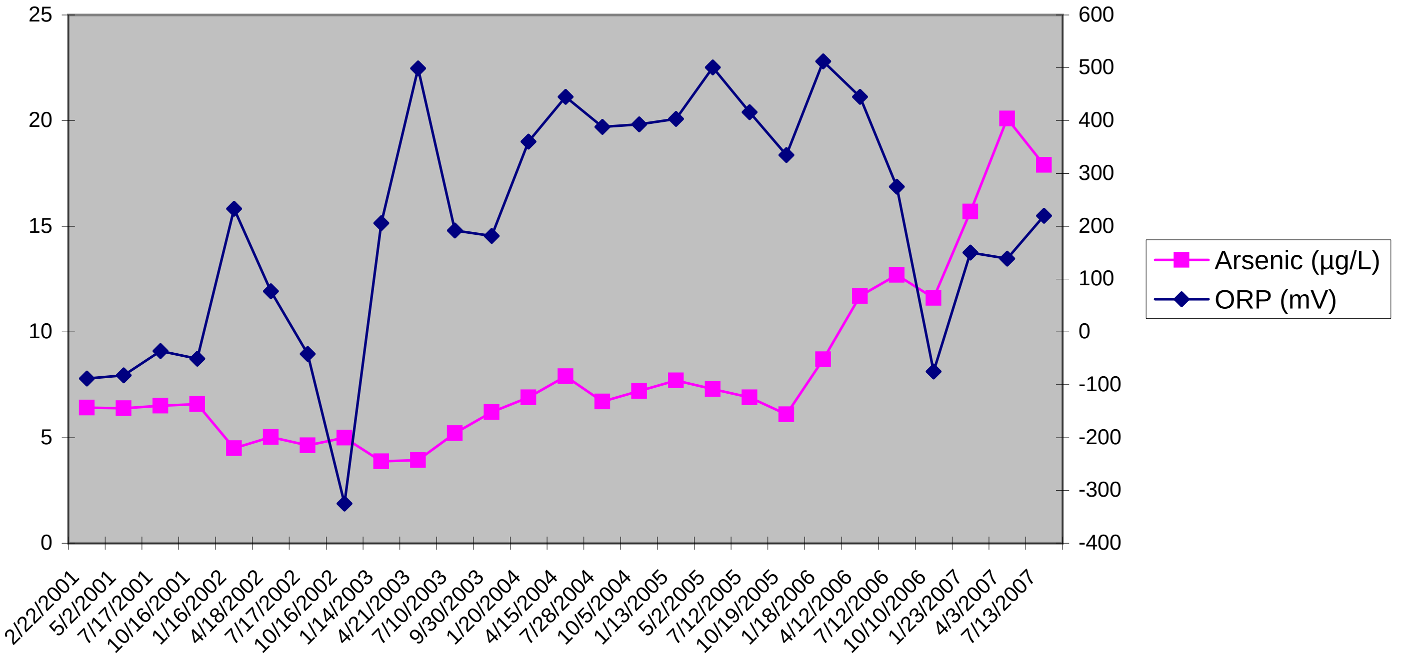
By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **6-41**

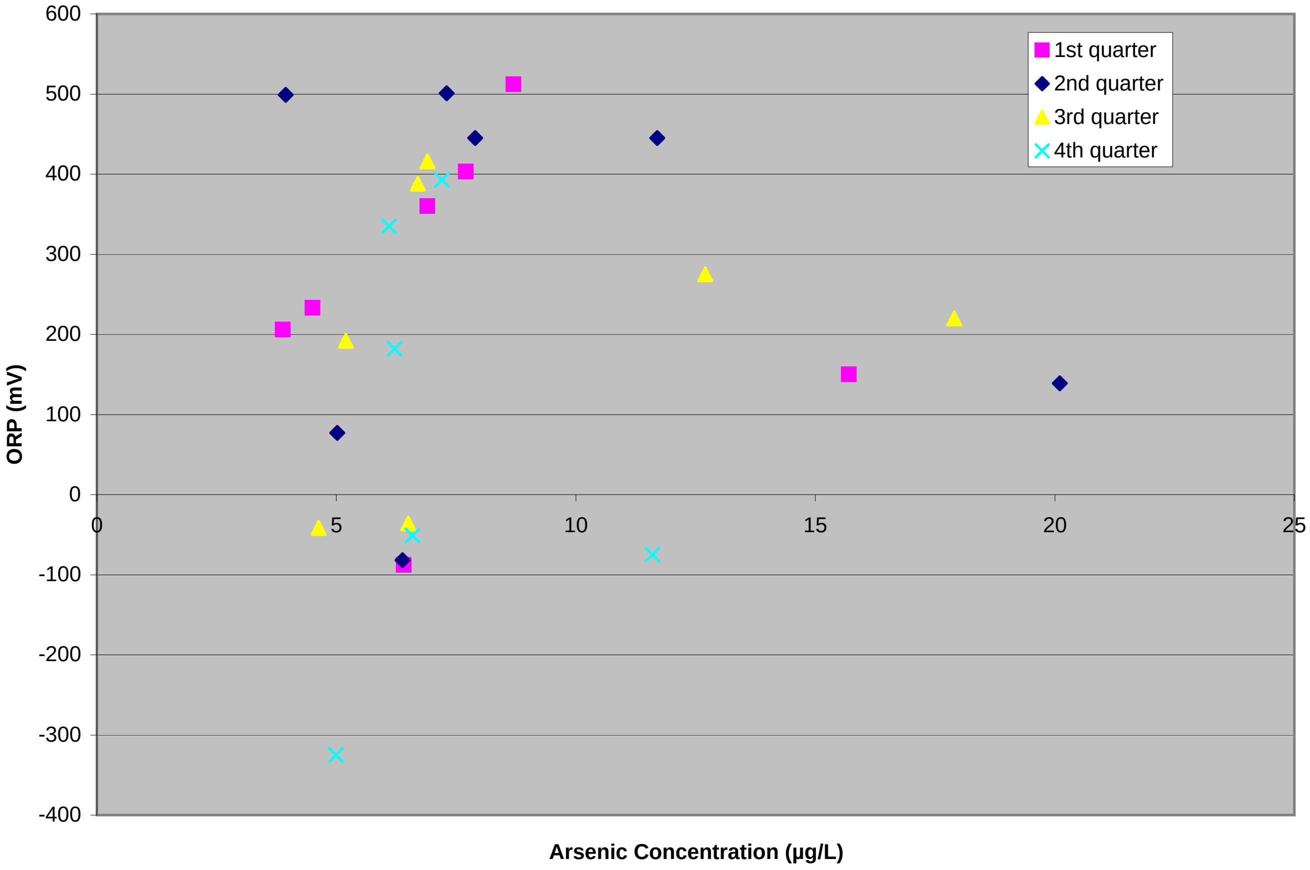




ARSENIC CONCENTRATION AND OXIDATION-REDUCTION POTENTIAL, MW-127-S
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **6-42**

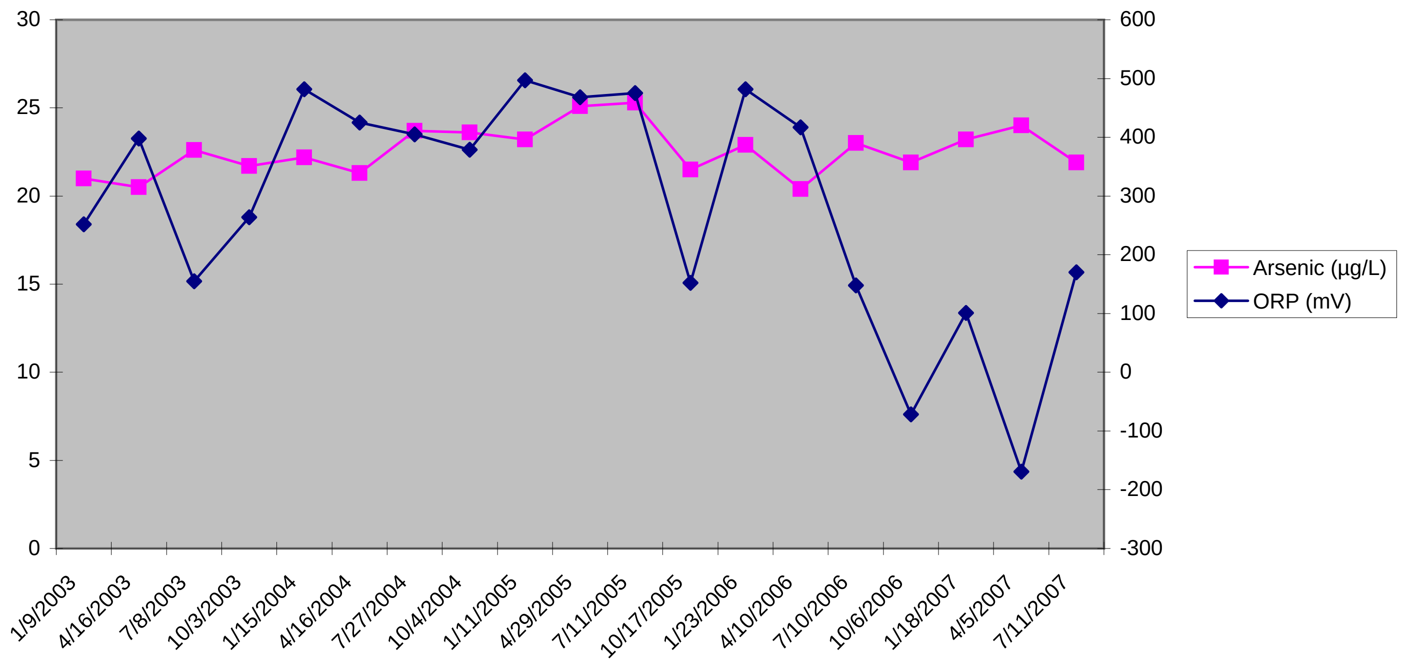


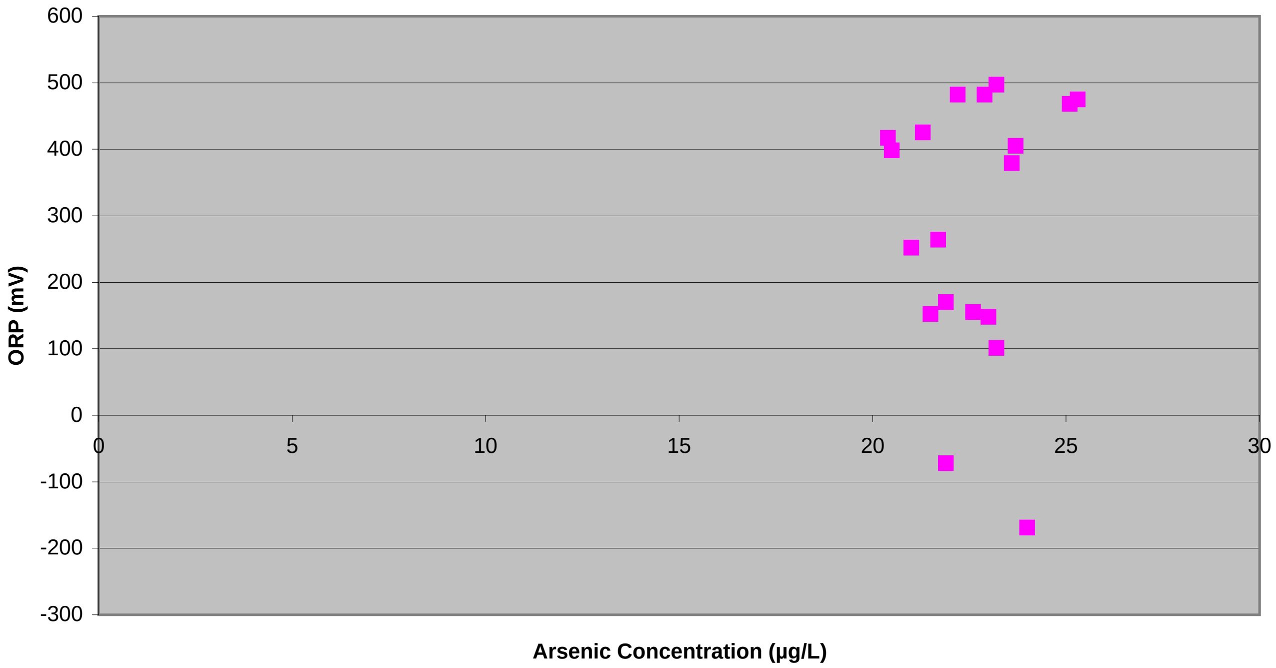


ARSENIC CONCENTRATION AND OXIDATION-REDUCTION POTENTIAL, MW-117-I2
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **6-43**

S:\9464\003_RI\Data\Figs 6-XX Arsenic and ORP-ADAM.xls



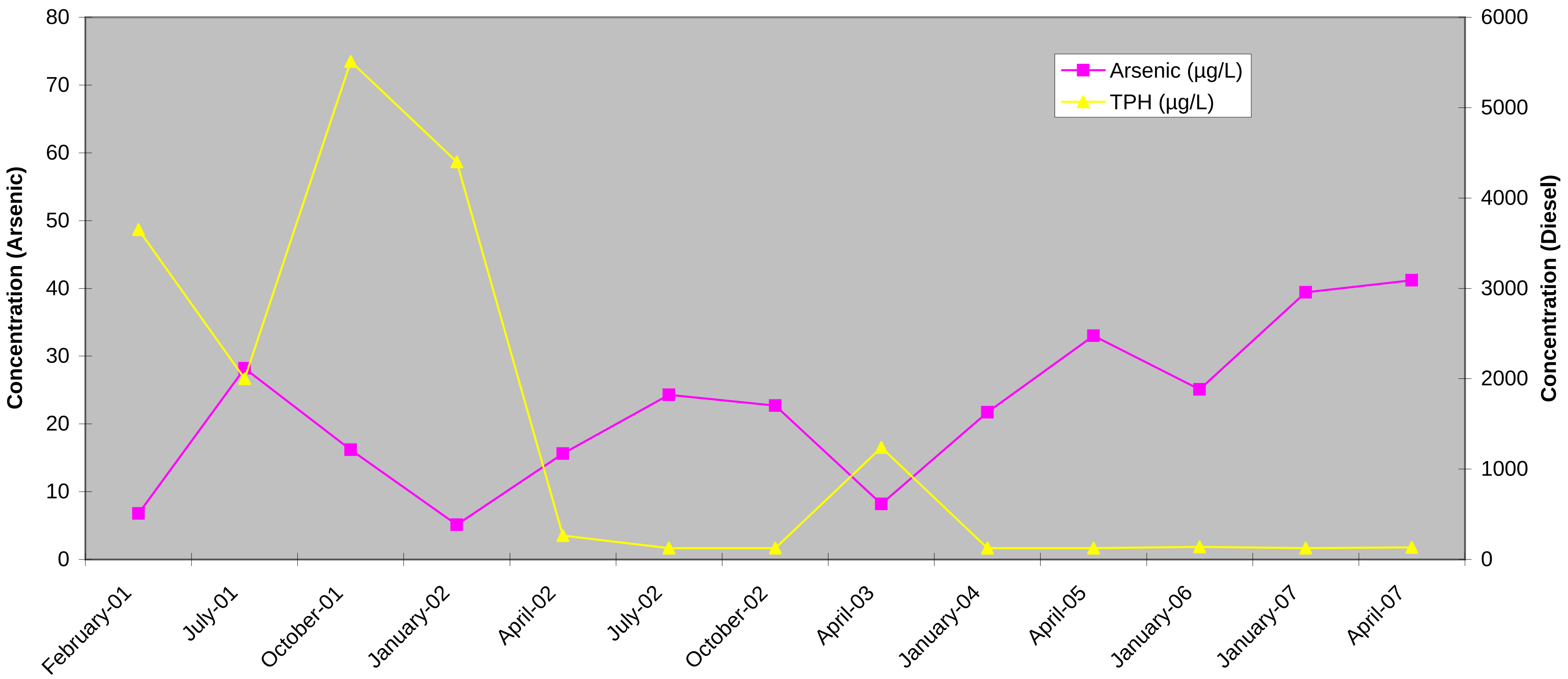


S:\9464\003_RI\Data\Figs 6-XX Arsenic and ORP-ADAM.xls

ARSENIC CONCENTRATION AND OXIDATION-REDUCTION POTENTIAL, MW-126-I
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.: 9464.002
Geomatrix		Figure **6-44**

S:\9464\003_RI\Data\Figs 6-XX Arsenic and Diesel-ADAM.xls

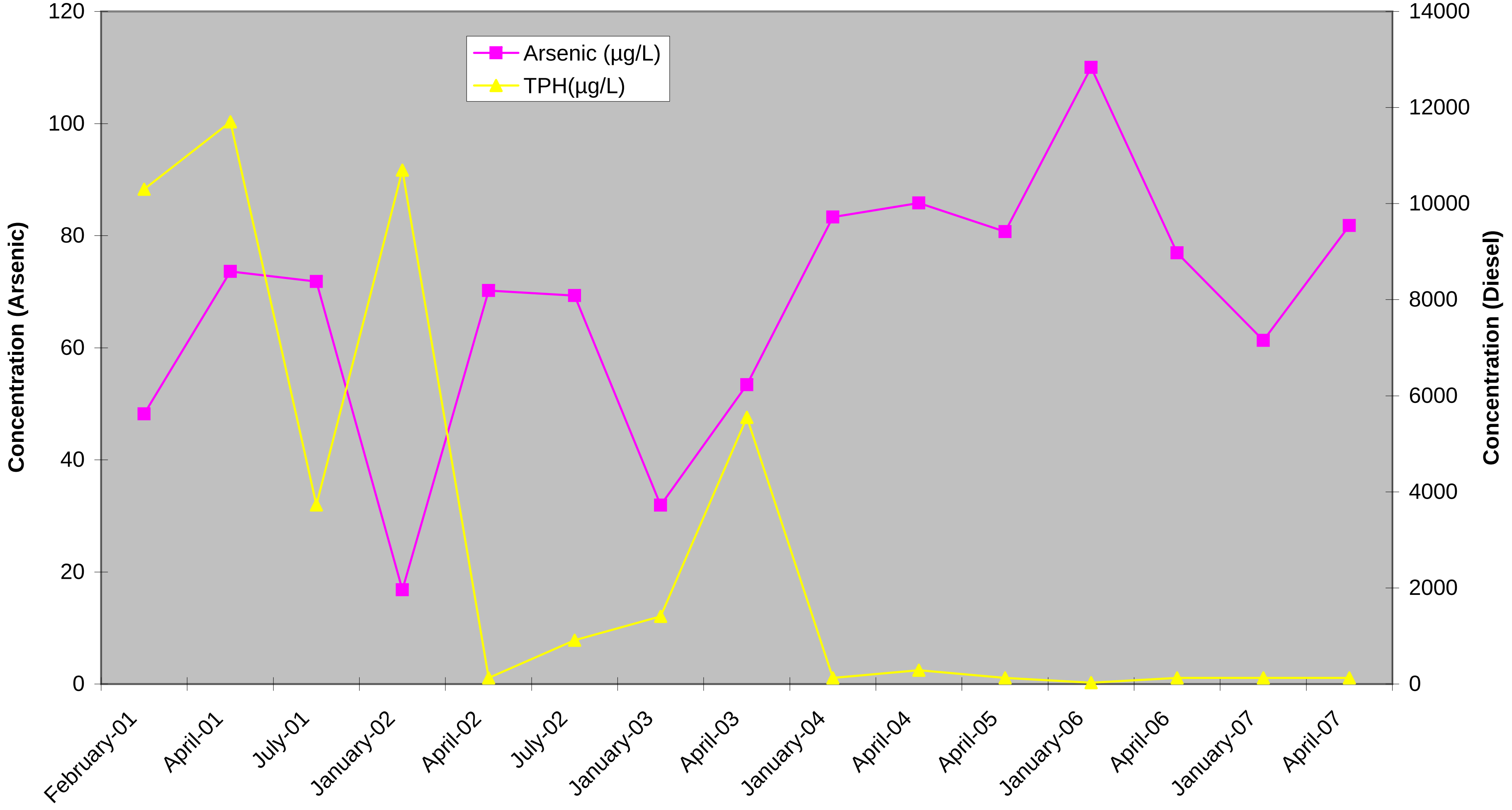


Note: non-detections plotted as 1/2 reporting limit.

ARSENIC AND DIESEL CONCENTRATIONS
OVER TIME, MW-112-S
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.:9464.002
Geomatrix		Figure **6-45**

S:\9464\003_RI\Data\Figs 6-XX Arsenic and Diesel-ADAM.xls



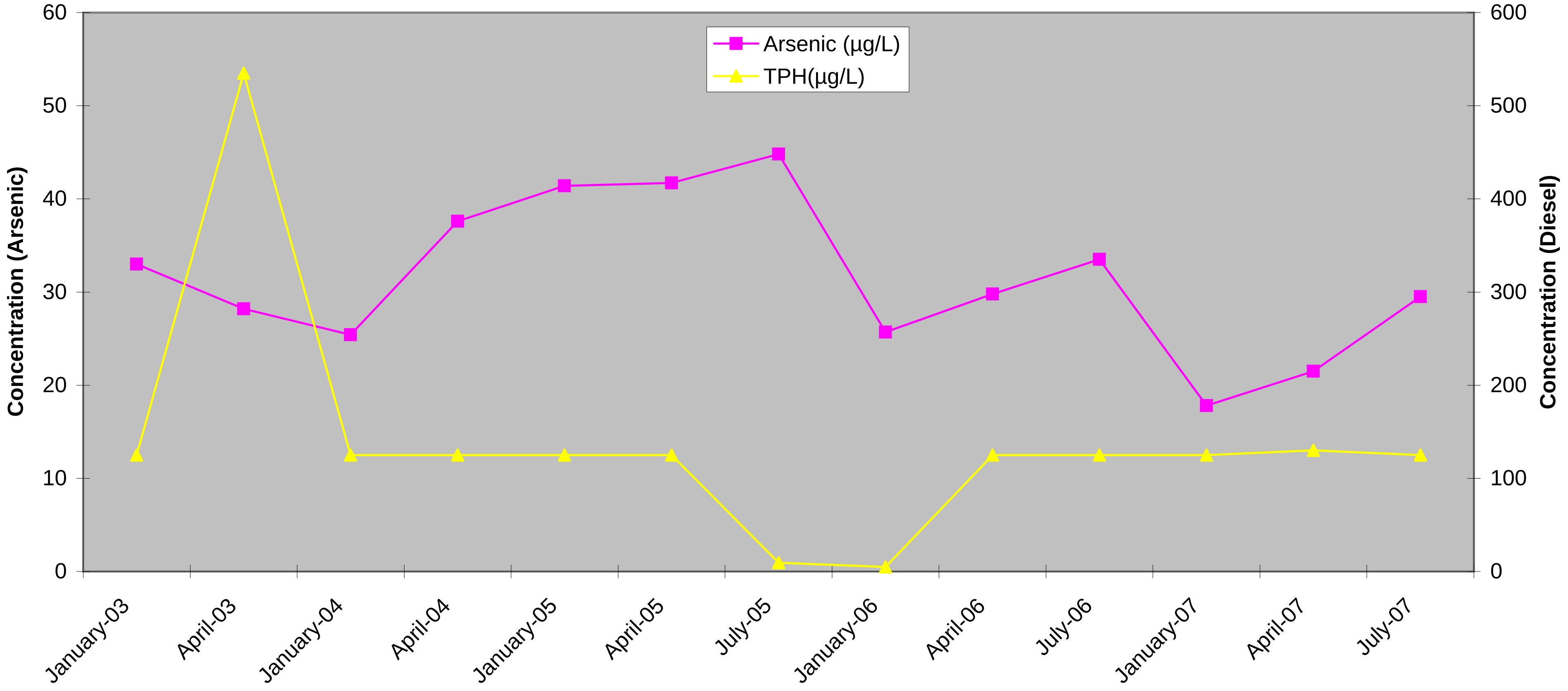
Note: non-detections plotted as 1/2 reporting limit.

ARSENIC AND DIESEL CONCENTRATIONS
OVER TIME, MW-123-S
PSC Kent Facility
Kent, Washington

By: APS
Date: 11/15/07
Project No.:9464.002

Geomatrix

Figure **6-46**

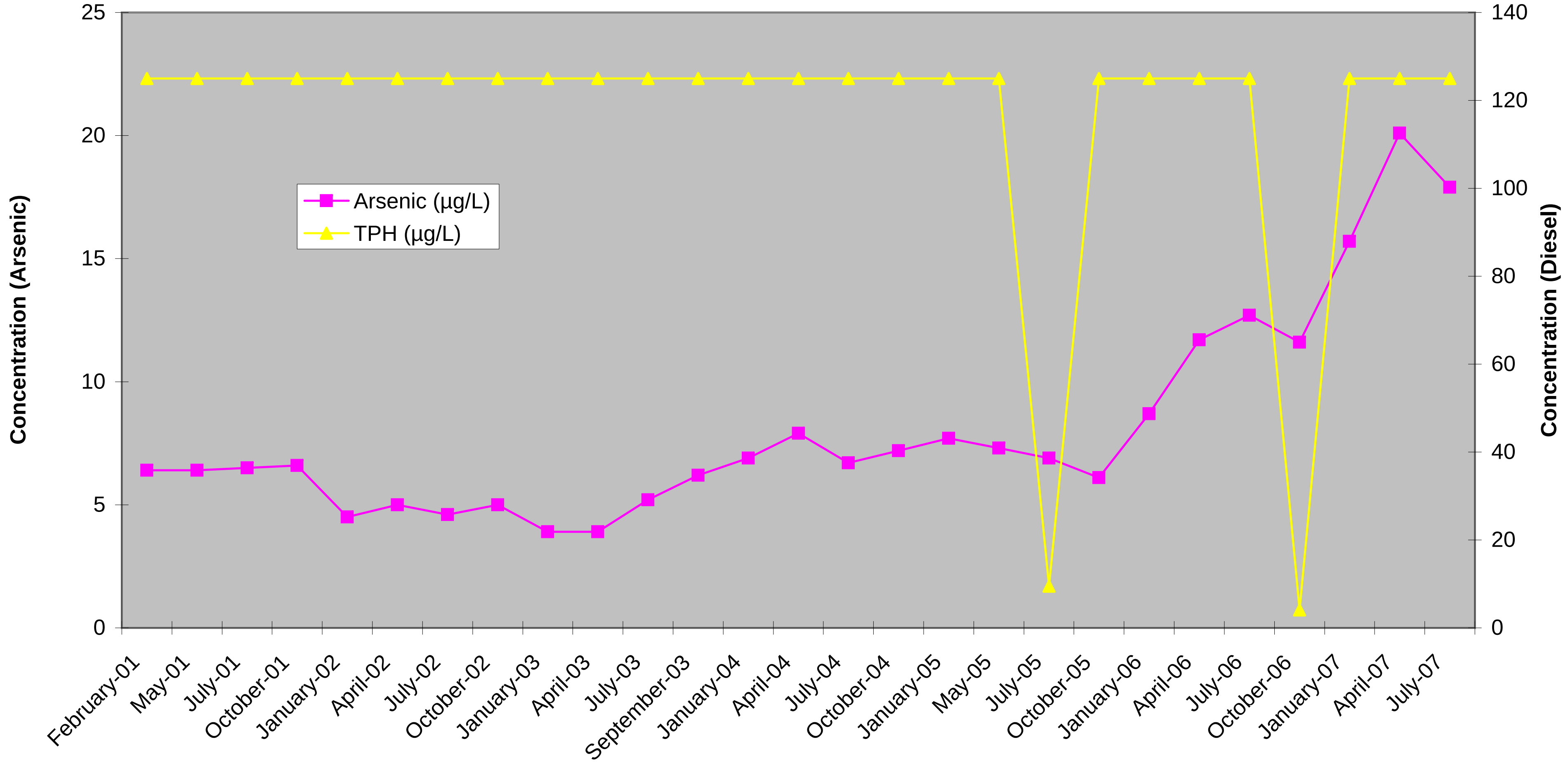


Note: non-detections plotted as 1/2 reporting limit.

ARSENIC AND DIESEL CONCENTRATIONS
OVER TIME, MW-127-S
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.:9464.002
Geomatrix		Figure **6-47**

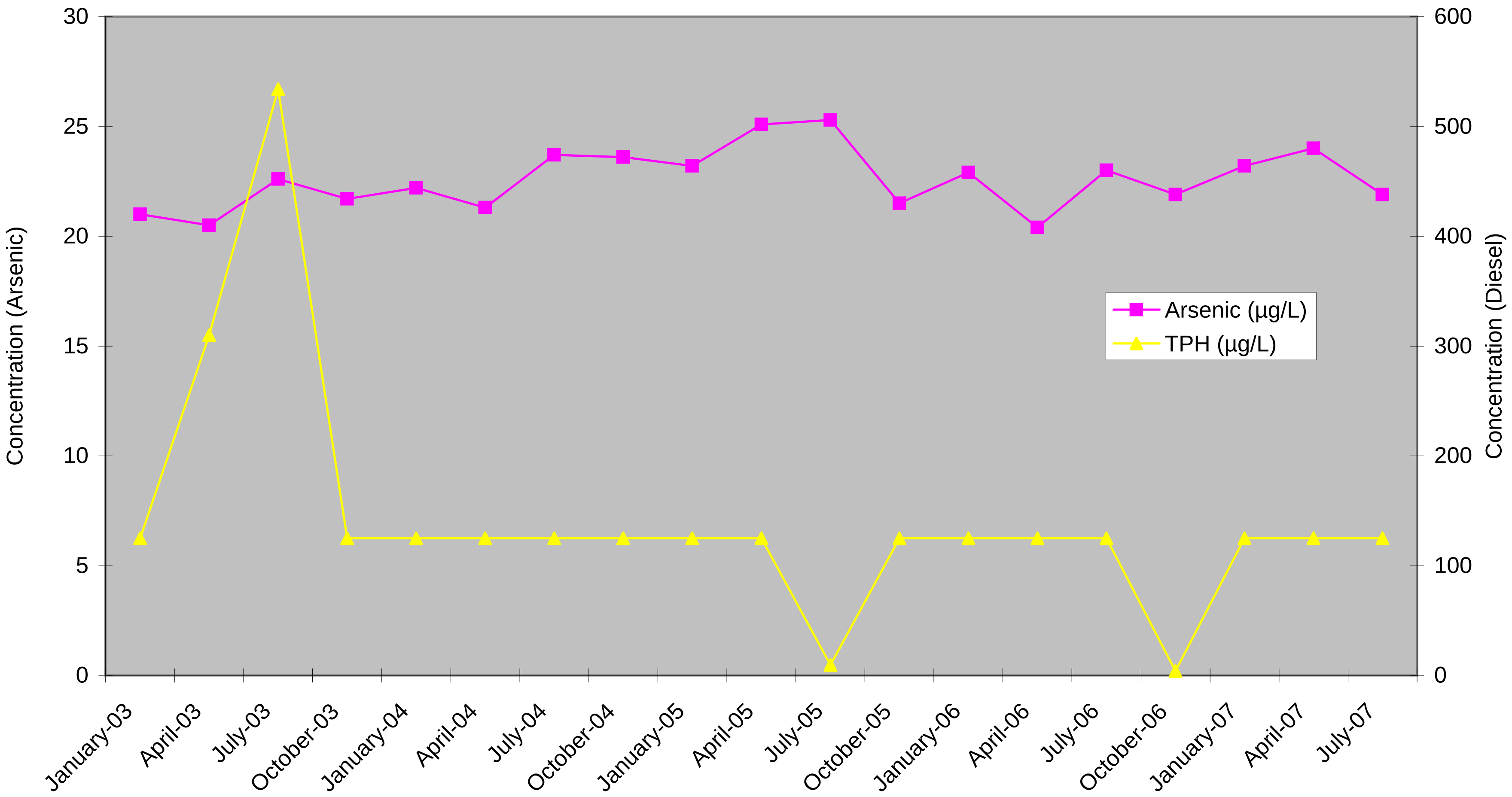
S:\9464\003_RI\Data\Figs 6-XX Arsenic and Diesel-ADAM.xls



Note: non-detections plotted as 1/2 reporting limit.

ARSENIC AND DIESEL CONCENTRATIONS
OVER TIME, MW-117-I2
PSC Kent Facility
Kent, Washington

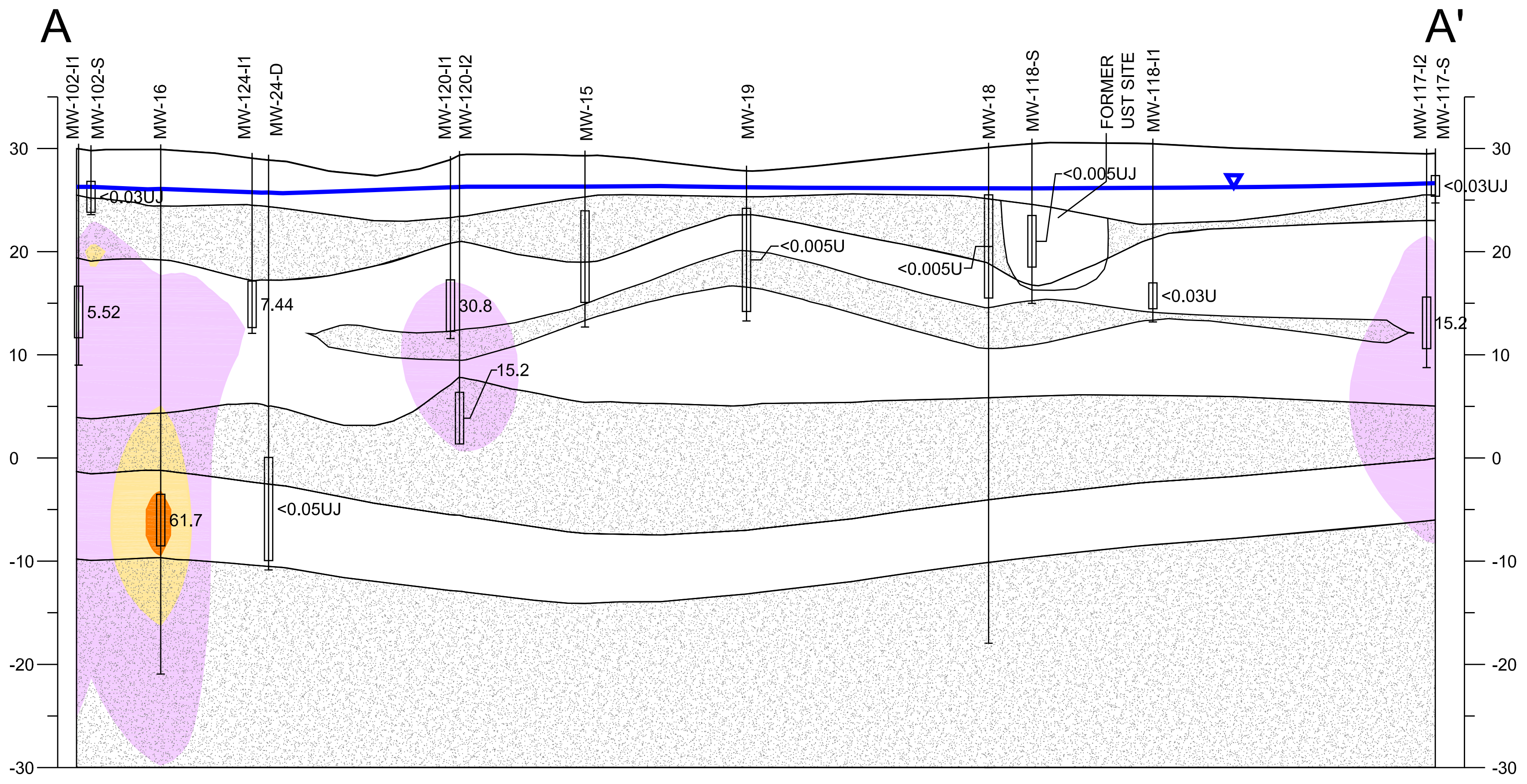
By: APS	Date: 11/15/07	Project No.:9464.002
Geomatrix		Figure **6-48**

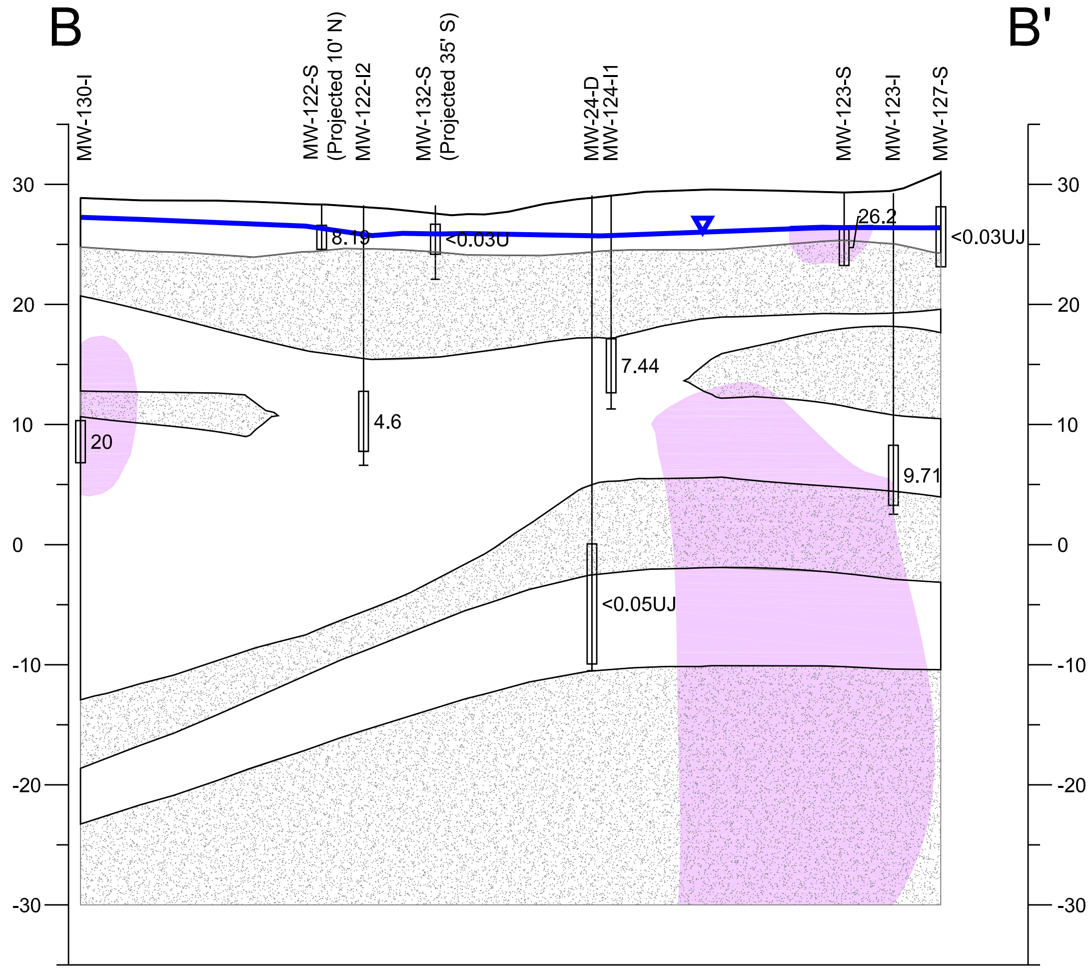


Note: non-detections plotted as 1/2 reporting limit.

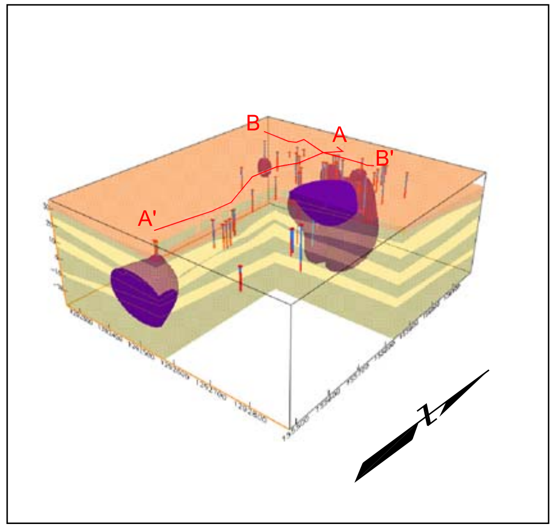
ARSENIC AND DIESEL CONCENTRATIONS
OVER TIME, MW-126-I
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No.:9464.002
Geomatrix		Figure **6-49**



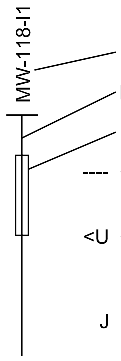


SCREENING LEVEL
HEXAVALENT CHROMIUM 50 ppb



THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 50 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION



WELL NAME

BLANK CASING

PERFORATED CASING

---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION

<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED

J VALUE IS ESTIMATED

<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED

▽ APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)

☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER

▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≥10 ppb

🟨 ≥30 ppb

🟧 ≥50 ppb

0	VERTICAL	10
0	HORIZONTAL	40

Geomatrix

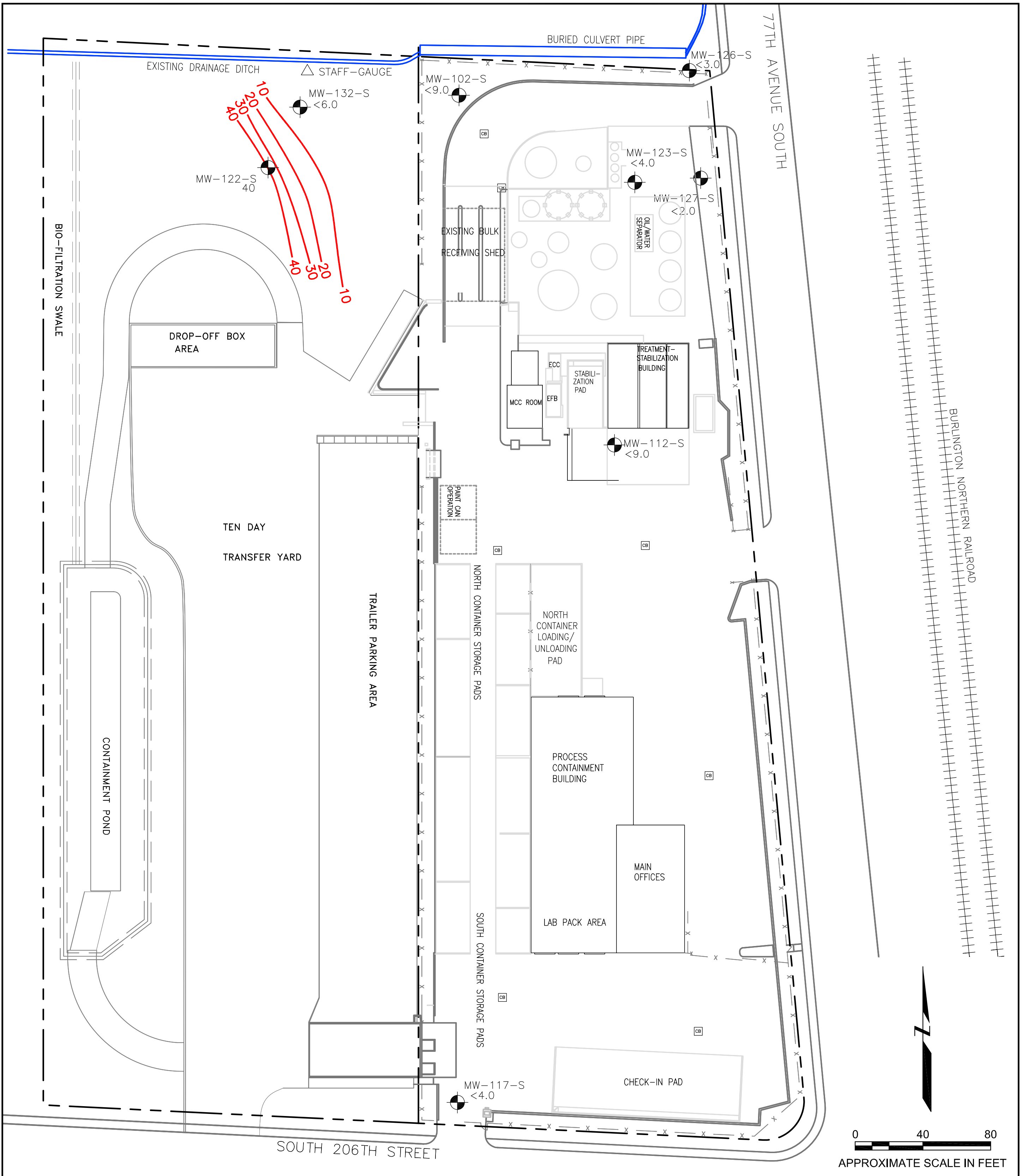
Geomatrix Consultants, Inc.
600 University Street, Suite 1020
Seattle, Washington 98101
(206) 342-1760

PSC KENT FACILITY
KENT, WASHINGTON

THREE–DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMUM HEXAVALENT CHROMIUM CONCENTRATIONS
IN GROUNDWATER

DATE:
SCALE:
SHEET: OF SHEETS
PROJ No: 9464.002
FIGURE 6–50

Plot Date: 12/05/07 - 10:45am, Plotted by: lummy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg



EXPLANATION

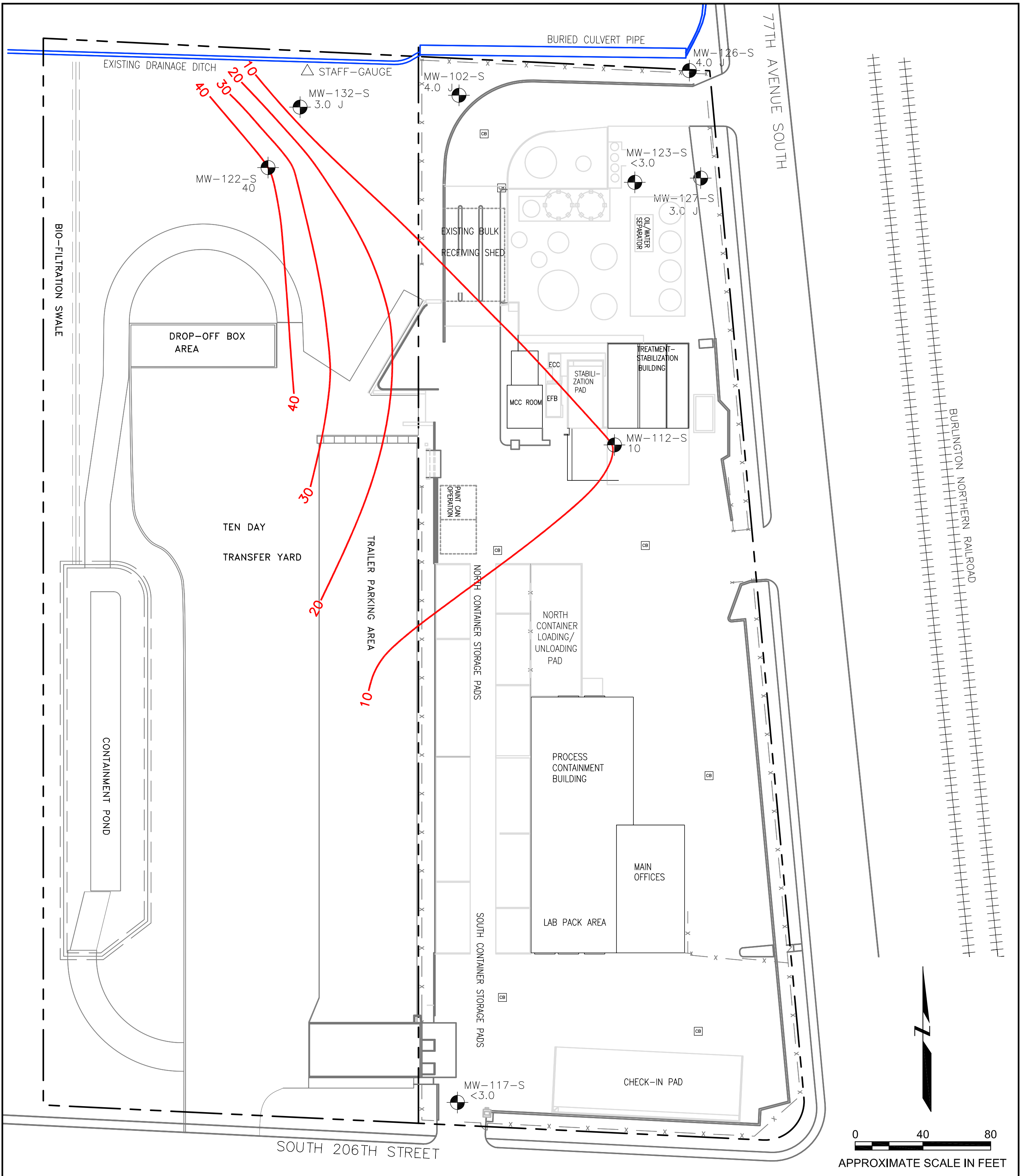
⊕ SHALLOW WATER-BEARING UNIT MONITORING WELL
WITH CHEMICAL CONCENTRATION (µg/L)

CHEMICAL CONCENTRATION CONTOUR
TOTAL CYANIDE IN µg/L (ppb)
CONTOUR INTERVAL = 10 (µg/L)

Plot Date: 11/15/07 - 12:06pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-51a_CyanideSh1Q07_PSC-Kent.dwg

CYANIDE IN SHALLOW WATER-BEARING UNIT
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-51a**



EXPLANATION

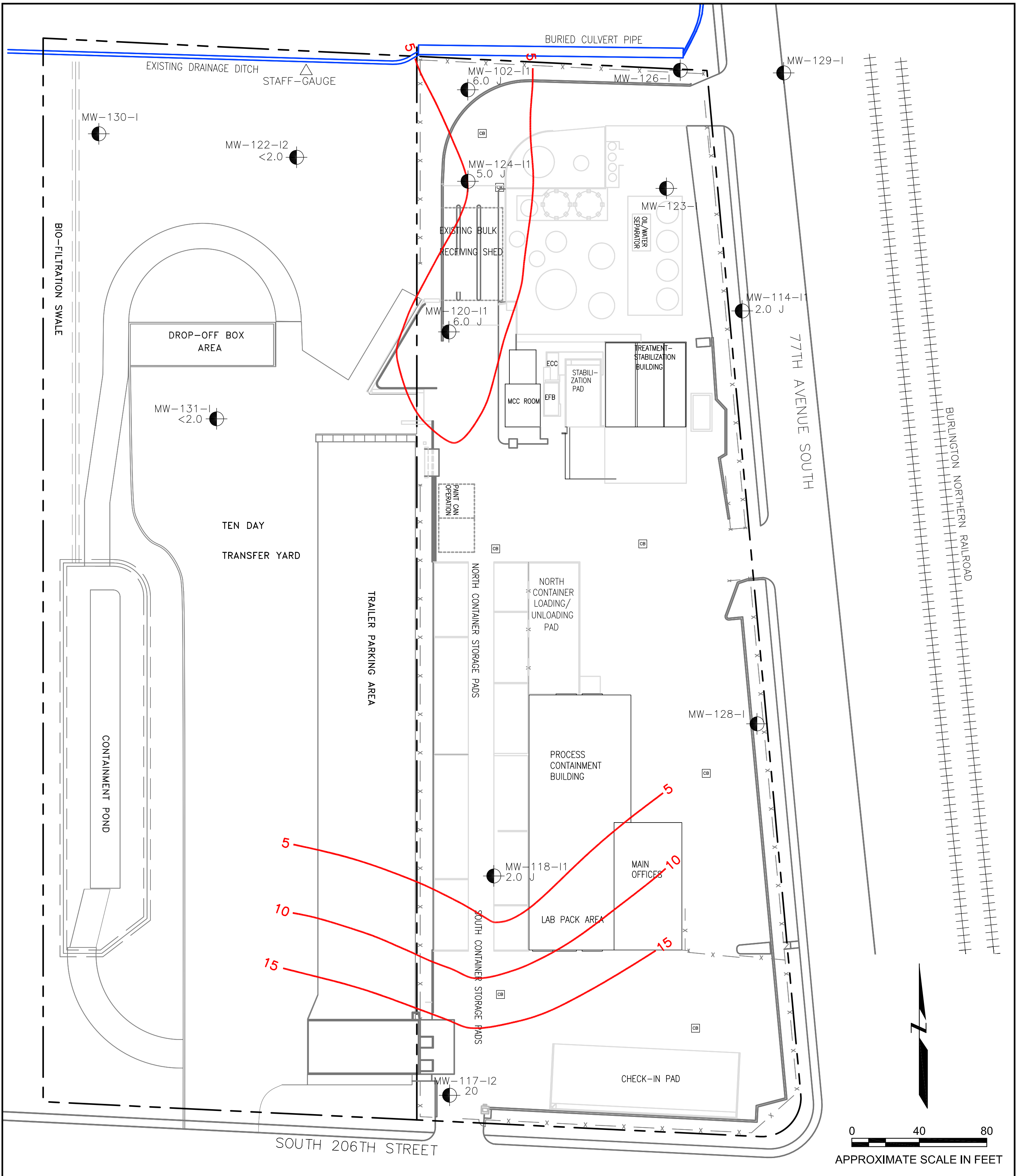
SHALLOW WATER-BEARING UNIT MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

CHEMICAL CONCENTRATION CONTOUR
TOTAL CYANIDE IN µg/L (ppb)
CONTOUR INTERVAL = 10 (µg/L)

CYANIDE IN SHALLOW WATER BEARING UNIT
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-51b**

Plot Date: 11/15/07 - 12:06pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-51b_CyanideSh2Q07_PSC-Kent.dwg



CYANIDE IN ZONE A - INTERMEDIATE AQUIFER
FOURTH QUARTER 2006
PSC Kent Facility
Kent, Washington

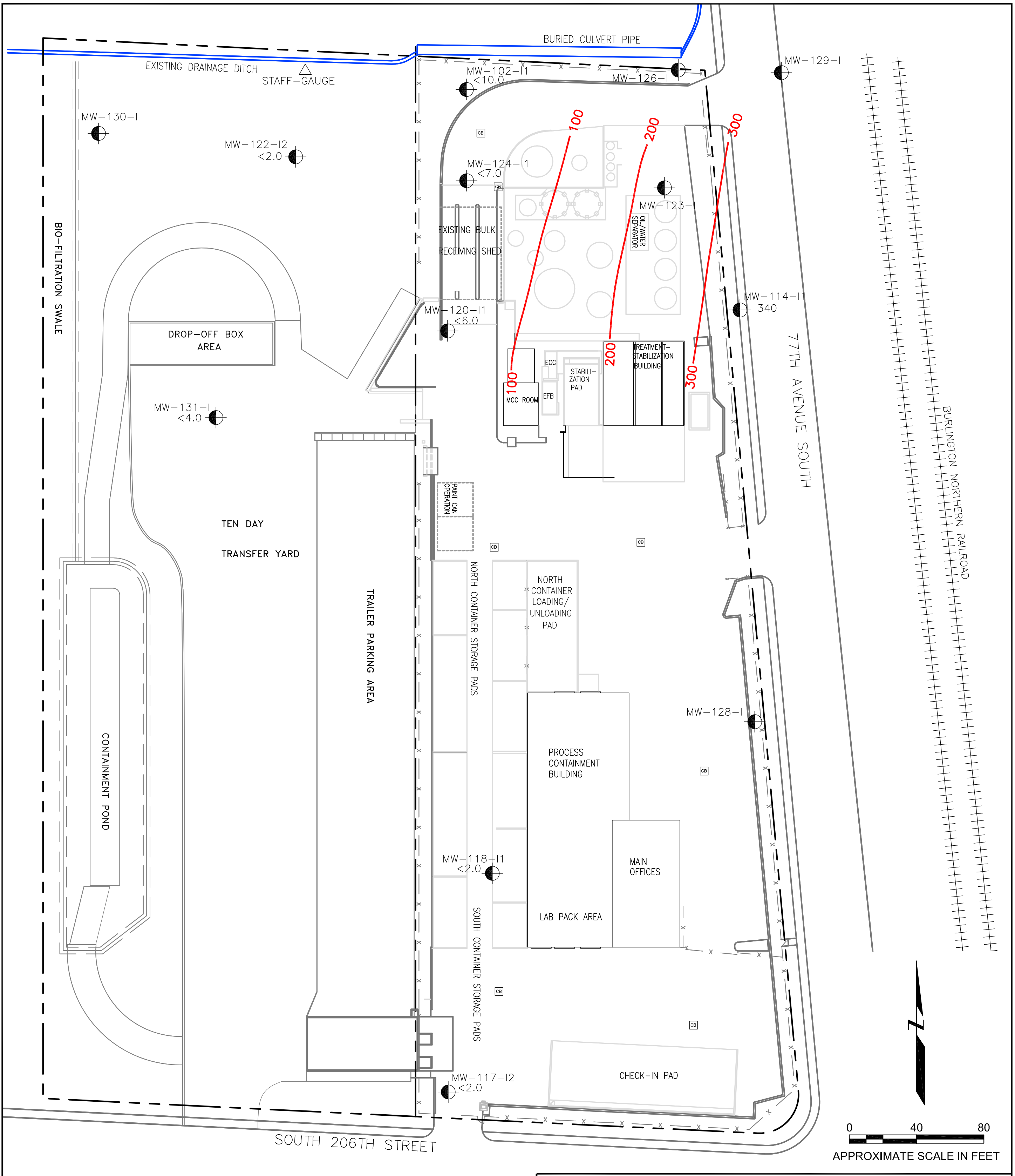
By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-52a**

EXPLANATION

◐ INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

CHEMICAL CONCENTRATION CONTOUR
TOTAL CYANIDE IN µg/L (ppb)
CONTOUR INTERVAL = 5 (µg/L)

Plot Date: 11/15/07 - 12:07pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-52a_Cyanide-A-Int4Q06_PSC-Kent.dwg



EXPLANATION

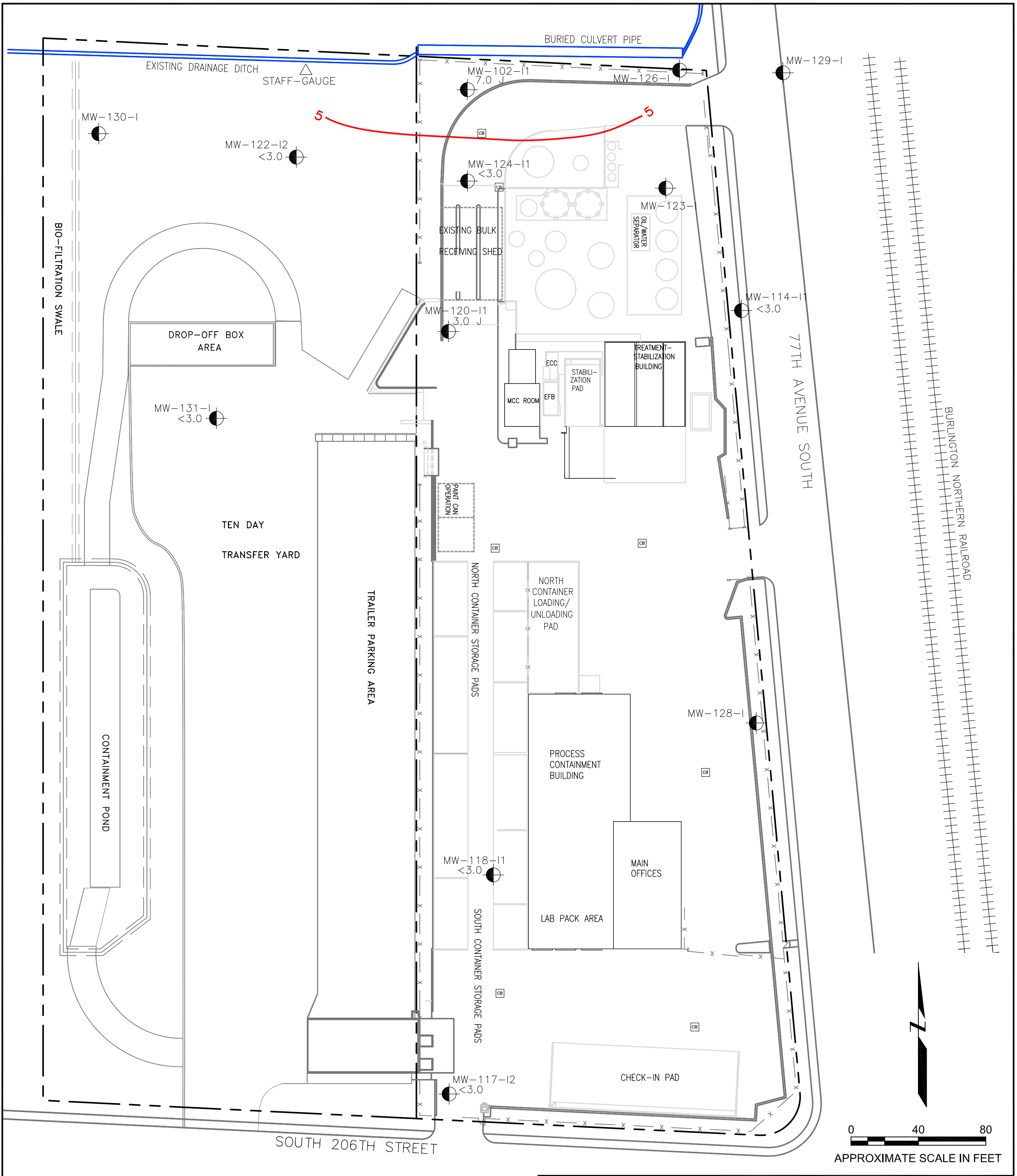
● INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

〰 CHEMICAL CONCENTRATION CONTOUR
TOTAL CYANIDE IN µg/L (ppb)
CONTOUR INTERVAL = 100 (µg/L)

CYANIDE IN ZONE A - INTERMEDIATE AQUIFER
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-52b**

Plot Date: 11/15/07 - 12:08pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-52b_Cyanide-A-Int1Q07_PSC-Kent.dwg



EXPLANATION

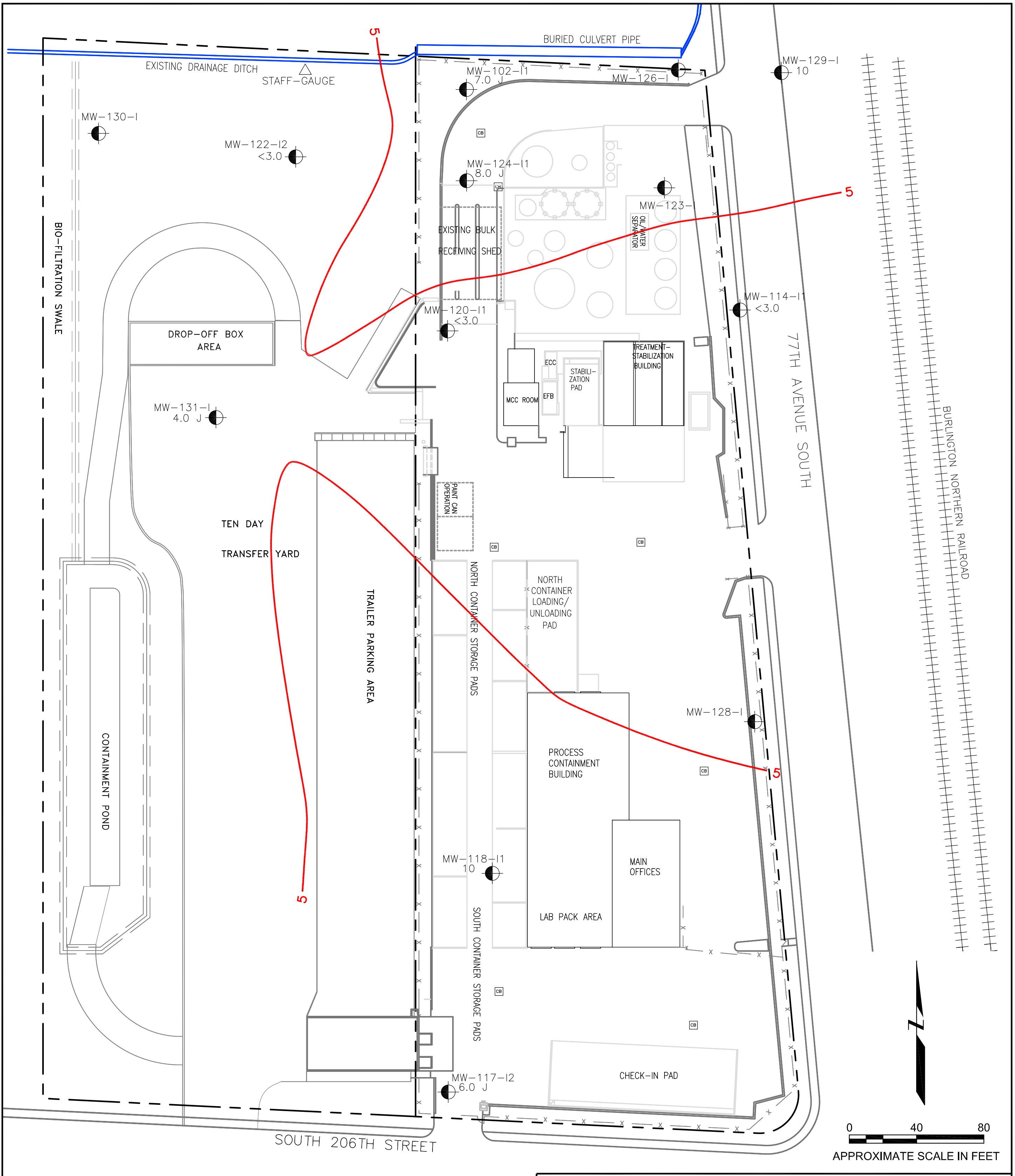
◐ INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

〰 CHEMICAL CONCENTRATION CONTOUR TOTAL CYANIDE IN µg/L (ppb) CONTOUR INTERVAL = 5 (µg/L)

CYANIDE IN ZONE A - INTERMEDIATE AQUIFER
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-52c**

Plot Date: 11/15/07 - 12:11pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-52c_Cyanide-A-Int2Q07_PSC-Kent.dwg



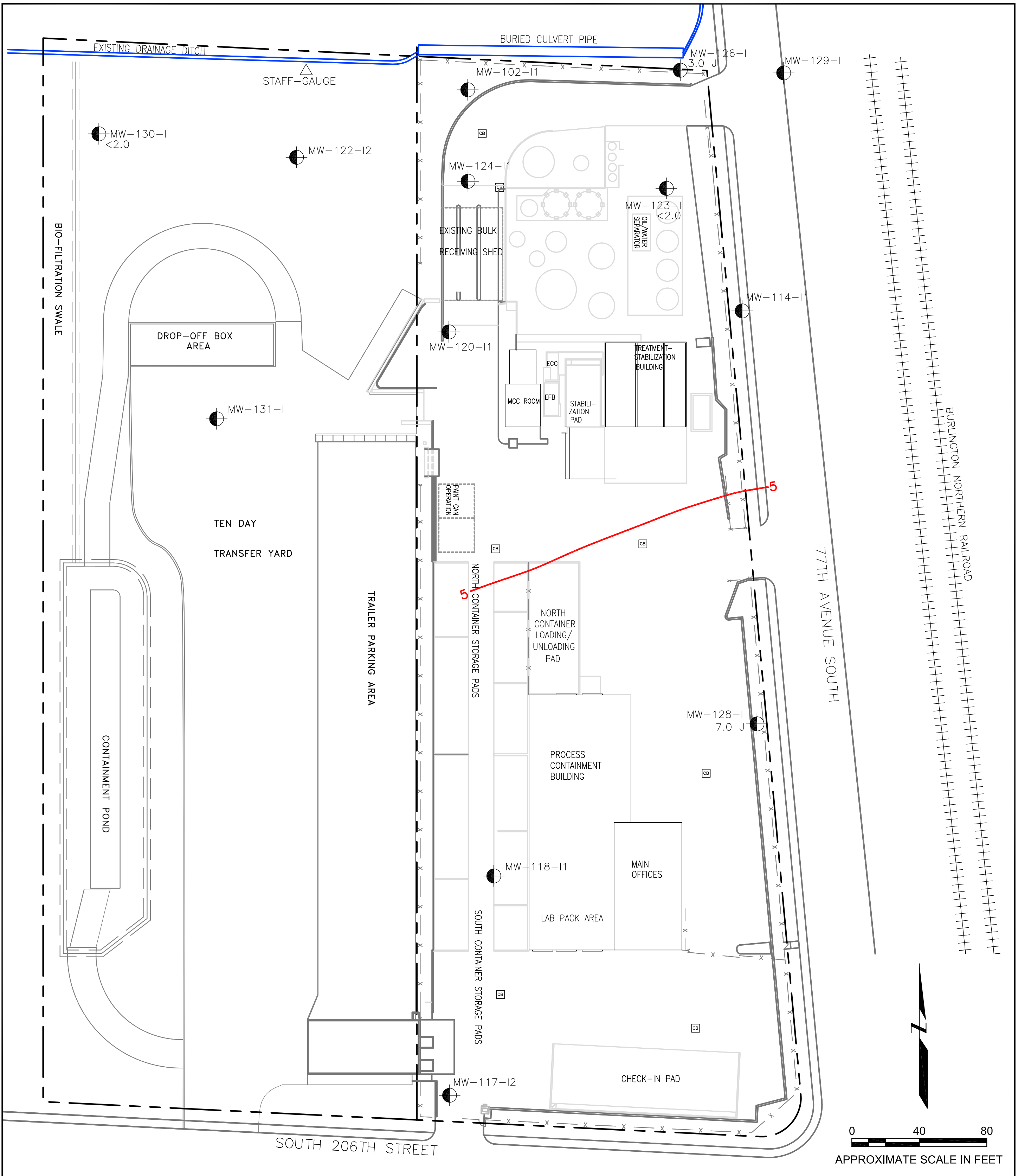
EXPLANATION

⊕	INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)
〰	CHEMICAL CONCENTRATION CONTOUR TOTAL CYANIDE IN µg/L (ppb) CONTOUR INTERVAL = 5 (µg/L)

CYANIDE IN ZONE A - INTERMEDIATE AQUIFER
THIRD QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-52d**

Plot Date: 11/15/07 - 12:13pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-52d_Cyanide-A-Int3Q07_PSC-Kent.dwg



EXPLANATION

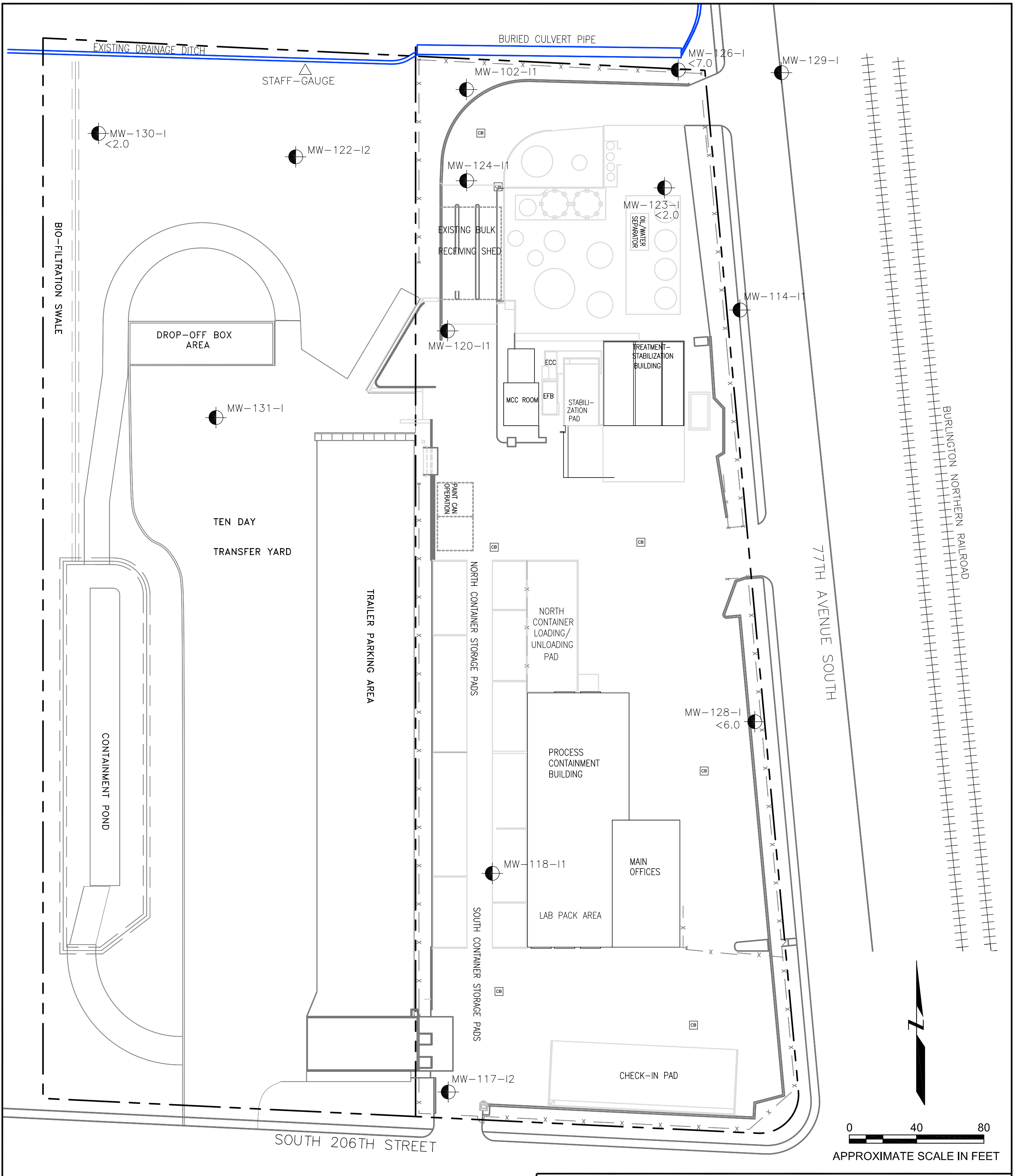
◐ INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

CHEMICAL CONCENTRATION CONTOUR
TOTAL CYANIDE IN µg/L (ppb)
CONTOUR INTERVAL = 5 (µg/L)

CYANIDE IN ZONE B - INTERMEDIATE AQUIFER
FOURTH QUARTER 2006
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-53a**

Plot Date: 11/15/07 - 12:14pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-53a_Cyanide-B-Int4Q06_PSC-Kent.dwg



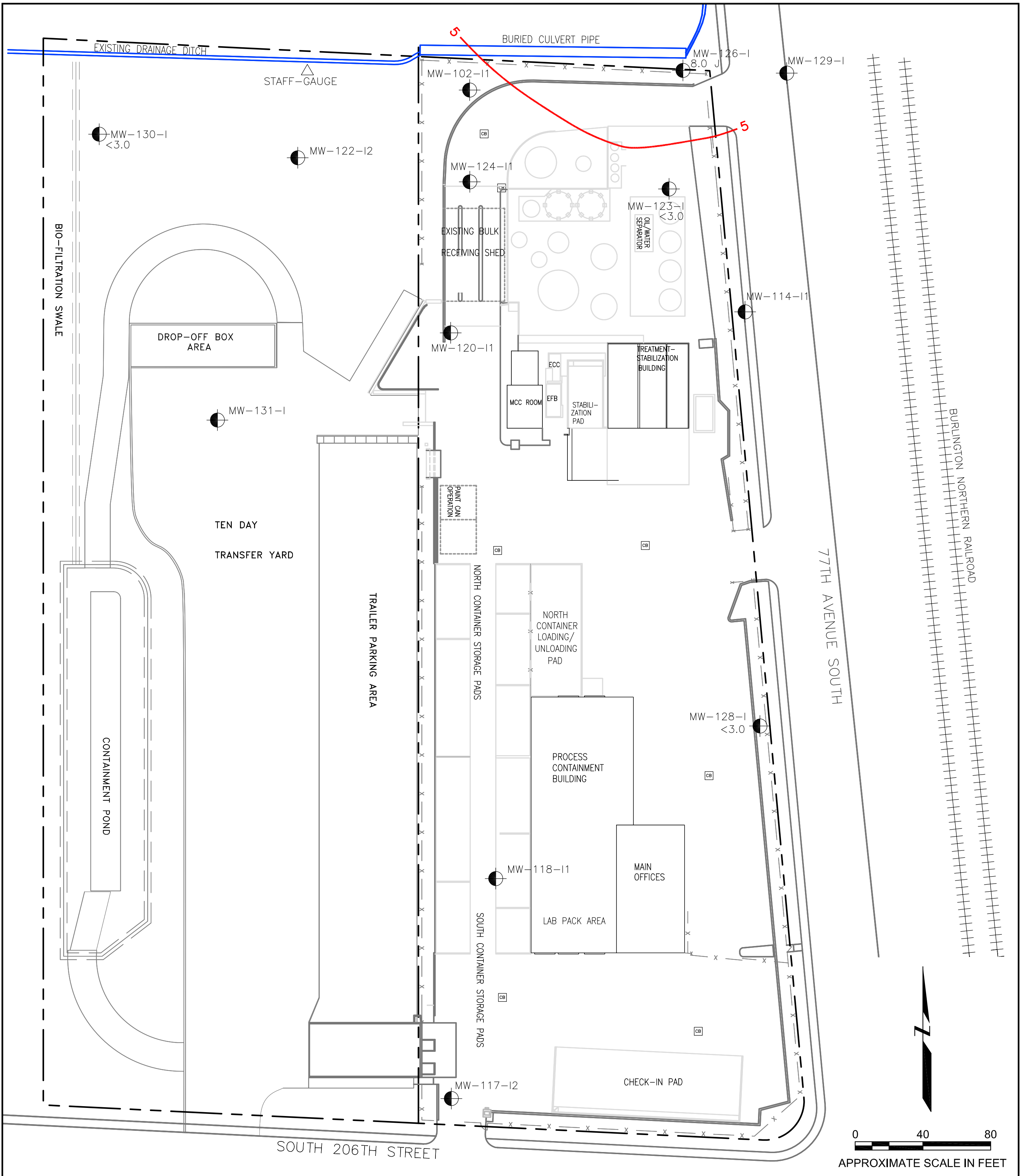
EXPLANATION

◐ INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

CYANIDE IN ZONE B - INTERMEDIATE AQUIFER
FIRST QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure 6-53b

Plot Date: 11/15/07 - 12:15pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-53b_Cyanide-B-Int1Q07_PSC-Kent.dwg



EXPLANATION

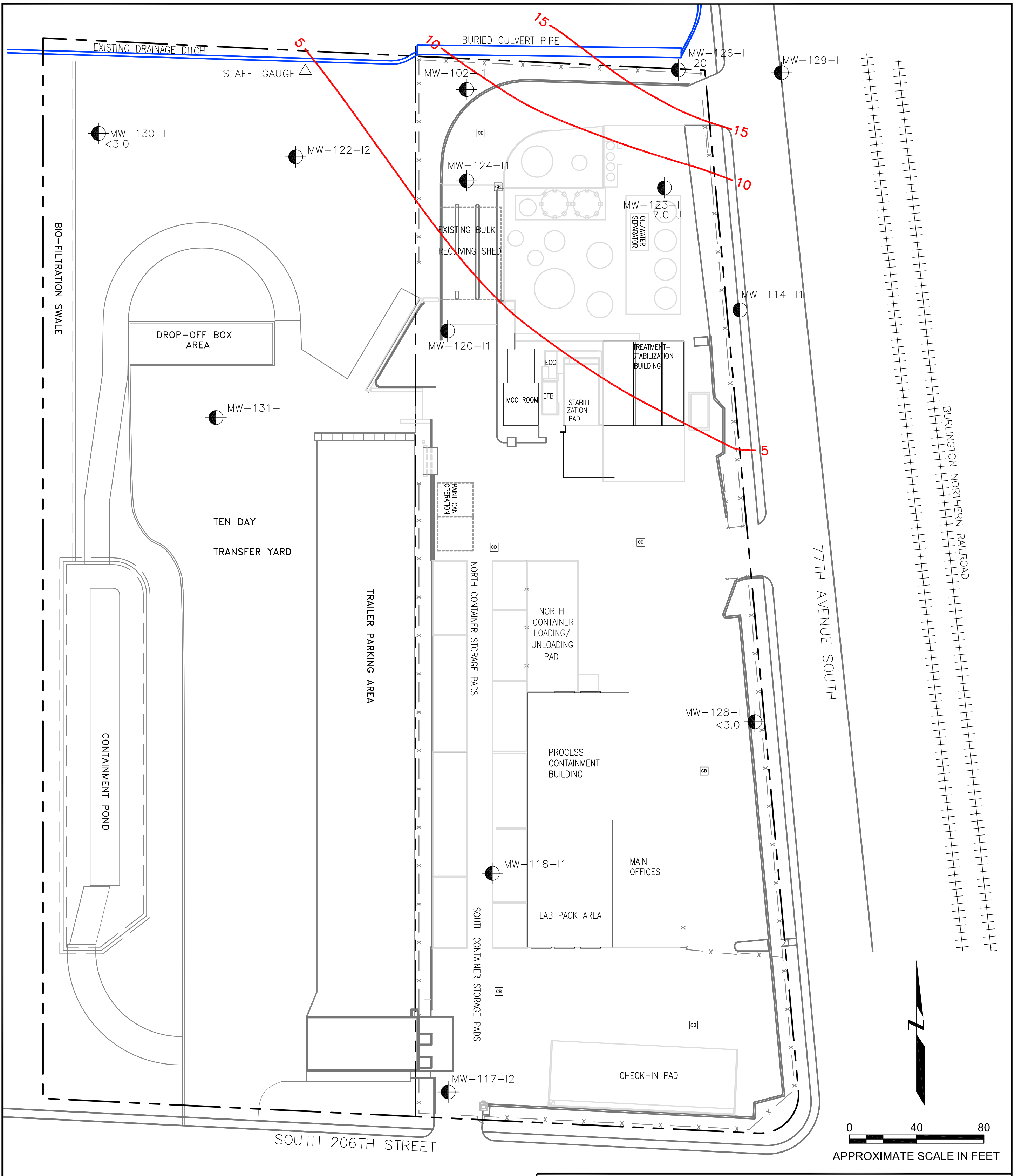
● INTERMEDIATE AQUIFER MONITORING WELL
WITH CHEMICAL CONCENTRATION (µg/L)

CHEMICAL CONCENTRATION CONTOUR
TOTAL CYANIDE IN µg/L (ppb)
CONTOUR INTERVAL = 5 (µg/L)

CYANIDE IN ZONE B - INTERMEDIATE AQUIFER
SECOND QUARTER 2007
PSC Kent Facility
Kent, Washington

By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-53c**

Plot Date: 11/15/07 - 12:16pm, Plotted by: astenberg
Drawing Path: S:\9464\003_R\CAD\, Drawing Name: Figure 6-53c_Cyanide-B-Int2Q07_PSC-Kent.dwg



CYANIDE IN ZONE B - INTERMEDIATE AQUIFER
THIRD QUARTER 2007
PSC Kent Facility
Kent, Washington

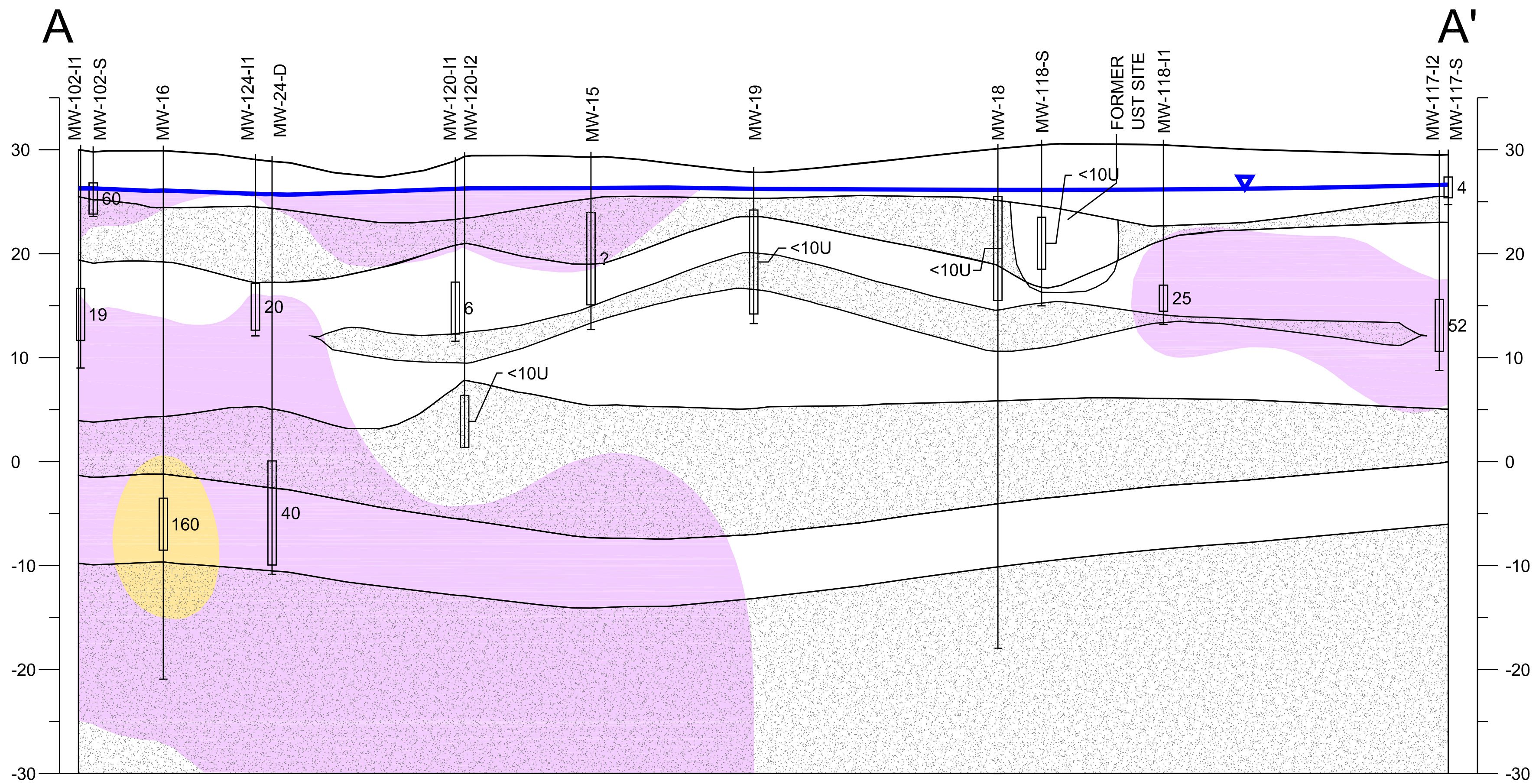
By: APS	Date: 11/15/07	Project No. 9464.002
Geomatrix		Figure **6-53d**

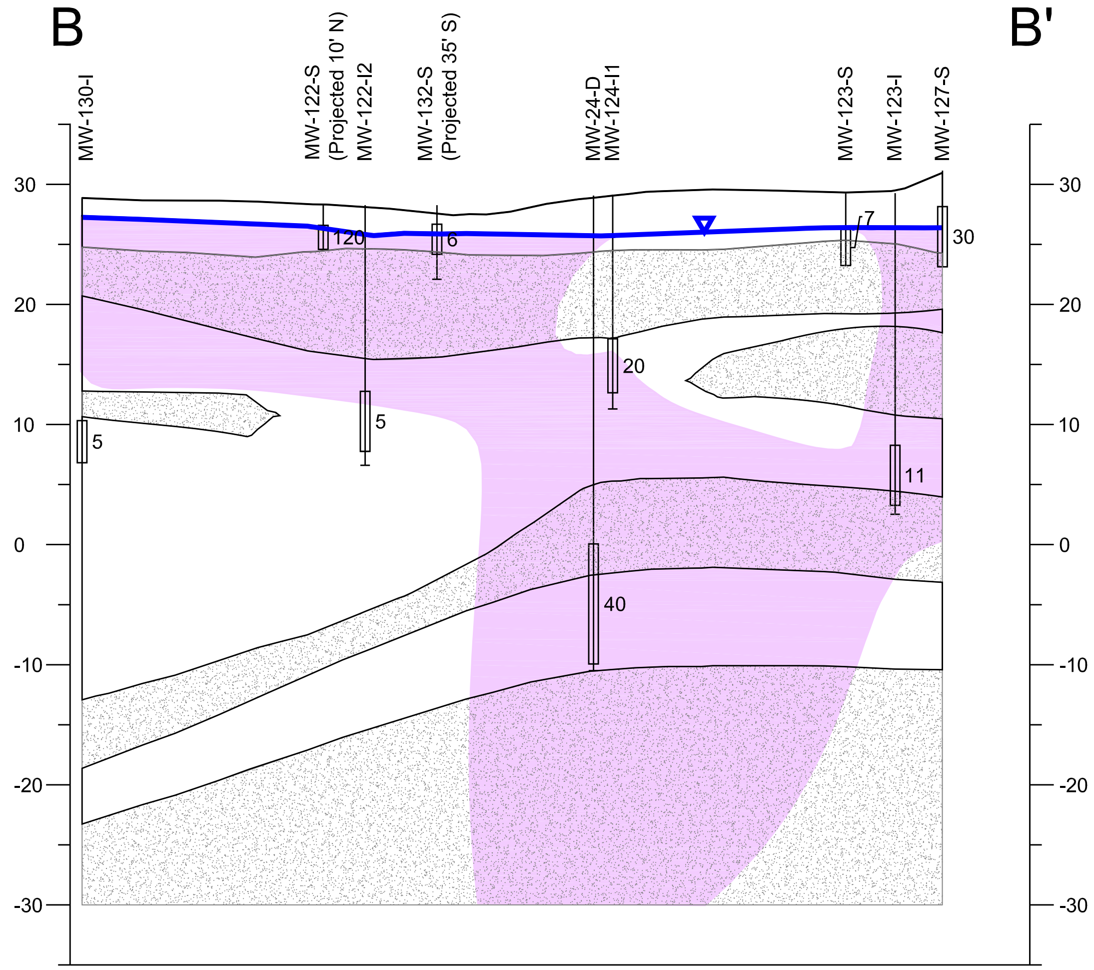
EXPLANATION

◐ INTERMEDIATE AQUIFER MONITORING WELL WITH CHEMICAL CONCENTRATION (µg/L)

〰 CHEMICAL CONCENTRATION CONTOUR
TOTAL CYANIDE IN µg/L (ppb)
CONTOUR INTERVAL = 5 (µg/L)

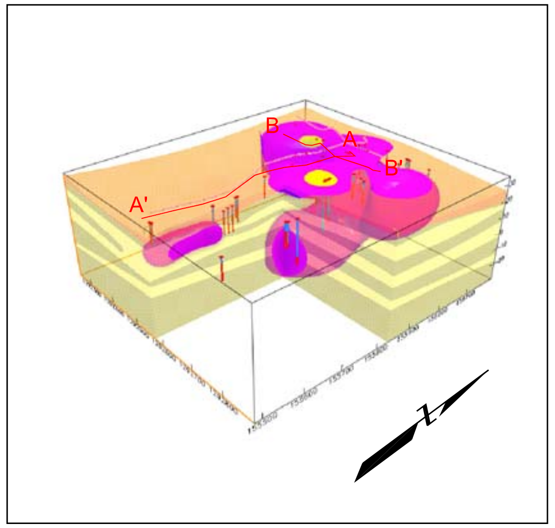
Plot Date: 11/15/07 - 12:17pm, Plotted by: astenberg
Drawing Path: S:\9464\003_RI\CAD\, Drawing Name: Figure 6-53d_Cyanide-B-Int3Q07_PSC-Kent.dwg





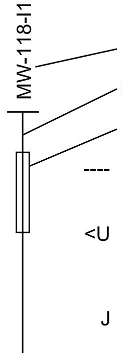
SCREENING LEVEL

CYANIDE 10 ppb



THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 10 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION



WELL NAME

BLANK CASING

PERFORATED CASING

---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION

<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED

J VALUE IS ESTIMATED

<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED

APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)

☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER

▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≥10 ppb

🟨 ≥100 ppb

Geomatrix

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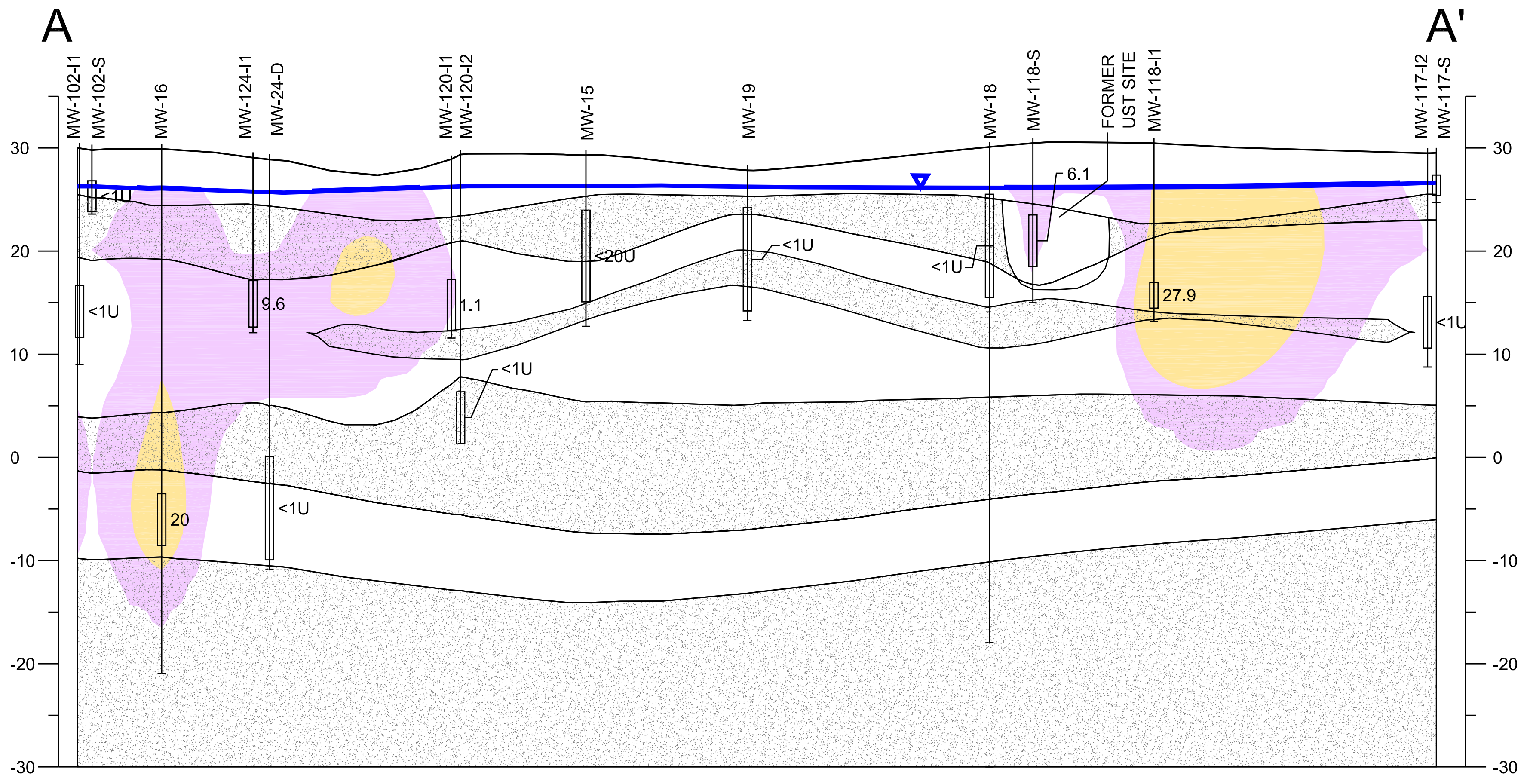
600 University Street, Suite 1020
Seattle, Washington 98101
(206) 342-1760

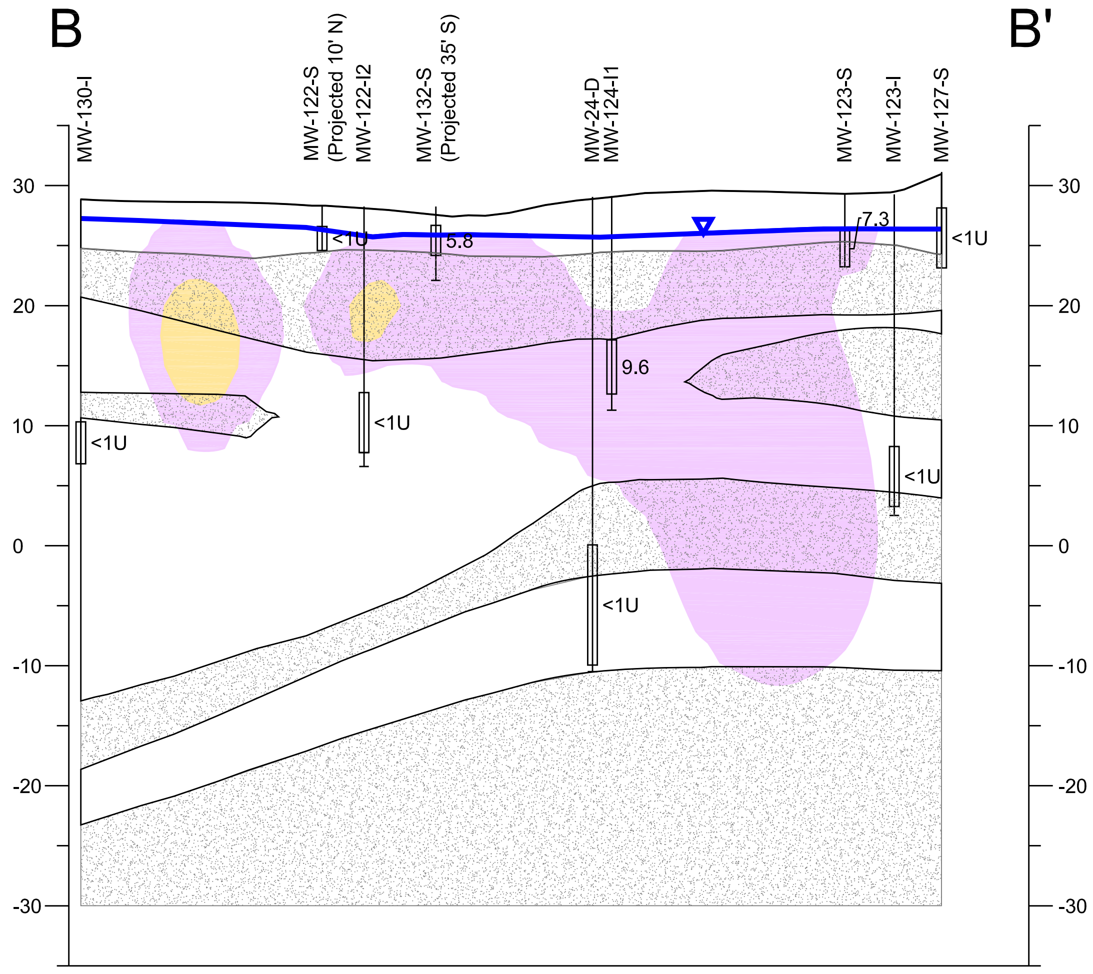
PSC KENT FACILITY
KENT, WASHINGTON

THREE–DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMUM CYANIDE CONCENTRATIONS
IN GROUNDWATER

DATE:
SCALE:
SHEET: OF SHEETS
PROJ No: 9464.002
FIGURE 6–54

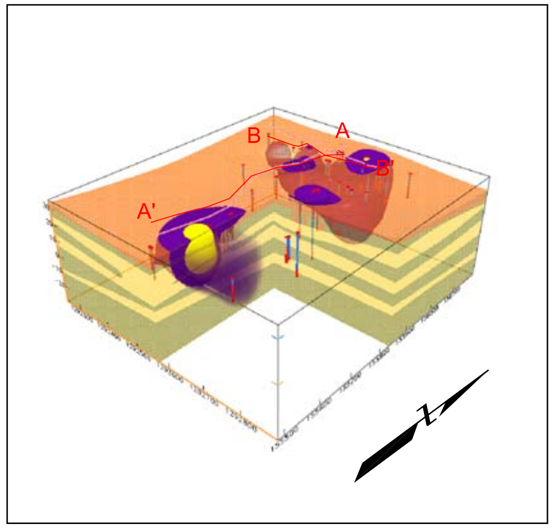
Plot Date: 12/05/07 - 10:41am, Plotted by: lummy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg





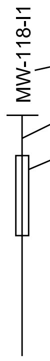
SCREENING LEVEL

LEAD 0.54 ppb



THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT 0.54 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION



WELL NAME

BLANK CASING

PERFORATED CASING

---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION

<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED

J VALUE IS ESTIMATED

<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED

APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)

☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER

▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≥ 0.54 ppb

🟨 ≥ 10 ppb

Geomatrix

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Seattle, Washington 98101
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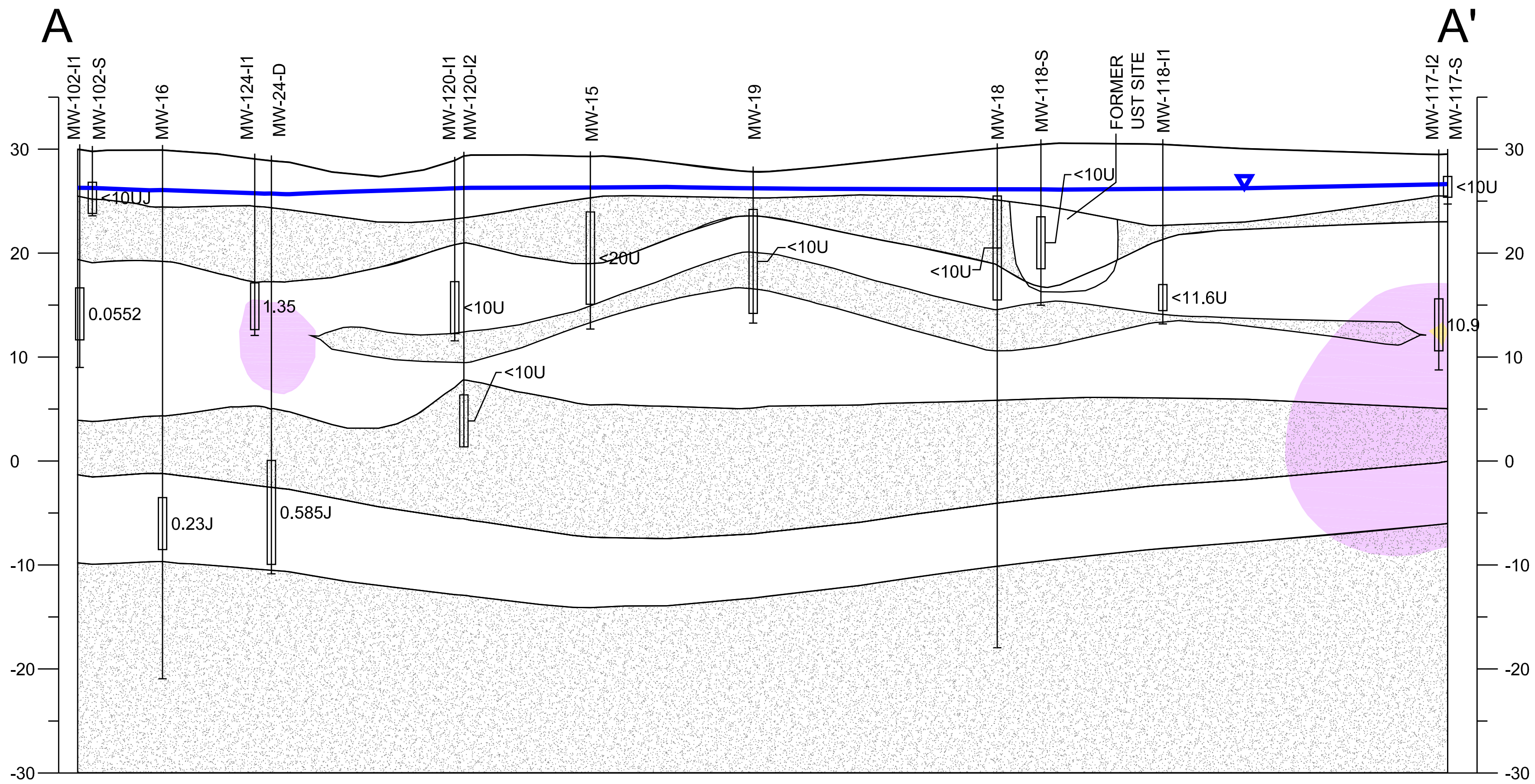
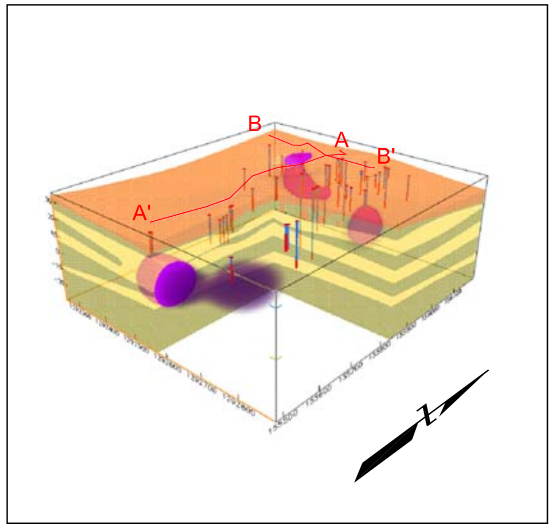
PSC KENT FACILITY
KENT, WASHINGTON

THREE–DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMUM LEAD CONCENTRATIONS
IN GROUNDWATER

DATE:	
SCALE:	
SHEET: OF SHEETS	
PROJ No: 9464.002	FIGURE 6–55

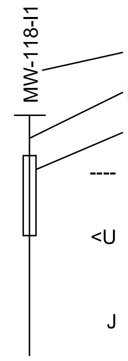
Plot Date: 12/05/07 - 10:47am, Plotted by: lurmy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg





THREE-DIMENSIONAL ISOCONCENTRATION SHELL AT
1 ppb AND LOCATION OF CROSS-SECTION

EXPLANATION



WELL NAME

BLANK CASING

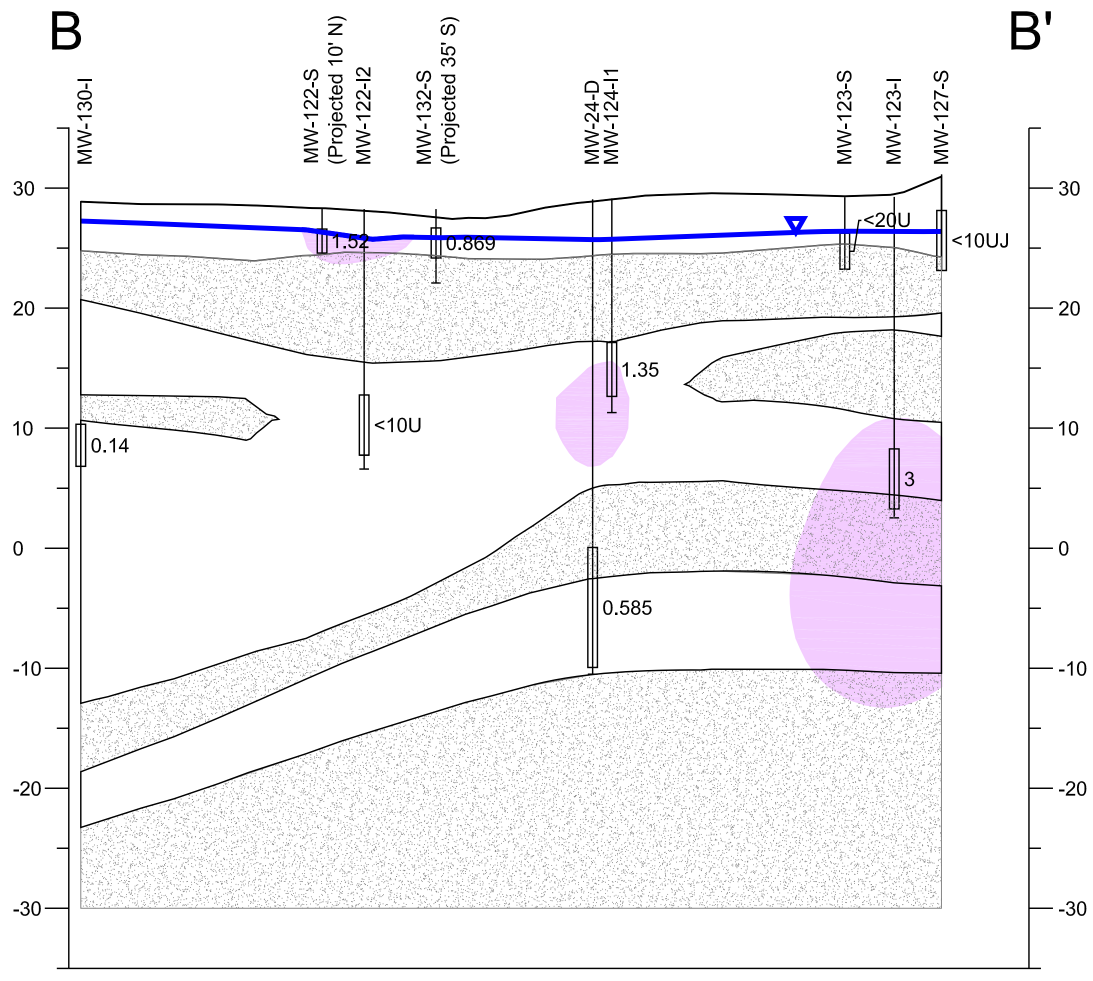
PERFORATED CASING

---- CONCENTRATION MODELED AT MIDSCREEN ELEVATION

<U COMPOUND ANALYZED FOR, BUT NOT DETECTED, OR RESTATED AS UNDETECTED

J VALUE IS ESTIMATED

<UJ RESTATEMENT AS UNDETECTED AND ESTIMATED



SCREENING LEVEL

PENTACHLOROPHENOL 1 ppb

APPROXIMATE ELEVATION OF GENERALIZED POTENTIOMETRIC SURFACE (MAY 2006)

☐ SHALLOW WATER BEARING UNIT, INTERMEDIATE AQUIFER ZONES A AND B, DEEP AQUIFER

▨ UPPER, INTERMEDIATE, LOWER AND DEEP AQUITARDS

CONCENTRATION LEVELS

🟪 ≥1 ppb

🟨 ≥10 ppb

Geomatrix

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Seattle, Washington 98101
(206) 342-1760

PSC KENT FACILITY
KENT, WASHINGTON

THREE–DIMENSIONAL FENCE DIAGRAM SHOWING
MAXIMUM PENTACHLOROPHENOL CONCENTRATIONS
IN GROUNDWATER

DATE:	
SCALE:	
SHEET: OF SHEETS	
PROJ No: 9464.002	FIGURE 6–56

Plot Date: 12/05/07 - 10:48am, Plotted by: lurmy
Drawing Path: I:\Project\9464\CAD\, Drawing Name: SECTIONS AA AND BB COMBINED.dwg